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NEW INVESTIGATIONS ON *APIS MELLIFERA CAPENSIS*

J. WOYKE
POLAND

Starting only with a piece of comb with fertilized eggs, pure *Apis mellifera capensis* colonies were created.

A piece of worker comb with *A. m. capensis* eggs was supplied by Prof. dr. F. RUTTNER. Workers as well as queens were reared from the hatched larvae. Workers emerged in screened isolators in an incubator. Young workers were marked on the thorax and introduced to queenless nuclei. They started to lay eggs few days later. Some queens were inseminated with semen of *A. m. mellifera* drones, and the other queens were treated with CO₂ only. All the queens were kept, until they started to lay eggs, in queen excluder isolators covering the whole comb placed in the middle of the brood nest (WOYKE 1979). After *A. m. capensis* queens produced drone brood, new queens were reared from larvae produced by laying workers. The new virgins were now inseminated with semen of *A. m. capensis* drones, and subsequently *A. m. capensis* colonies were created.

A. m. capensis queens, as well as laying workers were introduced to queenless *A. m. mellifera* colonies.

A. m. capensis workers are easily accepted by *A. m. mellifera* workers.

Unfertilized *A. m. capensis* queens produced drone brood in drone cell. But contrary to *A. m. mellifera*, they did not produce drone brood in worker cells although they laid eggs there. Drone brood of this subspecies did not complete its development in worker cells, although it did in drone cells. Most drone brood did not survive 3rd — 4th day of larval life.

Laying workers of *A. m. capensis* lay unfertilized eggs from which females develop. Mechanism of this phenomenon is not known till now. Drone brood was mostly not found among brood in worker cells. But in drone cells, some brood was found. 3—9% of drone brood was produced by laying workers in drone cells. Microscopical investigation revealed that those drones had 16 chromosomes which indicated that they were haploid.

Sealed worker brood produced by laying workers was scattered, although eggs were deposited to almost all comb cells. Comparative investigation, conducted in the same colony, showed, that brood produced by laying workers survived in 44% while that produced by queens in 97%. This might indicate the fusion of two haploid egg nuclei, with the same sex alleles, and consequently the production of diploid drone larvae which are eaten by the workers. But preliminary efforts to rear diploid drones from eggs deposited by *A. m. capensis* laying workers failed. There have been found that brood produced by laying workers of *A. m. mellifera* survived also in about 40% only. Thus the mechanism of thelytoky in *A. m. capensis* may differ from that what is considered till now. Worker cells were sealed in colony headed by *A. m. capensis* laying worker with lids 2.4 mm higher than those in colony headed by *A. m. capensis* queen. *A. m. mellifera* workers are larger than the *capensis* ones produced by queens. They were sealed with higher lids than those in colony headed by *A. m. capensis* queen but with lower lids than those in colony headed by laying *A. m. capensis* worker.

Bees reared in colonies headed by laying *A. m. capensis* workers either in worker or drone cells, differed significantly from those reared in queenright colonies.

They had conical smooth shining abdomen, and larger individuals resembled small queens. They had mandibles with notching, corbiculae covered with hairs in 83⁰/₀—100⁰/₀ and 3—9 rows of bristles in brush of hind leg basitarsus in those reared in worker cells and 1—4 rows in bees reared in drone cells. But workers reared in worker cells in queenright colonies had 9—11 rows of bristles.

Out of 22 characters analyzed statistically, 18 were significantly larger in workers reared in colonies headed by laying workers. The average number of size of body parts of those workers reached in comparison to workers reared in queenright colonies 125⁰/₀ for no of bristles on the wing, 119—126⁰/₀ for width of mandibles, 111—124⁰/₀ for abdominal tergites and sternites and 120—135⁰/₀ for the weight. Those bees had twice as many ovarioles in ovaries 71—78⁰/₀ and 2—3 times larger spermatheca (0.697×0.851 mm — 0.794×0.971 mm) than normal workers. As compared with sizes of queen body parts, the workers being larger than the normal ones, showed many intermediary characters between workers and queens.

But some head parts which are normally larger in workers than in queens showed super-worker characters.

The amount of bee milk supplied to 1—3 day old larvae, was 8 times higher in colonies headed by laying workers (1310 mg per 100 cells) than in the queenright ones (170 mg per 100 cells). Thus the larger bees were reared due to larger amount and perhaps different composition of food supplied to them.

The larger *A. m. capensis* bees were successfully inseminated instrumentally and they produced progeny with father's characters. Since they produce diploid worker bees from unfertilized eggs, were the bees reared from fertilized eggs triploid?