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A TERATOLOGICAL SPECIMEN OF *DENDROCERUS CARPENTERI* (CURTIS, 1829)

(*HYMENOPTERA: CERAPHRONOIDEA*)

SUMMARY - A teratological specimen of *Dendrocerus carpenteri* (Curtis, 1829) is described, which is cyclopic - having the eyes fused. The incidence of the phenomenon is reviewed and the records amongst the *Hymenoptera* are listed.

I obtained a monstrous female of *Dendrocerus carpenteri* (Curtis, 1829) whilst accumulating material for a revision of the British representatives of the genus. The eyes of the specimen are fused, this type of teratology is so rare that it warrants a separate publication. The specimen was collected along with a normal female, by D. A. SHEPPARD at Greyforth, Northumberland, England in June 1973, ex aphids on *Ribes nigrum*.

The eyes (fig. 1) are fused completely across the face. The lateral margins of the eyes are sited normally but the eyes do not laterally protrude, thus the head has an unusual rounded appearance. The occipital carina, when viewed dorsally has a median dip instead of the usual apex of curvature. The preoccipital crescent is totally absent, the ocelli are missing. A large depression is present above a weak interantennal carina. Normally the preoccipital crescent is well developed, the frons has no large depression and the interantennal carina is totally absent. The antennae, lower face and mouthparts are normal. An apparent elongation of the face is caused by the flatness of the eye. Apart from the head the teratological specimen is a normal *D. carpenteri*. The head of a normal *D. carpenteri* female is shown in figure 2 for comparison.

Abnormal eye convergence occurs in various degrees which can be arranged in a sequence.

(1) The preholoptic forms in which the interocular distance is reduced. A good example of the preholoptic state was recorded by PERKINS (1914). He collected on the same day, two almost identical abnormal females of *Priocnemis exaltata* (Fabricius, 1775) [*Hym*: *Pompi-*

lidae]. The eyes are not fused but they are abnormally large and the interocular distance on the vertex is short. The ocelli are absent.

(2) Next is the holoptic condition in which the eyes meet in a coadapted line, this usually takes place on the vertex above the ocelli (CONSTANTINEANU, 1930; LOTMAR, 1936).

(3) Various stages of fusion and downward expansion of the single eye occur until the full cyclopic condition is reached, in which the face is covered by a huge single eye. The ocelli may be forced down by the eye to occupy a small pit just above the antennae or they may sink within the head, losing their corneae in the process (PETERKA, 1928; MILLER, 1936).

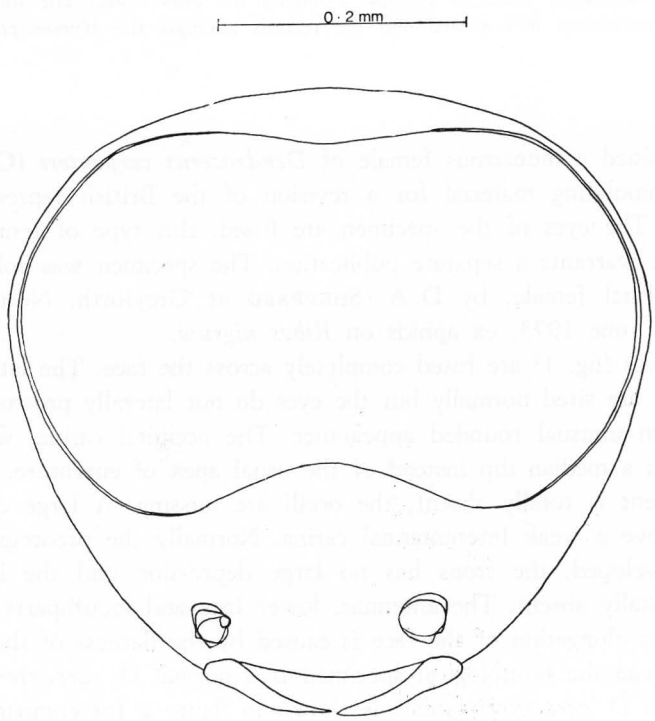

Fig. 1 - Face of a cyclopic specimen of *Dendrocerus carpenteri* (Curtis, 1829), antennae mostly removed.

In the *Hymenoptera*, most authors have included the holoptic state under the term cyclopia and excluded the preholoptic forms. The specimen described here is close to the full cyclopic condition the lateral margins of the eye,

however, still correspond with those of normal eyes. Although there is a depression above the antennae, the ocelli are not visible within it.

Considering the scarcity of records, the likelihood of publication on such curios, the ease of recognition of the condition and the enormous numbers of *Hymenoptera* that have been studied, it must be assumed that cyclopia is an extremely rare phenomenon. PAETZOLD and VATER (1968) surveyed the parasite complex of *Brevicoryne brassicae* (Linnaeus, 1758) [*Hemiptera*: *Aphididae*] for teratology. Out of more than 233,000 specimens studied, only 29 were abnormal and only one of those was cyclopic. Thus it appears that the incidence of cyclopia is in the order of a few, perhaps only one, per million normal specimens.

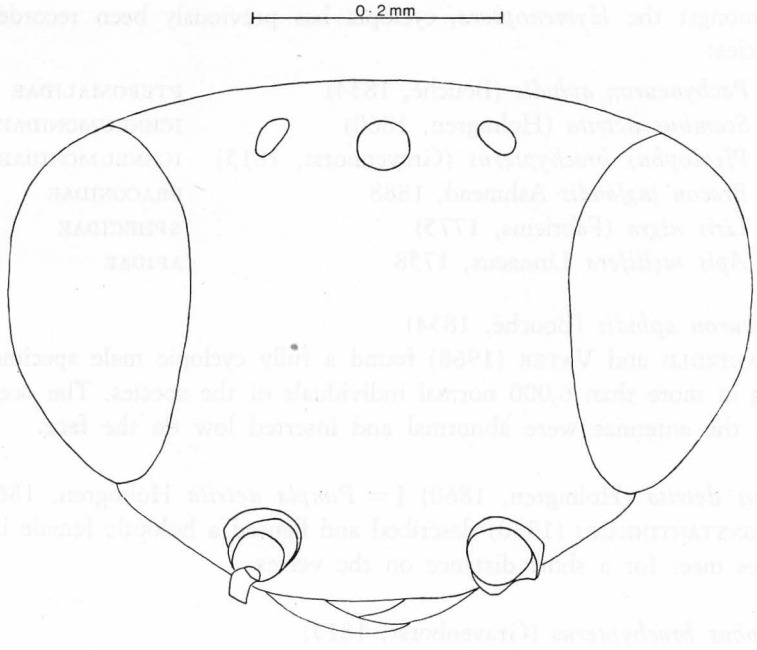

Fig. 2 - Face of a normal specimen of *Dendrocerus carpenteri* (Curtis, 1829), antennae mostly removed.

There are examples of higher incidence, where a population has been artificially treated in some way so as to increase the rate of mutation e.g. by irradiation. GREB (1933) has shown that in *Bracon juglandis* Ashmead, 1888

[*Hym*: *Braconidae*] cyclopic forms were rather frequent among the offspring when their mothers were exposed to high temperatures. A social insect colony exhibiting a inheritable mutation is likely to produce more examples of the mutant than are found elsewhere. There is some evidence (LUCAS, 1868; DITTRICH, 1891; HAYDAK, 1948) that cyclopia can be inherited. Thus it is no surprise that many of the records and the great majority of examples are of *Apis mellifera* Linnaeus, 1758 [*Hym*: *Apidae*]. LOTMAR, (1936) records a hive with a 2% incidence of cyclopia and KRANCHER (1919) obtained over 80 specimens from one hive.

PAETZOLD and VATER included the genus *Dendrocerus* (= *Lygocerus*) in their survey, they looked at 280 individuals and found no abnormalities. In my study I have looked at over 2,000 *Dendrocerus* of which 800 are *D. carpenteri* (CURTIS, 1829) and found only this one abnormal specimen.

Amongst the *Hymenoptera*, cyclopia has previously been recorded from six species:

Pachyneuron aphidis (Bouché, 1834)	PTEROMALIDAE
Scambus detrita (Holmgren, 1860)	ICHNEUMONIDAE
Pleolophus brachypterus (Gravenhorst, 1815)	ICHNEUMONIDAE
Bracon juglandis Ashmead, 1888	BRACONIDAE
Liris nigra (Fabricius, 1775)	SPHECIDAE
Apis mellifera Linnaeus, 1758	APIDAE

Pachyneuron aphidis (Bouché, 1834)

PAETZOLD and VATER (1968) found a fully cyclopic male specimen after looking at more than 6,000 normal individuals of the species. The ocelli were absent, the antennae were abnormal and inserted low on the face.

Scambus detrita (Holmgren, 1860) [= *Pimpla detrita* Holmgren, 1860]

CONSTANTINEANU (1930) described and figured a holoptic female in which the eyes meet for a short distance on the vertex.

Pleolophus brachypterus (Gravenhorst, 1815)

GAUSS (1966) described and figured a cyclopic male without ocelli.

Bracon juglandis Ashmead, 1888 [= *Habrobracon juglandis* (Ashmead, 1888)]

GREB (1933) found cyclopic specimens during experiments on the effects of temperature on mosaic production.

Liris nigra (Fabricius, 1775) [= *Notogonia pompiliformis* (Panzer, 1806)]

A female was briefly recorded by MEUNIER (1888).

Apis mellifera Linneaeus, 1758 [= *Apis mellifa* Linnaeus, 1766]

Cyclopic workers, drones and pupae have been found. Because of the larger numbers of cyclopic specimens, most of the research has been on the Honeybee. LOTMAR (1936) studied the main and transitional forms. PETERKA (1928) found that the ocelli were often concealed under a lobe just above the antennae. HAYDAK (1948) reported cyclopic gynandromorphs. FYG (1959) commented that the head is often strikingly small, he also mentioned a holoptic drone with white eyes. MILLER (1936) looked into the histology and found that two distinct basement membranes were present, thus proving that two eyes had fused, as opposed to the enlargement of a single eye. LOTMAR (1936) showed that the brain, central nerve trunk and the hind gut could also be affected. ALFONSUS (1931) found a cyclopic bee which could only walk backwards. HAYDAK (1948) in his review of cyclopic bees mentioned that they can run and behave normally except that they could not fly properly, reaching a height of only 50cm or so before they fell to the ground. Cyclopic bees have also been recorded by LUCAS (1865 and 1868), KIRSCH (1869), DITTRICH (1891), KRANCHER (1919) and HOFFMANN and KÖHLER (1954). The first record was by STANNIUS in 1835.

The abnormal specimen of *D. carpenteri* is in the collection of the British Museum (Natural History).

This appears to be the first record of teratology in the *Ceraphronoidea*. Teratology in the *Proctotrupoidea* has been reviewed by BIN (1976), BALAZUC (1958) covered all the *Hymenoptera* and included a comprehensive bibliography.

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