INTEGRATED PEST MANAGEMENT
A SUCCESSFUL CASE STUDY

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Workshop
'Best practices addressing environmental needs'
Practices and their environmental/economic performance

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BACKGROUND
PROBLEM: LARGE USE OF SOIL INSECTICIDES (INCLUDING SYSTEMIC NEONICOTINOIDs) IN MAIZE AND OTHER ARABLE CROPS WITH DIRECT COSTS AND SEVERE ENVIRONMENTAL IMPACT (INCLUDING BEES)

SOLUTION:

IPM (compulsory based on Directive 2009/128/CE but actually implemented???) +

RISK ASSESSMENT+

INSURANCE COVER
MAIZE CASE STUDY
IPM
1) USING INSECTICIDES ONLY WHERE/WHEN IS NEEDED

2) USING OTHER EFFECTIVE NON CHEMICAL STRATEGIES WHEN/WHERE AN ECONOMIC POPULATION OCCURS
MAIZE PESTS AT EARLY STAGES

VIRUSES TRANSMITTED BY INSECTS

OTHER INSECTS AND OTHER ARTHROPODS

Diabrotica (WCR)

Neonics effective but diseases have low incidence, hybrids are usually resistant – resistant hybrids as effective as neonicotinoids against vector of Maize Rough Dwarf Virus


Other solutions

Rotation the only full effective strategy (provisions of directive 128/2009/CE make this solution compulsory)


> 95% of damage caused by wireworms
WIREWORMS

TOOLS FOR AN EFFECTIVE IPM ARE AVAILABLE!

A) RISK FACTORS
B) PHEROMONE TRAPS
C) BAIT TRAPS
D) AGRONOMIC STRATEGIES
E) BIOCIDAL PLANTS AND MEALS
F) OTHER BIOLOGICAL TREATMENTS

PLANTING CROPS WHERE AND WHEN THERE IS NO SERIOUS ECONOMIC DAMAGE RISK

THE FIRST AND MOST POWERFUL ALTERNATIVE TO INSECTICIDE USE
RISK ASSESSMENT
WHAT IS THE ACTUAL SOIL PEST RISK FOR MAIZE?

A 30 Ys DATA SET (NORTH EAST ITALY) INCLUDING 16% OF LAND WITH THE MOST IMPORTANT RISK FACTORS MAKES CLEAR THAT A RISK OF YIELD REDUCTION OCCURS IN LESS THAN 4% OF THE CULTIVATED LAND

Confirmations in other Italian Regions and Europe; see:

INSURANCE COVER
MUTUAL FUND

Instrument managed by collective of farmers aimed to create a compensation and to balance the risk through an interregional distribution of risks.

No profit, vehicle of innovation with transparency rules.

Compensation commensurate with the financial resources of the Fund. Fund stock increased by savings in forecast costs.

Solutions that are not offered by the traditional insurance market.
PRACTICAL IMPLEMENTATION

CONDIFESA VENETO

AGRIFONDO MUTUALISTICO
Associazione Mutualistica Dei Condifesa Del Veneto e Friuli V.G.
(PRIVATE ASSOCIATION OF FARMERS)

MAIZE MUTUAL FUND
SINCE 2014
### RISKS COVERED
- Insufficient plant density (stand) due to adverse weather conditions (i.e. drought, flooding, freezing cold)
- Insufficient plant density (stand) due to soil pests (e.g. wireworms, black cutworms), or diseases, such as Fusarium spp. (rotten roots, seedlings)
- Diabrotica (WCR) damage
- Loss of production caused by wild fauna

### TARGET
Members of farmer consortia

### OBLIGATIONS
- Contract to be signed within 7 days after sowing;
- Implementation of good cultivation practices;
- Connection and implementation of suggestions in “Annual Crops Bulletin”

### COSTS
€ 3-5/ha all inclusive (including flooding, excessive rain, freezing cold, drought, pest risk)

### COMPENSATION
Up to € 500/ha including:
- Resowing (up to € 250/ha) if stand below 4 pls/m²
- Yield reduction (up to € 250/ha) based on sowing delay, crop change
- Up to € 1000/ha for WCR damage
ADVANTAGES OF MUTUAL FUNDS

1. Reduces costs/ha;
2. Covers risks due to mistakes or difficulties in IPM implementation (e.g. delay in black cutworm treatments);
3. Covers other risks, e.g. flooding and drought, not covered by insecticides;
4. Reduces health risk for farmers, as there is no contact with insecticides;
5. No negative impact of insecticides on soil beneficials;
6. No pollution risks for soil and water tables;
7. No risk to bees and other wild pollinators; more generally, reduces risk to fauna;


ENVIRONMENTAL/ECONOMICAL PERFORMANCE
INSURANCE APPROACH vs PESTICIDE APPROACH

ASSUMPTIONS (prudential) for 100 ha of arable crops including 16% of land having the most important risk factors: 1) Mutual fund cost (MF) 5 €/ha; 2) soil insecticides cost 40 €/ha; 3) the highest damage cost 500 €/ha on 4 ha out of 100; 4) soil insecticides efficacy 100%

<table>
<thead>
<tr>
<th>STRATEGY</th>
<th>MF (ha)</th>
<th>soil insecticides (ha)</th>
<th>IPM COST (€)</th>
<th>MF COST (€)</th>
<th>insecticide cost (€)</th>
<th>damage cost (€)</th>
<th>TOTAL COST (€)</th>
<th>COST DIFFERENCE MF vs insecticides</th>
<th>Effects on humans/environment</th>
<th>compliance with directive 2009/128/CE</th>
<th>Syntetic general evaluation (1 to 5 stars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mutual funds only</td>
<td>100</td>
<td>0</td>
<td>0</td>
<td>500</td>
<td>0</td>
<td>2000</td>
<td>2500</td>
<td>-1500</td>
<td>no</td>
<td>yes</td>
<td>*****</td>
</tr>
<tr>
<td>IPM with mutual funds based on risk factors</td>
<td>100</td>
<td>20</td>
<td>100</td>
<td>500</td>
<td>800</td>
<td>0</td>
<td>1400</td>
<td>-2600</td>
<td>reduced</td>
<td>partial</td>
<td>***</td>
</tr>
<tr>
<td>IPM with mutual funds based on risk factors + monitoring</td>
<td>100</td>
<td>10</td>
<td>1000</td>
<td>500</td>
<td>400</td>
<td>0</td>
<td>1900</td>
<td>-2100</td>
<td>very reduced</td>
<td>yes</td>
<td>****</td>
</tr>
<tr>
<td>soil insecticides (prophylactic use)</td>
<td>0</td>
<td>100</td>
<td>0</td>
<td>0</td>
<td>4000</td>
<td>0</td>
<td>4000</td>
<td>=</td>
<td>yes</td>
<td>no</td>
<td>*</td>
</tr>
</tbody>
</table>

COST DIFFERENCE MF vs insecticides is calculated as follows: MF cost - insecticide cost = TOTAL COST.

Effects on humans/environment:
- no: no effect
- yes: positive effect

Compliance with directive 2009/128/CE:
- no: not compliant
- yes: compliant

Syntetic general evaluation (1 to 5 stars):
- *: lowest score
- *****: highest score
WHEN RISK IS LOW THE INSURANCE APPROACH IS CONVENIENT FOR FARMERS AND MUCH SAFER FOR PEOPLE & THE ENVIRONMENT (INCLUDING BEES)

A INSURANCE APPROACH MUCH BETTER THAN INSECTICIDES
MUTUAL FUNDS (INSURANCE APPROACH) CAN IMMEDIATELY REDUCE PESTICIDE USE, AT THE SAME TIME INCREASING FARMERS’ NET INCOME BY:

1) REPLACING PESTICIDES WITH A LOW DAMAGE RISK

2) INCREASING IPM APPLICATION MAKING FARMERS COMFORTABLE WITH IPM IMPLEMENTATION
CONCRETE EFFECTS UP TODAY
RESULTS 2015-2016 (average)

1) 47.558 ha with MAIZE MF cover

2) COST: 3,3 €/ha (TEN TIMES LESS THAN A SOIL INSECTICIDE)

3) TOTAL REVENUE TO COVER DAMAGE BY WIREWORMS, DIABROTICA, WILD FAUNA AND OTHER MINOR PITFALLS 160.335 €

4) TOTAL DAMAGE PAID 83.863 €

5) SIGNIFICANT INCREASE OF MF STOCK FOR NEXT YEARS
RESULTS 2014-2016 (average)
DETAILED STUDY OF A REPRESENTATIVE AREA (450 HA)
INCLUDING RISK FACTORS WITH a) UNTREATED
MONITORED FIELDS OR b) UNTREATED AND TREATED
STRIPS WHERE SIGNIFICANT PEST POPULATIONS HAD
BEEN FOUND

Hectares with economic damage
2014: 0,56% - 2015: 0,00% - 2016: 0,38%

Value of yield reduction
2014: 700 €/100 ha - 2015: 0,00 €/100 ha - 2016: 118 €/100 ha

Value of yield reduction average 2014/2016
270 €/100 ha – 2,70 €/ha
First results of a survey (based on questionnaires) about the actual effect of MAIZE MUTUAL FUND on IPM and pesticide use, after two years of full implementation
MAIZE MUTUAL FUNDS EFFECT ASSESSMENT
First results

Veneto Provinces PD-TV-VR
Sample of 1655 ha of maize (126 farms)

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>KNOWLEDGE OF MUTUAL FUND (ha)</td>
<td>73%</td>
</tr>
<tr>
<td>ACQUAINTANCE WITH BCE (ha)</td>
<td>67%</td>
</tr>
<tr>
<td>CHANGING AFTER READING BCE (ha)</td>
<td>52%</td>
</tr>
<tr>
<td>TREATMENT REDUCTION (ha)</td>
<td>10%</td>
</tr>
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</table>
WHAT CAN GOVERNMENT INSTITUTIONS DO TO MAKE EFFECTIVE IPM IMPLEMENTATION?

1) SUPPORT RISK ASSESSMENT STUDIES FOR ALL THE CROPS TO IMPROVE IPM STRATEGIES AND COST EVALUATION FOR MUTUAL FUNDS

2) GIVE PRECISE TARGETS FOR IPM (e.g. maximum % of cultivated land that may be treated with soil insecticides in each MS or region)

3) GIVE FEASIBLE CONTRIBUTIONS TO MUTUAL FUNDS IN ORDER TO “TURN THE KEY” IMMEDIATELY

4) SUPPORT INDEPENDENT ADVISORY SYSTEM

5) SUPPORT APPLIED RESEARCH FOR PRACTICAL SOLUTIONS AND KNOWLEDGE TRANSFER – A DRAMATIC CHANGE IS IMMEDIATELY POSSIBLE – JUST A QUESTION OF WILLINGNESS
WHICH OTHER CROPS WITH THIS APPROACH?

Sunflower

canola

Winter wheat,......
ANNUAL CROPS BULLETIN

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(on the left “Bollettino colture erbacee”)

http://www.venetoagricoltura.org/subindex.php?IDSX=120