

New species for the fauna of Europe after publication of the previous volumes

In this section we present 21 new species for the fauna of Europe, discovered after the publication of the related GME volume (HAUSMANN 2001; MIRONOV 2003; HAUSMANN 2004; HAUSMANN & VIIDALEPP 2012; SKOU & SIHVONEN 2015). A few of them have been described as new to science (improved taxonomy), others are new to the fauna of Europe (described earlier and later found in Europe). In eleven additional chapters important taxonomic changes are briefly mentioned and explained.

Updated species lists for the six GME Volumes:

GME1 (Archiearinae to Geometrinae), HAUSMANN 2001: Three new species recorded here, three species (*Alsophila*, *Epirranthis*) moved to Ennominae (actual total: 42).

GME2 (Sterrhinae), HAUSMANN 2004: Seven new species recorded here, four species (*Lythria*) added in Vol. 3 – one species now synonymized (actual total: 206).

GME3 (Larentiinae I), HAUSMANN & VIIDALEPP 2012: One new species recorded here, four species (*Lythria*) belonging to Sterrhinae (actual total 265).

GME4 (Larentiinae II), MIRONOV 2003: Eight new species recorded here (actual total 159).

GME5 (Ennominae I), SKOU & SIHVONEN 2015: Two new species recorded here, three species (*Alsophila*, *Epirranthis*) added from Vol. 1 (actual total 146).

GME6 (Ennominae II): present volume: 181 species.

With these new faunistic records and improved taxonomy, the number of European geometrid species is raised to 999 (cf. summary to the complete checklist in this volume).

Archiearinae

Leucobrephos GROTE, 1874

Leucobrephos GROTE, 1874: Bull. Buffalo Soc. Nat. Sci. 2: 53. Type species: *Anarta brephoides* WALKER, 1857 by original designation (Canada).

EXTERNAL CHARACTERS AND ABDOMEN: Ground colour of hindwing whitish or pale grey. Antennae shortly bipectinate in male, filiform in female. Palpi long, palpi and head densely covered with hairy scales. Abdomen densely covered by long, bifurcate scales dorsally and laterally. Tympanum with ansa broad at base, conically narrowing towards tip.

MALE GENITALIA: Gnathos present, weak. Socii absent. Valva long, narrow, curved. Aedeagus without cornuti.

FEMALE GENITALIA: Papillae anales with fine setae and apophyses anteriores long as in *Boudinotiana* (thus unlike *Archiearis*). Ductus bursae and posterior part of corpus bursae narrow, long. Signum round.

HABITAT: Associated with cold habitats in polar tundra and mountainous valleys with river-side vegetation.

REMARKS: Two species in the northern parts of the Holarctic region. In multi-gene analysis *Leucobrephos* is the most basal Archiearinae taxon, sister to *Boudinotiana* + *Archiearis* lineage (MURILLO-RAMOS et al. 2019).

182. *Leucobrephos middendorffii* (MÉNÉTRIÉS, 1858)

Amphidasis middendorffii MÉNÉTRIÉS, 1858: Bull. classe phys.-mat. Acad. impériale Sci. St.-Pétersbourg 17 (12–14): 221 (eastern Russia, eastern Siberia: Udscoe; Vilui). Lectotype ♂ (ZISP, designated by V. MIRONOV, examined).

Brephos ussuriensis MOLTRECHT, 1914: Ezheg. gosud. Muz. N.M. Mart'yanova 2 (1): 73 (eastern Russia, Ussuri Region: 300 km north of Vladivostok). Syntypes 5♂. Validated at subspecies rank (SCOBLE 1999), but the type locality relatively close to that of the nominotypical subspecies suggesting potential synonymy.

Leucobrephos middendorffii nivea KOZHANTSCHIKOV, 1924: Ent. Rd.sch. 31 (6): 34 (central Russia, Sajon region: River Tansybei). Syntype(s). Valid at subspecies rank (SCOBLE 1999).

Leucobrephos mongolicum VOJNITS, 1977: Ann. hist.nat. Mus. natn. Hung. 69: 166 (Mongolia: Chentej Aimak Aduen). Validated at species rank (SCOBLE 1999), recently downgraded to synonymy (BELJAEV 2016).

Unavailable names: (incorrect subsequent spelling): *middendorffii*: MÉNÉTRIÉS (1859), followed by LERAUT (2009).

EXTERNAL CHARACTERS AND ABDOMEN: Wingspan ♂ 25–28 mm, ♀ 24–25 mm. Female forewing shorter than that of male, at apex more rounded. Ground colour of forewing dark grey, of hindwing whitish. Forewing with blackish ante- and postmedial lines. Postmedial line zig-zagging and projecting towards termen in centre, distally bordered by whitish or ochreous fascia. Terminal area dark. Hindwing with broad, black band at termen and at inner margin. Underside of forewing dark grey, with much broader postmedial fascia than on upper-side, with small rectangular spot subapically on costa. Hindwing as described for upperside. Fringe weakly chequered white and grey. Female with ground colour of forewing grey, paler than in male, ante- and postmedial lines well contrasted. Hindwing pattern as in male but ground colour with stronger dark suffusion. Eyes small, vertically elongate, tapering ventrally. Antennae of ♂ shortly bipectinate, in ♀ filiform, flagellum black, each flagellomere with white scales, appearing slightly lamellate. Palpi long, palpi and head densely covered with hairy scales.

VARIATION: Varying in the width of the blackish terminal area of hindwing, and in the density of the dark suffusion along the inner margin of hindwing.

MALE GENITALIA: Uncus short and broad, triangular. Gnathos present, weakly sclerotized. Socii absent. Saccus broadly rounded. Juxta large, trapezoid, posteriorly with short projection. Valva long, narrow, strongly curved in distal third. Aedeagus narrow, curved, without cornuti. Everted vesica showing minute spinules at base.

FEMALE GENITALIA: Papillae anales with fine setae. Apophyses anteriores comparatively stout, long (1.0 mm), 2/3 length of apophyses posteriores. Tergum A8 trapezoid. Sternum A7 (lamella antevaginalis) a comparatively broad band. Ductus bursae and posterior part of corpus bursae narrow, long, longitudinally wrinkled, antrum dilated funnel-shaped, more strongly sclerotized. Anterior part of corpus bursae oval. Signum at dorsal side of corpus bursae, round, with shallow, sclerotized teeth at anterior margin.

DISTRIBUTION AND ABUNDANCE: Siberian. In Europe single specimens recorded in the Polar Urals (K. NUPPONEN pers. comm.). – Very rare and local in Europe. – Outside Europe in northernmost Asia (Siberia) to Far East Russia. In North America replaced by the allopatric sister species *L. brephoides* (WALKER, 1857).

PHENOLOGY: Univoltine, scarce data from late April to mid-May. Adults active during day-time, starting to fly when ground is still covered by snow (K. NUPPONEN pers. comm.).