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PREPARATORY WORK FOR COMPARISON OF EFFECT OF WINTER STAY ON DIFFERENT FOOD TYPES AND WINTER STAY INFLUENCE ON BEE-COLONIES DEVELOPMENT

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Nowadays vast amount of farmland on which bees can gather winter feed is occupied by sunflower. Sunflower honey has high crystallization ability that highly worsens bee wintering and can cause bee colonies death. Object of our researches is to determine the influence of honey with low crystallization ability and sunflower honey on wintering and bee colonies' development in early spring. We have done necessary preparatory work for organization of wintering on various kinds of honey. We have determined honey reserve of the territory, have made honey balance of the territory and calendar of meliferous plant blossoming and provided bee colonies with different feed stocks for winter.

Keywords: *bee colonies, carbohydrate food, honey, winter stay.*

Statement of objects. Fact that honey is not only marketable product but the main carbohydrate food for bees throughout the year is extremely important for beekeeping. There are two distinct periods in bee life such as active life and winter dormancy. During the active life period bee colony increases colony strength, pollinates plants, store feed, builds nests etc. During winter dormancy bee colony tries to preserve itself as a biological unit. Honey quality and quantity has significant impact on winter stay result during this period.

Analysis of the latest researches and publications which discuss this problem. Academician A.M. Butlyerov said: "Bee wintering is the hardest beekeeping task. Winter brings major losses to beekeepers. These losses are often unpredictable and therefore unavoidable. That is why beekeepers should be highly interested in everything concerning winter and its results." Successful winter stay is determined not only by the fact that all colonies survived, as commonly believed, but also by bee colony quality that is preserved energy, activity, working capacity, clean nest and absence of nozematoz symptoms [3].

Honeybees have a remarkable adaptation to low temperatures and long winters. They learned to create and keep warmth for their life. Thus, bee colonies death from frost is impossible. Low temperatures and temperature fluctuations are not reasons of the bad bee winter stay in apiaries. The grossest violation of the conditions to which bees have adapted in their evolutionary history is the main reason. Feed reserve quality and quantity is one of the key reasons of successful winter stay. Three quarters of colonies die only from starvation. [5]

Adult bee feed consists of pollen and honey, honey provides bees with carbohydrates mainly in the form of glucose and fructose and pollen provides with proteins. Crystallization ability is the most important honey characteristic that influences winter stay process and quality. Honey produced from nectar of most flowering plants does not crystallize for a long time while sunflower honey crystallizes very quickly. Large amount of crystallized honey in honeycombs negatively influences winter stay because bees live on only liquid feed in winter. Winter feed contained not only sunflower honey but also honey from other plants ten years ago. Due to this factor honey began to crystallize much later and honey crystallization was not so dangerous. However, recently bee keeping feed base has changed dramatically due to the fact that agricultural enterprises prefer sunflower sowing recently. It is not recommended to leave sunflower honey as a winter feed for bee colonies.

Sunflower honey must be substituted for sugar syrup. [2] However, the research found out that autumn bee feeding with sugar is extremely harmful. Such feeding wears out bees, increases the risk of death and adversely affects the spring development of bee colonies and their resistance to disease. It is proved that flower honey mineral content is 0.1-0.3%, and sugar does not contain minerals.[1].

Research objective and tasks. Objective is to study the influence of different herb honey on winter stay and further development of bee colonies of Ukrainian steppe bee species. The tasks of the research are to determine the honey reserve of the territory; to make nectariferous balance of the territory and calendar of meliferous plant blossoming; to prepare colonies to winter on different honey varieties.

Research material and methods. Researches are conducted in the climatic conditions of the forest-steppe zone of Ukraine in Poltava region, in the apiary of Poltava regional public organization "Beekeeper Union." We selected two groups of five colonies of equal strength in each for the research. Experimental colonies are kept in horizontal hives with frames of 435x300 mm size; winter stay is outdoors, winter nest is formed with light brown frames, each frame has at least 2 kg of capped honey; frames are placed perpendicularly to bee entrance, ventilation is carried out through the bottom bee-entrances.

Research results. The first group of bees winters on sunflower honey and the second one winters on herb honey. To ensure the purity of the experiment feeding frames for the second group were made before sunflower flowering. Quality of experimental colonies wintering individually and as a whole group will be evaluated by the amount of consumed honey during winter, the bee colonies' strength and the number of dead bees after winter, the number of brood during the first flyby period and one month after it and bee diarrhea.

During spring and summer period of 2012 we determined honey reserve of the territory (see Fig.).

Figure. Plan of research apiary melliferous land

Honey reserves were evaluated in the radius of 2 km around the apiary. It is the best radius of productive bee fly. We defined area of individual land according to the map and individual melliferous

plant composition and area. Plots of lands which are feeding base of our apiary are marked on the map: 1 - meadows 2 - forest plantations, 3 - bastard acacia, 4 - sunflower.

Honey balance of the territory was made up according to the data (Table 1).

1. Honey balance of the territory

Melliferous plants and plot of land	Area, hectares	Blossoming duration, days	Honeyproductivity, kg/ha	Honey reserve			
				Total		used by bees (50 %)	
				kg	% to total	Total during blossoming period	During one blossoming day, kg
Forests	57	50	50	2850	10,7	1425	28,5
Orchards	9	11	25	225	0,8	112,5	10,2
Bastard acacia	23	10	500	11500	43,2	5750	575
Meadows	230	140	30	6900	25,9	3450	24,6
Sunflower	129	31	40	5160	19,4	2580	83,2
Total	448	-	-	26635	100	13317,5	-

1. Calendar of meliferous plants blossoming

Plants	Meliferous plants blossoming period							Honeyproductivity, kg/ha
	03.12	04.12	05.12	06.12	07.12	08.12	09.12	
Goat willow								80
Swamp willow								50
Norway maple								200
Orchards								25
Tatarian maple								300
Bastard acacia								500
Russian olive								200
Fluellin								50
Blowball								100
Brown knapweed								130
Blue-sailors								100
Sharp sow thistle								140
Yellow sweet clover								200

Lilac sage																						400
Blueweed																						350
Large-leaved lime																						800
Tillet																						600
Motherwort																						300
Плакун верболистий																						300
Pot marjoram																						70
Field sow thistle																						250
Honey clover																						300
Sunflower																						40
Meadow geranium																						30

The area of certain plots of land, types of melliferous plants and nectarproductivity are indicated in the table 1. In order to determine honeyproductivity of certain plots of lands it is necessary to multiply hectare rate of sugar reserve by the land hectares quantity. Established honeyproductivity of each plot of lands is included

and the sum will be equal to honey reserve of the territory. So honey reserve of the territory is 26635 kilograms. At the same time it is established that bee colonies can efficiently use about 50% of nectar reserve of the territory (13,317.5 kilograms). However, honey balance calculations are not enough. So we made up the calendar of melliferous plants blossoming in the experimental apiary area (table 2). The calendar of melliferous plants blossoming shows that the experimental apiary is fully provided with honey flow throughout the season. This territory is suitable for experiments according to feeding base [3, 4].

Feed that experimental groups consume in winter was stocked up during honey gathering period. Pollen grain content and their compliance with certain plant species were determined in percentage ratio using pollen honey analysis and special atlases. This confirmed that the experimental group will really winter on sunflower honey and herb honey. White paper for collecting bits of wax and possible saccharified honey crystals was placed on the bottom of the hive under the nest in the last decade of October. It will enable us to control winter bee gathering movement and crystallized honey availability [6].

Conclusions: 1. Nowadays science and practice recommend moderate use of sugar as a winter feed for bees. In many cases it is better not to use sugar. It is reasonably to store full frames of high

quality honey during the main honey flow period and form colonies' nests for winter. This is an old classic method and we must remember about it nowadays.

2. As meadow herbs and sunflower are the most common melliferous plants for winter feed in the forest-steppe zone of Ukraine, namely in Poltava region, studying and comparison of effects of winter stay on different feed types and its influence on bee colonies development will be the next stage of research.

REFERENCES

1. Martynov A.G., Nazin S.N. Sugar and varroatoz / / Pchelovodstvo. - 1990. - № 10. – P. 13-15.2.
2. Polishchuk V.P. Beekeeping. - Lviv: "Ukrainian beekeeper", 2001. - 296 p.
3. Stroykov S.A. Cookery for bees / / Beekeeping. - 1990. - № 1. - P. 36-38.4.
4. Khmara P.Ya., Mukvich N.V. Industrial beekeeping technology. - K.: Urozai, 1987. - 96 p.
5. Cherhyk N.I. Baga A.M. Bee feeding base. - K.: Vintage, 1976. - 186 p.
6. Shabarshov I. Art of beekeeper is checked by winter stay / / Pchelovodstvo. - 1990. - № 8 -P 2-4.