

METHODS FOR IDENTIFYING INFECTIOUS AND NON-INFECTIOUS DISEASES IN BEES AND THEIR EFFECTIVE TREATMENT (BASED ON ANALYSIS OF LITERATURE DATA) .

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This article analyzes the literature on the prevalence of infectious and non-infectious diseases of bees, their clinical signs, diagnostic methods and modern treatment measures. The main attention is paid to infectious diseases such as varroaosis, American rot, nosematosis, as well as non-infectious diseases such as poisoning, dysfunctions due to improper care. The analysis of the literature shows the effectiveness of veterinary drugs widely used in beekeeping and also reveals the importance of preventive measures. The article recommends effective methods of control based on scientific sources and highlights the important principles of maintaining a healthy apiary.

INTRODUCTION. Relevance of the topic: **Bee diseases** are diseases that occur in bees. They are mainly divided into infectious, invasive (contagious) and non-infectious diseases. Of the infectious diseases, American rot disease (in the fungus) and European rot disease (in the larvae) are most common. It is observed when the seeds placed in the cells in the frames rot. The disease is caused by fungi. Treatment and control measures: the affected frames in the hive are disinfected, one of the antibiotics such as penicillin, norsulfazole, streptomycin (at the rate of 1 g per 1 liter of the broth) is added to the healing broth. Of the infectious diseases, nosematosis disease damages the midgut of bees and is observed with severe diarrhea. It is caused by spores of the *Nosema apis* fungus. Sick bees do not stay in the frames, but stick to the walls of the hive. Treatment: a medicinal broth (2 kg of sugar, 1 l of water) is given with the addition of fumaglin (50-100 g per 1 l). The treatment is repeated 2-3 times with an interval of 5-7 days. Another infectious disease is varroaosis, a disease

caused by mites. It is widespread in Central Asia. Mites parasitize on the comb, under the wings and abdomen of bees. Control measures: a tin plate with Vaseline is placed under the bee frames. The phenothiazine preparation is smoked and the hive is steamed for 30-40 minutes (under the influence of smoke, the mites fall onto the tin plate with Vaseline and stick to it). The hive is opened, ventilated, and the mites are collected and burned. Of the non-infectious diseases, poisoning from nectar, pollen from poisonous and harmful plants, as well as various chemicals, is more common. Treatment: when signs of the disease are detected, bees are given warm water or 20% sugar solution in the evening. Moving the apiary to another place gives a good result. Despite their short lifespan, bees can be affected by various diseases. Bee diseases are infectious and non-infectious. Non-infectious diseases arise as a result of a violation of the conditions necessary for the life of the bee colony. When conditions are restored, diseases disappear. Infectious diseases include infectious and invasive diseases. The causative agents of infectious diseases are bacteria, viruses and fungi that originate in plants. The causative agents of invasive diseases are unicellular and multicellular parasites. Infectious diseases include American and European rot, bag rot, stone and lime worm diseases. Infectious invasive diseases include Nosematosis, Acarapetosis, Varroatosis, and Brauliosis. To heal bee colonies, it is necessary to timely detect diseases, treat them, and fully implement sanitary and preventive measures. It is much easier to prevent diseases than to treat them. To do this: When establishing a new colony, purchase bee colonies only from colonies whose health is known; thoroughly disinfect used apiaries, beekeepers and any equipment before use; do not allow bees to be fed with honey purchased from abroad; when working in the colony, the beekeeper should wear a clean gown, wash his hands as often as possible, and disinfect the hive and other small tools from time to time; strictly observe cleanliness within the colony, burn dead bees; Never allow frames with maggots, honey and honey-free combs to be taken from sick families and installed in healthy families. Do not allow theft among bees. Store beekeeping products consisting of honey, wax and comb in a place where bees cannot access them; Feed bee colonies in normal conditions, provide them with sufficient food and heat the apiaries well; Every year in the spring, after removing bee colonies from wintering, they must be moved to disinfected and clean apiaries. It is necessary to declare quarantine on colonies affected by rotting disease until the disease is eliminated!

European rot disease . The disease occurs in the spring, first half of summer, most often during cold and dry days. In nature, the disease decreases as honey plants increase, and in the fall, when bees stop collecting honey, it increases again. Microbes that cause the disease

. This disease is caused by Pluton streptococci. Pluton streptococci are less resistant and do not form spores, which makes it much easier to fight European rot disease. The bodies of larvae that die from European rot disease also contain other microbes. Symptoms of the disease. Since the larvae in the cells that are not watered when European rot disease occurs are damaged, the cells that are affected by this disease do not have perforated cells. Closed and perforated cells are found only in cases where the disease is very severe. The dead larvae become dull, loose, initially yellowish, then dirty yellow or yellowish brown, and finally black or brown. Infected larvae are restless and die in various situations. The rotting substance does not stretch. The larvae's skin does not stick to the cell walls, so honey bees can easily remove these skins from the cells. Rotting larvae have a musty or leathery smell. Disinfection, removal, and treatment are the same as for American foulbrood.

American rot disease. The disease usually appears in the summer - when the queen bee is actively laying eggs. A colony that is heavily affected by this disease dies in mid-summer, and a colony that is less affected dies in late summer, winter or early spring. In sick colonies that have overwintered, the disease is most severe in early spring. The disease is caused by the Larvae bacillus. This microbe produces very resistant spores. These spores can survive for several years in the dried shells of larvae and, if partially contained in honey, in boiling water for 15 minutes, in wax heated to 100 ° for up to 5 hours. Sunlight can kill the spores only after 3 days. This disease affects the larvae in the closed cells. The lids of the cells are sunken inward from the weight of the larvae stuck to them and are often perforated. The body of the larvae is sticky and can stretch for several centimeters. Bees try to open such cells and get the putrefactive substance from them, but because this substance is sticky and stretchy, they often cannot do this. A dead larva is light brown to dark brown in color. The diseased larva lies stretched out on the lower wall of the cell. The shell of the dried larva is tightly attached to the lower wall of the cell and slightly rises upwards. The bees are not strong enough to remove such a shell from the cell. The rotting larvae smell like melted carpenter's glue. If only 1-2 colonies in the colony are infected with American foulbrood, their brood should be thawed. If many colonies are affected, they should be moved to a new apiary and given a treatment solution. Relocation The site of the diseased bee colony is dug up and sprinkled with 10% slaked lime (1 liter per 1 m² of land), frames with intact honeycombs or artificial honeycombs are placed in the newly cleaned apiary. The queen bee is found, placed in a cage, and placed between the frames of the new apiary. The treatment juice is prepared and placed in a trough located above the frames. The hive is wrapped in a special cloth and the apiary is closed. Relocation should be carried out in the afternoon. The

door of the new apiary is opened and a large sheet of paper is spread in front of it. The bees are taken from the old apiary with their frames and shaken onto the paper in front of the door. Then they are driven away with smoke and introduced into the new apiary. After the bees have entered, a net is pulled over the door so that they do not leave the hive. The paper placed in front of the door is burned. In this case, the hive will stand for 4 days. After 4 days, the transfer is repeated and the queen bee is replaced. Disinfection: The old apiary and the damaged frames with honeycombs should be disinfected (disinfected). Before disinfecting the apiaries, they should be thoroughly cleaned of wax and propolis, washed with a mixture of 2 kg of hot ash in 1 bucket of water, dried and burned evenly with the flame of a blowtorch. Also, 10% hydrogen peroxide solution or 3% acetic acid is used for disinfection. The honey from the damaged frames with honeycombs should be separated (this honey is harmless to humans) and the wax should be melted. The empty frames with honeycombs should be disinfected with 2% hydrogen peroxide or 1% acetic acid. The frames with honeycombs should be soaked in the prepared solution for 1 day, then washed with clean water. Special fabrics, gowns, towels, face masks and other small tools are disinfected by soaking them in a 20% hydrogen peroxide solution for 5 hours or in a 1% activated chloramine solution for 2 hours. The honey extractor, if it was used to extract honey from a sick colony, is washed with a 2% solution of boiling washing soda. Treatment. Method 1: Sugar paste can be used for treatment. To do this, add 1 g of terramycin and 45 g of sunflower oil to 154 g of sugar powder to prepare a treatment paste. The sugar paste is prepared in the form of a 200 g cake and placed on a thin cloth base on the frame. Alternatively, 2.5 g of terramycin is mixed with 100 g of sugar powder without adding sunflower oil and sprinkled on the beehive. Method 2: Treatment juice - prepared by mixing two parts of sugar with one part of water and bringing to a boil. After the prepared sugar juice is cooled to 30 °, one of the drugs is added. For one liter of sugar juice: Biomycin - 500,000 ED IB (international units). Oxytetracycline - 400,000 ED. IB (international units). Streptomycin is given at a dose of 900,000 to 100,000 IU (international units) per liter of sugar syrup. Norsulfazole is given at a dose of 1 g of norsulfazole sodium per liter of sugar syrup. The prepared treatment syrup is given at a rate of 150 mg per bee colony until the bees are completely cured. Each of the added drugs is first dissolved in warm water and then mixed with the sugar syrup.

Oxyvit - yellow powder is used to treat honey rot disease. Treatment juice: 1/1 prepared sugar juice is added to 0.5 g of Oxyvit per liter and given to each family in 100 g of feeders. So, the prepared mixture is enough for 10 families. Treatment should be given every three

days until the disease is over. If the same drug is used for a long time, it will not affect the pathogens. Therefore, they should be changed. Treatment juice can be placed in the feeder or sprayed on the bee corridor and the bee body. Bag-shaped rot disease. Bag-shaped rot disease is an infectious disease caused by a very small virus, which mainly begins in early summer due to lack of food and cold. This disease is caused by 5-6-day-old larvae. When the larvae are removed with tweezers, they look like a bag with liquid. This disease is similar in appearance to American foulbrood, but the decaying material of the larvae affected by this disease does not stretch and the shell does not adhere tightly to the walls of the cells. The bodies of the dried larvae turn into a dark black, brown shell and are easily removed from the cells. The source of infection of the disease is the larvae, which are spread within the colony by young bees when feeding the larvae, removing dead larvae, and cleaning the cells. The disease spreads if the colony is kept cold or if there is not enough food. The diseased colony is moved to a new apiary, excess frames are removed, the colony is compacted, warmed, and fed. The virus that causes the disease dies after 30 minutes when heated to 100 ° or after 7 hours in sunlight. In case of exacerbation of the disease, the bee colony is transferred to a newly disinfected apiary, and clean disinfected frames are placed instead of frames with honeycombs, the apiary is heated and fed. Sick and weakened colonies are combined. The wax of the diseased honeycombs with larvae is melted. The queen bee of the colony is placed in a cage for up to 7 days, then a queen bee is taken from the reserve and replaced. Treatment juice does not give good results. For prevention, 50 mg of biomycin or levomycetin should be mixed with 1/1 liter of prepared juice. For treatment, antibiotics are added to equal parts of sugar juice. Add 500 mg of IB biomycin, tetracycline or terramycin to one liter of sugar juice, mix thoroughly, and 150 ml of treatment juice is given to one bee colony three times every 7 days. Stoneworm disease Stoneworm disease affects both closed and open larvae. In rare cases, the disease affects adult bees. This disease is observed in the spring and summer seasons. High humidity and excessive expansion of the hive contribute to the development of the disease. The causative agent of the disease is brought into the hive with nectar and pollen. In the cells affected by the disease, yellow or light yellow mold first appears, and then this mold turns dark. The dead larvae look like black stones. When the frame with larvae is removed and shaken, a stone-like sound is heard. Some families get sick in the apiary. Treatment with the juice does not give a good result. Sick single frames with larvae are thawed, the bees are transferred to a clean apiary and fed. In the apiary, it is necessary to feed strong families that are resistant to the disease.

Limescale maggots Limescale maggots affect both covered and uncovered maggots. Male maggots are more susceptible. The disease occurs in spring and summer, when the air humidity is high. The disease is brought to the hive by water and pollen. White mold resembling a sooty mold appears on the cells affected by this disease. This mold extends beyond the edges of the cell and spreads in a circle. The dead maggots harden, turn light brown and look like limestone. Treatment with syrup does not give a good result. Often, some colonies are affected. The bee colony should be kept dry. Wet apiaries should be replaced. The disease is treated by melting the wax of single-comb frames and replacing them with clean frames. For treatment, it is necessary to give sugar syrup, remove excess frames from the hive, wrap them in a blanket and warm them. To combat this disease, beekeepers first wrap 5 g of garlic bulbs in gauze and store them in the refrigerator. When the disease appears, placing each garlic bulb wrapped in gauze in the beehive for three days gives good results in treatment.

Asconazole – Used to combat Stone and Lime diseases. One ml of asconazole is first mixed in 50 ml of water and then added to 3 liters of sugarcane juice. The treatment juice is given to each family 300 g 2 times every 5 days.

Askovet – Used to combat stone and lime diseases. One ml of askovet is first mixed in 50 ml of water, then added to 3 liters of sugar syrup. The therapeutic syrup is given to each family in the amount of 300 g 2 times every 5 days.

Acarapis is an infectious disease of adult bees. Acarapis is an invasive disease caused by the Acarapis wood mite that attacks the respiratory system. Young bees, males and queens are affected by this disease. The Acarapis wood mite is invisible to the naked eye, it settles in the respiratory tract and feeds on the bee's blood. This mite cannot live outside the bee's body. These mites multiply in the bees' respiratory system, making it difficult to breathe. Bees infected with Acarapis become thin and unable to fly. They fall to the ground and crawl around the apiary, their wings folded. The disease spreads from one bee to another. This disease does not infect larvae, artificial brood, or other parts of the apiary. The mites injure young bees more often. The disease spreads very quickly when bees are kept in poor conditions. The development of mites is caused by humid air, lack of sap in poisonous plants, precipitation, etc. The cause of the disease is determined in late winter and early spring. Samples of bee colonies affected by acarapidosi should be taken and sent to the laboratory. Treatment. To treat the disease, it is necessary to close the openings of the apiary well and smoke phenothiazine through the lower door. Phenothiazine powder is used in spring and autumn when the temperature is not lower than 15 °. 1.5 g of phenothiazine is used per colony. The treatment is applied twice a day. Three times a month. Before treatment, greased paper is laid on the floor of the apiary and any holes are closed. For

treatment, 3 g of phenothiazine wrapped in paper is placed on the coals inside the censer and smoked between the two colonies. First, it is smoked for 30 seconds for each colony, then it is returned after 20 seconds. After the incense is burned, the doors are narrowed, the written paper is removed from the nest and burned.

Braulosis is an invasive disease of worker and queen bees, caused by the Braula insect. This is a lice disease of bees. The bee lice are small wingless red-brown insects that live on the bodies of bees. They are more common in queen bees. They feed on the food consumed by queen bees and honeybees. The lice attach to the mouthparts of the bees and tickle them until a drop of food appears. Then they eat this food. Sick bees lose weight, the queen reduces egg laying, the colony weakens and dies. You can clearly see the lice on the bees with your eyes. It is recommended to use phenothiazine, naphthalene or camphor preparations to treat bees. Before treatment, greased paper is placed under the frames, and if there are holes in the apiary, it is poured. After smoking, the paper on which the lice have fallen is carefully removed and burned. Phenothiazine is burned at a rate of 1.5 g per colony, and the entrances are narrowed. 12 g of naphthalene is wrapped in gauze for each colony, placed in the evening, and removed in the morning. Camphor is also burned at a rate of 5 g per colony, placed in gauze, and burned inside the apiary until morning. The treatment is repeated for 3 consecutive days.

Varroatosis is a dangerous disease. This mite settles on bees and feeds on their blood. The varroatosis mite is brown and can be seen with the naked eye. This mite lays its eggs before the larvae of the larvae are closed. It lays up to 4-8 eggs in one larva. Males lay 10-14 eggs in cells with bees. Males of this mite are not much of a threat to bees. The mites inside the closed larvae of the During the winter, bees that are infested with mites become restless, fly out of the apiary and die. In spring and summer, the bee colony weakens, the honeycombs of the cells are pierced, and you can see the larvae and wingless bees that have been thrown out in front of the apiary. The treatment is with the preparation Bipin. At an air temperature of +4°C, 1 g of Bipin is mixed with 2 liters of water and 10 ml is sprayed on each bee colony. Phenothiazine powder should be used as described in the case of brucellosis.

Phenothiazine powder. In spring and autumn, when the temperature is not lower than 15°, phenothiazine powder is used. 1.5 g of phenothiazine is used per family. The treatment is applied 2 times a day. Three times a month. Before treatment, greased paper is written on the floor of the apiary, and if there are holes in the apiary, it is closed. For treatment, 3 g of phenothiazine wrapped in paper is placed on the coals inside the incense burner and smoked through the doors of two families, as described above. First, each family is smoked for 30 seconds, then for 20 seconds. After smoking, the doors are narrowed, and the written paper is burned.

Treatment with formic acid. A piece of cardboard measuring 15x25 cm and 3-5 mm thick is placed in a polyethylene bag and 150 ml of formic acid is added. The bag must be

intact so that the formic acid does not leak out! After the cardboard has absorbed the added acid, the mouth of the bag is closed. Before use, a 1.5 cm hole is made in one side of the bag. Then, the hole is placed on the frames of the bee colony for 21 days with the hole facing down. This method is used when the air temperature is $+10^{\circ}$, $+30^{\circ}$. The treatment is stopped 10 days before the main honey collection period. During the treatment, the above doors are also opened.

Thymol treatment. Thymol is a colorless powder. It is used in the treatment when the air temperature is $+7^{\circ}$, $+27^{\circ}$. For treatment, 0.25 g of thymol is sprayed between two frames 3 times every 7 days, and is also used to prevent nosematosis, ascopherosis and rotting diseases. Add 3 g of thymol dissolved in warm water to 1/1 prepared 25 liters of sugar syrup and give 100 g to each frame every three days. The treatment is repeated 4 times. 2% acetic acid is used in the treatment when the air temperature is not lower than 16° . 10 ml is sprayed on each frame covered by a full-fledged bee. Bipin-T. It is used in early spring and autumn to combat varroatosis. One g of bipin is mixed with 2 liters of boiled water cooled to 30° , and 10 ml is sprayed on each bee lane. The drug "Dilabik" is used against varroatosis in spring and autumn when the air temperature is $+3^{\circ}$, $+10^{\circ}$. To prepare the drug, 0.5 ml of dilabik concentrate is mixed with one liter of boiled water cooled to 30° , and 10 ml is sprayed into each bee path. A fumigant is a thin, long piece of wood 200x25x1 mm in size, impregnated with the drug. It is used in early spring and autumn. For one strong family, two pieces of wood are placed in the apiary. For weak families and nuclei, one piece of wood is enough. The placed pieces of wood are left in the apiary for 3 to 25 days, depending on the number of frames with larvae in the bees.

Nosema is a disease that occurs in worker, queen and drone bees. This disease occurs at the end of winter and the beginning of spring. The causative agent of the disease is *Nosema apis*, a unicellular organism that parasitizes in the midgut of bees. It gets there with contaminated food honey. The disease is spread by sick bees. They contaminate honey, soil, water and hives through their waste (excrement). Healthy bees, when consuming contaminated honey, soil, water, contract the disease during cleaning of cells or from equipment. At the end of winter, sick bees multiply and the bees become restless. They have diarrhea. Sick bees try to leave the hive. The bees that have escaped die in the cold, unable to return and in front of the apiary. Yellow spots appear on the walls of the apiary, on the frames, as a result of their diarrhea. This disease often occurs when the queen bee is infected with eggs and in most cases dies. The life span of the bees is reduced by 1-2 months. The bee colony weakens. Before treatment, the traces of solidified bee excrement in the apiary are scraped off with a brush, then burned with a blowtorch. The frames with honeycombs are disinfected with a 4% solution of formalin. The apiary and other wooden objects are washed with 2% caustic soda. In the conditions of Uzbekistan, bees hibernate in the open air, and when spring comes early, on warm days, they fly out and empty their intestines. At this time, it is necessary to open the apiary, urgently improve the food, transfer the bees to

disinfected apiaries and frames with honeycombs, and warm the hive. For treatment, the antibiotic fumagillin is given, mixed with 1/1 sugar syrup. When preparing the treatment syrup, 20 g of fumagillin is added to 25 liters of syrup. The treatment juice should be given to each family in 500 g. The treatment lasts 10 days. Acetic acid is given as a brine. It is mixed well with 3 ml of vinegar essence in 1/1 prepared 10 liters of sugar syrup and placed in the feeders. This food is also given to each family in early spring in 500 g. Nosemacid - first dissolve 5 grams in 50 ml of hot water, add to 2 liters of sugar syrup prepared 1/1 and mix well. The prepared juice is given in 100 g per bee colony .

Septicemia is a disease of adult bees that occurs in spring and summer. The disease develops rapidly when humidity is high. The causative agent is a bacterium. At the beginning of the disease, adult bees are agitated and panicked, running around frequently and then dying. The body of a dead bee is crushed when touched with ash. Treatment The bee colony should be moved to a clean and dry apiary, unsealed frames with honey should be removed, and the hive should be warmed up. The bees should be given a healing syrup. Add 300,000 IU of tetracycline or biomycin to one liter of sugar syrup and give 100 grams to each bee lane in the evening 3 times every 4 days.

Conclusion: The analysis of the literature showed that among the diseases of bees in Uzbekistan, infectious diseases such as varroatosis, American rot, nosematosis, as well as non-infectious pathologies caused by environmental influences, are widespread, which cause serious economic damage to beekeeping farms. The course of these diseases is often latent, which complicates their early detection and effective control. Based on the analysis of modern scientific sources, the etiology, clinical signs and diagnostic methods of these diseases were clarified. It was also noted that the use of environmentally friendly and effective treatment agents that meet the requirements of biological safety, as well as the systematic implementation of veterinary and sanitary measures, play an important role in the fight against diseases.

Based on the research results, the following conclusions were reached:

- Loss can be reduced by detecting common diseases in bees at an early stage and implementing systematic preventive measures.

- One of the urgent tasks is to introduce laboratory methods for diagnosis and improve the professional capacity of veterinary specialists.

- The use of environmentally safe, biological medicines is one of the promising areas in maintaining the health of bees.

The results of this analytical work serve as a scientific and theoretical basis for the formation of healthy beekeeping in the conditions of Uzbekistan, ensuring the sustainable development of local beekeeping farms, and improving veterinary and preventive measures.

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