COMPARATIVE STUDIES ON THE CARNIOLAN HONEY BEE RACE AND ITS CROSSES

BY

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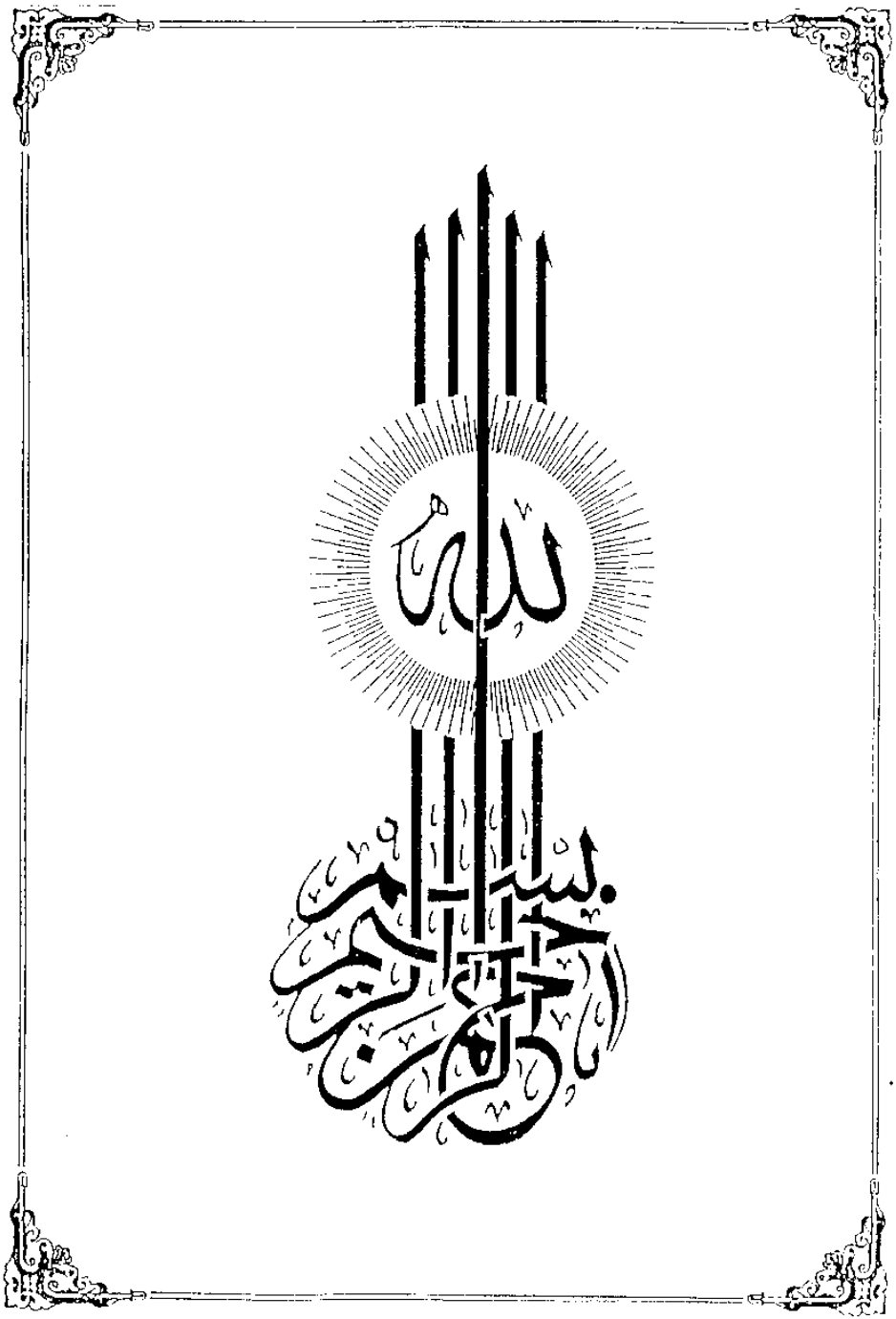

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ABSTRACT

The experiments on the Carniolan honey bee were conducted at Institüt für Bienenkunde, Frankfurt University, Germany, during 1989-1990. The first experiment was to study the biological route of sperm from testes (in drones) until egg fertilization (in queen).

The second experiment was to estimate the heritabilities and genetic correlations for some morphometric and biologic characters by adopting the half-sib analysis.

1- The biological route of sperm from testes until egg fertilization

The spermatozoa begin to accumulate in the drone's seminal vesicles 3 days after emergence and increase by ageing to average 10.373 million when 12-15 days old. The

drone ejaculates about one microleter of semen containing only about 7.930 million sperm. The majority of spermatozoa are lost after being inseminated in the queen as only 5.215 million sperm are counted in the spermatheca after insemination with 8 μl of semen. However, the semen of multiple matings mix randomly both in the oviduct and in the spermatheca. An average of 23.77 sperm are used per egg for fertilization at the start of oviposition. During the most active period of egg laying it is expected that only one or two sperm fertilize the egg as it is estimated that 1884.6 sperm deplete daily from the spermatheca.

2- Heritabilities and genetic correlations

The heritability estimates were high and considerable only for the ovariole numbers in queens and in most morphometrics of workers; proboscis, fore-wing width, wing hooks, hind leg parts and 1st wax mirror length.

All hind leg parts (femur, tibia and basitarsus length) are geneticaly correlated with each other and with the proboscis length. So, selection for any of these organs may lead to improvement in the others. Selection for the proboscis length may lead also to amelioration of fore-wing width and wax-mirror width.

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