1ST WORLD APIMONDIA CONFERENCE
ON ORGANIC BEEKEEPING
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TREATMENTS OF BEE DISEASES IN BULGARIAN ORGANIC BEEKEEPING

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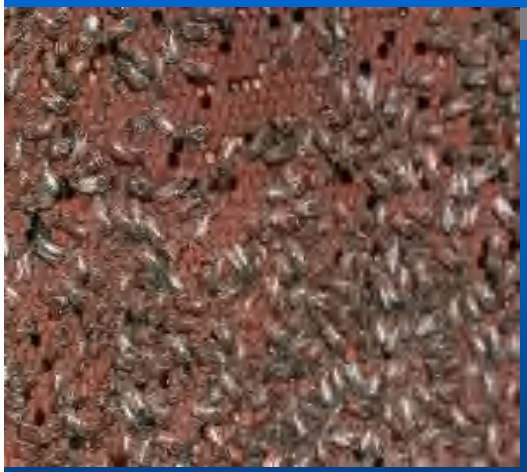
Bacterial diseases

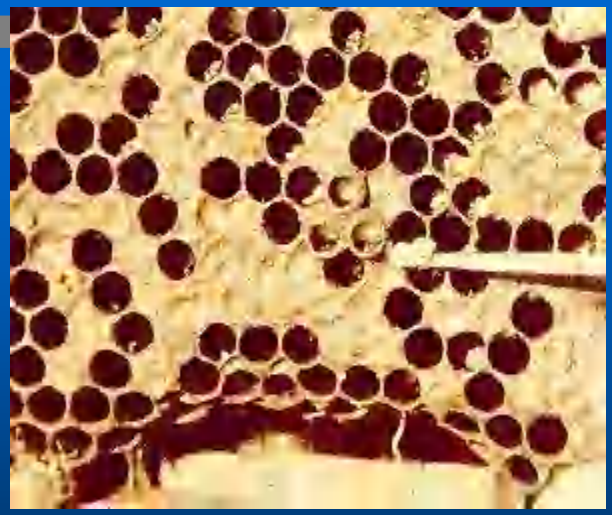
Disease / Cause agent	Time of appearance and predispose factors	Age of brood	Typical Symptoms / Changes of bee larvae	Diagnose / Therapy	Follow actions
American foulbrood (AFB) / Paenibacillus larvae subsp. Larvae (White)	Mai-July, hot weather, lack of nectar and pollen flow	Sealing brood	Between ill found health brood, hollow top of the dark cells / Bee larvae stick tightly to the cells. Mucilage sharpens long mass after trying to extract bee larvae from the cell with sharp object. Putrid odor. [2]	Fast test for diagnostic – Vita (Europe) LTD (www.vita-europe.com)[4] Diagnose must be confirm by laboratory. / Not allowed antibiotics!	Foul Brood Diseases are present in Bulgaria. As antibiotic treatments are not allowed following preventive measures are used: - fast tests for diagnostics - Vita (Europe) LTD (www.vita-europe.com) [4], confirm by laboratory; - destruction of diseased combs (burning); - transfer of bees into new hives with new honeycombs; - disinfection - NaOH-solutions for disinfection ot the hive, then neutralised by organic acids [8] - 2% NaOH-solution in dose 0,5 lt / 1m^2 twofold (1 h interval), followed after 2 weeks by three times washing (1 h intervals), with 3% Formic acid in dose 1 lt / 1m^3 (12-frame beehive), and drying [1]. Equipment should be immersed in at least 0.5% hypochlorite for 20 minutes [9]. Hands of the beekeeper must disinfect before and after work with ill hives. Clothes – with boiling water; and - laboratory control (1 year quarantine of apiary after last positive sample);

Field test for American Foulbrood

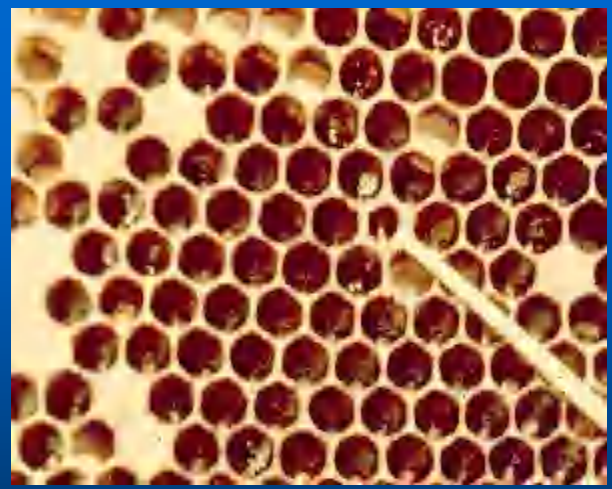
Disease / Cause agent	Time of appearance and predispose factors	Age of brood	Typical Symptoms / Changes of bee larvae	Diagnose / Therapy	Follow actions
European foulbrood (EFB) / Melissococcus plutonius	Mai-Jun, lowering of the temperatures, shortage of nectar and pollen flow	Unsealing brood (in some cases and sealing brood)	Between ill found health brood, hollow top of the yellow and grey cells / Bee larvae not stick tightly to the cells. Mucilage sharpens short mass after trying to extract bee larvae from the cell with sharp object. Acid odor.[2]	Fast test for diagnostics (Vita-Europe Ltd [4], confirm by laboratory / Not allowed antibiotics.	As American foulbood



Healthy brood



European Foul Brood Showing Dead Larvae And Scales



American Foul Brood Showing Tongue Attachment

Disease / Cause agent	Time of appearance and predispose factors	Age of brood	Typical Symptoms / Changes of bee larvae	Diagnose / Therapy	Follow actions
Septicaemia from bacterial causes / Salmonella sp., Pseudomonas aeruginosa *etc.*	Mai-Jun or September, lowering of the temperatures, shortage of nectar and pollen flow	Adult bees have disorders	Crowded dead bees easily crumbled[2]	**Laboratory diagnose / Not allowed antibiotics.**	**Quarantine of apiary, destruction of ill combs (burning), and shake of bees in new hives with new honeycombs.**

Disease / Cause agent	Time of appearance and predispose factors	Age of brood	Typical Symptoms / Changes of bee larvae	Diagnose / Therapy	Follow actions
Viral diseases					
Acute bee paralysis virus (ABPV) or (APV) **Israel acute paralysis virus (IAPV)** **Kashmir bee virus (KBV)** **Black Queen Cell Virus (BQCV)** **Chronic Paralysis Virus [CPV]** **Cloudy Wing Virus (CWV)** **Deformed Wing Virus (DWV)** **Sacbrood virus (SBV)** **Kakugo virus (KV)** **Varroa destructor virus 1**	Lowering of the temperatures, shortage of nectar and pollen flow	Different ages of bees	Paralysis deformed wings of bees etc.	**As septicaemia**	**from bacterial causes**

Disease / Cause agent	Time of appearance and predispose factors	Age of brood	Typical Symptoms / Changes of bee larvae	Diagnose / Therapy	Follow actions
			Fungal diseases		
Chalkbrood / Ascosphaera apis	A fungal disease that infests the gut of the larva, most commonly visible during wet springs.	The fungus will compete with the larva for food, ultimately causing it to starve.	The fungus will then go on to consume the rest of the larva's body, causing it to appear white and 'chalky'. 	**Visual and laboratory diagnose**	**Improvement of worker bees hygienic behaviour by management and selection. Requeening of the hive and increasing the ventilation.**
Stonebrood / Aspergillus fumigatus, Aspergillus flavus and Aspergillus niger. (The fungi are common soil inhabitants and are also pathogenic to other insects, birds and mammals.)	A fungal disease infects the gut growing rapidly to form a collar like ring near the head. 	When a bee larva takes in spores they may hatch in the gut. It causes mummification of the brood of a honey bee colony.	Eventually the fungus erupts from the integument of the larva and forms a false skin. In this stage the larvae are covered with powdery fungal spores. After death the larvae turn black and become difficult to crush, hence the name stonebrood	**Visual and laboratory diagnose. The disease is difficult to identify in the early stages of infection. The spores of the different species have different colours.**	**As Chalkbrood**

Disease / Cause agent	Time of appearance and predispose factors	Age of brood	Typical Symptoms / Changes of bee larvae	Diagnose / Therapy	Follow actions
Pests and parasites					
Varroatosis / Varroa destructor	Parasitic mites that feed off the bodily fluids of adult, pupal and larval bees. Varroa in combination with Deformed Wing Virus and bacteria have been theoretically implicated in Colony Collapse Disorder. Bees that are infected with this virus during their development will often have visibly deformed wings. Varroa are generally not a problem for a hive that is growing strongly.	Adult, pupal and larval bees	Varroa mites can be seen with the naked eye as a small red or brown spot on the bee's thorax	**Visual and laboratory diagnose / Different chemicals are allowed as ecological terapeutics for varroatosis.** **Recently we have some researches for essential oils from medical herbs – see "Hissopus officinalis L. essential oil for varoa control "(P.Nenchev, Lecture 18 from conference)**	**Broodright colonies [7] "Apilife Var - Evaporating tablets" with thymol, eucalyptus, camphor and mentol (Chemical Life, Italy), (http://www.beekeeping.com/chemical-laif/index.htm) [6] – low dosage:1 tab broken in 3-4 pieces on the lath holding the comb, 3-4 times after 7-8 days;high dosage:2 tabs broken for 2-3 pieces for 12 days, tenn repeat the same sdministration 1 time. Ecostop (plates) (with thymolum and oleum menthae) – Primavet-Sofia, Ltd [5]-1-3 plates on the top of the brood frames, spryng and autom. Apiguard (with thymol) - Vita (Europe) LTD (www.vita-europe.com)[4] - put the tray on the top of the brood frames, after 2 weeks - a second tray, last treatment after 4-6 weeks Thymol (Powdered crystals) – evaporate by loading into special frames Formic acid – 60% vapor; pads with absorbent material (40 ml from 60% F.acid) or gel packs "Mite-Away"[3]** **Broodless colonies [7] Oxalic acid – spray, drible or evaporation methods**

***Varroa destructor* on a honey bee larva**

Disease / Cause agent	Time of appearance and predispose factors	Age of brood	Typical Symptoms / Changes of bee larvae	Diagnose / Therapy	Follow actions
Acarine (Tracheal) mites / Acarapis woodi	Tracheal mites	Adult, pupal and larval bees	Adult bees couldn't fly	**Diagnosis for tracheal mites generally involves the dissection and microscopic examination of a sample of bees from the hive (laboratory diagnose). / Acarine mites are commonly controlled with grease patties (typically made from 1 part vegetable shortening mixed with 3-4 parts powdered sugar) placed on the top bars of the hive. The bees come to eat the sugar and pick up traces of shortening, which disrupts the mite's ability to identify a young bee. Some of the mites waiting to transfer to a new host will remain on the original host. Others will transfer to a random bee - a proportion of which will die of other causes before the mite can reproduce. Menthol, either allowed to vaporize from crystal form or mixed into the grease patties, is also often used to treat acarine mites.**	**Quarantine for 1 year for apiary after therapy, followed with negative laboratory test.[3]**

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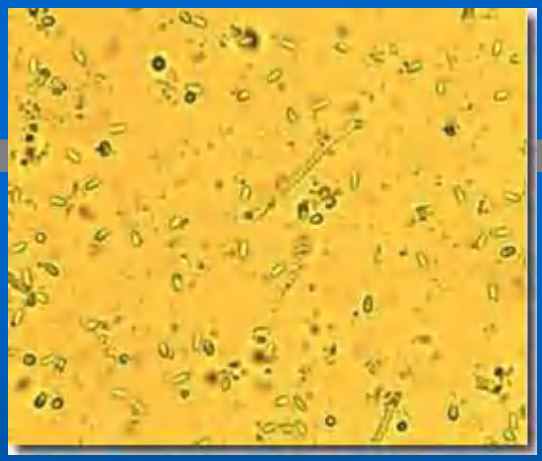
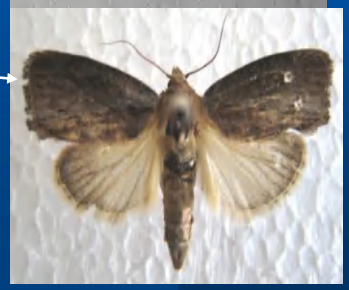
Nosema / spore-forming protozoan Nosema apis and recently by Nosema ceranae	Winter and spring; lack of nutrition; honeydew honey for winter nutrition	Flying bees / queen	Disorders / ill bees have white color of middle intestine	**Visual and laboratory diagnose / Removal of honeydew honey and transfer bees in disinfected hives.** **A Bulgarian biological preparation is used Nosestat ("Primavet – Sofia", Ltd. [5]), (iodine, potassium iodide and formic acid showed high efficiency – treatments with sugar solution 3 times at intervals of 3 days and repetition of the sheme after 7 days. [10; 11; 12].** **Extracts of plants that are environmentally safe and non-toxic for the humans - "ApiHerb", "Chemical Life", Italy [6] – feeding with sugar solution for 3 weeks.**	**Hives and other tree and metal materials (centrifuge, equipment etc.), disinfect with 2% solution of NaOH as foulbrood diseases [1].** **Hands of the beekeeper - disinfect before and after work with ill hives. Clothes - treat with boiling water.** **Absence of cause agent in disinfected hives must be proved by laboratory.**



Disease / Cause agent	Time of appearance and predispose factors	Age of brood	Typical Symptoms / Changes of bee larvae	Diagnose / Therapy	Follow actions
Small hive beetle / Aethina tumida **-not been discovered in Bulgaria**	This is a small, dark-colored beetle that lives in beehives 	Comb slimed by hive beetle larvae. Hives infested at this level will drive out bee colonies.		**Visual and laboratory diagnose / Alternative controls (cooking-oil-based bottom board traps); Beetle eaters that go between the frames that uses cooking oil.**	**The life cycle of this beetle includes pupation in the ground outside of the hive. Controls to prevent ants from climbing into the hive are believed to also be effective against the hive beetle. Use of diatomaceous earth around the hive as a way to disrupt the beetle's lifecycle. The diatoms abrade the insect's surface, causing them to dehydrate and die.**
Wax moths / Wax moth (Aphomia sociella) - more often associated with bumble bees (Bombus sp.) and Galleria mellonella (greater wax moths)  	Not attack the bees directly, but feed on the wax used by the bees to build their honeycomb.	When honey supers are stored for the winter in a mild climate, or in heated storage, the wax moth larvae can destroy portions of the comb, even though they will not fully develop. Because wax moths cannot survive a cold winter, they are usually not a problem for beekeepers in the northern The destruction of the comb will spill or contaminate stored honey and may kill bee larvae. 	**Visual and laboratory diagnose / Damaged comb may be scraped out and will be replaced by the bees. Treatments with B401(Bacillus thuringensis) – Vita (Europe) LTD (www.vita-europe.com) [4] – diluted with water to 5% (1 vol. B401 for 19 vol. of water) -1,5 ml from solution per 10 cm^2 of comb.**	**Freezing storage of beecombs could prevent disease because freezing kills wax moth larvae and eggs.**

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THANK YOU FOR YOUR ATTENTION !