

First host record of the parasitoid wasp *Meteorus pulchricornis* (Braconidae) from larvae of the Forest Ringlet butterfly *Dodonidia helmsii* (Nymphalidae)

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Observation

The Forest Ringlet butterfly (*Dodonidia helmsii* Butler, 1884) is an “Threatened - Nationally Vulnerable” endemic New Zealand nymphalid associated with native forest habitats (Hoare *et al.* 2026). At Mahakirau Forest Sanctuary, larvae develop on cutting sedges, namely *Gahnia pauciflora* and *G. setifolia*. Elsewhere, *G. procera* and other monocots, especially *Chionochloa conspicua* have also been recorded as host plants (Barker & Smerdon 2024). Larvae are slow-growing and relatively sedentary, typically remaining on a single host plant for the duration of their development.

During routine monitoring of Forest Ringlet larvae at Mahakirau Forest Sanctuary, Coromandel Peninsula, a parasitoid cocoon was observed attached to a third-instar *D. helmsii* larva (Figs. 1-2). The cocoon was suspended beneath the larva on the underside of a *G. pauciflora* leaf by a silk thread characteristic of parasitoids in the genus *Meteorus* (Braconidae).

An exit wound was clearly visible on the lower abdominal flank of the host larva (Fig. 2). The larva and cocoon (Fig. 2) were collected on 17 February 2026. Fifteen days later, on 4 March 2026, an adult female parasitoid wasp (Fig. 4) emerged from the cocoon. A second, unsuccessful cocoon subsequently formed within the collection bag, suggesting that a single Forest Ringlet larva may host two parasitoid larvae.

Morphological features of both the adult wasp (Fig. 3) and cocoon (Figs. 1-4) are consistent with *Meteorus pulchricornis* (Wesmael 1835), a solitary koinobiont endoparasitoid known to attack a wide range of Lepidoptera larvae (see Walker & Martin 2018). Identification was supported by the distinctive suspended “basket-type” cocoon typical of the genus *Meteorus*.



Figure 1: *Meteorus pulchricornis* cocoon attached to *Dodonidia helmsii* larva (lateral view).



Figure 2: *Meteorus pulchricornis* cocoon suspended beneath *D. helmsii* larva with clearly visible exit wound on the larva (ventral view).



Figure 3: Emerged *Meteorus pulchricornis* female with cocoon.



Figure 4: *Meteorus pulchricornis* cocoon with lid cut open.

A second cocoon of identical structure was subsequently found at a separate location within Mahakirau Forest Sanctuary associated with a dead *D. helmsii* larva. An adult female emerged from the cocoon 14 days after collection (25 February-10 March 2026) by cutting open a

characteristic “lid” at the distal end (Fig. 4). In both cases the host larvae were determined to be third instar, indicating that *M. pulchricornis* is capable of utilising mid-stage Forest Ringlet larvae as hosts.

Discussion

Meteorus pulchricornis is a cosmopolitan solitary koinobiont endoparasitoid of Lepidoptera larvae and is recognised by its distinctive suspended cocoon (Shaw & Huddleston 1991). It is a highly polyphagous species and is considered adventive in New Zealand, having established following accidental introduction (Berry & Walker 2004; Berry 2007; Walker & Martin 2018). It was first detected in 1996 (Berry 1997) and is now widely distributed, with records ranging from Northland to Central Otago (Berry & Walker 2004).

A wide range of moth families have been recorded as hosts (Berry & Walker 2004; Schnitzler *et al.* 2004; Walker & Martin 2018), but the present observation appears to represent the first documented case of a New Zealand butterfly (Rhopalocera: Nymphalidae) being used as a host. An experimental study by Chhagan *et al.* (2008) looking at the developmental biology of *M. pulchricornis* on larvae of the Painted Apple Moth (*Teia anartoides*) found that developmental times were greatly influenced by ambient temperatures. Development time from egg to adult ranged from as little as 16 days at 25°C, to as long as 64.5 days at 13°C. The duration of egg-to-pupa stages was roughly equal to, but a few days longer than pupal development. Given that the pupal stage of the present study was at least 15 days, complete development from egg to adult was probably c.35 days or greater. This suggests that oviposition probably took place in second instar *D. helmsii* larvae, with the parasite exiting from the larva during third instar. Chhagan *et al.* (2008) showed that of the four instars of *Teia anartoides*, there was a strong preference for second and third instar host larvae being used by *P. pulchricornis*.

Although parasitoids are recognised as potential pressures on *Dodonidia helmsii* (e.g. Gibbs 1980; Barker & Smerdon 2024) confirmed host associations remain limited. The observations reported here provide direct evidence of *Meteorus pulchricornis* parasitising *Dodonidia helmsii*. The discovery of multiple specimens within the sanctuary suggests this interaction may occur widely within the local population, and as *M. pulchricornis* is widely distributed in New Zealand, other *D. helmsii* populations may be similarly affected.

This record contributes a new parasitoid association for *D. helmsii* and adds to current knowledge of ecological pressures affecting this rare endemic butterfly. Further monitoring will help determine how frequently this basket-cocoon parasitoid utilises Forest Ringlet larvae as hosts and whether it represents a significant mortality factor within populations.

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