HYSTEROTELY IN GRAPHODERES BILINEATUS DEGEER (COLEOPTERA)*)

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Modern teratology knows many different cases of abnormities in insects. In nature we find abundantly anomalies produced by a purely mechanical factor. Various new morphological formations of the cuticle may occur, caused by injury of the cuticle, combined with the ability for regeneration. There are known, e.g., different superfluous outgrowths, tumors, multiplications of certain parts of the body, or alterations of some body organs, by which these become either asymmetrical, or completely symmetrical. Symmetrical alterations of the body sometimes lead to erroneous taxonomic interpretations.

Real rarities in nature are, however, represented by teratological specimens in which parts of the body are of dissimilar physiological development. These cases always represent a certain transition between two constant characters, either transition between the sexes or transition between the larval and imaginal stages. An example of the former type is gynandromorphism, of the latter type the prothetely, the metathetely and the hysterotely.

An absolute discrimination between monstrosities due to mechanical pressure and those of hormonal or morphogenic type is, of course, not possible. It is quite probable that with a purely mechanical injury of the larva physiological deviation may also have taken place and influence the metamorphosis. It can even be assumed that physiological influences are dominant, and that it may be rather food, humidity and temperature conditions, than some mechanical injury which are of great importance. (In the laboratory prothetelic forms are obtained by means of the thermostat).

Sometimes it is also very difficult to discriminate between prothetelic, metathetelic and hysterotelic specimens.

The intention of the present paper is to discuss hysterotely briefly, and to draw attention to an interesting hysterotelic specimen.

Hysterotely is a case of the metamorphosis of a larva into a pupa or of a pupa into an imago, where some organs or parts of the body remain in the larval stage. This abnormal metamorphosis has been known for a much longer time than, e.g., prothetely, and many authors have already dealt with this problem. Thus papers were published on butterflies with caterpillar heads (HAGEN 1872, SCHULZE 1922, HAERING 1934), beetles with larval heads or other parts of the body (WESTWOOD 1879), flies with larval heads and prothorax (VIMMER 1935), etc.

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*) Third contribution to the teratology of insects. (For the second contribution see *Casopis Csl. Spolecnosti Entomol.*, 1950, vol. 47, p. 159—162).

In a number of cases of hysterotely the body or a part of it is enclosed in the corresponding part of the larval exuvia, and adhers to it abnormally tightly. One of the later authors, Dr. J. BALAZUC of Paris, emphasises this feature as follows (1947, p. 87): "Sans doute, dans la plupart de ces cas, la tête de l'imago existe-t-elle emprisonnée dans la partie correspondante de l'exuvie larvaire dont une adhérence anormale a empêché la déhiscence."

The most typical cases of hysterotely are, e.g., adults with larval heads, as in the case given below. An interesting and exceptional phenomenon is described and figured by WILSON (1923), in the aquatic beetle *Dineutes americanus* Say. Due to the adhering fissure line the head of the pupal exuvia could not be shed, so that the larval head still protruded from the imaginal head, causing an unusual, bizarre form of this head. According to that author, this abnormal specimen was not able to feed.

A teratological male specimen of the aquatic beetle *Graphoderes bilineatus* Deg. was found by one of us (WINKLER) in the partially-dried river Váh in the village of Csörgö in Slovakia (Czechoslovakia). The specimen was found in the mud of a small pool of water (it moved, and thus drew the attention of one of us.) After collecting the beetle it was noted that it had abnormally parted elytra. As the head and prothorax were soiled with mud, it was taken for one of the current monstrosities which are very frequently found. The beetle was killed. After it had been brought to Prague, it was cleaned of the traces of dried mud and only then WINKLER discovered that it was a very interesting case of hysterotely[1]).

Description (plate 3, figs. 1—3)

Length 13 mm, breadth 9 mm (normal specimen : length 14.5 mm, breadth 9 mm).

Differs at first glance from a normal male specimen by smaller size, larval head and abnormally stretched and parted elytra. Coloration fairly similar to that of normal specimens, except for the elytra which are of less intensive black colour (greyish), with the yellow irregular spots lighter. The markings on the prothorax are also light yellow. The head much darker than the yellow markings on the prothorax.

(Larval) head rather large, strongly and darkly pigmented ; it is inserted into the prothorax so that almost the whole of it protrudes. The constriction at its base permits of sidewards movements, as sufficient room is left between the head and the upper corners of the prothorax. The hollow mandibulae and four ocelli on either side are partly visible from above. The two large, considerably prominent, upper ocelli are striking. They are convex with an irregularly rounded centre with dark brown pigmentation, and with a yellow annular margin. The two small lower ocelli are also dark brown, the upper ocellus placed closer to the lower large ocellus; the lower ocellus is situated at the periphery of the head, more sidewards from this upper ocellus. In the direction from the large upper ocelli,

[1]) For this reason the anomalous beetle could not be observed alive in captivity in the laboratory, and then fixated histologically.

where the antennae should be situated at the periphery of the head, there are crater-like pits instead, with a strongly raised margin ; the antennae are lacking. The hollow mandibulae and the labial palpi stand out, especially when viewed from the underside; but the maxillary palpi are not perceptible. The head is paler on the under side than on the upper side, only here and there dark brown The two lower ocelli on either side of the head are normal.

(Imaginal) prothorax almost normal, the yellow markings very pale and thus conspicuous. The underside of the prothorax much lighter yellowish-brown than the head.

Elytra deformed, with several rather large depressions, not touching the suture nor the scutella, parted so that a considerable part of the meso- and metathorax and of the abdomen is visible. The coloration is lighter than in normal specimens, the usually black parts are greyish, the small yellow irregular spots scattered all over the elytra are much lighter. The normal membranous wings partly project from under the elytra. The elytra cover the abdominal segments only partially.

The (imaginal) abdominal segments are normal, straw-colour; four spiracles (from the right side of the abdomen) are visible on the last segments under the parted elytra. The anal segment is shifted more forewards than in normal specimens. On the underside the individual abdominal segments are lighter coloured; only the last segments are more brownish.

(Imaginal) legs. The anterior pair has the dilatations with numerous suckers, the typical feature of the normal males of this genus.

Locality : Csörgö, in the bed of the half-dried Váh River (Slovakia, Czechoslovakia), July, 1950, leg. J. Winkler.

The specimen in the collection of J. WINKLER, Prague.

The probable cause of this teratological phenomenon seems to be some mechanical defect in the larval — pupal moulting process, which has prevented the casting off of the larval head capsule.

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