IPM in Brassica vegetables and oilseed rape: challenges and opportunities

EIP focus group IPM in Brassica

Monica Höfte – Ghent University
Inge Van Oost – DG Agriculture and Rural development
The European Innovation Partnership (EIP) „Agricultural Productivity and Sustainability“
Demand driven innovation under the EIP-AGRI
European Innovation Partnership

Rural Development

- Funding for setting up of an “Operational Group”: farmers, advisors, agribusiness, researchers, NGOs, etc. planning an innovation project (Art 35)
- Project funding for the Operational Group’s project (Art 35). This co-operation could be combined with other measures (investment, knowledge transfer, advice)
- Supporting innovation support services

Horizon 2020

- Research projects, including on-farm experiments to provide the knowledge base for innovative actions
- Interactive innovation formats such as multi-actor projects and thematic networks genuinely involving farmers, advisors, enterprises,...."all along the project"
Focus groups

(Focus groups form part of the **networking function** of the EIP: up to 20 experts - typically: scientists, farmers, advisors)

**Focus on practical knowledge in a particular field, and where to get that knowledge**, organised in 4 strands:

1. Take stock of the **state of the art of practice** (list of best practices), listing problems and opportunities

2. Take stock of the **state of the art of research**, summarizing possible solutions to the problems listed (incl. list of useful projects with the contacts)

3. **Identify needs from practice**: dissemination and propose further research where needed

4. Propose priorities for innovative actions, e.g. list of **ideas for future interactive OG projects**
Focus Groups 2013 - 2014

May 2013
1. Organic farming - optimizing arable yields
2. Protein crops
3. Animal husbandry – reduction of antibiotics use in the pig sector

Sept 2013
4. Genetic resources co-operation models
5. Soil organic matter content in Mediterranean regions
6. Integrated pest management (IPM) – Brassica
March 2014
7. High Nature Value (HNV) farming profitability
8. Mainstreaming precision farming
9. Profitability of permanent grassland
10. Fertiliser efficiency – focus on horticulture in open field

September 2014
11. Soil-borne diseases
12. Ecological Focus Areas
13. Short food supply chains
Tasks of the focus group IPM in Brassica

- Identify (types of) pests and diseases relevant for Brassica for different EU regions;
- Compare methods between different specialty crops and, particularly, between specialty crops and rapeseed;
- Compare existing IPM methods from the cost-effectiveness point of view.
- List ongoing IPM experiments for Brassica
- List existing IPM practices for Brassica and indicate where improvement is needed
- Needs for further research
- Priorities for innovative actions
Integrated Pest Management (IPM)

- Broad-based approach in which all available pest control techniques are considered in order to grow a healthy crop with the least possible disruption to agro-ecosystems.
- IPM is based on accurate pest identification and typically includes regular crop monitoring to determine if, when and what treatments are needed for effective control.
- Emphasis is given to preventive measures
- Preference for non-chemical control measures
- Chemical pesticides selected for minimal harm to people and environment + anti-resistance strategies
Most important Brassica species in Europe

Oilseeds – 6 million ha
- Oilseed rape (B. napus)
- Turnip rape (B. rapa)

Brassica vegetables – 430 000 ha
- White cabbage
- Cauliflower
- Broccoli
Diseases of oilseed rape

Type of diseases

- Soil borne or surviving on crop debris
- Their importance increases due to narrow rotations and tendency to no-tillage
- Similar diseases throughout Europe

Club root
Plasmodiophora

White mould
Sclerotinia

Verticillium wilt

Phoma stem canker/black leg

Light leaf spot
Pyrenopeziza
Current control strategies

- Resistant varieties
- Fungicides
- Very little IPM (farmers have no incentives)

Problems

- Newly emerging diseases (mainly in the UK)
  - White leaf spot
  - Olpidium brassicae
- Resistance is not stable
  - Clubroot/Black leg/Light leaf spot
- Fungi become resistant to fungicides
  - Sclerotinia
  - Pyrenopeziza (Light leaf spot)
Pests of oilseed rape

**At emergence and young plants**
- Cabbage root fly (Delia)
- Flea beetle (Phylletreta)
- Cabbage stem flea beetle (Psylliodes)
- Cabbage stem weevil (Ceutorhynchus)

**Flower buds**
- Pollen beetle (Meligethes)

**Flowering**
- Cabbage seed weevil

**Pods**
- Brassica pod midge (Dasineura)
- Cabbage aphid (Brevicoryne)
Current control strategies

- Insecticides
  - Seed treatments with neonicotinoids
  - Foliar sprays, mainly with pyrethroids

Problems

- Recent ban on neonicotinoid seed treatments in oilseed rape
- Resistance to pyrethroids in pollen beetle and stem flea beetle
Opportunities for biocontrol in oilseed rape

Available

- Biological control of Sclerotinia
- Not widely used because considered too expensive and complicated to apply

Needs

- (Alternative) control strategies for Clubroot/Blackleg/Light leaf spot/Verticillium wilt
- Alternative control strategies for insect pests, mainly pollen beetle (entomopathogenic fungi?) and stem flea beetle
- Seed treatments
Diseases on Brassica vegetables

Types of diseases

- Large differences in key diseases among crops and regions
- Club root key problem in most European countries
- Leaf pathogens
  - Downy mildew: mainly in nurseries
  - Alternaria: mainly in Southern countries
  - Mycosphaerella: key problem on cauliflower in France
  - Xanthomonas: widely occurring
- Viruses: mainly in the UK
• Postharvest pathogens: problematic in some countries

**Emerging diseases**
• Fusarium avenaceum on cabbage in Poland
• Light leaf spot

**Control strategies**
• More IMP than in OSR (certification schemes drive IPM)
• Resistant varieties used when available
• Fungicides widely used because cheap and effective
• Biological control regularly applied against Sclerotinia and Rhizoctonia (Contans, Trichoderma)
Opportunities for biocontrol products

**Problems**

- Fungicide resistance
  Sclerotinia and Pyrenopeziza
- Not many fungicides registered for minor crops
- Limited choice in resistant varieties
- Clubroot resistance not stable

**Needs**

- Products that can be used at the last stages of vegetable production

**Opportunities**

- Application of biocontrol agents in nurseries
Pests on Brassica vegetables

**Major pests**
- Cabbage root fly
- Lepidopteras
- Spodopteras in Southern countries
- Aphids
- Swede midge (Contarinia)

**Oilseed rape pests**
- Oilseed rape serves as a green bridge for pests (and diseases) in Brassica
- Pollen beetle, cabbage root fly, white fly

**Slugs**
Control strategies

- Biological control
  Bacillus thuringiensis against Lepidopteras and Spodoptera

- Insecticides
  Spinosad seed treatments/drenches against cabbage root fly
  Pyrethroids

- Naturally occurring parasitoids
  Control aphids

Problems

- Presence of oilseed rape

- Insecticides
  Broadspectrum insecticides such as pyrethroids and Spinosad have side-effects on beneficials
  Resistance against pyrethroids in white fly and Spodoptera
Opportunities for biocontrol against Brassica pests

Needs

• Alternative control strategies with less side effects on beneficials (mainly for cabbage root fly)
• Effective control strategies for white fly
• Effective control strategies for slugs
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