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Honeybee (*Apis mellifera*) Races, Ecotypes and Their General Characteristics in Turkey

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Abstract: The present studies carried out before the development of migratory beekeeping on the identification of the Anatolian honeybee population showed that the honeybee population could be a valuable genetic potential for breeding and also preservation. Since these initial studies, many research have been carried out to identify races, ecotypes; morphological, physiological and behavioural characteristics of honeybees inhabited in Turkey. According to the behavioural and ecological data of Ruttner (1), there are three different honeybee races in Turkey, *Apis mellifera anatoliaca, Apis mellifera caucasica, Apis mellifera meda*.

Key words: *A. m.* anatoliaca, apis mellifera caucasica, apis mellifera meda, general characteristics

INTRODUCTION

Turkey with its broad geography, topography, high colony number, rich flora and different ecological characteristics is one of the most suitable regions and is highly rich country with its gen resource for honeybees[1]. Archaeological studies showed that honeybees culture in Anatolia have practised since 7000 BC[2].

The present honeybee population show a great genetic variation and this variation provides some advantages to improve the present honeybee culture in Turkey. The studies carried out before the development of migratory beekeeping on the identification of the Anatolian honeybee population showed that the honeybee population could be a valuable genetic potential for breeding and also preservation[3]. Since these initial studies, many researches study have been carried out to identify races, ecotypes, morphological, physiological and behavioural characteristics of honeybees inhabited in Turkey[4-10].

According to the behavioural and ecological data of Ruttner[5], there are three different honeybee races in Turkey; *Apis mellifera anatoliaca* is spread around Thrace, Aegean, Mid Anatolia and seashore of Mediterranean regions, *Apis mellifera caucasica* is colonised around Northeast Anatolia and seashore of east Blacksea, while *Apis mellifera meda* is mostly distributed around the Southeast Anatolia. Additionally, ecotypes of *Apis mellifera anatoliaca*, East Aegean Island Bees (*Apis mellifera adami*) spread, mainly in different Aegean Islands Gökçeada, Muğla Bees are distributed around the West Mediterranean and Aegean Regions of Turkey and Thrace Bees are located around the European side of Anatolia.

Races, ecotypes and their general characteristics of honeybees (*apis mellifera* l.) in turkey

Anatolian bees (*Apis mellifera anatoliaca*): Anatolia is a peninsula with its many bee races and their ecotypes. Some study findings have shown only one single race but many different ecotypes with different morphological, physiological and behavioural characteristics of Anatolian bee have been observed in the bee gens centre of Anatolia[1,11]. Anatolian bees are not as dark coloured as Caucasian bee with calm temper and mid-size body structure. Wintering ability is high with low level honey consumption. With high adaptation ability Anatolian bees are distributed in a broad range of area in Anatolia. Brood production efficiency of Anatolian bees is high as long as they are maintained under good environmental conditions. Robbing tendency is very low with highly orientation ability. Due to lack of isolated area, uniformity in the race cannot be seen. Therefore, a great deal of variation in the race can be seen from area to area in the Anatolia. Additionally, high propolis consumption and comb construction in hive space are the main disadvantages of this race. Some researches have been carried out to determine honey yields of Anatolian bee in Turkey. These studies showed highly differences (10 to 25 kg/colony) in honey yields but a honey yield of 17-18 kg/colony is accepted as a mean[5,7,8].

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East aegean islands bee (*Apis mellifera adami*: ecotype of A. *mellifera anatoliaca*): This ecotype is distributed all around the Gökçeada, Crete Island and other Aegean islands and also Marmara region of Turkey. It is a member of group of dark coloured bees with grey-brown colour with white-grey circle on the abdomen. Reproduction efficiency and resistance to hard weather conditions (windy and cold) of these bees are very high. These bees are also known with their slightly high temper, but not as high temper as Iranian bees and also with their high swarm rate, which could not permit to obtain strong population. However, they can produce high amount honey. Research findings under the condition of migratory beekeeping showed that they can produce about 35-40 kg/colony honey[7].

Thrace bee (ecotype of *Apis mellifera anatolicia*): This ecotype has kept widespread in modern and primitive hives in Trache region (the European side of Anatolia) of Turkey. This ecotype has been well adapted to this region. Although it has been also kept in other regions of Turkey, the performance level is not as high as the amount obtained in the Thrace region. Especially, in the Thrace region colony population growth rate of this bee is very high with its low temper. This ecotype is also characterised with its dark colour, high swarm tendency, low wintering ability and honey yield of 17-18 kg/colony, which is almost the level of Turkey's annual mean honey production per colony[7].

Muğla bee (ecotype of *Apis mellifera anatolicia*): This Ecotype of *Apis mellifera anatolicia* is mainly located around Muğla province and also seen Aegean and Mediterranean regions of Turkey. The main characteristics are reproduction performance throughout the year and produce strong colonies in spring and summer. Study findings showed that this ecotype has the highest performance in terms of colony growth, honey yield and wintering ability in the Aegean, Southeast and Mid Anatolian regions of Turkey. With normal migratory beekeeping conditions this ecotype could produce 40 kg/colony (35 to 65 kg/colony) honey[5,7,10]. With respect to its significant characteristics for beekeeping, this ecotype should be well examined for breeding purposes. However, high amount of pollen collection behaviour, brood production performance during the honey yielding time could be disadvantages of this ecotype. Additionally, pure breeds of this ecotype are generally dark coloured but its crossbreeds could be yellow coloured.

Caucasian bee (*Apis mellifera caucasica*): Its motherland is known to be high valley of Caucasian, but it could be seen in high plateau of East Anatolia. Caucasus Border of Anatolia and East Black sea shore as pure and also crossbreeds. This race has been transported to different countries as a gen source because of its low temper and high level of honey yields. The most significant characteristics of this race is its tongue, which is the longest (longer than 7 mm) tongue[12,7]. This characteristic has been associated with its high level of honey yields. Caucasian bees have great body structure and long hairs covered.

This race has low level of swarm tendency. Wintering ability is lower due to having small population in winter with a relatively low level of honey consumption. However this race has high level of robbing tendency and high sensitive to *Nosema Apis*. High propolis consumption and slow colony development in spring could be classified as disadvantages of this race.

Many researches have been carried out to determine honey yields of this race in different regions and different times in Turkey. The results obtained these studies showed great differences (20 to35 kg/colony) in honey yields but a honey yield of 27-28 kg is accepted as a mean[5,13,7,9,10].

Iranian bee (*Apis mellifera meda*): According to the Bodenheimer[4] and Adam[14] specified the bees around the Northeast of Mediterranean (South of the district from Hatay to Van Lake) as Syrian Bees (*Apis mellifera syriaca*), Ruttner[5] specified the bee population in the above area as Iranian bees (*Apis mellifera meda*) as result of his biometrics study.

This race could be characterised with its low population rate, high swarm rate, low honey yields and also with very high temper. Research findings showed that high honey yield of the race varies between 2 to 6 kg/colony and mean yield could be accepted 4.5 kg/colony honey[6].

Syrian bee (*Apis mellifera syriaca*): This honey bee race is found in Southeast region of Turkey or along the border of Syria Fig. 1. This race might be characterised with low population grow, high aggressiveness and swarm tendencies and low honey yield[4]. It has a high resistant against the bad weather conditions. In addition, it has a good wintering ability and survival rate. Average honey yield of this race is lower than 5-6 kg/colony per year. Due to the low honey yield, high swarming and aggressiveness tendencies this race isn't being kept very much by beekeepers.

Morphological characteristics: Some important morphological characteristics of Turkish honeybee (*Apis mellifera* L.) races and ecotypes are shown in Table 1 and their distribution areas are also shown in Fig. 1.

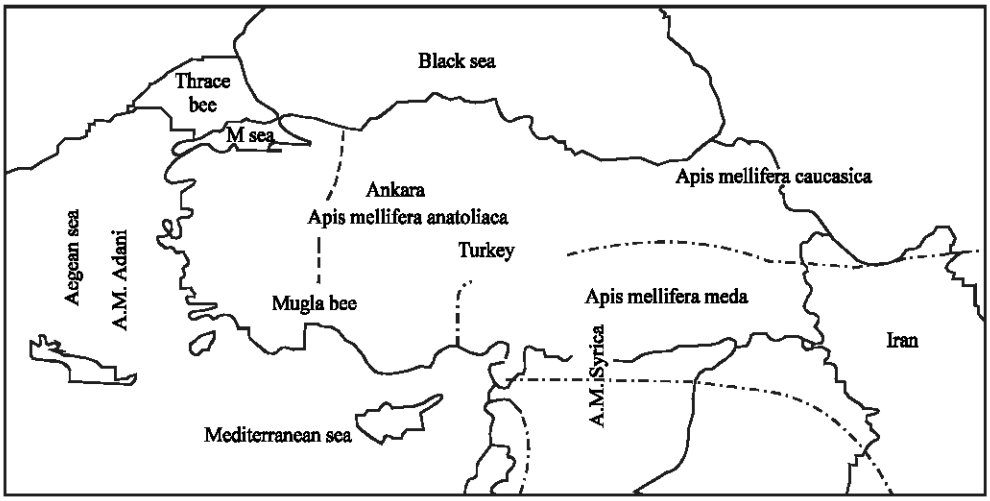

Fig. 1: Distribution areas of turkish honeybees races and ecotypes (*Apis mellifera* L.)

Table 1:Some Morphological Characteristics of Turkish Honeybees (*Apis mellifera* L.)

	Genotypes Mean values					
Characteristics	Caucasian bee (*A.m.caucasica*)	Anatolian bee (*A.m.anatoliaca*)	Iran bee (*A.m. meda*)	East aegean islands bee (*A.m.adami*)	Thrace bee (*A.m.anatoliaca*)	Muğla bee (*A.m.anatoliaca*)
ProboscislLenght (mm)	6.967	6.489	6.275	6.530	6.348	6.579
Cubital index (a/b)	2.108	2.132	2.134	2.084	2.606	2.200
5th Tegit hair lenght (mm)	0.327	0.276	0.227	0.323	0.302	0.299
Tomentum width (mm)	1.072	1.037	0.890	1.125	0.930	1.132
Sternum index	0.787	0.795	0.800	0.800	0.810	0.800
Scutellum colour (Scala)	0.111	5.833	5.320	0.544	0.789	1.222
Front wing lenght (mm)	9.306	9.127	9.246	9.218	9.087	9.167
Front wing width (mm)	3.226	3.142	3.114	3.209	3.143	3.172
Hind leg lenght (mm)	8.222	8.076	7.650	8.128	8.031	8.203
Metatarsal index	0.599	0.583	0.569	0.585	0.571	0.609
A4 Wing vein angle (°)	35.356	32.789	35.325	32.967	31.022	33.300
D7 Wing vein angle (°)	103.867	100.767	97.700	102.056	98.511	101.711
O26 Wing vein angle (°)	34.089	31.611	-	35.989	34.667	34.267
2th Tergit colour (Scale)	4.267	8.067	8.800	4.911	3.889	5.322
3th Tergit colour (Scale)	3.789	7.622	7.735	4.889	3.711	5.133

CONCLUSION

In all studies carried out in Turkey, Muğla Bees are classified as a different group in respect to their morphological, physiological and behavioural characteristics. Therefore this ecotype could be evaluated as a different race rather than ecotype and used as a genetic source for breeding studies.

However, all honey bee races and their ecotypes in Turkey have not been fully determined due to lack of scientific research. It is well known that there are many different races and also ecotypes apart from the races and ecotypes given in this article can be found locally.

Discriminate analyses of data obtained from scientific studies carried out on the determination of morphological and physiological characteristics of honey bees in Turkey showed that the present bees are differ in classes. Therefore, it could be more realistic that bees evaluated in ecotypes should be accepted as different races in Turkey.

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