

Action Statement

Flora and Fauna Guarantee Act 1988

No. 123

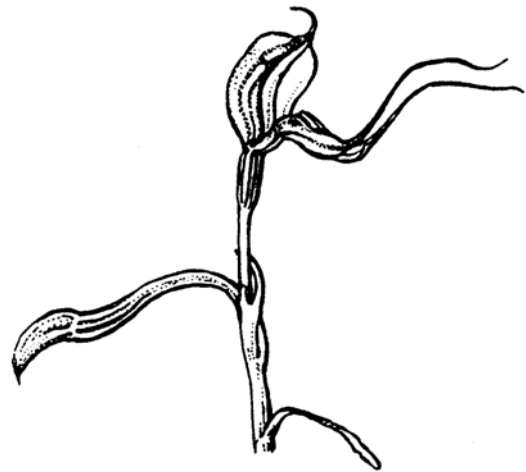
Lowly Greenhood *Pterostylis despectans*

Description and distribution

The Lowly Greenhood *Pterostylis despectans* (Nicholls) M.A. Clem. et D.L. Jones, is a small, inconspicuous, deciduous, terrestrial orchid. After an autumn dormancy survived by the root tuber, a rosette of five to ten leaves 1-1.8cm long and 6-9mm wide, appears in June (Backhouse and Jeanes 1995, Bishop 1996, Walsh and Entwisle 1994). The three or four stem-leaves are reduced to sheathing bracts. The rosette withers before flowering time.

The flowering stem reaches 5-8cm tall (Walsh and Entwisle 1994), though it is often only 2-3cm (Jones 1988). During the two to three month flowering period (December to January), it produces up to six short, stout flowers which are translucent grey-green to brown, very similar to the colour of the leaf litter in which it grows. These flowers are on slender stalks 1-3cm long, and open one at a time, facing downwards, often touching the soil, with their long sepals. The dark brown labellum, a specialised petal, springs closed when an insect or small object touches it, and has 6-18 pairs of marginal hairs (Walsh and Entwisle 1994, Jones 1988) as well as a pair of prominent, erect hairs at its base, which is constricted.

The Lowly Greenhood was originally described as *Pterostylis rufa* R. Br. var. *despectans* by Nicholls. It has also been informally referred to as *Pterostylis* R. Br. var. *despectans* (Blackmore et Clemesha). In 1989 it was classified as a separate species *Pterostylis despectans* by Clements and Jones (M.A. Clem. and D.L. Jones in Clements 1989). The name of 'Lowly Greenhood' has recently been assigned to the species, although it is not in common use.



Lowly Greenhood *Pterostylis despectans*



Distribution in Victoria

[from Flora Information System, NRE 2000]

The pre-European range of the Lowly Greenhood is not well known but it is likely that it occurred relatively widely in dry open woodlands between Stawell and Rushworth (J. Jeanes *pers. comm.*), and possibly extending into the Wimmera. Much of the area formerly supporting these woodlands is now cleared, and cropped or sown to introduced pasture. The species is believed to be extinct near Talbot at the site from which the type specimen was collected. Other specimens in the National Herbarium collection include some from near Ararat or Stawell. However the orchid is also presumed extinct in this area.

There is a specimen of a very similar plant in a private collection made by Mr. Alex Hicks, of Kaniva and now held by the Shire of West Wimmera. The specimen (labelled '*Pterostylis mitchelli*' - a species now recognised as *Pterostylis setifera*). This specimen came from near Kiata, east of Nhill, around 1960 (D. Beardsell *pers. comm.*) or in the 1950s (Beardsell 1985). This site supports a woodland dominated by Buloke *Allocasuarina luehmannii*, Black Box *E. largiflorens* and Weeping Pittosporum *Pittosporum phylliraeoides* with Bristly Wallaby-grass *Danthonia setacea* in the understorey (*ibid.*).

A herbarium record from 1947 describes the Lowly Greenhood as common around Maryborough (Beardsell 1985). Now, however, there are only six sites supporting the species - all in central-western Victoria, near Maryborough. These six sites have never been ploughed and have not been grazed for at least the last 20 years. One population, comprising about 150 plants dispersed in small clusters over approximately two hectares is on covenanted private land. Three populations of about 150 plants, dispersed in small clusters are found in State forest south of Maryborough. The fifth population, of about 10 plants covers only three square metres of State forest north of Maryborough. One other population is in the Paddy's Ranges State Park and consists of about 20 plants.

All recorded populations occur in flat or undulating woodlands or open forest, of Yellow Gum *Eucalyptus leucoxylon* and Grey Box *E. microcarpa*, or Yellow Gum *E. leucoxylon* and Yellow Box *E. melliodora*, with an understorey of Spreading Wattle *Acacia genistifolia* and Gold-dust Wattle *A. acinacea*. The narrow ecotone in which the orchid is found occurs between Red Gum *E. camaldulensis* woodland on adjoining lower elevations and Long-leaf Box *E. goniocalyx* and Red Box *E. polyanthemus* open forests on adjoining higher elevations (Beardsell 1985). The summers are hot and dry, the litter and diverse ground cover are sparse (70% bare ground, Beardsell 1985). The soil at the three extant sites sets rock hard in summer after flowering (G. Cheers, R. Bates *pers.*

comm.). Beardsell (1985) notes that one site becomes waterlogged in winter, but at least one of the remaining sites does not.

Current conservation status

ANZECC (1999)endangered (Aust.)

NRE (1999)endangered (Vic.)

SAC (1993) threatened (Vic.)

The Lowly Greenhood has been listed as a threatened taxon under the **Flora and Fauna Guarantee Act 1988**.

Reasons for conservation status

In its final recommendation the Scientific Advisory Committee (SAC 1993) has determined that the Lowly Greenhood is:

- in a demonstrable state of decline which is likely to result in extinction;
- significantly prone to future threats which are likely to result in extinction, and
- very rare in terms of abundance or distribution.

Major conservation objectives

1. To prevent further decline of the three existing populations. Therefore the threatening processes at these sites must be mitigated.
2. To increase the number of plants in the wild to 500 within a decade. A minimum number of populations, regarded as providing reasonable security against a single unexpected event eliminating the species, is five, so that the minimum in each population will need to be 200.

Management issues

Ecological issues specific to the taxon

One population of the Lowly Greenhood is informally monitored, and in the 1997/98 flowering season, only two plants flowered, neither setting seed. A dry spring preceded this result.

Habitat throughout the known and potential range of the orchid is fragmented and disturbed. This may have reduced the overall ability of the Lowly Greenhood to survive and reproduce. Specific disturbances in habitat suitable for the species have included clearing, cultivation, timber harvesting, stock grazing, gold exploration, fossicking and the introduction of rabbits and exotic grasses.

Grazing by rabbits is thought to be a major factor limiting the regeneration of some populations of the Lowly Greenhood (C. Beardsell *pers. comm.*). In the case of the population on private land, there

are no other green plants nearby to attract rabbits at the time of flowering (G. Cheers *pers. comm.*). While the rosette is so low to the ground it is unlikely to be grazed, the flower stems are vulnerable to rabbit grazing.

Stock grazing may have been a contributing factor in the extinction of the plant from most of its former range. However moderate stock grazing at non-flowering time may be beneficial to orchids especially in certain situations, in reducing competition from introduced grasses and native perennials (R. Bates *pers. comm.*, L. Morcom *pers. comm.*).

All the known sites are free from grazing by sheep or cattle. Grazing by hares may prevent the orchid from thriving but the severity of this grazing does not appear to be high.

White-winged Choughs *Corcorax melanorhamphos* dig up soil with their beaks, eat orchid tubers (I. Temby *pers. comm.*), and may also be able to relocate sites from one year to the next (C. Beardsell *pers. comm.*). Their numbers are not high in the area of the orchid, but a chance visit by a group of birds could decimate a population.

The Lowly Greenhood must have survived feeding by these native birds in the past, but with its lowered rate of recruitment, this pressure may be too much for the orchid to survive.

Assuming similarity with other *Rufa* group orchids the insect pollinator for this orchid is likely to be a Mycetophilid fly, or 'fungus gnat', although pollination of the Lowly Greenhood has not been observed (M. Clements *pers. comm.*). Other *Rufa* group orchids exude pheromones attractive to these flies and it is likely that the Lowly Greenhood is similar in this respect (C. Beardsell *pers. comm.*).

It is likely that breeding success of the orchid is reduced by low pollination rates (G. Backhouse, C. Beardsell *pers. comm.*). This is probably because the orchids become increasingly time consuming, per flower, for the flies to find as the flowers become scarcer. It is possible, though less likely, that an important habitat component for the fly is missing (Clements *pers. comm.*), so that the fly's numbers are low.

Inoculation of the germinating seed with the symbiotic fungus *Ceratobasidium cornigerum*, is essential for the orchid's successful germination and later survival (M. Clements *pers. comm.*). A reduction in the amount of leaf litter, and decaying grass roots on which the fungus is likely to feed (it may also feed on depleted supplies of fallen timber) may have reduced the viability of the orchid. Conversely, a build up of litter at the spot where an orchid is growing appears to suppress growth by excluding light to this small plant. A build-up of leaf litter, due to altered habitat

conditions, appears to be extinguishing the smallest population of the species. The fungus on which the orchid depends prefers bare patches of ground (Clements *pers. comm.*).

Nothing is known about the effect of fire on the Lowly Greenhood. The effect of fire on orchids in general is variable, encouraging some to flower and harming others (Backhouse and Jeanes 1995). Some *Pterostylis* species appear to be adversely affected by fire, taking several years to recover and rebuild their numbers (*ibid.*).

Observation of the small number of groups of plants at one site suggests that small patches (20 cm²) of moderate soil disturbance near adult plants promotes colonisation of new areas of ground by the orchid.

Echidnas and kangaroos may cause incidental damage to the plants.

Wider conservation issues

Land management favourable to the survival and recovery of the Lowly Greenhood is likely to also benefit other native plants in the area. The control of rabbits, for example, will benefit both other native plants and agricultural production on adjacent private land. Other rare or threatened species in the forests around Maryborough that may benefit from increased rabbit control and protection from vehicular disturbance include Weak Daisy *Brachyscome debilis*, Small Milkwort *Comesperma polygaloides*, Spreading Eutaxia *Eutaxia diffusa*, Clover Glycine *Glycine latrobeana*, Leafy Templetonia *Templetonia stenophylla* and the Sun-orchid *Thelymitra macmillanii*.

The potential need to control White-winged Choughs in the immediate vicinity of the orchid can be addressed, if required, without causing impacts to the local survival of this species.

Gold exploration and mining is a potential threat to the species. However, as the known populations occupy only a few hectares, restriction of mining from sites supporting the Lowly Greenhood orchid should occur as it will have negligible impact on these activities. Mining activity in the area has declined since the 1988-1994 mini-boom, which peaked in 1992-1993, when ephemeral "doze-and-detect" operators caused considerable damage in the area (N. Grollman, G. Cheers *pers. comm.*).

Illegal collection is thought to have resulted in the extinction of the former population of the Lowly Greenhood at Talbot around 1990-1991. Illegal collection also seriously threatens the extant populations. It is therefore important that the precise location of these populations is not disclosed. As well as the illicit excitement of cultivating a very rare orchid, some orchid enthusiasts also aim to prevent the extinction of

the plant by maintaining it in cultivation. However *ex situ* cultivation must be conducted in a strictly limited and coordinated way, with good probability of success, if it is not to further threaten the species. This cannot be achieved when whole populations are anonymously removed and possibly split up, their fate unknown. In addition, methods of propagation may exist which are less destructive of wild populations than removing whole plants.

The cooperation of orchid enthusiasts is required if conservation efforts are not to be undermined. For this, orchid enthusiasts need to be confident that public conservation efforts are effective. Therefore NRE needs to work with orchid groups.

Viruses that infect orchids and reduce their vigour are quite common in cultivated orchids and are a serious problem. If any orchids were returned to natural habitat after having been kept in a contaminated environment, this could infect the wild population and extinguish the Lowly Greenhood, given its already low rate of seed set.

Vehicular and foot traffic associated with firewood collection, rabbiting, fossicking and sightseeing may crush plants. There are a large number of tracks in the State forest concerned and this may promote traffic. Excessive soil disturbance from fossicking, rabbiting and wood collecting at sites where the orchid exists will damage plants.

Previous management action

Very little conservation work has been done on Lowly Greenhood.

Survey and monitoring

The Maryborough Field Naturalists Club has conducted numerous searches for the Lowly Greenhood around Maryborough. The Club has also counted plants in each of the three extant populations, and has conducted some subsequent monitoring.

Artificial Pollination:

Hand pollination has been attempted but the results were not monitored.

Site protection

Two groups of plants, within a single population on public/ private land have been fenced out from choughs and rabbits but no increase in the population in the fenced area has been observed.

Propagation

Symbiotic germination trials have been conducted in Canberra, with some success, and three plants have been grown from the resultant seedlings by

Helen Richards (*pers. comm.*). These plants lived for several years before apparently succumbing to waterlogging.

Intended management action

Management of the Lowly Greenhood in the wild will involve mitigating the known threats as well as promotion of seeding and monitoring and research. Several sites for reintroduction will need to be chosen, preferably on Public land.

Site protection - public land

1. Exclude firewood collection and other forest production activities from public land sites supporting Lowly Greenhood. Carefully planned and implemented thinning of trees may be considered at the sites with the specific purpose of aiding the survival of Lowly Greenhood.

Responsibility: NRE (NW Region)

2. Reduce the potential for off-road vehicle damage to the orchid by rationalising the track network on the public land sites supporting the orchid and ensuring that tracks that remain open are well maintained. Provision of appropriate parking areas would also be beneficial. Erect explanatory signs at suitable locations without revealing the precise location of the orchids.

Responsibility: NRE (NW Region), Parks Victoria

3. Protect sites supporting Lowly Greenhood from mining, intrusive exploration activities and gravel collection.

Responsibility: NRE (NW Region)

4. Cage plants at locations where populations are screened by shrubs. Cages would need to be checked frequently and cleared of litter build up and weed growth.

Responsibility: NRE (NW Region), Parks Victoria

Rabbit control

5. Investigate the best option for controlling rabbits. This is particularly important in the growing and flowering season and may include options such as rabbit proof caging or poisoning rabbits with 1080, near known populations just prior to flowering. There is a risk when using a bait-laying machine that some outlying plants would be dug up by the bait layer. If a machine were used to make a trail, the exact course to be driven with the bait layer should be carefully walked in winter, to make sure there are no plants on it, and this exact course marked for use in summer.

Responsibility: NRE (NW Region, Parks Flora and Fauna Division, Forests Service), Parks Victoria

Survey and monitoring

6. Survey suitable habitat between Stawell and Rushworth for Lowly Greenhood rosettes in winter. As the Lowly Greenhood is very hard to detect, unrecorded populations may still exist. However given the previous search efforts of orchid enthusiasts and the disturbed state of much of the potentially suitable habitat, it is unlikely that there will be many. This could include areas from Stawell to Rushworth (J. Jeanes pers. comm.). Extreme care should be taken searching for plants, as they are so well camouflaged when flowering that even orchid experts have accidentally crushed hidden plants while searching for them.

Responsibility: NRE (NW Region, Parks Flora and Fauna Division, Forests Service), Parks Victoria

7. Monitor populations annually, including measurement of natural rates of seed set and plant numbers. If possible it would be beneficial to monitor populations three times a year in order to count the number of rosettes that first appear in Autumn, the number of flowers that come up, the number of flowers per plant, natural pollination rates and reproduction success. Rates of seed-set amongst similar orchids is 10 to 20%.

Responsibility: NRE (NW Region, Parks Flora and Fauna Division, Forests Service), Parks Victoria

Artificial Pollination

8. Hand-pollinate some plants within populations and compare rates of seed-set of hand-pollinated plants with insect-pollinated plants. If hand-pollinated plants were significantly more productive, then low activity by pollinators would be indicated as a factor in the orchid's apparent decline. Hand pollination has been successful in the case of the Rosella Spider-orchid *Caladenia rosella* (G. Backhouse pers. comm.).

Responsibility: NRE (NW Region, Parks Flora and Fauna Division)

Propagation

9. Cultivate seed taken from wild populations in a securely quarantined location. A single fertile seed capsule may contain a thousand viable seed, thus providing ample to work with. The seed can be stored for several years in a deep freeze (Clements pers. comm.). *Ex situ* cultivation must be conducted under

strictly quarantined conditions, which must be sure to be maintained until the completion of the project, to avoid infecting wild populations with a virus transmitted by aphids and common in cultivated plants.

Responsibility: NRE (NW Region, Parks Flora and Fauna Division), Royal Botanic Gardens

10. Identify two sites for establishment of Lowly Greenhood. Commence the establishment of new populations at these sites if feasible. Paddy's Range State Park is a possible location. Fencing populations against rabbits and choughs is not recommended as this may inadvertently assist illegal collection of the species by alerting collectors to the site.

Responsibility: NRE (NW Region, Parks Flora and Fauna Division), Parks Victoria

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