

## **Sub-brachypterous form of *Nysius caledoniae* Distant (Hemiptera: Orsillidae) found in Bay of Plenty.**

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### **Abstract:**

*Nysius caledoniae* is a species of seed bug found across many islands in the South Pacific including Australia. *N. caledoniae* was first sighted in Auckland, New Zealand, in 2006. Here, we report finding six specimens of *N. caledoniae* in Te Puke from 2014 to 2015. In 2014 a male *N. caledoniae* was found during searches for *N. huttoni*. The following summer three *N. caledoniae* were caught in wind vane traps set up in loadout zones of kiwifruit orchards in Te Puke, one of which appears to be sub-brachypterous. Another male *N. caledoniae* was found feeding on cudweed in a Paengaroa orchard in March. A sub-brachypterous female *N. caledoniae* was also found in an artificial hibernation hide on May 29<sup>th</sup> on the Plant and Food Te Puke Research station.

### **Introduction:**

*Nysius caledoniae* Distant (Hemiptera: Orsillidae) is a minor horticultural pest of sunflower and safflower, common in Australia with a widespread distribution in the South Pacific (Eyles & Malipatil 2010). In 2006 *N. caledoniae* was found on a lettuce crop in Pukekohe, Auckland. The following year it was found in two additional Auckland locations (Eyles & Malipatil 2010). In 2011 it was collected in Whananki, Northland (A. Eyles). *N. caledoniae* preferentially feeds on weeds, particularly Asteraceae, and only becomes an issue on crops if its preferred food source dries up (Eyles & Malipatil 2010).

There are three native species of *Nysius* in New Zealand: *N. huttoni*, *N. convexus* and *N. liliputanus* (Eyles & Malipatil 2010). *N. huttoni* is a passenger pest in the apple and kiwifruit industries and is known as the wheat bug due to the damage it causes by feeding on wheat crops. Little research has been done on *N. convexus* or *N. liliputanus*. As both *N. caledoniae* and *N. huttoni* feed on the seeds produced by common weeds it

is possible that the ubiquitous habitat of *N. huttoni* in New Zealand will become shared with *N. caledoniae*.

### **Methods:**

In 2014/5 we surveyed kiwifruit orchards near Te Puke in the Bay of Plenty for *N. huttoni* by sampling their preferred habitat containing the host plants *Polygonum aviculare* and *Spergularia rubra*. The following summer and autumn wind vane traps were set up in loadout zones of four orchards in the Te Puke area to monitor the flight behaviour of *N. huttoni*. Traps were checked weekly from mid-December 2014 to the end of March 2015. Artificial hibernation hides were also put out in wheat bug habitat and checked fortnightly. Some specimens of *N. caledoniae* were collected along with specimens of *N. huttoni*.

### **Results and Discussion:**

In the present paper we only present the results for our finds of *Nysius caledoniae*. Results for the surveys on *N. huttoni*, as outlined in ‘Methods’ will be presented in a commercial report. A single male *N. caledoniae* was found in Te Puke, Bay of Plenty, in 2014 whilst the authors were hand-collecting *N. huttoni*. Three *N. caledoniae* were caught in wind vane traps: two females (January, March) and one male (January). Two additional *N. caledoniae* were found during ground searches; one female in an artificial hibernation hide located at Plant and Food Research’s Te Puke research centre (May) and a male on an orchard in Paengaroa (March). To our knowledge, these individuals are the first reports of *N. caledoniae* south of the Auckland area.

The initial male specimen was identified by A. Eyles and was used as a voucher specimen to identify other individuals. *Nysius caledoniae* were recognised by their much larger size than *N. huttoni* (see Fig. 1) (*N. caledoniae*: 4 -5mm vs *N. huttoni*: 2.4 -4.3mm in length). The scutellum of *N. caledoniae* is rounded and upturned at the apex and parameres had a less marked curvature (see Fig. 2) as diagnosed by Eyles and Matipatil (2010).



Fig.1. Adult *N. caledoniae* (left) and *N. huttoni* (right)



Fig.2. Parameres of *N. caledoniae* (left) and *N. huttoni* (right).

*Nysius huttoni* specimens can be classed into three different groups based on wing size: 1) macropterous, where the wings extend beyond the posterior of the abdomen, 2) sub-brachypterous where the wing tip finishes level with, or scarcely exceeds, the posterior of the abdomen and 3) brachypterous, where the wing tip does not reach the end of the abdomen

(Eyles 1960). Specimen examples of these wing forms are shown in Fig. 3.

*Nysius caledoniae* is currently only known as a macropterous species; however, Eyles & Matapatil (2010) predicted that under the New Zealand climate *N. caledoniae* may develop sub-brachypters and brachypters. According to Eyles (1960) lower temperatures (9 -21°C) during the nymphal development of *N. huttoni* favour the brachypterous form. Wei (2011) conducted further research on *N. huttoni* which indicated that both low and high temperatures, as well as short daylength with low temperatures, tend to accelerate the production of sub-brachypters and brachypters. Macropters are produced in high temperature under long photoperiod.



Fig.3. Wing morphs of *N. huttoni*.

The most common wing-form in *Nysius huttoni* populations in Bay of Plenty is the sub-brachypterous form (60%). Followed by, the macropterous form (28%) and then the rarer brachypterous form (12%) (C. Rowe unpub. data). It appears that the thermal environment in Bay of Plenty has stimulated the species *N. caledoniae* to produce sub-brachypters, as two of our specimens have wings that only slightly exceed the length of the abdomen (see Fig. 4). Both sub-brachypterous specimens are female; their total wing length measures 3.4 and 3.3mm, respectively 6% and 9% of their wings exceed the length of their abdomen (0.2 and 0.3mm). Our macropterous female has a total wing length of 2.9mm with

17% of the wing exceeding the length of the abdomen (0.5mm). Previously, all *N. caledoniae* found have been macropterous, this is the first discovery of a sub-brachypterous form in the species.



Fig 4. Sub-brachypterous form of *N. huttoni*

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