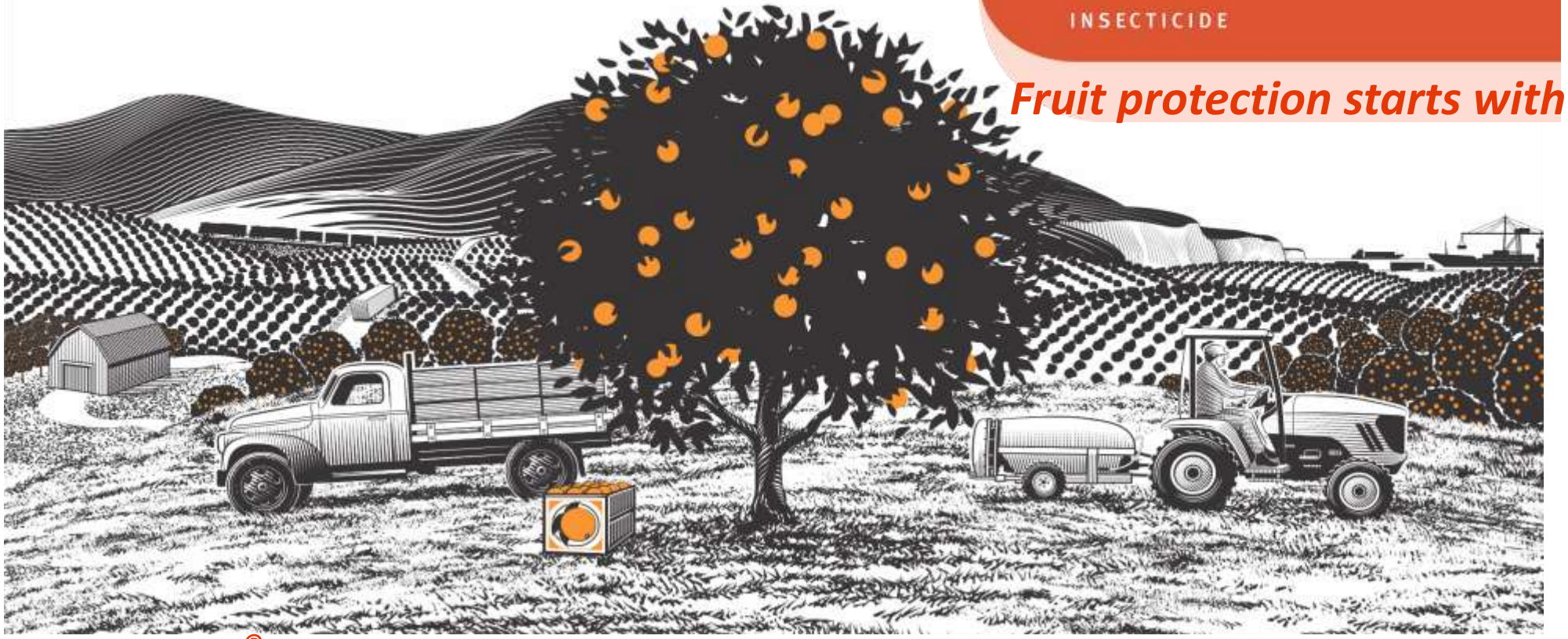
Citrus Australia Technical Forum

6th March 2019

Exirel®
INSECTICIDE

Fruit protection starts with Exirel®



Exirel® - a practical example for the management of insecticide resistance in Fuller's rose weevil

Geoff Cornwell, FMC Australasia

FMC

Exirel® Provides Outstanding & Extended Crop Protection

When applied early in pest infestation cycle, Exirel® helps to keep pest populations below damaging levels

Exirel® provides:

- Unique cross-spectrum activity on a range of key chewing and rasping pests in Citrus
- Impact on multiple life stages including pest reproduction
- Rapid feeding cessation and immediate crop protection from feeding damage
- Translaminar activity and local translocation aiding coverage and control of pests in hidden feeding sites
- A new MOA for pests in Citrus – and is effective against pests resistant to other insecticides
- A new tool for helping to manage Fuller's rose weevil incursions in Citrus destined for the **Korea China Thailand** export market

Exirel® - Labeled Pests

Exirel® provides unique cross-spectrum activity

on a range of chewing and rasping pests in Citrus

- Chewing Pests
  - Light brown apple moth (*Epiphyas postvittana*)
  - Fuller's rose weevil (*Asynonychus cervinus*) – suppression only

- Rasping Pests
  - Kelly's citrus thrips (*Pezothrips kellyanus*)

Kelly's citrus thrips

Light brown apple moth

Fuller's rose weevil

Exirel® - Label Directions for Citrus

CROP	PEST	RATE/HA	WHP	CRITICAL COMMENTS
Citrus	Rasping pest; Kelly's citrus thrips (*Pezothrips kellyanus*) Chewing pests; Light brown apple moth (*Epiphyas postvittana*) Fuller's rose weevil (*Asynonychus cervinus*) **(Suppression only)**	**Dilute spraying:** 75 mL/100 L **DO NOT** apply more than 3 L/ha **Concentrate spraying:** Refer to Mixing / Application section (**DO NOT** add a Surfactant / Wetting agent)	NIL	A maximum of two (2) applications are to be applied to any one crop per season. Monitor crops from flowering onwards for the presence of Kelly's citrus thrips and Lightbrown apple moth. Apply Exirel®, after flowering, once local pest thresholds are reached. A single application may be suitable where pest pressure is low. Continue to monitor crops and where thrips pressure is moderate to high, apply a second application, no less than 14 days after the first and prior to calyx closure. Fuller's rose weevil: Monitor for weevil emergence. Continue monitoring after spraying. Time at least one application to occur prior to the start of egg lay which usually occurs from late summer and through autumn. **DO NOT** retreat within fourteen (14) days. The use of Exirel® should be used in conjunction with other weevil control measures. **DO NOT** use for trunk band spraying.

This means a water volume of no more than 4,000 L/ha

Recommendations for Exirel® control of Fuller's Rose Weevil in citrus:

Season	Location	FRW pressure	Data statistically analysed	How did Exirel® programs compare to Trunk Band Spray's?
2015-16	Coomealla, Sunraysia	Moderate	No	Not compared
2016-17	Coomealla, Sunraysia	Low	No	Trend of better performance
	Griffith, Riverina	High	Yes	Performed significantly better
2017-18	Paringa, Riverland	High	Yes	Performed equally well
	Nangiloc, Sunraysia	High	Yes	Performed equally well
	Wamoon, Riverina	Low - moderate	Yes	Performed equally well

- A range of Exirel® spray timings ie. early (Nov) vs late (Jan → March) and spray frequencies (1 or 2) were evaluated across the six (6) trials and there was little difference in performance between any of the regimes. All performed similarly and well in preventing FRW egg lays under orange calyx's at harvest.
- Use a two spray Exirel® program under high insect pressure scenarios.
- Target at least one Exirel® spray just prior to peak adult weevil emergence so as to maximise efficacy.
- A minimum period of 1 week should be allowed after an Exirel® application to ensure adult weevil mortality.
- Budget on additional applications of insecticides for mealy bug and red scale control during the season, where Exirel® is used in a spray program for FRW control.

Exirel® - Spray Timing to Protect Your Citrus from Fuller's rose weevil

Pests	May-mid August Floral induction & initiation.	September Flowering & fruit set.	October Flowering & fruit set.	November Flowering & fruit set.	December	January	February	March	April Fruit maturation	May Fruit maturation	June Fruit maturation
Chewing pests											
Fuller's Rose Weevil (*Asynonychus cervinus*)						Peak adult emergence					

AUE-13-101. Lane orange. FRW damage. Monak, NSW. R&D Solutions.

Use Exirel® here for KCT, LBAM, FRW

Apply up to 2 consecutive Exirel® applications no less than 14 days apart

Trial work conducted over the last three seasons (2015-16, 2016-17 & 2017-18) indicates that Exirel® has reasonable spray timing flexibility for effective control of Fuller's rose weevil, in order to pass Korea/China/Thailand inspection protocols both in February and at harvest. The most reliable Exirel® program was an early season application (around calyx closure) followed by a second application in early February.

Exirel® - Responsible Resistance Management in Citrus

Organophosphate resistant populations have been documented in Australia

Risk of resistance development-

Light brown apple moth	low
Kelly's citrus thrips	moderate
Fuller's rose weevil	moderate

Exirel® & responsible resistance management in Citrus

Industry agronomists and consultants to keep FMC informed of any control failures so cause can be investigated.

Maximum of **two (2) applications** per crop per season.
Works best when applied **back to back**, limiting exposure to **one generation** of insect where applicable.

New mode of action with no known cross resistance.
New tool for the control of chewing and rasping pests in Citrus.
Has the potential to take the selection pressure off older MOA's.
Use in conjunction with other FRW control methods eg. orchard hygiene & different modes of action insecticides.

Insecticide Resistance Management Principles for Exirel®

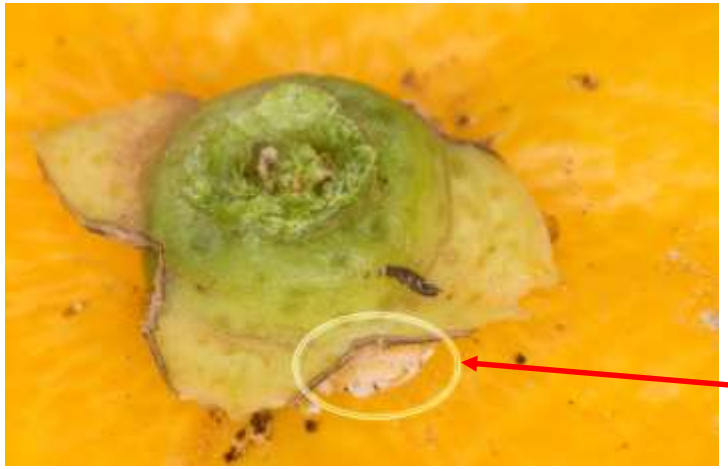
- Exirel® is a **GROUP 28 INSECTICIDE**
- To help prevent the development of resistance to Exirel® insecticide, observe the following instructions:

  - Apply Exirel® using a "window" approach to avoid exposure of consecutive insect pest generations to the same mode of action
  - Successive applications of Exirel® are acceptable if they are used to treat a single insect generation. Apply a **maximum** of two applications of Exirel® per crop
  - Following a "window" of Exirel® rotate to a "window" of applications of effective insecticides with a different mode of action
  - The total exposure period of Group 28 active windows applied throughout the crop cycle (from fruit set to harvest) should not exceed 50% of the crop cycle
  - Incorporate IPM techniques into the overall pest management program
  - Monitor insect populations for loss of field efficacy

Current registered products for FRW management in citrus:

Treatment	Application method	Number allowable applications per season	Harvest WHP
Exirel®	Cover spray (foliar)	Two	0
Karate Zeon* + Bond + Surround	Trunk Band Spray	No restriction but typically 2 - 4 per season	4 weeks
Samurai Systemic Insecticide*	Micro-irrigation. Apply 2 weeks after flowering has finished (petal drop).	One	20 weeks

Source: APVMA Pubcris, Feb 2019

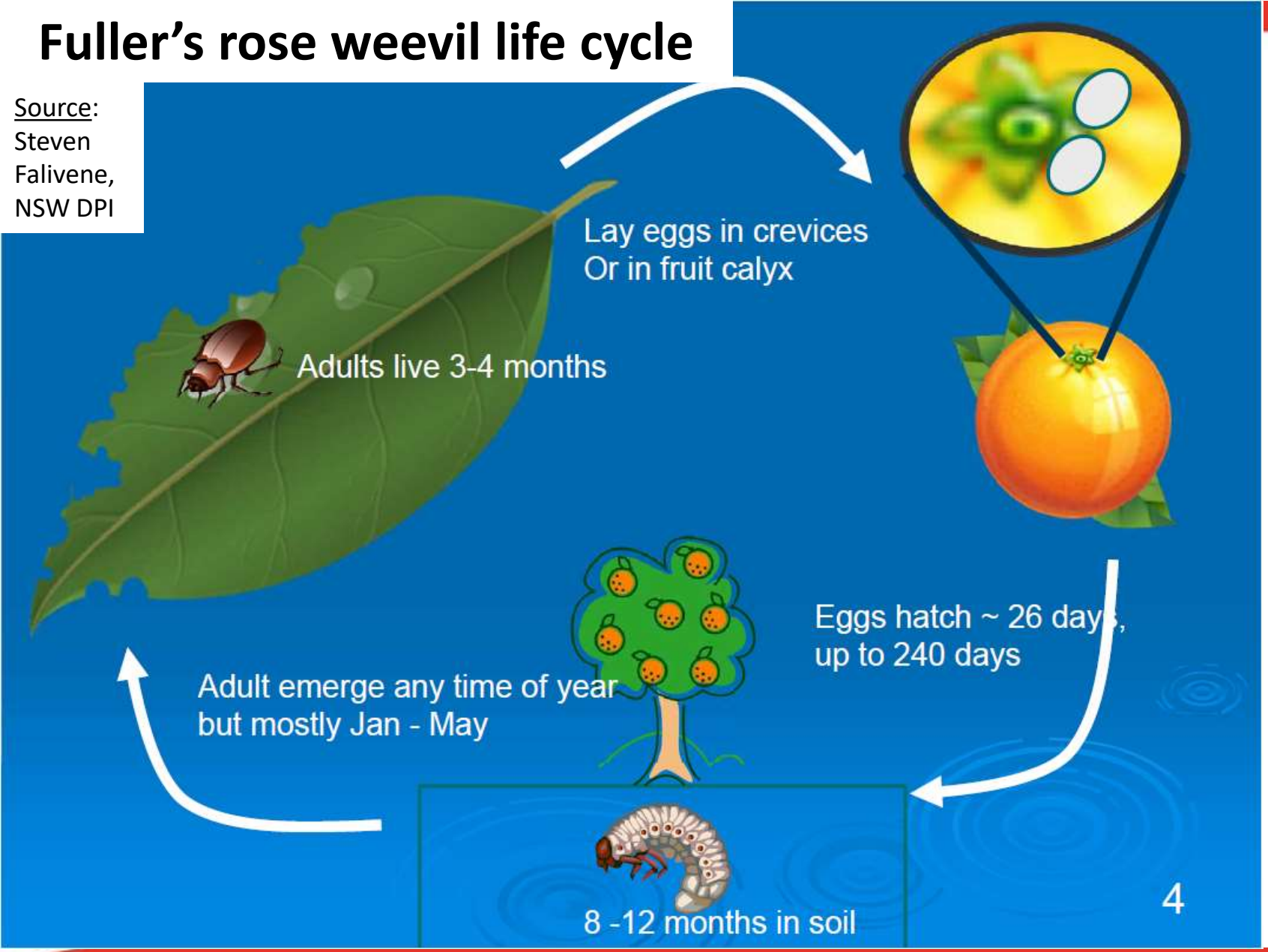


FRW egg raft under orange calyx. The industry issue.

Source: FRW management by Jianhua Mo & Steven Falivene, NSW DPI

Fuller's rose weevil life cycle

Source: Steven Falivene, NSW DPI



FRW fun facts-

- Adult egg rafts under the calyx cause the problem in citrus fruit
- Native to South America "+"
- Adults are flightless "+"
- Adults are exceptionally long lived (up to 210 days) "-"
- Adults emerge from soil mostly January – mid April
- All adults are female & reproduce without mating "+"

Source: FRW management by Jianhua Mo & Steven Falivene, NSW DPI

FRW – pest with moderate risk of resistance development

Responsible Insecticide Resistance Management in Citrus

- An integrated approach is required for controlling all pests in citrus focusing on biological and cultural methods in the first instance.
- When these techniques need a helping hand or support, then where possible, selective chemical control methods should be implemented.
- Fuller's rose weevil is an example of a pest in citrus where chemical intervention is required to produce saleable fruit for the export markets.
- So as to avoid the development of insecticide resistance and to maintain the effectiveness of the registered chemical options for FRW into the future, it is recommended they be used in rotation <u>within</u> and <u>between</u> seasons across the citrus landscape.
  - There are now **three** different **mode of action insecticides** registered for management of Fuller's rose weevil in Australian citrus so the opportunity now exists for the industry to implement sound Insecticide Resistance Management Strategies.

Thank you for your attention.
Questions?

Exirel®
INSECTICIDE

ALWAYS REFER TO THE PRODUCT LABEL BEFORE USE

All information in this presentation is current as at February 2019

FMC