

Grape moth control

In Switzerland, grape for wine production covers roughly 16'000 ha and about 75% of that acreage is conducted in integrated pest management (IPM) or organic production (BIO).

Specific and selective means for grape moths control

The main insect pests in Swiss vineyards are grape wine moth *Lobesia botrana* and grape berry moth *Eupoecilia ambiguella*. They have two annual generations.

Mating disruption (MD)

MD is only applicable on large area or isolated vineyards with low or moderate initial population pressure. Dispensers registered: **RAK1** (grape berry moth *E. ambiguella*), **RAK2** (grape wine moth *L. botrana*), **RAK1+2** (for both species). Dispensers have to be distributed at the beginning of the first flight and are effective for both generations. If more than 5% of bunches are damaged in first generation, a preventive treatment is recommended on second generation.

Bacillus thuringiensis (BT)

Considering its ingestion activity, this bacterial toxin has to be treated immediately before egg hatch of second generation. Adjunction 1% sugar at the solution increase the efficiency. Generally, the treatment has to be repeated after 12-15 days.

Insect growth regulators and inhibitors (IGR, IGI)

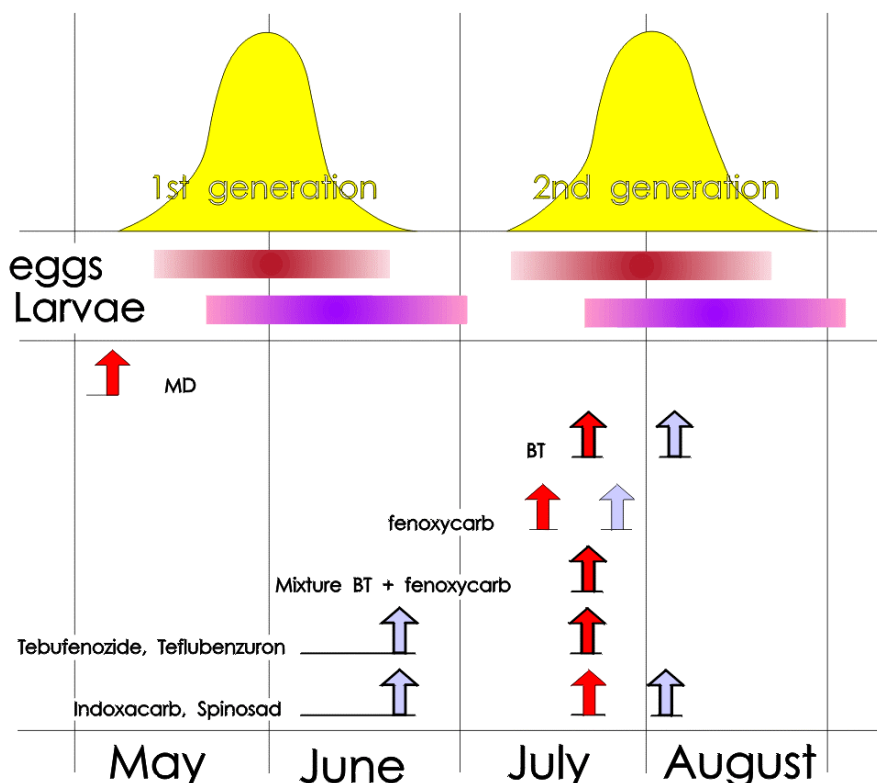
The IGR **fenoxycarb** (Insegar) applied at the beginning of second generation flight has a good ovicidal efficiency. Generally, the treatment has to be repeated after 10-15 days. The IGR **tebufenozide** (Mimic) has no ovicidal efficiency but induces a precocious lethal moulting. It has to be applied at the beginning of egg hatch of second generation or as curative treatment in first generation. The IGI **teflubenzuron** is only efficient on *L. botrana*. That product has to be applied at the beginning of egg hatch of second generation or as curative treatment in first generation.

Mixture of BT and fenoxycarb

That mixture allows controlling the second generation of both grape moths by a single application. BT kills the first hatching larvae and fenoxycarb kills the last deposited eggs.

New products

Two new insecticides acting through ingestion and contact on nervous system by different way as organophosphates have been registered recently. **Indoxacarb** (Steward), blocs the transmission in Na-channels and **spinosad** (Audiencz), a biological toxin produced by a fungus, acts as exciter on the neurones, paralysing the insect. These products have to be applied at the beginning of egg hatch of second generation or as curative treatment in first generation. Generally, the treatment has to be repeated after 10-15 days.



Organophosphate insecticides (OP)

OP insecticides are no more allowed in IPM, except in special occasion to combine control with secondary pests.

Optimal timing to control grape moth depending from way of action of the products.