Genet Resour Crop Evol
DOI 10.1007/s10722-008-9385-z

RESEARCH ARTICLE

Oman at the cross-roads of inter-regional exchange of cultivated plants

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Received: 16 June 2008 / Accepted: 4 November 2008

Abstract During the past years the Sultanate of Oman which is located at the south-eastern tip of the Arabian peninsula has been studied for its cultivated plant genetic resources. Data from this study, that commenced in 2002 and information from the literature have been combined to document the millenia-old cultivation history of many agri- and horticultural crop plants in this country at the cross-roads of inter-regional exchange. The resulting checklist comprises 194 species from 133 genera and 53 families and 11 geoelements of 136 selected species. Notable inputs came from South and South-east Asia with 21.3%, from the Near East and East Mediterranean with 20.6%, and from Central and South America with 15.4%. Most elements are allochthonous while real autochthonous elements such as *Boswellia sacra* Flueck. and *Prunus arabica* (Oliv.) Meikle are rare. A remarkable infraspecific variation in several crop species and evidence of introgression were found indicating an evolutionary power of Oman that is similar to that of South Italy.

Keywords Agrobiodiversity · Arabian Peninsula · Catalogue · Checklist · Crop diversity · Cultivated flora · Genetic erosion · Oman

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Introduction

Famous as the origin of the best fumitory frankincense, a major copper producer and the birth place of the legendary trader "Sinbad the Sailor", Oman maintained ancient trade relations with all major countries in the region. Between the late 2nd millennium BC and the middle of the 3rd century AD, the highly valuable frankincense, known as the "Perfume of Arabia" was transported together with other commodities on domesticated camels along the famous Incense Road (Fig. 1) from the production areas in Southern Oman through Yemen passing Mecca and Medina to the major markets in Mesopotamia and the Mediterranean (Böhlmann 2006; Pickering 2007).

The long trading history of the Omani resulted in the importation of foreign germplasm and it was thus hypothesized that the region hosts a high diversity of cultivated plants. Annual and perennial crops have been cultivated since ancient times in irrigated oasis

Published online: 24 December 2008

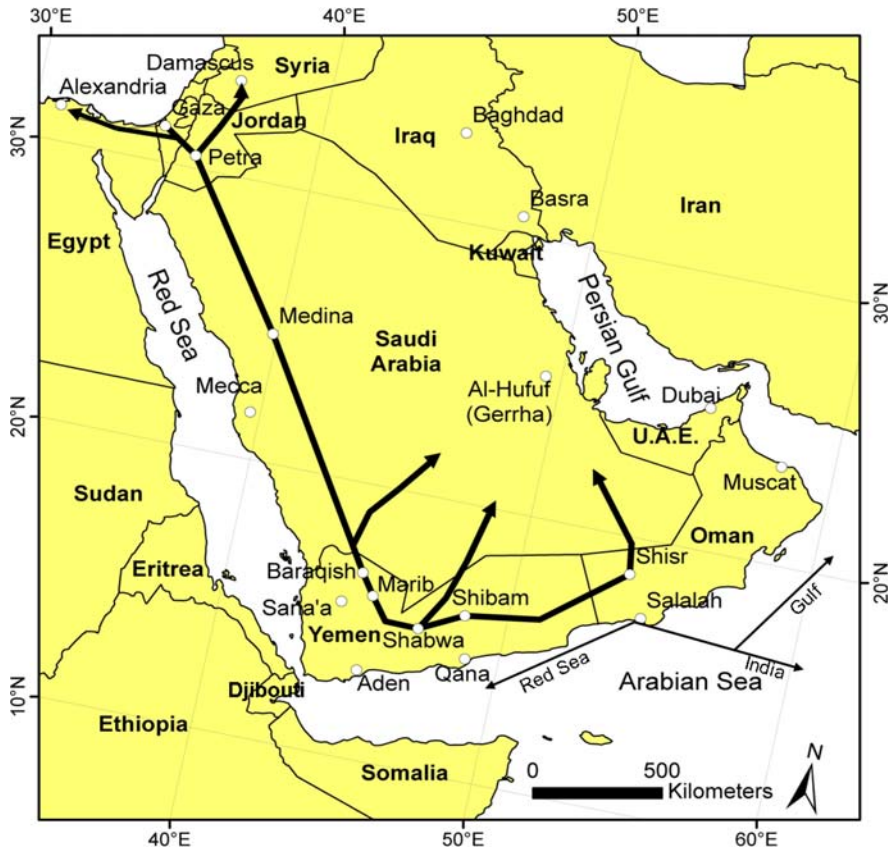

Fig. 1 Ancient Incense Road (indicated by the black arrows) from 500 BC until 100 AD and the current country borders of today (altered from Böhlmann 2006)

agriculture across the country and under rainfed conditions in Musandam and Dhofar. Due to their spectacular slopes, the terraces on the Al Jabal al Akhdar massif are famous as "Hanging Gardens" far beyond the borders of Oman (Buerkert et al. 2007).

Furthermore, Oman's different geographical regions are characterised by a wide range of climatic conditions. It is hot-dry in the interior, hot-humid in the costal area, and humid in the south with its summer monsoon rains. The total number of species in the flora of Oman amounts to 1,204 vascular plants of which 1,182 are angiosperms (Ghazanfar 2003).

The importance of checklists for cataloging and analyzing wild plants has been widely recognized in the last decades (Burnett 1994; Reichhardt 1999; Govaerts 2001; Lughadha 2004; Crane 2004; Klopper et al. 2007). However, checklists for cultivated plants are still relatively rare (Knüpffer et al. 2002; Hammer and Laghetti 2006), even if their importance for research in the assessment and conservation of crop genetic resources has been stressed by Hammer (1990, 1991), Della (1999) and Hammer et al. (2000).

In view of the above, this study aims at describing the origin of plant genetic resources in Oman and to provide a concise checklist of Oman's cultivated plants.

Materials and methods

Agricultural survey

Since 2002 several explorations have been conducted in different parts of Oman to study its agrobiodiversity. Survey work was carried out in the districts of Muscat, Batinah, Sharqia, Dakhilia and Dhahira including the Al-Hajar range of northern Oman (Fig. 2). In addition to these surveys three exemplary remote mountain oasis systems were studied in detail (Hammer et al. 2004b; Gebauer et al. 2007a) and a special mission covered the Musandam district (Al Khanjari et al. 2005a). Dhofar was visited in 2005 up to the Yemeni border and a marginal investigation was conducted in the Wusta district, of the central desert of

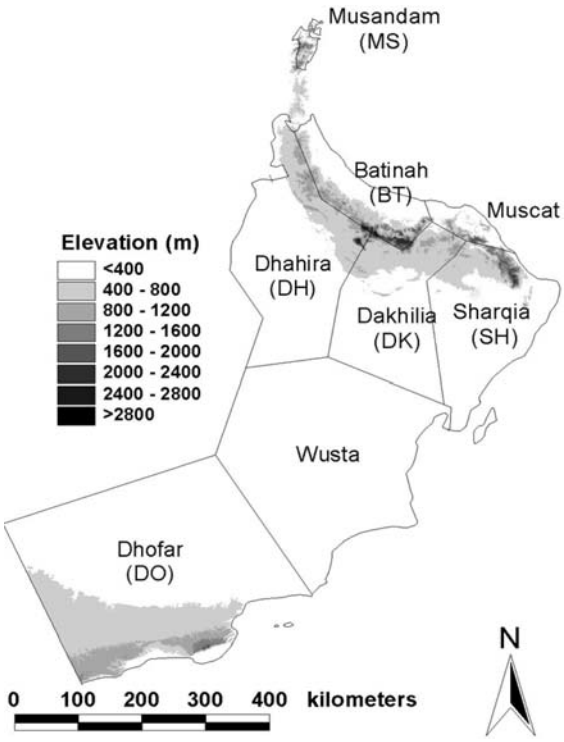

Fig. 2 Map of Oman indicating the districts where the explorations were conducted (Al Khanjari et al. 2007a)

Oman. All explorations were carried out using the checklist method described by Hammer (1991). A first checklist was established for the oasis Balad Seet (Hammer et al. 2004b) using the experiences from climatologically similar Libya (Hammer et al. 1988).

Explanations to the checklist

The checklist includes cultivated plants with the exception of ornamentals and forest plants which have no agricultural or horticultural use. It contains the botanical names with the author(s) in alphabetical order and some synonyms. Plant families are given in brackets after the botanical names. The different uses of plants (purpose of cultivation) are indicated in order of their importance beginning with the most important one. The plant part mainly used is given in brackets. According to Hammer et al. (1999), the following abbreviations are used:

use category

cereal: C.
fibre crop: Fi.
fodder crop: Fo.
fruit: Fr.
industrial crop: I.
medicinal plant: M.
nut and related: N.
oil crop: Oi.
pulse: Pu.
spice and condiment: Sp.
starch plant
excl. cereals: St.
vegetable: V.

part used

bulb: b
bark: ba.
flower: fl.
fruit: fr.
herb: h.
leaf: l.
root and rhizome: r.
seed: s.

Additional (minor or rare) uses such as 'wind break' are given in full text.

Cultivated plants have often been introduced from other areas. These regions of origin, where the domestication of the different species took place, have been determined from the relevant literature, mainly from Hanelt and IPK (2001). The geoelements were standardized for better comparison according to Zeven and De Wet (1982) and are mentioned for each plant. Where ever possible, references were added to prove the cultivation of the listed species in Oman.

Results

In total, 194 species of 133 genera and 53 families were identified and are compiled in the appendix. Among the families, Leguminosae (21 spp.), Gramineae (17 spp.), Rosaceae (13 spp.) and Cucurbitaceae (10 spp.) have the highest number of species (Table 1). Areas of geographical origin were identified for 136 selected taxa. Many different areas participated in the evolution/domestication of the cultivated plants identified. Notable inputs came from South and Southeast Asia with 21.3%, from the Near East and East Mediterranean with 20.6%, and from

Table 1 Families and genera of Oman's crop plants. The number of more than one species per genera is given in brackets. Infraspecific taxa are not considered in the counts

Family	Genera
Agavaceae	*Agave* (2)
Amaranthaceae	*Amaranthus* (3)
Anacardiaceae	*Mangifera*, *Pistacia*
Annonaceae	*Annona* (2)
Araceae	*Colocasia*, *Xanthosoma*
Balsaminaceae	*Impatiens*
Bombacaceae	*Adansonia*, *Ceiba*, *Durio*
Boraginaceae	*Cordia* (3)
Bromeliaceae	*Ananas*
Burseraceae	*Boswellia*
Cactaceae	*Hylocereus*, *Opuntia* (3)
Caricaceae	*Carica*
Casuarinaceae	*Casuarina*
Chenopodiaceae	*Atriplex*, *Beta*, *Spinacia*
Combretaceae	*Terminalia*
Compositae	*Carthamus*, *Cichorium*, *Helianthus*, *Lactuca*
Convolvulaceae	*Ipomoea*
Cruciferae	*Brassica* (3), *Eruca*, *Lepidium*, *Raphanus*
Cucurbitaceae	*Citrullus* (2), *Cucumis* (2), *Cucurbita* (2), *Lagenaria*, *Luffa*, *Momordica* (2)
Ebenaceae	*Diospyros*
Euphorbiaceae	*Manihot*, *Ricinus*
Fagaceae	*Castanea*
Gramineae	*Avena*, *Chloris*, *Dactyloctenium*, *Eleusine*, *Hordeum*, *Panicum*, *Pennisetum* (2), *Saccharum* (2), *Setaria*, *Sorghum*, × *Triticosecale*, *Triticum* (4), *Zea*
Iridaceae	*Crocus*
Juglandaceae	*Carya*, *Juglans*
Labiatae	*Mentha* (3), *Ocimum* (3), *Origanum*
Lauraceae	*Persea*
Leguminosae	*Cajanus*, *Canavalia*, *Cicer*, *Indigofera* (3), *Lablab*, *Lathyrus*, *Lens*, *Leucaena*, *Medicago*, *Melilotus*, *Pisum*, *Pithecellobium*, *Psoralea*, *Sesbania*, *Tamarindus*, *Trigonella*, *Vatovaea*, *Vicia* (2), *Vigna* (2)
Liliaceae	*Allium* (2), *Aloe*
Lythraceae	*Lawsonia*
Malvaceae	*Abelmoschus* (2), *Abutilon*, *Gossypium* (4)
Meliaceae	*Azadirachta*
Moraceae	*Artocarpus* (2), *Ficus* (4), *Morus* (3)
Moringaceae	*Moringa*
Musaceae	*Musa* (2)
Myrtaceae	*Myrtus*, *Psidium*, *Syzygium*
Oleaceae	*Jasminum* (3), *Olea*
Oxalidaceae	*Averrhoa*
Palmae	*Cocos*, *Phoenix*
Pandanaceae	*Pandanus*
Passifloraceae	*Passiflora*
Pedaliaceae	*Sesamum*
Polygonaceae	*Rumex*
Punicaceae	*Punica*
Rhamnaceae	*Ziziphus* (3)
Rosaceae	*Cydonia*, *Fragaria*, *Malus*, *Prunus* (7), *Pyrus*, *Rosa*, *Rubus*
Rutaceae	*Citrus* (8), *Ruta*
Sapotaceae	*Manilkara*, *Mimusops*
Solanaceae	*Capsicum* (2), *Datura* (2), *Lycopersicon*, *Nicotiana*, *Solanum* (2)
Tamaricaceae	*Tamarix*
Tiliaceae	*Corchorus* (3), *Muntingia*
Umbelliferae	*Anethum*, *Apium*, *Coriandrum*, *Cuminum*, *Daucus*, *Foeniculum*, *Petroselinum*
Vitaceae	*Vitis*

Central and South America with 15.4% (Table 2). Less germplasm material came from cooler areas such as Europe and North America. Almost 7% of the cultivated flora was domesticated locally. Real autochthonous elements such as *Boswellia sacra* Flueck. and *Prunus arabica* (Oliv.) Meikle are rare, and do not belong to the cultivated plants of greater importance.

Discussion

Checklist

The occurrence of 194 species of crop plants in Oman (Appendix) reflects the diversity of eco-regions comprising hot deserts, Mediterranean highlands and subtropical monsoon areas but it does not reach the 279 species recorded in arid Libya (Hammer et al. 1988).

Floristic research is still a developing field in Oman with recent records of new wild plants

Table 2 Selected geoelements of the Oman's and South Italian's flora of cultivated plants

Area	Oman		South Italy[a]
	No. of taxa	%	%
Study area	9	6.6	36.8
Near East and East Mediterranean	28	20.6	16.2
Europe	1	0.7	7.6
Central and Middle Asia	22	16.3	3.4
Western Mediterranean	–	–	0.8
Northern and Eastern parts of Africa	14	10.3	3.8
South and Southeast Asia	29	21.3	3.4
East Asia	3	2.2	6.3
Tropical Africa	3	2.2	–
South Africa	5	3.7	2.1
Central and South America	21	15.4	10.7
North America	–	–	5.0
Australia and New Zealand	1	0.7	2.1
Total	136	100	100 ($n = 524$)

[a] According to Hammer et al. 1999

(Ghazanfar 2002; Patzelt 2004; Gebauer et al. 2007b). Two modern floras are available, but both of them have only reached their first volume (Miller and Cope 1996; Ghazanfar 2003).

Investigations into the different botanical aspects of crop plants are still in a preliminary state. Therefore, even the development of a concise checklist is an important step to document the plant genetic resources of Oman.

Geoelements

Areas of geographical origin were identified for 136 selected taxa (Table 2). When comparing these geoelements with the results from South Italy (Hammer et al. 1999), there are some characteristic similarities. Many different areas contributed to the composition of the cultivated flora. A very important foreign source for both countries is the Near East and the East Mediterranean. The percentage of neophytes from Central and South America is similar in both countries. Differences result from more tropical provenances (South and Southeast Asia, Tropical Africa) and less material from cooler areas (Europe, North America) for Oman. In comparison with South Italy, Oman has an almost equally broad spectrum of species and can therefore be considered rich in plant genetic resources. South Italy belongs to the classical Mediterranean gene center as defined by Vavilov (1928). Vavilov visited Ethiopia (another of his proposed gene centers) and Djibouti (Vavilov 1997) and while his colleagues reached Yemen (Vavilov 1964) it was impossible to enter into Oman in the twenties and thirties of the last century. The isolated situation of Oman and the limited logistical capability of research travelers in the last century are the most likely reasons that Oman has been overlooked as a center of diversity.

Evolutionary importance of Oman

Recent reports have shown the surprising inter- and infraspecific variation of Omani wheat (Al-Maskri et al. 2003; Hammer et al. 2004a; Alkhanjari et al. 2005; Al Khanjari et al. 2005, 2007a, b, 2008). The data indicate that there has been and continuous to be an intensive differentiation process within the traditional wheat germplasm of Oman which has led to the formation of new races. The landraces are often genetically very variable and may comprise several species with different genomic levels (4×, 6×). The results also indicated introgressions between the available genomic levels. Wheat, already introduced by at least 3,000 BC to Oman, may be a convincing example for the evolutionary importance of field and garden crops, including barley (*Hordeum vulgare* L. s.l.), date palm (*Phoenix dactylifera* L.), field bean (*Vicia faba* L.) and mango (*Mangifera indica* L.). But other crops that were introduced much later such as banana (*Musa* spp.), mulberry (*Morus* spp., Gebauer et al. 2008) and several species of citrus (*Citrus* spp.), also show a remarkable variation. In cucumber (*Cucumis* spp.), fig (*Ficus* spp.), olive tree (*Olea europaea* L.), sweet basil (*Ocimum basilicum* L.) and water melon (*Citrullus* spp.), the cultivated races seem to have come in touch with their wild relatives or even progenitors, and introgressions may have happened or can be predicted. The evolutionary power (Hammer and Perrino 1995) of Oman therefore can be easily compared to that of South Italy.

In addition to this some new cultivated species have been reported such as *Ocimum forskolei* Benth., *Prunus arabica* (Oliv.) Meikle and *Vatovaea*

pseudolablab (Harms) Gillett and as well as a few infraspecific races such as *Ruta chalepensis* var. *bracteosa* (DC.) Boiss. Such findings add to previous evidence that Oman has been an important country for the evolution and diversification of economic plants for a long time (Lawton 1985; Ghazanfar 1994).

Conclusions and recommendations

Oman may be characterized as a country rich in plant genetic resources which have developed under traditional agriculture reaching back to 3,000 years BC. The position of Oman at the cross-roads of several important trading routes provided a favorable precondition for the introduction of many crops. The evolutionary power of the area results from the ready availability of new plants from many parts of the world and the conservation and evolution of the plants in oases often isolated by steep mountains. This should also lead to a broadening of our narrow view of Oman as a country mainly influenced by Indian and African agri- and horticulture.

Our investigations have also provided evidence that in recent years strong genetic erosion has occurred for all traditional cultivated plants in the different eco-systems of the country. Therefore further collection and conservation efforts to limit the loss of valuable plant genetic resources are needed.

Acknowledgements The contributions of Dr. Annette Patzelt of the Oman Botanic Garden, Dr. Herbert Dietz of the Sultanate of Oman's Royal Court Affairs and Dr. Maher Nagieb, formerly Sultan Qaboos University of Oman, is highly appreciated. We thankfully acknowledge the cooperation of the Extension Center Al Jabal al Akhdar of the Ministry of Agriculture and Fisheries of Oman and the infrastructural support of the College of Agriculture and Marine Sciences, Sultan Qaboos University, Muscat. Thanks also to Dr. Eike Luedeling for drawing the map of the ancient Incense Road. This research was financially supported by the Deutsche Forschungsgemeinschaft (DFG) within the project BU1308.

Appendix: Checklist of cultivated plants in Oman

Abelmoschus esculentus (L.) Moench (Malvaceae). V. (fr.), Africa to India. A common vegetable for better soils. Wild in Dhofar. Ref.: Miller and Morris 1988, Ghazanfar 2003.

Abelmoschus manihot (L.) Medik. (Malvaceae). V. (l.). S Asia. Widely grown in the better soils of the monsoon mountains of Dhofar. Ref.: Miller and Morris 1988, Ghazanfar 2003.

Abutilon theophrasti Medik. (Malvaceae). Fi. (st.). C Asia. Ref.: Hammer et al. 2004b.

Adansonia digitata L. (Bombacaceae). I. (fr., fi.), V. (l.), M. (fr.). Africa. In Dhofar about 50 trees are growing. Introduced by early traders from E Africa or natural relic population? Ref.: Miller and Morris 1988.

Agave americana L. (Agavaceae). Fi. (l.), Fo. (l.), also ornamental plant. C America. Ref.: Gebauer et al. 2007a.

Agave sisalana Perrine (Agavaceae). Fi. (l.). C America. Formerly cultivated, now adventive.

Allium cepa L. (Liliaceae). V. (b.,l.). C Asia. Ref.: Hammer et al. 2004b, Gebauer et al. 2007a.

Allium sativum L. (Liliaceae). Sp. (b.), V. (b.). C Asia. Ref.: Hammer et al. 2004b, Gebauer et al. 2007a.

Aloe vera (L.) Burm. f. (Liliaceae). M. (l.). SW Asia, N Africa. Ref.: Hammer et al. 2004b, Gebauer et al. 2007a.

Amaranthus viridis L. (Amaranthaceae). V. (l.). India. Occasionally cultivated in N Oman. Other species are mentioned as cultivated (*A. lividus* L. convar. *oleraceus* (L.) Thell.) or collected from the wild (*A. graecizans* L.). Ref.: Miller and Morris 1988, Mandaville 1977.

Ananas comosus (L.) Merrill (Bromeliaceae). Fr. S America. Dhofar.

Anethum graveolens L. (Umbelliferae). Sp. (h.), V. (h.). Eastern Mediterranean. Traditional condiment in Oman. Ref.: Miller and Morris 1988, Hammer et al. 2004b, Gebauer et al. 2007a.

Annona muricata L. (Annonaceae). Fr. C America. Dhofar. Ref.: Schwartz 1939.

Annona squamosa L. (Annonaceae). Fr. C America. Dhofar. Ref.: Schwartz 1939.

Apium graveolens L. (Umbelliferae). V. (l.). Near East and Eastern Mediterranean to Middle Asia. A rare vegetable in the Muscat area. Ref.: Schwartz 1939.

Appendix continued

Artocarpus altilis (Parkinson) Fosberg (Moraceae). St. (fr.). Oceania. Dhofar.

Artocarpus heterophyllus Lam. (Moraceae). Fr., St. (s.). India. Dhofar.

Atriplex halimus L. (Chenopodiaceae). Fo., hedge plant. N Africa. Ref.: Ghazanfar 2003.

Avena sativa L. (Gramineae). C., Fo. (l.). SW Asia. Evidently a more recent introduction. Ref.: Hammer et al. 2004b, Gebauer et al. 2007a.

Averrhoa carambola L. (Oxalidaceae). Fr. SE Asia. Dhofar.

Azadirachta indica Juss. (Meliaceae). Shade tree, multipurpose tree. S Asia Ref.: Schwartz 1939

Beta vulgaris L. (Chenopodiaceae). V. (l., r.). Mediterranean. Foliage beet (var. *cicla* L.) and red beet (var. *vulgaris*, syn. var. *conditiva* Alef.) are cultivated. Ref.: Gebauer et al. 2007a.

Boswellia sacra Flueck. (Burseraceae). I. (frankincense). Native of the area. Occasionally cultivated all over Oman. Wild stands are tapped in Dhofar. Ref.: Elqassani 1984, Miller and Morris 1988, Böhlmann 2006, Gebauer et al. 2007a.

Brassica juncea (L.) Czern. (Cruciferae). Oi. (s.). Middle East. Ref.: Schwartz 1939, Ghazanfar 2003.

Brassica oleracea L. (Cruciferae). V. (l.). Mediterranean. Mainly head cabbages are grown. Ref.: Ghazanfar 2003, Hammer et al. 2004b, Gebauer et al. 2007a.

Brassica rapa L. ssp. *pekinensis* (Lour.) Hanelt (Cruciferae). V. (l.). E Asia. Ref.: Miller and Cope 1996, Ghazanfar 2003, Hammer et al. 2004b, Gebauer et al. 2007a.

Cajanus cajan (L.) Millsp. (Leguminosae). Pu. India. Ref.: Guarino 1990a, Gebauer et al. 2007a.

Canavalia ensiformis (L.) DC. (Leguminosae). Pu. Tropical America. Ref.: Gebauer et al. 2007a.

Capsicum annuum L. (Solanaceae). V. (fr.). America. A relatively new crop. Ref.: Miller and Morris 1988, Gebauer et al. 2007a.

Capsicum frutescens L. (Solanaceae). Sp. (fr.), V. (fr.). America. A relatively new crop. Ref.: Hammer et al. 2004b, Gebauer et al. 2007a.

Carica papaya L. (Caricaceae). Fr. C America. Ref.: Ghazanfar 2003, Hammer et al. 2004b, Gebauer et al. 2007a.

Carthamus tinctorius L. (Compositae). I. (fl., dye). India. Ref.: Hammer et al. 2004b, Gebauer et al. 2007a.

Carya illinoinensis (Wangenh.) K. Koch, syn.: *Carya pecan* Engl. et Graebn. (Juglandaceae). N. N America. Recently planted in the higher mountains of N Oman.

Castanea sativa Mill. (Fagaceae). N. E Mediterranean to SW Asia. Recently planted in the higher mountains of N Oman.

Casuarina equisetifolia L. (Casuarinaceae). Hedge plant, wind break. Australia. Ref.: Miller and Cope 1996, Ghazanfar 2003.

Ceiba pentandra (L.) Gaertn. (Bombacaceae). Fi. (s.), shade tree. Central America. Ref.: Ghazanfar 2003.

Chloris gayana Kunth (Gramineae). Fo. Africa. Ref.: Guarino 1990a.

Cicer arietinum L. (Leguminosae). Pu. W Asia. Ref.: Hammer et al. 2004b, Gebauer et al. 2007a.

Cichorium intybus L. (Compositae). (V.) l. Mediterranean to SW Asia. Possibly relatively new crop for Oman. *Cichorium endivia* was cultivated in Yemen (Schwartz 1939). Ref.: Gebauer et al. 2007a.

Citrullus colocynthis (L.) Schrad. (Cucurbitaceae). M. (fr.). Native of the area. Occasionally cultivated. Ref.: Miller and Morris 1988.

Citrullus lanatus (Thunb.) Matsum. et Nakai (Cucurbitaceae). V. (fr.). Africa. A common crop. Ref.: Miller and Morris 1988, Mandaville 1977, Ghazanfar 2003, Gebauer et al. 2007a.

Citrus aurantiifolia (Christm. et Panz.) Swingle (Rutaceae). Fr., Sp. (fr.). C and S Asia. A common fruit tree in Oman. Ref.: Miller and Morris 1988, Hammer et al. 2004b, Gebauer et al. 2007a.

Citrus aurantium L. (Rutaceae). Fr. C and S Asia. Occasionally cultivated in N Oman. Ref.: Hammer et al. 2004b, Gebauer et al. 2007a.

Citrus limettioides Tanaka (Rutaceae). Fr. India. Occasionally cultivated in N Oman. Ref.: Gebauer et al. 2007a.

Citrus limon (L.) Burm. f. (Rutaceae). Fr. S-E Asia. A rare fruit tree in N Oman. Ref.: Miller and Morris 1988, Hammer et al. 2004b, Gebauer et al. 2007a.

Citrus limonia Osbeck (Rutaceae). Fr. E Asia. Ref.: Hammer et al. 2004b.

Citrus medica L. (Rutaceae). Fr. India. Traditional fruit in the area (N). Ref.: Miller and Morris 1988, Hammer et al. 2004b, Gebauer et al. 2007a.

Citrus paradisi Macfadyen (Rutaceae). Fr. Probably originated from a cross of *C. sinensis* and *C. maxima* (Burm.) Merrill in C America. A new crop in N Oman. Ref.: Miller and Morris 1988.

Citrus sinensis (L.) Osbeck (Rutaceae). Fr. India to China. Traditional fruit in the area (N). Ref.: Miller and Morris 1988, Hammer et al. 2004b, Gebauer et al. 2007a.

Appendix continued

Cocos nucifera L. (Palmae). N. S-E Asia. Extensively cultivated in Dhofar along the coast. Ref.: Miller and Morris 1988, Guarino 1990a.

Colocasia esculenta (L.) Schott ex Schott et Endl. (Araceae). St. (b.). S Asia. Ref.: Schwartz 1939, Miller and Morris 1988.

Corchorus olitorius L. (Tiliaceae). V. (l.). Africa to India. Occasionally cultivated as a vegetable. *C. aestuans* L. and *C. trilocularis* L. are also mentioned. Ref.: Schwartz 1939, Miller and Morris 1988, Ghazanfar 2003.

Cordia myxa L. (Boraginaceae). Fr. N Africa to India. A garden plant in Dhofar. Ref.: Schwartz 1939, Miller and Morris 1988, Gebauer et al. 2007a.

Cordia perrottettii Wight (Boraginaceae). Fr. India. Occasional garden plant in N Oman, also occurring in Dhofar. Ref.: Miller and Morris 1988.

Cordia sinensis Lam. (Boraginaceae). Fr. India. A garden plant in Dhofar. Ref.: Miller and Morris 1988.

Coriandrum sativum L. (Umbelliferae). Sp. (s.), V. (l.). W Asia. A special race has been described from Oman - var. *omanense* Diedr. (Diederichsen and Hammer 2003). Ref.: Guarino 1990a, Hammer et al. 2004b, Gebauer et al. 2007a.

Crocus sativus L. (Iridaceae). Sp. (fl.). E Mediterranean. Ref.: Scholz 1984.

Cucumis melo L. (Cucurbitaceae). Fr. M Asia and Near East. Important crop in Oman. The wild/weedy ssp. *agrestis* (Naud.) Pangalo occurs in Dhofar. Hybrid swarms are reported. Ref.: Miller and Morris 1988.

Cucumis sativus L. (Cucurbitaceae). V. (fr.). India. A common crop in Oman. The occurrence of the wild progenitor var. *hardwickii* (Royle) Gabaev in Dhofar with intensively used sweet and also bitter races sheds new light on the evolution of cucumber. Ref.: Miller and Morris 1988, Ghazanfar 2003, Gebauer et al. 2007a.

Cucurbita moschata (Lam.) Duch. ex Poir. (Cucurbitaceae). V. (fr.). C America. Ref.: Gebauer et al. 2007a.

Cucurbita pepo L. (Cucurbitaceae). V. (fr.). C America. Mainly modern types are cultivated (convar. *giromontiina* Greb.). Ref.: Gebauer et al. 2007a.

Cuminum cyminum L. (Umbelliferae). Sp. (s.). Middle Asia. Ref.: Guarino 1990a.

Cydonia oblonga Mill. (Rosaceae). Fr. Central and Middle Asia. Ref.: Schwartz 1939.

Dactyloctenium aegyptium (L.) Willd. (Gramineae). Fo. E Africa. Ref.: Guarino 1990a.

Datura metel L., syn. *Datura fastuosa* L. (Solanaceae). M. (l., fl.). Possibly C America. Formerly India was taken as the place of origin for the species. Omani material was certainly introduced from India. Commonly cultivated and naturalized in Dhofar. Ref.: Miller and Morris 1988.

Datura inoxia Mill. (Solanaceae). M. (h.). C and N America. Today mostly considered as an ornamental plant. Ref.: Gebauer et al. 2007a

Daucus carota L. (Umbelliferae). V. (r.). AfghanistanΓÇöIran. In Oman occasionally the traditional carrot is cultivated (eastern or anthocyanin carrot, ssp. *sativus* (Hoffm.) Schübl. et Mart. var. *atrorubens* Alef.). Ref.: Gebauer et al. 2007a.

Diospyros kaki L. f. (Ebenaceae). Fr. SE Asia. Recently planted in the higher mountains of N Oman.

Durio zibethinus Murr. (Bombacaceae). Fr. SE Asia. Dhofar.

Eleusine coracan (L.) Gaertner (Gramineae). C. Africa to India. Ref.: Schwartz 1939, Guarino 1990a.

Eruca sativa Mill. (Cruciferae). V. (l.). Mediterranean. A common weed. Ref.: Miller and Cope 1996, Hammer et al. 2004b, Gebauer et al. 2007a.

Ficus carica L. (Moraceae). Fr. SW Asia to NW India. Very common fruit tree. As its wild progenitor *F. palmata* Forssk. is discussed. This species is also sometimes grown in the area for its edible fruits. Ref.: Miller and Morris 1988, Miller and Cope 1996, Ghazanfar 2003.

Ficus sycomorus L. (Moraceae). Fr. Native of the area. Occasionally also cultivated as a shade tree. *F. vasta* Forssk. is also transplanted as a shade tree in Dhofar. Ref.: Miller and Morris 1988, Ghazanfar 2003.

Foeniculum vulgare Mill. (Umbelliferae). Sp. (fr.), V. (l.). Mediterranean. Ref.: Gebauer et al. 2007a.

Fragaria × *ananassa* Duch. (Rosaceae). Fr. Originated in Europe by parents introduced from the New World. Observed by us in N Oman.

Gossypium arboreum L. (Malvaceae). Fi. (fr.). South Africa to India. This species is quite common in the farmersΓÇÖ gardens. *G. hirtum* L., a cotton from the New World, is occasionally planted as a curiosity. *G. stocksii* Masters an important genetic resource, grows wild in Dhofar Guarino 1990c. Ref.: Mandaville 1977, Miller and Morris 1988, Ghazanfar 2003, Hammer et al. 2004b, Gebauer et al. 2007a.

Gossypium herbaceum L. (Malvaceae). Fi. (s.). C Africa. Formerly frequently cultivated in Oman. Ref.: Ghazanfar 2003.

Helianthus annuus L. (Compositae). Fo. N America. Observed by us in N Oman.

Hordeum vulgare L. s.l. (Gramineae). C., Fo. (l.). Middle East. Ref. Guarino 1990b, Hammer et al. 2004b, Gebauer et al. 2007a.

Appendix continued

Hylocereus undatus (Haw.) Britt. et Rose (Cactaceae). Fr. C America. Dhofar.

Impatiens balsamina L. (Balsaminaceae). I. (h., dye). S Asia. Naturalized in Dhofar after former cultivation as ornamental and dye plant. Ref.: Miller and Morris 1988.

Indigofera coerulea Roxb. (Leguminosae). I. (dye). Native of the area. Formerly one of the species used in indigo-dyeing in N Oman. Now occasionally grown as a curiosity. *I. tinctoria* L. and *I. arrecta* Hochst. ex Rich. have been also grown. Ref.: Mandaville 1977, Miller and Morris 1988, Siebert et al. 2005.

Ipomoea batatas (L.) Poir. (Convolvulaceae). St. (b.). C America. Ref.: Guarino 1990a, Hammer et al. 2004b, Gebauer et al. 2007a.

Jasminum grandiflorum L. (Oleaceae). I. (fl., perfume). India. Occasionally cultivated. Also occurring in the natural vegetation of Dhofar (ssp. *floridanum* (R. Br. ex Fresen.) P. s. Green. Ref.: Miller and Morris 1988.

Jasminum officinale L. (Oleaceae). I. (fl., perfume). W Asia to India. Occasionally cultivated. Ref.: Miller and Morris 1988, Hammer et al. 2004b.

Jasminum sambac (L.) Aiton (Oleaceae). I. (fl., perfume). India. Cultivated in the gardens of Salalah. Ref.: Miller and Morris 1988.

Juglans regia L. (Juglandaceae). N. M Asia. Only in the higher elevations of N Oman. Ref.: Miller and Cope 1996, Gebauer et al. 2007a.

Lablab purpureus (L.) Sweet (Leguminosae). Pu. Africa - Asia. Ref.: Guarino 1990a, Hammer et al. 2004b, Gebauer et al. 2007a.

Lactuca sativa L. (Compositae). V. (l.). North Africa, Middle East. Ref.: Guarino 1990a, Hammer et al. 2004b, Gebauer et al. 2007a.

Lagenaria siceraria (Mol.) Standl. (Cucurbitaceae). V. (fr.), I. (fr., bottles). Tropical Africa. Ref.: Gebauer et al. 2007a.

Lathyrus aphaca L. (Leguminosae). Pu., Fo. (l.). Europe - India. Ref.: Hammer et al. 2004b.

Lawsonia inermis L. (Lythraceae). I. (l., dye), hedges. N Africa to India. A traditional crop in the area, planted since ancient times. Ref.: Schwartz 1939, Miller and Morris 1988, Gebauer et al. 2007a.

Lens culinaris Medik. (Leguminosae). Pu. W Asia, E Mediterranean. Today very rare under cultivation in N Oman because of cheap imports. Ref.: Hammer et al. 2004b, Gebauer et al. 2007a

Lepidium sativum L. (Cruciferae). Sp. (l.), V. (l.). Middle East. Ref.: Miller and Cope 1996, Gebauer et al. 2007a.

Leucaena leucocephala (Moc. et Sessé) Benth. (Leguminosae) Fo. (l.), hedge plant. C America. Ref.: Gebauer et al. 2007a.

Luffa acutangula (L.) Roxb. (Cucurbitaceae). I. (vegetable sponges). Native of the area. Wild forms (var. *amara* (Roxb.) C. B. Clarke) occur in Dhofar. Occasionally cultivated (var. *acutangula*). Ref.: Miller and Morris 1988, Ghazanfar 2003.

Lycopersicon esculentum Mill. (Solanaceae). V. (fr.). C America. Hammer et al. 2004b, Gebauer et al. 2007a.

Malus domestica Borkh. (Rosaceae). Fr. Middle Asia. Only in the higher elevations of N Oman. Ref.: Ghazanfar 1992, Gebauer et al. 2007a.

Mangifera indica L. (Anacardiaceae). Fr. India. Ref.: Hammer et al. 2004b, Gebauer et al. 2007a.

Manihot esculenta Crantz (Euphorbiaceae). St. (r.). Tropical S America. Ref.: Guarino 1990a.

Manilkara zapota (L.) van Royen (Sapotaceae). Fr. M America. Ref.: Gebauer et al. 2007a.

Medicago sativa L. (Leguminosae). Fo. (l.). SW Asia. Ref.: Hammer et al. 2004b, Gebauer et al. 2007a.

Melilotus officinalis (L.) Pall. (Leguminosae). Fo. (l.). Near and Middle East to W China. Ref.: Hammer et al. 2004b, Gebauer et al. 2007a.

Mentha asiatica Boriss. (Labiatae). Sp. (l.). S and W Asia. Only cultivated in Jabal al Akhdar. *M. longifolia* as mentioned by Guarino (1990a) may belong here. Ref.: Gebauer et al. 2007a.

Mentha × *piperita* L. (Labiatae). Sp. (l.). Europe. Ref.: Hammer et al. 2004b, Gebauer et al. 2007a.

Mimusops laurifolia (Forsk.) Friis (Sapotaceae). Fr. Egypt to Ethiopia. Very rare tree in Oman. Ref.: Hammer et al. 2004b.

Momordica balsamina L. (Cucurbitaceae). V. (fr.). S Africa to Australia. Reported from the Muscat area. Ref.: Schwartz 1939.

Momordica charantia L. (Cucurbitaceae). V. (fr.). India, S-E Asia. Ref.: Ghazanfar 2003.

Moringa oleifera Lam. (Moringaceae). V. (fr., l.). India. Occasionally cultivated in N Oman. Ref.: Miller and Morris 1988, Miller and Cope 1996, Ghazanfar 2003.

Morus alba L. (Moraceae). Fr. E Asia. Ref.: Miller and Cope 1996, Ghazanfar 2003, Gebauer et al. 2007a.

Morus macroura Miq., Pl. Jungh. (1851) 42.ΓÇö*Morus viridis* Buch-Ham. ex Wal., Catal. (1831) no. 1650, nom. nud.; *Morus laevigata* Wall., Catal. (1831) no. 4649, nom. nud. ex Brandis, Forest Fl. N.W. India (1874) 409; *Morus alaisia* Deless. ex Moretti in Giorn. Ist. Lomb. Sci. 1 (ΓÇ£1841ΓÇ¥, 1842) 182, nom. nud.; *Morus alba* L. var. *laevigata* Bur. in DC., Prodr. 17 (1873) 245; *Morus glabrata* Wall. ex J.D. Hook., Fl. Brit. India 5 (1888) 493 (see also Müller 2001; Vul'f and Maleeva 1969; Bennet 1987). [a] (Moraceae). Fr. India. A recent introduction in Oman. Observed by us in Sohar.

Appendix continued

Morus nigra L. (Moraceae). Fr. Mediterranean to W Asia. Variable fruit sizes, fruits up to 5 cm long. Ref.: Ghazanfar 2003, Hammer et al. 2004b, Gebauer et al. 2007a.

Muntingia calabura L. (Tiliaceae). Shade tree, Fr. Tropical America. Ref.: Ghazanfar 2003

Musa acuminata Colla (Musaceae). Fr. S to S-E Asia. Ref.: Hammer et al. 2004b.

Musa × *paradisiaca* L. (Musaceae). Fr. S-E Asia. Various types have been introduced to Oman including also plantains. Ref.: Hammer et al. 2004b, Gebauer et al. 2007a.

Myrtus communis L. (Myrtaceae). Sp. (fr., l.). Mediterranean to NW Himalaya. Ref.: Guarino 1990a, Hammer et al. 2004b.

Nicotiana tabacum L. (Solanaceae). I. (l., smoking). America. Formerly cultivated in Oman. Escaped tobacco plants can still be found nearly naturalized in Dhofar. Ref.: Miller and Morris 1988.

Ocimum basilicum L. (Labiatae). Sp. (l.). Tropical Asia. Variable crop in the area, var. *thyrsiflorum* (L.) Benth. is relatively common. Ref. Hammer et al. 2004b, Gebauer et al. 2007a.

Ocimum forskolei Benth. (Labiatae). Sp. (l.). Native of the area. Present in many oases, also semi-cultivated. Ref. Miller and Morris 1988, Jongbloed et al. 2003.

Ocimum tenuiflorum L., syn. *O. sanctum* L. (Labiatae). Sp. (l.), M. (l.). S Asia. Dhofar. Ref.: Schwartz 1939.

Olea europaea L. (Oleaceae). Oi. (fr.). Native of the area. *O. europaea* ssp. *africana* (Mill.) Green is discussed as one of the progenitors of the cultivated oil tree. Several situations have been observed by us where cultivated and wild trees grow in close proximityΓÇöan ideal precondition for introgression and evolution. Ref.: Miller and Morris 1988, Hammer et al. 2004b, Gebauer et al. 2007a.

Opuntia dillenii (Ker-Gawler) Haw. (Cactaceae). Living fences. M America. Observed by us in N Oman.

Opuntia ficus-indica (L.) Mill. (Cactaceae). Fr., hedge plant. M America. Miller and Cope 1996, Gebauer et al. 2007a.

Opuntia monacantha (Willd.) Haw. (*O. vulgaris* auct. non Mill.) (Cactaceae). Fr., hedges. According to Hunt et al. (2006) this is the widely distributed species (not *O. compressa* (Salisb.) Macbr. ≡ *Cactus opuntia* L. ΓåÆ *Opuntia humifusa*). M America. Ref.: Gebauer et al. 2007a.

Origanum majorana L. (Labiatae). Sp. (h.). E Mediterranean. Ref.: Gebauer et al. 2007a.

Pandanus tectorius Parkinson (Pandanaceae). N., hedge plant. SE Asia. Ref.: Schwartz 1939.

Panicum maximum Jacq. (Gramineae). Fo. (l., st.). Tropical and S Africa. Ref.: Gebauer et al. 2007a.

Passiflora edulis Sims (Passifloraceae). Fr. Tropical America. Dhofar.

Pennisetum glaucum (L.) R. Br., syn.: *P. americanum* L., *P. typhoides* (Burm.) Stapf et Hubbard (Gramineae). C. Africa. Ref.: Schwartz 1939, Guarino 1990a, Hammer et al. 2004b, Gebauer et al. 2007a.

Pennisetum setaceum (Forssk.) Chiov. (Gramineae). Fo. (l., st.). N Africa to Arabia. Ref.: Gebauer et al. 2007a.

Persea americana Mill. (Lauraceae). Fr. M America. Dhofar.

Petroselinum crispum (Mill.) Nym. ex A. W. Hill (Umbelliferae). V. (l.). Middle East to Eastern Mediterranean. Ref.: Gebauer et al. 2007a.

Phoenix dactylifera L. (Palmae). Fr. Probably indigenous to Persian Gulf region, the original wild races are still under discussion. Extensively cultivated in a large variation. Ref.: Miller and Morris 1988, Hammer et al. 2004b, Gebauer et al. 2007a.

Pistacia vera L. (Anacardiaceae). N. SW Asia. Occasionally cultivated in N Oman.

Pisum sativum L. (Leguminosae). Pu. SW Asia. Ref.: Hammer et al. 2004b.

Pithecellobium dulce (Roxb.) Benth. (Leguminosae). Fr., hedges, Fo. (l.). M America. Ref.: Gebauer et al. 2007a.

Prunus arabica (Oliv.) Meikle (Rosaceae). Sometimes cultivated as a wind break. Native of the area. Ref.: Prendergast 1994, Miller and Cope 1996.

Prunus armeniaca L. (Rosaceae). Fr. China. Ref.: Miller and Cope 1996, Gebauer et al. 2007a.

Prunus avium L. (Roaceae). Fr. SW Asia. Recently planted in the higher mountains of N Oman.

Prunus domestica L. (Rosaceae). Fr. SW Asia. Ref.: Miller and Cope 1996, Gebauer et al. 2007a.

Prunus dulcis (Mill.) D. A. Webb (Rosaceae). N. (fr.). E Mediterranean. Ref.: Miller and Cope 1996, Gebauer et al. 2007a.

Prunus mahaleb L. (Rosaceae). Grafting stock. SW Asia. Observed by us as a rootstock for other *Prunus* spp. In N Oman.

Prunus persica (L.) Batsch (Rosaceae). Fr. Middle Asia. Ref.: Miller and Cope 1996, Hammer et al. 2004b, Gebauer et al. 2007a.

Psidium guajava L. (Myrtaceae). Fr. C America. Ref.: Gebauer et al. 2007a.

Psoralea corylifolia L. (Leguminosae). M. (s.). India. Naturalized in Dhofar. Occasionally cultivated in Arabia for its medicinal properties. Ref.: Miller and Morris 1988, Guarino 1990a.

Appendix continued

Punica granatum L. (Punicaceae). Fr. Middle East. Ref.: Hammer et al. 2004b, Gebauer et al. 2007a.

Pyrus communis L. (Rosaceae). Fr. M Asia. Ref.: Gebauer et al. 2007a.

Raphanus sativus L. (Cruciferae). V. (l.). E MediterranenanΓÇöMiddle East. Often occurring as a weed with well developed white swollen tap roots. Ref.: Miller and Cope 1996, Hammer et al. 2004b, Gebauer et al. 2007a.

Ricinus communis L. (Euphorbiaceae). Oi. (s.), M. (s.). Originally a native of NE Africa. Also a weedy species in many parts of Oman. Ref.: Mandaville 1977, Miller and Morris 1988, Hammer et al. 2004b, Gebauer et al. 2007a.

Rosa damascena Mill. (Rosaceae). I. (fl., perfume). Middle East (Syria). Often planted as an ornamental in the oases. Ref.: Hammer et al. 2004b, Gebauer et al. 2007a.

Rubus laciniatus Willd. (Rosaceae). Fr. England. Recently planted in the higher mountains of N Oman.

Rumex vesicarius L. (Polygonaceae). V. (l.). Native of the area. Occasionally cultivated in N Oman. Ref.: Gebauer et al. 2007a.

Ruta chalepensis L. var. *bracteosa* (DC.) Boiss. (Rutaceae). Sp. (h.). Native of the area. Also cultivated in Yemen (Schwartz 1939) Ref.: Hammer et al. 2004b, Gebauer et al. 2007a.

Saccharum officinarum L. (Gramineae). I. (sugar), today the stalks only used as sweets for children. Pacific islands, Guarino (1990a) also collected *Saccharum barberi* Jeswiet. Ref.: Schwartz 1939.

Sesamum indicum L., syn.: *Sesamum orientale* L. (Pedaliaceae). Oi. (s.). India. Ref.: Schwartz 1939, Guarino 1990a.

Sesbania sesban (L.) Merr. (Leguminosae). Multipurpose tree. Subtropical Africa. Cultivated in Dhofar. Ref.: Miller and Morris 1988.

Setaria italica (L.) P. Beauv. (Gramineae). C. Originated in China and Europe (different races). Ref.: Guarino 1990a.

Solanum melongena L. (Solanaceae). V. (fr.). India. Ref.: Hammer et al. 2004b.

Solanum tuberosum L. (Solanaceae). V. (r.). S America. Ref.: Gebauer et al. 2007a.

Sorghum bicolor (L.) Moench s.l. (Gramineae). C. Africa. Ref.: Hammer et al. 2004b, Gebauer et al. 2007a.

Spinacia oleracea L. (Chenopodiaceae). V. (l.). M Asia. Ref.: Miller and Cope 1996.

Syzygium cumminii (L.) Skeels (Myrtaceae). Fr. India. Ref.: Gebauer et al. 2007a.

Tamarindus indica L. (Leguminosae). Fr. Tropical Africa. Occasionally grown for fruits and shade. Dhofar is a part of its natural distribution or naturalization. Highly domesticated races have been introduced from India. Ref.: Miller and Morris 1988.

Tamarix aphylla (L.) Karst. (Tamaricaceae). Wind break, landscape tree. N Africa, SW Asia. Ref.: Ghazanfar 2003.

Terminalia catappa L. (Combretaceae). N. (s.). SE Asia islands. Ref.: Hammer et al. 2004b, Gebauer et al. 2007a.

Trigonella foenum-graecum L. (Leguminosae). Fo. Middle East to Ethiopia. Ref.: Schwartz 1939, Hammer et al. 2004b, Gebauer et al. 2007a.

× *Triticosecale* Wittm. (Gramineae). C. Europe. First man-made cereal by artificially crossing *Triticum* spp. and *Secale* cereale L. Found as an admixture in field of traditional wheat. The hexaploid race was observed. As in remote areas of Afghanistan (Buerkert et al. 2006) also the mountain oases of Oman prove the fast distribution of newly bred material to traditional agroecosystems. Ref.: Gebauer et al. 2007a.

Triticum aestivum L. (Gramineae). C. Middle East. Important cereal of Oman. Mainly races with compact spikes are grown (*T. compactum* Host). Introduced in the same way as the other *Triticum* species. Usually grown in mixture with other wheats. New varieties have been described from the mountains of N Oman. Ref.: Al Khanjari et al. 2005, 2007b.

Triticum aethiopicum Jakubc. (Gramineae). C. Middle East? This wheat has been recently detected by us in Oman. Formerly it was considered as an endemic of Ethiopia. Now there are hints for a (former?) occurrence in Iran and Egypt. From Iran it could have been brought via Musandam (two botanical varieties of the species have been found by us here), other parts of northern Oman (several other varieties have been found in this area) and the rest of the Arabian peninsula (probably via Yemen) to Ethiopia where it became the predominant wheat. In N Oman it is more variable and common than *T. durum*. Ref.: Al Khanjari et al. 2005, 2007a.

Triticum dicoccon Schrank (Gramineae). C. Middle East. This wheat has become very rare in Oman. Recently we could observe a cultivation in Dhofar. *T. dicoccon* from Oman belongs to Asiatic emmer (ssp. *asiaticum* Vav.) but it shows also characters of the Ethiopian emmer (ssp. *abyssinicum* Vav.). The way of introduction from Iran and further distribution to Ethiopia seems to be the same as in the other species of *Triticum*. Ref.: Guarino 1990a, Hammer et al. 2004b, Al Khanjari et al. 2005, 2007a.

Triticum durum Desf. (Gramineae). C. Middle East. This wheat shows some variation but, in the area it is less variable than *T. aethiopicum*. The races of this species are related to Iranian material. The way of introduction to Oman may be the same as for *T. aethiopicum*, but, so far, no *T. durum* was found in Musandam. Ref.: Al Khanjari et al. 2005, 2007a.

Vatovaea pseudolablab (Harms) Gillett (Leguminosae). Pu. Tropical Africa. Occasionally cultivated in Africa (Bosch and Borus 2007). In Dhofar the young pods are eaten raw. Ripe seeds are eaten raw or cooked. The roots are delicious. Formerly an important food source (possibly also semi-cultivated), now becoming increasingly rare. Ref.: Miller and Morris 1988.

Appendix continued

Vicia faba L. (Leguminosae). Pu. Middle East. Local races with small grains are very rare now. Ref.: Hammer et al. 2004b, Gebauer et al. 2007a.

Vicia sativa L. (Leguminosae). Fo. Mediterranean to SW Asia. Ref.: Hammer et al. 2004b.

Vigna radiata (L.) R. Wilczek var. *sublobata* (Roxb.) Verdc. (Leguminosae). Pu. SE Asia. Cultivated as an agricultural auxiliary plant in Dhofar. Ref.: Miller and Morris 1988.

Vigna unguiculata (L.) Walp. Pu. (Leguminosae). Subsaharan Africa. Occasionally cultivated in the mountain seasonal gardens of Dhofar. Ref.: Miller and Morris 1988, Guarino 1990a.

Vitis vinifera L. (Vitaceae). Fr. M Asia. Different varieties, most of them introduced from E Mediterranean and Middle East. Ref.: Hammer et al. 2004b, Gebauer et al. 2007a.

Xanthosoma sagittifolium (L.) Schott ex Schott et Endl. (Araceae). St. (b.). S America. Observed by us in Dhofar. Ref.: Miller and Morris 1988.

Zea mays L. (Gramineae). C. C America. Ref.: Hammer et al. 2004b, Gebauer et al. 2007a.

Ziziphus jujuba Mill. (Rhamnaceae). Fr. Mediterranean to China. A rare fruit in N Oman. Ref.: Miller and Morris 1988.

Ziziphus mauritiana Lam. (Rhamnaceae). Fr. India. Occasionally cultivated. Fruits much larger than those of *Z. spina-christi*. Ref.: Miller and Morris 1988, Gebauer et al. 2007a.

Ziziphus spina-christi (L.) Willd. (Rhamnaceae). Fr. N Africa to India. Native of the area. Very variable. A non-spiny variety (var. *inermis* Boiss.) is grown in Dhofar. Ref.: Mandeville 1977, Miller and Morris 1988, Prendergast 1994, Hammer et al. 2004b, Gebauer et al. 2007a.

[a] The nomenclature is still under discussion. The first record of our species was by Wallich as *Morus laevigata* (1831). This name is a nomen nudum and was emended relatively late. Ohle (1986), following the indication of Vul'f and Maleeva (1969), selected Delessert ex Moretti ("1841", 1842) as the accepted name. But *Morus alaisia* is only mentioned by Moretti as a synomym of *Morus viridis* Hamilton (specie V) in the following way: "*Morus alaisia*? Erbar. Delessert." *Morus viridis* Hamilton belongs to the synonyms of our species. But there is no description or other information available in Moretti (1842) which can serve for the emendation of *Morus alaisia* Delessert. Morevover, *Morus laevigata* Wallich is enumerated as "specie VI" by him. But also here no description is available which would allow the emendation of this name. Only in 1851 a species from western Java was described as *Morus macroura* Miq. which was originally collected by Junghuhn.

Recently the second volume of the Flora of Oman appeared (Ghazanfar 2007) with notes on the following cultivated plants (alphabetical order, species not yet included in our checklist are in bold face):

Acacia auriculiformis A. Cunn. ex Benth. (Leguminosae), ***Acacia farnesiana*** (L.) Willd. (Leguminosae), ***Acacia nilotica*** (L.) Delile (Leguminosae), ***Albizia lebbek*** (L.) Benth. (Leguminosae), *Apium graveolens* (Umbelliferae), *Azadirachta indica* (Meliaceae), ***Caesalpinia pulcherrima*** (L.) Sw. (Leguminosae), *Citrus aurantiifolia* (Rutaceae), ***Citrus latifolia*** Tanaka (Rutaceae), *Citrus limettioides* (Rutaceae), *Citrus limon* (Rutaceae), ***Clitoria ternatea*** L. (Leguminosae), ***Conocarpus lancifolius*** Engl. et Diels (Combretaceae), *Coriandrum sativum* (Umbelliferae), *Daucus carota* (Umbelliferae), ***Delonix regia*** (Boj. ex Hook.) Raf. (Leguminosae), *Lawsonia inermis* (Lythraceae), *Leucaena leucocephala* (Leguminosae), *Mangifera indica* (Anacardiaceae), *Medicago sativa* (Leguminosae), ***Parkinsonia aculeata*** L. (Leguminosae), *Petroselinum crispum* (Umbelliferae), *Pithecellobium dulce* (Leguminosae), ***Prosopis juliflora*** (Swartz) DC. (Leguminosae), *Prunus arabica* (Rosaceae), *Prunus domestica* (Rosaceae), *Prunus dulcis* (Rosaceae), *Prunus persica* (Rosaceae), *Psoralea corylifolia* (Leguminosae), *Punica granatum* (Punicaceae), *Ricinus communis* (Euphorbiaceae), *Rosa damascena* (Rosaceae), ***Senna elata*** (L.) Roxb. (Leguminosae), ***Sesbania grandiflora*** (L.) Poir. (Leguminosae), *Sesbania sesban* (Leguminosae), *Tamarindus indica* (Leguminosae), *Terminalia catappa* (Combretaceae), *Trigonella foenum-graecum* (Leguminosae), *Vicia faba* (Leguminosae), *Vigna radiata* var. *sublobata* (Leguminosae), *Ziziphus spina-christi* (Rhamnaceae).

Morus laevigata was later on considered conspecific with *Morus macroura*. The species shows a tendency to be distributed westwards. Recently reported also from Saudi Arabia (Chaudhari 1999).

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