

Incidence of American Foulbrood in Honey Bee Colonies of Eastern Azerbaijan Province, Northwest of Iran

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Abstract: The aim of this study was to investigate the incidence of prevalence of American foulbrood (AFB) in honey bee colonies of Eastern Azerbaijan province, northwestern Iran. By examination of bee larva and honey samples collected from 650 apiaries during two year, 5.8% total infection rate was recorded. May and June are two main months with AFB incidence, of 17.3 and 11%, respectively. It is concluded, the incidence of AFB in apiaries of eastern Azerbaijan province mainly occurred at May and June and generally infection rate is not more than previously reported AFB rates from different regions of world.

Key words: American foulbrood · Apiary · Honey bee · Iran

INTRODUCTION

American foulbrood (AFB) is a lethal disease of honey bee colonies (*Apis mellifera* L.) caused by the spore-forming, Gram-positive bacterium *Paenibacillus larvae* subsp. *Larvae* [1]. It is considered to be the most serious disease of bacterial origin that affects honey bees, which are only susceptible to infection by the pathogen at less than 48h of larval age [2]. These bacteria spores are resistant to some antibiotics. In America and Canada because of development of new oxytetracycline-resistant strains of bacteria, AFB therapy is serious problem for beekeepers [3].

The spores are extremely infective and resilient and one dead larva may contain billions of spores [2]. Because of spread potential of AFB via spores, local studies on prevalence of disorder is necessary for control and preventing. On other hands, previous studies [4, 5] on regional honey bee disease showed incidence rate of nosemosis and varroasis at eastern Azerbaijan (important Beekeeping centre in Iran) colonies.

The aim of this study was to investigate the incidence of prevalence of AFB, as a serious bee disease.

MATERIAL AND METHODS

Sampling from Hives: About fifteen gram fresh honey was tacked from each hive for *in vitro* cultivation and direct examination for AFB. Sampling was done from spring to autumn.

Examination of Honey Samples: Five gram of each honey samples dissolved in distilled water and mixed completely. Next, samples were heated at 90°C for 5 min to inactivation of other bacterial and fungal agents. 0.04 ml of each samples cultured in petri dish with MYP GP AGAR and 0.04 ml was cultured in Colombia agar medium. After 24 hours petries turned at 180°C and after 72 hours, we investigated possible colony formation of *Bacillus Larvae*, daily.

Direct Experiment: Bee Larva's were selected from old combs and stained with negrosin. The samples were cultured in specific mediums.

These experiments was done for 650 colonies during two year at April, May, June, July, August and September in random selected colonies from different beekeepers of eastern Azerbaijan province.

RESULTS AND DISCUSSION

Results obtained for two continuous year (2008-2009) investigation on AFB incidence in honey bee colonies at eastern Azerbaijan province are presented in Table 1.

AFB is serious bee disease in Middle East. Beekeepers expressed that AFB is second harmful bee disease with serious economic losses [6]. In Sweden, it is estimated that 0.5- 0.6% of the colonies have clinical symptoms of AFB [7]. In Western Australia, AFB has been detected in about 12% of hives, an increase since 2000 when the organism was detected in around 5% of

Table 1: Incidence of American foulbrood (AFB) in honey bee colonies of Eastern Azerbaijan province during spring and summer 2008-2009

Month	Investigated Colony	Infected colony	Infection rate (%)
April	100	0	0
May	150	26	17.3
June	100	11	11
July	100	1	1
August	100	0	0
September	100	0	0
Total	650	38	5.8

apiaries [8]. Freis and Raina [9] after comparison of honey imported from different countries, reported that no *P. larvae* subsp. *larvae* spores were found in any honey produced in Africa south of the Sahara although honey imported into this region frequently contains the pathogen. Swedish honey frequently contains *P. larvae* subsp. *larvae* spores. Steinkraus and Morse [10] reported 8.5% AFB incidence in collected eighty-two samples of honey from America and Canada.

In the present study 5.8% total infection rate was observed, AFB infection was started at May with highest incidence rate (17.3% of apiaries) and finished July with 1%. With attention to a previous study at region [4], May and June were the suitable months for high incidence of nose-mosis and also incidence of AFB in honey bee colonies of eastern Azerbaijan province. On other hand, Varroasis in colonies of region is in highest rate at March (often with 48% incidence rate) [5]. It is seems that high incidence rate of varroasis at winter and early spring cause weakness of colonies and make suitable condition for prevalence of other bee disease such as nose-mosis and AFB in region. This suggestion was according to De Rycke *et al.* [11] that indicated role of Varroa in transmission and prevalent of AFB among apiaries. In overall, total incidence rate of AFB in the present study was similar to reports of Bitidningen [7] from Sweden and less than those of reported by Steinkraus and Morse [10] and Ghose and Hawkins [8] from America and Australia.

It was concluded that, the incidence of AFB in apiaries of Eastern Azerbaijan province mainly occurred at May and June and generally infection rate was not more than previously reported AFB rates from different regions of world.

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