

# Review of fungus gnats of the genus *Tarnania* Tuomikoski, with a phylogeny of the *Rymosia* s.l. genus group (Diptera: Mycetophilidae)

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The four known species of *Tarnania* Tuomikoski are reviewed, viz. *T. dziedzickii* (Edwards, 1941), *T. fenestralis* (Meigen, 1818), *T. nemoralis* (Edwards, 1941), and *T. tarnanii* (Dziedzicki, 1910). Males and females are re-described, photographed and their terminalia figured. An attempt is made to homologize and name specific substructures of the male gonostylus, widely recognizable within the tribe Exechiini. A phylogenetic analysis of the *Tarnania* species, including representatives of the six other genera of the *Rymosia* s. lat. genus group, strengthens the view that *Tarnania* is monophyletic. *Tarnania* is supported by six unambiguous character changes of which three are considered to be unique synapomorphies, viz. 1) lower parts of metepisternum and metepimeron covered with campaniform sensilla; 2) hind tibia with several curved bristles posterodorsally, placed irregularly in more than one row; and 3) anterior branch of male gonostylus forming an elongated, bifurcated lobe. The most parsimonious hypothesis for relationships among the species of *Tarnania* is ((*T. tarnanii* + *T. nemoralis*) + (*T. dziedzickii* + *T. fenestralis*)). The practice of regarding the genera of the *Rymosia* s. lat. genus group as an assemblage of plesiomorphic genera is also supported, the most parsimonious hypothesis for relationships among them being (*Notolopha* (*Allodiopsis* (*Myrosia* (*Synplasta* (*Tarnania* + (*Rymosia* + *Pseudorymosia*)))))).

*Tarnania* is most diverse in northwestern Europe, with all four species known from Norway, Sweden, Great Britain, Belgium, Germany, Switzerland, and France. *T. dziedzickii* extends its distribution southwards to include the North African and the Near East Regions. *T. fenestralis* is widely distributed in the western Palaearctic Region and extends its distribution eastwards to the eastern Palaearctic region. Only *T. tarnanii* displays a wide Holarctic distribution including most of Russia, Alaska, Canada and Greenland.

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## Introduction

A review of the species of *Tarnania* Tuomikoski is motivated by a need to update knowledge of its species using modern taxonomic methods, and the fact that the genus apparently is among the more primitive genera of the tribe Exechiini and has its core distribution in northwestern Europe. As a part of the Swedish Taxonomic Initiative (see Miller 2005), taxonomic reviews of genera of the tribe Exechiini in Fennoscandia is being carried out. The first aim of this paper is to infer the phylogeny of *Tarnania* in relation to related genera of the *Rymosia* s.lat. genus group. Hence, a phylogenetic analysis is designed to allow for both a test of the

monophyly of *Tarnania* as well as for the practice of dividing *Rymosia* s.lat. into seven genera. The second aim is to present a detailed generic description of *Tarnania*, with an extended terminology of the male terminalia. The third aim is to provide a key for determination of the adults of *Tarnania*, to provide updated descriptions and illustrations of both sexes, and to infer their phylogenetic relationships. Hopefully, this study can form a reference for further work with the genera of Exechiini in Fennoscandia.

Tuomikoski (1966) revised the generic taxonomy of the Exechiini, and divided *Rymosia* Winertz s.lat. into four genera, viz. *Rymosia* s. str.,

*Tarnania* Tuomikoski, *Pseudorymosia* Tuomikoski, and *Allodiopsis* Tuomikoski. *Allodiopsis* was further divided in four subgenera, viz. sg. *Allodiopsis* s. str., sg. *Gymnogonia* Tuomikoski, sg. *Notolopha* Tuomikoski, and sg. *Myrosia* Tuomikoski. *Gymnogonia* was subsequently found to be a junior synonym of the genus *Synplasta* Skuse (Matile, 1987). Tuomikoski (1966) regarded all subgroups of *Rymosia* s. lat. as a residue of plesiomorphic taxa, characterized by plesiomorphic rather than synapomorphic characters. All subgenera were accordingly raised to generic level by Søli et al. (2000). Hence, *Rymosia* as a compound genus is presently divided into seven genera (Table 1). Tuomikoski (1966) based his phylogenetic considerations on morphological characters of the adults, and regarded *Tarnania* as representing one of the most plesiomorphic genera within the tribe Exechiini. Rindal (2000) presented the first cladistic analysis that included most of the genera of Exechiini, and placed *Tarnania* as a rather apomorphic clade, most closely related to *Pseudexechia* Tuomikoski. The analysis by Rindal (2000) was based on morphological characters of the adults, but did not include characters from the terminalia. There is little consensus between the classifications proposed by Tuomikoski (1966) and Rindal (2000) and a need for further studies that can incorporate characters from both studies into a combined and strengthened hypothesis.

*Tarnania* was raised for four species displaying an apomorphic loss of wing vein trichiation, special arrangement of the posterior bristles on the hind tibia, and unique details of the male terminalia (Tuomikoski 1966: 171). The included species are: *T. dziedzickii* (Edwards, 1941), *T. fenestralis* (Meigen, 1818), *T. nemoralis* (Edwards, 1941), and *T. tarnanii* (Dziedzicki, 1910). Originally *Tarnania* was known from Europe only (Tuomikoski 1966). Despite being rather well studied (Krivoshchina et al. 1986, Ostroverkhova 1979, Polevoi 2000, Zaitzev 1999, 2003) only two of the species are so far reported from Russia; *T. fenestralis* being mainly restricted to the European part and the much more widespread *T. tarnanii* (Chandler 2004, Zaitzev 2003). Vockeroth (1981) further reported *T. tarnanii* to be widespread in the Nearctic Region; later it has also been found in Greenland (Chandler 2004). Hence, it has a wide Holarctic, almost circumpolar distribution, however, not yet found in Iceland (Kjørandsen et al. *in press.*). *T. dziedzickii* is widely distributed in Europe

(Hackman et al. 1988, Chandler 2004) and extends its distribution southwards also to include the North African and Near East Regions (Burghele 1966, Chandler & Ribeiro 1995, Chandler 2004). *T. nemoralis* seems to be restricted mainly to NW Europe (Hackman et al. 1988, Chandler 2004).

Table 1. Divisions of the compound genus *Rymosia* Winnertz s. lat. as treated by Edwards (1925), Tuomikoski (1966) and Søli et al. (2000).

Winnertz (1863) Edwards (1925)	Tuomikoski (1966)	Søli et al. (2000)
<i>Rymosia</i> Winnertz, 1863	<i>Rymosia</i> s. str.	<i>Rymosia</i> s. str.
-	<i>Pseudorymosia</i> Tuomikoski, 1966	<i>Pseudorymosia</i>
-	<i>Tarnania</i> Tuomikoski, 1966	<i>Tarnania</i>
-	<i>Allodiopsis</i> Tuomikoski, 1966	<i>Allodiopsis</i> s. str.
-	s.g. <i>Gymnogonia</i> Tuomikoski, 1966	<i>Synplasta</i> Skuse, 1890 = <i>Gymnogonia</i>
-	s.g. <i>Myrosia</i> Tuomikoski, 1966	<i>Myrosia</i>
-	s.g. <i>Notolopha</i> Tuomikoski, 1966	<i>Notolopha</i>

## Material and methods

The holotypes of *Tarnania apicalis* (Meigen, 1838), *T. dziedzickii*, *T. fenestralis*, *T. nemoralis*, and *T. bavaria* Plassmann, 1980 have been re-examined. The type material of *T. tarnanii* was destroyed during the Second World War (see Trojan 2002), and its identity rests primarily on the illustrations provided by Dziedzicki (1910). Additional material studied consists of more than 600 specimens of *Tarnania*, collected mainly in various parts of Fennoscandia. Females are associated with the males by the combination of non-genitalic characters and co-occurrences. The majority of the material is preserved in alcohol but some dry, pinned specimens were also studied. The material was obtained from and is deposited at the following museums and collections:

- BMNH – Natural History Museum, London, United Kingdom
- MNHN – Muséum National d'Histoire Naturelle, Paris, France.
- MZHF – Zoological Museum, University of Helsinki, Helsinki, Finland
- MZLU – Museum of Zoology, Lund University, Lund, Sweden
- NHRS – Swedish Museum of Natural History, Stockholm, Sweden
- ZMUN – Zoological Museum, University of Oslo, Oslo, Norway
- ZSMC – Zoologische Staatssammlung, München [= Munich], Germany

All specimens examined were recorded with unique identification codes in the Biota 2 database software (Colwell 2004), and the "material examined" lists were extracted from this database. For each species and country the localities are sorted hierarchically within provinces, districts, localities and sites respectively.

In order to produce color plates of the species, fresh specimens stored in alcohol were arranged under bright light on white background and photographed with a digital camera (Nikon coolpix 995) while lying in alcohol. Five or more males and females of each species were cleared and slide mounted in Canada balsam. The specimens were dissected in alcohol. Both wings and the legs from the left side were cleared in acetic acid. The head, antennae, thorax with right legs, and the whole abdomen with terminalia were cleared in heated 10% KOH for 15 - 45 minutes, then neutralized in acetic acid together with the rest of the specimen. Then all parts were successively transferred to absolute alcohol, a mixture of absolute alcohol and cedar wood oil, and to pure cedar wood oil. The terminalia of some specimens were further dissected while in cedar wood oil. The gonostylus of one side were detached and sometimes also tergite IX with cerci. All parts were finally mounted in Canada balsam under 5-6 separate cover slips in the following order: wings, one dorsal, one ventral; detached legs in anterior view; head in dorsal view with detached antennae; thorax with attached legs in lateral view; abdomen in lateral view plus terminalia that usually were detached and mounted in different views (ventral, dorsal & lateral); and finally often gonostylus in internal view under a sixth cover slip.

For the phylogenetic analysis male and female representatives of the other genera of the *Rymosia* s. lat. genus group and two outgroup taxa were slide mounted following the same procedure.

### Terminology and measurements

The general morphological terminology follows Sølvi (1997) and Sølvi et al. (2000). Terminology of sensilla follows Seifert (1975). An attempt is made to further homologize and name six specific genitalic substructures of the male gonostylus, widely recognizable within the tribe Exechiini. These are: The "dorsal branch", the "dorsointernal branch", the "medial branch", the "ventral branch", the "anterior branch" and the "internal branch" (Fig. 3D).

Apart from total body length all measurements were made from the slide-mounted specimens and are given as the range of measured specimens followed by the mean value when 5 or more specimens were measured. The head is measured in dorsal view. Head width is measured at the widest point and head length is measured from the vertex to the frontal tubercle. Only the three apical maxillary palpomeres are measured, beginning with the antepenultimate palpomere. The palpomere ratios are thus given as the ratio of the fourth and fifth palpomere to the length of the antepenultimate (third) palpomere. The wing length is measured from the distal median plate to apex of wing (Fig. 2B). The fork length ratio is given as the distance from the distal median plate to the branching of M (A in Fig. 2B) over the distance from the distal median plate to the branching of CuA (B in Fig. 2B). The R5 termination ratio is given as the distance between R<sub>1</sub> and R<sub>5</sub> termination (C in Fig. 2B) over the distance between R<sub>5</sub> and M<sub>1</sub> termination (D in Fig. 2B). The fork width ratio is given as the distance between M<sub>1</sub> and M<sub>2</sub> termination (E in Fig. 2B) over the distance between CuA<sub>1</sub> and CuA<sub>2</sub> termination (F in Fig. 2B). Otherwise the M-ratios, CuA-ratios and leg ratios follow Sølvi (1997).

### Phylogenetic methods

The data matrix for the phylogenetic reconstruction was built by using the computer program MacClade 3.04 (Maddison & Maddison 1992). Maximally parsimonious resolution, MPR, was searched for after exporting the data matrix to the program PAUP 4.0 (Swofford 2002). Support for the branches was assessed using the decay index or 'Bremer support' (Källersjö et al. 1992) and bootstrapping (Felsenstein 1985; Swofford 1993). The decay index search was performed by Auto-Decay 3.0.3 (Eriksson 1996) with the tree rooted and PAUP search parameters set to default (addseq = random nreps = 10 reseed = 1). Total Support, TBS, was calculated by the sum of individual decay indexes (Källersjö et al. 1992). Bootstrapping was performed with 1000 pseudoreplications, each with 10 random addition searches.

### Phylogeny and classification

The following 10 taxa were included in the ingroup for the *Rymosia* s. lat. genus group: *Alloidiopsis domestica* (Meigen, 1830), *Myrosia macu-*

*losa* (Meigen, 1818), *Notolopha cristata* (Staeger, 1840), *Pseudorymosia fovea* (Dziedzicki, 1910), *Rymosia affinis* Winnertz, 1863, *Synplasta karelica* Zaitzev, 1993, *Tarnania dziedzickii* (Edwards, 1941), *Tarnania fenestralis* (Meigen, 1818), *Tarnania nemoralis* (Edwards, 1941), and *Tarnania tarnanii* (Dziedzicki, 1910). *Speolepta leptogaster* (Winnertz, 1863) and *Dynatosoma norwegiense* Zaitzev & Økland, 1994 were used as outgroup. The following 69 morphological characters of the adults were used to infer relationships between the included taxa. The observed states of the characters are given in Table 2.

#### HEAD:

1. Antenna with second flagellomere: 0 = long rectangular, 1 = short subquadrate.
2. Scape and pedicel of antenna: 0 = with normal setae 1 = with strong, short bristles.
3. Sensory pit in third palpomere: 0 = absent. 1 = an internal sac with a narrow, basal opening, 2 = a longitudinally arranged, open furrow.
4. Fifth palpomere: 0 = shorter than third and fourth palpomere combined, 1 = longer than third and fourth palpomere combined.
5. Head shape: 0 = round, 1 = elongated.
6. Median ocellus: 0 = present and well developed, 1 = vestigial, but traceable, 2 = absent.
7. Occipital furrow: 0 = present, 1 = absent.
8. Frontal furrow: 0 = reaching the frontal tubercle, 1 = reduced.
9. Frontal tubercle; 0 = broad, 1 narrow, pointed.
10. Lower frons: 0 = without setae, 1 = with setae.
11. Premental apodeme: 0 = with two posterior processes, 1 = with one posterior process.
12. Clypeus: 0 = round, 1 = ovate, 2 = subtriangular to cordate.

#### THORAX:

13. Proepisternum: 0 = with more than two strong bristles, 1 = with two strong bristles, 2 = with one strong bristle, 3 = without strong bristles.
14. Mesoscutum: 0 = scattered with strong setae, 1 = scattered with small setae.
15. Mesoscutal setae; 0 = dark, 1 = pale.
16. Mesoscutal acrostichal bristles: 0 = present, strong, 1 = present, but reduced in size, 2 = absent.
17. Mesoscutal dorsocentral bristles: 0 = present, strong, 1 = present, but reduced in size.
18. Mesoscutal dorsocentral bristles: 0 = normal,

1 = strong, apically truncated.

19. Scutellar bristles: 0 = many strong bristles. 1 = two strong pairs, 2 = one strong pair.
20. Anepisternum: 0 = with bristles dorsally, 1 = with scattered small setae, 2 = without setae.
21. Anepimeron: 0 = with setae, 1 = without setae.
22. Laterotergite: 0 = without setae, 1 = with scattered small and large bristles.
23. Mediotergite: 0 = with setae, 1 = without setae.
24. Metepisternum: 0 = without setae, 1 = covered with setae, 2 = setae confined to posterior part.
25. Metepisternum: 0 = without campaniform sensilla, 1 = lower parts covered with campaniform sensilla.
26. Mesonotal stripes: 0 = indistinct or absent, 1 = distinct.

#### WINGS:

27. Wing membrane: 0 = with trichia irregularly arranged apically in r-sector, 1 = with trichia arranged into rows apically in r-sector.
28. Basicosta: 0 = without pair of strong bristles, 1 = with pair of strong bristles.
29. Crossvein h: 0 = without setae, 1 = with setae.
30. Distal medial plate dorsally: 0 without setae, 1 with setae.
31. Distal medial plate ventrally: 0 without setae, 1 with setae.
32. Costa: 0 = ending at R<sub>5</sub>-termination, 1 = produced beyond R<sub>5</sub>.
33. Subcosta: 0 = long, 1 = short.
34. Subcosta: 0 = ending free, 1 = ending in R.
35. Crossvein ta: 0 = oblique, 1 = longitudinal.
36. Crossvein ta: 0 = without weakened, pale spot, 1 = with weakened, pale spot.
37. R<sub>4</sub>: 0 = present, 1 = absent.
38. R<sub>5</sub>: 0 = straight, 1 = curved, 2 = sinusoid.
39. M-fork: 0 = with setae, 1 = without setae.
40. CuA -fork: 0 = starts beyond base of crossvein ta, 1 = starts before base of crossvein ta.
41. CuA-fork: 0 = starts before M-fork, 1 = starts beyond M-fork.
42. CuA-fork: 0 = with setae, 1 = without setae.

#### LEGS:

43. Tibia: 0 = apically without transverse brush, 1 = apically with transverse brush.
44. Fore tibia: 0 = with trichia irregularly arranged, 1 = with trichia in rows.
45. Front tarsi 3-4: 0 = normal, 1 = spinose ven-

trally.

46. Mid femur: 0 = apically with bristles, 1 = apically without bristles.
47. Hind coxa basally: 0 = without bristles, 1 = with two bristles, 2 = with one bristle only.
48. Hind tibia: 0 = without rows of trichia, 1 = with rows of trichia.
48. Hind tibia: 0 = without several rows of curved setae posteroapically, 1 = with several rows of curved setae posteroapically.
49. Empodium: 0 = well developed, 1 = rudimentary.

#### ABDOMEN

51. Pale abdominal markings: 0 = absent, 1 = situated towards the apices of the tergites, 2 = situated towards the bases of the tergites

#### MALE TERMINALIA:

52. Gonocoxite: 0 = ventrally closed, 1 = moderately incised ventrally, 2 = deeply incised ventrally.
53. Hypandrial lobe: 0 = vestigial or absent, 1 = present as a small bud, 2 = present as a large plate.
54. Hypandrial lobe: 0 = vestigial or absent, 1 = weakly sclerotized, 2 = heavily sclerotized.
55. Hypandrial lobe: 0 = apically without dorsally directed hook, 1 = apically with dorsally directed hook.
56. Aedeagal guides: 0 = absent, 1 = present as large lobes, 2 = present as small lobes.
57. Tergite IX: 0 = undivided, 1 = divided.
58. Tergite IX: 0 = without long, strong bristles, 1 = with pair of long, strong bristles, 2 = with pair of extra long, apically truncated bristles.
59. Cercus: 0 = Simple, one segmented, 1 = double lobed.
60. Gonostylus: 0 = simple, 1 = with three or more separated lobes.
61. Dorsal branch of gonostylus: 0 = apically striated with blunt lamellae, 1 = without blunt lamellae apically, 2 = reduced, sclerotized, 3 = inapplicable.
62. Dorsointernal branch of gonostylus: 0 = absent, 1 = present as internally directed fan-shaped lamellate lobe.
63. Medial branch of gonostylus: 0 = absent, 1 = simple, hook shaped, 2 = elongated, possessing specialized setae.
64. Ventral branch of gonostylus: 0 = absent, 1 =

present as a large shield.

65. Anterior branch of gonostylus: 0 = absent, 1 = present as bulbous lobe, 2 = present as elongated, bifurcated lobe.
66. Internal branch of gonostylus: 0 = absent, 1 = large, fleshy, striated cushion, 2 = reduced cushion, still striated, 3 = vestigial, without striation.
67. Aedeagus: 0 = elongated, apically pointed, 1 = furcated, 2 = reduced to internal, sclerotized bud.

#### FEMALE TERMINALIA:

68. Cercus: 0 = two segmented, 1 = one segmented.
69. Postgenital plate: 0 = bare, 1 = bearing setae.

The parsimony analysis using the exhaustive search option of PAUP resulted in one minimum length tree of 125 steps, a consistency index of 0.58, a retention index of 0.58, and a total Bremer support of 23 (Fig. 1). After the analysis the tree was rooted with *Speolepta leptogaster* (Winnertz, 1863) as outgroup. The *Exechiini* genera in the *Rymosia* s. lat. group remained monophyletic in relation to the outgroup taxa, and are well supported by the data with a Bremer support of 9 and a bootstrap value of 99%. As plesiomorphic representatives of *Exechiini* the *Rymosia* s. lat. group are supported by nine unambiguous character changes:

1. Frontal furrow of head reduced (character 8: 0->1).
2. Frontal tubercle of head narrow, pointed (character 9: 0->1).
3. Clypeus ovate (character 12: 0->1)
4. Tibia with transverse brush apically (character 43: 0->1)
5. Mid femur without bristles apically (character 46: 0->1)
6. Empodium rudimentary (character 50: 0->1)
7. Pale abdominal markings situated towards the apices of the tergites (character 51: 0->1)
8. Gonocoxite deeply incised ventrally (character 52: 0->2)
9. Medial branch of gonostylus simple, hook shaped (character 63: 0->1)

With the possible exception of *Rymosia* and *Pseudorymosia*, none of the genera grouped together in monophyletic subgroups. Rather, they form a

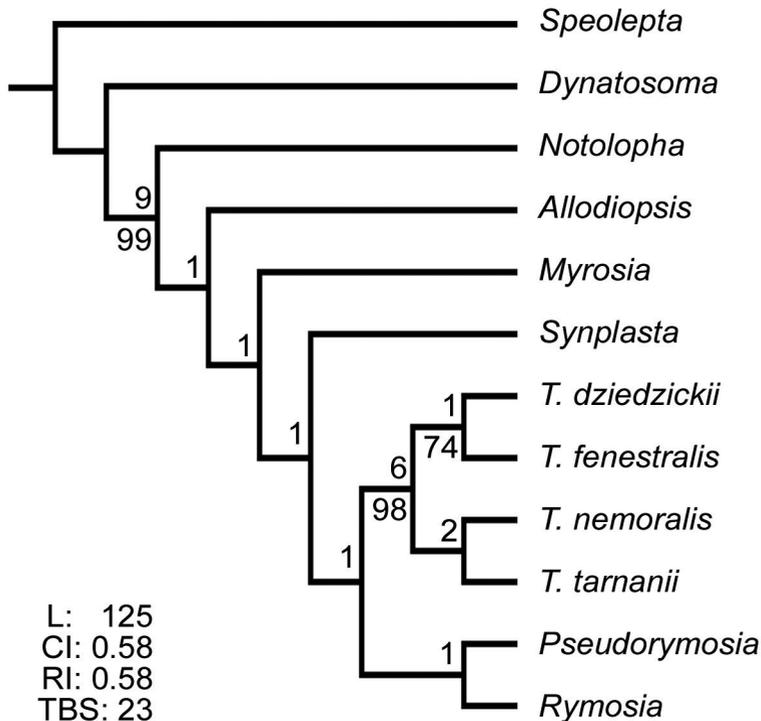


Fig. 1. Most parsimonious hypothesis for relationship between *Tarnania* Tuomikoski species, and their relationship to other genera in the *Rymosia* Winnertz s. lat. genus group. The number of extra steps needed to break up the monophyly of a clade (the decay index or Bremer support) is given above and bootstrap values (above 50% of 1000 replicates) is given below the corresponding branch. Studied taxa in the *Rymosia* s. lat. genus group are: *Allodiopsis fovea* (Dziedzicki, 1910), *Rymosia affinis* Winnertz, 1863, and *Synplasta karelica* Zaitzev, 1993. Outgroup taxa are: *Speolepta leptogaster* (Winnertz, 1863) (Sciophilini) and *Dynatosoma norwegiense* Zaitzev & Økland, 1994 (Mycetophilini). Abbreviations: L = tree length; CI = consistency index; RI = retention index; TBS = Total Bremer Support.

“Hennigian comb” nested within each other in the sequential order: (*Notolopha* (*Allodiopsis* (*Myrosia* (*Synplasta* (*Tarnania* (*Rymosia*, *Pseudorymosia*)))))). Hence, the practice of treating the whole group as seven plesiomorphic genera is supported, but their relationships are rather weakly supported by the present data. *Tarnania* remained monophyletic, well supported by the data with a Bremer support of 6 and a bootstrap value of 98%. The nearest sistergroup of *Tarnania* seems to be *Rymosia* and *Pseudorymosia* combined, but further analyses, including all Exechiini genera should be undertaken to conclude on this issue. The most parsimonious hypothesis for relationships among the species of *Tarnania* is ((*T. tarnanii* + *T. nemoralis*) + (*T. dziedickii* + *T. fenestralis*)).

### Genus *Tarnania* Tuomikoski

*Tarnania* Tuomikoski, 1966: 170

*Type species.* – *Rymosia tarnanii* Dziedzickii, 1910 by subsequent designation.

*Diagnosis.* – Species of the genus *Tarnania* are large, stout exechiines, body length 6–9.5 mm (Fig. 2A). They can be recognized by the combination of the following characters: Proepisternum usually with one strong bristle, a second, smaller bristle present in *T. tarnanii*. Anepisternum scattered with small setae. Lower parts of metepisternum and metepimeron covered with campaniform sensilla (Fig. 2C). Wings with subcosta ending in  $R_1$ , M-fork and Cu-fork without setae, CuP and  $A_1$  long and strong (Fig. 2B). Hind tibia with several

Table 2. Observed states of morphological characters used to infer phylogenetic relationships between the included taxa. All characters are treated as unordered. Characters no. 1-51 are of adults, no. 52-67 of males only, and no. 68-69 of females only. The studied taxa are: *Speolepta leptogaster* (Winnertz, 1863), *Dynatosoma norwegiense* Zaitzev & Økland, 1994, *Allodiopsis domestica* (Meigen, 1830), *Myrosia maculosa* (Meigen, 1818), *Notolopha cristata* (Staeger, 1840), *Pseudorymosia fovea* (Dziedzicki, 1910), *Rymosia affinis* Winnertz, 1863, *Synplasta karelica* Zaitzev, 1993, *Tarnania dziedzickii* (Edwards, 1941), *Tarnania fenestralis* (Meigen, 1818), *Tarnania nemoralis* (Edwards, 1941), and *Tarnania tarnanii* (Dziedzicki, 1910).

Taxon	Characters																																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	
<i>Speolepta</i>	0	0	0	0	0	0	1	0	0	0	0	0	3	0	0	0	0	0	2	2	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0
<i>Dynatosoma</i>	0	1	2	0	1	2	0	0	0	1	1	0	0	1	0	2	1	0	0	0	0	1	1	1	0	0	1	1	1	1	1	1	0	1	1	0
<i>Allodiopsis</i>	0	0	2	0	0	1	1	1	1	0	1	1	0	1	0	1	0	0	1	2	1	1	1	2	0	1	1	1	1	0	0	0	1	1	0	
<i>Myrosia</i>	0	0	2	1	0	2	1	1	1	0	1	2	0	0	0	1	0	0	1	1	1	1	1	2	0	1	1	1	1	0	0	0	1	1	0	
<i>Notolopha</i>	1	1	1	0	0	1	1	1	1	0	1	1	0	0	1	0&1	0	1	1	2	1	1	1	2	0	0	1	1	1	0	0	1	1	0	1	1
<i>Pseudorymosia</i>	0	0	1	1	0	2	1	1	1	0	1	2	1	0	0	2	1	0	2	1	1	1	0	1	0	1	1	1	1	1	1	1	0	1	1	1
<i>Rymosia</i>	0	0	1	1	0	2	1	1	1	0	1	0	1&2	1	0	2	0	0	1	1&2	1	1	0	2	0	1	1	1	1	0	0	0	0	1	1	1
<i>Synplasta</i>	0	0	2	1	0	2	1	1	1	0	1	1	1	1	1	2	1	1	2	2	1	1	1	2	0	1	1	1	1	1	1	1	0	1	1	1
<i>T. dziedzickii</i>	0	0	2	1	0	2	1	1	1	0	1	2	2	0	0	2	0	0	2	1	1	1	1	2	1	1	1	1	1	1	1	1	0	1	1	1
<i>T. fenestralis</i>	0	0	2	1	0	1	1	1	1	0	1	2	2	0	0	2	0	0	2	1	1	1	1	2	1	1	1	1	1	1	1	1	0	1	1	1
<i>T. nemoralis</i>	0	0	2	1	0	2	1	1	1	0	1	2	2	0	0	2	0	0	2	1	1	1	1	2	1	0	1	1	1	1	1	1	0	1	1	1
<i>T. tarnanii</i>	0	0	2	1	0	1	1	1	1	0	1	2	1	1	0	2	0	0	2	1	1	1	1	2	1	0	1	1	1	1	1	1	0	1	1	1

Taxon	Characters																	
	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53
<i>Speolepta</i>	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Dynatosoma</i>	0	1	0	0	0	1	0	0	1	0	0	2	1	0	0	0	0	0
<i>Allodiopsis</i>	0	1	0	0	1	0	1	0	1	0	1	2	1	0	1	1	2	
<i>Myrosia</i>	1	1	1	0	1	0	0	1	1	0	1	1	0	1	1	2	2	
<i>Notolopha</i>	1	1	1	0	1	0	0	1	1	0	1	2	1	0	1	2	1	
<i>Pseudorymosia</i>	1	1	1	0	0	0	1	1	1	2	1	0	1	2	0	0	0	
<i>Rymosia</i>	0	1	1	1	0	0	1	1	0&1	1	1	1	0	1	2	0	0	
<i>Synplasta</i>	0	1	0	0	1	0	0	1	1	0	1	1	1	0	1	2	2	
<i>T. dziedzickii</i>	0	1	1	1	0	0	1	1	1	0	1	1	1	1	1	2	1	
<i>T. fenestralis</i>	0	1	1	1	0	0	1	1	1	0	1	1	1	1	1	2	1	
<i>T. nemoralis</i>	0	1	1	1	1	0	1	1	1	0	1	2	1	1	1	2	1	
<i>T. tarnanii</i>	0	1	1	1	1	0	1	1	1	0	1	2	1	1	1	1	0	

curved bristles posterodorsally, placed irregularly in more than one row (Fig. 2D). Abdomen with pale abdominal markings situated towards the apices of the tergites (Figs 5&6). Male terminalia large; tergite IX undivided (Fig. 9), without pair of strong, elongated setae; cerci one-segmented, elongated; gonocoxite deeply incised ventrally where a large, sclerotized, hypandrial lobe is situated (Fig. 7); hypandrial lobe apically with dorsally directed hook (Fig. 10). Dorsal branch of gonostylus apically striated with blunt lamellae (Fig. 8); dorsointernal branch present as internally directed, fan-shaped, bluntly lamellate lobe; internal branch present as a large, bulbous, striated pouch; anterior branch present as elongated, bifurcated structure, where the ventrally directed lobe is covered with small spicules. Female terminalia (Fig. 12) with two-segmented cerci of which the apical segment is short to long ovate; sternite X and gon-

apophysis IX fused and extended into long, setose postgenital plate; gonocoxite VIII pointed, with three strong setae; gonapophysis VIII present as hyaline protrusion, extending well beyond apex of gonocoxite VIII.

*Synapomorphies.* – Lower parts of metepisternum and metepimeron covered with campaniform sensilla (Fig. 2C, character 25: 0->1, no parallelism). Hind tibia with several curved bristles posterodorsally, placed irregularly in more than one row (Tuomikoski 1966: 170, Fig. 2D, character 49: 0->1, no parallelism). Hypandrial lobe apically with dorsally directed hook (Fig. 10, character 55: 0->1, parallelism in *Notolopha*). Aedeagal guides present as large lobes (Fig. 3C, character 56: 2->1, parallelism in *Notolopha* and some *Rymosia*). Male tergite IX undivided (Figs 3B & 9, character 57: 1->0, parallelism in *Allodiopsis*, *Notolopha*

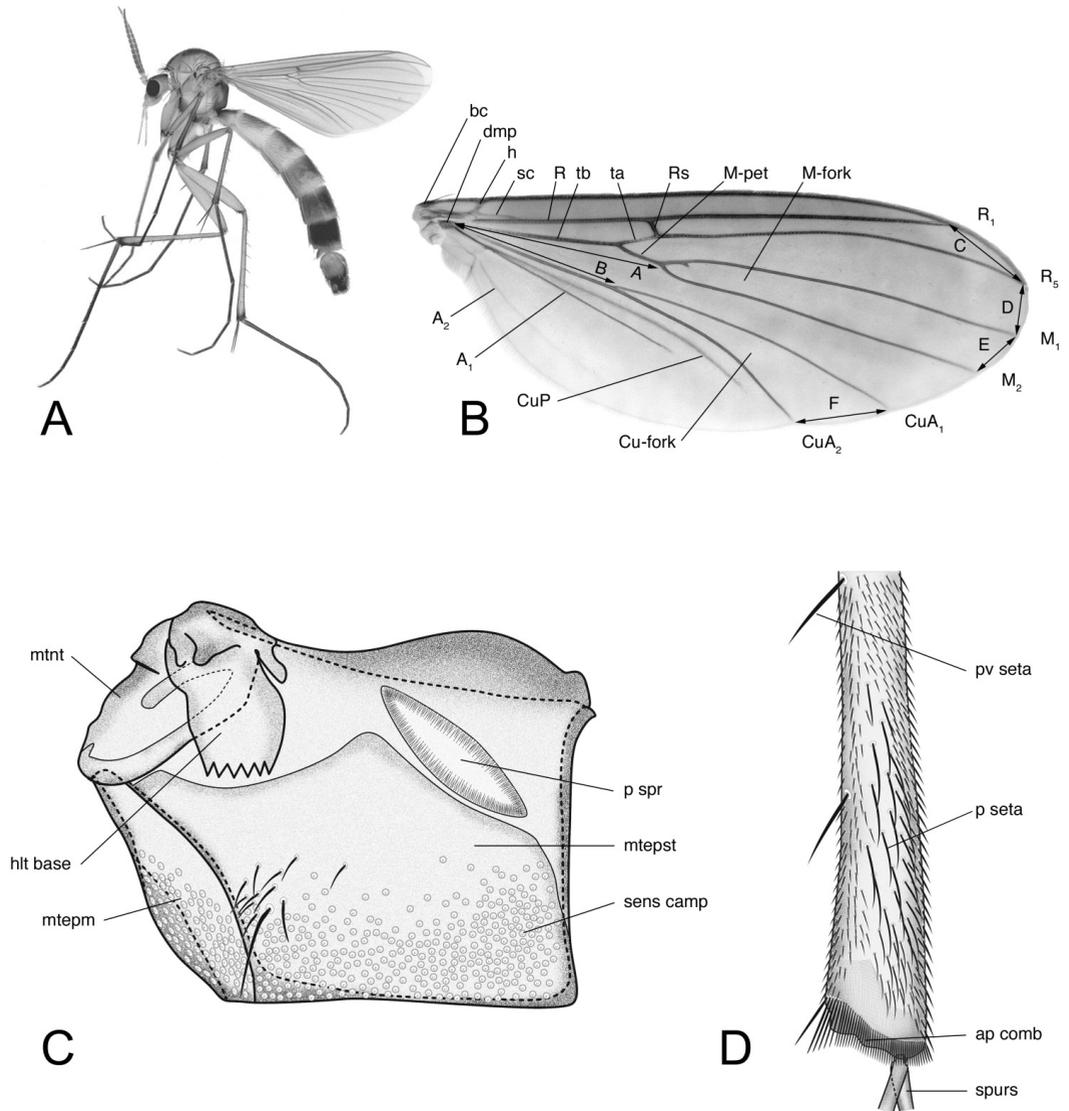


Fig. 2. Morphology of *Tarnania* Tuomikoski [A, B & D = *T. fenestralis* (Meigen, 1818), C = *T. dziedickii* (Edwards, 1941)]. – A: Habitus, lateral view. – B: Wing. – C: Metapleuron, lateral view – D: Hind tibia, posterior view. Abbreviations: A = distance between base of the distal median plate to the branching of media; A<sub>1</sub> = anterior anal vein; A<sub>2</sub> = posterior anal vein; ap comb = apical comb; B = distance between base of the distal median plate to the branching of CuA; bc = cubital fork; C = distance between R<sub>1</sub> and R<sub>5</sub> termination; CuA<sub>1</sub> and CuA<sub>2</sub> = anterior branch of cubitus; Cu-fork = cubital fork; CuP = posterior branch of cubitus; D = distance between R<sub>5</sub> and M<sub>1</sub> termination; dmp = distal median plate; E = distance between M<sub>1</sub> and M<sub>2</sub> termination; F = distance between CuA<sub>1</sub> and CuA<sub>2</sub> termination; h = humeral; hlt base = base of halter; M<sub>1</sub> and M<sub>2</sub> = branches of media; M-fork = medial fork; mtepm = metepimeron; mtepst = metepisternum; mnt = metanotum; p seta = posterior setae; p spr = posterior spiracle; pv seta = posteroventral setae; R = radius; R<sub>1</sub> = anterior branch of radius; R<sub>5</sub> = posterior branch of radius; Rs = radial sector; sc = subcosta; sens camp = campaniform sensilla; ta = anterior transversal (= crossvein rm); tb = basal transversal.

and outgroup taxa). Anterior branch of male gonostylus present as elongated, bifurcated lobe (Fig. 3D, character 65: 0->1, no parallelism).

*Description.* – Adults: Large, stout, with long legs and abdomen (Fig. 2A), body length 6-9.5 mm.

Head: Antenna with 14 flagellomeres; scape with a patch of close set setae medially, scape and pedicel otherwise with scattered setae; flagellomeres long rectangular, densely covered with medium sized, decumbent setae; scape, pedicel and half of first flagellomere pale, rest of flagellum darker. Vertex with five strong orbital bristles, otherwise covered with medium sized, decumbent, black setae. Ocelli two, set close to compound eyes; remnants of median ocellus usually present. Frontal furrow reduced, not reaching frontal tubercle. Face wide rectangular, covered with small setae. Clypeus subtriangular to cordate, covered with small setae. Palp with four distinct palpomeres; sensory pit in third palpomere present as a longitudinally arranged, open furrow, with trichoid sensilla; fifth palpomere longer than third and fourth palpomere combined.

Thorax: Proepisternum usually with one strong bristle only (a second, smaller bristle present in *T. tarnanii*). Scutum without acrostichals, with strong dorsocentrals, with strong prealar and postalar bristles, otherwise covered with small, black setae; with or without dark thoracic stripes on pale ground. Scutellum with one strong pair of bristles, otherwise covered with black setae of variable size. Anepisternum scattered with small, black setae. Anepimeron without setae. Laterotergite with small scattered black setae and some large bristles. Mediotergite without setae. Metepisternum (Fig. 2C) posteriorly with close-set group of small setae, lower half covered with campaniform sensilla. Metepimeron (Fig. 2C) with lower half covered with campaniform sensilla.

Wings (Fig. 2B): Wing membrane unspotted, yellowish tinted, with microtrichia only; trichia arranged into regular rows apically. Trichiation dark. Basicosta with pair of strong bristles. Crossvein h with dorsal setae. Distal medial plate with both dorsal and ventral setae. Costa, R, R<sub>1</sub>, tb, ta, and R<sub>5</sub> with both dorsal and ventral setae. Sc, Rs, M, CuA, CuP, A<sub>1</sub>, A<sub>2</sub> without setae. Costa terminates at tip of R<sub>5</sub>. R<sub>4</sub> absent. R<sub>5</sub> distinctly curved posteriorly. Crossvein ta without small white spot. M-fork long, M-petiole 0.8 - 1.7 times as long as ta. CuA-fork long, starts well before M-

fork, before or after base of ta. CuP long and basally strong, breaking or fading out about 1/7 before wing margin. A<sub>1</sub> shorter, distinct and strong, breaking abruptly well beyond CuA-fork. A<sub>2</sub> indistinct, short.

Legs: Trichiation dark. Fore coxa covered with small setae on anterior and lateral surface; anteriorly and apically with strong bristles. Mid coxa with narrow row of small setae anteriorly; basolaterally with some close-set, small setae; apical half with narrow row of small setae laterally; apically with larger setae and some bristles. Hind coxa with 1-3 strong setae basolaterally; with narrow row of small setae along posterolateral surface; apically with larger setae and some bristles. Femora uniformly covered with small setae. Tibiae with trichia in regular rows. Fore tibia with short anterior, anterodorsal and posteroventral bristles; anteroapically with triangular depressed area, covered with trichia. Mid tibia with row of small, close set anterior bristles; a few larger dorsal bristles; a few small posterodorsal bristles; some small posterior bristles; and a few small ventral and anteroventral bristles. Hind tibia (Fig. 2D) with a few large anterior bristles; some large dorsal bristles; several smaller, curved bristles placed irregularly in more than one row posterodorsally; a few small posterior bristles; and a few small posteroventral and ventral bristles; posteroapically with transverse comb of setae. Foretarsus without row of spine-like setae ventrally. Empodia rudimentary.

Abdomen (Fig. 2A): Dark areas of tergites in males gradually darker towards terminalia. Pale abdominal markings present along apices of tergites; more or less extended anteriorly to form larger triangular or complete pale areas laterally, sometimes granulated with large dark spots (Fig. 6A).

Male terminalia (Fig. 3): Tergite IX (Figs 3B & 9) large, undivided, with wide v-shaped incision apically; scattered with setae that get larger towards apicolateral corners, where 2-3 extra strong setae are situated. Cercus one-segmented, long ovate to slender, with or without dorsal widening basomedially; scattered with small, thin setae. Gonocoxite (Fig 3C) large, deeply incised ventrally in which a hypandrial lobe is situated; apically divided into an outer wall (section II) and a medioventral, inner wall (section III). Epiproct (Fig. 3B) pointed triangular, hyaline, without setae. Hypoproct (Fig. 3B) extends anteriorly to

about two-thirds the length of tergite IX; medio-ventrally with keel onto which aedeagus apparently slides back and forth. Aedeagus (Figs 3A, 3C & 11) short, triangular to quadrangular, sclerotized, with medial invagination apically, well retracted within gonocoxite, basally jointed with narrow gonocoxal apodeme. Aedeagal guides (Fig. 3C) large, hyaline lobes; situated dorsolaterad of hypandrial lobe. Hypandrial lobe (Figs 3C, 7 & 10) well developed, large and sclerotized; its angle in relation to gonocoxite variable, usually exposed and aligned with gonocoxite, sometimes retracted into gonocoxite and produced interodorsad; basally shaped as broad rectangular plate, apically usually constricted to a narrow lobe of variable length; basolaterally with patch of placoid sensilla; apically usually with distinct, dorsally directed hook. Gonostylus divided into six branches (Figs 3D & 8). Dorsal branch short, wide, apically rounded; apicointernal margin with row of small, blunt la-

mellae; lateral surface covered with strong setae. Dorsointernal branch present as a fan-shaped outgrowth of the ventrointernal margin of the dorsal branch; with row of small, blunt lamellae along entire internal margin; without setae. Medial branch small, hook-shaped, with a few setae. Ventral branch large, shaped as a subrectangular, slightly concave shield; external surface scattered with setae; internal surface with variable setal coverage. Anterior branch bifurcated into two long, digitate lobes; anteriorly directed lobe with strong setae apically; ventrally directed lobe covered with small spicules; without setae. Internal branch present as a large, bulbous, largely striated pouch; posteriorly with a few setae and a small, digitate lobe with setae on apex.

Female terminalia (Fig. 4): Usually partly retracted within tergite VII. Tergite VIII well developed, unmodified, devoid of setae. Sternite VIII large; ventrally scattered with small setae; fused

Table 3. Summary of associations of *Tarnania* species with fruit-bodies of fungi, based on references to reared material. 1 = Jakovlev (1994), 2 = Zaitzev (2003), 3 = original data. No association is known for *T. nemoralis* (Edwards, 1941).

	<i>T. dziedickii</i> (Edwards, 1941)	<i>T. fenestralis</i> (Meigen, 1818)	<i>T. tarnanii</i> (Dziedzicki, 1910)
<b>GOMPHALES</b>	-	<i>Ramaria</i> (Fr.) Bonord.	1 -
<b>POLYPORALES</b>	-	<i>Pleurotus</i> (Fr.) Qué.	2 -
<b>BOLETALES</b>	-	<i>Boletus</i> Dill. ex L. : Fr.	2 -
	-	<i>Leccinum</i> S. F. Gray	2 -
<b>AGARICALES</b>			
	-	<i>Armillaria</i> (Fr. : Fr.) Staude	2 <i>Armillaria</i> (Fr. : Fr.) Staude 1
<i>Camarophyllus</i> (Fr.) Kumm.	1	-	-
<i>Clitocybe</i> (Fr.) Staude	1	<i>Clitocybe</i> (Fr.) Staude	2 -
-	-	<i>Collybia</i> (Fr.) Kumm.	2 <i>Collybia</i> (Fr.) Kumm. 1
-	-	<i>Cortinarius</i> Fr.	2 <i>Cortinarius</i> Fr. 1
-	-	<i>Entoloma</i> (Fr.) Kumm.	2 <i>Entoloma</i> (Fr.) Kumm. 2
<i>Hygrocybe</i> Kumm.	3	-	-
-	-	<i>Hygrophorus</i> Fr.	2 <i>Hygrophorus</i> Fr. 1
-	-	<i>Hypholoma</i> (Fr.) Kumm.	2 -
-	-	-	<i>Inocybe</i> (Fr.) Fr. 1
-	-	<i>Lepista</i> (Fr.) W. G. Smith	2 -
-	-	<i>Leucopaxillus</i> Bours.	2 -
-	-	<i>Lyophyllum</i> Karst.	2 <i>Lyophyllum</i> Karst. 1
<i>Macrolepiota</i> Sing.	1	<i>Macrolepiota</i> Sing.	2 -
-	-	-	<i>Melanoleuca</i> Pat. 1
-	-	<i>Pholiota</i> Kumm.	2 -
-	-	-	<i>Rozites</i> Karst. 1
<i>Tricholoma</i> (Fr.) Qué.	1	<i>Tricholoma</i> (Fr.) Qué.	2 <i>Tricholoma</i> (Fr.) Qué. 1
<b>RUSSULALES</b>			
<i>Russula</i> Pers.	1	-	<i>Russula</i> Pers. 1

with the well-developed, apically pointed gonocoxite VIII, bearing 3-4 strong setae along apicodorsal margin. Gonapophysis VIII present as narrow, very hyaline protrusion, extending well beyond apex of gonocoxite VIII, dorsally slightly serrated, without setae. Labia not discernible or fused basally with gonapophysis VIII. Tergite IX well developed, partly fused with gonocoxite IX; with a few small setae apicolaterally. Sperma-

thecal duct apically constricted towards the eminance. Tergite X reduced or fused with epiproct. Epiproct triangular, hyaline, apically excavated, without setae. Sternite X apparently fused basally with gonapophysis IX; forming a long, sclerotized, narrow spatulate postgenital plate; apicoventrally scattered with small setae. Cercus two-segmented, scattered with small setae; apical segment slender to short ovate.

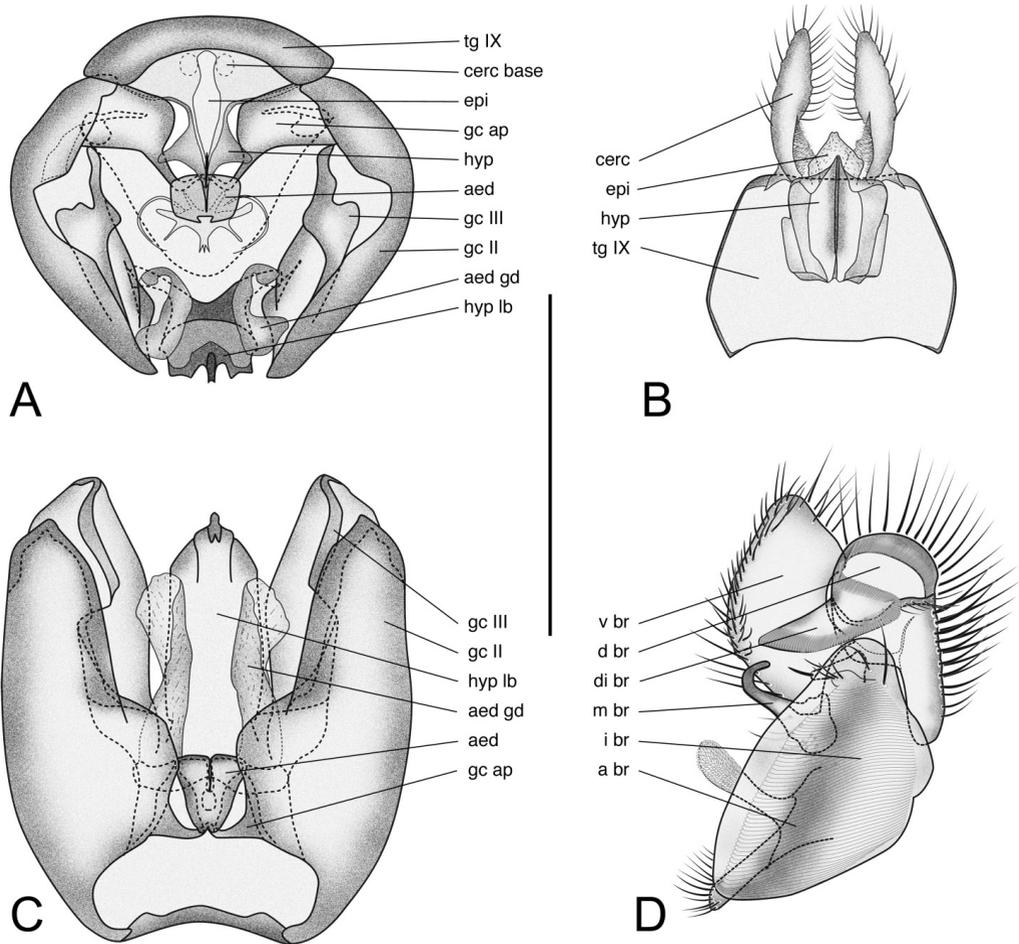


Fig. 3. Morphology of male terminalia of *Tarnania* Tuomikoski [A-C = *T. dziedickii* (Edwards, 1941), D = *T. fenestralis* (Meigen, 1818)]. – **A**: Terminalia, caudal view with gonostyles and cerci removed. – **B**: Tergite IX and proctiger in ventral view. – **C**: Terminalia, dorsal view with tergite IX and proctiger removed. – **D**: Gonostylus, internal view. Abbreviations: a br = anterior branch of gonostylus; aed = aedeagus; aed gd = aedeagal guide; cerc = cercus; cerc base = base of cercus; d br = dorsal branch of gonostylus; di br = dorsointernal branch of gonostylus; epi = epiproct; gc ap = gonocoxal apodeme; gc II = section II of gonocoxite; gc III = section III of gonocoxite; hyp = hypoproct; hyp lb = hypandrial lobe; i br = internal branch of gonostylus; m br = medial branch of gonostylus; tg IX = tergite IX; v br = ventral branch of gonostylus. Scale bar represents 0.5 mm.

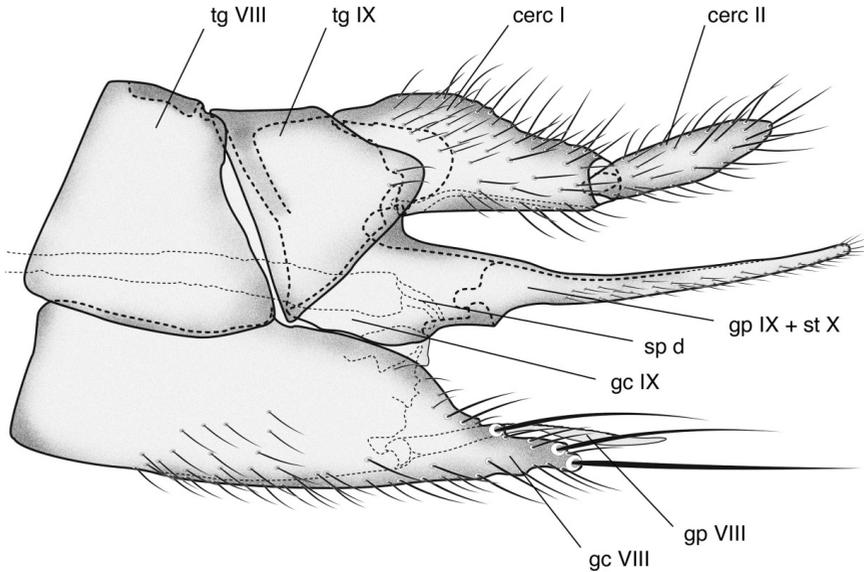


Fig. 4. Morphology of female terminalia of *Tarnania* Tuomikoski [*T. dziedickii* (Edwards, 1941) in lateral view]. Abbreviations: cerc I = first segment of cercus; cerc II = second segment of cercus; gc VIII = gonocoxite VIII; gc IX = gonocoxite IX; gp VIII = gonapophysis VIII; gp IX = gonapophysis IX; sp d = spermathecal duct; st X = sternite X; tg VIII = tergite VIII; tg IX = tergite IX.

**Biology.** – The larva of *Tarnania* has not been described in detail, but based on reared adults there are numerous records of their associations with fruit-bodies of mushrooms. Species of *Tarnania* must be regarded as polyphagous generalists, utilizing a wide range of species and genera of Gomphales, Polyporales, Boletales, Agaricales, and Russulales (Table 3). The adults can be found all year around. They frequently visit caves, mines and cellars for aestivation or hibernation (Matile 1970; Kjærandsen 1993).

**Key to males and females of *Tarnania***

- 1 Mesonotal stripes distinct (Fig. 5A); point of furcation of CuA opposite or beyond base of crossvein ta; vertex and frons uniformly dark; mid and hind coxa usually with indistinct dark marks medially; abdominal tergite III and IV often granulated with large dark spots in the pale apical area (Fig. 6A); male terminalia as large as or larger than abdominal segment VI ..... 2
- Mesonotal stripes indistinct or absent (Fig. 5D); point of furcation of CuA before base of crossvein ta; vertex pale, frons contrasting darker in front of lateral ocelli; mid and hind coxa usually with distinct dark marks medially; abdominal tergite III and IV not granulated with large dark spots in the pale apical area, if

- slightly granulated, then with small dark spots (Fig. 6D); male terminalia smaller than abdominal segment VI ..... 3
- 2 Overall coloration dark reddish brown, with sharply defined mesonotal stripes, narrowly surrounded by pale ground that usually gets darker towards the humeral area; laterotergite reddish brown. Male hypandrial lobe wide subquadrangular in ventral view, without constriction except at extreme tip (Fig. 7A). Male cercus long, slender (Fig. 9A). Female cercus II slender, 3.5 - 4.6 times as long as wide (Fig. 12A) ..... *Tarnania dziedickii* Edwards
- Overall coloration yellowish brown, with less sharply defined mesonotal stripes on uniformly pale ground extending to humeral area; laterotergite pale yellow. Male hypandrial lobe in ventral view basally tapering into a large, constricted, apical hook (Fig. 7B). Male cercus less slender, distinctly broader basally (Fig. 9B). Female cercus II short ovate, 2.5 to 3 times as long as wide (Fig. 12B) ..... *Tarnania fenestralis* Meigen
- 3 Only one strong propleural bristle present; antenna longer, second flagellomere about 1.3 as long as wide. Basal third of male hypandrial lobe rectangular in ventral view, then abruptly constricted into a long, narrow cylindrical process (Fig. 7C) with a large apical hook (Fig. 10C). Female cercus II slender, 3.5 - 4 times as long as wide (Fig. 12C) ..... *Tarnania nemoralis* Edwards

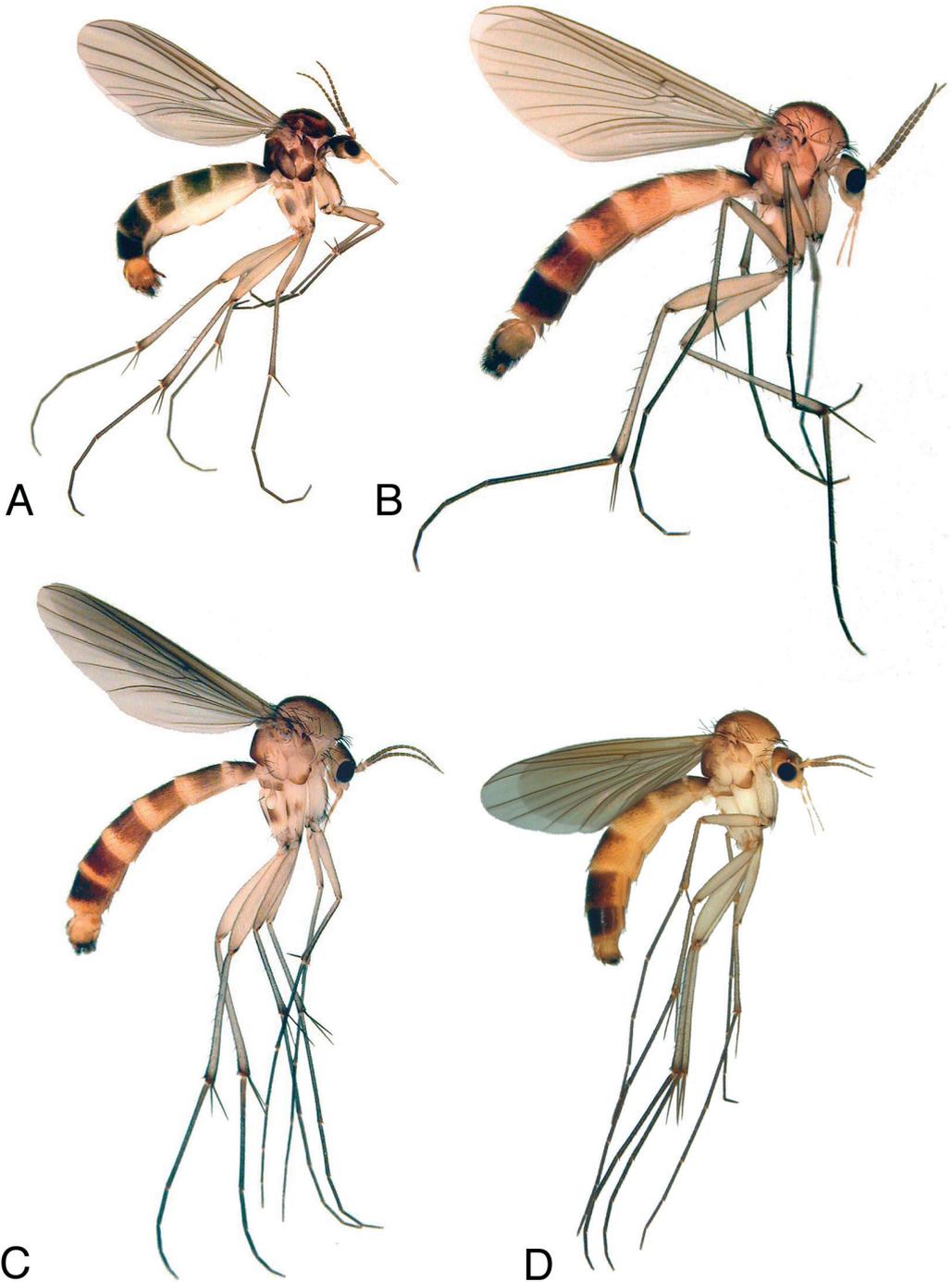


Fig. 5. Digital habitus photos of *Tarnania* Tuomikoski males.  
– A: *T. dziedzickii* (Edwards, 1941), – B: *T. fenestralis* (Meigen, 1818),  
– C: *T. nemoralis* (Edwards, 1941), – D: *T. tarnanii* (Dziedzicki, 1910).

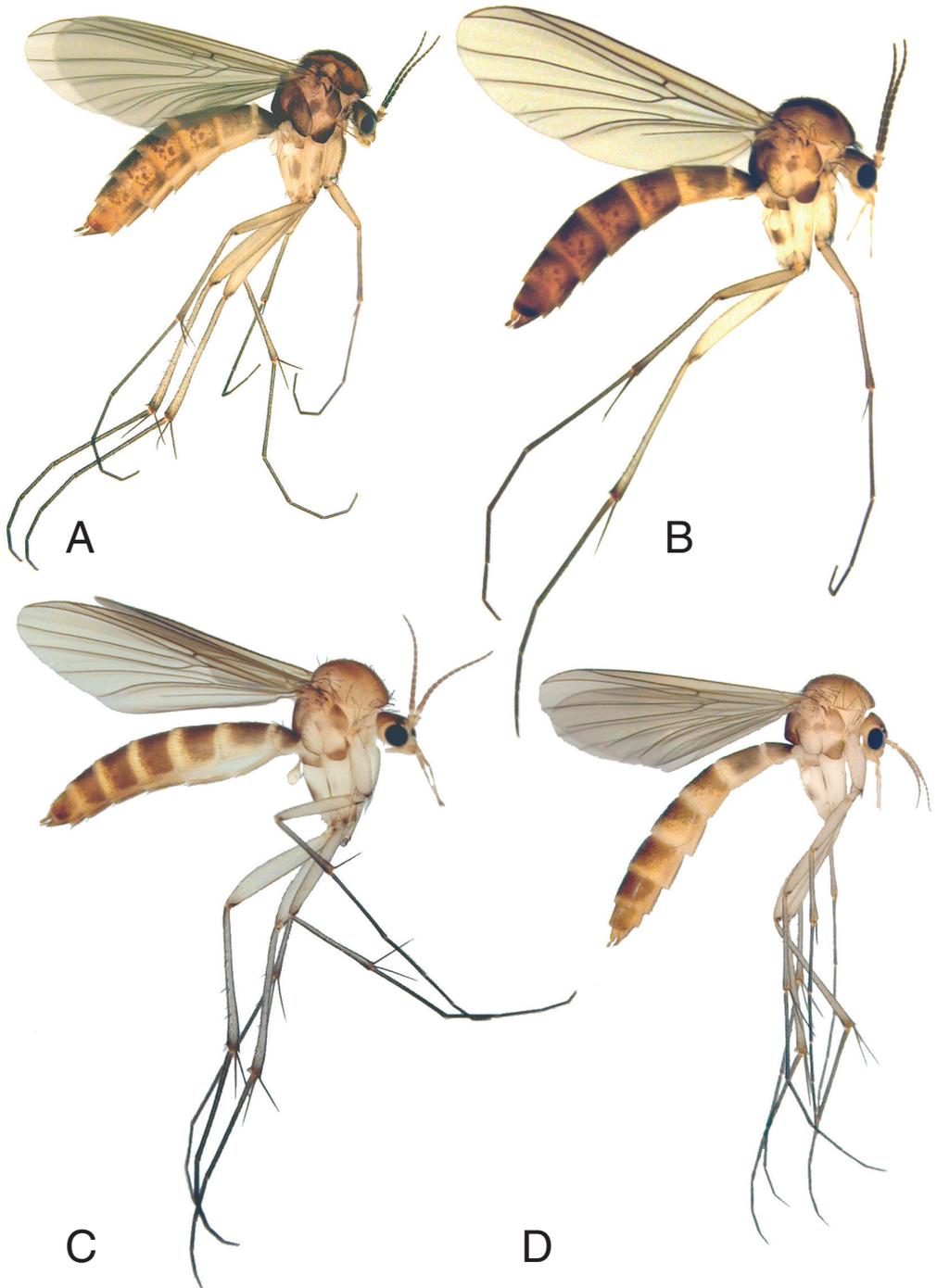


Fig. 6. Digital habitus photos of *Tarnania* Tuomikoski females.  
- A: *T. dziedickii* (Edwards, 1941), - B: *T. fenestralis* (Meigen, 1818),  
- C: *T. nemoralis* (Edwards, 1941), - D: *T. tarnanii* (Dziedzicki, 1910).

- One strong and one lesser propleural bristle present; antenna shorter, second flagellomere about as long as wide. Male hypandrial lobe in ventral view with basal half to two thirds wide rectangular, then abruptly constricted into a short pointed plate (Fig. 7D) with a less distinct apical hook (Fig. 10D). Female cercus II short ovate, 2 - 3.5 times as long as wide (Fig. 12D).....*Tarnania tarnanii* (Dziedzicki)

## Re-description of species

### *Tarnania dziedzickii* (Edwards, 1941)

(Figs 2C, 3A-C, 4, 5A, 6A, 7A, 8A, 9A, 10A, 11A, 12A)

*Rymosia dziedzickii* Edwards, 1941 – Edwards (1941: 78, fig. 8h-i)

*Rhymosia dziedzickii* Edwards, 1941 – Burghele (1965: 154, fig. 2)

*Tarnania dziedzickii* (Edwards, 1941) – Tuomikoski (1966: 171)

*Types examined.* – Holotype (male): GREAT BRITAIN: Gloucester, Symond's Yat, Sep 1936 (BMNH, leg. F. W. Edwards).

*Additional material examined.* – NORWAY: HOY, Bømlo, in mine galleries at Lykling, 10 Feb 1991 (MZLU, leg. J. Kjørandsen) – 23 females, 13 males; 1 Feb 1999 (MZLU, leg. J. Kjørandsen) – 10 females, 20 males; 11 Nov 2001 (MZLU, leg. J. Kjørandsen) – 1 male; 5 Jan 2003 (MZLU, leg. J. Kjørandsen) – 22 females, 12 males; 28 Dec 2004 (MZLU, leg. J. Kjørandsen) – 11 females, 11 males; 10 Feb 1991 (MZLU, leg. J. Kjørandsen) – 29 females, 4 males; Sveio, in WW2 bunkers at Nordbø, 29 Dec 2001 (MZLU, leg. J. Kjørandsen) – 1 female, 1 male; Bømlo, in small displacement-cave on Rundøy, Langevåg, 27 Jan 2002 (MZLU, leg. J. Kjørandsen) – 2 females; Øygarden, Storavann, Alvøy, 10-20 Nov 1987 (MZLU, leg. T. Andersen) – 18 females, 25 males; Dalsvann, Alvøy, 20 Oct-5 Nov 1987 (MZLU, leg. T. Andersen) – 1 female, 1 male; Seløy, Hjelmevann (MZLU, leg. T. Andersen) – 4 females, 8 males; Bømlo, Vorland, Langevåg, 11 Feb 2002-12 Feb 2003 (MZLU, leg. J. Kjørandsen) – 2 females, 2 males; RY, Utsira, 30 Sep 1990 (MZLU, leg. J. Kjørandsen) – 1 male; SWEDEN: SK, Lund, (MZLU, leg. J. W. Zetterstedt) – 1 male; 1 May 1835 (MZLU, leg. J. W. Zetterstedt) – 1 female.

*Diagnosis.* – Apart from the coloration as given in the key the male can be separated from other *Tarnania* primarily by the shape of the hypandrial lobe, which in ventral view is subrectangular and parallel-sided for most of its length, except at extreme tip where it is constricted to a tiny, pointed apex (Fig. 7A). Further diagnostic characters of the male include: The ventral branch of the gonostylus usually having a distinct protrusion apicodorsally and short setae internally on apical half (Fig. 8A); the median branch being evenly broad towards apex (Fig. 8A); the cercus being slender,

without dorsal widening basomedially (Fig. 9A); and the aedeagus being narrow triangular (Fig. 11A). The female is best separated from other *Tarnania* by the combination of dark coloration (Fig. 6A), having narrowly pointed gonapophysis VIII and long, slender cercus II (Fig. 12A).

*Description.* – Male (n = 5, except where otherwise stated): Total length 7 – 8, 7.3 mm. Wing length 3.84 – 4.38, 4.12 mm, or 3.33 – 3.47, 3.4 x as long as profemur. Mesonotum length 1.04 – 1.24, 1.11 mm, or 0.26 – 0.28, 0.27 x as long as wing.

Coloration (fresh animal in alcohol): Antenna with scape and pedicel light brown, basal half of first flagellomere light yellow, rest of flagellum uniformly brown. Head reddish brown, also on postgena; clypeus reddish brown, maxillary palp yellow. Thorax with sharply defined mesonotal stripes narrowly surrounded by pale yellow ground graduated towards darker reddish brown humeral areas; Anteprepronotum, proepisternum, anepisternum, lower two thirds of katepisternum, upper part of anepimeron, laterotergite, mediotergite and metepisternum reddish brown. Wings unmarked; yellow tinted, especially in costal and radial sector; wing veins yellow with dark setae. Halter whitish. Legs mainly yellow; fore coxa brownish basally; mid and hind coxae yellow, with large but diffuse brownish spot medially. Abdomen mainly reddish brown with narrow yellow bands apically, tergites III and IV with reddish yellow triangular area lateroapically granulated with large dark spots; tergite VI dark brown; sternites gradually darker towards terminalia; terminalia yellow basally, reddish brown apically; tergite IX and cercus yellow.

Head: Round, width / length to frontal tubercle 1.26 – 1.54, 1.41. Antenna 1.5 – 1.86 (n=3) mm long. First flagellomere 1.62 – 1.81, 1.72 times as long as second flagellomere. Second flagellomere 1.5 – 1.7, 1.6 times as long as wide. Length / width of clypeus 0.66 – 0.89, 0.76. Antepenultimate palpomere 0.15 – 0.19, 0.17 mm long, palpomere ratios 1: 1.23 – 1.41, 1.29: 2.73 – 3.04, 2.88.

Thorax: One strong proepisternal bristle.

Wings: Wing length to length of R<sub>1</sub> 2 – 2.17, 2.09. R<sub>5</sub> slightly sinusoid, wing length to length of R<sub>5</sub> 1.61 – 1.68, 1.65. Length of ta to length of M-petiole 1.15 – 1.43, 1.29. Fork length ratio (A/B) 0.99 – 1.09, 1.05. Fork width ratios (C/D and E/F) 2 – 2.4, 2.17 and 0.7 – 0.86, 0.76. M-ratios 0.58 –

0.64, 0.61 and 0.64 – 0.7, 0.66. CuA-ratios 0.69 – 0.84, 0.75 and 0.9 – 1.09, 0.97. CuP length to length of wing 0.55 – 0.69, 0.59. A<sub>1</sub> length to length of wing 0.45 – 0.48, 0.47.

Legs: Leg ratios given for fore, mid and hind leg: LR 0.95 – 1.03, 0.99: 0.97 – 1.04, 0.99: 0.75 – 0.79, 0.78; SV 1.94 – 2.1, 2.01: 1.92 – 2.04, 1.99: 2.29 – 2.39, 2.34; BV 1.64 – 1.81, 1.76: 2.02 – 2.15, 2.07: 2.66 – 2.91, 2.76; TR 1.48 – 1.63, 1.55: 1.74 – 1.91, 1.82: 2.11 – 2.25, 2.16.

Terminalia: Genitalia (Fig. 7A) as large as or larger than abdominal segment VI. Tergite IX (Fig. 9A) distinctly shorter than wide, covered with relatively few setae. Cercus narrow, slender, 5 – 5.94 (n=4) as long as wide in dorsal view; without dorsal widening basomedially. Aedeagus narrow triangular, with deep medial invagination apically (Fig. 11A). Hypandrial lobe in ventral view a long subrectangular and parallel-sided plate, without constriction except at extreme tip (Fig. 7A); in lateral view with small, distinct hook apically (Fig. 10A). Gonostylus (Fig. 8A) with dorsointernal branch fan-shaped; median branch evenly broad towards apex, apically with short, lanceolate seta; ventral branch usually with distinct protrusion apicodorsally, with short setae internally on apical half.

Female (n = 5, except where otherwise stated): Total length 7.5 – 9.5, 8.2 mm. Wing length 4.2 – 5.24, 4.71 mm, or 3.23 – 3.53, 3.41 x as long as profemur. Mesonotum length 1.14 – 1.5, 1.32 mm, or 0.27 – 0.29, 0.28 x as long as wing.

Coloration (fresh animal in alcohol): As for male, except abdominal tergites III – VI with larger, subrectangular reddish yellow areas laterally, more heavily granulated with large dark spots; tergite VII and terminalia reddish yellow.

Head: Round, width / length to frontal tubercle 1.22 – 1.56, 1.39. Antenna short, 1.8 – 2.2, 1.96 mm long. First flagellomere 1.62 – 2.09, 1.82 times as long as second flagellomere. Second flagellomere 1.6 – 1.77, 1.68 times as long as wide. Length / width of clypeus 0.64 – 0.77, 0.7. Antepenultimate palpomere 0.16 – 0.21, 0.19 mm long, palpomere ratios 1: 1.23 – 1.5, 1.37: 2.58 – 3.1, 2.83.

Thorax: One strong proepisternal bristle.

Wings: Wing length to length of R<sub>1</sub> 1.98 – 2.09, 2.04. R<sub>5</sub> slightly sinusoid, wing length to length of R<sub>5</sub> 1.61 – 1.67, 1.63. Crossvein ta with small, distinct white spot. Length of ta to length of M-peti-

ole 1.05 – 1.43, 1.27. Fork length ratio (A/B) 0.82 – 1.14, 1.02. Fork width ratios (C/D and E/F) 1.79 – 2.33, 2.15 and 0.57 – 0.79, 0.68. M-ratios 0.57 – 0.59, 0.58 and 0.62 – 0.65, 0.63. CuA-ratios 0.63 – 1.01, 0.75 and 0.8 – 1.33, 0.98. CuP length to length of wing 0.55 – 0.58, 0.57. A<sub>1</sub> length to length of wing 0.43 – 0.46, 0.45.

Legs: Leg ratios given for fore, mid and hind leg: LR 0.97 – 1.02, 0.99: 0.98 – 1.01, 0.99: 0.77 – 0.85, 0.79; SV 1.98 – 2.03, 2.01: 1.97 – 2.05, 2: 2.22 – 2.4, 2.31; BV 1.72 – 1.91, 1.82: 2.01 – 2.14, 2.1: 2.75 – 2.98, 2.88; TR 1.56 – 1.71, 1.62: 1.74 – 1.88, 1.82: 2.19 – 2.31, 2.24.

Terminalia (Fig. 12A): Cercus I conical. Cercus II slender, 3.53 – 4.58, 4.29 as long as wide in lateral view. Gonapophysis VIII narrowly pointed towards apex; apicodorsal margin usually distinct sinusoid.

*Distribution.* –Western Palaearctic, including most of western and southern Europe, viz. Balearic Islands, Belgium, Great Britain, Bulgaria, Crete, Dodecanese Islands, French mainland, Germany, Greek mainland, Ireland, Italian mainland, Norwegian mainland, Portuguese mainland, Romania, Slovakia, Spanish mainland, Switzerland, and Yugoslavia (Chandler 2004). Newly reported also from Sweden by Kjærandsen (2005) and by present records. Apparently absent from North-eastern Europe. Outside Europe reported from the North African and the Near East Regions (Chandler 2004).

### *Tarnania fenestralis* (Meigen, 1818)

(Figs 2A, B & D, 3D, 5B, 6B, 7B, 8B, 9B, 10B, 11B, 12B)

*Mycetophila fenestralis* Meigen, 1818 – Meigen (1818: 265)

*Mycetophila apicalis* Meigen, 1838 – Meigen (1838: 47) synonymized by Hackman et al. (1988: 325)

*Rymosia fenestralis* (Meigen, 1818) – Winnertz (1863: 822)

*Rhymosia fenestralis* (Meigen, 1818) – Edwards (1941: 77, fig. 8f-g)

*Rhymosia fenestralis* (Meigen, 1818) – Burgehele (1965: 154, fig. 3)

*Tarnania fenestralis* (Meigen, 1818) – Tuomikoski (1966: 171)

*Tarnania bavaria* Plassmann, 1980 – Plassmann (1980: 212, figs 8-10) synonymized by Sevcik (2001: 151)

*Tarnania fenestralis* (Meigen, 1818) – Krivosheina et al. (1986: 160, fig. 47.2)

*Tarnania fenestralis* (Meigen, 1818) – Zaitzev (2003: 214, figs 51.6 & 52.2)

*Diagnosis.* – Apart from the coloration as given in the key the male can be separated from other *Tarnania* primarily by the shape of the hypandrial lobe, which in ventral view is wide basally, then gradually tapering to a constricted apical half (Fig. 7B); in lateral view distinctly concave (Fig. 10B). Further diagnostic characters of the male include: Ventral branch of the gonostylus with internal setae confined to ventral margin (Fig. 8B); tergite IX about as long as wide (Fig. 9B); and the aedeagus being wide triangular, with narrow, u-shaped excavation anteriorly (Fig. 11C). The female is best separated from other *Tarnania* by the combination of dark coloration (Fig. 6B), having broad, less pointed gonapophysis VIII and short, ovate cercus II (Fig. 12B).

*Types examined.* – Holotype (male): Type locality not given, probably Germany (MNHN, leg. J. W. Meigen). Holotype of *T. apicalis* (male): Type locality not given, probably Germany (MNHN, leg. J. W. Meigen). Holotype of *T. bavaria* (male): GERMANY: Bayern, Moorloch b. Obreau, Franken, aus fränkischen Höhlen, 20 Aug 1975 (ZSMC, leg. H. Plachter).

*Additional material examined.* – FINLAND: Ab, Kuustö (MZHF, leg. C. Lundström) – 1 male; N, Esbo, 29 Oct 1975 (MZHF, leg. W. Hackman) – 1 female, 1 male; Esbo, Westend, 25 Aug 1962 (MZHF, leg. W. Hackman) – 1 male; Hangö, Russard, 14-23 Oct 1990 (MZHF, leg. I. Kullberg) – 2 females, 5 males; 24 Oct-17 Nov 1990 (MZHF, leg. I. Kullberg) – 4 females; Helsingfors, Fredriksberg, 12 Oct 1930 (MZHF, leg. A. Luther) – 1 female; Masaby, 2 Nov 1975 (MZHF, leg. G. Lundquist) – 25 females, 25 males; Tvärminne, 29 May 1935 (MZHF, leg. L. Storå) – 1 male; NORWAY: FV, Alta, Gargia, 6 Aug-25 Sep 1996 (ZMUN, leg. L. O. Hansen & H. Rinden) – 1 female; Alta, Elvestrand, 18 Jul-16 Sep 1996 (ZMUN, leg. H. Rinden) – 1 female, 1 male; Hasvik, Sørvær, 17-20 Jun 1986 (MZLU, leg. G. E. E. Søli) – 1 male; HOI, Voss, Nesheimstunet, in cellar, 4 Apr 1992 (MZLU, leg. J. Kjørandsen) – 2 females; HOY, Bergen, in mine galleries at Haukeland, 4 Mar 2001 (MZLU, leg. J. Kjørandsen) – 3 females, 1 male; 28 Jun 1991 (MZLU, leg. J. Kjørandsen) – 1 male; in mine galleries at Riple, 18 Aug 1991 (MZLU, leg. J. Kjørandsen) – 1 male; in mine galleries at Gymmeland, 9 Dec 1990 (MZLU, leg. J. Kjørandsen) – 1 female; 3 Feb 1991 (MZLU, leg. J. Kjørandsen) – 1 female, 1 male; 21 Mar 1991 (MZLU, leg. J. Kjørandsen) – 1 female, 1 male; 26 Jan 1992 (MZLU, leg. J. Kjørandsen) – 1 male; 2 Apr 2004 (MZLU, leg. J. Kjørandsen) – 3 females, 7 males; Stord, in mine gallery at Litlabø, 11 Feb 1991 (MZLU, leg. J. Kjørandsen) – 1 male; Bømlo, in mine galleries at Lykling, 10 Feb 1991 (MZLU, leg. J. Kjørandsen) – 2 females, 1 male; 1 Feb 1999 (MZLU, leg. J. Kjørandsen) – 3 females, 5 males; 5 Jan 2003 (MZLU, leg. J. Kjørandsen) – 1 female, 2 males; 28 Dec 2004 (MZLU, leg. J. Kjørandsen) – 2 males; Øygarden, Dalsvann, Alvøen, 10-20 Nov 1987 (MZLU, leg. T. Andersen) – 5 females, 10 males; Seløy, Hjelmevann, 20 Oct-5 Nov 1987 (MZLU, leg. T. An-

dersen) – 1 male; Bømlo, Godalen, 1 Apr-25 Jun 2000 (MZLU, leg. J. Kjørandsen) – 1 male; Fjell, Vindenes, 25 Oct 1977 (MZLU, leg. T. Andersen) – 3 females, 2 males; SWEDEN: SK, Blentarp, Stampenbäcken, 10 Nov 1969 (MZLU, leg. B. W. Svensson) – 1 male; 20 Nov 1969 (MZLU, leg. B. W. Svensson) – 2 females, 1 male; Helsingborg, (MZLU, leg. O. Ringdahl) – 1 female; Ramlösa, 13 Apr 1906 (MZLU, leg. O. Ringdahl) – 1 male; Härkeberga Nature Reserve, 19 Sep 2004 (MZLU, leg. J. Kjørandsen) – 5 females, 4 males; 3 Oct 2004 (MZLU, leg. J. Kjørandsen) – 1 male; Lomma, in pine forest at Habo gård N Lomma, 10, 23 May 2004 (MZLU, leg. J. Kjørandsen) – 1 male; UP, Rydebo, ref. 484, 7 Oct 1956 (NHRS, leg. E. Kjellander) – 4 females, 2 males.

*Description.* – Male (n = 5, except where otherwise stated): Total length 7 – 8.5, 8 mm. Wing length 4.6 – 5.2, 4.97 mm, or 3.49 – 3.61, 3.53 x as long as profemur. Mesonotum length 1.14 – 1.38, 1.3 mm, or 0.25 – 0.27, 0.26 x as long as wing.

Coloration (fresh animal in alcohol): Antenna with scape, pedicel and basal half of first flagellomere light yellow; rest of flagellum brown, paler towards apex. Head reddish brown, postgena yellow; clypeus yellow, maxillary palp yellow. Thorax with well defined mesonotal stripes on pale yellow ground including entire humeral areas; Anterior margin of anepisternum, lower two thirds of katapisternum, posterior margin of laterotergite, posterior two thirds of mediotergite and metepisternum yellowish brown; thoracic sclerites otherwise pale yellow. Wing unmarked; yellow tinted, especially in costal and radial sector; wing veins yellow with dark setae. Halter whitish. Legs pale yellow; mid and hind coxae with small, usually distinct, brownish spot apicomediaally. Abdomen mainly brown with narrow yellow bands apically, tergites III - V with narrow reddish yellow area lateroapically granulated with medium sized dark spots; tergite VI dark brown; sternites gradually darker towards terminalia; terminalia yellow; tergite IX and cercus yellow.

Head: Round, width / length to frontal tubercle 1.37 – 1.62, 1.46. Antenna 2 – 2.28 (n=4) mm long. First flagellomere 1.74 – 1.97, 1.86 times as long as second flagellomere. Second flagellomere 1.24 – 1.9, 1.46 times as long as wide. Length / width of clypeus 0.59 – 0.69, 0.64. Antepenultimate palpomere 0.2 – 0.23, 0.22 mm long, palpomere ratios 1: 1.21 – 1.39, 1.29: 2.46 – 2.85, 2.74.

Thorax: One strong preepisternal bristle.

Wings: Wing length to length of R<sub>1</sub> 1.97 – 2.14, 2.04. R<sub>5</sub> slightly sinusoid, wing length to length of

R<sub>5</sub> 1.61 – 1.68, 1.64. Crossvein ta with small, distinct white spot. Length of ta to length of M-petiole 0.81 – 1.29, 1.11. Fork length ratio (A/B) 0.96 – 1.14, 1.06. Fork width ratios (C/D and E/F) 1.91 – 2.25, 2.07 and 0.6 – 0.83, 0.72. M-ratios 0.5 – 0.6, 0.57 and 0.54 – 0.66, 0.61. CuA-ratios 0.62 – 0.77, 0.69 and 0.81 – 1.07, 0.92. CuP length to length of wing 0.55 – 0.59, 0.58. A<sub>1</sub> length to length of wing 0.44 – 0.45, 0.44.

Legs: Leg ratios given for fore, mid and hind leg: LR 1.1 – 1.18, 1.13: 1.02 – 1.11, 1.07: 0.78 – 0.82, 0.8; SV 1.68 – 1.76, 1.73: 1.76 – 1.9, 1.85: 2.21 – 2.31, 2.25; BV 1.56 – 1.76, 1.62: 1.95 – 2.1, 2: 3 – 3.21, 3.11; TR 1.54 – 1.67, 1.6: 1.8 – 1.91, 1.88: 2.51 – 2.64, 2.59.

Terminalia: Genitalia (Fig. 7B) as large as or larger than abdominal segment VI. Tergite IX (Fig. 9B) about as long as wide, densely covered with setae. Cercus stout, with dorsal widening basomedially; 3.39 – 4.48, 3.81 as long as wide in dorsal view. Aedeagus widely triangular, with less deep medial invagination apically (Fig. 11B). Hypandrial lobe wide basally, then gradually tapering to a constricted apical half (Fig. 7B); in lateral view distinctly concave, with small, distinct hook apically (Fig. 10B). Gonostylus (Fig. 8B) with dorsointernal branch fan-shaped; median branch with apical half distinctly tapered, apically without seta; ventral branch without distinct protrusion apicodorsally, with internal setae confined to ventral margin.

Female (n = 5, except where otherwise stated): Total length 8 – 9.5, 8.7 mm. Wing length 5.24 – 5.6, 5.39 mm, or 3.48 – 3.67, 3.56 x as long as pro-femur. Mesonotum length 1.4 – 1.5, 1.46 mm, or 0.27 – 0.28, 0.27 x as long as wing.

Coloration (fresh animal in alcohol): As for male, except abdominal tergites III - VI with larger, triangular reddish yellow areas laterally, more heavily granulated with large dark spots; tergite VII and terminalia reddish yellow.

Head: Round, width / length to frontal tubercle 1.28 – 1.56, 1.46. Antenna long, 2.24 – 2.36, 2.31 mm. First flagellomere 1.74 – 1.97, 1.86 times as long as second flagellomere. Second flagellomere 1.34 – 1.7, 1.47 times as long as wide. Length / width of clypeus 0.58 – 0.84, 0.73. Antepenultimate palpomere 0.22 – 0.26, 0.24 mm long, palpomere ratios 1: 1.22 – 1.33, 1.28: 2.66 – 2.84, 2.72.

Thorax: One strong proepisternal bristle.

Wings: Wing length to length of R<sub>1</sub> 1.98 – 2.1, 2.03. R<sub>5</sub> slightly sinusoid, wing length to length of R<sub>5</sub> 1.58 – 1.64, 1.62. Crossvein ta with small, distinct white spot. Length of ta to length of M-petiole 0.94 – 1.36, 1.14. Fork length ratio (A/B) 1.08 – 1.15, 1.12. Fork width ratios (C/D and E/F) 1.92 – 2.14, 2.03 and 0.6 – 0.8, 0.68. M-ratios 0.55 – 0.63, 0.59 and 0.61 – 0.68, 0.64. CuA-ratios 0.64 – 0.67, 0.66 and 0.84 – 0.9, 0.88. CuP length to length of wing 0.57 – 0.6, 0.58. A<sub>1</sub> length to length of wing 0.44 – 0.46, 0.45.

Legs: Leg ratios given for fore, mid and hind leg: LR 1.12 – 1.17, 1.14: 1.02 – 1.13, 1.08: 0.78 – 0.83, 0.8; SV 1.67 – 1.74, 1.7: 1.75 – 1.94, 1.84: 2.19 – 2.28, 2.24; BV 1.58 – 1.67, 1.61: 1.86 – 2.06, 1.99: 2.99 – 3.16, 3.08; TR 1.56 – 1.64, 1.6: 1.71 – 1.94, 1.86: 2.47 – 2.63, 2.55.

Terminalia (Fig. 12B): Cercus I less conical. Cercus II short, ovate, 2.56 – 2.94, 2.75 as long as wide in lateral view. Gonapophysis VIII broadly pointed towards apex; apicodorsal margin not sinusoid.

*Distribution.* – Widely distributed in the Western Palaearctic Region, including most of Europe, viz. Belgium, Bosnia and Herzegovina, Great Britain, Bulgaria, Croatia, Czech Republic, Danish mainland, Estonia, Finland, French mainland, Germany, Greek mainland, Hungary, Ireland (including Northern Ireland), Italian mainland, Latvia, Lithuania, Macedonia, Norwegian mainland, Poland, Portuguese mainland, Romania, Russia North, Slovakia, Spanish mainland, Sweden, Switzerland, The Netherlands, Ukraine, and Yugoslavia (Chandler 2004). Outside Europe reported from the East Palaearctic region (Chandler 2004).

### *Tarnania nemoralis* (Edwards, 1941)

(Figs 5C, 6C, 7C, 8C, 9C, 10C, 11C, 12C)

*Rhymosia nemoralis* Edwards, 1941 – Edwards (1941: 78, fig. 8j-k)

*Tarnania nemoralis* (Edwards, 1941) – Tuomikoski (1966: 171)

*Diagnosis.* – Apart from the coloration as given in the key the male can be separated from other *Tarnania* primarily by the shape of the hypandrial lobe, which in ventral view is wide rectangular basally, then abruptly constricted into a long, narrow cylindrical process (Fig. 7C); in lateral view with large apical hook (Fig. 10C). Further diagnostic characters of the male include: Ventral

branch of the gonostylus with long setae internally on apical half (Fig. 8C); and the aedeagus being wide triangular, with wide, rectangular excavation anteriorly (Fig. 11C). The female is best separated from other *Tarnania* by the combination of pale coloration (Fig. 6C), having narrowly pointed gonapophysis VIII, and both cercus I and cercus II slender (Fig. 12C).

*Types examined.* – Holotype (male) GREAT BRITAIN: N. Lancs, 21 May 1938 (BMNH, leg. F. W. Edwards).

*Additional material examined.* – NORWAY: AK, Bærum, in mine gallery at Kirkerud, 26 Dec 2001 (MZLU, leg. J. Kjørandsen) – 1 male; SWEDEN: SK, Blentarp, Stampenbäcken, 18 Oct 1969 (MZLU, leg. B. W. Svensson) – 1 male; Degeberga, Segeholmsån vid Trollalider, ref. 2451, 29 May 1983 (MZLU, leg. H. Andersson) – 1 male; Rövarekulan, ref. 2441, 5 Sep 1982 (MZLU, leg. H. Andersson) – 5 males; Hariösa, Borstbacken, ref. 2339, 20 May 1984 (MZLU, leg. H. Andersson) – 3 females, 1 male; Kullaberg, ref. 1796, 28 Jul 1968 (MZLU, leg. H. Andersson) – 2 females; ref. 2563, 22 Sep 1983 (MZLU, leg. H. Andersson) – 1 male; Klöva hallar, 2 Oct 1988 (MZLU, leg. H. Andersson) – 1 female, 1 male; Hallandsås, Kågleån N Nyhem, ref. 2568, 1 Oct 1983 (MZLU, leg. H. Andersson) – 1 female, 1 male; Häckeberga Nature Reserve, 19 Sep 2004 (MZLU, leg. J. Kjørandsen) – 3 females, 10 males; Melby, Kivik's Esperöd (MZLU, leg. J. W. Zetterstedt) – 1 female; Ystad, Hagestads Nature Reserve, Backåkra, 27 May 2004 (MZLU, leg. J. Kjørandsen) – 3 females.

*Description.* – Male (n = 5, except where otherwise stated). Total length 7 – 8.5, 7.7 mm. Wing length 4.1 – 4.7, 4.41 mm, or 3.37 – 3.56, 3.48 x as long as profemur. Mesonotum length 1.02 – 1.34, 1.22 mm, or 0.25 – 0.29, 0.28 x as long as wing.

Coloration (fresh animal in alcohol): Antenna with scape, pedicel and basal half of first flagellomere light yellow; rest of flagellum brown, paler towards apex. Head reddish yellow, distinctly darker in front of lateral ocellus; postgena pale yellow; clypeus yellow, maxillary palp yellow. Thorax pale reddish yellow without well defined mesonotal stripes, humeral areas pale yellow; most of anepisternum, lower half of katepisternum, posterior margin of laterotergite, posterior two thirds of mediotergite and metepisternum yellowish brown; thoracic sclerites otherwise pale yellow. Wing unmarked; yellow tinted, especially in costal and radial sector; wing veins yellow with dark setae. Halter whitish. Legs pale yellow; mid and hind coxae with medium sized, distinct brownish spot apicomediaally. Abdomen mainly reddish brown with narrow yellow bands apically, tergite III - V with triangular reddish yellow area

lateroapically, hardly granulated with dark spots except in narrow transition zone; tergite VI dark brown; sternites gradually darker towards terminalia; terminalia yellow; tergite IX and cercus reddish yellow.

Head: Round, width / length to frontal tubercle 1.3 – 1.47, 1.41. Antenna 1.7 – 1.84 (n=4) mm long. First flagellomere 1.7 – 1.93, 1.82 times as long as second flagellomere. Second flagellomere 1.11 – 1.67, 1.31 times as long as wide. Length / width of clypeus 0.51 – 0.69, 0.58. Antepenultimate palpomere 0.16 – 0.2, 0.18 mm long, palpomere ratios 1: 1.41 – 1.71, 1.53: 3.06 – 3.48, 3.29.

Thorax: One strong proepisternal bristle.

Wings: Wing length to length of  $R_1$  1.87 – 2.19, 2.06.  $R_5$  slightly sinusoid, wing length to length of  $R_5$  1.62 – 1.72, 1.66. Crossvein ta with small, distinct white spot. Length of ta to length of M-petiole 1 – 1.38, 1.16. Fork length ratio (A/B) 1.01 – 1.22, 1.15. Fork width ratios (C/D and E/F) 1.76 – 1.95, 1.89 and 0.71 – 0.83, 0.77. M-ratios 0.59 – 0.67, 0.63 and 0.64 – 0.73, 0.69. CuA-ratios 0.62 – 0.74, 0.67 and 0.79 – 0.96, 0.87. CuP length to length of wing 0.58 – 0.6, 0.59.  $A_1$  length to length of wing 0.42 – 0.47, 0.45.

Legs: Leg ratios given for fore, mid and hind leg: LR 1.19 – 1.31, 1.24: 1.04 – 1.26, 1.13: 0.77 – 0.82, 0.8; SV 1.48 – 1.66, 1.57: 1.56 – 1.9, 1.76: 2.17 – 2.36, 2.27; BV 1.45 – 1.63, 1.51: 1.91 – 2.06, 1.96: 2.97 – 3.12, 3.08; TR 1.55 – 1.67, 1.59: 1.82 – 1.96, 1.88: 2.42 – 2.49, 2.45.

Terminalia: Genitalia (Fig. 7C) smaller than abdominal segment VI. Tergite IX (Fig. 9C) shorter than wide, with relatively few setae. Cercus short, 2.68 – 3.89, 3.3 as long as wide in dorsal view; with dorsal widening basomedially. Aedeagus wide triangular, with wide, rectangular excavation anteriorly (Fig. 11C). Hypandrial lobe in ventral view wide rectangular basally, then abruptly constricted into a long, narrow cylindrical process (Fig. 7C); in lateral view with large apical hook (Fig. 10C). Gonostylus (Fig. 8C) with dorsointernal branch fan-shaped; median branch with apical half distinctly tapered, apically without seta; ventral branch without distinct protrusion apicodorsally, with long setae internally on apical half.

Female (n = 5, except where otherwise stated): Total length 8 – 9, 8.4 mm. Wing length 4.44 – 5.34, 4.78 mm, or 3.46 – 3.66, 3.56 x as long as

profemur. Mesonotum length 1.2 – 1.56, 1.32 mm, or 0.27 – 0.29, 0.28 x as long as wing.

Coloration (fresh animal in alcohol): As for male, except abdominal tergite III - VI with larger, triangular reddish yellow areas laterally; tergite VII yellow basally, with broad reddish band apically; terminalia reddish yellow.

Head: Round, width / length to frontal tubercle 1.41 – 1.53, 1.44. Antenna 1.7 – 1.86 (n=4) mm long. First flagellomere 1.7 – 2.13, 1.96 times as long as second flagellomere. Second flagellomere 1.25 – 1.45, 1.34 times as long as wide. Length / width of clypeus 0.59 – 0.64, 0.61. Antepenultimate palpomere 0.17 – 0.22, 0.19 mm long, palpomere ratios 1: 1.53 – 1.76, 1.66: 3.21 – 3.5, 3.39.

Thorax: One strong proepisternal bristle.

Wings: Wing length to length of  $R_1$  2.02 – 2.25, 2.11.  $R_5$  slightly sinusoid, wing length to length of  $R_5$  1.65 – 1.76, 1.69. Crossvein  $ta$  with small, distinct white spot. Length of  $ta$  to length of M-petiole 1.19 – 1.36, 1.26. Fork length ratio (A/B) 1.18 – 1.32, 1.23. Fork width ratios (C/D and E/F) 1.85 – 2.28, 2.08 and 0.55 – 0.74, 0.68. M-ratios 0.63 – 0.68, 0.65 and 0.68 – 0.74, 0.7. CuA-ratios 0.58 – 0.67, 0.62 and 0.76 – 0.87, 0.82. CuP length to length of wing 0.56 – 0.59, 0.57.  $A_1$  length to length of wing 0.43 – 0.45, 0.45.

Legs: Leg ratios given for fore, mid and hind leg: LR 1.22 – 1.27, 1.24: 1.1 – 1.15, 1.12: 0.79 – 0.89, 0.82; SV 1.53 – 1.62, 1.57: 1.69 – 1.79, 1.75: 2.1 – 2.3, 2.21; BV 1.53 – 1.61, 1.56: 1.94 – 2.04, 2.01: 3.02 – 3.33, 3.23; TR 1.58 – 1.66, 1.63: 1.86 – 1.98, 1.92: 2.42 – 3.03, 2.64.

Terminalia (Fig. 12C): Cercus I slender, not conical. Cercus II slender, 3.25 – 3.53, 3.34 as long as wide in lateral view. Gonapophysis VIII narrowly pointed towards apex; apicodorsal margin usually distinct sinusoid.

*Distribution.* – This species seems to have a rather restricted distribution in the western Palaearctic Region, where it so far is reported from Austria, Belgium, Great Britain, Bulgaria, Danish mainland, French mainland, Germany, Portuguese mainland, and Switzerland (Chandler 2004). The present records add this species as new to southern Sweden and south-eastern Norway. Not yet reported from outside Europe.

### *Tarnania tarnanii* (Dziedzicki, 1910)

(Figs 5D, 6D, 7D, 8D, 9D, 10D, 11D, 12D)

*Rymosia tarnanii* Dziedzicki, 1910 – Dziedzicki, (1910: 99)

*Rhymosia tarnanii* Dziedzicki, 1910 – Barendrecht (1938: 45, fig. 9)

*Tarnania tarnanii* (Dziedzicki, 1910) – Tuomikoski (1966: 171)

*Tarnania tarnanii* (Dziedzicki, 1910) – Krivosheina et al. (1986: 160, fig. 47.3)

*Tarnania tarnanii* (Dziedzicki, 1910) – Zaitzev (1999: 206, fig. 124.6)

*Tarnania tarnanii* (Dziedzicki, 1910) – Zaitzev (2003: 214, fig. 52.3-4)

*Diagnosis.* – Apart from the coloration as given in the key the male can be separated from other *Tarnania* primarily by the shape of the hypandrial lobe, which in ventral view is wide rectangular basally, then abruptly constricted into a short, pointed plate (Fig. 7D); in lateral view with less distinct apical hook (Fig. 10D). Further diagnostic characters of the male include: One strong and one lesser propleural bristles; ventral branch of the gonostylus internally with a cushion, densely covered with long setae (Fig. 8D); dorsointernal branch being more spatulate than fan-shaped (Fig. 8D); and the aedeagus being subquadrate (Fig. 11D). The female is best separated from other *Tarnania* by the combination of pale coloration (Fig. 6D), having narrowly pointed gonapophysis VIII, and short, ovate cercus II (Fig. 12D).

*Material examined.* – USA: ALASKA, Palmer, jeep trap, 13 Jul 1964 (MZLU, leg. K. M. Sommerman) – 1 male; CANADA: YT, Ogilvie Mountains, Dempster HWY km 138, in dense spruce forest, 10 Jul 1985 (MZHF, leg. K. Mikkola) – 5 females, 4 males; FINLAND: Ab, Kuustö (MZHF, leg. C. Lundström) – 2 females, 2 males; Nagu (MZHF, leg. Nordman) – 1 male; Al, Saltvik (MZHF, leg. R. Frey) – 1 male; Sund (MZHF, leg. R. Frey) – 1 male; Ka, Vehkalahti, 17 Oct 1970 (MZHF, leg. L. Tiensuu) – 1 male; 6 May 1971 (MZHF, leg. L. Tiensuu) – 1 male; 24 Jul 1971 (MZHF, leg. L. Tiensuu) – 1 male; 4 Aug 1971 (MZHF, leg. L. Tiensuu) – 3 males; Vehkalahti, Suokallio, 19 Jul 1971 (MZHF, leg. L. Tiensuu) – 2 females, 1 male; Ks, Kuusamo, Kiutaköngäs, 19-24 Jul 1967 (MZHF, leg. R. Tuomikoski) – 2 females, 5 males; N, Tammissaari, Gullö, 12-28 Sep 1967 (MZHF, leg. K. Mikkola) – 2 females, 1 male; Ok, Sotkamo, Aareniemi, 2 Jul 1966 (MZHF, leg. K. Keynäs) – 2 males; NORWAY: BØ, Drammen, Underlia, 1-30 Sep 1996 (ZMUN, leg. L. O. Hansen) – 1 male; FN, Berlevåg, 5-6 Jul 1986 (MZLU, leg. G. E. E. Sjøli) – 1 male; FV, Alta, Vassbotndalen, birch forest, 9 May-6 Sep 1998 (ZMUN, leg. H. Rinden) – 1 female; Alta, Elvestrand, 18 Jul-16 Sep 1996 (ZMUN, leg. H. Rinden) – 2 females; MRI, Sunndal, Jordalsgrenda, Jordalsøra, Hamrene, 31 May-13 Jul

2004 (MZLU, leg. J. B. Jordal) – 1 male; STI, Oppdal, Kongsvoll, Knutshø, Sprænbekken, 1000 m a.s.l., pan trap no. 2, 10 Aug-19 Sep 1994 (MZLU, leg. J. Skartveit) – 4 females, 16 males; Kongsvoll, Knutshø, Sprænbekken, 1300 m a.s.l., pan trap no. 11-12, 19-22 Aug 1992 (MZLU, leg. J. Skartveit) – 5 females, 6 males; Kongsvoll, S. Knutshø, 1150 m a.s.l., 15-19 Aug 1992 (MZLU, leg. J. Skartveit) – 15 females, 29 males; TRI, Målselv, Høgskardhus, 9 Sep 1987 (MZLU, leg. G. E. E. Søli) – 1 male; TRY, Tromsø, Prestevannet, 18 Aug 1987 (MZLU, leg. G. E. E. Søli) – 1 male; SWEDEN: DS, Holm, Skäret Ljungen, 28 Aug 1942 (MZLU, leg. K. Ander) – 1 male; LÜ, Jokkmokk, Messaure, pitfall traps no. 101-120, 2 Sep-4 Oct 1971 (MZLU, leg. K. Müller) – 5 males; Porsj VVO, Tussilagolunden, 2 km E Vuollerim, 60 m a.s.l., 14 Apr-18 Oct 2003 (MZLU, leg. M. Karström) – 3 females, 2 males; Porsj VVO, Porsitjärn, 2.5 km SE Vuollerim, 60 m a.s.l., 6 May-13 Aug 2004 (MZLU, leg. M. Karström) – 2 males; 13 Aug-13 Oct 2004 (MZLU, leg. M. Karström) – 21 females, 24 males; Lövbäcksravinen, 16 Jun 2004 (MZLU, leg. J. Kjärandsen) – 1 female, 5 males; Bombmurkleskogen VVO, 21 Jun 2004 (MZLU, leg. J. Kjärandsen) – 2 males; Luottäive Nature Reserve, 20 Jun 2004 (MZLU, leg. J. Kjärandsen) – 3 female, 4 males; Vettasjärvi, Haapavaara/Annavaara, E of Puolva Nature Reserve, "Burk 21 -1994" (NHRS, leg. R. Rova & B. Viklund) – 8 males; NB, Muonio, Muonionalusta, 8 Jul 1911 (MZHF, leg. R. Frey) – 1 male; Niemisel, Bläkölens domenreservat, 13 Jun-31 Aug 1994 (NHRS, leg. B. Viklund) – 1 female, 1 male; SK, Kullaberg, ref. 1795, 28 Jul 1968 (MZLU, leg. H. Andersson) – 3 males; TO, Abisko, Stordalen, 18-25 Sep 1975 (MZLU, leg. K. Müller) – 1 female, 2 males; VB, Kallviken, 5 km SE Lövänger, 71°28'43"N, 017°41'10"E, RN 21L NV, 25 Jun-15 Sep 1997 (NHRS, leg. Sporrang & Viklund) – 1 male.

*Description.* – Male ( $n = 6$ , except where otherwise stated): Total length 6 – 7.5, 6.7 mm. Wing length 3.68 – 3.94, 3.85 mm, or 3.35 – 3.61, 3.48 x as long as profemur. Mesonotum length 1.04 – 1.12, 1.08 mm, or 0.27–0.29, 0.28 x as long as wing.

Coloration (fresh animal in alcohol): Antenna with scape, pedicel and basal half of first flagellomere light yellow; rest of flagellum reddish yellow, darker towards apex. Head reddish yellow, darker in front of lateral ocellus; postgena pale yellow; clypeus yellow, maxillary palp yellow. Thorax reddish yellow without well defined mesonotal stripes, humeral areas pale yellow; most of anepisternum, upper part of anepimeron, lower half of katapisternum, posterior margin of laterotergite, mediotergite and metepisternum yellowish brown; thoracic sclerites otherwise pale yellow. Wing unmarked; yellow tinted, especially in costal and radial sector; wing veins yellow with dark setae. Halter whitish. Legs pale yellow; mid and hind coxae with medium sized, distinct brownish spot apicomediaally. Abdomen mainly

reddish brown with narrow yellow bands apically, tergites II - IV with triangular yellow area latero-apically, hardly granulated with dark spots except in narrow transition zone; tergite VI brown; sternites gradually darker towards terminalia; terminalia yellow; tergite IX and cercus yellow.

Head: Round, width / length to frontal tubercle 1.31 – 1.41, 1.37 ( $n=5$ ). Antenna 1.4 – 1.52, 1.47 ( $n=5$ ) mm long. First flagellomere 1.79 – 3.44, 2.32 ( $n=5$ ) times as long as second flagellomere. Second flagellomere 0.73 – 1.19, 1.03 ( $n=5$ ) times as long as wide. Length / width of clypeus 0.66 – 0.87, 0.77 ( $n=5$ ). Antepenultimate palpomere 0.15 – 0.17, 0.16 ( $n=5$ ) mm long, palpomere ratios 1: 1.33 – 1.64, 1.41 ( $n=5$ ): 2.84 – 3.56, 3.15 ( $n=5$ ).

Thorax: One strong and one less strong propleural bristles.

Wings: Wing length to length of  $R_1$  1.98 – 2.26, 2.16.  $R_5$  slightly sinusoid, wing length to length of  $R_5$  1.68 – 1.74, 1.71. Crossvein ta with small, distinct white spot. Length of ta to length of M-petiole 1.25 – 1.5, 1.35. Fork length ratio (A/B) 1.1 – 1.21, 1.17. Fork width ratios (C/D and E/F) 1.55 – 1.84, 1.75 and 0.69 – 0.92, 0.81. M-ratios 0.61 – 0.63, 0.62 and 0.67 – 0.69, 0.68. CuA-ratios 0.61 – 0.71, 0.65 and 0.79 – 0.93, 0.84. CuP length to length of wing 0.55 – 0.6, 0.57.  $A_1$  length to length of wing 0.44 – 0.49, 0.46.

Legs: Leg ratios given for fore, mid and hind leg: LR 1.02 – 1.07, 1.05 ( $n=5$ ): 1.04 – 1.11, 1.06 ( $n=5$ ): 0.72 – 0.8, 0.76 ( $n=5$ ); SV 1.83 – 1.95, 1.89 ( $n=5$ ): 1.78 – 1.92, 1.87 ( $n=5$ ): 2.33 – 2.45, 2.39 ( $n=5$ ); BV 1.32 – 1.38, 1.35 ( $n=5$ ): 1.65 – 1.88, 1.79 ( $n=5$ ): 2.57 – 2.89, 2.75 ( $n=5$ ); TR 1.28 – 1.4, 1.33 ( $n=5$ ): 1.63 – 1.74, 1.7 ( $n=5$ ): 1.93 – 2.19, 2.09 ( $n=5$ ).

Terminalia: Genitalia (Fig. 7D) smaller than abdominal segment VI. Tergite IX (Fig. 9D) subrectangular, shorter than wide, with relatively few setae. Cercus short, 2.86 – 3.37, 3.16 ( $n=5$ ) as long as wide in dorsal view; with dorsal widening basomedially. Aedeagus subquadrate (Fig. 11D). Hypandrial lobe in ventral view wide rectangular basally, then abruptly constricted into a short, pointed plate (Fig. 7D); in lateral view with less distinct apical hook (Fig. 10D). Gonostylus (Fig. 8D) with dorsointernal branch more spatulate than fan-shaped; median branch with apical half distinctly tapered, apically with strong seta; ventral branch without distinct protrusion apicodorsally, internally with a cushion, densely covered with long setae.

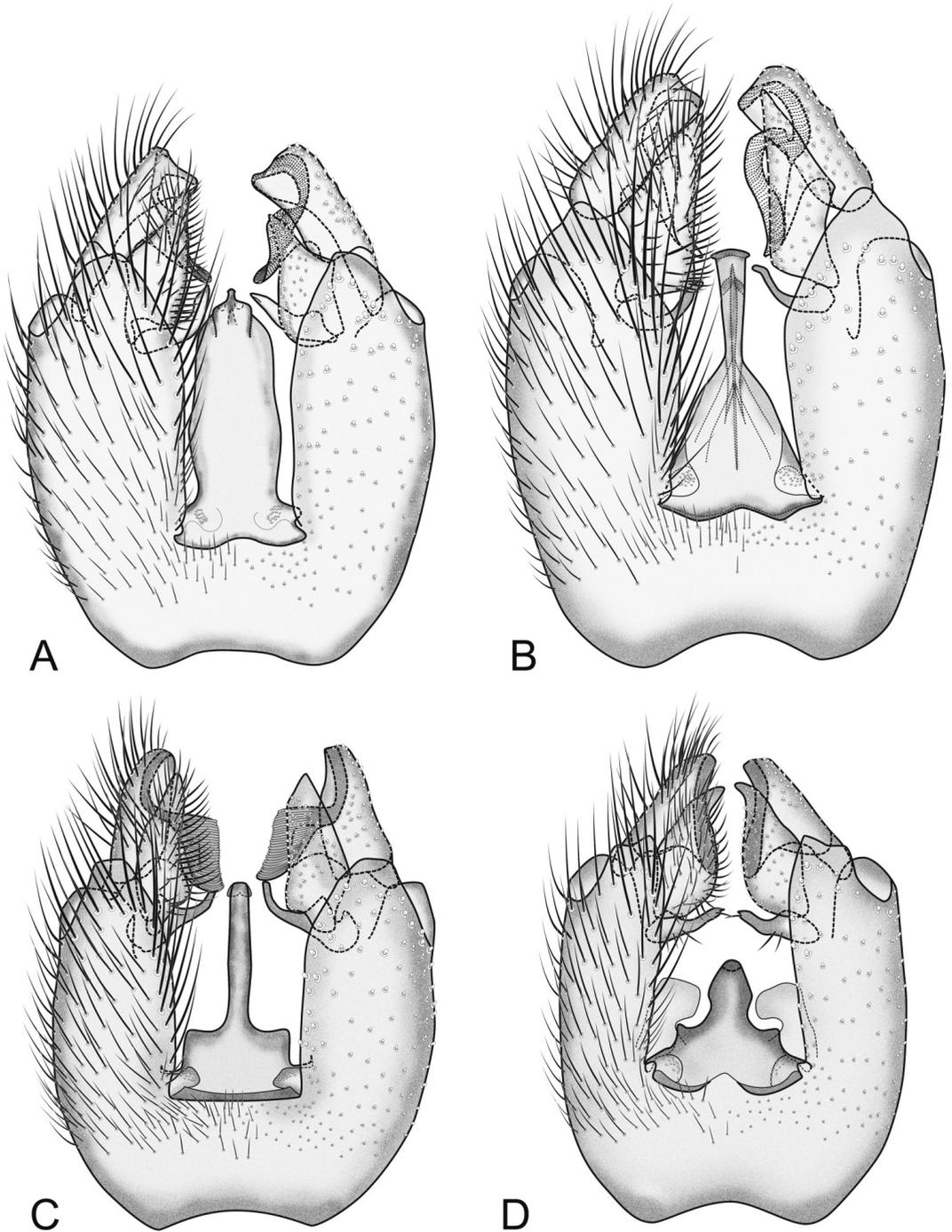


Fig. 7. Terminalia of *Tarnania* Tuomikoski males, ventral view. – A: *T. dziedzickii* (Edwards, 1941), – B: *T. fenestralis* (Meigen, 1818), – C: *T. nemoralis* (Edwards, 1941), – D: *T. tarnanii* (Dziedzicki, 1910).

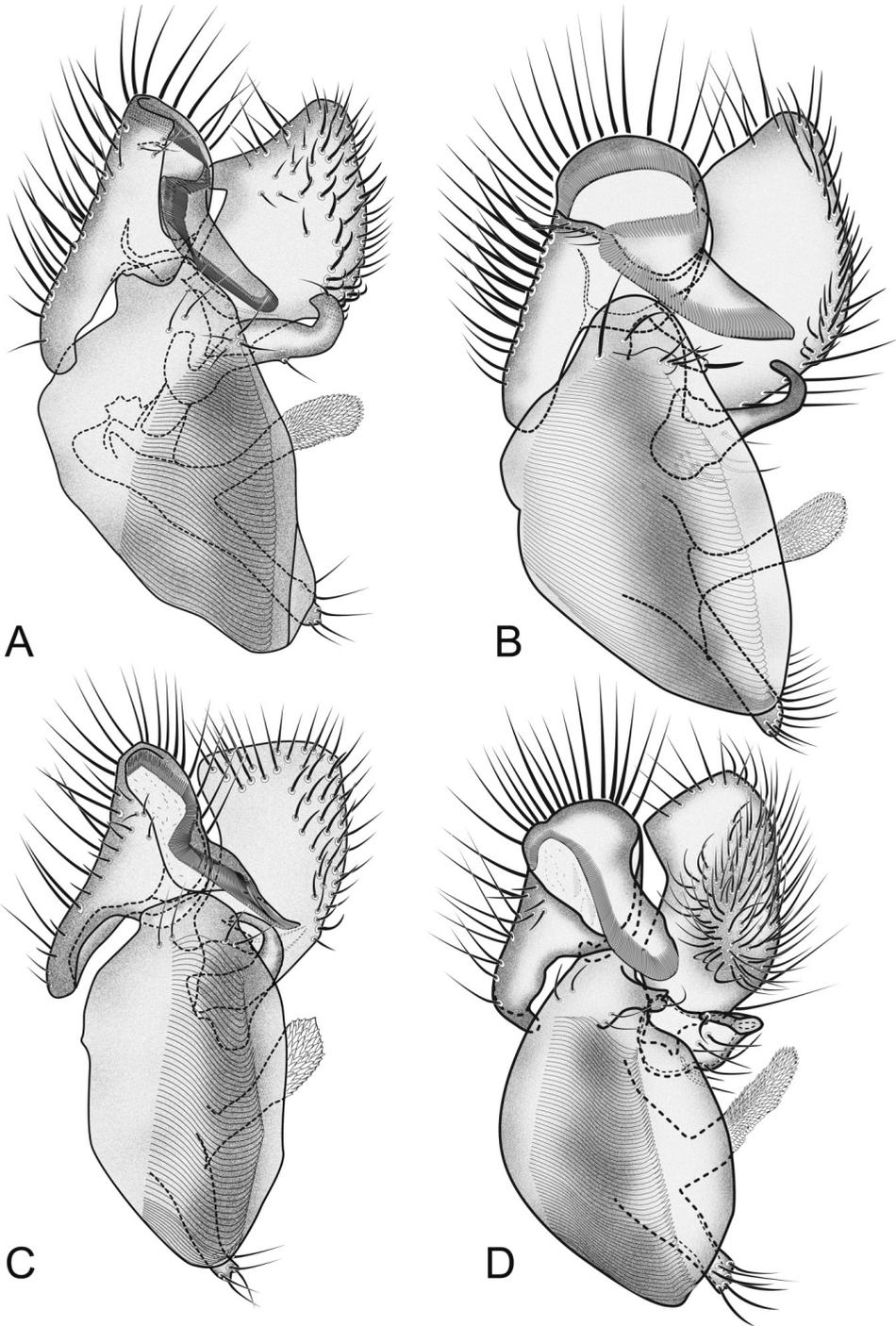


Fig. 8. Gonostylus of *Tarnania* Tuomikoski males, internal view. – A: *T. dziedzickii* (Edwards, 1941), – B: *T. fenestralis* (Meigen, 1818), – C: *T. nemoralis* (Edwards, 1941), – D: *T. tarnanii* (Dziedzicki, 1910).

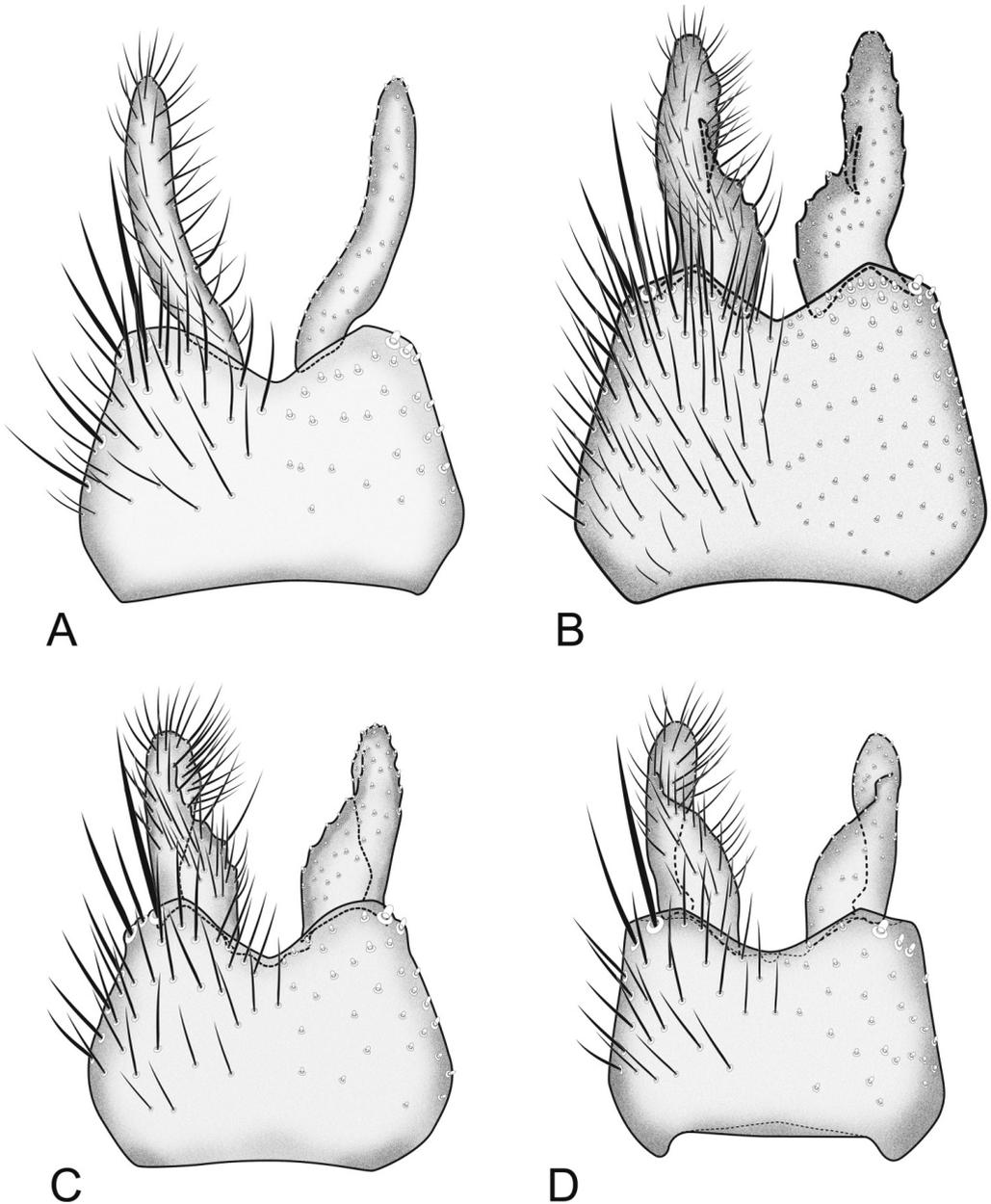


Fig. 9. Tergite IX and cerci of *Tarnania* Tuomikoski males, dorsal view. – **A**: *T. dziedickii* (Edwards, 1941), – **B**: *T. fenestralis* (Meigen, 1818), – **C**: *T. nemoralis* (Edwards, 1941), – **D**: *T. tarnanii* (Dziedzicki, 1910).

Female (n = 6, except where otherwise stated):  
Total length 7 – 8.5, 7.4 mm. Wing length 3.74 –  
4.62, 4.16 mm, or 3.63 – 3.91, 3.71 x as long as

profemur. Mesonotum length 1 – 1.3, 1.15 mm, or  
0.27 – 0.29, 0.28 x as long as wing.

Coloration (fresh animal in alcohol): As for

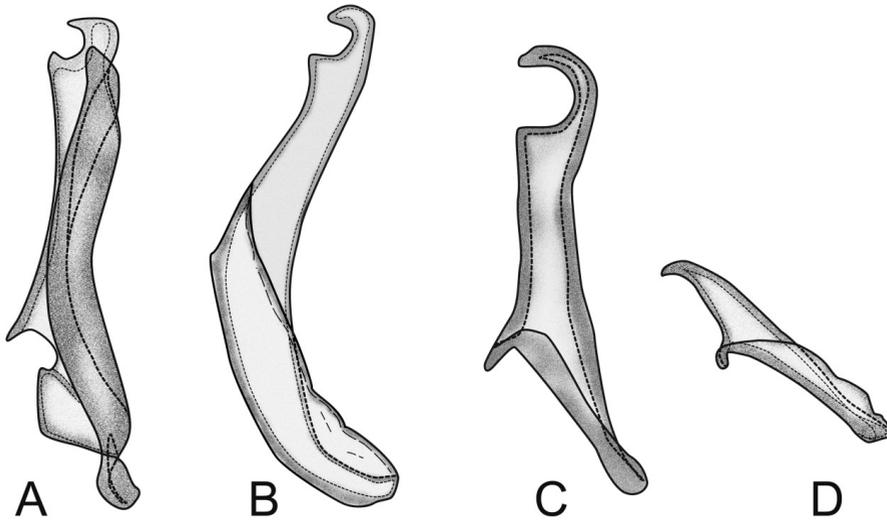


Fig. 10. Hypandrial lobe of *Tarnania* Tuomikoski males, lateral view. – **A:** *T. dziedickii* (Edwards, 1941), – **B:** *T. fenestralis* (Meigen, 1818), – **C:** *T. nemoralis* (Edwards, 1941), – **D:** *T. tarnanii* (Dziedzicki, 1910).

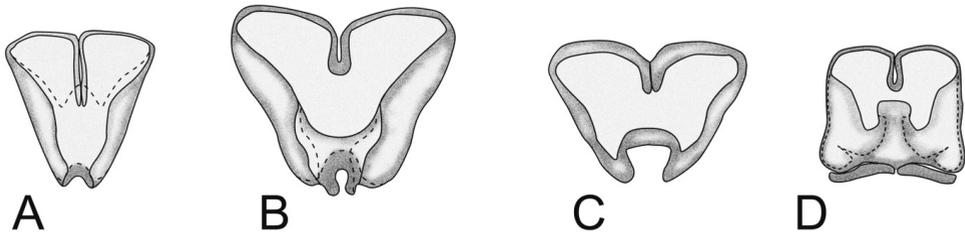


Fig. 11. Aedeagus of *Tarnania* Tuomikoski males, dorsal view. – **A:** *T. dziedickii* (Edwards, 1941), – **B:** *T. fenestralis* (Meigen, 1818), – **C:** *T. nemoralis* (Edwards, 1941), – **D:** *T. tarnanii* (Dziedzicki, 1910).

male, except abdominal tergites II - V with larger, triangular yellow areas laterally; tergite VII and terminalia reddish yellow.

Head: Round, width / length to frontal tubercle 1.29 - 1.52, 1.4 (n=5). Antenna 1.28 - 1.7, 1.47 (n=5) mm long. First flagellomere 1.79 - 3.44, 1.99 (n=5) times as long as second flagellomere. Second flagellomere 1.04 - 1.3, 1.13 (n=5) times as long as wide. Length / width of clypeus 0.66 - 0.74, 0.69 (n=5). Antepenultimate palpomere 0.15 - 0.2, 0.17 (n=5) mm long, palpomere ratios 1: 1.28 - 1.44, 1.38 (n=5); 2.55 - 3.02, 2.86 (n=5).

Thorax: One strong and one lesser strong propleural bristles.

Wings: Wing length to length of  $R_1$  2.1 - 2.26,

2.16.  $R_5$  slightly sinusoid, wing length to length of  $R_5$  1.62 - 1.8, 1.69. Crossvein ta with small, distinct white spot. Length of ta to length of M-petiole 1.14 - 1.7, 1.41. Fork length ratio (A/B) 1.05 - 1.27, 1.15. Fork width ratios (C/D and E/F) 1.6 - 2, 1.83 and 0.65 - 0.81, 0.71. M-ratios 0.53 - 0.58, 0.56 and 0.58 - 0.65, 0.62. CuA-ratios 0.52 - 0.67, 0.61 and 0.65 - 0.83, 0.76. CuP length to length of wing 0.55 - 0.62, 0.59.  $A_1$  length to length of wing 0.44 - 0.47, 0.45.

Legs: Leg ratios given for fore, mid and hind leg: LR 1.02 - 1.07, 1.04 (n=5); 1.01 - 1.04, 1.03 (n=5); 0.74 - 0.78, 0.75 (n=5); SV 1.84 - 1.97, 1.92 (n=5); 1.86 - 1.93, 1.9 (n=5); 2.36 - 2.46, 2.41 (n=5); BV 1.34 - 1.41, 1.37 (n=5); 1.79 -

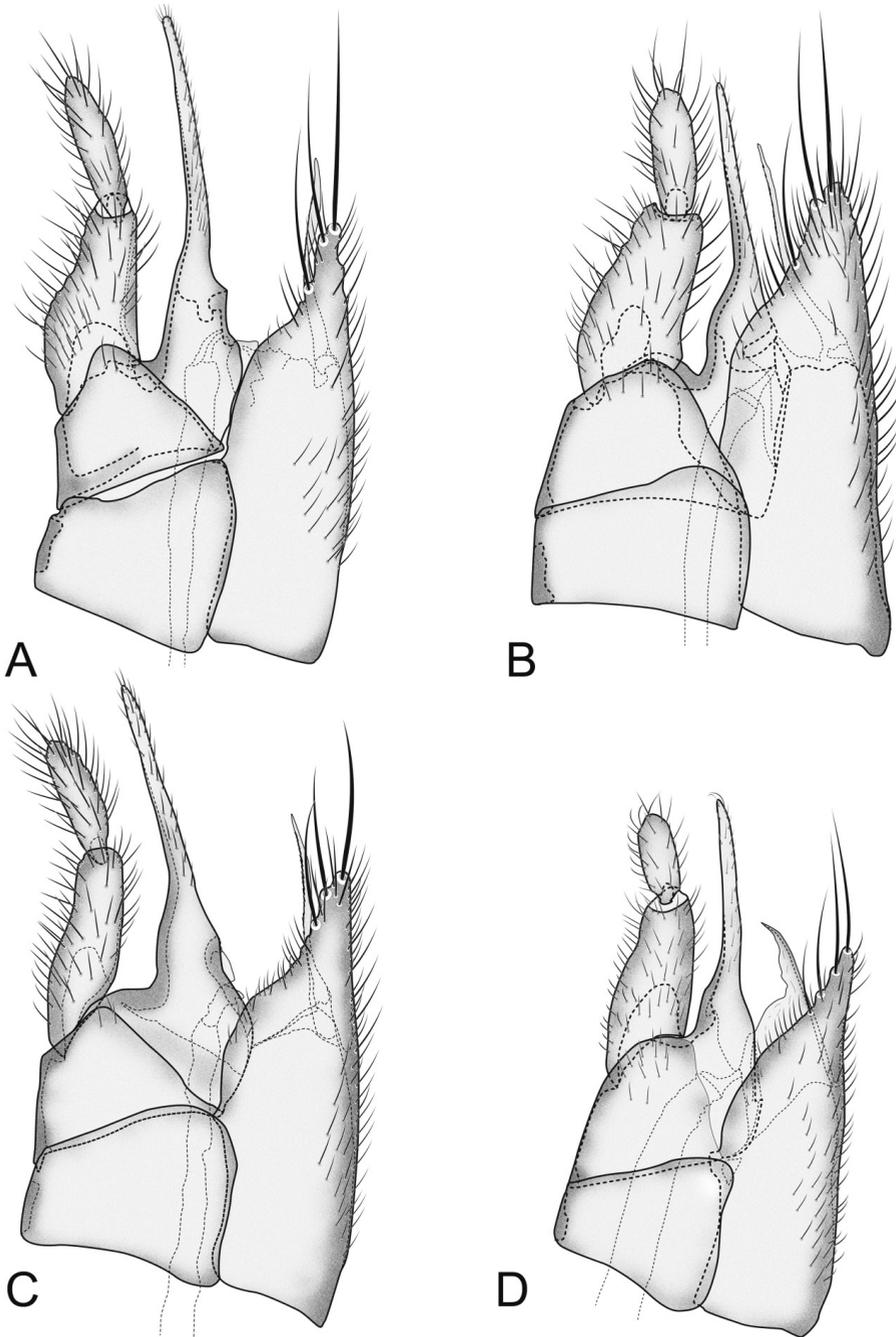


Fig. 12. Terminalia of *Tarnania* Tuomikoski females, lateral view. – **A:** *T. dziedzickii* (Edwards, 1941), – **B:** *T. fenestralis* (Meigen, 1818), – **C:** *T. nemoralis* (Edwards, 1941), – **D:** *T. tarnanii* (Dziedzicki, 1910).

1.85, 1.83 (n=5): 2.55 – 2.82, 2.72 (n=5); TR 1.32 – 1.44, 1.36 (n=5): 1.64 – 1.75, 1.67 (n=5): 2 – 2.14, 2.08 (n=5).

Terminalia (Fig. 12D): Cercus I long, less conical. Cercus II short, ovate, 2.31 – 2.73, 2.57 (n=5) as long as wide in lateral view. Gonapophysis VIII narrowly pointed towards apex; apicodorsal margin less sinusoid.

*Distribution.* – Holarctic, with a seemingly circumpolar distribution, although not yet found in Iceland (Kjærandsen et al. *in press*). In Europe reported from Austria, Belgium, Great Britain, Czech Republic, Danish mainland, Estonia, Finland, French mainland, Germany, Italian mainland, Latvia, Lithuania, Norwegian mainland, Poland, Romania, Russia Central, Russia North, Russia Northwest, Slovakia, Sweden, Switzerland, and The Netherlands (Chandler 2004). Outside Europe reported widely in the East Palearctic region from Siberia, Mongolia, and the Primorsky Region of the Far East (Chandler 2004, Zaitzev 2003). Further reported as widespread in the Nearctic Region (Vockeroth 1981), and from Greenland (Chandler 2004). The Nearctic records are confirmed in the present study by material from the Yukon Territory of Canada and Alaska.

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