



Redefining Pest Management - a Holistic Approach

## Practice Abstract N° 32

### Biological control of apple scab

Apple scab, caused by the fungus *Venturia inaequalis*, is a major disease in world-wide apple production. Apple growing environments usually characterized by cool and rainy summers, favor this disease, which requires intense chemical control measures. The disease affects leaves, buds, flowers and fruits and sometimes twigs. Symptoms include twisted and puckered leaves that have black, circular scabby spots on the underside. On the upper surface the spots look velvety and have an olive-green, sooty appearance. As the disease progresses, the leaves get yellow and drop. The fruit develops scabby spots that are tan and sunken.

In organic agriculture, copper and sulfur compounds are the most important fungicides allowed for the control of apple scab. The use of copper was reduced by the European Union Regulation 2018/1981 to 4kg/ha/year, because of its toxicity to soil and microorganisms.

OPTIMA project searches alternative products to reduce the use of copper-based formulations. Tests are in progress in Italy and Spain with biological plant protection products such as: *Trichoderma* spp., *Bacillus* spp., *Pythium oligandrum*, *Aureobasidium pullulans*, *Saccharomyces cerevisiae*, sweet orange essential oil.

Planting of resistance or tolerant varieties, elimination of crop residues (e.g. overwintering leaves), the use of natural products such as laminarin or potassium bicarbonate, the use of Decision Support Systems to optimize PPPs use and application timing are the recommendations suggested to farmers to reduce the number of copper based treatments.



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