

Taxonomic notes on Oriental Hesperiidæ, 4. A key to the continental species of *Baoris* MOORE, [1881] and *Caltoris* SWINHOE, 1893, based on the female genitalia

(Lepidoptera, Hesperiidæ)

by

ALEXEY L. DEVYATKIN

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Summary: A key to the continental species of the genera *Baoris* MOORE, [1881] and *Caltoris* SWINHOE, 1893 is presented, based solely on the characters of the ♀ genitalia and aimed to make possible identification of any ♀ specimen belonging to these genera irrespective of its external condition.

The identification of ♀ specimens of the genera *Baoris* MOORE, [1881] and *Caltoris* SWINHOE, 1893 has always posed some problems, even to skilled researchers. The ♀♀ of both genera are sometimes much alike, being at the same time even more variable than the ♂♂ in the respect of the size and spotting pattern. The available keys to the species (EVANS, 1949; CORBET & PENDLEBURY, 1992) are based only on the external characters and genitalia of the ♂♂; the ♀ genitalia never have been studied.

Examination of numerous ♀ specimens, mostly from Vietnam and the collections of the Natural History Museum (London) allowed to reveal good diagnostic characters of the genitalia which make possible identification of species irrespective of the condition of the external features. These are the shape and size of the postvaginal plate (PPL), the shape and length of the distal projections of the lateral lobes (LL) of the antevaginal plate and partly the structure of the sclerotized ductus bursae (fig. 1).

The key below is confined to the continental species, of which only one, viz. *Caltoris septentrionalis* KOIWAYA, 1995 (a single ♂ from Shaanxi, China, is known), is missing; the treatment of the island taxa, some of them very peculiar, is a matter of a full revision.

Abbreviations: LL - lateral lobes of the antevaginal plate; PPL - postvaginal plate

1 (10) LL wide, weakly differentiated, somewhat angled or rounded distally, the area between them membranous; PPL rounded, oval or roughly triangular, always produced much further than the distal side of LL (*Baoris* MOORE)

2 (5) Distal part of PPL rounded; distal side of LL wide, with 2 rounded angles.

3 (4) PPL rounded oval (fig. 2 A) *B. leechii* (ELWES & EDWARDS, 1897)

4 (3) Proximal part of PPL wider than distal part and almost straight (fig. 2 B)
..... *B. penicillata* MOORE, [1881]

5 (2) PPL distally tapered or pointed.

6 (7) PPL looks more oval than triangular, distally tapered but not pointed. LL distally rounded-angled (fig. 2 C) *B. oceia* (HEWITSON, [1868])

7 (6) PPL roughly triangular-shaped, distally pointed.

8 (9) PPL shaped as a stout triangle, with its lateral sides convex, rather weakly and uniformly sclerotized, central part covered with microtrichia. LL distally broadly rounded or almost flat, with

- 2 unclear rounded angles. Ductus bursae rather short, only slightly longer than LL+PPL (fig. 2 D) *B. farri* (MOORE, 1878)
- 9 (8) PPL shaped as a long triangle, with its lateral sides concave near base which is wing-like widened; central part strongly sclerotized. LL distally acutely angled. Ductus bursae very long, about 1 ½ times longer than LL+PPL (fig. 2, E) *B. pagana* (DE NICEVILLE, 1887)
- 10 (1) LL with distal projections of different length and shape; the area between LL more or less sclerotized; PPL of a different (sometimes complex) shape, never being rounded or oval (*Caltois* SWINHOE)
- 11 (12) PPL very large, trapezium-shaped, almost rectangular. LL projections very slender, 6-7 times narrower than PPL (fig. 3, A) *C. aurociliata* (ELWES & EDWARDS, 1897)
- 12 (11) PPL distally rounded, triangular or of a complex shape, never rectangular.
- 13 (28) LL projections very much produced beyond PPL, roughly parallel-sided or slightly expanded at ends. PPL distally not acute or, if so, the width of LL projections comparable to that of PPL.
- 14 (17) PPL distally acute. LL projections only slightly (at most 1 1/2 times) narrower than PPL.
- 15 (16) PPL transversal, trilobate, the central lobe being acute and the lateral ones rounded or almost rectangular. LL projections rather broad, distally obliquely rounded, laterally indented (fig. 3 B) *C. brunnea caere* (DE NICEVILLE, 1891)
- 16 (15) PPL longitudinal, simple, proximally rounded or almost rectangular, distally acute. LL projections rather narrow, sometimes slightly expanded, rounded, gently angled or almost flat at ends (fig. 3 C) *C. sirius* (EVANS, 1926)
- 17 (14) Distal side of PPL rounded, flat or concave, never acute. LL projections in most cases narrower than PPL.
- 18 (21) PPL distally rounded.
- 19 (20) LL projections almost as wide as PPL (fig. 3, D) ... *C. canaraica* (MOORE, [1884])
- 20 (19) LL projections about twice narrower than PPL (fig. 3 E) *C. tenuis* EVANS, 1932
- 21 (18) PPL distally concave, excavate at the middle or almost flat, its sclerotized central part usually with acute outer angles.
- 22 (23) PPL with an additional strong and rounded ventral lobe (well seen in lateral view) (fig. 3 F) *C. bromus* LEECH, 1893
- 23 (22) PPL simple, without additional lobe.
- 24 (25) Distal side of PPL almost flat; LL projections short and broad, as wide as PPL, distally widely blunted (fig. 3 G) *C. malaya* (EVANS, 1926)
- 25 (24) Distal side of PPL concave or conspicuously excavate; LL projections long and narrow, distally rounded.
- 26 (27) PP shallowly excavate at the middle; LL projections about twice narrower than PPL (fig. 3 H) *C. confusa* (EVANS, 1932)
- 27 (26) PPL distally concave, with its outer angles acute; LL projections only slightly narrower than PPL (fig. 3 I) *C. kumara moorei* (EVANS, 1926)
- 28 (13) LL projections not or only slightly produced beyond the end of PPL.
- 29 (30) PPL distally concave, wider than the adjacent part of LL projections (fig. 3 J) *C. philippina* (HERRICH-SCHÄFFER, 1869)
- 30 (29) PPL distally acute.
- 31 (32) Medial field between LL (from PPL to ostium) parallel-sided, strongly sclerotized, with a double central fold. LL projections very slender, at least 2 times narrower than PPL (fig. 3 K) ... *C. cahira austeni* (MOORE, [1884])

- 32 (31) Medial field extended and rounded before ostium, uniformly (usually weakly) sclerotized. LL projections broad.
- 33 (34) PPL transversal, with lateral wings, its central part sharply pointed and strongly sclerotized. LL projections slightly narrower than PPL (fig. 3 L) *C. cormasa* (HEWITSON, 1876)
- 34 (33) PPL strongly longitudinal, acutely triangular. LL projections much wider than PPL.
- 35 (36) PPL not much (at most twice) narrower than LL projections. Ductus bursae $1\frac{1}{2}$ - 2 times longer than PPL (fig. 3, M) *C. plebeia* (DE NICÉVILLE, 1887)
- 36 (35) PPL very narrow, almost needle-like distally, several times narrower than LL projections. Ductus bursae very short, only slightly longer than PPL (fig. 3, N) *C. tulsi* (DE NICÉVILLE, [1884])

The ♀ genitalia are rather similar in all species of the genus *Baoris*, except *B. pagana* (DE NICÉVILLE) which looks somewhat transitional to the genus *Caltoris*, this being confirmed by the genitalia and external characters of the male, which are different from those of other *Baoris* species. It is rather difficult to define species-groups in the genus *Caltoris*, due to great variety of the genitalia. *C. aurociliata* (ELW. & EDW.) and *C. brunnea* Author definitely represent separate groups. Other species demonstrate different kinds of transitions, except *C. plebeia* (DE NICÉVILLE) and *C. tulsi* (DE NICÉVILLE) which are similar to each other in some characters of the genitalia and also show similarity to a representative of another genus, viz. *Baoris pagana* (DE NICÉVILLE).

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Address of the author

Dr. ALEXEY L. DEVYATKIN
Department of Entomology
Faculty of Biology
Moscow State University
119992 Moscow, Russia

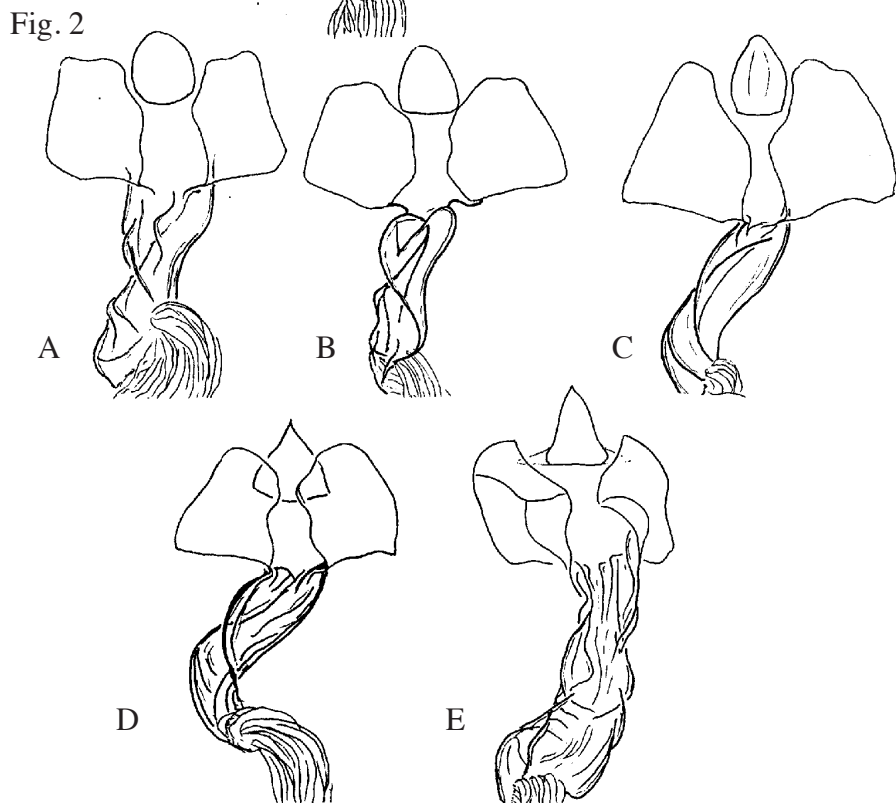
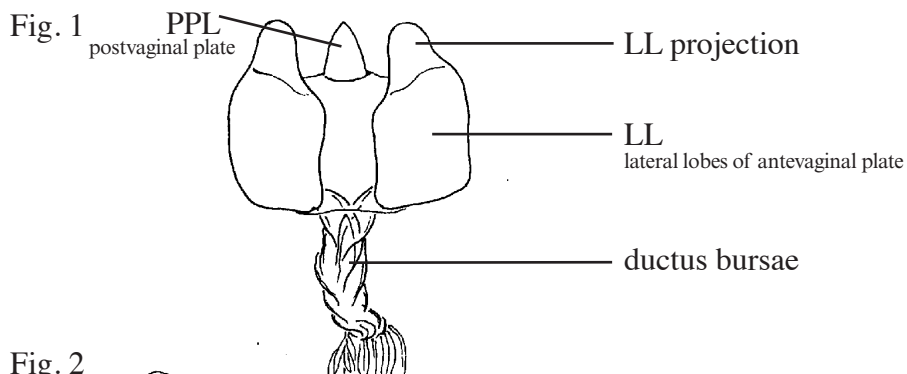


Fig. 1: General scheme of the ♀ genitalia of *Baoris* MOORE, [1881] and *Caltoris* SWINHOE, 1893, without papillae anales and bursa copulatrix.

Fig. 2: The ♀ genitalia of the genus *Baoris* MOORE, [1881]: A - *B. leechii* (ELWES & EDWARDS, 1897); B - *B. penicillata* MOORE, [1881]; C - *B. oceia* (HEWITSON, [1868]); D - *B. farri* (MOORE, 1878); E - *B. pagana* (DE NICEVILLE, 1887).

Fig. 3

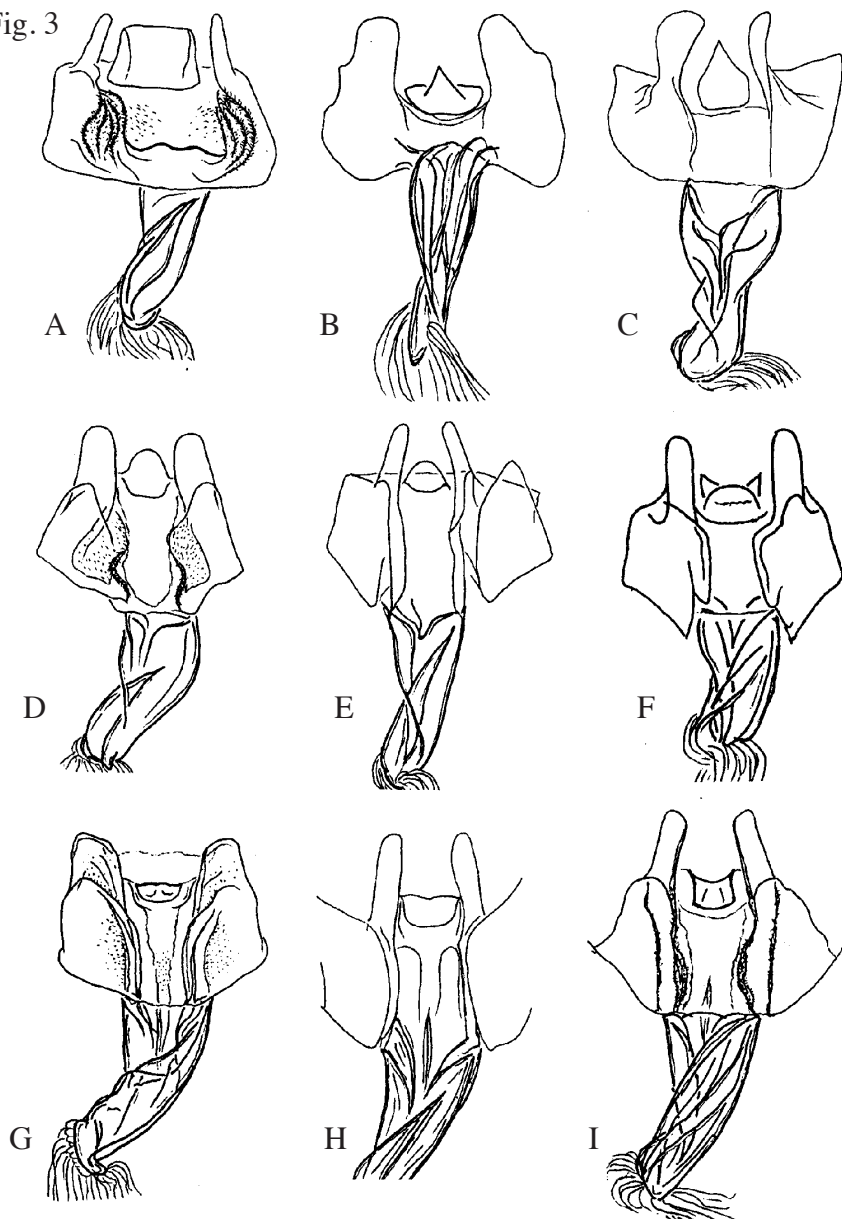


Fig. 3. The ♀ genitalia of the genus *Caltoris* SWINHOE, 1893: A - *C. aurociliata* (ELWES & EDWARDS, 1897); B - *C. brunnea caere* (DE NICÉVILLE, 1891); C - *C. sirius* (EVANS, 1926); *C. canarica* (MOORE, [1884]); E - *C. tenuis* EVANS, 1932; F - *C. bromus* LEECH, 1893; G - *C. malaya* (EVANS, 1926); H - *C. confusa* (EVANS, 1932); I - *C. kumara moorei* (EVANS, 1926).

Fig. 3

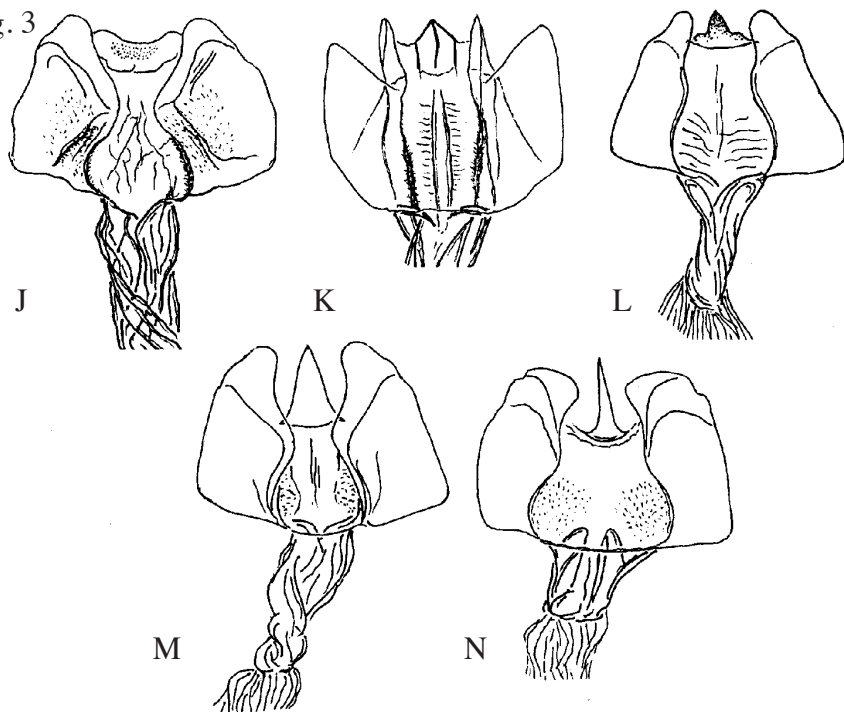


Fig. 3. The ♀ genitalia of the genus *Caltoris* SWINHOE, 1893: J - *C. philippina* (HERRICH-SCHÄFFER, 1869); K - *C. cahira austeni* (MOORE, [1884]); L - *C. cormasa* (HEWITSON, 1876); M - *C. plebeia* (DE NICÉVILLE, 1887); N - *C. tulsi* (DE NICÉVILLE, [1884]).

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Autor(en)/Author(s): Devyatkin Alexey L.

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