EKOLOGIJA. 2005. Nr. 2. P. 22-28

Dipterous miners collected in greenhouse areas in Lithuania

Henrikas Ostrauskas[1],

Saulius Pakalniškis[2],

Loreta Taluntytė[3]

[1, 3] *Lithuanian State Plant Protection Service, Pelesos 85, LT-11351 Vilnius, Lithuania*
E-mail: vaathe@ vaat.lt [1], vaatlo@ vaat.lt [3]

[2] *Institute of Ecology of Vilnius University, Akademijos 2, LT-08412, Vilnius, Lithuania*
E-mail: saupak@ekoi.lt

Dipterous miners were searched in Lithuanian closed habitats (industrial and temporary greenhouses) by using sticky traps and examining mined plants. The frequency of *Liriomyza bryoniae* was highest among all dipterous miner species found in sticky traps. *Chromatomyia horticola, Liriomyza phryne, Agromyza albipennis, L. taraxaci, L. congesta, Hydrellia griseola, L. soror, Phytomyza wahlgreni* were further most frequent in sticky traps after *L. bryoniae*. *Amauromyza luteiceps* and *Pseudonapomyza moraviae* are new species for Lithuania. *Liriomyza labanoro, L. obliqua* and *Phytomyza ferina* are very rare species in Lithuania; *Liriomyza intonsa* and *Phytoliriomyza arctica* are rare insects in natural habitats, their distribution was supplemented with new data. Mines of *Liriomyza strigata* were most abundant in closed systems, *L. bryoniae* being less abundant. In total, 93 dipterous miners of 5 families were identified in closed system habitats during 1997 and 1999-2003. 55% of the species discovered were found also on vegetation outside, and these 51 dipterous miner species in closed habitats made 36% of all species discovered in greenhouse surroundings in 2001-2003 (Ostrauskas et ai., 2003). Since greenhouses in Lithuania are systems not closed enough (they have no insect nets on windows or wind fences), the nearest vicinity (outside territories) can serve as a reservation for pests of plants cultivated inside. The list of dipterous miners in Lithuanian greenhouse areas up to 2003 contained 174 species of 7 families.

Key words: dipterous miners, sticky traps, Lithuania, greenhouse area

INTRODUCTION

The tomato leaf miner *Liriomyza bryoniae* (Kaltenbach, 1858) was a quarantine species for Lithuania (Lietuvos..., 2000) and for Europe (Quarantine..., 1997). This species was found in open territories of Lithuania (Pakalniškis et ai., 2000), but only some data were available about the distribution of *L. bryoniae* in closed systems of the country (Nečajeva et ai., 2003; Taluntytė 2001; Taluntytė, 2002). On the other hand, *Liriomyza trifolii,* also a quarantine species, was intercepted in 2002 with imported *Gypsophila* (Ostrauskas, 2002). Thu, a survey was organised for searching economically important *Liriomyza* species in a relatively warm habitat of closed systems.

Many species (as well as individuals) of dipterous miners that stick to the traps are not related to plants cultivated or weeds growing inside and get into greenhouses from the environment. A retroactive connection with the vicinity of greenhouses is noticeable, too (Ostrauskas et ai., 2003).

The present study is aimed at analysis of usual fauna of mining Diptera in closed systems of Lithuania and their relationship with the environment.

MATERIALS AND METHODS

In total, 2356 colour sticky traps produced by the AgriSense company (USA) and Hombio firm (Belgium) were used in industrial and temporary greenhouses from late May to late August in 1997 and 1999-2003. The crops were vegetables (10 plant species), spice, strawberries, ornamentals (30 species). The majority of traps were set on tomato (37% of all traps) and on cucumber (30%). In total, greenhouse plants of 238 companies and private farmers were searched for mining dipterans during six years throughout Lithuania, and 17% of growers' closed systems were investigated for 3 or more years. The other kind of material, the majority of dipterans, were determined according to the mines formed by larvae *in situ,* and the plants were determined at the site in greenhouses

during the same investigation period. Part of samples - mines (104) in plant leaves (tomato, cucumber, capsicum and eggplant) - were delivered by inspectors to the Phytosanitary Research Laboratory for rearing larvae till adult stage. In total, 433 mines from 62 growers were checked. Both methods (trapping and dipteran identification by mines) were used in closed system crops of 249 growers.

The genitalia of miner adults were mounted according to the published method (Spencer, 1981). A number of Agromyzidae specimens (females belonging to certain groups of 6 genera) could not been determined correctly in the absence of early stages or imago males.

The frequency of dipterous miners (%) was counted as a ratio of the number of sticky traps with one species caught to the quantity of all used catch plates. The Menhinick index *(R)* for evaluation of species abundance and the S0rensen coefficient *(S)* for evaluation of similarity of species composition were used (Ludwig, Reynolds, 1988).

RESULTS

The frequency of *Liriomyza btyoniae* was the highest among all dipterous miner species found using traps in greenhouses with 8 cultivated crops (Table 1). In total, individuals of tomato leaf miner specimens made 52% of all specimens. The tomato leaf miner was found in greenhouses of 1 grower in 1997, of 5 in 1999, of 12 in 2000, of 26 in 2001, of 24 in 2002, of 26 in 2003, in total of 70 growers during six years, and it made 29% of all investigated growers. Forty-five new localities and 10 new administrative districts were added to the list of the distribution of *L. bryoniae* in Lithuania. The increased number of sites depended on the number of traps used and not on the species spreading.

Chromatomyia horticola, Liriomyza phryne, Agromyza albipennis, L. taraxaci, L. congesta, Hydrelliagriseola, L. soror, Phytomyza wahlgreni were second most frequent in sticky traps after *L. bryoniae. Amauromyza luteiceps* and *Pseudonapomyza moraviae* are new species for Lithuania. *Liriomyza labanoro* and *Phytomyza ferina* are very rare in Lithuania (Pakalniškis et ai., 2000), their host plants and biology are not known. *Liriomyza obliqua* is also very rare (Pakalniškis et ai., 2000), and its first host plant has been determined recently (Ostrauskas et ai., 2005). *Liriomyza intonsa* and *Phytoliriomyza arctica,* rare insects in natural habitats (Pakalniškis et ai., 2000), were found, too. New sites of findings were added to the list of species distribution in Lithuania: Kazokai (Molėtai district) for *Liriomyza "labanoro;* Daugai, Lelionys and Panemuninkai (Alytus district), Kvietiniai (Klaipėda district), Laibiškiai (Ukmergė district), Ruoščiai (Kėdainiai district), Šiauliai for *L. intonsa;* Laibiškiai (Ukmergė district) and Kėdainiai (Kėdainiai district) for *L. obliqua;* Laibiškiai (Ukmergė district) for *Phytomyza ferina;* Punia (Alytus district) for *Phytoliriomyza arctica.*

There were 77 species found on tomato crops and 53 species on cucumber. Distinctly purer fauna was obtained on capsicum (21), *Lilium* (20), 11 mixed flowers (11), *Rosa* (10), *Gerbera* (7), *Dianthus* and *Alstroemeria* (4), *Brassica* (cabbage), *Laurus, Lavandula* (3), *Begonium* and *Chrysanthemum* (2), over *Cucurbita* (zucchini), *Lactuca* (lettuce), *Solanum* (eggplant), spice and not specified vegetables (1). Many insect species (Table 1) do not attack plants cultivated in greenhouses according to the published data (Ivinskis et ai., 2000; Spencer, 1973; Spencer, 1990), they were non-target species trapped in greenhouses, or some weeds growing inside could be the hosts (pure crop management). In total, 92 species from 4 families of dipterous miners were discovered during six years of trapping.

Mines of *Liriomyza strigata* were most abundant (51% of all mines found) in greenhouses, and they were determined on 9 genera of plants (Table 2). *L. bryoniae* was less abundant (25% of all mines), found on three crops in 37 growers' greenhouses. *Chromatomyia horticola* mined mostly *Cucumis* and *Lycopersicon,* other plant genera were attacked by this species occasionally. These three species of dipterans could influence the crop quality, especially damaging plant sets (Beiger, 1989; Spencer, 1973). Parasitic wasps attacked 16 larvae (6 of *Liriomyza strigata* and 10 of *Chromatomyia horticola)* according to our rearing data (15% of miners in leaves delivered to the laboratory). In total, 8 species belonging to 3 families of dipterous miners were determined from mines. Three species were connected with crop and 7 species were determined on weeds.

When we summarized the data of both methods applied, *Liriomyza bryoniae* was found in 81 industrial and temporary greenhouses (32.5%), and individuals of tomato leaf miner made 49% of all specimens. The majority of *Liriomyza bryoniae* localities were discovered only once, 12 sites - 2 years, 4 sites - 3 years and 2 sites - 4 years. The *L. bryoniae* sites in greenhouses were detected in all 10 Lithuanian State Plant Protection Service regions. There were in total 93 dipterous miners of 5 families identified in closed system habitats. The list of dipterous miners contained 51 species discovered in greenhouse vicinity (Ostrauskas et ai., 2004). It made 55% of all species trapped in greenhouses and 36% of all species in greenhouse vicinity discovered during 2001-2003.

DISCUSSION

There were even 85 species of dipterous miners discovered in the temporary greenhouses. The natural ground is often used here, and it is one of the insect sources; also weeds can remain here comparatively abundant and variegated in some years, attracting and occasionally breeding the miners. Usually

Table I. List of dipterous miners caught with sticky traps in Lithuanian greenhouses during 1997 and 1999-2003

FAMILY, *species*	Frequency (%)	Number of specimens	Crop
AGROMYZIDAE			
Agromyza albipennis Meigen	1.40	44	*Cucumis, Lycopersicon, Capsicum, Lilium Chrysanthemum*
Agromyza filipendulae Spencer	0.04	1	*Lycopersicon*
Agromyza frontella (Rondani)	0.04	1	*Lycopersicon*
Agromyza lucida Hendel	0.04	1	*Lycopersicon*
Agromyza mobilis Meigen	0.17	5	*Capsicum, Cucumis, Lycopersicon, Begonium,* not specified flowers
Agromyza nigrella (Rondani)	0.21	5	*Lycopersicon, Rosa*
Agromyza nigripes Meigen	0.25	11	*Capsicum, Cucumis, Lycopersicon, Gerbera*
Agromyza nigrociliata Hendel	0.08	2	*Cucumis*
Agromyza rondensis Strobl	0.13	3	*Gerbera, Rosa*
Agromyza spp. ?S	0.68	20	*Capsicum, Cucumis, Lycopersicon, Lilium, Petunia*
Amauromyza chenopodivora Spencer	0.42	26	*Capsicum, Cucumis, Lycopersicon, Alstroemeria*
Amauromyza labiatarum (Hendel)	0.04	1	*Lilium*
Amauromyza luteiceps (Hendel)	0.04	4	*Capsicum, Cucumis, Lycopersicon*
Amauromyza monfalconensis (Strobl)	0.30	7	*Brassica, Cucumis, Lycopersicon, Cucurbita* (zucchini)
Aulagromyza tridentata (Loew)	0.04	1	*Cucumis*
Calycomyza artemisiae (Kaltenbach)	0.08	2	*Capsicum, Cucumis, Lycopersicon,* not specified flowers
Cerodontha atra (Meigen)	0.21	6	*Lycopersicon*
Cerodontha caricicola (Hering)	0.08	2	*Lycopersicon*
Cerodontha denticornis (Panzer)	0.42	10	*Cucumis, Lycopersicon, Rosa*
Cerodontha fasciata (Strobl)	0.04	1	*Lycopersicon*
Cerodontha fulvipes (Meigen)	0.13	3	*Lycopersicon*
Cerodontha incisa (Meigen)	0.30	7	*Cucumis, Lycopersicon, Lilium*
Cerodontha lateralis (Macquart)	0.21	6	*Cucumis, Lycopersicon, Lilium*
Cerodontha morosa (Meigen)	0.04	1	*Lycopersicon*
Cerodontha muscina (Hendel)	0.81	19	*Cucumis, Lycopersicon*
Cerodontha pygmaea (Meigen)	0.21	6	*Cucumis, Lycopersicon*
Cerodontha superciliosa (Zetterstedt)	0.08	2	*Lycopersicon*
Cerodontha suturalis (Hendel)	0.04	1	*Lycopersicon*
Cerodontha spp. ??	0.04	2	*Lycopersicon*
Chromatomyia horticola (Goureau)	4.03	138	*Capsicum, Cucumis, Lactuca* (lettuce), *Lycopersicon, Chrysanthemum, Dianthus, Gerbera, Laurus, Lavandula, Lilium, Rosa,* not specified flowers
Liriomyza artemisicola de Meijere	0.17	5	*Cucumis, Lycopersicon*
Liriomyza bryoniae (Kaltenbach)	9.25	1525	*Capsicum, Cucumis, Lycopersicon, Solanum* (eggplant), not specified spices and vegetables, *Alstroemeria, Lilium, Rosa,* not specified flowers
Liriomyza cannabis Hendel	0.04	1	*Lycopersicon*
Liriomyza centaureae Hering	0.04	1	not specified flowers
Liriomyza congesta (Becker)	1.06	41	*Brassica, Cucumis, Lycopersicon, Dianthus, Gerbera, Laurus, Lavandula, Lilium,* not specified flowers
Liriomyza endiviae Hering	0.04	1	*Cucumis*
Liriomyza eupatorii (Kaltenbach)	0.13	3	*Cucumis, Lycopersicon*
Liriomyza flaveola (Fallen)	0.17	4	*Cucumis, Lycopersicon*

Liriomyza graminivora Hering	0.04	1	*Lycopersicon*
Liriomyza hampsteadensis Spencer	0.04	1	*Cucumis, Lycopersicon*
Liriomyza hieracivora Spencer	0.04	2	*Lycopersicon*
Liriomyza infuscata Hering	0.04	1	*Lycopersicon*
Liriomyza intonsa Spencer	0.64	25	*Capsicum, Cucumis, Lycopersicon*
Liriomyza labanoro Pakalniškis	0.04	1	*Lycopersicon*
Liriomyza obligua Hendel	0.08	2	*Lycopersicon*
Liriomyza phryne Hendel	1.44	45	*Capsicum, Cucumis, Lycopersicon, Lilium, Rosa*
Liriomyza pisivora Hering	0.13	3	*Cucumis, Lycopersicon, Gerbera*
Liriomyza ptarmicae de Meijere	0.25	6	*Lycopersicon, Alstroemeria, Rosa,* not specified flowers
Liriomyza sonchi Hendel	0.21	5	*Cucumis, Lycopersicon,* not specified flowers
Liriomyza soror Hendel	0.98	34	*Capsicum, Cucumis, Lycopersicon, Laurus, Lavandula, Lilium*
Liriomyza spp.	9.59	542	*Capsicum, Cucumis, Lactuca, Lycopersicon,* not specified vegetables, *Celosia, Chrysanthemum, Gerbera, Lavandula, Lilium, Petunia, Rosa, Rosmarinus,* not specified flowers
Liriomyza strigata (Meigen)	0.21	6	*Cucumis, Lycopersicon, Dianthus*
Liriomyza taraxaci Hering	1.15	39	*Brassica, Capsicum, Cucumis, Lycopersicon, Lilium, Rosa*
Liriomyza violicaulis Hering	0.04	1	*Lycopersicon*
Melanagromyza aeneoventris (Fallen)	0.08	2	*Capsicum, Cucumis, Lycopersicon*
Melanagromyza albociila Hendel	0.04	1	*Capsicum, Cucumis, Lycopersicon*
Melanagromyza dettmeri Hering	0.04	1	*Lycopersicon*
Melanagromyza lappae (Loew)	0.08	2	*Lycopersicon*
Melanagromyza oligophaga Spencer	0.04	1	*Lycopersicon*
Melanagromyza pubescens Hendel	0.13	3	*Capsicum, Cucumis, Lycopersicon, Lilium*
Melanagromyza spp.	0.51	13	*Capsicum, Cucumis, Lycopersicon, Lilium, Rosa*
Napomyza lateralis (Fallen)	0.08	2	*Cucumis, Lycopersicon*
Ophiomyia alliariae Hering	0.04	1	*Lycopersicon*
Ophiomyia cunctata (Hendel)	0.21	5	*Cucumis, Lycopersicon, Lilium*
Ophiomyia curvipalpis (Zetterstedt)	0.08	2	*Lycopersicon*
Ophiomyia disordens Pakalniškis	0.04	1	*Lycopersicon*
Ophiomyia galii Hering	0.04	1	*Lycopersicon*
Ophiomyia labiatarum Hering	0.08	2	*Capsicum, Cucumis, Lycopersicon*
Ophiomyia nasuta (Melander)	0.04	1	*Lycopersicon*
Ophiomyia ononidis Spencer	0.08	2	*Lycopersicon*
Ophiomyia orbiculata (Hendel)	0.21	5	*Capsicum, Cucumis, Lycopersicon*
Ophiomyia puticaria (Meigen)	0.47	14	*Cucumis, Lycopersicon, Rosa,* not specified flowers
Ophiomyia spp.	0.13	3	*Lycopersicon*
Phytoliriomyza arctica (Lundbeck)	0.08	2	*Lycopersicon, Dianthus*
Phytoliriomyza dorsata (Siebke)	0.13	3	*Capsicum, Cucumis, Lycopersicon, Lilium*
Phytoliriomyza melampyga (Loew)	0.04	1	*Cucumis*
Phytoliriomyza perpusilla (Meigen)	0.08	2	*Lycopersicon*
Phytoliriomyza sp.	0.04	1	*Cucumis*
Phytomyza albipennis Fallen	0.08	2	*Cucumis, Gerbera*
Phytomyza brischkei Hendel	0.04	1	*Cucumis*
Phytomyza clematidis Kaltenbach	0.04	1	*Cucumis*
Phytomyza crassiseta Zetterstedt	0.04	1	*Capsicum, Cucumis, Lycopersicon*
Phytomyza fallaciosa Brischke	0.08	2	*Lilium*
Phytomyza ferina Spencer	0.04	1	*Lycopersicon*
Phytomyza heringiana Hendel	0.04	1	*Lycopersicon*
Phytomyza lappae Goureau	0.04	1	*Lilium*

Table I (continued)

FAMILY, *species*	Frequency (%)	Number of specimens	Crop
AGROMYZIDAE			
Phytomyza plantaginis Robineu-Desvoidy	0.04	1	*Cucumis*
Phytomyza pullula Zetterstedt	0.21	5	*Cucumis, Lycopersicon*
Phytomyza ranunculi (Schrank)	0.08	2	*Cucumis*
Phytomyza rufipes Meigen	0.38	9	*Capsicum, Cucumis, Lycopersicon, Lilium*
Phytomyza spp. S9	0.76	18	*Capsicum, Cucumis, Lycopersicon, Lilium*
Phytomyza spinaciae Hendel	0.08	2	*Lycopersicon*
Phytomyza wahlgreni Rydėn	0.93	47	*Cucumis, Lycopersicon, Begonium, Gerbera, Rosa,* not specified flowers
Pseudonapomyza atra (Meigen)	0.42	10	*Capsicum, Cucumis, Lycopersicon, Lilium*
Pseudonapomyza moraviae Černý	0.04	1	*Cucumis*
Pseudonapomyza spp.	0.55	14	*Capsicum, Cucumis, Lycopersicon, Rosa*
DROSOPHILIDAE			
Scaptomyza flava (Fallen)	0.04	1	*Lycopersicon*
Scaptomyza graminum (Fallen)	0.25	7	*Cucumis, Lycopersicon, Lilium*
EPHYDRIDAE			
Hydrelliagriseola (Fallen)	1.06	30	*Cucumis, Lycopersicon, Lilium,* not specified flowers
TEPHRITIDAE			
Acùiia cognata (Wiedemann)	0.21	15	*Cucumis, Lycopersicon, Alstroemeria*

Table 2. Dipterous miners determined according to the mines formed by larvae *in situ* in greenhouses or reared up to imago from plant parts delivered from greenhouses to the laboratory

FAMILY, *species*	Number of mines/specimens	Crop or plant genus as hosts	Year
AGROMYZIDAE			
Chromatomyia horticola (Goureau)	94	*Antirrhinum, Capsella, Chrysanthemum, Cucumis, Galinsoga, Lactuca, Lycopersicon, Rudbeckia, Senecio, Sonchus, Taraxacum*	2001-2003
Liriomyza bryoniae (Kaltenbach)	108	*Capsicum, Cucumis, Lycopersicon*	1999-2003
Liriomyza congesta (Becker)	2	*Trifolium, Medicago*	2003
Liriomyza sonchi Hendel	1	*Sonchus*	2003
Liriomyza strigata (Meigen)	222	*Brassica, Capsicum, Chrysanthemum, Cirsium, Cucumis, Datura, Lycopersicon, Physocarpus, Solanum*	2002-2003
ANTHOMYHDAE			
Pegomyia hyosciami (Panzer)	1	*Chenopodium*	2003
Pegomyia spp.	3	*Chenopodium, Rumex*	2003
DROSOPHILIDAE			
Scaptomyza flava (Fallen)	1	*Armoracia*	2003
Scaptomyza graminum (Fallen)	1	*Stellaria*	2003

some trees, vegetable gardens and parterre are present in the nearest reaches, too. So the species abundance of mining dipterans was found here to being $R = 2.07$, containing mostly species ordinary in Lithuanian country settlements.

In the industrial greenhouses 47 species were discovered ($R = 1.77$), the majority of them being *Agromyza, Cerodontha* and *Liriomyza* grass miners, and 2 species feeding on *Taraxacum {Liriomyza taraxaci, Phytomyza wahlgreni)* must be noted as abundant al-

so. That should reflect the more specific and monotonous fauna of the short grassland surrounding the greenhouses.

Thus, the species discovered in industrial and in temporary greenhouses were not similar (S = 0.56), but the distribution of 9 species (Table 2) reproducing inside on crops and sparse weeds does not allow to reveal any difference of this kind.

Every glass (polyethylene) construction can serve for further insects as a refuge or work as a trap attractive for more light and warmth, as well as like a Malaise trap, forming an artificial wall (obstacle) with windows (entrances into the glasshouse).

Nevertheless, the species compositions discovered in closed systems were not similar (S = 0.43) to species composition in open habitats (greenhouse surroundings). Thus, part of species that represent the richer (R = 2.94) vicinity fauna very probably get into greenhouses and stick to the traps more frequently than other dipterous leaf miners, and that can depend on species behaviour as well. For example, mines of *Liriomyza strigata* were more frequent and abundant than of *L. btyoniae,* but the number of the first species imagines stuck to the traps was miserable. Since greenhouses in Lithuania are systems not closed enough (no insect nets on windows or wind fences), the nearest vicinity (outside territories) can serve as a reservation for pests of plants cultivated inside.

The total list of dipterous miners in the areas of Lithuanian greenhouses up to 2003 contained 174 species of 7 families.

CONCLUSIONS

1. The species of dipterous miners found in closed systems generally represent the common fauna of Lithuanian townships and farmstead fauna, but some very rare species detected here cannot be called accidental, although their biology is usually unknown.

2. Many of the species sticking to the traps are not related to the plants cultivated or common weeds growing inside, and get into greenhouses from the environment.

3. Since greenhouses in Lithuania are not closed systems (no insect nets on windows or wind fences), the nearest surroundings can serve as a reservation for pests of plants cultivated inside.

4. The attractivity of coloured sticky traps is evidently different for certain dipterous miners, and a complex of methods is desirable in pest research.

ACKNOWLEDGEMENTS

We are grateful to inspectors from Lithuanian State Plant Protection Service for setting traps in greenhouses and sampling mines.

Received 15 September 2003

References

1. Beiger M. Miniarki (Agromyzidae) - szkodniki roślin uzytkowych. *Seria Zoologia.* Wydawnictwo naukowe UAM w Poznaniu, 1989. Vol. 16. P. 1-97.

2. Ivinskis P., Pakalniškis S., Jonaitis V. Structure and distribution of trophic relations of different groups of insects in various ecosystems. In: Jonaitis V. (ed.). *The Inter-Ecosystematic Relationships of Insects and Their Dynamics.* Institute of Ecology, 2000. Vol. 11. P. 226.

3. Lietuvos Respublikos žemės ūkio ministro 2000 11 20 įsakymas Nr. 315: Dėl karantininių organizmų, augalų, augalinių produktų ir kitų objektų sąrašų patvirtinimo ir 1998 12 28 įsakymo Nr. 321 pripažinimo netekusiu galios. *Valstybės žinios.* 2000. Nr. 102. P. 59.

4. Ludwig J. A., Reynolds J. F. *Statistical Ecology. A Primer on Methods and Computing.* New York-Singapore: John Wiley & Sons, 1988.

5. Nečajeva L., Mackevičius J., Grigaliūnas J., Taluntytė L. (eds.). *Augalų apsauga. 2002 metų veiklos apžvalga.* Vilnius: VAAT, 2003.

6. Ostrauskas H. Šilumamėgė minamusė išauginta Lietuvoje. *Baltasis gandras.* 2002. Nr. 5-6. P. 28-29.

7. Ostrauskas H., Pakalniškis S., Taluntytė L. The species composition of plant mining dipterous (Insecta: Diptera) of greenhouse surroundings in Lithuania. *Ekologija.* 2003. Nr. 3. P. 3-11.

8. Ostrauskas H., Pakalniškis S., Taluntytė L. Dipteran leafminers in the vicinity of glasshouses and plant markets in Lithuania. *OEPP/EPPO Bulletin.* 2005. N 34.

9. Pakalniškis S., Rimšaitė J., Sprangauskaitė-Bernotienė R., Butautaitė R., Podėnas S. Checklist of Lithuanian Diptera. *Actą Zoologica Lituanica.* 2000. Vol. 10. N 1. P. 3-58.

10. Quarantine Pests for Europe. *Data Sheets on quarantine pests for the European Union and for the European and Mediterranean Plant Protection Organization.* CAB International. Paris, 1997.

11. Spencer K. A. Agromyzidae (Diptera) of economic importance. *Series Entomologica.* 1973. Vol. 9. P. 1-418.

12. Spencer K. A. A revisionary study of leaf-mining flies (Agromyzidae) of California. *Univ. Calif, Div. Agric. Sciences,* Spec. Publ. 1981. 3273. P. 1-489.

13. Spencer K. A. Host Specialization in the World Agromyzidae. *Series Entomologica.* 1990. Vol. 45. p. 1-444.

14. Taluntytė L. 2000 metais Fitosanitarinių tyrimų laboratorijoje atliktų tyrimų suvestinė. In: Gošovskienė J. (ed.). *Augalų apsauga.* VAAT. Vilnius, 2001. P. 22-27.

15. Taluntytė L. Fitosanitarinių tyrimų laboratorijos tyrimų 20001 metais suvestinė. In: Gošovskienė J. (ed.). *Augalų apsauga. Apžvalga 2001.* VAAT. Vilnius, 2002. P. 26-29.

Henrikas Ostrauskas, Saulius Pakalniškis,
Loreta Taluntytė

MINUOJANTIEJI DVISPARNIAI, APTIKTI LIETUVOS ŠILTNAMIŲ PLOTUOSE

Santrauka

Minuojantys dvisparniai ieškoti uždarose sistemose (pramoniniuose ir laikinuose šiltnamiuose), naudojant klijines gaudykles bei tiriant minuotus augalus. *Liriomyza bryoniae* buvo dažniausia iš visų aptiktų minuojančiųjų dvisparnių šiltnamiuose pakabintose gaudyklėse. Kitos dažnos gaudyklėse rūšys buvo šios: *Chromatomyia horticola, Liriomyza phryne, Agromyza albipennis, Liriomyza taraxaci, Liriomyza congesta, Hydrellia griseola, Liriomyza soror, Phytomyza wahlgreni.* Nustatytos naujos Lietuvai rūšys - *Amauromyza luteiceps* ir *Pseudonapomyza moraviae. Liriomyza labanoro, L. obliqua* ir *Phytomyza ferina* - labai retos rūšys Lietuvoje; *Liriomyza intonsa* ir *Phytoliriomyza arctica* - reti vabzdžiai natūraliose cenozėse, jų paplitimas papildytas naujais duomenimis. *Liriomyza strigata* minos buvo dažniausiai aptinkamos, rečiau pasitaikė *Liriomyza bryoniae* minos. Iš viso 1997 ir 1999-2003 m. Lietuvos šiltnamiuose surastos 93 minuojančių dvisparnių rūšys, priklausančios 5 šeimoms. Šio sąrašo 55% rūšių aptikta šiltnamių išorėje augusiuose augaluose, ir ši 51 rūšis sudarė 36% visų rūšių, suregistruotų šiltnamių aplinkoje 2001-2003 m. (Ostrauskas ir kt., 2003). Kadangi šiltnamiai Lietuvoje - nepakankamai uždaros sistemos (ant langų nėra vabzdžių tinklelių ar oro srovės užuolaidų), šiltnamių aplinka gali būti kenkėjų rezervacija, turinti įtakos viduje auginamiems augalams. Iš viso šiltnamių plotuose iki 2003 m. imtinai nustatytos 174 minuojančių dvisparnių rūšys, priklausančios 7 šeimoms.