Maize Case Study and Maize-Based Cropping Systems Case Study

J. Kiss, SzIE, Hungary
M. Sattin & V.P. Vasileiadis, CNR, Italy
P. Mouron, & M. Meissle, ART, Switzerland
C. Moonen, SSSUP, Italy
P. Kudsk, AU, Denmark
X. Pons, UdL, Spain
Maize Case Study: Maize in the EU, Goals and Activities

- **Maize in the EU:**
  - grain maize: 8.3 million ha, green maize: 5.0 mill. ha:
    - acreages, commodity and value;
    - pesticide use and environmental impact.

- **Goals:**
  - Overview and description of maize maize cultivation practices, focus on short-term solutions for reducing pesticide input;
  - Provide important technical expertise towards a system based approach for developing IPM.

- **Activities:**
  - Knowledge compilation and analysis of current maize production systems and their main plant protection problems (pests, diseases, weeds) in European regions;
  - Identify options and restrictions to shift from current to advanced crop protection strategies.
Maize Case Study: Participants, Regions

- Leader: ART, CH
- Partners: 11 institutes
- Regions:
  - Spain: Ebro Valley
  - Italy: Po Valley
  - Hungary: 2 counties
  - Poland: Southwest
  - Germany: Southwest
  - Denmark: Whole country
  - Netherlands: Whole country
  - France: Normandie, Grand-Ouest and Southwest
Maize Case Study: Outputs

- Maize production characteristics in 11 regions in Europe:
  - climatic conditions,
  - share of maize crop,
  - production purposes,
  - cultivation frame:
    ◇ conventional,
    ◇ integrated, organic,
  - agronomic practices:
    ◦ rotated/continuous,
    ◦ fertilization,
  - plant protection:
    ◦ diseases, weeds, pests:
      ▪ present status,
      ▪ tendencies,
    ◦ control strategies, tools,
    ◦ pesticide use, tendencies.

endure®
diversifying crop protection
Maize Case Study: Outputs

- **Scientific paper, talks at conferences, workshops:**

- **Leaflets:**

- **Inputs to other WPs**, specifically Maize-Based Cropping System WP, highlighting:
  - regional differences in pests, cultivation practices, etc.
  - certain pests, disease and weeds CAN NOT BE MANAGED within one single crop and year:
    - their lyfe cycle extends two or more cropping seasons,
    - effect of pre-crop (host of pathogens), rotation,
    - effect of adjacent crops on pest level, economic issues.
• IPM development NEEDS a system approach:
  o in time (crop rotation)
  o in space (fields, farm, landscape)

• Goals:
  – Evaluation of actual Maize-Based Cropping Systems (MBCSs) and possible innovations for Sustainable Plant Protection,
  – Designing Innovative crop protection strategies in Maize-Based Cropping Systems.

• Activities:
  – Identification of economic pest problems, pest control practices in the selected regions, SWOT analysis existing MBCSs,
  – Recommendations for sustainable plant protection with innovative methods, approaches and implications for IPM,
  – Adaptation of environmental and social components of DEXiPM to MBCSs.

• Inputs for other WPs, scientific papers, leaflets, recommendations.
Maize-Based Cropping Systems Case Study: Participants, Regions

- **Maize-Based Cropping Systems**
  - Leader: SZIE, Hungary
  - Partners: 8 institutes
  - Regions:
    - northern region
      - Denmark
      - The Netherlands
    - central-eastern region
      - Hungary (2 counties)
    - south-western region
      - Spain (Ebro Valley)
    - southern region
      - Italy (Po Valley)
• Maize-Based Cropping Systems in 4 European regions:
  • Survey scheme:
    - production purpose
      o grain/green (silage, energy)
    - cultivation practice
      o rotated/continuous maize
    - cultivation methods
      o irrigated/non-irrigated
    - „role” in the cropping system
      o main economic/minor but important crop in the rotation
    - economic driving forces, socio-economic implications

Expert Survey
Maize-Based Cropping Systems Case Study: Outputs

- **Leaflet:** SWOT Analysis and IPM of MBCSs in 4 Regions

  **Maize Based Cropping Systems in Four European Regions: SWOT Analysis and IPM Considerations**

  Vasileios P. Vasileiadis, Stefan Otto and Maurizio Sattin, National Research Council (CNR), Italy; Zoltán Pálinkás, Andrea Veres, Kita Bán and Jozsef Kiss, Szent István University (SZIE), Hungary; Xavier Boix, Universitat de Lleida (UdL), Spain; Per Kerkvliet, University of Aarhus (AU), Denmark; Romy van der Wedde, Applied Plant Research Wageningen UR (PPG), The Netherlands; Ezbilta Gzennor, Plant Breeding and Acclimatization Institute, IHAR, Poland

  **Conclusion:** In order to assess current Maize Based systems and develop IPM, a broader view and adjusted TOOL is necessary.

  - Adaptation of **environmental components** of DEXiPM:
    - Adapting pesticide mobility and pesticide eco-toxicity attributes,
  - Adaptation of **social components** of DEXiPM:
    - Social sustainability assessment
    - Social changes caused by converting the system to innovative IPM.
• **EXPERT SURVEY**
  - Innovative IPM tools,
  - Their potential from agronomic, environmental, economic and social impacts (- 0 +) on MBCS,

• **RECOMMENDATIONS FOR IPM DEVELOPMENT**
  - The adoption of *more diversified crop rotations in MBCSs* is essential to develop “new” systems.
  - **Regional policies to encourage sustainable systems** based on crop rotation and advanced/innovative IPM strategies should be developed.
  - Applied research should evaluate **systems that have longer term benefits** and be economically competitive.
  - **Subsidies to farmers through agri-environmental schemes** will encourage the adoption of innovative IPM systems.
  - **Improved links among stakeholders** can be the basis for a better understanding and efficient use of innovative IPM strategies through mutual recognition and information sharing.
Maize-Based Cropping Systems Case Study: Outputs

- **Scientific paper, talks at workshops:**
  - Scientific paper, talks at workshops:

- **Leaflets:**
  - General Recommendations for IPM Development in MBCSs: Innovative Methods and Tools
  - 4 Regional Recommendations for IPM Development...
Thank you for the attention

Teams involved:

<table>
<thead>
<tr>
<th>Institute</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACTA</td>
<td>France</td>
</tr>
<tr>
<td>AGROS</td>
<td>Switzerland</td>
</tr>
<tr>
<td>AU</td>
<td>Denmark</td>
</tr>
<tr>
<td>CNR</td>
<td>Italy</td>
</tr>
<tr>
<td>DAAS</td>
<td>Denmark</td>
</tr>
<tr>
<td>IBMA</td>
<td></td>
</tr>
<tr>
<td>IHAR</td>
<td>Poland</td>
</tr>
<tr>
<td>JKI</td>
<td>Germany</td>
</tr>
<tr>
<td>SSSUP</td>
<td>Italy</td>
</tr>
<tr>
<td>SZIE</td>
<td>Spain</td>
</tr>
<tr>
<td>UdL</td>
<td></td>
</tr>
<tr>
<td>WUR/PPO</td>
<td>The Netherlands</td>
</tr>
</tbody>
</table>

Teams involved

SZIE        Szent István University, Hungary
CNR         National Research Council, Italy
SSSUP       Scuola Superiore St’ Anna, Italy
UdL         University of Lleida, Spain
AU          Aarhus University, Denmark
PPO         WAU and Res. Center, Appl. Plant Prod., The Netherlands
IHAR        Plant Breeding and Accl. Institute, Poland
ACTA/ARVALIS, France

© P. Hoffmann, SZIE