

Carob moth- the forgotten grub

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18th Australian Almond Conference

Pullman Hotel Melbourne, Albert Park, Victoria October 30th - November 1st, 2018

Carob moth - the forgotten grub

- 18th Australian Almond Conference October 30th - November 1st, 20
- Overview of carob moth as a pest in Australian almonds
- Management of carob moth- what we already know and what we still need to learn
 - Orchard hygiene
 - Pesticides
 - Mating disruption
 - Trapping
 - Biocontrol



Carob moth - the forgotten grub

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- Industry focus has shifted from carob moth to carpophilus beetle
- Carob moth damage to nonpareil for 2017 & 2018 harvests averaged around 1%, with 4% on some farms



Carob moth - the forgotten grub

- Ectomyelois (=Apomyelois) ceratoniae
 - Family Pyralidae (NOW & IMM)
 - Mediterranean origin
 - Global pest of economic crops
 - Carob, dates, citrus, stone fruit, pistachio, pomegranate, macadamia, almonds...
 - Alternative host for seasonal carry-over







Carob moth in Australian almonds



- Mummy nuts = alternative host
 - Only resource for 9-10 months









Carob moth in Australian almonds



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Carob moth seasonal distribution in almonds

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Carob moth seasonal distribution in almonds



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Carob moth seasonal distribution in almonds

Contraction of the second seco



- Distribution of mummy infestation vs new crop damage
- Effective sampling patterns

	Row	518	512	506	500	494	488	482	476	470	464	458	452	446	440
Tree															
1		20%	40%	0%	50%	0%	20%	40%	20%	0%	20%	30%	20%	60%	30%
2		40%	60%	10%	10%	40%	20%	30%	10%	10%	30%	20%	10%	30%	20%
3		20%	40%	40%	30%	30%	30%	20%	10%	20%	50%	20%	20%	10%	20%
4		30%	20%	10%	10%	30%	30%	20%	20%	10%	0%	50%	30%	30%	20%
5		20%	10%	40%	50%	10%	10%	40%	20%	30%	40%	20%	10%	30%	10%
6		10%	40%	80%	20%	20%	40%	10%	20%	30%	30%	20%	10%	20%	30%
7		30%	10%	0%	20%	40%	60%	0%	20%	20%	30%	20%	0%	30%	20%
8		20%	30%	0%	30%	20%	40%	50%	40%	20%	10%	10%	10%	10%	20%
9		10%	30%	30%	50%	10%	20%	20%	10%	30%	20%	0%	10%	20%	50%
10		10%		30%		0%		30%		30%		30%		30%	

Carob moth management: Orchard hygiene



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Carob moth management: Orchard hygiene

- Mummy nut threshold
 - Winter surveys of mummy numbers
 - Harvest assessments of new crop damage levels



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Carob moth management: Pesticides

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- Emergency permit in 2011
- Chlorantraniliprole & Methoxyfenozide registered
- Some success in reducing carob moth population and kernel damage
- Issues of concern
 - Cost effectiveness?
 - Off-target effects?
 - Application efficiency?



- When to apply?

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- Spring generation & hull split to harvest approx 8 weeks

Carob moth management: Pesticides





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Carob moth management: Pesticides

Carob moth management: Mating disruption



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- Disrupts pheromone signals that allow male moths to locate females
- Mixed results in Australian almonds





Carob moth management: Female traps

- Potential for improved monitoring & mass attract and kill system
 - Identify baits attractive to female moths
 - Analyse volatiles from baits
 - Formulate and test lures









Carob moth management: Biological control

- Natural enemies
 - Predatory bugs, red and blue beetle, lacewing larvae, earwigs

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Parasitic wasps



Carob moth management: Biological control

- Trichogramma wasps
 - Commercial product
 - Parasitise carob moth eggs
 - Effectiveness in an orchard environment being assessed









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Field test for parasitism

Trichogramma wasp

Healthy - - carob moth eggs - - parasitised

Carob moth: Summary





- Carob moth has not been replaced by carpophilus beetle
 - A serious pest in its own right
 - Sustained by large populations of mummy nuts
- Potential management options
 - Orchard hygiene (required, regardless of other options)
 - Pesticides
 - Mating disruption
 - Female moth lures
 - Biological control

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Project Team

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