PROTEIN FEEDING EFFECT OF STIMULATION OF BEE FAMILIES

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ABSTRACT

Better results in maintaining bee population size entering in the winter period were obtained by using the mixture FEEDBEE + pollen preserved in comparison with FEEDBEE' exclusive use, but lower than the single use of pollen.

At the end of the experimental period between batch E_4 which was fed with syrup + 20% pollen, and batch E_3, which received syrup + 10% FEEDBEE + 10% pollen, there was a significant difference statistically speaking of the average number of bees per family, which demonstrates the possibility of partial replacement with good results of the pollen preserved with the pollen substitute FEEDBEE.

INTRODUCTION

The food supply from the hive in the autumn and winter influences the evolution of the number of bees in the cold season and the power of building honeycombs during the following spring (Bura M., 2003), and the storage of pollen reserves of inferior quality could determine a sudden drop in the population during spring (Spătaru Carmen Lia, 1970).

To have strong families in the next spring that could produce a large amount of honey at the first gathering, the protein feeding of stimulation has to be performed in the early autumn (Colă M., 2006).

In this experience was studied the effect of using the mixture of pollen substitutes "FEEDBEE", separately or together with the pollen preserved, in the food administered to the bee families during autumn (Kleinschmidt G., 1983).

The Feedbee product is produced in Canada, it is the first pollen substitute in the world that doesn't contaminate the quality of honey, but which increases the power and health of bees. After numerous studies it is shown that Feedbee is as good as pollen, bees consume it as well as pollen. Families fed with Feedbee produce a double quantity of honey and it also doubles the bee family. Spring feeding helps the growth of families, and the autumn one reduces winter mortality and it is an ideal food for the queen (Miloiu I., 1990).

MATERIAL AND METHODS

There were formed 5 batches, one being a control batch, which received sugar syrup and honey and 4 experimental batches which received syrup + FEEDBEE, syrup + FEEDBEE + pollen and syrup+ pollen (Table 1)

Table 1

Experimental scheme

Batch	n	Treatment applied during the autumn period (1-14 September)	Objectives pursued
Control	5	Sugar syrup and honey 2:1	Brood area and the number of sealed cells Evolution of the number of bees
E_1	5	Syrup + 10 % FEEDBEE	
E_2	5	Syrup + 10 % FEEDBEE + 5% pollen	
E_3	5	Syrup + 10 % FEEDBEE + 10 % pollen	
E_4	5	syrup + 10 % pollen	

Each batch consisted of 5 families of bees that were balanced as biological power (number of individuals and brood of all ages) and reserves of food (honey and bee bread). Likewise, the queens of all the families were of the same age and origin.

The administration of protein feeding for stimulation was 1-14 September, a period which represents "an empty gathering" regarding pollen and nectar, which occurs in late summer and early autumn, when most honey plants practically cease their floral work.

Each family of bees from the control batch received 5 times 500 ml of sugar syrup and honey, at every 3 days for 2 weeks, and for the families in the experimental batches in the syrup was also added protein food.

Batch E_1 was fed with syrup + 10% FEEDBEE, batch E_2 with syrup + 5% FEEDBEE + 5% pollen, batch E_3 with syrup + 10% FEEDBEE + 10% pollen and batch E_4 with syrup + 20% pollen. All studies were conducted in one's own apiary, in the village Măldăreşti, Vâlcea. The recorded data were statistically processed, settling the influence of the use of different treatments in the stimulating protein feeding of bees in the autumn.

RESULTS AND THEIR INTERPRETATION

Brood area and the number of sealed cells during autumn

Measurements were carried out in September - October 2011.

Brood area and number of sealed cells measured at the families from the 5 batches at the first measurement made on 10 September are shown in Table 2.

Sealed brood surface was expressed in dm2/family. The control batch had a brood area of 6.963 dm2 similar in value to the experimental batches.

Among the experimental batches fed with syrup + 20% pollen, E_4 ranked first, followed by batch E_3.

Given the size of the brood area, the number of sealed brood cells was calculated; on a dm2 surface were built 800 cells.

The control batch had an average of 5572 sealed brood cells per family, and in the batches which received syrup + food protein, the lowest value was recorded in batch E_2 (syrup + 10% FEEDBEE) of 5390 cells.

Table 2

Brood area and the number of sealed cells on September 10

Batch	Sealed brood surface (dm^2/family)				
	F_1	F_2	F_3	F_4	F_5
Control	6,790	7,113	6,725	6,950	7,238
E_1	6,863	**6,650**	6,962	6,787	7,000
E_2	6,688	6,738	6,850	6,650	6,763
E_3	6,838	6,913	7,275	6,900	7,013
E_4	7,238	7,013	7,350	7,163	7,363
Batch	**Sealed Cells (nr/family)**				
Control	5440	5690	5380	5560	5790
E_1	5490	5320	5570	5430	5600
E_2	5350	5390	5480	5320	5410
E_3	5470	5530	5820	5520	5610
E_4	5790	5610	5880	5730	5890

Based on data obtained from the determination of 10 September (after the administration of syrup or syrup + food protein at the beginning of the month) it is found that between the control batch and experimental batches were not significant differences. Between the batch E_4 fed with syrup+20% pollen and batches E_1 (syrup + 10% FEEDBEE)

and E_2 (syrup + 5% FEEDBEE + 5% pollen), the differences were clearly significant, and between batch E_2 and E_3 and the difference was significant.

At the second measurement, performed after 2 weeks on September 24, the differences between batches increased as a result of the treatments applied (Table 3).

Table 3

Brood area and the number of sealed cells on September 24

Batch	Sealed brood surface (dm^2/family)				
	F_1	F_2	F_3	F_4	F_5
Control	3,200	3,313	3,250	3,525	3,462
E_1	4,400	4,263	4,475	4,350	4,513
E_2	5,013	4,900	5,338	5,063	5,315
E_3	5,275	5,400	5,675	5,313	5,5,43
E_4	5,450	5,500	5,263	5,338	5,638
Batch	**Sealed Cells (nr/family)**				
Control	2560	2650	2600	2820	2770
E_1	3520	3410	3580	3480	3610
E_2	4010	3920	4270	4050	4250
E_3	4220	4320	4540	4250	4520
E_4	4360	4400	4210	4270	4510

In all groups there was a visible decrease of the sealed brood surface in comparison with the first measurement, due to the influence of environmental conditions.

Between the average number of sealed cells/family of the control batch and experimental batches which received protein food, very significant differences were registered.

Likewise, between the batch E_1 that consumed syrup + FEEDBEE and batches E_2 - E_4 were significant differences which indicates attractiveness and a lower intake of pollen substitutes at the families of batch E_1.

Between batches E_2 and E_3 which received food in different proportions of FEEDBEE + pollen, the differences were significant, and between the batches E_3 and E_4 (syrup + 20% pollen) the differences were significant.

At the third determination made on October 10 the brood surface and the number of cells decreased, the differences increased more, depending on the type of protein food administrated (Table 4).

Between the control batch, fed only with syrup, and the experimental batches, very significant differences were recorded, indicating the importance of administration in syrup of substitute or pollen for the extension of the deposing activity of eggs by the queen.

Significant differences were obtained between E_1 and E_3-E_4 batches and also between E_2 and E_3 - E_4, while among the best results recorded in batches E_4 and E_3, the differences were significant.

Table 4

Brood area and the number of sealed cells on October 8

Batch	Sealed brood surface (dm^2/family)				
	F_1	F_2	F_3	F_4	F_5
Control	1,150	1,213	1,200	1,200	1,050
E_1	2,200	2,250	2,363	2,175	2,575
E_2	1,788	1,750	1,975	1,875	2,113
E_3	3,025	3,075	3,300	3,138	3,150
E_4	3,175	3,125	3,313	3,125	3450

Batch	Sealed Cells (nr/family)				
Control	920	970	960	960	840
E_1	1760	1800	1890	1740	2060
E_2	1430	1400	1580	1500	1690
E_3	2420	2460	2640	2510	2520
E_4	2540	2500	2650	2500	2760

At the three measurements conducted during September-October, the control batch registered 9182 brood cells/family followed by batch E_1 with 10,852 cells / family and batch E_2 with 11,010 cells / family (Table 5).

Table 5

Total number of sealed cell during autumn

Batch	Total cells	Differences compared to the control batch	
		Nr. cells	%
Control	9182	-	-
E_1	10852	1670	18,2
E_2	11010	1828	19,9
E_3	12470	3288	35,8
E_4	12720	3538	38,5

The highest number of sealed brood cells was obtained in batch E_4, on the second place being the batch E_3 .

Analyzing the recorded data it results the positive influence of the stimulating protein food administration in the autumn period for further activity of the queen, resulting in a slower decrease of the brood surface and brood cells/ family compared to using only carbohydrate supplementation with sugar syrup and honey.

The number of sealed brood cells was higher as a result of stimulating protein feeding administered from September 1 to 14, with 18.2 to 38.5% compared to the control batch.

In comparison with pollen stimulating feeding, similar results were obtained by introducing in syrup a mixture of FEEDBEE substituents in 10% and 10% pollen, the differences between the two treatments were statistically insignificant.

The evolution of the number of bees in autumn

The average number of bees per family and batch according to the stimulating protein feeding was determined after the measurements made on September 10 and presented in Table 6.

Table 6

Number of bees according to the stimulating protein feeding in autumn (September 10th)

Batch	Bees per family				
	F_1	**F_2**	**F_3**	**F_4**	**F_5**
Control	21000	22600	21200	21900	21500
E_1	22300	21000	22500	21500	22100
E_2	21300	22000	22900	21700	22600
E_3	21700	21000	22200	23100	22000
E_4	22000	21100	23000	21200	22200

The statistical analysis of differences between batches shows that there were not significant differences at this determination between the control batch and the experimental batches.

Likewise, between batches receiving different types of food protein the differences are not statistically provided at 10 days from the beginning of the stimulating food.

After two weeks, at the measurements made on 24 September, there was a distinction in the average number of bees / family according to the treatment used (Table 7).

Between the control batch and batch E_1, the difference was not significant, in comparison with E_2 the difference was significant, and compared to batches E_3 and E_4 the differences were very significant.

In the experimental batches the differences were from insignificant to very significant. Thus, between the batch fed 10% FEEDBEE and the batch E_2 (5% FEEDBEE + 5% pollen) the difference was not significant, but compared to batches E_3 and E_4, the differences were very significant.

Between the two batches (E_3 and E_4) receiving food protein represented by FEEDBEE + pollen in different concentrations, better results were obtained by using 10% FEEDBEE + 10% pollen, the difference being significant compared to batch E_2. There were no significant differences in treatments in batches E_3 and E_4.

Table 7

Number of bees according to stimulating protein feeding in autumn (September 24th)

Batch	Bees per family				
	F_1	F_2	F_3	F_4	F_5
Control	17900	17500	17800	17800	18000
E_1	17900	18100	18300	18000	18700
E_2	20300	19000	19300	18000	18900
E_3	22600	21300	21300	21800	21000
E_4	22000	22100	23500	21500	22800

CONCLUSIONS

Stimulating protein feeding during autumn positively influenced further eggs deposit of the queen and the maintenance of a large area of brood cells, respectively of sealed cells during the months of September and October at the bee families under apiary conditions.

The best result was obtained in batch E_4 by administering a mixture of syrup + 20% pollen, followed by batch E_3 receiving syrup + 10% FEEDBEE + 10% pollen, the difference between the average number of sealed brood cells of the two batches at the end of the experimental period was statistically insignificant.

The bee population from the families of the control batch decreased from September10 to October 22 from 21,640 bees to 12,000 bees which represents a decrease of 44.5%, compared to families from the experimental batches, the decrease ranged between 26.5 and 36.9%.

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