

## THE OMAN BOTANIC GARDEN (1):

## THE VISION, EARLY PLANT COLLECTIONS AND PROPAGATION

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## ABSTRACT

The Oman Botanic Garden (OBG) is a new botanic garden which is being constructed on a 423ha site near to Muscat, the capital of Oman. Oman is floristically rich and is considered a centre of plant diversity in the Arabian Peninsula. The plan is that OBG will showcase this plant diversity, inform visitors of its value and provide a model for sustainability. This paper, part 1, covers the vision, early plant collections and propagation, and part 2, which will be included in *Sibbaldia* No. 7, will cover design, construction, interpretation and planting.

## THE SITE

The Oman Botanic Garden (OBG), which is currently under construction, is to be a brand new, iconic botanic garden in the Sultanate of Oman. It is to be located on 423 hectares of natural habitat at Al Khoud, just to the west of the capital Muscat (Fig. 1). On the northern side of the site is a range of hills up to 281m high and within the site are a number of smaller hills (up to 170m). There are three wadis that cross the site, the largest of which is Wadi Sidr, which contains some pools of water throughout the year. The overall wide range of ground conditions will enable a large number of species to be grown within OBG, making it an excellent choice of location.

The site is remarkably green at certain times of the year and its most distinctive flora is the open woodland that dominates the wadi areas. The predominant species within this habitat is *Acacia tortilis*, but with occasional *Acacia ehrenbergiana*, *Prosopis cineraria* and *Ziziphus spina-christi*.

## OMAN – A REGIONAL BIODIVERSITY HOTSPOT

The flora of Oman is floristically rich with a high degree of endemism. In the Sultanate of Oman c. 1,200 species of vascular plants are presently known (Miller & Cope, 1996).

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Fig. 1 A section of the 423ha site for the Oman Botanic Garden. Photo: Annette Patzelt.

Oman is a centre of plant diversity in the Arabian Peninsula, with 15.8% of the flora being range-restricted (Patzelt, 2008). Southern and central Oman have been identified as one of the world's 35 key biodiversity hotspots – areas that contain at least 1,500 endemic species of vascular plants (> 0.5% of the world's total), and where at least 70% of the natural vegetation has been lost (Mittermeier *et al.*, 2005). Of the total of 189 range-restricted species, 78 species are strictly endemic to the country, 48 are near-endemics and 63 are regional endemics (Patzelt, 2008).

There are currently 2,204 botanic gardens known in the world in 153 countries, but there are very few in the Middle East and South-West Asia (BGCI, 2001), although the area accounts for an estimated 58,500 species. OBG will be the sole garden in the area and aims to achieve a comprehensive *ex situ* conservation collection of native plants.

#### VISION AND OVERALL AIM

The vision is that “the Oman Botanic Garden as a new world class botanic garden conserves the unique botanical and ethnobotanical heritage of Oman and to ensure that the flora, heritage and ecosystems of Oman are valued by all”. The garden has the unique aim of propagating and displaying the complete indigenous flora of the Sultanate of Oman, within defined habitat zones (including large, iconic, environmentally controlled biomes for northern and southern flora), and aims to sustainably address the urgent need for conservation solutions to the biodiversity crisis.

The representation of a native flora in habitats has not had a prominent place in most botanic gardens. With both an interest in target 8 of the Global Strategy for Plant

Conservation and the development of a habitat-based garden, the OBG represents a new model for botanic gardens in the 21st century and is a groundbreaking initiative of *ex situ* conservation in Arabia. OBG sees its role in providing a model with conservation and sustainability at the forefront of its messages and the experience gained of vital importance for other major new gardens in development across Arabia.

#### SPECIFIC GOALS

OBG has a number of major objectives, as follows:

- Value the unique flora and ethnobotany of Oman
- Reflect and honour Oman's heritage
- Create an international 'must see' iconic visitor destination
- Provide a model for sustainability
- Exemplify the unique hospitality of Oman
- Lead the development of botanic gardens in Arabia
- Develop a cadre of professional Omani staff to manage the OBG
- Provide a major education resource in the field of biodiversity conservation
- Present and interpret exhibits of indigenous plant species and local cultivated crops, their habitats, traditional knowledge and animal-plant interactions
- Promote the use of indigenous plants for ornamental horticulture.

#### KEY CHALLENGES

OBG faces three broad key botanical and horticultural challenges during its development phase:

- Building up horticultural expertise in the team and the development of standard protocols in all areas of plant propagation and collection management for all Omani plants, including a wide range of range-restricted and threatened species.
- Identifying key botanical questions within the Omani flora and the development of the OBG team to be able to prioritize and answer them.
- Defining and developing the scientific impact of OBG in the wider *ex situ* conservation of Arabian plants and in the overall delivery on the Global Strategy for Plant Conservation (GSPC).

The development of such a botanic garden from scratch presents an outstanding example of *ex situ* conservation being undertaken in a botanic garden with national, regional and international significance. The planning for the development of OBG commenced in 2004. A master plan was submitted in 2006, the design finalized in 2008 and construction of phase one, the nursery, started at the beginning of 2008.



Fig. 2 Initial OBG propagation space was rented from a commercial nursery at Seeb, Muscat. Photo: Leigh Morris.

#### INITIAL PRODUCTION NURSERY

Overall, plant collections at OBG will eventually comprise of a living collection, seed bank, herbarium and also a digital herbarium. The initial priority for OBG, however, has been the propagation of the c. 400,000 indigenous and endemic living plants that are required for the planting of the habitat zones and all other planted areas within OBG. It is fundamental that when the OBG opens, the garden looks relatively established and contains as wide a selection of the Omani flora as possible.

Prior to the OBG project, very few Omani plants were in nursery cultivation. There are small nurseries in and around Muscat but these predominantly produce exotic plants for the ornamental market. The existence of these nurseries, however, proved to be extremely valuable to OBG, as space was rented within one for the propagation of Omani plants (Fig. 2). So, in early 2006, through these modest rented facilities and a single member of staff, OBG had a physical presence. Since then, both the OBG nursery team and the number of plants have increased and by June 2008 there were 20 staff and 51,851 individual plants on two rented nursery sites. This already therefore represented the largest documented Arabian plant collection.

#### PLANT COLLECTION

One of the key objectives of OBG is to cultivate and display only Omani plants and due to the lack of any significant numbers already in cultivation, this gave the OBG team the challenge of collecting all plant material from the wild. Diversity was of major importance, so collections were predominantly from seed; however, whole living plants and cuttings were also collected for certain species (but from a wide range of mother plants).





Fig. 3 Seed collection on Jabal Samhan in the Dhofar region of Oman being carried out by an OBG team member. Photo: Leigh Morris.



Fig. 4 RBGE's Leigh Morris training OBG staff in the collection of vegetative propagation material on Jabal Al Akhdar (December 2006). Photo: Annette Patzelt.

Seeds were collected in a standard way (Fig. 3) into fabric bags and stored in boxes for transport. On longer field trips the seed drying process started in the field, usually by hanging the bags in shady and slightly breezy locations. The collection and propagation of vegetative material (cuttings and whole plants) proved more of a challenge in such a hot climate but, through collaboration with Royal Botanic Garden Edinburgh (RBGE) horticulturists, successful protocols were developed involving the correct selection of material (Fig. 4) and the use of moist sealable plastic bags and cool-boxes.



Fig. 5 Dr Annette Patzelt inputting collection data into the database in the field. Photo: Leigh Morris.

A fundamentally important part of the plant collection process was the gathering and recording of information on all the plants, including date of collection, name(s) of collectors, location (GPS coordinates; longitude, latitude and altitude), locality, type of material, life form, soil type, associated flora, local uses and descriptions. Voucher herbarium specimens, material for genetic analysis and photographs were also collected. The vouchers are stored in the OBG's herbarium. Temporary labels were used during transportation and much of the information was typed straight into the database on a lap-top computer in the field (Fig. 5). The database allows a link from the living collection to the herbarium voucher, to provide a back-up specimen should the living material fail for any reason.

#### PROPAGATION TECHNIQUES

After transport to the OBG nursery seeds were dried, cleaned and stored in the dark at room temperatures. Species from the high mountain areas in northern Oman were stored in a dark fridge at 10°C to provide stratification. A seed processing form was developed that remains with the seed lot from the moment it arrives in the garden until the seeds are sown. Prior to germination seeds are soaked in water for 24 hours and then directly sown into standard 200 × 300mm seed trays with potting media. Smaller seeds are broadcast into the trays but larger seeds are spaced using a template to form 40 holes in a tray. The seed trays are watered daily, being soaked in large trays, to enable water to penetrate from the bottom rather than from the top. The date of first germination is recorded. If germination occurs, young plantlets are pricked-out after reaching 50–100mm in height.



Fig. 6 RBGE's Nursery Supervisor, Peter Brownless, training OBG staff in vegetative propagation techniques. Photo: Annette Patzelt.

Initial attempts at rooting cuttings by the OBG team were variable, so RBGE staff were asked to visit Muscat in December 2006 in order to develop protocols for vegetative propagation (Fig. 6). Peat moss and vermiculite (ratio 1:1) was decided upon for the rooting media, the design of the propagation tunnels was modified to allow better access and OBG staff were taught the importance of looking after the cuttings and maintaining hygiene within a propagation environment.

It was believed to be important to start with less sophisticated methods of plant propagation, as the rented facilities were basic and there was not the depth of skill and experience within the OBG team. With the development of the staff and the move to new nursery facilities on the OBG site in June/July 2008, however, the propagation techniques and establishment and growth requirements will be expanded and, through experimentation, precise production protocols will be developed for every species.

Overall, propagation to date has been successful, with much learned that will be of use when the nursery expands into phase two. So far, 327 species from 68 different families have been propagated or collected, representing 29% of the country's flora (Table 1). Eighty-five of the species are on the National Red List (Patzelt, 2008). Appendix I summarizes the propagation success over the first two years. Initially, success rates were not recorded accurately and were counted as 'Very Poor' (success < 5%), 'Poor' (5–10%), 'Medium' (10–60%), 'Good' (60–80%) and 'Very Good' (> 80%).



Month	Total plants in nursery	No. of species	No. of families	No. of species on the Red List
February 2006	0	0	0	0
April 2006	2,021	102	40	23
June 2006	6,398	131	44	31
August 2006	9,267	165	54	42
October 2006	10,626	167	59	45
December 2006	16,563	244	59	49
February 2007	16,695	269	62	49
April 2007	26,038	288	65	66
June 2007	34,797	300	65	76
August 2007	35,866	303	65	76
October 2007	37,858	314	66	76
December 2007	38,296	317	67	77
February 2008	49,352	321	67	80
April 2008	50,658	321	67	80
June 2008	51,851	327	68	85

*NB: The total flora of Oman contains c. 1,200 species within 124 plant families. 261 species are currently on the National Red List.*

Table 1. Plant production and collection figures for the OBG nursery.

#### GROWING-ON PLANTS

After propagation, seedlings and rooted cuttings are potted-up and retained in a polythene tunnel until clear signs of root formation are obvious. They are then transferred into the larger polythene tunnel or shade structure. Whole plants, bulbs and tubers collected from the wild are treated in the same way.

RBGE staff worked with the OBG team in December 2006 to develop a standard OBG potting medium, consisting of peat moss, vermiculite and sweet soil (ratio 3:1:1) and slow release fertilizer. All plants were then placed in a cooled, shaded greenhouse, under a shade net providing 70% shade, and were watered daily. For succulents, plants of sand dunes and bulbs, however, different soil mixtures were developed by the OBG team: for succulents, coarse gravel and vermiculite (ratio of 1:1), for sand plants, sand plus the standard OBG mix (ratio 1:1) and for bulbs, the OBG standard mix plus coarse vermiculite and fine sweet soil is used (ratio of 1:2:1).

The propagation, growing and maintenance of so many different Omani plants from a range of restricted and extreme environments (and which have never been previously cultivated) has been a challenge and a huge learning curve for the OBG team but this has been helped greatly through the horticultural support, consultancy and the teaching of



Fig. 7 RBGE's Leigh Morris reviewing the growth of a batch of wild collected plants with OBG staff in the nursery at A Seeb. Photo: Annette Patzelt.

good maintenance and collection management techniques provided by Mark Richardson (BGCI), Dr Mike Maunder (Fairchild Tropical Botanic Garden) and the horticulturists from RBGE (Fig. 7). One of the key areas has been irrigation of plants from highly diverse habitats. The arid climate in Muscat, especially during the hot summer months, has increased the irrigation challenge and a couple of electrical power cuts have resulted in water supply failures that have damaged part of the collection.

#### PRODUCTION LIST

A key part of the plant collection and propagation for OBG has been the development of a detailed Nursery Production List, which lists the species and the size(s) and number required, for all the habitat areas. During the early collection and propagation of plants this list was basic but as more detailed habitat plans have been developed, the nursery team has been able to draw up a more accurate schedule with respect to numbers and types required. As with any nursery production list, however, it is still constantly evolving and will not be finalized until the OBG detailed design phase is complete.

The production list also serves as a reference for the landscape design team, as to which species are characteristic for which habitat. The use of the list as a tool during the first years of the planning and development allows for coordination between collection, cultivation and detailed design planning.



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APPENDIX I. Propagation success at OBG over the first two years.  
 In First germination (days) column n.a. signifies 'not applicable' and n.r. signifies 'not recorded'.

Family	Species	Propagation method	First germination (days)	Success rates (%)	Status	Oman Plant Red Data Book assessment
Acanthaceae						
	<i>Barleria aucheriana</i> Nees	Seeds	4	9	Endemic	EN A1 abc
	<i>Barleria aucheriana</i> Nees	Whole plants	n.a.	0–10	Endemic	EN A1 abc
	<i>Barleria candida</i> Nees	Seeds	n.r.	very poor		
	<i>Barleria hochstetteri</i> Nees	Whole plants	n.a.	50–100		
	<i>Barleria samhanensis</i> Knees, A.G. Mill. & A. Patzelt	Seeds	6	63	Endemic	CR B1B2ab(iii)
	<i>Barleria samhanensis</i> Knees, A.G. Mill. & A. Patzelt	Cuttings	n.a.	64	Endemic	CR B1B2ab(iii)
	<i>Blepharis ciliaris</i> (L.) B.L. Burtt	Seeds	3	21		
	<i>Blepharis dhofarensis</i> A.G. Mill.	Whole plants	n.a.	33	Endemic	VU B1b(ii,iii)
	<i>Blepharis linariaefolia</i> Pers.	Seeds	n.r.	very poor		
	<i>Echbolum viride</i> (Forssk.) Alston	Cuttings	n.a.	very good		
	<i>Lepidagathis calycina</i> Hochst. ex Nees	Whole plants	n.a.	75		
	<i>Neuracanthus spinosus</i> Deflers	Seeds	n.r.	very poor		
	<i>Ruellia discifolia</i> Oliv.	Seeds	n.r.	very poor		
	<i>Ruellia grandiflora</i> (Forssk.) Blatter	Seeds	5	26	Regional Endemic	NT
	<i>Ruellia patula</i> Jacq.	Seeds	9	10		
	<i>Ruellia</i> sp.	Seeds	n.r.	medium		

Family	Species	Propagation method	First germination (days)	Success rates (%)	Status	Oman Plant Red Data Book assessment
	<i>Rutya fruticosa</i> Lindau	Cuttings	n.a.	medium		
	<i>Rutya fruticosa</i> Lindau	Seeds	10	60		
<b>Adiantaceae</b>						
	<i>Adiantum incisum</i> Forssk.	Whole plants	n.a.	95		
	<i>Adiantum incisum</i> Forssk.	Spores	0	0		
	<i>Adiantum capillus-veneris</i> L.	Whole plants	n.a.	14–82		
	<i>Cheilanthes vellea</i> (Aiton) F. Muell.	Whole plants	n.a.	1		
	<i>Cheilanthes pteridioides</i> (Reichard) C. Chr.	Whole plants	n.a.	11		
<b>Agavaceae</b>						
	<i>Sansevieria ehrenbergii</i> Schweinf. ex Baker	Division	n.a.	100		
	<i>Sansevieria ehrenbergii</i> Schweinf. ex Baker	Whole plants	n.a.	86–100		
<b>Amaranthaceae</b>						
	<i>Aerva artemisioides</i> Vierh. & Schwartz subsp. <i>batharittica</i> A.G. Mill.	Seeds	6	very good	Endemic	VU D1
	<i>Aerva javanica</i> (Burm.f.) Schult.	Seeds	n.f.	very poor		
	<i>Psilotrichum virgatum</i> C.C. Townsend	Seeds	n.f.	poor	Rare and threatened	VU D1
<b>Amarylhidaceae</b>						
	<i>Crinum</i> sp.	Bulbs	n.a.	80		
	<i>Pancratium maximum</i> Forssk.	Bulbs	n.a.	100	Regional Endemic	LC

Family	Species	Propagation method	First germination (days)	Success rates (%)	Status	Oman Plant Red Data Book assessment
<b>Anthericaceae</b>						
	<i>Chlorophytum laxum</i> R. Br.	Bulbs	n.a.	good		
<b>Anacardiaceae</b>						
	<i>Rhus aucheri</i> Boiss.	Cuttings	n.a.	good	Endemic	NT
	<i>Rhus somaliensis</i> Engl.	Seeds	n.r.	poor		
<b>Apocynaceae</b>						
	<i>Adenium obesum</i> (Forssk.) Roem. & Schult.	Whole plants	n.a.	58–77		
	<i>Calotropis procera</i> (Aiton) Dryand	Seeds	3	10		
	<i>Caralluma arabica</i> N.E. Br.	Whole plants	n.a.	38–100	Regional Endemic	VU A4a,d
	<i>Caralluma</i> cf. <i>flava</i>	Whole plants	n.a.	100		
	<i>Caralluma flava</i> N.E. Br.	Whole plants	n.a.	60–100	Regional Endemic	VU C2a(i)
	<i>Caralluma flava</i> × <i>arabica</i> ined.	Whole plants	n.a.	94–100		
	<i>Caralluma quadrangula</i> (Forssk.) N.E. Br.	Seeds	2	76	Regional Endemic	NT
	<i>Caralluma quadrangula</i> (Forssk.) N.E. Br.	Whole plants	n.a.	74–100	Regional Endemic	NT
	<i>Caralluma penicillata</i> (Defflers) N.E. Br.	Whole plants	n.a.	53	Rare and threatened	CR C2a(i)
	<i>Caralluma adenensis</i> (Defflers) A. Berger	Whole plants	n.a.	48–100	Regional Endemic	CR D1

Family	Species	Propagation method	First germination (days)	Success rates (%)	Status	Oman Plant Red Data Book assessment
	<i>Caralluma</i> sp.	Whole plants	n.a.	86		
	<i>Cibirhiza dhofarensis</i> Bruyns	Seeds	16	8	Near Endemic	VU B1b(iii,v)
	<i>Echidnopsis scutellata</i> (Deflers) A. Berger subsp. <i>dhofarensis</i> Bruyns	Division	n.a.	71–99	Endemic	VU B2b(ii,iii)
	<i>Echidnopsis scutellata</i> (Deflers) A. Berger subsp. <i>dhofarensis</i> Bruyns	Whole plants	n.a.	41–100	Endemic	VU B2b(ii,iii)
	<i>Glossonema varians</i> (Stocks) Benth. ex Hook.f.	Whole plants	n.a.	poor		
	<i>Leptadenia pyrotechnica</i> (Forssk.) Decne.	Seeds	n.r.	medium		
	<i>Nerium oleander</i> L.	Cuttings	n.a.	poor		
	<i>Nerium oleander</i> L.	Seeds	11	60		
	<i>Periploca aphylla</i> Decne. in Jacquem.	Seeds	n.r.	poor		
	<i>Periploca visciformis</i> (Vatke) K. Schum.	Seeds	13	33		
	<i>Periploca</i> cf. <i>visciformis</i>	Seeds	5	99		
	<i>Periploca</i> sp.	Seeds	n.r.	good		
	<i>Rhazya stricta</i> Decne.	Seeds	n.r.	very good		
	<i>Rhytidocaulon fulleri</i> Lavranos & Mortimer	Whole plants	n.a.	very good	Near Endemic	EN B1b(i,iii)
	<i>Rhytidocaulon</i> sp.	Whole plants	n.a.	very good		
	<i>Sarcostemma viminalis</i> (L.) R. Br.	Whole plants	n.a.	96		
	<i>Orbea wismanii</i> (O. Schwartz) Bruyns subsp. <i>parviloba</i> Bruyns	Division	n.a.	92	Regional Endemic	EN B1b(ii,iii)



Family	Species	Propagation method	First germination (days)	Success rates (%)	Status	Oman Plant Red Data Book assessment
	<i>Orbea wismanii</i> (O. Schwartz) Bruyns subsp. <i>parviloba</i> Bruyns	Whole plants	n.a.	88	Regional Endemic	EN B1b(ii,iii)
	<i>Orbea luntii</i> (N.E. Br.) Bruyns	Division	n.a.	75	Near Endemic	EN B1b(ii,iii)
	<i>Orbea luntii</i> (N.E. Br.) Bruyns	Whole plants	n.a.	100	Near Endemic	EN B1b(ii,iii)
<b>Asparagaceae</b>						
	<i>Asparagus</i> sp.	Whole plants	n.a.	very good		
<b>Asphodelaceae</b>						
	<i>Aloe praetermissa</i> McCoy & Lavranos	Division	n.a.	100	Endemic	LC
	<i>Aloe praetermissa</i> McCoy & Lavranos	Whole plants	n.a.	96-100	Endemic	LC
	<i>Aloe whitcombei</i> Lavranos	Division	n.a.	90	Endemic	CR B2a;D1
	<i>Aloe whitcombei</i> Lavranos	Whole plants	n.a.	100	Endemic	CR B2a;D1
	<i>Aloe dhufarensis</i> Lavranos	Seeds	10	50	Near Endemic	VU B1b(ii,iii)
	<i>Aloe dhufarensis</i> Lavranos	Whole plants	n.a.	73	Near Endemic	VU B1b(ii,iii)
<b>Asteraceae</b>						
	<i>Blepharispernum hirtum</i> Oliver	Seeds	4	very good	Near Endemic	VU A4abc
	<i>Cichorium intybus</i> L.	Whole plants	n.a.	poor		
	<i>Ditoma schimperii</i> (DC.) Baill. ex O. Hoffm.	Seeds	n.r.	n.r.		
	<i>Echinops spinosissimus</i> Freyn	Seeds	n.r.	good		
	<i>Euryops arabicus</i> Steud. ex Jaub. & Spach	Seeds	n.r.	84		

Family	Species	Propagation method	First germination (days)	Success rates (%)	Status	Oman Plant Red Data Book assessment
	<i>Euryops arabicus</i> Steud. ex Jaub. & Spach	Whole plants	n.a.	100		
	<i>Euryops arabicus</i> Steud. ex Jaub. & Spach	Cuttings	n.a.	very poor		
	<i>Gnaphalium makranicum</i> Rech.f. & Esfand	Whole plants	n.a.	very poor		
	<i>Iphiona aucheri</i> (Boiss.) Anderb.	Seeds	n.r.	n.r.		
	<i>Iphiona horrida</i> Boiss.	Seeds	n.r.	poor		
	<i>Iphiona scabra</i> DC.	Whole plants	n.a.	very poor		
	<i>Iphiona senecionoides</i> (Baker) Anderb.	Seeds	n.r.	n.r.	Near Endemic	NT
	<i>Kleinia odora</i> (Forssk.) DC.	Seeds	3	6		
	<i>Kleinia odora</i> (Forssk.) DC.	Whole plants	n.a.	83–90		
	<i>Kleinia saginata</i> P. Halliday	Whole plants	n.a.	63–80	Near Endemic	NT
	<i>Kleinia</i> sp.	Whole plants	n.a.	100		
	<i>Launaea bornmuelleri</i> (Hauskn. ex Bornm.) Bornm.	Seeds	n.r.	n.r.		
	<i>Launaea castanosperma</i> F.G. Davies	Seeds	n.r.	n.r.	Near Endemic	NT
	<i>Osteospermum vaillantii</i> (Desne.) Norlindh	Whole plants	n.a.	very poor		
	<i>Parthenium hysterophorus</i> L.	Seeds	n.r.	very poor		
	<i>Pluchea arabica</i> (Boiss.) Qaiser & Lack	Seeds	n.r.	n.r.		
	<i>Pulicaria cylindrica</i> (Baker) O. Schwartz	Seeds	28	poor	Regional Endemic	NT
	<i>Pulicaria glutinosa</i> (Boiss.) Jaub. & Spach subsp. <i>glutinosa</i>	Seeds	n.r.	n.r.	Regional Endemic	LC

Family	Species	Propagation method	First germination (days)	Success rates (%)	Status	Oman Plant Red Data Book assessment
	<i>Pulicaria glutinosa</i> (Boiss.) Jaub. & Spach subsp. <i>glutinosa</i>	Whole plants	n.a.	very poor	Regional Endemic	LC
	<i>Pulicaria</i> sp.	Whole plants	n.a.	very poor		
	<i>Vernonia arabica</i> F.G. Davies	Seeds	n.r.	n.r.		
	<i>Vernonia spathulata</i> (Forssk.) Sch. Bip.	Seeds	11	4		
	<i>Voluntaria sinaica</i> (DC.) Wagenitz	Seeds	4	12		
<b>Avicenniaceae</b>						
	<i>Avicennia marina</i> (Forssk.) Vierth.	Seeds	n.r.	good	Rare and threatened	VU A labeled
<b>Bigoniaceae</b>						
	<i>Tecomella undulata</i> (Roxb.) Seem.	Cuttings	n.a.	very poor		
	<i>Tecomella undulata</i> (Roxb.) Seem.	Suckers	n.a.	60		
<b>Bombacaceae</b>						
	<i>Adansonia digitata</i> L.	Seeds	8	7	Rare and threatened	VU D1
<b>Boraginaceae</b>						
	<i>Cordia nevillii</i> Alston	Seeds	n.r.	very poor		
	<i>Cordia</i> sp.	Cuttings	n.a.	very poor		
	<i>Echiochilon persicum</i> (Burm.f.) I.M. Johnst.	Whole plants	n.a.	very poor		
	<i>Echiochilon callianthum</i> Lönn	Whole plants	n.a.	very poor	Regional Endemic	LC
	<i>Echiochilon callianthum</i> Lönn	Seeds	n.r.	very poor	Regional Endemic	LC

Family	Species	Propagation method	First germination (days)	Success rates (%)	Status	Oman Plant Red Data Book assessment
	<i>Echiochilon</i> sp.	Whole plants	n.a.	very poor		
	<i>Heliotropium calcareum</i> Stocks	Seeds	n.r.	poor		
	<i>Heliotropium calcareum</i> Stocks	Whole plants	n.a.	poor		
	<i>Heliotropium kotschyi</i> Gürke	Seeds	8	7		
	<i>Heliotropium kotschyi</i> Gürke	Whole plants	n.a.	8–14		
	<i>Lappula sintaca</i> (A. DC.) Asch. ex Schweinf.	Seeds	n.r.	good		
	<i>Trichodesma africanum</i> (L.) Lehm.	Whole plants	n.a.	poor		
	<i>Trichodesma hildebrandtii</i> Gürke	Seeds	n.r.	good		
<b>Brassicaceae</b>						
	<i>Farsetia aegyptiaca</i> Turra	Seeds	n.r.	good		
	<i>Farsetia linearis</i> Decne. ex Boiss.	Seeds	n.r.	good	Regional Endemic	LC
	<i>Farsetia linearis</i> Decne. ex Boiss.	Whole plants	n.a.	0–20	Regional Endemic	LC
	<i>Physorrhynchus chamaerapistrum</i> (Boiss.) Boiss.	Seeds	n.r.	good		
<b>Burseraceae</b>						
	<i>Boswellia sacra</i> Flück.	Cuttings	n.a.	poor	Rare and threatened	VU B1b(i,iii,v)
	<i>Boswellia sacra</i> Flück.	Seeds	10	1	Rare and threatened	VU B1b(i,iii,v)
	<i>Commiphora</i> cf. <i>kataf</i>	Cuttings	n.a.	poor		

Family	Species	Propagation method	First germination (days)	Success rates (%)	Status	Oman Plant Red Data Book assessment
	<i>Commiphora foliacea</i> Sprague	Seeds	16	13		
	<i>Commiphora gileadensis</i> (L.) C. Chr.	Seeds	6	5		
	<i>Commiphora gileadensis</i> (L.) C. Chr.	Whole plants	n.a.	100		
	<i>Commiphora kua</i> (R. Br. ex Royle) Vollensen	Whole plants	n.a.	100		
	<i>Commiphora kua</i> (R. Br. ex Royle) Vollensen	Cuttings	n.a.	very good		
	<i>Commiphora kua</i> (R. Br. ex Royle) Vollensen	Seeds	4	20		
	<i>Commiphora wightii</i> (Arm.) Bhandari	Cuttings	n.a.	poor		
	<i>Commiphora</i> sp.	Cuttings	n.a.	100		
<b>Capparaceae</b>						
	<i>Cadaba heterotricha</i> Stocks ex Hook.	Seeds	n.r.	very poor		
	<i>Capparis cartilaginea</i> Decne.	Seeds	n.r.	good		
	<i>Capparis spinosa</i> L.	Cuttings	n.a.	very poor		
	<i>Dhofaria macleishii</i> A.G. Mill.	Seeds	25	89	Near Endemic	VU B2b(i,iii)
	<i>Dipterygium glaucum</i> Decne.	Seeds	n.r.	very poor		
	<i>Maerua crassifolia</i> Forssk.	Seeds	5	7		
<b>Caryophyllaceae</b>						
	<i>Cometes abyssinica</i> (R. Br.) Wall.	Seeds	5	10		
	<i>Gymnocarpus decandrus</i> Forssk.	Whole plants	n.a.	very poor		
	<i>Gymnocarpus decandrus</i> Forssk.	Seeds	n.r.	very poor		



Family	Species	Propagation method	First germination (days)	Success rates (%)	Status	Oman Plant Red Data Book assessment
	<i>Herniaria maskatenensis</i> Borrm.	Whole plants	n.a.	very poor		
	<i>Polycarpaea jazirensis</i> R.A. Clement	Seeds	59	poor	Endemic	CR D1
	<i>Xerotia arabica</i> Oliver	Seeds	n.r.	very poor	Regional Endemic	VU B1b(ii,iii)
<b>Celastraceae</b>						
	<i>Maytenus dhofarensis</i> (Roxb. ex Willd.) Voight	Whole plants	n.a.	100	Endemic	LC
	<i>Maytenus</i> sp. nov.	Seeds	13	15		
<b>Chenopodiaceae</b>						
	<i>Anabasis setifera</i> Moq.	Whole plants	n.a.	very poor		
	<i>Cornulaca monacantha</i> Delile	Whole plants	n.a.	very poor		
	<i>Halothamnus bottea</i> Jaub. & Spach	Whole plants	n.a.	poor	Regional Endemic	LC
	<i>Suaeda aegyptiaca</i> (Hasselq.) Zohary	Whole plants	n.a.	poor		
	<i>Suaeda moschata</i> A.J. Scott	Seeds	n.r.	poor	Near Endemic	NT
	<i>Suaeda</i> cf. <i>vermiculata</i>	Whole plants	n.a.	100		
<b>Cistaceae</b>						
	<i>Helianthemum citrinum</i> S.A. Chazanfar	Seeds	44	26	Near Endemic	LC
	<i>Helianthemum lippii</i> (L.) Dum.-Cours.	Whole plants	n.a.	very poor		
<b>Cleomaceae</b>						
	<i>Cleome noeana</i> Boiss. subsp. <i>noeana</i>	Seeds	n.r.	good		

Family	Species	Propagation method	First germination (days)	Success rates (%)	Status	Oman Plant Red Data Book assessment
<b>Combretaceae</b>	<i>Anogeissus dhofarica</i> A.J. Scott	Cuttings	n.a.	poor	Near Endemic	VU A4abcd
	<i>Anogeissus dhofarica</i> A.J. Scott	Seeds	4	good	Near Endemic	VU A4abcd
<b>Commelinaceae</b>						
	<i>Commelina albescens</i> Hassk.	Whole plants	n.a.	100		
	<i>Commelina</i> sp.	Whole plants	n.a.	good		
<b>Convolvulaceae</b>						
	<i>Convolvulus hystrix</i> subsp. <i>dhofarica</i> R.R. Mill ined.	Seeds	n.r.	very poor		NT
	<i>Convolvulus pilosellifolius</i> Desr.	Seeds	n.r.	poor		
	<i>Convolvulus pilosellifolius</i> Desr.	Whole plants	n.a.	6		
	<i>Convolvulus virgatus</i> Boiss.	Seeds	n.r.	poor		
	<i>Convolvulus virgatus</i> Boiss.	Whole plants	n.a.	100		
	<i>Convolvulus austroaegyptiacus</i> Abdallah & Sa'ad	Seeds	n.r.	poor	Regional Endemic	LC
	<i>Convolvulus</i> sp.	Seeds	n.r.	very poor		
	<i>Convolvulus</i> sp.	Whole plants	n.a.	very poor		
	<i>Hildebrandtia africana</i> Vatke subsp. <i>arabica</i> Sebsebe	Seeds	6	3	Regional Endemic	LC
	<i>Merremia somalensis</i> (Vatke) Hall.f.	Seeds	n.r.	3		
	<i>Seddera latifolia</i> Hochst. & Steud.	Seeds	n.r.	poor		

Family	Species	Propagation method	First germination (days)	Success rates (%)	Status	Oman Plant Red Data Book assessment
	<i>Seddera latifolia</i> Hochst. & Steud.	Whole plants	n.a.	0		
	<i>Stictocardia punctata</i> (Baker) R.R. Mill. ined.	Seeds	7	0.5	Rare and threatened	CR D1
<b>Crassulaceae</b>						
	<i>Kalanchoe glaucescens</i> Britten	Whole plants	n.a.	100		
<b>Cucurbitaceae</b>						
	<i>Citrullus colocynthis</i> (L.) Schrad.	Seeds	n.r.	good		
	<i>Corallocarpus glomeruliflorus</i> (Deflers) Cogn.	Whole plants	n.a.	12	Rare and threatened	VU D1
<b>Cupressaceae</b>						
	<i>Juniperus excelsa</i> M. Bieb. subsp. <i>polycarpos</i> (K.Koch) Takhtajan	Seeds	22	1	Rare and threatened	VU A4ac; B1b(i,iii,iv)
	<i>Juniperus excelsa</i> M. Bieb. subsp. <i>polycarpos</i> (K.Koch) Takhtajan	Cuttings	n.a.	very poor	Rare and threatened	VU A4ac; B1b(i,iii,iv)
<b>Cyperaceae</b>						
	<i>Cyperus conglomeratus</i> Rothb.	Whole plants	n.a.	0–7		
	<i>Cyperus</i> sp.	Seeds	6	good		
	<i>Fimbristylis cymosa</i> R. Br. subsp. <i>spathacea</i> (Roth) Koyama	Whole plants	n.a.	100		
	<i>Schoenoplectus</i> sp.	Whole plants	n.a.	85		
	<i>Schoenus nigricans</i> L.	Whole plants	n.a.	100	Rare and threatened	VU A4abc

Family	Species	Propagation method	First germination (days)	Success rates (%)	Status	Oman Plant Red Data Book assessment
<b>Dracaenaceae</b>						
	<i>Dracaena serrulata</i> Baker	Whole plants	n.a.	92	Regional Endemic	EN 4abcd
<b>Ephedraceae</b>						
	<i>Ephedra foliata</i> Boiss. ex C.A. Mey.	Seeds	n.r.	good		
	<i>Ephedra pachyclada</i> Boiss. subsp. <i>pachyclada</i>	Whole plants	n.a.	55–100		
<b>Euphorbiaceae</b>						
	<i>Andrachne aspera</i> Spreng.	Whole plants	n.a.	0		
	<i>Andrachne telephioides</i> L.	Whole plants	n.a.	0		
	<i>Chrozophora oblongifolia</i> (Delile) A. Juss. ex Spreng.	Seeds	n.r.	poor		
	<i>Euphorbia balsamifera</i> Aiton subsp. <i>adenensis</i> (Deflers) Bally	Seeds	6	4		
	<i>Euphorbia balsamifera</i> Aiton subsp. <i>adenensis</i> (Deflers) Bally	Whole plants	n.a.	100		
	<i>Euphorbia cactus</i> Ehrenb. ex Boiss.	Whole plants	n.a.	100		
	<i>Euphorbia hadramautica</i> Baker	Whole plants	n.a.	100		
	<i>Euphorbia larica</i> Boiss.	Seeds	7	1		
	<i>Euphorbia larica</i> Boiss.	Whole plants	n.a.	73–100		
	<i>Euphorbia masirahensis</i> A.G. Ghazanfar	Whole plants	n.a.	very poor	Endemic	DD
	<i>Euphorbia orbiculifolia</i> S. Carter	Whole plants	n.a.	89–100	Near Endemic	VU D2
	<i>Euphorbia smithii</i> Deflers	Whole plants	n.a.	100	Near Endemic	NT

Family	Species	Propagation method	First germination (days)	Success rates (%)	Status	Oman Plant Red Data Book assessment
	<i>Euphorbia</i> aff. <i>schimperi</i> sensu Miller and Cope	Seeds	n.r.	poor	Endemic	LC
	<i>Euphorbia</i> aff. <i>schimperi</i> sensu Miller and Cope	Whole plants	n.a.	65	Endemic	LC
	<i>Euphorbia</i> aff. <i>uzmuk</i> sensu Miller and Cope	Seeds	6	55	Endemic	NT
	<i>Euphorbia</i> aff. <i>uzmuk</i> sensu Miller and Cope	Whole plants	n.a.	100	Endemic	NT
	<i>Flueggea virosa</i> (Roxb. ex Willd.) Voigt	Cuttings	n.a.	poor		
	<i>Flueggea virosa</i> (Roxb. ex Willd.) Voigt	Whole plants	n.a.	100		
	<i>Jatropha dhofarica</i> Radcl.-Sm.	Cuttings	n.a.	14–36	Near Endemic	LC
	<i>Jatropha dhofarica</i> Radcl.-Sm.	Seeds	15	3	Near Endemic	LC
	<i>Jatropha dhofarica</i> Radcl.-Sm.	Whole plants	n.a.	96–100	Near Endemic	LC
	<i>Ricinus communis</i> L. Muell.-Arg.	Seeds	n.r.	good		
<b>Gentianaceae</b>						
	<i>Exacum</i> aff. <i>affine</i> Balf.f. ex Regel	Seeds	n.r.	poor	Regional Endemic	EN B 1ab(ii,iii)+2ab(iii,iv)
<b>Hyacinthaceae</b>						
	<i>Dipcadi biflorum</i> S.A. Ghazanfar	Whole plants	n.a.	40	Regional Endemic	LC
	<i>Dipcadi erythraeum</i> Webb & Berthel	Bulbs	n.a.	very poor		
<b>Iridaceae</b>						
	<i>Gladiolus candidus</i> (Rendle) Goldblatt	Seeds	10	25		
	<i>Gladiolus candidus</i> (Rendle) Goldblatt	Bulbs	n.a.	12		



Family	Species	Propagation method	First germination (days)	Success rates (%)	Status	Oman Plant Red Data Book assessment
	<i>Gladiolus italicus</i> Mill.	Bulbs	31	96	Rare and threatened	NT
<b>Juncaceae</b>						
	<i>Juncus rigidus</i> Desf.	Seeds	n.r.	very good		
<b>Lamiaceae</b>						
	<i>Lavandula dhofarensis</i> A.G. Mill. subsp. <i>ayunensis</i> A.G. Mill.	Seeds	11	very poor	Endemic	LC
	<i>Lavandula dhofarensis</i> A.G. Mill. subsp. <i>dhofarensis</i> A.G. Mill.	Seeds	9	very good	Near Endemic	LC
	<i>Lavandula hasikensis</i> A.G. Mill.	Seeds	n.r.	poor		
	<i>Lavandula subnuda</i> Benth.	Seeds	n.r.	poor	Regional Endemic	LC
	<i>Leucas inflata</i> Benth.	Seeds	n.r.	medium		
	<i>Mentha longiflora</i> Opiz ex Steud.	Whole plants	n.a.	93		
	<i>Ocimum forskolei</i> Benth.	Seeds	n.r.	good		
	<i>Ocimum forskolei</i> Benth.	Whole plants	n.a.	poor		
	<i>Orthosiphon pallidus</i> Royle ex Benth.	Seeds	45	6		
	<i>Plectranthus barbatus</i> Andrews	Whole plants	n.a.	80-84		
	<i>Plectranthus cylindraceus</i> Hochst. ex Benth.	Whole plants	n.a.	100		
	<i>Salvia aegyptiaca</i> L.	Seeds	n.r.	medium		
	<i>Salvia aegyptiaca</i> L.	Whole plants	n.a.	0		

Family	Species	Propagation method	First germination (days)	Success rates (%)	Status	Oman Plant Red Data Book assessment
	<i>Salvia macilentia</i> Boiss.	Seeds	n.r.	poor		
	<i>Salvia</i> sp. aff. <i>hillcoatae</i>	Seeds	7	1		
	<i>Teucrium mascatense</i> Boiss.	Seeds	n.r.	very poor	Endemic	LC
	<i>Teucrium mascatense</i> Boiss.	Whole plants	n.a.	100	Endemic	LC
	<i>Teucrium stocksianum</i> Boiss subsp. <i>stenophyllum</i> R.A. King	Seeds	n.r.	good	Endemic	LC
	<i>Teucrium stocksianum</i> Boiss subsp. <i>stenophyllum</i> R.A. King	Whole plants	n.a.	poor		
<b>Leguminosae</b>						
	<i>Acacia asak</i> (Forssk.) Willd.	Seeds	n.r.	good		
	<i>Acacia ehrenbergiana</i> Hayne	Seeds	n.r.	good		
	<i>Acacia hamulosa</i> Benth.	Seeds	3	93		
	<i>Acacia senegal</i> (L.) Willd.	Seeds	19	81		
	<i>Acacia tortilis</i> (Forssk.) Hayne	Seeds	3	7		
	<i>Acacia gerrardii</i> Benth. subsp. <i>gerrardii</i>	Seeds	n.r.	good		
	<i>Acacia gerrardii</i> Benth. subsp. <i>negevensis</i> Zohary	Seeds	n.r.	good		
	<i>Argyrobium crotalaroides</i> Jaub. & Spach	Whole plants	n.a.	0		
	<i>Cordia purpurea</i> (Picc.) Aiton	Seeds	5	89		
	<i>Ceratonia oreoethauma</i> subsp. <i>oreoethauma</i> Hillc., G.P. Lewis & Verdc.	Seeds	n.r.	very good	Regional Endemic	VU D2

Family	Species	Propagation method	First germination (days)	Success rates (%)	Status	Oman Plant Red Data Book assessment
	<i>Crotalaria aegyptiaca</i> Benth.	Seeds	n.r.	good		
	<i>Crotalaria aegyptiaca</i> Benth.	Whole plants	n.a.	10		
	<i>Crotalaria leptocarpa</i> Balf.f.	Seeds	n.r.	good		
	<i>Crotalaria persica</i> (Burm.f.) Merr.	Seeds	5	10		
	<i>Crotalaria saltiana</i> T. Anders	Seeds	4	96		
	<i>Dalbergia sissoo</i> Roxb.	Cuttings	n.a.	80		
	<i>Dalbergia sissoo</i> Roxb.	Whole plants	n.a.	90		
	<i>Delonix elata</i> (L.) Gamble	Seeds	3	60		
	<i>Indigofera articulata</i> Gouan	Seeds	n.r.	n.r.		
	<i>Prosopis cineraria</i> (L.) Druce	Seeds	3	65		
	<i>Pseudolotus makranicum</i> (Rech.f. & Esfand.) Rech.f.	Seeds	n.r.	very poor		
	<i>Taverniera brevipetiolata</i> Thulin	Seeds	n.r.	medium	Endemic	EN B2ab(ii,iii)
	<i>Taverniera cuneifolia</i> (Roth) Arn.	Seeds	n.r.	very good		
	<i>Taverniera cuneifolia</i> (Roth) Arn.	Whole plants	n.a.	100		
	<i>Taverniera lappacea</i> (Forssk.) DC.	Seeds	n.r.	poor		
	<i>Tephrosia apollinea</i> (Delile) Link	Seeds	n.r.	very good		
	<i>Tephrosia apollinea</i> (Delile) Link	Whole plants	n.a.	20–50		
	<i>Tephrosia nubica</i> (Boiss.) Baker	Seeds	4	very good		
	<i>Tephrosia quartiniiana</i> Cufod. ex Greuter & Burdet	Whole plants	n.a.	very poor		

Family	Species	Propagation method	First germination (days)	Success rates (%)	Status	Oman Plant Red Data Book assessment
<b>Lythraceae</b>						
	<i>Woodfordia uniflora</i> (A. Rich.) Koehne	Whole plants	n.a.	100		
<b>Malpighiaceae</b>						
	<i>Acridocarpus orientalis</i> A. Juss.	Seeds	21	4		
<b>Malvaceae</b>						
	<i>Abutilon pannosum</i> (G. Forst.) Schltr.	Whole plants	n.a.	poor		
	<i>Gossypium stocksii</i> Masters	Seeds	n.r.	good		
	<i>Hibiscus micranthus</i> L.	Seeds	n.r.	very good		
	<i>Hibiscus micranthus</i> L.	Whole plants	n.a.	8		
	<i>Hibiscus sidiiformis</i> Baill. in Bull.	Seeds	6	2		
	<i>Pavonia arabica</i> Hochst. & Steud. ex Boiss.	Seeds	n.r.	medium		
	<i>Senra incana</i> Cav.	Seeds	3	10		
<b>Menispermaceae</b>						
	<i>Cocculus balfourii</i> Schweinf. ex Balf.f.	Seeds	n.r.	poor	Regional Endemic	NT
	<i>Cocculus pendulus</i> (J. Forst.) Diels	Cuttings	n.a.	poor		
<b>Moraceae</b>						
	<i>Dorstenia foetida</i> (Forssk.) Schweinf.	Whole plants	n.a.	84–100		
	<i>Ficus cordata</i> Ridl. subsp. <i>salicifolia</i> (Vahl) C.C. Berg	Cuttings	n.a.	58		

Family	Species	Propagation method	First germination (days)	Success rates (%)	Status	Oman Plant Red Data Book assessment
	<i>Ficus cordata</i> Ridl. subsp. <i>salicifolia</i> (Vahl) C.C. Berg	Seeds	9	very good		
	<i>Ficus sycamorus</i> L.	Seeds	17	very good		
	<i>Ficus vasta</i> Forssk.	Cuttings	n.a.	22		
	<i>Ficus vasta</i> Forssk.	Whole plants	n.a.	100		
	<i>Ficus johannis</i> Boiss.	Cuttings	n.a.	good		
<b>Moringaceae</b>						
	<i>Moringa peregrina</i> (Forssk.) Fiori	Seeds	n.r.	poor		
<b>Nyctaginaceae</b>						
	<i>Boerhavia elegans</i> Choisy subsp. <i>stenophylla</i> (Boiss.) A.G. Mill.	Seeds	n.r.	very good		
	<i>Boerhavia elegans</i> Choisy subsp. <i>stenophylla</i> (Boiss.) A.G. Mill.	Whole plants	n.a.	0		
	<i>Commicarpus helenae</i> (Roemer & J.A. Schultes) Meikle	Seeds	18	50		
	<i>Commicarpus mistus</i> Thulin	Seeds	n.r.	good		
	<i>Commicarpus mistus</i> Thulin	Whole plants	n.a.	75		
<b>Oleaceae</b>						
	<i>Olea europaea</i> L. subsp. <i>cuspidata</i> (Wall. ex G. Don) Ciffleri	Cuttings	n.a.	18		
	<i>Olea europaea</i> L. subsp. <i>cuspidata</i> (Wall. ex G. Don) Ciffleri	Seeds	66	11		

Family	Species	Propagation method	First germination (days)	Success rates (%)	Status	Oman Plant Red Data Book assessment	
<b>Orchidaceae</b>	<i>Epipactis veratrifolia</i> Boiss. & Hohen. ex Boiss.	Seeds	0	0	Rare and threatened	VU A4abc	
	<i>Eulophia petersii</i> (Rechb.f.) Rechb.f.	Bulbs	n.a.	100	Rare and threatened	NT	
	<i>Eulophia guineensis</i> Lindl.	Whole plants			Rare and threatened	NT	
	<i>Habenaria malacophylla</i> Rechb.f.	Bulbs	n.a.	n.r.	Rare and threatened	NT	
	<i>Nervilia crociformis</i> (Zoll. & Mor.) Seidentf.	Bulbs	n.a.	100	Rare and threatened	VU A4abc	
	<i>Nervilia bicarinata</i> (Blume) Schltr.	Bulbs	n.a.	100	Rare and threatened	NT	
	<b>Plumbaginaceae</b>	<i>Dyerophytum indicum</i> (Gibs. ex Wight) Kuntze	Seeds	7	4		
		<i>Dyerophytum indicum</i> (Gibs. ex Wight) Kuntze	Whole plants	n.a.	poor		
<i>Limonium axillare</i> (Forssk.) Kuntze		Seeds	n.r.	medium			
<i>Limonium milleri</i> S.A. Ghazanfar & J.R. Edmondson		Whole plants	n.r.	poor	Endemic	LC	
<i>Limonium sarcophyllum</i> S.A. Ghazanfar & J.R. Edmondson		Whole plants	n.a.	0	Endemic	VU A4abc	
<i>Limonium sarcophyllum</i> S.A. Ghazanfar & J.R. Edmondson		Seeds	n.r.	very good	Endemic	VU A4abc	
<i>Limonium</i> sp.		Seeds	n.r.	very poor			
<i>Plumbago zeylanica</i> L.		Cuttings	n.a.	poor			

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<b>Poaceae</b>						
	<i>Aristida abnormis</i> Chiov.	Seeds	n.r.	good		
	<i>Cenchrus ciliaris</i> L.	Seeds	n.r.	good		
	<i>Chrysopogon aucheri</i> (Boiss.) Stapf	Whole plants	n.a.	18		
	<i>Chrysopogon plumulosus</i> Hochst.	Seeds	n.r.	very poor		
	<i>Cymbopogon commutatus</i> (Steud.) Stapf	Seeds	n.r.	good		
	<i>Cymbopogon commutatus</i> (Steud.) Stapf	Whole plants	n.a.	31		
	<i>Cymbopogon pospischilii</i> (K. Schum.) C.E. Hubb.	Whole plants	n.a.	11		
	<i>Cymbopogon schoenanthus</i> (L.) Spreng.	Seeds	n.r.	good		
	<i>Cymbopogon schoenanthus</i> (L.) Spreng.	Whole plants	n.a.	poor		
	<i>Dichanthium foveolatum</i> (Delile) Roberty	Whole plants	n.a.	0–8		
	<i>Digitaria nodosa</i> Parl.	Seeds	n.r.	good		
	<i>Enneapogon persicus</i> Boiss.	Seeds	n.r.	poor		
	<i>Hyparrhenia hirta</i> (L.) Stapf	Whole plants	n.a.	poor		
	Indet.	Whole plants	n.r.	good		
	<i>Lasiurus scindicus</i> Henrard	Seeds	n.r.	good		
	<i>Panicum turgidum</i> Forssk.	Whole plants	n.a.	poor		
	<i>Pennisetum setaceum</i> (Forssk.) Chiov.	Seeds	n.r.	poor		
	<i>Pennisetum</i> sp.	Seeds	n.r.	medium		
	<i>Saccharum griffithii</i> Munro ex Boiss.	Whole plants	n.a.	74		

Family	Species	Propagation method	First germination (days)	Success rates (%)	Status	Oman Plant Red Data Book assessment
	<i>Saccharum griffithii</i> Munro ex Boiss.	Seeds	5	good		
	<i>Saccharum ravennae</i> (L.) Murray	Seeds	6	very good		
	<i>Sporobolus</i> sp.	Seeds	4	good		
	<i>Stipagrostis ciliata</i> (Desf.) De Winter	Seeds	3	poor		
	<i>Stipagrostis ciliata</i> (Desf.) De Winter	Whole plants	n.a.	100		
	<i>Tricholaena teneriffae</i> (L.f.) Link	Seeds	n.r.	very good		
<b>Polygalaceae</b>						
	<i>Polygala dispar</i> S.A. Ghazanfar	Whole plants	n.a.	0	Endemic	DD
	<i>Polygala irregularis</i> Boiss.	Whole plants	n.a.	0		
	<i>Polygala mascatense</i> Boiss.	Seeds	n.r.	poor	Endemic	LC
	<i>Polygala mascatense</i> Boiss.	Whole plants	n.a.	23	Endemic	LC
	<i>Polygala tinctoria</i> Vahl	Seeds	12	9	Regional Endemic	LC
<b>Polygonaceae</b>						
	<i>Calligonum comosum</i> L'Hér.	Cuttings	n.a.	very poor		
	<i>Calligonum comosum</i> L'Hér.	Seeds	4	8		
	<i>Pteropyrum scoparium</i> Jaub. & Spach	Cuttings	n.a.	0	Regional Endemic	LC
	<i>Pteropyrum scoparium</i> Jaub. & Spach	Seeds	4	40	Regional Endemic	LC



Family	Species	Propagation method	First germination (days)	Success rates (%)	Status	Oman Plant Red Data Book assessment
<b>Portulacaceae</b>						
	<i>Portulaca dhofarica</i> M.G. Gilbert	Whole plants	n.a.	66	Near Endemic	LC
<b>Primulaceae</b>						
	<i>Dionysia mira</i> Wendelbo	Seeds	2	98	Endemic	EN B 1ab(ii,iii)+2ab(iii)
<b>Pteridaceae</b>						
	<i>Pteris vittata</i> L.	Whole plants	n.a.	67		
<b>Resedaceae</b>						
	<i>Ochradenus arabicus</i> Chaudhary, Hille. & A.G. Mill.	Seeds	n.r.	poor	Regional Endemic	LC
	<i>Ochradenus aucheri</i> Boiss. subsp. <i>aucheri</i> A.G. Mill.	Seeds	n.r.	poor	Regional Endemic	LC
	<i>Ochradenus aucheri</i> Boiss. subsp. <i>aucheri</i> A.G. Mill.	Whole plants	n.a.	poor	Regional Endemic	LC
	<i>Ochradenus harsusiticus</i> A.G. Mill.	Seeds	41	poor	Endemic	EN B 1b(ii,iii)
	<i>Ochradenus</i> sp. nov.	Seeds	9-20	1-4	? Endemic	
	<i>Reseda sphenocleoides</i> Deflers	Seeds	n.r.	5	Regional Endemic	LC
<b>Rhamnaceae</b>						
	<i>Sageratia thea</i> (Osbeck) M.C. Johnston.	Seeds	n.r.	very poor		
	<i>Ziziphus hajarensis</i> D.D. Duling, S.A. Ghazanfar & H.D. Prendergast	Seeds	n.r.	good	Endemic	NT
	<i>Ziziphus leucodermis</i> (Baker) O. Schwartz	Seeds	n.r.	good	Regional Endemic	LC

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	<i>Ziziphus spina-christi</i> (L.) Desf.	Seeds	9	88		
<b>Rubiaceae</b>						
	<i>Gaillonia aucheri</i> (Guill.) Jaub. & Spach	Cuttings	n.a.	0		
	<i>Gaillonia aucheri</i> (Guill.) Jaub. & Spach	Seeds	n.r.	poor		
	<i>Gaillonia aucheri</i> (Guill.) Jaub. & Spach	Whole plants	n.a.	0		
	<i>Kohautia retrorsa</i> (Boiss.) Bremek.	Whole plants	n.a.	0		
	<i>Pseudogaillonia hymenostephana</i> (Jaub. & Spach) Lincz.	Seeds	n.r.	poor		
	<i>Pseudogaillonia hymenostephana</i> (Jaub. & Spach) Lincz.	Whole plants	n.a.	0		
	<i>Coptosperma graveolens</i> (S. Moore) Degreef subsp. <i>arabicum</i> (Cufod.) Degreef	Seeds	33	3	Rare and threatened	NT
<b>Rutaceae</b>						
	<i>Haplophyllum tuberculatum</i> (Forssk.) A. Juss.	Seeds	n.r.	poor		
	<i>Haplophyllum tuberculatum</i> (Forssk.) A. Juss.	Whole plants	n.a.	0		
<b>Salvadoraceae</b>						
	<i>Azima tetracantha</i> Lam.	Seeds	12	55		
<b>Sapindaceae</b>						
	<i>Allophylus rubifolius</i> (Hochst. ex A. Rich.) Engl.	Whole plants	n.a.	100		
	<i>Dodonaea viscosa</i> (L.) Jacq.	Cuttings	n.a.	53		

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	<i>Dodonaea viscosa</i> (L.) Jacq.	Seeds	n.r.	good		
	<i>Dodonaea viscosa</i> (L.) Jacq.	Whole plants	n.a.	44–100		
<b>Sapotaceae</b>						
	<i>Sideroxylon mascatense</i> (A. DC.) Penn.	Seeds	12	54		
<b>Scrophulariaceae</b>						
	<i>Campylanthus antonii</i> Thulin	Seeds	6	25	Near Endemic	VU B2ab(ii,iii)
	<i>Campylanthus chascaniflorus</i> A.G. Mill.	Seeds	n.r.	poor	Endemic	VU B2b(ii,iii)
	<i>Campylanthus pungens</i> O. Schwartz	Seeds	0	0	Regional Endemic	NT
	<i>Campylanthus sedoides</i> A.G. Mill.	Seeds	6	good	Endemic	EN B1ab(i,i,iii)+2ab(iii)
	<i>Lindenbergia indica</i> (L.) Vatke	Seeds	33	poor		
	<i>Schweinfurthia imbricata</i> A.G. Mill., M. Short & D.A. Sutton	Seeds	n.r.	0	Near Endemic	NT
	<i>Schweinfurthia papilionacea</i> (L.) Boiss.	Seeds	n.r.	good		
	<i>Striga gesnerioides</i> (Willd.) Vatke ex Engl.	Seeds	0	0		
	<i>Verbascum omanense</i> Hub.-Mor.	Seeds	n.r.	good	Endemic	DD
<b>Solanaceae</b>						
	<i>Hyoscyamus insanus</i> Stocks	Seeds	n.r.	good		
	<i>Lycium shawii</i> Roem. & Schult.	Seeds	n.r.	medium		
	<i>Solanum incanum</i> L.	Seeds	n.r.	good		

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	<i>Withania somnifera</i> (L.) Dun.	Seeds	n.r.	very good		
	<i>Withania qaraica</i> A.G. Mill. & J. Biagi	Seeds	6	very good	Near Endemic	LC
<b>Sterculiaceae</b>						
	<i>Hermannia paniculata</i> Franch.	Seeds	4	85		
	<i>Hermannia testacea</i> Vollesen	Seeds	n.a.	medium		
	<i>Melhania muricata</i> Balf.f.	Seeds	6	38		
	<i>Melhania muricata</i> Balf.f.	Whole plants	n.a.	50		
	<i>Melhania ovata</i> (Cav.) Spreng. subsp. <i>abyssinica</i> (A. Rich.) Schum.	Seeds	17	19		
	<i>Melhania philippinae</i> Bak.f.	Seeds	n.r.	good		
<b>Tamaricaceae</b>						
	<i>Tamarix aphylla</i> (L.) G. Karsten	Cuttings	n.a.	very good		
<b>Thymelaeaceae</b>						
	<i>Daphne mucronata</i> Royle	Cuttings	n.a.	0		
<b>Tiliaceae</b>						
	<i>Corchorus depressus</i> (L.) Stocks	Seeds	n.r.	good		
	<i>Grewia erythraea</i> Schweinf.	Whole plants	n.a.	0		
	<i>Grewia erythraea</i> Schweinf.	Cuttings	n.a.	poor		
	<i>Grewia erythraea</i> Schweinf.	Seeds	9	21		
	<i>Grewia villosa</i> Willd.	Seeds	n.r.	good		

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	<i>Grewia tenax</i> (Forssk.) Fiori	Seeds	17	3		
<b>Verbenaceae</b>						
	<i>Phyla nodiflora</i> (L.) Greene	Whole plants	n.a.	9		
	<i>Prenna resinosa</i> (Hochst.) Schauer	Seeds	n.f.	very poor		
	<i>Verbena</i> cf. <i>viburnoides</i>	Seeds	7	0.1		
	<i>Vitex agnus-castus</i> L.	Seeds	4	95		
<b>Vitaceae</b>						
	<i>Cissus quadrangularis</i> L.	Whole plants	n.a.	95		
<b>Zygophyllaceae</b>						
	<i>Fagonia indica</i> Burm.f.	Whole plants	n.a.	4		
	<i>Fagonia paulayana</i> Wagner & Vierth.	Whole plants	n.a.	4		
	<i>Tetraena qatarense</i> (Hadidi) Beier & Thulin	Whole plants	n.a.	47	Regional Endemic	LC

