

Varroa Task Force
CSI-Varroa



Global coordinators:

Fani Hatjina, Division of Apiculture, Inst. of Animal Science, ELGO 'DIMITRA', Greece; fhatjina@gmail.com

Janja Filipi, Department of Ecology, Agronomy and Aquaculture, University of Zadar, Croatia; jfilipi@unizd.hr

Nikola Kezic, Faculty of Agriculture, University of Zagreb, Croatia; kezic@irb.hr

Canada coordinator:

Olav Rueppell, Department of Biological Sciences, University of Alberta, Canada, olav@ualberta.ca

Dear Participants of the Citizen Science Initiative for Varroa,

The following is a short introduction into this global project to learn more about Varroa mites, one of the most serious threats to global beekeeping. Your participation is important to represent your country and contribute important data to an overall analysis of the impact of Varroa. Please consider carefully after reading the information below and contact your country coordinator if you would like to be registered as a contributor.

Why CSI Varroa?

Varroa is a key pest affecting beekeeping and honey bee health. While eradication is not practical, management strategies to control Varroa have become the tool to deal with this invasive species. In a global effort to understand how the mite populations are developing during the year and what damage to the colonies results, we initiated this study. For our goal of a truly comprehensive analysis, we rely on the help of beekeepers as citizen scientists to gather the data everywhere. Each country's efforts will be coordinated to educate and ensure quality and timeliness of the contributed data. In order to achieve meaningful outcomes, a large participation of beekeepers is required in this international effort.

What we do not know?

Are Varroa damage thresholds different in different regions or under different environmental and management conditions? For instance, do these thresholds change according to the varroa-control strategy already performed? Does the density of the colonies in the apiary (and possibly other environmental factors, such as climate) have an influence?

Who can participate?

Experienced beekeepers with a minimum of 3 colonies, preferably over 20 colonies. Colonies selected for the study should follow standard management practices. No form of Varroa

management excludes participation but the timing and form of treatment must be reported in the records.

Beekeepers participating in this study will monitor bee populations and varroa infestation levels. The benefit for doing so will be: (1) knowledge on effect of winter varroa numbers on colony strength in spring, (2) development of the initial varroa population during the year, (3) population dynamics of the colonies during the year, (4) final effectiveness of the treatment(s) undertaken, (5) consequences of varroa infestation on colony productivity compared to the average level, (6) possible correlation with local climatic conditions.

How are data going to be collected?

The study is planned for the next 2 full years (March 2021-March 2023). An online reporting tool will be launched and all country / regional coordinators as well as all Citizen Scientists will be notified individually prior to the month(s) of data collection and a subsequent reminder will also be sent within the sampling month. For each year data collection will be divided in three separate surveys regarding the season: spring, summer and autumn.

Main parameters to be monitored:

- Colony strength before the winter
- Colony strength in spring
- Natural mite fall in spring
- Varroa on adult bees in active season (before and after the main treatment (s))
- Colony strength in summer
- General judgement of the colony's relative productivity

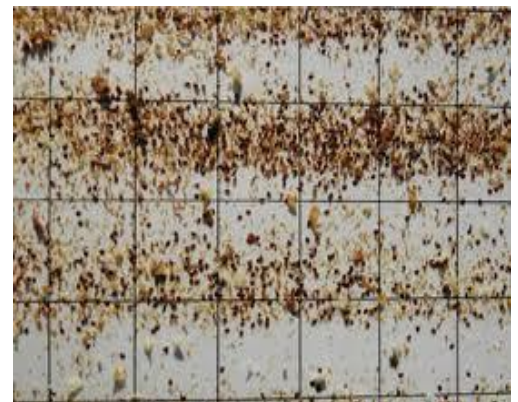
Colony strength

During the last full inspection before winter, estimate the bee population of each colony by counting the number of frames with bees (at least 75% covered per side, each side counts as ½ frame) and brood presence (number of frames that have at least a brood area of the size of a tennis-ball).

Natural mite fall (NMF):

Refers to the number of varroa on bottom boards after winter and as early as possible (at the first pollen or nectar flow utilized by your colonies). Count the natural mite fall for a total of 14 days. Inspections twice a week are recommended when mite fall is high but not necessary. Calculate and report the number of mites per day by dividing the total number of mites by the total days. Mite fall should be measured by inserting a card board at the bottom of the colony, which is treated with grease or oil to immobilize mites and prevent their removal. For more information, check for example:

[Ontario's MOAFR web information.](#)



Varroa infestation level on adult bees:

Count the number of varroa on adult bees with the same method all times, We recommend to use the icing sugar method firstly because the bees are not killed and secondly because it is easy to collect a good sample of bees in order to be as representative as possible. However, everybody is free to follow the method with which they are most familiar with.

For the icing sugar method: Measurement should be taken during a dry and sunny day. Use side frames to take worker bees for the measurement. In a 500 ml jar or glass collect approximately 100 ml bees (= 500 individuals), add 3 soup spoons of icing sugar. After three minutes of gentle shaking, the icing sugar with varroa should be shaken onto the fine mesh (honey filter). Put bees back in the hive, and count the varroa on the mesh. Report the number of varroa per 100 bees, calculated by the formula: $\text{number of varroa} \times 100/500$ (see also picture).



For the alcohol or soap wash method: collect the bees in a big jar and carry it in back to the lab/ house. Add dilute alcohol or soapy water and shake well. Then empty the bees in a drainer, above a bigger open container. Count the bees on the drainer and the varroa in the vase and report mites/100 bees.

Three independent measures per hive are preferred, at least one is required, during each active season (please note when counts were performed relative to Varroa treatment)

Other secondary parameters to be monitored:

Data of your varroa treatment(s) and other management parameters will help us interpreting the other results and thus contribute to better understanding of an economic damage threshold. Please report:

- Month and type of main varroa treatment (any management strategy or direct treatment)
- Month and type of second varroa treatment
- Was swarming observed (yes/no)?
- Colony loss (date and reason); in that case you could replace the colony with new one and new identification number.
- Queen replacement (month of the year). The new colony then has a new ID
- GPS coordinates of the apiary
- Migratory or stationary beekeeping
- Number of colonies in the apiary

Thank you for considering to participate in this very important study.