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Sibling species in *Tenthredo* Linné (Hymenoptera: Tenthredinidae): the status of some East Asian taxa

Двойники в роде *Tenthredo* Linné (Hymenoptera: Tenthredinidae): статус некоторых восточноазиатских таксонов

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Ключевые слова: пилильщики, аллопатрическое распространение, новый вид, новый статус, определительные таблицы, лектотипы.

Abstract. Three pairs of species of *Tenthredo* with a probably allopatric distribution in Japan (and Sakhalin) and the Asian Mainland are treated. *Tenthredo leleji* **sp.n.**, a species similar to *T. eburata* Konow, 1900 is described from Japan and Sakhalin. *Tenthredo tenuipennis* Malaise, 1931, **sp.rev.** is removed from synonymy with *T. hilaris* F. Smith, 1874. The differences between *T. jonoensis* Matsumura, 1912 and *T. cockerelli* (Rohwer, 1925) are described and illustrated. Lectotypes are designated for *Tenthredo eburata* Konow, 1900, *T. jonoensis* Matsumura, 1912, *T. vitta* Enslin, 1920, and *T. tenuipennis* Malaise, 1931.

Резюме. Рассмотрены три пары видов рода *Tenthredo* с возможно аллопатрическим распростанением в Японии (и на Сахалине) и на материковой Азии. Из Японии и Сахалина описывается близкий к *T. eburata* Konow, 1900 вид *Tenthredo leleji* **sp.n.** *Tenthredo tenuipennis* Malaise, 1931 (**sp.rev.**) восстановлен из синонимов *T. hilaris* F. Smith, 1874. Выявлены отличия между *T. jonoensis* Matsumura, 1912 и *T. cockerelli* (Rohwer, 1925). Обозначены лектотипы для *Tenthredo eburata* Konow, 1900, *T. jonoensis* Matsumura, 1912, *T. vitta* Enslin, 1920 и *T. tenuipennis* Malaise, 1931.

Introduction

Tenthredo Linné, 1758 is a Holarctic and Oriental genus of sawflies comprising more than 1,000 species [Taeger et al., 2010]. Compared with other sawflies, many species are large and have an impressive appearance. The imagines are often easy to collect in numbers from flowers, where they feed, hunt and mate. Therefore, the representation of *Tenthredo* in Hymenoptera collections is generally quite good, which may in itself have been an impetus for sawfly taxonomists to describe numerous taxa. However, the task of identifying the vast diversity of forms is currently nearly impossible, because of the lack of comprehensive, modern identification tools for most subgroups and geographical regions. Species exhibiting distinct colour patterns or morphological characters have sometimes been described repeatedly. On the other hand, type series of existing nominal species sometimes include several morphologically very similar species. Furthermore, the subdivision into subgenera and species-groups is apparently unsatisfactory, and a thorough, large-scale analysis of *Tenthredo* combining morphological and genetic data has not been published. The current subgeneric classification of the large genus *Tenthredo* is often insufficient and requires scrutiny.

About 20 years ago, A. Taeger and A. Shinohara recognised that pairs of *Tenthredo* species exist, with allopatric distributions in Japan and on the East Asian mainland. Selected types were also studied during these earlier studies. For several reasons, the results were never published. Independently, M. Wei also noted that the so-called *T. eburata* Konow, 1900 from Japan is not conspecific with similar specimens from the Asian mainland and that *T. tenuipennis* Malaise, 1931 represents a valid species. In this paper we discuss three of these species pairs and describe the differences between the species in each of them, thus enabling the

identification of specimens without knowledge of their geographic origin.

Material and methods

The specimens examined with scanning electron microscopy (SEM) were uncoated. The images reproduced in Figs 12a, 12b, 13a and 13b were taken with a SEM JSM-6060LV (Jeol) at 1.7–2.0 kV acceleration voltage. Figs 12c and 13c were taken with Keyence VHX-D510 Digital SEM/Microscope.

Photos were taken by the first author with a Leica DFC 495 digital camera and a Leica M405 C stereomicroscope (except for Figs 4a, 4b — A.D. Liston; 11, 12a, 12b, 13a, 13b — C. Kutzscher, 12c, 13c — H. Kamezawa). Composite images with an extended depth of field were created from stacks of images using the software CombineZP, and finally arranged and partly enhanced with Ulead PhotoImpact X3. Micosoft Image Composite Editor (ICE) was used to stitch together images of large specimens.

The following abbreviations of insect depositaries are used: BMNH — Natural History Museum, London, UK; CSCS — Central South University of Forestry and Technology, Changsha, China; EIHU — Hokkaido University, Sapporo, Japan; KUK — Kobe University, Kobe, Japan; NHRS — Naturhistoriska riksmuseet, Stockholm, Sweden; NSMT — National Museum of Nature and Science, Tsukuba, Japan; SDEI — Senckenberg Deutsches Entomologisches Institut, Müncheberg, Germany; UOPJ — Osaka Prefecture University, Sakai, Osaka, Japan; USNM — National Museum of Natural History, Department of Entomology, Washington D.C., USA; YNU — Department of Life Sciences, Yeungnam University, Gyeongsan, South Korea; ZSM — Zoologische Staatssammlung München, Germany.

Type specimens we examined about 20 years ago were not borrowed again for present study. These types could not be illustrated by high resolution photographs.

Morphological terms follow Viitasaari [2002].

Results

Genetic data are available only for one species considered here. Our subgeneric placements (if made) are therefore based mainly on morphology and are to be considered as preliminary.

The morphological differences between the species in each pair are comparatively weak, but appear sufficient for their taxonomic separation. Whereas *T. eburata* and *T. leleji* **sp.n.** are separated mainly by colour, *T. cockerelli* (Rohwer, 1925) and *T. jonoensis* Matsumura, 1912 are separated almost only by morphology and *T. tenuipennis* and *T. hilaris* F. Smith, 1874 by a mixture of colour and morphology. There is little doubt that the species within each of these pairs are closely related. We here treat all these taxa at species level. To answer the question whether they might be better treated as pairs of subspecies would require acquisition of additional data, e.g. from interbreeding experiments.

I. *Tenthredo eburata* Konow, 1900 (Asian mainland) and *Tenthredo leleji* sp.n. (Japan and Sakhalin), Figs 1–5.

Diagnosis and placement within Tenthredo. In Enslin's [1920] key, these two species run to *Tenthredo eburata* Konow, 1900. Zhelochovtsev and Zinovjev [1988] placed *T. eburata* in the subgenus *Tenthredella* Rohwer, 1910 and created for it the «*eburata* group». Taeger et al. [2006, 2010] listed the taxon without explanation in the subgenus *Olivacedo* Zhelochovtsev, 1988. This placement is based mainly on the basally comparatively deeply incised mandibles in the male (Fig. 4c). Shang and Wei [2013a] treated the species in a work dealing with species of the «*simlaensis* group» and synonymised *Tenthredella rubrocaudata* Takeuchi, 1936 with *T. eburata*. Comparing *T. eburata* with specimens similar to *T. simlaensis* Cameron, 1899 from Nepal, Myanmar and Borneo, the taxa seem not to be closely related. In the latter specimens the mandibles are differently shaped, e.g. basally not incised, and the eyes in frontal view converge much more strongly. The coloration of the abdomen (i.e. the dark stripes on the terga) resembles *T. eburata*, and therefore the species look rather similar at first glance.

According to H. Goulet [personal communication] «The two species are better associated with *Tenthredella* than *Olivacedo*. Based on images of *T. leleji* (Fig. 1d), there is no embossment on the gena, the clypeus is typically emarginated, and more importantly the penis valve is typical of most North American species. The whip of the penis valve is clearly shorter than the whip of the *T. atra* and *T. colon* groups.»

Tentatively we follow here this placement.

Tenthredo eburata and *T. leleji* **sp.n.** are distinguished as follows:

a Facial orbits completely yellow, yellow pattern almost reaching occipital carina (Figs 3d, 4c).

b Mesoscutum black with broad yellow stripes on median mesoscutal lobes along notauli, lateral mesoscutal lobes usually yellow-marked close to apex of median mesoscutal lobes and at curve of their dorsal and posterior part (Figs 3a, 3b, 5);

c In ♀ terga 2–7 dorsally black, each medially with pale triangular spot, terga 8 and 9 pale brown to reddish (Figs 3a, 5).

d In ♀ mesepisternum pale, with small dark spot close to middle, with horizontal dark stripe below spot on posterior part of mesepisternum (Fig. 3c) (in the 25♀ from China the dark spot usually absent or very small and the black stripe usually present also anteriorly).

e In ♂ metatibia dorsally black lined (Fig. 4a). (N Korea, Russian mainland, China, NE Europe) .... *Tenthredo eburata* Konow, 1900

aa Upper part of head almost completely black, antennal crests and spot at upper corner of eye yellow (Figs 1c, 1d, 2b).

bb Mesoscutum almost completely black, lateral mesoscutal lobes with narrow pale mark at curve of dorsal and posterior part (Figs 1c, 2b).

cc In ♀ terga 2–5(–7) dorsally black, each medially with pale triangular spot, terga (6–) 8–9 pale brown to reddish (Fig. 1a).

dd In ♀ upper half of mesepisternum pale, lower half black (Fig. 1b).

ee In ♂ metatibia predominantly orange, basally more or less black marked (Fig. 2a). (Japan: Honshu, Hokkaido; Russia: Sakhalin) ..... ***Tenthredo leleji* sp.n.**

Tenthredo eburata Konow, 1900

Tenthredo eburata Konow, 1900: 125–126, syntype(s) ♀. Type locality «Sibiria (Irkutsk)» (ca. 52.3°N, 104.3°E). Lectotype ♀ here designated (SDEI) «*Tenthredo eburata* Knww. Sibir. Irkutsk». Figs 3a–3c; see also https://dx.doi.org/10.6084/m9.figshare.1553387.

Rethrax eburata: Cinovskij [1953].

Tenthredella rubrocaudata Takeuchi, 1936: 74–75, plate VI «Holotype, ♀; 5 paratopotypes, ♀ , Tonnai, North-Corea, July 23, 1935 (K. Takeuchi); 1 paratype, ♀, Motodomari, Saghalien, August 16, 1914 (S. Issiki).» Holotype ♀ examined (NSMT), Fig. 5; see https://dx.doi.org/10.6084/m9.figshare.1553402. Type locality Tōnai (41.316°N 128.900°W) (North Korea, Ryanggang-do). Three conspecific paratypes see https://dx.doi.org/10.6084/m9.figshare.1553404. Synonymy by Shang, Wei [2013a]. The paratype specimen from Motodomari belongs to *T. leleji* described below.

Material examined. 33♀♀,18♂♂ (CSCS, NSMT, SDEI).

Distribution. NE Europe: SE Finland, Estonia, Latvia; Russia: NE to Primorskiy Territory; N Korea; China: Jilin, Shanxi.

Additional notes. Body size 11–12(–13?) mm. Described from Irkutsk, the species is rare in North Eastern Europe (SE Finland, Estonia, Latvia, NE Russia) but obviously more common in Eastern Siberia. In Asia it was hitherto mixed up with *T. leleji* (see below). Apart from the characters given in the key, *T. eburata* seems to be usually less strongly sculptured than *T. leleji*.

Oehlke and Wudowenz [1984] referred to the type specimen in the SDEI as possibly being a holotype. However, there is no indication in the original description, that Konow had only a single specimen. Therefore this specimen originally had the status of syntype. It is here designated as lectotype.

The type series of *T. rubrocaudata* includes both species. However, the Korean specimens (including the holotype) all belong to *T. eburata*. The paratype specimen from Sakhalin belongs to *T. leleji*.

Tenthredo leleji Taeger, Wei et Shinohara, **sp.n.**

Figs 1a–1h, 2a–2d.

Type material. Holotype: ♀, «[JAPAN: Hokkaido] Nisshotoge, 1100m Hidaka Mts. Hidaka / Tokachi 17.VII.2005 H. Hara» (NSMT). https://dx.doi.org/10.6084/m9.figshare.1572279

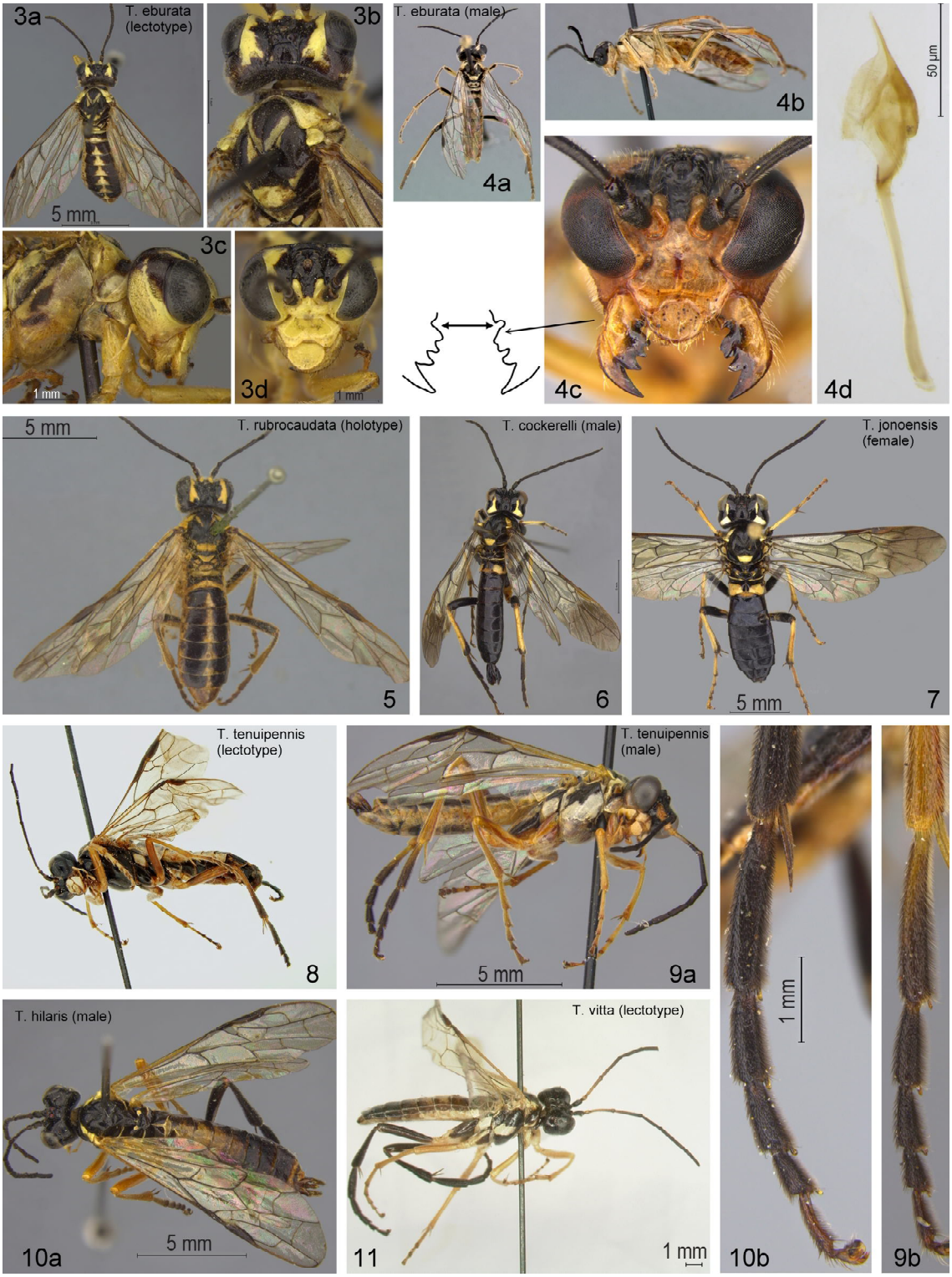
Paratypes: 90♀♀, 42♂♂ (CSCS, KUK, NSMT, SDEI, USNM). **Japan**. **Hokkaido**. 1♀, Aizankei, Daisetsuzan Mts., Kamikawa [43.719°N, 142.814°E], 21.VII.1974, A. Shinohara; 1♀, Aizankei Kamikawa, 6.VII.1980, A. Shinohara; 1♀, Sekihoku-toge, 900 m, Kamikawa [43.650°N, 143.167°E], 9.VII.1996, H. Hara; 1♀, Asahidake-onsen, 1000 m, Daisetsuzan Mts., Kamikawa [43.647°N, 142.790°E], 27–28.VI.1997, A. Shinohara; 1♀, Asahidake-onsen, 1000 m, Daisetsuzan Mts., Kamikawa, 2.VII.2000, A. Shinohara; 1♀, same data, but 1050 m [43.647°N, 142.791°E], 27–29.VI.2009; 1♀, Asahidake-onsen, Daisetsuzan Mts., Kamikawa, 16.VII.2002, A. Shinohara; 1♀, Kogen-onsen, Mts. Daisetsuzan, Kamikawa [43.626°N, 142.931°E], 11.VII.1996, A. Shinohara; 1♀, Mikuni-toge, 1000 m, Tokachi [43.595°N, 143.124°E], 16.VII.1998, A. Shinohara; 1♂, Nukabira Tokachi, 500 m [43.367°N, 143.187°E], 6.VII.1994, A. Shinohara; 1♀, Nukabira Tokachi [43.367°N, 143.187°E], 16–21.VI.1982, A. Shinohara; 1♀, Nukabira Tokachi, 900 m [43.368°N, 143.130°E], 30.VI.1980, A. Shinohara; 1♀, Horoshika-toge, 1050 m, Daisetsuzan Mts., Tokachi [43.337°N, 143.163°E], 28.VI.2012, A. Shinohara; 1♀, Horoshika-toge, 1100 m, Tokachi [43.334,°N, 143.169°E], 7.VII.1994, A. Shinohara; 1♂, same data, 7.VII.1994 (DEI-GISHym 30731); 1♀, same data, 21–25.VI.1997; 1♂, Yamada-onsen, Tokachi [43.310°N, 143.125°E], 29.VII.1973, A. Shinohara (DEI-GISHym 30730); 1♀, Yamada-onsen, 1000 m, Tokachi [43.325°N, 143.100°E], 21–24.VI.1997, A. Shinohara; 1♀, Yamada-onsen, 800–1000 m, Tokachi [43.310°N, 143.125°E], 11.VII.1998, A. Shinohara; 2♂♂, Nisshotoge, 1100 m, Hidaka Mts., Hidaka/Tokachi [42.971°N, 142.752°E], 23.VI.2004, A. Shinohara; 1♀, same data (DEI-GISHym 30732, smallest female, 11 mm, https://dx.doi.org/10.6084/m9.figshare.1572277). **Honshu.** 1♂, Miyagi: Mt. Zawosan [38.135°N, 140.480°E], 27.VII.1971, A. Shinohara; 1♀, 1♂, Miyagi: Kamoshika spa, Zawo [38.135°N, 140.480°E], 24.VII.1976 N. Takeuchi; 1♀, Niigata: Mt. Myokozan [36.906°N, 138.101°E], 30.VII.1976, A. Shinohara; 1♀, Tochigi: Mt. Keichozan [36.901°N, 139.763°E], 5. VIII. 1967, K. Tomita; 3♀♀, same data, but 20.VII.1970, T. Saito; 2♀♀, Tochigi: Happogahara, Yaita [36.829°N, 139.904°E], 20.VI.1976, T. Saito; 1♀, Niigata: Renge-onsen, Itoigawa [36.811°N, 137.799°E], 3.VIII.1985, A. Shinohara; 2♀♀, Tochigi: Yumoto, Oku-Nikko [36.780°N, 139.450°E], 12.VII.1987, T. Saito; 1♀, Nagano: Utsukushigahara [36.228°N, 138.130°E], 28.VII.1963, A. Shinohara; 1♀, Nagano: Karuizawa [36.355°N, 138.589°E], 29.VI.1969, A. Shinohara; 1♀, Nagano: Mt. Nyukasayama [35.905°N, 138.175°E], 17.VII.1969, A. Shinohara; 1♂, Nagano: Ogisawa, Omachi [36.559°N, 137.723°E], 22–23.VII.1981, A. Shinohara; 1♀, Nagano: Shimashima-dani, 30.VII.1933 [36.190°N, 137.820°E]; 1♀, Nagano: Kamikochi [36.250°N, 137.638°E], 15.VII.1922, S. Issiki ; 2♀♀, Nagano: Kamikochi, 15.VIII.1936, K. Takeuchi ; 4♀♀, 2♂♂, Nagano: Yarisawa, 1600–1900 m, Kamikochi [36.318°N, 137.683°E], 18–22.VII.1989, A. Shinohara; 1♂, Nagano: Yarisawa, 1600–1900 m, Kamikochi, 30.VII.1990, A. Shinohara; 2♂♂, same data, but 1800–2100 m [36.318°N, 137.683°E], 31.VII.1990, A. Shinohara; 2♀♀, Nagano: Shiga-kogen [36.685°N, 138.497°E], 7.VIII.1984, A. Shinohara; 1♀, Nagano: Makuiwa, 1550 m, Shiga-kogen [36.704°N, 138.485°E], 22.VII.1998, A. Shinohara; 1♀, Nagano: Makuiwa, 1550 m, Shiga-kogen, 7–9.VIII.1996, A. Shinohara; 1♀, 1♂, Nagano: Minoto, Yatsugatake Mts. [35.982°N, 138.336°E], 25.VII.1980, A. Shinohara; 2♀♀, Nagano: Minoto, ca 1900 m, Yatsugatake Mts.[35.984°N, 138.341°E], 29.VII.1982, A. Shinohara; 2♂♂, same data, but 30.VII.1982; 1♀, 2♂♂, same data, but 5.VIII.1982; 1♀, same data, but 6.VIII.1982; 1♂, Nagano: Minoto, 2000 m, Yatsugatake Mts.[35.988°N, 138.345°E], 2.VIII.1984, A. Shinohara; 1♀, 1♂, same data, but 3.VIII.1984; 2♀♀, Nagano: Minoto, 1800 m alt., Yatsugatake Mts.[35.981°N, 138.331°E], 29.VII–3.VIII.1986, A. Shinohara; 1♂, same data, but 29.VII–3.VIII.1986 (DEI-GISHym 30750, https://dx.doi.org/10.6084/m9.figshare.1572950); 6♀♀, 2♂♂, same data, but 4–8.VIII.1987; 3♀♀, 1♂, same data, but 6–9.VIII.1991; 2♂♂, Nagano: Minoto, 1850 m, Yatsugatake Mts.[35.982°N, 138.336°E], 23–26.VII.1996, A. Shinohara; 2♀♀, same data, but 31.VII.1997; 1♂, same data, but 3.VIII.1997; 1♀, 5♂♂, same data, but 27–31.VII.1999; 1♂, same data, but 27–31.VII.1999 (DEI-GISHym 84888, https://dx.doi.org/10.6084/m9.figshare.1572275); 12♀♀, 7♂♂, same data, but [35.987°N, 138.359°E], 25–29.VII.2000; 1♀, Nagano: Minoto, 1750–2000 m, Yatsugatake Mts., 25–29.VII.2000, A. Shinohara; 1♀, Nagano: Karasawa-kosen, 1700 m, Yatsugatake Mts.[36.024°N, 138.330°E], 27–28.VII.2006, A. Shinohara; 1♀, Nagano: Akadake-kosen, Yatsugatake Mts.[35.987°N, 138.359°E], 2.VIII.1972, A. Shinohara; 1♀, Nagano: Shibunoyu, Yatsugatake Mts.[36.036°N, 138.328°E], 4.VII.1978, A. Shinohara; 1♀, 1♂, same data, but 5.VII.1978 N. Matsuba; 1♀ Nagano: Shibunoyu, 11.VII.1974, T. Naito; 1♀, Nagano: Mt. Nyugasayama [35.896°N,138.172°E], 31.VII.1983, Y. Nishimoto; 1♀, same

Figs 1–2 — *Tenthredo leleji* **sp.n.** 1 — holotype, ♀: a, dorsal view; b, ventrolateral view; c, head and thorax, dorsal view; d, face; e, head and thorax, lateral view; f, hypopygium; g, apex of saw (in situ); h, antenna. 2 — paratype, ♂: a, dorsal view; b, head and thorax, dorsal view; c, head and thorax, lateral view; d, penis valves.

Рис. 1–2 — *Tenthredo leleji* **sp.n.** 1 — голотип, ♀: a, вид сверху; b, вид снизу и сбоку; c, голова и грудь сверху; d, лицо; e, голова и грудь сбоку; f, гипопигий; g, вершина пилки (in situ); h, усик. 2 — паратип, ♂: a, вид сверху; b, голова и грудь сверху; c, голова и грудь сбоку; d, вальвы пениса.

data, but 13.VIII.1993; 1♀, Yamanashi; Mitsutoge [35.549°N, 138.808°E], 30.V.1974 K. Kimura; 1♀, Kowashimizu, 1630–1700 m, Kirigamine [36.098°N, 138.167°E], 7.VIII.2015, A. Shinohara; 1♀, Ishikawa: Hakusan [36.156°N, 136.767°E], 24.VII.1937, K. Takeuchi; 1♀, Gifu: Ontake, Sengendara [35.896°N, 137.470°E], 2.VIII.1966, T. Okutani; 3♀♀, 1♂, [Japan, leg. Kumamoto, SDEI]. **Russia,** ***Sakhalin:*** ♀ (paratype of *T. rubrocaudata*), Motodomari (= Vostochnoye, Sakhalinskaya oblast, 48.280°N, 142.632°E, https://dx.doi.org/10.6084/m9.figshare.1563666).

Description. Holotype ♀: Figs 1a–1h. Body size 13 mm, fore wing 13 mm, antenna about 6.5 mm. Antenna slightly



Figs 3–11 — *Tenthredo* spp. 3 — *Tenthredo eburata* (lectotype, ♀): a, dorsal view; b, head and thorax, dorsal view; c, head and thorax, lateral view; d, face. 4 — *Tenthredo eburata* (♂): a, dorsal view; b lateral view; c, face; d, penis valve. 5 — *Tenthredo eburata* (holotype of *T. rubrocaudata,* ♀), dorsal view. 6 — *Tenthredo cockerelli* (♂), dorsal view. 7 — *Tenthredo jonoensis* (♀), dorsal view. 8 — *Tenthredo tenuipennis* (lectotype, ♀), ventrolateral view. 9 — *Tenthredo tenuipennis* (♂): a, ventrolateral view; b, metatarsus. 10 — *Tenthredo hilaris* (♂): a, dorsal view; b, metatarsus. 11 — *Tenthredo hilaris* (lectotype of *Tenthredo vitta,* ♂), lateral view.

Рис. 3–11 — *Tenthredo* spp. 3 — *Tenthredo eburata* (лектотип, ♀): a, вид сверху; b, голова и грудь сверху; c, голова и грудь сбоку; d, лицо. 4 — *Tenthredo eburata* (♂): a, вид сверху; b, вид сбоку; c, лицо; d, вальва пениса. 5 — *Tenthredo eburata* (голотип *T. rubrocaudata,* ♀), вид сверху. 6 — *Tenthredo cockerelli* (♂), вид сверху. 7 — *Tenthredo jonoensis* (♀), вид сверху. 8 — *Tenthredo tenuipennis* (лектотип, ♀), вид снизу и сбоку. 9 — *Tenthredo tenuipennis* (♂): a, вид снизу и сбоку; b, задняя лапка. 10 — *Tenthredo hilaris* (♂): a, вид сверху; b, задняя лапка. 11 — *Tenthredo hilaris* (лектотип *Tenthredo vitta,* ♂), вид сбоку.

narrowed towards the apex; 1st antennomere about 1.3 times as long as 2nd; 8th antennomere about 2.0 times as long as broad. In dorsal view maximum width between outer eye edges subequal to maximum width between outer edges of temples. Postocellar area about 1.5 times as broad as long, laterally limited by deep furrow, posteriorly by distinct carina, anteriorly by a shallow furrow. Frontal ridges continuous from antennal crests to posterior ocelli. Postocellar area and vertex rather densely pitted, interspaces with microsculpture, thus silkily shiny, face almost smooth with spaced small pits. Clypeus anteriorly rather shallowly emarginate, not separated by furrow from face. Thorax finely pitted, with microsculpture, silkily shiny. Hypopygium (sternum 7) medially and laterally emarginated, forming two distinct apical lobes. Hairs pale, usually about as long as diameter of ocelli, anterior part of mesonotum covered by shorter, dark hairs. General colour dorsally mainly black with rich pale marks, ventrally mainly pale (Fig. 1a, 1b). Pale colour mainly yellow, apex of abdomen and parts of legs reddish brown or orange.

♂ (Figs 2a–2d) similar to ♀, head in dorsal view clearly contracted posterior of eyes. Thorax ventrally almost completely yellowish, abdomen dorsally less dark, usually only terga 1–3 with distinct black areas.

Variability. Body size (11–)12–13(–14) mm. The sculpture on upper head is sometimes clearly less extensive than in the holotype: the postocellar area and vertex may only be pitted, and almost lack microsculpture between the pits. The upper thorax also shows a clear variability in the density of sculpture. However, the quality of surface sculpture on head and thorax seem to vary independently of each other. The black pattern of the tergites is usually restricted to the basal five segments, but exceptionally the black colour extends to the 7th tergite, and the triangular dorsal yellow spots may be reduced to narrow yellow lines.

Distribution. Japan: Honshu, Hokkaido; Russia: Sakhalin.

Etymology. This species is named in honour of our friend and colleague Professor Arkadiy Stepanovich Lelej.

II. *Tenthredo cockerelli* (Rohwer, 1925) (Asian mainland) and *Tenthredo jonoensis* Matsumura, 1912 (Japan) (Figs 6, 7, 12, 13)

Diagnosis and placement within *Tenthredo*. In Enslin's [1920] key, females of these two species run to *T. goliath* Enslin, 1920 [current valid name: *Tenthredo platycera* (Mocsáry, 1909) (https://dx.doi.org/10.6084/m9.figshare.2076031)]. Their males run to *T. maculata* Geoffroy, 1785. However, in both cases most characters given there disagree with these two species. In Malaise [1945] one arrives at couplet 174, but from that point the given character sets no longer fit *T. jonoensis* or *T.cockerelli*. Both species may be easily separated from the other taxa included in these keys by the colour of the wings, which are apically broadly infuscate (Figs 6, 7). Furthermore, they have free-standing antennal crests (lower part of the frontal crest, «supra-antennal tubercles» of Malaise [1945]; see Viitasaari [2002]).

Taeger et al. [2010] placed the species in the subgenus *Tenthredella*. Togashi [1966] created the *T. jonoensis* group for three Japanese species. Shang and Wei [2013b] considered both species in a discussion of their new *T. maculipennis* group.

The shape of the mandibles and the male genitalia differ rather strongly from *T. atra* Linnaeus, 1758 (type species of *Tenthredella*). The character sets of *Endotethryx* Lacourt, 1997 and *Dorhettenyx* Lacourt, 1997, which were treated in the past under *Tenthredella*, also disagree. Currently, a subgeneric association of the taxa remains uncertain and we leave this question open.

Hitherto *T. jonoensis* and *T. cockerelli* have only been treated as separate species in a key by Shang and Wei [2013b, in Chinese]. However, the applied colour characters are not reliable for the safe discrimination of these taxa, and the data given there for *T. cockerelli* also included Japanese records. On the other hand, several records of *T. jonoensis* from Korea (e.g., [Lee et al., 2000]) are given in that paper. According to our results, the distribution of the two species does not overlap: *T. jonoensis* is restricted to Japan, whereas *T. cockerelli* occurs only on the Asian mainland.

The two species may be distinguished as follows:

a Antennal crests very sharply separated from face (Figs 13a, 13c).
b Sharp change between angle of upper head and remaining face at about level of median ocellus (Fig. 13b).
c Colour of clypeus variable: completely black, pale spotted, or largely pale. (Korea; Russian Far East; China) .... *Tenthredo cockerelli* (Rohwer, 1925)

aa Antennal crests less sharply separated from face (Figs 12a, 12c).
bb Gradual change between angle of upper head and remaining face at about level of median ocellus (Fig. 12b).
cc Colour of clypeus mainly or completely pale. (Japan) . ..... *Tenthredo jonoensis* Matsumura, 1912

Tenthredo jonoensis Matsumura, 1912

Tenthredo jonoensis Matsumura, 1912: 38–39, Pl. XLIV, Fig. 13. Syntype(s) ♀. Type locality «Kiushu (Jono)» (33.858°N, 130.886°E). Lectotype ♀ here designated (EIHU) «Jiono, Japan, 8. 3., Matsum.», «13», «*Tenthredo jonoensis* Matsumura Type» [red label]. Apex of left antenna, entire left flagellum, right foreleg, left metatarsus and abdomen from 4th segment missing.

Material examined. 13♀♀, 11♂♂ (EIHU, NSMT, SDEI, UOPJ).

A female specimen compared by Shinohara with the lectotype is figured here: https://dx.doi.org/10.6084/m9.figshare.1572951 (from Tochigi: Iramuro-onsen Nasu, 10.VIII.92, leg. A. Shinohara; about 37.070°N, 139.918°E).

Distribution. Japan: Kyushu, Honshu

Tenthredo cockerelli (Rohwer, 1925)

Tenthredella cockerelli Rohwer, 1925: 10–11, holotype ♀. Type locality «Kongaus, Siberia» (error for Kangaus = Anisimovka; 43.166°N 132.800°E, Russia) (see: http://usnmhymtypes.com/default.asp?Action = Show_Types&Single_Type=True&TypeID=5939). Holotype ♀ examined: «Kangaus, Siberia, Cockerell, August 1923» (= Anisimovka), «Type No. 27622, U.S.N.M.» [red], «*Tenthredella cockerelli* TYPE ♀ Roh.» (USNM).

Tenthredella bituberculata Takeuchi, 1940: 468–470, holotype ♀. Type locality «Mt. Kongo, Corea» [= Kumgangsan, 38.657°N 128.105°E, North Korea]. Holotype ♀ examined: «7. viii.1935, Mt. Kongo, Takeuchi», «*Tenthredella bituberculata* Tak., Holotype», «*Tenthredo* (*Tenthredella*) *cockerelli* (Rohwer) det. A. Taeger 96√». Fig. 13c and https://dx.doi.org/10.6084/m9.figshare.3113338. Specimen in perfect condition (UOPJ).

Paratype ♂ see https://dx.doi.org/10.6084/m9.figshare.3113425. Synonymy by Wei et al. [2006].

Material examined. 36♀♀, 25♂♂ (CSCS, NSMT, SDEI, UOPJ, USNM, YNU).

Additional figures of specimens are given here: S. Korea, 1♂, Mt. Sobaeksan, Kyongsangbukdo, Huibangsa, 21.V.87, leg. Shinohara, A. (36.916°N, 128.466°E) https://dx.doi.org/10.6084/m9.figshare.2082754; China: Hebei 1♀(39.986°N, 115.024°E) https://dx.doi.org/10.6084/m9.figshare.1575756.

Distribution. Russia (Primorskiy Territory), Korea, China (Hebei, Heilongjiang, Liaoning, Inner Mongolia, Shanxi).

Additional notes. Wei et al. [2006] synonymised *Tenthredo bituberculata* with *T. cockerelli* without explanation. This synonymy followed an unpublished manuscript by Taeger and Shinohara dating from 1995 and 1996. In those years we compared the relevant types and came to the conclusion that these nominal taxa are conspecific.

Tenthredo bituberculata was described because of the black clypeus and the longitudinal depression of the clypeus. *Tenthredo cockerelli* shows wide variability in the colour of the clypeus. The typical form of *T. cockerelli* has the clypeus largely pale, but specimens also exist in which it has one (asymmetrical!) or two small yellow spots, or is almost completely black. The depression on the scutellum is also a variable character among the available specimens. Consequently, *T. cockerelli* and *T. bituberculata* are considered conspecific.

III. *Tenthredo tenuipennis* Malaise, 1931 (Asian mainland) and *Tenthredo hilaris* F. Smith, 1874 (Japan) (Figs 8–11)

Diagnosis and placement within *Tenthredo*. The species are currently placed in the subgenus *Tenthredella* Rohwer, 1910. Barcode data (COI) are available for a female of *T. tenuipennis* from Korea (GenBank KX101016). The most similar barcodes are to be found in the Nearctic *T. stricklandi* (Ross, 1931) (about 5 % difference) and the West Palaearctic *T. procera* Klug, 1817 (about 6 % difference). In Enslin [1920] the females run to *T. hilaris* although his description does not fit in several respects. The original description of *T. hilaris* [Smith, 1874] did not mention the strikingly pale lateral colouration of the black abdomen (compare Fig. 8. and https://dx.doi.org/10.6084/m9.figshare.1289415). This character was subsequently described by Kirby [1882]. Enslin [1920], who based his redescription on these two works, presented a contradictory description of the abdomen (in the beginning as an almost black one, at the end black with pale sides). In the Palaearctic, a similar colouration of the female abdomen is only known in *Tenthredo silensis* Costa, 1859 and *T. borea* Enslin, 1919.

The males of these species run in Enslin [1920] to *T. vitta* Enslin, 1920, which is a subjective synonym of *T. hilaris*. However, the male of *T. tenuipennis* differs in the characters given below.

The latter species was hitherto treated as a synonym of the Japanese *T. hilaris* [Takeuchi, 1951]. Females of both taxa are very similar. However, the males are clearly distinguishable in colour and morphology. Therefore, the validity of *T. tenuipennis* seems to be very likely.

a Frontal crests somewhat notched below frontal ocellus, furrow between crests shallow or almost missing.
b Antenna in ♀ black, sometimes scape partly brown; in ♂ scape and pedicel mainly yellow, base of 3rd antennomere more or less yellow.
c In ♂ mesepisternum ventrally largely pale (Fig. 9a).
d In ♂ metatibia and base of tarsomere 1 mainly pale brown, metatarsus dark towards the apex (Fig. 9a).
e Metatarsomere 1 about 6.0–7.0 (usually about 6.5) times as long as broad (Fig. 9b). (Korea; Russia: Far East; China: Heilongjiang) .... *Tenthredo tenuipennis* Malaise, 1931, spec. rev.

aa Frontal crests not notched below frontal ocellus, furrow between crests distinct for complete length.
bb Antenna in both sexes black, frequently antennomeres 3–5 dark or pale brown.
cc In ♂ mesepisternum mainly black, posterior part medially with pale stripe (Fig. 11).
dd In ♂ metatibia and metatarsus mainly black (Fig. 11).
ee Metatarsomere 1 about 5.0–6.0 (usually about 5.5) times as long as broad (Fig. 10b). (Japan) .... *Tenthredo hilaris* F. Smith, 1874

Tenthredo hilaris F. Smith, 1874

Tenthredo hilaris F. Smith, 1874: 382–383, holotype (assumed as such by Kirby [1882]) ♀. Type locality «North Japan» (BMNH, not examined).

Tenthredo vitta Enslin, 1920: 60, 90, syntype(s) ♂, «Nippon». Type locality «Haruna Japan» [ca. 36.470°N, 138.850°E]. Lectotype ♂ here designated (ZSM). Fig. 11. Synonymy by Takeuchi [1951] https://dx.doi.org/10.6084/m9.figshare.2519257.

Material examined. 52♀♀, 18♂♂ (CSCS, SDEI, NSMT).

Distribution. Japan.

Host plant. *Aucuba japonica* Thunberg, 1784 (Aucubaceae) [Okutani, 1967]

Tenthredo tenuipennis Malaise, 1931, **spec. rev.**

Tenthredo tenuipennis Malaise, 1931: 109–110. Syntypes 12♀♀, 5♂♂, «Wladiwostokgegend… Sedanka, Tigrowaja …Suchan».

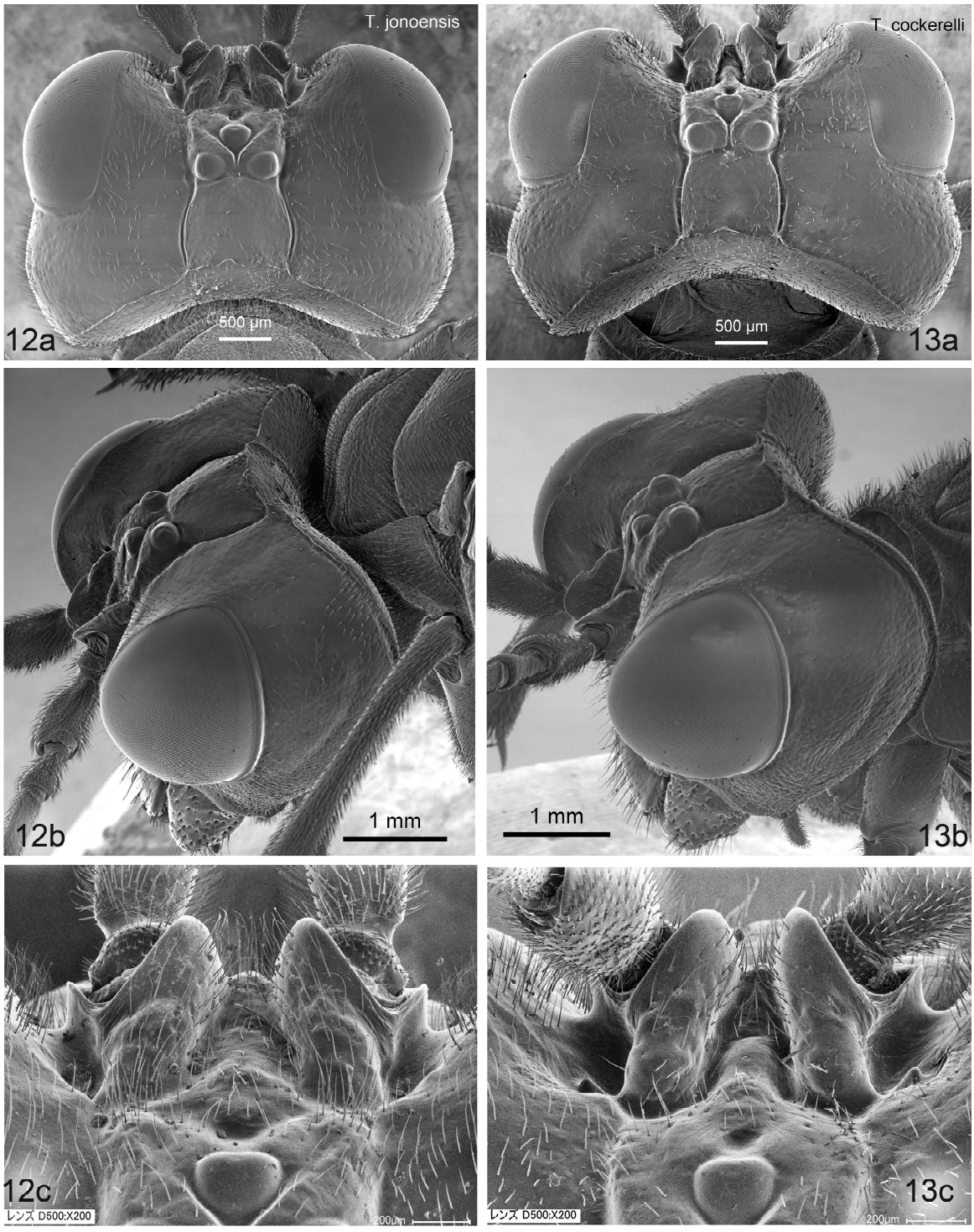
Lectotype ♀ here designated. Type locality: «Vladivostok Tigrovaja»[= Tigrovoye, 80 km E of Vladivostok, 43.193°N, 132.903°E], 3.VII.1930, leg. R. Malaise. (Fig. 8). (NHRS) https://dx.doi.org/10.6084/m9.figshare.2441413. Paralectotypes: 2♂♂, same data as lectotype (see https://dx.doi.org/10.6084/m9.figshare.1545613); 1♂, 3♀♀, Tigrovaja (without date, 20.VI.1930–23.VIII.1930); 1♀, Sedanka , 24.VI.1930 (43.218°N, 131.959°E), 1♀ Sedanka (without date, 20.VI.1930–23.VIII.1930) (all NHRS). 1♀, Tigrovaja, 1♂, Sedanka, 1♀ Suchan, 14.VII.1930; (all NSMT). One more paralectotype (♀ ?) is housed at the Oxford University Museum [Hale Carpenter, 1933]. The whereabouts of the remaining syntypes (now paralectotypes) are unknown.

Material examined. 39♀♀, 22♂♂ (CSCS, NHRS, NSMT, SDEI, YNU)

Additional figures: https://dx.doi.org/10.6084/m9.figshare.1546757, ♂, from Russia: Anisimovka; https://dx.doi.org/10.6084/m9.figshare.1289415, ♀, from South Korea: Mt. Baegunsan.

Distribution. Russia (Primorskiy Territory), Korea, China (Heilongjiang, Jilin, Hebei).

Additional notes. Malaise usually labelled his types as «Typus», «Allotypus» and «Paratypus». However, frequently there is no mention of a holotype in his original descriptions, and the types are therefore to be considered syntypes. Malaise distributed many of his «paratypes» among collections all over the world. In reality these specimens are frequently syntypes if no lectotype has been designated.



Figs 12–13 — *Tenthredo* spp. 12 — *Tenthredo jonoensis* (♀): a, head, dorsal view; b, dorsolateral view; c, antennal crests. 13 — *Tenthredo cockerelli* (♀): a, head, dorsal view; b, dorsolateral view; c, antennal crests.

Рис. 12–13 — *Tenthredo* spp. 12 — *Tenthredo jonoensis* (♀): a, голова сверху; b, вид сверху и сбоку; c, антеннальные гребни. 13 — *Tenthredo cockerelli* (♀): a, голова сверху; b, вид сверху и сбоку; c, антеннальные гребни.

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References

Cinovskij J.P. 1953. [Insects of Latvia SSR. Horntails and sawflies]. Riga: Akademiya Nauk Latviyskoy SSR. 209 p. [In Russian].

Enslin E. 1920. Die Blattwespengattung *Tenthredo* L. (*Tenthredella* Rohwer) // Abhandlungen der Zoologisch-Botanischen Gesellschaft in Österreich. Bd.11. Ht.1. S.1–96.

Hale Carpenter G.D. 1933. Exotic Tenthredinidae in the Oxford University Museum // The Entomologist's Monthly Magazine, Third Series. Vol.69. No.19. P.275.

Kirby W.F. 1882. List of Hymenoptera with descriptions and figures of the typical specimens in the British Museum. 1. Tenthredinidae and Siricidae. London, by order of the Trustees. Vol.1. P.1–450.

Konow F.W. 1900. Neue Sibirische Tenthrediniden // Entomologische Nachrichten (Herausgegeben von Dr. F. Karsch). Bd.26. S.119–126.

Lee J.-W., Ruy S.-M., Quan Y.T., Jung J.-C. 2000. Economic insects of Korea. 2. Hymenoptera (Symphyta: Tenthredinidae) // Insecta Koreana. Supplement. Vol.9. P.1–223. [In Korean].

Malaise R. 1931. Blattwespen aus Wladiwostok und anderen Teilen Ostasiens // Entomologisk Tidskrift. Vol.52. No.2. P.97–159.

Malaise R. 1945. Tenthredinoidea of South-Eastern Asia with a general zoogeographical review // Opuscula Entomologica, Lund. Supplement. Vol.4. P.1–288.

Matsumura S. 1912. Thousand insects of Japan. Supplement IV. Tokyo: Keiseisha. 247 p. [In Japanese].

Oehlke J., Wudowenz J. 1984. Katalog der in den Sammlungen der Abteilung Taxonomie der Insekten des Institutes für Pflanzenschutzforschung, Bereich Eberswalde (ehemals Deutsches Entomologisches Institut), aufbewahrten Typen — XXII (Hymenoptera: Symphyta) // Beiträge zur Entomologie. Bd.34. Ht.2. S.363–420.

Okutani T. 1967. Food-plants of Japanese Symphyta (II) // Japanese Journal of Applied Entomology and Zoology. Vol.11. P.90–99. [In Japanese].

Rohwer S.A. 1925. Sawflies from the Maritime Province of Siberia // Proceedings of the United States National Museum Vol.68. P.1–12.

Shang Y.-F., Wei M.-C. 2013a. Two new species of *Tenthredo simlaensis* group (Hymenoptera, Tenthredinidae) from China // Acta Zootaxonomica Sinica. Vol.38. No.3. P.609–615.

Shang Y.-F., Wei M.-C. 2013b. A new species of *maculipennis* group of *Tenthredo* Linnaeus (Hymenoptera, Tenthredinidae) from China // Acta Zootaxonomica Sinica. Vol.38. No.2. P.351–355.

Smith F. 1874. Descriptions of new species of Tenthredinidae, Ichneumonidae, Chrysididae, Formicidae &c. of Japan // Transactions of the Entomological Society of London for the Year 1874. No.3. P.373–409.

Taeger A., Blank S.M., Liston A.D. 2006. European sawflies (Hymenoptera: Symphyta) — a species checklist for the countries // Blank S.M., Schmidt S., Taeger A. (eds): Recent Sawfly Research: Synthesis and Prospects. Keltern: Goecke and Evers. P.399–504.

Taeger A., Blank S.M., Liston A.D. 2010. World Catalog of Symphyta (Hymenoptera) // Zootaxa. Vol.2580. P.1–1064.

Takeuchi K. 1936. Tenthredinoidea of Saghalien (Hymenoptera) // Tenthredo. Acta Entomologica. Vol.1. No.1. P.53–108.

Takeuchi K. 1940. Chinese sawflies and woodwasps in the collection of the Musée Heude in Shanghai (second report) // Notes d'Entomologie Chinoise, Changhai. Vol.7. No.2. P.463–486.

Takeuchi K. 1951. New and unrecorded sawflies from Shikoku, Japan 1). (Hymenoptera: Symphyta) // Transactions of the Shikoku Entomological Society, Matsuyama. Vol.2. No.4. P.57–62.

Togashi I. 1966. On the *jonoensis*-group of *Tenthredo* (Hymenoptera, Tenthredinidae) in Japan // Kontyû, Tokyo. Vol.34. No.2. P.168–171.

Viitasaari M. 2002. Sawflies (Hymenoptera, Symphyta) I. A review of the suborder, the Western Palaearctic taxa of Xyeloidea and Pamphilioidea // Helsinki Tremex Press Ltd. Vol.1. P.1–516.

Wei M., Nie H., Taeger A. 2006. Sawflies (Hymenoptera: Symphyta) of China — Checklist and Review of Research // Blank S.M., Schmidt S., Taeger A. (eds): Recent Sawfly Research: Synthesis and Prospects. Keltern: Goecke and Evers. P.505–574.

Zhelochovtsev A.N., Zinovjev A.G. 1988. [27. Order Hymenoptera — Wasps. Suborder Symphyta (Chalastogastra) — Sawflies and woodwasps] // Medvedev G.S. (Ed.): Opredelitel' Nasekomykh Evropeiskoi Chasti SSSR. T.III. Pt.6. Nauka: Leningrad. P.7–237. [In Russian].

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