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Research article

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Diversity and distribution of *Pleioplectron* Hutton cave wētā (Orthoptera: Rhaphidophoridae: Macropathinae), with the synonymy of *Weta* Chopard and the description of seven new species

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Abstract. The genus *Pleioplectron* was first described by Hutton (1896) and included six New Zealand species. This genus has since had three species moved, one each to the genera *Pachyrhamma* Brunner von Wattenwyl, 1888, *Miotopus* Hutton, 1898 and *Novoplectron* Richards, 1958. Here we clarify the status and appearance of *Pleioplectron simplex* Hutton, 1896 (incl. *P. pectinatum* Hutton, 1896 syn. nov.) and *P. hudsoni* Hutton, 1896, as well as *P. thomsoni* (Chopard, 1923) comb. nov., which is transferred from the genus *Weta* Chopard, 1923. The genus *Weta* is newly synonymised with *Pleioplectron*. We also describe seven new species of *Pleioplectron* from South Island, New Zealand: *P. auratum* sp. nov., *P. caudatum* sp. nov, *P. crystallae* sp. nov., *P. flavicorne* sp. nov., *P. gubernator* sp. nov., *P. rodmorrisi* sp. nov and *P. triquetrum* sp. nov. We base these descriptions on morphology using fresh specimens of both male and female adults, and provide support for each with DNA sequence variation (mtDNA, partial COI).

Keywords. Cave wētā, *Pleioplectron,* Rhaphidophoridae, systematics, New Zealand.

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Introduction

The systematics of New Zealand cave wētā at the generic and specific levels has been hampered by the limited number of accessible and diagnostically informative morphological characters and often brief original descriptions for many of the nineteen genera of New Zealand Rhaphidophoridae (Cook *et al.* 2010). The genus *Pleioplectron* is a case in point with several broad traits including size, overall

shape and surface patterning being pleisiomorphic among Rhaphidophoridae (Hubbell & Norton 1978; Ward 1997; Johns & Cook 2013). As a result a number of unrelated species have been assigned to *Pleioplectron*, while related taxa have been assigned to other genera.

Hutton (1896) established the genus *Pleioplectron* and described four species, two each from South and North Islands of New Zealand. On South Island they were *P. simplex* Hutton, 1896 from Canterbury and Banks Peninsula, and *P. pectinatum* Hutton, 1896 also from Banks Peninsula. On North Island they were *P. hudsoni* Hutton, 1896 from Wellington and *P. diversum* Hutton, 1896 from Wanganui (now Whanganui). Hutton later added *P. cavernae* Hutton, 1900 from Taupo, North Island, and *P. serratum* Hutton, 1904 from the Chatham Islands (Hutton 1900, 1904). Kirby (1906) reallocated *Macropathus edwardsii* (Scudder, 1869) to *Pleioplectron edwardsii* (Scudder, 1869).

After collecting more specimens on the Chatham Islands, Richards (1958) found that *Pleioplectron serratum* Hutton, 1904 shows five major morphological differences compared to other species in the genus *Pleioplectron*, and that this species does in fact not fit in any known genus of Rhaphidophoridae. Richards (1958) thus described a new genus, *Novoplectron* Richards, 1958, and reallocated the Chatham Island endemic species as *Novoplectron serratum* (Hutton, 1904).

Examining Hutton's immature and damaged holotype, Richards (1959) concluded that *Pleioplectron cavernae* Hutton, 1900 was closer to the genus *Pachyrhamma* Brunner von Wattenwyl, 1888 than it was to *Pleioplectron*, and later transferred the species to *Turbottoplectron* Salmon, 1948 (Richards 1961a). Richards (1961b) also moved *Pleioplectron edwardsii* (Scudder, 1869) to the genus *Gymnoplectron* Hutton, 1896. Referring to morphological and genetic traits, Cook *et al*. (2010) synonymised *Turbottoplectron* and *Gymnoplectron* with *Pachyrhamma*. Richards (1959) presumed that the number of tibial and femoral apical spines should be constant within a species, which differs from more recent analyses (e.g., Cook *et al.* 2010; Fitness *et al.* 2015) that suggest that presence/absence of the hind femur retrolateral apical spine can vary within a species.

Hutton (1898) transferred his North Island species *Pleioplectron diversum* to a new genus, *Miotopus* Hutton 1898, based on the presence of a retrolateral apical spine on the fore femur and of dorsal linear spines on the mid tibiae, and redefined *Pleioplectron.* Fitness *et al.* (2018) demonstrated the validity of *Miotopus* for *M. diversus* (Hutton, 1896) on morphological and genetic evidence, and added a second, predominantly South Island species, *M. richardsae* Fitness *et al.*, 2018.

Thus, recently the genus *Pleioplectron* has comprised *P. simplex* on South Island, *P. hudsoni* on North Island and *P. pectinatum* on Banks Peninsula, where it is sympatric with *P. simplex*.

Chopard's monotypic genus *Weta* (for *W. thomsoni*) was given a detailed and accurate description, but it did not provide a clear distinction from *Pleioplectron* (Chopard 1923). Although seemingly distinguished by being originally reported only in caves, *Weta thomsoni* has several morphological traits similar to those found in species of *Pleioplectron*, including shape of the ovipositor, presence of dorsal linear spines on the first and second hind tarsal segments, and the size, shape and number of spines on the hind tibiae. A second species of *Weta*, *W. chopardi* Karny, 1937, has since been transferred to the genus *Talitropsis* Bolivar, 1882 (Johns & Cook 2013).

Here, we review the status of *Pleioplectron* and *Weta* using morphological and genetic data. We identify and describe female *P. hudsoni*, as no females were included in the original description of this species. We use a combination of dense sampling throughout New Zealand, morphological traits and DNA sequence data to test the status of putative *Pleioplectron* and identify seven hitherto undescribed species.

Material and methods

Collection and morphological methods

Cave wētā were collected opportunistically around New Zealand using day and night searching of forests and caves, and pitfall trapping. Two-letter codes in the Material examined sections below refer to the New Zealand entomological regions seen on Fig. 2C. More than 4300 specimens have been catalogued, and many have been examined in detail and sampled for DNA sequence comparison, including 378 specimens of *Pleioplectron*. Specimens are held in the Phoenix Lab collection at Massey University (MPN) with the exception of type material, which is lodged at Museum of New Zealand Te Papa Tongarewa (NMNZ). Relevant specimens were identified based on the descriptions by Hutton (1896), Chopard (1923), Richards (1959) and Fitness *et al*. (2018).

Specimens were examined and photographed using a DSLR camera (Nikon D800, Nikon D850 or Sony α7RII) attached to a Nikon Plan 4/0.13 microscope tip and Nikon PB-6 bellows, mounted on a Cognisys Stackshot 3× automated rail. Focus stacks were generated using the software Helicon Focus 6.8.0 Pro (Helicon Soft Ltd, 2000). Adults were distinguished from immature individuals by darker, sclerotised bodies and fully formed external genital structures. In particular, the pigmentation, shape and sharpness of ovipositors, subgenital plates and cerci were informative about developmental stage. We looked for the presence/absence of each of 22 apical leg spines (Fitness *et al.* 2015) (Fig. 1), as well as the combinations and numbers of linear spines on the legs, the characteristics of the antennae and the shape of the subgenital and suranal plates. Measurements of key body parts were obtained using digital callipers (Table 1; also presented in Supplementary Material).

Collection acronyms

CMNZ = Canterbury Museum, Christchurch, New Zealand
iNaturalist = Available from iNaturalist.org [accessed 28 Apr. 2019]
LCR = Landcare Research, Wellington, New Zealand
MNHN = Muséum national d'histoire naturelle, Paris, France
MPN = Phoenix Lab, Massey University, Palmerston North, New Zealand
NMNZ = Museum of New Zealand Te Papa Tongarewa, Wellington, New Zealand

Molecular methods

Genomic DNA was extracted from tissue (usually leg muscle) of specimens representing each morphotype, using a salting-out protocol (Trewick & Morgan-Richards 2005). For most samples, a ~1500 base pair (bp) fragment spanning most of the mitochondrial cytochrome *c* oxidase I (COI) gene of the mitochondrial genome was amplified using polymerase chain reaction (PCR) with the invertebrate primers LCO1490 (Folmer *et al*. 1994) and L2-N-3014 (Simon *et al.* 1994). Where DNA was of lower quality, a shorter fragment (~800 bp) was amplified using primers C1-J-2195 and L2-N-3014 (Simon *et al.* 1994).

Successful PCR products were sequenced using both forward and reverse primers with Bigdye Chemistry and an ABI 3730 genetic analyser (Applied Biosystems Inc., Carlsbad, CA). Nucleotide sequences were assembled and aligned using Geneious ver. 9 (Kearse *et al.* 2012). No insertions/deletions were detected and sequences were translated to confirm that there were no stop codons or frame shifts that would indicate the presence of nuclear paralogs.

We examined the relationships of putative taxa of *Pleioplectron* by phylogenetic reconstruction using Bayesian and Maximum Likelihood criteria, applying a GTR evolutionary model with a gamma-distributed rate variation across DNA sites and a proportion of invariable sites. Representative, homologous mtDNA COI sequences from the New Zealand cave wētā *Talitropsis sedilloti* Bolivar, 1882

Table 1. Dimensions and spine counts in species of *Pleioplectron* Hutton, 1896 (continued on next page).

		P. simplex	***P. hudsoni***	***P. thomsoni*** comb. nov.	***P. triquetrum*** sp. nov.	***P. auratum*** sp. nov.
Sample size		10 (5 ♀♀, 5 ♂♂)	11 (5 ♀♀, 6 ♂♂)	19 (8 ♀♀, 11 ♂♂)	15 (7 ♀♀, 8 ♂♂)	12 (6 ♀♀, 6 ♂♂)
Apical spines fore, mid and hind femora [1]		1 0 , 1 1 , 0 1	1 0 , 1 1 , 0 0	1 1 , 1 1 , 0 1	1 1 , 1 1 , 0 1	1 1 , 1 1 , 0 1
Apical spines fore, mid and hind tibiae		4-4-8	4-4-6	4-4-6	4-4-8	4-4-8
Body length (mm) [2]		14.6 (13.7–20.9)	9.4 (8.4–11.1)	14.7 (12.8–16.6)	11.2 (9.7–13.0)	11.55 (8.6–13.5)
Pronotum length (mm)		4.55 (3.8–5.4)	3.3 (2.8–3.6)	4.7 (4.2–5.2)	3.7 (3.2–4.2)	3.65 (3.1–4.9)
Ovipositor length (mm)		10.2 (9.9–11.7)	7.4 (6.8–8.1)	11.1 (10.2–12.4)	8.0 (7.6–9.0)	10.8 (9.9–12.3)
Ratio ovipositor to body length		0.71 (0.56–0.78)	0.78 (0.65–0.79)	0.78 (0.68–0.95)	0.73 (0.62–0.78)	0.96 (0.73–1.21)
Teeth: ventral valve of ovipositor		5 (4–6)	8 (7–9)	6 (5–6)	5 (4–6)	6 (5–7)
Teeth: dorsal valve of ovipositor		0	0	0	0	0
Length of hind tibia (mm)		15.0 (12.4–21.0)	11.2 (10.1–12.1)	20.0 (14.2–25.6)	14.0 (12.8–16.8)	14.3 (11.6–18.4)
Ratio hind tibia to body length		1.00 (0.84–1.33)	1.18 (1.05–1.35)	1.31 (0.97–1.74)	1.27 (1.09–1.49)	1.32 (0.99–1.57)
Superior spines hind tibia	prolateral retrolateral	26 (20–33) 28 (23–35)	20 (18–25) 21 (19–24)	40 (32–51) 41 (28–48)	30 (22–32) 27 (21–33)	33.5 (25–36) 32 (25–36)
Spine density on hind tibia (count/ mm)	prolateral retrolateral	1.61 (1.46–1.94) 1.87 (1.51–2.05)	1.79 (1.59–2.38) 1.96 (1.65–2.11)	2.12 (1.77–2.32) 1.98 (1.62–2.32)	2.05 (1.63–2.44) 1.89 (1.64–2.25)	2.21 (1.88–2.57) 2.24 (1.77–2.54)
Pairs of longer spines on hind tibia		0	0	0	0	1 (1–1)
Superior spines on 1st tarsus segment		8 (5–11)	8 (7–11)	12 (3–16)	9 (7–13)	9 (6–15)
Superior spines on 2nd tarsus segment		4 (0–5)	3 (2–4)	4 (1–7)	5 (3–9)	5 (2–7)
Fore tibia, inferior spines	prolateral retrolateral	3 (3–3) 3 (3–3)	1 (0–1) 2 (2–2)	2 (2–3) 2 (2–3)	2 (2–4) 3 (2–4)	3 (2–3) 3 (2–3)
Fore tibia, superior spines		0	0	0	0	0
Mid tibia, inferior spines	prolateral retrolateral	3 (3–3) 3 (2–3)	2 (1–3) 1 (0–2)	2 (1–2) 2 (2–3)	2 (1–3) 2 (1–3)	3 (2–3) 3 (1–3)
Mid tibia, superior spines	prolateral retrolateral	0	0	0	0	0
Fore femur, inferior spines	prolateral retrolateral	0	0	0	0	1 (0–2) 0
Mid femur, inferior spines	prolateral retrolateral	0	0	0	0	0
Hind femur, inferior spines	prolateral retrolateral	0 (0–1), v. small 3 (2–4), v. small	0 1 (0–1), v. small	0	0 5 (3–7), v. small	2 (0–2) 7 (4–8)

[1] The six numbers are, in order from left to right: fore femur prolateral and retrolateral, mid femur prolateral and retrolateral, hind femur prolateral and retrolateral. '1' means that an apical spine is present, '0' means that an apical spine is absent.

[2] Body length is measured from the apex of the fastigium to the posterior margin of the suranal plate.

Table 1. Dimensions and spine counts in species of *Pleioplectron* Hutton, 1896 (continued from preceding page).

		P. gubernator sp. nov.	***P. caudatum*** sp. nov.	***P. flavicorne*** sp. nov.	***P. crystallae*** sp. nov.	***P. rodmorrisi*** sp. nov.
Sample size		28 (14 ♀♀, 14 ♂♂)	7 (1 ♀, 6 ♂♂)	11 (7 ♀♀, 4 ♂♂)	17 (8 ♀♀, 9 ♂♂)	16 (7 ♀♀, 9 ♂♂)
Apical spines fore, mid and hind femora [1]		1 0 , 1 1 , 0 0 1 0, 1 1, 0 1	1 0 , 1 1 , 0 1	1 0 , 1 1 , 0 0	1 0 , 1 1 , 0 0	1 1 , 1 1 , 0 0
Apical spines fore, mid and hind tibiae		4-4-6	4-4-6	4-4-6	4-4-6	4-4-8
Body length (mm) [2]		10.85 (8.9–13.3)	11.8 (10.9 –12.3)	11.9 (9.5–14.0)	9.4 (7.1–11.0)	14.2 (12.0–16.2)
Pronotum length (mm)		3.45 (2.7–4.5)	3.5 (2.7–3.8)	4.0 (3.1–4.8)	3.3 (2.4–2.8)	3.7 (3.3–4.2)
Ovipositor length (mm)		8.9 (7.7–9.9)	7.8	9.6 (9.0–10.0)	7.4 (7.0–7.8)	8.9 (8.1–9.5)
Ratio ovipositor to body length		0.75 (0.65–0.93)	0.63	0.76 (0.68–0.86)	0.81 (0.67–0.85)	0.61 (0.52–0.67)
Teeth: ventral valve of ovipositor		9.5 (8–12)	9	10 (9–11)	7 (6–9)	7 (6–8)
Teeth: dorsal valve of ovipositor		0	0	0	0	0
Length of hind tibia (mm)		13.5 (11.2–17.5)	14.5 (13.0–17.5)	13.7 (10.8–16.0)	10.8 (8.3–14.1)	17.5 (15.4–21.3)
Ratio hind tibia to body length		1.24 (0.87–1.52)	1.20 (1.13–1.56)	1.14 (1.05–1.23)	1.13 (0.90–1.42)	1.31 (1.00–1.48)
Superior spines hind tibia	prolateral retrolateral	25 (22–28) 24 (20–29)	28 (27–30) 27 (25–29)	26 (24–30) 26 (23–29)	18 (13–22) 16 (13–20)	40 (33–46) 37.5 (30–44)
Spine density on hind tibia (count/ mm)	prolateral retrolateral	1.87 (1.60–2.30) 1.79 (1.63–2.18)	1.94 (1.66–2.31) 1.98 (1.43–2.09)	1.90 (1.70–2.31) 1.88 (1.63–2.50)	1.68 (1.13–2.41) 1.47 (1.06–2.29)	2.19 (1.99–2.71) 2.02 (1.74–2.59)
Pairs of longer spines on hind tibia		0	0 (0–1)	0	4 (4–5)	0
Superior spines on 1st tarsus segment		7 (5–12)	7 (5–8)	9 (7–10)	7 (5–11)	9 (6–14)
Superior spines on 2nd tarsus segment		2 (1–4)	3 (2–3)	3 (0–5)	2 (1–4)	3 (1–6)
Fore tibia, inferior spines	prolateral retrolateral	2 (1–3) 1 (1–3)	1 (0–2) 2 (0–2)	2 (1–2) 2 (2–2)	2 (1–2) 1 (0–2)	3 (3–4) 3 (2–4)
Fore tibia, superior spines		0	0	0	0	0
Mid tibia, inferior spines	prolateral retrolateral	2 (1–3) 1 (1–2)	2 (1–2) 2 (2–2)	2 (1–2) 2 (1–2)	2 (1–2) 1 (0–1)	3 (3–3) 3 (3–3)
Mid tibia, superior spines	prolateral retrolateral	0	0	0	0	0 0 (0–2)
Fore femur, inferior spines	prolateral retrolateral	0	0	0	0	5 (3–8) 0
Mid femur, inferior spines	prolateral retrolateral	0	0	0	0	4.5 (1–9) 0 (0–2)
Hind femur, inferior spines	prolateral retrolateral	0	0	0	0 3 (0–5), v. small	14.5 (9–23) 7.5 (6–10)

[1] The six numbers are, in order from left to right: fore femur prolateral and retrolateral, mid femur prolateral and retrolateral, hind femur prolateral and retrolateral. '1' means that an apical spine is present, '0' means that an apical spine is absent.
[2] Body length is measured from the apex of the fastigium to the posterior margin of the suranal plate.

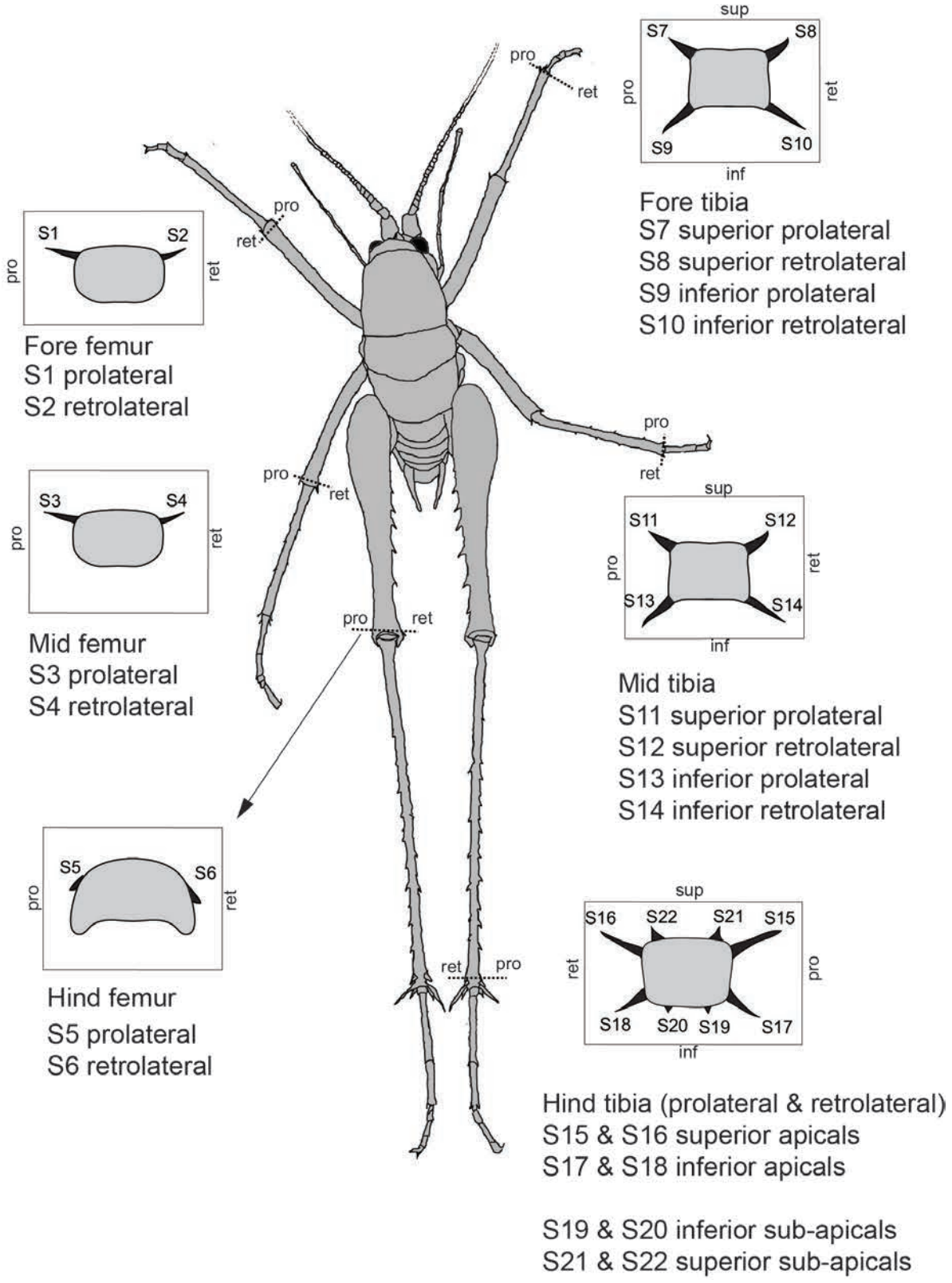

Fig. 1. Apical spine numbering, terminology and position in Rhaphidophoridae Walker, 1869, after Fitness *et al.* (2015). Dorsal view, showing cross-sectional relationship of each potential spine on femora and tibiae. Positions are indicated as prolateral (anterior facing), retrolateral (posterior facing), inferior (ventral facing) and superior (dorsal facing).

(MPN CW1830), *Miotopus diversus* (Hutton, 1896) (GenBank accessions MK606169, MK606170, MK871353), *M. richardsae* (GenBank accessions MK532396, MK606171) and *Pachyramma edwardsii* (Scudder, 1869) (MPN CW746; GenBank accession MK871354) were used as an outgroup based on available phylogenetic information (Allegrucci *et al.* 2010; Fitness *et al.* 2018). A reduced taxon dataset with just 19 putative specimens of *Pleioplectron* allowed Bayesian inference to assess the monophyly of the genus. The Bayesian analysis used a chain length of 4 million generations sampling every 2000, and with a burn-in of 100 000 generations. Maximum Likelihood was then used with mtDNA sequences from 88 putative specimens of *Pleioplectron* to test species hypotheses based on morphology and confirm the association of males and females within each taxon.

Mitochondrial DNA sequence variation allowed us to verify prior hypotheses of distinct taxa based on morphological traits, and confirm the association of male and female individuals collected at the same and different locations, including confirmation for the first time of females of *Pleiplectron hudsoni*. The correlation of morphological and genetic clusters is expected from distinct evolutionary lineages that are consistent with their treatment as distinct taxonomic units (Mallet 1995, 2013). We note that large stable populations observed in New Zealand insect species tend to yield distributions of pairwise mtDNA differences that deviate from the expected exponential distribution owing to their common history (Slatkin & Hudson 1991; Morgan-Richards *et al*. 2017), which can mislead species delimitation tools that rely on this single non-recombining locus (Dellicour & Flot 2015).

Results

Identity of previously described species

Using the morphology of terminalia in adult specimens and unique combinations of apical spines (Table 1), we identified cave wētā that could be assigned to *Pleioplectron hudsoni* Hutton, 1896, *P. simplex* Hutton, 1896, *Weta thomsoni* Chopard, 1923 and seven other related species. Analysis of mtDNA COI sequence variation (Genbank accessions MK871355–MK871373) confirmed the distinction between *Pleioplectron* and *Miotopus* (Fitness *et al.* 2018), and the monophyly of individuals assigned by morphological identification to *Pleioplectron hudsoni*, *P. simplex* and *Weta thomsoni* (Fig. 2). Our mtDNA sequence analysis supported Richards (1958) in separating *Novoplectron serratum* (Hutton, 1904) from the genus *Pleioplectron* (Fig. 2B). The seven new species identified by morphology were each found to correspond to a distinct mtDNA lineage within the monophyletic *Pleioplectron* (plus *Weta*) clade (Fig. 2).

Weta thomsoni presents several morphological characters that are similar to those of *Pleioplectron simplex*: the configuration of the male terminalia, especially the shape of the suranal and subgenital plates; the shape of the ovipositor, smooth above and with strong teeth on the lower valve near the apex; the shape and configuration of linear spines on the hind tibiae; and the structure of the hind tarsi, with long dorsal apical spurs and several small dorsal spines on first and second tarsal segments. The ecology of the two species is also more similar than originally thought. While it was initially assumed that *W. thomsoni* lived only in caves, because this is where the type specimens were collected, we now know that it does in fact live in leaf litter on the forest floor of both native and exotic forests in South Canterbury and Otago, readily occupying caves wherever these are available. As *W. thomsoni* and *Pleioplectron* spp. are morphologically and genetically similar and *Pleioplectron* has chronological precedence over *Weta*, we consider that this species should now be referred to as *Pleioplectron thomsoni* (Chopard, 1923) comb. nov.

Given that *Weta thomsoni* is the type species for the genus *Weta* Chopard, 1923, and that the only other species in the genus, *W. chopardi* Karny, 1937, has since been transferred to *Talitropsis* (Johns & Cook 2013), we also reallocate the genus *Weta* Chopard, 1923 as a junior synonym of *Pleioplectron* Hutton, 1896.

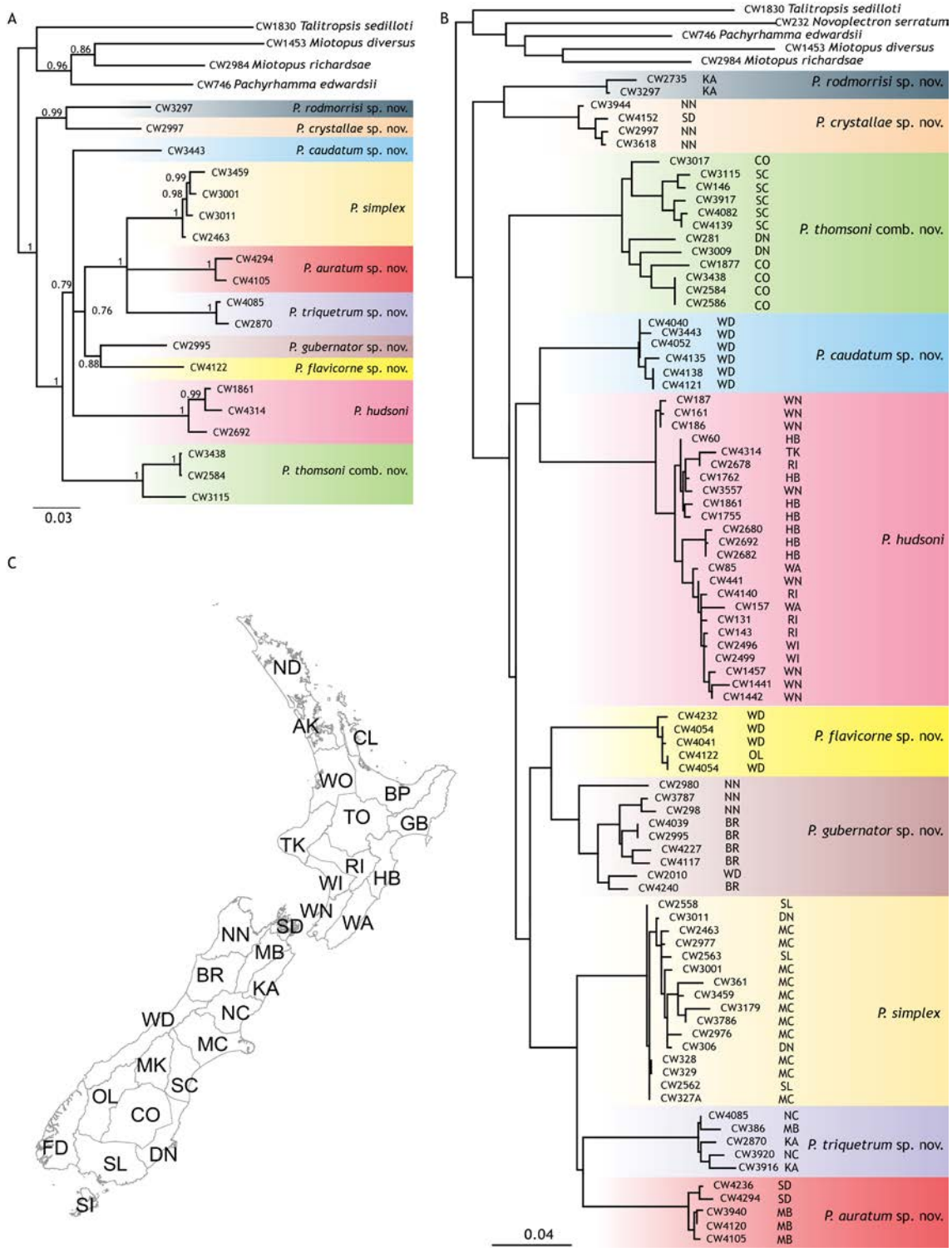

Fig. 2. Phylogenetic relationships of *Pleioplectron* Hutton, 1896 cave wētā based on mtDNA sequence. **A**. Bayesian analysis using a mtDNA sequence alignment of 1429 bp spanning the majority of COI, with a minimum individual sequence length of 1330. Posterior probabilities are shown by nodes. **B**. Maximum Likelihood tree using PhyML with a COI alignment that contained sequences ranging from 483bp to 1429 bp, although the majority were > 850 bp at the 3′ end of the gene. **C**. Map of New Zealand entomological (Crosby) regions. These codes are indicated in the Material examined section for each species.

None of the cave wētā specimens examined could be assigned to *P. pectinatum* Hutton, 1896. These include 17 specimens from two sites on Banks Peninsula, the type location for *P. pectinatum*. Distinguishing between *P. simplex* and *P. pectinatum* appears to be near impossible using the descriptions by Richards (1959). We examined the male type specimens of *Pleioplectron simplex* and *P. pectinatum,* stored in ethanol at the Canterbury Museum in Christchurch, New Zealand (Fig. 3, Table 2). While the specimens are not in perfect condition, the terminalia are preserved well enough for us to confirm that all specimens do in fact belong to one species, *P. simplex*. The suranal plate appears to be identical in the lectotype male of *P. simplex* and the paratype male of *P. pectinatum* (compare Fig. 3B, E). The subgenital plates in the holotype specimen of *P. pectinatum* and in the lectotype male of *P. simplex* have the same tricuspidate shape (compare Fig. 3C, F). It appears that specimens that were assigned to *P. pectinatum* were distinguished only by having everted terminalia, as they would have during copulation. This is something that happens occasionally when cave wētā are euthanised in ethanol. Given that *P. simplex* is the type species for *Pleioplectron*, we have decided to keep this species name and re-allocate *P. pectinatum* as its junior synonym.

Our examination of specimens of Rhaphidophoridae from the North Island of New Zealand identified a common species of small, dark, forest dwelling cave wētā. This species is consistent in morphology at all locations where we observed it from Bay of Plenty to Wellington. Adult males and females are often found together and they have the same apical leg spine combination (Table 1). The spines match

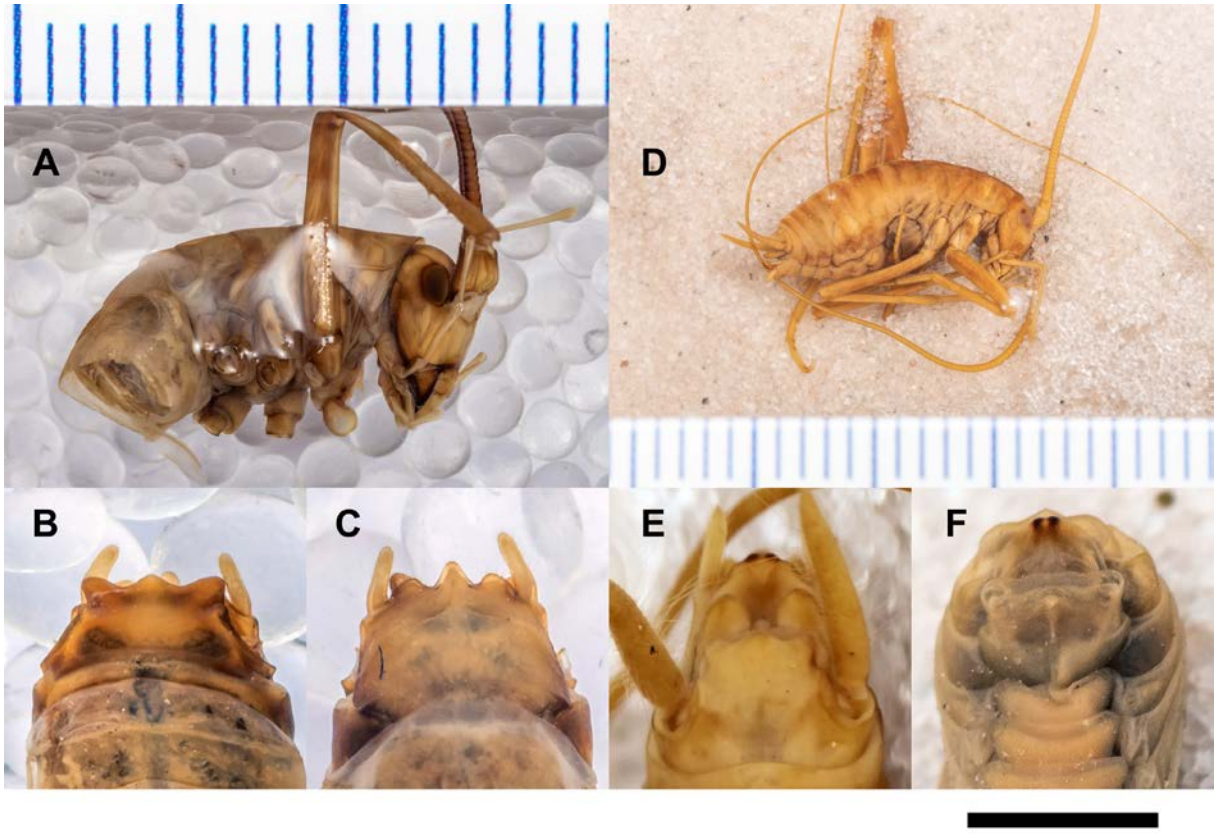

Fig. 3. *Pleioplectron simplex* Hutton, 1896, type specimens. **A–C**. Lectotype, ♂ (CMNZ 000280). **A**. Lateral view. **B**. Terminalia, dorsal view. **C**. Terminalia, ventral view. **D–E**. Paratype of *Pleioplectron pectinatum* Hutton, 1896, ♂ (CMNZ 000266a). **D**. Lateral view. **E**. Terminalia, dorsal view. **F**. Holotype of *Pleioplectron pectinatum* Hutton, 1896, ♂ (CMNZ 000266), terminalia, ventral view. Scale bar = 2 mm (applies to B–C, E–F only).

Hutton's original description of *P. hudsoni*, with three pairs of apical spines on the hind tibia, and so does the male subgenital plate, which is slightly longer than broad in a cuspidate shape and is slightly keeled. Here we consider that the widespread North Island morph represents *P. hudsoni*, but the brevity of Hutton's original description (and the lack of females) justifies its redefinition for clarity. Given that the holotype specimen is missing (Richards 1959) and no other type material is available, we designate a male neotype for *P. hudsoni*.

Taxonomy

Order Orthoptera Latreille, 1793
Superfamily Rhaphidophoroidea Walker, 1869
Family Rhaphidophoridae Walker, 1869
Subfamily Macropathinae Karny, 1930
Tribe Macropathini Karny, 1930

Genus ***Pleioplectron*** Hutton, 1896

Pleiplectron Hutton, 1896: 232.
Weta Chopard, 1923: 234. **syn. nov.**

Etymology

Not explained by Hutton. '*Pleios*' = 'many', '*plectron*' = 'plectrum' in Greek (most likely an analogy for the dorsal spines on the hind tibiae, which are shaped like a plectrum). The hind tibiae are armed with many dorsal spines, more numerous than in other genera Hutton would have been familiar with. *Pleioplectron* is neuter gender.

Description

With ten species in the genus, it is difficult to isolate morphological characters that apply to every species of *Pleioplectron*. Here, we focus on characters that fit either all species, or only some, but are not found in other genera, and comment further on the differentiation of *Pleioplectron* from other genera of New Zealand Rhaphidophoridae in the Discussion.

Small- to medium-sized cave wētā (body length of adults 8.5 to 20 mm) found mainly in leaf litter in forests, occasionally in caves or above the tree-line, on the two main islands of New Zealand.

Head broad, nearly oval. Scapes of antennae sexually dimorphic in all species, very broad in males, thinner in females (Fig. 4). Segments of antennae fitted with sensory hairs in sexually mature males of three species (*Pleioplectron simplex* Hutton, 1896, *P. rodmorrisi* sp. nov. and *P. triquetrum* sp. nov.), a character not seen in other genera of Rhaphidophoridae (Fig. 5). Eyes approximately 1.2 mm across on longest dimension regardless of size of animal, strongly bulging and appearing disproportionately large in smaller species (compare Fig. 4A–B with Fig. 4C–D). Maxillary palps of varying length, with moderately dense covering of hair.

Dorsal body colour patchy or chequered brown in most species, light/tawny in one species (*Pleioplectron thomsoni* (Chopard, 1923) comb. nov.), very dark/nearly black in some others (*P. gubernator* sp. nov. and *P. caudatum* sp. nov.). Two species (*P. rodmorrisi* sp. nov. and *P. crystallae* sp. nov.) with more varied and vibrant colouration. Most species with a prominent yellow median line along length of dorsum (Fig. 6). Lateral edges of pronotum with a pronounced rim and bent upwards in all species.

Leg length varies strongly among species and between individuals within a species. In some species, males tend to have longer legs than females. The difference in leg length between sexes does generally not exceed 20%, and is mostly less important than individual variation. Apical spines: all species have

one anterior spine at the apex of the fore femur; four out of ten species additionally have a posterior spine at the apex of the fore femur (Table 1). All species have both an anterior and a posterior spine at the apex of the mid femur. The hind femur has a retrolateral apical spine in five out of ten species (Table 1). All species have four apical spines at the apex of both fore and mid tibia, and at the apex of the hind tibia a pair of dorsal apical spines, a pair of dorsal sub-apical spines and a pair of ventral apical spines. Four out of ten species additionally have a pair of ventral sub-apical spines at the apex of the hind tibia (Table 1). The dorsal apical spines on the hind tibia are very long, generally at least twice or three times the length of ventral apical spines. Linear spines: fore and mid femur generally unarmed, except in *Pleiplectron auratum* sp. nov. and *P. rodmorrisi* sp. nov. Hind femur generally armed below; the number of spines varies both within and between species. Fore tibia always unarmed above; mid tibia generally unarmed above, except in *Pleioplectron rodmorrisi* sp. nov. Fore and mid tibia armed below, with one to three pairs of linear spines; the number varies both within and between species. The hind tibia is always armed above with two parallel rows of 20 or more (up to 50) linear spines; only *P. crystallae* sp. nov. has fewer than 20 dorsal spines in each row (Table 1). Linear spines on the hind tibiae are socketed but not articulated, very variable in size on the same animal, randomly smaller and larger without obvious

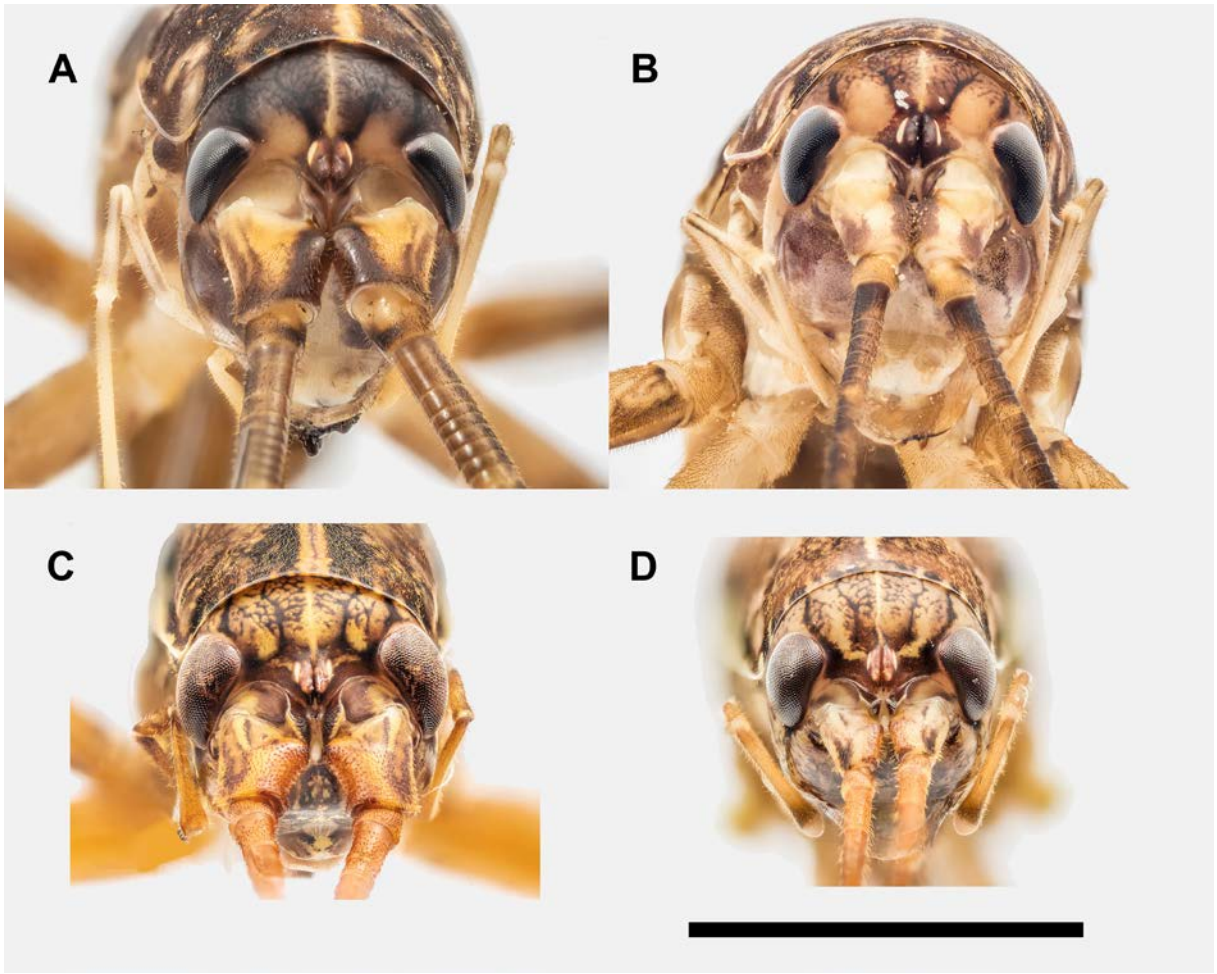

Fig. 4. Head of cave wētā in the genus *Pleioplectron* Hutton, 1896 showing sexual dimorphism. **A–B**. *P. simplex* Hutton, 1896. **A**. Adult ♂, Hinewai Reserve, Banks Peninsula (MPN CW4118). **B**. Adult ♀, Helicopter Hill Track, Craigieburn (MPN CW3914). **C–D**. *P. crystallae* sp. nov. **C**. Adult ♂, Branch Creek Hut, Mt Owen (MPN CW4271). **D**. Adult ♀, Salisbury Lodge, Mt Arthur Tablelands (MPN CW3941). Scale bar = 5 mm.

pattern (Fig. 7). Additionally, two species (*P. auratum* sp. nov. and *P. crystallae* sp. nov.) have one or more (up to four) pairs of much larger, possibly articulated dorsal spines on the hind tibiae. Fore and mid tarsi: all segments unarmed. Hind tarsi: always armed above with a variable number of small spines on both the first and the second tarsal segment. The spines on the hind tarsi are most often alternate, meaning that if a spine is on the posterior edge, there is no corresponding spine in the same position on the anterior edge, and vice versa.

Male and female terminalia are species specific (Figs 8–11), yet they have common structures and elements in all species except for *Pleioplectron rodmorrisi* sp. nov. The male suranal plate is generally square on the posterior edge and covers all genital structures above. The male subgenital plate varies in shape between triangular and tri-lobed, but is often short, exposing three complex layers of genital structures in a ventral view. The female subgenital plate is rounded, bi-lobed or tri-lobed, at times small and largely hidden by the last sternite. The upper valve of the ovipositor is smooth in all species of *Pleioplectron*; the lower valve has few (up to ten) strong, well visible teeth near the apex (Figs 10–11).

Pleioplectron simplex Hutton, 1896

Figs 2A–B, 3, 4A–B, 5, 6A, 7A, 8A–C, 10A–C, 12A, 14A–B, 18B

Pleioplectron simplex Hutton, 1896: 233, pl. 13, figs 13–13e.
Pleioplectron pectinatum Hutton, 1896: 234. **syn. nov.**

Diagnosis

A medium-sized cave wētā found in forested and urban areas in the southern South Island, east of the mountains, mainly in inland Canterbury and the east coast. It is very common in highly modified environments, including around dwellings and firewood piles; *Pleioplectron simplex* is 'the' urban cave wētā of New Zealand's South Island. Being chequered grey-brown in colour, often with a prominent yellow median line running along the length of the dorsum, it could be most easily mistaken for *P. thomsoni* (Chopard, 1923) comb. nov., with which it is sympatric, and with *P. triquetrum* sp. nov. at the northern end of its distribution range. It is readily distinguished from both of these species by lacking a retrolateral apical spine on the fore femur. *Pleioplectron simplex* is generally darker in colour compared to *P. thomsoni* comb. nov. and lighter compared to *P. triquetrum* sp. nov.

Etymology

Not explained by Hutton; '*simplex*' is Latin for 'simple' or 'plain'.

Material examined (see also Table 2 in Supplementary Material)

Lectotype

NEW ZEALAND • ♂, adult; Mid Canterbury (MC); date unknown; F.W. Hutton leg.; CMNZ 000280.

Other material

NEW ZEALAND – **Mid Canterbury (MC)** • 1 ♂, holotype of *P. pectinatum*; Banks Peninsula; 43.7° S, 173° E; date unknown; F.W. Hutton leg.; CMNZ 000266 • 1 ♂, paratype of *P. pectinatum* [labelled as "paralectotype"]; Christchurch; 43.5° S, 172.6° E; unknown date; F.W. Hutton leg.; CMNZ 000266a • 1 ♂, 1 ♀; Lake Ellesmere, Motukarara; 43.72448° S, 172.59575° E; 20 m a.s.l.; 26 May 2016; C. Putwain leg.; MPN CW2976, CW2977 • 2 ♂♂; Banks Peninsula, Hinewai Reserve; 43.81095° S, 173.02865° E; 460 m a.s.l.; 29 Mar. 2017; D. Hegg leg.; in basement of keeper's house; insect net; MPN CW3001, CW3002 • 5 ♂♂, 2 ♀♀; Banks Peninsula, Hinewai Reserve; 43.81510° S, 173.02819° E; 280 m a.s.l.; 22 Sep. 2018; D. Hegg leg.; on stream bank; night search + insect net; MPN CW4109 to CW4114, CW4118 • 5 ♂♂, 3 ♀♀; Banks Peninsula, Wainui; 43.80957° S, 172.91348° E; 0 m a.s.l.; 30 Nov.

2012; B. Taylor-Smith and M. Morgan-Richards leg.; leaf litter, forest fragment; night search; MPN CW2137, CW2186 to CW2188, CW2201, CW2403, CW2418, CW2463 • 1 ♂, 3 ♀♀; Waimakariri River, Cass field station; 43.03585° S, 171.76077° E; 600 m a.s.l.; 25 Feb. 2006; J. Whitfeld leg.; rooty overhang near stream; MPN CW327A, CW327B, CW328, CW329 • 1 ♀; Craigieburn, Helicopter Hill Track; 43.14628° S, 171.72807° E; 800 m a.s.l.; 19 Mar. 2006; P.M. Johns and R. Pratt leg.; in native forest; pitfall trap; MPN CW359 • 2 ♀♀; same locality as preceding; 10 Feb. 2017; D. Hegg leg.; clay bank on side of walking track; night search; MPN CW3459, CW3914 • 1 ♀; Porters Pass, Foggy Peak; 43.29361° S, 171.74232° E; 1000 m a.s.l.; 19 Mar. 2006; P.M. Johns and R. Pratt leg.; near stream; pitfall trap; MPN CW361 • 3 ♀♀, 1 ♂; Lake Coleridge, H.E. Hart Arboretum; 43.36282° S, 171.53006° E; 400 m a.s.l.; 18 Nov. 2016; D. Hegg leg.; exotic forest; night search + insect net; MPN CW3178 to CW3181 • 1 ♀, 1 nymph; Mt Somers, Sharplin Falls; 43.62802° S, 171.4167° E; 500 m a.s.l.; 13 Oct. 2017; D. Hegg leg.; under boulder in native forest; night search + insect net; MPN CW3786, CW4001. – **Dunedin (DN)** • 4 ♂♂, 1 ♀; Long Beach; 45.7444° S, 170.6406° E; 0 m a.s.l.; 10 May 2016; D. Hegg leg.; in sea cave; night search + insect net; MPN CW3009 to CW3013 • 1 ♂; same collection data as for preceding; 8 Nov. 2016; MPN CW4013 • 1 ♂; Opoho; 45.85399° S, 170.5339° E; 120 m a.s.l.; 14 Feb. 2016; D. Hegg leg.; in wooden retaining wall on roadside; night search + insect net; MPN CW2821 • 1 ♂, 1 nymph; Otago Boys' High School; 45.87083° S, 170.49588° E; 100 m a.s.l.; 18 Oct. 2016; D. Hegg and R. Roe leg.; in school basement; photograph only; iNaturalist 4382005 [with link from table] • 1 ♀; Caversham; 45.89803° S, 170.48239° E; 20 m a.s.l.; 14 Mar. 1999; MMR and S. Trewick leg.; under house; day search; MPN CW306. – **Southland (SL)** • 1 ♀; Awarua Bay; 46.56126° S, 168.45545° E; 0 m a.s.l.; 2013; T. Jewell leg.; beneath dead wood; MPN CW2558 • 1 ♂; Invercargill, Otatara; 46.43639° S, 168.28637° E; 10 m a.s.l.; 4 Dec. 2006; P.M. Johns leg.; in drain pipes in urban garden; MPN CW663 • 1 ♂, 1 ♀; Bluff Hill; 46.61625° S, 168.34024° E; 220 m a.s.l.; 2013; T. Jewell leg.; under rocks in manuka shrubland; MPN CW2562, CW2563.

Description

Measurements. See Table 1.

Fig. 5. *Pleioplectron simplex* Hutton, 1896, adult ♂, Hinewai Reserve, Banks Peninsula (MPN CW4109). Detail of antenna showing sensory hairs. Scale bar = 1 mm.

Originally described by Hutton (1896), the species was redescribed adequately by Richards (1959). A notable detail omitted by both Hutton (1896) and Richards (1959) is the presence of sensory hair tuffs on the antennal segments of some, but not all, sexually mature males (Fig. 5).

Male *Pleioplectron simplex* on Banks Peninsula tend to reach larger dimensions than elsewhere, but our genetic data provide no evidence that the Banks Peninsula population is distinct. Of five adult males we measured from Banks Peninsula, the smallest (MPN CW4112) measured 16.3 mm in body length, 12% longer than the largest adult male we collected elsewhere (MPN CW4013 from Long Beach, Dunedin, 14.5 mm long). To avoid introducing geographical bias in our measurements, we only included one adult male *P. simplex* from Banks Peninsula in Table 1, which gives us an estimate for the maximum size of the species.

Pleioplectron hudsoni Hutton, 1896
Figs 2A–B, 6G, 7B, 8D–F, 10D–F, 14E, 18A, 19

Pleioplectron hudsoni Hutton, 1896: 234, pl. 13, figs 14, 14a.

Diagnosis

A small brown cave wētā with a yellow median dorsal stripe or band, found in forests throughout the North Island, New Zealand. It could be most easily confused with *Miotopus diversus* (Hutton, 1896) or *Neonetus variegatus* Brunner von Wattenwyl, 1888, two species with which it is sympatric and shares the forest habitat. From both of these species it is distinguished by the lack of a posterior apical spine on the fore femur. Additionally, it is smaller than *M. diversus* and lacks dorsal linear spines on the mid tibia.

Etymology

Named after the New Zealand entomologist George V. Hudson (1867–1946), who collected the holotype specimen (a male) in Wellington (Richards 1959). According to Richards (1959), the holotype is now missing.

Material examined (see also Table 3 in Supplementary Material)

Neotype

NEW ZEALAND • ♂, adult; Wellington (WL), Zealandia Ecosanctuary; 41.305537° S, 174.736776° E; 250 m a.s.l.; 25 Feb. 2017; Edward (Ted) Trewick, Mary Morgan-Richards and Steve Trewick leg.; in native forest; NMNZ AI.037500 (previously MPN CW3561).

Representative female

NEW ZEALAND • ♀, adult; same collection data as for holotype; NMNZ AI.037501 (prev. MPN CW3552).

Other material

NEW ZEALAND – **Wellington (WN)** • 1 ♂, 1 nymph; Wellington, Zealandia Ecosanctuary; 41.30554° S, 174.73678° E; 250 m a.s.l.; 17 Aug. 2004; R. Goudswaard leg.; MPN CW135, CW136 • 1 ♀, 1 nymph; same locality as preceding; 22 Aug. 2006; R. Goudswaard leg.; MPN CW477, CW478 • 8 ♂♂, 14 ♀♀; same locality as preceding; 25 Feb. 2017; E. Trewick, M. Morgan-Richards and S. Trewick leg.; native forest; MPN CW3549 to CW3551, CW3553 to CW3560, CW3562 to CW3564, CW3566, CW3567, CW3571, CW3573, CW3575, CW3578 to CW3580 • 1 ♀; Wellington, Khandallah Reserve; 41.23884° S, 174.78733° E; 200 m a.s.l.; 12 Aug. 2004; S. Trewick leg.; logs and sticks in native forest; MPN CW138 • 2 ♂♂; Wellington, Newlands; 41.23335° S, 174.82746° E; 160 m a.s.l.; 17 Sep. 2016; S. Trewick leg.; night search; MPN CW3125, CW3126 • 2 ♀♀; Wellington, Eastbourne, Butterfly Creek; 41.30599° S, 174.90046° E; 50 m a.s.l.; 16 Apr. 2006; M. Morgan-Richards and S. Trewick leg.; MPN CW364, CW365 • 1 ♂, 1 ♀; Wainuiomata River, Catchpool Campsite; 41.35207° S,

174.92389° E; 50 m a.s.l.; 21 Oct. 1999; S. Trewick leg.; under rocks at base of beech tree; MPN CW171A, CW171B • 1 ♂, 1 ♀; Kapiti Island; 40.85336° S, 174.92955° E; 100 m a.s.l.; 14 Nov. 2011; B. Taylor-Smith and S. Trewick leg.; MPN CW1993, CW1995 • 2 ♂♂; Tararua Forest, Otaki Forks; 40.88085° S, 175.21887° E; 150 m a.s.l.; 4 Nov. 2017; D. Hegg leg.; in roots of uprooted tree; night search + insect net; MPN CW3889, CW3890 • 1 ♀; Levin, Lake Papaitonga; 40.6444° S, 175.23394° E; 10 m a.s.l.; 20 Sep. 2004; S. Trewick leg.; MPN CW161 • 1 nymph; Tararua Forest, Makahika Stream; 40.63057° S, 175.41321° E; 200 m a.s.l.; 20 Mar. 2004; M. Morgan-Richards leg.; MPN CW71 • 1 ♀; Palmerston North, Turitea Road; 40.41566° S, 175.6639° E; 100 m a.s.l.; 15 Nov. 2004; S. Trewick leg.; on ground under gorse bush; MPN CW186 • 1 ♂; same locality as preceding; 18 Nov. 2004; M. Morgan-Richards and S. Trewick leg.; under porch of house; MPN CW187 • 2 ♂♂; Palmerston North, Turitea Reserve; 40.43039° S, 175.67276° E; 150 m a.s.l.; 2008; M. Morgan-Richards and S. Trewick leg.; MPN TD17(1)A, TD19(1)A • 2 ♂♂, 1 ♀; same locality as preceding; 15 Aug. 2010; S. Trewick leg.; near boat shed; MPN CW1440 to CW1442 • 2 ♂♂, 2 ♀♀; same locality as preceding; 19 Nov. 2010; S. Trewick leg.; night search; MPN CW1454, CW1457, CW1464, CW1465 • 1 ♀; Palmerston North, Esplanade; 40.37222° S, 175.61740° E; 25 m a.s.l.; Apr. 2006; J. Goldberg leg.; MPN CW434 • 1 ♀; Manawatu Gorge; 40.31936° S, 175.78692° E; 300 m a.s.l.; Apr. 2006; J. Goldberg leg.; MPN CW441. – **Rangitikei (RI)** • 1 ♂; Pohangina River, Totara Reserve; 40.12239° S, 175.85601° E; 150 m a.s.l.; 22 Aug. 2004; E. Trewick and S. Trewick leg.; MPN CW131 • 1 ♀, 1 nymph; Ruahine Forest, Alice Nash Memorial Heritage Lodge; 39.95591° S, 176.01522° E; 700 m a.s.l.; 28 Oct. 2018; D. Hegg leg.; on clay bank on side of track; night search + insect net; MPN CW4134, CW4140 • 1 ♀; Ruahine Forest, Gold Creek Track; 39.76367° S, 176.19614° E; 700 m a.s.l.; 25 Mar. 2014; M. Lusk leg.; in standing dead wood; MPN CW2678 • 1 ♂, 1 ♀; Ruahine Forest, Parks Peak Track; 39.68° S, 176.25° E; 9 Mar. 2012; M. Lusk leg.; MPN CW1916, CW1917 • 1 ♂; Rangitikei River, Mangaweka campsite; 39.81084° S, 175.80666° E; 300 m a.s.l.; 11 Sep. 2004; E. Trewick and S. Trewick leg.; in decaying log; MPN CW143. – **Wanganui (WI)** • 2 ♀♀; Bushy Park; 39.79690° S, 174.93084° E; 250 m a.s.l.; 29 Dec. 2013; M. Morgan-Richards and S. Trewick leg.; night search; MPN CW2496, CW2499. – **Taranaki (TK)** • 1 ♂, 2 ♀♀; Lake Rotokare; 39.45409° S, 174.40923° E; 200 m a.s.l.; 2008; J. Fitness leg.; pitfall trap; LCR LR-L5-b, LR17-live-a, LR19(6)-live. – **Wairarapa (WA)** • 1 ♂; Bideford; 40.86653° S, 175.86795° E; 150 m a.s.l.; 18 Sep. 2004; M. Morgan-Richards and S. Trewick leg.; under rotting logs; MPN CW157 • 1 ♂; Puketoi Range, Towai Road; 40.41614° S, 176.14002° E; 600 m a.s.l.; 22 Oct. 1999; R. Brown leg.; MPN CW85. – **Hawkes Bay (HB)** • 1 ♂; Elsthorpe Reserve; 39.91961° S, 176.81603° E; 150 m a.s.l.; 29 Dec. 2005; S. Trewick leg.; MPN CW263 • 1 ♂; Mohi Bush; 39.85725° S, 176.90068° E; 450 m a.s.l.; 27 Nov. 1995; M. Morgan-Richards and S. Trewick leg.; inside log; MPN CW60 • 1 ♂, 2 ♀♀; same locality as preceding; 1 Jan. 2012; M. Morgan-Richards and S. Trewick leg.; MPN CW1755, CW1759, CW1762 • 1 ♀; same locality as preceding; 8 Oct. 2012; M. Morgan-Richards and S. Trewick leg.; MPN CW1861 • 1 ♀, 1 nymph; Waipatiki Reserve; 39.28256° S, 176.96400° E; 100 m a.s.l.; 27 Jun. 2011; M. Lusk leg.; MPN CW1972, CW1973 • 1 ♀; Kaweka Range, Smith-Russell Track; 39.37815° S, 176.33550° E; 600 m a.s.l.; 4 Feb. 2014; M. Lusk leg.; under log; MPN CW2680 • 1 ♀; Kaweka Range, Kuripapango Lakes; 39.36148° S, 176.36078° E; 700 m a.s.l.; 16 Feb. 2014; M. Lusk leg.; under log; MPN CW2682 • 1 ♂; Kaweka Range, Makahu; 39.2184°S, 176.48407°E; 460 m a.s.l.; 6 Jan. 2014; M. Lusk leg.; under log; MPN CW2692 • 1 ♂; Maungahuru Range, Maungahuru Track; 39.20474° S, 176.68408° E; 750 m a.s.l.; 10 May 2011; M. Lusk leg.; MPN CW1609. – **Bay of Plenty (BP)** • 1 ♀; Manganuku Campsite, Waioeka River; 38.29081° S, 177.38637° E; 200 m a.s.l.; 12 Apr. 1998; S. Trewick leg.; MPN CW56A • 1 ♂; same locality as preceding; 2 Jan. 2011; M. Morgan-Richards leg.; MPN CW1984 • 1 ♂; Opotiki, Hukutaia Domain; 38.06943° S, 177.26368° E; 50 m a.s.l.; 3 Nov. 2018; Y. Mori leg.; MPN CW4131.

Description

Measurements. See Table 1.

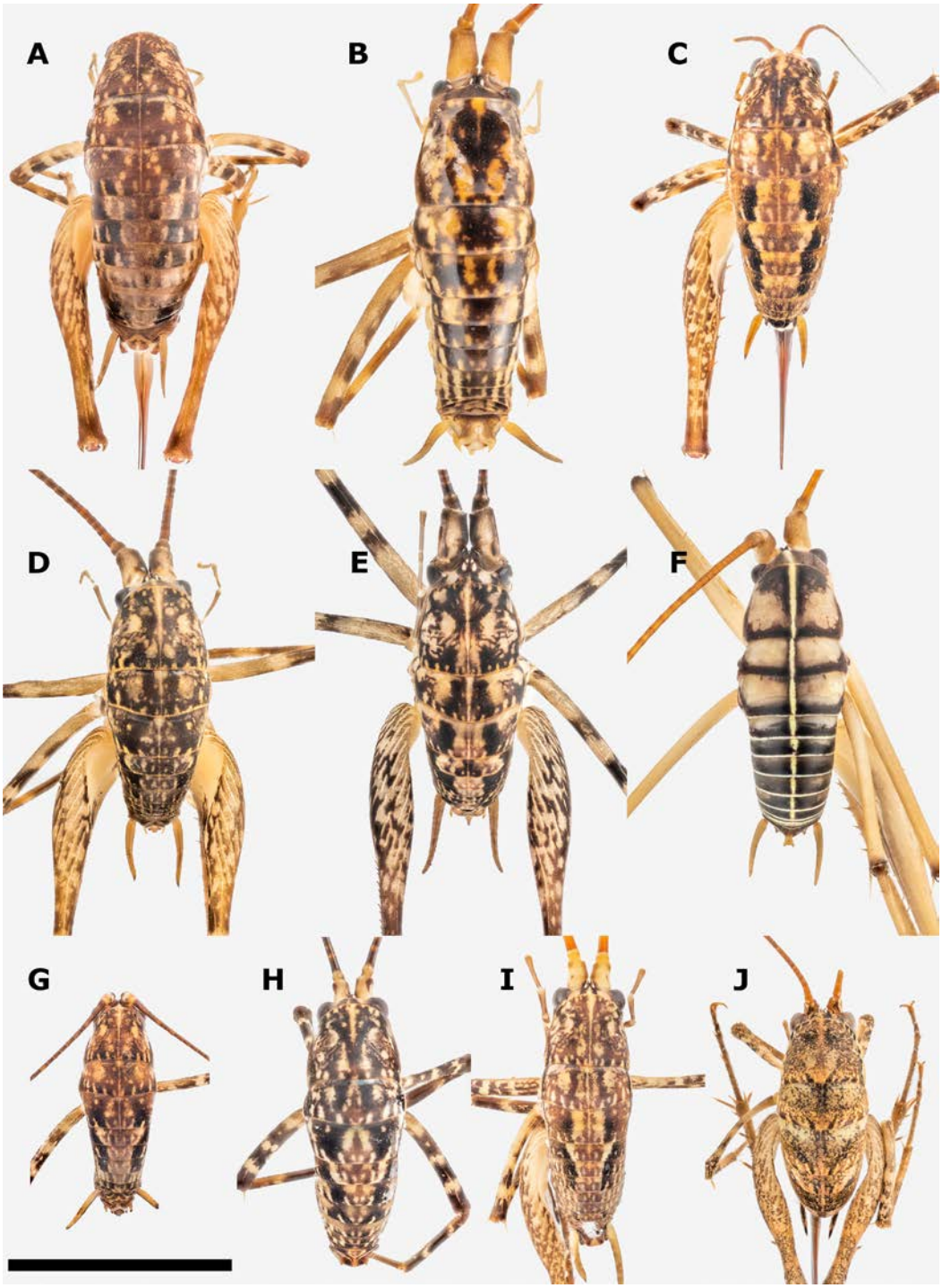

Fig. 6. Dorsal views of cave wētā in the genus *Pleioplectron* Hutton, 1896. **A**. *P. simplex* Hutton, 1896, adult ♀, Helicopter Hill Track, Craigieburn (MPN CW3914). **B**. *P. thomsoni* (Chopard, 1923) comb. nov., adult ♂, Claremont Bush, South Canterbury (MPN CW4115). **C**. *P. gubernator* sp. nov., adult ♀, Mt Arthur (MPN CW4056). **D**. *P. triquetrum* sp. nov., adult ♂, Hinau Track, Kaikōura (MPN CW3928). **E**. *P. auratum* sp. nov., adult ♂, Whites Beach, Rarangi (MPN CW4295). **F**. *P. rodmorrisi* sp nov., adult ♂, Hodder River, Inland Kaikōura Range (MPN CW3824). **G**. *P. hudsoni* Hutton, 1896, adult ♂, Karori, Wellington (MPN CW3564). **H**. *P. caudatum* sp. nov., adult ♂, Brewster Hut Track, Haast Pass (MPN CW4049). **I**. *P. flavicorne* sp nov., adult ♂, Brewster Hut Track, Haast Pass (MPN CW4055). **J**. *P. crystallae* sp nov., adult ♀, Cave Brook, Gouland Downs (MPN CW3991). Scale bar = 10 mm.

Head. Frons dark brown, covered with very sparse setae; vertex glabrous and of variegated colour. Eyes dark, bulging and large compared to size of head. Fastigium dark, with a white spot on either side. Scapes and peduncles pale and pilose; antennae reddish brown, covered in fine setae. Maxillary and labial palpi light brown, with fine tomentum.

Thorax. Pronotum variegated brown; dark with pale bars next to posterior margin; covered in sparse, fine tomentum. Pronounced yellow median line. All margins of pronotum slightly rounded.

Legs. Moderately long; hind femora of approximately equal length as body in both males and females. Hind tibiae 5% to 20% longer than body in females, 10% to 30% longer than body in males. Coxae and trochanters mottled light and dark brown. Fore and mid femora and tibiae with alternating conspicuous light and dark bands; hind legs variegated. Fore coxae with a pronounced lateral spine. Fore femora without linear spines above or below, but armed with one prolateral spine at apex. Fore tibiae armed below, generally with one linear spine on anterior edge, two linear spines on posterior edge. Fore tibiae armed with two long spines below (one prolateral and one retrolateral) and two short spines above (one prolateral and one retrolateral) at apex. Mid femora without linear spines above or below, but armed with one prolateral and one retrolateral spine at apex. Mid tibiae armed below, with one to three linear spines on anterior edge, zero to two linear spines on posterior edge. Mid tibiae armed with two long spines below (one prolateral and one retrolateral) and two short spines above (one prolateral and one retrolateral) at apex. Hind femora often armed with one small retrolateral linear spine below on interior edge, but without apical spines. Hind tibiae armed with approximately 20 linear spines above, of varying length, on both anterior and posterior edges. Hutton (1896) described these as "eight outer and 12 inner spines, and several minute teeth between them". Hind tibiae with two superior subapical spines (one prolateral and one retrolateral), two superior apical spines (one prolateral and one retrolateral) and two inferior apical spines (one prolateral and one retrolateral). Superior subapical spines and inferior apical spines of approximately equal length, superior apical spines approximately three times as long as inferior apical spines. Hind tarsi with four segments, first and second segments with a pair of spines on distal end. First segment with 7–11 small, alternate dorsal spines. Second segment with 2–4 small, alternate dorsal spines. Second and fourth segments one third of length of first segment. Third segment one third of length of second and fourth segments.

Abdomen. Colour variegated brown, often with dark, nearly black patches on sides of second, fourth, fifth and eighth tergites; covered in sparse, fine tomentum. Yellow median dorsal line usually pronounced, of varying width, occasionally as a yellow band occupying middle third of dorsum.

Male terminalia. Cerci long, pointed at apex, brown in colour, clothed in setae. Styli short and broad at base, almost triangular, not extending beyond end of subgenital plate. Subgenital plate as wide as long in a triangular shape; terminates in a blunt point between styli; slightly keeled. Terminalia appear tricuspidate at apex when seen from above.

Female terminalia. Subgenital plate with three rounded points, outer two wider at base and longer than middle one. Ovipositor brown, recurved above, tapering very gently until near apex; relatively short (approximately three quarters of body length). Upper valve smooth above; lower valve with 7 to 9 blunt teeth at apex on ventral edge. Dorsal view of terminalia as in *Pleioplectron simplex* (Fig. 12A).

Pleioplectron thomsoni (Chopard, 1923) comb. nov.
Figs 2A–B, 6B, 7C, 8G–H, 10G–H, 13, 14C–D, 18C, 20

Weta thomsoni Chopard, 1923: 234, figs 10–18.

Diagnosis

A medium-sized cave wētā with long legs, pale colour, pronotum and tergites glabrous and shiny. It is common and widespread in caves and forests in South Canterbury and Otago, New Zealand. It has prolateral and retrolateral apical spines on both fore and mid femur.

Etymology

Named in honour of Dr. J. Allan Thomson (1881–1928), director of the Dominion Museum, Wellington, who sent the type specimens to Chopard. It is not known whether Thomson collected the specimens himself, or whether they were given to him by someone else.

Material examined (see also Table 4 in Supplementary Material)

Syntypes

NEW ZEALAND • 1 ♂, adult; South Canterbury (SC), Opihi River, Raincliff; 44.16158° S, 170.99234° E; 150 m a.s.l.; 4 May 1917; limestone caves; MNHN EO-ENSIF4924 • 1 ♀, adult; same data as for preceding; MNHN EO-ENSIF4925.

Other material

NEW ZEALAND – **South Canterbury (SC)** • 2 ♂♂, 1 ♀; same locality as syntypes; 11 Sep. 2004; S. Pawson leg.; MPN CW146 to CW148 • 1 ♂, 1 ♀, 1 nymph; same locality as syntypes; 2 Jul. 2016; D. Hegg leg.; night search + insect net; MPN CW3115 to CW3117 • 1 ♀, 3 nymphs; same locality as syntypes; 5 Nov. 2016; D. Hegg leg.; night search + insect net; MPN CW3911, CW3945 • 1 ♂, 1 ♀; Opihi River, Pioneer Park; 44.13967° S, 170.96495° E; 200 m a.s.l.; 5 Nov. 2016; D. Hegg leg.; on log in native forest; night search + insect net; MPN CW3912, CW3913 • 1 ♂, 1 nymph; Peel Forest, Big Tree; 43.89352° S, 171.25776° E; 300 m a.s.l.; 11 Dec. 2017; D. Hegg leg.; on forest floor in native forest; night search + insect net; MPN CW3643, CW3644 • 1 ♂; Timaru, Centennial Park; 44.38946° S, 171.19512° E; 50 m a.s.l.; 27 Nov. 2018; D. Hegg leg.; on clay bank under pine trees; night search + insect net; MPN CW4241 • 2 ♂♂, 1 ♀, 1 nymph; Claremont Bush Reserve; 44.41300° S, 171.08382° E; 120 m a.s.l.; 21 Sep. 2018; D. Hegg leg.; on forest floor under pine trees; night search + insect net; MPN CW4082, CW4115, CW4116, CW4139 • 1 ♀; Valley of the Moa; 44.42930° S, 170.97600° E; 200 m a.s.l.; 17 Mar. 2018; D. Hegg leg.; under limestone boulder; night search + insect net; MPN CW3918 • 1 ♂; Otaio Gorge; 44.52386° S, 170.92736° E; 250 m a.s.l.; 17 Mar. 2018; D. Hegg leg.; on tree trunk in native forest; night search + insect net; MPN CW3917. – **Central Otago (CO)** • 1 nymph; Danseys Pass; 44.96188° S, 170.32864° E; 650 m a.s.l.; 7 May 2016; D. Hegg leg.; on rocky stream bank; night search + insect net; MPN CW3017 • 4 ♂♂, 1 ♀; Cromwell, Bendigo; 44.93904° S, 169.36751° E; 600 m a.s.l.; 29 Nov. 2006; L.D. Cook and P.M. Johns leg.; in gold mining tunnel; MPN CW1877 to CW1881 • 2 ♂♂, 5 ♀♀; Cromwell, Bannockburn loop track; 45.07912° S, 169.13912° E; 300 m a.s.l.; 29 Nov. 2006; L.D. Cook, P.M. Johns and R.C. Pratt leg.; in gold mining tunnel; MPN CW1390 to CW1396 • 2 ♂♂, 1 ♀; same locality as preceding; Jan. 2013; T. Jewell leg.; MPN CW2584 to CW2586 • 1 ♂, 1 ♀, 8 nymphs; same locality as preceding; 26 Nov. 2016; D. Hegg leg.; insect net; MPN CW3432 to CW3438, CW4008, CW4009, CW4014. – **Otago Lakes (OL)** • 1 ♂; Wanaka, Mt Iron Track; 44.69315° S, 169.16461° E; 500 m a.s.l.; Jan. 2016; T. Jewell leg.; MPN CW2850. – **Dunedin (DN)** • 3 ♂♂, 2 ♀♀; Trotters Gorge; 45.40581° S, 170.77583° E; 100 m a.s.l.; 12 Aug. 2017; D. Hegg leg.; in cave; insect net; MPN CW3780, CW4006, CW4007, CW4010, CW4011 • 1 ♀; Dunedin, Long Beach; 45.74939° S, 170.64381° E; 0 m a.s.l.; 10 May 2016; D. Hegg leg.; under boulders; night search + insect net; MPN CW3009 • 1 ♀, 2 nymphs; same locality as preceding; 8 Nov. 2016; D. Hegg leg.; night search + insect net; MPN CW4012, CW4013, CW4015 • 4 ♂♂, 1 ♀; Silverpeaks, Tunnels Track; 45.71178° S, 170.51262° E; 200 m a.s.l.; 24 Oct. 2017; D. Hegg leg.; in gold mining tunnel; insect net; MPN CW3703, CW3883 to CW3886 • 2 ♂♂, 1 ♀, 1 nymph; Manuka Gorge, Mt Stuart Tunnel; 46.06945° S,

169.8276° E; 100 m a.s.l.; 12 Jan. 2005; S. Trewick leg.; in old railway tunnel; MPN CW281A, CW281B, CW282, CW283 • 1 ♂, 1 ♀; same locality as preceding; 27 Mar. 2016; D. Hegg leg.; insect net; MPN CW2845, CW2846 • 1 ♂, 1 nymph; same locality as preceding; 15 Nov. 2016; D. Hegg leg.; insect net; MPN CW4004, CW4005.

Description

The original description by Chopard (1923) is both detailed and accurate, and is complemented by excellent drawings that have stood the test of time (see Fig. 13). A redescription is not required.

Pleioplectron triquetrum sp. nov.
urn:lsid:zoobank.org:act:75D542D6-516C-4905-ABE0-3F14A89DCE72
Figs 2A–B, 6D, 7D, 8J–L, 10J–L, 14F, 18D

Diagnosis

A small to medium-sized, dark-coloured inhabitant of the forests in the northeast of the South Island of New Zealand. The habitus is typical of *Pleioplectron*, chequered grey-brown in colour, with visibly banded legs and often with a dorsal median line. At the southern end of its range (Canterbury/North Canterbury), it could be most easily confused with *P. simplex* Hutton, 1896, from which it is distinguished by the presence of a retrolateral apical spine on the fore femur, the darker colour and slightly smaller size. In northern Marlborough, it is most easily mistaken for *P. auratum* sp. nov., which is generally of lighter colour, but an examination of the terminalia is required to reliably distinguish the two species. Further inland and west, it could be confused with *P. gubernator* sp. nov., a smaller species that lacks the retrolateral apical spine on the fore femur.

Etymology

'*Trĭquĕtrus*' is Latin for 'three-cornered' or 'triangular', after the triangular shape of the subgenital plate in the adult males (Fig. 8J).

Material examined (see also Table 5 in Supplementary Material)

Holotype

NEW ZEALAND • ♂, adult; Kaikōura (KA), Hinau Track; 42.349586° S, 173.566727° E; 200 m a.s.l.; 22 Oct. 2016; Danilo Hegg leg.; at base of tree in native forest; night search + insect net; NMNZ AI.037480 (prev. MPN CW3922).

Paratype

NEW ZEALAND • ♀, adult; North Canterbury (NC), Gore Bay, Tweedies Gully; 42.862247° S, 173.3073717° E; 40 m a.s.l.; 7 Apr. 2018; Danilo Hegg leg.; on clay bank on side of track in native forest; night search + insect net; NMNZ AI.037481 (prev. MPN CW3846).

Other material

NEW ZEALAND – **Marlborough (MB)** • 2 ♂♂, 2 ♀♀; Hanmer Springs, Fir Trail; 42.50273° S, 172.84644° E; 500 m a.s.l.; 20 Dec. 2005; J. Goldberg and F. Wieland leg.; MPN CW386 to CW389. – **Kaikōura (KA)** • 1 ♂, 2 ♀♀, 1 nymph; Hodder River; 41.95700° S, 173.65023° E; 1150 m a.s.l.; 6 Apr. 2018; D. Hegg leg.; under boulders at bush-line; night search + insect net; MPN CW3826, CW3827, CW3858, CW3916 • 1 ♂, 2 ♀♀; same collection data as for holotype; 28 Mar. 2016; MPN CW2870 to CW2872 • 1 ♂, 1 ♀, 2 nymphs; same collection data as for holotype; MPN CW3921, CW3923, CW3924, CW3972 • 2 ♂♂, 1 ♀; same collection data as for holotype; 1 Apr. 2017; MPN

CW3928, CW3929, CW3970. – **North Canterbury (NC)** • 3 ♂♂, 2 ♀♀, 1 nymph; same collection data as for paratype; MPN CW3839 to CW3841, CW3844, CW3845, CW3920 • 3 nymphs; Waipara, Tiromoana Bush Walk; 43.09836° S, 172.84595° E; 150 m a.s.l.; 27 Sep. 2018; D. Hegg leg.; on clay bank on side of track; night search + insect net; MPN CW4084 to CW4086.

Description

Measurements. See Table 1.

Head. Frons dark brown, with very sparse setae; vertex glabrous and of variegated colour. Eyes dark. Fastigium dark, with a white spot on either side. Scapes and peduncles pale and pilose; antennae dark with occasional pale segments, covered in fine setae. Maxillari and labial palpi brown, with fine tomentum. In some sexually mature males, antennal segments have sensory hair tuffs as in *P. simplex* (see Fig. 5).

Thorax. Pronotum variegated dark brown with pale patches; dark with pale bars next to anterior and posterior margins; covered in sparse, fine tomentum. Anterior and lateral margins slightly rounded; posterior margin nearly straight.

Legs. Moderately long; hind femora 10% to 20% longer than body in both males and females; hind tibiae 10% to 30% longer than body in females, 20% to 50% longer than body in males. Coxae and trochanters mottled light and dark brown. Fore and mid femora and tibiae with conspicuous alternating light and dark bands. Hind femora variegated; hind tibiae uniform dark colour. Fore coxae with a pronounced lateral spine. Fore femora without linear spines above or below but armed with one prolateral and one retrolateral spine at apex. Fore tibiae armed below, generally with two (up to four) linear spines on anterior edge and three (two to four) linear spines on posterior edge. Fore tibiae armed with two long spines below (one prolateral and one retrolateral) and two short spines above (one prolateral and one retrolateral) at apex. Mid femora without linear spines above or below, but armed with one prolateral and one retrolateral spine at apex. Mid tibiae armed below, with one to three linear spines on both anterior and posterior edges. Mid tibiae armed with two long spines below (one prolateral and one retrolateral) and two short spines above (one prolateral and one retrolateral) at apex. Hind femora armed with three to seven very small retrolateral linear spines below, and one retrolateral apical spine. Hind tibiae armed with 21 to 33 linear spines above, of varying length, on both anterior and posterior edges. Hind tibiae with two superior subapical spines (one prolateral and one retrolateral), two superior apical spines (one prolateral and one retrolateral), two inferior apical spines (one prolateral and one retrolateral) and two inferior subapical spines (one prolateral and one retrolateral). Superior subapical spines about twice as long as inferior subapical spines, inferior apical spines twice as long again; superior apical spines approximately three times as long as inferior apical spines. Hind tarsi with four segments, first and second segments with a pair of spines on distal end. First segment with 7–13 small dorsal, alternate spines. Second segment with 3–9 small dorsal, alternate spines. Second and fourth segments of approximately half of length of first segment, third segment one third of length of second and fourth segments.

Abdomen. Colour variegated brown/black, with a few lighter patches; covered in sparse, fine tomentum. Dorsal median line generally visible but thin and not very pronounced (Figs 6D, 14F).

Male terminalia. Cerci long, pointed at apex, dark brown colour, clothed in setae. Styli short and stumpy, extending about as far as end of subgenital plate. Subgenital plate forms a neat triangle, not keeled (Fig. 8J). Apex of subgenital plate visible from above, looking like a small alpine hat (Fig. 8K).

Female terminalia. Subgenital plate weakly bilobed, its lobes separated by a very shallow depression (Fig. 10J). Ovipositor reddish-brown, strongly curved upwards at apex, terminating in a very sharp

point; relatively short (approximately three quarters of body length). Upper valve smooth above; lower valve with 4 to 6 strong teeth at apex on ventral edge (Fig. 10K–L). Dorsal view of terminalia as in *P. simplex* (Fig. 12A).

Fig. 7. Left hind tibia of cave wētā in the genus *Pleioplectron* Hutton, 1896, dorsal view. **A**. *P. simplex* Hutton, 1896, adult ♀, Hinewai Reserve, Akaroa (MPN CW4114). **B**. *P. hudsoni* Hutton, 1896, adult ♂, Otaki Forks, Tararua Forest (MPN CW3890). **C**. *P. thomsoni* (Chopard, 1923) comb. nov., adult ♂, Claremont Bush Reserve, South Canterbury (MPN CW4115). **D**. *P. triquetrum* sp. nov., adult ♂, Hinau Track, Kaikōura (MPN CW3921). **E**. *P. auratum* sp. nov., adult ♂, Whites Beach, Rarangi (MPN CW4295). **F**. *P. gubernator* sp. nov., adult ♂, Lewis Pass (MPN CW4066). **G**. *P. caudatum* sp. nov., adult ♂, Moeraki River (MPN CW4239). **H**. *P. flavicorne* sp. nov., adult ♀, Brewster Hut Track, Haast Pass (MPN CW3896). **I**. *P. crystallae* sp. nov., adult ♂, Cave Brook, Gouland Downs (MPN CW3994). **J**. *P. rodmorrisi* sp. nov., adult ♂, Hodder River, Inland Kaikōura Range (MPN CW3819). Scale bar = 5 mm.

Pleioplectron auratum sp. nov.
urn:lsid:zoobank.org:act:97429B5F-54CF-4891-8174-64F038866150
Figs 2A–B, 6E, 7E, 8M–O, 10M–O, 15A, 18E

Diagnosis

A small to medium-sized cave wētā found in forests and in urban and disturbed habitats in the northeast corner of South Island. The habitus is typical of *Pleioplectron*, chequered grey-brown in colour, with visibly banded legs and with a dorsal median line (Fig. 15A). A prominent pair of longer spines stands out on the hind tibia, about one third of the way up from the apex (Fig. 7E). Relative to body size, the ovipositor is longer than in any other species of this genus. *Pleioplectron auratum* sp. nov. is most similar to *P. triquetrum* sp. nov., although it is generally lighter in colour. An examination of the terminalia is required to reliably tell the two species apart from each other.

Etymology

'*Aurātus*' is Latin for 'adorned with gold', because of the fine golden hair that adorns the posterior margins of the insect's tergites.

Material examined (see also Table 6 in Supplementary Material)

Holotype

NEW ZEALAND • ♂, adult; Marlborough Sounds (SD), Rarangi, Whites Beach, Black Jack Track; 41.384238° S, 174.058243° E; 20 m a.s.l.; 12 Dec. 2018; Danilo Hegg leg.; on clay bank on side of track in native forest; night search + insect net; NMNZ AI.037482 (prev. MPN CW4295).

Paratype

NEW ZEALAND • ♀, adult; Marlborough (MB), Blenheim, New Renwick Rd; 41.526987° S, 173.8478117° E; 40 m a.s.l.; 28 Sep. 2018; Danilo Hegg leg.; in firewood pile; night search + insect net; NMNZ AI.037483 (prev. MPN CW4119).

Other material

NEW ZEALAND – **Marlborough (MB)** • 1 nymph; Blenheim, Onamalutu Rd; 41.47045° S, 173.73144° E; 50 m a.s.l.; 3 Apr. 2018; D. Hegg leg.; in stone retaining wall on roadside; night search + insect net; MPN CW3940 • 1 ♂, 1 ♀; same collection data as for paratype; MPN CW4105, CW4120 • 1 ♀; same collection data as for paratype; 19 Oct. 2018; MPN CW4142 • 3 ♂♂, 3 ♀♀; Blenheim, Waihopai River; 41.52456° S, 173.73504° E; 80 m a.s.l.; 19–22 Oct. 2018; D. Hegg leg.; in flooding debris next to river; night search + insect net; MPN CW4141, CW4143 to CW4147. – **Marlborough Sounds (SD)** • 1 ♀, 2 nymphs; Picton, Bob's Bay Track; 41.28757° S, 174.01008° E; 10 m a.s.l.; 11 Dec 2018; D. Hegg leg.; disturbed vegetation, bank on side of track; night search + insect net; MPN CW4235, CW4236, CW4281 • 1 ♂; same collection data as for holotype; MPN CW4294.

Description

Measurements. See Table 1.

Head. Frons glabrous, mostly pale, with dark patches under eyes and in middle; vertex glabrous and of variegated colour. Eyes dark. Fastigium dark, with a white spot on either side. Scapes and peduncles variegated and pilose, with dark antennae covered in fine setae. Maxillari and labial palpi light brown, with fine tomentum.

Thorax. Pronotum mottled with pale and dark patches, but dark with pale bars next to anterior and posterior margins and covered in sparse, fine tomentum. All margins slightly rounded. Posterior margin decorated with fine golden tomentum.

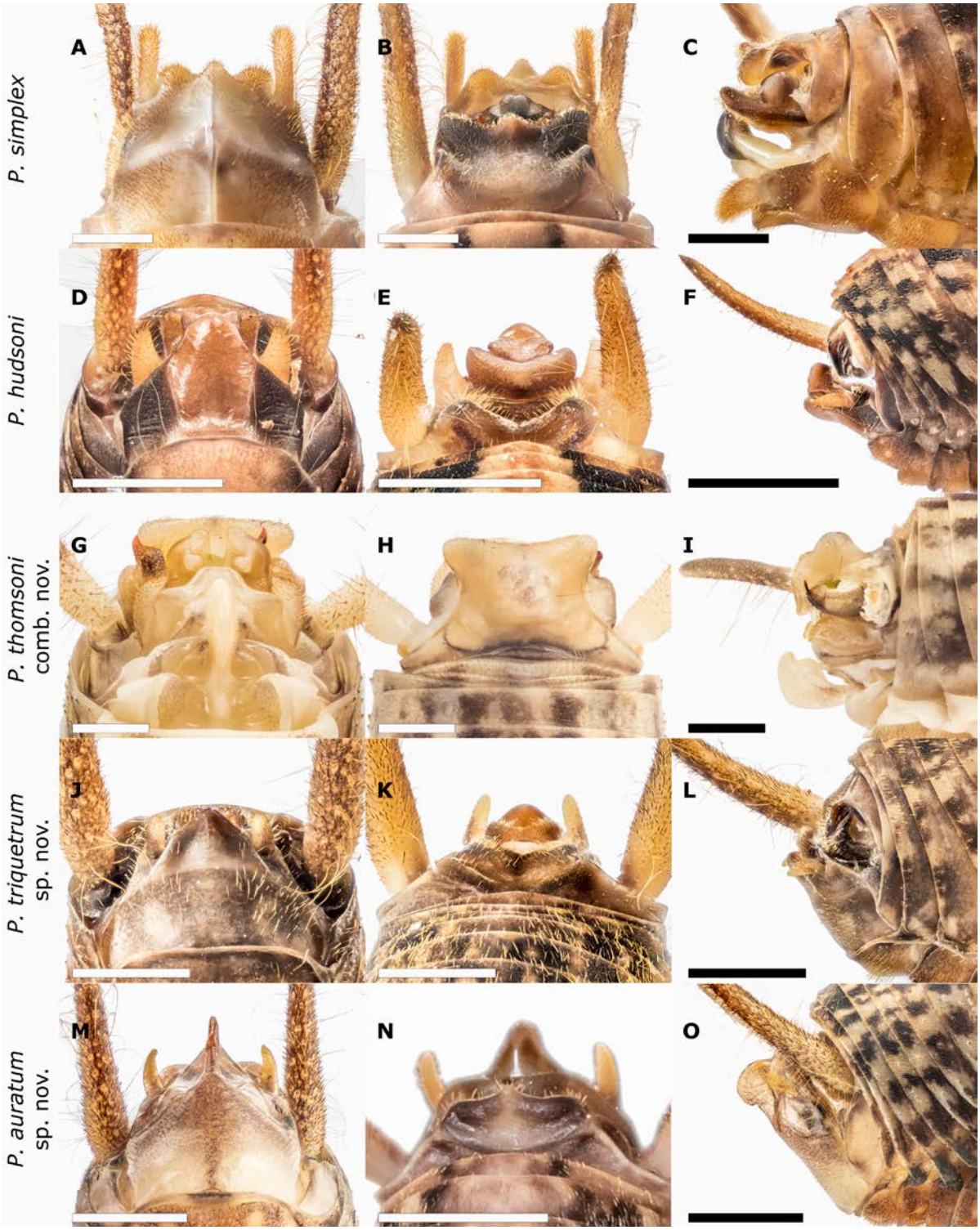

Fig. 8. Adult male terminalia of cave wētā in the genus *Pleioplectron* Hutton, 1896. Left column: ventral view (subgenital plate); central column: dorsal view; right column: lateral view. **A–C**. *P. simplex* Hutton, 1896, Hinewai Reserve, Banks Peninsula. **A–B**. MPN CW4109. **C**. MPN CW4118. **D–F**. *P. hudsoni* Hutton, 1896, Otaki Forks, Tararua Forest Park (MPN CW3890). **G–I**. *P. thomsoni* (Chopard, 1923) comb. nov., Trotters Gorge, Otago (MPN CW3780). **J–L**. *P. triquetrum* sp. nov., Hinau Track, Kaikōura. **J, L**. MPN CW3922. **K**. MPN CW3928. **M–O**. *P. auratum* sp. nov. **M, O**. Whites Beach, Rarangi (MPN CW4295). **N**. Waihopai River, Blenheim (MPN CW4146). Scale bars = 1 mm.

Legs. Moderately long; hind femora up to 20% longer than body; hind tibiae up to 50% longer than body in both males and females. Coxae and trochanters mottled light and dark brown. Fore and mid femora and tibiae with conspicuous alternating light and dark bands. Hind femora variegated; hind tibiae of uniform dark colour. Fore coxae with a pronounced lateral spine. Fore femora often with one or two prolateral linear spines below, armed with one prolateral and one retrolateral spine at apex. Fore tibiae usually with three linear spines below on both anterior and posterior edges. Fore tibiae armed with two long spines below (one prolateral and one retrolateral) and two short spines above (one prolateral and one retrolateral) at apex. Mid femora without linear spines above or below, but with one prolateral and one retrolateral spine at apex. Mid tibiae generally with three linear spines below on both anterior and posterior edges. Mid tibiae armed with two long spines below (one prolateral and one retrolateral) and two short spines above (one prolateral and one retrolateral) at apex. Hind femora with four to eight small, retrolateral linear spines, up to two prolateral linear spines and armed with one retrolateral spine at apex. Hind tibiae with 25 to 36 linear spines of varying length above, on both anterior and posterior edges. Hind tibiae with two superior subapical spines (one prolateral and one retrolateral), two superior apical spines (one prolateral and one retrolateral), two inferior apical spines (one prolateral and one retrolateral) and two inferior subapical spines (one prolateral and one retrolateral). Superior subapical spines about as long as inferior apical spines and twice as long as inferior subapical spines; superior apical spines three to four times as long as inferior apical spines. Hind tarsi with four segments, first and second segments with a pair of spines on distal end. First segment with 6–15 small dorsal, alternate spines. Second segment with 2–7 small dorsal, alternate spines. Second and fourth segments approximately one third length of first segment and third segment one third length of second and fourth segments.

Abdomen. Colour variegated, mainly pale, but with at least one pair of black patches on every tergite and covered in sparse, fine tomentum. Dorsal median line generally visible but thin and not very pronounced. All tergites with a pattern of alternating pale and dark bars next to posterior margin, the latter covered with fine golden tomentum, like the pronotum, giving the animal quite a beautiful look.

Male terminalia. Cerci long, pointed at apex, dark brown in colour, clothed in setae. Styli short, extending about as far as end of subgenital plate. Subgenital plate ends with a strongly keeled triangle bent upwards (Fig. 8M, O).

Female terminalia. Subgenital plate strongly bilobed, its pointed lobes separated by a deep, U-shaped depression (Fig. 10M). Ovipositor reddish-brown, long (approximately as long as body length, and up to 20% longer) and relatively straight, but strongly recurved upwards near apex and terminating with a very sharp point. Upper valve smooth above, but lower valve with 5 to 7 strong teeth at apex on ventral edge (Fig. 10N–O). Dorsal view of terminalia as in *P. simplex* (Fig. 12A).

Pleioplectron gubernator sp. nov.

urn:lsid:zoobank.org:act:50773A0B-37C2-47E8-887D-10A11B27FF57

Figs 2A–B, 6C, 7F, 9A–C, 11A–C, 15B, 16, 18F

Diagnosis

A small inhabitant of the forest floor in the northwest of the South Island of New Zealand. The habitus is typical of *Pleioplectron*, chequered grey-brown in colour, with visibly banded legs. Very dark all over, with median dorsal line hardly visible. In Westland it could easily be mistaken for *P. caudatum* sp. nov., which lives further south along the coast. Examination of the terminalia is required to reliably distinguish the two species (compare Fig. 9A–C with 9D–F). Nymphs of *P. gubernator* sp. nov. have antennae with bright yellow scapes similar to those of *P. flavicorne* sp. nov., but the two species are geographically well separated.

Etymology

'*Gŭbernātŏr*' is Latin for 'helmsman', because of the very prominent fin under the male subgenital plate (Fig. 9A, C), which resembles the rudder under a boat.

Material examined (see also Table 7 in Supplementary Material)

Holotype

NEW ZEALAND • ♂, adult; Buller (BR), Lewis Pass, Cannibal Gorge; 42.339893° S, 172.42208° E; 840 m a.s.l.; 3 Feb. 2017; Danilo Hegg leg.; in rotting tree stump in native forest; night search + insect net; NMNZ AI.037484 (prev. MPN CW4063).

Paratype

NEW ZEALAND • ♀, adult; Nelson (NN), Abel Tasman National Park, Awapoto Hut; 40.86314° S, 172.9391° E; 660 m a.s.l.; 12 Oct. 2017; Danilo Hegg leg.; in roots of fallen tree; night search + insect net; NMNZ AI.037485 (prev. MPN CW4057).

Other examined

NEW ZEALAND – **Nelson (NN)** • 1 ♀; East Takaka; 40.92435° S, 172.85541° E; 600 m a.s.l.; 29 Jan. 2006; M. Morgan-Richards and S. Trewick leg.; on ground under beech tree; night search; MPN CW298 • 1 nymph; same collection data as for paratype; MPN CW3787 • 1 ♂; Heaphy Track, Perry Saddle; 40.90029° S, 172.40416° E; 900 m a.s.l.; 19 Apr. 2016; D. Hegg leg.; under boulder on side of track; night search; MPN CW2986 • 1 ♂; Heaphy Track, Perry Saddle; 40.90029° S, 172.40416° E; 900 m a.s.l.; 24 Dec. 2016; D. Hegg leg.; in leaf litter on forest floor; night search + insect net; MPN CW4075 • 2 ♂♂; Heaphy Track, Gouland Downs, Cave Brook; 40.89240° S, 172.35540° E; 600 m a.s.l.; 26 Dec. 2016; D. Hegg leg.; on forest floor; night search + insect net; MPN CW4073, CW4074 • 1 ♀; Heaphy Track, Gouland Downs, Cave Brook; 40.89240° S, 172.35540° E; 600 m a.s.l.; 4 Feb. 2018; D. Hegg leg.; on forest floor; night search + insect net; MPN CW4058 • 1 ♂; Heaphy Track, Gouland Downs, Three Pointer; 40.88383° S, 172.30983° E; 750 m a.s.l.; 22 Apr. 2016; D. Hegg leg.; on tree trunk; night search; MPN CW2980 • 1 ♀; Mt Arthur Tablelands, Salisbury Lodge; 41.18511° S, 172.64465° E; 1150 m a.s.l.; 8 Feb. 2018; D. Hegg leg.; on tree trunk; night search + insect net; MPN CW4056 • 1 ♂; Mt Owen, Bulmer Creek; 41.57134° S, 172.52491° E; 1000 m a.s.l.; 7 Jan. 2019; D. Hegg leg.; at base of tree; night search + insect net; MPN CW4262 • 1 ♂; Mt Owen, Branch Creek Hut; 41.52465° S, 172.51128° E; 920 m a.s.l.; 11 Jan. 2019; D. Hegg leg.; on tree trunk; night search + insect net; MPN CW4276 • 3 ♀♀; Mt Owen, Fyffe River; 41.58800° S, 172.49235° E; 600 m a.s.l.; 12 Jan. 2019; D. Hegg leg.; rotting tree stump in forest; night search + insect net; MPN CW4277 to CW4279. – **Buller (BR)** • 1 ♂, 1 ♀; Lewis Pass; 42.37782° S, 172.40297° E; 850 m a.s.l.; 26 Apr. 2016; D. Hegg leg.; stream bank; night search; MPN CW2995, CW2996 • 1 ♂, 2 nymphs; Lewis Pass; 42.37782° S, 172.40297° E; 850 m a.s.l.; 23 Dec. 2016; D. Hegg leg.; rotting tree stump in forest; night search + insect net; MPN CW4059 to CW4061 • 4 ♂♂, 2 ♀♀; Lewis Pass; 42.37782° S, 172.40297° E; 850 m a.s.l.; 10 Jan. 2017; D. Hegg leg.; rotting tree stump in forest; night search + insect net; MPN CW4065 to CW4068, CW4071, CW4072 • 1 ♂, 2 ♀♀; same collection data as for holotype; MPN CW4064, CW4069, CW4070 • 1 ♂, 3 ♀♀; Lewis Pass, Nina Valley; 42.46601° S, 172.32211° E; 750 m a.s.l.; 26 Jan. 2018; D. Hegg leg.; on forest floor; night search + insect net; MPN CW4037 to CW4039, CW4062 • 1 nymph; Charleston, Darkies Terrace; 41.90941° S, 171.45284° E; 40 m a.s.l.; 18 Oct. 2018; D. Hegg leg.; at base of tree; night search + insect net; MPN CW4117 • 1 ♂, 1 ♀, 3 nymphs; Paparoa Range, Buckland Peaks; 41.87418° S, 171.62879° E; 1040 m a.s.l.; 8 Dec. 2018; D. Hegg leg.; on forest floor; night search + insect net; MPN CW4251 to CW4253, CW4266, CW4280 • 1 nymph; Paparoa Range, Buckland Peaks; 41.87526° S, 171.62669° E; 1150 m a.s.l.; 8 Dec. 2018; D. Hegg leg.; on *Celmisia* leaf, above tree line; night search + insect net; MPN CW4227 • 1 ♂, 1 nymph; Punakaiki, Truman Track; 42.09270° S, 171.34071° E; 40 m a.s.l.; 6 Dec. 2018; D. Hegg leg.;

in roots of fallen tree; night search + insect net; MPN CW4240, CW4264 • 1 ♂, 2 ♀♀; Paparoa Range, Blackball Creek; 42.32962° S, 171.39728° E; 300 m a.s.l.; 4 Apr. 2019; D. Hegg leg.; on bank on side of track; night search + insect net; MPN CW4327 to CW4329. – **Westland (WD)** • 1 ♂; Hokitika, Awatuna, Havill Drive; 42.64646° S, 171.06245° E; 20 m a.s.l.; 24 Apr. 2012; B. Taylor-Smith leg.; MPN CW2010.

Description

Measurements. See Table 1.

Head. Frons dark brown, with very sparse setae; vertex glabrous and of variegated colour. Eyes dark and bulging. Fastigium dark, with a white spot on either side. Scapes and peduncles pale and pilose; antennae dark brown, covered in fine setae. Maxillari and labial palpi light, with fine tomentum.

Thorax. Pronotum variegated brown, mainly dark, with a few pale patches, dark with pale bars next to posterior margin and covered in sparse, fine tomentum. Anterior and lateral margins slightly rounded; posterior margin nearly straight.

Legs. Moderately long; hind femora of approximately equal length as body; hind tibiae on average 25% longer than body in both males and females. Coxae and trochanters mottled light and dark brown. Fore and mid femora and tibiae with conspicuous alternating light and dark bands; hind femora variegated; hind tibiae dark brown. Fore coxae with a pronounced lateral spine. Fore femora without linear spines above or below, but armed with one prolateral spine at apex. Fore tibiae armed below, generally with two (sometimes three) linear spines on anterior edge, and one linear spine on posterior edge. Fore tibiae armed with two long spines below (one prolateral and one retrolateral) and two short spines above (one prolateral and one retrolateral) at apex. Mid femora without linear spines above or below, but armed with one prolateral and one retrolateral spine at apex. Mid tibiae armed below, with one to three linear spines on anterior edge and one to two linear spines on posterior edge. Mid tibiae armed with two long spines below (one prolateral and one retrolateral) and two short spines above (one prolateral and one retrolateral) at apex. Hind femora unarmed below. Hind femora armed with one retrolateral apical spine in specimens collected at Gouland Downs, but apical spines absent in specimens collected elsewhere. Hind tibiae with 20 to 29 linear spines of varying length above, on both anterior and posterior edges. Hind tibiae with two superior subapical spines (one prolateral and one retrolateral), two superior apical spines (one prolateral and one retrolateral) and two inferior apical spines (one prolateral and one retrolateral). Superior subapical spines and inferior apical spines of approximately equal length, superior apical spines approximately three times as long. Hind tarsi with four segments, first and second segments with a pair of spines on distal end. First segment with 5–12 small dorsal, alternate spines. Second segment with 1–4 small dorsal, alternate spines. Second and fourth segments one third of length of first segment, third segment one third of length of second and fourth segments.

Abdomen. Colour variegated brown, very dark with black patches and with sparse, fine tomentum. Dorsal yellow median line absent or very thin.

Male terminalia. Cerci long, rounded at apex, dark brown in colour, clothed in setae. Styli very short and not visible from above. Subgenital plate very long, protruding through heavily deformed last two sternites, with a thin, translucent but very pronounced fin that gives this species its name (Fig. 9A, C). This feature is missing in specimens collection in the Paparoa Range, and the posterior part of the subgenital plate is covered by undeformed sternites (Fig. 16). Structure of male terminalia otherwise the same. Suranal plate a tall truncated cone almost half length of cerci, covering styli and all genital organs entirely (Fig. 9B).

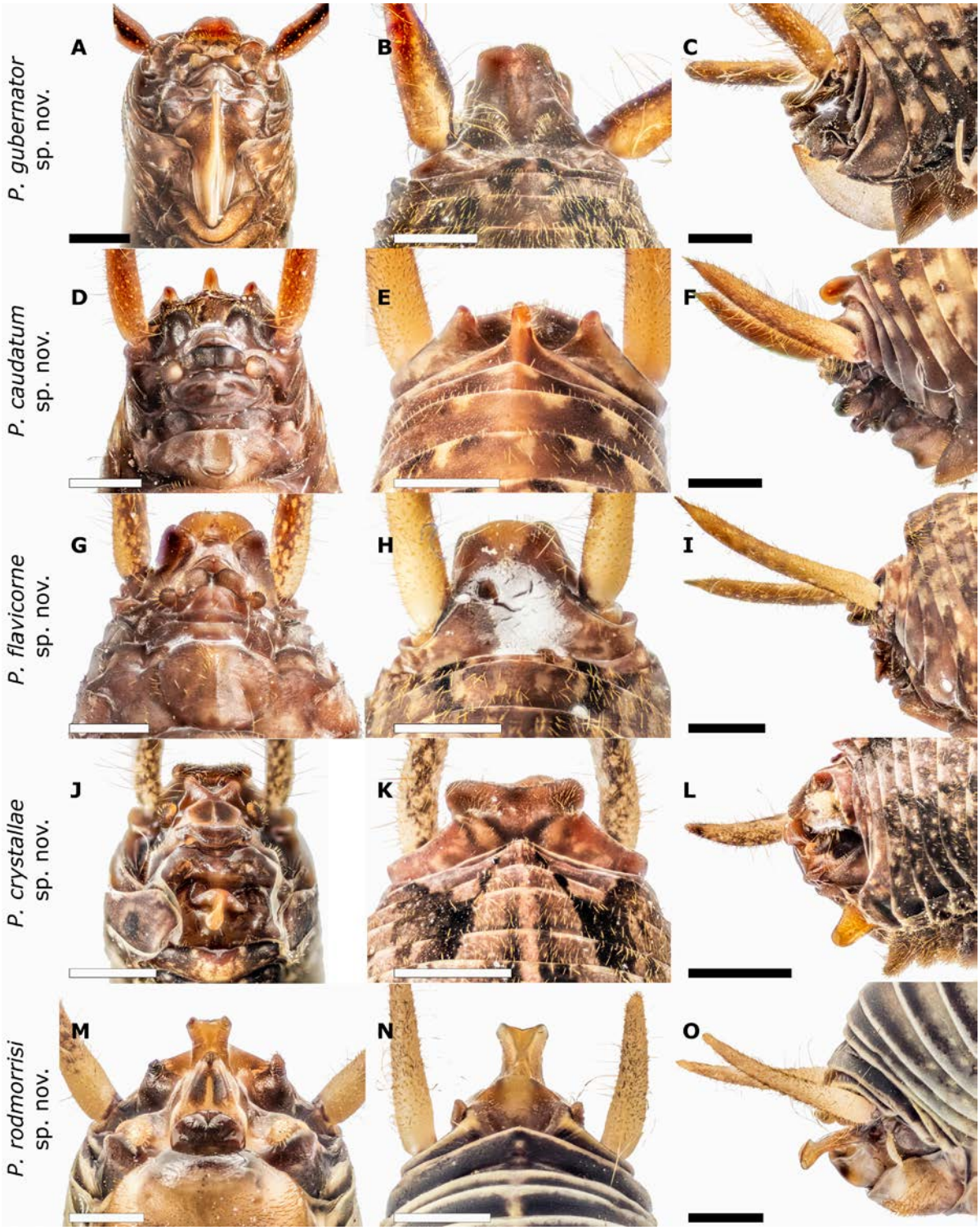

Fig. 9. Adult male terminalia of cave wētā in the genus *Pleioplectron* Hutton, 1896. Left column: ventral view (subgenital plate); central column: dorsal view; right column: lateral view. **A–C**. *P. gubernator* sp. nov., Lewis Pass. **A**. MPN CW4063. **B**. MPN CW4067 **C**. MPN CW4059. **D–F**. *P. caudatum* sp. nov., Brewster Hut Track, Haast Pass (MPN CW4053). **G–I**. *P. flavicorne* sp. nov., Brewster Hut Track, Haast Pass (MPN CW4055). **J–L**. *P. crystallae* sp. nov., Cave Brook, Gouland Downs, Heaphy Track. **J**. MPN CW3994. **K–L**. MPN CW3995. **M–O**. *P. rodmorrisi* sp. nov., Kahutara Saddle, Seaward Kaikōura Range. **M**. MPN CW3536. **N–O**. MPN CW3395. Scale bars = 1 mm.

Female terminalia. Subgenital plate tri-lobed, with middle lobe pointed, two outer lobes broad and rounded (Fig. 11A). Ovipositor reddish brown, recurved above near tip, terminating in a very sharp point; approximately 80% of body length. Upper valve smooth above; lower valve with 8 to 12 small but strong teeth at apex on ventral edge (Fig. 11B–C). Dorsal view of terminalia with a sharp point on last tergite, as in *P. crystallae* sp. nov. (Fig. 12B).

Pleioplectron caudatum sp. nov.
urn:lsid:zoobank.org:act:7ADDB012-690F-4A3F-83F9-FDC54F8F9EED
Figs 2A–B, 6H, 7G, 9D–F, 11D–F, 12C, 15C, 18G

Diagnosis

A small inhabitant of the forest floor in the southwestern regions of the South Island of New Zealand. The habitus is typical of *Pleioplectron*, chequered grey-brown in colour, with banded legs but overall dark and without a median dorsal line. At the northern end of its distribution range, it could easily be mistaken for *P. gubernator* sp. nov, which lacks the prominent 'tail stump'. An examination of the adult terminalia is required to reliably distinguish these two species (compare Fig. 9D–F with 9A–C). Around Haast Pass, *P. caudatum* sp. nov. is sympatric and shares the same microhabitat with *P. flavicorne* sp. nov. The latter is of a lighter brown colour, has bright yellow scapes on the antennae and lacks the 'tail stump'.

Etymology

'*Caudatum*' is Latin for 'tailed', because of the protuberance on the last tergite in both sexes, which resembles a tail stump (Figs 9E, 12C).

Material examined (see also Table 8 in Supplementary Material)

Holotype

NEW ZEALAND • ♂, adult; Westland (WD), Haast Pass, Brewster Hut Track; 44.08062° S, 169.39055° E; 700 m a.s.l.; 25 Nov. 2017; Danilo Hegg leg.; on forest floor; night search + insect net; NMNZ AI.037486 (prev. MPN CW4053).

Paratype

NEW ZEALAND • ♀, adult; same collection data as for holotype; NMNZ AI.037487 (prev. MPN CW4040).

Other material

NEW ZEALAND – **Westland (WD)** • 1 nymph; Haast Pass, Brewster Hut Track; 44.08062° S, 169.39055° E; 700 m a.s.l.; 17 Feb. 2017; D. Hegg leg.; on forest floor; night search + insect net; MNP CW3443 • 2 ♂♂; same collection data as for holotype; MNP CW4049, CW4052 • 1 ♂, 1 nymph; Lake Moeraki, Monro Beach Walk; 43.70461° S, 169.26677° E; 20 m a.s.l.; 15 Oct. 2018; D. Hegg leg.; on small tree in lowland forest; night search + insect net; MNP CW4121, CW4138 • 1 ♂; Franz Josef Glacier, Tatare Tunnel Track; 43.38668° S, 170.1928° E; 200 m a.s.l.; 17 Oct. 2018; D. Hegg leg.; under bent tree trunk; night search + insect net; MNP CW4135 • 1 ♂; Moeraki River, Blowfly Hut; 43.79108° S, 169.34630° E; 120 m a.s.l.; 13 Dec. 2018; D. Hegg leg.; on forest floor; night search + insect net; MNP CW4239.

Description

Measurements. See Table 1.

Head. Frons dark brown, with very sparse setae; vertex glabrous and of variegated colour. Eyes dark and bulging. Fastigium dark, with a white spot on either side. Scapes and peduncles pale and pilose; antennae dark brown, covered in fine setae. Maxillari and labial palpi light brown, with fine tomentum.

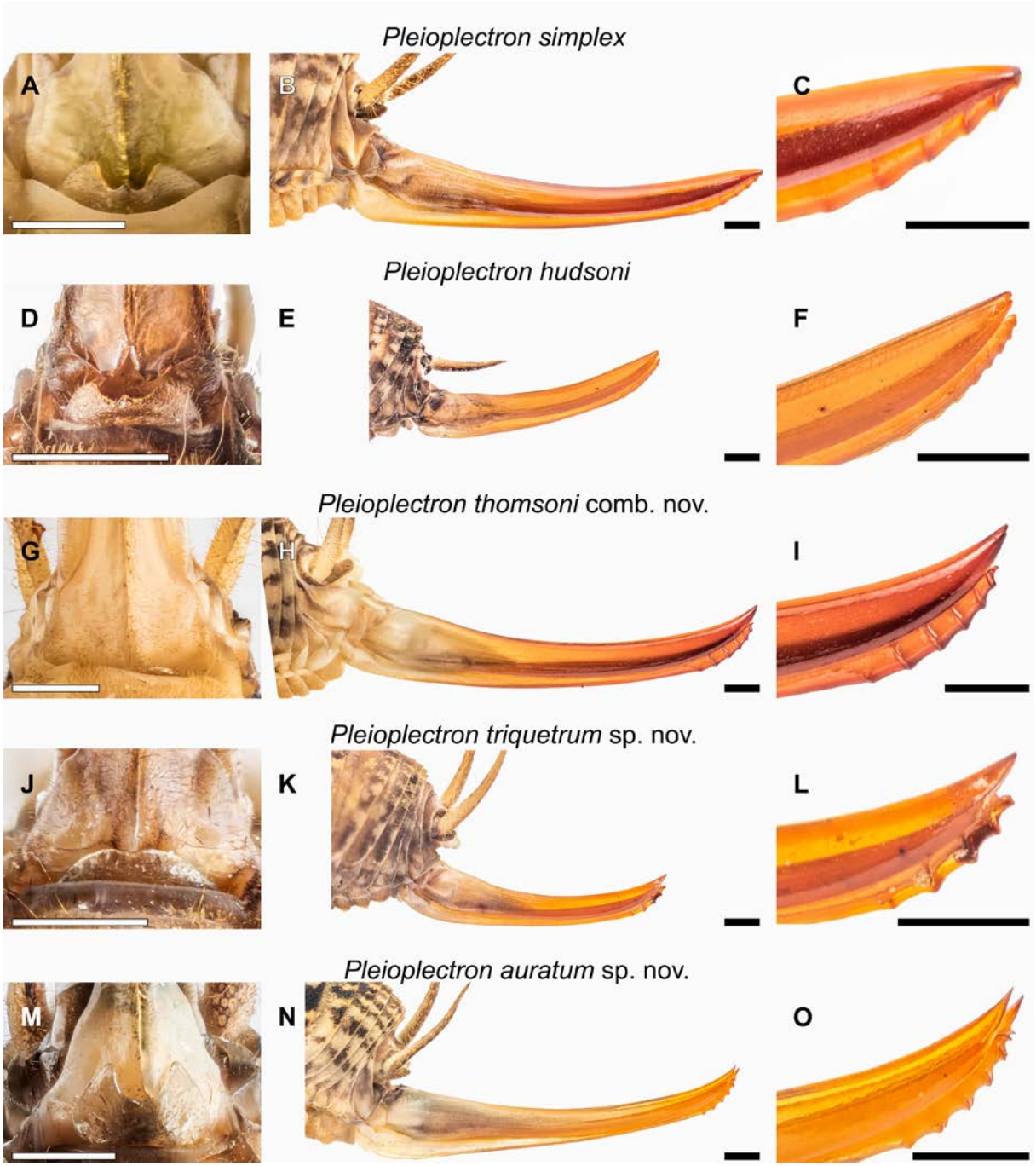

Fig. 10. Adult female terminalia of cave wētā in the genus *Pleioplectron* Hutton, 1896. Left column: subgenital plate; central and right columns: ovipositor. **A–C**. *P. simplex* Hutton, 1896, Hinewai Reserve, Banks Peninsula (MPN CW4114). **D–F**. *P. hudsoni* Hutton, 1896, Karori Ecosanctuary, Wellington. **D**. MPN CW3554. **E–F**. MPN CW3552. **G–I**. *P. thomsoni* (Chopard, 1923) comb. nov. **G**. Pioneer Park, Opihi River, South Canterbury (MAPN CW3913). **H–I**. Trotters Gorge, Otago (MPN CW4007). **J–L**. *P. triquetrum* sp. nov., Tweedies Gully, Gore Bay (MPN CW3846). **M–O**. *P. auratum* sp. nov., Renwick, Blenheim. **M**. MPN CW4120. **N–O**. MPN CW4119. Scale bars = 1 mm.

Thorax. Pronotum variegated brown, mainly dark, with a few pale patches; dark with pale bars next to posterior margin; covered in sparse, fine tomentum. Anterior and lateral margins slightly rounded; posterior margin nearly straight.

Legs. Moderately long; hind femora of approximately equal length as body; hind tibiae on average 20% longer than body in both males and females. Coxae and trochanters mottled light and dark brown. Fore and mid femora and tibiae with alternating conspicuous light and dark bands; hind legs variegated. Fore coxae with a pronounced lateral spine. Fore femora without linear spines above or below; armed with one prolateral spine at apex. Fore tibiae armed below, generally with one (at most two) linear spines on anterior edge, two linear spines on posterior edge. Fore tibiae armed with two long spines below (one prolateral and one retrolateral) and two short spines above (one prolateral and one retrolateral) at apex. Mid femora without linear spines above or below, but armed with one prolateral and one retrolateral spine at apex. Mid tibiae with two linear spines below on both anterior and posterior edge. Mid tibiae armed with two long spines below (one prolateral and one retrolateral) and two short spines above (one prolateral and one retrolateral) at apex. Hind femora unarmed below, but have one retrolateral apical spine. Hind tibiae with 25 to 30 linear spines above, of varying length, on both anterior and posterior edges. Hind tibiae with two superior subapical spines (one prolateral and one retrolateral), two superior apical spines (one prolateral and one retrolateral) and two inferior apical spines (one prolateral and one retrolateral). Superior subapical spines and inferior apical spines of approximately equal length, superior apical spines two to three times as long. Hind tarsi with four segments, first and second segment with a pair of spines on distal end. First segment with 5–8 small dorsal, alternate spines. Second segment with 2–3 small dorsal, alternate spines. Second and fourth segments one third of length of first segment, third segment one third of length of second and fourth segments.

Abdomen. Colour variegated brown, very dark with black patches and covered in sparse, fine tomentum. Dorsal median line absent.

Male terminalia. Cerci long, pointed at apex, dark brown in colour, clothed in setae. Styli short, rounded and not visible from above. Subgenital plate short, broadly oval, with median indentation (Fig. 9D). Last tergite with a distinctive protuberance, resembling a tail stump, that gives this species its name. Folds at base of cerci also pointed on interior edge, giving terminalia shape of a trident when seen from above (Fig. 9E).

Female terminalia. Subgenital plate broad and rounded (Fig. 11D). Ovipositor reddish brown, weakly recurved above at tip and relatively short (approximately 60% of body length). Upper valve smooth above, but lower valve with 9 shallow teeth on ventral edge at apex (Fig. 11E–F). Terminalia with a strong protuberance on last tergite when viewed from above, unique to this species (Fig. 12C).

Pleioplectron flavicorne sp. nov.
urn:lsid:zoobank.org:act:48E7E3C2-7BF9-4B3E-B101-E77DC005F6C0
Figs 2A–B, 6I, 7H, 9G–I, 11G–I, 15D, 18H

Diagnosis

A small inhabitant of the forest floor in the southwestern regions of the South Island of New Zealand. The habitus is typical of *Pleioplectron*, mottled brown in colour, with visibly banded legs and generally a visible median dorsal line. The species stands out for the yellow colour of the scapes of the antennae. *Pleioplectron flavicorne* sp. nov. is sympatric and shares the same microhabitat with *P. caudatum* sp. nov., but compared to the latter it is lighter brown in colour and lacks a 'tail stump'. Nymphs of *P. gubernator* sp. nov. have bright yellow scapes of the antennae as in *P. flavicorne* sp. nov., but the two species are geographically well separated.

Etymology

'*Flāvicornis*' is Latin for 'yellow horned' in reference to the bright yellow scapes of the antennae (Figs 6I, 15D).

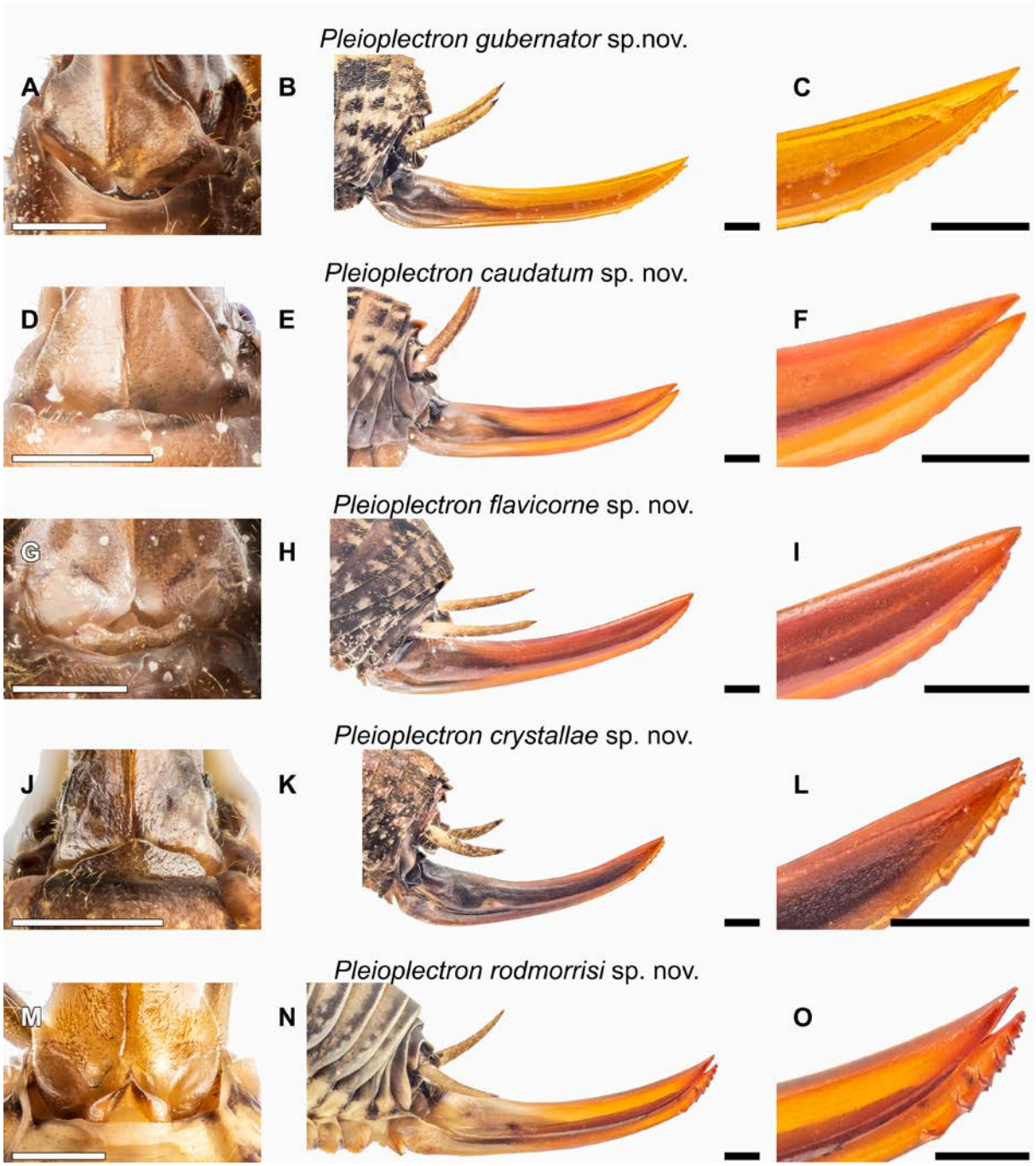

Fig. 11. Adult female terminalia of cave wētā in the genus *Pleioplectron* Hutton, 1896. Left column: subgenital plate; central and right columns: ovipositor. **A–C**. *P. gubernator* sp. nov. **A**. Awapoto Hut, Abel Tasman NP (MPN CW4057). **B–C**. Lewis Pass (MPN CW4071). **D–F**. *P. caudatum* sp. nov., Brewster Hut Track, Haast Pass (MPN CW4040). **G–I**. *P. flavicorne* sp. nov., Brewster Hut Track, Haast Pass (MPN CW4042). **J–L**. *P. crystallae* sp. nov., Cave Brook, Gouland Downs, Heaphy Track. **J**. MPN CW3993. **K–L**. MPN CW3990. **M–O**. *P. rodmorrisi* sp. nov., Hodder River, Inland Kaikōura Range (MPN CW3822). Scale bars = 1 mm.

Material examined (see also Table 9 in Supplementary Material)

Holotype

NEW ZEALAND • ♂, adult; Westland (WD), Haast Pass, Brewster Hut Track; 44.08062° S, 169.39055° E; 700 m a.s.l.; 25 Nov. 2017; Danilo Hegg leg.; on forest floor; night search + insect net; NMNZ AI.037488 (prev. MPN CW4055).

Paratype

NEW ZEALAND • ♀, adult; same collection data as for holotype; NMNZ AI.037489 (prev. MPN CW4042).

Other material

NEW ZEALAND – **Westland (WD)** • 1 ♀; Haast Pass, Brewster Hut Track; 44.08062° S, 169.39055° E; 700 m a.s.l.; 17 Feb. 2017; D. Hegg leg.; on forest floor; night search + insect net; MPN CW3896 • 3 ♂♂, 6 ♀♀, 1 nymph; same collection data as for holotype; MPN CW4041, CW4043 to CW4048, CW4050, CW4051, CW4054 • 2 ♀♀ (sub-adults); Moeraki River, Blowfly Hut; 43.79108° S, 169.34630° E; 120 m a.s.l.; 13 Dec. 2018; D. Hegg leg.; on forest floor; night search + insect net; MPN CW4232, CW4233. – **Otago Lakes (OL)** • 1 nymph; Haast Pass, Bridle Track; 44.12142° S, 169.34396° E; 460 m a.s.l.; 13 Oct. 2018; D. Hegg leg.; on bank on side of track; night search + insect net; MPN CW4122.

Description

Measurements. See Table 1.

Head. Frons dark brown except for two white lateral patches; with very sparse setae; vertex glabrous and of variegated colour. Eyes dark and bulging. Fastigium dark, with a white spot on either side. Scapes and peduncles bright yellow and pilose; antennae reddish brown, covered in fine setae. Maxillari and labial palpi mottled light brown, with fine tomentum.

Thorax. Pronotum mottled reddish brown/dark brown, with few pale patches; dark with pale bars next to posterior margin; covered in sparse, fine tomentum. All margins slightly rounded.

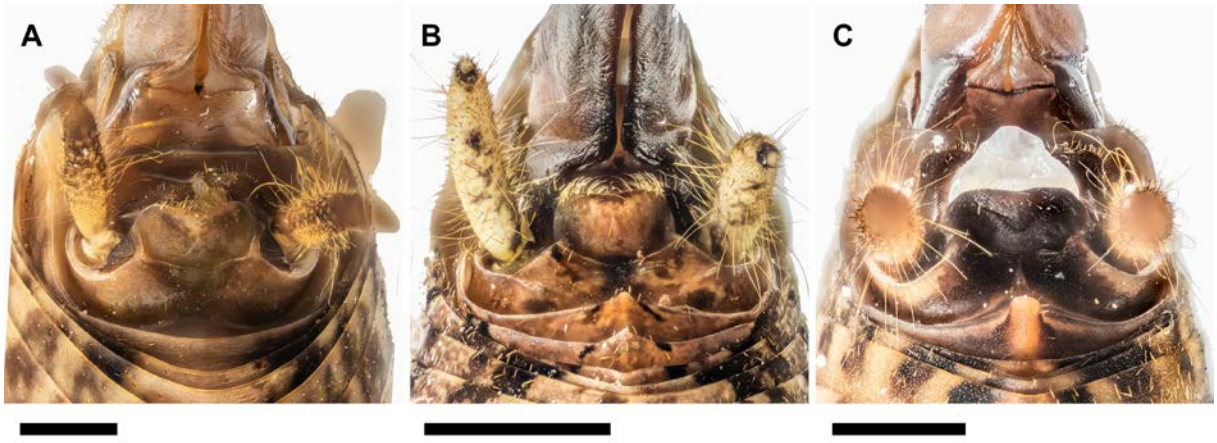

Fig. 12. Adult female terminalia of cave wētā in the genus *Pleioplectron* Hutton, 1896, dorsal view (suranal plate). **A**. *P. simplex* Hutton, 1896, Hinewai Reserve, Banks Peninsula (MPN CW4114). **B**. *P. crystallae* sp. nov., Salisbury Lodge, Mt Arthur (MPN CW3941). **C**. *P. caudatum* sp. nov., Brewster Hut Track, Haast Pass (MPN CW4040). Scale bars = 1 mm.

Legs. Moderately long; hind femora of approximately equal length as body; hind tibiae on average 15% longer than body in both males and females. Coxae and trochanters pale with dark patches. Fore and mid femora and tibiae with conspicuous alternating light and dark bands, and hind legs variegated. Fore coxae with a pronounced lateral spine. Fore femora without linear spines above or below, but armed with one prolateral spine at apex. Fore tibiae armed below, generally with two linear spines on both anterior and posterior edge. Fore tibiae armed with two long spines below (one prolateral and one retrolateral) and two short superior spines (one prolateral and one retrolateral) at apex. Mid femora without linear spines above or below, but armed with one prolateral and one retrolateral spine at apex. Mid tibiae with up to two linear spines below on both anterior and posterior edge. Mid tibiae armed with two long spines below (one prolateral and one retrolateral) and two short spines above (one prolateral and one retrolateral) at apex. Hind femora unarmed below and at apex. Hind tibiae armed with 23 to 30 linear spines above, of varying length, on both anterior and posterior edges. Hind tibiae with two superior subapical spines (one prolateral and one retrolateral), two superior apical spines (one prolateral and one retrolateral) and two inferior apical spines (one prolateral and one retrolateral). Superior subapical spines and inferior apical spines of approximately equal length, superior apical spines approximately twice as long. Hind tarsi with four segments, first and second segment with a pair of spines on distal end. First segment with 7–10 small dorsal, alternate spines. Second segment with up to five small dorsal, alternate spines. Second and fourth segments one third to one half of length of first segment, third segment one third of length of second and fourth segments.

Abdomen. Colour variegated brown, mostly reddish brown with black patches and covered in sparse, fine tomentum. Dorsal yellow median line thin but generally pronounced and visible.

Male terminalia. Cerci long, pointed at apex, brown in colour and clothed in setae. Styli short and not visible from above. Subgenital plate broad, oval (Fig. 9G). Suranal plate a tall truncated cone, almost half length of cerci, and covering styli and all genital organs entirely (Fig. 9H).

Female terminalia. Subgenital plate tri-lobed, all lobes shallow and rounded (Fig. 11G). Ovipositor reddish brown, weakly recurved above at tip and relatively short (approximately three quarters of body length). Upper valve smooth above, but lower valve with 9 to 11 shallow teeth on ventral edge at apex (Fig. 11H–I). Terminalia similar to those of *P. simplex* when viewed from above (Fig. 12A).

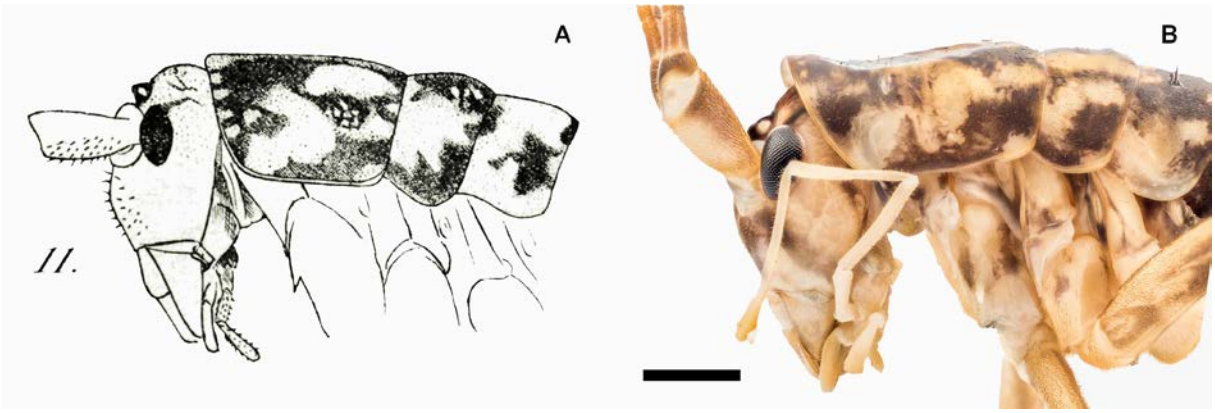

Fig. 13. *Pleioplectron thomsoni* (Chopard, 1923) comb. nov., adult ♂ **A**. Original drawing by Lucien Chopard (1923), syntype, ♂, Raincliff Reserve, South Canterbury (MNHN EO-ENSIF4924). **B**. Pioneer Park, South Canterbury (MPN CW3912). Scale bar = 2 mm.

Pleioplectron crystallae sp. nov.
urn:lsid:zoobank.org:act:0C869BE1-87F8-45AE-A3B7-120B11DE9FBD
Figs 2A–B, 4C–D, 6J, 7I, 9J–L, 11J–L, 12B, 15E–F, 18I

Diagnosis

A small cave wētā from the northwestern regions of the South Island of New Zealand, found predominantly near the tree line and in sub-alpine habitats, on the forest floor or on tree trunks, where it feeds on *Racomitrium* Brid. moss and occasionally on lichens. Unmistakable in its looks, this striking species stands out for its four or five pairs of very long, articulated spines on the hind tibiae, the chevron pattern on its back and a colour that varies from military green to brown and reddish brown. Because of its small size, the long spines on the hind tibiae and its preference for moss, it could be mistaken for *Maotoweta virescens* Johns & Cook, 2013, although it is larger, never bright green and the spines on the hind tibiae do look different when examined under the microscope.

Etymology

Named for Crystal Brindle, hut warden at Gouland Downs when the species was first discovered.

Material examined (see also Table 10 in Supplementary Material)

Holotype

NEW ZEALAND • ♂, adult; Nelson (NN), Heaphy Track, Gouland Downs, Cave Brook; 40.89240° S, 172.35540° E; 600 m a.s.l.; 4 Feb. 2018; Danilo Hegg leg.; moss on forest floor; night search + insect net; NMNZ AI.037490 (prev. MPN CW3994).

Paratype

NEW ZEALAND • ♀, adult; Nelson (NN), Mt Arthur Tablelands, Salisbury Lodge; 41.18511° S, 172.64465° E; 1150 m a.s.l.; 8 Feb. 2017; Danilo Hegg leg.; moss on forest floor; night search + insect net; NMNZ AI.037491 (prev. MPN CW3941).

Other material

NEW ZEALAND – **Nelson (NN)** • 1 ♀; Mt Owen, Blue Creek; 41.51241° S, 172.56223° E; 1100 m a.s.l.; 10 Jan. 2019; D. Hegg leg.; on tree trunk; night search + insect net; MPN CW4267 • 2 ♂♂; Mt Owen, Branch Creek Hut; 41.52465° S, 172.51128° E; 920 m a.s.l.; 11 Jan. 2019; D. Hegg leg.; on tree trunk; night search + insect net; MPN CW4270, CW4271 • 3 ♂♂; same collection data as for paratype; MPN CW3925 to CW3927 • 1 ♂; Mt Arthur Tablelands, Balloon Hut; 41.16913° S, 172.62251° E; 1270 m a.s.l.; 7 Feb. 2018; D. Hegg leg.; in firewood shed; night search + insect net; MPN CW3944 • 1 ♂, 1 ♀; Heaphy Track, Gouland Downs, Cave Brook; 40.89240° S, 172.35540° E; 600 m a.s.l.; 20 Apr. 2016; D. Hegg leg.; moss on forest floor; night search + insect net; MPN CW2997, CW2998 • 1 ♂, 1 ♀; Heaphy Track, Gouland Downs, Cave Brook; 40.89240° S, 172.35540° E; 600 m a.s.l.; 26 Dec. 2016; D. Hegg leg.; moss on forest floor; night search + insect net; MPN CW3894, CW3900 • 1 ♂, 4 ♀♀; same collection data as for holotype; moss on forest floor and tree trunks; MPN CW3990 to CW3993, CW3995 • 1 ♂; Heaphy Track, Perry Saddle; 40.90029° S, 172.40416° E; 900 m a.s.l.; 24 Dec. 2016; D. Hegg leg.; moss on forest floor; night search + insect net; MPN CW3618. – **Marlborough Sounds (SD)** • 1 ♀; Mt Stokes; 41.08747° S, 174.10983° E; 1000 m a.s.l.; 17 Nov. 2018; D. Hegg leg.; moss on forest floor; night search + insect net; MPN CW4152.

Description

Measurements. See Table 1.

Head. Frons mottled, a mix of dark brown and yellow patches, with sparse setae; vertex glabrous and of variegated colour. Eyes reddish brown and bulging. Fastigium reddish brown, with a white spot on

either side. Scapes and peduncles red with brown patches; antennae red, covered in fine setae. Maxillari and labial palpi mottled light brown, with fine tomentum (Fig. 4C–D).

Thorax. Pronotum mottled, red, red-brown, brown or military green; dark with pale bars next to anterior and posterior margins; covered in sparse, fine tomentum. Dorsal yellow median line generally pronounced. All margins are slightly rounded.

Fig. 14. Live *Pleioplectron* Hutton, 1896 in their natural environments. **A–B**. *P. simplex* Hutton, 1896, Hinewai Reserve, Banks Peninsula. **A**. Adult ♀ feeding on a small native snail *Flammulina zebra* (Le Guillou, 1842). **B**. Adult ♂. The different colouration is due to individual variation, not sexual dimorphism. **C–D**. *P. thomsoni* (Chopard, 1923) comb. nov. **C**. Adult ♂ in natural cave, Trotters Gorge, Otago. **D**. Adult ♀ in mining tunnel in Bannockburn, Central Otago, where a population of nearly white colour exists. **E**. *P. hudsoni* Hutton, 1896, adult ♀, Otaki Forks, Tararua Forest. **F**. *P. triquetrum* sp. nov., ♂, Hinau Track, Kaikōura.

Legs. Relatively short; hind femora generally shorter than body length. Hind tibiae up to 15% longer than body in females, up to 40% longer than body in males. Coxae and trochanters variegated. All legs red with inconspicuous brown patches or bands. Fore coxae with a pronounced lateral spine. Fore femora without linear spines above or below, but armed with one prolateral spine at apex. Fore tibiae armed below, generally with two linear spines on anterior edge, one linear spine on posterior edge. Fore tibiae armed with two long spines below (one prolateral and one retrolateral) and two short spines above (one prolateral and one retrolateral) at apex. Mid femora without linear spines above or below, but armed

Fig. 15. Live *Pleioplectron* Hutton, 1896 in their natural environments. **A**. *P. auratum* sp. nov., adult ♂, Whites Beach, Rarangi. **B**. *P. gubernator* sp. nov., two adult ♂♂, Three Pointer, Gouland Downs, Heaphy Track. **C**. *P. caudatum* sp. nov., adult ♂, Blowfly Hut, Moeraki River, South Westland. **D**. *P. flavicorne* sp. nov., sub-adult ♀, Blowfly Hut, Moeraki River, South Westland. **E–F**. *P. crystallae* sp. nov. **E**. Adult ♂, Cave Brook, Gouland Downs, Kahurangi NP. **F**. Adult ♀ feeding on *Racomitrium* Brid. moss, Salisbury Lodge, Mt Arthur, Kahurangi NP.

with one prolateral and one retrolateral spine at apex. Mid tibiae armed below, generally with two linear spines on anterior edge, one linear spine on posterior edge. Mid tibiae armed with two long spines below (one prolateral and one retrolateral) and two short spines above (one prolateral and one retrolateral) at apex. Hind femora armed below with up to five very small, retrolateral, linear spines but unarmed at apex. Hind tibiae with 13 to 22 linear spines of varying length above on both anterior and posterior edges, including four or five pairs of prominent, articulated spines, plainly visible to the naked eye (Fig. 7I). Hind tibiae with two superior subapical spines (one prolateral and one retrolateral), two superior apical spines (one prolateral and one retrolateral) and two inferior apical spines (one prolateral and one retrolateral). Superior subapical spines and inferior apical spines of approximately equal length, superior apical spines approximately twice as long. Hind tarsi with four segments, first and second segment with a pair of spines on distal end. First segment with 5–11 small dorsal, alternate spines. Second segment with 1–4 small dorsal, alternate spines. Second and fourth segments one third to one half of length of first segment; third segment one third of length of second and fourth segments.

Abdomen. Colour red, red-brown, brown or military green; covered in sparse, fine tomentum. Tergites adorned with a characteristic chevron or diamond pattern (Figs 6J, 15E–F). Dorsal yellow median line generally pronounced and well visible.

Male terminalia. Cerci long, pointed at apex, variegated, clothed in setae. Styli very short, not visible from above. Subgenital plate with an orange protuberance shaped like a blunt blade with lateral swellings at its tip (Fig. 9J). Suranal plate square (Fig. 9K).

Female terminalia. Subgenital plate with a single lobe (Fig. 11J). Ovipositor dark brown, tapering quickly near base, strongly recurved above at tip and on average about 80% as long as body. Upper valve smooth above, but lower valve with 6 to 9 strong teeth on ventral edge at apex (Fig. 11K–L). From above, terminalia appear to have a sharp point on last tergite (Fig. 12B).

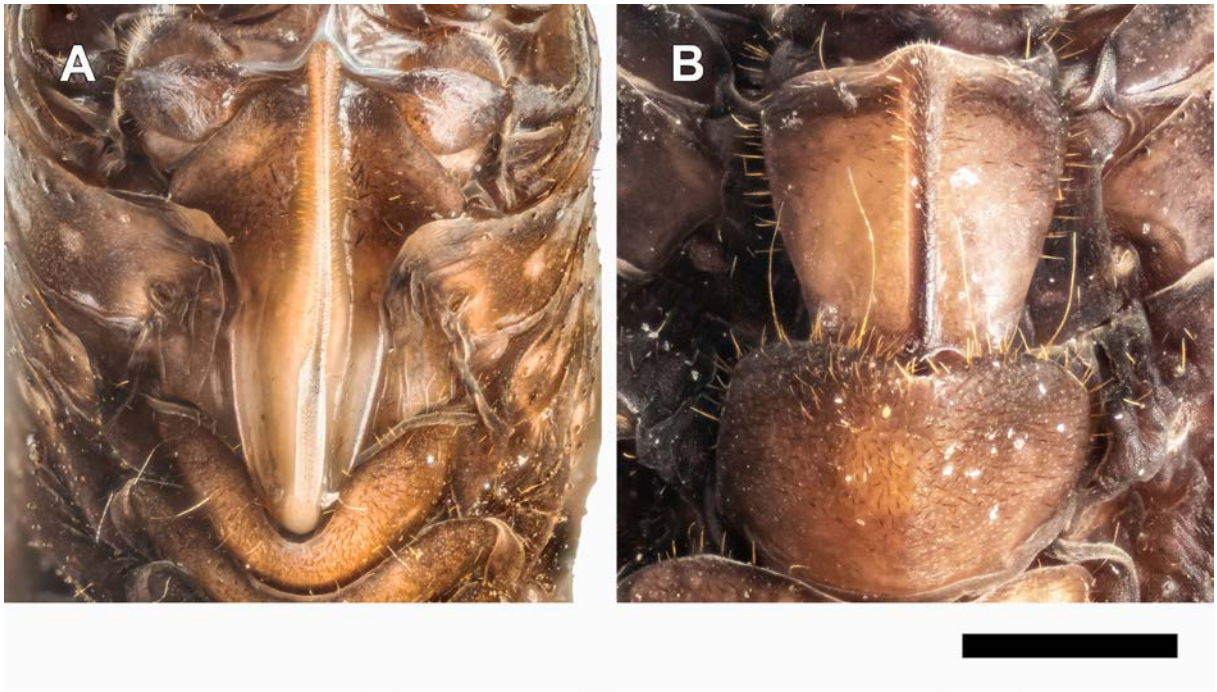

Fig. 16. *Pleioplectron gubernator* sp. nov., adult ♂♂, ventral view of subgenital plate in two populations. **A**. Lewis Pass (MPN CW4063). **B**. Punakaiki (MPN CW4264). Scale bar = 1 mm.

Pleioplectron rodmorrisi sp. nov.
urn:lsid:zoobank.org:act:30DFE3FC-B505-4B33-931E-183676CDF422
Figs 2A–B, 6F, 7J, 9M–O, 11M–O, 17, 18J

Diagnosis

A medium-sized cave wētā that inhabits rock bluffs in the sub-alpine and low alpine regions of the Kaikōura Ranges and North Canterbury on South Island, New Zealand, up to an elevation of approximately 1500 m a.s.l. A strikingly beautiful and unmistakeable animal, it stands out for its unusually long legs (especially in the males), red-orange legs and antennae, purple-black back and a bold dorsal yellow median line.

Etymology

Named for Rod Morris, biologist and wildlife photographer, who first discovered and documented the species in the Seaward Kaikōura Range in 1993.

Material examined (see also Table 11 in Supplementary Material)

Holotype

NEW ZEALAND • ♂, adult; Kaikōura (KA), Seaward Kaikōura Range, Kahutara Saddle; 42.3229282° S, 173.4276819° E; 1200 m a.s.l.; 1 Apr. 2017; Danilo Hegg leg.; rock bluffs in low alpine zone; night search + insect net; NMNZ AI.037492 (prev. MPN CW3395).

Paratype

NEW ZEALAND • ♀, adult; Kaikōura (KA), Inland Kaikōura Range, Hodder River, Hodder Huts; 41.970802° S, 173.63714° E; 1400 m a.s.l.; 4 Apr. 2018; Danilo Hegg leg.; rock bluffs in low alpine zone; night search + insect net; NMNZ AI.037493 (prev. MPN CW3822).

Other material

NEW ZEALAND – **Kaikōura (KA)** • 1 ♂; Seaward Kaikōura Range, Kahutara Saddle; 42.32293° S, 173.42768° E; 1200 m a.s.l.; Dec. 1993; R. Morris leg.; rock bluffs in low alpine zone; photograph • 4 ♂♂, 4 ♀♀; Seaward Kaikōura Range, Kahutara Saddle; 42.32293° S, 173.42768° E; 1200 m a.s.l.; 3 Jan. 2017; D. Hegg leg.; rock bluffs in low alpine zone; night search + insect net; MPN CW3536 to CW3539, CW3908, CW3909, CW4020, CW4021 • 8 ♂♂, 9 ♀♀; same collection data as for holotype; MPN CW3297, CW3298, CW3380 to CW3386, CW3394, CW3396, CW3397, CW3403, CW3404, CW3905 to CW3907 • 1 ♂; Hodder River, Hodder Huts; 41.970802° S, 173.63714° E; 1400 m a.s.l.; 18 Feb. 2014; B. Taylor-Smith and N. Smith leg.; rock bluffs in low alpine zone; night search; MPN CW2735 • 3 ♂♂, 1 ♀; same collection data as for paratype; MPN CW3821, CW3823 to CW3825 • 2 ♂♂ ; Hodder River; 41.95700° S, 173.65023° E; 1150 m a.s.l.; 6 Apr. 2018; D. Hegg leg.; under boulders at bush-line; night search + insect net; MPN CW3819, CW3020. – **North Canterbury (NC)** • 1 ♂; Organ Range, Mt Skedaddle; 42.67084° S, 172.52222° E; 1400 m a.s.l.; 16 Feb. 2012; W. Chinn leg.; rock bluffs in low alpine zone; photograph; iNaturalist 9067227.

Description

Measurements. See Table 1.

Head. Frons glabrous, pale pink-orange, with dark patches under eyes; vertex glabrous and of variegated colour. Eyes dark brown. Fastigium dark, with a white spot on either side, but yellow anteriorly. Scapes and peduncles orange-red and hairy; antennae orange-red, covered in fine setae. Maxillari and labial palpi pale, with fine tomentum. In sexually mature males some antennal segments may have sensory hair tufts as in *P. simplex* (see Fig. 5).

Thorax. Pronotum pink orange, with a prominent yellow median line, and black regions next to all margins; covered in sparse, fine tomentum. All margins slightly rounded. Anterior corners of pronotum rounded, posterior corners more angular.

Legs. Very long, sexually dimorphic (see Fig. 17), longer in males than in females. Coxae and trochanters pale pink/orange. Fore and mid femora orange. Hind femora variegated, purple in proximal portion and

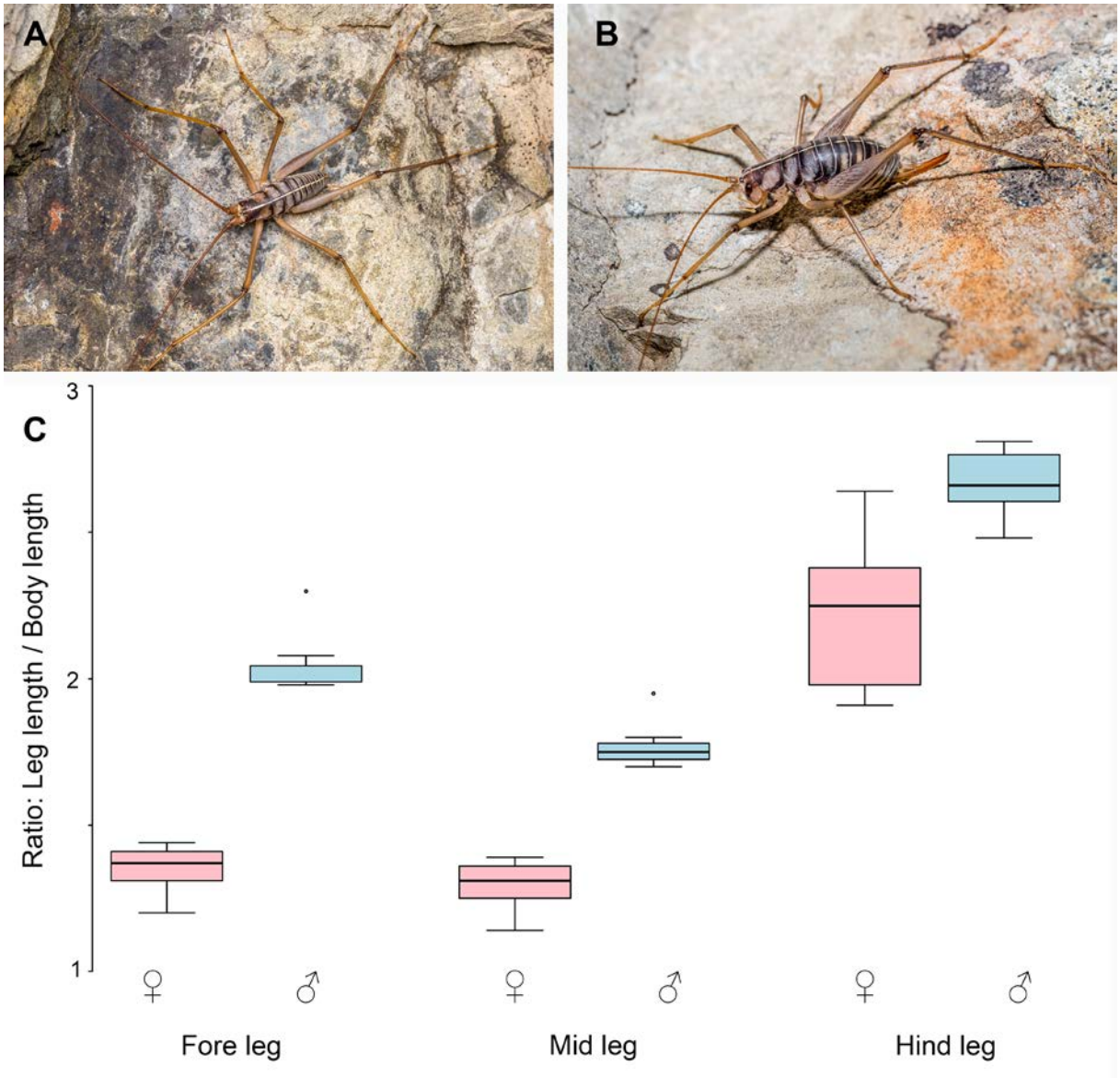

Fig. 17. Sexual dimorphism in the legs of *Pleioplectron rodmorrisi* sp. nov., with boxplot for a sample of 8 adult males and 7 adult females. 'Leg length' was calculated as the sum of the lengths of femur and tibia. **A–B**. Photographs of live specimens of *P. rodmorrisi* sp. nov. in their natural environment. Kahutara Saddle, Seaward Kaikoura Range. **A**. Adult ♂. **B**. Adult ♀. **C**. Box plot for the ratio of leg length/body length, by sex. A one-way ANOVA test on leg length by sex shows that all legs are significantly longer in males than they are in females, with the following results:
Fore leg: $F = 198.5$ on 1 and 13 degrees of freedom; $P = 3 \times 10^{-9}$; $R^2 = 0.9385$.
Mid leg: $F = 130.9$ on 1 and 13 degrees of freedom; $P = 4 \times 10^{-8}$; $R^2 = 0.9097$.
Hind leg: $F = 16.18$ on 1 and 13 degrees of freedom; $P = 0.001$; $R^2 = 0.5545$.

orange in distal part; hind tibiae orange. Fore femora armed below with 3 to 8 needle-like, prolateral linear spines; armed with one prolateral and one retrolateral spine at apex. Fore tibiae generally with three linear spines below on both anterior and posterior edges. Fore tibiae armed with two long spines below (one prolateral and one retrolateral) and two short spines above (one prolateral and one retrolateral) at apex. Mid femora armed below with 1 to 9 prolateral and up to two needle-like, retrolateral linear spines and with one prolateral and one retrolateral spine at apex. Mid tibiae with three linear spines below on both anterior and posterior edges, and up to two linear spines above on posterior edge. Mid tibiae armed with two long spines below (one prolateral and one retrolateral) and two short spines above (one prolateral and one retrolateral) at apex. Hind femora armed below with 9 to 23 prolateral and 6 to 10 retrolateral linear spines. Hind tibiae with 30 to 46 small linear spines above on both anterior and posterior edges. Linear spines on hind tibiae more uniform in size than in other species of *Pleioplectron* (see Fig. 7J). Hind tibiae with two superior subapical spines (one prolateral and one retrolateral), two superior apical spines (one prolateral and one retrolateral), two inferior apical spines (one prolateral and one retrolateral) and two inferior subapical spines (one prolateral and one retrolateral). Superior subapical spines about as long as inferior subapical spines and inferior apical spines about 50% longer, but twice as thick at base. Superior apical spines approximately twice as long as inferior apical spines. Hind tarsi with four segments, first and second segment with a pair of spines on distal end. First segment with 6–14 small dorsal, alternate spines. Second segment with 1–6 small dorsal, alternate spines. Second and fourth segments approximately one third of length of first segment, third segment one third of length of second and fourth segments.

Abdomen. Tergites pink/purple, black next to anterior and posterior margins; covered in sparse, fine tomentum. Dorsal yellow median line very pronounced and continuous all the way to last tergite.

Male terminalia. Cerci long, pointed at apex, pale, clothed in setae. Styli short and thin, pale and hairy. A V-shaped structure connected by a membrane protrudes beyond both suranal and subgenital plates, well visible both from above and from below (Fig. 9M–N).

Female terminalia. Subgenital plate an inverted V, pointed (Fig. 11M). Ovipositor reddish-brown, short (approximately 60% of body length), curved upwards at apex, and terminating in a sharp point. Upper valve smooth above and lower valve with 6 to 8 very strong teeth on ventral edge at apex (Fig. 11N–O). Dorsal view of terminalia similar to that in *P. simplex* (Fig. 12A).

Discussion

Distribution and habitat

Cave wētā in the genus *Pleioplectron* are common and widespread in all regions of New Zealand's two main islands, except for Fiordland (Fig. 18); however, species are partitioned geographically across the country.

Only one species, *Pleioplectron hudsoni*, is known on North Island. While we have examined specimens of *P. hudsoni* collected from Wellington to Bay of Plenty (Fig. 18A), photographs we have seen suggest that this species is also found in Coromandel and in Northland, making it ubiquitous on North Island. *Pleioplectron hudsoni* is a forest specialist and limited to low and mid elevations; it lives in leaf litter on the forest floor and is often found among tree roots, in piles of sticks or under logs. Females lay eggs in dirt or in rotting wood (Fig. 19).

A very different picture emerges on South Island, where at least nine species have evolved, each confined to a limited geographical region and specific habitat. While most South Island species also inhabit forest, two species (*P. crystallae* sp. nov. and *P. rodmorrisi* sp. nov.) have adapted to sub-alpine or alpine habitats. Several species readily use human-modified habitats, and at least one species (*P. thomsoni* comb. nov.) is common in caves within its range.

Pleioplectron simplex is usually observed at night on the forest floor in both native forests and exotic plantations in Mid Canterbury and on Banks Peninsula. Of all cave wētā species in New Zealand it is the most commonly observed in urban habitats. *Pleioplectron simplex* is common in basements of houses and in firewood piles in all major towns on the east coast of South Island, between Christchurch and Invercargill. Several hundred specimens can be found in the basement of the caretaker's house at Hinewai Reserve on Banks Peninsula. A population has also established itself in sea caves at Long Beach, Dunedin.

Pleioplectron thomsoni comb. nov. seems to be at home in leaf litter in native forests and in exotic plantations throughout South Canterbury and Otago, as well as on the boulders and low cliff faces of inland South Canterbury and in the rocky landscapes of Central Otago's lowlands. It does, however, reach its highest densities in caves and abandoned mining and railway tunnels, where it often co-occurs with Rhaphidophoridae of the genus *Macropathus* Walker, 1869. Dense clusters of individuals are common on the ceiling of caves, with overlapping legs and antennae (Fig. 20). The population of *P. thomsoni* comb. nov. in abandoned gold mining tunnels in Silverpeaks, Dunedin, reaches the thousands; the floor of the mining tunnels is entirely covered by a layer of cave wētā frass. *Pleioplectron thomsoni* comb. nov. also tolerates human modified habitats; it inhabits urban parks in Timaru, South Canterbury, and is occasionally spotted in firewood piles in Central Otago and in Mount Cook Village.

Pleioplectron triquetrum sp. nov. and *P. auratum* sp. nov. inhabit native and exotic forests in the northeast of South Island. *Pleioplectron triquetrum* sp. nov. is widespread in North Canterbury, South Marlborough and in the Kaikoura Region, whereas *P. auratum* sp. nov. seems to be confined to North Marlborough and to the Marlborough Sounds, south and east of Queen Charlotte Sound. The scarcity of

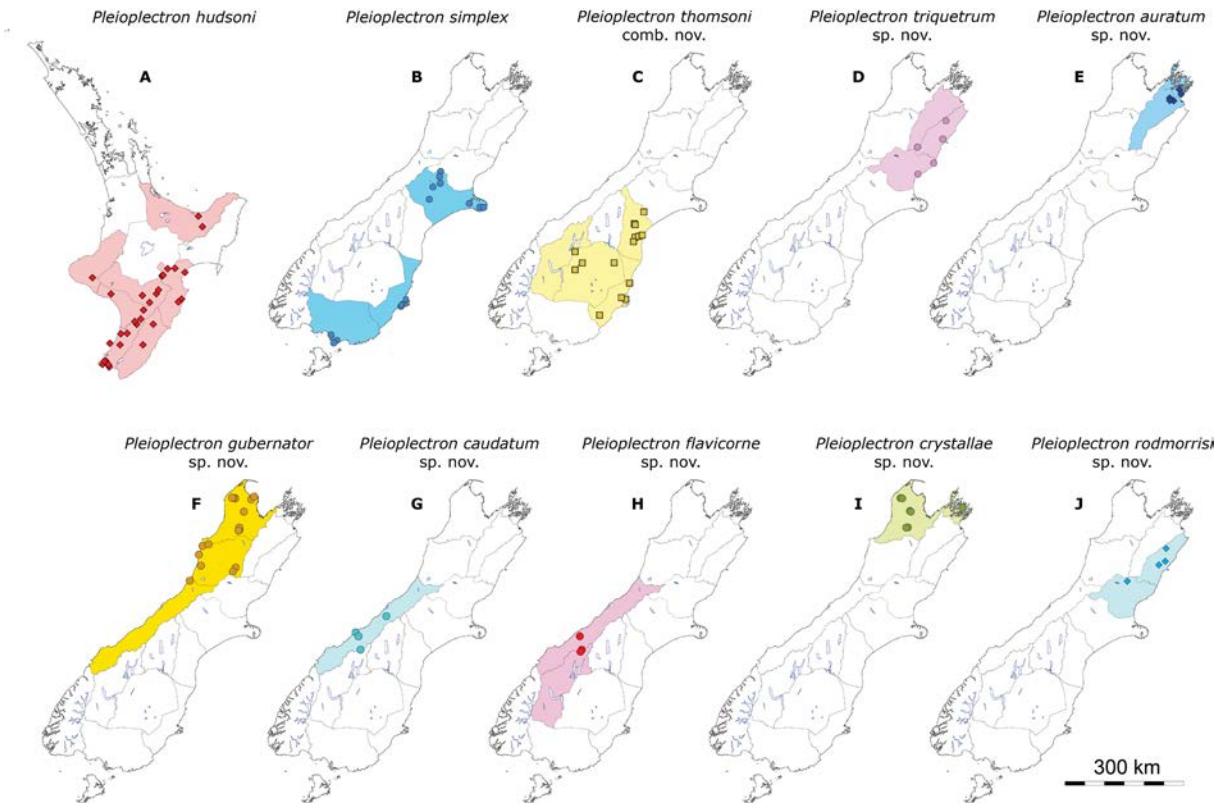

Fig. 18. Known distribution of cave wētā in the genus *Pleioplectron* Hutton, 1896. **A**. North Island, New Zealand, showing the distribution of *P. hudsoni*. **B–J**. South Island, New Zealand, showing the distribution of the remaining nine species.

caves within their distribution range means we do not know whether they would use cave habitat, but we did not find *P. auratum* sp. nov. in caves near Rarangi, while we did find it in native forest nearby. *Pleioplectron auratum* sp. nov. has been observed in human modified habitats such as firewood piles, roadside stone walls and in flood debris at the edge of rivers.

Pleioplectron gubernator sp. nov., *P. caudatum* sp. nov. and *P. flavicorne* sp. nov. are three apparently ecologically very similar species, adapted to life in the leaf litter of rain forests in the western regions of South Island. Their small size and dark colour, combined with their nocturnal habits typical of all cave wētā, make them well camouflaged and hard to spot in their habitat. All three species are found from sea level right up to the tree line, and on at least one occasion we have found *P. gubernator* sp. nov. on leaves of mountain daisy (*Celmisia* Cass. spp.), one hundred metres above the tree line. *Pleioplectron gubernator* sp. nov. and *P. caudatum* sp. nov. have distinct distributions, north and south of the glaciers respectively. *Pleioplectron flavicorne* sp. nov. is sympatric and shares the same microhabitat with *P. caudatum* sp. nov., and the two species are often found in mixed populations, although *P. flavicorne* sp. nov. may be confined to a smaller region in the vicinity of Haast Pass. Caves and mining tunnels are common within the ranges of these three species, and are regularly inhabited by other Rhaphidophoridae, such as *Miotopus richardsae* Fitness *et al.*, 2018, *Macropathus filifer* Walker, 1869 and *Pachyrhamma edwardsii* (Scudder, 1869). We have never found *Pleioplectron gubernator* sp. nov., *P. caudatum* sp. nov. or *P. flavicorne* sp. nov. in a cave or in a mining tunnel.

Pleioplectron crystallae sp. nov. is also a ground dweller, almost exclusively found feeding on *Racomitrium* Brid. moss and on lichens in the far north of South Island. It mainly lives at higher elevations, in forests near the tree line, or on vegetated cliffs in the sub-alpine zone. Our highest observation is on cliffs at 1400 m a.s.l. on Mount Peel in Kahurangi National Park. Notably, *P. crystallae* sp. nov. has four to five pairs of prominent, long dorsal spines on the hind tibia, a trait it shares with another moss specialist, *Maotoweta virescens* Johns & Cook, 2013, in what appears to be a case of convergent evolution.

Pleioplectron rodmorrisi sp. nov. is possibly the most peculiar among *Pleioplectron*, having adapted to life on bare cliffs in the subalpine and low alpine regions in the northeast of the South Island, up to 1500 m a.s.l. At all sites, we have found it to coexist with *Petrotettix serratus* Richards, 1972, a typically alpine species. Our lowest observation of *P. rodmorrisi* sp. nov. is at 1150 m a.s.l., right at the tree line in the Hodder River, Inland Kaikoura Range, where it forms mixed populations with *Pleioplectron triquetrum* sp. nov.

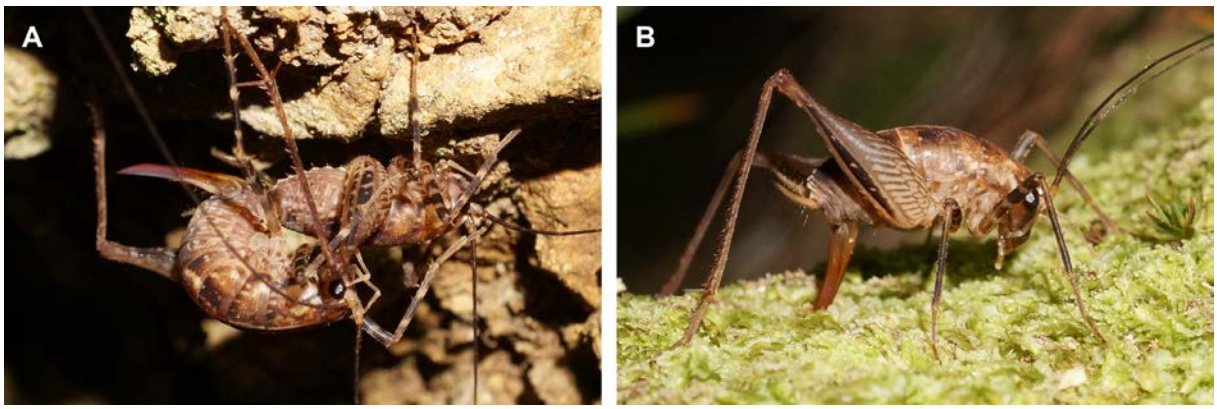

Fig. 19. *Pleioplectron hudsoni* Hutton, 1896. Live specimens in their natural environment. Zealandia Ecosanctuary, Wellington. **A**. Mating pair. As in most New Zealand Rhaphidophoridae, the female is on top. **B**. Adult ♀ egg-laying in rotting log.

Differentiation of *Pleioplectron* from other genera of Rhaphidophoridae in New Zealand

In the generic description we listed traits that are characteristic of *Pleioplectron*. Many of them, however, are not unique to *Pleioplectron*, and are not necessarily useful to differentiate it from other genera of New Zealand Rhaphidophoridae.

Ward (1997) made a first attempt at compiling a key to New Zealand genera of Rhaphidophoridae. He included the following features: apical spine count on fore, mid and hind femora; apical spine count on fore, mid and hind tibiae; shape of male subgenital plate; shape of female subgenital plate. Johns & Cook (2013) included a table as an appendix to their generic description of *Maotoweta*, in which they compared six genera of New Zealand Rhaphidophoridae based on the following traits: body length; apical spine count on fore, mid and hind femora; ventral linear spines on hind femora; dorsal linear spines on hind tibiae; apical spines on hind tibiae; hind tarsal plantulae; male subgenital plate; male suranal plate; female subgenital plate.

From our observations it is apparent that not all of these features are useful to characterise genera. The shape of male and female suranal and subgenital plates, for instance, used by both Ward (1997) and Johns & Cook (2013), is strongly species specific, and while it certainly is most useful when trying to differentiate between species, it is too variable within a genus to be helpful for identification at the generic level, with the possible exception of *Pachyrhamma* Brunner von Wattenwyl, 1888. The same can be said about body length. Even less useful are apical spines on the hind femora and the ventral linear spines on the hind femora, two traits that we have found to be not even species specific (see also Cook *et al*. 2010; Fitness *et al*. 2015).

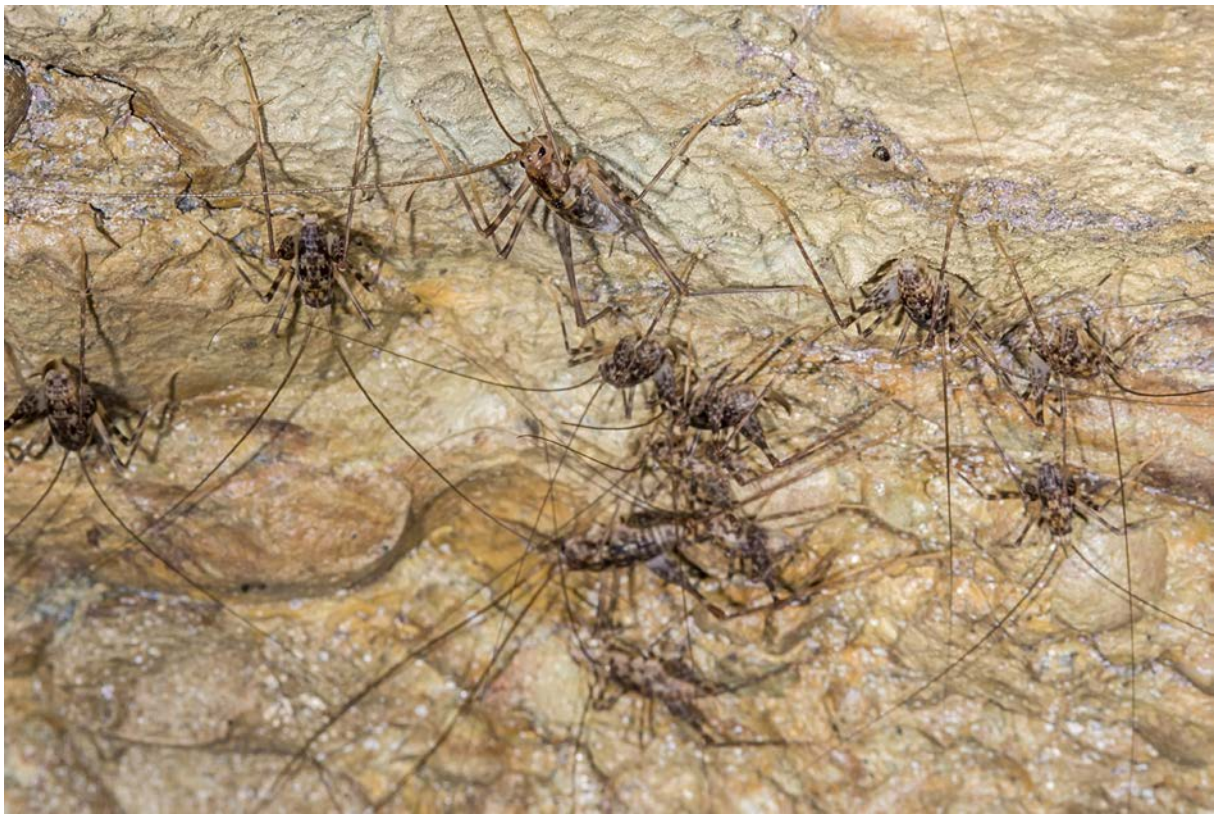

Fig. 20. Tangle of *Pleioplectron thomsoni* (Chopard, 1923) comb. nov. on cave ceiling. Trotters Gorge, Otago.

While our observations mostly align with those of Ward (1997) and Johns & Cook (2013), there are nonetheless some differences. Ward (1997), for instance, described the female subgenital plate in *Weta* Chopard, 1923 as "small, notched", with a matching illustration. In contrast, what we have observed (Fig. 10G) is in close agreement with the original description by Chopard (1923): "subgenital plate very small, almost hidden between the seventh sternite and the base of the ovipositor, rounded or little notched at the apex". Table 1 in Johns & Cook (2013) also seems to contain some inconsistencies, as *Pleioplectron simplex* and *P. thomsoni* comb. nov., for instance, are both described as having tarsal pads "bordered by spinules". We can clearly see these in the latter species, but not in the former. On the other hand, Johns & Cook (2013) reported the occasional presence of a retrolateral apical spine on the hind femur in *P. thomsoni* comb. nov., not in *P. simplex* or in *Talitropsis sedilloti* Bolivar, 1882. We have consistently found a retrolateral apical spine on the hind femur to be present in all three species. Johns & Cook's (2013) description of the dorsal spines on the hind tibiae of *Pleioplectron simplex*, "2 or 3 pairs immoveable socketed spines, 5–10 pairs fixed spines," is also in disagreement with our spine count (20 to 33 prolateral, 23 to 35 retrolateral; see Table 1) or that of Richards (1959) (25–32 prolateral, 24–29 retrolateral). In the original description of *Pleioplectron simplex*, Hutton (1896) reported about 29 prolateral and 17 retrolateral dorsal spines on the hind tibiae. In agreement with Richards (1959), we assume the 17 to be a typographic error, 27 being the correct number, since the numbers of prolateral and retrolateral dorsal spines always closely match each other in all species of cave wētā.

While we note the inadequacy of the generic keys offered by Ward (1997) and by Johns & Cook (2013) in respect to *Pleioplectron*, we consider it premature to present an alternative one, without first having discussed in detail other genera of New Zealand Rhaphidophoridae.

A detail that has received little attention so far in the study of New Zealand Rhaphidophoridae is the structure of the antennae. The sensory hair tufts on the antennae of some (but not all) adult male *Pleioplectron* appear to be unique to this genus, and different from the antennal structures in *Pachyrhamma* Brunner von Wattenvyl, 1888 (Fea *et al*. 2019). While their precise function is currently unknown, typically, the sexually dimorphic structures of insect antennae have the purpose of increasing surface area for sensory perception in males (Fea *et al*. 2019).

Acknowledgements

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Errata corrigendum

In a previous paper published in the *European Journal of Taxonomy*, Fitness *et al.* 2018 (available from https://doi.org/10.5852/ejt.2018.468), we described and named a new species of Rhaphidophoridae, *Miotopus richardsi*. Since it is named after a female scientist, Aola Mary Richards, the correct declension is *Miotopus richardsae*, in compliance with article 31.1.2 of the ICZN Code.