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MORPHOLOGICAL CHARACTERISTICS OF MALE GENITALIA IN SOME SPECIES OF THE GENUS *EURYTOMA* (EURYTOMIDAE, HYMENOPTERA)

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Morphological Characteristics of Male Genitalia in Some Species of the Genus *Eurytoma* (Eurytomidae, Hymenoptera). Klymenko S. I. — Based on the analysis of morphological characteristics of related species of the genus *Eurytoma,* several groups of cryptic species poorly distinguishing by external morphology, but clearly confined to certain hosts are shown to have morphological differences of male genitalia that are highly species-specific and can be useful for identification of cryptic species of the genus *Eurytoma* (*E. rosae* Nees, *E. strigifrons* Thomson, and *E. jaceae* Mayr species complexes).

Key words: Hymenoptera, Eurytomidae, *Eurytoma,* genitalia, phallobase.

Морфологические особенности генитального аппарата самцов некоторых видов рода *Eurytoma* (Eurytomidae, Hymenoptera). Клименко С. И. — В результате анализа морфологических особенностей близких видов рода *Eurytoma* обнаружено несколько групп криптических видов, которые плохо различаются по признакам внешней морфологии, однако четко приурочены к определенным хозяевам. Все эти группы видов находяться в пределах рода *Eurytoma* (Eurytomidae). Нами проведено исследование этих видов по особенностям генитального аппарата самцов как признака, который является высоко видоспецифическим и может способствовать определению близких видов рода *Eurytoma* (видов близких к *E. rosae* Nees, видов близких к *E. strigifrons* Thomson и видов близких к *E. jaceae* Mayr).

Ключевые слова: генитальный аппарат, фаллобаза, *Eurytoma, E. strigifrons, E. rosae, E. jaceae.*

Claridge and Askew (1960) established for the first time that the genus *Eurytoma* includes groups of closely related species poorly distinguishing by their external morphology, but clearly confined to certain hosts. These authors studied the complex of species similar to *E. rosae* Nees, 1834, and showed that *E. rosae* and *E. brunniventris* Ratzeburg, 1852 are related very closely, and belong to the species complex also including of 6 species: *E. rosae*, *E. brunniventris, E. hypochoeridis* Claridge, 1960*, E. centaureae* Claridge, 1960, *E. curculionum* Mayr, 1878*, E. aciculata* Ratzeburg, 1854.

Later, other researchers faced this problem, in particular Domenichini (1960) who tried to use characteristics of male genitalia in description of *E. rosae* and *E. brunniventris*. However, according to drawings, Domenichini studied only the distal part of genitalia of those two species. We advanced a little and studied all the structures of *E. rosae* and *E. brunniventris* male genitalia, as well as other related species: *E. hypochoeridis* and *E. caninae* Lotfalizadeh et Delvare, 2007. We established that *E. rosae* have the phallobase closed, 2 large sharp hooks and 3 small indents at the bases of hooks on digital sclerites; and *E. brunniventris* has the phallobase opened, digital sclerites with 2 long hooks and without indents (table 1). As we can see, *E. rosae* and *E. brunniventris* have different structure of phallobase and digital sclerites. By the structure of male genitalia, *E. rosae* is clearly differs from *E. hypochoeridis*, which also has closed phallobase, but the shape of digital sclerites and their indents are entirely different (fig. 1, *1, 3*).

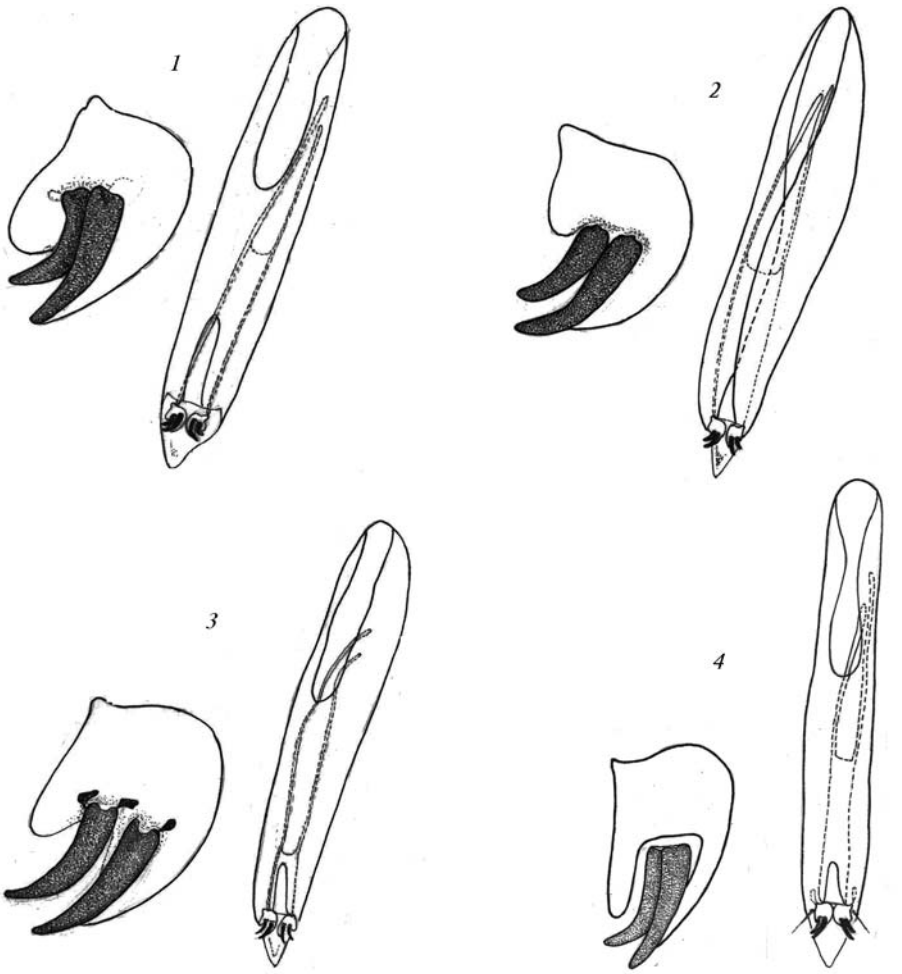

Fig. 1. Male genitalia: *1 — E. hypochoeridis*; *2 — E. brunniventris*; *3 — E. rosae*; *4 — E. caninae*.
Рис. 1. Гениталии самца: *1 — E. hypochoeridis*; *2 — E. brunniventris*; *3 — E. rosae*; *4 — E. caninae*.

We studied the structure of male genitalia in specimens of *E. hypochoeridis* reared from galls of some cynipids on stems of *Hieracium umbellatum* and *Acroptilon repens*. The structure of phallobase and digital sclerites in those specimens is the same showing conspecificity of examined specimens and rather wide host association of *E. hypochoeridis* to a few cynipid species on herbaceous plants. From *E. rosae* it differs mostly by size of digital sclerites and no indents in their base.

We studied also *E. caninae*, the species recently recorded in Ukraine and morphologically similar to *E. rosae* (Klymenko, 2009). It differs from *E. rosae* by as follows: the clypeus without incisures on external edge, the mid coxa without lamella, the male

Table 1. Structure of male genitalia of *Eurytoma* species close to *E. rosae*
Таблица 1. Строение генитального аппарата самцов *Eurytoma*, близких к *E. rosae*

Species	Phallobase	Digital sclerites	Hooks on digital sclerites
E. rosae	closed	1.4 times as wide as long at middle	2 hooks; tips sharp; 3 indents at base
E. hypochoeridis	closed	rectangular, 2 times as wide as long at middle	2 long hooks; tips slightly sharpened
E. caninae	closed	elongate, 3.3 times as wide as long at middle	2 long thin hooks
E. brunniventris	opened	square 0.7 times as wide as long at middle	2 wide hooks; tips blunt

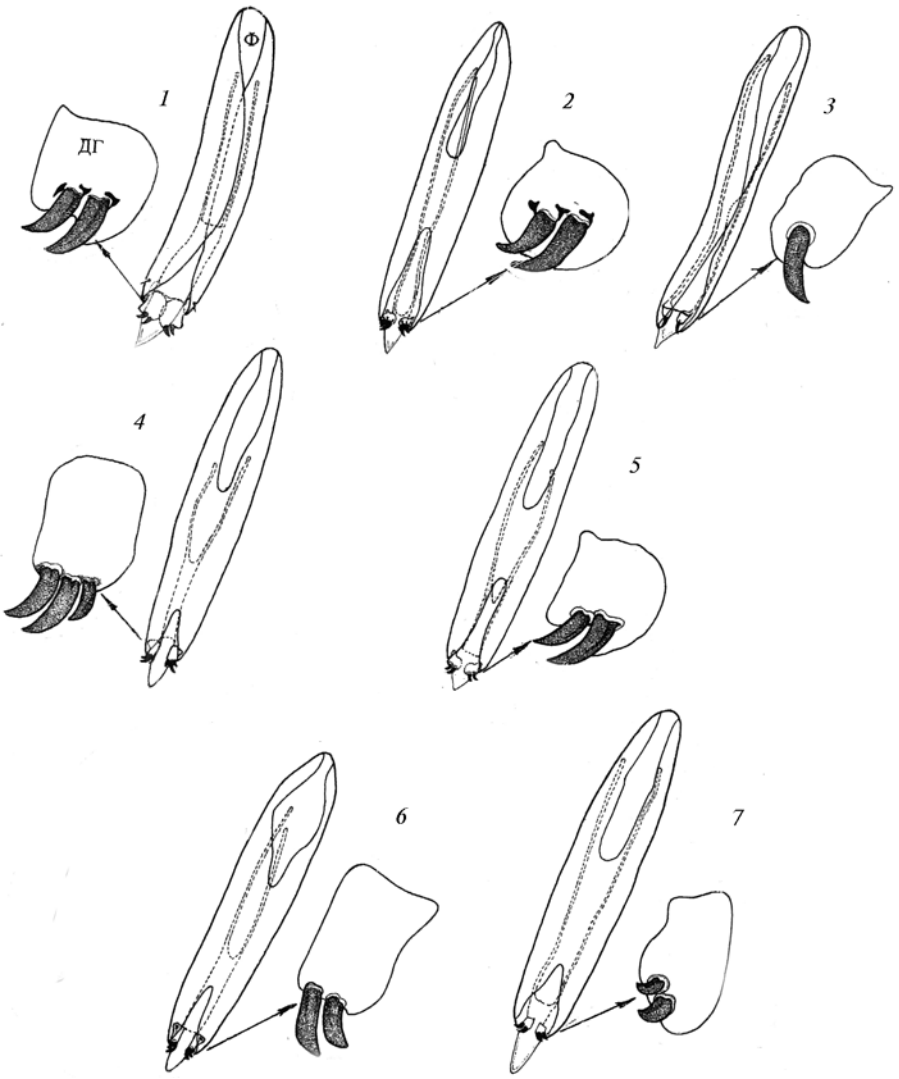

Fig. 2. Male genitalia: 1 — E. strigifrons; 2 — E. zlatae; 3 — E. victori; 4 — E. ruthenica; *5 — E. adpressa*; *6 — E. alexii*; *7 — E. taraxaci.*

Рис. 2. Гениталии самца: *1 — E. strigifrons*; *2 — E. zlatae*; *3 — E. victori*; *4 — E. ruthenica*; *5 — E. adpressa*; *6 — E. alexii*; *7 — E. taraxaci.*

flagellum segments with extended pedicel. The analysis of male genitalia structure in these species confirms that the phallobase in both *E. rosae* and *E. caninae*) is closed (fig. 1, *4*). In *E. caninae* male genitalia have extended digital sclerites, two hooks, no indents at their base, whereas male genitalia in *E. rosae* have three small indents at hooks bases.

We also examined the male genitalia structure in the species of other groups of genus *Eurytoma* for comparison purposes, for instance, the complexes of species related to *E. strigifrons* Thomson and to *E. jaceae* Mayr.

In our material, the *E. strigifrons* species complex was represented by morphologically very similar species, including recently described *E. adpressa* Zerova et Klymenko, *E. alexii* Zerova et Klymenko, *E. zlatae* Zerova et Klymenko, *E. taraxaci* Zerova et Klymenko (Zerova et al., 2010).

In addition to the species mentioned, morphological characters of *E. victori* Zerova et Klymenko, and *E. ruthenica* Zerova et Klymenko (not found in Ukraine yet, but

Table 2. Structure of male genitalia in the *Eurytoma strigifrons* species complex
Таблица 2. Строение генитального аппарата самцов *Eurytoma*, близких к *Eurytoma strigifrons*

Species	Phallobase	Digital sclerites	Hooks on digital sclerites
E. strigifrons	opened	rectangular, 1.5 times as wide as long at middle	2 large and 3 small hooks
E. zlatae	closed	rectangular, 2 times as wide as long at middle	2 large and 3 small hooks
E. victori	opened	elongated rectangular, 1.5 times as long as wide	1 large hook
E. ruthenica	closed	elongated rectangular, 1.5 times as long as wide	2 large and 1 small hook
E. adpressa	closed	square, as long as wide	2 large sharp hooks
E. alexii	closed	massive, rectangular, 1.35 times as wide as long	2 large hooks
E. taraxaci	closed	elongate, prominent in the middle	2 small blunt hooks

Table 3. Structure of male genitalia in the *Eurytoma jaceae* species complex
Таблица 3. Строение генитального аппарата самцов *Eurytoma*, близких к *E. jaceae*

Species	Phallobase	Digital sclerites	Hooks on digital sclerites
E. abdita	closed	almost square, 1.4 times as wide as long in the middle	3 hooks with sharp tips (2 utmost large, middle small) with 3 indents at their bases
E. jaceae	closed	elongated, prominent in the middle	2 hooks; tips blunt; no indents at bases
E. coleopterae	closed	almost square	3 large sharp equally long hooks

expected to be found here) was studied. By external morphology, the species related to *E. strigifrons* are characterized by the followings characters: the eye with indistinct edging, the face above the clypeus with numerous thin fan-shaped diverging keels, the female abdominal petiole is short, the fore coxa without prominence on the fore edge with more or less developed lamella, the hind femur without vertical plate.

All species of this complex habitually look like *E. strigifrons*, but differ by the structure of the antenna in both sexes, the sculpture of intermediate segment, abdomen shape, and something less by the venation of the fore wing. However, the most clear diagnostic characters were obtained from examination of the male genitalia (table 2).

As the result, opened phallobase was found in *E. strigifrons* and *E. victori*. The latter species differs from the other representatives of the group by presence of only one large hook on the digital sclerite. Other species have two large hooks and differ by their size and shape.

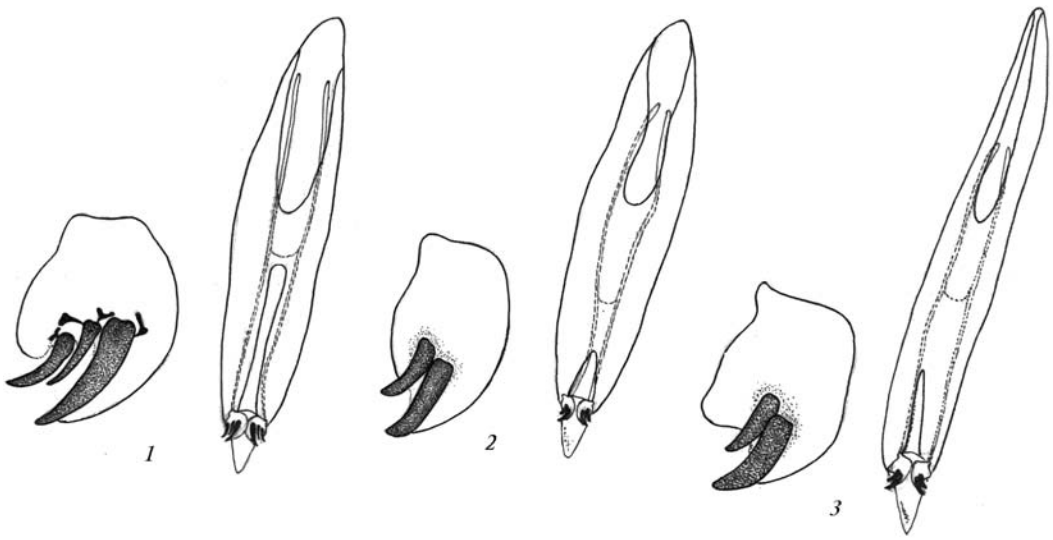

Fig. 3. Male genitalia: *1 — E. abdita*; *2 — E. jaceae*; *3 — E. jaceae* (ex *Hypecoum*).
Рис. 3. Гениталии самца: *1 — E. abdita*; *2 — E. jaceae*; *3 — E. jaceae* (ex *Hypecoum*).

Complex of species close to *E. jaceae* Mayr presented in Ukrainian fauna by 3 species: *E. jaceae*, *E. abdita* Zerova and *E. coleopterae* Zerova (table 3), but only first two species are trophically associated with cynipids. However, all three species occur in steppes and they are difficult to be identified based on external morphology in the material obtained by sweeping. Examination of male genitalia shows that specimens reared from cynipid galls in the stems of some *Centaurea* species belong to *Eurytoma jaceae* Mayr. They were identical to specimens reared from cynipid galls on *Serratula bracteifolia* (Iljin) Schischk. and *Hypecoum imberbe* Sibth. et Sm. (fig. 3, *3*). As the result, *E. jaceae* trophic association is believed to be wider than it was expected (Zerova, Seryogina, 1995).

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