
PARTICIPATORY EVALUATION AND DEMONSTRATION OF THE SIMPLEST METHOD OF HONEYBEE COLONY MULTIPLICATION TECHNIQUES IN FEDIS DISTRICT, EAST HARARGHE ZONE, OROMIA REGION, ETHIOPIA

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ABSTRACT

The activity was implemented in Fedis district of East Hararghe Zone at Boko sub-station for the last three years. This activity was initiated with the objective of evaluating and demonstrates simplest honeybee colony multiplication techniques. The activity was undertaken for the consecutive two years (2015-2016). For this case, the apiary site was established at sub-station of Fedis Agricultural Research Center. Three districts were selected to participate in the technology processing such as Fedis, Babile and Kersa. In the technology processing, farmers, development agents and subject matter specialists were involved from the beginning up to the end of the activity. For this purpose, training was provided for those members for both theoretical and practical aspect of full package technology. During demonstration, the bee colonies were transferred to modern hives and splitting of mother colonies were conducted with participation of the farmers, development agents and experts. As a result, four mother colonies were splitted but one absconded and four daughter colonies were developed using this technique. The yield obtained from splitted was 12.50 and 13.77 from daughter this indicate the daughters are active in producing honey than mothers. The feedback of the farmers indicated that the technique was very important for colony multiplication as they compared to their practice. It is recommended to disseminate technology further to reach larger farmers in the areas as it is very simple to practice after having training and reduce cost from buying queen that was raised with the existing price.

Keywords: Participatory demonstration, simplest method, Honeybee, colony multiplication, Queen rearing, splitting

INTRODUCTION

Currently, due to various factors, honey bee colony population is in a state of continuous decline. This is mainly due to indiscriminate application of various agro-chemicals and ecological changes like clearing of vegetation and subsequent recurrent drought. Absconding is also becoming the major problem in beekeeping development and known to be a peculiar characteristic of the area. As the result, it is becoming more difficult to obtain adequate swarms every year to start and expand an apiary (Nuru and Dereje, 1999). In similar way other study

indicated that Beekeepers in the area and other parts of the country believed that the rapid deforestation of honeybee plants around the area is the primary reason for the diminishing number of honeybee colonies. Moreover, the drought existed for many years due to shortage of rainfall, is the other reason to aggravate the problem (Abebe, 2008). As a result, in most cases, farmers in the area are also complaining for that they are facing serious shortage of honeybee colonies. Number of honeybee colonies in the country has been declining (CSA, 2012) and consequently the honey and beeswax production as well as export earnings fell down (Gezahegne, 2001).

Today, based on the knowledge of natural queen rearing systems, different investigators had attempted to develop different techniques of colony multiplications. Moreover, simplified methods of queen rearing have been shown by (Cook, 1986). Besides this, the possibilities of rearing queen using top bar hives, has been well reported (Hardison, 1991). As a result today there are a number of ways of rearing queen. However, all techniques of queen rearing may not be equally suitable to all type of races of bees and to all levels of beekeeping. According to studies carried out at Holeta Bee Research Center on assessing the responses of local honeybees to different queen rearing techniques (Nuru and Dereje 1999) it has been found that Splitting and Miller were more suitable to local bees and the level of beekeeping conditions in the country.

Today, in the country, the role of beekeeping in diversifying and increasing the incomes of the farming communities has been well realized and emphasis is given more than ever. According to the strategic plan of regional states, huge numbers of box hives are being distributed to many districts of the regions (Jim Cameron, 1984). However, its implementation becomes difficult due to shortage of colonies, particularly in colony scarce areas like Hararghe zone. Moreover, today as many landless and jobless youth and private investors become more motivated to get involve in beekeeping getting honeybee colonies become a great challenge. As a result the demand for honeybee colonies become very high and its price is increasing from time to time. Today, in the eastern parts of the country the price of a single colony raised up to 700 to 2100 Birr (observation). Some organization and beekeepers are forced to travel up to hundreds of kilometer to purchase honeybee colonies.

Rearing honeybee queens is a very indispensable task of beekeeping and has many practical advantages like in select and multiply colonies with desired traits, replace old and lost queens and to multiply colonies to be used as source of income and to increase the existing stock. In this regard, many beekeepers want to increase their colony numbers, but their options are through purchasing or baiting swarms which may not be always possible. Moreover, some beekeepers would like to specialize in multiplication and selling of honeybee colonies in which its price is more attractive than honey selling. But they have no skills how to multiply their colonies. However, this technology has not been demonstrated to beekeepers in eastern Hararghe. Therefore, this research activity was developed to demonstrate and transfer knowledge of simplest honeybee colony multiplication techniques.

Objectives

1. To demonstrate and transfer knowledge of simplest honeybee colony multiplication techniques
2. To create awareness among farmers, developmental agents, subject matter specialists and other participant stakeholders on honey bee colony multiplication technique.

Materials and Methods

Description of the study area

The activity was conducted at Fedis sub-station of Fedis Agricultural Research Center. For this purpose participants from three districts were purposely (Fedis, Babile and Kersa) selected and participate on the queen rearing training process. Fedis district has latitude between 8°22' and 9°14' north and longitude between 42°02' and 42°19' east, in middle and low land areas: altitude range is from 1200 – 1600m.a.s.l meters, with a prevalence of low lands. The area receives average annual rain fall of 400 - 804 mm; the minimum and maximum temperature of the area is 20 – 25°C and 30 – 35°C, respectively. Rain-fed is the main agricultural practice they depend. The cropping system is classified as intensive with cereal mono-cropping mainly sorghum and maize. Chat and groundnut is the main cash crop in the study area (FARC, 2011)

Site and farmers selection

Fedis Agricultural Research Center sub-station (Boko) was selected purposely for closely monitoring as it needs day to day inspecting and management and also it helps to involve large number of farmer's one center place is important that near to three districts. The selected districts were based on the potential of Beekeeping production and have an experience on the utilization in the areas. Accordingly three districts were selected such as Fedis, Babile and Kersa.

For this case, one FRG member established which had a total of 17 farmers' established at Fedis district from one Kebele. Among them 13 farmers were male while 4 are female. Those selected farmers were with the collaboration of district's Office of Agriculture and Natural resource, Development Agents and key informant farmers. Those target members were selected with the criteria of having an experience on the beekeeping technology, willingness, innovativeness and have strong commitment and motivation for technology.

Implementation procedures

The activity of honeybee queen multiplication was undertaken at sub-station of Fedis Agricultural Research Center to establish well recognized apiary site to host all beekeepers of the

area target group. For this case, 9 modern beehives were prepared and transferred into 6 and 3 used to keep the split colonies. When the colonies were strong enough, purposive splitting was applied on 3 colonies.

A day after arrangement of the resources, the splitting of the colonies was conducted using recommended procedures (Spivak and Reuter, 1997) Queenless colonies kept in the original apiary site while maternal colonies were moved 500 m away from its place to minimize risk of re-uniting. Inspection was undertaken after 3 days to see the raising of queen cells. On the 9th days, ripe queen pupae was harvested and fixed to combs in the nuclei colonies. On the 16th day the colony checked for the emerged queen and all necessary management carried out. Along with queen pupae harvested, the nuclei colonies were formed and these nuclei colonies kept in nuclei modern beehives produced for this purpose. Then the nuclei colonies were moved away from mother colonies. During this time, necessary management practice was conducted to strength the nuclei colonies until they become well established. Strong colonies with supers was selected and fed with concentrated sugar syrup (2:1 ratio sugar to water) at the beginning of active seasons. To make the work more effective and to create awareness among beekeepers, on spot training was given to the target farmer beekeepers, Development agents and Subject Matter Specialists.

Data collection and analysis method

Both quantitative data (Number and gender participated on the demonstration amount of crude honey/beeswax, amount of purified honey/beeswax and qualitative (quality of honey and perception of the participants) data were collected during implementation. The quantitative data was collected through measuring basic data and using checklist format while qualitative data was collected using through personal observation, interview of farmers and their feedback and focus group discussion. As a result, quantitative data collected from the field was analyzed using simple descriptive statistics and compare means by SPSS version 20 while qualitative data that collected using focus group discussion and key informant interviews and field observation were analyzed using narrative explanation and argument.

RESULT AND DISCUSSION

Apiary site and Target group formation

Fedis district where Fedis Agricultural Research center sub-station established was purposively selected for this study. The site was selected because of suit for close monitoring and center for others districts. And different technologies which are undertaken by researchers from different disciplines exist on this station as a result, farmers get and develop couple of experience they have and from the research station. For this research activity we formed one Farmers Research Group which composed men, women and young farmers based on their interest/willingness to accept technology, sharing knowledge, skill and experience to other groups and innovativeness, and discipline they have in the community respect, model and teach others.



Fig 1 Apiary site picture

Training given

Training is an important core component of this activity. So that according to this activity plan, well organized training was delivered to the target groups. In this training, 17 target farmers (18 males and 12 females), 6 DAs and 2 experts were participated from selected districts during different times. During the training different professional researchers were participated and share their knowledge and skills through theoretical and practical application on the topics of honey bee biology, health, management and queen rearing techniques as well as advises from research extension was given. In addition to this, distribution of extension materials such leaflets and manuals were contributed to the participant groups. This all events were undertaken during different times in organized way.



Fig 2. During training of experts, DAs and farmers

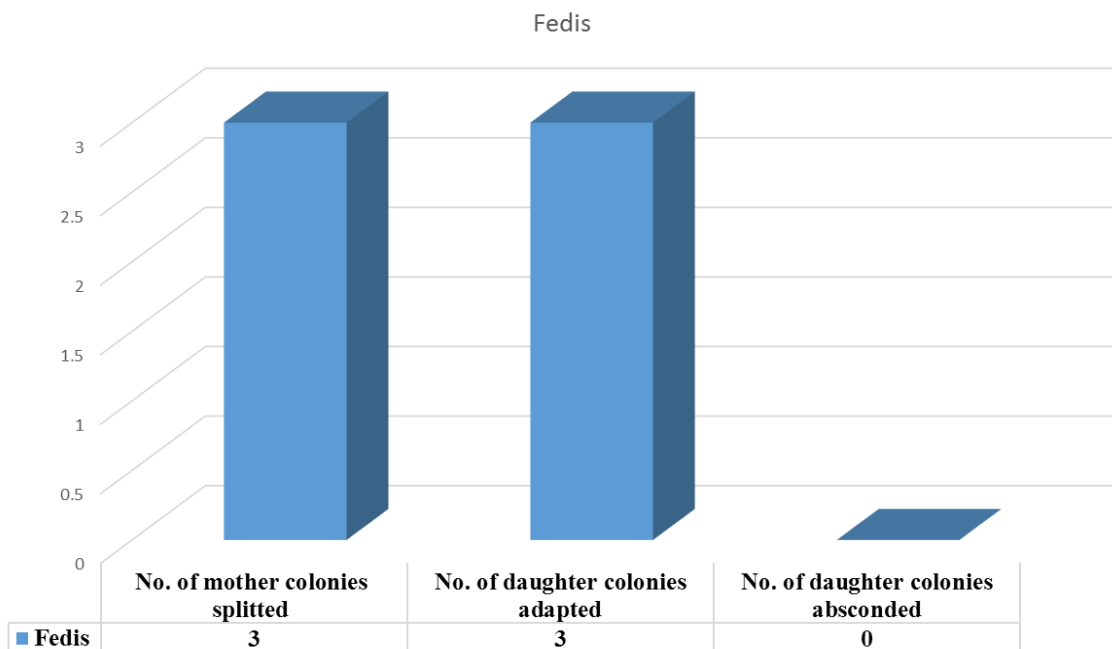
Table .1.Number of participant

Participants								
Districts	Farmers		Development agents		Subject specialist		matter Total	
	Male	Female	Male	Female	Male	Female	Male	Female
Fedis	5	2	1	1	2	0	8	3
Babile	4	1	2	0	1	0	7	1
Kersa	4	1	2	0	1	0	7	1
Total	13	4	5	1	4	0	22	5

Source: Own computation 2015/16

Honeybee colony splitting

For this research activity, seven honeybee colonies were established on research station in active season during flowering time. The established colonies were successfully performed in good condition to undertake the next activity of research objective, splitting. Honeybee colonies splitting were undertaken by the farmers’ research groups and researchers. The time taken to finalize the process by following correct procedure, and the average time taken was 1hour. However, out of the total honeybee colonies splitted and 100% successfully transferred.



Harvested honey yield

The Farmers Research Groups (FRG) with researchers evaluated honey yield harvested on average 13.775 and 12.42 kg from daughter and mother colonies for two seasons respectively. The management like feeding during dearth period cleaning apiary, keeping from pests and diseases for the colonies were equally treated to avoid any confusion on colony strength which attributed to yield gained.

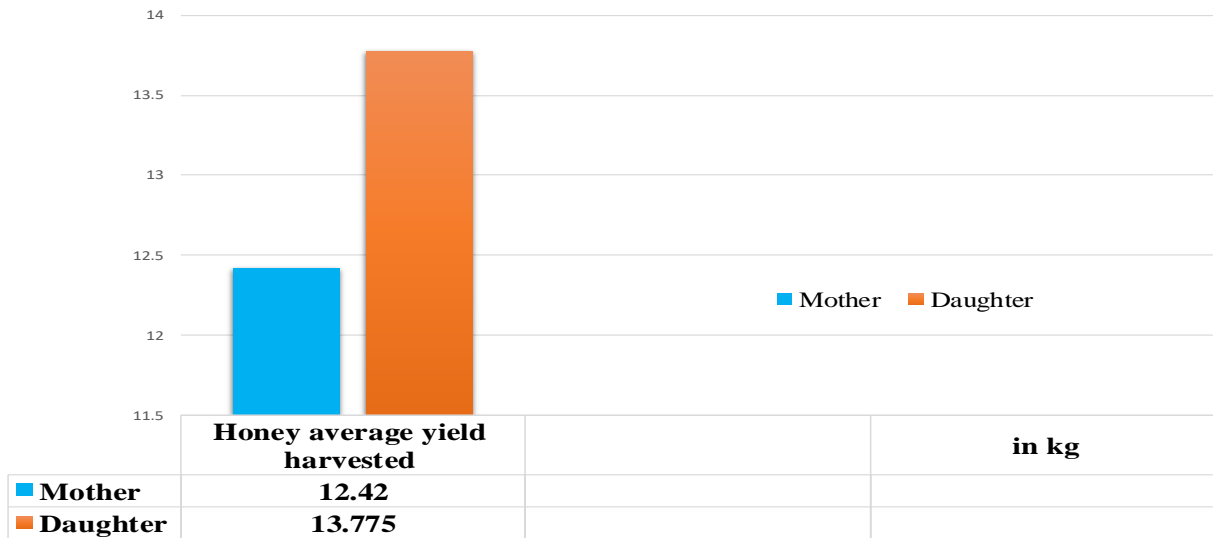


Figure 1. Honey yield harvested from beehives in the area

Source: Own computation, 2015/16



Fig 3. During queen splitting

Participant's feedback on the technology

From apiary/colony establishment to the yield harvesting the of Farmers Research Group suggested different feedback like they lack colonies of honeybee in area due to different reasons like recurrent drought and pesticides which is usable for chat and other crops. For this problem researchers suggested that planting comfortable plants flowers which bees like more around their home or establish a single apiary around/on their farm and avoid pesticide and give great attention for non-smoke industry. The farmers also worried for the first time how to split colonies and finally succeeded in splitting by themselves. They also commented that this technology is very cheap in cost in terms of labor and time since then on station splitting for seven colony splitting it took only one hour and two farmers performed activities round by round in labor and time. This method also could increase number of colonies and no more difficult to split. It could reduce risk of catch swarm in the future. The Farmers Research Group and participant farmers showed interest to continue this colony rearing by splitting techniques in their future production

Conclusion and Recommendation

The honeybee colony and its production like honey, wax and others in this era are becoming expensive, and it is devastating due to recurrent drought, pesticides which farmers are using for chat, and other crops; farmers focus on other agricultural production like crop production and other related activities than beekeeping. To solve this very impeding factors agricultural extension research team established an apiary Fedis Agricultural Research Center on station which consisted seven colonies splitted four daughter colonies with successful and three mother colonies successful but one mother colony absconded. From this research activity apiary establishment farmers got good knowledge, skill and even changed their attitude toward rearing through splitting.

Farmers' Research Group and other participating farmers accepted technology of rearing honeybee colonies through splitting colonies and started around their home and some of them on their farm. Factors like recurrent drought, pesticides farmers use for different purpose, predators are very impeding factors for honeybee colonies as the farmers research group identified it. Rearing honeybee colonies through splitting successfully completed through various processes from its establishment to harvesting reared colonies ant their production. In these achievements different challenges faced, therefore, the following reflections are indispensable for the future research and development activities. The focus of honeybee should be strengthened the extension service and skill of honey bee rearing should be given more fully for the development agents in effective and efficient more on practical and its theoretical concept at farm level to address more number of development agents and the technology should be undertaken further on more number of farmers' field by giving the training and create and build skill to a larger communities.

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