

# Action Statement

Flora and Fauna Guarantee Act 1988

No. 82

## Yellow Hyacinth Orchid *Dipodium hamiltonianum*

### Description and Distribution

The Yellow Hyacinth Orchid (*Dipodium hamiltonianum* F.M. Bailey) is a leafless, terrestrial, saprophytic orchid with a flower stem up to 95 cm tall. It bears 3–25 flowers, each 45 mm across, which are bright yellow to dull yellowish-green and bear numerous scattered red or purple spots. The petals and sepals are widely spread and are not reflexed or recurved near the tips. The 20 mm long labellum is narrow and elongate and projects forward; it is pink/purple to white, with a tuft of white hairs extending from the callus to the tip. Detailed descriptions are given in Jones (1988), Walsh and Entwisle (1994) and Backhouse and Jeanes (1995).

For most of the year this orchid remains dormant underground as a large, fleshy, branched tuberous root. It is notable that it flowers during the hottest and driest months — December to February.

The Yellow Hyacinth Orchid is found on the eastern Australian coast from Queensland to East Gippsland. In Queensland and New South Wales it is reasonably common and grows in a wide range of habitats (Jones 1988). In the tropics it has been recorded from grassy habitats growing close to stream banks, while in the sub-tropics it favours coastal scrub and heathlands (Jones 1988). In Victoria, however, the Yellow Hyacinth Orchid is restricted to dry, generally north-facing slopes in shallow, well-drained granitic soil, and is confined to lower rainfall and rain-shadow areas.

The orchid is known in Victoria from only nine populations — seven on public land managed under the *National Parks Act* 1975, and two on private land. Victorian populations range from 1 to 58 plants, with a total population of 105 plants.

In the rain-shadow areas of East Gippsland, two populations (20 and seven plants respectively) near Wulgulmerang have been recorded, in the Alpine National Park (Cobberas-Tingaringy Unit) and Snowy River National Park. Rain-shadow woodland with White Box *Eucalyptus albens* dominates these sites (Clark 1976, Beaglehole 1981). There is also an as yet unconfirmed record of Yellow Hyacinth Orchid from Suggan Buggan River (Beaglehole 1981).

In the lower rainfall parts of north-eastern Victoria, seven populations have been recorded. Four are in the Beechworth area: one in Beechworth Historic Park (59 plants), two in Mt Pilot Multi-Purpose Park (each with two plants), and one on private land (1 plant). All are dominated by low open forest dominated by Red Stringybark (*E. macrorhyncha*), Red Box (*E. polyanthemus*), Blakelys Red Gum (*E. blakeyi*) and Black Cypress-pine (*Callitris endlicheri*).

The Yellow Hyacinth Orchid also occurs in Chiltern Regional Park (12 plants) and has recently been recorded on private land in the Chesney Vale area (2 plants), 18 km north-east of Benalla. Low open forest with an understorey of Daphne Heath (*Brachyloma daphnoides*), Erect Guinea-flower *Hibbertia riparia*, and Flat-leaf Bush-pea (*Pultenaea platyphylla*), Hairy Hop-bush (*Dodonaea boroniifolia*) and Cat's Claws (*Grevillea alpina*) respectively, dominate these sites. Out-cropping granite boulders (Devonian origin) are a feature of all these sites.

The remaining site (one plant) is within the Burrowa - Pine Mountain National Park, in the far north-east of Victoria.

## Conservation Status

### Current Status

CNR (1994)                      Endangered in Victoria

SAC (1995)                      Threatened in Victoria

The Yellow Hyacinth Orchid is listed as a threatened taxon in Schedule 2 of the *Flora and Fauna Guarantee Act 1988*.

### Reasons for Conservation Status

Yellow Hyacinth Orchid is known from only nine widely spaced localities with a total population of 105 flowering plants recorded. The extremely small population sizes and fragmentation make it vulnerable to threats which could result in the extinction of this species in Victoria.

The browsing of flower spikes by native and introduced herbivores, coupled with infrequent spike production and the development of few pods, is thought to be an important factor which limits the abundance of the Yellow Hyacinth Orchid. Other possible threats include road works, weed invasion, flower spike collection, altered fire regimes, and trampling.

In its final recommendations, the Scientific Advisory Committee (1996) determined that the Yellow Hyacinth Orchid is:

- significantly prone to future threats which are likely to result in extinction; and
- very rare in terms of abundance or distribution.

### Major Conservation Objectives

The major conservation objectives are to:

- protect, enhance and ensure the viability of all known Yellow Hyacinth Orchid populations, .
- accurately determine the species' distribution, .
- increase the total population from 105 to 250 by the year 2001; and .
- reach 500 plants and reduce the conservation status from endangered to vulnerable by 2010.

## Management Issues

### Ecological Issues Specific to the Taxon

Other than a few evergreen tropical species, members of the genus *Dipodium* have no leaves and contain virtually no chlorophyll. The Yellow Hyacinth Orchid must therefore rely almost entirely on mycorrhizal fungus associations for its

supply of nutrients. Some hyacinth orchids appear to need a specific mycorrhizal fungus, while other species of orchids host a wide range of fungi (Backhouse & Jeanes 1995). It is not known whether the Yellow Hyacinth Orchid needs a specific mycorrhizal fungus or whether the mycorrhizal relationship is maintained for the entire life cycle.

The symbiotic relationship with mycorrhizal fungi has been described for the Purple Hyacinth Orchid *D. punctatum*, a close relative of the Yellow Hyacinth Orchid, by Jones (1988). He suggests that the Purple Hyacinth Orchid, although growing in soils depleted of humus, is able to survive due to a complex interchange between its swollen tuberous roots, a symbiotic fungus, and the live roots of a species of plant belonging to the Myrtaceae family (usually a eucalypt). The fungus is parasitic on the eucalypt roots and also invades the surface cells of the orchid. At some stage of the invasion it is possible that the orchid digests all of the fungus material in its cells as well as obtaining the nutrients brought in from the tree by the fungus.

Anecdotal reports (1990) of the death of two plants in the Beechworth Historic Park population following inadvertent penetration by wooden stakes (installed to monitor orchids) suggest Yellow Hyacinth Orchid's large tuberous root is sensitive to disturbance or damage.

The Yellow Hyacinth Orchid reproduces from seed. Generally one flower spike is produced, although the tuberous root of *Dipodium* species can become quite large and may send up more than one flower spike (Backhouse & Jeanes 1995). Individual orchids vary in their frequency of spike production. Since intensive monitoring commenced at Chiltern and Beechworth (1990), no individual has flowered every year. Furthermore, the majority have flowered only once or twice in five years, and only a few have flowered four times in that period.

Specific invertebrate pollinators of the Yellow Hyacinth Orchid are unknown. However Jones (1988) and Backhouse and Jeanes (1995) suggest that the flowers of *Dipodium* species may be pollinated by small native bees or wasps, which are attracted to the flowers, possibly by floral mimicry. Jones (1988) has observed wasps removing pollinia from the flowers of the Northern Hyacinth Orchid *D. stenochilum*. Yellow Hyacinth Orchid pod production has only rarely been recorded in Victorian populations. However, very limited hand-pollination trials have proved successful. It is possible that the small orchid populations fail to adequately attract appropriate pollinators, or that the pollinators are themselves uncommon.

Four genera of wingless ants (*Notoncus*, *Monomorium*, *Aphaenogaster* and *Phelidole*, in the order Hymenoptera) have been recorded on Yellow

Hyacinth Orchid. The significance of this is not known, as their role (if any) in pollination is considered only accidental (Yen, *pers. comm.*). However, they appear to 'milk' a substance from the base of each flower, near the junction with the main flower stalk. A symbiotic relationship may exist, where the ants obtain an exudate in return for protecting the flowers from invertebrate grazing.

Although sporadic, browsing by native herbivores (mainly Black Wallabies, *Wallabia bicolor*) has a significant impact due to the relatively low flower and pod production of this orchid. Wallabies usually snip the flower spike towards its base, yet do not appear to eat either the remaining piece or the cut-off spike. Introduced herbivores (the European Rabbit, *Oryctolagus cuniculus*) are present in the orchid habitat and represent an additional threat. Grazing of flowers by insects (particularly grasshoppers) has also been recorded but is not considered a significant threat. The combined impact of browsing and grazing contributes to reduced flowering and pod production.

The impact of altered fire regimes and the susceptibility of Yellow Hyacinth Orchid to fire is not known. However, Backhouse & Jeanes (1995) indicate that the flowering of *Dipodium* species in general appears to be largely unaffected by fire, and Willis (1970) states that the Purple Hyacinth Orchid flowers well after fires.

Weed invasion is considered to be a low threat due to the harsh habitat in which the orchid grows. Furthermore, annual exotic grasses, such as Large Quaking-grass (*Briza maxima*) which are the main weeds present, have generally died off by the flowering time of the Yellow Hyacinth Orchid. However, the close proximity of some sites to townships and roads may exacerbate future weed problems.

One of the Wulgulmerang populations is located immediately adjacent to a popular tourist road and is potentially threatened by road maintenance, widening, realignment or landslip.

The removal of the tuberous roots of the Yellow Hyacinth Orchid by orchid enthusiasts is unlikely to be a major problem. Due to its close symbiotic relationship with mycorrhizal fungi, the orchid cannot be successfully transplanted or cultivated. Jones (1988) states that attempts to transplant species in the genus *Dipodium* into garden situations result in the death of the orchid. Transplanted specimens may flower, but this is usually a last fling before the death of the plant. The collection of flower spikes is nonetheless a potential threat at more readily accessible sites. Indeed, collection has occurred in the past at Beechworth (Ingrams Rock) (Gladstone, *pers.*

*comm.*), and the species is now thought to be extinct at that locality.

Trampling and the consequent soil compaction associated with monitoring populations of the Yellow Hyacinth Orchid and recreation is a minimal threat to populations of this orchid.

#### **Wider Conservation Issues**

Conservation of the Yellow Hyacinth Orchid will benefit flora and fauna associated with its preferred Granite Hills Woodland vegetation community. Rare or threatened species that would particularly benefit include the Hairy Hop-bush (*Dodonaea boroniifolia*), Carpet Python (*Morelia spilota variegata*), and Turquoise Parrot (*Neophema pulchella*) at Chesney Vale, and Slender Bottlewashers (*Enneapogon gracilis*) and Large Tick-trefoil (*Desmodium brachypodum*) at the Alpine and Snowy National Park locations.

#### **Social and Economic Issues**

Actions to achieve the major conservation objectives will involve only minor social or economic issues.

The intended management actions can all be implemented at a relatively low cost. Although sites are geographically widespread, NRE actions are consistent with and can be incorporated into existing work programs.

Community group participation in the Botanic Guardians scheme will improve public awareness and increase involvement in rare plant species management.

Future road maintenance, widening or realignment may be restricted at one site where the Yellow Hyacinth Orchid occurs, but will only result from cooperative agreement with VicRoads and local authorities.

On private land, conservation actions will only proceed with the voluntary agreement from landholders. Virtually no impacts to current grazing and fire prevention programs will result from proposed activities. The Beechworth private land site is not grazed and the landholder is keen to protect this site. The Chesney Vale site is already fenced, however sheep very infrequently are allowed to graze within this area. In 1996 the landholder placed a wire mesh guard around one of the orchids to afford it protection against native and introduced herbivores and is also interested in the conservation of the species.

#### **Previous Management Action**

##### **Wulgulmerang Populations**

Populations were first discovered in 1966. La Trobe University commenced monitoring in 1984, after

which the Bairnsdale Field Naturalists Club were involved periodically. In 1985 VicRoads participated in an on-site inspection of orchids adjacent to the Bonang-Gelantipy Rd site. In 1996 NRE commenced detailed monitoring and mapping, with all flowering plants protected with mesh guards.

#### **Chiltern Regional Park**

First known from a herbarium specimen obtained from the then Chiltern State Forest in 1974, this population was rediscovered in 1992. A wire mesh guard was erected around the single orchid to protect the flower spike from browsing by native and introduced herbivores. In conjunction with Friends of Chiltern Park, detailed monitoring and mapping commenced in 1993, and an additional 10 orchids were recorded. Hand-pollination resulted in pods on three orchids.

#### **Beechworth Historic Park**

Two orchids were apparently killed in 1990 when monitoring markers were accidentally driven into the tubers. In 1992 NRE commenced detailed monitoring incorporating mapping and non-intrusive marking of orchid localities.

#### **Chesney Vale**

New population of two orchids were discovered on private land in 1996. The landholder placed a tree guard over remaining unbrowsed specimen.

#### **Intended Management Action**

The intended management actions will be implemented by NRE's North East and Gippsland Regional Parks and Flora and Fauna staff, with the assistance of community groups including 'Friends' groups and Field Naturalist Clubs.

#### **Monitoring**

1. Undertake annual monitoring of individuals in all known populations, at flowering time and later if possible, to assess pod production (NRE and local naturalists).
2. Mark and number individual orchid locations (avoiding soil disturbance) and undertake detailed mapping to facilitate future monitoring. Staking of plants is not to be permitted.
3. Assess threats to the known populations of this orchid and evaluate the success of any previous management on an annual basis.
4. Establish permanent photographic point and complete Victorian Rare or Threatened Population (VROTPop) forms and undertake quadrat survey for all known populations.
5. Undertake training of Parks and other NRE staff to facilitate field identification and

ecological monitoring of the Yellow Hyacinth Orchid.

#### **Protection from Herbivores**

6. Search sites at which Slender Goodenia or Swamp Goodenia have previously been recorded in North-east Victoria as they may have been mis-identified.
  - small populations (<10 plants): guard all flowering plants;
  - larger populations (10 +): guard 50% of flowering plants;
  - discretion to be exercised where sites are adjacent to public access (guards should not attract undue public attention).
  - no penetration of the ground (stakes or wire pins) is permitted, particularly within 50 cm of flower spikes. Guards may be attached to existing vegetation where possible.

Note: These actions will also be encouraged on private land.

#### **Pest Plants and Animals**

7. Monitor rabbit activity and weed infestation, and where necessary implement control programs in the vicinity of Yellow Hyacinth Orchid populations.

#### **Survey**

8. Undertake surveys in suitable habitat (dry, generally north facing slopes, with outcropping granite boulders of Devonian origin) in East Gippsland and north-eastern Victoria for other populations.
9. Validate the Mt Pilot and Burrowa-Pine Mountain National Park populations and undertake systematic searches in areas such as Mount Lawson, Chesney Vale Hills, Warby Range State Park, Mt Mitta Mittite.
10. Conduct systematic searches to validate Little Suggan Buggan River records.

#### **Pollination**

11. Develop a hand-pollination protocol for Yellow Hyacinth Orchids. Conservative protocol prescriptions under consideration for the pollination of individual flowers (generally low on spike) are as follows:
  - small populations only (<10 plants): 1-3 flowers per plant, ensuring cross-pollination from flowers of different plants if possible (up to 25% of plants pollinated), and

- larger populations: 10% of plants pollinated.

#### **Liaison**

12. Provide biological and management information and incentives (e.g. through the Land Protection Incentives Scheme) to landholders to conserve the Yellow Hyacinth Orchid on private land.
13. Encourage landholders to participate in the Land for Wildlife scheme, and promote the Trust for Nature's Conservation Covenant process.

#### **Public Authority Cooperative Agreement**

14. Liaise with VicRoads (and Shire) to develop a Public Authority Cooperative Agreement, including the erection of significant roadside area sign (low key environmental markers) to alert roadside workers in the Wulgulmerang (Bonang - Gelantipy Rd) area and negotiate guidelines relating to road maintenance, widening or alignment.

#### **Community Involvement**

15. Encourage local 'Friends of Parks' groups and field naturalists to participate in the conservation of the Yellow Hyacinth Orchid by promoting the use of the Botanic Guardians scheme. Assist groups with monitoring and searching new areas.

#### **Other Desirable Management Action**

##### **Research**

16. Encourage research into the ecological and biological requirements of the Yellow Hyacinth Orchid. In particular promote research into the role of insects in pollination.
17. Encourage research to identify and, if possible, isolate the mycorrhizal fungus that forms an association with the Yellow Hyacinth Orchid and other hosts of the fungus.
18. Encourage cultivation trials using asymbiotic seed germination or tissue culture, and symbiotic seed germination

#### **Legislative Powers Operating**

##### **Legislation**

*Catchment and Land Protection Act 1994* — provides for integrated management and protection of catchments, participation of the

community and a system of controls for noxious weeds and pest animals.

*Conservation Forests and Lands Act 1987* — provides for the management of public land under the Act, the coordination of legislation administered by NRE and for the preparation of codes of practice.

*Crown Land (Reserves) Act 1978* — provides for reserving areas as public land and for making a specific reservation status for existing public land.

*Country Fire Authority Act 1958* — provides for fire protection and suppression in country areas and requires that authorities take practical steps for the prevention of fires.

*Fences Act 1968* — provides guidelines for the control, maintenance and repair of dividing fences for landholders.

*Flora and Fauna Guarantee Act 1988* — provides for the protection of flora and fauna in Victoria, and the declaration of critical habitat if so designated.

*Local Government Act 1958* — provides for local council by-laws and conservation regulations (e.g. permit requirement for land clearing).

*National Parks Act 1975* — provides for the preservation, protection and management of natural areas and includes controls over taking native flora and fauna from parks.

*Planning and Environment Act 1987* — provides for the protection of native vegetation through the State section, and for regional planning controls in all planning schemes.

*Victorian Conservation Trust Act 1972* — provides for the establishment of conservation covenants on land titles.

##### **Licence/Permit Conditions**

Permits for the collection of Yellow Hyacinth Orchid pods or vegetative material will be granted only for work which is in accordance with the conservation objectives and management actions.

Permits for the collection of entire tuberous root systems will not be issued. Permits for root tissue collection will only be considered where it can be demonstrated that the activity will not have adverse effects.

##### **Consultation and Community Participation**

The following individuals and organisations were consulted during the development of this Action Statement:

- Bairnsdale Field Naturalists Club
- Friends of Chiltern Park .

- Peter and Phil Branwhite .
- Private landholders .
- La Trobe University, Department of Environmental Management and Ecology, Wodonga Campus .
- Jeff Jeanes, National Herbarium, Melbourne (MEL) .
- Gary Backhouse, NRE Melbourne .
- David Jones, Botanist, National Botanical Gardens, Canberra .
- Alan Yen, Senior Curator, Invertebrate Survey Department, National Museum of Victoria .
  - Flora and Fauna and National Parks Service staff from North East and Gippsland Regions

The North East and East Gippsland Catchment and Land Protection Boards will be kept informed of progress in the implementation of this Action Statement.

#### Implementation, Evaluation and Review

The NRE Regional Managers in the North East and Gippsland Regions will coordinate the implementation of this Action Statement. Primary responsibility for implementation and assessment of the effectiveness of the management actions lies with Flora and Fauna Management Officers and Parks Victoria. In line with the major conservation objectives, the results of monitoring will be assessed annually. The action statement will be reviewed in 2002.

#### Contacts

##### Management

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Parks Victoria Chief Ranger

##### Biology

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J. Jeanes, National Herbarium, Melbourne (MEL)  
D. Jones, National Botanic Gardens, Canberra

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#### Personal Communications

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Further information can be obtained from Department of Sustainability and Environment Customer Service Centre on 136 186.

Flora and Fauna Guarantee Action Statements are available from the Department of Sustainability and Environment website: <http://www.dse.vic.gov.au>

This Action Statement was first published in 1997 and remains current. This version has been prepared for web publication. It contains the original text of the Action Statement, but the layout has been updated to conform to the Department of Sustainability and Environment standards.

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