DETERMINATION OF MITE INFESTATION INTENSITY USING NATURAL MITE FALL AND DYNAMICS OF VARROA POPULATION IN NORTHERN AFRICA

Jérôme TROUILLER - VITA (Europe) Limited – Basingstoke – UK
Saïd MOUTAHID - CEA-VITA Tnine des Stouka - Morocco
Arezki MOHAMMEDI - University of Boumerdes – Algeria

Summary

The relationship between total varroa mite population in colonies and natural mite fall has been followed in many instances, sites, and seasons in North Africa. The accuracy of such parameter and its interest for beekeeping is discussed.
The dynamics of development of Varroa destructor in North Africa is described. The particular of the local climate is discussed concerning the strong influence on varroa population dynamics.

Introduction

Even though many parameters like the bee races, possibly varroa race, climate, and beekeeping practice are unique in Northern Africa, varroosis has not been studied in detail. Generally, aspects of varroosis, studied for example in Europe, are taken from granted. For example, the speed of varroa population dynamics is not well known and consequently the optimum frequency of treatment cannot be fixed. Often colonies are treated only when strong signs of varroosis are appearing and consequently too late to optimize the positive effect of treatments. We tried to find some aspects of varroa dynamics in Northern Africa and to determine a simple method to monitor varroa infestation.

Natural mite fall evolution

The natural mite fall was followed in two sites (The region of the Mitidja in Algeria and Azemmour in Morocco). We used hives in production equipped with a bottom screen allowing the mites to pass through but not the workers. To limit dead mite removal by scavenger insects, a counting board covered with grease was used and mite fall was counted regularly (every 3 to 5 days).

In the Mitidja, 40 Langstroth hives were used between 5th April and 27th June 2000 (figure 1). In Azemmour, 20 Dadant hives were used between 31st March and 12th June 2000 (figure 2) and in the same site another set of 20 hives between the 4th July and the 29th of August 2000 (figure 3).

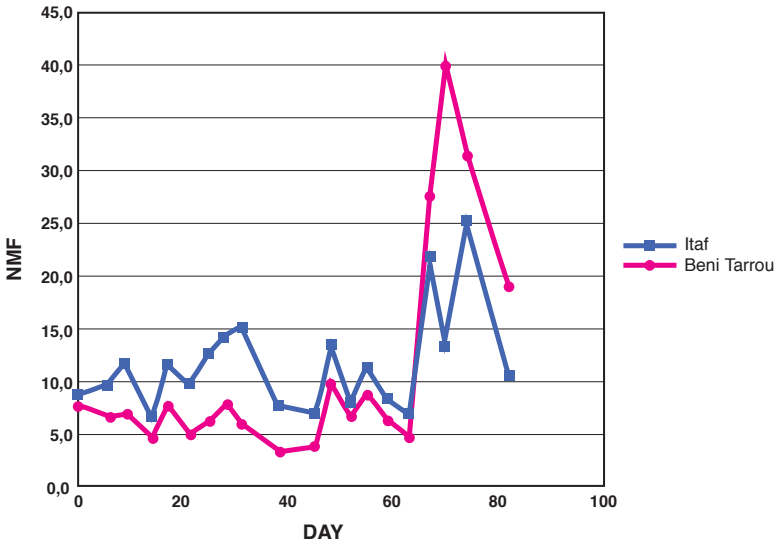


Figure 1: Natural mite fall in the Mitidja.

Figure 2: Natural mite fall in Azemmour in Spring.

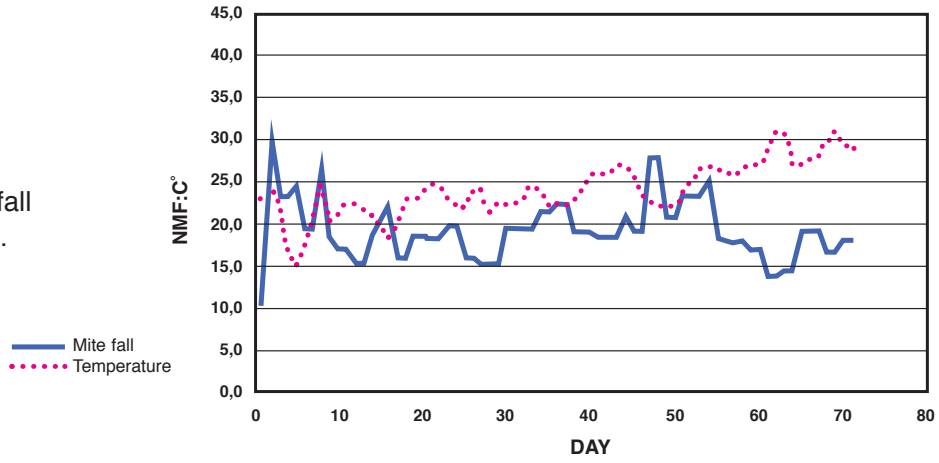
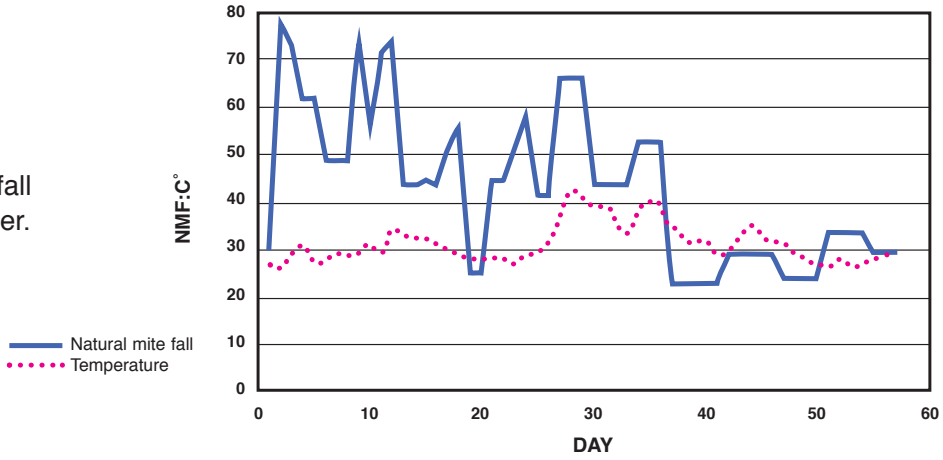


Figure 3: Natural mite fall in Azemmour in Summer.



The evolution of mite fall did not show any increase in spring excepting in the Mitidja where it was caused by hot winds (see lower). In summer, the mite fall had a tendency to decrease. In all the cases, the data observed were opposite to what is generally observed in Europe.

Effects of temperature on mite fall

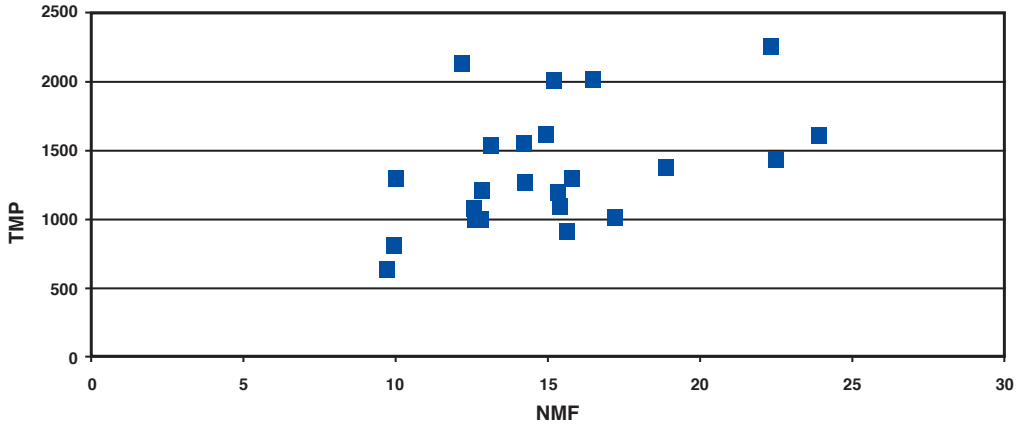
In June 2000, in 2 apiaries in the Mitidja (Algeria) (Itaf: 19 and Beni Tamou: 21 colonies), during the 6 days the Saharan wind was blowing, the natural mite fall was 20.0% and 27.7% of the total population (figure 3).

In August 2004, in Ben Slimane (Morocco), during the 5 days the Saharan wind (chergui) was blowing, the natural mite fall was of 68.3% of the total population in an apiary of 10 colonies (s.d.: 18.8. Mean of total mites: 593.2). More than temperature, the dryness elicited by the wind seemed to be responsible of increased mite fall.

Relationship between natural mite fall and mite population

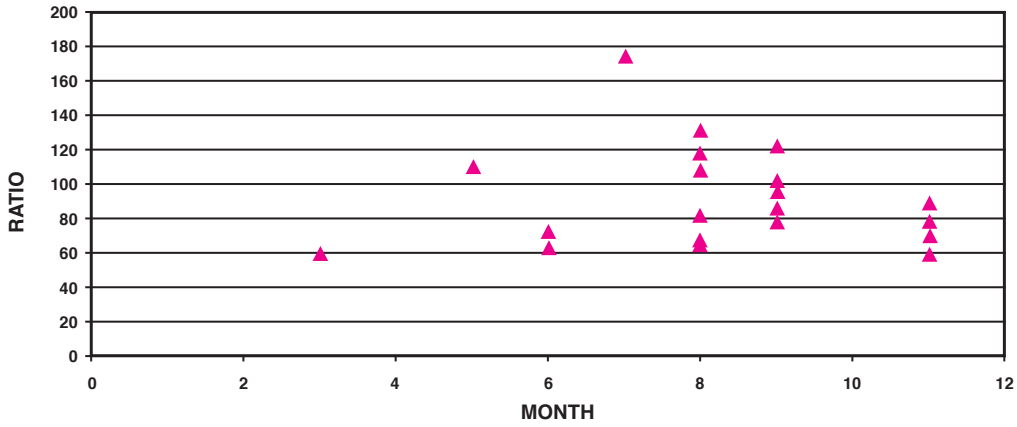
Many experiments were performed in Morocco to find a relationship between natural mite fall and total mite population. Experiments were performed at different seasons in the year. The natural mite fall was followed for five days, following which a treatment recognised as efficient was performed to evaluate the total mite population.

Figure 4: relationship between natural mite fall (NMF) and total mite population (TMP). Each dot corresponds to 6 to 21 hives.



Even if there is a correlation between total mite population and the natural mite fall, the variability is high (from 59 to 175. Mean: 92.3. S.D.: 28.6). The variability is even higher when comparing data of each individual hive.

Figure 5: ratio (TMP/NMF) as a function of month.



A tendency of a higher ratio in summer can be observed. However, more data for spring and winter are required to ensure this tendency.

Conclusion

The use of natural mite fall is not accurate enough to give a precise figure of total mite population in a given hive. However, when this is performed on a sufficient number of hives, a relationship of a factor 92 can give a range value of global mite pressure in the apiary (total mite population = 92 times the number of mites fallen daily). The relatively low number of mites found at the end of a season compared to other Mediterranean countries could be explained by the strong pressure exerted on mite population by the Saharan winds.