Aromatic plants in East-Asia to enhance natural enemies towards biological control of insect pests. A review

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Objectives

- Identifying aromatic plants attractive and beneficial to natural enemies
- Evaluating their ability of enhancing biological pest control
- Exploring the factors affecting these interactions (plant and insect family, species, functional group)
- Discussing the results by considering plant and insect traits

Methodology

1. Systematic research in Web of Science

- **Identification of the aromatic plants studied in East Asia:**

"aromatic plant*" OR "aromatic herb*" OR "aromatic tree" OR "aromatic shrub" OR "aromatic grass*" OR "aromatic forb" OR "aromatic flower*"
Restricted to English papers, from China, Tawain, Korea, Japan
→ **190 aromatic species were identified**

- **Identification of plant–natural enemy interactions**

"*aromatic species*" AND (coccinellid* OR ladyb* OR syrphid* OR hoverfly OR chrysopidae OR lacewing OR "hymenopter* wasp" OR parasitoid)
Restricted to English papers, from China, Tawain, Korea, Japan
→ **224 unique papers were identified**

2. Selection of relevant papers

- Research papers (Reviews were excluded)
- Assessing paired and direct insect-flower interactions
- Where at least the family taxa of natural enemies was mentionned
- The aromatic species being the associated plant in intercropping

→ **64 unique papers**
→ **32 aromatic plant species**

3. Description of insect-flower interactions

Attractiveness
- Choice tests between plants
- Choice tests between volatiles
- Flower visitations
- Morphometric compatibiliy
- Pollen / Nectar consumption

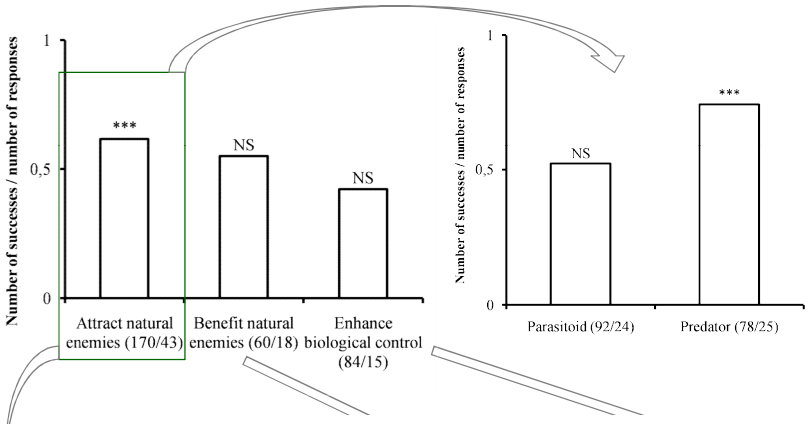
Benefits
- Longevity
- Fecundity

Biological control - if natural enemies colonize adjacent crops

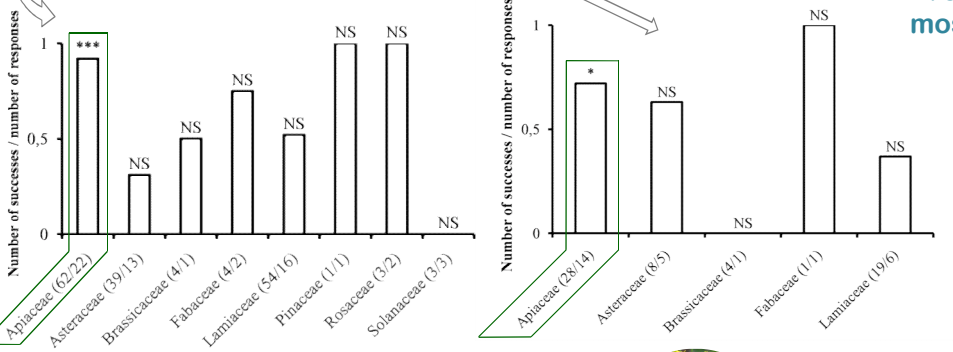
4. Data analyses: **Vote counting analyses using Bernouilli tests**

Results & Discussion

1. There is a significant number of studies showing that aromatic plants attract natural enemies, especially predators



2. There is a significant number of studies showing that Apiaceae attract natural enemies and provide them benefits



3. Regarding pest control enhancement, >75% of responses were carried from China, mostly from apple and pear orchards

Foeniculum vulgare

Anethum graveolens

Coriandrum sativum

Flowers with open nectar (Müller 1881 classification in the BIOFLOR database)
→ Accessible food ressources

Yellow and white colors
→ Generally attractive for insects