

Western Palaearctic Cryptinae (Hymenoptera: Ichneumonidae) in the National Museums of Scotland, with nomenclatural changes, taxonomic notes, rearing records and special reference to the British check list. Part 2. Genus *Gelis* Thunberg (Phygadeuontini: Gelina)

M. SCHWARZ* & M. R. SHAW†

National Museums of Scotland, Chambers Street, Edinburgh, EH1 1JF

Introduction

The general rationales for this work, our approaches to it, and the sources of material are outlined by Schwarz & Shaw (1998). The present paper follows from a second period of three months spent by the first author in Edinburgh, and gives an account of just over 2000 specimens (excluding a further *ca* 200 males that cannot at present be identified) of Western Palaearctic species of the large genus *Gelis* in the National Museums of Scotland (NMS). Of the 62 species in the collection 49 are represented by British specimens. Eight species are recorded from Britain for the first time, and one species is reinstated in the British list. Attention is drawn to a further 12 species (nine represented in the collection) whose presence in Britain has been recorded since the last British check list (Fitton *et al.*, 1978), in many cases on the basis of material in NMS.

Gelis species are mostly rather small ichneumonids and, while some species are fully winged, many are apterous or brachypterous, especially in the female sex. They are idiobionts, and often conspicuously active in their search for the cocoons or cocoon-like structures that are central to the host range of the genus. In general they are functionally ectoparasitoids inside these structures, although some *Gelis* species will also oviposit through pupal cuticle (e.g. of Microlepidoptera) in which case they could be regarded literally as facultative endoparasitoids as they develop inside (but often positioned externally on a pharate adult).

Some *Gelis* species attack spiders' egg sacs, inside which the spider's eggs are successively devoured by the parasitoid larva or larvae. The species that parasitise spiders' egg sacs are invariably entirely specialised to that host group: other *Gelis* species appear never to use spiders' egg sacs directly but instead attack a range of insect cocoons or cocoon-like structures (very commonly including case-bearing Lepidoptera and sometimes more exposed pupae). Very often these species include the cocoons of Ichneumonidae and Braconidae in their host range, in which case they may have roles as both a primary parasitoid of a given host (e.g. a species of Lepidoptera) and a secondary parasitoid by also attacking cocoons of that host's primary parasitoids (occasionally this may include those of Ichneumonidae developing in spiders' egg sacs). It is useful, from a population dynamics viewpoint, to recognise that the latter is a form of

* Present address: *Eben 21, A-4202 Kirchschlag, Austria*

† Author for correspondence

hyperparasitism, reducing the population of the primary parasitoid rather than that of the original host, but the term 'pseudohyperparasitism' is recommended to indicate that the primary parasitoid has finished with, and in that sense become independent of, the original host before it is attacked. This distinguishes it from true hyperparasitism, in which the primary parasitoid is attacked while it is still developing on or in its host. Rearing records of *Gelis* from Ichneumonidae and Braconidae are all as pseudohyperparasitoids and (when possible) in the present account the name of the original host is given as well in the form 'primary parasitoid/original host'.

In the presentation of records, 'several' refers to 4–10 specimens, 'many' to 11–25, and 'numerous' to more than that. The rearing records are presented in condensed form. A single number in brackets following a host name refers to the number of independent rearings (i.e. host mortalities) of the parasitoid species from that host. The absence of the word 'brood' implies that the parasitoid is a solitary species, that is, it has a one to one relationship with its host (for parasitoids that attack spiders' egg sacs, the whole content of a sac is regarded as the host unit). Some Cryptinae, including many *Gelis* species, are solitary parasitoids of gregarious aggregations of cocoons – for example of microgastrine Braconidae that had developed gregariously in a single host. In these cases the discovery and acceptance of the cocoon mass is regarded as a unitary event, and we give the number of specimens reared from each cocoon cluster separately (e.g. 3, 2, 2 or, if only one cluster is involved, 3:1). For species that are actually gregarious in their development, for example inside the egg sacs of spiders, the word 'brood' is used. Only in these cases are sex compositions routinely recorded. Unless otherwise indicated, rearing records are from the British Isles. Non-British rearings are given in the form '+ France' to indicate both British and French records from the host concerned, or simply 'France' to indicate that the record(s) given from that host are entirely from France. The British Isles V.C. numbers referred to in the text correspond to those mapped in Fig. 1.

The extent of development of wings in the genus *Gelis* is complex, with the female sex always showing the greatest tendency for reduction. In some species each sex is apparently absolutely stable in this respect, but in others one or other of the sexes exhibits polymorphism. In addition to a few species that are habitually thelytokous, in which males are practically unknown, the following seven combinations are believed to occur: (1) both female and male always macropterous; (2) female either macropterous or brachypterous, male always macropterous; (3) both female and male either macropterous or brachypterous; (4) female always brachypterous, males unknown to us but expected to be always macropterous; (5) female always apterous, male always macropterous; (6) female always apterous, male either macropterous or brachypterous; (7) female always apterous, male either macropterous, brachypterous or apterous. These characteristics, which to some extent correlate with searching environment and thus the realised host range, are given for each of the listed species.

The modern taxonomy of *Gelis* is heavily centred on the female sex, and recent keys exist for the identification of brachypterous and winged females of Western Palaearctic species (Horstmann, 1986, 1993a; Schwarz, 1994). For apterous females some progress in the taxonomy and systematics has recently

been made (Schwarz, 1995, 1998), but as yet there is no modern key (Schwarz, in prep.).

Check list of British *Gelis*

In the revised check list given below, names of some species that we believe to be valid have been asterisked to indicate that we have not seen British specimens, though this should not be interpreted as a challenge to their right to be included. They have simply been brought forward from the last check list (Fitton *et al.*, 1978). We have seen British material of all the other species listed

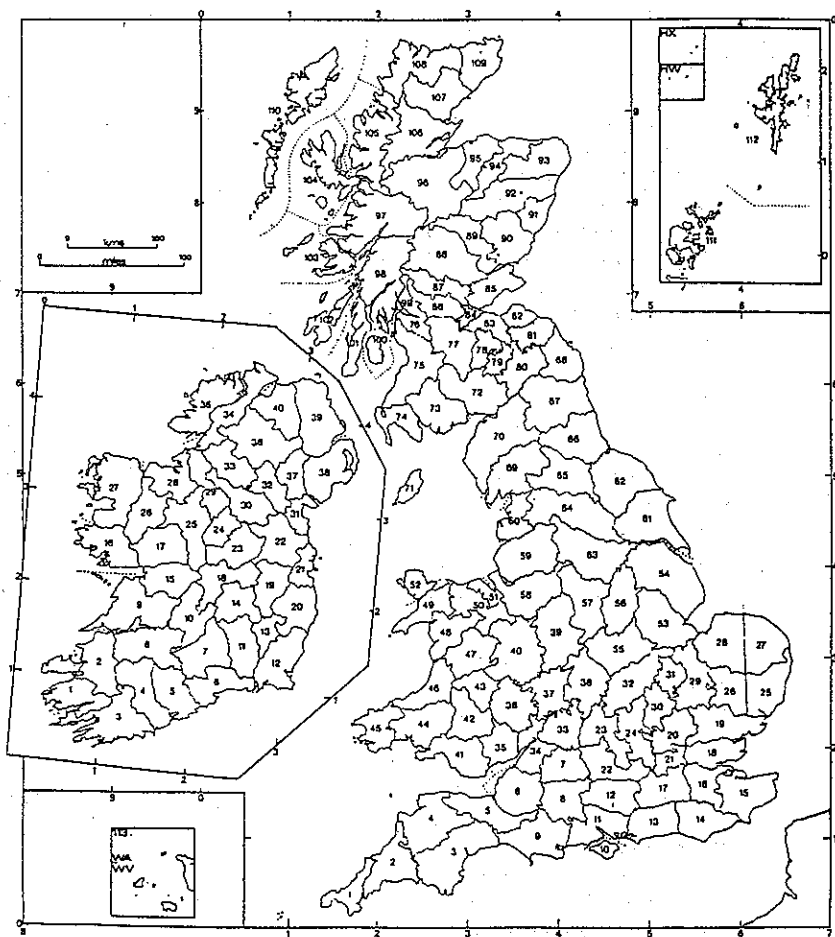


Fig. 1. Vice counties of Great Britain and of Ireland. The Irish series is prefixed 'H' when referred to in the text.

except *G. nitidus* Horstmann (see text). Three species, *G. alpiwagus* (Strobl), *G. stevenii* (Gravenhorst) and *G. taschenbergii* (Schmiedeknecht), have been deleted on grounds explained in the text. The following species listed under *Gelis* by Fitton *et al.* (1978) have subsequently been transferred to the genus *Thaumatogetis* Schmiedeknecht (Schwarz, 1995): *aquisgranensis* (Foerster), *pilosus* (Capron), *sybicolica* (Foerster), *vulpinus* (Gravenhorst), and *zonatus* (Foerster).

PHYGADEUONTINI (part)

HEMITELINI

GELINI

GELINA (part)

GELIS Thunberg, 1827

PEZOMACHUS Gravenhorst, 1829

PEZOLOCHUS Foerster, 1850

CATALYTUS Foerster, 1851

HEMIMACHUS Ratzeburg, 1852

acarorum (Linnaeus, 1758)

cautus (Foerster, 1850)

fraudulentus (Foerster, 1850)

agilis (Fabricius, 1775)

instabilis (Foerster, 1850)

albicinctoides Schwarz, 1998

albipalpus (Thomson, 1884)

anthracinus (Foerster, 1850)

gonatopinus (Thomson, 1884)

areator (Panzer, 1804)

pulchellus (Gravenhorst, 1829)

avarus (Foerster, 1850)

balteatus (Thomson, 1885)

bicolor (Villers, 1789)

distinctus (Foerster, 1850)

muelleri (Foerster, 1850)

timidus (Foerster, 1850)

brassicae Horstmann, 1986

brevis (Bridgman, 1883)

caudator Horstmann, 1986

cinctus (Linnaeus, 1758)

bicolorinus (Gravenhorst, 1829)

**cursitans* (Fabricius, 1775)

curvicauda Horstmann, 1993

discedens (Foerster, 1850)

vagans misident.

quaesitorius (Foerster, 1850)

divaricatus Horstmann, 1993

edentatus (Foerster, 1850)

modestus (Foerster, 1850)

vagantiformis (Bridgman, 1886)

- exareolatus* (Foerster, 1850)
nigrinus (Foerster, 1850)
falcatus Horstmann, 1986
fallax (Foerster, 1850)
nigricornis (Foerster, 1850) preocc.
fasciitinctus (Dalla Torre, 1901)
festinans (Fabricius, 1798)
pumilus (Foerster, 1850)
tener (Foerster, 1850)
formicarius (Linnaeus, 1758)
confusus (Bridgman, 1883)
forticornis (Foerster, 1850)
hortensis (Christ, 1791)
acarorum misident.
canaliculatus (Foerster, 1850)
gentilis (Foerster, 1850)
impotens (Foerster, 1850)
inermis (Foerster, 1850)
intermedius (Foerster, 1850)
kiesenwetteri (Foerster, 1850)
costatus (Bridgman, 1886)
**limbatus* (Gravenhorst, 1829)
liparæ (Giraud, 1863)
ilicicolator Aubert, 1966
longicauda (Thomson, 1884)
longulus (Zetterstedt, 1838)
**lucidulus* (Foerster, 1850)
mangeri (Gravenhorst, 1815)
fulveolatus (Gravenhorst, 1829)
foersteri (Bridgman, 1882)
meigenii (Foerster, 1850)
insolens (Foerster, 1850)
?rufotinctus (Bridgman, 1883)
melanocephalus (Schrank, 1781)
melanogaster (Thomson, 1884)
melanophorus (Foerster, 1851)
foersteri (Bridgman, 1886) preocc.
micrurus (Foerster, 1850)
mitis Schwarz, 1994
**mutillatus* (Gmelin, 1790)
mutillarius (Fabricius, 1787) preocc.
vagans (Olivier, 1792)
pedicularius (Fabricius, 1793)
nigritulus (Zetterstedt, 1838)
terebrator (Ratzeburg, 1848)
nitidus Horstmann, 1986
obscuripes Horstmann, 1986
papaveris (Foerster, 1856)
hieracii (Bridgman, 1883)

- problemator* Aubert, 1989
proximus (Foerster, 1850)
 analís (Foerster, 1850)
 attentus (Foerster, 1850)
 corruptor (Foerster, 1850)
 hostilis (Foerster, 1850)
 incubitor (Foerster, 1850)
 ochraceus (Foerster, 1850)
 tonsus (Foerster, 1850)
 vigil (Foerster, 1850)
 indagator (Foerster, 1851)
 indigator misspelling
 prudens (Foerster, 1851)
 hyponomeutae (Bridgman, 1883)
 ovatus (Bridgman, 1883)
 rufipes (Bridgman, 1883) preocc.
**pulicarius* (Fabricius, 1793)
ruficornis (Retzius, 1783)
 agilis misident.
rufipes (Foerster, 1850)
rufogaster Thunberg, 1827
 carnifex (Foerster, 1850)
 detritus (Foerster, 1850)
 gracilis (Foerster, 1850)
 lugubris (Foerster, 1850)
 rufulus (Foerster, 1850)
 unicolor (Foerster, 1850)
 annulicornis (Bridgman, 1883)
rugifer (Thomson, 1884)
seyrigi Ceballos, 1925
spinula (Thomson, 1884)
thomsoni (Schmiedeknecht, 1933)
trux (Foerster, 1850)
 comes (Foerster, 1850)
viduus (Foerster, 1850)
 mandibularis (Thomson, 1884)
**vulnerans* (Foerster, 1850)
zeirapherator (Aubert, 1966)
 sp. A Schwarz, in prep.
 sp. B Schwarz, in prep.

Material in NMS and taxonomic notes

Gelis agilis (Fabricius) nec auctt. (= *instabilis* (Foerster))

Numerous specimens. England: V.C. 1, 3, 11, 12, 13, 15, 16, 17, 18, 22, 23, 25, 27, 29, 34, 40, 49, 58, 59, 60, 61, 62, 67, 69, 70. Wales: V.C. 52. Scotland: V.C. 72, 77, 80, 82, 83, 85, 86, 90, 92, 95, 96, 97, 98, 99, 100, 101, 103, 104. France: Ardèche, Eure-et-Loire, Côte-d'Or, Dordogne, Savoie, Hautes-Alpes, Gard. Germany: Baden-Württemberg. Sweden: Öland, Småland, Västmanland, Torne Lappmark,

Södermanland. British specimens collected in iv and vi-ix. Reared from Lepidoptera (presumed primary parasitoid), Coleoptera (primary parasitoid) and Hymenoptera (pseudohyperparasitoid of Lepidoptera and spiders' eggs) as follows. From Lepidoptera, Psychidae: *Psyche casta* (Pallas) (7, + Sweden), *Sterrhopterix fusca* (Haworth) (1); Tineidae: *Psychoides* sp. on *Asplenium* sp. (1); Gracillariidae: *Caloptilia cuculipennella* (Hübner) (1), *Aspilapteryx tringipennella* (Zeller) (2), *Phyllonorycter junoniella* (Zeller) (1); Choreutidae: *Tebenna micalis* (Mann) (1), *Prochoreutis* sp. on *Scutellaria galericulata* (1); ?Glyphipterigidae: dead stem of *Dactylis glomeratus* containing *Glyphipterix simplicella* (Stephens) (1); Coleophoridae: *Coleophora gryphipennella* (Hübner) (1), *Coleophora pyrrehulipennella* Zeller (1), *Coleophora idaecella* Hofmann (3), *Coleophora saturatella* Stainton (4), *Coleophora genistae* Stainton (1), *Coleophora conspicuella* Zeller (1), *Coleophora albidella* ([Denis & Schiffermüller]) (1), *Coleophora otitae* Zeller (1), *Coleophora serratella* (Linnaeus) (3), *Coleophora onosmella* (Brahm) (1), *Coleophora viminetella* Zeller (1), *Coleophora* spp. (*Imula*, *Prunus*) (2); ?Oecophoridae: ?*Agonopterix* sp. on *Daucus carota* (1); Gelechiidae: *Nothris congressariella* (Bruand) (1); ?Pyralidae: ?*Udea prunalis* ([Denis & Schiffermüller]) (1); Pterophoridae: *Platyptilia gonodactyla* ([Denis & Schiffermüller]) (1), indet. Pterophoridae (1); Coleoptera, Curculionidae: *Hypera* sp. (1); Hymenoptera, Ichneumonidae: *Alcima orbitale* (Gravenhorst)/*Zygaena lonicerae* (Scheven) (1), *Alcima orbitale*/Zygaena *trifolii* (Esper) (4), *Charops cantator* (Degeer)/Zygaena *lonicerae* (5 + broods of 2♀ and 2♀, Sweden), *Charops cantator*/Zygaena *lonicerae* or *filipendulae* (Linnaeus) (1, Sweden), *Scirtetes robusta* (Woldstedt)/*Orthosia gracilis* ([Denis & Schiffermüller]) (1), *Diadegma holopyga* (Thomson)/*Calybites phasianipennella* (Hübner) (1, France), indet. Campopleginae/*Cerura vinula* (Linnaeus) (1), indet. Campopleginae on *Myrica* (brood of 2♀), indet. Campopleginae on *Crataegus* (1), *Hercus fontinalis* (Holmgren)/indet. microlepidopteron on *Alnus* (1); Braconidae: *Bracon* sp./*Hadena bicurris* (Hufnagel) (1, France), *Aleiodes assimilis* (Nees)/Zygaena *purpuralis* (Brünnich) (5), *Aleiodes assimilis*/Zygaena *exulans* (Hohenwarth) (1, Sweden), *Aleiodes pallidator* (Thunberg)/*Leucoma salicis* (Linnaeus) (2), *Aleiodes alternator* (Nees)/*Lasiocampa quercus* (Linnaeus) (1), *Aleiodes borealis* (Thomson)/indet. Noctuidae (1), *Aleiodes* sp./?*Entephria caesiata* ([Denis & Schiffermüller]) (1), *Aleiodes* sp. (1), *Meteorus* sp. (1), *Cotesia arctica* (Thomson)/*Aricia artaxerxes* (Fabricius) (1 + 3 *Gelis proximus* (Foerster)), *Cotesia acuminata* (Reinhard)/*Euphydryas maturna* (Linnaeus) (4, 3, 3, 3, 3, 2, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, Sweden), *Cotesia acuminata*/Melitaea *phoebe* ([Denis & Schiffermüller]) (1, France), *Cotesia melitaeorum* (Wilkinson)/*Euphydryas aurinia* (Rottemburg) (3:1), *Cotesia melitaeorum* (5:1, Sweden), *Cotesia bignellii* (Marshall) (7:1, France), *Cotesia vanessae* (Reinhard)/*Aglais urticae* (5, 3), *Cotesia villana* (Reinhard) (1), *Cotesia zygaenarum* (Marshall)/Zygaena *filipendulae* (Linnaeus) (7, 6, 5, 3, 3, 2, 2, 2, 1), *Cotesia* ?*zygaenarum* (6, 1, 1), *Cotesia limbata* (Marshall)/*Abraxas grossulariata* (Linnaeus) (2:1), *Cotesia* sp. (8:1), *Cotesia* sp. (1), *Pholetesor* sp./*Calybites phasianipennella* (1, France), *Glyptapanteles triangulator* (Wesmael)/*Pseudoterpna pruinata* (Hufnagel) (5, 2 + 7 *Lysibia nanus* (Gravenhorst), 2 + 5 *L. nanus*), *Glyptapanteles fraternus* (Reinhard) (3:1), *Microgaster tibialis* Nees/*Aspilapteryx tringipennella* (18), indet. Microgastrinae on *Silene maritima* (1); indet. Ichneumonoidea/*Prochoreutis* sp. (1). In addition, 1 brood of 2♀ emerged from an egg sac of an unidentified spider on *Phragmites*, in which they were probably pseudohyperparasitoids of *Gelis melanocephalus* (Schränk), which was abundant in other similarly placed sacs (France). *Gelis agilis* is a solitary parasitoid (rare broods of two have probably resulted from multiple attacks) of cocoons and cocoon-like

structures (occasionally Lepidoptera pupae) on low vegetation and bushes in open habitats. Interestingly, when it encounters gregarious cocoons, such as those of many *Cotesia* species, it appears usually to attack only a few of the individuals present. All reared specimens have emerged in the year of collection and the species probably overwinters as an adult. Rearing experiments in Britain (*G. Salt*), Austria (*M. Schwarz*) and Finland (*G. Lei*) have shown that *G. agilis* is a thelytokous species. The female is apterous.

Gelis albicinctoides Schwarz

Schwarz (1998) has already recorded this species from Britain.

England: 1♂ (tentatively identified), Kent, Dungeness (V.C. 15), ex *Psyche casta* (Pallas) (Lepidoptera: Psychidae), coll. 7.vi.1950, em. 1950 (*E. C. Pelham-Clinton*). Females are apterous and the tentatively identified males are macropterous.

Gelis albipalpus (Thomson)

Numerous specimens. **England:** V.C. 3, 7, 11, 12, 17, 19, 21, 22, 23, 28, 29, 58. **Scotland:** V.C. 84, 86, 88, 99, 101. **Ireland:** V.C. H9. **France:** Lot-et-Garonne. British specimens collected from v-x(?xi) on trees and in woodland. Reared from cocoons of Lepidoptera (presumed primary parasitoid) and Hymenoptera (pseudo-hyperparasitoid of Lepidoptera) as follows. From Lepidoptera, Bucculatricidae: *Bucculatrix ulmella* Zeller (2), *Bucculatrix crataegi* Zeller (1), *Bucculatrix* sp. under *Platanus* bark (2), *Bucculatrix* sp. (1); Hymenoptera, Braconidae: *Oncophanes laevigatus* (Ratzeburg) (1), indet. Microgastrinae in web of ?*Carcina quercana* (Fabricius) (1), indet. Microgastrinae (2). Cocoons of *Bucculatrix* species seem to be regular hosts, but it has also been reared several times as a primary parasitoid of other Lepidoptera (Horstmann, 1986) and from cocoons of Braconidae stemming from them. Probably plurivoltine. Although reared specimens have emerged in the year of collection, some are from cocoons collected as early as March, suggesting that this species may overwinter in the cocoon. Both sexes are macropterous.

Gelis alpiwagus (Strobl)

This name appears in the last British check list (Fitton *et al.*, 1978) but its retention was an oversight as the only primary British record was that of Carr (1924) and thus it should have been deleted (cf. Fitton *et al.*, 1978: v-vi). The type, which we have examined, is a male and it is unclear with which female it is associated (Schwarz, 1995).

Gelis anthracinus (Foerster) (= *gonatopinus* (Thomson))

Many specimens. **England:** V.C. 11, 34, 60. **Scotland:** V.C. 72, 75, 77, 82, 86, 95, 96, 97, St. Kilda, 'Sutherland'. **Ireland:** V.C. H19, H30. Specimens collected from iv-vi and in viii and x, in open habitats. Reared, probably as a primary parasitoid, from mines of Lepidoptera, Elachistidae: *Elachista humilis* Zeller in *Deschampsia* (2), from *Carex flacca* containing mines of *Elachista biatomella* (Stainton) but possibly also other species (1); Momphidae: *Mompha miscella* ([Denis & Schiffermüller]) in *Helianthemum* (1), coll. 17.v.1998, em. 25.ix.1998; and also from a cocoon of Hymenoptera, Braconidae: *Cotesia zygaenarum* (Marshall) in the role of pseudo-

hyperparasitoid, presumably of *Zygaena* sp. (1). This is probably a univoltine species; adults have all emerged in the year of collection and the cocoon phase is prolonged, suggesting that females may pass the winter as adults. Females are apterous and we have seen brachypterous and apterous males.

Gelis areator (Panzer) (= *pulchellus* (Gravenhorst))

Numerous specimens. **England:** V.C. 1, 3, 8, 11, 12, 15, 16, 17, 18, 20, 21, 22, 23, 24, 25, 27, 28, 29, 37, 52, 53, 58, 59, 60, 62, 63, 64, 67, 69, 70. **Wales:** V.C. 42, 52. **Scotland:** V.C. 72, 76, 77, 81, 82, 83, 84, 85, 86, 87, 88, 92, 94, 95, 96, 97, 98, 99, 100, 105, 106, 108. **Ireland:** V.C. H9, H19, H20, H30. **France:** Dordogne, Lot-et-Garonne, Haute-Marne. **Spain:** Zaragoza. **Slovakia:** Slovakia. **Germany:** Baden-Württemberg, Schleswig-Holstein, Niedersachsen. **Netherlands:** Gelderland. **Sweden:** Uppland. **Finland:** Lapponia Kemensis. British specimens collected from iv-x. Reared from Lepidoptera (presumed primary parasitoid), Neuroptera (presumed primary parasitoid), and Hymenoptera (presumed primary parasitoid, and pseudohyperparasitoid of Lepidoptera, Hymenoptera and Coleoptera) as follows. From Lepidoptera, Psychidae: *Narycia monilifera* (Geoffroy) (2), *Taleporia tubulosa* (Retzius) (4), *Psyche casta* (Pallas) (3, + Netherlands); Gracillariidae: *Caloptilia elongella* (Linnaeus) (2), *Caloptilia betulicola* (Hering) (11), *Caloptilia alchimiella* (Scopoli) (1), *Caloptilia rufipennella* (Hübner) (1), *Caloptilia syringella* (Fabricius) (1); Choreutidae: *Choreutis pariana* (Clerk) (2); Coleophoridae: *Coleophora serratella* (Linnaeus) (24, + Germany), *Coleophora cerasivorella* Packard (2), *Coleophora binderella* (Kollar) (2), *Coleophora alticolella* Zeller (2, Germany), *Coleophora anatipennella* (Hübner) (3), *Coleophora ibipennella* Zeller (4), *Coleophora hydrolapathella* Hering (1), *Coleophora albidella* ([Denis & Schiffermüller]) (1), *Coleophora palliatella* (Zincken) (1), *Coleophora adjectella* Herrich-Schäffer (1), *Coleophora pyrrehulipennella* Zeller (1), *Coleophora hemerobiella* (Scopoli) or *anatipennella* (Hübner) (1), *Coleophora lutipennella* (Zeller) or *flavipennella* (Duponchel) (1), *Coleophora ?currucipennella* Zeller (1, Netherlands), *Coleophora* spp. (on *Malus*, *Prunus*, *Betula* and *Ulmus*) (6); Neuroptera, Chrysopidae: sp. indet. (1); Hymenoptera, Diprionidae: *Neodiprion sertifer* (Geoffroy) (1), ?*Gilpinia* sp. (1, Germany); Ichneumonidae: *Agrothereutes mandator* (Linnaeus)/*Trichiosoma ?lucorum* (Linnaeus) (9 individuals from 2 *Trichiosoma* cocoons), *Alcima orbitale* (Gravenhorst)/*Zygaena trifolii* (Esper) (1), *Hyposoter clausus* (Brischke)/*Agriopsis* spp. (7), *Phobocampe* sp./*Operophtera* spp. (6), indet. Campopleginae/*Epiphyas postvittana* (Walker) (7), indet. Campopleginae/*Cerura vinula* (Linnaeus) (1), indet. Campopleginae/*Anthophila fabriciana* (Linnaeus) (1), indet. Campopleginae/*Zygaena lonicerae* (Scheven) or *viciae* ([Denis & Schiffermüller]) (1, Sweden), indet. Campopleginae (2); Braconidae: *Aleiodes gastritor* (Thunberg) (agg.)/*Operophtera brumata* (Linnaeus) (1), *Aleiodes gastritor* (agg.)/*Epipirrita autumnata* (Borkhausen) (1, Finland), *Aleiodes gastritor* (agg.)/*Lomaspilis marginata* (Linnaeus) (3), *Aleiodes pallidator* (Thunberg)/*Leucoma salicis* (Linnaeus) (6), *Aleiodes alternator* (Nees)/*Orgyia antiqua* (Linnaeus) (2), *Aleiodes* sp./*Abraxas grossularata* (Linnaeus) (3), *Aleiodes* sp./*Cyclophora* sp. (1, France), *Aleiodes* sp./*Eupithecia pusillata* ([Denis & Schiffermüller]) (3), *Dinocampus coccinellae* (Schränk)/*Coccinella septempunctata* (Linnaeus) (Coleoptera) (1), *Pygostolus* sp. (1), *Meteorus* spp. (3, + Spain), *Meteorus* sp./*Thaumetopoea processionea* (Linnaeus) (1, Germany), ?*Charmon* sp. (1), *Macrocentrus* sp. (13:1), *Ascogaster* sp./*Pandemis cerasana* (Hübner) (1), indet. Cheloninae (1), *Cotesia melanoscela* (Ratzeburg)/*Leucoma salicis* (Linnaeus) (9), *Cotesia risilis* (Nixon)/*Gonepteryx rhamni* (Linnaeus) (1, France), *Cotesia juniperatae* (Bouché)

(1), *Rasivalva calceata* (Haliday)/*Thera* sp. (6), *Dolichogenidea longicauda* (Wesmael)/*Choreutis pariana* (1), indet. Microgastrinae/*Swammerdamia caesiella* (Hübner) (1), indet. Microgastrinae/*Agriopsis* spp. (2), indet. Microgastrinae/*Caloptilia syringella* (1), indet. Microgastrinae (7). In addition a single specimen was reared from an egg sac of a spider, *Agroeca* sp. (Liocranidae), during an extensive survey of parasitoids of this species and was probably a pseudohyperparasitoid via one or other of the ichneumonids *Bathythrix formosa* (Desvignes) or *Thaumatogelis audax* (Olivier), both of which were abundant. *Gelis areator* is a parasitoid of a wide range of small to medium-sized cocoons or cocoon-like structures, especially on trees and bushes or in the upper parts of field layer vegetation in more open habitats. These commonly include Lepidoptera cocoons (e.g. *Caloptilia* and *Choreutis*) or cases (e.g. *Coleophora* and Psychidae), and the cocoons of Ichneumonidae and Braconidae. Depending on the habits of the host, and in common with many species of *Gelis*, in some parasitoid complexes of, for example, Lepidoptera it functions both as a primary parasitoid and as a pseudohyperparasitoid; in others just as a pseudohyperparasitoid. The fact is stressed here because *G. areator* is a species with an extensive host records literature, but the records do not always make its role clear. It is plurivoltine, overwintering in host cases/cocoons. However, in addition there is an adult female collected inside an aged polypore fruit in December, and two others that emerged in April from recently collected dead wood, which may suggest that it can also overwinter as an adult. Both sexes are macropterous.

Gelis avarus (Foerster)

This species is here recorded as British for the first time. Many specimens. England: V.C. 15, 17, 28. Wales: V.C. 52. Scotland: V.C. 82, 86, 99. In addition 1♀ without data (determined by C. Morley as *Pezomachus fraudulentus* Foerster). Collected in viii(?ix) and x, occurring in open and mostly boggy situations. Reared from Lepidoptera, Coleophoridae: *Coleophora glaucicolella* (Wood) (5, includes 2♂), *Coleophora ?glaucicolella* on *Juncus maritima* (2), *Coleophora alticolella* Zeller (4, includes 1♂), *Coleophora* sp. on *Juncus compactus* (1), *Coleophora* sp. on *Juncus maritima* (2♂), *Coleophora* sp. on *Juncus* sp. (3), *Coleophora argentula* (Stephens) (1). It appears to be specialised to *Coleophora* species that overwinter as relatively well-grown larvae in low vegetation, perhaps especially in boggy situations. Apart from the male, only tentatively identified, from *Coleophora alticolella* (which emerged 21.xi), all reared specimens had overwintered in the host case and emerged in iv-v: the limited phenological data suggest that this may be a univoltine species that aestivates. Females are apterous; the males recorded above, all of which are identified only tentatively, are macropterous.

Gelis balteatus (Thomson)

This was listed by Fitton *et al.* (1978) as a doubtfully placed species in *Hemiteles* Gravenhorst.

Many specimens. England: 1♂, Norfolk, Barton Turf (V.C. 17), *Phragmites/Cladium* fen, 12-13.vii.1983 (*M. R. Shaw*); 3♀, 1♂ Norfolk, Catfield, TG 3720 (V.C. 27), abandoned wet meadow [reverted to *Phragmites*-dominated fen], 10-17.vii.1983, 27.vii-10.viii.1984, 8-17.viii.1983 and 1-8.viii.1983 (♂) (*R. T. J. Jarvis*); 2♀, 3♂, Norfolk, Catfield Common, TG 4021 (V.C. 27), ex egg sacs of the spider *Clubiona*

phragmitis C. L. Koch (Clubionidae) in fen, coll. 30.vii.1988, em. 9.vi.1989 (*M. R. Shaw*) (from broods of 3♀, 1♂; 2♂: in both cases some spiderlings also emerged). **Wales:** 1♀, Pembrokeshire, Western Cleddau, SM 8931 (V.C. 45), 23.vi.1987 (*P. Holmes*); 1♀ Anglesey, Cors Bordeilio, SH 5077 (V.C. 52), 26.vii.1988 (*P. Holmes*). The rearing data suggest that this is an only partly plurivoltine species that overwinters in the host spider's egg sac. It may be restricted to reedbeds (*Phragmites*). The females are usually macropterous, rarely brachypterous, and the males are macropterous. The female from Western Cleddau is brachypterous and differs from the macropterous females in having shorter antennal segments and a darker gaster.

Gelis bicolor (Villers) (= *distinctus* (Foerster); = *muelleri* (Foerster); = *timidus* (Foerster))

Many specimens. **England:** V.C. 27, 28. **Wales:** V.C. 46. **Scotland:** V.C. 77, 82, 86, 89, 92. **France:** Lot-et-Garonne. Specimens collected from vi–viii and in xii. Reared from egg sacs of the spiders *Theridion pallens* Blackwall (Theridiidae) (1) and *Dictyna* sp. (Dictynidae) (4, one of them only tentatively identified). The adult females hibernate. Females are apterous; males macropterous or brachypterous.

Gelis brassicae Horstmann

This species is here recorded as British for the first time. Numerous specimens. **England:** V.C. 7, 23, 27, 28, 29, 58, 59, 76. **Wales:** V.C. 52. **Scotland:** V.C. 83, 86, 88, 92, 96, 97, 99, 101, 102, 105, 106. Specimens collected from v–ix, mostly in woodlands. Reared from Lepidoptera (presumed primary parasitoid) and Hymenoptera (pseudohyperparasitoid of Lepidoptera) as follows. From Lepidoptera, Psychidae: *Diplodoma laichartingella* (Goeze) (1), *Luffia ferchaultella* (Stephens) (2); Yponomeutidae: *Ypsolopha* sp. (1); Coleophoridae: *Coleophora lithargyrinella* Zeller (1); Hymenoptera, Ichneumonidae: *Caenocryptus rufiventris impunctatus* Schwarz/*Ypsolopha vittella* (Linnaeus) (1); Braconidae: *Cotesia melanoscela* (Ratzeburg)/*Leucoma salicis* (Linnaeus) (1). *Gelis brassicae* appears to be frequently a primary parasitoid of Lepidoptera cocoons and cases, and it is active especially around tree trunks. Probably plurivoltine. All reared specimens have emerged in the year of collection; however, on three occasions from cocoons or cases collected in April, which may suggest that it had overwintered in them, possibly as a preadult stage. Both sexes are macropterous.

Gelis brevithorax Roman

Hungary: 1♀, Simontornya. Females are apterous; the male is unknown.

Gelis brevis (Bridgman)

Germany: 1♀, Baden-Württemberg, Hessigheim, 8.x.1906. Females are apterous; we have not seen males.

Gelis carbonarius (De Stefani)

France: 1♀, Var, Barjols, 13.vii.1997 (*M. R. Shaw*); 2♀, 1♂, Vaucluse, Bédoin, ex cocoons of *Dolichogenidea* sp. (Hymenoptera: Braconidae) in webs of *Xerocnephasia*

rigana (Sodoffsky) (Lepidoptera: Tortricidae) on low *Clematis*, coll. 15.vii.1993, em. viii.1993 (*M. R. Shaw*). **Madeira**: 1♀, Ribeiro Frio, 13.iv.1981 (*R. R. Askew*); 1♀, Boca do Risco, 18.iv.1981 (*R. R. Askew*). Females are apterous, males macropterous.

Gelis caudator Horstmann

This species is here recorded as British for the first time. **Scotland**: 1♀, Inverness-shire, Loch Garten (V.C. 96), v.1981 (*J. A. Owen*). **Austria**: 1♂, Oberösterreich. In Austria the adult female hibernates (Schwarz, 1994). Both sexes are macropterous.

Gelis cinctus (Linnaeus) (= *bicolorinus* (Gravenhorst))

Many specimens. **England**: V.C. 15, 16, 21, 22. **Scotland**: V.C. 83, 96. **France**: 'Northern France'. **Germany**: Baden-Württemberg. British specimens collected from v-vii, usually in buildings. Reared from Lepidoptera, Tineidae: *Tinea pellionella* (Linnaeus) (3), *Tineola biselliella* (Hummel) (2), *Tinea pellionella* or *Tineola biselliella* (2), *Tinea dubiella* Stainton in nest of swallow (1); Tortricidae: *Epinotia demarniana* (Fischer von Röslerstamm) (1). In addition, a P. Cameron specimen is labelled as reared from a gall of the tenthredinid sawfly *Pontania proxima* (Lepeletier) (as *Nematus gallicola*) (det. C. Morley as *Hemiteles areator* and is probably the specimen referred to by Cameron (1907)). It is clear that *G. cinctus* is strongly associated with several species of clothes-moths and, like them, it is probably plurivoltine, at least indoors. The winter is passed in the host cocoon and both sexes are macropterous.

Gelis cursitans (Fabricius)

Numerous specimens. **Germany**: Baden-Württemberg. **Sweden**: Öland, Småland, Halland, Södermanland, Uppland, Torne Lappmark. The Swedish specimens are all reared from Lepidoptera (presumed primary parasitoid) and from Hymenoptera (pseudohyperparasitoids of Lepidoptera) as follows. From Lepidoptera, Psychidae: *Taleporia tubulosa* (Retzius) (14), probably *Taleporia tubulosa* or possibly *Psyche casta* (Pallas) (3); Hymenoptera, Ichneumonidae: *Charops cantator* (De Geer)/*Zygaena lonicerae* (Scheven) (3), *Charops cantator*/*Zygaena lonicerae* or *filipendulae* (Linnaeus) (4), indet. Campopleginae/*Zygaena lonicerae* or *viciae* ([Denis & Schiffermüller]) (2); Braconidae; *Aleiodes assimilis* (Nees)/*Zygaena exulans* (Hohenwarth) (2). In addition, 1♂, identified only tentatively, from one of the above sites emerged from a cocoon of *Zygaena lonicerae* in which it appeared to have been a primary parasitoid. *Gelis cursitans* is a relatively large species, occurring in grassland habitats, which probably accounts for its apparently strong association with *Zygaena* species simply because they are parasitised by suitably large ichneumonoids. We have seen it reared from a wider range of hosts in other parts of Europe (Schwarz, 1998). The specimens listed above all emerged in the year of collection and it is not clear how the winter is passed. The females are apterous and the males are macropterous.

Gelis curvicauda Horstmann

Schwarz (1994) has already recorded this species from Britain.

England: 1♀, Norfolk, Santon Downham, TL 8188 (V.C. 28), heath with birch and pine, 24.vii-5.viii.1983 (*J. Field*). Additionally, 1♀ from the P. Cameron collection,

not necessarily British (without locality). The females are brachypterous and males are unknown.

***Gelis discedens* (Foerster) (= *vagens* auctt. nec Olivier; = *quaesitorius* (Foerster))**

Numerous specimens. **England:** V.C. 25, 27, 28, 69. **Wales:** V.C. 49, 52. **Scotland:** V.C. 80, 92. **Germany:** Baden-Württemberg. Specimens collected in Britain from vi–viii, in Germany ix–x. Reared from egg sacs of spiders, Tetragnathidae: ?*Tetragnatha* sp. on old *Phragmites* flower (1), ?*Tetragnatha* sp. (broods of 2♀, 2♂; 1♀), *Tetragnatha extensa* (Linnaeus) (brood of 4♀); unidentified egg sac on *Peucedanum palustre* (brood of 3♀), unidentified egg sac on grass (brood of 1♀, 2♂ and 2♀, 1♂ *Gelis hortensis* (Christ) also emerged). All specimens are from wetland habitats. The parasitoids emerged from the egg sacs in the same year they were collected and it seems likely that *G. discedens* overwinters as an adult. Females are apterous, males usually macropterous but there is one specimen with slightly shortened wings.

***Gelis divaricatus* Horstmann**

Horstmann (1993b) has already added this species to the British list.

England: 1♀, Hampshire, Emmer Bog (V.C. 11), ex *Coleophora albicosta* (Haworth) (Lepidoptera: Coleophoridae) on *Ulex europaeus*, coll. 1.i.1992, em. v.1992 (J. R. Langmaid). **Wales:** 1♀ (paratype), Anglesey, Llangristiolus, SH 4373 (V.C. 52), Malaise trap by hayfield, 27.viii–25.ix.1982 (S. A. & D. C. Wilkinson). The reared specimen overwintered in the host case. The three known females of this species are all macropterous; the male is unknown.

***Gelis edentatus* (Foerster) (= *modestus* (Foerster); = *vagantiformis* (Bridgman))**

England: 1♀, Surrey, Shere (V.C. 17), no date (from C. Morley's collection). This specimen was determined by Morley as *vagantiformis* and it is probably the specimen (or one of the specimens) mentioned from that locality by Morley (1907: 204). Females are wingless; the male has not been confidently recognised but it is likely to be macropterous, in common with other species in the *agilis*-group.

***Gelis exareolatus* (Foerster) (= *nigrinus* (Foerster))**

Numerous specimens. **England:** V.C. 15, 59, 70. **Scotland:** V.C. 86, 88, 89, 96. **Austria:** Niederösterreich. **Germany:** Schleswig-Holstein. **Norway:** Nordseik Tschoerninge. Specimens collected in v. Reared from Lepidoptera, Coleophoridae: *Coleophora alticoella* Zeller (40, + Austria, Germany, Norway), *Coleophora glaucicolella* Wood (2), *Coleophora alticollela* or *glaucicolella* (1), *Coleophora* sp. on *Juncus gerardii* (4), *Coleophora* sp. on *Juncus* sp. (4). Although it appears to be a specialist parasitoid of *Coleophora* on *Juncus*, there is one specimen in coll. Schwarz reared from *Psyche* sp. (Lepidoptera: Psychidae) in Austria. *Gelis exareolatus* overwinters in the host case. Females are apterous; males are usually macropterous but one of the above is brachypterous.

***Gelis falcatus* Horstmann**

Horstmann (1986) has already added this species to the British list.

Scotland: 2♀ (holotype and paratype), Midlothian, SE. of Braidwood (V.C. 83), ex bark of birch, coll. 27.iii.1976, em. 17–18.iv.1976 (*K. P. Bland*); 1♀, Inverness-shire, Cairngorms, NN 9899 (V.C. 96), immobilised on snow, 21.vi.1983 (*N. P. Ashmole*). The four known specimens of this species are all macropterous females and all were collected in Scotland. See further comment under *G. longicauda*.

***Gelis fallax* (Foerster) (= *nigricornis* (Foerster))**

Wales: 1♀, Anglesey, Newborough Warren NNR (V.C. 52), 31.vii.1981 (*M. R. Shaw*). **Ireland:** 1♂ (tentatively identified), Ballyteige, Wexford (V.C. H12), 14.viii.1950 (*R. C. Faris*). **Germany:** 1♂, Baden-Württemberg, 3.x.1906. **Spain:** 2♂, Navarra, 30.vi (*P. Cameron*). Females are apterous and we have seen brachypterous males.

***Gelis fasciitinctus* (Dalla Torre)**

This species is here recorded as British for the first time. **England:** 1♀, Surrey, Chobham Common (V.C. 17), ex egg sac of the spider *Agroeca brunnea* (Blackwall) or *A. proxima* (O. Pickard-Cambridge) (Liocranidae), coll. 20.ix.1979, em. 20.v.1980 (*M. R. Shaw*). It has been reared several times from egg sacs of this spider genus in Europe (Horstmann, 1986). The parasitoid overwinters in the host sac. Both sexes are macropterous, though in some females the wings are slightly shortened.

***Gelis festinans* (Fabricius) (= *pumilus* (Foerster); = *tener* (Foerster))**

Many specimens. **England:** V.C. 13, 26, 28, ?29, 40, 58. **Wales:** V.C. 46, 52. **Scotland:** V.C. 77, 83, 99, 103, 105, St Kilda. Specimens collected in v and from vii–ix, in open habitats. Reared from egg sacs of the spider *Erigone atra* (Blackwall) (Linyphiidae) (4, from a single survey: van Baalen, Sunderland & Topping, 1994; van Baalen, Topping & Sunderland, 1996). The reared specimens emerged in the year of collection but it is not clear how many annual generations it has or how the winter is passed. Females are apterous; males are apterous, brachypterous or macropterous.

***Gelis formicarius* (Linnaeus, 1758) (= *Hemimachus confusus* Bridgman, 1883, syn. nov.)**

Several specimens. **England:** V.C. 15, 21, 22, 58. Specimens collected from (?iv)v–vi and in xii, in woodland. Reared from gall of *Andricus quercuscalicis* (Burgsdorf) (Hymenoptera: Cynipidae) (1). *Gelis formicarius* is possibly associated with *Quercus*. Voltinism and mode of overwintering are unclear. Females are apterous and males are macropterous.

The lectotype (♂) of *Hemimachus confusus* Bridgman, 1883, is here designated: 'Box Hill', 'Syntype', 'Syntype ♂ *Hemimachus confusus* Bridgman 1883 det. M. G. Fitton, 1975', 'E. A. Fitch coll.', 'Lectotypus ♂ *Hemimachus confusus* Bridgman des. Mart. Schwarz '98', 'B.M. Type Hym. 3B.2211(a)' (BMNH). The three paralectotypes (♂) also belong to *G. formicarius*.

***Gelis forticornis* (Foerster)**

This species was recorded from England by Schwarz (1998), and it is on that basis that we include it in the check list.

Gelis fortificator Aubert

Austria: 1 ♀, Salzburg. Females are apterous and males are macropterous or rarely brachypterous.

Gelis hortensis (Christ) (= *acarorum* auctt. nec Linnaeus; = *canaliculatus* (Foerster); = *gentilis* (Foerster); = *impotens* (Foerster); = *inermis* (Foerster))

Numerous specimens. **England:** V.C. 16, 20, 22, 23, 27, 29, 58. **Wales:** V.C. 35, 44, 45, 49, 52. **Scotland:** V.C. 76, 77, 82, 83, 86, 87, 93, 99, 108. **Ireland:** V.C. H9, H20, H40. **Germany:** Baden-Württemberg, Schleswig-Holstein. British specimens collected in iii and from vi-xi in open habitats, especially wetlands. Reared from Lepidoptera (presumed primary parasitoid) and Hymenoptera (pseudohyperparasitoid of Lepidoptera and spiders' egg sacs) as follows. From Lepidoptera, Coleophoridae: *Coleophora ramosella* Zeller (1), *Coleophora panatipennella* (Hübner) (1), *Coleophora serratella* (Linnaeus) (2, Germany); Oecophoridae: *Depressaria pastinacella* (Duponchel) (1); pupa of Lepidoptera on *Angelica sylvestris* (1); Hymenoptera, Ichneumonidae: *Barichneumon heracliana* (Bridgman)/*Depressaria pastinacella* (2), indet. Campopleginae/*Prochoreutis* sp. (1); Braconidae: *Colastes* sp./mine of indet. Agromyzidae (Diptera) or *Elachista* sp. in *Phragmites* or *Phalaris* (1), *Aleiodes gastritor* (Thunberg) (agg.)/indet. Geometridae (1), *Microgaster 'alebion* var. A' Nixon/*Prochoreutis myllerana* (Fabricius) (1). Additionally indet. spider's egg sac on grass ('brood' of 2 ♀, 1 ♂, but 1 ♀, 2 ♂ *Gelis discedens* (Foerster) also emerged, and probably the *G. hortensis* had developed as solitary pseudohyperparasitoids from that species). In all cases the parasitoids hatched in the year of collection. *Gelis hortensis* seems to be a plurivoltine species and the females probably overwinter as adults, as they can be collected very early in the spring. However, we are puzzled by two males 'reared' from a Yellow Wagtail's nest collected at the beginning of February. These seem most likely to have overwintered as a preadult stage, as we do not know of any European species of Cryptinae in which males overwinter as adults. Females are apterous; males usually apterous, rarely brachypterous or macropterous.

Gelis hypsibatus Schwarz

Austria: 1 ♀ (paratype), Salzburg, Hohe Tauern, Gamsboden, 47°07'N, 12°50'E, 2550 m, 2.viii.1995 (*M. Schwarz*). Females are apterous and males are macropterous.

Gelis infumatus (Thomson)

France: 1 ♀, Lot-et-Garonne, Bernac, 29.vi-11.vii.1993 (*R. R. Askew*). Females are winged.

Gelis intermedius (Foerster)

Morley (1907) gave British localities for *G. intermedius* (as *Pezomachus*), but Kloet & Hincks (1945) listed the name as a junior synonym of *G. distincta* (Foerster), which is now regarded as a junior synonym of *G. bicolor* (Villers) (Schwarz, 1995). Fitton *et al.* (1978) listed both *G. distinctus* and *G. bicolor* separately, but did not include *G. intermedius* even as a synonym. We have seen a British specimen of *G. intermedius* correctly determined by C. Morley; therefore it is here reinstated on the British list rather than being added.

Many specimens. **England:** V.C. 11, 24, 27. **France:** Lot-et-Garonne, Vienne. One British specimen was collected in vi and the French specimens from vii–viii. Reared from spiders' egg sacs: indet. Linyphiidae (brood of 2♀), indet. sp. on 'leaf' (1), and indet. sp. on *Juncus* (brood of 1♀, 3♂). The reared specimens all emerged in the year of collection, but voltinism and the means of passing the winter are unknown. Females are apterous; males generally macropterous but one of the above specimens has slightly shortened wings.

***Gelis kiesenwetteri* (Foerster)**

Several specimens. **England:** V.C. 22. **Scotland:** V.C. 72, 97, 100. **Ireland:** V.C. H3. Specimens collected in v/vi and viii, occurring in open habitats with short vegetation. Reared from cocoon of *Hypera* sp. (Coleoptera: Curculionidae) on *Lotus corniculatus* (1), seemingly as a primary parasitoid. The reared specimen emerged in the year of collection. Females are apterous and males macropterous.

***Gelis limbatus* (Gravenhorst)**

This nominal taxon was listed by Fitton *et al.* (1978) as a doubtfully placed species of *Hemiteles* Gravenhorst, but Horstmann (1979) has subsequently placed it in *Gelis*. The holotype is a macropterous male, and has not been reliably associated with its female.

***Gelis liparæ* (Giraud, 1863) (= *Hemiteles pulchellus* var. *ilicicola* Seyrig, 1927, syn. nov.; = *Gelis iliculator* Aubert, 1966, syn. nov.)**

Horstmann (1986) has already added this species to the British list.

Many specimens. **England:** V.C. 17, 22, 24. **France:** Lot-et-Garonne, Lot. **Italy:** Toscana, Umbria. **Spain:** Zaragoza. Specimens collected from vii–viii (England), (?vi)vii–ix (France, Italy), mostly at light in open woodland. Both sexes are macropterous.

We have seen the holotype of *Hemiteles liparæ* Giraud, and the lectotype of *Hemiteles pulchellus* var. *ilicicola* Seyrig, and we base our interpretation of *Gelis iliculator* Aubert on key characters given by Horstmann (1986) and on specimens determined by him. The ratio of malar space to basal mandibular breadth in female specimens in NMS varies more or less continuously from 0.9 to 1.2, encompassing the values given for *G. iliculator* (0.9) and *G. ilicicola* (1.1–1.2) by Horstmann (1986). Males of *G. iliculator* (now *liparæ*) were said by Horstmann (1986) to be distinguishable from males of *G. areator* by the larger ratio of the diameter of the hind ocellus to its distance from the eye (OD : OOL) in the former species, but material in NMS shows too great a range of variation, in both species, for this character to be reliable. However, the colour differences given by Horstmann do appear to be reliable for both sexes.

***Gelis longicauda* (Thomson)**

Numerous specimens. **England:** V.C. 12, 17, 20, 22, 28, 29, 55, 58. **Scotland:** V.C. 75, 88, 92, 96, 97, 98, 99, 105, 107, 108. **Ireland:** V.C. H1 or H2. **France:** Lot-et-Garonne, Dordogne. British specimens collected from iv–x(xxi). *Gelis longicauda* is a woodland

species which has been collected several times on the trunks of deciduous trees. Reared from *Ypsolopha* sp. (Lepidoptera: Yponomeutidae) (1). Its long flight period suggests that it is a plurivoltine species; but its overwintering strategy is unclear. Females are macropterous; we have not been able to recognise British males but, if they occur, they would be expected to be macropterous.

Two females from Scotland (from Loch Arkaig, Inverness-shire) have a black pronotum, much weaker dark patches on the fore wing and shorter antennal segments than typical specimens of *G. longicauda*. These two specimens appear to be somewhat intermediate between *G. falcatus* and *G. longicauda*, though *G. falcatus* differs by its lustrous second tergite of the gaster and its hyaline wings. Nevertheless, the possibility that *G. falcatus* is merely a form of *G. longicauda* occurring in northern populations is worthy of further investigation.

Gelis longulus (Zetterstedt)

Schwarz & Boriani (1994) have already added this species to the British list. Numerous specimens. **England:** V.C. 28, 40, 58. **Scotland:** V.C. 72, 76, 77, 78, 82, 83, 84, 86, 87, 88, 92, 95, 96, 106. **Sweden:** Torne Lappmark, Västmanland. British specimens collected from ii-x, mostly in woodland habitats with *Pinus* or *Juniperus*. Reared from Lepidoptera (presumed primary parasitoid) and Hymenoptera (pseudo-hyperparasitoid of Lepidoptera and spiders' egg sacs) as follows. From Lepidoptera, Psychidae: *Dahlica lichenella* (Linnaeus) (1); Gracillariidae: *Caloptilia betulicola* (Hering) (1); Coleophoridae: *Coleophora serratella* (Linnaeus) (1); Tortricidae: sp. indet. on *Calluna* (1); Hymenoptera, Ichneumonidae: *Phobocampe* sp. on *Juniperus* (1), *Tromatobia occulatoria* (Fabricius)/egg sac Araneidae on *Myrica* (1), *Hemiteles similis* (Gmelin)/egg sac indet. spider, *Pinus* bark (1), indet. ?Ichneumonidae/egg sac indet. spider, *Pinus* bark (1); Braconidae: *Aleiodes* sp./*Eupithecia pusillata* (Denis & Schiffermüller) (7), *Aleiodes* sp./*Eupithecia intricata* (Zetterstedt) (1), *Aleiodes* sp./*Thera* sp. on *Pseudotsuga* (1), *Cotesia acuminata* (Reinhard)/*Euphydryas maturna* (Linnaeus) (2,1, Sweden), ?*Cotesia* sp./?*Euphydryas iduna* (Dalman) on *Bartsia* (1, Sweden), indet. Microgastrinae on *Pinus* (1). All reared specimens have emerged in the same year that the host was collected and the data suggest that this is a potentially plurivoltine species with overwintering adult females. Females are apterous, males macropterous.

Gelis lucidulus (Foerster)

Austria: 1♀, 1♂, Oberösterreich. Females are apterous and we have seen brachypterous males.

Gelis mangeri (Gravenhorst) (= *fulveolatus* (Gravenhorst); = *foersteri* (Bridgman))

Fitton *et al.* (1978) listed this species (with the incorrect date 1829) in the genus *Catalytus* Foerster, which is now regarded as a junior synonym of *Gelis* Thunberg (Schwarz, 1995).

Numerous specimens. **England:** V.C. 12, 22, 25, 26, 27, 28. **Wales:** V.C. 52. Specimens collected from iii-iv and from vi-x. *Gelis mangeri* is usually found low

down in reedbeds and other wet, open habitats. Reared from egg sac of the linyphiid spider *Gonyglidium rufipes* (Sundevall) or *Hypomma cornutum* (Blackwall) on *Salix* (1). Adult females hibernates. Females are brachypterous, rarely macropterous; males are more equally brachypterous or macropterous. Even in macropterous individuals, however, the wings of both sexes are slender and rather short.

Gelis meigenii (Foerster, 1850) (= *insolens* (Foerster); = ? *Hemimachus rufotinctus* Bridgman, 1883, *syn. nov.*)

Numerous specimens. **England:** V.C. 1, 2, 4, 9, 11, 12, 17, 23, 34, 40, 45, 46, 58, 59, 69, 71. **Wales:** V.C. 46, 49, 52. **Scotland:** V.C. 83, 86, 88, 96, 97, 103, 104, 105. **France:** Ille-et-Vilaine. **Denmark:** 1 doubtful specimen. British specimens collected in iv and from vi-ix in open habitats. Reared from Lepidoptera (presumed primary parasitoid), Coleoptera (primary parasitoid) and Hymenoptera (pseudohyperparasitoid of Lepidoptera and spiders' egg sacs) as follows. From Lepidoptera, Psychidae: *Psyche casta* (Pallas) (1), *Pachythelia villosella* (Ochsenheimer) (1), sp. indet. (1); Glyphipterigidae: *Glyphipterix haworthana* (Stephens) (1); Coleophoridae: *Coleophora discordella* Zeller (1); Tortricidae: sp. indet. (pupa) on *Myrica* (1); Nymphalidae: *Mellicta athalia* (Rottemburg) (pupa) (1); Coleoptera, Curculionidae: *Hypera plantaginis* (De Geer) (1); Hymenoptera, Ichneumonidae: ?*Gambrus* sp./*Zygaena filipendulae* (Linnaeus) (1), *Alcima orbitale* (Gravenhorst)/*Zygaena filipendulae* (3), *Alcima orbitale/Zygaena trifolii* (Esper) (4), ?*Alcima orbitale/Zygaena* sp. (2), indet. Campopleginae/?*Pseudoterpnia pruinata* (Hufnagel) (1), indet. Campopleginae in grassland (2); Braconidae: *Aleiodes alternator* (Nees)/*Arctia caja* (Linnaeus) (1), *Aleiodes alternator/Philudoria potatoria* (Linnaeus) (3), *Aleiodes alternator/Lasiocampa quercus* (Linnaeus) (1), *Aleiodes assimilis* (Nees)/*Zygaena purpuralis* (Brünnich) (7), *Aleiodes pallidator* (Thunberg)/*Leucoma salicis* (Linnaeus) (2), *Cotesia zygaenarum* (Marshall)/*Zygaena filipendulae* (1), *Cotesia zygaenarum/Zygaena* sp. (3:1), *Cotesia* sp./*Zygaena* sp. (1). In addition, one specimen ex egg sac *Agroeca brunnea* (Blackwall) (Liocranidae) from France. *Gelis meigenii* is one of the larger *Gelis* species in Britain and it attacks relatively large cocoons and cocoon-like structures (including Lepidoptera pupae). Egg sacs of spiders are evidently not in the normal host range of this parasitoid, and it is probable that in the above rearing it was functioning as a pseudohyperparasitoid. All except one of the reared specimens emerged in the year of collection, but the exception (ex *Alcima orbitale/Zygaena trifolii*) emerged the following March. *Gelis meigenii* is probably plurivoltine but it is not clear how the winter is usually passed. Females are apterous; males macropterous.

We have seen the holotype (♂) of *Hemimachus rufotinctus* Bridgman, and it agrees extremely well with several males of *Gelis meigenii* in NMS that were reared along with females from the same hosts and localities. However, as males of species that might be expected to be closely similar to that of *meigenii* have not yet been recognised, some uncertainty remains as to its identity.

Gelis melanocephalus (Schrank)

Numerous specimens. **England:** V.C. 3, 12, 15, 22, 23, 27, 28, 29, 59, 70. **Wales:** V.C. 46, 52. **Scotland:** V.C. 75, 76, 85, 86, 87, 88, 92, 96, 98, 101, 108, 110. **Ireland:** V.C. H30. **France:** Ille-et-Vilaine, Dordogne, Haute-Marne, Côte-d'Or. **Spain:** Aragon. British specimens collected from v-viii and in x, mainly in reedbeds and other wet

habitats, in the upper zone of field vegetation and on bushes. Reared from spiders' egg sacs, Dictynidae: *Dictyna* sp. (1); Clubionidae or Salticidae: sp. indet. in *Phragmites* head (brood of 8♀, 1♂); Liocranidae: *Agroeca* spp., mostly believed to be *brunnea* (Blackwall) but one ?*proxima* (O. Pickard-Cambridge) (broods of 4♀, 2♂; 2♀, 1♂; 3♀, 7♂; 1♀, 1♂; 1♀, 3♂; 1♀, 1♂; 5♀, 6♂, 4♂; 1♀, 1♂; the foregoing all British; 1♀ + 1 *Thaumatogetis audax* (Olivier) also emerged (France)); Tetragnathidae: *Tetragnatha* spp. (broods of 4♀; 3♀; 2♀, 3♂; 3♀, 2♂; 1♀); Araneidae: *Larinioides cornutus* (Clerck) (broods of 1♀; 1♀, 1♂; 8♀; 6♀, with 6 *Conioscinella halophila* Duda (Chloropidae) co-developing; 27♀ + 1 *Gelis proximus* (Foerster), probably a pseudohyperparasitoid; 1♀ + 4 emerged cocoons + 40♀, 3♂ of *Pediobius brachyurus* (Thomson) (Eulophidae) as gregarious pseudohyperparasitoids from a further 9 cocoons; 1♀ + 2 dead cocoons + 21♀, 3♂ *Pediobius brachyurus* as gregarious pseudohyperparasitoids from a further 3 cocoons), *Singa nitidula* C. L. Koch in *Phragmites* heads (broods of 4♀, 1♂; 2♀, 2♂; 2♀; 1♀, 2♂; 1♀, 1♂; 1♀; all France); unidentified spiders' egg sacs (broods of 3♀; 1♀; and a further 3♀, 3♂ comprising parts of several broods of unknown sizes). The preponderance of records from *Agroeca*, *Singa* and *Larinioides* is the result of sampling bias; the apparent difference in sex ratio from *Larinioides* in comparison with other hosts is perhaps worthy of further investigation. From most parasitised egg sacs of *Larinioides* and some of those of *Singa* a few spiderlings also emerged. *Gelis melanocephalus* has always emerged from egg sacs in the year of collection and the rearing data suggest that it is plurivoltine with overwintering adult females. Females are apterous; males macropterous.

Gelis melanogaster (Thomson)

This species is here recorded as British for the first time. Wales: 1♀, Anglesey, Llangristiolus, SH 4373 (V.C. 52), 7–27.viii.1982 (S. A. & D. C. Wilkinson) and 1♀ same locality, 30.vii.1987 (M. R. Shaw). Scotland: 1♀, Stirlingshire, Mugdock, 6.viii (P. Cameron). The Scottish specimen was misidentified as *Hemiteles tristator* Gravenhorst (now *Hemiteles bipunctator* (Thunberg)) and the record published by Cameron (1907). The females are macropterous; we have not seen males but they should also be macropterous if they occur.

Gelis melanophorus (Foerster, 1851) (= *Pezomachus fuscicornis* Foerster, 1850, preocc., syn. nov.; = *Pezomachus foersteri* Bridgman, 1886, preocc., syn. nov.)

Several specimens. England: V.C. 15. Scotland: V.C. 72, 76, 82, 85, 96. Ireland: V.C. H9. Specimens collected in ii and vi in open habitats. Reared from *Coleophora ramosella* Zeller (Lepidoptera: Coleophoridae) (1). The reared specimen emerged in the year of collection and a female specimen collected in February suggests that this species passes the winter as an adult. Females are apterous; males are brachypterous or macropterous.

We have seen the holotype of *Pezomachus melanophorus* Foerster and the lectotype of *Pezomachus foersteri* Bridgman. The identity of *Pezomachus fuscicornis* Foerster (type destroyed) is based on the description (cf. Schwarz, 1995). The holotype of *P. melanophorus* (listed as 'nomen dubium' by Schwarz (1995)) is a brachypterous male that agrees well with males reared experimentally by G. Salt.

***Gelis micrurus* (Foerster)**

Numerous specimens. **England:** V.C. 5, 14, 17, 19, 22, 27, 28, 33, 38. **Wales:** V.C. 41, 46, 49, 52. **Scotland:** V.C. 77, 92. Specimens collected from vii–viii, often on rather bare ground, but most specimens have been reared (earlier in the year in the case of overwintered cocoons) from egg sacs of spiders, Pisauridae: *Pisaura mirabilis* (Clerck) (broods of 3♀; 1♀; 2♂; 5♂; 4♂); Lycosidae: *Pardosa lugubris* (Walkenaer) (brood of 5♀), *Pardosa proxima* (C. L. Koch) (brood of 5♀), *Pardosa nigriceps* (Thorell) or *pullata* (Clerck) (broods of 2♀; 2♀; 2♀; 2♀; 1♀, 1♂; 2♀, 1♂), and unidentified lycosids (discrete broods of 3♀, 1♂; 3♂; plus 14♀, 4♂ bulk reared in gregarious broods of unknown sizes). *Gelis micrurus* is a gregarious parasitoid; in some of the broods from *Pisaura* emergence rates have been rather poor and usually about 4 to 6 cocoons were present. Although the rearing data show that *G. micrurus* is a plurivoltine species, a high proportion of broods are of only one sex, perhaps reflecting a fixed response to the seasonally poor prospect of sib-mating consequent on brood synchrony when *G. micrurus* passes the winter in the host sac. Females are apterous and males macropterous.

***Gelis mitis* Schwarz**

This species was recorded from England by Schwarz (1994) and it is on that basis that we include it in the check list.

***Gelis nigrifulus* (Zetterstedt) (= *terebrator* (Ratzeburg))**

Many specimens. **England:** V.C. 28. **Scotland:** V.C. 88, 108, 110, 111. Specimens collected from (vii)vii–viii, in very open habitats. Reared from cocoons of *Nepticula dryadella* Hofmann (Lepidoptera: Nepticulidae) (1) and *Cotesia tibialis* (Curtis) (Hymenoptera: Braconidae) (8:1). The rearing data indicate that *G. nigrifulus* is a plurivoltine species, passing the winter in the host cocoon. Females are apterous and we have seen apterous and brachypterous males.

***Gelis nitidus* Horstmann**

Horstmann (1986) included a paratype from England in his description of this species, and we include it in the check list on that basis.

***Gelis obesus* (Ashmead)**

Austria: 1♂, Kärnten, Hohe Tauern, Tauerneck, 47°04'N, 12°49'E, 6.ix.1994 (*M. Schwarz*). Females are apterous; males are brachypterous and probably macropterous.

***Gelis obscuripes* Horstmann**

Horstmann (1986) has already added this species to the British list.

Many specimens. **England:** V.C. 7, 22, 23, 29. **Wales:** V.C. 45, 46. **Scotland:** V.C. 96. Specimens collected from v–ix(?x), both in wetland habitats and ancient woodlands. Females are macropterous; males are unknown.

***Gelis papaveris* (Foerster) (= *hieracii* (Bridgman))**

Austria: 1♀, Salzburg. Females are apterous and males are brachypterous or macropterous.

***Gelis problemator* Aubert**

Schwarz (1994) has already added this species to the British list.

England: 1♀, Oxfordshire, Aston Rowant NNR (V.C. 23), 24.vi.1972, chalk scrub (P. J. Chandler). **Scotland:** 1♀, Dumbartonshire, Caldarvan, NS 4483 (V.C. 99), 27.vi-7.vii.1983, *Betula/Myrica* (I. C. Christie). Females are brachypterous and males are unknown.

Gelis proximus (Foerster, 1850) (= *analis* (Foerster); = *attentus* (Foerster); = *corruptor* (Foerster); = *hostilis* (Foerster); = *incubitor* (Foerster); = *ochraceus* (Foerster); = *tonsus* (Foerster); = *vigil* (Foerster); = *indagator* (Foerster); = *prudens* (Foerster); = *hyponomeutae* (Bridgman); = *Hemimachus ovatus* Bridgman, 1883, **syn. nov.**; = *Hemimachus rufipes* Bridgman, 1883, **syn. nov.**)

Numerous specimens. **England:** V.C. 2, 3, 7, 9, 11, 12, 14, 15, 19, 20, 22, 23, 27, 28, 58, 59, 61, 62, 69. **Wales:** V.C. 41, 45, 46, 49, 50, 52. **Scotland:** V.C. 77, 80, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 95, 96, 97, 98, 99, 103, 105, 110. **Ireland:** V.C. H9, H20. **Netherlands:** Gelderland, Noord-Holland. **Sweden:** Västmanland. **Switzerland:** Neuchâtel. British specimens collected from v-x. Reared from Lepidoptera (presumed primary parasitoid), Coleoptera (primary parasitoid), Diptera (presumed primary parasitoid), and Hymenoptera (pseudohyperparasitoid of Lepidoptera, Coleoptera and spiders' egg sacs) as follows. From Lepidoptera, Nepticulidae: *Fomoria weaveri* (Stainton) (1); Incurvariidae: *Incurvaria zinckenii* (Zeller) (3); Tineidae: *Psychoides filicivora* (Meyrick) (2); Bucculatricidae: *Bucculatrix capreella* Kroeber (2), *Bucculatrix cristatella* Zeller (1); Gracillariidae: *Caloptilia cuculipennella* (Hübner) (1), *Callisto coffeella* (Zetterstedt) (2, tentatively identified), *Phyllonorycter junoniella* (Zeller) (3, + Netherlands), *Phyllonorycter maestingella* (Müller) (1, Netherlands), *Phyllonorycter nigrescentella* (Logan) (1); Choreutidae: *Prochoreutis* sp. (1); ?Glyphipterigidae: dead stems of *Dactylis glomeratus* containing *Glyphipterix simpliciella* (Stephens) (2); Coleophoridae: *Coleophora saturatella* Stainton (1), *Coleophora serratella* (Linnaeus) (4), *Coleophora trochilella* (Duponchel) (1), *Coleophora sylvaticella* Wood (4), *Coleophora paripennella* Zeller (1), *Coleophora discordella* Zeller (1), *Coleophora solitariella* Zeller (3), *Coleophora ?alticoella* Zeller (1); Gelechiidae: *Anacampsis temerella* (Lienig & Zeller) (1); Scythrididae: *Scythris grandipennis* (Haworth) (1); Coleoptera, Curculionidae: *Cionus* sp. on *Scrophularia* (1); Diptera, Syrphidae: Syrphinae sp. indet. (1); Hymenoptera, Ichneumonidae: indet. Campopleginae/*Platypitia gonadactyla* ([Denis & Schiffermüller]) (1); Braconidae: *Coeloides scolyticida* Wesmael/*Scolytus scolytus* (Fabricius) or *multistriatus* (Marshall) (1), *Aleiodes borealis* (Thomson)/indet. Noctuidae (3), *Aleiodes ?nigricornis* Wesmael/indet. Noctuidae (1), *Aleiodes assimilis* (Nees)/*Zygaena purpuralis* (Brünnich) (3), *Aleiodes* sp./*Eupithecia pusillata* ([Denis & Schiffermüller]) (1), *Cotesia acuminata* (Reinhard)/*Euphydryas maturna* (Linnaeus) (1, Sweden), *Cotesia arctica* (Thomson)/*Aricia artaxerxes* (Fabricius) (3:1 + 1 *Gelis agilis* (Fabricius)), *Cotesia bignellii* (Marshall)/*Euphydryas aurinia* (Rottemburg) (1), indet. Microgastrinae (on *Urtica* and *Vaccinium*) (2). Additionally one specimen that emerged with 27 *Gelis melanocephalus* (Schrank) from an egg sac of *Larinioides cornutus* (Clerk) (Araneidae), in which it had presumably been a pseudohyperparasitoid via *G. melanocephalus*. *Gelis proximus* attacks various small cocoons and cocoon-like structures, especially in low vegetation. Although most of these rearings have been as primary parasitoids of

Lepidoptera, it is a regular parasitoid of cocoons of Ichneumonoidea and, in Austria, it has also been reared from Symphyta. All reared specimens emerged in the year of collection and *G. proximus* is almost certainly a plurivoltine species with overwintering adult females. Females are apterous and males are brachypterous or macropterous. *Gelis proximus* is a rather variable taxon across Europe, possibly a species aggregate. British specimens are like the normally dark western European forms in having relatively dense pubescence of the gaster, but they are much more variable in colour, with some specimens being even lighter than the central European form.

The interpretation of *Pezomachus proximus* Foerster is discussed by Schwarz (1995). We have seen the holotype (♂) of *Hemimachus ovatus* Bridgman, and we here designate the single syntype (cf. Fitton, 1976) (♂) of *Hemimachus rufipes* Bridgman that remains in the Bridgman collection at Norwich as lectotype: '98', 'Syntypus *Hemimachus rufipes* Bridgm. ♂' [K. Horstmann's manuscript], 'Lectotypus ♂ *Hemimachus rufipes* Bridgman des. Mart. Schwarz '98'.

***Gelis rotundiventris* (Foerster)**

Austria: 1 ♀, Salzburg. Females are apterous; males are macropterous.

***Gelis ruficornis* (Retzius) (= *agilis* auctt. nec (Fabricius))**

Numerous specimens. **England:** V.C. 15, 22, 69. **Scotland:** V.C. 72, 79, 782, 95, 111. **France:** Lot-et-Garonne. **Sweden:** Västmanland. British specimens collected in iv and from vi-x, occurring in woodlands and scrub. Reared (as a pseudohyperparasitoid of Lepidoptera and Coleoptera) from cocoons of Hymenoptera, Braconidae: *Coeloides scolyticida* Wesmael/*Scolytus scolytus* (Fabricius) or *multistriatus* (Marshall) (11), *Microplitis mandibularis* Thomson/indet. Noctuidae (3:1), *Cotesia acuminata* (Reinhard)/*Euphydryas maturna* (Linnaeus) (7, 6, 4, 3, 2, 1, 1, 1, all Sweden). Reared specimens have always emerged in the year of collection: rearing data suggest that *G. ruficornis* may be a plurivoltine species, probably with overwintering adult females. Females are apterous; males are brachypterous or macropterous.

***Gelis rufipes* (Foerster)**

England: 2 ♂, Norfolk, Santon Downham, TL 8188 (V.C. 28), heath with birch and pine, 20-30.vii.1985 (J. Field). **Germany:** 1 ♀, Baden-Württemberg. Females are apterous; the males are macropterous.

***Gelis rufogaster* Thunberg (= *carnifex* (Foerster); = *detritus* (Foerster); = *gracilis* (Foerster); = *lugubris* (Foerster); = *rufulus* (Foerster); = *unicolor* (Foerster); = *annulicornis* (Bridgman))**

Numerous specimens. **England:** V.C. 7, 17, 22, 27, 28, 38, 58, 70, 'York'. **Wales:** V.C. 45, 51, 52. **Scotland:** V.C. 76, 83, 88, 96, 105, 106. **Ireland:** V.C. H20, H40. Specimens collected from ii-x(?xi), in woodland and scrub. Reared from spiders' egg sacs: *Ero furcata* (Villers) (Mimetidae) (1) and unidentified spider egg sacs (3). Reared specimens have emerged in the year of collection and *G. rufogaster* appears to be a plurivoltine species in which the females overwinter as adults. Females are apterous and males are brachypterous or macropterous.

The lectotype (δ) of *Hemimachus annulicornis* Bridgman, 1883, is here designated: 'm', 'Syntype', 'Syntype δ *Hemimachus annulicornis* Bridgman 1883 det. M. G. Fitton, 1974', 'E. A. Fitch coll.', 'Lectotypus δ *Hemimachus annulicornis* Bridgman des. Mart. Schwarz '98', 'B.M. Type Hym. 3B.2209(b)' (BMNH). There are two paralectotypes (δ) of which one probably and the other possibly belongs to the same species as the lectotype. Bridgman (1883) suggested that *H. annulicornis* may be the same species as *Pezomachus juvenilis* Foerster (= *Gelis rufogaster* Thunberg), and Horstmann (1972) synonymised it with *G. rufulus* (Foerster) (= *G. rufogaster*).

Gelis rugifer (Thomson)

Several specimens. **England:** V.C. 69. **Wales:** V.C. 45. **Scotland:** V.C. 92, 98, 99. Collected in vii in bogs and fens. Reared from spiders' egg sacs, Clubionidae: *Clubiona reclusa* O. Pickard-Cambridge on *Myrica* (4), *Clubiona* sp. on *Myrica* (1). *Gelis rugifer* overwinters in its cocoon and is univoltine. Both sexes are macropterous.

Gelis seyrigi Ceballos

This species has already been recorded as British by Schwarz (1998).

England: 1 ♀, Norfolk, Morston Salt Marsh (V.C. 28), 13.viii.1980 (*M. R. Shaw*); 1 ♀, Kent, Faversham (V.C. 15), ex *Coleophora alticolella* Zeller or *glaucicolella* Wood (Lepidoptera: Coleophoridae) on *Juncus* sp., [em.] 1.vii.1967 (*E. S. Bradford*); 1 ♀, Kent, Nagden Marshes, TR 0362 (V.C. 15), ex unknown host on *Aster tripolium*, coll. 11.vi.1996, em. vii.1997 (*J. R. Langmaid*). **Spain:** 1 ♀, Zaragoza, Los Monegros, Retuerta de Pina, 9.vi.1991 (*J. Blasco-Zumeta*). In Britain *G. seyrigi* appears to be a salt marsh species and the Spanish locality, although inland, is also saline. Females are apterous; males are unknown.

Gelis spinula (Thomson)

England: 1 ♀, Suffolk, Brandon (V.C. 26), 4.vi.1903 (*C. Morley*). **Scotland:** 1 ♂, East Lothian, Dunbar (V.C. 82), 3.v.1983 (*K. P. Bland*); 1 ♀, Stirlingshire, Flanders Moss (V.C. 87), 5.vi.1996 (*M. R. Shaw*). **Ireland:** 1 ♀, Co. Cavan, Eighter, Lough Ramor (V.C. H30), 7.vi.1940 (*R. C. Faris*). The Suffolk specimen was determined as *Pezomachus nigritus* Foerster (= *Gelis exareolatus* (Foerster)) and recorded by Morley (1907: 199) from Brandon under that name. Females are apterous, as are the few males we have seen.

Gelis stevenii (Gravenhorst)

Morley (1907: 227) questioned the validity of Desvignes' (1856) record of this species from Britain. There is no British specimen now over that name in the BMNH and there have been no further British records of this mainly southern and eastern European species, which we consider is extremely unlikely ever to have occurred here. Therefore we have omitted it from the check list.

Greece: 1 ♀, Corfu. Females are apterous; we have seen no males.

***Gelis taschenbergii* (Schmiedeknecht)**

This nominal taxon was listed by Fitton *et al.* (1978) as a doubtfully placed species of *Hemiteles* Gravenhorst, but Horstmann (1983) has subsequently placed it in *Gelis*. As the only primary British record is that of Carr (1924), it was retained in error in the 1978 check list (cf. Fitton *et al.*, 1978: v-vi) and should have been deleted. The holotype is a macropterous male and has not been reliably associated with its female.

***Gelis thomsoni* (Schmiedeknecht)**

Fitton *et al.* (1978) listed this taxon as a doubtfully placed species in *Hemitel* Gravenhorst.

England: 1♀, Wiltshire, Savernake Forest, SU 2167 (V.C. 7), 15.viii-5.ix.1990. Females are brachypterous; males are not known.

***Gelis trux* (Foerster) (= *comes* (Foerster))**

England: 1♀, 1♂, Norfolk, Horsey (V.C. 27), ex egg sac of the spider *Philodromus cespium* (Walckenaer) (Philodromidae) on *Rubus*, coll. 1.viii.1988, em. 15.viii.1988 (*M. R. Shaw*) (from brood of 2♀, 2♂). **Wales:** Carnarfon, Cors Geirch, SH 3037 (V.C. 49), vii.1988 (*P. Holmes*). Both collection sites are reedbeds (*Phragmites*), but it is not restricted to such sites in Europe. The reared specimens are abnormally small. Females are apterous and males macropterous.

***Gelis viduus* (Foerster) (= *mandibularis* (Thomson))**

Numerous specimens. **England:** V.C. 14, 16, 24, 27, 40. **Wales:** V.C. 45, 46, 49, 50, 51. **Scotland:** V.C. 72, 76, 77, 79, 81, 82, 83, 86, 87, 88, 94, 97, 98, 105, 107, 110, St Kilda. **Ireland:** V.C. H40. Specimens collected in iv, from vi-x and in xii, most often where there are bushes. Reared from unidentified spider's egg sac (brood of 6♀). This appears to be a potentially plurivoltine species with females hibernating as adults. Females are apterous and we have seen both apterous and brachypterous males.

***Gelis vulnerans* (Foerster)**

Austria: 1♀, 1♂, Salzburg, Salzachau near Anif, 6.iv.1990 (♂) and 13.x.1990 (♀) (*M. Schwarz*).

***Gelis zeirapherator* (Aubert)**

This species is here recorded as British for the first time. **Scotland:** 1♀, Easter Ross, Beinn Dearg, NH 3177 (V.C. 106), 730 m, 17.vi.1988 (*I. MacGowan*). This species is otherwise known only from Switzerland and Austria. Both sexes are macropterous.

***Gelis* sp. A [new species in *lucidulus*-group]**

This species, which will be formally described elsewhere (*Schwarz*, in prep.), is here recorded as British for the first time. **Scotland:** 1♀, 4♂ (paratypes), Inverness-shire, Creag Meagaidh, NN 4185 (V.C. 97), 790 m, *Deschampsia* grassland, 16.v-18.vi.1983 (4♂) and 18.vi-10.vii.1983 (*D. Horsfield*); 1♂ (paratype), Inverness-shire,

Cairngorms, NN 9898 (V.C. 96), immobilised on snow, 24.iv.1982 (N. P. Ashmole). Evidently a montane species.

Gelis sp. B [new species in *bicolor*-group]

This species, which will be formally described elsewhere (Schwarz, in prep.), is here recorded as British for the first time. **England:** 2♀ (holotype, paratype), Shropshire, Whixall Moss (V.C. 40), x.1991 and ix.1991 (S. Tilling); 1♀ (paratype), Cumbria, Witherslack, Foulshaw Moss (V.C. 69), 24.vii.1992 (M. R. Shaw). Evidently a species of lowland raised bogs.

Summary

Distributional, phenological and, in many cases, rearing data are given for 62 species of western Palaearctic *Gelis* (Hymenoptera: Ichneumonidae, Cryptinae), based on about 2000 specimens in the National Museums of Scotland. Eight species are recorded from Britain for the first time. Taxonomic and nomenclatural remarks are made and the 1978 British check list is revised. Taxonomic changes proposed are: *Gelis formicarius* (Linnaeus) (= *Hemimachus confusus* Bridgman, 1883, **syn. nov.**), *Gelis meigenii* (Foerster) (= ? *Hemimachus rufotinctus* Bridgman, 1883, **syn. nov.**), *Gelis melanophorus* (Foerster) (= *Pezomachus fuscicornis* Foerster, 1850, preocc., **syn. nov.**; = *Pezomachus foersteri* Bridgman, 1886, preocc., **syn. nov.**), *Gelis proximus* (Foerster) (= *Hemimachus ovatus* Bridgman, 1883, **syn. nov.**; = *Hemimachus rufipes* Bridgman, 1883, **syn. nov.**), *Gelis rufogaster* Thunberg (= *Hemimachus annulicornis* Bridgman, 1883, synonymy confirmed). Lectotypes of *Hemimachus confusus* Bridgman, 1883; *Hemimachus rufipes* Bridgman, 1883; and *Hemimachus annulicornis* Bridgman, 1883, are designated.

Acknowledgements

Martin Schwarz was employed for a second term of three months at NMS as a Pelham-Clinton Memorial Fellow from funds available through the Pelham-Clinton Trust. For general acknowledgements concerning the origin of material in the NMS collection please see part 1 of this series (Schwarz & Shaw, 1998). We are indebted to the following for the loan of type specimens: M. G. Fitton and S. Lewis (The Natural History Museum, London (BMNH)), A. G. Irwin (Castle Museum, Norwich), C. Villemant (Muséum National d'Histoire Naturelle, Paris), E. Diller (Zoologische Staatssammlung, München); to G. Salt and W. A. Foster (University Museum of Zoology, Cambridge) for the loan of the Salt collection of mainly experimentally reared *Gelis*; and to M. G. Fitton and S. Lewis for loans from the BMNH collection. Finally we are grateful to Keith Bland for help in tracing localities, to Mike Fitton and Klaus Horstmann for their comments on a draft of the manuscript, and to Dot Hartley for her wordprocessing skills.

References

- Baarlen, P. van, Sunderland, K. D. & Topping, C. J. 1994. Eggsac parasitism of money spiders (Araneae, Linyphiidae) in cereals, with a simple method for estimating percentage parasitism of *Erigone* spp. eggsacs by Hymenoptera. *J. appl. Ent.* 188: 217–223.
- Baarlen, P. van, Topping, C. J. & Sunderland, K. D. 1996. Host location by *Gelis festinans*, an eggsac parasitoid of the linyphiid spider *Erigone atra*. *Entomologia exp. appl.* 81: 155–163.
- Bridgman, J. B. 1883. Further additions to Mr. Marshall's catalogue of British Ichneumonidae. *Trans. ent. Soc. Lond.* 1883: 139–171.
- Cameron, P. 1907. A contribution towards a knowledge of the Scottish Cryptinae (Ichneumonidae). *Ann. Scot. nat. Hist.* 1907: 88–93.
- Carr, L. A. 1924. The Ichneumonidae of the Lichfield District, Staffordshire. *Trans Rep. N. Staffs. Fld Club* 58: 1–70.
- Desvignes, T. 1856. *Catalogue of British Ichneumonidae in the collection of the British Museum* 120 pp. London.
- Fitton, M. G. 1976. The Western Palaearctic Ichneumonidae (Hymenoptera) of British authors. *Bull. Br. Mus. nat. Hist. (Ent.)* 32: 301–373.
- Fitton, M. G., Graham, M. W. R. de V., Bouček, Z. R. J., Fergusson, N. D. M., Huddleston, T., Quinlan, J. & Richards, O. W. 1978. A check list of British Insects (2nd Edition) Part 4: Hymenoptera. *Handbk Ident. Br. Insects* 11(4).
- Horstmann, K. 1972. Type revision of the species of Cryptinae and Campopleginae described by J. B. Bridgman (Hymenoptera: Ichneumonidae). *Entomologist* 105: 217–228.
- 1979. Typenrevision der von Gravenhorst beschriebenen oder gedeuteten *Hemiteles*-Arten (Hymenoptera, Ichneumonidae). *Polskie Pismo ent.* 49: 151–166.
- 1983. Typenrevision der von Schmiedeknecht beschriebenen *Hemiteles*-Arten (Hymenoptera, Ichneumonidae). *Mitt. münch. ent. Ges.* 72: 147–158.
- 1986. Die westpaläarktischen Arten der Gattung *Gelis* Thunberg, 1827, mit macropteren oder brachypteren Weibchen (Hymenoptera, Ichneumonidae). *Entomofauna* 7: 389–424.
- 1993a. Revision der brachypteren Weibchen der westpaläarktischen Cryptinae (Hymenoptera, Ichneumonidae). *Entomofauna* 14: 85–148.
- 1993b. Nachträge zu Revisionen der Gattungen *Aclastus* Förster, *Ceratophygadeuon* Viereck, *Chironica* Förster und *Gelis* Thunberg (Hymenoptera, Ichneumonidae, Cryptinae). *NachrBl. bayer. Ent.* 42: 7–15.
- Kloet, G. S. & Hincks, W. D. 1945. *A Check List of British Insects* 483 pp. Stockport.
- Morley, C. 1907. British Ichneumons. Cryptinae. *Ichneumonologia Britannica* 2: 1–351. Plymouth.
- Schwarz, M. 1994. Beitrag zur Systematik und Taxonomie europäischer *Gelis*-Arten mit macropteren oder brachypteren Weibchen (Hymenoptera, Ichneumonidae). *Linzer biol. Beitr.* 26: 381–391.
- 1995. Revision der westpaläarktischen Arten der Gattungen *Gelis* Thunberg mit apteren Weibchen und *Thaumatogelis* Schmiedeknecht (Hymenoptera, Ichneumonidae). Teil 1. *Linzer biol. Beitr.* 27: 5–105.
- 1998. Revision der westpaläarktischen Arten der Gattungen *Gelis* Thunberg mit apteren Weibchen und *Thaumatogelis* Schmiedeknecht (Hymenoptera, Ichneumonidae). Teil 2. *Linzer biol. Beitr.* 30: 629–704.
- Schwarz, M. & Boriani, M. 1994. Redescription of *Gelis longulus* (Hymenoptera: Ichneumonidae), a parasitoid of *Ocnerostoma piniariellum* (Lepidoptera: Yponomeutidae). *Eur. J. Ent.* 91: 331–334.
- Schwarz, M. & Shaw, M. R. 1998. Western Palaearctic Cryptinae (Hymenoptera: Ichneumonidae) in the National Museums of Scotland, with nomenclatural changes, taxonomic notes, rearing records and special reference to the British check list. Part 1. Tribe Cryptini. *Entomologist's Gaz.* 49: 101–127.