Acarapidosis of bees, prevention and treatment measures

Rakhimov Mukhamad Yunusovich

Veterinary Research Institute

ABSTRACT

The article provides information on the prevention and treatment of varroatosis, which occurs in bees and causes great economic damage. This disease is an invasive disease that is acute and chronic. In the prevention of disease, it is advisable to ensure the zoo hygienic conditions of the environment and the exchange of effective drugs against diseases.

Keywords: Varroatosis, mite, pyretroid, waxed cage, drug preparation, medicine, disinfection.

Introduction: The development of beekeeping is mainly hindered by varroatosis, acarapidosis, American and European rot, nosematosis, ascospherosis, pesticide poisoning and a number of other infectious and parasitic diseases.

It has not been studied in which regions these diseases are more or less common, that is, their prevalence, at what time of the year diseases occur, the causes of diseases, the percentage of bee colonies affected by these diseases, their amount of damage caused by them.

One of the main problems of acarapidosis is that any storage conditions (strong family, good nutrition in winter), methods and means used in the treatment and prevention of other diseases cannot guarantee the elimination of acarapidosis in this farm.

Treatment of this disease requires special medical methods and means. Inventory, disinfection of hives and other measures can prevent infection of bees with infectious diseases. However, disinfection measures for acarapidosis do not affect them.

Economic damage: the disease leads to a weakening of the bee colony in winter and spring, followed by death. The disease spreads slowly, at first causing less damage to beekeeping farms, and then gradually more.

The causative agent of the disease is the mite Acarapis woodi. Ticks parasitize on the trachea of adult bees. The size of the female tick is 190-160 x 80-110 microns, the size of the male tick is 85-120 x 60-80 microns. The shape of the pincers is oval and flattened. The tick has four pairs of legs, each of which consists of six segments. The mites are found in the bee's trachea. After 3-4 days, a fertilized female tick lays 4-10 eggs, when their size is much larger (60-65 x 120-140 microns). After 4-5 days, larvae 100-120 x 200-220 microns in size emerge from the laid egg. The larvae have three pairs of legs, 2 of which are well developed and have 2 claws on each leg, between which there is a shield. The larva turns into an eight-legged nymph. It differs from the adult tick in that there are no arcuate lines on its skin. The nymph is mobile and shedding its skin becomes an adult bee. It takes 11-16 days for a female tick to develop and

reach sexual maturity, and 10-13 days for a male. The female is 2-3 times more numerous than the male. The structures of the mouth are adapted to pierce the tissues of the body and feed it with hemolymph.

Ticks enter the bee through a pair of thoracic trachea, a pair of thoracic stigmas. The width of the thoracic stigmas provide access to the passage of ticks. Access to the rest of the stigmas is impossible because of the narrow opening.

Ticks (larvae, nymphs, adults) can also feed on its hemolymph by piercing the delicate skin around the base of the bee's wing.

The tick is an endoparasite. It affects only adult bees. Eggs, larvae and cocoons are not damaged.

Epizootology: The disease proceeds slowly. From one infected bee, it takes 3-5 years to infect 50% of the colony. The first signs of the disease appear when the family is affected by 50% or more.

The affected family will not recover. If left untreated, she will die sooner or later.

Symptoms and course of the disease: The disease is chronic, may be latent or overt. The latent form can persist for several years after infection of bee colonies. Such a hidden form may not be detected even when examining all colonies of a bee farm.

The manifest form of the disease occurs much later, when a third, half or more bee colonies are affected. The rate of transition of the latent form of the disease to the open form is influenced by environmental conditions.

The disease is most common in northern latitudes, where the climate is humid, ranging from 70 degrees to 40 degrees. (Uzbekistan is located at 41 degrees north latitude and 69 degrees longitude).

Since Uzbekistan is also located at 41 degrees north latitude, the disease can be prevalent in beekeeping.

Obvious signs of the disease often appear when the bees begin to fly in the spring after wintering, and in the summer after prolonged rainfall and high humidity. Bees that have flown out of diseased colonies fall to the ground, and hundreds and thousands of bees crawl around the hive. The wings of sick bees are displaced, as if folded.

Diagnosis: placed by viewing the anterior pair of bee tracheae under a microscope. The tracheae of a sick bee are perforated by mites and the hemolymph is sucked out of them, which turns first yellow, brown, and then black. A. woodi mites are found in the trachea at various stages of development (Figure 7).

Prevention. Generally healthy colonies should not include diseased bee colonies from unhealthy farms. Unhealthy farms must be on a strict list of veterinary authorities. The sale of bee colonies or queen bees from such farms is not allowed.

Every year, with the onset of the spring season, bee colonies are checked for acarapidosis. If there are so many bees flying around the boxes that the bees flying out of the hollow cannot fly, take 50 bees from 3-5 colonies on such a farm and send them to the veterinary laboratory for research.

Measures to combat acarapidosis: Acarapidosis is a dangerous disease that cannot be eradicated by treatment alone. Treatment is only an auxiliary measure and does not guarantee the full health of the farm. The treatment method is partially effective, so the treatment on the farm will need to be repeated every year.

Since there is no modern perfect method for diagnosing acarapidosis, it is difficult to know exactly the degree of damage to all families in the farm. When acarapidosis is confirmed in one colony on a bee farm as a result of laboratory tests, the suspicion of the disease is put on all bee colonies on this farm. In this case, in addition to this farm, quarantine will be declared for beekeeping farms within a radius of 5 km.

Quarantine is canceled after the disappearance of the disease. Until the complete elimination of the disease, the boundaries of the spread of acarapidosis will be determined, and all bee colonies on the

border of the spread of the disease will be destroyed.

Families of bees infected with acarapidosis, isolated for death, are carried out by fumigation with sulfur dioxide, taking into account local conditions.

The elimination of acarapidosis is primarily organized in areas or farms where the disease has re-emerged.

Acarapidosis is treated in unhealthy areas.

Treatment. For the treatment of acarapidosis, one of the following agents is used: folbex, ethersulfonate, ethyl dichlorobenzilate, tedion. For a single treatment of a family of 10 cells, the bees spend the following: Folbex 0.5 g, for a full course 4 g; analogue of ethersulfonate 0.3 and 2.4; tedion 1 and 10 g. Extra cells are removed from the family before processing. The family is limited by a spacer plywood that is assembled in the middle of the box. Their top and sides are covered with paper to prevent the exit of bees, if there are holes under the box, they are covered with wax, the hole where the bees fly is reduced to 2-7 cm, depending on the size of the family; weak families are reunited.

All bee colonies are processed from May to September. The full course of treatment lasts 1.5–2 months. Folbex or ethersulfonate is treated up to 8 times with an interval of 7 days (after each examination). The course of treatment is repeated in the early spring of the next year.

For treatment with Folbex, moisture-proof paper (for example, filter paper) is soaked in a 15% solution of potassium nitrate and dried. The paper is then soaked in folbex (or chlorobenzene or 4,4-dichlorobenzilic acid ethyl ester). This paper is dried again and cut into strips of 10 x 2 cm. Each of these strips contains a medicinal active ingredient intended for one family. Such a tape is hung between the cells of the family, keeping it burning (extinguishable in case of fire) at one end. The family hive closes immediately. Folbex smoke spreads inside the box, settles on the chitinous skin of adult bees and is absorbed into the trachea. Under the influence of smoke, ticks die off.

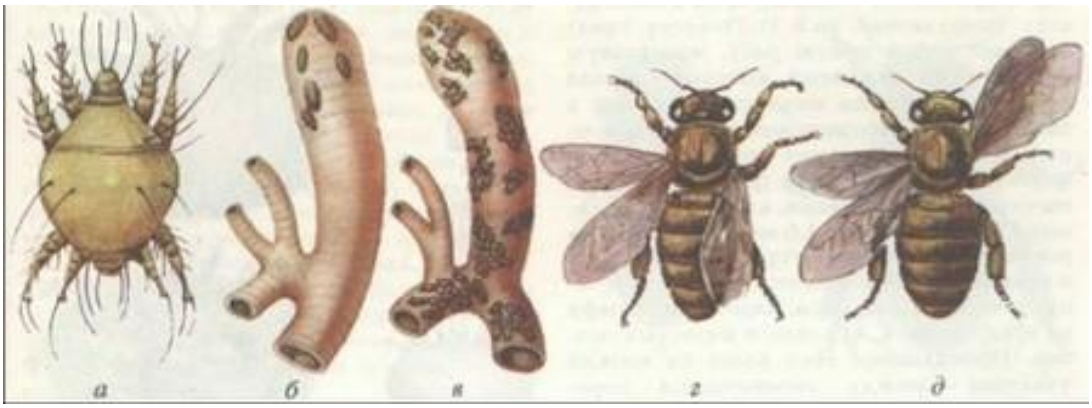

Figure 1. a) Acarapis woodi - female mite; b) mites in the trachea of bees with a latent form of the disease; c) mites in the trachea of bees with an open form of the disease; d) twisting of bee wings in the open form of the disease.

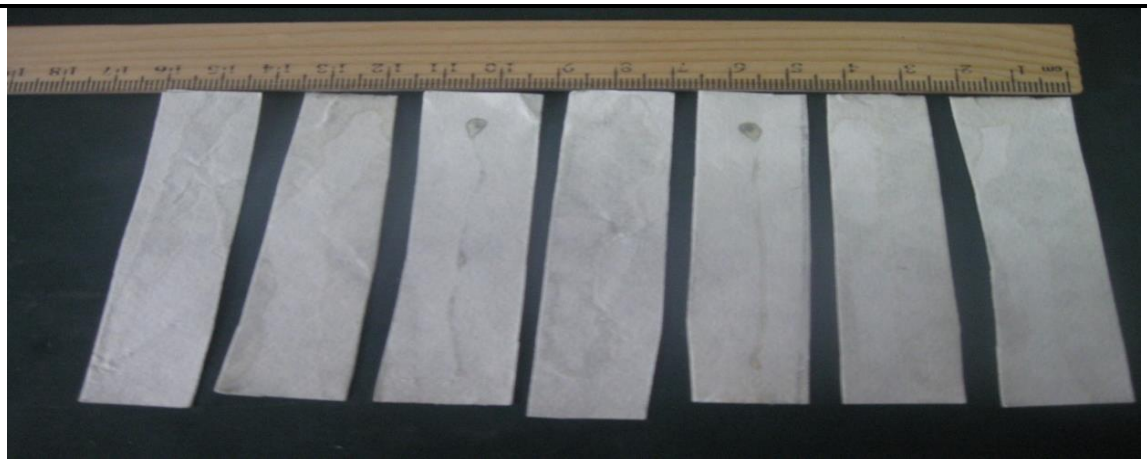

Figure 2. Flucin 6.75 mg of the active ingredient, impregnated with 10x2 cm filter paper strips.

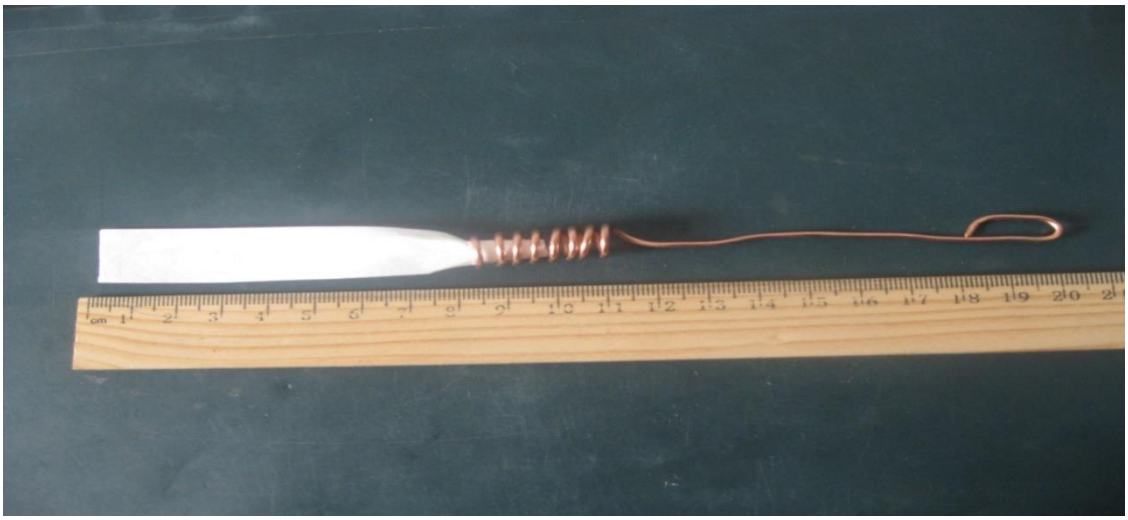

Figure 3. Placing a paper tape from a fuming acaricidal filter that holds the copper device

The ethersulfonate is prepared on filter paper or thin moistened cardboard soaked in a 15% solution of potassium nitrate, as well as using folbex. Each strip contains 0.3 g of the active substance ethersulfonate. The ribbon is hung at one end between family cells, and its other end is lit. Tedion is used in the form of tablets of 1 gram. A lit tablet is placed on the side on the back wall of the bottom of the box through the hole through which the bees fly. This operation is repeated 10 times with an interval of one day. A month after the end of the course of treatment, 50 bees from each severely affected colony are delivered to the laboratory for research. In this case, if a bee infected with a mite is found, the course of treatment is repeated.

Also highly effective against acarapidosis are flucin, valine, ammonia, drugs developed by scientists of the Research Institute of Veterinary Medicine against diseases of bees, varroatosis, American and European rot, ascospherosis, aspergillosis.

1. Bees infected with the A. woodi mite in the family die when soaked in 6.5 mg of filter paper 10x2 cm in size due to the active substance of the drug **Flucin** and are pushed through the inlet and outlet of the bee colony. The bee family is cleared of diseased bees, and the drug does not work on healthy bees. The smoke of paper not impregnated with the drug, as well as the inclusion of the drug in the bee colony and closing the outlet for 1 hour, does not have a harmful effect on the bees.

2. All bees infected with Acarapis woodi mites in the bee colony die during the fourth treatment with an interval of 7 days by soaking 15 mg of the active substance **Valine** in paper strips 10x2 cm in size and introducing them through the inlet and outlet of the bee

colony, the bee colony is completely cleaned, recover and develop rapidly.

3. When soaking with **Amikar** in the hive by soaking 6.25 mg in a 10x2 cm filter paper containing the active ingredient, bees infested with Acarapus woodi mites in the bee colony die and fall to the bottom of the box. In a bee colony cleared of infected bees, the process of infecting healthy bees with mites stops. The drug does not have a negative effect on healthy bees at the indicated dose (Figure 1-3).

Conclusions: Disease Acarapidosis under any storage conditions (strong family, good nutrition in winter), methods and means used in the treatment and prevention of other diseases cannot guarantee the elimination of acarapidosis in this farm.

Treatment of this disease requires special medical methods and means. Inventory, disinfection of hives and other measures can prevent infection of bees with infectious diseases. However, disinfection measures for acarapidosis do not affect them.

Today, all remedies against acarapidosis are used by the fumigation method, since the active substances must be delivered to the parasites in the respiratory tract of bees in the form of gas, vapor or aerosol. At the same time, under the action of the drug, healthy bees weaken, their life is shortened. On the other hand, mite-infected bees die as a result of the death of A. woodi mites in their respiratory tract. Therefore, the only way to prevent and cure the spread of this disease is to kill and destroy all bees infested with the mite.

Acarapidosis is a dangerous disease that cannot be eradicated by treatment alone. Treatment is only an auxiliary measure and does not guarantee the full health of the farm. The treatment method is partially effective, so the treatment on the farm will need to be repeated every year.

References:

1. Davidov A.S. Problems and ways of solving acarapidosis in beekeeping. Journal "Zooveterinary", 2013, Issue 3.
2. Davidov, T. Katayseva, G. Uzakova. Valine against varroatosis of bees. Journal "Zooveterinary", 2012, Issue 2, 16 p.
3. A.S.Davidov, G.P.Islamov. Epizootology and economic damage from psoroptosis. The role and perspective tasks of young researchers in the development of agricultural science and production. Materials of the scientific-practical conference at the Samarkand Agricultural Institute, part 1, 129 pages.
4. Mavlanov S. Oripov A., Davidov O., Kataytseva T. Veterinary measures in preparation for winter // Journal "Agriculture of Uzbekistan", 2014, Issue 9, p. 12.
5. Davidov A.S., Dzhurakulov O.K. "Methods and means of preparing disinfectant solutions in beekeeping" Agronauka 3 (41), 2016, p. 25
6. Davidov A.S., Doskulov V.M., Dzhurakulov O.K. Materials of the International Scientific Conference dedicated to the 90th anniversary of the Veterinary Research Institute "Medicinal plants against bee diseases", Samarkand - 2016, pp. 86-88
7. A.S.Davidov, V.M.Doskulov, O.K. Dzhurakulov "Medicinal plants against bee diseases" Veterinarian popular scientific journal 2017, No. 4, pp. 39-40.
8. Duskulov V.M., Davidov O.S., Isaev M., Dzhurakulov O.K. "The effectiveness of local medicinal plants in the treatment of bee diseases" Veterinary Medicine, Issue 9, 2018. P. 33-35.
9. Duskulov V.M., Elmuradov B., Meyliev M. "Highly profitable sector of beekeeping" Veterinary Medicine, Issue 12, 2018.

Author: Mukhamad Rakhimov, Head of the Laboratory of Poultry and Bee Diseases
Amir Temur street 50
tel. +998995030654
Samarkand region, Taylak fortress
Veterinary Research Institute