

AOUPINIA, A REMARKABLE NEW GENUS OF ADELIINI FROM NEW CALEDONIA
(COLEOPTERA: TENEBRIONIDAE)

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Aoupinia pseudohelea, new genus and species, is described from Aoupinie Special Fauna Reserve, New Caledonia, where it occurs in rainforest leaf litter. Although strongly resembling the unrelated Australian tenebrionine *Helea* Latreille, *Aoupinia* belongs to the lagriine tribe Adeliini, a Gondwanan group which has diversified extensively in New Caledonia. There is an analysis showing that the new taxon belongs to a group of ten Australian and New Caledonian genera termed the northern squalid group, but that it is of uncertain relationship vis-à-vis particular genera within this group. □ *Coleoptera*, *Tenebrionidae*, *Adeliini*, *New Caledonia*, *new genus*.

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New Caledonia has a diverse representation of the Gondwanan tribe Adeliini, which also occurs in Australia, New Zealand and Chile (Matthews, 1998). Kaszab (1982), in his revision of the Tenebrionidae of the island, described and keyed eight genera and 50 species of Adeliini, and 20 additional species were described after two subsequent visits there by G.B. Monteith of the Queensland Museum (Kaszab, 1986). While it was evident from the small number of known specimens of some taxa that the tenebrionid fauna of New Caledonia was still imperfectly known, it nevertheless came as a surprise to discover there a taxon of Adeliini which was completely different from any other member of the tribe, one which in fact bears a striking external resemblance to the unrelated Australian genus *Helea* Latreille.

A single specimen of this species was found in late 2000 in the Réserve Spéciale de Faune de l'Aoupinie by G.B. Monteith. This reserve straddles the 1000m Massif Central which forms the east/west divide in the centre of the island and is traversed by a road which crosses between Poya and Ponerihouen servicing a radio repeater station on the summit. In the following year three more specimens were found in the same place by the same collector.

SYSTEMATICS

Aoupinia gen. nov.

TYPE SPECIES: *Aoupinia pseudohelea* sp. nov.

DESCRIPTION. Oblong, castaneous, alutaceous, both dorsal and ventral surfaces squalid, covered

with a thin layer of fine soil retained by numerous small, curved, thickened setae disposed over entire body and legs, not tuberculate.

Head. Clypeus with anterior edge convex, straight in middle. Clypeo-frontal suture deeply impressed. Frontal grooves present, distinctly impressed. Eyes strongly transverse, surrounded by a groove. Antennae not quite reaching base of prothorax, antennomeres (Fig. 3A) 1-7 more or less oblong or a little obconic, with sparse long setae, 3 as long as 4 and 5 combined, 7 $1.5 \times$ as long as 6, 8-11 moniliform, paler and slightly wider than preceding segments, densely covered with very short setae as well as a few longer bristles. Mentum trapezoidal, depressed on basal and middle areas, a little raised anteriorly in middle. Terminal maxillary palpomere enlarged and securiform.

Prothorax. Pronotum with sides expanded into wide flanges which arch forward over head. Hind edge with 4 projections partly overlapping elytral bases. Prosternum long before coxae, its anterior edge raised into a prominent convex collar (Fig. 2, c). Prosternal process flat, moderately wide, slightly expanded posteriorly with almost straight hind edge.

Pterothorax. Elytral disc smooth, not tuberculate. A wide reflexed flange emerging along entire length of elytron just outside 8th stria. No epipleuron evident underneath, outside edge of elytron with narrow beading. Wings absent. Meso- and metaventrites as in Fig. 2.

Legs. Slender, femora and tibiae subparallel, densely covered with small curved setae holding a layer of soil, apical spurs very small.

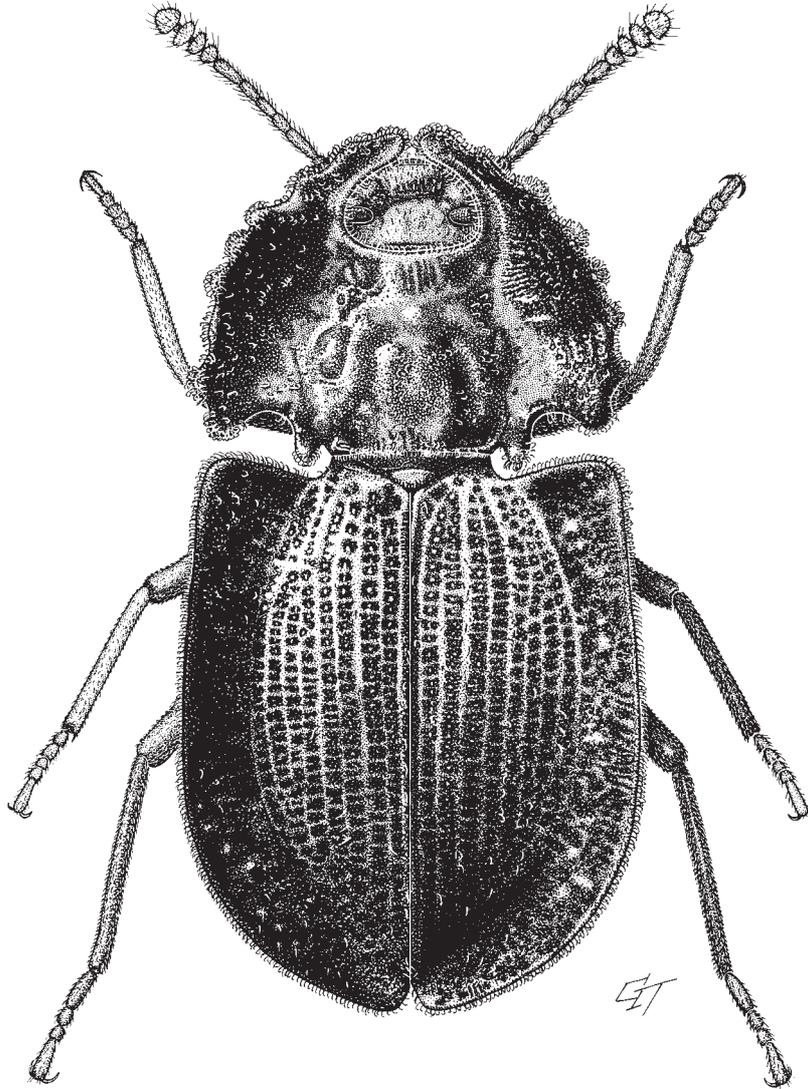


FIG. 1. *Aoupinia pseudohelea*, ♂.

Tarsomeres not expanded, obconic or moniliform, densely and finely setose, penultimate tarsomere with outer face moderately oblique and only slightly prolonged into a small rounded lobe. Basal metatarsomere subequal in length to apical one.

Abdomen. Intercoxal process of first ventrite broadly rounded (Fig. 2). Tergite 7 without stridulatory files or thickened basal portion. Segment-7 glands absent. Very long extrusible glands emerging between segments 8 and 9.

Ovipositor (Fig. 3C) with elongated and fused coxites 3 and 4, gonostyles terminal. Vagina without sclerites, with diverticulum (Fig. 3C) a cluster of a few spermathecal tubules (Fig. 3C) at base of accessory gland (ag).

***Aoupinia pseudohelea* sp. nov.**
(Figs 1-3)

MATERIAL. HOLOTYPE: Museum National d'Histoire Naturelle, Paris: ♂, New Caledonia, Aoupinie top camp, 23 November 2001, G.B. Monteith, QM Berlesate 1045,

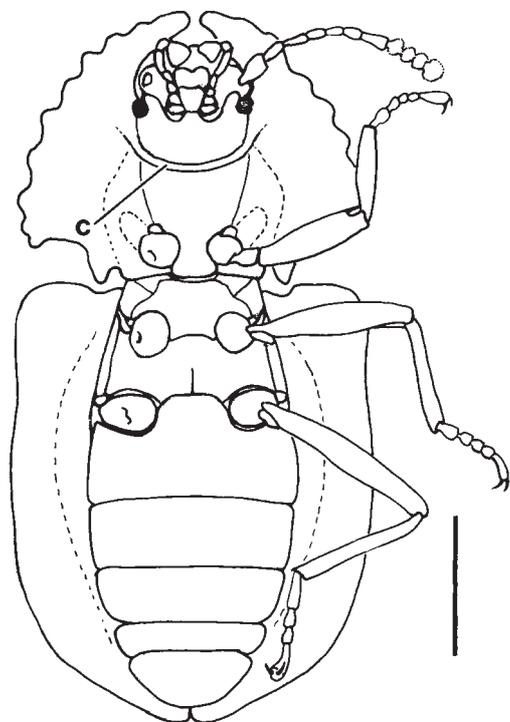


FIG. 2. *Aoupinia pseudohelea*, outline of underside. c, collar of prosternum. Scale = 2mm.

21°11'S 165°18'E, Rainforest 850m, Sieved litter. PARATYPES: All in Queensland Museum: 1 ♀: Same data as holotype (QMT93428); 1 ♂: Aoupinie, 20 Nov 2000, G.B. Monteith, QM Berlesate 1035, 21°11'S 165°19'E, Rainforest, 850m, Sieved litter (QMT93427); 1 ♀: Aoupinie top camp, 2-3 Nov 2001, G.B. Monteith, QM Berlesate 1060, 21°11'S 165°18'E, Rainforest, 850m, Sieved litter (QMT93426).

DESCRIPTION. Total length 9.8-11.0mm, maximum width across elytra 5.0-5.7mm.

Head. As for genus.

Prothorax. Disc of pronotum smooth and somewhat uneven, a little depressed in middle, with trace of median impressed line at base only, anterior edge concave, posterior edge straight in middle, each side expanded into a basally very wide upcurved flange with scalloped edges which narrows anteriorly to produce an extension arching forward over head, not quite meeting extension of other side (Fig. 1). Edge provided with a fringe of numerous closely-spaced short, curved and thickened setae. Hind edge of flange deeply arcuately excised outwardly with produced hind angle, inwardly with a strong

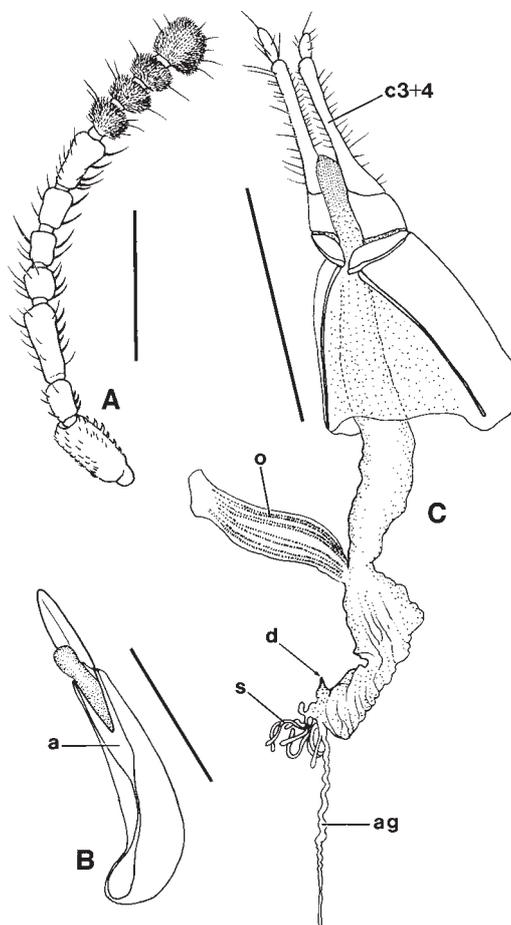


FIG. 3. *Aoupinia pseudohelea*. A, left antenna from below; B, aedeagus in ventral view; C, ovipositor and female tract in ventral view. a, fused alae of aedeagus; ag, spermathecal accessory gland; c3+4, fused coxites 3 and 4; d, diverticulum; o, common oviduct; s, spermathecal tubules. Scales = 1mm.

projection directed backward toward base of elytron, upper surface of flange feebly rugose and punctate.

Pterothorax. Discal surface feebly convex, intervals flat, striae consisting of closely spaced moderately impressed punctures, 8th stria at base of flange with larger and deeper punctures. Flanges wide, about 1/3 as wide as elytral disc, their edges even and provided with serrated row of hooked setae, dorsally with numerous large shallow punctures not aligned into striae.

Legs. As for genus.

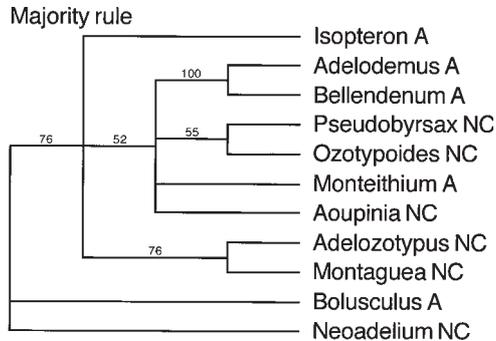


FIG. 4. 50% majority rule consensus of 33 trees for ten related squalid genera of Adeliini with *Neoadelium* as the outgroup, using PAUP 3.1. All characters unordered and unweighted. Tree length 54, CI 0.533. A = Australia; NC = New Caledonia.

Abdomen. Aedeagus (Fig. 3B) with sides of basal piece inflected but not quite meeting, alae (Fig. 3B) membranous, fused, no basal flange. Otherwise as for genus.

HABITAT. *Aoupinia* was extracted by Berlese funnel from sieved leaf litter collected in undisturbed rainforest at 850m altitude at the point on the summit of the range where the east and west access roads meet. It is curious that no other rainforest-inhabiting Adeliini were found in this area, apart from a specimen of an undescribed species of *Ozotypoides* Kaszab obtained by pyrethrum fogging of a tree trunk (G.B. Monteith, pers. comm.). Like all the squalid Adeliini *Aoupinia* is covered in life with a layer of fine clay which presumably serves to make the beetle inconspicuous, and which in this case bridges the gap between the two wings of the pronotal flanges.

RELATIONSHIPS OF *AOUPINIA*

In spite of its close resemblance to *Helea*, which belongs to the Tenebrioninae, *Aoupinia* is shown to be in the Adeliini (Lagriinae) by the pair of long eversible defensive gland sacs emerging between segments 8 and 9 of the abdomen. All other Tenebrionidae with defensive glands have them between segments 7 and 8 (and much shorter). Also, the ovipositor and female tract configuration (Fig. 3C), with slender coxites, terminal gonostyles, and multiple spermathecal tubules, is typical of Adeliini and unknown in Tenebrioninae.

Within Adeliini *Aoupinia* is strikingly different in appearance from other genera because of its

TABLE 1. List of characters and their states.

1. Clypeus anterior edge: 0, straight; 1, emarginate.
2. Clypeo-frontal suture: 0, shallow; 1, deep.
3. Frontal grooves: 0, absent; 1, present.
4. Groove around eye: 0, absent; 1, present.
5. Eye shape: 0, transverse; 1, round.
6. Antennomere 7: 0, subparallel, a little longer than wide; 1, subparallel, 1.5-1.7 × as long as wide; 2, cupuliform.
7. Tomentose ('club') segments of antennae: 0, none; 1, three; 2, four.
8. Pronotal lateral outgrowths: 0, absent; 1, present.
9. Interlocking of fore and hind body: 0, absent; 1, present.
10. Prosternal collar: 0, absent; 1, present.
11. Prosternal process shape: 0, simple; 1, nodose; 2, bifurcate.
12. Swollen metasternum: 0, absent; 1, present.
13. Elytral flange or carina along stria 8: 0, absent; 1, present.
14. Elytral intervals: 0, smooth; 1, tuberculate.
15. Epipleuron width: 0, widening anteriorly; 1, narrow throughout or not evident.
16. Penultimate tarsomere: 0, feebly or not lobed; 1, strongly lobed, symmetrical; 2, strongly lobed, asymmetrical.
17. Basal metatarsomere length: 0, shorter than or subequal to claw segment; 1, longer than claw segment.
18. Intercoxal process of first abdominal ventrite: 0, arcuate; 1, truncate.
19. Stridulatory files of tergite 7: 0, present; 1, absent.
20. Vaginal sclerites: 0, present; 1, absent.
21. Sides of aedeagal basal piece: 0, not meeting; 1, meeting.
22. Alae of aedeagus: 0, present, separate; 1, present, fused; 2, absent.

wide pronotal and elytral flanges with the former nearly meeting above the head, and its relatively large size. Nevertheless it is clear that it belongs to the group of northern rain forest genera informally called the *Pseudobyrsax* group by Matthews (1998), which includes all the New Caledonian squalid genera plus *Monteithium* Matthews of the Queensland wet tropics. This group is characterised by a squalid integumentary surface (one which holds a layer of soil) which is also tuberculate in all members except *Aoupinia*, antennae with the apical three or four segments contrastingly tomentose (Fig. 3A), anterior edge of the prosternum often raised into a collar (Fig. 2), epipleuron narrow throughout, presence of a diverticulum on the vagina (Fig. 3C), and absence of sexual dimorphism. It is a characteristic of some

TABLE 2. Character state distribution for the northern squalid group with *Neoadelium* as outgroup. A = Australia, NC = New Caledonia.

	1		2	
	12345	67890	12345	67890
<i>Neoadelium</i> NC	00100	00000	00001	10011
<i>Isopteron</i> A	11010	00000	20000	00100
<i>Bolusculus</i> A	00100	00100	00111	00111
<i>Adelodemus</i> A	11100	00101	21010	11001
<i>Pseudobysax</i> NC	01010	02101	20011	10111
<i>Adelozotypus</i> NC	1			
	11110	01011	00011	00111
<i>Montaguea</i> NC	01110	01011	20011	00111
<i>Ozotypoides</i> NC	01010	12000	20011	10111
<i>Bellendenum</i> A	00100	00100	11010	21010
<i>Monteithium</i> A	00101	22101	21011	10110
<i>Aoupinia</i> NC	01110	12111	00111	00011

members of the group to interlock the fore and hind bodies by means of an interdigitation of integumentary projections and cavities, a feature which is maximally developed in *Montaguea* Kaszab. In *Aoupinia* there are similarly two backward inner projections on the prothorax (Fig. 1) which can be braced against the depressed part of the elytral bases.

In a previous analysis (Matthews, 1998) it was found that the intuitive *Pseudobysax* group is not clearly differentiated from the similarly squalid *Isopteron* group of four Australian genera, although the two together appear to be monophyletic and may be termed 'the northern squalid group' (there is an unrelated southern squalid group involving taxa from New Zealand, Chile and southeastern Australia). The northern squalid group is a syntaxon of five New Caledonian and five Australian genera, which is confined to the rainforests of northeastern Queensland and New Caledonia (with the single exception of the much more widespread Australian xerophilic *Isopteron* Hope). In New Caledonia the squalid genera have a very polarised distribution: of the five genera present, all occur in the northern half of the island while only one (*Pseudobysax* Kaszab) occurs in the southern half.

Here the 10 genera of the northern squalid group are briefly analysed again using PAUP 3.1, with *Aoupinia* and *Ozotypoides* Kaszab added to

the previously included eight in Matthews (1998), and some additional characters introduced. The outgroup is the non-squalid, or carabiform, New Caledonian *Neoadelium* Carter which appears as a sister group in Matthews (1998, fig. 175). Table 1 lists the 22 characters involved and their states, and Table 2 shows the taxon character matrix. Autapomorphies (character states 5.1, 6.2, and 16.2) are included in the matrix even though uninformative in order to present a complete picture of character state distribution.

Intuitively it appears that *Aoupinia* is related to the Australian *Monteithium*, as suggested by the sharing of elaborate pronotal outgrowths and four tomentose antennal club segments, but in fact there are more numerous differences between the two as may be seen in the table. The resultant analysis (Fig. 4) leaves both these genera ungrouped either with each other or with any other single genus, while most of the remainder form a series of terminal pairs which are either wholly Australian or wholly New Caledonian. In other words, there is no suggestion of a closer relationship between any given Australian and New Caledonian taxa beyond that of their common membership in the northern squalid group as a whole.

ACKNOWLEDGEMENTS

I am grateful to Geoff Monteith of the Queensland Museum for giving me the opportunity to describe this extraordinary insect, latest in a long series of his discoveries in tropical rainforest. I also wish to thank Geoff Thompson of the Queensland Museum for the fine illustration of the whole beetle (Fig. 1), and the curators of the following collections for the loan of comparative material of New Caledonian Adeliini: Hungarian Natural History Museum (O. Merkl), New Zealand Arthropod Collection (R. A. Leschen), and Queensland Museum (G.B. Monteith).

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