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)

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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 sacks, inside which the spider's eggs are successively devoured by the parasitoid larva or larvae. The species that parasiitise spiders' egg sacks are invariably entirely specialised to that host group: other Gelis species appear never to use spiders' egg sacks 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 sacks). It is useful, from a population dynamics viewpoint, to recognise that the latter is a form of

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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 aterous, male always macropterous; (6) female
always aterous, male either macropterous or brachypterous; (7) female always
aterous, male either macropterous, brachypterous or aterous. 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

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*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. alpicagus* (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 *Thaumatogelis* Schmiedeknecht (Schwarz, 1995): *aquisgranensis* (Foerster), *pilosus* (Capron), *sylvicola* (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

*aclarorum* (Linnaeus, 1758)

*caetus* (Foerster, 1850)

*fraudulentus* (Foerster, 1850)

*agilis* (Fabricius, 1775)

*instabilis* (Foerster, 1850)

*albicinctoides* Schwarz, 1998

*albipalpus* (Thomson, 1884)

*anthracinus* (Foerster, 1850)

*gonatopimus* (Thomson, 1884)

*areator* (Panzier, 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)

*nigritus* (Foerster, 1850)

*falcatus* Horstmann, 1986

*fallax* (Foerster, 1850)

*nigricornis* (Foerster, 1850) preocc.

*fasciintinctus* (Dalla Torre, 1901)

*festinans* (Fabricius, 1798)

*pubulus* (Foerster, 1850)

*tener* (Foerster, 1850)

*formicarius* (Linnaeus, 1758)

*confusus* (Bridgman, 1883)

*forticorns* (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)

*kiparae* (Giraud, 1863)

*illicicola*tor Aubert, 1966

*longicauda* (Thomson, 1884)

*longulus* (Zetterstedt, 1838)

*luicidulus* (Foerster, 1850)

*mangeri* (Gravenhorst, 1815)

*fulveolatus* (Gravenhorst, 1829)

*foersteri* (Bridgman, 1882)

*meigenii* (Foerster, 1850)

*insolens* (Foerster, 1850)

*rufocinctus* (Bridgman, 1883)

*melanocephalus* (Schrank, 1781)

*melanogaster* (Thomson, 1884)

*melanophorus* (Foerster, 1851)

*foersteri* (Bridgman, 1886) preocc.

*micruus* (Foerster, 1850)

*mitis* Schwarz, 1994

**mutillatus** (Gmelin, 1790)

*mutillarius* (Fabricius, 1787) preocc.

*vagans* (Olivier, 1792)

*pedicularius* (Fabricius, 1793)

*nigritulus* (Zetterstedt, 1838)

*tebrator* (Ratzeburg, 1848)

*nitidus* Horstmann, 1986

*obscures* Horstmann, 1986

*paepervis* (Foerster, 1856)

*hieraci* (Bridgman, 1883)
problemator Aubert, 1989
proximus (Foerster, 1850)
analis (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)
umicolor (Foerster, 1850)
amulinicorns (Bridgman, 1883)
rugiifer (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))

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: *Calopila cuculipennella* (Hübner) (1), *Aspilapteryx tringipennella* (Zeller) (2), *Phyllopronocyter junoniiella* (Zeller) (1); Choreutidae: *Tebenna micalis* (Mann) (1), *Prochoreutis* sp. on *Scutellaria galericulata* (1); ?Glyphipterigidae: dead stem of *Dactylis glomeratus* containing *Glyphipteris simpliciella* (Stephens) (1); Coleophoridae: *Coleophora gryphiipennella* (Hübner) (1), *Coleophora pyrrhulipennella* Zeller (1), *Coleophora idaeella* Hofmann (3), *Coleophora saturatella* Stainton (4), *Coleophora genistae* Stainton (1), *Coleophora conspicuella* Zeller (1), *Coleophora albidella* (Denis & Schiffermüller) (1), *Coleophora oitae* Zeller (1), *Coleophora serratella* (Linnaeus) (3), *Coleophora onosmella* (Brahm) (1), *Coleophora vimitella* Zeller (1), *Coleophora spp.* (Imula, Prunus) (2); ?Occophoridae: ?Agonopterix sp. on *Daucus carota* (1); Gelechiidae: *Nathris congressiella* (Brund) (1); ?Pyralidae: ?*Udea prunalis* ([Denis & Schiffermüller]) (1); Pterophoridae: *Platyptila gonodactyla* ([Denis & Schiffermüller]) (1), indet. Pterophoridae (1); Coleoptera, Curculionidae: *Hypera* sp. (1); Hymenoptera, Ichneumonidae: *Alicma orbitalae* (Gravenhorst)/*Zygaela lonicerae* (Scheven) (1), *Alcma orbitalae/Zygaela trifoli* (Esper) (4), *Charops cantator* (Degener)/*Zygaela lonicerae* (5 + broods of 2♀ and 2♂, Sweden), *Charops cantator/Zygaela lonicerae* or *foliendulae* (Linnaeus) (1, Sweden), *Scirites robusta* (Woldstedt)/*Orthosia gracill* ([Denis & Schiffermüller]) (1), *Diadega holopyga* (Thomson)/*Calibites phasianipennella* (Hübner) (1, France), indet. Campopleginae/*Curra vinula* (Linnaeus) (1), indet. Campopleginae on *Myrica* (brood of 2♀), indet. Campopleginae on *Crataegus* (1), *Hercus fontinalis* (Holmgren)/indet. microlepidopteron on *Alnus* (1); Braconidae: *Braccon* sp./*Hadena bicurris* (Hufnagel) (1, France), *Aleiodes assimilis* (Necs)/*Zygaela purpurralis* (Brünnich) (5), *Aleiodes assimilis/Zygaela exulans* (Hohenwarth) (1, Sweden), *Aleiodes pallidator* (Thunberg)/*Leucoma salicis* (Linnaeus) (2), *Aleiodes alternator* (Necs)/*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)/*Arcia 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, 1, 1, 1, 1, Sweden), *Cotesia acuminatae/Melitaea phasebe* ([Denis & Schiffermüller]) (1, France), *Cotesia melitaeaerum* (Wilkinson)/*Euphydryas aurinia* (Rottemburg) (3:1), *Cotesia melitaeaerum* (5:1, Sweden), *Cotesia bignelli* (Marshall) (7:1, France), *Cotesia vanessae* (Reinhard)/*Aglais urticae* (5, 3), *Cotesia villana* (Reinhard) (1), *Cotesia zygazarium* (Marshall)/*Zygaela filiendulae* (Linnaeus) (7, 5, 6, 3, 3, 3, 2, 2, 2, 1), *Cotesia ?zygaenariae* (6, 1, 1), *Cotesia limbata* (Marshall)/*Abraxas grossulariata* (Linnaeus) (2:1), *Cotesia sp.* (8:1), *Cotesia sp.* (1), *Pholetesor sp./Calibites 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* Necs/*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* (Schrank), which was abundant in other similarly placed places (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 apterus.

**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 apterus 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* (Ratzburg) (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 alpivagus** (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); Morphidae: *Morphia miscella* ([Denis & Schiffermüller]) in *Helianthemum* (1), coll. 17.v.1998, em. 25.ix.1998; and also from a cocoon of Hymenoptera, Braconidae: *Cotesia sygaenarum* (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))

(1), Rasivalva calceata (Haliday)/Thera sp. (6), Dolichogenidea longicauda (Wesmael)/Choreutis pariana (1), indet. Microgastrinæa/Swammerdamia caesiella (Hübner) (1), indet. Microgastrinæa/Agriops spp. (2), indet. Microgastrinæa/Caloptilia syringella (1), indet. Microgastrinæa (7). In addition a single specimen was reared from an egg sac of a spider, Agroeca sp. (Lioceranidae), during an extensive survey of parasitoids of this species and was probably a pseudohyperparasitoid via one or other of the ichneumonids Bathy thrithrix 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 glaucocolella (Wood) (5, includes 2♂), Coleophora ?glaucocolella on Juncus maritima (2), Coleophora alitocella 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 alitocella (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 Hemiptera Gravenhorst.

*Phragmites* C. L. Koch (Clorionidae) 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.vi.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. (Dictyidae) (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. 77, 82, 86, 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 vitella* (Linnaeus) (1); Braconidae: *Cotesia melanoscela* (Ratzburg)/ *Leucoma satius* (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 *Xerocnephia*

_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 vi–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 curtisana_ (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 curtisana_ 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 disceden**s (Foerster) (= vagnes 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–vii, in Germany ix–x. Reared from egg sacs of spiders, Tetragnathiidae: ?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. disceden 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, Llangrishiolius, 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) (= nigritus (Foerster))

Numerous specimens. **England**: V.C. 15, 59, 70. **Scotland**: V.C. 86, 88, 89, 96. **Austria**: Niederösterreich. **Germany**: Schleswig-Holstein. **Norway**: Nordseik Tsoerninge. Specimens collected in v. Reared from Lepidoptera, Coleophoridae: Coleophora alticolella Zeller (40, + Austria, Germany, Norway), Coleophora glaucicolella Wood (2), Coleophora alticolela 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 fasciinctus* (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 brunnnea* (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 forficorns* (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); = impotent (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. Rearing from Lepidoptera (presumed primary parasitoid) and Hymenoptera (pseudohyperparasitoid of Lepidoptera and spiders' egg sacs) as follows. From Lepidoptera, Coleophoridae: _Coleophora ramosella_ Zeller (1), _Coleophora ranatipennella_ (Hübner) (1), _Coleophora serratella_ (Linnaeus) (2, Germany); Oecophoridae: _Depressaria pastinacella_ (Duponchel) (1); pupa of Lepidoptera on _Angelica sylvestris_ (1); Hymenoptera, Ichneumonidae: _Barichneumon heraciana_ (Bridgman)/ _Depressaria pastinacella_ (2), indet. Campoplegidae/ _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 discens_ (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)


**Gelis intermedius** (Foerster)

Morley (1907) gave British localities for _G. intermedius_ (as _Pezomachus_), but Kloeot & 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 *ficus* (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** (Feuersteiner)

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

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


We have seen the holotype of *Hemiteles liparcae* Giraud, and the lectotype of *Hemiteles pulchellus* var. *ilicicola* Seyrig, and we base our interpretation of *Gelis ilicicolar* 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. ilicicolar* (0.9) and *G. ilicicola* (1.1–1.2) by Horstmann (1986). Males of *G. ilicicolar* (now *liparae*) 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)

species which has been collected several times on the trunks of deciduous trees. Reared from *Ypsolophia* 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 (pseudohyperparasitoid of Lepidoptera and spiders’ egg sacs) as follows. From Lepidoptera, Psychidae: *Dahlia 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), *Hemitelis similis* (Gmelin)/egg sac Araneidae on *Myrica* (1), *Hemitelis similis* (Gmelin)/egg sac Araneidae on *Myrica* (1), *Hemitelis similis* (Gmelin)/egg sac Araneidae on *Myrica* (1), *Hemitelis similis* (Gmelin)/egg sac Araneidae on *Myrica* (1), *Hemitelis similis* (Gmelin)/egg sac Araneidae on *Myrica* (1), *Hemitelis similis* (Gmelin)/egg sac Araneidae on *Myrica* (1), *Hemitelis similis* (Gmelin)/egg sac Araneidae on *Myrica* (1), *Hemitelis similis* (Gmelin)/egg sac Araneidae on *Myrica* (1), *Hemitelis similis* (Gmelin)/egg sac Araneidae on *Myrica* (1), *Hemitelis similis* (Gmelin)/egg sac Araneidae on *Myrica* (1), *Hemitelis similis* (Gmelin)/egg sac Araneidae on *Myrica* (1), *Hemitelis similis* (Gmelin)/egg sac Araneidae on *Myrica* (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 *Catalythus* 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 *Gongylidium rufipes* (Sundevall) or *Hyponoma cornutum* (Blackwall) on *Salix* (1). Adult females hibernate. 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), *Pachythele villosella* (Ochsenheimer) (1), sp. indet. (1); Glyphipterigidae: *Glyphipterix hauorthana* (Stephens) (1); Coleophoridae: *Coleophora discordella* Zeller (1); Tortricidae: sp. indet. (pupa) on *Myrica* (1); Nymphalidae: *Melicta athalia* (Rottemburg) (pupa) (1); Coleoptera, Curculionidae: *Hypera plantaginis* (De Geer) (1); Hymenoptera, Ichneumonidae: *?Gambus* sp./*Zygaena filipendulae* (Linnaeus) (1), *Alcima orbitale* (Gravenhorst)/*Zygaena filipendulae* (3), *Alcima orbitale/Zygaena trifoli* (Esper) (4), *?Alcima orbitale/Zygaena* sp. (2), indet. Campopleginae/?*Pseudotorpna pruinata* (Hufnagel) (1), indet. Campopleginae in grassland (2); Braconidae: *Aleiodes alternator* (Nees)/*Arctica caja* (Linnaeus) (1), *Aleiodes alternator/Philudoria potatoria* (Linnaeus) (3), *Aleiodes alternator/Lasiocampa quercus* (Linneaus) (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 trifoli*) 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 vii–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♀; 2♀, 7♂; 1♀, 1♂; 1♀, 3♂; 1♂, 1♂; 5♀; 6♀, 4♂; 1♀; 1♀; the foregoing all British; 1♀ + 1 Thaumatogelis 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 Conicoscinella 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 melanoccephalus 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 Hemitelis tristata Gravenhorst (now Hemitelis bipunctata (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.; = Pseudomachus 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 nigritulus** (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. nigritulus* 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 vi–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 problematicus Aubert

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


Gelis proximus (Foerster, 1850) (= analis (Foerster); = attenus (Foerster); = corruptor (Foerster); = hostilis (Foerster); = incubitor (Foerster); = ochraceus (Foerster); = tonsus (Foerster); = vigil (Foerster); = indagator (Foerster); = prudens (Foerster); = hyponomeuta (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 szökenii* (Zeller) (3); Tineidae: *Psychodes filicóra* (Meyrick) (2); Bucculatricidae: *Bucculatrix capreella* Krogerus (2), *Bucculatrix cristatella* Zeller (1); Gracillariidae: *Caloptilia cuculipennella* (Hübner) (1), *Callisto coffeella* (Zetterstedt) (2, tentatively identified), *Phyllonycter junoniella* (Zeller) (3, + Netherlands), *Phyllonycter maestingella* (Müller) (1, Netherlands), *Phyllonycter nigrescentella* (Logan) (1); Choreutidae: *Prochoreutis* sp. (1); ?Glyphipterigidae: dead stems of *Dactylis glomeratus* containing *Glyphipterix simpliciella* (Stephens) (2); Coleophoridae: *Coleophora saturaella* 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 ?alticolella* Zeller (1); Gelechiidae: *Anacampsis temerella* (Lienig & Zeller) (1); Scythridiidae: *Scythris grandipennis* (Haworth) (1); Coleoptera, Curculionidae: *Cionus* sp. on *Scrophularia* (1); Diptera, Syrphidae: *Syrphinae* sp. indet. (1); Hymenoptera, Ichneumonidae: indet. Campopleginae/Platypilina gonadactyla ([Denis & Schiffermüller]) (1); Braconidae: *Coeloctes sphyricus* Wesmael/Scytus scolytus (Fabricius) or *multistriatus* (Marsham) (1), *Aleioidea borealis* (Thomson)/indet. Noctuidae (3), *Aleioidea ?ignicorvus* Wesmael/indet. Noctuidae (1), *Aleioidea assimilis* (Nees)/Zygaena purpuralis (Brünnich) (3), *Aleioidea sp./Euphthemia 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 bignelli* (Marshall)/Euphydryas aurinia (Rottemburg) (1), indet. Microgastrinae (on *Urtica* and *Vaccinium*) (2). Additionally one specimen that emerged with 27 *Gelis melanoccephalus* (Schrank) from an egg sac of *Larinioides cornutus* (Clerck) (Araneidae), in which it had presumably been a pseudohyperparasitoid via *G. melanoccephalus*. *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_ Bridg. ♂' [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, 282, 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 pseudohyper-parasitoid of Lepidoptera and Coleoptera) from cocoons of Hymenoptera, Braconidae: _Coeloidea scolytica_ Wesmael/Scolytus scolytus (Fabricius) or _multistriatus_ (Marsham) (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 (T. 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 (♂) of Hemimachus annulicornis Bridgman, 1883, is here designated: ‘m’, ‘Syntype’, ‘Syntype ♀ Hemimachus annulicornis Bridgman 1883 det. M. G. Fitch, 1974’, ‘E. A. Fitch coll.’, ‘Lectotypus ♀ Hemimachus annulicornis Bridgman des. Mart. Schwarz ’98’, ‘B.M. Type Hym. 3B.2209(b)’ (BMNH). There are two paralectotypes (♂) 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 rugogaster Thunberg), and Horstmann (1972) synonymised it with G. rufulus (Foerster) (= G. rugogaster).

**Gelis rugifer** (Thomson)


**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 alitolella Zeller or glaucicolella Wood (Lepidoptera: Coleophoridae) on *Juncus* sp., [em.] 1.vii.1967 (E. S. Bradford); 1 ♀, Kent, Naden 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 nigrius 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 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 *Hemitelus* 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 *Hemitelus* Gravenhorst.


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 cespitum* (Walckenaer) (Philodromidae) on *Rubus*, coll. 1.viii.1988, em. 15.viii.1988 (M. R. Shaw) (from brood of 2♀, 2♂). _Wales:_ Carnarvon, Cors Gethch, 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 Dearn, 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 Meagaindh, 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,

**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, preoc., syn. nov.; = *Pezomachus foersteri* Bridgman, 1886, preoc., 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.

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