
exciting solutions
exciting science

Development of an IPM Programme for avocados in New Zealand

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Pest Control in 2020

- Production of high quality fruit with 95% packout
- Fruit meets all pesticide residue standards
- Routine monitoring of pests and beneficials
- Experienced pest scouts available
- Proven action thresholds
- No pesticide resistance
- Selective pesticides available
- Non-chemical means of control predominate
- Ongoing research and improvements

The avocado pest management journey

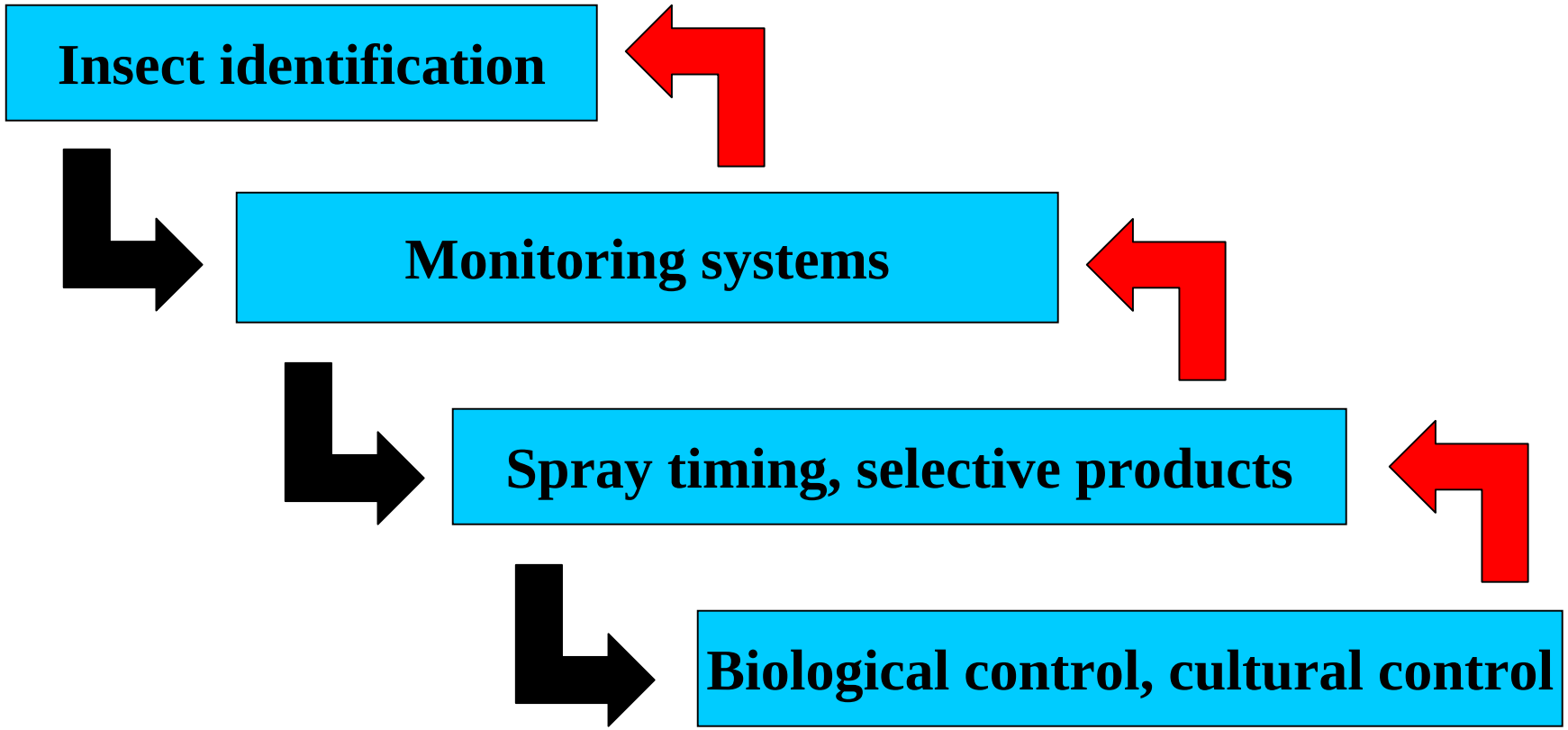
Where we have been...

- Calendar spray progamme based on broad-spectrum products

Where we are going...

- IPM programme producing high quality fruit for all markets

Developing an IPM system

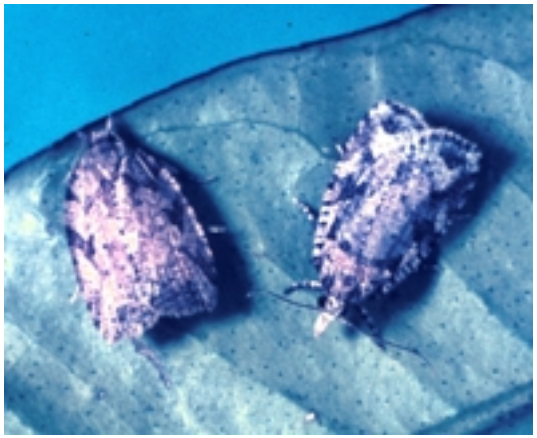


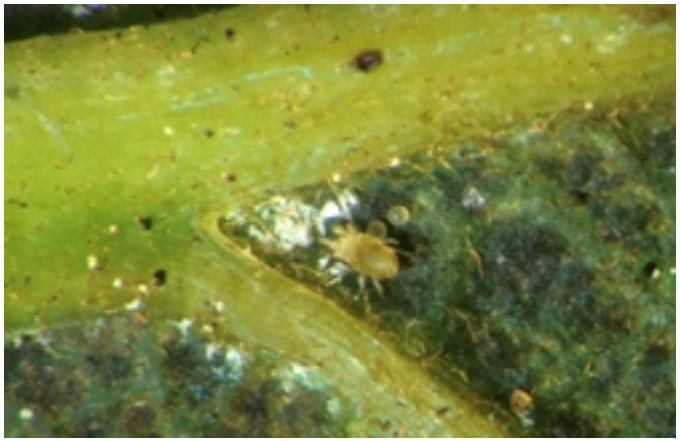
Making the IPM vision a reality

- To achieve the IPM vision involves many separate components
- Integration and implementation of the IPM vision needs to by a step-wise process
- Some of the components of the IPM system will require longer term research, while others can be achieved over the short term.
- It is important not to focus on the short-term components at the expense of those with a longer time frame
- The New Zealand avocado industry has started developing and implementing the components but there is still a long way to go

Pests of avocado in New Zealand

- Leafrollers
- Greenhouse thrips
- Armoured scale
- Six-spotted mite





Leafrollers

- Predominantly the endemic brownheaded leafroller *Ctenopseustis obliquana*.

- If no sprays are applied up to 30% of fruit can be damaged.

- Live larvae/eggs on harvested fruit unacceptable

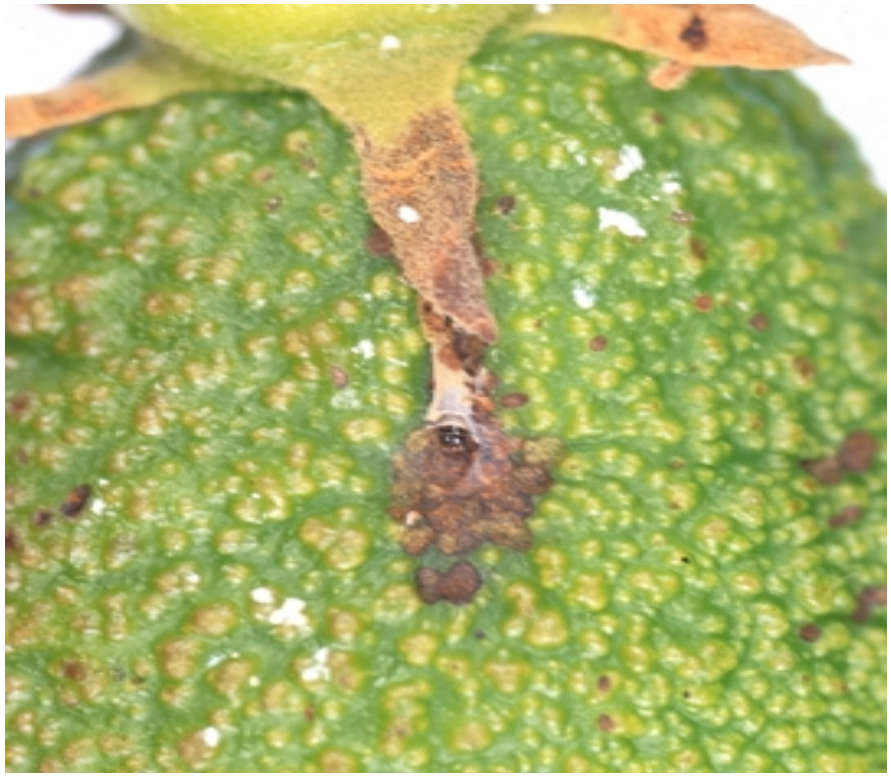
Control of leafrollers in IPM

- The pest ecology is reasonable well established and the critical time of the season for prevention of damage is known.

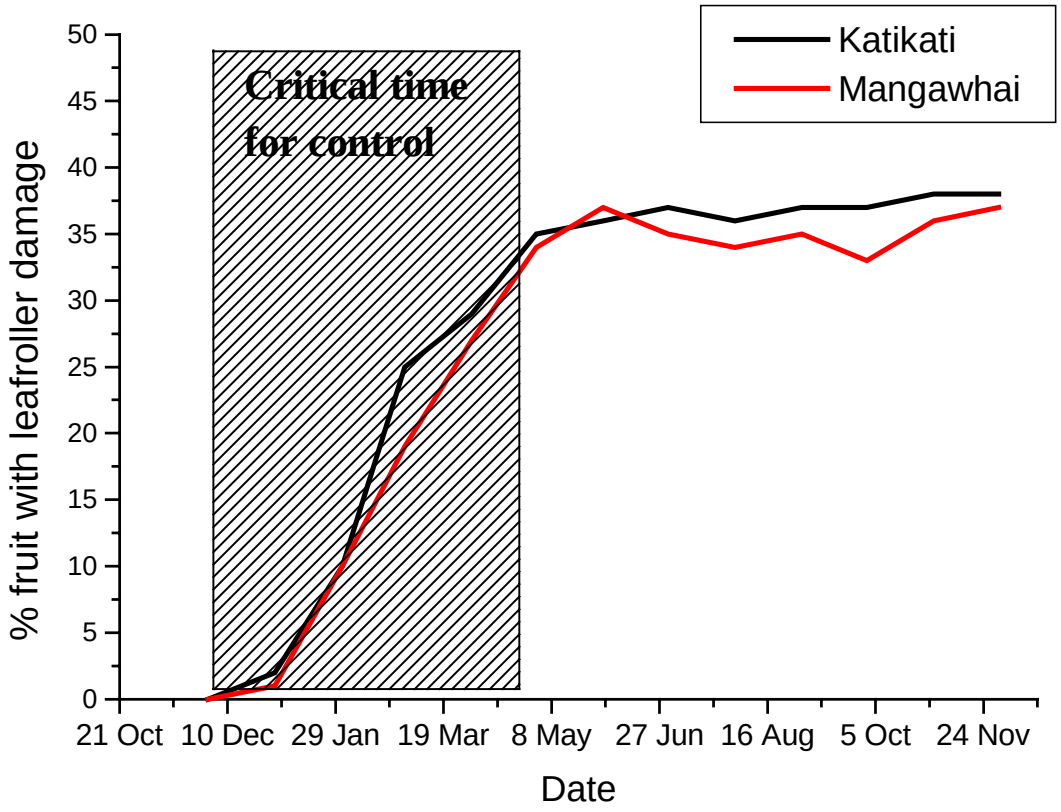
- Selective products are available (Bt, tebufenozide, spinosad).

- A simple scouting system has been developed and tested. Pheromones are known and traps are available.

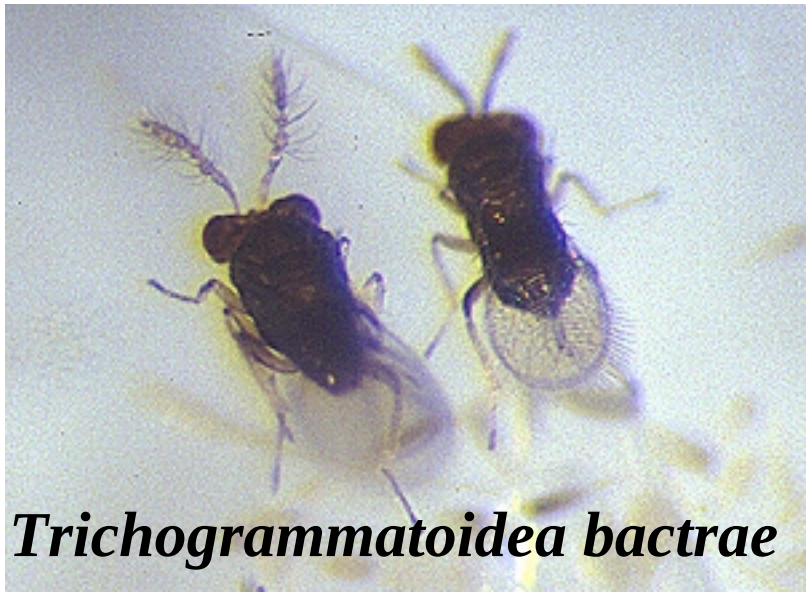
- A range of natural enemies are present



Timing of leafroller damage to avocados



Trigonospila brevifacies



Trichogrammatoidea bactrae

Controlling leafrollers in the future

- Scouting for presence of larvae and natural enemies
- Spray threshold using pest/beneficial data
- Routine use of selective products
- Enhancement/conservation of biological control agents.

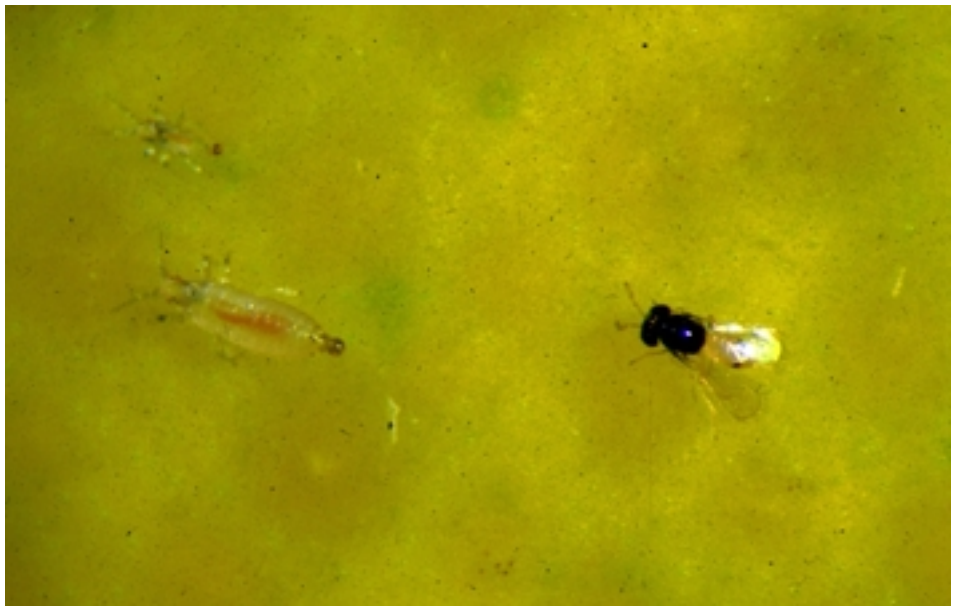
Greenhouse thrips

- *Heliothrips haemorrhoidalis* is a cosmopolitan species
- Feeding causes skin blemishs to avocado fruit

Controlling Greenhouse thrips in IPM

- The ecology of greenhouse thrips in NZ is less well known than for leafrollers
- Recent research has aimed to determine damage periods and develop the basis for scouting systems and spray thresholds, identify effective pesticides, and introduce a new biological control agent

Thripobius semiluteus



The introduction of a new biocontrol agent

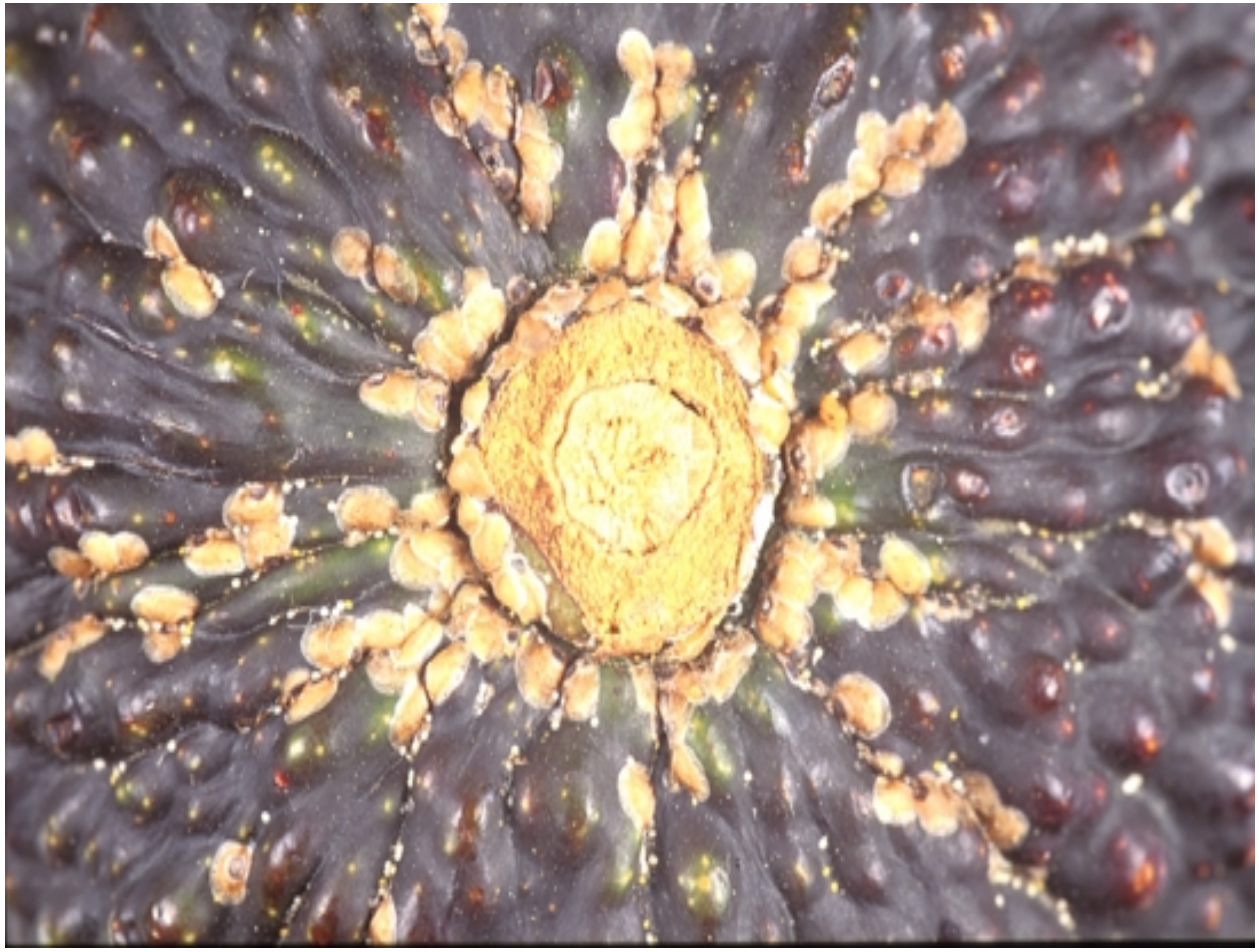
- Prior to 2000 no parasitoids of greenhouse thrips were present in New Zealand
- Thripobius had already been introduced into California from Australia, and subsequently from California, to Israel and Europe.
- In late 2000 Thripobius was introduced into New Zealand from a colony in Italy.
- In February/March 2001, approximately 75,000 parasitoids were released in Gisborne, the Bay of Plenty, and Northland.

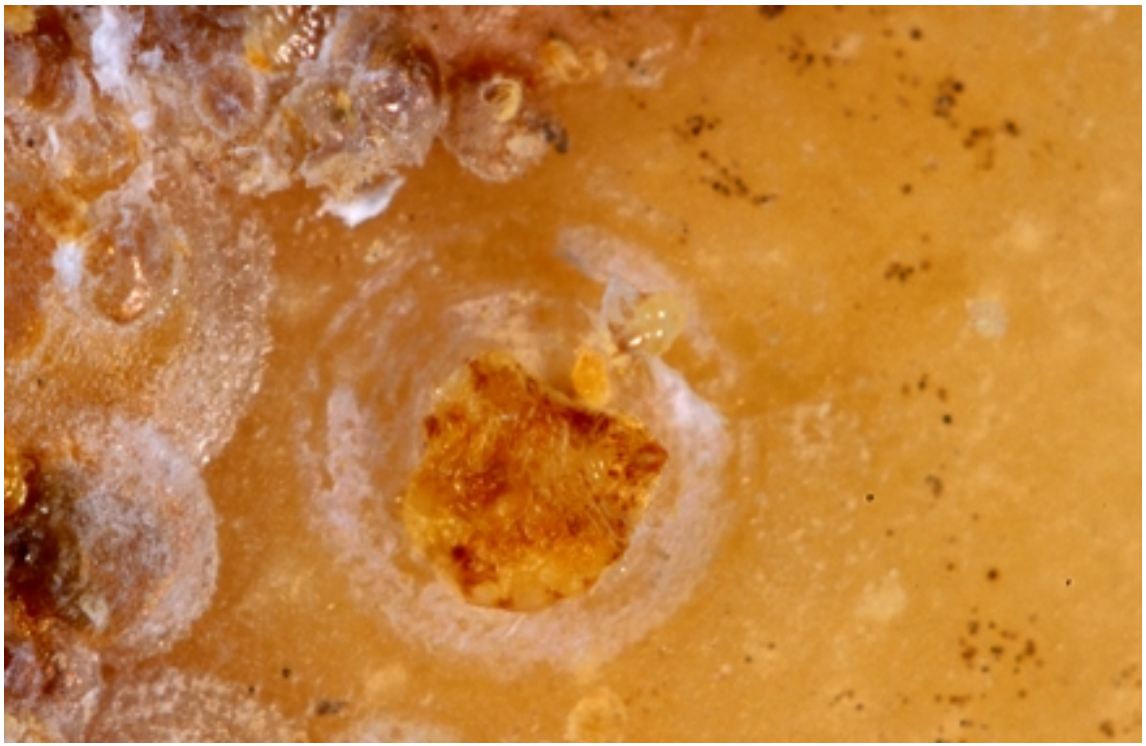
Controlling greenhouse thrips in the future

- Pest and beneficial scouting
- ‘Soft’ sprays with minimal impact on biocontrol agents
- Releases of biocontrol agents if needed
- Resistant trees? (reports of some indian root stocks conferring greenhouse thrips resistance to Hass avocados)

Armoured scale

- Latania scale *Hemberlesia lataniae*
- The ecology of scale on avocado in New Zealand is not well known.





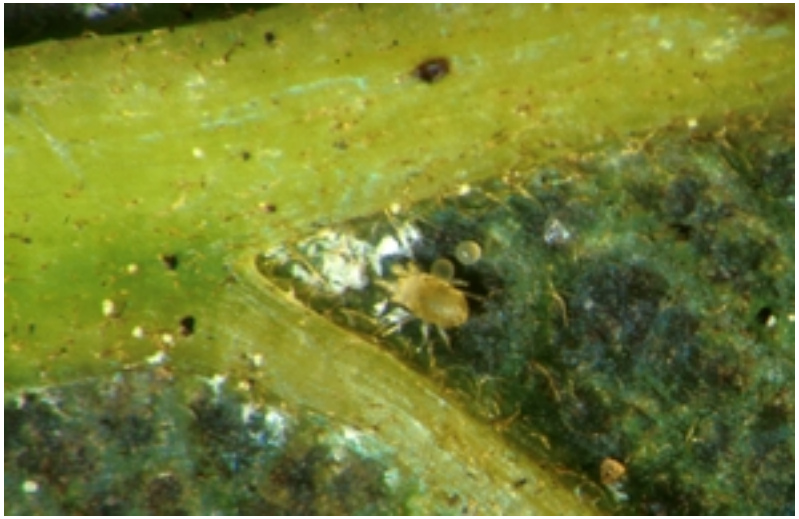
Controlling Armoured scale in IPM

- Need to develop a scouting system
- Need new more selective means of control - Oil, IGR's.
- Enhancement of biological control. Establishment of *Hemisarcoptes coccophagous* in northland and the far north.

Six-spotted mites in avocado

Eotetranychus sexmalulatus

Cause massive defoliation of trees



Controlling six-spotted mites in IPM

- Little is known about six-spotted mites
- Need to understand basic ecology, natural enemies, factors causing outbreaks (prevention rather than cure)
- Need efficient scouting systems and action thresholds
- Need options for control - chemical/biological (no pesticides registered from control of mites in avocado)

Are mite outbreaks caused by pesticides?

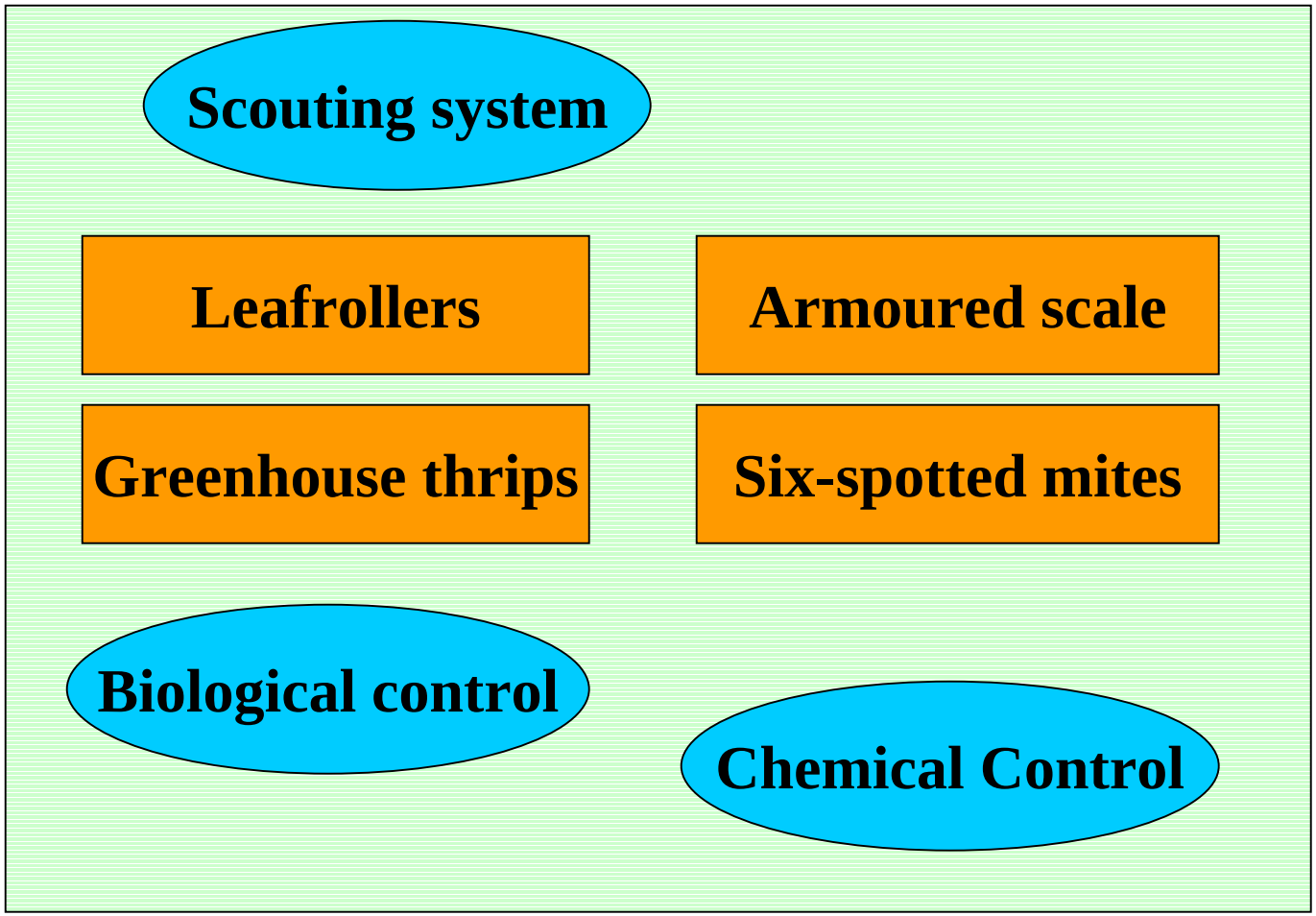
Numbers of mites per leaf and % leaves infested with six-spotted mites after 7 months spray programme divergence (leaves sampled 22 May 2001)

Spray regime	mites/leaf	% infested leaves
1% Oil	3.3	53.8
2% Oil	6.2	49.4
Malathion	3.6	49.3
Averte	20.2	98.0
Unsprayed	1.5	32.5

Control of Six-spotted mite in IPM

- Scouting system and action thresholds
- Good understanding of factors causing outbreaks
- A resistance management programme including a choice of different miticides
- Knowledge of the important natural enemies and compatibility with pesticides
- Predators commercially available

IPM for NZ avocados



Implementation of IPM in New Zealand

- Implementation of AvoGreen™ will be a cooperative effort between growers, scouts, grower organisations, researchers, Agchem companies, biocontrol companies.

- However, the avocado growers organisations will lead and manage the process

- An accreditation system will ensure minimum standards

In the future

- All growers will have access to professional pest scouts that are committed to the industry

- A greater range of selective products will be available to enable control of pests without disrupting biological control agents.

- Key biological control agents will be commercially available, and their compatibility with pesticides will be known.

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