Guide to New Zealand *Gastrodia* (Orchidaceae)

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Introduction

Gastrodia is a genus of about 90 species distributed through Asia, islands of the Pacific and Indian oceans, Australasia, and Africa. *Gastrodia* are commonly described as saprophytic orchids, meaning they derive their nutrients from decaying organic matter. However, it is more accurate to describe them as parasites of fungi that are either saprophytic or mycorrhizal on the roots of living plants. The interaction between *Gastrodia* and fungi in New Zealand is not well understood, but studies of *Gastrodia* species overseas have shown them to be parasites of fungi such as *Armillaria mellea* and *Mycena* spp.

Five species of *Gastrodia* are recognised in New Zealand.

Orobanche minor—frequently confused with *Gastrodia*

The introduced root parasite broomrape (*Orobanche minor*) is frequently mistaken for a *Gastrodia*. The error is made because, like *Gastrodia* spp., *Orobanche* plants lack leaves—they draw their nutrients from the roots of other plants. However, a close inspection will reveal fundamental differences between *Orobanche* and *Gastrodia*. *Orobanche* are core eudicotyledonous plants, and their flowers bear stamens and pistils. The stems and flowers of *Orobanche* are clad in glandular hairs.

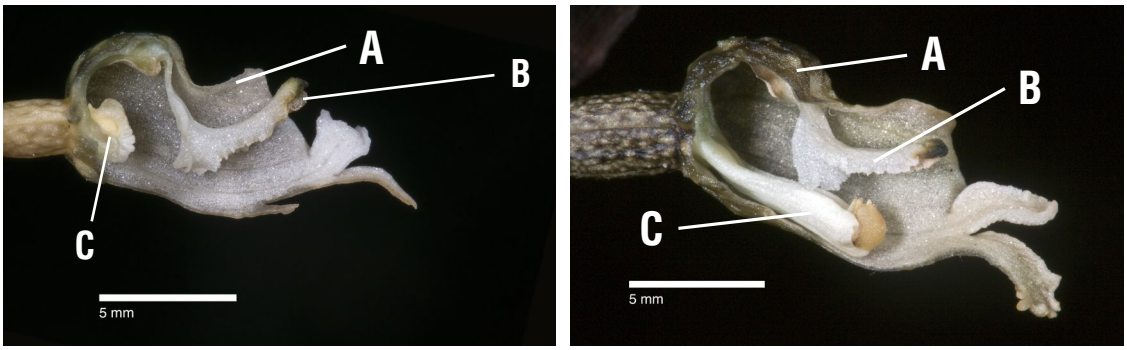
Gastrodia, being orchids, have flowers that bear a column instead of stamens and pistils. The column is the unique defining character of orchids. *Gastrodia* stems and flowers are glabrous.

Orobanche minor bears a superficial resemblance to *Gastrodia* spp. but *Orobanche* are hairy (*Gastrodia* are glabrous) and their flowers bear stamens and pistils whereas *Gastrodia* flowers bear a column.

Cover: *Gastrodia molloyi*; (background) A 'colony' of *Gastrodia cunninghamii*.

Anatomy of a *Gastrodia* flower

Significant identification features are the texture of the perianth (is it tuberculate (warty) or smooth?), the apex of the labellum (is it yellow or brown to black?), and the length of the column (is it very short and therefore not visible when the flower is intact, or is it long and its apex visible below the apex of the labellum?).



Gastrodia cunninghamii (left) and *G. cooperae* (right) flowers with half the perianth removed to expose the labellum and column.
(A) perianth (petals and sepals collectively, which in *Gastrodia* are fused into a tube for most of their length); (B) labellum; (C) column

Identification key

1a Stem and flowers hairy; flowers having stamens and pistils ..... ***Orobanche minor***

1b Stem and flowers glabrous; flowers having a column ..... ***Gastrodia* spp.** **2**

2a Column much shorter than labellum, curved over the stigma, column apex not visible in mouth of intact flower **3**

2b Column almost as long as labellum, projecting away from the stigma, column apex usually visible in mouth of intact flower **4**

3a Flowering stem < 30 cm tall, flowers < 10 per stem; perianth < 12 mm long; labellum apex yellow ..... ***Gastrodia minor*** (page 4)

3b Flowering stem usually > 30 cm tall, flowers usually > 10 per stem (stems often shorter and fewer-flowered on plants exposed to strong light); perianth > 15 mm long; labellum apex brown or black ..... ***Gastrodia cunninghamii*** (page 5)

4a Perianth pale brown to cream or pale pink, surface smooth; labellum apex yellow ..... ***Gastrodia sesamoides*** (page 6)

4b Perianth greenish gold, golden-brown to dark green or brown, surface tuberculate; labellum apex yellow or brown-black **5**

5a Perianth greenish gold to golden brown; labellum apex yellow ***Gastrodia molloyi*** (page 7)

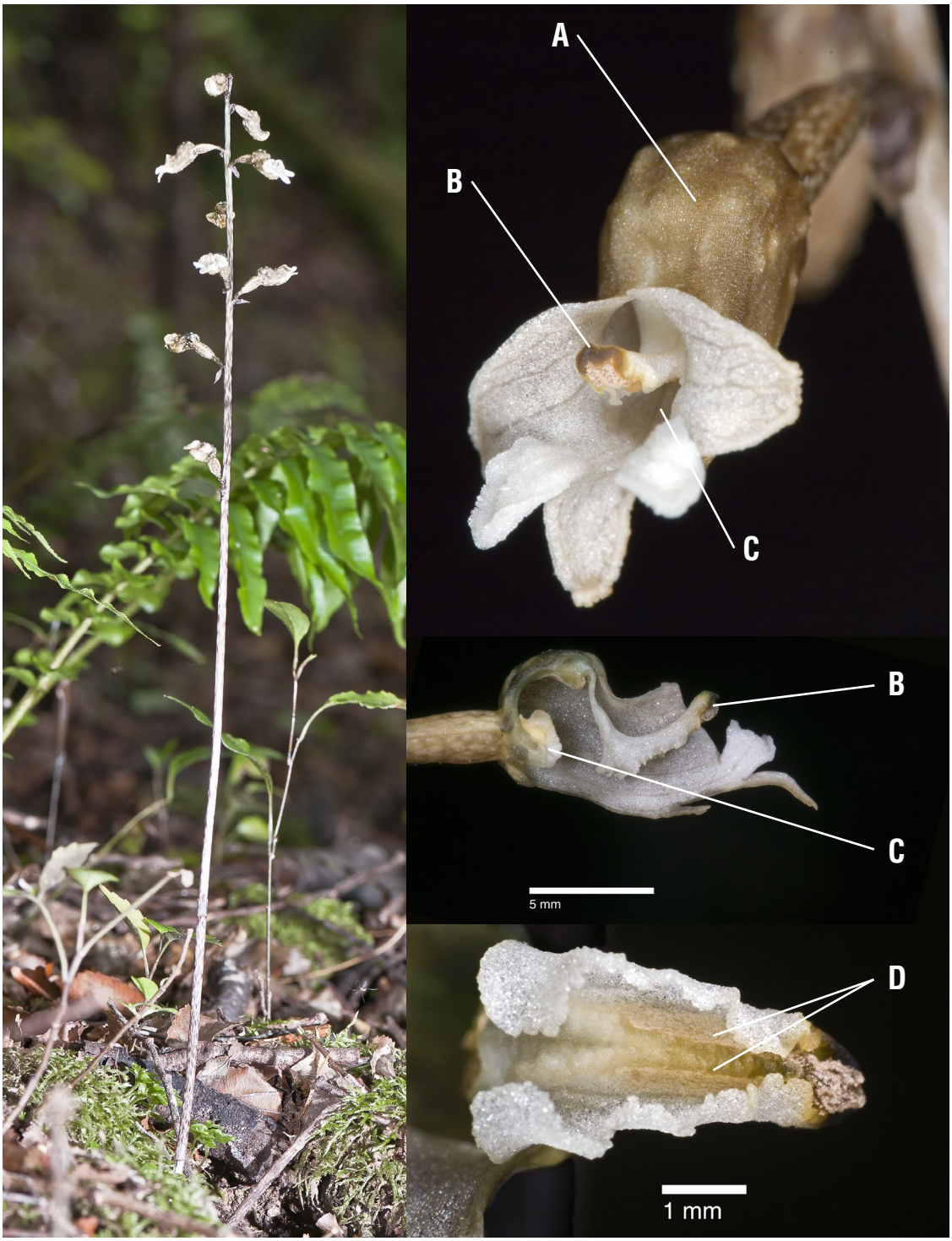
5b Perianth dark brown to black; labellum apex dark brown to black ..... ***Gastrodia cooperae*** (page 8)

Gastrodia minor

This species is very distinctive, being smaller and having fewer flowers than other gastrodias. A: perianth with dark stripes; B: labellum apex yellow; C: column short.

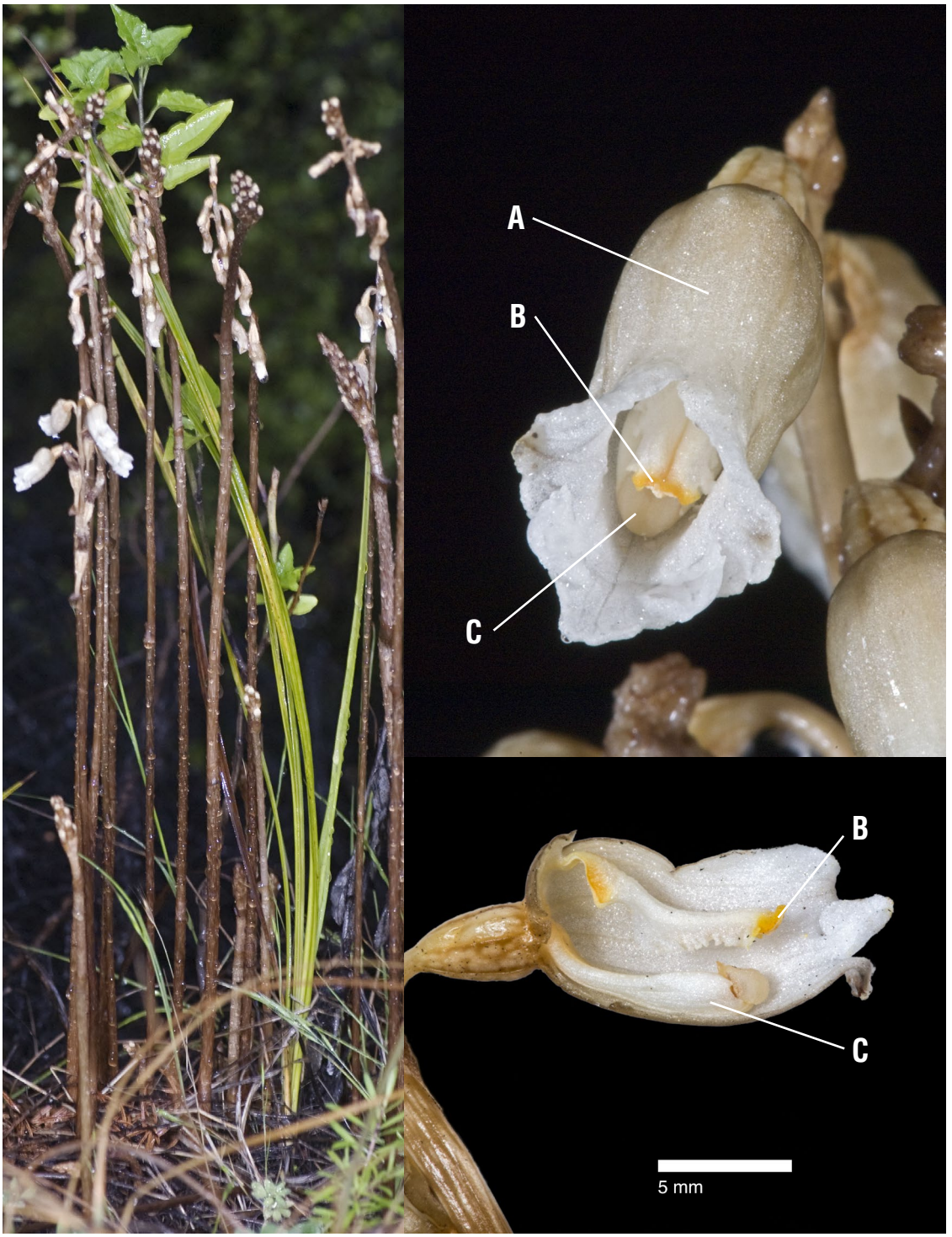
Gastrodia cunninghamii

A: perianth tuberculate; B: labellum apex brown or black; C: column short, apex not visible; D: ridges on underside of labellum almost parallel to apex..



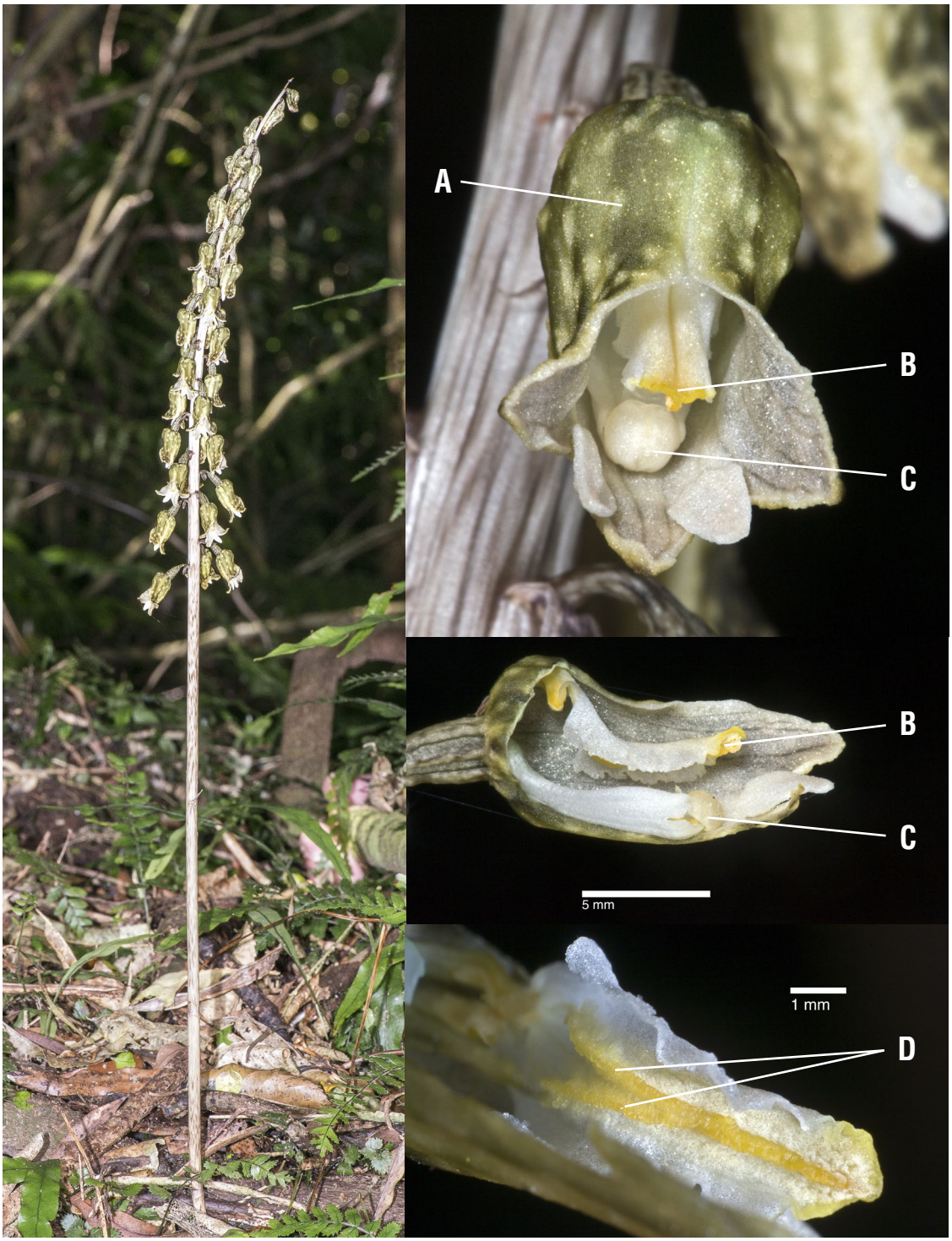
Gastrodia sesamoides

A: perianth smooth; B: labellum apex yellow; C: column long, apex visible in mouth of intact flower.



Gastrodia molloyi

A: perianth tuberculate; B: labellum apex yellow; C: column long, apex visible; D: ridges on underside of labellum meet part-way towards apex, forming a 'wishbone' shape.



Gastrodia cooperae

A: perianth tuberculate; B: labellum apex black; C: column long, apex visible; D: ridges on underside of labellum meet part-way towards apex, forming a 'wishbone' shape.