

## **COMPARATIVE DESCRIPTION OF ANTIVARROATOSIC EFFICIENCY OF VEGETABLE ACARICIDES IN DIFFERENT PERIODS OF THE YEAR**

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*The analysis of antivarroatic efficiency of herbal acaricides (powder of wormwood bitter grass, powder of eucalyptus leaves, smoke of horse-radish root) is conducted in the processing of bee families before the main nectar flow (summer) and before forming of winter club (autumn). Acaricidal processing with the use of vegetable preparations on the basis of wormwood bitter grass, eucalyptus leaves and horse-radish root is low effective at autumn treatment against a varroa invasion. Powder of wormwood bitter grass is an effective environmentally clean mean for a fight with varroa before the main collection of honey. Powder of eucalyptus leaves possesses  $55,94 \pm 10,21$  % by efficiency in the processing of bee families before main collection of honey. Horse-radish root is low effective for a fight against a varroa invasion.*

**Keywords:** *varroa, bees, vegetable acaricides.*

**Statement of the problem.** A particular problem in technology of reception of bee products causes an increase in the number of troubled by various diseases apiaries. A significant obstacle to the development of beekeeping is a contagious disease of bees, in the first place, Varroa, that became widespread in the apiaries of many countries, including the Ukraine in the past decade [7].

**Analysis of basic researches and publications which discuss the problem.** The mite Varroa jacobsoni Oudemans harms adult individuals of bee family throughout the year, and in the active period – and of brood. In the process of parasitism on the honey bee it creates favorable conditions for entry into its pathogenic organism of bacterial diseases [2, 5, 8, 9, 13]. The associative flow of infection and invasion is intensified by a pathogenic process, inflicts a substantial economic harm and, as a rule, families perish [3].

Domestic and foreign science and practice has a long experience in organizing zootechnical, therapeutic, preventive measures in beekeeping. In spite of the presence of various acaricidal facilities, a study and use of new generation of preparations remains a very vital task due to the increase of stability disease agents of bees to the available drugs [1, 10]. Moreover, the application of chemical acaricides promotes pollution of bee products by their residues and metabolites [11, 17], the toxic and adverse effects of drugs on bees [6, 16].

On the efficiency of drugs a large influence has weather and climate conditions [4, 12]. However, little is known about the effectiveness of acaricides used to treat bees in different climatic zones of Ukraine, including the Crimea.

In this regard, it is necessary to study the effectiveness of drugs and further improvement of the drugs and methods of their application, especially at the regional level [15].

**Purpose of research.** *Purpose* – to conduct the analysis of antivarroatic efficiency of herbal acaricides (powder of wormwood bitter grass, powder of eucalyptus leaves, smoke of horse-radish root) at treatment of bee families before main nectar flow (summer) and before forming of winter club (autumn). *The task* – to study acaricidal efficiency of properties of herbal preparations (on the basis of grass of wormwood bitter, leaves of eucalyptus and root of horse-radish) against a varroatic invasion in different periods of the year.

**Materials and methods.** The study was performed on bee families, belonging to the Crimean enterprise of “Krympcheloprom” in 2011-2012. For the experiment on the basis of analogues 20 bee families were selected and divided into four groups, 5 in each. Forming of groups was conducted in accordance with the “Guidelines for the experiments in beekeeping” [14].

Autumn treatment was conducted from 24<sup>th</sup> October to 9<sup>th</sup> November, 2011 on bees, belonging to the breed of Carpathian breed, with the volume of the nest – 10 frames of Langstroth, age of uterus-sisters one year and four months, force of families is 10 streets, an amount of forage is 20 kg, extensivity of invasion – II level, that is contained in the beehives of Langstrota in identical terms on one point.

Acaricidal treatment of insects before the main nectar flow was carried out from 1 to 14 June 2012 on bees belonging to the Carpathian breed, with the volume of the nest – 20 frames of Langstroth, age of queens sisters – one year, the strength of families – 20 lanes, the amount of feed – 20 kg, extent of infestation – II level, that is contained in the Langstroth hives in the same conditions on the same point.

As an acaricide drug for the treatment of bee families of the first group the powder of herb wormwood bitter to 5 g per street was used. To do this, wormwood bitter was placed in a gauze bag for 14 days, which was spread out thinly on the framework over the nest and covered with polyethylene.

For acaricide treatment of bee families of the second group a eucalyptus leaf powder of 7.5 g per street was used. It was also placed in a gauze bag for 14 days, spread out thinly on the framework over the nest and covered with polyethylene.

The third group of bee family was fumigated smoke from the dried root of horse-radish. For this purpose 30 g of horse-radish roots were placed in erupted smoker and there was made by 1 blow on a street in the bee-entrance of every family.

In every group the leaves of white paper, smeared with Vaseline to fix crumbling varroa mites, were placed on the bottom of beehive.

Acaricidal effectiveness of drugs was calculated by the formula:

$$Ae = 100 - EI_2 / EI_1 \times 100,$$

Where: Ae – acaricidal efficiency of drug;

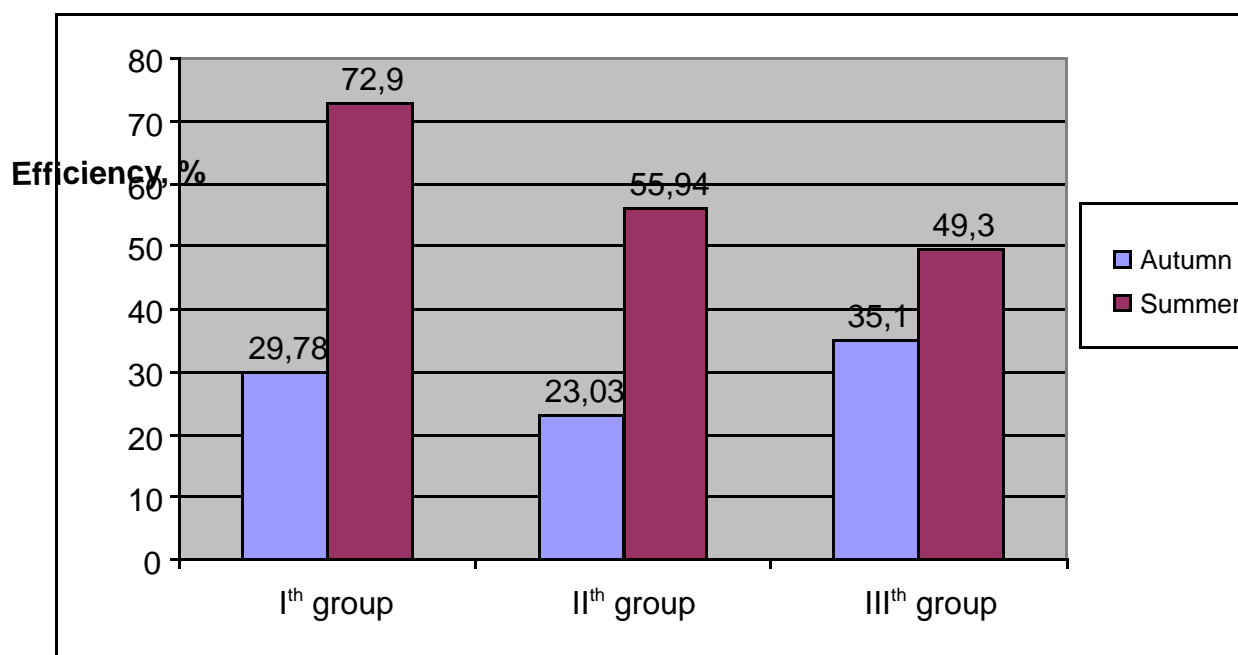
EI<sub>1</sub> – extent of infestation before treatment;

EI<sub>2</sub> – extent of infestation after treatment;

100 – coefficient of the expression of the result, %.

**Studies.** Our observations showed that at treatment of bee families against varroatosis before forming of winter club (in autumn) acaricidal efficiency of powder of wormwood bitter grass in the first group was  $29,78 \pm 2,77$  %. At the same time the weak strewing of within the period of application of the drug was registered (pic.1).

In the second group weak shedding of mites during the 14 days of use of eucalyptus leaf powder was also observed. Acaricide efficacy of the herbal preparation was  $23,03 \pm 3,49$ %.



***Pic. 1. Antivarroatic efficiency of herbal preparations in the different terms of treatment***

In the third group immediately after acaricide treatment strong excitation of bee families and shedding of mites was noted. Acaricide efficacy of horseradish root was  $35,1 \pm 2,92$ %.

After the treatment of bee families against varroatosis before the main nectar flow (summer) the following data was provided.

The use of powder of wormwood grass resulted to a strong shattering of ticks on the second day after the introduction of the drug into the hive. Subsequently, a slight shedding of parasites was noted during the period of application of the drug. Acaricide efficacy of powder of wormwood grass was  $72,9 \pm 7,92$ %.

After the use of eucalyptus leaf powder as acaricidal agents a slight shedding of varroa mites was recorded during all 14 days. Acaricide efficacy of the herbal preparation was  $55,94 \pm 10,21$ %.

In the third group immediately after acaricide treatment a strong excitation of bee families and slight shedding of mites were noted. Acaricide efficacy of horseradish root was  $49,3 \pm 5,39$ %.

The figure shows that antivarroatic efficiency of powder of wormwood bitter at treatment of bee families before main nectar flow (summer) is higher on 43,12 %, compared with the autumn treatment, of eucalyptus leaf powder – up to 32.91%, horseradish – 14.2 %.

### **Conclusions:**

1. Acaricidal treatment with the use of herbal preparations on the basis of wormwood bitter grass, eucalyptus leaves and horse-radish root there are low effective at autumn treatment against a varroatic invasion.

2. Powder of wormwood bitter grass is an effective ecologically pure way to deal with Varroa before the main nectar flow.

3. Powder of eucalyptus leaves possesses  $55,94 \pm 10,21$  % by efficiency at treatment of bee families before the main nectar flow.

4. Horse-radish root is an ineffective mean for a fight against a varroa infestation.

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