

TAXONOMY AND DISTRIBUTION OF THE
 TRIFURCULA (*GLAUCOLEPIS*) RAIKHONAE
 GROUP (LEPIDOPTERA: NEPTICULIDAE)

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Trifurcula (*Glaucolepis*) *melanoptera* sp. n. is described from southern Europe, where it is widespread. It is closely related to the Central Asian *T. (Glaucolepis) raikhonae* Puplesis, which is redescribed. Together they form the *raikhonae* species group. *Sinoptricula* Yang is here synonymized with *Glaucolepis* Braun, its only species *S. sinica* Yang is tentatively regarded as closely related, if not conspecific with *T. raikhonae*. The distribution is mapped. On the basis of recent Chinese findings the larvae are assumed to be gall-makers on *Prunus* branches. Some phylogenetic and biogeographic remarks are given.

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Key-words. – Microlepidoptera, Central Asia, Southern Europe, biogeography, phylogeny, gall-former, new species.

The subgenus *Glaucolepis* Braun, 1917, is one of three subgenera of *Trifurcula* Zeller, 1848 (van Nieukerken 1986b, 1990). It comprises to date 21 described species (see van Nieukerken 1986a, 1986b) and a large number of undescribed species. Most of these occur in the Mediterranean region. The type species *T. saccharella* (Braun, 1912) is the only Nearctic species. Further, one undescribed species occurs in Japan, one in North-East India and *T. raikhonae* (Puplesis, 1985) in Central Asia. In treating *Glaucolepis* as a subgenus, we follow the opinion of the senior author, whereas the junior author prefers to treat it as separate genus (Puplesis 1985).

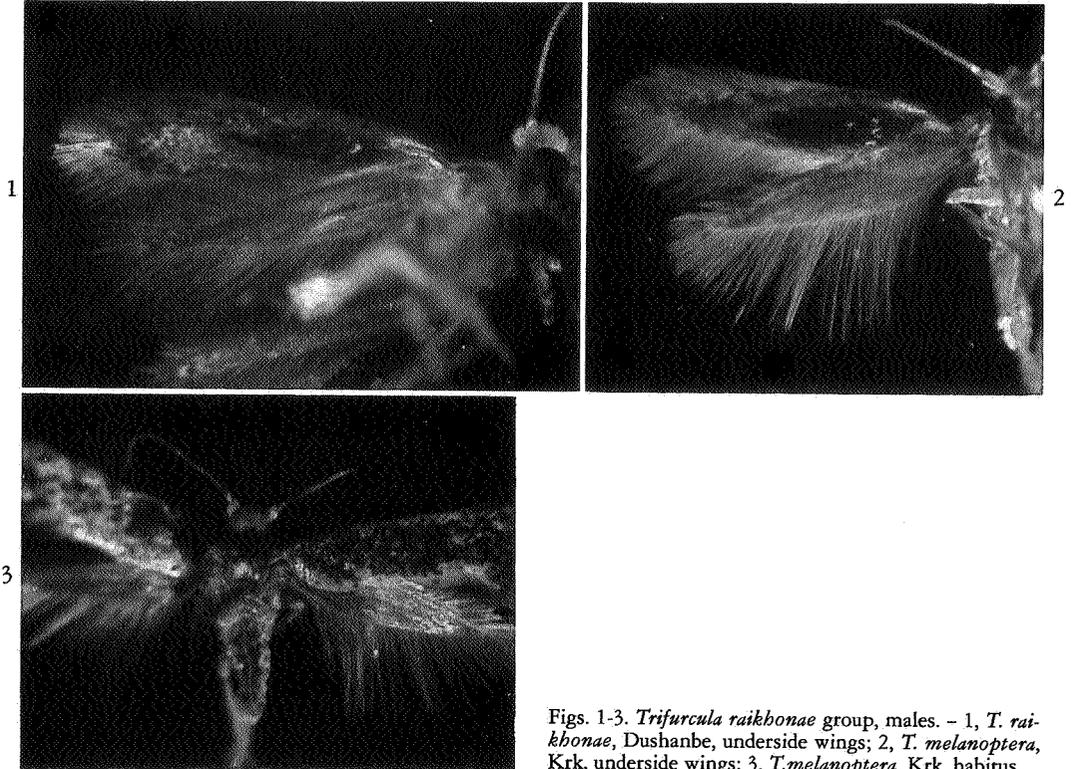
Amongst unidentified material from southern Europe, one apparently widespread species very similar to *T. raikhonae* was found by both authors independently. Although a revision of the many Mediterranean species is not yet practicable at this stage, we would like to single out this peculiar species, because it forms a well defined monophyletic group with *T. raikhonae*: the *raikhonae* species group. This group can easily be distinguished from all other species in the subgenus, both on externals and genitalia and possibly also on biology. It was also desirable to have the new name

available for a general work on Nepticulidae of the Soviet-Union and other faunistical reports. We further take the opportunity to redescribe *T. raikhonae* for the first time in English, including new data and the description of the female, and to discuss a recently described Chinese taxon. Some remarks on phylogeny and biogeography conclude this paper.

MATERIAL AND METHODS

Genitalia were prepared as described by van Nieukerken et al. (1990). Line figures of genitalia were prepared with a Zeiss Axioskop with drawing apparatus, both from genitalia in glycerin and permanent mounts. SEM micrographs were taken with a Jeol JSM 840A scanning electron microscope. Specimens were air-dried, mounted on stubs and gold-coated.

Measurements of genitalia are taken with a Zeiss Axioskop at 200X, and are accurate at the nearest 5 µm. Capsule length is measured along mid-line, from tip of tegumen (pseuduncus) to anterior margin of vinculum, in middle. All measurements based on sample size of at least five specimens are accompanied by mean, standard deviation and sample size in brackets.



Figs. 1-3. *Trifurcula raikbonae* group, males. - 1, *T. raikbonae*, Dushanbe, underside wings; 2, *T. melanoptera*, Krk, underside wings; 3, *T. melanoptera*, Krk, habitus.

Locality names are spelled in accordance with the Times Atlas of the World (Comprehensive edition 1975 and later). For all European localities the appropriate UTM grid references are given, see also van Nieukerken (1990).

Abbreviations (codens) for depositories follow Arnett & Samuelson (1986), with the addition of ZKVV (Zoologijos Katedra VPI, Vilnius, Lithuania).

SYSTEMATIC PART

Subgenus *Glaucolepis* Braun

Glaucolepis Braun, 1917.

Fedalmia Beirne, 1945.

Trifurcula (*Glaucolepis*); van Nieukerken 1986b: 65.

Sinopticala Yang, 1989: 79, 81. Type-species: *Sinopticala sinica* Yang, 1989 (by monotypy and original designation). Syn. n.

Recently, Yang (1989) described *Sinopticala sinica* from China. Although we have been unable to borrow material, we are convinced on the basis of description and figures that this species is closely related to, if not the same as *T. raikbonae*. We therefore synonymize *Sinopticala* here with *Glauc-*

colepis, and hence with *Trifurcula*. For description of genus and subgenus and detailed references we refer to van Nieukerken (1986b).

The *Trifurcula raikbonae* group

This group is established here to accommodate *T. raikbonae*, *T. sinica* and *T. melanoptera* sp. n. It can be distinguished from other species of *Trifurcula* (*Glaucolepis*) by the absence of the 'velvet' patch of raised scales on the male hindwing underside, the presence of dark brown or black androconial scales on the forewing underside, the absence of rows of spines near phallotreme in the aedeagus and the relatively well developed accessory sac in the female genitalia.

Trifurcula (*Glaucolepis*) *raikbonae* (Puplesis) (figs. 1, 3, 5-7, 14, 17-19)

Glaucolepis raikbonae Puplesis, 1985: 71. Holotype ♂: USSR, Tadzhikistan, about 30 km S Dushanbe, Kondara canyon, 10-20 June 1982, Sherniyazova (ZMAS) [examined].

Trifurcula raikbonae; van Nieukerken 1986b: 68.

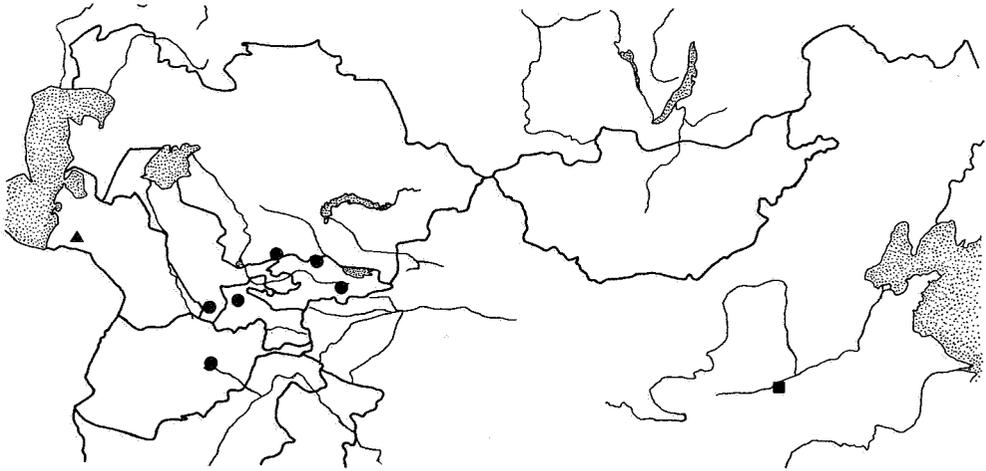


Fig. 4. Distribution of *Trifurcula raikbonae* group in east Palaearctic. —Circles: *T. raikbonae*, square: *T. sinica* (Xi'an), triangle: easternmost record of *T. melanoptera* (Kopet Dag).

Description

Male (fig. 1). — Forewing length 3.1-3.9 mm (3.42 ± 0.19 , $n=32$). Head: frontal tuft pale orange to ferruginous, collar slightly paler. Antenna brown, with 45-56 segments (50.3 ± 3.0 , $n=19$); scape yellowish white. Thorax fuscous. Forewings fuscous, slightly irrorate with white because of paler scale bases; dorsum often paler, with some white scales at tornus, sometimes extending further; cilia-line more or less distinct, terminal cilia pale grey. Forewing underside anterior of fold usually with an elongate patch of about $\frac{1}{2}$ wing-length and $\frac{1}{2}$ wing-width, with dark fuscous to black androconial scales (fig. 1), usually with blue iridescence, occasionally patch absent or paler and almost invisible. Hindwing grey, humeral lobe with a small group of extremely small whitish special scales, macroscopically hardly visible, distinct under SEM (figs. 17-19): they are strongly ribbed, with small holes between the ribs; in fig. 19 it seems that the scale has an apical pore. Costal bristles normal; underside without velvet patch as most other *Trifurcula* (see van Nieukerken 1986b, 1990). Abdomen grey-brown dorsally, yellowish ventrally; three pairs of anal tufts yellowish grey.

Female. — Forewing length 3.2-4.0 mm (3.56 ± 0.26 , $n=8$). Antenna with 42-49 segments (44.8 ± 2.6 , $n=5$). Forewing underside grey-brown, further as male.

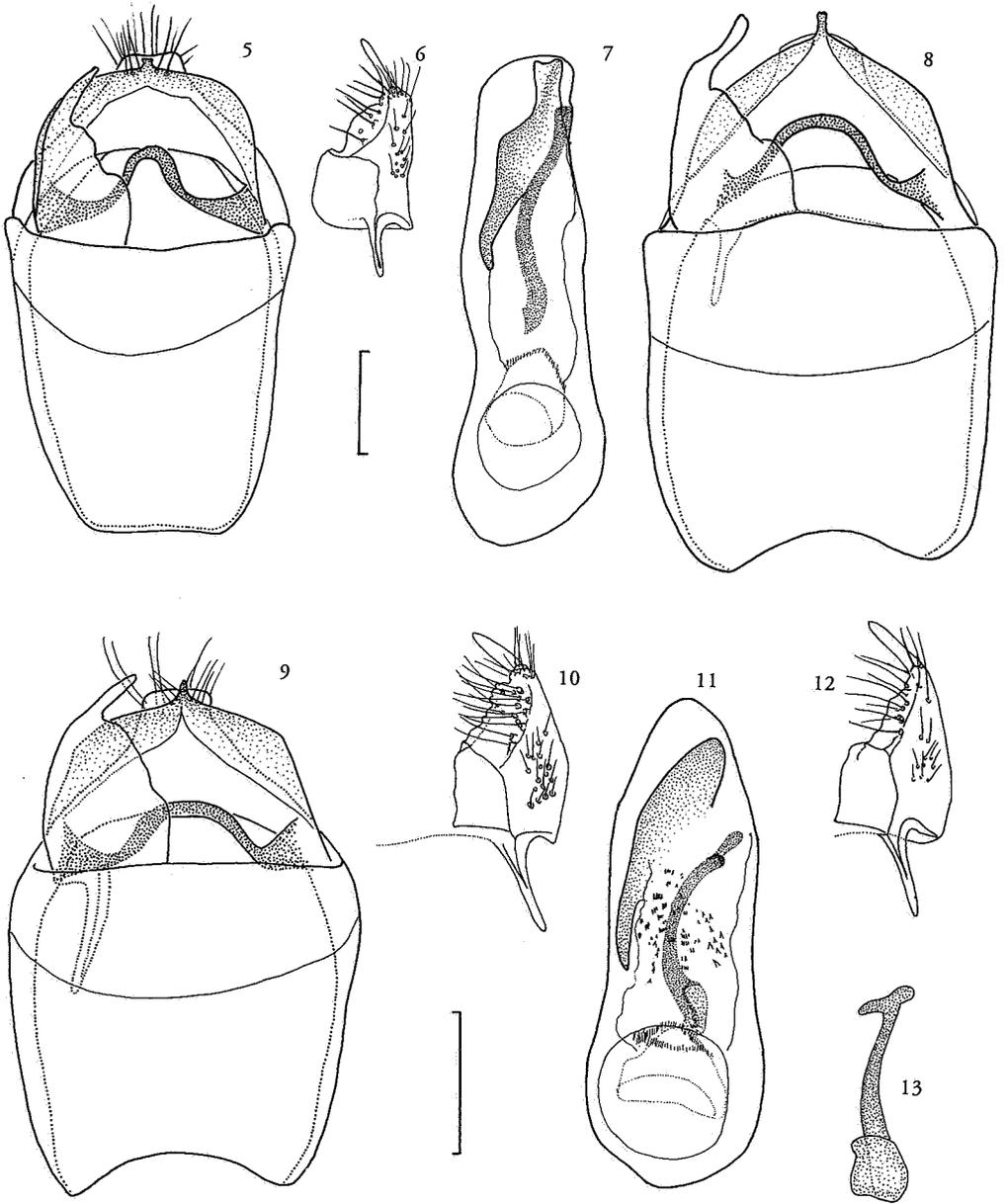
Male genitalia (figs. 5-7). — Capsule length 390-470 μm (430.0 ± 27.7 , $n=6$). Vinculum with very long, truncate, anterior extension, length (190) 245-280 μm , ca (0.5) 0.6 \times capsule length. Teg-

men forming a broadly truncate pseuduncus. Uncus with slightly widened tip, truncate, lateral arms broadly shouldered, very conspicuous. Gnathos with broadly rounded central element, lateral arms inserted on vinculum near valva base. Valva short, 165-185 μm long, almost triangular, with pointed narrow tip of about $\frac{1}{3}$ valva length, inner margin with slight bulges in second half; sublateral process relatively short, transverse bar of transtilla not sclerotized, but present. Aedeagus 365-430 μm (400.0 ± 22.4 , $n=6$) long, with asymmetrical ventral lobe, more sclerotized at left side; single long cornutus 185-235 μm long, about $\frac{1}{2}$ aedeagus length, slightly curved, tip more or less rounded; cathrema large, almost triangular, no additional cornuti.

Female genitalia (fig. 14). — Terminal segments blunt and rounded; T8 with groups of many scales and several setae, anal papillae with 34-53 setae each. Vestibulum with conspicuous folded accessory sac. Ductus spermathecae outer canal wide and distinct, inner canal strongly sclerotized, with long basal straight part, followed by 7 convolutions. Bursa relatively small, covered with transverse rows of pectinations and single spicules; reticulate signa very inconspicuous, only visible under high magnification, using phase-contrast or differential interference contrast; cells mostly incomplete, recognized by longitudinal groups of pectinations.

Diagnosis

From other species of *Glaucolepis*, *raikbonae* differs by the absence of a velvet patch on the male



Figs. 5-13. *Trifurcula raikhonae* group, male genitalia – 5-7, *T. raikhonae*, Tadzhikistan, slide EJVn 2787; 8-13, *T. melanoptera*: 9-11, holotype, slide EJVn 2786; 8, 12, Turkey, slide EJVn 2784; 13, Armenia, slide RP. – 5, 8, 9, capsule, ventral aspect; 6, 10, 12, left valva, dorsal aspect; 7, 11, aedeagus, ventral aspect; 13, cornutus, ventral aspect, but slightly rotated compared to fig. 11. Scales: 0.1. mm, top to *raikhonae*, bottom to *melanoptera*.

hindwing underside, the relatively large size and the frequently present androconial patch on forewing underside. It is currently the only known Central Asiatic *Glaucolepis*, and can therefore hardly be confused with any other nepticulid of the area. It differs from the only other Central Asiatic *Trifurcula* species, *T. puplesisi* van Nieuwerkerken, 1990, by its larger size, dark colour and in male by absence of yellow patch on forewing underside and velvet patch on hindwing. For differences with *melanoptera* see below.

Biology

Unknown, but considering the biology of the closely related, if not conspecific *sinica*, possibly also a gall-maker of *Prunus*. Various *Prunus* species are widespread and common in the Central Asian mountains. Adults found from May to August, at light.

Distribution (fig. 4)

Widespread in Central Asian mountains: western and central Tyan Shan (Kazakhstan and Kirgiziya), Gissarskiy (Hissar) ridge (Tadzhikistan), and northern Kugitangtau mountains (Uzbekistan) and in central Afghanistan. Previously only known from two specimens in Tadzhikistan and Kirgiziya (Puplesis 1985). Not found in lowland desert areas.

Material examined. – Afghanistan: 1 ♂, Paghman, 30 km NW Kabul, 2100 m, 20-30.vii.1962, E. & A. Vartian (NHMW); 1 ♂, same locality, 2500 m, 15-18.vii.1965, Kasy & Vartian (NHMW). – USSR: Kazakhstan: 11 ♂, 1 ♀, Tyan Shan, 90 km E Chimgent, 1300 m, Aksu Dzhabagly, 7-12.viii.1987, Sheriyazova (ZKVV, RMNH) – Kirgiziya: 1 ♂ (paratype), 5 km SW Naryn, 26.vii.1981, Sinev (ZMAS); 2 ♂, 2 ♀, Sosnovka, 40 km S Kara Balty, 13.viii.1987, Lvovskiy (ZMAS). – Uzbekistan: 3 ♂, env. Derbent, 18.v.1985, R. Puplesis (ZKVV, RMNH). – Tadzhikistan: ca 90 ♂, ♀, 30 km N Dushanbe, Kondara, 27.vi-20.viii.1986, R. Puplesis (ZKVV, RMNH); 13 ♂, 6 ♀, idem, but 17-20.viii.1989 (ZKVV).

Trifurcula (Glaucolepis) sinica (Yang) comb. n.

Sinopticala sinica Yang, 1989: 80, 82. Holotype ♂: China, Shaanxi prov., Xi'an, emerged 24-30.iv.1985, from galls on *Prunus*, Yan-wen (Beijing Agricultural University) [not examined]

Remarks

The relatively detailed description of *Sinopticala sinica* Yang, 1989 and the small, but distinct figures show many similarities to *raikhonae*. The slight differences in the form of the valvae in Yang's figure from the usual shape in *raikhonae* might be

due to the preparation technique. Without detailed examination we would rather not synonymize *sinica* here, although we suspect that it indeed is conspecific with *raikhonae*. The locality Xi'an is at the east end of the almost continuous Central Asian mountain ranges, in which *raikhonae* presumably is widespread.

Biology

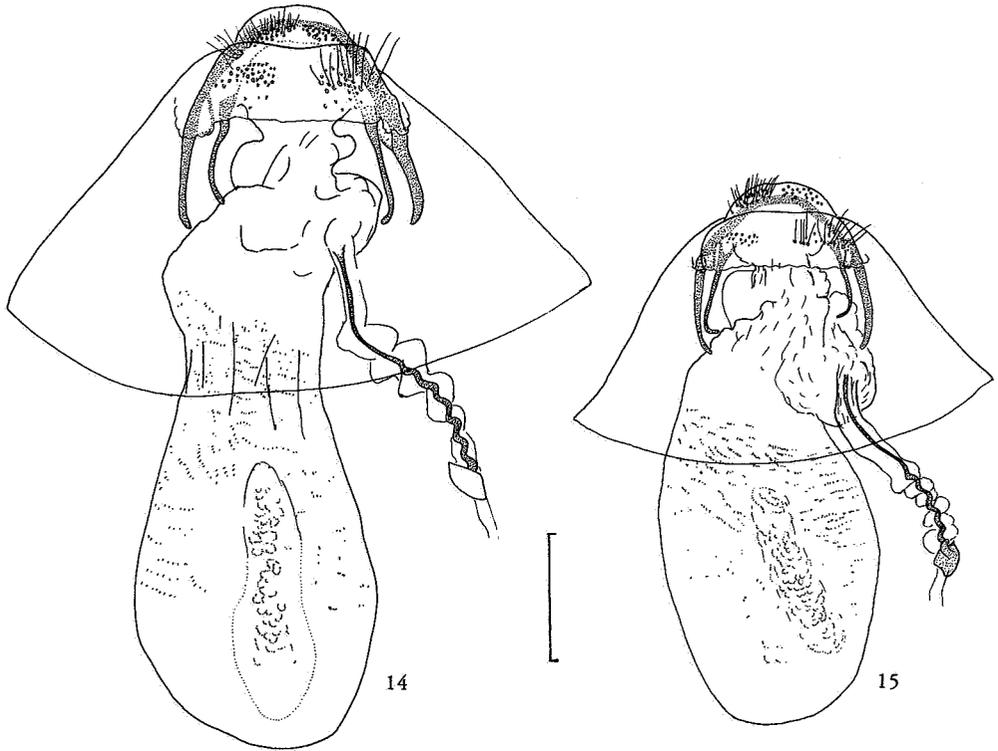
According to Yang (1989) the larvae make galls in young branches of *Prunus cerasifera* Ehrh., *P. dulcis* (Miller) D. A. Webb (= *P. amygdalus* Bartsch) and *P. persica* (L.) Batsch. It is not clear from the description, how these galls look like. Adults emerged in April.

Distribution (fig. 4)

Only known from China, Shaanxi province.

Trifurcula (Glaucolepis) melanoptera sp. n. (figs. 2, 3, 8-13, 15, 16, 20-22).

Type-material. – Holotype: ♂, Yugoslavia (Croatia), Krk, Misucaynica [UTM: 33T VK78], 4.viii.1986, G. Bal-dizzone, Genitalia slide E. J. van Nieuwerkerken No. 2786 (RMNH). – Paratypes: 52 ♂, 3 ♀: Austria: 1 ♂, Hackels-berg, N. Neusiedlersee (N. Burgenland) [UTM: 33U NV52], 24.viii.1973, F. Kasy (NHMW). – Czechoslovakia: 3 ♂, Slovakia, Turňa n. B. [UTM: 34U DU9183], 4-5.viii.1990, A. Laštůvka (coll. Laštůvka); 1 ♂, Slovakia, Tinianska stran [NE Michalovce] [UTM: 34U EV60], 20.viii.1989, Z. Tekár. – France: 1 ♀, Les Mees (Alpes de Haute Provence) [UTM 31T GJ37], 28.viii.1985, G. Lang-gohr (RMNH); 1 ♂, Chapeau [not traced, near Digne?], 27.vii.1903, Chrétien (MNHN); 12 ♂, 1 ♀, Viens (Vau-cluse) [UTM: 31T GJ06], 9.viii.1973, 14.vii-23.viii.1974, 6.viii.1975, 9-27.viii.1976, 15.viii.1979, 8.viii.1980, 12.viii.1982, R. Buvat (RMNH, coll. Buvat). – Italy: 1 ♂, Sardinia, Bacu Trotu, Ortuabis 800 m [UTM: 32S NK11], 23.viii.1978, Gg. Derra (coll. Derra). – Spain: 1 ♂, Cadalso (Madrid) [UTM: 30T UK86], 15.vii.1985, C. Gielis (coll. Gielis); 2 ♂, Cadalso de los Vidrios, 2 km E (Madrid), [UTM: 30T] UK8062, 7.viii.1986, at light ML, matorral, cult. area, E. J. van Nieuwerkerken & S. Richter (RMNH); 1 ♂, Noguera (Teruel), [UTM: 30T XK17], 9-10.viii.1989, C. Gielis (coll. Gielis); 1 ♂, Paterna del Madera (Alba-cete), 1350 m [UTM: 30S WH57], 18.vii.1986, C. Gielis (RMNH); 1 ♀, Pto de Mora (Granada) 1350 m [UTM: 30S VG52] 22.vii.1986, C. Gielis (RMNH); 1 ♂, Riazza (Sego-via), [UTM: 30T VL57], 3.viii.1986, C. Gielis (coll. Gielis); 1 ♂, San Miguel de Valero (Salamanca), 3 km S Linare de Riofrio, [UTM: 30T] TK59, 2.viii.1986, at light ML, *Quercus pyrenaica* forest and heathland, 850 m, E. J. van Nieuwerkerken & S. Richter (RMNH); 2 ♂, Vega del Codorno (Cuenca), 1350 m, [UTM: 30T WK97], 23.vii.1985, at light, J. H. Kuchlein (RMNH, coll. Kuchlein). – USSR, Turkmeniya: 1 ♂, 30 km E Kara Kala, (Western Kopet Dag range), env. Juvankala [UTM: 40S DH35], 18.viii.1988, R. Puplesis (RMNH) – USSR, Ukraina: 2 ♂, Crimea, Kara Dag, 20 km W Feodosia [UTM: 36T XQ78],



Figs. 14, 15. Female genitalia, dorsal aspect. - 14, *T. raikbonae*, Tadzhikistan, slide EJvN 3205; 15, *T. melanoptera*, paratype, Spain, slide EJvN 3102. Scale: 0.2 mm.

3.viii.1986, Buhashkim (ZMAS); 1 ♂, same data, 13.vii.1987, Sinev (ZMAS); 6 ♂, same data, 15-22.vii.1987, R. Puplesis (ZKVV, RMNH). - Yugoslavia (Croatia): 1 ♂, Krk, no further data, 10.viii.1975, at light, G. Baldizzone (Coll. Baldizzone); 2 ♂, 1 ♀, Krk, Draga Baska [UTM: 33T VK78], 30.vii.1986, 15.viii.1988, G. Baldizzone (RMNH, coll. Baldizzone); 2 ♂, Krk, Misucaynica [UTM: 33T VK78], 19.viii.1986, G. Baldizzone (coll. Baldizzone); 10 ♂, Krk, road Krk-Vrbnik [UTM: 33T VK78], 2, 18.viii.1987, 20.vii-11.viii.1988, G. Baldizzone (RMNH, ZKVV, coll. Baldizzone).

Material excluded from type series (34 ♂). - Hungary: 30 ♂ (all in poor condition), Budapest, Julianna Major, apple orchard, 9+11.viii.1991, glued pheromone traps, M. Tóth (RMNH). - Italy: 1 ♂, Latina, Monti Aurunci, 850 m, 5 km N Itri [UTM: 33T UF77], 4-11.viii.1972, R. Johansson (coll. Johansson). - Turkey: 2 ♂, 10 km NW Kizilcahaman (Ankara), 1150-1250 m [UTM: 36T VK68], 6-7.viii.1989, Fibiger & Esser (ZMUC). - USSR, Armenia: 1 ♂, Chosrov reserve [UTM: 38S MK82], 20.ix.1986, P. Ivinskis (ZKVV).

Description

Male (figs. 2, 3). - Forewing length 2.4-3.0 mm (2.74 ± 0.12 , 29), wingspan 5.8-6.9 mm. Head: frontal tuft pale orange to ferruginous, collar

slightly paler. Antenna brown, with 40-45 (42.2 ± 1.4 , 23) segments; scape yellowish white. Thorax fuscous, often distally paler. Forewings fuscous, slightly irrorate with white because of paler scale bases; dorsum with narrow stripe of white scales, occasionally reduced to white tornal spot; cilia-line more or less distinct, terminal cilia pale grey. Forewing underside anterior of fold almost completely covered with dark fuscous to black androconial scales, usually with blue iridescence, except at wing tip, which is greyish-brown. Ultrastructurally with many circular holes between ribs (figs. 21, 22). Hindwing grey, humeral lobe with few fuscous androconial scales, as forewing; occasionally these scales extending on hindwing upperside along Rs+M, forming an elongate patch; costal bristles forming a short brown hair-pencil; near frenulum a group of microtrichia, no scales (fig. 20); underside without velvet patch as most other *Trifurcula*. Abdomen grey-brown dorsally, yellowish ventrally; three pairs of anal tufts yellowish grey.

Female. - Forewing length 2.75-3.0 mm, wingspan 6.4-6.7 mm. Antenna with ± 39 segments. Forewing underside dark grey-brown, darker than

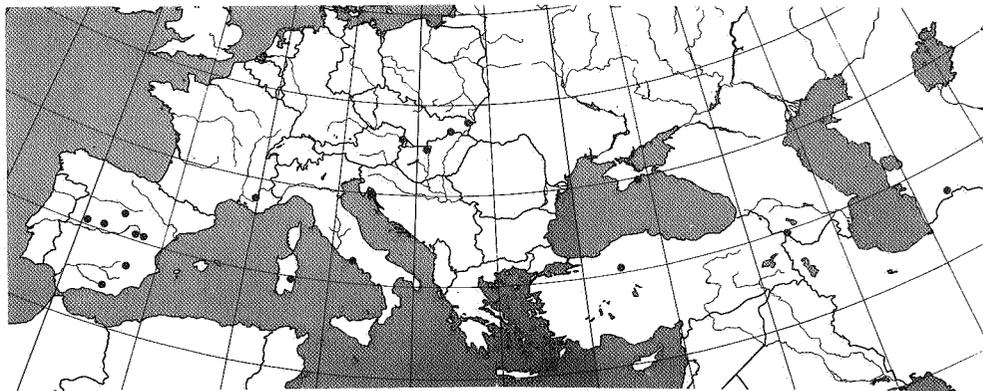


Fig. 16. Distribution of *Trifurcula melanoptera*, mapped on 50 km squares of UTM grid.

hindwing. Otherwise as male. Ovipositor wide and truncate.

Male genitalia (figs. 8-13). – Capsule length 305-390 μm (345 ± 20.3 , $n=11$). Vinculum with very long, truncate, anterior extension, length 200-260 μm , ca 0.6-0.7 \times capsule length. Tegumen forming a broadly truncate pseuduncus. Uncus with slightly widened tip, or pointed, lateral arms shouldered, but less than in *raikhonae*. Gnathos with broadly rounded central element, lateral arms inserted on vinculum near valva base. Valva short, 140-165 μm (149.1 ± 6.3 , $n=11$) long, almost triangular, with pointed narrow tip of about $\frac{1}{3}$ to $\frac{1}{4}$ valva length, inner margin with slight bulges in second half; sublateral process relatively short, transverse bar of transtilla not sclerotized. Aedeagus 325-390 μm (356.8 ± 18.4 , $n=11$) long, with distinct asymmetrical ventral lobe, sclerotized at left side, with anterior point; single long cornutus 130-205 μm long, slightly less than $\frac{1}{2}$ aedeagus length, curved, tip distinctly bifurcate, with rounded lobes forming an angle of almost 180° (fig. 13); several additional small cornuti, some forming 'pectinations'; cathrema large, almost triangular.

Female genitalia (fig. 15). – Very similar to those of *T. raikhonae*, but smaller. Anal papillae with 25-30 setae each. Accessory sac of bursa even larger than in *raikhonae*. Ductus spermathecae with $5\frac{1}{2}$ to $6\frac{1}{2}$ convolutions.

Diagnosis

Very similar to *T. raikhonae*, but distinctly smaller and in male with much larger androconial patch on forewing underside and with small similar patch on humeral lobe of hindwing. In male genitalia easily distinguished by the bifurcate cor-

nutus. In female genitalia by larger accessory sac and smaller bursa. From other southern European species of *Trifurcula*, males of *melanoptera* differ by the absence of a velvet patch on the male hindwing underside, and the large black or fuscous androconial patch on the forewing underside.

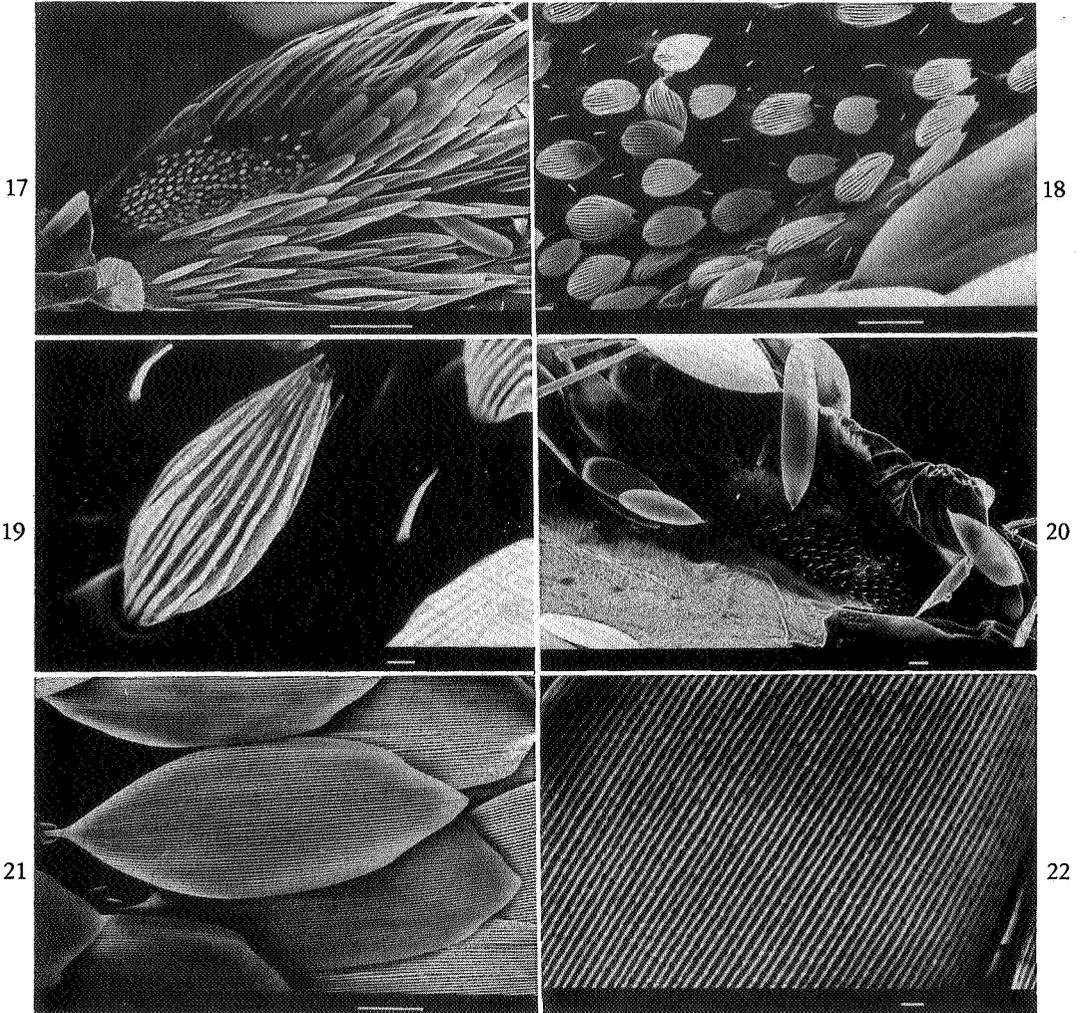
Variability

Specimens from Turkey and Armenia differ from the remaining material by the presence of androconial scales on the hindwing upperside. Also the genitalia of especially the Armenian specimen differ slightly in size, shape and position of cornutus. However, these characters seem to vary within the whole distribution area, with the Armenian specimen as the extreme example. Since we also observed few androconial scales on the hindwings of some other specimens, we tentatively assume that *melanoptera* forms one widespread, slightly variable species, until more data become available.

It should also be noted that the specimen from Italy, Itri, has relatively small genitalia, which look slightly different, but tentatively is regarded as an aberration. Both this specimen and the Turkish and Armenian specimens are excluded from the type series.

Biology

Immature stages and hostplant unknown. Judging from its close relationships with *T. raikhonae* (and hence *sinica*), it is not impossible that also *melanoptera* is a gall-maker on *Prunus*. In some localities, visited by the senior author, such as Viens, France, *Prunus spinosa* L. was abundant; galls were, however, not yet seen. The record of



Figs. 17-22. *Trifurcula raikbonae* group, male scale structures, scanning micrographs. – 17-19, *T. raikbonae*, hindwing humeral lobe, upperside: patch of small special scales, with details. 20-22, *T. melanopectera*: 20, hindwing humeral lobe with group of microtrichia and special scales (left); 21, 22, androconial scales of forewing underside with many circular holes. Scale bars: 100 μm (17), 10 μm (18, 20, 21), 1 μm (19, 22).

males taken in pheromone traps in an apple orchard in Budapest does not contradict this, since this orchard contains several fruit trees, including *Prunus* spp., and is surrounded by shrub with much *Prunus spinosa* (G. Szöcs in litt.).

Adults caught from 13 July to 28 August, in Armeniya on 20 September, most likely univoltine.

Distribution (fig. 16)

Widespread in southern Europe: Spain, south-

ern France, Italy, Sardinia, Austria, Czechoslovakia, Hungary, Yugoslavia and Crimea and in western Asia: Anatolia, Armeniya and western Turkmeniya (Kopet-Dag range).

Etymology

A noun in apposition. From *melanos* (Greek), black and *ptera* (Greek), wings, referring to the black androconial scales on the forewing underside in the males.

PHYLOGENETIC AND BIOGEOGRAPHIC CONSIDERATIONS

The two species discussed here clearly belong to *Trifurcula* Zeller s. l., since they possess four out of the six apomorphies for this taxon as listed by van Nieukerken (1986b: 63). Character 44 (velvet patch of raised androconial scales on male hind-wing-underside) is absent in both species, as is also the case in *Trifurcula (Glaucolepis) saccharella* (Braun, 1912), the type species of *Glaucolepis*. Since this patch is present in all other *Trifurcula* species, examined by us, it has most likely been secondarily lost in these three species. The doubtful apomorphy 45 (Hostplant: Fabaceae) has already been discussed by van Nieukerken (1986b).

The *T. raikhonae* species group is here regarded as belonging to *Glaucolepis*, with which it shows the closest similarity. Van Nieukerken (l.c.) only lists three apomorphies for *Glaucolepis*: the species under discussion show some deviations in these characters:

48. Transverse bar of transtilla lost. In both species the transverse bar is apparent, although it is not present as a sclerotized bar. We tentatively assume that this can be regarded as a first step towards the complete loss of the transverse bar.

49. Aedeagus with spines near phallosoma: these are completely lacking in the *raikhonae* group.

50. Vesica with single long cornutus: the vesica here has indeed one long cornutus, but unlike other *Glaucolepis* species studied, in *T. melanoptera* there are some additional small cornuti present.

We believe that the condition of character 48 and 50 in the *raikhonae* group and the large similarity of the male genitalia in general are sufficient for inclusion in *Glaucolepis*. On this basis we also have synonymized *Sinopticala* Yang. However, it is not unlikely that this group belongs to a clade, which is the sistergroup to all remaining known species of *Glaucolepis*. Character 49 could then be an apomorphy for the remaining species.

An additional apomorphy for *Glaucolepis*, including the species under study, is possibly the long, straight basal part of the ductus spermathecae, proximal to the coiled part. In *Trifurcula* s. str. and in *Levarchama* Beirne, the coiled part starts almost immediately near the vestibulum.

The close similarity in many characters between *T. raikhonae* and *melanoptera* makes it very likely that both share a common ancestor, which once was widely distributed in the Palaearctic. The species now have a completely vicariant distribution: *melanoptera* has a distribution type which very much resembles those of holomediterranean ele-

ments of the expansive type (De Lattin 1967), whereas *T. raikhonae* is widespread in the Central Asian mountains. Although *melanoptera* occurs as far east as the Kopet-Dag mountains in Turkmeniya, the deserts between this range and the Central Asian mountains (southern parts of the Karakum) form an important gap, which is apparent in the distributions of many taxa (Kryzhanovskij 1965, De Lattin 1967, Matyushkin 1982). Although the present-day desert could be an important barrier, the separation most likely goes back to the Pleistocene, when Europe and Central Asia were separated by the enlarged Aralo-Caspian Sea and the West Siberian Ice lake, or extensions of the continental ice-shields (De Lattin 1967, see also review in Tangelder 1988).

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REFERENCES

- Arnett, R. H. & G. A. Samuelson, 1986. The insect and spider collections of the world. 220 pp. - E. J. Brill/Flora & Fauna publications, Gainesville.
- Kryzhanovskij, O. L., 1965. Sostav i proiskhozhdeniye nazemnoj fauny Srednej Azii. - Moskva-Leningrad, 381 pp. [The composition and origin of the terrestrial fauna of Central Asia].
- Lattin, G. de, 1967. Grundriss der Zoogeographie. - Gustav Fischer Verlag, Stuttgart. 602 pp.
- Matyushkin, E. N., 1982. Regional'naya differenciatsiya lesnoi fauni Palearktiki v proshlom i nastoyashchem. - In: Teoreticheskiye i prikladnyye aspekty biogeografii. Moskva, Nauka: 52-80. [Regional differentiation of the forest fauna of the Palaearctic in past and present. - Theoretical and applied aspects of biogeography].

- Nieukerken, E. J. van, 1986a. A provisional phylogenetic check-list of the western palaeartic Nepticulidae, with data on hostplants (Lepidoptera). – *Entomologica Scandinavica* 17: 1-27.
- Nieukerken, E. J. van, 1986b. Systematics and phylogeny of Holarctic genera of Nepticulidae (Lepidoptera, Heteroneura: Monotrypsia). – *Zoologische Verhandlungen, Leiden* 236: 1-93.
- Nieukerken, E. J. van, 1990. The *Trifurcula subnitidella* group (Lepidoptera: Nepticulidae); taxonomy distribution and biology. – *Tijdschrift voor Entomologie* 133: 205-238.
- Nieukerken, E. J. van, E. S. Nielsen, R. Johansson & B. Gustafsson, 1990. Introduction to the Nepticulidae. – In: R. Johansson et al., *The Nepticulidae and Opostegidae (Lepidoptera) of North West Europe*. – *Fauna Entomologica Scandinavica*, 23: 11-109.
- Puplesis, R. K., 1985. Novye vidy molej-maljutok (Lepidoptera, Nepticulidae) s juga dal'nego vostoka i Tadzhikistana (New species of the nepticulid moths from Southern Far east and Tadzhikistan). – *Trudy zoologicheskogo Instituta, Akademiya Nauk SSSR, Leningrad* 134: 59-72.
- Tangelder, I. R. M., 1988. The biogeography of the Holarctic *Nephrotoma dorsalis* species-group (Diptera, Tipulidae). – *Beaufortia* 38: 1-35.
- Yang, Chi-kun, 1989. *Sinopticala sinica* (Lepidoptera: Nepticulidae), a new genus and species from China. – *Entomotaxonomia* 11: 79-82 [in Chinese and English].

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Unfortunately the following errors have been overlooked during proof-reading of the above cited paper:

p. 207. – Figs. 7-10: figs 9 and 10 have been accidentally interchanged, the left figure with no. 9 actually is fig. 10 (*T. coronillae*), the right one is fig. 9 (*T. subnitidella*). Arrows in figs 8-10 have been omitted.

p. 222. – Figs. 57-60. Abbreviations: bs=black scales; cf=costal fold; fw=forewing; hw=hindwing; yp=yellow patch.

p. 228. – The sentences after the last paragraph of p. 228 (male genitalia of *iberica*) were accidentally omitted during page formatting:

[sublat-]eral processes. Aedeagus 335-340 μm long, with ventral carina fringed; aedeagal tube posteriorly spatulate, dorsal lobe at right side conspicuous, with serrate margin; vesica with one long spine-like cornutus (125-145 μm), with blunt tip, joined basally to a conical cornutus (50 μm); further a large cornutus with serrate tip; very few long spine-like cornuti and numerous small ones. Juxta fig. 78.

p. 230. – Line 1-2, right column: read hind-wing instead of hindwing.

In some holotype designations, the genitalia slide number has not been mentioned, they are:

- p. 219, 5. *T. victoris*: Genitalia slide EvN 2743.
p. 225, 7. *T. josefklimeschi*: Genitalia slide EvN 2744.
p. 228, 8. *T. iberica*: Genitalia slide EvN 1928.
p. 230, 9. *T. silviae*: Genitalia slide EvN 2742.