

Effect of a liquid diet with protein, vitamins and probiotics on colony weight and immune response in *Apis mellifera iberica*.

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INTRODUCTION

The aim was to investigate the effect of different diets, with and without added probiotics *Enterococcus faecium* y *Bacillus subtilis*, on the hive weight and the reduction of infestation caused by *Nosema* sp., in colonies of *Apis mellifera iberica*.

METHODOLOGY



LOCATIONS

- Murcia, Spain (experimental apiary at the University of Murcia).
- Soria, Spain.



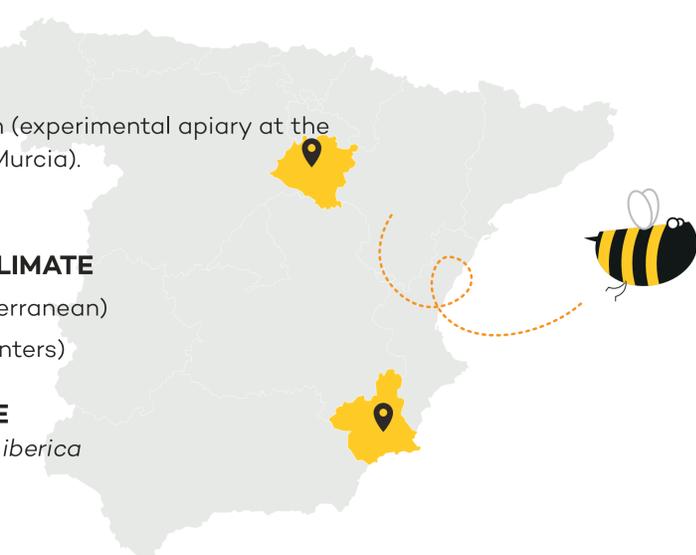
TYPES OF CLIMATE

- Murcia (Mediterranean)
- Soria (Cold winters)



TYPE OF BEE

Apis mellifera iberica



GROUPS OF STUDIES

30 colonies were distributed into 6 groups (5 hives each):



GROUP 6



Control group
No supplementary feed.



GROUP 2
GROUP 4



Fed with liquid diet with probiotics
These groups were fed with syrup (75% d.s.) with probiotics.



GROUP 1
GROUP 3
GROUP 5



Fed with liquid diet without probiotics
These groups were fed with syrup (75% d. s.) without probiotics.

RESULTS

The different diets were almost equally consumed in all groups. Average consumption was high and stable in Murcia, whereas it was initially low in Soria (cold winters) but raised to almost 100% at the onset of spring.

We found an **increase in the weight of the colonies fed in both locations, compared to the hives of the control group**. Food type 2 (with probiotics) exerted the best effect but this was not so with food type 4 (which also included probiotics).

In Murcia, after feeding, the number of spores notably increased in colony groups fed with probiotics (2 and 4), but the numbers rapidly decreased to reach the same level of null or low infestation levels found for the other groups.

It seems that the **rich food of groups 2 and 4 initially favored an explosive population increase of *Nosema* but that the parasite infestation was lately controlled by the improved immune system**. In Soria we found similar results.

The experiments were carried out in colonies settled in Murcia (Southwest Spain) and Soria (Central Spain), between 29/10/2021 and 10/04/2022. Thirty colonies were divided into six groups, five hives each. Three of these groups were fed with three different liquid diets without probiotics (groups 1, 3, 5), whereas liquid diet with probiotics was given to groups 2 and 4. Group 6 was not fed and served as control. The total consumption of the diet was 10-11kg/hive. The improvement of immune system was measured by counting the number of *Nosema* spores as indicator.



CONCLUSIONS

In conclusion, our initial data suggest that the **inclusion of probiotics in artificial diets has favorable effects** for the colonies and the investigated parameters of colony weight increase and the reduction of infestation levels of *Nosema* sp.