

## Chapter 6

# Plant families

**I**N THE FOLLOWING SECTIONS, I DISCUSS EACH PLANT family, providing you with detailed notes on suitable propagation methods. These notes are based on literature searches and knowledge gained through experience. It includes accounts of my own and other people's experience in the field.

The possibility always exists that species are grown successfully, but that nobody knows about them. It is very important to document these successes, as well as the failures. This will help others who are looking for the best way to propagate these plants.

## ACANTHACEAE

### Acanthus family

I have had some fun recently growing a whole range of plants that belong to the family Acanthaceae. It started with propagation from cuttings of *Metarungia longistrobus* and seed of *Justicia*, *Peristrophe*, *Duvernoia*, *Dicliptera*, and *Hypoestes*, followed by cuttings of *Barleria*, and finally a new species of *Metarungia* for South Africa—*Metarungia pubinervia*—discovered in the Krantzklouf Nature Reserve.

This family of plants supports a whole host of fauna, implying that the more species you have in a garden, the better for the local wildlife, particularly butterflies.

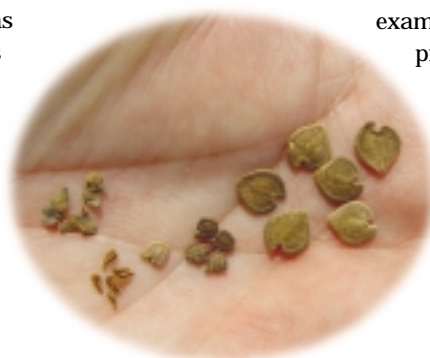
The seed of all members of Acanthaceae has a capsule that splits open longitudinally to scatter two or four seeds into the environment. The textures of the individual seeds of each genus and even between species vary. The seeds are usually flattened and roundish in shape.

#### ■ Collecting

To start the process, find a plant that has finished flowering. Look for the capsules amongst the bracts. Be careful, as these often have a sharp spine or two, especially the capsules of *Hygrophila*. The capsules should have started to change from green to a tawny straw colour. Place these capsules in a paper packet (to allow air exchange and prevent rotting) on a warm windowsill and wait for the artillery barrage to begin. Always close the packet to prevent seeds from scattering all over the place.

#### ■ Sowing

Once the seeds have been shed from the capsules, use a tray and sow the seed onto the seedling mixture. The seedling mixture should be free-draining to ensure that



▲ Seed of *Asystasia gangetica* (centre) and *Ecbolium* sp. (far right).



the young roots do not become waterlogged. Most species germinate where there is plenty of light. If a species is shade-loving, move the tray into the shade once the seeds start to germinate. Always ensure that you are able to keep the soil temperature up to encourage growth. In southern Africa, enough light is not a problem for germination or growth.

Pioneer species, such as *Justicia*, do better if seed is sown *in situ*. The young plants develop faster. *Isoglossa woodii*, *Dyschoriste depressa*, *Justicia flava*, *J. capensis*, *J. betonica*, and even *Rhinacanthus gracilis* are

examples of plants that are successfully propagated from seed. *Hygrophila auriculata*, which lives in boggy habitats along river and stream edges, is also best grown from seed scattered in its own habitat. I often prick out plants germinated *in situ* to start new populations in other wetland areas.

Once the first proper leaves are produced, prick the young seedlings out into their own packets or into the ground where they will be growing.

#### ■ Cuttings

Most members of Acanthaceae grow very easily from cuttings. Growth occurs from tip cuttings taken when the plants are growing actively. Rooting takes place within ten to fourteen days if the bed is bottom-heated and there is mist to keep the shoots cool.



▲ *Metarungia pubinervia* seed capsule.  
 ◀ *Metarungia pubinervia* flower.

### ■ Climbers

Climbers, such as *Thunbergia alata* and *T. dregeana* will root, but only in the active growing season from mature stems that have some energy stored to generate roots. My feeling about these species is that they are pioneers and prefer low soil nutrient levels. They struggle if you try to grow them in pots with good soil. They only need a soil rich in organic matter.

## AIZOACEAE. SEE MESEMBRYANTHEMACEAE

## ALANGIACEAE

Although the number of *Alangium chinense* in the wild is low, it is pan-tropical and grown elsewhere in the world. According to the Royal Horticultural Society encyclopaedia, propagation is best undertaken from seed. *Alangium chinense* can also be grown from soft-tip cuttings, taken in early summer. Grow in a mistbed or cold frame with bottom heat (Brickell, 1989).

*Barleria repens*, *B. obtusa*, *B. obtusa* x *repens*, *Dicliptera heterostegia*, *Dyschoriste rogersii*, *D. depressa*, *Isoglossa woodii*, *Justicia betonica*, *J. protracta*, *Phaulopsis imbricata*, and *Asystasia gangetica* root readily and grow in virtually any soil, and under any conditions regarding moisture or water content.

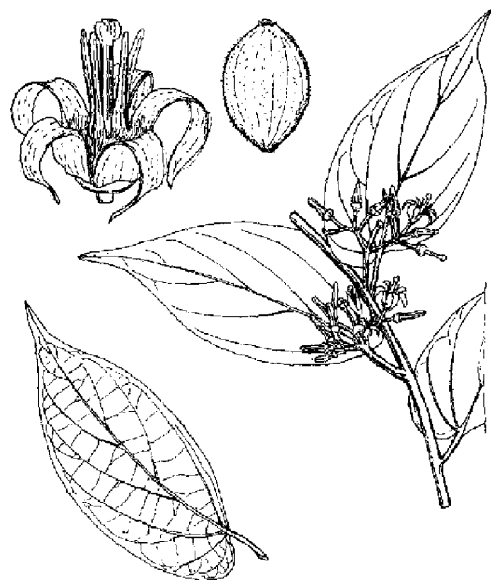
More mature stems should be taken from *Blepharis natalensis*, *Barleria crossandriformis*, *B. prionitis*, and *B. repens*, and in some instances *B. saxatilis*, to ensure that new roots are formed. This might be a response to the plants growing in drier habitats and soft-tip cuttings tend to rot off before rooting.

### ■ Pests

This family is prone to Australian and Mealy Bug. I find that if the plants are in good condition and not stressed, the insects don't cause too much trouble. Should it be necessary to use insecticides, use only the chemicals registered for these pests.

### ■ Woody taxa

The woody taxa, such as *Ruttya ovata*, *Ruspolia*, *Sclerochiton apiculatus*, *Mackaya bella*, *Duvernoia aconitiflora* and *D. adhatodooides*, X *Ruttyruspolia*, *Anisotes formosissimus*, and *Metarungia longistrobis*, *M. galpinii*, and *M. pubinervia* will have no problem growing from stem cuttings, but will take around a month to six weeks to root. All these genera grow easily from seed if you can get it.



(Illustration from Beentje, 1994.)

## AMARANTHACEAE

### Pigweed family

The dry country species of Amaranthaceae that occur in Namibia are ideally suited to setting seed quickly and then disappearing until the rain reappears in the new season. Seeds are usually fine and hard. The seed of the dry species may need to go through a dry, cool period before it will germinate. The subtropical species that I am familiar with germinate within days of sowing.

Sandpaper the shiny black *Pupallia*, *Cyathula*, or *Celosia* seeds, soak them for a day, and only then sow them in trays in a warm, sunny place. Heated beds are useful. Alternatively, use a plastic tunnel or even a cold frame that will raise the temperature to be higher than outside and maintain it there for a longer period at night.

Propagation from soft-tip cuttings works well in bottom-heated or ordinary mistbeds. Rooting takes place within 10–14 days.

## AMARYLLIDACEAE

### Daffodil family

Graham Duncan and I both regard cutting up a bulb into pieces to increase bulb numbers a risky operation, but it has been proven successful in the case of certain Amaryllidaceae genera, such as *Nerine*, for which the 'twin scaling' method can be used. The bulb is cut into four or six equal parts, so that each part consists of two bulb scales attached to a portion of the basal plate. The twin scales are treated with a fungicide, such as Captab, and stored at about 20°C in moist vermiculite in a polythene bag for a period of twelve weeks. New bulblets form between the two bulb scales and are grown in seed trays for one year until they are large enough to plant into pots. Chopping up a bulb causes trauma to the plant that in turn allows pathogens to enter the damaged tissue. The hygiene of the propagation unit has to be strictly maintained or else unnecessary complications may occur.

See more details in Chapter 3 under the Bulb and Corm section.

## ANACARDIACEAE

### Mango family

The Marula (*Sclerocarya birrea* var. *africana*) grows from truncheons, which enables us to select better-fruited varieties. It grows well from seed, provided the seed is cleaned and sown quickly. More than one seedling can be produced per seed, because it is a multi-carpelled seed. Seed germinate all year round. By preventing all the seed from germinating at the same time, the successful passing on of genes is ensured.

Ease of cultivation varies greatly amongst the rest of the family. *Ozoroa* has proven the most difficult to grow, followed by *Loxostylis alata* and *Protorhus*. Growing *Rhus*, on the other hand, has not been too difficult, provided the seed is clean and sown fresh.



Masting also seems to be the order of the day for this family—this is the phenomenon where a whole bunch of trees in an area fruit at the same time, and then do not fruit again for a few years. This pattern is a good reason for collecting more seeds than necessary, as it ensures that there are plants to draw from during the lean years.

### WARNING

*Smodingium*, a tree with corrosive sap, causes an allergic reaction, including blisters, on exposed skin.

*Lannea* seed grows easily, but stiff competition from birds and animals coming to feast can complicate the process. Some species have a suffrutex or underground stem that should be planted out in the ground as soon as possible to develop without the constriction caused by a container.

Experiment on some of the other genera to see if cuttings might not work as a method of propagation.

### ■ Sowing

Clean off the outer flesh and sow the seeds immediately. The seed is recalcitrant and loses viability in a matter of days. Seed generally germinates in about 10 days, but this could take up to 60 days, depending on the heat, water, and light. If seed ripens near the end of the growing season, ensure that the young plants are kept warm during the first winter, particularly if you live in a frost zone. Prevent too much moistness, as this will certainly cause the roots to rot.

## ANNONACEAE

### Custard apple family

Members of this family are best propagated from seed. The hard outer cover of the fruit should be removed to expose the seeds within. *Annona reticulata*, and I imagine *Hexalobus* and *Friesodielsia* too, are survival fruit (fruit of wild species that humans resort to when normal domestic crops have failed, because of drought or pests). Often herd boys learn about veld or survival foods when herding livestock during school holidays.

- ▶ opposite *Annona senegalensis* fruit being eaten by children.
- ▼ inset *Sclerocarya birrea* seed germinating; below *Loxostylis alata* fruit.







▲ top *Monodora junodii* fruit; bottom *Monodora junodii* seed germinating.  
 ▼ *Monanthotaxis caffra* seeds germinating.



I have seen *Friesodielsia* in the wild up in north-eastern Namibia. The seeds germinate well; all take about a month to germinate. The seed of the harder woody fruits of *Monodora* is large and brown and germinates quite readily.

When *Monanthotaxis* and *Uvaria* seed germinate, the testa is left behind, covering the cotyledons. A pair of tweezers can be used to remove the testa.

These plants prefer to be in open ground and take a while to establish. In general, they grow slower than most other shrubby plants.

## APIACEAE

### Carrot or parsley family

The carrot family is best propagated from seed.

The forbs, such as *Alepidea*, *Pimpinella*, and *Peucedanum*, can be grown from suckers that appear at the base of the plant. When removing these suckers in the new season, ensure that some root is taken with the new plant. Propagation from seed is, however, by far the quickest and most efficient way to cultivate this family. The plants like slightly heavier soil, but take care that it doesn't become waterlogged

*Heteromorpha arborescens* and *Steganotaenia araliacea* are two tree-forming species that grow from truncheons taken in the spring, about two weeks before the new leaves appear.

Seed of *Alepidea* stains one's hands orange and has a strong, clean, antiseptic smell. Clean the seed and sow it within a couple of days of harvesting for the best germination results. Seed germinates within approximately 14 days (Crouch *et al.*, 1999).

Another plant that I would like to see in cultivation more often is *Berula erecta*. This streamside plant likes its feet wet and head in the sun. It is used medicinally in KwaZulu-Natal.



◀ *Alepidea amatymbica* in cultivation.

▼ *Adenium swazicum* plant in cultivation at the Skukuza Nursery in the Kruger National Park. Note the many seed follicles on the plant. Because the plant is growing in captivity in its natural habitat, the insect pollinators are able to get to the flowers. This means a ready source of seed near your nursery, easily harvested and grown on. (Photo: Llewellyn Foxcroft.)



## APOCYNACEAE

### Periwinkle family

This family now includes the Asclepiadaceae and the Periplocaceae. Plants are easily grown from seed and cuttings.

#### ■ Sowing

Clean the seeds to remove the silky-haired parachutes and then sow them on a well drained, light, sandy soil mixed with compost. A 1:1 mix of soil and compost is best.

Keep plants well ventilated in good light. Dry the plants out in the dormant season.

#### ■ Cuttings

In my experience, cuttings of *Adenium* grow well if allowed to dry out for a week or so before being placed in the rooting medium.

Take cuttings in the period just before the growing season starts until about two months before it ends. Treat the fresh wound or cut with a fungicide or flowers of sulphur. Use sterile tools when taking cuttings—a concentration of 1% of sodium hypochlorite acts as steriliser. Another good sterilant to use is Bac 20. Soak the tools for about 20–30 minutes. Note that stainless steel is pitted and stained in the process.

If grown in the open ground, local insects control pests and the infestations only affect weak, sick plants. It is important to remove these plants to prevent spreading of disease.

The Skukuza Nursery at the Kruger National Park in South Africa grows *Adenium multiflorum* and *A. swazicum*, as well as *Pachypodium saundersii* under trees in semi-shade with abundant leaf litter mulch between the plants. These plants produce thousands of seeds annually.

At the Etosha Game Reserve in Namibia, the large plants of *Adenium boehmianum* produce many seeds that could be germinated annually. Reserve staff could collect the seed annually and send it to the Windhoek Gardens. The *A. boehmianum* plants that I have been cultivating since 1980 flower but do not set seed, because of the absence of pollinators.



▲ *Pachypodium saundersii* seed—Kruger Park. (Photo: Llewellyn Foxcroft.)



◀ *Raphionacme hirsuta* follicles, almost ripe. The colour changes to a darker shade when ripe.  
 ▼ *Adenium obesum* seed showing parachute hairs at both ends of the seed.



### ■ Pollination

So far, I have failed to find any published reference to actual field observations of insects or other visitors to *Adenium* or *Pachypodium* flowers, and their pollination mechanism was not established until 1980. In 1934, H.P. de la Bathie considered all species of *Pachypodium* to be self-pollinating (autogamous), because of the pollen that is released directly above the style. He did, however, express surprise at the existence of natural hybrids that would not be possible if self-pollination represented the full story. Plants of either genus do not set seed of their own accord. One is very fortunate if seed pods are ever set on any cultivated plants, even after attempts at hand-pollination. All Apocynaceae that have been tested so far show a strong degree of self-incompatibility, so that two separate specimens are needed to ensure fertilisation. As is the case with most flowering plants, self-incompatibility is not absolute, and there are cases, though rare, of an isolated specimen ripening seed pods.



◀ *Mondia whitei* follicle shedding seed. Seed of this family often have the flattened look of rolled oats or wheat. Look for this pattern and you'll know the family of seed floating past on its silken parachute. Seed in South Africa is ripe in late August just as the summer rains begin.

Although it would seem inevitable that gravity would cause the pollen to drop onto the style head of the same flower, this hardly ever happens. The pollen grains are tacky and hang together in a loose mass, while the enclosure is so rigid that it is difficult to be shaken down. All of this proves that De la Bathie's interpretation does not hold water.

The architecture of the flower turns out to be wonderfully coordinated with the structure and behaviour of the pollinator, resulting in efficient cross-pollination (Rowley, 1983). The narrow gaps between adjacent stamens limit access to the nectar, which is secreted at the bottom of the tube around the carpels. The proboscis of the insect feels its way down, touching the wall until it encounters the nectar, which may be secreted from visible glands or merely from the tissue that surrounds the two carpels. The proboscis is then withdrawn promptly and in a more central position, away from the wall. It is at this stage, occupying but a split second in time, that the vital cross-pollination takes place. First, the proboscis is guided between the two adjacent lobes of the anthers, which act as scrapers, drawing off any pollen brought in from outside against the sticky head of the style. The pollen subsequently germinates, pushes out a pollen tube down the style, and effects fertilisation with the ovules in the carpels.

This is only half the story. As the proboscis continues to retract, it becomes freshly gummed against the style and now picks up new pollen from the mass suspended above. On visiting the next flower, the process of delivery and recharging will be repeated many times during one flight.

When the flower tube is slit open, one can see the

strands of grey gum, which are drawn off the style and pick up fresh pollen above. It is easy to simulate the operation in slow motion with the help of a needle or bristle. With a little care, one soon finds the correct angle of insertion. Remember that the object of the exercise is to produce seed, which means that two plants produced from different sources are needed.

Nobody knows yet what pollinates *Adenium* in nature. Oleander has its own hawk moth, *Deilephila nerii*, which arrives at dusk and hovers in front of the blooms, inserting its very long proboscis. The wider tube of the *Adenium* flower suggests a large bee, whose proboscis should be about 18 mm long to reach the nectar. Church (1908) noted with regards to allied genera that any insect with too short a proboscis soon gives up the struggle, since it becomes clogged with glue from the stigma—an effective device to deter all but the right agency for pollen transfer.

I hope that by drawing attention to the truly remarkable partnership between flower and pollinator, more attention will be paid in the field to the observation of visitors to the flowers, so that this fascinating chapter in the life history of *Adenium* and *Pachypodium* can be completed.

#### ■ Fruits and seeds

Following fertilisation, the flower parts of Apocynaceae wither and fall, leaving the two carpels to enlarge greatly. Two horn-like follicles form. They measure 8–18 cm lengthwise and have a diameter of 8–12 mm. When ripe, these split vertically, like the pods of *Asclepias* and Willow

Herb, releasing a great number of approximately cylindrical seeds that are 7–16 mm long, with a circle of fine, brownish hairs of 2–4 cm at each end (Rowley, 1983).

*Orbea*, *Brachystelma*, and some *Ceropegia* and *Raphionacme* are best grown from seed. Wait until the dry or dormant season before removing these plants from their natural habitat. Use some of the local soil to inoculate the nursery soil to assist in healthy growth. These species do best in relatively shallow trays that allow the soil to dry out between watering. Many of these species have creeping or twining shoots. Provide each container with its own mini trellis over which the shoots can creep and climb. This group is prone to attack from Mealy bug and other sucking insects. Ensure good greenhouse hygiene. Bruce Bayer advises growers of this family, especially of *Stapelia*, “the best insecticide is the sound of the farmer’s footsteps through his orchard”.

*Mondia whitei* is considered by many to be rare in the wild. This may seem to be true because of its value in traditional medicine as an antacid. It has become overexploited in certain parts of its habitat. This species is actually common in the wild in both South Africa and Malawi and is cultivated easily from seed.

*Raphionacme* with its huge, tuberous rootstock is difficult to grow and needs a deep container and good drainage. *Raphionacme* has to be grown from seed or plants lifted carefully during the dry season when it is dormant. In KwaZulu-Natal, seed is ripe in early summer, in time for the rains. This ensures a good start for the seedlings.

▼ *Stapelia gigantea* follicles.

