

New data on the taxonomy of species of the genus *Laburrus* Ribaut, 1942 (Homoptera: Auchenorrhyncha: Cicadellidae: Deltocephalinae): one case of an incomplete speciation and two new synonymys

Новые данные по систематике видов рода *Laburrus* Ribaut, 1942 (Homoptera: Auchenorrhyncha: Cicadellidae: Deltocephalinae): один случай неполного видообразования и два новых синонима

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КЛЮЧЕВЫЕ СЛОВА: цикадки, морфология, вибрационные сигналы самца, кормовые растения, Палеарктика.

ABSTRACT. *Laburrus abrotani* is widespread in the Palearctic steppe and semidesert zones and feeds on *Artemisia procera*. In Moscow Oblast, the northernmost population of this species associated with *A. campestris* was discovered. Specimens from different host plants are indistinguishable in morphological characters. At the same time, they have small but consistent differences in the male calling signal patterns. Apparently, these two host races represent an example of incomplete speciation. Still, we believe that currently it is premature to formally describe the race from *A. campestris* as a new subspecies or species, taking into account small number of populations studied, relatively small differences in the signal patterns, and the absence of morphological differences. A study of materials on two species of *Laburrus* from different regions revealed synonymy *L. similis* Vilbaste, 1965 = *L. vulgaris* Mityaev, 1971, **syn.n.** and *L. handlirschi* (Matsumura, 1908) = *L. potanini* Mityaev, 1971, **syn.n.**

РЕЗЮМЕ. *Laburrus abrotani* широко распространен в степной и полупустынной зонах Палеарктики и питается на *Artemisia procera*. В Московской обл. обнаружена самая северная популяция этого вида, связанная с *A. campestris*. Морфологических различий между особями с разных кормовых растений не выявлено. В то же время, между ними имеются небольшие, но устойчивые различия в паттерне призывных сигналов самцов. Вероятно, эти две кормовые расы представляют собой пример незавершенного видообразования, однако мы считаем преждевременным формальное описание расы с *A. campestris* в качестве

нового подвида или вида, учитывая малое число исследованных популяций, недостаточно выраженные различия в паттерне сигналов и отсутствие морфологических различий. Изучение материалов по двум видам *Laburrus* из разных регионов позволило установить синонимию *L. similis* Vilbaste, 1965 = *L. vulgaris* Mityaev, 1971, **syn.n.** и *L. handlirschi* (Matsumura, 1908) = *L. potanini* Mityaev, 1971, **syn.n.**

Introduction

The transpalearctic genus *Laburrus* Ribaut, 1942 (Homoptera: Auchenorrhyncha: Cicadellidae: Deltocephalinae) includes two subgenera, *Laburrus* (*Esolanus*) Ribaut, 1952 with the only species, *Laburrus* (*Esolanus*) *pellax* (Horváth, 1903), and *Laburrus* (*Laburrus*) Ribaut, 1942 with 12 species [Dmitriev *et al.*, 2022 onward]. Members of the nominotypical subgenus feed on wormwoods (*Artemisia*, Asteraceae) and are most numerous and diverse in arid regions. Male genitalia in different species of *Laburrus* (*Laburrus*) are similar; minor interspecific differences are observed mainly in the shape of aedeagus. Also, some species differ distinctly in coloration and size.

In all species of *Laburrus* (*Laburrus*) a peculiar phenomenon is observed. Almost every sufficiently large sample contains a small percentage of aberrant males indistinguishable in appearance from normal ones but having somewhat another shape of the pygofer lobes, terminal segments, and aedeagus [Tishechkin, 2002]. Since these males retain symmetry in the genitalia shape, they do not look like aberrant; for this reason, new species were occasionally described

based on such specimens. Their genitalia are deformed in the same manner in different species: the posterior margins of the pygofer lobes are shortened and widely rounded or nearly truncated (cf. Figs 1 and 2), the aedeagal shaft is curved to a lesser extent (cf. Figs 3 and 4), and the terminal segments are less sclerotized (cf. Figs 5 and 6).

Similar shape of the male genitalia in different species combined with the presence of aberrant forms causes considerable difficulties for taxonomy in this genus. A study of *Laburrus* species of European Russia using the male calling signal analysis to distinguish closely related species and clarify the status of dubious forms revealed new synonyms and supplemented the data on the distribution of some species [Tishechkin, 2002]. Also, the use of acoustic characters confirmed the species status of one poorly studied taxon from the steppes of Southern Siberia [Tishechkin, 2009].

In this paper, population of *L. abrotani* Emeljanov, 1962 discovered to the north of the known range, feeding on another host plant, and differing from the typical form in the calling signal pattern is described and two new synonyms are established.

Material and methods

Leafhopper vibrational signals were recorded by means of portable recording equipment consisting of a piezocrystal gramophone cartridge GZP-311 connected to the microphone input of a cassette recorder Elektronika-302 (before 2005), minidisk recorder Sony Walkman MZ-NH900 (2005–2016), or Roland R-05 wave/mp3 recorder (since 2017) via a custom-made matching amplifier. For recording, a stem of the host plant about 10–15 cm in length was attached to the cartridge by a rubber ring with the cartridge needle slightly touching the stem. Then a nylon cage containing a male leafhopper was put on the twig. After some time, the male usually sat on the twig and started singing.

Oscillograms of signals were produced with Cool Edit Pro 2.1 software.

For elements of signal temporal pattern, the following terms are used. **Pulse** is a brief elementary fragment of signal (or succession of sine waves) with rapid increase and subsequent decrease of amplitude, i.e. separated from similar fragments by amplitude minimums. Short fragments with constant temporal pattern usually repeated with regular intervals and consisting of uniform or different pulses are referred to as **syllables**. Any more or less prolonged signal with complex pattern (e.g. succession of similar or different syllables) is referred to as a **phrase**.

Digital images of male genitalia were obtained with a Micromed 3 LED M microscope equipped with a Mlchrome 5 Pro camera (Tucsen). Materials studied are deposited in the collection of the Zoological Museum of M.V. Lomonosov Moscow State University (ZMMU).

Results

Laburrus abrotani Emeljanov, 1962 Figs 7–38.

Widespread in steppes and semideserts of the Palearctic. Recently, a population of this species, different from the typical form in some characters, was discovered in the southeastern Moscow Oblast, north to the known range. A comparative description of the two forms is given below.

COLORATION AND MORPHOLOGY. Light yellowish green; forewings with brown spots in some cells, wing apices usually darkened (Figs 7–12). Females generally lighter than males. Specimens with different degrees of dark pattern development can be found in same sample.

Male genitalia shape generally similar to that of other members of subgenus. Valve, subgenital plates, styles (Figs 13, 22), and terminal segments (Figs 18, 20) of typical shape. Apices of pygofer lobes directed backward and upward and narrowly rounded (Figs 19, 21). Aedeagus shaft more or less uniformly or angularly curved, with two widely spaced apical processes (Figs 14–17, 23–26). Angle between base and shaft of aedeagus, as well as steepness of shaft curvature, usually similar in males from same sample (Figs 14–15, 23–24) but vary between specimens from different localities (cf. Figs 14–15 and 16).

Body length: ♂, 3.5–4.1 mm; ♀, 3.7–4.5 mm.

No consistent differences in the coloration (cf. Figs 7–9 and 10–12) or shape of the male genitalia (cf. Figs 13–19 and 20–26) were found between the typical southern and the newly found northern form.

HOSTS. In the Lower Volga region and Southern Urals, we collected this species from *Artemisia abrotanum* L. (subgenus *Artemisia*, section *Abrotanum*). Holotype was collected from *A. proceraeformis* Krasch. [Emeljanov, 1962]. Mityaev [2002] lists *A. abrotanum*, *A. proceraeformis*, and *A. procera* Willd. as hosts of this species in northern and eastern Kazakhstan, but according to Krasnoborov [1997], *A. procera* = *A. abrotanum* = *A. proceraeformis*.

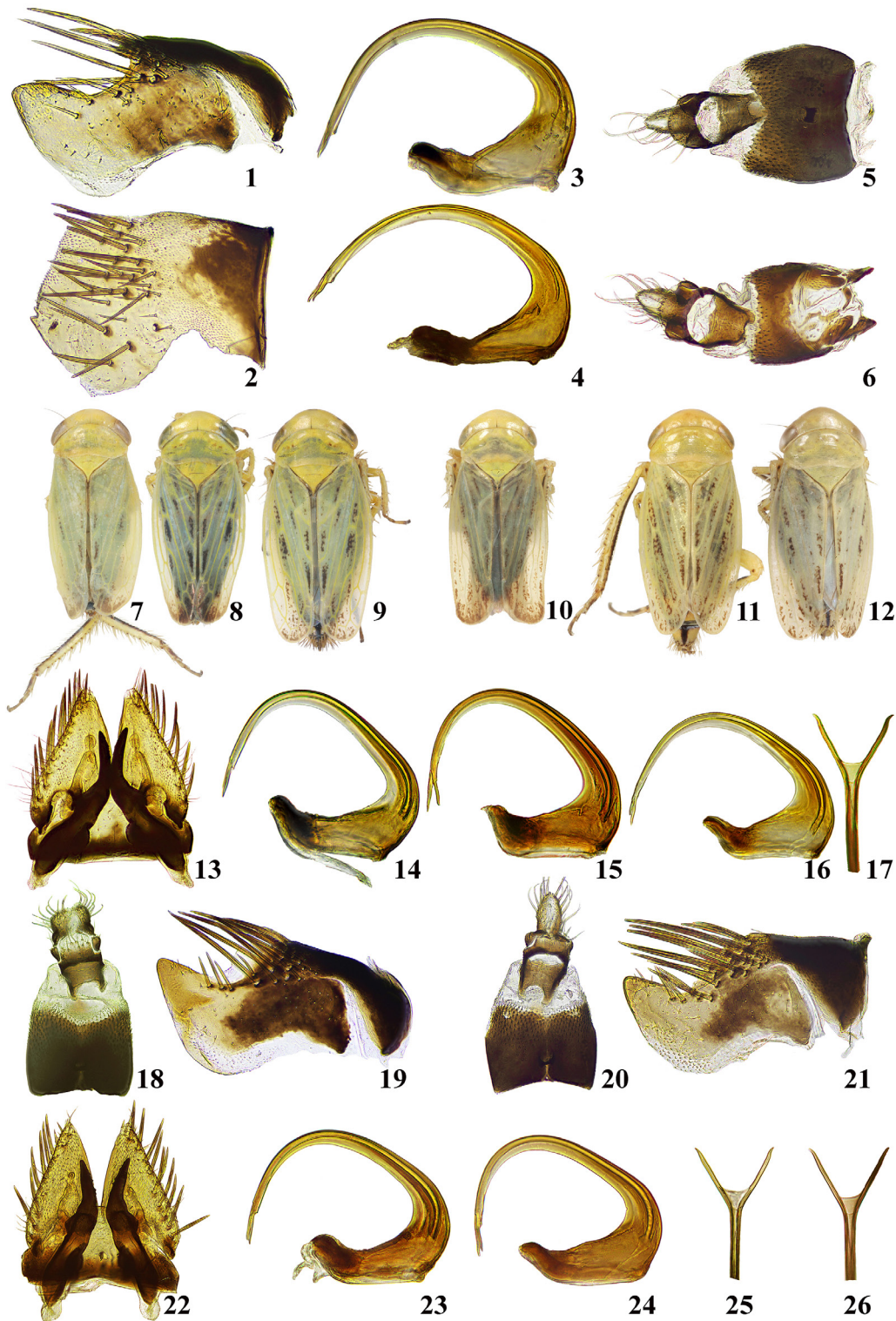
Population from Moscow Oblast was found on *A. campestris* L. (subgenus *Dracunculus*, section *Campestris*, subsection *Commutatae*); in Moscow Oblast we have never collected this species from *A. abrotanum* in spite of the fact that this plant is quite abundant in the valleys of the Oka and the lower Moskva rivers. In western Kazakhstan, Mityaev [2002], in addition to *A. abrotanum*, collected *L. abrotani* from *A. tomentella* Trautv. belonging to the same subsection as *A. campestris*.

Thus, *L. abrotani* apparently has two host races that feed on wormwoods from different subgenera. Each race is characterized by a very narrow host specialization and lives only on one or two closely related wormwood species.

CALLING SIGNALS. Signals of males from the following localities were investigated.

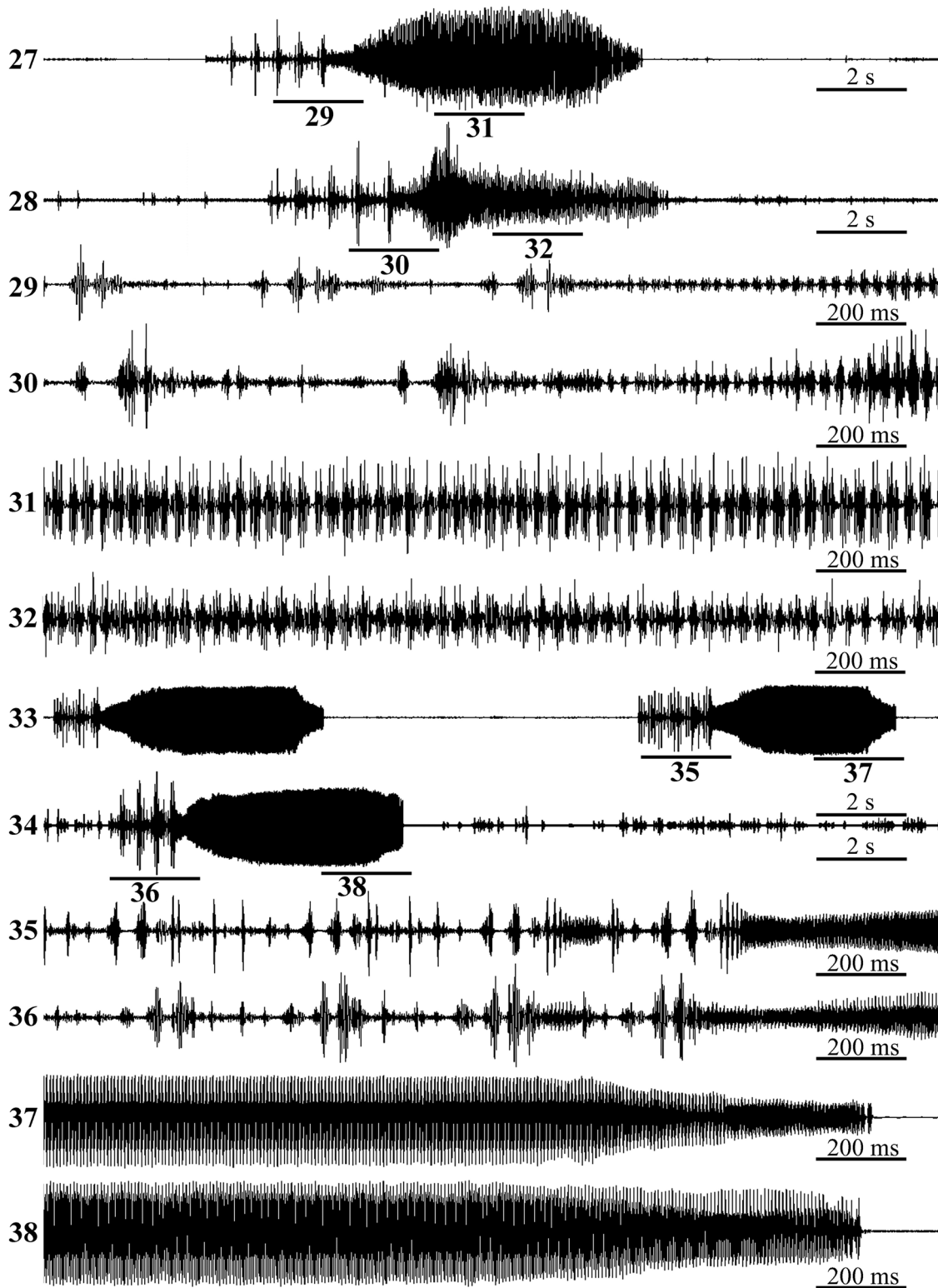
1. Volgograd Oblast, environs of Ilovlya Town, *A. abrotanum* on the meadow near the Ilovlya River, 49.326° N, 43.991° E, 1.VII.2025, signals of five males recorded at 23 °C;
2. Southern Urals, Orenburg Oblast, environs of Guberlya Village, ca. 20 km west of Orsk, from *A. abrotanum* on the bank of the Guberlya River, 6.VII.1996, signals of two males recorded at 24–25 °C;
3. Moscow Oblast, Voskresensk District, environs of Beloozerskiy Town, dry meadow on the shore of the lake, 55.467° N, 38.448° E, from *A. campestris*, 7.VIII.2017, signals of one male recorded at 25 °C;
4. Moscow Oblast, Voskresensk District, environs of Beloozerskiy Town, dry meadow in the floodplain of the Moskva River, west of Mikhalevo Village, 55.442° N, 38.414° E, from *A. campestris*, 1.VIII.2022, signals of one male recorded at 24 °C.

In males from *A. abrotanum*, calling signal is a phrase lasting for about 8–11 s and consisting of 4–5 syllables and a long train of pulses (Figs 27–32). Phrases follow each other with long irregular gaps. Syllable repetition period in the first part of a phrase is 470–530 ms in population from Volgograd Oblast and 610–720 ms in population from Southern Urals. Pulse repetition period in the second part of a phrase is 26–



Figs 1–26. *Laburris* spp. 1–6 — *L. impictifrons* (1, 3, 5 — normal male, 2, 4, 6 — aberrant male from the same sample); 7–26 — *L. abrotani* (7–9, 13–19 — specimens from *Artemisia abrotanum*, 10–12, 20–26 — specimens from *A. campestris*). 1–2, 19, 21 — pygofer lobe, 3–4, 14–16, 23–24 — aedeagus, lateral view, 5–6, 18, 20 — terminal segments, dorsal view, 7–12 — dorsal habitus, 13, 22 — valve, subgenital plates, and styles, dorsal view, 17, 25–26 — apex of aedeagus.

Рис. 1–26. *Laburris* spp. 1–6 — *L. impictifrons* (1, 3, 5 — обычный самец, 2, 4, 6 — aberrантный самец из той же выборки); 7–26 — *L. abrotani* (7–9, 13–19 — экземпляры с *Artemisia abrotanum*, 10–12, 20–26 — экземпляры с *A. campestris*). 1–2, 19, 21 — доля пигофора, 3–4, 14–16, 23–24 — эдеагус сбоку, 5–6, 18, 20 — анальная трубка сверху, 7–12 — вид сверху, 13, 22 — вальва, генитальные пластины и стилусы, вид сверху, 17, 25–26 — вершина эдеагуса.



Figs 27–38. *Laburrus abrotani*, male calling signal oscillograms (27, 29, 31 — male from *Artemisia abrotanum*, Volgograd Oblast, 28, 30, 32 — male from *A. abrotanum*, South Urals, 33–38 — males from *A. campestris*, two localities in Moscow Oblast). Faster oscillograms of the parts of signals indicated as “29–32” and “35–38” are given under the same numbers.

Рис. 27–38. *Laburrus abrotani*, осциллограммы призывных сигналов самца (27, 29, 31 — самец с *Artemisia abrotanum*, Волгоградская обл., 28, 30, 32 — самец с *A. abrotanum*, Южный Урал, 33–38 — самцы с *A. campestris*, два местонахождения в Московской обл.). Фрагменты сигналов, помеченные цифрами “29–32” и “35–38”, представлены на осциллограммах под соответствующими номерами.

39 ms in both populations; only in the very end of signal it increases to 40–50 ms.

In males from *A. campestris*, the phrase is slightly shorter; it lasts for about 4.9–6.5 s and consists of 3–4 syllables and a long monotonous part, the pulses in which are indistinguishable (Figs 33–38). Syllable repetition period in the first part of a phrase is 360–410 ms.

Thus, aside from slight differences in phrase length, the signals of the two host races differ in the temporal pattern of the second part. In the race from *A. abrotanum*, it consists of distinct pulses (Figs 31–32), while in the race from *A. campestris*, the pulses are indistinguishable (Figs 37–38). In the syllable repetition period in the first part of a phrase, the different races differ to the same extent as populations of the same race from Volgograd Oblast and the Southern Urals.

DISTRIBUTION. The main part of the range covers the steppe and semidesert zones of the Palearctic from Ukraine to Mongolia. Population from Moscow Oblast presently is a northernmost locality where this species was found.

REMARKS. In herbivorous insects with narrow host specialization, host plant shift can result in divergence of populations from different hosts and, finally, in speciation. Examples of speciation caused by host plant shifts were described in many insects, including leafhoppers. Divergence of populations associated with different hosts can occur under both sympatry and allopatry conditions, for example, when a species expands into new territories (see Tishechkin [2020] for more references).

The emergence of host races is the initial stage of speciation, but determining the extent to which these races are reproductively isolated and whether they can already be considered different biological species is possible only through long-term study under natural conditions and crossbreeding experiments in the laboratory. We believe that currently it is premature to formally describe the host race from *A. campestris* as a new subspecies or species, taking into account small number of populations studied, small, although constant, differences in the signal patterns, and the absence of morphological differences. One can only conclude that these two races represent an example of incomplete speciation, extremely difficult for taxonomists, but of interest for specialists studying evolutionary processes.

Laburris similis Vilbaste, 1965

Figs 39–43, 47–60.

Laburris melanurus Vilbaste, 1966: 69–71 (synonymy by Tishechkin, 2002: 802)

Laburris vulgaris Mityaev, 1971: 161, 179, **syn.n.**

COLORATION AND MORPHOLOGY. Yellowish green with darkened apices of forewings (Figs 39–43). Generally, in males wing apices darkened stronger than in females, but in most populations specimens with different degrees of dark pigmentation development can be found. Also, in males from Far East forewings usually darker, than in populations from Siberia and European Russia (Fig. 40).

Valve, subgenital plates, styles, and terminal segments generally same as in other members of subgenus (Figs 50, 60 and 5, 18, 20, 63). Apices of pygofer lobes directed backward and upward, comparatively wide and short, triangular, with rather widely rounded apices (Figs 47–49, 56). Aedeagus shaft rather abruptly curved, with two widely spaced apical processes (Figs 51–53, 57–59).

Small appendages covered with minute denticles on the dorsal edges of the pygofer lobes described by Vilbaste [1965] in males of *L. similis* from Altai Mts. but not found in speci-

mens from the Russian Far East [Vilbaste, 1966] is, apparently, an aberration.

L. similis, together with *L. impictifrons* (Boheman, 1852) and *L. confusus* Vilbaste, 1980, form a group of closely related species that slightly differ in size, coloration, and in details of the genitalia shape, but none of these characters allows for reliable species identification in all cases. However, all three taxa are clearly distinguished from each other by the male calling signal patterns and are undoubtedly good biological species [Tishechkin, 2009].

HOSTS. Feeds on wormwoods from subgenera *Artemisia* and *Dracunculus*. Was collected from *A. vulgaris* L. (subgenus *Artemisia*, section *Artemisia*) in Volgograd Oblast, from *A. abrotanum* (subgenus *Artemisia*, section *Abrotanum*) in the Southern Urals, from *A. laciniata* Willd. (subgenus *Artemisia*, section *Abrotanum*) in the Altai Mts., and from unidentified species of the subgenus *Dracunculus* in Transbaikalia. In the Russian Far East is abundant on wormwoods from nominotypical section. Identification of males from all hosts and localities listed above was confirmed by the calling signal analysis.

DISTRIBUTION. Rare and sporadic in the Lower Volga region and the Southern Urals, more common in the forest-steppe and steppe regions of Siberia and in the Kazakh part of the Altai Mts., common in the southern part of the Russian Far East.

REMARKS. *L. vulgaris* was briefly described in the keys to species of leafhoppers of Kazakhstan [Mityaev, 1971a]. Later its full description was published along with descriptions of some other new species from these keys [Mityaev, 1971b]. In both works, the names of these species are marked "sp. n.", which is incorrect, since in the second work they can no longer be considered new species, because they were described earlier. In the drawings of genitalia of *L. vulgaris* in Mityaev [1971a, b], aedeagal shaft is moderately curved and the pygofer lobe is shortened and truncated (Figs 54–55); this indicates that the drawings depict an aberrant male.

According to the second work [Mityaev, 1971b], the type series includes 6 ♂♂ and 21 ♀♀ with the label "East-Kazakhstan Oblast, env. Bolshenarymsk, the Balgyn River valley, 24.VII.1961" [Mityaev, 1971b]. In the collection of ZMMU there are 3 ♂♂ and 11 ♀♀ mounted on two pins with labels "Eastern Kazakhstan, B.-Narymsk District, the Balgyn River valley, *Artemisia vulgaris*, 24.VII.1961, I.D. Mityaev" and "*Laburris vulgaris* Mit., 1971, I. Mityaev det." but without type labels (Figs 42–43, 56–60); our interpretation of this species is based on these specimens.

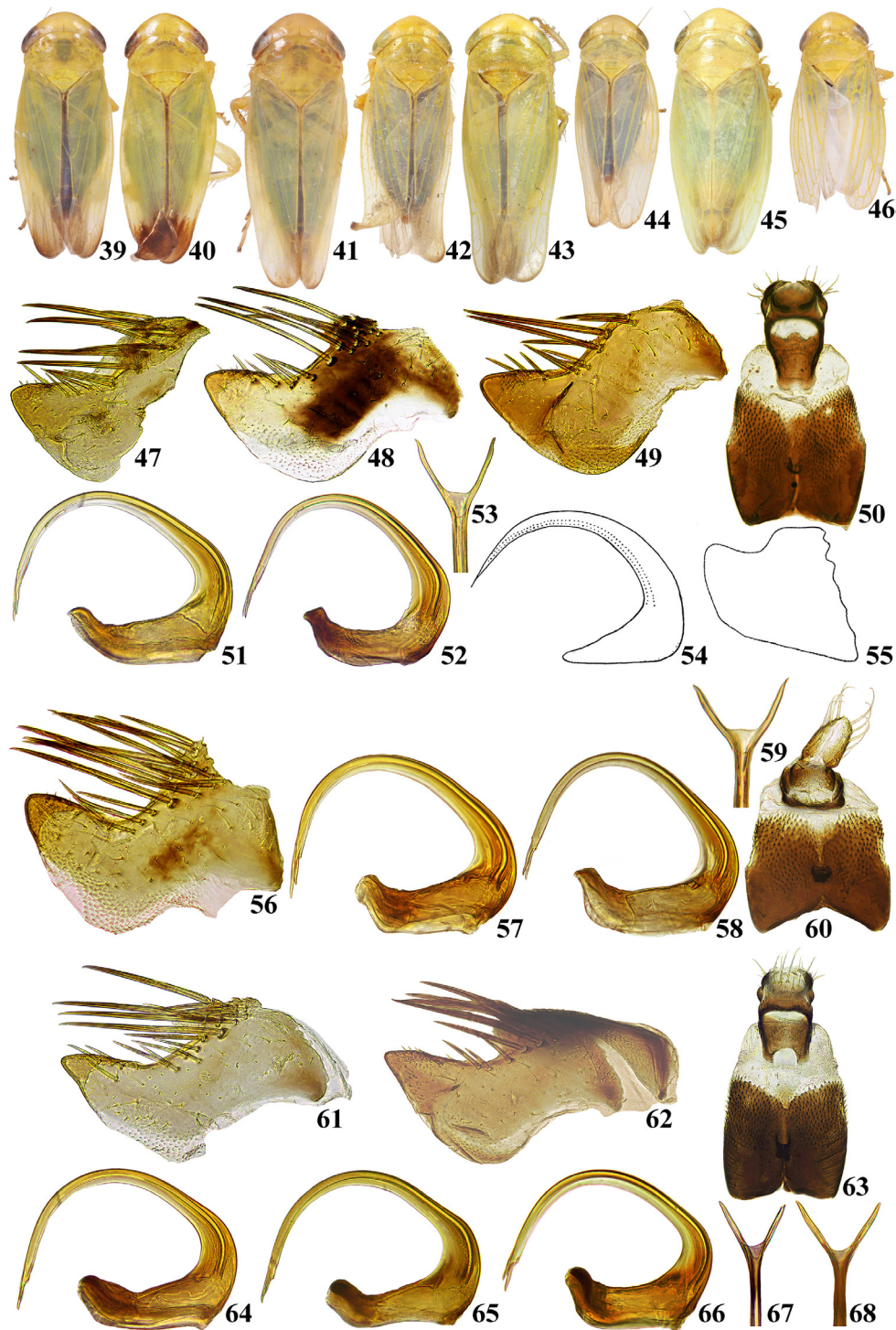
The species was collected only once and was subsequently not found anywhere else [Mityaev, 2002].

In the body length, the studied specimens of *L. vulgaris* are similar to *L. similis*, while the body length indicated in the original description of *L. vulgaris* is significantly smaller and close to the body length of *L. confusus* (Table).

Table. Body length in taxa from the *Laburris impictifrons* species group, mm.

Таблица. Длина тела таксонов группы *Laburris impictifrons*, мм.

Taxon	Male	Female
<i>L. similis</i>	4.2–5.1	4.8–6.1
<i>L. impictifrons</i>	3.9–4.8	4.4–5.1
<i>L. confusus</i>	3.7–4.2	4.3–4.8
<i>L. vulgaris</i>	3.7–4.2 (according to the original description) 4.4–4.5 (studied specimens, 3 ♂♂)	4.1–4.3 (according to the original description) 4.7–5.4 (studied specimens, 11 ♀♀)



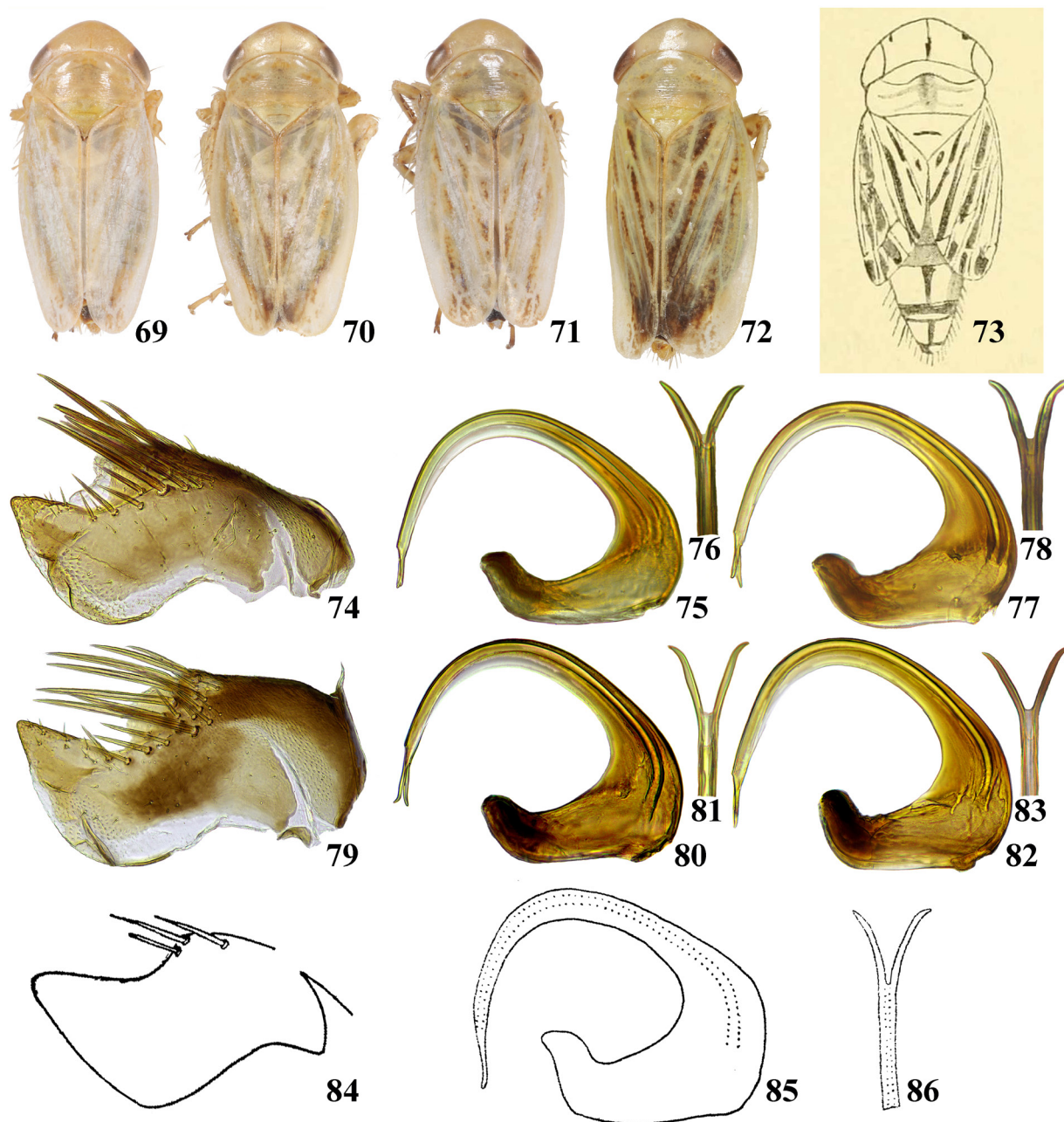
Figs 39–68. *Laburrus* spp. 39–43, 47–60 — *L. similis* (39 — specimen from the Lower Volga region, 40–41, 49–50, 52–53 — specimens from the Russian Far East, 42–43, 56–60 — specimens from eastern Kazakhstan identified as *L. vulgaris* by Prof. Mityaev, 47, 51 — specimen from the Russian Altai Mts., 48 — specimen from Transbaikalia, 54–55 — drawings from the original description of *L. vulgaris*, after Mityaev [1971a]); 44–45, 61–68 — *L. impictifrons* (44 — specimen from Moscow Oblast, 45, 61, 64 — specimens from Astrakhan Oblast, 62–63, 65–68 — specimens from southeastern Kazakhstan); 46 — *L. confusus*. 39–46 — dorsal habitus, 47–49, 55–56, 61–62 — pygofer lobe, 50, 60, 63 — terminal segments, dorsal view, 51–52, 54, 57–58, 64–66 — aedeagus, lateral view, 53, 59, 67–68 — apex of aedeagus.

Рис. 39–68. *Laburrus* spp. 39–43, 47–60 — *L. similis* (39 — экземпляр из Нижнего Поволжья, 40–41, 49–50, 52–53 — экземпляры с Дальнего Востока России, 42–43, 56–60 — экземпляры из восточного Казахстана, определенные проф. Митяевым как *L. vulgaris*, 47, 51 — экземпляр с российского Алтая, 48 — экземпляр из Забайкалья, 54–55 — рисунки из первоописания *L. vulgaris*, по: Митяев [1971а]); 44–45, 61–68 — *L. impictifrons* (44 — экземпляр из Московской обл., 45, 61, 64 — экземпляры из Астраханской обл., 62–63, 65–68 — экземпляры из юго-восточного Казахстана); 46 — *L. confusus*. 39–46 — вид сверху, 47–49, 55–56, 61–62 — доля пигофора, 50, 60, 63 — анальная трубка сверху, 51–52, 54, 57–58, 64–66 — эдеагус сбоку, 53, 59, 67–68 — вершина эдеагуса.

In the shape of the pygofer lobes, *L. vulgaris* and *L. similis* are indistinguishable (Figs 47–49, 56), but differ from *L. impictifrons*, in which the pygofer lobes are usually more elongated and pointed (Figs 61–62). Males with an abruptly curved aedeagal shaft, as in specimen shown on Fig. 58, are rather common among *L. similis* (Fig. 52), but very rare among *L. impictifrons* (Figs 64–66). Males with only slightly dark-

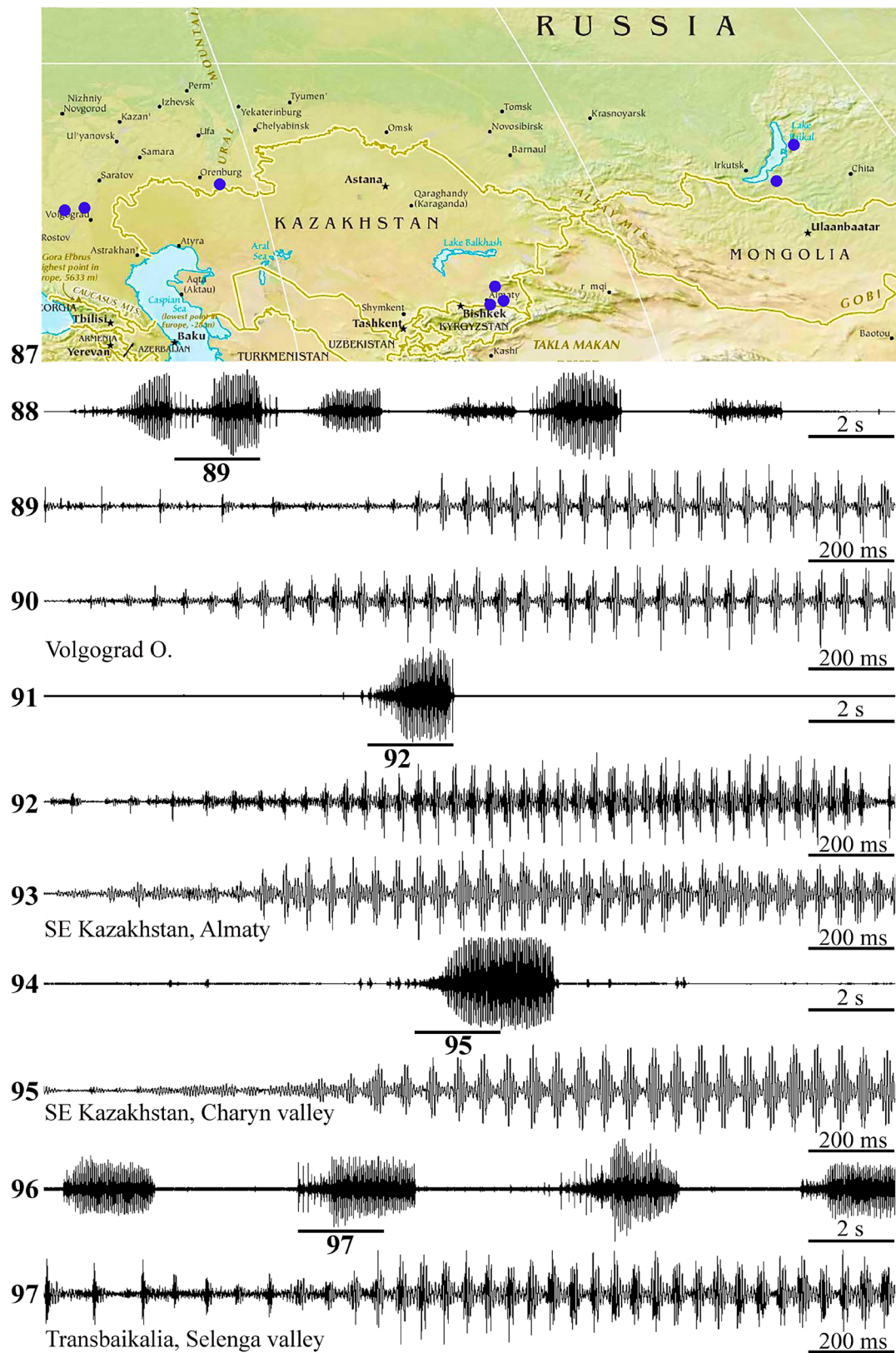
ened forewing apices are rare among *L. similis*, still sometimes can be found in European and West Siberian populations. The studied females of *L. vulgaris* are indistinguishable from females of *L. similis* (cf. Figs 41 and 43).

L. confusus is much smaller than *L. vulgaris* and *L. similis* (Table) and has greenish yellow forewings with usually light and only occasionally very slightly darkened apices (Fig. 46).



Figs 69–86. *Laburrus handlirschi* (69, 74–78 — specimens from Volgograd Oblast, 70–72, 79–83 — specimens from southeastern Kazakhstan, 73 — drawing from the original description of *L. handlirschi*, after Matsumura [1900], 84–86 — drawings from the original description of *L. potanini*, after Mityaev [1971a]). 69–73 — dorsal habitus, 74, 79, 84 — pygofer lobe, 75, 77, 80, 82, 85 — aedeagus, lateral view, 76, 78, 81, 83, 86 — apex of aedeagus.

Рис. 69–86. *Laburrus handlirschi* (69, 74–78 — экземпляры из Волгоградской обл., 70–72, 79–83 — экземпляры из юго-восточного Казахстана, 73 — рисунок из первоописания *L. handlirschi*, по: Matsumura [1900], 84–86 — рисунки из первоописания *L. potanini*, по: Митяев [1971а]). 69–73 — вид сверху, 74, 79, 84 — доля пигофора, 75, 77, 80, 82, 85 — эдеагус сбоку, 76, 78, 81, 83, 86 — вершина эдеагуса.



Figs 87–97. *Laburrus handlirshi*. 87 — map of signal recording sites, 88–97 — male calling signal oscillograms; localities are indicated under oscillograms. Faster oscillograms of the parts of signals indicated as “89”, “92”, “95”, and “97” are given under the same numbers.

Рис. 87–97. *Laburrus handlirshi*. 87 — места сбора насекомых для записи сигналов, 88–97 — осциллограммы призывных сигналов самца, места сбора указаны под осциллограммами. Фрагменты сигналов, помеченные цифрами “89”, “92”, “95” и “97”, представлены на осциллограммах под соответствующими номерами.

This contradicts the description of *L. vulgaris*, which indicates that “forewings opaque with yellow veins, apex often infumose, its top often brown” [Mityaev, 1971b: 62].

Based on all these data, we believe that the studied materials from eastern Kazakhstan labelled “*Laburris vulgaris* Mit., 1971, I. Mityaev det.” represent weakly pigmented specimens of *L. similis*, and the small body length of *L. vulgaris* indicated in the original description is an error. For this reason, we establish the synonymy *L. similis* Vilbaste, 1965 = *L. vulgaris* Mityaev, 1971, **syn.n.** It is also confirmed by the fact that *L. similis* is widespread in the Altai, including its Kazakh part, where *L. vulgaris* was collected. It should be added that Prof. Mityaev never recorded *L. similis* from the territory of Kazakhstan, despite the fact that this species is present in his materials, and probably confused it with closely related species.

Laburris handlirschi (Matsumura, 1908)
Figs 69–97.

Athysanus artemisiae Matsumura, 1900: 233–235 (primary homonym of *Athysanus artemisiae* Gillette et Baker, 1895, replaced by Matsumura, 1908: 2).

Laburris maculosus Vilbaste, 1961 (synonymy in Nast, 1972: 396).

Laburris potanini Mityaev, 1971, **syn.n.**

COLORATION AND MORPHOLOGY. Whitish-grey with dark spots in cells of forewings, often forming oblique longitudinal stripes (Figs 69–73). Degree of dark pigmentation varies greatly; even within same sample, light-colored specimens with hardly visible dark pattern and specimens with well-developed dark spots in almost all forewing cells can be found.

Valve, subgenital plates, styles, and terminal segments of typical shape. Apices of pygofer lobes directed backward and upward, comparatively short, triangular, with acute apices (Figs 74, 79). Aedeagus shaft usually evenly curved (Figs 75, 77, 80, 82), apical processes with close bases, slightly arcuately curved inward (Figs 76, 78, 81, 83).

Body length: ♂, 3.0–3.4 mm; ♀, 3.5–4.2 mm.

HOSTS. Was collected from *Artemisia austriaca* Jacq. in Volgograd Oblast, from *A. frigida* Willd. in the valley of the Selenga River, Transbaikalia (both species belong to the subgenus *Artemisia*, section *Absinthium*), and on unidentified species of *Artemisia* from the subgenus *Seriphidium* in south-eastern Kazakhstan.

CALLING SIGNALS. Calling signals of males from two localities in the steppes of European Russia, one locality in the Southern Urals, three localities in southeastern Kazakhstan, and two localities in Transbaikalia were investigated (Fig. 87).

Calling signal is a phrase lasting for 2–4 s (Figs 88–97). It begins with a short succession of syllables consisting of one short high-amplitude pulse and several partially merged low-amplitude ones each (Figs 89, 97, the beginning of oscillograms). Syllables follow with a period from about 55–70 up to 150–200 ms; quite often this part of signal is almost entirely reduced (Figs 90, 95). The main part of a signal is a prolonged train of pulses following each other with a period of 40–55 ms. Phrases usually follow with long, irregular gaps; in actively singing males, the gaps between phrases become shorter and more constant (Fig. 96).

Signals of males from different localities do not have significant differences.

DISTRIBUTION. The steppe and semidesert zones of the Palearctic from Eastern Europe to Transbaikalia and Mongolia.

REMARKS. Was described based on about thirty females and one parasitized male from the shore of the saline lake

Neusiedl, Hungary, around which the westernmost fragments of the Eurasian steppes exist [Matsumura, 1900]. The dorsal habitus drawing from the original description is reproduced in Fig. 73; Fig. 72 is a photograph of a female with similar coloration.

We were unable to find a paper where *L. maculosus* is synonymized under *L. handlirschi*, although this synonymy is mentioned in Nast [1972]. However, we have a hard copy of the paper with the original description of *L. maculosus* [Vilbaste, 1961] from Vilbaste's archive; in this reprint, in the caption to fig. 1, which depicts the genitalia of *L. maculosus*, the name “*maculosus*” is crossed out and corrected by hand to “*handlirschi*” (probably by Vilbaste himself). It is possible that Vilbaste came to the conclusion that these two species are synonyms and communicated this to some colleagues, although he did not publish this information himself.

The type locality of *L. potanini* is the foothills of Zailiyskiy Alatau Mtn. Range in the environs of Kalinino (presently, Tuzdybastau on the northeastern border of Almaty), southeastern Kazakhstan. The nearest point where we collected material for signal recordings is situated in the foothills of Zailiyskiy Alatau on the southern border of Almaty ca. 15 km from the type locality (Figs 91–93). Also, some paratypes were collected in the Kyrgauldy Gorge on the southwestern border of Almaty, about 13 km from our collecting site.

L. handlirschi differs from all other members of the genus by the apical processes of the aedeagus, which are close together at bases and slightly arcuately curved towards each other (Figs 76, 78, 81, 83); in other species these processes are more widely spaced and straight or slightly lyrate-shaped (Figs 25–26, 53, 59, 67–68). In this character, as well as in coloration, *L. potanini* (Fig. 86) and our specimens from southeastern Kazakhstan (Figs 81, 83) are indistinguishable from *L. handlirschi* from European steppes (Figs. 76, 78). The calling signal temporal patterns in males from different localities in the southern part of European Russia, Southern Urals, southeastern Kazakhstan, and Transbaikalia are also similar (Figs. 87–97). Based on this, we establish the synonymy *L. handlirschi* (Matsumura, 1908) = *L. potanini* Mityaev, 1971, **syn.n.**

In the keys to species of Auchenorrhyncha of Kazakhstan [Mityaev, 1971a] under the name “*L. handlirschi*” some other species is illustrated.

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