

REVISION OF THE *NEOCNEMODON SIMPLICIPES* SPECIES-GROUP
(DIPTERA: SYRPHIDAE, *NEOCNEMODON* GOFFE, 1944), WITH A
DESCRIPTION OF A NEW SPECIES

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Summary. Four species distributed in East Asia are assigned to the *Neocnemodon simplicipes* species-group. Among them a new species, *N. leleji* sp. n., is described based on a single male from Zabaikalsky Krai. One species is transferred from genus *Heringia* and a new combination *Neocnemodon sinica* (Cheng, 1998), **comb. n.** is proposed. A key to the males of the *Neocnemodon simplicipes* species-group is also given.

Key words: hoverflies, *Neocnemodon*, taxonomy, new species, key, Russia, Eastern Asia.

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Резюме. Четыре вида из Восточной Азии отнесены к группе видов *Neocnemodon simplicipes*. Из Забайкальского края по единственному самцу описывается новый вид *N. leleji* sp. n. Один вид перенесен из рода *Heringia* и предложена новая комбинация: *Neocnemodon sinica* (Cheng, 1998), **comb. n.** Также дана определительная таблица самцов, относящихся к группе видов *Neocnemodon simplicipes*.

INTRODUCTION

The use of molecular markers in combination with critical morphological characters of male genitalia to resolve long-standing problems in the systematics and phylogeny of the tribe Pipizini has supported the independence of the genus *Neocnemodon* Goffe, 1944 as a monophyletic lineage relative to the genus *Heringia* Rondani, 1865 (Vujić *et al.*, 2013).

At present the genus *Neocnemodon* includes species of the tribe Pipizini, which have the following diagnostic characters: frons not produced, katapimeron pilose antero-dorsally, vein *Sc* ending beyond crossvein *r-m*; the angle between veins *M*₁ and *R*₄₊₅ at cell *r*₄₊₅ less than 90°, ventral extremity of the median lobe of the lunule with long pile, postpedicel less than 1.5 times as long as deep. Many authors point to spurs on the mesocoxae and metatrochanters, as well as various modifications of the pro- and mesolegs, as the main diagnostic characters of male *Neocnemodon* distinguishing them from the otherwise similar male *Heringia* (Skevington *et al.*, 2019; Speight, 2020; Vujić *et al.*, 2013). Since the paper

by Claussen *et al.* (1998), few have mentioned the Far Eastern species of *Neocnemodon* in which the males have unmodified legs. Claussen *et al.* (1998) were the first to note the main distinguishing features of male *Neocnemodon* from *Heringia*: male *Neocnemodon* have two segments (basi- and distiphallus) to the aedeagus whereas there is only a single element (phallus) in *Heringia*. Species related to *Neocnemodon simplicipes* (Stackelberg, 1952) where the males are without morphological leg modifications are known only from East Asia. We suggest that representatives of the *simplicipes*-group may be among the Nearctic species currently considered to belong in *Heringia* (Skevington *et al.*, 2019). At least one of these species (*Heringia intensica* Curran, 1921) has previously been assigned to *Neocnemodon* based on molecular marker studies (Vujić *et al.*, 2013).

While studying hoverflies collected by Denis Kochetkov in the Daurian Nature Reserve (Zabaikalsky Krai, Russia), we discovered a single male of an unknown species, closely related to *Neocnemodon simplicipes* and *N. tsherepanovi* Mutin, 1988, prompting us to revise this species group. Since identification of female *Neocnemodon* is a long-standing problem currently without a solution, we limit our review to males only.

MATERIAL AND METHODS

The material for this review, in addition to the male of the new species from Zabaikalsky Krai, included some specimens from an earlier review (Mutin, 1988) as well as some collected later in different places in the Khabarovsky Krai and Primorsky Krai (Russia).

The male genitalia were prepared using traditional technology after 10–12 hours of macerating or short boiling (1–2 minutes) in a 15% KOH solution. The morphological terminology follows Thompson (1999) with later additions (van Steenis *et al.*, 2023). Photographs were taken with an Olympus SZX16 stereomicroscope and an Olympus DP74 digital camera and stacked using Helicon Focus software. The final illustrations were post-processed for contrast and brightness using Adobe® Photoshop® software.

The holotype of the new species is deposited in the Federal Scientific Center of East Asia Terrestrial Biodiversity, Vladivostok, Russia (FCBV). The following abbreviation is used below: IOZ – the Institute of Zoology, the Chinese Academy of Sciences; ZISP – Zoological Institute of the Russian Academy of Sciences.

TAXONOMY

Neocnemodon simplicipes species-group

DIAGNOSIS. *Neocnemodon simplicipes* species-group is characterized by follow combination of features: mesocoxa and metatrochanter without spine. Basitarsus of proleg simple, more or less cylindrical. Mesotibia simple, more or less cylindrical without tubercle or keel. Abdominal sterna without any medial spur-like protuberance. In other species of the genus *Neocnemodon* species mesocoxa and metatrochanter with spine; basitarsus of proleg usually with a hollow, or sometimes with a bulge; mesotibia usually with keel near middle; sterna III or IV sometimes with medial spur-like protuberance.

REMARKS. The modern understanding of the status and species composition of the genus *Neocnemodon* Goffe, 1944 = *Cnemodon* Egger, 1865 (preoccupied by *Cnemodon* Schoenherr, 1823) is essentially shaped by two articles: Claussen *et al.* (1998) and Vujić *et al.* (2013). Following precedent, the authors of the first paper continued to consider *Neocnemodon* as a subgenus of *Heringia*, but demonstrated a fundamental difference between this taxon and the nominotypical subgenus in the structure of the aedeagus (phallus). They noted that

the subgenus includes the Eastern Palaearctic species *Neocnemodon simplicipes* (Stackelberg, 1952) and *N. tsherepanovi* Mutin, 1988. These species represent a well-defined morphological group within the genus. In addition to simple unmodified legs, males in this group have a uniform genital structure. A distinctive structure for this group is the form of the postanal hood (van Steenis *et al.*, 2019), previously called the proctiger (Mutin, 1998). Interspecific differences in the structure of the postanal hood are limited to minor changes in the proportions of its components. The postgonite is clearly split into two apicoventral lobes; the inner lobe is larger with a rounded edge framed with tiny denticles, while the outer lobe is coarsely serrate. In contrast, the postgonite of *Neocnemodon pubescens* (Delucchi & Pschorn-Walcher, 1955) has almost reduced outer lobe with a few finely denticles along its margin; the inner lobe is extended apico-ventrally and framed by exactly the same denticles. The postgonite of *N. brevidens* (Egger, 1865) appears almost flat; its outer lobe reduced to a weakly visible row of small denticles. It should also be noted that there are no outgrowths on the abdominal sternites in members of the *Neocnemodon simplicipes* species-group.

Key to males of the *Neocnemodon simplicipes* species-group

1. Face with pale pile. Wing membrane mainly blackish, pterostigma brown *N. leleji* sp. n.
– Face with black or dark brown pile. Wing membrane hyaline, pterostigma usually yellowish 2
2. Legs with pale pile. Scutellum on top with black pile *N. sinicus* (Cheng, 1998)
– Legs mainly with black pile. Scutellum entirely with pale pile 3
3. Pleura with light yellow pile. Theca of hypandrium longer than its maximal width by 2.8–3.2 times *N. simplicipes* (Stackelberg, 1952)
– Pleura with dark-brown or black pile. Theca of hypandrium longer than its maximal width by 2.1–2.3 times *N. tsherepanovi* Mutin, 1998

An annotated list of the species with description of a new species

Neocnemodon leleji Mutin, sp. n.

<https://zoobank.org/NomenclaturalActs/D2548ED5-37B8-4694-A143-F047CB32E07F>

Figs 1–3

TYPE MATERIAL. Holotype – ♂, **Russia**. Zabaikalsky Krai: Daurian Nature Reserve, Khadanyata locality, 74 km SE Nizhny Tsasuchey vill., 50°29'31"N, 115°09'28"E, 29–30.VII 2025, leg. D.N. Kochetkov [FCBV].

DESCRIPTION. Male. Body length 7.6 mm. Wing length 6.2 mm.

Ratio of head width to facial width as 8 : 3. Face and frons black, slightly shiny, with barely noticeable pruinosity along eyes. Facial pile mainly goldish-yellow, except a few black pile under anterior tentorial pit. Frontal triangle with black pile, except admixture of pale pile before eye contiguity. Median lobe of lunule with strong black pile. Angle of approximation near 90°. Ratio of frontal height to length of eye contiguity as 5:3. Vertex dull black, mainly goldish pilose except a few dark-brown pile on ocellar triangle. Ocellar triangle almost equilateral. Eye covered by black pile. Occiput pruinose, pale pilose. Scapus and pedicel dark brown dorsally and paler ventrally, with black pile. Postpedicel mainly blackish and red-brown baso-ventrally, longer than wider in 1.5 times. Arista black.

Scutum, scutellum, posterior anepisternum and anepimeron with long goldenish pile. Katepisternum dorsally and katepimeron antero-dorsally with short paler pile. Extreme ventral surface of katepimeron with a few pale pile. Calypter dark grey. Plumule whitish. Haltere with brownish-grey capitulum. Wing darkened; pterostigma brown; wing membrane

with microtrichia except basal part of cells *c*, *br*, *bm*, *cua*. Legs without any modifications, mainly black except for yellow of the basal 1/6–1/7 of the pro- and mesotibiae, probasitarsus and two basal segments of mesotarsus, covered in the main with pale yellow pile except black pile on postero-dorsal surface of protibia.

Abdomen entirely black, except yellowish-grey posterior margin of sternum III, covered in the main with pale pile except black pile on posterior corners of tergum IV and all the following visible segments.



Figs 1–3. *Neocnemodon leleji* sp. n., male. 1 – habitus, lateral view; 2 – male genitalia, ventral view; 3 – male genitalia, lateral view. Scale bars: 0.5 mm for fig.1; 0.1 mm for figs 2, 3.

Male genitalia (Figs 2, 3). Surstyli symmetric, uniformly curved and tapering to apex. Postanal hood spade-shaped, concave ventrally, strongly swollen dorso-basally, with transverse dorso-apical keel divided in the middle (Fig. 2). Hypandrium three times longer than wide (lateral view). Postgonite nearly hemispherical, split apico-ventrally into two lobes, the outer smaller and strongly serrate (Fig. 2).

Female is unknown.

DIFFERENTIAL DIAGNOSIS. *Neocnemodon leleji* sp. n. differs from other known species of the *simplicipes*-group by the distinctly darkened wings, black pile on the eyes (in *N. simplicipes*, the pile on the eyes is yellow or sometimes brownish as in *N. tsherepanovi*) as well as the predominantly pale pile on the legs, including the outer-posterior surface of the metatibia (legs of *N. simplicipes* and *N. tsherepanovi* are covered with mainly black pile,

at least metatibia with long black pile antero-dorsally). An additional character of *N. leleji* sp. n. to distinguish it from *N. tsherepanovi* is the longer theca of the hypandrium; the latter has a shorter theca narrowed strongly from the base to the apex, and the ratio of its length to the maximum width at the base is 2 : 1.

HABITAT. A single specimen was collected by sweep netting in the steppe (Fig. 4).

DISTRIBUTION. Russia: Zabaikalsky Krai (Dauria).

ETYMOLOGY. The species is named in honor of the Russian entomologist Arkady Stepanovich Lelej as a token of my great gratitude for his many years of friendly support of my entomological research.



Fig. 4. The steppe with *Ulmus pumila*, the Khadanyata locality of the Daurian Nature Reserve (photos of D. Kochetkov).

***Neocnemodon simplicipes* (Stackelberg, 1952)**

Neocnemodon simplicipes Stackelberg, 1952: 353 (holotype – ♂, Primorsky Krai: Anuchinskii district, Vinogradovka Village, 16.VII 1929, leg. Djakonov, Filipjev [ZISP]; examined). Original description was based on single male.

Heringia (*Neocnemodon*) *simplicipes*: Mutin & Barkalov, 1999: 498, Fig. 313; Ohara *et al.*, 2014: 489.

Neocnemodon simplicipes: Peck, 1988: 85.

MATERIAL EXAMINED. **Russia.** Primorsky Krai: 18 km SW Krounovka Village, 29.VII 1990, 1 ♂, leg. Lelej, [FCBV]; 30 km N Terney Township, 14.VIII 1982, 1 ♂, leg. Mutin [FCBV]; Khabarovsk Krai: Komsomolskii Nature Reserve, Kamenka Cordon, 20.VII–3.VIII 2018, 1 ♂, leg. Kuberskaya [FCBV]; Lower Amurland, Komsomolskii Nature Reserve, the mouth of Gorin River, 4.VI 1986, 2 ♂, leg. Mutin [FCBV].

DISTRIBUTION. Russia (Primorsky Krai, Khabarovsk Krai), Japan (Hokkaido).

***Neocnemodon sinicus* (Cheng, 1998), comb. n.**

Heringia sinica Cheng, 1998: 420, 425 (holotype – ♂, China: Jilin Province, Changbaishan, 42°N, 128.1° E, h=850 m, 21.VII 1996 [IOZ]). Original description was based on 14 males and 5 females.

MATERIAL. None examined.

DISTRIBUTION. China (Jilin Prov.).

REMARKS. Based on the description of *Heringia sinica* and primarily the figure of its male genitalia (Cheng *et al.*, 1998), we can be sure that it belongs to the *Neocnemodon simplicipes* species-group.

DIFFERENTIAL DIAGNOSIS. The morphological features of the male given in the original description indicate a significant similarity of *Neocnemodon sinicus* to *N. simplicipes* and *N. tsherepanovi*; all three species have undarkened wings and black pile on the face, but the former differs from the other two by pale pile on the legs and the presence of black pile on the apex of the scutellum.

The similarity between *N. sinicus* and *N. leleji* sp. n. is expressed in the pale pile of the legs, the latter distinguished by yellow pubescence of the face, darkened wings and the completely pale pile of the scutellum.

A more precise diagnosis of *N. sinicus* can be made after studying the type series or additional materials from the type locality, to confirm the status of this species accordingly.

***Neocnemodon tsherepanovi* Mutin, 1998**

Neocnemodon tsherepanovi Mutin, 1998: 130 (holotype – ♂, Primorsky Krai: 30 m N Terney Township, 13.VIII 1982, leg. Mutin [ZISP]; examined). Original description was based on five males, including the holotype.

Heringia (*Heringia*) *tsherepanovi*: Takeuchi *et al.*, 2016: 47, Fig. 8 (♂).

Heringia (*Neocnemodon*) *tsherepanovi*: Mutin & Barkalov, 1999: 500, Fig. 313.

MATERIAL EXAMINED. **Russia.** Primorsky Krai: 30 m N Terney Township, 13.VIII 1982, 1 ♂ (paratype), leg. Mutin [FCBV]; Khabarovsk Krai: Komsomolskii Nature Reserve, Kamenka Cordon, 2.VII 2020, 1 ♂, leg. Mutin [FCBV]; Anyui River, Anyuyskii National Park, Kon Cordon, 12–14.VII 2024, 1 ♂, leg. Mutin [FCBV].

DISTRIBUTION. Russia (Primorsky Krai, Khabarovsk Krai), Japan (Honshu).

REMARKS. Two male paratypes of *N. tsherepanovi* with labels “Lower Amurland mouth of Gorin River, 4.VI 1986 (Mutin)” are actually specimens of *N. simplicipes*.

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