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# A New Species of the Genus *Sinonychus* (Coleoptera, Elmidae) from Kyushu, Japan

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**Abstract** A new species of the genus *Sinonychus*, *S. tsujunensis*, is described from Kyushu, Japan. This is the third species of this genus. The new species differs from the previously known species by the body size, the presence of elytral carinae on intervals III, bidentate mandible, and the shape of aedeagus. Methods for the observation to endophallus and its structures in the family Elmidae are briefly discussed.

## Introduction

The genus *Sinonychus* JÄCH et BOUKAL, 1995 (Elminae, Macronychini) is occurred from China and Japan, and represented by two described and two undescribed species (JÄCH & BOUKAL, 1995; YOSHITOMI & NAKAJIMA, 2007). This genus is characterized by the 7-segmented antennae, small body (ca. 1.1−1.5 mm), absence of hind wing, and the presence of elytral carinae on III and V−VII or V−VII intervals (JÄCH & BOUKAL, 1995).

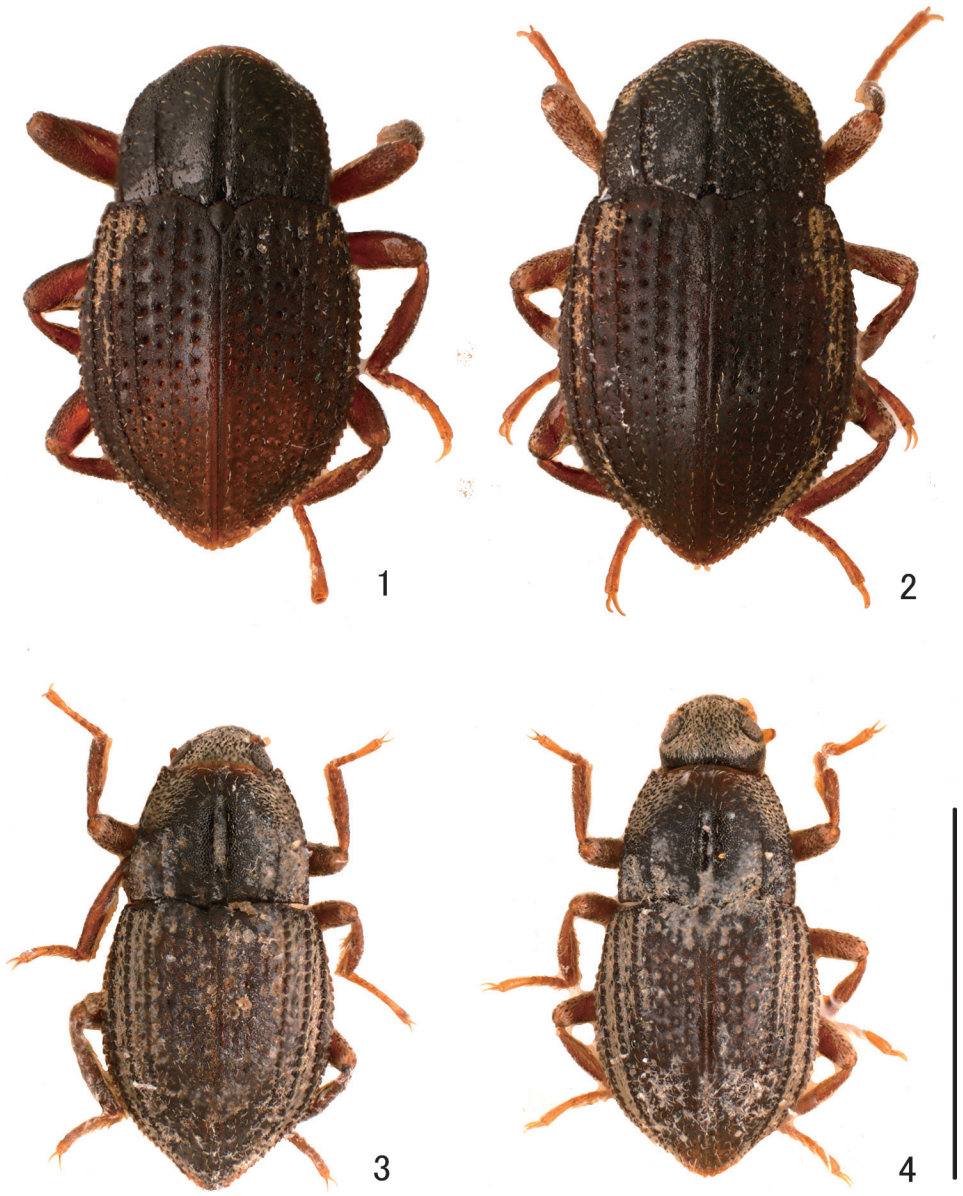
The type species of the genus, *Sinonychus lantau* JÄCH et BOUKAL, 1995 was described from Lantau Island, South-west Hong Kong, China. The second species, *S. satoi* YOSHITOMI et NAKAJIMA, 2007 (Figs. 3−4) was described from Tokashiki-jima and Zamami-jima, the Ryukyus, Japan, and subsequently KAMITE and MORIYA (2011) recorded this species from Amami-Ôshima. The remaining two undescribed species were known from China (JÄCH & BOUKAL, 1995).

In the paper, we are going to describe a new species of *Sinonychus* from Kyushu, Japan. This is the northern limit of the distribution of this genus.

## Materials and Methods

The general observation and dissection were made under a stereoscopic microscope (Leica MZ95). Microstructures were observed under a microscope (Olympus BH-2) on the dissected part mounted on hollow slides with pure glycerine. After the observation, the dissected parts were mounted on slides with Canada Balsam. Some structures were observed with SEM (Hitachi S-225) after coating with gold. For the observation of the sclerites of the endophallic structure, the male genitalia put in lactic acid in 24 hours under room temperature, and the sclerites was removed from the penis using pin and tweezers.

Morphological abbreviations used in measurement are as follows: PL − length of pronotum; PW − width of pronotum; EL − length of elytra; EW − width of elytra; TL − total length (head to elytral apices in dorsal aspect). The average is given in parenthesis after the range.




Figs. 1–4. *Sinonychus* spp. in Japan. —— 1–2, *Sinonychus tsujunensis* sp. nov.; 3–4, *Sinonychus satoi* YOSHITOMI et NAKAJIMA. —— 1 and 3, Holotypes, males; 2 and 4, paratypes, females. Scale bar＝1.0 mm.

The holotype and some paratypes designated in this paper will be preserved in the Ehime University Museum, Matsuyama (EUMJ), and other paratypes in the Naturhistrisches Museum, Wien (NMW), the California Academy of Sciences, San Francisco (CASC), and the National Museum of Nature and Science, Tokyo (NSMT).

Technical terms of the genitalia follow KODADA and JÄCH (2005).

### ***Sinonychus tsujunensis*** sp. nov.

[Japanese name: Kyushu-kara-hime-doromushi]

(Figs. 1−2, 5−31)

*Type series*. Holotype (EUMJ): 1 male, "Tsujun-yousui, Aitouji, Yamato-cho, Kamimashiki-gun, Kumamoto Pref., JPN 3. XII. 2011 J. NAKAJIMA leg." Paratypes, 4 males & 14 females (EUMJ, NSMT, NMW, CASC), same data as for the holotype; 1 male & 5 females (EUMJ, NMW), "Shinden, Honyabakei-machi, Nakatsu-shi, Ôita Pref., JPN 27. II. 2007 J. Nakajima leg."; 4 males & 6 females (EUMJ, NMW, CASC), "Magome, Nishiaidakami-machi, Hitoyoshi-shi, Kumamoto Pref., JPN 2. IX. 2011 J. Nakajima leg."; 1 female (EUMJ), "Shimauchi Kawanabe Town, Kagoshima Pref., 31. X. 2005 S. Imasaka leg."

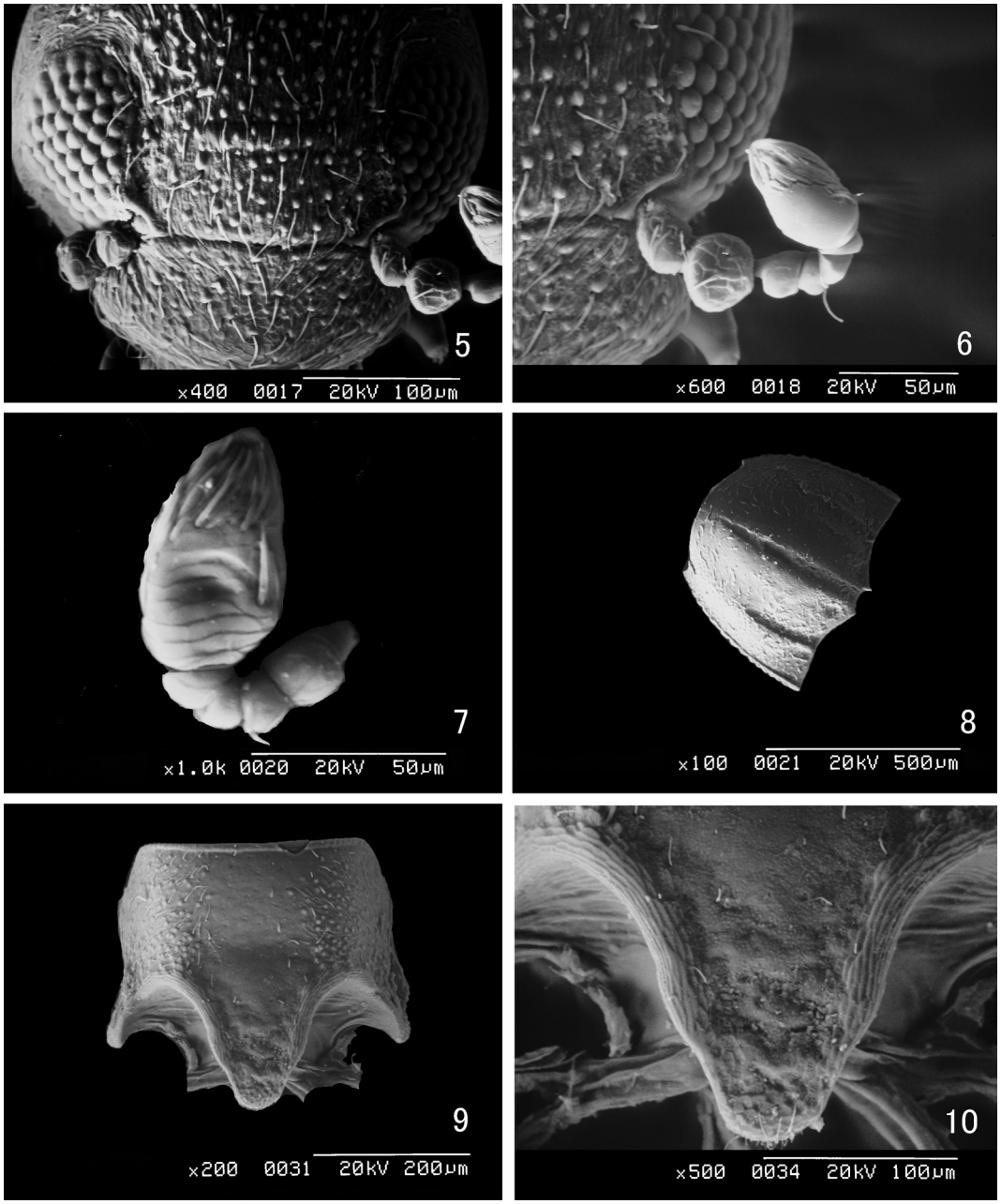
M a l e (Fig. 1). Body obovate, well convex dorsally, slightly shining. Coloration of body almost blackish brown, but mouth parts, antennae, legs, and abdominal sternites brown.

Head (Fig. 5) almost flat in dorsal surface, densely covered with granules. Eyes (Fig. 5) moderate in size, slightly prominent; the distance between eyes about 1.9 times as long as the maximum diameter of an eye. Mandibles with two apical teeth. Antennae (Figs. 6−7) closely covered with short setae in apical part of antennomere VII; approximate ratio of each antennomeres (n=1) as 4.0 : 4.0 : 2.4 : 1.4 : 1.2 : 1.0 : 6.5. Pronotum (Fig. 8) finely punctate, densely covered with granules in lateral part; antero-lateral angles produced anteriad; postero-lateral angles almost rectangular; sublateral grooves extending from the base to basal 1/2; median groove extending from the base to just before anterior margin; PW/PL 1.13−1.50 (1.27, n=5). Prosternum (Fig. 9) granulate in lateral parts; prosternal process (Fig. 10) converging posteriorly, densely punctate in apical part. Scutellum small, subtriangular. Elytra (Figs. 11−13) obovate, widest at basal 2/3, roof-like in cross section; elytral carinae consisting of granules present in intervals III and V−VII from base to basal 2/5 (III) or 4/5 (V−VII); lateral margins distinctly serrate; EL/EW 1.19−1.30 (1.23, n=5); EL/PL 1.69−2.25 (1.95, n=5); EW/PW 1.21−1.30 (1.25); TL/EW 1.71−1.85 (1.76). Intercoxal process of sternite III (Fig. 14) wide, pentagonal. Sternite VII (Fig. 17) arcuate in caudal margin, irregularly glanulate. Tergite VIII (Fig. 18) semicircular, closely covered with minute setae. Sternite VIII (Fig. 19) semicircular, with a long median strut, sparsely bearing short setae in caudal margin. Sternite IX (Fig. 20) oblong, with a pair of lateral sclerites and median strut.

Aedeagus (Figs. 21−22) long, about 0.51 mm, moderately sclerotised; phallobase short, oval; parameres short, weakly sclerotised, bearing short setae in basal parts, reaching about 2/5 of penis; penis long, about 5.1 times as long as phallobase, gently curved dorsally, punctate in apical part; endophallus bearing minute serrae; sclerites in apical part of endophallus (Figs. 23−25) oblong, closely covered with fine furrows in ventro-laterally, with short hook-like projection in mesal part.

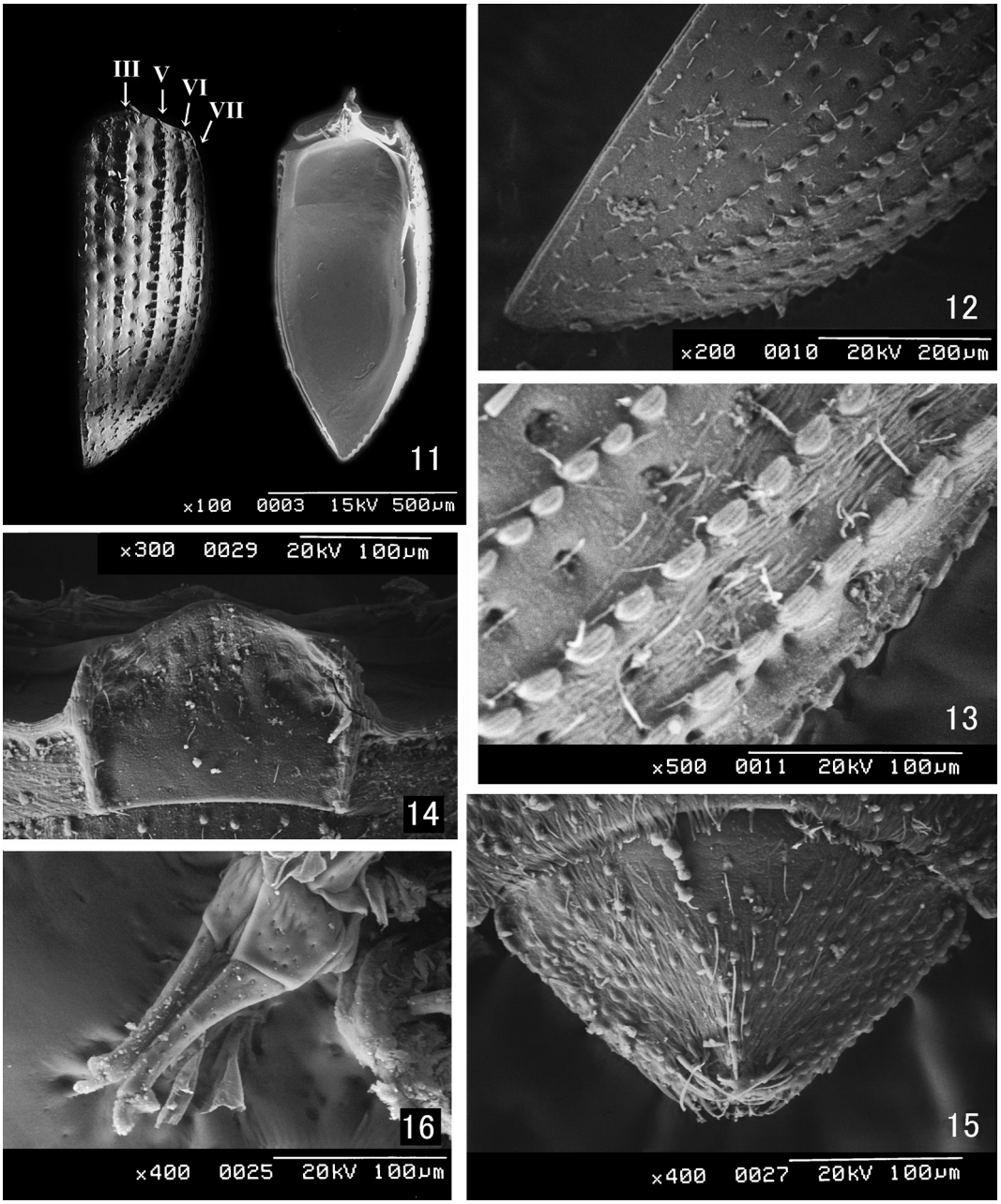
F e m a l e (Fig. 2). Sexual dimorphism indistinct, somewhat larger than male; PW/PL 1.08−1.24 (1.17, n=9); EL/EW 1.06−1.25 (1.17, n=9); EL/PL 1.67−2.00 (1.81); EW/PW 1.27−1.42 (1.32); TL/EW 1.59−1.88 (1.75). Sternite VII (Figs. 15, 26) rather wider than that of male. Tergite VIII (Fig. 27) semicircular, closely covered with short setae. Sternite VIII (Fig. 28) semicircular, with a long and stout median strut, closely bearing short setae in caudal margin. Ovipositor (Figs. 16, 29) short, curved laterally in stylus and apical parts of coxite, sparsely punctate; approximate ratio of stylus, coxite and valvifer (n=1) as 1.0 : 12.5 : 21.0.

*Measurement*. Male (n=5): TL 1.20−1.35 (1.31) mm; PW 0.55−0.62 (0.59) mm; PL 0.40−0.55 (0.47) mm; EL 0.83−0.95 (0.91) mm; EW 0.70−0.78 (0.74) mm. Female (n=9): TL 1.35−1.50 (1.44) mm; PW 0.60−0.65 (0.63) mm; PL 0.50−0.60 (0.54) mm; EL 0.90−1.00 (0.96) mm; EW 0.80−0.90 (0.82) mm.




Figs. 5–10. *Sinonychus tsujunensis* sp. nov., paratype, female. —— 5, Head; 6, antenna; 7, antennomeres III–VII; 8, pronotum; 9, prosternum; 10, prosternal process.

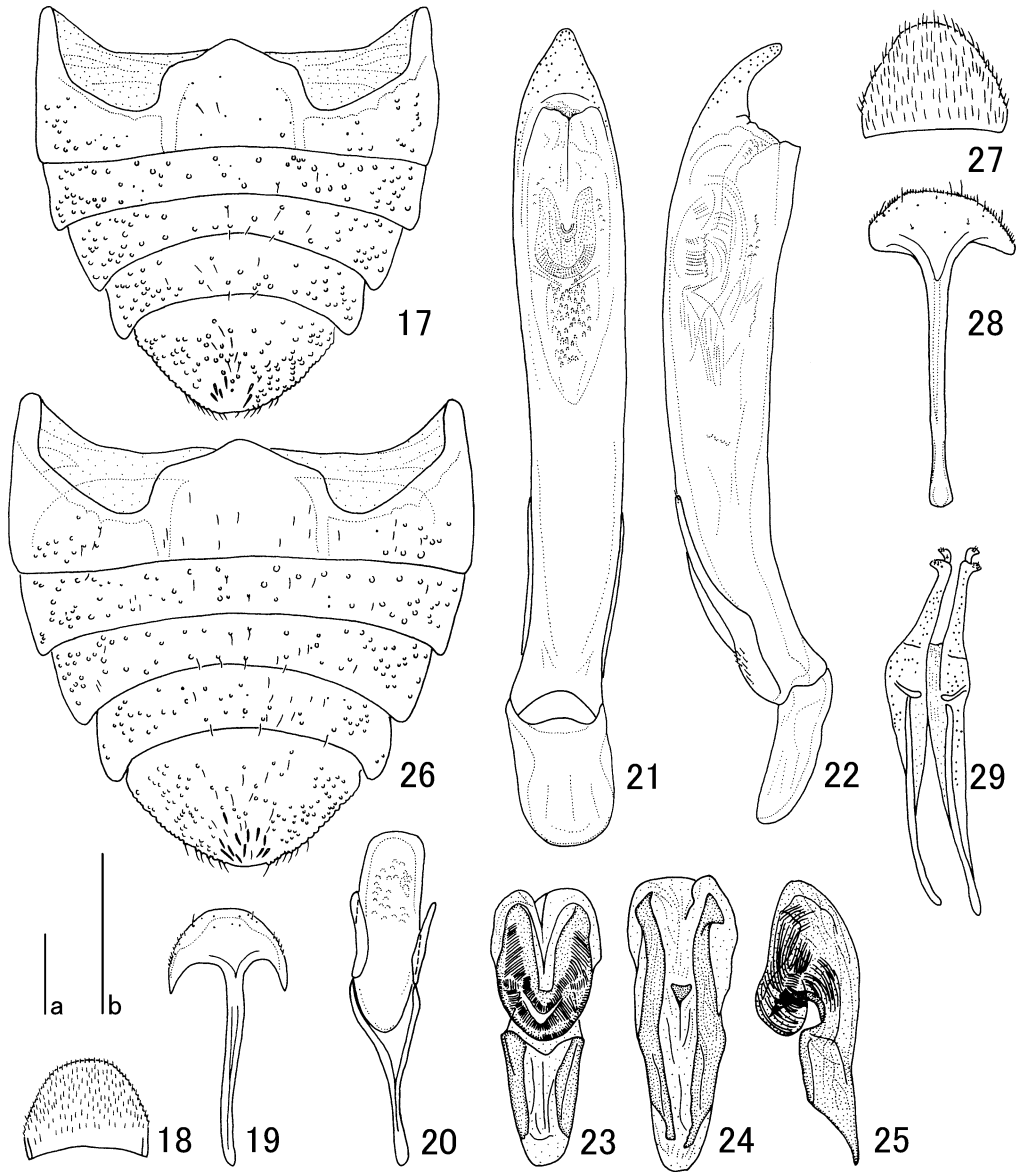
*Remarks*. This new species is closely similar to the previously known two species (*S. satoi* and *S. lantau*), but differs from them by the following characteristics: 1) body larger, TL 1.20–1.50 mm (smaller, TL 1.10–1.35 mm in *satoi*, ca 1.10 mm in *lantau*); 2) elytral carinae on intervals III present (absent in *satoi*); 3) mandible with two apical teeth (three in *lantau*); 4) basal parts of parameres bear-




Figs. 11−16. *Sinonychus tsujunensis* sp. nov., paratype, female. —— 11, Elytra in dorsal (left) and ventral (right) aspects; 12, elytral apex; 13, elytral carinae on V−VII intervals; 14, intercoxal process of sternite III; 15, sternite VII; 16, ovipositor.

ing short setae (lacking in *satoi*); 5) apical part of penis rather robust, gently curved ventrally (comparatively slender and strongly curved in *satoi*).

*Biological notes*. The type locality (Fig. 30) is a small stream flowing in a forest and paddy field.




Figs. 17−29. *Sinonychus tsujunensis* sp. nov., paratype, male (17−25) and female (26−29). —— 17 and 26, Sternite; 18 and 27, tergite VIII; 19 and 28, sternite VIII; 20, sternite IX; 21 and 22, aedeagus in ventral (21) and lateral (22) aspects; 23−25, endophallic sclerites in ventral (23), dorsal (24) and lateral (25) aspects; 29, ovipositor. Scale bars＝0.1 mm; a for 17−20, 26−29; b for 21−25.

This species inhabits muddy gravel bottoms with river-bed water. This species (Fig. 31) was collected with two *Zaitzeviaria* species, *Z. brevis* (NOMURA, 1958) and *Z. ovata* (NOMURA, 1959) in the type locality.

*Etymology.* The species is named after the type locality.


Figs. 30–31. *Sinonychus tsujunensis* sp. nov., type locality (30) and habit (31). Photos by JN.

## Discussion

Although it has been well known that the endophallic structures of the family Elmidae are important and valuable characters for taxonomically and phylogenetically as known in other beetle families, Carabidae (e.g. Sasakawa, 2006), Lucanidae (e.g. Kubota *et al*., 2009) and Cerambycidae (e.g. Yamasako & Ohbayashi, 2011), its comparative morphology in Elmidae has not been studied (Kodada & Jäch, 2005). It is probable that the reason why the structures have not been studied that the body size of Elmidae is too small to dissect and examine the endophallic structures.

In the present paper, we removed only the sclerite situated in apical part of endophallus using pin and tweezers (see methods part), and examined and figured it (Figs. 23–25). The sclerite is well sclerotised, and it is relatively easily removed from the endophallus. Compared with two known species (figs. 27–28 in Jäch & Boukal, 1995; fig. 3E–F in Yoshitomi & Nakajima, 2007), it is suggested that the characteristics of the sclerite show the generic and species features (however in this paper the strict comparison of them could not be done, because the previous figures drew the sclerite not removed but seen through the aedeagus). Such sclerites present in the genera *Zaitzevia* and *Zaitzeviaria* (Jäch & Boukal, 1995 and our observation), therefore the character can be applied for these genera to compare. On the other hand, the other genera (e.g. *Optioservus*, *Graphelmis*, and most Macronychini genera) lack such sclerites in endophallus, and it is thought that the membranous part and minute structures on its surface of the endophallus are important for taxonomically as well as other groups of Coleoptera. The other new technique must be attempt for these genera.

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## 要　　約

吉富博之・中島　淳：九州からカラヒメドロムシ属 *Sinonychus* の 1 新種（鞘翅目ヒメドロムシ科）．――中国と日本（渡嘉敷島・奄美大島・座間味島）からそれぞれ 1 種，および中国から 2 未記載種が知られるカラヒメドロムシ属 *Sinonychus* を九州から発見し，キュウシュウカラヒメドロムシ *Sinonychus tsujunensis* sp. nov. として記載した．本種は既知 2 種と体長，鞘翅間室の隆起条，大顎先端の歯の数，雄交尾器の特徴などから区別することができる．ヒメドロムシ科の雄交尾器の内袋とその構造物の観察方法について若干の考察を行った．

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