

Records of Coccinellidae (Insecta: Coleoptera) collected in Latvia (2007–2009), with emphasis on species found in orchards and greeneries

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Abstract

As many ladybirds are predators with agricultural significance, these insects can be useful in fruit orchards. From 2007 to 2009 these beetles have been collected in different orchards, as well as in other habitats. One of research tasks was to obtain data on predatory ladybird diversity in orchards. In total 1569 specimens have been collected and 17 species have been identified and reported here. The most common and dominant species in orchards are three predaceous ladybirds — *Adalia bipunctata*, *Coccinella septempunctata* and *Propylea quatuordecimpunctata*.

Keywords: useful insects, ladybeetles, biodiversity

Introduction

Ladybird family (Coccinellidae) are a species-rich group of beetles with agricultural significance (Iperti 1999; Seago & al. 2011). These beetles generally are predators, phytophages or fungivores (Hagen 1962; Obrycki & Kring 1998; Giorgi & al. 2009; Sutherland & Parrella 2009). However, for some particular species or for adult beetles, mixed feeding has also been reported, when ladybirds are attracted by floral and extrafloral nectar or other food produced by flowers, or fungivory mixed with predation (Pemberton & Vandenberg 1993; Lundgren 2009a, 2009b; Sutherland & Parrella 2009). Predatory ladybirds are natural enemies of aphids, mealybugs, mites, psyllids, scale insects, whiteflies and some other insects (Putman 1955; Hagen 1962; Herren & Neuenschwander 1991; Iperti 1999; Giorgi & al. 2009; Hodek & Honěk 2009; Obrycki & al. 2009) as well as of other arthropods with agricultural importance. However, it has been reported that some aphids are poisonous for particular species of ladybirds (Hodek 1967). Due to the agricultural importance of ladybirds, several species have been used or introduced into new areas as biological control agents and some of them have been established in new territories (Obrycki & Kring 1998; Iperti 1999; Adriaens & al. 2003; Obrycki & al. 2009). *Harmonia axyridis*, a ladybird species of Asian origin is one of those used as a biological control agent against aphids, but now this species has expanded into many new areas outside its native range, and *Harmonia axyridis* has become highly invasive, threatening native ladybird species (Coderre & al. 1995; Adriaens & al. 2003; Kenis & al. 2010; Brown & al. 2011; Katsanis & al. 2013).

Information on ladybirds inhabiting the territory of Latvia has been available since the 18th century, but the number of works specifically dedicated to this beetle family is quite small. In most publications ladybirds are reported together with other insects (Spuris 1990, Bar-

ševskis & Lazdāns 2010). Two catalogues dedicated only to ladybirds in the fauna of Latvia have been published, and the most recent catalogue lists 61 species (Spuris 1990, Barševskis & Lazdāns 2010), including *Harmonia axyridis*, which is alien for Latvia (Barševskis 2009, Barševskis & Lazdāns 2010; Gudžinskas & al. 2014; Telnov & al. 2016). Ladybirds, collected during research conducted from 2007 to 2009 are reported in this article. The research was mainly done to obtain more information on useful insect diversity in orchards, particularly where fruit plants are grown. Information on ladybirds caught outside orchards has been reported here also.

Materials and methods

Beetles were collected by different methods — using an entomological net, collection by hand or shaking of woody plants. A portion of the beetles were caught on yellow glue (sticky) traps that were used for *Rhagoletis cerasi* monitoring. The majority of beetle samples were collected from woody plants, particularly in orchards, home gardens and greeneries. Beetles were identified in the laboratory by stereomicroscopy. All identified ladybird species are listed in alphabetical order followed by locality information. Data for each locality (**loc.**) is organised in chronological order for each plant species (plant names listed in alphabetical order). Number of caught specimens (ind.) is shown after each date. Unfortunately, ladybird collection material was damaged and lost during storage and this report is prepared on the base of register of newly identified beetles. Only species that have been identified to species level are included in this report. All specimens were caught (except one) and identified by the author.

Results and discussion

Over three years (2007–2009), a total of 1569 ladybird specimens were caught and identified as

belonging to 17 species (Table 1). The abundance of several species was increased during the 2007 season. This also explains why a large number of beetles were caught on yellow glue traps exposed in cherry orchards to monitor *Rhagoletis cerasi* flies during the summer of 2007, when a total of 592 ladybirds belonging to eight species were caught — *Adalia bipunctata* (176 ind.), *Adalia decempunctata* (5), *Coccinella septempunctata* (253), *Halyzia sedecimguttata* (1), *Propylea quatuordecimpunctata* (143), *Psyllobora vigintiduopunctata* (5), *Tytthaspis sedecimpunctata* (6), and *Vibidia duodecimguttata* (3). In 2008 and 2009, ladybirds were not so abundant. The most dominant species, especially in orchards and greeneries are *Adalia bipunctata*, *Coccinella septempunctata* and *Propylea quatuordecimpunctata*, and accordingly 387, 613 and 326 specimens of each species were caught (Table 1).

It was observed that *Adalia bipunctata* and especially *Coccinella septempunctata* are attracted by flowers and these ladybirds quite often were caught from flowers of blackcurrants, redcurrants and different rosaceous fruit-plants. *Coccinella septempunctata* caught from flowers were usually covered with pollen and it seems that in addition to bees and bumblebees, these ladybirds are pollen carriers. Attraction to nectar for adult ladybirds, including both mentioned species was also observed previously (Pemberton & Vandenberg 1993)

This study and other observations (A. Stalažs, unpublished data) show that *Adalia bipunctata*, *Coccinella septempunctata* and *Propylea quatuordecimpunctata* are the most dominant species of ladybirds inhabiting different types of gardens and orchards. As mentioned, ladybirds are predators on aphids (Hagen 1962; Thomson & Simmonds 1965; Klausnitzer & Klausnitzer 1979; Erkin 1983; Iperiti 1999; Lundgren 2009b; Triltsch 1999; Kalushkov & Hodek 2004; Giorgi & al. 2009; Sutherland & Parrella 2009), and these species are important natural enemies in gardens and fruit-plant orchards. Presence of ladybirds and other predatory arthropods now is important for farmers, as integrated plant growing systems are required in Latvia and other countries within the European Union. Farmers are recommended to take into account the need to maintain

places suitable for useful arthropod wintering. From previous research it is known that *Adalia bipunctata* is abundant in open areas, orchards and especially these beetles are associated with urban habitats (Лусис 1961; Приедитис 1973; Barševskis 1989), that was also confirmed in this study. *Adalia bipunctata* is not always the dominant species, but it is quite common (Table 2), while *Coccinella septempunctata* and *Propylea quatuordecimpunctata* are usually most abundant (Приедитис 1973; Pūtele 1977; Ozols 1985; Lazdāns & Barševskis 2010). According to Ozols (1985), *Coccinella septempunctata* is also common in coniferous forests where it is massively abundant species in crowns of Scots pine (*Pinus sylvestris*) (Table 3). In Latvia, *Coccinella septempunctata* and *Coccinella quinquepunctata* are also abundant in strawberry agrocenoses (Petrova & al. 2006). According to observations, *Propylea quatuordecimpunctata* prefer open habitats — grasslands, home gardens, orchards etc., and also woodlands.

Table 1 Number of ladybird species identified per year (2007–2009)

	2007	2008	2009
<i>Adalia bipunctata</i>	387	3	25
<i>Adalia decempunctata</i>	16	0	0
<i>Anatis ocellata</i>	4	1	3
<i>Anisosticta novemdecimpunctata</i>	1	0	0
<i>Calvia decemguttata</i>	1	0	0
<i>Calvia quatuordecimguttata</i>	3	1	10
<i>Ceratomegilla notata</i>	2	0	0
<i>Chilocorus renipustulatus</i>	5	0	0
<i>Coccinella quinquepunctata</i>	10	0	0
<i>Coccinella septempunctata</i>	613	24	23
<i>Halyzia sedecimguttata</i>	4	0	0
<i>Myzia oblongoguttata</i>	2	0	0
<i>Oenopia conglobata</i>	24	1	2
<i>Propylea quatuordecimpunctata</i>	326	29	20
<i>Psyllobora vigintiduopunctata</i>	18	2	0
<i>Tytthaspis sedecimpunctata</i>	6	0	0
<i>Vibidia duodecimguttata</i>	3	0	0
	1425	61	83
Total:	1569		

Table 2 Most frequently recorded species in comparison with previous studies

Ladybird species	Number of beetles		%		Number of beetles		%		Number of beetles		%	
	This study		Приедитис 1973		Pūtele 1977							
<i>Adalia bipunctata</i>	415	26.4	87	2.8	19	2.3						
<i>Adalia decempunctata</i>	16	1.0	3	0.1	1	0.1						
<i>Calvia quatuordecimguttata</i>	14	0.9	424	13.8	4	0.5						
<i>Chilocorus renipustulatus</i>	5	0.3	258	8.4	6	0.7						
<i>Coccinella quinquepunctata</i>	10	0.6	1086	35.4	143	17.0						
<i>Coccinella septempunctata</i>	660	42.1	288	9.4	127	15.1						
<i>Propylea quatuordecimpunctata</i>	375	23.9	647	21.1	251	29.8						
<i>Psyllobora vigintiduopunctata</i>	20	1.3	7	0.2	91	10.8						
<i>Tytthaspis sedecimpunctata</i>	6	0.4	3	0.1	47	5.6						
All species in total	1569		3067		843							

Two species, *Anatis ocellata* and *Myzia oblongoguttata*, are specialists, mainly associated with coniferous trees and both these ladybird species usually occur only sporadically on other plants (Durska & al. 2003; Sloggett 2008). In this study, only one record of *Anatis ocellata* [(in the Gribulīte river valley (Gribuļupīte))] was spatially distant from typical coniferous forests. Although both species have been caught in orchards of the Latvia State Institute of Fruit-Growing, since 1 January 2016 name of institute is *Institute of Horticulture*, Agricultural University of Latvia (Krimūnu pagasts), this site is close to a Scots pine (*Pinus sylvestris*) forest mixed with deciduous trees. In accordance to habitat choice, all three dominant species, *Adalia bipunctata*, *Coccinella septempunctata* and *Propylea quatuordecimpunctata*, are generalists (Sloggett 2008), which explains the wide range of their distribution. *Oenopia conglobata* was recorded locally, mainly in Riga and Salaspils.

Parthenocissus quinquefolia (06-05-2007, 2 ind.); **loc.** surroundings of Augusta Deglava iela near railway, Rīga, from *Tilia* sp. (07-05-2007, 1 ind.); **loc.** forest Bīķernieku mežs, Rīga, from *Prunus padus* (14-05-2007, 3 ind.); **loc.** Lienes iela near Vagonu iela, Rīga, from *Tilia* sp. (16-05-2007, 1 ind.); **loc.** railway station "Dobeles", Dobeles, Dobeles novads, from *Rosa rugosa* (16-05-2007, 1 ind.); **loc.** territory of National Botanical Garden of Latvia, Salaspils, Salaspils novads, from *Prunus padus* (17-05-2007, 4 ind.); *Salix* sp. (17-05-2007, 1 ind.); **loc.** Pērnavas iela near Matīsa iela, Rīga, from *Tilia* spp. (17-05-2007, 3 ind.); **loc.** Rīga Port territory oposit Hanzas iela, Rīga (N 56.96241; E 024.09706), from *Malus* sp. (18-05-2007, 1 ind.); *Tilia* spp. (18-05-2007, 3 ind.); **loc.** Vagonu iela, Rīga, from *Crataegus* sp. (18-05-2007, 7 ind.); *Tilia* spp. (18-05-2007, 25 ind.); **loc.** Kronvalda bulvāris, Rīga, from *Tilia* sp. (18-05-2007, 1 ind.); **loc.** Kalpaka bulvāris near Kongresu Nams, Rīga, from *Tilia* sp. (18-05-2007, 2 ind.); **loc.** city forest park, Dobeles, Dobeles novads (N 56.60761; E 023. 28731), from *Corylus avellana* (21-05-2007, 1 ind.); *Prunus padus* (21-05-2007, 1 ind.); **loc.** Jaunolaine, Olaines pagasts, Olaines novads, from *Crataegus* sp. (22-05-2007, 3 ind.); **loc.** Pērnavas iela 77, Rīga, from *Malus* sp. (25-05-2007, 3 ind.); *Prunus cerasus* (25-05-2007, 2 ind.); *Prunus domestica* (25-05-2007, 5 ind.); indoors (19-10-2008, 1 ind.); **loc.** railway edge near "Dau-

Table 3 Ladybirds in forests: review of ladybirds found in Scots pine (*Pinus sylvestris*) crowns, according to Ozols (1985)

Ladybird species	Occurrence
<i>Adalia bipunctata</i>	rare
<i>Anatis ocellata</i>	rather rare
<i>Calvia quatuordecimguttata</i>	rather rare
<i>Coccinella quinquepunctata</i>	frequently
<i>Coccinella septempunctata</i>	highly frequently, massively abundant species
<i>Exochomus quadripustulatus</i>	rather rare
<i>Halyzia sedecimguttata</i>	rather rare
<i>Hippodamia septemmaculata</i>	rather rare
<i>Myzia oblongoguttata</i>	rather rare
<i>Parexochomus nigromaculatus</i>	rare
<i>Propylea quatuordecimpunctata</i>	rather rare
<i>Psyllobora vigintiduopunctata</i>	rather rare
<i>Scymnus nigrinus</i>	highly frequently
<i>Scymnus suturalis</i>	rather rare

List of species (new records)

Adalia bipunctata (Linnaeus, 1758)

Feeding: generally aphidophagous; facultatively coccidophagous and pollen (Hagen 1962; Thomson & Simmonds 1965; Klausnitzer & Klausnitzer 1979; Erkin 1983; Ipert 1999; Lundgren 2009b).

loc. orchards of Latvia State Institute of Fruit-Growing, Krimūnu pagasts, Dobeles novads, from *Abies concolor* (07-05-2007, 1 ind.; 11-05-2007, 1 ind.); *Amelanchier* sp. (27-04-2007, 1 ind.); *Caragana arborescens* (07-05-2007, 2 ind.); *Corylus avellana* (26-04-2007, 1 ind.; 10-05-2007, 2 ind.; 10-07-2007, 1 ind.; 11-06-2009, 1 ind.); *Corylus colurna* (22-05-2007, 2 ind.; 24-05-2007, 5 ind.; 31-05-2007, 3 ind.; 11-06-2007, 1 ind.); *Crataegus* spp. (24-05-2007, 2 ind.; 20-05-2008, 1 ind.; 04-05-2009, 3 ind.; 21-05-2009, 7 ind.; 01-06-2009, 4 ind.; 10-06-2009, 1 ind.; 11-06-2009, 5 ind.); *Lonicera* spp. (15-05-2007, 1 ind.); *Malus* spp. (10-05-2007, 1 ind.; 16-05-2007, 1 ind.); *Prunus avium* (07-05-2007, 3 ind.; 21-05-2007, 5 ind.; 31-05-2007, 8 ind.; 05-06-2007, 4 ind.; 12-06-2007, 3 ind.; 20-06-2007, 2 ind.); *Prunus cerasus* (21-05-2007, 3 ind.; 31-05-2007, 2 ind.; 05-06-2007, 1 ind.; 20-06-2007, 2 ind.); *Prunus domestica* (21-05-2007, 3 ind.; 31-05-2007, 1 ind.; 12-06-2007, 1 ind.); *Prunus padus* (26-04-2007, 10 ind.; 07-05-2007, 1 ind.); *Prunus* spp. (12-05-2009, 1 ind.; 25-05-2009, 1 ind.) *Pyrus* spp. (27-04-2007, 2 ind.; 07-05-2007, 3 ind.; 21-05-2007, 5 ind.; 24-05-2007, 4 ind.); *Ribes* spp. (27-04-2007, 3 ind.; 05-06-2007, 1 ind.; 16-06-2009, 2 ind.); *Rosa rugosa* (25-06-2007, 1 ind.); yellow glue traps in *Prunus avium* orchard (11-05-16-05-2007, 1 ind.; 17-05-22-05-2007, 7 ind.; 18-05-13-06-2007, 2 ind.; 06-06-12-06-2007, 115 ind.; 13-06-20-06-2007, 51 ind.); **loc.** Vagonparks near Lauvas iela, Rīga, from *Rosa* sp. (28-04-2007, 1 ind.); **loc.** surroundings of Stopiņu iela and Vestienas iela, Rīga, from *Prunus cerasifera* (05-05-2007, 2 ind.); *Prunus padus* (05-05-2007, 10 ind.); **loc.** Suntažu iela, Rīga, from

gavas Stadions", Rīga, from *Prunus cerasifera* (25-05-2007, 1 ind.); **loc.** Kalpaka bulvāris 13, Rīga, from *Acer tataricum* (25-05-2007, 2 ind.); **loc.** Skolas iela 15, Rīga, from *Tilia* sp. (25-05-2007, 1 ind.); **loc.** surroundings of Brīvības gatve near Berģu iela, Rīga, from *Aesculus hippocastanum* (26-05-2007, 1 ind.); *Malus* sp. (26-05-2007, 3 ind.); *Tilia* sp. (26-05-2007, 1 ind.); **loc.** bank of lake Juglas Ezers near Brīvības gatve, Rīga, from *Malus* sp. (26-05-2007, 8 ind.); *Prunus padus* (26-05-2007, 6 ind.); *Tilia* sp. (26-05-2007, 1 ind.); **loc.** near "Iecavnieks", Iecavas novads (N 56.57720; E 024.22010), from *Prunus padus* (29-05-2007, 1 ind.); **loc.** Brīvības gatve 267, Rīga, from *Tilia* sp. (29-05-2007, 2 ind.); **loc.** Lielvārdes iela 36/38, Rīga, from *Carpinus betulus* (29-05-2007, 1 ind.); **loc.** Stirnu iela 45a, Rīga, from *Salix alba* (15-06-2007, 1 ind.); **loc.** Stirnu iela 39, Rīga, from *Prunus cerasus* (15-06-2007, 2 ind.); **loc.** "Mazkuģnieki", Vandzenes pagasts, Talsu novads, from *Prunus cerasifera* (26-06-2007, 1 ind.); **loc.** near Kuldīgas iela, Sabile, Talsu nov., from *Betula pendula* (30-06-2007, 3 ind.); **loc.** Vecauce, Auces nov., from *Prunus domestica* (06-06-2008, 1 ind.).

Adalia decempunctata (Linnaeus, 1758)

Feeding: aphidophagous and coccidophagous (Dixon 1958; Thomson & Simmonds 1965; Klausnitzer & Klausnitzer 1979; Erkin 1983; Hodek & Honěk 2009).

loc. orchards of Latvia State Institute of Fruit-Growing, Krimūnu pagasts, Dobeles novads, from *Corylus colurna* (24-05-2007, 1 ind.; 31-05-2007, 1 ind.); *Malus* sp. (27-04-2007, 1 ind.); *Prunus avium* (24-05-2007, 2 ind.; 31-05-2007, 1 ind.; 05-06-2007, 1 ind.); *Prunus padus* (26-04-2007, 2 ind.); *Pyrus* sp. (27-04-2007, 1 ind.); yellow glue traps in *Prunus avium* orchard (17-05-22-05-2007, 1 ind.; 18-05-13-06-2007, 1 ind.; 13-06-20-06-2007, 3 ind.); **loc.** "Grīgas", Lielvārdes pagasts, Lielvārdes novads, from *Corylus avellana* (30-05-2007, 1 ind.).

Anatis ocellata (Linnaeus, 1758)

Feeding: aphidophagous (especially *Schizolachnus pineti*), other insects, pollen (Thomson & Simmonds 1965; Kesten 1969; Klausnitzer & Klausnitzer 1979; Giorgi & al. 2009; Lundgren 2009b).

loc. orchards of Latvia State Institute of Fruit-Growing, Krimūnu pagasts, Dobeles novads, from *Crataegus* sp. (01-06-2009, 1 ind.); *Prunus avium* (28-07-2008, 1 ind.); *Prunus* sp. (12-05-2009, 1 ind.; 25-05-2009, 1 ind.); *Pyrus* sp. (07-05-2007, 1 ind.); **loc.** Pērnavas iela 77, Rīga, from *Prunus cerasus* (25-05-2007, 1 ind.); **loc.** surroundings of Brīvības gatve near Bergu iela, Rīga, from *Prunus avium* (26-05-2007, 1 ind.); **loc.** valley of river Gribulīte (Gribuļupīte) near "Grigas", Lielvārdes pagasts, Lielvārdes novads, from *Prunus padus* (20-05-2007, 1 ind.).

Anisosticta novemdecimpunctata (Linnaeus, 1758)

Feeding: aphidophagous (especially *Hyalopterus pruni*), pollen (Klausnitzer & Klausnitzer 1979; Sloggett 2008; Lundgren 2009b).

loc. "Grigas", Lielvārdes pagasts, Lielvārdes novads, indoors (20-05-2007, 1 ind.).

Calvia decemguttata (Linnaeus, 1758)

Feeding: aphidophagous and psyllidophagous (Pūtele 1977).

loc. orchards of Latvia State Institute of Fruit-Growing, Krimūnu pagasts, Dobeles novads, from *Corylus colurna* (24-05-2007, 1 ind.).

Calvia quatuordecimguttata (Linnaeus, 1758)

Feeding: aphidophagous and psyllidophagous (Hagen 1962; Klausnitzer & Klausnitzer 1979; Erkin 1983; Jansone-Henkuzene 1993).

loc. orchards of Latvia State Institute of Fruit-Growing, Krimūnu pagasts, Dobeles novads, from *Crataegus* spp. (20-05-2008, 1 ind.; 04-05-2009, 5 ind.; 21-05-2009, 2 ind.; 11-06-2009, 2 ind.); *Prunus avium* (04-06-2007, 1 ind.); *Prunus padus* (26-04-2007, 1 ind.); *Prunus* sp. (21-05-2009, 1 ind.); **loc.** "Grigas", Lielvārdes pagasts, Lielvārdes novads, from *Crataegus* sp. (30-05-2007, 1 ind.).

Ceratomegilla notata (Laicharting, 1781)

Feeding: aphidophagous, facultatively mycophagous, pollen (Giorgi & al. 2009; Lundgren 2009b).

loc. valley of river Gribulīte (Gribuļupīte) near "Grigas", Lielvārdes pagasts, Lielvārdes novads, from *Prunus padus* (20-05-2007, 2 ind.).

Chilocorus renipustulatus (Scriba, 1790)

Feeding: coccidophagous (Thomson & Simmonds 1965; Priedītis 1995; Giorgi & al. 2009; Hodek & Honěk 2009).

loc. orchards of Latvia State Institute of Fruit-Growing, Krimūnu pagasts, Dobeles novads, from *Caragana arborescens* (09-05-2007, 1 ind.); **loc.** city forest park, Dobele, Dobeles novads (N 56.60761; E 023.28731), from *Prunus padus* (21-05-2007, 1 ind.); **loc.** territory of National Botanical Garden of Latvia, Salaspils, Salaspils novads, from *Alnus incana* (17-05-2007, 1 ind.); *Salix* sp. (17-05-2007, 2 ind.).

Coccinella quinquepunctata Linnaeus, 1758

Feeding: aphidophagous and psyllidophagous (Ozols 1925; Hagen 1962; Thomson & Simmonds 1965; Klausnitzer & Klausnitzer 1979).

loc. orchards of Latvia State Institute of Fruit-Growing, Krimūnu pagasts, Dobeles novads, from *Caragana arborescens* (07-05-2007, 1 ind.); *Corylus avellana* (10-05-2007, 1 ind.); *Malus* sp. (10-05-2007, 1 ind.); *Prunus padus* (26-04-2007, 1 ind.); *Ribes* spp. (27-04-2007, 1 ind.; 07-05-2007, 1 ind.); **loc.** territory of National Botanical Garden of Latvia, Salaspils, Salaspils novads, from *Prunus* sp. (17-05-2007, 1 ind.); **loc.** Jaunolaine, Olaines pagasts, Olaines novads, from *Crataegus* sp. (22-05-2007, 1 ind.); **loc.** valley of river Gribulīte (Gribuļupīte) near "Grigas", Lielvārdes pagasts, Lielvārdes novads, from *Prunus padus* (20-05-2007, 2 ind.).

Coccinella septempunctata Linnaeus, 1758

Feeding: predaceous (particularly aphids; other: psyllids, thrips, scale insects); sometimes predated ladybird larvae; also fungus, pollen and nectar (Ozols 1925; Hagen 1962; Thomson & Simmonds 1965; Klausnitzer & Klausnitzer 1979; Ipert 1999; Tritsch 1999; Kalushkov & Hodek 2004; Sutherland & Parrella 2009).

loc. orchards of Latvia State Institute of Fruit-Growing, Krimūnu pagasts, Dobeles novads, from *Betula pendula* (15-05-2007, 1 ind.); *Caragana arborescens* (07-05-2007, 6 ind.); *Corylus avellana* (26-04-2007, 3 ind.; 10-05-2007, 8 ind.; 10-05-2008, 2 ind.); *Corylus colurna* (24-05-2007, 1 ind.); *Crataegus* spp. (15-05-2007, 1 ind.; 24-05-2007, 17 ind.; 12-05-2008, 6 ind.; 20-05-2008, 6 ind.; 04-05-2009, 1 ind.; 21-05-2009, 8 ind.; 01-06-2009, 1 ind.; 10-06-2009, 1 ind.; 11-06-2009, 3 ind.); *Cydonia oblonga* (01-06-2009, 1 ind.); *Lonicera* spp. (15-05-2007, 3 ind.); *Malus* spp. (10-05-2007, 2 ind.;

16-05-2007, 2 ind.); *Prunus avium* (07-05-2007, 10 ind.; 15-05-2007, 10 ind.; 21-05-2007, 19 ind.; 24-05-2007, 3 ind.; 05-06-2007, 2 ind.; 20-06-2007, 1 ind.); *Prunus cerasifera* (07-05-2007, 3 ind.); *Prunus cerasus* (21-05-2007, 6 ind.; 31-05-2007, 1 ind.; 05-06-2007, 1 ind.; 12-06-2007, 1 ind.; 20-06-2007, 1 ind.); *Prunus domestica* (21-05-2007, 3 ind.); *Prunus padus* (26-04-2007, 20 ind.; 22-04-2008, 7 ind.); *Prunus* spp. (21-05-2007, 3 ind.; 12-05-2009, 4 ind.; 21-05-2009, 2 ind.; 25-05-2009, 1 ind.; 01-06-2009, 1 ind.); *Pyrus* spp. (27-04-2007, 14 ind.; 07-05-2007, 7 ind.; 24-05-2007, 3 ind.); *Ribes* sect. *Botrycarpum* (27-04-2007, 14 ind.; 16-05-2007, 17 ind.); *Rosa rugosa* (15-05-2007, 3 ind.); *Salix caprea* (07-05-2007, 3 ind.); *Syringa* sp. (15-05-2007, 1 ind.); yellow glue traps in *Prunus avium* orchard (11-05-16-05-2007, 22 ind.; 17-05-22-05-2007, 147 ind.; 18-05-13-06-2007, 25 ind.; 06-06-12-06-2007, 48 ind.; 13-06-20-06-2007, 11 ind.); **loc.** "Grigas", Lielvārdes pagasts, Lielvārdes novads, from *Malus* sp. (30-05-2007, 1 ind.); **loc.** "Klives", Elejas pagasts, Jelgavas novads, from *Malus* sp. (29-05-2007, 1 ind.); **loc.** "Ķekavas dārzs", Ķekavas pagasts, Ķekavas novads, from *Malus* sp. (29-05-2007, 2 ind.); **loc.** "Vildes"-2, Vandzenes pagasts, Talsu novads, from *Salix* sp. (26-06-2007, 3 ind.); **loc.** forest Biķernieku mežs, Rīga, from *Amelanchier spicata* (14-05-2007, 3 ind.); *Prunus avium* (14-05-2007, 3 ind.); *Prunus padus* (14-05-2007, 8 ind.); *Ribes alpinum* (14-05-2007, 8 ind.); *Sorbus aucuparia* (14-05-2007, 1 ind.); **loc.** Brīvības gatve near Brīvdabas iela, Rīga, from *Acer negundo* (26-05-2007, 1 ind.); **loc.** surroundings of Brīvības gatve near pie Bergu iela, Rīga, from *Malus* sp. (26-05-2007, 4 ind.); *Prunus avium* (26-05-2007, 2 ind.); **loc.** city forest park, Dobele, Dobeles novads (N 56.60761; E 023.28731), from *Ribes uva-crispa* (15-05-2007, 1 ind.); *Corylus avellana* (15-05-2007, 3 ind.); *Prunus padus* (15-05-2007, 5 ind.); *Sambucus* sp. (15-05-2007, 1 ind.); *Euonymus europaeus* (15-05-2007, 1 ind.); *Lonicera* spp. (15-05-2007, 1 ind.; 21-05-2007, 1 ind.); **loc.** railway station "Dobele", Dobele, Dobeles novads, from *Rosa rugosa* (16-05-2007, 6 ind.); **loc.** valley of river Gribulīte (Gribuļupīte) near "Grigas", Lielvārdes pagasts, Lielvārdes novads, from *Prunus padus* (20-05-2007, 28 ind.); *Salix* spp. (20-05-2007, 11 ind.); **loc.** Iecavas novads, from *Salix* sp. (29-05-2007, 1 ind.); **loc.** Jaunolaine, Olaines pagasts, Olaines novads, from *Crataegus* sp. (22-05-2007, 12 ind.); *Fagus sylvatica* (22-05-2007, 1 ind.); **loc.** bank of lake Juglas Ezers near Brīvības gatve, Rīga, from *Malus* sp. (26-05-2007, 4 ind.); *Prunus padus* (26-05-2007, 4 ind.); *Salix* sp. (26-05-2007, 1 ind.); **loc.** Kalpaka bulvāris near Kongresu Nams, Rīga, from *Tilia* sp. (18-05-2007, 1 ind.); **loc.** Lienes iela near Vagonu iela, Rīga, from *Tilia* sp. (16-05-2007, 1 ind.); **loc.** cemetery Matīsa Kapī, Rīga, from *Lonicera* sp. (13-05-2007, 1 ind.); **loc.** forest near Jelgava-Tukums railway, Glūdas pagasts, Jelgavas novads (N 56.64061; E 023.66333), under bark of dead tree (14-03-2007, 1 ind.); **loc.** territory of National Botanical Garden of Latvia, Salaspils, Salaspils novads, from *Abies* sp. (17-05-2007, 1 ind.); *Crataegus* spp. (17-05-2007, 4 ind.); *Lonicera* sp. (17-05-2007, 1 ind.); *Prunus* spp. (17-05-2007, 11 ind.); *Salix* spp. (17-05-2007, 9 ind.); **loc.** Pērnavas iela 77, Rīga, from *Prunus domestica* (25-05-2007, 1 ind.); **loc.** railway edge in surroundings of Vagonparks, Rīga, from *Medicago sativa* (24-05-2007, 3 ind.); **loc.** junction of Matīsa iela and Valmieras iela, Rīga, from *Crataegus* sp. (25-05-2007, 1 ind.); **loc.** near "Iecavnieks", Iecavas novads (N 56.57720; E 024.22010), from *Brassica napus* (29-05-2007, 1 ind.); *Prunus padus* (29-05-2007, 3 ind.); **loc.** Skolas iela 15, Rīga, from *Tilia* sp. (25-05-2007, 1 ind.); **loc.** Suntažu iela, Rīga, from *Rosa* sp. (06-05-2007, 1 ind.); **loc.** Vagonu iela, Rīga, from *Crataegus* sp. (18-05-2007, 8 ind.); *Tilia* sp. (18-05-2007, 2 ind.); **loc.** Vietalvas iela, Rīga, from *Euonymus europaeus* (13-05-2007, 1 ind.); **loc.** "Klives", Elejas pagasts, Jelgavas novads, from yellow glue trap in orchard (15-05-2008, 1 ind.); **loc.** "Poceri", Lone, Saukas pagasts, Viesītes novads, from *Prunus domestica* (22-05-2008, 1 ind.); yellow glue trap in orchard (22-05-2008, 1 ind.).

Halyzia sedecimguttata (Linnaeus, 1758)

Feeding: mycophagous (Klausnitzer & Klausnitzer 1979; Sutherland & Parrella 2009).

loc. orchards of Latvia State Institute of Fruit-Growing, Krimūnu pagasts, Dobeles novads, from *Corylus avellana* (10-07-2007, 1 ind.); yellow glue traps in *Prunus avium* orchard (13-06-20-06-2007, 1 ind.); **loc.** forest Biķernieku mežs, Rīga, from *Prunus padus* (14-05-2007, 2 ind.).

Myzia oblongoguttata (Linnaeus, 1758)

Feeding: aphidophagous (Klausnitzer & Klausnitzer 1979; Giorgi & al. 2009).

loc. orchards of Latvia State Institute of Fruit-Growing, Krimūnu pagasts, Dobeles novads, from *Prunus avium* (31-05-2007, 1 ind.); **loc.** forest Biķernieku mežs, Rīga, from *Malus* sp. (26-05-2007, 1 ind.).

Oenopia conglobata (Linnaeus, 1758)

Feeding: predaceous, aphids (Thomson & Simmonds 1965; Klausnitzer & Klausnitzer 1979; Erkin 1983; Yaşar & Özger 2005; Giorgi & al. 2009).

loc. orchards of Latvia State Institute of Fruit-Growing, Krimūnu pagasts, Dobeles novads, from *Prunus* sp. (01-06-2009, 1 ind.); **loc.** Lienes iela near Vagonu iela, Rīga, from *Tilia* sp. (16-05-2007, 2 ind.); **loc.** Pērnavas iela near Matīša iela, Rīga, from *Tilia* sp. (17-05-2007, 3 ind.); **loc.** territory of National Botanical Garden of Latvia, Salaspils, Salaspils novads, from *Tilia* sp. (17-05-2007, 2 ind.); **loc.** Kalpaka bulvāris near Kongresu Nams, Rīga, from *Tilia* sp. (18-05-2007, 2 ind.); **loc.** Rīga Port territory oposit Hanzas iela, Rīga (N 56.96241; E 024.09706), from *Malus* sp. (18-05-2007, 1 ind.); **loc.** Vagonu iela, Rīga, from *Crataegus* sp. (18-05-2007, 1 ind.); *Tilia* sp. (18-05-2007, 6 ind.); **loc.** Pērnavas iela 77, Rīga, from *Prunus domestica* (25-05-2007, 2 ind.); **loc.** Kalpaka bulvāris 13, Rīga, from *Acer tataricum* (25-05-2007, 1 ind.); **loc.** Skolas iela 15, Rīga, from *Tilia* sp. (25-05-2007, 2 ind.); **loc.** bank of lake Juglas Ezers near Brīvības gatve, Rīga, from *Malus* sp. (26-05-2007, 1 ind.); **loc.** Brīvības gatve 267, Rīga, from *Tilia* sp. (29-05-2007, 1 ind.); **loc.** Lielā iela 2, Jelgava, indoors (15-10-2008, 1 ind.); **loc.** Zaļā iela, Dobeles novads, from *Prunus cerasifera* (08-06-2009, 1 ind.).

Propylea quatuordecimpunctata (Linnaeus, 1758)

Feeding: generally aphidophagous, facultatively mycophagous, pollen (Hagen 1962; Thomson & Simmonds 1965; Klausnitzer & Klausnitzer 1979; Giorgi & al. 2009; Lundgren 2009b; Sutherland & Parrella 2009).

loc. orchards of Latvia State Institute of Fruit-Growing, Krimūnu pagasts, Dobeles novads, from *Amelanchier* sp. (27-04-2007, 1 ind.); *Corylus avellana* (26-04-2007, 1 ind.; 10-05-2007, 1 ind.; 15-05-2007, 2 ind.; 21-05-2007, 1 ind.; 10-05-2008, 3 ind.; 12-05-2009, 1 ind.; 21-05-2009, 1 ind.); *Corylus colurna* (24-05-2007, 3 ind.); *Crataegus* spp. (24-05-2007, 6 ind.; 12-05-2008, 20 ind.; 20-05-2008, 2 ind.; 04-05-2009, 1 ind.; 21-05-2009, 6 ind.; 11-06-2009, 4 ind.); *Cydonia oblonga* (01-06-2009, 1 ind.); *Malus* sp. (10-05-2007, 6 ind.); *Prunus avium* (15-05-2007, 8 ind.; 21-05-2007, 8 ind.; 24-05-2007, 5 ind.; 31-05-2007, 2 ind.); *Prunus cerasifera* (07-05-2007, 5 ind.); *Prunus cerasus* (21-05-2007, 3 ind.; 31-05-2007, 2 ind.; 20-06-2007, 1 ind.); *Prunus domestica* (21-05-2007, 7 ind.); *Prunus padus* (26-04-2007, 24 ind.; 07-05-2007, 7 ind.); *Prunus* sp. (24-05-2007, 1 ind.; 12-05-2009, 1 ind.; 21-05-2009, 1 ind.; 11-06-2009, 3 ind.); *Pyrus* spp. (27-04-2007, 1 ind.; 07-05-2007, 1 ind.); *Ribes* spp. (27-04-2007, 1 ind.; 16-05-2007, 1 ind.; 21-05-2007, 1 ind.; 31-05-2007, 3 ind.; 05-06-2007, 1 ind.; 12-06-2007, 1 ind.; 16-06-2009, 1 ind.); *Rubus caesius* (25-06-2007, 1 ind.); *Syringa* sp. (27-04-2007, 1 ind.); with entomological net (12-06-2007, 2 ind.); yellow glue traps in *Prunus avium* orchard (11-05-16-05-2007, 1 ind.; 17-05-22-05-2007, 48 ind.; 18-05-13-06-2007, 50 ind.; 06-06-12-06-2007, 29 ind.; 13-06-20-06-2007, 15 ind.; 30-05-06-06-2008, 4 ind.); **loc.** cemetery Matīša Kapi, Rīga, from *Caragana frutex* (13-05-2007, 1 ind.); **loc.** forest Bīkernieku mežs, Rīga, from *Amelanchier spicata* (14-05-2007, 1 ind.); *Prunus avium* (14-05-2007, 2 ind.); *Prunus padus* (14-05-2007, 6 ind.); *Salix* spp. (14-05-2007, 2 ind.); *Sorbus aucuparia* (14-05-2007, 1 ind.); **loc.** city forest park, Dobeles novads (N 56.60761; E 023. 28731), from *Corylus avellana* (15-05-2007, 2 ind.); *Prunus padus* (15-05-2007, 15 ind.; 21-05-2007, 7 ind.); *Salix caprea* (15-05-2007, 2 ind.); **loc.** railway station "Dobeles", Dobeles novads, from *Rosa rugosa* (16-05-2007, 4 ind.); **loc.** territory of National Botanical Garden of Latvia, Salaspils, Salaspils novads, from *Crataegus* spp. (17-05-2007, 2 ind.); *Prunus* sp. (17-05-2007, 1 ind.); *Tilia* spp. (17-05-2007, 2 ind.); **loc.** valley of river Gribulīte (Gribulūpīte) near "Grīgas", Lielvārdes pagasts, Lielvārdes novads, from *Prunus padus* (20-05-2007, 13 ind.); *Salix* sp. (20-05-2007, 1 ind.); **loc.** Jaunolaine, Olaines pagasts, Olaines novads, from *Crataegus* sp. (22-05-2007, 2 ind.); **loc.** junction of Matīša iela and Valmieras iela, Rīga, from *Crataegus* sp. (25-05-2007, 1 ind.); **loc.** Stabu iela near Brīvības iela, Rīga, from *Tilia* sp. (25-05-2007, 1 ind.); **loc.** railway edge near "Daugavas Stadions", Rīga, from *Robinia* sp. (25-05-2007, 1 ind.); *Rosa* spp. (25-05-2007, 2 ind.); **loc.** surroundings of Brīvības gatve near Berģu iela, Rīga, from *Malus* sp. (26-05-2007, 1 ind.); *Tilia* sp. (26-05-2007, 2 ind.); **loc.** "Ķekavas dārzs", Ķekavas pagasts, Ķekavas novads, from *Prunus cerasifera* (29-05-2007, 1 ind.); **loc.** "Mazkuģnieki", Vandzenes pagasts, Talsu novads, from *Prunus cerasifera* (26-06-2007, 1 ind.); **loc.** "Poceri", Lone, Saukas pagasts, Viesītes novads, from yellow glue trap in orchard (17-07-2007, 1 ind.).

Psyllobora vigintiduopunctata (Linnaeus, 1758)

Feeding: obligatory mycophagous (Klausnitzer & Klausnitzer 1979; Sutherland & Parrella 2009).

loc. orchards of Latvia State Institute of Fruit-Growing, Krimū-

nu pagasts, Dobeles novads, from *Prunus avium* (15-05-2007, 1 ind.); yellow glue traps in *Prunus avium* orchard (06-06-12-06-2007, 2 ind.; 13-06-20-06-2007, 2 ind.; 30-05-06-06-2008, 1 ind.); in orchard (21-05-2007, 1 ind., Leg. ?); on the fly (26-04-2007, 1 ind.); on woody desk (11-05-2007, 1 ind.); **loc.** "Poceri", Lone, Saukas pagasts, Viesītes novads, from yellow glue trap in orchard (17-07-2007, 1 ind.; 22-05-2008, 1 ind.); **loc.** forest Bīkernieku mežs, Rīga, from *Prunus padus* (14-05-2007, 2 ind.); **loc.** railway station "Dobeles", Dobeles novads, from *Rosa rugosa* (16-05-2007, 5 ind.); **loc.** territory of National Botanical Garden of Latvia, Salaspils, Salaspils novads, from *Salix* sp. (17-05-2007, 1 ind.); **loc.** city forest park, Dobeles novads (N 56.60761; E 023. 28731), from *Prunus padus* (21-05-2007, 1 ind.).

Tytthaspis sedecimpunctata (Linnaeus, 1758)

Feeding: mixed feeding: mycophagous, predaceous (aphids, Acari, Thysanoptera) (Thomson & Simmonds 1965; Klausnitzer & Klausnitzer 1979; Lundgren 2009b; Sutherland & Parrella 2009).

loc. orchards of Latvia State Institute of Fruit-Growing, Krimūnu pagasts, Dobeles novads, from yellow glue traps in *Prunus avium* orchard (11-05-16-05-2007, 2 ind.; 17-05-22-05-2007, 3 ind.; 18-05-13-06-2007, 1 ind.).

Vibidia duodecimguttata (Poda, 1761)

Feeding: mycophagous (Klausnitzer & Klausnitzer 1979; Sutherland & Parrella 2009).

loc. orchards of Latvia State Institute of Fruit-Growing, Krimūnu pagasts, Dobeles novads, from yellow glue traps in *Prunus avium* orchard (13-06-20-06-2007, 1 ind.; 21-06-03-07-2007, 2 ind.).

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