



Entomofauna

ZEITSCHRIFT FÜR ENTOMOLOGIE

Band 25, Heft 21: 321-332 ISSN 0250-4413 Ansfelden, 20. Dezember 2004

A list of Lance flies from Taiwan with descriptions of new species (Diptera, Lonchaeidae)

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Abstract

This paper provides a list of Lonchaeidae (Diptera) recorded from Taiwan during survey work carried out between 2000 and 2002. It includes descriptions of two new species in the genus *Lonchaea* FALLÉN, 1820; *L. formosa* sp. nov. and *L. macrocercosa* sp. nov., and three new species in the genus *Silba* MACQUART, 1851; *S. flavitarsis* sp. nov., *S. schachtii* sp. nov. and *S. trigena* sp. nov.

Key Words: Diptera, Lonchaeidae, *Lonchaea*, *Silba*, new species, Taiwan.

Zusammenfassung

Es werden Lonchaeidae-Arten aus Taiwan aufgelistet, die im Verlauf von drei Forschungsreisen in den Jahren 2000 bis 2002 gesammelt wurden. Die Arbeit enthält Beschreibungen von zwei neuen Arten der Gattung *Lonchaea* FALLÉN, 1820, *L. formosa* sp. nov. und *L. macrocercosa* sp. nov. sowie drei neue Arten der Gattung *Silba* MACQUART, 1851, *S. flavitarsis* sp. nov., *S. schachtii* sp. nov. und *S. trigena* sp. nov.

Background

The specimens of Lonchaeidae listed here were collected as part of a PPP/DAAD-project entitled "Entomological contribution to the biogeography of Taiwan" which is a co-operative project between the Zoologische Staatssammlung München (ZSM), Munich, Germany, and the National Chung-Hsing University Taichung (NCHU), Taiwan.

Apart from HENNIG (1948) who published descriptions of three new species based on specimens from Taiwan little is known about the Lonchaeid fauna of the island.

Genus *Lonchaea* FALLÉN, 1820: 25

***Lonchaea incisurata* (HENNIG, 1948)**

Material examined: Taiwan, Taoyuan Co. [County], Tungyenshan Region, Shayin, Kudji River, ca. 24°49'N / 121°23'E, ca.500m, 22.XI.2002, leg. W. SCHACHT et al., 2 ♂♂. Specimens in ZSM.

The type specimens originate from Taiwan (HENNIG 1948). MCALPINE (1975) also records this species from Sri Lanka.

***Lonchaea formosa* sp. nov.**

Male. Head: Eyes bare. Frons at level of ocellar triangle approximately half the width of an eye but gradually narrowing down to the base of the antennae where it is about one third eye width. Frons polished and shining on upper part from just in front of anterior ocellus, lower part of the frons pollinose, frons flat without ant depressions or rugosity. Orbital plates bare and wide, at level of posterior ocellus reaching more than half way between eye margin and ocellus. Frons with hairs short, at most only one quarter the length of the orbital bristle. Lunule and parafacials silver dusted, face only slightly silver. Lunule with three to four hairs on each side.

First antennal flagellomere long, three times as long as it is deep, reaching down over the oral margin, flat on dorsal surface but ventrally gradually sloping up towards the rounded apex, black apart from, on the inner surface, orange colouration ventrally extending along basal two thirds of the segment, covered in minute silver hairs. Arista with microscopic pubescence. Subvibrissal hairs extending anteriorly along the mouth edge as a single row of four to five short hairs, these only about one third as long as the orbital bristle, Palps about half the width of the depth of the first antennal flagellomere, bearing a few short hairs.

Thorax: Toracic dorsum shining, with short black hairs which are no more than one quarter the length of the orbital bristle, sides of thorax also shining as is the disc of the scutellum. Prothoracic sternum bare. One stigmatal and one propleural bristle. Anepisternum with two strong anterior bristles and three strong posterior bristles otherwise bearing hairs which are about half as long as the bristles. Katepisternum with one strong bristle, no hairs behind or below it but with approximately eight to ten hairs on the anterior part of the sclerite, these being half the length of the bristle. Scutellar disc entirely covered in hairs, these similar in length to those on the thoracic dorsum, no stronger hairs present on the scutellar margin between the strong bristles.

Squamae slightly grey in colour with a darker margin, squamal fringe pale, wings clear with yellow veins, intercostal section approximately twice as long as crossvein ta. Wing length 3.0 mm. Legs with femora and tibiae all black, metatarsi and second tarsomere clear yellow, others becoming progressively darker apically. Abdomen with tergites shining, sternite one bare, others setulose.

Male genitalia: Figs 1, 2, 3. Epandrium, slightly taller than it is wide with rather long hairs at the posteroventral corner, the longest of these reaching past the apex of the cerci. Cerci rather small, height less than half the height of the epandrium, club shaped, bearing short hairs apically. Surstylus not protruding from the shell of the epandrium. In ventral view surstyli with serrated edge ventrally with an exceptionally large "tooth" just below the cerci. Pregonites equal in size with inner margin deeply serrated. Aedeagus a slender J shaped tube, tapering towards the apex.

Female unknown.

Holotype male: Taiwan, E Taichung, Hueisuen [Huisun], Experimental Forest, 600m, ca. 24°07'N / 121°03'E, 23.-27.VI.2000, leg. W. SCHACHT. Holotype deposited in NCHU.

Only known from the holotype male.

Differential diagnosis: With a combination of relatively small size, shining blue black in ground colour, pale tarsi, wings and squamae and with a long first antennal flagellomere reaching down over the mouth edge indicate that this species belongs to the *Lonchaea impressifrons* BEZZI, 1920 group within the genus *Lonchaea* as defined by MCALPINE (1960).

The further character of the completely haired scutellar disc indicates that *L. formosa* lies within a small group of species which includes *L. dasyscutella* MCALPINE, 1964 (Australia), *L. iridala* MCALPINE, 1964 (Vanuatu), *L. cuneifrons* MCALPINE, 1964 (Australia) and *L. megacera* KERTESZ, 1901 (New Guinea). Differentiation between these species and *L. formosa* is made by comparison of characters in the male genitalia, in particular the shape of the apices of the pregonites and the aedeagus. *L. dasyscutella*, *L. iridala* and *L. cuneifrons* all have the surstyli extending beyond the shell of the epandrium, in addition the aedeagus and pregonites of each is differently shaped. *L. megacera* is only known from the female holotype, it is distinguished from *L. formosa* by the shape of the first antennal flagellomere which in *L. megacera* is rather strongly attenuated on the apical half.

Lonchaea macrocercosa sp. nov.

Male. Head: Eyes bare. Frons wide, more than half the width of an eye, parallel sided, slightly pollinose but with underlying bluish reflections, at certain angles with slight vertical striations visible. Hairs on frons short, the majority less than half the length of the orbital bristle but with a few longer ones immediately above the lunule. Orbital plate shining and relatively broad extending more than half way between the eye margin and the ocellar triangle, without any hairs. Lunule, face and parafacials shining silver when seen from above. Lunule with three hairs on each side. First antennal flagellomere very long, three times as long as it is wide, reaching down over the mouth edge, entirely black. Arista with pubescence rather short, at a maximum not more than half the width of the first antennal flagellomere. Palps broad, as wide as the first antennal flagellomere. Subvibrissal hairs extending anteriorly along the mouth edge as a single row of four hairs, the basal two of these the strongest but not markedly stronger than the other subvibrissal hairs.

Thorax: Thoracic disc covered with rather strong hairs, most of these half as long or

more than the length of the orbital bristle, three pairs of prescutellar dorsocentrals and two pairs of arcostichials. All of the thoracic disc, sclerites on the sides of the thorax, and scutellum heavily dusted. Prothoracic sternum bare. One propleural and one stigmal bristle. Anepisternum with two strong bristles anteriorly and four strong bristles posteriorly. Katepisternum with two strong bristles, the posterior one being slightly stronger and situated slightly above the anterior one, no hairs posterior to or below these strong bristles, the only other hairs on this sclerite being approximately six hairs scattered along the anterior margin.

Scutellum on margin with four hairs on each side between the lateral and apical strong bristles, these arranged in several rows vertically, two hairs between the strong apical bristles. Squamae and fringes white. Wings clear, wing length 5.5mm

Legs all black but the hind metatarsus and second tarsomere ventrally with a dense fringe of golden brown hairs. Hind tibiae with a distinctive antero dorsal row of about eleven long setulae, the majority of these longer than the width of the tibiae.

Male genitalia: Figs 4, 5. Epandrium wider than it is high, with a large antero dorsal process, this rather rectangular and rounded anteriorly, extending anteriorly past the main portion of the epandrium. The epandrium is attached anteriorly by a mass of muscle fibres which can make the detail of the anteriodorsal process difficult to see. On the postero-ventral corner of the epandrium there is a mass of long, fine, curved hairs, otherwise surface of the epandrium with few hairs. The cerci are very large in comparison to the epandrium, in pinned specimens often easily visible protruding ventrally below the tip of the abdomen. Main part of cerci rather rectangular in shape with a row of fine hairs around the edges, connected to the other parts of the genitalia by a rather narrow neck, membranous areas present dorsally. Surstyli rather reduced and not extending beyond the shell of the epandrium, no obvious teeth present on the surstyli but internally with a clasp like process posteriorly on each side.

Aedeagus simple, a squarish basal portion from which extends at a 45° angle a long slender tube which is slightly upturned near the apex.

Holotype male: Taiwan, N-Nantou Co., Road No. 14, NE Puli, Reyen Shi-Reg., Meifeng, ca. 24°06'N / 121°10'E, 2200m, 9.-11.XI.2002, leg. W. SCHACHT et al. Holotype deposited in NCHU.

Paratypes: Taiwan, Kaohsiung Co., Tengir, Endemic Sp. Res. St. [Endemic Species Research Institute/Station], ca 23°07'N / 120°47'E, 1600m, 6.-10.VII.2000, leg W. SCHACHT, 5♂♂ 3♀♀. Taiwan, Kaohsiung Co., Jungyang Mts, Tengir, Endemic Spec. Res. Inst., ca. 23°07'N / 120°47'E, 1600m, 14.-19.XI.2002, leg. W. SCHACHT et al., 1♀. Taiwan, Shiueshan Mountains, Fushan, Botanical Garden, 650m, ca. 24°45'N / 121°35'E, 7.-9.V.2001, leg. W. SCHACHT et al., 1♀. Taiwan, Central Taiwan Mountains, Road No.14, NE Puli, Reyen Shi-Region, Tsuifeng, 2200m, ca. 24°08'N / 121°10'E, 28.VI.-2.VII.2000, leg. W. SCHACHT et al., 3♀♀. 4 paratypes deposited in NCHU and 9 in ZSM.

Differential diagnosis: This species lies close to *Lonchaea incisurata* (HENNIG, 1948) which also has short plumose arista, two sternopleural bristles and generally similar male genitalia. It differs from that species however by the presence in both sexes of a fringe of golden brown hairs ventrally on the hind metatarsus and second tarsomere and in the detail of the male genitalia, particularly the shape of the aedeagus.

The male genitalia of *L. macrocercosa* differ from that of *L. incisurata* in the follo-

wing ways: The anteriodorsal process of the epandrium is broader in *L. macrocercosa* than it is in *L. incisurata*, the epandrium bears a large number of long, fine, curved posteroventral hairs unlike in *L. incisurata* where these hairs are not so dense and long, the cerci have the hairs absent from the central portion whilst *L. incisurata* has hairs more evenly spread across the cerci, *L. incisurata* has a slight posteroventral lump on the cercus which is absent in *L. macrocercosa*. The aedeagus however shows the greatest differences between the species, in *L. incisurata* the aedeagus is J shaped (Fig. 6) whilst in *L. macrocercosa* the base of the aedeagus is solid with the slender apical portion extending at about 45° from the basal portion (Fig. 5).

Distributional note: Both specimens of the closely related *L. incisurata* collected in this survey were taken at 500m whilst the majority of *L. macrocercosa* specimens were taken at or above 1600m with only one being taken at 650m. This may suggest that the two species have a differing altitudinal range.

Genus: *Silba* MACQUART, 1851: 277

***Silba excisa* (KERTESZ, 1901)**

Material examined: Taiwan, Taichung Co., Taiwan mountains, west side; Huisun, Experimental Forest, ca. 24°07'N / 121°03'E, 600m, 3.-8.IX.2002, leg. W. SCHACHT et al., 2♂♂. Specimens in ZSM

A widespread species recorded from India to Philippines, SE Seychelles, SW Solomons & Australia, north to Japan. It has previously been recorded (MCALPINE 1975) as being captured on jungle shrubs and in along the side of small streams often in ravines.

***Silba flavitarsis* sp. nov.**

Male. Head: Eyes bare. Frons approximately half the width of an eye, pollinose, covered in short hairs which are at most one quarter the length of the orbital bristle, longer ones present immediately above the lunule. Orbital plate bare. First antennal flagellomere long, reaching past the mouth margin, three times as long as it is deep, on the internal surface broadly orange on the basal quarter. Arista with plumosity at its greatest extent approximately three quarters the depth of the first antennal flagellomere. Subvibrissal hairs extending anteriorly along the mouth edge in a single row of four to five hairs, these hairs all short, none more than half the length of the orbital bristle, not noticeably longer than the other hairs on the jowls..

Thorax: Thoracic disc, sides of thorax and disc of scutellum all heavily pollinose. Thoracic disc with short hairs, these approximately one third the length of the orbital bristle. One stigmatal and one propleural bristle. Anepisternum with two strong bristles anteriorly and three posteriorly, twelve to fourteen other hairs present on the anepisternum, these about one half as long as the strong bristles. Katepisternum with two strong bristles, the posterior of the two being slightly longer and stronger, no hairs present posterior to or below these bristles, four to six other hairs present on the anterior part of the sclerite, these approximately half as long as the anterior strong bristle. Scutellum entirely bare on disc and margins apart from the usual four strong bristles. Squamae and

fringes entirely whitish, wings clear with yellow veins. Wing length 3.0mm. Legs all black but with all metatarsi and second tarsomeres clear yellow, other tarsomeres becoming progressively darker apically.

Abdomen with tergites and sternites pollinose, sternite one bare, others setulose.

Male genitalia: Figs 7, 8, 9, 10. The epandrium is twice as high as it is wide, tapering from being broad posteriorly to relatively narrow anteriorly, bearing a regularly spaced row of hairs posteriorly but at the posteroventral angle with a clump of eight to ten closely spaced long hairs. Cerci tall and narrow, almost half as high as the epandrium with a row of moderately long hairs vertically. Surstyli in lateral view with posterior lobe produced beyond the shell of the epandrium with teeth clearly visible. also projecting slightly anteriorly. In ventral view posterior lobe of surstylus clearly visible, bearing eight to ten small black teeth, a rounded lobe below these, otherwise bearing only a few hairs on the lower margins. Pregonites with a long, finger like posterior projection, seen in lateral view with a somewhat angular basal portion. Aedeagus rather small forming a rather open U shape, with an obvious small protuberance on inner surface of basal portion, with a single basal process which in ventral view is lanceolate in shape.

Female unknown.

Holotype male: Taiwan; Hualien Co., Jungyang Mountains, Butterfly Valley, S Kuang-fu near Fuiuan, ca. 23°35'N / 121°21'E, 13.-15.V.2001. leg. W. SCHACHT et al. Holotype deposited in NCHU.

Only known from the holotype male

Differential diagnosis: With partly yellow tarsomeres, pale squammal fringes and male genitalia which have a combination of a tall narrow epandrium and cerci along with a prominent posterior lobe of the surstyli this species belongs to the *Silba admiralis* MCALPINE, 1956 group of species which as well as *S. admiralis* (India) also includes *Silba chalkei* MCALPINE, 1956 (Korea), *S. pappi* SOOS, 1977 (Afghanistan) and probably *S. pallicarpa* (BEZZI, 1920) (Philippines).

S. flavitarsis is distinguished from all of these species apart from *S. pallicarpa* by the fact that the scutellar margin is entirely devoid of hairs between the strong bristles.. The male genitalia are also distinct in terms of the shape of the pregonites, aedeagus and by having a clump of long hairs present at the posteroventral angle. The aedeagus is very similar to that of *S. pappi* but in that species the epandrium has different characters.

This only requires the need for comparison with *S. pallidicarpa* which is apparently only known from the female holotype. That species has the first antennal flagellomere black apart from being "a little brownish along the inner border", it reaches the mouth margin, the arisal plumosity is as wide as the depth of the first antennal flagellomere and the wings broad with diverging third and fourth veins, characters not shared by *S. flavitarsis*.

Silba schachtii sp. nov.

Male. Head: Eyes bare. Frons about half the width of an eye, pollinose and flat. Orbital plates sub shining and rather narrow, not reaching more than half way from the eye margin to the anterior ocellus, without any hairs. Frons with very short hairs these only about one quarter as long as the orbital bristle apart from a row of approximately six hairs

on the anterior margin of the frons just above the lunule which are about half as long as the orbital bristle. Lunule with six hairs on each side, these about half as long as the orbital bristle. Lunule, face and parafacials all with a silver pollinosity. First antennal flagellomere two and a half times as long as it is deep, reaching down over the oral margin, all black but covered in minute silver hairs, parallel sided and rounded at the tip with the ventral margin sloping towards the apex sooner than the dorsal margin. Arista yellow basally, plumosity at its greatest width just less than the depth of the first antennal flagellomere. Jowls as wide as the depth of the first antennal flagellomere. Subvibrissal hairs extending anteriorly along the mouth margin as a row of five to six hairs, the basal two or three of these being the strongest hairs on the jowls, but even so not markedly stronger than the others. Palps narrow, their width about half the depth of the first antennal flagellomere.

Thorax: Hairs on thoracic disc short, at most half the length of the orbital bristle. Prothorax with three hairs on each side. One propleural and one stigmatal bristle. Anepisternum pollinose, with three strong anterior bristles and three strong posterior bristles, the other hairs on the mid part of the sclerite about half the length of these bristles. Katepisternum with two strong bristles, no hairs posterior to or below these, about twelve hairs anteriorly on the anterior part of the sclerite, these half the length of the strong bristles. Scutellum subshining, on margin between apical and lateral bristles with two strong hairs anteriorly, below and posterior to these two finer hairs, two small hairs present between the apical bristles.

Squamae and fringes straw yellow, wings clear with yellow veins. Wing length 4.5mm. Legs entirely black but hind metatarsi and second tarsomeres with a ventral fringe of golden brown stiff hairs. Abdomen with sternite one bare and shining, the other sternites pollinose and haired.

Male genitalia: Figs 11, 12, 13. Epandrium slightly higher than it is wide, rather rounded, anteriorly bearing a larger number of hairs than is usual for a *Silba* species, these arranged in loose rows vertically over much of the ventral portion of the epandrium. Cerci rather small and squarish in shape, less than half the height of the epandrium, mostly chitinised but with membranous portion dorsally, bearing moderately long hairs posteriorly and ventrally with a few longer hairs present at the apex. Surstyli extending slightly from epandrial shell all along ventral margin, following the shape of the epandrium margin without any obvious processes, posterior lobe bearing four small black teeth with a single tooth on each side centrally below the base of the cerci, with regular moderately long hairs along ventral margin. Aedeagus with a deep, boat like basal portion from which arises a slender, sinuous apical part.

Female unknown.

Holotype male: Taiwan, S-Nantou Co., Road No. 21, Hoshier; ca 23°35'N / 120°53'E, ca. 1000m, 19.-21.V.2001, leg W. SCHACHT et al., 1♂. Holotype deposited in NCHU.

Only known from the holotype male.

Differential diagnosis: The structure of the male genitalia, in particular the aedeagus with its deep basal portion are not similar to any other described *Silba* species.

Silba srilanka MCALPINE, 1975

Material examined: Taiwan, East Coast, Hualien to Shueilian, 0-100m, 13.V.2001, leg. W. SCHACHT et.al., 1♂. Taiwan, Hualien Co., Jungyang Mountains, Butterfly Valley, ca. 350m, S Guangfu near Fuiuan, ca 23°35'N / 121°21'E, 13.-15.V.2001, leg. W. SCHACHT et. al., 1♂.

Previously only recorded from Sri Lanka by MCALPINE (1975) who lists records of 10 specimens taken on the island during March 1962 at altitudes of between approximately 1000m and 1200m at streamside habitats.

Silba taiwanica (HENNIG, 1948)

Material examined: Taiwan, Road No. 14, Central Taiwan Mts, NE Puli, Reyen Shi-Region, E Tsuifeng to Yuanfeng, ca. 2500-2700m, ca. 24°08'N / 121°12'E, 1.VII.2000, leg W. SCHACHT et al., 1♂.

Previously recorded from Taiwan without location (HENNIG 1948)

Silba trigena sp. nov.

Male. Head: Eyes bare. Frons about half the width of an eye, flat and moderately pollinose. Orbital plate bare, shining and extending half way between the eye margin and the anterior ocellus. Hairs on the upper part of the frons very short, not more than one quarter the length of the orbital bristle, a row of six to seven longer ones at the anterior margin of the frons just above the lunule. Lunule, face and parafacials moderately silvered when seen from above, lunule with four long hairs on one side and five on the other, these as long as the long hairs on the anterior margin of the frons. Subvibrissal hairs extending as a single row anteriorly this consisting of six to seven hairs, the basal three of these amongst the strongest hairs on the jowls but not noticeably stronger than the rest. Jowls relatively narrow, narrower than the depth of the first antennal flagellomere. First antennal flagellomere two and a half times as long as it is deep, reaching down over the mouth margin, all black apart from being very obscurely dark brown at the base internally, slightly constricted in apical half and upturned towards the apex. Arista yellowish on basal third, plumosity at its maximum extent as wide as the depth of the flagellomere.

Thorax: Hairs on the thoracic disc short, about one quarter as long as the orbital bristle. All pleurae dusted as is the scutellar disc and the hind margin of the thoracic disc. One propleural and one stigmatal bristle. Anepisternum with two strong bristles anteriorly and three posteriorly. Katepisternum with the usual two strong bristles, no hairs present posterior to or below these, anterior bristle only very slightly weaker than the posterior one, the other hairs on the anterior part of the katepisternum short, only about one quarter as long as the strong bristles. Scutellar margin between lateral and apical bristles with one hair on one side and two hairs on the other otherwise bare, apical scutellar bristles crossed near their apex.

Squamae and squamal fringes white, wings clear with yellow veins. Legs entirely black, front femur with a row of eight strong bristles posteriorly ventrally. Sternite one shining and without hairs, other sternites dusted and setulose.

Male genitalia: Figs 14, 15, 16, 17. Epandrium as high as it is wide, rounded ventrally with a projection anteriorly and a circular excavation dorsally, posteroventrally well covered in hairs but none of these exceptionally long or strong. Cerci relatively small and simple bearing numerous hairs. In lateral view surstyli not projecting beyond shell of epandrium but in ventral view with obvious rounded lobes which bear a series of regular hairs, otherwise remainder of margin of surstyli bare. Seven small sharp black teeth present on posterior lobe of the surstyli, these extending down on the inner surface of the surstyli, one small tooth present centrally below the base of the cerci. Aedeagus in lateral view with two sharp and pointed lateral lobes the same size as the central projection, in ventral view these slightly lobed near the apex and curving out like horns on either side of the central projection, basal portion of aedeagus rather flat and simple.

Female unknown.

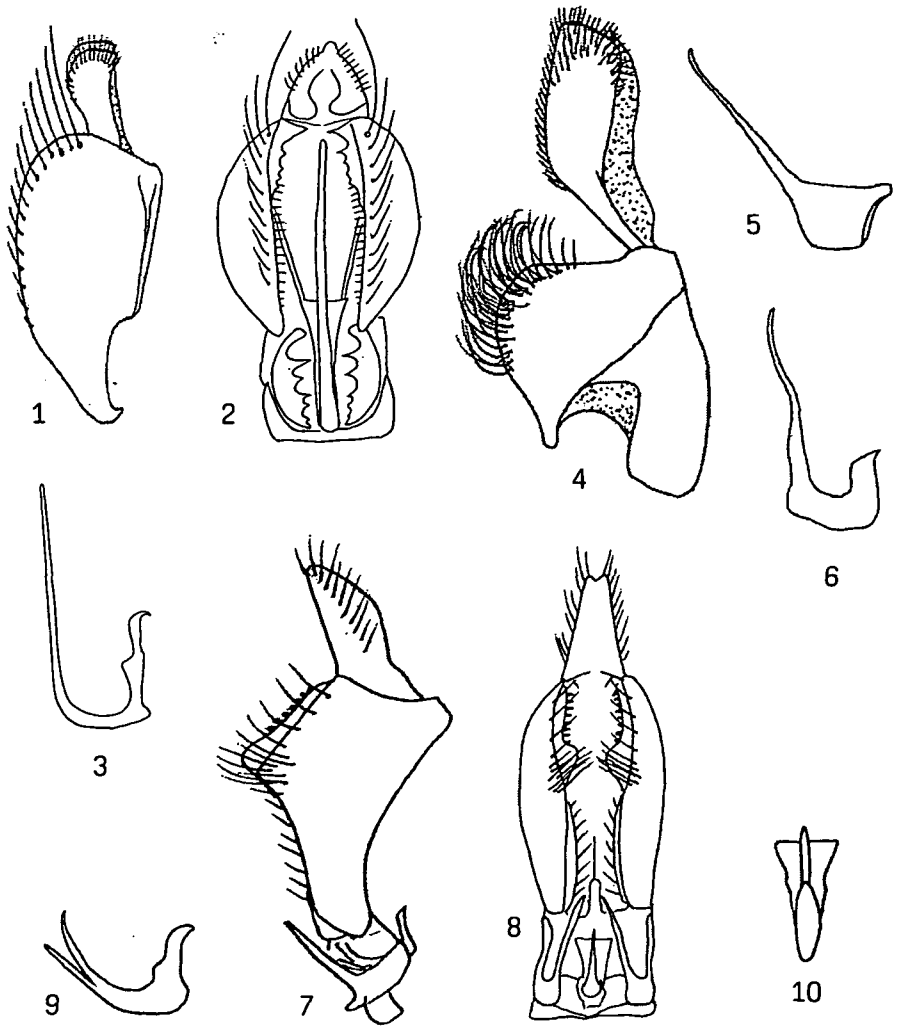
Holotype male: Taiwan, Sun Moon Lake, Eastside, Youth Centre, 600m, ca. 23° 51'N / 120° 56'E, 11.-14.VII.2000, leg. W. SCHACHT, 1♂. Holotype deposited in NCHU.

Species only known from the holotype.

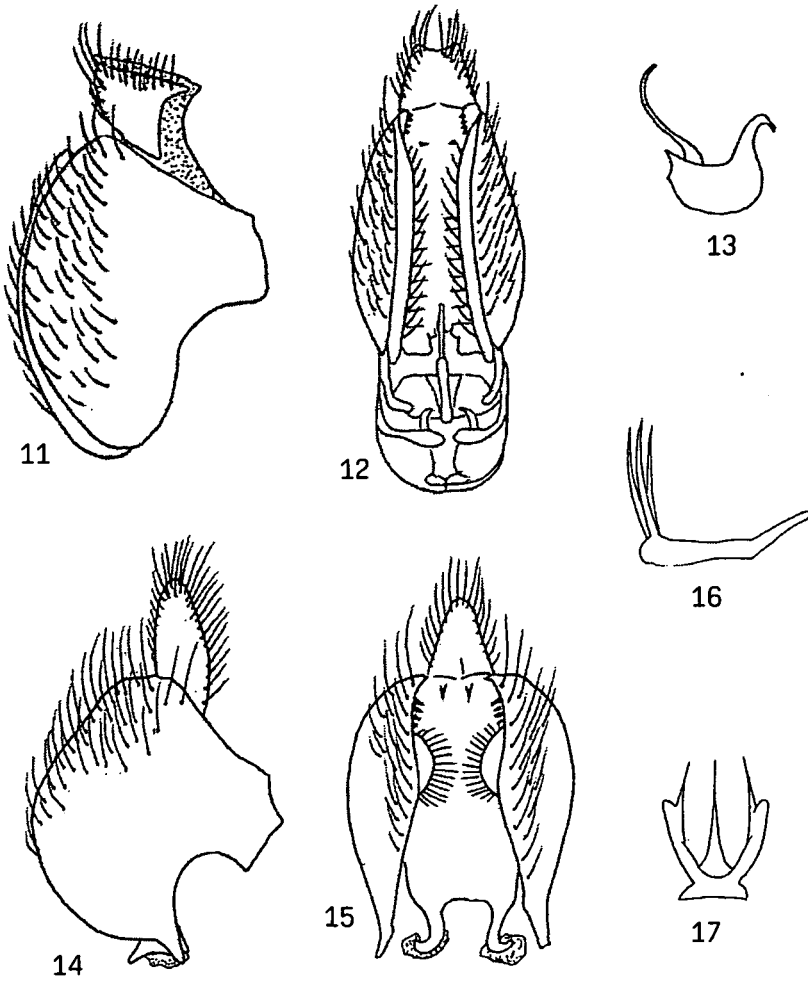
Differential diagnosis: The structure of the male genitalia, in particular the three pronged aedeagus is not similar to any other described *Silba* species.

Acknowledgement

I thank Wolfgang SCHACHT, ZSM, for the provision of the Lonchaeid material from Taiwan.



Figs 1-10. 1-3 *Lonchaea formosa* sp.nov.: 1 male genitalia and associated structures, lateral view; 2 same, ventral view; 3 aedeagus, lateral view. 4-5 *Lonchaea macrocercus* sp. nov.: 4 male genitalia and associated structures, lateral view; 5 aedeagus, lateral view. 6 *Lonchaea incisurata* (HENNIG, 1948): aedeagus, lateral view. 7-10 *Silba flavitarsis* sp. nov.: 7 male genitalia and associated structures, lateral view; 8 same, ventral view; 9 aedeagus, lateral view; 10 aedeagus, ventral view.



Figs 11-17: 11-13 *Silba schachtii* sp. nov.: 11 male genitalia and associated structures, lateral view; 12 same, ventral view; 13 aedeagus, lateral view. 4-7 *Silba trigena* sp. nov.: 14 male genitalia and associated structures, lateral view. 15 same, ventral view; 16 aedeagus, lateral view; 17 same, ventral view.

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Maximilian SCHWARZ, Konsulent für Wissenschaft der O.Ö. Landesregierung,
Eibenweg 6, A-4052 Ansfelden, e-mail: maxschwarz@everyday.com
Redaktion: Erich DILLER (ZSM), Münchhausenstrasse 21, D-81247 München, Tel.(089)8107-159
Fritz GUSENLEITNER, Lungitzerstrasse 51, A-4222 St. Georgen / Gusen
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Jahr/Year: 2004

Band/Volume: [0025](#)

Autor(en)/Author(s): Macgowan Iain

Artikel/Article: [A list of Lande flies from Taiwan with descriptions of new species \(Diptera, Lonchaeidae\). 321-332](#)