

Action Statement

Flora and Fauna Guarantee Act 1988

No. 200

Purple Diuris

Diuris punctata var. *punctata*

Description and distribution

Purple Diuris or Purple Donkey-orchid (*Diuris punctata* var. *punctata*) is a deciduous, geophytic herb, growing up to 50 cm in height. Plants are erect, with 1 to 3 linear green leaves up to 25 cm in length. Flowers number one to 10 per plant, are mauve to purple, often with darker purplish blotches, and yellow at the base of the labellum. Lateral sepals are greenish brown, narrow and up to 60 cm in length. The flowering season is from October to November. For systematics and a more detailed description see Flora of Victoria Vol 2 (Walsh & Entwisle 1994) or Backhouse & Jeanes (1995)

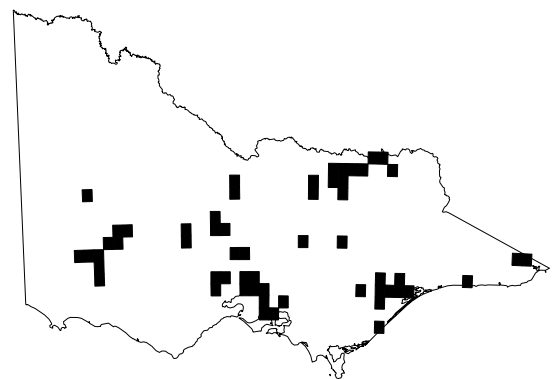
Purple Diuris exhibits considerable variation in flower, shape and size, and may be difficult to distinguish from the closely related species Wedge Diuris (*Diuris dendrobioides*), with which it coexists in northern Victoria, and Sunshine Diuris (*Diuris fragrantissima*), an endangered species known from a single wild population near Melbourne.

In northern Victoria, Purple Diuris is distinguished from Wedge Diuris on the basis of flowering time and flower colour, which are distinctive. However, populations of Purple Diuris in Gippsland display considerable variation in both flowering time and flower colour; indeed Bishop (1996) has defined a taxon *Diuris* sp. aff. *dendrobioides* (Bairnsdale) as a separate entity within the *Diuris punctata* var. *punctata* complex. The presence of a fragrant form, that does not readily key out to *D. punctata* var. *punctata* has also been noted in Gippsland (F. Coates, pers. comm.) This separate entity is not formally recognised in Victoria.

Purple Diuris is distributed widely across lowland areas of Victoria including the Dundas Tablelands, Greater Grampians, Goldfields, Victorian Volcanic



Purple Diuris,
Diuris punctata var. *punctata*
(Photo: John Eichler)



Distribution in Victoria (DSE 2004)

Plain, Gippsland Plain, Victorian Riverina, Northern Inland Slopes, East Gippsland Uplands and East Gippsland Lowlands bioregions. Old records exist from the Wimmera, Highlands Southern Fall and Central Victorian Uplands, but the species is presumed extinct there now.

This distribution (Figure 1) suggests Purple Diuris was formerly widespread and common throughout its range in Victoria. Purple Diuris has also been recorded from the south east corner of South Australia, where it is now presumed extinct (Weber & Bates 1986), the ACT, New South Wales and Queensland.

A total of 67 extant populations are known in Victoria, with strongholds in Gippsland, north east Victoria and south west Victoria.

Habitat

Purple Diuris occurs principally in lowland native grasslands, grassy woodlands, heathy woodlands and open heathlands, usually on fertile, loamy soils and including periodically inundated areas.

Dominant understorey species growing with Purple Diuris include Kangaroo Grass (*Themeda triandra*) with a diverse range of grasses and forbs, including peas, lilies and daisies typically found in temperate grassland ecosystems. In wetter sites, sedges including *Lepidosperma* spp., *Gahnia* spp., and Mat-rush (*Lomandra* spp.) may form a large component of the understorey. In heathy sites Purple Diuris commonly occurs with Prickly Tea-tree (*Leptospermum continentale*) or Burgan (*Kunzea ericoides sens. lat.*).

Where present, overstorey trees include River Red Gum (*Eucalyptus camaldulensis*), Forest Red Gum (*E. tereticornis*), Blakely's Red Gum (*E. blakelyi*), Manna Gum (*E. viminalis*), Snow Gum (*E. pauciflora*), Swamp Gum (*E. ovata*) or Black Sallee (*E. stellulata*).

Life history and ecology

Purple Diuris survives the dry summer period as a dormant underground tuber. Reproduction is vegetative from tuberoids, or from seed. With the onset of autumn rains, daughter tuberoids commence growing, with early leaf shoots emerging as early as March or April, depending on seasonal conditions. Growth continues until flowering, usually in October or November. The majority of plants produce flowers in their second or third year (G. Johnson, *pers. comm.*) and individual plants may live for 15-20 years (M. Clements, *pers. comm.*). Flowers wither immediately after pollination occurs, and maturation of seed continues through to the end of December, when foliage dries off and capsules dehisce, dispersing millions of microscopic seeds.

Flowers are insect pollinated in the wild, with extremely variable success rates reported. Even in large populations of Purple Diuris and a relatively intact flora, less than 5% of plants may set seed (J. Hoey, *pers. obs.*; G. Johnson, *pers. obs.*). Hand pollination of plants with fresh pollen can be achieved with relative ease (G. Earl, *pers. obs.*).

Despite the potential to produce abundant seeds, there is little evidence to suggest that recruitment from seed occurs on a grand scale. Impediments to germination may include insect predation on seed, competition for resources, and unsuitable soil conditions or fungal concentrations.

Like all terrestrial orchids, Purple Diuris maintains a symbiotic association with mycorrhizal fungi in the soil. Germination from seed cannot occur without fungus, and it is suspected that long term survival of terrestrial orchids depends on the right fungus being present. Unless plants are infected by the right fungus from the wild, they will probably decline over time, progressively exhausting the tuber reserves until they are gone (R. Raleigh, *pers. comm.*)

Little is known about seedling development in the wild, although propagation from seed has been undertaken (M. Clements, *pers. comm.*). Seed has been germinated asymbiotically (without the fungal host).

Plants growing in *Themeda*-dominated grassland or heathy woodland appear to benefit from periodic burning. In a high quality grassland remnant in Gippsland, where Kangaroo Grass dominates the understorey, Purple Diuris flowering reached a peak 2 years after spring burning took place. Regular burning at sites where heavy biomass accumulation occurs (>4 t/ha), reduces competition for light and other resources for native grassland herbs, including Purple Diuris.

The timing of burns may influence the immediate response of Purple Diuris plants. Ideally burning in the height of summer (Jan-Feb), after seed has matured and before plants have resprouted, is desirable. For a number of reasons burning at that time is not often undertaken, being instead scheduled for spring or autumn. Where burning damages growing stems, as may happen with spring or autumn burns, flower production may be terminated or disrupted for that particular season, which may explain why Lunt (1994) recorded optimal flowering in the second season after a fire (I. Lunt, *pers. comm.*).

Encroaching shrubs or trees may render sites unsuitable for the orchid's survival, e. g. in heathy sites. Regular burning is a management tool that may also assist the maintenance of Purple Diuris at such sites.

Biomass reduction through slashing or mowing may also achieve a desirable outcome for Purple Diuris, and may be more suitable in circumstances where the use of fire is problematic, e.g. near populated areas. However, slashing increases the potential for weed dispersal at a site, particularly if aggressive species like Chilean Needle-grass and Serrated Tussock are present, and is not recommended in these situations.

Conservation status

National conservation status

Purple Diuris has not been listed under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999.

Victorian conservation status

Purple Diuris has been listed as threatened under the **Flora and Fauna Guarantee Act 1988**.

Purple Diuris is considered 'vulnerable' in Victoria according to "Advisory List of Rare or Threatened Vascular Plants in Victoria - 2003" (DSE 2003).

Decline and threats

On the basis of 1999-2000 information, it is estimated a minimum of 50 000 plants survive in the wild in Victoria. This number is undoubtedly an underestimate, as in practice only flowering plants are reliably counted. It is possible that the actual number of plants could be ten times greater.

Purple Diuris is confined to 67 populations in 9 bioregions, with over half of these occurring along road and rail reserves in Gippsland, Port Phillip and North East regions. Substantial populations occur on private property in south west and north east Victoria, and also in cemeteries in Gippsland. A further 41 populations are presumed extinct (38% of all known sites)

Five populations occur in national parks, but only two of these, both in Croajingolong National Park have substantial numbers of individuals. In the Grampians National Park plants have not been reported since 1991 and may now be extinct there. A further 7 populations occur in other conservation reserves.

The largest populations occur on rail reserves in Gippsland and the north east, and on private property in the south west and the north east. These represent about 90% of the total population (Table 1).

Conservation of Purple Diuris is hampered by its lack of representation on land designated for conservation, and its dependence on appropriate habitat management, both on public and private land. The inability of agencies to meet the management requirements of Purple Diuris, due to

resource limitations and the relatively moderate conservation priority of the species, means that some populations will not be appropriately managed, to the point where they are ultimately extinguished.

Although numerically abundant in Victoria, Purple Diuris has undoubtedly undergone a dramatic decline in both extent and numbers. Willis (1970) commented that Purple Diuris was "once locally common but now with much reduced range and becoming rare through destruction of its habitat".

It is not unreasonable to speculate that the scale of its demise parallels that of lowland temperate grassland, the ecosystem with which Purple Diuris is closely associated. Less than 1% of lowland temperate grassland now remains in Australia (McDougall & Kirkpatrick 1994). Lunt (1994) estimated between 50-110,000 flowering plants per hectare at a good quality grassland site in Gippsland, giving some indication of the historical population densities that Purple Diuris must have attained across native grasslands in Victoria.

While the historical loss of populations is beyond dispute, it is not clear whether an overall decline in the remaining Purple Diuris plants is still occurring. Detailed monitoring of Purple Diuris populations really only commenced in the early 1990s, and the few continuing studies demonstrate that flowering rates fluctuate enormously with seasonal and climatic conditions, irrespective of management (Lunt 1994; G. Johnson unpubl. data)

Key threats to the survival of Purple Diuris include:-

- competition for resources from weeds and other native plants, including grasses, shrubs or trees. In grassy sites this is frequently associated with an absence of burning or slashing to remove accumulated biomass.
- grazing by native and introduced herbivores.
- soil disturbance associated with road/rail maintenance, or with agricultural practices such as cropping, trampling, grazing, ploughing, fertiliser application.
- recreational damage caused by heavy trampling, vehicle traffic
- illegal collection of plants.

Throughout the last two decades, significant efforts to conserve native *Themeda* grasslands have provided great benefit to Purple Diuris populations. In particular, fencing, signposting, burning and education awareness programs have assisted Purple Diuris conservation.

Regardless of tenure, it appears that populations actively managed to control threatening processes, may be stable or increasing in numbers. In contrast, those populations in sites that have not

been actively managed for orchid conservation continue to decline, with some approaching local extinction.

In the medium term, it is likely that the numbers of populations of Purple Diuris will continue to decline, but the overall numbers of plants may remain stable, or even increase.

Existing conservation measures

- monitoring of some key populations
- regular burning and weed control in Themeda grasslands
- control of grazing and trampling, including fencing and signposting
- restrictions on collection through permit system
- informal management agreements with landholders and management authorities
- ad hoc translocation

Conservation objectives

Long term objective

By the year 2011 Purple Diuris will be securely represented in all bioregions where it currently occurs. In identified key populations, prescribed management practices will be undertaken, achieving stable or increasing numbers of plants. Measures to consolidate smaller populations, will ensure that genetic variation is conserved in each bioregion. Populations on private land will be managed cooperatively with landholders. Research into reproductive mechanisms will develop methods for in-situ recruitment of plants and protection of genetic variation within the taxon.

Objectives of this Action Statement

1. Within 2 years locate and accurately document all extant populations of Purple Diuris. Specific and urgent attention should be given to those populations not confirmed in the last 5-10 years which are potentially extant (see Supporting Documents).
2. Identify key populations necessary to maintain bioregional representation. Key populations for each bioregion occur in
 - high quality sites, and/or
 - sites supporting large populations, and/or
 - sites where conservation is already a priority, including road and rail reserves managed for native grassland conservation, and/or
 - sites giving broad representation of habitats, and/or
 - sites where translocation of plants could occur.

3. Ensure clear monitoring and management programs are implemented for key populations of Purple Diuris.
4. Maintain or increase plant numbers in key populations .
5. Conserve genetic material particularly from small, declining populations.

Intended management actions

The intended management actions listed below are further elaborated in DSE's Actions for Biodiversity Conservation (ABC) system. Detailed information about the actions and locations, including priorities, is held in this system and will be provided annually to land managers and other authorities.

Site identification

1. Identify and map key populations of Purple Diuris.

Responsibility: DSE Regions, Parks Victoria

Threat assessment

2. Assess threats and prepare site management plans for key populations of Purple Diuris, including those within conservation reserves.

Responsibility: DSE Regions, Parks Victoria

Monitoring

3. Monitor all populations not assessed in the past 5 years that are likely to be extant. Record monitoring information on VROTPop or similar database.

Responsibility: DSE Regions, Parks Victoria

Site management

4. Undertake management at key sites to reduce competition from weeds, grasses, trees and shrubs. Comprehensive and regular management for all key populations, including, biomass reduction where required, grazing management, vehicle and visitor management. Consideration of Purple Diuris in management of other native grassland sites, where relevant. Management at other (non-key) sites, where resources permit. Record management actions on VROTPop or similar database.

Responsibility: DSE Regions, Parks Victoria

5. Encourage the protection and rehabilitation of riparian zones in areas containing populations of Purple Diuris.

Responsibility: Catchment Management Authorities

6. Improve community awareness of Purple Diuris and provide opportunities for the

involvement of community groups in conservation activities.

Responsibility: DSE Regions

Landholder liaison

7. Liaise with landholders to achieve sympathetic management for Purple Diuris populations on private land.

Responsibility: DSE Regions, Trust for Nature

8. Provide advice about grazing management for Purple Diuris conservation.

Responsibility: DSE Regions, Trust for Nature

9. Investigate options for covenants and/or Land for Wildlife participation.

Responsibility: DSE Regions, Trust for Nature

Management agreements

10. Establish Public Authority Management Agreements for other public land sites. Provide advice and management guidelines to land managers. Facilitate education and training for contractors.

Responsibility: DSE Regions

Ex situ conservation and translocation

11. Collect and store seed from small or declining populations.

Responsibility: Royal Botanic Gardens, DSE Biodiversity & Natural Resources Division, DSE Regions

12. Investigate translocation as an option for consolidating plants from small populations in decline.

- establish trials to determine whether translocation of plants from non-viable populations at insecure sites, could be successfully relocated into suitable sites with clear conservation objectives.
- ensure all trials are documented comprehensively.

Responsibility: DSE (Biodiversity & Natural Resources Division)

13. Investigate taxonomy of Purple Diuris plants in Gippsland; clarification of taxonomy assigned to plants in Gippsland by Bishop (1996) is desirable.

Responsibility: Royal Botanic Gardens, Melbourne

14. Investigate in-situ recruitment by germination of seed: establish trials to determine whether broadcasting of seed in situ, could be utilised as a method of recruiting Purple Diuris into suitable sites with clear conservation objectives.

Responsibility: DSE (Biodiversity & Natural Resources Division)

References

- Backhouse, G. & Jeanes, J. (1995) *The Orchids of Victoria*. Melbourne University Press, Melbourne.
- Bishop A. (1996) *Field Guide to the Orchids of New South Wales and Victoria*. UNSW Press, Sydney.
- DSE (2003) *Advisory List of Rare or Threatened Vascular Plants in Victoria - 2003*. Department of Sustainability and Environment, East Melbourne, Victoria.
- Jessop, J.P. & Toelken, H.R. (1986) *Flora of South Australia*, Part IV, South Australian Government Printing Division, Adelaide.
- Lunt, I. D. (1994) Variation in flower production of nine grassland species with time since fire, and implications for grassland management and restoration in *Pacific Conservation Biology* Vol.1: 359-366.
- McDougall, K. & Kirkpatrick, J.B. [eds.] (1994) *Conservation of Lowland Australian Grasslands in South-eastern Australia*. Worldwide Fund for Nature, Sydney.
- NRE (2000) *Victorian Flora Information System*, Spring 1998. CD-Rom, Viridans Biological Databases and the Department of Natural Resources and Environment: Victoria.
- SAC (1992) Final recommendation on a nomination for listing: *Diuris punctata* (nomination No. 163). Flora and Fauna Guarantee, Scientific Advisory Committee. Department of Conservation & Natural Resources: Melbourne.
- Walsh, N. G. & Entwisle, T. J., [eds.] (1994) *Flora of Victoria Volume 2. Ferns and Allied Plants, Conifers and Monocotyledons*. Melbourne: Inkata Press.
- Weber, J.Z. & Bates, R. (1986) *The Orchidaceae*, in Jessop & Toelken (1986)

Compiled by Gillian Earl and Tim Barlow (consultants) for the Department of Sustainability and Environment.

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 has been prepared under section 19 of the Flora and Fauna Guarantee Act 1988 under delegation from Professor Lyndsay Neilson, Secretary, Department of Sustainability and Environment, September 2004.

© The State of Victoria, Department of Sustainability and Environment, 2004

Published by the Department of Sustainability and Environment, Victoria. 8 Nicholson Street, East Melbourne, Victoria 3002 Australia

This publication may be of assistance to you but the State of Victoria and its employees do not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for any error, loss or other consequence which may arise from you relying on any information in this publication.

ISSN 1448-9902

Appendix 1 – Distribution and abundance of Purple Diuris in Victoria

Bioregion	Number of populations			Known no of plants		Tenure - % of plants/bioregion (number of extant pop'ns)				
	Extinct	Extant	TOTAL	pre1991	1999-2000	National Park	Cons'n Reserve*	Other Public**	Road/Rail	Private
Wimmera	1	0	1	0	0	-	-	-	-	-
Dundas Tablelands	1	8	9	?	4000-6000	-	0.3 (1)	-	2.7(2)	97.0(5)
Greater Grampians	2	3	5	c50	?	100(3)	-	-	-	-
Goldfields	7	2	9	?	?	-	-	?(1)	-	?(1)
Victorian Volcanic Plain	6	7	13	?	59	-	-	-	100(6)	?(1)
Gippsland Plains	8	25	33	<2,000	23,428	-	0.02(1)	3.6(3)	96.4(21)	-
Victorian Riverina	1	4	5	<50	900	-	-	0.4(1)	99.6(3)	-
Northern Inland Slopes	9	15	24	c200	20,500	-	1.9(2)	0.1(2)	2.3(9)	95.7(2)
East Gippsland Uplands	0	3	3	<2000	108	-	-	100(2)	?(1)	-
East Gippsland Lowlands	7	2	9	-	c1000	50(2)	-	50(4)	-	-
Central Victorian Uplands	2	0	2	-	0	-	-	-	-	-

* Conservation Reserve category includes Flora Reserves, Bushland Reserves, Regional and State Parks

** Other Public Land category includes Cemeteries, Airfields, Water Production Reserves, State Forest, Crown Reserves, Multi-purpose Parks and Recreation Reserves