# Threatened Species Assessment

## *Diuris gregaria*
## Clumping Golden Moths

### Taxonomy

*Diuris gregaria* D.L. Jones

Rare hybrids between *Diuris gregaria* and *D. palustris* yield plants that are indistinguishable from *D.* X *fastidiosa* (VicFlora, 2018).

### Current conservation status

Listed as threatened under the *Flora and Fauna Guarantee Act 1988*.(SAC 2007)

Categorised as Endangered in the 2014 Advisory list of rare or threatened flora (DEPI 2014).

### Proposed conservation status

Critically Endangered in Australia

Criteria A2c+4ce

### Species Information

#### Description and Life History

The taxon is a flowering plant slender, 10-20 cm tall, often in densely crowded tufts of up to 30 plants. Leaves mostly 3-7, linear, 5-10 cm long, in a loose, erect tussock. Flowers 1 or 2, semi-erect to porrect, often not opening widely, bright yellow, with a few short dark striations on the base of the dorsal sepal and sometimes also the labellum; pedicel (excluding ovary) 1-2.5 cm long, very slender, partly enclosed within bract; dorsal sepal obliquely erect or porrect, ovate, 7-12 mm long; lateral sepals obliquely deflexed, usually parallel, linear-oblanceolate, 14-18 mm long, green; petals incurved to spreading, 8-12 mm long, claw green, lamina ovate to ovate-elliptic. Labellum porrect or obliquely deflexed, 10-17 mm long, 3-lobed; lateral lobes small, oblong-cuneate, outer margins toothed; mid-lobe flat or shallowly concave, c. 3 times as long as the lateral lobes, ovate to broadly ovate, narrowed at base, with 2 widely separated, pubescent, longitudinal ridges extending shortly beyond base, a single, less distinct ridge continuing nearly to apex. Column wings about same height as anther (VicFlora, 2018).

The leaves appear in winter and plants flower in September and October, setting seed and going dormant in late spring. Reproduction is from seed and vegetative reproduction through tuber multiplication. The pollinators of *D. basaltica* are probably native halictid bees (Walker, 1997), through simple food deception, where the orchid mimics nearby nectar or pollen-bearing flowers but offers no food reward of its own. Halictid bees are opportunistic in their foraging activities and can gather pollen and nectar from a wide variety of plant species (Backhouse et al., 2016).

#### Generation Length

The generation length of *D. gregaria* is estimated to be 20 to 40 (midpoint 30) years. Generation time for non-colonial terrestrial orchids is estimated to be a nominal 30 years based on the annual replacement of the mother tuber by daughter tubers. Whilst somatically immortal, each individual is susceptible to endogenous exhaustion or environmental causes of mortality at rates likely to result in replacement at intervals of several decades only. Such orchids are classed as obligate seed regenerators (OSRs) reliant on seed-based recruitment for population maintenance.

VICTORIA State Government | Environment, Land, Water and Planning

### Distribution

The taxon is endemic to Victoria, where it occurs on the basalt plains of the south-west. The altitude ranges from 120-275 metres ASL, Rokewood to Dunkeld region (Backhouse et al. 2016).

### Habitat

The taxon grows in herb-rich native grassland and grassy woodland, on heavy black clay soils derived from basalt (Backhouse et al. 2016).

### Threats

*Diuris gregaria* must have been once enormously abundant across the basalt plains, but it is now much rarer due to losing almost all of its habitat to agriculture. Remaining populations are now largely confined to road reserves, where they are at risk from soil disturbance, vehicle movement and weed invasion (Backhouse et al., 2016).

Remaining populations of *D. gregaria* are at risk from a variety of current and potential threats, including accidental disturbance to, or destruction of, plants and habitat from vehicle and stock movement and road/utilities installation. Maintenance activities is a serious ever-present risk at all sites, despite some populations being sign-posted. Soil disturbance facilitates weed invasion and establishment, with weeds readily colonizing disturbed sites. The taxon is threatened by weed invasion, especially by pasture grasses and other weeds such as *Phalaris aquatica, Romulea rosea* and *Cuscuta dubia* is a major recurring problem at all sites, especially sites suffering soil disturbance or with the prolonged absence of fire.

The taxon probably requires periodic fire to reduce accumulation of grasses, especially Kangaroo Grass, which otherwise may suppress growth if grass swards become too dense.

The taxon is also threatened by grazing by introduced herbivores (rabbits/hares), a minor threat at several locations, while invertebrate predation on seed capsules also occurs. Grazing and trampling by stock are a potential threat if the stock are moved along roadsides that contain the species (Duncan and Coates 2010).

## IUCN Criteria

**Criterion A. Population size reduction.**
Population reduction (measured over the longer of 10 years or 3 generations) based on any of A1 to A4

| | Critically Endangered | Endangered | Vulnerable |
|---|---|---|---|
| A1 | ≥ 90% | ≥ 70% | ≥ 50% |
| A2, A3, A4 | ≥ 80% | ≥ 50% | ≥ 30% |

A1 Population reduction observed, estimated, inferred or suspected in the past and the causes of the reduction are clearly reversible AND understood AND ceased.

A2 Population reduction observed, estimated, inferred or suspected in the past where the causes of the reduction may not have ceased OR may not be understood OR may not be reversible.

A3 Population reduction, projected or suspected to be met in the future (up to a maximum of 100 years) [(*a) cannot be used for A3*]

A4 An observed, estimated, inferred, projected or suspected population reduction where the time period must include both the past and the future (up to a max. of 100 years in future), and where the causes of reduction may not have ceased OR may not be understood OR may not be reversible.

*based on any of the following:*

(a) direct observation [*except A3*]

(b) an index of abundance appropriate to the taxon

(c) a decline in area of occupancy, extent of occurrence and/or quality of habitat

(d) actual or potential levels of exploitation

(e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites

## Evidence:

**Eligible under Criterion A2 as Critically Endangered**

The population reduction over the past 60 to 120 years is estimated to be 75 to 85 %, based on (c) above.

Past decline is based on overall decline of the Western Basalt Plains Grasslands since 1900 (DSE 2003).

The causes of the reduction may not have ceased, be understood or be reversible.

**Eligible under Criterion A4 as Critically Endangered**

The population reduction over any 60 to 120 year period, including both past and future (up to 100 years in the future), is estimated to be 60 to 85 %, based on (c) and (e) above. The causes of reduction may not have ceased, be understood or be reversible.

This is based on past decline of the Western Basalt Plains Grasslands, and future threats outlined in DSE 2003).

| Criterion B. Geographic range in the form of either B1 (extent of occurrence) and/or B2 (area of occupancy | | | |
|---|---|---|---|
| | Critically Endangered Very restricted | Endangered Restricted | Vulnerable Limited |
| B1. Extent of occurrence (EOO) | < 100 km² | < 5,000 km² | < 20,000 km² |
| B2. Area of occupancy (AOO) | < 10 km² | < 500 km² | < 2,000 km² |
| AND at least 2 of the following 3 conditions: | | | |
| (a) Severely fragmented OR Number of locations | = 1 | ≤ 5 | ≤ 10 |
| (b) Continuing decline observed, estimated, inferred or projected in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) area, extent and/or quality of habitat; (iv) number of locations or subpopulations; (v) number of mature individuals | | | |
| (c) Extreme fluctuations in any of: (i) extent of occurrence; (ii) area of occupancy; (iii) number of locations or subpopulations; (iv) number of mature individuals | | | |

## Evidence:

**Eligible under Criterion B as Endangered**

The Area of Occupancy (AoO) is estimated to be 160 km², based on 2 x 2 km grids derived from accepted, post-1970 records in the Victorian Biodiversity Atlas (VBA).

The taxon is considered to occur in one location as all key identified threats apply across its range and can rapidly affect all individuals of the taxon present.

It has a continuing decline in (i), (ii), (iii), (iv) and (v) above, based on ongoing habitat degradation and threats outlined in DSE (2003).

| Criterion C. Small Population size and decline | | | | |
|---|---|---|---|---|
| | | Critically Endangered | Endangered | Vulnerable |
| Number of mature individuals | | < 250 | < 2,500 | < 10,000 |
| AND at least one of C1 or C2 | | | | |
| C1 | An observed, estimated or projected continuing decline of at least (up to a max. of 100 years in future): | 25% in 3 years or 1 generation (whichever is longer) | 20% in 5 years or 2 generations (whichever is longer) | 10% in 10 years or 3 generations (whichever is longer) |
| C2 | An observed, estimated, projected or inferred continuing decline AND least 1 of the following 3 conditions: | | | |
| (a) | (i) Number of mature individuals in each subpopulation | ≤ 50 | ≤ 250 | ≤ 1,000 |
| | (ii) % of mature individuals in one subpopulation = | 90 – 100% | 95 – 100% | 100% |
| (b) Extreme fluctuations in the number of mature individuals | | | | |

## Evidence:

**Ineligible under Criterion C**

It is estimated that there are 10,000 to 20,000 mature individuals, which exceeds the thresholds for criterion C.

| Criterion D. Very small or restricted population | | | |
|---|---|---|---|
| | Critically Endangered | Endangered | Vulnerable |
| Number of mature individuals (observed or estimated) | <·50 | <·250 | <·1,000 |
| D2 Only applies to the VU category<br>Restricted area of occupancy or number of locations with a plausible future threat that could drive the species to critically endangered or Extinct in a very short time. | - | - | D2. Typically:<br>AoO <·20 km2 or number of locations ≤·5 |

## Evidence:

**Ineligible under Criterion D**

It is estimated that there are 10,000 to 20,000 mature individuals.

**Criterion E (Quantitative Analysis) was not addressed as the taxon does not have a detailed Population Viability Analysis.**

## References

Backhouse, G., Kosky, B., Rouse, D., and Turner, J. (2016). *Bush Gems: A Guide to the Wild Orchids of Victoria, Australia.* Melbourne, Victoria: EBook.

DSE (2003). Action Statement - Central Gippsland Plains Grassland, Forest Red Gum Grassy Woodland, Northern Plains Grassland, South Gippsland Plains Grassland, Western (Basalt) Plains Grassland (No. 182). Department of

Sustainability and Environment, East Melbourne. Retrieved from: https://www.environment.vic.gov.au/__data/assets/pdf_file/0017/32453/Northern-Plains-Grassland.pdf

Duncan, M., and Coates, F. (2010). National Recovery Plan for Twenty-two Threatened Orchids in South-eastern Australia. Department of Sustainability and Environment, Melbourne.

Jones, D.L. (2006), in Banks, D.P. (ed.) Miscellaneous new species of Australian Orchidaceae. *Australian Orchid Research* 5: 79-80

Kirkpatrick, J., McDougall, K., and Hyde, M. (1995). Australia's Most Threatened Ecosystems - The southeastern lowland native grasslands. Surrey Beatty and Sons and The World Wide Fund for Nature, Australia.

SAC (2007). Flora and Fauna Guarantee Scientific Advisory Committee: Final Recommendation on a Nomination for Listing. Nomination No. 783 *Diuris gregaria*

VicFlora (2018). Flora of Victoria, Royal Botanic Gardens Victoria: *Diuris gregaria*. Retrieved from: https://vicflora.rbg.vic.gov.au/flora/taxon/171f8950-bbe0-488e-9959-5c53d65b5055

Walker, K. (1997). Natural history information on the presumed pollinator (*Lasioglossum* (Chilactus) *lanarium*) of the Small Golden Moth Orchid (*Diuris* sp. aff. *lanceolata*). Museum of Victoria, unpublished report to the Department of Natural Resources and Environment, Victoria.