The efficacy of Thymovar ® and Oxuvar® in the control of Varroa destructor in Iran

By Dr Reza SHAHROUZI International Counsellor for Agriculture & beekeeping
reza.shahrouzi@hotmail.com.Mob :+98 9125819733

Arash.SHAHROUZI ,Univerity of Zanjan-Iran.
arashshahrouzi@yahoo.com. Mob:+989366384616

Varroa destructor was first found in Iran in the 1980s and for four decades Iranian beekeepers have had to deal with this mite. Various treatments were evaluated and pyrethroids (Apistan®, Bayvarol® became the most popular. However, in 1996 and 2005 the problems worsened when Apistan®,and Bayvarol® resistant populations of Varroa emerged. The main reasons for the resistance development are the following :

- Since 1989 Apistan®,and Bayvarol® were been the principal treatment used in Iran.
- Fluvalinate and Flumethrin are liposoluble, so residues are left in beeswax combs and accumulate progressively as the wax is reused for comb foundation.
- The wax of continuously used comb contains only small amounts of the active compound.
- The reuse of used strips that only contain a small dose of the active preparation.
- But Pyrethroids ,(Apistan®,Bayvarol®) also Apivar®CheckMite® have a tendency to ……create resistant varroa populations after several years of continuous treatment.

Physico-chemical properties of Thymol

Thymol is a monophenol. Its chemical formula is as follows: (C 10 H 14 O) 2- isopropyl- 5-methylphenol. Thymol is in the form of colorless crystals very poorly soluble in water (1.4 g / l at 40 ° C) but however very soluble in most organic solvents in particular: chloroform (1400 g / l), ethnol (1000 g / l), ether (700g / l), oils (600g / l), these values solubility values are given at 40 ° C.

The possibility of using thymol in the treatment of varroa in bee colonies dates back to the work of Mikityuk V.V. in 1979 [13]. By its antiseptic and antiparasitic properties, thymol is an effective therapeutic agent against varroa destructor which is fairly well tolerated by bees despite a fairly remarkable disturbance in behavior at the start of treatment and the drawbacks. It is recommended to keep it in a tightly closed container away from light.

Materials and methods

The trial site was the apiary of the Qazvin and Tehran in Iran.The study lasted from 3rd May 2020 and 31st May 2020. Fourty colonies with approximately 50.000 bees and one mated queen and with a normal brood pattern (eggs, larvae and pupae) were used. At the start of trial the colonies occupied 10 frames: The 5 to 7 middle frames contained brood while the other frames contained the pollen and honey stores. Colonies were naturally infested with Varroa destructor. Colonies were randomly allocated to two different beeyards two treatment groups of 10 colonies each.

-The first group(Tab.1A,1B)was treated by Thymovar®,Thymovar® was registered in Iran 2017.

Thymovar® consists of tissue sponge pads, which contain 15 g of Thymol for food use. Evaporation of the concentration of Thymol on the platelets in the hive turns out to be very toxic to varroa mites. Treatment with Thymovar® for Varroa is simple, quick and effective. Ideal for long-term treatment and as protection against re-invasion. Thymovar is very effective at outside temperatures of 20 - 25 ° C.

Provide the bees with enough food for the treatment duration of 4 weeks. Thymovar® strips will be cut or broken in two pieces for easy placement. Best results are seen at temperatures of 20 °C to 25 °C and a distance of the strips to the brood cells of 4 to 10 cm. Do start with a reduced dose when temperatures of >+30 °C are to be expected in the first 3 days of the treatment and complete the dosage after three days. Leave 1–2 cm space over the strips to allow good evaporation of the active thymol. Remove the used strips after 2 weeks. After a pause of one week for the replenishing of the food you start the second treatment after two weeks. Thymol works with a retarded action. Increased fall of Varroa will be observed after two days. Due to the long duration of the treatment Varroa mites hidden in sealed cells will be reached and exposed to thymol vapours as soon as they emerge with the newly hatched bees. For sufficient evaporation the elevated temperature over brood cells is essential. Bees will retract from the strips when evaporation becomes too strong. This may lead to the buildup of bee clusters in front of the hive entrance on a hot day at the beginning of a treatment. Bees

will try to remove the strips by nibbling the used sponge. In some cases the strips will be partly covered with propolis to reduce the evaporation.

Thymovar ®

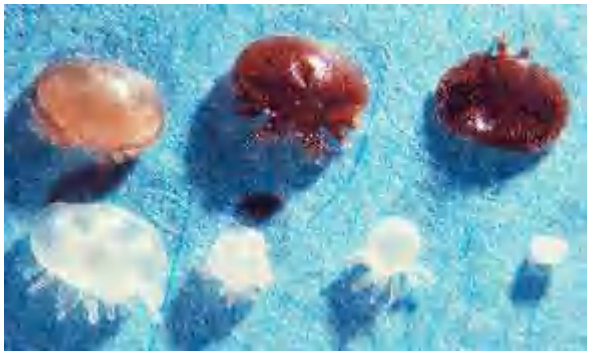
-The second group (Tab.2A, 2 B) was treated by Oxuvar ®, Oxuvar was registered in Iran 2019

Bees on combs are sprayed with a hand sprayer in an angle of 25° to 35° . 4-5 sprays (3–4 ml) are enough to moisten the bees on one side of the comb. Bees in clusters are sprayed with 20–25 ml per kg of bees. Best results are seen when the application is done when the bees remain inside the hive for a few hours following the treatment. Oxalic acid dihydrate in a 3% solution for spraying is very well tolerated by the bees and queen. Avoid spraying into open brood cells to avoid residues inside the brood cells. Thus the recommendation of the 45° angle. The bees need not be dripping wet. A fine mist on the bee is sufficient. Oxalic acid is fast acting on contact and Varroa are being removed in the first two days. Since the solution does not contain any sugar, the bees dry quickly and the oxalic acid dihydrate remains in form of tiny, needle shaped crystals on the bee until the bees cleans them off. Oxalic acid dihydrate spraying solution should not be used more than twice on a generation of worker bees since sublethal damages and stress may shorten the life span of the bees. Repeated use may cause damage to the queen with time.

Oxuvar ®

Processing condition

Average temperature: ± 25 ° C. Presence of brood. Unfortunately there were changes in temperature, especially now the climate has become difficult to predict.
Treatment period: 3rd to 31st May 2020 .9 AM h to 15 PM .
For Thymovar® we put the second strips on May 17th, 2020 Two weeks interval after 1st treatment.
For Oxuvar® we repeated the second treatment on May 17 th, 2020, Interval two week after 2nd treatment.



Treatment with Thymovar ®

Tab.1-A) Taken before treatment on the 3rd May 2020

N°.Hives	Department	Take bees	N.Varroa	% infestation
1 a' 10	Qazvin	1202	105	8.73 %
1 a' 10	Teheran	1198	102	8.51 %

Average infestation before treatment: 8.62%

Tab.1-B) Bee samples taken after treatment on 31st May 2020

N°.Hives	Department	sampled bees	N.Varroa	%infestation
1 a' 10	Qazvin	1081	10	0.92 %
1 a' 10	Teheran	1199	11	091 %

Average infestation after treatment: 0.91 %

2)Treatment with Oxuvar ®

Tab.2-A) Taken before treatment on the 3rd May 2020

N°.Hives	Department	Take bees	N.Varroa	%infestation
1 a' 10	Qazvin	1225	107	8.73 %
1 a' 10	Teheran	1246	108	8.66 %

Average infestation before treatment: :8.69 %

Tab.2-B) Bee samples taken after treatment on 31st May 2020

N°.Hives	Department	Take bees	N.Varroa	%infestation
1 a' 10	Qazvin	1221	9	0.73 %
1 a' 10	Teheran	1227	8	0.65 %

Average infestation after treatment :0.69 %

Reminder of results Obtained	with Thymovar (Tab.N° 1 en %)	with Oxuvar (Tab.N° 2 en %)
Average infestation before treatment	8.26 %	8.69 %
Average infestation after treatment	0.96 %	0.72 %
Efficacy against Varroa	89..45 %	92.06 %

Conclusion

The tests we carried out in Qazvin and Tehran in Iran against Varroa destructor show a good effectiveness, of Thymovar® 89.45 %,for Oxuvar® 92.06%.
With Thymovar® strips and Oxuvar® two treatments seems to be sufficient to reduce significantly the impact of Varroa on the colonies for a year.
Varroa destructor is a serious disease in the world. Although we are in the 21st century, Varroa destructor will undoubtedly remain for several years one of the principal agents of the weakening of apiarian livestock.
It is necessary to learn how to live with it. This can be done:

• By preserving only strong colonies in the apiaries
• By systematically changing the queens every two years, by developing queens selected …..for resistance to the diseases.
• Also changing treatment with pyrethroids, (Apistan,Bayvarol) also Apivar every 5 to 6 years.
•If an apiary's colonies are located in an area conductive to rearing of brood (potential source of development for the mite). The first treatment must be carried out in early spring with Thymovar ®, in Iran and Afghanistan, Tajickistan, Irak,also in Turkey.
•The second treatment must be carried out in late November or early December in Iran, also Near and Midle East ,with Oxuvar® .
•The apiary must be treated in November or early December without brood with Oxuvar. The effectiveness will be between 96 to 99%. in this case the colonies pass very well the winter with a reduction in number of varroa.

Bibliography

-Baggio,A;Piro,R;Crivalleri.D;Dainese,N;Damolin,O;Mutinelli,F (2002). Prodotti a base di timolo per il controllo della varroasi.studio dell'efficacia e dei residui nel miele,L'Ape nostra Amica(4):30-34.
-Dr.M.E.COLIN-1999 option mediterraneenne,Bee diagnosis P.117-146
-La santé de l'abeille N° 194 Mars-Avril 2003 La Varroase.
-Shahrouzi.R,2019 -Four decades of living with varroa in Iran . Apimondia Canada-Monteral 12 to 15 September.
-Shahrouzi.R,2009.Causes of bee colony mortality.Bulletin OIE,No 4.2009 page 5-1 www.oie.int/eng/publicat/bull% 2009-4-ENG.pdf.
-Shahrouzi.R,2003.Effectivement against varroa in Iran of the Medicaments. Having an AMM control in six Deptements,Apimondia Ljubljana,Slovenia.24 to 28 August.
-Shahrouzi.R,2001.Tests de terrain effectués en Iran sur les nouveaux produits antvarroa, Bulltin.Technique.Apicole 28(2) 73-76.
-Shahrouzi. Resistance of varroa to medicament used in Iran .http://www.beekeeping. Com/articles/us/varroa_iran.htm
-Shahrouzi.R. La varroatose en Iran,Abeilles de France N° 911-Fev 2005