Acanalonia conica (Say, 1830) and three other true hopper species new for Austria

(Hemiptera: Auchenorrhyncha)

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Summary: *Acanalonia conica* (Say, 1830), *Aplos simplex* (Germar, 1830) and *Hishimonus hamatus* Kuoh, 1976 are three alien species reported for the first time from Austria. They were found in a garden centre in Graz and presumably imported with ornamental shrubs from Italy. Another first record is *Chiasmus conspurcatus* (Perris, 1857), an indigenous species found in the Neusiedlersee-Seewinkel National Park. In addition, we present a list of 71 Auchenorrhyncha species found at the two inland salt marshes, where *C. conspurcatus* occurs.

Keywords: *Acanalonia conica*, *Aplos simplex*, *Hishimonus hamatus*, *Chiasmus conspurcatus,* Cicadomorpha, Fulgoromorpha, Issidae, Acanaloniidae, Cicadellidae, new record, ornamental plant trade, alien species, inland salt marsh, iNaturalist.

1. Introduction

The Auchenorrhyncha fauna of Austria is well investigated; according to the latest checklist (Mühlethaler et al. 2018), 646 species are known. New records mostly concern recent introductions of alien species and remarkable findings of very rare taxa, or result from new taxonomic discoveries. Here we present records of three alien species introduced to Austria quite recently, and one record of a rare indigenous species.

2. Methods

The species were found during various Auchenorrhyncha collecting trips, using sweep net sampling and suction sampler. Specimens are deposited in the collections ÖKOTEAM and G. Kunz.

3. Results and Discussion

Acanalonia conica (Say, 1830), Fam. Acanaloniidae

The genus *Acanalonia* Spinola, 1839 is restricted to the New World and comprises more than 60 species (Bourgoin 2020). *Acanalonia conica* (Say, 1830) is an alien species in Europe, originating from southern North America (USA). The first European record was reported by D'Urso & Uliana (2006) from Italy (Padua, in 2003). The species then spread throughout Italy (e.g. Aldini et al. 2006, 2008; Zandigiacomo et al 2009) and was subsequently found in southernmost Switzerland (Ticino; Trivellone et al. 2015), Romania (Bucharest; Chireceanu et al. 2017), Slovenia (in the vicinity of Nova Gorica; Seljak 2018) and Serbia (Novi Sad; Šćiban & Kosovac 2020). In 2019, the species was recorded in Austria (this paper) and in 2020, it also appeared in France (Pelozuelo et al. 2020, in print) for the first time.

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Our Austrian findings of *A. conica* originate from four localities in Styria and one in Carinthia. The records, sorted by observation date, are as follows:

Styria, Mirnsdorf, on the wall of a house, 46°47'56"N; 15°38'13"E, 26.10.2019, 1 adult, photo proof by Sarah Scherr uploaded on iNaturalist (https://www.inaturalist.org/)

Styria, Graz, Liebenau, private garden in 250m distance of a garden centre, 47°2'18"N, 15°27'28"E, 17.07.2020, 1 nymph on *Buddleja* sp., photo proof by Sandro Michael Heschl uploaded on iNaturalist (https://www.inaturalist.org/); 20.08.2020, 7 adults on *Buddleja* and *Raphanus sativus* (Fig. 1), sweep net, Sandro Michael Heschl & Gernot Kunz leg.

Styria, Graz, Liebenau, in a garden centre trading with plants imported from Italy, mainly on *Buddleja* sp. 47° 2'26"N; 15°27'29"E, 20.08.2020, 9 adults & one nymph (Fig. 2), hand catch & sweep net, David Stan & Gernot Kunz leg.; 19.09.2020, 3 adults, sweep net, Werner Holzinger leg.

Carinthia, Klagenfurt, nursery garden, 46°37'56"N, 14°19'8"E, 25.08.2020, 1 adult, photo proof by Bruno Brudermann uploaded on iNaturalist (https://www.inaturalist.org/).

Styria, Leibnitz, private garden, 46°47'28"N, 15°33'22"E, 29.09.2020, 1 adult, found dead in a spider web, photo proof by Johann Brandner.

Fig. 1: *Acanalonia conica* on *Raphanus sativus* in a garden in Graz, Liebenau (Photo G. Kunz).

Fig. 2: Nymph of *Acanalonia conica* from Austria (Photo G. Kunz).

According to David Stan, employee of the gardening centre in Graz, *Acanalonia conica* is present at this place already for several years. Due to several recent findings in Styria, it is likely that the species is already established in southern Austria.

In North America, *A. conica* it is often associated with the three Flatidae species *Metcalfa pruinosa* (Say, 1830), *Anormenis septentrionalis* (Spinola, 1839) and *Ormenoides venusta* (Melichar, 1902) (see Wilson & McPherson 1980). *Metcalfa* is already present in Europe and Austria, and it is quite likely, that the two latter species are forthcoming aliens, too.

***Aplos simplex* (Germar, 1830), Fam. Issidae**

This species was known as *Thionia simplex* until Gnezdilov (2018) erected a new genus, *Aplos* Gnezdilov, 2018 in course of the beginning of a revision of the speciose genus *Thionia* Stål, 1859. The species originates from the Eastern USA and was also recorded from Italy for the first time in Europe: Gnezdilov & Poggi (2014) found it 2012 in Lombardia near Milan.

It is polyphagous on shrubs and trees (Gnezdilov & Poggi 2014, Wheeler & Wilson 1988), was found on *Ulmus* in Italy and has a high potential for becoming another established alien species in Europe, including the thermophilic parts of Austria.

Our single record is obviously the first European one outside from Italy: G. Kunz found one nymph (Fig. 3) in a garden market (47° 2'18"N, 15°27'28"E, 20.08.2020) and reared it on *Hedera helix* to adult stage (Fig. 4). It is unclear whether this specimen was very recently introduced by fresh plant material delivered from Italy or if the nymph already indicates the presence of a fertile population in Styria.

Fig. 3: The nymph of *Aplos simplex* found in a gardening centre in Graz (Photo G. Kunz).

Fig. 4: The reared adult of *Aplos simplex* from the garden centre in Graz (Photo G. Kunz).

***Hishimonus hamatus* Kuoh, 1976, Fam. Cicadellidae**

Hishimonus Ishihara, 1953 is a large Cicadellidae genus with more than 60 species. It is distributed in temperate and subtropical parts of Asia, Australia and Africa (e.g. Du & Dai 2019). So far, two species have been published from Europe (D'Urso et al. 2019): *H. hamatus* Kuoh, 1976 from Slovenia (Seljak, 2013), Italy and Switzerland (Trivellone et al. 2015), and *H. sellatus* (Uhler, 1896) from Krasnodar territory, Russia (Gnezdilov 2008). Seljak (2013) provides an excellent description and photographs of *H. hamatus*, and the key to Chinese species recently published by Du & Dai (2019) includes the two species known from Europe.

The first record from Austria is the finding of a female of *Hishimonus hamatus* (Fig. 5) in a garden market in Graz Liebenau (47° 2'18"N, 15°27'28"E, 20.08.2020) by G. Kunz. *H. hamatus* is a polyphagous taxon, feeding on various trees and shrubs, with a high potential of becoming a pest species in Europe (Seljak 2013).

***Chiasmus conspurcatus* (Perris, 1857), Fam. Cicadellidae**

In course of the Austrian Barcoding of Life project (ABOL) we collected true hoppers along the shoreline of two alkaline salt lakes in the Neusiedlersee-Seewinkel National Park: at the „Darscholacke" (47°45'55"N, 16°50'15" E, 117m a.s.l.) and along the „Lange Lacke" (47°45'23"N, 16°52'53"E, 117m a.s.l., Fig. 6). Here we found *Chiasmus conspurcatus* (Fig. 7) in Austria for the first time. Old records of this species from „Austria" refer to South Tyrol (Then 1886 as *Atractotypus gautschii;* see Holzinger 2009b*),* today part of Italy. *Ch. conspurcatus* is a pontomediterranean species, feeding on grasses *(Aeluropus littoralis, Cynodon dactylon* and others, fide Tishechkin 2018).

Besides *Chiasmus conspurcatus*, the Auchenorrhyncha fauna of these salt marshes comprise several other very rare and threatened species. Table 1 provides a list of Auchenorrhyncha species collected at both lakes between 2012 and 2020.

Fig. 5: The female of *Hishimonus hamatus* from a gardening centre in Graz (Photo G. Kunz).

Fig. 6: Habitat of *Chiasmus conspurcatus* directly at the ("normal") shoreline of the alkaline salt lake "Lange Lacke" in the Neusiedlersee-Seewinkel National Park. The lake was unusually dry in summer 2019 (Photo 28.08.2019). As vineyards and crop fields adjacent to the National Park are irrigated by ground water in a non-sustainable dimension, the – quite sensitive – water balance of the lakes is already seriously damaged, and this effect will be boosted by climate warming in future (Photo W.E. Holzinger).

Fig. 7: Brachypterous individuum of *Chiasmus conspurcatus* (Photo G. Kunz).

Table 1: Auchenorrhyncha species recorded 2012-2020 from Darscholacke (DL) and Lange Lacke (LL), both inland salt marshes in the Neusiedlersee-Seewinkel National Park. Collecting dates: 28.8.2019, W.E. Holzinger, E. Huber, L. Schlosser & M. Wilson (both sites), 12.6.2012, 13.6.2013, 3.6.2014, 9.6.2015, 7.6.2016, 30.5.2017, 5.6.2018, 30.8.2019 (Lange Lacke, G. Kunz), 3.9.2020 (Darscholacke, G. Kunz). RL = Threat status according to the Austrian Red List (Holzinger 2009a).

Nr	Species	DL	LL	DATE(S)	RL
	Delphacidae				
1	*Anakelisia fasciata* (Kirschbaum, 1868)		3	12.06.12	EN
2	*Chloriona glaucescens* Fieber, 1866	1		28.08.19	EN
3	*Kelisia henschii* Horváth, 1897	37	3	12.06.12, 05.06.18, 28.08.19, 03.09.20	EN
4	*Kelisia melanops* Fieber, 1878	2	1	28.08.19	
5	*Kelisia monoceros* Ribaut, 1934		2	28.08.19	VU
6	*Kelisia sabulicola* Wagner, 1952	1	6	28.08.19	CR
7	*Kelisia yarkonensis* Linnavuori, 1962		2	28.08.19	CR
8	*Laodelphax striatella* (Fallén, 1826)		2	28.08.19	LC
9	*Megadelphax sordidula* (Stål, 1853)			28.08.19	LC
10	*Ribautodelphax imitans* (Ribaut, 1953)	1		28.08.19	VU
11	*Toya propinqua* (Fieber, 1866)	1	1	28.08.19	NT
	Caliscelidae				
12	*Ommatidiotus dissimilis* (Fallén, 1806)		4	12.06.12, 28.08.19	DD
	Cixiidae				
13	*Hyalesthes obsoletus* Signoret, 1865		1	12.06.12	EN
14	*Pentastiridius leporinus* (Linnaeus, 1761)	1		03.09.20	NT
	Flatidae				
15	*Metcalfa pruinosa* (Say, 1830)	3	3	28.08.19	NE
	Tettigometridae				
16	*Tettigometra virescens* (Panzer, 1799)		1	28.08.19	EN
	Aphrophoridae				
17	*Lepyronia coleoptrata* (Linnaeus, 1758)	1	3	12.06.12, 03.06.14, 09.06.15, 28.08.19	NT
18	*Neophilaenus campestris* (Fallén, 1805)	3	8	12.06.12, 03.06.14, 05.06.18, 28.08.19, 03.09.20	LC
19	*Neophilaenus infumatus* (Haupt, 1917)		2	28.08.19	CR
20	*Neophilaenus lineatus* (Linnaeus, 1758)	8	3	12.06.12, 03.06.14, 09.06.15, 28.08.19, 03.09.20	LC
21	*Philaenus spumarius* (Linnaeus, 1758)	7	9	12.06.12, 03.06.14, 09.06.15, 30.05.17, 05.06.18, 28.08.19, 03.09.20	LC
	Cercopidae				
22	*Cercopis sanguinolenta* (Scopoli, 1763)		3	07.06.16, 30.05.17, 05.06.18	LC

Nr	Species	DL	LL	DATE(S)	RL
	Membracidae				
23	*Gargara genistae* (Fabricius, 1775)	6	1	28.08.19, 03.09.20	VU
	Cicadellidae				
24	*Allygidius abbreviatus* (Lethierry, 1878)		1	12.06.12	NT
25	*Anaceratagallia laevis* Ribaut, 1935	2	5	28.08.19	CR
26	*Arocephalus languidus* (Flor, 1861)	1	1	03.06.14, 03.09.20	LC
27	*Aphrodes bicincta* (Schrank, 1776)		2	03.06.14, 05.06.18	DD
28	*Arthaldeus pascuellus* (Fallén, 1826)		1	05.06.18	LC
29	*Arthaldeus striifrons* (Kirschbaum, 1868)	26	1	05.06.18, 28.08.19, 03.09.20	VU
30	*Artianus interstitialis* (Germar, 1821)	2	10	12.06.12, 05.06.18, 28.08.19	LC
31	*Athysanus argentarius* Metcalf, 1955	2	2	05.06.18, 28.08.19, 03.09.20	LC
32	*Austroagallia sinuata* (Muls. & Rey, 1855)	13		28.08.19, 03.09.20	LC
33	*Balclutha saltuella* (Kirschbaum, 1868)	2	1	28.08.19	DD
34	*Chiasmus conspurcatus* (Perris, 1857)	3	34	28.08.19, 30.08.19, 03.09.20	
35	*Chlorita paolii* (Ossiannilsson, 1939)	2		28.08.19	LC
36	*Cicadella viridis* (Linnaeus, 1758)	5	20	07.06.16, 05.06.18, 28.08.19, 03.09.20	LC
37	*Doratura stylata* (Boheman, 1847)		4	12.06.12, 30.05.17, 05.06.18	
38	*Doratura homophyla* (Flor, 1861)	23	29	03.06.14, 28.08.19	LC
39	*Empoasca decipiens* Paoli, 1930	2	4	28.08.19	LC
40	*Empoasca pteridis* (Dahlbom, 1850)	1	1	28.08.19	LC
41	*Empoasca vitis* (Göthe, 1875)	1		28.08.19	LC
42	*Enantiocephalus cornutus* (H.-S., 1838)		2	12.06.12, 05.06.18	NT
43	*Errastunus ocellaris* (Fallén, 1806)		1	05.06.18	LC
44	*Eupelix cuspidata* (Fabricius, 1775)	6	9	03.06.14, 05.06.18, 28.08.19, 03.09.20	NT
45	*Eupteryx atropunctata* (Goeze, 1778)		1	28.08.19	LC
46	*Euscelis incisus* (Kirschbaum, 1858)	2		28.08.19, 03.09.20	LC
47	*Graphocraerus ventralis* (Fallén, 1806)		3	12.06.12, 03.06.14	LC
48	*Henschia collina* (Boheman, 1850)	3	9	03.06.14, 28.08.19, 03.09.20	NT
49	*Hephathus nanus* (Herrich-Schäffer, 1835)	1	1	05.06.18, 28.08.19	EN
50	*Laburrus handlirschi* (Matsumura, 1908)		8	12.06.12, 03.06.14, 09.06.15, 05.06.18	CR
51	*Limotettix striola* (Fallén, 1806)		1	09.06.15	VU
52	*Macrosteles quadripunctulatus* (Kirschbaum, 1868)		7	28.08.19	NT
53	*Macropsis elaeagni* Emeljanov, 1964		1	12.06.12	NE
54	*Macropsis fuscula* (Zetterstedt, 1828)		1	12.06.12	LC

Nr	Species	DL	LL	DATE(S)	RL
55	*Maiestas schmidtgeni* (Wagner, 1939)	6	1	12.06.12, 28.08.19	EN
56	*Megophthalmus scanicus* (Fallén, 1806)		1	12.06.12	LC
57	*Metalimnus obtusus* Emeljanov, 1966		7	13.06.13, 03.06.14, 30.05.17, 05.06.18	DD
58	*Mocydiopsis longicauda* Remane, 1961	2		28.08.19	NT
59	*Mocydiopsis parvicauda* Ribaut, 1939	8	2	28.08.19	EN
60	*Neoaliturus fenestratus* (H.-S., 1834)	10	1	28.08.19, 03.09.20	NT
61	*Paralimnus phragmitis* (Boheman, 1847)	46	4	12.06.12, 03.06.14, 28.08.19, 03.09.20	LC
62	*Paramesus major* Haupt, 1927		14	28.08.19	CR
63	*Planaphrodes bifasciata* (Linnaeus, 1758)		1	05.06.18	LC
64	*Populicerus albicans* (Kirschbaum, 1868)		1	05.06.18	LC
65	*Psammotettix alienus* (Dahlbom, 1850)	5	17	28.08.19	LC
66	*Psammotettix asper* (Ribaut, 1925)	6	1	28.08.19	EN
67	*Psammotettix confinis* (Dahlbom, 1850)	10	18	28.08.19	LC
68	*Stictocoris picturatus* (C. Sahlberg, 1842)		1	12.06.12	NT
69	*Turrutus socialis* (Flor, 1861)	15	4	03.06.14, 28.08.19, 03.09.20	LC
70	*Utecha trivia* (Germar, 1821)	1		28.08.19	VU
71	*Zyginidia pullula* (Boheman, 1845)	25	6	28.08.19, 03.09.20	LC

Auchenorrhyncha species numbers in Austria

Including the species records presented in this paper, the total number of true hoppers published from Austria is now 650 and the total number of neozoic Auchenorrhyncha is 16 (see Fig. 8).

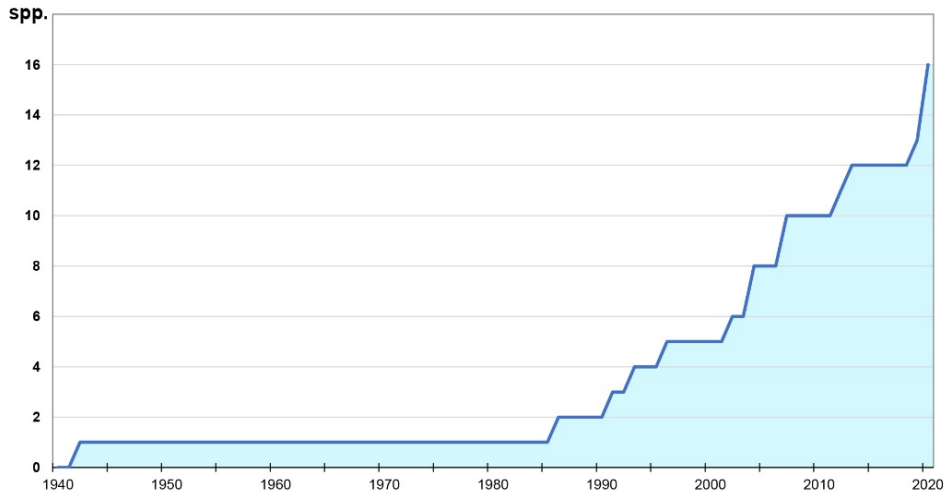

Fig. 8: Cumulative number of alien Auchenorrhyncha species known from Austria since 1940. The trend is alarming, but not surprising, as global trade policy continues to facilitate the global spread of neobiota (see Seebens et al. 2020). Species names and introduction dates see Holzinger (2009a), Mühlethaler et al. (2019) and this paper.

4. Zusammenfassung

Acanalonia conica (Say, 1830) und drei weitere Zikadenarten neu für Österreich (Hemiptera: Auchenorrhyncha). – Drei Neozoen, *Acanalonia conica* (Say, 1830), *Aplos simplex* (Germar, 1830) und *Hishimonus hamatus* Kuoh, 1976 wurden in einer Gärtnerei in Graz erstmals für Österreich nachgewiesen. Sie wurden wahrscheinlich mit Ziersträuchern aus Italien importiert. Ein weiterer Erstnachweis betrifft *Chiasmus conspurcatus* (Perris, 1857). Diese Art ist heimisch und wurde an zwei Salzlacken des Nationalparks Neusiedlersee-Seewinkel nachgewiesen. Eine Gesamtliste jener 71 Zikadenarten, die an den beiden Lacken gefunden wurden, wird ebenfalls vorgelegt.

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