Organic farmers’ reality to manage functional agrobio diversity in European organic apple orchards

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Farmers’ reality to manage functional agrobiodiversity in organic apple orchards

Results of an European survey

Problematic

- There is a gap of knowledge between agroecological principles and practical on-farm applications...

→ How farmers perceive and manage functional agro-biodiversity (FAB) in Europe?

→ What techniques are currently implemented by farmers to improve it in apple orchards?

→ What are the benefits and limitations of these FAB-techniques implementation according to farmers?
Material and methods
Structured interviews performed in two steps in 9 countries:
- An advisor questionnaire (n=55) and a farmer one (n=125)
- Either by face-to-face or by phone

Sample construction to get the broadest vision:
- Various degrees of experience and conviction about FAB
- Various sources of contact
- Various farming systems…
A high diversity of contexts
Sample description : National means variabilities

- **Farmers interviewed**
  Average number per country

- **Specialization degree**
  Proportion of farm specialized in pome fruit (%)

- **Orchard surface**
  Average surface of farmers apple orchard (in ha)

- **Experience in OF**
  Average number of years since conversion

- **Advise–frequency**
  Proportion of farmers with a frequent monitoring (≥3/year)

- **FAB-tk experience**
  Average number of FAB-techniques mentioned by farmers
Results

1. FAB-Techniques description and between-countries variability
2. FAB-Techniques main targets (beneficials and pest)
3. FAB-Techniques assessment by farmers
FAB-Techniques description

- FAB-Techniques described belong to 3 categories
  - Ecological infrastructures: long-term implementation
  - Agricultural practices: adaptable from a season to another
  - System redesign: deeper interactions with the production system
Open questions asked to farmers:

1] Can you describe the FAB-techniques you currently use and/or have ever used in your orchard?

2] Do you know other FAB-techniques (seen or heard) that you don't use in your orchards?
Open questions asked to farmers:

1] Can you describe the FAB-techniques you currently use and/or have ever used in your orchard?

2] Do you know other FAB-techniques (seen or heard) that you don’t use in your orchards?
Unequal distribution among countries (TOP 10)
% of farmers interviewed who say they implement each technique
Why such differences?

- Different natural and socio-technical contexts?
  - Existing infrastructure, cultural and traditional heritage (LV, FR…)
  - Different national and regional regulation (DE, DK…)
  - Higher communication about one technique (DK, FR…)
  - Insufficient knowledge and skepticism about effectiveness (PL, LV…)
  - "Fashion trend" for some techniques (DK, FR, …)
  - Very common techniques not mentioned but used (SE, DK…)
  - Etc…

→ No conclusion, but our methodology opens hypothesis for further perspectives…

- Other objectives than FAB targeted?
- The interview bias: 9 different interviewers and languages…
Why such differences?
Variability of FAB-techniques implementation *ex: Flower strips*

- Different conception within farmers… and even within researcher!
- Can vary in term of:
  - Location in the orchard
  - Spontaneous wild flowers VS sown mix of seeds
  - Choice of species
  - Management strategy
  - Objectives targeted: pest regulation, pollination, nitrogen input…
  - …
FAB-techniques targets (1)

Why do you use (or have used) each one?

- Lepidopteran e.g. C. Pomonella
- Aphids e.g. D. Plantaginea
- Mites P. ulmi
- Voles
- Mollusks Slugs, snails
- Disease
- Weeds

Various FAB-Techniques
Various FAB-Techniques

- Arthropods natural enemies
  - Lepidopteran e.g. C. Pomonella
  - Aphids e.g. D. Plantaginea
  - Mites P. ulmi
- Mammals
  - Voles
- Birds
- Reptiles/amphibians
- Domestic animals

Wild and sown vegetation
Grass, flowers, shrubs and trees

Why do you use (or have used) each one?
- Lepidopteran e.g. C. Pomonella
- Aphids e.g. D. Plantaginea
- Mites P. ulmi
- Voles
- Mollusks Slugs, snails
- Disease
- Weeds
FAB-techniques targets (1)

Pest regulation

Various FAB-Techniques

Wild and sown vegetation
Grass, flowers, shrubs and trees

Arthropods natural enemies

Mammals

Birds

Reptiles/amphibians

Domestic animals

Lepidopteran
e.g. C. Pomonella

Aphids
e.g. D. Plantaginea
Mites
P. ulmi

Voles

Mollusks
Slugs, snails

Disease

Weeds

Why do you use (or have used) each one?
FAB-techniques targets (2)

Various FAB-Techniques

Wild and sown vegetation
Grass, flowers, shrubs and trees

Why do you use (or have used) each one?

- Arthropods natural enemies
- Mammals
- Birds
- Reptiles and amphibians
- Domestic animals
FAB-techniques targets (2)

Various FAB-Techniques

Wild and sown vegetation
Grass, flowers, shrubs and trees

Pollinators

Pollination

Why do you use (or have used) each one?

- Arthropods
  - Natural enemies

- Mammals

- Birds

- Reptiles and amphibians

- Domestic animals
FAB-techniques targets (2)

Overall biodiversity

Various FAB-Techniques

Wild and sown vegetation
  Grass, flowers, shrubs and trees

Pollination

Arthropods
  natural enemies

Mammals

Birds

Reptiles and amphibians

Domestic animals

Other organisms

Why do you use (or have used) each one?
FAB-techniques targets (2)

Pollinators
- Arthropods
- Natural enemies
- Mammals
- Birds
- Reptiles and amphibians
- Domestic animals

Pollination

Overall biodiversity

Production

Wild and sown vegetation
- Grass, flowers, shrubs and trees

Cultivated plants
- Fruit and nut trees

Various FAB-Techniques

Why do you use (or have used) each one?

Mechanical protection

+ Various functions...
FAB-Techniques assessment
Ranking according to criteria given by the interviewer

Among all these FAB-techniques you know, which one is 1] **the most effective** / 2] **the easiest to implement** / 3] **the most innovative** in your opinion? And why?

<table>
<thead>
<tr>
<th>Rank</th>
<th>Most efficient</th>
<th>Easiest to implement</th>
<th>Most innovative</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No answer (n=51)</td>
<td>No answer (n=30)</td>
<td>No answer (n=47)</td>
</tr>
<tr>
<td>2</td>
<td>Flower strips (n=13)</td>
<td>To adapt interrow mowing (n=27)</td>
<td>Flower strips (n=12)</td>
</tr>
<tr>
<td>3</td>
<td>Hedgerows (n=12)</td>
<td>Bird houses (n=13)</td>
<td>Insect shelter (n=11)</td>
</tr>
<tr>
<td>4</td>
<td>To reduce pesticide (n=12)</td>
<td>Hedgerows (n=12)</td>
<td>Animal introduction (n=11)</td>
</tr>
<tr>
<td>5</td>
<td>To adapt interrow mowing (n=7)</td>
<td>Flower strips (n=8)</td>
<td>To adapt interrow mowing (n=6)</td>
</tr>
</tbody>
</table>

- The amount of “no answer”
  - Lack of easy-to-use monitoring tools (EcoOrchard WP2)
  - Combination is more relevant than a single technique
  - Other criteria used for assessment
<table>
<thead>
<tr>
<th>Criteria</th>
<th>Negative (limitations)</th>
<th>Positive (interests)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crop protection</td>
<td>Pest disease and/or weeds increase, Voles and rodents increase</td>
<td>Weed management, Reduce pest and disease, Attract natural enemies</td>
</tr>
<tr>
<td>Economy</td>
<td>Reduce production, Space consuming, high-cost</td>
<td>Secondary production, Energy saving, Fruit quality, Time gain</td>
</tr>
<tr>
<td>Environment</td>
<td>Reduce biodiversity</td>
<td>Overall biodiversity, Landscape quality, Water quality, Reduce pollution, Pollinator enhancement</td>
</tr>
<tr>
<td>Agronomy</td>
<td>Competition</td>
<td>Pesticide drift and wind protection, Soil quality, Nitrogen supply,</td>
</tr>
<tr>
<td>Working conditions</td>
<td>Time consuming, hard to apply and/or maintain</td>
<td>Aesthetic, Less workload, Harmony, Personal pleasure and philosophy</td>
</tr>
<tr>
<td>Technique</td>
<td>Incompatible with nets or other techniques, Spraying restriction, Ineffective</td>
<td>Locally adapted, easy to implement, effective</td>
</tr>
<tr>
<td>Social</td>
<td>Mentality, Risk increase, Visual bad effect,</td>
<td>Image, Communication,, Work diversification, Patrimony</td>
</tr>
</tbody>
</table>
FAB-Techniques assessment
Based on the Pros and Cons mentioned for each technique

<table>
<thead>
<tr>
<th>Technique</th>
<th>Limitations</th>
<th>Interests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agronomy</td>
<td>0</td>
<td>668</td>
</tr>
<tr>
<td>Environmt</td>
<td>0</td>
<td>1013</td>
</tr>
<tr>
<td>Economic</td>
<td>0</td>
<td>307</td>
</tr>
<tr>
<td>Social</td>
<td>50</td>
<td>390</td>
</tr>
<tr>
<td>Working conditions</td>
<td>0</td>
<td>517</td>
</tr>
<tr>
<td>Crop protection</td>
<td>50</td>
<td>307</td>
</tr>
</tbody>
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Number of occurrence in the farmers interviews
FAB-Techniques assessment
Based on the Pros and Cons mentioned for each technique

Limitations

How to reduce limitations?

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<th>Interests</th>
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<td>Crop protection</td>
<td></td>
</tr>
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Number of occurrence in the farmers interviews

How to improve benefits?
Perspectives for the oncoming Workshop

- Presentation of FAB-Techniques with their Pros and Cons mentioned by European farmers ➔ 5 technical sheets provided based on information collected in the interviews

⇒ To discuss, evaluate and complete the information we’ve collected with your expertise: how to overcome limitations and improve benefits?

⇒ To discuss how to disseminate it to farmers and help FAB-techniques adoption and management

This afternoon: 17h35-19h10
Thanks for your attention...
...and waiting for meeting you at our workshop for further discussions!

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