

Asian plant bugs of the subgenus *Pityopsallus* E. Wagn., genus *Psallus* Fieb. (Heteroptera: Miridae)

N.N. Vinokurov

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The Holarctic subgenus *Pityopsallus* E. Wagn. (genus *Psallus* Fieb.) is represented by 9 species in the Asian boreal forest zone. 3 new species are described: *P. yasunagai* sp. n. is related to the *P. luridus*-group, *P. nipponicus* sp. n. is close to *P. ermolenkoi* Kerzh. (both new species from Hokkaido, Japan) and *P. sachaensis* sp. n. from East Siberia (Central Yakutia) replaces the European *P. piceae* Reut. in the East Palaearctic. *P. kimi* Jos., stat. n. is a senior synonym of *P. salicicola* Schwartz & Kelton and recorded for the first time from East Siberia and Kamchatka. The Siberian *P. laticeps* Reut. is a good species closely related to the European *P. pinicola* Reut. A key to species of the subgenus *Pityopsallus*, except the little-known European *P. lapponicus* Reut. and the Chinese *P. hani* Zheng & Li, is given.

N.N. Vinokurov, Institute of Biological Problems of the Cryolite Zone, Siberian Department, Russian Academy of Sciences, pr. Lenina 41, Yakutsk 677000, Russia.

Introduction

The subgenus *Pityopsallus* was established by Wagner (1952) for species of the genus *Psallus* Fieb. mainly living on coniferous trees, and 6 of them were recorded from the Asian boreal zone (Reuter, 1878; Kulik, 1965; Kerzhner, 1979, 1988; Vinokurov, 1979, 1982, 1985; Vinokurov & Kanyukova, 1995a, 1995b). Two Euro-Siberian species, *P. vittatus* Fieb. and *P. luridus* Reut., are distributed widely in the taiga zone of Siberia. Reuter (1878) described *P. laticeps* from West Siberia (the Yenisei River). Later this poorly investigated species was recorded by Kulik (1965, 1974) from the Irkutsk Prov. and Yakutia, but I believe that these records were based on misidentifications, because Kulik mentioned as host plants deciduous shrubs and birch, whereas *P. laticeps* lives on conifers.

In 1997, I had an opportunity to examine the *Pityopsallus* specimens collected by participants of the joint Japanese-Russian biological expedition in Siberia (1995) and Japan (1997) and, in addition, the material obtained in Yakutia during my heteropterological research. After careful examination of these collections, two new species from Japan and one new species from East

Siberia were found. The long series of specimens from Central Yakutia which I have recorded earlier as *P. pinicola* Reut. (Vinokurov, 1985) proved to be the mysterious *P. laticeps*. Several distinctive features in the structure of the male genital segment were found and used for compiling an original key to Palaearctic species. Two species are not included in the key: *P. lapponicus* Reut. and *P. hani* Zheng & Li.

The depositories of the specimens are abbreviated as follows: HUE – Hokkaido University of Education (Sapporo, Japan); IBPCZ – Institute of Biological Problems of Cryolite Zone, SD RAS (Yakutsk, Russia); ZISP – Zoological Institute RAS (St.Petersburg, Russia). All measurements in the text are given in millimeters.

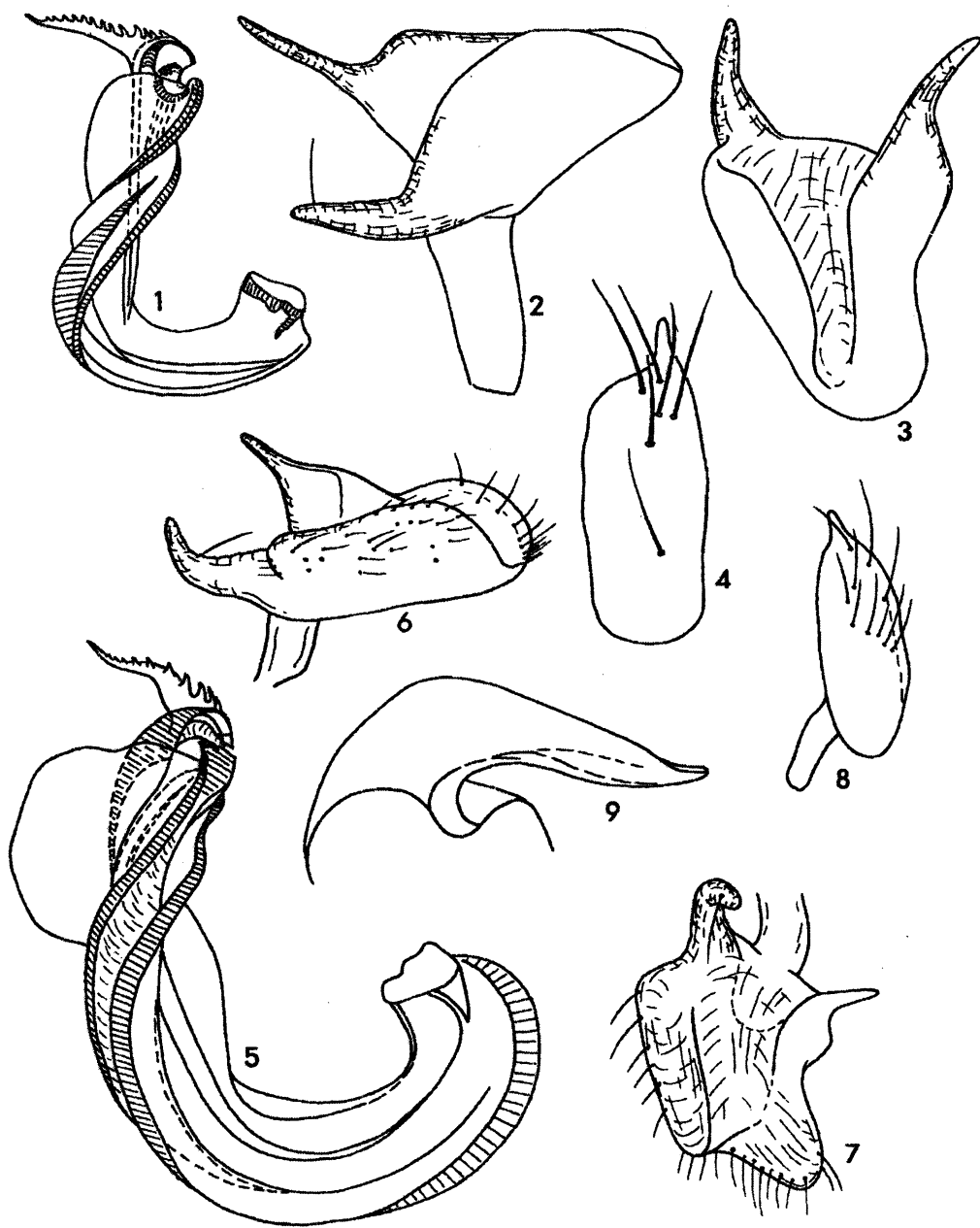
Descriptions of new and little-known species

***Psallus (Pityopsallus) kimi* Josifov, 1983, stat. n.**
(Figs 1-4, 26)

Psallus lapponicus kimi Josifov, 1983: 210.

Psallus salicicola Schwartz & Kelton, 1990: 941, **syn. n.**

Material examined (ZISP, HUE, IBPCZ). **Russia:** South Yakutia: 7 ♂, 11 ♀, Aldan plateau, Chul'makan R. mouth, left tributary of the Timpton R., 750 m, 13.VII.1995 (T. Yasunaga); 1 ♀, Stanovoi



Figs 1-9. *Psallus* (*Pityopsallus*), male genitalia. 1-4, *P. kimi* Jos. (South Yakutia); 5-9, *P. nipponicus* sp. n. (Hokkaido). 1, 4, vesica; 2, 6, left paramere, lateral view; 3, 7, left paramere, dorsal view; 4, 8, right paramere; 9, theca, lateral view.

Range, near road Yakutsk – Bol'shoi Never, between Nagorny and Iengra, 1000 m, 18.VII.1995 (T. Yasunaga); Kamchatka: 2 ♂, Petropavlovsk-Kamchatsky, Dolinovka vill., 2.VIII.1977 (Parkhomenko). USA, Alaska: 1 ♂, Umiat, 12.VII.1959 (R. Madge); 1 ♀, Chicken, 27.VII.1982 (L.A. Kelton).

Description of Siberian specimens. General coloration of dorsum orange-red, varying from whitish green in pale individuals to dark brown in dark ones; with black erect and white scale-like hairs longer on pronotum and lateral margin of the anterior part of hemelytra. Antennae with oblique, short, white hairs and sparser, long, erect, black bristles. Apical half of antennal segment I with 2 very long, black, strong bristles, sometimes with brown spots at their bases. Rostrum short, yellow or brown; segment IV black apically, reaching or sometimes slightly surpassing metacoxa. Legs yellow. Femora with long and short white hairs, with fused brown spots in distal part composing 2 or 3 transverse marks. Tibiae with white hairs and long, erect, dark brown bristles, with black spots at their bases; in pale specimens, distal part of bristles lighter and black spots at their bases absent. Abdomen with white hairs.

♂. Elongate, body 2.7-3 times as long as wide. Coloration of dorsum varying from brownish pale green to dark brown. Head between eyes from yellow to dark brown; clypeus yellow, sometimes with reddish patch or dark brown. Vertex 1.76-2.00 times as wide as eye. Mandibular and maxillary plates yellow. Ventral part of head yellow. Antennal segments I and II dirty yellow or brown, sometimes segment I with fuscous markings near proximal and distal ends; segments III and IV brown. Pronotum in pale individuals dirty yellow with greenish calli, in dark specimens dark brown with yellow hind corners. Propleura and mesepisterna yellow or orange yellow, mesepimera and ostiolar peritremes sometimes greenish; in dark individuals, metathorax dark brownish. Trochanters and coxae yellow; femora and tibiae usually yellow, in dark specimens, dark brown. Scutellum unicolourous with pronotum, with yellow basal corners. In pale individuals, scutellum, apex of clavus and posterior part of corium fuscous, cuneus entirely white. In typically coloured specimens, lateral margin of corium and cuneus, except its white base, reddish. Membrane grey, with white longitudinal spot near apical angle of cuneus, with two, sometimes fused, dark grey spots beyond cuneus; cells grey, veins unicolourous with membrane. Abdomen yellow or

pale green, in dark individuals dark brown. Ventral side of genital segment with whitish longitudinal keel, under the left paramere with small narrow lateral tubercle. Vesica, paramere and genital segment as in Figs 1-4, 26.

♀. Elongate-oval, 2.2-2.5 times as long as wide. Dorsum usually orange red, in pale individuals pale greenish, in dark ones red with dark brown corium. Head between eyes, clypeus, mandibular and maxillary plates yellow orange, in pale individuals yellow, in dark ones vertex, frons and clypeus brown red. Rostrum yellow or brown; segment IV black in distal half, reaching metacoxa and not surpassing base of abdomen. Antennae yellow or brown-yellow, segments III and IV usually darker. Pronotum orange-red, sometimes calli yellow, posterior part with some longitudinal white stripes. Clavus orange red, sometimes almost entirely white except narrow reddish triangular stripe near the base. In dark individuals, apical part of corium dark brown. Cuneus red, narrowly white at base, in pale individuals white or with reddish shade. Thorax laterally orange-red or with red spots. Abdomen laterally red, on the underside white. Legs yellow.

Measurements – ♂ (♀): body length 4.4-4.8 (3.7-4.2); body width 1.5-1.6 (1.21-1.36); head width 0.81-0.87 (0.81-0.91); vertex width 0.34-0.41 (0.41-0.54); eye width 0.21-0.24 (0.19-0.21); length of antennal segments I-IV: 0.27-0.29 (0.29), 1.17-1.31 (1.07-1.23), 0.79-0.81 (0.71-0.80), 0.39-0.42 (0.39-0.42); length of rostrum 1.42-1.64 (1.42-1.69); width of pronotum at base 1.17-1.34 (1.21-1.36); ratios: vertex width/ eye width 1.41-1.93 (2.07-2.59), antennal segment II length/ head width 1.34-1.52 (1.29-1.51); antennal segment II length/ pronotum width 0.91-1.04 (0.86-1.01).

Distribution. Russia (Yakutia, Kamchatka), North Korea, and North America (Alaska, Canada).

Discussion. *P. lapponicus* was described by Reuter (1874) from a male and a female collected by C.H. Boheman from middle Lappland, Sweden. According to information from the late P. Lindskog, the types are preserved in the Naturhistoriska Riksmuseet, Stockholm. My efforts to receive these types for study were unsuccessful. The species was recorded subsequently from many countries of Northern and Central Europe. Reuter (1908) listed as host plants various conifers (*Picea excelsa* [= *P. abies*], *Abies alba*, *Larix europaea*), but noted that, according to B. Poppius, the species lives in Lappland on *Salix*. Also Lammes & Rinne (1990) indicated *Salix* spp. (e.g. *S. phylicifolia*, *S.*

glauca, *S. lapponum*) as host plants in Finland. Ossiannilsson (1967a, 1967b) designated as lectotype a male from Inari (Finland) collected by J. Sahlberg, figured its genitalia and indicated *Picea abies* as the host plant in Sweden. The lectotype designation is invalid, as the specimen does not belong to the type series. Judging by the various host plants indicated in the literature, there is very possible that several species were confused under the name *P. lapponicus*. As the types were not re-examined, the identity of *P. lapponicus* remains more or less doubtful.

Josifov (1983) described a new subspecies, *P. lapponicus kimi*, from specimens collected from *Salix* in high mountains of North Korea. I compared the original description with the specimens from Yakutia and Kamchatka mentioned above and with specimens of *P. salicicola* Schwartz & Kelton from North America and found that they belong to one species. It differs from the original description of *P. lapponicus* in the short rostrum (in *P. lapponicus*, the rostrum reaches the middle of abdomen in female and surpasses it in male). I consider therefore *P. kimi* as a separate species. It belongs to the *luridus-yasunagai* group.

Contrary to other species of the subgenus *Pityopsallus*, inhabiting coniferous trees, *P. kimi* was recorded from *Salix* in North Korea and North America. In Yakutia, the species was swept by entomological net from canopy of *Salix* and, maybe occasionally, from *Dusheckia fruticosa* as well as from *Larix*. In Kamchatka, the species was collected on grasses growing under *Salix* and *Alnus*. Adults in July and early August.

***Psallus (Pityopsallus) nipponicus* sp. n.**

(Figs 5-9, 27)

Holotype. ♂ (ZISP). **Japan, Hokkaido**: 4-bangawa River, 15 km south of Mt. Shokanbetsu, Ishikari District, 15.VII.1997 (Vinokurov).

Paratypes (HUE, ZISP, IBPCZ). **Japan, Hokkaido**: 3 ♂, 4-bangawa R., 15 km south of Mt. Shokanbetsu, 15.VII.1997 (Vinokurov); 1 ♂, 2 ♀, Aoyama, 10 km north of Tobetsu Town, 14-16.VII.1997 (Vinokurov, Endoh).

Description. Dorsum covered with dense and easily rubbed off scale-like hairs longer on head and pronotum, and with sparser simple black hairs.

♂ darker than ♀. Antennae with short and long whitish hairs; segments I and II yellow, III and IV brown; inner side of segment I beyond middle with 2 long erect setae, with dark

spots at their bases. Rostrum yellow or yellow-brown, with black apex, very long, surpassing middle of abdomen.

♂ elongate, 2.6-3 times as long as wide. Head between eyes and mandibular and maxillary plates yellow-brown; clypeus brown; eyes large; ventral side of head yellow or whitish. Pronotum brown, with irregular, scattered, sparse brown spots behind calli; anterior part paler. Scutellum brown, sometimes with dark red base. Clavus and corium brown-yellow to reddish brown. Outer margin of corium red; cuneus red, with white base. Membrane grey, with dark smoky pattern in outer part and round white spot near apex of cuneus; veins unicolourous with corium; interior cell grey. Genital segment (caudal view), in addition to median keel, laterally with outstanding smoothed out crest (Fig. 27). Vesica with reduced number of teeth on apical appendix; lateral lamina large (Fig. 5); parameres and theca as in Figs 6-9.

♂ oval; body 2.2-2.4 times as long as wide; dorsum dirty green to brown. Head and pronotum with sparse brown spots. Ventral side of head, thorax laterally, lateral part of abdomen mostly greenish. Thorax laterally brown, with greenish meso- and metapleura. Coxae and trochanters whitish or greenish. Femora green, with large black spots on ventral, anterior and posterior sides; on upper side spots present only in distal third. Tibiae yellow, with short light hairs and long black bristles, with black spots at bases of bristles. Tarsi brown.

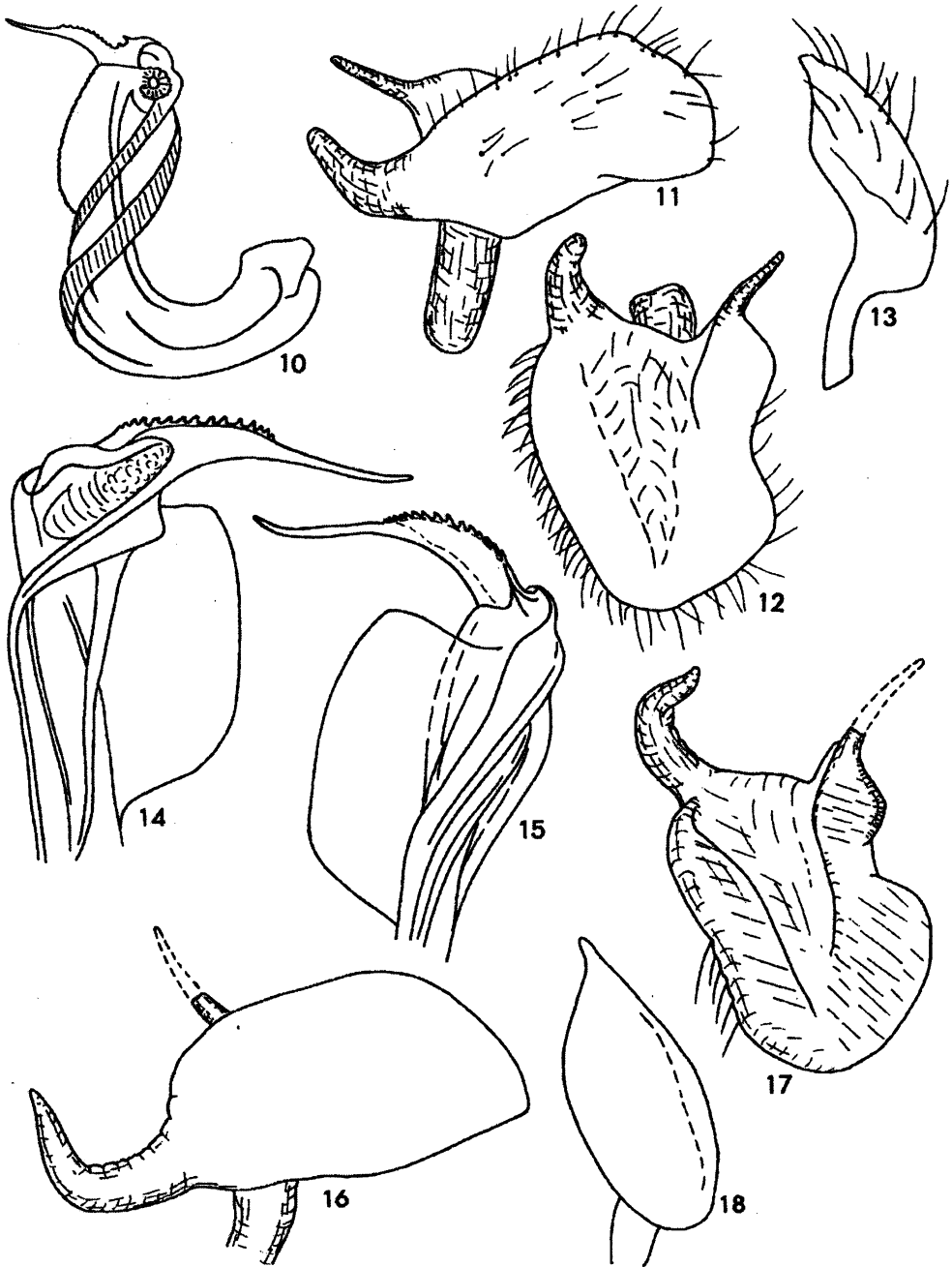
Measurements - ♂ (♀): body length 4.3-4.5 (3.8-4.1); body width 1.7-1.8 (1.7-1.8); head width 0.99-1.00 (1.00-1.04); vertex width 0.50-0.51 (0.50-0.54); eye width 0.24 (0.20-0.21); length of antennal segments I-IV: 0.29 (0.29-0.31), 1.14-1.21 (1.09-1.17), 0.71-0.83 (0.64-0.76), 0.42-0.50 (0.42-0.50); length of rostrum 2.5 (2.6); basal width of pronotum 1.31-1.36 (1.21-1.36); ratios: vertex width / eye width 2.00-2.12 (2.07-2.59), antennal segment II length/ head width 1.14-1.21 (1.29-1.51); antennal segment II length/ pronotum width 0.84-0.92 (0.86-1.01).

Biology. The new species lives on *Abies sachalinensis*; adults in middle of July.

***Psallus (Pityopsallus) yasunagai* sp. n.**

(Figs 10-13, 28)

Holotype. ♂ (HUE). **Japan, Hokkaido**: Kyowa-Nakasono, Etanbetsu, Asahikawa C., 5.VII.1997 (T. Yasunaga).



Figs 10-18. *Psallus (Pityopsallus)*, male genitalia. 10-13, *P. yasunagai* sp. n. (Hokkaido); 14-18, *P. sachaensis* sp. n. (Central Yakutia). 10, 14, vesica; 11, 15, left paramere, lateral view; 12, 17, left paramere, dorsal view; 13, 18, right paramere.

Paratypes (HUE, IBCPZ, ZISP). **Japan, Hokkaido:** 8 ♂, 6 ♀, Kyowa-Nakazono, Etanbetsu, Asahikawa C., 5.VII.1997 (T. Yasunaga); 20 ♂, 14 ♀, Tomakomai Experimental Forest, 19-22.VII.1997 (T. Yasunaga).

Description. Both sexes identically coloured, distinguished only by some body proportions. Dorsum yellow-brown to dark brown, with erect and adpressed, easily rubbed off dark brown simple and silverish scale-like hairs. Elongate-oval, body in ♂ 2.6-2.8, in ♀ 2.5-2.6 times as long as wide. Head with brown vertex; clypeus, mandibular and maxillary plates dirty yellow; ventral side yellow. Antennae unicolourous, brown-yellow to dark brown, with brown, dense, adpressed and sparse erect hairs; in ♂ segments III and IV distinctly narrower than segment II; segment I with 2 erect setae. Rostrum yellow brown, with black apex, long, in ♂ reaching the anterior border of genital segment, in ♀ slightly surpassing the anterior border of genital sclerites. Pronotum with smoothed calli; anterior part often paler than posterior part. Scutellum and base of corium usually paler than distal part of corium and cuneus. Membrane dark grey, with light spot near apex of cuneus; outer vein dark grey; inner vein yellow. Ventral side of thorax yellow. Legs dirty yellow to brown; femora with indistinct dark spots; tibiae with dark brown bristles and dark spots at their base. Tarsi brown, with dark apical segment. Abdomen yellow-brown, sometimes dirty green. Lateral lamina of vesica wide, its outer margin finely notched (Fig. 10); left paramere in lateral view more or less trapezoidal (Fig. 11); right paramere as in Fig. 8; genital segment, in addition to median keel, with a small, sharp lateral keel (Fig. 28).

Measurements – ♂(♀): body length 3.8-4.2 (3.8-4.0); body width 1.4-1.6 (1.5-1.6); head width 0.88-0.96 (0.92-0.94); vertex width 0.43-0.50 (0.50-0.51); eye width 0.23-0.24 (0.21); length of antennal segments I-IV: 0.29-0.31 (0.29-0.37), 1.10-1.26 (1.14-1.29), 0.71-0.86 (0.74-0.89), 0.41-0.47 (0.40-0.47); length of rostrum 1.9-2.0 (2.0-2.14); basal width of pronotum 1.17-1.29 (1.20-1.24); ratios: vertex width/ eye width 1.71-1.81 (2.33-2.48), antennal segment II length/ head width 1.24-1.38 (1.23-1.31), antennal segment II length/ pronotum width 0.94-1.06 (0.93-1.00).

Biology. In Hokkaido, the new species lives on *Larix leptolepis* imported from Honshu and now widespread over the island. This larch is a relic endemic of the central

part of Honshu where it grows in the belt of mountain coniferous forests. Apparently, *P. yasunagai* is an endemic of Honshu and recently was imported to the north together with its host plant.

Etymology. The species is named after Dr. T. Yasunaga in appreciation of his enthusiastic study of Heteroptera in Hokkaido.

***Psallus (Pityopsallus) sachacensis* sp. n.**
(Figs. 14-18, 29)

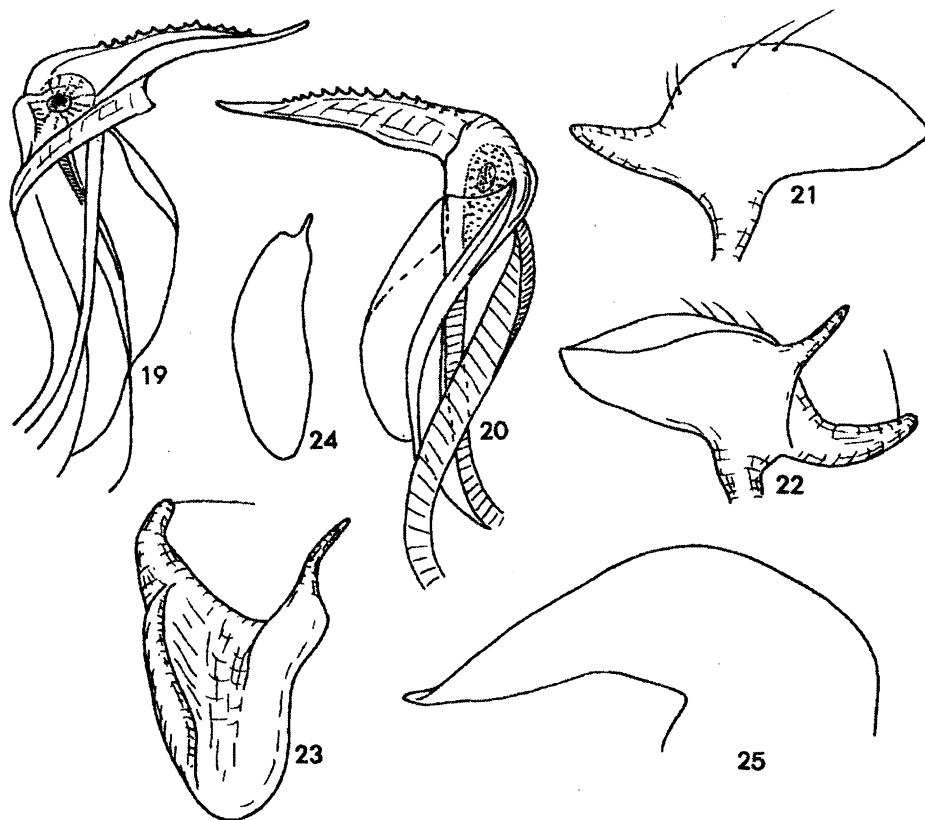
P. piceae: Vinokurov, 1979: 193; 1985: 61; Vinokurov & Kanyukova, 1985a: 21; 1985b: 120 (Central Yakutia).

Holotype. ♂ (ZISP), **Russia, Central Yakutia:** Olom, path to the Amga River, 24.VII.1925 (L. Bianchi).

Paratypes (ZISP, IBCPZ). **Russia: Central Yakutia:** 1 ♂, Onkuchakh stream, path to the Amga River, Yakutsk District, 17.VII.1925 (L. Bianchi); 1 ♂, mouth of Lepiske R., left tributary of Lena R., 50 km lower of Vilyui mouth, 16.VII.1977 (Vinokurov); 1 ♂, Lena R. valley, Edei vill., 200 km SW of Yakutsk, 11.VII.1980 (Gavril'eva).

Description. Body 2.5 times as long as wide. Dorsum dirty yellow to red-brown, with easily rubbed off light scale-like and simple hairs which are longer and more erect on head, pronotum and particularly on scutellum and anterior part of corium. Head between eyes brown; eyes testaceous brown; base of clypeus with a small dark brown spot; ventral side paler than dorsal one. Antennae dirty yellow to brown, covered with short oblique hairs and longer, erect, light hairs, the latter half as long as segment thickness; segments III and IV darker than proximal ones; inner side of segment I with long erect setae. Rostrum long, surpassing middle of abdomen, segments I and II yellow with upperside narrowly brown, both distal segments brown. Ventral side of body yellow to yellow-brown. Legs yellow. Femora with small brown spots near anterior margin and in distal half. Tibiae with pale oblique hairs and pale or brown erect bristles, with small brown spots at bases of bristles. Vesica, parameres and genital segment as in Figs 14-18, 29.

Measurements – ♂: body length 3.5-3.7; body width 1.5; head width 0.78-0.81; vertex width 0.40-0.41; eye width 0.19-0.21; length of antennal segments I-IV 0.29, 1.01-1.07, 0.64, 0.34-0.43; length of rostrum 1.8-1.9; basal width of pronotum 1.10-1.14; ratios: vertex width/ eye width 1.93-2.23, antennal segment II length/ head width 1.29-1.32, antennal segment II length/ pronotum width 0.89-0.97.



Figs 19-25. *Psallus (Pityopsallus) laticeps* Reut. (Central Yakutia), male genitalia: 19, 20, vesica; 21, 22, left paramere, left and right views; 23, left paramere, dorsal view; 24, right paramere; 25, theca, lateral view.

Biology. The new species lives in the Lena valley forests on *Picea obovata*.

Etymology. The name "sachaensis" is formed from the original name of Sakha (Yakutian) people inhabiting East Siberia.

***Psallus (Pityopsallus) laticeps* Reuter, 1878**
(Figs 19-25, 30)

P. laticeps Reuter, 1878: 180 (Yenisei: Verkhne-Imbatskoe); ? Kulik, 1974: 30 (Irkutsk; SW coast of Lake Baikal; Yakutia).

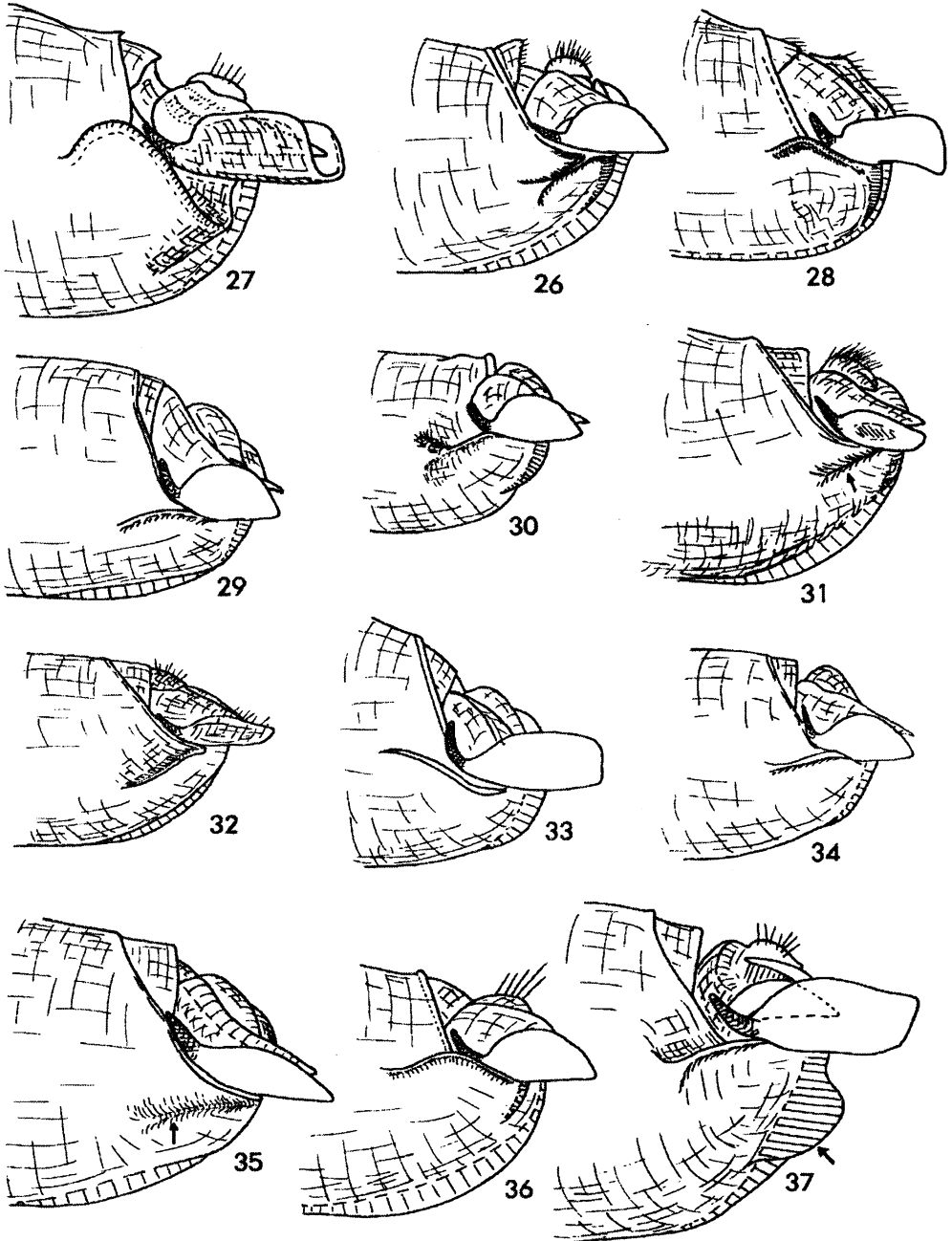
P. picicola: Vinokurov, 1985: 30 (Central Yakutia).

Material examined. Russia: Central Yakutia: 11 ♂, 8 ♀, Lena R., Kharyalakh Island near Edei village, 200 km SW of Yakutsk, 11.VII.1980 (Gavrill'eva), 5.VII.1985 (Vinokurov); **West Yakutia:** 2 ♀, 11 km SW of Toibokhoi vill., 50 km W of Suntar, 24.VIII.1996 (A. Stepanov).

Specimens in the Heteropteran collection of IBPCZ from Central Yakutia determined previously as *P. picicola* (Vinokurov, 1985) were re-examined. After careful comparison

with Reuter's description of *P. laticeps* and specimens of true *P. picicola* in coll. ZISP, I have concluded that characters of these specimens fit the first species. Also several distinctions between both Reuter's species were found in the male genital structures. Some additions to the original description of *P. laticeps* are given below.

Description. Body yellow to brown. Rostrum short or of middle length, usually reaching and sometimes surpassing metacoxae. Legs yellow or brownish; femora with minute brown spots; tibial bristles light, with minute brown spots at their bases. Ventral side of male genital segment with short keel near its base; lateral keel projected as narrow crest; the ridge under left paramere slightly wavy (Fig. 30). Vesica with narrow lateral lamina and wide and flattened apical appendix (Figs. 19, 20); left paramere segment-like in lateral view (Figs. 21, 22), with narrowed posterior part in upper view (Fig.



Figs 26-37. *Psallus* (*Pityopsallus*), male genital segment. 26, *P. kimi* Jos. (Central Yakutia); 27, *P. nipponicus* sp. n. (Hokkaido); 28, *P. yasunagai* sp. n. (Hokkaido); 29, *P. sachaensis* sp. n. (Central Yakutia); 30, *P. laticeps* Reut. (Central Yakutia); 31, *P. vittatus* Fieb. (South Yakutia); 32, *P. chysopsilus* Reut. (Carpathians); 33, *P. piceae* Reut. (Carpathians); 34, *P. pinicola* (Carpathians); 35, *P. laricinus* Vin. (South Yakutia); 36, *P. luridus* Reut. (South Yakutia); 37, *P. ermolenkoi sichotensis* Kerzh. (South Yakutia).

23); right paramere narrow (Fig. 24); theca and genital segment as in Figs 25 and 30.

Measurements – ♂ (♀): body length 3.0-3.7 (2.5-3.2); body width 1.1-1.3 (1.2-1.3); head width 0.70-0.77 (0.73-0.76); vertex width 0.33-0.34 (0.37-0.40); eye width 0.19-0.21 (0.18-0.19); length of antennal segments I-IV 0.20-0.24 (0.21-0.24), 0.84-1.00 (0.79-0.86), 0.49-0.64 (lost), 0.31-0.39 (lost); length of rostrum 1.21-1.36 (1.4-1.5); basal width of pronotum 0.98-1.08 (0.97-1.07); ratios: vertex width/ eye width 1.47-1.78 (1.92-2.24), antennal segment II length/ head width 1.18-1.35 (1.06-1.18), antennal segment II length/ pronotum width 0.84-0.95 (0.80-0.88).

Notes on the Asian species of the subgenus *Pityopsallus*

Some characters differentiating the three new species from other species of the subgenus are shown in the Table.

The Holarctic species *P. kimi* is similar to the Euro-Siberian *P. luridus* and East Siberian *P. laricinus* in the body length and coloration of legs. Moreover, some specimens of the latter two species may be red-coloured. But *P. kimi* can be readily distinguished by its short rostrum which only sometimes slightly surpasses the metacoxae. Three species (*P. kimi*, *P. luridus* and *P. yasunagai* sp. n.) are similar in the segment-like left paramere (in lateral view) and the shape of the lateral lamina of vesica, but the outer margin of lamina is smooth only in *P. kimi* (in two other species it is finely jugged). *P. laricinus* differs in the narrower lateral lobe of vesica and lanceolate left paramere (in lateral view). In the structure of the male genitalia, this species is more closely related to the European *P. chrysopsilus* Reut. and probably is vicarious to it.

P. yasunagai sp. n. resembles brown specimens of *P. luridus* and *P. laricinus*. It is similar to both species in the long rostrum and to the first species in the finely jugged outer margin of lateral lamina of vesica. The males of the new species can be readily distinguished by the structure of the left paramere: its posterior part is very wide in upper view and abruptly sharply in lateral view. In two other species, the posterior part of the left paramere is narrow in upper view and triangular in lateral view.

P. nipponicus sp. n. due its very long rostrum almost reaching the apex of abdomen and very wide lateral lamina of vesica is

closely allied to the East Palaearctic *P. ermolenkoi*. But it is distinguished by some peculiarities of the male genitalia (reduced number of teeth on the apical appendix of vesica, shape of lateral ridge under left paramere, shape of parameres), black, large and numerous spots on femora and different host plants. *P. ermolenkoi* Kerzh. lives on *Pinus pumila*, and the dark spots on its femora are brown.

Two East Palaearctic species, *P. sachensis* sp. n. and *P. laticeps*, have similar body length, dorsal pubescence, coloration of femora and pale bristles on tibiae, but are readily distinguished by the peculiarities of the male genitalia. As mentioned above, both species are vicarious to the European *P. piceae* Reut. and *P. pinicola* Reut. respectively. *P. piceae* differs from *P. sachensis* in the wider and shorter lateral lamina of vesica and trapezoidal form of the left paramere in lateral view (see Ossiannilsson, 1967a, Figs 4 and 5). In *P. pinicola*, the body of the left paramere is narrower, the right paramere wide and short (see Vinokurov, 1979, Figs 447-448). They are distinguished from other Asian species in the shorter body and pale bristles on tibiae. Another small species, *P. vittatus*, differs in the dark body and legs, low lateral keel on the male genital segment, left paramere lanceolate in lateral view and lateral lamina of vesica very narrow, as in *P. chrysopsilus* and *P. laricinus*.

Key to Palaearctic species of the subgenus *Pityopsallus*

1. Rostrum short, reaching only metacoxae or slightly surpassing them. Lateral lamina of vesica narrow 2
- Rostrum long, reaching or surpassing the middle of abdomen. If rostrum short and surpassing slightly metacoxae (in some *P. laticeps*), body length less than 3.7 mm, dorsum yellow to brown, and left paramere segment-like in lateral view ... 5
2. Head and pronotum for the most part black; hemelytra from dirty yellow to black. Bristles on tibiae black, dark spots at their bases absent or barely visible. Left paramere narrow in lateral view, lanceolate (Fig. 31); lateral keel of male genital segment not developed. 3.3-3.8 mm *P. vittatus* Fieb.
- Dorsum uniformly yellow, brown, dark brown or rust-coloured; head and pronotum never black. Bristles on tibiae light or dark brown, with black or brown spots at base 3
3. Left paramere more or less segment-like in lateral view; lateral and median keels of male genital segment distinct (Fig. 26). Dorsum reddish, in pale individuals whitish green, in dark individuals to

Table. Characters of species of the subgenus *Pityopsallus* E. Wagn.

| Species | Rostrum* | Spots on hind femora | Bristles on hind tibiae | Lateral keel of genital segment | Ridge under left paramere | Left paramere in lateral view | Lateral lamina of vesica | Body coloration |
|------------------------|--------------------------|----------------------|-------------------------|---------------------------------|---|-------------------------------|--|-------------------------------|
| <i>P. vittatus</i> | short | brown | black | distinct, low, narrow | low, directed downward | low, lanceolate | narrow, smooth | light brown to black |
| <i>P. chrysopsilus</i> | short | small, dark brown | dark brown | absent | high, directed downward | low, lanceolate | middle-sized, smooth | dark brown |
| <i>P. laricinus</i> | short | brown | dark brown or yellow | weak, rounded | low, directed downward | low, lanceolate | middle-sized, smooth | light brown to red |
| <i>P. luridus</i> | moderately long | brown | dark brown or yellow | distinct, moderately extended | high, sharp, convex in middle part | high, segment-like | wide, finely jugged | light brown to dark brown |
| <i>P. kimi</i> | short | brown | dark brown | distinct, moderately extended | low, straight, directed downward | high, segment-like | wide, smooth | light green to dark brown |
| <i>P. yasunagai</i> | moderately long | brown | dark brown | distinct, extended | high, sharp, convex in middle part | high, trapezoidal | wide, finely jugged | yellow-brown to dark brown |
| <i>P. piceae</i> | long | pale brown | brown | distinct, very high | low, slightly convex | trapezoidal | very wide, almost triangular, rather short | red to red-brown |
| <i>P. sachaeensis</i> | long | pale brown | brown | distinct, high | low, slightly convex | high segment-like | very wide, rectangular, long | yellow-brown to red-brown |
| <i>P. pinicola</i> | long | pale brown | brown | distinct, narrow, high | low, almost straight | high, segment-like | narrow, smooth | yellow-brown to brown |
| <i>P. laticeps</i> | moderately long or short | pale brown | brown or yellow | distinct, narrow, high | low, almost straight | high, segment-like | narrow, smooth | yellow to brown |
| <i>P. nipponicus</i> | long | large, black | black | distinct, wide, high | low, almost straight | almost trapezoidal | wide, almost, rectangular | pale green to dark brown |
| <i>P. ermolenkoi</i> | long | large, black | black | distinct, narrow, very high | high, sharp, strongly convex in anterior part | high, trapezoidal | very wide, almost rectangular | dark brown with reddish tones |

* Short – reaching or slightly surpassing metacoxae; moderately long – reaching the middle of abdomen; long – surpassing far the middle of abdomen.

- dark brown. Bristles on tibiae with black spots at base. Ridge under left paramere directed obliquely downward (Fig. 26). Lateral lamina of vesica wide (Fig. 1). ♂ 4.4-4.8, ♀ 3.7-4.2 mm *P. kimi* Jos.
- Left paramere very narrow in lateral view, lanceolate; male genital segment without or with weakly developed lateral keel; median keel weakly developed; lateral ridge under left paramere directed downward (Figs 32, 35) 4
4. Body uniformly dark brown. Eyes smaller: vertex in ♂ 2.1-2.2, in ♀ 2.4-2.7 times as wide as eye. Antennal segment II in ♂ 1.4-1.5, in ♀ 1.1-1.2 times as long as head width. Male genital segment as in Fig. 32. ♂ 3.7-4, ♀ 3.5-3.7 mm *P. chrysopsilus* Reut.
- Dorsum yellowish to brown with reddish tones (in specimens from Altai Mts. and Mongolia red). Eyes larger: vertex in ♂ 1.2-1.6, in ♀ 1.5-2.3 times as wide as eye. Antennal segment II in ♂ 1.4-1.7, in ♀ 1.3-1.5 times as long as head width. Lateral keel of male genital segment like smooth tubercle (Fig. 35). 3.6-4.8 mm *P. laricinus* Vin.
5. Rostrum slightly surpassing the middle of abdomen. Bristles on tibiae brown or dark brown. Lateral lamina of vesica segment-like and finely jagged or smooth (Fig. 2); left paramere segment-like (Figs 30, 36) or trapezoidal (Fig. 28) 6
- Rostrum continuing far beyond middle of abdomen and sometimes almost reaching its apex. Bristles on tibiae black; in case they are brown, left paramere almost segment-like in lateral view (*P. pinicola*, Fig. 34) or lateral lamina of vesica with rectangular corner (*P. sachensis*, Figs 14, 15) 8
6. Shorter: ♂ 3.0-3.7, ♀ 2.5-3.2 mm. Dorsum yellow to brown. Lateral lamina of vesica narrow and smooth (Figs 19, 20). Right paramere long and narrow (Fig. 24). Ridge under left paramere wavy (Fig. 29) *P. laticeps* Reut.
- Longer: ♂ and ♀ more than 3.8 mm. Lateral lamina of vesica wide and finely jagged (Fig. 10). Ridge under left paramere convex (Figs 28, 36) 7
7. Vertex in ♂ 1.7-1.8, in ♀ 2.3-2.5 times as wide as eye. Male genital segment as in Fig. 28. Left paramere more or less trapezoidal in lateral view, wide in upper view (Figs 11, 12). 3.8-4.2 mm *P. yasunagai* sp. n.
- Vertex in ♂ 2.0-2.5, in ♀ about 3 times as wide as eye. Male genital segment as in Fig. 36. Left paramere segment-like in lateral view (Fig. 36), narrow in upper view. 3.9-4 mm *P. luridus* Reut.
8. Shorter: ♂ 3.5-3.7, ♀ 2.8-3.0 mm. Left paramere segment-like or trapezoidal in lateral view (Figs 29, 34) 9
- Longer: ♂ more than 4.0, ♀ more than 3.8 mm. Left paramere trapezoidal or rectangular in lateral view (Figs 26, 34, 37) 10
9. Lateral lamina of vesica and posterior part of left paramere in upper view as in *P. laticeps* (Figs 19, 20, 23). Ridge under left paramere directed slightly downward (Fig. 34). ♂ 3.6-4.0, ♀ 3.5-3.7 mm *P. pinicola* Reut.

- Lateral lamina of vesica wide (Fig. 14, 15). Posterior part of left paramere wide (Fig. 17). ♂ 3.5-3.7, ♀ 2.8-3.0 mm *P. sachensis* sp. n.
10. Femora with numerous large black spots. Lateral keel of male genital segment wide, not sharp; ridge under left paramere high, strongly convex in anterior part (Fig. 27). Apical appendix of vesica with reduced teeth (Fig. 5). In ♀ dorsum dirty green or brown. ♂ 4.3-4.9, ♀ 3.8-4.1 mm *P. nipponicus* sp. n.
- Femora with small or large brown spots. Lateral keel of male genital segment well-developed, sharp (Figs 33, 37). Apical appendix of vesica with numerous teeth 11
11. Legs brown; femora with small, often indistinct dark spots; tibiae with dark brown spots. Male genital segment as in Fig. 33: lateral keel not convex, ridge under left paramere directed upward; left paramere trapezoidal. ♂ 3.8-4.2, ♀ 3.5-3.7 mm *P. piceae* Reut.
- Legs yellow brown; femora with large dark brown, tibiae with black spots. Male genital segment (Fig. 37) with high, convex lateral keel, ridge under left paramere directed downward. 4-5 mm *P. ermolenkoi* Kerzh.

Check-list of species and subspecies of the subgenus *Pityopsallus* E. Wagn.

1. *Psallus (Pityopsallus) vittatus* Fieber, 1861. – Euro-Siberian, continental; on *Larix gmelinii*, *L. kajanderi*.
2. *Psallus (Pityopsallus) chrysopsilus* Reuter, 1878. – European (the Alps and Carpathians). On coniferous trees.
3. *Psallus (Pityopsallus) laricinus* Vinokurov, 1982. – East and North-East Siberia; on *Larix gmelinii*, *L. kajanderi*.
4. *Psallus (Pityopsallus) luridus* Reuter, 1878. – Euro-Siberian, continental; on *Larix gmelinii*, *L. kajanderi*, *Picea excelsa*.
5. *Psallus (Pityopsallus) kimi* Josifov, 1983 (= *P. salicicola* Schwartz & Kelton, 1990). – Eastern Asia (East Siberia, Kamchatka, North Korea) and North America (Alaska, Canada); on *Salix*.
6. *Psallus (Pityopsallus) yasunagai* sp. n. – Japan (Hokkaido); on *Larix leptolepis*.
7. *Psallus (Pityopsallus) lapponicus* Reuter, 1878. – Central and Northern Europe. On *Picea* and/or *Salix*.
8. *Psallus (Pityopsallus) piceae* Reuter, 1878. – Central (the Carpathians) and Northern (Sweden) Europe; on *Picea abies*, *Pinus sylvestris*.
9. *Psallus (Pityopsallus) sachensis* sp. n. – East Siberia (Central Yakutia); on *Picea obovata*.
10. *Psallus (Pityopsallus) pinicola* Reuter, 1878. – Central Europe (the Pyrenees, Alps, Carpathians); on *Picea* and *Abies*.

11. *Psallus (Pityopsallus) laticeps* Reuter, 1878. – Siberia; on *Abies sibirica*, *Picea obovata*, *Larix kajanderi*.

12a. *Psallus (Pityopsallus) ermolenkoi ermolenkoi* Kerzhner, 1979. – Sakhalin; on *Pinus pumila*.

12b. *Psallus (Pityopsallus) ermolenkoi sichotensis* Kerzhner, 1979. – East Siberia (South Yakutia) and Far East (Magadan Prov., Primorsk Terr.); on *Pinus pumila*.

13. *Psallus (Pityopsallus) nipponicus* sp. n. – Japan (Hokkaido), on *Abies sachalinensis*.

14. *Psallus (Pityopsallus) hani* Zheng & Li, 1990. – China (Henan).

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