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Tipula (Yamatotipula) aleutica Alexander (Diptera: Tipulidae), a reclassification

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Abstract

Tipula (Yamatotipula) aleutica is redescribed and illustrated and reasons are presented for its removal from the subgenus *Arctotipula* Alexander, 1933, and its placement in the subgenus *Yamatotipula* Matsumura, 1916.

Key words: *Tipula aleutica*, *Yamatotipula*, *Arctotipula*, reclassification, geographical distribution

Introduction

While working on a monograph of the subgenus *Tipula (Arctotipula)* Alexander, 1933 it became clear to me that *Tipula aleutica* Alexander, 1923 had been erroneously placed in the subgenus *Tipula (Arctotipula)* and more properly belongs in *Tipula (Yamatotipula)* Matsumura, 1916. In this paper I am redescribing and illustrating both the male and female of *T. (Y.) aleutica* to justify this subgeneric transfer and to make these descriptions more complete and therefore more useful for clarifying phylogenetic relationships. The morphological terminology adopted here, including venation, follows McAlpine (1981).

The following abbreviations for museums are used in the text.

CAS: California Academy of Sciences, San Francisco, California, United States of America, Dr. N. Penny and Dr. P. Arnaud, Jr.

CNC: Canadian National Collection of Insects, Ottawa, Canada, Dr. Jeffrey Cummings, Dr. D.M. Wood, Harold Walther, and the late Dr. Herbert Teskey.

SEM: Snow Entomological Museum collection, Lawrence, Kansas, USA, Dr. George Byers.

ZM NNHM NASU: The Zoological Museum of National Museum of Natural History of National Academy of Science of Ukraine, Kiev, Ukraine, Nikolai N. Szczerbak, former director of the Museum.

UMMZ: University of Michigan Museum of Zoology, Ann Arbor, Michigan, USA, Dr. T.E. Moore.

ZIN: Zoological Institute of The Russian Academy of Science, St. Petersburg, Russia, Dr. E. P. Nartshuk.

Subgeneric Classification of *Tipula aleutica*

The classification of *Tipula aleutica* has always been problematical. In the original description Alexander (1923) did not place *aleutica* (nor any of the other species newly described in that paper) in a subgenus but suggested that *aleutica* belongs to a group composed of *perlongipes* Johnson, *sulphurea* Doane, *tenebrosa* Coquillett, *kennicotti* Alexander and *cimmeria* Speiser. The first

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mentioned species, however, is in the subgenus *Triplicitipula* Alexander, 1965, and the others are in *Yamatotipula* Matsumura, 1916. It is telling that Alexander also described *T. alascaensis* in the paper mentioned above because he obviously did not see any close relationship between *alascaensis* and *aleutica* at that time. Later, when he erected the subgenus *Arctotipula* (Alexander 1933), *alascaensis* was included among the original species but not *aleutica*. By 1965, however, Alexander listed *aleutica* in the subgenus *Arctotipula*.

Mannheims (1953) named a new species, *Tipula (Arctotipula) lackschewitzi*, based on specimens misidentified as *Tipula besselsi* by Lackschewitz. Savchenko (1961) had some doubts about this subgeneric designation and these doubts remained when he later (Savchenko 1966) synonymized *Tipula (?Arctotipula) aleutica* and *Tipula (?Arctotipula) lackschewitzi*. Savchenko (1961) noted that *aleutica* (as *lackschewitzi*) differs markedly from the other species in this subgenus by having darker edges or borders around the dorsal thoracic stripes, the relatively long first flagellar segment of the antenna, and the more distal position of the fork M_{3+4} at the discal cell of the wing, as well as a tendency toward a fusion of the 9th tergite and sternite into a complete genital ring. I regard only the last character to be of subgeneric importance; all the rest appear to be species specific characters.

The salient features of the subgenus *Arctotipula* mentioned by Alexander (1933) are the unusually glabrous wing veins (those beyond the cord lacking macrotrichia, or, macrotrichia much reduced in size and number) and the peculiar structure of the ovipositor (terminal abdominal segments being abruptly narrowed, ovipositor very small, cerci moderately elongate, only weakly sclerotized, with smooth margins; hypovalvae small and compressed). Other characters noted by Alexander include a relatively short nasus, conspicuously hairy body including setae on all coxae and usually on the sternopleurite, and in the wing, R_{1+2} entire, cell M_1 usually short-petiolate to sessile. The male hypopygium was described as simple, with a separation between tergite and sternite. In *T. aleutica*, however, the veins in the wing are distinctly haired, and the female ovipositor is not as described above for *Arctotipula* but strongly sclerotized and quite typical of *Yamatotipula* species.

There is a discrepancy in the literature as to whether or not the male 9th tergite is fused to the rest of the genital capsule in *T. aleutica*. This character is important because it is key to distinguishing several *Tipula* subgenera. The genital capsule of *T. aleutica* is fused basally but there remains a noticeable membranous separation of the 9th tergite distally (Figs. 1 & 2). A "fused 9th sternite and tergite" is characteristic of the subgenus *Yamatotipula*, but several other *Yamatotipula* species show a similar partial separation of these sclerites distally, *e.g.*, *toklatensis* Alexander, *tenebrosa* (Coquillett), and *tephrocephala* (Loew). In *Arctotipula*, by comparison, these sclerites are separate almost to their bases, being joined only at what I consider to be the very narrow, true genital ring (Brodo 1987).

Seven additional characters which strongly suggest that *aleutica* is better placed in *Yamatotipula* are the following. (1) The lateral arms of the aedeagal guide (adminiculum of authors) are free, expanded at their tips, and they extend distally so that they are usually plainly visible posteriorly (Fig. 3), an important character of *Yamatotipula* (Alexander and Byers 1981). In *Arctotipula*, by contrast, the lateral arms of the aedeagal guide are very short and more or less fused to the 9th sternite. (2) The 9th tergite is evenly and relatively lightly haired to its tip, and the tip is contrastingly lightened (Fig. 2). In *Arctotipula* the 9th tergite is rather abruptly thickly haired on its distal half and has fine, scattered hairs proximally. (3)Ventrally, the male hypopygium in *aleutica* is much more extended than in *Arctotipula* and has a broader, membranous region medially, similar to many species of *Yamatotipula*. (4) The inner gonostylus lacks the characteristic sensory area found on *Arctotipula* species. (5) The wings of *aleutica* have very noticeable hairs on the media, as do

Yamatotipula species, whereas *Arctotipula* species have the media bare, but there may be hairs on radius or subcosta. (6) In the female the hypogynial valves are long, broad distally, and lack lateral lobes (Fig. 6), whereas in *Arctotipula* the hypogynial valves are shorter, pointed distally and usually have lateral lobes. (7) The structures of the 9th sternite (Fig. 7) are larger and more heavily sclerotized than in *Arctotipula* species, especially the genital fork which is elongated and heavily sclerotized in other *Yamatotipula* species (e.g., *caloptera* Loew, *dejecta* Walker, *grenfelli* Alexander) but much reduced and weakly sclerotized in *Arctotipula*.

North American keys use the separation between the 9th tergite and sternite in the male hypopygium and the glabrous nature of the wing veins as key characters that distinguish *Arctotipula* (Alexander 1942, Alexander and Byers 1981). *Tipula aleutica* would, therefore, key out to *Yamatotipula* once it is recognized that the genital capsule is at least partially fused basally.

Tipula (Yamatotipula) aleutica

Tipula aleutica Alexander, 1923: 164.
Tipula besselsi; Lackschewitz 1936 (nec Osten Sacken 1877).
Tipula (Arctotipula) lackschewitzi Mannheims, 1953: 116.
Tipula (? Arctotipula) lackschewitzi; Savchenko 1961: 345.
Tipula (? Arctotipula) aleutica; Savchenko 1966: 91; 1983: 375.
Tipula (Arctotipula) aleutica; Lantsov and Chernov 1987: 26.

DIAGNOSIS. In the male, two yellowish distal lobes on the 9th tergite and a long, sharply pointed spur on the lateral surface of the inner gonostylus distinguish *T. aleutica*. Both male and female are dark gray, moderately hairy, with dorsal stripes on thorax more or less outlined in darker gray; nasus short stubby or lacking and wings with stigma barely darker than costal edge of wings and hairs on most veins in the wing.

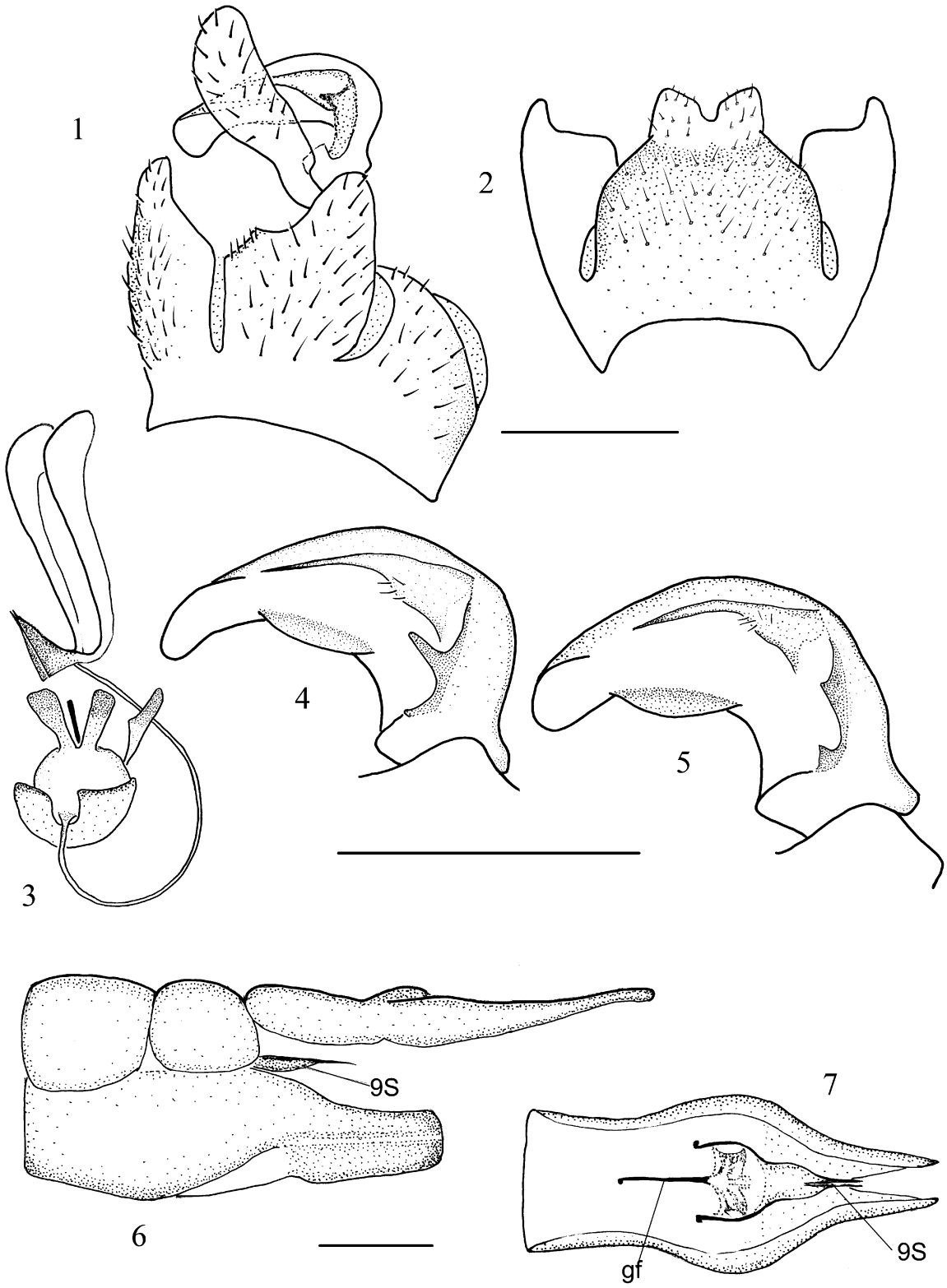
DESCRIPTION. (Terminology, including wing venation, follows McAlpine 1981.)

ADULT. General appearance: bluish gray, moderately hairy; thoracic dorsal stripes bordered by darker gray with hairs between stripes. Male body length 10.5-11 mm, wing length 13.7-14.2 mm. Female body length 12-13.7 mm, wing length 13.4-14.4 mm.

MALE. Head: Vertex bluish gray, hairs brown, erect, of moderate length, with distinct prominence behind antennae. Gena pale bluish gray, with hairs beneath and lateral to antennal base. Postgena densely hairy; hairs brown, semi-erect. Rostrum of moderate length, three fourths as long as head, hairs erect; nasus ranging from short and broad to absent. Terminal segment of palpus long, longer than two preceding segments. Pseudoocellus inconspicuous.

Antenna brown, extending about to wing base; scape covered with long hairs; 1st flagellomere almost cylindrical, distinctly longer than 2nd, with scattered hairs in addition to verticils; succeeding flagellomeres progressively shorter, middle flagellomeres very slightly constricted medially, with verticils on slight basal prominence, dorsal verticils 3 times or more length of ventral verticils; 11th flagellomere about half length of 10th.

Thorax: Pronotum bluish gray with short, pale hairs. Scutum 1 with stripes bluish gray, contrasting with background, outlined in darker gray, hairs outlining dorsal stripes long, pale yellowish white; middle stripe glabrous, divided by distinct longitudinal line. Scutum 2 with hairs both antero- and posterolaterally, bare medially. Scutellum and mediotergite densely hairy. Pleurae bluish gray, hairs not as long as coxal hairs; anepisternum bare; katepisternum usually bare, may have a few scraggly hairs; metakatepisternum with hairs; rest of pleuron bare.



FIGURES 1–5 *Tipula (Yamatotipula) aleutica* male genitalia. Figure 1. Male hypopygium, left aspect. Note the solid basal ring and the secondary membranous divisions distally. Figure 2. 9th tergite and conjoined goncoxites, dorsal aspect, showing the extent of the membranous divisions. Figure 3. Aedeagal complex. Figure 4. Left inner gonostylus, lateral aspect, typical of specimens from the Yukon. Figure 5. Left inner gonostylus, lateral aspect, typical of specimens from Alaska and Russia. Figures 6 & 7 female genitalia. Figure 6. left lateral aspect. Figure 7. dorsal aspect, cerci removed. 9 S = 9th sternum; gf = genital fork.
Scale lines = 0.5 mm.

Wings: squamae bare; membrane almost hyaline, with smallish stigma not flanked by lightened lunules, therefore stigma less conspicuous than in most arctic crane flies; wing fold area less heavily sclerotized, including proximal and posterior sides of discal cell. Subcosta heavily haired; radius with hairs on R_1, R_2, R_3, and R_{4+5}; media with hairs distally on M_1, M_2, M_3; cubitus with hairs on CuA and CuA_1; hairs on A_2. Sc ending closer to fork of Rs than to its origin; costal cross vein present; R_{1+2} and R_2 distinct; r-m joining R_{4+5}, creating short stem for cell R_{4+5}; cell M_1 longer than its petiole. Discal cell sharply angled at both ends. Wing with short element m-cu absent, 1st segment of CuA_1 (m-cu of authors) touching discal cell proximal to middle of cell.

Halteres: with stem more or less concolorous with bare knob.

Legs: neither femora nor tibiae noticeably darkened at tips; fore leg with 1st tarsal segment longer than the rest combined; mid and hind legs with 1st tarsal segment longer than 2nd & 3rd combined; tarsal claws toothed.

Abdomen: dorsal stripe not evident; segments lighter distally.

Genitalia: 9th tergite with fine scattered hairs, dusky dark brown proximally with two yellowish-brown, rounded lobes distally, lobes separated by deep, U-shaped emargination. Outer gonostyle longer than broad, attached to base of inner gonostyle. Inner gonostyle with broadly rounded distal beak expanding to a smoothly curved, long, dorsal crest; no medial sensory area; laterally with long, narrow, sharply pointed spur widening at base; small shelf-like expansion on lateral edge below spur; flattened, ear-like lobe proximal to spur, varying from broadly triangular to long and narrow (Figs. 4 & 5). Gonocoxite fused basally to 9th tergite, partially separated distally; secondary membranous division seemingly separating gonocoxite from 9th sternite; ventrally a broadly membranous, somewhat expanded area. Aedeagal guide (adminiculum) with broadly rounded lateral arms long, free from gonocoxites except connected narrowly at base. Aedeagus narrow, moderately long. Sperm pump with elongated distal arms.

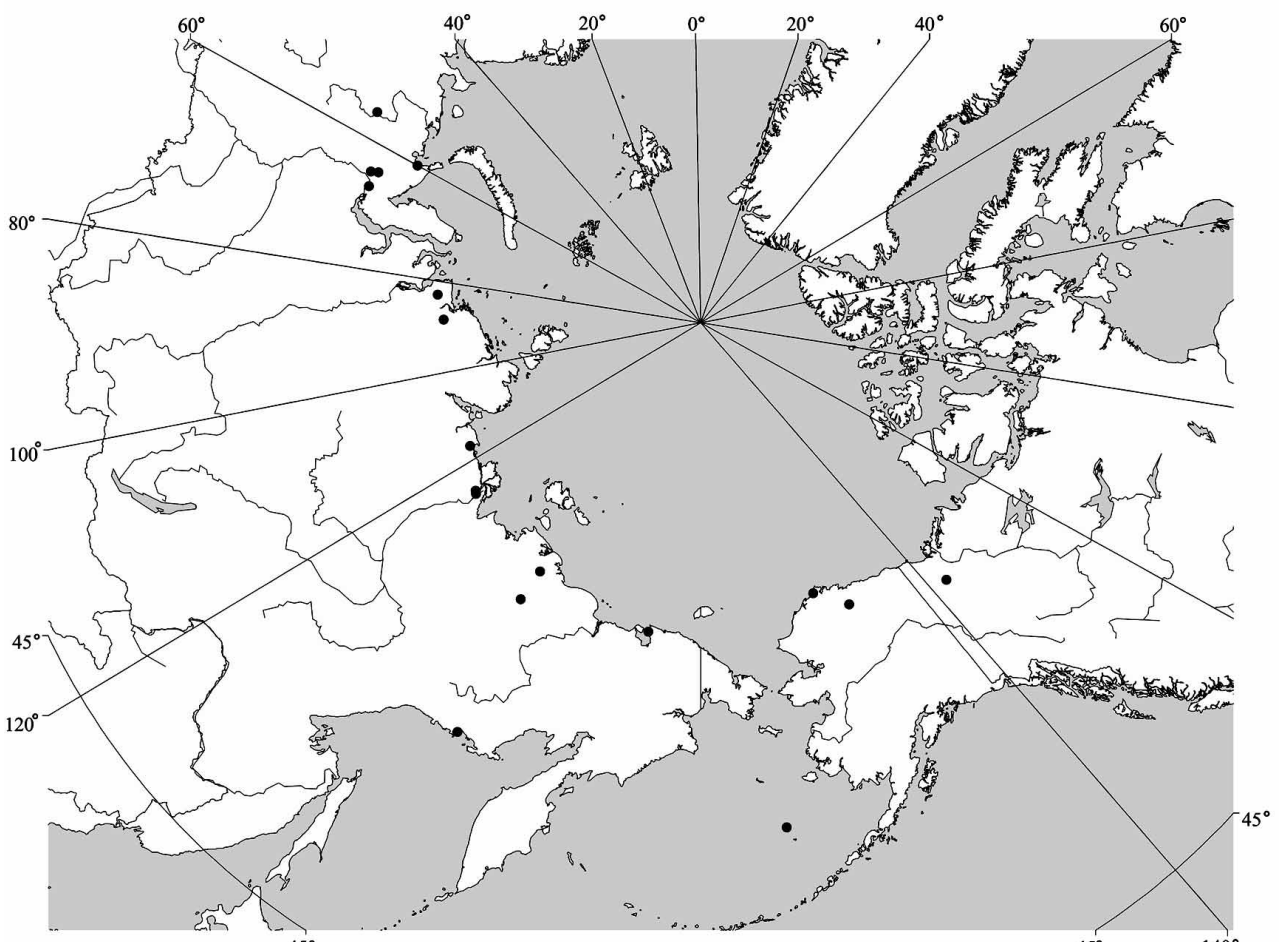
FEMALE. Antenna short, not extending to wing base, bluish gray; scape concolourous with flagellum, densely hairy; 1st flagellomere with scattered hairs, verticils on distinct prominence; middle flagellomeres almost cylindrical, dorsal verticils 2 x or less length of ventral verticils; 11th flagellomere slightly smaller and narrower than 10th.

Genitalia: ovipositor elongate, similar to that of most other tipulines; cerci slightly longer than 10th tergite; hypogynial valves broad and blunt-tipped, without lateral lobes; small irregular membranous area medially. External tip of 9th sternite longer than broad. Genital fork long and narrow with short, broad distal arms. Spermathecal ducts with sparse, short hairs; common spermathecal duct (between bursa and junction of spermathecal ducts), long, convoluted; cul-de-sac (anterior to junction of the three spermathecal ducts) short, almost straight.

VARIATION. The small lobe near the base of the spur on the inner gonostylus is broadly triangular in the holotype and other specimens from Alaska and Russia. In the specimens from the Yukon this structure tends to be much more slender (Fig. 4).

GEOGRAPHIC DISTRIBUTION (see Map). This is an arctic tundra species that occurs in marshy or boggy areas usually associated with *Carex* species, or on lichen-moss tundra. It shows a Beringian distribution and is widespread across the northern edge of the Russian mainland from "Malozemelyskaya tundra in the west to Chukotka in the east" (Lackschewitz 1936; Savchenko 1961). In Eurasia it ranges from Polar Ural, Shuch'ya River (South Jamal), Syradasay River (Taimyr Peninsula), Tiksi to the mouth of the Indigirka River (Lantsov, Chernov 1987). According to these authors it belongs to hypoarctic species (l.c.). *Tipula aleutica* extends into the western Nearctic in the Pribilof Islands, northern Alaska and northern Yukon. Most of this large area was ice-free during the Wisconsinan glacial maximum, except for isolated glacial areas (Lafontaine & Wood 1988), and

this species probably survived in one or more pockets in this region. The Yukon record came from a region that has shale scree hills rising above the general level of dry tundra (Lafontaine, pers. comm.). This species seems to have barely expanded its range since deglaciation. It does not occur in wet tundras nor in the taiga east of the Yukon, nor does it occur in the arctic islands of Canada, Russia or in northern Scandinavia.



MAP. The black circles represent one or more specimens of *Tipula (Yamatotipula) aleutica* collected at that locality.

FLIGHT RECORDS: 9 June–24 July.

TYPES EXAMINED. I have examined the male holotype of *Tipula aleutica* in the Smithsonian Collection (USNM). It bears the labels: St. George Id/ Bering Sea/ June 27, 1914 (white); G. Dallas Hanna/ Collector (white); GDH Lot No. 49 (white); Holotype/ *Tipula aleutica*/ C.P. Alexander (red); Type No./ 26465/ U.S.N.M. (Red). The genitalia and left wing of the holotype are on two separate slides, both numbered 509, and with the same collection data as above. On the pinned specimen the right antenna and all three left legs are missing and only the right middle leg is complete, the others are missing tarsal segments. The specimen is discoloured, somewhat faded reddish brown. The slide-mounted genitalia are laterally compressed and somewhat faded, making the structures difficult to see. One can distinguish, however, the two characteristic distal tips of the 9th tergite, the diagnostic, long, sharp medial spine on the inner dististyle, and the long, lateral arms of the aedeagal guide (adminiculum) with their broadened tips. (I have also seen a male specimen from St. Paul Island,

Alaska, vi.14.1920, Hanna (CAS), erroneously labelled as a paratype; there was no paratype mentioned in the original description.)

I did not see the holotype of *T. lackschewitzi* that is in the Zoologisches Museum, Humboldt Universität, Berlin. In 1993, however, I examined the following specimens that were collected by Zaitsev in the Polar Ural, Tobol'sk, and bearing the labels: *T. besselsi* and *vide* Lackschewitz: 1 ♂, 19 vi 1909, F. Zaitsev (ZM NNHM NASU), and 2 ♂♂, 24 and 29 vi 1909, F. Zaitsev (ZIN). I concur with the synonymy of *lackschewitzi* with *aleutica*, and confirm that *T. besselsi* is a distinctly different species.

SPECIMENS EXAMINED 45 ♂♂, 11 ♀♀. Additional records marked with * represent specimens identified by Savchenko and recorded in Lantsov & Chernov 1987.

CANADA. Yukon Territory: Km 465 Dempster Hwy, 67°01' N 136°12' W, 1 ♂, 1♀, 23-25.vi.1980, Wood & Lafontaine (CNC); 13 ♂♂, 2 ♀♀, 25-26.vi.1982, G & M Wood (CNC).

USA. Alaska: Point Barrow, 71°30' N 157°20' W, Central Marsh Area, 2 ♂♂, 17.vii.1956, Montgomery (SEM); St. Paul Island, 57°24' N 170°16' W, ♂ "paratype", 14.vi.1920, Hanna, (CAS, no paratypes mentioned in the original description); Umiat, 69°22' N 152°09' W, 3 ♂♂, 20-21.vi.1947, Knight (UMMZ); 3 ♂♂, 22-23.vi.1947, Jachowski (UMMZ including slide of wing).

RUSSIA. ARKHANGELSKAYA OBLAST, Nenets Admin. Distr., Yugorskiy Peninsula, Polar Station, Barents Sea near Vaygach I., 69° N 61° E, marsh, 5 ♂♂, 9.vii.1957, Yu Chernov; (ZIN, ZM NNHM NASU) (I saw 3 of 4 males mentioned by Savchenko and identified as *lackschewitzi*). KOMI REPUBLIC, Ust'Kozhva, Pechora Distr., 65°06' N 57°03' E, 2 ♀♀, 13.vii.1903, 11.vii.1905, Zhuravskiy (ZIN, ZM NNHM NASU). KRASNOYARSK TERRITORY, *Taimyr Peninsula, Syradasay River, 72°47' N 84°07' E (Lantsov & Chernov 1987); *near Tareya, 73°15' N 90°44' W (Lantsov & Chernov 1987). MAGADANSKAYA OBLAST, Chukotskiy Peninsula, 24 km SE of Pevek, 69°42' N 170°18' E, 1 ♂, vii.1963, Gorodkov (FB); *Magadan, 59°34' N 150°48' E, 1 ♂, 1 ♀, 20.vi.1963 (Savchenko 1966). TYMENSKAYA OBLAST, Bolshoy Ural, Obdorsk Ural, basin of Sob River, near Salekhard, 66°32' N 66°36' E, 3 ♂♂ (1 on slide), 2 ♀♀, 12-24.vii.1925, Fridolin (ZIN, ZM NNHM NASU); near Salekhard, 1 ♂, 22.vi.1957, Krivosheina (ZIN); Polar Ural, Tobol'sk Gouv. 67° N 65° E, 2 ♂♂, 19, 24.vi.1909, Zaitsev (ZIN, ZM NNHM NASU); *Polar Ural, South Yamal Peninsula, Shchuch'ya River, 66°48' N 68°22' E (Lantsov & Chernov 1987). YAKUTSKAYA REPUBLIC, Chemchan, 55 km N of Bulun, lower Lena River, 71°45' N 127°20' E, 2 ♀♀, 17.vi.1908, Pfitzenmayer (ZIN, ZM NNHM NASU); Tiryakhzakh River valley, right tributary of the Indigirka R., 40 km from Moma River, 70°48' N 148°54' E, 2 ♂♂, 9.vi.1929, Indigirskaya Exped. (ZIN, ZM NNHM NASU); * mouth of Indigirka River, USSR Academy of Sciences (Savchenko 1961); Neelov Gulf, 20 km NW of Tiksi, 71°40' N 128°45' E, small marsh, 5 ♂♂, 2 ♀♀, 29.vi - 9.vii.1957, Gorodkov (ZIN, ZM NNHM NASU); 3-5 km S of Tiksi, 3 ♂♂, 2 ♀♀, 9.vii.1957, Gorodkov (ZM NNHM NASU); Monkholo River System, basin of Olenek R., 73° N 119°55' E, 1 ♂, 1874, Chekanovskii (ZIN).

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