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Review of the New Zealand endemic family Cyclaxyridae, new family (Coleoptera: Polyphaga)

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Abstract. In this paper we review the endemic New Zealand cucujoid beetle family Cyclaxyridae, fam. nov., which includes only the genus *Cyclaxyra* Broun, 1893. One new species is described (*Cyclaxyra jelineki* sp. nov.) and one new synonymy is established (*C. politula* (Broun, 1881) = *C. impressa* Broun, 1915, syn. nov.), resulting in the recognition of two valid species in the family. Lectotype of *C. politula* is designated. Larvae are described and illustrated and phylogenetic relationships and biology are discussed.

Keywords. Coleoptera, Cucujoidea, Cyclaxyridae, Phalacridae, taxonomy, new species, sooty mold, sooty mould, fumagine fungus, New Zealand

Introduction and Taxonomic history

Cyclaxyra is an historically enigmatic genus of New Zealand endemic Cucujoidea with a long, convoluted taxonomic history out of proportion to its prominence in collections. Adults of the genus are readily distinguished from almost all other Coleoptera by the possession of a single pair of deep elytral epipleural foveae lined with stiff setae (Fig. 3), except for the New Zealand leiodid *Baeosilpha rufescens* Broun, 1895, which possesses a reduced antennomere 8 and other characters typical of Leiodidae. The foveae of adult *Cyclaxyra* Broun, 1893 are often filled with a white solid substance of waxy appearance and unknown composition (Fig. 4). In the New Zealand Arthropod Collection, Auckland (NZAC), three species were identified in the collection, and one series from Mt Domett in Northwest Nelson was labeled as a new species by the late coleopterist Charles Watt. Because of the importance of this group as an endemic family, and one that is strictly associated with sooty moulds (Klimaszewski & Watt 1997; Leschen et al., in press), we carried out an intensive study to verify the number of species and place the taxonomy of the family on a sound foundation.

Cyclomorpha was erected by Broun (1881: 667) as a genus in the family Nitidulidae to accommodate a new species, *C. politula*, described from Tairua, New Zealand. This name is a junior homonym of *Cyclomorpha* Pease, 1871 (a genus of mollusc) and was subsequently given the replacement name *Melanochroa* by Broun (1882a, reprinted in Broun 1882b). Broun (1893) redescribed the genus and, in an apparent oversight, gave it the replacement name *Cyclaxyra* with the comment "This species was formerly named *Cyclomorpha*, but, as I find the name had been used before, I have substituted *Cyclaxyra*" (p. 1077). He later described the species *Cyclaxyra impressa* Broun, 1915, from Greymouth, New Zealand. The name *Melanochroa* Broun has not been used as valid since its original publication, and additionally it is the senior homonym of *Melanochroa* Roeder, 1886, a genus of Diptera, and *Melanochroa* Yoshiyasu, 1985, a genus of Lepidoptera. Watt & Crowson (1986) successfully petitioned for conservation of the name *Cyclaxyra* Broun, 1893, and suppression of the name *Melanochroa* Broun, 1882 (ICZN 1988).

Crowson (1955: 99) removed *Cyclaxyra* from Nitidulidae and provisionally referred it to the family Sphindidae based on similarity to the genus *Aspidiphorus* Ziegler in Dejean, 1821, but admitted that *Cyclaxyra* may not belong here since it, unlike all other Sphindidae, has open procoxal cavities (p. 102). Sen Gupta & Crowson (1966: 62), without explanation, included the genus in a modified key to families of Clavicornia as "Phalacridae, genus *Cyclaxyra* Broun" and noted at the end of the key that the position of the genus deserves a more thorough discussion. Crowson (1967, 1968) implied that the genus should be included in the family Phalacridae, since it exhibits the "essential larval features of this group," but admitted the adults differed in a number of characters. This classification was followed in Crowson (1981: 607) and Lawrence (1982: 529). Lawrence & Newton (1995), recognizing two subfamilies of Phalacridae (Phalacrinae and Phaenocephalinae), included *Cyclaxyra* as Phalacridae *incertae sedis*. Crowson (1984: 259), in a review of Ascomycete-associated beetles, referred to "Phalacridae-Cyclaxyrinae" in relation to sooty mold fauna but gave no further mention of this taxon. Watt & Crowson (1986) indicated that a new family was to be established for this genus in "Crowson & Sen Gupta, in press" but this work was not completed before Crowson's death. Klimaszewski & Watt (1997), in a review of the family-group taxa of New Zealand Coleoptera, erected the subfamily Cyclaxyrinae in Phalacridae to accommodate the genus, but this is a *nomen nudum* as it was not accompanied by a formal description or diagnosis and does not satisfy article 13.1 for establishment of a new name (ICZN 1999). Lawrence et al. (1999a), in a CD-ROM (which precludes having any standing in nomenclature), elevated the group to family rank, citing a lack of adult or larval characters to support placement in Phalacridae. This arrangement was followed by Lawrence & Leschen (2003) and Leschen et al. (2005), but neither of these provides a formal description or diagnosis. Here we formally name the family-group in Cucujoidea.

Materials and methods

Genitalia were drawn with the aid of a camera lucida attached to an Olympus BX50 microscope. Dissected genitalia were mounted in a drop of dimethyl hydantoin formaldehyde (DMHF) on a small rectangle of cellulose acetate pinned beneath the specimen. Pronotal

length was taken along the midline, elytral length is postscutellar along the suture, and total length is the sum of the head length (along midline, including clypeus), pronotal length, and elytral length. Two-letter area codes were used for specimen localities according to Crosby et al. (1998). These are decoded below:

AK	Auckland	MC	Mid Canterbury	SI	Stewart Island
BR	Buller	NC	North Canterbury	TK	Taranaki
FD	Fiordland	NN	Nelson	TO	Taupo
KA	Kaikoura	OL	Otago Lakes	WD	Westland
MB	Marlborough	SD	Marlborough Sounds		

Depositories:

AMNZ	Auckland Museum, Auckland, New Zealand;
ANIC	Australian National Insect Collection, Canberra, Australia;
BMNH	The Natural History Museum, London, United Kingdom;
CAS	California Academy of Sciences, San Francisco, CA, USA;
FMNH	Field Museum of Natural History, Chicago, IL, USA;
JNIC	John Nunn Collection, Dunedin, New Zealand;
LSAM	Louisiana State Arthropod Museum, Baton Rouge, LA, USA;
LUNZ	Entomology Research Museum, Lincoln University, Christchurch, New Zealand;
NZAC	New Zealand Arthropod Collection, Landcare Research, Auckland, New Zealand.

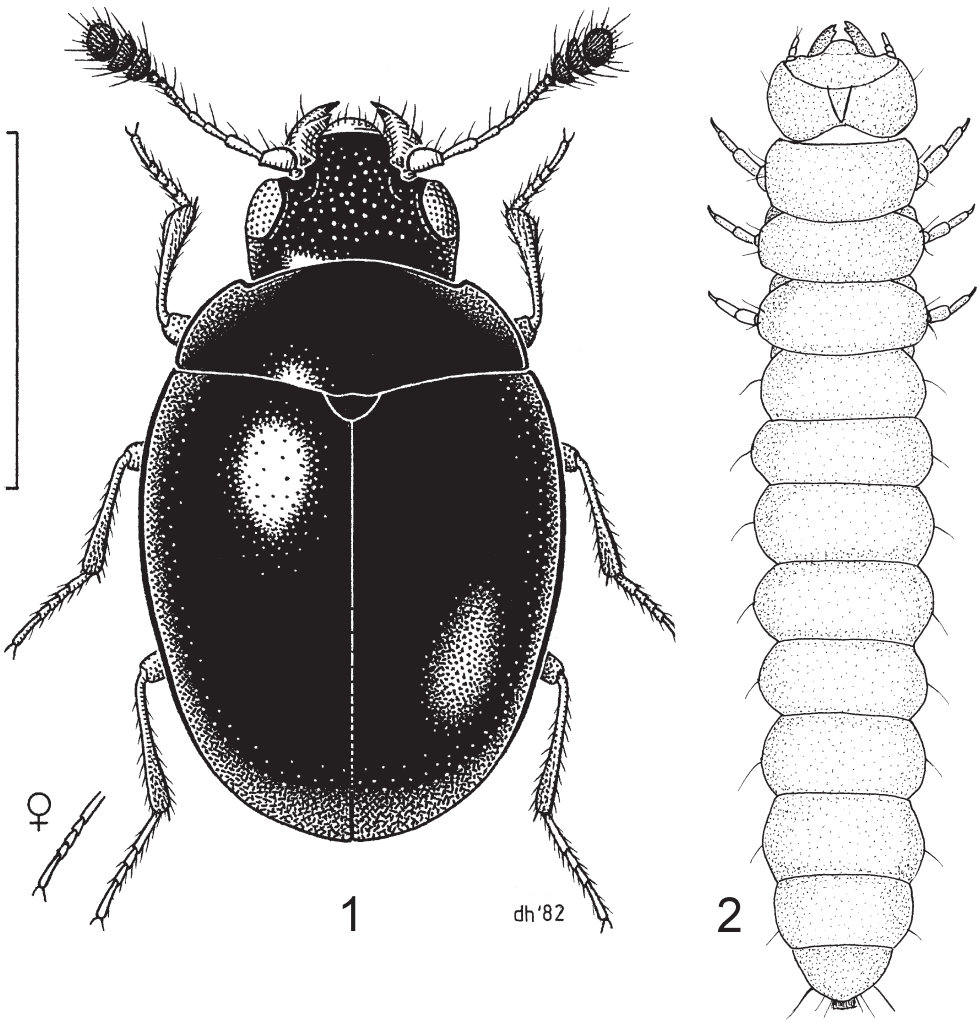
Taxonomy

Cyclaxyridae, fam. nov.

Cyclaxyrinae Klimaszewski & Watt 1997: 49, as subfamily of Phalacridae Leach, 1815. Nomen nudum.
Cyclaxyridae Lawrence et al. 1999a. Unavailable name.
Cyclaxyridae Lawrence & Leschen 2003: 910. Nomen nudum.
Cyclaxyridae Leschen et al. 2005: 63, 67. Nomen nudum.

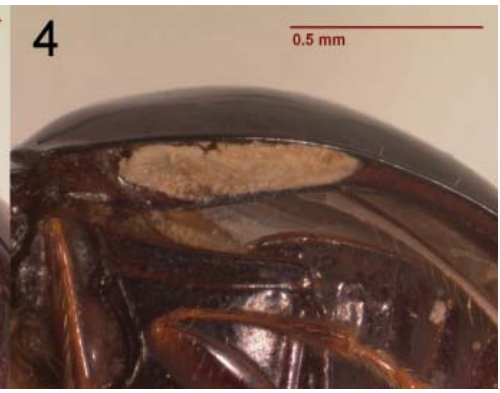
Type genus. *Cyclaxyra* Broun, 1893.

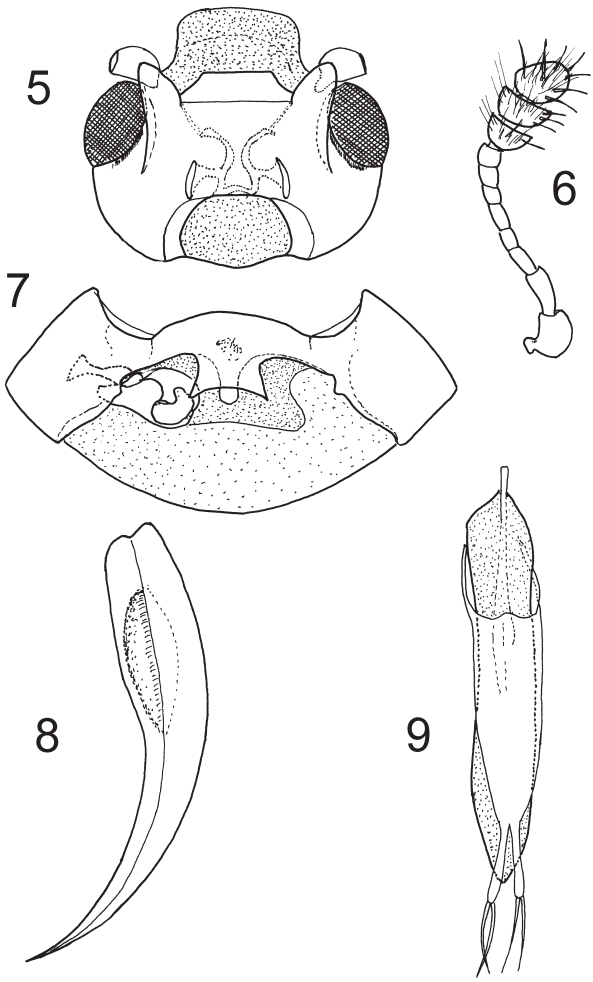
Adult description. Length 2.00–2.76 mm. Body (Fig. 1) 1.4–1.5 times as long as wide, nearly circular, very convex; dorsal surface smooth, shiny; vestiture of extremely sparse, inconspicuous, recumbent hairs. Head (Fig. 5) about 1.15 times wider than long, frons usually punctate, punctures coarse to fine (Figs. 19–21); mouthparts anteriorly oriented; head not constricted behind eyes, transverse vertexal line absent; stridulatory file absent, temples about twice as long as eyes. Tentorial arms moderately separated at base, extending posteriorly from epistome to behind level of posterior margin of eye, slightly diverging, corpotentorial bridge narrow and median tendon absent. Frontoclypeal suture absent; clypeus extending well in front of antennal insertions, subrectangular at apex, sides arcuately emarginate above antennal insertions. Eyes moderately large, subcircular, prominent anteriorly, moderately coarsely facetted, without interfacetal setae. Antennae (Fig. 6) 11-segmented with a distinct 3-segmented club; antennal insertions exposed from above; genae with deep antennal grooves; genae not projecting. Gular sutures well separated. Cervical sclerites apparently absent. Labrum visible, broadly rounded. Mandible about 1.15 times as long as wide at base, bent abruptly mesally, with slight dorsal concavity, not setose; apex tridentate; mola well



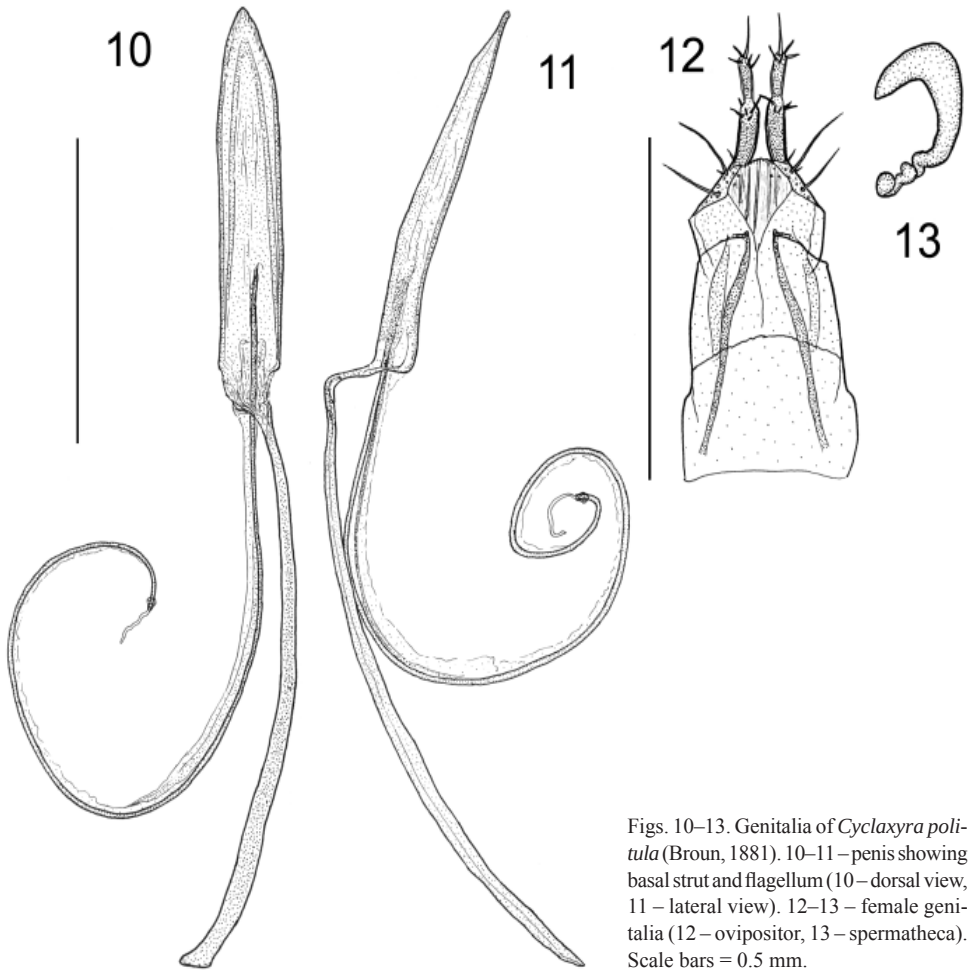
Figs. 1–2. Habitus of *Cyclaxyra politula* (Broun, 1881). 1 – adult (scale bar = 1.0 mm); 2 – larva.

developed and transversely ridged; prostheca consisting of a wide membrane and brush of setae. Maxilla with galea 3–4 times as wide as lacinia; apex of lacinia with a pair of spines; terminal maxillary palpomere about 3 times as long as wide, widest just proximal to middle. Mentum transverse; apical labial palpomere about twice as long as wide, cylindrical. Pronotal length 0.40–0.56 mm, about 2.25 times wider than long, base as wide as elytral base; sides evenly arcuate, with distinct lateral bead; lateral carina sharp, complete, feebly explanate; anterior angles acute, protruding; anterior edge with margin, margin obsolete near midline; posterior edge strongly posteriorly arcuate, weakly margined; disc with sparse, irregularly





Figs. 3–9. 3, 4 – elytral epipleuron of *Cyclaxyra politula* (Broun, 1881) (3 – without waxy substance; 4 – with waxy substance). 5–9 – details of adult *C. politula* (5 – head capsule, ventral view; 6 – antenna; 7 – prothorax, ventral view; 8 – elytral epipleuron, ventral view; 9 – relationship of tegmen and penis in repose, dorsal view).



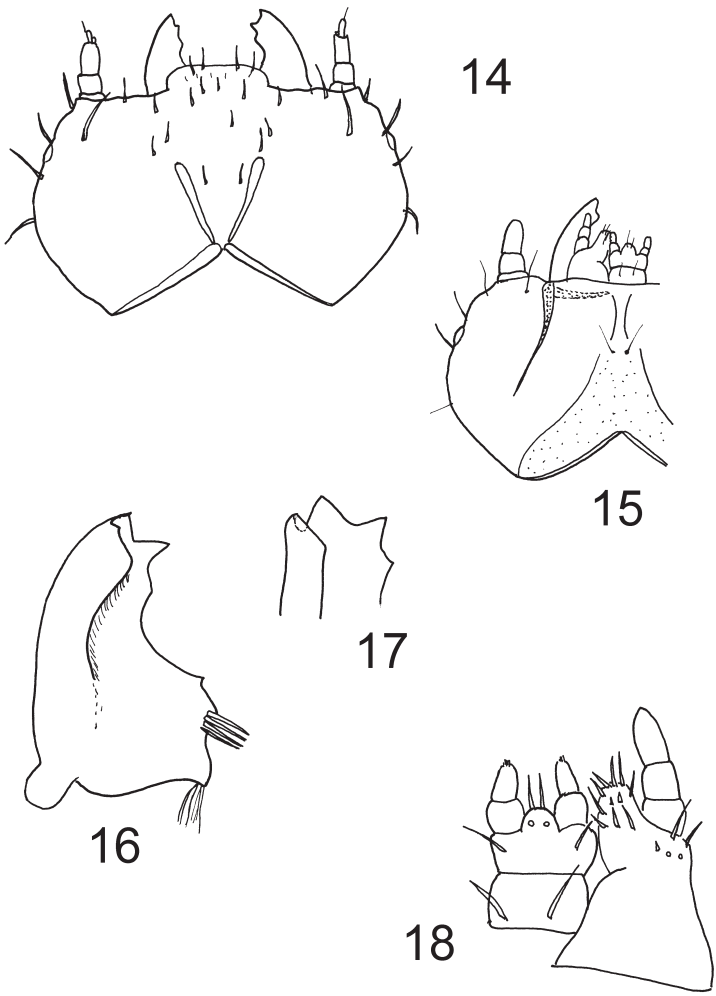
Figs. 10–13. Genitalia of *Cyclaxyra politula* (Broun, 1881). 10–11 – penis showing basal strut and flagellum (10 – dorsal view, 11 – lateral view). 12–13 – female genitalia (12 – ovipositor, 13 – spermatheca). Scale bars = 0.5 mm.

spaced punctures. Prosternum (Fig. 7) short in front of coxae, about half as long as coxal cavity; male with medial rounded setiferous sex patch; prosternal process broad, not extended posteriorly beyond level of procoxae, sides expanded laterally at apex, apical edge straight; apicomedian process (not visible in ventral view) articulating with notch on mesoventrite. Notosternal suture complete. Procoxae not projecting. Procoxal cavities slightly transverse, with narrow lateral extension, externally broadly open behind, internally narrowly open behind; trochantins exposed. Mesoventrite short, convex, with vertical anterior procoxal rests. Mesocoxal cavities subcircular, separated by about their diameter, open laterally (partly closed by mesepimera), with exposed trochantins. Metaventrite about 1.5 times wider than long, convex, discrimen absent. Metepisternum long and narrow, about 6 times longer than wide.

Metendosternite with broad, hyaline stalk, long arms, with long S-shaped ventrolateral projections arising from middle of arms. Metacoxae strongly transverse, subcontiguous, reaching metepisternum. Scutellum slightly wider than long, rounded posteriorly, almost semicircular, impunctate. Elytral length 1.22–1.70 mm, 1.72–1.74 times as long as wide and about 3 times as long as pronotum, humeri well developed, slightly obtuse; disc strongly and evenly convex, punctation very fine and sparse, punctures not in distinct rows. Epipleura (Fig. 8) complete, wide anteriorly, abruptly narrowed about midway to apex, with a deep longitudinal fovea in anterior half containing moderately dense, stout, erect setae. Hind wings reduced to short pads or fully developed; apical field more than 0.5 times wing length; radial cell present but reduced and somewhat oblique; linear sclerite present just beyond radial cell; r3 very short and r4 incomplete; basal portion of RP very short to moderately long, with vaguely indicated long apical extension; medial spur straight and not reaching wing margin; medial field with 4 free veins (sometimes with remnant of a fifth) and no medial fleck; wedge cell absent; anal notch deep. Legs moderately long, slender; trochanterofemoral joint oblique; femur inflated near middle; tibiae weakly compressed, slightly expanded at apex, not spined; tibial spurs weak, paired, equal in length. Tarsi 5-5-5 in female and 5-5-4 in male; penultimate tarsomere slightly lobed beneath; protarsomeres 1–4 subequal; mesotarsomere 1 about 1.5 times as long as 2, mesotarsomeres 2–4 subequal; metatarsomere 1 about twice as long as 2, penultimate and antepenultimate metatarsomeres subequal; pretarsal claws simple; empodium small, not projecting between claws. Abdomen with 5 free ventrites, ventrite I not much longer than II, without postcoxal lines; intercoxal process acute. Abdominal spiracles present on segments I–V. Sternite VIII in male without anterior strut, sternite IX in male apically membranous, basally with anterior strut (spiculum gastrale, Figs. 25, 29). Aedeagus (Fig. 9) uninverted, with tegmen dorsal to penis; tegmen (Figs. 22, 26) with anterior strut; parameres free, contiguous at base. Penis (Figs. 10, 11) with long basal strut, extending internally to prothorax when retracted; endophallus with long flagellum. Female sternite VIII with well-developed spiculum ventrale. Ovipositor (Fig. 12) about 2 times as long as wide, with two pairs of elongate, slender baculi (dorsal and ventral); gonocoxite, valvifer, and paraproct subequal in length; paraproct with heavily sclerotised internal process on anterior edge; styli well developed, apically attached; spermatheca (Fig. 13) sclerotised, C-shaped, duct with coils (Lawrence et al. 1999b; Leschen et al., in press).

Larval description (based on *C. politula*). Body (Fig. 2) elongate, more or less parallel-sided and slightly flattened; very lightly pigmented, except for head capsule and tergum IX; dorsal surfaces smooth; vestiture consisting of fine hairs or setae. Head (Fig. 14) prognathous, relatively transverse with strongly rounded sides; posterior edge of head capsule distinctly emarginate. Epicranial stem absent; frontal arms lyriform, contiguous at bases, initially V-shaped then suddenly angled and extending laterally to antennal sockets; frontal arms joined anteriorly by depigmented band; median endocarina absent; paired endocarinae present under V-shaped portion of frontal arms. Stemmata on each side 5. Antennae 3-segmented, less than 0.15 times as long as head width; first two antennomeres transverse, third elongate; sensorium shorter than apical antennomere, conical or palpiform. Frontoclypeal suture absent; labrum fused to clypeus, small, with long, widely separated tormae. Mandibles (Figs. 16, 17)

symmetrical, broad at base and narrow at apex, tridentate, without accessory ventral process; incisor edge with 1 or 2 subapical teeth; mesal surface of mandibular base with 2 to 5 hyaline processes, sometimes joined basally; mola absent. Ventral mouthparts (Figs. 15, 18) protracted; cardo undivided, transverse; stipes wider than long; articulating area absent; mala simple, not cleft, rounded or truncate and setose or spinose; palps 3-segmented. Labium consisting



Figs. 14–18. Details of larval *Cyclaxyra politula* (Broun, 1881). 14 – head capsule, dorsal view; 15 – head capsule, ventral view; 16 – mandible; 17 – apex of mandible; 18 – labium and maxilla.

of prementum and postmentum, which are basally connate with maxillae; ligula shorter than labial palp, simple; palps 2-segmented, separated by more than width of first palpomere. Hypopharyngeal sclerome absent. Hypostomal rods moderately long, subparallel and not extending to posterior of head; ventral epicranial ridges absent. Gular sutures very narrowly separate; gula longer than wide and not separated from labium by suture. Prothorax not longer than meso- and metathorax combined, terga with fine and sparse asperities, especially anteriorly; protergum without sclerotised plates. Prosternum with single, weakly defined sclerite. Legs well developed but relatively short, 5-segmented; pretarsus claw-like with 2 setae; mesocoxae separated by more than 2 basal coxal diameters. Abdomen more than twice as long as thorax; segments I–VII lacking ventrolateral processes, terga and sterna with lateral patches of fine asperities; paired abdominal glands absent. Abdominal segment IX shorter than VIII; tergum extending onto ventral surface but not forming articulated plate; urogomphi absent. Sternum IX simple, not enclosed by sternum VIII. Segment X without paired pygopods; anal region posteroventrally oriented. Spiracles annular-biforous, not placed at ends of spiracular tubes, those on segment VIII about the same size as others on abdomen, facing laterally; accessory chambers about as long as peritreme and facing posteriorly (Lawrence et al. 1999a; Leschen et al., in press).

Differential diagnosis. Adults of this family may be distinguished from all other Coleoptera by the highly convex body form, eighth antennomere not significantly reduced in size, ventral antennal grooves present on the head, externally broadly open procoxal cavities, deep elytral epipleural foveae lined with stiff setae, and 5-5-4 tarsal formula in the male. Adults can be further separated from similar-looking Phalacridae by the antennal insertion exposed, lacinial uncus absent, protrochantin exposed, elytral punctation confused and not seriate, mesocoxal cavity open laterally, and functional spiracles absent on abdominal segment VII. Among Cucujoidea the larvae of Cyclaxyridae are distinguished by their parallel body without pigmented terga, head capsule posteriorly emarginated, paired endocarinae contiguous at base and anteriorly divergent, lack of urogomphi, protracted ventral mouthparts, mesal surface of mandibular base with hyaline process, inner apical angle of mala rounded or truncate, and labial palpi 2-segmented, pretarsus bisetose, segment X and anal opening posteroventral, and spiracles annular-biforous.

Composition and distribution. The family contains only the genus *Cyclaxyra*, with two species (one newly described below) occurring on the North, South, and Stewart Islands in New Zealand. The two species have not been taken at the same site, and *C. politula* appears to be mostly absent from northeastern South Island. A Quaternary fossil identified as *C. impressa* Broun, 1915 has been reported by Marra et al. (2008) from Taranaki.

Phylogenetic relationships. In a phylogenetic analysis of 99 larval and adult characters, Cyclaxyridae was placed as sister taxon to the Australian family Tasmosalpingidae by Leschen et al. (2005), a placement that was supported mainly by adult characters, as this sister-relationship is shown by adult-only trees. Possibly, *Cyclaxyra* is more closely related to Lamingtoniidae (Lawrence & Leschen 2003), as suggested in larval-only trees.

Biology. Both larvae and adults are inhabitants of sooty-mould fungi (Ascomycota: Dothideomycetes: Capnodiales), which in south temperate regions form thick black "wefts" of mycelia of up to six different species (Hughes 1972: 226), generally on the surfaces of foliage, branches, tree trunks, and often surrounding rocks and soil. These growths are associated with sugary exudates of leaves or with the "honeydew" produced by sternorrhynchous Hemiptera, primarily in association with *Nothofagus*, but other plants as well (Klimaszewski & Watt 1997, Carlton & Leschen 2007). Based on examination of gut contents the beetles feed on spores, conidia, and hyphae of the fungus. This habit has evolved in multiple lineages of Coleoptera, and in New Zealand and elsewhere beetles in several genera and families are also associated with sooty moulds (e.g., *Nothoderodontus* Crowson, 1959 (Derodontidae; found in temperate South America, New Zealand and Australia), *Metaxina* Broun, 1909 (Metaxinidae; family endemic to New Zealand), *Agapytho* Broun, 1921 (Agapythidae; family endemic to New Zealand), *Hisparonia* Kirejtshuk, 2004 (Nitidulidae; genus endemic to New Zealand), *Triphyllus* Dejean, 1821 (Mycetophagidae; one species associated mainly with sooty moulds), and *Doxozilora* Broun, 1909 (Melandryidae; genus is endemic to New Zealand); see Johnson et al. 2008).

Figs. 19–21. Frons of *Cyclaxyra* Broun, 1893. 19 – *C. jelineki* sp. nov.; 20–21 – *C. politula* (Broun, 1881) (20 – typical form; 21 – nearly impunctate form).

Cyclaxyra species are active at night and may be collected in large numbers on trunks of trees and larger shrubs where sooty moulds are growing. Mating has also been observed at this time where males mount females on top (not back to back) (Leschen, pers. observ.).

The function of the epipleural foveae remains unknown. We have not observed spores within these, and the structure is not sexually dimorphic.

Cyclaxyra Broun, 1893

Cyclomorpha Broun, 1881: 667 (junior homonym of *Cyclomorpha* Pease, 1871).
Melanochroa Broun, 1882a: 409 (replacement name for *Cyclomorpha* Broun, 1881; senior homonym of *Melanochroa* Roeder, 1886; suppressed by ICZN (1988: 69)).
Cyclaxyra Broun, 1893: 1076 (replacement name for *Cyclomorpha* Broun, 1881).

Type species. *Cyclomorpha politula* Broun, 1881, by monotypy.
Diagnosis. As for Cyclaxyridae fam. nov.

Key to species of *Cyclaxyra*

1 Punctation of frons relatively fine and very dense with punctures separated by 1 diameter (Fig. 19); metaventrite medially densely, finely punctate; brachypterous; tegmen with long basal strut (Fig. 22); penis more elongate, more than 5 times as long as wide (Fig. 24); northeastern South Island. ..... ***C. jelineki* sp. nov.**
– Punctation of frons extremely coarse to very weak, sparse to moderately dense with punctures separated by 1–3 diameters (Fig. 20), or nearly absent (Fig. 21); metaventrite medially impunctate or sparsely, finely punctate; brachypterous or macropterous; tegmen with short, tapering basal strut (Fig. 26); penis shorter, broader, less than 4.5 times as long as wide (Fig. 28); widespread throughout New Zealand. ..... ***C. politula*** (Broun, 1881)

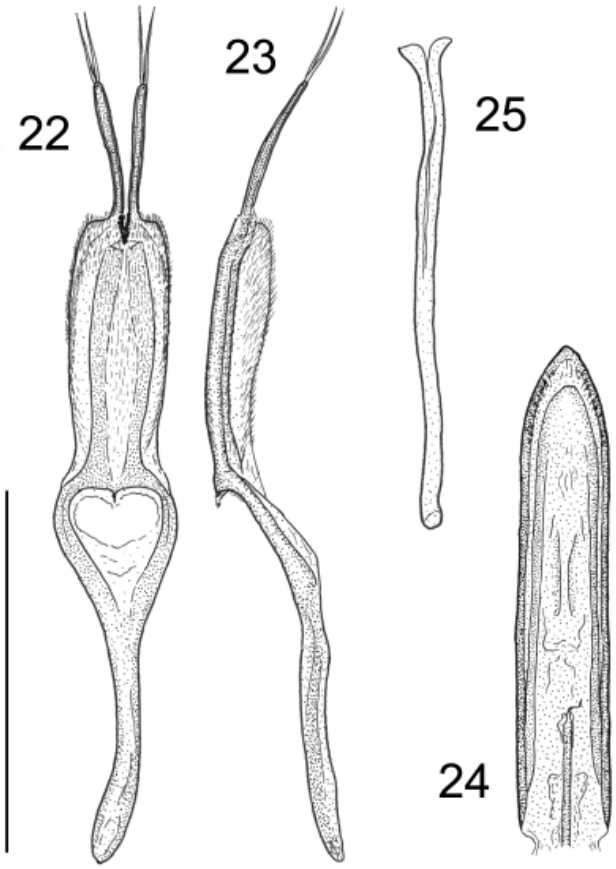
Cyclaxyra jelineki sp. nov.

(Figs. 19, 22–25)

Type material. Holotype. ♂: "NEW ZEALAND: KA, Mt. Fyffe, Hinau Loop, Kowhai Valley, 17.II.2009, K. Marske & R. Leschen, ex sooty mould at base of tree, night, 42°21.008′S, 173°34.077′E, 200 m, KM314 / HOLOTYPE Cyclaxyra jelineki design. R. Leschen, 2009" (NZAC).

Paratypes (130 spec.): **NEW ZEALAND: KA:** same data as holotype, except KM312 & KM314, 87 (NZAC), 10 (ANIC), 10 (LSAM), and 10 (FMNH); same data as holotype, except 5.IV.2004, RL846, R. Leschen, 2 (NZAC); Oaro, black sooty mould on tree, 20.III.1982, C.A. Muir & R.M. Emberson, 4 (LUNZ); Blue Duck Scientific Reserve, 42°15′S, 173°46′E, leaf litter, 18.XI.1999, RL497, R. Leschen & R. Hoare, 2 (NZAC). **NC:** Front Dismal [near Dismal Valley] (71ha), 42°37′S, 172°21′E, FIT 14 days, forest 64m ground, #1637-014, 11.II.2001, R.K. Didham, 1 (AMNZ); Glentui, Glentui Reserve, 43°12.023′S, 172°15.194′E, under logs, 5.II.2007, RL1284, R. Leschen, T. Buckley, & K. Marske, 4 (NZAC).

Adult description. Total length: 2.00–2.58 mm; body colouration of mature specimens usually deep black, teneral specimens often with base of elytra, pronotum anteromedially, and metaventrite darker than rest of integument; appendages rufous, antennal club usually concolourous with funicle; glabrous above; frons (Fig. 19) with fine, dense punctation, punctures separated by 1 diameter; metaventrite with fine, dense punctation; hind wings reduced to short pads; pronotal length 0.40–0.56 mm; elytral length 1.22–1.70 mm; tegmen of aedeagus (Figs. 22,



Figs. 22–25. Male genitalia of *Cyclaxyra jelineki* sp. nov. 22 – tegmen, dorsal view; 23 – tegmen, lateral view; 24 – penis, dorsal view (basal strut omitted). 25 – spiculum gastrale. Scale bar = 0.5 mm.

23) with long, curved basal strut, parameres proportionally long; penis (Fig. 24) not including basal strut more that five times as long as wide; spiculum gastrale as in Fig. 25.

Variation. The basal strut of the penis is variable in form. The thinly sclerotised posterolateral regions of the tegmen are often flexed inward as a result of clearing, making the tegmen appear narrowed apically.

Etymology. The species is named in honor of Dr Josef Jelínek in recognition of his excellent work in Nitidulidae (including New Zealand work) and other microcoleoptera and for his kindness to fellow entomologists.

Differential diagnosis. Adults may be distinguished from *C. politula* by the finely, densely punctate frons and metaventrite, and by the characters of the male genitalia noted in the key.

Distribution. Known only from the northeastern regions of the South Island, New Zealand, from North Canterbury northward to at least Blue Duck Scientific Reserve. Most specimens were collected at Mt. Fyffe, on the Hinau Loop in Kowhai Valley which is predominantly a broadleaf forest, but other localities consist of stands of *Nothofagus* and broadleaf trees, or a mix of these trees with podocarps.

Cyclaxyra politula (Broun, 1881)

(Figs. 1–18, 20, 21, 26–29)

Cyclomorpha politula Broun, 1881: 668.
Cyclaxyra politula: Broun (1893: 1077; transfer to *Cyclaxyra* Broun, 1893).
Cyclaxyra impressa Broun, 1915: 314, **syn. nov.**

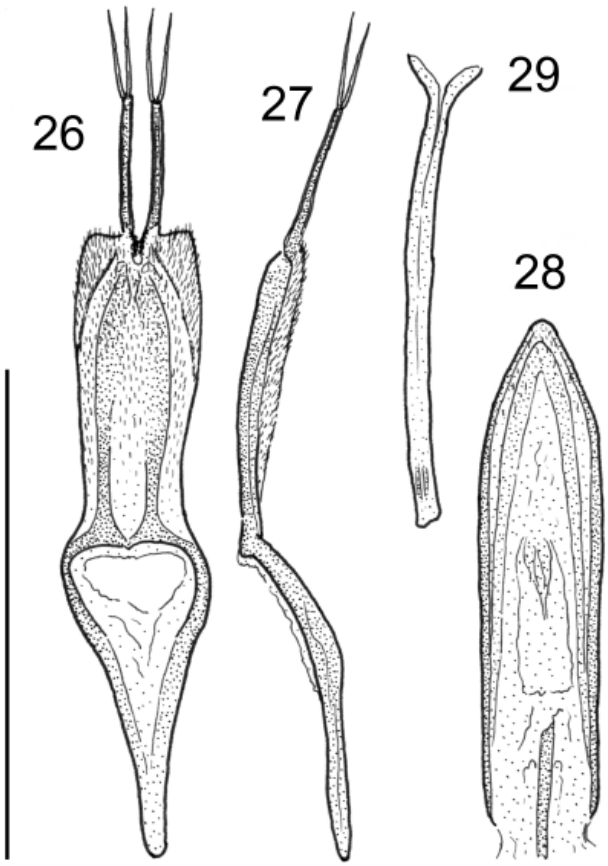
Type locality. *Cyclomorpha politula*: New Zealand, Tairua. *Cyclaxyra impressa*: New Zealand, Greymouth.

Type material. *Cyclomorpha politula*: Two syntypes present in BMNH. Lectotype (here designated): ♂, second specimen in syntype series, card-mounted ventral side up, with the labels "1165 / Tairua / New Zealand Broun Coll. Brit. Mus. 1922-482. / Cyclaxyra politula. / [invalid paralectotype label added by J.C. Watt (1985), turned over] / LECTOTYPE ♂ Cyclomorpha politula Broun des. M.L. Gimmel 2009" (BMNH). Paralectotype: ♀, "Type / 1165 / Tairua / New Zealand Broun Coll. Brit. Mus. 1922-482. / Cyclaxyra politula. / [invalid lectotype label added by J.C. Watt (1985), turned over] / PARALECTOTYPE Cyclomorpha politula Broun des. M.L. Gimmel 2009" (BMNH). The lectotype designation is necessary to fix the identity of this species since another species has been described.

Cyclaxyra impressa: Holotype: ♂, "New Zealand Broun Coll. Brit. Mus. 1922-482. / Greymouth 5.12.1907 / Cyclaxyra latitarsis / HOLOTYPE ♂ Cyclaxyra impressa Broun det. J.C. Watt 1985 (Broun's det in error)" (BMNH).

Additional material examined (386 spec.). **NEW ZEALAND: North Island: TO:** Waimarino, I.1910, T. Broun, 1 (BMNH), 1 (NZAC); **TK**: Hooker track, Mt. Egmont, 3700′, 15.VI.1965, J.I. Townsend, 1 (NZAC). **AK:** Waitakere Ra, Piha, wasp survey, Malaise trap, duration ca. 1 week, 21.III.2000, 1 (AMNZ); same data except 20.IV.2000, 2 (AMNZ); same data except 28.IV.2000, 1 (AMNZ); same data except 6.VI.2000, 2 (AMNZ); same data except 13.VI.2000, 3 (AMNZ); same data except 21.VI.2000, 1 (AMNZ). **South Island: NN:** Tasman Mts., Lake Sylvester, 4330′, 30.IV.1969, James E. Tobler, 7 (CAS); Takaka Hill, 2000′, 5.II.1957, E.S. Gourlay, 4 (NZAC); Takaka Hill, beech forest, forest litter, 18.IV.1963, G. Kuschel, 1 (NZAC); Hope, 21.XII.1915, 1 (NZAC); Upper Maitai, 19.X.1941, E.S. Gourlay, 3 (NZAC); same data except 13.II.1957, 1 (NZAC); Maitai Valley, fumagine fungus on *Nothofagus*, 27.III.1966, J.C. Watt, 1 (NZAC); Upper Maitai Valley, moss sample, 15.II.1967, J.I. Townsend, 3 (NZAC); Wooded Pk., Dun Mt., 609 m, 13.VIII.1966, J.C. Watt, 6 (NZAC); Wooded Pk., Dun Mt., 2000′, fungus on *Nothofagus fusca*, 31.VIII.1966, J.C. Watt, 2 (NZAC); Nelson area, fumagine on *Nothofagus*, 1.III.1957, R.A. Crowson, 15 (ANIC); Nelson, Third House, Dun Mt. track, litter, 14.IX.1971, G. Ramsay, 7 (NZAC); Nelson, Dun Mt., 2000′, fumagine fungus, 31.VIII.1966, J.C. Watt, 1 (NZAC); Dun Mt., 1850′, in fumagine fungus on *Nothofagus fusca*, 4.IV.1966, J.C. Watt, 8 (NZAC); same data except moss under beech trees, 29.III.1966, J.I. Townsend, 1 (NZAC); Dun Mt. track, 609 m, fungus, 6.XI.1969, J.C. Watt, 21 (NZAC); Eves Valley, 5.XII.1972, G. Kuschel, 2 (NZAC); ridge between Totaranui & Anapai, fumagine fungus on beech trees, 6.V.1967, F. Alack, 2 (NZAC); Aorere area, Brown R., above 1000′, fumagine fungus, 22.VIII.1967, F. Alack, 1 (NZAC); Karamea Bluff, 41°31′S, 172°01′E, sooty mould, 9.II.1999, RL284, R. Leschen & R. Hoare, 6 (NZAC); Karamea Bluff, View Hill Saddle, 41°30.981′S, 172°01.229′E, 411 m, ex sooty mould from beech trunks, 2.III.2007, KM041, K. Marske, 1 (NZAC); Harwoods Hole, 40°57′S, 172°53′E, sooty mould, 17.II.1999, RL332, R. Leschen & R. Hoare, 1 (NZAC); Pigeon Saddle, 41°22′S, 173°01′E, sooty mould, 15.II.1999, RL320, R. Leschen & R. Hoare, 2 (NZAC); same data except 16.II.1999, RL327, 2 in NZAC; 1.1 km E 2 Mile Creek, 41°42′S, 172°31′E, leaf litter rotten logs berlesate, 8.II.1999, RL273, R. Leschen & R. Hoare, 1 (NZAC); Mt. Domett, 1066–1219 m, XI–XII.1971, G. Kuschel, 3 (NZAC); same data except *Nothofagus*, XII.1971, G. Ramsay, 1 (NZAC); Abel Tasman NP, Torrent Bay, on trees at night, 23.VII.1985, R.M. Emberson & P. Syrett, 1 (LUNZ); Heaphy Track, Heaphy Hut - Lewis Hut, sooty mould, 40°58'S, 172°08'E, 7.XI.1999, RL441, R. Leschen & G. Hall, 1 (NZAC); Kahurangi N.P., Cobb Ridge, above Cobb Reservoir, *Not-*

hofagus menziesii & *N. solandri cliffortioides* forest, pyr.-fogging sooty mold on *Nothofagus*, ANMT site 1159, 1050 m, 41°06.351′S, 172°41.658′E, 29.XI.2005, A. Newton, 13 (FMNH) (in 95% ethanol). **SD:** Opouri Saddle, 487 m, fungus, 14.I.1969, collector unknown, 22 (NZAC); Okiwi Bay, Malaise trap, VI–19.VII.1984, T. Jones, 1 (NZAC); Queen Charlotte Sound, Bay of Many Coves, yellow pan trap, *Leptospermum* bush, 27.XII.1987–9.I.1988, J.W.M. Marris, 1 (LUNZ); Elie Bay, 11.XI.1949, E.S. Gourlay, 1 (NZAC); Ronga Valley, 28.II.1957, E.S. Gourlay, 2 (NZAC). **MB:** Pelorus Bridge, fumagine fungus on *Nothofagus solandri*, 25.VII.1967, J.C. Watt, 14 (NZAC); same data except at night on fumagine fungus, 20.IX.1967, 1 (NZAC); Fell Pk., Richmond Ra., 4250′, litter, 13.III.1969, J.C. Watt, 1 (NZAC). **KA:** Hundalee, 19.VIII.1962, E.S. Gourlay, 1 (NZAC). **BR:** Inangahua, 23.I.1957, E.S. Gourlay, 6 (NZAC); Capleston, 21–22.I.1957, E.S. Gourlay, 1 (NZAC); Flowers Ck., Capleston, fungus, 28.I.1972, J.C. Watt, 2 (NZAC); same data except 12.XI.1971, 2 (NZAC); Pororari R. [as "Pororari R."], 30 m, Malaise trap, 28.X–17.XI.1984, G.R. Champness, 3 (LUNZ); Punakaiki, Bullock Ck., 20 m, Malaise trap on edge of *Podocarpus* broadleaf forest, 15.VIII–23.X.1983, G.R. Champness, 2 (NZAC); Punakaiki Scen. Res., Bullock Ck., 20 m, Malaise trap, 24.I–8.II.1983, G.R. Champness, 1 (LUNZ); same data, except 17.IV–5.VII.1983, 1 (LUNZ); Lewis Pass Nat. Res., 11.9 km ESE Springs Junction, 540 m, *Nothofagus* spp. for., log & leaf litter #715, FMHD #85-445, 17.XII.1984–21.I.1985, A. Newton & M. Thayer, 1 (FMNH); Lewis Pass, St. James Walkway, 42°23′S, 172°25′E, dried sap flow, 14.II.1999, RL312, RL313, & RL315, R. Leschen & R. Hoare, 9 (NZAC); Nelson Lakes NP, N slope Mt. Robert w/ *Nothofagus* spp., 860 m, on trees & logs w/ lichens & moss at night, 23–26.III.1980, A. Newton & M. Thayer, 2 (NZAC), 6 (ANIC), 1 (FMNH); Mt. Robert, 1220 m, yellow pan trap in *Nothofagus* forest, 18–23.XII.1983, J.W. Early & L. Masner, 1 (LUNZ); Lake Rotoiti, 610 m, leaf mould, 20.IX.1978, A.K. Walker, 2 (NZAC); Lake Rotoiti, 41°32′S, 172°51′E [latitude in error], beating, 13.XI.1999, RL458, R. Leschen & R. Hoare, 1 (NZAC); Nelson Lakes NP, St. Arnaud tr., L. Rotoiti w/ *Nothofagus* spp., 650 m, pyrethrin-fogging *Nothofagus menziesii* bark, 24–26.III.1980, A. Newton & M. Thayer, 1 (NZAC); Nelson Lakes NP, St. Arnaud tr., L. Rotoiti, 610–650 m, berl. sooty mould, 24–26.III.1980, A. Newton & M. Thayer, 5 (ANIC), 1 (FMNH); Nelson Lakes NP, St. Arnaud tr., L. Rotoiti, 610–650 m, *Nothofagus* spp. sooty mould, 24–26.III.1980, A. Newton & M. Thayer, 12 (ANIC); Nelson Lakes NP, Lake Rotoiti, St. Arnaud track, 645 m, sooty mould on *Nothofagus*, 14.XII.1984–6.I.1985, A. Newton & M. Thayer, 2 (NZAC); Lake Rotoiti, nr. Paddys Hut, 900 m, beaten from dead *Nothofagus* branches, 9.I.1993, J.W.M. Marris, 1 (LUNZ); Lake Rotoiti, 615 m, swept in *Nothofagus* forest at night, 19–20.XII.1983, J.W. Early, 1 (LUNZ); Lake Rotoiti, beech forest, emergence trap, 12–20.XII.2003, D. Hartnett, 1 (AMNZ); same data except 16.I–12.II.2004, 10 (AMNZ); Woods Creek track, 42°33.194′S, 171°20.926′W, 184 m, regenerating *Wienmannia racemosa* and Rahu forest, dead wood with fungi, 24.II.2007, KM010, K. Marske, 2 (NZAC). **WD:** South Westland, Malaise trap, 3.VIII–3.IX.1984, R. Stewart, 1 (NZAC); Doughboy Creek, 6 km SW Mahitahi, fungus, 5.II.1984, J.C. Watt, 1 (NZAC); Haast River, Sunny Flat, 100 m, sifted litter, 25.I.1978, G. Kuschel, 1 (NZAC); 7.7 km SSE Kumara, podocarp-broadleaf, 90 m, sooty mould on *Nothofagus*, 18–22.III.1980, A. Newton & M. Thayer, 1 (NZAC), 4 (ANIC); Mt. Aspiring NP, Arawata Biv., 840 m, pitfall trap, 31.I–5.II.1989, R.M. Emberson, 1 (LUNZ); same data except at night on moss, 3.II.1989, J.W. Early, 2 (LUNZ); Westland NP, Canavans Knob, 140 m, Malaise trap in grassy clearing, *Podocarpus* forest, 12.IX–14.X.1982, A. Miller, 2 (NZAC); Westland NP, adj. Canavans Knob, 140 m, Malaise trap, 28.III–10.IV.1982, A.B. Miller, 1 (LUNZ); same data except 10–26.IV.1982, 2 (LUNZ); same data except 12–26.IV.1982, 3 (LUNZ); same data except 26.IV–5.V.1982, 2 (LUNZ); same data except 5.V–6.VI.1982, 1 (LUNZ); same data except 19.VIII–12.IX.1982, 1 (LUNZ); same data except 14.X–XI.1982, 2 (LUNZ). **MC**: Greyneys Ck., Arthurs Pass, 24.IV.2005, J. Nunn, 2 (JNIC). **OL:** Mavora Lakes, 45°18′S, 168°11′E, 650 m, *Nothofagus* leaf litter, 23.II.1998, RL115, R. Leschen & C. Carlton, 1 (NZAC). **FD:** Fiordland NP, track above Gunns camp, 250 m, on moss at night, 5.II.1980, R.M. Emberson, 1 (LUNZ); same data except 12.II.1980, R.M. Emberson, C.A. Muir, & P.T. Townsend, 5 (LUNZ). **Stewart Island (and surrounding islets): SI:** Big S. Cape I., at night, 14.XI.1968, J.C. Watt, 8 (NZAC); Big S. Cape I., reared from sooty fungus on *Olearia colensoi*, XI.1968 (larvae), J.C. Watt, 6 (NZAC); Big S. Cape I., general beating, XI.1968, G. Kuschel, 2 (NZAC); Big S. Cape I., at night, II.1969, J.I. Townsend, 27 (NZAC); same data except bush at night, 2 (NZAC); same data except general beating, II.1969, B.A. Kuschel, 2 (NZAC); Stewart Island, Freshwater Hut, night collecting on trees in bush, 4.II.1991, R.M. Emberson & P. Syrett, 2 (LUNZ); Stewart Island, Mason Bay, on tree trunks at night, 2.II.1991, S.P. Worner, 1 (LUNZ); same data except 3.II.1991, J.W. Early, 1 (LUNZ); same data except 2.II.1991, Rumpf, S.K., 2 (LUNZ); Stewart Island, Mason Bay, Island Hill Homestead, on mossy trees at night coastal forest, 2.II.1991, R.M. Emberson, 1 (LUNZ); same data except on bark and trees at night behind homestead, H.M. Harman, 1 (LUNZ);



Figs. 26–29. Male genitalia of *Cyclaxyra politula* (Broun, 1881). 26 – tegmen, dorsal view; 27 – tegmen, lateral view; 28 – penis, dorsal view (basal strut omitted); 29 – spiculum gastrale. Scale bar = 0.5 mm.

same data except at night, J.B. Waller, 2 (LUNZ); same data except from logs and trees behind homestead, P. Syrett, 1 (LUNZ); Stewart Island, Port William, 9.II.1991, P. Syrett & R.M. Emberson, 5 (LUNZ); Dryad Is., P. Pegasus, Stewart Island, on tree bark at night, *Olearia*-broadleaf forest, 14.XII.1974, R.M. Emberson, 8 (LUNZ); Stewart Island, Glory Cove Scen. Res., 46°58′S, 168°10′E, ex sooty mould, 30.IV.2002, RL698, R. Leschen, 5 (LSAM), 21 (NZAC); Excelsior Road to Leonard Road, 46°54.057′S, 168°07.524′E, hand collecting, 21.I.2007, RL1170, R. Leschen, T. Buckley & K. Marske, 2 (NZAC); Garden Mound track, 46°52.049′S, 168°07.359′E, at large, 21.I.2007, RL1167, R. Leschen, T. Buckley & K. Marske, 2 (NZAC).

Adult description. Total length: 2.22–2.76 mm; body colouration of mature specimens deep black, but with the following regions often rufotestaceous: clypeus, lateral and basal margins of pronotum, scutellum, sutural and basal margins and apex of elytra, metacoxae, abdominal ventrites medially; appendages testaceous to rufous, antennal club usually darker; glabrous

above; frons (Fig. 20) with coarse to fine, sparse to moderately dense punctation, punctures separated by 1–3 diameters, or with punctation nearly effaced (Fig. 21); metaventrite medially smooth or with very fine, sparse punctation; fully winged or hind wings reduced to short pads; pronotal length 0.48–0.56 mm; elytral length 1.28–1.65 mm; tegmen of aedeagus (Figs. 26, 27) with short, straight basal strut, parameres proportionally short; penis (Fig. 28) not including basal strut less than 4.5 times as long as wide; spiculum gastrale as in Fig. 29.

Variation. The punctation is highly variable in strength and distribution on the frons and pronotum (Figs. 20, 21). Approximately 25% of specimens are fully winged, the remainder have the hind wings reduced to short pads. The male genitalia are highly variable with regard to the length of the paired terminal setae on the parameres, formation of the basal strut of the penis, and shape of the apex of the penis. The thinly sclerotised posterolateral regions of the tegmen are often flexed inward as a result of clearing, making the tegmen appear narrowed apically. These differences overlap between North and South Island populations, and therefore we regard *C. impressa* as a synonym of *C. politula*. Broun's (1915) diagnostic character for separation of his new species, the "elongate impression behind the scutellum," was not apparent in the holotype. The specimens from Mt Domett originally labeled as a new species fall well within the variation of *C. politula*.

Differential diagnosis. Adults may be distinguished from *C. jelineki* sp. nov. by the coarsely, more sparsely punctate frons (or punctation sometimes almost absent), the medially smooth or finely, sparsely punctate metaventrite and by the characters of the male genitalia noted in the key.

Distribution. The species is recorded from throughout the North and South Islands, and from Stewart Island and its surrounding islets, New Zealand. Specimens are mainly collected in *Nothofagus* forests, but may be common in *Leptospermum* and podocarp forests (e.g., Stewart Island where no *Nothofagus* exists). They are rarely collected in the North Island.

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