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British and European *Phytodietus* Gravenhorst (Hymenoptera: Ichneumonidae, Tryphoninae) in the National Museums of Scotland, with a key to European species of the subgenus *Neuchorus* Uchida and descriptions of three new species

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Synopsis

The identified British and European material belonging to the ichneumonid genus *Phytodietus* in the National Museums of Scotland (NMS) is detailed. Six species are newly recorded from Britain, and a key is provided to the European species of the subgenus *Neuchorus*, of which three species are newly described on the basis of specimens in NMS and the Zoological Institute, St Petersburg.

Key words: *Phytodietus*, *Neuchorus*, *maculator* sp. nov., *nemoralis* sp. nov., *tauricus* sp. nov., Tryphoninae, Ichneumonidae, hosts, western Palaearctic.

Introduction

Although the genus *Phytodietus* Gravenhorst, 1829, is easy to recognise, separation of the species has always been difficult and, despite the many attempts to key the European or Palaearctic species in part or in whole (Šedivý, 1961; Kerrich, 1962; Tolkanitz, 1973; Kasparyan, 1993; Kasparyan & Tolkanitz, 2000), determination has remained problematical.

Examination of the material present in the National Museums of Scotland (NMS) and the Zoological Institute in St Petersburg (ZISP) has revealed three new European species in the subgenus *Neuchorus* Uchida, 1931 (which are described below), and this has prompted the new key to the European species of that subgenus presented here. Terminology follows Townes (1969).

We also give an account of the *Phytodietus* s.l. material present in NMS, providing data on distribution and phenology of 12 species represented from Britain (six of which are recorded from Britain for the first time) and similar data on a further five species represented only by specimens from elsewhere in Europe. Nomenclature follows Yu & Horstmann (1997), updated according to Horstmann (1998; 2000*a*; 2000*b*), where necessary. In expressing voltinism we use the term 'plurivoltine' simply to signify more than one annual generation; it does not necessarily imply more than two. Data are presented in full when

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there are reared or few specimens, and for all species new to Britain, but in condensed form otherwise.

Reared material of eight identified species is present in the collection, and firm host records are given for seven. Nevertheless, in the subgenus *Phytodietus*, about 20 specimens of each sex (including 17 reared from various Tortricidae) remain unidentified and have not been listed. These mostly belong to the poorly characterised *Phytodietus gelitorius*/*montanus*/*polyzonias* species-group. The impression gained from the host data is that several species have broad host ranges, but that more reared material might reveal clear regular associations at the host family or habitat level for some species.

Phytodietus species are solitary koinobiont ectoparasitoids of 'Microlepidoptera' larvae living in leaf-spinnings and similar semi-concealed situations. According to Simmonds (1947), who studied a North American species attacking a rather unusually deeply concealed host, the host is stung and temporarily paralysed, enabling the adult female parasitoid to place her eggs with precision. The egg is anchored externally, and usually ventrally in this species, to one of the thoracic segments of the final instar host larva, and the egg often hatches before the host has finished feeding. [The following is based also on our own observations of additional species.] The egg is pale yellowish; the first instar larva remains partly within the egg shell, and successive instars also remain attached to the host at this position, through the sloughed larval skins that build up caudally, until in its final instar the parasitoid larva breaks free and completes its feeding, leaving only the skin of its host unconsumed. However, the parasitoid larva delays the final destruction of the host until the latter has prepared its pupation chamber, and it is there that the parasitoid makes its firm, ovoid, honey-brown and sometimes centrally banded or semi-translucent cocoon. Most hosts of *Phytodietus* live and pupate semi-concealed in leaf spinnings etc., so cocoons of most species are usually formed in these above-ground situations. The winter is spent in the cocoon, but many species are plurivoltine. Species of another tribe of Tryphoninae parasitising semi-concealed 'Microlepidoptera', the Oedemopsini, behave rather similarly but most construct much less substantial cocoons from which they emerge quickly. Fitton & Ficken (1990) provide a key to the British Oedemopsini.

Key to European species of *Phytodietus* subgenus *Neuchorus*

1 Fore wing without areolet. Hind wing often with nervellus not intercepted and discoidella absent (but sometimes discoidella present, intercepting nervellus) ..... subgenus ***Weisia*** Schmiedeknecht, 1907
[There are four Western Palaearctic species: *Ph. bayeri* Gregor, 1935 (Czechoslovakia), *Ph. elegans* Schmiedeknecht, 1907 (Tunisia), *Ph. rhodopaea* Kolarov, 2003 (Bulgaria) and *Ph. januszi* Kostro-Ambroziak, 2007 (Poland). They are keyed by Kostro-Ambroziak (2007)].

– Fore wing with areolet. Hind wing with nervellus always intercepted by discoidella 2

2 Tergite 1 gradually narrowing to base from apex, usually 1.3–1.5 times (1.0–1.7) as long as wide, its dorsolateral margins sharp. Epomia usually absent or indistinct. Flagellum usually with 30–35 segments (in *Ph. antennator* Kasparyan and sometimes in *Ph. geniculatus* Thomson up to 39–41 segments in

large specimens). Frontal orbits usually black except for yellow stripe between ocellus and eye (often yellow in *Ph. polyzonias* (Forster) only). Hind tibia with or without whitish basal spot. Mesopleurum without punctures (except for *Ph. astutus* Gravenhorst) …… ..... [subgenus ***Phytodietus*** s. str.]

– Tergite 1 strongly narrowed anterior to spiracles, about 2 times (1.6–2.7) as long as wide (Fig. 7), its dorsolateral margins behind spiracles usually rounded. Epomia distinct. Flagellum with 36–44 segments (except for *Ph. maculator* sp. nov. with 34 segments). Frontal (and often facial) orbits yellow. Hind tibia without white spot at base. Mesopleurum with fine but discernible punctures [subgenus ***Neuchorus*** Uchida, 1931] 3

3 Flagellum with 34 segments. Hind coxa black and whitish yellow (Figs 11–13). Scutellum entirely yellow dorsally (Fig. 7). Male flagellum reddish brown, not darkened apically; flagellar segments 15–22 (–25) at apical half with a thickened sensillary area (Fig. 5). – Habitus: Fig. 16 – England .... ***Ph***. (***Neuchorus***) ***maculator*** sp. nov.

– Flagellum with at least 36 segments (usually with 38–40). Hind coxa red or black, or red with black marks. Scutellum of female predominantly black dorsally. Male flagellum with at least five apical segments blackish; sensillary areas on flagellar segments not convex (in *Ph. obscurus*), or distinctly projecting on segments about 15 to 30 or more (in *Ph. tauricus*, Fig.6) 4

4 Males (males of *Ph. nemoralis* are unknown) 5

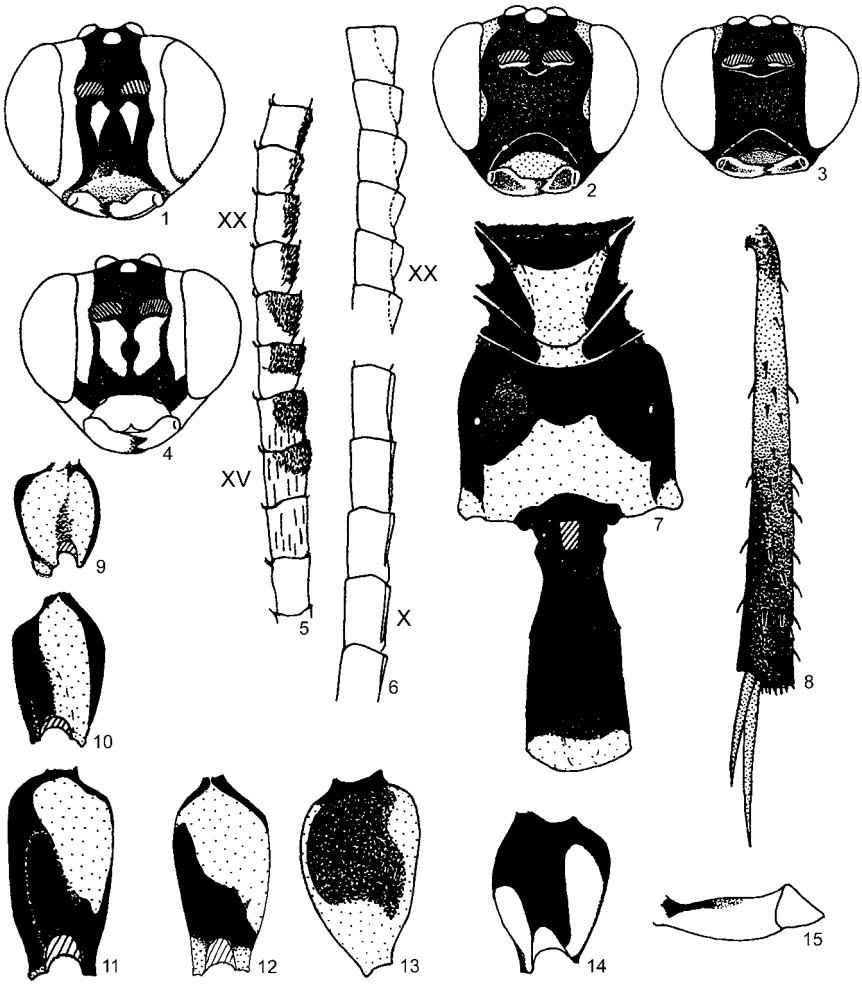
– Females 7

5 Flagellum pale rufous or reddish brown at least ventrally, always blackish at apex, filiform, with trichoid sensillae discernible from apex of flagellar segments 7–9 to subapical segments, areas with sensillae not projecting. Malar space about 1.0 as long as basal width of mandible. Base of first tergite marked with yellow. Hind tarsal segments dark brown, at extreme base and apex reddish or pale brown. Scutellum entirely yellow dorsally. Propodeum with a broad subapical transverse yellow band) .... ***Ph***. (***N***.) ***obscurus*** (Ratzeburg, 1852) (= *rufipes* Holmgren, 1860)

– Flagellum uniformly black or brown (except one or two basal segments reddish ventrally); segments from about 12–15 to 30–35 with tyloids, each forming a longitudinal projection at apical half of segment, making ventral side of flagellum appear saw-like (stronger in *Ph. tauricus* – Fig. 6). Malar space about 0.6 as long as basal width of mandible. Base of first tergite black. Hind tarsal segments 1–3 unicolorous blackish 6

6 Propodeum beyond middle almost entirely yellow (except for a small apical black median spot). Scutellum almost completely yellow above. Mesopleurum in lower half and mesosternum predominantly yellow. Parameres short, rather broad, with dorsal and lower margins subparallel, with a small dorsal excision ..... ***Ph.*** (***N.***) ***elongator*** Aubert, 1963

– Propodeum almost entirely black or with a pair of posterolateral yellow spots that are sometimes connected by a thin yellow line. Scutellum black dorsally with basolateral yellow spots and with yellow apex (sometimes dorsolateral margins completely yellow). Mesopleurum in lower half predominantly black, mesosternum with black spots. Parameres longer, tapered to apex .... ***Ph.*** (***N***.) ***tauricus*** sp. nov.



Figs 1–15. *Phytodietus*, subgenus *Neuchorus* (except for Fig. 4 – *Phytodietus* s.str.). 1–4, head, anterior view of (1) *Ph. maculator* sp. nov., (2) *Ph. obscurus* Ratzeburg, (3) *Ph. elongator* Aubert, (4) *Ph. polyzonias* (Forster). 5, 6, middle flagellar segments of male of (5) *Ph. maculator* sp. nov., (6) *Ph. tauricus* sp. nov. 7–13, *Ph. maculator* sp. nov. (7–11 female; 12, 13 male): 7, hind part of thorax and base of abdomen, dorsal view; 8, hind tibia; 9–11, coxae of female (9, 10, 11 – fore, middle and hind coxae); 12, 13, hind coxa of male (12 – dorsal view, 13 – posterior view). 14, 15. *Ph. nemoralis* sp, nov., female: 14, fore coxa, dorsal view; 15, fore trochanters, anterior view.

7 Hind coxa entirely or partly black dorsally; fore and mid coxae usually black. Ovipositor sheath 1.4–1.5 times as long as hind tibia. First tergite about 1.6-1.7 times as long as wide. Mesosoma (except for yellow spots on scutellum) and metasoma entirely black. – Crimea and Caucasus ... ***Ph.*** (***N.***) ***tauricus*** sp. nov.

– Hind coxa entirely red and/or ovipositor sheath shorter (0.85–1.25 times as long as hind tibia); fore and mid coxae often red. First tergite about 2 times as long as wide 8

8 Mesoscutum with a yellow anterolateral spot. Ovipositor sheath about 1.15–1.25 times as long as hind tibia. Face without yellow orbital marks. Cheeks strongly convergent beneath (Fig. 3). Hind tarsal segments unicolorous blackish. Propodeum with yellow marks; metasomal tergites with broad, white apical band. All coxae red ..... ***Ph.*** (***N.***) ***elongator*** Aubert, 1963

– Mesoscutum completely black. Ovipositor sheath about 0.85–1.15 times as long as hind tibia. Face often with yellow orbital marks. Cheeks more weakly convergent beneath (Fig. 2). Hind tarsus brownish or blackish, its segments reddish or pale brown at extreme base and apex. Propodeum entirely black or with yellow marks; metasomal tergites black or with white apical band. All coxae red, or fore and mid coxae entirely or partly black 9

9 Hind tibia rufous or reddish with apical 0.2–0.4 fuscous. Face with distinct yellow mark on facial orbits (sometimes inner orbits entirely yellow); temples near middle with a yellow stripe on orbits. Propodeum entirely black or with yellow marks. Fore coxa and trochanter usually entirely red, but coxa may be black or blackish with red marks, trochanters can be reddish yellow with dorsal blackish stripe. Hind tarsus usually fuscous with extreme base and apex of segments 1–4 rufous ..... ***Ph***. (***N***.) ***obscurus*** (Ratzeburg, 1852)

– Hind tibia dirty greyish anterodorsally, predominantly dirty whitish yellow posteroventrally; its apical 0.4 and basal dorsal spot (0.2) blackish. Yellow facial mark on orbits usually very small and narrow; temples may be entirely black. Propodeum with a yellow, transverse median band. Fore coxa (and usually mid coxa) black with a whitish apical spot dorsally (Fig. 14); fore trochanter I yellow with a wedge-like dorsal blackish stripe (Fig. 15). Hind tarsus blackish; basal 0.2 of hind basitarsus and basal 0.4 of hind spurs white. – France .... ***Ph***. (***N***.) ***nemoralis*** sp. nov.

***Phytodietus* (*Neuchorus*) *maculator* sp. nov.**

(Figs 1, 5, 7–13, 16)

Phytodietus maculator is distinct from other species of the subgenus *Neuchorus* in having the flagellum 34-segmented (37–44 flagellar segments in other Palaearctic species of the subgenus), the scutellum completely yellow dorsally and the coxae black and yellow (Figs 9–13). The male of this species may easily be distinguished by the pattern of coloration of the hind coxae (Figs 12, 13) and by the presence of convex sensillary areas on about flagellar segments 15–22 (–25) (Fig. 5); somewhat similar structures (tyloids) are formed on flagellar segments in the male of *Ph. tauricus* (Fig. 6), but in that species the flagellum is black and these structures extend to the apical segments of the flagellum.

Fig. 16. *Phytodietus maculator* sp. nov. Habitus and colour pattern of female.

Female (holotype). Fore wing 6.0 mm long. Antenna with 34 flagellar segments; the two basal flagellar segments together 0.8 times as long as maximum diameter of eye; flagellum 6.2 mm long. Temples strongly and almost linearly narrowed behind eyes. Face matt with distinct and dense fine punctures, laterally at upper half impressed, rather convex medially. Clypeus strongly convex, impressed before lower margin, the latter weakly bilobed; basal part of clypeus smooth with moderately large, sparse punctures. Malar space 0.6 times as long as basal width of mandible. Epomia present as a short carina crossing the transverse pronotal impression. Notauli sharp on anterior slope of mesoscutum. Prepectal carina present on mesosternum, short and indistinct on mesopleurum. Mesopleurum with very fine, but discernible and rather dense punctures, below subtegular ridge smooth and almost impunctate; speculum large, polished, without hairs. Metapleurum matt, with very fine punctures. Propodeum smooth and shiny. Hind femur 6.0 times as long as its lateral width; proportion of hind tarsal segments 7.5 : 3.7 : 2.7 : 1.5 : 2.1 (3rd segment about 1.3 times as long as segment 5). Nervulus interstitial. Nervellus intercepted at lower 0.3. First metasomal tergite 2.2 times as long as wide; its dorsolateral margins sharp anterior to spiracles and moderately sharp posterior to spiracles; dorsal submedian carina short and superficial (Fig. 7). Tergite 2 0.75 times as long as wide. Ovipositor sheath about 0.75 times as long as hind tibia.

Body black with whitish yellow spots and bands (Fig. 16). Antennae dark brown; scape at apical margin, pedicel, and flagellar segments 1–2 (3) yellow ventrally. Clypeus pale brown, black at its basal 0.3. Head and mesosoma predominantly black with the following yellow pattern: anterior orbits entirely (Fig. 1), two median spots on face below antennal sockets, malar space (except partly black just beyond mandibles), mandibles except for teeth, cheeks, outer orbits at lower 0.35 of temple, palpi, hind corners of pronotum, spot on pronotal collar, tegulae, subtegular ridge, mesepimeron, anterolateral hooked spots on mesoscutum extending as two submedian lines almost to prescutellar groove (Fig. 16), scutellum dorsally to apex and postscutellum (Fig. 7), spots on upper division of metapleurum just behind hind tegula, small spot in hind lower corner of mesopleurum and of metapleurum before base of coxae, very broad transverse band on propodeum (Fig. 7). Coxae black, fore coxa whitish dorsally, mid and hind coxae with a large, dorsoposterior, whitish yellow spot (Figs 9–11); fore and mid trochanters whitish yellow, mid trochanter I black ventrally; hind trochanter I black with apical margin yellow, hind trochanter II yellow with brown anterobasal mark. Fore and mid legs beyond trochanters pale rufous, mid tarsus pale brownish dorsally. Hind femur reddish with very small fuscous lateral marks before apex; hind tibia brownish rufous, blackish at about basal 0.12 and at apical 0.3 (dorsally) to 0.5 (ventrally) (Fig. 8), spurs brownish; hind tarsus dark brown, base of segments pale brown at basal 0.2 (segment 1) or at basal 0.1 (segments 2–5). Metasoma black; tergites 1–7 with a white apical band that does not extend onto epipleura; this band broader on segments 1–3 (Fig. 16). Epipleura black. Sternites 1–5 dark brown with white membranous apical part (0.3–0.6) on sternites 2–5; sternite 6 (hypopygium) blackish brown with a pale, narrow apical band.

Male. Fore wing about 5 mm long. Flagellum with 34 segments, about 1.1 times as long as fore wing; flagellar segments from about 15 to 22 (–25) at apical half ventrally with a convex area densely covered with apically curved trichoid sensillae; owing to these structures, the ventroapical margins of segments 15–22 considerably

project (Fig. 5). Inner orbits distinctly divergent ventrally, on lower part of face the distance between eyes 1.15 times as wide as on upper part of frons. Sculpture of head and thorax as in female. Head yellow, except for black ocellar area, vertex, upper 0.3 of temple and upper half of occiput; scape and pedicel yellow ventrally and laterally. Mesosoma dorsally and first tergite coloured as in female (Fig. 7); laterally and ventrally thorax much paler: propleurum, fore margin of pronotum entirely, and more or less its dorsolateral and hind margins, tegulae, subtegular ridge, mesepimeron, lower half of mesopleurum and mesosternum (except for black on prepectus and postpectus), upper division of metapleurum almost entirely, yellow. Coloration of propodeum similar to that of female (Fig. 7). Tergites of metasoma (except for tergite 8) with a whitish apical band that expands on epipleura; sternites blackish but sternites 1–4 (5) partly white. Fore and mid coxae and trochanters yellow; femora, tibiae and tarsi pale rufous; apical segment of mid tarsus brown. Hind coxa black with large ventral and dorsoposterior yellow spots (Figs 12, 13) that coalesce posteriorly at apex of coxa; hind trochanter I black with pale apical margin; hind femur reddish, slightly fuscous before base ventrally and before apex dorsally; hind tibia and tarsus coloured as in female (Figs 8, 16). Pterostigma yellowish, paler centrally.

MATERIAL EXAMINED

Holotype ♀, **England**: Chippenham Fen., Cambs. TL 650695 Malaise trap: carr at reedbed edge 9-22.vii.[19]83 (*J. Field*) RMSNH 1986.021 (NMS, Edinburgh).

Paratypes. **England**: 2 ♂ with same data as holotype, but 29.vi.–9.vii.[19]84 and 25.vi.–9.vii.[19]85 (NMS, Edinburgh). **Russia**: 1 ♂, Chelyabinsk District, Ilmenskij zapovednik (= reserve), 7.vii.1970 (*Nevolina*) (ZISP, St. Petersburg).

***Phytodietus* (*Neuchorus*) *nemoralis* sp. nov.**

(Figs 14, 15)

Phytodietus nemoralis is closely related to *Ph. obscurus*. It is distinct from the latter in having temples entirely black (without a yellow stripe on orbits), fore coxae and trochanters black and white (Figs 14, 15), and hind tibia dorsally and anteriorly darker at base (0.2), black at apex (0.4), and whitish yellow posteriorly at basal 0.6.

Female (holotype). Fore wing 6.5 mm long. Antenna with 40 flagellar segments; the two basal flagellar segments together 1.05 times as long as maximum diameter of eye; flagellum 8.2 mm long (1.25 times as long as fore wing). Temples strongly narrowed behind eyes. Face almost smooth with distinct and dense, moderately fine punctures, impressed laterally at upper half, rather convex medially. Clypeus very strongly convex, its lower margin in middle 0.4 almost straight; basal part of clypeus smooth with moderately fine and rather dense punctures. Malar space 0.5 times as long as basal width of mandible. Epomia present as an oblique, moderately long carina crossing the transverse pronotal impression. Notauli sharp in anterior 0.4 of mesoscutum. Prepectal carina sharp and distinct. Mesopleurum smooth, more or less evenly covered with fine and rather dense punctures that are sparser below subtegular ridge; speculum polished, with small area without hairs. Metapleurum matt with very fine dense punctures. Propodeum smooth and shiny. Hind femur 5.6 times as long as its lateral width; proportion of hind tarsal segments 10.2 : 5.0 : 3.2 : 1.7 : 2.3 (3rd segment 1.4 times as long as segment 5;

2nd segment 2.2 times as long as segment 5). Nervulus distinctly postfurcal, distad from basal vein by 0.3 of its length. Nervellus reclivous, intercepted at lower 0.4. First metasomal tergite 1.95 times as long as wide; its dorsolateral margins sharp before spiracles and moderately sharp beyond spiracles; dorsal submedian carina short, bordered only at base of median basal concavity. Second tergite 0.75 times as long as wide. Ovipositor sheath 1.0 times as long as hind tibia.

Body black with a few whitish yellow spots and bands. Antennae dark brown, slightly lighter (brownish) ventrally at its median 0.7; scape at apical margin, pedicel ventrally, and extreme apex of basal 5-7 flagellar segments, yellow. Clypeus pale brown, black at its basal 0.4. Frontal orbits entirely and facial orbits in middle 0.5 of face yellow (in paratype face entirely black); posterior orbits without yellow stripe (temples completely black); mandible pale brown with teeth and a large triangular spot at its basal 0.6 dark brown, labial palpi brownish, maxillary palpi yellow with basal segment brown. Mesosoma black with tegulae, plates in base of fore wing, dorsolateral margins of scutellum and its apex and hind margin to base of hind wing, apex of postscutellum and its hind margin, transverse arcuate band on propodeum (broadened anteriorly at middle), yellow. Fore and mid coxae black, fore coxa with white pattern dorsally (Fig. 14), mid coxa with a large dorsoposterior, whitish yellow spot; fore and mid trochanters whitish yellow, fore trochanter I with black dorsal stripe (Fig. 15); mid trochanter I with similar dorsal stripe and pale brownish ventrally at basal 0.5. Fore and mid legs beyond trochanters pale rufous, segments 1–4 of mid tarsus brownish (paler ventrally and on extreme apex of segments), segment 5 dark brown. Hind coxa entirely red (or, in paratypes, infuscate basally and with a large blackish spot on the dorsoapical depression). Hind femur completely red; hind trochanter I black with apical margin yellow, hind trochanter II whitish yellow with apex pale reddish. Hind tibia brownish anteriorly and dorsally, with about basal 0.2 dark brown (dorsally), and with apical 0.4 entirely blackish; posterior side of hind tibia dirty whitish yellow at basal 0.6; spurs pale brownish with basal 0.4 whitish. Hind tarsus blackish, with segment 4 brownish; base of segments pale brown at basal 0.2 (segment 1) or at basal 0.1 (segments 2-5). Metasoma black; only hind margin of tergite 3 with thin, dorsal white stripe that does not extend onto epipleura (in paratype tergites 1–3 on hind margin with a dorsal white stripe). Epipleura black. Sternites 1–5 dark brown with white membranous apical part (0.3–0.6) on sternites 2–5; sternite 6 (hypopygium) blackish brown with a pale narrow apical band.

MATERIAL EXAMINED

Holotype: ♀, **France**, Dordogne, St. Marcel de Perigord, Malaise trap, 1–13. vi. 1998 (*R. R. Askew*) (NMS, Edinburgh).

Paratypes. **France**: 2 ♀, Dordogne, St Alvère, Malaise trap 8–12.vi.2002 and 13–25.vi.2002 (*R. R. Askew*) (NMS; ZISP).

***Phytodietus* (*Neuchorus*) *tauricus* sp. nov.**

(Fig. 6)

Phytodietus (*Neuchorus*) *elongator elongator* Aubert, partim; Kasparyan & Tolkanitz, 2000: 91, male.

Phytodietus tauricus is distinct from other European species of the subgenus *Neuchorus* in having the ovipositor longer (ovipositor sheath 1.5 times as long

as hind tibia; 0.75–1.30 in other species). The male of this species may easily be distinguished by the numerous tyloids (on flagellomeres from the 15th to the subapical ones) that give the flagellum in lateral view a saw-like appearance (Fig. 6)**;** it is also distinctive on account of its blackish flagellum and black propodeum and metapleuron.

Female (holotype). Fore wing 7.0 mm long. Antenna with 38 flagellar segments; the two basal flagellar segments together about 0.8 times as long as maximum diameter of eye; flagellum 7.7 mm long. Temples strongly and roundly narrowed behind eyes. Face matt with distinct and dense fine punctures, laterally at upper half impressed, moderately convex medially. Clypeus moderately convex, its lower margin sharp, straight and with vertical rugosity; basal part of clypeus smooth with moderately large sparse punctures. Malar space 0.55 times as long as basal width of mandible. Pronotum with fine and dense distinct punctures. Epomia present as a short carina crossing the transverse pronotal impression. Notauli sharp on anterior third of mesoscutum. Prepectal carina present on mesosternum, rather weak on mesopleurum, its upper end far distant from anterior margin of mesopleurum. Mesopleurum with moderately fine, dense punctures; under subtegular ridge punctures finer and sparser; speculum rather small, polished, without hairs. Metapleurum rather smooth, more or less evenly covered with fine punctures. Propodeum smooth. Hind femur 6.0 times as long as its lateral width; proportion of hind tarsal segments 8.8 : 4.3 : 3 : 1.6 : 2.4. Nervulus interstitial. Nervellus intercepted at lower 0.35. First metasomal tergite 1.7 times as long as wide; its dorsolateral margins sharp before spiracles and in apical half of postpetiole; dorsal submedian carina short and superficial. Second tergite 0.75 times as long as wide. Ovipositor sheath about 1.5 times as long as hind tibia.

Body black with whitish yellow spots and bands. Antennae blackish; pedicel at apical margin, annellus and flagellar segments 1–4 pale. Clypeus at lower 0.6 and mandibles reddish brown; palpi yellowish except their basal segment dark brown. Orbits anteriorly from middle of frons to top of eye, and small spot on posterior orbits just on middle of temple, yellow. Tegulae yellow with distal margin pale brown; plates at base of fore wing completely yellow. Scutellum with a pair of small, basolateral yellowish spots; hind margin of mesonotum and metanotum yellow. Tergites 5–7 dorsally pale on apical margin.

Fore and mid legs predominantly pale rufous; their coxae black, mid trochanter I slightly infumate at base. Hind coxa reddish at ventral 0.7 and blackish at dorsal 0.3 with small dirty-reddish, subbasal dorsoanterior spot; hind trochanters black with apex of trochanter II and its ventral part reddish; hind femur completely red; hind tibia dirty reddish brown at median 0.35, blackish at basal 0.2 and apical 0.45; spurs brown, hind tarsus blackish. Pterostigma pale brownish yellow with margins brownish.

Variability. Fore wing 6.0–7.5 mm. Antenna with 36-40 flagellomeres. First tergite 1.6-1.7 as long as wide at apex (distinctly shorter than in *Ph. elongator*). In some females the body is almost completely black (except for orbits near top of eye and hind edge of scutellum and postscutellum), but as well as basolateral yellow spots on scutellum there is also a spot at apex of scutellum and sometimes a small spot on anterior margin of mesoscutum just distad of base of notaulus.

Male. This was described earlier as the male of *Ph. elongator* Aubert in error (Kasparyan & Tolkanitz, 2000). Fore wing 5.8–6.5 mm; flagellum with 37–40

segments; flagellomeres from about segment 15 to subapical one with ventral projection, so that apical half of antenna seen laterally has a saw-like appearance (Fig. 6). Face broadened to mandibles; malar space 0.75 times as long as basal width of mandible. First tergite about 2.0 times as long as wide. Lower part of mesothorax yellow, but beyond fore coxa on prepectus and before mid coxa predominantly black; mesopleurum with black oval spot at about position of sternaulus. Propodeum with only a lateral yellow spot close to apex (without a complete transverse subapical yellow band). Otherwise yellow pattern is typical of males of genus: scape below, face, clypeus, mandibles, palpi, cheeks, anterior orbits completely, temple in lower 0.5-0.6, propleurum, collar of pronotum, its fore margin and hind corner (sometimes pronotum entirely bordered with yellow), anterolateral spots on mesoscutum, subtegular ridge, tegulae, mesepimeron, a pair of basal spots or dorsolateral margins of scutellum, apex and hind margin (to base of hind wing) of scutellum and sometimes of postscutellum, sometimes small spot in hind corner of metapleurum, fore and mid coxae and all trochanters (except for black hind trochanter I), yellow. Hind coxa tricoloured: predominantly red, black dorsally, and yellow ventrally at apex. Hind tibia usually reddish brown with blackish brown base and apex, sometimes predominantly brownish black and partly brownish in middle 0.35. Hind tarsus dark brown to blackish, segments without a pale spot at their base. Hind margin of tergites with distinct white band, narrower on tergites 6 and 7.

MATERIAL EXAMINED

Holotype ♀, **Ukraine**: Crimea, Nikita Botanical Garden, cape Mart'yan, *Quercus* and *Juniperus*, 28.v.1990 (*Kasparyan*) (ZISP).

Paratypes (ZISP, and 1 ♀, 1 ♂ in NMS). **Ukraine**: Crimea: 6 ♀, 26–30.v.1990, other data as holotype; 1 ♂, same locality, at light, 1.vi.1989 (*V. Kornilov*); 1 ♂, Yalta, Novyj Port, oak forest, 17.iv.1989 (*Kasparyan*); 4 ♀, 9 ♂, East Crimea, Kara-Dag reserve, 14.v.1972 (3 ♂) (*Tobias*), 4–6.v.1992 (2 ♀) and 9–14.v.1992 (2 ♀, 6 ♂) (*Kasparyan*). **Russia**: 1 ♂, Krasnodar Territory, Lazarevskaya N Sochi, 26.v.1973 (*Tobias*).

Identified material of *Phytodietus* species in NMS

The nomenclature of the Lepidoptera hosts follows Karsholt & Razowski (1996).

Phytodietus (*Neuchorus*) *elongator* Aubert, 1963 (= *iassiensis* Constantineanu, 1929 [invalid, cf. Horstmann, 2000*a*])

New to Britain. **England**: 1 ♀, Norfolk, Morston Salt Marsh (V.C. 28), 13.viii.1980 (*M. R. Shaw*). We take this opportunity to record the presence of further English specimens, 1 ♀, 2 ♂, in BMNH from Wilmington, Kent, 22.vii.1934 (*W. Rait-Smith*), reared from the pyralid *Pempelia* [as *Salebrosa*] *formosa* (Haworth).

Phytodietus (*Neuchorus*) *kunashiricus* Tolkanitz, 1976

Russia: 1 ♀, Transbikalia, Chita reg., Klichka, 7.vii.1975 (*Kasparyan*).

Phytodietus (*Neuchorus*) *maculator* Kasparyan & Shaw, sp. nov.

England: ♀ holotype and 2 ♂ paratypes, see above.

Phytodietus (*Neuchorus*) *nemoralis* Kasparyan & Shaw, sp. nov.

France: ♀ holotype and 1 ♀ paratype, see above.

Phytodietus (*Neuchorus*) *obscurus* (Ratzeburg, 1852) (= *rufipes* Holmgren)

Ukraine: 1 ♀, Kuryazh, near Khar'kiv, "Phytodietus coryphaeus Grav.", 2.vii.1885

(*Jaroshevski*). **Russia**: 1 ♀, 1 ♂, Volgograd, 13.vi.1977 (1 ♂), 14.vi.1977 (1 ♀) (*Kasparyan*); 2 ♀, 1 ♂, Yakutsk, 21–26.vi.1927 (1 ♂), 24.vii.–1.vii.1927 (2 ♀) (*Moskwin*). [We have not seen British material of this species.]

Phytodietus (*Neuchorus*) *tauricus* Kasparyan & Shaw, sp. nov.
Ukraine: 1 ♀ (paratype), Crimea, Nikita Botanical Garden, cape Mart'yan, 28.v.1992 (*Kasparyan*); 1 ♂ (paratype), Kara-Dag, Karagach ridge, 12.v.1992 (*Kasparyan*).

Phytodietus (*Phytodietus*) *alpinator* Aubert, 1969
France: 1 ♀, Hautes-Alpes, Col du Lautaret, 2000 m, 20.vii.1997 (*M. R. Shaw*).

Phytodietus (*Phytodietus*) *astutus* Gravenhorst, 1829 (= *obscurus* Desvignes, 1856 preocc. = *continuus* Thomson, 1877 = *britannicus* (Habermehl, 1923))
England: 1 ♀, Oxfordshire, Frilford Heath, SU 442986 (V.C. 22), Malaise trap 18.vi.–12.vii.1991 (*K. Porter*); 1 ♂, Cumbria, Milnthorpe (V.C. 69), ex *Agonopterix heracleana* (Linnaeus) (Depressariidae) on *Heracleum sphondylium*, coll. 15.vii.1989, cocoon 20.vii.1989, em. 9.vi.1990 (*M. R. Shaw*). **Wales**: 1 ♀, Anglesey, Llangristiolus, SH 434736 (V.C. 52), Malaise trap 16-30.vi.1982 (*S. A. & D. C. Wilkinson*). The rearing data suggest that this species is univoltine, at least in northern England.

Phytodietus (*Phytodietus*) *basalis* Kasparyan, 1993
New to Britain. **England**: 7 ♀, 2 ♂, Wiltshire, Savernake Forest, SU 209670, SU 214671 and SU 229656 (V.C. 7), v.1990 (4 ♀), 2–22.v.1990 (1 ♀), 4–25.vii.1990 (1 ♂), 26.vii.–16.viii.1990 (1 ♂), 2–30.v.1991 (1 ♀), 25.vii.–22.viii.1991 (1 ♀) (*K. Porter*); 1 ♀, Wiltshire, Braydon, SU 0588 (V.C. 7), 20.v.2004 (*K. J. Grearson*); 1 ♀, Hampshire, Pamber Forest (V.C. 12), 4–21.viii.1991 (*M. Edwards*); 2 ♀, Buckinghamshire, Burnham Beeches, SU 953849 (V.C. 24), 20.vii–2.viii.1995 (*J. W. Ismay*); 1 ♂, Norfolk, Santon Downham, TL 818883 (V.C. 28), 1–15.viii.1984 (*J. Field*); 3 ♀, 1 ♂, Cambridgeshire, Chippenham Fen, TL 650693 (V.C. 29), 20.vii.–1.viii.1984 (1 ♂), 1–15.viii.1984 (2 ♀), 11–22.viii.1985 (1 ♀) (*J. Field*). **Scotland**: 1 ♂, Perthshire, Coire Choille Chuile, NN 3328 (V.C. 88), vi.1986 (*I. MacGowan & R. M. Lyszkowski*). **France**: 1 ♀, Dordogne, St Alvère, 8–23.vii.2001 (*R. R. Askew*). The English specimens were collected in v and vii–viii, and the species is presumed to be bivoltine. All specimens were collected by Malaise traps, in more or less wooded habitat.

Phytodietus (*Phytodietus*) *femoralis* Holmgren, 1860
New to Britain. **Scotland**: 1 ♂, Morayshire, Dallas, NJ 1252 (V.C. 95), Malaise trap in *Pinus contorta* plantation 13–26.vi.1999 (*B. Hicks*).

Phytodietus (*Phytodietus*) *gelitorius* (Thunberg, 1822)
England: 1 ♀, Berkshire, Burghfield Common (V.C. 22), cocoon coll. in folded *Betula* leaf 24.ix.1979, em. 1980 (*M. R. Shaw*). **Scotland**: 1 ♀, Lanarkshire, Leadhills (V.C. 77), 21.vi.1981 (*A. D. Liston*); 1 ♂, Stirlingshire, Boquhan (V.C. 86), vi.1912 (*W. Evans*); 1 ♀, Argyll, Isle of Coll (V.C. 103), ex *Epinotia subocellana* (Donovan) (Tortricidae) coll. 1984, em. 4.v.1985 (*I. C. Christie*). The data suggest that it is plurivoltine.

Phytodietus (*Phytodietus*) *geniculatus* Thomson, 1877
30 ♀, 4 ♂. **England**: V.C. 1, 7, 22, 23, 24, 27, 28, 29, 38, 57, 60. **Wales**: V.C. 52. **Scotland**: V.C. 83, 87, 92, 96, 97, 98, 99. **France**: Dordogne, Lot-et-Garonne. Reared from the following hosts: *Agonopterix ciliella* (Stainton) or *A. heracliana* (Linnaeus) (Depressariidae) on *Angelica sylvestris* (*J. R. Langmaid*); *Teleiodes proximella* (Hübner) (Gelechiidae) (*A. N. B. Simpson*); *Acleris schalleriana* (Linnaeus) (Tortricidae) on *Viburnum lantana* (*M. R. Shaw*); *Acleris hastiana* (Linnaeus) on *Salix viminalis* (*J. R. Langmaid*); ?*Apotomis betulana* (Haworth) (Tortricidae) on *Betula* (*M. R. Shaw*); *Epinotia solandriana* (Linnaeus) (Tortricidae) on *Betula* (*J. R. Langmaid*); indet. Tortricidae on *Betula* (2); and indet. Microlepidoptera on *Rosa* and on *Vaccinium*. Non-reared specimens were collected from v–ix. The rearing data indicate that this is a plurivoltine species with a wide host range.

Phytodietus (*Phytodietus*) *griseanae* Kerrich, 1962
Scotland: 1 ♀, Dunbartonshire, Caldarvan, NS 448838 (V.C. 99), Malaise trap 8–20.vi.1983 (*I. C. Christie*); 1 ♀, Sutherland, Dalchork (V.C. 107), ex litter below *Pinus sylvestris* coll. winter 1983/1984, em. v/vi.1984 (*S. R. Leather*). **Switzerland**: 4 ♀, 2 ♂, Grisons and Engadine, all reared 1965 (*V. Delucchi*), most with cryptic data but one labelled ex *Zeiraphera griseana* (Hübner) (Tortricidae), of which it is a well-known parasitoid in the Alps. It is probably strongly associated with conifers.

Phytodietus (*Phytodietus*) *montanus* Tolkanitz, 1979
New to Britain. **England**: 2 ♀, Wiltshire, Savernake Forest, SU 2167/2266 (V.C. 7), Malaise trap v.1990 and 27.vi.–27.vii.1991 (*K. Porter*); 2 ♀, Hampshire, Pamber Forest (V.C. 12), ex indet. Tortricidae on *Quercus robur*, coll. 21.vi.1978, em. 15.v.1979, and *Prunus spinosa*, coll. 12.vii.1979, em. 17.v.1980 (*M. R. Shaw*); 1 ♀ Kent, Dungeness (V.C. 15), cocoon coll. on *Salix cinerea* 2.vii.1979, em. 28.v.1980 (*M. R. Shaw*); 2 ♀ Oxfordshire, Wychwood Forest, SP 3317/3417 (V.C. 23), Malaise trap 23.v.–15.vii.1990 and 7.vi.–4.vii.1991 (*K. Porter*). **Wales**: 1 ♀, Anglesey, Llangristiolus, SH 434736 (V.C. 52), Malaise trap 24.vii.–7.viii.1982 (*S. A. & D. C. Wilkinson*); 1 ♀, Anglesey, Cors Erddriniog, SH 474825 (V.C. 52), 22.ix.–6.x.1988 (*P. Holmes*). **Scotland**: 5 ♀, 2 ♂, Lanarkshire, Leadhills (V.C. 77), 7.vii.1982 (*M. R. Shaw*); 1 ♀, Glasgow, Cathkin Braes, NS 615584 (V.C. 77), 25.ix.1983 (*R. P. Knill-Jones*); 7 ♀, 4 ♂, Aberdeenshire, Morrone Birkwood (V.C. 92), Malaise trap 4–29.vii.1983 and 4–27.ix.1983 (*B. D. Batty*); 1 ♀, Inverness-shire, Bognacruie, NJ 0415 (V.C. 95), Malaise trap 19.vii.–3.viii.1999 (*M. Edwards*); 1 ♀, Inverness-shire, Loch Mullardoch, NN 2231 (V.C. 96), 25.vi.1999 (*P. J. Chandler*); 1 ♂ Inverness-shire, Loch Arkaig, NN 0291 (V.C. 97), Malaise trap vi.1992 (*I. MacGowan*); 1 ♀, Jura, Leargybreck, NR 5371/5571 (V.C. 102), 31.v.1982 (*D. Horsfield*); 1 ♀, Dunbartonshire, Caldarvan, NS 448838 (V.C. 99), Malaise trap 17–31.viii.1983 (*I. C. Christie*); 1 ♀, 1 ♂, Wester Ross, Sheildaig, NG 8252 (V.C. 105), Malaise trap vii.1991 (*I. MacGowan*). **Ireland**: 1 ♀, Co. Kildare, Ardskull Mote (V.C. H19), 10.vii.1969 (*P. J. Chandler*). **Russia**: 1 ♀, Caucasus, Teberda reserve, 2500 m, vii.1982 (*Dbar*) (Tolkanitz det.). The flight time of British non-reared specimens is from v–ix(x). Puzzlingly, the rearing data suggest that this species is univoltine, even in southern England, but specimens collected at several sites in September indicate that it is probably plurivoltine even in Scotland. This raises the possibility that we may have failed to separate two species under this name.

Phytodietus (*Phytodietus*) *ornatus* Desvignes, 1856
England: 3 ♂, Wiltshire, Savernake Forest, SU 229656 (V.C. 7), Malaise trap 2–22.v.1990 (1) and 23.v.–13.vi.1990 (2) (*K. Porter*); 1 ♀, Cheshire, Alderley Edge (V.C. 58), ex *Diurnea fagella* ([Denis & Schiffermüller]) (Chimabachidae) on *Betula*, coll. 13.x.1976, em. 26.v.1977 (*M. R. Shaw*). **Scotland**: 1 ♀, 1 ♂, Argyll, Taynish, NR 730845 (V.C. 101), Malaise trap 1–10.vi.1984 (♂) and 31.viii.–21.ix.1984 (♀) (*I. C. Christie*). The data suggest that it is plurivoltine.

Phytodietus (*Phytodietus*) *polyzonias* (Forster, 1771)
18 ♀, 1 ♂. **England**: V.C. 3, 7, 11, 12, 17, 23, 24, 27, 28, 58, 69. Reared from Tortricidae as follows: *Tortrix viridana* Linnaeus on *Corylus*/*Lonicera* (beneath *Quercus*), coll. 12.vi.1979, em. 15.vii.1979 (*M. R. Shaw*); *Acleris schalleriana* (Linnaeus) on *Viburnum opulus*, coll. 8.viii.1976, em. 25.viii.1976 (*J. R. Langmaid*); *Acleris hastiana* (Linnaeus) on *Salix atrocinerea*, coll. 21.ix.1978 (*J. R. Langmaid*); *Ancylis mitterbacheriana* ([Denis & Sciffermüller]) on *Quercus* (2), coll. 26.xii.1973 (*A. M. Emmet*) and coll. 6.x.1984, em. 6.v.1985 (*R. J. Heckford*). Non-reared specimens were collected from v–ix. The rearing data show that it is plurivoltine.

Phytodietus (*Phytodietus*) *variegatus* (Fonscolombe, 1854) (= *albipes* Holmgren, 1856)
New to Britain**. England**: 1 ♂, Devon, Fernhill Wood (V.C. 3), ex *Teleiodes paripunctella* (Thunberg) (Gelechiidae) on *Quercus*, coll. 20.viii.1996, em. 30.iii.1997 (*R. J Heckford*); 2 ♂,

Somerset, Bishops Lydeard (V.C. 5) ex *Teleiodes scriptella* (Hübner) on *Acer campestre*, coll. 15.ix.1984, em. iii.1985 (*J. R. Langmaid*); 1 ♀, 1 ♂, Hampshire, Portsmouth (V.C. 11), ex *Scrobipalpa* sp. (Gelechiidae) on *Suaeda maritima*, coll. 2.x.1977, em. iii.1978 (*J. R. Langmaid*); 3 ♀, Hampshire, Emer Bog (V.C. 11), ex *Ancylis subarcuana* (Douglas) (Tortricidae) on *Salix repens*, coll. 28.ix.1980, em. iii.1978 (*J. R. Langmaid*); 5 ♀, 2 ♂, Hampshire, Pig Bush (V.C. 11), ex *A. subarcuana* on *S. repens*, coll. 1.ix.1980 (*R. J. Heckford*); 1 ♀, Berkshire, Snelsmore Common (V.C. 22), ex *Caloptilia stigmatella* (Fabricius) (Gracillariidae) on *Salix atrocinerea*, coll. 28.ix.1979 (*M. R. Shaw*); 2 ♂, Oxfordshire, Otmoor (V.C. 23) ex *C. stigmatella* on *S. atrocinerea*, coll. 12.ix.1979, em. 1980 (*M. R. Shaw*); 1 ♂, Wychwood Forest, SP 343171 (V.C. 23), Malaise trap 11.vii.–14.viii.1990 (*K. Porter*). **Scotland**: 1 ♂, Stirlingshire, Rowardennan (V.C. 86) ex indet. ?Tortricidae on *Betula*, coll. 2.ix.1989, em. 11.v.1990 (*M. R. Shaw*); 1 ♀, Aberdeenshire, Crathie (V.C. 92), swept from *Juniperus* 24.vi.1984 (*M. R. Shaw*); 1 ♀, Aberdeenshire, Dinnet (V.C. 92), ex *Ypsolopha* ?*ustella* (Clerck) (Yponomeutidae) on *Quercus*, coll. as cocoon 12.vii.1970, em. 26.vii.1970 (*E. C. Pelham-Clinton*); 1 ♀, Dunbartonshire, Caldarvan, NS 448838 (V.C. 99), Malaise trap 1–17.viii.1983 (*I. C. Christie*); 1 ♀, Sutherland, Spinningdale (V.C. 107) [mounted with cocoon inside that of *Ypsolopha* sp., det. MRS], *Quercus*, coll. 10.vii.1997, em. 1.viii.1997 (*P. F. Entwhistle*). Although emergence dates in captivity as early as March are unlikely to reflect the natural situation, the rearing data demonstrate that this is a plurivoltine species. The high representation of non-tortricoid hosts in what is evidently a wide host range is of interest.

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References

Aubert, J. F. 1963. Les Ichneumonides du rivage méditerranéen français (Hym.). 6e serie: Pimplinae, Banchinae, Tryphoninae, Scolobatinae, Orthocentrinae, Diplazontinae, Metopiinae, Microleptinae de l'Hérault et des Bouches-du-Rhône. *Bulletin de la Société entomologique de France* **68**: 91–100.

Constantineanu M. I. 1929. Contributions à l'étude des Ichneumonides en Roumanie. *Annales Scientifiques de l'Université de Jassy* **15**: 387–642.

Fitton, M. & Ficken, L. 1990. British ichneumon-flies of the tribe Oedemopsini (Hymenoptera: Ichneumonidae). *Entomologist* **109**: 200–214.

Horstmann, K. 1998. Revisionen von Schlupfwespen-Arten II (Hymenoptera: Ichneumonidae, Braconidae). *Mitteilungen der Münchner Entomologischen Gesellschaft* **88**: 3–12.

——— 2000*a*. Über die von M. I. Constantineanu vor 1961 in der Familie Ichneumonidae (Hymenoptera) beschrieben Formen und Varietäten und ihre Einstufung als infrasubspezifische Namen. *Linzer Biologische Beiträge* **32**: 133–144.

——— 2000*b*. Typenrevisionen einiger von Habermehl beschriebener Ichneumonidae (Hymenoptera). *Nachrichtenblatt der Bayerischen Entomologen* **49**: 67–70.

Karsholt O. & Razowski, J. 1996. *The Lepidoptera of Europe. A Distributional Checklist* 380 pp. Stenstrup.

Kasparyan, D. R. 1993. Review of Palearctic species of wasps of the genus *Phytodietus* Grav. (Hymenoptera, Ichneumonidae). *Entomologicheskoe Obozrenie* **72**: 869–890 [English translation: 1994, *Entomological Review* **77**: 56–79].

Kasparyan, D. R & Tolkanitz, V. I. 2000. Ichneumonidae. Subfamily Tryphoninae: tribes Sphinctini, Phytodietini, Oedemopsini, Tryphonini (addendum), Idiogrammatini. Subfamilies Eucerotinae, Adelognathinae (addendum), Townesioninae. *Fauna of Russia and neighbouring countries*, Insecta III Hymenoptera No. 3: 405 pp. St Petersburg. [In Russian.]

Kerrich, G. J. 1962. Systematic notes on Tryphoninae, Ichneumonidae (Hym.). *Opuscula Entomologica* **27**: 45–56.

Kostro-Ambroziak, A. 2007. A new species of the genus *Phytodietus* Gravenhorst, 1829 (Hymenoptera: Ichneumonidae) from Poland. *Annales Zoologici* **57**: 823—826.

Šedivý, J. 1961. Beitrag zur Kenntnis der Tryphoninen-Gattung *Phytodietus* Grav. und *Weisia* Schmiedkn. (Hymenoptera, Ichneumonidae). *Časopis Československé Společnosti Entomologické* **58**: 37–44.

Simmonds, F. J. 1947. The biology of *Phytodietus pulcherrimus* (Cress.) (Ichneumonidae, Tryphoninae) parasitic of *Loxostege sticticalis* L. in North America. *Parasitology* **38**: 150–157.

Tolkanitz, V. I. 1973. [Ichneumon flies of the genus *Phytodietus* Gravenhorst (Hymenoptera) in the fauna of the USSR]. [In Russian with English summary.] *Zoologicheskii Zhurnal* **52**: 876–882.

Townes, H. 1969. The genera of Ichneumonidae, part 1. *Memoirs of the American Entomological Institute* **11**: 1–333.

Yu, D. S. & Horstmann, K. 1997. A catalogue of world Ichneumonidae. *Memoirs of the American Entomological Institute* **58**: 1–1558.