THE HONEYBEE OF TANZANIA, *APIS MELLIFERA ADANSONII*

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TANZANIA

This honeybee was originally identified as a having *Apis mellifera unicolor* having two races, *intermissa* and *adansonii*. The two races were distinguished from one another by their habitat, the former occupying mountainous areas and the later, the rest of the territory.

Further investigations by Smith revealed that there were three varieties, distinguished from another by their size, colouration and habitat. The most commonly exploited honeybee which occupies the plateau was identified as *Apis mellifera adansonii.* The honeybee that inhabits the mountains, which is larger and darker than the common *adansonii* was named *Apis mellifera monticola.* The third variety inhabits the coastal belt and which is similar in colour too but smaller than *adansonii* was named *Apis mellifera litorea*.

The plateau and coastal varieties are characterised by their vicious behaviour, attributed to the presence of various bee enemies and overheating. The plateau variety is a prolific and highly productive bee. This is evidenced by remarks by Kerr, after he had imported a few queens into Brazil from Tanzania.

All three varieties have highly developed migratory instinct and will abscond upon being persistently attacked by enemies. In the coastal variety migration is accentuated by its lack of instinct to co-ordinate brood rearing with a dearth period, which is often created by presence of pirate wasps during a hot dry spell.

The African beekeeper in Tanzania has successfully “domesticated” the Tanzania honeybee by adapting himself to the characteristics of the honeybee and its environment. He has used cylindrical bark or trunk hives, sited high up in trees to avoid fire hazards, as well as bee enemies. Annually he collects up to 30 lbs. honey and 2 lbs. beeswax from one cylindrical hive. The ability of this honeybee to stay in frame hives has led to investigation being carried out on its productivity in Modified Dadant hives. In this hives the bees can be given certain forms of management and up to 60 lbs. honey and 4 to 5 lbs. beeswax have been collected from a single colony. Some strains have been observed to produce up to 150 lbs. honey and 9 lbs. beeswax.

Attempts are now being made to produce a docile strain by crossing the plateau with the mountain bee as well as selection, to be able to carry out all forms of bee management and thus increase production per colony. The results from crossing are most encouraging, only that care should be taken not to produce second generation hybrids. These have been observed to be extremely vicious and highly susceptible to EFB. Supplementary to this effort the importation of European races will be attempted under a carefully planned programme.

Introduction

The honeybee indigenous to Tanzania is the common African honeybee which is found widely distributed throughout that part of Africa, south of the Sahara desert, except in the Mediterranean Region of this continent. *Apis mellifera adansonii* Latreille (1804) is the name of this honeybee and it falls under the following general zoological classification:

Kingdom	*Animal*
Phyllum	*Arthropoda*
Class	*Insecta or hexapoda*
Order	*Hymenoptera*
Family	*Apidae*
Genus	*Apis*
Species	*Mellifera or mellifica*
Race	*Adansonii*

The natural habitat of this honeybee is the various forests and woodlands, ranging from tropical rain forests to mountain forests and scrublands. In Tanzania variation in climatic conditions and vegetation accounts for the existence of three varieties, distinct from one another in size and some behaviour patterns. During the initial stages of beekeeping observations in this country this honeybee was identified as *Apis mellifera unicolor, L.,* having two races, namely *intermissa*, Butt-Reep and *adansonii,* Latr. (1). *Unicolor* was said to be restricted to the mountains of the north-east; *intermissa* covering the mountains of the north-east and the south-west, also in Bukoba to the west of the lake Victoria; *adansonii* was said to be found in practically every district in the country. This description was probably overlooked by Smith (1921) (2) when

he named the mountain variety *Apis mellifera adansonii monticola*, to distinguish it from the common *adansonii* bee. Earlier (3) he has found no evidence of any difference between the varieties described by Harris (1931) (1). However, the purpose of this paper is to present a more clarified outline of the behaviour and biology of the honeybee of Tanzania, to be able to examine possibilities of adapting this race to other climatical conditions without producing adverse results.

Biometrical consideration

The three varieties of the honeybees found in Tanzanian are distinguished from one another by their size. The common *adansonii* bee found all over the plateau and the lower parts of the mountains Meru and Kilimanjaro build several parallel combs whose worker cell measurements range from 4.76 to 4.94 mm., from centre to centre. Measurements of forewing and tongue length give an average of 8.4 mm for the forewing and 5.85 mm. for the tongue. The worker cell measurements for the combs of the mountain variety give an average of 5.04 mm. center to center. This gives a difference of 0.24 mm. compared with the normal size of 4.80 mm. for the common plateau *adansonii.* The forewing of the mountain variety gives an average length of 9.00 mm., a difference of 0.60 mm. from that of the common *adansonii* bee. The length of the tongue measures 6.05 mm. producing a difference of 0.20 mm. So that the mountain variety is comparably larger than the plateau variety. The coastal variety builds similar combs to those of the other varieties. But the worker cell sizes vary between 4.50 mm. and 4.72 mm., giving an average of 4.62 mm., centre to centre. The forewing and tongue length (average) are 8.18 mm. and 5.75 mm. respectively. This variety is therefore the smallest.

Colouration

Harris (1) described the colour of the plateau *adansonii* as having the abdomen orange-yellow with a variation in colour in different specimens. His description of the *unicolor* and *intermissa* which appears to refer to the mountain variety, is that the former is black with the dorsal surface of the abdomen practically hairless, and the latter being dark coloured with narrow bands of paler hairs on the abdomen.

Smith (2) depicts that the plateau variety is subject to variation in colour and that the workers have yellow bands on the first three segments of the abdomen with yellowish hairs. Strains with four bands of yellow and with all black abdomen do occur, with dark strains in mountainous regions. Very light yellow queens as well as black have been observed. The drones may have tan bands on the abdominal segments with creamy hairs and may be all black. The large black bee inhabiting the mountain areas, particularly at 8000-10,000 feet, has narrow bands of pale grey on the abdomen. The queens and drones are black. The coastal variety is a yellow banded bee, similar in appearance to the plateau variety.

In Tanzania therefore we distinguish three varieties of *Apis mellifera adansonii*, and Irvine (1957) (4) has reported on the Tanganyika Chagga beekeepers as being acquainted with various varieties of bees.

Behaviour

The plateau and coastal varieties are notorious for their vicinousness, which is attributable to persistent molestations from bee enemies and overheating. The enemies include ants, hive beetles, pirate wasps, moths, birds, lizards and the honey badger, with man for the greatest bee enemy. Overheating is brought about by direct rays of the sun striking on the hives, and often during the midday sun the bees are so alerted that they will start a stinging rumpus if a colony approached. The safest distance from a colony of these bees at which one can stay without being attacked has been observed to be 4 feet. This has been taken advantage of in siting the hives. The mountain variety is quite calm and a colony can be approached, as near as just to be able to take off the roof without any danger of being attacked.

A remark by Kerr (5) on the plateau variety, which he imported into Brazil ten years ago was that he found the best strains of bees to be the most prolific, productive and vigorous bees. In a correspondence to us he said that the main difficulty with *Apis mellifera adansonii* was its viciousness and some beekeepers were thinking of destroying the *adansonii* colonies, while others were inclined to retain them on account of their greater production and resistance. The vigour of this honeybee is illustrated by Nogueira-Neto (6) when he remarks on its rapid spread in Brazil and the suppression aggressiveness. But this question is subject to further investigation. However, these remarks on the “Italianlike - but terribly aggressive bees” are genuine and one of the precautionary measures when importing - *adansonii* should probably be controlled breeding with reports referring to its size and other characteristics.

Migration and absconding are common to all varieties. Migration is usually caused by exhaustion of honey stores in the colony as a result of a dearth of nectar. The degree of absconding in the three varieties varies somewhat. In the plateau variety migration is accentuated by simple beekeepers, who rob their

colonies off all the stores, including brood. In the mountain variety, while food conservation is very good, migration may be caused by adverse weather conditions, as well as molestations from various enemies. In this case this kind of behaviour is aptly described as absconding. The coastal variety migrates largely due to lack of food created by the failure of the colonies to co-ordinate brood rearing with the coming of a dearth. But this variety lives in a region where no period of dearth is evident. The only dearth created by the presence of pirate wasps, *Palarus latrifons*, occurs during a hot dry spell.

Migration of bees is so common that Smith (1953) (7) describes the presence of *adansonii* bees in the Savanna woodlands found on the plateau as making them appear to be almost a pest in settled areas. They occupy nearly every convenient cavity and annually, during the migration season which occurs in July and August, large numbers of swarms come to towns where they can get water and subsistence food. We have stocked our hives with bees by catching these migratory swarms.

Swarming is also common with these bees.

Exploitation

The African beekeeper in Tanzania has adapted his method of beekeeping to forest conditions and behaviour of bees. His cylindrical hives made of bark or hollowed out tree trunk are sited high up in trees in the forest, to ensure that they receive swarms and are out of reach of the many bee enemies. As stated above these honeybees are highly productive. Annually substantial quantities of honey and beeswax are collected from the cylindrical hives. These hives are left alone and no form of bee management is carried out. On this let alone method, followed by the simple beekeepers, one hive is capable of producing up to an average of 30 lbs. honey and 2lbs. beeswax.

Adansonii bees can be kept in frame hives and management that can possibly be done on the colonies, despite the bees′ viciousness, enables these bees produce considerable amounts of honey and beeswax.

Colonies kept in Modified Dadant hives with swarm control management on them have produced up to an average of 60 lbs. of honey and 4 to 5 lbs of beeswax. Strains do occur with an average production of 150 lbs. honey and 9 lbs.beeswax.

The future of Tanzania beekeeping

In trying to eliminate the adverse characteristics of *Apis mellifera adansonii* it is essential to lay down a workable programme which should not involve complete eradication of subspecies, because it is the only bee that survives the Tanzania conditions. The programme should include selective breeding and cross breeding between the plateau variety and the gentle mountain variety. The latter has been started with encouraging results. The only aspect which requires precautionary measures is the production of second hybrid generation. In this case preliminary observations have revealed that small bees with an extreme vicious behaviour have been bred, highly susceptible to E.F.B.

Attempts have been made at introducing Europeans races, but although the queens were successfully introduced to the local *adansonii* colonies, their colonies did not survive owing to attacks from the local bees. Another characteristic behaviuor of *adansonii* for which it is noted is robbing. Attempts to rear European races should be accompanied by selection of isolated places. This is not practicable in Tanzania, a factor which calls for some control measures to be thought of.

Summary

The honeybee of Tanzania, *Apis mellifera adansonii*, is one that is subject to variation largely due to the variation in climatic and topographical conditions. In Tanzania we distinguish three varieties of *Apis mellifera adansonii*.

1. The most common plateau variety which is exploited by simple beekeepers in the main honey and beeswax producing regions and noted widely for its viciousness, a factor which has made it difficult to determine suitable bee and hive management methods to make it a highly productive African subspecies.

2. The large gentle mountain variety known only to the Chagga beekeepers on the slopes of mountain Kilimanjaro, which Smith (1961) identified as a separate subspecies and named it *Apis mellifera monticola.*

3. The small coastal variety which appears to be less valuable and least exploited by coastal beekeepers and which Smith (1961) identified as a separate subspecies and named it *Apis mellifera litorea.*

All the three varieties have been a subject of investigation ant their value with regard to honey and beeswax production has been to some extent determined. Efforts are now directed towards improving their productiveness by selective breeding and production of crosses.

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