Chandlerea and Nunnea (Coleoptera: Staphylinidae: Pselaphinae), Two New Genera from New Zealand with Descriptions of Three New Species

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Chandlerea and *Nunnea* (Coleoptera: Staphylinidae: Pselaphinae), two new genera from New Zealand with descriptions of three new species

Jong-Seok Park and Christopher E. Carlton*

Abstract

Two new genera and three new species of New Zealand endemic pselaphine staphylinid beetles belonging to the supertribe Faronitae are described as follows: *Chandlerea* Park & Carlton, **gen. nov.**, including *C. donaldi* Park & Carlton, **sp. nov.**; and *Nunnea* Park & Carlton, **gen. nov.**, including *N. johni* Park & Carlton, **sp. nov.**, and *N. kuscheli* Park & Carlton, **sp. nov**. A key to species, habitus photographs, line drawings of diagnostic characters and distribution maps for all species are provided.

Key Words: taxonomy; biogeography; Faronitae; Faronini

Resumen

Se describen dos nuevos géneros y tres nuevas especies de escarabajos estafilínidos pselaphine endémicas de Nueva Zelanda que pertenecen a la supertribu Faronitae de la siguiente manera: *Chandlerea* Park & Carlton, **gen. nov.,** incluyendo *C. donaldi* Park & Carlton, **sp. nov**.; y *Nunnea* Park & Carlton, **gen. nov**., incluyendo *N. johni* Park & Carlton, **sp. nov.,** y *N. kuscheli* Park & Carlton, **sp. nov**. Se proveen una clave para las especies, fotografías del habitus, dibujos de los caracteres diagnósticos y mapas de distribución de todas las especies.

Palabras Clave: taxonomía; biogeografía; Faronitae; Faronini

During an examination of museum specimens from the Field Museum of Natural History (Chicago, IL, USA) and New Zealand Arthropod Collection (Auckland, New Zealand), we noticed 3 distinct morpho-types within the supertribe Faronitae (Coleoptera: Staphylinidae: Pselaphinae) possessing enlarged abdominal segments VI, a character that has previously been used to characterize genus boundaries (Park & Carlton 2013, 2014). Based on morphological study, these morpho-species also have different foveal patterns, and cannot be assigned to other existing faronite genera. Moreover, one morpho-species can be easily separated from the others by the presence of enlarged male antennomeres 7, anterior frontal fovea on the anterior-dorsal aspect of the head, and the absence of basolateral fovea on abdominal sternites V–VI. Based on these features, we describe 2 new genera, *Chandlerea* **gen. nov.** and *Nunnea* **gen. nov.**, and 3 new species, *C. donaldi* **sp. nov.**, *N. johni* **sp. nov.** and *N. kuscheli* **sp. nov**.

Materials and Methods

Thirty-one specimens were studied from the Field Museum of Natural History (FMNH), Chicago, IL, USA and New Zealand Arthropod Collection (NZAC), Auckland, New Zealand.Holotypes of species described herein are deposited in the New Zealand Arthropod Collection (NZAC). Paratype depositions are indicated parenthetically. Holotype label data are transcribed verbatim, and those for paratypes are standardized for consistency.

Four specimens were mounted on permanent slides to aid in observation of internal characters and fine external characters not apparent using a dissecting microscope. Permanent microscopic slides were prepared using the techniques described by Hanley & Ashe (2003). Terminology for the foveal system and enumeration of abdominal sclerites follows Chandler (2001). Numbering of abdominal sclerites indicates actual segment counts (i.e., not ventrites) for consistency with Chandler's system, but meso- metathoracic ventral sclerites are referred to as ventrites (*sensu* Beutel & Leschen 2010).

New Zealand maps were produced by modifying the map of Crosby et al. (1976) and adding appropriate symbols using Adobe Photoshop®. The area codes of the New Zealand sub regions follow the system of Crosby et al. (1998). Multiple specimens from the same locality are indicated by a single symbol.

Each figure of an aedeagus illustrates the organ in dorsal view with the median lobe oriented forward (up on page). Right and left are indicated based on this orientation, not the morphological orientation when inside the body, which would be reversed.

Results

Chandlerea Park & Carlton **gen. nov.**

http://zoobank.org/8C34C897-2B57-465D-9CB3-280AA3F71AD7

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Type species: *Chandlerea donaldi* **sp. nov.**, here designated (monotypy)

DIAGNOSIS

The members of *Chandlerea* may be separated from other faronite genera by the following combination of characters: small, body length 1.8 mm (Fig. 1); male antennomere 7 enlarged and subquadrate with round depression (Fig. 1); frontal rostrum prominent and frontal sulcus linear, reaching apex of rostrum (Fig. 4); anterior and posterior frontal foveae present, anterior frontal fovea covered by rostrum (Fig. 4); prosternum with median and lateral procoxal foveae (Fig. 6); mesoventrite with promesocoxal foveae (Fig. 8); abdominal segment VI enlarged, at least twice longer than VII (Fig. 10); only known from northern South Island (Fig. 16: black squares).

DISTRIBUTION

New Zealand.

ETYMOLOGY

This genus is named for a world-renown beetle specialist and one of the most influential specialists of Pselaphinae during modern time, Donald S. Chandler.

REMARKS

Females are unknown.

Chandlerea donaldi **sp. nov.** (Figs. 1, 4, 6, 8, 10, 12 and 16)

http://zoobank.org/ECB8FBC6-476F-4EFE-BD7E-E54D404A90B5

DESCRIPTION OF MALE

Length 1.8 mm. Body reddish brown, maxillary palpi, elytra, and legs paler (Fig. 1). *Head.* Male head bluntly transverse, widest across eyes (Fig. 4). Antennomere 1 approximately 1.5 times longer than wide, 2 longer than wide, 3–5 subquadrate, 6 transverse, 7 enlarged and subquadrate with round depression, 8–10 transverse (Fig. 1). Frontal rostrum prominent and frontal sulcus linear reaching apex of rostrum (Fig. 4). Anterior and posterior frontal foveae present, anterior frontal fovea covered by rostrum (Fig. 4). Posterior frontal sulcus deep and round (Fig. 4). Eyes large and prominent, two-thirds length of temples (eye : temple = 2 : 3) (Fig. 4). *Thorax.* Prosternum as long as wide, widest at midpoint of prosternum (Fig. 6). Elytra longer than wide (Fig. 1). Hind wings fully developed. Meso- metaventrite trapezoidal, longer than wide (Fig. 8). *Abdomen.* Abdominal tergite IV with pair of transverse patches of microtrichia reaching middle (Fig. 1). Abdominal segment VI enlarged, at least twice longer than VII (Fig. 10). Abdominal sternite IV with distinct basolateral foveae, lacking on V–VI (Fig. 10). *Aedeagus.* Median lobe oval and dorsal process transverse (Fig. 12). Phallobase symmetrical and rounded (Fig. 12). Parameres asymmetrical and slender with many apical setae (Fig. 12).

TYPE MATERIAL

HOLOTYPE. NEW ZEALAND: Marlborough (MB): 1♂ (NZAC), "NEW ZEALAND: MB: Pelorus Bridge Scenic Reserve, 35m, 41" 18.3' S 173" 34' E, 27 xi 2005, mixed broadleaf (incl. *Nothofagu*s spp.)-podocarp forest; FMHD#2005-042, berl., leaf & log litter, A. Newton, A. Solodovnikov & D. Clarke; ANMT site 1155", "HOLOTYPE *Chandlerea donaldi* Park and Carlton des. 2013". PARATYPE (1 male): New Zealand: Nelson (NN): 1♂ (slide-mounted), Dun Mt., 2000' 10-I-1942, E. S. Gourlay (NZAC).

DISTRIBUTION

Marlborough (MB), Nelson (NN) (Fig. 16: black circles).

HABITAT

The holotype was collected by sifting leaf and log litter in broadleaf and podocarp forests.

ETYMOLOGY

This species is named for a world-renowned beetle specialist and one of the most influential specialists of Pselaphinae during modern time, Donald S. Chandler.

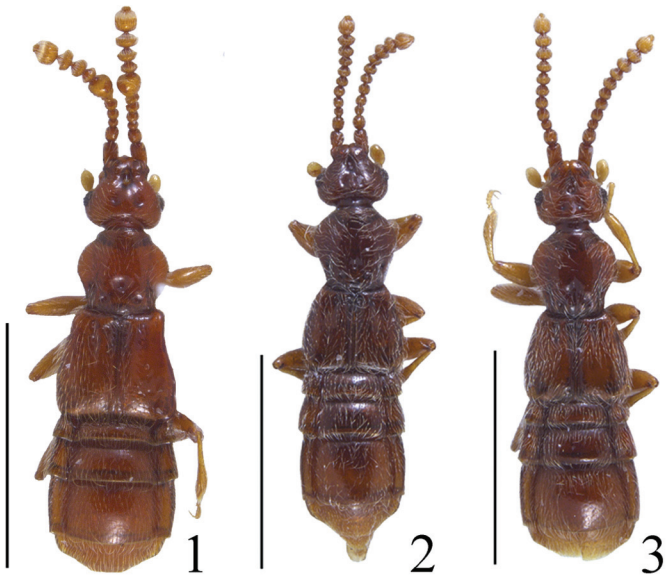
NUNNEA PARK & CARLTON **GEN. NOV.**

http://zoobank.org/6B361E5E-CF2D-4EDB-89EF-229411AB56E9

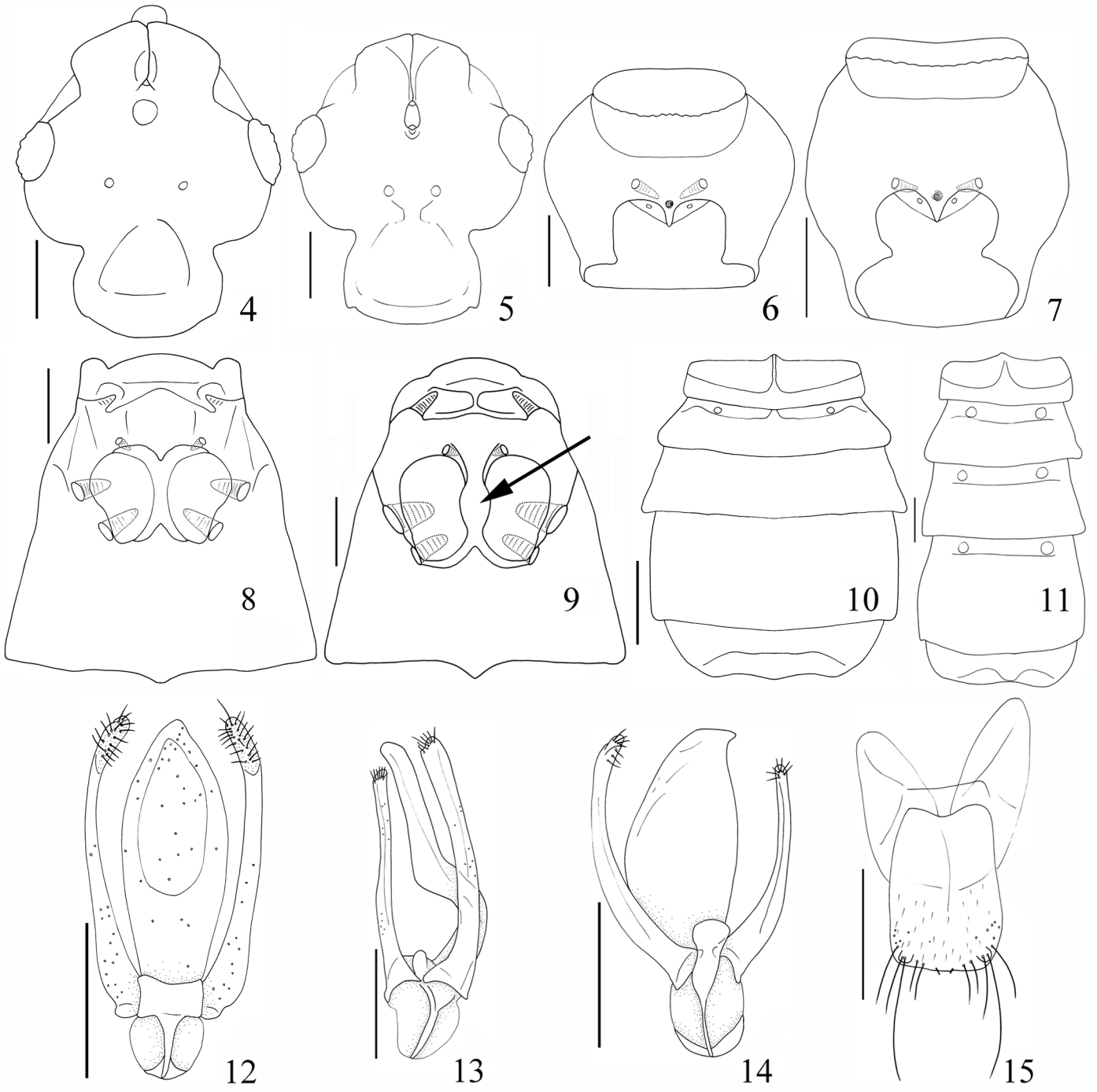
Type species: *Nunnea johni* **sp. nov.**, here designated

DIAGNOSIS

The members of *Nunnea* may be separated from other faronite genera by the following combination of characters: body length 1.8–2.5 mm (Figs. 2 and 3); frontal rostrum prominent and frontal sulcus linear, reaching eyes (Fig. 5); anterior frontal fovea absent and posterior frontal fovea oval (Fig. 5); prosternum longer than wide with lateral procoxal foveae (Fig. 7); mesocoxae divided by distinctively prominent ventral process (Fig. 9: arrow); mesoventrite with promesocoxal foveae and large lateral mesosternal fovea (Fig. 9); abdominal segment VI at least twice larger than VII (Fig. 11); abdominal sternites IV–VI with distinctly large basolateral foveae (Fig. 11); only known from northern South Island (Fig. 16: black triangles and circles).



Figs. 1–3. Habitus. Scale bars = 1 mm. (1) *Chandlerea donaldi* **sp. nov.**; (2) *Nunnea johni* **sp. nov.**; (3) *N. kuscheli* **sp. nov.**



Figs. 4–15. Head, dorsal view. (4) *Chandlerea donaldi* **sp. nov.**; (5) *Nunnea johni* **sp. nov.** Prosternum, ventral view. (6) *C. donaldi.* **sp. nov.**; (7) *N. johni* **sp. nov.** Meso- and metaventrite, ventral view. (8) *C. donaldi.* **sp. nov.**; (9) *N. johni* **sp. nov.** Abdomen, ventral view. (10) *C. donaldi.* **sp. nov.**; (11) *N. johni* **sp. nov.** Male genitalia, dorsal view. (12) *C. donaldi.* **sp. nov.**; (13) *N. johni* **sp. nov.**; (14) *N. kuscheli* **sp. nov.** (15) female sternite IX of *N. johni* **sp. nov.**, dorsal view. Scale bars = 0.1 mm.

DISTRIBUTION

New Zealand.

ETYMOLOGY

This genus is named for the collector of the holotype, John T. Nunn, who also provided many valuable specimens for this study.

REMARKS

The members of this genus do not possess distinct external secondary sexual characters. Male abdominal sternite IX is fragile, and partially concealed by sternite VIII, rendering it simple and reduced in appearance. Females possess a more robust, rectangular abdominal sternite IX bearing a pair of long setae that are usually visible in ventral view. Female genitalia, including spermathecae, apparently are mem-

branous and were not observable after clearing specimens using 10% potassium hydroxide.

Nunnea johni Park and Carlton **sp. nov.** (Figs. 2, 5, 7, 9, 11, 13, 15 and 16)

http://zoobank.org/2F02E262-A913-4F40-B52D-46164FF6989D

DIAGNOSIS

This species is separated from other species of *Nunnea* by the dimensions of antennomere 4, which is longer than wide (Fig. 2) and slender median lobe of genitalia (Fig. 13).

DESCRIPTION

Length 1.8–2.5 mm. Body reddish brown; antenna, elytra, legs, maxillary palpi paler (Fig. 7). *Head.* Male head round, widest across eyes (Fig. 5). Ventral head convex. Antennomere 2 longer than wide, 3 subquadrate, 4 longer than wide, 5–10 subquadrate (Fig. 5). Eyes prominent, approximately one-half length of temples (eye : temple = 1 : 2) (Fig. 5). *Thorax.* Prosternum longer than wide, widest at midpoint of prosternum (Fig. 7). Elytra as long as wide (Fig. 2). Hind wings rudimentary as small pads. Meso- metaventrite trapezoidal, longer than wide (Fig. 9). *Abdomen.* Abdominal tergite IV without patches of microtrichia (Fig. 2). *Aedeagus.* Median lobe slender and S-shaped with round dorsal process (Fig. 13). Phallobase symmetrical and rounded (Fig. 13). Parameres symmetrical with apical setae (Fig. 13). Female abdominal sternite IX rectangular, longer than wide and bearing pair of long and short setae from posterior margin (Fig. 15).

TYPE MATERIAL

HOLOTYPE. NEW ZEALAND: Nelson (NN): 1♂ (NZAC), "NEW ZEALAND: NN: Kahurangi N.P., Arthur Range, above Flora Saddle, 1000m, 41"11.351'S 172"44.456'E, 28 XI-19 XII 2005, *Nothofagus*-dominant forest; FMHD#2005-044, flight intercept trap, A. Newton & M. Thayer; ANMT site 1156", "HOLOTYPE *Nunnea johni* Park and Carlton des. 2013". PARATYPEs (n = 19; 8 males, 11 females). New Zealand: Buller (BR): 3♂♂ 2♀♀ (1♂, slide-mounted), Nelson Lakes NP, Mt. Robert, Speargrass Tr, 875 m, 41° 49' 46" S, 172° 48' 31" E, 30-XI–17-XII-2005, *Nothofagus* forest, FMHD#2005-061, pitfall trap, A. Newton, M. Thayer, ANMT site 1161 (FMNH); 1♀, Nelson Lakes NP, n slope Mt. Robert, Pinchgut Tr, 950 m, 14-XII-1984–6-I-1985, *Nothofagus* forest, A. Newton, M. Thayer 707, window trap (FMNH); Nelson (NN): 1♀, same data as holotype (FMNH); 1♂, Kahurangi NP, Cobb Dam Rd, Asbestos Tr, 450 m, 41° 06' 33" S, 172° 43' 17" E, 29-XI–18-XII-2005, mixed broadleaf (incl. *Nothofagus fusca*)-podocarp forest, FMHD#2005-111, litter, A. Solodovnikov, D. Clarke et. al, ANMT site 1160 (FMNH); 3♂♂ 2♀♀, Dun Mt., 31-VI-1996, A. K. Walker, litter 66/274 (NZAC); 1♂, Upper Maitai, 13-II-1957, E. S. Gourlay (NZAC); 1♀, Cobb Reservoir, 1037 m, 18-IX-1964, T. G. Wood, moss 64/100 (NZAC); Marlborough Sounds (SD): 3♀♀, Tennyson Inlet, west side Te Mako Bay, 125 m, 15-XII-1984–5-I-1985, *Nothofagus*-podo-hdwd, A. Newton, M. Thayer 710, FIT&window trap (FMNH); 1♀, 70 km ne Nelson, Tennyson Inlet, 480 m, 27-V-1982, FMHD#2005-604, Beech forest litter, S. Peck (FMNH).

DISTRIBUTION

Buller (BR), Nelson (NN), Marlborough Sounds (SD) (Fig. 16: black squares).

HABITAT

Specimens of this species were collected using pitfall, flight intercept, window traps, or by sifting beech and leaf litter in broadleaf, hardwood, podocarp or *Nothofagus* forests.

ETYMOLOGY

This species is named for the collector of the holotype, John T. Nunn, who also provided many valuable specimens for this study.

Nunnea kuscheli Park & Carlton **sp. nov.** (Figs. 3, 14 and 16)

http://zoobank.org/5C1DCB25-1702-462C-BE00-0CFF8C211D74

DIAGNOSIS

This species is separated from other species of this genus by the dimensions of antennomere 4, which are subquadrate (Fig. 3) and broader median lobe of genitalia (Fig. 14).

DESCRIPTION

Length 1.8–2.5 mm. Body reddish brown; antennae, elytra, legs, and maxillary palpi paler (Fig. 3). *Head.* Male head round, widest across

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Fig. 16. Known collection localities of *Chandlerea* **gen. nov.** and *Nunnea* **gen. nov.** *C. donaldi* **sp. nov.**: black squares; *N. johni* **sp. nov.**: black circles; *N. kuscheli* **sp. nov.**: triangles.

eyes. Ventral head convex. Antennomere 2 longer than wide, 3–10 subquadrate (Fig. 3). Eyes prominent, approximately one-half length of temples (eye : temple = 1 : 2). *Thorax.* Prosternum longer than wide, widest at midpoint of prosternum. Elytra as long as wide (Fig. 3). Hind wings rudimentary as small pads. Meso- metaventrite trapezoidal, longer than wide. *Abdomen.* Abdominal tergite IV without patches of microtrichia (Fig. 3). *Aedeagus.* Median lobe broad and semicircular with round dorsal process (Fig. 14). Phallobase symmetrical and rounded (Fig. 14). Parameres symmetrical apical setae (Fig. 14). Female abdominal sternite IX rectangular, longer than wide and bearing pair of setae from posterior margin.

TYPE MATERIAL

HOLOTYPE. NEW ZEALAND: Nelson (NN): 1♂ (NZAC), aedeagus dissected and mounted in balsam on a clear plastic card, "New Zealand: NN: Devil River Rd, Tawhai SF 3km S of Reefton 17 IV 1972, 197m J. McBurney, litter, PB15", "HOLOTYPE *Nunnea kuscheli* Park and Carlton des. 2013". PARATYPES (*n* = 8; 4 males, 4 females). New Zealand: Buller (BR): 2♀♀, Fletchers Ck, Stoney Ck, 28-I-1972, J. S. Dugdale, PN15, litter 72/101 (NZAC); 1♂ 1♀, Fletchers Ck, 7-III-1972, J. S. Dugdale, litter 72/106 (NZAC); 2♂♂, Reefton, 12-IV-1977, J. A. Wightman, pit trap cutover pine (NZAC); 1♂, W Inangahua SF, 126 m, Fletchers Ck, 18-IV-1972, J. S. Dugdale, moss & litter on Beech forest floor, XB2 (NZAC); 1♀, 1.8 km n Punakaiki, 80 m, 19-XII-1984–20-I-1985, hardwood forest with nikau, A. Newton, M. Thayer 718, FIT & window trap (FMNH).

DISTRIBUTION

Buller (BR), Nelson (NN) (Fig. 16: black triangles).

HABITAT

Specimens of this species were collected using pitfall, flight intercept, window traps, or by sifting moss and leaf litter.

ETYMOLOGY

This species is named for one of the most influential New Zealand beetle specialists, Guillermo Kuschel.

Key to species of *Chandlerea* **gen. nov.** and *Nunnea* **gen. nov.**

The key is based on male specimens because female specimens are indistinguishable based on external morphology, and a female specimen of *Chandlerea* **gen. nov.** is unknown.

1.— Male antennomere 7 enlarged (Fig. 1); elytra longer than wide (Fig. 1) . . . . . *Chandlerea donaldi* Park & Carlton **sp. nov.**

1′.— Antennomere 7 of both sexes slightly larger than 6 (Figs. 2–3); elytra as long as wide (Figs. 2 and 3) 2

2. (1) Antennomere 4 longer than wide; median lobe of genitalia slender and S-shaped (Fig. 13) . . . . . *Nunnea johni* Park & Carlton **sp. nov.**

2′.— Antennomere 4 subquadrate; median lobe of genitalia broad and semicircular (Fig. 14) . . . . . *N. kuscheli* Park & Carlton **sp. nov.**

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