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AGRICULTURE & INNOVATION

Integrated Pest Management

for oilseed rape and *Brassica* vegetables



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The EIP-AGRI Focus Group on 'Integrated Pest Management - Focus on *Brassica* species' brought together 20 experts with different backgrounds (scientists, farmers and advisers), to propose innovative solutions on this topic. They concentrated on winter oilseed rape (OSR) and the three most important *Brassica* vegetables: cauliflower, broccoli and white cabbage. This brochure is based on the [final report](#) in which the Focus Group listed its conclusions.

For more information please see the [Focus Group webpage](#).





► Integrated Pest Management for oilseed rape and *Brassica* vegetables

Brassica vegetables such as broccoli, cauliflower, kale and cabbage, as well as *Brassica* oilseeds like turnip rape and oilseed rape are economically important for European farmers. Throughout Europe, *Brassica* crops have been suffering from a range of existing and newly emerging pests and diseases, which are overcoming the plant's disease resistance, or which are becoming increasingly resistant to pesticides.

Using Integrated Pest Management (IPM) measures could help farmers to control problems in *Brassica* production. The IPM approach encourages natural pest control mechanisms and preventive measures, for instance by using plant varieties that are free from or resistant to pests and diseases, by supporting functional biodiversity, or by adopting specific agronomic practices. This brochure suggests promising ways to effectively deal with pests and diseases in *Brassica* crops, focusing on winter oilseed rape (OSR) and on the three most important *Brassica* vegetables: cauliflower, broccoli and white cabbage. It also offers ideas on how farmers, advisers and researchers can collaborate to promote an economically viable IPM for *Brassica* in Europe.

► Oilseed rape and *Brassica* vegetables in Europe

Did you know?

- White cabbage is the most important *Brassica* vegetable in Eastern Europe, with Hungary, Romania and Poland as major producing countries.
- *Brassica* oilseeds (mainly oilseed rape) are produced on more than 6 million ha in Europe.



Which European countries produce *Brassica* oilseeds and vegetables?

- Find the details on the [EIP-AGRI Focus Group page](#)



Main oilseed rape (OSR) and Brassica vegetable (BV) producing countries in Europe



► A good start: breeding for resistant and healthy plants

To control pests and diseases, Integrated Pest Management first considers preventive measures, such as wide crop rotation and removing infected debris on which certain diseases and fungi survive. By using healthy certified seeds and resistant plant varieties, farmers may reduce or avoid disease and pest problems in *Brassica* vegetables and winter oilseed rape from the start.

Researchers can identify genes that protect crops against pests and diseases, to help plant breeders develop plants that are partially or generally resistant. There is a lot of genetic variation within the *Brassica* family. By organising research and breeding for resistance at a European level, information about host plant resistance and pathogen evolutions can be shared more easily. Private companies do a lot of research on resistance breeding, so they also need to be involved in the process.



Tracing resistance traits for high-quality *Brassica* crops

Vegetable Brassicas are an important crop in Portugal, both for the local market and for export. Diseases and pests can cause substantial crop losses, and chemical control is limited by legal restrictions, a negative environmental impact, and uncertain results. The vegetable industry is increasingly accepting IPM strategies using resistant crop cultivars. Continuous research is needed to develop these cultivars, and to ensure that the resistance is maintained.

Portuguese researchers from the National Institute for Agrarian and Veterinarian Research (INIAV), the University of Lisbon (ISA-UL, Instituto Superior de Agronomia) and the University of Algarve have identified traditional Portuguese varieties of cabbage and kale as potential sources of resistance to downy

mildew disease. Paula Coelho, researcher at the INIAV Institute, underlines the value of this type of research for the whole chain: "An international collaboration between researchers, producers and the private sector is very important for the sector and for farmers. Producers recognise the advantage of using resistant varieties for higher-quality crops."



Together with private companies, research now focuses on finding sources of downy mildew resistance in Brassicas (*Brassica oleracea*) and other plants such as radish (*Raphanus sativus*) and wild rocket (*Diplotaxis tenuifolia*), with promising results.



► Tools for pest and disease monitoring and forecasting

Integrated Pest Management is based on accurately identifying pests and diseases. This requires regular observation and crop monitoring. It also implies accepting a certain economic damage threshold that will help determine if, when, and which treatments are needed. Some measures can be applied to suppress or prevent pests and diseases:

- Agronomic practices, such as clearing away plant debris after harvesting
- Using pest-free and disease-free plant material
- Planting resistant crop varieties
- Supporting functional biodiversity, for instance by using natural enemies of crop pests



Prevention tools for farmers

Monitoring requires a pest-specific approach, and it can be expensive because of the time it takes. In several European countries, farmers have access to reliable, cost-effective and easy-to-use monitoring and forecasting systems for *Brassica* crops. Camera traps can count insects or other pests through sensors, or by using glue, insect pheromones or other ways to lure pests. Combining insect traps with webcams can save farmers and advisers a lot of time and effort, allowing them to monitor the traps on their smartphones or from their own offices. Sharing information about locally used tools will allow more farmers and advisers to benefit from the results.



A broader view on pest monitoring – Slovenia

The European funding programme Horizon 2020 has awarded support to a Slovenian SME (small and medium-sized enterprise) that has developed an automated pest monitoring system. This tool monitors insects that have been lured into pheromone traps. The system sends daily updates to farmers and advisory services, providing them with a real-time overview of the insect population in their fields.

Rosemary Collier, expert from the EIP-AGRI Focus Group on IPM for *Brassica*, has led a UK project evaluating different monitoring approaches for pests on salad and *Brassica* crops, including the Trapview tool: “The main advantage of this tool is that growers can see the captured pests from their offices. If they agree to be part of a network, they can also see what other traps have captured, which is especially valuable when growers are dealing with pests that migrate into the UK, for instance, and where it is hard to forecast when they will arrive.”

More information: www.trapview.com





► Collaborating beyond the field

For long-term strategies to manage pests and diseases, farmers may need to look beyond their own fields. The density of *Brassica* production in the area can be an important factor in controlling pests and diseases. So can landscape features, and how neighbouring farms manage their pests and diseases.

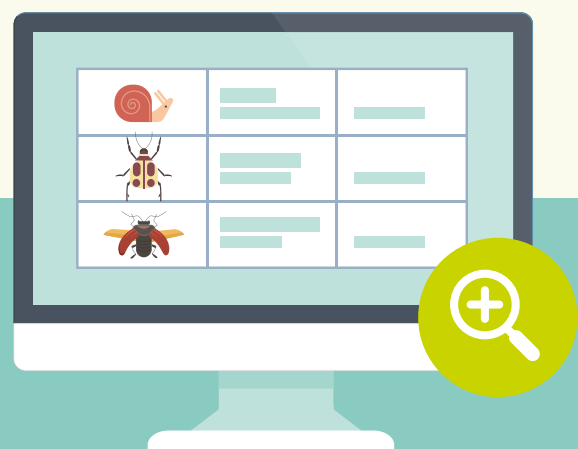
Oilseed rape crops that are grown as green manure, for instance, can act as a 'green bridge' for pests and diseases in *Brassica* vegetable crops, allowing them to survive longer. Landscape features such as hedgerows or flowering field margins can also influence pest pressure. They can act as barriers for pests, or as hosts for natural enemies. By organising pest and disease management at a broader landscape scale, overall disease and pest populations can be lowered. To make this happen, neighbouring farms and extension services will need to collaborate.

Oilseed rape can form a 'green bridge' for pests and diseases in *Brassica* vegetables. Neighbouring farmers will need to find solutions together to avoid this.

Market-driven incentives for farmers can help develop long-term and economically viable strategies. Several supermarket chains in Europe are demanding that the vegetables they buy are certified pesticide-free, or that they have been produced in an environmentally friendly way. However, it is important that the market compensates farmers for the extra costs involved in IPM practices by paying more for the products.

Tackling pests and diseases in European *Brassica* crops

Experts from the EIP-AGRI Focus Group on IPM for *Brassica* collected information on current control practices and IPM alternatives that can be applied for *Brassica* vegetables (notably broccoli, cauliflower and white cabbage) (BV) and oilseed rape (OSR).



► Have a look at the [overview](#) and other Focus Group results on [the IPM Brassica Focus Group page](#).

5 tips for reducing pest and disease damage

- ▶ Manage crop rotations in a way that leaves enough time between *Brassica* crops
- ▶ Use healthy, certified seeds
- ▶ Plant resistant or tolerant varieties
- ▶ Remove infected debris on the field
- ▶ Apply adapted irrigation strategies for *Brassica* vegetables, to help control downy mildew (*Hyaloperonospora*) and black rot (*Xanthomonas*).



▶ Sharing knowledge for better pest and disease management

By joining forces and exchanging knowledge, farmers, advisers and researchers from different EU countries can contribute to finding practical and innovative solutions for issues in *Brassica* disease and pest management. Knowledge exchange between EU countries would be especially useful on these topics:

- ▶ Reliable, cost-effective and easy-to-use forecasting and decision support systems for pest control
- ▶ Market-driven schemes that make additional IPM practices beyond the obligatory level economically attractive for producers of oilseed and *Brassica* vegetable crops. These need to involve consumers and retail (supermarkets)
- ▶ Breeding for resistance
- ▶ Research on management practices for functional biodiversity, for instance in the form of flower strips to attract natural enemies of *Brassica* pests
- ▶ Research on selective control strategies that won't harm beneficial insects

Some ideas for Operational Groups

- ▶ Exploring and testing incentives for farmers to adopt IPM strategies in oilseed rape (such as retailer demands, labels, or agro-environmental schemes)
- ▶ Testing combinations of IPM tools for specific *Brassica* vegetables in different regions and production systems
- ▶ Finding ways to organise easily accessible and impartial advisory services for farmers on IPM

Public authorities can encourage farmers and advisory services to coordinate pest and disease control at regional levels, to reduce overall pest population levels.

Find out more in the [EIP-AGRI brochure on Operational Groups](#)



