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First record of *Anaphothrips dentatus* Cui, Xi et Wang, 2017 (Thysanoptera: Thripidae) from Russia

Первая находка трипса *Anaphothrips dentatus* Cui, Xi et Wang, 2017 (Thysanoptera: Thripidae) на территории России

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KEY WORDS**:** thrips, fauna, *Carex*, *Anaphothrips dentatus,* identification key
КЛЮЧЕВЫЕ СЛОВА: трипсы, фауна, *Carex*, *Anaphothrips dentatus*, ключ.

ABSTRACT. *Anaphothrips dentatus* Cui, Xi et Wang, 2017 is for the first time recorded from Russia. It is occurs widespread on *Carex* in Siberia. A description is given with notes on variation in colouration and metanotal structure. An identification key to Russian *Anaphothrips* species is given.

РЕЗЮМЕ. *Anaphothrips dentatus* Cui, Xi et Wang, 2017 впервые обнаружен в фауне России. Вид широко распространен в Сибири на осоке. Описание вида дано с примечаниями об изменчивости окраски и структуры метанотума. Приведен определитель российских видов *Anaphothrips*.

Introduction

Of the genus *Anaphothrips* 86 species are described in the world fauna [ThripsWiki, 2022]. Five species of this genus are known in Russia: *Anaphothrips badius* (Williams, 1913), *A. euphorbiae* Uzel, 1895, *A. gracillimus* Priesner, 1923, *A. obscurus* (Müller, 1776), [Meshcheryakov, 1986; Schliephake, 1977; Vierbergen, 2022] and *A. ponokikirmui* Kudo, 1989 [Evdokarova, Vierbergen, 2021]. From the fauna of Yakutia are known *A. badius*, *A. obscurus, A. ponokikirmui* [Bagachanova, 2001; Evdokarova, 2011; Evdokarova, Vierbergen, 2021]. Recently, comprehensive investigations in the province resulted in at least new *Anaphothrips* species of this region, which was found in C, W, NE, N Yakutia and W Siberia is *Anaphothrips dentatus* Cui, Xi et Wang, 2017.

Material and methods

Thrips were collected in Yakutia, Novosibirsk region (Western Siberia). Specimens were macerated with KOH and enclosed in Canada Balsam. All measurements and descriptions were made with an Olympus BX51 microscope at 40x, 100x, 200x, 400x and 1000x magnification, with phase contrast option. All measurements are in micrometers (μm). Photos were taken with a Leica DFC450 C camera and Imagic IMS Client software.

Order THYSANOPTERA
Suborder TEREBRANTIA
Family THRIPIDAE
genus *Anaphothrips* Uzel, 1895

Anaphothrips dentatus Cui, Xi et Wang, 2017
Figs 1–14.

MATERIAL. Russia: Eastern Siberia: *Central Yakutia*, Yakutsk, Botanical Garden IBPC SB RAS, 62°01′21,15″N, 129°36′53,33″E *Càrex juncella* 27.07.2016 3♀ 3♂, 12.08.2016 4♀, 27.07.2016 2♀2♂, 19.07.2017 1♀ leg. Evdokarova T.G.; same, 24.08.2018 1♀ leg. Burnasheva A.P.; same, green meadow 62°01′18,22″N, 129°44′47,15″E, Cyperaceae 17.06.2014 1♀ leg. Nogovitsyna S.N.; *North-East Yakutia*, 1.5 km from the Khara-Khaya hill, Old Khandyga–Magadan road 63°11′57″N, 144°01′03″E, Poaceae 18.07.2011 leg. Evdokarova T.G. 1♀; Cherskii ridge, Ebe stow, 13 km up the Inyali confluence, left bank of Indigirka riv. 65°23′N, 142° 54′E Cyperaceae 16.07.2012 leg. Nogovitsyna S.N. 1♀; *West Yakutia*, Kysyl-Syr, right bank of Vilyui r. 07.07.2021 leg. Sivtseva L.V. 2♀; *North Yakutia*, coast East-Sibirian sea, mouth of Enumchuveem river, tundra, *Eriophorum* and *Carex* 08.08.2021 leg. Burnasheva A.P. 2♀. Western Siberia: *Novosibirsk region*, Yurmanka, slope of the mountain Glukharinaya, grassy vegetation (Cyperaceae and Poaceae), 06.08.2017 leg. Burnasheva A.P. 1♀.

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Deposition material. From the sample from the Botanical Garden of Yakutsk (coll. date 27.07.2016; 19.07.2017) 3♀ and 2♂ are preserved in the collection of the Netherlands Institute for Vectors, Invasive plants and Plant health at Wageningen. All other material is added to the collection of IBPC SB RAS — 16♀, 3♂.

DISTRIBUTION. NE China: Heilongjiang province; Russia: E Siberia: C, W, N-E, N Yakutia, W Siberia**:** Novosibirsk region (Fig. 1).

Fig. 1. World distribution of *Anaphothrips dentatus*.
Рис 1. Распространение *Anaphothrips dentatus*.

DESCIPTION. **Female** (micropterous). Body length 1.4–1.5 mm. Head length 90, width 107; antenna length 237.

Body brown, legs brown, with distal half of tibia and tarsi yellow (Fig. 2) or legs almost completely yellow; antennae 9-segmented, I light brown or brown, II and VI–IX brown III and IV light brown; V brown, with extreme base yellow (Figs 3–4), segment VI with an incomplete oblique suture; segments III–IV with small forked sensorium and rows of microtrichia.

Head slightly wider than long; ocelli reduced or absent, three pairs of ocellar setae; dorsal surface with transverse reticulations (Fig. 5).

Pronotum smooth, without long setae (Fig. 5). Mesonotum with transverse reticulations, and a pair of campaniform sensilla close to anterior margin. Metanotum with polygonal reticulations, a pair of anterosubmarginal setae and, a pair of median setae variously located in a region one third to two thirds separated from the anterior margin, a pair of campaniform sensilla in the posterior third (Figs 6–9), metascutellum partly separated from the metascutum (Figs 6–7) or metascutellum completely fused, and often indistinguishable (Figs 8–9); mesofurca with spinula, metafurca without spinula. Fore wings reduced to small scales (Figs 5–8) (see note below), axillary sclerites present.

Abdominal tergites II–VIII with sculpture laterally, with a pair of median setae and two pairs of campaniform sensilla; tergite VIII posteromarginally with a complete craspedum formed of small teeth shaped pointed lobes, which little increase in size to both sides (Fig. 10); tergite IX with a pair of mid-dorsal setae and two pairs of campaniform sensilla, with S1 and S2 located to posterior margin and slightly longer than tergite X; tergite X with a pair of campaniform sensilla and two pair of long setae close to posterior margin. Sternites II–VII reticulated laterally, without discal setae.

Male (micropterous): body yellow length 0.9–1.1 mm, antennal segment I–V completely yellow, except V, which has apical fourth brown, VI–IX completely brown; sternites III–VI with C-shaped pore plate, on VII boomerang or oval shaped (Figs 11–12); tergite VIII with craspedial lobes sometimes medially absent; tergite IX with two pairs of stout median setae (Fig. 13).

NOTE. In Cui et al. [2017] both sexes of *Anaphothrips dentatus* are described to be apterous, but in fact both sexes are micropterous; in figure 7 of their publication wing pads with axillary sclerites are visible.

KEY TO RUSSIAN SPECIES OF *ANAPHOTHRIPS*

1 Antennae 8-segmented 2
— Antennae 9-segmented, segment VI with transverse or oblique transverse suture 3
2 Both sexes macropterous, with body predominantly dark brown; abdominal tergite VIII posteriomarginal comb weakly developed laterally ..... *A. euphorbiae*
— Female macropterous or micropterous, male micropterous; both sexes completely yellow, but macropterous female usually yellow with a brown spot pattern; abdominal tergite VIII posteromarginal comb complete ..... *A. gracillimus*
3 Female body yellow or predominantly yellow; abdominal tergite VIII posteromarginally without dentate craspedium; other character states various 4
— Female body brown; antennal segment VI with a transverse suture; abdominal tergite VIII posteriomarginally with comb of long microtrichia or with dentate craspedium 5
4 Body completely yellow or with brown markings on pronotum, laterally on meso- and metanotum and medially on tergite II–VII; antennal segment VI with an oblique suture; metascutum with a pair of campaniform sensillae; abdominal tergite VIII posteromarginally with comb of long microtrichia; micropterous and macropterous. ..... *A. obscurus*
— Body completely yellow without brown spots; antennal segment VI with a transverse suture; metascutum without campaniform sensillae; abdominal tergites II–VII with lateral serrations at posterior margin; male on sternite III–VII with small round to oval pores. ..... *A. ponokikirmui*
5 Both sexes macropterous with metascutum and -scutellum well separated; body brown; abdominal tergite VIII posterior margin with comb of long microtrichia, male sternites III–VII with small circular pore plates. ..... *A. badius*
— Both sexes micropterous, tending to be apterous by completely or partially fused metascutum and -scutellum; female body brown and male body yellow; abdominal tergite VIII posterior margin with dentate craspedium; male sternites III–VII with C-shaped pore plates. ..... *A. dentatus*

Molecular identification

Sanger sequencing was used on two specimens of the Yakutsk, Botanical Garden location with LCO1490 and HCO2189 primers [Folmer et al., 1994] to obtain the cox1 barcode region. Both analyzed specimens gave an identical nucleotide sequence. The nucleotide BLAST in NCBI resulted in 99.63%–99.81% similarity to three COI sequence references in GenBank. Results of this analysis (nr 282749, LIMS nr. 5682012 based on 1 male and 1 female) did not give any indication of species

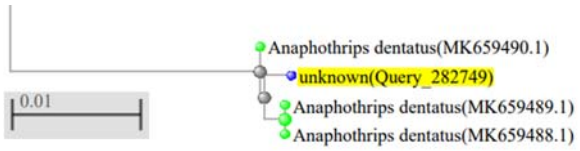
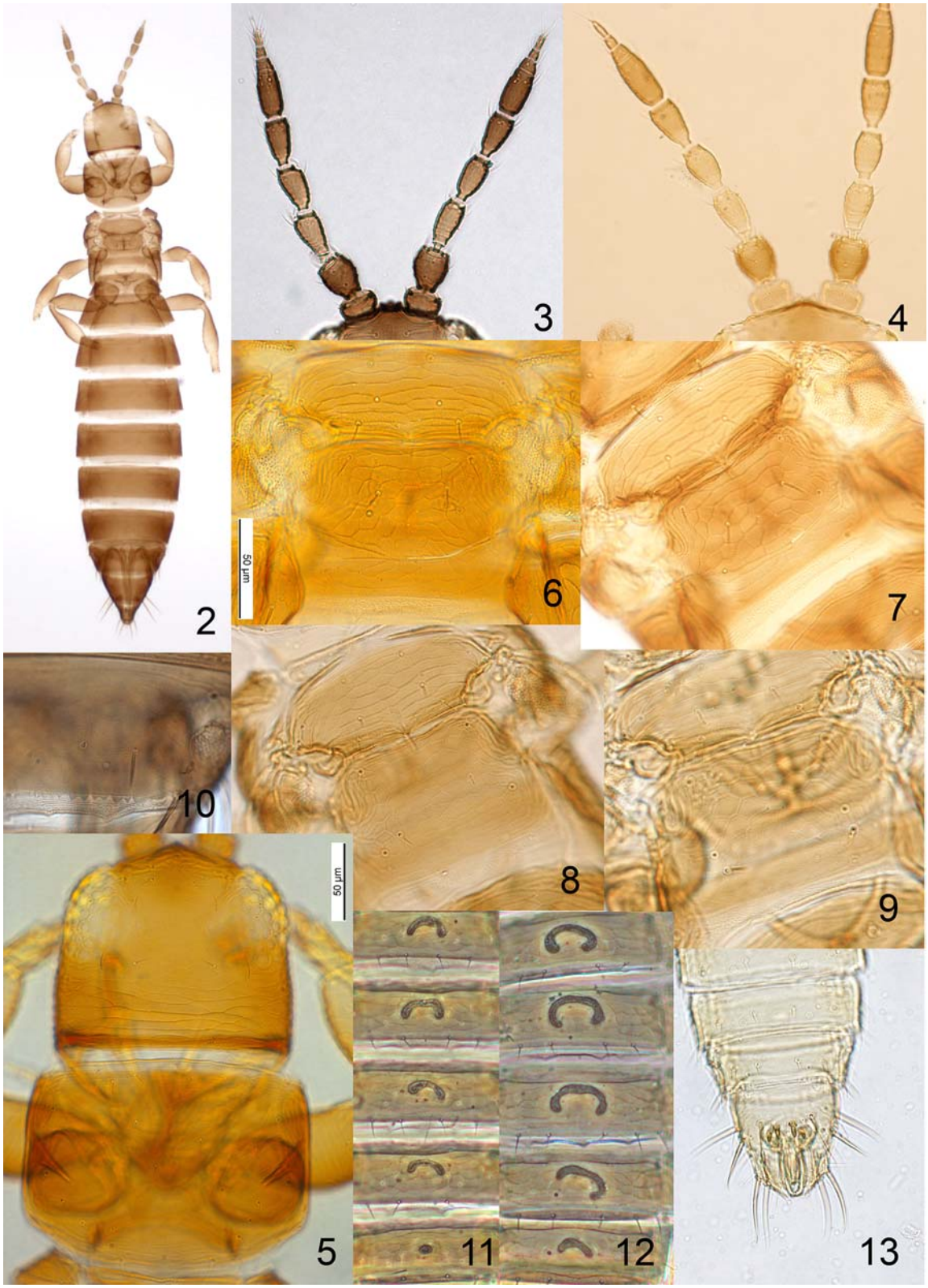


Fig. 14. Fast Minimum Evolution tree of NCBI COI sequence results of a male and female of the Yakutsk Botanical Garden.

Рис. 14. Дендрограмма результатов секвенирования NCBI COI самца и самки из Якутского ботанического сада



Figs 2–14. *Anaphothrips dentatus*: 2–10 — female; 11–13 — male; 2 — body; 3–4 — antenna, dark and light segment I; 5 — head and pronotum; 6–9 — meso- and metanotum, showing variation in metanota; 10 — tergite VIII, right half; 11–12 — sternit III–VII, variation in pore plate shape; 13 — tergite VII–X.

Рис. 2–13. *Anaphothrips dentatus*: 2–10 — самка; 11–13 — самец. 2 — внешний вид; 3–4 — усики, темный и светлый I членик; 5 — голова и пронотум; 6–9 — мезо- и метанотум, изменчивость метаноты; 10 — VIII тергит, правая половина; 11–12 — III–VII стерниты, изменчивость формы поровой пластины; 13 — VII–X тергиты.

separation between Chinese and Russian specimens for the COI gene fragment (Fig. 14).

Comments

Anaphothrips species with nine antennal segments have the abdominal tergite VIII posterior margin simple, with neither craspedum nor comb of microtrichia ór they can have tergite VIII usually with comb of microtrichia, at least laterally, but sometimes weakly craspedate or with small teeth or lobes [Mound, Masumoto, 2009]. *A. dentatus* belongs to the small group having small tooth shaped lobes together with *A. moundi* Pitkin, 1978 and *A. woodi* Pitkin, 1978, both occurring in Australia. They can be distinguished from *A. dentatus* by the sensorium on antennal segment III simple, wing pads absent, in the female body yellow and in the male abdominal sternites with differently shaped pore plates.

Unless the morphological variation in the metanotum of Siberian females (Figs 6–9) and the use of non-type specimens for reference COI sequence analysis [Wang J., in litt., 2020] it can be concluded the high similarity does not separate the Chinese and Siberian specimens at species level. The metanotal variation in *A. dentatus*, primarily observed as fusion of the metascutum with the metascutellum is a part of an adaptation of a micropterous to an apterous form. As a result of the process of the transition this fusion can be observed in other Thripinae species as well (in e.g. *Frankliniella fusca* (Hind), *Iridothrips iridis* (Watson), *Pezothrips pelikani* Masumoto et Okajima). This adaptation is regarded to be induced by gene expression, and it does subsequently not have any taxonomic value [Mound, in litt. 2021].

The description of the micropterous female from Heilongjiang Province in North-East China by Cui et al. [2017] shows a stable species with its metascutellum not separated, but distinguishable by lines of sculpture and a small oval scutellum. It differs from some females from Siberia in the position of metascutum campaniform sensillae, which are in the Chinese specimens in the anterior half, while in all Siberian specimens these sensillae are found in the posterior half of the disc; additionally Chinese specimens have antennal segment I and legs yellow, while some Siberian females have antennal segment I as brown as segment II and legs brown, with proximal half of tibia and tarsi brown. Additionally both sexes of the Siberian specimens have a variable position of metanotal medial setae and in several specimens and sometimes partly separation of the metascutellum from the metascutum can be observed. This variation is a modification to an apterous form, in which many Thripinae species show a reduced metanotum lacking e.g. a scutellum and an anteromarginally large notch [Mound et al., 2005]. Interestingly, the metanotal variation in a Siberian *Anaphothrips* as a result of premature modification is found in a very small number of Thripinae species. To understand the adaptation of metanotal variability and the process of loss of flight, more facets of this thoracial modification are worth to be studied within the order Thysanoptera.

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