Two new Oriental genera of Doryctinae (Hymenoptera, Braconidae) from termite nests

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(Accepted 20 December 2000)

Two new genera of the subfamily Doryctinae collected in termite nests are described and illustrated: Termitospathius gen. n. from Sumatra (type species T. sumatranus sp. n.) and Ceylonspathius gen. n. from Sri Lanka (type species C. nixoni sp. n.). It is the first record of the braconids from termite nests in the Old World. The biological features of the Doryctinae species and phylogenetic positions of the new genera are discussed.

KEYWORDS: Old World, Braconidae, Doryctinae, termite nest, mode of life, new genera and species, descriptions.

Introduction

Members of the subfamily Doryctinae are idiobiont ectoparasitoids mostly on the larvae of different families of xylophagous or bark-boring Coleoptera (Tobias, 1967, 1968; Shaw and Huddleston, 1991; Belokobylskij, 1996a, 1996b). Ectoparasitic development of doryctines and the absence of trophic specialization enable the larvae of Symphyta (Xiphydriidae) and Lepidoptera (Sesiidae), living in the similar ecological conditions as xylophagous Coleoptera, to be exploited as hosts. Several specialized groups of Doryctinae infest the larvae of Lepidoptera (Crambidae, Gelechiidae, Pyralidae, Tortricidae, Prodoxidae, etc.) and Symphyta (Cephidae), developing in the stem of grasses, leaf-rolls, spinnings or leaf-mines (species of Heterospilus Haliday, Spathius Nees, Rhaconitus Ruthe, Rhoptrocentrus Marshall, Parallorhogas Marsh, Ipodoryctes Granger). Some Neotropical species of Heterospilus attack the larva of Pempfredoninae (Sphecidae) wasps of the genera Microstigmus Ducke and Spilomena Shuckard (Richards, 1935; Marsh and Melo, 1999). Unusual biological features are known for the Neotropical genus Sericobracon Shaw (Shaw and Edgerly, 1985). A species of this genus infests adult Embioptera and the larva of the parasitoid develops inside the body of embia (endoparasitic development). The data on the endoparasitizing of adults is so unexpected for the doryctine mode of life that they need to be verified.

Phytophagy was recorded for some Neotropical members of Doryctinae (as well
as *Monitoriella* Hedqvist (Exothecinae: Infante *et al.*, 1995) and *Mesostoa* Achterberg (Mesostoinae: Austin and Dangerfield, 1998; cited from: Macedo *et al.*, 1998). The species of *Allorhagias* Gahan are known to feed on the seed tissue of *Pithecellobium tortum* Martius (Papilionaceae) (Macedo and Monteiro, 1989; Marsh, 1991; Macedo *et al.*, 1998). Species of *Psenobolus* Reinhard were recorded in figs of *Ficus* spp. in Central America, where they developed as inquilines with chalcid fig wasps and had very distinct sexual dimorphism (Ramirez and Marsh, 1996). No indication of parasitic development of this wasp was found, and phytophagy is the most probable type of feeding of *Psenobolus* species.

The genera *Ypsistocerus* Cushman and *Termitobracon* Brues were collected from termite nests in Central and South America (Brues, 1923; Cushman, 1923). This ecological niche, and the highly specific morphological characters of these genera, suggested their placement in the subfamily Ypsistocerinae a long time ago (Cushman, 1923; Shenefelt, 1978). However, investigation of the venom glands and reservoirs, and structures of the ovipositor, revealed an affinity of these genera with Doryctinae (Quicke and Achterberg, 1990; Quicke *et al.*, 1992a, 1992b), where they are now placed as a separate tribe only. The members of these genera live in the termite nests, but probably infest larvae of termitophilous beetles or some other inquiline insects.

Two new genera described below (Termitospathius gen. n. and Ceylonspathius gen. n.) are the first record of doryctines from termite nests in the Old World. The label data for *Ceylonspathius nixoni* sp. n., ‘supposed to be parasitic on egg of the termite’, are rather dubious. Probably (as is also supposed for Neotropical genera of Ypsistocerini: Quicke and Achterberg, 1990), the members of these genera attack other inquiline insects in the termite nests (e.g. termitophilous beetles).

Whereas the phylogenetic position of the tribe Ypsistocerini is not clear yet, the close relationship of *Termitospathius* and *Ceylonspathius* with Spathiini is beyond doubt. The synapomorphies of these genera and Spathiini are the long acrosternite of first metasomal tergite (which is longer than half of tergite) and the venation of the fore wing (the state of the last character unknown for *Ceylonspathius*). The similar mode of life inside termite nests has resulted in the parallel development of several morphological characters in the new genera described herein and in genera of Ypsistocerini. These are: widely separated antennal sockets which have a high position on the head, small eyes, reduced numbers of palpal segments, almost entirely smooth body, absence of marginate areas on propodeum and metapleural flange, shortened and transformed wings of males. However, these apomorphic states indicate only the canalization of the evolutionary transformation in the similar conditions of the termite nest in the two separate phylogenetic groups of Doryctinae.

The terms of wing venation are used as defined by Belokobylskij and Tobias (1998). The following abbreviation are used: POL, postocellar line; OOL, ocellar–ocellar line; Od, maximum diameter of lateral ocellus; BMNH, The Natural History Museum (London, UK); CNC, Canadian National Collection (Ottawa, Canada); ZISP, Zoological Institute, Russian Academy of Sciences (St Petersburg, Russia).

**Termitospathius** gen. n.

*Type species.* *Termitospathius sumatranus* sp. n.

*Etymology.* From ‘termite’ and ‘Spathius’, because this genus is similar to *Spathius* Nees and was collected in the termite nest. Gender is masculine.
Diagnosis. This new genus is similar in widespread to the Old World genus *Spathius* Nees (Spathini) and differs in the palpi with fewer segments, basal segments of flagellum without placoid sensilla, metapleurale flange absent, all femora with a more or less distinct ventropapical tooth, third to sixth metasomal tergites shortly setose entirely and body almost entirely smooth. This new genus is similar also to *Embobraccon* Achterberg from Panama (Achterberg, 1995) and differs in the basal segments of the flagellum without placoid sensilla, metapleurale flange absent, all femora with more or less distinct ventropapical tooth, postfurcal position of recurrent vein, closed radial cell of fore wing, closed medial cell of hind wing, distinct notauli, and hypopygium of female not retractable under metasoma.

Description

Head weakly transverse (figure 2), its width 1.5 × median length. Ocelli almost an equilateral triangle. Antennal socket situated at upper level of eyes, its maximum diameter 0.8–0.9 × distance between sockets, almost twice distance from socket to eye (figure 1). Eyes glabrous. Occipital carina distinct, shortly interrupted dorsally, ventrally absent at long distance. Malar suture very shallow or absent. Hypoclpeal depression round (figure 1). Postgenal bridge rather wide. Palpi short; maxillary palpi five-segmented, labial palpi three-segmented. Scapus (figure 4) rather long, without apical lobe; length of scapus 1.7–1.9 × its maximum width. Three or four basal segments of flagellum without placoid sensilla (figure 4).

Neck of promesosoma rather short (figure 13). Pronotal keel present, but fine, situated in anterior third of pronotum. Propleurale lobe present and narrow. Mesonotum highly and convexly raised above pronotum (figure 13). Notaulli smooth, deep in anterior half, more or less shallow in posterior half. Scuto-scutellar suture present. Postscutellatum without median tooth. Mesopleural pit narrow, long, oblique, running along most parts of mesopleura. Sternaulli absent or almost absent. Prepectal carina present ventrally only. Metapleurale flange absent. Propodeum without marginate areas, lateral tubercles very small or indistinct, propodeal bridge absent. Propodeal spiracles small and round, situated in basal one-quarter. Metapleurale suture indistinct.

Pterostigma of fore wing (figure 5) narrow and long; radial vein arising before middle of pterostigma. Both radiomediale veins present. Recurrent vein postfurcal. Nervulus present. Discoidal cell very shortly petiolate. Parallel vein almost interstitial. Brachial cell closed. Transverse anal veins absent. Hind wing (figure 6) with four hamuli. Nervculus present. Submedial cell small. First abscissa of mediocubital vein 0.6 × as long as second abscissa. Recurrent vein present. Medial cell narrow, 0.4 × as long as hind wing. Radial vein arising from costal vein. Radial cell narrowed toward apex, without additional transverse vein. Wings of male narrow and distinctly shortened, fore wing with sclerotized apical third (figures 7, 8).

Legs. All femora ventrally with more or less distinct subapical teeth (figures 9, 10), but in hind femur this tooth small; in male all these teeth small. Fore and middle tibiae with sparse small spines almost in one row. Hind tibia with four slender spines in outer distal margin and with sparse hairs in inner distal edge. All basitarsi subcylindrical and straight. Hind coxa small, without basoventral tooth (figure 10). All femora without dorsal protuberances. Hind tibial spurs rather short, slender, glabrous, but with single long median seta; inner spur about 0.3 × as long as hind basitarsus. Basitarsus of hind tarsus 0.8–0.9 × as long as second to fifth segments combined.
First metasomal tergite petiolate, rather wide (figures 14–16). Acrosternite 0.5–0.6 × as long as first tergite, its apical margin situated significantly behind spiracles (figure 14). Dorsopore of first tergite and basolateral lobes absent. Second suture indistinct. Third to sixth tergites entirely shortly setose. Second tergite without areas or furrows (figure 16). Second and succeeding tergites without separate laterotergites. Ovipositor shorter than metasoma. Apical part of ovipositor with two small dorsal nodes and serrate ventrally (figure 12).

**Distribution.** Indonesia (Sumatra 1.)

**Termitosphathius sumatranus** sp. n.  
(figures 1–16)


**Paratype.** One male, with same label (ZISP).

**Description**

**Female.** Body length 3.0 mm; fore wing length 2.2 mm. Head behind eyes weakly roundly narrowed, temple 1.8 × as long as transverse diameter of eye (dorsal view). POL 1.4 × Od, 0.3 × OOL; Od 0.2 × OOL. Malar space height equal to height of eye, 1.5 × basal width of mandible. Face width 1.8 × eye height and equal to height of face and clypeus combined. Clypeus with short flange along lower margin. Width of hypoclypeal depression 0.75 × distance from depression to eye, 0.4 × width of face. Head distinctly and roundly narrowed below eyes.

Antennae setiform, 23-segmented, flagellar segments thick basally. Three basal segment of flagellum widened submedially, shortly and very sparsely setose. Segments in apical half of antenna moniliform, with rather long and almost erect hairs. First flagellar segment 3 × as long as its maximum width, 1.1 × as long as second segment. Penultimate segment 2.2 × as long as its maximum width, almost as long as apical segment, which is pointed apically.

**Mesosoma.** Length 1.7 × its height. Subalar depression smooth, with fine striation below. Propodeum weakly roundly sloping backward (lateral view).

**Wing.** Length of fore wing 3.3 × its maximum width. Pterostigma 5.7 × as long as wide, 0.9 × as long as metacarpos. Second radial abscissa 3.7 × first abscissa, 0.5 × straight third abscissa, 1.6 × second radiomedial vein. Length of second radiomedial cell about 3 × its width, 1.6 × length of brachial cell. Second abscissa of medial vein 0.6 × as long as recurrent vein.

**Legs.** Hind femur 3.6–4.2 × as long as wide. Hind tarsus almost as long as hind tibia. Second tarsal segment 0.3 × as long as first segment, almost as long as fifth segment (without pretarsus). Hind basitarsus without lower keel.

**Metasoma.** Length of petiole 1.7 × its apical width, 1.6 × length of propodeum. Combined length of second and third tergites almost equal to basal width of second tergite. Ovipositor sheath 0.8 × as long as metasoma, 3 × as long as petiole, 0.65 × as long as fore wing.

**Sculpture and pubescence.** Head smooth, face finely rugulose in lower third. Mesosoma almost entirely smooth. Legs smooth. Metasoma smooth, petiole laterally narrowly and finely aciculate. Face densely and shortly setose, clypeus with long hairs. Mesosoma, metasoma and legs with very short and rather sparse hairs.
Fig. 1–16. *Termitospathius sumatranus* gen. et sp. n. (1–6, 9–16: female; 7, 8: male). (1) Head, frontal view; (2) head, dorsal view; (3) head, lateral view; (4) basal and apical segments of antenna; (5, 8) fore wing; (6, 7) hind wing; (9) fore femur; (10) hind coxa, trochanter, trochantellus and femur; (11) hind tibia; (12) apex of ovipositor; (13) mesosoma, lateral view; (14) petiole, lateral view; (15) petiole, dorsal view; (16) metasoma, dorsal view.

**Colour.** Body light reddish brown, metasoma paler. Antenna yellow in basal third, yellowish brown submedially, dark brown in apical half. Palpi yellow. Legs yellowish brown, sometimes darker, all trochanters and trochantelli, fore and middle coxae, apex of femora, base and apex of tibiae and all tarsi yellow. Wings very faintly infuscate. Pterostigma brown.
Male. Body length 2.9 mm; fore wing length 1.1 mm. Head behind eyes widened in anterior half, roundly narrowed in posterior half; temple 2.8 × as long as transverse diameter of eye. POL almost equal to Od. 0.2 × OOL. Malar space height 1.4 × height of eye. Face width twice eye height. Width of hypoclypeal depression 0.7 × distance from depression to eye, 0.45 × width of face. Antenna 22-segmented. Four basal segments of flagellum without placoid sensilla, first flagellar segment 2.6 × its maximum width, almost equal to second segment. Penultimate segment twice as long as width. Length of mesosoma about twice its height. Length of fore wing about 7 × its width. Longitudinal veins, anastomosing submedially, present in basal two-thirds of fore wing. Apical sclerotized part of wing elongate. Hind tarsus 0.9 × as long as hind tibia. Second tarsal segment 0.8 × as long as fifth segment (without pretarsus). Petiole 1.7 × as long as propodeum. Combined length of second and third tergites 1.2 × basal width of second tergite. Petiole entirely smooth. Otherwise similar to female.

Ceylonpathius gen. n.

Type species. Ceylonpathius nixoni sp. n.

Etyymology. From ‘Ceylon’ and ‘Spathius’, because this genus is similar to Spathius Nees and was collected in the termite nest in Sri Lanka (Ceylon). Gender is masculine.

Diagnosis. This new genus is closely similar to Termitospathius gen. n. and differs in the basitarsi of all legs strongly depressed and usually curved, sternauli present, prepectal carina absent, propodeum with several depressions, and metasomal tergites glabrous.

Description

Head weakly transverse (figure 18), its width 1.6 × median length. Ocelli almost an equilateral triangle. Antennal socket situated at upper level of eyes, its maximum diameter equal to distance between sockets, 2.8 × distance from socket to eye (figure 17). Eyes glabrous. Occipital carina rather fine, but distinct, shortly interrupted dorsally and with two distinct submedian teeth upper, ventrally absent at short distance near mandible. Malar suture very shallow. Hypoclypeal depression suboval (figure 17). Postgenal bridge rather wide. Palpi short; maxillary palpi five-segmented, labial palpi three-segmented, labial segments very short. Scapus (figure 20) wide, without apical lobe; length of scapus 1.5 × its maximum width. Four basal segments of flagellum without placoid sensilla (figure 20).


Wings missing; venation may be similar basically to that in Termitospathius.

Legs. Fore and middle femora very thick and wide, with distinct subapical tooth ventrally (figures 21–23); hind femur less widened and with small ventral
tooth (figure 24). Fore and middle tibiae strongly curved in basal third (figure 21). Fore tibia with dense small spines in narrow line. Hind tibia with three slender spines in outer distal margin and with sparse and short hairs in inner distal margin. Fore and middle basitarsi short, depressed and distinctly curved (figure 21); hind basitarsus long, depressed and almost straight. Hind coxa rather large, with small basoventral tooth. All femora without dorsal protuberances. Hind tibial spurs rather long, slender, glabrous, inner spur about 0.6 × as long as hind basitarsus. Basitarsus of hind tarsus 0.6 × as long as second to fifth segments combined.

First metasomal tergite petiolate, narrow (figures 25, 26). Acrosternite 0.7 × as long as first tergite, its apical margin situated significantly behind spiracles. Dorsopre of first tergite and basolateral lobes absent. Second suture absent. Third to sixth tergites entirely glabrous. Second tergite without areas or furrows (figure 26). Second and following tergites without separate laterotergites. Ovipositor shorter than metasoma. Apical part of ovipositor with two small dorsal nodes and serrate ventrally (figure 27).

**Distribution.** Sri Lanka.

_Ceylonopathius nixoni_ sp. n.  
(figures 17–29)


**Description**

**Female.** Body length 3.6 mm. Head behind eyes weakly widened anteriorly, roundly narrowed posteriorly, temple 1.8 × as long as transverse diameter of eye (dorsal view). POL 1.6 × Od, 0.4 × OOL; Od 0.25 × OOL. Malar space height 0.9 × height of eye, 1.5 × basal width of mandible. Face width 1.6 × eye height and almost equal to height of face and clypeus combined. Clypeus with very short flange along lower margin. Width of hypopyleal depression 0.6 × distance from depression to eye, 0.35 × width of face. Head distinctly and roundly narrowed below eyes.

Antennae almost filiform, rather thick, more than 18-segmented (apical segments broken). Four basal segments of flagellum widened apically, rather shortly setose. Subapical segments moniliform and with rather long hairs. First flagellar segment 2.5 × as long as its apical width, slightly shorter than second segment. Subapical segments 1.2–1.3 × as long as their maximum width.

**Mesosoma.** Length 1.8 × its height. Subalar depression entirely smooth. Propodeum distinctly and almost linearly sloping toward apex (lateral view), with shallow longitudinal median depression, oblique basomedian short furrows, two mediolateral and two posterior subround depressions. Sternauli crenulate.

**Legs.** Fore and middle femora very thick and wide; length of fore femur twice its width (without tooth), length of middle femur almost twice. Hind femur 3 × as long as wide. Hind tibia 1.4 × as long as hind tarsus.

**Metasoma.** Length of petiole 1.6 × its apical width, 1.2 × as long as propodeum. Combined length of second and third tergites 1.6 × basal width of second tergite. Ovipositor sheath 0.8 × as long as metasoma, 2.4 × as long as petiole, as long as mesosoma.
Sculpture and pubescence. Head smooth, malar space with fine striation near base of mandible. Mesosoma, legs and metasoma smooth. Face sparsely and shortly setose, clypeus with long hairs. Rest of body almost glabrous (including metasomal tergites). Ovipositor sheath with long dense erect hairs.


Male. Unknown.
Acknowledgements

I wish to express my sincere thanks to Dr M. Sharkey, Dr D. Quicke and Dr M. Fitton (London) for the important opportunities to visit Ottawa and London and work with material of the Canadian National Collection and the famous collection of the Natural History Museum. I am very grateful to Dr B. A. Korotyaev for his very useful corrections of the English text.

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