



Microbial Biocontrol Agents (MBCAs) for IPM

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RA4.3 – Exploitation of natural biological processes

Involved partners:

- Endure Partner 1: INRA
- Endure Partner 2: RRES
- Endure Partner 3: CNR
- Endure Partner 4: IBMA
- Endure Partner 5: UdL
- Endure Partner 6: PRI

FOOD
QUALITY
AND
SAFETY

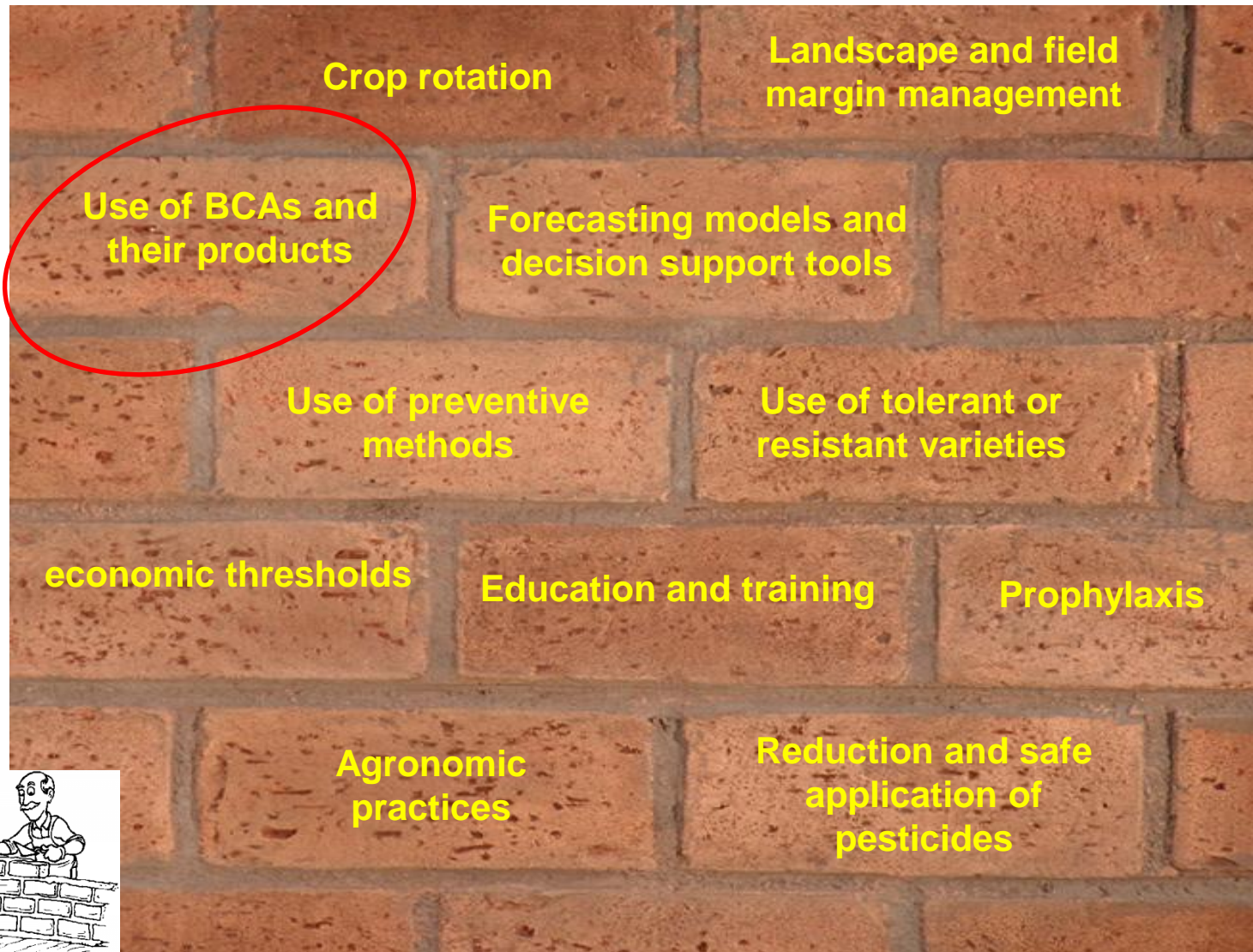


Integrated Pest Management in Europe

Paris, November 2010



Integrated Pest Management (IPM) covers a variety of practices which ensure satisfactory plant protection



Microbial BioControl Products

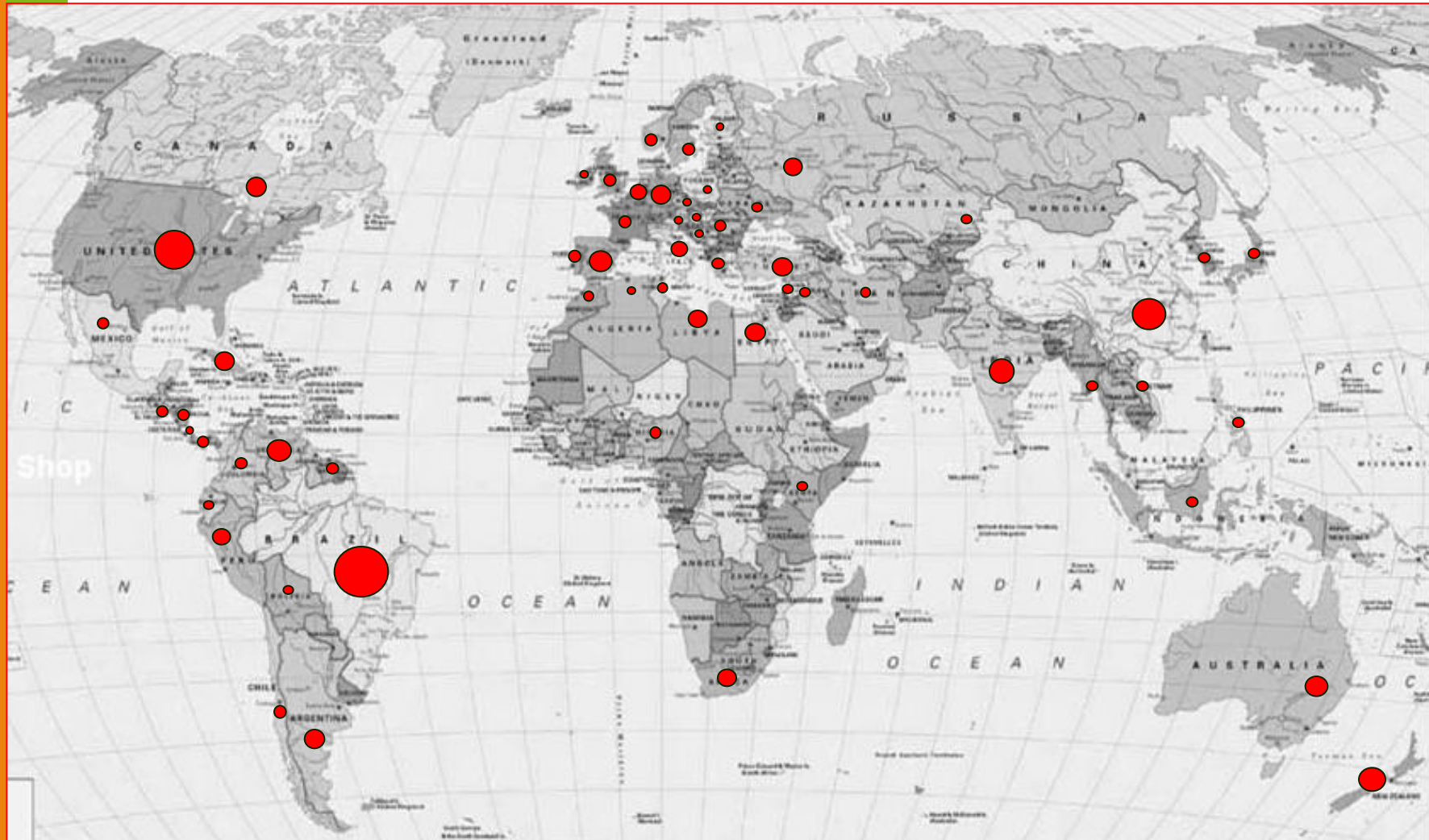
Annex VI to Directive 91/414/EEC regarding plant protection products containing micro-organisms

A microbial plant protection product may contain viable and non-viable micro-organisms (including viruses) and formulation substances. It may also contain relevant metabolites/toxins produced during growth, residues from the growth medium, and microbial contaminants.

To analyse the actual situation of biological control in Europe to:

- Identify the key biological and economical constraints in the evaluation and commercial development of biocontrol agents
- Determine how to overcome the gaps: by using/directing/or organizing research, technical improvements, industry initiatives and policy interventions

Use of a MBCA is a reality all over the world



Over 100 products containing *Trichoderma*, a successful fungal BCA on the market

The Honduras project funded by ONU



700 kg/day *Trichoderma*
40 kg/ha, 120.000 kg



- Better selection of local strains
- From 40 kg to 5 L per hectare
- Directly into the irrigation system
- Saved energy and reduced cost
- Increased yield by about 20%
- Large reduction in pesticide/fertilizer application



Biocontrol is an available alternative method for crop protection, but in Europe, the growth in the use of biocontrol products is well below the level found in other regions of the world

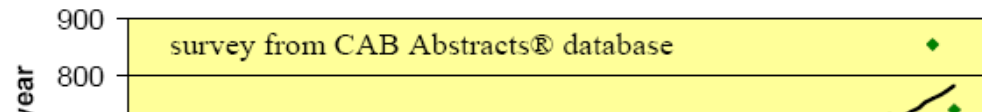
- Research
- Industry
- Policy
- Knowledge dissemination
- Economic consideration

Research

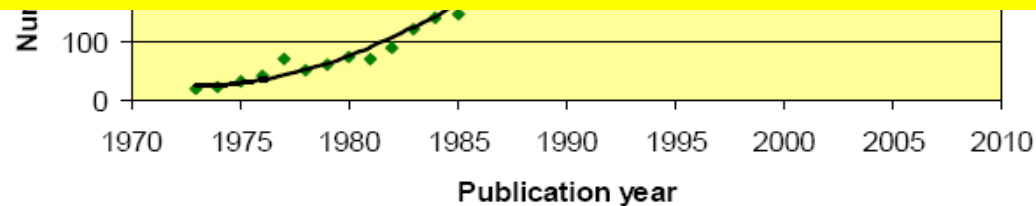
- There has been an increasing investment in biological control research

Published research on biocontrol against plant diseases

>12 000 publications between 1973 and 2008



BUT



- steady increase in yearly scientific production since 1973
- soilborne pathogens: 2/3; airborne pathogens: 1/3

Registered biocontrol agents against plants diseases in the EU

14 microbial agents currently listed on Annex I of 91/414/EEC
(EU Pesticide Database - Status on 26/4/2010)

<i>Coniothyrium minitans</i>	2004	17	AT BE CZ DE DK EL ES FR IT LU NL PL SE SK UK HU PT
<i>Pseudomonas chlororaphis</i>	2004	15	AT BE DE DK FI FR IT LT LU NL PL SE UK ES PT
<i>Ampelomyces quisqualis</i>	2005	6	BG CY DE EL IT SI
<i>Gliocladium catenulatum</i>	2005	4	BE EE FI SE
<i>Bacillus subtilis</i>	2007	7	DE FR IE IT PL SI UK
<i>Phlebiopsis gigantea</i>	2009	7	DK EE FI LV PL SE UK
<i>Pythium oligandrum</i>	2009	3	CZ PL SK
<i>Streptomyces</i>	2009	9	EE EL FI HU IT LT NL PL SE
<i>Trichoderma aspellerum</i>	2009	3	ES FR IT
<i>T. atroviride</i>	2009	3	ES IT SE
<i>T. gamsii</i>	2009	2	CY ES
<i>T. harzianum</i>	2009	4	BE ES FR NL
<i>T. polysporum</i>	2009	1	SE
<i>Verticillium albo-atrum</i>	2009	2	FR NL

Research needs: key issues identified

- **Devise better strategies for the screening of biocontrol agents:** Current methods need to be improved both in terms of logistics (high throughput to allow rapid mass screening of large numbers of candidates) and in terms of the pertinence of criteria for efficacy, production and commercialization.
- **Improve knowledge on efficacy-related issues:** by exploiting the biological properties of the biocontrol agents and enhancing their effectiveness through formulation of the products.
- **Promote multidisciplinary approaches to integrate better biocontrol with IPM and other production practises:** More emphasis will need to be placed on the compatibility of biocontrol agents with the implementation of IPM, preferably in a systemic approach of integrated production.
- **Develop adapted delivery technologies:** Research is needed to provide growers with low pressure spraying equipment to preserve the viability of the microbials. Technological improvements are also needed for optimal coverage of the target plant surfaces to be protected by the biocontrol agents
- **Safeguard the durability of biocontrol**

Economic Industrial issues

- **Size of the target market:** Most MBCAs are being developed for small, if not niche, markets. The potential market for MBCAs is fragmented, often involving minor crops of little interest to large agro-chemical companies
- **Production cost:** producing MBCAs requires a complicated and much more expensive four-phase production process starting with fermentation and running through extraction, purification, and formulation and packaging
- **Registration cost:** The estimated cost for registering a MBCA is currently lower than that for a chemical pesticide, though the size of the investment is still very high in comparison with the potential market
- **Business profitability:** Comparing estimated production and other costs relative to the sales value at the plateau level, highlights large differences between chemical pesticides and microbial biocontrol agents. The gap between the two in terms of estimated profit is nearly 10-fold in favour of chemical pesticide.

Industry needs

- **Quality control:** manufacturers of biological control agents must guarantee the quality of their products. The definition of tests and their routine implementation is crucial to ensure reliable efficacy and maintain confidence of farmers for biocontrol.
- **Improve distribution systems:** by the integration with Decision Support Systems and training courses organized by farmer associations

Needs for Biocontrol's Development

- **Training of advisers and farmers:** Compared to chemical control, the implementation of biological control presents an additional level of technical complexity because the "active substance" is a living organism or microorganism. The success of large scale use of biological control in the future will require stepping up the technical training of farmers and advisers.
- **Development and dissemination of Decision Support Systems (DSS):** the complexity of biocontrol and its necessary integration in system approaches of crop protection and production make DSS more and more a key component.
- **Establishment of demonstration schemes and development of farmer networks:** is needed to stimulate the dissemination of information to and among farmers.

- **MBCAs must not be considered as a chemical pesticide**
- **Registration protocols should differentiate between MCBAs and chemical pesticides**
- **Incentives to growers who convert to IPM agriculture**
- **Provide assistance for the creation of a strong European-based industry and research.**



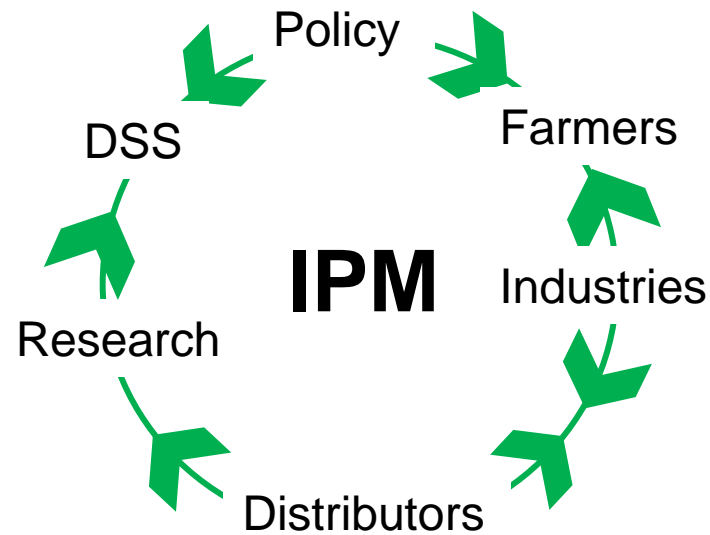
Thank you for
your attention!!!

Grazie

Integrated Pest Management

will be the result of

INTEGRATION



Thank you for your
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