Apanteles (*Choeras*) *gielisi* spec. nov. (Hymenoptera: Braconidae: Microgastrinae) from The Netherlands and the first report of Trichoptera as host of Braconidae

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Key words: Hymenoptera; Braconidae; Microgastrinae; *Apanteles gielisi; Choeras* ; new species; *Enoicyla pusilla*; Limnophilidae; Trichoptera; Palaearctic; Netherlands.
A new species of the genus *Apanteles* Foerster, 1862 (subgenus *Choeras* Mason, 1981) from The Netherlands is described and illustrated. The new species is reported to be a parasitoid of larvae of terrestrial Trichoptera (Limnophilidae), which is the first report of this order as host of Braconidae. A key to the European species of the subgenus *Choeras* Mason is added.

Introduction

Last year Dr C. Gielis reared from terrestrial larvae of *Enoicyla pusilla* (Burmeister, 1839) (Trichoptera: Limnophilidae) an unknown species of the subgenus *Choeras* Mason, 1981, (genus *Apanteles* Foerster, 1862; Hymenoptera: Braconidae: Microgastrinae) which differs considerably from all other European species of the subgenus. The other species are parasitoids of microlepidopterous larvae; up to now Trichoptera are unknown as host of Braconidae. A second species reared is a new species belonging to the Campopleginae (Hymenoptera: Ichneumonidae) which will be described by Prof. Dr K. Horstmann (in litt.). The host *Enoicyla pusilla* (Burmeister) is an aberrant member of the family Limnophilidae Kolenati, 1859, because it has terrestrial larvae and the adult females are nearly wingless. Both characters are very rare within the order Trichoptera.

The subgenus *Choeras* is a small cosmopolitan subgenus, especially common in the temperate zones of Chile, Australia and the Oriental region. As fas as known all other members are parasitoids of larvae of Lepidoptera. The small submarginal cell of fore wing is aberrant for the subgenus *Choeras*, but occurs in some similar New World genera (*Clarkinella* Mason, 1981; *Hypomicrogaster* Ashmead, 1898 s.l.; *Papanteles* Mason, 1981). The new species does not fit in any of these genera because of having the metanotum hardly emarginate anteriorly, combined with no costulae or median carina on the propodeum, and is, therefore, retained in the subgenus *Choeras*.

For the recognition of the subfamily Microgastrinae Nees, 1814, see van Achterberg (1990, 1993, 1997), for a key to the (sub)genera of the subfamily Microgastrinae, see Mason (1981), for the position of the subgenus *Choeras* see van Achterberg (2002), and for the terminology used in this paper, see van Achterberg (1988).

Key to European species of the subgenus *Choeras* Mason

1. Tarsal claws distinctly pectinate; hind femur black, and robust, about 3 times as long as wide; hypopygium of ♀ evenly sclerotized medially and no medio-ventral crease; at most basal 0.2 of hind tibia yellowish; vein 1-SR of fore wing directed to vein cu-a; wing membrane weakly infuscate; vein r-m of fore wing usually completely absent ..... ***A. validus*** Thomson, 1895
- Tarsal claws only setose (except of *A. arene*, which has hind femur completely yellowish, and more slender, about 3.5 times as long as wide); hypopygium of ♀ at least medially (as narrow line) membranous and with a medio-ventral crease; at least basal 0.4 of hind tibia yellowish or ivory; vein 1-SR of fore wing directed to vein 1-CU1; colour of wing membrane variable, if infuscate then part of vein r-m of fore wing present (fig. 3) 2
2. Basal third of pterostigma conspicuously yellowish, contrasting with remainder of pterostigma; apical antennal segments largely smooth and shiny, with hardly visible setosity; vein r-m of fore wing distinct; parasitoid of *Cnephasia* species (Tortricidae) on herbs ..... ***A. tiro*** (Reinhard, 1880)
- Basal third of pterostigma completely or largely dark brown or blackish, not contrasting with remainder of pterostigma; apical antennal segments normal and matt, with distinct setosity; vein r-m of fore wing variable 3
3. Vein r of fore wing curved up to vein r-m (actually vein r plus part of vein 2-SR because of low position of vein r-m) and about 3 times as long as vein 2-SR (figs 1, 3); vein 2-CU1 of fore wing about twice as long as vein 1-CU1 (fig. 1); wing membrane weakly infuscate; basal 0.4 of hind tibia ivory, strongly contrasting with blackish apical 0.6 of hind tibia (fig. 5); hind femur largely dark brown dorsally; second submarginal cell of fore wing minute (fig. 3); vein 2-SR+M of fore wing comparatively long (fig. 3); hypopygium of ♀ only ventrally narrowly membranous and apically acute (fig. 7); parasitoid of terrestrial larvae of Trichoptera (Limnophilidae) ..... ***A. gielisi*** spec. nov.
- Vein r of fore wing straight up to vein r-m and 0.8-1.3 times as long as vein 2-SR (figs 9, 13, 17); vein 2-CU1 of fore wing about as long as vein 1-CU1; wing membrane subhyaline; basal 0.6 of hind tibia yellowish, less contrasting with infuscate apico-lateral and -ventral 0.4 (or less) of hind tibia; hind femur yellowish dorsally; second submarginal cell of fore wing larger (figs 9, 13, 17); vein 2-SR+M of fore wing comparatively short (figs 9, 13, 17); hypopygium of ♀ variable, usually widely membranous and apically truncate 4
4. First metasomal tergite subtriangular, strongly narrowed apically (basally about 4 times wider than apically); ovipositor sheath about half as long as hind tibia; first and second tergites largely smooth ..... ***A. ciscaucasicus*** Tobias, 1971
- First tergite distinctly quadrangular, much less narrowed apically (basally at most about twice wider than apically; figs 10, 14, 18); ovipositor sheath about as long as hind tibia or slightly shorter; first and second tergites usually partly rugose (figs 10, 14) 5
5. Tarsal claws pectinate; hypopygium of ♀ largely sclerotised, only near median line membranous and apically acute; hind tibia largely brownish; antenna of ♀ erect and dense short bristly setose; penultimate antennal segment of ♀ about 1.3

times longer than wide; area of second tergite smooth, except for some punctures; parasitoid of Pterophoridae living in stem galls on herbs ..... ***A. arene*** Nixon, 1973

- Tarsal claws only setose; hypopygium of ♀ near median line widely membranous and apically truncate; hind tibia often distinctly dark brown apically; antenna of ♀ normally setose (figs 11, 15); penultimate antennal segment of ♀ variable, often about as long as wide (fig. 15); area of second tergite more or less finely rugose or coarsely punctate laterally 6

6. Antenna ventrally yellowish-brown (but more or less darkened apically); especially scapus of ♂ swollen, almost touching each other (fig. 12); propodeum with rugose median band, and a complete irregular median carina (fig. 10); subapical antennal segments of ♀ subquadrate (fig. 11); metanotum straight anteriorly or nearly so; inner side of hind tibia of ♀ usually largely yellowish apically; first metasomal tergite distinctly narrowed apically (fig. 10); parasitoid of Plutellidae; (= *A. hedymeles* Nixon, 1973) ..... ***A. ruficornis*** (Nees, 1834)
- Antenna ventrally dark brown or largely so, but third antennal segment sometimes brownish ventrally; scapus of ♂ normal, remaining in upright position distinctly separate from each other (fig. 16); propodeum without rugose median band (fig. 18), and if rugose then without complete irregular median carina (fig. 14); subapical antennal segments of ♀ variable (figs 4, 15); metanotum weakly concave anteriorly (cf. fig. 6); inner side of hind tibia of ♀ usually distinctly infuscate or dark brown apically; first tergite variable, often hardly narrowed apically and widely rugose (fig. 14) 7

7. Face distinctly punctate and rather mat; setose part of ovipositor sheath slightly longer than hind tibia ..... ***A. gnarus*** Tobias & Kotenko, 1984
- Face nearly smooth, shiny; setose part of ovipositor sheath as long as hind tibia or somewhat shorter 8

8. Apical half of first metasomal tergite distinctly narrowed apically and its apical width equal to median length of second tergite (fig. 18); first tergite superficially sculptured and second tergite largely smooth laterally (fig. 18); propodeum largely smooth medio-anteriorly, at most punctate (fig. 18); parasitoid of Tortricidae in catkins of coniferous trees and cases of Psychidae (*Dahlica* (= *Solenobia* auctt.) species) ..... ***A. tedellae*** Nixon, 1961
- Apical half of first tergite hardly or not narrowed apically (fig. 14) and its apical width at least 1.2 times median length of second tergite (fig. 14); first tergite coarsely sculptured and second latergite rugulose laterally (fig. 14); propodeum more or less rugose medio-anteriorly (fig. 14); parasitoid of hosts associated with herbs 9

9. Vein r of fore wing 1.2-1.4 times as long as vein 2-SR (fig. 13); subapical antennal segments of ♀ moniliform, and penultimate segment about as long as wide (fig. 15); stub of vein r-m of fore wing short, resulting in an open second submarginal cell (fig. 13), rarely closed; side of scutellum hardly or not crenulate posteriorly (near anterior border of metanotum); hind femur yellowish apically, rarely somewhat infuscate; propodeum without median carina (fig. 14); parasitoid of Tineidae in decaying organic matter, e.g., old bracket fungi on trees ..... ***A. parasitellae*** (Bouché, 1834)
- Vein r of fore wing 1.0-1.2 times as long as vein 2-SR (cf. fig. 17); subapical anten-

nal segments of ♀ not moniliform, penultimate segment about 1.2 times as long as wide; stub of vein r-m of fore wing usually rather long, and resulting in a largely closed second submarginal cell; side of scutellum distinctly, but narrowly crenulate posteriorly (near anterior border of metanotum in a depressed area); hind femur more or less dark brown apically; median carina of propodeum variable, often partly with regular carina; parasitoid of mainly Pyraloidea and Gelechioidea on herbs; (= *A. suffolciensis* (Morley, 1902)) ..... ***A. dorsalis*** (Spinola, 1808)

Notes.— This species is quite variable and sometimes difficult to separate from *A. parasitellae* (Bouché) despite that in literature the presence of vein r-m of fore wing is given as an exclusive character and that both often have been included in two different genera (e.g., Nixon, 1973 and Tobias, 1986).

In RMNH is a male from Wageningen (Netherlands) reared from leaves of *Hypericum calycinum* Linnaeus with mines of *Trifurcula septembrella* (Stainton, 1849), which has the first tergite only sparsely punctate.

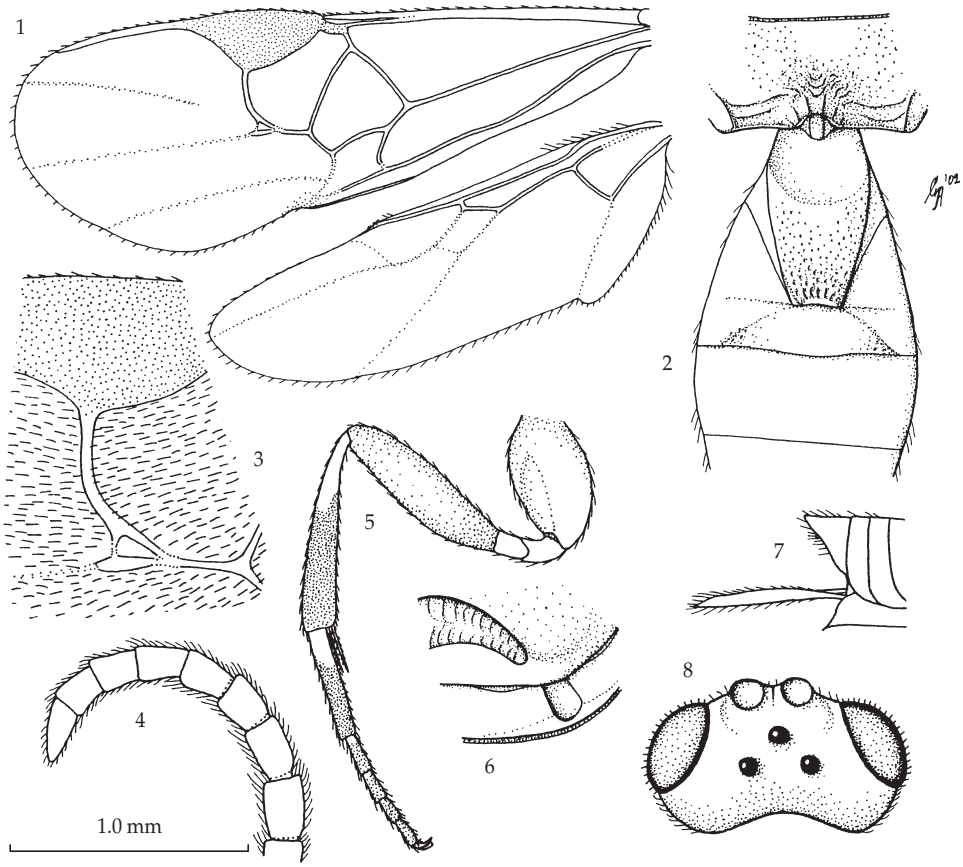
Apanteles (*Choeras*) *gielisi* spec. nov.
(figs 1-8)

Material.— Holotype, ♀ (RMNH), "Netherlands: Z.-H., Lexmond, 6.ix.2001, ex *Enoicyla pusilla* (Burm.) (terr[estrial] Trichoptera-Limnoph[ilidae]), C. Gielis, RMNH 2001".

Holotype, ♀, length of body 2.6 mm, of fore wing 2.7 mm.

Head.— Antenna with 18 segments, segments normally finely setose, length of third segment 0.9 times fourth segment, length of third, fourth and penultimate segments 3.7, 4.0 and 1.2 times their width, respectively (fig. 4); length of maxillary palp 0.8 times height of head; mouthparts hardly protruding; in dorsal view length of eye 1.8 times length of temple (fig. 8); temple densely and rather finely punctate; area behind stemmaticum setose; OOL:diameter of ocellus:POL = 5:3:8; frons largely smooth and nearly flat medially; punctulate laterally and narrowly setose; vertex, face and clypeus punctulate, with soft sheen; clypeus concave ventrally; labrum flat and smooth; malar suture narrow, complete and its surroundings matt and very finely coriaceous; length of malar space 1.6 times basal width of mandible; mandible strongly twisted apically.

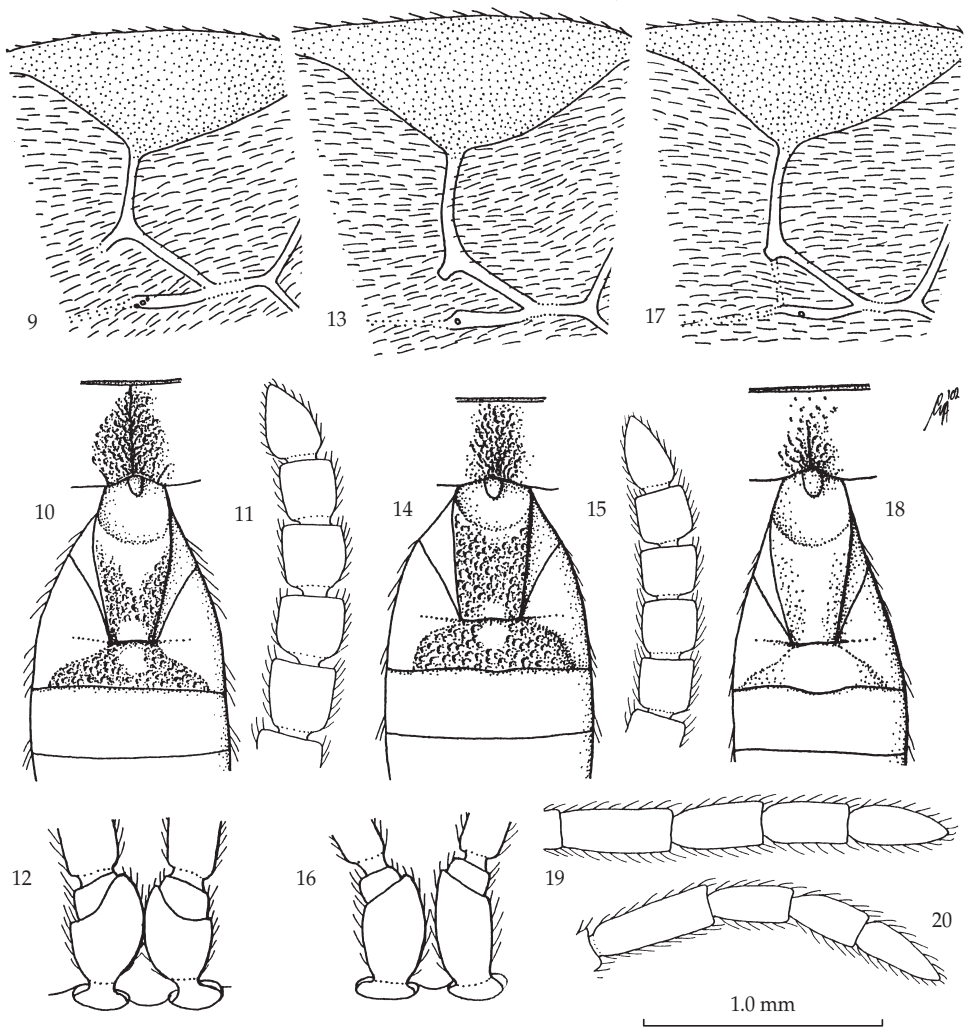
Mesosoma.— Length of mesosoma 1.5 times its height; side of pronotum smooth and oblique groove distinct and nearly smooth; propleuron convex and punctulate; mesosternal sulcus narrow, shallow and smooth; prepectal carina and precoxal sulcus completely absent; mesopleuron distinctly punctate and setose, but smooth and glabrous medially and postero-dorsally; pleural sulcus very finely crenulate, almost smooth; metapleuron smooth anteriorly, remainder coarsely punctate and with deep submedial pit; mesosutum finely and densely punctate, becoming indistinct posteriorly and with soft sheen, densely setose; notauli absent; scutellar sulcus very narrow, with hardly visible crenulation; scutellum flat and rather sparsely punctulate, posteriorly with smooth and strongly shiny band; side of scutellum with wide crenulate depression, and lunula medium-sized and elliptical (fig. 6); posteriorly without distinct crenulation; metanotum weakly emarginate anteriorly (fig. 6); antepropodeal suture narrowly crenulate; propodeum medio-anteriorly mainly smooth, remainder distinctly punctate and posteriorly with some rugae, no areola , costulae or median carina (fig. 2).



Figs 1-8, *Apanteles* (*Choeras*) *gielisi* spec. nov., ♀, holotype. 1, wings; 2, propodeum, and first-third tergites, dorsal aspect; 3, detail of vein r and second submarginal cell of fore wing; 4, apex of antenna; 5, hind leg (infuscation indicated for femur, tibia and tarsus); 6, side of scutellum and metanotum, latero-dorsal aspect; 7, ovipositor sheath; 8, head, dorsal aspect. 1, 5, 7: 1.0 × scale-line; 2, 6: 1.8 ×; 3, 4: 2.5 ×; 8: 1.5 ×.

Wings.— Fore wing: r (actually r plus part of 2-SR because of low position of r-m) 3 times as long as 2-SR and distinctly curved (fig. 3); 1-CU1:2-CU1 = 9:20; 1-SR pointing to 1-CU1 (fig. 1); second submarginal cell very small (figs 1, 3); 2-SR+M comparatively long (fig. 3); 1-R1 3.5 times distance of 1-R1 to SR1 (fig. 1). Hind wing: r at basal 0.4 of marginal cell; basal cell evenly setose less densely than other cells; 2-SC+R shortly transverse (fig. 1); M+CU:1-M = 12:15; cu-a straight, vertical; plical lobe with fringe and posterior margin partly straight (fig. 1).

Legs.— Hind coxa sparsely punctulate dorsally and laterally, but densely punctate ventrally; tarsal claws slender and setose, without distinct comb, but basally with some bristles; length of femur, tibia and basitarsus of hind leg 3.5, 7.0 and 6.0 times their width, respectively (fig. 5); length of hind tibial spurs of equal length, 0.35 times hind basitarsus; fore tarsus rather slender; hind femur moderately densely punctate.



Figs 9-12, *Apanteles* (*Choeras*) *ruficornis* (Nees), ♂ (but 11 of ♀), Netherlands, Amerongen; figs 13-16, 19, *A.* (*C.*) *parasitellae* (Bouché), ♂, Netherlands, Den Bosch, but 13 and 15 of ♀, Amerongen; figs 17, 18, 20, *A.* (*C.*) *tedellae* Nixon, ♂, Netherlands, Terlet. 9, 13, 17, detail of vein r and second submarginal cell of fore wing; 10, 14, 18, propodeum, and first-third tergites, dorsal aspect; 11, 15, 19, 20, apex of antenna; 12, 16, scapus and pedicellus, anterior aspect. 9, 13, 17: 2.3 × scale-line; 10, 14: 1.5 ×; 11, 12, 15, 16, 19, 20: 2.5 ×; 18: 1.6 ×.

Metasoma.— Length of first tergite 3 times its apical width, distinctly narrowed posteriorly, its apical width 1.2 times median length of second tergite (fig. 2), surface of its posterior half mainly punctate; medial area of second tergite transverse and mainly smooth (fig. 2); third and following tergites smooth; length of ovipositor sheath 0.20 times (setose part) or 0.26 times (total length) length of fore wing, and

setose part 0.6 times hind tibia (fig. 7); ovipositor sheath rather widened, nearly parallel-sided (fig. 7); hypopygium of ♀ only ventrally narrowly membranous and apically acute (fig. 7).

Colour.— Black; labrum and mandibles yellowish-brown; palpi, tegulae, fore leg, middle coxa, trochanter, trochantellus and femur (but dorsally and basally darkened), hind trochantellus, middle of hind femur in lateral view, first and second tergites laterally, and baso-ventral half of metasoma brownish-yellow; basal 0.4 of middle and hind tibiae, and of hind basitarsus yellowish-white; remainder of middle and hind femora and hind basitarsus blackish-brown (fig. 5); hind trochanter, remainder of hind femur and tarsus, middle tarsus and middle coxa narrowly baso-dorsally dark brown; pterostigma and veins dark brown, but 1- and 2-SR+M, and m-cu and veins of hind wing weakly pigmented; parastigma partly brown; wing membrane weakly brownish.

Distribution.— Netherlands.

Biology.— Solitary parasitoid of larvae of *Enoicyla pusilla* (Burmeister) (Trichoptera: Limnophilidae).

Note.— The hypopygium of the female of the new species is as in *A. arene* Nixon, but this species has the vein r of fore wing about 0.8 times vein 2-SR and straight; the hind femur completely yellowish and the hind tibia only with weak apical infuscation; the penultimate antennal segment comparatively erect setose; the antescutellar sulcus groove-like and crenulate; the posterior half of the first tergite and medial area of the propodeum distinctly rugose and wing membrane subhyaline. In addition to the morphological differences the biology is aberrant.

Etymology.— I am glad to name this species after its collector, the lepidopterist Dr C. Gielis.

Acknowledgements and abbreviations

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