

Genetic Evidence of Biparental Origin of Adult Honey Bee Drones

by

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Since the times of Dzierzon [1] (1845) it was generally accepted, that female honey bees develop from fertilized eggs and drones from unfertilized ones.

Woyke and collaborators [2], [4], [9], [10], lately established that some sibling-mated queens produced in worker cells diploid drone larvae. These larvae were eaten by the workers within a few hour of hatching [3]. Genetic proof of the diploid character of adult drones has so far been lacking. The factors governing the eating phenomenon were investigated [5], [6] and a method of rearing these drones to maturity has now been described [7], [8]. This enables to prove the biparental origin of the drones in question.

Material and methods

Homozygous chartreuse (ch) eyed queens were mated either to a dominant wild (black) or o a wild-eyed and recessive cordovan (cd) coloured body brother.

The first mating should enable to detect the participation of the father in the origin of the offspring, the second, in addition to that — also to exclude androgenesis.

Three queens producing in worker cells a brood with 50 per cent survival rate were selected.

The diploid drones normally eaten by the workers were reared by the already mentioned method [7], [8]: two or three days on royal jelly, and then transferred to drone cells in the rearing colonies. Before emergence the cells with these drones were screened and the imagines were examined.

Results

All the three chartreuse eyed queens gave rise in the drone cells to drones carrying the chartreuse gene. The females produced in worker cells were of wild phenotype.

Adult drones were also reared from eggs hatched in the worker cells in an incubator. Imaginal drones (22) of wild phenotype were obtained from the two chartreuse queens mated to a wild brother. Thus the offspring carried the character of the mother's mate. This indicates, that the drones developed with the participation of the father.

To exclude androgenesis, a brood of the chartreuse queen mated to the cordovan brother, was reared. Again 22 wild-eye and-body adult drones were obtained. They