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Feed Resources of Honeybees in Kewet District of Amhara, Ethiopia

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Abstract
A study was conducted in Kewet district of North Shewa zone Amhara Regional State to assess the feed resources of honeybees. Cross-sectional types of studies were used to collect data. Using a purposive sampling technique, 60 beekeepers were included in the survey. Data were analyzed using Statistical Package for Social Sciences software. Plants that are generally considered to be toxic to bees and humans or suspected in the study areas by the respondents are: Gumero, Yeferenj Digit *(Cassia siamea),* Bisan *(Croton macrostachyus),* Iret *(Aloe brahana),* Foch *(Zizyphusmucronata),* Endod *(Phytolaccadodecandra)* and *Susbania species.* Survey conducted in the district showed that the cultivated and natural honey flora potential of the area makes it very favorable for beekeeping. The study district besides cereals, pulses and shrubs/trees/herbs it has known for its horticulture production. Based on the source status and abundance, 60 plant species were identified by the respondents as important bee flora in the study area. The respondents indicated that even though there are different types of bee plants in honey flora seasons, there is a shortage of bee food during the dry seasons. They also indicated that bee forages become declining as compared with the past period due to forest degradation, population growth and expansion of cultivated lands in the area.
Key words*: feed resources, beekeepers, colony, poisonous, Kewet*

Introduction

Ethiopia has a huge natural resource base for honey production and beekeeping is traditionally a well-established household activity in almost all parts of the country. But the benefit from the sector to the nation and beekeepers is not satisfactory. Beekeeping sector provides an employment opportunity for many Ethiopian. About 4,601,806 hives exist in Ethiopia out of which about 95.5% was traditional, 4.3% transitional and 0.20% frame hives (Beyene and Davide, 2007).

The elimination of good nectar and pollen producing tree species in many areas makes it difficult to maintain bee colonies without feeding (Kerealem, 2005). Shortage of bee forage is mainly resulted in Ethiopia due to population pressure and its ecological impacts such as deforestation and shifting cultivation. As the country is endowed with varied ecological zones and different flora, there is a great potential in the country for working with communities by introducing simple and easily adaptable apiculture production systems that will lead to considerable gains in productivity beyond family consumption needs (MoARD, 2007).

Even though there are a substantial number of bee colonies in the different agro-ecosystems of the district, and traditional honey production is a common practice. In Kewet district, the indigenous apiculture knowledge on the feed resources has not been supported by adequate research and extension efforts. Assessment of the feed resources of honeybees in the study area are very valuable tool for producers and other stakeholders involved in the business so as to make an improvement in the sub-sector.

Methodology

Description of Study Area

The study was conducted at Kewet, which is located at about 225 km north east of Addis Ababa close to the highway to Dessie. It is located at 11° 55' N latitude and 37° 20' E longitude at an altitude of 1380 m.a.s.l. The area has an average annual rainfall of 1007 mm, with short rain between March and April and long rain between June and September, and annual mean minimum and maximum temperatures of 16.5 and 31°C, respectively (BoA, 2000).

Sampling procedure and sample size

The study was conducted in three peasant associations of the district (Tere, Yelen and Birbira) selected by purposive sampling technique where beehive productions dominant. A total of 60 beekeepers were randomly selected and approached for interview.

Data collection and analysis

The data obtained from the respondents were collected through interviews using a semi-structured questionnaire. Secondary data was collected from district's rural agricultural development office. The generated information was analyzed using descriptive statistics of SPSS (SPSS ©, Version 20).

Results and Discussion

Socio-Economic Characteristics of the Respondents

The mean age of the beekeepers was 40.1 (Table 1) years with standard deviation of 8.73 for Kewot district. The minimam and maximam age of interviewed beekeepers was 23 and 65 years old for Kewet, respectively. This result showed that people in the most productive age are actively engaged in beekeeping activities.

Table 2. Average age, beekeeping experience, family size and land holding of the sample respondents in the study areas

Socio-economic indicators of respondents (Average)	Kewet district
Age of households	40.1
Experience (year)	11.4
Family size (person)	7
Land holding (hectare)	0.84
Sex (Male) in number	53
Sex (Female) in number	7

Beekeepers had an average experience of 11.4 (ranges from 1 to 39) (Table 1). The level of beekeepers' experience was taken to be the number of years that an individual was continuously engaged in beekeeping. The very limited number of female participation in beekeeping agrees with the findings of (Adebabay, 2008; Tewodros, 2010 and Workeneh *et al*. 2011) who reported low level of women participation in beekeeping.

Table 2. Educational level of the beekeepers

Level of education	% of respondents who have attained education
Illiterate	33.3
Basic education [a]	1.7
Grade 1-4	30
Grade 5-8	0
Grade 9-12	35
Total	100

[a]This includes those respondents who can read and write, including church school.

Educational level of the farming households may have significant importance in identifying and determining the type of development and extension service approaches. The high level of illiteracy in Kewet district limits the effectiveness of formal training programs and requires more emphasis to be placed on practical demonstration of essential concepts especially in improved beekeeping. Traditional beekeeping practices are based on informal opportunities and an individual's level of formal education does not matter (Gichora, 2003). Those who can read and write should be supplied with training materials written in a local language in the way that they can understand easily.

Poisonous nectar and pollen sources

During this survey, beekeepers were interviewed if they do know poisonous plants in their localities. Only experienced beekeepers list few poisonous plants. These can be plants whose nectar or pollen is toxic to the bees themselves, and those in which the honey produced from their nectar are toxic to humans. Fortunately, there are relatively few such plants are reported in the study areas and also in the Northern Regions of Ethiopia (Nuru, 2002).

Plants that are generally considered to be toxic to bees and humans or suspected in the study areas by the respondents are*:* Gumero, Yeferenj Digit *(Cassia siamea),* Bisan *(Croton macrostachyus),* Iret *(Aloe brahana),* Foch *(Zizyphusmucronata),* Endod *(Phytolaccadodecandra)* and *Susbania species.* Nuru (2002) reported some

poisonous bee plants from Northern regions of Ethiopia, and pollen grains of nine poisonous species of bee plants from the families *Ranuculaceae*, *Solanaceae*, *Acanthacae*, *Euphorbiaceae* and *Phytolacaceae* were analyzed and documented.

The knowledge of beekeeper regarding the damage caused by poisonous bee plants on honeybees was comparatively very limited. Only deaths of field bees were reported under or around the suspected 'plants'. However, there is no evidence whether plant products or pesticide applications poisoned the bees. Generally, damage to colonies of bees from the poisonous nectar or pollen from these plants may be severing in one year and of little consequence another time (Robinson and Oertel, 1976).

Honey Bee Flora

Vegetation characteristics of the study areas are considered to be an important indicator for the potentialities of the area for beekeeping. Beekeeping is more dependable on ecological suitability of an area than any other livestock production (Nuru, 2002). Survey conducted in the district showed that the cultivated and natural honey flora potential of the area makes it very favorable for beekeeping. Naturally growing plants occupies quite large in variety proportions than cultivated crops (Amsalu, 1996).

The major honey flow season of Kewot district is from October to November and the minor flow season is from May to June, and it depends upon the availability of bee forage. Based on the source status and abundance, 60 plant species were identified by the respondents as important bee flora in the study area. The scientific names were determined using reference books of Fichtl and Admassu (1994) and Azene *et al*. (1993).

Table 3. List of Honey plant species found in Kewet district.

No	Scientific name	Common name	Agro-ecology	Flowering period Months
1	*Acacia species*	Girar	High/Mid land	March – July
2	*Eucalyptus camadulensis*	Qeyibarzaf	Mid land	March –June
3	*Cordia Africana*	Wanza	Mid land	August – November
4	*Corotonmacrostachy*	Bisana	Mid land	March –June
5	*Grevillearobusta*	Grevillea	Mid /High land	August- November
6	*jacaranda mimosifolia*	yetebemenjazaf	Mid land	January - March
7	*Junipurusprocera*	Tid	Mid /High land	Year round
8	*Ficusvasta*	Warka	Mid /High land	March –June
9	*Ficussur*	Shoal	Mid land	March – June
10	*Acacia saligna*	Saligna	Mid /High land	August –October
11	*Sesbaniasesban*	Sesbania	Mid land	August –October
12	*Ricinuscommunis*	Gulo	Mid /High land	April – June
13	*Vernonia species*	Girawa	High/Mid land	December – March
14	*Carissa edulis*	Agam	Mid /High land	October-December
15	*Entadaabyssinica*	Kontir	Mid /High land	August –October
16	*Euphorbia tirucalli*	Kinchebe	Mid /High land	January-April
17	*Syzygiumguiness*	Dokima	High/Mid land	April – June
18	*Euphorbia spp*	Qulqwal	Mid land	November- October
19	*Millettiaferruginee*	Birbera	Mid /High land	Jannuery- April
20	*Dovyaliscaffra*	Koshim	Mid /High land	March – June
21	*Rosa abyssinica*	Kega	Mid /High land	August – October
22	*Aloe berhana*	Alole	Mid land	September –October
23	*Echinopessp*	Kosheshila	Mid land	March – April
24	*Millettiaferruginee*	Bir-bira	Mid /High land	October
25	*Solaniumindicum*	En'buai	Mid land	January-February
26	*Justice schimperina*	Sensel	Mid /High land	August- January
27	*Eucleaschimperi*	Dedeho	Mid /High land	January – March
28	*Rosemerinaofficinlis*	Rosmery	Mid /High land	August-Sept
29	*Zea mays*	Bokolo	Mid land	June – September
30	*Eragrostisteff Teff*	Teff	Mid land	September-October
31	*Sorghum bicolor*	Mashila	Mid land	June – September
32	*capsicum annuum*	Berbere	Mid land	August-October
33	*Phaseolus vulgaris L.*	Boleke	Mid land	August – September
34	*Cicerarietium*	Shumbura	Mid land	October-November
35	*Unidentified*	Duba	Mid/Highland	August-October
36	*Allium cepa*	Shenkurt	Mid/Highland	MayJune/Yearround
37	*Brassica carinata*	Gomenzer	Mid/Highland	September-October

38	*Lycopersiconesculentm*	Timatim	Mid land	December –February
39	*Guizotiaabyssinica*	Nuge	Mid/Highland	September-October
40	*helianthus annus*	Sun flower	Mid/Highland	September
41	*Helianthus annuus*	Suf	Mid/Highland	September-November
42	*Linumutitudismum*	Telba	Mid/Highland	September
43	*Brasicanigra*	Senafich	Mid/Highland	September- April
44	*Nigella sativa*	Tikurazmud	Mid land	November–December
45	*coffee Arabica*	Coffee	Mid/Highland	March – April
46	*Rubusspp*	Enjori	Mid/Highland	March – June
47	*carica papaya*	Papaya	Mid land	August –October
48	*Psidiumguajava*	Zeytuna	Mid land	June – September
49	*Musa x paradisiacal*	Muz	Mid land	April – June
50	*Citrus sinensis*	Orange	High/Midland	December-January
51	*Citrus aurantifolia*	Lomi	High/Midland	March – June
52	*Mangiferaindica*	Mango	Mid land	January-March
53	*Annonasenegalensis*	Gishta	Mid land	January-March
54	*Persea Americana*	Abokato	Mid land	January-March
55	*Guizotiascabra*	Mech	Mid/Highland	August-December
56	*Bidens sp.*	Adey – abeba	Mid/Highland	August-October
57	*Ocimumbasilicum*	Besobila	Mid/Highland	August-December
58	*Trifoliumsteudneri/acaule*	Maget	Mid/Highland	August-December
59	*Cajanuscajan*	Pigeon pea	Mid/Highland	August-September
60	*Eleusinefloccifolia*	Serdo (Grass)	Mid/high land	August- November

The study district besides cereals, pulses and shrubs/trees/herbs it has known for its horticulture production. Various horticultural crops as *Allium cepa, Citrus sinensis, Perseaamericana, Casmiroaedulis, Malusdomesticas, pranuspersica, Psidium, guajava, carica papaya, Lycopersiconesculentum, Citrus aurantifolia, Mangiferaindica, Annonasenegalensis and Musa x paradisiacal* have been grown at the backyard of every homestead for cash and consumption purposes. All these plants were regularly visited by honeybees. In the study area, it was also reported by the beekeepers that there are some species of plants, which flower during the long drought periods. Generally, honeybee plants such as *Acacia* spp, *Vernonia* spp., *Echinopes spp., Ficussur, Ficusvasta, Jacaranda mimosifolia, Corotonmacrostachy* and *Rubus spp.* are well known for their dry period flowering and serve as subsistence forage to bees in the study areas.

The respondents indicated that even though there are different types of bee plants in honey flora seasons, there is a shortage of bee food during the dry seasons. They also indicated that bee forages become declining as compared with the past period due to forest degradation, population growth and expansion of cultivated lands in the area.

Conclusions

To alleviate the shortage of honey flora, protection and conservation of natural vegetation and plantation of bee forage in farm boundaries and homestead, using multipurpose bee forage species should be well promoted. Also the positive impact of grazing area enclosures should be encouraged. It could be known the floral calendar of the poisonous plants so as to practice migratory beekeeping at the time of blooming.

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References

Adebabay Kebede, Kerealem Ejigu, Tessema Aynalem and Abebe Jenberie, 2008. Assessment of the status of beekeeping in Amhara region. Amhara Regional Research institute, Bahirdar Ethiopia. 2008; 32-35.

Amsalu Bezabih, 1996. Preliminary study on honey plants around Holeta. Holleta Bee Research and Training Center, Holeta, Ethiopia.

Azene Bekele, A. Birinie and B.Tengnas, 1993. Useful trees and shrubs for Ethiopia, Identification, propagation and management for agricultural and pastoral communities. Swedish International Development Authority, Nairobi, Kenya. pp. 474.

Beyene T. and Davide P. (2007). Ensuring Small Scale Producers in Ethiopia to Achieve Sustainable and Fair Access to Honey Markets. Paper Prepared for International Development Enterprises (IDE) and Ethiopian Society for Appropriate Technology (ESAT).

BOA, 2003b. (Bureau of Agriculture). Amhara National Regional State (ANRS) Bureau of Agriculture, Special report on technology packages. BOA, Bahir Dar, Ethiopia.pp.4-6.
Fichtl, R. and Admassu Addi. 1994. Honeybee Flora of Ethiopia. Margraf Verlag, Germany. 510p.
Gichora M 2003 Towards Realization of Kenya's Full Beekeeping Potential: A Case Study of Baringo District. Ecology and Development Series No. 6, 2003. Cuvillier Verlag Gottingen, Germany.157p.
Kerealem E. (2005). Honeybee production system, opportunities and challenges in Enebsesarmidir woreda (Amahara region) and Amaro special woreda(SNNPR),Ethiopia. Unpublished M.Sc. Thesis, Alemaya University, Alemaya.
MoARD (Ministry of Agriculture and Rural Development), 2007. Livestock Development Master Plan Study Phase I Report – Data Collection And Analysis Volume N – Apiculture, Ministry of Agriculture and Rural Development, Addis Ababa, Ethiopia.
Nuru Adgaba, 2002. Northern region of Ethiopia prodissertation Rhodes university department of zoology and entomology South Africa.
Robinson, F.A. and E. Oertel, 1976. Sources of nectar and pollen. pp.283-302. In: Dadant and Sons (ed.), The Hive and the Honey Bee. Dadant and Sons, Inc, Hamilton, Illinois, U.S.A.
Tewodros Alemu 2010 Assessment of Honeybee Production Practices and Honey Quality in Sekota Woreda of Waghimra Zone, Ethiopia. MSc Thesis Presented to the School of Graduate Studies of Haramaya University; 2010.Pp.122.
Workneh Abebe 2011 Identification and documentation of indigenous knowledge of beekeeping practices in selected districts of Ethiopia. Journal of Agricultural Extension and Rural Development Vol. 3(5); 2011.pp. 82-87.

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