

## NOTABLE NEW FINDINGS OF AUCHENORRHYNCHA (HEMIPTERA) IN SLOVENIA

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**Abstract** - Three planthopper and six leafhopper species are recorded for the first time for the fauna of Slovenia: *Cixius similis*, *Nothodelphax albocarinata*, *Acanalonia conica*, *Metidiocerus impressifrons*, *Tautoneura polymitusa*, *Euscelis distinguendus*, *Streptopyx tamaninii*, *Arocephalus grandii* and *Allygus communis*. Additional distributional data for three rare and little-known species *Limotettix carniolicus*, *Jassargus dentatus* and *Cosmotettix costalis* are provided and discussed too. *Acanalonia conica* and *Tautoneura polymitusa* are new alien species that have spread into Slovenia recently.

KEY WORDS: Hemiptera, Auchenorrhyncha, fauna, Slovenia

### **Izveček** - POMEMBNE NOVE NAJDBE ŠKRŽATKOV V SLOVENIJI (HEMIPTERA, AUCHENORRHYNCHA)

Objavljeni so podatki o devetih novih vrstah škržatkov za favno Slovenije: *Cixius similis*, *Nothodelphax albocarinatus*, *Acanalonia conica*, *Metidiocerus impressifrons*, *Tautoneura polymitusa*, *Euscelis distinguendus*, *Streptopyx tamaninii*, *Arocephalus grandii* in *Allygus communis*. Dodani in komentirani so novi podatki o razširjenosti treh redkih in malo znanih vrst škržatkov – *Limotettix carniolicus*, *Jassargus dentatus* in *Cosmotettix costalis*. *Acanalonia conica* in *Tautoneura polymitusa* sta novi tujerodni vrsti, ki sta se pred kratkim razširili na ozemlje Slovenije.

KLJUČNE BESEDE: Hemiptera, Auchenorrhyncha, favna, Slovenija

### **Introduction**

With the author's latest accounts on the fauna of planthoppers and leafhoppers of Slovenia, the number of species increased by 82 species and raised to 565 altogether

(SELJAK, 2016 and 2017). Recently, several additional species have been discovered that have not been recorded yet. These new findings may be of special significance, because some of the species dealt with are considered as rare or with a very limited distribution range, or they are new aliens and have spread into the territory of Slovenia only recently.

### Material and methods

Specimens were collected by sweep-netting of plants or with a suction sampler or by light trapping. Voucher specimens of all species were dry mounted and are stored in the author's private collection.

### List of species

#### Cixiidae

#### ***Cixius similis* Kirschbaum, 1868** (Figure 1 and 11)

*Material examined:* Hotedršica - 590 m (45°56'28" N, 14°09'25" E), 15.5.2017; 3 ♂♂ and 2 ♀♀ swept from a tree of *Salix eleagnos* in an intermediate bog.

This species has a predominantly boreo-alpine distribution in Europe. Further south it is confined to bogs and mountains (HOLZINGER & al. 2003; NICKEL, 2003). The record given above is the first from Slovenia. The species may be more common, but so far, its habitats have been subject to little investigation, notably at the time of adults' flight in May and June.



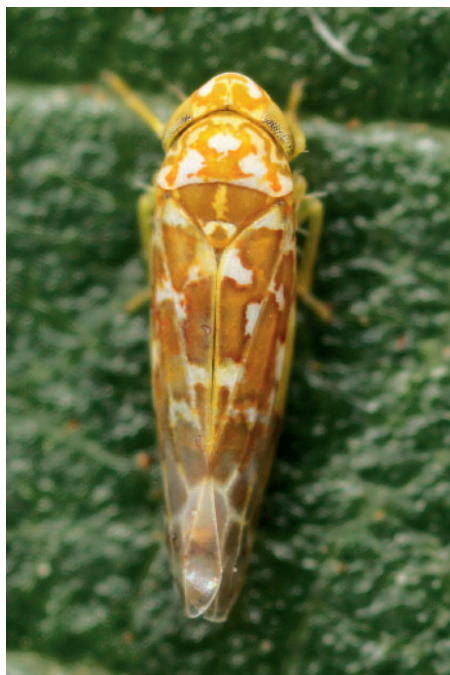
**Fig. 1:** *Cixius similis* (size 4.7-6.5 mm)



**Fig. 2:** *Acanalonia conica* – adult (size 8.2 – 11.0 mm)



**Fig. 3:** *Acanalonia conica* - 5<sup>th</sup> instar nymph



**Fig. 4:** *Tautoneura polymitusa* (dorsal view; size 2.4-2.7 mm)

Delphacidae

***Nothodelphax albocarinata* (Stal, 1858)** (Figure 11)

*Material examined:* Zakraj (Bloška planota) - 750 m (45°47'53" N, 14°32'07" E), 17.7.2017; 5 ♂♂ and 5 ♀♀; in an intermediate bog.

Like the previous, this species is also considered to have a predominantly boreal distribution range in Europe, Asia and North America. In Central Europe it mainly occurs in very scattered populations (HOLZINGER & al. 2003; NICKEL, 2003). The locality above, which is the first record for Slovenia, is among the southernmost in Europe. In the Alpine raised bogs of Slovenia, only the sister species *N. distincta* (Flor 1861) has been found so far. However, it seems that both species might be rather rare.

Acanaloniidae

***Acanalonia conica* (Say, 1830)** (Figures 2, 3 and 11)

*Material examined:* Miren - 60 m (45°54'04" N, 13°36'53" E), 30.6.2017 - 1 ♀, 11 nymphs, 11.7.2017 - 1 ♀, 2 ♂♂ and 21.8.2017 - 1 ♂; Nova Gorica - 105 m (45°57'27" N 13°39'15" E), 24.6.2018 - 1 nymph.

In Europe this Nearctic species was first recorded in 2003 in North Italy, being captured on the light near Padua (D'URSO & ULIANA, 2004). Afterwards it has spread gradually in North Italian provinces (D'URSO & ULIANA, 2006, ALDINI et al., 2008; ZANDIGIACOMO & al., 2009), reaching southern Switzerland (Ticino) in 2014 (TRIVELLONE & al., 2015). Recently, an accidental introduction to Romania has also been

recorded (CHIRECEANU & al., 2017). As early as in 2010, its occurrence has been reported barely 10 km away from the Slovene border in Friuli Venetia Giulia in Italy (ZANDIGIACOMO & al., 2009), hence its spread to the western areas of Slovenia has been expected. At the end of June 2017, several nymphs of fourth and fifth instar and the first adult specimen were caught in an abandoned sand pit area close to the Italo-Slovene border. The presence of pre-imaginal stages clearly shows that it has spread to this locality at least a year earlier. Later, during the summer months of 2017, several other places along the Italian border around Nova Gorica were visited, but no further positive localities found. In June 2018, a nymph of the forth instar was swept from an ornamental bush in Nova Gorica.

Cicadellidae

*Metidiocerus impressifrons* (Kirschbaum, 1868) (Figure 12)

*Material examined*: Cerknjško jezero – 550 m (45°45'43" N 14°21'43" E), 17.7.2017 - 1 ♀ on *Salix purpurea*.

This species is obviously rare in Slovenia, at least in its western part. It might be more common in the continental part of the country, which was little investigated so far and where its host plants occur more commonly. It is also possible that this species has been overlooked in the past. THEN (1886) recorded it from Raibl (nowadays Cave del Predil) in Italy, a locality very close to the north-western Slovene border.

*Tautoneura polymitusa* Oh & Jung, 2016 (Figures 4 - 7 and 12)

*Material examined*: Nova Gorica – 105 m (45°57'28" N, 13°39'14" E), 14.9.2010 - 2 ♀♀, 28.6.2011 - 1 ♂, 11.7.2011 - 1 ♀, 26.8.2011 - 1 ♂, 6.7.2013 - 1 ♀, 13.7.2013 - 3 ♀♀ and 22.6.2018 – 1 ♀; Kromberk – 125 m (45°57'48" N, 13°39'33" E), 13.7.2013 - 4 ♂♂, 31 ♀♀ and 11.8.2013 - 3 ♀♀.



**Fig. 5:** *T. polymitusa* (lateral view)



**Fig. 6:** *T. polymitusa* – aedeagus (posteroventral view)

This species has been described very recently in South Korea (OH & al., 2016). Only a year later, the occurrence of this unambiguously East-Palaeartic species has been recorded in Hungary (TOTH & al., 2017). However, the presence of this species in Europe had already been detected as early as before 2010 in northern Italy and in Spain (Francesco Poggi, Italy, pers. comm.) and since 2010 in western Slovenia as well. From the very beginning, this species was suspected as to be a new, still undescribed one, which is, however, alien to Europe. Nevertheless, an original description based on the European material has not been accomplished.

In Slovenia, most of the material was trapped on the light, partly also collected by sweep-netting from the canopies of *Ulmus minor* trees. *Ulmus* spp. are obviously the host plants of this species, which was already suspected by the earlier authors (OH & al., 2016; TOTH & al., 2017). Among the material collected in Slovenia, females



**Fig. 7:** *T. polymitusa* – styli, connexiv and subgenital plates

**Fig. 8:** *Streptopyx tamaninii* – female



markedly prevailed. Out of 48 specimens being caught, only 6 were males. Adults have been collected from end of June to mid of September. The exact number of annual generations is still unknown, but it is thought that only one generation might occur. In western Slovenia, the population was always rather small and after 2013 a single female was caught in June 2018 again.

A good description and illustrations of *T. polymitusa* are given by the Korean and Hungarian authors (OH & al, 2016; TOTI & al., 2017). Thus, there is no reason to repeat them here. The photos added may illustrate this colourful species even better.

***Euscelis distinguendus*** (Kirschbaum, 1868) (Figure 12)

*Material examined:* Cerknjsko jezero – 550 m (45°46'3,9" N, 14°21'32" E), 17.7.2017 - 6 ♂♂, 3 ♀♀.

The only earlier record of this species that could refer also to the territory of Slovenia was by GRÄFFE (1903). His generalized distributional statement for this species "Auf Wiesen in April und Mai" in the area (Küstenland) that encompassed Istria and a wider area around Trieste and Gorizia (Görz) in Italy, and also included areas of the western parts of nowadays Slovenia, only allowed a certain level of probability for its actual occurrence in Slovenia too. Even an incorrect interpretation of this species by Gräffe cannot be excluded, due to the immense taxonomic changes inside the genus *Euscelis* that followed. The above-mentioned locality is the only one confirmed so far. The specimens were collected on a temporarily flooded meadow. It

seems to be rare, but it also might be overlooked in the past due to great similarity with the common and widely distributed *E. incisus*.

***Streptopyx tamaninii* Linnavuori, 1958** (Figures 8 and 12)

*Material examined:* Mangartsko sedlo - 2030 m (46°26'38" N, 13°38'51" E), 7.7.2017 - 3 ♀♀ and 03.07.2018 – 3 ♀♀.

So far, this rare oreophilous leafhopper has only been recorded in a few Alpine localities in northern Italy, south-eastern France, and in Tirol and Carinthia in Austria (LINNAVUORI, 1958; HELLER, 1989; DELLA GIUSTINA, 1989; HOLZINGER, 1996; HOLZINGER, 2009; ALMA & al., 2009, HUBER & KUNZ, 2016). It is considered as endemic to the south-Alpine area. Earlier, I myself knew this species from a single male collected in the Mont Avic Natural Park (Italy) near the Dondena refuge (2400 m) in September 2007 (ALMA & al., 2009). Recently, this species has been collected on alpine pastures on Reißkofel in Carinthia (HUBER & KUNZ, 2016). In this context, its occurrence in the north-westernmost part of Slovenian Alps is not a surprise. This species has so far been collected only rarely, probably also because adult specimens appear as late as in September and conclude their lifespan in late spring. In Carinthia, for instance, adult specimens have only been collected in mid-May, but no longer in the third decade of June (HUBER & KUNZ, 2016). Our late findings at the beginning of July (females only) may be ascribed to a higher altitude and long snow persistence at that locality. Because of the rarity, nothing is known yet about its host plant(s).



**Fig. 9:** *Jassargus dentatus*



**Fig. 10:** *J. dentatus* – male's genital segment (ventral view)



***Arocephalus grandii*** Servadei, 1972 (Figure 13)

*Material examined:* Kastelec – 320 m (45°35'9" N, 13°51'39" E), 21.9.2016 - 2 ♂♂, 1 ♀; Mahniči - 230 m (45°46'59" N, 13°53'58" E), 23.9.2017 - 1 ♂ and 28.06.2018 - 2 ♂♂, 1 ♀; Pared (Kačiče, 45°38'52.94" N, 13°58'36.92" E) - 440 m (VL25), 28.8.2018 - 1 ♂.

Like the previous species, *A. grandii* is also an endemic species of the south-Alpine region. It has been recorded in northern Italy and southern Switzerland (SERVADEI, 1972; D'URSO, 1995; GÜNTHART & MÜHLETHALER, 2002). Externally, this species is indistinguishable from *A. languidus* (Flor, 1861). It differs from the latter only in the shape of aedeagal appendages. In *A. grandii*, the recurrent apical appendages are about half as long as the shaft itself and clearly extend beyond the base of the gonopore. In posterior view they run nearly parallel to the shaft, whereas in *A. languidus*, they diverge arc-shaped from the shaft and do not exceed one third of the shaft length and do not extend beyond the base of the gonopore. In Slovenia, *A. grandii* has only been found in three localities on karstic meadows. Its host plant is unknown, but some indications point towards *Chrysopogon gryllus*.

***Allygus communis*** (Ferrari 1882) (Figure 12)

*Material examined:* Dragonja - 25 m (45°27'8" N, 13°39'48" E), 31.8.2017 - 2 ♂, 1 ♀; Veli Brgud – 400 m (Croatia, 45°25'55.87" N, 14°17'27.55" E), 25.6.2008 - 1 ♂.

Although this species is widely distributed in mid-Europe according to Fauna Europaea, it has been confirmed in the territory of Slovenia only very recently. Three specimens were obtained during a light trap catching in late August on a dry sub-Mediterranean meadow with scattered trees of *Quercus pubescens*. At the same time, *A. furcatus* (Ferrari, 1882) abundantly occurred in the same locality. Another locality was recorded in Veli Brgud in Croatia, only about 5 km south from the Slovene border.

***Jassargus dentatus*** D'Urso, 1980 (Figures 9, 10 and 13)

*New records:* Gradišče pri Vipavi, Mlake - 120 m (45°49'03" N, 13°57'56" E), 1.6.2018, 13.6.2018, 17.6.2018 and 16.08.2018 (several dozens of specimens).

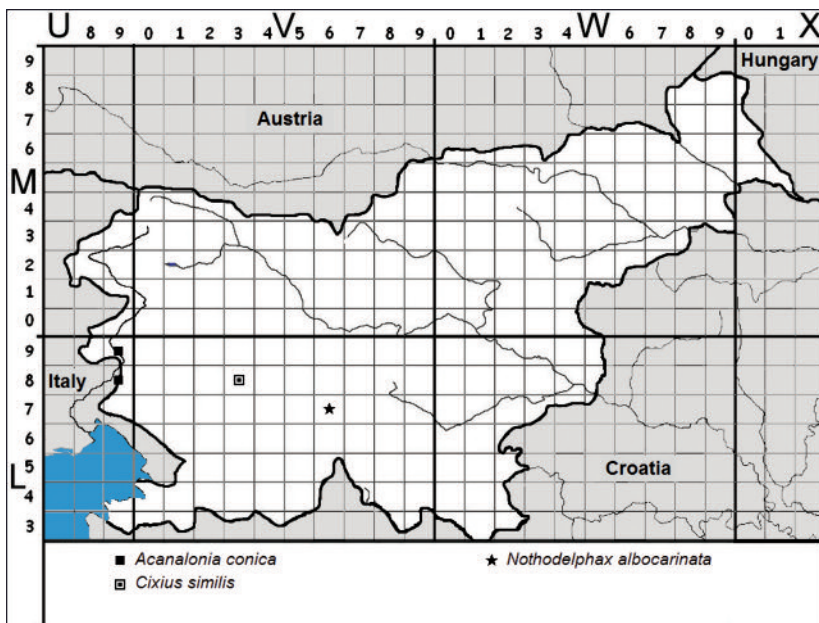


Fig. 11: Distribution map of *A. conica*, *C. similis* and *N. albocarinata*

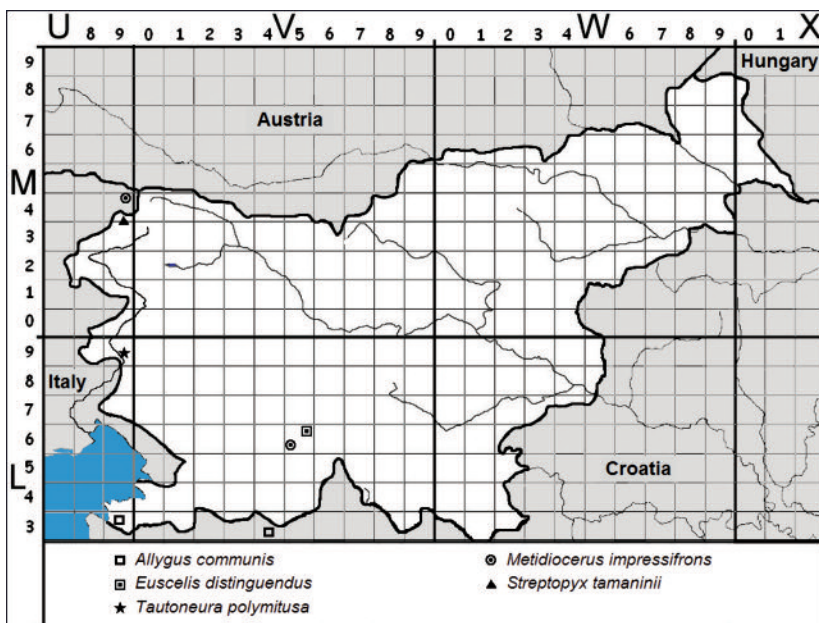
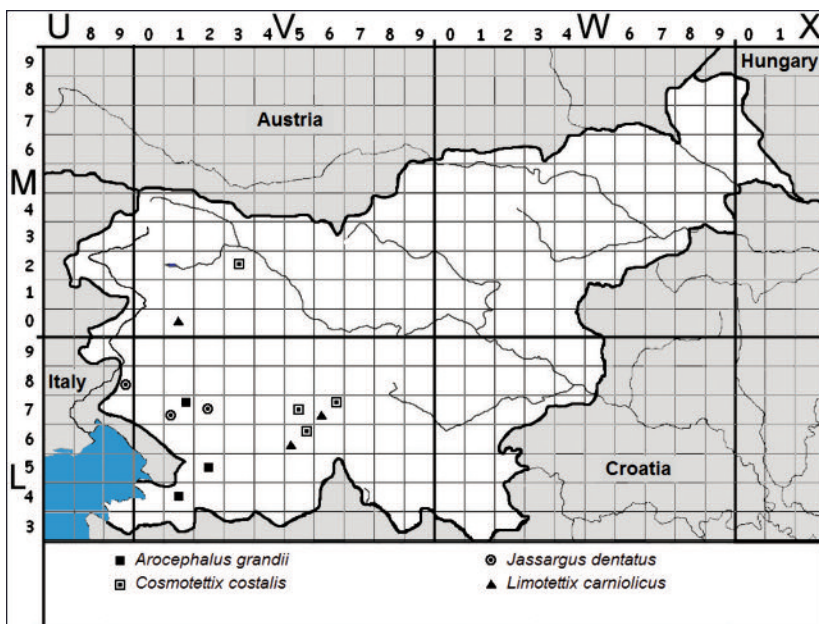


Fig. 12: Distribution map of *A. communis*, *E. distinguendus*, *M. impressifrons*, *S. tamaninii* and *T. polymitusa*



**Fig. 13:** Distribution map of *A. grandii*, *C. costalis*, *J. dentatus* and *L. carniolicus*

This species has long been known only from the type locality Masserano in Piedmont (Italy) (D'URSO, 1980). In June 2003, a few specimens of this species were first found in Slovenia at the cemetery lawn in Stara Gorica near Nova Gorica. This was only the second known locality of this species (SELJAK, 2004). The population, although rather small, still exist in that place. In June 2018, a much larger population was discovered near Vipava about 30 km SE from the previous locality. It populates a moderately moist meadow, which is part of the protected area Mlake pri Vipavi. If there were some suspicions of a possible introduction from elsewhere in the previous locality, this one unequivocally confirms that *J. dentatus* is indigenous here. It is just another representative of the rich fauna of endemic *Jassargus* species in the south-alpine area. Its hostplant is not unambiguously known yet, but some indications point toward the grass *Molinia caerulea*, which grows on both localities abundantly.

***Limotettix carniolicus* Seljak, 2017 (Figure 13)**

*New records:* Cerknjiško jezero - 550 m (45°45'45" N, 14°21'37" E), 27.6.2017 - 6 ♂♂, 1 ♀ and 17.7.2017 4 ♂♂; Velike Bloke - 740 m (45°47'35" N, 14°29'42" E), 17.7.2017; Zakraj - 750 m (45°47'53" N, 14°32'07" E), 17.7.2017 and 16.8.2018; Volčje - more than 100 specimens.

In the original description of this newly discovered species only the type locality was recorded, as no other findings were known at that time (SELJAK, 2017). Further field investigations in 2017 and 2018 gave three new localities, all inside the Dinaric area, suggesting a bit wider Dinaric distribution. Further potential sites of its occurrence have to be expected towards the Croatian mountainous region Gorski Kotar. The

species lives on *Eleocharis quinqueflora*, but it is not quite clear yet, whether some other species from the genus *Eleocharis* are used too.

***Cosmotettix costalis*** (Fallén, 1826) (Figure 13)

*New records:* Laze pri Gorenjem Jezeru - 550 m (45°43'30" N, 14°24'11" E), 17.7.2017 - 4 ♀♀; Ulaka - 750 m (45°47'34" N, 14°28'9" E), 17.7.2017 - 1 ♀; Velike Bloke - 740 m (45°47'37" N, 14°29'38" E), 17.7.2017 - 3 ♀♀.

This species is considered as to have a more northern distribution ranging from Britain through Fennoscandia and middle Europe towards central Russia and Kazakhstan. The most southern findings have been recorded from the south-eastern Alpine area (NICKEL, 2003; SELJAK, 2016). These new findings have shifted the known range considerably towards the south. In all cases the specimens were obtained from tall sedge vegetation by using the suction collecting method. According to LAUTERER (1986), this species may develop two generations a year; one from the beginning of June to mid-August and the second from August to late autumn. It looks like in our case the first generation already faded out in mid-July, as only females were caught.

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