Advanced Course
INTEGRATED PEST MANAGEMENT FOR SUSTAINABLE AGRICULTURE

Zaragoza (Spain), 17-22 March 2025

PROGRAMME

0. **Opening (1 hour)**
1. **Considerations about pests in agriculture (2 hours) (R. Albajes, N. Munier, M. Pugliese)**
   - 1.1. types of pests:
     - 1.1.1. Phytophagous insects and mites
     - 1.1.2. Plant pathogens: fungi, oomycetes, bacteries, viruses, viroids, mycoplasmas
     - 1.1.3. Weeds
   - 1.2. Types of damages caused by pests
   - 1.3. Losses caused by pests in agriculture and forestry
   - 1.4. Pest is not an intrinsic characteristics of the organism
     - 1.4.1. Epidemiology and population dynamics: damage thresholds
     - 1.4.2. Strategic basis for pest control
   - 1.5. Factors determining occurrence of pests and damages
   - 1.6. Causes of enhancement and control of pest populations
2. **Major challenges of IPM systems for the modern age (3 hours)**
   - 2.1. Sustainable use of pesticide (1 hour) **(J.L. Alonso Prados, B. Gu)**
     - 2.1.1. Recent evolution of the amount of chemical pesticides and biopesticides used in agriculture and forestry
     - 2.1.2. Impact on health and environment of pesticides
     - 2.1.3. Pesticide resistance
     - 2.1.4. Legislation in EU on pesticides
     - 2.1.5. Minimize risk of pesticide use in IPM approach
   - 2.2. Prevention of emerging and re-emerging pests (0.5 hour) **(R. Jiménez-Díaz)**
   - 2.3. Reducing the spread of invasive organisms (1 hour) **(R. Jiménez-Díaz)**
     - 2.3.1. Restrict trade of plants and plant material
     - 2.3.2. Stricter regulations and also their application in border inspection
     - 2.3.3. Quick and reliable detection and identification tools
   - 2.4. Mitigation of causes and consequences of climate change (0.5 hour) **(M. Pugliese)**
     - 2.4.1. Reduction of emission of greenhouse gases
     - 2.4.2. Prevision of the establishment and distribution of new invasive organisms
3. **Holistic approach of IPM (4 hours) (R. Albajes, N. Munier, FAO)**
   - 3.1. Presentation of the concept
   - 3.2. Landscape as the holistic vision for analysing and controlling pest populations
     - 3.2.1. Functional scale of landscape
     - 3.2.2. Key elements for and IPM approach
   - 3.3. Cropping system. Good practices
   - 3.4. Non chemical solutions
   - 3.5. Decision making to avoid unnecessary treatment (0.5 hour) **(T. Caffi)**
   - 3.6. Efficiency of treatment
   - 3.7. Site specificity of IPM
   - 3.8. Cost efficiency of IPM

3.9. A One Health approach to Plant Health and IPM
  3.9.1. Concept of One Health
  3.9.2. The need of uniqueness of the 'Health' concept
  3.9.3. Why Plant Health must be included within the One Health concept?
3.10. Whole value chain (1 hour) **(S. de Kool)**
  3.10.1. Security, safety and sustainability in the agrifood value chain
  3.10.2. IPM and social, economic and environmental objectives of the agrifood system
  3.10.3. An updated paradigm of IPM in the current agrifood system
3.11. IPM as component of agroecology. The vision of FAO (0.5 hour FAO)

4. Improved tools for an efficient IPM (4 hours) (R. Albajes, Ph. Nicot, K.A. Wyckhuys, P. Kudsk, N. Desneux, E. Gil)
4.1. New methods for pest identification and diagnosis
4.2. Application of smart farming to IPM
  4.2.1. Precision agriculture
  4.2.2. Robotics
  4.2.3. Artificial intelligence
4.3. Plant resistance to diseases and phytophagous arthropods
4.4. Biological control of pests
4.5. Behaviour modifiers
4.6. Biotechnological tools for IPM
4.7. IPM and Plant Health complexity

5. Adoption and scaling up IPM through farmer participatory approach (2 hours) (N. Munier, B. Gu)
5.1. EU IPMworks hub
5.2. FAO IPM farm field school

6. Case studies
6.1. **Orchards (2 hours) (J. M. Montagnon, A. Lemarquand)**
  6.1.1. Short description of the most relevant agricultural practices: sowing and harvesting dates, their situation in the rotation, geographical distribution, import/export of plant material
  6.1.2. List of arthropod pests and their control
  6.1.3. List of diseases and their control
  6.1.4. List of weeds and their control
  6.1.5. Discussion of IPM systems available in the crop (with the entomologist, plant pathologist and weed scientist)
  6.1.6. Cost efficiency
6.2. **Arable crops (2 hours) (N. Munier, R. Albajes, TBC)**
  6.2.1. Short description of the most relevant agricultural practices: sowing & harvesting dates, their situation in the rotation, geographical distribution, import/export of plant material
  6.2.2. List of arthropod pests and their control
  6.2.3. List of diseases and their control
  6.2.4. List of weeds and their control
  6.2.5. Discussion of IPM systems available in the crop (with the entomologist, plant pathologist and weed scientist)
  6.2.6. Cost efficiency

6.3. **Protected Vegetables (2 hours) (J. Arnó, E. Crisol, TBC)**

6.3.1. Short description of the most relevant agricultural practices: sowing & harvesting dates, their situation in the rotation, geographical distribution, import/export of plant material

6.3.2. List of arthropod pests and their control

6.3.3. List of diseases and their control

6.3.4. Discussion of IPM systems available in the crop (with the entomologist, plant pathologist and weed scientist)

6.4. **Vine crops (2 hours) (T. Caffi)**

6.4.1. Short description of the most relevant agricultural practices: sowing & harvesting dates, their situation in the rotation, geographical distribution, import/export of plant material

6.4.2. List of arthropod pests and their control

6.4.3. List of diseases and their control

6.4.4. List of weeds and their control

6.4.5. Discussion of IPM systems available in the crop (with the entomologist, plant pathologist and weed scientist)

7. **Participants' presentations (3 hours)**
8. **Round table on IPM: current states and future of IPM (2 hours)**
9. **Closing session (1hour)**
10. **Technical visit (Saturday)**