# A new species of *Xylechinus* Chapuis (Coleoptera: Curculionidae: Scolytinae: Hylurgini) from Taiwan, with notes on its biology

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ABSTRACT: A new species of bark beetle, *Xylechinus fatsiae* Lin (tribe Hylurgini) is described from Taiwan. The life cycle of the beetles in the host plant, *Fatsia polycarpa* (Araliaceae) is briefly described. The life cycle is completed in about one month in the laboratory.

KEY WORDS: bark beetle, Coleoptera, Curculionidae, Fatsia polycarpa, new species, Hylurgini, Scolytinae, Taiwan, Xylechinus.

#### INTRODUCTION

The tribe Hylurgini Gistel, 1848 (Coleoptera: Curculionidae: Scolytinae) contains 15 genera, most of them with a worldwide distribution (Wood, 1986; Petrov and Perkovsky, 2018). Xylechinus was first described by Chapuis in 1869, and is one of largest genera of Hylurgini. The diagnostic characters of this genus include: antennal funicle with five segments, conical club with three sutures marked by rows of seta; eyes shallowly emarginate; basal margin of elytra armed by one row of coarse crenulations; and sculpture rather simple (Wood, 1982). Forty-one species of Xylechinus have been described and distributed in North and South America, Africa, Asia and Europe (Wood and Bright, 1992; Bright, 2014; Petrov, 2016). All the species are monogynous and phloeophagous (Wood, 2007), and breed in both broadleaved trees (Cussonia, Oreopanax (Araliaceae); Ougenia (Fabaceae); Phellodendron (Rutaceae); Prunus (Rosaceae); Quercus, Nothofagus (Fagaceae)) and conifers (Abies, Larix, Picea (Pinaceae); Araucaria (Araucariaceae)) (Rühm, 1976; Wood and Bright, 1992; Bright, 2014). The transverse biramous parental galleries and randomly directed larval galleries are in the phloem tissues (Wood, 1982).

The true bark beetles mostly feed directly on nutrient-rich phloem, and often show strict specificity to host plant genus or family (Hulcr *et al.*, 2007). In August 2016, a new species of *Xylechinus* was found attacking fresh, moist trunks and branches of *Fatsia polycarpa* Hayata (Araliaceae) in central Taiwan. Based on this fresh material, *X. fatsiae* sp. n. is described and biological notes are provided.

## MATERIALS AND METHODS

The studies were conducted from May 2016 to July 2017 in a mixed forest of deciduous and coniferous trees

in Rueiyan River Major Wildlife Habitat (24°5.849'N, 121°10.846'E) located in Ren-ai township, Nantou county in central Taiwan, where the annual mean temperature and precipitation are about 15°C and 3000-4000 mm yr-1 respectively. Twelve species of broadleaved trees (Eurya strigillosa, Schima superba (Theaceae); Fatsia polycarpa Hayata (Araliaceae); Lithocarpus castanopsisifolius (Fagaceae); Litsea acuminate, Machilus zuihoensis (Lauraceae); Meliosma callicarpifolia (Sabiaceae); Perrottetia arisanensis (Celastraceae); phaeosticta Prunus (Rosaceae); Oreocnide pedunculata (Urticaceae); Rhododendron Viburnum ellipticum (Ericaceae); arboricolum (Adoxaceae)) that less than 15 cm in diameter were chosen as bait trees at about 2100 m a.s.l.. All cut stems were stood in bottles filled with water. After one month, the main stem, branches and small twigs were dissected. Measurements of specimens were taken using a Leica stereomicroscope (M 205-C) equipped with an eyepiece micrometer in a Pl 10x/22 eyepiece and calibrated at magnification of 4.0. Length was measured from the pronotal apex to the elytral apex. Entrances tunnel and parental gallery were measured using a Mitutoyo vernier caliper (No 530-312).

## TAXONOMIC TREATMENT

Xylechinus fatsiae Lin, sp. nov.

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*Type*: Holotype, female, Taiwan: Nantou county, Rueiyan River Major Wildlife Habitat, alt. 2175 m, 24°5.849'N, 121°10.846'E, from *Fatsia polycarpa*, 9 May 2017, *C. S. Lin.*, deposited in National Museum of Natural Science (NMNS), Taichung, Taiwan. *Paratypes*: (a total of 10 males, 9 females) in same site except collected on 17 Nov. 2016; 22 Dec. 2016; 13 Oct. 2016;

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Fig. 1. Xylechinus fatsiae Lin, sp. n., A-B: Dorsal and lateral views; C: female, front view; D: male, front view.

9 May 2017. Paratypes are deposited in National Museum of Natural Science (NMNS), Taichung, Taiwan, Michigan State University Arthropod Research Collection (MSUC), East Lansing, MI, USA, The Natural History Museum (NHML), London, UK, National Museum of Natural History (NMNH), Washington, DC, USA, Naturhistorisches Museum, Wien (NMW), Austria, Taiwan Agricultural Research Institute (TARI), Taichung, Taiwan, A.V. Petrov's collection (AVP), Institute of Forest Science Russian Academy of Science, Russia, R.A. Beaver's private collection (RAB), Chiangmai, Thailand.

**Diagnosis.** The new species is closely related to *X. bergeri* Spessivtsev, 1919, but can be distinguished by the larger size (2.23–2.5 mm long vs. 1.82–1.9 mm for *X. bergeri*), by the stouter body (body ratio 2.11–2.23 vs. 2.28–2.38 for *X. bergeri*); elytral strial punctures deep and coarse, elytral striae 3 and 6 forming loop for *X. fatsiae* vs. striae 3 and 8 forming loop for *X. bergeri*; and by the more gradually sloping elytral declivity. (a pair of *X. bergeri* were sent by Dr. A.V. Petrov).

**Description**. Female: length 2.25 mm (paratypes 2.23–2.50 mm (mean =  $2.34 \pm 0.10$  mm; n = 5)); 2.14 times as long as wide (paratypes 2.11–2.23). Head dark

brown to black, body brown to dark brown to black, antennae and tarsi yellowish brown. Frons flat convex, surface coarsely reticulate, with a fine, longitudinal, median subcarinate line extending from epistomal margin to upper level of eyes (Fig. 1C-D); long golden setae along upper rim of epistoma. Anterior margin of eyes shallowly sinuate. Antennal funicle five-segmented, scape long, distally strongly widened, club 1.67 times as long as wide (paratypes 1.5–2.0), with three transverse, septate sutures, slightly constricted at each suture. Pronotum wider than long, widest slightly before the base, 0.81 times as long as wide (paratypes 0.74-0.85), widest near base, sides convergently arcuate, with distinct antero-lateral constriction, basal margin weakly bisinuate; surface shiny, with shallow, close, and irregularly shaped punctures, each with a scalelike seta. Scutellum depressed, subround and shiny, with fine hairlike setae. Elytra 1.52 times as long as wide (paratypes 1.49–1.65), 2.46 times as long as pronotum (paratypes 2.29–2.87); basal margin bisinuate, transverse crenulations on basal margins, sides subparallel on basal half, gradually converging posteriorly and terminating in a narrowly rounded apex, declivity gradually sloping with convex face; striae moderately impressed and





Fig. 2. *Xylechinus fatsiae* Lin, sp. n., A-B: Biramous parental gallery. C: The egg niches were covered by the boring dust. D-E: Subparallel larval galleries away from parental galleries. F. Mature larvae with honey-color heads and reddish brown mandibles. G. Creamy white and exarate pupa with rugose elytra. H. Newly emerged adult.



marked by deep and large punctures, the punctures with fine setaceous hairs, striae 9 and 10 joining near posterior metepisternum and extending along elytral margin to the apex of elytra to meet striae 1, striae 2 extending close to apical margin, striae 3, 6; and 7, 8 forming loops on the declivity; interstriae wide, interstriae 1 convex on declivity and extending to apex of elytra, interstriae 2, 6 and 8 extending to striae 9; vestiture consisting of short recumbent setae arranged irregularly in about threefold or fourfold rows, scattered with slightly longer erect bristles. Male: smaller than female, length 1.98–2.33 mm (mean =  $2.18 \pm 0.13$  mm; n = 6; 2.08–2.21 times as long as wide. Similar to female except frons shallowly impressed from epistoma to upper level of eyes (Fig. 1D), and antennal club 1.63 times as long as wide.

*Etymology*: The name of the new species refers to the host plant *Fatsia polycarpa*.

Biological notes: X. fatsiae is a phloeophagous bark beetle. Adults were found on stems of F. polycarpa with a diameter between 2.3 and 4.9 cm. The bait tree logs were transported from mountain to laboratory on April 6, 2017, and kept in boxes at room temperature. The final observations were carried out on May 8, 2017. The gallery system was a biramous gallery (Figs. 2A-B). The entrance tunnel length was about 1.8 mm, the parental gallery was about 1.0-1.5 mm in width, and 1.1-4.3 mm in length. The eggs were pearly white, translucent and oblong in shape, protected in the egg niches by a covering of frass (Fig. 2C). After hatching, larvae mined subparallel to each other outward from the parental gallery from 1.3 cm up to 2.8 cm depending on available space (Fig. 2D-E). Mature larvae (Fig. 2F) prepared shallow pupal cells at the end of the larval galleries (Fig. 2G). Teneral adults (Fig. 2H) emerged from the pupal chamber by tunneling straight through the bark over it. After emergence, adults flew to the suitable trees to produce the next generation. The life cycle was completed in about one month in the laboratory when the temperature of laboratory was about 25-28°C. Because the temperature in the mountain is lower than the laboratory, the time to complete one generation will be longer than the laboratory.

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