

***Petersonia* gen. nov. (Coleoptera: Buprestidae) from Papua New Guinea and a redescription of *Petersonia shelleybarkeri* (Nylander, 2006)**

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Abstract: The new genus *Petersonia* is described for *Castiarina shelleybarkeri* Nylander, 2006 (Coleoptera: Buprestidae: Stigmoderini) from the Morobe Province of Papua New Guinea. This species is distinctive in the structure of the male antenna and this feature in association with others outlined here, justify its placement in a separate genus from *Castiarina*. The new genus is named after well known biologist, naturalist and photographer, Mr Magnus Peterson of Western Australia. Aspects of adult morphology, mimicry and habitat are also reviewed and commented upon.

Introduction

Nylander (2006) described a spectacularly coloured buprestid from northern Papua New Guinea as *Castiarina shelleybarkeri*. However, the distinctive antennae of the male and other features combined, clearly indicate that this insect should be placed in a separate genus. Ergo, the new genus *Petersonia* is diagnosed below and the type species designated as *Petersonia shelleybarkeri* (Nylander, 2006) described from Aseki, Morobe Province, Papua New Guinea.

***Petersonia* gen. nov.**

Type species: *Castiarina shelleybarkeri* Nylander, 2006: *Lambillionea*, *CVI*, *Supp. II*: 4-5 (2006).

Diagnosis: Medium sized buprestids of the tribe Stigmoderini, body very elongate, dorsal profile distinctive, tapered anteriorly and posteriorly; pronotum broad from the mid lateral margin, deeply sculptured; antennal segments 3-10 bipectinate, antennal segment 11 tripectinate; lateral and apical margins of elytra extending substantially beyond abdomen, elytral epipleura distinctively hooked; sternal cavity rather narrow, meso-metasternal sutures prominent and oblique; adult colour pattern possibly a mimic of certain toxic rainforest bugs (Hemiptera) or beetles, Coleoptera (e.g. Cantharidae).

Etymology: The name of this new genus honours well-known herpetologist and entomologist, Mr Magnus Peterson (1955-), who has been a zoologist for over 40 years and has produced numerous papers on the taxonomy and biology of many Australian reptiles and invertebrates. Magnus and I have been colleagues for 25 years and have been on many collecting expeditions in eastern and western Australia.

***Petersonia shelleybarkeri* comb. nov. (Figs. 1-4).**

Type: Holotype: Male, 13 Jan. 2005, Aseki, Morobe Province, collector unknown (type in collection of U. Nylander, Valbo, Sweden).

Description (modified from Nylander, 2006): Body length: 22 mm, width 8 mm at widest point on elytra. Head: metallic blue to blue-green, green around the eyes and gular region,

sulcate between the eyes and emarginate near antennal insertions, glabrous, setae present only on labrum. Antennae: blue-green, conical, scape 2.5 times as long as broad, antennal segment 2 triangular, antennal segments 3-10 bipectinate, antennal segments 11 tripectinate, surfaces with short, erect setae. [N.B. Holotype has most of left antenna missing, Fig. 1]. Pronotum: metallic blue-green, 1.4 times wider than long; anterior margin weakly bisinuate, almost straight, with weakly impressed line; posterior margin strongly bisinuate; pronotal disc with the following 6 foveate impressions as follows- (a) four deep slightly rounded impressions 2 either side near opposite anterior lateral angle, (b) two deep rounded medial impressions anterior to the other impressions, (c) two lateral impressions, more shallower than the others in (a) and (b) above at the lateral posterior margin (see Fig. 3). Scutellum: blue-green, small, triangular, with a central depression and fine puncturation. Elytra: broader than the width of the abdomen; lateral and apical margins of elytra extend substantially beyond abdomen, bright dark yellow with two violet-black markings (a) anterior mark confluent with anterior margin of elytra and extending almost to lateral margin and also extending downwards to about 1/6 the length of the elytra, (b) posterior mark shield-shaped extending from about 2/3 the length of the elytra broadening outwards either side in a shallow arc to almost the margin, then extending in a broad arc either side to almost the apex narrowing before apex and then flanging outwards to the margin in a narrow band, finally narrowing at margin; red coloration surrounds the posterior mark and then extends a short way anteriorly along the lateral margin; elytra punctate-striate, apex rounded without spines (see Fig. 1). Legs and tarsi: Legs mostly metallic blue-green, hind tarsus slightly longer than mid tarsus, tarsal segments flattened with well-developed pulvilli, tarsal claws simple. Ventral surface: metallic blue-green except for ventrites 5-7 and half of ventrite 4, which are dark orange, almost brownish. Prosternal process with deep and scattered puncturations. Sternal cavity rather narrow, meso-metasternal sutures prominent and oblique. Aedeagus: as in Figs. 1,2,4.

Comments: As noted by Nylander (2006), the most distinctive feature of the adult of this species, is the morphology of the antenna. The antennae have segments 3-10 bipectinate, with the last segment (11) tripectinate. These features alone set it apart from the rest of the Stigmoderini, although Nylander (2006) was reluctant to place this species in a new genus. The only other species of the Stigmoderini to have similar antennae to *Petersonia* is *Hypostigmodera variegata* (Blackburn, 1892) but in this species, the antennae are bipectinate from segment 4 onwards and the antennae have no tripectinate segments. The 3rd segment of *Petersonia* is bipectinate which suggests that the sensory antennal apparatus of *Petersonia* is more extensive than in any other Stigmoderini genus because the sensory apparatus in other Stigmoderini begins at the 4th segment or beyond only.

In addition, there is the peculiar sculpture of the pronotum (Figs. 1 & 3) and coupled with the shape of the pronotum, is another unique feature of this species. Nylander (2006) also alluded to this peculiar sculpture, although he noted that it was present in lycid mimicking species such as *C. nasuta* (Saunders). This pronotal sculpturing also occurs to various degrees in such species as *C. latipes* (Carter), *C. spinolae* (Gory), *C. costalis* (Saunders), and *C.*

rufipennis (Kirby) (see Barker, 2006). However, in all these lycid mimics, the pronotal colour is dull matt black while in *Petersonia shelleybarkeri*, it is metallic blue-green. Only lycid mimics within *Castiarina* have foveate pronota but none have a metallic green/green-blue pronotum. [The overall shape and colour of *P. shelleybarkeri* resembles that of some *Conognatha* species from South America].

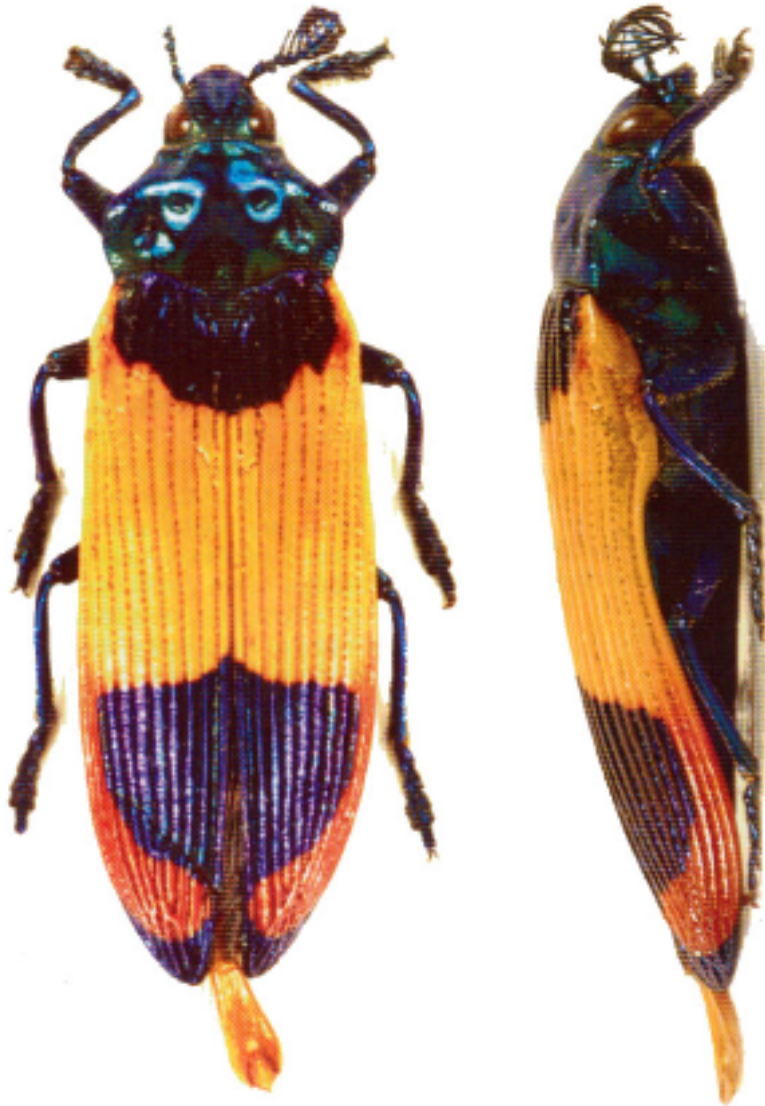


Fig. 1. (Left). Habitus of *Petersonia shelleybarkeri* (Nylander). Fig. 2. (Right). Side profile of *P. shelleybarkeri*. [Both from Nylander, 2006].

Nylander (2006) also noted that there were two other distinctive morphological features of *P. shelleybarkeri*, viz. the narrow sternal cavity (instead of being broad and strongly transverse) and the oblique meso-metasternal sutures (instead of being straight. The significance of these differences is unclear at this stage.

There are at least two other interesting morphological features of this insect which were not commented upon by Nylander (2006). These are (a) the elytra overhang the abdomen significantly and especially in the apical half (see Plate 1, Figure 2 in Nylander, 2006). This flanging is probably part of the adaptive mimicry displayed by this insect which more likely mimics a noxious rainforest stink bug or cantharid beetle, not another buprestid as suggested by Nylander (2006)(see also discussion below). It is well known that many bugs have wings extending over the abdomen and especially in the apical area, and (b) the elytral epipleura are distinctively hooked (see Plate II, Fig. 1 of Nylander, 2006 and Fig. 2, this paper). This distinctive hooking occurs in many *Temognatha* and other Stigmoderini but not in all species. Its significance is not known for certain but may have some importance in improved flight. These two features in association with the antennae, pronotal sculpture and colour pattern categorically set this species apart from presently known Stigmoderini.



Fig. 3. (Left). Outline of pronotum of *P. shelleybarkeri*. Fig. 4. (Right). Aedeagus of male, dorsal view.
[Drawn by T.J. Hawkeswood from illustrations in Nylander, 2006].

Nylander (2006) commented that this species is a mimic of *Castiarina meeki* Thery. However, I would like to dispute this suggestion, stating that *P. shelleybarkeri* does not mimic *C. meeki* but that both species more likely mimic rainforest bugs (presently unknown but possibly from the family Coreidae and/or Pentatomidae) or beetles (Coleoptera, also presently unknown but possibly from the family Cantharidae). As these bugs and beetles would most probably be toxic to predators, the mimicry would be Batesian.

Petersonia shelleybarkeri is also somewhat unrelated phylogenetically from *Hypostigmodera variegata* (Blackburn) in being metallic in colour, with a different overall body morphology and size. *H. variegata* is a much smaller species, is mostly dull black in colour and is comparatively non-elongate.

Nylander (2006) speculated on the ecological role of the antennae of *P. shelleybarkeri*, noting that the bipectinate antennae may have been a development to increase the surface area to cope with the needs of a large number of chemical receptors to detect female pheromones in an environment where sight is insufficient to find a mate. [Until the female of *P.*

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shelleybarkeri is discovered these comments are necessarily speculative]. Or is it possible that the species occurs in such low densities that the bipectinate antennae are required to detect the female from long distances? The fact that many other rainforest buprestids don't have bipectinate/tripectinate antennae is interesting and requires further study.

It is most unfortunate that critical ecological data are lacking for this species, e.g. detailed habitat description, larval and adult host plants etc., as these would provide a better insight to its ecology and evolution. In addition, the male holotype has only one antenna and the female of the species is unknown (Nylander, 2006). It is hoped that further collecting in the Morobe Province of Papua New Guinea may better shed light on the the mysteries surrounding this amazing beetle.

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