

Testing the quality of carbohydrate patties during honeybee colonies wintering period by total substitution of natural food reserves

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Colonies wintering and replacement of winter honeybee generations represent critical periods in beekeeping. Nutrition plays an important role as both quantity and quality, therefore in a first stage of this period the nutritional requirements of honeybees are mainly based on honey reserves in combs to ensure the thermal regime inside the cluster. Further on, as bees resume the activity of brood raising, the consumption of carbohydrate-protein food intensifies proportionally with the brood quantity, based on fat body and stored food. However, natural food reserves (honey and bee bread) may be insufficient or inadequate for various reasons such as the lack of honey flora resources, their contamination or the presence of honeydew honey or heather honey, therefore ensuring the winter reserves may require total or partial substitution; as a result, testing the quality of some substitutes during the winter period becomes imperative.

METHODOLOGY

A comparative experiment to winter two groups of honey bee colonies (*A. m. carpatica*) was set up on a period of three months (December 9th, 2023 - February 12th, 2024), in Romania:

- **10 experimental colonies group** fed exclusively on carbohydrate patties - *Ideal Bee Ginseng* - Dulcofruct Bee Nutrition Science™, prepared as sugar fondant with ginseng extract (*Eleutherococcus senticosus*);
- **5 control colonies group**, colonies wintered on the basis of natural reserves, honey and bee bread.

Colonies were standardised as strength and successively provided with more carbohydrate patties placed above the colonies' nest.

The quality of wintering was assessed by measuring 2 parameters:

- The quantity of bees registered at the beginning and the end of experiment when time allowed interventions in the hive;
- The surface of brood rearing area at the end of experiment, including observations on starting moment.



RESULTS

- The data statistics show *equal group variances* between the two groups by *Bartlett test*, $\alpha=0,05$ regarding the difference in the honey bee quantity, between the two moments of the experimental period - beginning and the end of experiments, as well as regarding the brood surface at the end of experiment.
- *ANOVA test* show *no significant differences* between the means of the two groups in terms of honeybees quantity, expressed as percentage out of the initial quantity (Figure 1), respectively brood surface (Figure 2) at the end of period: F-ratio ($\alpha=0,05$) = 1,24 (Parameter 1), respectively 0,79 (Parameter 2).
- The resumption of brood rearing in the experimental colonies based on the bees' body nutritional reserves took place as compared to the control colonies, starting at the end of December 2023 and increasing regularly by the end of experimental period, when all the colonies begun the brood rearing.

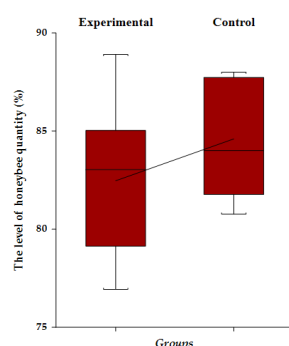


Figure 1 - Parameter 1 - the quantity of bees (%) at the end of the experimental period (February 12th, 2024) as compared with the beginning moment (November 9th 2023)

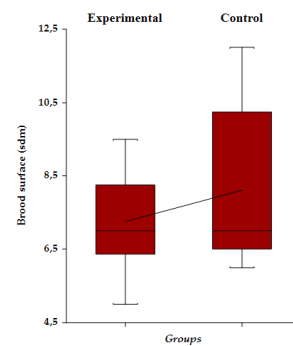


Figure 2 - Parameter 2 - the brood surface (sdm) at the end of the experimental period (February 12th, 2024)

CONCLUSIONS

- A very good wintering, without significant losses.
- During the feeding, the honeybees forms a bell where the bees move freely to feed themselves and carry the food, the temperature and humidity inside helping the consumption process;
- The needs for supplementation are met by adding patties when the consumption reaches the last upper patty;
- At the wintering end (February, in Romania conditions), the brood rearing consumes the fat body of bees, being mandatory to providing protein substitutes (as for example *Superprotein patties* - Dulcofruct Bee Nutrition Science™);
- The proposed method of feeding assure the supplements of feed in critical periods, whenever it is necessary (winter preparation, wintering, swarm formation);
- The obtained results show that partial or even total replacement of honey stores, with quality carbohydrate patties, represents a true insurance policy to avoid food risks in different periods of the year.



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Colonies wintering and replacement of winter honeybee generations represent critical periods in beekeeping. Nutrition plays an important role as both quantity and quality, therefore in a first stage of this period the nutritional requirements of honeybees are mainly based on honey reserves in combs to ensure the thermal regime inside the cluster. Further on, as bees resume the activity of brood raising, the consumption of carbohydrate-protein food intensifies proportionally with the brood quantity, based on fat body and stored food. However, natural food reserves (honey and bee bread) may be insufficient or inadequate for various reasons such as the lack of honey flora resources, their contamination or the presence of honeydew honey or heather honey, therefore ensuring the winter reserves may require total or partial substitution; as a result, testing the quality of some substitutes during the winter period becomes imperative. In this regard, over an experimental period of three months (2023/2024), we set up a comparative experiment in Romania for the wintering of an experimental honey bee (*A. m. carpatica*) colonies group fed exclusively on carbohydrate patties (Dulcofruct Bee Nutrition Science™) prepared as sugar fondant with ginseng extract (*Eleutherococcus senticosus*). As control group, colonies wintered on the basis of natural reserves, honey and bee bread. All colonies were standardised as strength and successively provided as were consumed, with carbohydrate patties placed above the colonies' nest. The quality of wintering was assessed by measuring the quantity of bees when time allowed interventions in the hive (above 12°C) as well as by checking out the moment of brood rearing starting and its area at the end of experiment. Through the carried-out research, we demonstrate that there were no significant differences between the parameters measured during the experimental period in the two groups of honey bee colonies, and the resumption of brood rearing in the experimental colonies based on the bees' body nutritional reserves took place as compared to the control colonies. The obtained results show us that partial or even total replacement of honey storage with quality carbohydrate patties represents a true insurance policy during critical periods of the year.