

The genus *Zethes*, with the description of three new taxa from Asia (Lepidoptera, Erebidae)

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Abstract. Description of one new species and two new subspecies of *Zethes* Rambur, 1833, with 24 colour illustrations and 24 genitalia figures.

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Introduction

The Palearctic taxa of the genus *Zethes* Rambur, 1833 are distributed from the Mediterranean area through Turkey, Caucasus, Near East, Azerbaijan, Iran to Central Asia (Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Pakistan). The genus is most diverse in SE Turkey and Iran.

List of the Palearctic taxa

Zethes insularis Rambur, 1833; **TL:** Corsica
Zethes narghisa Brandt, 1938; **TL:** Iran, Fort Sine-Sefid; Mian-Kotal
Zethes narghisa subrufa **subsp. n.**; **TL:** Pakistan, Waziristan
Zethes zahedanica **sp. n.**; **TL:** Iran, Baluchistan
Zethes propinquus Christoph, 1885; **TL:** Armenia, Caucasus, Lagodekhi
Zethes brandti Janzon, 1977; **TL:** Iran, Fars, Shiraz-Kazeroun road, Fort Sine-Sefid
Zethes brandti pakistana **subsp. n.**; **TL:** Pakistan, Hindukush Mts.
Zethes nemea Brandt, 1938; **TL:** Iran, Fort Sine-Sefid; Mian-Kotal
Zethes monotonus Wiltshire, 1938; **TL:** N Afghanistan, Herat, Bala Murghab
Zethes pistazina Weisert, 2000; **TL:** Kyrgyzstan, Kara-Kul, S of Arslanbab

The validity of *Z. propinquus* Christoph, 1885, which was described from Lagodekhi (Caucasus, N Armenia) in Romanoff (1885) is an unsolved problem. This species was described from one female holotype, deposited in the Museum St. Petersburg, but the abdomen now missing, and genitalia dissection is impossible. As far as author knows, this holotype is the only existing specimen of this species. Comparing the coloured illustration in Romanoff with *Z. nemea* and *Z. brandti*, it is not impossible that it can be conspecific with one of them, although the type locality of *Z. propinquus* is geographically far to the North of the two similar species. This problem has already been mentioned by previous researchers of *Zethes* (Janzon 1977, Weisert 2000). Thus *Z. propinquus* must be left as a species. Lehmann & Zahiri (2011) mention *Z. propinquus* from Armenia, Azerbaijan, Turkmenistan and N Iran (Aras river valley and near Caspian Sea), but without genitalia evidence. Because the genitalia of the type of

Z. propinquus are unknown, these data unsupported and could refer to the similar *Z. nemea* and *Z. brandti*. A female specimen and genitalia from Armenia are figured here (Figs 10, 42), as a disputable species. However, it is much darker than the type of *Z. propinquus*, figured by Romanoff (1885), and the female genitalia show more affinities to *Z. narghisa* (Figs 38–39).

There are species pairs in the genus *Zethes*, the separation of which needs careful study due to the very strong resemblance in both external features and configuration of the genitalia. One of them is *Z. insularis* Rambur, 1833 and *Z. narghisa* Brandt, 1938 species pair, which are easily separated by the external and genitalia features and distributional pattern; however *Z. narghisa* has a South Iranian (S. Zagros Mts.) form which is very like *Z. insularis* and occurs sympatrically with typical *Z. narghisa* (Figs 4–7).

The most problematic species pair is *Z. nemea* and *Z. brandti* (Figs 4–7). The two occur sympatrically in many localities and some specimens of *Z. nemea* closely resemble *Z. brandti*, and can only be separated with certainty by genitalia investigation.

The taxonomic rank of the populations of *Z. pistazina* Weisert, 2000 is also doubtful, whether it is a distinct species, a subspecies or a mere synonym of *Z. monotonus* Wiltshire, 1938. Taking into consideration the figures of the types in the original descriptions and following dissection of some specimens of both taxa by the author, no constant, significant differences in the male and female genitalia were found. Furthermore, there are monochrome and contrasting forms of both (Figs 18–24, 34–36, 45–47).

One new species and two new subspecies of *Zethes* are described here. The male and female genitalia of all the new and known taxa are figured below, even though the differences between them are mostly slight.

Abbreviations for personal and institutional collections used here: HNHM= Hungarian Natural History Museum (Budapest, Hungary); HT= holotype; PT=paratype; PGM= collection of Péter Gyulai (Miskolc, Hungary); PO= collection of Oleg Pekarsky, Budapest, Hungary); GYP= genitalia slide of P. Gyulai; OP= genitalia slide of Oleg Pekarsky; TL= type locality; m =male, f= female

Description of new taxa

***Zethes narghisa subrufa* subsp. n.** (Figs 7, 8, 28, 29)

Holotype: male (Fig. 7), Pakistan, NWFP S. Waziristan Agency, near Tanai vill., 28. VII.-12. VIII. 2005, 1500-2500 m., leg. V. Gurko, slide no. GYP 5293 (coll. PGM, later to be deposited in HNHM).

Paratypes: male, Tajikistan, S Darwaz Mts., Planj river, Raynob river valley, 1,5 km N of Zhag vill., 1057 m, 23. V. 2017, leg. B. Benedek & S. Ilniczky, (coll. PGM); female, 35 mm Tajikistan, Hissar Mts., distr. Varzob, vill. Kondara, 1150-1200 m, 4-6. V. 2012, leg. E. Rutjan (coll. PO); female, Tajikistan, prov. Khatlon, distr. Kurgan-Tube, near Sarband (=Kalininabad), 750-850 m, 17.V.2012, leg. E. Rutjan (coll. PO). slide nos. GYP 5685m, OP 1888f, OP 4921f

Diagnosis. *Zethes narghisa subrufa* subsp. n. (Figs 7, 8) is the eastern, Central Asiatic subspecies of the nominotypical *Z. narghisa* Brandt, 1938, (Figs 3–6), which occurs in SE Turkey and Iran. The new subspecies differs conspicuously from nominotypical *Z. narghisa* and all other taxa of the genus *Zethes* in the intense monochromatic reddish, violet, or pale ochre colouration in the marginal-submarginal area of all the four wings and the pale reddish colour of the underside of the wings. It also lacks (or in one of the females very pale) the light greyish, bluish-grey suffusion in the marginal-submarginal area, which is more or less typical of other *Zethes*.

The male genitalia of the new subspecies (Figs 28, 29) can be distinguished from those of the nominotypical *Z. narghisa* by the asymmetrical, long saccular extensions, of which the right one is somewhat shorter, and the smaller terminal part of the valvae. The female genitalia (Fig. 40) differ by the medially not asymmetrical, rather tubular ductus bursae.

Description. (Figs 7, 8). Wingspan 27-29 mm, length of forewing 13-15 mm. Antennae with fine whitish and brownish variegated segments, finely ciliated; third joint of palpi long, evenly thin. The vesture of the body and ground colour of the subapical patch in the forewings and basal and median area dark reddish brown on all wings, somewhat darker in the outer field; with monochromatic light reddish colouration in the marginal-submarginal area of all four wings. Orbicular and reniform stigmata dark brown, typical but tiny. Transverse lines brown; antemedian line semicircularly curved, with a fine outer ghost. The dark median field is sharply divided from the reddish subterminal area by the zigzag-arched postmedian cross-line, as typical in the genus; its shape is most like that in *Z. insularis* and *Z. narghisa* and lacks the protrusion toward the outer costa in the lower section. The curved shade running from the costa toward the termen brown. The crosslines in the hindwings dark brown, wavy-sinuuous. Cilia of all the wings brown.

Male genitalia. (Figs 28, 29). Uncus strong, curved, apically evenly pointed, slightly hooked; terminal part of the valvae enlarged, with a dorsal bifurcate prominence and a smaller, lateral, apically finely pointed process; saccular extensions very long, somewhat falciform, asymmetrical, the right one slightly shorter. Aedeagus strongly sclerotized, horse-shoe shaped, long and narrow; vesica with three membranous diverticula.

Female genitalia. (Fig. 40). Papillae anales setose, elongate, terminally angular; apophyses posteriores very long, about two times as long as apophyses anteriores. Ostium oval, antrum funnel-like with strongly sclerotized narrow edge, and angular plate, posteriorly with two elongate eversible wing-like extensions; ductus bursae tubular, appendix bursae small, not prominent; corpus bursae large, globular-ovoid, without signum.

Biology and distribution. The new subspecies is known only from Pakistan and Tajikistan; evidently local and rare.

Etymology. This subspecies is named from the intensive monochromatic light reddish colouration in the marginal-submarginal area of all the four wings mostly in the males and the pale reddish colour of the underside of the wings.

***Zethes zahedanica* sp. n.** (Figs 9, 40, 48)

Holotype: female (Fig. 9), Iran, Sistanva Baluchistan, 200 km E of Bam, 20-21. IX. 2006, leg. P. Gyulai & A. Garai, slide no. GYP 2298 (coll. PGM, later to be deposited in HHNM).

Diagnosis. *Zethes zahedanica* sp. n. is a unique species within the genus *Zethes*, because in that it has a large, conspicuous, oval white subcostal patch on the forewings; the initial section of the postmedian line is finely zigzag, the white ghost of it clearly defined. These features provide an easy distinction from the closest relative *Z. narghisa* Brandt, 1938, (Figs 3-6), which occurs in SE Turkey and western Iran, and all other taxa of the genus *Zethes*. *Z. zahedanica* is distinctive also in geographical isolation and the late flight period; it is the only species of *Zethes* found in the end of September, all other *Zethes* are on the wing in spring or early- and mid-summer, apart from the Pakistani subspecies of *Z. brandti*.

The male genitalia are unknown. The female genitalia of the new species (Fig. 40) are easily distinguished from those of all the similar, related taxa by the strongly sclerotized larger, terminally more extended, funnel-like antrum and its larger, rectangular plate and the medially broadened, oval ductus bursae with the evenly thin appendix bursae.

Description (Fig. 9). Wingspan 23 mm, length of forewing 14 mm. Antennae ochreous with fine whitish and brownish variegated segments in the initial section; third joint of palpi long, evenly pointed, thin, white. The vesture of the body and ground colour of the wings more or less dark reddish brown sparsely with fine white scales; the darkest the subapical patch and the outer field of the median area in the forewings and the median area in the hindwings. The most conspicuous features in the forewing pattern are the oval white subcostal patch on the forewings, the finely zigzag initial section of the postmedian line, with clearly defined white ghost. Antemedian line brown with fine outer whitish ghost, semicircularly curved, somewhat wavy. Orbicular and reniform stigmata obscure. The curved brown shade running from the costa toward the termen brown. Transverse lines in the hindwings brown, the



Text-fig. 1. Type locality of *Zethes zahedanica* sp. n., Iran, Sistan-va-Baluchestan

basal one the strongest, the two outer finer, with lighter outer ghost. Cilia white and brown variegated in all the wings. Underside of wings brownish, with indication of all the wing patterns, even of the orbicular and reniform stigmata, which are hardly visible on the upper side.

Female genitalia. (Fig. 40). Papillae anales setose, elongate; apophyses posteriores very long, about three times as long as apophyses anteriores; ostium oval, antrum strongly sclerotized, somewhat funnel-like, terminally extended, with broadly rectangular plate, posteriorly with two elongate eversible wing-like extensions; ductus bursae medially broadened, oval; appendix bursae small, almost evenly thin, not prominent, corpus bursae large, globular, without signum.

Male genitalia. Unknown.

Biology and distribution. *Zethes zahedanica* sp. n. is known only from the south-eastern Province of Iran, Sistan-va-Baluchistan (Text-fig. 1). It is an early autumnal species.

Etymology. *Zethes zahedanica* is named after the capital of the Province, because the type was collected travelling from Zahedan (Prov Sistan-va-Baluchistan) toward Bam city (Prov. Kerman).

***Zethes brandti pakistana* subsp. n.** (Figs 13, 14, 31, 43).

Holotype: male, Pakistan, 2450 m, Hindukush Mts., E of Teru, Samaran village, 17-18. IX. 1998, leg. P. Gyulai & A. Garai, slide no. GYP 5695 (coll. PGM, later to be deposited in HNHM).

Paratypes: one male, three females, Pakistan, Himalaya Mts., valley of Indus, between Chilas and Dassu, motel Barseen, 27-28. IX. 1998, leg. P. Gyulai & A. Garai (coll. PGM) slide nos.: 5673f, 5683f, 5684 m

Diagnosis. *Zethes brandti pakistana* **subsp. n.** (Figs 13, 14, 31, 43) is the eastern subspecies of *Z. brandti* Janzon, 1977, (Figs 11, 12, 30, 42), from which it differs in the darker brown medial area of the wings, particularly in the forewings. The correct identification is supported by the geographical isolation and the late flight period, in late September, while that of the nominotypical subspecies is May and June. The male genitalia of the new subspecies differ from the nominotypical one in the longer and stronger left and right saccular extensions, the much longer, discoidal carina plate and the much larger, longer main diverticulum of the vesica, recurved dorsad. The female genitalia of the new subspecies (Fig. 43) have more sclerotized-ribbed appendix bursae with a discoidal plate, while the appendix bursae is less sclerotized and the plate is shorter, rather semiglobular in the nominotypical subspecies; the corpus bursae of the new subspecies is about twice the size of that in the nominotypical one.

Description (Figs. 13, 14). Wingspan 23-30 mm, length of forewing 12-14 mm. The vesture of the body and ground colour of the wings more or less brownish, greyish brown, the darkest in the subapical patch and the outer field of the median area in the forewings and the median area in the hindwings. The subterminal and terminal fields in all the four wings with greyish, bluish grey suffusion. Antemedian line oblique, almost straight, postmedian line typical of the *Zethes* species, prominent then arched; both lines brown with fine outer whitish ghost. Orbicular stigma dot-like, reniform typical but small; both dark brown, obscure. The curved shade which extends from costa towards termen greyish.

Male genitalia. (Fig. 31). Uncus strong, curved, apically with a small horn; distal part of valvae enlarged, laterally strongly, asymmetrically extended (the left one larger), apically finely rounded; saccular extensions asymmetrical, the left one strong, slightly curved; the right one much longer, somewhat falciform. Aedeagus strongly sclerotized, slightly curved, with a large carinal plate, densely covered with a field of tiny cornuti; the main diverticulum of the membranous vesica a long tube, recurved dorsad.

Female genitalia. (Fig. 43). Papillae anales setose, elongate, angular; apophyses posteriores very long, about three times as long as apophyses anteriores. Antrum strongly sclerotized, circular with strongly sclerotized narrow edge, posteriorly with two elongate eversible wing-like extensions terminally; ductus bursae rugose, appendix bursae sclerotized-ribbed with a discoidal plate inside; corpus bursae large, globular, without signum.

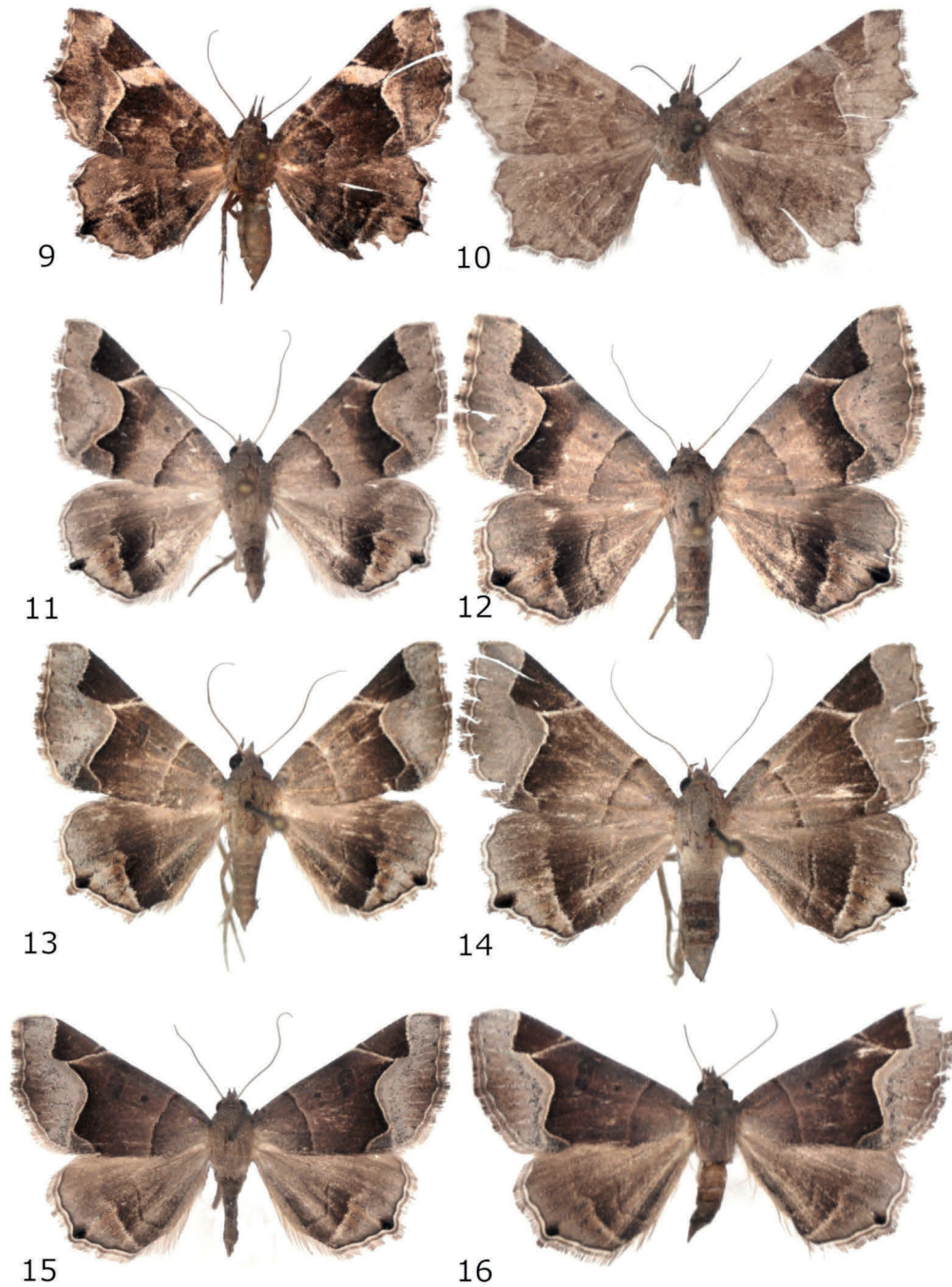
Biology and distribution. *Zethes brandti pakistana* **subsp. n.** occurs in the Pakistani Himalaya and Hindukush, at medium high elevations. Flight period early autumn.

Etymology. This new subspecies is named after its distribution.

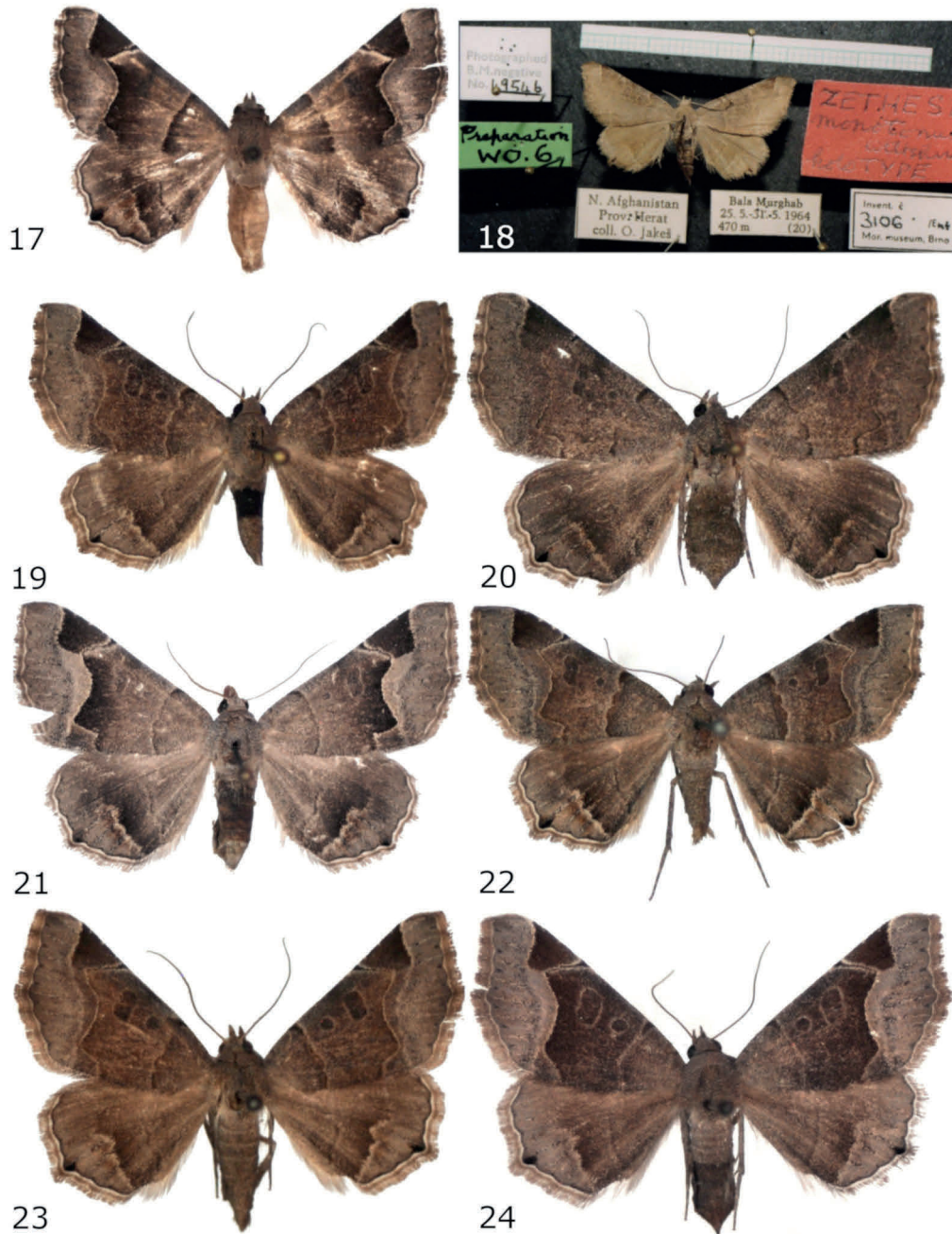
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Figs 1-8. 1. *Z. insularis* ♂, W Cyprus, Akamas paeninsula; 2. *Z. insularis*, ♀, Bulgaria, Struma v.; 3. *Z. narghisa*, ♂, Iran, Boyerahmad-va-Kohgiluyeh, SE- Zagros; 4. *Z. narghisa*, ♀, Iran, Boyerahmad-va-Kohgiluyeh, SE- Zagros; 5. *Z. narghisa*, ♂, Iran, Fars, 40 km SW of Sivand; 6. *Z. narghisa*, ♀, Iran, Fars, 5 km s of Thangebolsay; 7. *Z. narghisa subrufa* ssp. n., HT, ♂, Pakistan, NWFP S. Waziristan, GYP 5293; 8. *Z. narghisa subrufa* ssp. n., PT, ♀, Tajikistan, Hissar Mts., OP 1888.



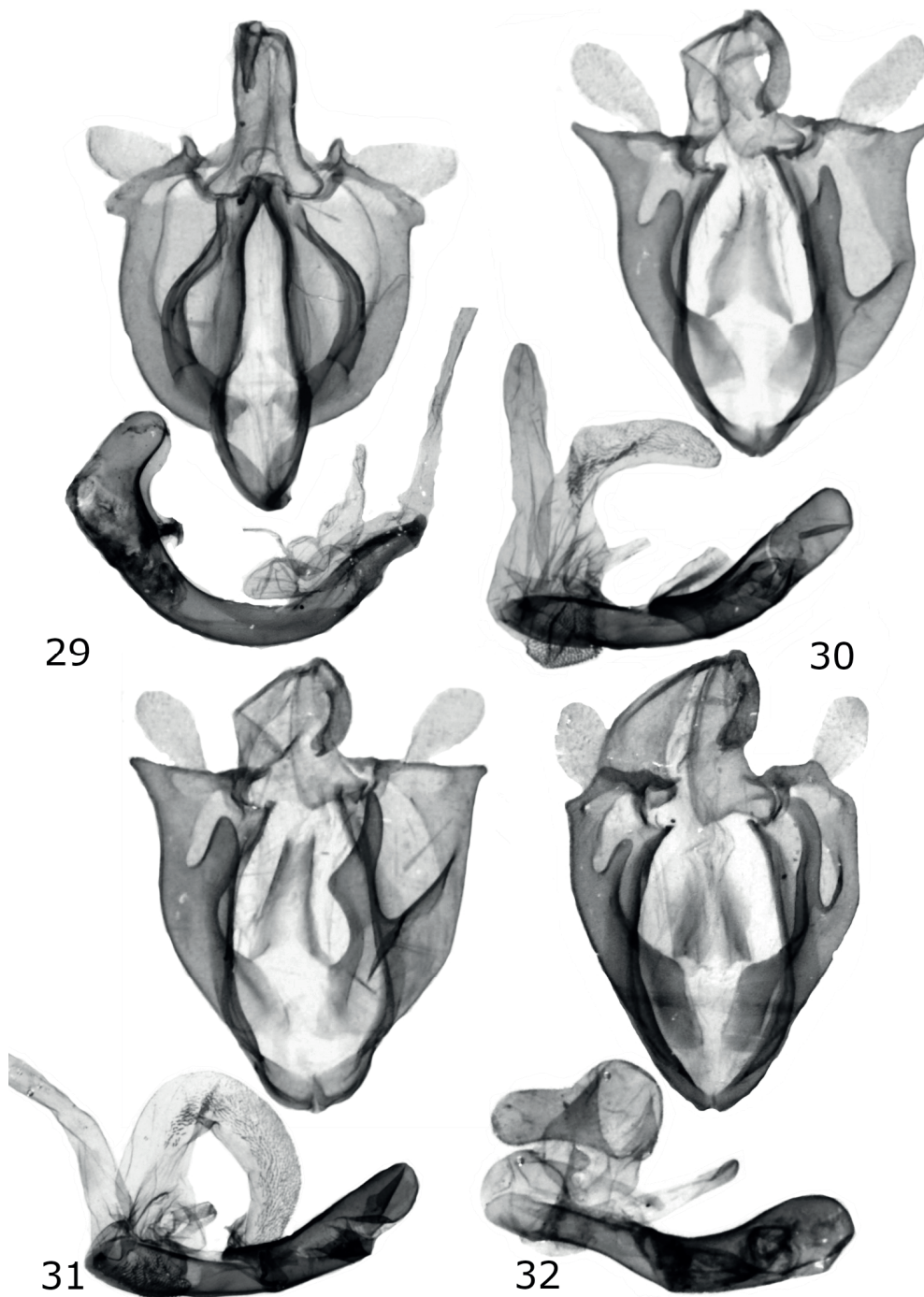
Figs 9-16. 9. *Z. zahedanica*, **sp. n.**, HT, ♀, Iran, GYP 2298; 10. *Z. sp.*, ♀, Armenia, GYP 5677; 11. *Z. brandti*, ♂, Iran, SE- Zagros; 12. *Z. brandti*, ♀, Iran, S-Zagros, 8 km NE of Thangebolhayat 13. *Z. brandti pakistana ssp. n.*, HT, ♂, Pakistan, 2450m, Hindukush Mts., GYP 5695; 14. *Z. brandti pakistana ssp. n.*, PT, ♀, Pakistan, Himalaya Mts.; 15. *Z. nemea*, ♂, Iran, Fars, Zagros Mts.; 16. *Z. nemea*, ♀, Iran, Fars, Zagros Mts., GYP 5691.



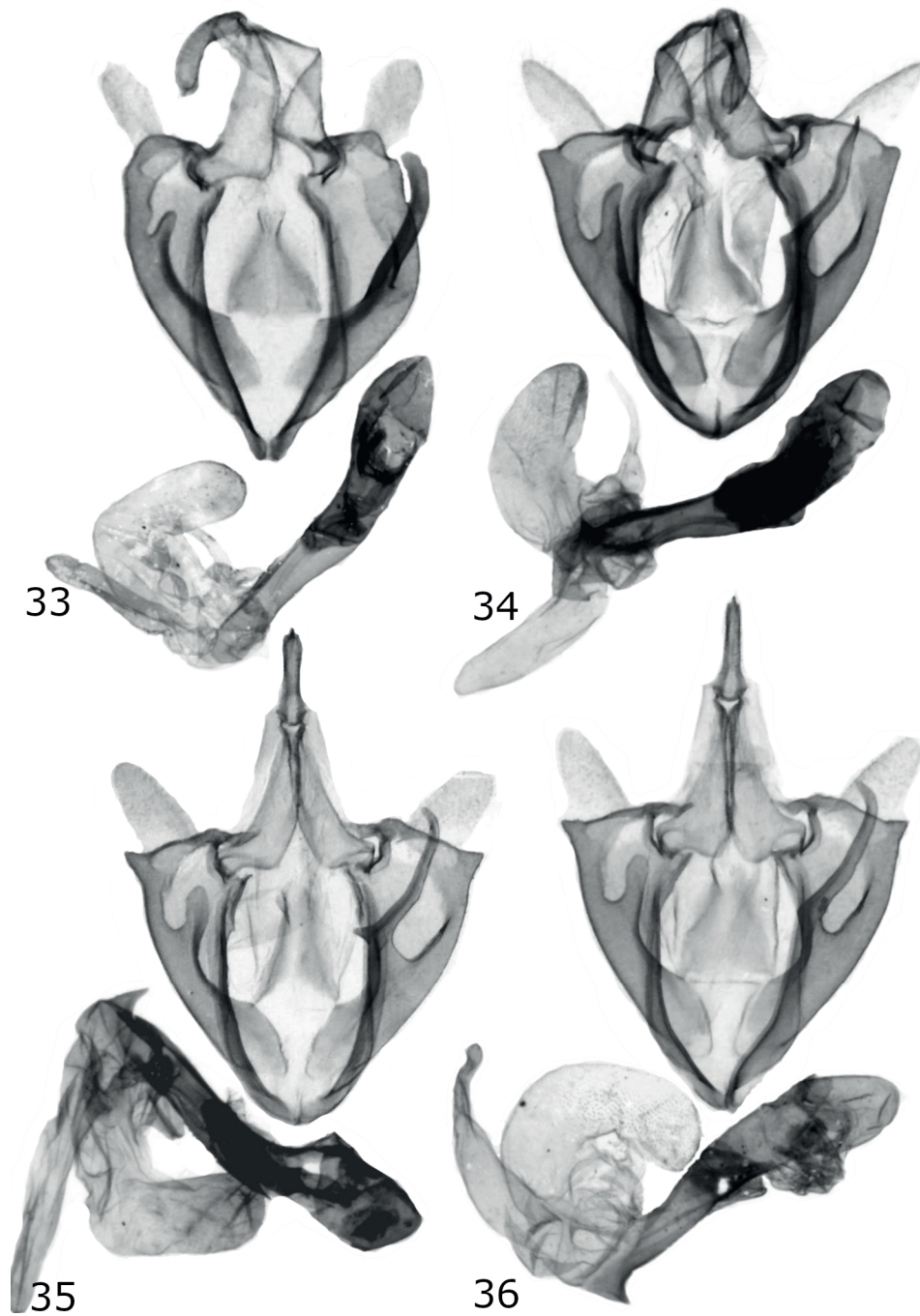
Figs 17–24. 17. *Z. nemea*, ♂, Iran, Khorasan-e-Jonoubi, Birjand, GYP 5696; 18. *Z. monotonus*, HT, ♂, Aghanistan, Herat; 19. *Z. monotonus*, ♂, Tajikistan, Khation, Vakhs; 20. *Z. monotonus*, ♀, Tajikistan, Khation, Vakhs, GYP 5690; 21. *Z. monotonus*, ♀, Tajikistan, Khation, Vakhs; 22. *Z. pistazina*, paratype, Kyrgyzstan, Kara-Kul, GYP 5681; 23. *Z. pistazina*, ♂, Tajikistan, 50 km W Kurgan Tyube, Babadag Mts, GYP 5686; 24. *Z. pistazina*, ♀, Tajikistan, 50 km W Kurgan Tyube, Babadag Mts.



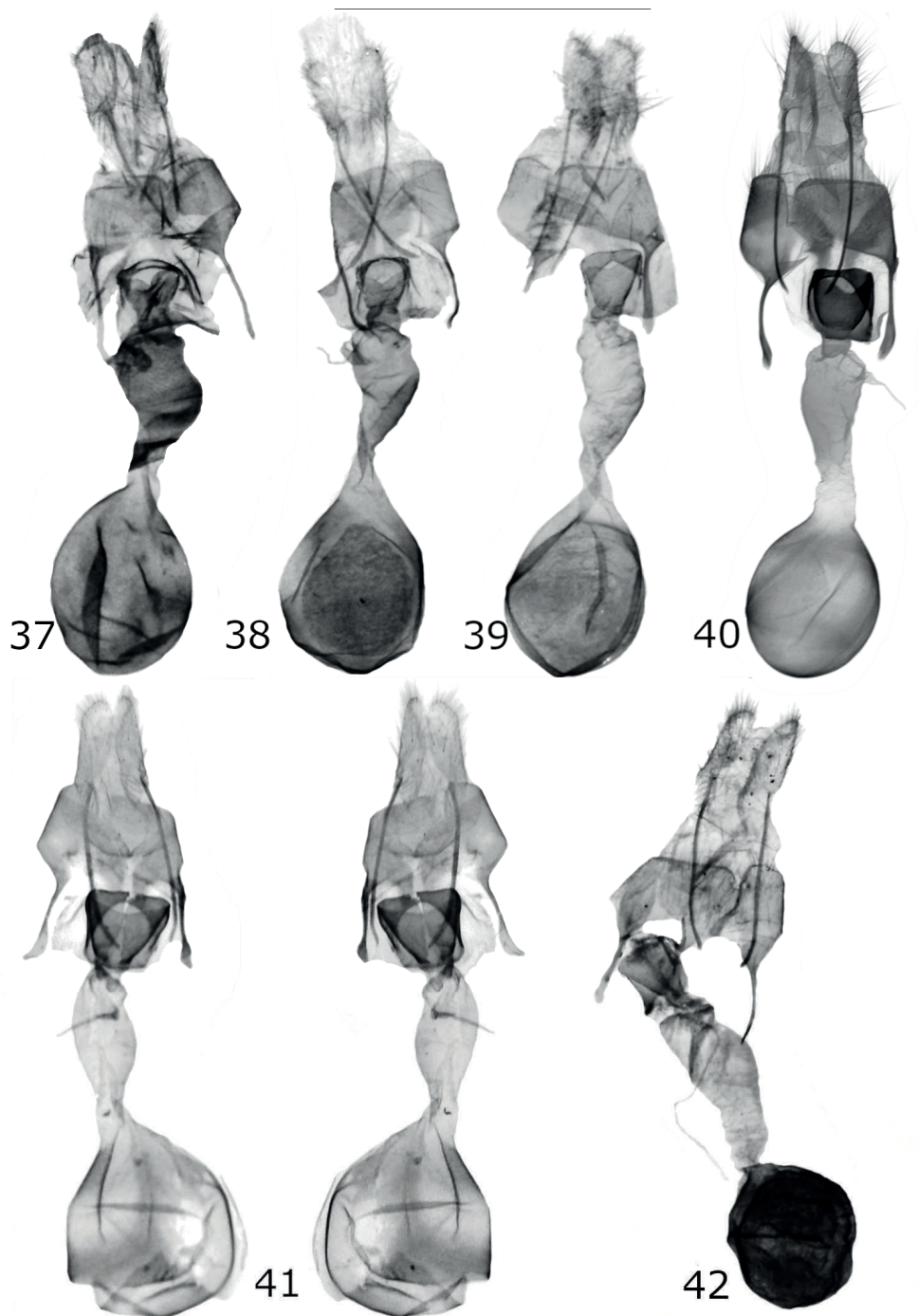
Figs 25–28. 25. *Z. insularis*, Bulgaria, Struma v., GYP 5689; 26. *Z. narghisa*, Iran, Boy-
erahmad, GYP 5676; 27. *Z. narghisa*, Iran, Fars, GYP 5698; 28. *Z. narghisa subrufa* **ssp. n.**,
HT, Pakistan, Waziristan, GYP 5699.



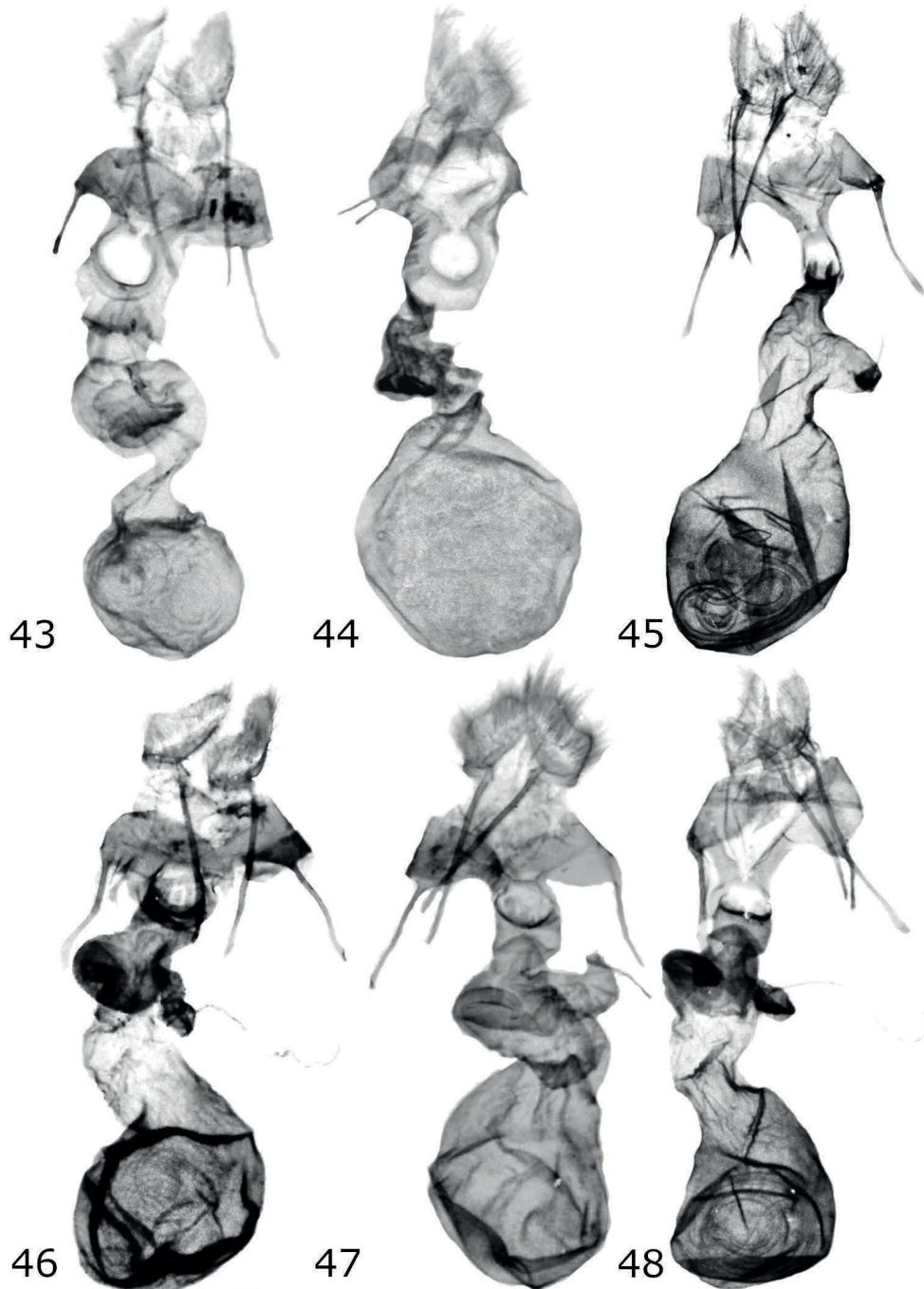
Figs 19–32. 29. *Z. narghisa subrufa* **ssp. n.**, PT, Tajikistan, S Darvaz, GYP 5685; 30. *Z. brandti*, Iran, Fars, GYP 5694; 31. *Z. brandti pakistana* **ssp. n.**, HT, Pakistan, Hindukush, GYP 5695; 32. *Z. nemea*, Iran, Fars, GYP 5692.



Figs 33–36. 33. *Z. nemea*, Iran, Khorasan, GYP 5696; 34. *Z. monotonus*, Tajikistan, Darvaz, GYP 5682; 35. *Z. pistazina*, paratype, Kyrgyzstan, Karakul, GYP 5681; 36. *Z. pistazina*, Tajikistan, Vakhs, GYP 5686.



Figs 37–42. 37. *Z. insularis*, Bulgaria, Struma v., GYP 5688; 38. *Z. narghisa*, Iran, Fars, GYP 5700; 39. *Z. narghisa*, Iran, Fars, GYP 5701; 40. *Z. narghisa subrufa* **ssp. n.**, PT, Tajikistan, Hissar Mts., OP 1888; 41. *Z. zahedanica* **sp. n.**, HT, Iran, Baluchestan, GYP 2298, dorsal and ventral view; 42. *Z. sp.*, Armenia, Megri, GYP 5677.



Figs 43–48. 43. *Z. brandti*, Iran, Fars, GYP 5675; 44. *Z. brandti* ssp. n., PT, Pakistan, Himalaya, GYP 5683; 45. *Z. nemea*, Iran, Fars, GYP 5691; 46. *Z. monotonus*, Tajikistan, Vakhs, GYP 5690; 47. *Z. pistazina*, Kyrgyzstan, Ferganski basin, GYP 5697; 48. *Z. pistazina*, Tajikistan, Babadag, GYP 5674.

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