Functional biodiversity in European wine growing

Cristina Carlos
Douro Demarcated Region

43 600 ha of vineyards

36 000 ha of steeply sloping vineyards!

Winegrowers: ADVID

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<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Surface vineyards (ha)</td>
<td>6 069.0</td>
</tr>
<tr>
<td>Integrated production</td>
<td>5 792.0</td>
</tr>
<tr>
<td>Organic</td>
<td>277.0</td>
</tr>
</tbody>
</table>
High Nature Value Farmlands

Source: 2012, JRC European Comission
Number of native varieties of grape* / km2 in Europe

* In national official lists

A. Martins, 2010
Alto Douro Vinhateiro – classified by UNESCO in 2001
Dry stone walls
High presence of semi-natural areas and other crops

Riparian galleries
Patches of native vegetation on slopes
Scrubland and woodland lots around vineyards
High risk of Erosion
Implementation of natural ground cover
Big impact of climate conditions on ground covers (from June-September)
Conservation biological control strategy

Key-pests

Predators

Parasitoids

Biological control agents

Grapevine moth

Green leafhopper
1- To provide key ecological resources (SNAP) for beneficials (habitat management)

2- Avoidance of harmful practices to beneficials (limited and selective use of pesticides)

High diversity of flora support a high diversity of beneficial fauna
SNAP (Shelter, Néctar, Alternative food, Pólen)
Local resources of flora
Implementation of conservation actions to enhance biodiversity of flora and beneficial fauna

And training of workers
Results of conservation actions (Hedges planted in 2013)
_results - training of growers (protection of native species)
To limit / promote a selective use of pesticides (with a lower toxicity against beneficials)

Integrated Pest Management / Integrated production (not conventional!)
1- Application of Preventive measures (ex. enhancement of functional biodiversity) +
2- Estimation of damages / economic threshold level +
3- Selection of protection methods (ex. cultural methods + biotechnical methods (mating disruption)) +
4- Selection of pesticides authorized for IPM

From 1997-2013 – A prior selection of less harmful pesticides, according to their toxicity (human, beneficials fauna, environment), was done by the National Authority

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### Key-pest Grapevine moth

<table>
<thead>
<tr>
<th>2013</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>total</td>
<td>Piretroids</td>
</tr>
<tr>
<td>Active ingredients</td>
<td>9</td>
</tr>
<tr>
<td>Comercial names</td>
<td>18</td>
</tr>
</tbody>
</table>
In 2014- With the implementation of the National Action Plan for the sustainable use of pesticides, following the publication of DIRECTIVE 2009/128/EC

- All the active ingredients available on market for a specific finality (ex. Grapevine moth) can be used, as long as growers respect their conditions of application (security interval and number maximum of applications). They are now responsible for selecting according to toxicity, price and efficacy.

<table>
<thead>
<tr>
<th>Key-pest</th>
<th>2013</th>
<th>2014</th>
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</thead>
<tbody>
<tr>
<td>Grapevine moth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>9</td>
<td>22</td>
</tr>
<tr>
<td>Piretroids</td>
<td>0</td>
<td>9</td>
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<tr>
<td>Active ingredients</td>
<td>18</td>
<td>71</td>
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<tr>
<td>Comercial names</td>
<td>0</td>
<td>42</td>
</tr>
</tbody>
</table>

The availability of such active ingredients on IPM programs may conduct, as a consequence, to:

- To negative impacts on beneficial fauna
- To outbreaks of secondary pests (mites, mealybugs)
Obrigada pela Vossa atenção!