

**A contribution to knowledge of Asian species of the genus *Teuchestes* Mulsant, 1842
with descriptions of two new species (Coleoptera: Scarabaeoidea: Aphodiidae)**

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Abstract. Two new species of Aphodiini with large scutellum are described as follows: *Teuchestes guangdong* sp. nov. from China and *Teuchestes (?) hongson* sp. nov. from Thailand. A key to seven species of the genus *Teuchestes* Mulsant, 1842 occurring in Asia is provided and supported by photos of the habitus and scutellum. Few supplementary data concerning the distribution of the Asian species are mentioned. Appropriate photographs of the habitus and epipharynx are presented and a comparison of the two new species with other species of the genus is discussed. The epipharynx of the *T. uenoi* Ochi, Kawahara et Kon, 2006 is first illustrated.

INTRODUCTION

The two new species described below belong to members of the tribe Aphodiini sharing large scutellum, which were revised on the world basis by Dellacasa (1986). The revision deals with 17 genus-group taxa. Out of them, *Teuchestes* Mulsant, 1842 concerned here includes seven species worldwide: one Holarctic species, three Afrotropical species and three species occurring in the Palearctic and/or Oriental Region. Since then, a further species was described by Ochi, Kawahara & Kon (2006) from China.

In our most recent work (Rakovič & Mencl, 2011) we explained our reasons for the use of the concept, in which many genus-group taxa in Aphodiinae were raised from subgenera of the genus *Aphodius* Illiger, 1798 (Dellacasa G., Bordat & Dellacasa M. (2001)) to genera. This concept is thus also adhered to in the work presented here.

The descriptions presented below are based on unique female holotypes. The authors are convinced that the discovery of the two new species is really worthy of publication and considerably supplements currently existing knowledge of the group of species with large scutellum, which are not very numerous. Both species exert very peculiar characters. They are undoubtedly very rare and further (male) specimens are not likely to be found in the near future.

A new Key to Asian species of the genus *Teuchestes* Mulsant, 1842 is provided below to include the four Asian species keyed by Dellacasa (1986), the species recently described by Ochi, Kawahara & Kon (2006) and the two new species described here, i.e. total of 7 species known from Asia until now.

MATERIAL AND METHODS

Specimens of the species described here were examined as specified below.

The following abbreviations stand for collections, in which the specimens studied here are kept:

- IRSNB Institut royal des Sciences naturelles de Belgique, Bruxelles, Belgium;
LM collection of Ladislav Mencl, Týnec nad Labem, Czech Republic;
MR collection of Miloslav Rakovič, Dobřichovice, Czech Republic.

In addition to the study of type specimens of the two species described here, as specified below within particular descriptions, during the work on the key to Asian species, the authors took advantage of examining 5 specimens of the *Teuchestes analis* (Fabricius, 1787) (1 in LM: from Laos and 4 in MR: 1 from India, Assam and 3 from N. Thailand, Mae Hong Son Province), 7 specimens of the *Teuchestes sinofraternus* (Dellacasa et Johnson, 1983) (5 in LM and 2 in MR: all from China, Yunnan Province), numerous specimens of the *Teuchestes fossor* (Linnaeus, 1758) (in LM and MR), 5 specimens of the *Teuchestes brachysomus* (Solsky, 1874) (1 in MR: from China, “Manchuria” [a formerly used name for an administrative region including several provinces of NE China], 1 specimen in MR and 3 specimens in IRSNB: from China, Guangdong Province) and two specimens (male and female - topotypes) of the *T. uenoi* Ochi, Kawahara et Kon, 2006 (both in MR: from China, Fujian Province).

The specimens were examined with the use of the MBS-10 and SZP 1120-T stereoscopic microscopes, Meopta laboratory microscope and CMOS 5 digital camera with the Helicon Focus programme.

Measurements of the ratio between the scutellum length and elytral suture length were carried out with an ocular micrometer.

RESULTS

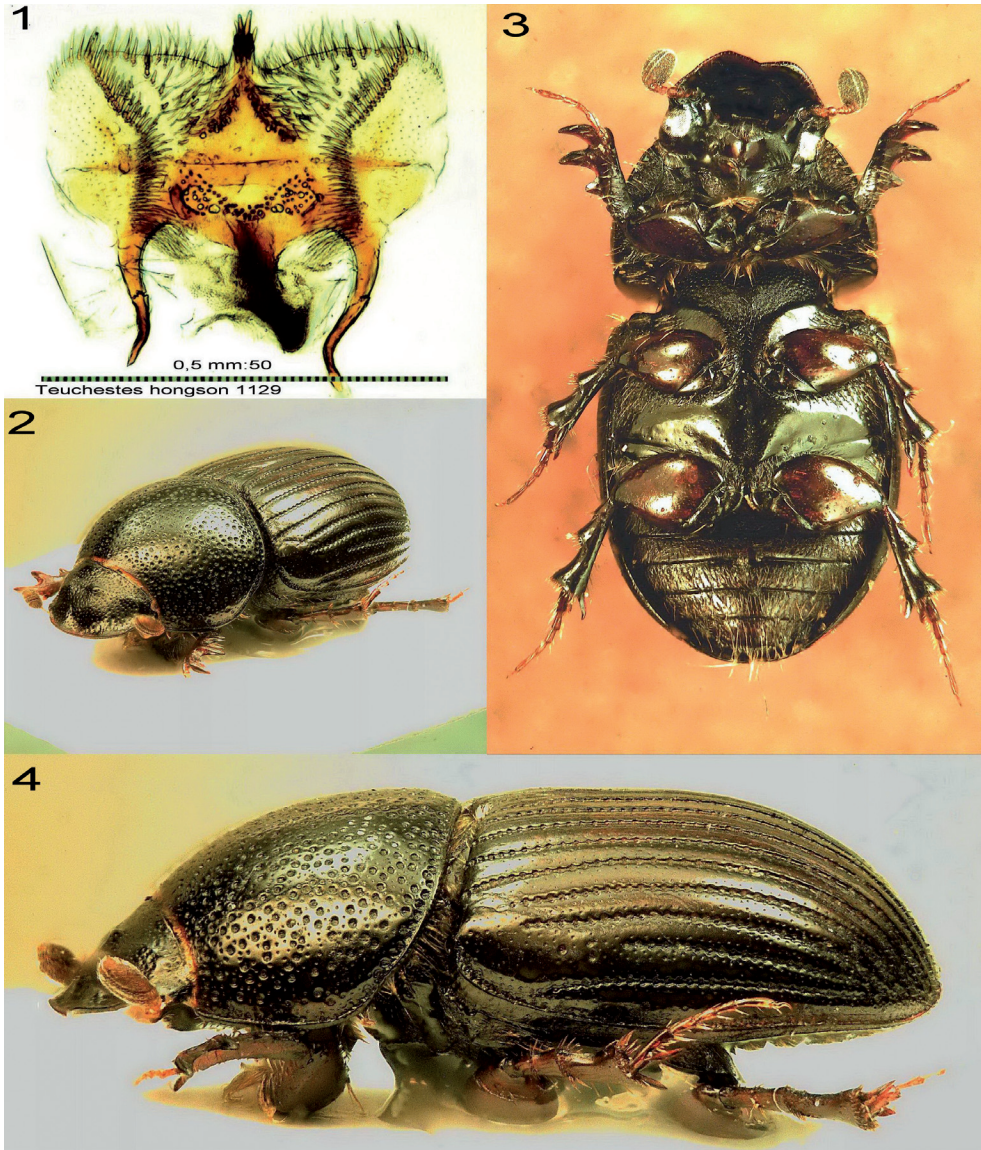
Teuchestes guangdong sp. nov.

(Figs 5-8, 13, 21)

Type material. Holotype (♀): A unique specimen equipped with labels as follows: 1. A printed yellow label “Coll. R.I.Sc.N.B., China: Kwangtung, Fort Bayard = Chan Chiang, Le Moulte vendit”; 2. A printed pale green label (specifying the photographic documentation by L. Mencl) “1130, Dok. L. Mencl, 2011”; 3. A printed red label “HOLOTYPE, *Teuchestes guangdong* sp. n. ♀, M. Rakovič & L. Mencl det. 2011”. Deposited in IRSNB.

Description of female holotype. Medium-sized (7.3 mm), glabrous, head and pronotum considerably shining, black, elytra moderately shining, black with distinct and large yellowish-red area spread apically over all elytral intervals, tibiae dark brown, tarsi reddish brown, ventral surfaces brown.

Clypeus emarginate anteriorly, quite rounded each side of emargination, clypeus margins distinctly upturned, frontal lobes (genae) considerably protruding and well differentiated from clypeus lateral margins (eyes not protruding). Epistome only slightly convex; frontal suture almost indistinct, very slightly elevated, V-shaped (vertex of its angle directed backwards).

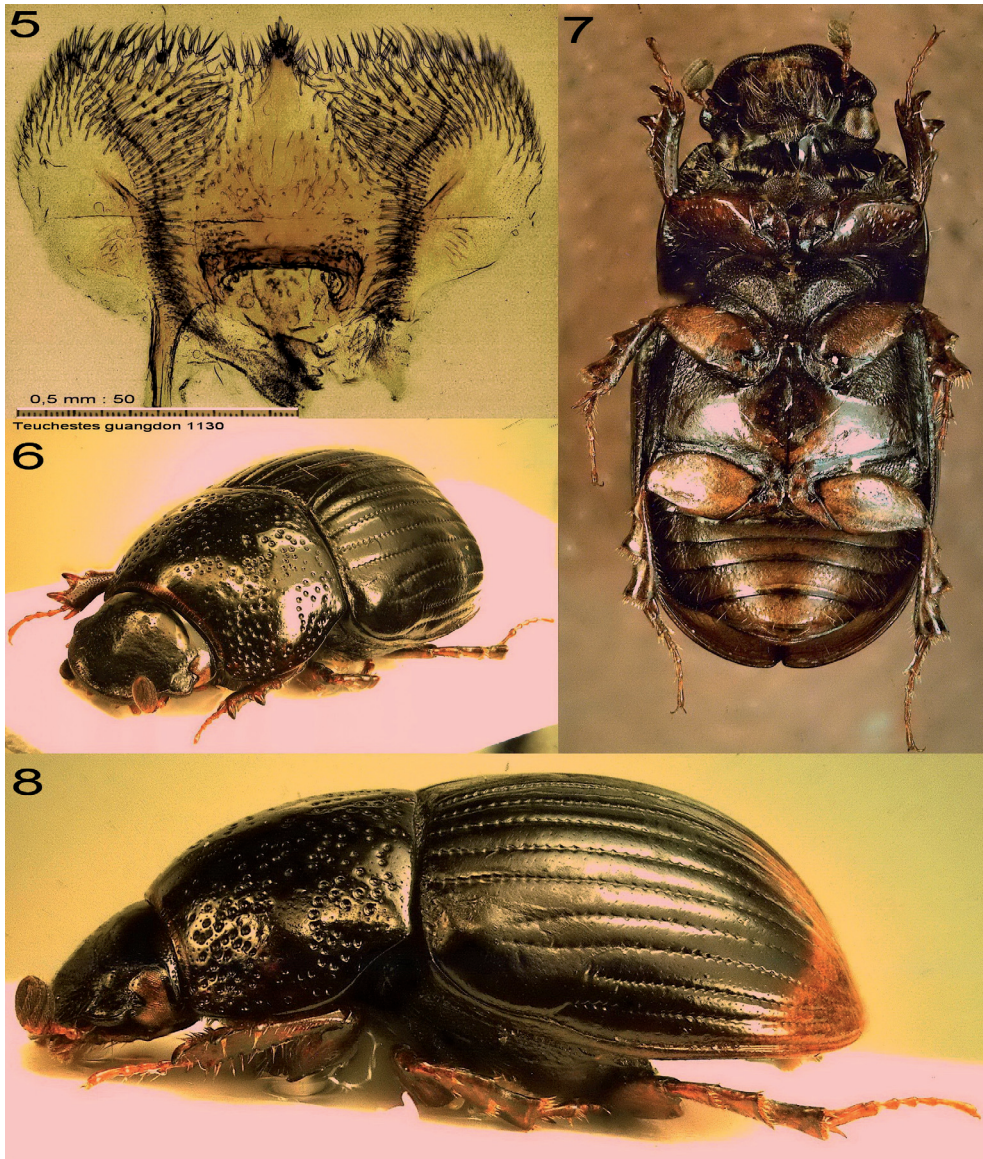


Figs 1-4. *Teuchestes hongson* sp. nov., holotype; 1- epipharynx; 2- oblique view; 3- ventral view; 4- lateral view.

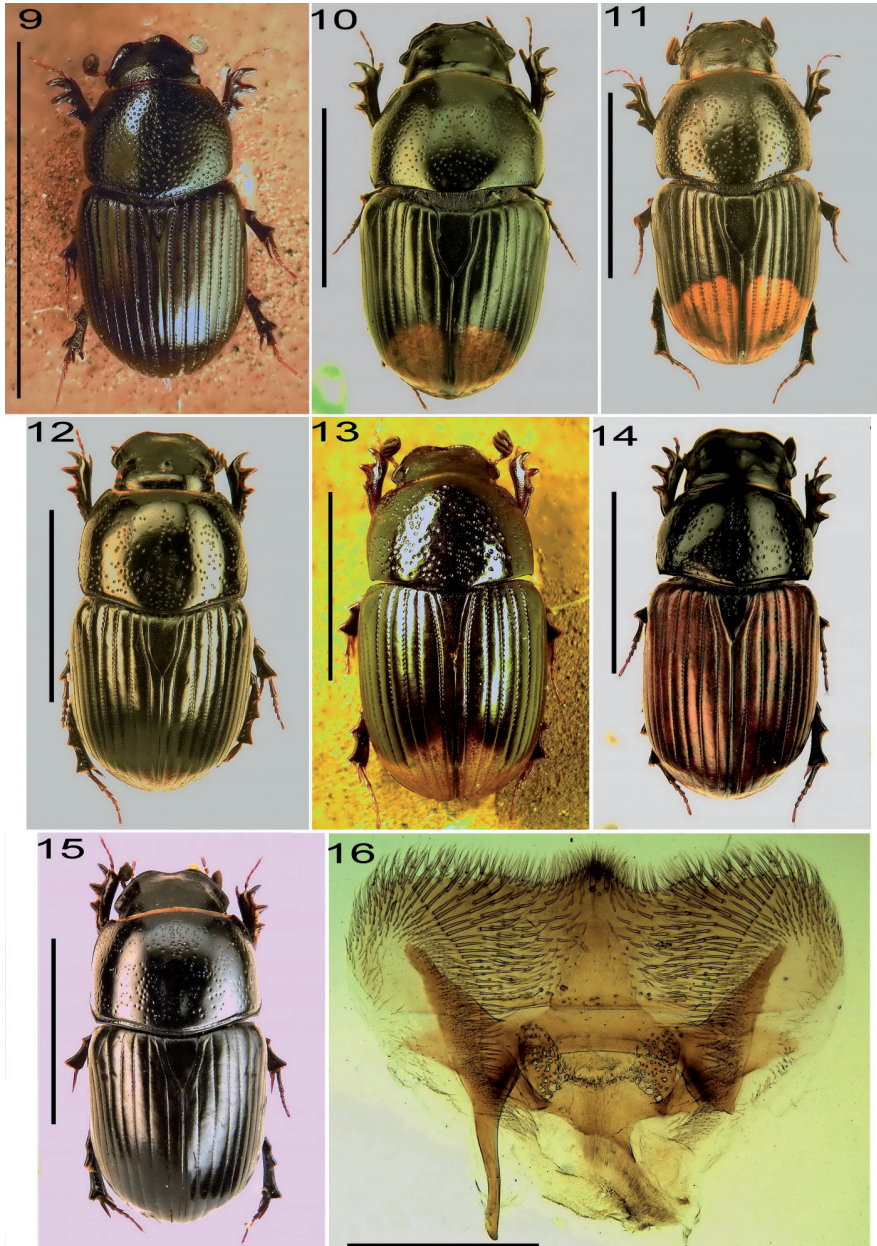
Area along clypeus anterior emargination essentially smooth and impunctate, areas between epistome and clypeus lateral margins slightly uneven (with weak wrinkles and few medium-sized punctures; epistome finely, sparsely punctate; frons very finely and sparsely punctate.

Pronotum without margin lines, lateral margin with few, very short setae at anterior corners. Widest close to its midlength; from there, continuously arcuately narrowed towards

obtusely rounded anterior corners, but in opposite direction, only shortly arcuately narrowed and then rather sinuate in front of angular posterior corners. Surface of pronotal disk with very strong, deep, coarse punctures arranged rather irregularly (as shown in Fig.13), intermixed with very fine sparsely distributed punctures; deep and coarse punctures laterally arranged as shown in Fig. 8, distances between them being smallest at anterior corners (Figs 6-8).



Figs 5-8. *Teuchestes guangdong* sp. nov., holotype; 5- epipharynx; 6- oblique view; 7- ventral view; 8- lateral view.



Figs 9-16. Habitus, dorsal aspect, female: 9- *Teuchestes hongson* sp. nov., holotype; 10- *T. sinofraternus* (Dellacasa et Johnson, 1983), (China: Yunnan); 11- *T. analis* (Fabricius, 1787), (N. Thailand); 12- *T. brachysomus* (Solsky, 1874), (China: Kwangtung); 13- *T. guangdong* sp. nov., holotype; 14- *T. uenoi* Ochi, Kawahara et Kon, 2006 (China: Wuping, Fujian); 15- *T. fossor* (Linnaeus, 1758), (Czech Republic). Scale lines: 5 mm. Fig. 16. Epipharynx, *T. uenoi* Ochi, Kawahara et Kon, 2006 (China, Wuping, Fujian). Scale line: 0.5 mm.

Scutellum narrow, triangular, very long: ratio of scutellum length – to – elytral suture length of 1:2.1. Without any excavation or keel – its plane at the same level with sutural interval. Scutellum surface with few (about 10) medium-sized punctures at base and a little more numerous (about 20) fine punctures on remaining surface (situated rather medially than laterally). Lateral margins sinuate (Fig. 21) from base to about two thirds scutellum length.

Elytra with ten striae and ten intervals, without humeral teeth and with only weakly pronounced humeral calluses. Striae with medium-sized punctures moderately crenating median margins of intervals. From base to point before apical declivity, first stria stronger and occupied with punctures closer one to another compared to other striae. Tenth elytral interval shortened anteriorly (Fig. 8). Elytral striae 1 – 6 extended anteriorly up to elytra base; striae 5 and 7 reach anteriorly humeral area only; striae 8 and 9 considerably shortened anteriorly (Fig. 8).

Protibia outer edge with three rather blunt teeth in apical half; basal half without denticles; edge of apex with fine, acute setae; apical spur relatively short. Mesotibia with long superior apical spur and short inferior one; apical margin fringed with equal setae. Metatibia with long superior apical spur and short inferior one, both having very short bent part (tip); metatibia apex fringed with equal setae; basimetatarsite longer than superior apical spur and nearly as long as metatarsites 2 to 4 combined.

Ventral surfaces more or less dark brown, legs paler, punctate and setose. For arrangement of punctures and setae see Fig. 7.

Epipharynx as in Fig. 5, very characteristic of the genus *Teuchestes*.

Sexual dimorphism. Male unknown.

Name derivation. Toponymic. Name of a province on the South China Sea Coast: “the Guangdong Province”.

Differential diagnosis. The new species resembles the species *T. analis* (Fabricius, 1787) and *T. sinofraternus* (Dellacasa et Johnson, 1983) from which it differs by its rounded clypeus each side of the anterior clypeus emargination. For other characters and differences from particular species see the Key to Asian Species of the Genus *Teuchestes*. The shape of the scutellum (Fig. 5) is particularly characteristic of the new species.

Teuchestes (?) *hongson* sp. nov.

(Figs 1-4, 9, 17)

Type material. Holotype (♀): A unique specimen equipped with labels as follows: 1. A printed white label “N. THAI, 35 km SE Pai”; 2. Another printed white label “16. 11. 00, M. Rakovič lgt.” 3. A printed pale green label (specifying the photographic documentation by L. Mencl) “1129, Dok. L. Mencl, 2011”; 4. A printed red label “HOLOTYPE, *Teuchestes* (?) *hongson* sp. n. ♀, M. Rakovič & L. Mencl det. 2011”. Deposited in MR.

Description of female holotype. Small (4.4 mm), glabrous, blackish-brown to black, (head mostly black, with narrowly brown clypeus margin, pronotum black, elytra blackish-brown, legs dark brown.

Clypeus angularly emarginate anteriorly, rounded and having considerably upturned margins each side of emargination. Lateral margins of clypeus straight before frontal lobes

(genae). Frontal lobes anteriorly only slightly differentiated from clypeus lateral margins, not more protruding than eyes, each bearing few (about five) pale setae. Epistome only very slightly convex. Frontal suture consisting of three transverse swellings; central swelling higher and shorter, lateral ones lower and longer. Area along clypeus margins uneven due to presence of small, indistinct and irregular wrinkles; head surface otherwise with medium-sized punctures throughout, distances between neighbouring punctures being equal to or slightly larger than puncture diameter.

Pronotum widest at about its midlength, considerably arcuately narrowed towards rounded anterior corners and only shortly arcuately narrowed towards slightly truncate and



Figs 17-23. Scutellum, female: 17- *Teuchestes hongson* sp. nov., holotype; 18- *T. sinofraternus* (Dellacasa et Johnson, 1983), (China: Yunnan); 19- *T. analis* (Fabricius, 1787), (N. Thailand); 20- *T. brachysomus* (Solsky, 1874), (China: Kwangtung); 21- *T. guangdong* sp. nov., holotype; 22- *T. uenoi* Ochi, Kawahara et Kon, 2006 (China: Wuping, Fujian); 23- *T. fossor* (Linnaeus, 1758), (Czech Republic); Fig 24. Habitus, lateral view, *T. uenoi* Ochi, Kawahara et Kon, 2006 (China, Wuping, Fujian).

sinuate posterior corners. Lateral margins, posterior corners as well as basal margin with distinct margin lines (basal margin line shortly discontinued at middle). Pronotum surface with double punctuation: coarser punctures having diameters mostly equal to or moderately smaller than distances between them intermixed with small punctures; a row of densely situated coarse punctures along each lateral part of basal margin line and posterior corner margin (Figs 2, 4). In top view, pronotum lateral margins seem to bear pale setae, but they outgrow from ventral surface.

Scutellum elongate, triangular (ratio of scutellum length – to – elytral suture length of 1:3.5), lying nearly at the same level as or at most at a slightly lower level than sutural interval, with straight lateral margins. Its surface rather uneven due to presence of few (about five) medium-sized punctures.

Elytra with ten striae and ten intervals, without humeral teeth and with only weakly pronounced humeral calluses. Striae very distinct and wide (for example on elytral disk, stria width equals half interval width). Punctures in striae of intermediate size, rather transverse, but only moderately crenating intervals. Intervals finely shagreened, distinctly elevated above striae, but only very slightly convex or nearly flat, glabrous except the presence of few minute, hardly perceptible setae on apex, with fine punctures arranged in two rows along lateral and median margins, respectively, these punctures being indistinct or absent in anterior half of disk, but distinct in lateral intervals and in posterior half. Striae 1 to 5 reaching elytra base, striae 6 and 7 anteriorly reaching humeral area only, stria 8 considerably shortened anteriorly (Fig. 4).

Protibia of usual shape, its outer edge with three teeth. Apices of mesotibiae and metatibiae fringed with equal setae. Superior terminal spur of mesotibia considerably longer than inferior one. Superior terminal spur of metatibia not considerably different in length from inferior one, about as long as basimetatarsite; basimetatarsite about as long as metatarsites 2 and 3 combined.

Ventral surfaces dark brown, legs brown, sparsely punctate and/or densely setose. For arrangement of punctures and setae see Fig. 3.

Epipharynx as in Fig. 1.

Sexual dimorphism. Male unknown.

Name derivation. Toponymic. Based on name of a province in N. Thailand: “the Mae Hong Son Province”.

Differential diagnosis. The new species is quite different from all the other species of the genus *Teuchestes* by its smaller body size, denser pronotum punctuation and less convex elytra.

KEY TO ASIAN SPECIES OF THE GENUS *TEUCHESTES* MULSANT

- 1(2) The smallest species (under 5 mm). Coarse punctures of pronotum essentially regularly distributed throughout. Elytra only moderately convex. 4.4 mm. N. Thailand (Mae Hong Son Province)
..... *Teuchestes* (?) *hongson* sp. nov.
- 2(1) Considerably larger species (7 to 14 mm). Coarse punctures of pronotum rather irregularly and/or sparsely distributed. Elytra strongly convex.

- 3(6) Clypeus angulate each side of anterior emargination; its sides emarginate.
- 4(5) Pronotum anteriorly without margin line. 8-10.5 mm. China (Fujian, Gansu, Guangxi, Xinjiang and Zhejiang Provinces) *Teuchestes sinofratermus* (Dellacasa et Johnson, 1983)
- 5(4) Pronotum anteriorly with margin line, which is only shortly interrupted at middle. 7-10 mm. China, Taiwan, N. Korea, S. Korea, Japan, Nepal, India, Oriental Region, Australian Region
..... *Teuchestes analis* (Fabricius, 1787)
- 6(3) Clypeus rounded each side of anterior emargination; its sides straight to arcuate.
- 7(8) Scutellum distinctly parallel in more than basal half Fig. 20. 7-10 mm. West Siberia, East Siberia, N. Korea, S. Korea, Japan, China (Fujian, Heilongjiang, Jilin and Guangdong Provinces)
..... *Teuchestes brachysomus* (Solsky, 1874)
- 8(7) Scutellum essentially continuously narrowed from base to apex (in shape of isosceles triangle when disregarding short slightly sinuate or arcuate parts of sides), as shown in Figs 21-23.
- 9(10) Scutellum very long (about ½ elytral suture margin length), with sinuate lateral sides Fig. 21). 7.3 mm
..... *Teuchestes guangdong* sp. nov.
- 10(9) Scutellum shorter (slightly longer than 1/3 elytral suture margin length); its sides not sinuate (Figs 22-23.
- 11(12) A species from SE China. Elytra reddish brown, head, pronotum and scutellum black. Frontal lobes (genae) strongly protruding, anteriorly considerably differentiated from clypeus lateral margins. Anterior pronotal corner area with coarse punctures. Scutellum mostly (at least in anterior 2/3) with strongly uneven surface (Fig. 22). Punctures of elytral striae distinct, crenating elytral intervals; elytral intervals considerably convex. 10.5-11.9. China (Fujian and Guangdong Provinces) *Teuchestes uenoi* Ochi, Kawahara et Kon, 2006
- 12(11) A species from other areas. Completely black (elytra rarely brownish or paler). Frontal lobes (genae) moderately protruding, anteriorly only slightly differentiated from clypeus lateral margins. Anterior pronotal corner area with fine punctures. Scutellum surface smooth or finely punctate, in some specimens only very slightly uneven (Fig. 23). Punctures of elytral striae rather indistinct, not crenating elytral intervals; elytral intervals only moderately convex. 10-14 mm. Most European countries, the Canary Islands, Algeria, West Siberia, East Siberia, Far East, Turkmenistan, Kazakhstan, Kyrgystan, Mongolia, South Korea, Canada, USA *Teuchestes fossor* (Linnaeus, 1758)

Note. The differentiation of the *Teuchestes* species from each other based on the key presented here can be supported by illustrations of the habitus (Figs 9-16, 24) and particularly of the scutellum (Figs 17-23), which is very characteristic of each species in terms of its size (length), shape, punctuation, presence or absence of any impressed area and roughness or evenness of its surface. The two new species, *T. guangdong* sp. nov. and *T. hongson* sp. nov. are described based on unique female holotypes and thus, female specimens of the remaining species were also chosen to provide photos of the habitus and scutellum although we do not believe that there is any sexual dimorphism in the appearance of the scutellum.

DISCUSSION AND CONCLUSION

The species *Teuchestes guangdong* sp. nov. undoubtedly belongs to the genus *Teuchestes*. It is not only similar to the other *Teuchestes* species in appearance, but it also exerts all the important characters of the genus including the shape of the epipharynx. On the other hand, the species *Teuchestes* (?) *hongson* sp. nov. rather differs from the other species of the genus, particularly by its only moderately convex elytra and shape of its epipharynx, which is not characteristic of *Teuchestes*. May be that it belongs to a new genus. However, based on the key to genera by Dellacasa (1986), it can be formally included into *Teuchestes* and we preferred to avoid establishing a new monotypical genus for the species at least until a male specimen is discovered.

Most data on the geographical distribution of particular *Teuchestes* species presented in the Key are based on the literature as follows: Balthasar (1964), Dellacasa (1986). Dellacasa G. & Dellacasa M. (2006), Gordon & Skelley (2007), Ochi, Kawahara & Kon (2006), and Schmidt (1922). Based on the specimens studied, the following supplements to these data can be added: India (Assam), Laos and N. Thailand (Mae Hong Son Province) for the *Teuchestes analis* (Fabricius 1787), China (Yunnan Province) for the *Teuchestes sinofraternus* (Dellacasa et Johnson, 1983), and China (Guangdong Province) for the *Teuchestes brachysomus* (Solsky, 1874). Indochina is mentioned in the literature in terms of the distribution of the *Teuchestes analis* (Fabricius, 1787), which of course includes the above mentioned countries Laos and Thailand.

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