

REICHENBACHIA

Staatliches Museum für Tierkunde Dresden

Band 33

Ausgegeben: 22. März 1999

Nr. 1

On three species of the planthopper genera *Cixius* and *Trirhacus* in the eastern Palaearctic Region (Hemiptera: Auchenorrhyncha: Fulgoromorpha: Cixiidae)

With 30 Figures

WERNER E. HOLZINGER

Abstract. Supplementary descriptions of the three eastern Palaearctic „*Trirhacus*“ species are given. Two species are re-assigned to *Cixius*: *C. nawae* MATS. (comb. resurrect.) and *C. towadensis* MATS. (comb. resurrect.). The systematic position of *Trirhacus iguchii* MATS. must be evaluated by studying male specimens. *Cixius cingulatus* MATS. is a synonym of *C. towadensis* MATS.

Introduction

The genus *Trirhacus* was established by FIEBER (1875: 354; type species *T. setulosus* FIEBER, 1876). Up to now 10 European and 3 northeast Palaearctic species have been placed in *Trirhacus* (NAST 1972, 1982). The definition of the genus itself is mainly based upon classificatoric characters: the shape of the hind wings (reduction of apical part without loosing the flight capacity; see WAGNER 1948, fig. 54) and the shape of the external female genitalia apparatus (NAST 1965; WAGNER 1939, 1959).

As part of a comprehensive analysis of this genus, the east Palaearctic species currently placed in *Trirhacus* were examined: *Trirhacus iguchii* MATSUMURA, 1914 and additional two taxa, which were described by MATSUMURA (1914) as *Cixius* species and transferred to *Trirhacus* by VILBASTE (1968): *Trirhacus towadensis* and *T. nawae*.

Cixius towadensis MATSUMURA

Cixius towadensis MATSUMURA, 1914: Annot. Zool. Japonenses 8: 402.

Cixius cingulatus MATSUMURA, 1914 **syn. n.**

Trirhacus nawae sensu VILBASTE (1968) nec MATSUMURA, 1914.

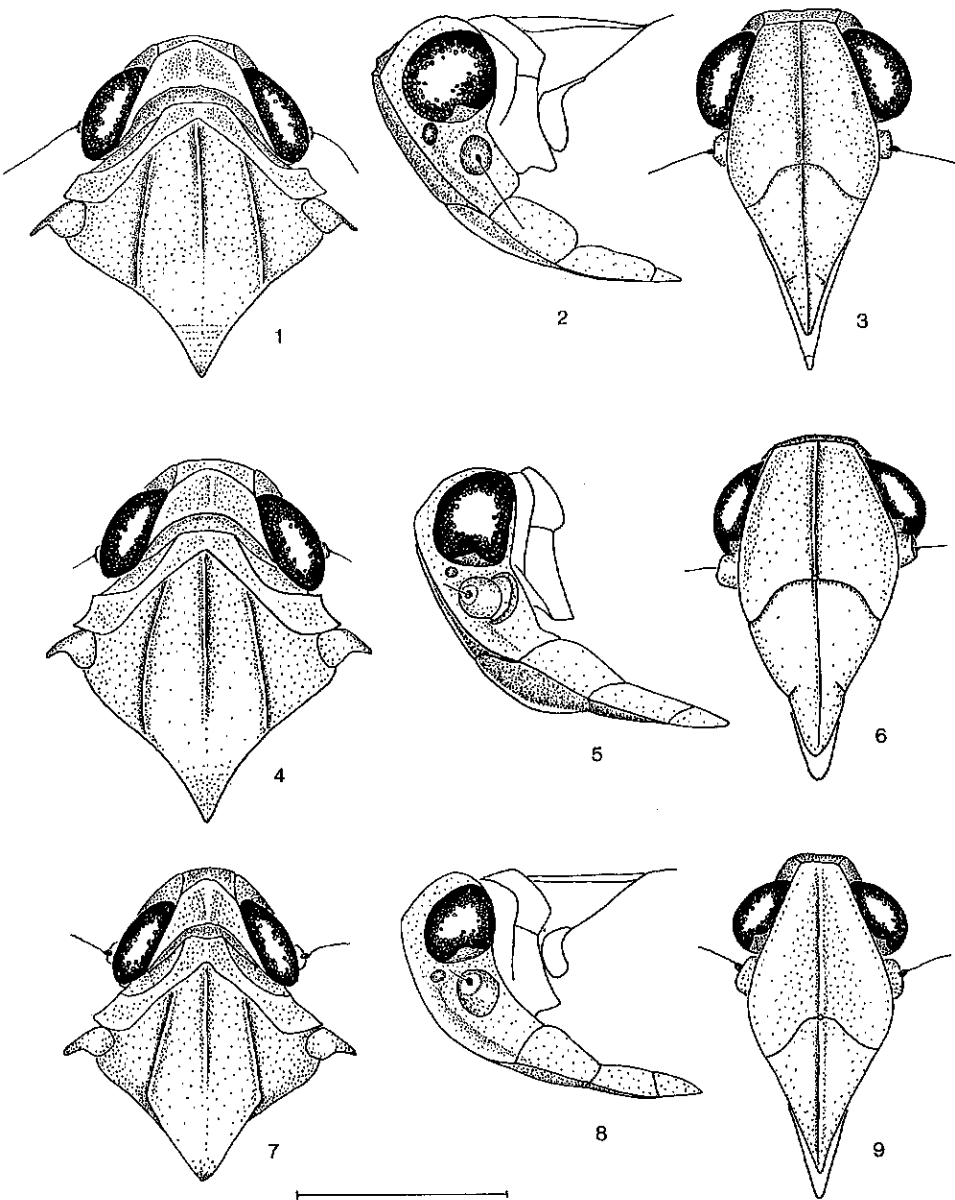
Trirhacus nawae sensu ANUFRIEV & EMELJANOV (1988) nec MATSUMURA, 1914.

Supplementary description (see also VILBASTE 1968, ANUFRIEV & EMELJANOV 1988). Overall length ♂ 5,6–5,7 mm; ♀ 5,9–6,1 mm; length of tegmen ♂ 4,7–5,0 mm; ♀ 5,0–5,2 mm.

Coloration: Males more or less uniform straw-coloured. Tegmen translucent, straw-coloured, granulae slightly darker. Females darker, mesonotum brownish, tegmen also darker, distinctly fumated in apical part.

Address of the author:

Dr. Werner E. Holzinger, Ökoteam – Institut für Faunistik und Tierökologie,
Bergmannsgasse 22, A-8010 Graz (Austria). E-mail: oekoteam@sime.com



Figs. 1-9: Head and thorax in dorsal, head in lateral and ventral aspect: 1-3 - *Cixius towadensis* MATSUMURA, male, lectotype; 4-6 - *Cixius nawae* MATSUMURA, male, holotype; 7-9 - *Trirhacus iguchii* MATSUMURA, female, holotype. Scale bar: 1 mm.

Head and fore body (Figs. 1-3, 10): Frons and clypeus distinctly tricarinate; clypeus slightly inflated. Mesonotum with three moderately produced carinae, the median one disappearing caudad.

Wings (Figs. 10, 13): Tegmen with small setose granulae on the veins and even on its distal margin

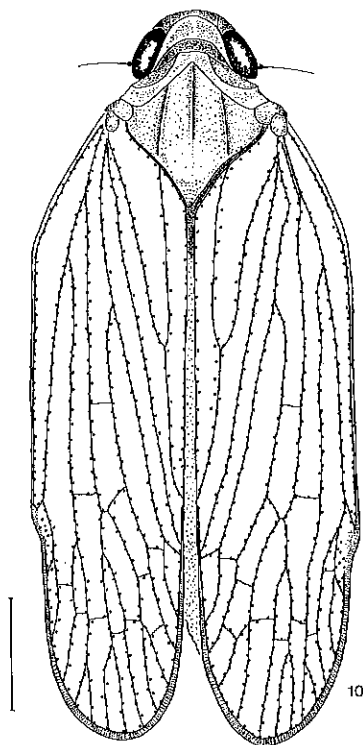


Fig. 10: *Cixius towadensis* MATSUMURA, habitus female (Russia: Maritime terr., Ussuri distr.). Scale bar: 1 mm.

right side and a massive ventral bifurcate projection directed basad. Apical part of the theca with two long, curved and pointed movable spines on the right side and a small process at the left side. Distal part of aedeagus bent rectangularly, without a conspicuous velum and without spines.

Female genitalia (Figs. 23–24): Anal and genital segment brownish in type specimen of *Cixius cingulatus*, anal segment and outer dorsal margin of genital segment black (remaining parts brownish) in the specimen from Russia. Ovipositor slender, slightly surpassing the end of the anal segment.

Distribution. Japan (Honshu [Hakone: type locality]; Hachijo Island; MATSUMURA 1914); Russia: Maritime Territory (VILBASTE 1968, ANUFRIEV & EMELJANOV 1988; sub *Trirhacus nawae*).

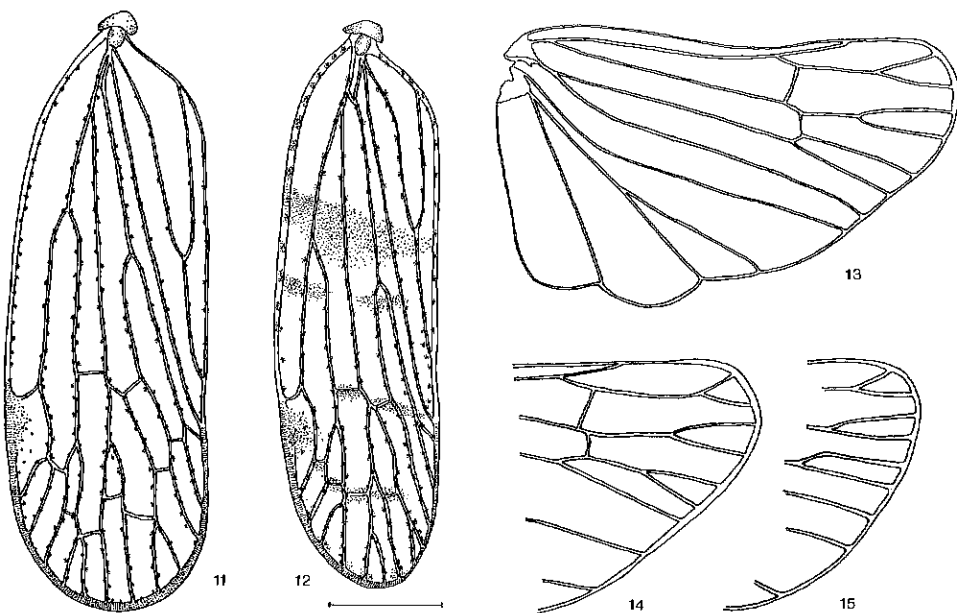
Biology. Months of collecting: July – August. Habitat and host plant(s) unknown.

Material examined. Lectotype male, designated by LIANG & SUWA (1998), labelled (translation after LIANG & SUWA 1998): / Hakone 7/27 / . Deposited in Hokkaido University, Faculty of Agriculture (= HU).

Holotype female of *Cixius cingulatus*, labelled / VIII 1905 Hachijo / *C. cingulatus* MATS. (HU). (Note: This specimen is a female, not dissected. On the same pin a genital vial is fixed, including a genital segment, parameres and an anal segment of a *Cixius towadensis* specimen).

2 ♂♂, 1 ♀ ex coll. EMELJANOV: Russia, Maritime Territory, Ussuri District, 20 km SW Krounovka, BELOKOSYZSKY leg.

Taxonomy (see also *Cixius nawae* below). The species drawn by VILBASTE (1968) and subsequently ANUFRIEV & EMELJANOV (1988) as *Trirhacus nawae* is in fact *Cixius towadensis*. *Cixius cingulatus* was synonymized with *T. nawae* by VILBASTE (1968). Examining the type specimen of *C. cingulatus*, it is very probable that this species is conspecific with *Cixius towadensis* (= *T. nawae* sensu VILBASTE).



Figs. 11–12: Left tegmen: 11 – *Cixius nawae* MATSUMURA, male, holotype; 12 – *Trirhacus iguchii* MATSUMURA, female, holotype. – Figs. 13–15: right hind wing: 13 – *Cixius towadensis* MATSUMURA, male (Russia: Maritime terr., Ussuri distr.); 14 – *Cixius nawae* MATSUMURA, male, holotype; 15 – *Trirhacus iguchii* MATSUMURA, female, holotype. Scale bar: 1 mm.

Cixius nawae MATSUMURA

Cixius nawae MATSUMURA, 1914: Annot. Zool. Japonenses 8: 402.

Supplementary description. Overall length ♂ 5,8 mm; length of tegmen ♂ 5,0 mm.

Habitus, coloration (Figs. 4–6, 11, 14): General appearance similar to *C. towadensis*, but (the only available male specimen) slightly taller and coloration distinctly darker. Head and pronotum yellow-brownish, mesonotum brownish, like in females of *C. towadensis*. Vertex slightly smaller than in *C. towadensis*. Clypeus strongly inflated, distinctly visible from (ventro-)lateral view.

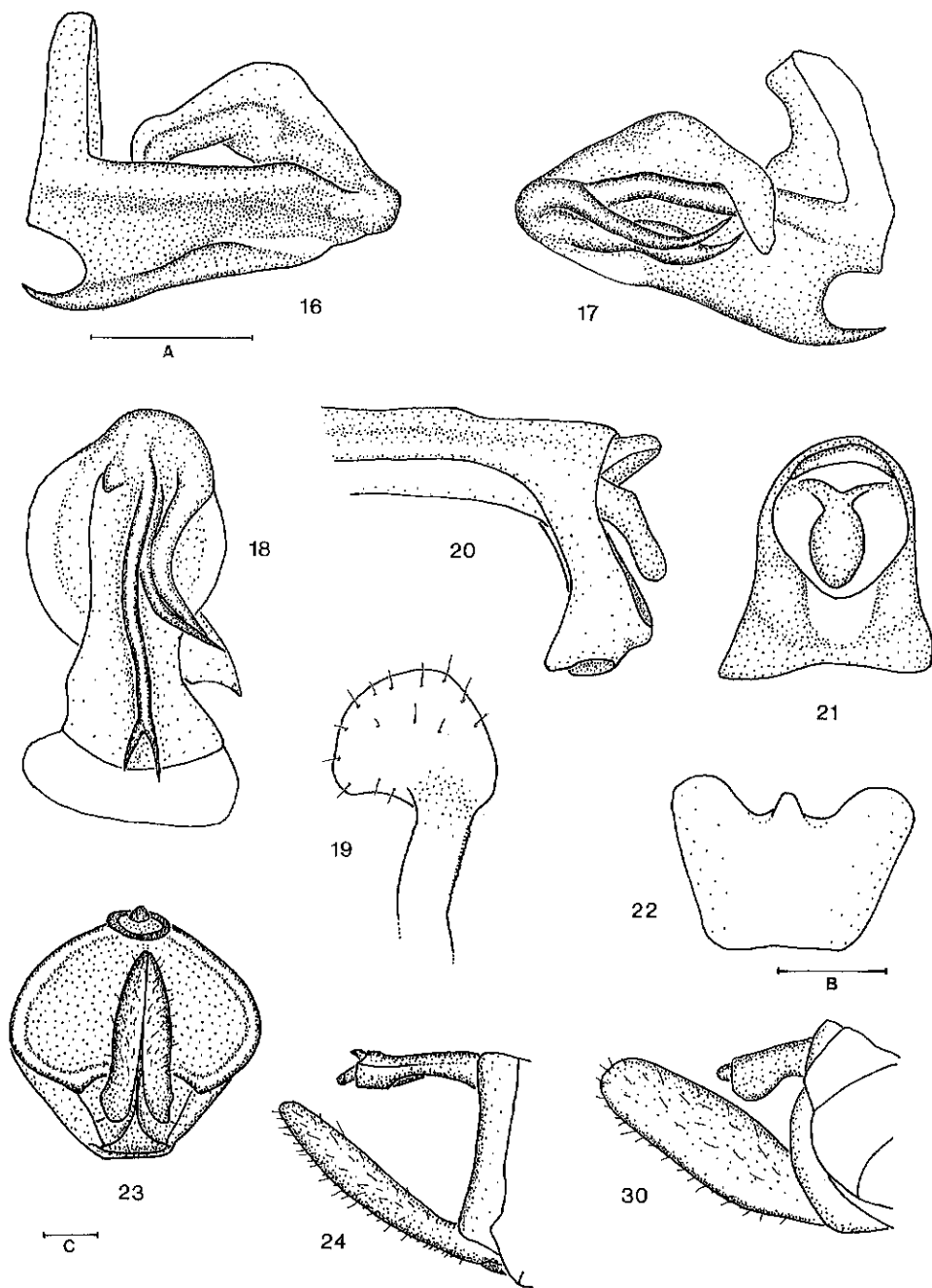
Male genitalia (Figs. 25–29): Anal segment slightly asymmetrical, distal portion slightly bent ventrad, lateral angles rounded. Medioventral process of genital segment distinctly larger than in *C. towadensis*, tongue-shaped in ventral view. Parameres symmetrical. Basal part of aedeagus (theca) with longitudinal ridges on the right and on the left side and a massive ventral bifurcate projection directed basad. In contrast to *C. towadensis* the two spines do not insert at the most distal point of the projection. Apical part of the theca with two movable spines arranged as in many *Cixius* (*Ceratocixius*) species: one long, semicircular spine at the right side and one slightly bent, short and stout spine on the left side. Distal part of aedeagus bent rectangularly, without a conspicuous velum at its apical part.

Distribution. Japan (Honshu, Ibuki Mountain [type locality]).

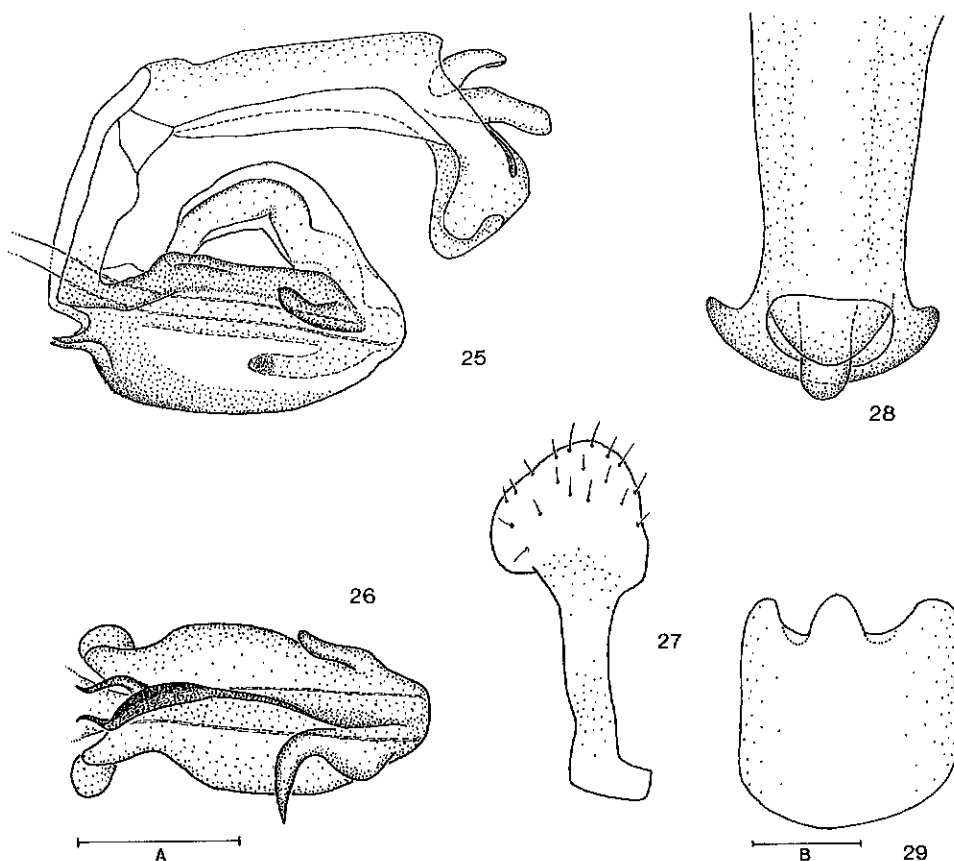
Biology. Unknown.

Material examined. Holotype male, labelled: / Ibuki 6/1 Nawa / 220 / *Cixius nawae* n. sp. (HU).

Female (holotype, *Cixius towadensis*). The diagnostic characters of *Trirhacus* given by MATSUMURA



Figs. 16-22: *Cixius towadensis* MATSUMURA, male genitalia, holotype: 16 - aedeagus, left lateral aspect; 17 - same, right lateral aspect; 18 - same, ventral aspect; 19 - left paramere, maximum view; 20 - anal segment, left lateral aspect; 21 - same, caudal aspect; 22 - genital segment, ventral aspect. - Figs. 23-24: *Cixius towadensis* MATSUMURA, female genitalia (Russia: Maritime terr., Ussuri distr.). 23 - lateral aspect, 24 - caudal aspect. - Fig. 30: *Trirhacus iguchii* MATSUMURA, female genitalia, holotype, lateral aspect. Scale bars: 0,25 mm; A in Figs. 16-21; B in Figs. 22, 30; C in Figs. 23, 24.



Figs. 25–29: *Cixius nawae* MATSUMURA, male genitalia, holotype: 25 – aedeagus and anal segment, left lateral aspect; 26 – aedeagus, ventral aspect; 27 – left paramere, maximum view; 28 – anal segment, dorsal aspect; 29 – genital segment, ventral aspect. Scale bars: 0,25 mm; A in Figs. 25–28; B in Fig. 29.

Cixius towadensis and *C. nawae* do not show these characters. On the contrary, these species are in general appearance, in the characters of wings and male genitalia very similar to several other Palaearctic and Oriental *Cixius* species (e.g. *Cixius acutus* TSAUR & HSU, *C. curvus* TSAUR & HSU, *C. capillatus* TSAUR & HSU from Taiwan; see TSAUR, HSU & VAN STALLE 1991). Therefore these three species should not be assigned to *Trirhacus*, but should be treated as *Cixius* species until a comprehensive phylogenetic analysis of the whole *Cixius-Trirhacus-Tachycixius* ... – group has been done.

Note. The same comments also apply to the Taiwanese taxon *Cixius nitobei* MATSUMURA, 1914. The assignment to *Trirhacus* by VILBASTE (1968) was properly not accepted by TSAUR, HSU & VAN STALLE (1991) in their redescription of this species.

Trirhacus iguchii MATSUMURA

Trirhacus iguchii MATSUMURA, 1914: Annot. Zool. Japonenses 8: 407.

Supplementary description. Overall length ♀ 5,5 mm; length of tegmen ♀ 4,55 mm. Coloration: Yellow-brownish, lighter than *C. nawae*, but darker than *C. towadensis*.

Head and fore body (Figs. 7–9): Vertex distinctly smaller than in *C. nawae* and *C. towadensis*, lateral carinae of frons strongly produced, therefore median carina of frons not visible in lateral aspect. Clypeus slightly inflated.

Wings (Figs. 12, 15): Tegmen hyaline with distinct dark markings as described by MATSUMURA (1914) and shown in Fig. 12. Setose granulæ half as much as in *Cixius towadensis*, of same size, but appearing larger due to the dark pigmentation of the adjacent area. Apical part of hind wing obviously slightly reduced, but without an incision at the insertion of the cubital vein.

Female genitalia (Fig. 30): Very small, ovipositor straight and stout, distinctly surpassing the anal segment.

Males, male genitalia: Unknown.

Distribution. Japan: Kyushu, Nagano [type locality].

Biology. Month of collecting: October (?); habitat and host plant(s) unknown.

Material examined. Holotype female, labelled: / Japan MATSUMURA [underside] Nagano 42.10.12 / *Trirhacus iguchii* n. sp. / Type Matsumura (various parts damaged, hind tarsi missing) (HU).

Taxonomy. The diagnostic characters of *Trirhacus* (see *C. nawae*) might fit to this species, but also a closer relationship to e. g. *Tachycixius* is possible. Male specimens are necessary to carry out further studies on this species.

Acknowledgements

I want to express my sincere thanks to Prof. Dr. REINHARD REMANE, Marburg, for introducing me to Auchenorrhyncha taxonomy and beyond for his information and help.

I also thank Dr. A. F. EMELJANOV, St. Petersburg, for help in translation and for some specimen of his collection, and Dr. M. R. WILSON, Cardiff, for helpful comments on the manuscript.

References

- ANUFRIEV, G.A. & A.F. EMELJANOV (1988): 1. Podotrijad Cicadinea (Auchenorrhyncha) - Zikado-vye. - In: Opredelitel Nasekomych Dal'nego Vostoka SSSR I. II.: 12–495.
- FIEBER, F.X. (1875): Les Cicadines d'Europe d'après originaux et les publications les plus récentes, première partie. - Rev. mag. Zoologie, 1875: 288–416.
- LIANG, A.-P. & M. SUWA (1998): Type specimens of MATSUMURA's species of Fulgoroidea (excluding Delphacidae) in the Hokkaido University Insect Collection, Japan (Hemiptera: Fulgoro-morpha). - Insecta Matsumurana, N. S. 54: 133–166.
- MATSUMURA, S. (1914): Die Cixiinen Japans. - Annot. Zool. Japonensis 8: 393–434.
- NAST, J. (1965): On the genus *Trirhacus* FIEB. (Homoptera, Cixiidae). - Festgabe für Wilhelm Wagner zum 70. Geburtstag, Zool. Beitr. N. F. 11 (1–2): 183–189.
- NAST, J. (1972): Palaeartic Auchenorrhyncha (Homoptera) - an annotated Check List. - Polish Scientific Publishers, Warszawa, 551 pp.
- NAST, J. (1982): Palaeartic Auchenorrhyncha (Homoptera) Part 3. New taxa and replacement names introduced till 1980. - Ann. Zool., Warszawa 36 (17): 1–74.
- TSAUR, S.-C., T.-C. HSU & J. VAN STALLE (1991): Cixiidae of Taiwan, Part VI. *Cixius*. - J. Taiwan Mus. 44 (2): 169–306.
- VILBASTE, J. (1968): Über die Zikadenfauna des Primorje Gebietes (russ.). - Tallinn, 179 pp.
- WAGNER, W. (1939): Die Zikaden des Mainzer Beckens. Zugleich eine Revision der Kirschbaumschen Arten aus der Umgebung von Wiesbaden. - Jahrb. Nass. Ver. Naturkd. Wiesbaden 86: 77–212.
- WAGNER, W. (1948): Neue deutsche Homopteren und Bemerkungen über schon bekannte Arten. - Verh. Ver. Naturwiss. Heimatforschung Hamburg 29 (1947): 72–89.
- WAGNER, W. (1959): Zoologische Studien in Westgriechenland, IX. Teil: Homoptera. - Österr. Akad. Wiss., Sitzungsber. math.-naturwiss. Kl., Abt. I, 168 (7): 581–605.