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Incidence Rate of Varroasis in Honey Bee Colonies of Eastern Azarbaijan Province, Northwestern Iran

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Abstract: The aim of this study is to come to a conclusion on the seasonal existence of varroasis in the apiaries of Eastern Azerbaijan Province, Northwestern Iran and comparing the spread rate of varroasis in this region with other regions (reported in similar studies). Among 942 apiaries under study (located in 10 regions in the province) in one year, 217 apiaries were infected by varroasis. Varroasis was witnessed to be found in its lowest rate in June (7.72%) and its peak was recorded to be in March (44%). Parasitic infection in the apiaries in the area in the months of honey production, during summer and fall demonstrated an increasing procedure in a way that in the months: July, August, September and October, the percentage of infected apiaries was, respectively 9.76, 26.82, 32.92 and 40%. In January, February and March the peak of infection witnessed was, respectively: 33.33, 34.66 and 44%. It is proposed that the rate of varroasis infection is higher in cold regions such as Eastern Azarbaijan Province comparing to warm climates and its incidence and spread in the cold seasons (fall and winter) is more than warm and hot seasons (spring and summer).

Key words: Varroasis, honey bee, apiary

INTRODUCTION

The varroa mite is one of the most serious pests known for *Apis mellifera*, principally because it is an introduced and therefore exotic organism on *Apis mellifera*. It feeds on the haemolymph of the developing honey bee larva, pupa and the adult bee (Ritter, 1981). Varroasis's most noticeable effects are: decrease in the number of adult bees, dispersal of larva raising areas and plunder of the hives by other bees and ultimately evacuation of the hives. The intensity of the effects of the disease varies according to the existence of the food in the colony, the climate of the area and the existence of other diseases in the colony or the apiary (Goodvin and Eaton, 2001).

Varroa is also known as the most serious problem in beekeeping all over the world (Fakimzadeh, 2001; Baggio *et al.*, 2004). Because of the damages caused by Varroa, beekeepers lose a great number of colonies in winter or start with an unhealthy, weak colony in the spring season (Imdorf and Carriere, 1996; Akyol and Ozkok, 2005).

The prevalence of varroa in high levels can lead to certain damages. for instance, the spread of varroasis in its first years in Turkey was the main factor in the loss of 600 honey bee colonies and 7000-7500 ton of products (Akyol and Korkmaz, 2005).

Despite conducting studies in relation with varroa epidemics and its certain damages in many different countries in the world and its high spread in Iran's apiaries; the statistics published in relation to the infection of varroasis in Iran is limited (Eilami *et al.*, 2006; Rahmani *et al.*, 2006). In addition, the limited statistics concerning the spread of varroasis in Iran's apiaries are often without climatic and seasonal information of the infection. It has been reported that the prevalence of honey bee diseases

such as varroasis and the nosemosis in Iran, vary accordingly based on the climate and the season (Eilami *et al.*, 2006; Lotfi *et al.*, 2009).

MATERIALS AND METHODS

In this study, the infection rate of honey bee colonies (*Apis mellifera*) in Eastern Azarbaijan Province (one of the most important beekeeping centers in Iran) to varroa has been inspected in 12 months (2008-2009) and the results related to varroasis spread have been compared to the previous reported statistics. Bee samples have been collected from 942 hives in 10 different cities of the province. In this study, approximately 100 adult bees (after separation from combs) were put in a container which contained water and soap solution. Then it was shaken well using the shaker for about 15 min. This way, mites were separated from the bees. Then the bees were strained and separated using a filter with rather large pours and the left-over was strained again through a piece of white cloth until the mites were seen. Counting the bees and mites, the number of infected colonies was specified by Excell software (Excell, 2003).

RESULTS

The results demonstrated in Table 1, shows that the lowest rate of varroasis spread was in spring (7.72%) with moderate weather and it increases in the following seasons respectively. In a way that the highest rate of varroasis spread in the hives was recorded in winter (37.33%) with cold weather. The lowest rate of incidence in June (7.72%) and the highest rate in March (44%) was recorded. The annual average of varroasis incidence was 23.39%.

The varroasis infection in the hives of the area in honey production season during summer and the beginning of fall demonstrated an increasing procedure, in a way that in July, August, September and October the percentage of the infected hives was, respectively 9.76, 26.82, 32.92 and 40% (Fig. 1). Also, in the resting season of the bees (winter), the highest rate of incidence of varroasis was recorded; in a way that in January, February and March, the peak of infection was, respectively witnessed to be: 33.33, 34.66 and 44% (Fig. 1).

Table 1: Seasonal Incidence rate of Varroasis in Eastern Azarbaijan Province

| Seasons | No. of (colony) inspected | No. of positive | Incidence rate (%) |
|---------|---------------------------|-----------------|--------------------|
| Spring | 246 | 19 | 7.72 |
| Summer | 246 | 57 | 23.17 |
| Autumn | 225 | 57 | 25.33 |
| Winter | 225 | 84 | 37.33 |
| Total | 942 | 217 | 23.39 |

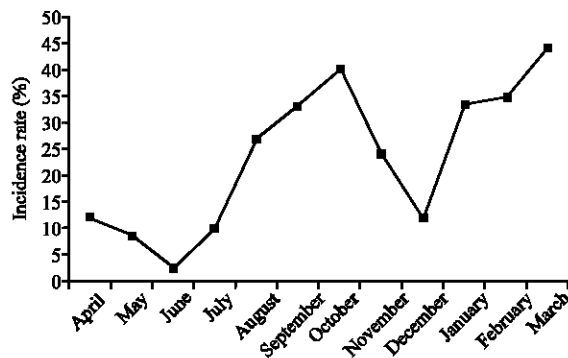


Fig. 1: Incidence rate of *Varroasis* in different months at Eastern Azarbaijan Province

DISCUSSION

In the study conducted in 2 subsequent years in 8 cities of Elazig Province in Turkey, 25.61% of the hives were infected by varroasis (Şimsek, 2005). In Poland 30% of the hives (Irzyk and Skrobot, 1987) and in Serbia 21.5% of the hives (Debeljak *et al.*, 1991) were reported as infected. There are limited references concerning seasonal varroasis spread. The study of varroasis in 2 subsequent years in Egypt demonstrated that varroa spread in fall and winter is in a high level (respectively: 10.2 and 13.2%) and in spring and summer in a low level (respectively: 5.1 and 5.3%) (Ghoniemy *et al.*, 2005). The seasonal order of the spread of the disease is in relation with the observations of the study of varroasis in Eastern Azerbaijan Province. However, some statistics reported on varroasis seasonal infection in various regions are different. For instance, statistical reports of 6 regions in Chile revealed the highest rate of varroasis incidence in a year to be during summer (58%) (Hinojosa and Gonzalez, 2004), which is higher than the level of infection in Eastern Azerbaijan Province.

The average incidence rate of varroasis in recent study (23.39%) was lower than the reported infection rate in Turkey (Şimsek, 2005), Poland (Irzyk and Skrobot, 1987) and Chile (Hinojosa and Gonzalez, 2004) and higher than the reported infection in Egypt and Serbia (Debeljak *et al.*, 1991). The researches conducted by De Jong *et al.* (1984) demonstrated that prevalence of varroasis is usually to be seen more in cold regions rather than warm climates, according to present study. In the recent study, Eastern Azerbaijan Province is a cold region and moreover, there to be seen high spread of varroasis during the year (23.39%) and the highest level of infection is in winter (37.33%). On the other hand, the statistics reported in Fars Province (one of central and hot regions in Iran) varroa infection during the year is less than in the 4% of the hives, which in the hottest areas of Fars Province decreases to even 0.34% (Eilami *et al.*, 2006). The results of the recent study in Eastern Azerbaijan Province showed the high rate of varroasis incidence in this province comparing with the results of Eliami *et al.* (2006) in Fars Province (warm climate) and also, the high rate of its incidence in winter in Eastern Azerbaijan, confirms the results of De Jong *et al.* (1984) and contradict with Eliami *et al.* (2006). The reason of these differences may be in related by climate. In other words, cold climate is suitable for some of the major disease such as nose mosis (Lotfi *et al.*, 2009). After occurrence or with occurrence of nose mosis, Hives are sensitive to acute varroasis infection. The study conducted by Eliami *et al.* (2006), significant association was witnessed between climate and the rate of varroasis incidence and in the cold regions, the rate of infection was reported to be in a higher level. Their results was in accordance with the results of the recent study and the study conducted by Ghoniemy *et al.* (2005). According to present studies and examinations of the reported statistics, honey bees of the region are struggling with parasitic infection of varroasis in both productivity and inactivity seasons. It is proposed that varroa infection in cold climates is more than that of warm climates and varroasis's rate of incidence in cold seasons (fall and winter) is more than warm and hot seasons (spring and summer). Regarding high rate of infection and incidence of varroasis in the Apiaries of Eastern Azerbaijan Province during the year, it seems necessary to have a regular control program in order to decrease the rate of infection in this region.

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