APIMONDIA SCANDINAVIA 2025
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PP-548 [Pollination and Bee Flora]

Nectar resources in Japan: Enhancing honeybee visitation.

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Introduction

Understanding when and where different flowers bloom, and how much nectar they produce, provides valuable understanding for beekeepers and farmers cultivating pollination-dependent crops.
We are currently conducting research to evaluate floral resources, including nectar volume, through year-round surveys of flowering plants, and to enhance pollination by increasing the availability of nectar-producing flowers

Conclusion

・The average of potential honey yield per Japanese chestnut tree is estimated to be approximately 70 g.
・Areas with more fields and houses tend to have a higher number of flowers, including those that serve as nectar sources.
・Presence of Brassica flowers increases honeybee visits to Japanese apricot flowers.

1.Estimation of nectar volume.

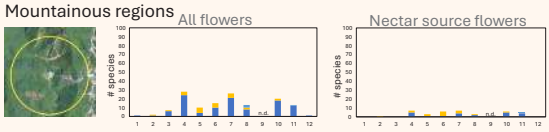
ex.) Japanese chestnut

	Porotan Mean ± S.D.	Tanzawa Mean ± S.D.	Tsukuba Mean ± S.D.	Average Mean ± S.D.
Nectar (μL) / flower	0.08 ± 0.037	0.14 ± 0.86	0.14 ± 0.05	0.12 ± 0.07
Brix value	41.4 ± 17.8	37.7 ± 15.4	36.0 ± 21.1	38.5 ± 17.4
Nectar(mL) / tree	40.9	78.6	266.5	104.1
Honey (g) / tree	29.6	51.9	167.9	70.1

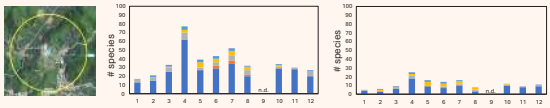
We measured nectar volume per flower using glass capillaries, and estimated the potential honey yield per tree by multiplying this value by the total number of flowers on each tree. Considering that nectar can be replenished over time, the actual yield may exceed this estimate. However, since seven flower-visiting insect species were observed besides honeybees, nectar consumption by these insects must also be taken into account.

2. Year-round dynamics of flowers

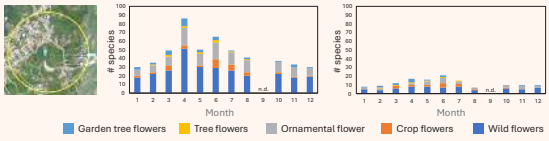
Mountainous regions



Rural farming areas



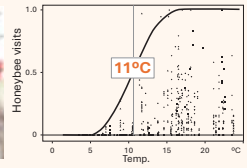
Populated rural village



We conducted monthly route censuses at three sites with different land-use conditions to comprehensively record flowering plant species. Among these, we quantified the number of flowers used by honeybees as nectar sources.

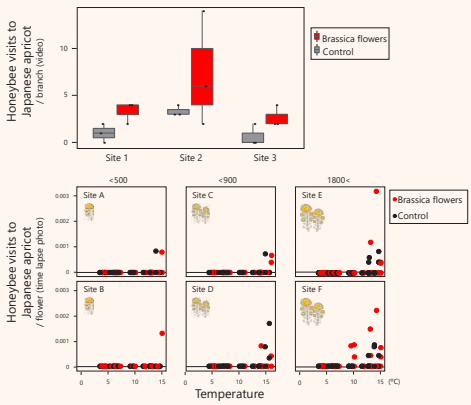
3. Enhancing honeybee visitation to Japanese apricot blossoms through Brassica flowers.

Japanese apricot bloom at **10 ºC** in February.



Apis mellifera does NOT work in cold condition.

Do **Brassica flowers** enhance honeybee visits ?



The number of honeybee visits to Japanese apricot flowers increased when Brassica plant flowers were nearby. This effect was more pronounced when the number of Brassica flowers was higher.

Maeda et al. (2023) Brassica plants promote Apis mellifera visitation to Japanese apricot in cold conditions. Scientia Horticulturae. 312:111844

This work was financially supported by the Ministry of Agriculture, Forestry, and Fisheries, Japan, through a research project titled "Beekeeping and Related Industry Promotion Project under the Sustainable Production Enhancement Program."

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Honeybees visit various flowers throughout the year, collecting nectar and pollen as essential resources. Understanding which flowers bloom when, where, and how much nectar they produce is valuable information for beekeepers harvesting honey. Additionally, farmers growing pollination-dependent crops should consider the availability of surrounding floral resources, as these can influence crop pollination. In this study, we comprehensively analyzed and compared the nectar volume, pollen quantity, fragrance components, and flower color of various wildflowers, crop flowers, and tree flowers. We also estimated nectar availability per unit area or per tree by combining data on nectar production per flower with flower density. Among these plants, we focused on Japanese apricot and Brassica plants blossoms, which serve as key nectar sources in early spring. The Japanese apricot, a winter-flowering fruit crop, requires mid-winter pollination. However, severe weather conditions, including low temperatures, restrict pollinator activity. We explored the use of Brassica plants, which bloom fully during the Japanese apricot blossom period, as additional flower resources to promote honeybee visitation.