# On-farm demonstration of splitting queen rearing technique in Meket woreda, Eastern Amhara

Tessema Aynalem and Wondimagegne Bekele

#### Abstract

Queen splitting technique was demonstrated in Meket woreda, North Wollo zone where beekeeping is a major farming activity. Farmers participating in the project obtained on average 1.09 new daughter colonies per hive by using the queen splitting technique. Sixty-seven percent of the new daughter colonies have adapted, but 33% of the colonies have absconded due to long lasted severe drought in the area during the experimentation period. The queen splitting technique has been highly accepted by the beekeepers. It is recommended that to encourage farmers and scale up the technique, the extension department need to focus on creating marketing opportunity and links for bee colonies produced by the beekeepers.

Key words: Abscond, beekeeping, daughter colonies, queen splitting.

#### Introduction

The diversified agroclimatic condition in Ethiopia has created conducive environment for the existence of over 700 species of flowering plants. The high proportions of Ethiopian plants are endemic to the country (Edwards, 1976). The ideal climatic conditions and diversified floral resources allow the country to sustain around 10 million honey bee colonies of which 7 million are kept by farmers and the remaining exist in the forest as wild colonies (EMA, 1981). Beekeeping is the long standing practice in the rural communities of Ethiopia. However, the type of beekeeping practiced in the country is largely traditional good source of income to beekeepers (Nuru, 2007). In these areas where reproductive swarming tendency is low, one of the major problems of apiculture is obtaining swarms either to start or to increase the existing stock. Thus, in these areas developing simple ways of colony multiplication skills such as splitting queen rearing would be very important. The technique has been proven to be efficient for local honey bee colonies (Nuru and Dereje, 1999). It has been also proven and become effective in Western Amhara and recommended to be done in different potential beekeeping districts of the region where there is promising bee forages and scarcity of the honey bee colonies (Adebabay, 2007). Thus, the objective of the current study was to demonstrate splitting queen rearing technique in Eastern Amhara under farmers' management condition.

#### Materials and methods

### Location and sampling technique

The study was conducted in one purposively selected kebele in Meket woreda of North Wollo zone. Meket woreda is selected for its potential for beekeeping. Nine farmers owning strong honey bee colonies in Kenyan top bar hives were purposively selected. Intensive training on splitting queen rearing technique and standard top bar nucleus hives and protecting clothes were given for participants.

### Queen rearing

Nucleus hives were cleaned and smoked with wax and aromatic plants traditionally known and available for farmers. Then the actual splitting of the mother honey bee colonies was undertaken at night using strong torch consecutively by coaching the farmers on checking the presence of eggs and day old larvae, which is potential queen and absence of mother queen during transferring into nucleus hives. The nucleus colonies splitted were put at 100 m to 1 km far from the mother colony to avoid the risk of reuniting. At the 9<sup>th</sup> to 10<sup>th</sup> days after splitting the nucleus hive, colonies were checked whether they have been constructed and sealed queen cells. Hence, by leaving the best queen cell, others were harvested and destroyed to control swarming. In order to check the safety of honey bee colonies, internal and external inspection was carried out in both mother and daughter colonies. At 12<sup>th</sup> to

13<sup>th</sup> days after the emerging, the queen was checked for starting to lay eggs and the colony was returned to the normal backyard apiary site. When the colonies in the nucleus hives become populous, they were transferred in to the standard Kenyan top bar hives.

# Data collection and statistical analysis

The data collected included number of hives multiplied, queens developed/hive, nucleus colonies produced from each parent hive, colonies adapted after splitting, and colonies absconded after splitting. Farmers' and extension workers' views on splitting queen rearing technique was also collected through interviews. The collected data was analyzed and interpreted using descriptive statistics. The SPSS (2003) software was used for data analysis.

# **Results and discussion**

Number of honey bee colonies split, adapted and absconded is presented in Table1. Twelve mother honey bee colonies were split by nine beekeepers. Eleven of the mother colonies gave one extra daughter colony each and one gave two daughter colonies.

|                    | Number of<br>mother<br>colonies<br>split | Number of daughter queens developed | Number of<br>daughter colonies<br>adapted | Number of<br>daughter colonies<br>absconded |
|--------------------|--|-------------------------------------|---|---|
| Total              | 11                                       | 12                                  | 8   | 4   |
| Mean per hive      |  | 1.09                                | 0.67                                      | 0.33  |
| Std. Error of mean |  | 0.091                               | 0.141                                     | 0.152                                       |

Table1. Number of honey bee colonies split, adapted and absconded.

Out of the honey bee colonies that gave one daughter colony, 70% of them have adapted and 30% have absconded. In the case of mother colony that gave two daughter colonies, one has adapted and the second has absconded. Out of the total twelve daughter queens that were developed from the eleven mother colonies, 67% have adapted and 33% have experimental period. The mean number of queens developed per hive was 1.0 and the mean number of nucleus colonies developed from parent hive was 1.09.

Upon completion of the experiment, field day was organized at the kebele in Meket woreda where the demonstration was conducted. The participants in the field day were the target beekeepers, other invited beekeepers, interested farmers, and development agents from the woreda, and socioeconomics and livestock researchers from Sirinka Agricultural Research Center.

Farmers reflected their view on the new bee colony multiplication technique. They expressed that splitting queen rearing technique is of significant importance to expand existing and establish new apiaries compared to their traditional practice. The traditional method of acquiring new bee colonies has been to wait for wild natural swarms coming from elsewhere to settle in their traditional hives which they hang on very tall trees in the forest, around the farm or homestead. The traditional practice is not convenient, requires climbing up tall trees and not suitable to women beekeepers. Farmers are convinced that the new technique will solve their problem of acquiring new honey bee colonies. The traditional bee keeping practice where new colonies are obtained by catching the swarmed colony during flowering period coincides and thus competes with peak agricultural activities such as weeding, harvesting, and livestock keeping. Besides, the traditional practice is very laborious. Furthermore, the colony takes a longer time to build combs, develop and become strong as the colony obtained is kept in traditional hives. As a result, it is rarely possible to harvest honey from the new colony in the first year of its establishment.

The new queen rearing technique demonstrated in this study also has some drawbacks, but the drawbacks can be compensated. The technique involves splitting a strong colony (either transitional or modern hive) containing seven to ten top bar or frames having a comb with egg, day old larvae and small amount of worker bees to cover the brood comb during the onset of flowering season. Participating farmers complained that this technique reduced the honey yield at the first year of splitting. However, they were convinced that the loss can be compensated by the new colony produced which can be sold as a breeding material or maintained as a potential honey producer for the coming year. Furthermore, it is also possible to harvest some honey at second cropping period of the first year. The bee keepers thus have a choice in this new technology, either for production of colony or honey. The advantage of the new queen rearing method is that queen rearing depends on the will of the bee keeper not by the natural process of swarming and it also alleviates the problem of pinching the queen abdomen to kill her and helps to produce queen free of damage.

According to farmers, the splitting queen rearing technique can be undertaken in both high and low honey production potential areas. The strategy for low potential areas could be to produce and sell honey bee colonies using the new queen rearing technique to supplement their income. Currently, honey bee colonies worth more than ETB 600. In high honey production potential areas, beekeepers can benefit from selling both colony and honey. The technology uptake is already encouraging as some follower beekeepers which did not participate in the study have already applied the technology by constructing nucleus hives from locally available materials.

# **Conclusion and Recommendation**

Our results strongly indicate that it is feasible to rear queens by splitting the colony under farmers' condition. The demonstrations also showed that the technique is acceptable and very easy to apply by smallholder bee keepers. The work needs further scaling up across different honey bee production potential areas of the region by using strong mother colonies during the onset of flowering season. The focus by the extension department should be on creating marketing opportunity and market links for honeybee colony producers adopting the new technology.

#### References

Adebabay Kebede, Keralem Ejigu and Assaminew Tassew. 2007. Onfarm evaluation of colony splitting technique in Amhara region. In proceeding of the 2<sup>nd</sup> annual regional conference on completed livestock research activities 14 to 16

September 2007. pp 64-70, Amhara agricultural research institute, Bahir Dar, Ethiopia.

- Edwards, S. 1976. Some wild flowering plants of Ethiopia. Addis Ababa university press, Addis Ababa, Ethiopia.
- EMA (Ethiopian Mapping Agency). 1981. National Atlas of Ethiopia. EMA, Addis Ababa, Ethiopia.
- Nuru Aadgaba and Dereje Wolteji. 1999. Response of Ethiopian honey bee colonies to different queen rearing techniques. In proceeding of 7th Annual conference of Ethiopian society of animal production. Addis Ababa, Ethiopia. pp 125-133,
- Nuru Aadgaba. 2007. Atlas of pollen grains of major honey bee flora of Ethiopia. Holleta Bee Research Center, Holleta, Ethiopia.
- SPSS (Statistical package for social science). 2003. SPSS user's Guide 12.0, SAS institute inc.