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PP-224 [Beekeeping Technology and Quality]

Installation applicable in organic control and testing the actual level of Varroa mite (Varroa destructor) infestation in a honeybee colony

BEE SCIENCE NUTRITION By DULCOFRUCT

Authors: Adrian SICEANU, Gabriela Oana VIŞAN

Dulcofruct Bee Nutrition Science SRL, Goleştii de Sus, Coteşti, Vrancea County, 627102, Romania

Varroa mite is one of the leading causes of honeybee colonies losses. In order to apply an effective treatment strategy, it is important to know the level of infestation with phoretic mites throughout the season, but also the effectiveness of new or existing treatments, including testing the resistance of mite to various treatment substances under standardized experimental conditions. Currently, the tools for assessing the mite population in a honeybee colony are based on estimation methods, mainly on powdered sugar or alcohol washing, starting from samples of several hundred bees. In order to increase the assessments accuracy regarding the phoretic mites' number at colony level and monitoring the infestation level in apiaries according to international recommendations, we developed a programmable installation for entire population sampling.

Installation is presented in detail on: https://www.youtube.com/@adriansiceanu5301

The new installation is provided with a swinging drum in two cycles of two minutes each, for the homogeneous powdering of bees collected from a colony with 100 g of powdered sugar/kg of bees (first cycle), followed by separation by sieving and collection of the almost entirely mite population (second cycle) in order to count the parasites, but also to eliminate them.

METHODOLOGY

- To test and optimize this installation an experiment was organized on **10 colonies;**
- **The effectiveness** of instalation was evaluated by quantifying the number of parasites collected **immediately after installation use** as well **after 2 and 24 hours**, on mites fallen on the antivarroa bottom board.
- The effectiveness was checked out by applying the classic **alcohol washing method** on 50g samples of bees collected from tested colonies.

RESULTS

- **The installation effectiveness** in monitoring the real level of infestation in colonies is between **80–93.6%, with the mean – 88%**;
- **The infestation level** with phoretic mites in the experiment was between **1–3.14 %/colony, with the mean – 2.32%.**

Exp. n =10	Qantity of bees in installation	Number of mites collected by installation (T0)	Infestation level (%) T0	Mites out of total collected by using the installation (%) T0	Number of mites fallen on the bottom board (T1=2h)	Infestation level (%) T1	Mites out of total collected by using the installation (%) T1	Number of mites fallen on the bottom board (T2=24h)	Infestation level (%) T2	Mites out of total collected by using the installation (%) T2	Total number of mites collected by using the new installation	Total infestation using installation (%) T0+T1+T2	Total mites collected by using the installation (%) T0+T1+T2	Quantity of bees for washing method	Number of residual mites – washing method	Total number of residual mites/colony	Total number of mites/ colony = residual + collected by installation	Infestation level per colony (%)	The effectiveness of installation
Min	12400	127	0.70	82.38	8	0.05	4.12	3	0.02	1.01	146	0.80	100.00	500	1	25	182	1.00	80.04
Max	18200	381	2.68	91.25	48	0.28	10.57	27	0.16	9.52	454	2.94	100.00	500	2	69	488	3.14	93.62
Mean	15300	267.2	1.75	86.70	23.7	0.15	7.69	17.3	0.11	5.61	308.2	2.01	100.00	500	1.3	39.85	348	2.32	87.98

CONCLUSIONS

- A very high efficacy in counting/control of infestation level;
- The factors that influence the effectiveness of the installation are:
  - the swinging speed in the two cycles and
  - the size of the powdered sugar particles
- This installation allows the organic control which could be applied to any biological unit, during specific works when deemed necessary;
- The procedure allows testing the effectiveness of treatments used and to monitor the real infestation level;
- The procedure helps the detection of other parasites (e.g. *Tropilaelaps* spp.).

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Installation applicable for testing the real level of Varroa mite (Varroa destructor) infestation and organic control in a honeybee colony

Adrian Siceanu, Gabriela Oana Vișan
Cirast SRL, Dulcofruct Bee Nutrition Science Research and Development Department, Coteşti, Vrancea county, Romania

Varroa mite is one of the leading causes of honeybee colonies losses. In order to apply an effective treatment strategy it is important to know the level of infestation with phoretic mites throughout the season, but also the effectiveness of new or existing treatments, including testing the resistance of mite to various treatment substances under standardized experimental conditions. Currently, the tools for assessing the mite population in a honeybee colony are based on estimation methods, mainly on powdered sugar or alcohol washing, starting from samples of several hundred bees. In order to increase the assessments accuracy regarding the phoretic mites number at colony level and monitoring the infestation level in apiaries according to international recommendations, we developed a programmable installation with a swinging drum in two cycles of two minutes each, for the homogeneous powdering of bees from a colony with 100-120g of powdered sugar/kg of bees (first cycle) followed by separation by sieving and collection of the entire mite population (second cycle) in order to count the parasites, but also to eliminate them. To test and optimize this installation, an experiment was organized in 2024 on 10 colonies in order to evaluate its effectiveness by quantifying the number of parasites collected immediately after installation use, as well as after 24 hours on mites fallen on the antivarroa bottom board. The effectiveness of installation was verified by applying the classic alcohol washing method on 50g bees samples collected from tested colonies. Based on the obtained results, it was found that the installation effectiveness and therefore the accuracy of monitoring the real level of infestation in colonies is between 80-90%. The factors that could influence the effectiveness of the installation are the swinging speed and the size of the powdered sugar particles, which could be further improved. This installation allows organic control which could be applied to any biological unit, during specific works when deemed necessary. The procedure also allows testing the effectiveness of used treatments and to monitor the infestation level, but also the detection of other parasites (e.g. Tropilaelaps spp.) for effective control strategies adapted to local conditions.