

ARTHROPOD BIODIVERSITY OF AGRICULTURAL GRASSLAND IN SOUTH AND EAST IRELAND: PARASITOID HYMENOPTERA

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Abstract

A total of 170 genera of parasitoid Hymenoptera were collected from lowland agricultural grasslands in the south-east of Ireland during the Ag-Biota project. Due to time constraints, large numbers of samples collected and identification difficulties, it was possible to make only a limited number of reliable species identifications. A total of 67 species were identified and are listed, together with details of the sites where they were found and an indication of their relative abundance in each county. From the samples, three genera and nine species were new Irish records.

Introduction

This paper focuses on the parasitoid Hymenoptera and is one of a series of four publications detailing the incidence and diversity of arthropod populations recorded in agricultural grasslands collected from the Ag-Biota Project, which was funded by the EPA from 2002- 2006 (Purvis *et al.*, 2005).

Methods

Parasitoid Hymenoptera were collected from grassland vegetation using a Vortis suction sampler at all sites, and in addition by sweep netting at Johnstown Castle, Co. Wexford. Further details of these methods and the sites sampled (including the site abbreviations used here) can be found in Anderson *et al.* (2008). Identification to genus, and species where possible, were made using the following sources:- Braconidae, Alysiinae (Wharton, 1997a); Braconidae, Aphidiinae (Achterberg, 1997); Braconidae, Microgastrinae (Whitfield, 1997); Diapriidae, Diapriinae (Nixon, 1980); Dryinidae (Trypitsyn, 1987); Encyrtidae (Noyes *et al.*, 1997); Eulophidae, Eulophinae (Askew, 1968a); Figitidae, Charipinae (Fergusson, 1986); Figitidae, Eucoilinae (Quinlan, 1978); Figitidae, Figitinae (Fergusson, 1986); Ichneumonidae, Adelognathinae (Townes, 1969); Ichneumonidae, Campopleginae (Townes, 1970b); Ichneumonidae, Cryptinae (Townes, 1970a); Ichneumonidae, Diplazontinae (Fitton and Rotheray, 1982); Ichneumonidae, Ichneumoninae, (Perkins, 1960); Ichneumonidae, Pimplinae (Fitton *et al.*, 1988); Ichneumonidae, Tersilochinae (Townes, 1971); Megaspilidae (Alekseev, 1987; Fergusson, 1980) and Pteromalidae (Bouček and Rasplus, 1991). In general, because of the relative difficulty associated with parasitoid identification, and the large number of samples and individuals collected, most identifications were taken only to genus, but where possible, taxa were identified to species. Species identifications for Braconidae and Ichneumonidae were determined by Dr Gavin Broad (Natural History Museum, London); Pteromalidae by Hannes Baur (Natural History Museum, Bern, Switzerland) and Encyrtidae by Dr John Noyes (Natural History Museum, London). Voucher specimens of new Irish records were lodged in the National Museum of Ireland.

Results

Over the five years of the project a total of 34,143 individuals representing 170 genera of parasitoid Hymenoptera from 18 families were recorded in samples from ten counties. In total, 67 species were identified from the 170 genera and details of

their distribution and relative abundance in samples are given here. Despite the constraints of limited time to fully identify many specimens, this list gives an indication of the diversity of these insects within agricultural grasslands of south-east Ireland. Two braconid genera are also included in the list as they were new records for Ireland.

In the following list of the species collected, the total abundance of individuals recorded in each county is given in bold, and the sites within each county in which they were recorded are given in parentheses. Location details are provided in Anderson *et al.* (2008). New Irish records are indicated by *.

Braconidae, Alysiinae

Dinotrema speculum (Haliday): Kildare **1** (OPC).

Pentapleura pumilio (Nees): Wexford **67** (JC, JC_{fm}).

Braconidae, Aphidiinae

Diaeretellus ephippium (Haliday): Meath **1** (18); Wexford **6** (JC_{fm}) (Anderson *et al.*, 2006).

Diaeretiella rapae (McIntosh): Wexford **3** (JC_{fm}).

Monoctonus Haliday: Carlow **2** (5); Cork **71** (11, 12, 13, 15, 28, 30, 31, 32, 33); Kildare **20** (L); Kilkenny **6** (6, 44, 45); Laois **2** (7); Meath **74** (3, 4, 18, 19, 20, 21, 22, 50, GR); **11** Tipperary (SH), Waterford **13** (16, 34, 35, 40, 43); Wexford **191** (4, 8, 36, 37, 38, 39, 49, JC_{fm} (Anderson *et al.*, 2006), JC_{co}, JC_{to}); Wicklow **10** (26, 27).

Braconidae, Blacinae

New to Ireland

Blacus ambulans* Haliday: Cork **1 (12); Wexford **19** (JC_{fm}).

Braconidae, Microgastrinae

Glyptapanteles Ashmead: Cork **1** (29); Wexford **1** (JC_{fm}) (Anderson *et al.*, 2006).

Sathon falcatus* (Nees): Wexford **1 (JC_{fm}) **New to Ireland**

Diapriidae, Diapriinae

Basalys orion Nixon: Kildare **1** (L.).

Labolips innupta Haliday: Cork **2** (11, 28); Meath **1** (19); Wexford **1** (8).

Dryinidae

Gonatopus bicolor (Haliday): Meath **1** (GRC); Wexford **8** (JC_{fm}).

Encyrtidae, Tetracneminae

Anagyrus belibus (Walker): Wexford **3** (JC).

Lamennaisia ambigua (Nees): Meath **1** (GR); Wexford **1** (42).

Rhopus acaetes* (Walker): Wexford **2 (JC_{fm}) **New to Ireland**

Eulophidae, Eulophiinae

Diglyphus isaea (Walker): Carlow **8** (23, 47, OP); Cork **74** (11, 13, 15, 28, 29, 30, 31, 32, 33); Kildare **77** (L, OPC); Kilkenny **15** (6, 24, 44, 45); Meath **52** (18, 19, 20, 21, 22, 50, GR); Tipperary **15** (SH, SHC); Waterford **156** (16, 17, 34, 35, 40, 41, 42, 45, 46); Wexford **197** (1, 9, 36, 37, 38, 39, 48, 49, JC, JC_{co}, JC_{fm}, JCC); Wicklow **10** (25, 26).

Hemiptarsenus ornatus (Nees): Cork **1** (12); Waterford **1** (43); Wexford **7** (JC_{fm}).

Hemiptarsenus fulvicollis Westwood: Meath **1** (21); Wexford **2** (JC_{fm}); Wicklow **6** (26, 27).

Hemiptarsenus unguicellus (Zetterstedt): Carlow **12** (5, OP); Cork **31** (28, 31); Kildare **20** (L, OPC); Meath **9** (3, 21, 22, GR); Tipperary **7** (SH); Waterford **13** (34, 42); Wexford **130** (1, 8, 36, 37, 39, JC_{co}, JC_{fm}, JC_{to}); Wicklow **4** (26, 27).

Figitidae, Charipinae

Alloxysta abdera Fergusson: Kildare **2** (L); Meath **1** (GR); Tipperary **1** (SHC); Wexford **2** (JC).

Alloxysta brachyptera (Hartig): Cork **2** (11); Meath **3** (22, GR); Wexford **21** (JC, JC_{fm}, JC_{to}).

Alloxysta brevis (Thomson): Carlow **1** (OP); Wexford **32** (JC, JC_{fm}, JC_{to}).

Alloxysta macrophadna (Hartig): Carlow **14** (OP); Cork **9** (31); Kildare **13** (L); Meath **32** (18, 22, GR); Tipperary **8** (SH, SHC); Wexford **92** (37, JC, JC_{fm}, JC_{to}, JCC); Wicklow **9** (10, 26).

Phaenoglyphus villosa (Hartig): Cork **1** (28); Kildare **15** (L, OPC); Kilkenny **2** (24, 44); Meath **9** (GR); Tipperary **2** (SH); Waterford **6** (35, 42); Wexford **11** (JC, JC_{fm}, JC_{to}).

Figitidae, Eucoilinae

Rhoptromeris heptoma (Hartig): Carlow **2** (47); Cork **22** (11, 12, 13, 15, 30, 31, 32); Kildare **10** (OPC); Kilkenny **19** (6, 24, 44, 45); Meath **27** (3, 4, 18, 19, 20, 21, 22, GR); Waterford **10** (17, 35, 41); Wexford **52** (1, 2, 8, 9, 37, 49, JC_{co}, JC_{fm}); Wicklow **9** (25, 26, 27).

Figitidae, Figitinae

Sarothrus tibialis (Zetterstedt): Kildare **2** (L); Meath **1** (50); Wexford **3** (JC_{fm}).

Ichneumonidae, Adelognathinae

Adelognathus dorsalis (Gravenhorst): **2** Wexford (JC_{fm}).

Ichneumonidae, Campopleginae

Campoletis annulata (Gravenhorst): Meath **1** (GR); Wexford **1** (JC_{to}).

Diadegma litorale (Holmgren): Wexford **2** (JC_{fm}).

Ichneumonidae, Cryptinae

Aclastus minutus (Bridgman): Carlow **1** (L) (Anderson *et al.*, 06); Kildare **2** (L).

Aclastus solutus (Thomson): Meath **1** (22); Wexford **12** (8, JC); Wicklow **1** (26).

Aritranis director (Thunberg): Wexford **2** (JC_{fm}).

Gambrus ornatus (Gravenhorst): Wexford **1** (JC_{fm}) (det. M. Schwarz).

Ichneumonidae, Diplazontinae

Promethes sulcator (Gravenhorst): Cork **1** (32); Tipperary **1** (SH); Wexford **1** (JC_{fm}).

Sussaba dorsalis (Holmgren): Meath **1** (GR); Tipperary **1** (SH).

Ichneumonidae, Ichneumoninae

Epitomus infuscatus (Gravenhorst): Wexford **1** (JC_{fm}).

Limerodops elongatus (Brischke): Wexford **2** (JC_{fm}).

Ichneumonidae, Pimplinae

Tromatobia variabilis (Holmgren): Wexford **1** (JC_{fm}).

Ichneumonidae, Tersilochinae

Probles (Microdiaparsis) neoversutus (Horstmann): Wexford **1** (JC_{fm}).

Megaspilidae, Megaspilinae

Dendrocerus aphidum (Rondani): Carlow **2** (OP); Cork **38** (11, 12); Kildare **17** (L,

OPC); Meath **32** (GR, GRC); Tipperary **1** (SH); Wexford **54** (39, JC, JC_{fm}, JC_{to}).

Dendrocerus carpenteri (Curtis): Meath **2** (GR); Wexford **4** (JC).

Dendrocerus rectangularis (Kieffer) [= *dubiosus* (Kieffer)]: Kildare **4** (L, OPC);

Meath **11** (GR); Wexford **45** (JC, JC_{fm}, JC_{to}).

Dendrocerus laticeps (Hedicke): Carlow **1** (OP); Kildare **5** (L, OPC); Meath **6** (GR); Wexford **28** (JC_{fm}, JC_{to}).

Pteromalidae, Asaphinae

Asaphes suspensis (Nees): Kildare **2** (L, OPC) (Anderson *et al.*, 2006); Meath **20** (GR); Tipperary **2** (SH); Wexford **24** (JC, JC_{fm}).

Asaphes vulgaris Walker: Wexford **4** (JC_{fm}).

Pteromalidae, Miscogasterinae

Halticoptera aenae (Walker): Kildare **1** (L); Wexford **2** (JC_{fm}).

Halticoptera circulus (Walker): Wexford **46** (JC, JC_{fm}, JC_{co}).

Merismus rufipes Walker: Wexford **6** (JC_{fm})* (Anderson *et al.*, 2006).

Miscogaster maulata Walker: Kildare **1** (L); Wexford **2** (JC_{fm}).

Thinodytes cyzicus (Walker): Wexford **23** (JC_{fm}).

Pteromalidae, Panstenoninae

Panstenon oxylus (Walker): Cork **2** (28, 31); Waterford **2** (40); Wexford **391** (49, JC, JC_{co}, JC_{fm}, JC_{to}); Wicklow **1** (27).

Pteromalidae, Pteromalinae

Callitula pyrrhogaster (Walker): Carlow **1** (5); Cork **3** (29, 32, 33); Kilkenny **5** (24, 44, 45); Waterford **7** (35, 40, 41, 45); Wexford **141** (2, 37, 38, 48, 49, JC, JC_{co}, JC_{fm}); Wicklow **26** (10, 27).

Chlorocythus formosus (Walker): Cork **1** (13); Wexford **3** (9, JC_{fm}); Wicklow **1** (27).

Cyrtogaster vulgaris Walker: Carlow **36** (5, 23, 47, OP); Cork **278** (11, 12, 13, 14, 15, 28, 29, 30, 31, 32, 33); Kildare **23** (L, OPC); Kilkenny **83** (6, 24, 44, 45); Laois **2** (7); Meath **157** (3, 4, 18, 19, 20, 21, 22, 50, GR); Tipperary **11** (SH); Waterford **261** (16, 17, 34, 35, 40, 41, 42, 45, 46); Wexford **323** (1, 2, 8, 9, 36, 37, 38, 39, 48, 49, JC_{co}, JC_{fm}, JC_{to}); Wicklow **33** (10, 25, 26, 27).

Homoporus febriculosis (Girault): Wexford 1 (JC_{fm}) (Anderson *et al.*, 2006).

Homoporus luniger (Nees): Wexford 1 (JC_{fm}).

Meraporus graminocola (Walker): Carlow 86 (23, 47, OP); Cork 10 (12, 28, 32, 33); Kildare 40 (L, OPC); Kilkenny 1 (6); Laois 1 (7); Meath 140 (3, 18, 21, GR, GRC); Tipperary 12 (SH); Waterford 40 (17, 34, 35, 45); Wexford 226 (36, 37; 49, JC, JC_{co}, JC_{fm}, JC_{to}); Wicklow 20 (10, 25, 26).

Mesopolobus aequus (Walker): Cork 1 (28); Kildare 2 (L); Kilkenny 1 (24); Meath 4 (19, 21); Tipperary 1 (SH); Waterford 2 (34); Wexford 35 (JC, JC_{fm}).

Mesopolobus diffinis (Walker): Wexford 2 (JC_{fm}).

Mesopolobus laticornis (Walker): Wexford 24 (JC_{fm}).

Spaniopus dissimilis Walker: Cork 2 (15, 31); Meath 1 (GR); Waterford 5 (16, 34, 35); Wexford 49 (49, JC_{fm}, JC_{co}).

Spintherus dubius (Nees): Wexford 9 (JC_{fm}) (Anderson *et al.*, 2006).

Stenomalina gracilis Walker: Meath 1 (GR).

Toxeuma fuscicorne Walker: Kildare 1 (L); Wexford 5 (JC).

Trichomalopsis hemiptera (Walker): Wexford 7 (JC_{fm}).

Trichomalus campestris (Walker): Cork 1 (28); Kildare 1 (L); Meath 1 (18, GR); Wexford 6 (JC_{fm}).

Trichomalus rufinus (Walker): Carlow 2 (OP); Wexford 3 (JC_{fm}).

Trichomalus gynetelus Walker: Carlow 1 (OP).

Discussion

The most abundant species collected were *Cyrtogaster vulgaris* (Pteromalidae) found at 58 of the 64 sites, *Meraporus graminocola* (Pteromalidae) at 31 of the 64 sites, *Rhoptromeris heptoma* (Figitidae) at 35 of the 64 sites and *Diglyphus isaea* (Eulophidae) at 50 of the 64 sites. Three genera, *Monoctonus*, *Diaeretellus* and *Glyptapanteles*, and nine species, *Aclastus minutus*, *Diaeretellus ephippium*, *Blacus ambulans*, *Sathon falcatus*, *Asaphes suspensis*, *Merismus rufipes*, *Homoporus febriculosis*, *Spintherus dubius* and *Rhopus acaetes* were found to be new to Ireland. With the exception of *B. ambulans*, *S. falcatus* and *R. acaetes*,

details of the above are available in Anderson *et al.* (2006). *B. ambulans*, *S. falcatus* and *R. acaetes* were all collected from the manipulated field margin experiment at Teagasc, Johnstown Castle (T022172), Co. Wexford. A female *B. ambulans* specimen was collected on 14 June 2004 from a suction sample and a female *S. falcatus* was collected from a sweep net sample on 9 August 2004. Both specimens were collected from a field margin plot that had been rotavated, allowed to naturally revegetate and fenced to prevent grazing and external farming inputs. A single, apterous female *R. acaetes* was collected from a grazed field adjacent to a fenced field margin on 14 June 2004.

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