



COPENHAGEN

Honey bee nutrition as a beekeeping management practice: the first global survey by the COLOSS Bee Nutrition Task Force

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INTRODUCTION

Honey bee malnutrition and starvation are current major global challenges. The pollen and nectar shortages are dramatically impacting bee health and the beekeeping sector, forcing repeated and prolonged emergency feeding interventions to ensure their well-being and their productivity. While poor nutrition has a negative impact on honeybee health and development, there is a limited understanding on the role and impact of feeding practices and perceptions among beekeepers. The COLOSS Bee Nutrition Task Force, that gathers experts in bee nutrition, has therefore developed and implemented a global nutrition survey to provide an overview of current feeding practices and the nutritional challenges faced by honey bee colonies.

Keywords: Honey bee nutrition, nutritional stressors, supplemental feeding, malnutrition, monitoring

METHODS

Data was collected through a questionnaire distributed to National Coordinators (NCs) in several countries. The NCs were responsible for translating the questionnaire into local languages to ensure accessibility and accuracy in responses. The survey was made available to beekeepers in both online and hard copy formats, allowing for broad participation across different regions and technological capabilities.

Number of Participants per Country

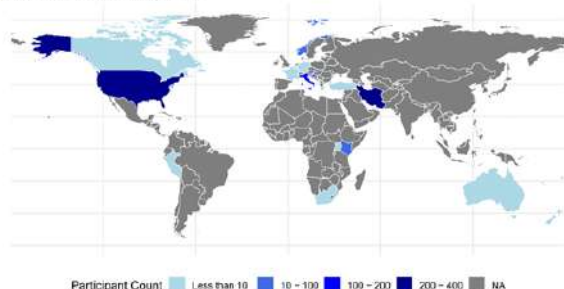


Figure 1. World map of participating countries (respondents number=n1118)



Figure 2. Beekeeper feeding colonies

RESULTS

The Task Force monitored 218,768 colonies distributed across 20 countries (year: 2022) (fig. 1). This survey revealed that feeding practices (carbs) are a very common strategy used by 78.1% of the beekeepers (fig. 3). Concerningly, 40.7% of the involved beekeepers perceive negatively supplemental bee feeding products highlighting dissatisfaction with commercial products (fig. 4), mostly due to disadvantages such as cost and the contamination of food sources (fig. 5). Most beekeepers (52.4%) describe that prolonged drought periods represented the most severe cause of honey bee nutritional stress (fig 6).

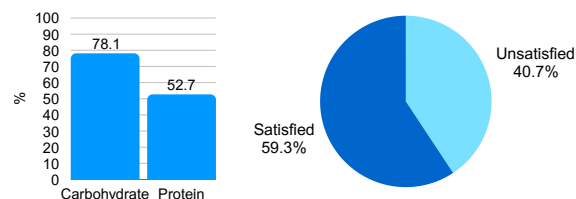


Figure 3. Supplemental feeding provided (Beekeepers%) (n=1118)

Figure 4. Satisfaction of beekeepers with the products commercially available on the market (n=818)



Figure 5. Reasons of dissatisfaction by commercial products (n=333)

CONCLUSIONS

Citizen science plays a crucial role in supporting scientific research, as demonstrated by this survey, which also helped identify beekeepers engaged in specialised activities such as pollen characterisation, systematic honey analysis, and colony monitoring with connected scales—showing how such initiatives foster mutually beneficial collaboration between researchers and practical beekeeping. Future activities involve integrating data from subsequent years and deepening knowledge of the beekeeper feeding strategies in broader areas of the world. This work highlights that, to face the dramatic increase of nutritional stress events, innovative strategies for sustainable beekeeping are needed.



Figure 6. Causes of nutritional stress (n=1118)

Table 1. Number of monitored colonies and respondents in each countries (n=1118)

	RESPONDENTS N.	COLONIES N.
USA	385	82253
IRAN	277	100260
ITALY	180	9938
CROATIA	108	8423
NORWAY	67	1920
SLOVENIA	39	2214
KENYA	16	1249
SLOVAKIA	12	270
CANADA	8	4252
FRANCE	6	1381
TURKEY	6	400
SOUTH AFRICA	4	2568
ALBANIA	2	220
AUSTRALIA	2	200
NEW ZEALAND	1	3000
UGANDA	1	100
CZECH REPUBLIC	1	60
BELGIUM	1	20
PERU	1	20
GERMANY	1	20
TOTAL	1118	218768



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