



Pests and diseases

The majority of pests likely to be encountered in cacti and succulents are the types to which most pot-plants are susceptible.

The location in which the plants are grown will have a bearing on the pests likely to appear and also on the treatment to be adopted to eradicate them. It is unlikely that a collection housed in a living-room will be attacked by **snails**, **slugs** or **caterpillars** but these can wreak havoc among leaf succulents housed in a greenhouse or frame. Any seen can be removed and killed individually, and if a visual inspection fails to reveal the pests, the use of conventional garden compounds such as slug pellets will usually do the trick. Take care to keep pets and children away from these and all other chemicals used in the garden.

Aphids such as the familiar **greenfly** and **blackfly** may be attracted to the juicy young flower stems of succulents but are easily eradicated by spraying with one of the conventional aphid killers. **Whitefly** is a persistent pest but fortunately does not often attack these plants. If it does, use a specific insecticide.

The pests most likely to be encountered in a succulent plant collection are **mealy bug**, **root mealy bug**, **red spider mite**, **sciarid fly**, **western flower thrip** and **vine weevil**.

Mealy bug (Figs. 1, 2 and 3)

This pest may be introduced on plants brought into the collection and a period of 'quarantine' for all acquisitions is a good policy to adopt. It can also invade existing collections and all plants need to be inspected regularly. Mealy bug, belonging to the family *Pseudococcidae*, is a small sap-sucking insect, 3–5mm in length, which looks rather like a miniature wood-louse with a waxy white covering (Fig. 1). In the early stages of infestation it tends to live a solitary life, quietly extracting its food from the tender tissue near the growing point of the plant. As the infestation develops, nests like tiny pieces of cotton-wool may be found in which the eggs hatch and grow (Fig. 2). Eventually large numbers of insects may congregate, particularly at the growing tip of the plant, which is rapidly damaged by their feeding. In small collections where it is possible to give each plant a close inspection at frequent intervals, mealy bugs can be dealt with using a fine paintbrush to dab a little methylated spirits

onto them. However, although this dissolves their waxy outer covering, it does not always kill them and if the infestation is heavier, or the collection is larger, a systemic insecticide should be used. This is diluted and sprayed onto the plant or watered onto the compost. The plant absorbs the insecticide, which makes its sap poisonous to the mealybug. It should be noted however, that using the same insecticide time and time again may allow the insects to build up an immunity to it.

Root mealy bug

This is a more insidious pest, as it attacks the roots of the plant and can do a great deal of damage before its presence becomes obvious. When repotting – and it is always a good idea to repot newly purchased plants – look out for white traces in the compost. If you notice any, inspect the roots closely for minute white, thin grubs about 1mm long, similar to mealy bugs but smaller. They often do so much damage to the roots that the plant can be seen to be doing poorly. These pests too can be treated with methylated spirits when the roots are exposed, but if any survive, they will soon recolonise the pot. Alternatively, or additionally, there are a number of soil insecticides, some available in granular form, which can be mixed with the compost when repotting, or stirred into the layers of a pot containing an established plant. Alternatively pots can be watered thoroughly with a systemic insecticide. An initial and less dramatic alternative to removing plants from pots is to first look underneath some of the pots, as there may be signs of the white traces and even the grubs themselves near the drainage holes or on the bench beneath them.

Red spider mite (Figs. 4 and 5)

This is a minute creature, all but invisible to the naked eye and is not a spider but a sap-sucking mite. Because of its small size it can build up to plague proportions before coming to the attention of the grower. The pest delights in the warm dry conditions found in a cactus collection and growers should always be on their guard against it. The presence of the mite is usually betrayed by a browning and, in severe cases, webbing of the plant body near the growing point, but by then it is normally

Photo: Roy Mattram



Fig. 1 Mealy bug on *Opuntia*



Fig. 2 Mealy bug on a *Cotyledon* pedicel

Photo: Roy Mattram

Photo: Alice Vanden Bon



Fig. 11 Black rot of stapeliad

Photo: Roy Mottram



Fig. 12 Mineral deficiency in Parodia ottonis

Photo: David Quail



Fig. 13 Lobivia ferox. New growth after suffering magnesium deficiency

Photo: Tony Morris



Fig. 14 Scorch on Copiapoa barquitenis

cutting to dry for about a week, or longer for bigger cuts and at lower temperatures, and then treat as for any other cutting.

General Hygiene

Cleanliness in the collection will reduce the likelihood of attack by pests and diseases. Never leave litter on the floor of a greenhouse or under the staging, as this provides an ideal location for pests to establish themselves. Always remove dead leaves and floral remains from around the plants for the same reason. A concrete or flagstone base to the greenhouse with a damp-proof course below will help maintain a drier atmosphere. Also ensure that the base of the greenhouse is well sealed.

If possible, keep newly acquired plants in quarantine away from the collection for a few weeks. This allows time for the eggs of pests to hatch and be dealt with before the plants is added to the collection. Inspect the plants in the collection regularly and meticulously, and if traces of pests or diseases are found, deal with them at once.

Larger pests can also cause havoc and it is not unknown for mice to take a fancy to lithops or to feed on the fruits of mammillarias. Also watch out for slugs and snails. These seem to find a way into the greenhouse even where there seems no obvious route in. However the slime trails they leave can usually help you to find the offender, hopefully, before it has damaged your prize acquisition!

Cultural Problems

This covers aspects of over or under watering and poor light conditions which are dealt with in other leaflets in this pack but some cultural problems can give rise to symptoms similar to those caused by pests.

Mineral deficiencies

Mineral deficiencies can produce alarming symptoms which on first inspection may appear to be due to insect damage. Chlorosis (Fig. 12) or browning of the growing tip of the plant, appearing superficially like red spider damage (Fig. 13), is a typical symptom. In the latter case this can be due to magnesium deficiency which can be remedied by giving a pinch of epsom salts to the water. Regular repotting of plants and the use of a balanced fertiliser will generally prevent mineral deficiencies but if a plant has been severely neglected sometimes the damage may be too great and the best course of action is to behead the plant to promote new growth and then take cuttings of the undamaged tissue.

Scorch

One of the commonest forms of damage which most growers would admit to having suffered at some time is scorch. The greatest danger of this is early in the year when the plants have become accustomed to the dull days of winter. A clear and bright spring day can lead to soaring temperatures in the greenhouse (or on the windowsill) and the soft plant bodies of winter are easily damaged. Also if plants are repotted and inadvertently turned when being replaced on the bench this too can lead to damage from scorch. When repotting plants always try to ensure that the pot is replaced in the same position. Use the label as a marker or some feature of the plant to remind you which way it was facing so that it can be replaced in the same position. Copiapoas in particular are susceptible to burning after the dull winter months (Fig. 14).

They are particularly attracted to members of the *Crassulaceae* and it is often not until the plant topples over that the presence of this pest first becomes apparent. Examination of the soil in the pot will undoubtedly reveal several wriggling white larvae. These can be despatched instantly by a firm stamp of the foot! Carefully examine neighbouring plants and treat accordingly. There are now several effective soil drench treatments on the market for vine weevil.

Biological controls

These are now available for some pests, consisting of small colonies of live predators that can be ordered by post and then released into the greenhouse to breed and feed on the pests. The instructions need to be adhered to carefully to ensure that the greenhouse has the right environment for the predators, and they are likely to die out once all the pests are eaten or when the environment becomes unsuitable (for example in winter). They are worth trying if you can provide the right conditions for them, particularly if you are having difficulties controlling the pests by other means. It should be emphasised that chemical control cannot be used at the same time as it will kill the biological agent.

Biological control of vine weevil is available as pathogenic nematodes which are watered into the soil.

Fungal infections (Fig. 11)

In general, fungal infections are relatively uncommon among succulent plant collections, thanks to the dry conditions in which the plants are grown. There are however occasions when the spores that are floating in the air find conditions to their liking and the grower must then act quickly. *Botrytis* (grey mould) may be a problem in the autumn and winter, when it is cold, damp and there is little air circulation. It can cause problems particularly when seed pods are left on cacti and the fungus gains entry to the plant body via the fruit. This will almost certainly cause the death of the plant and it is worth spending a little time in the autumn removing any fruits that can be easily detached. Other fungi can infect young seedlings, and in the warm moist conditions essential for germination can rapidly spread. This is a common experience, to notice a few sickly seedlings one day, and find the whole batch keeled over within another couple of days. Fortunately this so-called 'damping off disease' can be avoided by treating the compost to destroy the spores before sowing seeds, or by watering with a fungicide if it shows up among germinating seedlings.

During the dull days of winter, particularly if the collection is kept at a low temperature, care must be taken if watering. Water trapped among the leaves or stems may remain there long enough to induce rot, and if this occurs, the only remedy left is to cut out all affected areas back to clean growth and re-root. Drips from the roof of a greenhouse or from overhanging shelves can also collect on the plants beneath and lead to rotting.

Stapeliads in particular tend to be susceptible to a fungal disease. This manifests itself as patches of black on the stems, steadily spreading until the whole plant is infected. There is no reliable cure for this complaint and removing and destroying the infected plant to prevent the spread of the disease is a drastic but often necessary treatment, though cutting back to an apparently unaffected area then drying off may work and can be worth trying with a choice plant. Always use a sterile razor blade or knife to cut away the dead tissue (sterilise with alcohol) and then dust the cut surfaces with sulphur powder. Leave the



Fig. 7 WFT on the petals and stamens of a *Coryphantha* flower



Fig. 8 Adult vine weevil



Fig. 9 Grub of vine weevil with its distinctive brown head



Fig. 10 Larva of vine weevil in root of *Adromischus*



Fig. 3 Mealy bug on the stem of *Crassula ovata*



Fig. 4 Red spider mite highly magnified



Fig. 5 Red spider mite damage on *Rebutia atrovirens*



Fig. 6 WFT damage to *Lithops julii*

too late to avoid permanent scarring. Close inspection with a magnifying glass may reveal the pest, but it is quite likely that the marauding army will have moved on to lush pastures. Since the mite is a sap-sucker, the use of a systemic pesticide that specifies red spider mite is the best means of defence. It seems to be very resistant to sprayed contact pesticides. Do ensure the systemic pesticide type is alternated to prevent a build-up of immunity.

Sciarid fly

Sciarid fly is commonly known as the mushroom fly and has moved into our collections as peat-based composts have grown in popularity. The adult fly is tiny and has a weak erratic flight, so tends to be found in close proximity to the plants. The insects even run about on the surface of the compost and will quickly conceal themselves when danger threatens. It thrives in moist conditions, laying eggs at the base of the plant stem. These hatch to become tiny, almost transparent grubs. The grubs feed mainly on decaying organic material, but the cactus sciarid also feeds on the plants themselves, chewing into the base of the plant and working upwards through the inside of the plant, eventually leaving a hollow shell. The conditions required for seed germination suit them very well, and an infestation can rapidly destroy a crop of young seedlings. Repeated spraying with a contact or systemic insecticide is a safe way of dealing with the adults, but the grubs in the compost are a more difficult proposition. Systemic or contact insecticides sprayed or watered well into the compost are the most suitable line of attack.

Western flower thrips (WFT) (Figs. 6 and 7)

This insect first appeared in greenhouses in the UK during the 1980s and it will feed on hundreds of different plant species. For the cactus and succulent grower the group of plants most affected by this pest is lithops. WFT are approximately only 2–3 mm in length but have mouthparts that will scrape and puncture plant tissue. The insects feed on sap that seeps from the wounds. They also consume pollen and spend much of their time in flower heads. WFT can occur in cactus and succulent flowers without apparently doing much harm (although they will damage petals and can cause some marking on soft-bodied plants) but they can completely disfigure lithops. With this group of plants the tiny insects seem to manage to gain access to the new growing head particularly when lithops are in flower. They congregate in the flower to eat the pollen but also attack the soft tissue of the new developing body. If the insect is not noticed at flowering time it may not be until the following year when the new heads appear that the damage will become apparent. Control of this insect is very difficult partly because the life cycle of this pest is variable, with many different stages, becoming more rapid as the temperatures rises. Carefully timed applications of systemic insecticide over approximately three weeks (one generation of insects) should keep control but a different insecticide is required if later spraying is necessary to prevent the insects acquiring immunity to the product.

Vine weevil (Figs. 8, 9 and 10)

The adult vine weevil is not itself the main cause of damage to cacti or succulents although it does eat the leaf margins of echeverias and this is often the first sign that the pest is present. It is the grubs that cause most damage to our plants. They bore into the stem bases of succulents and feed on the plant roots.