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Notes on some asiatic *Furcula* LAMARCK, 1816
(Lepidoptera: Notodontidae)

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Abstract

Since the revision of the genus *Furcula* by DANIEL (1965) newly collected material especially from Central Asia has accumulated. This material offers the opportunity to study this group again. Besides chorological additions also four new species of the *Furcula bifida*-group: *Furcula gorbunovi* **sp. nov.**, *Furcula mimonovi* **sp. nov.**, *Furcula danieli* **sp. nov.**, *Furcula pakistana* **sp. nov.** and three new subspecies of the *furcula*-group: *Furcula furcula turcica*, **ssp. nov.**, *Furcula furcula altaica* **ssp. nov.**, *Furcula aeruginosa mongolica* **ssp. nov.** are described. The distribution of asiatic *Furcula* is illustrated on maps.

Zusammenfassung

Nach dem Erscheinen der *Furcula*-Revision (DANIEL 1965) gesammeltes Material eröffnet jetzt die Möglichkeit, diese Gruppe erneut zu untersuchen. Neben Ergänzungen zur Chorologie werden auch vier neue Arten der *bifida*-Gruppe: *Furcula gorbunovi* **sp. nov.**, *Furcula mimonovi* **sp. nov.**, *Furcula danieli* **sp. nov.**, *Furcula pakistana* **sp. nov.**, sowie drei neue Unterarten der *furcula*-Gruppe: *Furcula furcula turcica* **ssp. nov.**, *Furcula furcula altaica* **ssp. nov.** und *Furcula aeruginosa mongolica* **ssp. nov.** beschrieben. Die Verbreitung der asiatischen *Furcula*-Arten wird durch Punkt-Verbreitungskarten illustriert.

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Synopsis of taxonomical changes

Furcula gorbunovi **sp. nov.**
Furcula mimonovi **sp. nov.**
Furcula danieli **sp. nov.**
Furcula pakistana **sp. nov.**
Furcula furcula turcica **ssp. nov.**
Furcula furcula altaica **ssp. nov.**
Furcula aeruginosa mongolica **ssp. nov.**
Furcula aeruginosa petri (ALPHERAKY, 1882) **comb. et stat. nov.**
Furcula aeruginosa sibirica (DANIEL, 1965) **comb. et stat. nov.**
Furcula aeruginosa ludoviciae (PÜNGELER, 1901) **comb. nov.**
Furcula aeruginosa ludovicior (GAEDE, 1933) **comb. nov.**
Furcula furcula persica (GAEDE, 1933) **stat. nov.**
Harpyia furcula pseudobicuspis DANIEL, 1965 **syn. nov.** of *Cerura persica* GAEDE, 1933
Furcula furcula songuladakensis (DANIEL, 1965) **syn. nov.** of *Cerura pulvigera* STAUDINGER, 1901.

Introduction

In the last years I was able to obtain much material of moths from the former Soviet Union, especially from the asiatic part. Among this material also members of the genus *Furcula* were found in numbers. So it was possible to study *Furcula* again, because at the time when the late Franz DANIEL published his monograph (DANIEL 1965), only a few specimens where known from Central Asia. Besides this, I was able to examine the collections of the zoological museums in Tartu, Moscow and St. Petersburg. Due to the new material also taxonomical changes became necessary.

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The type material is preserved in the Zoological Museum of Moscow University (MGU); the Zoological Museum St. Petersburg; the Museum Thomas WITT, Munich; the Museum KOENIG, Bonn (ZFMK); in coll. GRIGORJIEV, St. Petersburg, and in coll. SCHINTLMEISTER, Dresden.

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I. The *Furcula furcula*-group

This group is characterised by the processes of valvae which are terminating unpointed. The following palaearctic species belong to this group:

Furcula furcula (HÜBNER, 1800)
bicuspis (BORKHAUSEN, 1790)
aeruginosa (CHRISTOPH, 1873)
terminata (WILTSHIRE, 1958)

I. 1. *Furcula furcula* (HÜBNER, 1800)

a. *Furcula furcula forficula* (FISCHER VON WALDHEIM, 1820)
(Pl. 1: 1–3)

Diagnosis: This subspecies is characterised by a pale greyish groundcolour of the wings, sometimes slightly mixed yellowish. The pattern is therefore not very contrasting.

Taxonomic note: The Turkish specimens and one male from Greece, 6 km N Pherae, are intermediate toward ssp. *turcica* ssp. nov.

Distribution: Balkan, East Europe, Turkey.

Material: 6 ♂♂ Hungary; 2 ♂♂ Romania; 10 ♂♂, 2 ♀♀ Bulgaria; 1 ♂ Croatia; 2 ♂♂ Greece. Turkey: Çanakkale (5): 1 ♂, Gelibolu, Galata, 20 m, 25.v.1982; Balikesir (6): 1 ♂, Balikesir, 15.v.1985. Ukraina: 3 ♂♂, Belgorod, Gubkin. Russia: 9 ♂♂, Moscow; 8 ♂♂, Briansk; 1 ♂, Saratov; 1 ♂, Cheboksary. Kasachstan: 1 ♂, Kurgan, 3.vii.1986 (GU 22-71).

b. *Furcula furcula turcica* ssp. nov.
(Pl. 1: 4–6)

Diagnosis: Forewing length in males 14–20 mm (most specimens 16–18 mm), in females 18 mm. The groundcolour of the forewings pale yellow-greyish; hindwings white with weakly developed black marginal spots. The blackish pattern of the forewings reduced. Especially the median area (which can be interrupted) near the costa narrower than in the other subspecies. The females resembling the males, but larger. The genitalia showing no significant differences with regard to the other subspecies of *furcula*.

Ssp. *turcica* rather resembles small specimens of *interrupta* CHRISTOPH than the fuscous *furcula pulvigera* STAUDINGER or *furcula persica* GAEDE, which differs by the broad fuscous median area and the fuscous hindwings. Ssp. *turcica* is next to ssp. *forficula*.

Taxonomic note: *F. furcula turcica* is externally remarkable similar to our series of *aeruginosa petri*, but paler. So the possibility, that *aeruginosa* and *furcula* are conspecific must be discussed (see under *aeruginosa*).

Distribution: Turkey.

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Holotype: ♂, [Turkey], Asia minor, Aksehir, 1000 m, 20.vii.–5.viii.1966, leg. CZIPKA, in coll. Museum Th. WITT, Munich.

Paratypes (all from Turkey): Izmir (14): 2 ♂♂, Bergama, Bakirtal 50 m, 26.v.1982; Burdur (18): 1 ♂, Toros Daglari, Cellikci-Pass, 1200 m, 8.vi.1982; 1 ♂, Toros Daglari, Kargican, 25 km N Silifke, 3.vi.1982; 1 ♂, Erdemie, 5.v.1985; Bolu (23): 1 ♂, 7 km NÖ Gerede, 23.v.1985 (GU 22-85); Ankara (27): 15 ♂♂, 2 ♀♀, Kizilcahaman, 1000 m, 1.–5.v.1967, 31.v.1990, 3.vi.1969, 5.–6.vi.1990, 21.–22.vi.1966, 29.vi.–2.vii.1970 (GU 1615), e. o. vii.1970; 1 ♂, 17 km W Elmadag, 800 m, 22.v.1985; 1 ♂♀, Cubak Bararge, 5.–17.v.1967; 1 ♂, Dutözi Köyü, 1300 m, 12.viii.1988; Konya (28): 1 ♂, Toros Dag, Tokatepe, 450 m, 3.v.1985; 3 ♂♂, Aksehir, 20.vii.– 5.viii.1966, 22.vii.–4.viii.1961; 4 ♂♂, Beysehir, 1100 m, 29.v.1982; 1 ♂, Karaman, 12.vi.78; Nevsehir (37): 1 ♀, Nevsehir, 25 km NÖ Ürgüp, 1500 m, 21.v.1985; Tokat/Sivas (43/46): 2 ♂♂, Camlibel-Pass, 22.v.1982, 1600 m; Tunceli (53): 1 ♂, Pülümür, 1600 m, N.-Hang, 27.vi.1983; Erzurum (59): 2 ♂♂, 35 km NW Erzurum, Yonkalik, 1.vii.1983; 1 ♂, Palandöken Daglari, 20 km SW Cat, 1900 m, 2.vii.1983; Bingöl (60): 1 ♂, 10 km W Solhan, 1200 m, 2.vii.1980; Agri (62): 2 ♂♂, 5 km E Sarican, 1800 m, 12.–15.vi.1991; 1 ♂, 15 km E Horosan 12.–15.vi.1991; 3 ♂♂, 7 km W Aydiniepe, 2200 m, 20.–22.vii.1990; Hakkari (67): 1 ♂, 15 km SW Yüksekova, Suüsti, 1900 m, 15.–16.vii.1980.

c. *Furcula furcula persica* (GAEDE, 1933) stat. nov.
(Pl. 1: 10–12)

= *Harpyia furcula pseudobicuspis* DANIEL, 1935 **syn. nov.**

Diagnosis: Groundcolour of forewings splendid white with a contrasting black pattern and an often broad and dark median area. The hindwings with broad fuscous submarginal fasciae. This ssp. resembles *Furcula bicuspis* (BORKHAUSEN).

Taxonomic note: see also ssp. *songuldakensis*. The type series (including holotype) of *pseudobicuspis*, which was examined, is more fuscous than other material from Iran. However it is not very likely that in this area two species similar to *furcula* are occuring. So *pseudobicuspis* becomes a junior synonym of *persica* (**syn. nov.**) which is treated as a ssp. of *furcula* (**comb.** et **stat. nov.**). The specimen from Dagestan stands externally between *pulvigera* and *persica* and rather resembles the type series of *pseudobicuspis*.

Distribution: Elburs Mts., Azerbaijan, Dagestan.

Material: Iran: 1 ♂, Elburs-Mts., Pol Sefid, 1500 ft., 11.ix.1961 (GU 1996); 8 ♂♂, Elburs Mts., Tacht i Suleiman 1900–2200 m, 10.–14.vii.1937 (holotype and paratypes of *pseudobicuspis*) (GU 497); 1 ♂, 7 km S Chalus; 1 ♂, Elburs Mts., Kendevan, 2300–2800 m, 8.–15. viii.1978; 1 ♂, Talysh, westl. Astara, 1600 m, 7.viii.1978. Azerbaijan: 8 ♂♂, Talysh, Aurora, 12 km S Lenkoran 12.v.1979, 27.iv.–12.v.1992, 26.viii.–15.ix.1992; Alexeevka near Lenkoran, 25.viii.1981, 9.v.1982, 12.v.1982 (GU 7–90); 1 ♂ Alexeevka, 27.iv.1993; 1 ♂, Lenkoran, 30.v. 1980; 2 ♂♂, Talysh, Dashdatjuk, 600 m, 19.vi.1984, 22.–24.v.1992; 1 ♀, Agutshera, 16.v.1987; 1 ♀, Nachitshevan, Buzgov, Daralages, 900 m, 4.v. 1982. Russia: 1 ♂, Dagestan, Budaisk raion, Termenik, 13.vii.1985. "NE Caucasus": 1 ♂, Fortanga 1000 m, 17.–18.vii.1991; 2 ♂♂, Olgeti, 1500 m, 3.– 7.vii.1991; 1 ♂, Harachoj, 14.viii.1988.

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d. *Furcula furcula pulvigera* (STAUDINGER, 1901)
(Pl. 1: 7–9; GU 2: 3)

= *Harpyia furcula songuldakensis* (DANIEL, 1938) **syn. nov.**
= *Harpyia furcula caucasica* SCHINTLMEISTER, 1981

Diagnosis: The largest subspecies of *furcula* (forewing length in males 18–22 mm) with a fuscous groundcolour of wings and diffuse markings especially of the postmedian pattern of forewings.

Taxonomic note: see SCHINTLMEISTER (1989: 82). The type series of *songuldakensis* matches well the other specimens from the Caucasus, but the specimens from Zonguldak are somewhat paler in groundcolour and the forewings span only 17 mm. However, the type series of *songoldakensis* resembles rather *pulvigera* than *turcica*. The other material from the Turkish Black Sea coast alike Caucasian *pulvigera*. Specimens from Kars and Sarikamis are of an intermediate type which is tending towards ssp. *turcica*.

Distribution: Russia: Northern Caucasus (Ossetia, Krasnodar region, Maikop), Armenia, Georgia, Turkish Black Sea coast and in the mountains of the Province of Kars.

Material: Russia: 4 ♂♂, N. Ossetia, Alagir, Dshimdon, 28.vi.1978 (holotypus and paratypes of *caucasica*); 2 ♂♂, 2 ♀♀, N. Ossetia, Ulu, 1800 m, 18.vii.1979, (paratypes of *caucasica*); N. Ossetia, Cej, 1800 m, 9.vi.–18.vii.1979 (paratypes of *caucasica*); 8 ♂♂, Teberda, 29.vii.–10.viii. 1976 (paratypes of *caucasica*); 4 ♂♂, 1 ♀, 60 km N Maikop, Nickel, 16.v.1978, 1.–6.vii.1978 (paratypes of *caucasica*); Maikop, Nickel 1.vii.1993; 1 ♂, NE Caucasius, Soun, 2300 m, 4.vii. 1991. Georgia: 1 ♂♀, Dargali-gonga, 12.–15.vii. 1990. Armenia: 14 ♂♂, 1 ♀, Dilizan, Sevanskij pereval, 1600–2100 m, 2.–10.vii.1977 (with 12 paratypes of *caucasica*); 1 ♂, Gechard, 16.vi. 1995; 1 ♂, 2 km S Ashtaruta. Turkey: Bolu (23): 1 ♂, Boludagi Begidi, 750 m, 4.viii.1984 (intermediate form toward ssp. *turcica*); Zonguldak (24): 7 ♂♂, 1 ♀, Songuldak, vii.–15.viii.1935 (GU 500) (holotype and paratypes of ssp. *songuldakensis*); Gümüshane (55): 1 ♂, Bogauli, 2300 m, 13.–14.vii.1983; Rize (55): 1 ♂, 8 km S Of, 200 m, 31.vii.1984; 1 ♀, Ikizdere 800 m, 17.vii. 1983; 1 ♂, Randgeb. Kackar-Massiv, Ilican, 1200 m, 14.–15.viii.1979; Kars (61): 1 ♂, Posof, 1400–1700 m, 10.–19.vii.1980; 6 ♂♂, Sarikamis, 2000–2300 m, 14.–19.vi.1982, 24.–29.vi.1981; 2 of the 6 ♂♂ from Sarikamis resemble ssp. *turcica*. The other 4 ♂♂ are intermediate between *pulvigera* and ssp. *turcica*.

e. *Furcula furcula altaica* ssp. nov.
(Pl. 2: 10–12, 15; GU 2: 3)

Forewing length in males 17–18 mm, in females: 20 mm. This ssp. resembles *aeruginosa sibirica*. The males have only few yellowish scales on the forewings. The hindwings are greyish fuscous with well developed black marginal spots. Very diagnostic are the well developed additional black basal- and postmedian fasciae. The female resembles *furcula fuscinula* and does not have the additional fasciae.

Distribution: Altaij Mts.

Holotype: ♂, Russia, Altai Mts., Gorni-Altaij, Ak-tash, 50.18° N.B., 87.44° E.L. ca. 1500 m, 30.vi.1992, leg. GRIGORJEV, in coll. SCHINTLMEISTER, Dresden.

Paratypes: 22 ♂♂, 2 ♀♀, as holotype 22.vi.–7.vii.1992 (GU 22-52); 1 ♀, Altaij Mts.,

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Gorno-Altaij, Kuraij, 51° 35' N, 85° 38' E, 27.vi.1993; 32 ♂♂, 13 ♀♀, ibid., 20.–30.vi. 1995.

f. *Furcula furcula sangaica* (MOORE, 1877)
(Pl. 1: 13–18, 20, 21; GU 2: 4)

= *Cerura lanigera* BUTLER, 1877

Diagnosis: A large ssp. with a greyish groundcolour of forewings, which resembles the European *Furcula furcula fuscinula* HÜBNER. The basal border of the fuscous median area often shows a diagnostic bend.

Taxonomic note: There is the opinion of some, especially Japanese authors, that *sangaica* is a distinct species. I (SCHINTLMEISTER, 1987, 1989) treated *furcula* as a holarctic species with many subspecies, also because of zoogeographic reasons. However, no material of *furcula* is actually known between Touva (E. Sajan Mts.) and Novokuznetsk in West Siberia.

The populations of ssp. *sangaica* show extensive variation with a tendency to large and fuscous specimens in the Sajan Mts. and in N. Mongolia, and to pale specimens in S. Mongolia, Manchuria, and Japan.

The specimens from NE. Siberia externally resemble ssp. *ajatar* SCHILDE, 1874 from N. Europe.

Distribution: Japan, Korea, Northern and Eastern parts of China, Siberia until Sajan Mts.

Material: 1 ♂, Novokuznetsk Kusdeeva, 400 m, 24.vi.1994; 18 ♂♂, Sajan Mts.; 14 ♂♂, 3 ♀♀, Amur; 1 ♀, Jakutsk, 1 ♂♀, Oltshan (Cerski Mts.); 17 ♂♂, 5 ♀♀, Chabarovsk region; 67 ♂♂, 33 ♀♀, Primorye; 7 ♂♂, 2 ♀♀, Kuril Isl.; 2 ♂♂, Sachalin; 19 ♂♂, Mongolia; 19 ♂♂, 9 ♀♀, China; 2 ♂♂, 1 ♀, Korea; 9 ♂♂, 4 ♀♀, Japan.

g. *Furcula furcula intercalaris* (GRUM-GRSHIMAILO, 1899)
(Pl. 1: 19)

Diagnosis: Similar to *sangaica*, but the groundcolour of forewings greyish-white. The male genitalia with remarkable long teeth on the end of the valve processes.

Taxonomic note: The status of this taxon is doubtful. Among the series of *sangaica* from Primorye and Amur there are a few specimens externally resembling *intercalaris* (but their genitalia do not differ from *sangaica*).

Distribution: China: Shansi.

Material: 1 ♂♀, Shansi, Tien-Tsing (holo- and paratype); 6 ♂♂, 1 ♀, Shansi, Mien-Shan, 2000 m, 1.–15.vii. (GU 17-04, 22-94).

I. 2. *Furcula aeruginosa* (CHRISTOPH, 1873)

Diagnosis: This species is characterised by its yellowish groundcolour of the forewings. The median area often with "additional black fasciae" in the basal and postmedial area not

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seen that way in the other species of this group.

The male genitalia like *F. furcula*; also the few dissected females of *aeruginosa* do not seem to differ significantly from *furcula*.

F. aeruginosa is the oldest available name for a complex of many subspecies mainly regarded as distinct species in the past.

It is remarkable that *aeruginosa* and *furcula* never occur sympatric, except in Novokuznetsk where both species have been collected during one night. Because the morphological differences of the imagines are rather restricted to pattern and colouration of the forewings, it might be possible—but from zoogeographical reasons actually not very likely—that both taxa are conspecific. For further discussion it would be useful to know the early stages of *aeruginosa*.

a. *Furcula aeruginosa aeruginosa* (CHRISTOPH, 1873)
(Pl. 2: 1–3; GU 2: 5)

Diagnosis: Distinct by its greyish-yellow fuscous groundcolour of the forewings. The additional basal- and postmedian fasciae weakly developed. The hindwings pale but with clearly seen black marginal spots.

Taxonomic note: The old and bred males from Uralsk have shorter pectinated and brown antennae. But the specimens from Rostov and Astrakhan have long pectinated and black antennae like *petri* and the other subspecies of this species.

Distribution: Along the rivers Don and Volga in the southern parts of Russia; steppes in Southern Ural.

Material: 18 ♂♂, 6 ♀♀, Uralsk 28.vii.1907, 29.v.1908 (e.o.) (GU 2000); 3 ♂♂, Orenburg; 10 ♂♂, Sarepta (= Krasnoarmeijsk) (GU 2-44); 2 ♂♂, Astrakhan; 1 ♂♀, Rostov/Don, 40 km W, Nedwigovka, 3.v.1977; vii.1975 (GU female: 22-84); 1 ♂, Taganrog.

b. *Furcula aeruginosa sibirica* (DANIEL, 1965) comb. et stat. nov.
(Pl. 2: 4, 5)

Diagnosis: Resembling ssp. *aeruginosa*, but the groundcolour generally more fuscous. There are forms with confluent as well as separated median area.

Distribution: W. Siberia, Altaij Mts.

Material: 2 ♂♂, Barnaul, 25., 27.vi.1931 (holo- and paratype); 7 ♂♂, W. Sajan Mts., Maina, Babik, 19.vi.1966, 14., 16.vii.1979 (GU 2-87, 22-69); 1 ♂, Semipalatinsk; 4 ♂♂, 1 ♀, Novokuznetsk Kusdeeva, 400 m, 24.vi.1994; 4 ♂♂, 2 ♀♀, S. Altaij, Mt. Belucha, Smegirevo, 2000 m, 5.–17.vii.1995; 1 ♀, ibid., 2.–5.vii.1995; 3 ♂♂, ibid., 1.–2.vii.1995.

c. *Furcula aeruginosa mongolica* ssp. nov.
(Pl. 2: 7–9, GU 1: 1)

Forewing length in males 16.5–17 mm. Groundcolour of forewings yellowish-white; all black markings reduced. The fuscous median area splitted into two parts. Often there is

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only a fuscous medial spot on the costa present besides the apical spot. The "additional" black basal and postmedial fasciae are not visible. The hindwings are white with small black marginal spots.

The male genitalia as in ssp. *aeruginosa*.

Taxonomic note: The specimen from SW Sajan Mts., Barum, shows the "additional" black fasciae on its forewings. The pattern of the forewings is better developed. So this specimen is situated between ssp. *sibirica* and *mongolica*.

Distribution: W. Mongolia, Touva, NE. Kazakhstan.

Holotype: ♂, Mongolia, Chovd aimak, Dsungar Gobi, Bulgan sum, 31.vii.–1.vii.1986, leg. P. GYULAI, in coll. SCHINTLMEISTER, Dresden.

Paratypes: 3 ♂♂, as holotype (GU 22-62); 1 ♂, Uvs aimak, 6 km SW Somon, Baruunturuum, 1350 m, 24.vi.1968; 1 ♂, Kasachstan, Saizan city, 15.–30.vi.1993.

Further material: 1 ♂, SW. Sajan Mts., Touva, Ak-Dovunak, Barum, 4.viii.1972 (not included in the type series).

d. *Furcula aeruginosa petri* (ALPHERAKY, 1882) comb. et stat. nov.

(Pl. 2: 13, 14, 16–18, 20, 21; GU 2: 6)

= *Cerura ludoviciae* PÜNGELER, 1901 **syn. nov.**

Diagnosis: 1–2 mm smaller than the other subspecies of *aeruginosa*. The forewings have a white-yellowish groundcolour. The pattern as in ssp. *aeruginosa*. The hindwings white with weakly developed black marginal spots. The median area is in the first generation specimens (April, May) of my material not interrupted, but 5 out of 6 second generation specimens (August) have an interrupted median area.

The female genitalia with longer apophyses than in the other sspp. of *aeruginosa*.

Taxonomic note: It was not possible to locate the holotype in the Zoological Museum in St. Petersburg in 1992. However ALPHERAKY (1882) illustrated the type in colour which shows pure white hindwings but greyish forewings. This specimen is intermediate between our material from Bakanas and ssp. *sibirica*.

The type locality of *petri* is not Kuldsha as DANIEL (1965) suggested, but the type specimen was caught—according to the original description—on 1.iv. on the way to Khorgossa near the chinese border.

The types of *ludoviciae* (illustrated in SCHINTLMEISTER 1989: 252, fig. 188) differ from our material from Bakanas and the original description of ALPHERAKY by the better developed postmedian fascia. However, besides this there are no other noticeable differences, so both taxa are considered synonyms.

Distribution: N. Kasachstan, Ili-area; Northeastern slopes of Chinese Thian Shan (Koksa-alatau).

Material: Kasachstan, 16 ♂♂, 1 ♀, Bakanas, 100 km N Alma Ata, 500 m, 20.v.1992; (GU male: 22-53 female: 22-83); 6 ♂♂, Bakanas, 500 m, 1.–8.viii.1992; 4 ♂♂, 1 ♀, Bakanas, 1.–10.v.1993; 5 ♂♂, 1 ♀, Bakanas 30.v.1993; 1 ♂♀, Ili river, Borochudzir, 25.vii. 1993; 1 ♀, Alakol-See, 400 m, 30.v.1986; 3 ♂♂, Aksu; 2 ♂♂, Aksu, fin v.1900 (types of *ludoviciae*); 1 ♂, Ili-Gebiet, Dsharkent, (GU 511); 3 ♂♂, 4 ♀♀, Bakanas, August 1994, 3 ♂♂, Ili river, 50 km above Bakanas, 4.vi.1993; 14 ♂♂, Kazachstan, Ili, Bakanas, 400 m, 3.–5.v.1995; 1 ♀, Kazachstan, Ili river, Borochudzir, 25.vii.1993; 2 ♂♂, 3 ♀♀, Kasachstan,

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110 km NE Alma Ata, Tshundsha, 2.vi.1993; 11 ♂♂, 1 ♀, Kazachstan, Alma Ata, 20 km SW Tschundscha, 500 m, 28.–30.v.1995; 6 ♂♂, 1 ♀, Kazachstan, Ili, Taldy-Kurgan, Altyn-Emel National Park, 500–900 m, 7.–13.v.1995; 1 ♀, Kazachstan, Semipalatinsk, Alakol-See, Karakol, 450 m, 2.v.1995; 1 ♂, Kazachstan, Almaty, Bayseit chilik valley, 700 m, 43° 14' N, 78° 21' E, 7.–15.v.1994; 1 ♂, 1 ♀, Kazachstan, Almaty, Kegen-Pass, 1600 m, 43° 10' N, 79° 3' E, 28.vii.1995; 1 ♂, Kazachstan, Almaty, 22 km N Masalc, 660 m, 43° 46' N, 78° 27' E, 27.vii.1995.

e. *Furcula aeruginosa ludovicior* (GAEDE, 1933) comb. nov.
(Pl. 2: 19)

Diagnosis: Similar to ssp. *petri*, but the groundcolour of the forewings more fuscous brownish-grey. The "additional" black fasciae well developed.

Taxonomic note: The known material is not sufficient enough to decide on the taxonomic value of the taxon *ludvicior*.

Distribution: Southern slopes of Chinese Tian Shan.

Material: 1 ♂♀, Maralbaschi (types of *ludovicior*); 1 ♂, "Thianshan" (MERZBACHER).

I. 3. *Furcula terminata* (WILTSHIRE, 1958) stat. nov.
(Pl. 3: 1–3; GU 2: 7)

Diagnosis: The ground colour of the wings white with a pattern as in *mimonovi* spec. nov., but the shape of the wings is broader in *terminata*.

The male genitalia like *furcula* (unlike *mimonovi*). The female genitalia with a hearth-shaped signum and with smoother and lesser bilobed 8th segment then in the other species of the *furcula*-complex.

Taxonomic notes: This taxon was described as a "forma" of *lanigera* BUTLER. DANIEL (1965: 39) combined "*Harpyia pulvigera* ssp. *terminata* WILTSHIRE, 1958" and SCHINTLMEISTER (1989: 82) "*Furcula petri terminata* (WILTSHIRE, 1958)". The species is easily separable from *petri* because of the differences in the female genitalia (signum and shape of ventral plate.)

DANIEL (1965: 32) mentioned and illustrated a male of *terminata* from "Tura 1889" as *interrupta*. So he concluded in error that *interrupta* and *syra* are two species. Tura was used by STAUDINGER for the area between Alai Mts. and Eastern Turkestan and has nothing in common with Sarepta, the type locality of *interrupta*.

Distribution: NE Afghanistan, W. Tian Shan, Alaiski Mts.

Material: Afghanistan: ♀, Faizabad, Koksha valley, 1450 m, 7.vii.1953 (holotypus). Uzbekistan: 4 ♂♂, 1 ♀, Almas, 2.–18.vii.1988 (GU 22-55); 2 ♂♂, 1 ♀, Tshatkalskij chrebet, Kamshik-pass, 2700 m, 6.–9.vii.1987 (GU female 22-80); 1 ♂, Ferghana, Skobelev, 18.v. 1914; 1 ♂, Tashkent; 1 ♂, Margilan. Kazakhstan: 1 ♂, Kazachstan, Ili, Bakanas, 400 m, 3.–5.v.1995. Kirghizia: 3 ♂♂, Alaijski chrebet, Dugoba, Iordan, 19.vii.1984, 15.vii.1987, 15.vii.1993; 2 ♂♂, Osh, 6.vi.1928, 11.v.1990 (GU 22-65); 1 ♂♀, Arkit, 22.v.1968, 12.vii. 1967 (GU 22-63, 22-82); 4 ♂♂, 3 ♀♀, Naryn, Kulamak, 2000 m, 5.–10.vi.1992; 1 ♂, Tura, 1889 (GU 1995); 18 ♂♂, Moldotau, Aktal, 1800 m, 6.vii.1993 (GU 23-70); ♂♂, 3 ♀♀,

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Kirgisia, Moldotau, 120 km NW Naryn, Tschon-Konduk, 1800–2000 m, 27.–28.vi.1995; 1 ♀, Kirghizia, Kekemeren river, 12 km NE Arnok, 41.47' N, 74.16' E 18.7.1994; 4 ♂♂, Kirghizia, Kekemeren river, 5 km W Arnok, 41.44' N, 74.08' E 14.–17.7.1994; 1 ♂♀, Alai Mts. Tengiz bai, 2200 m, 27.vii. 1994; 1 ♂, Alai Mts., 20 km E Sopu-Korgon, 13.vii.1993. 1 ♀, "Irgin iv"; 1 ♂, Ur. Su-uchte, Uvali Dshurunte, 22.vi.1924 (KOSLOV) [the last two localities are unknown to me].

II. The *Furcula bifida*-group

The member of this group are characterised by a pointed processus of the valvae in the male genitalia.

The following species belong to this group:
Furcula bifida (BRAHM, 1787)
interspersa (ROTHSCHILD, 1917) **stat. nov.**
gorbunovi **sp. nov.**
pakistana **sp. nov.**
danieli **sp. nov.**
turbida (BRANDT, 1938)
interrupta (CHRISTOPH, 1867)
mimonovi **sp. nov.**
nicetia (SCHAUS, 1928)

II. 1. *Furcula bifida* (BRAHM, 1787)
(Pl. 4: 8, 11, 12; GU 1: 2, 2: 8)

Furcula bifida bifida (BRAHM, 1787)
= *Harpyia bifida beida* RUNGS, 1956 **syn. nov.**

Diagnosis: Distinguishable externally by its greyish rectangular middle area which is bordered by a contrasting black fasciae. In the pale greyish postmedian area there is a black discal spot and a white fasciae which is black towards the margin.

The male genitalia with pointed valve processes and triangular tegumen. Gnathos not bilobed.

In the female genitalia the two pairs of apophyses approximately of the same length. The ventral plate shows diagnostic sclerotisation, which is unique in the genus *Furcula*.

Taxonomic notes: The populations from Turkey, Mongolia and Russia do not differ from specimens of Middle Europe, except the specimen from Rostov/Don which resembles f. *urocera* BOISDUVAL, 1840. The three specimens from Alanya/Turkey are paler and with a yellowish groundcolour. There are 2 ♂♂ and 1 ♀ from Morocco (1 ♂, Moyen Atlas, Ifrane 24.vi.–2.vii. 1972; 1 ♂♀, Hochland von Zemmours, 500 m, Dayet-er-Roumi, 20 km SW Khemisset) which are identic with Spanish specimens. Therefore *beida* RUNGS becomes a synonym of *bifida* (syn. nov.).

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Distribution: North Africa, Europe (including Mallorca, Sardinia, Corsica and Sicily), Turkey, Caucasus, Ural up to the Altai Mts. and Mongolia.

Material: ca. 200 ♂♂, 80 ♀♀ of various localities in Europe including Mallorca Isl., Corsica, Sardinia; Morocco. Russia: 1 ♂, Moscow, 1.vii.1992 (Gu 22-72); 1 ♂, Kasan, 26.vi.1976, 1 ♂, Rostov/Don, 26.v.1984 (GU 22-67); 1 ♀, N. Kaukasus, Maikop, vi.1975; 2 ♂♂, Cheboksari, 10.v. and 17.vi.1983; 1 ♂, W. Sajan Mts., Maina, 22.vii.1966; 1 ♂, S. Sajan Mts., Touva, Kyzil, 7.vii.1972; 1 ♀, Gorno Altaij, Kuraij, 20.–30.vi.1995. Kasachstan: 3 ♂♂, Zyrianovsk, SW. Altaij Mts. 28.v.1993, 500 m; 3 ♀♀, S. Altaij, Mt. Belucha, Smegirevo, 2000 m, 1.–17.vii.1995. Mongolia: 1 ♂♀, Kentai Mts., Tjerelsh, 26.vi.–4.vii. Turkey: Balikesir (6): 1 ♂, Ivrindi, 250 m, 11.vi.1982; Kütahya (11): 4 ♂♂, Siav, 850 m, 10.vi.1982; 1 ♂, 15 km NW Abide, 800 m, 14.iv.1983; Antalya (19): 1 ♂, 2 ♀♀, Alanya, 25.–27.vii.1968, 2.vii.1968 (GU W14); Burdur (18): 1 ♀, Toros, Celtikci-Pass, 16.vii. 1982; Bolu (23): 1 ♂, 13 km NÖ Bolu, 19.vii.1984; Kastamonu (25): 1 ♀, 10 km W Arac, 800 m, 24.vi.1982; Ankara (27): 5 ♂♂, 3 ♀♀, Kizilcahaman, 1000 m, 6.–12.vi.1966, 3.–4.vii.1970, 2.vii.1971, 13.vii.1986 (GU W1); Nevsehir (37): 1 ♂, Göreme-Tal 10 km W Ürgüp, 1200 m, 20.vii.1984; Tokat/Sivas (43/46): 5 ♂♂, 3 ♀♀, Camlibel-Pass, 11.vi.–30.vi.1980, 20.–23.vi.1982, 28.–29.vi.1983, 1.–10.vii.1978; Rize (57): 1 ♂, Ikizdere, 800 m, 17.vii.1983; Gümüshane (55): 1 ♂, 28 km osö Gümüshane, Vaukdagi Gecidi 1800 m, 3.vii.1984 (GU 22-68). Kars (61): 5 ♂♂, Kagizman, Kotek, 1550 m, 13.–14.vi. 1982; 25 ♂♂, 3 ♀♀, Sarikamis, 2000–2300 m, 14.–19.vi.1982, 24.–29.vi.1981, 16.–24. vii.1978, 18.– 20.vii.1982; Erzurum (59): 1 ♂, Soganli-Daglari Ovit Pass, 1600 m 20.vii. 1986; Agri (62): 1 ♂, 2 ♀♀, 7 km W Aydintepe, 2200 m, 20.–22.vii.1990; 2 ♂♂, 5 km E Sarican, 1800 m, 12.–15.iv. 1991; Hakkari (67): 1 ♂, 15 km NW Yüksekova, 1900 m, 20.vi.1981.

II. 2. *Furcula interspersa* (Rothschild, 1917) stat. nov.

(Pl. 4: 7, 9; GU 1: 3, 2: 9)

Diagnosis: Forewings with yellowish-grey or greyish groundcolour. The median area often interrupted and narrower than in *bifida*. The specimens resemble externally *furcula* rather than *bifida*.

The male genitalia similar to *bifida*, but the gnathos bilobed and the pointed valve process ending in a hook not seen that kind in the other species of *Furcula*.

The female genitalia differs by having a slender ventral plate with much shorter apophyses than *bifida*.

Taxonomic note: Because of the external and genitalia differences *interspersa* is treated as bona species and not as a ssp. of *bifida*, which was found in Morocco. The genitalia of the the other members of the *bifida*-group show individual variability also in the shape of the valve process. So it is possible that the remarkable shape of the valve process might prove to be an individual form if more material for dissection becomes available.

Distribution: NW. Africa.

Material. Algeria: 3 ♀♀, Mauritania, Batna, 1910 (GU W8). Tunesia: 1 ♂♀, Hammamet 20.v.1988 (e.o. 20.vii.1988) (GU W7, W15).

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II. 3. *Furcula gorbunovi* sp. nov.
(Pl. 3: 10–13; GU 1: 7, 2: 10)

Forewing length in males 20–21.5 mm, in females 23–24 mm. The pattern of forewings similar to that in *bifida*. The outer black fascia of the median area as in *bifida* slightly coloured orange. The median area is blackish, not greyish as in *bifida*. The white basal area concave, not straight. The submarginal area darker than in *bifida*.

The male genitalia resembles that of *bifida* and *interrupta*, but the gnathos is deeper bilobed than in *interrupta*. The female genitalia has reduced apophyses posteriores and a relative smooth 8th segment. The sclerotisation of the ventral plate is very different to that of *bifida* and *pakistana*.

Named after my friend Oleg GORBUNOV, Moscow, who collected the greatest part of the type series.

Distribution: N. Tadshikistan; S. Kirghizia.

Holotype: ♂, Tadshikistan, Gissar Mts., Ramit Nature Reserve, 38.25° N.B., 69.20° E.L. 25.iv.1988 leg. O. GORBUNOV, in coll. SCHINTLMEISTER, Dresden.

Paratypes: 10 ♂♂, as holotype (GU 22-60); 1 ♂, 3 ♀♀, Gissar Mts., Kondara, 30.v.1979, 15.vi.1965 (GU 22-66, GU 22-79); 1 ♂, Ljanggar, 1900 m, 29.vi.1979 (GU 22-61); 1 ♀, Mt. Peter I., Obichingou valley, 1500 m, 11.–12.vi.1991; 1 ♂, NW. Pamir, Vantsh, Gutsevast, 2200 m, 7.–10.vi.1978 (GU 22-57); 1 ♀, Romit [= Ramit] 12.vi.1978.

There is an additional female from Chodshent pass, 1.–7.viii.1914 (ca. 40.27° N. 76.17° E.), which resembles the new species in genitalia (GU 22-81) but is much paler and with an interrupted median area. Not included in the type series.

II. 4. *Furcula pakistana* sp. nov.
(Pl. 4: 10, 13–15; GU 1: 5, 2: 11)

Diagnosis: Forewing length in male 19 mm, 22 mm in females. The groundcolour of the forewings is grey. The pattern intermediate between *danieli* and *bifida*, but without orange coloured scales of the wings.

The male genitalia as in *bifida*. It differs by the slightly bilobed and broader gnathos. The female genitalia somewhat resembling *bifida* with a diagnostic sclerotisised ventral plate. The shape of the sclerotisised area differs principally from *gorbunovi*, as illustrated.

Taxonomic note: The occurrence of the genus *Furcula* in Pakistan was a surprise and extends the known distribution area of this genus to the south side of the Himalayas. The new species from Pakistan is more similar to *bifida* than to the other asiatic species of the *bifida*-group.

Distribution: N. Pakistan, Ladakh.

Holotype: ♂, N. Pakistan, Astor, 2200 m, 35.23' N, 74.53' E, 30.v.1992 (GU W 10), in coll. Museum WITT, Munich.

Paratypes: Pakistan: 1 ♀, Shigar 2200 m, 35.28° N, 75.43° E, 8.vi.1992; 1 ♀, Swat, Miandam, 1800 m, 35.10° N, 72.32° E, 25.vi.–5.vii.1992 (GU W 6); NW. India: 1 ♂, Himachal Pradesh, Kulla-valley, Nagar, 1750 m, 28.–30.viii.1994; 1 ♂♀, Kaghan valley, 20 km NE Balakot, Thatabaya, 34° 41' N, 73° 25' E, 27.vii.1994.

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II. 5. *Furcula danieli* sp. nov.
(Pl. 4: 1–5; GU 1: 6, 2: 12)

Forewing length in males 18 mm (the specimen from Ai-Dere spans 20 mm), in the female 22 mm. The shape of forewings in males and females more elongated than in *bifida* and *gorbunovi*. *F. turbida* BRANDT differs from *danieli* by its unique even more elongated wings. The groundcolour of the wings is grey, the hindwings are paler. The markings and pattern similar to *bifida* but without any orange scales. The median area of the forewings generally shaped rectangular. The series from Sayvona/Kopet Dagh, which was collected at the end of june is somewhat paler in groundcolour and shows tendencies of reduction of the median area. The female from Kopet Dagh Mts. resembles the males. The specimen from Askhabad with an interrupted median area.

The male genitalia similar to *interspersa* and *bifida* but with a deep and broad bilobed gnathos. The valve process rather slender. The female genitalia resembles *interspersa*, but shows only a small area of stronger sclerotisization.

Named in honeur of the late Franz DANIEL, who published a monograph about *Furcula* in 1965, which is the basis for this study.

Taxonomic note: *F. danieli* and *mimonovi* are sympatric in Tachtakupyr and Tigrovaja Balka. It seems that *turbida, interspersa* and *danieli* are forming a group of related allopatric species or possibly also subspecies.

Holotype: ♂, Tadshikistan, Tigrovaja Balka, (180 km S Dushanbe), 1.–3.iv.1977, leg. A. RAITVIIR, in coll. SCHINTLMEISTER.

Paratypes: Tadshikistan: 1 ♂, as holotype (GU 22-59). Uzbekistan: 1 ♂, Karakalpakija, Tachtakupyr, 43.02 N.B., 60.17' E.L., 12.v.1988. Turkmenia: 2 ♂♂, W. Kopet Dagh, Iol-Dere, 15 km NO Kara-Kala, 6., 7.v.1953 (GU 22-56); 2 ♂♂, 1 ♀, W. Kopet Dagh, Ai-Dere, 56.46' E, 38.19' N, 600–1000 m, 21.–23.iv.1991, 29.iv.1984, (GU 22-75, W4, W5); 3 ♂♂, Kopet Dagh Mts., Sayvona valley, 56.50' E, 38.17' N, 1000 m, 28.vi.1992; (GU W1, W9); 1 ♀, Kopet Dag, Ipay-Kala, 15 km SW Nochur, 38° 15' N, 56° 55' E, 26.vi.1992; 1 ♂, Kopet Dag, Sumbar, Durdychan, 1.–2.v.1995; 1 ♀, Transcaspia, Aschchabad, 28.vii.1906; 1 ♂, W. Kopet Dag, NSG Sunt-Haear-Dagh, Schevian 13.iv.1994. Iran: (S. Kopet Dagh) Mts. Mashad, 24.iv.1971 (GU W 12); 1 ♂, Bojnurd, 21.vi.1992 (GU 24-33).

Further material: 1 ♂, Azerbaijan (former Soviet part), Kucheti, 16.v.1963 (GU 22-70), not included in the type series because the locality seems to be doubtful.

Distribution: S. Lake Aral, Kopet Dagh, SW Tadshikistan, ? Azerbaijan.

II. 6. *Furcula turbida* (BRANDT, 1938)
(Pl. 4: 6)

Diagnosis: This fuscous species resembles externally rather members of the *furcula*-group than those of the *bifida*-group. It differs from the other known *Furcula*-species by its very elongated forewings.

The male genitalia as in *bifida*.

Taxonomic note: *F. turbida* is not conspecific with *pulvigera* STAUDINGER, 1901 from SW-Caucasus as DANIEL (1965) suggests. The latter belongs to *furcula*. *F. turbida* has also

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nothing in common with the various sspp. of *interrupta*. The only relative of this geographically isolated species is *danieli*.

Distribution: SW. Iran.

Material: 1 ♂, Iran mer. occ., Borasdjen (= Borazjan), Daliki, 120 m, 13.–17.iii.1938 (GU WITT 510); 1 ♀, Fars, S'-apur, 16.v.1941.

II. 7. *Furcula interrupta* (CHRISTOPH, 1867)
(Pl. 3: 4–9; GU 1: 4, 2: 13)

= *Harpyia syreyae* REBEL, 1933

= *Harpyia höferi* BYTINSKI-SALZ, 1936

= *Cerura interrupta leucotera* STICHEL, 1911 **syn. nov.**

Diagnosis: The groundcolour of the forewings pure white with reduced but contrasting black markings towards the margin. The greyish median area is often deeply bilobed or seperated into two areas.

The male genitalia as in *bifida* but the gnathos slightly bilobed (less bilobed than in *mimonovi*). The female genitalia resembling *mimonovi*, but not showing the *bifida*-like sclerotisation. The apophyses posteriores longer than the antapophyses.

Ssp. *syra* GRUM-G"TNRexpert "rishimailo, 1899 is characterised by its reduced fuscous median area (often interrupted) and the brownish-yellowish groundcolour of the forewings. Ssp. *clarior* WILTSHIRE, 1943 with more reduced black markings and pure white groundcolour of forewings. There is only a fuscous costal spot instead of the median fascia on the yellowish-white forewings.

Taxonomc notes: Taxa *interrupta, syra* GRUM-GRSHIMAILO, 1899, *clarior* WILTSHIRE, 1943 and *leucotera* STICHEL, 1911 are conspecific (DANIEL 1965: 36, 37; SCHINTLMEISTER 1989: 83). It was not possible to separate the populations from Iran and Turkey taxonomically. So *leucotera* becomes a junior synonym of *interrupta* (**syn. nov.**).

However the male genitalia of *bifida* and *interrupta* are similar, both taxa occurring sympatric in Sarepta (= Krasnoarmeijsk), and Kizilcahaman (near Ankara), so that there is no doubt on the status of distinct species. Also the caterpillars of both species are different (Prof. Dr. KOBES, pers. communication).

Material:

ssp. *interrupta*:

Russia: 2 ♂♂, 2 ♀♀, Sarepta (= Krasnoarmeijsk), 23.vii.1868. Azerbaijan: 1 ♀, Lerik, 3.vi. 1981; 1 ♂, Nachitshevan, Buzgov, 14.vi.1988 (GU 22-88). Turkey: Canakkale (5): 1 ♂, Ge- libolu, 29.vi.1982; Ankara (27): 5 ♂♂, 4 ♀♀, Kizilcahaman, 1000–1300 m, 1.–5.v.1967 (GU W2, W3), 22.v.1985 (GU ♀ 22-77); 20.vi.–5.vii.1970, e.o.; 20.viii.1970; 3 ♂♂, Baraij, 1000 m, 5.–17.v.1967; 8 ♂♂, 7 ♀♀, Barrage, 10 km NÖ Ankara, 1100 m, 5.–17.v.1967, 13.–17.vi.1966, e.o. 16.viii.1966; 1 ♂♀, Dutözü Köyü, 1300 m, 1.v.1989 (GU W13); 2 ♂♂, Kiki Kkale, 22.viii.1976; Konya (28): 14 ♂♂, 8 ♀♀, Aksehir, 1000 m, 13.–30.vi.1964 (GU 616), 20.vii.– 5.viii.1966 (GU 22-74); 20.vii.–23.viii.1967, 22.vii.–4.viii.1961 (with 6 paratypes of *sureyae*); 1 ♂, Sultan Dagh, 1000–1300 m, 16.vi.–1.vii. 1976; 1 ♂, 2 ♀♀, Toros Dag, Eregli-Juritz, 8.–9.vi.1978; Maras (33): 2 ♂♂, 5 ♀♀, Marasch, 800 m, 1.–2.v.1939 (paratype of *sureyae*), vii.1931 (GU 491), e.l. 1938 (paratype of

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sureyae); Nevsehir (37): 1 ♀, Nevsehir, 1200 m, 8.–12.vii. 1986; Corum (39): 1 ♂, Bokaskale, 1200 m, 4.vii.1981; Tokat (43): 1 ♂, Tokat, 600 m, vii.1974; Sivas (46): 2 ♀♀, Gürün, 19.–30.vi.1976; Tokat/Sivas (43/46): Camlibel-Pass, 11.–30.vi.1980; Malatya (47) 1 ♂, Nurihak dagi, 16.vi.1990. Iran: 1 ♂♀, Derbend, 25 km N Teheran, 2000 m, 10.vii.1962, e.l., 20.viii.1962, e.o.; 4 ♂♂, 3 ♀♀, Vanak 15 km N Teheran, 1600 m, 20.viii.1962; 2 ♂♂, 1 ♀, Elbursgebirge, Keredjin, e.l. 1936 (GU 1560); 1 ♂, Täbris, 1600 m, 4.vii.1974 (GU 8-52).

ssp. *syra*:

Türkei: Maras (33): 4 ♂♂, 1 ♀, Amanus, Dül-Dül Dagh, M vii.-M ix., ix.–x.1932; 1 ♂, Göksu-valley 25.vi.1992 (GU 22-58); Adiyaman (48): 1 ♂♀, 20 km N Gölbasi, 600 m, 6.–8.v. 1979; Urfa (49): 2 ♂♂, Urfa, 1 km S Halfeti, 350 m, 1.v.1987, 15.–18.v.1990; 5 ♂♂, Adana, e.o. 1955. Lebanon: 1 ♂, Beyrouth (Beirut); 9 ♂♂, 2 ♀♀, Bscharre, 1300–1600 m, 1.–15.vi.1931, vii.1931, viii.–ix.1931. Syrien: 1 ♂, "Syrien" 1904; 2 ♂♂, Homs, iii.1963, 1.v.1963.

ssp. *clarior*:

Iraq: 1 ♂, Bagdad, 19.vi.1937 (holotype); 1 ♀, Baghdad, 100 ft., x.1954. Iran: 2 ♂♂, Hamadan, 6000 ft., 23., 26.vi.1938.

II. 8. *Furcula mimonovi* sp. nov.

(Pl. 3: 14–17; GU 1: 8, 2: 14)

Forewing length in males 18–19 mm, in females 19–21 mm. The species resembles externally *interrupta*. The groundcolour of the wings greyish-white, not so brilliant as in *interrupta interrupta* but also not brownish-yellowish mixed as in *interrupta syra*. The pattern similar to *interrupta* but the postmedian area with 3 clearly marked black fasciae and the median area interrupted in most specimens.

The male genitalia similar to *interrupta* but the gnathos deeper bilobed. The female genitalia distinct by the shape of the 8th segment which resembles *interrupta*.

The species is named after Evgeni MIMONOV, Moscow, who collected part of the type series.

Taxonomic note: Perhaps *mimonovi* becomes a subspecies of *interrupta* if the life history and the caterpillars are known. The different scheme of the black pattern of the forewings indicates to treat *mimonovi* actually better as a bona species.

Distribution: S. Lake Aral, SW Tadshikistan.

Holotype: ♂, Uzbekistan, Karakalpakija, Tachtakupyr, 43.02° N.B., 60.17° E.L. 13.vi. 1984, leg. E. MIMONOV, in coll. SCHINTLMEISTER. Paratypes: 3 ♂♂, 11 ♀♀, as holotype but 7.vii., 8.vii. 29.vii., 6.viii.1983, 12.vi., 27.vii.1984, 12.vi.1988 (GU males: 22-54, 22-64, female: 22-78); 2 ♂♂, 1 ♀, Tadshikistan, Tigrovaja Balka, 180 km S Dushanbe, 8.–9.vii.1991 (GU male: 22-76); 1 ♀, Syr-Darja, Perowsk; 3 ♂♂, 7 ♀♀, Kazachstan, Tshimkent, Syr Darya, Bairkum, 250 m, 22.–30.v.1994; 2 ♂♂, Amu Darya, Surkhandarya, 30 km E Termez, 300 m, 3.–4.v.1994; 6 ♂♂, 2 ♀♀, Amu Darya, 37 km W Shartuz, 300 m, 27.–28.vi.1994; 1 ♂, Dushanbe, ex pupa (july 1973 on *Salix*) 10.viii.1973; 1 ♂, Syr Daja.

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Plate 1

1. *Furcula furcula forficula* (FISCHER VON WALDHEIM, 1820), ♂, Bulgaria, Pirin Mt., Liljanovo, 1.–30.vi.1984, leg. EICHLER.
2. *Furcula furcula forficula*, ♂, Ukraine, Belgorod, Gubkin, 20.viii.1984, leg. ANISKOWITSCH.
3. *Furcula furcula forficula*, ♀, Rossia, Briansk, village Paluje, 13.vii.1982, leg. ANISKOWITSCH.
4. *Furcula furcula turcica* **ssp. nov.**, ♂, Asia minor, Aksehir, 1000 m, 20.vii.–5.viii.1966, leg. CZIPKA (Holotype).
5. *Furcula furcula turcica* **ssp. nov.**, ♂, Kleinasien, Erzurum, 35 km NW Erzurum, vic. Yonkalik, 1850 m, 1.vii.1983, leg. DE FREINA (Paratype).
6. *Furcula furcula turcica* **ssp. nov.**, ♀, Anatolien, Kizilcahaman, e.o. 9.viii.1970, leg. PINKER (Paratype).
7. *Furcula furcula pulvigera* (STAUDIGER, 1901), ♂, NW Kaukasus, Teberda, 1300 m, 29.vii.–10.viii.1976, leg. Dr. ENGELHARDT (Paratype of *Harpyia furcula caucasica* SCHINTLMEISTER).
8. *Furcula furcula pulvigera*, ♂, Asia minor occ., Songuldak, vii.1935 (Paratype of *Cerura furcula songuldakensis* DANIEL).
9. *Furcula furcula pulvigera*, ♀, Türkei, Rize, Ikizdere, 800 m, 17.vii.1983, leg. W. THOMAS.
10. *Furcula furcula persica* (GAEDE, 1933), ♂, Persia sept., Elburs Mts., Tacht i Suleiman, Sardab Tal, (Vanderban) 1900–2200 m, 10.–14.vii.1937, leg. PFEIFFER & FORSTER (Holotype of *Cerura furcula pseudobicuspis* DANIEL).
11. *Furcula furcula persica*, ♂, Iran, Elburz Mts., Pol Sefid, 1500 ft., 11.ix.1961, leg. SUTTON.
12. *Furcula furcula persica*, ♀, Azerbaidshan, Agudrera, 16.v.1987.
13. *Furcula furcula sangaica* (MOORE, 1877), ♂, Russia, Sajan Mts. Mondy, 51.40°N, 100.59°E, 25.vii.1992, leg. SINAJEV.
14. *Furcula furcula sangaica* (MOORE, 1877), ♂, Mongolia, Kentai Gebirge, Tjerelsh, 1900 m, 26.vi.–4.vii.1889, leg. SALK.
15. *Furcula furcula sangaica* (MOORE, 1877), ♀, Russia, Primorye, Progranitshnyi, 44.25°N, 131.21°E, 10.–20.vii.1992, leg. ANISKOWITSCH.
16. *Furcula furcula sangaica*, ♂, Mongolia, Bulgan aimak, 64 km W Erdenecant, 47.05°N, 104.95°E, 1.viii.1987, leg. PEREGOVITS, HREBLAY & STEGER (whitish population).
17. *Furcula furcula sangaica*, ♂, China, Beijing, 29.v.1973, leg. CAI.
18. *Furcula furcula sangaica*, ♀, Russia, Jakutsk, 14.vi.1988, leg. SAIZONOV.
19. *Furcula furcula intercalaris* (GRUM-GRSHIMAILO, 1899), ♂, China, Shansi, Mien-Shan, 2000 m, 9.vii.1937, HÖNE.
20. *Furcula furcula sangaica*, ♂, Russia, Amurskaja oblast, Zeiskij Zapovednik, vi.1975, leg. MURZIN (form alike *intercalaris*).
21. *Furcula furcula sangaica*, ♀, Japan, Hokkaido, Obihiro, 15.vi.1960, leg. MURAYAMA.

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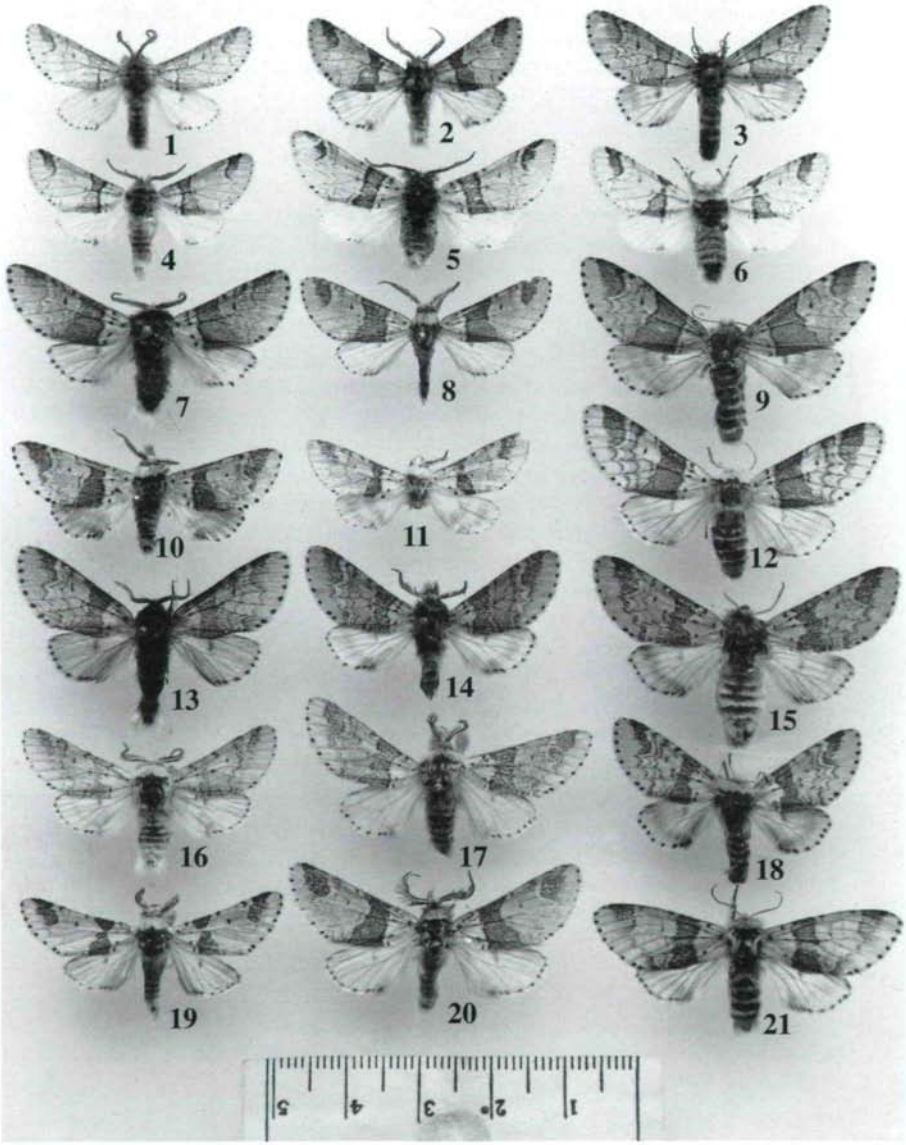

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Plate 2

1. *Furcula aeruginosa aeruginosa* (CHRISTOPH, 1873), ♂, Russia, Rostov/Don, 40 km W, Nedwigovka, 3.v.1977, leg. POLTAWSKI.
2. *Furcula aeruginosa aeruginosa*, ♂, Russia, Uralsk, 14.viii.1907, leg. BARTEL.
3. *Furcula aeruginosa aeruginosa*, ♀, Russia, Uralsk, e.o.
4. *Furcula aeruginosa sibirica* (DANIEL, 1965), ♂, Russia, W. Sajan Mts., Maina-Babik, 6.–14.vii.1979, leg. MACHAT.
5. *Furcula aeruginosa sibirica*, ♀, Kazachstan, Altaij Mts., Mt. Belucha, Smegirevo, 5.–17.vii.1995, leg. ANISKOWITSCH.
6. *Furcula aeruginosa*, ♂, Russia, Tuva, Barum, Ak-Dovunak, 4.viii.1972, leg. RUBEN & VIIDALEPP (intermediate between *mongolica* and *sibirica*).
7. *Furcula aeruginosa mongolica* **ssp. nov.**, ♂, Mongolia, Chovd aimak, Dsungar Gobi, Bulgan sum, 31.vii.–1.vii.1986, leg. GYULAI (Holotype).
8. *Furcula aeruginosa mongolica* **ssp. nov.**, ♂, Mongolia, Chovd aimak, Dsungar Gobi, Bulgan sum, 31.vii.–1.vii.1986, leg. GYULAI (Paratype).
9. *Furcula aeruginosa mongolica* **ssp. nov.**, ♂, Uvs aimak, 6 km SW Somon, Baruunturuum, 1350 m, 24.vi.1968, leg. KASZAB (Paratype).
10. *Furcula furcula altaica* **ssp. nov.**, ♂, Russia, Altai Mts., Gorni-Altaij, Ak-tash, 50.18° N. 87.44° E., ca. 1500 m, 30.vi.1992, leg. GRIGORJEV (Holotype).
11. *Furcula furcula altaica*, ♂, Russia, Altai Mts., Gorni-Altaij, Ak-tash, 50.18° N. 87.44° E., 1500 m, 30.vi.1992, leg. GRIGORJEV (Paratype).
12. *Furcula furcula altaica*, ♂, Russia, Altai Mts., Gorni-Altaij, Ak-tash, 50.18° N. 87.44° E., 1500 m, 30.vi.1992, leg. GRIGORJEV (Paratype).
13. *Furcula aeruginosa petri* (ALPHERAKY, 1882), ♂, Kasachstan, Ili-Gebiet, Bakanas, 100 km N Alma Ata, 500 m, 20.v.1992, leg. MURZIN.
14. *Furcula aeruginosa petri*, ♂, Kazachstan, Almaty, 22 km N Masak, 600 m, 16.v.1994, 43° 46' N, 78° 27' E, leg. FABIAN & RETEZAR.
15. *Furcula furcula altaica*, ♀, Russia, Altai Mts., Gorni-Altaij, Ak-tash, 50.18° N. 87.44° E., 1500 m, 30.vi.1992, leg. GRIGORJEV (Paratype).
16. *Furcula aeruginosa petri*, ♂, Kazachstan, Almaty, 5 km NE Kok-Pek, Mt. Syugeti, 1000 m, 21.v.1994, 43° 28' N, 78° 45' E, leg. FABIAN & RETEZAR.
17. *Furcula aeruginosa petri*, ♀, Kazachstan, 50 km SW Dzharkent Ili-river, 19.vii.1994, leg. KOSTJUK.
18. *Furcula aeruginosa petri*, ♂, Aksu.
19. *Furcula aeruginosa ludovicior* (GAEDE, 1933), ♂, [China] Thianshan, leg. MERZBACHER.
20. *Furcula aeruginosa petri*, ♀, Kazachstan, Almaty, 22 km N Masak, 600 m, 16.v.1994, 43° 46' N, 78° 27' E, leg. FABIAN & RETEZAR.
21. *Furcula aeruginosa petri*, ♂, Kazachstan, Almaty, Bayseit, 8 km E Chilik, 43° 14' N, 78° 21' E, 7.–15.v.1994, leg. FABIAN & RETEZAR.

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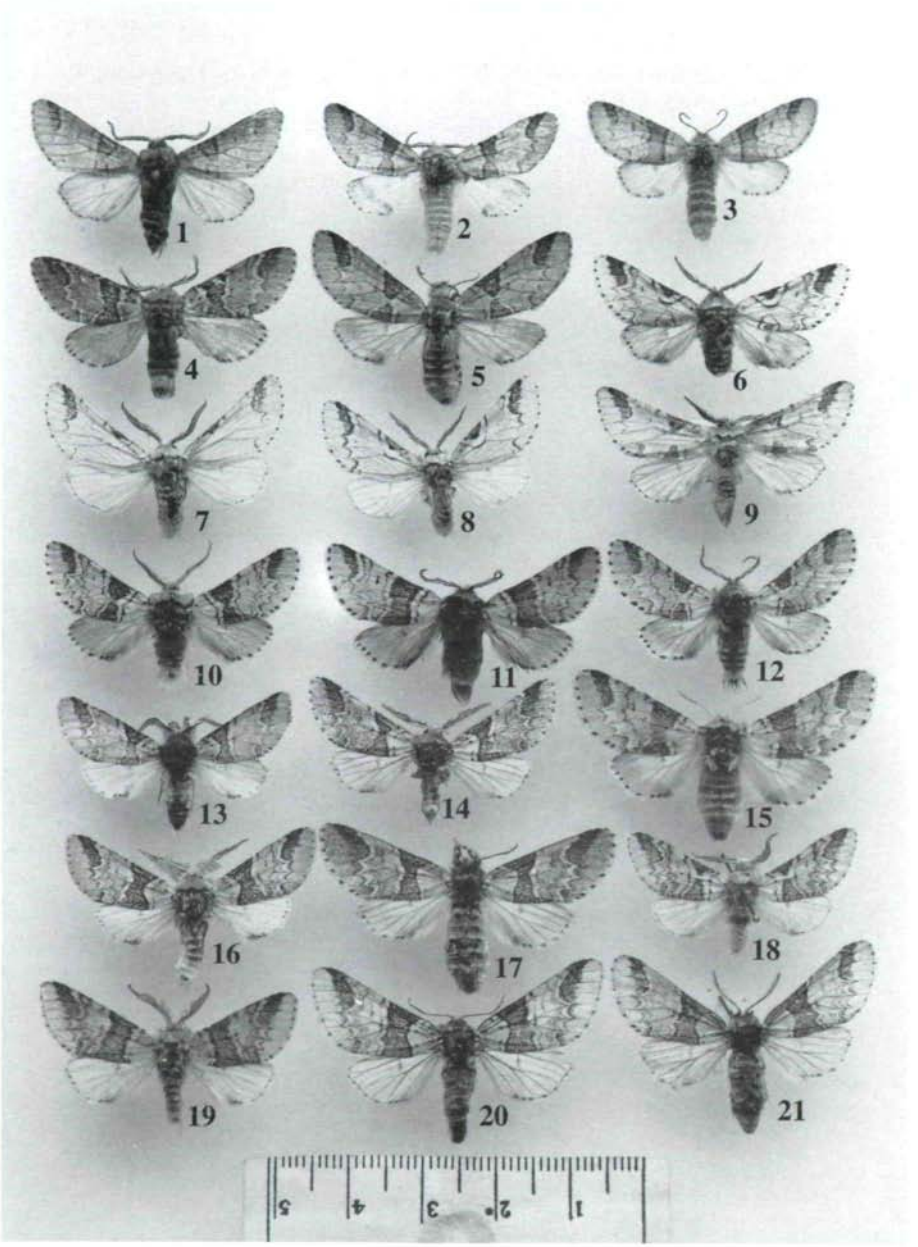

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Plate 3

1. *Furcula terminata* (WILTSHIRE, 1958), ♂, Kirgisia, Alai Mts. Dugoba, Iordan, 15.vii.1987, leg. MURZIN.
2. *Furcula terminata*, ♂, Kirgisia, Naryn, Kulamak, 5.–10.vi.1992, 2000 m, leg. TOROPOV.
3. *Furcula terminata*, ♀, Usbekistan, Almas, 800 m, 2.–18.vii.1988, leg. P. SALK.
4. *Furcula interrupta interrupta* (CHRISTOPH, 1867), ♂, Türkei, Aksehir, 1000 m, 20.vii.–23.viii.1967, leg. CZIPKA.
5. *Furcula interrupta interrupta*, ♂, Iran, Elbursgebirge, Keredjin, e.l. 1936, leg. BRANDT.
6. *Furcula interrupta interrupta*, ♀, Türkei, Gürün, 19.–30.vi.1976, leg. FRIEDEL.
7. *Furcula interrupta syra* (GRUM-GRSHIMAILO , 1899), ♂, Urfa, 1 km S Halfeti, 350 m, 37° 14.5' N, 37° 52.5' E, 1.v.1987, leg. W. WOLF.
8. *Furcula interrupta syra*, ♂, Libanon, Beyrouth 1300 m, 1.–15.vi.1931, leg. PFEIFER.
9. *Furcula interrupta clarior* (WILTSHIRE, 1943), ♂, Irak, Hamadan, 6000 ft., 23.vi.1938, leg. WILTSHIRE.
10. *Furcula gorbunovi* **sp. nov.**, ♂, Tadshikistan, Gissar Mts., Ramit, 38° 25' N, 69° 20' E, 25.iv.1988, leg. GORBUNOV (Holotype).
11. *Furcula gorbunovi* **sp. nov.**, ♂, Tadshikistan, Gissar Mts., Ramit, 38° 25' N, 69° 20' E, 25.iv.1988, leg. GORBUNOV (Paratype).
12. *Furcula gorbunovi*, ♀, Tadshikistan, Mt. Peter I., Obichingou, 11.–12.vi.1991, 1600 m, leg. JÜRIVETE (Paratype).
13. *Furcula gorbunovi*, ♀, Tadshikistan, Gissar Mts., Kondara, 15.vi.1965, leg. TSVETAEV (Paratype).
14. *Furcula mimonovi* **sp. nov.**, ♀, Tadshikistan, Tigrovaja Balka, 180 km S Dushanbe, 8.-9.vii.1991, leg. ZOLOTUCHIN (Paratype).
15. *Furcula mimonovi*, ♂, Uzbekistan, Karakalpakija, Tachtakupyr, 43° 02' N, 60° 17' E, 13.vi.1984, leg. MIMONOV (Holotype).
16. *Furcula mimonovi*, ♂, Uzbekistan, Karakalpakija, Tachtakupyr, 43° 02' N, 60° 17' E, 16.vi.1984, leg. MIMONOV (Paratype).
17. *Furcula mimonovi*, ♀, Uzbekistan, Karakalpakija, Tachtakupyr, 43° 02' N, 60° 17' E, 6.viii.1983, leg. MIMONOV (Paratype).

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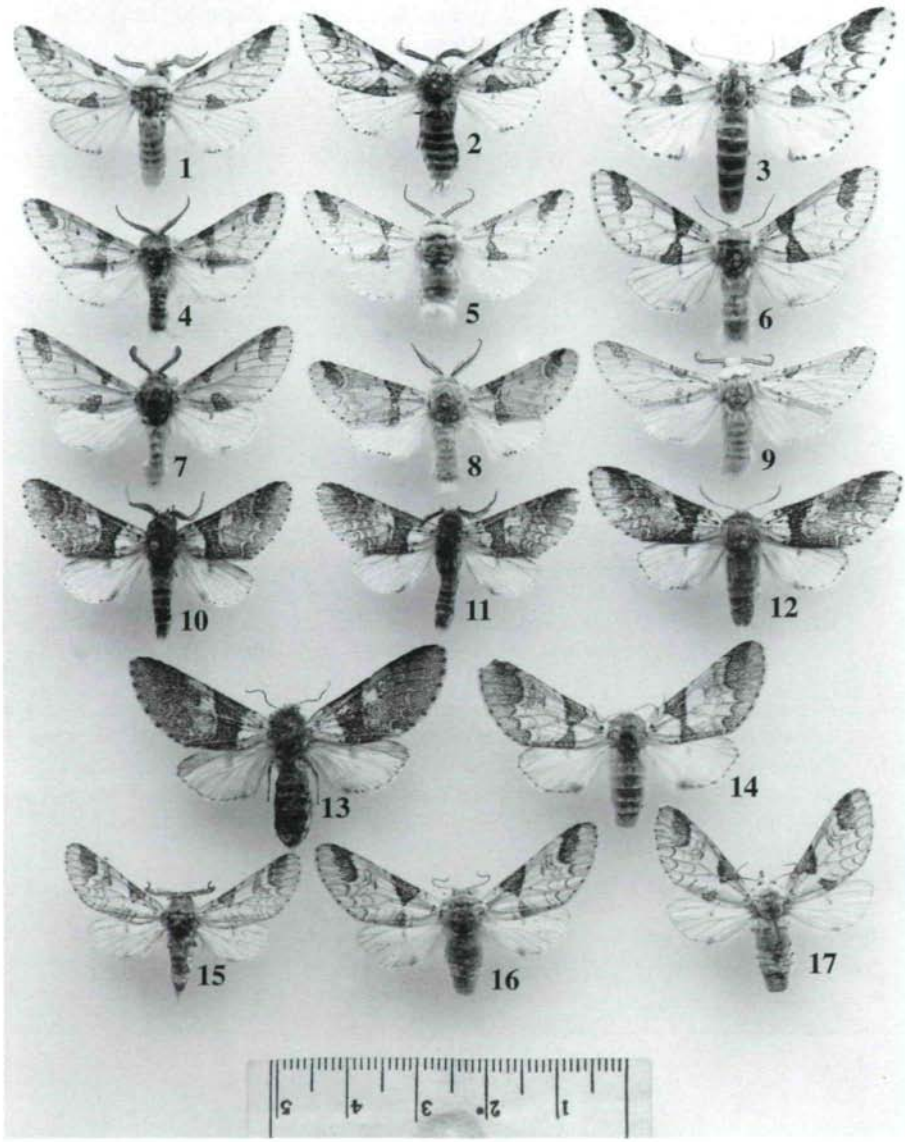

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Plate 4

1. *Furcula danieli* **sp. nov.**, ♂, Tadshikistan, Tigrovaja Balka, 1.–3.iv.1977, leg. RAITVIIR (Holotype).
2. *Furcula danieli*, ♂, Turkmenia, W. Kopet Dag, Iol-Dere, 15 km NE Kara-Kala, 6.–7.v.1953, leg. KUZNEZOV (Paratype).
3. *Furcula danieli*, ♀, Turkmenia, Kopet Dagh, Ai-Dere, 38° 19' N, 56° 46' E, 600–1000 m, 21.–23.iv.1991, leg. CSORBA, FABIAN, HERCZIG, HREBLAY & G. RONKAY (Paratype).
4. *Furcula danieli*, ♂, Turkmenia, Kopet Dagh, Ai-Dere, 38° 19' N, 56° 46' E, 600–1000 m, 21.–23.iv.1991, leg. CSORBA, FABIAN, HERCZIG, HREBLAY & G. RONKAY (Paratype).
5. *Furcula danieli*, ♂, Turkmenia, Kopet Dagh, Ipay-Kala, 38° 15' N, 56° 55' E, 600–1000 m, 26.vi.1992, leg. FABIAN, HERCZIG, PODLUSSANY & VARGA (Paratype).
6. *Furcula turbida* (BRANDT, 1938), ♂, Iran mer., Borasdjen, Daliki, 120 m, 13.–17.iii.1938.
7. *Furcula interspersa* (ROTHSCHILD, 1917), ♂, Tunesia, Hammamet, 20.v.1988 e.o., leg. DIEMER.
8. *Furcula bifida* (BRAHM, 1787), ♂, Russia, Transbaical, Jablonovi Mts., 20 km N Tshita, 29.vi.1993, leg. KOSTJUK.
9. *Furcula interspersa*, ♂, Algeria, Batna, 1910.
10. *Furcula pakistana* **sp. nov.**, ♂, Pakistan, Astor, 35° 21' N, 74° 53' E, 2200 m, 30.v.1992, leg. HREBLAY & CSORBA (Holotype).
11. *Furcula bifida*, ♂, Marokko, Moven Atlas, Ifrane, 1650 m, 24.vi.–2.vii.1972, leg. FRIEDEL.
12. *Furcula bifida*, ♀, Zemmours, 500 m, Dayel-el-Roumi 20 km SW Khemisset, leg. H. & CH. WIEGEL.
13. *Furcula pakistana*, ♂, Pakistan, Kaghan valley, 20 km NE Balakot, Tathabaya, 34° 41' N, 73° 25' E, 27.vii.1994, leg. HERCZIG, LAZLO & G. RONKAY (Paratype).
14. *Furcula pakistana*, ♀, Pakistan, Kaghan valley, 20 km NE Balakot, Tathabaya, 34° 41' N, 73° 25' E, 27.vii.1994, leg. HERCZIG, LAZLO & G. RONKAY (Paratype).
15. *Furcula pakistana*, ♀, Pakistan, Shigar, 2200 m, 35° 28' N, 75° 43' E, 8.vi.1992, leg. HREBLAY & CSORBA (Paratype).
16. *Furcula nicetia* (SCHAUS, 1928), ♂, China, Yunnan, A-tun-tse, 4000 m, 7.vii.1936, HÖNE.
17. *Furcula nicetia*, ♂, China, Yunnan, Li-kiang, 3000 m, 3.viii.1934, HÖNE.
18. *Furcula nicetia*, ♀, China, Yunnan, Li-kiang, 2000 m, 16.vii.1935, HÖNE.

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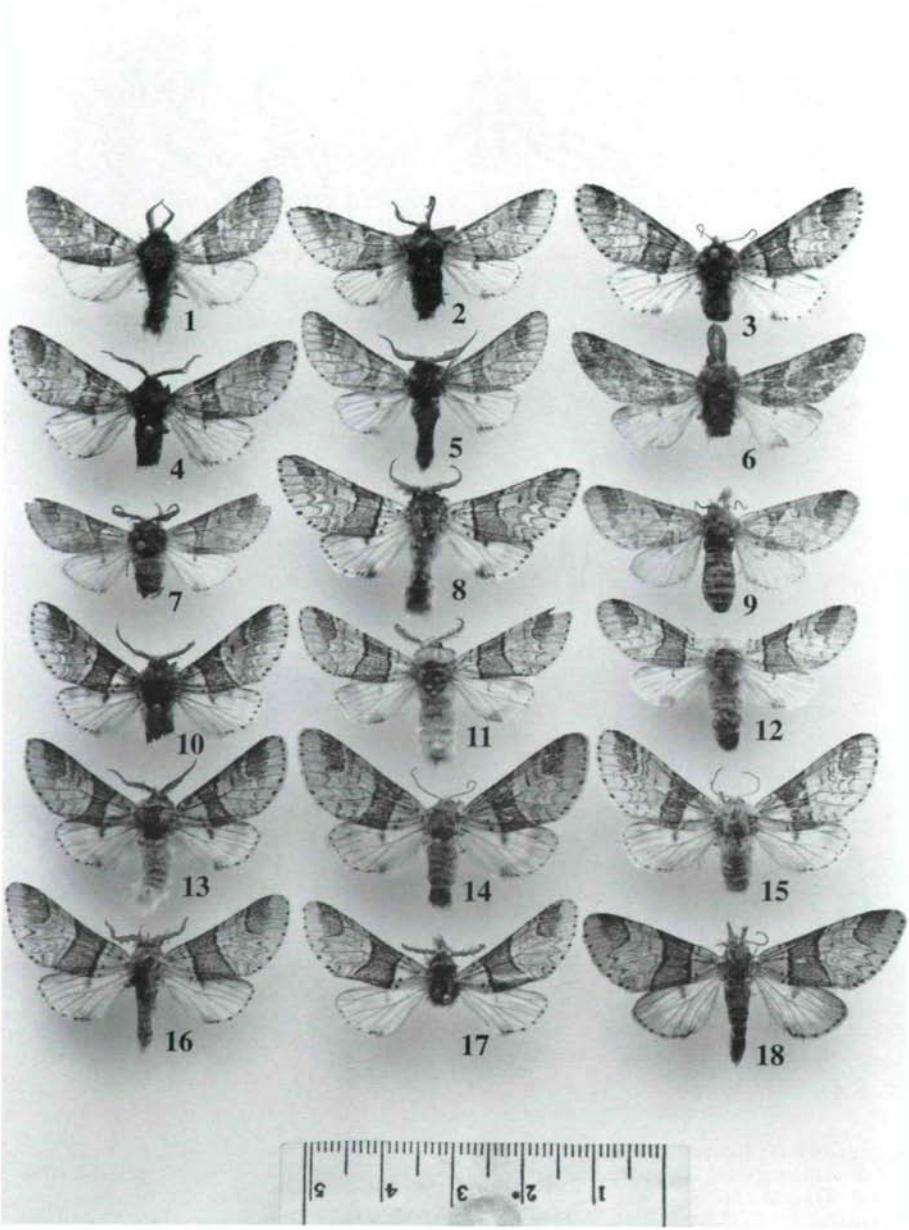

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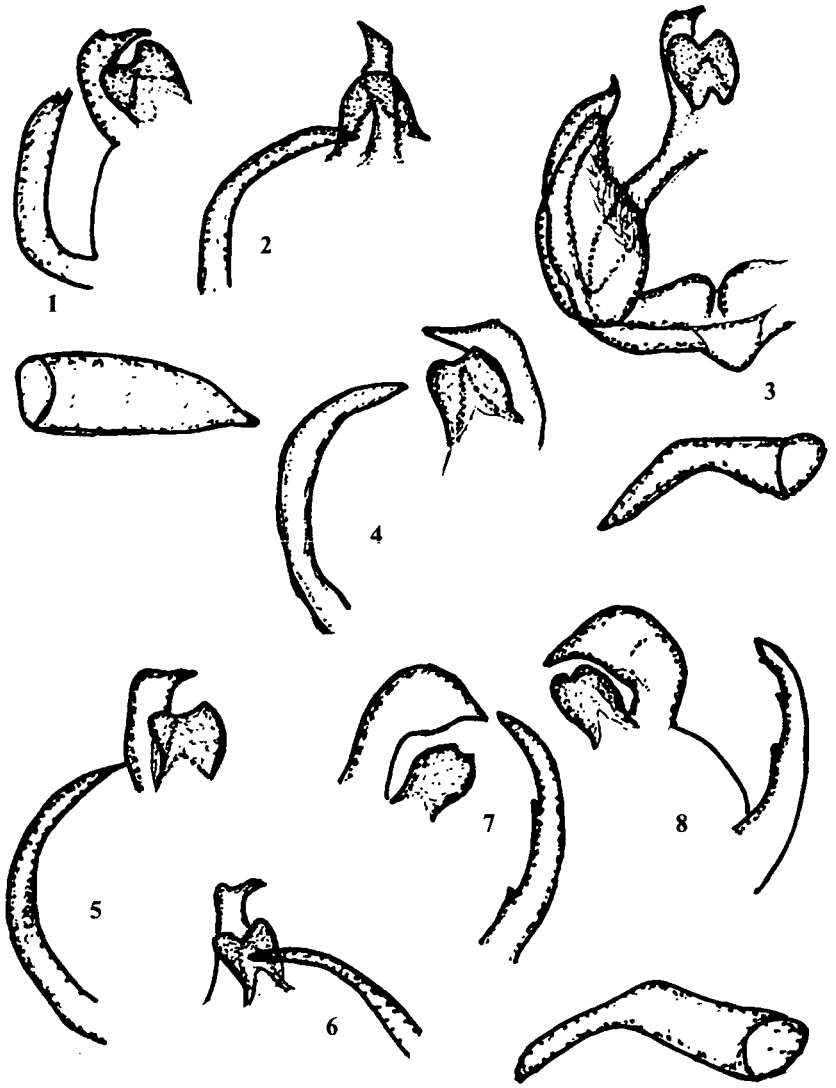

GU 1: Genitalia figures, males
1. *Furcula aeruginosa mongolica* **ssp. nov.**, Mongolia, Bulgan sum, (GU 22-63). 2. *Furcula bifida*, Turkey, Kizilcahaman, (GU W1). 3. *Furcula interspersa*, Tunesia, Hammamet (GU W7). 4. *Furcula interrupta*, Azerbaidshan, Tābris, (GU 8-52). 5. *Furcula pakistana* **sp. nov.**, N. Pakistan, Astor, (GU W10), Holotype. 6. *Furcula danieli* **sp. nov.**, Kopet Dagh Mts., Sayvona valley, (GU W1). 7. *Furcula gorbunovi* **sp. nov.**, N. Pamir, Ljanggar, (GU 22-61). 8. *Furcula mimonovi* **sp. nov.**, Tadshikistan, Tigrovaja Balka, (GU 22-76).

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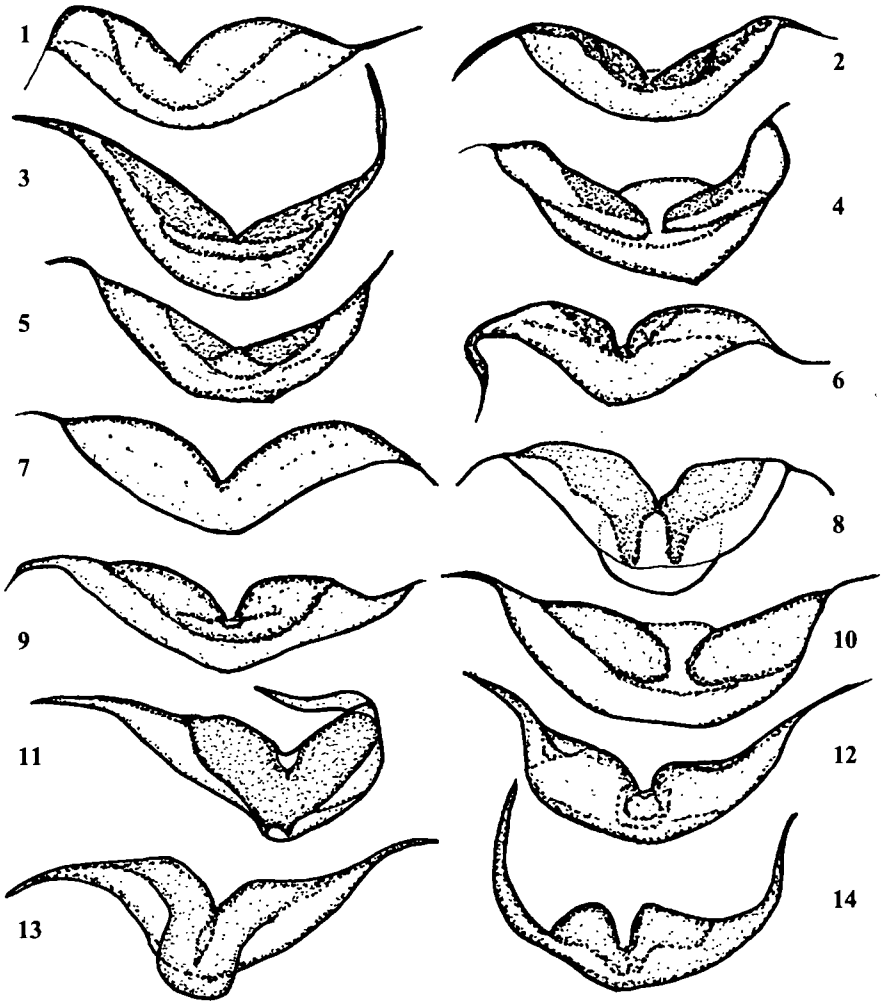

GU 2: Genitalia figures, females (ventral-plate only)
1. *Furcula bicuspis*, Finland, (GU 8-53). 2. *Furcula furcula fuscinula*, (GU 19-94). 3. *Furcula furcula pulvigera*, Kaukasus, Ossetia, (GU 21-98). 4. *Furcula furcula sangaica*, Primorye, Ussurijsk, (GU 19-93). 5. *Furcula aeruginosa aeruginosa*, Uralsk (GU 20-00). 6. *Furcula aeruginosa petri*, Kasachstan, Bakanas (GU 22-83). 7. *Furcula terminata*, Arkit (GU 22-82). 8. *Furcula bifida*, Turkey, Antalya (GU W14). 9. *Furcula interspersa*, Mauritania, Batna (GU W8). 10. *Furcula gorbunovi*, Tadshikistan, Ramit (GU 22-79). 11. *Furcula pakistana*, Swat, Miandam (GU W6). 12. *Furcula danieli*, Kopet Dagh, (GU W4). 13. *Furcula interrupta*, Turkey, Kizilcahaman (GU W3). 14. *Furcula mimonovi*, Usbekistan, Tachtakupyr, (GU 22-78).

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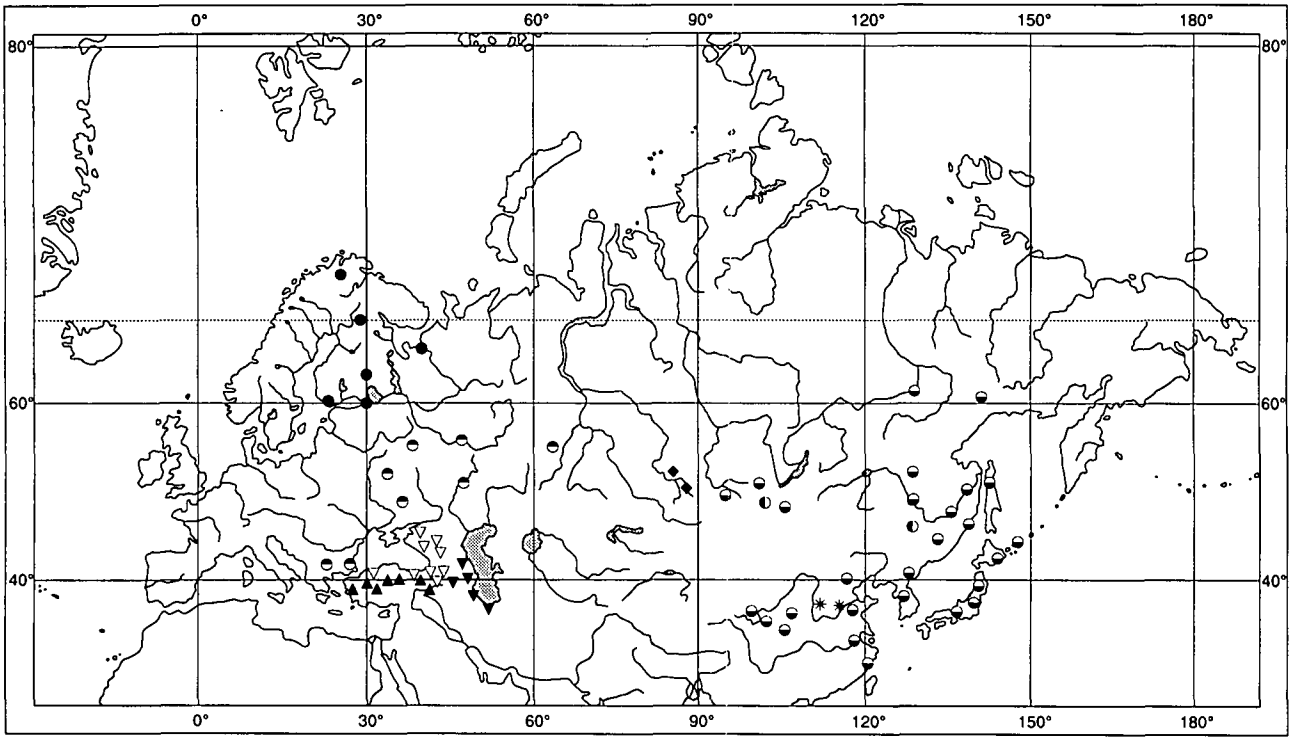

Map 1: Distribution of *Furcula furcula*

- ● *Furcula furcula ajatar* (SCHILDE, 1874)
- ▲ *Furcula furcula turcica* **ssp. nov.**
- ▼ *Furcula furcula persica* (GAEDE, 1933)
- ◒ *Furcula furcula sangaica* (MOORE, 1877)
- ✳ *Furcula furcula intercalaris* (GRUM-GRSHIMAILO, 1899)
- ◓ *Furcula furcula forficula* (FISCHER VON WALDHEIM, 1820)
- ▽ *Furcula furcula pulvigera* (STAUDINGER, 1901)
- ◆ *Furcula furcula altaica* **ssp. nov.**
- ◐ *Furcula furcula sangaica* formae

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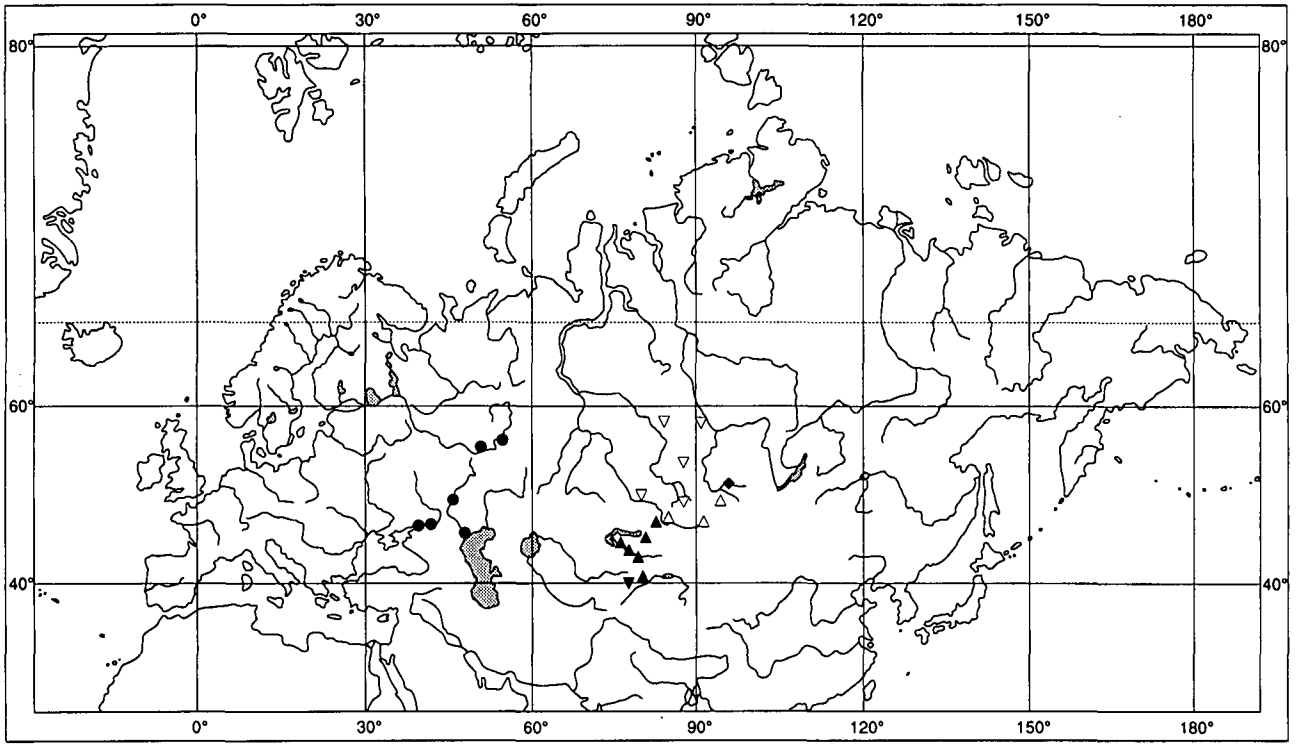

Map 2: Distribution of *Furcula aeruginosa*

- ● *Furcula aeruginosa aeruginosa* (CHRISTOPH, 1873)
- ◆ *Furcula aeruginosa mongolica/sibirica* (intermediate form)
- ▲ *Furcula aeruginosa petri* (ALPHERAKY, 1882)
- ▼ *Furcula aeruginosa ludovicior* (GAEDE, 1933)
- ▽ *Furcula aeruginosa sibirica* (DANIEL, 1965)
- △ *Furcula aeruginosa mongolica* **ssp. nov.**

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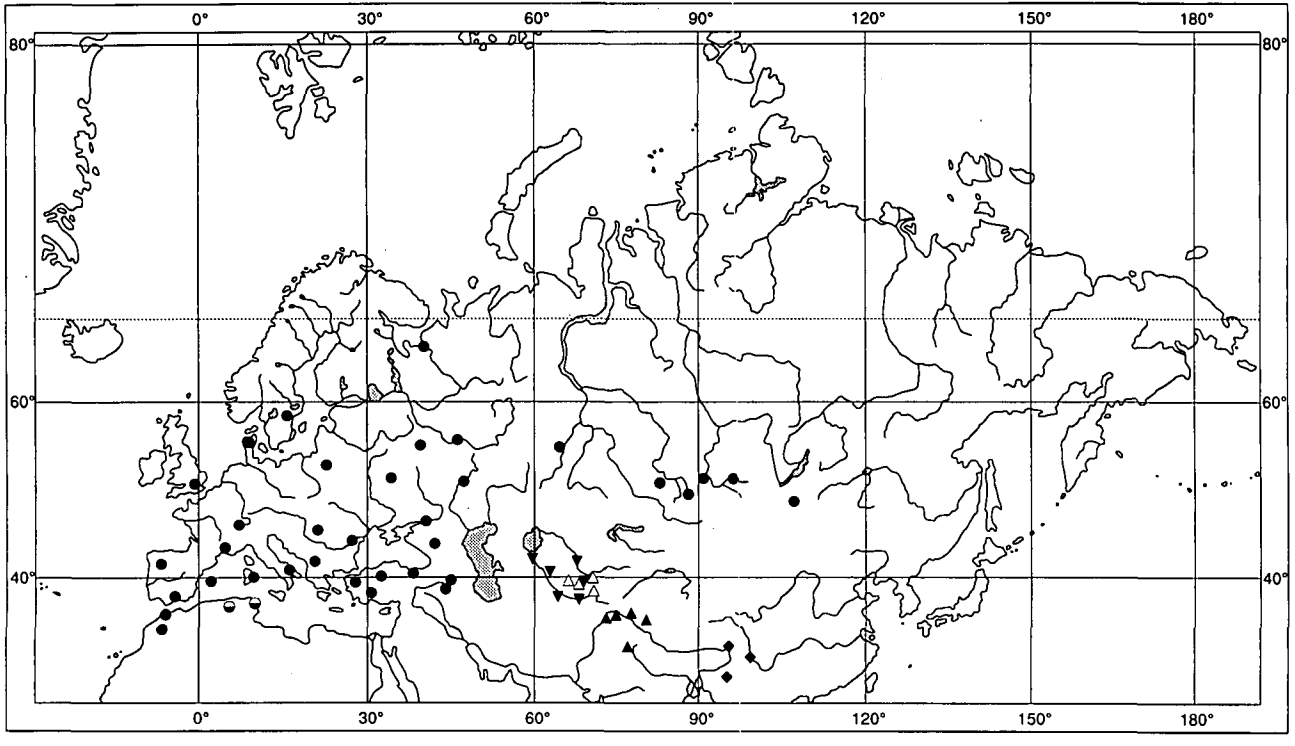

Map 3: Distribution of *Furcula bifida, interspersa, mimonovi, gorbunovi, pakistana* and *nicetia*

- ● *Furcula bifida* (BRAHM 1787)
- ▼ *Furcula mimonovi* **sp. nov.**
- ▲ *Furcula pakistana* **sp. nov.**
- ◒ *Furcula interspersa* (ROTHSCHILD, 1917)
- △ *Furcula gorbunovi* **sp. nov.**
- ◆ *Furcula nicetia* (SCHAUS, 1928)

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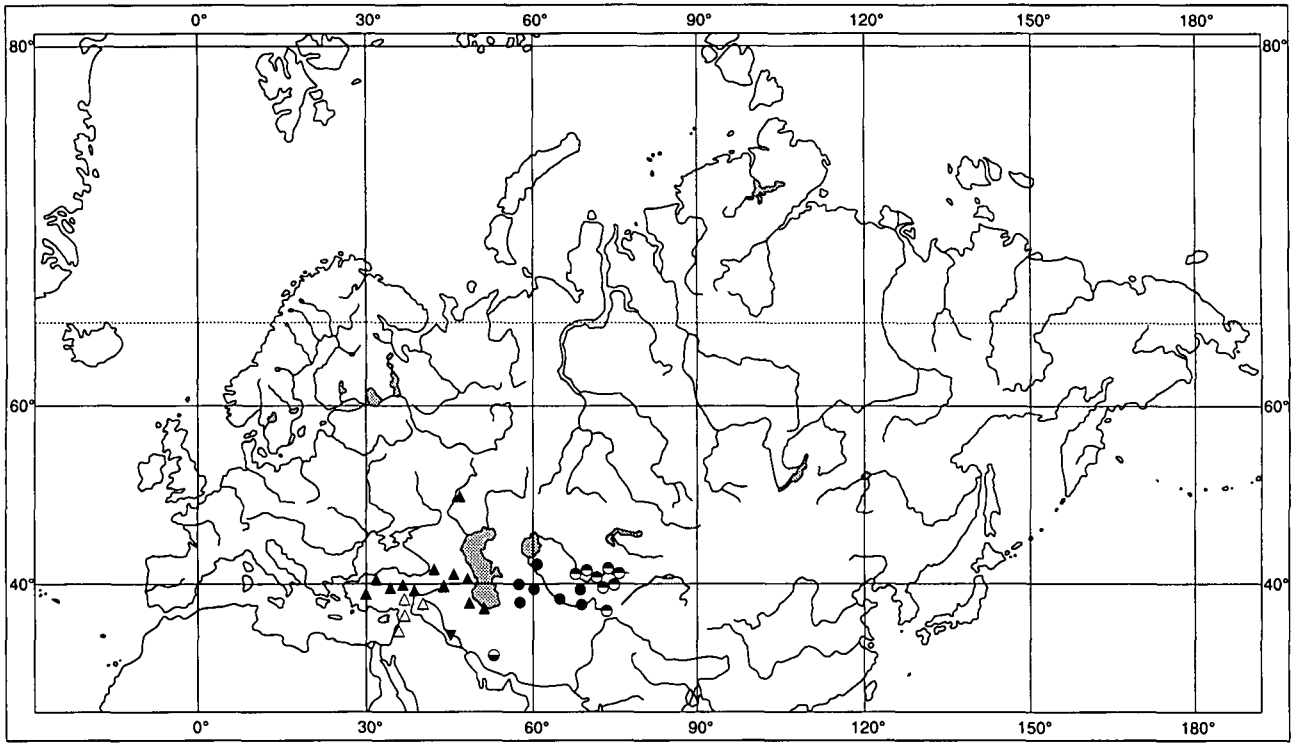

Map 4: Distribution of *Furcula interrupta, danieli, turbida* and *terminata*

▲ *Furcula interrupta interrupta* (CHRISTOPH, 1867)
▼ *Furcula interrupta clarior* (WILTSHIRE, 1943)
◒ *Furcula turbida* (BRANDT, 1938)
△ *Furcula interrupta syra* (GRUM-GRSHIMAILO, 1899)
● *Furcula danieli* **sp. nov.**
◓ *Furcula terminata* (WILTSHIRE, 1958)

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II. 9. *Furcula nicetia* (SCHAUS, 1928)
(Pl. 4: 16–18)

Diagnosis: Externally alike *bifida*, but differing in the pattern of the postmedian area which shows some very filigran marked fasciae.

The male genitalia with a valve process which is terminating unpointed and without teeth. It therefore resembles some members of the *furcula*-group.

Taxonomic note: Because of the structure of the male genitalia this species is standing between the *bifida*- and *furcula*-group.

Distribution: NE Birma, China: SW. Sichuan, NW. Yunnan.

Material: 27 ♂♂, 5 ♀♀, from Yunnan (Lijiang, A-tun-tse) and Sichuan (Wei-Si-Bahand, Ta-tsien-Lou), 25.v.–4.ix., up to 4000 m (see SCHINTLMEISTER 1989: 83 for details).

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Appendix

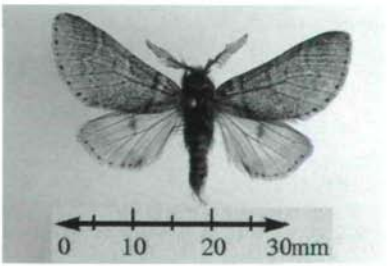
Furcula tibetana sp. nov.

Diagnosis: Forewing length in males 19–20 mm. The basal area of the forewings whitish, the groundcolour of the other part of the forewing fuscous greyish. Postbasal line marked by a thick straight black fascia. Median area blackish, outer margin near costa marked by a well developed black fascia. Black discoidal spot only weak. Postbasal, median and postmedian fasciae covered with prominent orange scales. Male genitalia similar to the species of the *furcula*-group.

Although the species resembles externally to some extent *F. nicetia*, it belongs to the group of *Furcula furcula* according to male genitalia structure. Compared with the eastern populations of *F. furcula* its wings are broader, the basal fascia is straight and the pattern of the postmedian area of the forewings is better developed. Its distribution adds to the treatment as bona species, but for fixing the taxonomic position, the female genitalia should be investigated.

Holotype ♂: China, East Tibet, Taba 3900 m, 18.vi.1996 leg. Willi FICKLER in coll. SCHINTLMEISTER, Dresden.

Paratypes: 6 ♂♂, same data as holotype (GU-30-51).



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