

Comparative advantages, Apiary site Selection and Types of Bee Keeping

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Summary: Bee keeping is highly profitable and important type of production in livestock resource development and promotion office, since it has numerous advantages for human beings. Honey bees can communicate to each other to transfer information through code system. Out of different communication dancing is the most important ways of communication by the social insects of honey bee. Apiary site selection is done based on preferred parameters. There are four type of bee keeping such as: 1) Traditional forest beekeeping, 2) Traditional back yard beekeeping, 3) Transitional beekeeping and 4) Frame box or modern bee keeping.

[Abebe, M.A. **Comparative advantages, Apiary site Selection and Types of Bee Keeping.** *Life Sci J* 2025;22(3):1-4]. ISSN 1097-8135 (print); ISSN 2372-613X (online). <http://www.lifesciencesite.com>. 01. doi:[10.7537/marslsj220325.01](https://doi.org/10.7537/marslsj220325.01)

Key words: Advantages; apiary site; bee keeping

1. Introduction

Apiculture (bee keeping) is a science based industry which uses bees as micromanipulators to harvest plant foods from environmental resources that would otherwise waste or the science and art of rising honey production for man's basic economy. Apiary is a place where honey bees and hives are kept (Eva *et al.*, 2012).

2. Comparative advantages of Bee keeping

There is numerous importance of bee keeping like: Valuable nutritional food, Honey (It is delicious and nutritious substance by which man combat in one way to other malnutrition. It is a sweet, viscous juice collected in larger quantities from bees hive), Pollen a male reproductive agent of flowering plants, Royal Jelly or bee's milk (Milk has studied to have a good source of vitamin B, It has medicinal value, it can be used as making chocolate, candy and wine as well as lotion and tonics for therapeutic use and it has high price (10€/gm), Providing Remunerative Employment (The expansion of bees industry absorb more labor), Earning foreign currency (Hive products (honey, bees wax, royal jelly and propolis are nonperishable commodities that can be marketed locally and abroad), Requiring small initial investment (Keeping bees in the apiary in both tropics and Europe which is very cheap, all the important inputs are available in the locality and Bee keeping is self-reliance or not depend on importation

of equipment), It increase crop production through the use of pollination (20 – 40% increment) and Wind and Insects are the two important pollination agents, It can be done by both sex group and It require little and waste land (Eva *et al.*, 2012).

3. Communication systems of honey bees

Honey bees can communicate to each other to transfer information through code system. The transferring or sending of information to other bee colonies called encode. Receiving of information from other bee colonies is called decode. Worker bees produce a specific pheromone to be recognized by the colony. The queen produces queen substance to be recognized by the nurse bee. They become alert to one another by her colony by the help of alarm odor produced by worker bees. When food is found in the field they tell other members of their community to visit the area and this is accomplish by bees dance to show the distance & direction.

3.1. Types of communication of honey bee

These are 1) Chemical communication (pheromone), 2) Tactile (touching by antennae), 3) Auditory (use of antennae hairs, taste, smell and direction), 4) Visual (eye /compound eye) and 5) Dance (movements of their body). From the above type of communication, **Dancing** is the most important ways of communication by the social insects of honey bee. Dancing tells as the **direction**,

distance, quality and quantity of the food resources to other members of the community.

There are a number of different types of dancing:- these includes, 1) Round dance, 2) Waggle dance, 3) Dorsa-ventral-abdominal- vibration (DVAV), 4) Just lying (immediately), 5) Trembling/sound in short period, 6) Shaking and 7) Buzzing (lively energetic)/ continuous sound and the last 4 are poorly understand but can recognized by honey bee (Eva *et al.*, 2012).

Round dance: It is the **simple dance** performed by the scout bees after discovering the food source. The dance is performed, when food is less than 100 meters in the **vicinity** of the hive. The scouts dance the "**round dance**" on the surface of the comb (left). The dance is round for one complete revolution and **turned back**. It turned to **opposite** direction after one rotation. Round dance indicates quality and the **distance** of the food source. During dancing the scout bees exchange the food sample to each other to test the quality of **nectar and** If the dance is vigorous and long lasting, it shows the food is **best quality and quantity**.

Waggle Dance: when the distance food is greater than 100 meters from the hive. The scouts dance the "**waggle dance**" (right). The waggle dance has two components that is a **straight** run which conveys information about the **direction** of the food and the **speed** at which the dance is repeated which indicates how **far** away or distance the food is. It tells as the direction, distance, quality, and quantity of the food and also indicates the duration (time taken). The dance seems or likes to be **figure 8** which is called **wag-tail dance**.

Dorsa ventral abdominal vibration (DVAV): The scout bees show their dance with worker to communicate the food source. They vibrate their abdomen dorsa-ventrally to communicate each other.

DVAV regulate either:- Foraging behavior of the workers or swarming behavior. Foraging behavior regulates (The daily foraging activities of the worker and Seasonality of forage (this dance is performed at peak season or honey flow period)) and Swarming behavior regulates (To stop laying egg or for interaction).

4. Major Parameters for Site Selection

These includes: Presence of natural vegetation, Presence of fresh water /Bees need water to dilute honey and cool the hive during hot weather, Presence of native honey bees, Environmental condition (Temperature, Humidity, Rain Fall) based on the species because, they cannot fly when the temperature is below 57°F and above 100°F, Chemical poisoning, Disease and predators and Locate your bees close enough to your home to observe them regularly (Johan *et al.*, 2014).

5. Types of Beekeeping

In different parts of the world and in Ethiopia as well four different types of beekeeping have been under exercise from ancient to present. These are: 1) Traditional forest beekeeping, 2) Traditional back yard beekeeping, 3) Transitional beekeeping and 4) frame box or modern bee keeping.

5.1. Forest beekeeping

It is the intermediate stage between honey hunting and back yard beekeeping in its developmental stages. Placing hives in the forest on very long trees for the occupation of hives by the bees. In some areas living trees are also used to catch swarms. Forest beekeeping is common in Russia, Germany, and England. It is also under exercise in Ethiopia especially around the forest-covered areas of the country where the population of honeybees is abundant.

Advantages of forest beekeeping are: The bees will not cause harm on the domestic animals and humans and Bees can get abundant forage plants in their vicinity.

Disadvantages of forest beekeeping are: Once the bees occupy the hive, the beekeeper goes to harvest the honey by checking the weight of the hive for the presence of the honey, i.e. no attendance/care is made for the bees, During the honey-harvesting period the hive is dropped down to the ground from the top of large tree, This causes the destruction of the bee colonies partially or totally and It can also create great danger to the beekeeper in climbing high tree at night to bring down the hive with its heavy content and stinging bees (Johan *et al.*, 2014).

5.2. Traditional back yard beekeeping

Keeping bees in a fixed comb hives as in the forest type of beekeeping but with some sort of safeguarding made for the bees. It is very common and widely practiced method of bee keeping in

different parts of the world and it is widely exercised in all parts of Ethiopia.

Advantages of traditional bee keeping are:

The construction of the hive is very simple; the hive can be constructed from locally available materials, High wax production, No need of hive accessories like modern bee keeping equipment to run the keeping, which is very expensive and no need of skilled manpower to run the bee keeping and prepare the hives (Johan *et al.*, 2014).

Disadvantages of traditional bee keeping

are: Inconvenient to inspect and for internal feeding during the need for supplementary by the bee colonies, Very small in size hence leads to uncontrolled for swarming, No possibilities of suppering, No partition ship between brood chamber and honey chamber, Poor honey quality, Hive production is poor, Transportation is difficult and Materials is also poor.

5.3. Transitional beekeeping

Kenya or Tanzania Transitional (intermediate) bee keeping is one of the improved methods of keeping bees using top bar hives. In this case the type of hive used is Kenya Top Bar hives (KTBH), Mud hive and others. A Top bar hive is a bee hive which bees build their comb from top bars, instead of attaching comb to the ceiling of the hive (as in traditional fixed comb hive), or building combs inside at tangled wooden frames (as in frame hive).

The bars are 3.2cm wide and 48.3cm long and are arranged across the hive top. To help the honeybees to place their combs on the right position on the bar, a line of bees wax is smeared at the center of the bar. Each hive carries specially designed **27-30 pieces of timber" Top Bars"** where honeybees attach their combs.

Advantages of Transitional Hive are:

It can be opened easily and quickly, The bees are guided into building parallel combs by following the line of the top bars, The top bars are easily removable and this enables the beekeeper to work fast, The top bars are easily to construct than frames, The top bar hive is relatively simpler to build than a hive with frames, The combs can be lifted from the hive, they replaced, and this allows the beekeeper to examine the condition of the colony. Honeycombs can be removed from the hive for harvesting without disturbing combs containing broods, The colony is

therefore will not be harmed and the bees can continue gathering, Harvesting of both honey and bees wax are obtained in this type of beekeeping, because (Relatively high yield and Relatively good wax production), Relatively transportation is good, Materials also good, the empty comb is not returned to the hive and the hive can be suspended with wires or ropes and this gives protection against predators.

Disadvantages of transitional beekeeping

are: Top bar hives can be (relatively) more expensive than traditional hives made from local materials, Combs suspended from the top bars are more to break off, this makes it difficult to transport colony hives in vehicles especially on bad roads for long distances, The honey harvested from top bar hive is less in quality than from the frame hives, as honey, pollen and broods are filled on the same comb and made from mud, plywood, stick and rope or Nile.

5.4. Improved (Modern) Bee keeping

In this type of bee keeping different types of frame hives are used. Some of these frame hive being used in our country are Zander and Lang troth hive, in common and Dadant, M. Zander and Segeberger (Foam hive) in rare cases. These hives differ in the number and A size of frames that are used and thus the overall dimensions of the hives are different. The standard Lang troth pattern hive accommodates 10 frames 44.8cm length at 34.9mm center-to-center spacing. The most commonly used type of hive in the country is Zander pattern 10-frame hive. Since the hives detailed above are designed for European races of bees they should be modified to suit the local-honey bees. The desired spacing for our bees is obtained by reducing the spacing of the frames from the standard 34.9mm to 31.8mm with this spacing the Lang troth hive will take exactly 11 frames as opposed to the normal 10. These frame hives has got certain hive component, which contains the bottom board, the brood chamber (base hive,) the super (honey chamber,) the inner and outer cover. The brood chamber and Honey chamber (a super) are essentially the same, and are frequently grouped as hive bodies (Myrsini *et al.*, 2015).

Advantages of Modern beekeeping are:

The amount of honey produced is high 15-20kg/hive averagely, But it ranges from 0-60kg/ hive, The quality of honey is good, much better than the honey produced from transitional and traditional bee

keeping. **This is because, here there are (Queen Excluders, Centrifugal honey extractor / are used and Honey strainer).** This method of bee keeping helps (makes possible) swarming control by: Suppering the hives, Seasonal inspection, It is possible (convenient) to make hive manipulation and search solution for the problems in the hive (to bees), It is possible to undertake migratory bee keeping (moving the bees from place to place: to search for available honey bees flowering plants) (Myrsini *et al.*, 2015).

Disadvantages of modern beekeeping are:

The bee keeping equipment of modern methods is relatively expensive. It requires skilled manpower to run the bee keeping and prepare the modern hives. The equipment needs very specific precaution. Required high quality of hive equipment (one box may cost up to 1200), required skilled manpower and it is not affordable by poor farmers

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6. References

1. Eva, F., Giles, E.B., Jean, D.C. and Michael, A.Z. (2012). Standard methods for European foul brood research. *Journal of Apiculture research*; 52(1):1-4.
2. Johan, P.H., Thomas, S.T., Jonathan, M.C., Abdullah, I., Stephen, F.P. (2014). Fumagillin: An Overview of Recent Scientific Advances and Their Significance for Apiculture, *Journal of Agricultural Food Chemistry*: 62(13): pages, 2728-2737.
3. Myrsini, E.N., Dino, P., McMohan, Vincent, D., John, B. and Robert, J.P. (2015). Interspecific competition in honey bee intracellular gut parasite is asymmetrical and favors the spread of emerging infectious diseases, *Proceeding of Biological Science*; 7: pages, 282-1798.

3/3/2025