



Conservation Advice for *Corunastylis ectopa* (Brindabella Midge-orchid)

In effect under the *Environment Protection and Biodiversity Conservation Act 1999* from 23 November 2021.

This document provides a foundation for conservation action and further planning.



Photograph of *Corunastylis ectopa* (Brindabella Midge-orchid) © Copyright, Tobias Hayashi (2020)

Conservation status

Corunastylis ectopa (Brindabella Midge-orchid) is listed in the Critically Endangered category of the threatened species list under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwth) (EPBC Act) effective from 6 June 2005.

At the time of listing *Corunastylis ectopa* was assessed by the Threatened Species Scientific Committee to be eligible for listing as Critically Endangered under Criterion 2, 3, and 4. The main

factors that make the species eligible for listing in the Critically Endangered category are restricted geographic distribution and small number of mature individuals, with a continuing decline in the area of occupancy and the number of mature individuals.

Species can also be listed as threatened under state and territory legislation. For information on the current listing status of this species under relevant state or territory legislation, see the [Species Profile and Threat Database](#).

Species information

Taxonomy

Conventionally accepted as *Corunastylis ectopa* (D.L.Jones) D.L.Jones & M.A.Clem.

The Brindabella Midge-orchid was renamed from *Genoplesium ectopum* to *Corunastylis ectopa* after a revision of the genus *Genoplesium* in 2002 (Jones et al. 2002 cited in Frawley 2010).

Description

The Brindabella Midge-orchid is a terrestrial orchid. It is a seasonal perennial, which shoots from a dormant underground tuber following summer rain. The solitary leaf grows to between 10 and 25 cm high. It is dark green to reddish at the base and encloses the flowering stem for most of its length. The flowering part of the plant is 15-30 cm in length and has 15-35 flowers in a densely crowded spike 2-4 cm long. Flowers are coloured either green and reddish-purple or wholly reddish-purple (Frawley 2010; ACT Scientific Committee 2019).

Distribution

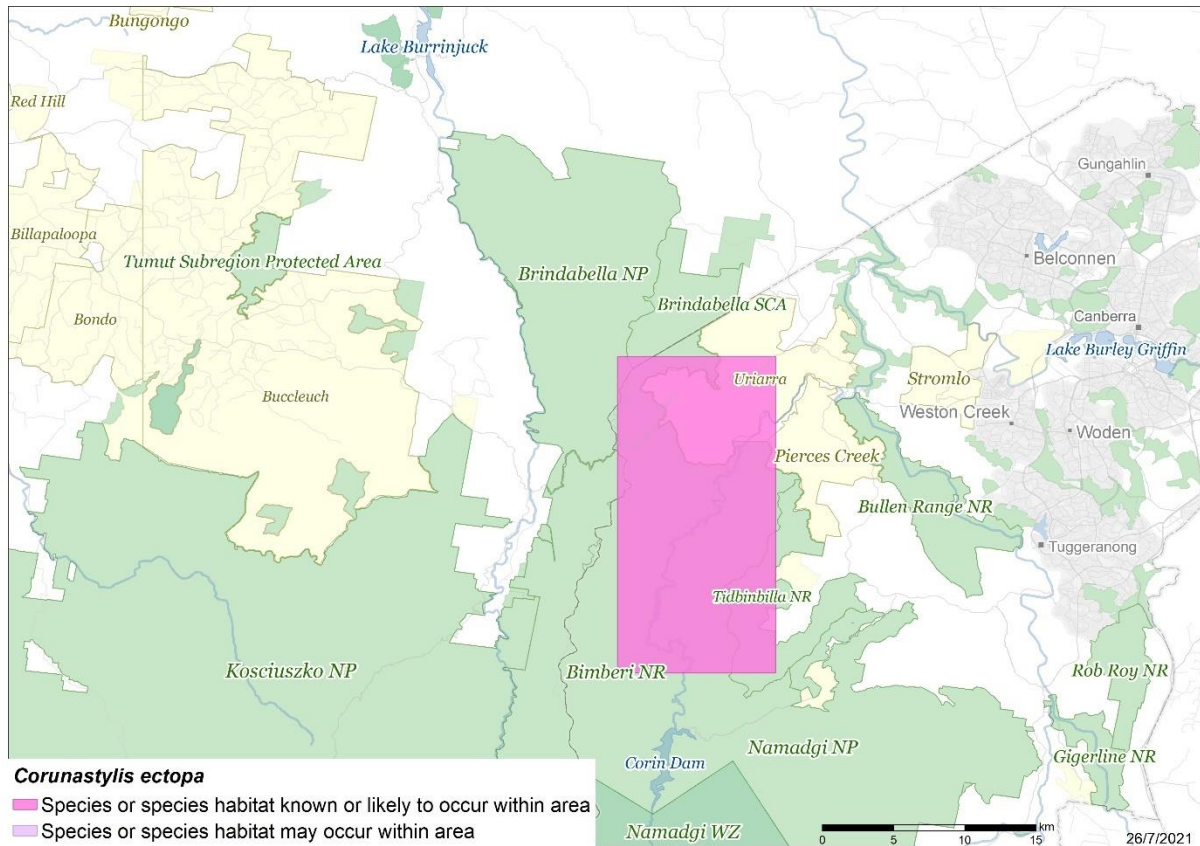
The Brindabella Midge-orchid is endemic to the Australian Capital Territory (ACT) and until recently was known only from a single location of less than one hectare in the Brindabella Range in Namadgi National park (subpopulation one). The location of subpopulation one has been defined and mapped, but not published to protect the site from illegal collection of plants (ACT Scientific Committee 2019). Table 1 below presents counts of individual plants within this subpopulation (Frawley 2010; ACT Conservator of Flora and Fauna 2020a,b). In January 2003, high intensity bushfire impacted the location of subpopulation one. Only 35 plants were recorded in subsequent surveys in February 2004 suggesting the species may be susceptible to fire-related threats, but is able to withstand occasional high intensity bushfire (Frawley 2010). The latest count for subpopulation one was a minimum 108 emerged individuals (ACT Conservator of Flora and Fauna 2020a). A newly discovered subpopulation (subpopulation two), also within Namadgi National Park has been confirmed, however no further information on this subpopulation has been made available at this time (Environment, Planning and Sustainable Development Directorate 2021). Two *Corunastylis* plants were also recorded in 2020 off Pipeline Road in the ACT however they weren't flowering at the time and could not be identified to species level. This could potentially be a third subpopulation, but will require confirmation once a suitable flowering specimen can be sampled in 2022 (ACT Conservator of Flora and Fauna 2020b; Environment, Planning and Sustainable Development Directorate 2021).

Table 1 Brindabella Midge-orchid counts from subpopulation one

Date	Subpopulation count ¹
1999	~70
February 2004	35
2008	14
2009	0
2009-10	77
2010-11	71
2011-12	49
2012-13	13
2013-14	127
2014-15	99
2015-16	57
2016-17	48
2017-18	11
2018-19	108
2019-20	115

¹ Subpopulation counts from 2009-10 to 2019-20 are the minimum number of emerged plants recorded annually (ACT Conservator of Flora and Fauna 2020a).

Map 1 Modelled distribution of Brindabella-midge Orchid



Source: Species distribution data [Species of National Environmental Significance](#) database, Base map Geoscience Australia

Caveat: The information presented in this map has been provided by a range of groups and agencies. While every effort has been made to ensure accuracy and completeness, no guarantee is given, nor responsibility taken by the Commonwealth for errors or omissions, and the Commonwealth does not accept responsibility in respect of any information or advice given in relation to, or as a consequence of, anything containing herein.

Species distribution mapping: The species distribution mapping categories are indicative only and aim to capture (a) the specific habitat type or geographic feature that represents to recent observed locations of the species (known to occur) or preferred habitat occurring in close proximity to these locations (likely to occur); and (b) the broad environmental envelope or geographic region that encompasses all areas that could provide habitat for the species (may occur). These presence categories are created using an extensive database of species observations records, national and regional-scale environmental data, environmental modelling techniques and documented scientific research.

Cultural and community significance

While the cultural significance of the Brindabella Midge-orchid is not known, Indigenous Australians have had a long association with Namadgi National Park where the only known subpopulations of the Brindabella Midge-orchid are located. In 2001, the ACT Government and members of the Ngunnawal Aboriginal community entered into an agreement which provides for co-operative management of the Park by the parties to the agreement (Department of Territory and Municipal Services 2010; Frawley 2010). Consultation with the Ngunnawal Aboriginal community who are the Traditional Owners of the land in which the species occurs should be undertaken regarding recovery and management actions for the species.

Relevant biology and ecology

Subpopulation one of Brindabella Midge-orchid grows at an altitude of 980 m on a steep slope with a northerly aspect. It inhabits open areas of tall *Eucalyptus robertsonii* (Robertson's Peppermint) – *Eucalyptus viminalis* (Ribbon Gum) Montane Forest with sparse shrub cover. The soil is stony brown loam over shale derived from the Nungar Beds. The site is subject to erosion (Frawley 2010; Milburn & Rouse 2004 cited in Frawley 2010). Habitat of subpopulation two is currently unreported.

The Brindabella Midge-orchid requires rain in mid to late summer to trigger flowering. If rain is received the buds develop rapidly and flowering commences about six weeks after the rain event, typically in late January to March. In the absence of rain in the appropriate season the plant remains dormant (Frawley 2010; Milburn and Rouse 2004 cited in Act Scientific Committee 2019).

The details of pollination remain unknown, but small vinegar flies (*Drosophila* sp.) have been observed pollinating other members of the genus. Germination occurs through seed interaction with a mycorrhizal fungal host and this relationship probably enables mature plants to receive an adequate supply of carbon and nutrients. Other *Corunostylis* species reproduce primarily by seed, rarely multiplying by production of daughter tubers (Jones 1988).

After setting seed, the above-ground portion of the plant withers. Tubers may be replaced each year (Jones 1988), but do not produce aerial shoots until the next substantial summer rainfall (Frawley 2010; Milburn and Rouse 2004 cited in Frawley 2010).

Habitat critical to the survival

Due to the species eligibility for listing (restricted geographic distribution and small population size), all habitat is considered critical to the survival of the species.

No Critical Habitat as defined under section 207A of the EPBC Act has been identified or included in the Register of Critical Habitat.

Important populations

In this section, the word population is used to refer to subpopulation, in keeping with the terminology used in the EPBC Act and state/territory environmental legislation.

There is sufficient evidence through the species eligibility for listing, to declare all populations/the national population as important populations of this species under particular pressure of survival and which therefore require protection to support the recovery of the species.

Threats

Table 2 presents known and likely threats to the Brindabella Midge-orchid. Due to its small distribution (two locations), the risk of decline and potential extinction associated with the threats to the species are heightened; with many threats considered to be very high risk (Table 3).

In addition to the threats presented in Table 2, grazing of the Brindabella Midge-orchid by native and introduced herbivores as well as trampling by introduced hooved animals could be potential

threats to the species. Grazing and/or trampling impacts have not previously been reported on for the species but monitoring of the species and its habitat should record any evidence of these potential threats to allow for adaptive management.

Table 2 Threats impacting Brindabella Midge-orchid

Threat	Status and severity ^a	Evidence
Habitat loss, disturbance, and fragmentation		
Erosion	<ul style="list-style-type: none"> • Timing: current • Confidence: known • Consequence: major • Trend: unknown • Extent: across the entire range 	Subpopulation one is located within 10 m of a road embankment. In the past, this embankment has eroded, and plants have been dislodged and lost due to small landslides (Jones 1999 cited in Frawley 2010). In 2004, the embankment appeared relatively stable following the bushfire of 2003 and subsequent rainfall (Milburn & Rouse 2004 cited in Frawley 2010). Erosion of the embankment and associated physical disturbance remains a threat to the species.
Roadworks	<ul style="list-style-type: none"> • Timing: current • Confidence: suspected • Consequence: catastrophic • Trend: static • Extent: across the entire range 	Subpopulation one is located within a road corridor about 10 m from a road, so roadworks including but not limited to widening, realignment, new drainage, regrading of the embankment and bulldozing of firebreaks, could pose a serious threat to the species (Frawley 2010).
Impacts of native species		
Shrub growth	<ul style="list-style-type: none"> • Timing: current • Confidence: known • Consequence: moderate • Trend: static • Extent: across the entire range 	Subpopulation one grows in a disturbed open area of Montane Forest with sparse shrub cover. The site is subject to shrub regrowth which requires control to maintain the preferred habitat for the species (Frawley 2010).
Invasive species		
Weed invasion	<ul style="list-style-type: none"> • Timing: current • Confidence: suspected • Consequence: minor • Trend: static • Extent: across the entire range 	Weed invasion has been considered a minor threat to the orchid (Frawley 2010).
Herbicide use	<ul style="list-style-type: none"> • Timing: historical • Confidence: suspected • Consequence: major • Trend: static • Extent: across the entire range 	Herbicides used to manage weeds and shrub regrowth in the road corridor have the potential to affect the Brindabella Midge-orchid if not applied correctly (Frawley 2010).
Human interference		
Illegal collection	<ul style="list-style-type: none"> • Timing: future • Confidence: suspected • Consequence: catastrophic • Trend: unknown • Extent: across the entire range 	There is no evidence for this having occurred to date, however it is a significant potential threat to the species (Frawley 2010).
Bushfire		

Threat	Status and severity ^a	Evidence
Inappropriate fire regimes	<ul style="list-style-type: none"> • Timing: current • Confidence: inferred • Consequence: moderate • Trend: increasing • Extent: across the entire range 	<p>The effects of fire regimes on the species and/or its adaptation to a particular fire regime is unknown (Frawley 2010). Fire during the active growth period could damage or destroy plants, and/or reduce flowering and recruitment. Following a high intensity bushfire in 2003, a count of flowering plants in 2004 suggested that the species is able to withstand high intensity bushfire. Due to the limited range (two sites), high frequency bushfires could potentially reduce populations of the species from fire-related threats. Additionally, fire can also impact on orchid pollinators by direct mortality or indirectly through changing plant communities and limiting food resources (Marquart 2017).</p>

Timing—identify the temporal nature of the threat;

Confidence—identify the extent to which we have confidence about the impact of the threat on the species;

Consequence—identify the severity of the threat;

Trend—identify the extent to which it will continue to operate on the species;

Extent—identify its spatial content in terms of the range of the species.

Each threat has been described in Table 2 in terms of the extent that it is operating on the species. The risk matrix (Table 3) provides a visual depiction of the level of risk being imposed by a threat and supports the prioritisation of subsequent management and conservation actions. In preparing a risk matrix, several factors have been taken into consideration, they are: the life stage they affect; the duration of the impact; and the efficacy of current management regimes, assuming that management will continue to be applied appropriately. The risk matrix and ranking of threats has been developed in consultation with experts using available literature.

Table 3 Brindabella Midge-orchid risk matrix

Likelihood	Consequences				
	Not significant	Minor	Moderate	Major	Catastrophic
Almost certain	Low risk	Moderate risk Weed invasion	Very high risk	Very high risk	Very high risk
Likely	Low risk	Moderate risk	High risk	Very high risk Erosion	Very high risk
Possible	Low risk	Moderate risk	High risk Shrub growth Inappropriate fire regimes	Very high risk Herbicide use	Very high risk Roadworks Illegal collection
Unlikely	Low risk	Low risk	Moderate risk	High risk	Very high risk
Unknown	Low risk	Low risk	Moderate risk	High risk	Very high risk

Priority actions have then been developed to manage the threat particularly where the risk was deemed to be ‘very high’ or ‘high’.

Conservation and recovery actions

Primary conservation objective

By 2030, the population of Brindabella Midge-orchid will have increased in abundance and viable subpopulations are sustained in habitats which are managed for ongoing threats.

Conservation and management priorities

Habitat loss, disturbance, and fragmentation

- Ensure the Brindabella Midge-orchid is protected from impacts associated with roadworks such as widening, realignment, new drainage, regrading of the embankment and bulldozing of firebreaks. Consider road redirections if feasible to reduce risk of unintended impacts to the Brindabella Midge-orchid.
- Investigate and if appropriate and practicable, undertake suitable works to stabilise the embankment near the Brindabella Midge-orchid.
- Maintain and update as required, existing 'Roadside Conservation Area' signs, without identifying specific details about the species.
- Conduct site maintenance activities (i.e. road grading, slashing of tracks and power line easements) in a manner that ensures that no plants are damaged or lost.

Impacts of native and invasive species

- Control and reduce the spread of potential weeds, including:
 - regularly inspect habitat and surrounds for growth of new shrubs and/or weeds, and undertake shrub and weed control in the orchid habitat, as required
 - maintain a weed-free buffer to reduce the likelihood of invasive plants becoming established within Brindabella Midge-orchid habitat
 - consult with experts to determine the most appropriate physical or chemical control methods for these weeds applied by hand without negatively impacting on the Brindabella Midge-orchid
 - herbicides should not come into contact with the orchid plants
 - where herbicide use is required, provide advice to contractors and park staff on appropriate herbicide use within known habitat to prevent herbicide contact with the Brindabella Midge-orchid

Human interference

- Generalise the precision of location information published for the species.

Bushfire

- Fires must be managed to ensure that prevailing fire regimes do not disrupt the life cycle of the Brindabella Midge-orchid, that they support rather than degrade the habitat necessary to the species, that they do not promote invasion of exotic species, and that they do not increase impacts of grazing. As such:
 - physical damage to the habitat and individuals of Brindabella Midge-orchid must be avoided during and after fire operations

- fire management authorities and land management agencies should use suitable fine-scale maps of the subpopulations and install field markers to avoid damage to the Brindabella Midge-orchid
- active weed control should be undertaken after fire management along urban roadsides
- avoid any use of prescribed fire or fire research and other activities that impact upon the persistence of the species unless there is evidence to show the impact would be a positive and enduring effect on the species persistence
- ensure that prescribed fires do not impact the species habitat during the above ground phase of the life cycle
- avoid the use of fire retardants and/or fire-fighting foams in the vicinity of subpopulations during fire operations
- maintain precise fire history records for the habitat of the Brindabella Midge-orchid.

Breeding, seed collection, propagation, and other ex situ recovery action

- Evaluate and undertake germplasm banking and the establishment of ex situ subpopulations of the species as well as potential enhancement of in situ subpopulations.
- Establish plants in cultivation in association with appropriate institutions such as the Australian National Botanic Gardens Canberra.
- To manage the risk of losing genetic diversity, undertake appropriate germplasm storage in long-term custodial collections and determine viability of stored seed. Best practice germplasm storage guidelines and procedures should be adhered to so as to maximise seed viability and germinability.

Stakeholder engagement/community engagement

- Identify partners including Traditional Owners, local experts, public land managers, community-based organisations and conservation organisations that can contribute to the recovery of the Brindabella Midge-orchid.
- Promote opportunities for partners to participate in the recovery of the Brindabella Midge-orchid.
- Determine objectives for any public engagement e.g. to improve management on private land, to avoid negative publicity, to ensure recent scientific knowledge is incorporated into public land management. Separate engagement processes will likely be required where there are different objectives.
- Recovery actions should be stated for each engagement process identified e.g. Indigenous consultation, a specific community consultation or a land manager consultation.
- Prepare a management plan for the species, including detailed mapping, and provide guidance for management actions undertaken as part of the management of Namadgi National Park.

Survey and monitoring priorities

- Survey the potential new subpopulation of Brindabella Midge-orchid off Pipeline Road in late summer or early autumn 2022 to identify plants to species level (Environment, Planning and Sustainable Development Directorate 2021).
- Alert field staff to the possible presence of the species while conducting vegetation surveys in appropriate habitat, increasing the chance the plant will be opportunistically recorded if present.
- Continue to monitor subpopulations, habitat condition and threats to Brindabella Midge-orchid annually to inform ongoing management actions and detect any new threats to the species. Regular monitoring is required, as the number of flowering plants fluctuates with seasonal conditions.
- Monitor the abundance of flowering plants and reproductive status of subpopulations of the Brindabella Midge-orchid before and after planned and unplanned fires to improve understanding of the fire response of this species.
- Following fire (planned or unplanned), record and monitor the effect fire has on flowering.

Information and research priorities

- Investigate the biology and ecology of the species, including reproductive processes, longevity, fecundity and recruitment in order to understand the vulnerability and potential threats to this species as well as the potential for propagation of ex situ subpopulations, and potential for translocations.
- Undertake seed germination and/or vegetative propagation trials to determine the requirements for successful establishment, including disturbance and mycorrhizal fungi requirements. The Orchid Conservation Program at the Royal Botanic Gardens Victoria should be contacted for any relevant and recent information.
- Undertake research into pollinator activity and the ecological requirements to support pollinator communities of the Brindabella Midge-orchid within the orchid's habitat.
- Collect and store germplasm of the Brindabella Midge-orchid, and develop germination protocols. Orchids have high fecundity making collection targets achievable. However, seed germination relies on association with specific mycorrhizal fungi which must also be collected and stored or propagated.

Links to relevant implementation documents

[Draft Action Plan for the Brindabella Midge Orchid \(*Corunastylis ectopa*\) \(2008\)](#)

[Brindabella Midge Orchid Action Plan \(2020\)](#)

[National Recovery Plan for the Brindabella Midge Orchid \(*Corunastylis ectopa*\) \(2010\)](#)

[Draft survey guidelines for Australia's threatened orchids \(2013\)](#)

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