TRICHOGRAMMA and LADYBIRDS
Outdoor utilization, in France
BIOTOP: Outdoor Biocontrol,

Biotop offers several products for fields and greenhouses:

- Trichogramma: corn fields
- Ladybirds: gardens,
- Orius, Macrolophus, …: greenhouses,
- Anthocoris: orchards,
- Pheromons: mating disruption and traps

The main activity is in open « fields »:

2 exemples:
- Ladybirds: garden and parks (interesting hobby market)
- Trichogramma: agriculture (a Biocontrol success story example)

How did we manage it? Difficulties? Needs?
2 different ladybirds

**Harmonia axyridis:**
- 1990: field trials by INRA (orchards, vegetables)
- 1995: commercialisation of larvae in garden centers
  (aphids on rose bushes and then on other plants)
- 2000: flightless strain (wild strain stopped)
  (looking for better efficacy and principle of precaution)

**Adalia bipunctata:**
- 2003: to offer solution for:
  - markets having difficulties with Harmonia (exotic beneficial),
  - situations where better efficacy is obtained with Adalia,
## Ladybirds: for garden and park

<table>
<thead>
<tr>
<th></th>
<th>COCCIBELLE <em>Harmonia axyridis</em>, flightless strain</th>
<th>COCCIFLY <em>Adalia bipunctata</em></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>For small plants</strong></td>
<td>For small plants vegetables, bushes, ...</td>
<td>For high plants trees, bushes, ...</td>
</tr>
<tr>
<td><strong>LARVAE</strong></td>
<td>10 - 30/m²</td>
<td>40 - 80/bush (or 20 - 50/m² on small plants)</td>
</tr>
<tr>
<td><strong>ADULTS</strong></td>
<td>4 - 8/m²</td>
<td>10 - 20/tree</td>
</tr>
</tbody>
</table>

Utilization also possible for agriculture, with spot releases (cost)
1975-1985: Research, experimentations with INRA

To produce *T. brassicae* on *Ephestia* eggs:
- with diapause (availability, reliability, quality)
- in small cardboard capsules

**Capsules:**
Protection of beneficials, very easy to release, by hand or mechanical way (plane, ...
1985: 3 releases/1st generation of ECB

capsules on the soil on 100 points/hectare

But:
- 3 releases = too much time (and costs),
- Product on soil: not adapted for early Ostrinia/small corns
TRICHOGRAMMA / ECB in France

Evolution with successive improvements, simplifications:

<table>
<thead>
<tr>
<th>Year</th>
<th>R1</th>
<th>R2</th>
<th>R3</th>
</tr>
</thead>
<tbody>
<tr>
<td>85</td>
<td>W1</td>
<td>W2</td>
<td></td>
</tr>
<tr>
<td>88</td>
<td>W1</td>
<td>W2</td>
<td>W3</td>
</tr>
<tr>
<td>92</td>
<td>W1</td>
<td>W2</td>
<td></td>
</tr>
<tr>
<td>94</td>
<td>W1</td>
<td>W2</td>
<td>W3</td>
</tr>
<tr>
<td>96</td>
<td></td>
<td>W2</td>
<td>W3</td>
</tr>
<tr>
<td>04</td>
<td>W1</td>
<td>W2</td>
<td>W3</td>
</tr>
<tr>
<td>05</td>
<td>W1</td>
<td>W2</td>
<td>W3</td>
</tr>
</tbody>
</table>

**BIOTOP**

*L'effet Nature*
TRICHOGRAMMA / ECB IN FRANCE

MORE THAN 20 YEARS STORY, … FOR A SUCCESS

1000 ha

RESEARCH EXPERIMENTATIONS

OPTIMIZATIONS

ONE RELEASE

3 RELEASES ➔ 1 RELEASE

1975 85 95 2005

BIOTOP
L’effet Nature
Trichogramma/ ECB in France

Very good technical and even commercial performances (about 20% of the ECB market, despite of high competition with chemicals which are easy to use and very cheap, …).

But: economically very hard project, only profitable about 20 years after the beginning,

And still challenges:
- large evolution of climate // Ostrinia development and Trichogramma utilization method?
- transgenic crops?
- mycotoxines?
- new pests (Diabrotica, Heliothis, …)?
- …
Ladybirds and Trichogramma

Nice and interesting examples of success in biocontrol,

But, there are so few examples of success in open fields

Because:
- very long time to set up and to improve systems
- very long time to have a profitable activity,

Therefore, difficult and risky investments,

Biocontrol is still very difficult to develop,
(despite of all talks about environment, pollutions, ...)
Biocontrol: main need?

Encourage investments and reduce risks on it, by:

- **strong, long term public help on basic knowledge:**
  more people working on pests, on beneficials, on systems, … (naturalists, taxonomists, biologists, …) and training end users, …

- **close public/private cooperations:**
  to set up production and utilization methods, …

- **simple way to introduce new products on the market:**
  simple and cheap regulation, without increasing time and difficulties to develop methods,
Conclusion

Biocontrol: good for the environment, make it:

- Reliable,
- Simple,
- Profitable (end-users, producers/distributors)

THANK YOU