

## COMPARATIVE STUDY OF MANAGEMENT OF BEES THROUGHOUT THE YEAR, IN TEMPERATE AND TROPICAL ZONES

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### Introduction

The study is based on the author's personal experience with respect to management of bees in different countries in temperate and tropical zones. There are differences between countries in terms of length of active seasons and details related to bee management. The principles of management in different countries of the same zone are similar, with significant differences being recorded between zones.

For a comparison between the management methods used in certain countries we shall consider Poland — as a temperate zone country, and El Salvador — as a tropical country. The environment conditions and bee management in Poland are characteristic of the European countries, of a part of Asia, and of North America. The condition and management in El Salvador are representative for the tropical American countries, part of Africa, part of Southern Asia, and northern Australia.

The major difference in terms of environment conditions is the cold winter in the temperate zone, which does not occur in tropical zones.

Winter would last for several months, during which temperature goes down below 0°C. On some days, temperatures of —30°C or lower would be recorded. Under such conditions, bees would not get out of the hive, forming the winter cluster and staying inactive, and the queen would not lay eggs.

In contrast to it, in the tropical zones the temperature is high throughout the year, the bees are active all the year round, and in general, the queen would not discontinue egg-laying. However, in the tropical zones a nectar flowless period also exists — for several months.

The beekeeping year would begin at the end of the main flow, an opportune period for starting preparation of colonies for the next main flow.

### Management of bees throughout the year in temperate zones

Table 1 illustrates the beekeeping operations to be performed in various periods of the year.

The main flow starts about May 15, with the flowering of rape (*Brassica napus* var. *oleifera*) and ends, in many zones, in July; it lasts up to August 15 in regions where buckwheat (*Fagopyrum esculentum*) is cultivated, and up to September 1—10, in uncultivated zones, where heather (*Caluna vulgaris*) flourishes.

The common feature of the management methods is that, after the main flow is over, the colonies must be prepared for the difficult wintering period. But in the regions where an early rape flow is expected

next May, there is not much time left after the winter is over, for strengthening the colonies. Under such conditions, after the main flow and before the beginning of winter, stimulative food is given early in August. For two weeks, bees are fed  $\frac{1}{4}$  l of sugar syrup in water (1 : 2) daily.

Before winter starts, all weak colonies are unified.

From August 15 to September 1—10, all colonies are given sugar syrup with water (2 : 1 or 4 : 3) to prepare them for wintering ; each colony thus receives 12—15 kgs of sugar as syrup.

After the winter is over, in March or early April, the very weak and queenless colonies are unified. Days and nights are still cold and bees cannot provide for food by themselves. Starting with April 20 stimulative food is given, but worker bees resulting from this feeding are expected to emerge only in early July when the clover (*Trifolium repens*) flow begins.

Therefore, the beekeepers expecting a rape flow after May 15 would stimulate the development of colonies already in the previous year. Others, for strengthening their colonies for this early flow, would unify two normal or strong colonies already when the flow starts, and divide them again when the flow is over.

In many regions, the main flow occurs as late as June, and others — in June and partially in July. There is not enough time before the main flow starts, for the divisions to build up and become strong for this flow. Normally, divisions would be made in June and July, during the main flow. No normal crop is expected to be obtained from divisions. These colonies are able to forage efficiently only in the regions where a flow from the latest honey plant — heather (*Calluna vulgaris*) is available.

### Management of bees throughout the year in tropical zones

In El Salvador the main flow begins in October, with *Ipomoea* sp. By the end of January the nectar yield decreases. Another abundant nectar flow is available in April — from coffee, which lasts until around May 15. Then follows a period of rain, with no nectar at all. But in El Salvador it usually rains at night only, so that one can work with bees during daytime. During the main flow, there is not enough time available for systematic inspection of the broodnest. The inspection made after the last honey extraction shows that some colonies are queenless, or with old or drone-laying queens, etc. They must be unified with the other colonies.

After the main flow is over, the colonies are less strong than during the flow. Causes of this fact include : a) queen's egg-laying was

limited during the main flow ; b) many bees died because of the heavy work done. But the colonies are still quite strong for divisions. After the main flow, colonies are divided and nuclei may be formed. There is time enough for all of them to develop into normal strong colonies for the next main flow. Divisions and nuclei may be made for two months, till July, when three more months are available until the beginning of the flow. Theoretically, when queens are available, divisions may be made until the end of July when two months are left before the flow starts.

Throughout the flowless period care must be taken to provide the colonies with enough food. Shortage of food causes the bees to die or leave the hive. Therefore, they must be supplied with food throughout this period, in two stages : a) emergency feeding ; b) stimulative feeding.

Between May 15, when the flow is over, and August 10, when 50 days are only left until the next flow, emergency feeding is provided for. Each colony is given 1—2 liters of 50% sugar syrup, weekly. About 50 days before the main flow, stimulative food is supplied. First, the food stores of colonies must be increased, supplying them first with say 4—5 liters of 50% sugar syrup. Then 1/4 l of 33% sugar syrup is given to them daily. When food cannot be supplied daily, greater amounts of food are given to colonies, at longer intervals.

Favourable in El Salvador is the fact that in this period maize and *Baltimoria recta* are in flower, which yield some pollen.

In order to have all colonies efficiently foraging the main flow, the weak colonies must be unified before the flow starts.

### **Comparative survey of the management methods used in the two zones**

The main flow is over in August in the temperate zone, and in May in the tropical zone. In both zones bees must be supplied food after the flow is over. The entire amount required for survival during flowless periods (winter, in temperate zones) must be supplied in a short interval of time — 2—3 weeks. In tropical zones, emergency feeding will last for 2 months.

Stimulative feeding is supplied 50 days before the main flow in both zones. In tropical zones there is no difficulty in this respect. But in the temperate zone, there is sometimes not enough time available for stimulative feeding before the main flow and therefore it is supplied in the previous year, before the feeding for winter.

Weak and queenless colonies are unified before and after wintering — in the temperate zone, and before and after the main flow — in the tropical zone.

For an efficient exploitation of the early flow, normal or strong colonies are also unified before this flow, in the temperate zone. This

is not necessary to be done in the tropical zone because enough time is available for all colonies and nuclei to build up to reach the normal strength before the flow starts. Weak colonies, which have not developed normally because of accidents or other reasons should be unified.

Table 1

COMPARATIVE SURVEY OF MANAGEMENT METHODS USED THROUGHOUT THE YEAR, IN TEMPERATE AND TROPICAL ZONES

Jan.	Febr.	March	Apr.	May	June	July	August	Sept.	Oct.	Nov.	Dec.
TEMPERATE ZONES											
MAIN FLOW											
				stimul. feeding				stimul. feeding			
								Feeding for winter			
DIVISIONS											
Winter										Winter	
		Unification of weak colonies						Unification of normal colonies			
								Unification of weak colonies			
TROPICAL ZONES											
MAIN FLOW				RAINS				MAIN FLOW			
				Emergency feeding				Stimulative feeding			
		Unification of weak colonies						Unification of weak colonies			
DIVISIONS											

In the temperate zones, divisions are made during the main flow period, which entails loss of part of the crop. In the tropical zone, divisions are made 2—4 months before the main flow, which allows them to become strong and be able to efficiently exploit the flow.

It is obvious therefore that bee management is much easier in the tropical zone; and that because all preparatory operations before the main flow can be completed at the right time, while in the temperate zone a number of operations cannot be made at the proper time because of the winter which does not allow for an early enough stimulative feeding, and where divisions must be made during the main flow.

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