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Effect of apistan and bayvarol on bee colonies with and without brood under coastal region of the Caspian Sea condition in western Mazandaran Province (Chaloo and Nowshahr)

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ABSTRACT

The aim of this study was to investigate the effect Apistan ticks and Bayvarol on Varroa mite in bee colonies with and without the Brood under the regional environmental condition. Eight colonies of bumblebee infected ticks were drawn in this research in two replicates. The obtained results were very different in all experiments, and seem that the effect of Bayvarol found more effective than Apistan. Also, in all treatments, it is observed that the drug successful in the without Brood bees were more compared with Brood populations (Apistan 14% and Bayvarol 18%). Therefore, considering the costal weather environment of Caspian Sea which can have Brood in all seasons, the drug success would be less. The non-mortality factor of mites (95%) considering the drug's effects could be due to the resistance varieties of mites against the drug ingredients due to continues usage of it for more than a decade.

Key words: Apistan, Bayvarol, Mites and Caspian Sea.

INTRODUCTION

Varroa disease caused by a Varroa destructor which is a mistakenly considered Varroa jacobsoni Oudemans for a long time long living on bee species in Southeast Asia, (Apis cerana). Varroa destructor is more dangerous than its eastern varieties and living on Western honey bee (Apis mellifera) which the Iranian honey bee is also located in the same group, is found [1].

Systematic Division of Varva mite

Systematic Division
Chelicerata
Arachnida
Acari
Mesostigmata
Varroidae
Varroa destructor
Varroa destructor



The photo of Varva mite:

Varroa destructor is imported along with Apis cerana, indica to Frankfurt University in 1977 and later is dispatched across the globe.

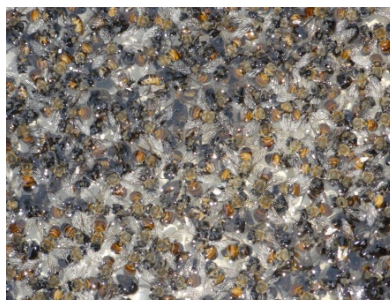
The Disease Factor in Iran:

The disease factor is a mite. This disease (Varroatose) like other unknown diseases by importing queen bees imported to Iran. There is no accurate date of arrival of this disease into Iran. In 1980's, approximately 40% of bee colonies are destroyed and being known very late due to an eight year War with Iraq. There are many drugs which are used against this disease, like, Perizin, Bayvarol and Apistan. In Iran, more than a decade two anti-mite (Apistan and Bayvarol) are commonly used, but the maximum achievement in success is not yet gained. In this regards, there are many reports that have been described this problem [2, 3 and 4].

MATERIALS AND METHODS

Location and Date:

This research is being carried in Summer 2011 in Western Mazandaran province of Iran in Nowshahr city. In this study, 8 colonies of honey bees with similar population and contaminated with Varroa mite were used. To carry out this research, the special hand-made beehives were employed which were divided into upper and lower parts so, had this ability to count the dead mites during the treatment. These 8 colonies were divided to A and B groups and sub-grouped and marked into A1, A2, B1 and B2. In beehives of A1 and B1, the population of without Brood and in A2 and B2, the population of with Brood bees were imported.



The groups A (A1 and A2) were treated with Apistan and groups B were treated with Bayvarol for 4 weeks. The Apistan and Bayvarol were procured from local market. After completion of the treatment, the dead mites were collected and counted. To know about the number of live mites, the bees were killed with boiling water to separate the remaining mites and to be counted. All these treatments were repeated twice and the data (S2 and M-) were analyzed by SPSS18 software.

The Apistan and Bayvarol and their ingredients:



Both the drugs used in this study were like plastic stripe and the effective ingredients were kept inside of these plastic cover. Upon contraction the bees with these plastic stripes, the drug were imported into the bees body post contacting and transmitted into the blood. The mite by ingestion of bee blood and transporting the drug into the body and finally transmitted to the body of the babies through the parents. The stripes of have the dimension of Apistan and Bayvarol were 3-4 cm width, 20-25cm length and 1-2 mm in diameter. Each stripe of Apistan has the 0.8 gr of Flumetrin and each strip of Bayvarol has 3.6 mg of Flumetrin. Each two types of stripes were kept for 4 weeks in beehives.

RESULTS

The results obtaining from the effect of Apistan and Bayvarol drugs on the population of bees without Brood in first replication showed that the Bayvarol had the better effect on the mites (Table 1).

Table 1: Results from the effects of Apistan and Bayvarol drugs on the population of honey bees without Brood– first replication:

Sign	Name of the drug	No. of bees (colony)	Duration	No. of dead mites in first replication	No. of mites after death of bees
A1	Apistan	2	4 weeks	62	17
B1	Bayvarol	2	4 weeks	73	10

In second trial, which is carried out to ensure the results of first trial, the Bayvarol drug was also showed the better results as shown in Table 2.

Table 2: Results from the effects of Apistan and Bayvarol drugs on the population of honey bees without Brood– second replication:

Sign	Name of the drug	No. of bees (colony)	Duration	No. of dead mites in second replication	No. of mites after death of bees
A1	Apistan	2	4 weeks	49	10
B1	Bayvarol	2	4 weeks	54	6

Table 3: The results obtained from the effects of 2 replicates on the population of honey bees without Brood.

Sign	Name of the drug	No. of bees (colony)	Duration	No. of dead mites in two replicates	No. of mites after death of bees	No. of total mites	% of success
A1	Apistan	4	4 weeks	111	27	138	80
B1	Bayvarol	4	4 weeks	127	16	143	89

Table 4: Results from the effects of Apistan and Bayvarol drugs on the population of honey bees with Brood– first replication.

Sign	Name of the drug	No. of bees (colony)	Duration	No. of dead mites in first replication	No. of mites after death of bees	No. of total mites
A2	Apistan	2	4 weeks	263	124	387
B2	Bayvarol	2	4 weeks	347	137	484

Table 5: Results from the effects of Apistan and Bayvarol drugs on the population of honey bees with Brood– second replication.

Sign	Name of the drug	No. of bees (box)	Duration	No. of dead mites in second replication	No. of mites after death of bees	No. of total mites
A2	Apistan	2	4 weeks	236	127	390
B2	Bayvarol	2	4 weeks	228	99	327

Table 6: The results obtained from the effects of 2 replicates on the population of honey bees with Brood.

Sign	Name of the drug	No. of bees (colony)	Duration	No. of dead mites in two replicates	No. of mites after death of bees	No. of total mites	% of success
A2	Apistan	4	4 weeks	499	241	750	66
B2	Bayvarol	4	4 weeks	575	236	811	71

The success percentage of Bayvarol in two replicates of the study 89% and Apistan 80% are found. The reason for better results in Bayvarol group (9%) could be due to the more effectiveness of the drug or less resistance of the beehives comparing with Apistan.

CONCLUSION

As shown in table 1, the results of the first replicate on Apistan and Bayvarol on the colony of without Brood showed that a significant difference between these two drugs and the second replicate proved the accuracy of the first replication. The success percentage of Bayvarol in two replicates in colonies without Brood is found 89% and in the same condition for Apistan is found 80%, which shows the 9% more improvement in Bayvarol group. As shown in Table 4, in the experiment of beehives with Brood, the Bayvarol is showed a better effectiveness than Apistan drug. The same is being confirmed in the results obtained in the second replicate (Table 5). The success percentage of the Bayvarol was found 71% and comparing to the success of Apistan (66%), an improvement of 5% was noticed [1 & 2]. The results obtained from these two replicates on the beehives with Brood were much closed to each other which prove the accuracy of these trials in this experiment. The result of this experiment is in accordance with the results of the other study [3, 4, 5 and 6]. In 2010 and 2011, also the better results of Bayvarol compared with Apistan were also reported [7, 8 and 9]. The most important point which could be noticed and re-advised to the farmers is that both the drugs (weather in with and without Brood) had the positive effects on the beehives and the maximum effect of Bayvarol found 89% and minimum of 71%. The maximum effect of Apistan found 80% and minimum is found 66%, which showed that the results from these experiments could challenge the usage of these drugs in farms.

The incomplete effect of these two drugs could have various reasons:

- 1)The Imperfect contact of all bees and Brood with drugs and therefore some of mites could remain healthy and noticed after death of the rest of the bees.
- 2)Resistance of mites to the drugs and prove this theory of adaptation in long time drug administration.

In this regard, plenty of reports from across the globe have been reported. Another reason of incomplete results might be due to existence of new Brood inside the population and the difference between the drug success among the drugs with and without Brood (18% in Bayvarol and 11% in Apistan) could be further investigated [11 & 12]. As mentioned earlier, the completion of this mite on the Brood of bees happens inside the closed boxes which trouble the contact of mites with drugs. Since the coastal lines of Caspian Sea has a moderate weather condition and environment, therefore, during the autumn and winter seasons the chances of having new Brood which hardly occur in reasons with coldest climates.

CONCLUSION

The results from the effects of Apistan and Bayvarol show that the Bayvarol gained a better success than Apistan. The much closed data in this experiment for both the drugs prove the accuracy of the data. The better data in the groups without Brood against the groups with Brood leads to suggest that the drug is better to be used during the seasons of which the beehives have no Brood, which the later happens when the bees spend their life in high altitudes in seasons and passing their sleeping periods, because in the low altitudes because of having moderate climates, the winter sleeping rarely occurs [13 & 14]. With respect to incomplete results, the reason could be due to resistance to the drugs by the bees and it is suggested that in future the other drugs having different effective agents to be used against mites [11, 15, 16 and 17].

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