have shown that the application of the "Mussispace®" biotechnique alone did not keep the number of mites at an acceptable level, at least under the conditions within the ecosystem considered. However it should be noted that an integrative pharmacological treatment could be administered in October when the colonies are broodless. In this case, the overall results should be better.
Further the beekeeper reported that in March the conditions of the A thesis colonies were better than those of the other two theses with respect to brood quantity and quality.
In addition the A thesis colonies had a greater supply of honey and appeared to be more docile.
These results are preliminary. Data will continue to be collected through December 2005 after which a more complete evaluation of the effectiveness of the "Mussispace®" biotechnique will be possible.

CURRENT EFFECTIVENESS OF AMITRAZ AGAINST VARROA IN PORTUGAL

No 181

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The varroa mite (Varroa destructor) was first detected in Portugal in 1986. Since then, there has been a frequent use of amitraz (Apivar, Acadrex) in the attempt to cope with it. Following (i) various credible international reports of increased varroa resistance to amitraz and (ii) regular claims, by national beekeepers, of poor efficacy of Apivar treatments, a large screening project was setup (2003/2004) for trying to identify honey bee colonies hosting varroa populations resistant to amitraz in continental Portugal. As a first step, approximately 1.200 beekeepers were enquired nationwide, with a view to building up a rank of apiary-specific probability indexes of varroa resistance to fluvalinate. From those beekeepers, approximately 4.000 colonies were field-tested in a similar way to the "British National Bee Unit" field testing methodology for fluvalinate, and compared to blank control tests (same kits and methodology, but without using amitraz). From those investigated colonies, 1.579 allowed conclusive testing (i.e. where 3 or more varroa per honeybee colony were submitted to the action of amitraz). Approximately 17% (272) of these colonies were considered to host varroa populations resistant to amitraz (using, as border line, 80% of amitraz induced varroa mortality). Furthermore, the efficacy of amitraz in the field tests carried out on those 272 colonies only reached an average of 60.1% (s.e.m. = 1.2%).

THE MONITORING TECHNICS OF VARROA RESISTANCE AND ROTATION OF THE VARROA TREATMENTS

No 182

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Since several years, the distribution of varroa resistance to the active ingredients of treatments against Varroa destructor has been indentified and monitored especially in Western Europe.
The different techniques used for laboratory or field tests, and for the different active ingredients used against the varroa are described. The different techniques used are discussed for their accuracy and their role for the monitoring.
The evolution of the intensity of varroa resistance in relation with the types of treatments used against the varroa mites are described. The ideal rhythms of rotation with the different active ingredients are discussed.
The example of reversion of varroa resistance to the pyrethroids in Europe will illustrate the different aspects of the rotation strategy.

HOW RESISTANT TO FLUVALINATE ARE VARROA POPULATIONS IN PORTUGAL?

No 183

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The varroa mite (Varroa destructor) was first detected in Portugal in 1986. Since then, there has been a widespread use of fluvalinate (Apistan, Klartan) in the attempt to cope with it. Following (i) various credible international reports of increased varroa resistance to fluvalinate and (ii) repeated claims from national beekeepers of poor efficacy of Apistan treatments, a large screening project was setup (2003/2004) for trying to identify honeybee colonies hosting varroa populations resistant to fluvalinate in continental Portugal. As a first step, approximately 1.200 beekeepers were enquired nationwide, with a view to building up a rank of apiary-specific probability indexes of varroa resistance to fluvalinate. From those beekeepers, approximately 4.000 colonies were field-tested according to the "British National Bee Unit" field testing methodology, and compared to blank control tests (same kits and methodology, but without using fluvalinate). From those investigated colonies, 1.536 allowed conclusive testing (i.e. where 3 or more varroa per honey bee colony were submitted to the action of fluvalinate). Approximately

57% (878) of these colonies were considered to host varroa populations resistant to fluvalinate (using, as border line, 60% of fluvalinate induced varroa mortality). Furthermore, it is alarming that the therapeutic efficacy of fluvalinate in the field tests carried out on those 878 colonies only reached an average of 26.4% (s.e.m. = 0.8%). Brood samples were later collected for laboratory reassessment of populations of varroa that had been flagged, by the field tests, as resistant to fluvalinate. In most cases, the laboratory tests confirmed the results the field tests had suggested.

CONTROL OF PYRETHROID AND COUMAPHOS-RESISTANT MITES IN NORTH AMERICA USING APIGUARD.

No 184

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Varroa mite infestations have increased in The United States over the past few years due to mite resistance to treatments currently in use. Varroa in some areas have become resistant to pyrethroids as well as to organophosphates (coumaphos or Check Mite+ Strips). Beekeepers relying solely on these products for control of varroa have lost many colonies because of insufficient control levels.
The slow-release gel, Apiguard, containing thymol has been developed especially to control pyrethroid, amitraz and OP- resistant mites; it has a different mode of action to these pesticides. Apiguard is registered and used by beekeepers in many countries and has been trialled in several sites within the USA, prior to registration. Results are reported here from trials conducted in several States and show that the product can be used successfully under a variety of environmental conditions.

EVALUATION OF FLUVALINATE, COUMAPHOS, THYMOL, OXALIC ACID AND FORMIC ACID AGAINST *VARROA DESTRUCTOR* IN EASTERN CANADA.

No 185

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Summer and fall studies to control Varroa destructor were conducted in Québec, Canada to evaluate the efficacy and safety of 1) two early-July treatments (n=30/treatment) using either oxalic acid (OA, 4%, 100ml by dripping one appl.) or formic acid (FA, 65%, 35ml Mitewipe evaporating pad one appl.) in hives with two honey supers and 2) four mid-September treatments (n=48/treatment) using either: A) formic acid (65%, 3 appl., 5 days apart, 35ml, Mitewipe evaporating pad); B) thymol (TH, 1 Thymovar® wafer, 30 days); C) fluvalinate (FV, 2 Apistan® strips, 42 days) or D) coumaphos (CM, 2 Check-Mite® strips, 42 days), each coupled with a single OA treatment (4%, 100ml by dripping) in October, November or December on hives with one brood chamber. Data from the summer study show no adverse effect of the treatments on honey production and brood rearing. Although OA increased mite drop following its application, none of the treatments resulted in a lower mite population in September ($p>0.05$). Higher FA honey concentrations were measured in the FA-treated hives (24-64mg/kg). Data from the fall study show that TH, FA and CM treatments coupled with OA in late fall or early winter achieved a similar efficacy (TH=95.2%; FA=98.1%; CM=95.5%) with less than 50 mites per hive remaining by April 2004. FV treated hives had the lowest efficacy (91.2%, $p<0.05$). Colonies that had a natural daily mite drop over 50 in September had a mortality rate of 50% and more during the winter, regardless of the treatment combination used.
In conclusion, data from the summer study show that one application of FA or OA in July was safe for the bees but did not succeed to reduce varroa populations in fall; and fall data show that a combination of either TH or FA in September coupled with OA applied when no brood is present was as efficient as CM.

A STUDY ON INCIDENCE OF TRACHEAL MITE (*ACARAPIS WOODI*) IN HONEYBEE COLONIES (*APIS MELIFERA*) IN CHAHARMAHAL AND BAKHTIARI PROVINCE

No 186

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Introduction: Acariosis is an important contagious parasitic disease that is caused by Acarapis woodi . Pathogens attack to trachea of bees and they establish disease in this way.
Today one of the problems of beekeepers in some of the countries is Acarapis woodi. Iran is one of them. Acariosis reported in England for the first time in 1904. In fact IBRA (International Bee Research Assosiations) pronounced Iran without Acarapis woodi until 1983. But some years later, in 1994, Mosadegh & Bahreany during their studies announced presence of mite Acarapis woodi in 18 provinces among 22 of Iran, which they choosed. For this reason, a survey of honeybee colinies for presence of Acaroids woody mite was started from September 2002 to April 2003 in Chaharmahal and Bakhtiari province.
Methods: Province divided to six areas, in each area ten apiaries were selected. In each apiary 10 percent of colonies were randomly sampled. Samples of (50-100) adult bees per hive were taken from the hive entrance and when available 50 dead bees from the ground in front of the same hive.