# Analyzing Gene Centres with the Help of the Checklist Method – the Case of Syria


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of the Institute of Crop Sciences of the University Kassel

Presented by

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Witzenhausen,

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Erster Gutachter: Prof. Dr. Karl Hammer

Zweiter Gutachter: Prof. Dr. Gunter Backes

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# Dedication

Dedicated to my beloved mother, father, husband, my sisters and brothers for their understanding and support during my studies and preparation of the thesis.

## List of publications

Kywan K. (2006) Collecting of wild wheat (*Triticum* spp.) from Syria, MSc. thesis, Univ Göttingen Press, Göttingen, Germany

# Acronyms and abbreviations

| | |
|---|---|
| **ACSAD** | Arabic Center Study for Dry Area |
| **FAO** | Food and Agriculture Organization of United Nations |
| **FAOSTAT** | FAO corporate statistical database |
| **GCSAR** | General Commission for Scientific Agricultural Research |
| **GIS** | Geographic information system |
| **IBPGR** | International Board for Plant Genetic Resources (now Bioversity International) |
| **ICARDA** | International Center for Agricultural Research in the Dry Area |
| **ICBN** | International Code of Nomenclature for Plants |
| **IPK** | Leibniz Institute of Plant Genetics and Crop Plant Research Gatersleben |
| **MAAR** | Ministry of Agriculture and Agrarian Reform |
| **NAPC** | National Anti-Poverty Commission |
| **NASA** | National Aeronautics and Space Administration |
| **PGR** | Plant Genetic Resources |
| **PGRFA** | Plant Genetic Resources for Food and Agriculture |
| **USDA** | United States Department of Agriculture (Agriculture data base) |
| **WANA** | West Asia and North Africa |

# 1 Introduction

Syria has an amazing wealth of agro-biodiversity, which is valuable of sustaining for possible future use. There is also a diversity of ecosystems occurring in Syria. The agro-biodiversity of Syria is poorly recorded; however existing data suggest that Syria has many species of international importance. Declines have been reported for several species over the last 50 years.

The ongoing crisis in Syria has had a very significant effect on the country's plant genetic resources. However, crop and livestock production, food availability and access to food have all taken an increasingly heavy fee over the last year as a result of the various consequences of the ongoing occasions inside Syria. The threat of violence has caused large numbers of inhabitants, including farmers, to leave the country and even larger numbers to move from their homes to safer areas within the country. Many of the means of production, processing and storage of crops have been either damaged or destroyed. If the present conflict continues, the food security prospects for 2015 could be worse than they are now. For example, the formally registered harvest of wheat amounted to around 2.9 million tonnes at the beginning of 2013. It was not imaginable for the assignment to measure the amount held locally, but it is expected that it is relatively small in view of the fact that many grain-storage structures have been either seriously damaged or destroyed since 2011 (FAO 2013).

I started working on this project during the period of peace before the start of strikes in Syria in 2011. I have strongly struggled to complete the project; the most important difficulties were afforded to complete the field work throughout the conflict.

## 1.1 Geographical situation of Syria

Syria, formally the Syrian Arab Republic, is a country in Southwest Asia. Syria, with a total area of 185,180 km², is bordered in the north by Turkey, in the east and southeast by Iraq, in the south by Jordan, in the southwest by Palestine (occupied by Israel), and in the west by Lebanon and the Mediterranean see (Fig. 1).

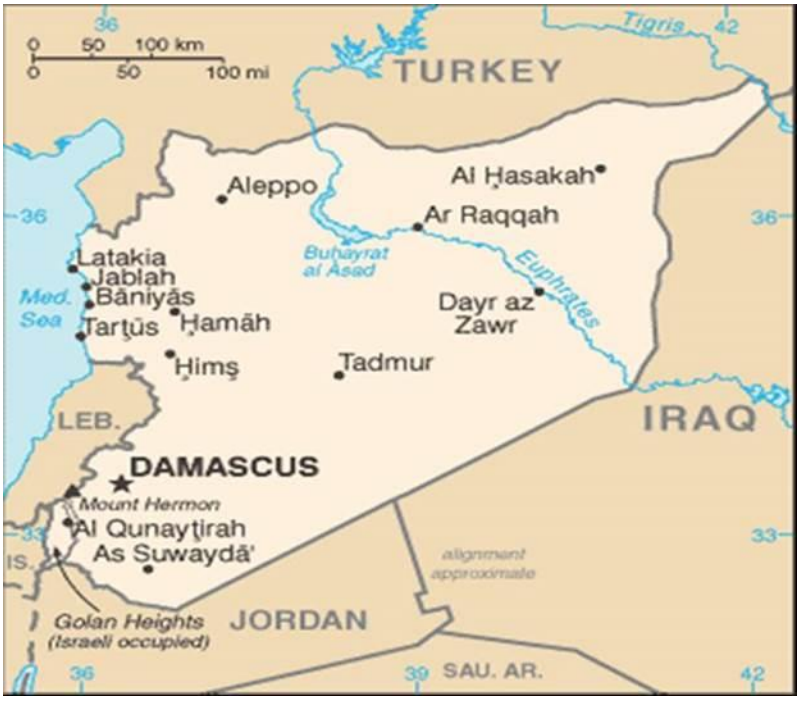


**Fig. 1.** Geographical location of Syria. Source: World Fact Book 2014

It lies to the East of the Mediterranean Sea, with 183 km of coastal borders, bounded by 32°19’ and 37°20’ N latitudes and 35°43’ and 42°25’ E longitudes. Hermon is the highest mountainous top of the country, it raises to 2814 m. Mountain tops above 2000 m are rather common in the Syrian eastern slopes of Anti-Lebanon mountains. The lowest part of the country lies at the foot of the Golan Heights reaching minus 200 m at the Tiberian Lake.

Much of the rest of the country is a plateau crossed by the valley of the Euphrates (al-Furat) River, which flows across from Turkey in the north to Iraq in the east. This plateau harbours most of Syria’s major towns and cities.

The Orontes is Syria’s second longest river. It has its source in Lebanon and flows from the Anti-Lebanese mountains, through western Syria to Turkey in the north. In the southeastern corner is the stony Syrian Desert (Fig. 2).

In terms of geology, Syria is located on a piece of different kinds of rocks, where very old calcareous rocks spread to the western part, while they become more recent to the east. Some Basalt lava dating from modern ages is scattered in north, west and south (Syria 1996).

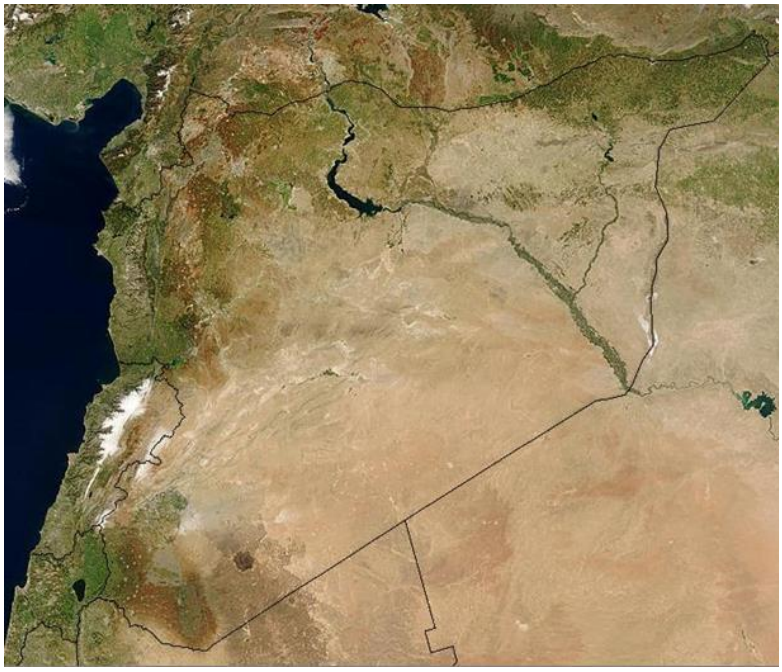

**Fig. 2.** Satellite image of Syria. Source: NASA, Wikimedia commons atlas of the world 2006

Topographically, Syria can be divided into four main regions containing 13 provinces.

- The coastal region, which extends from the north to the south along the Mediterranean coast, between the mountains and the sea.
- The mountainous region, which includes the mountains and hills that run from the north to the south along the Mediterranean Sea.
- The central region, including the plains of Damascus, Homs, Aleppo, Al-Hasakah, and Dara, which is located to the east of the mountainous region.
- The Badia that are the desert plains, located in the southeastern part of the country along the Jordanian and the Iraqi borders.

## 1.2 Population

According to estimates of 2013 (FAO 2013), the total population of Syria reached 21.9 million inhabitants, but today it declined to only 18 million inhabitants (World Factbook 2015).

## 1.3 Climate

The climate of Syria is of Mediterranean nature, which is an extra-tropical climate with intense rainfall in the cool or quite cold seasons of the year. Summer, the hottest season, is dry.

**Temperature** is highly affected by the topography and the latitude of the different parts of the country. In general, temperature increases from North to South, where the mean annual temperature rises from just below 13 °C in the N-NW to approximately 19 °C in the S-SE of the country. December and January are the coldest months of the year, while July and August are the hottest. In winter the temperature frequently falls under 0 °C (in all regions except the coastal areas), while in summer it may frequently rise up to 45 °C (in the desert regions). The daily differences between the maximum and the minimum temperatures are generally quite high in most parts of the country. This difference sometimes reaches 23 °C in the central region and around 13 °C in the coastal region (see Fig. 3).

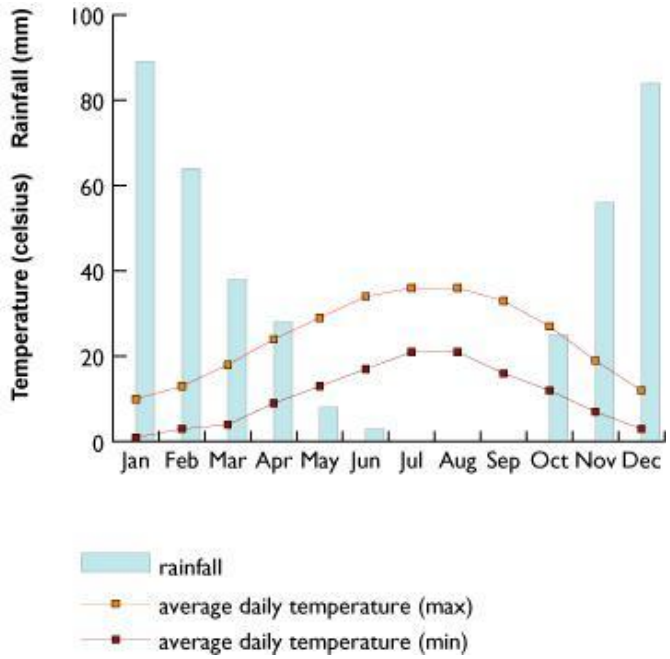


**Fig. 3.** Average temperatures and rainfall in Syria. Source: Ministry of Agriculture and Agrarian Reform (MAAR), Damascus, Syria

The annual **rainfall** ranges from about 1000 mm in the North and Northwest to less than 100 mm in the Southeast of the country. Syria is divided into five distinct zones according to the rainfall:

**Zone 1** has an average rainfall of more than 350 mm. It consists of two sub zones. The first one receives more than 600 mm annually where yields of rain-fed crops are sure for all the years. The production is sustainable in two out of every three years. It occupies an area of 2.6 million hectares and constitutes 14.6% of the total country area.

**Zone 2** receives 250–350 mm precipitation annually. In two out of three years the rainfall is more than 250 mm. Main crops are wheat, barley and summer crops. This zone makes up 13.3% of the country area, i.e. 2,470,000 ha.

**Zone 3** receives 250 mm of precipitation annually. This amount of rainfall is granted for more than 50% of the monitored years, i.e. 1–2 out of 3 years, the production is sufficient. This

zone has mainly grain crops; however legumes do grow there as well. This zone makes up 7.1% of the total area, i.e. 1,306,000 ha.

**Zone 4** is a margin zone, which receives 200–250 mm precipitation annually. This amount of rainfall is certain for more than 50% of the monitored years. Only barley can be grown. The area can be used for permanent pastures. This zone makes up 9.91% of total, which means 1,883,000 ha.

**Zone 5** less than 200 mm precipitation annually is received and steppe lands make up 55.1% of the total area of Syria. These lands are not suitable for rainfed cultivation. Its area reaches 10,208,000 ha. Main crops are wheat, barley, cotton, lentil, vegetables, and legumes, as well as olive, citrus and apples (Country report 2008).

## 1.4 Soils of Syria

The soils of Syria (see Fig. 4) belong to five orders of the 1975 United States Department of Agriculture Soil Taxonomy (Ilaiwi, 1980). The major soil types are:

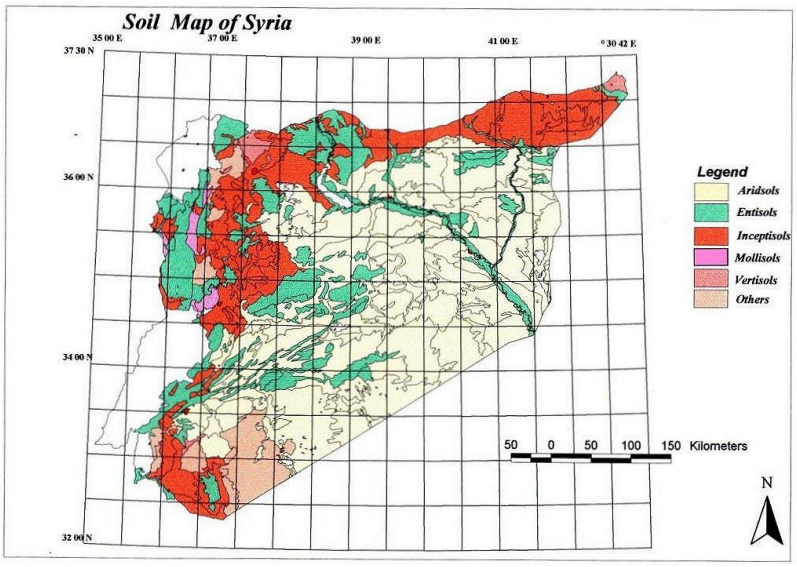


**Fig. 4.** Soil map of Syria. Source: Suttie and Reynolds 2001

- **Aridisols** cover 47.5% of the country. They generally occur where the annual rainfall drops below 250 mm, and are thus the dominant soils in the Badia, but they also occur around Damascus. They are mostly characterized by calcic or gypsic horizons close to the soil surface, weak structure and relatively light texture, which predisposes them to erosion.
- **Inceptisols** are the second most frequent soils covering about 21.7% of the country. They are the prevailing soils in the rainfed areas in the north of the country and also in the areas to the east of the coastal mountains around Homs, Hama and Idlib. They are mostly characterized by calcic horizons, heavy texture and moderate to strong structure.
- **Entisols** are relatively young soils, occupying about 16.9% of the country. They are mainly found as shallow soils over the coastal and central mountains or as alluvial soils on river terraces. They are the predominant soil in the Euphrates valley.
- **Mollisols** have a dark surface layer and well-developed structure, and only occur over 1.2% of the land. They are mainly confined to the coastal region.
- **Vertisols** are heavily textured cracking soils, which cover only 2.1% of Syria's landmass. They mainly occur as related soils with the Inceptisols and are most common in the north of the country between Aleppo and the Turkish border.

## 1.5 Vegetation of Syria

Syria has quite limited areas of natural vegetation. The non-arable areas are too dry to support plant life, and most of the arable areas have been cleared from natural cover.

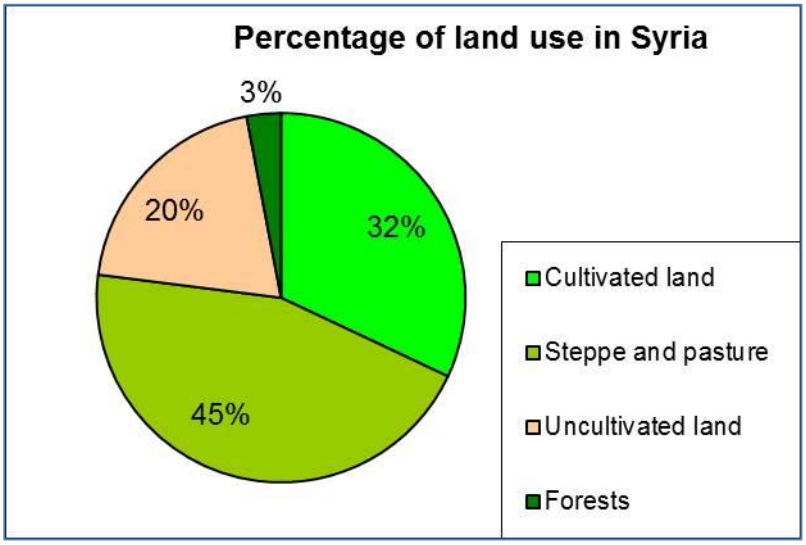


**Fig. 5.** Land use in Syria

Yew, lime, and fir trees grow in the mountains. In the Euphrates Valley and the Oasis of Palmyra, date palms are established. On the coast and the fertile inland regions, grains, olives, vines, apricot trees, oaks, and poplars are to be found. Citrus trees including lemon and orange grow along the coastal area as well as some reed grasses, wild flowers, trees, and shrubs. In the Anti-Lebanon Mountains, forests of Aleppo pine and Syrian and Valonia oak are present.

There are few forests to be found in Syria (Fig. 5) as remains. They are distributed in the mountains, especially in the coastal mountain ranges. The use of many forests for wood and paper has decreased their cover. The steppe is characterized by the absence of natural tree cover, except for some sparsely distributed trees, having no significant effect. For a short time in the spring, the Syrian land is covered by an ephemeral vegetation of different colourful species including flowers and grassy plants (Barkouda 1998).

### 1.5.1 Agricultural regions of Syria

The Syrian Arab Republic as already described in the introduction can be subdivided into five main agricultural regions, namely, Southern, Central, Coastal, Northern, and Eastern (NAPC 2003):

- The Southern region covers about 15.7 percent of the total area of the country. It includes the provinces of Damascus, Dara, Sweida, and Qunattra. It is famous for fruit production, especially apricots, apples and grapes, but it also produces crops such as chickpeas, lentils and tomatoes.
- The Central region accounts for about 27.6 percent of the total area. It includes the provinces of Homs and Hama, and produces mainly sugar beets, dried onion, potato, lentils, almonds and irrigated wheat.
- The Coastal region on the Mediterranean Sea includes the provinces of Lattakia and Tartous. Although this region is relatively small (2.3 percent of the total area), it significantly contributes to national agricultural production, with citrus, olives, tomatoes and tobacco.

- The Northern region covers 12.6 percent of the country's total area and includes the provinces of Aleppo and Idlib. Its main contributions to national agricultural production are lentils, chickpeas, olives, and pistachios.
- The Eastern region is the largest in the country, covering 41.8 percent of the total area. It includes the provinces of Deir alzour, Al-Raqa, and Al-Hassakah, concentrating the national cereals and cotton production, as well as irrigated wheat, rain-fed wheat contributes, cotton and lentils.

### 1.5.2 Short history of exploration of the Syrian flora

Syria is a part of the Fertile Crescent, which differs widely in water availability, temperature, soil type, altitude and vegetation. This semi-circle of fertile land encompasses the Syrian Desert. This is where agriculture first began.

Starting from the Ghab depression, it extends eastward to create the most important geographical feature in Syria. Morphological and physiological variation observed in these habitats has arisen by natural selection (Nevo et al. 1988).

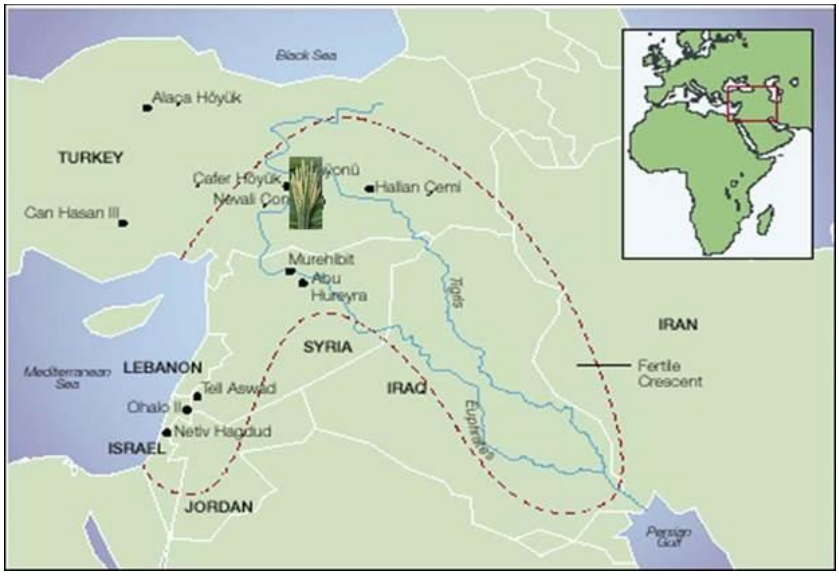


**Fig. 6.** Several wild wheat species grow in the Fertile Crescent in SW Asia. Source: Salamini et al. 2002.

Forming a part of the Fertile Crescent (Fig. 6), where many of the world's agricultural plants have evolved, Syria is extremely rich in agrobiodiversity. Wild progenitors of wheat and barley and wild relatives of many fruit trees such as almonds and pistachio as well as forage species are still found in marginal lands and less disturbed areas. These are threatened by a wide range of human activities, notably modern, extensive agriculture, overgrazing, over-cutting and urban expansion.

The majority of crops domesticated in the Fertile Crescent (Fig. 6) as well as their wild ancestors (Table 1) are of worldwide importance (Harlan 1975a).

This region is an important centre of plant diversity in the world. Biodiversity here is of unique importance because it is the centre of diversity for two major staple food species. Wheat and barley were domesticated in this area some 10,000 years ago, as shown by the archaeological findings at Tel Abu-Hureyra (Hillman et al. 2000) (Fig. 7).

**Table 1.** Wild crop relatives typically found in Syria, alphabetically arranged. Source: Mouterde (1966), Post (1896)

| | | |
|---|---|---|
| *Aegilops biuncialis* | *Erodium romanum* | *Poa timoleontis* |
| *Aegilops caudata* | *Festuca valesiaca* | *Poterium spinosum* |
| *Aegilops columnaris* | *Ficus* sp. | *Prunus microcarpa* |
| *Aegilops cylindrica* | *Hordeum bulbosum* | *Prunus prostrata* |
| *Aegilops geniculata* | *Hordeum spontaneum* | *Pyrus syriaca* |
| *Aegilops triuncialis* | *Juniperus excelsa* | *Quercus calliprinos* |
| *Aegilops umbellulata* | *Lathyrus* spp. | *Quercus infectoria* |
| *Aegilops vavilovii* | *Lolium perenne* | *Rhamnus libanotica* |
| *Amygdalus korschinskii* | *Medicago radiata* | *Scandix iberica* |
| *Amygdalus orientalis* | *Medicago rigidula* | *Trifolium pilulare* |
| *Asphodelus microcarpus* | *Medicago rugosa* | *Trifolium stellatum* |
| *Astragalus coluteoides* | Other *Medicago* spp. | Other *Trifolium* sp. |
| *Avena barbata* | *Noaea mucronata* | *Triticum boeoticum* |
| *Avena sterilis* | *Onobrychis cornuta* | *Triticum dicoccoides* |
| *Bromus tomentellus* | *Ononis natrix* | *Triticum urartu* |
| *Carex stenophylla* | *Pistacia atlantica* | *Vicia angustifolia* |
| *Carthamus flavescens* | *Pistacia palestina* | *Vicia ervilia* |
| *Cerasus prostrata* | *Poa bulbosa* | *Vicia hybrida* |
| *Cicer* spp. | *Poa diversifolia* | *Vicia narbonensis* |
| *Crataegus azarolus* | *Poa libanotica* | *Vicia villosa* |
| *Dactylis glomerata* | *Poa sinaica* | Other *Vicia* spp. |

Syria as a sector of the Middle East had received special botanical interest from the early explorers and botanists. Michael Zohary, in his well-known book "Geobotanical foundations of the Middle East" gave an accumulated review of the historical botanical studies of the Middle East including Syria. Here are excerpts from this book and additional information from new publications (Zohary 1973).

J. J. H. de Labillardiere in 1791–1812 printed five volumes of "Icones plantarum Syriae rariorum". These include the results of his travels in the area adjacent to Damascus, Lebanon and Cyprus.

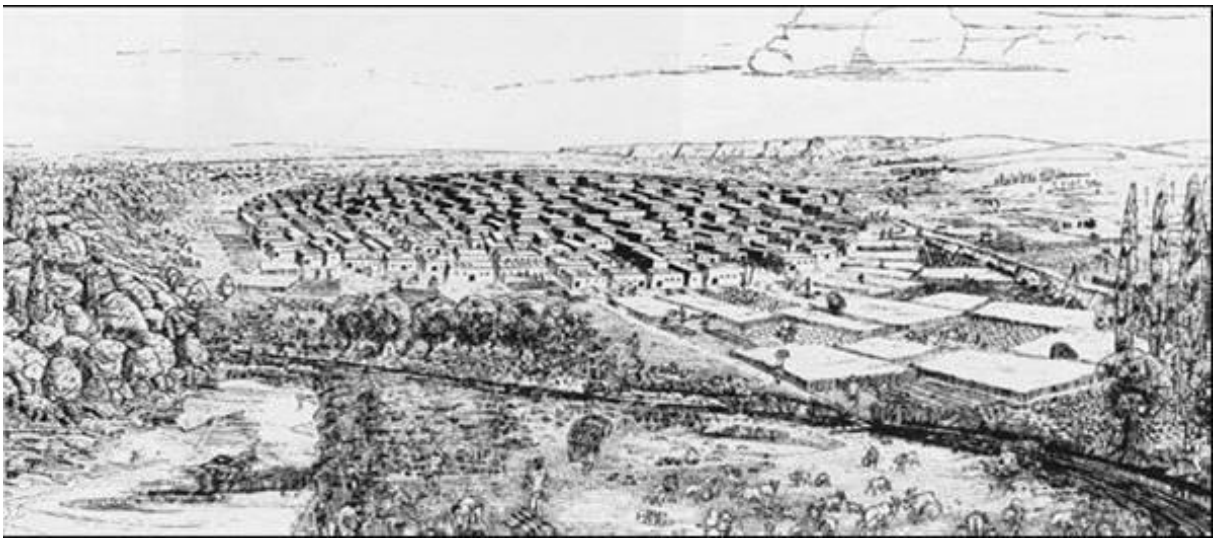

**Fig. 7.** Neolithic village at Abu-Hureyra, Syria. Source: Ministry of Tourism of Syria.

A. Russell and P. Russell completed wide studies on the flora and vegetation of Aleppo.

G. A. Olivier and J. G. Bruguire travelled in Egypt, Syria, Mesopotamia and Persia in 1796–1797. Their results have been composed in "Voyage dans l'Empire Othoman, l'Egypte et la Perse".

U. J. Seetzen's journey in Trans-Jordan "Hauran to Moav and the Dead Sea" was reported in 1810 in two publications.

J. L. Burckardt was one of the significant travellers in the area. For two years (1810–1812) he travelled in Syria, Lebanon, and Palestine; several botanical observations are integrated in his "Travels in Syria and the Holy Land 1822".

P. M. R. Aucher-Eloy travelled in Damascus in 1830 and in the northern portion of Syria in 1835. His gatherings hold thousands of species from the Orient.

T. Kotschy is amongst the most important botanists of the Middle East. He travelled (1835–1860) in Northern Syria, Anti-Lebanon and the Syrian seaside as a part from the Mediterranean basin, also to the mainstream of the Middle East countries and Arabia.

P. E. Boissier in 1846 completed his enormous journey in the Near East, through the Nile Valley to Assouan, then to Mt. Sinai and through Arabia Petraea to Gaza, Jerusalem and the Dead Sea, and then went to Damascus, Lebanon, Antiochia, Aleppo, and back to southern Lebanon. The results of these journeys were published in his monumental work "Flora Orientalis" in five volumes and an extra volume (1867–1888). This enormous flora has remained for long time the main basis of the knowledge on Middle-East flora.

H. K. Haussknecht explored Syria, Armenia and SE Turkey in 1864–1866; the results of his work were published in "Iter Syriaco-Armeniacum".

C. I. Blanche and R. P. Vincent collected large herbaria in Beirut at the same time as Post (see below) and achieved extensive exploration in the area. Their large herbarium is conserved in the American College of Beirut.

G.E. Post (1838–1909) visited most of the Middle East countries during his journeys. His route in Syria was through Mt. Hermon, Anti-Lebanon, Palmyra and Hauran. The accounts of his travels were published in "Flora of Syria, Palestine and Sinai" (1883–1906), which was the first standard flora for the area, since the "Flora Orientalis" of Boissier.

J. F. N. Bornmüller is one of the well-known surveyors of the oriental flora. In 1892 he explored the whole of the Near East up to Turkestan. His contribution to the knowledge of the Middle-Eastern flora were enormous. One of his important works was the publication of the collections of H. C. Haussknecht and T. Strauss.

A. Aaronsohn, a Romanian botanist and agronomist, made his surveys in the years 1905–1915. He travelled in Palestine, Syria and Turkey, and discovered wild wheat; he also started the phytogeographical work in the area. His main diaries and collections have been edited and supplemented by H. R. Oppenheimer (1930) and H. R. Oppenheimer and M. Evenari (1940).

J. E. Dinsmore of the American Colony in Jerusalem was active in Palestine and Syria in the first half of the 20th century. He revised the edition of Post's Flora (1932–1933), and incorporated all applicable data in print since 1896.

A significant contribution to the knowledge of the Syro-Lebanese flora was published in 1930, namely the "Flora du Liban et de la Syrie" by père L. Boulomony, the second volume of which contains photographs of herbarium specimens of most of the plants of these countries.

R. Gimbals collected with J. Thiébout in Jabil El Arab, the Syrian Desert and other parts of Syria and Lebanon during the period from 1930–1935. He is the author of a large Flora in three volumes "Flore Libano-Syrienne" published in 1936–1953, while Gombault was publishing many significant contributions to the flora of the two countries since 1932.

G. Samuelsson went in 1932 and 1933 together with E. Wall to Palestine, Syria, Lebanon and southern Turkey. Most of his works were printed after his death by K. H. Rechinger as "Reliquiae Samuelssonianae" in six volumes (1949–1959). Amongst others, Samuelsson similarly edited the collections made by the English ornithologist Colonel R. Meinertzhagen in Jebel Al-Arab and the Syrian Desert, by M. Hardjian in Syria, Turkey, and Cyprus in 1906–1913.

Père P. Mouterde, one of the botanists of Syria and Lebanon, has intensively herbarised all parts of these two countries. Besides "La flora du Djebel druz" in 1953, three volumes of his "Nouvelle Flora du Liban et de la Syrie" have already appeared in 1966, 1970, and (because of the war in Lebanon), the third one only in 1983.

In the last three decades of the 20th century, many studies have been carried out by Syrian botanists.

L. Nahal, one of the well-known Syrian botanists, studied the vegetation and plant ecology in Syria, which determined on the Eu-Mediterranean vegetation of the coastal Mountains, e.g. *Pinus brutia*, *Quercus pseudocerris* (Nahal 1962).

N. Chalaby's contribution to the studies of Syrian flora and vegetation started in the 1970s. He focused on the forest formations in Syria (Chalaby 1980, 1982).

Y. Barkoudeh, a famous taxonomist in the Middle East, worked at ACSAD for about 15 years, herbarised in the Arab Central Herbarium of ACSAD and published in collaboration with Al-Oudat in 1983. Also, there are many master theses regarding the vegetation of Syria that have been published by the University of Syria in the 1990s:

Ghazal (1994) studied the auto-ecology, taxonomy and phytosociology of *Quercus aegilops* L.

M. Chikhali (1994) studied the ecology and distribution of the *Tulipa* species in Syria.

N.G. Asswad (1998) studied the vascular flora in the Al-Forouluk humid forest.

S. Karzoun (1996) studied the ecological and geographical distribution of *Castanea sativa* Mill. in Syria.

Also some pulses wild plants e.g. Ehrman and Maxted (1990) collecting herbarium and germplasm accessions of members of tribe Vicieae, including wild peas from Syria.

According to Mouterde and the National Syrian report on biodiversity (2009), the total number of the species in the flora of Syria amount to about 3,077, belonging to 133 families and 919 genera. Table 2 shows the largest families of the Syrian flora with the number of genera and species that belong to those families.

**Table 2.** The largest families of the Syrian flora with the number of genera and species that belong to those families in alphabetic order. Source: Mouterde (1966), Post (1896)

| Family | No. of genera | No. of species | Family | No. of genera | No. of species |
|---|---|---|---|---|---|
| Amaryllidaceae | 5 | 9 | Lamiaceae | 31 | 180 |
| Boraginaceae | 29 | 90 | Leguminosae | 50 | 402 |
| Campanulaceae | 5 | 24 | Liliaceae | 24 | 142 |
| Caryophyllaceae | 23 | 159 | Malvaceae | 7 | 25 |
| Chenopodiaceae | 30 | 71 | Oleaceae | 5 | 7 |
| Cistaceae | 5 | 16 | Orchidaceae | 11 | 32 |
| Compositae | 106 | 332 | Papaveraceae | 8 | 34 |
| Convolvulaceae | 4 | 21 | Polygonaceae | 8 | 36 |
| Crassulaceae | 5 | 25 | Primulaceae | 7 | 7 |
| Cruciferae | 71 | 184 | Ranunculaceae | 12 | 75 |
| Cucurbitaceae | 4 | 6 | Rosaceae | 19 | 44 |
| Cyperaceae | 10 | 33 | Rubiacae | 11 | 55 |
| Euphorbiaceae | 5 | 51 | Scrophulariaceae | 15 | 108 |
| Gramineae | 104 | 227 | Solanaceae | 10 | 17 |
| Iridaceae | 5 | 41 | Umbelliferae | 74 | 154 |

Zohary (1973) summarised the general features of the Syrian flora as follows:

- Poverty of tropical plants, even in warmer parts of the country.
- Presence of an objectively large number of forest trees that are found in their southern limits.
- Presence of a large number of northern (excision) species which might be regarded as relicts of more humid vegetation.

- Presence of a sub-alpine tragacanthic flora in the higher mountain areas having close similarity to that of eastern Anatolia and Iran.
- The total of a nival-alpine flora on the mountain peaks having similarity to that of the Euro-Siberian region.
- The presence of a large number of trees and shrubs growing in rather dry mountainous habitats.

Syria includes only an insignificant number of Sahara-Arabian plants but a very large number of Irano-Turanian plants centred mostly in the Syrian Desert.

### 1.5.3 Endemism in the Syrian flora

The total number of endemics is 243 species, which represent about 8.7% of the Syrian flora. These species belong to 35 families and 113 genera (Mouterde survey, see Tables 3, 4).

**Table 3.** The largest 15 families and their endemic species and genera in Syria in decreasing order of number of endemic species. Source: Mouterde (1966), Post (1896)

| Family | No. of species | No. of genera | Endemic species | Genera of endemics | % of species | % of genera |
|---|---|---|---|---|---|---|
| Leguminosae | 402 | 50 | 52 | 9 | 13 | 17.6 |
| Compositae | 332 | 106 | 29 | 14 | 8 | 13 |
| Labiatae | 180 | 31 | 27 | 13 | 15 | 41.9 |
| Liliaceae | 142 | 24 | 25 | 9 | 17 | 37.5 |
| Iridaceae | 41 | 5 | 16 | 4 | 39 | 80 |
| Umbelliferae | 154 | 74 | 12 | 11 | 7.8 | 14.8 |
| Scrophulariaceae | 108 | 15 | 10 | 2 | 9 | 13 |
| Caryophyllaceae | 21 | 11 | 7 | 6 | 33 | 54.5 |
| Cruciferae | 184 | 71 | 7 | 6 | 3.8 | 8 |
| Ranunculaceae | 75 | 12 | 6 | 3 | 8 | 25 |
| Euphorbiaceae | 51 | 5 | 5 | 1 | 9.8 | 20 |
| Boraginaceae | 90 | 29 | 4 | 4 | 4 | 13.7 |
| Gramineae | 227 | 104 | 4 | 4 | 1.7 | 3.8 |
| Campanulaceae | 24 | 5 | 4 | 1 | 16.6 | 20 |
| Malvaceae | 25 | 7 | 3 | 3 | 12 | 42.8 |

For evaluation determinations all endemic species in Syria and Lebanon (common characteristics for flora) extent ca 330 species, that means around 8% of the total flora of the two countries is endemic.

**Table 4.** The largest 10 genera and their endemic species in Syria, in decreasing order of endemism ratio. Source: Mouterde (1966), Post (1896)

| Genus | Family | Species | Endemic species | % of endemism |
|---|---|---|---|---|
| *Iris* | Iridaceae | 23 | 12 | 38 |
| *Astragalus* | Papilionaceae | 110 | 31 | 28 |
| *Centaurea* | Compositae | 45 | 10 | 26.6 |
| *Allium* | Liliaceae | 46 | 12 | 26 |
| *Verbascum* | Scrophulariaceae | 36 | 8 | 22 |
| *Campanula* | Campanulaceae | 18 | 4 | 22 |
| *Trifolium* | Papilionaceae | 53 | 7 | 13 |
| *Salvia* | Labiatae | 30 | 4 | 13 |
| *Euphorbia* | Euphorbiaceae | 45 | 5 | 11 |
| *Vicia* | Papilionaceae | 35 | 4 | 11 |

To save our genetic resources we must have a genebank to include *ex situ* and *in situ* under legal collection of indigenous plants by corporations who patent them for their own use to avoid bio-piracy, used to describe situations where corporations from the developed world sustain genetic resources and traditional knowledge and technologies of developing countries.

On the other hand, it is the unauthorized use of genetic resources and the knowledge associated with these genetic resources held by the communities living in the locality. Modern agricultural practices are especially damaging as they lead to widespread habitat loss and replacement of genetic resources by using new varieties instead of landraces.

## 1.6 History of the flora of cultivated plants of Syria

While we have a very detailed knowledge on wild plants, the flora of cultivated plants in Syria is only marginally investigated. Although a small country (185.180 $km^2$), Syria accommodates numerous ecosystems that allow for a large number of plant genetic resources ranging from cold-requiring crops to subtropical crops to live and thrive.

Agriculture today is considered by a stark decline in the diversity of cultivated plants run out of an expected total of ca 3000 agricultural edible plant species, only 30 ‘nutrition the world’, with the three main crops being maize (*Zea mays*), wheat (*Triticum aestivum*) and rice (*Oryza sativa*) (FAO, 1996).

The agricultural area in the Syrian Arab Republic, according to FAOSTAT (2011) is 13,864,1000 ha, characterized by a diversity of agricultural environments. The Syrian environment and soil are suitable for producing cereals (wheat, barley, oats, maize, millet, sorghum), legumes (chickpea, lentil, common vetch, bitter vetch, faba bean, lupine, alfalfa, pea, grass pea, soybeans, golden clover), vegetables (potato, sweet potato, garlic, groundnut, onion, sweet leek, salad leek, shallot leek, spinach, chicory, endive, artichoke, cabbage,

cauliflower, musk melon, watermelon, cucumber, tomato, carrot, rhubarb), and fruits (fig, olive tree, pistachio, chestnut, apricot, almond, peach, pomegranate, apple, pear, grapevine, quince, sweet cherry, plum, garden plum, lemon, orange, palm tree, blackthorn, hackberry) and other crops such as sunflower, rape mustard, sesame, cumin, fennel, anise, safflower, fenugreek, flax (linseed), common hemp, and opium poppy.

Particular attention is given to planning of the so-called strategic crops: wheat, barley, cotton (short-staple cotton), lentil, chickpea, tobacco, and sugar beet. Together these crops inhabit about 75% of rain-fed and irrigated land under cultivation. Wheat and cotton account for 96% of the total area of irrigated land planted to the strategic crops, and barley and wheat for 92% of the rain-fed land (MAAR 2010).

While the area which gave the world agriculture and several major crops finds itself today in the grasp of food shortage. Maybe, that in spite of the early lead of the Fertile Crescent in agricultural development the area lost out finally because of the ecologically desperate and indefensible strategies accepted by the people of that area, e.g. deforestation, overgrazing, monoculture and the repetition of irrigation without crop rotation. These consequences destroyed the soil and began widespread erosion as well as salinization logged by a decline in soil fertility and crop yields.

Among the first checklists of cultivated plants are those of Cuba (Esquivel et al. 1989) and of South Italy (Hammer et al. 1990).

Checklists are important for germplasm collecting expeditions, as well as for studies of national floras of cultivated plant species.

Checklists of cultivated species are valuable (Hammer 1991), they support the collector in finding rare or disappearing crop species, and checking whether a plant found was reported for the region before.

For that reason the checklist provides taxon name data for all species known to be cultivated in an area, including synonyms, vernacular names, geographical information, plant uses and plant parts used, narrative text information, and literature references.

To get a detailed and fast insight of the crop plants of Syria, the checklist method is valuable, cf. Hammer and Perrino (1985) for Italy, Esquivel et al. (1989) for Cuba, Hoang et al. (1997) for Korea, and Li et al. (2011) for China.

Checklists are beneficial tools in all kinds of botanical research. They have, on the other hand, been largely neglected in studies on plant genetic resources. As long-established by Hammer and Perrino (1985), they can be used in surveys of far-away areas, such as the Ghat oases of Libya, when results had to be obtained within a rather limited time.

They are also useful for systematic studies of larger areas, e.g. Libya (Hammer et al. 1988). The general work with checklists has been described by Hammer (1990). For now, checklists were used in several countries, and a database was formed, the contents of which is summarised in Table 5.

**Table 5.** Summary of the database for checklists of cultivated plants. The year refers to the respective publications for Cuba (Esquivel et al. 1992), Korea (Hoang et al. 1997) and Italy (Hammer et al. 1999)

| Country or region | Cuba (1992) | Korea (1997) | E Asia (in prep.) | Albania (in prep.) | Italy | Syria (2014) |
|---|---|---|---|---|---|---|
| Taxa | 1,044 | 605 | 996 | 433 | 687 | 390 |
| Species | 1,029 | 578 | 940 | 418 | 665 | 262 |
| Genera | 531 | 378 | 529 | 255 | 380 | 146 |
| Families | 117 | 111 | 147 | 82 | 105 | 57 |
| Synonyms | 729 | 497 | 686 | 225 | 459 | 236 |
| Vernacular names | 1,669 | 714 | 2,889 | 264 | 15,621 | 358 (en); 328 (syr) |

## 1.7 Genetic resources in Syria during four years of war

Syria suffers of a long lasting conflict. In recognition of the significant circumstances of the plant genetic resources and agricultural sector in Syria during four years of war, the following points are summarized as results:

- Removal of forest tree or trees in the areas under siege from different fighting groups to be used as fuel for heating, cooking and water heating.
- Many people leave their own home as refugee inside or outside Syria and neglect work in agriculture.
- Different fighting groups burned the field crop sometimes even before harvesting time, for example wheat fields in south Syria.
- Homegardens and wild genetic resources are used for nutrition, and in big cities like Aleppo and Damascus people cultivated vegetables around their residence and even in the buildings.
- Many farmers were arrested or killed, or even migrated inside or outside Syria; therefore women are responsible to support their families and to cultivate fields or homegardens.
- Enthusiasm to support *in situ* conservation have partly come from bad experience with *ex situ* conservation, but also, and more recently, because of the difficulties to save material in genebank, during war time no one knows what happened with accessions in GCSAR genebank in Damascus today.

## 1.8 Objective

Agricultural biodiversity is important for food and nutritional security in spite of the dramatic population growth of the human population during the past 150 years. Beside the background of climate change, over exploitation, pollution, invasive alien species and the usage of transgenic plants in agriculture, the protection of our agrobiodiversity and the evaluation use of local variety species (including crop wild relatives) and the crop varieties turned into an important target during the recent decades. Agricultural biodiversity also contains

environments and species outside of farming systems which have to be improved (Heywood 2003).

The aim of the present study was to compile a checklist of Syria's cultivated plants of agriculture and horticulture excluding plants only grown as ornamental or for forestry

Furthermore, plants taken for reforestation have not been included, if there are no agricultural or horticultural uses. Therefore, the inclusion of plants into the checklist follows the same principles as "Mansfeld's Encyclopedia" (Schultze-Motel 1986, Hanelt and IPK 2001), also describing the origin of plant genetic resources in Syria was obtained.

# 2 Material and Methods

The checklist method was used as described e.g., by Hammer (1991). Checklists of cultivated plants are a useful tool to document the agricultural and horticultural biodiversity found in a certain region or country, to assist crop plant collectors to know what species they can expect to find, and to note when a new, hitherto not documented crop species is encountered.

Several studies have been performed to study agrobiodiversity in different parts of Syria, but usually they focussed on wild species. Many collections have been carried out but they concentrated preferably on cereals, and particularly on wheat, e.g. during Vavilov's collection journey in 1926 (Vavilov 1997).

As previously mentioned the present survey of cultivated plants is the first for Syria, so for sure, some cultivated species will be missing.

Moreover, due to the civil war in Syria, it was not possible to visit the country in the frame of the present work, as initially planned.

The checklist will be made available to the scientific community by a separate publication.

## 2.1 Sources of information

Main sources of information were published literature, such as Mansfeld's Encyclopedia (Schultze-Motel 1986, Hanelt and IPK 2001), floras of Syria, Lebanon and the Mediterranean (Mouterde 1966), as well as Syrian printed sources in Arabic and/or English, reports from FAO on agricultural statistics in Syria, and data from ICARDA and Bioversity International. In addition, personal observations gathered during my professional work in GCSAR in Syria (since 1989) and my participation in projects was taken into account. These projects were:

(1) "Conservation and Sustainable Use of Dry Land Agrobiodiversity in the Near East" (Jordan, Lebanon, Syria, Palestinian Authority), focussing on conserving landraces and wild relatives of barley, wheat, lentil, alliums, feed legumes, and fruit trees (1999–2005). The project was managed by GCASR staff, and besides GCASR staff, also international expertise, especially from ICARDA, and some national experts from universities were involved.
(2) A project for vegetable landraces (1993–1995) in collaboration with Bioversity International (previously International Plant Genetic Resources Institute, IPGRI) and UNDP, in which 380 local vegetable accessions were evaluated at research centres. For medicinal plants and fruit trees I was in personal contact with different departments in GCSAR or in MAAR, in addition to personal contact with private organizations.

The resulting checklist was compared with the catalogue of crop plants of Italy (Hammer et al. 1992, 1999), and the checklist of cultivated plants of Iraq (Husain and Kasim 1975).

**Table 6.** Arabic Alphabet with English transliteration and transcription, after Baalbaki and Baalbaki (2007)

| Arabic alphabet | Transliteration | Transcription | Arabic alphabet | Transliteration | Transcription |
|---|---|---|---|---|---|
| ا | Alif | A | ض | Dad | D |
| ب | Ba | B | ط | Ta | T |
| ت | Ta | T | ظ | Za | Z |
| ث | Tha | Th | ع | Ain | E |
| ج | Jim | J | غ | Ghain | Gh |
| ه | Ha | H | ف | Fa | F |
| خ | Kha | Kh | ق | Qaf | Q |
| د | Dal | D | ك | Kaf | K |
| ذ | Zal | Z | ل | Lam | L |
| ر | Ra | R | م | Mim | M |
| ظ | Zay | Z | ن | Nun | N |
| س | Sin | S | ه | Ha | H |
| ش | Shin | Sh | و | Waw | W |
| ص | Sad | S | ي | Ya | Y |

## 2.2 Explanations for the checklist

The checklist includes cultivated plants, presented in alphabetical order according to their accepted scientific names. Each species entry consists of a nomenclatural part, folk names, details of plant uses, the distribution in Syria (by provinces), a textual description, and references to related literature (cf. Hammer et al. 1992).

The nomenclatural part includes the **scientific name** (with author and publication), **synonyms**, and the **plant family** (in brackets). To find the accepted name for a synonym, the Index of Synonyms can be used.

Syrian Arabic (syr) **vernacular names** (also: common or folk names) transcribed into English alphabet (the transcription table used is provided in Table 6), and English common names (en) are listed next. The Syrian names were extracted from different literature sources, including the English-Arabic and Arabic-English dictionary (Baalbaki and Baalbaki 2007), and completed by information

**Table 7.** Abbreviations for main plant uses

| Crop use | abbreviation |
|---|---|
| Cereals including pseudo-cereals | C. |
| Fibre crops. | Fi. |
| Fodder crops, forages | Fo. |
| Fruits | Fr. |
| Industrial crops | I. |
| Medicinal crops | M. |
| Nuts and other fruits used like nuts | N. |
| Oil crops | Oi. |
| Pulses | Pu. |
| Spices and condiments | Sp. |
| Starch plants exclusive cereals | St. |
| Vegetables | V. |

gathered during my work in Syria (GCSAR).

The different **plant uses** (purposes of cultivation) are indicated in the order of their importance as in Table 7. The **plant parts used** are given in brackets; the abbreviations used are given in Table 8; cf. Hammer et al. 1992, 1999. Specific additional uses such as 'shade tree' are given in full text.

The **distribution** of each cultivated plant species is given according to provinces. Thirteen provinces of Syria are shown in a map (Fig. 8) and listed with their abbreviations in Table 9.

**Table 8.** Abbreviations for main plant parts used

| Part used | abbreviation |
|---|---|
| Bulb | (b.) |
| Bark | (ba.) |
| Flowers | (fl.) |
| Fruits | (fr.) |
| Herb | (h.) |
| Leaves | (l.) |
| Roots, rhizomes | (r.) |
| Stem | (st.) |

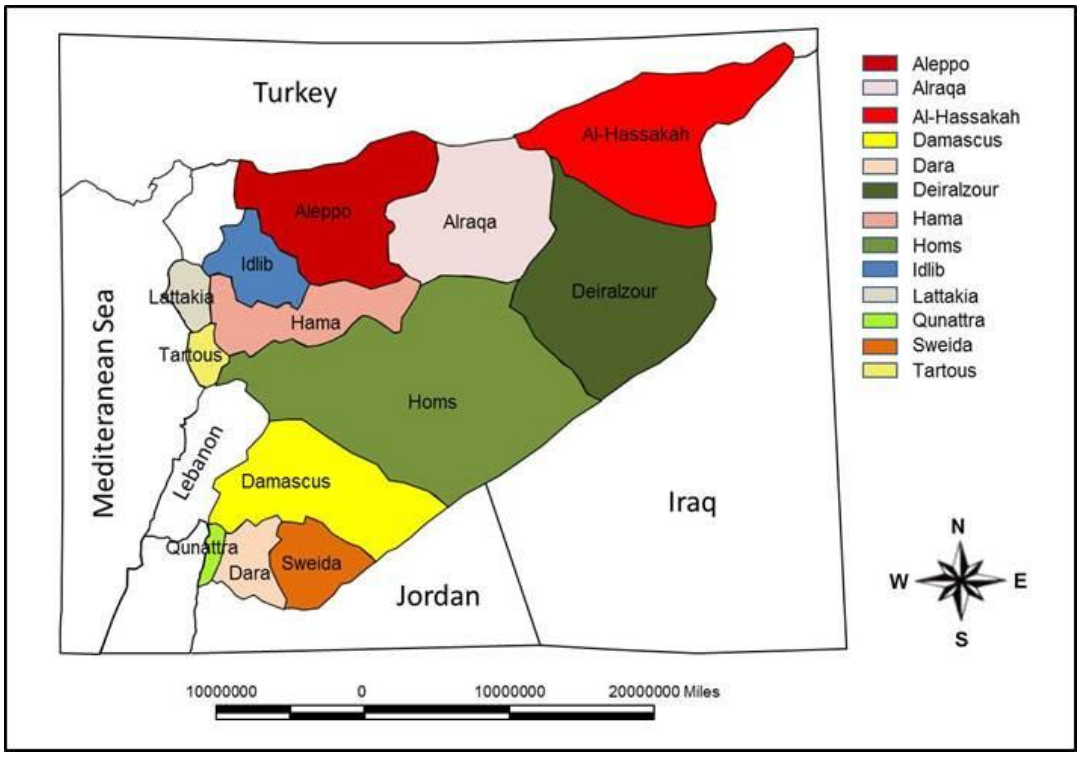


**Fig. 8.** Map of Syrian provinces. Source: Ministry of Agriculture and Agrarian Reform (MAAR), Soil Research Directorate, GIS Department

**Table 9.** Provinces of Syria (with abbreviations) and their characteristics

| No. | Province | Abbr. | Characteristics |
|---|---|---|---|
| 1 | Dara | Dar. | Located 100 km south of Damascus, known throughout history as the Horan region. Dara is very rich in biodiversity, especially in wheat landraces. The mean annual rainfall is above 450 mm. Cultivation of field crops and grazing on natural grasslands are the main agricultural activities. The dominant tree species are olives; field crops include cereals, pulse legumes and a high number of forage species. |

| No. | Province | Abbr. | Characteristics |
|---|---|---|---|
| 2 | Qunattra | Qu. | Located in the southwest of Syria. A large part is occupied by Israel, but the surrounding areas are still cultivated with fruits and vegetables. |
| 3 | Sweida | Sw. | Located 128 km southeast of Damascus. The mean annual rainfall is 200 mm. Sweida is one of the most important sites of dryland agrobiodiversity in West Asia. More than 600 plant species, including landraces and wild relatives of important crop species, were described in previous botanical surveys in Sweida (Khaled Obary s.a.). Big parts of Sweida Province are still not under cultivation, which is one of the reasons for the high biodiversity. Large number of forage species (*Trifolium*, *Medicago*, *Vicia*, and *Lathyrus*), and wild relatives of almond, pear, and pistachio. Landraces of wheat, barley, lentil, common fig (*Ficus carica*), and grape are still grown by farmers in the region, but their use is being reduced significantly by the widespread introduction of apple trees, mainly of two varieties, 'Golden Delicious' and 'Starling'. These apple plantations have encroached on natural habitats. |
| 4 | Damascus | Dam. | Located in the central part of the country. Its mean rainfall is 200 mm. Damascus city has been inhabited as early as 8,000 to 10,000 BC and is known to be one of the oldest continuously inhabited cities in the world. In Damascus province much agricultural land is eroded due to expansion of residential areas, which led to a drastic reduction in its agrobiodiversity. |
| 5 | Homs | Hom. | Located 160 km east of Damascus. Rainfall varies from 250 to 500 mm. The winters in the northern centre can be cold, with temperatures often falling to below freezing. Homs province is an area between the desert and the coast in a break between the mountains known as the Homs gap. Homs province was very famous for vegetable production, especially lettuce landraces, but nowadays there are big problems of pollution because of oil and fertilizer industries. |
| 6 | Hama | Ham. | Situated 47 km north of Homs Province. The mean rainfall is 275 mm. Surrounding areas of Hama are famous for sheep and milk production. However, overgrazing led to a damage and loss in agrobiodiversity. |
| 7 | Idlib | Id. | Situated in the northwest of Syria 160 km away from Aleppo. Mean rainfall is 489 mm. This Province shows a rich biodiversity. The area around Idlib city is very fertile, producing cotton, cereals, olive, fig, tomato, sesame seed, almond, olive tree, and pistachio. But cultivated wheat has a lodging problem because of strong wind. |
| 8 | Lattakia | La. | Located in the Mediterranean seashore with hot dry summers and mild wet winters, with mean daily temperatures of 29 °C in summer and 10 °C in winter. Mean annual rainfall along the Coast ranges from 750 to 1,700 mm. It belongs to the west coastal area (Al Haffa). The most hospitable and pleasant climate in Syria is to be found here. This province is rich in forestry, especially cedars; the vineyards were planted on the side of gently sloping hills. |
| 9 | Tartous | Tar. | Lies in the Mediterranean seashore. Mediterranean conditions give hot dry summers and mild wet winters, with mean daily temperatures of 29 °C in summer and 10 °C in winter. Mean annual rainfall along the Coast ranges from 750 to 1,000 mm. This province is rich in citrus and vegetables grown in greenhouses. |

| No. | Province | Abbr. | Characteristics |
|---|---|---|---|
| 10 | Aleppo | Al. | Located 350 km north from Damascus. Winters in this northern region can be cold, with temperatures often falling to below freezing; the mean annual rainfall is 325 mm. The land use in Aleppo is famous for rain fed watermelon production and pistachio (Fig. 29), water scarcity and calcareous soil are the most typical problems in north Syria. |
| 11 | Al-Hassakah | Has. | Positioned in the outer north-western corner of Syria. The mean annual rainfall is 350 mm. This province is one of the most important regions of wheat production. One reason is the low opportunity to cultivate other crops due to its climatic and soil conditions (FAO, country report, 1996). |
| 12 | Alraqa | Raq. | Located in the Northeast of Syria; most common crops are cotton, sugar beet, wheat, barley, and vegetables. |
| 13 | Deir alzour | De. | Situated at the border with Iraq, most common cultivated plants are cotton, sugar beet, and palm tree. |

**Notes** (additional text information) are provided on the region of origin, information on the centre of domestication, but also the region from where the particular plant was introduced to Syria, often based on Zeven and de Wet (1982), Schultze-Motel (1986), Hanelt and IPK (2001). In addition, available information on the species variation in Syria, genetic erosion (loss of this variation) is given. For evolutionary and historical elements, information was taken from Schultze-Motel (1986) and Hanelt and IPK (2001). The latter compilation, Mansfeld's Encyclopedia, includes about 7,000 cultivated plant species. In addition, important landraces or cultivars are listed. The number of local varieties of the most important fruit trees is shown in Table 10.

Predominantly Syrian **literature references** conclude the articles for the taxa. They are given in alphabetical order of first authors.

Appendices provide indexes which allow one to access the information in the main checklist by other criteria, i.e. by families (Table 14), synonyms (Appendix 2), English and Syrian common names (Appendices 3a, b), and major plant uses (Appendix 1).

**Table 10.** Local varieties of the most important fruit trees in Syria. Source: General Commission for Scientific Agricultural Research in Damascus, Syria, 2011

| Crop | Number of local varieties | Crop | Number of local varieties |
|---|---|---|---|
| Grape | 75 | Almonds | 12 |
| Olive | 92 | Quince | 5 |
| Pomegranate | 15 | Apple | 18 |
| Figs | 85 | Palm tree | 10–15 |
| Pistachio | 21 | Berries | 5 |
| Apricot | 10 | Nuts | 33 |

# 3 Results: Checklist of cultivated plants of Syria

The checklist supports a characterization of the state of plant genetic resources in Syria. As could be expected, most of the species of Syria were also indicated for the Levant (Belad Al Sham) which includes Syria, Lebanon, Jordan and Palestine (occupied by Israel since 1948); moreover some species are shared with Turkey and Iraq, especially in North and North West Syria.

In total, 262 cultivated species of 146 genera and 57 families were identified. Among the families, the following have the highest number of species: Leguminosae (34 spp.), Rosaceae (24), Gramineae (18), Labiatae (18), Compositae (14), Cruciferae (14), Cucurbitaceae (11), Rutaceae (10), Malvaceae (9), Alliaceae (7), and Anacardiaceae (7) (Table 11).

There are 328 Syrian folk names (Appendix 3b) and 358 English folk names (Appendix 3a).

Within-species (intraspecific) diversity is a significant measure of biodiversity.

**Table 11.** Summary of contents of the Syrian checklist for cultivated plants.

| Contents | No. of items |
|---|---|
| Taxa | 390 |
| Species | 262 |
| Genera | 146 |
| Families | 57 |
| Synonyms | 236 |
| Vernacular Syrian names | 328 |
| Vernacular English names | 358 |

## Checklist

Explanations are included under Material and Methods.

**Abelmoschus esculentus** (L.) Moench, Methodus (1794) 617. — *Hibiscus esculentus* L., Sp.

**Fig. 9.** *Abelmoschus esculentus*, bamia (syr), lady's finger, okra (en). Landrace from south Syria, Dara, 2014

Pl. (1753) 696 (Malvaceae).
Bamia (syr), lady's finger, okra (en)
Dar., Qu., Dam., Hom., Ham., Raq., De., Has.
V. (fr.)
Originated in India. Known from Egypt, previously in the 2nd millennium BCE (Hammer 1986). Okra comes in different varieties and sizes. Generally grown in Syria. Young immature fruits are an important vegetable, consumed cooked or fried. The fruits can be conserved by drying. Two types of landraces are known, one with short and thick pods "Bamia dyreah", common in N Syria (Deir alzour province), and the other one with long and slim pods. Also many new varieties of okra are cultivated today with different sizes and colours as e.g. a new variety of okra pods with a dark red pigmentation (GCSAR 2011).
GCSAR 2011, Hammer 1986

**Abelmoschus moschatus** Medik., Malvenfam. (1787) 46. — *Hibiscus abelmoschus* L., Sp. Pl. (1753) 696; *Abelmoschus sagittifolius* Merr., Lingnaam Agric. Rev. ii (1924) 40; *Hibiscus sagittifolius* Kurz, Nat. Hist. 40 (1) (1871) 46 (Malvaceae).
Hab el mesk (syr), ambrette, musk mallow, musk okra (en)
La., De.
V. (fr.), I. (s., perfume)
Originated in India. Possibly it came to Syria from Greece. In former times mostly cultivated because of the musk-like aromatic oil of the seeds (ambrette oil). Today it is uncommon, used for the production of perfumes to flavour tobacco, drinks and sweets; young fruits are eaten as vegetables. The seeds are used to flavour coffee (in Arab countries), moreover cultivated as ornamental plant for its attractive flowers in homegardens (pers. obs.).

**Acacia dealbata** (Wendl.) Link, Enum. Hort. Berol. 2 (1821–22) 445. — *Mimosa dealbata* Wendl., Bot. Beob. (1798) 57 (Leguminosae).
Akasia (syr), silver wattle (en)
Dam., Hom., Ham., Has., Al., Raq., De.
I. (ba., tanning), shade and ornamental plant.
Originated from Australia. Cultivated in warm temperate regions of the world, however on a very small scale (Hammer 1992). In Syria used as shade tree in landscaping, and as ornamental (Barkoudah 1999).
Barkoudah 1999, Hammer 1992

**Acacia farnesiana** (L.) Willd., Sp. Pl. 4 (1806) 1083. — *Mimosa farnesiana* L., Sp. Pl. (1753) 521 (Leguminosae).
Akasia (syr), sweet acacia, needle bush (en)
Dam., Hom., Ham., Has., Al., Raq., De.
hedge plant
Introduced from Central America. Came to Syria during the French mandate period (1920–1946) (Bashur 1994). It is grown on the edges of the streets in major cities in Syria (Lock and Simpson 1991).
Bashur 1994, Lock and Simpson 1991

**Acacia mellifera** (Vahl) Benth. in Hook., London J. Bot. 1 (1842) 507. — *Mimosa mellifera* Vahl, Symb. Bot. 2 (1791) 103 (Leguminosae).
Sant muasel (syr), black thorn acacia (en)
Dam., Al., La.
hedge plant
Introduced to Syria (Euro-Med 2006, Lock and Simpson 1991). Planted for wind protection and ridge stabilization. Planted around farms (protection against wild animals) and fruit orchards. The flowering tree is an excellent bee fodder and is recommended for honey production.
Euro-Med 2006, Lock and Simpson 1991

**Acacia nilotica** (L.) Delile, Ill. Fl. Aeg. (1813) 79. — *Mimosa nilotica* L., Sp. Pl. (1753) 521; *Acacia arabica* (Lam.) Willd., Sp. Pl. 4, 2 (1806) 1085, emend. Benth. in Hook., London J. Bot. 1 (1842) 500 (Leguminosae).
Sant sayal, shagaret al semgh araby (syr), gum Arabic tree (en)
Dam., Hom., Ham., Al., De.
M. (gum), living fences
Native in Syria (Lock and Simpson 1991). Cultivated for production of the brown gum, drained from cuts in the bark. It is used as raw material for chewing gum, sweets and food industry, food additive, and as a cosmetic (Wahbe 1997).
Lock and Simpson 1991, Wahbe 1997

**Achillea millefolium** L., Sp. Pl. (1753) 899, s.l. (Compositae).
Khaysoom alphy (syr), common yarrow (en)
Ham., Has., Raq., De.
M. (fl., h.), Fo.
Native to temperate regions of the Northern Hemisphere. Extensively used; classically collected from the wild but recently also cultivated as a medicinal plant. Additionally it can be planted to stop erosion due to its drought resistance (Barkoudah 1999) and as a forage plant (Masri 2006).
Barkoudah 1999, Masri 2006

**Actinidia deliciosa** (A. Chev.) C. F. Liang et A. R. Ferguson, Guihaia 4, 3 (1984) 181, New Zealand Fruit and Produce J. (1985) 26, 28, 30. — *Actinidia chinensis* J. E. Planch. in Hook., London J. Bot. 6 (1847) 303 in adnot.; *Actinidia chinensis* J. E. Planch. var. *deliciosa* A. Chev., Rev. Bot. appl. Agric. trop. 21 (1941) 241 (Actinidiaceae).
Kiwi (syr), kiwi fruit (en)
Tar., La.
Fr.
Originated in China. Cultivated in the Mediterranean. The kiwi tree has been introduced to Syria during the last two decades. The fruits contain a high amount of vitamin C. They are consumed fresh or processed with ice cream and soft drinks. Currently it is an essential crop in the Syrian Coastal cities and several cultivars are grown (GCSAR s.a.). Three accessions entered in the field gene banks (GCSAR s.a.).
GCSAR s.a.

**Aegilops geniculata** Roth, Bot. Abh. Beob. (1787) 45 (Gramineae).
Hasheshet al maeze, shaer eblees (syr), ovate goatgrass (en)
Dar., Sw.
Fo.
It is native to the Mediterranean and W Asia, including Syria. In Syria it is cultivated and protected in open fields to stop overgrazing pastures (Henedy 2013).
Henedy 2013

**Agaricus bisporus** (Lge.) Imbach., Mitt. naturf. Ges. Luzern 15 (1946). — *Psalliota hortensis* (Cooke) J. Lange, Fl. Ag. Danica 4 (1939) 58 (Agaricaceae).
Feter (syr), cultivated mushroom, button mushroom, common mushroom, white mushroom, table mushroom, champignon mushroom (en)
Qu., Dam., La., Al., De.
V.
Probably native to the temperate and southern regions of Europe. Nowadays often and in many countries escaped and naturalized. The edible mushroom can be found as wild in *Pinus brutia* Tenore and *P. halepensis* Miller forests in Syria (Cavalcaselle 1999). The mushroom is cultivated in Syria as new crop (Elias 2008). *Agaricus bisporus* is one of the most common mushrooms in the world; it is the most commonly grown mushroom in Syria for culinary consumption, cultivated on manure or artificial media (GCSAR 2011).
Cavalcaselle 1999, Elias 2008, FAO 1999, GCSAR 2011

**Agropyron junceum** (L.) P. Beauv., Ess. Agrost. 146 (1812) 180. — *Agropyron farctum* (Viv.) Rothm., Feddes Rep. 52 (1943) 271 (Gramineae).
Safun, syfun (syr), sand couch, sea wheatgrass (en)
Tar., La.
Fo., I. (l.)
Native in Syria. Widely distributed in sandy soils at the seashore of Tartous and Latakia. Tolerates soil salinity. Seeds can be ground into flour and used to make bread. Leaves are used for making mats, ropes, paper etc. Often planted near the coast to stabilize sand banks. Also used as a source of salt tolerance genes in wheat breeding (Al-Oudat and Qadir 2011).
Al-Oudat and Qadir 2011

**Agropyron libanoticum** Hack. ex Kneuck., Allg. Bot. Z. Syst. (1904) 21 (Gramineae).
Alrazeen (syr), crest wheat (en)
Dar., Ham., Der., Has.
Fo.
Native in the desert area of Syria (Mouterde 1966), good fodder grass. Normally occurring wild, but also experimentally cultivated to rehabilitate damaged pastoral areas (Masri 2006).
Masri 2006, Mouterde 1966

**Alcea rosea** L., Sp. Pl. (1753) 687. — *Althaea rosea* (L.) Cav., Diss. 2 (1790) 91 (Malvaceae).
Al-khatmia (syr), garden hollyhock (en)
Dar., Dam., Hom., La., Al., Der.

M. (fl.)
Native in Syria. Cultivated typically in homegardens (Husain and Kasim 1975). In folk medicine (Barkoudah 1999), the liquid of the plant is used to treat injuries, burns, coughs and inflammation. Flower buds are also used medicinally (Wahbe 1997). The plant flowers from April till June; flower buds are edible, cooked and raw (Wahbe 1997).
Barkoudah 1999, Greuter et al. 1989, Husain and Kasim 1975, Wahbe 1997

**Allium ampeloprasum** L., Sp. Pl. (1753) 294 (Alliaceae).
Thom al feel (syr), wild leek (en)
La., Al., Has.
V. (bu.)
Originated in Asia Minor. Native in Syria (Kew 2010). Probably already used in old Syrian times, both wild and cultivated. Today a very rare crop (GCSAR 2011).
GCSAR 2011, Kew 2010

**Allium cepa** L., Sp. Pl. (1753) 300, var. **aggregatum** G. Don, Monogr. Allium (1827) 27. — *Allium ascalonicum* L., Amoen. Acad. 4 (1759) 454, Sp. Pl. ed. 2 (1762) 429, p. p., exl. pl. spont. Palaest., non L. s. str.*; Allium cepa* L., Sp. Pl. (1753) 300, var. *ascalonicum* (L.) Backer, Bekn. Fl. Java Afl. 11 (1951) Amaryll. 5 (Alliaceae).
Kurat andalusy (syr), shallot, potato onion (en)
V. (bu., l.)
Formerly more common in Syria. Grown mainly in homegardens and mostly propagated vegetatively. The bulbs are smaller than those of common onions. Many landraces are still in cultivation (GCSAR 2011).
GCSAR 2011

**Allium cepa** L., Sp. Pl. (1753) 300, var. **cepa** (Alliaceae).
Bassal (syr), onion (en)
Dar., Qu., Dam., Ham., Hom., Al., De.
V. (bu., I.), M. (bu.)
Used as a vegetable. Furthermost widely cultivated crop of the genus *Allium*. The onion plant is unknown in the wild; it has been grown and selectively produced in cultivation for at least 7,000 years. Common onions are normally available in three colour varieties: yellow, brown and red; a new variety is purple onion. In Syria a cultivar exists with purplish red skin and white flesh collared with red. These onions tend to be medium to large in size, have a mild to sweet flavour; it is a new variety in Syria (GCSAR 2011). They are often consumed raw, grilled or lightly cooked with other foods, or added as colour to salads or dried. They tend to lose their redness when cooked. They can be stored from three to four months at room temperature. A landrace with good quality is "Bassal salamouny", a white onion cultivated around and in Hama province. Formerly onion was also used as traditional remedial plant (Wahbe 1997).
GCSAR 2011, Wahbe 1997

**Allium kurrat** Schweinf. ex K. Krause, Notizbl. Bot. Gart. Berlin 9, no. 87 (1926) 524. — *A. porrum* auct. mult. aegypt. non L. (1753). — *Allium porrum* var. *kurrat* (Schweinf. ex K. Krause) Seregin, Novosti Sist. Vyssh. Rast. 36 (2004) 102 (Alliaceae).
Kurrat (syr), kurrat, salad leek (en)
Dar., Qu., Dam., Hom., Ham., Al., De.
V. (f., l., r.)
Originated in Asia Minor. Wild in S and N Syria (Kew 2010). Cultivated in Syria mainly in homegardens (GCSAR 2011). A plant with flat overlapping leaves forming an elongated cylindrical bulb that together with the leaf bases is eaten as a vegetable. Bulb and leaves are eaten raw or cooked, used as flavouring in cooked dishes. The whole plant can be cooked and used like *A. porrum*; raw flowers are used as a dressing on salads.
GCSAR 2011, Kew 2010

**Allium porrum** L., Sp. Pl. (1753) 295. — *Allium ampeloprasum* L. var. *porrum* (L.) J. Gay, Ann. Sc. nat. bot. ser. 3, 8 (1847) 218 (Alliaceae).
Kurrat (syr), leek (en)
Dam., Hom., Ham.
V. (bu., l.)
Possibly originated in the E Mediterranean from *Allium ampeloprasum* L. Not grown widely in Syria but more commonly in homegardens. The edible parts, the stem and the basal parts of the leaves, are generally used as vegetables, cooked but likewise used fresh or pickled for salads or spice. New varieties are used (GCSAR 2011).
GCSAR 2011

**Allium sativum** L., Sp. Pl. (1753) 296 (Alliaceae).
Thoom (syr), garlic (en)
Dar., Dam., Hom., Dam., Ham., Al., Has., De.
Sp. (bu.), V. (bu.)
Garlic is native to W Central Asia; with a history of human use of over 7,000 years it was an important crop in Roman era and has long been dominant in the Mediterranean region. Many landraces are grown in Syria such as “Balady”, “Yabriudy” and “Salamouny”, but also modern cultivars are used like “Chinese” garlic with large cloves (GCSAR 2011).
GCSAR 2011

**Allium scorodoprasum** L., Sp. Pl. (1753) 297 (Alliaceae).
V. (bu.)
Kurrat al remal (syr), sand leek (en)
Native in Syria. It is edible but rarely cultivated in Syria (Kew 2010), sometimes cultivated in homegardens (pers. obs.).
Kew 2010

**Aloe vera** (L.) N. L. Burm., Fl. indica (1768) 83. — *Aloe barbadensis* Mill., Gard. Dict. ed. 8 (1768) no. 2; *Aloe vulgaris* Lam., Encycl. 1 (1783) 86; *Aloe perfoliata* L. var. *vera* L., Sp. Pl. (1753) 320 (Liliaceae).
Sabber (syr), aloe vera (en)

Dam., La.
M. (l.), cosmetics (l., juice), hedges
Cultivated since ancient times. The Arabs introduced it to many areas. Cultivated in homegardens as medicinal plant and for its interesting flowers (Barkoudah 1999).
Barkoudah 1999

**Althaea officinalis** L., Sp. Pl. (1753) 686 (Malvaceae).
Al khobyz (syr), marsh mallow (en)
Dam., Dar., Hom., Ham., Al., De., Has., Raq.
M. (r.), V. (l.)
Wild and cultivated as leaf vegetable, used as medicinal plant. Mallow was an edible vegetable among the Romans; a dish of marsh mallow was one of their delicacies. Many of the poorer inhabitants of Syria subsist for weeks on herbs, of which marsh mallow is one of the most common. When boiled first and fried with onions and butter, the roots are said to form a palatable dish, and in times of scarcity consequent upon the failure of the crops, this plant, which fortunately grows there in great abundance, is collected heavily as a foodstuff (pers. obs.). The root extract (halawa extract) is sometimes used as flavouring in the making of a Middle Eastern snack called halva. The roots are used as medicine (Wahbe 1997). There are indications of genetic erosion for its diversity.
Wahbe 1997

**Amaranthus lividus** L., Sp. Pl. (1753) 332. — *Amaranthus oleraceus* L., Sp. Pl. ed. 2 (1763) 1403; *Amaranthus blitum* L. (1753), l.c. 990 (Amaranthaceae).
Khateefa, salef al arous (syr), purple amaranth, African spinach (en)
V. (l.), M.
Wild and cultivated in homegardens as new vegetable (Barkoudah 1999).
Barkoudah 1999

**Amaranthus retroflexus** L., Sp. Pl. (1753) 991 (Amaranthaceae).
Salef al aroos (syr), red-root amaranth (en)
V. (h.), O. (fl.)
This plant is eaten as a vegetable in different places of the world, but in Syria it is used only in homegardens as ornamental plant. Wild and formerly cultivated (Wahbe 1997).
Wahbe 1997

**Ammi visnaga** (L.) Lam., Fl. franc. 3 (1778) 462. — *Daucus visnaga* L., Sp. Pl. (1753) 242 (Umbelliferae).
Al khella balady (syr), tooth-pick weeds (en)
Dam., Hom.
M. (fr.)
Distributed as wild in Syria (Barkoudah 1999), but also cultivated as a medicinal plant. Preparations from the fruits have been applied in folk medicine since ancient times (Wahbe 1997). Thickened rays of the umbellum have been used as toothpicks (Meswak).
Barkoudah 1999, Wahbe 1997

**Ammophila arenaria** (L.) Link, Hort. Berol. (1827) 105. — *Ammophila arundinacea* Host, Ic. Descr. Gram. Austr. 4 (1809) 24 (Gramineae).
Qasab el-remaal (syr), marram grass (en)
La., Tar.
sandy soil erosion control
Native in Syria. Widely distributed in sandy soils at the seashore. Tolerates sea-shore conditions, and (by effect) salt spray and sea exposure. Recently cultivated in experiments, against sandy soil erosion (Al-Oudat and Qadir 2011).
Al-Oudat and Qadir 2011

**Anethum graveolens** L., Sp. Pl. (1753) 263 (Umbelliferae).
Shabat (syr), dill (en)
Dar., Qu., Dam., Hom.
Sp. (h., s.), M. (h., s.)
True native area uncertain. Widely escaped from cultivation or naturalized as a weed, especially in the Mediterranean. Cultivated as a spice plant for the herb, fruits and essential oil of the fruits worldwide, mainly in temperate and subtropical areas. The leaves or the whole plants with immature fruits (dill seed) are used fresh or dehydrated for flavouring pickled vegetables and added to soups, sauces, cheese, herb butter and various fish, meat and egg dishes (Barkoudah 1999). The fruits are also used medicinally (stomachic, carminative).
Barkoudah 1999

**Anthemis chia** L., Sp. Pl. (1753) 894 (Compositae).
Babonej (syr), chamomile (en)
Qu. (Golan Heights)
M. (fl.)
In the Mediterranean woodlands and shrublands, it is found as wild plant (Barkoudah 1999), but also cultivated in homegardens (Husain and Kasim 1975).
Barkoudah 1999, Husain and Kasim 1975

**Anthemis tinctoria** L., Sp. Pl. (1753) 867 (Compositae).
Babonej asffar (syr), yellow chamomile, dyers chamomile (en)
Qu. (Golan Heights), Sw., Dar.
M. (fl.)
Formerly cultivated as a dye plant; the flowers were also used as herbal medicine. Presently cultivated in Syria as medicinal plant (Wahbe 1997). Also grown as an ornamental (Husain and Kasim 1957).
Husain and Kasim 1975, Wahbe 1997

**Apium graveolens** L., Sp. Pl. (1753) 264 (Umbelliferae).
krafs (syr), celery (en)
V. (l., r.)
Natural in Syria (Barkoudah 1999). Cultivated worldwide as an important vegetable. Celery is used around the world as a vegetable for the crisp petiole (leaf stalk). The leaves are strongly

flavoured and are less useful, either as a flavouring in soups and stews or as a dried herb (GCSAR 2011).
Barkoudah 1999, GCSAR 2011

**Arachis hypogaea** L., Sp. Pl. (1753) 741. — *Arachnida hypogaea* (L.) Moench, Methodus (1794) 122 (Leguminosae).
Fostock abeed, fool soudany (syr), peanut, groundnut (en)
Hom., Tar., La., Raq.
N.
Introduced probably from Brazil. An allotetraploid crop species, not known in the wild and cultivated in many tropical and subtropical countries. In Syria it was first planted in the area of Banias in 1922, and then in Tartous, Jableh and Homs. Used in recipes or as roasted salted peanuts. Two landraces have been cultivated formerly: "Turkish" with large fruits containing two grains, and "Balady" with fruits smaller than in "Turkish". Many new varieties are used today such as "Soury", "Assi", and "Sahel" (GCSAR 2011).
GCSAR 2011

**Arbutus andrachne** L., Syst. Nat., ed. 10 (1759) 1024. — *Arbutus integrifolia* Salisb., Prodr. (1796) 288 (Ericaceae).
Katlab, katel abeeh (syr), Greek strawberry tree (en)
Dam., La., Tar.
Fr.
Native in Syria (Greuter 1986, Valdés 2009). Occasionally cultivated for its edible fruits in old homegardens.
Greuter 1986, Valdés 2009

**Arbutus unedo** L., Sp. Pl. (1753) 395. — *Arbutus serratifolia* Salisb., Prodr. Stirp. (1796) 288 (Ericaceae).
Shajaret al deb, moshmosh bary, katlab, katel abeeh (syr), strawberry tree (en)
Dam., La., Tar., Id., Al.
Fr., M. (l., bark)
Native in Syria (Greuter et al. 1986). Occasionally planted as fruit tree and ornamental in homegardens. The fruits are sweet, but not very aromatic; fruits are eaten raw or made into jam. Leaves and bark are used in leather tanning and as medicine for their high tannin content.
Greuter et al. 1986

**Artemisia absinthium** L., Sp. Pl. (1753) 848 (Compositae).
Sheeh (syr), warmot (en)
Dar., Qu., Dam.
Sp. (l.), M. (h.)
Native in Syria (Barkoudah 1999). Collected from the wild, newly cultivated in homegardens, used as spice. From old time the herbage is used in folk medicine (Wahbe 1997).
Barkoudah 1999, Wahbe 1997

**Artemisia arborescens** L., Sp. Pl. ed. 2 (1763) 1188 (Compositae).
Sheeh moshajar (syr), great mugwort, tree wormwood, old man (en)
Sp. (l.), M. (h.)
Native in Syria (Greuter 2006). Cultivated in homegardens. The young aromatic leaves and shoots are sometimes used for flavouring cakes and other culinary preparations. The plant is of minor importance as food, but is more common as an ornamental.
Greuter 2006

**Artemisia dracunculus** L., Sp. Pl. (1753) 849 (Compositae).
Tarkhun, sheeh, shajaret maryam (syr), tarragon, French tarragon, dragon sagewort (en)
Dam., Dar., Qu., Ham., Al., De.
V. (h.), Sp. (l.), M. (h.)
Native in Syria (Zeven and Zhukovsky 1975). It is cultivated in homegardens (Barkoudah 1999); the leaves are used as an aromatic culinary herb (Wahbe 1997).
Barkoudah 1999, Wahbe 1997, Zeven and Zhukovsky 1975

**Arundo donax** L., Sp. Pl. (1753) 81 (Gramineae).
Al-zall, kosyb (syr), Giant reeds, Spanish cane (en)
Dar., Qu., La., Tar., De.
M. (h.), hedges, musical instruments (st.)
Native in Syria. Great variability among different populations (Barkoudah 1999). Recently plants are grown alongside irrigation canals to prevent soil erosion, and as halophyte species. It is the best source material for basket production, for wickers-work, mats, fishing rods, as windbreak hedges in rural areas and along roads. Unbroken reed is used for walking sticks and musical instruments (e.g. Nay flute). Also ornamental and medicinal plant (Al-Oudat and Qadir 2011).
Al-Oudat and Qadir 2011, Barkoudah 1999

**Asparagus officinalis** L., Sp. Pl. (1753) 313 (Liliaceae).
Halluon (syr), asparagus (en)
V. (young sprouts)
In Syria a new crop for high-level restaurants and hotels. But wild plants are found from olden times (Barkoudah 1999). The young sprouts are eaten blanched or unblanched as vegetable. The herb, rhizomes and seeds are used as a tonic, antifebrile, anti-rheumatic and diuretic medicine (Wahbe 1997).
Barkoudah 1999, Wahbe 1997

**Atriplex halimus** L., Sp. Pl. (1753) 1052 (Chenopodiaceae).
Raghel melhy (syr), shrubby orache (en)
Dar., La., Albadia (N Syria)
Fo., M., wind break
Fodder plant, wild and cultivated in N Syria in trials against desertification, as wind break, and for soil stabilization (Oweis and Hachum 2003). Excellent natural nutritional supplement, rich in vitamins C, A and D, and minerals such as boron and chromium which are known to

play a role in appetite control. May prove useful in the treatment of type 2 diabetes due to its chromium content (Al-Oudat and Qadir 2011).
Al-Oudat and Qadir 2011, Oweis and Hachum 2003

**Beta vulgaris** L., Sp. Pl. (1753) 222, var. **altissima** Doell, Rhein. Fl. (1834) 239, sub subsp. *rapacea* (Koch) Doell. — *Beta vulgaris* L. var. *saccharifera* Alef., Landw. Fl. (1866) 281 (Chenopodiaceae).
Shawander (syr), sugar beets (en)
Hom., Ham., Al., Raq., De.
I. (sugar)
Cultivated for the tubers (Hammer 1986). Sugar beet is a relatively new crop in Syria; it is produced on some 2.3 percent of Syria's irrigated land. It is becoming one of the strategic crops in Syria (GCSAR 2009).
GCSAR 2009, Hammer 1986

**Beta vulgaris** L., Sp. Pl. (1753) 222, var. **cicla** L. s.l., Sp. Pl. (1753) 222. — *Beta cicla* L., Syst. ed. 12 (1767) 195; *Beta vulgaris* L. convar. *cicla* (L.) Alef., Landw. Fl. (1866) 718 (Chenopodiaceae).
Silq (syr), spinach beet, ordinary beet, chard (en)
Dam., Hom., Ham., Al., Raq., De.
V. (l.)
Cultivated as a vegetable. (GCSAR 2009).
GCSAR 2009

**Beta vulgaris** L., Sp. Pl. (1753) 222, var. **rapacea** Koch, Syn. (1837) 606, s. str. — *Beta vulgaris* L. var. *rapa* Dum. in Hegi, Ill. Fl. Mitt. Eur. 3 (1912) 215, excl. f. *rubra*; *Beta vulgaris* L. var. *crassa* (Alef.) Wittm., Bot. Kult. techn. ed. 5 (1924) 65 (Chenopodiaceae).
Shawander (syr), fodder beets, garden beets (en)
Dam., Hom., Ham., Al., Raq., De.
Fo. (r.)
Beet races with thickened roots are known from the Arabic horticulture in Spain (Hammer 1986); used for food and as fodder (GCSAR 2009).
GCSAR 2009, Hammer 1986

**Beta vulgaris** L., Sp. Pl. (1753) 222, var. **vulgaris**. — *Beta vulgaris* Miller, Gard. Dict. ed. 8, 1 (1768) no. 3; *Beta italica* A. Kerner, Verh. Zool.-Bot. Ges. Wien 5 (1855) 819; *Beta vulgaris* L. var. *conditiva* Alef., Landw. Fl. (1866) 279 (Chenopodiaceae).
Shawander, banger (syr), table beet, garden beets (en)
Dar., Sw., Dam., Hom., Ham., Al., De., Raq.
V. (r.)
Cultivated for the tubers and the leaves. The wild ancestor is found in Syria (Barkoudah 1999). The roots are most commonly deep red-purple in colour; varieties with golden yellow and red-and-white striped roots are less common (GCSAR 2009). The usually deep purple roots of beetroot are eaten grilled, boiled, or roasted as a vegetable, cold as a salad after

cooking, furthermore used for colouring and as food additives. A large proportion of the commercial production is processed into boiled and sterilised beets or into pickles.
Barkoudah 1999, GCSAR 2009

**Brassica napus** L., Sp. Pl. (1753) 666, emend. Metzg., Syst. Beschr. Kohlart. (1833) 39 subsp. **napus** — *Brassica napus* L., Sp. pl. (1753) 666, s. str; *Brassica napus* L., Sp. Pl. (1753) 666 s. str., var. *oleifera* (Moench) Delile, Mem. Bot. Descr. Egypte 4 (1813) 19; *Brassica rapa* L. subsp. *napus* (L.) Schuebl. et Mart., Fl. wuertbg. (1834) 438; *Brassica campestris* L. var. *napus* (L.) Babingt., Man. Brit. Bot. ed. 8 (1881) 31 (Cruciferae).
Left zayte, raps (syr), rapeseed (en)
Dam., Al.
Oi. (s.)
Originated in N Africa. *Brassica napus* is cultivated mainly for its oil-rich seed; the third largest source of vegetable oil in the world, but in Syria it is not an important crop because people preferably consume olive oil (GCSAR 2011). Formerly also a rare root crop (pers. obs.).
GCSAR 2011

**Brassica nigra** (L.) Koch in Roehling, Deutsch. Fl. ed. 3, 4 (1833) 713. — *Sinapis nigra* L., Sp. Pl. (1753) 668 (Cruciferae).
khardal aswad (syr), black mustard (en)
Dar., Al.
Sp. (s.)
Domesticated in the Mediterranean. Wild in Syria (Barkoudah 1999). Black mustard is commonly found in neglected gardens, on roadsides, in abandoned fields, and in areas where waste is disposed of. Probably formerly cultivated. The eastern Group of the species, *B. nigra* subsp. *hispida* (Schulz) Gladis is cultivated in Syria, Israel, Thessalia and Asia Minor (Hanelt and IPK 2001).
Barkoudah 1999, Hanelt and IPK 2001

**Brassica oleracea** L., Sp. Pl. (1753) 667 (Cruciferae).
Cultivated and wild taxa of the *B. oleracea* group belong to this species. Economically most important types of *B. oleracea* are cabbage, cauliflower and broccoli. The centre of origin of the cultivated taxa of *B. oleracea* has to be placed in the Mediterranean. Many landraces are cultivated but new varieties are also used (GCSAR 2011).
GCSAR 2011

**Brassica oleracea** L., Sp. Pl. (1753) 667, var. **botrytis** L., Sp. Pl. (1753) 667 (Cruciferae).
Zahraa, karnabeet (syr), cauliflower (en)
Dar., Qu., Dam., Ham., Hom., Al.
V. (fl.)
In cauliflower, white is the most common colour in Syria. It is an annual plant that reproduces by seed. Typically, only the head (the white curd) is eaten (GCSAR 2011). The first reliable reference to cauliflower is found in the writings of the Arab Muslim scientists Ibn al-Awwam and Ibn al-Baitar, in the 12$^{th}$ and 13$^{th}$ centuries (Filaha project).

**Brassica oleracea** L., Sp. Pl. (1753) 667, var. **capitata** L., Sp. Pl. (1753) 667 (Cruciferae).
Malfouf (syr), cabbage (en)
Dar., Dam., Hom., Ham.
V. (l.)
Old crop in Syria, used for salad, cooked and pickled. Many land-aces are cultivated such as "Malfouf Balady" with white and soft leaves. New varieties are being imported by different companies (GCSAR 2011).
GCSAR 2011

**Brassica oleracea** L., Sp. Pl. (1753) 667, var. **gongylodes** L., Sp. Pl. (1753) 667. — *Brassica oleracea* L. var. *caulorapa* DC., Syst. 2 (1821) 586; *Brassica caulorapa* (DC.) Pasquale, Cat. Ort. Bot. Nap. (1867) 17 (Cruciferae).
Krenb (syr), kohlrabi (en)
Dam., Qu., Hom., Ham.
V. (swollen stem, l.)
Rarely cultivated in Syria. The stem tuber is used as vegetable, fresh or cooked. New cultivars are introduced by different seeds companies (GCSAR 2011).
GCSAR 2011

**Brassica rapa** L., Sp. Pl. (1753) 666, emend. Metzg., Syst. Beschr. Kohlart. (1833) 48, subsp. **rapa**. — *Brassica rapa* L., Sp. Pl. (1753) 666, s. str.; *Brassica rapa* L. subsp. *rapifera* Metzg., Syst. Beschreib. Kohlart. (1833) 52; *Brassica campestris* L. var. *rapa* (L.) Hartm., Handb. Skand. Fl. ed. 6 (1854) 110 (Cruciferae).
Left (syr), turnip, white turnip (en)
Dar., Dam., Hom., Ham., Al.
V. (r.), Fo.
The subsp. *rapa* has a wide range of variation. Nowadays it is cultivated nearly all over the world and has also been introduced to tropical countries, where it is grown at higher altitudes. The turnip is a root vegetable commonly grown for its white, bulbous taproot. Small, tender varieties are grown for human consumption, while larger varieties are grown as feed for livestock. Cultivated in Syria in fields (GCSAR 2011). It is also typically a homegarden crop for fresh consumption and for pickles locally named Mkhalal, tourshy.
GCSAR 2011

**Brassica rapa** L., Sp. Pl. (1753) 666, emend. Metzg., Syst. Beschr. Kohlart. (1833) 48, subsp. **pekinensis** (Lour.) Hanelt, Mansf. Verz. (1986) 304. — *Sinapis pekinensis* Lour., Fl. cochinch. (1790) 400; *Brassica chinensis* L. var. *pekinensis* (Lour.) Sun, Bull. Torrey Bot. Club 73 (1946) 374 (Cruciferae).
V. (l.)
New crop in Syria (GCSAR 2011). Used as vegetable only in homegardens.
GCSAR 2011

**Cannabis sativa** L., Sp. Pl. (1753) 1027 (Cannabidaceae).
Kenab hendy, konboz seed (syr), common hemp (en)
Fi. (st.), Oi. (s.), Fo. (s.)
Native of Central Asia. The selection for fibres, oilseed, and painkiller resin under different conditions has created large variation in *Cannabis*. The seeds contain a drying oil, used for paints, varnishes and the manufacture of soap. They are also employed as bird and poultry feed and consumed by man (Barkoudah 1999). The stems produce bast-fibres. Formerly hemp was cultivated, but its cultivation is not allowed in Syria today, with the exception of medicinal use. Not cultivated commercially.
Barkoudah 1999

**Capparis sicula** Duham., Arbr. 1 (1768) 159. — *Capparis ovata* Desf., Fl. Atlant. 1 (1798) 404 (Capparaceae).
kabbar (syr), caper plant (en)
Dar., Sw., Qu., Al., La., Id., De., Has.
Sp. (fl., buds), M. (r.)
Cultivated in the Mediterranean countries, very rare in trials in Syria to increase the farmer income in poor areas (FAO 2002). Usually the flower buds are pickled. The bark of the root was used medicinally in classical times (Barkoudah 1999).
Barkoudah 1999, FAO 2002

**Capparis spinosa** L., Sp. Pl. (1753) 503 (Capparaceae).
kabbar, shaffalah, lassaf (syr), common caper-bush (en)
Dar., Sw., Qu., Id., Al., La., De., Has.
Sp. (fl., buds), M. (ba.)
Native in the Mediterranean. Can be found growing wild everywhere in Syria around dry and rocky areas, at roadsides and on old walls (Barkoudah 1999). In Syria cultivated only on an experimental level in research nurseries. The caper bush requires a semiarid or arid climate. Salt-tolerant plant. It was used medicinally in classical times, mostly for treating muscular and joint pains (FAO 2002). Consideration should be given to local cultivation (Al-Oudat and Qadir 2011). Recently cultivated in homegardens.
Al-Oudat and Qadir 2011, Barkoudah 1999, FAO 2002

**Capsicum annuum** L., Sp. Pl. (1753) 188 (Solanaceae).
Flyfleh hamra (syr), red pepper (en)
Dar., Dam., Qu., Ham., Hom., Al., Id., De.
V. (fr.), Sp. (fr.)
This is the most widely spread and highly cultivated of all the *Capsicum* species; probably first domesticated in Mexico. Also cultivated in Syria, many landraces as "Flyfleh balady", "Aleppo flyfleh", but new cultivars increasingly displace the landraces (GCSAR 2011).
GCSAR 2011

**Capsicum frutescens** L., Sp. Pl. (1753) 189 (Solanaceae).
Flyfleh shagarea (syr), chili pepper (en)
Dar., Dam., Al.

V. (fr.), Sp. (fr.)
Recently cultivated in Syria with small and very hot fruits (GCSAR 2011), generally cultivated in homegardens (pers. obs.).
GCSAR 2011

**Cardaria draba** Desv., J. Bot. Agric. 3 (1815) 163 (Cruciferae).
Alqnneberh (syr), lepidium draba, whitetop, hoary cress (en)
V. (h.), M. (h.)
Distributed in the Mediterranean. In ancient time it was cultivated as a salad plant and as a spice. The leaves, shoots, and fruits of this plant are all edible. It is wild in Syria, but recently cultivated as medicinal plant (Barkoudah 1999).
Barkoudah 1999

**Carthamus tinctorius** L., Sp. Pl. (1753) 830 (Compositae).
Ossfor (syr), safflower (en)
Dam., Dar., Qu., Ham., La., Id., Al., De.
Oi. (s.), I. (fl., dye)
Safflower is one of humanity's oldest crops. Originated in the Near East and Central Asia. Not known in the wild. Used as a dye and oil plant since ancient times (Barkoudah 1999). It is used, moreover, as a food colorant. Some landraces are still used such as "Syrian Hama" (GCSAR 2011).
Barkoudah 1999, GCSAR 2011

**Carum carvi** L., Sp. Pl. (1753) 263 (Umbelliferae).
Caraway (syr), caraway, Persian cumin (en)
Dam., Al.
Sp. (fr.), M. (fr.)
Wild and cultivated in Syria (Barkoudah 1999) as a spice and medicinal plant for its fruits in many regions (Wahbe 1997). Syria is among the major producers worldwide (Hanelt and IPK 2001). In Damascus it is used as a sweet with nuts to celebrate the birth of a child.
Barkoudah 1999, Hanelt and IPK 2001, Wahbe 1997

**Carya illinoinensis** (Wangenh.) K. Koch, Dendrologie 1 (1869) 593 (Juglandaceae).
Jooz al bekan (syr), pecan (en)
Dar., Qu., Sw., Dam., Hom., Ham., La., De.
N.
Cultivated in Syria as new tree crop from N America (Nabulsi 2004). Nuts are very tasty, used in ice-creams, pastries etc., and the protein-rich seed cake is used in sweets.
Nabulsi 2004

**Castanea sativa** Mill., Gard. Dict. ed. 8 (1768) no. 1. — *Fagus castanea* L., Sp. Pl. (1753) 997 (Fagaceae).
Kastanna holwa (syr), chestnut, sweet chestnut (en)
Sw., Hom., Ham., Id.
N., M. (fr.)

Distributed wild in the Mediterranean (Karzoun 1996) and frequently cultivated as fruit tree there. Cultivated in Syria since the French mandate (1920–1946). The nuts are popular foods, they are eaten roasted. Sometimes planted for erosion control as bee fodder plant and as park tree (GCSAR s.a.).
GCSAR s.a., Karzoun 1996

**Celtis australis** L., Sp. Pl. (1753) 1043. — *Celtis excelsa* Salisb., Prodr. (1796) 175 (Ulmaceae).
Almeas, sidrat al muntaha, Loote tree (syr), Mediterranean hackberry, honeyberry (en).
Sw., La., Al., Id., De.
M. (fr.), shade tree
Occurs wild in Syria (Hanelt and IPK 2001). It is often planted as a long-living ornamental, resistant to air pollution and also as shade tree, it can tolerate drought but not shade. The Mediterranean climate is especially suitable for the plant. The fruit is sweet and can be eaten raw or cooked. The leaves and fruits are astringent, lenitive and stomachic (GCSAR s.a.). Wild in Syria (Barkoudah 1999), but it is recently planted as medicinal plant and for reforestation or in homegardens for making tea from the sweet fruits.
Barkoudah 1999, GCSAR s.a., Hanelt and IPK 2001

**Celtis tournefortii** Lam. Encycl. 4 (1797) 138 (Ulmaceae).
Almeas al sharky (syr), oriental hackberry (en)
De., La.
Fr., shade
Common in Syria. Normally it is found growing wild (Barkoudah 1999), but for reforestation now cultivated.
Barkoudah 1999

**Ceratonia siliqua** L., Sp. Pl. (1753) 1026 (Leguminosae).
Kharub (syr), Carob tree, St. John's bread (en)
La., Al., De., Has.
Fo. (fr.), St. (fr.), M. (s.)
The area of origin is possibly the E Mediterranean region or the Arabian Peninsula. At present frequently cultivated in the tropics and subtropics. It is a dryland crop, friendly to the environment. In Syria it is found in the wild, but also cultivated for its ripe fruit, or as shade tree (Barkoudah 1999). The seeds are used for medicinal and cosmetic purposes (Wahbe 1997).
Barkoudah 1999, Wahbe 1997

**Fig. 10.** *Ceratonia siliqua*, kharub (syr), Carob tree, St. John's bread (en). Very old tree (khalamoon, ean al teeny) near Damascus,

**Chenopodium album** L., Sp. Pl. (1753) 219 (Chenopodiaceae).

Rejel el-batta, al-sarmak (syr), fat hen, white goose foot (en)
V., M.
Native in Syria. Widely distributed in fields, gardens, and waste areas (Barkoudah 1999). Salt-tolerant, distributed at seashore. Formerly cultivated for making a kind of bread because of its highly nutritious seeds. High vitamin C content, used for salads; also used in medicine (Al-Oudat and Qadir 2011).
Al-Oudat and Qadir 2011, Barkoudah 1999

**Cicer arietinum** L., Sp. Pl. (1753) 738 (Leguminosae).
Hummus (syr), chickpea (en)
Dar., Qu., Dam., Ham., Al., Id., De., Has.
Pu.
Domesticated in the Near East. Chickpea is one of the pulse crops domesticated in the Old

**Fig. 11.** *Cicer arietinum*, hummus (syr), chickpea (en). Landraces from south Syria, Dara, 2014

World ca. 7,000 years ago. Most probably, it has originated in an area of SE Turkey and Syria. Three wild annual *Cicer* species, *C. bijugum* Rech. f., *C. echinospermum* P. H. Davis, and *C. reticulatum* Ladiz., are closely related to chickpea. Chickpea is the third most important pulse of the world. Mostly landraces are used such as "Ghab 4", "Ghab 3" (GCSAR 2009). Chickpea is a good resource for protein, used in many traditional dishes, as a snack (kodama) made from roasted chickpeas, and as vegetable (young sprouts), common and popular in Syria (pers. obs.).
GCSAR 2009

**Cichorium endivia** L., Sp. Pl. (1753) 813 (Compositae).
Hendeba (syr), shikoria, winter endive (en)
Dar., Dam., Qu., Hom., Ham.
V. (l.), Fo. (l.)

This species is newly cultivated (Post 1896) as vegetable in Syria, for its leaves (Barkoudah 1999). Plants are grown from seed, usually eaten raw as salad or cooked. Leaves are used blanched as a fresh salad or unblanched as a cooked vegetable (FAO 2007).
Barkoudah 1999, FAO 2007, Post 1896

**Cichorium intybus** L., Sp. Pl. (1753) 813 (Compositae).
Hendeba (syr), wild endive, common chicory (en)
Dar., Dam., Qu., Hom., Ham.
V. (l.), Fo. (l), M. (r.)
Native in Syria (Post 1896). Chicory is wild and cultivated in Syria (Barkoudah 1999). In the Mediterranean region and SW Asia certain types of the plant are grown as salad plants and for greens. The root contains inulin, vitamins A and C, chicoric acid, esculitin, and other bitter compounds. It has also medicinal properties and is a source of natural sweetener and flavour; in addition it is grown for forage (Rożek 2007).
Barkoudah 1999, FAO 2014, Post 1896, Rożek 2007

**Fig. 12.** *Citrullus lanatus*, bateech (syr), watermelon (en). Different varieties from South Syria, Dara, 2014

**Citrullus colocynthis** (L.) Schrad., Linnaea 12 (1838) 414. — *Cucumis colocynthis* L., Sp. Pl. (1753) 1010 (Cucurbitaceae).
Handal (syr), bitter apple, bitter cucumber, desert gourd (en)
Der., Has., Raq.
M. (s.)
Native of N Africa and naturally wild in Syria as a desert plant that grows in sandy arid soil. Sometimes cultivated on a small scale as medicinal plant and traditionally used (Sincech and Al-Khatīb 2002).
Sincech and Al-Khatīb 2002

**Citrullus lanatus** (Thunb.) Matsum. et Nakai, Cat. Sem. et Spor. Hort. Bot. Univ. Imp. Tokyo (1916) 30. — *Cucurbita citrullus* L., Sp. Pl. (1753) 1010; *Momordica lanata* Thunb., Prodr. Fl. Cap. (1794) 13; *Citrullus vulgaris* Schrad. ex Eckl. et Zeyh., Enum. Pl. Afr. Austr. 2 (1836) 279 (Cucurbitaceae).
Bateech (syr), watermelon (en)
Dar., Dam., Qu., Hom., Ham., Al., Id., De.
Fr.
Possibly domesticated in Asia Minor and Egypt (Grebenščikov 1986). Old crop in Syria, the plant has good drought resistance. Watermelon not only tolerates hot weather but for best growth requires more heat than any other vegetable (pers. obs.). Very suitable landraces against drought were used, but today new varieties are grown. Mostly eaten raw as a dessert fruit. The seeds yield good edible oil or are eaten roasted. Seedless watermelons are also used as new kind of variation (GCSAR 2011). According to (FAO 2011), Syria produces 670,559 tons and the cultivated area was 31,044 hectares.
FAO 2011, Grebenščikov 1986, GCSAR 2011

**Citrus aurantiifolia** (Christm. et Panz.) Swingle, J. Wash. Acad. Sci. 3 (1913) 465. — *Limonia aurantiifolia* Christm. et Panz. in L., Pflanzensyst. 1 (1777) 618 (Rutaceae).
Lomy (syr), common lime, sour lime, Egyptian lime (en)
La., Tar., Hom., Ham., Id., Dar., De.
Fr.
Native to SE Asia and Australia. Citrus cultivation was introduced into most Mediterranean countries by the Arabs during the first century CE. In Syria, citrus plantations expanded only in the beginning of the 20$^{th}$ century (Westlake 2000). The sour, juicy fruit serves for the production of soft drinks (lime juice, lemonade), marmalade, and jelly or the extraction of citric acid. Common tree in Syrian homegardens (pers. obs.).
Westlake 2000

**Citrus aurantium** L., Sp. Pl. (1753) 782. — *Citrus vulgaris* Risso, Ann. Mus. Paris 20 (1813) 190; *Citrus bigaradia* Lois. in Duham., Arb. ed. nov. 7 (1819) 99 (Rutaceae).
Nareng (syr), bitter orange (en)
La., Tar.
Fr., Sp. (fr.), M. (fr.)
Originated in SE Asia. Cultivated in many countries of the tropics and subtropics. It arrived at the Mediterranean region via the Arabs. In Damascus traditional tree in homegardens, known for several years before orange tree (pers. obs.). The sour, juicy fruit serves for the production of soft drinks (lime juice, limeade), marmalade, and jelly or the extraction of citric acid. An important hybrid derivative of *C. aurantium* L. is the clementine (*C. clementina* Tanaka), resulting from crossings with *C. deliciosa* Ten. It has been found in Algeria in 1912 and has been grown for fruits in Syria since that time (Westlake 2000).
Westlake 2000

**Citrus paradisi** Macf. in Hook., Bot. misc. 1 (1830) 304 (Rutaceae).
Grefoon, lemoon hindi (syr), grapefruit (en)
Dar., Hom., Ham., La., Tar., Id., De.

Fr.
The grapefruit is a subtropical tree known for its sour to semi-sweet fruit. Citrus plantations in Syria expanded only in the beginning of the 20th century. In Syria cultivated in the seashore area. New varieties are common (Westlake 2000). The fruit is yellow-orange skinned and the flesh is lobed and acidic, changing in colour depending on the variation, which includes white, pink and red core, pink and red pulps of varying sweetness (pers. obs.).
Westlake 2000

**Citrus limon** Burm. f., Fl. ind. (1768) 173 (Rutaceae).
Lymoon, hamud (syr), lemon (en)
Dar., Qu., La., Tar., Hom., Ham., Id., De.
Fr.
Currently cultivated in many subtropical countries, very common in Syria, cultivated in orchards and homegardens. Citrus manors in Syria expanded only in the beginning of the 20th century. The extract of the fruits is utilized for making traditional drinks (lemonade). Additionally the fruit juice is used for dressing salad, flavouring fish and meat, and for essence cakes, ice cream, tea, marmalade, and sweets. The plant serves as a rootstock for other *Citrus* species (Westlake 2000). In Syria cultivated very traditionally in old homegardens (pers. obs.).
Westlake 2000

**Citrus bergamia** Risso et Poit., Hist. orang. (1818) t. 53–56. — *Citrus limetta* Risso var. *bergamia* Risso, Ann. Mus. Paris 20 (1813) 197; *Citrus aurantium* L. var. *bergamia* Wight et Arn., Prodr. (1834) 98 (Rutaceae).
Bargamot (syr), bergamot orange (en)
Sw., La., Tar.
Sp. (fr. peel)
Place of origin unknown (Westlake 2000). The first *Citrus* in the Mediterranean. Later it was introduced to Syria from Brazil and Argentina as a small tree for homegardens, but not very common (pers. obs.).
Westlake 2000

**Citrus maxima** (Burm.) Merr., Interpr. Herb. Amboin. (1917) 46. — *Citrus decumanus* L., Syst. Nat. ed. 12 (1767) 580; *Citrus grandis* Osbeck, Dagb. Ostind. resa (1757) 98; *Aurantium maximum* Burm. in Rumph., Herb. Amb. Auctuar. (1755); *Citrus aurantium* L. var. *grandis* L., Sp. Pl. (1753) 783 (Rutaceae).
Bomaly (syr), pomelo (en)
La., Tar., Hom., Ham., Id., Dar., De.
Fr.
Originated in SE Asia, cultivated in Syria along with other *Citrus* species. Farms in Syria expanded only in the beginning of the 20th century (Westlake 2000).
Westlake 2000

**Citrus reticulata** Blanco, Fl. Filip. (1837) 610. — *Citrus nobilis* Andrews, Bot. repos. 9 (1810) t. 608 (Rutaceae).

Mandaleena, yousef afandy (syr), sour mandarin (en)
Dar., Hom., Ham., La., Tar., Id., De.
Fr.
Traditionally cultivated in the homegardens in different provinces, and in orchards in the coastline area (Westlake 2000). Usually eaten fresh or in fruits salads.
Westlake 2000

**Citrus sinensis** (L.) Osbeck, Dagb. Ostind. resa (1757) 41, 89. — *Citrus aurantium* L. var. *sinensis* L., Sp. Pl. (1753) 783 (Rutaceae).
Bortokal helo (syr), sweet orange (en)
Dar., Hom., Ham., Id., Lat., Tar., De.
Fr.
Possibly originated in SE Asia (Westlake 2000). In Syria cultivated in the seashore areas in orchards, and in different provinces in homegardens. Many landraces are adapted to the local climate, such as "Shamouti" with easily removable peel; the pulp is very juicy (pers. obs.).
Westlake 2000

**Fig. 13.** *Citrus* sp., sour mandarin and lemon from South Syria, Dara, 2014

**Citrus tangerina** hort. ex Tanaka, China Cit. Rept. (1926) 8 (Rutaceae).
Yousfy (syr), tangerine (en)
Dar., La., Tar., Hom., Ham., Id., De.
Fr.
Originated probably in China. New fruit in Syria (Westlake 2000).
Westlake 2000

**Citrus unshiu** Marc., Izv. Sochin. Oblast. Sukhum. Stants. 2 (1921) 5 (Rutaceae).
Mandareen (syr), cold hardy mandarin, satsuma mandarin (en)
Dar., Hom., Ham., La., Tar., Id., De.
Fr.

Originated in Japan (Morettini 1977), and introduced also to Syria. It is a seedless and easy-peeling *Citrus* species (Westlake 2000).
Morettini 1977, Westlake 2000

**Corchorus capsularis** L., Sp. Pl. (1753) 529 (Tiliaceae).
Mulukhiyah (syr), mallow-leaves, white jute (en)
Dar., Dam., Hom., Ham., Al., De., Raq.
V. (l.), I. (st.)
Known only from cultivation (Husain and Kasim 1975). Wide and longer leaves. Young shoots and leaves eaten as vegetable. The jute from *C. capsularis* has the best quality from all fibres of this genus. In Syria cultivated only as vegetable (pers. obs.).
Husain and Kasim 1975

**Corchorus olitorius** L., Sp. Pl. (1753) 529 (Tiliaceae).
Molukhia, jute hindi ahmar (syr), jute (en)
Dar., Dam., Hom., Ham., Al., De., Raq.
V. (l.)
Possibly native in India. Present from Palestine to Syria during the last 50 years where it is very common. Leaves and young shoots are used as a vegetable (Husain and Kasim 1975), cooked with chicken (traditional dish); the whole plant is also used as animal forage (pers. obs.).
Husain and Kasim 1975

**Fig. 14.** *Corchorus olitorius*, mulukhiyah (syr), mallow-leaves, white jute (en). South Syria, Dara, 2014

**Coriandrum sativum** L., Sp. Pl. (1753) 256 (Umbelliferae).
kuzbara (syr), coriander (en)
All over the country.
V. (l.), M. (fr.), Sp. (fr., l.)
Possibly domesticated in the E Mediterranean region or the Near East. Cultivated as an important vegetable (leaves), spice and medicinal plant (fruits) (Wahbe 1997). Old crop in Syria (Barkoudah 1999). Typically cultivated in homegardens.
Barkoudah 1999, Wahbe 1997

**Coridothymus capitatus** Rchb. f., Oesterr. Bot. Wochenbl. 7 (1857) 161 (Labiatae).
Zaatar (syr), conehead thyme, Persian-hyssop, Spanish oregano (en)
Sp. (h.), M. (h.)

Mediterranean woodlands and shrublands, semi-steppe shrublands, montane vegetation of Mt. Hermon. New cultivar in home gardens, used as condiment and medicinal plant (Barkoudah 1999).
Barkoudah 1999

**Cornus mas** L., Sp. Pl. (1753) 117 (Cornaceae).
Karaz akeke ahmar (syr), cornelian cherry, European cornel, dogwood (en)
Id., Al., Has.
Fr.
Native in Syria, distributed in N Syria (Barkoudah 1999). Since ancient times known as a medicinal plant with valuable fruits and wood (Kew 2010). The fruits are used fresh and for making jams, jellies, and fruit candies. Also grown as an ornamental plant for its late winter flowers.
Barkoudah 1999, Kew 2010

**Coronilla varia** L., Sp. Pl. (1753) 743 (Leguminosae).
Al ekelel (syr), crown vetch (en)
Dar., Dam., Al.
Fo. (fr., h.), M., soil erosion control
From long ago the species had been used as fodder and for soil protection (SPPIS Syria) Frequently sown as a medicinally used ornamental shrub. One of the most important legumes cultivated against soil erosion along highways (GCSAR 2009).
GCSAR 2009, SPPIS Syria

**Corylus avellana** L., Sp. Pl. (1753) 998. — *Corylus grandis* Poir., Encycl. 4, 2 (1798) 496; *Corylus avellana* L. var. *maxima* Audib., Cat. Vig. Cult. Audib. (1817) 15 (Corylaceae).
Bondok (syr), filbert (en)
La.
N., hedge
Cultivated (Barkoudah 1999); the nuts are tasty and rich in oil, they are used as fresh fruit, in the tartlet and chocolate industry. Nut oil is used as edible oil, for paints and technical purposes. Planted locally as bee fodder and hedge. Wood and fruits were used as medicine in the Middle Ages. Relics of cultivated hazel nuts can be found in the gardens.
Barkoudah 1999

**Crataegus azarolus** L., Sp. Pl. (1753) 477 (Rosaceae).
Zaroor (syr), azarole (en)
Qu., Sw., Dam., La., De.
Fr.
Originated in the E Mediterranean. Native in Syria (FSO, Syria), cultivated and more or less naturalized (Nabulsi 2004). In Syria it is found in the high mountains mostly in semi-cultivation. The tree is thorny, about 2 to 10 meters high and its orange fruit is one of the best types used to eat. The flowers are used as tea; it is very useful for the heart. Azarole trees are preserved in the natural protected area in Hama province near Abu Qubais (Barkoudah 1999).
Barkoudah 1999, FSO Syria, Nabulsi 2004

**Crataegus monogyna** Jacq., Fl. Austriac. 3 (1775) 50 (Rosaceae).
Zaroor waheed al madaka (syr), Mediterranean medlar, common hawthorn (en)
Dam. (Zabadany suburb), Sw., Ham., La.
Fr., M. (fr.), hedges
Native in coastal parts of Syria and at the border of Lebanon (Nabulsi 2004); widely planted as hedge plant (Christensen 1992), especially for agricultural use (GCSAR 2004) and as medicinal plant. The fruits are edible (Browicz 1986), commonly made into jams and syrups; the petals are also edible.
Christensen 1992, Browicz 1986, Nabulsi 2004

**Crataegus orientalis** M. Bieb., Fl. Taur. Cauc. 1 (1808) 187, non (Poiret) Bosc ex DC. (1825) (Rosaceae).
Zaroor mashreky (syr), oriental hawthorn (en)
Qu., Al., Der., Raq.
M. (l.)
Origin in E Mediterranean. Cultivated in W Syria. Fruits are usually eaten fresh; occasionally they are ground and added to flour for baking sweet bread. Occasionally seedlings are used as rootstocks for pears (Nabulsi 2004).
Nabulsi 2004

**Crocus sativus** L., Sp. Pl. (1753) 36 (Iridaceae).
Zahfaran (syr), saffron (en)
Hom.
Sp. (stigma), M.
Its progenitors are possibly from the E Mediterranean. The saffron or "red gold" was formerly used in the treatment of many diseases, and in foods as supporter of flavours and a colorant

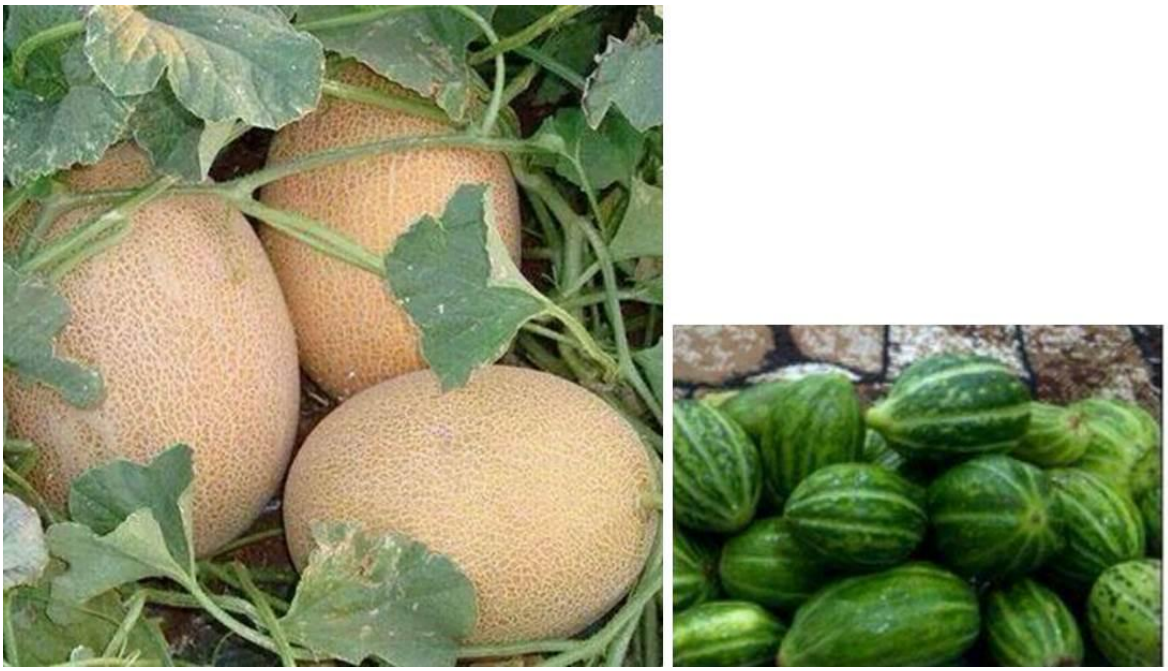

**Fig. 15.** *Cucumis melo*, Bateekh asfar, shamam (syr), melon, musk melon (en), and faqus varieties from south Syria, Dara, 2014

(pers. obs.). Saffron is very expensive, it is sold in grams. It is a new crop Syria since 2001, unknown in the wild (GCSAR 2011), but another species is common in the wild, namely *Crocus cancellatus* Herb. distributed in Aleppo, the eastern mountains of Lebanon, Zabadani, Damascus, Damascus countryside (pers. obs.).
GCSAR 2011

**Fig. 16.** *Cucumis sativus*, khiar (syr), cucumber (en). Landraces from south Syria, Dara, 2014. Bbackground: *Cucumis melo* var. *flexuosus* (L.) Naud. (vegetable), Armenian cucumber (en), getha

**Cucumis melo** L., Sp. Pl. (1753) 1011 (Cucurbitaceae).
Bateekh asfar, shamam (syr), melon, musk melon (en)
Dar., Qu., Dam., Hom., Ham., La., Al., De., Raq., Has.
Fr., V. (fr.)
Originated in Middle Asia and Asia Minor. Old crop in Syria, many varieties have been developed as landraces. New varieties aggressively replaced the old material (GCSAR 2011). Fruit used as dessert, very good for relieving thirst in warm weather.
GCSAR 2011

**Cucumis sativus** L., Sp. Pl. (1753) 1012 (Cucurbitaceae).
khiar (syr), cucumber (en)
Dar., Dam., Qu., Hom., Ham., La., Tar., Al., Id., De., Raq., Has.
V. (fr.)
Originated in India, widely cultivated in Syria since long times as open field crop and in greenhouse (GCSAR 2011), also in homegardens. Used as fresh fruit and pickled (Mekhalal). Many landraces are cultivated and adapted to local climate. Mini cucumbers are preferred in Syria (pers. obs.). Also new varieties such as "long cucumber" are cultivated today.
GCSAR 2011

**Cucurbita argyrosperma** Huber, Cat. Graines (1867) 8. — *Cucurbita mixta* Pangalo, Bull. appl. Bot., Leningrad 23, 3 (1930) 258, 254 (Cucurbitaceae).
koussa (syr), cushaw squash, green striped cushaw (en)
Dar., Dam., Qu., Hom., Ham., Al., La., De., Raq.
V. (fr.)
Known in the wild from Mexico to Nicaragua. Cultivated for its fruit and seeds. The plant is adapted to warm climates (GCSAR 2011).
GCSAR 2011

**Cucurbita maxima** Duch., Encycl. 2 (1786) 151 (Cucurbitaceae).
Qareh (syr), pumpkin, buttercup squash, winter squash, hubbard squash (en)

Dar., Dam., Hom., Ham., Al., De.
V. (fr.), Fo. (fr.)
Ancient crop in S America. Widely cultivated in Syria (GCSAR 2011). Buttercup squash can be roasted, baked, and mashed into soups.
GCSAR 2011

**Cucurbita moschata** Duch., Dict. sci. nat. 11 (1818) 234. — *Cucurbita pepo* L. var. *moschata* Duch. ex Lam., Encycl. 2 (1786) 152 (Cucurbitaceae).
Qareh (syr), pumpkin (en)
V. (fr.)
Originated in the New World. Cultivated in Syria as vegetable plant (GCSAR 2011).
GCSAR 2011

**Cucurbita pepo** L., Sp. Pl. (1753) 1010 (Cucurbitaceae).
khoussa (syr), zucchinis, summer squash, Acorn squash, courgettes (en)
Dar., Qu., Dam., Hom., Ham., Al., La., Tar., Id., De., Raq., Has.
V. (fr.)
Origin from Central America, but many landraces exist. Typically used as a summer squash (GCSAR 2011). Immature fruits are used as vegetable. Consumers in Syria prefer small fruits with light colour (cream), and many traditional dishes are cooked such as mahshy.
GCSAR 2011

**Cuminum cyminum** L., Sp. Pl. (1753) 254 (Umbelliferae).
kamoon (syr), cumin (en)
Dar., Qu., De.
Sp. (s.), M (s.)

**Fig. 17.** Preparation of food, different vegetables used to make pickles, Damascus, 2014

Native of Central Asia, known since Roman times (Barkoudah 1999). Cultivated as a spice and medicinal plant (Wahbe 1997). Syria is a second producer country of this crop (GCSAR 2011).
Barkoudah 1999, GCSAR 2011, Wahbe 1997

**Cupressus arizonica** Greene, Bull. Torrey Bot. Club 9 (1882) 64 (Cupressaceae).
Sarow arizony (syr), water cypress (en)
Dar., Qu., Dam., Hom., Ham., Al.
M. (cones), hedges, windbreak
Originated in N America. New tree in Syria, recently planted as windbreak (Barkoudah 1999). Sometimes also cultivated for the pharmaceutically used cones. Needle oil used for cosmetics and pharmaceutic (Wahbe 1997).
Barkoudah 1999, Wahbe 1997

**Cupressus sempervirens** L., Sp. Pl. (1754) 1002 (Cupressaceae).
Sarow (syr), Mediterranean cypress (en)
Dar., Qu., Dam., Al., Tar., La.
M. (cone), hedges
Planted as windbreak. Occasionally also cultivated for the pharmaceutically used cones. Needle oil used for cosmetics (Barkoudah 1999). Wild distributed in the Mediterranean, Asia Minor, Iran and Syria (Tar., La.).
Barkoudah 1999

**Cydonia oblonga** Mill., Gard. Dict. ed. 8 (1768). — *Pyrus cydonia* L., Sp. Pl. (1753) 480 (Rosaceae).
Safarjel (syr), quince (en)
Sw., Qu., Dam., Al., Id.
Fr.
Domesticated in W Asia. Primary wild distribution area probably limited to the E Caucasus and Transcaucasia. Partially connected with this core area are populations in Anatolia, Syria, Turkmenistan and Afghanistan, however, perhaps only as relics of the early spread of cultivated forms. True wild trees in the centre of origin in Caucasus have small crown and fruits (3 cm across). Today cultivated on all continents in warm-temperate to temperate climates. Cultivated in homegardens and in orchards in Syria. Size, shape and quality of quinces are quite different; the biggest ones can reach a weight of 3 kg. In Syria, it is used to make jam (Mrabba safarjel), or cooked in pomegranate paste (dibs rouman) with meat and kibbeh (a Middle Eastern meat pie with burghul and minced meat) and is called kibbeh safarjalieh raw. Many landraces adapted to our climate such as “Sedawy”, “Sbedrany” (Nabulsi 2004).
Nabulsi 2004

**Cynara cardunculus** L., Sp. Pl. (1753) 828 (Compositae).
Akoub, khurfysh (syr), cardoon, globe artichoke (en)
Dar., Dam., Hom., Ham.
V. (l. stalk)

Native to the Mediterranean. Domesticated possibly in Egypt (Zohary and Dothan 1978). Wild and cultivated in Syria (Barkoudah 1999). It is still found in S Syria as wild, locally people pick it and prepare many traditional dishes. Cultivated as a vegetable in Syria, but rare. Several varieties already known.
Barkoudah 1999, Zohary and Dothan 1978

**Cynara scolymus** L., Sp. Pl. (1753) 827. — *Cynara cardunculus* L. subsp. *scolymus* (L.) Hayek (Compositae).
Dam., Hom., Ham., Al.
Ardy shoky, angenaar (syr), artichoke (en)
V. (fl.), M. (h.)
Only known as cultivated, domesticated possibly in Egypt and certainly known to the Romans in many cultivars (Tittel 1986). Mostly grown as vegetable but also as a medicinal plant (Barkoudah 1999). New cultivars in Syria.
Barkoudah 1999, Tittel 1986

**Cyperus esculentus** L., Sp. Pl. (1753) 45 (Cyperaceae).
Al saed al latheeth, hab el aziz (syr), chufa, earth almond (en)
St. (r.), M. (r.)
Wild in Syria (Barkoudah 1999), occasionally cultivated for the sweet tubers but on an experimental scale. The plant is able to grow on saline soils and is therefore sometimes used for recultivation purposes. Sometimes cultivated in homegardens as a medicinal plant.
Barkoudah 1999

**Cyperus rotundus** L., Sp. Pl. (1753) 45 (Cyperaceae).
Saed moustadeer (syr), nut-grass (en)
M. (tuber), V. (tuber)
Wild distributed in the tropics and subtropics. Since very ancient times, bitter-tasting and aromatic tubers of wild species were collected for food (Barkoudah 1999), as well as for medicinal and aromatic purposes in the area east and south of the Mediterranean. Sometimes cultivated in homegardens as a medicinal plant.
Barkoudah 1999

**Cyperus papyrus** L., Sp. Pl. (1753) 47. — *Cyperus syriacus* Parl., Fl. ital. 2 (1852) 43 (Cyperaceae).
Burdaa (syr), Nile grass, paper reed (en)
Dar., De.
I. (paper)
Originated in tropical Africa. Natural distribution in the northern part of the Jordan valley (Post 1896). Naturalized in S Syria in Al Yarmouk valley (Barkoudah 1999). Used for making paper.
Barkoudah 1999, Post 1896

**Dactylis glomerata** L., Sp. Pl. (1753) 71 (Gramineae).
Esbaeah motagemah (syr), cocks foot grass, orchard grass (en)

Fo.
Native in Syria. Very good forage grass (Masri 2006).
Masri 2006

**Daucus carota** L., Sp. Pl. (1753) 242, subsp. **sativa** (Hoffm.) Schuebl. et Mart., Fl. Wuerttemb. (1834) 1979. — *Daucus carota* L. var. *sativa* Hoffm., Deutschl. Fl. 1 (1791) 94; *Daucus sativa* (Hoffm.) Roehl., Deutschl. Fl. 2 (1812) 213 (Umbelliferae).
Jazar (syr), carrot (en)
Dam., Hom., Ham.
V. (r.)
Probably domesticated in the 10th century in Afghanistan (Maass 1986). Main root vegetable plant, cultivated globally. Two main groups of cultivated carrots are recognized, namely, *D. carota* subsp. *sativus* var. *atrorubens* Alef. (Eastern or anthocyanin carrot) and var. *sativus* (Western or carotene carrot). Cultivated white-rooted races of *D. carota* subsp. *carota* are grown as medicinal plants since classical times. In Homs province a very famous vegetable and many landraces of red and violet colours exist (GCSAR 2011).
GCSAR 2011

**Diospyros kaki** Thunb., Nov. Act. Soc. Upsal. 3 (1780) 208 (Ebenaceae).
Kaki (syr), date plum, persimmon (en)
La., Tar., Ham. (Sahel al ghab)
Fr.
Originated in E Asia. New crop in Syria, around 1990 it became an important fruit (pers. obs.). In Syria different varieties are grown. Eleven accessions are cultivated in two field gene banks (GCSAR s.a.).
GCSAR s.a.

**Diospyros lotus** L., Sp. Pl. (1753) 1057 (Ebenaceae).
Kharma (syr), Caucasian persimmon, date plum (en)
La., Tar.
Fr.
This species is used as rootstock for kaki and can be grown at higher elevations. Probably domesticated in E Asia. New crop in Syria (GCSAR s.a.).
GCSAR s.a.

**Fig. 18.** *Eriobotrya japonica*, akedenia, moshmosh hinde (syr), loquat, Japanese medlar (en). Rraditional variety from Damascus, 2014

**Eriobotrya japonica** (Thunb.) J. Lindl., Trans. Linn. Soc. London 13 (1821) 102. — *Mespilus*

*japonicus* Thunb., Fl. Jap. (1784) 206; *Photinia japonica* Benth., Mem. Inst. Egypt. (1887) 73; *Crataegus bibas* Lour., Fl. Cochinch. 1 (1790) 319 (Rosaceae).
Akedenia, moshmosh hinde (syr), loquat, Japanese medlar (en)
Dar., Dam., Hom., Ham., Al., De.
Fr.
Originated in Japan. Cultivated on a small scale in homegardens (Kurtto 2009) in many provinces in Syria. Grown commercially for its yellow fruits, and as an ornamental plant. The fruits cannot be preserved, therefore they have to be consumed immediately and eaten fresh or as jam. Many landraces are used with good quality and adapted to the local climate. There are two field gene banks with eleven accessions (GCSAR s.a.).
GCSAR s.a., Kurtto 2009

**Eruca sativa** Mill., Gard. Dict. ed. 8 (1768) no. 1. — *Brassica eruca* L., Sp. Pl. (1753) 667; *Eruca vesicaria* var. *sativa* (Mill.) Thell., Fl. adv. Montp. (1912) 260 (Cruciferae).
Gargir (syr), salad rocket (en)
V. (l.)
Grown as an edible herb in the Mediterranean since Roman times. In Syria also wild populations were used (Barkoudah 1999). Used as a salad and spice (for production of sauces or mustard) or as medicinal plant (GCSAR 2011). Sometimes cultivated in homegardens but salad rocket is a typical neglected vegetable in Syria.
Barkoudah 1999, GCSAR 2011

**Eucalyptus gomphocephala** DC., Prodr. 3 (1828) 220 (Myrtaceae).
Keena (syr), eucalyptus (en)
Dar., Dam., Qu., Ham., Hom., La., Al., De., Has.
M. (s.), wind break, shade tree
Native of Australia. Now widespread cultivated as shade tree, windbreak, for soil erosion control and to reduce soil salination by lowering the water table. Also used as medicinal plant (pers. obs.).

**Ficus carica** L., Sp. Pl. (1753) 1059 (Moraceae).

**Fig. 19.** *Ficus carica*, Teen (syr), common fig (en). Landraces from south Syria, Dara, 2014

Teen (syr), common fig (en)
Dar., Dam., Qu., Id., Al., La., Tar.
Fr.
Native of the area (Uotila 2011). Distributed as wild in many areas such as Damascus, N of Aleppo, W Idleb province (Barkoudah 1999). The earliest document of fig cultivation is known from archaeological Neolithic sites of the 4th millennium BCE. Syrian fig is a very old tree for fresh and dry fig production. In the past figs were grown only for local consumption; large amounts for export are produced today. Many landraces distributed in Syria adapted to the local climate, some of them for fresh consumption and other for dry fig production. Some local varieties are "Alzabaly", "Soultany", "Shenshary", "Kalze", "Khany", "Halaby" (Nabulsi 2004).
Barkoudah 1999, Uotila 2011, Nabulsi 2004

**Ficus sycomorus** L., Sp. Pl. (1753) 1059 (Moraceae).
Gemmayz (syr), sycamore fig, fig-mulberry (en)
La., Tar.
Fr., rootstock
Native in Ethiopia, Middle Africa but it is cultivated in Syria from olden time, distributed in the coastal mountains (Nabulsi 2004). The edible fruits are of inferior quality than those of *Ficus carica* (Hanelt and IPK 2001).
Hanelt and IPK 2001, Nabulsi 2004

**Foeniculum vulgare** Mill., Gard. Dict. ed. 8 (1768) no. 1. — *Anethum foeniculum* L., Sp. Pl. (1753) 263 (Umbelliferae).
Shumraa (syr), fennel (en)
Dar., Qu., De.
M. (s.), Sp. (s.), V. (b., l.)
Fennel is indigenous to the shores of the Mediterranean. It is a highly aromatic and flavourful herb (taste of seeds similar to anise), with culinary and medicinal uses (Wahbe 1997).
Wahbe 1997

**Fragaria ×ananassa** (Duch.) Guedes, Taxon 33 (1984) 724. — *Fragaria vesca* L. race *ananassa* Duch., Hist. Nat. Frais. (1766) 190; *Fragaria chiloensis* (L.) Mill., Gard. Dict. ed. 8 (1768) no. 4, var. *ananassa* (Duch.) Bailey, Cyclop. 3 (1917) 272; *Fragaria magna* Thuillier, Fl. Env. Paris, ed. 2 (1800) 254 (Rosaceae).
Freez (syr), strawberry (en)
Dar., Dam., Hom., Ham., Lat., Tar., Al.
Fr.
Introduced from America. The garden strawberry, or simply strawberry, is a widely-grown hybrid species. It is cultivated worldwide for its fruit (Barkoudah 1999). A relatively new introduction, cultivated in fields and also in homegardens in Syria (pers. obs.).
Barkoudah 1999

**Fragaria vesca** L., Sp. Pl. (1753) 494 (Rosaceae).
Freez (syr), wild strawberry, woodland strawberry (en)

Dam., Qu.
Fr.
Native in Syria as wild. The strawberry fruit was mentioned in ancient Roman literature in reference to its medicinal use. Formerly cultivated for the fruit in different regions and at different times but today very rare (Barkoudah 1999).
Barkoudah 1999

**Fraxinus ornus** L., Sp. Pl. (1753) 1057 (Oleaceae).
Lesan al asfour, mouran (syr), manna ash, flowering ash (en)
Al., Ham.
I. (manna), windbreak
Native of the area, before drying the swamp Al Ghab (near Hama). This is possibly the unique place in the world for this endangered tree (Al-Oudat 2010). Furthermore today it is a rare tree, introduced to the Syrian cities as an ornamental tree frequently cultivated in the streets, e.g. in Aleppo province.
Al-Oudat 2010

**Glycine max** (L.) Merr., Interpr. Herb. Amboin. (1917) 274. — *Soja hispida* Moench, Methodus (1794) 153; *Phaseolus max* L., Sp. Pl. (1753) 725; *Glycine hispida* (Moench) Maxim., Bull. Acad. Sci. Petersb. 18 (1873) 398 (Leguminosae).
Fool al soya (syr), soybean (en)
Sw., Hom., Ham., Tar., Al., Id., Raq.
Fo. (s.)
Originated in E Asia. Soybean is the most important oil and protein crop of the world. Known only in cultivation and grown traditionally in E, SE and S Asia, nowadays however also in many countries of the subtropical to warm-temperate zones (Williams 1993). Cultivated in N Syria, but only as fodder plant (GCSAR 2011).
GCSAR 2011, Williams 1993

**Glycyrrhiza glabra** L., Sp. Pl. (1753) 742 (Leguminosae).
Ereck al soos (syr), liquorice (en)
M. (r.)
Native of SE Europe. It is a herbaceous perennial plant widely distributed as wild in Syria (Barkoudah 1999). Presumably only naturalized (Mouterde 1997) and newly cultivated as medicinal plant (Wahbe 1997). Liquorice is also very popular in Syria where it is sold as a drink. Dried liquorice root can be chewed as a sweet. A major part of the supply is still coming from wild populations; cultivation is reported from different Mediterranean countries.
Barkoudah 1999, Mouterde 1966, Wahbe 1997

**Gossypium herbaceum** L., Sp. Pl. (1753) 693 (Malvaceae).
Cotton (syr), tree cotton, Levant cotton (en)
Ham., Al., De., Has., Raq.
Fi., M.
Possibly natural of Africa. Cotton is the primary natural fibre used by modern humans. Cultivated cotton is also a major oilseed crop, as well as a main protein source for animal

feed. Cotton plants thus have an enormous importance in the world economy and are essential for agriculture, industry and trade of many tropical and subtropical countries (GCSAR 2012).
GCSAR 2012

**Gossypium hirsutum** L., Sp. Pl. ed. 2, 2 (1763) 975 (Malvaceae).
Cotton (syr), upland cotton (en)
Al., De., Has., Raq.
Fi.
The centre of origin is probably Mexico. Cultivated in Syria. This "Upland" cotton now is the commercially most important cotton of the world. Today it is introduced into most subtropical and tropical countries (Valdés 2011). Cotton has a long history in Syria. It is one of the strategic crops grown in large quantities in N and NE Syria in the area of the Syrian desert (Al jazeera). The Syrian cotton produces the finest cotton in the world, and is exported to many countries, especially to Europe, used in the industries of high quality textiles. The most important types are cultivated in Deir al Zour province such as "G73" and "Der. 22", recently grown as organic green cotton and brown green cotton (GCSAR 2012).
Valdés 2011, GCSAR 2012

**Gundelia tournefortii** L., Sp. Pl. 2 (1753) 814 (Compositae).
Aqub, Salkeen (syr), gundelia (en)
Dar., Dam., Sw., Ham., Hom., Al., De.
V. (l., st., r., fl. buds), M.
Distributed as wild in Syria (Mouterde 1984, Boissier 1875), furthermore as leaf vegetable in Syria. The leaves, stems, roots, and undeveloped flower buds are edible, when they first sprout in early spring (February–March). The plant becomes gradually drier over the summer. Syrians use it for food and healing purposes. It is gathered in the wild. Sold in markets in Syria, a popular dish using the plant consists of the heads covered in minced meat and olive oil and fried, and then simmered with lemon juice. Newly cultivated in Syria for experiment as medicinal plant (pers. obs.).
Boissier 1875, Mouterde 1984

**Helianthus annuus** L., Sp. Pl. (1753) 904 (Compositae).
Abaad al shams (syr), sunflower (en)
Dar., Dam., Qu., Hom., Ham., Id., Al., De.
Oi. (s.), Fo.
Originated in N America. A relatively new crop in Syria, important for oil; the seed cake is a valuable fodder. The seeds are eaten fresh or roasted, and used as birdfood (GCSAR 2012).
GCSAR 2012

**Hordeum vulgare** L., Sp. Pl. (1753) 84 (Gramineae).
Shaeer (syr), barley (en)
Dar., Qu., Sw., Dam., Hom., Ham., Al., Id., Has., Raq., De.
C.
Originated in the Near East (Zohary and Hopf 1988). It was one of the first domesticated cereal grains, originating in the Fertile Crescent about 10,000 years ago (Zohary 1959).

Archeological finds of two-rowed hulled forms had been made from the 7th–8th millennia BC in Syria and neighbouring countries (Hanelt and IPK 2001). Barley is one of the main cereals, particularly noted for its tolerance to cold, drought, alkali, and salinity (James 1983). Local types are two-rowed or six-rowed. It is mainly grown as animal feed, and both the grain and the straw are utilized. Landraces such as "Arabi aswad", "Arabi abiad" are adapted to environmental stress such as drought, cold, heat, and salinity (GCSAR 2009).
GCSAR 2009, Hanelt and IPK 2001, James 1983, Zeven and Zhukovsky 1975, Zohary 1959, Zohary and Hopf 1993

**Humulus lupulus** L., Sp. Pl. (1753) 1028 (Moraceae).
Hasheshet al denaar, jonjol (syr), common hop (en)
Sw.
M. (fr.), V. (young sprouts)
Naturalized in Syria (Greuter et al. 1989). It has bitter taste. Used for the manufacture of beer (non-alcoholic as well as alcoholic).
Greuter et al. 1989

**Hyssopus officinalis L.**, Sp. Pl. (1753) 569 (Labiatae).
Zoofa (syr), hyssop (en)
La.
M. (h.), I. (perfume, h.)
Native to S Europe and the Middle East. Naturalized from cultivation. The species as a whole is resistant to drought. Grown for the essential oil of the herb, as a medicinal and flavouring plant (Kew 2010).
Kew 2010

**Ipomoea batatas** (L.) Lam., Tabl. Encycl. 1 (1797) 465, var. **edulis** (Thunb.) Kuntze, Rev. Gen. 2 (1891) 442. — *Batatas edulis* (Thunb.) Choisy, Mem. Soc. phys. Genève 6 (1833) 435; *Convolvulus edulis* Thunb., Fl. Jap. (1784) 84; *Ipomoea batatas* (L.) Lam., Tabl. encycl. 1 (1797) 465; *Convolvulus batatas* L., Sp. Pl. (1753) 154 (Convolvulaceae).
Batatah helwa (syr), sweet potato (en)
Dar., Dam., La., Ham.
St. (r.)
Possibly originated in northern S America. Introduced to the Mediterranean by the Spaniards and Portuguese. Only known in cultivation, all over in the tropics and subtropics. Grown for its sweetish tubers eaten cooked or roasted as snack in Syria. Very good food for kids. Old landraces are found in the coastal area, specifically in Latakia province. Today many new varieties are cultivated which show a great variation of tuber form, tuber colour, flesh colour, time to harvest, and of nearly all morphological characters of shoots, leaves, and flowers (GCSAR 2004).
GCSAR 2004

**Isatis tinctoria** L., Sp. Pl. (1753) 670 (Cruciferae).
Wasmet al sabagheen, neelah (syr), woad (en)
La., Al.

I. (l., dye)
Native in Syria (Greuter et al. 1986). Formerly cultivated as dye plant which gives a blue colour (Barkoudah 1999).
Barkoudah 1999, Greuter et al. 1986

**Juglans regia** L., Sp. Pl. (1753) 997 (Juglandaceae).
Jooz (syr), walnut (en)
Dar., Qu., Sw., Dam., Hom., Ham., La., De.
N., M. (fr.)
Possibly domesticated in NE Turkey, introduced to Syria in the Roman era. Cultivated mainly for its nutritious nuts that are used as food, in chocolate industry and for baked foods, in the pharmaceutical and cosmetic industry. The press cake resulting from oil production is used as a feedstuff. Leaves, fruit hulls and bark are used for tanning, dye production, as a drug and source of vitamin C. Mostly important landraces are still used such as "Balady" (Nabulsi 2004). Also cultivated in homegardens (pers. obs.).
Nabulsi 2004

**Juniperus drupacea** Labill., Pl. Syr. Decad. ii. 4. t. (1791) 8 (Cupressaceae).
Arar soury (syr), Syrian juniper (en)
Wind break
Wild and cultivated, threatened species in risk of extinction. Native to the E Mediterranean from S Greece, S Turkey, W Syria, and Lebanon, growing on rocky sites at 800–1700 m altitude (Barkoudah 1999).
Barkoudah 1999

**Juniperus oxycedrus** L., Sp. Pl. 2 (1753) 1038 (Cupressaceae).
Arar sharbeeny (syr), prickly cedar (en)
M. (wood tar, fr.)
Native in Syria. Used to obtain essential oil through destructive distillation of the wood of this shrub. It yields dark, aromatic oil with a strong smoky smell, which is used for cosmetics and traditional skin treatment drugs, as well as incense (Barkoudah 1999). Recently cultivated in Syria for experimental reason (pers. obs).
Barkoudah 1999

**Lactuca sativa** L., Sp. Pl. (1753) 795. — *Lactuca capitata* Gars., Descr. vertus pl. (1767) 196 (Compositae).
Khass (syr), lettuce (en)
Dar., Dam., Hom., Ham., Al., De.
V. (l.)
Probably originated in the E Mediterranean, already cultivated in ancient Egypt (Tittel 1986), also by the Greeks and Romans (Zohary and Hopf 1988) for the production of oil from its seeds. Known only in cultivation in all temperate and many tropical countries. It is cultivated in Syria commercially, also in homegardens (GCSAR 2011).
GCSAR 2011, Tittel 1986, Zohary and Hopf 1988

**Lagenaria siceraria** (Molina) Standl., Publ. Field Mus. Nat. Hist. Chicago, Bot. ser. 3 (1930) 435. — *Lagenaria vulgaris* Ser., Mém. Soc. Phys. Genève 3, 25, t. (1825) 2 (Cucurbitaceae).
Kussa tawyla, kussa kelay (syr), opo squash, bottle gourd (en)
Dam., Hom., Ham., Al., De., Raq.
V. (fr.)
Probably originated in Africa. Formerly it was cultivated for use as a water container but now rarely grown in Syria, only for local use as vegetable (GCSAR 2011).
GCSA 2011

**Lathyrus sativus** L., Sp. Pl. (1753) 730 (Leguminosae).
Jalaban mazroh, kerssany (syr), chickling vetch, grass pea (en)
Dar., Qu, Has., Al., De.
Pu., Fo. (s., h.)
Originated in E Mediterranean countries. Cultivated in most countries of the Mediterranean. Chickling vetch is grown as a model for drought-tolerant plants in many countries (Al-Oudat 2010). Today in Syria it is not a significant plant (GCSAR 2009), cultivation is seriously declining.
Al-Oudat 2010, GCSAR 2009

**Laurus nobilis** L., Sp. Pl. (1753) 369 (Lauraceae).
Gaar (syr), bay laurel (en)
La., Al.
Sp. (l.), Oi. (fr.), M. (fr.)
Native to the Mediterranean (Barkoudah 1999). Most of the laurel forests around the Mediterranean are believed to have disappeared approximately ten thousand years ago, some remnants still persist in the mountains of S Turkey, N Syria and along the coastal area. Already cultivated in antiquity, the species is now cultivated in many countries of the Mediterranean region. The largest producers of laurel leaves are Italy, Greece, the former Yugoslavia, Turkey, and Syria. Few farmers cultivate laurel trees in their homegardens (Christiansen 1997). Leaves are used as culinary herb, to give the aromatic taste to food. The leaves (officinal as Folia Lauri) and the fruits (officinal as Fructus Lauri) are utilized as spice. The laurel oil (officinal as Oleum Lauri), extracted from the fruits, is used medicinally, and in the manufacture of high-quality natural soap (Aleppo soap).
Barkoudah 1999, Christiansen 1997

**Lavandula angustifolia** Mill., Gard. Dict. ed. 8 (1768) no. 2. — *Lavandula spica* L., Sp. Pl. (1753) 572, nom. ambig.; *Lavandula officinalis* Chaix in Vill., Hist. pl. Dauphiné (1786) 355; *Lavandula vera* DC., Fl. franc. ed. 3, 5 (1815) 398 (Labiatae).
Khouzamma, darm (syr), lavender (en)
I. (perfume, h.), M. (h.)
Native to the W Mediterranean, primarily the Pyrenees and other mountains in N Spain. It is a strongly aromatic shrub. Lavender is commonly grown in Syria as an ornamental plant. It is popular for its colourful flowers (Barkoudah 1999). The flowers and leaves are used as an herbal medicine (Wahbe 1997).
Barkoudah 1999, Wahbe 1997

**Lens culinaris** Medik., Vorles. Chur. Phys. Ges. 2 (1787) 361. — *Ervum lens* L., Sp. Pl. (1753) 738; *Lens esculenta* Moench, Methodus (1794) 131 (Leguminosae).
Adas (syr), lentil (en)
Dar., Qu., Ham., De., Raq., Has.
Pu.

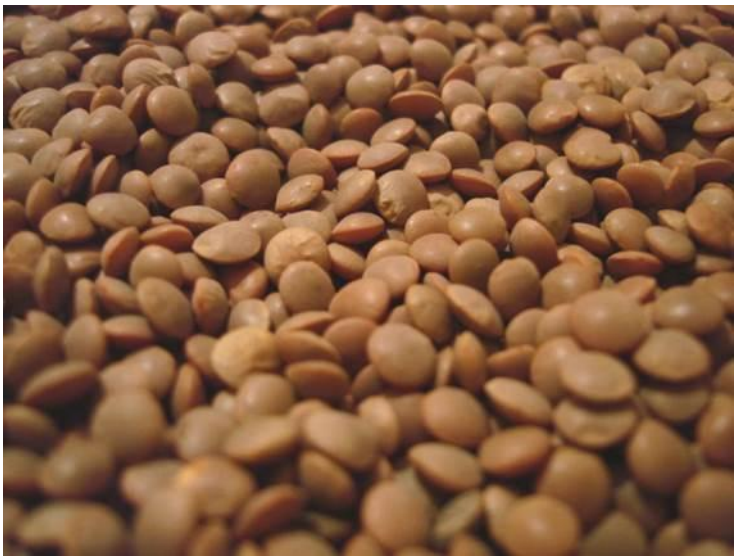

**Fig. 20.** *Lens culinaris*, adas (syr), lentil (en). South Syria,

Originated in the Near East. The lentil belongs to the founder crops of Old World Neolithic agriculture and is associated with the spread of agriculture from Near East to the Nile valley, to Europe, to Middle Asia and India. Prehistoric remains from cultivated lentils had been detected from the 7$^{th}$ millennium BC in Palastine and Syria (Hanelt and IPK 2001). Lentils have been part of the human diet since the Aceramic period (before pottery). The species is classified into the ancestral wild subsp. *orientalis* (Boiss.) Ponert, and subsp. *culinaris* cultivated for seed. Lentil colours range from yellow to red-orange to green, brown and black. Lentils also vary in size, and are sold in many forms, with or without the husks, whole or split. In Dara, lens is small and brown, and it is called adas hourani, but in Hama it is light green and the seed is more flat and larger. Main producers are India, Turkey and Syria, as well as other countries of SW and S Asia. Many landraces are used such as "Hourani Ahmar" (drought-resistant, small-seeded with red cotyledon) and "Kurdi" (drought-resistant and large-seeded with crème cotyledon) (GCSAR 2009).
GCSAR 2009, Hanelt and IPK 2001

**Lepidium sativum** L., Sp. Pl. (1753) 644 (Cruciferae).
Rashad (syr), garden cress (en)
V. (l.)
Possibly originated in SW Asia (Hanelt 1986). Cultivated as a salad plant and as a spice in small fields and homegardens in Syria (GCSAR 2011).
GCSAR 2011, Hanelt 1986

**Lilium candidum** L., Sp. Pl. (1753) 302 (Liliaceae).
Zanbak abiad (syr), white lily (en)
I. (perfume, fl.), Sp. (fl.)
Dar., Dam.
Native to Syria, Lebanon and Palestine, Turkey, Greece and the Balkans (E Mediterranean to SW Asia). A very traditional garden plant, mainly cultivated as ornamental and for extraction of essential oil (Barkoudah 1999), common in homegardens in Syria.
Barkoudah 1999

**Linum usitatissimum** L., Sp. Pl. (1753) 277 (Linaceae).
kettan (syr), linseed, flax (en)
Ham., Al., De.
Fi. (st.), Oi. (s.)
The original home of the species extends from the E Mediterranean to India. It is believed that it was first used in the Fertile Crescent. Flax is amongst the oldest fibre crops in the world. Cultivated in Syria since classical time (Al-Oudat 2010).
Al-Oudat 2010

**Luffa acutangula** (L.) Roxb., Fl. Ind. ed. Carey 3 (1832) 713. — *Cucumis acutangulus* L., Sp. Pl. (1753) 1011 (Cucurbitaceae).
Luff (syr), common loofah, vegetable sponge (en)
I. (sponges)
Probably originally a native of tropical Asia. Vegetable sponges formerly cultivated but today a rare crop in Syria (pers. obs.).

**Luffa aegyptiaca** Mill., Gard. Dict. ed. 8 (1768). — *Momordica cylindrica* L., Sp. Pl. (1753) 1009; *Luffa cylindrica* (L.) Roem., Syn. Pep. 2 (1846) 63 (Cucurbitaceae).
Leef (syr), dishrag gourd, Egyptian luffa, gourd loofa, silk gourd, smooth luffa (en)
Dar., Qu., Dam., Ham., La., Al., De., Raq.
V. (young fr.)
Origin Asia or possibly Africa. The young fruits are used as vegetable (Sargent and Maynard 2012). Mature fruits are used as natural cleaning sponges (Prance 2004).
Prance 2004, Sargent and Maynard 2012

**Lupinus albus** L., Sp. Pl. (1753) 721 (Leguminosae).
Termos abiad (syr), white lupin, lupin beans (en)
Dar., Qu., Al., Id., De.
Pu., Fo.
The beginning of lupin cultivation in the Old World is associated with the times of the ancient Egyptian civilization. White lupin was introduced into cultivation in ancient time. Traditional pulse crop of the Mediterranean countries, but cultivation is decreasing. According to Al-Oudat (2010), seeds are, after pre-treatment for removing the alkaloids, cooked and salted as snacks, often used as grain forage. Plants are fed to livestock as fresh or dry fodder, used also in medicine (Wahbe 1997). The species is cultivated in Syria. It is also found as escaped plant in Dara province.
Al-Oudat 2010, Wahbe 1997

**Lupinus angustifolius** L., Sp. Pl. (1753) 721 (Leguminosae).
Termos daek al awrak (syr), narrow-leafed lupin, blue lupin (en)
Pu., Fo.
Native in Syria. Formerly cultivated as fodder (Masri 2006, Greuter et al. 1989).
Greuter et al. 1989, Masri 2006

**Fig. 21.** *Lycopersicon esculentum*, bandoora (syr), tomato (en). South Syria, Dara, 2014

**Lycopersicon esculentum** Mill., Gard. Dict. ed. 8 (1768) no. 2. — *Solanum lycopersicum* L., Sp. Pl. (1753) 185; *Lycopersicon lycopersicum* (L.) Farw., Ann. Rep. Commissioners Park & Boulevards Detroit 11 (1900) 84 (Solanaceae).
Bandoora (syr), tomato (en)
Dar., Dam., Tar., La., Hom., Ham., Al., De.
V. (fr.)
Origin probably Peru or Ecuador, from where in pre-Columbian times it spread to the north. Now cultivated in most tropical and temperate countries and one of the most important vegetables of the world. Many different cultivars have fruits varying in size, shape and colour (red, golden, etc.), which can be eaten raw or cooked in various ways. Tomato sauce is made industrially from the flesh of the fruits. The cherry tomato, *L. esculentum* var. *cerasiforme* (Dunal) Alef., Landw. Fl. (1866) 135, is presumably an early form of the large-fruited varieties. Many new varieties are used but landraces are still grown in homegardens (GCSAR 2011).
GCSAR 2011

**Malus domestica** Borkh., Theor. prakt. Handb. Forstbot. 2 (1803) 1272 (Rosaceae).
Toufaah (syr), apple (en)

Dam., Dar., Sw., Qu., Hom., La., Al.
Fr.
The centre of diversity of the genus *Malus* is in E Turkey. The apple tree was perhaps one of the first cultivated trees, and its fruits have been improved through selection over thousands of years. Cultivated in the temperate zones with the exception of summer-dry regions. Common fruit tree in Syria. Most important fruit tree in high-mountain and cold areas such as Qunatra (Al Joulan Mountain), Sweida, and Latakia. Common Syrian landraces are "Skarji", "Sukari", "Abu Ghabra", and "Khlati" (Nabulsi 2004).
Nabulsi 2004

**Fig. 22.** *Malus domestica*, toufaah (syr), apple (en). Damascus,

**Malus orientalis** Uglitzk., Trudy Sev.-Kavk. Inst. Spets. Tekhn. Kultur 1 (3) (1932) 18 (Rosaceae).
Toufaah sokarry (syr), orient apple (en)
Dar., Qu., Dam., Hom., De.
Fr.
The domestication of the apple began probably within the large and rich genepool of Middle Asia. Because of early finds far away in Jordan and Turkey (6,500 BCE) a rather early start must be supposed. The cultivation could have moved westward under participation of the *M. orientalis* genepool in Armenia and Transcaucasia into the area of the Greek civilisation. The first cultivated apples are mentioned by Homer (9$^{th}$ century BCE); cultivars are named and data about orchard management are given by Theophrastus (320 BCE). Wild distribution in N Anatolia, Armenia, mountain belt in N Iran, Caucasus (Zohary 1997). Local cultivars originating from *M. orientalis* are grown in different regions of Syria. Therefore, *M. orientalis* could have contributed to the domestication of the apple by some character introgressions. Many landraces are still used but also new variation exists (Nabulsi 2004).
Nabulsi 2004, Zohary 1997

**Malva neglecta** Wallr., Syll. Pl. Nov. 1 (1824) 140 (Malvaceae).
khubeza (syr), common mallow, roundleaf mallow (en)

Dar., Qu., Dam., Hom., De.
V., M.
Native in Syria (Greuter et al. 1989). Spreading as wild in the Mediterranean and Arabia (Barkoudah 1999). Introduced as weed worldwide in tropical, subtropical and warm temperate regions. It is newly planted in Syria as vegetable and medicinal plant (Sincech and Al-Khatīb 2002).
Barkoudah 1999, Greuter et al. 1989, Sincech and Al-Khatīb 2002

**Malva parviflora L.,** Amoen. Acad. 3 (1756) 416, Sp. Pl. ed. 2 (1762) 969. — *Althaea microcarpa* Alef., Oesterr. Bot. Z. 12 (1862) 261; *Malva parviflora* Alef., Oesterr. Bot. Z. 12 (1862) 261 (Malvaceae).
Khubeza sagheerat al aworak (syr), little mallow, small flowered mallow, cheese weed, cheese weed mallow, malva (en)
Dar., Qu., Dam., Hom., De.
V., M.
Native in Syria (Levant) and the entire Mediterranean, the species is widespread throughout the temperate, tropical and subtropical regions. Mallow, which grows wild in Syria (Barkoudah 1999), is widely used as a source of nutrition in war time and periods of strictness. In Syria, it is used as the main ingredient in a traditional Arab dish called khubeza; as well as in salads, soups and other dishes by the local Arab people. *Malva* sp. leaves have been used in traditional medicine (Sincech and Al-Khatīb 2002). Cultivated in homegardens.
Barkoudah 1999, Sincech and Al-Khatīb 2002

**Fig. 23.** *Malva parviflora*, khubeza sagheerat al aworak (syr), little mallow, small flowered mallow, cheese weed (en). Landraces from South Syria, Dara, 2014

**Malva verticillata** L., Sp. Pl. (1753) 689. — *Althaea verticillata* (L.) Alef., Oesterr. Bot. Z. 12 (1862) 261 (Malvaceae).
Khubeza Magdoula (syr), curled mallow (en)
V. (l.), M.
Domesticated in E Asia. In former times introduced (Greuter et. al. 1989) as a vegetable and medicinal plant worldwide. Leaves are cooked (with garlic and olive oil) and eaten as vegetable, or raw as salad. Furthermore known as medicine from olden times (Wahbe 1997).
Greuter et. al. 1989, Wahbe 1997

**Fig. 24.** *Malva verticillata*, khubeza Magdoula (syr), curled mallow (en). Landrace from South Syria, Dara, 2014

**Matricaria recutita** L., Sp. Pl. (1753) 891. — *Matricaria chamomilla* L., Fl. suec. ed. 2 (1755) 296 (Compositae).
Babonej almany (syr), chamomile (en)
M. (fl.)
Naturalized in Syria. Cultivated for medicinal use, it can be found near populated areas; more commonly, wild plants are collected. The dried and just opening flower heads have been used in medicine since old time; the extract is also used in cosmetics (Wahbe 1997).
Wahbe 1997

**Medicago arabica** (L.) Huds., Fl. Angl. (1762) 288 (Leguminosae).
Fassa Arabia (syr), heart clover, burclover (en)
Dam., Qu., Hom.
Fo., soil improvement

Native in Syria (ILDIS 2010). Cultivated as fodder and grassland plant (Barkoudah 1999). The soil is enriched with nitrogen.
Barkoudah 1999, ILDIS 2010

**Medicago arborea** L., Sp. Pl. (1753) 778. — *Medicago arborescens* Presl, Fl. sic. 1 (1826) 20 (Leguminosae).
Fassa shajaria (syr), shrubby medick, moon trefoil (en)
Dar., Qu., Dam., Hom., Ham., Id., Al., De.
Fo., soil improvement
Native in Syria. Formerly cultivated as fodder plant (Barkoudah 1999).
Barkoudah 1999

**Medicago sativa** L., Sp. Pl. (1753) 778 (Leguminosae).
Barseem hejazy (syr), alfalfa (en)
Dar., Dam., Hom., Ham., Id., Al., De.
Fo. (h.), soil improvement
Domesticated in W Asia. Cultivated as fodder plant (Barkoudah 1999) and for soil improvement.
Barkoudah 1999

**Melilotus alba** Medik., Vorles. Churpf. Phys. Ges. 2 (1787) 382 (Leguminosae).
Nafel abiad (syr), white sweet clover, white melilot (en)
Dar., Sw., Dam., Hom., Ham., Al.
Fo.
Native in Syria. Cultivated as fodder plant and for soil improvement. Furthermore it is attractive for bees (Al-Oudat 2010).
Al-Oudat 2010

**Melilotus indica** (L.) All., Fl. Pedem. 1 (1785) 308. — *Trifolium indica* L., Sp. Pl. (1753) 765 (Leguminosae).
Nafel hendy (syr), Indian clover (en)
Cultivated in Syria under irrigation as pasture crop. Used commonly to improve soil value as green fertilizer (Al-Oudat 2010).
Al-Oudat 2010

**Melilotus officinalis** (L.) Pall., Reise russ. Reich 3 (1776) 537. — *Trifolium officinale* L., Sp. Pl. (1753) 765 (Leguminosae).
Ekleel al malek, handouq teby (syr), yellow sweet clover (en)
Dar., Sw., Dam., Hom., Ham., Al., De.
M. (fr.), Sp. (l.), Fo. (h.), soil improvement
Resistant to drought. Due to its abundant seed production, in some habitats it is an invasive species. Commonly found in prairies, abandoned fields, roadsides, and railroad ballasts. Not tolerating dense shade (Barkoudah 1999). This plant is mainly used for agricultural purposes. It is considered an excellent green manure. Sweet clover is a major source of nectar for domestic honey bees. Flowers and seeds can be used as flavouring.

Barkoudah 1999

**Melissa officinalis** L., Sp. Pl. (1753) 592 (Labiatae).
Melissa (syr), lemon balm (en)
Dam., Dar., Al., Hom., Ham.
I. (perfume, h.), Sp. (l.), M., bee attractant
Originated in the E Mediterranean. Distributed as wild in S Europe and the Mediterranean, Anatolia, Caucasus, and Iraq. Mostly cultivated in home gardens as a spice, but now it is also grown as medicinal and bee plant (Syria 1999).
Barkoudah 1999

**Mentha longifolia** (L.) L., Amoen. Acad. 4 (1759) 485. — *Mentha spicata* L. var. *longifolia* L., Sp. Pl. (1753) 576; *Mentha sylvestris* L., Sp. Pl. ed. 2 (1763) 804 (Labiatae).
Nanaa taweel al aworak (syr), horse mint, long mint leaves (en)
M. (l.), herbal tea
Native in Syria. The aromatic leaves are used for herbal tea or as a pot herb (Barkoudah 1999), and as medicinal plant (Wahbe 1997).
Barkoudah 1999, Wahbe 1997

**Mentha ×piperita** L., Sp. Pl. (1753) 576. — *Mentha citrata* Ehrh., Beitr. Naturk. 7 (1792) 150 (Labiatae).
Nana maee, nanaa (syr), pepper mint (en)
M. (l.)
Probably originated in England. Planted in homegardens as aromatic plant. It can be used also as herbal tea (Barkoudah 1999).
Barkoudah 1999, Wahbe 1997

**Mentha pulegium** L., Sp. Pl. (1753) 577 (Labiatae).
Nanaa barry (syr), wild mint (en)
Sp. (l.)
Native in Syria. Collected from the wild (Barkoudah 1999). Cultivated in homegardens as a condiment plant (Wahbe 1997).
Barkoudah 1999, Wahbe 1997

**Mentha spicata** L., Sp. Pl. (1753) 576. — *Mentha spicata* L. var. *viridis* L., Sp. Pl. (1753) 576; *Mentha viridis* (L.) L., Sp. Pl. ed. 2 (1763) 80 (Labiatae).
Nana modabab (syr), spearmint (en)
M. (l.), Sp. (l.)
Native to Syria. Medicinal and aromatic plant in Syria (Wahbe 1997), typically cultivated in homegardens. Leaves can be used fresh, dried, or frozen, likewise conserved in salad and drinks. It is a very variable herbaceous perennial plant with a peppermint-perfumed aroma (Barkoudah 1999).
Barkoudah 1999, Wahbe 1997

**Mespilus germanica** L., Sp. Pl. (1753) 478 (Rosaceae).
Zaror (syr), medlar (en)
Dam., Qu., Sw., La., Tar., Al.
Fr.
Distributed as wild in Syria but today cultivated for the propagation of medlar cultivars by grafting onto rootstocks of *Crataegus*, *Cydonia* or *Pyrus* (Nabulsi 2004).
Nabulsi 2004

**Morus alba** L., Sp. Pl. (1753) 986 (Moraceae).
Tut abiad, tut shamy (syr), white mulberry (en)
Dam., Dar., Sw., Qu., Ham., Tar., Id., Al.
Fr., Fo.
Olden crop in China and Korea. Cultivated in Syria (Uotila 2011) from old time (Barkoudah 1999). The fruits are eaten fresh or conserved. Cultivated as fodder for silkworms and as traditional fruit in homegardens (Nabulsi 2004).
Barkoudah 1999, Nabulsi 2004, Uotila 2011

**Morus nigra** L., Sp. Pl. (1753) 986 (Moraceae).
Tut aswad (syr), black mulberry (en)
Sw., Qu., Dam., Tar., De.
Fr.
Originated in SW Asia, naturalized in the Mediterranean, also in Syria (Barkoudah 1999). Cultivated in warm-temperate regions. Black mulberry has long been cultivated for its edible fruits (Nabulsi 2004). The dark-red fruits are stewed and used for the production of beverages, syrup, wine, vinegar and jam. Very common in homegardens in Syria.
Barkoudah 1999, Nabulsi 2004

**Musa acuminata** Colla, Mem. Accad. Sci. Torino 25 (1820) 394. — *Musa cavendishii* Lam. ex Paxton, Magaz. Bot. 3 (1837) 51 (Musaceae).
Mouz (syr), banana (en)
Qu. (Golan Heights), La.
Fr.
Probably originated on the Canary Islands after introduction from the Old World tropics. Lady finger bananas can grow to a height of 7.5 m. They are resistant to drought, eaten fresh or used in desserts. Fruits are short and sweet. Normally growing in Syria along the coast only on a small scale, but are similarly cultivated as houseplants (pers. obs.).

**Myrtus communis** L., Sp. Pl. (1753) 471 (Myrtaceae).
Ass (syr), myrtle (en)
Dam., Sw., La.,
Sp. (fr., l.), M. (l., fl.), hedge plant
Widespread in the Mediterranean, it is wild in Syria (Barkoudah 1999), nevertheless commonly cultivated as fencing plant and traditionally used in the graveyard.
Barkoudah 1999

**Nasturtium officinale** R. Br. in W. et W. T. Ait., Hort. Kew. ed. 2, 4 (1812) 111. — *Nasturtium fontanum* (Lam.) Aschers., Fl. Brandenburg 1 (1860) 72; *Rorippa nasturtium* Beck, Fl. Nied.-Oest. 2, 1 (1892) 463 (Cruciferae).
Jarjeer al mah, korret al ean (syr), watercress (en)
V. (l.)
Native to Europa and Asia. Watercress is cultivated on large-scale and in gardens. Being semi-aquatic, watercress is well-suited to hydroponic cultivation (Barkoudah 1999). This kind of cultivation is still new in Syria.
Barkoudah 1999

**Nerium oleander** L., Sp. Pl. (1753) 29 (Apocynaceae).
Doufla (syr), nerium (en)
hedges, wind break
Probably originated in SW Asia. Cultivated along roadsides and common in gardens as wind break (Barkoudah 1999).
Barkoudah 1999

**Nicotiana glauca** (Graham) Griseb., Goett. Abh. 19 (1874) 216 (Solanaceae).
Tenback, tabegh azrak (syr), tree tobacco (en)
M. (l.)
Tree tobacco is native to S America, widely distributed in tropical and subtropical regions (Valdés 2012). Grown as an ornamental plant, escaped and naturalized worldwide. Cultivated in the Mediterranean and Iraq (Husain and Kasim 1975). The plant is used for medicinal determinations (Barkoudah 1999); the leaves can be applied to cuts, bruises, swellings and other wounds. Formerly cultivated in Syria, also found in ramparts and along roadsides. Also pesticide production is possible (Al-Oudat 2010).
Al-Oudat 2010, Barkoudah 1999, Husain and Kasim 1975, Valdés 2012

**Nicotiana tabacum** L., Sp. Pl. (1753) 180 (Solanaceae).
Tabegh (syr), cultivated tobacco (en)
Dar., Ham., La., Tar.
I. (l.)
Native of tropical and subtropical America, but now commercially cultivated worldwide. Cultigen introduced into the area (Valdés 2012) during the French mandate period (1920–1946). Latakia tobacco is a specifically primed tobacco first formed in Syria and named after the harbour city of Latakia. It is the result of a procedure whereby the leaves are cured over controlled fires of fragrant woods like oak and aromatic herbs. Latakia produces a very rich, heavy taste, with an aroma that has a “smoky” character. It is also a toxic plant (Al-Oudat 2010).
Al-Oudat 2010, Valdés 2012

**Nigella sativa** L., Sp. Pl. (1753) 534 (Ranunculaceae).
Habet al baraka, kamoon aswad, al-kezhaa (syr), black cumin, balck caraway (en)
Dar., Dam., Ham., Al., De.
Sp. (s.), M. (s.)

**Fig. 25.** *Olea europaea*, zeitoun (syr), common olive, olive tree (en). Different landraces with the extraction of olive oil, South Syria, Dara, 2014

Native to S and SW Asia. Very old crop in Syria (GCSAR 2011), but found also as wild (Barkoudah 1999). The seeds are mainly used for flavouring sauces and bread cheese, also for syrup. They also serve as insecticide and for medicinal purposes, both as an herb and pressed into oil (Wahbe 1997).
Barkoudah 1999, GCSAR 2011, Wahbe 1997

**Ocimum basilicum** L., Sp. Pl. (1753) 597 (Labiatae).
Habak, ryhaan (syr), sweet basil (en)
Sp. (l.), M. (h.)
Probably arose from in NW India. Classical crop in Syria. Sweet basil is a culinary herb (Barkoudah 1999). Since its introduction in the Mediterranean, a great number of varieties have been selected by farmers (Eckelmann 2003). It is certainly one of the most typical condiment crops in the Mediterranean, an important spice used in the preparation of many traditional foods in the whole region. Besides used as medicinal plant. Mostly it is cultivated in homegardens as ornamental and medicinal plant (Wahbe 1997).
Barkoudah 1999, Eckelmann 2003, Wahbe 1997

**Olea europaea** L., Sp. Pl. (1753) 8 (Oleaceae).
Zeitoun (syr), common olive, olive tree (en)
Dar., Qu., Sw., Dam., Hom., Ham., La., Tar., Al., Id., De., Raq., Has.
Oi. (fr.), Fr.

One of the oldest cultivated plants. The olive tree is considered ancient in Syria, which later spread over the whole Mediterranean and adjacent areas (Kew 2010). It takes the first place in terms of area and production. The olive tree is very hardy drought and disease resistant. All parts of the fruit contain non-drying, edible oil widely used for human nutrition. Because of its different flavour it is often considered as condiment (Katana and Pole 1999). It is also much used for a wide range of technical purposes. Pickled or otherwise prepared fruits are eaten as delight or used in bread, soups, salads, etc. Many different cultivars exist in Syria; several local varieties are grown, such as ”Surani”, ”Alzayte” or “Kurdish”, “Qaisi”, “Khudhairi”, “Daabla” or “Altmrani”, “Al-dan”, “Musabi”, “Mohazam abu satel”, “Algelot” or “Tadmoury”, “Almhati”, “Al-Egeizi”, “Algelt”, “Toufahy”, “Ebadi Abu Ghubrat”, “Aljba”, “Alemansnala”, “Altrilla”, “Alchoranina”, and “Italian” (Nabulsi 2004). Olive trees are also cultivated in homegardens (pers. obs.).

Katana and Pole 1999, Kew 2010, Nabulsi 2004

**Opuntia ficus-indica** (L.) Mill., Gard. Dict. ed. 8 (1768) no. 2. — *Cactus ficus-indica* L., Sp. Pl. (1753) 468; *Cactus opuntia* Guss., Fl. Sic. Prodr. (1828) 559, non L. (1753); *Opuntia vulgaris* Tenore, Syll. Fl. Neap. (1831) 239, non Mill. (1768) (Cactaceae).

Sabar (syr), Indian fig (en)

Dam., Dar., Al., La., Tar.

Fr., Fo., hedges

**Fig. 26.** *Opuntia ficus-indica*, sabar (syr), Indian fig (en). South Syria, Al-yarmouk valley, Dara, 2014

This old domesticate is supposed to be native to Mexico. Important in agricultural economies throughout arid and semiarid parts of the world. *Opuntia* species have gained an important place in the agricultural system of Syria as a fruit, forage, and fodder provider, particularly in subsistence agriculture where they have a comparative advantage due to their capacity to grow with minimal agronomic inputs. The cactus grows also adventively. Many different races are cultivated for their fruits. The fruits are often eaten during the summer months raw or mixed with ice cream. Jams and jellies are produced from the fruit, which is similar to strawberries and figs in colour and flavour. The red fruit colour of some varieties is used as a colorant for food. Spineless varieties are also cultivated as forage and fodder for animals. Commonly grown as hedge plant. The most common landraces cultivated in Syria are “Saliba” with large-size fruit and sweet taste, and “Sukarry” characterized by sweet taste (GCSAR 2011).

GCSAR 2011

**Origanum majorana** L., Sp. Pl. (1753) 590. — *Majorana vulgaris* Mill., Gard. Dict. Abr. ed. 4 (1754); *Majorana hortensis* Moench, Methodus (1794) 406 (Labiatae).
Mardagush (syr), marjoram (en)
La.
Sp. (h.), M. (h.)
Native of the E Mediterranean. Ancient spice and medicinal plant grown in gardens in the Mediterranean; locally naturalized in Syria and collected from the wild (Barkoudah 1999). Sometimes cultivated as a spice plant for its aromatic leaves for making tea, either green or dry, and for culinary purposes and as medicinal plant (Wahbe 1997).
Barkoudah 1999, Wahbe 1997

**Origanum syriacum** L., Sp. Pl. (1753) 590. — *Majorana crassa* Moench, Methodus (1794) 406 (Labiatae).
Zaatar (syr), Syrian oregano (en)
Qu., Ham., Al., La.
Sp. (l.)
Wild in the Lebanese mountains; it can be found everywhere in rocky places in N to S Syria and at different altitudes. Formerly it was only wild (Barkoudah 1999). *Origanum* species have locally been collected from the highland for centuries, for flavouring traditional dishes, e.g. for preparing zaatar. Recently it entered cultivation due to high levels of demand as a spice plant (Khairallah 2010), furthermore for numerous purposes in traditional medicine since olden times for its ability to respite stomach and stomach pain (pers. obs.).
Barkoudah 1999, Khairallah 2010

**Oryza sativa** L., Sp. Pl. (1753) 333 (Gramineae).
Arouz (syr), rice (en)
Dar., Hom., Al., Raq., Has.
C.
Area of origin may be the foothills of the Himalayas. Introduced as a crop to Syria about two decades ago. Only cultivated. Rice came to be grown in Syria as a new crop experimentally, especially in the Euphrates basin. Recommended upland varieties are ‘Faro’ and ‘Nerica’ (GCSAR 2011).
GCSAR 2011

**Paliurus spina-christi** Mill., Gard. Dict. ed. 8 (1768). — *Rhamnus paliurus* L., Sp. Pl. (1753) 194; *Paliurus aculeatus* Lam., Encycl. Bot. 4 (1797) 697; *Paliurus australis* Gaertn., Fruct. sem. pl. 1 (1788) 203 (Rhamnaceae).
Nabeck, shook al maseeh (syr), Jerusalem thorn (en)
La., Al.
hedges
Normally wild in Syria (Greuter et al. 1984). Sometimes planted as fence.
Greuter et al. 1984

**Panicum miliaceum** L., Sp. Pl. (1753) 58 (Gramineae).
Dakhen (syr), broomcorn millet (en)

Dar., Qu., Dam., Ham., Al., De.
C.
Originated in Central Asia (Zohary and Hopf 1988). Formerly cultivated as fodder in Syria, but today it is a rare crop (GCSAR 2009).
GCSAR 2009, Zohary and Hopf 1988

**Papaver somniferum** L., Sp. Pl. (1753) 508 (Papaveraceae).
Khoshkhash monawem (syr), opium poppy (en)
Hom. (border to Lebanon)
M. (fr., h.)
Originated in the W Mediterranean. Wild distributed in Syria (Barkoudah 1999). Formerly cultivated. Now illegal in Syria, but as medicinal plant it is cultivated in a small area (Al-Oudat 2010).
Al-Oudat 2010, Barkoudah 1999

**Peganum harmala** L., Sp. Pl. (1753) 444 (Zygophyllaceae).
Harmal (syr), Syrian rue, harmela shrub, harmal (en)
Syrian Desert
M. (fr.), Sp. (fr.), dye
Native in Syria (Barkoudah 1999). Rarely cultivated for its seeds. Drought-tolerant, but mainly plants from wild populations used from olden times for medicinal, psychedelic, dyeing purposes, and as a condiment (Sincech and Al-Khatīb 2002).
Barkoudah 1999, Sincech and Al-Khatīb 2002

**Petroselinum crispum** (Mill.) Nym., Consp. fl. eur. 2 (1879) 309. — *Apium petroselinum* L., Sp. Pl. (1753) 264; *Carum petroselinum* (L.) Benth. in Benth. et J. D. Hook., Gen. pl. 1 (1867) 891; *Petroselinum sativum* Hoffm., Gen. pl. umbell. (1814) 178; *Petroselinum hortense* Hoffm., Gen. pl. umbell. (1814) 163, 166; *Apium crispum* Mill., Gard. Dict. ed. 8 (1768) no. 2 (Umbelliferae).
Bakdones (syr), parsley (en)
V. (l.), M. (l.), Sp. (l.)
Originated in SE Europe or in W Asia. Traditional garden crop in Syria all over the country (GCSAR 2011). Most common landraces have smooth and small, flat leaves. Used as a condiment and medicinal plant (Wahbe 1997). Parsley is a key ingredient in several Syrian salads such as tabbouleh and fatoush.
GCSAR 2011, Wahbe 1997

**Phaseolus coccineus** L., Sp. Pl. (1753) 724. — *Phaseolus multiflorus* Lam., Encycl. 3 (1789) 70; *Phaseolus multiflorus* Willd., Sp. Pl. 3 (2) (1800) 1030 (Leguminosae).
Fasoulia (syr), runner bean (en)
Dar., Sw., Qu., Dam., Hom., Ham., La., Tar., Al., Id., De., Raq.
Pu.
Originated in America. Cultivated in diverse extent in Syria typically in highland areas, runner beans are the most drought tolerant (GCSAR 2011). The large white beans (Fasoulia

**Fig. 27.** *Phaseolus vulgaris*, fasoulia (syr), common bean, garden bean, snap bean, kidney beans (en). Landraces from Damascus, 2014

kalawy) known in Syria are from the climbing bean *P. coccineus*. Also cultivated in homegardens (pers. obs.).
GCSAR 2011

**Phaseolus lunatus** L., Sp. Pl. (1753) 724. — *Phaseolus limensis* Macf., Fl. Jamaica 1 (1837) 279 (Leguminosae).
Fasoulia baydah (syr), lima bean, butter bean (en)
Dar., Qu., Dam., Hom., Ham., La., Tar., Al., De., Raq.
Pu.
Originated in America. Not so common in Syria, distributed mainly in the lowlands. Cultivated in nearly all parts of Syria and in homegardens, landraces are used (pers. obs.), but also new varieties (GCSAR 2011).
GCSAR 2011

**Phaseolus vulgaris** L., Sp. Pl. (1753) 723. — *Phaseolus nanus* Jusl., Cent. Pl. 1 (1755) 23 (Leguminosae).
Fasoulia (syr), common bean, garden bean, snap bean, kidney beans (en)
Dar., Qu., Dam., Hom., Ham., Al., Tar., La., De., Raq.
Pu., V. (fr.)
Originated in America. Old crop in Syria, consumed as vegetable (fruits) and as dry seeds. The common bean is a highly variable species with a long history of cultivation (GCSAR 2011). All of the wild members of the species have a climbing habit, but there are many cultivated varieties, classified as bush bean, or pole bean depending on their particular style of growing. Fasoulia kalawy, navy bean, and wax bean are types of *P. vulgaris* named for their fruit and seed characteristics. Cultivated in most homegardens, many landraces are advanced as “Fasoulia hamanea”, “Easha khanoum”, also new varieties are used (pers. obs.).
GCSAR 2011

**Phoenix dactylifera** L., Sp. Pl. (1753) 1188 (Palmae).
Nacheel al balah, tamer (syr), date palm, palm tree (en)
Der., Has., Hom., Raq., Palmyra (Tadmor)
Fr.
Date palm was domesticated in the Near East. It is an important fruit tree with old local seed groups and an important hereditary diversity. The fruits are highly demanded and consumed throughout the world. Date palm is important in Syria. According to FAO (2007), there is a belt of convenient environments for planting, now including Palmyra, Deir Alzour, Al-Hassaka, Al-Boukamal, and Al-Raqa. Homs and Deir Alzour provinces are considered to be the pioneers in date palm plantations, followed by Al-Raqa and Al-Hassaka provinces (Syria 2007). Most famous landraces are "Khastawy", "Zahdy", and "Tadmour" (Nabulsi 2004). In NW Syria in many homegardens the palm tree has been cultivated from olden times (pers. obs.).
FAO 2007, Nabulsi 2004, Syria 2007

**Fig. 28.** *Phoenix dactylifera*, nacheel al balah, tamer (syr), date palm, palm tree (en). Date palm gardens, Northwest Syria, Deir-alzour, Syria, 2014

**Pimpinella anisum** L., Sp. Pl. (1753) 264 (Apiaceae).
Yansoon (syr), anise (en)
Dar., Qu., Dam., Al., De.
M. (s.), Sp. (s.)
Probably originated in the E Mediterranean. Wild and cultivated in Syria (Barkoudah 1999). Grown on a large scale in Syria from olden times a medicinal and aromatic plant (Wahbe 1997). Cultivation of notable commercial importance in Syria (Hanelt and IPK 2001).
Barkoudah 1999, Hanelt and IPK 2001, Wahbe 1997

**Pinus halepensis** Mill., Gard. Dict. ed. 8 (1768) no. 8 (Pinaceae).
Sonawober halaby (syr), Aleppo pine (en)
Dam., La., Tar., Al., Raq.
I. (s.), shade tree
Aleppo pine is native to the Mediterranean. It was first described in Syria and Lebanon (Mouterde 1966). *Pinus halepensis* is widely planted for its fine timber in its native area

(Barkoudah 1999), being one of the most important trees in forestry. Today it is used as shade tree.
Barkoudah 1999, Mouterde 1966

**Pinus pinea** L., Sp. Pl. (1753) 1000 (Pinaceae).
Sonawober thamary (syr), stone pine (en)
Dar., Qu., Sw., Hom., Ham., La., Tar., Id., Al., Raq., Has.
N. (s.), M. (seed oil)
Planted since Roman times, therefore it is difficult to separate wild and cultivated areas. In the Mediterranean it is used for its nuts (Barkoudah 1999), added to many dishes. The seeds are eaten raw or roasted and used for making sweets. Seeds of high quality are used for yielding oil for pharmaceutical purposes.
Barkoudah 1999

**Pistacia atlantica** Desf., Fl. atlant. 2 (1799) 364 (Anacardiaceae).
Batem atlasy (syr), atlas mastic tree (en)
Dar., Qu., Sw., Dam., La., De.
grafting stock, soil erosion control
Probably introduced from N Africa. It is important to challenge soil erosion. It supports the soil, and is used for replanting of arid and steep slopes, and to prevent landslides. Used as a grafting stock for *P. vera*. Cultivated as nematode and fungi resistant rootstock. Tolerant to drought and cold, it grows in dry areas (IPGRI 1995). Resin and fruit oil were historically used for a variety of medicinal purposes. Because other trees were rare, *P. atlantica* was a common tree in the past in the whole area, but since it was also almost the only tree it was over-exploited for its wood, reducing its current distribution (Nabulsi 2004). Besides cultivated for trials. Fruits are edible (Mouterde 1966).
IPGRI 1995, Mouterde 1966, Nabulsi 2004

**Pistacia khinjuk** Stocks in Hook., J. bot. Kew gard. misc. 4 (1852) 143. — *Pistacia acuminata* Boiss. et Buhse, Nouv. Mém. Soc. Nat. Moscou 12 (1860) 53 (Anacardiaceae).
Batem akhdar (syr), pistacia khinjuk (en)
Al., De.
Grafting stock.
Wild distributed in N Syria (Padulosi et al. 1995, Mouterde 1966). Cultivated in Syria as rootstock for *P. vera*. (Nabulsi 2004).
Mouterde 1966, Nabulsi 2004, Padulosi et al. 1995

**Pistacia vera** L., Sp. Pl. (1753) 1025 (Anacardiaceae).
Fustuq (syr), pistachio nut (en)
Dar., Sw., Dam., Ham., Al., Id.
N.
Possibly domesticated in Assyria about 4,000 years ago. Introduced into the Mediterranean, especially in the east. Now mainly cultivated in Turkey, Syria, Iran (Mabberley 2008). The seeds are eaten roasted or used like almonds in saccharine, sweets, desserts, ice cream etc. In many countries similarly to Syria the high concentration of pistachio cultivation in current

**Fig. 29.** *Pistacia vera* , fustuq (syr), pistachio nut (en). North Syria, Idlib, 2014

years has caused a narrowing of the genetic base of pistachio varieties. This is reflected by the occurrence of very few cultivars in the fields, an alarming sign that strong genetic erosion is taking place (Padulosi et al. 1995). Most important pistachio landraces and varieties in Syria are "Ashouri – red Aleppo" (characterized by green seeds and low temperature requirements), "White batoury", "Red jalab", "Nab al jamal", "Marawahy", "Lazwardy", and "Ajami" (Nabulsi 2004).

Mabberley 2008, Nabulsi 2004, Padulosi et al. 1995

**Pisum sativum** L., Sp. Pl. (1753) 727. — *Pisum arvense* L., Sp. Pl. (1753) 727; *Pisum sativum* L. var. *fulvus* L., Sp. Pl. (1753) 324 (Leguminosae).

Bazylah (syr), pea, garden pea (en)

Dar., Qu., Dam., Ham., Hom., Al., De., Raq.

Pu., V. (fr.)

Domesticated in the Near East. The wild pea is restricted to the Mediterranean basin and the Near East. Syria is a primary centre of diversity for Pisum, situated at the junction of the Mediterranean and Irano-Turanian floras (Ehrman and Maxted 1990). Peas are the most important legume for human consumption in temperate areas and one of the most important pulses world-wide; for the people in many Near East, Middle East and Mediterranean countries peas are an important source of protein. Cultivated in Syria in fields and homegardens; many landraces are grown, but also new varieties (GCSAR 2011).

GCSAR 2011

**Fig. 30.** *Pisum sativum*, bazylah (syr), pea, garden pea (en). Landrace from South Syria, Dara,

**Plantago afra** L., Sp. Pl. ed. 2 (1762) 168, p. p. — *Plantago psyllium* L., Sp. Pl. (1753) 115, p. p., emend. L., Sp. Pl. ed. 2 (1762) 167, non L. (1759),

nom. ambig.; *Plantago cynops* L., Sp. Pl. (1753) 116, nom. illeg., non L. (1762) et auct. (Plantaginaceae).
Lesan al hamal (syr), black psyllium (en)
M. (s.)
Natural in Syria. *Plantago* species have been used since early times for herbal therapies. Rarely cultivated in Syria as medicinal plant (Barkoudah 1999).
Barkoudah 1999

**Portulaca oleracea** L., Sp. Pl. (1753) 445 (Portulacaceae).
Farfaheena, backly hamkah (syr), common purslane (en)
Dam., Dar., Ham., Hom., Al., De., Raq.
V. (l.)
Possibly originated in W Asia. The wild and weedy progenitor of the domesticated type, but widely spread as a weed, grows in abundance in light soils, in addition to the valleys where streams covering vast areas in the rainy season and on the edges of canals and roadsides (Barkoudah 1999), occasionally cultivated as a vegetable.
Barkoudah 1999

**Prunus armeniaca** L., Sp. Pl. (1753) 474. — *Armeniaca vulgaris* Lam., Encycl. 1 (1783) 2 (Rosaceae).
Moshmosh (syr), apricot (en)
Dam., Hom., Ham., Al., Id., De.
Fr., N.
Originated in Central Asia in warm temperate to subtropical regions. Widely cultivated in Syria. Many local races are still important such as "Moshmosh klaby" (bitter seed) in Damascus, and "Moshmosh hamway" (sweet seed) in Hama province. The seeds, if sweet, can be used like almonds as food or for obtaining oil for cooking or as lamp-oil. Bitter seeds yield bitter "almond" oil for pharmaceutic and cosmetic preparations. From such plantations in Middle Asia and Asia Minor wild populations developed. Their seedlings can be used as rootstocks for cultivars; also *P. domestica* L., *P. cerasifera* Ehrh. besides peach-seedlings are used for this purpose. In Damascus it is a very important fruit and it is consumed fresh, used for jams, marmalades

**Fig. 31.** *Prunus armeniaca* , moshmosh (syr), apricot (en). Landrace "Balady", Dara, 2014

and pure and mixed juices or also dried. There is a traditional drink, khamar al deen, made from dried apricot leather. Most local varieties are resistant against cold such as “Kelaby”, “Hamawy”, “Balady”, “Ajamy”, “Sendiany”, and “Lawozy” (Nabulsi 2004).
Nabulsi 2004

**Fig. 32.** *Prunus avium*, karaz (syr), sweet cherry (en). Damascus, 2014

**Prunus avium** L., Fl. suec. ed. 2 (1755) 165. — *Cerasus avium* (L.) Moench, Methodus (1794) 672 (Rosaceae).
Karaz (syr), sweet cherry (en)
Sw., La., Id.
Fr.
The progenitor of the sweet cherry is distributed in the Levant and the Mediterranean, Turkey and the Caucasus, the Balkans and most parts of Europe. Fruits to 1 cm across, variable colour, yellow and pink to black, often with a bitter taste. Formerly collected from the wild. Young branches of *P. avium* subsp. *avium* are occasionally cultivated for trials, additionally since old times used as rootstocks for sweet and sour cherries (Nabulsi 2004).
Nabulsi 2004

**Prunus cerasifera** Ehrh., Beitr. Naturk. 4 (1789) 17 (Rosaceae).
Jarenek toufahy (syr), cherry plum (en)
Dar., Sw., Dam., Qu., La., Tar., Al., Id., De.
Fr.
Present since Roman times. Typically this species can be found growing wild where it has escaped from cultivation and became naturalized, old trees in semi-wild state in NW Syria, at the border with Iraq. Cultivated cherry plums can have fruits, leaves, and flowers in any of several colours. Some varieties have sweet fruits that can be eaten fresh, while others are sour and better for making jam. In Damascus it is eaten before ripening (“Jarenek”), traditionally as a snack in the beginning of spring. There are two local varieties “Jarenek Toufahy” with medium-sized fruit coloured golden, yellow or greenish, and “Jarenek Agamy” with large-sized fruits are coloured yellow. Moreover, it is used as grafting stock for *P. domestica* L. (Nabulsi 2004).
Nabulsi 2004

**Prunus cerasus** L., Sp. Pl. (1753) 474. — *Cerasus vulgaris* Mill., Gard. Dict. ed. 8 (1768) no. 1 (Rosaceae).
Karaz hamod (syr), sour cherry, tart cherry (en)

Sw., Dam., Al., Id.
Fr.
Sour cherries are native to the Near East centre which includes Asia Minor, Iran, Iraq and Syria (Vavilov 1951). Old trees in semi-wild condition. Usually cultivated in irrigated sandy plains, especially in orchards and citrus gardens. Commonly grown in the warm to cool-temperate areas of the northern Aleppo and Idlib provinces. Fresh consumption of the fruits of some cultivars with suitable acid/sugar association is possible. Only cultivated, even so often escaped, typically cultivated together with olive tree (Nabulsi 2004).
Nabulsi 2004, Vavilov 1951

**Prunus domestica** L., Sp. Pl. (1753) 475. — *Prunus insititia* Jusl., Cent. 1 (1755) 12 (Rosaceae).
Khokh (syr), plum (en)
Dar., Qu., Dam., Hom., Ham., La., Tar., Al., Id., De.
Fr.
Originating possibly from SE Europe. Plums may have been one of the first fruits domesticated by humans. The earliest records of growing and grafting of plums are from Roman times. Not known in the wild. Plums are grown commercially in orchards but also in homegardens. They include many varieties. Some types with easy-to-remove kernel and other types difficult to remove. Plums come in a wide variety of colours and sizes. Some are much stronger-fleshed than others, and some have yellow, white, green or red flesh, with similarly varying skin colour (Nabulsi 2004). Plums are eaten fresh or dried (Prune, Karasia).
Nabulsi 2004

**Fig. 33.** *Prunus domestica,* khokh (syr), plum (en). Different varieties from Damascus,

**Prunus dulcis** (Mill.) D. A. Webb, Feddes Rep. 74 (1967) 24. — *Amygdalus communis* L., Sp. Pl. (1753) 473; *Amygdalus dulcis* Mill., Gard. Dict. ed. 8 (1768) no. 2; *Prunus communis*

Arcang., Com. fl. ital. (1882) 209; *Prunus amygdalus* Batsch, Beytr. Entw. Pragm. Gesch. Nat.-Reiche 1 (1801) 30 (Rosaceae).
Louze (syr), common almond (en)
Dam., Qu., Hom., Ham., Al., Has., Id., La.
N.
Almond originated in central to SW Asia. One theory assumes that cultivated types appeared within *P. dulcis* in Iran, Turkmenistan and Tajikistan or even extended in Transcaucasia, central Turkey, Syria, Lebanon and Jordan (Browicz 1974). It was believed that almonds were one of the earliest domesticated fruit trees due to the ability of the grower to raise good-looking almonds from seed. Adapted to drought, therefore, it is grown in different regions of Syria in mountains and plains. Almond seeds have a good storability and are a food in warm-temperate, semi-arid regions (Nabulsi 2004). Local varieties, including "Balady", "Shamy farek" and "Ouja" (Hneidi 2013). Traditional eaten as fresh and green (Ouja) especially in Damascus.
Browicz 1974, Hneidi 2013, Nabulsi 2004

**Fig. 34.** *Prunus dulcis*, louze (syr), common almond (en). North Syria, Idlib, 2014

**Prunus mahaleb** L., Sp. Pl. (1753) 474. — *Cerasus mahaleb* (L.) Mill., Gard. Dict. ed. 8 (1768) no. 4 (Rosaceae).
Mahlab (syr), mahleb cherry (en)
Sw., La., Id.
Fr. (grafting stock)
The tree is native in the Mediterranean. Distributed in Syria, especially in mountainous areas of the coastline (Nabulsi 2004).
Nabulsi 2004

**Prunus persica** (L.) Batsch, Beytr. Entw. Pragm. Gesch. Naturw. 1 (1801) 30. — *Amygdalus persica* L., Sp. Pl. (1753) 672; *Persica vulgaris* Mill., Gard. Dict. ed. 8 (1768) no. 1; *Prunus persica* (L.) Batsch var. *cordiformis* Rehder, J. Arn. Arb. 26 (1945) 68 (Rosaceae).
Dourak (syr), peach (en)

Dar., Sw., Dam., Qu., Ham, La., Al.
Fr.
Possibly originated in China. The peach tree was planted in Damascus more than 2,500 years ago. It was known to Alexander the Great in Damascus, and he was impressed by this fruit. Cultivated in temperate and subtropical zones throughout the world, fresh eating of the refined fruits is common (Nabulsi 2004).
Nabulsi 2004

**Fig. 35.** *Prunus persica*, Dourak (syr), peach (en), Source: different varieties from Damascus, 2014

**Prunus spinosa** L., Sp. Pl. (1753) 475 (Rosaceae).
Khoukh shaek, barkook shaek (syr), blackthorn (en)
Al., La.
Fr. (grafting stock), hedges
The types of wild plum are cultivated as fence in the border of homegardens. Also

**Fig. 36.** *Punica granatum*, romman (syr), pomegranate (en). North Syria, Aleppo, 2014

occasionally used for soil erosion control (Nabulsi 2004).
Nabulsi 2004

**Punica granatum** L., Sp. Pl. (1753) 472. — *Punica nana* L., Sp. Pl. (1753) 472 (Punicaceae).
Romman (syr), pomegranate (en)
Dar., Dam., Al., Id., De., Raq.
Fr., M. (fr.)
Present as native in N Syria, wild or in semi-culture (Greuter et. al. 1989). It is grown as a fruit crop plant and as ornamental tree or shrub in parks and homegardens. *Punica granatum* has more than 11 named cultivars. The same genotype is named differently across regions of Syria. Several characteristics between pomegranate genotypes vary for identification, preferred use, the most important of which are fruit size, exocarp colour (ranging from yellow to purple, with pink and red most common), seed-coat colour (ranging from white to red), hardness of seed, maturity, juice content and its acidity, sweetness, and astringency. The fruits are consumed fresh (Nabulsi 2004). The pulp of the seeds is eaten or prepared into a juice. Pomegranates are used in cooking (pomegranate syrup or molasses), moreover flowers and fruit peel which is rich in tannin, are used medicinally. Fruit peel and root bark are also used for tanning. Most important landraces are "Mawardy" with sweet taste and red colour, "Tarabulsy" and "Laffany" with sour taste.
Greuter et. al. 1989, Nabulsi 2004

**Pyracantha coccinea** Roemer, Fam. Nat. Syn. Monogr. 3 (1847) 104, 219. — *Mespilus pyracantha* L., Sp. Pl. (1753) 478; *Crataegus pyracantha* Medik., Gesch. Bot. (1793) 84 (Rosaceae).
Zahret al naar (syr), fire thorn (en)
hedges
Native to an area extending from SE Europe to SW Asia. Cultivated as hedges, typically in homegardens (Barkoudah 1999).
Barkoudah 1999

**Pyrus communis** L., Sp. Pl. (1753) 479. — *Pyrus domestica* Medik., Gesch. Bot. (1793) 87 (Rosaceae).
Ejass, komathra (syr), European pear (en)
Dam., Sw., Ham., La., Id.
Fr.
Possibly originated in Persia. Many landraces can still be found. Archaeological evidence shows that pears were collected from the wild long before their introduction into cultivation. Most important local varieties are "Meskawy", "Mostafa beak", "Othmany", "Roomy", "Abu satel" and "Asaferie" (Nabulsi 2004).
Nabulsi 2004

**Pyrus syriaca** Boiss., Diagn. Pl. Orient. ser. 1, 10 (1849) 1 (Rosaceae).
Komathra soria (syr), Syrian pear (en)
Qu., Sw., Ham., La., Tar, De.
Fr., grafting stock

Seedlings are used for grafting. Wild and cultivated distributed in shrublands, semi-steppe shrublands, and montane vegetation of Mt. Hermon in Syria. Endangered species in the forests of Sweida province (Al-arab mountain), numbers are declining because of the spread of trees in private holdings, which led to cut large numbers of it. So the government is trying to protect and rehabilitate for grafting of *P. communis* scions on native wild trees in Syria. *Pyrus syriaca* as rootstock is highly resistant to drought and frost and provides the only possibility in this region for pear growing. Occasionally trees with edible fruits are found, possibly hybrids with *P. communis*. The species is very variable. *Pyrus syriaca* possibly participated in the domestication of *P. communis* (Nabulsi 2004).
Nabulsi 2004

**Quercus infectoria** G. Olivier, Voy. emp. Othoman 1, 252 (1801) t. 14, 15 (Fagaceae).
Sendian (syr), oak (en)
Qu., Sw., Ham., La., Al., Der., Raq.
I (ba., cork)
Native in Syria. Sometimes cultivated for the production of tanning bark to produce the pigment of the wood (Barkoudah 1999, Husain and Kasim 1975).
Barkoudah 1999, Husain and Kasim 1975

**Quercus macrolepis** Kotschy, Eichen t. 16 (1862) (Fagaceae).
Sendian roomy, baloot (syr), valonia oak (en)
Qu., La.
N., I. (ba.)
Distributed in Syria. Historically it was used for cork since Greek and Roman times. Mediterranean woodlands and shrublands, mountainous vegetation of Mt. Hermon. Now it is a rare and endangered species in Syria. It bears very large acorns, and these are used as food by the folks (Barkoudah 1999), the ripe acorns are eaten raw or boiled. Furthermore, expensive furniture is made from the wood. It is currently being produced in the nursery forest by the Department of Forestry for expansion of the cultivated area in coastal and S Syria, Al Sheikh Mountain (Henedy 2013).
Barkoudah 1999, Henedy 2013

**Raphanus sativus** L., Sp. Pl. (1753) 669. — *Raphanus caudatus* L., Mant. Pl. 95 (1767) (Cruciferae).
Fegil (syr), radish (en)
Dam., Dar., De., Al., Hom., Ham., Id., Raq., Has.
V. (r.), Fo. (l., r.)
Probably originated in the E Mediterranean. Old crop in Syria. Radish was a well-established crop in Hellenistic and Roman times, which leads to the assumption that it was brought into cultivation at an earlier time. Common garden crop in Syria for local consumption; landraces are still found in homegardens mostly. Many new varieties are used (GCSAR 2011).
GCSAR 2011

**Reseda luteola** L., Sp. Pl. (1753) 448 (Resedaceae).
Bolayha mousffara, khozaam (syr), reseda luteola (en)

Al., De., Id.
I. (M., dye)
Wild distribution in the Mediterranean and Anatolia; native in Syria (Martín-Bravo 2011). Formerly cultivated. Used as a dye plant, and as a sedative and a treatment for bruises since Roman times (Barkoudah 1999).
Barkoudah 1999, Martín-Bravo 2011

**Rheum rhabarbarum** L., Sp., Pl. (1753) 372. — *Rheum undulatum* L., Sp. Pl. ed. 2 (1762) 531 (Polygonaceae).
Rababa hamda (syr), rhubarb (en)
V. (l., stalk)
Origin of E Asia. In some Syrian homegardens planted as a vegetable (pers. obs.).

**Rheum ribes** L., Sp. Pl. 1 (1753) 372 (Polygonaceae).
Ribas (syr), wild rhubarb (en)
Dam., Al., La.
M.
The Syrian rhubarb is a partially commercial vegetable collected from the nature in E and S Anatolia, N Iraq and partly NW Iran in early spring. *Rheum ribes* is considered as a valuable species in herbal medicine. Wild (Barkoudah 1999), nevertheless recently also cultivated (pers. obs.).
Barkoudah 1999

**Rhus coriaria L.**, Sp. Pl. (1753) 267 (Anacardiaceae).
Somak (syr), Sicilian sumac, tanning sumac (en)
Dam., Sw., Hom., Ham., Al. (Afrin), Id., De., La.
I. (l., tanning), Sp. (s.), M. (l., fr.), wind break
Wild and cultivated in Syria. The fruit has a sour taste; dried and crushed, it is a popular spice in Syria. The ground fruit is added to zaatar and kebab. Immature fruits and seeds are also eaten. Leaves and bark contain tannic acid; they were traditionally used in tanning. Dyes of various colours (red, yellow, black, and brown) can be made from different parts of the plant (Barkoudah 1999). Moreover it is used as afforestation plant resistant to drought and as wind break used in marginal areas of Syria (pers. obs.). Leaves and fruits have also medicinal importance in the native area (Wahbe 1997).
Barkoudah 1999, Wahbe 1997

**Rhus cotinus** L., Sp. Pl. (1753) 267 (Anacardiaceae).
Somak (syr), elm-leaved sumac, wig tree, sumac dyers, Syrian sumac, sumac lumbar (en)
Dam., Sw., La., Al. (Afrin), Hom., Ham, Id., De.
I. (l., tanning), windbreak, cover plant
Wild distributed and cultivated in Syria for its tannin, also as cover plant or for windbreaks (Barkoudah 1999).
Barkoudah 1999

**Rhus trilobata** Nutt. in Torr. et A. Gray, Fl. N. Amer. 1 (1838) 219 (Anacardiaceae).

Somak shawoky (syr), spinal sumac (en)
Dam.
M., soil erosion
Possibly native in Syria. Recently cultivated against soil erosion (Barkoudah 1999) and also as medicinal plant (Wahbe 1997).
Barkoudah 1999, Wahbe 1997

**Ricinus communis** L., Sp. Pl. (1753) 1007 (Euphorbiaceae).
Al kharwah (syr), castor-oil plant (en)
La., Al.
M. (s.), Oi. (s.)
Castor is indigenous to the SE Mediterranean Basin (Barkoudah 1999). Formerly cultivated as medicinal plant in a small area (Wahbe 1997). The oil of the castor plant has long been used for pharmaceutical purposes.
Barkoudah 1999, Wahbe 1997

**Robinia pseudo-acacia** L., Sp. Pl. (1753) 722 (Leguminosae).
Robenia (syr), black locust (en)
Dar., Qu., Dam., Raq.
Soil erosion control, hedges
Introduced from eastern N America. Used for hedges and soil erosion control. In Syria naturalized in the north (border with Turkey) and south (border with Jordan) (ILDIS 2010). It is often planted alongside streets and in parks, especially in Damascus and Aleppo as ornamental and soil loss regulator tree. With poplars and eucalypt trees, one of the most widely distributed forest trees.
ILDIS 2010

**Rosa damascena** Mill., Gard. dict. ed. 8 (1768) no. 15 (Rosaceae).
Al warda al damshqyah (syr), Damas rose (en)
Dam., widely distributed in all provinces
M. (fl.), I. (fl., perfume)
Originated in W Asia. It is an old garden plant of traditional houses in Damascus and Aleppo. *Rosa damascena* is the most important commercially grown *Rosa* species, producing a high-value aromatic oil (Barkoudah 1999), which is used in flavourings and fragrance industries, pharmaceutically (Wahbe 1997), and for rose water production, also as food additive (flowers, rose oil), moreover for decorative use. Fruits are used for beverages and sweets. *Rosa damascena* is of hybrid origin from crossings between *R. gallica* L. and *R. phoenicea* Boiss., or *R. moschata* Herrm. Originated probably in Syria.
Barkoudah 1999, Wahbe 1997

**Rosmarinus officinalis** L., Sp. Pl. (1753) 23 (Labiatae).
Ekleel al jabal, hassa al bahn (syr), rosemary (en)
M. (h.), Sp. (l.), I. (fl., perfume)

Native to the Mediterranean. Wild in Syria (Barkoudah 1999) and rarely cultivated in homegardens. It can tolerate droughts, surviving a severe lack of water for long time. Used as medicinal plant (Wahbe 1997).
Barkoudah 1999, Wahbe 1997

**Rumex patientia** L., Sp. Pl. (1753) 333. — *Rumex patientia* var. *kurdicus* Boiss., Fl. orient. 4 (1879) 1009 (Polygonaceae).
Houmad kabeer (syr), monk's rhubarb, patience dock, spinach-dock (en)
Dar., Sw., Dam.
V (l.), M. (l.)
Native in Syria. Traditionally collected as wild leaf vegetable, now also cultivated in homegardens as new vegetable (Barkoudah 1999). In S Syria used as medicinal plant (Wahbe 1997).
Barkoudah 1999, Wahbe 1997

**Salvia officinalis** L., Sp. Pl. (1753) 23 (Labiatae).
Myramia, kaseen teby (syr), garden sage, common sage (en)
Sp. (l.), M. (h.)
Probably domesticated in Greece. In Syria cultivated from ancient time. Wide distribution as medicinal (Wahbe 1997), and culinary plant (Barkoudah 1999). Cultivated in homegardens in Syria (pers. obs.).
Barkoudah 1999, Wahbe 1997

**Salvia fruticosa** Mill., Gard. Dict. ed. 8, no. 5 (1768) (Labiatae).
Kaseen shagary (syr), Greek sage (en)
M. (h.), Sp. (l.)
Native in Syria. Wild (Barkoudah 1999) and cultivated in homegardens from olden times. It has a long tradition of use in Syria, where it is valued for its beauty, medicinal use (essential oil) (Wahbe 1997) and culinary purposes.
Barkoudah 1999, Wahbe 1997

**Salvia sclarea** L., Sp. Pl. (1753) 27 (Labiatae).
Kaff ed-dubb (syr), clary sage (en)
M. (h.)
Wild and cultivated in Syria (Barkoudah 1999). Used for flavouring dishes, salads and for the production of soaps, perfumes and other cosmetics. The herbage is used in folk medicine (Wahbe 1997).
Barkoudah 1999, Wahbe 1997

**Satureja hortensis** L., Sp. Pl. (1753) 568 (Labiatae).
Nadegh bostany (syr), summer savory, satureja (en)
Sp. (h.), M. (h.)
Domesticated in the E Mediterranean. Used from olden times as spice and medicinal plant, cultivated in homegardens in Syria (Barkoudah 1999).
Barkoudah 1999

**Satureja montana** L., Sp. Pl. (1753) 568 (Labiatae).
Nadegh shatwy (syr), winter savory (en)
Sp. (h.), M. (h.)
Native in Syria (Kew 2010). Easy to grow, it makes a beautiful border plant in homegardens. Used from former times as condiment and medicinal plant (Barkoudah 1999), and as aromatic and medicinal plant.
Barkoudah 1999, Kew 2010

**Schinus molle** L., Sp. Pl. (1753) 388. — *Schinus areira* L., Sp. Pl. (1753) 389 (Anacardiaceae).
Felfel berovy (syr), false pepper (en)
Dam., Al.
Sp. (fr.)
Native to the arid zone of S America. Introduced to subtropical areas and the Mediterranean. It is drought tolerant. Cultivated as ornamental plant along roadsides. Bark, leaves and berries are aromatic when crushed, so sometimes used as aromatic plant. It is found as adventive plant (Barkoudah 1999).
Barkoudah 1999

**Senegalia senegal** (L.) Britton, Sci. Surv. Porto Rico & Virgin Islands 6 (1930) 538. — *Mimosa senegal* L., Sp. Pl. (1753) 521; *Acacia senegal* (L.) Willd., Sp. Pl. 4, 2 (1806) 1077 (Leguminosae).
Sant sayal, shagaret semgh araby (syr), gum Arabic tree, red talah (en)
La., Tar., Al., De.
I. (gum), M. (l., s.)
The tree is of high commercial importance because it produces Arabic gum or meska, to be used as a food additive, in industry, and as a cosmetic. Gum drained from cuts in the bark is also used for therapeutic purposes (Wahbe 1997).
Wahbe 1997

**Sesamum orientale** L., Sp. Pl. (1753) 634. — *Sesamum indicum* L., Sp. Pl. (1753) 634 (Pedaliaceae).
Soumsoum (syr), sesam (en)
Dar., Qu., Hom., Ham., Al., De., Raq.
Oi. (s.), Sp. (s.), M. (oil)
Probably originated in India. Sesame is perhaps the oldest oil crop, domesticated well over 3,000 years ago. It reached Babylon and Mesopotamia (present-day Iraq and Syria) from Africa already 2,300 BC. (Hanelt and IPK 2001). Sesame is drought-tolerant, able to grow where other crops fail. It was a major summer crop in many provinces in Syria (pers. obs.), good landraces are “Hourany” and “Zuory”. Today, in experiment, many new varieties are used (GCSAR 2009). Traditionally sesam oil is used for medicinal purposes (Wahbe 1997).
GCSAR 2009, Hanelt and IPK 2001, Wahbe 1997

**Setaria italica** (L.) Pal. Beauv., Agrost. (1812) 51. — *Panicum italicum* L., Sp. Pl. (1753) 56 (Gramineae).

Dakhen (syr), foxtail millet (en)
De., Raq., Al.
C.
Old crop in Syria, cultivated since Roman times, but only as fodder plant (Post 1896). In general the cultivation is declining; some landraces are used as "Dahken 1" and "Daghen 2" (GCSAR 2009). After the end of cultivation it remains as an annual weed especially in temperate regions.
GCSAR 1999, Post 1896

**Solanum melongena** L., Sp. Pl. (1753) 186. — *Solanum esculentum* Dunal, Hist. Sol. (1813) 208 (Solanaceae).
Bathenjan (syr), aubergine, eggplant (en)
Dar., Dam., Hom., Ham., De.
V. (fr.)
Probably of African origin. Widely cultivated in Syria. Landraces are still grown such as "Homsy", "Bead al ejel", and "Balady", but also many new varieties are cultivated (GCSAR 2011).
GCSAR 2011

**Solanum tuberosum** L., Sp. Pl. (1753) 185. — *Solanum sinense* Blanco, Fl. Filip. (1837) 137 (Solanaceae).
Batata (syr), potato (en)
Dam., Dar., Hom., Ham.
V. (r.), St. (r.)
Originated in S America. Potatoes were not known in the ancient world, only in the last fifty years this crop became known in Syria (GCSAR 2011).
GCSAR 2011

**Sorbus torminalis** (L.) Crantz, Stirp. austr. fasc. 2 (1763) 45. — *Crataegus torminalis* L., Sp. Pl. (1753) 476 (Rosaceae).
Ghoberaa momaghsah (syr), checker tree (en)
La., Al.
Shade tree, Fr.
Native in Syria (Browicz 1982, Scholz 1995). Recently cultivated as shade tree in the big cities like Aleppo.
Browicz 1982, Scholz 1995.

**Sorghum bicolor** (L.) Moench, Methodus (1794) 207. — *Holcus bicolor* L., Mant. Pl. 2 (1771) 301; *Sorghum saccharatum* (L. em. L.) Moench convar. *technicum* (Koern.) Tzvelev, Novosti sist. vyss. rast. (1968) 15; *Andropogon sorghum* Brot. var. *technicus* Koern., Handb. Getreideb. 1 (1885) 308; *Sorghum vulgare* Pers., Syn. pl. 1 (1805) 101 (Gramineae).
Thurra rafeea (syr), sorghum (en)
Dam., Dar., Al., De.
C., I., Fo.

Originated in Africa, it is an old crop in Syria (Mansour 2009), used as fodder and to make brooms, but as minor crop (GCSAR 2009).
GCSAR 2009, Mansour 2009

**Spinacia oleracea** L., Sp. Pl. (1753) 1027 (Chenopodiaceae).
Sabanekh (syr), spinach (en)
Dam., Dar., Qu., Hom., Ham., La., Al., Id., De.
V. (l.)
Possibly domesticated in Persia. Introduced to Syria (Greuter et al. 1984), it is a very common winter vegetable in Syria with many landraces such as "Sabanekh Balady", but also new varieties are used (GCSAR 2011). Cultivated in homegardens (pers. obs.).
GCSAR 2011, Greuter et al. 1984

**Thymus vulgaris** L., Sp. Pl. (1753) 591 (Labiatae).
Zaatar (syr), garden thyme (en)
Sp. (h.), M.
Widely cultivated as a spice, ornamental and medicinal plant (Wahbe 1997). In the Mediterranean in the past, people used to gather thyme from the hills and woodlands (Barkoudah 1999). But there was a decline in wild thyme because of environmental changes and high demand for this herb. People started thinking about ways to preserve and produce thyme, and the solution was to cultivate it, just like other crops. Thyme mixed with sesame seeds, sumac and nuts is a common delicacy. Thyme is also the main ingredient used in bakeries in making manaqish (Arabic pastries), the favourite breakfast food for Syrians. *Thymus syriacus* Boiss. and *T. serpyllum* L. exhibited higher oil content than *T. vulgaris* and *T. cilicicus* Boiss. et L. H. Bailey, the aromatic oil plants cultivated in Syria (pers. obs.).
Barkoudah 1999, Wahbe 1997

**Thymus capitatus** (L.) Hoffmanns. et Link, Fl. Portug. 1 (1809) 123. — *Satureja capitata* L., Sp. Pl. (1753) 568 (Labiatae).
Mardakoush (syr), conehead thyme, Spanish oregano (en)
Qu., La.
Sp. (h.), M.
Distributed in the Mediterranean. Wild and cultivated in Syria (Barkoudak 1999) as a medicinal plant (Wahbe 1997), also used for food flavouring. Newly cultivated in homegardens.
Barkoudah1999, Wahbe 1997

**Trifolium argutum** Banks et Sol. in Russell, Nat. Hist. Aleppo, ed. 2, 2 (1794) 260 (Leguminosae).
Nafel thahaby (syr), golden clover, large trefoil (en)
Dar., Qu., Dam., Hom., Al., De.
Fo.
Native in Syria. The plant is very common, and grows well on poor, undisturbed grounds (Zohary and Heller 1984). While it possibly has good nutritious values, perennial species are favoured as forage.

Zohary and Heller 1984

**Trifolium glomeratum** L., Sp. Pl. (1753) 770 (Leguminosae).
Barseem (syr), clover (en)
Dar., Qu., Dam., Al., De., Raq.
Fo.
Commonly distributed in Syria. At least formerly occasionally grown as forage crop (Masri 2006).
Masri 2006

**Trifolium pratense** L., Sp. Pl. (1753) 768 (Leguminosae).
Barseem ahmar (syr), red clover (en)
Dar., Qu., Dam.
Fo.
Native in Syria (Barkoudah 1999). One of the major fodder crops of the temperate zone and here cultivated everywhere except semi-arid areas (Masri 2006). The crop is grown in poor or fallow land; it is used as green or dry fodder, for pasture and soil improvement.
Barkoudah 1999, Masri 2006

**Trifolium repens** L., Sp. Pl. (1753) 767 (Leguminosae).
Barseem abiad, nafel zahef (syr), white clover (en)
Dar., Dam., Qu.
Fo.
Native in Syria. Introduced worldwide as a pasture crop; it is the most widely cultivated clover. Domesticated in the Netherlands or England at the beginning of the 17$^{th}$ century (Hanelt 1986). Important forage crop in Syria used for hay or silage (Masri 2006).
Masri 2006, Hanelt 1986

**Trigonella foenum-graecum** L., Sp. Pl. (1753) 777 (Leguminosae).
Helba (syr), fenugreek (en)
Dar., Dam., Ham., Hom., De.
M. (s.), Fo., Sp. (s.)
Probably domesticated in the Near East. Wild distributed in Syria (Sincech and Al-Khatīb 2002). Also cultivated worldwide as a semi-arid crop grown in gardens or fields, partly

**Fig. 37.** *Triticum aestivum*, qameh tary, hinta (syr), bread wheat, common wheat, soft wheat (en). Experimental fields. Source: GCSAR, Damascus, Syria, 2011

under irrigation or in mixed croppings, e.g. with sesame (GCSAR 2011). Mature seeds are used as condiment and in human and veterinary medicine.
GCSAR 2011, Sincech and Al-Khatīb 2002

**Triticum aestivum** L., Sp. Pl. (1753) 85. — *Triticum vulgare* Vill., Hist. Pl. Dauph. 2 (1787) 153; *Triticum compactum* Host, Gram. Austr. 2 (1809) 5 (Gramineae).
Qameh tary, hinta (syr), bread wheat, common wheat, soft wheat (en)
Dar., Dam., Hom., Ham., Tar., Al., Id., Raq., De., Has.
C.
First domesticated in W Asia during the early Holocene, and spread from there to N Africa, Europe and E Asia in the prehistoric period. The most important cereal for bread making, used for the production of soft wheat flour. Used in very different manner for human consumption and as forage. Centres of variation of common wheat are the Near East and Middle Asia. Perhaps more than 10,000 cultivars and landraces are known. During the 20$^{th}$ century, the introduction of high-yielding varieties, and the structural changes in wheat farming systems, led to a loss of genetic diversity (Jaradat 2014). Many landraces disappear and new varieties are entered; the process of genetic erosion is going on. The most significant certified wheat varieties in Syria are 'Cham 10', 'Cham 8', 'Cham 6', 'Douma 2', 'Douma 4', and 'Bohous 4' (GCSAR 2009).
GCSAR 2009, Jaradat 2014

**Triticum dicoccon** Schrank, Baier. Flora 1 (1789) 389. — *Triticum dicoccum* Schuebler, Char. et descr. cereal., Hort. Tuebing. (1818) 29 (Gramineae).
Qameh thonay al habah (syr), emmer wheat, hulled wheat, farro (en)
De.
C.
Domesticated in SW Asia. It was spread to Syria (Padulosi et al. 1996). Since some decades completely disappeared from agricultural cultivation, but maintained in collections as a relic crop (GCSAR 2009).
GCSAR 2009, Padulosi et al. 1996

**Triticum durum** Desf., Fl. Atlant. 1 (1798) 114. — *Triticum turgidum* L. subsp. *durum* (Desf.) Husn., Gramin. 4 (1899) 80; *Triticum turgidum* L. var. *durum* (Desf.) Mac Key, Hereditas, Suppl. 2 (1966) 268 (Gramineae).
Qameh kassy (syr), durum wheat, hard wheat, macaroni wheat (en)
Dar., Dam., Hom., Ham., Al., Tar., Id., De., Raq., Has.
C.

**Fig. 38.** *Triticum durum*, qameh kassy (syr), durum wheat, hard wheat, macaroni wheat (en), South Syria, Dara, Syria, 2014

Domesticated in SW Asia. Cultivated in Syria (Hanelt and IPK 2001). Second most important wheat, more than 10% of the world's wheat production refers to durum wheat. It is used to produce pasta and bulgur. Durum wheat had been found at first sporadically already from the 7th/6th millennium BCE in Syria, Turkey, Iran. Well adapted landraces are grown under contrasting climatic regions of Syria, such as "Hamari", "Jidouri", "Zedi", "Gharbi", "Joulani", "Jabali", "Siklawi", "Baladi" (local), and "Haurani" (*T. durum* subsp. *horanicum* Vavilov). They are very well adapted to hot and arid climates. Their seeds have excellent technological characteristics for pasta making; "Bayadi" with many shoots is drought resistant and grows on poor soil with calcareous deficiency; "Yabroudi" is frost-resistant (GCSAR 2009). Landraces are threatened mostly by newly developed varieties (pers. obs.).


**Fig. 39.** *Triticum durum*. Experimental fields. Source:GCSAR, Damascus, Syria, 2011

GCSAR 2009, Hanelt 2001, Pagnotta et al. 2004

**Triticum monococcum** L., Sp. Pl. (1753) 86 (Gramineae).
Qameh waheed al haba (syr), einkorn wheat, small spelt wheat (en)
De.
C.

Domesticated in SW Asia. Native in Syria (Schiemann 1946). Einkorn wheat is one of the earliest cultivated forms of wheat, alongside emmer. Grains of wild einkorn have been found in Epi-Paleolithic sites of the Fertile Crescent. It was first domesticated approximately 7,500 BCE in SE Turkey (Hopf and Zohary 2000). The salt-tolerance feature of *T. mono-*

**Fig. 40.** Traditional tool for cracking wheat to make bulgur, also frekah. South Syria, Dara, 2014

*coccum* was incorporated into durum wheat. Mostly it is used as fodder plant. It is adapted to the climate in Syria so it is advisable for plant breeder to improve local varieties. Einkorn is a diploid hulled wheat. The cultivated form is similar to the wild, except that the ear stays intact when ripe and the seeds are larger. Today in Syria cultivated only for experimental purposes.
Hopf and Zohary 2000, Schiemann 1946

**Triticum polonicum** L., Sp. Pl. ed. 2 (1762) 127. — *Triticum turgidum* L. subsp. *polonicum* (L.) A. et D. Löve, Bot. Not. 114 (1961) 50 (Gramineae).
Qameh robaey al haba (syr), gommer, Polish wheat (en)
C.
Native in Syria (Post 1896). A minor crop in Syria and almost always associated with other wheats, mainly durum (GCSAR 2009). Many landraces are heat- and drought-tolerant, and have good technological characteristics, such as "Nab El Jamal".
GCSAR 2009, Post 1896

**Triticum turgidum** L., Sp. Pl. (1753) 86 (Gramineae).
Qameh makhrooty (syr), cone wheat, pollard wheat, rivet wheat (en)
Dam., Der., Has., Raq.
C.
Domesticated in SW Asia, originated in N Syria as wild (Post 1896). Cultivated in Syria (GCSAR 2009). It is usually ground into flour and used as a cereal for making macaroni, spaghetti pasta, bulgur, and freekah (young seed roasted and dried).
GCSAR 2009, Post 1896

**Ulmus glabra** Huds., Fl. Angl. (1762) 95. — *Ulmus campestris* L., Sp. Pl. (1753) 225, p. p., nom. ambig. (Ulmaceae).
Dardar ajrad (syr), wych elm, scots elm (en)
Dam., Al., Ham., De.
Shade tree, hedges
Native in Syria (Mouterde 1966, Uotila 2011). Cultivated for fences, as a shade tree (Browicz 1982), also in homegardens (pers. obs.).
Browicz 1982, Mouterde 1966, Uotila 2011

**Ulmus minor** Mill., Gard. Dict., ed. 8 (1768) no. 6 (Ulmaceae).
Dam., Al., Ham., De.
Dardar al hakel, dardar asfar (syr), field elm (en)
Shade tree, hedges
Native in Syria (Uotila 2011). Cultivated for fences or as a shade tree, also in homegardens (pers. obs.).
Uotila 2011

**Vicia ervilia** (L.) Willd., Sp. Pl. 3, 2 (1800) 1103. — *Ervum ervilia* L., Sp. Pl. (1753) 738 (Leguminosae).
Kirsannah (syr), bitter vetch (en)
Dam., Dar., Qu.

Fo.
Native in Syria (Greuter et al. 1989). Formerly it was a very traditional crop (Barkoudah 1999). Possibly still cultivated as a minor crop of decreasing importance in Syria as fodder plant (Masri 2006).
Barkoudah 1999, Greuter et al. 1989, Masri 2006

**Vicia faba** L., Sp. Pl. (1753) 737 (Leguminosae).
Fool (syr), broad bean (en)
Dar., Qu., Dam., Hom., Ham., Al., De.
Pu.
The domestication of faba bean took place apparently in the Near Eastern-Eastern Mediterranean region. No wild progenitor is known; landraces are well adapted to the local climate, such as "Fool koubresy", "Balady" or "Baly" (rainfed varieties), and "Zori" (GCSAR 2009).
GCSAR 2009

**Vicia sativa** L., Sp. Pl. (1753) 736 (Leguminosae).
Kirsannah, beekia (syr), common vetch (en)
Dar., Qu., Sw., Dam., De., Hom., Ham.
M. (s.), Fo.
Native in Syria (Greuter 1989). Common vetch has also been part of the human diet, as proved by carbonised remains found in early Neolithic sites (Zohary and Hopf 2000). In Syria grown in semi-arid Mediterranean regions with October-April rainfall of 200–400 mm (GCSAR 2009).
GCSAR 2009, Greuter et. al. 1989, Zohary and Hopf 2000

**Vigna unguiculata** (L.) Walp., Rep. 1 (1842) 779. — *Dolichos unguiculata* L., Sp. Pl. (1753) 725; *Dolichos sinensis* L., Herb. Amboin. (1754) 23; *Vigna sinensis* (L.) Savi ex Hassk., J. J. B. 1, 5 (1971) 279 (Leguminosae).
Lubiya (syr), cowpea, black eyed bean (en)
Dar., Qu., Dam., Hom., Ham., De., Al., Id., Raq.
Pu., V. (fr.)
Originated in tropical Africa. Cowpea is one of the most important food legume crops in the semiarid tropics. Many landraces are used in homegardens in Syria; new cultivars are distributed by seed companies. Seeds for culinary use, green fruits are eaten as vegetables (GCSAR 2011).
GCSAR 2011

**Vitis vinifera** L., Sp. Pl. (1753) 202. — *Vitis laciniosa* L., Sp. Pl. (1753) 203; *Vitis vinifera* L. var. *laciniosa* (L.) Fiori, Nuov. Fl. anal. Ital. 2 (1925) 109 (Vitaceae).
Karma, enab (syr), grape, grapevine (en)
Dar., Sw., Qu., Dam., Al., Der., Id., Raq., Has.
Fr., M.
Possibly native to the Mediterranean. For thousands of years, grape has been harvested for both medicinal and food value. Syria is an important producer. The grape is eaten fresh as

table grapes or dried as sultanas, Damask grape syrup (debs, molasses) and raisins (dried on the plant), braised or processed in different ways (such as juice). Most of the grapes is made into wine, especially in Sweida province. Many landraces can still be found, such as "Doumany" (very sensitive to *Phylloxera*), formerly grown in Douma, the suburbs of Damascus, "Jabally" in Dara and Sweida, "Ashoury" and "Housromy" in NE Syria. Local grapevine varieties are "Doumany ahmar", "Dyrany aswad", "Zainy", "Dourobly abiad", "Ashlamesh", "Helwani", "Kassofee", and "Khoudeiry". There are five field gene banks which include 159 accessions (Nabulsi 2004). Very common in homegardens.
Nabulsi 2004

**Fig. 41.** *Vitis vinifera*, karma, enab (syr), grape, grapevine (en).
Different landraces from south Syria, Dara, 2014

**Zea mays** L., Sp. Pl. (1753) 971 (Gramineae).
Thurah, durah (syr), maize, corn, mealies (en)
Dar., Sw., Qu., Dam., Ham., Hom., La., Tar., Al., Id., Has., Raq., De.
C., V. (cobs)
Introduced from America via Spain in the 16$^{th}$ century (Hammer 1992). Maize is topping the list of strategic crops in Al-Raqa province. Seeds are used as forage (dent corn) and for human consumption (sweet corn). Traditionally cooked with water, or roasted as popcorn and eaten as snack. People from Dara and Damascus suburbs like the landrace "Thurah balady", especially in homegardens (Mansour and Arafa 2009).
Hammer 1992, Mansour and Arafa 2009

**Ziziphus jujuba** Mill., Gard. Dict. ed. 8 (1768) no. 1. — *Rhamnus zizyphus* L., Sp. Pl. (1753) 194; *Ziziphus sativa* Gaertn., Fruct. sem. pl. 1 (1788) 202; *Ziziphus vulgaris* Lam., Encycl. 3 (1789) 316; *Ziziphus zizyphus* (L.) Meikle, Fl. Cyprus 1 (1977) 358 (Rhamnaceae).
Eanab, nabec, sokouk al maseeh (syr), jujube tree, Chinese date, French jujube (en)
La.
Fr., M.
Domesticated in India or China. Growing wild in the coastal areas of Syria. Its small round dark red fruits are eaten fresh and dried. Tolerant to extreme temperatures, salinity, alkalinity, and drought (Magness et al. 1971). Normally wild trees, cultivated jujube is limited to homegardens and experimental plantings for medicinal purpose (ICARDA 2005).
ICARDA 2005, Magness et al. 1971

**Ziziphus lotus** (L.) Lam., Encycl. 3 (1789) 317. — *Rhamnus lotus* L., Sp. Pl. (1753) 194 (Rhamnaceae).
Sedra, enab (syr), African date palm, Jew thorn (en)
Fr., M. (fr.), hedges, shade tree
Deciduous shrub, native in the Mediterranean, likewise in Syria (Barkoudah 1999). Cultivated as a fruit tree and for hedges. The edible fruit freshly harvested as well as the candied dried fruits are often eaten as a snack, or with coffee. Mostly used as shade tree or in old homegardens (pers. obs.).
Barkoudah 1999

# 4 Discussion

Syria has experienced several civilizations. Man settled in this productive land since ancient times and used its resources. However, such use has led to changes in vegetation and lack of wildlife through the country, in seashore areas, interior, mountains, and grassland. Plant domestication and growing started more than 10,000 years ago in West Asia. Since then plentiful of economic plant species were present and used by man and his domesticated animals.

As it was mentioned before, plant genetic resources studying and surveying in Syria have been rather abandoned, so individual few references are accessible in these concerns.

Because of its geographical location, Syria shows a flora of heterogeneous phytogeographical character. The following geographical elements are represented in the flora of Syria (Syria 2009):

- Mediterranean
- Irano-Turanian
- Saharo-Arabian
- Euro-Siberian

A portion from these monoregional plant groups together made the greater amount of the flora. Extreme of the species, which are identified as Euro-Siberian elements in Syria, are limited to special habitats that may pervade into other Irano-Turanian, as well as into Mediterranean regime of hot, dry summers and cool, wet winters. A lowland area known as the "Syrian Saddle," which separates the Anti-Taurus from the Syro-Palestine ranges, allows the Mediterranean influence to extend inland.

The inland regions, however, have a more continental climate. An exceptive of these species found distributed in the forest zone of Syria is of historic importance as possible relict of the flora of the tertiary era. The number of bi- and multi-regional species in the flora of Syria, which are the plants species growing in two or more phytogeographical regions, is high. Syria includes only an insignificant number of Saharo-Arabian plant species.

Several crops domesticated in Syria and their wild ancestors are of universal importance. The following is a short list of those crops having their centres of origin in Syria (Jaradat 2011):

- Cereals: *Avena* spp. (wild oats); *Hordeum* spp. (wild and cultivated barley); *Secale cereale* (wild rye); *Triticum* spp. (wild and cultivated wheat); *Aegilops* spp. (goat grass);
- Pulses: *Cicer* spp. (wild and cultivated chickpea); *Lens* spp. (wild and cultivated lentil); *Pisum* spp. (wild and cultivated pea); *Vicia faba* (cultivated faba bean);
- Vegetables: *Lactuca sativa* (lettuce); *Brassica* spp. (turnip, cabbage and their wild relatives); *Raphanus sativus* (radish); *Allium* spp. (wild and cultivated onion and garlic); *Daucus* spp. (carrot and wild relatives); *Cynara scolymus* (artichoke); *Sinapis alba* (mustard);

- Spices: *Cuminum cyminum* (cumin); *Mentha* × *piperita* (peppermint); *Foeniculum vulgare* (fennel);
- Fibre/jute crops: *Linum usitatissimum* (flax, linseed); *Sesamum indicum* (sesame);
- Forages: *Medicago* spp. (medics and wild relatives); *Vicia sativa* (vetch and wild relatives);
- Fruit and nut trees*: Olea europaea* (olive and wild relatives); *Ficus carica* (fig and wild relatives); *Phoenix dactylifera* (date palm) – an ancient crop in Syria, cultivated in NW Syria; *Vitis vinifera* (grape); *Punica granatum* (pomegranate) – more commonly cultivated in homegardens than in orchards; *Pistacia* spp. (pistachio and wild relatives); *Prunus* spp. (plum, cherry, apricot, etc.); *Prunus dulcis* (almond and wild relatives);
- Timber trees: *Abies* spp., *Acacia* spp., *Castanea sativa*, *Cedrus* spp., *Fagus orientalis*, *Juglans regia*, *Pinus* spp.;
- Dyes: *Alkanna tinctoria*, *Anchusa italica*, *Indigofera* spp., *Rubia tinctorum*;
- Essential oils and herbs: *Achillea* spp., *Artemisia* spp., *Origanum* spp., *Thymus* spp.;
- Plants of horticultural value: *Allium* spp., *Asparagus* spp., *Colchicum* spp., *Crocus* spp., *Lilium* spp., *Rosa persica*, *Tulipa* spp.

The origins of agriculture are still a matter of continuous investigation (Hammer 2004). Syria is part of the original centre of cultivated plants (Zohary 1970) rich in agrobiodiversity (food, forage crops, and fruit trees), such as wheat, barley, lentil, chickpea, lathyrus, olive, almond, pear, plum, medic, clover, as well as ornamental, medicinal, and aromatic plants. Such plants are of main interest for agriculture; therefore Syria is an area of megadiversity of different crops.

Moreover, Syria is a part of the Fertile Crescent. The typical crops domesticated in this region together with to their wild relatives, are of universal importance (Harlan 1992). Man populated this fertile land since olden times and used its resources. Syria is part of the Near East (Harlan 1971).

Furthermore, the Silk Road penetrating Syria from the southeast to the northwest, connecting China and the Middle East across Central Asia, raised other supplies that originated in Asia and were traded including spices, flowers, medical herbs, fruit species like *Morus nigra* (black mulberry) and *Morus alba* (white mulberry). Also some new cultivated species have been reported such as *Actinidia deliciosa* (kiwi fruit). Such discoveries add to the previous indication that Syria has been an important country for the evolution and variation of economic plants for long time. As a result of the local ethno-botanical heritage and traditional food consumption habits, a number of species of the wild flora are harvested and used as food, including aromatic plants, spices and condiments.

Syria also is considered as one of the main diversity centres (Vavilov 1997). Vavilov collected in Syria in 1926 as a part of the Mediterranean and Middle East. The first expeditions to crop fields presented the exclusive nature of cultivated plants of Syria with a high number of endemic forms. The most important crop grown was durum wheat, *Triticum durum*. Amongst the fields of this wheat, Vavilov recognized a special subspecies which he named subsp. *horanicum* Vavilov. In barley, he found varieties endemic to the Near East,

namely var. *syriacum* Vavilov et Orlov and var. *palestinicum* Vavilov et Orlov (Fig. 42). Orabi et al. (2009) reported about the genetic diversity of barley in the area.

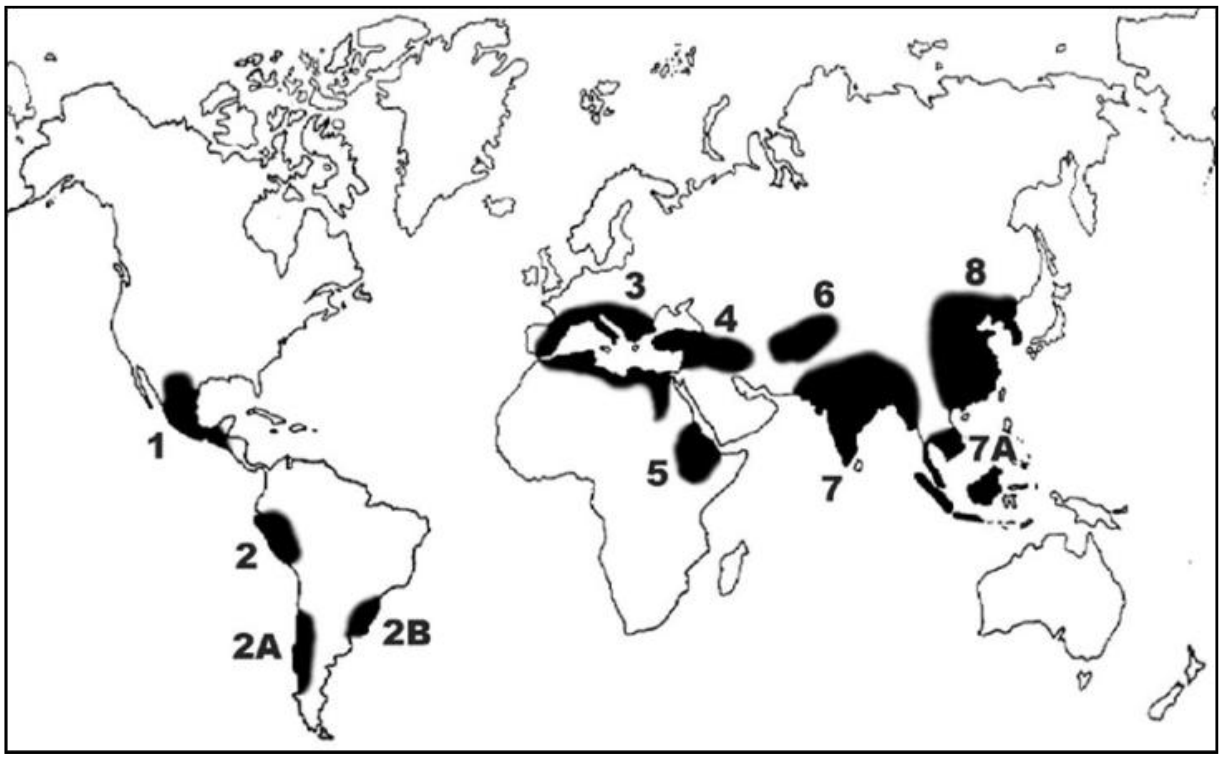


**Fig. 42.** Vavilov's centres of genetic diversity (adapted from Vavilov 1997). (1) Mexico-Guatemala, (2) Peru-Ecuador-Bolivia, (2A) Southern Chile, (2B) Southern Brazil, (3) Mediterranean, (4) Middle East, (5) Ethiopia, (6) Central Asia, (7) Indo-Burma, (7A) Siam, (8) China and Korea

Amongst the very rich collections of *Vicia faba* L., the endemic form var. *syriaca* Murat. was recognized, similarly large groups of lentil (*Lens culinaris* Medik.), pea samples (*Pisum* spp.), flax (*Linum* spp.), sesame (*Sesamum indicum* L.), and alfalfa (*Medicago sativa* L.) (Vavilov 1992).

Introgression is one of the greatest exciting approaches, creating new variation in cultivated plants (Esquivel and Hammer 1992). Many crops of Syria are influenced by hybridization other cases result from introgressions of wild into cultivated species and vice versa. Collection cases are shown in Table 12.

One earlier considered case happened in wheat. Wild wheat can be found as a weed in fields where other landraces or commercial varieties are planted. Under such conditions an interesting variation has been generated. The result also indicated introgression between the wild species and the cultivated ones.

Over the past four decades, a unique collection of crop genetic resources has been established, residing with the Genebank of the International Centre for Agricultural Research in the Dry Areas (ICARDA) at Aleppo in Syria, duplicated accession which collected together with ICARDA at the GCSAR genebank in Damascus.

The collections between GCSAR and ICARDA focused on barley, faba bean, lentil and many forage legumes and fruit trees, ancient varieties of durum and common wheat.

**Table 12.** The founder crops of Neolithic agriculture and their wild progenitors. Adapted from Weiss and Zohary (2011)

| Domesticated crop | | Wild progenitor | |
|---|---|---|---|
| Common name | Scientific name | Common name | Scientific name |
| Einkorn wheat | *Triticum monococcum* | Wild einkorn | *Triticum boeoticum* |
| Emmer wheat | *Triticum dicoccon* | Wild emmer | *Triticum dicoccoides* |
| Barley | *Hordeum vulgare* | Wild barley | *Hordeum spontaneum* |
| Lentil | *Lens culinaris* | Wild lentil | *Lens orientalis* |
| Pea | *Pisum sativum* | Wild pea | *Pisum humile* |
| Chickpea | *Cicer arietinum* | Wild chickpea | *Cicer reticulatum* |
| Bitter vetch | *Vicia ervilia* | Wild bitter vetch | *Vicia ervilia* |
| Flax | *Linum usitatissimum* | Wild flax | *Linum bienne* |

They have been collected from different regions in Syria as a part of the Fertile Crescent in Western Asia, where the earliest known crop domestication was observed. Crops in these regions have developed under cultivation through thousands of years of survival, adaptation and evolution.

Seeds from indigenous crops in Syria are an exclusively rich resource for agricultural scientists seeking material that can be used in international and national breeding programmes to develop crop varieties tolerant to climate change, diseases, pests and harsh weather conditions.

## 4.1 Values of genetic resources

Genetic diversity is the basic factor of evolution in species. It is the foundation of sustainability because it provides raw material for adaptation, evolution, and survival of species and individuals, especially under changed environmental, disease and social conditions (Hammer 2004), and it will allow them to respond to the challenges of the next century (Hammer et al. 1999).

The future food supply of all societies depends on the exploitation of genetic recombination and allelic diversity for crop improvement, and many of the world's farmers depend directly on the harvests of the genetic diversity they sow for food and fodder as well as the next seasons seed (Smale et al. 2004). The considerable genetic diversity of traditional varieties of crops is the most immediately useful and economically valuable part of global biodiversity. Subsistence farmers use landraces as a key component of their cropping systems. Such farmers account for about 60% of agricultural land use and provide approximately 15–20% of the world's food (Francis 1986). In addition, landraces are the basic raw materials used by plant breeders for developing modern varieties.

The diversity of plants in different ecosystems provides advantages and inspiration to people with cultural and/or religious significance and the potential for income generation through

ecotourism. Thus, it is important to appreciate the contribution to human welfare and environmental sustainability made by all the three levels of biodiversity: (1) ecosystems, (2) species, and (3) genetic diversity (IPGRI 1993).

The work of the genebank in Syria about four years ago was stopped due to conflict and insecure life of employees in the genebank place near Damascus (Douma). Only with international help from ICARDA it was possible to prevent catastrophic breakdowns, but not for all accessions stored in the Syrian genebank, only for cereals and some fodder crops.

The damage of ICARDA genebank at times of war in the last four years in Syria is an unlucky event. The war destroys national seed banks (as happened in Afghanistan and Iraq); at least we are sure that some of the local and ancient agricultural biodiversity has been saved nevertheless: 25,000 new seed samples including varieties of chickpeas, faba beans and other seeds from Syria are stored in the Svalbard Global Seed Vault in Norway. Around 110,000 Syrian duplicate seed samples out of 750,000 samples stored in Syria have been safely duplicated (ICARDA 2013).

## 4.2 Genetic erosion

Degradations have been reported for several species over the last 50 years. In recent years, the sequence of action of genetic erosion became noticeable for all crops in Syria. There are differences at crop level. While genetic erosion has been very fast in cereals and other major crops, it is less progressed in horticulture and minor crops which are often preserved in small gardens and at the edges of larger fields.

Therefore the characterization and investigation of PGRFA is important. Syrian agrobiodiversity is being disturbed over many reasons such as scarcity of natural environments, increase of the cultivation of arable lands, growth of cultivation into marginal areas to the point of desertification and biodiversity loss, reserve of varied and widely adapted landraces by new cultivars which based on a narrow genetic base (Frankel 1978).

Nevertheless also genetic erosion was observed in Syria with the replacement of landraces and local cultivars with new varieties. Landraces in many crops have been recognized as the most threatened group of genetic resources (Hawkes 1983, Fowler and Mooney 1990).

Over the times, traditional farmers have given us helpful values of thousands of locally adapted genotypes of major and minor crops, that have evolved because of natural and artificial selection forces (Myer 1994).

The genetic base of landraces, wild and weedy relatives on which future breeding is based has been threatened by various factors of genetic erosion. Erosion of these genetic resources, along with accompanying practices and knowledge that farmers use to develop, utilize and conserve crop genetic resources could pose a severe threat to the world's food security in the long term (see Fig. 43).

Loss of genetic variation may decrease the potential of species to persist in the face of abiotic and biotic environmental change as well as alter the ability of a population to cope with short-term challenges such as pathogens and herbivores.

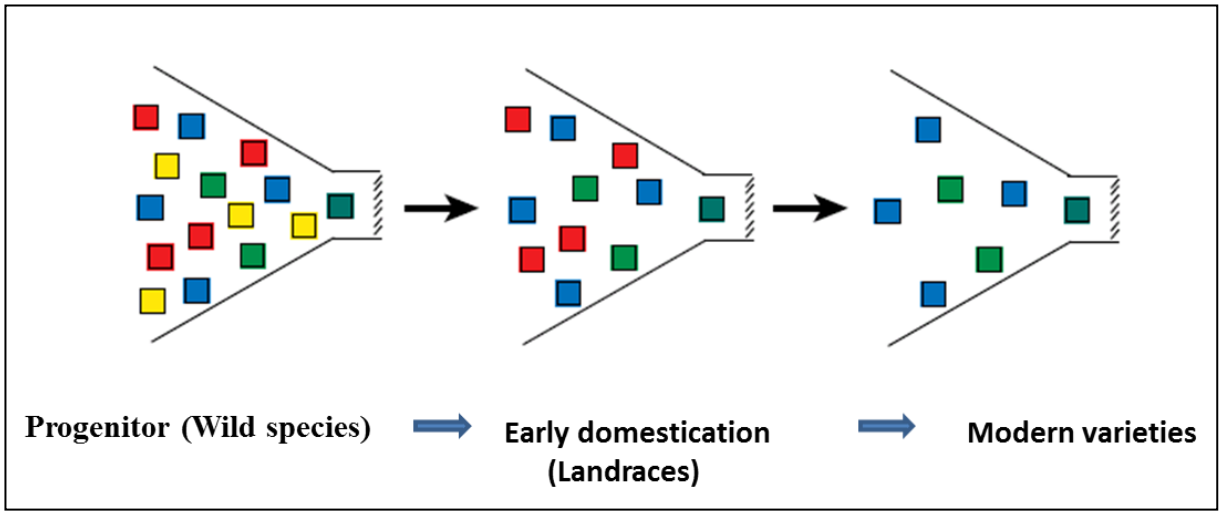


**Fig. 43.** Genetic diversity reduction process. Adapted from Tanksley and McCouch (1997)

A loss of genetic diversity of domesticated and wild relatives is cited among the potential problems of the introduction of transgenic crops (Berthaud and Gepts 2004). When alien transgenes escape and express normally in wild relatives and weedy species, the transgenes will persist and disseminate within the wild or weedy populations. This will lead to contamination of the original populations of the wild relatives, and even to the extinction of endangered populations of the wild relatives in local ecosystems (Ellstrand and Elam 1993).

Examples of genetic assimilation or extinction by displacement of native allelic diversity are provided in date palm (*Phoenix dactylifera*) and olive (*Olea europaea*). Thousands of genetically distinct varieties of Syrian major food crops have experienced years of evolution and careful selection and improvement by our farmer ancestors. Nevertheless, processes that once took hundreds or thousands of years to develop could then be carried out within decades or even years under human influence (Hammer 2004). There has been a significant loss of genetic diversity during the last 100 years and the process of gene-erosion continues (Hammer et al. 2003).

As already indicated, with genetic erosion it is not only genetic resources that are under threat of disappearance but also the indigenous knowledge of selecting, utilizing, and conserving these materials that has been accumulated for thousands of years. Erosion of crop genetic resources could pose a severe threat to the world's food security in the long term since loss of genetic variation may decrease the potential for a species to persist in the face of abiotic and biotic environmental change as well alter the ability of a population to cope with short term challenges such as pathogens and herbivores. It is also threatening the genetic base of many important crops on which future breeding is based (Hammer and Teklu 2008).

In Syria, apple and grape were the most important fruits planted by farmers. Overgrazing, expanding apple orchards and destruction of natural habitats are affecting biodiversity significantly; many variable landraces are still cultivated in the lower parts of land.

Considerable gene erosion can be detected as in Damascus and its suburb Al Ghuta which was very rich in many fruit trees such as apricot, grape and almond. But also in the lowlands,

for example in Dara province, there is sometimes a great variability present especially among the wheat and vegetables. In addition, food demands and economics have encouraged change from locally adapted varieties (landraces and local varieties) to higher yielding cultivars of both fruit trees and field crops, thus reducing their gene pools.

Genetic erosion is a procedure threatening the genetic integrity of crops (Guarino 1995). There are too few studies estimating the amount of genetic erosion in Syria. In general we can calculate genetic erosion (see Hammer et al. 1996) as follows:

Genetic erosion = 100% - (genetic integrity)

To reduce the occasion of biodiversity loss in Syria can be increased in the development of the landraces varieties and the difference for agricultural expansion and intensification, infrastructure change, industrial and urbanization development (Jaradat 2011).

Therefore, unabated gene erosion must by all means be reversed. Urgent action is needed to collect and preserve irreplaceable genetic resources (Frankel 1974). All effort should be made to cover this future need by utilizing both *in situ* as well as *ex situ* maintenance. *In situ* where the species are allowed to remain in their ecosystems within a natural or properly managed ecological continuum. This method of conservation is of significance to the wild relatives of crop plants and a number of other crops, especially tree crops and forest species where there are limitations on the effectiveness of *ex situ* methods of conservation.

The *ex situ* form of conservation includes, in a broad sense, the botanic gardens and storage of seed or vegetative material in genebanks. Biotechnology has generated new opportunities for genetic resources conservation. Techniques like *in vitro* culture and cryopreservation have made it possible to collect and conserve genetic resources, especially of species that are difficult to conserve as seeds, DNA and pollen storage also contribute to *ex situ* conservation.

Advances in biotechnology have offered a new arsenal of methods to effectively utilize genetic resources. Gene technology increased the possible use of distantly related trait carriers as donors for the desired characteristics. However, the movement of genes across species boundaries presents many opportunities for both expected and unexpected risks.

The impact of humans upon biodiversity has gradually increased with growing technology, population, production and consumption rates. The quest for increasing food production and the ensuing success achieved in several crops has begun to replace landraces by uniform, true-breeding cultivars. Several approaches have been employed to estimate the degree of genetic erosion that a particular taxon faces in a certain region over a given time.

Landraces adapted to optimal local agronomic conditions are probably the crop plant genetic resources that are most at risk of future loss through habitat destruction or by replacement by introduced elite germplasm (Brush 1995). Yield (or yield potential), which is the characteristics of most modern varieties, is the most important criterion for the choice of a variety by a farmer (Heisey and Brennan 1991).

According to Erskine and Muehlbauer (1990), droughts of just a single season could result in people consuming seed stocks, while successive years of drought can prompt changes in

cropping patterns and the geographic distribution of crops. Social disruptions or wars also pose a constant threat of genetic wipe out of such promising diversity. Overexploitation and also the introduction of invasive alien species are other factors contributing to the loss of genetic resources. More recently, global warming and a high degree of pollution have also been recognized as further causes for the loss of biodiversity (Myer 1994).

The modern world is placing a range of pressures on wild areas and on traditional agricultural communities, and external interests (often dominated by economic or political issues) strongly impinge (Tunstall et al. 2001).

The major external forces advocate the introduction of high-yielding varieties, accompanied by mechanization and major chemical inputs, as the means to increase total production and economic return. These forces change the nature of the decision-making process dramatically; the farmer is encouraged to grow high-yielding varieties in monoculture using inputs of fertilizer and pesticides. In many parts of the world, farmers were given several socio-economic incentives to replace varieties that evolved within their agro-ecosystem with improved/introduced varieties (Louette et al. 1997, Teklu and Hammer 2006). That means that external inputs can take over functions of agrobiodiversity and vice versa.

In homogenous, high-input agricultural systems, ecosystem functions that are missing because of low agrobiodiversity are replaced with intensive management and external inputs. Therefore, those components of agrobiodiversity, whose functions can be substituted at lower cost, are particularly endangered. Indigenous crops are adapted to the conditions of less developed agriculture such as “crude land preparation and low soil fertility” (Harlan 1975b). As these conditions change with improved traction and fertilizer, the existing adaptation of landraces turns from asset to liability.

In the world collection, beyond the problem of duplication among accessions, the security of *ex situ* conservation as a whole is endangered. About half of all gene bank accessions urgently require rejuvenation, and in several countries the percentage is even higher (Hammer 2004).

Genetic erosion can also be caused by limited support for genebanks and in appropriate focus or change in institutional policies.

Other evident causes of genetic erosion include the market preferences of consumers for uniform grains, vegetables or foods (Myer 1994), pest and disease outbreaks (for example, the grape landrace “Dyrany” disappeared because of Phylloxera (*Dactylosphaera vitifoliae*) attack), urbanization, population pressure, lack of recognition of current or future value of genetic resources; poor monitoring and management, and lack of sustainable breeding programmes. For example, the focus on varieties of table grapes, neglecting the landraces of extraction wine or juice industry, also lower price make people ignore this landraces, its way to extinction.

## 4.3 Genetic resources conservation

The conservation of plant diversity is of critical importance because of the direct benefits to humanity that can arise from its exploitation in improved agricultural and horticultural crops, as well, of the potential for development of new medicinal and other products and because of

the pivotal role played by plants in the functioning of all natural ecosystems. Several species and varieties are becoming extinct and many others are threatened and endangered.

Conservation is the process that dynamically holds the diversity of the gene pool with a view to actual or potential utilization (Maxted et al. 2002). Utilization is the human exploitation of that genetic diversity. The aim of conservation is to collect and conserve adaptive gene complexes.

A great diversity of plants is needed to keep the various natural ecosystems functioning stably. No organism exists alone but all depend on a magnitude of interactions (Prance 1997). No doubt, primitive and wild gene pools will continue to serve as important sources of genes for resistance to parasites or for characteristics indicated by advances in science or technology or by changing demands of the consumer. In the case of species, which are already used by human beings as crops, it is very important to have a broad genetic base, to improve existing genotypes when necessary. In formulating strategies for the conservation of any crop, it is essential to know its area of distribution, and identify regions where collecting for conservation activities could usefully be initiated.

On-farm conservation is active and is expected to preserve the developmental procedures that keep determining genetic diversity. It is grounded on the acknowledgment that farmers have enhanced and developed genetic diversity and that this practice at the latest continues within several farmers regardless of socio-economic and technical modifications. Farmers play an enormous role through their choice of plant material which influences the evolutionary process and concluded their choices to keep with a convinced landrace or not (Bellon 1996). Each season the farmers keep a part of harvested seed for re-sowing in the following year. The farmer makes an aware decision about which sample to retain for seed (Hammer and Teklu 2008).

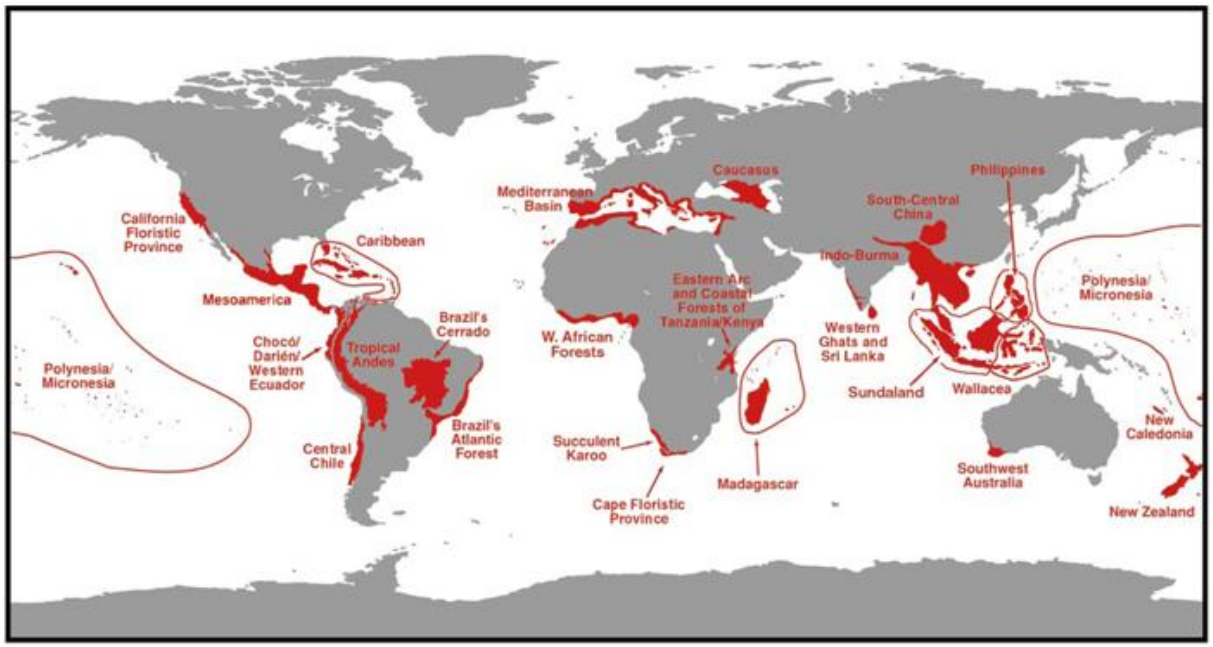


**Fig. 44.** Biodiversity hotspots. Source: Myer (1988, 1990)

Syria is a part of a biodiversity hotspot (Fig. 44). The institution of an effective programme for the maintenance of plant genetic resources (PGR) started in the mid-1970s. This programme considered *ex situ* and *in situ* collection of the genetic resources of various field crops, fruit trees and vegetables. It is also necessary to insurance the whole Syrian areas, and evaluate all the already collected accessions and those which will be collected, and to develop them in plant breeding programmes. *In situ* conservation is also important, meanwhile much of these species are threatened or disappeared (FAO 1995). There is a severe danger that much of the inherent biodiversity of Syria will be missing. The number of native species is 3100 and the number of endemic species is 400, see Table 13.

**Table 13.** Numbers of native, endemic, and percentage of endemic vascular plant species in Syria and its border countries. Adapted from Jaradat, 2011

| Country | Area (km²) | Native species | Endemic species | % endemic |
|---|---|---|---|---|
| Syria | 185,180 | 3100 | 400 | 13 |
| Turkey | 783,562 | 8700 | 2700 | 31 |
| Iraq | 437,072 | 3000 | 190 | 6 |
| Lebanon | 10,452 | 2600 | 300 | 7 |
| Palestine | 26,990 | 2200 | 170 | 7 |
| Jordan | 89,342 | 2100 | 150 | 7 |

To recover the loss of Syrian agrobiodiversity, it is important to plan a Strategy for Agro-Biodiversity conservation in Syria, including the following components:

1. Study the present status of agrobiodiversity.
2. Maintenance of Syrian steppe rangeland.
3. Protection of Syrian forests and a forestation area.
4. Preservation of Syrian plant genetic resources.

Furthermore, it is essential to be conscious of sustainable socio-economic development through sustainable investment of biological resources movements to get local communities elaborate and preserve their traditional knowledge and practice, in order to characterize best methods to extent sustainable livelihood and food security, as follows:

The Conservation and Sustainable Use of Dry Land Agro-Biodiversity with its two target areas:

1. Al-Haffe (Slenfeh-Lattkia): Rich region in forages wild relatives (vetch, lathyrus, clover). Wheat, barley and lentil landraces. Wild relatives of fruit trees (pear, plum, pistachio, almond).
2. Sweida: Rich region in landraces and wild relatives of food and forage legumes, cereals. Also wild relatives of e.g. onion, medic, clover, oat, lentil, wheat, barley, in addition to wild relatives and local varieties of fruit trees (olive, almond, pistachio, apricot, cherry, fig and pear).

## 4.4 Checklist

The present study of plant genetic resources is the first one formally in Syria. Checklists have proved as a useful tool for overviewing the plant genetic resources of selected areas (Hammer 1991) and allow a characterization of the state of plant genetic resources of Syria.

Only 30 crops make up the major part of the conserved plant material in genebank indicating that most of the remaining 7,000 species of cultivated plants and many other valuable genetic resources species have only been included on a limited scale in the gene bank collections (Hammer 2004).

The largest family in terms of number of cultivated plant species in Syria is the Leguminosae (cf. Tables 14, 15) which includes very common species like *Cicer arietinum* (cultivated chickpea); *Lens culinaris* (cultivated lentil); *Pisum* spp. (wild and cultivated pea); *Phaseolus lunatus* (Lima bean), *P. vulgaris* (common bean); *Vicia faba* (cultivated faba bean).

The second largest family is Rosaceae which includes most important species like *Malus domestica* (apple), *Crataegus orientalis* (Oriental hawthorn), *Prunus domestica* (plum), *Pyrus syriaca* (Syrian pear) which is already threatened strongly, *Rosa damascena* (Damascus rose), very common in homegardens especially in Damascus.

The third largest family is Gramineae which comprises very important cereal species such as *Hordeum vulgare* (barley), *Triticum durum* (durum wheat), and *T. aestivum* (common wheat).

The fourth largest family is Labiatae; it includes *Thymus vulgaris* (garden thyme) and *Mentha* ×*piperita* (peppermint).

Most of them are cultivated also in homegardens as landraces; however in the large fields new varieties have replaced the old cultivars.

Checklist taxa can be classified according to their use, as follows in decreasing order from the most frequent to the least frequent uses (see Table 16).

1. Medicinal plants include 91 species, the first large group of cultivated plants in Syria. Many of which are cultivated in homegardens and sometimes collected from the wild, used in traditional medicine especially in poor areas, such as *Citrullus colocynthis, Foeniculum vulgare, Glycyrrhiza glabra, Humulus lupulus, Hyssopus officinalis, Juniperus oxycedrus, Nigella sativa, Origanum majorana.*
2. Vegetables 65 species: *Phaseolus, Vigna, Pisum, Solanum, Lycopersicon, Capsicum, Allium*, cucurbits, *Abelmoschus, Daucus, Brassica, Raphanus, Lactuca sativa* most of them have very adapted and tasty landraces.
3. Fruit trees comprise 49 species; most important species are *Malus domestica, M. orientalis, Olea europaea, Prunus armeniaca, P. persica, P. spinosa, Pyrus communis, P. syriaca, Punica granatum, Vitis vinifera, Citrus limon*, and other *Citrus* species.

**Table 14.** Families and genera of Syria's crop plants. The numbers in brackets indicate if more than one species exists per family or genus. Infraspecific taxa are not considered in the

Actinidiaceae — *Actinidia*
Agaricaceae — *Agaricus*
Alliaceae (7) — *Allium* (7)
Amaranthaceae (2) — *Amaranthus* (2)
Anacardiaceae (7) — *Pistacia* (3), *Rhus* (3), *Schinus*
Apiaceae — *Pimpinella*
Apocynaceae — *Nerium*
Cactaceae — *Opuntia*
Cannabidaceae — *Cannabis*
Capparaceae (2) — *Capparis* (2)
Chenopodiaceae (7) — *Atriplex, Beta* (4), *Chenopodium, Spinacia*
Compositae (15) — *Achillea, Anthemis* (2), *Artemisia* (3), *Carthamus, Cichorium* (2), *Cynara* (2), *Gundelia, Helianthus, Lactuca, Matricaria*
Convolvulaceae — *Ipomoea*
Cornaceae — *Cornus*
Corylaceae — *Corylus*
Cruciferae (14) — *Brassica* (8), *Cardaria, Eruca, Isatis, Lepidium, Nasturtium, Raphanus*
Cucurbitaceae (11) — *Citrullus* (2), *Cucumis* (2), *Cucurbita* (4), *Lagenaria, Luffa* (2)
Cupressaceae (4) — *Cupressus* (2), *Juniperus* (2)
Cyperaceae (3) — *Cyperus* (3)
Ebenaceae (2) — *Diospyros* (2)
Ericaceae (2) — *Arbutus* (2)
Euphorbiaceae — *Ricinus*
Fagaceae (3) — *Castanea, Quercus* (2)
Gramineae (18) — *Aegilops, Agropyron* (2), *Ammophila, Arundo, Dactylis, Hordeum, Oryza, Panicum, Setaria, Sorghum, Triticum* (6), *Zea*
Iridaceae — *Crocus*
Juglandaceae (2) — *Carya, Juglans*
Labiatae (19) — *Coridothymus, Hyssopus, Lavandula, Melissa, Mentha* (4), *Ocimum, Origanum* (2), *Rosmarinus, Salvia* (3), *Satureja* (2), *Thymus* (2)
Lauraceae — *Laurus*
Leguminosae (35) — *Acacia* (4), *Arachis, Ceratonia, Cicer, Coronilla, Glycine, Glycyrrhiza, Lathyrus, Lens, Lupinus* (2), *Medicago* (3), *Melilotus* (3), *Phaseolus* (3), *Pisum, Robinia, Senegalia, Trifolium* (4), *Trigonella, Vicia* (3), *Vigna*
Liliaceae (3) — *Aloe, Asparagus, Lilium*
Linaceae — *Linum*
Malvaceae (9) — *Abelmoschus* (2), *Alcea, Althaea, Gossypium* (2), *Malva* (3)
Moraceae (5) — *Ficus* (2), *Humulus, Morus* (2)
Musaceae — *Musa*
Myrtaceae (2) — *Eucalyptus, Myrtus*
Oleaceae (2) — *Fraxinus, Olea*
Palmae — *Phoenix*
Papaveraceae — *Papaver*
Pedaliaceae — *Sesamum*
Pinaceae (2) — *Pinus* (2)
Plantaginaceae — *Plantago*
Polygonaceae (3) — *Rheum* (2), *Rumex*
Portulacaceae — *Portulaca*
Punicaceae — *Punica*
Ranunculaceae — *Nigella*
Resedaceae — *Reseda*
Rhamnaceae (3) — *Paliurus, Ziziphus* (2)
Rosaceae (24) — *Crataegus* (3), *Cydonia, Eriobotrya, Fragaria* (2), *Malus* (2), *Mespilus, Prunus* (9), *Pyracantha, Pyrus* (2), *Rosa, Sorbus*
Rutaceae (10) — *Citrus* (10)
Solanaceae (7) — *Capsicum* (2), *Lycopersicon, Nicotiana* (2), *Solanum* (2)
Tiliaceae (2) — *Corchorus* (2)
Ulmaceae (4) — *Celtis* (2), *Ulmus* (2)
Umbelliferae (9) — *Ammi, Anethum, Apium, Carum, Coriandrum, Cuminum, Daucus, Foeniculum, Petroselinum*
Vitaceae — *Vitis*
Zygophyllaceae — *Peganum*

4. Spices and condiments 41 species, important in the Syrian cuisine: *Allium sativum, Brassica nigra, Carum carvi, Coriandrum sativum, Cuminum cyminum, Nigella sativa, Petroselinum crispum, Rhus coriaria*; and many species are not only cultivated but also collected from wild. These species are important for the country because of their close relationship to its ethno-botanical heritage, local food habits and to their cultural and nutritional value particularly during food shortage periods.
5. Forage and fodder plants consist of 35 species: *Medicago sativa, Sorghum bicolor, Trifolium repens, Lathyrus sativus,* and *Opuntia ficus-indica,* which are cultivated as adapted species in areas with deficiency of water and drought tolerance.
6. Industrial plants comprise 23 species, most important *Beta vulgaris* var. *altissima* for sugar production, *Nicotiana tabacum* for tobacco industry.
7. Hedges 18 species, which include new species like *Acacia farnesiana* and others; traditional plants in homegardens, e.g. *Prunus spinosa*.
8. Cereals include 11 species. The most important agricultural crops are *Triticum durum* and *T. aestivum* distributed in the irrigated area in Syria, but the landraces are aggressively replaced with new varieties especially in large fields. In the dry areas and low average of rainfall less than 200 mm, *Hordeum vulgare* is cultivated. *Oryza sativa* entered into experimental cultivation but is not common.
9. Nuts 10 species. Most important and traditional are *Juglans regia, Pinus pinea, Pistacia vera,* and new species like *Carya illinoinensis.*
10. Pulses 10 species: *Cicer arietinum, Lens culinaris* are very particular for their small size and superior taste, *Vicia faba,* and *Vigna unguiculata.*
11. Oil plants 9 species: *Olea europaea* is the olden tree in Syria for oil consumed, *Laurus nobilis,* and *Linum usitatissimum.*
12. Shade tree 9 species: *Eucalyptus gomphocephala, Ziziphus lotus, Pinus halepensis.*
13. Windbreak 8 species: *Atriplex halimus, Cupressus arizonica, Juniperus drupacea* and *Nerium oleander.*
14. Soil erosion controls 5 species: *Ammophila arenaria, Rhus trilobata* and *Robinia pseudoacacia.*
15. Fibre plants which contain 4 species, e.g. *Gossypium hirsutum* as old species but *G. herbaceum* is commonly used today; cotton is the most important crop for good income distributed in the north and northeast of Syria with many new varieties. The species *Linum usitatissimum* and *Cannabis sativa* are not cultivated as in former times principally after replacing them by artificial fibre strings.
16. Grafting stock 3 species, the old species *Pistacia atlantica, P. khinjuk* and *Pyrus syriaca* are now under threat.
17. Starch plants, excl. cereals, 2 species: *Ipomoea batatas* var. *edulis.*
18. Cosmetics 1 species *Aloe vera* used with many products for stunning cream and shampoo.

**Table 15.** Plant families with the largest number of species in the checklist (families with more than eight species), in decreasing order of number of species

| Family | No. of species |
|---|---|
| Leguminosae | 34 |
| Rosaceae | 24 |
| Gramineae | 18 |
| Labiatae | 18 |
| Compositae | 14 |
| Cruciferae | 14 |
| Cucurbitaceae | 11 |
| Rutaceae | 10 |
| Malvaceae | 9 |
| Umbelliferae | 9 |

**Table 16.** Summary of cultivated plants in Syria: plant uses with number of taxa.

| Plant use | No. of species |
|---|---|
| Medicinal plants (M.) | 91 |
| Vegetables (V.) | 65 |
| Fruits (Fr.) | 49 |
| Spices and condiments (Sp.) | 41 |
| Forage and fodder plants (Fo.) | 35 |
| Industrial plants (I.) | 23 |
| Hedges | 18 |
| Cereals (C.) | 11 |
| Nuts (N.) | 10 |
| Pulses (Pu.) | 10 |

| Plant use | No. of species |
|---|---|
| Oil plants (Oi.) | 9 |
| Shade tree | 9 |
| Wind break | 8 |
| Soil erosion control | 5 |
| Fibre plants (Fi.) | 4 |
| Grafting stock | 3 |
| Starch plants, excl. cereals (St.) | 2 |
| Cosmetics | 1 |
| **Total** | 394 |

According to UN mission 2013, the overall results of the war in Syria attacked the agricultural sector include a decrease in the area of cropped land and an estimated further reduction in the area of land harvested.

Around of the 10 million Syrians who live in rural 80 percent derive their livelihoods from agriculture.

The following results have been reported:

- Wheat and barley production declined to less than 2 million t last year from 4 to 4.5 million t in normal years.
- Vegetable, fruit and olive production declined heavily in both Homs and Dara provinces, including a 60 percent decrease in vegetable production in Homs and a 40 percent drop in olive oil production in Dara.
- Only 45 percent of the farmers were able to fully harvest their cereal crops while 14 percent reported they could not harvest due to insecurity and deficiency of fuel.
- There is an absence of exchange to agricultural inputs including excellence seeds and fertilizers.
- There is an absence of irrigation due to destruction to main irrigation canals especially in Homs and lack of fuel for irrigation pumps.

## 4.5 Genebank

Before the conflict, there have been about 8,750 accessions kept in the cold stores of the Genetic Resources Unit of the Directorate of Scientific Agricultural Research (GCSAR), Damascus, Syria. The numbers are shown in Table 17.

According to the report (Syria 2009), some of these samples have duplicates held in the following institutions and centres:

1. International Centre for Agricultural Research in the Dry Areas (ICARDA).
2. Wales Port Centre for the Preservation of Vegetable Seeds, UK.
3. N. I. Vavilov Research Institute of Plant Production, St. Petersburg, Russia.

The Genetic Resources Unit stopped to distribute information after the beginning of the conflict in Syria, and no data is available concerning the table of these accessions (personal observation).

The Syrian Genetic Resources Unit has been collaborating with ICARDA since 1987 on the collection, maintenance, identification and evaluation of different wild genetic resources and landraces of different crops (cereals, food legumes, forage legumes).

**Table 17.** Number of accessions in GCSAR genebank, wild and cultivated species. Source: FAO 1996

| Crop or species | Number of accessions |
|---|---|
| Wild wheat (*Triticum* sp., *Aegilops* sp.) | 855 |
| Wild barley (*Hordeum spontaneum*) | 176 |
| Wild wheat (*Triticum* sp.) | 5 |
| Different species of wild food and feed forage | 1,350 |
| Wild vegetables | 15 |
| Cultivated wheat (*Triticum* sp.) | 115 |
| Cultivated barley (*Hordeum vulgare*) | 665 |
| Lentils (*Lens culinaris*) | 580 |
| Chick peas (*Cicer arietinum*) | 257 |
| Faba bean (*Vicia faba*) | 186 |
| Bitter vetch (*Vicia ervilia*) | 52 |
| Common vetch (*Vicia sativa*) | 58 |
| Chickling vetch (*Lathyrus sativus*) | 85 |
| Maize (*Zea mays*) | 205 |
| Cultivated vegetables | 1,720 |
| Safflower (*Carthamus*) | 27 |
| Sesame (*Sesamum indicum*) | 24 |
| Sunflower (*Helianthus annuus*) | 120 |
| Sorghum (*Sorghum bicolor*) | 50 |
| brooms (*Sorghum*) | 70 |
| Various crops | 100 |

On the other hand, ICARDA Genebank stores perhaps the world's biggest collection of barley, faba bean and lentil crops in the world, along with ancient varieties of durum and common wheat. The ICARDA genebank keeps 141,052 accessions in its active collection, of which 96.2% are safety duplicated. In addition, 78.46% are also stored in the Svalbard Global Seed Vault in Norway (see Table 18).

Moreover, 98% of ICARDA's accessions are also safely duplicated in other dependable genebanks outside Syria and the remaining 2% stored in the centre's replacement sites in Lebanon, Morocco and Tunisia (Majumdar 2014). In light of the principal situation in Syria, main concern was given to the 23,950 accessions transported to other genebanks for safety duplication and provisional storage. All routine activities have sustained, together with the collecting of 1985 new accessions and the reproduction and characterization of additional 11,000 accessions planted at Tel Hadya near Aleppo. Co-workers in 11 countries obtained 1446 accessions and 3681 were delivered to ICARDA researchers (ICARDA 2013), also in IPK there are some accessions collected from Syria (see Table 19).

The Leibniz Institute of Plant Genetics and Crop Plant Research (IPK) Gatersleben has accessions from Syria, saved in the genebank. The largest genus is *Hordeum* spp. (144 accessions), followed by *Triticum* spp. (40) and further genera (see Table 19).

**Table 18.** Number and percentage of accessions conserved in Svalbard. Adapted from ICARDA (2012)

| Taxon | conserved at Svalbard | |
|---|---|---|
| | No. | % |
| Barley | 24,393 | 85.69 |
| Wild *Hordeum* | 1497 | 75.69 |
| Durum wheat | 18,884 | 96.18 |
| Common wheat | 12,158 | 86.23 |
| Primitive wheat | 625 | 68.53 |
| Wild *Triticum* | 1569 | 99.05 |
| *Aegilops* | 3073 | 75.75 |
| Wheat hybrid | 0 | 0.0 |
| Lentil | 10,201 | 97.19 |
| Wild *Lens* | 144 | 53.33 |
| Chickpea | 6060 | 63.51 |

| Taxon | conserved at Svalbard | |
|---|---|---|
| | No. | % |
| Wild *Cicer* | 6491 | 77.29 |
| Faba bean | 2434 | 60.91 |
| *Medicago* | 3796 | 62.17 |
| *Lathyrus* | 3411 | 55.52 |
| *Pisum* | 3407 | 58.72 |
| *Vicia* | 1605 | 35.38 |
| Range and pasture | 3407 | 58.72 |
| *Trifolium* | 1605 | 35.38 |
| Other cereals | 18 | 10.65 |
| Total | 110,672 | 78.46 |

## 4.6 Homegardens

Since earliest times, interesting plants for human has been desired of the idea of the garden

**Fig. 45.** Homegardens, Damascus, 2014

**Table 19.** Number of accessions in IPK, 2014 from different origins compared with accessions of Syrian origin. Source: IPK 2014

| Family | Genus | No. of accessions in IPK | No. of accessions from Syria |
|---|---|---|---|
| Gramineae | *Hordeum* | 23,943 | 144 |
| Gramineae | *Triticum* | 27,268 | 40 |
| Leguminosae | *Vicia* | 5,019 | 26 |
| Gramineae | *Aegilops* | 1,524 | 17 |
| Umbelliferae | *Petroselinum* | 240 | 17 |
| Umbelliferae | *Coriandrum* | 490 | 16 |
| Leguminosae | *Pisum* | 5,307 | 9 |
| Gramineae | *Avena* | 4,837 | 6 |
| Gramineae | ×*Triticosecale* | 1,597 | 2 |
| Fabaceae | *Cicer* | 527 | 2 |
| Compositae | *Cichorium* | 686 | 2 |
| Cucurbitaceae | *Cucumis* | 1,166 | 2 |
| Ranunculaceae | *Nigella* | 56 | 2 |
| Cruciferae | *Brassica* | 4,282 | 1 |
| Cannabidaceae | *Cannabis* | 55 | 1 |
| Compositae | *Carthamus* | 195 | 1 |
| Cucurbitaceae | *Cucurbita* | 1,070 | 1 |
| Umbelliferae | *Cuminum* | 50 | 1 |
| Solanaceae | *Hyoscyamus* | 146 | 1 |
| Leguminosae | *Lens* | 459 | 1 |
| Leguminosae | *Lupinus* | 2,769 | 1 |
| Papaveraceae | *Papaver* | 1,141 | 1 |
| Leguminosae | *Phaseolus* | 8,997 | 1 |
| Umbelliferae | *Pimpinella* | 44 | 1 |
| Plantaginaceae | *Plantago* | 82 | 1 |
| Cruciferae | *Raphanus* | 831 | 1 |
| Lamiaceae | *Satureja* | 53 | 1 |
| Caryophyllaceae | *Silene* | 13 | 1 |
| Gramineae | *Zea* | 1,510 | 1 |

named El Geneina, El Hadeekah, and Alhakorah in Arabic language.

The homegarden remains one of the main components of the house in rural areas and cities, it adds to the charm of the houses nature and clean air and idyllic atmosphere of silence and a high sense of psychological comfort.

Commonly the area of a homegarden is about 750 square meters in the rural area, and less than 200 square meters in the big cities. From personal observations in Syria it can be concluded that the genetic diversity is relatively high within a garden and more limited between gardens within a given community.

Women in Syria are very interested and active to keep the gardens, so they have a monopoly of the traditional knowledge, more than men. In the case of vegetables and spices for

**Fig. 46.** Homegarden, South Syria, Dara, 2014

example, women are more or less responsible for their cultivation, they would therefore be expected to have more knowledge on such crop plants but in field crops, men have more experiences (Watson and Eyzaguirre 2002). Therefore, homegardens contain occasionally genetic diversity that has changed or has been developed locally, mainly planted and harvested by women. They grow vegetables such as potatoes, beans in all varieties, corn, eggplant, squash, pumpkin, artichoke, cucumber, tomato, turnip, cabbage, cauliflower, spinach, carrot, beet and many other vegetables, and fruit trees like lemon, orange, citron, pomegranate, apricot, plum, peach, apple, cherry, blackberry, mulberry, fig, olive, date, grape, walnut, pistachio, filbert, almond and many other trees.

Spicy food is always observed as the superiority and prestige of a household. For this purpose, a number of spices, such as chili, garlic, shallot, onion, fenugreek, coriander, are often found in Syrian homegardens. Similarly, people also keep a number of medicinal plants in their homegarden for their usual household uses because they often have very poor access to modern medicines and medical facilities (Al-Oudat and Laham 1994).

Of these *Ocimum basilicum*, basil essential oils extracted via steam distillation from the leaves and flavouring are used to flavour foods, dental oral products, in fragrances industry, traditional rituals and medicines (Guenther 1949, Simon and Reiss-Bubenheim 1987) and *Mentha spicata* is normally used to cure colds, coughs and stomach disorders (Simon et al. 1988). Traditional healers and medical practitioners tend to maintain a range of medicinal plants in their homegardens and use them in their treatments (personal observation).

**Fig. 47.** Homegardens, South west Syria, Quneitra, 2014

From a plant genetic resources viewpoint, it is clear that the homegarden is an important location for the cultivation of so-called neglected and underutilized species (neglected from a research side and underutilized from a larger economic side). Such species have so far not received much care from ecologists, botanists and agronomists, and they are considerably under-characterized in genebanks.

Moreover, during the conflict in Syria, homegardens are an essential source of vegetables, fruits, and medicinal plants were planted on roofs of houses as small gardens to cultivate some vegetables, spicy, and medicinal plants for food and nutrition, especially in cities under siege.

## 4.7 Protected areas

Syria has an agrobiodiversity, which is worth of conserving for potential future use. Currently there are 13 recognised protected areas in Syria covering 0.6% of the land area.

It is easier to protect areas and make nature protection than to use and conserve cultivated plants!

- The Directorate of Scientific Agricultural Research has *in situ* 15 gene banks of fruit trees (local landraces and exotic varieties). It has also a natural reserve in Aleppo (the Agricultural Research Centre, Yahmoul) established in collaboration with ICARDA to preserve crop genetic resources, two other reserves at Serghaya Research Centre (near

Damascus), and Sweida Research Centre for the conservation of crop genetic resources since 1996.

- The Steppe Directorate has 28 natural reserves in the steppe. The average area of each reserve is 3,000 ha. They aim to protect the genetic resources of forage crops and to re-habilitate vegetation through preservation, artificial seeding and plantation.
- The Forestation Directorate has the following reserves:
  1. Jabal Abdel Aziz reserve at Al-Hassakah province (4,220 ha) which aims to preserve wild pistachio from becoming extinct, restore the ecological balance and to re-habilitate vegetation.
  2. Jaziret Al Thawra Reserve, Al-Raqa (590 ha) to re-habilitate the plant cover and introduce forest species.
  3. Cedar and Fir Reserve at Slenfeh/Lattakia (1,350 ha) to preserve the existing forest species from becoming extinct, particularly, cedar, fir and other conifers.

# 5 Conclusions

1. The agricultural and horticultural situation in Syria has to be studied in more detail, additionally including the wild (non-native species) flora for material related to crop plants and therefore allowing geneflow from wild to cultivated plants and the opposite; so, the checklist for plant genetic resources will be very supportive.
2. Additional field studies are necessary in Syria (morphological and genetic characterization of landraces and local varieties). By using the checklist, this will be easier.
3. Our results suggest that Syria is a conservation centre for crops and their wild relatives with variable landraces.
4. The socio-economic conditions have to be studied; controls for agriculture have to be addressed.
5. Since genetic erosion proceeds with considerable speed, methods for on-farm conservation have to be developed. Introgressions are suitable to prove the evolutionary activity of an area. Therefore, an integrated on-farm / *in-situ* complement is necessary and new ways have to be developed for a joint nature and traditional farm conservation.
6. Genebanks should be integrated in those programmes to guarantee the conservation of the rare and critically endangered autochthonous crop plants and as starting point for their possible reintegration into the agroecosystems.

# 6 Outlook

1. To improve the checklist for cultivated plants and wild plants, new studies and genetic resources collections are very important.
2. In Syria, the characterization and evaluation of PGRFA is typically restricted to morphological descriptors and agronomical traits. It has been practical so far for landraces and improved varieties of fruit trees, field crops and some vegetables. Molecular characterization has only been functional to an exclusive number of crops. Financial and technical support is needed to expand PGRFA characterization and evaluation by using progressive methods and by association skills and accepting suitable tools.
3. Homegardens and local agriculture systems have been considered as important components within larger agriculture systems so encouraging to improve homegardens and distributed it all the country especially in big cities are important by using local varieties without chemical fertilizers or pesticides to support healthy food and improved income.
4. Landraces from different crop plants (cereals, vegetables, pulses, fruit trees, medicinal plants) unfortunately are neglected.
5. Wild species are very important to plant breeding for new varieties adapted to local climate.
6. Breeding strategies and priorities need to be improved; only limited breeding activities have been carried out in Syria for wheat, barley, chickpea and lentil. Concerning fruit species, breeding activities are limited to some clonal selection activities that have been in recent times carried out for stone fruits and grapevines. There is a critical need to start a national strategy for the breeding and improvement of the Syrian PGRFA for target crops. As a protection, some actions are needed now to increase the genetic basis used on-farm.
7. Documentation of plant genetic resources, both wild and cultivated, on national level is very necessary in Syria, since there is little reference about cultivated plants, landraces or wild plants except some work that was done in collaboration with international organizations such as ICARDA, FAO, ACSAD, Bioversity International (former IPGRI).
8. Translate the checklist to Arabic language to be available for many people in this area. Because

"People only protect what they love. But they can only love what they know."

— **Jacques-Yves Cousteau**

# 7 References


Afḍal M (10th–14th centuries): Bughyat al-fallāḥīn fī al-ashjār al-muthmirah wa-al-rayāḥīn [The Farmers' desired object for fruit-bearing trees and aromatic plants]. Kutub al-Filāḥa [Books of Husbandry], compiled by Arab, especially Andalusian, agronomists mainly between the 10th–14th centuries. http://www.filaha.org/introduction.html, visited 30.11.2014

Al-Oudat M (2010) Syria's Poisonous Plant Information System – SPPIS. Atomic Energy Commission, Damascus, Syria

Al-Oudat M, Laham G (1994) Medicinal plants and their uses, dar al ahaly of the printing and publishing and distribution, 4th ed, Damascus, Syria [Arabic]

Al-Oudat M, Qadir M (2011) The Halophytic Flora of Syria, International Center for Agricultural Research in the Dry Areas (ICARDA), Aleppo, Syria. viii+186 pp

Axtell BL, Fairman RM (1992) Minor oil crops. FAO Agric. Services Bull. 94. Food and Agriculture Organization, Rome, vii+241 pp

Baalbaki M, Baalbaki R (2007) Al-Mawrid Dictionary, English-Arabic and Arabic-English. Dar al-illm lilmaliyeen, Beirut, Lebanon

Barkoudah Y (1999) Country profile: Syrian Arab Republic (Syria). In: Heywood VH, Skoula M (eds) Wild food and non-food plants: information networking. Cahiers Options Méditerranéennes 38: 275–294

Bashur W (1994) Syria's state-making and the birth of a nation. Damascus, Syria, Dar Yazigi [Arabic]

Bell GDH (1987) The history of wheat cultivation. In: Lupton FGH (ed) Wheat Breeding, its scientific basis. Chapman and Hall, London/New York, pp 31–49

Bellon MR (1996) Understanding farmer seed and variety systems. On-farm conservation as a process: An analysis of its components. In: Sperling L, Loevinsohn M (eds) Using Diversity, Enhancing and Maintaining Genetic Resources On-Farm. Internat Devel Res Centre, Canada, pp 9–22

Berthaud J, Gepts P (2004) Assessment of effects on genetic diversity. In: Maize and Biodiversity: The Effects of Transgenic Maize in Mexico. North American Commission on Environmental Cooperation (CEC). http://www.cec.org/files/PDF//Maize-Biodiversity-Chapter3_en.pdf

Boissier E (1875) Flora Orientalis, vol 3. Asher & Co, Geneve, pp 655–668

Browicz K (1974) The genus *Amygdalus* in Turkey. Proc Int Symp on Turkish Flora. Istanbul Univ Orman Fac Yainlari 209: 239–255

Browicz K (1986) Chorology of trees and shrubs in south-west Asia and adjacent regions, vol 5. Polish Sci Publ, Warsaw, Poznan, 88 pp

Brush SB (1995) *In situ* conservation of landraces in centers of crop diversity. Crop Sci 35: 346–354

Cavalcaselle B (1999) Edible mushroom production in forest villages of Turkey, Syria and Jordan. In: Medicinal, Culinary and Aromatic Plants in the Near East. Proc Internat Expert Meet. FAO, Cairo, 1999. http://www.fao.org/docrep/x5402e/x5402e10.htm (visited 30.06.2014)

Christensen KI (1992) Revision of *Crataegus* sect. Crataegus and nothosect. Crataeguineae (Rosaceae-Maloideae) in the Old World. Syst Bot Monogr 35: 1–199

Christiansen S, Vaughan CMA (eds) (1997) Conservation, management and sustainable use of dryland biodiversity within priority agro-ecosystems of the Near East: Highlights of the Proceedings of a Workshop, 31 Oct – 3 Nov, Izmir, Turkey. ICARDA, Aleppo, Syria, 54 pp

Duke JA (1983) *Hordeum vulgare* L. In: Duke JA, Handbook of energy crops. Purdue Univ, Center for New Crops and Plants Products. Unpublished. http://www.hort.purdue.edu/newcrop/duke_energy/Hordeum_vulgare.html (accessed 23 Jan 2015)

Eckelmann S (2003) Biodiversität der Gattung *Ocimum* L., insbesondere der Kulturisppen. Schr Genet Ressour 19: 1–151

Ehrman T, Maxted N (1990) Ecogeographic survey and collection of Syrian Vicieae and Cicereae (Leguminosae). Plant Genet Resour Newsl 77: 1–8

Elias E (2008) Effect of nutrient media on mushroom spawn production of *Agaricus bisporus* (J. Lge.) Imbach at local production. Master thesis, Tishreen Univ, Lattakia, Syria [Arabic]

Ellstrand NC, Elam DR (1993) Population genetic consequences of small population size: implications for plant conservation. Ann Rev Ecol Syst 24: 217–242

Erskine W, Muehlbauer FJ (1990) Effects of climatic variations on crop genetic resources and plant breeding aims in West Asia and North Africa. In: Jackson MT, Ford-Lloyd BV, Parry ML (eds) Climatic change and plant genetic resources. Belhaven Press, London, pp 148–157

Esquivel M, Castiñeiras L, Knüpffer H, Hammer K (1989) A checklist of the cultivated plants of Cuba. Kulturpflanze 37: 211–357

Esquivel M, Hammer K (1992) The Cuban homegarden 'conuco': a perspective environment for evolution and *in situ* conservation of plant genetic resources. Genet Resour Crop Evol 39: 9–22

FAO [Food and Agriculture Organization of the United Nations] (1995) Production Yearbook vol 48, 1994. FAO, Rome, Italy

FAO (1996) Syria Country Report to the International Technical Conference on Plant Genetic Resources (Leipzig 1996). FAO, Rome, Italy; Damascus 1995, Syria

FAO (2007) The Regional near East Office of the Food and Agriculture Organization Organizes a Regional Training Workshop on "Irrigation of Date Palm and Associated Crops". Food and Agriculture Organization of the United Nations, Department of Agriculture. Damascus, Syria. 27–30 May

FAO (2009) Food Insecurity in the World. Food and agriculture organization of the United Nations, Rome, Italy. http://faostat.fao.org/site/567/default.aspx#ancor (visited 30.11.2014)

FAO (2011) Statistics, Food and Agriculture Organization of the United Nations, Production Yearbook 2003. Vol. 57. Rome, Italy

FAO/WFP (2013) Crop and food security assessment mission to the Syrian Arab Republic Food and agriculture organization of the United Nations, World Food Programme, Rome, Italy. http://www.fao.org/docrep/meeting/027/mg074e.pdf (visited 30.11.2014)

FAO (2014) Food and Agriculture Organization of the UN – Helping to build a world without hunger *Cichorium intybus*. Ecocrop. http://ecocrop.fao.org/ecocrop/srv/en/cropView?id=694 (visited 30.11.2014)

Feldman M (1976) Wheats, *Triticum* spp. (Gramineae-*Triticinae*). In: Simmonds NW (ed) Evolution of crop plants. Longman, London, pp 120–128.

Flora Syria On Line. http://www.florasyria.com/ (visited 30.11.2014)

Fowler C, Mooney P (1990) The threatened gene: food, politics and the loss of genetic diversity. Lutterworth Press, Cambridge, UK

Francis CA (1986) Multiple cropping systems. Macmillan, New York

Frankel OH (1974) Genetic conservation: our evolutionary responsibility. Genetics 78: 53–65

Frankel O (1978) Conservation of crop genetic resources and their wild relatives: an overview. In: Hawkes JG (ed) Conservation and Agriculture. Duckworth, London, UK, pp 123–149

GCSAR (2004) The annual report of the general commission for scientific agricultural research, General commission for scientific agricultural research, Damascus, Syria, [Arabic]

GCSAR (2009) Annual Technical report, Crop management research, General commission for scientific agricultural research. Ministry of Agriculture and Agrarian Reform, Season 2007–2008. Damascus, Syria [Arabic]

GCSAR (2011) Annual general report, General Commission for Scientific Agricultural Research, Ministry of Agriculture and Agrarian Reform, Season 2009–2010. Damascus, Syria [Arabic]

GCSAR (2012) Annual Technical Report Crops Research Management, General Commission for scientific agricultural research Season 2010–2011. Damascus, Syria [Arabic]

GCSAR (s.a.) Report from General Commission for Scientific Agricultural Research Directorate of Agriculture (Ministry of Agriculture and Agrarian Reform. Damascus, Syria [Arabic]

Grebenščikov I (1986) Cucurbitaceae–Gramineae. Coix bis Zea. In: Schultze-Motel, J. (ed.) (1986) pp 914–951

Greuter W, Burdet HM, Long G (eds) (1984) Med-Checklist, Bd 1, Pteridophyta (ed 2), Gymnospermae, Dicotyledones (Acanthaceae-Cneoraceae). Conservatoire et Jardin botaniques, Ville de Genève

Greuter W, Burdet HM, Long G (eds) (1986) Med-Checklist, Bd 3, Dicotyledones (Convolvulaceae-Labiatae). Conservatoire et Jardin botaniques de la Ville de Genève

Greuter W, Burdet HM, Long G (eds) (1989) Med-Checklist, Bd 4, Dicotyledones (Lauraceae-Rhamnaceae). Conservatoire et Jardin botaniques de la Ville de Genève

Greuter W (2006-) Compositae (pro parte majore). In: Greuter W, von Raab-Straube E (eds) Compositae. Euro+Med Plantbase – the information resource for Euro-Mediterranean plant diversity. http://ww2.bgbm.org/EuroPlusMed/ (accessed 3.2.2015).

Guarino L (1995) Assessing the threat of genetic erosion. In: Guarino L, Rao VR, Reid R (eds) Collecting Plant Genetic Diversity – Technical Guidelines. CAB International, Wallingford, UK, pp 67–74

Guenther E (1949) The essential oils. VIII. RE Krieger Publ. Co. Malabar, Florida. pp 399–433

Hammer K (1986) Malvaceae. In: Schultze-Motel J (ed) (1986), pp 846–868

Hammer K (1990) Botanical checklists prove useful in research programs on cultivated plants. Diversity 6: 31–33

Hammer K (1991) Checklists and germplasm collecting. FAO/IBPGR Plant Genet Resour Newsl 85: 15–17

Hammer K (2004) Resolving the challenge posed by agrobiodiversity and plant genetic resources – an attempt. J Agric Rural Devel Tropics Subtropics, Beih 76. DITSL, Kassel Univ Press, Germany

Hammer K, Arrowsmith N, Gladis T (2003) Agrobiodiversity with emphasis on plant genetic resources. Naturwissenschaften 90: 241–250

Hammer K, Diederichsen A, Spahillari M (1999) Basic studies toward strategies for conservation of plant genetic resources. In: Serwinski J, Faberová I (eds) Proc Techn Meet Methodology of the FAO World Information and Early Warning System on Plant Genetic Resources, pp 29–33

Hammer K., Khoshbakht K (2005) Agrobiodiversity and plant genetic resources. Environm Sci 4: 2–22

Hammer K, Knüpffer H, Esquivel M (1989) An inventory of Cuban cultivated medicinal plants. Newsl Medic Arom Pl 28: 54–75

Hammer K, Knüpffer H, Laghetti G, Perrino P (1992) Seeds from the past. A catalogue of crop germplasm in South Italy and Sicily. Bari, Italy, ii+173 pp

Hammer K, Knüpffer H, Laghetti G, Perrino P (1999) Seeds from the past. A catalogue of crop germplasm in Central and North Italy. Bari, Italy

Hammer K, Knüpffer H, Perrino P (1990) A checklist of the South Italian cultivated plants. Kulturpflanze 38: 191–310

Hammer K, Knüpffer H, Xhuveli L, Perrino P (1996) Estimating genetic erosion in landraces – two case studies. Genet Resour Crop Evol 43: 329–336

Hammer K, Lehmann CO, Perrino P (1988) A check-list of the Libyan cultivated plants including an inventory of the germplasm collected in the years 1981, 1982 and 1983. Kulturpflanze 36: 475–527

Hammer K, Nagieb M, Buerkert A (2004) Eine Checkliste der Kulturpflanzen in der Bergoase Balad Seet, Oman. In: Nagieb M (ed) Nährstoffflüsse und pflanzengenetische Ressourcen in zwei Bergoasen des nördlichen Omans, Ph. D. Thesis. Univ Kassel Press, Kassel, Germany

Hammer K, Perrino P (1985) A check-list of the cultivated plants of the Ghat oases. Kulturpflanze 33: 269–286

Hammer K, Ri J-Dz, Hoang H-Dz (1989) Additional notes to the check-list of Korean cultivated plants. Kulturpflanze 37: 193–210

Hammer K, Teklu Y (2008) Selected issues from genetic erosion to genetic engineering. J Agric Rural Devel Tropics Subtropics 109: 15–50

Hanelt P (1986) Leguminosae. In: Schultze-Motel J (ed) (1986), pp 430–699

Hanelt P, IPK [Institut für Pflanzengenetik und Kulturpflanzenforschung] (eds) (2001) Mansfeld's Encyclopedia of Agricultural and Horticultural plants. 6 vols. Springer, Berlin, Germany

Harlan JR (1971) Agricultural origins: centers and noncenters. Science 174: 468–474

Harlan JR (1975a) Crops and man. Amer Soc Agron, Madison, Wisconsin, USA

Harlan JR (1975b) Our vanishing genetic resources. Science 188: 618–621

Harlan JR (1992) Crops and man. 2nd ed. Amer Soc Agron, Madison, WI

Hawkes JG (1983) The diversity of crop plants. Harvard Univ Press, Cambridge, London, 184 pp

Heisey PW, Brennan J (1991) An analytical model of farmers' demand for replacement seed. Amer J Agric Econ 73: 44–52

Henedy M (2013) Preparation division of biodiversity and environmental management of protected areas. Published 24 September, Damascus, Syria [Arabic]

Hneidi K (2007–2008) An economic study of the reality of the production of an almond tree in Sweida province., Damascus, Syria [Arabic]

Hoang H-Dz, Hammer K (1988) Additional notes to the check-list of Korean cultivated plants (2). Kulturpflanze 36: 291–313

Hoang H-Dz, Knüpffer H, Hammer K (1997) Additional notes to the checklist of Korean cultivated plants (5). Consolidated summary and indexes. Genet Resour Crop Evol 44: 349–391

Husain SM, Kasim MH (1975) Cultivated plants of Iraq and their importance. Dept Biol Univ Mosul, Mosul, 221 pp

Heywood VH (2003) Conservation strategies, plant breeding, wild species and land races. In: Ammann K, Jacot Y, Braun R (eds) Methods for risk assessment of transgenic plants IV. Biodiversity and biotechnology. Birkhäuser, Basel, Switzerland, pp 143–159

ICARDA [International Center for Agricultural Research in the Dry Areas] (2013) ICARDA Annual Report 2012. ICARDA, Beirut, Lebanon. 70 pp

IUCN [International Union for Conservation of Nature and Natural Resources] (1994) Red List Categories, IUCN species survival commission. IUCN, Gland, 21 pp

ILDIS [International Legume Database & Information Service] (2010) World Database of Legumes. http://www.ildis.org/ (visited 17.12.2014)

IPGRI [International Plant Genetic Resources Institute] (1993) Diversity for Development. The Strategy of the International Plant Genetic Resources Institute. IPGRI, Rome

IPGRI (1996) Annual Report. IPGRI, Rome, Italy

IPGRI (1999) Diversity for Development. The New Strategy of the International Plant Genetic Resources Institute. IPGRI, Rome, Italy

IPGRI (2002) Neglected and Underutilized Plant Species, Strategic Action Plan of the International Plant Genetic Resources Institute. IPGRI, Rome, Italy

IPK (2014) Genebank Information System of the IPK [Leibniz Institute of Plant Genetics and Crop Plant Research] Gatersleben. http://gbis.ipk-gatersleben.de/GBIS_I/ (accessed 1.12.2014)

Jaradat AA (1998) Biodiversity and sustainable agriculture in the Fertile Crescent. In: Albert J, Bernhardsson M, Kenna R (eds) Transformations of Middle Eastern natural environments: legacies and lessons. Bull Series, Yale Sch Forestry Envir Stud 103: 31–57.

Jaradat AA (2011) Wheat landraces: genetic resources for sustenance and sustainability. USDA-ARS, Morris, MN, USA. http://www.ars.usda.gov/SP2UserFiles/Place/50600000/products-wheat/AAJ-Wheat%20Landraces.pdf (accessed 23 Jan 2015)

Jaradat AA (2014) The value of wheat landraces (editorial). Emir J Food Agric 26 (2)

Jiménez-Mejías P, Luceño M (2011) Cyperaceae. In: Euro+Med Plantbase – the information resource for Euro+Mediterranean plant diversity. http://ww2.bgbm.org/EuroPlusMed/PTaxonDetail.asp?UUID=BA709F0D-74A8-404E-BEF9-93CB0BCEBFAE (visited 17.12.2014)

Katana H, Kotob M (1999) Fruit Evergreen. Damascus Univ Press, Syria [Arabic]

Keith HG (1965) A preliminary check list of Libyan flora. 2 vols. Ministry of Agriculture and Agrarian Reform, Tripoli, Libya

Kew (2010) The Board of Trustees of the Royal Botanic Gardens, World Checklist of Selected Plant Families.
http://ww2.bgbm.org/EuroPlusMed/PTaxonDetail.asp?NameCache=Hyssopus+officinalis#1
(visited 03/02/2015)

Khairallah S (2010) Plant story – helping to conserve *Origanum syriacum*. RBG Kew, LARI, Tel Amara, Lebanon. http://www.kew.org/discover/news/plant-story-helping-conserve-origanum-syriacum (visited 15.01.2015)

Knüpffer H, Hammer K (1999) Agricultural biodiversity: a database for checklists of cultivated plants. In: Andrews S, Leslie AC, Alexander C (eds) Taxonomy of cultivated plants: 3rd Internat Symp. Royal Bot Gard Kew, pp 215–224.

Kurtto A (2009) Rosaceae (pro parte majore). In: Euro+Med Plantbase – the information resource for Euro-Mediterranean plant diversity.
http://ww2.bgbm.org/EuroPlusMed/PTaxonDetailOccurrence.asp?NameId=30949&PTRefFk=7300000 (visited 30/11/2014)

Li CY, Guang YZ, Hammer K, Yang CY, Long CL (2011) A checklist of the cultivated plants of Yunnan (PR China). Genet Resour Crop Evol 58: 153–164

Lock JM, Simpson K (1991) Legumes of West Asia: A Checklist. RBG, Kew

Louette D, Charrier A, Berthaud J (1997) *In situ* conservation of maize in Mexico: Genetic diversity and maize seed management in a traditional community. Econ Bot 51: 20–38

MAAR [Syrian Ministry of Agriculture and Agrarian Reform] (2010). Annual Agricultural Statistical Abstract, Several volumes 1980–2010. Department of Planning and Statistics, Division of Agricultural Statistics Computer Center, Damascus, Syria [Arabic]

Mabberley DJ (2008) Mabberley's plant-book: A portable dictionary of plants, their classifications and uses. Cambridge University Press

Majumdar R (2014) World heritage seed collection makes its way from Syria to Svalbard. ICARDA press release, Beirut and Bonn. http://www.icarda.org/press-release-world-heritage-seed-collection-makes-its-way-syria-svalbard (visited 14.01.2015)

Mansour T, Arafa MZ (2010) The cultivation of maize crop guide. Ministry of Agriculture and Agrarian Reform, Damascus, Syria [Arabic]

Martín-Bravo S (2011) Resedaceae. In: Euro+Med Plantbase – the information resource for Euro-Mediterranean plant diversity
http://ww2.bgbm.org/EuroPlusMed/PTaxonDetail.asp?NameId=53180&PTRefFk=7500000
(visited 16.01.2015)

Masri A (2006) Country pasture/forage resource profiles. Damascus, Syria

Maxted N, Guarino L, Myer L, Chiwona EA (2002) Towards a methodology for on-farm conservation of plant genetic resources. Genet. Resour. and Crop Evol. 49: 31–46

Millennium Ecosystem Assessment (2005) Ecosystems and Human Well-being: Synthesis. Island Press, Washington, DC. http://www.millenniumassessment.org/documents/document.356.aspx.pdf (accessed 26.01.2015)

Ministry of State for Environmental Affairs (2009) The Fourth National Report on Biodiversity. Damascus, Syria

Mirali N, Aziz R, Nabulsi I (2012) Genetic characterization of *Rosa damascena* species growing in different regions of Syria and its relationship to the quality of the essential oils. Int J Med Arom Pl 2: 41–52

Mouterde P (1966) Novelle flore du Liban et de Syrie. Dar al machreq, Beyrouth, Lebanon

Myer N (1988) Threatened biotas: hot spots in tropical forests. Environmentalist 8: 118– 208

Myer N (1990) The biodiversity challenge: expanded hot-spots analysis. Environmentalist 10: 243–256

Myer N (1994) Protected areas – protected from a greater what? Biodiv Conserv 3: 411–418

Nabulsi G (2004) The case of genetic resources of fruit trees, maintenance and investment. Damascus, Syria [Arabic]

NAPC [National Agriculture Policy Center] (2003) The state of food and agriculture in the Syrian Arab Republic 2002. FAO Project GCP/SYR/006/ITA. Ministry of Agriculture and Agrarian Reform, Damascus, Syria

Nevo E, Beiles A, Krugman T (1988) Natural selection of allozyme polymorphisms: a microgeographic climate differentiation in wild emmer wheat (*T. dicoccoides*). Theor Appl Genet 75: 529–538

Orabi J, Jahoor, A, Backes G (2009) Genetic diversity and population structure of wild and cultivated barley from West Asia and North Africa, Plant Breeding 128 (6): 606–614

Oweis TY, Hachum AY (2003) Farming where there is no water in dry West Asia and North Africa. Leisa Magazine 19(2): 26–28

Padulosi S, Ager H, Frison E (compilers) (1995) Report of the IPGRI workshop on conservation and use of underutilized Mediterranean species, 28–30 March 1994, Bari, Italy. IPGRI, Rome, Italy

Padulosi S, Hammer K, Heller J (eds) (1996) Hulled wheats. Promoting the conservation and use of underutilized and neglected crops, 4. Proc 1st InternatWorkshop Hulled Wheats, 21–22 July 1995, Castelvecchio Pascoli, Tuscany, Italy. IPGRI, Rome, Italy

Pagnotta MA, Alfredo I, Tanzarella OA, Nachit MM, Porceddu E (2004) Genetic variation of the durum wheat landrace Haurani from different agro-ecological regions. Genet Resour Crop Evol 51: 863–869

Post GE (1896) Flora of Syria, Palestine and Sinai; from the Taurus to Ras Muhammad, and from the Mediterranean Sea to the Syrian desert. Syrian Protestant College, Beirut, Syria.

Prance GT (1997) The conservation of botanical diversity. In: Maxted N, Ford-Lloyd BV Hawkes JG (eds) Plant genetic conservation: the *in situ* approach. Chapman and Hall, London, pp 3–14

Prance G (2004) The cultural history of plants. Taylor and Francis, UK

Royal Botanic Gardens (Kew) (2010) World Checklist of Selected Plant Families. http://apps.kew.org/wcsp/qsearch.do (visited 26/01/2015)

Rożek E (2007) Plonowanie cykorii sałatowej (*Cichorium intybus* L. var. *foliosum* Bisch.) uprawianej w kilku terminach [Yielding of chicory (*Cichorium intybus* L. var. *foliosum* Bisch.) cultivated at several dates]. Ann Univ Mariae Curie-Sklodowska, Sect EEE Horticultura (Poland) 17: 11–18

Saleh, R. A., El- Nofey A.Y (2001) A study of aromatic oil of Syrian thyme: composition and effective factors.Journal Bulletin of Faculty of Agriculture, Cairo University (2001) 52: 401–425 [Arabic]

Sargent SA, Maynard DN (2012) Cucurbits. In: Rees D, Farrell G, Orchard J (eds) Crop post-harvest: science and technology, perishables. Wiley-Blackwell, UK, pp 286–316

Scholz H (ed) (1995) Illustrierte Flora von Mitteleuropa, ed. 2 IV(2B) Berlin

Schultze-Motel, J. (ed.) (1986) Rudolf Mansfelds Verzeichnis landwirtschaftlicher und gärtnerischer Kulturpflanzen (ohne Zierpflanzen). 4 vols. Akademie-Verlag, Berlin.

Simon JE, Reiss-Bubenheim D (1988) Field performance of American basil varieties. Herb, Spice Med Pl Digest 6: 1–4. Mass Coop Ext Serv Amherst, MA

Sincech F, Al-Khatīb (2002) Bedouin traditional medicine in the Syrian steppe. Al-Khatīb speaks: an interview with a Hadīdīn traditional doctor. FAO, Rome, Italy

Smale M, Bellon MR, Jarvis D, Sthapit B (2004) Economic concepts for designing policies to conserve crop genetic resources on farms. Genet Resour Crop Evol 51: 121–135

Syria [Syrian Arab Republic] (2009) The Fourth national report on Biodiversity in the Syrian Arab Republic. Ministry of State for Environmental Affairs, Directorate of Biodiversity and PAs, Damascus, Syria

Tanksley SD, McCouch SR (1997) Seed banks and molecular maps: unlocking genetic potential from the wild. Science 277: 1063–1066

Teklu Y, Hammer K (2006) Farmers perception and genetic erosion of Ethiopian tetraploid wheat landraces. Genet Resour Crop Evol 53: 1099–1113

Tunstall V, Teshome A, Torrance JK (2001) Distribution, abundance and risk of loss of sorghum landraces in four communities in North Shewa and South Welo, Ethiopia. Genet Resour Crop Evol 48: 131–142

UN Mission (2013) Urgent assistance to rural areas needed, 23 January, Damascus/Rome http://www.fao.org/news/story/pt/item/168676/icode/ (visited 30/11/2014)

Uotila P (2011) Moraceae. In: Euro+Med Plantbase – the information resource for Euro-Mediterranean plant diversity http://ww2.bgbm.org/EuroPlusMed/PTaxonDetail.asp?NameCache=Morus&PTRefFk=7300000 (visited 30/11/2014)

Valdés B, with contributions from von Raab-Straube E, Parolly G (2009) Ericaceae. In: Euro+Med Plantbase – the information resource for Euro-Mediterranean plant diversity http://ww2.bgbm.org/EuroPlusMed/PTaxonDetailOccurrence.asp?NameId=19575&PTRefFk=7100000 (visited 30/11/2014)

Valdés B (2011) Malvaceae. In: Euro+Med Plantbase – the information resource for Euro+Mediterranean plant diversity http://ww2.bgbm.org/EuroPlusMed/PTaxonDetail.asp?NameId=25791&PTRefFk=7100000 (visited 30/11/2014)

Valdés B (2012) Solanaceae. In: Euro+Med Plantbase – the information resource for Euro+Mediterranean plant diversity http://ww2.bgbm.org/EuroPlusMed/PTaxonDetail.asp?UUID=9191A1F1-C2A5-43C4-9C9F-0082A4181FBA (visited 17.12.2014)

van Slageren MW, Elings A, Holly L, Humeid B, Jaradat AA, Obari Kh (1989) Cereals, food legumes and their wild relatives in Syria and Jordan. FAO/IBPGR Pl Genet Resour Newsl 80: 5–14

van Wyk BE (2005) Food plants of the World. Briza Publications, Pretoria

Vavilov NI (1926) Studies on the origin of cultivated plants. Bull Appl Bot, Genet Pl Breed 16: 1–248 [Russian]

Vavilov NI (1951) The origin, variation, immunity and breeding of cultivated plants. In: Selected writings of NI Vavilov, translated by KS Chester. Chron Bot 31 (1/6), 364 pp

Vavilov NI (1992) Origin and geography of cultivated plants. Cambridge Univ Press, Cambridge

Vavilov NI (1997) Five continents. IPGRI, Rome, Italy/VIR, St. Petersburg, Russia

Wahbe T (1997) Medicinal and aromatic plants in Syria. In: Medicinal, Culinary and Aromatic Plants in the Near East. Proc Internat Expert Meet. FAO, Cairo, 1999. http://www.fao.org/docrep/x5402e/x5402e05.htm (visited 30.11.2014)

Watson JW, Eyzaguirre PB (eds) (2002) Proc 2nd Internat Home Gardens Workshop: Contribution of home gardens to *in situ* conservation of plant genetic resources in farming systems, 17–19 July 2001, Witzenhausen, Germany. IPGRI, Rome, Italy

Weiss E, Zohary D (2011) The Neolithic Southwest Asian founder crops: their biology and archaeobotany. Curr Anthropol 52: 237–254

Westlake M (2000) Final report on the Citrus Sector. Project GCP/SYR/006/ITA, Assistance in Institutional Strengthening and Agricultural Policy Project. FAO and Ministry of Agriculture and Agrarian Reform, Damascus, Syria

Williams JT (1993) Pulses and vegetables. Chapman & Hall, London, 247 pp

Yamashita K (1980) Origin and dispersion of wheats with special reference to peripheral diversity. Z Pfl-Zücht 84: 122–123

Zeven AC, de Wet JMJ (1982) Dictionary of cultivated plants and their regions of diversity. PUDOC, Wageningen, 263 pp

Zeven AC, Zhukovsky PM (1975) Dictionary of cultivated plants and their centres of diversity. PUDOC, Wageningen, 219 pp

Zohary D (1959) Is *Hordeum agriocrithon* the ancestor of six-rowed cultivated barley? Evolution 13: 279–280

Zohary D (1970) Centers of diversity and centers of origin. In: Frankel OH, Bennett E (eds) Genetic resources in plants – their exploration and conservation. Blackwell Sci Publ, Oxford, pp 33–42

Zohary D (1997) Wild apples and wild pears. Bocconea 7: 409–416

Zohary D, Hopf M (1993) Domestication of plants in the Old World: the origin and spread of cultivated plants in West Africa, Europe and the Nile Valley. Clarendon Press, Oxford, 278 pp [2nd ed 2000]

Zohary M (1973) Geobg otanical foundations of the Middle East. 2 vols. G Fischer Verlag, Stuttgart, Germany, x+728 pp

Zohary M, Feinbrun-Dothan N (1978) Flora palaestina. Vols 3–4. Jerusalem

# 8 Summary

The present survey of species diversity of cultivated plants is the first for Syria. Some cultivated species will be added in the future, because due to the civil war in Syria, it was not possible to visit the country in the frame of the present work, as initially planned. Checklists proved to be a useful tool for overviewing the cultivated plants of selected areas and allow a characterization of the state of plant genetic resources of Syria.

Syria has experienced several civilizations. Man settled in this productive land since ancient times and used its resources. However, such use has led to changes in vegetation and decline of wildlife through the country, in seashore areas, interior, mountains, and grassland. Plant domestication and growing started more than 10,000 years ago in West Asia. Since then, plentiful of economic plant species were present and used by man and his domesticated animals.

Forming a part of the Fertile Crescent, where many of the world's agricultural plants have evolved, Syria is extremely rich in agrobiodiversity. Wild progenitors of wheat and barley and wild relatives of many fruit trees such as almonds and pistachio as well as forage species are still found in marginal lands and less disturbed areas. These are threatened by a wide range of human activities, notably modern, extensive agriculture, overgrazing, overcutting and urban expansion.

Syria is also considered as part of one of the main centres of origin, according to Vavilov, who had collected in Syria in 1926. The first expeditions to crop fields showed the exclusive nature of cultivated plants in Syria with a high number of endemic forms. Furthermore, Syria is a part of a biodiversity hotspot.

Several studies have been performed to study agrobiodiversity in different parts of Syria, but usually on wild species. Many collections have been carried out; however, they focussed preferably on cereals and pulses, and particularly on wheat, like Vavilov's expedition.

Only 30 crops make up the major part of the conserved Syrian crop plant material in the genebank, indicating that most of the remaining 7,000 species of cultivated plants and many other valuable genetic resources species have only been included on a limited scale in the genebank collections.

Although a small country (185,180 $km^2$), Syria accommodates numerous ecosystems that allow for a large diversity of plant genetic resources for agriculture ranging from cold-requiring to subtropical crops to live and thrive. Only few references are available in this respect.

The aim of the present study was to complete a checklist of Syria's cultivated plants of agriculture and horticulture excluding plants only grown as ornamental or for forestry. Furthermore, plants taken for reforestation have not been included, if they do not have also agricultural or horticultural uses. Therefore, the inclusion of plants into the checklist follows the same principles as "Mansfeld's Encyclopedia".

Main sources of information were published literature, floras of Syria, Lebanon and the Mediterranean, as well as Syrian printed sources in Arabic and/or English, reports from FAO on agricultural statistics in Syria, and data from ICARDA and Bioversity International. In addition, personal observations gathered during professional work in the General Commission for Scientific Agricultural Research (GCSAR) in Syria (since 1989) and participation in projects were taken into account. These were:

(1) A project on "Conservation and Sustainable Use of Dry Land Agrobiodiversity in the Near East" with participation of Jordan, Lebanon, Syria, and the Palestinian Authority, focussing on landraces and wild relatives of barley, wheat, lentil, alliums, feed legumes, and fruit trees (1999–2005).

(2) A project for vegetable landraces (1993–1995) in collaboration with the former International Plant Genetic Resources Institute and the UN Development Programme, in which 380 local vegetable accessions were evaluated. For medicinal plants and fruit trees I was in personal contact with departments of GCSAR and the Ministry of Agriculture and Agrarian Reform, as well as with private organizations.

The resulting checklist was compared with the catalogues of crop plants of Italy and a checklist of cultivated plants of Iraq.

The cultivated plant species are presented in alphabetical order according to their accepted scientific names. Each entry consists of a nomenclatural part, folk names, details of plant uses, the distribution in Syria (by provinces), a textual description, and references to literature.

In total, 262 species belonging to 146 genera and 57 families were identified. Within-species (intraspecific) diversity is a significant measure of the biodiversity. Intraspecific diversity for wild plants has been and remains to be well studied, but for crop plants there are only few results. Mansfeld's method is an actual logical contribution to such studies.

Among the families, the following have the highest number of crop species: Leguminosae (34 spp.), Rosaceae (24), Gramineae (18), Labiatae (18), Compositae (14), Cruciferae (14), Cucurbitaceae (11), Rutaceae (10), Malvaceae (9), Alliaceae (7), and Anacardiaceae (7).

The establishment of an effective programme for the maintenance of plant genetic resources in Syria started in the mid-1970s. This programme considered *ex situ* and *in situ* collection of the genetic resources of various field crops, fruit trees and vegetables. From a plant genetic resources viewpoint, it is clear that the homegarden is an important location for the cultivation of so-called neglected and underutilized species (neglected from a research side and underutilized from a larger economic side). Such species have so far not received much care from ecologists, botanists and agronomists, and they are considerably under-represented in genebanks.

# 9 Zusammenfassung

Die vorliegende Untersuchung der Artenvielfalt von Kulturpflanzen ist die erste für Syrien. Einige Kulturpflanzenarten werden sicherlich künftig noch aufgenommen werden können, da es auf Grund des Bürgerkriegs in Syrien nicht möglich war, das Land im Rahmen der Untersuchungen zu besuchen, wie ursprünglich geplant. Checklisten haben sich als nützliches Hilfsmittel erwiesen, um sich einen Überblick über die Kulturpflanzen bestimmter Gebiete zu verschaffen, und sie ermöglichen eine Charakterisierung des Status der pflanzengenetischen Ressourcen in Syrien.

Syrien hat mehrere Zivilisationen erlebt. Der Mensch siedelte seit der Antike in diesem produktiven Land und nutzte seine Ressourcen. Allerdings hat diese Nutzung zu Veränderungen in der Vegetation und zum Niedergang des Wildtierbestandes im ganzen Land geführt – an der Küste, im Landesinneren, in den Gebirgen und im Grünland. Domestikation und Anbau von Pflanzen begannen in Westasien vor mehr als 10.000 Jahren. Seither gab es eine Vielzahl wirtschaftlicher nutzbarer Pflanzenarten, die vom Menschen und seinen Haustieren genutzt wurden.

Als Teil des Fruchtbaren Halbmonds, in dem sich viele der weltweit genutzten landwirtschaftlichen Kulturpflanzen entwickelt haben, ist Syrien extrem reich an Agrobiodiversität. In Randgebieten und weniger gestörten Gebieten findet man noch wilde Vorfahren von Weizen und Gerste, wilde Verwandte vieler Obstbäume wie Mandeln und Pistazien, sowie Futterpflanzenarten. Diese werden von einer breiten Palette von menschlichen Aktivitäten, vor allem von der modernen extensiven Landwirtschaft, Überweidung, Überschnitt und Stadterweiterung bedroht.

Syrien ist auch Teil eines der wichtigsten Ursprungsgebiete nach Vavilov, der im Jahre 1926 in Syrien gesammelt hatte. Bereits die ersten Expeditionen erwiesen die Exklusivität der Kulturpflanzen auf den Feldern in Syrien mit einer hohen Anzahl an endemischen Formen. Darüber hinaus ist Syrien Teil eines Biodiversitäts-Hotspots.

Mehrere Untersuchungen zur Agrobiodiversität in verschiedenen Teilen Syriens wurden bisher durchgeführt, die sich jedoch in der Regel auf wildlebende Arten beschränkten. Viele Sammlungen wurden durchgeführt, allerdings vorzugsweise auf Getreide und Hülsenfrüchten konzentriert, insbesondere auf Weizen, wie Vavilovs Expedition.

Nur 30 Pflanzenarten bilden den Großteil des in der Genbank erhaltenen syrischen Kulturpflanzenmaterials, was darauf hinweist, dass die meisten der übrigen 7.000 Kulturpflanzenarten und viele andere wertvolle genetische Ressourcen nur in begrenztem Umfang in die Genbanksammlungen aufgenommen worden sind.

Obwohl Syrien mit 185.180 $km^2$ ein relativ kleines Land ist, beherbergt es zahlreiche Ökosysteme, die eine große Vielfalt an pflanzengenetischen Ressourcen ermöglichen, von kälteliebenden Arten bis hin zu subtropischen Kulturen, die hier leben und gedeihen können. Nur wenige Nachweise gibt es in dieser Hinsicht in der Literatur.

Ziel der vorliegenden Studie war es, eine Checkliste der syrischen landwirtschaftlichen und gartenbaulichen Kulturpflanzen zu erstellen, mit Ausschluss von Zier- und Forstpflanzen (einschl. Wiederaufforstung), sofern sie nicht auch landwirtschaftliche oder gartenbauliche Nutzungen erfahren. Daher folgt die Aufnahme von Pflanzen in die Liste den gleichen Prinzipien wie in „Mansfeld's Encyclopedia".

Wesentliche Informationsquellen waren die publizierte Literatur, Floren von Syrien, dem Libanon und dem Mittelmeerraum, sowie syrische Veröffentlichungen in arabischer und/oder englischer Sprache, Berichte der FAO über die Agrarstatistik in Syrien, und Daten aus dem ICARDA und von Bioversity International. Darüber hinaus wurden persönliche Beobachtungen berücksichtigt, die im Rahmen der fachlichen Arbeit seit 1989 in der General Commission for Scientific Agricultural Research (GCSAR) in Syrien und durch Teilnahme an Projekten gesammelt wurden. Dies waren:

(1) Ein Projekt zur „Erhaltung und nachhaltigen Nutzung der Agrobiodiversität von Trockengebieten im Nahen Osten" unter Beteiligung von Jordanien, Libanon, Syrien und der Palästinensischen Autonomiebehörde, mit Schwerpunkt auf Landrassen und wildlebende Verwandte von Gerste, Weizen, Linsen, Zwiebeln, Futterleguminosen und Obstbäume (1999–2005).
(2) Ein Projekt für Gemüselandsorten (1993–1995) in Zusammenarbeit mit dem früheren International Plant Genetic Resources Institute und dem UN Development Programme, in welchem 380 lokale Gemüse-Akzessionen evaluiert wurden. Bezüglich Heilpflanzen und Obstbäumen war ich in persönlichem Kontakt sowohl mit Abteilungen der GCSAR und des Ministeriums für Landwirtschaft und Agrarreform, als auch mit privaten Organisationen.

Die erarbeitete Checkliste wurde mit den Katalogen der Kulturpflanzen Italiens und einer Checkliste der Kulturpflanzen des Irak verglichen.

Die Kulturpflanzenarten werden in alphabetischer Reihenfolge nach ihrer akzeptierten wissenschaftlichen Namen vorgestellt. Jeder Eintrag besteht aus einem Nomenklaturteil, Volksnamen, Nutzungsdetails, der Verteilung in Syrien (nach Provinzen), einer textuellen Beschreibung sowie Literaturverweisen.

Insgesamt wurden 262 Arten identifiziert, die 146 Gattungen und 57 Familien angehören. Innerartliche (intraspezifische) Vielfalt ist ein wichtiges Maß für die Biodiversität. Die intraspezifische Vielfalt für Wildpflanzen war und ist gut untersucht worden, während es für Kulturpflanzen nur wenige Ergebnisse gibt. Die Mansfeld-Methode ist ein geeigneter Beitrag zu solchen Untersuchungen.

Unter den Pflanzenfamilien haben folgende die höchsten Anzahlen kultivierter Arten: Leguminosen (34 spp.), Rosaceae (24), Gramineae (18), Labiatae (18), Compositae (14), Cruciferae (14), Cucurbitaceae (11), Rutaceae (10), Malvaceae (9), Alliaceae (7) und Anacardiaceae (7).

Der Aufbau eines wirksamen Programms zur Erhaltung pflanzengenetischer Ressourcen in Syrien begann Mitte der 1970er Jahre. Dieses Programm beinhaltet *Ex-situ-* und *In-situ-*

Sammlungen genetischer Ressourcen verschiedener Feldfrüchte, Obstbäume und Gemüse. Aus der Sicht der pflanzengenetischen Ressourcen ist es klar, dass der Hausgarten ein wichtiger Standort für den Anbau von sogenannten vernachlässigten und unzureichend genutzten Arten (aus Forschungssicht vernachlässigt bzw. aus wirtschaftlicher Sicht zu wenig genutzt) ist. Solche Arten haben bisher nicht genügend Aufmerksamkeit von Ökologen, Botanikern und Agrarwissenschaftlern erhalten, und sie sind in Genbanken stark unterrepräsentiert.

# 10 Appendices

**Appendix 1.** Index of taxa by uses

**C. = Cereals**
Hordeum vulgare
Oryza sativa
Panicum miliaceum
Setaria italica
Triticum aestivum
Triticum dicoccon
Triticum durum
Triticum monococcum
Triticum polonicum
Triticum turgidum
Zea mays

**Fo. = Forage and fodder plants**
Achillea millefolium
Aegilops geniculata
Agropyron junceum
Agropyron libanoticum
Atriplex halimus
Beta vulgaris var. rapacea
Brassica rapa subsp. rapa
Cannabis sativa
Ceratonia siliqua
Cichorium endivia
Cichorium intybus
Coronilla varia
Cucurbita maxima
Dactylis glomerata
Glycine max
Helianthus annuus
Lathyrus sativus
Lupinus albus
Lupinus angustifolius
Medicago arabica
Medicago arborea
Medicago sativa
Melilotus alba
Melilotus officinalis
Morus alba
Opuntia ficus-indica
Raphanus sativus
Sorghum bicolor
Trifolium argutum
Trifolium glomeratum
Trifolium pratense
Trifolium repens
Trigonella foenum-graecum
Vicia ervilia
Vicia sativa

**Fi. = Fibre plants**
Cannabis sativa
Gossypium herbaceum
Gossypium hirsutum
Linum usitatissimum

**Fr. = Fruits**
Actinidia deliciosa
Arbutus andrachne
Arbutus unedo
Celtis tournefortii
Citrullus lanatus
Citrus aurantiifolia
Citrus aurantium
Citrus paradisi
Citrus limon
Citrus maxima
Citrus reticulata
Citrus tangerina
Citrus unshiu
Cornus mas
Crataegus azarolus
Crataegus monogyna
Cucumis melo
Cydonia oblonga
Diospyros kaki
Diospyros lotus
Eriobotrya japonica
Ficus carica
Ficus sycomorus
Fragaria ×ananassa
Fragaria vesca
Malus domestica
Malus orientalis
Mespilus germanica
Morus alba
Morus nigra
Musa acuminata
Olea europaea
Opuntia ficus-indica
Phoenix dactylifera
Prunus armeniaca
Prunus avium
Prunus cerasifera
Prunus cerasus
Prunus domestica
Prunus mahaleb
Prunus persica
Prunus spinosa
Punica granatum
Pyrus communis
Pyrus syriaca
Sorbus torminalis
Vitis vinifera
Ziziphus jujuba
Ziziphus lotus

**I. = Industrial plants**
Abelmoschus moschatus
Acacia dealbata
Beta vulgaris var. altissima
Carthamus tinctorius
Corchorus capsularis
Cyperus papyrus
Fraxinus ornus
Hyssopus officinalis
Isatis tinctoria
Lavandula angustifolia
Lilium candidum
Luffa acutangula
Melissa officinalis
Nicotiana tabacum
Pinus halepensis
Reseda luteola
Rhus coriaria
Rhus cotinus
Rosa damascena
Rosmarinus officinalis
Senegalia senegal
Sesamum orientale
Sorghum bicolor

**M. = Medicinal plants**
Acacia nilotica

Achillea millefolium
Alcea rosea
Allium cepa var. cepa
Aloe vera
Althaea officinalis
Amaranthus lividus
Ammi visnaga
Anethum graveolens
Anthemis chia
Anthemis tinctoria
Arbutus unedo
Artemisia absinthium
Artemisia arborescens
Artemisia dracunculus
Arundo donax
Atriplex halimus
Capparis sicula
Capparis spinosa
Cardaria draba
Carum carvi
Castanea sativa
Celtis australis
Ceratonia siliqua
Chenopodium album
Cichorium intybus
Citrullus colocynthis
Citrus aurantium
Coriandrum sativum
Coridothymus capitatus
Coronilla varia
Crataegus monogyna
Crataegus orientalis
Crocus sativus
Cupressus arizonica
Cupressus sempervirens
Cynara scolymus
Cyperus esculentus
Cyperus rotundus
Eucalyptus gomphocephala
Foeniculum vulgare
Glycyrrhiza glabra
Gossypium herbaceum
Gundelia tournefortii
Humulus lupulus
Hyssopus officinalis
Juglans regia
Juniperus oxycedrus
Laurus nobilis
Lavandula angustifolia
Malva neglecta
Malva parviflora
Malva verticillata
Matricaria recutita
Melilotus officinalis
Melissa officinalis
Mentha longifolia
Mentha ×piperita
Mentha spicata
Myrtus communis
Nicotiana glauca
Nigella sativa
Ocimum basilicum
Origanum majorana
Papaver somniferum
Peganum harmala
Petroselinum crispum
Pimpinella anisum
Pinus pinea
Plantago afra
Punica granatum
Reseda luteola
Rheum ribes
Rhus coriaria
Rhus trilobata
Ricinus communis
Rosa damascena
Rosmarinus officinalis
Rumex patientia
Salvia officinalis
Salvia fruticosa
Salvia sclarea
Satureja hortensis
Senegalia senegal
Sesamum orientale
Thymus capitatus
Trigonella foenum-graecum
Vicia sativa
Vitis vinifera
Ziziphus jujuba
Ziziphus lotus

**N = Nuts**
Arachis hypogaea
Carya illinoinensis
Castanea sativa
Corylus avellana
Juglans regia
Pinus pinea
Pistacia vera
Prunus armeniaca
Prunus dulcis
Quercus macrolepis

**Oi. = Oil plants**
Brassica napus
Cannabis sativa
Carthamus tinctorius
Helianthus annuus
Laurus nobilis
Linum usitatissimum
Olea europaea
Ricinus communis
Sesamum orientale

**Pu. = Pulses**
Cicer arietinum
Lathyrus sativus
Lens culinaris
Lupinus albus
Lupinus angustifolius
Phaseolus coccineus
Phaseolus lunatus
Phaseolus vulgaris
Vicia faba
Vigna unguiculata

**Sp. = Spices and condiments**
Allium sativum
Anethum graveolens
Artemisia absinthium
Artemisia arborescens
Artemisia dracunculus
Brassica nigra
Capparis sicula
Capparis spinosa
Capsicum annuum
Capsicum frutescens
Carum carvi
Citrus aurantium
Citrus bergamia
Coriandrum sativum
Coridothymus capitatus
Crocus sativus

Cuminum cyminum
Foeniculum vulgare
Laurus nobilis
Lilium candidum
Melilotus officinalis
Melissa officinalis
Mentha pulegium
Mentha spicata
Myrtus communis
Nigella sativa
Ocimum basilicum
Origanum majorana
Origanum syriacum
Petroselinum crispum
Pimpinella anisum
Rhus coriaria
Rosmarinus officinalis
Salvia officinalis
Salvia fruticosa
Satureja hortensis
Satureja montana
Schinus molle
Sesamum orientale
Thymus capitatus
Trigonella foenum-graecum

**St. = Starch plants, excl. cereals**
Cyperus esculentus
Ipomoea batatas var. edulis

**V. = Vegetables**
Abelmoschus esculentus
Abelmoschus moschatus
Agaricus bisporus
Allium ampeloprasum
Allium cepa var. aggregatum
Allium cepa var. cepa
Allium kurrat
Allium porrum
Allium sativum
Allium scorodoprasum
Althaea officinalis
Amaranthus lividus
Amaranthus retroflexus
Apium graveolens
Artemisia dracunculus
Asparagus officinalis
Beta vulgaris var. cicla
Beta vulgaris
Brassica oleracea var. botrytis
Brassica oleracea var. capitata
Brassica oleracea var. gongylodes
Brassica rapa subsp. rapa
Brassica rapa subsp. pekinensis
Capsicum annuum
Capsicum frutescens
Cardaria draba
Chenopodium album
Cichorium endivia
Cichorium intybus
Corchorus capsularis
Corchorus olitorius
Coriandrum sativum
Cucumis melo
Cucumis sativus
Cucurbita argyrosperma
Cucurbita maxima
Cucurbita moschata
Cucurbita pepo
Cynara cardunculus
Cynara scolymus
Cyperus rotundus
Daucus carota subsp. sativa
Eruca sativa
Foeniculum vulgare
Gundelia tournefortii
Humulus lupulus
Lactuca sativa
Lagenaria siceraria
Lepidium sativum
Luffa aegyptiaca
Lycopersicon esculentum
Malva neglecta
Malva parviflora
Malva verticillata
Nasturtium officinale
Petroselinum crispum
Phaseolus vulgaris
Portulaca oleracea
Raphanus sativus
Rheum rhabarbarum
Solanum melongena
Solanum tuberosum
Spinacia oleracea
Vigna unguiculata
Zea mays

**Grafting stock**
Pistacia atlantica
Pistacia khinjuk
Pyrus syriaca

**Hedges**
Acacia farnesiana
Acacia mellifera
Aloe vera
Arundo donax
Corylus avellana
Crataegus monogyna
Cupressus arizonica
Cupressus sempervirens
Myrtus communis
Nerium oleander
Opuntia ficus-indica
Paliurus spina-christi
Prunus spinosa
Pyracantha coccinea
Robinia pseudo-acacia
Ulmus glabra
Ulmus minor
Ziziphus lotus

**Shade tree**
Acacia dealbata
Celtis australis
Celtis tournefortii
Eucalyptus gomphocephala
Pinus halepensis
Sorbus torminalis
Ulmus glabra
Ulmus minor
Ziziphus lotus

**Soil erosion control**
Ammophila arenaria
Coronilla varia
Pistacia atlantica
Rhus trilobata

Robinia pseudo-acacia

**Wind break**
Atriplex halimus
Cupressus arizonica
Eucalyptus gomphocephala
Fraxinus ornus
Juniperus drupacea
Nerium oleander
Rhus coriaria
Rhus cotinus

**Cosmetics**
Aloe vera

**Appendix 2.** Index of synonyms

Abelmoschus sagittifolius Merr. — A. moschatus
Acacia arabica (Lam.) Willd. — A. nilotica
A. senegal (L.) Willd. — Senegalia senegal
Actinidia chinensis J. E. Planch. — A. deliciosa
A. chinensis var. deliciosa A. Chev. — A. deliciosa
Agropyron farctum (Viv.) Rothm. — A. junceum
Allium ampeloprasum L. var. porrum (L.) J. Gay — A. porrum
A. ascalonicum L. — A. cepa var. aggregatum
A. cepa L. — A. cepa var. aggregatum
A. porrum auct. — A. kurrat
A. porrum var. kurrat (Schweinf. ex K. Krause) Seregin — A. kurrat
Aloe barbadensis Mill. — A. vera
A. vulgaris Lam. — A. vera
Althaea microcarpa Alef. — Malva parviflora
A. rosea (L.) Cav. — Alcea rosea
A. verticillata (L.) Alef. — Malva verticillata
Amaranthus blitum L. — Amaranthus lividus
Amaranthus oleraceus L. — A. lividus
Ammophila arundinacea Host — A. arenaria
Amygdalus communis L. — Prunus dulcis
A. dulcis Mill. — Prunus dulcis
A. persica L. — Prunus persica
Andropogon sorghum var. technicus Koern. — Sorghum bicolor
Anethum foeniculum L. — Foeniculum vulgare
Apium petroselinum L. — Petroselinum crispum
Arachnida hypogaea (L.) Moench — Arachis hypogaea
Arbutus integrifolia Salisb. — A. andrachne
A. serratifolia Salisb. — A. unedo
Armeniaca vulgaris Lam. — Prunus armeniaca
Aurantium maximum Burm. — Citrus maxima
Batatas edulis (Thunb.) Choisy — Ipomoea batatas var. edulis
Beta cicla L. — B. vulgaris var. cicla
B. italica A. Kerner — B. vulgaris var. vulgaris
B. vulgaris convar. cicla (L.) Alef. — B. vulgaris var. cicla
B. vulgaris var. conditiva Alef. — B. vulgaris var. vulgaris
B. vulgaris var. crassa (Alef.) Wittm. — B. vulgaris var. rapacea
B. vulgaris var. rapa Dum. — B. vulgaris var. rapacea
B. vulgaris var. saccharifera Alef. — B. vulgaris var. altissima
B. vulgaris Miller — B. vulgaris var. vulgaris
Brassica campestris var. napus (L.) Babingt. — B. napus
B. campestris var. rapa (L.) Hartm. — B. rapa subsp. rapa
B. caulorapa (DC.) Pasquale — B. oleracea var. gongylodes
B. chinensis var. pekinensis (Lour.) Sun — B. rapa subsp. pekinensis
B. eruca L. — Eruca sativa
B. napus var. oleifera (Moench) Delile — B. napus
B. oleracea var. caulorapa DC. — B. oleracea var. gongylodes
B. rapa L. — B. rapa subsp. rapa
B. rapa subsp. rapifera Metzg. — B. rapa subsp. rapa
Cactus ficus-indica L. — Opuntia ficus-indica
C. opuntia Guss. — Opuntia ficus-indica
Capparis ovata Desf. — C. sicula
Carum petroselinum (L.) Benth. — Petroselinum crispum
Celtis excelsa Salisb. — C. australis
Cerasus avium (L.) Moench — Prunus avium
C. mahaleb (L.) Mill. — Prunus mahaleb
C. vulgaris Mill. — Prunus cerasus
Citrullus vulgaris Schrad. ex Eckl. et Zeyh. — C. lanatus
Citrus aurantium var. bergamia Wight et Arn. — C. bergamia
C. aurantium var. grandis L. — C. maxima
C. aurantium var. sinensis L. — C. sinensis
C. bigaradia Lois. — C. aurantium
C. decumanus L. — C. maxima
C. grandis Osbeck — C. maxima
C. limetta var. bergamia Risso — C. bergamia
C. nobilis Andrews — C. reticulata
C. vulgaris Risso — C. aurantium

Convolvulus batatas L. — Ipomoea batatas var. edulis
C. edulis Thunb. — Ipomoea batatas var. edulis
Corylus avellana L. var. maxima Audib. — C. avellana
C. grandis Poir. — C. avellana
Crataegus bibas Lour. — Eriobotrya japonica
C. pyracantha Medik. — Pyracantha coccinea
C. torminalis L. — Sorbus torminalis
Cucumis acutangulus L. — Luffa acutangula
C. colocynthis L. — Citrullus colocynthis
Cucurbita citrullus L. — Citrullus lanatus
C. mixta Pangalo — C. argyrosperma
C. pepo var. moschata Duch. ex Lam. — C. moschata
Cynara cardunculus subsp. scolymus (L.) Hayek — C. scolymus
Cyperus syriacus Parl. — C. papyrus
Daucus carota var. sativa Hoffm. — D. carota
D. sativa (Hoffm.) Roehl. — D. carota
D. visnaga L. — Ammi visnaga
Dolichos sinensis L. — Vigna unguiculata
Dolichos unguiculata L. — Vigna unguiculata
Eruca vesicaria var. sativa (Mill.) Thell. — E. sativa
Ervum ervilia L. — Vicia ervilia
E. lens L. — Lens culinaris
Fagus castanea L. — Castanea sativa
Fragaria chiloensis var. ananassa (Duch) Bailey — F. ×ananassa
F. vesca race ananassa Duch. — F. ×ananassa
Glycine hispida (Moench) Maxim. — G. max
Hibiscus abelmoschus L. — Abelmoschus moschatus
H. esculentus L. — Abelmoschus esculentus
H. sagittifolius Kurz — Abelmoschus moschatus
Holcus bicolor L. — Sorghum bicolor
Ipomoea batatas (L.) Lam. — I. batatas var. edulis
Lactuca capitata Gars. — L. sativa
Lagenaria vulgaris Ser. — L. siceraria
Lavandula officinalis Chaix — L. angustifolia
Lavandula spica L. — Lavandula angustifolia
L. vera DC. — L. angustifolia
Lens esculenta Moench — L. culinaris
Limonia aurantiifolia Christm. et Panz. in L. — Citrus aurantiifolia
Luffa cylindrica (L.) Roem. — L. aegyptiaca
Lycopersicon lycopersicum (L.) Farw. — L. esculentum
Majorana crassa Moench — Origanum syriacum
M. hortensis Moench — Origanum majorana
M. vulgaris Mill. — Origanum majorana
Matricaria chamomilla L. — M. recutita
Medicago arborescens Presl — M. arborea
Mentha citrata Ehrh. — M. ×piperita
M. spicata var. longifolia L. — M. longifolia
M. spicata var. viridis L. — M. spicata
M. sylvestris L. — M. longifolia
M. viridis (L.) L. — M. spicata
Mespilus japonicus Thunb. — Eriobotrya japonica
M. pyracantha L. — Pyracantha coccinea
Mimosa dealbata Wendl. — Acacia dealbata
M. farnesiana L. — Acacia farnesiana
M. mellifera Vahl — Acacia mellifera
M. nilotica L. — Acacia nilotica
Mimosa senegal L. — Senegalia senegal
Momordica cylindrica L. — Luffa aegyptiaca
M. lanata Thunb. — Citrullus lanatus
Musa cavendishii Lam. ex Paxton — M. acuminata
Nasturtium fontanum (Lam.) Aschers. — N. officinale
Opuntia vulgaris Tenore — O. ficus-indica
Paliurus aculeatus Lam. — Paliurus spina-christi
Paliurus australis Gaertn. — Paliurus spina-christi
Panicum italicum L. — Setaria italica
Persica vulgaris Mill. — Prunus persica
Petroselinum hortense Hoffm. — P. crispum
P. sativum Hoffm. — P. crispum
Phaseolus limensis Macf. — P. lunatus
P. max L. — Glycine max
P. multiflorus Lam. — P. coccineus
P. multiflorus Willd. — P. coccineus
P. nanus Juslen — P. vulgaris
Photinia japonica Benth. — Eriobotrya japonica
Pistacia acuminata Boiss. et Buhse — P. khinjuk

Pisum arvense L. — P. sativum
P. sativum var. fulvus L. — P. sativum
Plantago cynops L. — P. afra
P. psyllium L. — P. afra
Prunus amygdalus Batsch — P. dulcis
P. communis Arcang. — P. dulcis
P. insititia Jusl. — P. domestica
P. persica var. cordiformis Rehder — P. persica
Psalliota hortensis (Cooke) J. Lange — Agaricus bisporus
Punica nana L. — P. granatum
Pyrus cydonia L. — Cydonia oblonga
P. domestica Medik. — P. communis
Raphanus caudatus L. — R. sativus
Rhamnus lotus L. — Ziziphus lotus
R. paliurus L. — Paliurus spina-christi
R. zizyphus L. — Ziziphus jujuba
Rheum undulatum L. — R. rhabarbarum
Rorippa nasturtium Beck — Nasturtium officinale
Rumex patientia var. kurdicus Boiss. — R. patientia
Satureja capitata L. — Thymus capitatus
Schinus areira L. — Schinus molle
Sesamum indicum L. — Sesamum orientale
Sinapis nigra L. — Brassica nigra
S. pekinensis Lour. — Brassica rapa subsp. pekinensis
Soja hispida Moench — Glycine max
Solanum esculentum Dunal — S. melongena
S. lycopersicum L. — Lycopersicon esculentum
S. sinense Blanco — S. tuberosum
Sorghum saccharatum convar. technicum (Koern.) Tzvelev — S. bicolor
S. vulgare Pers. — S. bicolor
Trifolium indica L. — Melilotus indica
T. officinale L. — Melilotus officinalis
Triticum compactum Host — T. aestivum
T. dicoccum Schuebler — T. dicoccon
T. turgidum subsp. durum (Desf.) Husn. — T. durum
T. turgidum subsp. polonicum (L.) A. et D. Löve — T. polonicum
T. turgidum var. durum (Desf.) Mac Key — T. durum
T. vulgare Vill. — T. aestivum
Ulmus campestris L. — U. glabra
Vigna sinensis (L.) Savi ex Hassk. — V. unguiculata
Vitis laciniosa L. — V. vinifera
V. vinifera var. laciniosa (L.) Fiori — V. vinifera
Ziziphus sativa Gaertn. — Z. jujuba
Z. vulgaris Lam. — Z. jujuba
Z. zizyphus (L.) Meikle — Z. jujuba

**Appendix 3.** Index of English and Syrian Arabic folk names

### 3a. English folk names

African date palm — Ziziphus lotus
African spinach — Amaranthus lividus
Aleppo pine — Pinus halepensis
alfalfa — Medicago sativa
aloe vera — Aloe vera
ambrette — Abelmoschus moschatus
anise — Pimpinella anisum
apple — Malus domestica
apricot — Prunus armeniaca
artichoke — Cynara scolymus
asparagus — Asparagus officinalis
atlas mastic tree — Pistacia atlantica
aubergine — Solanum melongena
azarole — Crataegus azarolus
balck caraway — Nigella sativa
banana — Musa acuminata
barley — Hordeum vulgare
bay laurel — Laurus nobilis
bergamot orange — Citrus bergamia
bitter apple — Citrullus colocynthis
bitter cucumber — Citrullus colocynthis
bitter orange — Citrus aurantium
bitter vetch — Vicia ervilia
black cumin — Nigella sativa
black eyed bean — Vigna unguiculata
black locust — Robinia pseudo-acacia
black mulberry — Morus nigra
black mustard — Brassica nigra
black psyllium — Plantago afra
black thorn acacia — Acacia mellifera
blackthorn — Prunus spinosa
blue lupin — Lupinus angustifolius
bottle gourd — Lagenaria siceraria
bread wheat — Triticum aestivum
broad bean — Vicia faba
broomcorn millet — Panicum miliaceum
burclover — Medicago arabica
butter bean — Phaseolus lunatus
buttercup squash — Cucurbita maxima
button mushroom — Agaricus bisporus
cabbage — Brassica oleracea var. capitata
caper plant — Capparis sicula
caraway — Carum carvi
cardoon — Cynara cardunculus
carob tree — Ceratonia siliqua
carrot — Daucus carota subsp. sativa
castor-oil plant — Ricinus communis
Caucasian persimmon — Diospyros lotus
cauliflower — Brassica oleracea var. botrytis
celery — Apium graveolens
chamomile — Anthemis chia, Matricaria recutita
champignon mushroom — Agaricus bisporus
chard — Beta vulgaris var. cicla
checker tree — Sorbus torminalis
cheese weed — Malva parviflora
cheese weed mallow — Malva parviflora
cherry plum — Prunus cerasifera
chestnut — Castanea sativa
chickling vetch — Lathyrus sativus
chickpea — Cicer arietinum
chili pepper — Capsicum frutescens
chinese date — Ziziphus jujuba
chufa — Cyperus esculentus
clary sage — Salvia sclarea
clover — Trifolium glomeratum
cocks foot grass — Dactylis glomerata
cold hardy mandarin — Citrus unshiu
common almond — Prunus dulcis
common bean — Phaseolus vulgaris
common caper-bush — Capparis spinosa
common chicory — Cichorium intybus
common fig — Ficus carica
common hawthorn — Crataegus monogyna
common hemp — Cannabis sativa
common hop — Humulus lupulus
common lime — Citrus aurantiifolia
common mallow — Malva neglecta
common mushroom — Agaricus bisporus
common olive — Olea europaea
common purslane — Portulaca oleracea
common sage — Salvia officinalis
common vetch — Vicia sativa
common wheat — Triticum aestivum
common yarrow — Achillea millefolium
cone wheat — Triticum turgidum
conehead thyme — Coridothymus capitatus, Thymus capitatus
coriander — Coriandrum sativum
corn — Zea mays
cornelian cherry — Cornus mas
courgettes — Cucurbita pepo

cowpea — Vigna unguiculata
crest wheat — Agropyron libanoticum
crown vetch — Coronilla varia
cucumber — Cucumis sativus
cultivated mushroom — Agaricus bisporus
cultivated tobacco — Nicotiana tabacum
cumin — Cuminum cyminum
curled mallow — Malva verticillata
cushaw squash — Cucurbita argyrosperma
damasc rose — Rosa damascena
date palm — Phoenix dactylifera
date plum — Diospyros kaki, D. lotus
desert gourd — Citrullus colocynthis
dill — Anethum graveolens
dishrag gourd — Luffa aegyptiaca
dogwood — Cornus mas
dragon sagewort — Artemisia dracunculus
durum wheat — Triticum durum
dyers chamomile — Anthemis tinctoria
earth almond — Cyperus esculentus
eggplant — Solanum melongena
Egyptian lime — Citrus aurantiifolia
Egyptian luffa — Luffa aegyptiaca
einkorn wheat — Triticum monococcum
elm-leaved sumac — Rhus cotinus
emmer wheat — Triticum dicoccon
eucalyptus — Eucalyptus gomphocephala
European cornel — Cornus mas
European pear — Pyrus communis
false pepper — Schinus molle
farro — Triticum dicoccon
fat hen — Chenopodium album
fennel — Foeniculum vulgare
fenugreek — Trigonella foenum-graecum
fig-mulberry — Ficus sycomorus
filbert — Corylus avellana
fire thorn — Pyracantha coccinea
flax — Linum usitatissimum
flowering ash — Fraxinus ornus
fodder beets — Beta vulgaris var. rapacea
foxtail millet — Setaria italica
French jujube — Ziziphus jujuba
French tarragon — Artemisia dracunculus
garden bean — Phaseolus vulgaris
garden beets — Beta vulgaris var. rapacea, var. vulgaris
garden cress — Lepidium sativum
garden hollyhock — Alcea rosea
garden pea — Pisum sativum
garden sage — Salvia officinalis
garden thyme — Thymus vulgaris
garlic — Allium sativum
globe artichoke — Cynara cardunculus
golden clover — Trifolium argutum
gommer — Triticum polonicum
gourd loofa — Luffa aegyptiaca
grape — Vitis vinifera
grapefruit — Citrus paradisi
grapevine — Vitis vinifera
grass pea — Lathyrus sativus
great mugwort — Artemisia arborescens
greek sage — Salvia fruticosa
greek strawberry tree — Arbutus andrachne
green striped cushaw — Cucurbita argyrosperma
groundnut — Arachis hypogaea
gum Arabic tree — Acacia nilotica, Senegalia senegal
gundelia — Gundelia tournefortii
hard wheat — Triticum durum
harmal — Peganum harmala
harmela shrub — Peganum harmala
heart clover — Medicago arabica
hoary cress — Cardaria draba
honeyberry — Celtis australis
horse mint — Mentha longifolia
hubbard squash — Cucurbita maxima
hulled wheat — Triticum dicoccon
hyssop — Hyssopus officinalis
Indian clover — Melilotus indica
Indian fig — Opuntia ficus-indica
Japanese medlar — Eriobotrya japonica
Jerusalem thorn — Paliurus spina-christi
Jew thorn — Ziziphus lotus
jujube tree — Ziziphus jujuba
jute — Corchorus olitorius
kidney beans — Phaseolus vulgaris
kiwi fruit — Actinidia deliciosa
kohlrabi — Brassica oleracea var. gongylodes
kurrat — Allium kurrat
lady’s finger — Abelmoschus esculentus
large trefoil — Trifolium argutum
lavender — Lavandula angustifolia
leek — Allium ampeloprasum, A. porrum
lemon — Citrus limon
lemon balm — Melissa officinalis

lentil — Lens culinaris
lepidium draba — Cardaria draba
lettuce — Lactuca sativa
levant cotton — Gossypium herbaceum
lima bean — Phaseolus lunatus
linseed— Linum usitatissimum
liquorice — Glycyrrhiza glabra
little mallow — Malva parviflora
long mint leaves — Mentha longifolia
loquat — Eriobotrya japonica
lupin beans — Lupinus albus
macaroni wheat — Triticum durum
mahleb cherry — Prunus mahaleb
maize — Zea mays
mallow-leaves — Corchorus capsularis
malva — Malva parviflora
manna ash — Fraxinus ornus
marjoram — Origanum majorana
marram grass — Ammophila arenaria
marsh mallow — Althaea officinalis
mealies — Zea mays
Mediterranean cypress — Cupressus sempervirens
Mediterranean hackberry — Celtis australis
Mediterranean medlar — Crataegus monogyna
medlar — Mespilus germanica
melon — Cucumis melo
monk's rhubarb — Rumex patientia
moon trefoil — Medicago arborea
musk mallow — Abelmoschus moschatus
musk melon — Cucumis melo
musk okra — Abelmoschus moschatus
myrtle — Myrtus communis
narrow-leafed lupin — Lupinus angustifolius
needle bush — Acacia farnesiana
nerium — Nerium oleander
Nile grass — Cyperus papyrus
nut-grass — Cyperus rotundus
oak — Quercus infectoria
okra — Abelmoschus esculentus
old man — Artemisia arborescens
olive tree — Olea europaea
onion — Allium cepa var. cepa
opium poppy — Papaver somniferum
opo squash — Lagenaria siceraria
orchard grass — Dactylis glomerata
ordinary beet — Beta vulgaris var. cicla
orient apple — Malus orientalis
oriental hackberry — Celtis tournefortii
oriental hawthorn — Crataegus orientalis
ovate goatgrass — Aegilops geniculata
palm tree — Phoenix dactylifera
paper reed — Cyperus papyrus
parsley — Petroselinum crispum
patience dock — Rumex patientia
pea — Pisum sativum
peach — Prunus persica
peanut — Arachis hypogaea
pecan — Carya illinoinensis
pepper mint — Mentha ×piperita
Persian cumin — Carum carvi
Persian hyssop — Coridothymus capitatus
persimmon — Diospyros kaki
pistachio nut — Pistacia vera
pistacia khinjuk — Pistacia khinjuk
plum — Prunus domestica
Polish wheat — Triticum polonicum
pollard wheat — Triticum turgidum
pomegranate — Punica granatum
pomelo — Citrus maxima
potato — Solanum tuberosum
potato onion — Allium cepa var. aggregatum
prickly cedar — Juniperus oxycedrus
pumpkin — Cucurbita maxima, C. moschata
purple amaranth — Amaranthus lividus
quince — Cydonia oblonga
radish — Raphanus sativus
rapeseed — Brassica napus
red clover — Trifolium pratense
red pepper — Capsicum annuum
red talah — Senegalia senegal
red-root amaranth — Amaranthus retroflexus
reseda luteola — Reseda luteola
rhubarb — Rheum rhabarbarum
rice — Oryza sativa
rivet wheat — Triticum turgidum
rosemary — Rosmarinus officinalis
roundleaf mallow — Malva neglecta
runner bean — Phaseolus coccineus
safflower — Carthamus tinctorius
saffron — Crocus sativus
salad leek — Allium kurrat
salad rocket — Eruca sativa
sand couch — Agropyron junceum
sand leek — Allium scorodoprasum
satsuma mandarin — Citrus unshiu

satureja — Satureja hortensis
scots elm — Ulmus glabra
sea wheatgrass — Agropyron junceum
sesam — Sesamum orientale
shallot — Allium cepa var. aggregatum
shrubby medick — Medicago arborea
shrubby orache — Atriplex halimus
Sicilian sumac — Rhus coriaria
silk gourd — Luffa aegyptiaca
silver wattle — Acacia dealbata
small flowered mallow — Malva parviflora
small spelt wheat — Triticum monococcum
smooth luffa — Luffa aegyptiaca
snap bean — Phaseolus vulgaris
soft wheat — Triticum aestivum
sorghum — Sorghum bicolor
sour cherry — Prunus cerasus
sour lime — Citrus aurantiifolia
sour mandarin — Citrus reticulata
soybean — Glycine max
Spanish cane — Arundo donax
Spanish oregano — Coridothymus capitatus, Thymus capitatus
spearmint — Mentha spicata
spinach — Spinacia oleracea
spinach beet — Beta vulgaris var. cicla
spinach-dock — Rumex patientia
spinal sumac — Rhus trilobata
St. John's bread — Ceratonia siliqua
stone pine — Pinus pinea
strawberry — Fragaria ×ananassa
strawberry tree — Arbutus unedo
sugar beets — Beta vulgaris var. altissima
sumac dyers — Rhus cotinus
sumac lumbar — Rhus cotinus
summer savory — Satureja hortensis
summer squash — Cucurbita pepo
sunflower — Helianthus annuus
sweet acacia — Acacia farnesiana
sweet basil — Ocimum basilicum
sweet cherry — Prunus avium
sweet chestnut — Castanea sativa
sweet orange — Citrus sinensis
sweet potato — Ipomoea batatas var. edulis
sycamore fig — Ficus sycomorus
Syrian juniper — Juniperus drupacea
Syrian oregano — Origanum syriacum
Syrian pear — Pyrus syriaca
Syrian rue — Peganum harmala
Syrian sumac — Rhus cotinus
table beet — Beta vulgaris var. vulgaris
table mushroom — Agaricus bisporus
tangerine — Citrus tangerina
tanning sumac — Rhus coriaria
tarragon — Artemisia dracunculus
tart cherry — Prunus cerasus
tomato — Lycopersicon esculentum
tooth-pick weeds — Ammi visnaga
tree cotton — Gossypium herbaceum
tree tobacco — Nicotiana glauca
tree wormwood — Artemisia arborescens
turnip — Brassica rapa subsp. rapa
upland cotton — Gossypium hirsutum
valonia oak — Quercus macrolepis
vegetable sponge — Luffa acutangula
walnut — Juglans regia
warmot — Artemisia absinthium
water cypress — Cupressus arizonica
watercress — Nasturtium officinale
watermelon — Citrullus lanatus
white clover — Trifolium repens
white goose foot — Chenopodium album
white jute — Corchorus capsularis
white lily — Lilium candidum
white lupin — Lupinus albus
white melilot — Melilotus alba
white mulberry — Morus alba
white mushroom — Agaricus bisporus
white sweet clover — Melilotus alba
whitetop — Cardaria draba
wig tree — Rhus cotinus
wild endive — Cichorium intybus
wild mint — Mentha pulegium
wild rhubarb — Rheum ribes
wild strawberry — Fragaria vesca
winter endive — Cichorium endivia
winter savory — Satureja montana L
winter squash — Cucurbita maxima
woad — Isatis tinctoria
woodland strawberry — Fragaria vesca
wych elm — Ulmus glabra
yellow chamomile — Anthemis tinctoria
yellow sweet clover — Melilotus officinalis
zucchinis — Cucurbita pepo

**Syrian folk names**

abaad al shams — Helianthus annuus
acorn squash — Cucurbita pepo
adas — Lens culinaris
akasia — Acacia dealbata, A. farnesiana
akedenia — Eriobotrya japonica
akoub — Cynara cardunculus
al ekelel — Coronilla varia
al kharwah — Ricinus communis
al khella balady — Ammi visnaga
al khobyz — Althaea officinalis
al saed al latheeth — Cyperus esculentus
al warda al damsqyah — Rosa damascena
al-kezhaa — Nigella sativa
al-khatmia — Alcea rosea
almeas — Celtis australis
almeas al sharky — Celtis tournefortii
alqnneberh — Cardaria draba
alrazeen — Agropyron libanoticum
al-sarmak — Chenopodium album
al-zall — Arundo donax
angenaar — Cynara scolymus
aqub — Gundelia tournefortii
arar sharbeeny — Juniperus oxycedrus
arar soury — Juniperus drupacea
ardy shoky — Cynara scolymus
arouz — Oryza sativa
ass — Myrtus communis
babonej — Anthemis chia
babonej almany — Matricaria recutita
babonej asffar — Anthemis tinctoria
backly hamkah — Portulaca oleracea
bakdones — Petroselinum crispum
baloot — Quercus macrolepis
bamia — Abelmoschus esculentus
bandoora — Lycopersicon esculentum
banger — Beta vulgaris var. vulgaris
bargamot — Citrus bergamia
barkook shaek — Prunus spinosa
barseem — Trifolium glomeratum
barseem abiad — Trifolium repens
barseem ahmar — Trifolium pratense
barseem asfar — Trifolium
barseem hejazy — Medicago sativa
bassal — Allium cepa var. cepa
batata — Solanum tuberosum
batatah helwa — Ipomoea batatas var. edulis
bateech — Citrullus lanatus
bateekh asfar — Cucumis melo
batem akhdar — Pistacia khinjuk
batem atlasy — Pistacia atlantica
bathenjan — Solanum melongena
bazylah — Pisum sativum
beekia — Vicia sativa
bolayha mousffara — Reseda luteola
bomaly — Citrus maxima
bondok — Corylus avellana
bortokal helo — Citrus sinensis
burdaa — Cyperus papyrus
caraway — Carum carvi
common loofah — Luffa acutangula
cotton — Gossypium herbaceum, G. hirsutum
dakhen — Panicum miliaceum, Setaria italica
dardar ajrad — Ulmus glabra
darm — Lavandula angustifolia
doufla — Nerium oleander
dourak — Prunus persica
durah — Zea mays
eanab — Ziziphus jujuba
ejass — Pyrus communis
ekleel al jabal — Rosmarinus officinalis
ekleel al malek — Melilotus officinalis
enab — Vitis vinifera, Ziziphus lotus
ereck al soos — Glycyrrhiza glabra
esbaeah motagemah — Dactylis glomerata
farfaheena — Portulaca oleracea
fasoulia — Phaseolus coccineus, P. vulgaris
fasoulia baydah — Phaseolus lunatus
fassa arabia — Medicago arabica
fassa shajaria — Medicago arborea
fegil — Raphanus sativus
felfel berovy — Schinus molle
feter — Agaricus bisporus
flyfleh hamra — Capsicum annuum
flyfleh shagarea — Capsicum frutescens
fool — Vicia faba
fool al soya — Glycine max
fool soudany — Arachis hypogaea
fostock abeed — Arachis hypogaea
freez — Fragaria ×ananassa, F. vesca
fustuq — Pistacia vera
gaar — Laurus nobilis
gargir — Eruca sativa
gemmayz — Ficus sycomorus
ghoberaa momaghsah — Sorbus torminalis

giant reeds — Arundo donax
grefoon — Citrus paradisi
hab el aziz — Cyperus esculentus
habak — Ocimum basilicum
habb el mesk — Abelmoschus moschatus
habet al baraka — Nigella sativa
halluon — Asparagus officinalis
hamud — Citrus limon
handal — Citrullus colocynthis
handouq teby — Melilotus officinalis
harmal — Peganum harmala
hasheshet al denaar — Humulus lupulus
hasheshet al maeze — Aegilops geniculata
hassa al bahn — Rosmarinus officinalis
helba — Trigonella foenum-graecum
hendeba — Cichorium endivia, C. intybus
hinta — Triticum aestivum
houmad kabeer — Rumex patientia
hummus — Cicer arietinum
jalaban mazroh — Lathyrus sativus
jarenek toufahy — Prunus cerasifera
jarjeer al mah — Nasturtium officinale
jazar — Daucus carota subsp. sativa
jonjol — Humulus lupulus
jooz — Juglans regia
jooz al bekan — Carya illinoinensis
jute hindi ahmar — Corchorus olitorius
kabbar — Capparis sicula
kabbar — Capparis spinosa
kaff ed-dubb — Salvia sclarea
kaki — Diospyros kaki
kamoon — Cuminum cyminum
kamoon aswad — Nigella sativa
karaz — Prunus avium
karaz akeke ahmar — Cornus mas
karaz hamod — Prunus cerasus
karma — Vitis vinifera
karnabeet — Brassica oleracea var. botrytis
kaseen shagary — Salvia fruticosa
kaseen teby — Salvia officinalis
kastanna holwa — Castanea sativa
katel abeeh — Arbutus andrachne, unedo
katlab — Arbutus andrachne, A. unedo
keena — Eucalyptus gomphocephala
kenab hendy — Cannabis sativa
kerssany — Lathyrus sativus
kettan — Linum usitatissimum
khardal aswad — Brassica nigra
kharma — Diospyros lotus
kharub — Ceratonia siliqua
khass — Lactuca sativa
khateefa — Amaranthus lividus
khaysoom alphy — Achillea millefolium
khiar — Cucumis sativus
khokh — Prunus domestica
khoshkhash monawem — Papaver somniferum
khoukh shaek — Prunus spinosa
khoussa — Cucurbita pepo
khouzamma — Lavandula angustifolia
khozaam — Reseda luteola
khubeza — Malva neglecta
khubeza magdoula — Malva verticillata
khubeza sagheerat al aworak — Malva parviflora
khurfysh — Cynara cardunculus
kirsannah — Vicia ervilia, V. sativa
kiwi — Actinidia deliciosa
komathra — Pyrus communis
komathra soria — Pyrus syriaca
konboz seed — Cannabis sativa
korret al ean — Nasturtium officinale
kosyb — Arundo donax
koussa — Cucurbita argyrosperma
krafs — Apium graveolens
krenb — Brassica oleracea var. gongylodes
kurat andalusy — Allium cepa var. aggregatum
kurrat — Allium kurrat, A. porrum
kurrat al remal — Allium scorodoprasum
kussa kelay — Lagenaria siceraria
kussa tawyla — Lagenaria siceraria
kuzbara — Coriandrum sativum
lassaf — Capparis spinosa
leef — Luffa aegyptiaca
left — Brassica rapa subsp. rapa
left zayte — Brassica napus
lemoon hindi — Citrus paradisi
lesan al asfour — Fraxinus ornus
lesan al hamal — Plantago afra
lomy — Citrus aurantiifolia
loote tree — Celtis australis
louze — Prunus dulcis
lubiya — Vigna unguiculata
luff — Luffa acutangula
lymoon — Citrus limon
mahlab — Prunus mahaleb

malfouf — Brassica oleracea var. capitata
mandaleena — Citrus reticulata
mandareen — Citrus unshiu
mardagush — Origanum majorana
mardakoush — Thymus capitatus
melissa — Melissa officinalis
molukhia — Corchorus olitorius
moshmosh — Prunus armeniaca
moshmosh bary — Arbutus unedo
moshmosh hinde — Eriobotrya japonica
mouran — Fraxinus ornus
mouz — Musa acuminata
mulukhiyah — Corchorus capsularis
myramia — Salvia officinalis
nabec — Ziziphus jujuba
nabeck — Paliurus spina-christi
nacheel al balah — Phoenix dactylifera
nadegh bostany — Satureja hortensis
nadegh shatwy — Satureja montana
nafel abiad — Melilotus alba
nafel hendy — Melilotus indica
nafel thahaby — Trifolium argutum
nafel zahef — Trifolium repens
nana — Mentha ×piperita
nana maee — Mentha ×piperita
nana modabab — Mentha spicata
nanaa barry — Mentha pulegium
nanaa taweel al aworak — Mentha longifolia
nareng — Citrus aurantium
neelah — Isatis tinctoria
ossfor — Carthamus tinctorius
qameh kassy — Triticum durum
qameh makhrooty — Triticum turgidum
qameh robaey al haba — Triticum polonicum
qameh tary — Triticum aestivum
qameh thonay al habah — Triticum dicoccon
qameh waheed al haba — Triticum monococcum
qareh — Cucurbita maxima, C. moschata
qasab el-remaal — Ammophila arenaria
rababa hamda — Rheum rhabarbarum
raghel melhy — Atriplex halimus
raps — Brassica napus
rashad — Lepidium sativum
rejel el-batta — Chenopodium album
ribas — Rheum ribes
robenia — Robinia pseudo-acacia
romman — Punica granatum
ryhaan — Ocimum basilicum
sabanekh — Spinacia oleracea
sabar — Opuntia ficus-indica
sabber — Aloe vera
saed moustadeer — Cyperus rotundus
safarjel — Cydonia oblonga
safun — Agropyron junceum
salef al aroos — Amaranthus retroflexus
salef al arous — Amaranthus lividus
salkeen — Gundelia tournefortii
sant muasel — Acacia mellifera
sant sayal — Acacia nilotica, Senegalia senegal
sarow — Cupressus sempervirens
sarow arizony — Cupressus arizonica
sedra — Ziziphus lotus
sendian — Quercus infectoria
sendian roomy — Quercus macrolepis
shabat — Anethum graveolens
shaeer — Hordeum vulgare
shaer eblees — Aegilops geniculata
shaffalah — Capparis spinosa
shagaret al semgh araby — Acacia nilotica
shagaret semgh araby — Senegalia senegal
shajaret al deb — Arbutus unedo
shajaret maryam — Artemisia dracunculus
shamam — Cucumis melo
shawander — Beta vulgaris var. altissima, var. rapacea, var. vulgaris
sheeh — Artemisia absinthium, A. dracunculus
sheeh moshajar — Artemisia arborescens
shikoria — Cichorium endivia
shook al maseeh — Paliurus spina-christi
shumraa — Foeniculum vulgare
sidrat al muntaha — Celtis australis
silq — Beta vulgaris var. cicla
sokouk al maseeh — Ziziphus jujuba
somak — Rhus coriaria, R. cotinus
somak shawoky — Rhus trilobata
sonawober halaby — Pinus halepensis
sonawober thamary — Pinus pinea
soumsoum — Sesamum orientale
syfun — Agropyron junceum
tabegh — Nicotiana tabacum
tabegh azrak — Nicotiana glauca
tamer — Phoenix dactylifera
tarkhun — Artemisia dracunculus
teen — Ficus carica

tenback — Nicotiana glauca
termos abiad — Lupinus albus
termos daek al awrak — Lupinus angustifolius
thom al feel — Allium ampeloprasum
thoom — Allium sativum
thurah — Zea mays
thurra rafeea — Sorghum bicolor
toufaah — Malus domestica
toufaah sokarry — Malus orientalis
tut abiad — Morus alba
tut aswad — Morus nigra
tut shamy — Morus alba
wasmet al sabagheen — Isatis tinctoria
yansoon — Pimpinella anisum
yousef afandy — Citrus reticulata
yousfy — Citrus tangerina
zaatar — Coridothymus capitatus, Origanum syriacum, Thymus vulgaris
zahfaran — Crocus sativus
zahraa — Brassica oleracea var. botrytis
zahret al naar — Pyracantha coccinea
zanbak abiad — Lilium candidum
zaroor — Crataegus azarolus
zaroor mashreky — Crataegus orientalis
zaroor waheed al madaka — Crataegus monogyna
zaror — Mespilus germanica
zeitoun — Olea europaea
zoofa — Hyssopus officinalis

# Declaration

I, the undersigned, declare that the doctoral dissertation handed-in is my own work. It has not been previously submitted to other university for the award of any degree. Information delivered from other works has been acknowledged in the text and cited in the reference lists.

Khouloud Kywan Gatersleben, Germany, January 2015