

**STUDIES ON THE GENUS *DIAPUS* CHAPUIS
(COLEOPTERA: PLATYPODIDAE)
NEW SPECIES AND NEW SYNONYMY**

R. A. Beaver

161/2 Mu 5, Soi Wat Pranon, T.Donkaew, A.Maerim
Chiangmai 50180, Thailand

ABSTRACT

Two new species of *Diapus* are described, *D. sabahensis* from Sabah, Malaysia, and *D. africanus* from South Africa. *Diapus javanus* Murayama, described as a subspecies of *D. aculeatus* Blandford, is given specific status, and the male and female redescribed. *Diapus formosanus* Nijjima and Murayama is transferred to the genus *Platypus* Herbst, and *Diapus quadrispinosus* Schedl to the genus *Genyocerus* Motschulsky. The following new synonymy is proposed: *Platypus beaveri* Browne (= *Diapus formosanus* Nijjima and Murayama, = *Platypus keelungensis* Browne), *Diapus quinquespinatus* Chapuis (= *Diapus tonkinensis* Schedl), *Diapus truncatus* Nijjima and Murayama (= *Diapus spatulifer* Browne). Lectotypes are designated for *Diapus formosanus* and *D. truncatus*.

Key words: Coleoptera, Platypodidae, genus *Diapus*, new species, new synonymy.

ABSTRAK

Dua spesies baru *Diapus* diperihalkan, *D. sabahensis* dari Sabah, Malaysia, dan *D. africanus* dari Afrika Selatan. *Diapus javanus* Murayama, diperihalkan sebagai subspesies *D. aculeatus* Blandford,

diberikan status spesies, di mana jantan dan betina dipisahkan semula. *Diapus formosanus* Nijima & Murayama dipindahkan ke genus *Platypus* Herbst, dan *Diapus quadrispinosus* Schedl ke genus *Genyocerus* Motschulsky. Sinonim baru berikut adalah dicadangkan: *Platypus beaveri* Browne (= *Diapus formosanus* Nijima & Murayama, = *Platypus keelungensis* Browne), *Diapus quinquespinatus* Chapuis (= *Diapus tonkinensis* Schedl), *Diapus truncatus* Nijima & Murayama (= *Diapus spatulifer* Browne). Lektotip-lektotip adalah didesignasikan untuk *Diapus formosanus* dan *D. truncatus*.

Kata kunci: Coleoptera, Platypodidae, genus *Diapus*, spesies baru dan sinonim baru.

INTRODUCTION

The genus *Diapus* was erected by Chapuis (1865) for four species of Oriental Platypodidae, and distinguished from other genera primarily by the widely separated procoxae. Hopkins (1914) designated *D. quadrispinatus* Chapuis as type species of the genus. Further species have been described by Schedl, Browne, Roberts and others (references in Wood & Bright 1992). Several of these species have later been transferred to the related genus *Genyocerus* Motschulsky (= *Diacavus* Schedl) (Wood 1969, Browne 1977, Roberts 1993, Beaver 1998), and one species (*D. apertus* Schedl) to *Platypus* Herbst (Roberts 1993). Wood & Bright (1992) list 38 species in the genus, 18 of which are endemic to Papua New Guinea. The species of the Papuan region have been treated by Roberts (1993).

Like almost all other Platypodidae, the species of *Diapus* are monogamous ambrosia beetles (Beaver 1989), constructing their gallery systems in the wood of recently dead or dying trees. In the majority of species, the female bears mandibular appendages, which are used in courtship to pull the male from the gallery system which it has begun (Roberts 1993). After mating, the female takes over gallery construction, and the mandibular appendages are shed. Ambrosia fungi carried by the adults in special mycangia are introduced into the gallery, and used as food by both adults and their offspring. Most species are polyphagous attacking a wide taxonomic

range of hosts, although host preferences are occasionally evident (see below). Many show a preference for large diameter stems and for bark-free areas (Roberts 1993, RAB pers. obs.). The gallery systems are often abundant and may penetrate quite deeply into the wood, producing 'pinholes' and staining the wood around them, reducing its value for furniture or veneer. Thus they can have some economic importance in tropical forests as part of the complex of Scolytidae and Platypodidae attacking recently felled trees (Browne 1968).

This paper describes two new species, one from the island of Borneo, the other from South Africa. A subspecies, *D. aculeatus javanus* Murayama, is raised to specific status and redescribed. Two species described in *Diapus* are transferred to other genera, and new synonyms are proposed. The following abbreviations are used for collections: BMNH (Natural History Museum, London), RAB (R.A. Beaver's collection), TVMP (Transvaal Museum, Pretoria), USNM (United States National Museum, Washington), ZMLU (Zoological Museum, Lund University).

TAXONOMY

Descriptions of new species

Diapus sabahensis Beaver, new species (Figs 5, 6)

Male: 2.5 mm long, nearly 3.6 times as long as wide. Head, except sides and lower part of frons, pronotum, except for sides, a small triangular area above the femoral grooves and a transverse band at the base, brown; elytra at base and to half way along sides brown, apices reddish; remainder of dorsal and lateral surfaces yellow; underside yellow, except for reddish-brown abdominal sternites. Frons almost flat, reticulate, sparsely, finely punctured, the punctures with fairly short, semierect hairs, more abundant on upper part of frons, which is rounded to apex; median stria short. Antennae inserted on lower part of frons, separated by about half its width, scape broadly clavate, about twice as long as wide, anterior face with scattered, fairly long hairs; club egg-shaped in outline, widest about 2/3 from base, anterior face with a narrow testaceous strip

extending about 1/3 length of club (Fig. 6), remainder of surface with a dense covering of very short sensillae and a few longer hairs. Pronotum slightly longer than wide (31:29), smooth, shining, femoral grooves shallow, median stria long, extending one-third from base, with a V-shaped furrow diverging from its anterior end, base with well-separated, setiferous punctures, smaller than the mycangial pores found in most other species. Elytra 2.8 times as long as pronotum, less than twice as long as wide (exact proportion difficult to determine because elytra are separated and partly raised); striae weakly impressed, striae 1 a little more strongly, with fine shallow punctures; interstriae weakly convex, becoming carinate in apical one-third, except for posterior part of interstriae 8; subterminal rim of elytra above declivity with six large, straight-sided, pointed interstitial spines (Fig. 5), the first and fifth of equal length, the second to fourth a little longer and subequal, the sixth shorter than the others, equal in length to a spine on the posterolateral angle of the elytra; between spines 2 - 3, and 3 - 4, at the end of interstriae 4 and 6, a short spine, about 1/3 the length of the larger spines; declivity short, concave, without spines or tubercles. Fourth abdominal ventrite with four posteroventrally-directed spines on each side of a median gap, the spines arising just before the apex of the ventrite; fifth ventrite almost flat, matt, reticulate, with narrow rugosities enclosing pentagonal or irregular, flattened areas. Female: not known.

HOLOTYPE. Male. MALAYSIA, Sabah, Sipitang, Mendolong, 31.iii.1989, leg. S. Adebratt (ZMLU).

Remarks. This species differs from all other *Diapus* in the large number of elytral spines, which are present on all interstriae except the second. It can also be distinguished by the presence of spines on the fourth abdominal sternite (found also in *D. aculeatus*), and the reticulate pattern on the fifth sternite. It is perhaps related, but not very closely, to *D. aculeatus* Blandford.

***Diapus africanus* Beaver, new species**
(Figs 1, 4)

Male: 3.5 mm long, 3.5-3.6 times as long as wide, head and pronotum dark brown, elytra similar at base, becoming ferruginous

towards apex, appendages paler. Frons weakly transversely impressed above epistoma, and medially, median stria short, distinct, surface aciculate to reticulate, finely fairly sparsely punctured, except above epistoma where granulate-punctate, the punctures with fairly long hairs, upwardly-directed except above epistoma; vertex rounded, strigose, except for a slightly-raised median and two lateral smooth bands. Antennae inserted on lower half of frons, separated by about two-thirds of frons width, scape clavate, anterior face moderately setose, club with a broad, apically-rounded testaceous strip extending nearly half its length (Fig. 4), remainder of surface densely covered with short sensillae and a few longer hairs. Pronotum 1.03 times as long as wide, weakly impressed medially just behind the apical margin, femoral grooves shallow, almost confined to anterior half of pronotum, surface near apex and base aciculate-reticulate, with a row of fine punctures just behind the apex, and a denser group of similar punctures on either side of median stria at base, the punctures with short hairs, remainder of pronotum smooth, shining, median stria distinct, extending about two-fifths of length of pronotum from base, without a V-shaped groove anterior to it. Elytra 2.0 times as long as wide, sides weakly diverging in basal two-thirds, then slightly narrowed and sinuate posteriorly; disc shining, smooth, except matt and sulcate between the terminal teeth in posterior one-sixth; striae and interstriae indistinct laterally, base of interstriae 3 weakly impressed, striae punctures fine, well-separated, not increasing in size posteriorly, interstitial punctures similar but wider apart, with short, semi-erect hairs; subterminal rim of elytra above declivity with four pairs of spines on interstriae 3, 5, 7 and 9 (Fig. 1), the spines on interstriae 5 and 9 slightly longer than the others, subequal, those on interstriae 3 longer than those on interstriae 7, the inner three pairs dorso-ventrally flattened, acute, slightly ventrally curved, the outer pair weakly medially and ventrally curved; declivity narrow, concave, almost vertical, the apical margin slightly projecting at the suture, without spines or tubercles. Fifth ventrite round, concave, surface reticulate, matt, margins with a few long hairs. Female: not known.

HOLOTYPE. Male. SOUTH AFRICA, Ciskei, Amatole, Pirie For., 32° 43' S - 27° 17' E, 8.xii.1987, E-Y: 2562, fungous logs, leg. Endrödy-Younga (TVMP).

PARATYPE. Male, same data as holotype (TVMP).

Remarks. The species is most closely related to *Diapus quinquespinatus* Chapuis and its close relative *D. malgassicus* Schedl. I have compared the two type specimens with specimens of *D. quinquespinatus* from the African, Oriental and Pacific regions in my collection, and with specimens of *D. malgassicus* in BMNH from Madagascar. *D. africanus* falls between them in size (*D. quinquespinatus* 2.5 - 3.2 mm long; *D. africanus* 3.5 mm; *D. malgassicus* 4.0 - 4.1 mm). It can be distinguished from males of both species by the absence of a transverse, subbasal band of mycangial pores on the pronotum. In *D. africanus*, there are only small, scattered seta-bearing pores, which may or may not be mycangial in function, near the pronotal base. In addition, the pointed tooth on the elytral declivity below the spine on interstriae 3, present in both *D. quinquespinatus* and *D. malgassicus*, is absent in *D. africanus*. The species may be further distinguished from *D. quinquespinatus* by the following characters: the discal surface just anterior to the elytral spines, and the spines themselves are rather dull and slightly rough, not smooth and shining; the elytral spines on interstriae 5 are longer than those on interstriae 3, and not vice versa; there is no subsidiary spine on the outer side of the large spine on interstriae 7; the setae on the elytral disc are longer and more abundant, although still sparsely distributed. *D. africanus* can be further distinguished from *D. malgassicus* by the sharply pointed, not obtuse or truncate, elytral spines. The spine on interstriae 9 is unidentate not bidentate. The characters of the species suggest that it is an endemic Afrotropical species, and not an import from the Oriental or Papuan regions. It appears to be morphologically distinct from all species described from the latter areas.

New synonymy and notes on species

Diapus javanus Murayama, revised status (Fig. 3)

Diapus aculeatus javanus Murayama, 1931: 200.

Remarks. This subspecies of the Japanese species, *D. aculeatus* Blandford, was briefly described by Murayama (1931) from male

and female specimens from Java which were smaller and more weakly sculptured than the type species. The subspecies listed as a synonym of *D. aculeatus* by Wood and Bright (1992). The types are not in the Murayama collection in USNM (G.N. House *in litt.*), and appear to have been lost. However, there are three male and two female specimens in BMNH which have the same data as the types, and which agree with Murayama's brief description. Two males and one female from this series are labelled as the holotype and paratypes of *Diapus gedeanus* Browne - a manuscript name which has no taxonomic status. The other two specimens identified by F.G. Browne as *Diapus aculeatus javanus* Murayama. A further male specimen collected in Sabah is conspecific. I have compared this series with a series of male and female specimens of *D. aculeatus* from Japan identified by Murayama (USNM). In my opinion, the specimens from Java and Sabah represent a good species allied to, but distinct from *D. aculeatus*. Murayama's subspecies is, therefore, raised to specific rank, and the male and female described in more detail below.

Male: 2.3 - 2.5 mm long, 3.7 - 3.85 times as long as wide, yellowish-brown, the head, antennal clubs, dorsum of the pronotum, and elytral apices darker. Head with frons nearly flat, slightly impressed in upper half, dull, weakly strigose, median stria very short, very slightly raised, fairly densely, rather coarsely punctured in lower part, the punctures finer above, bearing erect or somewhat upcurved hairs, vertex rounded, more coarsely punctured, strigose posteriorly between the usual slightly raised median and lateral ridges, the erect hairs longer than on the frons. Antennae inserted in lower quarter of frons, scape unmodified, with scattered, rather long hairs, club without a testaceous area on anterior face. Pronotum 1.1 times as long as wide, femoral grooves shallow, deepest 0.35 of distance from apex, surface smooth to weakly reticulate, shining, a row of fine punctures just behind apex bearing short, erect hairs, median stria distinct, extending from base a little more than 0.4 of pronotal length, a subbasal band of 70 - 80 small mycangial pores, 3 - 4 rows deep, extending on each side of median stria for 0.65 - 0.70 of maximum pronotal width. Elytra about 2.2 times as long as wide, twice as long as pronotum, sides slightly diverging, widest about 0.75 of length from base, then weakly narrowed to dentate apex, subshining; striae sparsely, finely punctured, striae 1 - 2 impressed

for almost whole length, interstriae nearly impunctate, interstriae 3 and 5 clearly convex on either side of flattened interstriae 4, posterior one-third of disc between interstriae 7 and 9 widened to form a smooth, flattened area in which striae are obsolete, and with a broad, acute, apical margin, interstriae 9 carinate from humerus to near apex; at apex of disc, interstriae 1 with a small tooth, interstriae 3, 5 and 7 with much longer, narrow, acutely pointed teeth, the tooth on interstriae 7 usually slightly longer than the other two which are subequal, apical margin between interstriae 7 and 9 armed with a series of 7 - 9 minute teeth (Fig. 3); declivity very short, concave, with a spine on each side below the end of interstriae 4, posterolateral angles prolonged into short, slightly curved spines; vestiture very sparse, a few hairs on discal interstriae posteriorly, and on elytral margins, a row of short hairs on posterior part of interstriae 9, and some longer hairs on apical teeth and spines. Abdomen with fifth ventrite moderately concave, oblique, fourth ventrite without a membranous extension, both with numerous hairs.

Female: Resembling male, but a little longer, 2.6 - 2.7 mm long, upper part of frons more strongly impressed above a transverse carina, lacking brushes of hairs (as male) and the short median stria. Antennal scape somewhat enlarged, with a rather sparse fringe of downwardly curved hairs on outer margin. Pronotum slightly more elongate, 1.2 times as long as wide, with subbasal band of mycangial pores a little deeper antero-posteriorly, and the pores a little larger, but not extending further laterally than in the male. Elytra similar in proportions to male, but the posterior flattened area between interstriae 7 and 9 much narrower, bluntly rounded apically and lacking the apical teeth and spines, with some coarser punctures apically between the apices of interstriae 3 and 5, and more laterally, declivity very short, convex with a fringe of short hairs. Abdomen with fifth ventrite convex, densely hairy.

The male of the species can be distinguished from the closely related *D. aculeatus*, by its smaller size (2.3 - 2.5 mm long relative to 2.8 - 2.95 mm), and slightly more elongate body (3.7 - 3.8 times as long as wide relative to 3.55 - 3.7 times), interstriae 1 with a distinct tooth at the apex of the disc (lacking or minute in *D. aculeatus*), interstriae 7 with a spine nearly equal in length to the spines on interstriae 3 and 5 (much shorter and more like a flattened tooth in *D. aculeatus*) (compare Figs. 2 and 3), the presence of a series of

spinules on the upper declivital margin lateral to the spine on interstriae 7 (absent in *D. aculeatus*), and the absence of two widely separated spines on the fourth abdominal ventrite (present in *D. aculeatus*). The female is very similar to that of *D. aculeatus*, and is most easily distinguished by its smaller size (2.6 - 2.7 mm relative to 2.9 - 3.1 mm). (Females of related species of Platypodidae are usually much more similar morphologically than the males.) *D. javanus* is known only from Indonesia (Java) and Malaysia (Sabah), whereas *D. aculeatus* has a more northerly distribution from northern India to Taiwan and Japan. Kalshoven (1960) notes that *D. javanus* (as *D. aculeatus*) was collected in small numbers from logs of '*Castanea javanica*' and '*C. tunggurut*' (Fagaceae), and briefly describes the gallery system. *D. aculeatus* also shows a strong preference for trees of the family Fagaceae (Nobuchi 1973).

Material examined. [Indonesia], Java, Mount Gedé, 900 m, xi.1924, L. G. E. Kalshoven (3 males, 2 females) [BMNH]; Malaysia, Sabah, Sipitang, Mendolong, 13.v.1988, S. Adebratt (male) [RAB].

Diapus quinquespinatus Chapuis

Diapus quinquespinatus Chapuis, 1865: 334.

Diapus tonkinensis Schedl, 1972: 201. **New Synonymy**

Remarks. I have examined the holotype of *D. tonkinensis* (BMNH) and compared it with syntypes of *D. quinquespinatus* (BMNH), and series of the latter species from the Afrotropical, Oriental and Pacific regions in my own collection. *D. tonkinensis* is larger (3.2 mm long) than most other specimens of *D. quinquespinatus* that I have seen, but is equalled in size by a specimen in RAB from Western Samoa. The other characters are not distinctive, falling within the range of variation shown by *D. quinquespinatus*.

Diapus truncatus Nijima & Murayama

Diapus truncatus Nijima & Murayama, in Murayama, 1934: 143.

Diapus spatulifer Browne, 1977: 10. **New Synonymy**

Remarks. *Diapus truncatus* was described from two male and one female syntypes. One male and one female are held by the USNM

in the Murayama collection, both mounted on the same pin. The upper specimen (male) is hereby designated lectotype, and the lower specimen (female) paralectotype. The pin bears the following three labels: VI. 1914/ Arisan/ Col. M.Maki // *Diapus truncatus*/ Murayama/ n.sp./ Type// J.Murayama/ Collection/ 1976.

I have directly compared the two types of *D.truncatus* with the holotype male, and male and female paratypes of *Diapus spatulifer* (BMNH). *D.spatulifer* is a somewhat variable species, particularly with regard to the shape of the mandibular appendages (cf. Fig. 2B, C in Browne 1977). The mandibular appendages of the female paralectotype of *D.truncatus* are broadly expanded towards the apex, as in some specimens of *D.spatulifer*. I believe that only a single species is represented. The species is known from Taiwan and the Himalayan foothills in the Indian states of Bihar and Uttar Pradesh. It will probably be found to occur in suitable intervening areas of China, and perhaps northern Myanmar. I know of no host records from Taiwan, but the species is evidently polyphagous in India (Browne 1977).

***Genyocerus quadrispinosus* Schedl, new combination**

Diapus quadrispinosus Schedl, 1969: 218.

Remarks. I have examined paratypes of *D.quadrispinosus* (NHMW). The species is closely related to *Genyocerus pendleburyi* (Schedl), *G.borneensis* (Browne) and *G.spinatus* (Browne), which were transferred from *Diapus* to *Genyocerus* by Beaver (1998), and also has to be transferred to the latter genus.

***Platypus beaveri* Browne**

Diapus formosanus Nijima and Murayama, in Murayama, 1925: 217 (nec *Platypus formosanus* Nijima and Murayama, in Murayama, 1925: 215). **New Synonymy**
Platypus beaveri Browne, in Beaver & Browne, 1975: 306.
Platypus keelungensis Browne, 1985: 294. **New Synonymy**

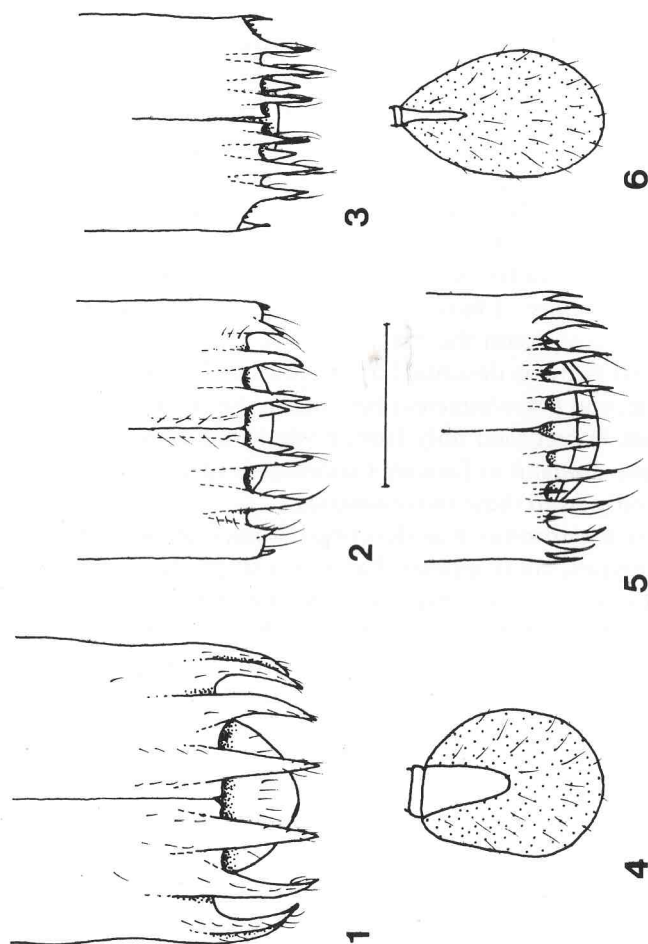
Remarks. I have examined a male syntype of *D.formosanus* (USNM). It clearly belongs in the genus *Platypus* and in the group of species related to *Platypus hirtellus* Schedl. It may be noted that

Murayama's detailed figures of *D.formosanus* (Murayama, 1925: Plate XII, Figs.7, 7a, 8, 8a) clearly show a male and female quite unlike any species of *Diapus*. It is curious that the error has not been corrected earlier. I have compared the syntype with the male holotype (BMNH) of *Platypus beaveri* Browne from northern Thailand, and with two male paratypes in my collection. The only difference between the two species is in their size (3.7 mm vs. 3.2 - 3.3 mm for *P.beaveri*). In the absence of further distinguishing characters, I consider the two species to be synonymous. The transfer of *Diapus formosanus* to *Platypus* creates a secondary homonym of *Platypus formosanus* Nijima & Murayama (Murayama, 1925: 215). However, because of the synonymy just proposed, a new name is not necessary. The name *Platypus beaveri* is available and can be used for the species previously known as *Diapus formosanus*. I have also compared the male holotype of *P.beaveri* directly with the male holotype (BMNH) of *Platypus keelungensis* Browne described from Taiwan. The two are clearly conspecific, and *P.keelungensis* becomes a synonym of *P.beaveri*. The species is recorded only from hosts in the family Fagaceae (*Lithocarpus konishii* in Taiwan, *Castanopsis* sp. in Thailand), and is known only from these two countries.

Diapus formosanus was described from four male and four female syntypes, but it appears that only a single male survives. I hereby designate as lectotype a male specimen in the USNM labelled (partly in Japanese script) as follows: [Japanese script] 4.III.25/ [male symbol]/ Jan. 2 1923// *Diapus/ formosanus/* Murayama// Formosa/ Jan. 1923/ Murayama// J.Murayama/ Collection/ 1976. According to Murayama (1925: 219) the species was described from Rengeti, Taichu Prov., Formosa.

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Figs 1-6. *Diaprius* species. 1-3, 5. Elytral apex of male: 1, *D. africanus*; 2, *D. aculeatus*; 3, *D. javanus*; 5, *D. sabahensis*. 4, 6. Antennal club, outer side: 4, *D. africanus*; 6, *D. sabahensis*. Scale line = 0.5 mm (figs 1-3, 5); 0.25 mm (figs 4, 6).

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