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Revision of the Tiliacea melonina (Butler, 1889) species group (Lepidoptera, Noctuidae: Xylenini)

B. BENEDEK, T. CSŐVÁRI & L. RONKAY

Department of Zoology, Hungarian Natural History Museum
H-1088 Budapest, Baross u. 13, Hungary. E-mails: benedek@zoo.zoo.nhmus.hu
csovari@zoo.zoo.nhmus.hu, ronkay@zoo.zoo.nhmus.hu

Abstract – The *melonina* group of the genus *Tiliacea* TUTT, 1896 is revised. Four new species, *T. peregovitsi* sp. n. (Vietnam, Thailand), *T. mimetica* sp. n. (Nepal), *T. karli* sp. n. (Vietnam) and *T. changsha* sp. n. (China: Hunan) are described. The taxonomic status of *T. opipara* (B. S. CHANG, 1991) is clarified. Phylogenetic connections and biogeography of the group are discussed. With 80 figures.

Key words – *Tiliacea*, *melonina* group, new species, taxonomy, South-eastern Asia.

INTRODUCTION

Our knowledge about the real diversity of the Noctuidae fauna of the wide sense Himalayan region has been considerably increased from the early 1990s when the first treatments of the material of the new and successful expeditions were published. These expeditions have already used the new collecting methods aided by the technical development of the light sources and the better access of the remote and formerly abandoned mountainous forest areas of eastern and south-eastern Asia, as well as the less explored autumnal and winter aspects of these regions. The investigations on this less or often completely unknown areas and aspects resulted in the discoveries of a surprisingly large number of undescribed Noctuidae species. These results promoted the activity of the new expeditions and also the taxonomic revisions of the typical genera and species groups of this special and highly diverse faunal type. This article is one in the row of the recently prepared generic revisions, containing the systematic survey of the *Tiliacea melonina* species group.

The *melonina* group has long been known as monotypical, its firstly discovered species, *T. melonina* (BUTLER, 1889) is widespread in the southern Himalayas. The next milestones in the knowledge of the group were settled more than one hundred years after the description of *T. melonina*. The first in the row is the comprehensive book of CHANG (1991) on the trifine Noctuidae species of Taiwan in which he described, besides several other novelties, two further taxa of the group, *T. opipara* and *T. tatachana*. The next step was the first systematic survey of the Himalayan late autumnal ("winter") Noctuidae by HACKER & RONKAY (1992) with the lectotype designation of *T. melonina*. The subsequent (and last) two remarkable papers have been published at the end of the century, dealing with the Noctuidae fauna of Nepal (HREBLAY & RONKAY 1998) and northern Vietnam (HREBLAY *et al.* 1999), resulting in the descriptions of *T. aculeata* and *T. glaucozona*.

The present paper provides the results of the entire revision of the *melonina* group. The intention for this work arose mainly from the results of the investigations carried out on the new expedition material from northern Indochina, Nepal, Taiwan and south-eastern China. The morphological characteristics important from a taxonomic point of view have been analysed, the available information on the distribution and bionomics of the species has been collected. As the most important results of the studies, four new species are recognised and described below, the taxonomic status of *T. opipara* is clarified and the biogeographical sketch of the group is established.

Abbreviations – BMNH = Natural History Museum (formerly British Museum (Natural History)), London, United Kingdom. HNHM = Hungarian Natural History Museum, Budapest, Hungary. NMNS = National Museum of Natural Science, Taichung, Taiwan. TFRI = Taiwan Forestry Research Institute, Taipei

CHARACTERISATION OF THE *TILIACEA MELONINA* GROUP

Taxonomy

The *Xanthia* OCHSENHEIMER, 1816 generic complex contains approximately two dozens of species, about half of them are still undescribed. The known taxa belong to numerous large phyletic lineages (see RONKAY *et al.* 2001), their taxonomic interpretation has not yet been resolved. The genus *Tiliacea* TUTT, 1896 has long been considered as a subgenus of *Xanthia* (see RONKAY *et al.* 2001), its presently known species belong to six different species groups.

The eastern Palaearctic taxa of the genus *Tiliacea* are rather remote from those of the western Palaearctic (mainly European) ones. The only lineage repre-

sented by species in both areas is the *T. citrago* species group where the three members are markedly similar externally, although the two eastern species are considerably larger (this is a general phenomenon within the genus, the eastern Palaearctic taxa of *Tiliacea* are medium-sized or large noctuids while the European–western Asian ones are generally "small medium-sized" moths). The *T. auragides* species group contains the species having no relatives in the Palaearctic and the externally most resembling taxa live in North America.

The *T. melonina* species group is most closely allied to the *T. aurago* species group ("*Aurxanthia* BECK, 1991"), although this relationship can be recognised only in the comparison of *T. aurago* ([DENIS & SCHIFFERMÜLLER], 1775) and the taxa of the most westerly distributed subgroup, *T. melonina* and its sister species.

The *melonina* group comprises two main phyletic lineages, the *melonina* and the *tatachana* subgroups, while the most ancient, known member of the group, *T. karli* sp. n. unifies most of the diagnostic features of both subgroups. The two subgroups are easily separable from each other by their external and genital characteristics (see below, in the characterisation of the three subgroups and in the illustrations of the adults and their genitalia), while the specific differences between the taxa of the given subgroup are often slight although clearly recognisable.

The detailed morphological characterisation of the *melonina* group is given below in the descriptive part. The diagnostic features of the entire group include 1) the large size with long, rather narrow, apically pointed or acute forewings; 2) the presence of the full noctuid pattern on the forewing; 3) the well-developed single corema of the last sternite of the males; 4) the sclerotised periostial incision of the last sternite of the females; 5) the apically (dorsally) dentate, sclerotised fultura inferior (juxta); 6) the presence of a variably large subapical costal lobe on the valva; 7) the large setose area on the ventral surface of the cucullus; 8) the long, stick-like, medially or subapically curved harpe; 9) the short, tubular aedeagus with sclerotised, often rather infundibular carina; 10) the short, generally tubular vesica with a subbasal single cornutus and a medial cornuti field; 11) the relatively long, conical ovipositor with narrow, long, weakly sclerotised papillae anales, and 12) the two narrow, ribbon-like signa of the corpus bursae.

The actual appearance of these features are rather uniform within the two main lineages but somewhat different in each species. The taxa of the *melonina* subgroup can be characterised by the larger size, broader, apically less acute forewings, paler, rather yellowish than orange-rufous ground colour, more prominent darker markings, the longer broader valvae with parallel costal and ventral margins, reduced costal lobe, small, globular clavi, small subbasal cornutus and large cornuti field consisting of a large number of fine bristle-like spinules, the longer and membranous ductus bursae and the absence of the sclerotised plate at junc-

tion of ductus bursae to corpus bursae. The typical features of the *tatachana* subgroup are the smaller size, narrower forewings with more acute apex, darker, usually orange-rufous ground colour, less conspicuous dark forewing pattern, shorter valvae tapering distally towards the base of cucullus, well-developed, cuneate or spiniform subapical costal lobe, large, lobate clavi, larger, more bulbed subbasal cornutus and smaller cornuti field consisting of a much smaller number of spinules, more sclerotised, shorter ductus bursae and the presence of a large sclerotised lamina nearby the junction of ductus bursae. The *karli* subgroup has an intermediate position between the two other subgroups by its meloninoid external appearance, and the globular clavi while the other important features of the male genitalia (shorter valvae with tapering medial third, long subapical costal process, shortened cucullus, large sub-basal cornutus of the vesica) are matching rather well with those of the species of the *tatachana* subgroup.

The specific differences of the members of the *melonina* group can be found in the shape and size of the valva and their cuculli, the costal process, the clavi, the fultura inferior and the armature of the vesica (males), the shape and size of the ostium and ductus bursae, their sclerotisation, the size of the sclerotised lamina at the posterior end of the corpus bursae, the shape and size of the signa and their rate of the length, and, last but not least, the shape and size of the postero-medial incision of the sternite VIII.

The configuration of the fultura inferior is very typical of the given species within the species group, the males can be satisfactorily identified by their fulturae (see the magnifications of the organs in the Figs 37–48). The only exception is the *aculeata–glaucozona* species pair where the fulturae are more or less identical. The situation is the same in the case of the structure of the last sternite of the females, here the separation of *T. opipara* and *T. peregovitsi* may only be problematic.

Synopsis of the *melonina* group

melonina subgroup
- *melonina* (BUTLER, 1889)
- *peregovitsi* sp. n.
- *opipara opipara* (B. S. CHANG, 1991) bona sp., stat. rev.
- *opipara* (B. S. CHANG, 1991) ssp. from Thailand
- *mimetica* sp. n.

karli subgroup
- *karli* sp. n.

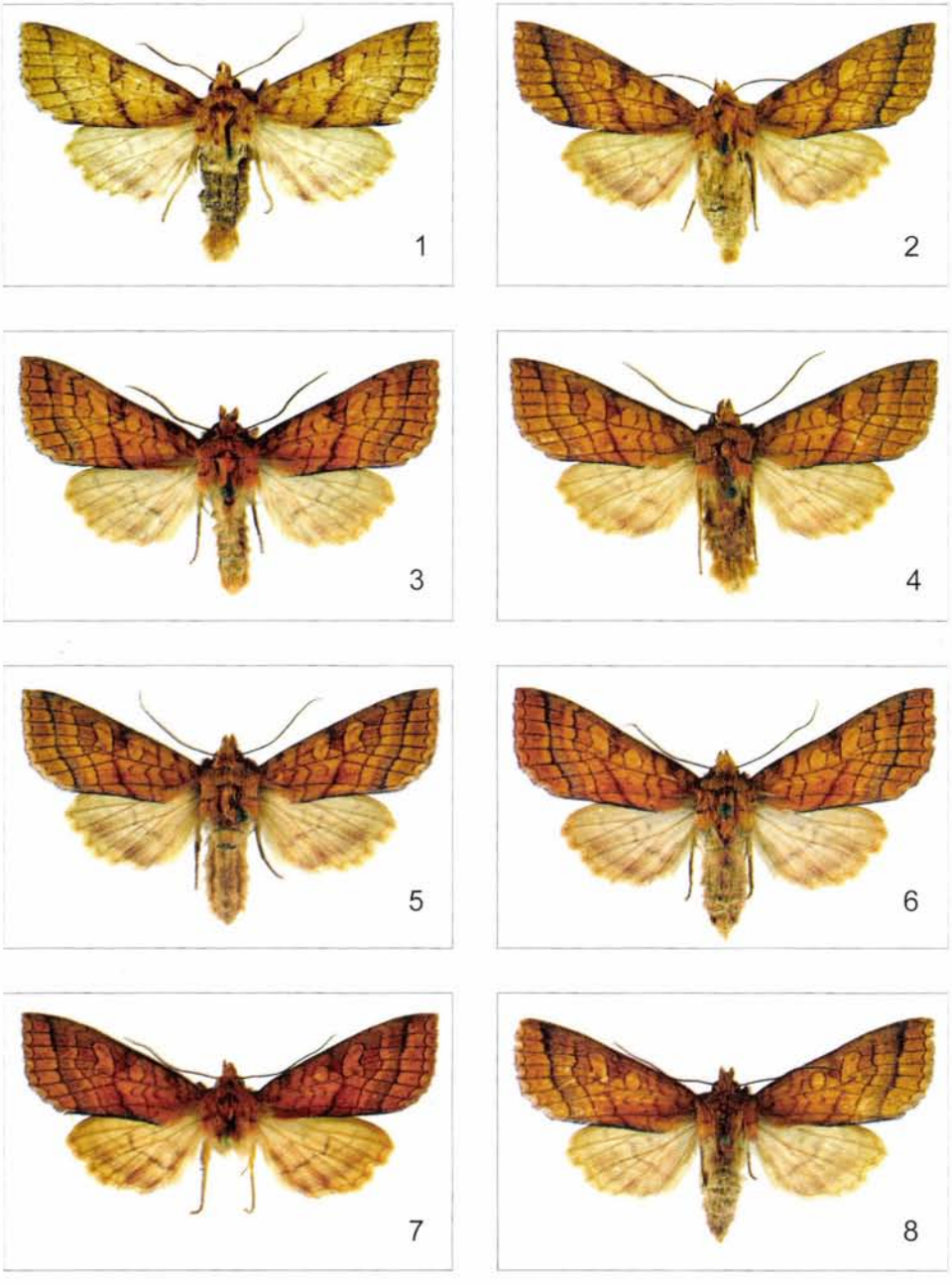
tatachana subgroup
aculeata (HREBLAY et RONKAY, 1998)
glaucozona (HREBLAY, PEREGOVITS et RONKAY, 1999)
changsha sp. n.
tatachana (B. S. CHANG, 1991)

GENERAL DESCRIPTION

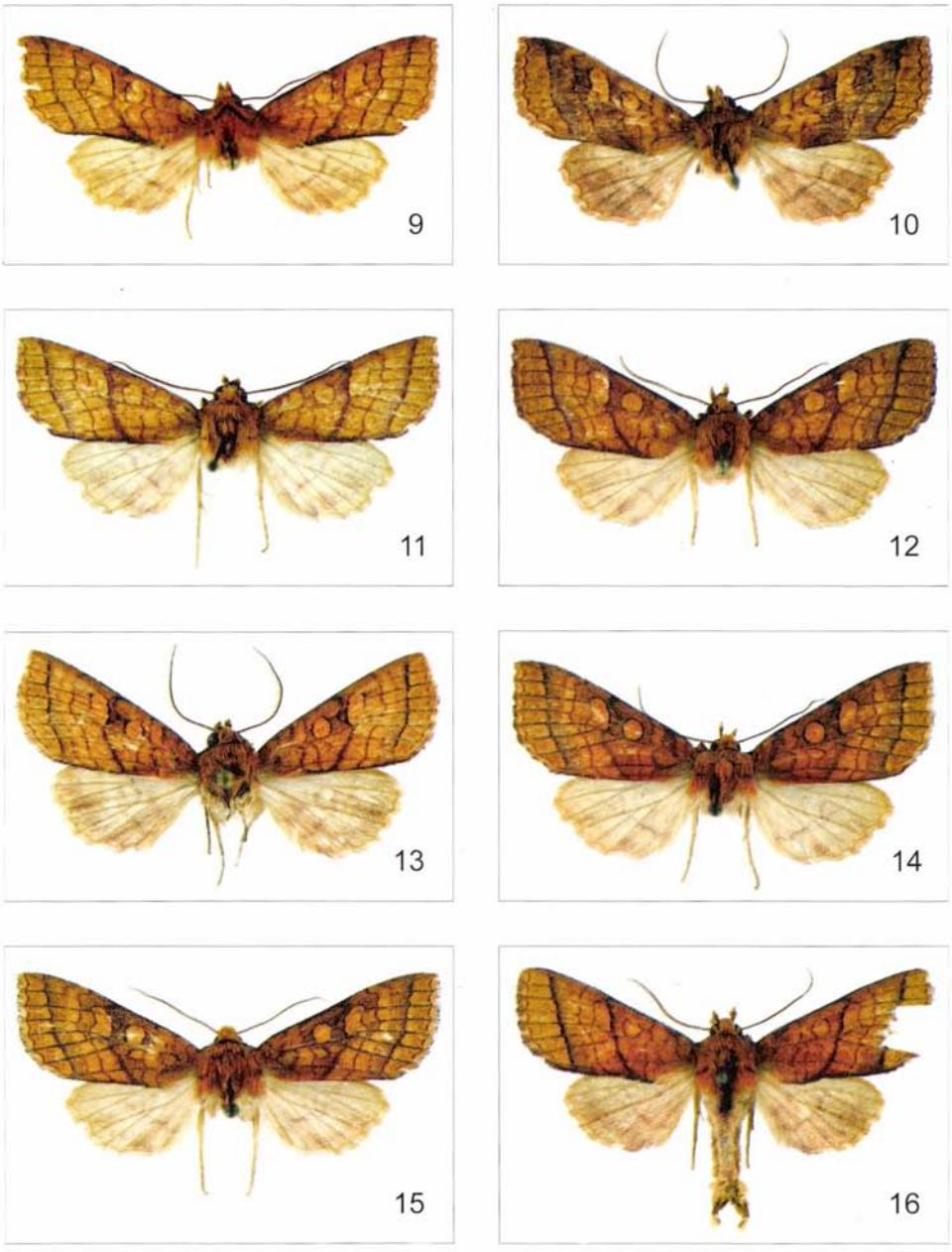
External morphology (Figs 1–24). – Medium-sized or relatively large species with long, slender body and with long, narrow fore wings having pointed or prominently acute apex. Head relatively small, frons smooth, covered with long hair-scales; vertex with large, raised tuft. Eyes large, globular, eye-lashes long, rather sparse; palpi medium-long, upturned, third joint finely pointed; proboscis well developed. Antennae of males most often ciliate with fasciculate cilia, in a species-pair (*aculeata* and *glaucozona*) shortly bipectinate; those of females filiform with short and rather sparse ciliation; basal scale-tuft often prominently whitish. Thorax relatively strong, broad, collar large, broad, tegulae well developed, pro- and metathoracic tufts large, cuneate-pyramidal. Legs strong, long, with long femoral and shorter tibial fringes. Abdomen slender, long, with variably long lateral ridges; dorsal crest weak; anal tuft and basal abdominal coremata of males well developed, large. Sternite VIII with well-defined, variably large, marginally heavily sclerotised, V-shaped or circular incision around ostium bursae. Colouration of head, thorax and forewings characteristically vivid yellowish, varying from bright golden yellow to deep orange and orange-rufous, dark markings mainly deep reddish brown to chocolate-brown, only rarily blackish. Hindwings much paler, whitish-ochreous with darker yellowish and/or orange-reddish suffusion, darker markings also remarkably paler, most often diffuse.

The members of the species group show a considerable range of variation in their external features, especially in the shade of the forewing colouration and the intensity of the dark pattern; the variation of the genital characters is significantly smaller, displaying no or only very slight overlap.

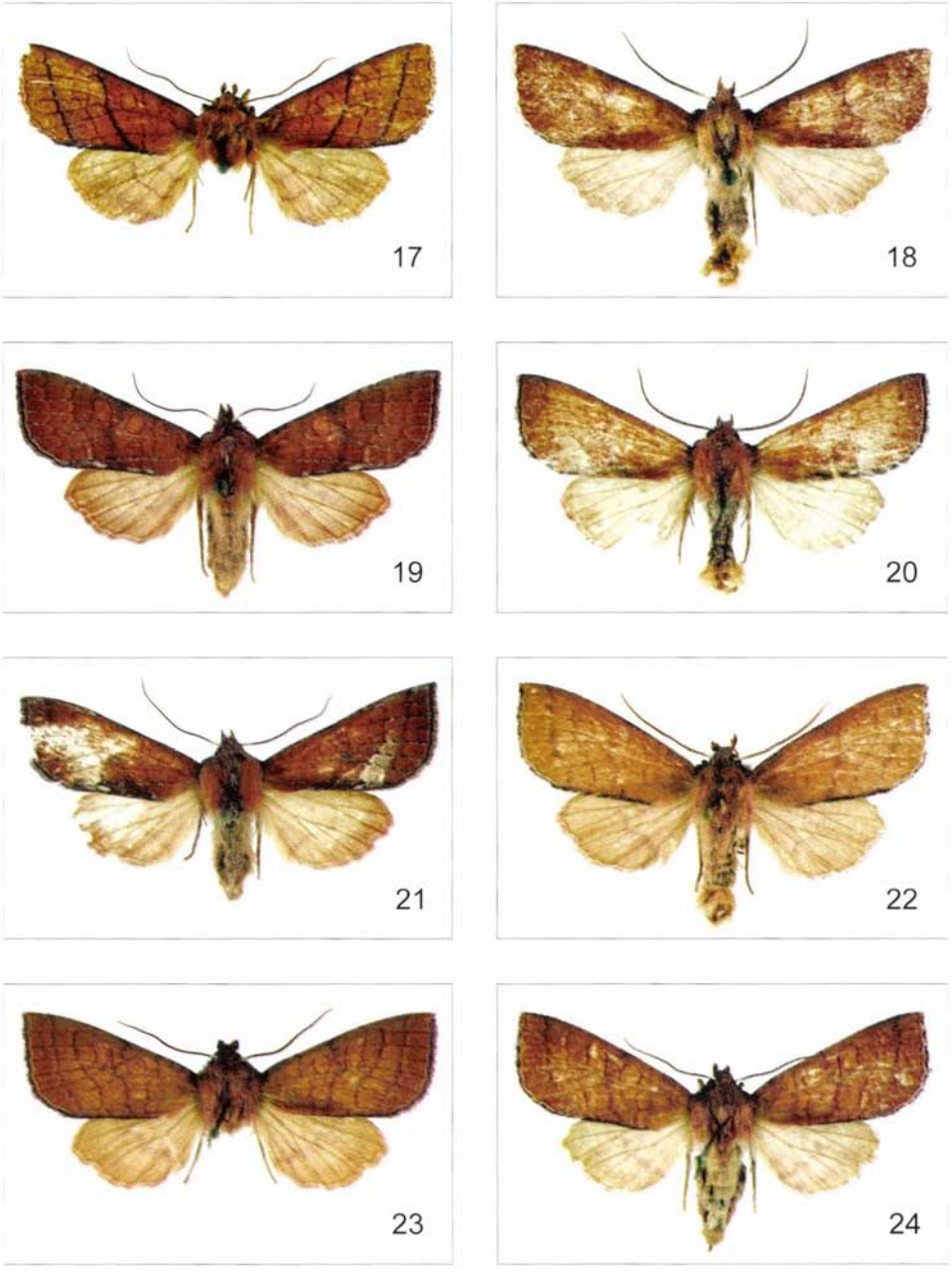
Male genitalia (Figs 25–60). – Genital capsula large, sclerotised, clasping apparate considerably stronger, larger than aedeagus. Uncus long, slender, flattened and apically pointed/hooked, basal part broadened, conical. Tegumen high and broad, relatively weakly sclerotised. Its dorsal section rather conical, lateral part much broader with large, rounded or ear-shaped penicular lobes covered densely with fine, long bristles of hair. Transtilla fine, unspecialised, fultura inferior (juxta) well-developed, large and sclerotised, its configuration an important diagnostic character for each species. Its shape generally deltoidal or subdeltoidal with variably large and broad deltoidal (subtriangular, rhomboidal) basal (ventral) plate and longer, variably strongly broadened, sometimes finely twisted apical (dorsal) process bearing always smaller or larger apical (subapical) teeth. Vinculum relatively short but strong, V-shaped. Valvae elongated, long and rather narrow, saccular part broad, sclerotised, distal part may be evenly broad or variably strongly tapering towards base of cucullus; cucullus always well-developed with dense covering of stronger bristles and finer hairs and with pointed or acute apex; corona present, moderately strong. Costa sclerotised, with small, rounded or large, prominent, cuneate subapical process. Harpe long or very long, slender, medially or subapically curved outwards in a right angle, subbasally sometimes finely dentate-serrate, its basal bar long, fine. Sacculus relatively short, clavus small, globular or somewhat mushroom-shape or considerably larger, lobate and densely setose. Aedeagus relatively small and short, cylindrical, carina sclerotised, in certain species slightly folded (and somewhat infundibular), ventrally of ventro-laterally dentated.



Figs 1–8. *Tiliacea* imagoes. 1–6 = *T. melonina* (BUTLER, 1889): 1 = male, Pakistan, 2 = female, Pakistan, 3–4 = male, Nepal, 5–6 = female, Nepal. 7–8 = *T. peregovitsi* sp. n., females, Vietnam: 7 = holotype, 8 = paratype



Figs 9–16. *Tiliacea* imagoes. 9–10 = *T. peregovitsi* sp. n., paratype, female: 9 = Vietnam, 10 = Thailand. 11–13 = *T. opipara* (B. S. CHANG, 1991): 11 = male, Taiwan, 12 = female, Taiwan, 13 = ssp., male, Thailand. 14–15 = *T. mimetica* sp. n., female, Nepal: 14 = holotype, 15 = paratype. 16 = *T. karli* sp. n., holotype, male, Vietnam



Figs 17–24. *Tiliacea* imagoes. 17 = *T. karli* sp. n., paratype, male, Vietnam. 18–19 = *T. aculeata* (HREBLAY et RONKAY, 1998), paratypes, Nepal: 18 = male, 19 = female. 20–21 = *T. glaucozona* (HREBLAY, PEREGOVITS et RONKAY, 1999), paratypes, Vietnam: 20 = male, 21 = female. 22 = *T. changsha* sp. n., holotype, male, China. 23–24 = *T. tatachana* (B. S. CHANG, 1991), Taiwan: 23 = male, 24 = female

Vesica always short, tubular, basally often slightly dilated and inflated, armed with a subbasal cornutus and a medial field of cornuti. Their shape, strength, number, etc. are distinctive specific features; both the cornutus (*opipara*) and the cornuti field (*aculeata*) may be entirely reduced.

Female genitalia (Figs 61–80). – Ovipositor medium-long, conical, papillae anales long, narrow, weakly sclerotised, covered densely with long, fine bristles; posterior gonapophyses long, slender. Penultimate segment narrow, ring-like, sclerotised, anterior gonapophyses medium-long, stick-like. Ostium bursae flattened, sclerotised, quadrangular or slightly calyculate, in certain cases with weaker (most species of the *melonina*-lineage) or stronger (*mimetica*; *tatachana*-lineage) opercular plate. Ductus bursae medium-long tubular, more or less straight or somewhat S-shaped, generally membranous with weaker or stronger wrinkles and gelatinous crests, rarily with smaller sclerotised plate(s) (*melonina*-lineage) or rather short, sclerotised and finely cristate (*tatachana*-lineage). Appendix bursae small, subconical, wrinkled-rugose. Corpus bursae spacious, elliptical-ovoid, entirely membranous (*melonina*-lineage), or with a smaller or larger, strongly sclerotised lamina at junction to ductus bursae (*tatachana*-lineage). Medial section with two narrow, ribbon-like signa, their absolute and relative length is another specific feature; they may be partly or even fully reduced in the *melonina*-lineage.

Bionomics – The taxa of the *T. melonina* group are typical members of the winter fauna of the wide sense Himalayan region, occurring everywhere in the medium-high and higher mountainous forest belts of monsoonic influence. This monsoonic influence appears as a strict limit for their distribution, at least in the western part of the range of the group where the most westernly distributed *T. melonina* follows categorically the line of the average expansion of the summer monsoon to the north in the SW Himalayas. It occurs practically everywhere in the southern Himalayas, extending towards to the north-western direction to the Murree Hills but not crossing the border of the Kaghan valley. The adults appear in the first half of October and their flight period extends until the end of November to beginning of December, even in those areas where the winter fauna is continuous and several species are on the wing in December, January and February. The group, therefore, belongs to the late autumnal section of the Himalayan winter Noctuidae fauna. All but one species of the *melonina* group are local and rare, the only exception is the name-holder taxon of the group: *T. melonina* may be locally frequent or even common in certain years in the Nepalese Himalayas. The adults are active and good flyers, visiting regularly the artificial light and attracted also to sugar baits (except in Taiwan where no observations are known about the appearance of any winter Noctuidae or Thyatiridae species on the sugar). The early stages and the foodplants are unknown, the larvae feed presumably on trees and shrubs.

Distribution – The range of the *melonina* group covers the monsoonic areas of the Himalayan–Sino-Pacific subregion from the Murree Hills in Pakistan throughout the entire southern Himalayas and the northernmost mountainous territories of Indochina (North Thailand, North Vietnam) to Hunan province in continental China and to Taiwan. The westernmost edge of the area is fitting well with

the regular extension of the summer monsoon in the western Himalayas, while the northernmost localities do not extend northwards from Taiwan. There are no records of the presence of the species group from the south-eastern edge of the Tibetan plateau (Yunnan, Sichuan) nor from the Central Chinese mountains (Taibaishan area) but the occurrence of the group in these parts of the region cannot be excluded.

The known distribution patterns of the three subgroups and the tendency of changes of numerous morphological features suggest that the centre of evolution of the *melonina* group lies in the northern Indo-Chinese mountain regions. All three subgroups are represented here by at least one species (the *melonina* subgroup by two more or less sympatric species!), including the most ancient, known member of the lineage (*T. karli*). The ranges of the two larger subgroups are more or less overlapping in the entire area of the species group and the biradial spreading and the subsequent allopatric speciation can be clearly detected analysing the character stati of several external and genital features of both the *melonina* and the *tatachana* subgroups.

KEY FOR THE SPECIES BASED ON THE MALE GENITALIA
(the male of *T. mimetica* is unknown)

1 Subapical costal lobe forming long, acute process (Figs 32–36) 2

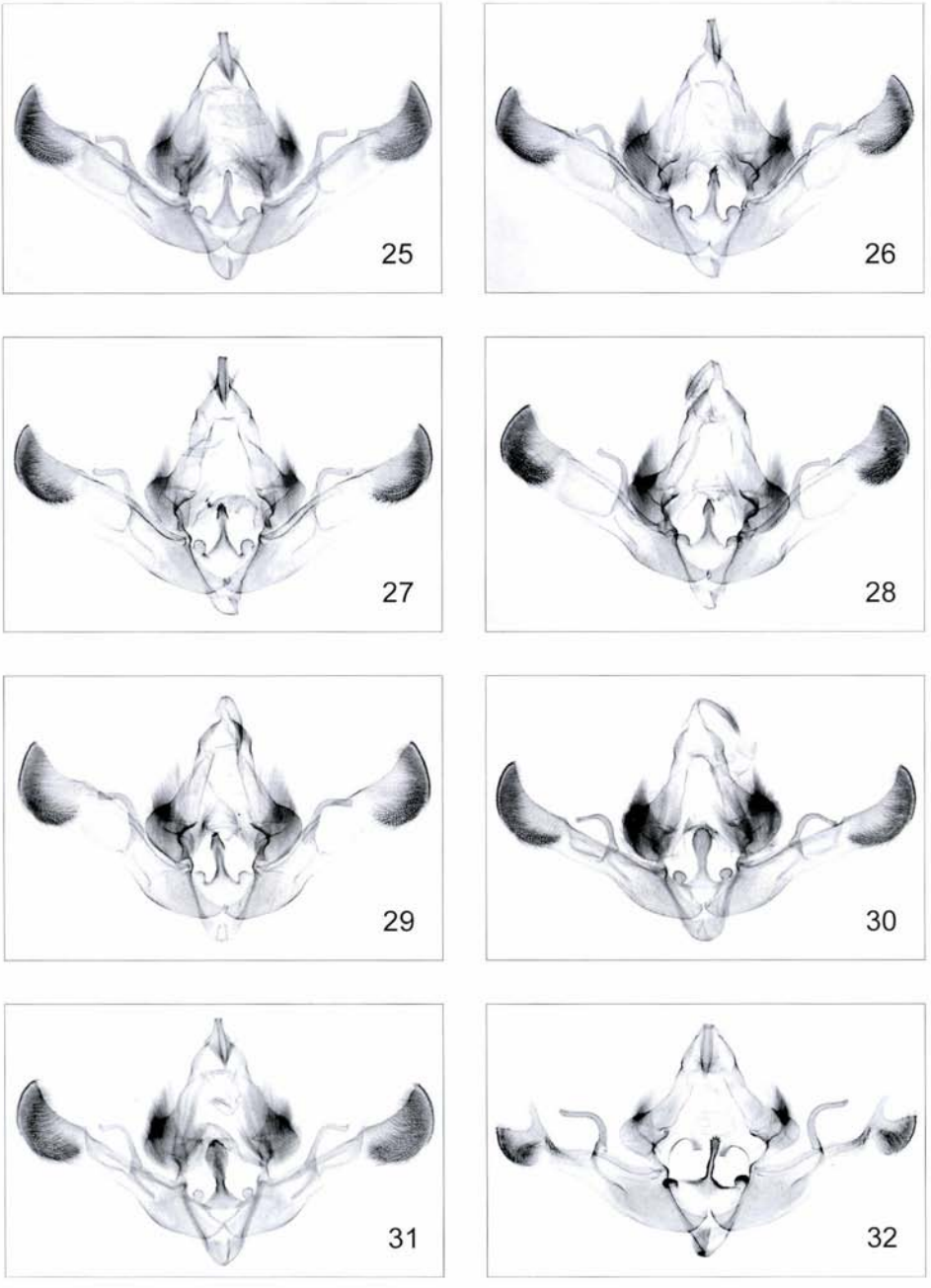
– Subapical costal lobe represented by a small, rounded hump (Figs 25–31) 6

2 Clavus small, globular, densely setose; basal plate of fultura inferior very broad, more than five times as broad as apical (dorsal) process; harpe relatively short, curved at middle (Figs 32, 44) **Tiliacea karli** sp. n.

– Clavus large, lobate; basal plate of fultura inferior max. four times as broad as apical (dorsal) process; harpe longer, curved at apical third (Figs 33–36, 45–48) 3

3 Apical process of fultura inferior curved nearby apex; harpes shorter and thicker; subbasal cornutus of vesica straight (Figs 33–34, 45–46, 57–58) 4

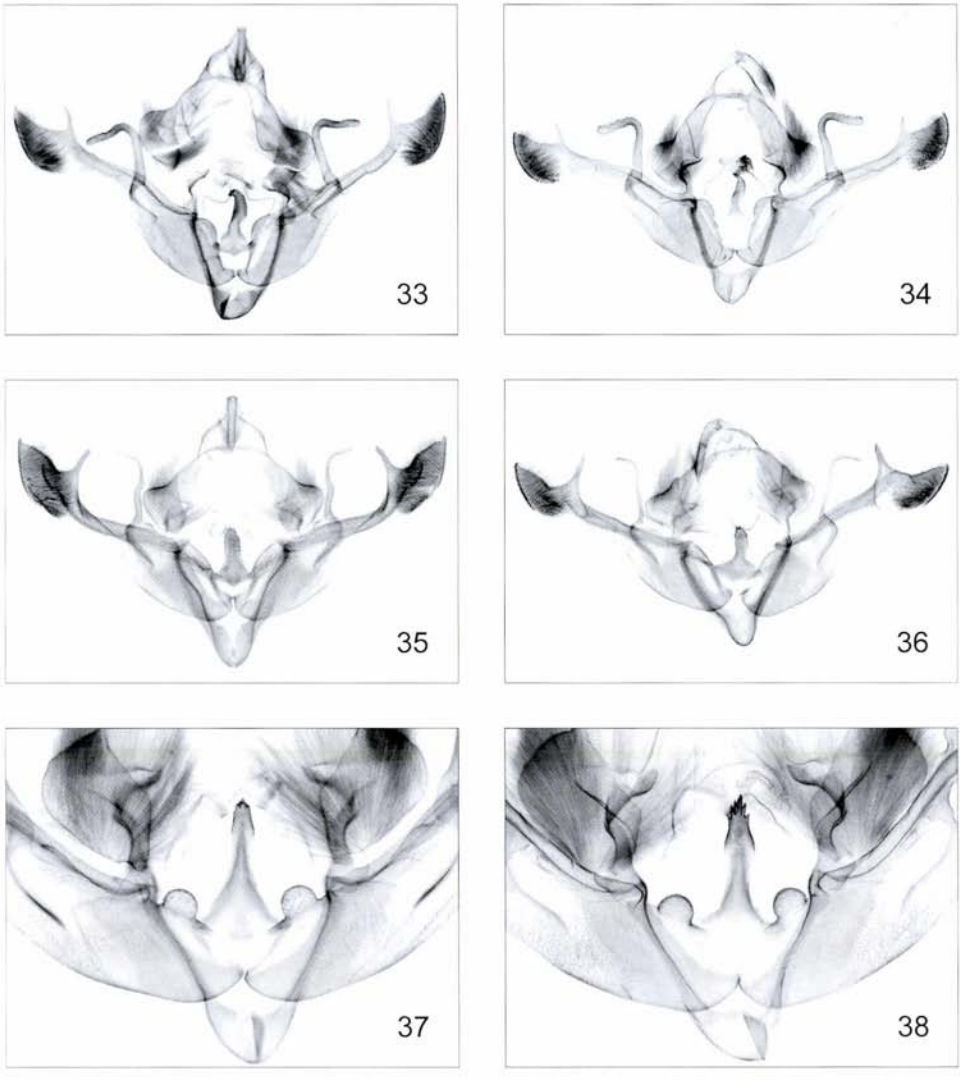
– Apical process of fultura inferior flattened, not curved nearby apex; harpes much longer and slenderer; subbasal cornutus of vesica curved nearby its basal bulb (Figs 35–36, 47–48, 59–60) 5



Figs 25–32. *Tiliacea* male genital capsula. 25–27 = *T. melonina* (BUTLER, 1889): 25 = Pakistan, 26–27 = Nepal. 28–29 = *T. peregovitsi* sp. n., paratype, Vietnam. 30–31 = *T. opipara* (B. S. CHANG, 1991): 30 = Taiwan, 31 = ssp., Thailand. 32 = *T. karli* sp. n., holotype, Vietnam

4 Cornuti field of vesica entirely reduced; cucullus considerably broader and apically more acute (Figs 33, 57)

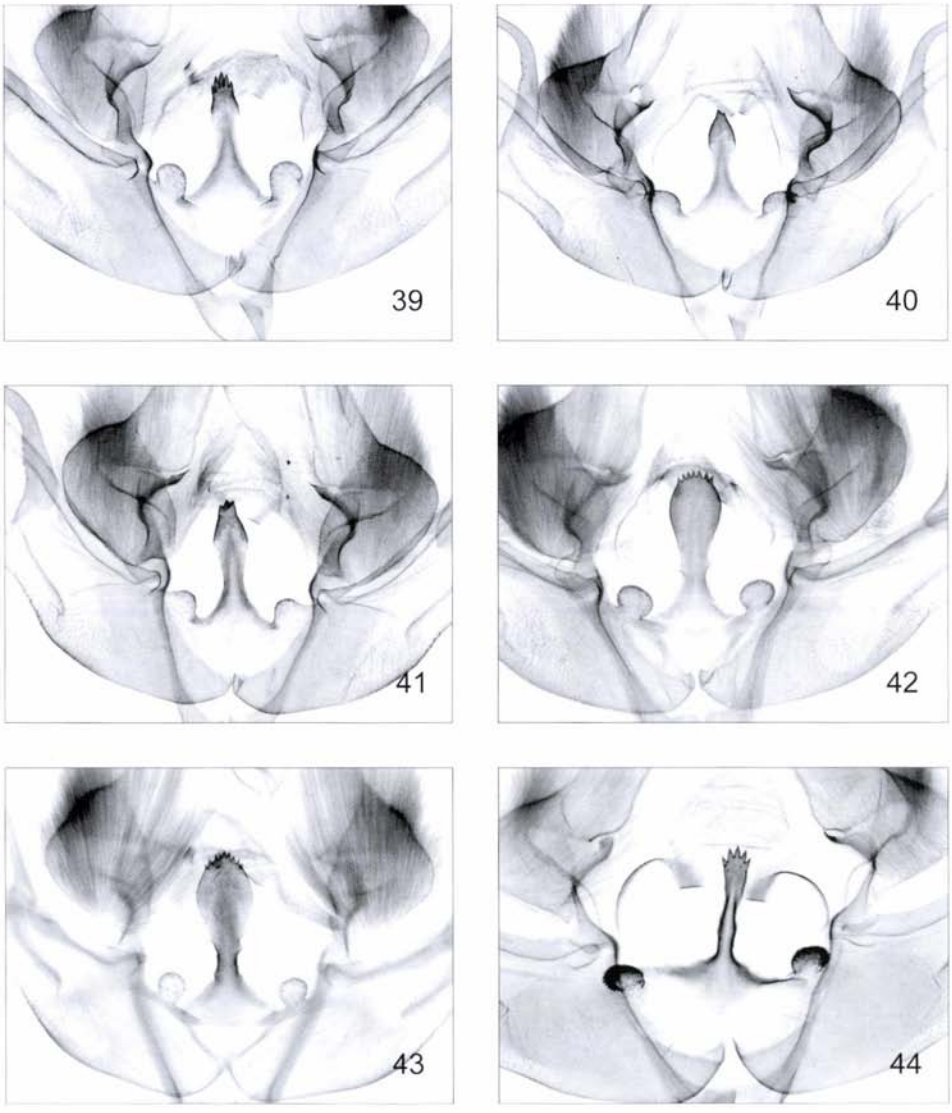
Tiliacea aculeata (HREBLAY et RONKAY, 1998)



Figs 33–38. *Tiliacea* male genital capsula. 33 = *T. aculeata*, paratype, Nepal, 34 = *T. glaucozona* (HREBLAY, PEREGOVITS et RONKAY, 1999), paratype, Vietnam, 35 = *T. changsha* sp. n., holotype, China, 36 = *Tiliacea tatachana* (B. S. CHANG, 1991), Taiwan. 37–38 = Fultura inferior of *T. melonina*: 37 = Pakistan, 38 = Nepal

– Cornuti field of vesica strongly developed, its spinules significantly longer than subbasal cornutus; cucullus considerably smaller, narrower, apically less acute (Figs 34, 58)

Tiliacea glaucozona (HREBLAY, PEREGOVITS et RONKAY, 1999)



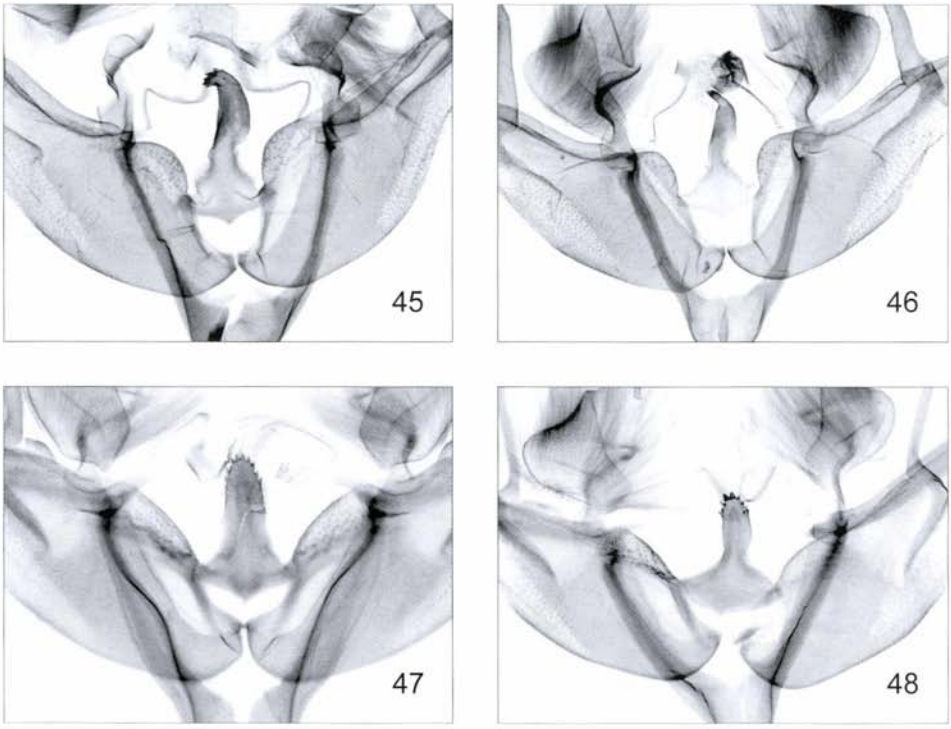
Figs 39–44. Fultura inferior of *Tiliacea* males. 39 = *T. melonina* (BUTLER, 1889), Nepal, 40–41 = *T. peregovitsi* sp. n., paratype, Vietnam, 42–43 = *T. opipara* (B. S. CHANG, 1991): 42 = Taiwan, 43 = ssp., Thailand. 44 = *T. karli* sp. n., holotype, Vietnam

5 Basal part of fultura inferior significantly broader, more than three times as broad as apical part; cucullus considerably smaller, narrower; subbasal cornutus of vesica longer, finer, thorn-like (Figs 36, 48, 60)
Tiliacea tatachana (B. S. CHANG, 1991)

– Basal part of fultura inferior much narrower, cca two times as broad as apical part; cucullus larger and broader; subbasal cornutus of vesica shorter but thicker, claw-like (Figs 35, 47, 59) **Tiliacea changsha** sp. n.

6 Subbasal cornutus of vesica absent; apical part of fultura inferior strongly broadened, terminated in a row of 7–9 small teeth of equal size (Figs 30–31, 42–43, 54, 57) *Tiliacea opipara* (B. S. CHANG, 1991)

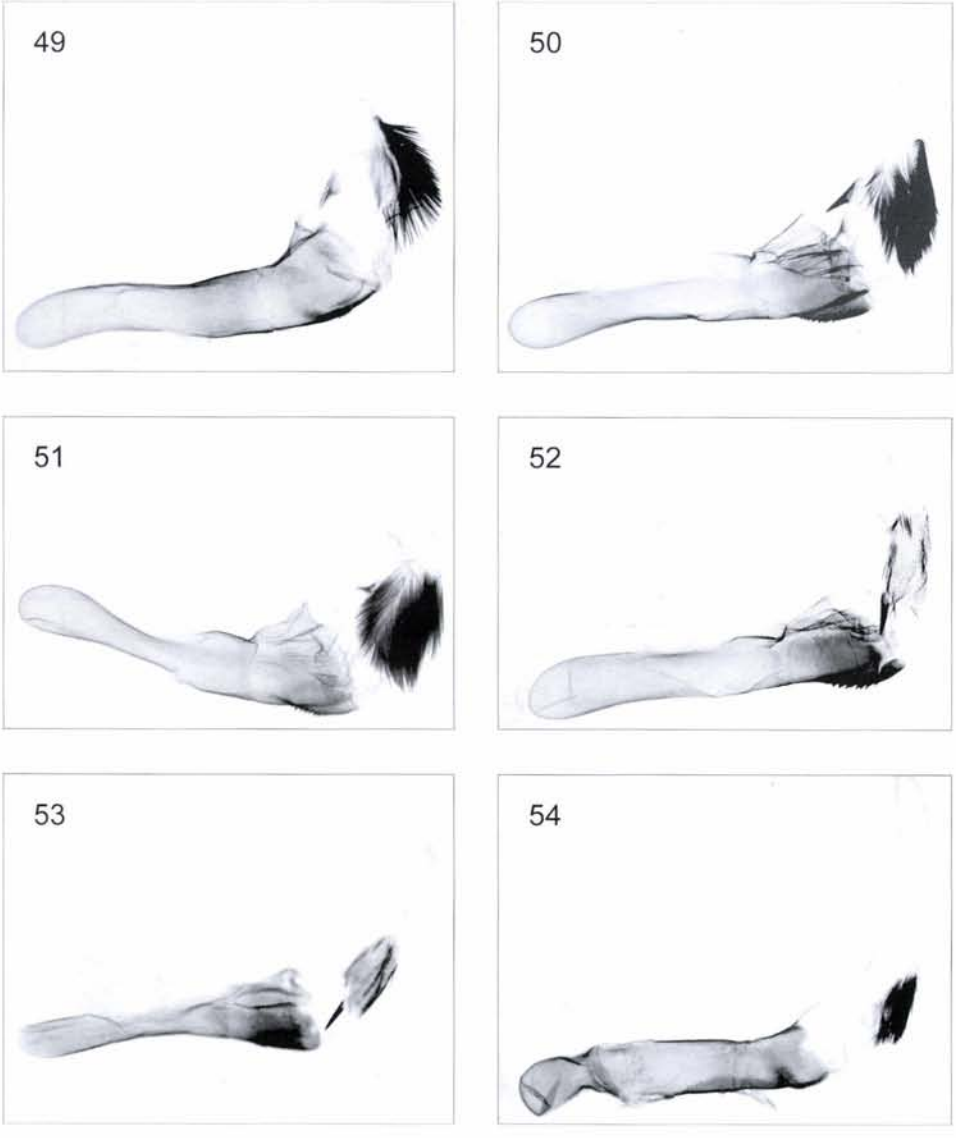
– Subbasal cornutus of vesica present, spiniform; apical part of fultura inferior narrow, candle-shaped, terminated in 2–6 rather inequal teeth (Figs 25–29, 37–41, 49–53) 7



Figs 45–48. Fultura inferior of *Tiliacea* males. 45 = *T. aculeata* (HREBLAY et RONKAY, 1998), paratype, Nepal, 46 = *T. glaucozona* (HREBLAY, PEREGOVITS et RONKAY, 1999), paratype, Vietnam, 47 = *T. changsha* sp. n., holotype, China, 48 = *T. tatachana* (B. S. CHANG, 1991), Taiwan

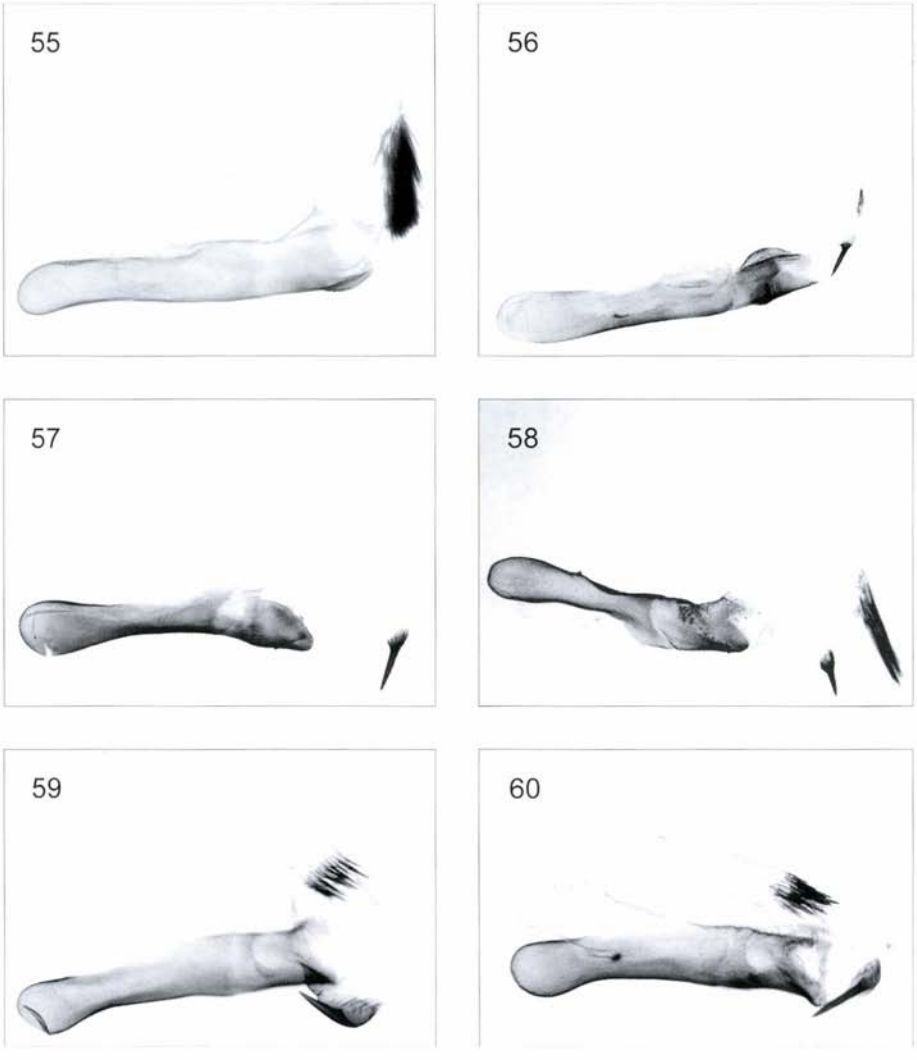
7 Valvae considerably narrower, with longer, narrower, more acute cucullus; deltoidal basal plate of fultura inferior remarkably longer, apical part less dilated; clavus more globular; carina of aedeagus more broadly infundibular; cornuti field larger, more dense (Figs 25–27, 37–39, 49–51)

Tiliacea melonina (BUTLER, 1889)



Figs 49–54. *Tiliacea* aedeagus. 49–51 = *T. melonina* (BUTLER, 1889): 49 = Pakistan, 50–51 = Nepal, 52–53 = *T. peregovitsi* sp. n., paratype, Vietnam, 54 = *T. opipara* (B. S. CHANG, 1991), Taiwan

– Valvae considerably broader, especially cucullus is broader and shorter, apically less acute; basal plate of fultura inferior much shorter, rather triangular than deltoidal, apical process more dilated; clavus less globular, more lobate; carina of aedeagus only slightly infundibular; cornuti field smaller, more sparse (Figs 28–29, 40–41, 52–53) **Tiliacea peregovitsi** sp. n.



Figs 55–60. *Tiliacea* aedeagus. 55 = *T. opipara* (B. S. CHANG, 1991) ssp., Thailand, 56 = *T. karli* sp. n., holotype, Vietnam, 57 = *T. aculeata* (HREBLAY et RONKAY, 1998), paratype, Nepal, 58 = *T. glaucozona* (HREBLAY, PEREGOVITS et RONKAY, 1999), paratype, Vietnam, 59 = *T. changsha* sp. n., holotype, China, 60 = *T. tatachana* (B. S. CHANG, 1991), Taiwan

KEY FOR THE SPECIES BASED ON THE FEMALE GENITALIA
(the females of *T. karli* and *T. changsha* are unknown)

1 Ductus bursae short, sclerotised; posterior part of corpus bursae rather separated from fundus bursae, with smaller or larger sclerotised plate and stronger ribs (Figs 68–70) 2

– Ductus bursae remarkably longer, generally membranous (sometimes with smaller sclerotised plates at junction to corpus bursae and/or close to ostium bursae); corpus bursae uniformly membranous, not divided into two differently sclerotised parts (Figs 61–67) 4

2 Sclerotised plate of posterior part of corpus bursae small, other parts of this section strongly ribbed; incision of last sternite extremely large, V-shaped, its edges rather concave (Figs 70, 80) *Tiliacea tatachana* (B. S. CHANG, 1991)

– Sclerotised plate of posterior part of corpus bursae much larger, other parts of this section less ribbed but with one or two larger crests; incision of last sternite considerably smaller, its edges crenulate and convex (Figs 68–69, 78–79) 3

3 Ductus bursae longer with longitudinal ribs; posterior part of corpus bursae with smaller sclerotised plate and without stronger sclerotised crest; last sternite broader with smaller incision (Figs 68, 78)
Tiliacea aculeata (HREBLAY et RONKAY, 1998)

– Ductus bursae shorter, its surfaces rather smooth; posterior part of corpus bursae with larger, longer sclerotised plate and with strong sclerotised crest; last sternite narrower with larger and remarkably deeper incision (Figs 69, 79) *Tiliacea glaucozona* (HREBLAY, PEREGOVITS et RONKAY, 1999)

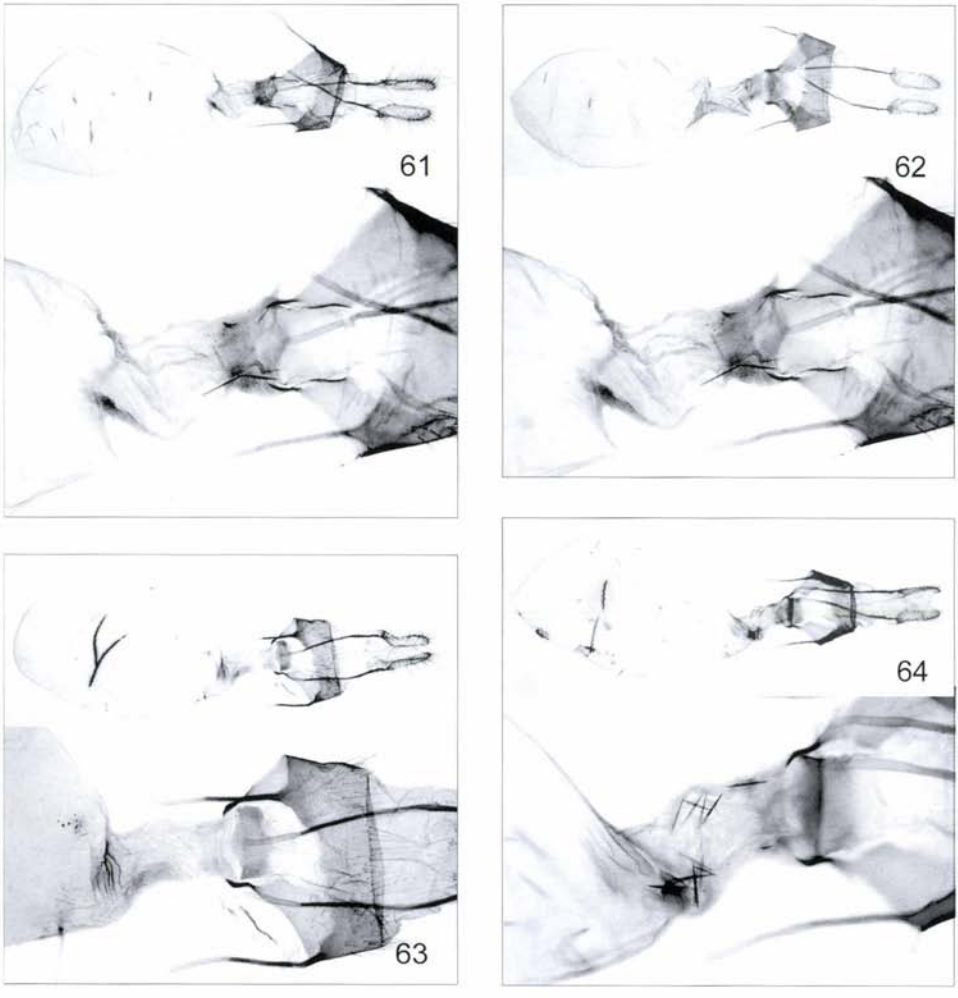
4 Ductus bursae short, entirely membranous, rather straight, with large posterolateral angle; signa very short (they may be partly or fully reduced); incision of last sternite small, V-shaped (Figs 61–62, 71–72)
Tiliacea melonina (BUTLER, 1889)

– Ductus bursae longer, somewhat curved or slightly S-shaped, membranous or with small sclerotised plate(s) nearby ostium bursae and/or junction to corpus bursae; signa longer, equal or strongly inequal; incision of last sternite small, larger or very large, calyculate or circular (Figs 63–67, 73–77) 5

5 Ostium bursae with strongly arcuate posterior and anterior edges; opercular plate of ostium bursae well-develeped, sclerotised; ductus bursae long, some-

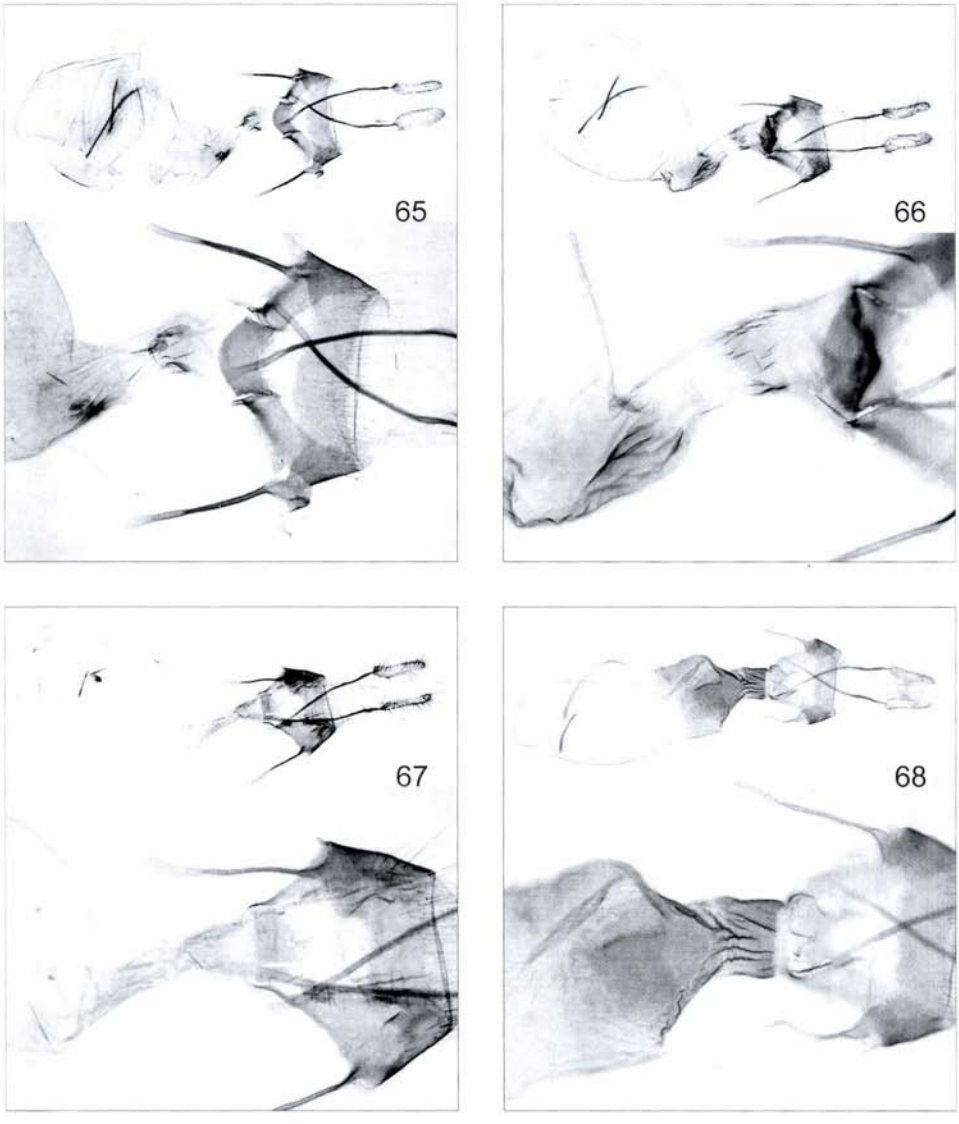
what S-shaped, with clearly recognisable sclerotised plate close to ostium bursae and with weaker, ribbed plate at junction to corpus bursae; signa strongly inequal, longer signum very long and thin; incision of last sternite very large, deeply calyculate (Figs 65–66, 75–76) **Tiliacea mimetica** sp. n.

– Ostium bursae quadrangular with more or less parallel edges; opercular plate of ostium bursae unspecialised, most often membranous; ductus bursae shorter, membranous or with weak, less recognisable sclerotised plate at

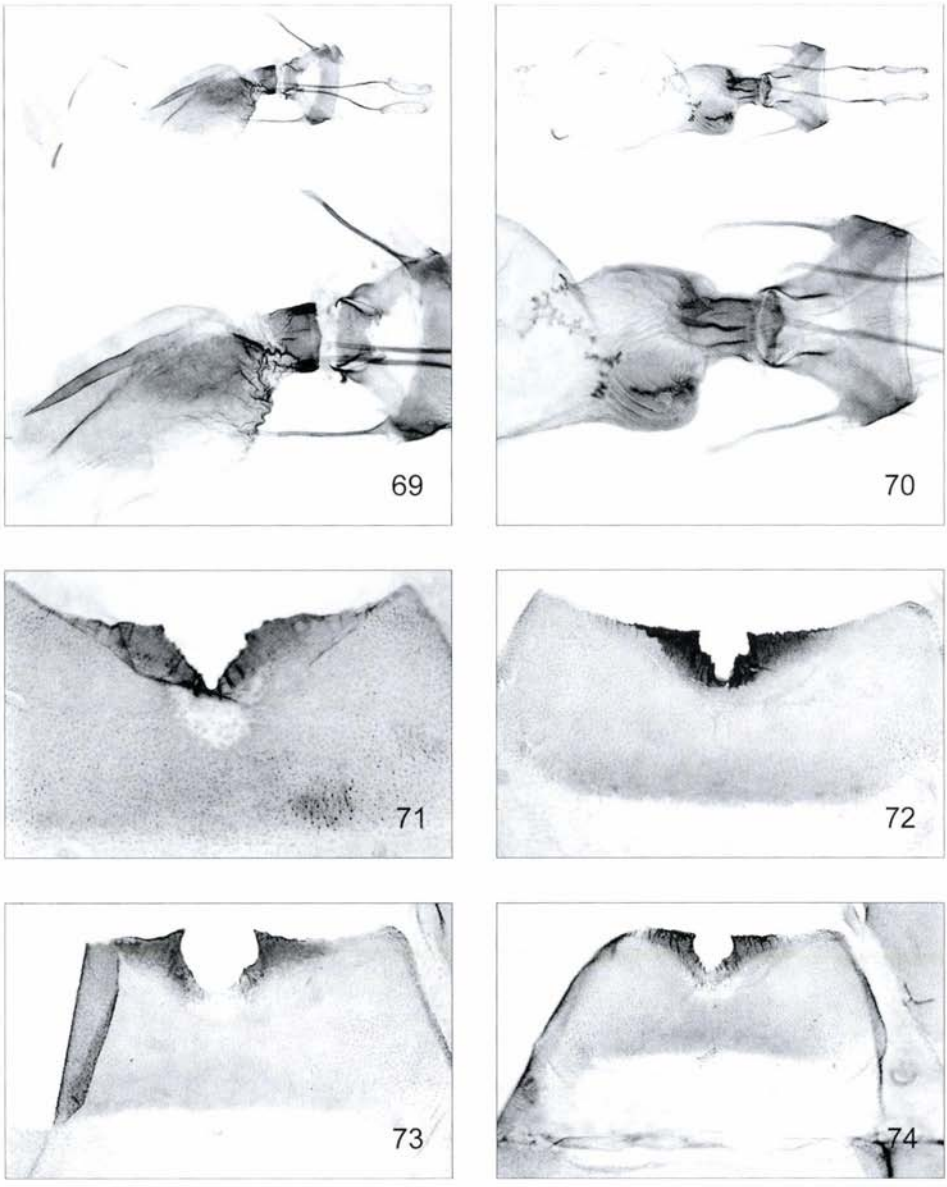


Figs 61–64. *Tiliacea* female genitalia. 61–62 = *T. melonina* (BUTLER, 1889): 61 = Pakistan, 62 = Nepal, 63–64 = *T. peregovitsi* sp. n.: 63 = holotype, Vietnam, 64 = paratype, Thailand

junction to corpus bursae; signa more or less equal, short or medium-long; incision of last sternite small or medium-sized, calyculate-circular (Figs 63–64, 67, 73–74, 77) 6



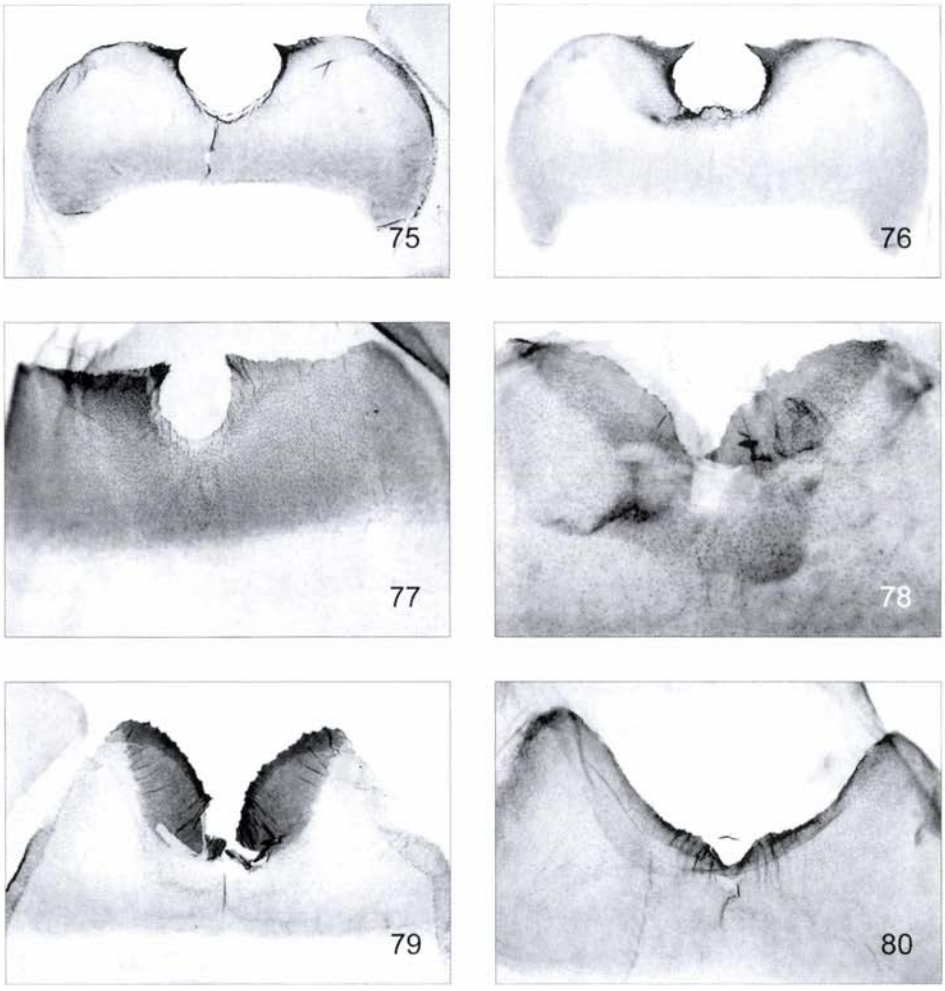
Figs 65–68. *Tiliacea* female genitalia. 65–66 = *T. mimetica* sp. n.: 65 = holotype, Nepal, 66 = paratype, Vietnam, 67 = *T. opipara* (B. S. CHANG, 1991), Taiwan, 68 = *T. aculeata* (HREBLAY et RONKAY, 1998), paratype, Nepal



Figs 69–74. *Tiliacea* female genitalia. 69 = *T. glaucozona* (HREBLAY, PEREGOVITS et RONKAY, 1999), holotype, Vietnam, 70 = *T. tatachana* (B. S. CHANG, 1991), Taiwan. *Tiliacea* 8th sternite of the females. 71–72 = *T. melonina* (BUTLER, 1889): 71 = Pakistan, 72 = Nepal. 73–74 = *T. peregovitsi* sp. n.: 73 = holotype, Vietnam, 74 = paratype, Thailand

6 Ductus bursae longer, considerably narrower, entirely membranous, with some gelatinous ribs and wrinkles; signa much shorter, weaker (Figs 67, 77)
Tiliacea opipara (B. S. CHANG, 1991)

– Ductus bursae shorter but broader, usually with fine sclerotised, rugose plate at junction to corpus bursae; signa significantly larger, longer and broader (Figs 63–64, 73–74) **Tiliacea peregovitsi** sp. n.



Figs 75–80. *Tiliacea* 8th sternite of the females. 75–76 = *T. mimetica* sp. n., Nepal: 75 = holotype, 76 = paratype, 77 = *T. opipara* (B. S. CHANG, 1991), Taiwan, 78 = *T. aculeata* (HREBLAY et RONKAY, 1998), paratype, Nepal, 79 = *T. glaucozona* (HREBLAY, PEREGOVITS et RONKAY, 1999), holotype, Vietnam, 80 = *T. tatachana* (B. S. CHANG, 1991), Taiwan

SYSTEMATIC PART

Tiliacea melonina (BUTLER, 1889)
(Figs 1–6, 25–27, 37–39, 49–51, 61, 62, 71, 72)

Xestia melonina BUTLER, 1889: 57, Taf. 128, Fig. 7. Type locality: [India, Himachal Pradesh] Dharmsala.

Type material examined – Lectotype male, Dharmsala, slide No. RL3979; 3 paralectotype females, from the same locality (coll. BMNH).

Additional material examined – Pakistan. 8 males, 19 females, Kashmir, Himalaya Mts, 30 km N Murree, Ayubia, 73°24'03"E, 34°01'75"N, 2650 m, 8–9.X. and 22–25.X.1998, leg. GY. M. LÁSZLÓ & G. RONKAY (coll. B. BENEDEK, P. GYULAI, G. RONKAY and HNHM). India. 3 males, Himachal Pradesh, 18 km S Simla, 16.XI.1992, leg. H. HACKER & H. PEKS (coll. H. HACKER and G. RONKAY). Nepal. A large series of both sexes from the following localities: Langtang: near Chandrabari, 85°21'E, 28°05'N, 2860 m, 25.IX.1994, leg. G. CSORBA & L. RONKAY; Annapurna Himal: between Ghorepani and Deorali, 3100 m, 83°43'E, 28°24'N, 5–6.X.1994, leg. G. CSORBA & L. RONKAY; Ganesh Himal: near Godlang, 2520 m, 85°17'E, 28°10'N, 13.X.1995 and 21.X.1995, leg. L. PEREGOVITS & L. RONKAY; 8 km W Godlang, 3050 m, 85°17'E, 28°10'N, 14.X.1995, leg. L. PEREGOVITS & L. RONKAY; Gothen village, 3150 m, 85°17'E, 28°09'N, 15–16.X.1995 and 20.X.1995, leg. L. PEREGOVITS & L. RONKAY; between Godlang and Nesim, 2720 m, 85°16'E, 28°08,5'N, 22.X.1995, leg. L. PEREGOVITS & L. RONKAY; above Nesim, 2300 m, 85°15,5'E, 28°06,5'N, 23.X.1995, leg. L. PEREGOVITS & L. RONKAY; Kanchenjunga Himal: Koshi, Terhathum area, Tinjure Phedi, 2900 m, 87°27E, 27°12N, 18.X.1996, leg. GY. M. LÁSZLÓ & G. RONKAY; Koshi, Terhathum area, Tshisopani, above Gorja, 2600 m, 87°37'E, 27°21'N, 20.X.1996, leg. GY. M. LÁSZLÓ & G. RONKAY; Mechi, Taplejung area, Mt. Pathibhara, 3155 m, 13–14.X.1994, leg. M. HREBLAY & T. CSŐVÁRI (coll. B. BENEDEK, T. CSŐVÁRI, GY. FÁBIÁN, M. FIBIGER, P. GYULAI, B. HERCZIG, S. T. KOVÁCS, G. RONKAY and HNHM).

Slide Nos: 6975, 6982, 8534 RONKAY (males); 6971, 6976, 6978, 6979, 8535 RONKAY (females).

Diagnosis – The species of the *melonina* subgroup are very similar externally (see the Figs 1–15), although their differences are recognisable by the comparison of larger series. *Tiliacea melonina* has the longest and narrowest, most pointed forewings within the subgroup with the ground colour being rather uniform; the inner area of the cell is not darkened and the filling of the orbicular and reniform stigmata is not remarkably different from that of the other parts of the cell like in *T. mimetica* and *T. opipara* (Figs 11–15); the median fascia is angled strongly inside and under the cell and not prominently straight like in *T. karli* (Figs 16–17).

The male genitalia show the typical features of the subgroup. The valvae are broader than those of *T. opipara* but narrower than those of *T. peregovitsi*, with the cuculli being remarkably shorter than those of *T. opipara* but significantly longer than those of *T. peregovitsi*. The fultura inferior is similar in shape to that of *T. peregovitsi* but has longer, larger deltoidal basal plate and apically less dilated dor-

sal part; the fultura of *T. opipara* is conspicuously different from those of *T. melonina* and *T. peregovitsi* by it apically strongly dilated and rounded dorsal plate having a long row of 7–9 smaller teeth at its top. The clavus is rather globular, more sphaerical than that of *T. peregovitsi* but less constricted at base than that of *T. opipara*. The harpe is the longest within the subgroup, it is somewhat longer than that of *T. peregovitsi*, extending far over costal margin, and a bit more longer than that of *T. opipara*. The structure of the aedeagus and the vesica of *T. melonina* and *T. peregovitsi* is very similar in type but the distal end of the aedeagus of *T. melonina* is more broadened, more infundibular, the basal part of the vesica is more inflated and the cornuti field is larger, more dense. The distal part of the aedeagus and the entire vesica is much narrower in *T. opipara*, the subbasal cornutus is fully reduced and the cornuti field is considerably smaller than in the other two relatives.

The female genitalia of the four members of the subgroup are also similar in type, the specific differences can be found in the shape and size of the ostial plate, the shape, length and (possible) sclerotisation of the ductus bursae and the absolute and relative length of the two signa; the configuration of the last sternite is also a very important specific feature. The ostial plate of *T. melonina* is rather quadratic, only slightly broader than long, its anterior margin more or less straight; the ductus bursae is short, entirely membranous, with some gelatinous ribs only, it is more or less straight with characteristic medio-lateral angle at left side, and the two signa are very short, one of them (exceptionally both!) may be fully reduced. The sclerotised plate of the ostial bursae is wider and shorter in *T. peregovitsi*, being considerably broader than long, its anterior margin is similarly straight as in *T. melonina*; the ductus bursae is medium-long, slightly oblique, most often entirely membranous and finely ribbed but with a finely cristate-wrinkled and weakly sclerotised plate may be present at junction to corpus bursae, the two signa are medium-long and remarkably thicker than those of *T. melonina* and are more or less equal in length. The third species of the subgroup, *T. mimetica*, has the largest and strongest ostial plate with strongly arcuate anterior and posterior margins, the longest, somewhat S-shaped ductus bursae with a smaller sclerotised plate at posterior end and a larger, wrinkled-cristate one at the junction to corpus bursae. This species has the longest signa within the subgroup, their size and rate of length (roughly 2:1) is similar to those of the taxa of the *T. tatachana* subgroup.

Most of the females of the *T. melonina* lineage can be identified successfully by checking the general shape and the medio-apical incision of the last abdominal sternite (see the Figs 71–77). The last sternite of *T. melonina* is broad, quadrangular, the medio-apical incision is small, V-shaped, broadest at posterior margin of the sternite. This sternite is rather trapezoidal in *T. peregovitsi* and *T. opipara* and

the incision is relatively small, cup-shaped (broadest at middle of incision) having strong, acute tips ("processi") at posterior margin. They differ only relatively slightly from each other, in the shape of the incision (it is more arcuate in *T. opipara*) and the lateral edges of the sternite (it is arcuate posteriorly in *T. opipara* while is practically straight in *T. peregovitsi*). The fourth species of the lineage, *T. mimetica*, has the strongest, characteristically cordiform last sternite with strongly rounded postero-lateral margins, and the medio-apical incision is huge, at least twice as large as in the other three species, it is rather circular with very long, thorn-like postero-apical processi.

The colouration of the species shows certain geographic tendency as the typical populations occurring in the western Himalayas (Pakistan, India: Himachal Pradesh) are considerably paler ochreous-yellowish than the orange-yellowish south-eastern Himalayan (Nepalese) ones. These populations are often more easily separable by their external appearance than, for instance, the worn specimens of *T. melonina* and *T. peregovitsi*. Their genitalia show, on the other hand, no mentionable differences and no material is available from western Nepal, the "gap" between the two differently coloured forms although the continuous range of the species in the southern Himalayas is highly predictable. Thus, we desist to describe the dark south-eastern Himalayan *T. melonina* as a distinct subspecies.

Description – External appearance as illustrated (Figs 1–6). Wingspan 36–43 mm, length of forewing 18–21 mm. The typical features are as follows: forewing long, narrow, with apex pointed, ground colour rather homogeneous, varying from pale yellow to deep orange, median are with only weak darker irroration in cell; inner margin widely suffused with dark greyish brown. Crosslines most often clearly visible, fine, dark brown, more or less parallel, finely sinuous; median fascia diffuse, dark red-brown, deeply angled inwards inside cell. Orbicular and reniform stigmata sharply defined, filled with ground colour; claviform stigma absent or marked with a few red-brownish scales only. Subterminal line rather straight, strong, usually strongest element of pattern, often defined with fine violaceous shaded zone at inner side.

Male genitalia (Figs 25–27, 37–39, 49–51). Uncus short, slender, dorso-laterally flattened; tegumen broad and long; penicular lobes large, rounded. Fultura inferior deltoidal with rather large, long deltoidal basal plate and relatively short, apically slightly dilated dorsal process having finely dentate tip; vinculum short, V-shaped. Valva narrow, elongate, medially slightly dilated; cucullus long, terminally upturned and acute; corona long, setose area medium-long. Subapical costal process represented by small, triangular lobe; sacculus short, narrow; clavus small, more or less globular, finely setose. Harpe long, relatively strong, strick-like, curved in right angle at apical third. Basal part of harpe relatively broad, medial section with finely plicate outer surface short. Aedeagus short, cylindrical, its distal end dilated, rather infundibular; ventral part of carina stronger sclerotised, dentate. Vesica short, everted forward, then upturned dorsally, basal part broad, distal tube narrow. Armature of vesica consist of a short, cuneate subbasal cornutus and a large medial cornuti field covered by a great number of fine, thin, setiform cornuti forming a large brush-like bundle.

Female genitalia (Figs 61–62, 71–72). Ovipositor long, conical, posterior papillae anales long, narrow, weakly sclerotised and densely setose; gonapophyses long, slender. Penultimate (9th) segment narrow, ring-like, sclerotised, bordering sclerotised ostial plate by narrow sclerotised bars.

Ostium bursae more or less quadratic or relatively narrow but long trapezoidal. Ductus bursae rather short, tubular, flattened, membranous with fine gelatinous ribs, more or less straight with large medio-lateral, bend-like lobe at left side. Appendix bursae small, conical, membranous; corpus bursae large, elliptical-ovoid, weakly membranous, with two short, fine signa (which may be partly or fully reduced).

Bionomics – The species is typical of, and locally frequent in the deciduous and mixed forest zones of the medium-high altitudes in the southern Himalayas (2000–3500 m) and is connected strongly to the areas markedly influenced by the summer monsoon. The moths are active flyers and are attracted strongly to light and sugar. The adults are on the wing in October–November, in the mid- and late autumnal aspects of the given locality. The early stages are unknown, the food-plants are supposedly different shrubs and trees.

Distribution – The species has a typical southern Himalayan distribution, its wide range extending from the Murree Hills in the Pakistani Himalayas throughout Himachal Pradesh and most parts of Nepal to Sikkim.

Tiliacea peregovitsi sp. n.

(Figs 7–10, 28–29, 40–41, 52–53, 63–64, 73–74)

Type material – Holotype: female, "VIETNAM, Prov. Lao Cai, 1900–2000 m, Fan-si-pan Mts, 14 km NW Sa Pa, 103°46.06'E, 22°20.9'N, 14–15.XI.1999, leg. A. KUN & L. RONKAY"; slide No. 6970 RONKAY (coll. HNHM). Paratypes. Vietnam: 2 females, with the same data as the holotype; 2 males, 17 females, Prov. Lao Cai, 1900–2000 m, Fan-si-pan Mts, 14 km NW Sa Pa, 103°46.06'E, 22°20.9'N, 4–6.XII.1997, leg. L. PEREGOVITS & L. RONKAY (coll. B. BENEDEK, T. CSŐVÁRI, P. GYULAI, G. RONKAY and HNHM Budapest). Thailand: 2 males, 4 females, Prov. Chiang Mai, Mt. Doi Inthanon NP, 2300 m, 11. and 19–20.XI.1998, leg. T. CSŐVÁRI & L. MIKUS; 2 females, from the same locality, 17.X.2000, leg. M. HREBLAY & I. SOÓS (coll. T. CSŐVÁRI).

Slide Nos: 6973, 6981 RONKAY (males), 6974, 6977, 6983, 6984, 6985, 6986, 8540, 8541, 8545, 8546 RONKAY (females).

Diagnosis – Tiliacea peregovitsi is an allopatric sister species of *T. melonina*. The two known populations of the new species are often remarkably different, as the Vietnamese specimens are generally larger, more orange-yellowish but the median area is regularly pale, not or only slightly darkened. The Thai examples are smaller, paler in colouration but the median zone is conspicuously darkened in the majority of the known specimens. The genitalia of both sexes of the two populations are practically identical, therefore they are not separated here into two distinct geographic races although their taxonomic distinctness is far not impossible.

The detailed comparison of the four known species of the *T. melonina* subgroup is given under the diagnosis of *T. melonina*. The diagnostic features of *T.*

peregovitsi are as follows: forewing relatively broad and less elongate, with apex pointed; medial and distal thirds of valva broad (broadest within the species group); cucullus short and broad, with short setose area; clavi small, rather lobate than sphaerical; basal plate of fultura inferior shorter, dorsal part longer and more dilated than in *T. melonina*; cornuti field of vesica relatively small, less dense; ostial plate broad and short; ductus bursae medium-long, with fine ribbed-cristate anterior plate; signa relatively wide, medium-long, more or less equal in size; medio-apical incision of last sternite small, cup-shaped, its margins having pointed posterior processes.

Description – External appearance as illustrated (Figs 7–10). Wingspan 32–40 mm, length of forewing 15–19 mm. Forewing long, relatively broad, with apex finely pointed, ground colour rather homogeneous orange-yellowish with fine brownish irroration or paler, deep yellow with stronger tobacco-brownish suffusion in median area; inner margin with wide dark stripe. Crosslines relatively fine, sometimes diffuse, dark brown, more or less parallel, finely sinuous, median fascia most often rather pale. Orbicular and reniform stigmata large, sharply defined, filled with ground colour; claviform stigma reduced to a little spot at its tip. Subterminal line slightly sinuous, strong, dark brown; marginal area with some violaceous irroration at inner side of subterminal line.

Male genitalia (Figs 28–29, 40–41, 52–53). Similar in type to those of *T. melonina* characterised above, the differential features are the following: basal plate of fultura inferior smaller, shorter deltoidal, dorsal part long, more dilated at apical third, narrowest part of fultura rather ventral than medial, apical teeth smaller, less acute; medial and distal parts valva considerably broader, cucullus much broader but shorter with short ventral setose area; clavus broadest at base, less globular; harpe less extending over costal margin; distal part of aedeagus narrower, less infundibular; vesica less inflated basally, with smaller medial cornuti field consisting of more removable cornuti.

Female genitalia (Figs 63–64, 73–74). Ovipositor rather long, conical, with long, fine, weakly sclerotised, densely setose papillae anales and long, slender apophyses posteriores. 9th segment narrow, sclerotised, apophyses anteriores stick-like, rather long. Ostium bursae with broad but short sclerotised dorsal plate; ductus bursae medium-long, anteriorly slightly curved, tubular and membranous with finely cristate-ribbed plate at junction to corpus bursae. Appendix bursae small, subconical, corpus bursae large, elliptical, both are weakly membranous; signum-stripes medium-long, relatively wide, more or less equal in size. Sternite VIII broad, trapezoidal with rather straight lateral margins, medio-apical incision small, cup-shaped, with heavily sclerotised margins producing into pointed posterior processes.

Bionomics – The species is a typical inhabitant of the primary and less disturbed mesomontane and montane monsoonic forest belts. The moths are late autumnal, with the flight period extending from the second half of October to the middle of December. The early stages and the foodplant are unknown.

Distribution – The new species appears as rather stenochorous, occurring in the northern high mountains of northern Indochina (North Thailand and North Vietnam).

Etymology – The new species is named after our friend and colleague, LÁSZLÓ PEREGOVITS, the dedicated explorer of the south-east Asian Lepidoptera fauna, one of the discoverers of the new species.

Tiliacea mimetica sp. n.
(Figs 14–15, 65–66, 75–76)

Type material – Holotype: female, "NEPAL, Koshi, Terhathum area, Chitre, 2500 m, 87°24'E, 27°05'N, 8.XI.1996, leg. GY. M. LÁSZLÓ & G. RONKAY"; slide No. 6972 RONKAY (coll. G. RONKAY, deposited in the HNHM). Paratypes. Nepal: 1 female, with the same data as the holotype (coll. G. RONKAY); 2 females, Mechi, Taplejung area, Surke Danda, 2 km NE. of Suketar, 2560 m, 10.XI.1998, leg. KARMA SHERPA (coll. T. CSŐVÁRI). Slide Nos 6980, 8538, 8539 RONKAY (females).

Diagnosis – The closest related species of *T. mimetica* is *T. opipara* but their exact relationship is hardly evaluated yet due to the lack of the male of *T. mimetica*. These two species are supposedly allopatric but the formerly known giant gap between their ranges has been disappeared by the discovery of a *T. opipara* population in northern Thailand. Their external appearance is rather similar but the new species has broader, larger wings, more vivid orange-yellowish colouration and more prominently defined orbicular and reniform stigmata. The two species are very easily distinguishable by checking the last sternite (*T. mimetica* has much larger medio-apical incision with sclerotised basal opercular plate and the last sternite is stronger, cordiform) and the female genitalia (*T. mimetica* has considerably larger, stronger ostial plate with arcuate posterior and anterior margins, there are two sclerotised plates in the ductus bursae which are missing in *T. opipara* and the signa of the new species are more than twice as long than those of its relative).

The differences between *T. mimetica* and the other two species of the *T. melonina*-line are even larger; they are discussed in the diagnosis of *T. melonina*.

Description – External appearance as illustrated (Figs 14–15). Female. Wingspan 37–42 mm, length of forewing 18–21 mm. Forewing long, broad, with apex finely pointed, ground colour dark orange-yellowish, with variably strong dark reddish brown irroration, median area with dark brownish suffusion, especially in cell; veins covered with dark brownish scales; dark line of inner margin fine, narrow. Crosslines fine, sometimes diffuse, dark brown, more or less parallel, finely sinuous, median fascia strong, obliquely M-shaped, angled strongly inwards in cell. Orbicular and reniform stigmata large, sharply defined, filled with ground colour, appearing as very prominent in the darkened cell; claviform stigma relatively strongly defined. Subterminal line slightly sinuous, strong, dark brown; marginal area with some violaceous irroration at inner side of subterminal line. Male unknown.

Female genitalia (Figs 65–66, 75–76). Ovipositor long, weakly sclerotised, conical, papillae anales narrow, densely covered with long bristles; apophyses posteriores long, slender. Sclerotised ring of penultimate segment narrow, apophyses anteriores strong, stick-like. Ostium bursae large,

dorsal plate broadly trapezoidal with arcuate posterior and anterior margins; ventral plate also somewhat sclerotised, forming an operculum attached to basal part of medio-apical incision of 8th sternite. Ductus bursae long, tubular, slightly S-shaped, membranous with smaller, finely, longitudinally ribbed posterior and larger, stronger anterior sclerotised plates. Appendix bursae small, rounded subconical; corpus bursae large, elliptical-ovoid, weakly membranous, signum-stripes long, fine, their rate of length cca 1.8–2 : 1.

Sternite VIII strongly sclerotised, broadly cordiform, with very large, circular medio-apical incision, its margins terminated in acute processes at posterior margin.

Bionomics – The species inhabits the medium-high, mixed deciduous forests of the eastern Himalayan region. The adults are on the wing in the first half of November, together with those of *T. aculeata* and slightly later than the imagoes of the sympatrically occurring populations of *T. melonina*.

Distribution – The species is known from the eastern Himalayas, the Nepalese part of the Kanchenjunga Himal.

Tiliacea opipara (B. S. CHANG, 1991), **stat. rev.**
(Figs 11–12, 30, 42, 54, 67, 77)

Xanthia opipara B. S. CHANG, 1991: 185. Type locality: Taiwan.

Type material examined – Holotype female, Taiwan, Taoyuan county, Wufeng, 22.XI.1982 (coll. NMNS).

Additional material examined – Taiwan: 2 males, Nantou County, Hohuanchi, 1950 m, 24°13'N, 121°16'E, 28.XI.1999, leg. A. KUN, L. PEREGOVITS & L. RONKAY (coll. HNHM and G. RONKAY); 1 female, Nantou county, Shihshan, near Tatachia, 23°29'19"N, 120°51'13"E, 2375 m, 23.XI.2002, L. RONKAY & O. MERKL (coll. HNHM). Slide Nos: 8532 RONKAY (male), 8533 RONKAY (female).

Diagnosis – This Taiwanese taxon was described originally as a full species. Later, HREBLAY & RONKAY (1997) downgraded it considering the morphological differences as too small between the Himalayan *T. melonina* and the Taiwanese *T. opipara* to separate them on species level. The thorough revision of the morphological character set of the species group has pointed out the taxonomic importance of these "small" differences. The re-assessment of the morphological features and the recent discovery of a *T. opipara* population in the northern mountainous areas of Thailand, occurring sympatrically with the sister-species of *T. melonina* have proved the specific rank of the taxon.

The species has been compared in detail with the related taxa under the diagnoses of *T. melonina* and *T. mimetica*. The most important specific features of *T. opipara* can be found in the male genitalia which are as follows: the characteristic shape of the fultura inferior (see Figs 42–43); the long and narrow valvae with long

cuculli and long ventral setose area, the relatively short harpe, the sphaerical clavus, the long, narrow vesica with small brush-like cornuti field and the absence of the subbasal cornutus. The female genitalia show a far less characteristic picture, the long, entirely membranous ductus bursae and the short, weak signa can be mentioned as specific characters.

Description – External appearance as illustrated (Figs 11–12). Wingspan 38–40 mm, length of forewing 17–18 mm. Forewing long, relatively broad, with apex less pointed, ground colour variably dark orange-yellowish (males paler than females) with weak dark reddish brown irroration in cell and in marginal area; veins covered with dark brownish scales; dark line of inner margin rather strong. Crosslines fine, dark brown, more or less parallel and finely sinuous; median fascia strong, broad, almost straight, usually stronger than subterminal line. Orbicular and reniform stigmata large, sharply defined, filled with ground colour, appearing as paler than other parts of cell; claviform stigma usually absent. Subterminal line slightly sinuous, strong, dark brown; marginal area with some brownish and violaceous irroration, mostly at inner side of subterminal line.

Male genitalia (Figs 30, 42, 54). Uncus slender, dorso-ventrally flattened, apically pointed; tegumen broad, long, penicular lobes large, rounded. Fultura inferior of characteristic shape, with small deltoidal basal plate and strongly sclerotised, distally broadened dorsal part, its apical edge covered with a row of fine teeth of equal size; vinculum short, V-shaped. Valva narrow, long; cucullus long, narrow, apically acute; corona and ventral setose area also long. Subapical costal process reduced to a tiny triangular peak; sacculus short; clavus sphaerical, constricted at base, its surface minutely tuberculate and setose. Harpe medium-long, relatively strong and slender, curved in right angle rather at middle than at apical third. Aedeagus short, cylindrical, with ventro-laterally dentated carina; vesica narrowly tubular, bent dorso-laterad, subbasal cornutus absent, medial field of cornuti relatively small but dense, consisting of long, bristle-like cornuti.

Female genitalia (Figs 67, 77). Ovipositor long, weakly sclerotised, papillae anales long, narrow, densely setose; apophyses posteriores long, slender. Sclerotised ring of penultimate segment relatively broad, apophyses anteriores strong, stick-like. Ostium bursae broadly quadrangular, relatively narrow. Ductus bursae long, tubular, slightly arched, membranous without sclerotised elements. Appendix bursae small, subconical; corpus bursae large, elliptical, weakly membranous, signum-stripes short, fine, more or less equal in size.

Sternite VIII trapezoidal with finely arched lateral margins, medio-apical incision small, cup-shaped, its margins with fine, pointed posterior processes.

Bionomics – The typical habitats of the species are the upper deciduous forests between 2000–2500 metres. The flight period appears as rather short, extending from mid-November to the beginning of December. The early stages and the larval foodplant are unknown.

Distribution – The species has long been considered as endemic to Taiwan, its presence in northern Indochina (northern Thailand) has been recognised only during this present revision (see below).

Tiliacea opipara (B. S. CHANG, 1991) ssp.
(Figs 13, 31, 43, 55)

Material examined – Thailand. 1 male, Prov. Chiang Mai, Mt. Doi Inthanon, 2300 m, 19–20. XI.1998, leg. T. CSŐVÁRI & L. MIKUS (coll. T. CSŐVÁRI). Slide No.: 8542 RONKAY (male).

Diagnosis – The discovery of the northern Thai populations of *Tiliacea opipara* is one of the most important and lucky moments of the revisional work of the *T. melonina* species group. The existence of the three "opiparoid" and the two "meloninoid" taxa and the discovery of the most ancient member of the lineage revealed the fact of the early segregation of the *opipara* and the *melonina* lines and their (at least partly) parallel processes of expansion and speciation.

The Taiwanese and Thai populations are fitting well in the main specific characters of *T. opipara* as the shape of the fultura inferior, the sphaerical clavus, the long and narrow valva, the long, tubular vesica with small medial cornuti field and the lack of the subbasal cornutus, on the other hand, there are small but clearly visible differences in the details of the external and genital features. The Thai specimen (Fig. 13) is more uniformly coloured and more orange-yellowish than the typical examples, the orbicular and reniform stigmata are less pronounced. In the male genitalia (Figs 31, 43, 55) the most remarkable differences are the larger cornuti field of the vesica, the shorter and broader cucullus and setose area and the longer harpe, the shape of the fultura also show little differences.

The material available is unfortunately very small. We had the opportunity to check only the single male listed above and the genitalia picture of another specimen collected in the Doi Phahompok Mts (preserved in the HREBLAY collection; slide No. 13321 HREBLAY). There are notes of the existence of additional specimens of both sexes in the HREBLAY collection but they were unaccessible for studies after the death of the owner. Thus, although we could use the locality and phaenology data of these moths, no further taxonomic studies were made on this very important taxon.

Bionomics – The Thai *T. opipara* inhabits the higher montane forest regions; the imagoes are on the wing relatively late, from the middle of November to the end of December. The early stages are unknown.

Distribution – This taxon has the southernmost range within the species group, it has been found only in two small regions of northern Thailand (Mts Doi Inthanon and Doi Phahompok).

Tiliacea karli sp. n.
(Figs 16–17, 32, 44, 56)

Type material – Holotype: male, "VIETNAM, Prov. Lao Cai, 1900–2000 m, Fan-si-pan Mts, 14 km NW Sa Pa, 103°46.06'E, 22°20.9'N, 14–15.XI.1999, leg. A. KUN & L. RONKAY"; slide No. 6969 RONKAY (coll. HNHM Budapest). Paratype: 1 male, with the same data as the holotype (coll. HNHM).

Diagnosis – The new species is considered as the most ancient member of the *T. melonina* species group, unifying several morphological features of the otherwise rather distinct two subgroups (see above, in the general characterisation of the species group). The species is easily separable from the taxa of the *T. melonina* subgroup by its relatively small size, dark orange-yellowing ground colour and the two conspicuous, strongly parallel dark lines (see the Figs 1–17; the median fascia and the subterminal line; the former is never as straight in the other species as in case of *T. karli*).

The male genitalia of the new species (Figs 32, 44, 56) differ mainly from those of the members of the *T. melonina* subgroup by the presence of the well-developed subapical costal process, the short, small cucullus, the relatively short, medially curved harpe, the uniquely shaped fultura inferior, the much stronger subbasal cornutus of the vesica and the very small medial field of cornuti; from those of the *T. tatachana* subgroup, besides of the characteristic fultura inferior, by the small, globular clavi, the shorter, medially curved harpe and the long, narrowly tubular vesica.

Description – External appearance as illustrated (Figs 16–17). Male. Wingspan 37 mm, length of forewing 17 mm. Forewing long, narrow, with apex finely pointed, ground colour dark, vivid orange, marginal area somewhat paler; veins with weak darker covering only; dark line of inner margin long, strong. Antemedial and postmedial crosslines fine, slightly sinuous, rather pale red-brownish; median fascia and subterminal line very strong, straight and parallel. Orbicular and reniform stigmata relatively small, finely encircled with reddish brown, filled with ground colour; claviform stigma indistinct. Female unknown.

Male genitalia (Figs 32, 44, 56). Uncus short, slender, dorsally flattened, apically finely pointed. Tegumen broad and long, penicular lobes large, rounded. Fultura inferior subdeltoidal with very broad and short, rhomboidal basal plate and narrow, subapically finely dilated and apically dentate dorsal process; vinculum short, V-shaped. Valva long, broad at base, evenly tapering towards base of short, rather axe-shaped cucullus; corona relatively long. Subapical costal process strong, straight and thick, more or less digitiform; sacculus short, narrow; clavus globular, densely covered with minute setae and tubercles. Harpe medium-long, relatively strong, slender, curved in right angle at medial part. Aedeagus relatively long, cylindrical, most parts of carina penis sclerotised, its ventral surface finely dentate, dorsal section slightly folded. Vesica rather narrowly tubular, upturned dorsally, weakly membranous, armed with medium-sized, more or less nail-shaped subbasal cornutus and a very small medial field of cornuti consisting of short, fine spinules.

Bionomics – A poorly known species. The two known specimens were collected during the same night in mid-November, at the "Legendary place" of the Fan-si-pan Mts, where regular collectings have been carried out in the late autumnal and winter aspects between 1997–1999. Both specimens were collected at light, at the bordert zone of he practically intact montane primary forest zone and the secondary forests which grew after a large fire destroying large forest areas in the lower parts of the valley. The early stages are unknown.

Distribution – The species is known from the type locality (northern Vietnam, Fan-si-pan Mts) only.

Etymology – The specific name is derived from the name of the KARL expedition which has discovered this curious species. The name of the expedition is an acronym, created from the initials of the names of the team members (KUN ANDRÁS and RONKAY LÁSZLÓ).

Tiliacea aculeata (HREBLAY et RONKAY, 1998) (Figs 18–19, 33, 45, 57, 68, 78)

Xanthia aculeata HREBLAY & RONKAY, 1998: 243. Type locality: Nepal.

Type material examined – Holotype male, "NEPAL, Ganesh Himal, 1 km E of Gadrang, 2520 m, 14–15.XI.1995"; slide No. 9111 HREBLAY (coll. M. HREBLAY and HNHM). Paratypes. Nepal: 1 male, Koshi, Terhathum area, Tshisopani, above Gorja, 2600 m, 87°37'E, 27°21'N, 5.XI.1996, leg. GY. M. LÁSZLÓ & G. RONKAY; 1 male, Koshi, Terhathum area, Tinjure Phedi, 2900 m, 87°27'E, 27°12'N, 7.XI.1996, leg. GY. M. LÁSZLÓ & G. RONKAY; 1 male, Koshi, Terhathum area, Sirumani, 2900 m, 87°27'E, 27°12'N, 6.XI.1996, leg. GY. M. LÁSZLÓ & G. RONKAY; 1 female, Mechi, Taplejung area, Kade Bhanjang (Anpang), 2300 m, 87°56'E, 27°25'N, 2.XI.1996, leg. GY. M. LÁSZLÓ & G. RONKAY (coll. G. RONKAY and HNHM).

Slide Nos: 6051 RONKAY (male), 8536 RONKAY (female).

Diagnosis – The *T. tatachana* subgroup comprises two sister species-pairs, the *T. aculeata–T. glaucozona* and the *T. changsha–T. tatachana* twin species. The two species-pairs are easily separable by their external and genital features, the differences between the siblings are much smaller although clear and hardly confuseable. The *T. aculeata–T. glaucozona* species-pair can be characterised by the bipectinate antennae of the males and the less deep, medio-apical incision of the last sternite bordered by convex, strongly crenellate sclerotised margins; the narrower fultura inferior having finely twisted and pointed dorsal part, much shorter, weaker subapical costal lobe, stronger, thicker but shorter harpe and different armature of the vesica (males, see the Figs 33–36, 45–48, 57–60); the stronger sclerotisation of the ductus bursae and corpus bursae and the longer signa (females, Figs 68–70, 78–80). The two species-pairs of the subgroup have different distribution patterns,

too: the *T. aculeata–T. glaucozona* species-pair occurs in the south-eastern Himalayas while the *T. changsha–T. tatachana* twin species ranges in the Sino-Pacific region (the Hunan area in continental China and in Taiwan).

The detailed comparison of *T. aculeata* and *T. glaucozona* is given under the latter species. The diagnostic features of *T. aculeata* are the absence of the whitish suffusion at tornal area of the forewing, the total absence of the medial cornuti field of the vesica, the long, acute cucullus, the large sclerotised plate of the ostium bursae, the relatively small, short sclerotised lamina of the posterior part of the corpus bursae and the small medio-apical incision of the last sternite of the females (the smallest within the *T. tatachana* subgroup).

Description – External appearance as illustrated (Figs 18–19). Wingspan 35–36 mm, length of forewing 16–17 mm. Head and thorax dark orange-red, abdomen more brownish; antenna of male shortly bipectinate. Forewing long, narrow triangular with apex acute, ground colour light orange-brown, irrorated with yellowish and dark red-brown, costa and inner margin dark brown, veins also darker. Crosslines and stigmata rather diffuse, sinuous, darker brown, stigmata large, incompletely encircled, filled with yellowish. Hindwing ochreous, irrorated with orange-brown, veins and diffuse marginal area darker brownish.

Male genitalia (Figs 33, 45, 57). Uncus short, slender, flattened, tegumen high, broad, penicular lobes large, rounded. Fultura inferior strong, subdeltoidal, with long, narrow, sclerotized apical process; vinculum short, strong, V-shaped. Valva narrow, elongated, medially constricted, apically dilated, cucullus high triangular, with apex acute, costa with a strong, straight subapical process; corona long. Sacculus strong, clavus large, lobate, rounded, its surface granulous and finely setose. Harpe long, slender, curved in right angle at apical third. Aedeagus short, cylindrical, carina with a stronger, finely dentated ventral plate. Vesica short, tubular, recurved, basal part with a conical diverticulum, bearing a strong, bulbed, thorn-like cornutus; cornuti field absent.

Female genitalia (Figs 68, 78). Ovipositor conical, relatively long and weakly sclerotised; posterior papillae anales long, narrow, with long, slender gonapophyses. Ostium bursae broadly trapezoidal-lyriform, sclerotized and verrucose. Ductus bursae short, broadly tubular, flattened, proximal part membranous, finely scobinate, tapering towards sclerotized, longitudinally ribbed distal part. Appendix bursae small, subconical, posterior (apical) part of corpus bursae rather quadrangular, with sclerotised lamina and stronger gelatinous ribs on both surfaces, anterior part of corpus bursae elliptical, hyaline, with two narrow, strongly inequal signum-stripes, a long and a considerably shorter, finer one. Sternite VIII with deep, marginally strongly sclerotised medial incision.

Bionomics – The species inhabits the medium-high deciduous and mixed forest zones of the southern Himalayas. It is a member of the first winter aspect, the adults are on the wing usually at the first half of October. A rare species, the few known examples were collected at light; the early stages are unknown.

Distribution – The known range of the species is restricted to Nepal, it occurs in the Central and eastern parts of the southern Himalayas from the Dailekh area to the western ranges of the Kanchenjunga Himal.

Tiliacea glaucozona (HREBLAY, PEREGOVITS et RONKAY, 1999) (Figs 20–21, 34, 46, 58, 69, 79)

Xanthia glaucozona HREBLAY, PEREGOVITS & RONKAY, 1999: 59. Type locality: Vietnam.

Type material examined – Holotype female, "VIETNAM, Prov. Lao Cai, 1900–2000 m, Fan-si-pan Mts, 14 km NW Sa Pa, 103°46.06'E, 22°20.9'N, 4–6.XII.1997, leg. L. PEREGOVITS & L. RONKAY"; slide No. 6209 RONKAY (coll. HNHM). Paratypes. Vietnam: 2 males, 1 female, with the same data as the holotype. Thailand: 2 males, 1 female, Prov. Chiang Mai, Mt. Doi Inthanon NP, 2300 m, 2.XII.1998, leg. M. HREBLAY, Y. SHERPA & I. SOÓS (coll. M. HREBLAY, G. RONKAY and HNHM).

Additional material examined – Vietnam: 1 female, Prov. Lao Cai, 1900–2000 m, Fan-si-pan Mts, 14 km NW Sa Pa, 103°46.06'E, 22°20.9'N, 14–15.XI.1999, leg. A. KUN & L. RONKAY (coll. G. RONKAY). Slide No.: 6042 RONKAY (male).

Diagnosis – This species is the twin species of the Nepalese *T. aculeata*. *Tiliacea glaucozona* differs externally from its sister species by its more distinct crosslines having much stronger bluish-whitish definition, especially along the postmedial line. The male genitalia of *T. glaucozona* differ from those of *T. aculeata* by their smaller, less acute cucullus having shorter but thicker subapical costal process, and the presence of a large cornuti field in the vesica, consisting of very long fine spines, this cornuti field is completely absent in *T. aculeata*. The female genitalia of *T. glaucozona* have, in comparison with those of *T. aculeata*, significantly smaller, weaker, ostium bursae, shorter ductus bursae and longer, larger sclerotised plate nearby appendix bursae having much stronger, longer sclerotised folds. The last sternites of the two species are also conspicuously different, as the media-apical incision of *T. glaucozona* is twice as deep and the posterior margin has much stronger sclerotisation than in case of *T. aculeata*.

Description – External appearance as illustrated (Figs 20–21). Wingspan 30–34 mm, length of forewing 14–16 mm. Head and thorax dark reddish orange, abdomen more brownish; antenna of male shortly bipectinate, that of female filiform. Forewing long, narrow triangular with apex acute, ground colour deep reddish orange, irrorated with yellowish and dark red-brown, costa and inner margin finely dark brown, veins also darker. Crosslines and stigmata diffuse or obsolescent, sinuous, darker brown, defined by bluish-whitish scales, especially at outer side of postmedial line. Stigmata less distinct, large, incompletely encircled with red-brown, filled with yellowish-orange.

Male genitalia (Figs 34, 46, 58). Uncus short, slender, flattened, tegumen broad, penicular lobes large, rounded triangular. Fultura inferior subdeltoidal with rather small basal plate and long, narrow, sclerotized, finely twisted apical process with acute, dentate tip; vinculum short, strong, V-shaped. Valva narrow, elongate, distally tapering, apically dilated, cucullus more or less quadrangular with apex pointed; corona long. Subapical costal process relatively strong, straight. Sacculus rather short, clavus a large, rounded triangular, granulous and finely setose lobe; harpe long, relatively strong, slender, curved in right angle at apical third. Aedeagus short, cylindrical, carina with strong, dentate lateral plate. Vesica short, basal half more or less globular, inflated, distal half strongly

tapering, bent ventro-laterally. Subbasal cornutus short, acute, bulbed, medial cornuti field consisting of very long, fine, pin-like spines.

Female genitalia (Figs 69, 79). Ovipositor rather long, weak, conical, posterior papillae anales long, narrow, pointed, gonapophyses long, slender. Ostium bursae small, trapezoidal, sclerotized, covered with fine teeth; ductus bursae very short, tubular, flattened, proximal part membranous with fine scobination and a few dorsal ribs, distal part sclerotized, its margins stronger, slightly upturned. Appendix bursae small, subconical, posterior (apical) part of corpus bursae large, rounded quadratic, partly sclerotized and ribbed on both surfaces, anterior part of corpus bursae elliptical, hyaline, with two narrow signum-stripes, a long and a considerably shorter, finer one. Sternite VIII with two heavily sclerotized, strongly dentate lobes attached firmly to ventral side of ostium bursae, forming large, deep, marginally heavily sclerotised medial incision.

Bionomics – The small series of specimens were found in the lower part of the montane primary forest zones in the northern Indo-Chinese high mountains, between 1900–2300 m altitudes. The adults are on the wing in November–December and are attracted to artificial light. No other details of the bionomics of the species are known yet.

Distribution – The species is known only from two localities, the Fan-si-pan Mts in northern Vietnam and the Doi Inthanon Mts at the northern border of Thailand.

Tiliacea changsha sp. n.
(Figs 22, 35, 47, 59)

Type material – Holotype: male, "CHINA, Prov. Hunan, Nanling Mts., 1500 m, 24°54'N, 112°57'E, november, 2003, leg. local collector"; slide No. 8505 RONKAY (coll. B. BENEDEK, HNHM).

Diagnosis – Tiliacea changsha is the Chinese sister species of *T. tatachana*. The two species are very similar externally, the only recognisable difference is the less distinct pattern of the new species on a somewhat paler, more ochreous background. The male genitalia of the siblings are also very similar at the first sight but are different in practically all details, the differences are clearly recognisable and in certain features remarkably large. One of the key features is the shape of the fultura (see Figs 47–48): the basal plate of the fultura inferior of *T. changsha* is much smaller and narrower, the dorsal part is considerably stronger, broader than those of *T. tatachana*. The other important differences in the clasping apparatus are the shape and size of the cucullus, the costal process and the harpe (see the Figs 35, 36): the cucullus of the new species is significantly larger, longer and more acute, the harpe is stronger, medially more sinuous and the costal process is not projecting over the tip of the cucullus like in case of *T. tatachana*. The configuration of the

carina and the subbasal cornutus of the vesica are also key features for the separation of the two species, as the sclerotised part of the carina of *T. changsha* is shorter and less dentate, the subbasal cornutus is curved, claw-like and much more bulbed than that of *T. tatachana* which has straight, thorn-like cornutus sitting on flat basal plate.

Description – External appearance as illustrated (Fig. 22). Wingspan 37 mm, length of forewing 17 mm. Male. Antenna filiform, with short fasciculate cilia; basal tuft prominently white. Forewing broad, relatively long, with apex pointed, outer margin finely concave below apex. Ground colour pale pinkish orange with weak orange-brownish irroration; dark line of inner margin rather strong, blackish-brown. Wing pattern rather pale, crosslines present but diffuse, sinuous, orange-brownish; orbicular and reniform stigmata incompletely encircled with reddish brown and filled with ground colour; cilia dark brown. Hindwing ochreous with pinkish sheen, irrorated with orange-brown, veins, small discal spot, transverse line and diffuse marginal area darker reddish-brown. Underside of wings shining milky ochreous with fine pinkish-orange shade, irrorated with reddish orange, especially along costal parts and on veins, discal spots and transverse lines diffuse, pale brownish. Female unknown.

Male genitalia (Figs 35, 47, 59). Uncus short, slender, dorso-ventrally slightly flattened, apically pointed. Tegumen broad, relatively low; penicular lobes large, rounded triangular. Fultura inferior subdeltoidal with rather small basal plate and long, broad, dorsally only slightly tapering, apically dentate dorsal part; vinculum short, strong, V-shaped. Valva broad at base, distally tapering towards base of cucullus; cucullus elongated, rather triangular with apex acute; corona long. Subapical costal process large, wedge-shaped. Sacculus rather short, clavus broad, relatively flat, finely granulous and setose. Harpe long, thin, medially sinous, subapically curved in right angle. Aedeagus short, cylindrical, carina with a stronger ventro-lateral sclerotisation. Vesica broadly tubular, basal part inflated, distal part bent dorso-laterad, tapering towards ductus ejaculatorius. Subbasal cornutus large, heavily sclerotised, broadly bulbed and claw-like, medial cornuti field consisting of two irregular rows of rather strong, finely bulbed, acute spinules.

Bionomics – The unique type specimen was collected in the second half of November, at a relatively high altitude in the given mountain region. Nothing is known about the early stages and the larval foodplants.

Distribution – The species is recorded only from the south-eastern part of the continental China (Prov. Hunan, Nanling Mts).

Etymology – The new species is named after the capital of the province Hunan, Changsha city.

Tiliacea tatachana (B. S. CHANG, 1991) (Figs 23, 24, 36, 48, 60, 70, 80)

Xanthia tatachana B. S. CHANG, 1991: 184. Type locality: Taiwan.

Type material examined – Holotype female (it is incorrectly mentioned as male in the original description), Taiwan, Prov. Nantou, Tatachia-Anpu, 2600 m, 17.XI.1990 (coll. NMNS).

Additional material examined – Taiwan: 2 females, Nantou county, Shihshan, near Tatachia, 23°29'19"N, 120°51'13"E, 2375 m, 23.XI.2002, leg. L. RONKAY & O. MERKL (coll. HNHM and G. RONKAY); 1 female, Nantou county, between Meifeng and Tsuifeng, 24°05'N, 121°10'E, 2100 m, 16.XI.2002, leg. L. RONKAY & O. MERKL (coll. HNHM); 1 male, Hualien County, Kuanyuan, 2380 m, 11–12.X.1996, leg. GY. FÁBIÁN & F. NEMES (coll. G. RONKAY). Slide Nos: 8513 RONKAY (male), 8537 RONKAY (female).

Diagnosis – The Taiwanese sister species of *T. changsha* sp. n. The detailed comparison of the two species is given under the diagnosis of the preceding species. The diagnostic features of *T. tatachana* are the broad-based fultura inferior with narrow dorsal plate, the small, narrow cucullus, the long subapical costal process with its tip exceeding far over the tip of the cucullus, the very long, slender harpe (the longest and narrowest within the entire genus), the long, rather bill-like ventro-lateral sclerotisation of the carina penis and the straight, thorn-like subbasal cornutus having flat basal plate.

The female genitalia of *T. tatachana* differ from those of *T. aculeata* and *T. glaucozona* by their narrowest ostium bursae, the smallest sclerotized ventral plate and the shortest signa; the medio-apical incision of the last sternite is far the largerst and deepest within the species group.

Description – External appearance as illustrated (Figs 23–24). Wingspan 35–38 mm, length of forewing 15–18 mm. Antennae of both sexes filiform, that of male shortly ciliate. Forewing broad, rather short, with apex acutely pointed, outer margin finely concave below apex. Ground colour brownish orange with fine pinkish shade; inner margin strong, blackish-brown. Wing pattern relatively sharply defined, crosslines and outlines of orbicular and reniform stigmata clearly visible, dark red-brown, stigmata filled with ground colour; cilia dark brown.

Male genitalia (Figs 36, 48, 60). Penicular lobes large, rather elongated and finely rounded. Fultura inferior subdeltoidal with large, rhomboidal basal plate and long, narrow dorsal process with numerous fine subapical and apical teeth. Valva strongly tapering at medial third, cucullus narrow, more or less triangular with apex pointed; subapical costal process large, cuneate-pyramidal with broad triangular basal and wedge-shaped apical parts; corona long. Clavus large, broad, relatively flat, verrucose and finely setose; harpe very long, thin, minutely sinuous medially, curved in right angle at apical third. Aedeagus short, tubular, carina with a strong, rather bill-like, dentate ventro-lateral sclerotisation. Vesica tubular, basal part broader, inflated, distal part curved dorso-laterally and tapering towards distal end. Subbasal cornutus large, sclerotised, thorn-like with flat basal plate, medial cornuti field consisting of two rows of strong, finely bulbed, acute spinules.

Female genitalia (Figs 70, 80). Ostium bursae more or less trapezoidal with arched lateral margins, opercular plate relatively strong. Ductus bursae short, tubular, flattened and sclerotized, dorsal surface longitudinally ribbed. Apical part of corpus bursae rather separated, strongly ribbed with gelatinous ribs; apical sclerotised plate relatively small, situated close to small, subconical appendix bursae. Proximal part of corpus bursae membranous, elliptical-ovoid, with a long and a considerably shorter, fine, signum-stripe. Sternite VIII with huge, very deep, broadly V-shaped medial incision.

Bionomics – The species is a typical member of the high montane forest fauna, the known localities lie between 2000–2700 m altitudes. The imagoes can be found from the middle of October to the beginning of December.

Distribution – Endemic to Taiwan.

*

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