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USE OF FEED ADDITIVES FOR BEE FAMILIES GROWTH STIMULATION DURING SPRING TIME

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Abstract

Bees collect nectar and pollen from flowers of the plants, and process them into food - honey and bee bread. In cases where the amount of family food reserves (honey) is insufficient, bees must be fed. As a substitute of honey, sugar syrup is used. The purpose of the study is to evaluate the use of feed additives in bees feeding during spring time. The families of bees during the spring harvest were fed using one liter of sugar syrup mixed with feed additives, once in every 12 days. It was found that in normal ambient conditions with high temperatures in the spring and during white acacia flowering, the greatest influence had a feed additive Bilaxan 100 mg/l of syrup, which has increased the productivity of bee families in average 5.12 kg of honey or 25.35% compared to the control group. The use of feed additives Primix-Bionorm-P, 100 mg/l of syrup increases the production of honey stored in the hive untill the end of honey harvesting by 23.02% compared to the control group and Primix-Bionorm-K, 100 mg/l of syrup, respectively, by 14.95%.

Key words: bee families, honey bees, feed additives, sugar syrup

Introduction

Bees collect nectar and pollen from flowers of the plants, and process into food - honey and bee bread. In cases where the amount of family food reserves (honey) is insufficient, bees must be fed.

To stimulate growth of juveniles the sugar syrup in concentrations of 50% is used (1 kg of sugar to 1 litre of water) (Crivtov et al., 2005).

Using sugar syrup as food stimulant is fully effective only if food contains protein substances as growth of the juveniles can only occur with a certain quantity of protein. If the protein food is missing in the hive or in nature, bees use the body's own protein reserves (Bilas and Benevolenscaia, 2002).

In order to stimulate the growth of juvenile the sugar syrup, is used at which often are added vitamins, micro elements, flower pollen, bee bread, extracts of coniferous trees (Ismuratova et al., 2002).

Feeding in small doses immediately (no later than 3-4 days) after the beginning of the period without picking ensures qualitative processing of sucrose required to ensure the main exchange of substances and a long stimulating impact for the growth of the juveniles by bees and respectively the secretion of wax. To force the queen to work with maximum impact, it is necessary to feed the bee family daily with sugar syrup (1:1) in an amount 1/10 of the mass of bees (Lonin, 2005).

Stimulating feeding contribute to the formation of strong apiary families. In it occurs much earlier the physiological maturity of individuals and a large number of bees flying are formed, which contributes to achieving greater quantities of honey product (Moreva and Cozub, 2013).

The use of the preparation Ecofitol (10 ml per 1 kg of fluid honey) in stimulating feeding (0.5 kg per family) effectively stimulates the overall development of the family, activates queen's force, increases the amount of royal jelly secreted

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at bees, provides early spring growth (Moreva and Meges, 2014).

It was found that probiotics have significant effects over the performance, health, vitality, bowel environment and on digestibility, documented in several studies (Fialho et al., 1998; Jensen, 1998; Houdijk et al., 1999; Mikkelsen et al., 2003).

Probiotics act over the reduction of intestinal pH, making it unfit for germs and conditioned pathogenic organisms (Salmonella spp. E. coli, etc.); reduce intestinal colonization with pathogens; stimulate the production of endogenous enzymes and increase the rate of absorption in the small intestine; stimulate immunity by increasing antibodies level and increasing the macrophage activity (Ewans et al., 1988; Nozdrin et al., 2002)

Using valuable feed substitutes during spring allows families to recover quickly after wintering, accelerates exchange of wintering bees, contributes at active growth of the family power (Gubaidulin, 2009).

Proceeding from the above, the purpose of the investigation is to study the influence of additives in bees feeding on stimulating the development and productivity of bee families.

Material and Methods

To achieve the proposed target, as object of investigations served the families of bees of breed Carpathian from the apiary "Albinarie" Ialoveni district, Republic of Moldova. The apiary "Albinarie" was assembled in four groups, each five beehives: bees in group I were fed with one litre of pure syrup (witness); in group II - with one litre of syrup Primix-Bionorm-K 100 mg / l; in group III - with Primix-Bionorm-P 100 mg / l; in group IV - with Bilaxan 100 mg / l.

The families of bees in the spring without honey harvest were fed with one litre of sugar syrup mixed with feed additives, every 12 days, from middle of the April to early harvest of white acacia.

Results and Discussion

One of the ways that contributes to increasing the bee growth is through early stimulational feeding.

As an added feed to the sugar syrup was used the additive "Primix-Bionorm-P", which is used for prophylaxis and therapy of gastrointestinal infections and dysbacteriosis of different etiology, restoring intestinal microflora, normalizing the exchange of substances, increasing resistance and respectively, the productivity of animals (Caisin, et al., 2014).

The composition of feed additives used in bee nutrition Primix-Bionorm-K, Primix-Bionorm-P and Bilaxan contains freeze-dried cells that include strains of lactobacillus and bifidus bacteria, B group vitamins, yeast extract, pectin, lecithin and lactulose.

When forming groups, on April 21st, 2012 in the nest of bee families were counted 5.0–6.0 combs, the power was, on average, 4.0–5.0 spaces between combs populated with bees, 60.2–63.6 hundred brood cell juveniles and 2.4–3.4 kg of honey reserves (Table 1).

In the control performed after 12 days following the feeding (May 01st, 2012) it was found that the nest of bee families included 6.8–8.4 combs, the power was 5.8–7.2 spaces between combs populated with bees - juveniles - 86.2-120.6 hundred of cells and honey reserve - 2.8–5.2 kg (Table 2). Differences between groups were not significant. The coefficient of variation of these indices ranged between 11.77 and 35.33%.

Table 1
Bees family control on April 21st, 2012

L.	Remedy administered per litre of sugar syrup	Indices	Number of combs in family, units	Family powers, spaces between combs of the bees population	Juveniles, hundreds of cells	Honey reserve, kg
I.	Sugar syrup 1:1 (witness)	$\overline{X} \pm S\overline{x}$	5.6 ± 0.245	4.6 ± 0.245	60.2±7.419	3.4±0.400
		V, %	9.78	11.91	26.86	26.31
II.	Primix-Bionorm-K, 100 mg/l	$\overline{X} \pm S\overline{x}$	5.8 ± 0.583	4.8 ± 0.583	61.2±6.621	2.8±0.374
		V, %	22.48	27.16	24.19	29.88
III.	Primix-Bionorm-P, 100 mg/l	$\overline{X} \pm S\overline{x}$	5.0 ± 0.00	4.0 ± 0.00	60.8±7.137	2.4±0.245
		V, %	0	0	26.25	22.82
IV.	Bilaxan, 100 mg/l	$\overline{X} \pm S\overline{x}$	6.0 ± 0.00	5.0 ± 0.00	63.6±6.772	3.4±0.510

The control results from May 13th, 2012 revealed that the families of the third group that received feed additives Primix-Bionorm-P, 100 mg / l of syrup have developed better and the nests counted, averaging 12 honeycombs, the power was 11 spaces between combs populated with bees and 148.25 hundred of brood cells (Table 3).

Prolificacy of the queens in group III, in this period was 1235 eggs in 24 hours or 333 more eggs than in the control group. The reserve of honey in the bees families nest varied from 7.8 to 10.6 kg, and in newly build honeycombs - 0.8–1.2 units.

Climatic conditions in 2012 were quite whimsical, maintaining high temperatures in spring, which stimulated plant

Table 2
Bees family control on May 01st, 2012

L.	Remedy administered per litre of sugar syrup	Indices	Number of combs in family, units	Family powers, spaces between combs of the bees population	Juveniles, hundreds of cells	Honey reserve, kg
I.	Sugar syrup 1:1 (witness)	$\overline{X} \pm S\overline{x}$	7.8 ± 0.490	6.6 ± 0.400	86.2±8.919	3.8±0.200
		V, %	14.04	13.55	23.13	11.77
II.	Primix-Bionorm-K, 100 mg/l	$\overline{X} \pm S\overline{x}$	6.8 ± 0.663	5.8 ± 0.663	103.8±7.372	3.6±0.510
		V, %	21.81	25.57	15.88	31.67
III.	Primix-Bionorm-P, 100 mg/l	$\overline{X} \pm S\overline{x}$	7.4 ± 0.60	6.0 ± 0.447	96.6±11.057	2.8±0.374
		V, %	18.13	16.67	26.25	29.88
IV.	Bilaxan, 100 mg/l	$\overline{X} \pm S\overline{x}$	8.4 ± 0.678	7.2 ± 0.583	120.6±8.658	5.8±0.917
		V, %	18.05	18.11	16.05	35.33

Table 3
The amount of honey stored in bees families from white acacia, on May 20th, 2012

Group	Remedy administered per litre of sugar syrup	X ± Sx	V, %	Limits (min.-max.)
I.	Sugar syrup 1:1 (witness)	20.20 ± 2.485	27.51	12.2 – 25.9
II.	Primix-Bionorm-K, 100 mg/l	23.22 ± 3.728	35.9	16.2 – 34.4
III.	Primix-Bionorm-P, 100 mg/l	24.85 ± 5.50	44.26	16.8 – 40.6

Table 4
Control of bee families from the apiary "Albinarie", May 13th, 2012

L.	Remedy administered per litre of sugar syrup	Indices	Number of combs in family, units	Family powers, spaces between combs of the bees population	Juveniles, hundreds of cells	Honey reserve, kg	Number of artificial combs, units
I.	Sugar syrup 1:1 (witness)	$\overline{X} \pm S\overline{x}$	9.4 ± 0.600	8.2 ± 0.583	108.2 ± 9.281	10.6 ± 1.631	0.8 ± 0.200
		V, %	14.27	15.9	19.18	34.4	55.9
II.	Primix-Bionorm-K, 100 mg/l	$\overline{X} \pm S\overline{x}$	9.4 ± 0.510	8.8 ± 0.735	117.4 ± 7.743	7.8 ± 0.970	1.0 ± 0.316
		V, %	12.13	18.67	14.75	27.79	70.71
III.	Primix-Bionorm-P, 100 mg/l	$\overline{X} \pm S\overline{x}$	12.0 ± 2.00	11.0 ± 2.00	148.25 ± 13.002	9.0 ± 1.871	1.0 ± 0.00
		V, %	33.33	36.36	17.54	41.57	0
IV.	Bilaxan, 100 mg/l	$\overline{X} \pm S\overline{x}$	10.6 ± 0.600	9.6 ± 0.600	137.2 ± 10.651	10.0 ± 1.761	1.2 ± 0.200
		V, %	12.66	13.97	17.36	39.37	37.27

growth and development, and as a result, white acacia began to blossom at 10-13 May, with 15 - 20 days earlier than usual. Therefore, bee families didn't have enough time to grow and accumulate high numbers of worker bees able to participate and perform the main white acacia picking.

The bees families in control group I stored on average by 20.2 kg from the white acacia, with variation between 12.2 to 25.9 kg in group II - 23.22 kg (16.2–34.4 kilograms), in group III - 24.85 kg (16.8 to 40.6 kg) and group IV - 25.32 kg (18.6 to 30.3 kg) (Table 4).

Conclusions

It was found that in normal ambient conditions with high temperatures in the spring and during flowering of white acacia, the greatest influence had a feed additive Bilaxan 100 mg/l of syrup, which had increased the productivity of bee families in average 5.12 kg of honey or 25.35% compared to the control group.

The use of feed additives Primix-Bionorm-P, 100 mg/l of syrup increases the production of honey stored in the hive until the end of honey harvesting by 23.02% compared with the control group and Primix-Bionorm-K, 100 mg/l of syrup, respectively, by 14.95%.

References

Caisin L. Ş. A., 2014. Probiotic Use „Biomin Imbo", „Primix-Bionorn-K" and „Bilaxan" in pigs feeding. Recommendations. Chisinau, 28 p. (Ro).

Bilas, N. G. and B. Benevolenscaia, 2002. Food Substitutes of bees. *Apiculture*, № 2, p. 24-26.

Gubaidulin, N. M., 2009. The nitrogen content in the body of bees when additionally fed on the background of nest aeroionization. *Apiculture,* N. 4, pp. 14-15.

Ishmuratova, N. M. et al., 2002. Candice preparation to stimulate the growth and development of families in the early spring. *Apiculture*, No. 2, pp. 20-21. (Ru).

Krivtsov, N. I., V. I. Lebedev and G. M. Tunikov, 2000. Apiculture. *Kolos*, Moscow, p. 398. (Ru).

Lonin, I., 2005. How to protect bees family from the weakening during summer and from death during autumn and winter. *Apiculture*, N.1, pp. 32-34.

Moreva, L. I. and M. A. Kozub, 2013. Influence of additional feeding over the spring bees families development in Krasnodar region. *Apiculture*, No. 8, pp. 10-11.

Moreva, L. I. and R. K. Meges, 2014. The development of the bees in the spring at feeding with Ekofitolom. *Apiculture*, No.5, pp. 33-34.

Nozdrin, A. et al., 2002. The technological aspects of probiotic preparations. New probiotic formulations in veterinary medicine. In: Materials of the Russian scientific-practical conference. Novosibirsk, pp. 55-56. (Ru).

Ewans, D. et al., 1988. Inactivated Propionibacterium acnes (Jmmuno-Regulin asddjunct to conventional therapy in the treatment of equine respiratory dislasaes. *Equine practice*, **10:** 17-21.

Fialho, E. et al., 1998. Probiotics utilization for piglets from 10 to 30 kg. *The 8th World Conference on animal Production Contributed Papers,* **1**: 622-633.

Houdijk, J. et al., 1999. Apparent ideal and total tract nutrient digestion by pigs as affected by dietary nondigestible oligosaccharides. *Journal Animal Science,* **77**: 148-158.

Jensen, B., 1998. The impact of feed additives on the microbial ecology of the gut in young pigs. *Journal Animal Feed Science*, **7**: 45-64.

Mikkelsen, et al., 2003. Effects of dietary oligosaccharides on microbial diversity and fructo-oligosacceride degrading bacteria in faces of piglets post-weaning. *Animal Feed Science and Technology*, **109**: 133-150.