

## ***Neocicindela aureata* sp. nov. and notes on some congeners (Coleoptera: Carabidae: Cicindelinae)**

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*Neocicindela aureata* sp. nov. is a distinctive tiger beetle from a perched, soggy fen-like habitat within a forested area of the Ngakawau Ecological District near Westport, South Island, New Zealand. Notes on its congeners *N. tuberculata*, *N. spilleri* and *N. dunedensis* are included.

**Keywords:** Cicindelinae, *Neocicindela*, new species

### **Introduction**

Following the intense collecting activities and publications of Savill (1999), Cassola and Moravec (2010) and Laroche and Larivière (2013), with the subsequent densely infilled distribution mosaics shown in Pons et al. (2011: fig. 1), another *Neocicindela* species has been found in a habitat that has been rarely examined. Its features add to the putative complex of species centred on *Neocicindela parryi* (White, 1846) (Pons et al. 2011), which has three distinct groups, but *N. garnerae* Laroche & Larivière, 2013 is not one of them. This latter species was recognised and split from *N. parryi* later and covers most but not all of the southern records south of the Buller River of *N. parryi* shown in Pons et al. (2011: Fig. 1).

### ***Neocicindela aureata* sp. nov.**

*Description:* Habitus: size and shape very similar to *N. parryi* figured by Laroche and Larivière (2013: fig. 143) and below (cf. Figs 1 and 2). Elytral proportions slightly shorter and broader. Length: 9.5–10.5 mm. Holotype measurements (mm): length 10.5; head - narrowest frontal width between eyes 1.4, broadest width between eyes 1.7, greatest width including eyes 2.5; thorax - midline 1.55, width

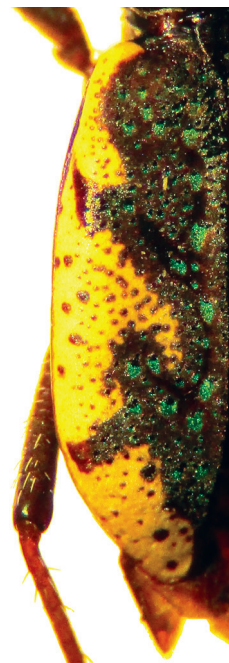
1.65, elytra-shoulder width at scutellar apex 2.9, greatest width 3.5, sutural length 5.5. Colour: labrum pale; strong blue-green iridescence in corners of clypeus, face of first antennomere, and inner margin of eye; antennomeres 2–4 and very base of 5 pale, others very dark brown; head, thorax and scutellum dark almost black, with coppery iridescence; elytra (Fig. 2) pale areas dull, greatly reduced in comparison with other species, very pale brown or cream, extensively dotted with dark brown to black spots and tubercles in females, less so in the male; humeral lunule narrow in female, slightly wider in male, almost obliterated mesad, completely isolated by a broad, smooth shining black band (Fig. 4), central areas black or dark brown; green foveae reduced, partly to mostly encircled or replaced by golden to bright red almost scarlet maculae also with fine white scales; submedian black velvet areas not extensive, and numerous shining black weakly tuberculate spots (Figs 5 and 6). In bright sunlight the elytra sparkle (N.B. description applies to fresh specimens and colours degrade, especially the white). Undersurface of entire body dark, almost black. Femora dark brown, the profemora with weak subapical/apical pale ring, its anterior and dorsal surfaces all iridescent blue-green; tibiae and tarsi pale



**Figure 1.** *Neocicindela parryi*, ex Wellington, the published type locality.



**Figure 2.** *Neocicindela aureata*, holotype female.



**Figure 3.** *Neocicindela* cf. *garnerae*, Mount Davy, Paparoa Range

brown, all podomeres with prominent dark brown apices. Labrum with 3 points and a variable straight to rounded lateral margin and corner; first antennomere with single seta; 2 supra-orbital setae (N.B. Larochelle and Larivière 2013: figs 8, 9 show four), no setae on vertex or pronotum; several elytral foveae have very short pale setae; convexity of the elytral lateral margins slightly greater than those of *N. parryi* but not as much as those of *N. cf. garnerae* (cf. Figs 1–3). Setation of palps and venter very similar to that of *N. parryi*; proepisternum with 0–2 white setae; mesepisternum with very few or no setae; abdominal ventrites with 2–8 setae near posterior margins and numerous short fine white setae along last ventrite edge. Male aedeagus as for *N. parryi*, but for the single specimen available the arrangement of the sclerites within internal sac appears different. A description of this feature is left until further material of this and other species are available for what is a very difficult dissection technique.

*Type material:* Holotype female, paratypes one male, four females. Mount Kuha, near Westport (41.8142°S, 171.6877°E, within 20 m radius), alt. 641 m. PM Johns, from 2:30pm 13 February 2018 to 1:00pm 15 February 2018 (Canterbury Museum).

*Material of other species examined:* Specimens of *N. parryi* group from: Franz Josef river bed, Orowaiti Lagoon, Bullock Creek, Mount Davy, Murchison, Springs Junction, Kohaihai River, Trovatore, Oparara and Haast Pass (Canterbury Museum accession numbers 2007.163.273–280, 2007.163.291, 2007.163.295–304, 2007.163.1243, 2007.163.1244, 2007.163.1265). Also specimens of *N. parryi* from Wiltons Bush, Wellington (=Port Nicholson), its type locality (Canterbury Museum accession numbers 2007.163.1274–1276).

*Etymology:* aureata (Latin: adorned with gold).

*Differential diagnosis:* The new species is close

morphologically to specimens of the genetically distinct *N. parryi* group PAA6 from sites near site 17 of Pons et al. (2011: table 1, fig. 2, ex Maruia River, sand and stone banks), the only South Island population processed for mtDNA by them. Larochelle and Larivière (2001, 2013) stated that *Neocicindela parryi* could “represent a species complex” or be “variable” in this area. *Neocicindela garneri* was separated from *N. parryi* and described by them in 2013.

The key to species as presented in Larochelle and Larivière (2013: 25) is now modified at couplet 3.

3 Foveae bright blue, green or bronzy-green not encircled or replaced by red to gold sheen; lateral pale areas of elytra extensive, not or only partly obliterated by brown or black spots.....3a

Foveae green, narrowly encircled or replaced by red to golden sheen; pale lateral areas of elytra greatly reduced, obliterated by the extensive, often anastomosing black or coloured spots and extra foveae.....*N. aureata*

3a Humeral and marginal pale areas separated by a broad black bar; extensive spotting over all pale areas but not their obliteration; few or no white setae on the proepisternum or mesepisternum; North Island and Northwest Nelson/Westland north of the Taramakau River valleys..... all populations presently known as *N. parryi*

Humeral and marginal pale areas tenuously separated by a thin triangular blackbar; sparse spotting over pale areas; 4–20 white setae on the proepisternum and mesepisternum very rarely fewer or absent; south of the Buller River system..... *N. garnerae* and *N. cf. garnerae* possible species complex

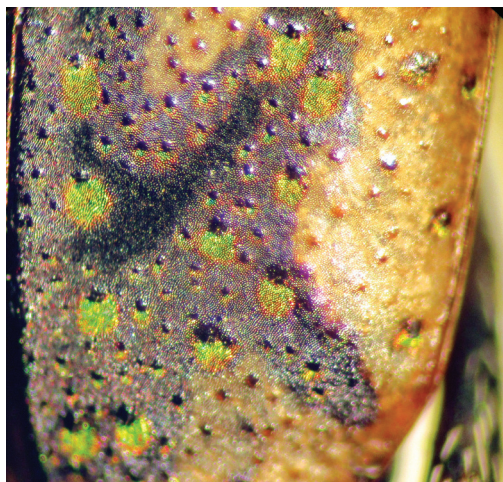
The variation in *N. parryi* is a possible basis for future work, which needs to be associated



Figure 4. *Neocicindela aureata* sp. nov., humeral lunule (45° angled view), male paratype.

with genetic analysis. Alpine populations of which one, shown as *N. cf. garnerae* (Fig. 3), could be of particular interest as it is known only from the southern end of the mountain range aligned south of Mount Te Kuha near Westport where this new species was found. Closer to the form of *N. parryi* (as in the key above) are high mountain populations at Mount Burnett, Northwest Nelson, mountains in the Mount Arthur – Mount Owen massif and further southeast in the Lewis Pass region. These populations show a tendency towards a sharper definition of the antennal pale and dark antennomeres as in *N. aureata* and *N. garnerae*. However, this particular feature may also depend on the length of the teneral stage in colder and wetter climates. Larochelle and Larivière (2001, 2013) made no mention of this possible developmental change.





**Figure 5.** *Neocicindela aureata* sp. nov., posterior region of elytron, male paratype.

*Remarks:* The type locality, presently the only known site, is a perched soggy fen (Fig. 6) with short sedges and grasses (10 cm) and stunted mānuka (30–50 cm) in an area of mean rainfall of at least 2.2 metres (>170 wet days per year). The bare, crusted soil/mud within the habitat is only a few centimetres above soil water level. This habitat is unlike those for all other species in New Zealand.

In sunlight, individuals quickly run over exposed soil (Fig. 7) dodging the numerous pink sundews and over the very irregular layer of moss, fine twigs, grass leaves and leaf litter and have short (up to 1 minute) stops. They disappear during the many cloudy or foggy periods. They remain active till sunset but were not seen at night. Flights were very short (c.10–30 cm) and did not rise above 20 cm. No other behaviours were observed during a 2 hour period of sun.

The area is within the Ngakawau Ecological District, characterised by its upland forests and shrublands on Buller coalfields and associated rock formations. The district is well known for its endemic fauna, particularly the snail *Powelliphanta augusta* Walker, Trewick & Barker, 2008, which is now confined to a few hectares close to the Stockton coal mine, and *Perionychella ngakawau* Blakemore, 2010, an

earthworm, considered critically endangered and again known only from the Stockton mine area. Immediately to the southwest is the Denniston Plateau and its coal mines. These are immediately northeast of the Te Kuha site, which now is also under examination for coal extraction. All these coal bearing areas are aligned over about 24 km and Mount Te Kuha is the only large unmodified area left at the higher altitudes. Mount Davy, where *N. cf. garnerae* (Fig. 3) was found, is a site 70 km distant from Te Kuha at 1,000 m on the southern tip of the Paparoa Range. As yet no other cicindelids have been found at similar heights along this range to its northern tip just 15 km from Mount Te Kuha.

#### *Neocicindela tuberculata* (Fabricius, 1775)

*Cicindela huttoni* Broun 1877 synonymy by Horn, 1936

*Cicindela huttoni* Broun 1880 (?partim)

The holotype of *N. tuberculata* was collected by Banks or his assistants, on James Cook's first voyage, in October–November 1769; thus the type locality could be restricted to one of a few sites where members of the Expedition landed in the North Island or possibly one site in the South Island. All are within the known distribution of the species. However, its synonym *N. huttoni* (Broun, 1877), was possibly described from three specimens. One, considered the holotype, in Broun's collection, came from a "bank of a creek flowing through Hikuwai forest about ten miles inland" from Tairua (Broun, 1877), a place restated by Brouerius van Nidek (1965) and Laroche and Larivière (2001) as "Hikuwai" [sic] (Hikuai). Hikuai was then a site for kauri log extraction from the forest. Tairua and Hikuai are directly only 20–25 kms to the south of Cooks Beach, Whitianga where Banks spent several days nearby collecting plants and insects, some of which were labelled "Observatory", pertaining to the observation of the Transit of Mercury.

The other two specimens mentioned by Broun (1877, 1880) were collected by Hutton



**Figure 6.** General habitat at Mount Kuha (fog/cloud close to ridgeline).



**Figure 7.** Bare crusted mud within habitat at Mount Kuha.



from Martin's Bay, western Otago, which is far outside the known distribution of *N. tuberculata*. They had been collected before Hutton shifted in 1873 from Dunedin to Christchurch. There is no direct evidence that Broun or Horn examined them, yet Hutton's handwritten manuscript (c. 1900–1902) of the types etc. in his collection, now in Canterbury Museum, clearly states that a cotype was present. Hutton's early insect collection is still extant and was used in teaching students at what is now Lincoln University. It is still in its original drawers but has been somewhat upgraded over the years by the addition of typed species labels below the specimens. The specimens are in poor condition and still on their original brass pins. Details of the Hutton's specimens are as follows:

One specimen labelled "huttoni", with a small blue paper disc. Two specimens labelled "tuberculata", one with a small pink paper disc and the other with a handwritten label "*Cicindela tuberculata* Fab". Two specimens labelled "parryi", one with a small pink paper disc and the other with a handwritten label "*Cicindela parryi* White". The handwriting on the labels could be Hutton's but is too cramped to be certain.

There are no other labels. The disc colour has no present-day meaning as to the status of these specimens although similar pink discs are on some types present in the later Hutton Collection in Canterbury Museum. It was also usual for Hutton to label his types clearly with "type" or "cotype".

All that can be said at present is that the "huttoni" specimen in his collection is not *N. tuberculata*, the "tuberculata" specimens are *N. tuberculata*, and the "parryi" specimens are possibly *N. parryi*. Thus not one of these specimens could be considered a syntype and the name "huttoni" is based alone on the specimen from Hikuai although it has been labelled subsequent to Broun's death and acquisition by the Natural History Museum, London as "Holotype" rather than "Lectotype".

### ***Neocicindela spilleri* Brouerius van Nidek, 1965**

This species is generally considered rather rare. However, it is certainly active at night as suspected. On Waiheke Island, Auckland, it was abundant for at least 2 hours after sunset on 6 January 2014. There, under a full canopy of 2–3 metre tall kākūka and sparse understory, individuals ran over the very dry (cracked), moderately bare ground, disturbed probably by the strong torchlight. Possible food items were the cockroach *Parellipsidion conjunctum* (Walker, 1868), small spiders and isopods. It was also actively mating. Flight was not seen at all.

### ***Neocicindela dunedensis* (Laporte de Castelnau, 1867)**

Another species whose habitat is poorly known even though it has been recovered, rarely, in large numbers. Collections at two sites point to it being rather reclusive, under shade rather than in open ground. It was seen, and collected in pitfall traps, under the canopy of a single ancient (>200 year old) *Sophora microphylla* tree, a species once very common on river flats near West Melton, Christchurch. That tree is now within a fenced, sloping, revegetated private reserve with planted *Coprosma propinqua*, matagouri, kākūka, *Corokia cotoneasta*, *Meuhlenbeckia astonii* and *Pittosporum* spp. There were no bare areas and no larval holes were found. The tiger beetle was not in any pitfall traps (five) set concurrently, 100–500 m from the revegetation site, across the adjacent relatively flat, lightly grazed grassland towards the Waimakariri River 1 km distant.

Near Fairlie, at the Burkes Pass Scenic Reserve, it was common between the tall tussocks and matagouri but not seen in the dry stream bed within the reserve.

## Acknowledgements

All specimens in Canterbury Museum, collected mainly by Anthony Savill, were made available to the author. Rowan Emberson reminded me of the Lincoln Hutton Collection and John Marris provided access and facilities. Helicopter transport to the Mount Te Kuha site was arranged by the Royal Forest and Bird Protection Society. Much appreciated were on-site discussions with Dr Kelvin Lloyd at Mount Te Kuha.

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