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Checklist of Aphidiinae (Hymenoptera: Braconidae) and *Aphelinus* (Hymenoptera: Aphelinidae) species from Belgium with respectively four and three new records

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Abstract

Aphid parasitoids have good potential for crop protection. However, they have been poorly studied in Belgium, especially in terms of species diversity. Therefore, the aim of this work was to establish the first checklist for the country. To complete the list, aphid parasitoids were sampled in wheat and pea fields near Gembloux (Belgium), in 2013 and 2014. Among the identified species, *Aphelinus asychis* Walker, *Aphelinus daucicola* Kurdjumov, *Aphelinus fusciscapus* (Förster), *Aphidius asteris* Haliday, *Aphidius eadyi* Starý, Gonzalez & Hall, *Praon barbatum* Mackauer, and *Trioxys auctus* (Haliday) were recorded for the first time in Belgium. Thirty-two Aphidiinae and seven *Aphelinus* species were included in the checklist. It is hoped this study will stimulate further research, as species diversity is still low compared with neighbouring countries.

Key words: aphid parasitoids, Ichneumonoidea, *Aphidius*, *Praon*, *Trioxys*, Chalcidoidea

Introduction

Parasitoids can play an important role in the control of aphid (Hemiptera: Aphididae) populations (Boivin *et al.* 2012). They mainly belong to the subfamily Aphidiinae Haliday (Hymenoptera: Braconidae), which contains about 615 species worldwide (Yu *et al*. 2012). According to the Fauna Europea database, 213 of them were recorded in Europe up to 2013 (van Achterberg 2013). In the family Aphelinidae (Hymenoptera: Chalcidoidea), all species from the genus *Aphelinus* Dalman are aphid parasitoids (Starý 1988). According to the Universal Chalcidoidea Database, 92 species are known worldwide. Among them, 36 are recorded in Europe (Noyes 2015).

Despite the potential of aphid parasitoids for crop protection (Boivin *et al.* 2012), Aphidiinae and *Aphelinus* have been poorly studied in Belgium. Therefore, the aim of this study was to increase the knowledge about species diversity, by reporting new species records and establishing the first national checklist.

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Methods

Species sampling. Parasitoid species were collected in yellow pan traps (Flora®, 27 cm diameter and 10 cm depth) placed in wheat (*Triticum aestivum*) and pea (*Pisum sativum*) fields at the Gembloux Agro–Bio Tech (University of Liège, Belgium) experimental farm (50° 29' 56" N; 4° 44' 11" E). Traps were filled with water containing a few drops of detergent (dish-washing liquid), and their content was emptied weekly between June and August 2013, and April and July 2014, using a 0.5 mm mesh sieve. Insects were then transferred into 70% ethanol. Mummified aphids were also collected on wheat tillers and pea plants. Parasitoid adults were preserved into 70% ethanol after their emergence.

Aphidiinae species were identified using the keys of Tomanović *et al.* (2003), Kavallieratos *et al.* (2005), Rakhshani *et al.* (2008) and Tomanović *et al.* (2009), and validated by the third author. *Aphelinus* species were identified by the fourth author using the keys of Nikol'skaya & Yasnosh (1966), Japoshvili & Abrantes (2006), Japoshvili & Karaca (2009), and Japoshvili & Hansen (2014).

Checklist

The Aphidiinae and *Aphelinus* species checklist from Belgium is based on information found in Taxapad (Yu *et al.* 2012). Other databases such as Fauna Europaea (van Achterberg 2013) for Aphidiinae and the Universal Chalcidoidea Database (Noyes 2015) for *Aphelinus* were also checked. Data were then completed by a systematic review of the literature mentioning Aphidiinae and *Aphelinus* species in Belgium. New species records were also included. Moreover, the presence of Belgian material was checked in the entomological collections of several museums. If no official data was published for conserved specimens, species were not included in the checklist. Finally, the species that are commercialized for biological control purposes are also considered, since they may be found in nature. They are indicated in the checklist by an asterisk (*). Data on species distribution were mainly extracted from Yu *et al.* (2012) for Aphidiinae and Noyes (2015) for *Aphelinus*.

Results

New records

A total of 12 Aphidiinae and four *Aphelinus* species were identified during the sampling survey. Among them, four Aphidiinae species and three *Aphelinus* species are new records for Belgium, and are identified in the checklist by 'new record'.

Checklist

Thirty-two Aphidiinae and seven *Aphelinus* species have been recorded in Belgium. The species are listed below.

Superfamily Ichneumonidae Latreille

Family Braconidae Nees

Subfamily Aphidiinae Haliday

Tribe Aphidiini Haliday

Subtribe Aphidiina Haliday

***Aphidius (Aphidius) asteris* Haliday:** collected in yellow traps. **New record**.

Distribution: Andorra, Azerbaijan, Bulgaria, Canada, China, Czech Republic, Denmark (Faeroe islands), Finland, France (incl. Corsica), Georgia, Germany, Greece, Hungary, India, Iran, Israel, Italy, Japan, Korea, Moldova, Mongolia, Pakistan, Poland, Russia, Slovakia, Slovenia, Spain, Tajikistan, Turkey, Ukraine, United Kingdom, United States of America, and Uzbekistan (Yu *et al*. 2012).

***Aphidius* (*Aphidius*) *avenae* Haliday**

Aphidius avenae: Marshall (1891; p. 575); Lameere (1907; p. 174); Leclercq (1946; p. 138); Leclercq (1952; p. 241); van Achterberg (2013).

Aphidius picipes: Latteur (1973; p. 142); Starý (1981; p. 385); Langer & Hance (2004; p. 208); Jansen (2005; p. 541); Alhmedi *et al.* (2006; p. 123) ; Alhmedi *et al.* (2009; p. 352); Lopes *et al.* (2015; p. 290).

Aphidius (*Aphidius*) *avenae*: Yu *et al.* (2012).

Distribution: Andorra, Austria, Belgium, Bulgaria, China, Croatia, Czech Republic, Finland, France (incl. Corsica), Georgia, Germany, Greece, Hungary, India, Ireland, Italy (incl. Sicily), Japan, Latvia, Lebanon, Lithuania, Moldova, Mongolia, Montenegro, Morocco, Netherlands, Pakistan, Poland, Portugal (Madeira islands), Russia, Serbia, Slovakia, Spain (incl. Canary islands), Sweden, Switzerland, Turkey, Ukraine, United Kingdom, and United States of America (Yu *et al*. 2012).

****Aphidius* (*Aphidius*) *colemani* Viereck**

Aphidius colemani: Anonyme (2002; p. 451); Dassonville *et al.* (2013; p. 148).

Distribution: Algeria, Angola, Argentina, Australia, Brazil, Bulgaria, Cape Verde, Chile, China, Colombia, Costa Rica, Cyprus, Czech Republic, Democratic Republic of Congo, Egypt, France (incl. New Caledonia and Réunion), Georgia, Germany, Greece (incl. Crete), Hungary, India, Iran, Iraq, Israel, Italy (incl. Sicily), Japan, Jordan, Kenya, Lebanon, Libya, Madagascar, Montenegro, Morocco, Mozambique, Norway, Pakistan, Peru, Poland, Portugal (incl. Madeira islands), Russia, South Africa, Spain (incl. Canary islands), Syria, Tajikistan, Tonga, Tunisia, Turkey, Turkmenistan, United Kingdom, United States of America (incl. Guam), Uruguay, Uzbekistan, Venezuela, and Yemen (Yu *et al*. 2012).

***Aphidius* (*Aphidius*) *eadyi* Starý, Gonzalez & Hall:** emerged from a *Acyrthosiphon pisum* (Harris, 1776) mummy. **New record**.

Distribution: Andorra, Bulgaria, Czech Republic, Finland, France, Georgia, Greece, Iran, Italy, Kazakhstan, Lithuania, Moldova, Morocco, New Zealand, Russia, Serbia, Slovakia, Spain, Switzerland, Turkey, United Kingdom, and Uzbekistan (Yu *et al*. 2012).

***Aphidius* (*Aphidius*) *ervi* Haliday**

Aphidius ervi: Latteur (1973; p. 142); Gonzalez *et al.* (1978; p. 241); Langer *et al.* (1998; p. 141); Langer & Hance (2000; p. 672); Anonyme (2002; p. 451); Langer & Hance (2004; p. 208); Jansen (2005; p. 541); Alhmedi *et al.* (2009; p. 352); Verheggen *et al.* (2009; p. 239); van Achterberg (2013); Lopes *et al.* (2015; p. 290).

Aphidius (*Aphidius*) *ervi*: Yu *et al.* (2012).

Distribution: Afghanistan, Algeria, Andorra, Argentina, Australia, Belgium, Brazil, Bulgaria, Canada (incl. Nova Scotia), Chile, China, Croatia, Cyprus, Czech Republic, Denmark, Finland, France (incl. Corsica), Georgia, Germany, Greece, Hungary, India, Iran, Iraq, Ireland, Israel, Italy (incl. Sicily), Japan, Korea, Lebanon, Lithuania, Mexico, Moldova, Montenegro, Morocco, Netherlands, New Zealand, Norway, Pakistan, Poland, Portugal (incl. Madeira islands), Romania, Russia, Saudi Arabia, Serbia, Slovakia, Slovenia, Spain (incl. Canary islands), Switzerland, Tajikistan, Turkey, Ukraine, United Kingdom, United States of America, and Uzbekistan (Yu *et al*. 2012).

***Aphidius* (*Aphidius*) *frumentarius* Latteur**

Aphidius frumentarius: Latteur & Rassel (1979; pp. 321–322); van Achterberg (2013).

Aphidius (*Aphidius*) *frumentarius*: Yu *et al.* (2012).

Distribution: Belgium and United Kingdom (Yu *et al*. 2012).

***Aphidius* (*Aphidius*) *matricariae* Haliday**

Aphidius matricariae: Anonyme (2002; p. 451); Jansen (2005; p. 541); Lopes *et al.* (2015; p. 290).
Aphidius (*Aphidius*) *matricariae*: Yu *et al.* (2012).

Distribution: Algeria, Andorra, Argentina, Belgium, Bulgaria, Canada, Chile, China, Cyprus, Czech Republic, Egypt, Finland, France (incl. Corsica and Réunion), Georgia, Germany, Greece, Hungary, India, Iran, Iraq, Ireland, Israel, Italy (incl. Sardinia and Sicily), Latvia, Lebanon, Lithuania, Macedonia, Montenegro, Morocco, Nepal, Netherlands, Norway, Pakistan, Peru, Poland, Portugal (incl. Madeira islands), Serbia, Slovakia, Slovenia, South Africa (incl. Prince Edward islands), Spain (incl. Canary islands), Turkey, Ukraine, United Kingdom (incl. Bermuda), United States of America (incl. Guam), Uzbekistan, and Zimbabwe (Yu *et al*. 2012).

***Aphidius* (*Aphidius*) *rhopalosiphi* de Stefani–Perez**

Aphidius rhopalosiphi: Starý (1981; p. 385); Langer *et al.* (1998; p. 141); Langer & Hance (2000; p. 672); Langer & Hance (2004; p. 208); Muratori *et al.* (2004; p. 170); Legrand *et al.* (2004; p. 140); Salin *et al.* (2004; p. 16); Muratori *et al.* (2006; p. 581); Alhmedi *et al.* (2009; p. 352); van Achterberg (2013); Lopes *et al.* (2015; p. 290).
Aphidius (*Aphidius*) *rhopalosiphi*: Yu *et al.* (2012).

Distribution: Andorra, Argentina, Belgium, Brazil, Bulgaria, Chile, China, Czech Republic, Denmark, Egypt, Finland, France, Germany, Greece, Hungary, India, Iran, Ireland, Israel, Italy (incl. Sicily), Macedonia, Morocco, Netherlands, New Zealand, Norway, Pakistan, Poland, Portugal, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom, United States of America, and Uzbekistan (Yu *et al*. 2012).

***Aphidius* (*Aphidius*) *rosae* Haliday**

Aphidius protaeus: Wesmael (1835; p. 75); Kirchner (1867; p. 125); Mackauer (1968; p. 58).
Aphidius rosae: Lameere (1907; p. 174); van Achterberg (2013).
Aphidius (*Aphidius*) *rosae*: Yu *et al.* (2012).

Distribution: Andorra, Belarus, Belgium, Brazil, Bulgaria, Canada, China, Croatia, Czech Republic, Denmark (Faeroe islands), Finland, France (incl. Corsica and Réunion), Georgia, Germany, Greece, Hungary, Iceland, India, Iran, Iraq, Ireland, Israel, Italy (incl. Sicily), Latvia, Lithuania, Moldova, Montenegro, Netherlands, Norway, Pakistan, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Spain (incl. Canary islands), Switzerland, Turkey, Ukraine, United Kingdom, United States of America, Uzbekistan, and Venezuela (Yu *et al*. 2012).

***Aphidius* (*Aphidius*) *smithi* Sharma & Subba Rao**

Aphidius smithi: Alhmedi *et al.* (2009; p. 352); van Achterberg (2013).
Aphidius (*Aphidius*) *smithi*: Yu *et al.* (2012).

Distribution: Afghanistan, Algeria, Andorra, Argentina, Australia, Belgium, Brazil, Bulgaria, Canada (incl. Nova Scotia), Chile, China, Croatia, Cyprus, Czech Republic, Denmark, Finland, France (incl. Corsica), Georgia, Germany, Greece, Hungary, India, Iran, Iraq, Ireland, Israel, Italy (incl. Sicily), Japan, Korea, Lebanon, Lithuania, Mexico, Moldova, Morocco, Netherlands, New Zealand, Norway, Pakistan, Poland, Portugal (incl. Madeira islands), Russia, Serbia, Slovakia, Spain (incl. Canary islands), Switzerland, Tajikistan, Ukraine, United Kingdom, United States of America, and Uzbekistan (Yu *et al*. 2012).

***Aphidius (Aphidius) urticae* Haliday**

Aphidius urticae: Alhmedi *et al.* (2006; p. 123); Alhmedi *et al.* (2009; p. 352).

Distribution: Afghanistan, Andorra, Belgium, Bulgaria, Canada, China, Czech Republic, Finland, France (incl. Corsica), Georgia, Germany, Greece, Hungary, India, Iran, Israel, Italy (incl. Sicily), Japan, Korea, Latvia,

Lithuania, Moldova, Montenegro, Morocco, Netherlands, New Zealand, Poland, Portugal (Madeira islands), Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Turkey, Turkmenistan, Ukraine, United Kingdom, United States of America, and Uzbekistan (Yu *et al*. 2012).

***Aphidius* (*Aphidius*) *uzbekistanicus* Luzhetzki**
Aphidius uzbekistanicus: Latteur (1973; p. 142); Starý (1981; p. 385); van Achterberg (2013).
Aphidius (*Aphidius*) *uzbekistanicus*: Yu *et al.* (2012).

Distribution: Andorra, Argentina, Belgium, Brazil, Bulgaria, Chile, China, Czech Republic, Denmark, Egypt, Finland, France (incl. Corsica), Germany, Greece, Hungary, India, Iran, Israel, Italy (incl. Sicily), Japan, Montenegro, Morocco, Netherlands, Norway, Pakistan, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Tajikistan, Turkey, Ukraine, United Kingdom, United States of America, Uzbekistan and (Yu *et al*. 2012).

***Diaeretellus ephippium* (Haliday, 1833)**
Aphidius ephippium: Crèvecoeur (1934, p. 386)

Distribution: Czech Republic, Denmark, Finland, France, Germany, Hungary, Ireland, Netherlands, Poland, Russia, Sweden, and United Kingdom (Yu *et al*. 2012).

***Diaeretiella rapae* (M'Intosh)**
Diaeretiella rapae: Jansen (2005; p. 541); Yu *et al.* (2012); Lopes *et al.* (2015; p. 290).

Distribution: Afghanistan, Algeria, Andorra, Argentina, Australia (incl. Tasmania), Austria, Azerbaijan, Belgium, Brazil, Bulgaria, Canada, Cape Verde, Chile, China, Costa Rica, Croatia, Cuba, Cyprus, Czech Republic, Egypt, Finland, France (incl. Corsica and Réunion), Georgia, Germany, Greece, Hungary, India, Iran, Iraq, Ireland, Israel, Italy (incl. Sicily), Japan, Jordan, Kazakhstan, Kenya, Korea, Kyrgyzstan, Latvia, Lebanon, Libya, Lithuania, Macedonia, Mexico, Moldova, Mongolia, Montenegro, Morocco, Netherlands, New Zealand, Norway, Pakistan, Peru, Poland, Portugal (incl. Azores and Madeira islands), Puerto Rico, Romania, Russia, Saudi Arabia, Serbia, Slovakia, Slovenia, South Africa, Spain (incl. Canary islands), Sri Lanka, Syria, Tajikistan, Turkey, Ukraine, United Kingdom (incl. Bermuda), United States of America (incl. Guam), Uruguay, Uzbekistan, and Venezuela (Yu *et al*. 2012).

Subtribe Lysiphlebina Mackauer

***Adialytus ambiguus* (Haliday)**
Adialytus ambiguus: Verheggen *et al.* (2009; p. 239).

Distribution: Algeria, Andorra, Azerbaijan, Bulgaria, China, Czech Republic, Egypt, Finland, France (incl. Corsica), Georgia, Germany, Greece (incl. Crete), Hungary, India, Iran, Iraq, Israel, Italy (incl. Sicily), Japan, Kazakhstan, Korea, Latvia, Lithuania, Moldova, Monaco, Montenegro, Pakistan, Poland, Romania, Russia, Serbia, Slovakia, Spain (incl. Canary islands), Sweden, Tajikistan, Turkey, Turkmenistan, Ukraine, United Kingdom, United States of America, and Uzbekistan (Yu *et al*. 2012).

***Lysiphlebus fabarum* (Marshall)**
Lysiphlebus fabarum: Alhmedi *et al.* (2009; p. 352); Verheggen *et al.* (2009; p. 239); Yu *et al.* (2012).

Distribution: Afghanistan, Algeria, Andorra, Australia, Azerbaijan, Belgium, Bulgaria, China, Croatia, Czech Republic, Egypt, Finland, France (incl. Corsica), Georgia, Germany, Greece, Hungary, India, Iran, Iraq, Israel, Italy (incl. Sardinia and Sicily), Japan, Kazakhstan, Korea, Latvia, Lebanon, Lithuania, Moldova, Monaco, Mongolia, Montenegro, Morocco, Netherlands, Pakistan, Poland, Portugal (incl. Azores and Madeira islands), Romania, Russia, Serbia, Slovakia, Slovenia, Spain (incl. Canary islands), Switzerland, Syria, Tajikistan, Turkey, Ukraine, United Kingdom, and Uzbekistan (Yu *et al*. 2012).

***Lysiphlebus testaceipes* (Cresson)**
Lysiphlebus testaceipes: Alhmedi *et al.* (2006; p. 123); Verheggen *et al.* (2009; p. 239); Yu *et al.* (2012).

Distribution: Algeria, Argentina, Australia, Belgium, Brazil, Canada, Chile, China, Costa Rica, Croatia, Cuba, Czech Republic, Dominica, France (incl. Corsica, Guadeloupe, and Martinique), Greece, Haiti, India, Iran, Italy (incl. Sicily), Korea, Mexico, Montenegro, Pakistan, Peru, Portugal (incl. Azores and Madeira islands), Puerto Rico, Serbia, South Africa, Spain (incl. Canary islands), Trinidad and Tobago, Turkey, United Kingdom (Bermuda), United States of America (incl. Guam, Midway islands, and St. Croix), and Uzbekistan (Yu *et al*. 2012).

Subtribe Monoctonina Mackauer

***Monoctonus* (*Monoctonus*) *crepidis* (Haliday)**
Aphidius tuberculatus: Wesmael (1835; p. 80); Kirchner (1867; p. 125).
Aphidius crepidis: Marshall (1891; p. 582); de Dalla Torre (1898; p. 7); Szépligeti (1904; p. 186).
Monoctonus (*Monoctonus*) *crepidis*: Mackauer (1968; p. 64); Yu *et al.* (2012).
Monoctonus crepidis: Mackauer (1962; p. 1090); van Achterberg (2013).

Distribution: Belgium, Canada, Czech Republic, Finland, France (incl. Corsica), Germany, Hungary, India, Latvia, Moldova, Montenegro, Netherlands, Poland, Serbia, Slovakia, Slovenia, Spain, Sweden, Turkey, United Kingdom, and United States of America (Yu *et al*. 2012).

Subtribe Trioxina Ashmead

***Binodoxys angelicae* (Haliday)**
Binodoxys angelicae: Jansen (2005; p. 541); Yu *et al.* (2012); van Achterberg (2013).

Distribution: Algeria, Andorra, Austria, Azerbaijan, Belgium, Bulgaria, China, Czech Republic, Egypt, Finland, France (incl. Corsica), Georgia, Germany, Greece, Hungary, India, Iran, Iraq, Ireland, Israel, Italy (incl. Sicily), Kazakhstan, Latvia, Lebanon, Lithuania, Moldova, Monaco, Montenegro, Morocco, Netherlands, Pakistan, Poland, Portugal (incl. Madeira islands), Romania, Russia, Serbia, Slovakia, Slovenia, Spain (incl. Canary islands), Switzerland, Tajikistan, Tunisia, Turkey, United Kingdom, and Uzbekistan (Yu *et al*. 2012).

***Binodoxys heraclei* (Haliday)**
Aphidius obsoletus: Wesmael (1835; p.83); Kirchner (1867; p. 125).
Trioxys heraclei: Lameere (1907; p. 175).
Binodoxys heraclei: Yu *et al.* (2012); van Achterberg (2013).

Distribution: Andorra, Belgium, Czech Republic, France, Georgia, Germany, Hungary, Iran, Ireland, Italy, Montenegro, Nepal, Netherlands, Poland, Serbia, Slovenia, Spain, Tajikistan, and United Kingdom (Yu *et al*. 2012).

***Trioxys auctus* (Haliday):** collected in yellow traps. **New record**.

Distribution: Canada, China, Czech Republic, Denmark (Faeroe islands), Finland, France, Germany, Hungary, India, Ireland, Italy, Japan, Lithuania, Netherlands, Norway, Poland, Russia, Serbia, Spain (Canary islands), Sweden, United Kingdom, and Uzbekistan (Yu *et al*. 2012).

Tribe Ephedrini Mackauer

****Ephedrus (Ephedrus) cerasicola* Starý**
Ephedrus cerasicola: Dassonville *et al.* (2013; p. 148); Thielemans *et al.* (2013; p. 32).

Distribution: Bulgaria, Czech Republic, Finland, France (incl. Corsica), Germany, Hungary, Iran, Italy, Lithuania, Moldova, Montenegro, Netherlands, New Zealand, Norway, Poland, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Turkey, United Kingdom, and United States of America (Yu *et al*. 2012).

***Ephedrus* (*Ephedrus*) *lacertosus* (Haliday)**

Ephedrus lacertosus: van Achterberg (2013) (Rijksmuseum van Natuurlijke Historie, Leiden, Netherlands).

Distribution: Bulgaria, Canada, China, Costa Rica, Cyprus, Czech Republic, Denmark (Faeroe islands), Finland, France, Germany, Hungary, Iceland, India, Ireland, Italy, Japan, Kazakhstan, Kyrgyzstan, Moldova, Mongolia, Montenegro, Netherlands, Norway, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Tajikistan, Thailand, Turkey, Ukraine, United Kingdom, United States of America, and Uzbekistan (Yu *et al*. 2012).

***Ephedrus* (*Ephedrus*) *persicae* Froggatt**

Ephedrus (*Ephedrus*) *persicae*: Yu *et al.* (2012).
Ephedrus persicae: Bribosia *et al.* (2005; p. 604); Peusens *et al.* (2006; p. 370); Žikić *et al.* (2010; p. 375); van Achterberg (2013).

Distribution: Algeria, Andorra, Argentina, Australia, Belgium, Brazil, Bulgaria, Canada, Chile, China, Cyprus, Czech Republic, Egypt, Finland, France (incl. Corsica), Georgia, Germany, Greece, Hungary, India, Iran, Iraq, Ireland, Israel, Italy (incl. Sicily), Japan, Jordan, Kazakhstan, Korea, Kyrgyzstan, Latvia, Lebanon, Libya, Lithuania, Madagascar, Moldova, Mongolia, Montenegro, Morocco, Netherlands, Norway, Pakistan, Poland, Portugal, Romania, Russia, Serbia, Slovakia, South Africa, Spain (incl. Canary islands), Sweden, Switzerland, Syria, Tajikistan, Turkey, United Kingdom, United States of America, and Uzbekistan (Yu *et al*. 2012).

***Ephedrus* (*Ephedrus*) *plagiator* (Nees)**

Elassus parcicornis: Wesmael (1835; p. 86).
Ephedrus (*Ephedrus*) *plagiator*: Starý & Schlinger (1967; p. 54); Gärdenfors (1986; p. 63); Yu *et al.* (2012).
Ephedrus plagiator: Marshall (1891; p. 545); Marshall (1899; p. 23); Langer & Hance (2004; p. 208); van Achterberg (2013).

Distribution: Andorra, Australia, Austria, Belgium, Brazil, Bulgaria, Chile, China, Czech Republic, Denmark, Estonia, Finland, France (incl. Corsica), Georgia, Germany, Greece, Hungary, Iceland, India, Iran, Iraq, Ireland, Italy (incl. Sardinia), Japan, Kazakhstan, Korea, Latvia, Lithuania, Moldova, Mongolia, Montenegro, Netherlands, New Zealand, Norway, Pakistan, Poland, Portugal (Madeira islands), Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Tajikistan, Turkey, Ukraine, United Kingdom, and Uzbekistan (Yu *et al*. 2012).

***Toxares deltiger* (Haliday)**

Toxares deltiger: Kirchner (1867; p. 124); Powell (1980; p. 408); Jansen (2005; p. 541); Yu *et al.* (2012); van Achterberg (2013).

Distribution: Belgium, Czech Republic, Finland, France, Germany, Hungary, India, Ireland, Italy, Lithuania, Moldova, Netherlands, Norway, Poland, Russia, Slovakia, Spain, Sweden, Turkey, United Kingdom, and United States of America (Yu *et al*. 2012).

Tribe Praini Mackauer

***Dyscritulus planiceps* (Marshall)**

Dyscritulus planiceps: Mackauer (1968; p. 21); Yu *et al.* (2012); van Achterberg (2013).

Distribution: Austria, Belgium, Bulgaria, Czech Republic, France, Germany, Hungary, Italy, Moldova, Netherlands, Poland, Romania, Serbia, Slovakia, Spain, Switzerland, and United Kingdom (Yu *et al*. 2012).

***Praon abjectum* (Haliday)**
Praum abjectum: Schulz (1910; p. 201).
Praon abjectum: Jansen (2005; p. 541); Yu *et al.* (2012).

Distribution: Andorra, Austria, Belgium, Bosnia Hercegovina, Bulgaria, China, Czech Republic, Denmark (Faeroe islands), Finland, France (incl. Corsica), Germany, Greece, Hungary, Iceland, India, Iran, Iraq, Ireland, Italy (incl. Sicily), Moldova, Montenegro, Norway, Poland, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Tajikistan, Turkey, United Kingdom, and Uzbekistan (Yu *et al*. 2012).

***Praon barbatum* Mackauer:** emerged from an *A. pisum* mummy. **New record**.

Distribution: Afghanistan, Andorra, Austria, China, Cyprus, Czech Republic, Finland, France, Germany, Greece, Iran, Italy, Japan, Lebanon, Moldova, Mongolia, Montenegro, Morocco, Poland, Serbia, Slovakia, Slovenia, Spain, Switzerland, Tajikistan, Turkmenistan, and Uzbekistan (Yu *et al*. 2012).

***Praon exsoletum* (Nees)**
Aphidius exoletus: Wesmael (1835; p. 81).
Praon exoletum: Leclercq (1946; p. 138).
Praon exsoletum: Marshall (1899; p. 17); Yu *et al.* (2012); van Achterberg (2013).

Distribution: Andorra, Belgium, Bulgaria, Canada, China, Cyprus, Czech Republic, Egypt, Finland, France, Germany, Greece, Hungary, Iran, Iraq, Israel, Italy, Lebanon, Mexico, Moldova, Montenegro, Poland, Serbia, Slovakia, Spain, Tajikistan, Turkey, United Kingdom, United States of America, Uzbekistan, and Yemen (Yu *et al*. 2012).

***Praon gallicum* Starý**
Praon gallicium [*Sic*!]: Jansen (2005; p. 541).
Praon gallicum: Starý (1981; pp. 384–385); Langer *et al.* (1998; p. 141); Langer & Hance (2004; p. 208); Yu *et al.* (2012); van Achterberg (2013).

Distribution: Andorra, Belgium, Brazil, Canada, Chile, China, Czech Republic, France, Germany, Greece, Hungary, Netherlands, Norway, Poland, Serbia, Slovakia, United States of America, and Uzbekistan (Yu *et al*. 2012).

***Praon volucre* (Haliday)**
Praon volucris: Lameere (1907; p. 174).
Praon volucre: Langer *et al.* (1998; p. 141); Anonyme (2002; p. 454); Langer & Hance (2004; p. 208); Jansen (2005; p. 541); Alhmedi *et al.* (2006; p. 123); Alhmedi *et al.* (2009; p. 352); Verheggen *et al.* (2009; p. 239); Yu *et al.* (2012); Colinet *et al.* (2012; p. 2); van Achterberg (2013); Lopes *et al.* (2015; p. 290).

Distribution: Algeria, Andorra, Argentina, Austria, Azerbaijan, Belgium, Bosnia Hercegovina, Brazil, Bulgaria, Chile, China, Czech Republic, Denmark, Egypt, Finland, France (incl. Corsica), Georgia, Germany, Greece, Hungary, Iceland, India, Iran, Iraq, Ireland, Israel, Italy (incl. Sardinia and Sicily), Japan, Kazakhstan, Korea, Kyrgyzstan, Lebanon, Lithuania, Macedonia, Moldova, Mongolia, Montenegro, Morocco, Netherlands, Norway, Pakistan, Poland, Portugal (incl. Madeira islands), Romania, Russia, Serbia, Slovakia, Slovenia, Spain (incl. Canary islands), Sweden, Switzerland, Tajikistan, Turkey, Ukraine, United Kingdom, and Uzbekistan (Yu *et al*. 2012).

Superfamily Chalcidoidea Latreille

Family Aphelinidae Thomson

Subfamily Aphelininae Thomson

Genus *Aphelinus* Dalman

***Aphelinus abdominalis* (Dalman)**
Aphelinus abdominalis: Sterk & Meesters (1997)

Distribution: Argentina, Australia, Austria, Azerbaijan, Brazil, Channel islands, Chile, China, Croatia, Cuba, Czech Republic, Denmark, Egypt, France, Georgia, Germany, Hungary, India, Iraq, Italy, Japan, Kazakhstan, Netherlands (Noyes 2015), Norway (Compton 1981), Pakistan, Poland, Portugal, Russia, Serbia, Slovakia, South Africa, Spain (incl. Canary islands), Sweden, Switzerland, United Kingdom, and Zimbabwe (Noyes 2015).

***Aphelinus asychis* Walker**: collected in yellow traps. **New record**.

Distribution: Angola, Argentina, Australia, Azerbaijan, Brazil, Chile, China, Colombia, Croatia, Czech Republic, Egypt, Finland, France, Georgia, Germany, Greece, Hungary, India, Iran, Iraq, Israel, Italy, Japan, Kazakhstan, Mexico, Morocco, Nepal, Netherlands (Noyes 2015), Norway (Japoshvili & Hansen 2014), Pakistan, Portugal, Russia, Slovakia, South Africa, Spain (incl. Canary islands and Balearics), Sweden, Turkey, Ukraine, United Kingdom, and United States of America (Noyes 2015).

***Aphelinus chaonia* Walker**
Aphelinus chaonia: Crèvecoeur (1947; p. 251)

Distribution: Austria, Azerbaijan, Brazil, Chile, China, Croatia, Czech Republic, France, Georgia, Germany, Hungary, Lithuania, Montenegro, Netherlands (Noyes 2015), Norway (Compton 1981), Pakistan, Poland, Portugal (incl. Madeira islands), Russia, Serbia, Slovakia, Spain (incl. Canary islands), Sweden, Turkey, Ukraine, United Kingdom, and United States of America (Noyes 2015).

***Aphelinus daucicola* Kurdjumov:** collected in yellow traps. **New record**.

Distribution: Azerbaijan, Croatia, Czech Republic, France, Georgia, Hungary, Kazakhstan, Macedonia, Montenegro, Portugal, Serbia, Slovakia, Sweden, and United Kingdom (Noyes 2015).

***Aphelinus fusciscapus* (Förster):** collected in yellow traps. **New record**.

Distribution: Azerbaijan, Georgia, Germany, and Hungary (Noyes 2015).

***Aphelinus mali* (Haldeman)**
Aphelinus mali: Fry (1989; p. 42).

Distribution: Argentina, Australia, Austria, Azerbaijan, Bolivia, Brazil, Bulgaria, Canada, Chile, China, Colombia, Costa Rica, Croatia, Cyprus, Czech Republic, Ecuador, Egypt, France, Georgia, Germany, India, Indonesia (incl. Java and Bali), Iraq, Israel, Italy, Japan, Korea, Lebanon, Malta, Mexico, Moldova, Morocco, Netherlands, New Zealand (Noyes 2015), Norway (Japoshvili & Hansen 2014), Pakistan, Paraguay, Peru, Philippines, Poland, Portugal, Puerto Rico, Romania, Russia, Saudi Arabia, Senegal, Slovakia, South Africa, Spain (incl. Canary islands), Sweden, Switzerland, Tajikistan, Trinidad and Tobago, Turkey, Ukraine, United Kingdom, United States of America, Uruguay, Uzbekistan, Venezuela, Zambia, and Zimbabwe (Noyes 2015).

***Aphelinus varipes* (Förster)**
Aphelinus nigritus: Crèvecoeur (1947; p. 251)

Distribution: Australia, Chile, Croatia, Czech Republic, Egypt, France, Georgia, Germany, Hungary, Israel, Italy, Japan, Kazakhstan, Mexico, Morocco, Nepal, Netherlands, Pakistan, Paraguay, Portugal (incl. Azores and Madeira islands), Russia, Serbia, Slovakia, South Africa, Spain (incl. Canary islands and Balearics), Sweden, Turkey, Ukraine, England, and United States of America (Noyes 2015).

Discussion

All of the new records were previously recorded in countries neighbouring Belgium such as France (*A. asteris*, *A. asychis*, *A. daucicola*, *A. eadyi*, *P. barbatum*, and *T. auctus*), Germany (*A. asteris*, *A. asychis*, *A. fusciscapus*, *P. barbatum*, and *T. auctus*), and the Netherlands (*A. asychis* and *T. auctus*), but also in the United Kingdom (*A. asteris*, *A. asychis*, *A. daucicola*, *A. eadyi*, and *T. auctus*) (Yu *et al.* 2012). No recent updates of Aphidiinae and *Aphelinus* species have been done in Belgium, unlike several European countries in the last decade, giving information on the diversity of these groups. For example, 24 Aphidiinae species are recorded in Norway (Westrum *et al.* 2010) and 180 in Germany (Belokoblylskij *et al.* 2003). As for *Aphelinus*, eight species are recorded from Portugal (Japoshvili & Abrantes 2006) and 11 from Norway (Japoshvili & Hansen 2014; Japoshvili *et al.* 2015). Several Aphidiinae and *Aphelinus* species listed for Belgium can also be found in countries where the climate may differ considerably, such as Iran (Barahoei *et al.* 2014) and Georgia (Japoshvili & Karaca 2009).

The species that are listed for Belgium are parasitoids of aphid species that can be found in widely cultivated crops in the country. In fact, Aphidiinae are important natural enemies for conservation biological control in Wallonia (Alhmedi *et al.* 2009; Lopes *et al.* 2015). However, further investigations are needed to better assess species diversity. This is especially true for the genus *Aphelinus*, which is still not well studied in Belgium. Therefore, it would be interesting to undertake a larger survey in Belgium in order to establish parasitoid-host aphid-plant tritrophic relationships, as done by Kavallieratos *et al.* (2004).

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