

THE EFFECTIVENESS OF A SINGLE STRIP OF APISTAN ON CONTROLLING *VARROA* MITES IN SMALL BROODLESS COLONIES

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Introduction

The majority of Greek beekeepers treat their colonies against *Varroa* mite with different acaricides. It was found in a survey in 1990, that 60% used Fluvalinate inserts, 10% Perizin, 12% Malathion, 8% Asuntol, 9% Amitraz, 0,1% Apitol, and none Folbex VA (THRASYVOULOU et al., 1991).

Apistan was registered in Greece against *Varroa* in February, 1991. Since this chemical proved to be a promising chemotherapy agent for controlling the mite in different countries (ARCULEO et al., 1989; BORNECK & MERLE, 1989; DE RUIJTER and EIJNDE, 1989; BARBATINI et al, 1989; LORENTE, 1989), it was considered useful to test its effectiveness under the unusual conditions of beekeeping in Greece. What is peculiar is that during fall the majority of the colonies from all over the country are gathered together in a few areas in the islands of Rhodos, Thassos, Euboea, Crete and in Chalkidiki to collect honeydew from pine trees. Since during this time no pollen is available, this results in an almost broodless situation. Thus the po-

pulation of the colonies is restricted to a few frames and the *Varroa* mites can be easily controlled, since they have no sealed brood cells to "hide in".

The protocol for testing Apistan strips requires the use of two strips per hive. In this paper we give results from the trial we made to control *Varroa* in small broodless colonies by using only one strip due to the above-mentioned peculiar conditions.

Materials and Methods

A single strip of Apistan was inserted in twenty colonies that had between 4 and 7 frames population (about 1750 bees/frame). Each hive was equipped with a trap for preventing the removal of dead bees and mites and which allowed their count daily. Brood was removed one day before the insertion of the Apistan strip and no other provisions were made for the bees until the end of the experiment.

The effectiveness of Apistan was calculated as a ratio of the total number of killed mites during the experiment to the initial number of mites before treatment. The initial number

of *Varroa* mites was found by adding the number of those killed during treatment to those that survived 40 days after the insertion of the strip. Surviving numbers were estimated as described by PAPPAS and THRASYVOULOU (1986). Five colonies were used as control.

Results and Discussion

Results from this experiment clearly showed that *Varroa* mite can be effectively controlled in small broodless colonies by a single Apistan strip. From the total initial number of 36954 mites only 1338 survived 40 days after the insertion of the strip in the hive. The mean effectiveness was 96.7% ranging between 88.5% and 100% (Table 1).

The coefficient of variation was low (3.6%) which indicates that no significant differences exist in the effectiveness of the chemical among the 20 experimental colonies. The small amount of brood that colonies reared during the 40 days of observation may have contributed to the variation. The number of mites in the control colonies increased from the total initial of 6867 to 7123 by the end of the experiment.

Varroa mites were totally restricted in six of the colonies which had a low initial number of mites (lower than 1000). However, we found no correlation between the initial number of mites and the efficiency of Apistan in controlling them (correlation coefficient = 0.077).

Bars in Figure 1 show the prolonged effect of Apistan on *Varroa* mites

Table 1

The effectiveness of Apistan against *Varroa* mites in small broodless colonies

a/a colony	Varroa number		Effect. %	a/a colony	Varroa number		Effect. %
	before	after			before	after	
1	940	26	97.2	14	980	50	94.8
2	2400	148	93.8	15	1230	128	89.6
3	974	0	100	16	4005	313	92.2
4	2675	20	99.2	17	3585	75	97.9
5	3675	25	99.3	18	1006	46	95.4
6	875	45	99.8	19	805	0	100
7	980	0	100	20	605	0	100
8	2360	82	96.5	Control colonies			
9	1874	215	88.5	21	2636	2847	—
10	980	0	100	22	1344	1256	—
11	2675	40	98.5	23	1301	1265	—
12	3460	125	96.4	24	730	845	—
13	870	0	100	25	856	910	—

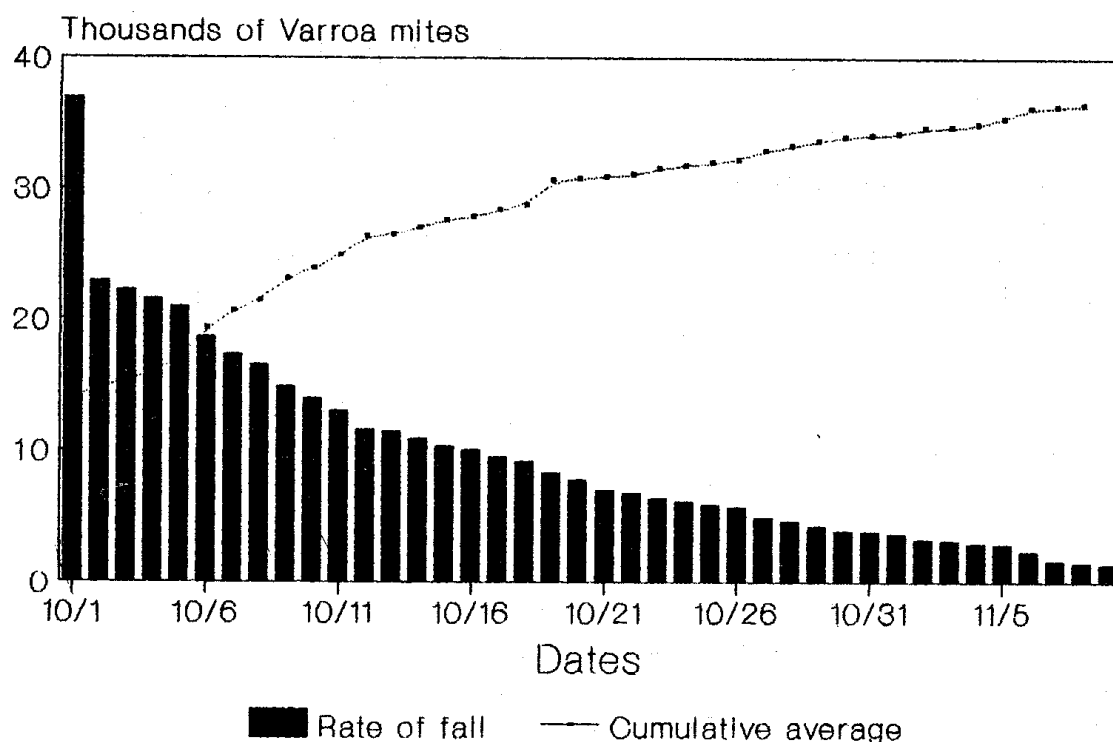


Fig. 1 — Total number of fallen Varroa mites per day due to Apistan treatment.
Dotted line indicates cumulative average of fallen mites.

while the dotted line indicates the cumulative daily average of fallen mites. Fifty percent of the mites had fallen about 6 days after insertion of the strip into the colonies and 90% after 30 days. This result indicates that Apistan requires a prolonged period of the use in order to be effective, in contrast to other agents used against *Varroa* which function within a few hours.

When the results of this study are compared with those obtained

by others, it appears that the effectiveness of the, single strip of Apistan against *Varroa* is somehow lower (Table 2). However, besides the number of strips used i.e. single or double, the duration of the application of Apistan could also be responsible for this difference, since the effectiveness of the strips increases by lengthening the time of application (BARBATTINI et al., 1989).

Table 2

The effectiveness of Apistan against *Varroa* mite

Number of col.	Days of treatment	Effectiveness %			References
		smallest	highest	average	
5	34	100	100	100	ARCULEO et al., 1989
40	42	99.3	99.7	99.6	BORNECK & MERLE, 1989
15	42	92.2	100	99.8	De RUIJTER et al., 1989
5	60	95.9	99.5	99.7	BARBATTINI et al., 1989
5	61	99.7	100	99.9	LORENTE, 1989
20	40	88.5	100	96.7	Present study

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