

# MORPHOLOGICAL CHARACTERISATION OF THE BULGARIAN HONEY BEES

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## ABSTRACT

The aim of the investigation was to determine the range of variation of some morphological traits of worker bees raised in region I of the Eastern preserve from 1990-1993. Samples of 100 worker bees were collected from 95 villages and 176 colonies. Length, width and cubital index of the fore right wing; length of proboscis; length of tergite II, III and IV; area of the right and left wax plate of the IIIrd wax sternite measured.

Ranges of variation of the above indices were determined. Regions with bee colonies suitable for future selection were defined.

## INTRODUCTION

In result of natural selection native bees have adapted to different environments. Studies on European honey bees have shown that when bees are raised in their original environment, they are most productive. Many authors (Avetisian, 1975; 1980; Bilash, 1977; Velichkov, 1979; 1982; Lazarov, 1975; Ruttner, 1972; 1988; Zinger, 1971; 1972) have reported about preserves of native bee populations where bees can be examined or improved by programmes and methods of genetics.

The Bulgarian native bees (Lazarov, 1979) constitute a "mix" of close populations. Gubin (1969) has classified the bees from the mountainous regions of Bulgaria, Romania to the *Krainska* bee. In 1982, after preliminary investigations, 3 preserves were organized in Bulgaria: Eastern, Western and Southern (Velichkov et al., 1982; Nenchev, 1990). A long programme for selection of the native bees has been developed and is being introduced.

The aim of investigation was to determine the ranges of variation of some morphological traits of worker bees raised in region I of the Eastern preserve.

## MATERIAL AND METHODS

The studies were carried out in the period from 1990-1993 in region I of the eastern preserve for Bulgarian native bees. Region I comprise 95 villages located in the mountainous regions of the Bourgas, Sliven, Targovishte and Shoumen districts. Samples of 100 one-day old worker bees were collected from 176 typical to the region/village bee colonies. The following morphological traits were measured: length, width and cubital index of the right forewing; length of proboscis; length of tergite II, III and IV and areas of the right and left wax plate of wax sternite III. Measurements were made using MBS-1 microscope by the method of Alpatov (1948). The cubital index was determined by the method of Goetze (1930). Area of the wax plates (p) of the sternite was estimated by the formula of Bornus (1976).

$$P=0.88[3.14 (a-b)/4]$$

a- length of the wax plate

b- width of the wax plate

## RESULTS AND DISCUSSIONS

Table (1) shows that the length of the right forewing varies from 8.880 to 9.466 mm; the width from 3.139 to 3.355 mm. The range of deviation in length is smaller with the Targovishte and Shoumen colonies, and in width with the Bourgas colonies. The cubital index is the best indicator of the bee breed. Lazarov (1961), Velichkov (1986), Tsonev (1967) and Ruttner (1962) report cubital Index values from 2.4 to 3.1 and an average 2.48 (Velichkov, 1968) in their studies on worker bees raised in Bulgaria. Some of the colonies we studied differ much more and their cubital index values varied in a broader range (2.059-3.118).

The length of the proboscis varied from 6.272-6.458 mm (Tsonev 1965), and 6.52 mm (Mitev, 1972). The proboscis in our studies measured from 6.105-6.589 mm. Moreover, 9% from the Burgas samples and 15% from the Sliven sample had proboscis measurements of more than 6.5 mm. The longest proboscis was found in the Shumen bees (70%) and the Targovishte bees (68%). The higher values in this case suggested a successful selection in the native bees.

The length of tergites varied from 2.282 to 2.587 mm with tergite II; from 2.216 to 2.503 mm with tergite III, and 2.154 to 2.446 mm with tergite IV. Higher similarities was observed in the Shumen and Targovishte bees.

Wax plates area of sternite II varied from 2.113 to 2.538 sq. mm with the right and from 2.073 to 2.555 sq. mm with the left wax plate. Similar values were obtained with the Shumen bees.

## CONCLUSION

1- We determined the ranges of variation of the indices: length, width, and cubital index of the right fore wing; length of proboscis; lengths of tergite II, III and IV, and area of the right and left wax plate of the III wax sternite.

2- With the Shumen and Targovishte colonies all indices had significantly higher values and indicated possibilities for successful selection.

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