

SUPPORTED COLONY MANAGEMENT SYSTEM FOR INCREASING HONEY PRODUCTION

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Abstract: Colony managements applied by beekeepers have effective roles in maintaining the increase in colony size and productivity. Some specific measurements used with this criteria have selective importance in honey production. Incorrect applications may cause decreases in crop production and lead to winter losses. The best colony management technics and colony support management systems are discussed under this topic. The Colony support management system is based on setting pair colonies which produce honey from each colony in every pair. Of this colony pair, one is called the supporter and the other is called the producer. Observations showed producer colonies able to produce honey more than any other usual colonies in all varying conditions and the system is able to increase total honey production of the apiary.

Introduction: As we know, the honey efficiency increases linearly as the colony population level increases (Figure 1). Therefore increasing the population level is accepted as the first factor in the productivity. One of the important factors which determine the productivity is the amount of production per worker bee. This feature increases as the population level increases but it decreases after a certain point. Therefore keeping the worker bees in the apiary in the most efficient population level increases the total productions amount of the apiary.

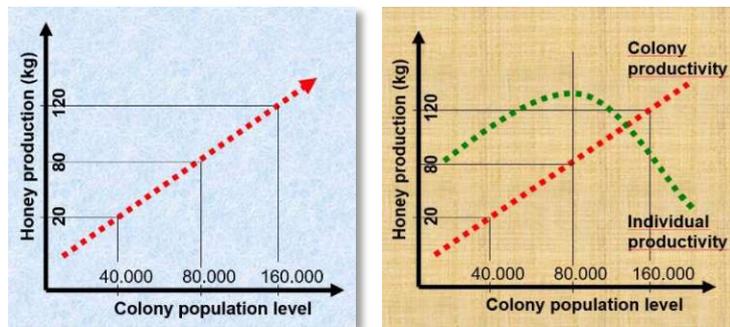


Figure 1. The relationship between colony population level and honey production.

However under some conditions, when the small colonies are gathering honey, it can be seen that the strong colonies are in starvation because of their brood production activity (Figure 2). The reason of this matter is the number of foragers are being very few in proportion to the young workers, namely the consumption is higher relatively to the production.



Figure 2. Results of the honey gathering and brood production activities.

One of the essential problems relating to the production is the coincidence of the period of having high ratio of the foraging bees with the period of the honey flow. This synchronization is one of the basic conditions of decreasing the period of brood production and gathering honey and thus, is one of the most important factors of the productivity.

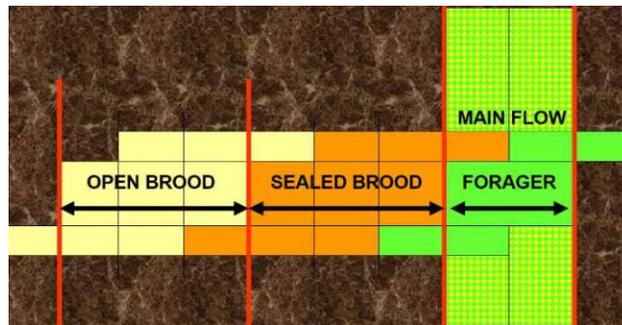


Figure 3.

All these factors mentioned about the productivity are the fundamental of the supported colony management system. This system as well as helps the beekeeper in increasing the productivity it is also enables the production of natural swarms and rearing the queens. The Colony support management system is based on setting pair colonies which produce honey from each colony in every pair. By changing tasks during the next period of main nectar flow, supporting colony becomes the producing colony and the producing colony becomes the supporting colony.

Although there are many environmental factors affecting honey productivity, this system shows that the total honey production from 2 consecutive honey flows can be increased almost 4 times theoretically. The object is to increase the honey production by collecting the foragers of the two colonies in the producer colony and collecting the consumers of the two colonies in the supporter colony before main nectar flows. The transfers of the consumers to the supporter colony and the transfers of the foragers to the production colony will result in a much higher level of total honey production from these two colonies.

Method: Supported colony management system is basically based on individual productivity enhancement. In this method it is aimed to increase brood production in all colonies in the apiary 6 weeks before the main nectar flows. The brood produced in this period will increase the number of foragers that will work efficiently in honey production during main nectar flows. These eggs become adults after 3 weeks and the colonies are divided into two parts, supporters and producers. The supporter colonies are numbered A₁, A₂, A₃, etc. And producer colonies are numbered B₁, B₂, B₃, etc. So that two groups work as a team. For example, A₁ and B₁ colonies support each other alternately.

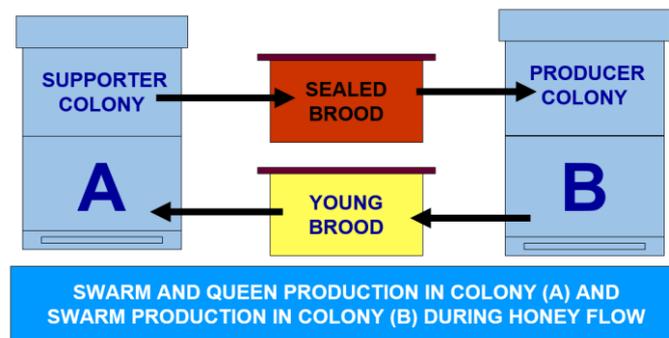


Figure 4.

Brood transfers to the production colony should be started 3-4 weeks before main honey flow and should be completed 1 week before the main nectar flow. Every week 1 or 2 frames with sealed broods of support colonies are transferred to production colonies. When the production hive begins to produce honey, the young broods are transferred to supporter colony to reduce honey consumption. The supporter colonies can be fed to the required amount.

In order to understand the essence of the supported colony management system let us suppose that each colony (Colony A and B) consists of 60.000 individuals. As an example to this situation let's assume that a colony collecting 60 kilograms of honey consumes 30 kilograms and accumulates 30 kilograms. When the foragers of the support colony collecting sixty kilograms are given to production colony, the production amount will equal to 90 kilograms, namely sum of thirty kilograms and sixty kilograms as there will be no consumers of the honey produced by the foragers.

EACH COLONY: 60.000 BEES = 30.000 PRODUCER + 30.000 CONSUMER

They produce 30 + 30 = 60 kg honey in total for the first main nectar flow.

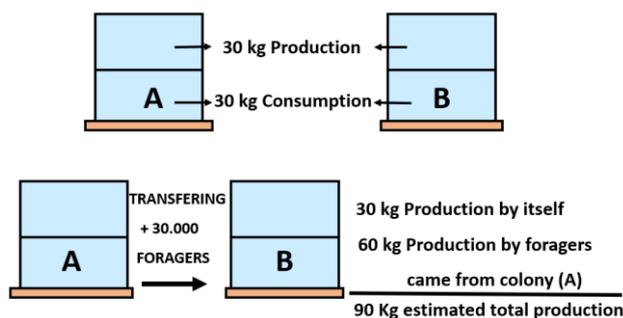


Figure 5.

This method gives excellent results especially for 2 consecutive main nectar flows (each of which lasts for an average of 3 weeks) or longer main nectar flows. Since the brood production will be decreased after the first main nectar flow, the number of consumers increases in colonies. In such situations colonies can not be productive in the second main nectar flow and as a result, the yield of honey is considerably reduced. In such situations it is almost impossible for colonies to accumulate 30 kg of honey that we theoretically accept for our example.

In this point, the colony support system ensures high efficiency in each of the two selected colony alternately, and that the total yield of these two columns can be increased 4 times.

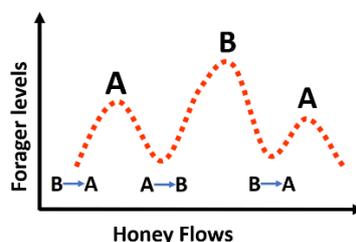


Figure 6. Alternation.

For the next honey flow, the support colonies are prepared as production colonies and this time the production colonies of the previous period support them by passing to the support position. Due to this conversion applied, half of the colonies are held as producer position and the other half as supporter position in every period and honey production in high levels are supplied from every hive.

Since only the sealed broods of the support colonies will be taken and transferred to the production colonies, there will be enough foragers remained in the support colonies to gather honey sufficient for the hives. Even though the honey gathered won't be accumulated, it will be sufficient to preparations for the next main nectar flow. Thus, for both nectar flows, support colonies will be able to survive and collect enough nectar and pollen for brood production. The aim of the system, theoretically, is to convert the 1:1 proportion of the foragers and consumers in the colonies to 1:2 (foragers : consumers) in the support colonies and 2:1 (foragers : consumers) in the production colonies at the start of main nectar flows. Brood transfers to the production colony should be started 4 weeks before main honey flow and should be completed 1 week before the main nectar flow. At the beginning of the

honey season, when the production hive begins to produce honey, the young broods are transferred to supporter colony to reduce honey consumption.

Thus both the consumption of the production colony is reduced and the consumption colony is converted to the production colony for the next honey flow. This ensures that the full range of workers' bees is used at maximum efficiency for 2 colonies and worker bees become productive at the highest possible level for main nectar flows.

The total yield for the first main nectar flow will be up to 120 kg since 30 kg of honey assumed to be consumed by production colony will decrease as a result of the transfer of the young broods to the support colony, that will come to the consumer position in the production colony.

When colony support system is not applied, these two colony will only be able to produce 60 kg of honey in total for two consecutive main nectar flows because of their brood production activity. However, when the support management system is applied the total yield can reach theoretically 120 kg for each main nectar flow since consumption in the production colony is decreased by the transfer of the consumers to the support column so the total yield will be 240 kg.

Conclusion: As a result, for the honeydew honey producers, this system provides warranted honey production from their colonies especially in autumn. Particularly in the honeydew honey production in Turkey and Greece, higher efficiency can be acquired when the half of the colonies are arranged as the producer in the first honey flow period which starts at the end of August and the other half in the second honey flow period during October and November. In addition, the system has a redemptive feature for the enterprises which are making production under restrictive and compulsive conditions such as organic apiculture. In this way, the sealing and ripening risk of honey is reduced in the colonies at gathering honey by leaps and bounds during the short nectar flow and a guaranteed production is provided without any supplementary feeding. This is also very advantageous for organic beekeeping. Although the support management system requires more labouring than the conventional production systems, it should be considered as a method that must be applied for providing honey, swarm and queen production facilities of very high levels, warranted and with ease and for creating rational and efficient usage facilities of the equipment.