Diversity of parasitoid wasps (Insecta, Hymenoptera) in oilseed rape fields in Serbia

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Abstract

Background

Oilseed rape is an important crop grown worldwide and used for various purposes, including oil extraction and animal feed. In Europe, there are six major pest species and several other minor pests that can significantly affect oilseed rape production, requiring growers to effectively control them in order to ensure crop yield. The host-parasitoid complexes of these pests have been studied in detail and recorded mainly in western, central and northern Europe. As an abundant source of pollen and nectar, oilseed rape may also be attractive to other parasitoids that do not have direct trophic interactions with oilseed rape pest species. The aim of this study is to fill the knowledge gap regarding the wider parasitoid community in oilseed rape fields, particularly in southern Europe.

New information

During the two-year study, a total of 3135 specimens of primary and secondary parasitoids were sampled, of which 2855 were found in oilseed rape fields and 280 in semi-natural habitats. We found 153 taxa, of which 119 were found in oilseed rape fields and 87 in semi-natural habitats. We identified 31 genera (33 species) as parasitoids of oilseed rape pests, 54 genera (97 species) parasitising non-pest species and 10 genera (23 species) as possible parasitoids of oilseed rape pests. This study shows that the parasitoid community in oilseed rape fields is very diverse and that includes parasitoids of both oilseed rape pest and non-pest species.

Keywords

oilseed rape pests, host species, Balkans, ecological interactions, biological control agents

Introduction

Oilseed rape (*Brassica napus* L.) is a very important crop, grown on more than 36 million hectares worldwide and more than 8 million hectares in Europe in 2021 (FAO 2022) and it is the third largest source of vegetable oil worldwide (Statista 2023). It is primarily used to extract oil from its seeds, which can be used for a variety of purposes, from food to making lubricants and soap, while the seed residue after oil extraction can also be used as animal feed (Alford 2003). In some countries, it is also an important break crop in cereal-dominated crop rotations (Angus et al. 2015). Similar to expanding global production, oilseed rape cultivation in Serbia increased from 5000–6000 ha at the end of the last century to more than 29,000 ha in 2022 (Sekulić and Kereši 2007, RZS 2023).

There are six major insect pest species of oilseed rape in Europe which growers often need to control to protect seed yield. In addition, there are a number of minor pests that may be of greater importance in some countries and at certain times of the year (Alford 2003, Williams 2010) (Table 1). Control of these pests is usually achieved through conventional pesticide use, but also through integrated pest management (IPM), as naturally occurring biological control agents, such as predators, parasitoids and pathogens can provide biocontrol and reduce pesticide use (Williams 2010). Parasitoids play particularly important role in pest control because their development is closely linked to their host species and show positive density-dependent patterns, while being specialised to one or few host species (Gunton and Pöyry 2016, Dainese et al. 2017). Higher parasitism rates (30–40%) can successfully suppress pest populations (Hokkanen 2008), although even lower rates (around 15%), especially when complemented with ground-dwelling predators, can also negatively affect pest abundance (Dainese et al. 2017). Semi-natural habitats that remain in agricultural landscapes are important for the conservation of these natural enemies, as they provide nectar resources, alternative host or prey species and overwintering sites (Landis et al. 2000, Bianchi et al. 2006) and their positive effect on oilseed rape pest suppression has been demonstrated (Thies and Tscharntke 1999, Dainese et al. 2017). However, oilseed rape itself can be a rich and highly attractive source of pollen and nectar for a wide range of insect species (Stanley et al. 2013), including parasitoids that use nectar as a food source (Heimpel and Jervis 2005, Varennes et al. 2016). Therefore, some parasitoid species may be present in oilseed rape fields without direct trophic interactions with known oilseed rape pests.

Host-parasitoid complexes for the aforementioned major and some minor pests have been extensively studied and recorded (Alford 2003, Williams 2010), but mainly based

on data from two projects: BORIS (1997-2000, CT-96-1314) and MASTER (2001-2005, QLK5-CT-2001-01447), focusing mainly on western, central and northern Europe. Data from southern Europe and Serbia, in particular, have been largely absent. To the best of our knowledge, there has not been a comprehensive list of parasitoids and hyperparasitoids that occur in oilseed rape fields for this region. Todorov et al. (2022) provide a list of parasitoid species found in oilseed rape fields in Bulgaria with comments on perspectives for biological control, but only for the family Pteromalidae. Oilseed rape pests, on the other hand, are relatively well studied in Serbian fields from both taxonomical and traditional chemical management aspects (Kereši et al. 2007, Sekulić and Kereši 2007, Štrbac et al. 2007, Mitrović et al. 2008, Milovac et al. 2010, Graora et al. 2013, Milovanović et al. 2013, Graora et al. 2015, Sivčev et al. 2015, Sivčev et al. 2016, Milovac 2016, Marjanović and Prodanović 2021). Similarly, the parasitoid wasp fauna of other crops in Serbia, especially cereals and alfalfa, has also been well studied (Tomanović et al. 2003, Kavallieratos et al. 2004, Kavallieratos et al. 2005a, Kavallieratos et al. 2005b, Tomanović et al. 2008, Žikić et al. 2012, Tomanović et al. 2021), but currently, there is a gap in knowledge of the parasitoid wasp fauna in oilseed rape. Therefore, we aim here to explore the entire parasitoid community in oilseed rape to better understand the trophic interactions and the wider potential for biological control in agricultural landscapes.

Materials and methods

Sampling was conducted in two consecutive years with a similar sampling design. In 2018, we selected five oilseed rape fields in the southern part of the Bačka Region (Serbia) (Table 2, Fig. 1). A single sampling transect of 20 m length was established in each field. Two fields had adjacent herbaceous semi-natural habitats where an additional sampling transect was established. In 2019, four oilseed rape fields were selected in the northern part of the Bačka Region, each of which had an adjacent herbaceous or shrubland semi-natural habitat. Two sampling transects were established in each field, one near the field edge (2 m from the field edge) and the second deeper in the field (20 m from the field edge) and one transect was established in the adjacent semi-natural habitat. Two fields had a second nearby semi-natural habitat and one additional sampling transect was established in each of them.

Parasitoids and hyperparasitoids were collected multiple times using different methods during the period from mid-April to mid-June, i.e. from the beginning of the oilseed rape flowering to the pre-harvest stage of pod maturation. Along each transect, 20 sweeps were made at the top of the vegetation with a sweep net and the collected samples were immediately stored in 96% ethanol. Sweep-net samples were collected seven times in 2018 and five times in 2019. In addition, during oilseed rape flowering phase, three clusters of pan traps were placed along each transect, at the beginning, middle and at the end of the transect. Each cluster consisted of three coloured water-filled bowls (yellow, white and blue) that were placed on the ground when surrounding vegetation was low or mounted on a pole and raised to the top of the vegetation when vegetation was tall. Traps

were left active for 72 hours in 2018 and 48 hours in 2019, after which samples were placed in 96% ethanol. In both years, pan-trap sampling was done three times, once in late April and twice in early May in 2018 and three times in mid- to late April in 2019. During each field visit, oilseed rape plants and other plants were systematically examined for the presence of aphids along each established transect, both in crop fields and in semi-natural habitats. If aphid colonies were found, they were placed in a mash-top plastic box for aphid parasitoids rearing. After four weeks, emerged parasitoids were transferred to 96% ethanol. In addition, in 2019 during pod maturation phase, we collected up to 100 oilseed rape pods per field transect and stored them in a mash-top plastic box to allow the emergence of pod midge parasitoids, which were then transferred to 96% ethanol. All collected parasitoids were identified using morphological identification keys (Suppl. material 1) to the lowest possible taxonomic level (species, genus or family). In case of identification to higher taxonomic levels, taxa were characterised and organised into different morphospecies (e.g. Eulophidae sp. 1, Eulophidae sp. 2 etc.). Voucher specimens are deposited in the collection of the Institute of Zoology, Faculty of Biology, University of Belgrade, Serbia. To establish consistency of occurrence of parasitoids in oilseed rape fields, we selected taxa/genera, based on two combined criteria across two years of sampling: 1) present in at least three fields (out of nine total) and 2) present with at least 10 individuals. We constructed species accumulation curves to assess completeness of our fauna survey in oilseed rape fields. We defined each combination of locality and sampling period as a “sampling event” which consisted of combined data from all sampling methods. To estimate extrapolated species richness for our study, we used Chao, First order Jackknife (Jack1), Second order Jackknife (Jack2) and Bootstrap estimates from the R package *vegan* (v.2.6-4; Oksanen et al. (2022)) within R Statistical Software (v.4.3.1; R Core Team (2023)).

Checklist of parasitoid wasps found in oilseed rape fields and adjacent semi-natural habitats in Serbia

Family Bethylidae

Goniozus claripennis (Förster, 1851)

Material

a. country: Serbia; locality: Đurđin; samplingProtocol: Pan traps; eventDate: 22-24.04.2019; habitat: oilseed rape; individualCount: 1 male; behavior: primary parasitoids, larval; occurrenceID: 2100E2C9-88FF-50B0-96C1-065E02A65373

Parasite of: Tortricidae

Notes: oilseed rape pest host: unknown

Plastanoxus westwoodi (Kieffer, 1914)

Material

a. country: Serbia; locality: Čenej; samplingProtocol: Pan traps; eventDate: 24-27.04.2018; habitat: oilseed rape; individualCount: 1 male; behavior: primary parasitoids, larval/pupal; occurrenceID: 69C5F48C-FA04-5E14-BD6A-6DCAFF0DB2BE

Parasite of: Cucujidae

Notes: oilseed rape pest host: unknown

Family Braconidae

Apanteles sp. 1

Material

a. country: Serbia; locality: Čenej, Mišićevo, Pačir; samplingProtocol: Sweep net; eventDate: 07.05.2018, 10.05.2018, 25.05.2018, 18.04.2019, 12.06.2019; habitat: oilseed rape, semi-natural habitat; individualCount: 8 males, 5 females; behavior: primary parasitoids, larval; occurrenceID: 670AD6EE-22E6-5A5C-8D72-C0625E726E99

Parasite of: Lepidoptera

Notes: oilseed rape pest host: unknown

Aphidius ervi Haliday, 1834

Material

a. country: Serbia; locality: Bajmok, Čenej, Đurđin, Srbobran; samplingProtocol: Sweep net, Pan traps, Aphid colony; eventDate: 24-27.04.2018, 04-07.05.2018, 07-10.05.2018, 25.05.2018, 22-24.04.2019, 23.05.2019; habitat: oilseed rape, semi-natural habitat; individualCount: 215 males, 60 females; behavior: primary parasitoids, larval; occurrenceID: C5B6BE40-91B1-5621-AC91-D69A68728B55

Parasite of: *Myzus persicae*

Notes: oilseed rape pest host: yes

Aphidius matricariae Haliday, 1834

Material

a. country: Serbia; locality: Čenej, Srbobran; samplingProtocol: Aphid colony; eventDate: 04.05.2018, 07.05.2018, 10.05.2018; habitat: oilseed rape; individualCount: 72 males, 40 females; behavior: primary parasitoids, larval; occurrenceID: 3950E1EC-D843-5AB9-B17F-937164B61976

Parasite of: *Myzus persicae*

Notes: oilseed rape pest host: yes

Aphidius sp. 1

Material

a. country: Serbia; locality: Đurđin; samplingProtocol: Aphid colony; eventDate: 05-23-19; habitat: oilseed rape; individualCount: 1 male, 1 female; behavior: primary parasitoids, larval; occurrenceID: 3E6F63DA-DB7D-5F1D-A55F-07289769670F

Parasite of: *Myzus persicae*

Notes: oilseed rape pest host: unknown, possible

Binodoxys angelicae (Haliday, 1833)

Material

a. country: Serbia; locality: Mišićevo; samplingProtocol: Aphid colony; eventDate: 05-23-19; habitat: oilseed rape; individualCount: 1 male; behavior: primary parasitoids, larval; occurrenceID: EBAA0EF7-3F19-5404-9F10-5282D552F36F

Parasite of: *Myzus persicae*

Notes: oilseed rape pest host: yes

Blacus nigricornis Haeselbarth, 1973

Material

a. country: Serbia; locality: Čenej, Srbobran; samplingProtocol: Sweep net, Pan traps; eventDate: 27.04.2018, 07-10.05.2018; habitat: oilseed rape, semi-natural habitat; individualCount: 2 males, 1 female; behavior: primary parasitoids, larval; occurrenceID: 92167F97-BDA3-57A5-9DB1-203EF3FAB78D

Parasite of: *Meligethes aeneus*

Notes: oilseed rape pest host: yes

Bracon picticornis (Wesmael, 1838)

Material

a. country: Serbia; locality: Bajmok; samplingProtocol: Pan traps; eventDate: 17-19.04.2019; habitat: oilseed rape; individualCount: 1 male; behavior: primary parasitoids, larval; occurrenceID: BD9DB36F-E474-5431-B537-EF01E6550C2E

Parasite of: *Meligethes aeneus*

Notes: oilseed rape pest host: yes

Bracon variator Nees, 1811

Material

a. country: Serbia; locality: Čenej; samplingProtocol: Sweep net, Pan traps; eventDate: 04-07.05.2018, 10.05.2018; habitat: oilseed rape; individualCount: 2 males; behavior: primary parasitoids, larval; occurrenceID: 76500E7C-7739-54B4-9FB6-1460E32CCBB5

Parasite of: *Ceutorhynchus assimilis*

Notes: oilseed rape pest host: yes

Chelonus oculator (Fabricius, 1775)

Material

a. country: Serbia; locality: Srbobran; samplingProtocol: Pan traps; eventDate: 04-07.05.2018; habitat: semi-natural habitat; individualCount: 1 male; behavior: primary parasitoids, egg/larval; occurrenceID: 981653E9-B91B-5795-8BE8-910E33C9FD2C

Parasite of: Lepidoptera, *Spodoptera exigua*

Notes: oilseed rape pest host: unknown

Choeras parasitellae (Bouché, 1834)

Material

a. country: Serbia; locality: Čenej; samplingProtocol: Sweep net; eventDate: 05-10-18; habitat: oilseed rape; individualCount: 1 female; behavior: primary parasitoids, larval; occurrenceID: A0968BCD-EB9E-5A04-A16E-734D2F88B3E8

Parasite of: Lepidoptera

Notes: oilseed rape pest host: unknown

Cotesia glomerata (Linnaeus, 1758)

Material

a. country: Serbia; locality: Srbobran; samplingProtocol: Sweep net, Pan traps; eventDate: 27.04.2018, 04-07.05.2018, 25.05.2018; habitat: oilseed rape; individualCount: 2 males, 1 female; behavior: primary parasitoids, larval; occurrenceID: 5DA837C7-FAF4-5E5D-BBAF-2679FD8A7656

Parasite of: *Pieris* spp.

Notes: oilseed rape pest host: yes

Cotesia vestalis (Haliday, 1834)

Material

a. country: Serbia; locality: Pačir; samplingProtocol: Sweep net; eventDate: 05-10-19; habitat: semi-natural habitat; individualCount: 1 female; behavior: primary parasitoids, larval; occurrenceID: D9CFE5F0-9B48-5FAB-887A-A19948176C6C

Parasite of: *Plutella xylostella*

Notes: oilseed rape pest host: yes

Dacnusa sp. 1

Material

a. country: Serbia; locality: Čenej; samplingProtocol: Pan traps; eventDate: 04-07.05.2018; habitat: oilseed rape; individualCount: 1 female; behavior: primary parasitoids, larval; occurrenceID: 9D21083D-9666-5D29-9B82-B599A478426B

Parasite of: *Phytomyza rufipes*?

Notes: oilseed rape pest host: unknown

Diaeretiella rapae (McIntosh,1855)

Material

a. country: Serbia; locality: Bajmok, Čenej, Đurđin, Mišićevo, Pačir, Srbobran; samplingProtocol: Sweep net, Pan traps, Aphid colony; eventDate: 24-27.04.2018, 04-07.05.2018, 07-10.05.2018, 25.05.2018, 17-19.04.2019, 22-24.04.2019, 08.05.2019, 10.05.2019, 23.05.2019, 12.06.2019, 13.06.2019; habitat: oilseed rape, semi-natural habitat; individualCount: 816 males, 427 females; behavior: primary parasitoids, larval; occurrenceID: 9B75C3AA-8CF9-5C70-A0AD-910DE1A7E9EA

Parasite of: *Myzus persicae*

Notes: oilseed rape pest host: yes

Diospilus capito (Nees, 1834)

Material

a. country: Serbia; locality: Srbobran; samplingProtocol: Sweep net; eventDate: 04-27-18; habitat: semi-natural habitat; individualCount: 1 female; behavior: primary parasitoids, larval; occurrenceID: 38221A3B-0E37-569C-8E40-2F3A41611E99

Parasite of: *Meligethes aeneus*

Notes: oilseed rape pest host: yes

Ephedrus persicae Froggatt, 1904

Material

a. country: Serbia; locality: Čenej; samplingProtocol: Aphid colony; eventDate: 05-10-18; habitat: oilseed rape; individualCount: 1 male; behavior: primary parasitoids, larval; occurrenceID: 894A5022-E488-56DD-8F1B-563D4D8E8E23

Parasite of: *Myzus persicae*

Notes: oilseed rape pest host: yes

Eubazus sigalphoides (Marshall, 1889)

Material

a. country: Serbia; locality: Čenej, Srbobran; samplingProtocol: Sweep net, Pan traps, Aphid colony; eventDate: 24-27.04.2018, 04.05.2018, 07.05.2018, 10.05.2018, 25.05.2018, 27.04.2018; habitat: oilseed rape; individualCount: 44 males, 8 females; behavior: primary parasitoids, larval; occurrenceID: AD0C09B2-CCD1-5DFD-882F-0BE15DE7EDE2

Parasite of: *Meligethes aeneus*

Notes: oilseed rape pest host: yes

Eubazus sp. 1

Material

a. country: Serbia; locality: Srbobran; samplingProtocol: Sweep net; eventDate: 27.04.2018, 04.05.2018; habitat: oilseed rape, semi-natural habitat; individualCount: 1 male, 1 female; behavior: primary parasitoids, larval; occurrenceID: C0808E15-FC75-5133-9529-253FC39B21F3

Parasite of: Curculionidae, *Pissodes* spp.

Notes: oilseed rape pest host: unknown, possible

Habrobracon hebetor (Say, 1836)

Material

a. country: Serbia; locality: Čenej; samplingProtocol: Sweep net, Pan traps; eventDate: 27.04.2018, 04-07.05.2018, 07-10.05.2018; habitat: oilseed rape; individualCount: 3 males; behavior: primary parasitoids, larval; occurrenceID: D172A12C-83BF-5A6C-882D-B89A6B2A56B7

Parasite of: *Plutella xylostella*

Notes: oilseed rape pest host: yes

Lysiphlebus fabarum (Marshall, 1896)

Material

a. country: Serbia; locality: Pačir, Srbobran; samplingProtocol: Pan traps, Aphid colony; eventDate: 07-10.05.2018, 23.05.2019; habitat: semi-natural habitat; individualCount: 7 males, 8 females; behavior: primary parasitoids, larval; occurrenceID: 5E911AD9-61F7-5767-82D5-2C5F9C00A3CC

Parasite of: *Myzus persicae*

Notes: oilseed rape pest host: yes

Microctonus sp. 1

Material

a. country: Serbia; locality: Čenej; samplingProtocol: Sweep net; eventDate: 04-27-18; habitat: oilseed rape; individualCount: 1 female; behavior: primary parasitoids, adult; occurrenceID: 2C6284BF-9E5E-5350-9DC9-0302DA217FF7

Parasite of: *Psylliodes chrysocephala*

Notes: oilseed rape pest host: unknown, possible

Microctonus sp. 2

Material

a. country: Serbia; locality: Čenej; samplingProtocol: Sweep net; eventDate: 05-10-18; habitat: semi-natural habitat; individualCount: 1 male; behavior: primary parasitoids, adult; occurrenceID: 5867C306-6324-5480-92E0-45222448E6D9

Parasite of: *Psylliodes chrysocephala*

Notes: oilseed rape pest host: unknown, possible

Microplitis sp. 1

Material

a. country: Serbia; locality: Čenej; samplingProtocol: Sweep net; eventDate: 07.05.2018, 10.05.2018, 25.05.2018; habitat: oilseed rape, semi-natural habitat; individualCount: 4 males; behavior: primary parasitoids, larval; occurrenceID: DAB4FA8A-9140-5590-AC18-0A40980767C9

Parasite of: Lepidoptera

Notes: oilseed rape pest host: unknown

Peristenus sp. 1

Material

a. country: Serbia; locality: Mišićevo, Pačir; samplingProtocol: Sweep net; eventDate: 25.04.2019, 10.05.2019; habitat: semi-natural habitat; individualCount: 2 males; behavior: primary parasitoids, adult; occurrenceID: FF098CFC-54DE-59E1-8DEF-F0B13AA0C33C

Parasite of: Hemiptera, Miridae

Notes: oilseed rape pest host: unknown

Peristenus sp. 2

Material

a. country: Serbia; locality: Pačir; samplingProtocol: Sweep net; eventDate: 05-10-19; habitat: semi-natural habitat; individualCount: 1 male; behavior: primary parasitoids, adult; occurrenceID: 134DA297-FDA0-5920-8599-D9951B634070

Parasite of: Hemiptera, Miridae

Notes: oilseed rape pest host: unknown

Praon volucre (Haliday, 1933)

Material

a. country: Serbia; locality: Čenej, Srbobran; samplingProtocol: Sweep net, Pan traps, Aphid colony; eventDate: 27.04.2018, 04-07.05.2018, 10.05.2018; habitat: oilseed rape, semi-natural habitat; individualCount: 17 males, 12 females; behavior: primary parasitoids, larval; occurrenceID: 87BA73CA-4D26-5BD6-957F-D51999F207CC

Parasite of: *Myzus persicae*

Notes: oilseed rape pest host: yes

Schizoprymnus obscurus (Nees, 1816)

Material

a. country: Serbia; locality: Čenej, Mišićevo; samplingProtocol: Sweep net, Aphid colony; eventDate: 20.04.2018, 10.05.2018, 12.06.2019; habitat: oilseed rape, semi-natural habitat; individualCount: 6 males; behavior: primary parasitoids, larval; occurrenceID: E16619A8-405D-5DB5-865C-9A40D688C840

Parasite of: *Ceutorhynchus* spp.

Notes: oilseed rape pest host: yes

Townesilitus bicolor (Wesmael, 1835)

Material

a. country: Serbia; locality: Čenej, Pačir, Srbobran; samplingProtocol: Sweep net, Pan traps; eventDate: 24-27.04.2018, 07.05.2018, 10.05.2018, 25.05.2018, 10.05.2019; habitat: oilseed rape, semi-natural habitat; individualCount: 29 males, 4 females; behavior: primary parasitoids, adult; occurrenceID: 6C1B44DA-6B18-5F2A-AA95-117FA9C8DC30

Parasite of: *Phyllotreta* spp.

Notes: oilseed rape pest host: yes

Triaspis thoracica (Curtis, 1860)

Material

a. country: Serbia; locality: Čenej, Srbobran; samplingProtocol: Sweep net; eventDate: 27.04.2018, 07.05.2018, 10.05.2018, 25.05.2018; habitat: oilseed rape; individualCount: 17 males, 53 females; behavior: primary parasitoids, larval; occurrenceID: 31AF200E-A505-5FF0-BE16-9F8C0D660AAC

Parasite of: Chrysomelidae, *Bruchus* spp.

Notes: oilseed rape pest host: unknown

Family Ceidae

Cea pulicaris Walker, 1837

Material

a. country: Serbia; locality: Srbobran; samplingProtocol: Pan traps; eventDate: 07-10.05.2018; individualCount: 1 male; behavior: primary parasitoids, larval; occurrenceID: 8C00D2C6-6FA5-5B26-9D99-ADDCC9E1D372

Parasite of: Agromyzidae, *Phytomyza* spp.

Notes: oilseed rape pest host: unknown

Spalangiopelta sp. 1

Material

a. country: Serbia; locality: Čenej, Đurđin, Mišićevo, Srbobran; samplingProtocol: Sweep net, Pan traps; eventDate: 27.04.2018, 04.05.2018, 07.05.2018, 25.05.2018, 22-24.04.2019, 25.04.2019, 12.06.2019; habitat: oilseed rape, semi-natural habitat; individualCount: 8 males, 4 females; behavior: primary parasitoids, larval; occurrenceID: E6ABC350-A923-5C28-BBBA-2465C9111481

Parasite of: Agromyzidae, Drosophilidae (miners)

Notes: oilseed rape pest host: unknown

Family Ceraphronidae

Ceraphronidae sp. 1

Material

a. country: Serbia; locality: Čenej, Srbobran; samplingProtocol: Sweep net, Pan traps; eventDate: 24-27.04.2018, 07-10.05.2018, 25.05.2018; habitat: oilseed rape, semi-natural habitat; individualCount: 2 males, 1 female; behavior: primary parasitoids, larval; occurrenceID: 6977C9C7-9469-5D55-9EB8-7B56EF27769E

Parasite of: Cecidomyiidae, Hemiptera, Neuroptera, Thysanoptera

Notes: oilseed rape pest host: unknown

Ceraphronidae sp. 2

Material

a. country: Serbia; locality: Đurđin; samplingProtocol: Pan traps; eventDate: 22-24.04.2019; habitat: semi-natural habitat; individualCount: 1 male; behavior: primary parasitoids, larval; occurrenceID: 3C03AC9C-9FF1-5178-9F37-501881047C03

Parasite of: Cecidomyiidae, Hemiptera, Neuroptera, Thysanoptera

Notes: oilseed rape pest host: unknown

Aphanogmus abdominalis (Thomson, 1858)

Material

a. country: Serbia; locality: Čenej, Srbobran; samplingProtocol: Sweep net, Pan traps; eventDate: 24-27.04.2018, 04-07.05.2018, 07-10.05.2018, 13.06.2018; habitat: oilseed rape, semi-natural habitat; individualCount: 9 males, 16 females; behavior: primary parasitoids, larval; occurrenceID: 67963D58-F8DD-5A8E-9A48-9100C67EC5F9

Parasite of: *Dasineura brassicae*

Notes: oilseed rape pest host: yes

Ceraphron sp. 1

Material

a. country: Serbia; locality: Srbobran; samplingProtocol: Pan traps; eventDate: 04-07.05.2018; habitat: semi-natural habitat; individualCount: 1 male; behavior: primary parasitoids, larval; occurrenceID: D3738836-AF98-56D5-8C8F-4906B24752AD

Parasite of: Cecidomyiidae, Hemiptera, Neuroptera, Thysanoptera

Notes: oilseed rape pest host: unknown

Ceraphron sp. 2

Material

a. country: Serbia; locality: Čenej, Đurđin; samplingProtocol: Pan traps; eventDate: 24-27.04.2018, 22-24.04.2019; habitat: oilseed rape; individualCount: 3 males; behavior: primary parasitoids, larval; occurrenceID: 4F1DC248-EF72-5FB1-9F45-07BCA5B0BBD8

Parasite of: Cecidomyiidae, Hemiptera, Neuroptera, Thysanoptera

Notes: oilseed rape pest host: unknown

Family Chalcididae

Brachymeria tibialis-group Steffan, 1958

Material

a. country: Serbia; locality: Đurđin, Srbobran; samplingProtocol: Sweep net, Pan traps; eventDate: 24-27.04.2018, 24.04.2019; habitat: oilseed rape, semi-natural habitat; individualCount: 2 males; behavior: primary/secondary parasitoids, larval/pupal; occurrenceID: BB4DEADB-F72A-5BD6-B3F9-A220BDF54A02

Parasite of: Lepidoptera, Hymenoptera, Diprionidae, Diptera, Cecidomyiidae

Notes: oilseed rape pest host: unknown

Family Diapriidae

Lyteba sp. 1

Material

a. country: Serbia; locality: Bajmok, Pačir, Srbobran; samplingProtocol: Sweep net, Pan traps; eventDate: 04-07.05.2018, 07-10.05.2018, 25.05.2018, 22-24.04.2019; habitat: oilseed rape, semi-natural habitat; individualCount: 10 males, 6 females; behavior: primary parasitoids, larval/pupal; occurrenceID: 7103B83E-8E05-5365-A4AE-3F10EDABCE1D

Parasite of: Diptera, Mycetophilidae, Sciaridae

Notes: oilseed rape pest host: unknown

Trichopria sp. 1

Material

a. country: Serbia; locality: Srbobran; samplingProtocol: Pan traps; eventDate: 24-27.04.2018; habitat: semi-natural habitat; individualCount: 1 male; behavior: primary parasitoids, larval/pupal; occurrenceID: 08A7A3D2-D256-5D3E-810C-1369C2BE9D0A

Parasite of: Drosophilidae, Sarcophagidae, Sepsidae, Muscidae, Calliphoridae

Notes: oilseed rape pest host: unknown

Family Encyrtidae

Encyrtidae sp. 1

Material

a. country: Serbia; locality: Čenej; samplingProtocol: Pan traps; eventDate: 07-10.05.2018; habitat: oilseed rape; individualCount: 1 male; behavior: primary/secondary parasitoids, egg/larval; occurrenceID: 665B033C-6A98-58E7-84CD-7A1EAB4A40C9

Parasite of: Hemiptera, Homoptera, Coccoidea, Acarina

Notes: oilseed rape pest host: unknown

Encyrtidae sp. 2

Material

a. country: Serbia; locality: Đurđin; samplingProtocol: Pan traps; eventDate: 22-24.04.2019; habitat: semi-natural habitat; individualCount: 1 female; behavior: primary/secondary parasitoids, egg/larval; occurrenceID: B44CF365-920E-5918-B950-D845517334A2

Parasite of: Hemiptera, Homoptera, Coccoidea, Acarina

Notes: oilseed rape pest host: unknown

Encyrtidae sp. 3

Material

a. country: Serbia; locality: Mišićevo; samplingProtocol: Sweep net; eventDate: 04-25-19; habitat: oilseed rape, semi-natural habitat; individualCount: 2 females; behavior: primary/ secondary parasitoids, egg/larval; occurrenceID: 329554B8-9214-5768-AC2A-A1C0CA3E1A72

Parasite of: Hemiptera, Homoptera, Coccoidea, Acarina

Notes: oilseed rape pest host: unknown

Anagyrus sp. 1

Material

a. country: Serbia; locality: Pačir; samplingProtocol: Pan traps; eventDate: 22-24.04.2019; habitat: semi-natural habitat; individualCount: 1 male, 2 females; behavior: primary parasitoids, egg; occurrenceID: EFEB1B0D-9452-5C73-960B-CEF3BB2D0609

Parasite of: Hemiptera, Pseudococcidae?

Notes: oilseed rape pest host: unknown

Copidosoma bakeri (Howard, 1898)

Material

a. country: Serbia; locality: Čenej, Pačir, Srbobran; samplingProtocol: Sweep net, Pan traps; eventDate: 04-07.05.2018, 07-10.05.2018, 22-24.04.2019; habitat: oilseed rape, semi-natural habitat; individualCount: 12 males, 1 female; behavior: primary parasitoids, egg/ larval; occurrenceID: A39B9228-A151-5F73-AF4B-1EEB2059E5C4

Parasite of: Noctuidae (*Euxoa auxiliaris*)

Notes: oilseed rape pest host: unknown

Eugahania fumipennis (Ratzeburg, 1852)

Material

a. country: Serbia; locality: Bajmok; samplingProtocol: Pan traps; eventDate: 22-24.04.2019; habitat: semi-natural habitat; individualCount: 1 male; behavior: primary parasitoids, larval; occurrenceID: EAC5B5D2-1D84-55D3-916E-4B86FBA7F964

Parasite of: Cicadellidae, *Macropsis vicina*

Notes: oilseed rape pest host: unknown

Metaphycus flavus (Ashmead, 1901)

Material

a. country: Serbia; locality: Mišićevo, Srbobran; samplingProtocol: Sweep net; eventDate: 07.05.2018, 25.04.2019; habitat: oilseed rape; individualCount: 3 males; behavior: primary parasitoids, egg; occurrenceID: 762F7BCB-A08B-592F-943A-91081FB581A4

Parasite of: Hemiptera, Coccoidea

Notes: oilseed rape pest host: unknown

Rhopus sp. 1

Material

a. country: Serbia; locality: Đurđin; samplingProtocol: Pan traps; eventDate: 22-24.04.2019; habitat: semi-natural habitat; individualCount: 1 male; behavior: primary parasitoids, egg; occurrenceID: D3D8E152-A381-585A-BFB5-C1BC53F9DE00

Parasite of: Hemiptera, Pseudococcidae

Notes: oilseed rape pest host: unknown

Family Eulophidae

Eulophidae sp. 1

Material

a. country: Serbia; locality: Mišićevo, Pačir; samplingProtocol: Sweep net; eventDate: 18.04.2019, 10.05.2019; habitat: oilseed rape, semi-natural habitat; individualCount: 2 males; behavior: primary/secondary parasitoids, egg/larval/pupal; occurrenceID: F9DCF374-157E-5B65-BD84-865CA67D29F5

Parasite of: Holometabolous insects

Notes: oilseed rape pest host: unknown

Eulophidae sp. 2

Material

a. country: Serbia; locality: Čenej; samplingProtocol: Sweep net, Pan traps; eventDate: 24-27.04.2018, 10.05.2018; habitat: oilseed rape, semi-natural habitat; individualCount: 1 male, 1 female; behavior: primary/secondary parasitoids, egg/larval/pupal; occurrenceID: A14BDA52-22D1-52AB-8ADD-D4687C566B92

Parasite of: Holometabolous insects

Notes: oilseed rape pest host: unknown

Eulophidae sp. 3

Material

a. country: Serbia; locality: Čenej, Mišićevo; samplingProtocol: Sweep net, Pan traps, Aphid colony; eventDate: 07-10.05.2018, 25.05.2018; habitat: oilseed rape, semi-natural habitat; individualCount: 7 males, 3 females; behavior: primary/secondary parasitoids, egg/larval/pupal; occurrenceID: CC0F692C-2F39-5777-B056-9BED5DFA170E

Parasite of: Holometabolous insects

Notes: oilseed rape pest host: unknown

Eulophidae sp. 4

Material

a. country: Serbia; locality: Mišićevo, Srbobran; samplingProtocol: Sweep net; eventDate: 07.05.2018, 12.06.2019; habitat: oilseed rape; individualCount: 2 males; behavior: primary/secondary parasitoids, egg/larval/pupal; occurrenceID: 33B3070D-A66C-5491-9238-C41CFD109A8F

Parasite of: Holometabolous insects

Notes: oilseed rape pest host: unknown

Eulophidae sp. 5

Material

a. country: Serbia; locality: Bajmok; samplingProtocol: Sweep net; eventDate: 05-08-19; habitat: oilseed rape; individualCount: 1 male, 1 female; behavior: primary/secondary parasitoids, egg/larval/pupal; occurrenceID: 5B30C53D-6E6B-52CD-B264-53B03B03E44E

Parasite of: Holometabolous insects

Notes: oilseed rape pest host: unknown

Tetrastichinae sp. 1

Material

a. country: Serbia; locality: Čenej, Srbobran; samplingProtocol: Sweep net, Pan traps; eventDate: 24-27.04.2018, 04-07.05.2018, 25.05.2018; habitat: oilseed rape, semi-natural habitat; individualCount: 15 males, 9 females; behavior: primary/secondary

parasitoids, egg/larval/pupal; occurrenceID: 25F73A04-63DB-5BCC-8198-6D334C049E02

Parasite of: Holometabolous insects, spiders, mites, nematodes

Notes: oilseed rape pest host: unknown

Tetrastichinae sp. 2

Material

a. country: Serbia; locality: Čenej, Srbobran; samplingProtocol: Sweep net, Pan traps; eventDate: 04-07.05.2018, 10.05.2018; habitat: oilseed rape; individualCount: 4 males; behavior: primary/secondary parasitoids, egg/larval/pupal; occurrenceID: 3B402071-358E-5202-9EE0-2FCB10998A76

Parasite of: Holometabolous insects, spiders, mites, nematodes

Notes: oilseed rape pest host: unknown

Aprostocetus epicharmus (Walker, 1839)

Material

a. country: Serbia; locality: Mišićevo; samplingProtocol: Aphid colony; eventDate: 06-12-19; habitat: semi-natural habitat; individualCount: 2 males; behavior: primary parasitoids, larval; occurrenceID: DBE900AA-7874-5147-B369-EB8AE571ABD1

Parasite of: *Dasineura brassicae*

Notes: oilseed rape pest host: yes

Aprostocetus sp. 1

Material

a. country: Serbia; locality: Bajmok, Čenej, Mišićevo, Pačir, Srbobran; samplingProtocol: Sweep net, Aphid colony; eventDate: 07.05.2018, 10.05.2018, 25.05.2018, 25.04.2019, 08.05.2019; habitat: oilseed rape, semi-natural habitat; individualCount: 16 males, 1 female; behavior: primary parasitoids, larval; occurrenceID: 65C1DA0B-F6CE-5521-8C0E-697DB235729C

Parasite of: *Dasineura brassicae*

Notes: oilseed rape pest host: unknown, possible

Diaulinopsis arenaria (Erdös, 1951)

Material

a. country: Serbia; locality: Čenej, Srbobran; samplingProtocol: Sweep net, Pan traps; eventDate: 24-27.04.2018, 04-07.05.2018, 10.05.2018, 25.05.2018; habitat: oilseed rape, semi-natural habitat; individualCount: 4 males, 3 females; behavior: primary parasitoids, larval; occurrenceID: 31245DC2-09E3-5E20-AD85-28106E0475FC

Parasite of: *Liriomyza* spp.

Notes: oilseed rape pest host: unknown

Diglyphus aff. isaea

Material

a. country: Serbia; locality: Srbobran; samplingProtocol: Pan traps; eventDate: 04-07.05.2018; habitat: oilseed rape; individualCount: 1 female; behavior: primary parasitoids, larval; occurrenceID: 77C33F6A-EF2C-5439-9474-63CAF51843D9

Parasite of: leaf miners

Notes: oilseed rape pest host: unknown

Elasmus platyedrae Ferrière, 1935

Material

a. country: Serbia; locality: Bajmok, Pačir; samplingProtocol: Pan traps; eventDate: 17-19.04.2019, 22-24.04.2019; habitat: semi-natural habitat; individualCount: 7 males; behavior: primary/secondary parasitoids, larval; occurrenceID: 9EE8B34B-6E58-5C9F-A1CF-CAF99F0BE995

Parasite of: Gelechiidae

Notes: oilseed rape pest host: unknown

Eulophus sp. 1

Material

a. country: Serbia; locality: Bajmok, Čenej, Pačir, Srbobran; samplingProtocol: Sweep net; eventDate: 04.05.2018, 07.05.2018, 10.05.2018, 25.05.2018, 25.04.2019, 13.06.2019; habitat: oilseed rape, semi-natural habitat; individualCount: 8 males, 11 females; behavior: primary parasitoids, larval; occurrenceID: 67E92477-7F66-5525-8171-B91BF18A0BEC

Parasite of: Cabbage Seed Weevil, Lepidoptera

Notes: oilseed rape pest host: unknown, possible

Necremnus sp. 1

Material

a. country: Serbia; locality: Bajmok; samplingProtocol: Pan traps; eventDate: 17-19.04.2019; habitat: semi-natural habitat; individualCount: 1 female; behavior: primary parasitoids, larval; occurrenceID: 52828C98-25D5-5FAD-9603-BBEF1E42BD1D

Parasite of: Cabbage Seed Weevil, Lepidoptera

Notes: oilseed rape pest host: unknown, possible

Omphale clypealis (Thomson, 1878)

Material

a. country: Serbia; locality: Bajmok, Čenej, Pačir; samplingProtocol: Sweep net, Pan traps; eventDate: 24-27.04.2018, 24.04.2019, 25.04.2019; habitat: oilseed rape; individualCount: 3 males; behavior: primary parasitoids, larval; occurrenceID: 57F0A662-3BF1-5D85-B023-CCE77D6685A9

Parasite of: *Dasineura brassicae*

Notes: oilseed rape pest host: yes

Pnigalio sp. 1

Material

a. country: Serbia; locality: Čenej, Pačir; samplingProtocol: Sweep net, Pan traps; eventDate: 24-27.04.2018, 25.04.2019; habitat: oilseed rape; individualCount: 1 male, 2 females; behavior: primary/secondary parasitoids, larval; occurrenceID: A73F7362-9DA0-512C-98E2-BA7EF36E0272

Parasite of: leaf miners: Lepidoptera, Diptera, Coleoptera, Hymenoptera

Notes: oilseed rape pest host: unknown, possible

Tetrastichus sp. 1

Material

a. country: Serbia; locality: Čenej, Mišićevo, Srbobran; samplingProtocol: Sweep net, Pan traps, Aphid colony; eventDate: 24-27.04.2018, 04-07.05.2018, 07-10.05.2018, 25.05.2018, 25.04.2019; habitat: oilseed rape, semi-natural habitat; individualCount: 9 males, 8 females; behavior: primary parasitoids, larval/pupal; occurrenceID: E1CEB768-7D5D-5081-B997-CC5BD051F615

Parasite of: Buprestidae, Cerambycidae, Chrysomelidae, Curculionidae, Lepidoptera, Diptera, Hymenoptera

Notes: oilseed rape pest host: unknown, possible

Family Eurytomidae

Eurytoma sp. 1

Material

a. country: Serbia; locality: Čenej, Mišićevo, Srbobran; samplingProtocol: Sweep net, Pan traps, Aphid colony; eventDate: 27.04.2018, 04-07.05.2018, 07-10.05.2018, 25.05.2018, 25.04.2019; habitat: oilseed rape, semi-natural habitat; individualCount: 4 males, 7 females; behavior: primary/secondary parasitoids, larval; occurrenceID: B8AA6924-7073-5B04-AFFD-EA1EA8F1323A

Parasite of: *Systole*, *Bruchophagus*, hyperparasitoid on *Tetramesa*

Notes: oilseed rape pest host: unknown, possible

Family Figitidae

Eucolinae sp. 1

Material

a. country: Serbia; locality: Čenej, Đurđin, Srbobran; samplingProtocol: Sweep net, Pan traps; eventDate: 24-27.04.2018, 07-10.05.2018, 22-24.04.2019; habitat: oilseed rape, semi-natural habitat; individualCount: 8 males; behavior: primary parasitoids, larval/pupal; occurrenceID: 6E9D43A2-09E0-53E1-9353-764D0E4F36C8

Parasite of: Cyclorraphic dipterous larvae

Notes: oilseed rape pest host: unknown

Eucolinae sp. 2

Material

a. country: Serbia; locality: Čenej, Srbobran; samplingProtocol: Sweep net, Pan traps; eventDate: 24-27.04.2018, 07-10.05.2018; habitat: oilseed rape, semi-natural habitat; individualCount: 2 males, 3 females; behavior: primary parasitoids, larval/pupal; occurrenceID: D2EAF200-7A66-5FD2-B360-62432C85BE8A

Parasite of: Cyclorraphic dipterous larvae

Notes: oilseed rape pest host: unknown

Alloxysta sp. 1

Material

a. country: Serbia; locality: Srbobran; samplingProtocol: Aphid colony; eventDate: 04.05.2018, 07.05.2018; habitat: oilseed rape; individualCount: 2 males; behavior: secondary parasitoids, larval; occurrenceID: E59C956B-93C4-59D4-99D5-D8A84FE5ACD3

Parasite of: Aphidiinae, Aphelininae, Encyrtidae

Notes: oilseed rape pest host: unknown, possible

Rhoptomeris sp. 1

Material

a. country: Serbia; locality: Čenej, Srbobran; samplingProtocol: Pan traps; eventDate: 24-27.04.2018; habitat: oilseed rape; individualCount: 2 males, 1 female; behavior: primary parasitoids, larval/pupal; occurrenceID: A8E2E3BE-ED68-5E53-A541-274CD00A5354

Parasite of: Chloropidae, Diptera

Notes: oilseed rape pest host: unknown

Family Ichneumonidae

Ichneumonidae sp. 1

Material

a. country: Serbia; locality: Srbobran; samplingProtocol: Sweep net; eventDate: 05-07-18; habitat: oilseed rape; individualCount: 1 female; behavior: primary/secondary parasitoids, egg/larval; occurrenceID: C67F9BF1-DD57-5167-ACC8-733B38E5777D

Parasite of: Holometabolous insects

Notes: oilseed rape pest host: unknown

Phaeogenini sp. 1

Material

a. country: Serbia; locality: Srbobran; samplingProtocol: Sweep net; eventDate: 05-25-18; habitat: oilseed rape; individualCount: 1 female; behavior: primary/secondary parasitoids, larval; occurrenceID: 064DA64F-7F98-5937-982C-A00C74CC4561

Parasite of: *Plutella xylostella*

Notes: oilseed rape pest host: yes

Phygadeuontinae sp. 1

Material

a. country: Serbia; locality: Đurđin; samplingProtocol: Pan traps; eventDate: 22-24.04.2019; habitat: semi-natural habitat; individualCount: 2 females; behavior: primary/secondary parasitoids, egg/larval; occurrenceID: B2778AA4-64F4-5F69-8FA4-DAD9C5EA9408

Parasite of: Holometabolous insects

Notes: oilseed rape pest host: unknown

Phygadeuontini sp. 1

Material

a. country: Serbia; locality: Srbobran; samplingProtocol: Sweep net; eventDate: 05-10-18; habitat: oilseed rape; individualCount: 1 female; behavior: primary/secondary parasitoids, larval; occurrenceID: 28B6A6C4-A371-5989-9208-88674A1797FE

Parasite of: Symphyta

Notes: oilseed rape pest host: unknown

Aneuclis incidens (Thomson, 1889)

Material

a. country: Serbia; locality: Čenej, Pačir, Srbobran; samplingProtocol: Sweep net, Pan traps; eventDate: 24-27.04.2018, 10.05.2019; habitat: oilseed rape, semi-natural habitat; individualCount: 1 male, 2 females; behavior: primary parasitoids, larval; occurrenceID: 183E1573-8527-5A4C-AD8B-C6D6D4B465BB

Parasite of: *Meligethes aeneus*

Notes: oilseed rape pest host: yes

Aptesis flagitator (Rossi, 1794)

Material

a. country: Serbia; locality: Bajmok; samplingProtocol: Sweep net; eventDate: 05-08-19; habitat: oilseed rape; individualCount: 1 male; behavior: primary parasitoids, larval; occurrenceID: C2101708-61BC-55AA-8D4F-478F8D7DDA85

Parasite of: *Agonopterix heracliana*, *Athalia spinarum*

Notes: oilseed rape pest host: yes

Bathyplectes curculionis (Thomson, 1887)

Material

a. country: Serbia; locality: Srbobran; samplingProtocol: Sweep net; eventDate: 04-27-18; habitat: semi-natural habitat; individualCount: 1 female; behavior: primary parasitoids, pupal; occurrenceID: AC0A6F81-CAE3-5C1C-BD6E-45A10A1B37D1

Parasite of: *Apion pisi*, *Hypera* spp.

Notes: oilseed rape pest host: unknown

Collyria coxator (Villers, 1789)

Material

a. country: Serbia; locality: Bajmok, Čenej, Đurđin, Pačir, Srbobran; samplingProtocol: Sweep net, Pan traps; eventDate: 04-07.05.2018, 10.05.2018, 25.05.2018, 22-24.04.2019, 08.05.2019; habitat: oilseed rape, semi-natural habitat; individualCount: 7 males, 14 females; behavior: primary parasitoids, larval; occurrenceID: CC1A9ECA-A7E3-52A2-9004-232735782E0D

Parasite of: *Cephus cinctus*, *Cephus pygmeus*

Notes: oilseed rape pest host: unknown

Diadegma insulare (Cresson, 1865)

Material

a. country: Serbia; locality: Mišićevo; samplingProtocol: Sweep net; eventDate: 06-12-19; habitat: oilseed rape; individualCount: 1 male; behavior: primary parasitoids, pupal; occurrenceID: CD57A189-7AE6-5C7A-B431-CBA52EAE2F73

Parasite of: *Plutella xylostella*

Notes: oilseed rape pest host: yes

Diplazon laetatorius (Fabricius, 1781)

Material

a. country: Serbia; locality: Čenej, Mišićevo; samplingProtocol: Sweep net, Aphid colony; eventDate: 27.04.2018, 12.06.2019; habitat: oilseed rape, semi-natural habitat; individualCount: 2 males; behavior: primary parasitoids, pupal; occurrenceID: 7FC941A6-E807-5486-B88F-9347CAAC84C4

Parasite of: Diptera, Syrphidae

Notes: oilseed rape pest host: unknown

Dusona pugillator (Linnaeus, 1758)

Material

a. country: Serbia; locality: Bajmok, Pačir; samplingProtocol: Sweep net, Pan traps; eventDate: 22-24.04.2019, 10.05.2019; habitat: semi-natural habitat; individualCount: 2 males; behavior: primary parasitoids, larval; occurrenceID: D3D73282-6F08-588D-B352-81F81E9CF17F

Parasite of: Lepidoptera

Notes: oilseed rape pest host: unknown

Diphyus ochromelas (Gmelin, 1790)

Material

a. country: Serbia; locality: Bajmok; samplingProtocol: Sweep net; eventDate: 05-08-19; habitat: oilseed rape; individualCount: 1 male; behavior: primary parasitoids, larval; occurrenceID: AD397A1A-B727-5C1F-BC52-DF4C511895AB

Parasite of: Lepidoptera

Notes: oilseed rape pest host: unknown

Mesochorus sp. 1

Material

a. country: Serbia; locality: Čenej; samplingProtocol: Sweep net; eventDate: 05-10-18; habitat: semi-natural habitat; individualCount: 1 male; behavior: secondary parasitoids, larval; occurrenceID: 747E1AF2-EA36-5BE5-B065-72D08031D9F9

Parasite of: *Cotesia* spp.

Notes: oilseed rape pest host: unknown, possible

Olesicampe sp. 1

Material

a. country: Serbia; locality: Srbobran; samplingProtocol: Pan traps; eventDate: 04-07.05.2018; habitat: oilseed rape; individualCount: 1 female; behavior: primary parasitoids, pupal; occurrenceID: 6489C6DD-884E-5CE6-9C8E-D4FA7EF45758

Parasite of: Tenthredinidae

Notes: oilseed rape pest host: unknown

Stibeutes curvispina (Thomson, 1884)

Material

a. country: Serbia; locality: Čenej, Đurđin, Srbobran; samplingProtocol: Sweep net, Pan traps; eventDate: 04-07.05.2018, 07-10.05.2018, 22-24.04.2019; habitat: oilseed rape; individualCount: 3 males, 2 females; behavior: primary parasitoids, larval; occurrenceID: 12C812FB-44D7-54FE-A5BC-CFEA81EDF1E1

Parasite of: *Ceutorhynchus pallidactylus*

Notes: oilseed rape pest host: yes

Syrphophilus bizonarius (Gravenhorst, 1829)

Material

a. country: Serbia; locality: Pačir; samplingProtocol: Sweep net; eventDate: 05-10-19; habitat: semi-natural habitat; individualCount: 1 female; behavior: primary parasitoids, larval; occurrenceID: C55EB950-248B-5402-B80F-E6B92AD77282

Parasite of: *Atherigona soccata*, *Delia radicum*, *Episyrphus balteatus*, *Eupeodes corollae*, *Eupeodes luniger*, *Emex spinosa*, *Loxostege sticticalis*, *Neocnemodon vitripennis*, *Sphaerophoria scripta*

Notes: oilseed rape pest host: unknown

Tersilochus heterocerus (Thomson, 1889)

Material

a. country: Serbia; locality: Čenej, Srbobran; samplingProtocol: Sweep net; eventDate: 04.05.2018, 07.05.2018, 10.05.2018, 27.04.2018; habitat: oilseed rape, semi-natural habitat; individualCount: 11 males, 7 females; behavior: primary parasitoids, larval; occurrenceID: FD6E7063-B95F-58FC-B7FB-D0FF05686E8E

Parasite of: *Meligethes aeneus*

Notes: oilseed rape pest host: yes

Thrybius praedator (Rossi, 1792)

Material

a. country: Serbia; locality: Srbobran; samplingProtocol: Sweep net; eventDate: 05-04-18; habitat: semi-natural habitat; individualCount: 1 female; behavior: primary parasitoids, larval; occurrenceID: E1618D03-CD78-5960-811F-FF74A0DC5B74

Parasite of: *Achnara spargani*, *Chilo phragmitellus*, *Oberea euphorbiae*

Notes: oilseed rape pest host: unknown

Family Megaspilidae

Conostigmus rufescens Kieffer, 1907

Material

a. country: Serbia; locality: Srbobran; samplingProtocol: Sweep net; eventDate: 05-07-18; habitat: oilseed rape; individualCount: 1 male; behavior: primary parasitoids, egg/larval; occurrenceID: FEF6BD20-000B-5AB3-A033-AB1C56E92AE1

Parasite of: *Dasineura brassicae*

Notes: oilseed rape pest host: yes

Lagynodes pallidus (Boheman 1832)

Material

a. country: Serbia; locality: Čenej, Srbobran; samplingProtocol: Sweep net, Pan traps; eventDate: 24-27.04.2018, 04-07.05.2018, 07-10.05.2018; habitat: oilseed rape, semi-natural habitat; individualCount: 9 males, 6 females; behavior: secondary parasitoids, larval; occurrenceID: 6CEF44D2-BB26-55B3-8C3B-AAF783C929E2

Parasite of: *Cotesia* spp.

Notes: oilseed rape pest host: unknown

Family Mymaridae

Mymaridae sp. 1

Material

a. country: Serbia; locality: Srbobran; samplingProtocol: Pan traps; eventDate: 24-27.04.2018; habitat: semi-natural habitat; individualCount: 1 male; behavior: primary parasitoids, egg; occurrenceID: 84DD4EAA-01BE-5B28-8A93-77EBB1BF35DF

Parasite of: Auchenorrhynchous, Hemiptera, Coleoptera, Psocoptera

Notes: oilseed rape pest host: unknown

Anagrus sp. 1

Material

a. country: Serbia; locality: Bajmok, Đurđin, Mišićevo; samplingProtocol: Sweep net, Pan traps; eventDate: 20-22.04.2019, 24.04.2019, 25.04.2019; habitat: oilseed rape, semi-

natural habitat; individualCount: 3 males, 1 female; behavior: primary parasitoids, egg; occurrenceID: 0DAC860B-40C2-503B-BBBE-2E2E7A426D30

Parasite of: Cicadellidae

Notes: oilseed rape pest host: unknown

Anagrus sp. 2

Material

a. country: Serbia; locality: Čenej, Srbobran; samplingProtocol: Pan traps; eventDate: 04-07.05.2018; habitat: oilseed rape, semi-natural habitat; individualCount: 2 males; behavior: primary parasitoids, egg; occurrenceID: 97C28639-6481-501E-A8A1-08EE18C9F29A

Parasite of: Cicadellidae

Notes: oilseed rape pest host: unknown

Anagrus sp. 3

Material

a. country: Serbia; locality: Mišićevo; samplingProtocol: Sweep net; eventDate: 25.04.2019, 12.06.2019; habitat: oilseed rape; individualCount: 2 males; behavior: primary parasitoids, egg; occurrenceID: 2C0C5CF7-B1AD-502E-9B1F-61E21AE752D3

Parasite of: Cicadellidae

Notes: oilseed rape pest host: unknown

Anaphes sp. 1

Material

a. country: Serbia; locality: Bajmok, Čenej, Đurđin, Mišićevo, Pačir, Srbobran; samplingProtocol: Sweep net, Pan traps; eventDate: 24-27.04.2018, 04-07.05.2018, 10.05.2018, 22-24.04.2019, 25.04.2019; habitat: oilseed rape, semi-natural habitat; individualCount: 27 males, 6 females; behavior: primary parasitoids, egg; occurrenceID: 9047154B-F856-51C1-AB08-FEB894164FCC

Parasite of: Coleoptera, Curculionidae, Chysomelidae, Hemiptera, Miridae

Notes: oilseed rape pest host: unknown, possible

Gonatocerus sp. 1

Material

a. country: Serbia; locality: Bajmok; samplingProtocol: Sweep net; eventDate: 05-08-19; habitat: oilseed rape; individualCount: 1 male, 1 female; behavior: primary parasitoids, egg; occurrenceID: B9F3DFBB-3D89-5BF3-BA8E-F5A92F59E93C

Parasite of: Cicadellidae

Notes: oilseed rape pest host: unknown

Litus cynipseus Haliday, 1833

Material

a. country: Serbia; locality: Čenej, Srbobran; samplingProtocol: Sweep net, Pan traps; eventDate: 04-07.05.2018, 10.05.2018; habitat: oilseed rape, semi-natural habitat; individualCount: 2 males; behavior: primary parasitoids, egg; occurrenceID: 5F95AF60-AC55-546E-A606-10F10185B721

Parasite of: Coleoptera, Staphylinidae

Notes: oilseed rape pest host: unknown

Lymaenon sp. 1

Material

a. country: Serbia; locality: Srbobran; samplingProtocol: Sweep net; eventDate: 05-04-18; habitat: oilseed rape; individualCount: 1 male, 1 female; behavior: primary parasitoids, egg; occurrenceID: 7E2F864C-48F5-5C7F-B559-119DB45F5F9E

Parasite of: Cicadellidae, Membracoidea

Notes: oilseed rape pest host: unknown

Ooctonus sp. 1

Material

a. country: Serbia; locality: Čenej, Srbobran; samplingProtocol: Sweep net, Pan traps; eventDate: 04-07.05.2018, 07-10.05.2018; habitat: oilseed rape, semi-natural habitat; individualCount: 1 male, 2 females; behavior: primary parasitoids, egg; occurrenceID: C1AD470E-FA4D-563F-AAAD-C752EA57D667

Parasite of: Cercopoidea, Cicadellidae

Notes: oilseed rape pest host: unknown

Ooctonus vulgatus Haliday, 1833

Material

a. country: Serbia; locality: Čenej; samplingProtocol: Pan traps; eventDate: 04-07.05.2018; habitat: oilseed rape; individualCount: 1 male; behavior: primary parasitoids, egg; occurrenceID: 3411EABA-B0DF-5C42-AF8D-86EE173E223D

Parasite of: *Philaenus leucophthalmus*, *Philaenus spumarius*

Notes: oilseed rape pest host: unknown

Polynema sp. 1

Material

a. country: Serbia; locality: Čenej; samplingProtocol: Pan traps; eventDate: 24-27.04.2018; habitat: oilseed rape; individualCount: 1 male; behavior: primary parasitoids, egg; occurrenceID: DF42C77F-441F-58DF-8209-E0D66D088FA6

Parasite of: Cicadellidae

Notes: oilseed rape pest host: unknown

Family Perilampidae

Perilampidae sp. 1

Material

a. country: Serbia; locality: Bajmok; samplingProtocol: Sweep net; eventDate: 06-13-19; habitat: oilseed rape; individualCount: 1 male; behavior: primary/secondary parasitoids; occurrenceID: 7DAD5AEB-28D5-587B-949F-16730565D0F7

Parasite of: Hymenoptera, Diptera, Coleoptera, Lepidoptera, Neuroptera

Notes: oilseed rape pest host: unknown

Chrysolampus thenae (Walker, 1848)

Material

a. country: Serbia; locality: Čenej, Srbobran; samplingProtocol: Sweep net; eventDate: 27.04.2018, 04.05.2018, 07.05.2018, 10.05.2018; habitat: oilseed rape, semi-natural habitat; individualCount: 17 males, 12 females; behavior: primary parasitoids, larval/pupal; occurrenceID: F85D3D08-C1FE-52C7-B833-46B497D6904E

Parasite of: *Meligethes pedicularis*

Notes: oilseed rape pest host: unknown

Perilampus aeneus (Rossius, 1790)

Material

a. country: Serbia; locality: Bajmok; samplingProtocol: Sweep net; eventDate: 06-13-19; habitat: oilseed rape; individualCount: 1 female; behavior: primary parasitoids, larval; occurrenceID: BA6E5516-6F02-56B5-95EB-05FCDCE6A515

Parasite of: *Athalia rosae*

Notes: oilseed rape pest host: yes

Family Pirenidae

Macroglenes sp. 1

Material

a. country: Serbia; locality: Čenej; samplingProtocol: Pan traps; eventDate: 04-07.05.2018; habitat: oilseed rape; individualCount: 1 female; behavior: primary parasitoids, egg/larval; occurrenceID: 64D88E4B-98DF-505A-8F73-991A3307575B

Parasite of: Cecidomyiidae

Notes: oilseed rape pest host: unknown

Family Platygastridae

Euxestonotus error (Fitch, 1861)

Material

a. country: Serbia; locality: Čenej, Mišićevo; samplingProtocol: Oilseed pods, Pan traps; eventDate: 04-07.05.2018, 12.06.2019; habitat: oilseed rape; individualCount: 2 males; behavior: primary parasitoids, larval; occurrenceID: D2051C6B-CCEF-5BD6-951B-4A4919461A19

Parasite of: *Sitodiplosis mosellana*, *Dasineura brassicae*?

Notes: oilseed rape pest host: unknown

Inostemma boscii (Jurine, 1807)

Material

a. country: Serbia; locality: Čenej, Mišićevo; samplingProtocol: Sweep net, Pan traps, Aphid colony; eventDate: 07-10.05.2018, 12.06.2019; habitat: oilseed rape, semi-natural

habitat; individualCount: 3 males; behavior: primary parasitoids, egg/larval; occurrenceID: 679DEE51-0DD2-51E1-BD76-D94776FDB43E

Parasite of: *Dasineura brassicae*

Notes: oilseed rape pest host: yes

Platygaster sp. 1

Material

a. country: Serbia; locality: Mišićevo; samplingProtocol: Sweep net; eventDate: 04-25-19; habitat: semi-natural habitat; individualCount: 1 male; behavior: primary parasitoids, larval; occurrenceID: CE7D884E-5A2C-5411-BEAF-3B9BC5B0E1B2

Parasite of: Cecidomyiidae (*Dasineura brassicae*?)

Notes: oilseed rape pest host: unknown, possible

Platygaster sp. 2

Material

a. country: Serbia; locality: Bajmok, Đurđin, Srbobran; samplingProtocol: Sweep net, Pan traps; eventDate: 07.05.2018, 17-19.04.2019, 22-24.04.2019; habitat: oilseed rape, semi-natural habitat; individualCount: 5 males, 1 female; behavior: primary parasitoids, larval; occurrenceID: 518A0586-0A1A-59F0-8C02-16CEDB1BED18

Parasite of: Cecidomyiidae (*Dasineura brassicae*?)

Notes: oilseed rape pest host: unknown, possible

Platygaster subuliformis Kieffer, 1926

Material

a. country: Serbia; locality: Čenej; samplingProtocol: Pan traps; eventDate: 07-10.05.2018; habitat: oilseed rape; individualCount: 1 male; behavior: primary parasitoids, egg/larval; occurrenceID: 4D15DF4D-D4AF-522F-8D92-C9DCC1A223F2

Parasite of: *Dasineura brassicae*

Notes: oilseed rape pest host: yes

Synopeas sp. 1

Material

a. country: Serbia; locality: Mišićevo; samplingProtocol: Sweep net; eventDate: 04-25-19; habitat: semi-natural habitat; individualCount: 1 male; behavior: primary parasitoids, egg/larval; occurrenceID: 290E0998-E75F-52A9-9155-ADFAB09FA382

Parasite of: Cecidomyiidae (*Dasineura brassicae*?)

Notes: oilseed rape pest host: unknown, possible

Telenomus sp. 1

Material

a. country: Serbia; locality: Bajmok, Čenej, Đurđin, Mišićevo, Srbobran; samplingProtocol: Sweep net, Pan traps; eventDate: 24-27.04.2018, 04-07.05.2018, 07-10.05.2018, 22-24.04.2019, 25.04.2019, 12.06.2019, 13.06.2019; habitat: oilseed rape, semi-natural habitat; individualCount: 25 males, 6 females; behavior: primary parasitoids, egg; occurrenceID: 8A98FE66-1FF3-5068-B91F-7CE2629032F3

Parasite of: Lepidoptera, Heteroptera, Diptera, Neuroptera

Notes: oilseed rape pest host: unknown

Telenomus sp. 2

Material

a. country: Serbia; locality: Đurđin, Srbobran; samplingProtocol: Pan traps; eventDate: 24-27.04.2018, 04-07.05.2018, 07-10.05.2018, 22-24.04.2019; habitat: oilseed rape, semi-natural habitat; individualCount: 5 males, 3 females; behavior: primary parasitoids, egg; occurrenceID: 3FF5D53B-3C0F-5687-8C81-91E1203DE58E

Parasite of: Lepidoptera, Heteroptera, Diptera, Neuroptera

Notes: oilseed rape pest host: unknown

Telenomus sp. 3

Material

a. country: Serbia; locality: Bajmok, Čenej, Đurđin, Mišićevo, Pačir, Srbobran; samplingProtocol: Sweep net, Pan traps; eventDate: 24-27.04.2018, 04-07.05.2018, 07-10.05.2018, 22-24.04.2019, 25.04.2019, 13.06.2019; habitat: oilseed rape, semi-natural habitat; individualCount: 17 males, 2 females; behavior: primary parasitoids, egg; occurrenceID: F2466748-82B0-547A-B168-23D648548A6E

Parasite of: Lepidoptera, Heteroptera, Diptera, Neuroptera

Notes: oilseed rape pest host: unknown

Telenomus sp. 4

Material

a. country: Serbia; locality: Bajmok, Čenej, Srbobran; samplingProtocol: Sweep net, Pan traps; eventDate: 24-27.04.2018, 04-07.05.2018, 07-10.05.2018, 13.06.2019; habitat: oilseed rape, semi-natural habitat; individualCount: 15 males, 6 females; behavior: primary parasitoids, egg; occurrenceID: 85A0CC52-0238-5F96-B65D-D7F0887B1630

Parasite of: Lepidoptera, Heteroptera, Diptera, Neuroptera

Notes: oilseed rape pest host: unknown

Family Pteromalidae

Pteromalidae sp. 1

Material

a. country: Serbia; locality: Čenej, Srbobran; samplingProtocol: Sweep net, Pan traps; eventDate: 27.04.2018, 04-07.05.2018; habitat: oilseed rape; individualCount: 4 males; behavior: primary/secondary parasitoids, larval/pupal; occurrenceID: 3AFD2F76-5B82-5461-9D51-BB9993A1B4AF

Parasite of: Lepidoptera, Coleoptera, Diptera

Notes: oilseed rape pest host: unknown

Pteromalidae sp. 2

Material

a. country: Serbia; locality: Čenej; samplingProtocol: Pan traps; eventDate: 24-27.04.2018; habitat: oilseed rape; individualCount: 1 male; behavior: primary/secondary parasitoids, larval/pupal; occurrenceID: 9C1CFA2D-48B0-5510-9CE6-46D7A0C71457

Parasite of: Lepidoptera, Coleoptera, Diptera

Notes: oilseed rape pest host: unknown

Pteromalidae sp. 3

Material

a. country: Serbia; locality: Srbobran; samplingProtocol: Pan traps; eventDate: 04-07.05.2018; habitat: semi-natural habitat; individualCount: 1 male; behavior: primary/secondary parasitoids, larval/pupal; occurrenceID: 6FF49984-DB97-5383-8383-99B291993177

Parasite of: Lepidoptera, Coleoptera, Diptera

Notes: oilseed rape pest host: unknown

Pteromalidae sp. 4

Material

a. country: Serbia; locality: Čenej, Srbobran; samplingProtocol: Sweep net; eventDate: 04.05.2018, 07.05.2018; habitat: oilseed rape; individualCount: 2 males; behavior: primary/secondary parasitoids, larval/pupal; occurrenceID: 0179DAD3-C720-5A57-AEAC-723A1C9ADB93

Parasite of: Lepidoptera, Coleoptera, Diptera

Notes: oilseed rape pest host: unknown

Pteromalidae sp. 5

Material

a. country: Serbia; locality: Čenej, Đurđin, Pačir, Srbobran; samplingProtocol: Sweep net, Pan traps; eventDate: 04-07.05.2018, 25.04.2019, 08.05.2019; habitat: oilseed rape; individualCount: 8 males; behavior: primary/secondary parasitoids, larval/pupal; occurrenceID: 7B2133A9-66DC-583C-B802-5C239B0A4033

Parasite of: Lepidoptera, Coleoptera, Diptera

Notes: oilseed rape pest host: unknown

Pteromalidae sp. 6

Material

a. country: Serbia; locality: Čenej; samplingProtocol: Sweep net; eventDate: 27.04.2018, 04.05.2018, 07.05.2018; habitat: oilseed rape; individualCount: 3 males; behavior: primary/secondary parasitoids, larval/pupal; occurrenceID: F3CE52EF-8D40-5F57-8755-722D2E3E1A4C

Parasite of: Lepidoptera, Coleoptera, Diptera

Notes: oilseed rape pest host: unknown

Pteromalidae sp. 7

Material

a. country: Serbia; locality: Čenej, Mišićevo, Srbobran; samplingProtocol: Sweep net; eventDate: 27.04.2018, 10.05.2018, 25.05.2018; habitat: oilseed rape, semi-natural habitat; individualCount: 5 males, 2 females; behavior: primary/secondary parasitoids, larval/pupal; occurrenceID: D1A62987-9E64-53EE-A8CC-F58803407DFD

Parasite of: Lepidoptera, Coleoptera, Diptera

Notes: oilseed rape pest host: unknown

Pteromalidae sp. 8

Material

a. country: Serbia; locality: Bajmok, Čenej, Srbobran; samplingProtocol: Sweep net; eventDate: 04.05.2018, 10.05.2018, 24.04.2019; habitat: oilseed rape; individualCount: 4 males, 2 females; behavior: primary/secondary parasitoids, larval/pupal; occurrenceID: 7E4CFEEE-8C69-5CBC-B5B5-63E2603EB967

Parasite of: Lepidoptera, Coleoptera, Diptera

Notes: oilseed rape pest host: unknown

Pteromalidae sp. 9

Material

a. country: Serbia; locality: Čenej; samplingProtocol: Sweep net; eventDate: 27.04.2018, 10.05.2018; habitat: oilseed rape, semi-natural habitat; individualCount: 1 male, 1 female; behavior: primary/secondary parasitoids, larval/pupal; occurrenceID: 3F827E96-D1E1-5159-AB7A-167D27E787FE

Parasite of: Lepidoptera, Coleoptera, Diptera

Notes: oilseed rape pest host: unknown

Pteromalidae sp. 10

Material

a. country: Serbia; locality: Srbobran; samplingProtocol: Aphid colony; eventDate: 05-07-18; habitat: oilseed rape; individualCount: 1 male; behavior: primary/secondary parasitoids, larval/pupal; occurrenceID: DE482C0B-356E-597F-9158-22C2E8DA290F

Parasite of: Lepidoptera, Coleoptera, Diptera

Notes: oilseed rape pest host: unknown

Pteromalidae sp. 11

Material

a. country: Serbia; locality: Bajmok; samplingProtocol: Pan traps; eventDate: 17-19.04.2019; habitat: semi-natural habitat; individualCount: 1 female; behavior: primary/secondary parasitoids, larval/pupal; occurrenceID: 4FBAA759-55F7-51FB-AA60-7D18FFC729CC

Parasite of: Lepidoptera, Coleoptera, Diptera

Notes: oilseed rape pest host: unknown

Dibrachys microgastri (Bouché, 1834)

Material

a. country: Serbia; locality: Srbobran; samplingProtocol: Pan traps; eventDate: 24-27.04.2018; habitat: oilseed rape; individualCount: 1 male; behavior: secondary parasitoids, pupal; occurrenceID: C2BE8652-2DBC-5A8D-9A41-B2A6C789A542

Parasite of: *Cotesia* spp.

Notes: oilseed rape pest host: unknown

Mesopolobus incultus (Walker, 1834)

Material

a. country: Serbia; locality: Bajmok, Mišićevo, Pačir; samplingProtocol: Sweep net; eventDate: 25.04.2019, 12.06.2019, 13.06.2019; habitat: oilseed rape; individualCount: 4 males, 1 female; behavior: primary parasitoids, larval; occurrenceID: 4FB3965B-1340-5F9B-BB35-111CAE2B6B29

Parasite of: Curculionidae, *Gymnetron* sp., *Gymnetron pascuorum*, *Mecinus* sp., Scolytidae, *Polygraphus poligraphus* , Agromyzidae, *Phytobia humeralis*, Cecidomyiidae, *Kaltenbachiola strobi*

Notes: oilseed rape pest host: unknown

Mesopolobus morys (Walker, 1848)

Material

a. country: Serbia; locality: Bajmok, Čenej, Đurđin, Mišićevo, Srbobran; samplingProtocol: Sweep net, Oilseed pods; eventDate: 27.04.2018, 10.05.2018, 25.05.2018, 12.06.2019, 13.06.2019; habitat: oilseed rape, semi-natural habitat; individualCount: 23 males, 5 females; behavior: primary parasitoids, larval; occurrenceID: 009636D4-DFBA-522C-90B6-8DBA0B11E1EB

Parasite of: *Ceutorhynchus assimilis*

Notes: oilseed rape pest host: yes

Mesopolobus sp. 1

Material

a. country: Serbia; locality: Čenej; samplingProtocol: Pan traps; eventDate: 04-07.05.2018, 07-10.05.2018; habitat: oilseed rape; individualCount: 10 males; behavior: primary parasitoids, larval; occurrenceID: 33B2176A-BC4D-5619-822B-22D79B58F442

Parasite of: *Ceutorhynchus* spp.

Notes: oilseed rape pest host: unknown, possible

Mesopolobus sp. 2

Material

a. country: Serbia; locality: Čenej, Srbobran; samplingProtocol: Sweep net, Pan traps; eventDate: 24-27.04.2018, 10.05.2018; habitat: oilseed rape; individualCount: 3 males; behavior: primary parasitoids, larval; occurrenceID: 3D0EEB7D-A975-53E6-B51B-B046F124045D

Parasite of: *Ceutorhynchus* spp.

Notes: oilseed rape pest host: unknown, possible

Mesopolobus sp. 3

Material

a. country: Serbia; locality: Čenej, Srbobran; samplingProtocol: Sweep net, Pan traps; eventDate: 04-07.05.2018, 10.05.2018; habitat: oilseed rape, semi-natural habitat; individualCount: 2 males, 1 female; behavior: primary parasitoids, larval; occurrenceID: E5605028-C316-573A-90BC-AA00987B6E8D

Parasite of: *Ceutorhynchus* spp.

Notes: oilseed rape pest host: unknown, possible

Pteromalus sp. 1

Material

a. country: Serbia; locality: Čenej, Srbobran; samplingProtocol: Sweep net; eventDate: 27.04.2018, 04.05.2018, 25.05.2018; habitat: oilseed rape; individualCount: 2 males, 3 females; behavior: primary parasitoids, pupal; occurrenceID: 963C73AA-A9C4-5BA1-9EA7-1B189335F65C

Parasite of: Lepidoptera, Tenthredinidae

Notes: oilseed rape pest host: unknown

Pteromalus sp. 2

Material

a. country: Serbia; locality: Mišićevo; samplingProtocol: Sweep net; eventDate: 04-25-19; habitat: semi-natural habitat; individualCount: 1 male; behavior: primary parasitoids, pupal; occurrenceID: 9F2959EB-40AA-5EBB-8492-CEC29BDA2C93

Parasite of: Lepidoptera, Tenthredinidae

Notes: oilseed rape pest host: unknown

Pteromalus sp. 3

Material

a. country: Serbia; locality: Mišićevo; samplingProtocol: Sweep net; eventDate: 25.04.2019, 10.05.2019; habitat: semi-natural habitat; individualCount: 2 males; behavior: primary parasitoids, pupal; occurrenceID: E8377C37-16CC-5F4F-ADF7-46E4C90C4146

Parasite of: Lepidoptera, Tenthredinidae

Notes: oilseed rape pest host: unknown

Trichomalus lucidus (Walker, 1835)

Material

a. country: Serbia; locality: Bajmok, Čenej, Đurđin, Pačir, Srbobran; samplingProtocol: Sweep net, Pan traps, Aphid colony; eventDate: 27.04.2018, 04-07.05.2018, 07-10.05.2018, 25.05.2018, 22-24.04.2019, 08.05.2019, 13.06.2019; habitat: oilseed rape, semi-natural habitat; individualCount: 244 males, 150 females; behavior: primary parasitoids, larval; occurrenceID: 9E42182F-CD4C-58E3-A006-500646839E1B

Parasite of: *Ceutorhynchus* spp., *Psylliodes chrysocephala*

Notes: oilseed rape pest host: yes

Trichomalus sp. 1

Material

a. country: Serbia; locality: Čenej, Srbobran; samplingProtocol: Pan traps; eventDate: 04-07.05.2018, 07-10.05.2018; habitat: oilseed rape, semi-natural habitat; individualCount: 3 males, 1 female; behavior: primary parasitoids, larval; occurrenceID: C0DFE327-FD39-5199-A973-1F370CF44F89

Parasite of: *Ceutorhynchus* spp.

Notes: oilseed rape pest host: unknown, possible

Trichomalus sp. 2

Material

a. country: Serbia; locality: Čenej, Srbobran; samplingProtocol: Pan traps; eventDate: 04-07.05.2018, 07-10.05.2018; habitat: oilseed rape; individualCount: 2 males, 4

females; behavior: primary parasitoids, larval; occurrenceID: 5B64E486-9913-590C-9EA2-3C7FEAF2EAD7

Parasite of: *Ceutorhynchus* spp.

Notes: oilseed rape pest host: unknown, possible

Trichomalus sp. 3

Material

a. country: Serbia; locality: Čenej; samplingProtocol: Sweep net; eventDate: 05-10-18; habitat: oilseed rape; individualCount: 1 male; behavior: primary parasitoids, larval; occurrenceID: 08BC1E84-4526-5A64-A66F-11A613C156A9

Parasite of: *Ceutorhynchus* spp.

Notes: oilseed rape pest host: unknown, possible

Trichomalus sp. 4

Material

a. country: Serbia; locality: Srbobran; samplingProtocol: Pan traps; eventDate: 04-07.05.2018; habitat: semi-natural habitat; individualCount: 1 male; behavior: primary parasitoids, larval; occurrenceID: 635BACFB-24DC-51D4-B87A-E94BBACEAD18

Parasite of: *Ceutorhynchus* spp.

Notes: oilseed rape pest host: unknown, possible

Family Scelionidae

Scelionidae sp. 1

Material

a. country: Serbia; locality: Srbobran; samplingProtocol: Sweep net; eventDate: 05-07-18; habitat: oilseed rape; individualCount: 1 female; behavior: primary parasitoids; occurrenceID: 155A11AF-C04E-5ACF-B427-5945A80564DA

Parasite of: Insects, arachnids

Notes: oilseed rape pest host: unknown

Eumicrosoma sp. 1

Material

a. country: Serbia; locality: Srbobran; samplingProtocol: Sweep net; eventDate: 05-07-18; habitat: oilseed rape; individualCount: 1 male; behavior: primary parasitoids, egg; occurrenceID: 80F2947C-A65A-5166-98C3-25C427411C13

Parasite of: Heteroptera, Pentatomidae, Lygaeidae

Notes: oilseed rape pest host: unknown

Gryon sp. 1

Material

a. country: Serbia; locality: Srbobran; samplingProtocol: Sweep net, Pan traps; eventDate: 24-27.04.2018, 07.05.2018, 10.05.2018; habitat: oilseed rape; individualCount: 1 male, 2 females; behavior: primary parasitoids, egg; occurrenceID: 8D48E981-9573-5984-A23B-2C7D628D0D7B

Parasite of: Hemiptera, Coreidae

Notes: oilseed rape pest host: unknown

Trimorus sp. 1

Material

a. country: Serbia; locality: Bajmok, Srbobran; samplingProtocol: Sweep net; eventDate: 07.05.2018, 24.04.2019; habitat: oilseed rape; individualCount: 1 male, 1 female; behavior: primary parasitoids, egg; occurrenceID: 02F2A15C-4302-5C1A-908C-8F0612805AEE

Parasite of: Carabidae

Notes: oilseed rape pest host: unknown

Trissolcus basalis (Wollaston, 1858)

Material

a. country: Serbia; locality: Bajmok, Čenej, Srbobran; samplingProtocol: Sweep net, Pan traps; eventDate: 24-27.04.2018, 04-07.05.2018, 07-10.05.2018, 25.05.2018, 13.06.2019; habitat: oilseed rape, semi-natural habitat; individualCount: 14 males, 5 females; behavior: primary parasitoids, egg; occurrenceID: F640CCB8-EB59-5547-8493-53E50E3F9240

Parasite of: Heteroptera, *Nezara viridula*

Notes: oilseed rape pest host: unknown

Family Spalangiidae

Spalangia nigra Latreille, 1805

Material

a. country: Serbia; locality: Čenej, Pačir; samplingProtocol: Pan traps; eventDate: 07-10.05.2018, 22-24.04.2019; habitat: oilseed rape, semi-natural habitat; individualCount: 3 males; behavior: primary parasitoids, pupal; occurrenceID: E0BC2BE7-A9F1-5930-B13D-8B4980F0D92D

Parasite of: Diptera puparia

Notes: oilseed rape pest host: unknown

Family Systasidae

Asaphes vulgaris Walker, 1834

Material

a. country: Serbia; locality: Čenej, Srbobran; samplingProtocol: Sweep net; eventDate: 10.05.2018, 25.05.2018; habitat: oilseed rape; individualCount: 2 males; behavior: secondary parasitoids, larval; occurrenceID: 0354FF52-0A62-5246-8340-A904585A61BD

Parasite of: aphid parasitoids

Notes: oilseed rape pest host: yes

Family Torymidae

Podagrion pachymerum (Walker, 1833)

Material

a. country: Serbia; locality: Mišićevo; samplingProtocol: Sweep net; eventDate: 04-25-19; habitat: semi-natural habitat; individualCount: 1 male; behavior: primary parasitoids, egg; occurrenceID: D3EA9F47-C288-59B0-8F97-02BF3560AC92

Parasite of: Mantodea, Mantidae

Notes: oilseed rape pest host: unknown

Pseudotorymus napi (Amerling & Kirchner, 1860)

Material

a. country: Serbia; locality: Čenej, Mišićevo, Srbobran; samplingProtocol: Sweep net, Pan traps, Aphid colony, Oilseed pods; eventDate: 24-27.04.2018, 04-07.05.2018, 07-10.05.2018, 25.05.2018, 25.05.2019; habitat: oilseed rape, semi-natural habitat; individualCount: 144 males, 74 females; behavior: primary parasitoids, larval; occurrenceID: A46E8930-EDC8-58B9-9BBA-D60067B74506

Parasite of: *Dasineura brassicae*

Notes: oilseed rape pest host: yes

Torymus sp. 1

Material

a. country: Serbia; locality: Pačir; samplingProtocol: Sweep net; eventDate: 04-25-19; habitat: oilseed rape; individualCount: 1 male; behavior: primary parasitoids, larval; occurrenceID: 59EE6B5E-7094-559B-BD13-2305E7E082C7

Parasite of: Ectoparasitoids of gall-forming insects (Cecidomyiidae, Cynipidae)

Notes: oilseed rape pest host: unknown

Family Trichogrammatidae

Trichogrammatidae sp. 1

Material

a. country: Serbia; locality: Bajmok; samplingProtocol: Sweep net; eventDate: 04-24-19; habitat: oilseed rape; individualCount: 1 male; behavior: primary parasitoids, egg; occurrenceID: 844E2307-1DB9-578E-9CE2-2A8A79EE2C32

Parasite of: Lepidoptera, Coleoptera, Neuroptera, Diptera, Hymenoptera

Notes: oilseed rape pest host: unknown

Trichogramma evanescens Westwood, 1833

Material

a. country: Serbia; locality: Srbobran; samplingProtocol: Pan traps; eventDate: 24-27.04.2018; habitat: semi-natural habitat; individualCount: 1 male; behavior: primary parasitoids, egg; occurrenceID: 1E041ED8-6884-5503-B24E-7115C06B7382

Parasite of: Lepidoptera, Chrysomelidae

Notes: oilseed rape pest host: unknown

Analysis

During this two-year study, we found a total of 3135 specimens of primary or secondary parasitoids, of which 2855 were found in oilseed rape fields and 280 in semi-natural habitats. In the 2018 season, we found 2926 individuals, while in 2019, we found only 209 individuals. The temporal dynamics of parasitoid abundance were also different in the two years. The highest abundance was in May in 2018 (2694) and in April in 2019 (107). Most individuals were found when sampling with sweep nets (1715), followed by rearing from aphid colonies (1001), pan traps (404) and collecting oilseed pods (15).

We found 153 different taxa, of which 119 were found in oilseed rape fields and 87 in semi-natural habitats. Not all specimens could be identified to species level, but only to genus or family level. We found a total of 92 different genera, 73 in oilseed rape fields and 59 in semi-natural habitats and 22 families, all of which occurred in oilseed rape and 19 in semi-natural habitats. The species accumulation curve shows that the number of detected species in oilseed rape fields has not reached a plateau (Fig. 2), while extrapolated species richness differed somewhat between different estimators (Chao = 173.2 ± 21.5, Jack1 = 165.4 ± 12.3, Jack2 = 193.2, Bootstrap = 138.1 ± 6.8). The number of singletons and doubletons in oilseed rape fields was 45 and 19, respectively.

The four most abundant families were Braconidae (1880), Pteromalidae (500), Torymidae (220) and Eulophidae (123) with more than 85% of all specimens captured and the four most numerous genera were *Diaeretiella* Starý, 1960 (1243), *Trichomalus* Thomson, 1878 (406), *Aphidius* Nees, 1818 (389) and *Pseudotorymus* Masi, 1921 (218) with more than 70%. The number of different taxa found in each family, sorted by number of taxa is shown in Table 3.

Of all the taxa we found, 119 are described in literature as primary parasitoids and five as hyperparasitoids, with another 29 that can be either primary or secondary parasitoids. Based on the literature examined, in both habitats, we found 31 genera (33 species) described as parasitoids of oilseed rape pests and 54 genera (97 species) parasitising non-pest species. We also identified 10 genera (23 species) as possible parasitoids of oilseed rape pests. These taxa could only be identified to the genus level and belong to genera that have at least one other species of oilseed rape pest parasitoids. In oilseed rape fields, we found 28 genera (29 species) of oilseed rape pest parasitoids, 40 genera (73 species) parasitising non-pest species and eight genera (17 species) of possible oilseed rape pest parasitoids.

Using two criteria for consistency of occurrence, we selected 25 taxa (22 genera) that regularly occur in our oilseed rape fields, of which 13 taxa (11 genera) were not reported as parasitoids of oilseed rape pests, although four taxa are identified as possible parasitoids (Table 4).

Detailed information on locations, collection dates, habitat, sampling methods, host, parasitism type, oilseed rape pest host status and number of specimens for each taxon can be found in Suppl. material 2 and Suppl. material 3 and additional data on host stage and references in Suppl. material 4.

Discussion

Oilseed rape fields are known to harbour a variety of parasitoids, which are natural enemies of oilseed rape pests (Alford 2003, Williams 2010). However, we have found that the diversity of parasitoids found in our oilseed rape fields goes beyond those associated with crop pests. In fact, only slightly less than 25% of the parasitoid taxa identified in oilseed rape fields are linked to crop pest species. This suggests that oilseed rape fields serve multiple functions for parasitoids, including providing host species that are not pests and floral resources that attract parasitoids. Although the aim of this study was not to conduct a detailed analysis of differences between oilseed rape fields and nearby semi-natural habitats, we observed a noticeably higher abundance and diversity of parasitoids in oilseed rape fields compared to nearby semi-natural habitats. The presence of a diverse parasitoid community in fields, including those not typically associated with oilseed rape pests, may contribute to the natural pest control of other crops and promote biodiversity in the surrounding environment. However, it is worth noting that some parasitoid species might also provide disservice to biological control by parasitising on other beneficial insects, like *Diplazon laetatorius* that can parasitise hoverfly pupae (Townes 1971), *Asaphes vulgaris* which is hyperparasitoid of several of the aphid parasitoids (Žikić et al. 2012) and *Podagrion* species that specialise on praying mantis eggs (Thompson 1958).

There are several taxa that were collected consistently and in greater numbers in our oilseed rape fields, but are not known to parasitise oilseed rape pest species. *Triaspis thoracica* was the most numerous of them and parasitises species of the genus *Bruchus* (Chrysomelidae), which are important pests in various types of bean crops, such as peas, lentils and vetches (Yu et al. 2011). In 2018, it was found in four fields, but only in one field in large numbers (65 out of a total of 70 individuals). Although this cannot be verified, it is possible that this particular field had a high understorey of some Fabaceae species that provided resources for the *Bruchus* population and consequently for *T. thoracica*. Similarly, *Trissolcus basalis* is an egg parasitoid of invasive pentatomid species, such as *Nezara viridula* and *Halyomorpha halys* (Stål, 1855), which are pests in many legumes, fruits and vegetables (Powell and Shepard 1982, Schaefer and Panizzi 2000, Zapponi et al. 2021). The sporadic presence of other plant species in the oilseed rape fields, such as wild grasses, may also possibly explain the presence of *Collyria coxator*, a specialised parasitoid of the European wheat stem sawfly (*Cephus pygmaeus* (Linnaeus, 1767)), which is a pest of cereal crops, but also feeds on various grass species. Likewise, *Telenomus* species parasitise various Heteroptera, but also Lepidoptera, which can be readily found as non-pests in oilseed rape fields. On the other hand, *Chrysolampus thenae* is known to parasitise *Lamiogethes pedicularis* (Gyllenhal, 1808) which are found

on Lamiaceae plants (Noyes 2019). It is possible that this parasitoid also attacks other species from the subfamily Meligethinae, such as *B. aeneus* or that host plants were present in the undergrowth. Given the significant presence of these parasitoids not associated with pest species, it would be valuable for future studies to note the previous season's crop as this may help explain the presence of volunteer plants and associated pests and parasitoids.

There are also some parasitoid species that are widely distributed in oilseed rape throughout Europe, but are absent or present only in small numbers in our study. According to Nilsson (2003), the most important pollen beetle parasitoid species are *Phradis interstitialis* (Thomson, 1889), *P. morionellus* (Holmgren, 1860) and *Tersilochus heterocerus*, with *Diospilus capito*, *Blacus nigricornis* and *Brachyserphus parvulus* (Nees, 1834) also being quite common. Only *T. heterocerus* was found in our study in noteworthy numbers to be considered as an important biological control agent. Two other species were found in very low numbers, *D. capito* only in semi-natural habitats and *B. nigricornis* in both habitats, while other species were not found. Interestingly, the most abundant pollen beetle parasitoid in our study was *Eubazus sigalphoides*, previously reported only from France and Poland (Nilsson 2003, Ulber et al. 2010). Likewise, for the cabbage seed weevil (*C. obstrictus*), only one species (*Mesopolobus morys*) of the three most common larval ectoparasitoids (*Stenomalina gracilis* (Walker, 1834), *Trichomalus perfectus* (Walker, 1835)) was detected in our study. We also found the two most common parasitoids of the brassica pod midge in Europe, *Platygaster subuliformis* and *Omphale clypealis*, but both in low abundance, while the dominant species in our study were *Pseudotorymus napi* and *Aphanogmus abdominalis*. The second most abundant parasitoid in our study was the pteromalid *Trichomalus lucidus*, which parasitises the cabbage stem flea beetle (*P. chrysocephala*) and the cabbage stem weevil (*C. pallidactylus*). This species is one of eight recorded parasitoids of the cabbage stem flea beetle and of several parasitoids of the cabbage stem weevil (Ulber 2003). Other parasitoid species of these two pests were either not observed or observed in very low numbers. Todorov et al. (2022) recently presented a checklist of the pteromalid fauna in Bulgarian oilseed rape fields and recorded 26 taxa, but, interestingly, did not find any *Trichomalus* species. Parasitoids of the cabbage flea beetle (*P. nemorum*) are represented only by *Townesilitus bicolor*, while other known species are absent or could not be determined at the species level, but only at the genus level. The most numerous group of parasitoids we found were aphid parasitoids, although their dominance was partly influenced by sampling methods, as about half of the specimens were from aphid rearing. *Diaeretiella rapae* and *Praon volucre* are known parasitoids of both cabbage aphid (*B. brassicae*) and peach-potato aphid (*M. persicae*), while *Aphidus ervi* and *A. matricariae* parasitise *M. persicae* (Tomanović et al. 2021).

It is unclear why some of the parasitoid species, which are widespread and numerous in various previously studied parts of Europe, do not occur at all or in greater numbers in Serbia. Nilsson (2003), while noting that there are no records from most of the Balkans, states that the parasitoid wasp fauna of this region should largely resemble that of Central Europe and that all Central European species should probably be present here.

This is a reasonable expectation since, for example, the three most important pollen beetle parasitoids (*P. morionellus*, *P. interstitialis* and *T. heterocerus*) occur in neighbouring Hungary (all three species) and Bulgaria (*T. heterocerus*) (van Achterberg and Zwakhals 2023). Furthermore, since the Balkans is a hotspot of biodiversity in Europe, the parasitoid wasp fauna of Serbia can be expected to be richer than that of Central Europe (Griffiths et al. 2004). Petrović (2022) compared the parasitoid wasp fauna of the subfamily Aphidiinae from different European countries and found that only the Czech fauna had greater diversity (about 135 species) than the Serbian fauna (121 species), while other countries, such as Germany (109), the United Kingdom (96) and Norway (26), had fewer species, although the Czech fauna may simply be much better studied. To date, only Todorov et al. (2022) have published a partial list of oilseed parasitoids for one Balkan country, Bulgaria and only for the family Pteromalidae. However, only two species (*Mesopolobus incultus* and *M. morys*) are recorded in both Bulgaria and Serbia, with the possible existence of several other taxa of the genera *Mesopolobus* and *Pteromalus* that are difficult to identify to species level.

We obtained the most specimens by two sampling methods, sweep-net sampling (about 1700) and rearing from aphid colonies (about 1000). However, it should be noted that sampling with sweep nets and pan traps yielded more diverse samples (106 and 88 taxa, respectively), although there was no way to directly associate the collected specimens with host pests or plants. On the other hand, rearing from oilseed pods or from aphid colonies provided more targeted samples of either seed pod pests (such as *D. brassicae* and *C. obstrictus*) or aphid species (*B. brassicae* and *M. persicae*). Most of the detected parasitoid families, with meaningfully large number of individuals, tended to be collected with sweep-net sampling, with the exception of Platygastridae and Mymaridae, which tended to occur more in pan traps. Therefore, the choice of sampling method can considerably limit the range of species detected and should be adapted to the research questions. Based on the examination of the species accumulation curve for samples from oilseed rape fields, it is clear that observed species richness obtained through our combined sampling methodology did not reach a plateau and that actual species richness is even higher. This is further corroborated by different species richness estimators which show a range of values, from 138 species as lowest estimate to 193 species as highest. We also found a seemingly large proportion of rare species (singletons and doubletons) in the oilseed rape fields in our study. About 38% were found only with one specimen and about 19% with two individuals. However, Scharff et al. (2003) give an overview of undersampling bias in terrestrial arthropod surveys and argue that, even in the “state of the art” arthropod surveys, about 50–70% of species are known from just one or two individuals.

Conclusions

Our study of the parasitoid community associated with oilseed rape fields revealed great diversity of parasitoid species. Interestingly, the majority of these parasitoids were not known to parasitise oilseed rape pest species, suggesting the existence of alternative hosts or other ecological interactions within oilseed rape fields. Additional factors should

be carefully measured, such as the previous season's crop in each field, the presence of volunteer plants and weed species and associated herbivores, to gain a better insight into the various interactions that appear to exist in oilseed rape fields. We also observed notable differences in the occurrence patterns of different parasitoid species in Serbia and other parts of Europe, indicating the need for further studies of the ecological dynamics and host associations of parasitoid species in oilseed rape fields. Understanding the factors affecting the presence, abundance and distribution of parasitoids will contribute to more effective regional and local pest management strategies.

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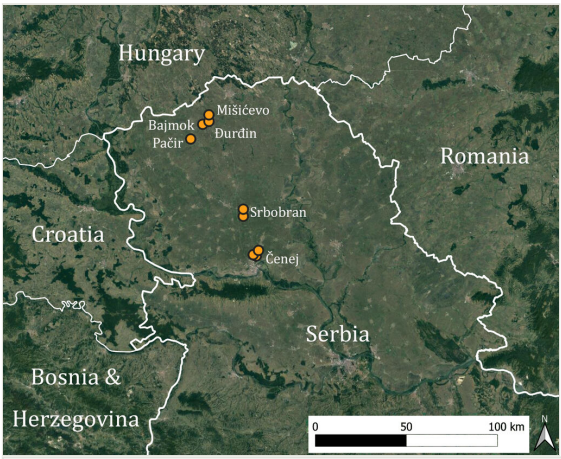

Figure 1.

Map of the study area.

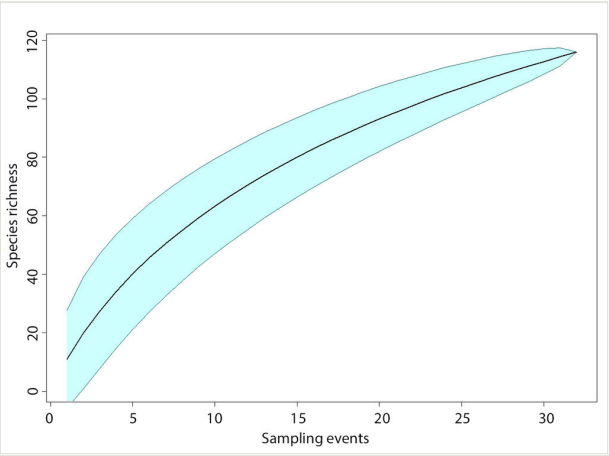

Figure 2.

Species accumulation curve for oilseed rape fields. Light blue area represents 95% confidence intervals.

Table 1.

List of major and minor oilseed rape pests (Alford 2003, Williams 2010)

	Latin name	Common name	Family
Major oilseed rape pests			
1	*Brassicogethes* Audisio & Cline, 2009	pollen beetles	Nitidulidae
2	*Psylliodes chrysocephala* Linnaeus, 1758	cabbage stem flea beetle	Chrysomelidae
3	*Ceutorhynchus obstrictus* (Marsham, 1802)	cabbage seed weevil	Curculionidae
4	*Ceutorhynchus pallidactylus* (Marsham, 1802)	cabbage stem weevil	Curculionidae
5	*Ceutorhynchus napi* Gyllenhal, 1837	rape stem weevil	Curculionidae
6	*Dasineura brassicae* (Winnertz, 1853)	cabbage pod midge	Cecidomyiidae
Minor oilseed rape pests			
1	*Ceutorhynchus picitarsis* Gyllenhal, 1837	rape winter stem weevil	Curculionidae
2	*Phyllotreta nemorum* (Linnaeus, 1758)	cabbage flea beetle	Chrysomelidae
3	*Athalia rosae* (Linnaeus, 1758)	turnip sawfly	Tenthredinidae
4	*Brevicoryne brassicae* (Linnaeus, 1758)	cabbage aphid	Aphididae
5	*Myzus persicae* (Sulzer, 1776)	peach-potato aphid	Aphididae

Table 2.

Coordinates of the sampled oilseed rape fields.

	South Bačka region					North Bačka region			
	Čenej			Srbobran		Bajmok	Đurđin	Mišićevo	Pačir
Latitude	45.3241	45.3468	45.3296	45.5216	45.5501	45.9516	45.9631	45.9892	45.8936
Longitude	19.8481	19.8615	19.8313	19.7571	19.7371	19.4771	19.5129	19.5126	19.4088

Table 3.

The number of parasitoid taxa found in each family in two habitats.

Total		Oilseed rape fields		Semi-natural habitats	
Family	**No. of taxa**	**Family**	**No. of taxa**	**Family**	**No. of taxa**
Braconidae	29	Braconidae	22	Braconidae	16
Pteromalidae	25	Pteromalidae	20	Eulophidae	11
Ichneumonidae	18	Eulophidae	14	Pteromalidae	11
Eulophidae	17	Ichneumonidae	12	Ichneumonidae	10
Mymaridae	11	Mymaridae	10	Platygastridae	8
Platygastridae	10	Platygastridae	8	Encyrtidae	6
Encyrtidae	8	Scelionidae	5	Mymaridae	6
Ceraphronidae	5	Encyrtidae	4	Ceraphronidae	4
Scelionidae	5	Figitidae	4	Ceidae	2
Figitidae	4	Ceraphronidae	3	Diapriidae	2
Perilampidae	3	Perilampidae	3	Figitidae	2
Torymidae	3	Bethylidae	2	Torymidae	2
Bethylidae	2	Megaspilidae	2	Chalcididae	1
Ceidae	2	Torymidae	2	Eurytomidae	1
Diapriidae	2	Ceidae	1	Megaspilidae	1
Megaspilidae	2	Chalcididae	1	Perilampidae	1
Trichogrammatidae	2	Diapriidae	1	Scelionidae	1
Chalcididae	1	Eurytomidae	1	Spalangiidae	1
Eurytomidae	1	Pirenidae	1	Trichogrammatidae	1
Pirenidae	1	Spalangiidae	1		
Spalangiidae	1	Systasidae	1		
Systasidae	1	Trichogrammatidae	1		

Table 4.

List of taxa consistently found in oilseed rape fields.

Taxon	Oilseed rape pest host	No. of specimens	No. of fields
Diaeretiella rapae (McIntosh, 1855)	*Myzus persicae*, *Brevicoryne brassicae*	1197	9
Trichomalus lucidus (Walker, 1835)	*Psylliodes chrysocephala*, *Ceutorhynchus pallidactylus*	392	6
Aphidius ervi Haliday, 1834	*Myzus persicae*, *Brevicoryne brassicae*	270	6
Pseudotorymus napi (Amerling & Kirchner, 1860)	*Dasineura brassicae*	217	5
Aphidius matricariae Haliday, 1834	*Myzus persicae*, *Brevicoryne brassicae*	112	4
Triaspis thoracica (Curtis, 1860)	unknown	70	4
Eubazus sigalphoides (Marshall, 1889)	*Brassicogethes aeneus* (Fabricius, 1775)	52	5
Mesopolobus morys (Walker, 1848)	*Ceutorhynchus obstrictus*	27	6
Praon volucre (Haliday, 1833)	*Myzus persicae*, *Brevicoryne brassicae*	27	5
Anaphes sp. 1	unknown/possible	24	7
Aphanogmus abdominalis (Thomson, 1858)	*Dasineura brassicae*	23	3
Townesilitus bicolor (Wesmael, 1835)	*Phyllotreta nemorum*	20	3
Eulophus sp. 1	unknown/possible	18	6
Collyria coxator (Villers, 1789)	unknown	18	3
Trissolcus basalis (Wollaston, 1858)	*Nezara viridula* (Linnaeus, 1758)	17	4
Tersilochus heterocerus (Thomson, 1889)	*Brassicogethes aeneus*	17	4
Aprostocetus sp. 1	unknown/possible	16	7
Telenomus sp. 3	unknown	15	7
Chrysolampus thenae (Walker, 1848)	unknown	15	3
Telenomus sp. 4	unknown	14	5
Telenomus sp. 1	unknown	13	5
Lagynodes pallidus (Boheman, 1832)	unknown	12	4
Tetrastichus sp. 1	unknown/possible	12	3
Spalangiopelta sp. 1	unknown	11	5
Apanteles sp. 1	unknown	10	3

Supplementary materials

Suppl. material 1: Supplements Table 1. List of identification keys used.

Authors: Milan Plećaš, Vladimir Žikić, Korana Kocić, Jelisaveta Čkrkić, Anđeljko Petrović, Željko Tomanović
Data type: List of references
Download file (17.87 kb)

Suppl. material 2: Supplement Table 2a. Checklist of parasitoids found in oilseed rape fields in Serbia

Authors: Milan Plećaš, Vladimir Žikić, Korana Kocić, Jelisaveta Čkrkić, Anđeljko Petrović, Željko Tomanović
Data type: Checklist with additional data
Brief description: Detailed information on locations, collection dates, habitat, sampling methods, parasitism type, oilseed rape pest host status and number of specimens for each taxon.
Download file (68.73 kb)

Suppl. material 3: Supplement Table 2b. Checklist of parasitoids found in oilseed rape fields in Serbia in csv format

Authors: Milan Plećaš, Vladimir Žikić, Korana Kocić, Jelisaveta Čkrkić, Anđeljko Petrović, Željko Tomanović
Data type: Checklist with additional data
Brief description: Detailed information on locations, collection dates, habitat, sampling methods, parasitism type, oilseed rape pest host status and number of specimens for each taxon provided in cvs format.
Download file (38.57 kb)

Suppl. material 4: Supplement Table 3. Checklist of parasitoids found in oilseed rape fields in Serbia with additional host information.

Authors: Milan Plećaš, Vladimir Žikić, Korana Kocić, Jelisaveta Čkrkić, Anđeljko Petrović, Željko Tomanović
Data type: Checklist with additional data
Brief description: Detailed information on OSR pest host status, parasitism type, host species and host stage and references.
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