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Revision of the Australian Zuphiinae 4. The genus *Parazuphium* Jeannel

(Insecta, Coleoptera, Carabidae)*

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Abstract

As a fourth part of a general revision of the Australian Zuphiinae the genus *Parazuphium* Jeannel in Australia, New Guinea, and New Britain is revised. The known species *Parazuphium mastersii* (Castelnau) and *P. rockhamptonense* (Castelnau) from Australia and *P. sinuum* (Darlington) from New Guinea have been hitherto classed among the genus *Zuphium* Latreille proper and are herewith transferred to *Parazuphium* Jeannel. The species are redescribed, the male genitalia of *P. mastersii* and *P. sinuum* are firstly described. The following species are newly described: *P. tropicum* spec. nov., *P. darlingtoni* spec. nov., *P. barbarae* spec. nov., *P. flavescens* spec. nov., and *P. weiri* spec. nov. In addition, *P. barbarae* is firstly recorded from New Guinea.

The distribution of the species is mapped. As all *Parazuphium* species in the Australian-New Guinean area are very rare in collections, very little is known about their distribution and their life histories. It is to be expected, that in future the range of the species will be much better known.

The relationships of the species and their phylogenetic status is briefly discussed. The differences between the Australian-New Guinean species are discussed and presented in a key. Although some species look extremely similar, it is possible to arrange them into three groups of apparently near relationships within. 1st group contains *P. tropicum* from Northern Australia and *P. sinuum* from New Guinea, New Britain, and Northern Australia. In many respects, these are by far the most primitive species in the area considered. 2nd group consists of *P. darlingtoni* from northern Australia which is a rather derivative species and seems nearly related to Oriental species as f. e. *P. philippense* (Jedlicka). 3rd group contains *P. mastersii*, *P. rockhamptonense*, *P. barbarae*, *P. flavescens*, and *P. weiri*. The species are very nearly related and seem rather derivative, as they share some apomorphic characters. For that reason an own subgenus *Austrozuphium* subgen. nov. has been erected to include these species. The subgenus is perhaps restricted to Australia and southern New Guinea.

From distribution of species and species groups some ideas as to immigration and age of the fauna are derived. The genus *Parazuphium* is a tropical faunal element which immigrated into Australia from the north. Nevertheless, as species of both, 1st and 3rd groups were able to cross vast desert areas to colonize the isolated Hamersley Range in Western Australia, at least these groups cannot be regarded as recent immigrants to Australia. Age of the fauna, however, and immigration route is still unknown.

Introduction

The subfamily Zuphiinae is a quite distinctive but not very numerous group of truncatipennian Carabidae. Especially in Australia Zuphiinae are rather heterogenous. The Australian Zuphiines are distributed in the Genera *Zuphium* Latreille, *Parazuphium* Jeannel, *Acrogenys* Macleay, *Pseudaptinus*

* Supported by a travel grant of the Deutsche Forschungsgemeinschaft (DFG).

Castelnau, *Colasidia* Basilewsky, and *Planetes* Macleay. The taxonomic status of *Planetes*, however, is rather controverse (BASILEWSKY 1963, JEDLICKA 1963, HABU 1967, REICHARDT 1967, DARLINGTON 1968). So far 12 Zuphiine species were known from Australia. By far most species have been described in the last century and most are not recognizable. Therefore, a revision of the Australian Zuphiinae has been started (BAEHR 1984, 1985) which is here continued with the revision of the genus *Parazuphium*.

Very few is known about the life histories of Zuphiinae, especially of the Australian species (BAEHR 1984, 1985). Perhaps, most species are hygrophilous and live near standing or running water in the tropical-subtropical part of Australia, but they are also distributed in rather dry areas of the interior, as for example, some *Pseudaptinus*-species. All species in Australia seem to be very rare and most of them are caught chiefly at light. Generally, Zuphiinae are pantropical Carabids, which penetrate just into temperate zones. Thus, they are not represented in Tasmania (SLOANE 1920) and they are rather rare in temperate southern Australia.

The Australian Zuphiines are considered quite recent invaders from tropical southeastern Asia. Perhaps, this is true only for some of the highly evolved genera as *Zuphium*, *Parazuphium*, *Planetes*, and *Colasidia*. Other genera are endemic (*Acrogenys*) or possess a very curious distribution in Australia and America, respectively, being absent from southeastern Asia (*Pseudaptinus*). Therefore, Zuphiinae are rather interesting with regard to zoogeographical questions.

The Australian *Parazuphium*-species have been hitherto included into the genus *Zuphium*. Both genera, however, have been separated with reasonable arguments some time ago (JEANNEL 1942, 1949). This separation is now also realized for the Australian species. Of the eight described *Zuphium*-species from Australia and New Guinea just three, *Zuphium mastersii* Castelnau, *Z. rockhamptonense* Castelnau, and *Z. sinuum* Darlington are actually *Parazuphium*-species, the rest belongs to the genus *Zuphium* s. str.

As in most other Australian Zuphiinae, material of the genus *Parazuphium* is very rare in collections, this is especially true for the known species except for *Z. mastersii*. Just in last 20–30 years collecting in remote areas, especially in northern Australia, revealed more specimens, which, however, are still unworked. Attention must be drawn especially to the collecting work of Darlington in northern Queensland, of Monteith in the Cape York Peninsula, and of Britton, Weir and others in the northern parts of the Northern Territory.

A travel, carried out by the author very recently, revealed rich material from northern and northwestern Australia. Of some species, however, still very few specimens are at hand, or the males are still unknown.

Generally, specimens of *Parazuphium* are to be found especially at light. Strikingly, females fly in much larger numbers to light than males. Perhaps, female *Parazuphium* are more active than males, an assumption which is supported by the fact, that in some species females possess by far larger eyes than males do. For that reason only females of some species are known.

Altogether, the revision is based on 134 specimens.

Acknowledgements

A large amount of the material under consideration was collected by the author during a travel through northern and northwestern Australia, carried out from November to December 1984. This travel was supported by a travel grant from the Deutsche Forschungsgemeinschaft (DFG). At this place, I want to thank once more the authorities of the DFG.

For loan of type specimens and for material from the collections they care for, or from their own collections I heartily thank following persons.

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Last, but not least thanks to my wife for her most valuable assistance in field work, while suffering from the rather inhospitable climate of Northern Territory and northwestern Australia.

Abbreviations of collections used in text

ANIC	– Australian National Insect Collection, Canberra
BM	– British Museum Natural History, London
BMH	– Bernice P. Bishop Museum, Honolulu
CBM	– Collection M. Baehr, München
CMC	– Collection B. P. Moore, Canberra
FMT	– Museum G. Frey, Tutzing
MCSN	– Museo Civico di Storia Naturale, Genova
MCZ	– Museum of Comparative Zoology, Cambridge/Mass.
NMV	– National Museum of Victoria, Melbourne
QM	– Queensland Museum, Brisbane
SAM	– South Australian Museum, Adelaide
ZSM	– Zoologische Staatssammlung, München

Methods

Characters

The most important character used for distinguishing of species is form and grade of deformation of aedeagus and parameres. However, as males are not known from all species, some other characters are also essential.

Body colour is helpful for immediate recognition of some species, as is density and length of pilosity of upper surface and of antennae.

Number of setae behind eyes (posterior supraorbital seta, temporal seta) varies from 2 to 0. Length and proportions of antennae are most characteristic in each species, especially length of 1st segment, length ratio of 3rd/2nd segments, and relative length of median segments. Also length of palpi is useful for separating some groups of species. Eye size is characteristic in some species, in others not, because in some species eyes of males and females differ greatly.

Shape of pronotum is very characteristic in most species, especially with regard to posterior angles. The posterior lateral seta may be very inconspicuous or even lost. Pilosity of elytra which may be more or less dense is useful for recognition of some species, as is relative length of lateral tactile setae. Grade of sinuosity of apex of elytra varies and can be used for selecting groups of species.

Measurements

Some measurements are presented in the table. Overall length of specimens has been measured from tip of labrum to apex of elytra. All measurements were made under a stereomicroscope by use of an ocular micrometer. For measurements of ratio length/width of 6th antennal segment 160× magnification has been used, for the other measurements 64× and 40× magnification, respectively.

Distribution maps

Distribution maps are based only on label data of examined specimens. In some older specimens it was not possible to localize the label data, these data are not indicated in the maps.

Classification

Subfamily Zuphiinae

Zuphietae, Bonelli, 1810, Obs. ent. I, Tab. syn.

Galérítides (part), Lacordaire, 1854, p. 79

Zuphiinae, Basilevsky, 1953, p. 224, 1963, p. 3

BAEHR, 1984, p. 119, 1985, p. 34

Zuphiini, Bedel, 1895, p. 15

SLOANE, 1920, p. 120 (Zuphiini!), 1923, p. 246

ANDREWES, 1929, p. 46

CZIKI, 1932, p. 1562

JEDLICKA, 1963, p. 477

HABU, 1967, p. 253

REICHARDT, 1967, p. 8; 1977, p. 448

DARLINGTON, 1968, p. 218

Zuphiidae, Jeannel, 1942, p. 1091

Zuphiitae, Jeannel, 1949, p. 1047

for further information see CZIKI, 1932, p. 1562

Type genus: *Zuphium* Latreille

Diagnosis: Elytres truncate. Body entirely pubescent. "Neck" distinctly separated from head. Head with 2 supraorbital setae. Antennae densely pubescent from 1st segment. 1st segment usually as long as 2nd and 3rd segments together or longer. Palpi usually pubescent, penultimate segment of labial palpus plurisetose. Labrum not enlarged laterally, as wide as clypeus. Mandibular scrobe without seta, but usually pubescent dorsally and/or ventrally. Paraglossae membraneous. Pronotum with distinct lateral border. Tarsi pubescent above, claws smooth. ♂ fore tarsus symmetrical (except *Planetes*). Coxal cavities of anterior coxa biperforate. Parameres conchoid, right paramere small.

For determination of the genus *Parazuphium* see key to Australian and New Guinean genera of Zuphiinae in BAEHR (1984).

Tribus Zuphiini

Apart from the tribe Zuphiini two other tribes have been described, Leleupidiini (BASILEWSKY 1951), a group of aberrant soil-living Zuphiines, and Patriziini (BASILEWSKY 1953). Limitation and justification of the tribes has been already discussed in detail (BAEHR 1985). *Parazuphium* belongs without doubt to the tribe Zuphiini.

Genus Parazuphium

The genus *Parazuphium* has been firstly separated from *Zuphium* by Jeannel (1942) as a subgenus. Later on (JEANNEL 1949), he gave it full generic status. Nevertheless, some rather recent authors classed *Parazuphium*-species among *Zuphium*, in the area under consideration for example JEDLICKA (1963) and DARLINGTON (1968).

Parazuphium, Jeannel, 1942, p. 1095

JEANNEL, 1949, p. 1051

ANTOINE, 1962, p. 637

HURKA & PULPAN, 1981, p. 1

HURKA, 1982, p. 281

Type species: *Parazuphium chevrolati* (Castelnau, 1833)

Diagnosis

Genus of subfamily Zuphiinae and tribus Zuphiini. Head distinctly separated from neck, temples large, more or less square. Mentum with a broad unidentate tooth. Glossa apically widened, square, polysetose, paraglossae membraneous, very long, free. Palpi pilose, labial palpus with two long setae and some shorter ones. Lacinia spinose. Galea with some short bristles at tip. Outer rim of mandibular scrobe pilose. Apex of labrum slightly excised, 6-setose. 1st antennal segment very elongate, about as long as 2nd – 4th segments together, dorsally with a very long tactile seta and with some additional se-

tae. 4th segment longer than 3rd segment. Pilosity of 1st – 3rd segments rather elongate, less dense, from 4th segment very dense and short. One or two pairs of setae behind eyes, generally far from eye at hind border of temples. With a long, conspicuous seta rather ventrally behind posterior border of eye. Pronotum with one long anterior marginal seta. Posterior marginal seta at hind angle, shorter than anterior seta, often inconspicuous, sometimes wanting. Elytres depressed, striae indistinct to scarcely visible. 3rd interval slightly more convex than others. Apex sinuose, excised in middle, with small hyaline fringe. Interior angle prominent. Last abdominal segment in ♂ with 1, in ♀ with 2 setae. ♂ fore tarsus symmetrically clothed. Orifice of aedeagus with two sclerites. Right paramere smaller than left, in some species both parameres small and strongly deformed. Genital segment square. All Australian species are winged.

Key to the species of *Parazuphium* from Australia, New Guinea and New Britain

1. Inner (temporal) seta behind eye present (Fig. 3, 4, 7). Striation of elytres normally more distinct (Fig. 3, 4), apex of elytres deeply sinuate in middle Subgenus *Parazuphium* s. str. 2.
- Inner (temporal) seta behind eye wanting (Fig. 5, 6, 8–10). Striation of elytres normally rather indistinct (Fig. 5, 6), apex of elytres far less conspicuously sinuate Subgenus *Austrozuphium* nov. 4.
2. Head and pronotum reddish, elytres reddish to yellowish. Body very depressed. Apex of pronotum laterally conspicuously oblique, pronotum at widest part nearly 2 × as wide as at narrowest part (Fig. 4). Aedeagus very elongate. Orificium and apical sclerites very short, nearly perpendicular. Apex lancet-shaped with lateral teeth. Both parameres highly deformed (Fig. 13) *darlingtoni* spec. nov.
- Colour different, plainly yellowish or light brown, head frequently darker. Body more convex. Apex of pronotum laterally just slightly oblique. Base wider, widest part of pronotum about 1.5 × as wide as narrowest part (Fig. 3, 7). Aedeagus not very elongate. Orificium and sclerites much more elongate, rather gently sloping. Apex without lateral teeth, both parameres far less deformed (Fig. 11, 12) 3.
3. Larger (3.5–3.95 mm). Colour lighter, yellowish, only head slightly darker. Pronotum less wide, about square, ratio length/width: 0.95–1. Posterior angles less acute (Fig. 3). Antennae slightly more elongate, median segments perceptibly more than 2 × as long as wide (ratio length/width: 2.1–2.2). Aedeagus stout, apex without terminal knob, left paramere broad (Fig. 11) *tropicum* spec. nov.
- Smaller (3.05–3.55 mm). Colour darker, brownish. Pronotum wider than long, ratio length/width: 0.9–0.95. Posterior angles acute, excision in front of angles deep (Fig. 7). Antennae stouter, median segments just 2 × as long as wide or shorter. Aedeagus narrow and flattened, apex with a small terminal knob, left paramere narrow (Fig. 12) *sinuum* (Darlington)
4. Antennae more elongate, 1st segment as long as or perceptibly longer than head from base of clypeus, 3rd segment about 2 × as long as 2nd segment or longer, median segments more than 3.5 × as long as wide 5.
- Antennae less elongate, 1st segment distinctly shorter than head from base of clypeus, 3rd segment just $1\frac{1}{2}$ – $1\frac{3}{4}$ × as long as 2nd segment, median segments less than 3 × as long as wide 7.
5. Colour uniformly clear yellow. Eyes very small. Both setae behind eyes wanting (Fig. 6). Pronotum narrow and elongate, ratio length/width: 1.3. Lateral border of pronotum straight near base, basal angles virtually not projecting, very obtuse (Fig. 6). Posterior lateral seta wanting. Tactile lateral setae of elytres very elongate, nearly as long as elytres wide. Legs very elongate *flavescens* spec. nov.
- Colour not uniformly clear yellow, especially head and elytres darker. Eyes at least in females larger, lateral setae behind eyes present (Fig. 5, 8). Pronotum wider, ratio length/width less than 1.2. Lateral border near base at least slightly curved, basal angles somewhat projecting (Fig. 5, 8). Posterior lateral seta present, but very short and inconspicuous. Tactile lateral setae of elytres much shorter than elytres wide. Legs shorter 6.
6. Prothorax wider, ratio length/width less than 1.1. Lateral border at widest part evenly rounded, lateral parts of pronotum not visible from above. Posterior angles well projecting laterally, rather acute, sides in front of angles well excised (Fig. 5). Aedeagus more elongate and depressed, tip of apex wider than base, somewhat spoonlike, slightly bent up. Left paramere small (Fig. 15) *barbarae* spec. nov.

- Prothorax less wide, ratio length/width: 1.1–1.2. Lateral border at widest part rather straight, thus, lateral parts of prothorax visible from above. Posterior angles just slightly projecting laterally, more obtuse, sides in front of angles less excised (Fig. 8). Aedeagus shorter and larger, tip of apex evenly tapering, distinctly bent down. Left paramere larger (Fig. 14) *mastersii* (Castelnau)
- 7. Generally larger (3.25–3.7 mm). Colour less contrasting, prothorax slightly darker. Prothorax longer than wide, ratio length/width: 1.05–1.1. Sides less strongly rounded at widest part, less abruptly excised in front of posterior angles. Angles rather obtuse, just slightly projecting (Fig. 9). 3rd segment of antennae more elongate, about $1\frac{3}{4} \times$ as long as 2nd segment *rockhamptonense* (Castelnau)
- Generally smaller (3.25–3.4 mm). Colour contrasting, especially pronotum clear yellow. Prothorax wider than long, ratio length/width about 0.95. Sides strongly and evenly rounded at widest part, abruptly excised in front of posterior angles. Angles rather strongly projecting (Fig. 10). 3rd segment of antennae shorter, about $1\frac{1}{2} \times$ as long as 2nd segment *weiri* spec. nov.

Description of species

Subgenus *Parazuphium* Jeannel

Parazuphium, Jeannel, 1942, p. 1095

JEANNEL, 1949, p. 1051

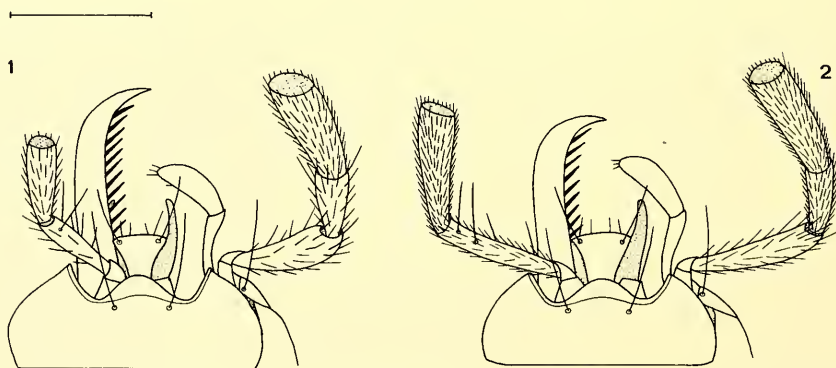
ANTOINE, 1962, p. 637

HURKA & PULPAN, 1981, p. 1

HURKA, 1982, p. 281

Type species: *Parazuphium chevrolati* (Castelnau, 1833)

Diagnosis: Inner (temporal) seta behind eye present, posterior lateral seta of pronotum shorter than anterior seta, but not inconspicuous. Posterior angles of pronotum prominent, acute, base behind angles strongly excised. Striation of elytrae fairly distinct, apex of elytrae strongly sinuate in middle, dorsal surface of sinuation depressed.



Figs. 1–2. *Parazuphium*, lower side of head and mouthparts. – 1: *P. darlingtoni* spec. nov. – 2: *P. barbarae* spec. nov. Scale: 0.25 mm.

Parazuphium tropicum spec. nov.

(Fig. 3, 11, 16)

Types: Holotypus: ♂, 14°39'S, 126°57' E, Drysdale River, W. A., 18.–21. Aug. 1975. J. F. B. Common & M. S. Upton (ANIC). Paratypes: 2♂♂, 1♀, Christmas Creek, 15 km w. of Fairview, via Laura, N. Qld., 26.–27. VI. 1975, G. B. Monteith (QM); 1♂, v. Cairns, Q., Feb. 1958, Darlingtons (MCZ); 1♂, Tin Creek, N. Q., 10. 1964, J. B. Brooks Bequest 1976 (ANIC); 2♂♂, Lockerbie, N. Cape York, Q. Jan. 1958, Darlingtons (MCZ); 1♀, “11 Mile Scrub”, 19 km N. of Moreton, Cape York Pen. N. Qld., 1.–2. VII. 1975, G. B. Monteith (QM); 1♀, Crystal Ck., Q., 23 km SSE of Ingham, 18°58'5''S, 146°16' E, 9. 12. 1968, at light, Britton & Misko (ANIC); 1♂, 12°23'5''S, 132°56' E, 7 km NW by N of Cahill's Crossing (East Alligator River), 4. XI. 72, at light, E. Britton (ANIC); 1♂, 12°49' S, 132°51' E, 15 km E by N of Mt. Cahill, NT., 29. X. 72, light trap, E. Britton (ANIC); 4♀♀, Fitzroy Crossing, WA, at light, 18.–20. 11. 1984, M. & B. Baehr (CBM); 1♀, 68 km nw. Wittenoom, Hooley Creek, WA, at light, 2. 12. 1984, M. & B. Baehr (CBM); 1♀, undated (NMV).

Locus typicus: Drysdale River near mouth, WA.

Diagnosis: Length: 3.5–3.95 mm, width: 1.3–1.4 mm (15 specimens measured). Colour: Dark yellow to light brown. Head at base and near eyes darker. Mouthparts from clypeus, antennes, and legs yellowish. A less flattened, rather distinctly striated species with distinctly shagreened surface. Large eyes, wide pronotum with well developed hind angles, and very short antennes distinguish this species from all other Australian species with exception of *P. sinuum* (Darlington).

Description of holotypus:

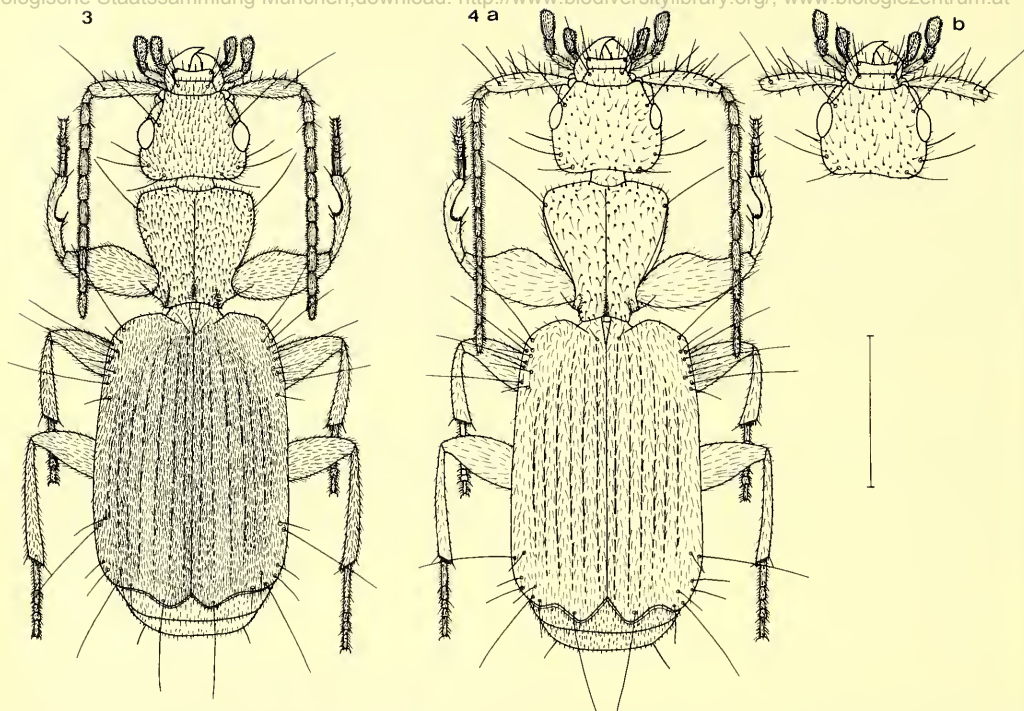
Length: 3.7 mm, width: 1.3 mm. Colour: as above.

Head: Surface shagreened. Temples behind eyes rather short and square, eyes laterally slightly protruding, large, about as long as temples. Posterior supraorbital seta situated just about half the length of eye behind hind border of eye. Pilosity of head dense, rather depressed. Tooth of mentum very wide. Apex of glossa slightly rounded, paraglossae fairly elongate, apex slightly hooked. Basal segment of labial palpus with two long, erect setae and some shorter depressed setae. Maxillary palpus basally rather sparsely setose, last segments of both palpi densely setose. Galea at outer border and at apex with some short bristles. Antennes short, 1st segment shorter than head from base of clypeus, 3rd segment just $1\frac{1}{3}\times$ as long as 2nd segment. Median segments about $2\times$ as long as wide (Tab.). Additional setae of 1st antennal segment rather short, also pilosity of antennes short and fairly depressed.

Tab. 1: Number of specimens measured. 1: Length (tip of labrum – apex of elytres) in mm. 2: Ratio length/width of pronotum. 3: Ratio widest/narrowest part of pronotum. 4: Ratio length of 1st antennal segment/length of head from base of clypeus. 5: Ratio length of 3rd/length of 2nd antennal segment. 6: Ratio length/width of 6th antennal segment. *) Specimens from New Britain

	N	1	2	3	4	5	6
<i>P. tropicum</i>	15	3,5 –3,95	0,96–1,01	1,45–1,57	0,79–0,87	1,21–1,33	2,08–2,2
<i>P. sinuum</i>	4	3,35–3,45	0,89–0,93	1,53–1,61	0,81–0,84	1,28–1,3	2 –2,02
<i>P. sinuum</i> *)	4	3,05–3,55	0,9 –0,93	1,57–1,64	0,78–0,84	1,24–1,3	1,82–1,9
<i>P. darlingtoni</i>	20	3,35–4,1	1,03–1,13	1,81–1,95	0,88–0,94	1,36–1,5	2,25–2,55
<i>P. mastersii</i>	16	3,4 –4,35	1,11–1,18	1,83–1,93	0,95–1,02	1,79–2,05	3,62–3,8
<i>P. barbarae</i>	36	3,65–4,15	1,06–1,11	1,73–1,85	1,03–1,1	2 –2,16	3,65–4,15
<i>P. flavescens</i>	5	3,55–3,8	1,28–1,32	1,75–1,83	1,1 –1,15	2,18–2,27	4,15–4,22
<i>P. rockhamptonense</i>	13	3,25–3,7	1,03–1,1	1,74–1,94	0,84–0,94	1,7 –1,81	2,55–2,75
<i>P. weiri</i>	2	3,25–3,4	0,95–0,97	1,85–1,91	0,83–0,86	1,5 –1,56	2,54–2,67

Pronotum: Rather wide, square, about as long as wide (Tab.). Also base very wide. Widest part very near to apex. Lateral border not evenly rounded, thus lateral part of prothorax narrowly visible from above. Prebasal excision rather deep, but less so than in *P. sinuum*. Basal angles acute and prominent, about 90°. Excision of base behind posterior angles deep. Anterior lateral seta far in front, at widest



Figs. 3–4. *Parazuphium*. – 3: *P. tropicum* spec. nov., holotypus, ♂ (ANIC). – 4 a: *P. darlingtoni* spec. nov., holotypus, ♂ (ANIC). – 4 b: head of ♀ from Mareeba, Qld. (MCZ). Scale: 1 mm.

part, posterior lateral seta at hind angles, much shorter. Median line visible, basal grooves rather deep. Surface distinctly shagreened, pilosity dense, depressed. Episternum pilose only at anterior border, pilosity of prosternum erect.

Elytres: Widened to apex, surface rather convex. Shoulders broadly rounded, apex deeply sinuate in middle, dorsal surface of sinuosity depressed. Striation rather distinct, intervals perceptibly raised. Puncture very dense, thus surface rather dull. Pilosity short, very dense, depressed, about 8 hairs each interval.

Legs: Short, tibiae straight. Male protarsus densely clothed.

Aedeagus: Rather big and stout. Orificium elongate, gently sloping to apex. Apex not thickened into a knob. Sclerites elongate. Left paramere large, hardly deformed.

Variation: A rather homogenous species with little variation, only pronotum in some specimens slightly wider (Tab.). In contrast to most other Australian species, eyes of ♂♂ not much smaller than eyes of ♀♀.

Distribution (Fig. 16): Northern Queensland, northernmost Northern Territory, and northwestern Australia south to Hamersley Ranges.

Material examined (18 specimens):

Queensland: 1♀, Crystal Creek s. of Ingham (ANIC); 1♂, Tin Creek (ANIC); 1♂, Cairns (MCZ); 2♂♂, 1♀, Fairview (QM); 1♀, 19 km N Moreton, Cape York Peninsula (QM); 2♂♂, Lockerbie, Cape York Peninsula (MCZ).

Northern Territory: 1♂, Mt. Cahill, Arnhem Land (ANIC); 1♂, Cahill's Crossing, Arnhem Land (ANIC).

Western Australia: 1♂, Drysdale River, Holotype (ANIC); 4♀♀, Fitzroy Crossing (CBM); 1♀, 68 km nw. Wittenoom, Hamersley Ranges (CBM).

Undated: 1♀, (NMV).

5

6

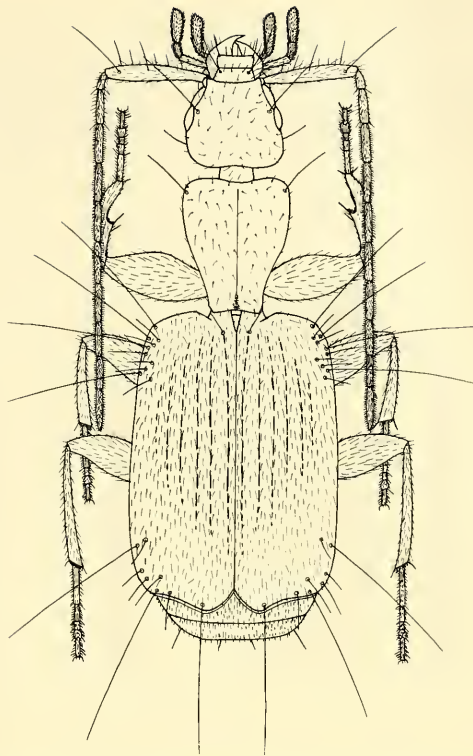
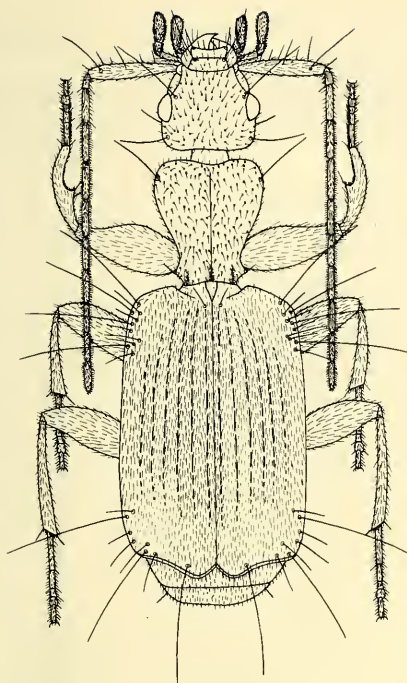


Fig. 5–6. *Parazuphium* (*Austrozuphium*). – 5: *P. barbarae* spec. nov., holotypus, ♂ (ANIC). – 6: *P. flavescens* spec. nov., holotypus, ♀ (ANIC). Scale: 1 mm.

Activity period: Specimens have been collected from June to August, and from October to February, mostly at light.

Habits: Unknown, as most specimens were collected at light. Most collecting places, however, are situated near standing or running water, as are the places, where I myself found the species, or they are situated in generally rather wet areas. Thus, the species likely lives at wet places, perhaps near the border of creeks, rivers or lagunes.

Parazuphium sinuum (Darlington, 1968)
(Fig. 7, 12, 16)

Darlington, 1968, Bull. Mus. Comp. Zool., 137(1), p. 219

Types: I saw the holotype, a ♀ from the Darlington Collection from New Guinea (MCZ, type NO. 31514), Aitape, NE. NG., Aug. 1944 (Darlington).

Locus typicus: Aitape, northern Papua New Guinea.

Diagnosis: Length: 3.05–3.55 mm, width: 1.2–1.3 mm (8 specimens measured). Colour: Brown, head darker, nearly blackish, mouthparts from clypeus, antennae, and legs yellowish. The species is very nearly related to *P. tropicum* spec. nov., but it is rather smaller and slightly darker. The pronotum is perceptibly wider and the aedeagus somewhat different.

Description:

In addition to DARLINGTON's (1968) description there are some more characters important for separating of *P. sinuum* from other species, especially from *P. tropicum*.

Head: Very similar to *P. tropicum*. Eyes of ♂♂ and ♀♀ rather similar. Shagreen of surface very distinct. Antennae short, especially median segments slightly shorter than in *P. tropicum*, ratio length/width of median segments about 2 or less.

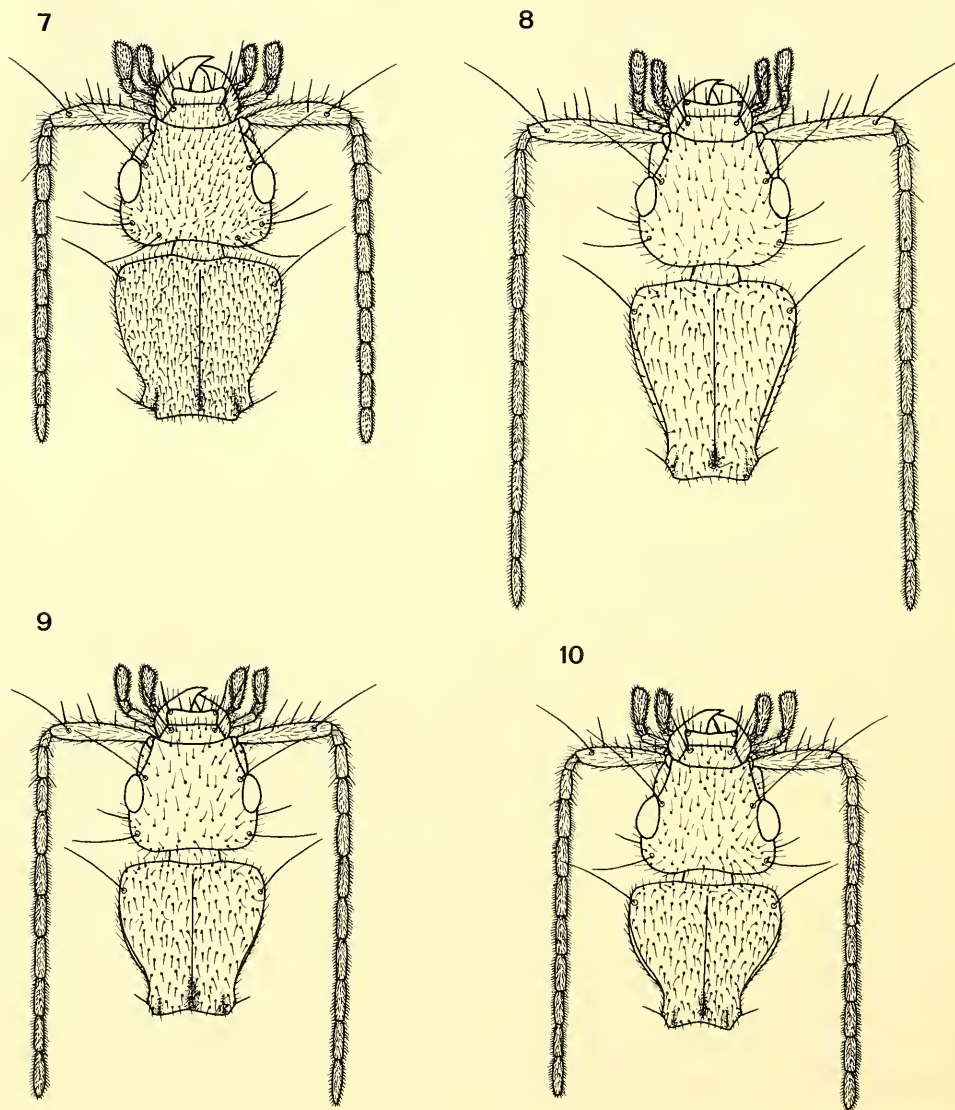


Fig. 7-10. *Parazuphium*, head and prothorax. - 7: *P. (Parazuphium) sinuum* (Darlington), holotypus, ♀ (MCZ). - 8: *P. (Austrozuphium) mastersii* (Castelnau), ♀ from Coombah, NSW (CMC). - 9: *P. (Austrozuphium) rockhamptonense* (Castelnau), ♀ from Willeroo NT (CBM). - 10: *P. (Austrozuphium) weiri* spec. nov., holotypus, ♀ (ANIC). Scale: 1 mm.

Pronotum: Distinctly wider than long, ratio length/width about 0.9 (Tab.). Sides more strongly and evenly curved than in *P. tropicum*, excision in front of posterior angles deep, angles rather acute, less than 90°.

Elytres: Distinctly striate, intervals slightly convex. Sinuosity of apical border as in *P. tropicum*. That excision which DARLINGTON (1968) thought to be characteristic of *P. sinuum* and from which he derived the name for his species, is actually present in all Australian species, in some, however, it is not so distinctly marked.

Aedeagus: Rather similar to aedeagus of *P. tropicum*, but by far narrower and more depressed. Apical tip thickened into a knob and slightly bent up. Left paramere long, but rather narrow, right paramere as in *P. tropicum*, but square apically.

Variation: There are 4 specimens before me from Cape Gloucester, New Britain, collected by Darlington, which DARLINGTON (1968) mentioned as: „This species (*P. sinuum* – note of author) or a close relative occurs also at Cape Gloucester, New Britain.” Indeed, the specimens are very similar to specimens from New Guinea. Their pronotum is also rather wide, the posterior angles are acute and they are still slightly darker coloured. The antennes, especially the median segments, seem to be still shorter than in the specimens from New Guinea. They could be likely representative of an own subspecies or even an own species. But, as there are only 3 specimens from New Guinea and 4 from New Britain before me, and as all specimens from New Britain are ♀♀, it is at present impossible to establish the real status of the New Britain specimens. It is by all means possible, however, that they belong to *P. sinuum*, without having developed to an own taxon, whether subspecies or species, the more, as they were collected in the westernmost part of New Britain, right opposite the eastern coast of New Guinea. There is an additional specimen from Arnhem land, northern Australia, which seems to belong rather to *P. sinuum* than to *P. tropicum*, especially with respect to small size, shape of pronotum, and structure of aedeagus and parameres. With regard to colour and relative length of antennal segments, however, it comes nearer to *P. tropicum*. It is tentatively classed with *P. sinuum*, which means that *P. sinuum* occurs also in northern Australia. Specimens from the tip of Cape York Peninsula, nevertheless, are true *P. tropicum*.

Distribution (Fig. 16): New Guinea, New Britain, perhaps also northern Australia.

Material examined (8 specimens):

New Guinea: 1♀, Aitape, holotypus (MCZ); 1♂, 1♀, SE. Mamai Pltn., E. of Pt. Glasgow, 7.II.1965, R. Straatman, light trap (BMH).

New Britain: 4♀♀, Cape Gloucester, I.–II.1944, Darlington (MCZ, CBM).

Australia, Northern Territory: 1♂, 12°23'5" S, 132°56' E, 7 km NW by N. of Cahill's Crossing (East Alligator River), 4.XI.72, at light, E. Britton (ANIC).

Activity period: Specimens were collected in January, February, August, and November.

Habits: Unknown, some specimens were collected at light.

Parazuphium darlingtoni spec. nov.

(Fig. 1, 4, 13, 17)

Types: Holotypus: ♂, 2 km nw. Windjana Gorge, 150 km e. of Derby, WA, 22.11.1984, at light, M. & B. Baehr (ANIC). Paratypes: 1♂, 13♀♀, 2 km nw. Windjana Gorge, 150 km e. of Derby, WA, 22.11.1984, at light, M. & B. Baehr (CBM, BM, BMH, CMC, ZSM); 4♀♀, Fitzroy Crossing, WA, 18.–20.11.1984, at light, M. & B. Baehr (CBM); 1♀, Ord River n. Ivanhoe, WA, 11.–13.11.1984, at light, M. & B. Baehr (CBM); 1♀, East Alligator River, NT, 10.1965, Demarz (FMT); 1♀, 12°40' S, 132°54' E, Magela Creek, NT., 9 km sse of Mudginberry H.S., 6.XI.72, at light, E. Britton (ANIC); 1♀, 12°48' S, 132°42' E, Nourlangie Creek, NT., 8 km N. of Mt. Cahill, 26.X.72, at light, E. Britton (ANIC); 1♀, 12°52' S, 132°50' E, Koongarra, 15 km e. of Mt. Cahill, NT., 15.XI.1972, M. S. Upton (ANIC); 1♀, 15°05' S, 133°07' E, Elsey Creek, 19 km e. of Mataranka, NT, 15.X.1972, M. S. Upton (ANIC); 6♂♂, 1♀, N. of Mareeba, N. Q., Feb. 1958, Darlingtons (MCZ, CBM).

Locus typicus: Windjana Gorge, Kimberley Division, north-western Australia.

Diagnosis: Length: 3.35–4.1 mm, width: 1.2–1.35 mm (20 specimens measured). Colour: Head and pronotum rusty red, elytres lighter, reddish at base, fading to yellow towards apex. Clypeus, labrum, mandibles, and 1st antennal segment reddish, remaining antennal segments, other mouthparts, and legs yellowish. A characteristically coloured species with rather short antennae, flattened, laterally broadly rounded pronotum with acute posterior angles and narrow base, and with very elongate aedeagus.

Description of holotypus:

Length: 3.85 mm, width: 1.3 mm. Colour as in diagnosis.

Head: Rather wide and flattened above, eyes rather small, much shorter than distance from hind border of eye to hind border of head, eyes hardly projecting laterally. Apex of labrum slightly excised. Tooth of mentum wide, glossa very wide apically, paraglossae elongate, apex just slightly hooked. 2nd segments of both palpi with several long setae, but without shorter hairs, last segments moderately densely setose. Galea smooth, only tip with some short bristles. Antennae rather short. 1st segment slightly shorter than head from base of clypeus (Tab.), 3rd segment less than $1.5\times$ as long as 2nd segment, median segments about $2.5\times$ as long as wide. 1st segment with several rather long, erect setae, pilosity long and hirsute, also pilosity of other segments rather elongate and erect. Surface of head distinctly shagreened and widely-spaced punctured, pilosity scattered, erect.

Pronotum: Depressed, longer than wide, widest part at site of anterior lateral seta, nearly twice as wide as narrowest part. Apex rather oblique, anterior angles broadly rounded off. Lateral border fairly oblique, strongly excised in front of posterior angles, thus, posterior angles acute and prominent, slightly less than 90° . At middle of lateral border sides of prothorax narrowly visible from above. Base sinuate. Posterior lateral seta shorter than anterior seta, but not inconspicuous. Surface distinctly shagreened, with widely-spaced and rather coarse punctures. Pilosity scattered, rather hirsute. Episternum not pilose, except at anterior border, pilosity of prosternum short, depressed.

Elytres: Depressed, slightly enlarged towards apex. Shoulders oblique. Apex strongly sinuate, still more than *P. sinuum* and *P. tropicum*. Sinuosity strongly excavate dorsally. Striae fairly distinct. Puncture rather sparse and coarse, surface rather shining. Pilosity well spaced, rather elongate and hirsute, about 3–4 hairs each interval.

Legs: Short and stout, especially profemur and metafemur thickened, posterior tibia of male slightly curved. Three basal segments of ♂ fore tarsus densely and rather extensively clothed.

Aedeagus: Very elongate, narrow, and depressed. Orificium very short, nearly perpendicular, sclerites also very short and nearly vertically sloping. Apex separated from aedeagus, arrow-shaped, only the very tip rounded. Both parameres deformed, left very small, right without terminal process.

Variation: Colour and unique shape of pronotum make *P. darlingtoni* recognizable at the first glance. Variation except for size is very slight. Size of eyes, however, is remarkably different in ♂♂ and ♀♀, ♀♀ possessing by far larger eyes (Fig. 4a, b). That difference is less conspicuous in the Windjana Gorge series, as ♂♂ from this place possess larger, and ♀♀ smaller eyes than in the rest of specimens.

Distribution (Fig. 17): Northeastern Queensland, northern parts of Northern Territory, and northwestern Australia north of the Great Sandy Desert.

Material examined (32 specimens):

Queensland: 6♂♂, 1♀, Mareeba (MCZ, CBM).

Northern Territory: 1♀ s. of Mataranka (ANIC); 1♀ Koongarra, Arnhem Land (ANIC), 1♀ Mt. Cahill, Arnhem Land (ANIC); 1♀, s. of Mudginberri, Arnhem Land (ANIC); 1♀, East Alligator River, Arnhem Land (FMT).

Western Australia: 1♀, Ivanhoe, Ord River (CBM); 4♀♀, Fitzroy Crossing (CBM); 2♂♂, 13♀♀, Windjana Gorge (ANIC, BM, BMH, CBM, CMC, ZSM).

Activity period: Specimens have been collected in February (Queensland specimens), October (3), and November (22).

Habits: Nothing is known about the habits of this species, but the series collected by the author is from the vicinity of standing or running rivers. As no specimen could be secured by hand collecting or in Barber-traps at the banks of the rivers mentioned, *P. darlingtoni* either does not live directly near water or it lives so deeply imbedded in soil or litter, as to escape the notice of collectors by use of hand collecting.

Subgenus *Austrozuphium* nov.

Some Australian species do not possess the inner (temporal) seta behind eye. Thus, according to the descriptions given by JEANNEL (1942, 1949), ANTOINE (1962), and HURKA (1981, 1982) they do not belong to *Parazuphium* proper. As these species share some more characters and are rather similar also in other respects, a new subgenus is herewith created for them.

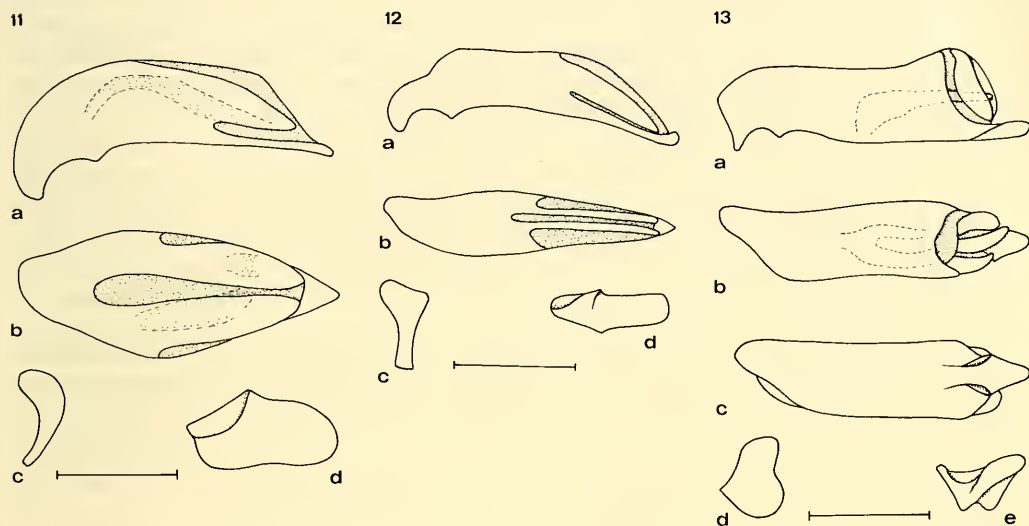


Fig. 11–13: *Parazuphium*, aedeagus. a: left side. b: ventral side. c: right paramere. d: left paramere. 11: *P. tropicum* spec. nov. – 12: *P. sinuum* (Darlington). – 13: *P. darlingtoni* spec. nov., c: dorsal side of aedeagus, d: right paramere, e: left paramere. Scale: 0.25 mm.

Austrozuphium subgen. nov.

Type species: *Parazuphium mastersii* (Castelnau, 1867)

Diagnosis: Subgenus of the genus *Parazuphium* Jeannel. Inner (temporal) seta behind eye wanting, posterior lateral seta of pronotum very inconspicuous or wanting. Posterior angles of pronotum less acute, often inconspicuous, base behind posterior angles less excised. Elytres less distinctly striate, apex less sinuate and less excised in middle. Most Australian species belong to the subgenus *Austrozuphium*.

Parazuphium mastersii (Castelnau, 1867) (Fig. 8, 14, 18)

Castelnau, 1867, Not. Austr. Col., p. 17, 1868, Trans. R. Soc. Vict., 8, p. 103
CZIKI, 1932, Cat. Coleopt., p. 1565

Types: I saw the holotype from the Castelnau Collection, a ♀ from Eastern Creek, NSW, leg. Masters (MCSN).

Diagnosis: Length: 3.4–4.35 mm, width: 1.3–1.5 mm (16 specimens measured). Colour: Dark yellowish, head at base and near eyes light brown, mouthparts from clypeus, antennae, and legs yellow. A light coloured species with rather elongate antennae, and with a rather long and narrow pronotum with straight and oblique lateral borders and obtuse posterior angles. Best distinguishable from the closely related *P. barbarae* by the different aedeagus.

Description:

Size and colour as above.

Head: Eyes of both, ♂♂ and ♀♀ rather large, slightly protruding laterally, those of the ♀ holotype, however, rather small. Temples broadly rounded behind. Tooth of mentum wide. Glossa apically wide, paraglossae elongate, apex slightly curved. Palpi rather elongate, 2nd segments sparsely hirsute, apical segments densely pilose. Galea without pilosity except for some short bristles at apex. Antennae elongate, 1st segment about as long as head from base of clypeus or slightly longer. 3rd segment about 1.8–2× as long as 2nd segment, median segments 3.5× as long as wide or slightly longer (Tab.). Erect setae of 1st segment unequal, rather short and somewhat depressed. Microsculpture of head visible, punctures very small, scattered, pilosity wide-spaced, inconspicuous.

Pronotum: Depressed, distinctly longer than wide, widest part at site of anterior lateral seta, there nearly 2× as wide as narrowest part in front of posterior angles. Apex slightly oblique, anterior angles rounded. Lateral border in middle oblique and rather straight, thus lateral parts of prothorax visible from above. Prebasal excision shallow, posterior angles not prominent, rather obtuse, about 130° or more. Base slightly sinuate. Posterior lateral seta very short, inconspicuous. Puncture and pilosity of surface wide-spaced, inconspicuous. Basal grooves shallow. Median line complete. Only first third of episternum wide-spaced and finely punctate.

Elytres: Considerably widened towards apex, shoulders obliquely rounded. Apex sinuate in middle, excision rather shallow. Striae indistinct, but perceptible. Surface uneven, lightly shagreened, rather densely punctured. Pilosity moderately dense and elongate, about 5–6 hairs each interval.

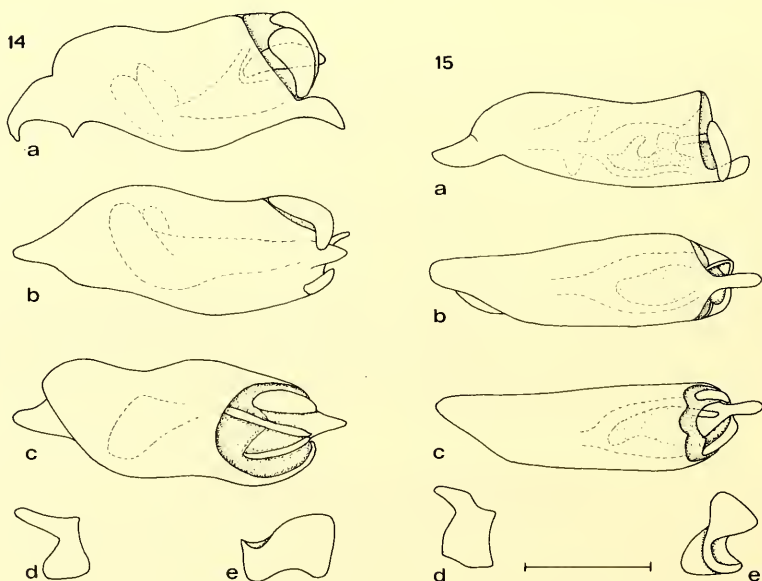


Fig. 14–15: *Parazuphium* (*Austrozuphium*), aedeagus. – 14: *P. mastersii* (Castelnau). – 15: *P. barbarae* spec. nov. Indications and scale as in Figs. 11 and 13.

Legs: Rather elongate, posterior tibia of ♂♂ straight. Clothing of ♂ fore tarsus in specimens at hand fairly inconspicuous.

Aedeagus: Rather short and big. Widest near apex, strongly curved. Orificium short, steeply sloping to apex. Sclerites short, nearly perpendicular. Tip of apex acute, strongly bent down. Both parameres rather small, but just slightly deformed. Right paramere with very elongate terminal process.

Variation: A rather variable species with regard to size and proportions. Apart from the holotype little variation of size of eyes. Also little variation of shape of pronotum. Aedeagus of both males at hand identical.

Distribution (Fig. 18): All states with exception of Tasmania, by far the most specimens at hand, however, are from southern states. A ♀ from Millstream, northern Western Australia, is tentatively clasped among *P. mastersii*, but there are minor differences. It is the unique record of this species from Western Australia.

Material examined (20 specimens):

South Australia: 1♀, Adelaide (Zietz) (SAM); 1♀, Lucindale (SAM).

Victoria: 1♀, Melbourne, 19. 9. 1920, F. E. Wilson, with a determination label of T. G. Sloane (NMV); 1♀, Melbourne, 24. 12. 1938, C. Oke (NMV); 1♀, Ringwood, C. Oke (NMV); 1♀, Dividing Range, Blackburn's Coll., Masters (SAM); 1♀, 34°44' S, 142°21' E, Lake Hattah, 28. II. 1967, G. W. Anderson (ANIC); 1♀, Victoria, Blackburn (SAM).

Australian Capital Territory: 1♀, Black Mt. Light trap, 21. 3. 1968, M. S. Upton (ANIC).

New South Wales: 1♀, Eastern Creek, Castelnaud, holotypus (MCSN); 1♀, Murrumbidgee River at Balranald, 34°38' S, 143°34' E, 6. 1. 1982, G. Bennison (NMV); 3♀♀, Jarmouth (SAM); 1♀, Coombah, light, 15. 12. 1972, B. P. Moore, with a determination label of B. P. Moore (CMC).

Queensland: 2♀♀, Dalby, Mrs. F. H. Hobler (SAM); 1♀, Cairns dist., A. M. Lea (SAM).

Northern Territory: 1♂, Darwin, Demarz, 10. 1965 (FMT).

Western Australia: 1♀, Fortescue River, e. of Millstream, at light, 3.–5. 12. 1984, M. & B. Baehr (CBM).

Activity period: Dated specimens have been collected in September, October, and from December to March.

Habits: Unknown, the Millstream specimen has been collected at light in the completely dry bed of the Fortescue River east of Millstream.

Parazuphium barbarae spec. nov.

(Fig. 2, 5, 15, 19)

Types: Holotypus: ♂, Fitzroy Crossing, WA, at light, 18.–20. 11. 1984, M. & B. Baehr (ANIC). Paratypes: 8♂♂, 15♀♀, Fitzroy Crossing, WA, at light, 18.–20. 11. 1984, M. & B. Baehr (BM, BMH, CBM, CMC, MCZ, SAM, ZSM); 3♂♂, 2♀♀, 2 km nw. Windjana Gorge, 150 km e. of Derby, WA, at light, 22. 11. 1984, M. & B. Baehr (CBM); 2♀♀, Ord River, 105 km n. of Hall's Creek, WA, at light, 15. 11. 1984, M. & B. Baehr (CBM); 1♀, 12°17' S, 133°20' E, Cooper Creek, NT, 11 km S by W of Mimbawah Rock, 1. 11. 1972, at light, E. B. Britton (ANIC); 1♀, 12°46' S, 132°39' E, 12 km NNW of Mt. Cahill, NT, 25. 10. 1972, at light, E. Britton (ANIC); 1♀, Magela Creek, 3 km n. of Mudginberri, Arnhem Land, NT, at light, 3. 11. 1984, M. & B. Baehr (CBM); 1♀, 15°05' S, 133°07' E, Elsey Creek, 19 km SSE of Mataranka, NT, 15. 10. 1972, M. S. Upton (ANIC); 1♀, Papua New Guinea, Morehead, Western Distr., 8°43' S, 141°38' E, 30. 8. 1970, Key & Balderson (ANIC).

Locus typicus: Fitzroy Crossing, northern Western Australia.

Diagnosis: Length: 3.65–4.15 mm, width: 1.4–1.55 mm (36 specimens measured). Colour: Head dark brown to blackish with a light stripe behind eyes. Pronotum dark yellowish, elytres light brown, distinctly darker than pronotum. Mouthparts from clypeus, antennae, and legs yellow. A rather varicoloured species, characterized by its elongate antennae, rather prominent posterior angles of pronotum, and its aedeagus which has a fairly elongate, slightly spoon-shaped tip.

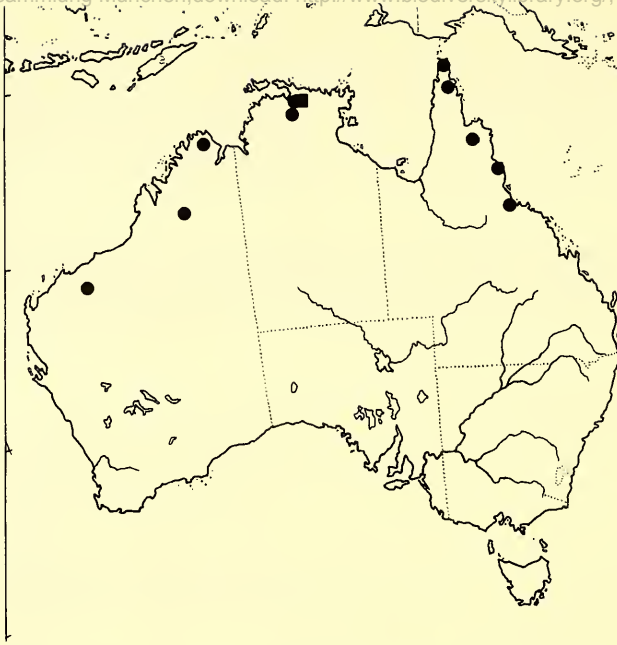


Fig. 16: Distribution of *Parazuphium tropicum* spec. nov.: ● and *P. sinuum* (Darlington): ■.



Fig. 17. Distribution of *Parazuphium darlingtoni* spec. nov.: ●.

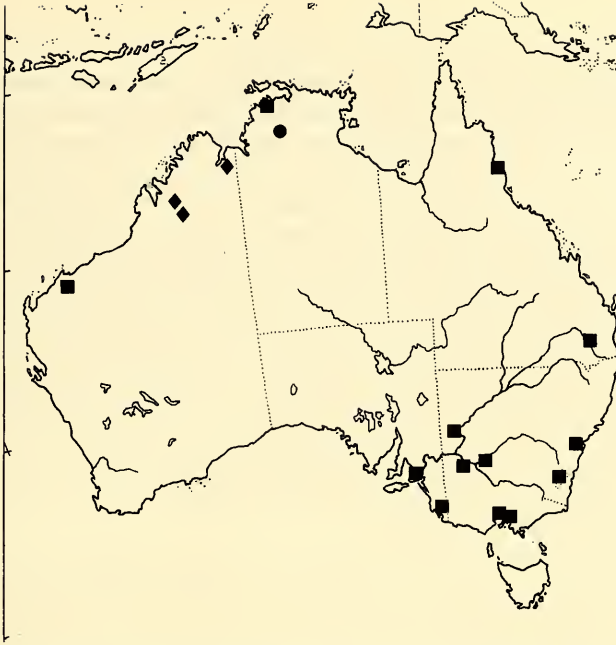


Fig. 18. Distribution of *Parazuphium (Austrozuphium) mastersii* (Castelnau): ■, *P. (Austrozuphium) flavescens* spec. nov.: ◆, and *P. (Austrozuphium) weiri* spec. nov.: ●.



Fig. 19. Distribution of *Parazuphium (Austrozuphium) barbaraе* spec. nov.: ●.

Length: 3.85 mm, width: 1.45 mm. Colour as in diagnosis.

Head: Eyes large, slightly protruding laterally, larger than temples behind eyes, temples rather evenly rounded off. Apex of labrum rather strongly excised. Palpi elongate, 2nd segment of maxillary palpus fairly densely hirsute, last segments of both palpi densely pilose. Galea without pilosity except for some short bristles at tip. Antennae very elongate, 1st segment slender, distinctly longer than head from base of clypeus, 3rd segment more than $2\times$ as long as 2nd segment, median segments $3\frac{3}{4}$ – $4\times$ as long as wide. Additional setae on 1st segment rather sparse, length fairly different, additional pilosity rather dense and short. Also pilosity of remaining antennal segments short and dense. Surface of head with perceptible microsculpture and widely-spaced, rather coarse punctures. Pilosity sparse, short.

Pronotum: Slightly convex, longer than wide (Tab.), widest part about $1\frac{3}{4}\times$ as wide as narrowest part in front of posterior angles. Apex just slightly oblique, anterior angles evenly rounded, not oblique. Lateral border fairly evenly rounded, lateral parts of prothorax hardly visible from above. Prebasal excision moderately deep, posterior angles fairly prominent, about 110 – 120° . Base moderately sinuate. Anterior lateral seta rather far from anterior angle, posterior lateral seta very short, inconspicuous. Surface rather shining, puncture not very conspicuous, pilosity short and depressed. Median line entire, depressed near base, basal grooves rather deep. Episternum smooth, except for anterior third. Pilosity of prosternum short, depressed.

Elytres: Depressed, moderately widened towards apex. Shoulders slightly oblique, broadly rounded. Apex sinuate, moderately excised in middle. Striation perceptible in anterior half, but somewhat irregular. Pilosity short and fairly dense, about 6–7 hairs each interval. Surface rather dull.

Legs: Fairly elongate, posterior tibia of ♂ straight. First three segments of ♂ fore tarsus clothed.

Aedeagus: Rather elongate, slightly curved dorsally. Orificium very short, nearly perpendicular, sclerites also extremely short. Right sclerite much shorter than left. Apex elongate, slightly spoon-shaped, tip broadly rounded, slightly bent up. Parameres small, fairly deformed, especially left paramere.

Variation: A very homogenous, rather large species. Variation of eye size is not very important.

Distribution (Fig. 19): Northernmost Northern Territory, northern parts of Western Australia, and southern New Guinea opposite the Cape York Peninsula.

Material examined (36 specimens):

Northern Territory: 1♀, Magela Creek n. Mudginberri, Arnhem Land (CBM); 1♀, Mt. Cahill, Arnhem Land (ANIC); 1♀, Cooper Creek, Arnhem Land (ANIC); 1♀, Elsey Creek n. Mataranka (ANIC).

Western Australia: 9♂♂, 15♀♀, holotypus, Fitzroy Crossing (BM, BMH, CBM, CMC, MCZ, SAM, ZSM); 3♂♂, 2♀♀, Windjana Gorge (CBM); 2♀♀, Ord River, 105 km n. Hall's Creek (CBM).

Papua New Guinea: 1♀, Morehead (ANIC).

Activity period: Specimens have been collected in August (New Guinea), October (2), and November (33).

Habits: Very little is known about the habits of this species. All Western Australian specimens collected by the author have been found at light in the vicinity of standing or flowing rivers. At all places intensive collecting by hand and by use of Barber-traps at the river or pool banks did not reveal any specimens. Possibly, this species has a very secretive habit deeply in the soil or under litter, or it does not live at all in the immediate vicinity of water, but rather away from water in rather dry, open country.

Parazuphium flavescens spec. nov.

(Fig. 6, 18)

Types: Holotypus: ♀, Fitzroy Crossing, WA, at light, 18.–20. 11. 1984, M. & B. Baehr (ANIC), Paratypes: 1♀, Fitzroy Crossing, WA, at light, 18.–20. 11. 1984, M. & B. Baehr (CBM); 2♀♀, 2 km nw. of Windjana Gorge, 150 km e. of Derby, WA, at light, 22. 11. 1984, M. & B. Baehr (CBM); 1♀, Kimberley Res. Stn., light trap, WA, october 1961, R. T. Richards (ANIC).

Locus typicus: Fitzroy Crossing, northern Western Australia.

Diagnosis: Length: 3.55–3.85 mm, width: 1.3–1.4 mm (5 specimens measured). Colour: Body including appendages uniformly yellow. A slender built, small-eyed (only ♀♀ are known) species with a long and narrow pronotum and delicate, extremely elongate antennae, characterized by the absence of the posterior lateral seta of pronotum and of any setae behind eyes.

Description of holotypus:

Length: 3.85 mm, width: 1.4 mm. Colour: as in diagnosis, but the darkest specimen.

Head: Eyes small, hardly projecting laterally, about half as long as temples behind them. Temples broadly and evenly rounded. Any setae behind eyes wanting. Apex of labrum slightly excised. Tooth of mentum wide, rather flattened. Both palpi elongate, 2nd segment of maxillary palpus rather sparsely hirsute, terminal segments of both palpi densely pilose. Galea smooth except for some short bristles at tip. Antennae very elongate and delicate, 1st segment slender, distinctly longer than head from base of clypeus, 3rd segment clearly more than 2× as long as 2nd segment (Tab.), median segments more than 4× as long as wide. Additional setae of 1st segment widely-spaced, their length rather different. Additional pilosity short, depressed also pilosity of other antennal segments very short, fairly depressed. Surface of head distinctly microsculptured, therefore, puncture hardly discernible, very wide-spaced. Pilosity extremely sparse, short.

Pronotum: Very elongate and narrow, especially at base. About 1.3× as long as wide, rather depressed, especially along median line. Apex hardly oblique, anterior angles shortly rounded off. Sides just slightly, but more or less evenly rounded, lateral parts of prothorax not visible from above. Prebasal sinuosity very shallow, posterior angles weakly developed, virtually not prominent, very obtuse, about 150° or more. Border, however, here slightly turned up. No excision behind posterior angles visible, base very narrow, rather strongly sinuate. Anterior lateral seta at widest part, somewhat moved back from apex. Posterior lateral seta wanting. Median line entire, conspicuous, depressed near base. Basal grooves shallow. Microsculpture of surface fairly distinct, puncture inconspicuous, very widely spaced. Pilosity very short, depressed, widely scattered. Anterior part of episternum very sparsely pilose, pilosity of prosternum short, sparse.

Elytres: Widened towards apex, surface depressed, uneven, striation perceptible at anterior half. Shoulders slightly oblique, broadly rounded off. Apex slightly excised, interior apical angles broadly rounded. Puncture of surface wide-spaced, inconspicuous. Elytres rather shining. Pilosity very sparse, about 2–3 hairs each interval. Pilosity short, depressed, unequal. Lateral tactile setae extremely elongate, nearly as long as elytres wide.

Legs: Elongate. Clothing of ♂ anterior tarsus unknown.

Aedeagus: Unknown, ♂ not known.

Variation: A rather homogenous species, so far we can judge from the little material at hand. Some variation present in proportions of pronotum, holotype possesses a rather wide pronotum.

Distribution (Fig. 18): Known only from the Kimberley Division in northwestern Australia.

Material examined (5 specimens):

Western Australia: 1♀, Kimberley Res. Stn. (ANIC); 2♀♀, Fitzroy Crossing, holotypus (ANIC, CBM); 2♀♀, Windjana Gorge (CBM).

Activity period: All specimens were collected in October and November.

Habits: Unknown, all specimens were collected at light, the Fitzroy Crossing and Windjana Gorge specimens have been collected near running or standing rivers. Small eyes, light colour, sparse pilosity, lost of setae on head and prothorax, and extreme elongation of lateral tactile setae of elytres, however, suggest a rather secretive way of life, perhaps more secretive than the other *Parazuphium*-species.

Parazuphium rockhamptonense (Castelnau, 1867)

(Fig. 9, 20)

Castelnau, 1867, Not. Austr. Col., p. 17, 1868, Trans. R. Soc. Vict., 8, p. 103

CZIKI, 1932, Cat. Coleopt., p. 1565

Types: I saw the holotypus from the Castelnau Collection, a ♀, Rockhampton, Thouzet (MCSN). The specimen is somewhat damaged, especially both antennes from 5th segment and right elytron are missing.

Locus typicus: Rockhampton, eastern central Queensland.

Diagnosis: Length: 3.25–3.7 mm, width: 1.3–1.4 mm (13 specimens measured). Colour: Head dark brown to blackish with a lighter stripe behind eyes. Pronotum dark yellowish, elytres brownish. Mouthparts from clypeus, antennes, and legs yellowish. A medium-sized species, in colour and shape rather similar to *P. barbarae*, but slightly smaller, with shorter antennes and less prominent posterior angles of pronotum.

Description:

Colour as above, without any sign of “a broad brown transversal band on the middle (of elytres – note of author) which grooves narrower towards the sutura“, as CASTELNAU (1867, 1868) stated, but elytres uniformly brown. Castelnau’s type specimen is apparently not fully coloured.

Head: Eyes rather large, slightly projecting laterally, about as long as temples behind them. Temples evenly rounded. Tooth of mentum widely rounded at tip. Palpi medium-sized, 2nd segment of maxillary palpus rather densely hirsute, last segments of both palpi densely pilose. Galea smooth except for some short bristles at tip. Antennes rather stout, 1st segment slightly shorter than head from base of clypeus, 3rd segment about $1\frac{1}{3}\times$ as long as 2nd segment, median segments slightly more than $2.5\times$ as



Fig. 20. Distribution of *Parazuphium* (*Austrozuphium*) *rockhamptonense* (Castelnau): ●.

long as wide (Tab.). Length of additional setae of 1st segment rather different, additional pilosity very short and depressed, also pilosity of remaining segments very short. Microsculpture of head conspicuous, punctures widely-spaced and rather inconspicuous, pilosity scattered, short.

Pronotum: Slightly convex, just slightly longer than wide. Apex slightly oblique, anterior angles evenly rounded, not oblique. Side borders evenly rounded, lateral parts of prothorax hardly visible from above. Prebasal sinuosity rather shallow, posterior angles obtuse, just slightly projecting, about 130–140°. Excision behind posterior angles very shallow, base sinuate. Anterior lateral seta rather removed from anterior angles, posterior lateral seta short, inconspicuous. Median line entire, distinct. Lateral grooves shallow. Microsculpture and puncture of surface rather inconspicuous, surface fairly shining. Pilosity short, depressed, moderately dense. Just anterior border of episternum pilose. Pilosity of prosternum short, depressed.

Elytres: Rather short and widened towards apex. Shoulders fairly oblique, but rounded off. Apex slightly sinuate, median apical angle broadly rounded. Surface of elytres uneven, shining, striae visible at least in basal half. Pilosity rather dense, depressed, somewhat unequal, about 5–6 hairs each interval.

Legs: Medium-sized. Clothing of ♂ fore tarsus unknown.

Aedeagus: Unknown, as all specimens at hand are females.

Variation: Some unimportant variation in shape and proportions of pronotum present, but altogether a very homogenous species. As no ♂♂ are known, nothing is to say about sexual variation of eye size.

Distribution (Fig. 20): Eastern central Queensland, northwestern Northern Territory, and northern Western Australia.

Material examined (13 specimens):

Queensland: 1 ♀, Rockhampton, holotypus (MCSN); 1 ♀, Peak Range, 50 km ne. of Clermont, 18. 12. 1981, at light, M. & B. Baehr (CBM).

Northern Territory: 4 ♀♀, 17 km ne. of Willeroo, at light, 8. 11. 1984, M. & B. Baehr (CBM, ANIC, ZSM).

Western Australia: 1 ♀, Ord River near Ivanhoe, at light, 11.–13. 11. 1984, M. & B. Baehr (CBM); 1 ♀, Ord River, 105 km n. of Hall's Creek, 15. 11. 1984, at light, M. & B. Baehr (CBM); 2 ♀♀, 108 km w. of Hall's Creek, at light, 16. 11. 1984, M. & B. Baehr (CBM); 2 ♀♀, Fitzroy Crossing, at light, 18.–20. 11. 1984, M. & B. Baehr (CBM); 1 ♀, 2 km nw. of Windjana Gorge, 150 km e. of Derby, 22. 11. 1984, at light, M. & B. Baehr (CBM).

Activity period: The specimens from the Northern Territory and from Western Australia were collected in November, one specimen from Queensland in December.

Habits: As all dated specimens were collected at light, few is known about habits of the species. Some specimens (Ord River, Fitzroy Crossing, Windjana Gorge) have been collected at light near standing or running rivers, the others in open Savannah woodland far from open water. The Peak Range specimen from Queensland, however, flew perhaps to light from a dried out watering place for cattle. Possibly, it came out of deep earth cracks.

Parazuphium weiri spec. nov.

(Fig. 10, 18)

Types: Holotypus: ♀, 14°30' S, 132°15' E, 3 km SSW of Katherine, N. T., 12. 11. 1979, T. Weir (ANIC). Paratype: 1 ♀, same locality, same data, same collector (CBM).

Locus typicus: Katherine, Northern Territory.

Diagnosis: Length: 3.25–3.4 mm, width: 1.23–1.28 mm (2 specimens measured). Colour: Head nearly black with a lighter stripe behind eyes, pronotum clear yellow, elytres brown, slightly lighter at base and near suture. Mouthparts from clypeus, antennes, and legs clear yellow. A small, vividly, very contrastingly coloured species with short antennes and a wide, rather heart-shaped pronotum.

Length: 3.4 mm, width: 1.28 mm. Colour as in diagnosis.

Head: Eyes large, convex, rather strongly projecting laterally, eyes about as long as temples behind them. Posterior supraorbital seta not far from posterior border of eye. Tooth of mentum apically very wide, somewhat square. Palpi rather short and stout, 2nd segment of labial palpus very sparsely, of maxillary palpus slightly denser pilose. Galea stout, with scattered minute bristles and some short bristles at tip. Antennae short, rather stout, 1st antennal segment far shorter than head from base of clypeus, 3rd segment just $1.5\times$ as long as 2nd segment, median segments about $2.5\times$ as long as wide (Tab. 1). Additional long setae on 1st segment of different length, additional pilosity short and depressed. Also pilosity of other segments very short and rather depressed. Head distinctly microsculptured, puncture rather inconspicuous, pilosity sparse, short.

Pronotum: Rather convex, distinctly wider than long, heart-shaped. Apex laterally slightly oblique, anterior angles broadly rounded off, virtually not oblique. Lateral border strongly and evenly rounded, prebasal sinuosity fairly deep, but posterior angles rather obtuse, not prominent, about $120\text{--}130^\circ$. Virtually no excision between posterior angles and base, base strongly sinuate. Anterior lateral seta slightly in front of widest part, posterior lateral seta very short, inconspicuous. Median line entire, conspicuous, somewhat depressed near base. Lateral basal grooves indistinct. Surface fairly shining, puncture indistinct, pilosity short, rather sparse. Episternum just at anterior border slightly pilose, pilosity of prosternum short, depressed.

Elytres: Fairly depressed, rather short and widened towards apex. Base laterally distinctly oblique, shoulders evenly rounded off, not oblique, apex moderately sinuate. Striae perceptible at least in basal half, intervals slightly convex. Surface fairly shining. Puncture inconspicuous, pilosity short, depressed, rather dense, about 5–6 hairs each interval.

Legs: Rather short. Clothing of ♂ fore tarsus unknown.

Aedagus: Unknown, ♂ not known.

Variation: The paratype is in all respects extremely similar to the holotype.

Distribution (Fig. 18): Northern part of Northern Territory.

Material examined (2 specimens):

Northern Territory: 2♀♀, holotypus, Katherine (ANIC, CBM).

Activity period: Both known specimens have been collected in November.

Habits: Unknown.

Discussion

Phylogenetic status of the genus *Parazuphium* and of its species.

A detailed differential diagnosis of the species has been omitted, for that purpose the reader should consult the key and the diagnoses heading the descriptions of each species. The systematic position of the genus *Parazuphium* and its relation to other Zuphiine genera shall not be discussed in detail, as not even all authors agree in limitation of the subfamily Zuphiinae, and as a general revision of the subfamily has never been attempted. In addition, too little is known on the Zuphiine faunas of New Guinea and of southeastern Asia, respectively. Therefore, it is only possible to name some likely apomorphic or plesiomorphic characters, respectively, which may illustrate the approximate phylogenetical status of *Parazuphium* within Zuphiinae. Possible apomorphic characters of *Parazuphium*, with respect to a supposed basic plan of Zuphiinae are:

1. Small size.
2. Light colour.
3. Depressed body form.

4. Strong contraction of neck.
5. Strongly enlarged temples, also in large-eyed species.
6. An additional (temporal) seta behind eye, medially of the posterior lateral supraorbital seta.
7. Elongate, scapiform 1st antennal segment, as long as 2nd–4th segments together.
8. Additional tactile setae on 1st antennal segment.
9. Advanced – away from base – posterior angles of pronotum.
10. Short and inconspicuous or missing posterior lateral seta of pronotum.
11. Weak striation of elytres.
12. Lack of tactile setae at odd intervals of elytres.
13. Rather dense and depressed pilosity on elytres.
14. Distinctly sinuate and excised apex of elytres.
15. Tendency of aedeagus and of parameres to become deformed.

They are hardly any clearly plesiomorphic characters in *Parazuphium* as compared with the Australian genera *Acrogenys* and *Pseudaptinus*. *Parazuphium*, however, is certainly very closely related to *Zuphium* s. str. which is illustrated by the fact, that *Parazuphium* was described first as a subgenus of *Zuphium* (JEANNEL 1942). *Zuphium*, however, is perhaps the more primitive genus, but there are few minor characters, which seem to be plesiomorphic in *Parazuphium*, as compared with *Zuphium*, e. g. less elongate antennae and palpi. Possibly, *Parazuphium* represents the most derivative genus of at least all Zuphiini.

Within the Australian species of *Parazuphium* it is rather difficult to establish a well founded phylogenetic classification, especially, as the aedeagi of some species are still unknown. Some species seem very nearly related and few species are immediately recognizable and morphologically well limited. Nevertheless, it is possible to distinguish three different groups:

1. *P. tropicum* and *P. sinuum* (subgenus *Parazuphium* s. str.).
2. *P. darlingtoni* (subgenus *Parazuphium* s. str.).
3. *P. mastersii*, *P. rockhamptonense*, *P. barbarae*, *P. flavescens*, and *P. weiri* (subgenus *Austrozuphium* nov.).

Species of first and second groups belong to subgenus *Parazuphium*, while all species of third group belong to *Austrozuphium*. In some respects the species of the 3rd group seem apomorphic in comparison to 1st and 2nd groups, namely in some characters which can be used for defining the subgenera:

1. Only one seta behind eyes.
2. Short, inconspicuous or missing posterior lateral seta of pronotum.
3. Rather obtuse, not prominent posterior angles of pronotum.

In one character, on the contrary, seem first and second groups more advanced:

Apex of elytres deeply excised in middle, surface of excision excavate dorsally.

Thus, subgenus *Parazuphium* s. str. is in general more primitive than subgenus *Austrozuphium*. Subgenus *Parazuphium* s. str., however, is rather diverse both, in morphology and in its phylogenetic status. First group, *P. sinuum* and *P. tropicum*, exhibits by far most plesiomorphic characters of all Australian species of the genus, e. g.:

1. Rather convex body form.
2. Large eyes.
3. Short antennae.
4. Wide, convex pronotum with prominent hind angles.
5. Rather distinct striation.
6. Very short and dense pilosity of surface, especially of elytres.
7. Just slightly deformed aedeagus.
8. Relatively large and hardly deformed parameres.

The second group consists only of *P. darlingtoni*. It is a very distinct species immediately recognizable by colour and body shape. Although it belongs to subgenus *Parazuphium* s. str., it exhibits some peculiarities, some of which might well represent apomorphic features of that species:

1. Very depressed body.
2. Prothorax with oblique apex and narrow base.
3. Rather sparse, elongate, erect pilosity on the whole body.
4. Extremely elongate aedeagus with very short orificium.
5. Small and strongly deformed parameres.

Some peculiarities, however, could perhaps be regarded as plesiomorphic characters, e. g.:

1. Rather strong cuticula.
2. Strong differences of eye size in ♂♂ and ♀♀.

Thus, *P. darlingtoni* seems very derivative in most respects, especially in the structure of aedeagus. It is quite isolated within Australian *Parazuphium*.

The species of the third group are fairly similar morphologically. They represent perhaps a distinct phylogenetical unit. Apart from characters mentioned above, there are some more presumably apomorphic characters, e. g.:

1. Rather weak cuticula.
2. Relatively small eyes.
3. Deformed aedeagus (so far it is known at all).

Within this group rather different phylogenetical levels are realized. *P. flavescens* seems by far most derivative. That is demonstrated by some apparent apomorphic characters of that species, e. g.:

1. Small eyes.
2. Very light colour.
3. Weak striation of elytres.
4. Lack of any setae behind eyes.
5. Lack of posterior lateral seta.
6. Delicate and elongate antennae and palpi.
7. Narrow pronotum with indistinct posterior angles.
8. Very sparse pilosity on the whole body.
9. Very elongate tactile setae at border of elytres.

The remaining species are more difficult to class. Weak pigmentation and elongate antennae, however, seem to represent derivative characters. If that is true, also *P. mastersii* should represent a rather derivative status, whereas *P. rockhamptonense* and *P. weiri* seem more primitive, and *P. barbarae* should hold an intermediate status. But, as the aedeagus of most species in this group is still unknown, the suggested ideas with regard to phylogenetic status of the species of subgenus *Austrozuphium* are rather speculative.

Distribution

Distribution of the Australian *Parazuphium*-species could likely support some of the above assumptions. Prior to describing the distribution, however, the current knowledge with regard to distribution and life histories of the different species should be briefly discussed. Australian *Parazuphium* specimens are very rare in all collections which is illustrated by the fact, that just about 60 specimens from all Australian museums and from the larger museums of the world were at hand, among them only 2 specimens from Western Australia. More than half the number, enclosing all specimens from Western Australia and from the Northern Territory, have been collected in last 20 years. Additional 10 specimens were collected by P. J. Darlington in Queensland in 1957/58.

Thus, Australian *Parazuphium*-species are either very rare generally, or they must have a very secret way of life, as most recent material has been collected at light, or their great majority lives in such remote area, as to escape hitherto the notice of collectors.

For settling these questions and for securing sufficient material for the current revision, from November to December 1984 the author carried out a travel through the northern parts of Northern Territory and of Western Australia. By means of daily lighting about 75 additional specimens of six species were collected in that area. This collection clearly illustrates that at least northern and northwestern Australia is rather rich in species and that also individuals in general are by no means rare. Therefore, it is the question, if careful searching in other remote areas, e. g. Cape York Peninsula, the interior of Northern Territory or of northern Queensland, should not give same results.

In spite of careful searching by hand and by use of Barber-traps in areas, where *Parazuphium* specimens had been collected at light (wet ground, borders of pools and rivers), no specimens could be secured by such collecting methods. *Parazuphium*-species perhaps must lead a extremely secret life, perhaps in deep earth cracks, when the surface is dried out, beneath deeply imbedded stones or boulders or even in termites nests, possibly not in the immediate vicinity of water, as has been supposed. Therefore, the suggested distribution of the species is most likely rather tentative and incomplete. Moreover, it is likely to be expected, that due to careful searching in remote areas still new species should be discovered.

With regard to the material at hand the current distribution can be described as following (Figs. 16–20): Of the eight species occurring in Australia only *P. mastersii* reaches as far south as Victoria. Indeed, this species has been found in all states except Tasmania from where no *Zuphiines* hitherto have been recorded, but most specimens of *P. mastersii* are from the southern states Victoria, South Australia, and New South Wales. *P. rockhamptonense*, which was known only from the type specimen from central eastern Queensland, was now recorded rather numerous from northwestern Northern Territory and from northern Western Australia. All other species occur, so far known, only in tropical northern Australia. *P. tropicum* and *P. darlingtoni* have been found in all northern states, Queensland, Northern Territory, and Western Australia, where *P. tropicum* goes as far south as the northern part of the Hamersley Range. *P. barbarae* is currently known only from Northern Territory and northern Western Australia, and from extreme southern New Guinea. *P. flavescens* is known only from the Kimberleys in northwestern Australia, *P. weiri* only from the vicinity of Katherine, Northern Territory, and the New Guinean species *P. sinuum* from one place in northernmost Northern Territory.

Pattern of distribution – most species in the far north, just one in the south – is in harmony with the idea, that *Parazuphium* is a pantropical faunal element which immigrated into Australia from the north. As environmental conditions change very much towards southern Australia, such tropical-subtropical species find less adequate conditions there and become more and more rare. Perhaps also geologic, geographic, or climatic barriers are important with regard to the rarity or the lack of species, respectively, in southern Australia or else in southwestern Australia. It is to be stressed, however, that these suggestions are rather tentative, as at least two species, *P. tropicum* and *P. mastersii* were able to cross the Great Sandy Desert from the north (*P. tropicum*) or (*P. mastersii*) to immigrate into the Hamersley Range across vast desert areas south and east from it. Perhaps, in future *Parazuphium*-species will be discovered still further south.

At least *P. tropicum*, *P. sinuum*, and *P. darlingtoni* possess rather close relatives outside from Australia, as they belong to the tropical distributed subgenus *Parazuphium* s. str. From that it follows likely, that these species invaded into Australia rather recently from the north. *P. tropicum* and *P. sinuum* are extremely closely related one to another and certainly the centre of origin of *P. sinuum* was in New Guinea or in New Britain. Perhaps, both species are also related to *P. inconspicuum* (Schmidt-Göbel) from Southeast Asia or to still other species from that area. *P. darlingtoni*, on the other hand, is rather similar to *P. philippense* (Jedlicka), for example. In any case, all Australian species of *Parazuphium* s. str. have near relatives in Southeast Asia. For the subgenus *Austrozuphium* the question is rather difficult to settle, as the fairly incomplete knowledge of the fauna of Southeast Asia for the moment preclu-

des the establishment of any relationships to the Australian species. It is possible, that the Australian *Austrozuphium*-species are derived from a stock which invaded into Australia considerable time earlier. The ancestor was probably much alike *P. rockhamptonense*. In the course of the splitting off into the recent species in northern and northwestern Australia the species *P. barbarae*, *P. flavescens*, and *P. weiri* evolved, some of them perhaps occupying rather limited areas, whereas *P. mastersii* spreaded to the south.

This idea is supported by the discovery of a specimen of *P. barbarae* in southern New Guinea, right opposite the Cape York Peninsula. This part of New Guinea is an area of open sclerophyll woodland, ecologically rather similar to the Savannah woodlands of northern Australia. Presumably, *P. barbarae* is an invader into southern Guinea from northern Australia, therefore, it belongs to the Australian faunal element of the New Guinean Carabid fauna as DARLINGTON (1971) described it for some more Savannah woodland species of southern New Guinea. Strange enough, *P. barbarae* – and other members of subgenus *Austrozuphium* – have not been hitherto recorded from the Cape York Peninsula, which is the part of Australia nearest to the occurrence of the species in New Guinea.

The Australian species of *Parazuphium* perhaps originated from three presumably independent invading stocks, whose relation to Oriental species varies to a considerable degree. The oldest, but presumably most advanced stock, was the ancestor of the subgenus *Austrozuphium* which since was subject of a considerable radiation in Australia. *P. darlingtoni* or its ancestor was possibly next to invade into Australia. Next invasion took place by *P. tropicum*, possibly much later or even at the same time as in *P. darlingtoni*, and perhaps along another route. *P. sinuum*, finally, is perhaps a rather recent immigrant from New Guinea. It is unknown, however, whether all three invasions took place down the Cape York Peninsula, the “normal” way for immigration of “oriental” species into Australia, the more, as the Zuphiine faunas of northern Australia as well as those of New Guinea and of the neighbouring areas of Southeast Asia are yet rather poorly known. For the same reason, nothing is known about time of immigration and age of the different groups. Occurrence of species of 1st group (*P. tropicum*) and of 3rd group (*P. mastersii*) in the isolated Hamersley Range, however, is evidence of a rather ancient immigration of at least two different species groups.

As in the already revised genera *Acrogenys* and *Pseudaptinus*, it becomes evident in *Parazuphium*, that the northern parts of the Northern Territory and of Western Australia are not only particularly rich in species, but that they house also some endemic species, an indication to the relatively old age of the fauna.

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