EFFICACY OF APISTAN PLUS APIGUARD TREATMENT AGAINST *VARROA DESTRUCTOR*

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Introduction

The resistance of *Varroa* mites to pyrethroids is widely diffused. During the *Varroa* treatment season in the North East of Italy, temperatures are often very low and thymol treatments alone may not be sufficient to control high and persistent levels of varroa population. Several beekeepers used Apistan and thymol products at the same time to increase the total efficacy and to avoid resistance problems. It is very interesting then, to evaluate the efficacy of this treatment regime over several years in the same apiary to analyse the effects of resistance and the strength of colonies at the end of treatments. The first trial was carried out in 2010.

Materials and methods

The apiary

The trial was carried out in an apiary in the province of Gorizia (San Martino locality), in a reasonably isolated area. 12 colonies were arranged in a row oriented NE-SE.

Colonies were marked with a number (1-5-9-13-17-21, 2-6-10-14-18-22).

About 60kg of honey per colony was obtained during the productive season. They had all been treated the year before with Apilife Var® (Chemicals Laif, Italy) and oxalic acid (vaporised). Some of the brood combs were newly built on foundations produced by Cereria del Nord (Italy). Each colony was provided in summer 2010 with a new queen and housed in a 10-frame Dadant-Blatt hive, without supers. All colonies contained eight combs.

Before the treatment (18th August) the colony strength was made as uniform as possible, exchanging brood combs and bees between colonies until bees covered about 7-8 combs of each hive.

All the hives were provided with a vaselined bottom board.

Colony management

During the trial, the colonies were inspected for the presence of the queen, brood and honey stores. Climatic conditions were also noted.

The hive entrance was partially restricted to avoid robbing.

Experimental colonies were organised in two different batches of six hives that received the same treatments described in Tab. 1.

Six colonies were fed only with syrup and six with syrup and protein feed supplement to stimulate brood rearing during the trial; 2.5 kg of syrup (Apiinvert®, Südzucker) were given for three times to each colony at intervals of 12 days from the beginning of the trial. In six colonies 100 g of protein bee feed was added to syrup at every application.

Control treatments

Apistan was applied to the colonies on 18th August and removed on 30th October; the first Apiguard was applied on 1st September and the second Apiguard on 13th September (Tab. 1).

A further treatment with oxalic acid (vaporized: 2 g oxalic acid/colony) was carried out on 30th October (Tab. 1). When the oxalic acid treatment was carried out, colonies were broodless.

Strength of colonies

The strength of the colonies was evaluated before the application of Apiguard on 1st September and at the end of thymol treatment on 15th October.

All the combs of each colony were evaluated in the apiary with a grid divided in 6 squares. This was done when the activity of the foragers was low. The number of squares covered by bees were counted (Tab. 1). An approximate estimate of the total number of adult bees was obtained, multiplying the number of squares by 253 (bees/square).

Varroa mite mortality

The fallen mites were recorded during the trial using a screened bottom board and a greased counting board.

Relative efficacy of treatments was calculated as:

$$\frac{\textit{Mites fallen due to treatment}}{\textit{Total fallen mites (Apistan plus Apiguard + vaporised Oxalic acid)}} \times 100$$

Results and discussion

Strength of colonies

No colonies died during the winter. The variation in colony strength was high, but amongst the groups, was very similar. The majority of colonies had a bee population which was optimal for wintering (graph 1)

Tab. 1 – Treatment, feed, data of strength and efficacy in every colony.

- Treatment - Feed	Colony number	Variation of strength	Efficacy
- Apistan plus Apiguard - Apiinvert (three applications every 12 days)	1 5 9 13 17 21 **average**	-1,5 0,0 -26,5 6,5 -31,5 -22,5 **-12,6**	88,3 93,9 94,8 96,8 94,1 89,4 **93,3**
- Apistan plus Apiguard - Apiinvert + 100g protein bee feed (three applications every 12 days)	2 6 10 14 18 22 **average**	6,0 2,0 -27,0 -6,5 -21,0 -24,5 **-11,8**	96,7 98,3 94,5 97,3 93,7 89,1 **94,4**

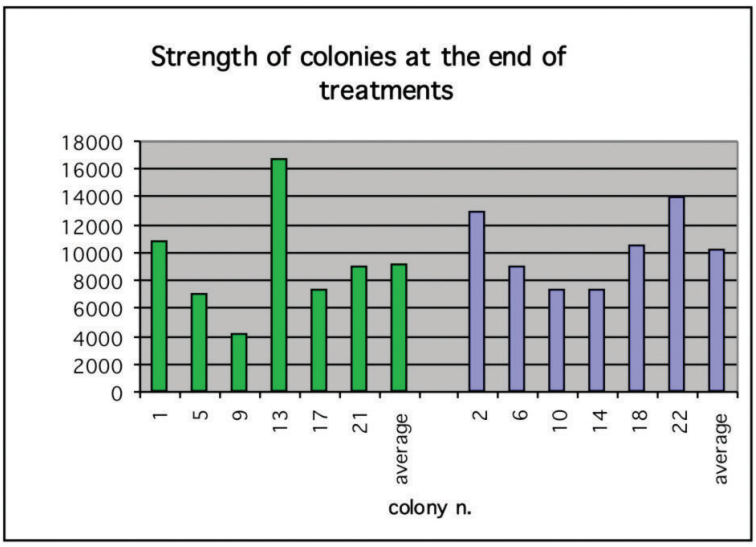
Varroa mite mortality

Apistan strips and Apiguard used in succession killed in total more than 90% of mites. Similar values were obtained in both of groups. Feeding protein supplement had no effect on efficacy.

According to the data of the efficacy of Apistan, varroa resistance to pyrethroids was found. In fact, the number of fallen mites recorded during the period of the Apistan treatment was very low and increased quickly when Apiguard was applied.

Data from the treatment using Apistan plus Apiguard suggests the overall efficacy is improved, compared to using either Apistan alone or Apiguard alone in these cold conditions but these should be regarded as preliminary results. Further studies may demonstrate the efficacy of such products.

Graph 1



The results were very important to the overall evaluation of the 2010 programme for *Varroa* control and safeguarding bee health in the region of Friuli Venezia Giulia (North East Italy).