

Guidelines for collecting plant material

WHEN IN THE FIELD ON A COLLECTING TRIP, BE METICULOUS to observe the habitat that you are collecting in. At microhabitat level, establish whether the plants grow in deep shade, or are exposed to full sun, whether they grow in well-drained soil or not, and whether they grow in leaf litter or between rocks. Take rocks and stones from the original habitat, as well as some soil to inoculate the growing medium. Rather than removing the parent plant from its natural habitat, collect seed or cuttings.

■ Preparing for a field trip

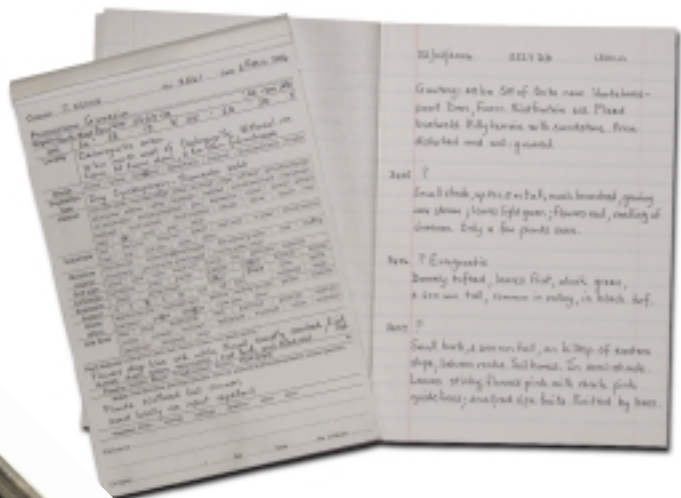
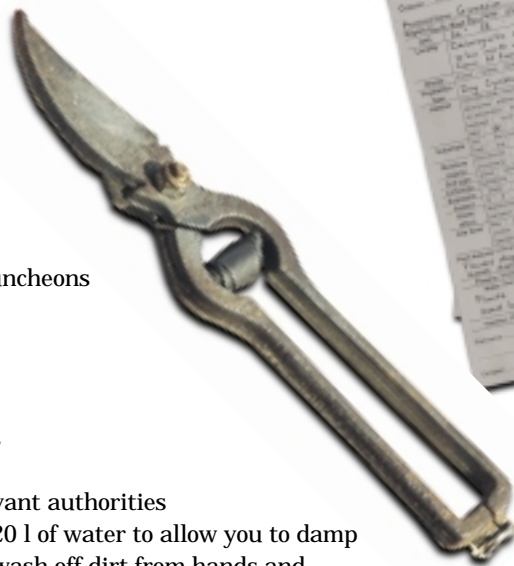
When collecting plant material in the field, you'll need to plan. It is very frustrating when you're far from home and find out you've forgotten something essential. Record keeping is vital; it takes time and energy, but it is worth it in a year's time when you want to see where and when you collected a certain plant. Human memory is a very variable thing! Pressing—and mounting—voucher specimens is another way of keeping a record of the plants you have collected.

I re-use 50 kg fertiliser bags instead of heavy-duty bags; the plastic is clear, tough, and costs nothing. Take some string along to tie the bags or the specimens into bunches with their attendant collecting labels. I always use a label that can be written on with a 2B grade pencil; it works in the dry and the wet. You'll also need digging tools to collect soil samples or to remove plants.

If you're serious about field collecting, I recommend the book *Herbarium Essentials—the southern African herbarium user manual* (Victor *et al.*, 2004).

Equipment

- Notebooks
- Pencils
- Labels
- Camera
- GPS (if you're lucky)
- Secateurs
- Sharp knife
- Bow saw for larger truncheons
- Spade
- Large garden fork
- Crowbar
- Large plastic bags
- Zip lock bags for seeds
- String
- Permits from the relevant authorities
- Water—take at least 20 l of water to allow you to damp down cuttings and to wash off dirt from hands and plant material



Sampling

Stratified random sampling is the best method to use. Before sampling, the habitat is divided into different patches (contrasts in aspect, slope, soil, vegetation density, moisture, areas of previous disturbance, etc.). Individuals are then randomly chosen from each patch. Samples are allocated in proportion to the size of the patches. If the habitat is uniform, random sampling is best. If a supplementary biased sample is needed (unique individuals), this sample should be kept separate.

- To preserve the maximum amount of genetic variability, there should be sampling at the extremes of a species' range in addition to the central parts.
- A general rule is to sample 10–50 individuals per population.
- For species occurring in three or fewer locations, all populations should be sampled.
- Among more widespread species, three to five populations should be sampled.
- Where there are large numbers of populations within a small area (and the boundaries between different populations may be blurred), it is better to treat these as a cluster. Sample one or two populations per cluster, and five clusters altogether. For two, three, or four clusters, one would sample two or three populations per cluster.

■ Seeds

Although plant selection is the key for passing on good genes, seed collected from as diverse a group of plants as possible, that is, different plants of the same species, is a very important principle to ensure genetic diversity and plant production.

Regard the following as general practice when collecting seed:

- Gather the best looking and largest fruited forms of the plant you want to grow and discard the shrivelled and malformed seed.
- Label the better forms of a species that are to be kept as future seed-bearers.
- Collect seed from 10–50 individuals.
- Equal numbers of seed per individual should be sampled to avoid unwanted bias.
- Sample size must allow for poor germination potential.
- Maximize the diversity within the sample by collecting as many fruit as possible from different microhabitats and at different times, to increase the number of pollination events and pollen sources.
- The collector cannot be sure of the exact number of parents (for out-breeding species); therefore, it is better to collect more.
- When only seeds are collected, multi-targeted trips should be organised, because species differ in maturity date.

■ Cuttings

Cuttings can be harvested at most times of the year, although the time of harvest affects the strike rate. They require speedy processing to retain their viability and need ready availability of space and proven techniques. Woody or perennial species are easier to process than annual herbaceous species; the latter require culture by *in vitro* methods.

Fewer samples are needed with cuttings compared to seeds, because the collector can be sure that an explicit number of distinct, naturally occurring individuals have been sampled.

- Sample 10 individuals from varying microhabitats, or randomly.
- Include any morphological variant likely to be both genetically based and of definite interest.
- Sample size must allow for poor striking from cuttings.

TIP

Cover your thumb with a piece of plaster to prevent being cut.

- The size of a cutting is important in propagation and depends on the family.
- For cuttings of any delicate plant, use a sharp pruning or budding knife. The last thing one wants is a cutting with a bruised stem kept for weeks in cutting medium under warm, moist conditions. This is a good recipe for pathogens to attack and kill the fledgling plant.

WARNING

Do not use secateurs, because the blade that moves up against the anvil will bruise the stems.

- Collect cuttings with straight stems for a better plant shape.
- Keep the cuttings damp and cool by using clear plastic bags and not black bags. The dark bags absorb heat and will parboil the cuttings.
- Place them in a shady spot when taking a rest. If it is necessary to leave cuttings in the bags for longer than a day, do not expose them to sunlight.
- Provide an anti-stress drench. This is a way to prolong life out of the soil for delicate plants: plunge these plants and broad-leaved species into clean water, for instance, a mountain stream, each evening to revitalise them. Some people dip the cuttings into a solution of seaweed extract, Vitamin B12, or sugar/sucrose. Some use homeopathic remedies.
- A cooler box protects cuttings from extreme changes in temperature on field trips.
- Zip lock bags seal in moisture.

■ Seedlings

Another form of propagation or collection, also known as “wildings”, refers to wild-germinated seedlings, often found under the parent tree or plant.

It is possible to lift seedlings from the forest floor or other natural habitat. This method works well in the case of trees and shrubs.

- Use a garden fork to loosen the soil around the plant and gently lift the plant without damaging its roots.
- Place the plant in a sealed plastic bag to prevent the roots from drying out or pot it up into appropriate planting tubes or black bags.
- Leave the lifted plants in the shade for about a week before gradually shifting them into their final growing light intensity.

I would collect as wide a variety of seedlings from under as many parent plants as possible to improve genetic variability.

■ Whole plants

Collecting cuttings and seeds are probably the better options than collecting whole plants, unless germination techniques are not known or viable cuttings cannot be taken.

- There are two disadvantages to collecting whole plants:
 - Removing whole plants can destroy a whole population. It is inappropriate for a rare and endangered species, unless the destruction of the natural source population is certain.
 - Transplanting whole individuals of deep-rooted perennials is difficult. Transplants of whole individuals require handling as large cuttings.

Information in this chapter was collected from Bennett (1970), Brown & Briggs (1991), Falk *et al.* (1996), Ford-Lloyd & Jackson (1986), and the Centre for Plant Conservation (1991).