Opposite Page

Top left: ***Coelogyne fragrans*** Schltr.
Photo by P. Spence.
Top right: ***Glomera aurea*** Schltr.
Bottom left: ***Oberonia arcuata*** Schltr.
Bottom right: ***Liparis werneri*** Schltr.
Photos by Mrs A. Millar (See page 195).

This Page

Top left: ***Diplocaulobium regale*** Schltr. - white form
Centre left: ***D. regale*** Schltr. - pink form
Bottom left: ***D. regale*** Schltr. - An unusual apricot form.
Below: ***Eria micholitzii*** Kraenzlin
Photos by T. Reeve (See page 194).

These colour pictures were made possible by a grant from the Australian Orchid Foundation.

ORCHIDS OF MOUNT GAHAVISUKA - PART THREE: THE OTHER EPIPHYTES

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In this third article of a series of four articles on Papua New Guinea highland orchids, I will discuss the other epiphytic orchids which occur in Mt Gahavisuka Provincial Park, near Goroka, Eastern Highlands Province. Why Epiphytes? As one approaches the equator, a larger proportion of the plants occur as epiphytes, especially in the rainforests. Although a few epiphytes occur even in temperate zones where the rainfall is very high, the species are usually confined to the mosses, lichens and ferns. However in the tropical rainforests, and even on isolated trees in humid tropical areas, epiphytes are abundant and a conspicuous feature of the landscape. Some of them are plants which also grow on the ground, but many occur as epiphytes only. These include the majority of orchids, some gingers, ant-plants, and even rhododendrons, as well as innumerable mosses, ferns and lycopods.

The reason for adopting this aerial habitat is first and foremost to obtain more light; the floor of a multi-storied forest may be very dark. Another reason is that, as epiphytes, they escape the competition from other plants growing on the floor of the forest. Many of them, especially most *Dendrobium* species, appreciate the free air movement and the swirling mists which sweep almost daily over the canopy. These factors have to be taken into account in their cultivation.

It is often asked how they obtain sufficient water and nutrients in such a situation. The answer of course is the heavy rainfall, high humidity and the accumulation of humus from decaying epiphytes, tree bark, and insect and animal excreta on the trunk or limbs above them. But there are periods of drought and starvation, and many epiphytes have developed succulent pseudobulbs and spongy roots to assist them in surviving these periods. Some open their stomates only at night to cut down loss of water and fix their carbon by the crassulacean acid metabolic pathway (CAM).

In any case, the epiphytes are remarkably successful in the highlands of PNG where the rainforests are reasonably intact, but are in great danger where the forests are being indiscriminately felled.

The *Dendrobium* Allies

Some of the close allies of *Dendrobium* were included by previous authors in this genus, but are now regarded as separate. One of the most widespread of these is *Diplocaulobium*. Some have a creeping habit and readily form mats, such as the ubiquitous *Diplocaulobium chrysotropis* which forms large patches on trunks of trees. A mass of delicate starry white flowers erupt periodically from these patches; the petals and sepals have yellow tips while the labellum has yellow and purple markings. The display lasts for a few days only. Many *Diplocaulobium* are of the pin-cushion type, having pseudobulbs which are bulbous at the base only and formed into long wand-like stems with a single leaf at the top, from the base of which the flowers emerge. The flowers are usually spidery in form, white in colour with gold tips to the sepals and petals. Alas, they are one-day-wonders or even half-day-wonders and turn a deep pink as they die and close. One common species, *Diplocaulobium iboense*, has very long golden 'stems' which the local people use for weaving bright yellow armlets. It is often planted as a decoration on the tops of village round-houses.

But the king of the genus, as its name implies, is *Diplocaulobium regale* which has flowers with broad segments of a bright cherry red colour. Another species, *Diplocaulobium auricolor*, has golden yellow flowers, while *Diplocaulobium centrale* has pure white flowers which fade to pink. Unfortunately, they are all one-day-wonders.

Another *Dendrobium* ally is *Eria*. This is a large and little known genus of orchids, some of which are hardly worth looking at while others are showy and attractive when in flower. However, the flowers do not last very long. Perhaps the best is *Eria javanica* (probably synonymous with *Eria micholitzii*; T M Reeve, pers. comm.) which has long sprays of starry creamy white flowers which open together but last only a few days. It has the appearance of a pendulous *Coelogyne*. Another, *Eria imitans*, is reminiscent of *Coelogyne beccarii*. An as yet undescribed species In our Park has narrow leaves and many delicate sprays of creamy white flowers which have labellums flecked with purple. Other *Eria* are more like a Latouria *Dendrobium* in growth, but the copious sprays of small white, yellow or pink

flowers are produced out of the side of the pseudobulb. Yet another group, of which *Eria velutina* is the type, has pendulous stems with brown velvet-like material on leaves and flowers. *Eria* is a genus which is not showy, but contains some delightful orchids.

Another member of the *Dendrobium* allies is *Cadetia*, the members of which are small tufted orchids which produce a single white flower from the base of the single leaf on each stem. They usually grow in colonies which often delightfully decorate treefern trunks. For those who like miniature orchids, *Cadetia* are worth growing. One of the taller ones in our Park is the aptly named *Cadetia ceratostyloides*.

The *Coelogyne*

Following Schlechter's classification, I will move back from the *Dendrobiinae* to the *Coelogyninae*. These come earlier in his system and are the first of the epiphytic groups. Everyone knows *Coelogyne* as many of them are in cultivation. I only know of seven in PNG but they are all delightful plants. The two commonest are *Coelogyne fragrans* and *Coelogyne asperata*. Both are large plants and all the flowers on the spray open together. Both can be epiphytic, lithophytic or terrestrial, although *Coelogyne asperata* rather prefers the latter but only on steep slopes. Both are slightly scented. *Coelogyne asperata* has much longer arching sprays, but *Coelogyne fragrans* has larger flowers. The colour is similar in both species; cream sepals and petals with deep orange to brown in the centre of the labellum. Both are beautiful species and easy to grow.

Smaller but somewhat similar is *Coelogyne truncicola* from lower montane forest. The long spiked *Coelogyne veitchii* is only from lowland areas. But there is another mountain species called *Coelogyne beccarii* whose rather large flowers open in succession. This habit is shared by the spectacular and rare *Coelogyne macdonaldii* which occurs only on Bougainville Island. When I first heard of this species, I was told that it had flowers seven inches across, but I think this must be an exaggeration. I found it myself on Mt Balbi in 1986, and the only rather faded flower I saw was about five inches across. However, this was spectacular enough, especially when added to its deep red and white speckled, labellum.

In this group are the two 'Chain Orchids', *Dendrochilum* and *Pholidota*. *Dendrochilum longifolium* is common at Mt Gahavisuka and has a delicate charm all of its own. *Pholidota pallida* is lowland, but we have one small species, probably *Pholidota carnea*, in the Park.

The Liparids

These are nearly all terrestrial, though a few species of *Liparis* are epiphytic, notably *Liparis werneri* which has pendulous sprays of delicate green translucent flowers with a forked labellum, like a snake's tongue. It is common in the Park. The one true epiphyte in this group is the charming little *Oberonia* with its equitant leaves and long tails of innumerable microscopic orange to red flowers. Well named after the king of the fairies.

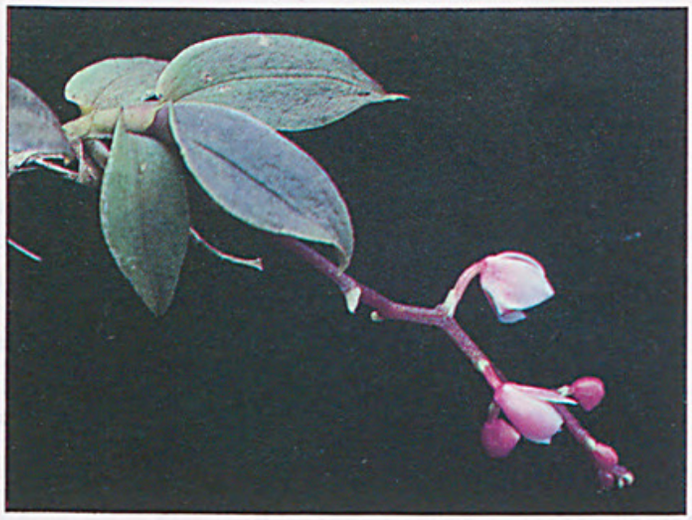
The Clustered Ones (*Glomerinae*)

This is a big group of many genera, typified by *Glomera* which has terminal flowers in a dense cluster. We have several species in our Park, of which the nicest is *Glomera aurea* whose small flowers in a dense head are golden yellow with a red-tipped labellum. Most *Glomera* species have white flowers, but all have that red tip. Their habit is grassy.

Next comes *Glossorhyncha* which is another genus of delicate plants with an almost sub-shrubby habit and small leaves. The flowers are starry and glistening white, sometimes with an incongruous black tip to the labellum. Some are deliciously scented. The best is *Glossorhyncha hamadryas*. Close to this, and by some included in it, is Schlechter's genus of *Giulianettia*. The flowers are more narrowly star-like and greenish to pinkish. The habit is like a little *Vaccinium*. Both these genera are common in the Park.

Another genus is curiously called *Aglossorhyncha*, presumably because it is not a *Glossorhyncha*. There are several species with greenish-white to greenish yellow flowers. There are many curious little orchids in the bush which look like small tufted rushes with minute orchid flowers just below the tip. One of these always grows upside down. These belong to the genus *Ceratostylis*. Others look like tufted grasses or reeds, with a few small white flowers at the tip. These are appropriately named *Agrostophyllum*. They are among the commonest orchids in the bush.

Also in this group are the two attractive genera *Epiblastus* and *Mediocalcar*. *Epiblastus* is about equally terrestrial or epiphytic, often forming big masses. The rather small flowers poke out from the leaves in bunches on long pedicels, and are bright red to pink and occaslonally white in colour. *Mediocalcar*, on the other hand, has the creeping habit of a *Bulbophyllum*, but is distinguished from that genus by the way one pseudobulb comes out



Left: ***Grosourdya sp.*** - Photo by T. Reeve

Centre left: ***Mediocalcar bifolium*** J.J. Sm.
Photo courtesy of Mrs A. Millar

Bottom left: ***Mediocalcar sp. nov*** - A common highland species with 4 or more leaves per pseudobulb.
Photo by T. Reeve

Below: ***Glossorhrycha sp.*** (See page 195).
Photo courtesy of Mrs A. Millar

These colour pictures were made possible by a grant from the Australian Orchid Foundation.

of another. The flowers are very curious, being formed mainly from the mentum which is always red, the sepals and petals being of a contrasting colour, green, yellow, orange, or pure white in one common species, *Mediocalcar bifolium*. It flowers abundantly and the flowers look like a lot of little bi-coloured globes. It has been nicknamed the 'Cherry Orchid'.

The Inconspicuous Ones

We now come to two rather unexciting groups, the *Podochilinae* and the *Thelasinae*. The first contains two genera of small tufted or creeping species with minute flowers in terminal racemes, *Podochilus* and *Appendicula*. One species of *Appendicula* hangs like moss all over the trees in the deep forest, turning purple when exposed to light. The second group contains two minute but fascinating genera, *Octarrhena* and *Chitonanthera*, distinguished by the number of pollinia, but otherwise very similar. They are only found in the high cloud forests from about 2700 m upwards. We have two species right at the top of our Park. The leaves are usually equitant and the flowers microscopic, usually orange or red. One minute unidentified *Octarrhena* which I collected on Mt Dayman is only about 2 cm high, the greenish flowers the size of a pin's head, and the glaucous succulent leaves like those of a *Sedum*.

The *Vanda* Family (*Sarcanthinae*)

These form a very homogeneous group. We have no *Vanda* species in the highlands, but we do have quite a few *Sarcanthinae*. Some of these I have not been able to identify. One which I failed to keep alive in the Park is the beautiful and conspicuous *Vandopsis longicaulis* which flourishes on a tree right in Bulolo town, at about 800 m. It has long pendulous stems and large deep red and white blotched flowers. A very fine plant. Another plant with a *Vanda*-like habit is *Cleisostoma paludosa* which has branching sprays of small fleshy flowers with a combination of green, white and mauve. This is native to Mt Gahavisuka.

We do not have the beautiful species of *Sarcochilus* which occur in Australia, but we do have a few close allies. *Pteroceras chrysanthus* has axillary flowers of bright golden yellow and *Pteroceras uniflorus* has cream flowers with violet spotting on the labellum. We have another *Sarcochilus*-like orchid in the Park with pinkish-white flowers, reminiscent of a miniature *Phalaenopsis*. I do not know what it is (It is probably the highland *Grosourdya*; T M Reeve, pers. comm.).

Other smaller genera in this group are: *Robiquetia* which has pendulous spikes of red or orange flowers; *Calymmanthera* which has branched sprays of tiny white feathery flowers; *Schoenorchis* which also has branched inflorescences of minute flowers; and *Thrixspermum* which is found mostly in coastal habitats. However, we do have a small species of this genus which grows on small twigs in exposed situations. It has reddish leaves and very occasional flowers which last only a day. These are round and yellow, like small golden coins. It has not been identified.

One of the most curious orchids is a *Hymenorchis* species, a tiny plant which also grows on twigs, usually in very humid situations. The leaves and sepals are surely unique among orchids in being dentate. The flowers are translucent, almost colourless, like glass, with a green labellum. It is rare and elusive, but occurs in the Park.

The Most Curious of All

I refer to the extraordinary genera which come under the *Sarcanthinae*, and are placed last in Schlechter's Book, namely *Microtatorchis* and *Taeniophyllum*. *Microtatorchis*, as its name implies, is a minute orchid with tiny green flowers opening successively on a zigzag bracteate peduncle arising from a tuft of tiny leaves, but with long green ribbon-like roots. If often dangles from twigs in high mossy forest. We have one at the top of the Park. In *Taeniophyllum*, the leaves have entirely disappeared and the ribbon-like roots have taken over their function of photosynthesis. These too tend to dangle from twigs in very humid forest, but a few minute species grow on quite exposed shrubs. I used to have a species from the Daga country of the Milne Bay Province which had a white flower nearly 4 cm across, but it has since died. We do have two others with small yellow flowers in the Park, one with very extensive dangling roots. Specimens of all have been sent to Lae, but we have not yet had any identifications.

Conclusion

This concludes the epiphytes. It emphasises the enormous diversity and abundance of the orchids of the Papua New Guinea montane forests and the importance of conserving them as more and more mining and timber projects are opening up in this developing country. Papua New Guinea surely has the richest orchid flora in the world in relation to its area.