OPTIMA EU project: main goal and first results of inventory about current spray practices in vineyards and orchards

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What is the OPTIMA project?

OPTIMA = OPTimized Integrated Pest Management

- OPTIMA is a HORIZON 2020 EU project (AGREEMENT n.773718)
  Start date: September 2018
  End date: March 2022

- 7 Countries involved
- 15 Partners
General goal of the project

To develop an environmentally friendly IPM framework for vineyards, apple orchards and carrots by providing a holistic integrated approach which includes all critical aspects related to integrated disease management.
Specific objectives of the project

A. Combined use of bio-PPPs and synthetic PPPs

B. Decision Support System (DSS) for disease prediction and to address product choice, time of application and sprayer settings

Disease detection / prediction → Spraying prescription
Specific objectives of the project

C. Spectral disease detection systems

D. Precision spraying techniques
Main actions of the project

1. Optimise early disease detection method and disease prediction models
   - Precise prediction of when, where and how much the disease will be present in the field

2. Screen and evaluate, first in lab then in field, biological and synthetic PPPs for maximal disease control
   - Carrot leaf blight, Vine downy mildew, Apple scab

3. Implement new precision spraying technologies on smart sprayer prototypes
   - Boom sprayer for carrots, Air assisted sprayer for vineyards, Air assisted sprayer for apple orchards
Main actions of the project

4. Create a DSS for supporting the operator in selecting appropriate time, PPP type and sprayer settings for each application
   - Date of treatment
   - Type of PPP
   - Volume application rate (L/ha)
   - Droplet size (fine, medium, coarse)
   - Number of active nozzles
   - Air flow rate
   - Etc.

5. Evaluation of new IPM elements in the field

6. Assess health, environmental and socioeconomic impacts of the proposed IPM system
Where the project is based, crops and target diseases

FRANCE (Nouvelle Aquitaine)
- carrots
- Alternaria

SPAIN (Aragon)
- apples
- Apple scab

ITALY (Piemonte)
- vines
- Downy mildew
OPTIMA Project has an olistic approach

First action

Identify, analyse and prioritize the end-users’ requirements in the 3 pilot Countries

Through a questionnarie and direct contacts with end users
Methods

A questionnaire structured in 3 sections was prepared and translated in FR, SP and IT for submission to end users:

Section 1 – Personal info (activities – age – education – farm surface)

Section 2 – Current practices in use (Disease detection system used – PP strategy n° of treatments/year – type of sprayer – ‘New’ technologies used – Volume applied and pressure used)

Section 3 – Needs and expectations about OPTIMA final results (Early disease detection; Selection use of PPPs; Smart sprayers; DSS; New IPM; Impacts on human health environment and economy)

Total: 20 questions
Methods

CONDUCTED INTERVIEWS

FRANCE (Nouvelle Aquitaine)

End-users selected:
6 field managers
3 field technicians
Total: 9 interviewed persons

SPAIN (Aragon)

End-users selected:
54 farmers
16 field technicians
Total: 70 interviewed persons

ITALY (Piemonte)

End-users selected:
82 farmers
11 field technicians
9 contractors
Total: 102 interviewed persons
Methods of disease detection commonly utilized

- France: Personal expertise (10%), Extension service (80%), Prediction models (10%)
- Italy: Personal expertise (40%), Extension service (60%)
- Spain: Personal expertise (5%), Extension service (90%), Prediction models (15%)
RESULTS – Type of sprayer used by farmers

- Conventional axial fan
- Cross flow
- Pneumatic
- Spray lance

- Conventional
- Air assisted
Results

Technology present on sprayers

- Any technology
- Antidrift nozzles
- Sprayer control unit
- GPS
- Other

FRANCE • ITALY • SPAIN
Results

Operating pressure

- Conventional axial fan
- Cross flow
- Pneumatic
- Lance

ITALY

SPAIN
Results

Applied volume

<table>
<thead>
<tr>
<th>Country</th>
<th>Fungicides</th>
<th>Insecticides</th>
<th>Herbicides</th>
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<tr>
<td>FRANCE</td>
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Results

ITALY: MOST PROMISING ACTIVITY WITHIN OPTIMA PER PROFESSIONAL FIGURE

Assessment of the impacts of the proposed system on human health, environment, economy & society

Evaluation of new IPM elements in the field

Development of DSS for the whole spray application

Implementation of new technologies on smart sprayers

Specific recommendations on selection and use of bio PPPs

Development of disease early detection tools and prediction models

[Bar chart showing the distribution of activities among contractors, farmers, and field technicians]
Results

SPAIN: MOST PROMISING ACTIVITY WITHIN OPTIMA PER PROFESSIONAL FIGURE

- Assessment of the impacts of the proposed system on human health, environment, economy & society
- Evaluation of new IPM elements in the field
- Development of DSS for the whole spray application
- Implementation of new technologies on smart sprayers
- Specific recommendations on selection and use of bio PPPs
- Development of disease early detection tools and prediction models

![Bar chart showing the distribution of promising activities in Spain per professional figure.](chart.png)
FRANCE: MOST PROMISING ACTIVITY WITHIN OPTIMA PER PROFESSIONAL FIGURE

- Assessment of the impacts of the proposed system on human health, environment, economy & society
- Evaluation of new IPM elements in the field
- Development of DSS for the whole spray application
- Implementation of new technologies on smart sprayers
- Specific recommendations on selection and use of bio PPPs
- Development of disease early detection tools and prediction models
1) The inquiry underlined a still generally “poor” situation in terms of:

a) **Pesticide application techniques**
   - few advanced technologies adopted
   - still too high pressure and applied volumes

b) **Strategies**
   - majority of farmers follow voluntary IPM plant protection
   - use of Bio PPPs still not adopted in vineyards (IT) and orchards (SP)
2) Development of an *early disease detection system* is considered the most promising OPTIMA activity.

3) Field technicians underlined also their expectation concerning the *development of DSS* for the whole management of spray application.

4) The design and development of *smart sprayers* shall take into account market cost for end users.
CONCLUSIONS (3/3)

OPTIMA Project is ongoing considering the farmers / technicians requirements

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Thank you for your attention

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