

# Clasping structures of the valva in Tortricinae (Lepidoptera, Tortricidae) with the description of a new Euliini genus

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*Clasping structures of the valva in Tortricinae (Lepidoptera, Tortricidae) with the description of a new Euliini genus.*— Evolutionary trends in the structure of Tortricidae valva are discussed. In some Euliini the distal part of the valva is armed with sclerites whose function is to clasp the female during copulation. This apomorphy is the complication rather than the simplification of a structure. A new genus of Euliini, viz., *Hasteulia*, and two new species, *H. emmeles* and *H. romulca*, are described from Ecuador. *Hasteulia* is characterised by dentate sclerites at the terminal portion of the valva disc and by the very slender termination of the gnathos.

Key words: Tortricidae, Euliini, Evolution, Valva, *Hasteulia* n. gen., Ecuador.

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## Introduction

Most studies on the functional morphology of the male genitalia in Tortricidae have been reported by KUZNETZOV & STEKOLNIKOV (1973) and RAZOWSKI (1989) has discussed the morphology and evolution of the valva. However, the clasping structures of the terminal portion of Tortricinae valva have not been previously described. Such structures were found in the new taxa described in this paper, and are herein compared with less specialised data.

## Material and methods

The studied material was collected in Ecuador and deposited in the collection of the Carnegie Museum, Pittsburgh. Valvae structures were examined in glycerine, and the genitalia were then fixed in Canada balsam.

## Results

### Clasping structures of valva

Two trends are apparent in the evolution of the valva of the male genitalia in Tortricidae, one in Tortricinae and Chlidanotinae, the other in Olethreutinae. In the former, the clasping function of the valva is performed mainly by its edges (costa and sacculus) and the weakly sclerotised distal portion of the valva; the valvae are usually devoid of any sclerotised prominences or spines. In Olethreutinae the m5 muscle is attached deep in the valva, the distal portion of which is expanded to form the cucullus-bearing spines or thorns. In Tortricinae the valva action is indirect as both pairs of muscles extending from the tegumen are attached to the transtilla. In Olethreutinae, these muscles are attached to the basal process of the valva and the valvae work in a direct way. Moreover, a full complement of these muscles (m2 and m4) occurs in the most generalised tribes (Cochylini, Euliini, Sparganothini), while in the more advanced tribes one of these muscles is completely reduced: m4 in Tortricini, m2 in Ceracini, Cnephasiini and Archipini.

In Archipini, the dorsal sclerotised part of the valva may be considerably smaller. In *Archips* Hübner and its allies the costa is completely atrophied. In these tribes the clasping function is performed by the ventral region of the valva, and the sacculus is often strengthened by the position of muscle m5, the main branch of which is attached to the ventral or ventro-median area of the valva.

The muscle arrangement and the valva structure as described above is variable in Tortricinae. For example, in Euliini both m2 and m4 are retained. In *Bonagota* Razowski and *Gauruncus* Razowski the distal part of the valva broadens to form a structure which is comparable with the cucullus, and in *Gauruncus* the outer wall of the valva consists of a thin flexible membrane somewhat larger than the disc (this is analogous to the structure of the valva in the Old World genus *Neocalyptis* Diakonoff). In some genera, e.g. in *Eriotortrix* Razowski, spines are situated near the disc suggesting that the discal area of the valva is important in clasping. To date, only two species characterised by postmedian or subterminal clasping structures are known (described below). In these two species the distal part of the disc has a strong sclerite which certainly plays a role in the clasping function. In *Hasteulia romulca* n. sp. it is accompanied by a dentate, rather rigid caudal border of the valva. Similar structures are found in *Lobogenesis* Razowski, in which the clasping sclerites are dorsal and submedian (a transverse lobe just beyond the centre of the dorsal half of the disc) and in *Coryssovalva* Razowski, both of which appear to belong to a group of Euliini genera in which the strong sclerite of the disc is situated dorso-submedially.

### Descriptions of new taxa

*Hasteulia* n. gen.

Type-species: *Hasteulia romulca* n. sp.

Alar expanse ca 20 mm; length of labial palpus 2-2.5 diameter of compound eye. Cryptic type pattern, with characteristic V-shaped marking extending from costa, with vertex near tornus. Coloration: ground-colour; brownish-grey to blackish grey pat-

tern. Venation: forewing with all veins separate, R5 to termen beyond apex; hindwing Rs-M1 stalked to middle, distance between M2 and M3 twice that between M3 and Cu1.

Male genitalia (figs. 1-5)

Uncus very long, slender, rigid; socius drooping, hairy, scaled; gnathos arms slender, terminal portion of gnathos long, slender, acute; arms of vinculum separate from one another ventrally, connected by a thick membrane; costa of valva distinctly sclerotised; sacculus a simple, sclerotised edge of valva; disc of valva armed with subterminal sclerites, asymmetric, simpler in the left than in the right valva; caudal edge irregular or with distinct dentation; transtilla with dorso-lateral processes, and short, rigid setae; aedeagus simple;

coecum penis long; caulis very short; cornuti short with traces of capituli.

Remarks

This genus is closely related to *Clarkenia* Razowski and probably to some other genera (e.g., *Netechma* Razowski, *Icteralaria* Razowski) with a rigid, very slender uncus. The base of the uncus in those genera is characteristically broadened. Putative autapomorphies of *Hasteulia* are the presence and position of the sclerites of the disc of valva, the very slender terminal part of the gnathos and numerous short setae of the central part of transtilla. Female and biology unknown. The two known species were collected in different biotopes, *H. emmeles* in montane woodland and *H. romulca* in cloud forest.

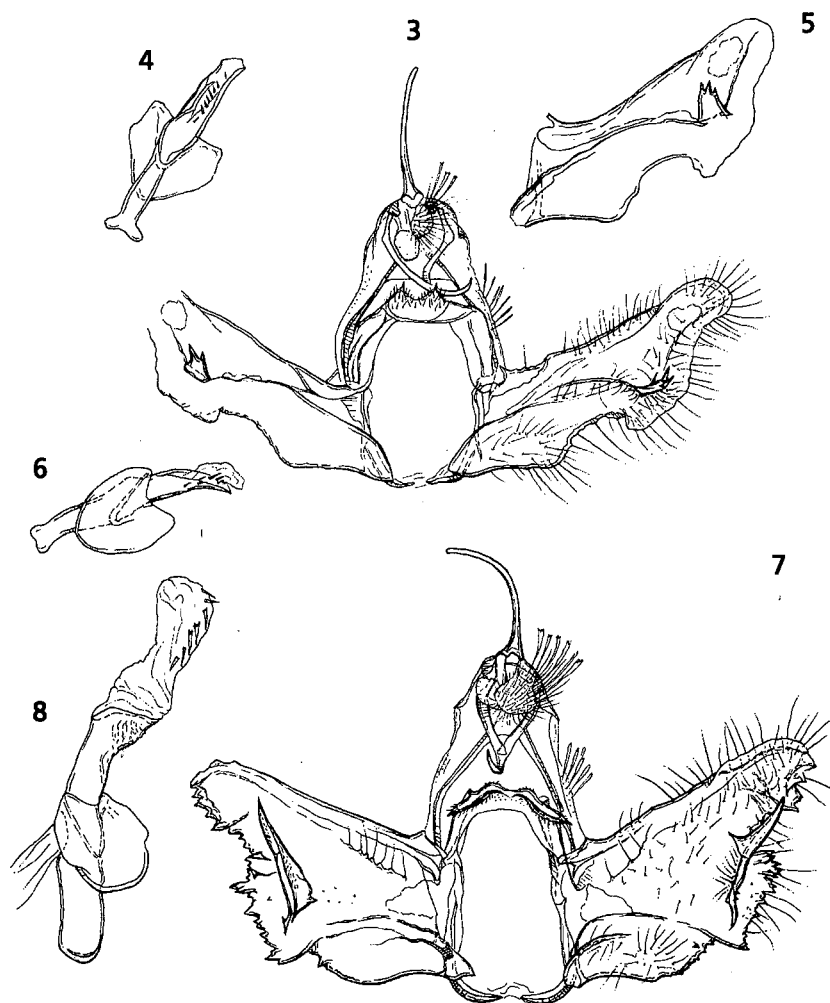


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Figs. 1, 2. Adults, holotypes: 1. *Hasteulia emmeles* n. sp.; 2. *H. romulca* n. sp.  
Adultos, holotipos: 1. *Hasteulia emmeles* sp. n.; 2. *H. romulca* sp. n.



Figs. 3-8. Male genitalia of *Hasteulia* n. gen.: 3, 4. *H. emmeles* n. sp., holotype; 5, 6. *H. emmeles* n. sp., valva and aedeagus of paratype; 7, 8. *H. romulca* n. sp., holotype.

Genitalia masculina de *Hasteulia* gen. n.: 3, 4. *H. emmeles* sp. n. holotipo; 5, 6. *H. emmeles* sp. n., valva y edeago del paratipo; 7, 8. *H. romulca* sp. n., holotipo.

*Hasteulia emmeles* n. sp. (fig. 1)

Alar expanse ca. 20 mm; head whitish, (white-grey in paratype); length of labial palpus 2.5 times diameter of compound eye, tinged brown-grey basally; thorax whitish tinged and scaled pale brown, dark brown proximally. Forewing uniformly broad through-

out, with costa convex, termen straight, oblique. Ground-colour whitish slightly mixed brownish, dotted dark brown, larger spots along costa and some pale brown suffusions between veins; dark brown markings consisting of a subtriangular basal blotch accompanied by a slender postbasal blotch at dorsum reaching mid-breadth of wing, a

V-shaped marking at costa with tip near anal vein before tornus and a subterminal, elongate-ovate blotch darker or even concolorous with ground colour in distal half; termen finely edged with brown. Fringes concolorous with ground colour, with basal line and terminations pale brownish. Hindwing whitish, tinged cream in distal third, indistinctly spotted greyish; fringes white.

#### Male genitalia (figs. 1-4)

Terminal plate of gnathos very long; dorsal incisure of transtilla rather small, processes fairly short; sacculus broad, angulate submedially, followed by distinct concavity terminating in a ventral prominence; dorso-terminal portion of valva elongate, rounded apically; sclerite of disc strong, somewhat variable in shape; sclerite of left valva with two horns, that of right valva with three thorns; delicate ridge of disc beyond sclerite, almost parallel to caudal edge of valva; two membranous fenestrae, one above sacculus postmedially, the other subterminal. Aedeagus somewhat bent; numerous small cornuti in vesica.

#### Material studied

Holotype, male: "Ecuador: Azuay. Pass. 8 km NE Giron. 2600 m. 8 Nov. 1987 J. Rawlins, C. Young, R. Davidson. Montane woodland." Genitalia on slide N° 10681. Paratype, a male with identical label.

#### *Hasteulia romulca* n. sp. (fig. 2)

Alar expanse ca. 20 mm; head brownish white, labial palpus ca. twice diameter of compound eye, brownish ventrally, white above and terminally; thorax whitish brown, dark brown proximally with some white scales. Forewing weakly expanding distally, broadest postmedially; costa bent to beyond middle, otherwise weakly so; termen as in *emmeles*. Ground colour white, weakly suffused brownish in basal and almost entire dorsal part, spotted brown. Pattern dark brown, basal blotch large, with oblique distal edge and whitish costal spot in middle; dorsal blotch broad, rounded proximally; a V-shaped marking accompanied by a small dorsal blotch; terminal pattern extending from apex to 3/4 of termen, with elongate dorsal portion and concave median part of proxi-

mal edge. Fringes paler than pattern, white at apex, whitish at tornus. Hindwing creamy spotted and reticulated grey especially in distal half; fringes paler than wing with basal line greyish.

#### Male genitalia (figs. 5, 6)

Dorsum of transtilla with broad concavity and distinct processes; valva broad; sacculus convex in middle; caudal edge of valva distinctly dentate; sclerite of disc subcaudal, with long dorsal process; aedeagus broadening in terminal part; cornuti larger than in *emmeles*.

#### Material studied

Holotype, male: "Ecuador: Carchi. 35 km W Tufino, west slope, 3120 m, 20 Nov. 1987, R. Davidson, R. Young. Cloud forest". Genitalia on slide N° 10680.

#### Remarks

Externally distinguished chiefly by brown forewing fringes, white ground-colour, and darker hindwing. Genital differences strong, described above.

### Discussion

The described structures of valva of Tortricinae are suspected to represent the apomorphic state as they are absent in all other Tortricinae (however, a simplification of particular organs is usually observed in the course of evolution). The tendency of greater strengthening of the distal region of the valva is analogous to that in Olethreutinae, but evolved independently. It is supposed that further taxa with a highly specialised caudal portion of the valva will be discovered in various groups of genera of this subfamily.

The discussed structures were found in two species of a new Neotropical genus described above.

### Resumen

*Las estructuras de sujeción de la valva de los Tortricinae (Lepidoptera, Tortricidae), y descripción de un nuevo género de Euliini*

Se discuten algunas tendencias evolutivas en

la estructura de la valva de los Tortricidae. En algunos Euliini la parte distal de la valva posee unos escleritos cuya función es la de sujetar a la hembra durante la cópula. Esta apomorfia es más la complicación de la estructura que su simplificación. Se describen un nuevo género de Euliini, viz., *Hasteulia* y dos nuevas especies, *H. emmeles* y *H. romulca* de Ecuador. *Hasteulia* se caracteriza por los escleritos dentados de la porción terminal del disco de la valva y por la parte terminal del gnatos muy fina.

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