

A new subgenus and two new species of the troglobitic genus *Dongodytes* Deuve from Guangxi, China (Coleoptera, Carabidae)

Mingyi TIAN

Department of Entomology, College of Natural Resources & Environment, South China Agricultural University, Wushan, Guangzhou, Guangdong, 510640, China; e-mail: mytian168@yahoo.com.cn

ABSTRACT

In the present paper, a new subgenus and two new species of the cave-dwelling genus *Dongodytes* Deuve, 1993 are described and illustrated: *Dongodytes (Dongodytodes) deharvengi*, subgen. and sp. nov. and *Dongodytes baxian*, sp. nov. from Du'an Xian, North Guangxi, China.

Key words: cave beetles, Trechinae, new subgenus, new species, Guangxi, China

INTRODUCTION

Since *Sinaphaenops mirabilissimus* Uéno & Wang, the first blind trechine was described in mainland China (Uéno and Wang 1991), many new genera and species have been discovered in southern Provinces or Regions such as Guizhou, Guangxi, Yunnan, Hunan, Sichuan and Chongqing, making China one of the richest countries in cave-dwelling trechine beetles on both generic and specific aspects (Tian 2008). Furthermore, all Chinese genera and species of cave-dwelling beetles are endemic, most of them occurring in a very narrow area, generally known only from the type locality, i.e. one or a few caves (Latella and Chen 2008). Because China holds the largest karstic areas in the world it is supposed that more and more new taxa of cave-dwelling trechines will be discovered in near future even they are always so rare.

It is too early to discuss the phylogenetic relationships of cave-dwelling trechines in China because of poor knowledge on the cave fauna of the country. For instance, the peculiar genus *Dongodytes* Deuve, 1993 is one of the most cave adapted trechine genera in the world (Ueno 1998). It is composed of three species so far, viz. *D. fowleri* Deuve, 1993, *D. grandis* Uéno, 1998 and *D. giraffa* Ueno, 2005. But the relationship of this genus within Trechinae has not been well determined. It was regarded either close to *Sinaphaenops* Uéno & Wang (Deuve, 1993), or allied to European trechine *Aphaenops* series (Vigna Taglianti 1997; Uéno 1998); for the latter hypothesis, there would be a big challenge to explain how to link between both lineages from the zoogeographical point of view.

Our recent discovery might provide a very important evidence for this interesting topic. Sponsored by a World Bank project which managed by the Biodiversity Office, Guangxi Forestry Bureau, Nanning, Dr. Louis Deharveng

(the Paris Museum of Natural History, MNHN), and the author, with assistance of Dr. Anne Bedos (MNHN) and Dr. Li Youbang (Guangxi Forestry Bureau, Nanning), made a twenty-day collecting exploration on cave fauna in several selected karstic areas of Guangxi Zhuang Minority Autonomous Region in April, 2010. Among the large collected material, we found two new species of *Dongodytes*, one of them represents a new subgenus which evidently different from the nominate subgenus.

MATERIALS AND METHOD

All specimens used in the study were collected in Du'an Yao Minority Autonomous Xian, Hechi City, Guangxi. All specimens are deposited in the insect collection of South China Agricultural University (SCAU), except two paratypes of *Dongodytes (Dongodytodes) deharvengi* sp. nov. in MNHN, Paris. Abbreviations of measurement used in the text are the same as in Tian (2009).

RESULTS

Dongodytodes, subgen. nov.
(Figs 1-5)

Type species: *Dongodytes (Dongodytodes) deharvengi*, sp. nov.

Diagnosis. *Dongodytodes*, subgen. nov. is similar to *Dongodytes* (s.str.) concerning the evidently swollen prothorax, the very elongate elytra without humeral angles, the unmodified protarsi of male, the bisetose labial palpomere 2 and the chaetotaxal pattern of elytra. However, the following peculiar features of *Dongodytodes* make it fall into another lineage rather than *Dongodytes*



Fig. 1 - *Dongodytes (Dongodytodes) deharvengi*, subgen. and sp. nov., habitus (paratype, female, photographed by Gao Qi).

(s.str.): (1) head more stout and broadly convex posteriorly, widest at the level of the end of frontal furrows, and neck very short in *Dongodytodes*, versus long and narrowly gradually convergent posteriorly, widest at the level of anterior supraorbital pores, neck much longer in *Dongodytes* (s.str.); frontal furrows shorter, straight and subparallel-sided before divergence in *Dongodytodes*, versus longer, evidently sinuate and not parallel-sided before divergence in *Dongodytes* (s.str.); head with two pairs of supraorbital pores, posterior pores far from anterior ones and closer to neck in *Dongodytodes*, versus both anterior and posterior pores (the latter sometimes not well marked, and irregularly located, or wanted) closer to each other than the posterior one to the neck in *Dongodytes* (s.str.); (2) antennae stouter and much shorter, hardly extending to beyond apices of elytra in *Dongodytodes*, versus much longer, elongate, and evidently extending over elytral apices in *Dongodytes* (s.str.); (3) clypeus sexsetose in *Dongodytodes*, versus quadrisetose in *Dongodytes* (s.str.); (4) surface of body densely covered with long and erected hairs or pubescence, and more or less punctate on elytra in *Dongodytodes*, versus with only a few sparse setae on head or sometimes on pronotum, and glabrous and impunctate on elytra in *Dongodytes* (s.str.); (5) the elytral chaetotaxal pattern of *Dongodytodes* is quite similar to that of *Dongodytes* (s.str.), but stria 3 with only one setiferous pore at about 3/5 from base in *Dongodytodes*, versus two or three in *Dongodytes* (s.str.); (6) elytral striae more or less evident throughout in *Dongodytodes*, but rather faint in *Dongodytes* (s.str.); (7) abdominal ventrite VII of male with only one pair preapical setae in *Dongodytodes*, versus two pairs in *Dongodytes* (s.str.); ventrites IV-VI each with only one pair of paramedian setae in *Dongodytodes*, versus two pairs in *Dongodytes* (s.str.); (8) body of *Dongodytodes* smaller than that of the members of *Dongodytes* (s.str.); and (9) *Dongodytodes* with much slender, and longer male aedeagus than that of *Dongodytes* (s.str.) considering its smaller body size.

Etymology. The name of the new subgenus refers to its similarity to *Dongodytes* (s.str.).

Distribution. Guangxi (Du'an Xian).

Dongodytes (Dongodytodes) deharvengi, sp. nov.
(Figs 1-9)

Holotype: male, collected in an anonymous cave, about 4 km south of Xia'ao Xiang, Du'an Yao Minority Autonomic Xian, coordinate around 107.55 E /24.16 N, 26 April, 2010, Louis Deharveng leg., in SCAU; paratypes: 1 male and 6 females, same data as holotype, Anne Bedos, Louis Deharveng & Mingyi Tian leg., in SCAU and MNHN, respectively.

Diagnosis. Small sized, blind, dark reddish brown beetle, surface covered with dense and short bristly setae, head and pronotum smooth, elytra evidently rugose and

punctate; antennae not exceeding over the elytral apices; head evidently expanded posteriorly, posterior supraorbital pores close to neck; protarsomere 1 not modified in male; aedeagus small and slender, evenly arcuate throughout, parameres elongate, each with four long setae at apex.

Description

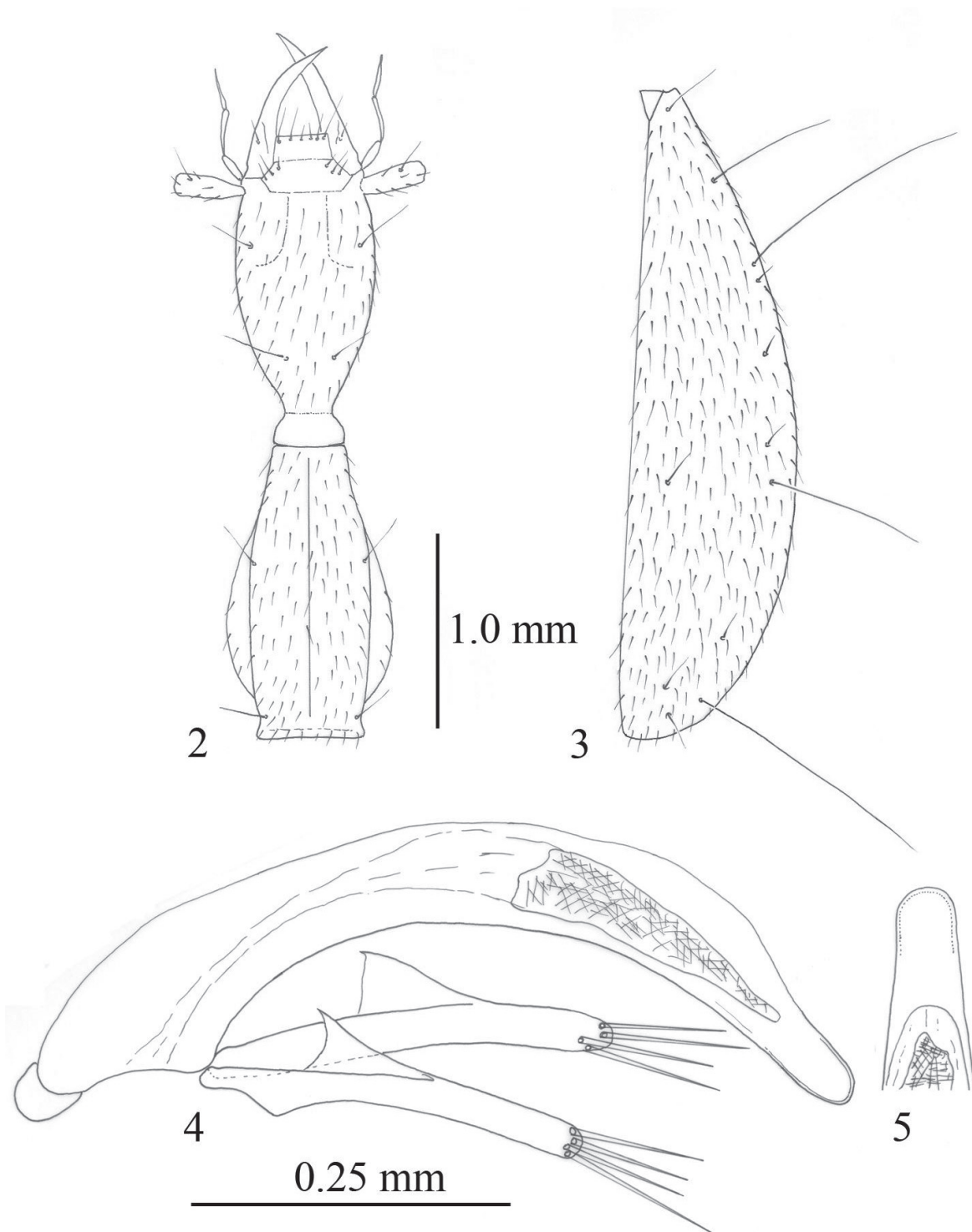
Length (including mandible): 6.2-6.4 mm.

Habitus as in Fig. 1. Whole body covered with dense and bristly setae, dark reddish brown. Surface moderately shiny, smooth on head and pronotum, more or less rugose and punctate on elytra. Microsculptural meshes fine transversal lines on head and pronotum, and strongly transversal polygons on elytra.

Head (Fig. 2) elongate and narrow, HL/HW=2.6-2.8; widest at about the level of end of frontal furrows, gently expanded from the level of posterior pores to frontal furrows, then suddenly and strongly constricted to neck; neck constriction evident, base of neck distinctly convex, ring-shaped; dorsal surface convex, frons and supraorbital area gently convex; frontal furrows comparatively short, well marked, subparallel-sided before the evidently divergence, ended a little behind the anterior supraorbital pores; the two pairs of supraorbital pores far from each other, posterior ones much closer to neck than to the anterior ones; mandibles moderately slender; labrum sexsetose, slightly bisinuate at frontal margin, with median margin nearly straight; clypeus sexsetose; mentum and submentum well separated by labial suture; mentum moderately concave, with the median tooth simple; ligula quite narrow, with two setae at apex; labial palpomere 2 bisetose at inner side; antennae rather long and slender, but not extending over elytral apices; antennomere 1 short and stout, slightly longer than antennomere 2; antennomeres 3, 4 and 5 subequal in length, each 2.3 times as long as antennomere 2.

Prothorax (Fig. 2) elongated subovate, shorter than head (including mandibles), HL/PL=1.3-1.5, but evidently wider, PW/HW=1.2; widest at about 3/7 from base, gradually narrowed towards apex but strongly towards base, suddenly sinuate before hind angles; much longer than wide, PL/PW=1.8; propleura markedly expanded, visible from above. Pronotum long, elongate, somewhat columnar; narrower than head, PNW/HW=0.8-0.9; widest at a little behind middle, and more straightly narrowed towards apex than towards base; PNW/PP=1.1, PNW/PA=1.4-1.5; posterior margin evidently wider than anterior one, PP/PA=1.4; sides feebly bordered throughout, more or less parallel-sided behind middle, sinuate before hind angles; hind angles broadly rectangular, fore angles rectangular; base more or less bordered, almost straight; disc moderately convex, basal transverse impression well marked; middle line fine and clear. Scutellum small.

Elytra (Fig. 3) elongate oblong-ovate, very narrow at base, apex narrowly rounded; much wider than wide,



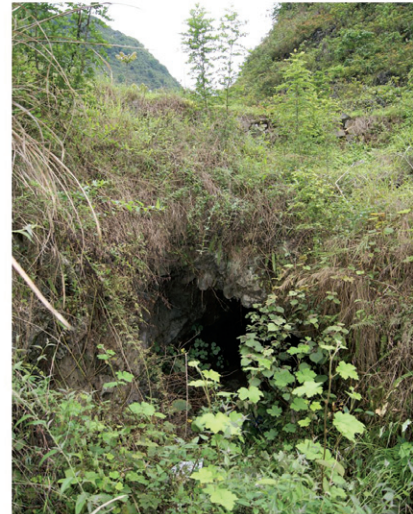
Figs 2-5 - *Dongodytes (Dongodytodes) deharvengi*, subgen. and sp. nov., holotype (2, head and prothorax; 3, right elytron; 4, aedeagus, lateral view; 5, apical part of aedeagus, dorsal view).

EL/EW=1.9; widest at about 2/3 from base, much less, and evenly narrowed towards base than towards apices, without shoulders; much wider and longer than prothorax, EW/PW=1.7, EL/PL=2.5-2.6; disc strongly convex, but evidently depressed near base; sides finely

bordered throughout, smooth; scutellar area distinctly convex before the depression, scutellar striae absent; striation very faint but traceable; stria 3 with a single moderately setiferous pore at about 3/5 from base; preapical setae present, moderate in length; marginal



6



7



8



9

Figs 6-9 - *Dongodytes (Dongodytodes) deharvengi*, subgen. and sp. nov. (6, locality of the coal mine, indicated by the arrow-head; 7-8, entrance of the mine; 9. wandering beetle in the cave).

umbilicate pores similar in arrangement to those of *Dongodytes* (s.str.).

Ventral surface wholly pubescent, denser in median portion of ventrites; apical margin of apical abdominal ventrite complete, with a pair of anal setae in male but two in female; ventrites IV-VI each with one pair of paramedian setae in both sexes.

Legs quite slender, but more or less shorter than those of *Dongodytes* (s.str.); tarsomere 1 long, pro- and metatarsomere 1 as long as pro- and metatarsomeres 2-4 combined, respectively, mesotarsomere 1 longer than tarsomeres 2-4 combined; protarsi not modified in male, though both male and female with protarsomere 1 slightly stouter than others.

Male aedeagus (Figs. 4-5) with the median lobe small and slender, evenly arcuate throughout; inner sac armed with a long and rather thin sclerotized copulatory piece, which is about 1/3 as long as the median lobe, base orifice quite narrow; in dorsal aspect, apex

broad and symmetric, nearly parallel-sided; parameres elongate, the right one as long as the left, each with four long apical setae.

Sexual dimorphism. No sexual dimorphism; male and female similar, the protarsi not modified in male, but abdominal ventrite VII with only one pair of setae in male, while two pairs in female.

Remarks. *Dongodytes (Dongodytodes) deharvengi*, sp. nov. is more or less similar to members of *Dongodytes* (s.str.). But it is very easy to separate this new species from all *Dongodytes* (s.str.) species by its smaller and pubescent body, stouter head, shorter antennae, sexsetose clypeus, punctuate elytra and slender aedeagus.

Etymology. This new species is named in honor of Dr. Louis Deharveng (MNHN, Paris), a well known specialist of Collembola and cave biodiversity.

Distribution. Guangxi (northern Du'an Xian). Known only from the type locality cave which is still anonymous. It is a ruined coal mine (Fig. 6-8). The entrance is

about 200 m from the main road (National Road G050) on the west side. First part of the passage is an horizontal mine, straight for about 30 m, then gradually going down for about 50 m, where it joins a natural cave passage. The natural passage continues towards the left (not explored); towards the right and upwards, it is a large and steep gallery for about 50 m; then, after a relatively narrower path, it goes down for about 50 m to a large room about 40 m wide. All the beetles were collected on the steep, wet and muddy slopes of this room and on formations. At the bottom of the room, the passage decreases in size and continues horizontally for at least 30 m, with some puddles. Most specimens were wandering when collected (Fig. 9) except two which were caught under stone.

Dongodytes (Dongodytes) baxian, sp. nov.
(Figs 10-13)

Holotype: male, Baxian Dong, a limestone cave in Baxian Park, at suburb of Du'an for about 8 km, 108.13°281'E / 23.91°404'N, 150 m, 26 April, 2010, Louis Deharveng leg., in SCAU.

Diagnosis. Small sized for *Dongodytes*, elongate and slender beetle; reddish brown, head, thorax covered with long and sparse setae, surface smooth, elytra glabrous; abdominal ventrites shortly pubescent; head a little more stout than other members of *Dongodytes* (s.str.), with only the anterior pair of supraorbital pores, the posterior ones wanted, with a few irregularly located setae; frontal furrows rather long; protarsomere 1 not modified in male; aedeagus very short and stout, with apical portion short and obtuse, and parameres narrow and slender, subequal in length, each with four long setae at apex.

Description

Length (including mandible): 7.3 mm.

Yellowish brown, palpi, antennomeres 5-11, and tarsi pale; surface moderately shiny, smooth on head and prothorax, faintly rugose on elytra; head and pronotum covered with long and sparse setae. Microsculptural meshes fine transverse or oblique lines on head and pronotum, irregularly polygons on elytra.

Head (Fig. 10) very long and narrow, HL/HW=3.1; widest at about the level of antennal articulation, and gradually narrowed to neck posteriorly; neck constriction quite elongate, base of neck evidently convex, ring-shaped; dorsal surface moderately convex; frontal furrows moderately long and well defined; with only anterior pairs of supraorbital pores, and a few irregularly located setae; labrum emarginated at frontal margin, clypeus quadrisetose; mandibles slender, and well developed; eyes effaced; mental tooth evident, faintly bifid at tip; palpi slender, labial palpomere 2 with two setae at inner side. Antennae long and slender, evidently extending over elytral apices; antennomere 1 with a long preapical setae and a few sparse shorter ones, other antennomeres with denser pubescence; antennomere 1 short and stout,

3.4 times as long as wide; antennomeres 1 and 2, and 3 and 4 subequal in length, respectively.

Prothorax (Fig. 10) elongated subovate, PL/PW=1.7; much shorter than head, HL/PL=1.9, as wide as head; widest at about 2/5 from base, and much more gradually narrowed towards apex than towards base; propleura markedly expanded, visible from above. Pronotum elongate, PL/PNW=2.1, much narrower than head, PNW/HW=0.3; widest at about 6/13 from base, almost straightly narrowed towards apex, and faintly sinuate towards base; PNW/PP=1.2, PNW/PA=1.8; posterior margin evidently wider than anterior one, PP/PA=1.6; sides well bordered throughout; both anterior and posterior angles rectangular, but the former more or less obtuse; with two pairs of marginal setae which is normally located. Scutellum comparatively large.

Elytra (Fig. 11) very slender, and narrow, widest at a little before 3/5 from base; EW/PW=2.0, EL/PL=2.8, EL/EW=2.0; sides well bordered throughout, smooth and not serrated; with very slight shoulders, feebly sinuate behind and almost straight before the faint shoulders; surface strongly convex exception of base area which is distinctly depressed; striae obsolete except for striae 1 and 3 which are more or less evident; stria 3 with two setiferous pores at 5/7 and 1/2 from base, respectively; marginal umbilicate pores similar to those in *D. fowleri* Deuve and *D. grandis* Ueno; without scutellar striae.

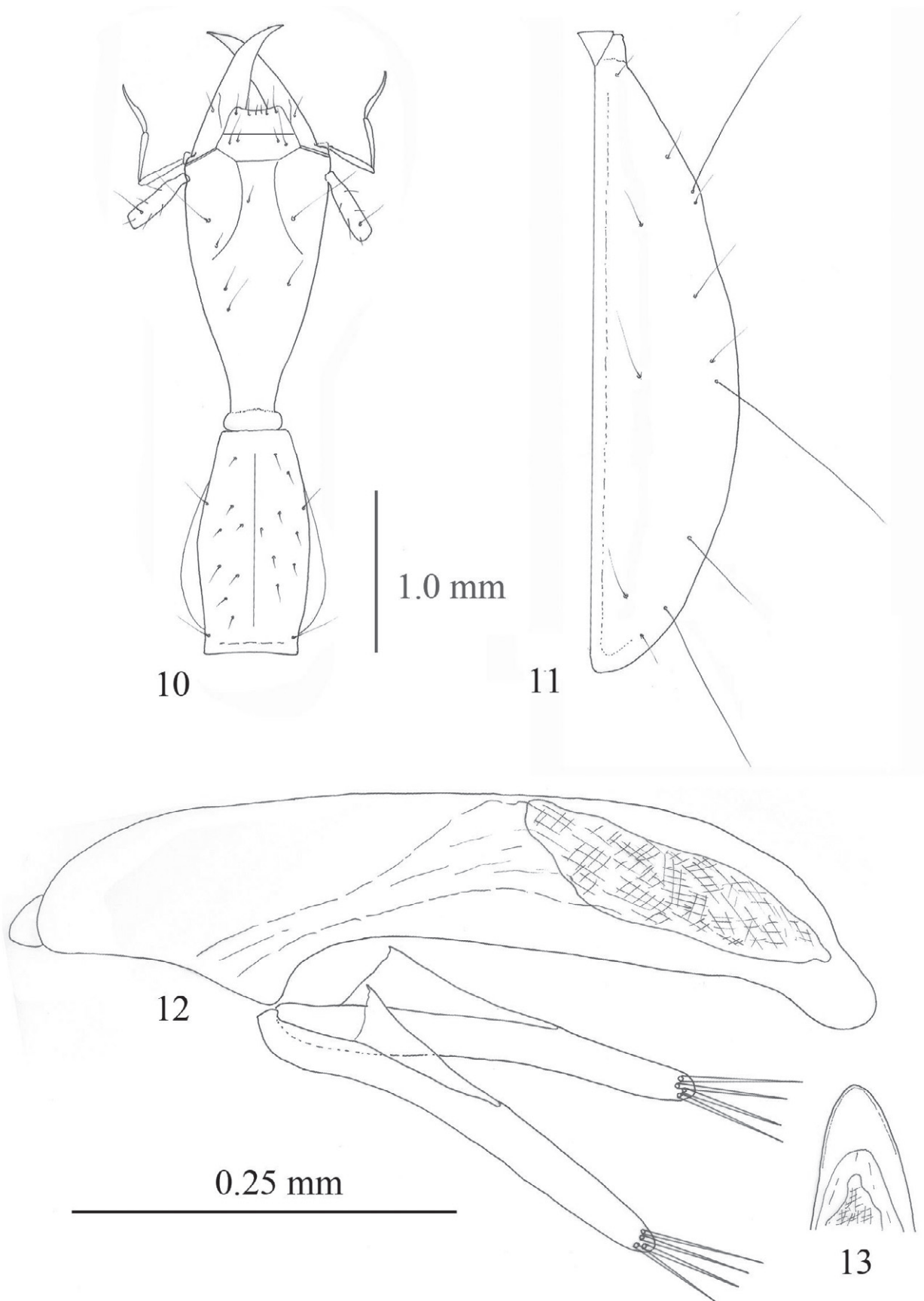
Underside of head and thoraxes smooth and glabrous, with sparse and long setae; abdominal ventrites shortly pubescent. Apical abdominal ventrite with two pairs of preapical setae; ventrites IV-VI each with a pair of setae at median portion.

Legs slender; procoxae glabrous, while meso- and metacoxae with long setae, denser on mesocoxae; tarsomere 1 long, protarsomere 1 shorter than protarsomeres 2 to 4 combined (0.8 times), while meso- and metatarsomere 1 are longer than meso- and metatarsomeres 2-4 combined (1.3 and 1.1 times), respectively; protarsomeres not modified in male.

Male aedeagus (Figs. 12-13) with the median lobe small, and short, but stout and well sclerotized, slightly membranous on apical dorsal part, base orifice wide, apex shortly broad, inner sac armed with a very large, well-defined sclerotized copulatory piece, which is about 1/3 as long as the median lobe; in dorsal aspect, apex broad, gently protrude and rounded, slightly membranous at tip; parameres long and slender, each with four long setae at apex.

Remarks. *D. baxian* sp. nov. is very similar to *D. fowleri* and *D. grandis* Ueno, but easily distinguished from them by the following characters: (1) aedeagus stouter and broader, parameres more elongate and slender; (2) pronotum covered with sparse and long setae; and (3) elytral sides slightly but obviously sinuate behind the very slight shoulders.

Etymology. This new species is named after its type locality: Baxian Dong. In Chinese, Ba Xian refers to the



Figs 10-13 - *Dongodytes baxian*, sp. nov., holotype (10, head and prothorax; 11, right elytron; 12, aedeagus, lateral view; 13, apical part of aedeagus, dorsal view).

eight immortals, viz. Zhang Guolao, Lu Dongbin, Cao Guojiu, Zhong Liquan, Li Tieguai, Han Xianzi, He Xian and Lan Caihe, who are symbols for good fortune.

Distribution. Guangxi (Du'an Xian).

ACKNOWLEDGEMENTS

I am greatly indebted to Dr. Thierry Deuve (MNHN) for his critical discussions and advices, Drs. Louis Deharveng and Anne Bedos (MNHN), and Dr. Leonardo Latella (Museo Civico di Storia Naturale di Verona) for their valuable corrections of the English text and/or suggestions which are helpful to improve the manuscript. My thanks also to Ms. Liu Jin and Dr. Tony Whitten (World Bank), Mr. Feng Bin and Dr. Li Youbang (Biodiversity Office, Guangxi Forestry Bureau, Nanning) for their various assistances during the work. This study was sponsored by the World Bank GEF-financed project "Guangxi integrated forestry development and conservation".

REFERENCES

- Deuve, T. 1993. Description de *Dongodytes fowleri* n. gen., n. sp., Coléoptère troglobie des karsts du Guangxi, Chine (Adephaga: Trechidae). Bulletin de la Société Entomologique de France, 98(3): 291-296
- Latella, L., H. Chen. 2008. Biological investigation of the Museo Civico di Storia Naturale of Verona in South China caves. Pp.65-88 in L. Latella, R. Zorzin (eds.). Research in South China Karst. Memorie del Museo Civico di Storia Naturale di Verona - 2. serie - Monografie Naturalistiche 3.
- Tian, M.Y. 2008. An overview to cave-dwelling carabid (Insecta: Coleoptera) in China. Proceedings of the 14th National Conference of speleology, Wulong, Chongqing (in Chinese): 333-342.
- Tian, M.Y. 2010. New records and new species of cave-dwelling trechine beetles from Mulun Nature Reserve, northern Guangxi, China (Insecta: Coleoptera: Carabidae: Trechinae). Subterranean Biology 7 (2009): 69-73
- Uéno, S.-I. 1998. Notes on *Dongodytes* (Coleoptera, Trechinae) with description of a new species. Journal of the Speleological Society of Japan, 23: 1-15
- Uéno, S.-I. 2005. A remarkably specialized new cave trechine (Coleoptera, Trechinae) from northern Guangxi, South China. Elytra 33(1): 333-339.
- Uéno, S.-I. & F.X. Wang. 1991. Discovery of a highly specialized cave trechine (Carabidae: Trechinae) in Southwest China. Elytra 19(1): 127-135
- Vigna Taglianti, A. 1997. A new genus and species of troglobitic Trechinae (Coleoptera, Carabidae) from southern China. International Journal of Speleology 25: 33-41