

***Dichrorampha distinctana* (Herrich-Schäffer, 1851)**

MATERIAL EXAMINED. Draga Bašćanska, 8.VII.1978. - DISTRIBUTION. Europe (?Poland, Czech Republic, Slovakia, Germany, France, Spain, Italy, Switzerland, Austria and Hungary). - BIOLOGY. Food plants, probably *Asteraceae*; adults observed from May till August. - COMMENTS. Reported as new for the Croatian fauna, from the island of Krk, by HABELER (1998).

Aknowledgements

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DIPTERA PESTS ON ONION VEGETABLES IN CROATIA

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The paper presents the list and descriptions of Diptera pests found on onion vegetables in Croatia in the period from 1999-2001. There is also presented the frequency of single species in the total population of flies registered in this period on onion vegetables in Hrastelnica near Sisak. Four species of Diptera from two families of insects were registered: *Delia antiqua* (Meigen) from the family *Anthomyiidae* and *Liriomyza cepae* (Hering), *Chromatomyia horticola* (Goureau) and *Napomyza gymnostoma* (Loew) from the family *Agromyzidae*. According to the references, the species *Suillia lurida* (Meigen) from the family *Heleomyzidae* is also present in Croatia but was not found on onion in these researches. The species *N. gymnostoma* is a new Diptera pest on onion vegetables in Croatia. Before the appearance of *N. gymnostoma*, *D. antiqua* was considered the most important Diptera pest on onion vegetables.

Diptera, Agromyzidae, Anthomyiidae, frequency of occurrence, onion

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U radu su prikazani i opisani kukci iz reda *Diptera* zabilježeni na lukovičastom povrću u Hrvatskoj u razdoblju od 1999-2001. godine. Također su prikazani i udjeli pojedinih vrsta u ukupnoj populaciji muha zabilježenih na lukovičastom povrću u Hrastelnici nedaleko od Siska. Zabilježene su četiri vrste štetnika iz dvije porodice: *Delia antiqua* (Meigen) iz porodice *Anthomyiidae* i *Liriomyza cepae* (Hering), *Chromatomyia horticola* (Goureau), te *Napomyza gymnostoma* (Loew) iz porodice *Agromyzidae*. Prema literaturi vrsta *Suillia lurida* (Meigen) iz porodice *Heleomyzidae* također je prisutna u Hrvatskoj, no tijekom istraživanja nije nađena na luku. Vrsta *N. gymnostoma* novi je član entomofaune dvokrilaca na lukovičastom povrću u Hrvatskoj. Prije pojave *N. gymnostoma*, smatralo se da je vrsta *D. antiqua* najznačajniji štetnik lukovičastog povrća u Hrvatskoj. Navedeni štetnici mogu umanjiti prinos i kakvoću lukovičastog povrća.

Diptera, Agromyzidae, Anthomyiidae, gustoća populacije, luk

Introduction

Onion is seeded in Croatia on over 7000 ha with the average yield of 7.6 t. The main reason for such small yields is onion seeding without irrigation. Some farmers in Croatia who use irrigation achieve much higher yields with good economic profit (LEŠIĆ et al., 2002). Other factors that could decrease yields are pests, weeds and diseases.

Pests can not only reduce the yield of onion vegetables, but also the quality. By damaging leaves, these pests provoke colour changing, reduce assimilation area, and – in cases of higher infestation – may provoke the wilting of plants. Infestation of leaves affects the quality of bulbs only indirectly. Pests that damage bulbs can provoke the wilting of plants and always reduce the quantity of bulbs. The most important pests of onion and other onion vegetables belong to four different insect orders *Thysanoptera*, *Lepidoptera*, *Coleoptera* and *Diptera*. *Thrips tabaci* Lindeman is the most common and harmful thrips and moths *Acrolepiopsis assectella* Zeller can sometimes affect the yield as well. In the past few years damage on leek caused by the beetle *Lilioceris merdigera* has also been recorded (MACELJSKI, 2002). Larvae of various phytophagous Diptera *Suillia lurida* (Meigen), *Delia antiqua* (Meigen), *Liriomyza cepae* (Hering), *Chromatomyia horticola* (Goureau) and *Napomyza gymnostoma* (Loew) cause more frequent and serious damage on onions.

Materials and Methods

The research concerning the fauna of the phytophagous flies on onions lasted three years (1999-2001). Observations were conducted during last half of March, April and first half of July every year. It was conducted using visual and mechanical methods. The method consisted in a detailed visual examination of onion plants, including a thorough inspection of bulbs. Visual examinations were conducted twice a week. In addition yellow sticky traps of dimensions 24.5'18 cm and manufactured by the Slovenian "Unichem" were used for the adult flight survey. The traps were placed on a field in the village Hrastelnica near Sisak. The same objects and methods were used during all three years of trials. In that field, the onion plants of cultivar "Stuttgarter-Holland yellow" were planted. The total area of the field is 5200 m² and onion was planted each year on the area of 1000 m². Traps were hanged on woody sticks so that the traps' bottom margin was 40 cm above the ground. Traps were replaced every 14 days. Traps with insects were taken to the laboratory of the Department for Agricul-

tural Zoology at the Faculty of Agriculture in Zagreb, where the insects were identified.

The mechanical method consisted in the use of McPhail container with the feeding attractant hydrolyzed protein "Buminal" in the concentration of 1%. It has been specially designed, so that insects once coming into the liquid inside the container cannot leave it. Insects caught in the McPhail container were taken to the laboratory for identification every week.

For identifying Diptera species, the following keys have been used: SPENCER 1972, 1973, 1976, 1990; SPENCER & STEYSKAL, 1986; SCHMIDT, 1970; NOVAK'S collection of Diptera insects from the family *Agromyzidae* at the Croatian Natural Sciences Museum in Zagreb.

Determination of *Napomyza gymnostoma* was confirmed by Gabrijel SELJAK, MSc from Nova Gorica, Slovenia, assisted by Franjo PEROVIĆ, MSc from the Croatian Natural Sciences Museum in Zagreb.

Nomenclature of observed pests were also checked in INRA's pest insects list (INRA, 2002) and in collection Diptera from the Iceland from Copenhagen Zoological museum (2002).

Results and Discussion

During the three-year trials in Sisak, several thousand onion plants were visually examined. In 1999, 1120 plants were visually examined and 193 of them were infested by various fly species. The largest number of these plants was infested with the leek-mining fly (*N. gymnostoma*) – 185. Only 4 plants were infested by the onion fly (*D. antiqua*), 19 plants by *Ch. horticola* and 2 plants by *L. cepae*.

In the year 2000, 3200 plants of onion were thoroughly examined. Number of infested plants with Diptera pests was 137. The majority of infested plants were attacked by *N. gymnostoma* – 130 plants; 29 plants were infested by *Ch. horticola*, 4 plants by *D. antiqua* and only 2 plants by *L. cepae*.

The same trials were conducted in 2001, when 2800 plants of onion were thoroughly examined and 297 plants were found to be infested by Diptera pests. For the third consecutive year, the highest infestation was with the species *N. gymnostoma* – 271 plants. In 2001, the infestation with the onion fly (*D. antiqua*) increased on 24 infested plants. 15 plants of onion were infested by *Ch. horticola* and 5 plants by *L. cepae*. Those results are graphically presented in Figure 1.

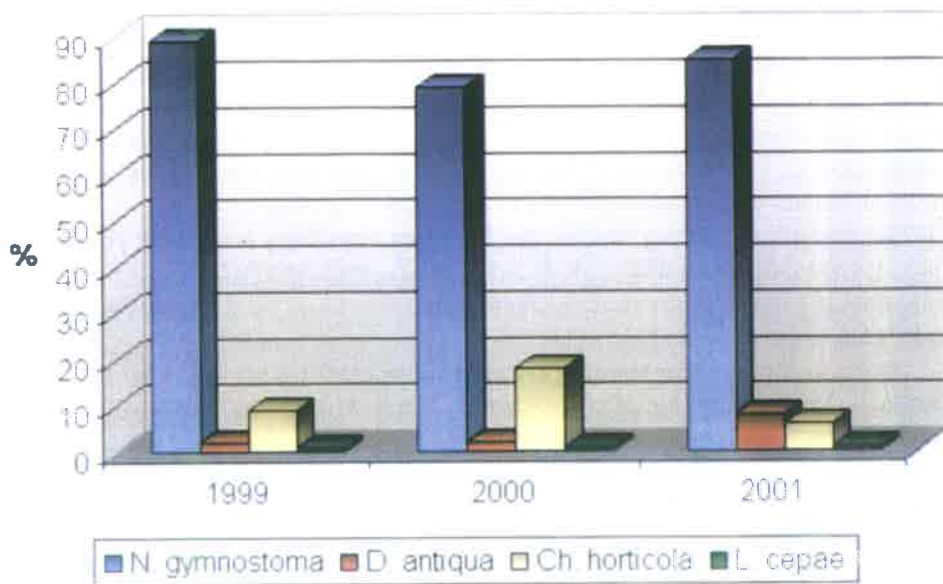


Figure 1. Relative shares of single species in total population of Diptera species on onions in Sisak in the period 1999-2001.

It is obviously that the species *N. gymnostoma* is the most dominant species feeding on onions in Croatia. Until the appearance of *N. gymnostoma* in 1990s, *D. antiqua* was considered the most important pest of onions in Croatia (IGRC BARČIĆ and MEŠIĆ, 2000). Now, its frequency and damages are smaller and less important than that of *N. gymnostoma*. From the graphs there is easy to notice that the frequency of *D. antiqua* increased in 2001. The reason might be a very humid weather in that spring. In the three-year observations, the second most frequent fly species on onions was *Ch. horticola*. From the agricultural point of view, it is not an important pest. Its share decreased in 2001 probably because of the higher humidity in that spring. *L. cepae* was present in the smallest share out of all four fly species on onions in Croatia.

Description of Diptera pests found on onions in Croatia in the period 1999-2001

Delia antiqua (Meigen, 1826), syn. *Hylemia antiqua*, *Phorbia antiqua* – onion fly

Onion fly is an important pest on onion vegetables in Croatia. Its presence was relatively scarce in 1999 and 2000 but increased in 2001. It is spread in all areas in

Croatia where onion is planted. It is the most important onion pest in the United States where it can destroy 20-90% of untreated onion plants (FRIELANDER, 1999).

Onion fly is the only known pest of onions belonging to the family *Anthomyiidae*, while others are members of the family *Agromyzidae*. The adult fly is similar to *Musca domestica*, but a bit smaller, 6-7 mm long. It has a yellowish-grey body with five dark stripes on the thorax, yellowish wings and black legs and antennae. Eggs are white, elliptic and 1.2-1.5 mm long. Larvae are yellowish-white, at the end of development 8-10 mm long. Pupa is light to dark brown, ovoid; width 2.5 mm; length 5-7 mm (MACELJSKI, 1999; MEŠIĆ, 2003).

In continental Croatia, it has two generations per year. Pupae spend the winter in the ground. The first imagos appear at the end of April and the beginning of May, later than the adult of the leek mining fly. Adults copulate after several days and females lay eggs. One female lays 150-200 eggs during her lifetime. Eggs are laid in groups of 4-9, usually on leaf base, plant neck or on the ground around the plant. After 2-8 days, the first larvae appear. Adults live less than two months. Larvae penetrate into plant tissue close to leaf base or into onion neck. Larvae feed inside the plants where they spend their entire lifetime. At the end of their development they pupate inside the infected tissue or leave the plant and pupate in the ground close to the plant. The development of pupae lasts 14-25 days. Adult flies of the second generation fly since the beginning of June till the beginning of July. Under good weather conditions, a third generation may be developed, but this is rarely the case. The possible adults of the third generation fly during August and attack the plants close to the harvest period. Larvae damage the plant stem and bulb of onion and leek, rarely of garlic. The first sign of infestation with onion fly is that the central leaf becomes yellow and withers. The leaf may easily be dragged out. Soon after that other leaves wither, plants are lying down and bulbs decay. The most harmful is the first generation of this pest because it attacks young plants. If the older plants are infected, there is more difficult to keep them in stock. (FINCH et al., 1986; SPASIĆ, 1995; MACELJSKI, 1999; CHAPUT, 2000; MEŠIĆ, 2003).

Liriomyza cepae (Hering, 1927), syn. *Dizygomyza cepae* - onion leaf miner

Onion leaf miner *Liriomyza cepae* (Hering) attacks only onion, but the damage caused by it in Croatia is usually very small. In the last few years, there was no economically important damage caused by this insect. In Croatia *Liriomyza cepae* was recorded for the first time on October 22, 1955 in Split. Specimens from this locality are deposited in Novak's collection of Diptera insects from the family *Agromyzidae* at

the Croatian Natural Sciences Museum in Zagreb. MAČEK (1998) wrote about *L. cepae* as an onion pest in Slovenia.

NIETZKE (1943, 1945, cit. SPENCER, 1973) divided the species *L. cepae* into two different races - the "Oggersheim race" which represented the "true" *L. cepae* and the "Herxheim race" which was described much later by Spencer as a new species - *Liriomyza nietzkei* Spencer, 1973. NOLTE (1960, cit. SPENCER 1973) noticed great damages on leek during October in areas of Halle and Magdeburg and in summer of 1963 (1964, cit. SPENCER, 1973) also on onion in the Aschersleben area. NOLTE writes in both papers about damage caused by *L. cepae*, but SPENCER (1973) claims that obviously both species were present there. SHANAB and BOGNAR (cit. SPENCER, 1973) observe damages caused by *Dizygomyza cepae* in Hungary and SPENCER (1973) thinks once more that is by both species - *L. cepae* and *L. nietzkei*.

SPENCER (1973) divides these two species as per their morphological characteristics. According to SPENCER (1973), *L. cepae* has a totally dark scutellum, pleura is mostly black, and femora is also black - at least on the upper side; wings and veins are pallid; wing length ranges from 2 mm in male to 2.5 mm in female. The species *L. nietzkei* has a yellowish scutellum, pleura is also more yellowish, femora is light yellow, and the species is smaller - wing length is from 1.6 mm in male to 1.9 mm in female. Adults of both species are medium-sized, with a conspicuously angulated third antennal segment, largely dark coxae and milky wings (SPENCER, 1973). Larva is lightly yellowish, with length in the final stage up to 3 mm. Pupa is reddish-brown, 3 mm long (MACELJSKI, 1999; MEŠIĆ, 2003).

According to our determinations only the "true" *Liriomyza cepae* occurs in Croatia.

Pupa overwinters in the ground. Adults fly from the end of April and during May. Hatched larva penetrates into the leaf tissue and makes the mine; at the beginning tight, widening then more and more as the larva grows. At the end of development, larva leaves the plant and falls on the ground. It pupates in the ground. Annually, the insect has 2-3 generations. Sometimes it can cause serious damage, especially its first generation when young and still weakly developed plants are attacked (MACELJSKI, 2002; MEŠIĆ, 2003).

Chromatomyia horticola (Goureau, 1851), syn. *Phytomyza horticola*

The main host suffering damage from *Ch. horticola* is pea, but it can also feed on lettuce, bean and on many other hosts belonging to several plant families - e.g. *Asteraceae*, *Papaveraceae*, *Alliaceae*, *Brassicaceae*, *Malvaceae* and *Fabaceae*. It can feed

on plants from 34 different families (GRIFFITHS, 1974; ANČEV & POSTOLOVSKI, 1977).

The genus *Chromatomyia* was established by Hardy (1849) for a group of seven European species having slipper-shaped pupae, which remain in the leaf at the end of the mine, as opposed to the barrel-shaped pupae of genus *Phytomyza*, which transform "on the ground". HENDEL (1932, cit. SPENCER & STEYSKAL, 1986) did not accept Hardy's genus, while it is also treated as a synonym of *Phytomyza* by FRICK (1952, cit. SPENCER & STEYSKAL, 1986; SPENCER, 1990) in his generic revision of North American species. The genus *Chromatomyia* was reviewed by GRIFFITHS (1974), who referred to it as "all those species of *Phytomyza* s. l. in whose males the distal section of the ejaculatory duct is simple (not bifid) and lies below a lobe on the "dorsal" (in anteriorly directed rest position) side of the aedeagus".

The species *Phytomyza horticola* was described by Goureau in 1851. In further scientific papers, SÉGUY (1934), BALACHOVSKY & MESNIL (1935) and HENNING (1953) consider the species *Phytomyza horticola* Goureau as a synonym for the species *Phytomyza articornis* Meigen. In Croatia, NOVAK made the first note about this species on May 4, 1951 in Palagruža, and his determination was confirmed by SPENCER in 1963 (collection of family *Agromyzidae* at the Croatian Natural Sciences Museum in Zagreb). Later, in 1965, it was found on the island Hvar, on the plants *Chrysanthemum coronarium* and *Cirsium creticum*.

The species *Ch. horticola* is largely spread throughout Europe, particularly in Mediterranean area. It occurs in some parts of Asia - including Japan, in South Africa, and it has been registered locally in the rest of Africa. It isn't common in Northern Europe and was not found in Australia and New Zealand (PAGLIARINI & SPASIĆ, 1984).

The mesonotum is distinctively mat, ash-grey, without acrostichals. The frons is broad, twice the width of the eye, and not projecting above the eye in profile. Orbital setulae are in a single row and proclinate. Eye is round and jowls deep up to 1/3 the height of the eye. Third antennal segment is small and round. Arista appears bare. The wing length is from 2.2-2.6 mm. The second costal section is short, 1½-2 times the length of the fourth. Frons is yellow or slightly darker, more orange. Orbits are always somewhat paler. The third antennal segment and palps are black. Face is greyish-black. Mesonotum is ash-grey and the sides of the thorax are similar. Coxae and femora are black, knees are yellow and tarsi are black. Aedeagus is characteristic, with diverging arms, strongly developed and V-shaped (SPENCER, 1973).

The early stages cannot be differentiated from those of *Chromatomyia syngenesiae* (Hardy) using classical morphological methods, adults only by the shape of aedeagus. The oval, white egg is smooth and shining and the chorion is without reticulation.

The full-grown larva can be up to 3 mm long. The delicate puparium is whitish-grey, somewhat flattened, measuring up to 2.5 mm in length (SPENCER, 1973).

One female lays approximately 330 eggs in her lifetime (AHMAD & GUPTA, cit. SPENCER, 1973). Embryonal development is 2-4 days. Larvae live between two leaf epidermises. They feed in the upper part of the leaf parenchyma. The larval leaf-mine is irregularly linear. At the temperature of 23-28°, the larvae develop in 5.2 days. They pupate in a pupal bubble at the end of mine. They stay in that stage for 7-15 days. Thus, the total development period of this insect lasts 14-21 days (PAGLIARINI & SPASIĆ, 1984; MEŠIĆ, 2003).

Napomyza gymnostoma (Loew, 1858)

N. gymnostoma has become the most important and the most frequent pest of onion vegetables in Croatia (IGRC BARČIĆ & MEŠIĆ, 2000).

H. Loew described the species as *Phytomyza gymnostoma* in 1858. Hendel described it with the same name in 1935, but he also used the synonyms *Phytomyza palpalis* or *Phytomyza palpata*. DARVAS (1988) for *Napomyza gymnostoma* also uses synonyms *Phytomyza algeriracensis* Strobl, 1906 and *Agromyza phytomyzina* Hering, 1933. SPENCER (1976) and SOÓS & PAPP (1984) use the name *Napomyza gymnostoma* (Loew).

According to the general concept of the genus *Phytomyza*, the basic characteristics are orbital setulae that proclinate and costa extending only to vein R₄₊₅. Therefore, there are still several species from the genus *Phytomyza* without the characteristic transversal vein. According to the differences in the morphology of terminal parts of male genitalia, it was established as belonging to the new genus *Napomyza* Westwood. The difference in morphology is based on the presence of small, straitened traces of sternum 8, partially connected with tergites 6-8 (SPENCER, 1973, 1976; SPENCER & STEYSKAL, 1986).

Imagos of *N. gymnostoma* are 3,5-4 mm long. Frons is broad, three times the width of the eye. Orbits are considerably projecting above the eye in profile. It has two upper orbital setae (ors) and three lower orbital setae (ori), all on the inner margin of the broad orbits. Orbital setulae are comparatively long and all proclinate. Jowls are deeply extended at the rear, up to 2/3 the height of the eye. The third antennal segment is rounded at the end, but elongated. Broad epistoma is present and palps broaden distally. According to SPENCER (1976), wing length is from 2.8 mm in males to 3.5 mm in females. In Croatia, we have measured wings from 2.9 mm in male to 4.0 mm in female (MEŠIĆ, 2003). SELJAK (1998) have measured in Slovenia wings length 3,0-4,1 mm, in average 3,52 mm and SPASIĆ (1994) writes that male wings length 3,5

mm and female 4 mm. The second costal section is long, four times the length of the fourth. Cross-vein is lacking. Colour of frons is orange yellow, hind-margin of eye and orbits to mid-ori is black. The first and second antennal segments are yellowish and the third is black - mesonotum is mat greyish black. Sides of thorax are uniformly dark. Legs are black, but knees are indistinctly yellowish. The species *N. gymnostoma* has the head, including the broad epistoma, exactly as in true *Napomyzas*. But, it is atypical in several characteristics. The aedagus is greatly reduced and the distal section remains divided; the 8th sternum is almost lost and the surstyli are free. The second costal section is long. The puparium differs from other species in the genus by being deeply segmented and it also retains the primitive arrangement of 3 spiracular bulbs (SPENCER, 1976; SELJAK, 1998; MEŠIĆ, 2003).

The leek mining fly has two generations per year: the spring and the autumnal one. Pupa overwinters in infected plants or in the ground. In spring, imago flies from the middle of March till the end of April. After its emergence from pupa, imago feeds on onion plants. The first sign of its presence are small white spots lined up on the surface of the leaf. After copulation, female lays eggs on leaf neck. Larvae can be found from the last decade of March till the end of May. During the summer period pupae goes in diapause. First adults of the second generation may be found in the second decade of September. After copulation, females of the second generation lay eggs on the leaves neck of leek. Larvae feed inside the plants during October and in the first decade of November. Pupation takes place inside the host plants or in the ground, where pupae overwinter as well (MEŠIĆ, 2003).



Picture 1: *Napomyza gymnostoma* Loew (MEŠIĆ, 2003, orig.)

Suillia lurida (Meigen, 1830), syn. *Heleomyza lurida* - garlic fly

Garlic fly (*Suillia lurida*) is a Diptera of palearctic origin. It belongs to the family *Heleomyzidae*, subfamily *Suilliinae* (CZERNY, 1927).

S. lurida is a common pest on garlic in Croatia, but it causes only occasionally some smaller damage on onion and leek. In some years, when the weather conditions are suitable for this pest, larvae of *S. lurida* can destroy up to 70% of plants in the field (MACELJSKI et al., 1997).

The pest was not found in our three-year research.

Conclusion

The species *Napomyza gymnostoma* became in late 1990s the most important and the most frequent fly pest on onion vegetables in Croatia. It is the only fly species that has permanently been causing economically important damage on onion vegetables in the last five years. In our research, its frequency in the total population of flies in the experimental area was between 79-88%.

The species *Delia antiqua* was the most important and dominant fly in the total pest population on onion vegetables in Croatia until the appearance of *N. gymnostoma* in late 1990s. It still appears in larger populations in the years with humid springs, but never in frequency higher than that of *N. gymnostoma*. In 1999 and 2000 its share was only 2%, but in the rainy spring of 2001 it increased to 8%. In such years it could cause damage of economic importance.

Polyphagous species *Chromatomyia horticola* is the second most frequent fly on onions registered in our research. The frequency of its population in total Diptera population in the research period was between 6% in very rainy springs to 18% in dry springs. Larvae of this species feed on plants from several families, but only exceptionally they cause some economic damage. The reason for this is the fact that larvae of *Ch. horticola* feed exclusively in leaves. Otherwise, larvae of *N. gymnostoma* and *D. antiqua* feed in bulbs and plant neck and are therefore much more noxious.

Liriomyza cepae has not been represented in larger populations. Each year, the frequency of this species in total population of all onion flies was only 1%. It is important to mention that only *Liriomyza cepae*, but not *Liriomyza nietzkei* was found in these researches. Garlic fly *Suillia lurida* could be found on onions according to the references, but hasn't been found in this three-year research.

This is the present situation of population distribution of different Diptera species on onion vegetables in Croatia. The situation would have been totally different if researches had been conducted ten years ago.

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CVRČCI RODA *Hauptidia* (HEMIPTERA, AUCHENORRHYNCHA, CICADELLIDAE) - MALO POZNATI ŠTETNICI UKRASNOG BILJA I POVRĆA U HRVATSKOJ I SLOVENIJI.

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Cvrčak *Hauptidia distinguenda* (Kirschbaum) nova je vrsta za faunu Hrvatske i Slovenije. U slobodnoj prirodi, u vrtovima i na balkonima u Zagreba ljeti 2003. god. ta je vrsta uzrokovala znatna oštećenja na surfinijama i ukrasnoj rajčici. U Slovenskom primorju takva oštećenja u zaštićenom prostoru na jaglacima uzrokovala je vrsta *H. provincialis* (Ribaut). S obzirom da se radi o novim potencijalno štetnim vrstama u zaštićenom prostoru i na vanjskim površinama kod nas, u članku su obrađene morfološke razlike između tri vrste roda *Hauptidia*, izgled i intenzitet šteta koje mogu izazvati.

Hauptidia distinguenda, *H. provincialis*, *H. maroccana*, Cicadellidae, Typhlocybininae, *Lycopersicon*, *Petunia*, Hrvatska, Slovenija, rajčica, surfinija.

¹SELJAK, G., ²PAGLIARINI, N. The leafhoppers of the genus *Hauptidia* (Hemiptera, Auchenorrhyncha, Cicadellidae) little known pests on ornamental plants and vegetables in Croatia and Slovenia. - ¹Agricultural and Forestry Institute Nova Gorica, Pri hrastu 18, SI-5000 Nova Gorica, Slovenia; ²Hreljinska 21, 10000 Zagreb, Croatia - Entomol. Croat. 2004, Vol. 8. Num.1-2: 57-64.

The leafhopper *Hauptidia distinguenda* (Kirschbaum) is a new species to the fauna of Croatia and Slovenia. In 2003 its appearance outdoors, in gardens and on the balconies in Zagreb region led to the remarkable injuries on tomato and *Surfinia*-plants. In Slovenian coastland identical injuries on indoor primroses have been caused by the species *H. provincialis* (Ribaut). Since they are new potential pests of cultivated plants in greenhouses and gardens, comparative morphological characteristics of three species of the genus *Hauptidia* are given. The type of injuries and damage on cultivated plants are also discussed.

Hauptidia distinguenda, *H. provincialis*, *H. maroccana*, Cicadellidae, Typhlocybininae, *Lycopersicon*, *Petunia*, Croatia, Slovenia, tomato, *Surfinia*

Uvod

Cvrčci roda *Hauptidia* iz potporodice Typhlocybininae, u poljoprivrednoj su praksi malo poznati kukci jer europske vrste vrlo rijetko izazivaju značajnija oštećenja na