

The Effect of Protein Consumption on Kashmir Bee Virus [KBV] and European Foulbrood [EFB]

INTRODUCTION

Most honeybee pathogens depend on protein consumption. When protein consumption begins, jelly production starts and leads to brood production so that any brood pathogens will have conditions to grow. Metabolism diseases such as amoeba and protozoa also have perfect conditions to grow in this case. Honeybees' immunities depend on absorbing high nutrients coming mostly from pollen. With a shortage of nutrients, the reverse conditions occur, bringing stress to a population and low immunity to the bees and larvae. Usually there are no symptoms of disease in areas with good, natural flow and not a lot of hives. Many pathogens can become serious that are not normally serious in a healthy colony. Such a pathogen that will appear in protein deficient hives in which larvae have no immunity is a *Streptococcus pluton*. In most cases this pathogen comes with two other bacillus pathogens. As for the Kashmir bee virus, it cannot affect bees unless larvae production is reduced. This means that there has to be a lack of protein consumption, usually caused by a shortage of pollen flow. Over 90% of affected honeybee colonies are cured naturally in less than a week when bees are moved to new honey flow areas. In this new method, it is explained how the Kashmir bee virus can be cultured and how European foulbrood and Kashmir bee virus can be prevented through proper provision of nutrients.

MATERIAL

- Lab facility and biotechnology to identify European Foulbrood [EFB] and Kashmir Bee Virus [KBV]
- Lab equipment for an antibiogram test (agar plates, agar, an isolated bacterial strain and various antibiotics)
- Infected bee operation

METHODOLOGY

European foulbrood:

Pollen and honey flow can change in a short amount of time in areas similar to British Columbia (Vancouver area) and North Iran (Caspian Sea area). This alters a colony's activity by creating stress in the colony's nutrition and brood production levels. If the temperature is reduced and long-term rain occurs as well, protein deficiency occurs and the bees cannot produce enough jelly to feed the larvae. After this, malnutrition creates low immunity in the larvae. In serious conditions, the bees

lose weight and discard the larvae and do not feed enough royal jelly to the queen because they cannot digest pollen anymore. The queen's spermatheca is affected as a result. When these conditions occur, many of the larvae become sensitive to bacterial diseases - especially European foulbrood. Usually these symptoms can be found in one location of an apiary, and an area with lots of bees having poor nutrition has more symptoms.

In the Vancouver area during cranberry pollination (June), most apiaries have symptoms of bacterial disease for more than 50% of the operation. When bees are moved to Alberta for honey production, though, the symptoms go away in less than a week. This also happens in Iran when the bees are moved from the Caspian Sea to a higher elevation where there is a greater level of pollen and honey flow. However, if there are EFB symptoms in the colony on more than 15% of the larva, immediate treatment with antibiotics is necessary. The amount of antibiotics used can be minimized and still reduce the level of disease by feeding Caspian Solution with lots of pollen. It is recommended that pollen and honey be prepared with Caspian Solution to prevent malnutrition. After that, antibiotics will not be necessary, as the symptoms will not reappear. When protein deficiency comes about at the end of the season (usually the end of summer) and a colony has lots of brood hatching, the bees will use their body proteins to feed the last generation because no more pollen exists in the colony. This not only reduces the colony's population, but also causes serious problems for the queen's spermatheca and may result in supersedure. Weaker hives are much susceptible to that. Before wintering, it is important to send any weaker hives to an area with pollen flow so that they can regenerate new populations or get some fat deposits by consuming pollen.

Kashmir bee virus:

Kashmir bee virus and many other microbes can become pathogenic to honeybees in two specific cases. There are varroa mites in the hives throughout all seasons, but viruses from varroa mites or other microbes can become pathogenic especially when bees have either protein deficiency or blood deficiency. Varroa mites are transferring microbes to the bees as they are consuming bees' blood. Usually Kashmir bee virus takes place when there is a gap between brood productions and there isn't much larvae in the hive. Many varroa hatch with the last batch of brood and have to consume blood from the bees. At the same time, though, there is a low pollen flow and the queen stops laying eggs so that not much larvae pheromone exists in the colony. As a result, the bees do not consume any more protein so they have to use their fat deposits to feed any new generations. At this point the bees' immunities are quite low and they are very sensitive to Kashmir bee virus and any other microbial attacks. Malnutrition and blood deficiency can go away in less than a week if the bees are moved to a pollen flow area. If the bees cannot be moved, feeding Caspian Solution or other high nutrient supplement products can artificially recover the bees.

RESULT

An excess of nutrients should be available for any diseases that are related to protein consumption so that malnutrition does not occur and promote Kashmir bee virus and other microbial attacks. Losing one generation of brood production requires two generations of brood production to make up the loss and become a producing hive. That can take 45 days and in itself be expensive for beekeepers.

Protein consumption in honeybees depends 100% on larvae and queen pheromones. Caspian Solution is a liquid protein supplement containing larvae and queen pheromones so that the bees are forced to consume more protein and more pollen. When this happens, not only do the bees begin jelly production, but all symptoms of disease disappear.

[Video and picture of jelly to show result of high nutrition from Caspian Solution]