

Early season disease and insect management

1

Principles of pest management.
Flor Acevedo

2

Management of early season
pests.
Andy Muza

3

Early season disease
management.
Bryan Hed

Do I have a pest problem?

- 1) Observation
- 2) Identification and diagnosis
- 3) Determine the correct timing for treatment
- 4) Select the appropriate control method.
Control is not extermination.
- 5) Evaluate.



Do I have a pest problem?



Picture: <http://www.my-grape-vine.com/blog/japanese-beetles-on-grapes/>



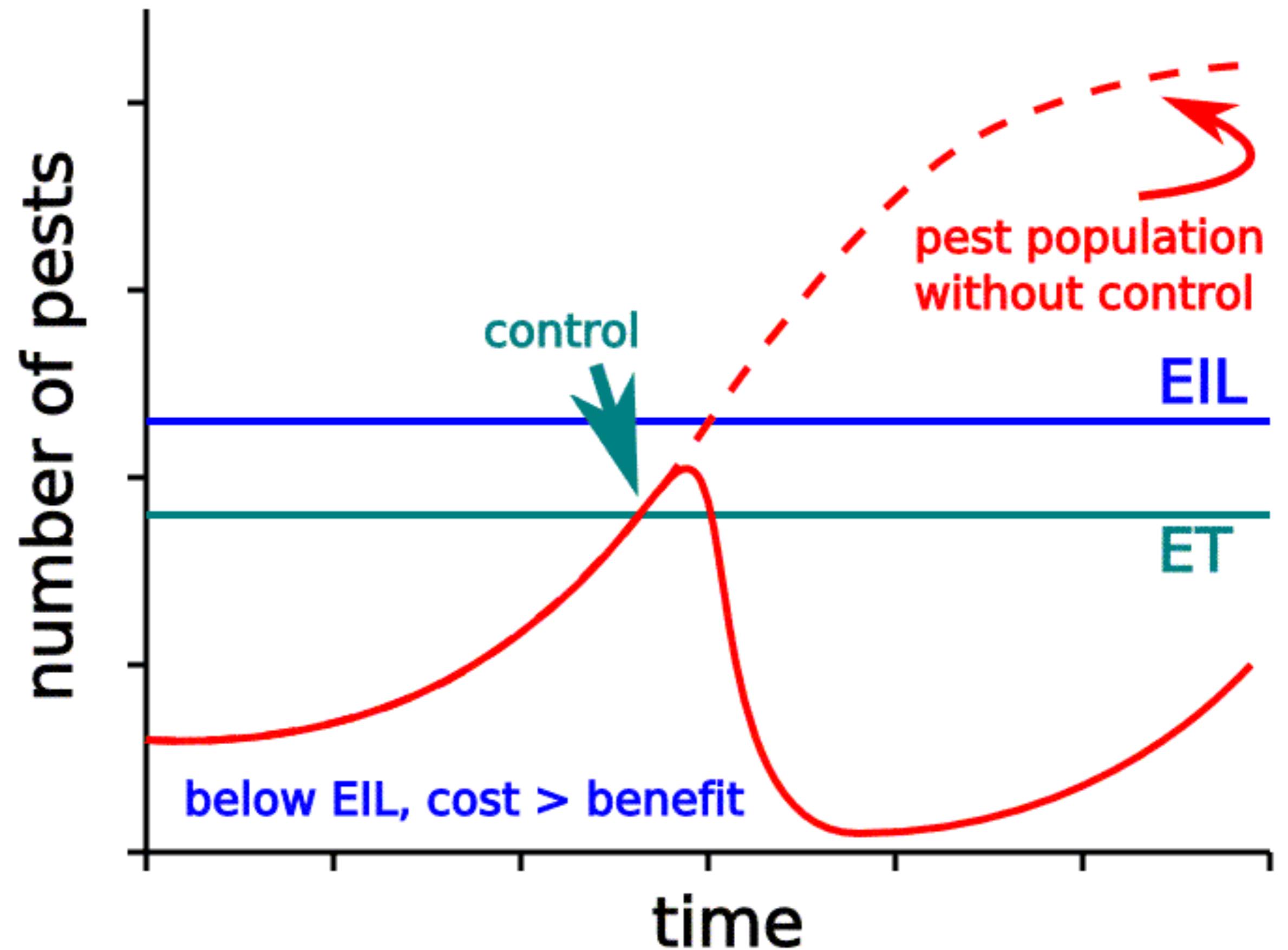
Photo Credit: [Ohio State University](#)

When to control?

Economic damage: Amount of injury which will justify the cost of control.

Economic injury level (EIL): The lowest population density that will cause economic damage.

Economic threshold (ET): Population density at which control action should be determined to prevent an increasing pest population from reaching the economic injury level



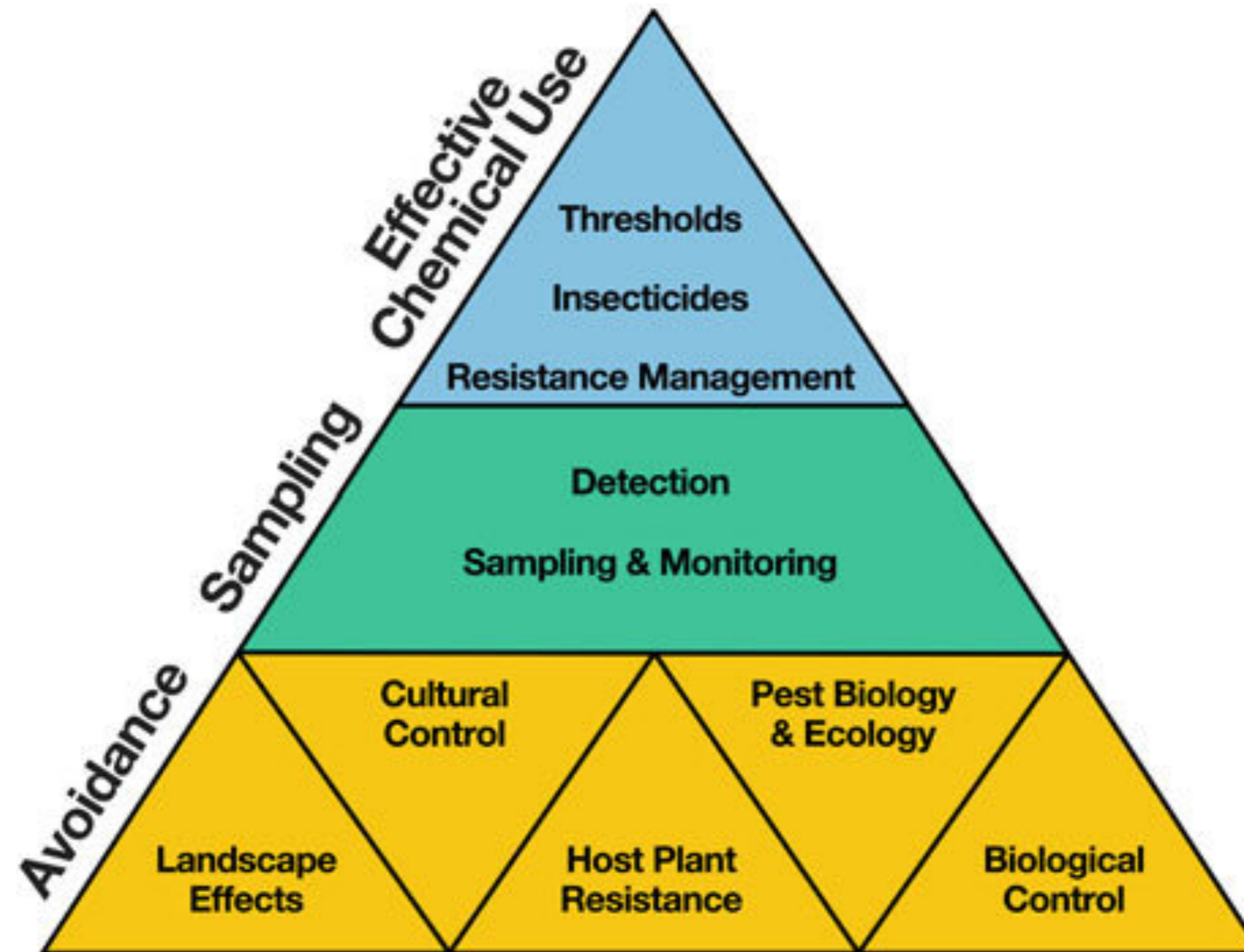
Stern *et al.*, (1959)

Image Credit: NC State Extension

Economic injury levels

- The value of the commercialized product (\$ per ton)
- The cost of the control treatment (\$ cost per acre)
- The amount of crop damage that is caused by a certain amount of insect injury. **This value requires years of research.**

How to control?



Fleischer *et al.*, (2011)

Insecticide resistance management

What is insecticide resistance? “A heritable change in the sensitivity of a pest population that is reflected in the repeated failure of a product to achieve the expected level of control when used according to the label recommendation for that pest species” (IRAC, 2020)

What is mode of action? The way that insecticides work. The way they cause disruption at their target sites.

How to prevent or delay resistance to insecticides?

*Alternation or rotation of pesticides with different modes of action

*Use of other control methods into integrated pest management programs

<https://irac-online.org/modes-of-action/>

Insecticides with same modes of action

Main Group and Primary Site of Action	Sub-group or exemplifying Active Ingredient	Active Ingredients
<p>1 Acetylcholinesterase (AChE) inhibitors</p> <p>Nerve action</p> <p>{Strong evidence that action at this protein is responsible for insecticidal effects}</p>	<p>1A Carbamates</p>	<p>Alanycarb, Aldicarb, Bendiocarb, Benfuracarb, Butocarboxim, Butoxycarboxim, Carbaryl, Carbofuran, Carbosulfan, Ethiofencarb, Fenobucarb, Formetanate, Furathiocarb, Isoprocarb, Methiocarb, Methomyl, Metolcarb, Oxamyl, Pirimicarb, Propoxur, Thiodicarb, Thiofanox, Triazamate, Trimethacarb, XMC, Xylylcarb</p>
	<p>1B Organophosphates</p>	<p>Acephate, Azamethiphos, Azinphos-ethyl, Azinphos-methyl, Cadusafos, Chlorethoxyfos, Chlorfenvinphos, Chlormephos, Chlorpyrifos, Chlorpyrifos-methyl, Coumaphos, Cyanophos, Demeton-S-methyl, Diazinon, Dichlorvos/ DDVP, Dicrotophos, Dimethoate, Dimethylvinphos, Disulfoton, EPN, Ethion, Ethoprophos, Famphur, Fenamiphos, Fenitrothion, Fenthion, Fosthiazate, Heptenophos, Imicyafos, Isofenphos, Isopropyl O-(methoxyaminothio-phosphoryl) salicylate, Isoxathion, Malathion, Mecarbam, Methamidophos, Methidathion, Mevinphos, Monocrotophos, Naled, Omethoate, Oxydemeton-methyl, Parathion, Parathion-methyl, Phenthoate, Phorate, Phosalone, Phosmet, Phosphamidon, Phoxim, Pirimiphos- methyl, Profenofos, Propetamphos, Prothiofos, Pyraclofos, Pyridaphenthion, Quinalphos, Sulfotep, Tebupirimfos, Temephos, Terbufos, Tetrachlorvinphos, Thiometon, Triazophos, Trichlorfon, Vamidothion</p>

IRAC 2020

Early season vineyard insect pests

Grape phylloxera



<https://bugguide.net/node/view/794979>

Insecticides
(foliar form):
Assail
Danitol
Movento

Photos (c) Prof. Dr. Joachim Schmid, Department of Grapevine Breeding and Grafting, Geisenheim Research Institute, Germany

Root form

Leaf form

Mealybugs



Photo: NJ Ag. Experiment Station

Grape mealybug
(*Pseudococcus maritimus*)



Photo: Koppert Biological Systems

Obscure mealybug
(*Pseudococcus viburni*)

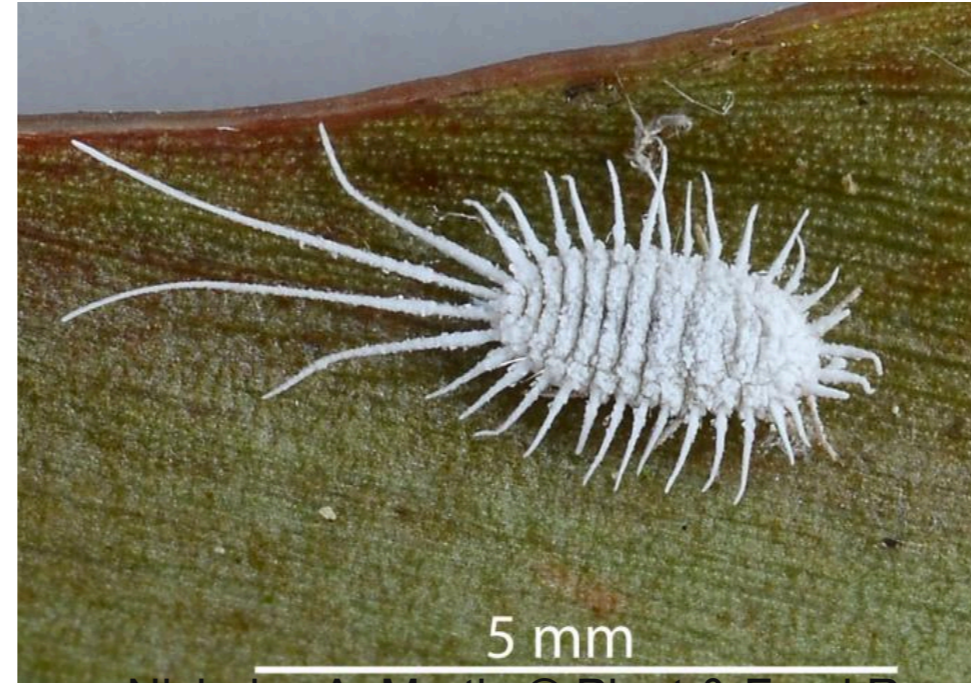


Image: Nicholas A. Martin © Plant & Food Research

Long-tailed mealybug
(*Pseudococcus longispinus*)



Photo: <http://www.chemtica.com/site/?p=3014>

Vine mealybug
(*Planococcus ficus*)

Insecticides:

Lorsban Advanced,
Movento, Baythroid XL,
Leverage 360, Triple crown,
Assail, Admire Pro, Provado,
Actara, Platinum, Voliam Flexi,
Sevin, etc