

A new genus of Diprioninae (Hymenoptera: Diprionidae) with one new species and seven new combinations

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Abstract: A new genus *Hugilpinia* within Diprioninae in the family Diprionidae is described, including one new species and seven new combinations. *Hugilpinia* **gen. nov.** is established with *Gilpinia tabulaeformis* Xiao, 1992 as the type species. *H. brevictenidia* **sp. nov.** is from Mt. Jiulianshan, Jiangxi, China. *H. hebedentata* (Xu, 1997) **comb. nov.**, *H. jinghongensis* (Xiao & Huang, 1984) **comb. nov.**, *H. jingxii* (Xiao & Huang, 1984) **comb. nov.**, *H. leksawasdii* (Smith, 1983) **comb. nov.**, *H. lipuensis* (Xiao & Huang, 1985) **comb. nov.**, *H. socia* (Klug, 1812) **comb. nov.** and *H. tabulaeformis* (Xiao, 1992) **comb. nov.** are all transferred from *Gilpinia*. The differences between *Hugilpinia* **gen. nov.** and *Gilpinia* Benson are discussed.

Key words: Tenthredinoidea; conifer sawflies; taxonomy

松叶蜂科一新属暨一新种和七新组合 (膜翅目: 松叶蜂科)

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摘要: 建立了松叶蜂科、松叶蜂亚科 1 新属: 弧松叶蜂属 *Hugilpinia* **gen. nov.**, 模式种为 *Gilpinia tabulaeformis* Xiao, 1992; 描述了采自江西九连山的弧松叶蜂属 1 新种: 短栉弧松叶蜂 *H. brevictenidia* **sp. nov.**; 建立 7 个新组合: 钝齿弧松叶蜂 *H. hebedentata* (Xu, 1997) **comb. nov.**, 景洪弧松叶蜂 *H. jinghongensis* (Xiao & Huang, 1984) **comb. nov.**, 景熹弧松叶蜂 *H. jingxii* (Xiao & Huang, 1984) **comb. nov.**, 弱齿弧松叶蜂 *H. leksawasdii* (Smith, 1983) **comb. nov.**, 断栉弧松叶蜂 *H. lipuensis* (Xiao & Huang, 1985) **comb. nov.**, 欧洲弧松叶蜂 *H. socia* (Klug, 1812) **comb. nov.** 和油松弧松叶蜂 *H. tabulaeformis* (Xiao, 1992) **comb. nov.**, 这 7 种原隶属于吉松叶蜂属 *Gilpinia*。讨论了吉松叶蜂属和弧松叶蜂属的主要差别。

关键词: 松叶蜂亚科; 叶蜂总科; 分类

Introduction

Diprionidae is a small family in Tenthredinomorpha in the order Hymenoptera. Its larvae feed on the needles of gymnosperms. Based on the authors' current statistics, about 11 genera and 152 extant species have been described worldwide. Of these, 8 genera and 41 species have been recorded from China.

Gilpinia Benson, 1939 is the second largest genus in Diprionidae and contains 39 known species (Wang *et al.* 2019; Li *et al.* 2022). This genus is mainly Palearctic with a few Oriental species. Among them, 23 species have been recorded from eastern Asia, 13 species

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from Europe and 2 from southeastern Asia. Sixteen species have been recorded from China. Wang *et al.* (2019) provided a key to the 15 Chinese species. However, this genus is clearly heterogeneous based on studies of the morphology and the mitochondrial genomes of the known species (Li *et al.* 2023).

Benson (1939) separated the species of *Gilpinia* into two groups: the *polytoma* group (female with inner hind tibial spur expanded into a leaf-like structure) and the *socia* group (female with inner hind tibial spur normal). The ongoing study on the phylogeny of Diprionidae based on the mitochondrial genomes finds that there are two distinct evolutionary lineages within *Gilpinia*. A new genus should be proposed for *G. tabulaeformis* Xiao, 1992, *G. socia* (Klug, 1812) and their relatives.

Material and methods

Specimens were examined with a Motic-SMZ-171 stereomicroscope. Images of adults were taken with a Nikon D700 digital camera and a Leica Z16APO microscope. The genitalia were examined with a Motic BA410E microscope and photographed with a Motic Moticam Pro 285A. Images were focus-stacked using Helicon Focus (HeliconSoft, Kharkiv, Ukraine) and further processed with Adobe Photoshop CS 11.0. The terminology of genitalia follows Ross (1945).

The types of the new species are deposited in the Asian Sawfly Museum, Nanchang, China (ASMN).

Taxonomy

Hugilpinia gen. nov.

Description. Body robust, dark reddish with a few blackish maculae, not black and greenish yellow (Fig. 1); malar space 1.5–2 times the length of pedicellum; clypeus oblique with anterior margin subtruncate; eyes small, distance between eyes much broader than longest axis of eye (Fig. 2A); antenna distinctly tapering toward apex, pedicellum broader than long, third antennomere longer than fourth antennomere, each antennomere with a distinct ventral process, process of middle flagellomeres longer than flagellomere axis (Fig. 2D); male antennal flagellomeres bipectinate; forewing with vein Sc distinct, vein R distinct and oblique, vein 1M and vein Rs+M meeting at one point, anal cell with a short and oblique cross vein beyond middle; petiole of hind anal cell much longer than breadth of anal cell and more than 1.5 times length of vein cu-a (Fig. 1); mesoscutellum broader than long, anterior margin obtusely protruding, posttergite very narrow; cenchrus quite narrow, distance between cenchri clearly shorter than longest axis of cenchrus, cenchrus longer than middle length of metascutellum (Fig. 2J); inner tibial spur of hind leg simple and as long as or slightly shorter than metabasitarsus excluding pulvillus, pulvilli large and roundish (Fig. 2G); claw small with a large inner tooth (Fig. 2H); lance with small basal-lateral process, strongly tapering toward acute apex (Figs 2F, 2K); lancet short and broad, with 11–14 annuli, first to third annuli strongly broadened, apical annuli strongly tapering toward apex of lancet, ventral margin of lancet distinctly incised, distance between first serrula and apex of lancet much less than 2

times largest breadth of lancet, serrulae very short (Figs 3A–H); male penis valve very long and slender, distinctly bent with an erect ergot (Figs 3I–N); body strongly punctured, abdominal tergites dim, densely microsculptured.

Type species. *Gilpinia tabulaeformis* Xiao, 1992.

Etymology. The generic name is composed of *Hu-* with *Gilpinia*. *Hu-*, the pronunciation of the Chinese word “弧”(arc) refers to the long and weakly curved ventral margin of lancet and the long and weakly curved basal annuli.

Range. Palaearctic and Oriental.

Host plants. *Pinus* spp. of Pinaceae.

Remarks. This genus is separated from *Gilpinia* Benson. *Hugilpinia* **gen. nov.** differs from *Gilpinia* by the following characters: body dark reddish brown with a few blackish maculae and without greenish tinge; flagellar processes much longer than axis length of flagellomeres; lancet short and broad, the first to third annuli strongly broadened, the apical annuli strongly tapering toward apex of lancet, the ventral margin of lancet distinctly incised, the distance between the first serrula and the apex of lancet much less than 2 times the largest breadth of lancet; lance gradually tapering toward apex; male penis valve very long and slender, distinctly bent with an erect ergot. The pattern of the lancet and penis valve are unique within the Diprionidae.

In addition, the mitochondrial genomes of the two genera differ significantly as well. The mitochondrial genomes of *Hugilpinia* contain only one major non-coding region (NCR), located downstream of the tRNA cluster IYM, whereas *Gilpinia* mitochondria have two NCRs flanking the tRNA cluster MIY. Furthermore, the gene order of the tRNA cluster between *nad3* and *nad5* varies with RAENS₁F for *Gilpinia* and RANS₁EF for *Hugilpinia*.

Hugilpinia **gen. nov.** contains 8 species including 1 new species and 7 new combinations transferred from *Gilpinia*, among which 1 species was recorded from Thailand, 1 from Europe and the remaining 6 species were recorded from China.

Key to species of *Hugilpinia* gen. nov.

1. Annulus 1 with a distinct serrula, first annular ctenidium reaching to serrula (Fig. 3G). China (Gansu)..... *H. tabulaeformis*
- Annulus 1 without serrula, first annular ctenidium remote from ventral margin of lancet (Figs 3 A–F, 3H); South China, Europe and Southeast Asia..... 2
2. Ctenidium 1 broken at middle (Fig. 3B) or very short with just upper forth remaining (Fig. 3A); lateral mesoscutal lobe entirely pale. China..... 3
- Ctenidium 1 entire, long and distinctly curved; lateral mesoscutal lobe pale with dark marks or entirely black..... 4
3. Ctenidium 1 broken at middle (Fig. 3B). China (Anhui, Zhejiang, Guangxi, Guizhou)..... *H. lipuensis*
- Ctenidium 1 very short, just upper forth remaining (Fig. 3A). China (Jiangxi)..... *H. brevictenidia*
4. Annuli 1 and 2 almost straight and parallel (Fig. 3F); mesoscutellum entirely pale; sheath with lateral margin of scopa slender and strongly protruding. China (Yunnan)..... *H. hebedentata*
- Annuli 1 and 2 distinctly curved and divergent downwards (Figs 3E, 3H); mesoscutellum entirely black or pale with black macula; sheath with lateral margin of scopa more or less flat..... 5
5. Lancet with 14 annuli, first and second serrulae distinctly incised with acute apex (Fig. 3H); labrum black; flagellomeres dorsally reddish brown; dorsal mesonotum mostly pale, mesoscutellum with posterior margin black. China (Yunnan)..... *H. jinghongensis*

- . Lancet with 11–13 annuli, first and second serrulae truncate 6
- 6. Lancet with 13 annuli, basal two annuli strongly divergent downward, bottom of first cypsella concave (Fig. 3E); dorsum of flagellomeres mostly pale brown. Europe *H. socia*
- . Lancet with 11–12 annuli, basal two annuli weakly divergent downward, bottom of first cypsella convex (Figs 3C, 3D); flagellomeres entirely black. Southeast Asia 7
- 7. Lancet with 12 annuli, annular teeth obscure (Fig. 3C); lateral mesoscutal lobes and mesoscutellum partly pale brown, abdomen except for first tergum entirely dark orange. Thailand *H. leksawasdii*
- . Lancet with 11 annuli, annular teeth acute (Fig. 3D); lateral mesoscutal lobes and mesoscutellum entirely black; narrow posterior margin of tergites 1–8 blackish. China (Yunnan, Guizhou) *H. jingxii*

***Hugilpinia brevictenidia* sp. nov.** (Figs 1, 2)

Description. Female holotype. Length 9 mm; body dark orange, labrum, narrow ocellar ring, narrow posterior margin of mesoscutellum, metanotum largely, posterior margin of abdominal tergites 1–7 brownish black, cerci and antennal flagellum black, pedicellum dark brown, abdominal sternites pale yellowish brown; wing hyaline, outer margin feebly infuscate, base of pterostigma black, center of pterostigma pale brown, margin of pterostigma and veins blackish brown; leg yellowish brown, basal 2/3 of each tibia and basal part of tarsomeres 1–3 whitish; body hairs silver.



Figure 1. Adult of *Hugilpinia brevictenidia* sp. nov., ♀, holotype.

Body distinctly punctured; punctures on pronotum and mesepisternum large, interspaces narrow and smooth; punctures on mesoscutellum large and sparse, smooth space broad (Fig. 2J); punctures on frons and inner orbits small and quite dense, punctures on postocellar area and temple small and sparse; metascutellum coarsely and densely punctured; punctures on ventral part of abdominal tergites and sternites shallow and sparse, dorsum of tergites impunctate, densely microsculptured, surface dim (Fig. 2L).



Figure 2. *Hugilpinia brevictenidia* sp. nov., ♀, holotype. A. Head, frontal view; B. Hind tibial spurs; C. Sheath, dorsal view; D. Head, dorsal view; E. Seventh sternite; F. Lance, dorsal view; G. Hind tarsus, ventral view; H. Claw; I. Antenna, lateral view; J. Mesoscutellum and metanotum; K. Lance, lateral view; L. Abdominal tergites 1–2; M. Lancet.

Clypeus oblique, anterior margin weakly incised; malar space 1.2 times diameter of lateral ocellus and 2 times length of pedicellum, distance between antennal toruli 1.7 times malar space; inner margins of eyes distinctly convergent downward, distance between lower corners of eyes 1.7 times longest axis of eye; frons flat, middle fovea broad and longitudinal; postocellar area strongly elevated (Fig. 2A), 2 times as broad as long, lateral furrows broad and curved, weakly divergent backward (Fig. 2D); antenna with 19 antennomeres, shorter than head breadth, middle flagellar teeth much longer than flagellomere axis (Fig. 2I); mesoscutellum broader than long, anterior margin weakly protruding; cenchrus short, distance between cenchri 0.5 times length of cenchrus (Fig. 2J); middle of vein Sc vestigial, vein cu-a

meeting cell 1M beyond middle; petiole of hind anal cell 2 times breadth of anal cell and 2.5 times length of cu-a (Fig. 1); middle process of sternite 7 short and broad with a small middle incision (Fig. 2E); sheath in dorsal view as Fig. 2C; middle part of lance not constricted (Figs 2F, 2K); lancet with 12 annuli, first ctenidium vestigial in lower 3/4 and developed in upper 1/4, second ctenidium long and weakly curved with sharp teeth, middle teeth on fifth to seventh ctenidium larger, first serrula small and triangularly protruding, basal cypsella (membranous margin between serrulae) weakly convex (Fig. 2M).

Male. Unknown.

Holotype. ♀, **China**, Jiangxi, Jiulianshan National Nature Reserve, Daqitian Protection Station, 24°32'59"N, 114°26'17"E, alt. 487 m, 10-IX-2020, leg. Lin LIU. **Paratype.** 1♀, data same as the holotype (ASMN).

Etymology. This species epithet is named after the very short first ctenidium.

Remarks. This new species is similar to *H. lipuensis* (G. Xiao & X. Huang, 1985) but the latter species differs from the new species by the following characters: the distance between antennal toruli 2 times malar space, the postocellar area more than 2 times as broad as long, the first ctenidium vestigial in middle 1/4 with the upper half and ventral 1/4 distinct, and the first and second serrulae acute with distinct middle incision.

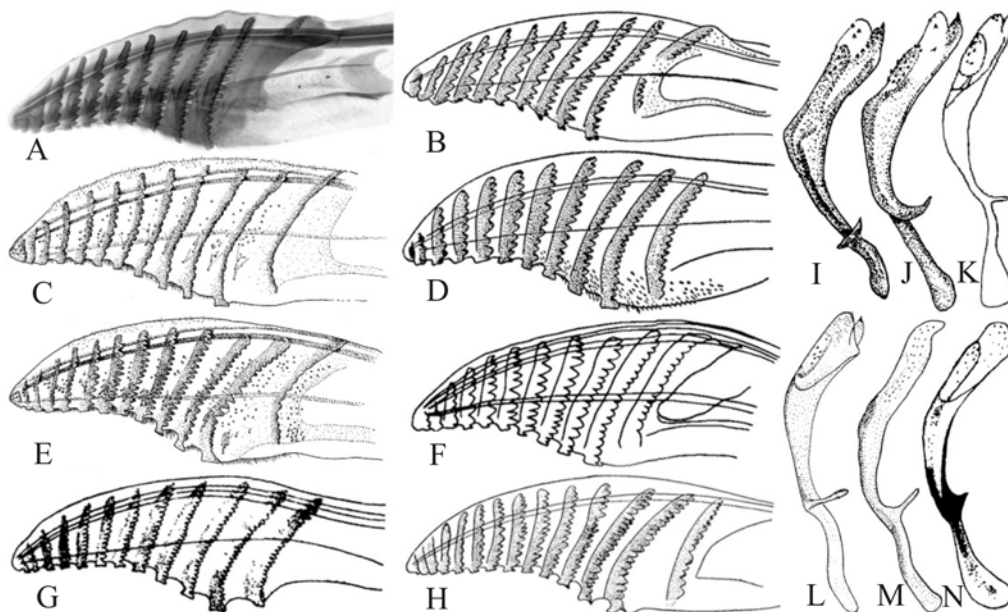


Figure 3. *Hugilpinia* spp. Lancet and penis valve. A. *H. brevictenidia* sp. nov.; B, M. *H. lipuensis*; C, I. *H. leksawasdii*; D, L. *H. jingxii*; E, J. *H. socia*; F, K. *H. hebedentata*; G, N. *H. tabulaeformis*; H. *H. jinghongensis*; A–H. Lancet, lateral view; I–N. Penis valve, lateral view. B, D, H, L, M. After Xiao *et al.* 1992; C, E, I, J. After Smith 1983; G, N. After Xiao, 1992; D, K. After Xu, 1997.

***Hugilpinia hebedentata* (Xu, 1997) comb. nov.** (Figs 3F, 3K)

Gilpinia hebedentata Xu, 1997: 171.

Distribution. China (Yunnan).

***Hugilpinia jinghongensis* (Xiao & Huang, 1984) comb. nov.** (Fig. 3H)*Gilpinia jinghongensis* Xiao & Huang, 1984: 142.

Distribution. China (Yunnan).

***Hugilpinia jingxii* (Xiao & Huang, 1984) comb. nov.** (Figs 3D, 3L)*Gilpinia jingxii* Xiao & Huang, 1984: 148.

Distribution. China (Yunnan).

***Hugilpinia leksawasdii* (Smith, 1983) comb. nov.** (Figs 3C, 3I)*Gilpinia leksawasdii* Smith, 1983: 212.

Distribution. Thailand (Chiang Mai).

***Hugilpinia lipuensis* (Xiao & Huang, 1985) comb. nov.** (Figs 3B, 3M)*Gilpinia lipuensis* Xiao & Huang in Xiao, Huang & Zhou 1985: 30.

Distribution. China (Anhui, Zhejiang, Guangxi, Guizhou).

***Hugilpinia socia* (Klug, 1812) comb. nov.** (Figs 3E, 3J)*Lophyrus socius* Klug, 1812: 60.*Gilpinia socia*: Benson, 1939: 341.*Lophyrus pineti* Hartig, 1837: 166.

Distribution. Europe (Austria, Croatia, Czech Republic, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Poland, Russia, Slovakia, Sweden, Switzerland, Ukraine).

***Hugilpinia tabulaeformis* (Xiao, 1992) comb. nov.** (Figs 3G, 3N)*Gilpinia tabulaeformis* Xiao, 1992: 194.

Distribution. China (Gansu).

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