The Cultivation of Cacti and Succulents in Ceylon

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Introduction

IN RECENT years the cultivation of cacti and succulents as window plants has gained popularity with amateur gardeners. It is proposed in this article to deal with their culture, propagation and pests and diseases.

Cacti and most succulents thrive in dry and arid conditions. They are excellent examples which are adapted to overcome extremes of heat or cold and lack of moisture. Most of them have no leaves at all and the functions of the leaf are taken on by the stem. Some are provided with leaves which are reduced to thick and waxy structures and in others leaves are replaced by spines. The stems take on various shapes to enable them to reduce the surface area exposed to the sun.

Most cacti are native to America while other succulents such as Euphorbias and Aloes are abundant in South Africa. The Sedums commonly known as the 'Stonecrop' are confined to cooler but drier regions of Europe. Examples of cacti indigenous to Ceylon are found in the *Rhipsalis cassytha* Gaertn. (Wal-navahandi S.) ; *Cereus grandiflorus* Mill. (Night flowering cactus E.) and *Opuntia Dillenii* Haw. (Prickly pear E., Katu-patuk S.) all of which thrive in the drier parts of the Island and are of Mexican or West Indian origin but naturalized to local conditions. Other succulents native to or naturalized to Ceylon are found in *Euphorbia Antiquorum* L. (Daluk S.) ; *E. Tirucalli* L. (Nava-handi S.) ; *Aloe vera* L. (Komarika S.), &c.

Cacti and succulents are fascinating, colourful plants though the duration of their flowers is short. They are excellent ornamental window plants varying in colour and not lacking in fragrance in certain types. Some of the *Ephiphyllum* Haw. varieties known as the 'Orchid Cacti' and the epiphytic climbing *Cereus* Mill. bear large and attractive flowers. The globular Mammillarias, Rebutias, Echinopsis, Lobivias and Gymnocalyciums serve as excellent pot plants which flower early. The majestic columnar Cereus and Opuntia varieties come into bloom as they grow older and Astrophytums, Lithops and Conophytums are curious-looking mimicry plants which imitate stones and such like objects around. They would hardly be noticeable in their own natural surroundings. Of the other succulents, the star-shaped Stapelias, Cotyledons, Echeverias, Sedums, Carallumas, Euphorbias and Huernias are of much interest.

Cultivation

Cacti can be grown successfully in a plant house with glass roofing, a sheltered frame or even on a window sill with little attention. The roof or frame should not leak. Cacti and succulents tolerate neglect to a greater degree than most other plants. They are

able to absorb and store large quantities of water enabling them to tide over long periods of drought without serious injury. It is important to note with care their periods of rest and growth. During the resting period cacti require very little water but as growth commences, watering once in three to four weeks will be necessary if the atmosphere is dry. In rainy weather watering should be restricted. It is better not to water in wet weather. The need for water is governed by the size of the plant and the pot in which it stands, for small pots dry more rapidly than larger ones and larger plants carry more stored up water. Once a plant is watered the excess water must be allowed to drain out fully. Watering is best done in the morning or late in the afternoon with water which has been allowed to stand for some time in a tub or tank.

The following potting mixture has been found satisfactory for cacti and succulents at the Royal Botanic Gardens, Peradeniya :—

1 part coarse, clean river sand
1 part sifted leaf mould
¼ part crushed bricks
¼ part crushed charcoal
¼ part old potting soil
⅛ part crushed old motar rubble.

The compost mixture should be 'springly' and loose, falling apart easily when squeezed in the hand. Generally, a sandy soil with calcareous material is ideal, for cacti are lime lovers.

The method of potting is important. A concave piece of crock is placed over the drainage hole with the concavity downwards. The pot is now filled to about a quarter of its depth with crocks and brickbats of ½–¾ inch diameter. A layer of partially decaying, sterilized leaves is then placed over the crocks and the pot filled to about half with compost mixture. Then the plant is held firmly resting on the compost mixture, with its roots spread out and the pot filled all round with compost, at the same time tapping it on its sides. Care should be taken not to bury the plant too deep. A layer of coarse sand or gravel on the surface will give it a better finish. The first watering is done by immersing the pots in a vessel of water and allowing the water to seep into the compost through the bottom drainage hole. Small plants should not be potted in large pots and *vice versa*. The pot should always be in proportion to the size of the plant. Unlike other plants, repotting is not done regularly each year unless the pots are root-bound and the drainage holes blocked. Sickly plants that have not made much growth during the preceding year should be carefully examined for diseases and pests. They should be treated, cleaned and repotted. In repotting, clean pots should always be used along with freshly prepared compost mixture.

Propagation

Cacti and succulents can be propagated by seed or vegetatively. Propagation by seed is the best method of increasing stocks as seedlings gradually acclimatize themselves to their new surroundings. Although the process is simple the seedlings are slow in growth and a great deal of patience is necessary. Sowing is done in shallow earthenware pans 8–9 inches in diameter and 5–6 inches deep.

A two-inch layer of broken crocks is placed at the bottom over the drainage holes with a thin layer of partially decaying sterilized leaves and the pans are filled up to an inch from the top with the sowing mixture made up of the following :

1 part clean river sand

1 part finely sifted leaf mould

¼ part old garden loam.

A pinch of carbonate of lime added to the mixture will help to control to a certain extent soil borne insect pests. The compost mixture is sterilized before use by baking in an old tin or pouring hot water. The surface is now pressed down with a flat piece of wood to give it a smooth finish. Fine seed such as those of Rebutia, Cereus and Mammillaria is sown evenly on the surface and covered lightly with a thin layer of clean sand, while Opuntia seed which is large is covered upto 1/12th inch layer of the compost and a little sand sprinkled over. The surface is again pressed lightly with a piece of wood to keep the seeds firm. The seed pans are then labelled and watered by allowing water to seep through into the compost from the bottom until the surface is wet. The pans are removed and the excess moisture allowed to drain away. They are left in a shady position giving them the advantage of the morning sun. A sheet of glass covered with brown paper is placed over each pan until germination has taken place. The paper is then removed and the glass sheet raised a little on one side during the day to allow free circulation of air.

Although cacti need very little water it is important to see that the seed pans are never allowed to dry. It is best to soak the pans in water every fourth day in dry weather and seventh day during wet periods until germination has taken place. Overhead watering should be avoided. To prevent any fungus or algae appearing on the surface of pans a little 'Chinosol' can be added to the water. Most seeds commence to germinate by the seventh day and continue upto three weeks. It is also important to sow fresh seed as old seed though viable may take over an year to germinate. When germination is complete the seedlings are given more light and air gradually but not exposed to direct sunlight. When they are about 6 to 8 months old they should be carefully 'pricked out' into seed pans or individually into two-inch pots in a richer compost allowing more drainage. The general potting mixture already mentioned can be used for this purpose. The young seedlings are kept moist but not wet, for, if they happen to dry a red colouration will be noticed in the tiny stems and a considerable retardation of growth will result. Seedlings should be arranged on racks in a warm sheltered position allowing direct sunlight on them during part of the day. Seedlings will take from 4½ to 5 years to flower.

Vegetative Propagation

This method of propagation is resorted to when seeds are not readily available. Some varieties flower regularly but may not seed, and others take a long time to flower. Two methods of

vegetative propagation are generally adopted, viz. :

(*a*) Propagation by cuttings,

(*b*) Propagation by grafting.

Cuttings : In the method of propagation by cuttings three types of material are commonly used :

(i) Offshoots produced around parent plants, e.g., Mammillaria, Rebutia and Echinopsis

(ii) Leaves in the case of succulents, e.g., Sedum and Echeveria

(iii) Stem cuttings e.g., Cereus and Phyllocactus.

In practice, propagation by means of cuttings is adopted for three reasons :

(*a*) to multiply stocks quickly

(*b*) to replace old plants

(*c*) to save a plant in which the root or stem has begun to rot.

Cuttings are severed from the parent plants with a clean sharp thin knife so that the tissues may not be damaged. If cuttings are detached at a joint as in Opuntia the scar left will be small and takes less time to heal and the mother plant is less disfigured. Cuttings of Epiphyllum and Phyllocactus taken across the broadest part of the stem grow more vigorously and flower earlier. Cuttings, offshoots or leaves must be selected from healthy mature plants. These must not be potted immediately but stored in dry sands in partial shade until the wound has callused over. This takes place in 3–4 weeks depending on the variety. The cut surface may be dusted with charcoal, brick powder or sulphur dust to prevent rotting.

In most succulents cuttings need not be dried so long as prolonged drying may injure them. After two or three days the bases of these cuttings are inserted in a mixture of sand and leaf mould and left in partial shade until they are rooted and new shoots begin to appear. They can then be potted. The leaves may shrink to a certain extent immediately after but will be able to nourish the new plant.

In cacti when cuttings are sufficiently dry and the wounds callused over, they are inserted in a mixture of sand and leaf mould in shallow pans. The first watering is then given ; the second will depend on prevailing conditions and may have to be given even two or three weeks later. As far as possible only the soil must be watered without wetting the stems or leaves to avoid rotting. In the case of delicate varieties such as Euphorbias and Carallumas the same method may be employed, but a more ingenious way to promote rooting is to hang up the cuttings vertically and place a glass of water underneath, the level of the water being about an inch below the base of the cutting. This accelerates production of roots and avoids danger to them by rotting. Cuttings thus inserted take 1–2 months to root in the case of cacti and a few weeks for succulents. Once rooted they may be potted or planted in beds in a porous compost mixture. The same compost for potting mature seedlings is recommended. Plants raised from cuttings or offshoots mature and flower earlier than those from seed.

Grafting: Propagation by grafts is employed in the case of species which do not set seed readily or produce branches or outgrowths suitable for cuttings. The stock and scion should be of the same family and of uniform thickness. Stocks are selected from vigorous growing species. Both stock and scion must be fairly ripe but not too mature or woody. Two methods of grafting are adopted.

(*i*) *Cleft Grafting.* In this method a horizontal cut is made on the stock with a sharp, thin knife about 1½ inches above the soil level. A second cut to a depth of half an inch is made vertically through the middle, and the halves pushed apart gently so that it forms a 'V' shaped cleft. The scion is shaped into a wedge at its base by two oblique cuts and fitted into the cleft of the stock. The stock and scion are kept in position firmly by passing at the sides a spine of an Opuntia which is pulled out when the union is complete. The operation must be performed quickly to prevent the sap of the cut surfaces drying. The graft is now shaded with oil paper and left in the shade. Complete union can take place in 10 to 14 days, when the oil paper can be removed. It is important to keep the point of union absolutely dry when watering as rotting is otherwise liable to occur. Grafting can be done successfully with less casualties if the stock and scion are at the height of their growing period. Columnar species, after grafting, should be staked so as to keep them firm. Any growth from the stocks is not encouraged.

(*ii*) *Top Grafting.* In this method the stock is horizontally cut as above but no cleft made. A similar horizontal cut is given at the base of the scion. The scion is placed over the stock and kept in position by two spines of Opuntia.

Diseases

The most serious and common disease is rot, which commences at the base of the stem above the soil or at the root. It is probably due to incorrect watering and insufficient drainage. Watering should be done sparingly and that too when necessary only, by immersing the pots in water and allowing the excess water to drain off. It may be possible to save the rotting plants if detected in time. The infected basal portion is destroyed having removed the top. The cut surface is dusted with sulphur and dried until the wound is healed over. It is advisable to isolate such plants from the rest of the collection lest disease spreads. Old compost should not be used in repotting. All injured parts are disinfected with sulphur or perenox as a precautionary measure as the fungus normally enters the plant through an external injury. Watering should be restricted until the wound is healed.

Pests

Mealy Bugs: These are small insects covered with a white, woolly, waxy substance which protects them from most insecticides as they take cover in crevices and other inaccessible places. Plants should be examined regularly and the insects brushed off with a solution of nicotine sulphate or methylated spirits. Mealy bugs are also found to attack the roots of plants.

Such plants should be repotted after cleaning and disinfecting the roots with nicotine sulphate solution. It is important to use well decomposed leaf mould in the compost to avoid such infections from the soil. All staging and crevices which breed mealy bugs should be sprayed regularly with a suitable insecticide.

Scales: This is a common pest found on the stems and leaves. It appears in the form of small whitish shields. The pest spreads rapidly and should be controlled early. The scales should be removed by means of a hard brush dipped in nicotine sulphate solution.

Red Spider: This is an insect which is hardly visible to the naked eye. It appears under dry conditions causing a reddish, rusty, colouration and blistering of the stems. Plants infected should be sprayed with 'Derriphytan solution'. This is made up by mixing ½ oz. 'Derriphytan' in a gallon of fresh water.

Wood Lice: This insect is common in houses where wooden structures have been in use for some time. They feed on young seedlings and new growths. They are eradicated by dusting with gammexane.

White Ants (Termites): This is a serious pest in the tropics. A colony can destroy a valuable collection overnight. Damage done is hardly noticeable at the early stages, but in time plants begin to wilt and rot. White ants gain entry through the drainage holes in the pots and feed on the roots and the pulp. This is controlled by watering the soil with 'Intox 8' once every six months (1 oz. to 12½ gals. of water).

Caterpillars: In the ridges covered with hairs or spines of cacti, moths often lay their eggs. The caterpillars hatching out eat their way into the pulp. Through these injuries rot sets in if action is not taken in time. Plants should be examined regularly and the caterpillars handpicked and destroyed. Dusting with gammexane would be helpful.

Most pests and diseases can be avoided by the use of correct composts, proper drainage, careful watering and clean cultivation. Plants should be closely examined daily and prompt action taken at the earliest incidence of pest and disease.

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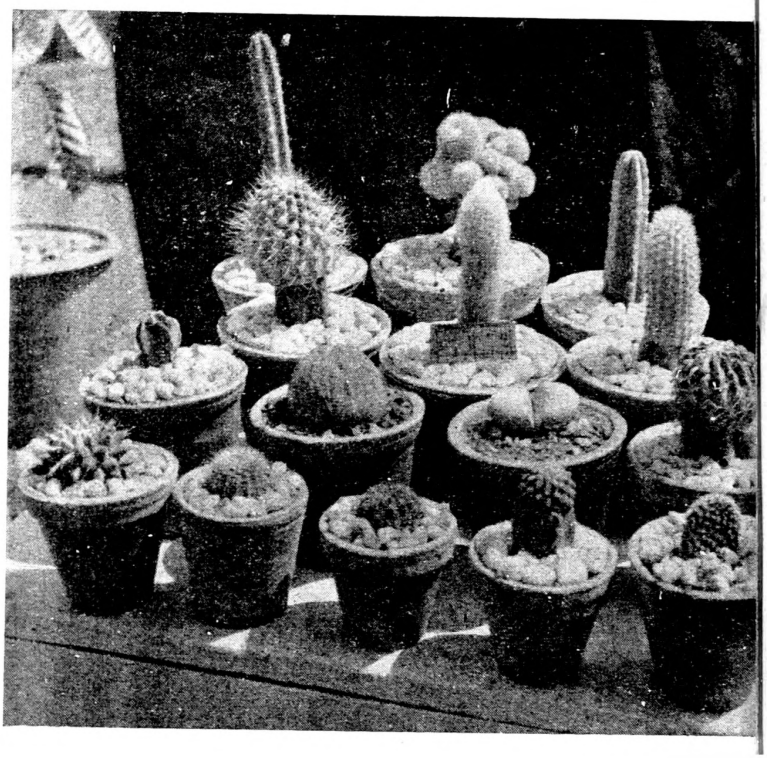
A plant of Aylostera pseudodeminuta

A group of succulents.

A plant of Weingartia Neumanniana
(*Spegazzinia Neumanniana*)



A group of cacti.