

IN MEMORIAM

prof. dr. Guido Nonveiller (B. Britvec)..... 101

OSVRTI – REVIEWS

VII Europski entomološki kongres, Thessaloniki, Grčka, 7. - 13. 10. 2002  
(T. Gotlin Čuljak) ..... 103

29. susret entomologa susjednih država, Ljubljana, Slovenija, 26. i 27. 10.  
2002 (M. Harapin) ..... 104

9<sup>th</sup> IWGO *Diabrotica* subgroup meeting and 8<sup>th</sup> EPPO ad hoc panel,  
Beograd, Srbija, 3. – 5. 11 2002 (R. Dobrinčić) ..... 106

Entomološki dani i sjednica SIEEC-a u Linzu (F. Perović) ..... 107

NOVE KNJIGE - BOOK REVIEW

Akademik Milan Maceljski: Poljoprivredna entomologija II izdanje  
(M. Harapin) ..... 108

DRUŠTVENE VIJESTI – SOCIETY NEWS

Hrvatsko entomološko društvo 2001. – 2002 (M. Harapin) ..... 109

**THE NEW REGISTERED SPECIES OF APHIDS (HEMIPTERA:  
APHIDOIDEA) IN CROATIA**

Tanja GOTLIN ČULJAK, Jasminka IGRC BARČIĆ, Renata DOBRINČIĆ

Department for Agricultural Zoology, Faculty of Agriculture University of Zagreb,  
Svetošimunska cesta 25, Zagreb, Croatia. E-mail: tgotlin@agr.hr

Accepted: October 3. 2002.

The paper presents the description of 24 newly established species of aphids in Croatia that have been collected and determined during the three-year research (1996 – 1998) using the following two methods: Rothamsted suction trap (RST) and yellow water trap (YWT), Zagreb locality. Out of 24 species, 11 were collected and determined by IGRC BARČIĆ in the 80's (the determinations have not been published), while the same species have also been determined during this research. They are as follows: *Capitophorus horni* (Börner, 1931), *Cavariella theobaldi* (Gillette&Bragg, 1918), *Elatobium abietinum* (Walker, 1849) *Megourella purpurea* (Hille Ris Lambers, 1949), *Microlophium carnosum* (Buckton, 1876), *Pterocallis alni* (de Geer, 1773), *Uroleucon tussilaginus* (Walker, 1850), *Chaitophorus leucomelas* (Koch, 1854), *Eriosoma ulmi* (Linnaeus, 1758), *Thelaxes driophylla* (Schrank, 1801) and *Tuberculatus querceus* (Kaltenbach, 1843). 13 species of aphids have been collected and determined for the first time in Croatia (GOTLIN ČULJAK): *Hyperomyzus lamsanae* (Börner, 1932), *Macrosiphum gei* (Koch, 1855), *Callipterinella calliptera* (Hartig, 1841), *Callipterinella minutissima* (Stroyan, 1953), *Tinocallis platani* (Kaltenbach, 1842), *Tuberculatus moerickei* (Hille Ris Lambers, (1972) 1974), *Chaitophorus populeti* (Panzer, 1804), *Periphyllus californiensis* (Shinji, 1917), *Drepanosiphum aceris* (Koch, 1855), *Drepanosiphum acerinum* (Walker, 1838), *Drepanosiphum dixonii* (Hille Ris Lambers, 1971), *Hormaphis betulae* (Mordvilko, 1901) and *Eulachnus sp.* (del Guercio, 1909). The species have been classified into 1 family, 8 subfamilies, 6 tribes and 19 genera. According to domination, the species were marked as eudominant, dominant, subdominant, recent or subrecent, while, according to the frequency of their occurrence, they have been marked as euconstant, constant, accessory or accidental.

**Aphididae, aphids, newly established species, domination, frequency of occurrence**

GOTLIN ČULJAK, T., IGRC BARČIĆ, J., DOBRINČIĆ, R., Novoutvrđene vrste lisnih uši (Hemiptera: Aphidoidea) u Hrvatskoj, Zavod za poljoprivrednu zoologiju, Agronomski fakultet Sveučilišta u Zagrebu, Svetošimunska cesta 25, 10000 Zagreb E-mail: tgotlin@agr.hr. - Entomol. Croat. 2002, Vol. 6, Num. 1-2: 5-22

U radu je prikazan opis 24 novoutvrđenih vrsta lisnih uši u Hrvatskoj koje su sabrane i determinirane tijekom trogodišnjeg istraživanja (1996 – 1998) pomoću dvije metode: usisne postaje (RST) i žute posude, lokalitet Zagreb. Od 24 vrste, 11

vrsta sabrala je i determinirala IGRC BARČIĆ osamdesetih godina (determinacije nisu objavljene), a te iste vrste utvrđene su i tijekom ovog istraživanja. To su sljedeće vrste: *Capitophorus horni* (Börner, 1931), *Cavariella theobaldi* (Gille & Bragg, 1918), *Elatobium abietinum* (Walker, 1849) *Megourella purpurea* (Hille Ris Lambers, 1949), *Microlophium carnosum* (Buckton, 1876), *Pterocallis alni* (de Geer, 1773), *Uroleucon tussilaginus* (Walker, 1850), *Chaitophorus leucomelas* (Koch, 1854), *Eriosoma ulmi* (Linnaeus, 1758), *Thelaxes driophylla* (Schrank, 1801) i *Tuberculatus querceus* (Kaltenbach, 1843). 13 vrsta lisnih uši sabrano je i determinirano po prvi puta u Hrvatskoj (GOTLIN ČULJAK): *Hyperomyzus lamsanae* (Börner, 1932), *Macrosiphum gei* (Koch, 1855) *Callipterinella calliptera* (Hartig, 1841) *Callipterinella minutissima* (Stroyan, 1953), *Tinocallis platani* (Kaltenbach, 1842), *Tuberculatus moerickei* (Hille Ris Lambers, 1972) 1974), *Chaitophorus populeti* (Panzer, 1804), *Periphyllus californiensis* (Shinji, 1917), *Drepanosiphum aceris* (Koch, 1855), *Drepanosiphum acerinum* (Walker, 1838), *Drepanosiphum dixoni* (Hille Ris Lambers, 1971), *Hormaphis betulae* (Mordvilko, 1901) i *Eulachnus* sp. (del Guercio, 1909). Vrste su svrstane u 1 porodicu, 8 potporodica, 6 tribusa i 19 rodova. Vrste su prema dominantnosti označene kao eudominantne, dominantne, subdominantne, recentne ili subrecentne, a prema svojoj učestalosti pojave označene su kao eukonstantne, konstantne, akcesorne ili akcidentalne.

**Aphididae, lisne uši, novoutvrđene vrste, dominantnost, učestalost pojave**

## Introduction

Aphids (Aphidoidea) feature as the most significant pests attacking agricultural crops. There is hardly a plant species that has not been attacked by these pests. There are around 4500 various aphid species in the world (EASTOP and BLACKMAN, 2001), while, according to the estimate by Leclant (quot. DINARINA, 1994), there are around 700 – 800 different species in Croatia. However, there is not much data or papers on the fauna of aphids in Croatia. KOVAČEVIĆ (1927) thus mentions 20 species, and, in 1956, in his book on forest pests, he lists 26, while later (1961) in the book on agricultural pests he lists 33 species of aphids. TANASIJEVIĆ and EASTOP (1963, 1968), while conducting a faunistic research across the entire ex Yugoslavia, determined the presence of 115 species of aphids. Out of this number, 18 were expressly listed in terms of sites on the territory of the Republic of Croatia. IGRC and MACELJSKI (1988) claim that – during their research work from 1981 – 1987 – they have identified around fifty species of aphids. DINARINA (1994) claims to have found 24 species of aphids while exploring the entomofauna of the weed *Cardaria draba*. IGRC BARČIĆ in MACELJSKI (1999, 2002) provides the description of 73 species of aphids, mostly agricultural crops pests. Through faunistic research, GOTLIN ČULJAK (2001) has determined 83 species of aphids, 13 out of which were completely new in

the fauna of aphids in Croatia. GOTLIN ČULJAK (2001) and GOTLIN ČULJAK, IGRC BARČIĆ (2002), having reviewed all the available references, unpublished determinations by Igrc and Dinarina, and their own three-year (1996 – 1998) faunistic research results, have provided the list of aphid species in Croatia. Thus the list of aphid species, including those newly established, encompasses 199 species. The list of aphid species obtained through the review of references includes 156 species, the unpublished determinations by Igrc Barčić 24, those by Dinarina 6 species, while 13 newly established species were determined by Gotlin Čuljak. The list is not final but rather constitutes the basis which needs to be built upon i.e. continuously added and updated.

The paper shall present 24 species of aphids 13 out of which were collected and determined by Gotlin Čuljak (the determinations were confirmed by professor J. Igrc Barčić, DSc and professor F. Leclant, DSc) and 11 species that were in the 80's collected and determined by Igrc Barčić (the determinations were confirmed by professor dr. F. Leclant), which have been collected and determined also during this research. The data on these species have not been published yet.

## Materials and Methods

The research of the fauna of aphids lasted three years (1996 – 1998). It was conducted using two methods: visual and mechanical. The visual method consisted in the use of the yellow water trap (YWT) of the size 70 x 70 cm placed at the permanent height of 70 cm above the ground. The vessel depth is 12 cm. The vessel's interior is painted by the yellow colour of the buttercup flower, proven to attract aphids the best. The yellow water trap was placed 50 m away from the Rothamsted Suction Trap (RST) in the trial garden of the Institute for Agricultural Zoology of The Zagreb University Faculty of Agronomy. The mechanical method consisted in the use of the suction trap (RST) built in 1988 in the garden of the Department for Agricultural Zoology of The Zagreb University Faculty of Agronomy in Maksimir, according to standard measures of Rothamsted Suction Trap. The suction trap, which is 12.2 m high, consists of a hermetically closed box of the size 0.76 x 0.76 m, 3.05 m high, with a pipe of 25.4 cm in diameter, 9.15 m long. At the bottom of the box there is a centrifugal ventilator which sucks all the insects flying over it into the pipe. The opening of the pipe has a grid preventing the birds from entering. Smaller insects pass through the filter and are collected into a vessel containing alcohol. Until 1992, daily intake of samples was not automatized, while it has been so since. Device for automatic exchange of the vessels makes it possible to replace vessels at midnight, which is why

every vessel contains aphids catch for the interval of 24 h. The time of replacing vessels is set by a specially programmed clock. The daily air capacity is 45000 m<sup>3</sup>.

For identifying aphid species we have used the following keys: RUPAIS, 1961.; TAYLOR, 1980.; BLACKMAN and EASTOP, 1984, 1994; notes by Igrč Barčić and the collection of permanent samples Leclant.

The determinations have been confirmed by prof. Jasminka Igrč Barčić, DSc and prof. F. Leclant, DSc, of Montpellier. The determination of around a dozen aphid species is still under way.

Based on the research of the representation level of the newly established species of aphids, the domination has been calculated according to Balogh, using the following equation:

$$D_1 = \frac{a_1}{\sum a_1} \times 100$$

where  $a_1$  is the number of aphids of a certain kind, and  $\sum a_1$  is the total number of aphids. According to Tischler and Heydemann, the species have been classified into the following groups:

1. EUDOMINANT – species with over a 10% share
2. DOMINANT – species with a 5 – 10% share
3. SUBDOMINANT – species with a 2 – 5% share
4. RECENT – species with a 1 – 2% share
5. SUBRECENT – species with a share below 1%

The frequency has been calculated according to the following equation:

$$C_{a1} = \frac{U_{a1}}{\sum U_{a1}} \times 100$$

where  $U_{a1}$  is the number of samples in which a certain species is present, while  $\sum U_{a1}$  is the total number of samples inspected. According to Tischler, the species have been classified into the following groups:

1. ACCIDENTAL species from 0-25% of frequency
2. ACCESSORY species from 25-50% of frequency
3. CONSTANT species from 50-75% of frequency
4. EUCONSTANT species from 75 – 100% of frequency

### Presentation of the newly established species of aphids in Croatia (systemized according to Nieto Nafria, 1998)

#### Order Hemiptera

##### Suborder Homoptera

##### infraorder Sternorrhyncha

##### Superfamily Aphidoidea

#### Fam. Aphididae

##### Subfam. Aphidinae Latreille, 1802

##### Trib. Macrosiphini Wilson, 1910

##### Gen. *Capitophorus* van der Goot, 1913

- *Capitophorus horni* Börner, 1931 (determined by Igrč Barčić & Gotlin Čuljak)

##### Gen. *Cavariella* del Guercio, 1911

##### Subgen. *Cavariella* del Guercio, 1911

- *Cavariella (Cavariella) theobaldi* Gillette & Bragg, 1918 (determined by Igrč Barčić & Gotlin Čuljak)

##### Gen. *Elatobium* Mordvilko, 1914

- *Elatobium abietinum* Walker, 1849 (determined by Igrč Barčić & Gotlin Čuljak)

##### Gen. *Hyperomyzus* Börner, 1932

##### Subgen. *Hyperomyzus* Börner, 1932

- *Hyperomyzus (Hyperomyzus) lampsanae* Börner, 1932 (determined by Gotlin Čuljak)

##### Gen. *Macrosiphum* Passerini, 1860

##### Subgen. *Macrosiphum* Passerini, 1860

- *Macrosiphum (Macrosiphum) gei* Koch, 1855 (determined by Gotlin Čuljak)

##### Gen. *Megourella* Hille Ris Lambers, 1949

- *Megourella purpurea* Hille Ris Lambers, 1949 (determined by Igrč Barčić & Gotlin Čuljak)

##### Gen. *Microlophium* Mordvilko, 1914

- *Microlophium carnosum* Buckton, 1876 (determined by Igrč Barčić & Gotlin Čuljak)

##### Gen. *Uroleucon* Mordvilko, 1850

##### Subgen. *Uroleucon* Mordvilko, 1850

- *Uroleucon (Uroleucon) tussilaginus* Walker, 1850 (determined by Igrč Barčić & Gotlin Čuljak)

##### Subfam. Calaphidinae Oestlund, 1919

##### Trib. Calaphidini Oestlund, 1919

##### Gen. *Callipterinella* van der Goot, 1913

- *Callipterinella calliptera* Hartig, 1841 (determined by Gotlin Čuljak)

- *Callipterinella minutissima* Stroyan, 1953 (determined by Gotlin Čuljak)  
Trib. Panaphidini Oestlund, 1919  
Gen. *Pterocallis* Passerini, 1860
- *Pterocallis alni* de Geer, 1773 (determined by Igrc Barčić & Gotlin Čuljak)  
Gen. *Tinocallis* Matsumura, 1919  
Subgen. *Tinocallis* Matsumura, 1919
- *Tinocallis (Tinocallis) platani* Kaltenbach, 1842 (determined by Gotlin Čuljak)  
Gen. *Tuberculatus* Mordvilko, 1894  
Subgen. *Tuberculatus* Mordvilko, 1894
- *Tuberculatus (Tuberculatus) querceus* Kaltenbach, 1843 (determined by Igrc Barčić & Gotlin Čuljak)  
Subgen. *Tuberculoides* van der Goot, 1915
- *Tuberculatus (Tuberculoides) moerickei* Hille Ris Lambers, (1972) 1974 (determined by Gotlin Čuljak)  
Subfam. Chaitophorine Mordvilko, 1908  
Trib. Chaitophorini Mordvilko, 1908  
Gen. *Chaitophorus* Koch, 1854
- *Chaitophorus leucomelas* Koch, 1854 (determined by Igrc Barčić & Gotlin Čuljak)
- *Chaitophorus populeti* Panzer, 1804 (determined by Gotlin Čuljak)  
Gen. *Periphyllus* van der Hoeven, 1863
- *Periphyllus californiensis* Shinji, 1917 (determined by Gotlin Čuljak)  
Subfam. Drepanosiphinae Herrich-Schaeffer, 1857  
Trib. Drepanosiphini Herrich-Schaeffer, 1857  
Gen. *Drepanosiphum* Koch, 1855
- *Drepanosiphum aceris* Koch, 1855 (determined by Gotlin Čuljak)
- *Drepanosiphum acerinum* Walker, 1838 (determined by Gotlin Čuljak)
- *Drepanosiphum dixonii* Hille Ris Lambers, 1971 (determined by Gotlin Čuljak)  
Subfam. Eriosomatinae Kirkaldy, 1905  
Trib. Eriosomatini Kirkaldy, 1905  
Gen. *Eriosoma* Leach, 1818
- *Eriosoma ulmi* Linnaeus, 1758 (determined by Igrc Barčić & Gotlin Čuljak)  
Subfam. Hormaphidinae Mordvilko, 1908  
Trib. Hormaphidini Mordvilko, 1908  
Gen. *Hormaphis* Osten-Sacken, 1861

- *Hormaphis betulae* Mordvilko, 1901 (determined by Gotlin Čuljak)  
Subfam. Lachninae Herrich-Schaeffer, 1857  
Trib. Eulachnini Baker, 1920  
Gen. *Eulachnus* del Guercio, 1909
- *Eulachnus sp.* del Guercio, 1909 (determined by Gotlin Čuljak)  
Subfam. Thelaxinae Baker, 1920  
Gen. *Thelaxes* Westwood, 1840
- *Thelaxes driophylla* Schrank, 1801 (determined by Igrc Barčić & Gotlin Čuljak)  
Distribution, biology and some morphology of the winged forms of the newly established species has been described according to BLACKMAN, EASTOP (1985, 1995), TAYLOR (1980), and according to the notes from the specialization of professor Jasminka Igrc Barčić. The largest part of the morphological description of the winged forms is based on the authors' own perceptions during the work.

#### Description of the newly established species of aphids

##### CAPITOPHORUS van der Goot, 1913

##### Aphidinae: Macrosiphini

##### *Capitophorus horni* Börner, 1931

The species is small to medium in size, of light green colour. The head front is shaped in the form of letter W with a well pronounced medial tubercle. The final rostrum segment is thin at the end with a well observable white ring behind which is the tip of a somewhat darker colour. This particular morphological characteristic of the rostrum is of exceptional importance to us, because this is how we differentiate it from the species of the genus *Cryptomyzus* which has a short final rostrum segment, rounded and quite bright. The antennae have a large number of rhinaria, while the end of the sixth segment is eight times longer than the base. The abdomen has a dark spot of a regular rectangular appearance below which transversal stripes may or may not be located. The lateral abdomen sides show well visible marginal points. The cauda is short and bright. The cornicels are long, with no pigmentation, and slightly broadened towards the top. Mixing up is possible also with other species of the genus *Capitophorus*. The species is monoecious and holocyclic. Its hosts are the species of the genus *Cirsium*, while, in Europe, they sometimes damage and inhabit the species *Cynara scolymus*. It is a subrecent species both in the RST (0.75%) and in the YWT (0.3%). In terms of the frequency of its occurrence, it pertains to the accidental species. In the samples of the RST it was identified in the course of 1996, 1997, and 1998 respectively. In the YWT samples it was identified in the course of 1996 and 1997 respectively.

**CAVARIELLA del Guercio, 1911****Aphidinae: Macrosiphini*****Cavariella (Cavariella) theobaldi* Gillette & Berger, 1918**

The species is spread in Europe, southwestern Asia, Siberia, and North America. It appears in springtime on *Salix* sp. It comes in colonies of yellow-greenish to greenish colour. It is 1.6 – 2.0 mm long. The head front is completely flat. On the third segment of the antennae it has many spread rhinaria, which makes the said segment uneven. The end of the sixth segment is four times longer than the base. The abdomen has a spot which is more or less pigmented, but it may also be spread or reduced to stripes. The cauda is pigmented, while above it there is a protuberance (like a little horn) characteristic for all the species of the same genus. The cornicles are flat; slightly, but evenly pigmented. They may be mistaken for other species of the genus *Cavariella*. The species *C. pastinacae* and *C. aegopodii* have rounded cornicles, while the cornicles of the species *C. theobaldi* are flat. Other morphological characteristics are very similar, nearly identical. The species starts flying late in the month of April and it lasts until June. Its secondary hosts are the plants from the family Umbeliferae (*Heracleum*, *Pastinaca*, *Aegopodium*, *Angelica*, *Chaerophyllum*). In late September, and also in October, they migrate back to the winter host. It is a subrecent species both in the RST (0.3%) and in the YWT (0.2%). As regards the frequency of its occurrence, it is an accidental species. It was found among the RST samples in 1996 and 1998 respectively, while it was present among the YWT samples throughout the three years of research.

**ELATOBIUM Mordvilko, 1914****Aphidinae: Macrosiphini*****Elatobium abietinum* Walker, 1849**

The species is spread in Europe, Tasmania, New Zealand, and the western part of North America. Apteræ are light green with two dark longitudinal stripes. The antennae are medium pigmented with large round rhinaria. 7-9 rhinaria on the third and 1 rhinaria on the fourth segment. On the abdomen, we may see light marginal spots, as well as tiny little spots across the entire abdomen. Long, light pigmented cornicles. The cauda has a sag and is less well pigmented. The male looks very much like the female. The species is monoecious and holocyclic. It appears on the species of the genera *Picea* and *Abies*. It is a subrecent species in the RST (0.08%). It has not been established in the YWT samples. As regards its frequency, it is accidental. It has been determined in the course of 1997 and 1998 respectively.

**HYPEROMYZUS Börner, 1932****Aphidinae: Macrosiphini*****Hyperomyzus (Hyperomyzus) lampsanae* Börner, 1932**

It is spread all over Europe. The front is flat in the shape of letter W. The abdomen has a spot which is compact and highly pigmented. The cornicles are medium

pigmented and rounded. The cauda is much lighter with regard to the species *H. lactucae*. The male of this species has many rhinaria on the third and fourth segment of the antennae and 5-7 rhinaria on the fifth segment. The cornicles are much lighter and more rounded than those of the female. The species is holocyclic and heteroecious. It was not found among the RST samples. Its share in the YWT samples is 0.2% and it pertains to the subrecent species. In terms of its frequency it is accidental. It has been identified in all three years of the research.

**MACROSIPHUM Passerini, 1860****Aphidinae: Macrosiphini*****Macrosiphum (Macrosiphum) gei* Koch, 1855**

It is spread all over Europe, to the east all the way to Kazakhstan, and in North America. The size of the species ranges from 1.9 – 4.5 mm; it is light, of yellow-green colour. The abdomen is light, with less well pigmented lateral spots. Sometimes one may see light stripes. The cornicles are pigmented with a light base. The cauda is long and bright. It is a subrecent species in the RST (0.08%). It has not been identified in the YWT samples. In terms of its frequency, it is accidental. It was determined in the course of 1996 and 1998.

**MEGOURËLLA Hille Ris Lambers, 1949****Aphidinae: Macrosiphini*****Megourella purpurea* Hille Ris Lambers, 1949**

It is spread in the Netherlands and Great Britain. The species has hairy antennae with numerous rhinaria on the third and fourth segment. The legs are dark with a white tibia base. On the abdomen, there are heavily pigmented and large marginal spots. At the pleural fields there are two smaller, but well pigmented spots, while on the spinal fields from the dorsal side, the spots are large and heavily pigmented. The cornicles are long, well pigmented and dark, and slightly rounded. The cauda is light. Its host are the species *Lathyrus pratensis* and *Vicia* sp. on which they infect the bottom part of the leaves. The species' share in total population is 0.03% in both methods. The species is subrecent and accidental. It was identified only in 1997.

**MICROLOPHIUM Mordvilko, 1914****Aphidinae: Macrosiphini*****Microlophium carnosum* Buckton, 1876**

The species is medium sized from 1.5 – 1.9 mm. On each side of the abdomen it has three poorly pigmented marginal spots (on the second, third and fourth segment of the abdomen). The pleural and the spinal fields on the back side of the abdomen are with no morphological marks or pigmentation whatsoever. The cauda is long and bright. The cornicles are very bright and long, widened at the very top. Its hosts are the species of the genus *Urtica*. It is very frequently found on the species *Urtica dioica*. It lives on the back side of leaves. The species is subrecent in the RST (0.8%), and recent in the YWT (1%). In the RST samples, as well as in the YWT, it was identified in 1997 and 1998.

**UROLEUCON Mordvilko, 1850****Aphidinae: Macrosiphini*****Uroleucon (Uroleucon) tussilaginus* Walker, 1850**

The species is spread in Europe and in the subtropic region. It is medium sized. On the abdomen, the marginal spots are well visible. The cornicles are long with well visible reticulation of the top. The top and the base of the cornicles are more pigmented. The cauda is long and light.

It is a subrecent species in the RST (0.08%). It has not been identified among the YWT samples. According to the frequency of its occurrence, the species is accidental. It was determined in the course of 1996 and 1997.

**CALLIPTERINELLA van der Goot, 1913****Calaphidinae: Calaphidini*****Callipterinella calliptera* Hartig, 1841**

The species is spread all over Europe and across northern Asia all the way to Siberia, Korea and Japan. It was introduced in North America. Apteræ are yellow-greenish to greenish, from 1.5 – 2.5 mm long, often with dark transversal stripes on all the tergites. On the third segment of the antennæ it has eight rhinaria in line. On the fourth segment it has no rhinaria. The male of the species has got - on the third segment - 11-15 rhinaria in a row. Alatae have dorsal markings less well developed. The cornicles are small. The cauda is light. The most frequent host of this species is *Betula pendula*; it comes less frequently to *Betula pubescens*, while in Japan we find it on *Betula platyphylla*. It appears on the bottom side of the leaves, but we may find it also within the leaf together with butterfly larvae. The species secretes honey dew in abundance. Oviparæ and alatae males appear from the month of September to the end of October. It is a subrecent species both in the RST (0,05%) and in the YWT (0,01%). In terms of its frequency of occurrence, it is an accidental species. The species has been determined in the RST and the YWT in the course of 1996 and 1997 respectively, while its finding was not recorded in 1998.

***Callipterinella minutissima* Stroyan, 1953**

The species is spread throughout Europe and was introduced into the western part of North America. Apteræ are small, with fat oval body, green to yellow-green, with a dark stripe on the eight abdominal tergites. The body length ranges from 0.9-1.4 mm. Alatae have a completely light abdomen with abdominal tubercles on the lower part, along the entire abdomena. The antennæ are dark with 5 – 6 rhinaria on the third segment. The cornicles are short and narrowed down towards the top, while their length is lower than the cornicles base diameter. The cauda is short, light, like a button. The males have transversal dark stripes on the dorsal part of the abdomen, pigmented cornicles and 8-9 rhinaria in a row on the third segment of the antennæ. Its host plants

in Europe are *Betula pendula*, *Betula pubescens*, and in North America it colonizes the vegetable species *Betula papyrifera*. Oviparæ and alate males are found on leaves from the month of September to the month of November. It is a subrecent species both in the RST (0.8%) and in the YWT (0.05%). As for the frequency of its occurrence, it is one among the accidental species. It was found in the samples of both methods in all three years of the research.

**PTEROCALLIS Passerini, 1860****Calaphidinae: Panaphidini*****Pterocallis alni* de Geer, 1773**

The species is spread in Europe to the east all the way to Turkey, in Iran and Lebanon, and was introduced into North America, New Zealand, Australia and Chile. It comes in two morphological forms: as winged and non-winged. Both forms are yellow-white to yellow-greenish, of the length 1.3 – 2.0 mm. According to our measurements, the species' length ranges from 1.1 – 1.5 mm. The tips of the antennæ joints are pigmented. The species has black tarsi. It is easily mistaken for *Appendiseta robinæ*. They differ in terms of vein distribution on the front pair of the wings and by the fact that *Pterocallis alni* has a black knee and very pigmented cornicles. In Europe, it comes on *Alnus glutinosa*, on the lower part of the leaves. The species does not secrete honey dew in any abundance, so that ants accompany its appearance only rarely. In North America, it is capable of feeding itself with various species of genus *Alnus*. The species is monoecious and holocyclic. Oviparæ and alate males appear in the month of October. The species is eudominant in the RST (14%), and subdominant in the YWT (2.8%). In terms of the frequency of its occurrence, it pertains to accidental species. Its finds were not recorded in 1996 in the YWT.

**TINOCALLIS Matsumura, 1919****Calaphidinae: Panaphidini*****Tinocallis (Tinocallis) platani* Kaltenbach, 1842**

The species is spread all over Europe, in Asia, to the east to Siberia, and was introduced into the western part of North America. Alatae are yellowish to greenish-white with black-brown marks on the head, chest, abdomen, by the veins (radial, medial and anal), on the wings and the black cornicles. The length ranges from 2.0-2.2 mm, which is consistent with our measurements. The problems of determination are associated with seasonal variations. Thus, for instance, in the course of May, the species has 17–25 rhinaria (usually 20-23) on the third segment, while, in the months of July and August, it has 7-20 rhinaria (usually 11-17). Its hosts are the species of genus *Ulmus*. It is found on the bottom part of the leaves, while it is especially numerous on the *Ulmus laevis* species. In North America, the species was found on *Ulmus americana*. Oviparæ and alate males appear in the month of October. Only several individuals were

determined in the RST in 1997, which is why we categorize it as a subrecent (0.008%) and accidental species. There were no finds of the species in the YWT samples.

**TUBERCULATUS Mordvilko****Calaphidinae: Panaphidini*****Tuberculatus (Tuberculatus) querceus* Kaltenbach, 1843**

A medium size aphid of light yellowish colour. Long antennae segments. On the third segment of the abdomen it has a spinal tubercle shaped as the letter Y, and large black lateral tubercles, which largely facilitates the determination of this kind. The cornicles are black. The species is recent in the RST (1.13%), and subrecent in the YWT (0.02%). In the YWT samples it was identified in 1997 and 1998 respectively, while – among the samples of the RST - it was present throughout the three years of research.

***Tuberculatus (Tuberculoides) moerickei* Hille Ris Lambers, (1972) 1974**

Spread in the Mediterranean region and northwestern Asia. Alatae are light yellow with dark segment edges and dark cornicles ends, 1.4 – 2.6 mm long. Its hosts are the species of genus *Quercus*, while it is particularly numerous on *Q. infectora*. The species is subrecent in the suck-in station (0.6%) and the yellow vessel (0.2%). It is subrecent in the RST (0.08%) and YWT (0.2%). In terms of the frequency of its occurrence it is accidental. Among the RST samples, it was present throughout the three years of the research. Among the YWT samples it was identified in 1997 and 1998 respectfully.

**CHAITOPHORUS Koch, 1854****Chaitophorinae: Chaitophorini*****Chaitophorus leucomelas* Koch, 1854**

The species is spread throughout Europe, southwestern and central Asia, and was introduced into South Africa, North and South America. The length of the species is 1.2 – 2.4 mm, which is consistent with our measurements. The apterous forms have a prolonged oval shape, of light green or yellow colour, with typical dark or dark green pleural stripes. These stripes may also be segmented. It has dark cornicles. Those alatae have a straight with well visible hairs. The third, the fourth and a half of the fifth segment are completely light with 10 – 12 rhinaria on the third segment of the antennae. The rostrum is long and dark. The medial vein of the wings is split in two parts with a visible dark stigma on the upper part. Across the abdomen it has dark parallel stripes and is entirely covered with thick and long hairs. These stripes need not always be clear and very pigmented, but they may also be lighter. The cauda is light and small in the shape of a little button, narrowed down at the top. The cornicles are short, wider on the base, very pigmented, while the length of the siphon is equal to the diameter of the base. It may be mistaken for the species of genus *Periphyllus*. The difference is that the species of genus *Peryphyllus* generally have larger dimensions,

the hairs that cover their body are numerous along the entire body, the cauda is completely short and round, while the length of the cornicles exceeds its base's diameter. The males of the species may have medium to dark abdominal stripes and marginal points. In springtime it appears on young shoots of *Populus sp.*, while later it appears on the bottom side of the leaves. We may find it in leave *galae* abandoned by other insects. The species secretes honey dew in abundance, so that its appearance is always accompanied by a large ant population. Host plants in Europe are mostly *Populus nigra* and other related species and hybrids, while in Northern America it has much more host species. Oviparae and alate males appear in the months of October and November. It is a recent species in the RST (1.9%), and subrecent in the YWT (0.2%). In terms of its occurrence it is accidental. Among the samples of the RST the species was present throughout the three years of the research. Among the YWT samples it was present in 1997, by only two individuals.

***Chaitophorus populeti* Panzer, 1804**

Apterae are oval, dark green to black, with dark green to black antennae, 1.5 – 2.9 mm long. The forms of this species have 15 rhinaria on the third and three rhinaria on the fourth segment of the antennae. The antennae are dark. The first half of the third antennae segment is bright, and these are the morphological marks by which we differentiate it from the previous species. On the abdomen there are dark dorsal stripes, and, from the ventral side, we have 5 dark stripes. The cornicles are very pigmented. The cauda is bright. It is a subrecent species in both the RST (0.05%) and the YWT (0.01%). In terms of the frequency of its occurrence, the species is accidental. In the RST samples it was present in 1996 and 1997. In the YWT it was present throughout the three years of the research.

**PERIPHYLLUS van der Hoeven****Chaitophorinae: Chaitophorini*****Periphyllus californiensis* Shinji, 1917**

It is spread in Europe, North America, Australia and New Zealand. Apterae are dark olive green to brown, with dark brown head and the first segment of the chest, 2.3 – 3.5 mm long. On the abdomen it has dark dorsal segmental spots or stripes. Alatae have 20 scattered rhinaria on the third segment of the antennae, while the end of the sixth joint is 4 times longer than the base. The front is flat, with no protrusions. Across the entire abdomen there are stripes which are very pigmented. The cornicles are conical, longer than the base diameter, but short. The cauda is very short and round. It is easily mistaken for the species of genus *Chaitophorus*. The species lives on the bottom side of the leaves next to the veins of the species *Acer pseudorioboldianum*, but also on *Aesculus turbinata* in Japan. The species is subrecent in the RST (0.2%), and subdominant in the YWT (2.02%). According to the frequency of its occurrence, it is an

accidental species. In the samples of the RST it was identified in 1996 and 1997. Among the YWT samples, the species has been identified in all three years of the research.

**DREPANOSIPHUM Koch, 1855****Drepanosiphinae: Drepanosiphini*****Drepanosiphum acerinum* Walker, 1838**

The species is spread in the whole of Europe, except for the Baltic region. The species is whitish-greenish or yellow, with dark thoracic pendants, 2.1 – 3.3 mm long. The antennae are long with many oval rhinaria on the front half of the third segment. On the fourth and fifth abdominal tergite one may often find a dark transversal stripe. The cornicels are large, elongated and usually dark, while they may also be bright with a dark top. In our research we have not found an individual of the species with completely dark cornicels, most frequently mentioned in the references. All the individuals of this species within our research had lighter cornicels with a darker pigmented top. It appears on the species *Acer pseudoplatanus* on the bottom side of the leaves, which usually lie in the shadow. We find it also on other species of the genus *Acer*. Oviparae and alatae males appear in September and October. There are no finds in the RST, while, in the YWT, it is a subrecent species (0.03%). As for its frequency of occurrence, the species is accidental. The species was present among the YWT samples in 1997 and 1998 respectively.

***Drepanosiphum aceris* Koch, 1855**

The species is spread in the whole of Europe, to the east all the way to Caucasus. Those alatae are yellowish or light white-green 2.7 – 4.2 mm long, which is consistent with our measurements. They have dark thoracic pendants. On the fourth and fifth abdominal tergites there is usually a transversal stripes which is medium pigmented and marginal spots which are to the opposite of the cornicels base. The cornicels are usually light with dark distal ends. It appears on the species *Acer campestre*, most frequently on the bottom side of the leaves in the lower part of the tree top. There were no finds in the RST, while in the YWT it is a subrecent species (0.05%). As to the frequency of its occurrence, the species is accidental. Its finding was recorded only in 1996.

***Drepanosiphum dixoni* Hille Ris Lambers, 1971**

The species is spread in England, the Netherlands, northern Italy, Yugoslavia (after reviewing the literature there were no indications as to its finds in Croatia), which is why we are here providing both its description and its first find on our territory. Alatae are greenish-whitish with a brown head, 2.5 – 3.3 mm long. They have dark thoracic pendants. On the fourth and fifth abdominal tergites there are two transversal

stripes which are very pigmented, and marginal spots opposite to the base cornicels base. The cornicels are light brown to black, but they may also be bright with pigmented distal tops. We find it on the species *Acer campestre* on the bottom side of the leaves, as well as on all *Drepanosiphum* sp. Alatae males and oviparae appear in the month of October. There are no finds in the RST, while in the YWT it is a subrecent species (0.05%). In terms of the frequency of its occurrence, the species is accidental. It was found throughout the three years of research.

**ERIOSOMA Leach, 1818****Eriosomatinae: Eriosomatini*****Eriosoma ulmi* Linnaeus, 1758**

Spread in Europe, southwestern and central Asia, all the way to Mongolia and China. Fundatrix and apterae fundatrigenous aphids are covered with a dark green wax cover, while alatae are brown. The head front is flat. The antennae are short, but the third segment is extremely long given other antennae segments. The rhinaria are very big, completely surrounding the third and the fourth segment, and look like arranged plates. The medial vein on the wings is bifurcated. On the abdomen, there are no marginal spots, the stripes are narrow and well visible. The cornicels are extremely short and, hence visible only as circlets. The cauda is short, elongated, and hardly visible. It may easily be mistaken for the species of the genus *Tetraneura*. The species is holocyclic and heterocercal. We find it in *galae* on the species of genus *Ulmus*. It migrates in the course of June and July on *Ribes rubrum* and *R. nigrum*. The species is subrecent (0.07%) in both the RST and the YWT (0.03%). As for the frequency of its occurrence, the species is accidental. It was found throughout the three years of research.

**HORMAPHIS Osten-Sacken, 1861****Hormaphidinae: Hormaphidini*****Hormaphis betulae* Mordvilko, 1901**

It is spread in northern and central Europe, while it was described also in Japan. The species has low length, of yellow-green or yellow-brown colour. In our determinations, 5 antennae segments were identified with big and wide similar to *Eriosoma* sp. It usually has a single vein on the back wings. It has no cornicels. The abdomen is bright, without marks. The species is similar to *Pemphigus* sp. It is an anholocyclic species on the species of genus *Betula* (*pendula*, *pubescens*, *nana*) in northern and central Europe. In Japan, it is described as the species *Hormaphis gallifoliae* which is holocyclic and forms *galae* on the bottom part of the leaves of the species *Hamamelis japonica*. Alatae leave the *galae* from the month of May all the way until June. The species is subrecent at the RST (0.04%), while there are no finds in the YWT. In terms



of the frequency of its occurrence, the species is accidental. It was identified in 1996 and 1998 respectively.

#### EULACHNUS del Guercio, 1909

#### Lachninae: Eulachnini

##### *Eulachnus* sp. del Guercio, 1909

The genus includes ten species with elongated bodies living on the needles of the species of genus *Pinus*. Not a single species of the said genus is strictly monophagous, although every species shows the tendency towards feeding itself on certain *Pinus* spp. The species of this genus have a flat head and very long legs. The cauda is triangular, and the cornicels are very much reduced (they have the form of circlets). The male and the female have no morphological differences. On the head, the antennae, the legs and the cauda, they have numerous hairs. We were not able to establish exactly which one of the species it is. Only 5 individuals were found among the RST samples in 1997 and 1998, so that it pertains to subrecent species (0.03%), while there were no finds of the species among the YWT samples. In terms of the frequency of its occurrence, the species is accidental.

#### THELAXES Westwood, 1840

#### Thelaxinae

##### *Thelaxes dryophila* Schrank, 1801

The species is spread all over Europe and the Mediterranean region. Alatae are widely oval, dorsoventrally flat, with dark brown reddish to purple-greyish back stripes which need not be easily observable. Alatae have dark marginal sclerites and dorsal transversal stripes on the back abdominal segments. The antennae are made of five short segments. The cauda looks like a button. The cornicels are reduced; there are only their indications similar to circlets. It is a monoecious and holocyclic species. It is hosted by vegetable species from the genus *Quercus*. The sexual forms are covered with wax and appear from June to October on the bottom part of the leaves next to the veins. It is a subrecent species in the RST (0.23%), but it was not found after 1996, while it was not found in the YWT at all. The species is accidental.

### Discussion

By the most part, the newly established species of aphids are forest species who come most frequently on the species of the genus *Betula*, *Populus*, *Acer*, *Pinus*, *Ulmus* and *Quercus*. Several species (*Capitophorus horni*, *Cavariella theobaldi*, *Hyperomyzus lamproanae*, *Megourella purpurea*, *Microlophium carnosum*) of aphids come on the various kinds of weeds from the genus *Vicia*, *Urtica*, as well as on the species of the families Poaceae and Umbeliferae.

This particular composition of aphids may be explained by the RST location in Maksimir, in the middle of the Maksimir park, partially encompassing also a large forest.

Out of the total of 24 newly established species of aphids, 20 species have been determined through the suction trap method (*Callipterinella calliptera*, *Callipterinella minutissima*, *Capitophorus horni*, *Cavariella theobaldi*, *Chaitophorus leucomelas*, *Chaitophorus populeti*, *Elatobium abietinum*, *Eriosoma ulmi*, *Eulachnus* sp., *Hormaphis betulae*, *Macrosiphum gei*, *Megourella purpurea*, *Microlophium carnosum*, *Periphyllus californiensis*, *Pterocallis alni*, *Thelaxes dryophila*, *Tinocallis platani*, *Tuberculatus moerickei*, *Tuberculatus querceus* and *Uroleucon tussilaginus*), while 17 species have been identified through the yellow water trap (*Callipterinella calliptera*, *Callipterinella minutissima*, *Capitophorus horni*, *Cavariella theobaldi*, *Chaitophorus leucomelas*, *Chaitophorus populeti*, *Drepanosiphum acerinum*, *Drepanosiphum aceris*, *Drepanosiphum dixonii*, *Eriosoma ulmi*, *Hyperomyzus lamproanae*, *Megourella purpurea*, *Microlophium carnosum*, *Periphyllus californiensis*, *Pterocallis alni*, *Tuberculatus moerickei* and *Tuberculatus querceus*).

4 species (*Drepanosiphum acerinum*, *Drepanosiphum aceris*, *Drepanosiphum dixonii* and *Hyperomyzus lamproanae*) have been identified in the yellow water trap samples without having been present among the suction trap samples. At the same time, the suction trap samples included 7 species of aphids (*Elatobium abietinum*, *Eulachnus* sp., *Hormaphis betulae*, *Macrosiphum gei*, *Tinocallis platani*, *Thelaxes dryophila* i *Uroleucon tussilaginus*) that were not present among the yellow water trap samples.

By analyzing the domination of the newly established species of aphids among the yellow water trap samples, we have identified 2 subdominant species: *Periphyllus californiensis* (2.02%) and *Pterocallis alni* (2.8%) and one recent species, *Microlophium carnosum* (1.0%). All other species are subrecent with a less than 1% share in total population.

By analyzing the domination of the newly established species of aphids among the suction trap samples, we have identified one eudominant species: *Pterocallis alni* (14%), while two species were recent: *Chaitophorus leucomelas* (1.9%) and *Tuberculatus querceus* (1.13%). All other species are subrecent with a less than 1% share in total population.

In terms of the frequency of occurrence in the samples from both methods, all the species (24) are accidental.

The description of each species includes our own measurements of the parts of its body as compared with those from the world's references. The measurements of the parts of the body do not show any considerable aberration from the reference data, which indicates that no new forms have been created on our territory.

Since we are here talking about new species, our further research will by all means go in the direction of researching their biology, as well as their determination on the host plants.

### Conclusion

In the course of a three-year faunistic research, 24 species have appeared as the newly established species of aphids for which a site in Croatia has been found for the first time. Out of 24 species, 11 species of aphids were determined by Igrc Barčić in the course of 80's (the determinations have not been published), while the same species have been established during this research as well. 13 species of aphids have been determined for the first time in Croatia (Gotlin Čuljak).

Given the importance of aphids, as well as their numerosity (there are around 4500 species worldwide, and 199 known in Croatia), we feel that our faunistic research should be both continued and broadened.

### References

- BLACKMAN, R., L., EASTOP, V., F., 1984, Aphids on the World žs Crops: An Identification Guide  
 BLACKMAN, R., L., EASTOP, V., F., 1994, Aphids on the World žs Trees: An Identification and Information Guide  
 DINARINA, P., 1994, Štetna entomofauna korova Cardaria draba (L.) Desv., Magistarski rad, Zagreb  
 GOTLIN ČULJAK, T., 2001, Istraživanje faune lisnih uši (Aphidina) u Hrvatskoj, Magistarski rad, Zagreb  
 GOTLIN ČULJAK, T., IGRC BARČIĆ, J., 2002, Popis vrsta lisnih natpor. Aphidoidea (Hemiptera, Homoptera, Sternorrhyncha) u Hrvatskoj, Natura Croatica, Vol 11(2), 243-264  
 IGRC, J., MACELJSKI, M., 1988, Rezultati praćenja dinamike populacije lisnih uši na krumpiru u Hrvatskoj u razdoblju 1981-1987. g., Poljoprivredna znanstvena smotra, 53, 3-4, 257-269  
 IGRC BARČIĆ, J. IN MACELJSKI, M., 1999, Poljoprivredna entomologija, Čakovec, 74-110  
 IGRC BARČIĆ, J. IN MACELJSKI, M., 2002, Poljoprivredna entomologija, drugo izdanje, Čakovec, 74 - 123  
 KOVAČEVIĆ, Ž., 1927, Biljne uši na kulturnom bilju, Zagreb, svezak 3  
 KOVAČEVIĆ, Ž., 1956, Primjenjena entomologija, iii knjiga-šumski štetnici, Zagreb  
 KOVAČEVIĆ, Ž., 1961, Primjenjena entomologija, drugo izdanje, ii knjiga - poljoprivredni štetnici, Zagreb  
 NIETO NAFRIA, J. M. et al., 1998: Serie Fauna iberica: Vol. 11 (internet: <http://www.fauna-iberica.mncn.csic.es>).  
 RUPAIS, A., 1969, Atlas of the Baltic Dendrofilous Plantlice, Zinatne, Riga  
 TANASIJEVIĆ, N., EASTOP, F., 1963, Aphid records from Yugoslavia, The Entomologist, 265-269  
 TANASIJEVIĆ, N., EASTOP, F., 1968, Aphid records from Yugoslavia, Entomologists' Monthly Magazine, 55-57  
 TAYLOR, L. R., 1980, A Handbook for Aphids Identification, Euraphid Rothamsted

## COMPARISON OF *MAYETIOLA* SPECIES ASSEMBLAGES AT DIFFERENT GEOGRAPHICAL SCALES: INFLUENCE OF HOST PLANT VARIATION

Maha MEZGHANI KHEMAKHEM<sup>1</sup>, Hanem MAKNI<sup>1,2\*</sup>,  
Mohamed MARRAKCHI<sup>1\*</sup>

<sup>1</sup>Laboratoire de Génétique Moléculaire, Immunologie et Biotechnologie, Faculté des Sciences de Tunis, Université Tunis El Manar, Campus universitaire, 2092 Tunis, TUNISIE.

<sup>2</sup>Institut Supérieur de l'Animation pour la Jeunesse et la Culture de Bir Elbey. \* co-responsible of this work, Corresponding author: Maha Mezghani, Laboratoire de Génétique Moléculaire, Immunologie et Biotechnologie, Faculté des Sciences de Tunis, Université Tunis El Manar, Campus universitaire, 2092 Tunis, TUNISIE. Email : [mezghani.h@planet.tn](mailto:mezghani.h@planet.tn)

Accepted: October 3, 2002.

In Tunisia, two species of *Mayetiola* (*M. destructor* and *M. hordei*) have been identified on the basis of diagnostic alleles and PCR-RFLP of the cytochrome b gene. They are the major pests of wheat and barley responsible for serious crop losses. As these two species show feeding preferences between cereals, knowledge of the population dynamics of this phytophagous insect is needed in order to survey ecology and evolution of host parasite interaction. In this study, the PCR-RFLP technique based on the cytochrome b gene was used to identify the two species of *Mayetiola* and to investigate the relationships with their hosts. The comparison of *Mayetiola* assemblages on barley in different regions in Tunisia, showed a continual geographical gradient variation in species compositions and dominance order. However, on wheat there is a homogenous distribution. Thus, monitoring of pest must take into account our finding that population assemblage differs from host types and geographical location.

### Diptera, Cecidomyiidae, *Mayetiola*, Tunisie

MEZGHANI KHEMAKHEM, M.<sup>1</sup>, MAKNI, H.<sup>1,2\*</sup>, & MARRAKCHI, M.<sup>1\*</sup>, Usporedba dviju skupina vrsta *Mayetiola* u različitim geografskim uvjetima: utjecaj varijacija biljke domaćina, <sup>1</sup>Laboratoire de Génétique Moléculaire, Immunologie et Biotechnologie, Faculté des Sciences de Tunis, Université Tunis El Manar, Campus universitaire, 2092 Tunis, TUNISIE. <sup>2</sup>Institut Supérieur de l'Animation pour la Jeunesse et la Culture de Bir Elbey. \* co-responsible of this work, Corresponding author: Maha Mezghani, Laboratoire de Génétique Moléculaire, Immunologie et Biotechnologie, Faculté des Sciences de Tunis, Université Tunis El Manar, Campus universitaire, 2092 Tunis, TUNISIE. Email : [mezghani.h@planet.tn](mailto:mezghani.h@planet.tn). - Entomol. Croat. 2002, Vol. 6, Num. 1-2: 23 -34

U Tunisu su utvrđene dvije vrste roda *Mayetiola* (*M. destructor* i *M. hordei*) koristeći diagnostičke allele i PCR-RFLP citokroma b gena. Ove su vrste važni štetnici pšenice i ječma te čine velike štete. Kako pokazuju preferenciju pri ishrani ovih žitarica potrebno je poznavati njihovu dinamiku populacije kako bi se mogle pratiti