

Prophylactic spraying of growth regulators pyriproxyfen and s-methoprene over an area of 850,000 ha – is that safe?

Dr Conny Turni

Baits used by the
National Fire Ant
Eradication
Program



Small pieces of corn grit soaked in soybean oil mixed with a broad spectrum growth regulator either s-methoprene or pyriproxyfen.

Broad spectrum means it is not specific for fire ants but for all arthropods.

The claim is that other animals do not eat the baits.

A study on five native ant species found that they also pick up the baits.



COMPARATIVE ATTRACTIVENESS OF TWO PYRIPROXYFEN-BASED ANT BAITES (DISTANCE® AND DISTANCE® PLUS) TO INVASIVE AND NUISANCE ANTS IN AUSTRALIA

G.A. Webb

- Over the past 10 years, various modifications to the standard corn and oil formulation in Distance® have been investigated to improve attractiveness for a wider range of ant species than just the original key target species, red imported fire ant.
- The remaining 5 species or species-groups (green tree ant, meat ants, greenhead ant, black ants and pale tyrant ant) are native to Australia and to varying extents constitute a nuisance to agriculture or human lifestyle (Gerozisis et al. 2008).

This program is helping the fire ants to establish

- One hypothesis suggests that, by also killing native ants, mass pesticide application reduced competitive burdens thereby enabling fire ants to invade more quickly than they would in the absence of management.
- Fire ant newly mated queens select open, human- altered ecosystems for founding new colonies
- By landing in disturbed habitat with its reduced native ant population, newly mated fire ants queens increase their chances of successful colony establishment.

2017

**The Red Imported Fire Ant: The Visitor Who Wouldn't Leave. A
brief overview of the control of *Solenopsis invicta* in the United
States**

Melissa Brown

- The thesis by Melissa Brown for her Masters in 2017 reported on the situation in America, where eradication of the fire ant has been unsuccessful, on the contrary the overuse of insecticides has exacerbated the fire ant problem.

Entomologist - Professor Joshua King from the University of Central Florida

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To whom it may concern,

I am writing regarding concerns that I have about the ongoing red imported fire ant (*Solenopsis invicta*) plan as conceived and currently being carried out by the National Management Group's *National Fire Ant Eradication Program* and the Queensland Government and Biosecurity Queensland's *Fire Ant Suppression Taskforce* in Queensland and potentially other areas (e.g. New South Wales) in eastern Australia. As a point of reference, I and my research group have one of the most active, continuously (US) federally-funded research programs in the world with the specific aims of understanding the biology and ecology of fire ants and how fire ants interact with species in the ecosystems they invade. We work to translate our understanding of fire ant ecology into effective, real-world management solutions to problems associated with fire ant invasion. As such, I have also developed the only non-toxic management technology for fire ants that is currently in use in the US managing fire ant populations in sensitive environments (Environmentally safe insect control system. U.S. Patent No. 10,716,302. Inventor: Joshua R. King. Issued July 21, 2020) and in defense of threatened and endangered wildlife affected by fire ants. In short, I bring decades of experience with real-world interactions with fire ants in a variety of natural and human-modified environments in a region (the southeastern US) that has been entirely invaded by fire ants for more than 50 years.

My concerns with the fire ant eradication programs that are ongoing and developing in Queensland and New South Wales are focused on two issues:

- 1) Excessive, potentially ecologically harmful over-application of toxic baits.
- 2) Lack of alternative management approaches and tools other than widespread application

- One of the specific issues of concern is that the toxic, prophylactic baiting is being conducted across the landscape, ignoring the reality of where fire ants are most likely to occur. The distribution of fire ants across the landscape is very predictable and ignoring what is known of their dispersal patterns and behavior during dispersal risks wasting time and resources (baiting in areas where fire ants are likely to never occur) as well as increasing the likelihood of non-target impacts. Fire ants thrive in early successional habitats (roadsides, suburban, and urban habitats created by human activity) with moist soils (maintained naturally or through irrigation).
- No eradication program has ever succeeded in preventing fire ant establishment and spread over larger areas and longer time spans. This is not anecdotal but has unfortunately been repeatedly demonstrate

- Of particular concern is that the widespread and prophylactic use of toxic broadcast baits may impact non-target ants
- Reduction of native ant communities has repeatedly been shown to be a factor in hastening, not slowing, the invasion of fire ants as any potential biotic resistance is removed, and fire ants are especially good at dispersing into ant-free successional habitats. Additionally, the potential for other non-target impacts on aquatic and terrestrial arthropods and wildlife is not trivial. In sum, there seems to be little justification for a prophylactic baiting program that has great potential for non-target impacts and that may, in fact, hasten the establishment of fire ants over time.



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- A [document](#) about fire ants put forward to the Environment Minister by the Threatened Species Scientific Committee (TSSC), in which they made this statement:
- "The only Australian study reported to date on the impact of fire ants on biodiversity is on a Brisbane forest remnant (Natrass and Vanderwoude 2001)."
- "No nationally listed threatened species were investigated by the Brisbane study. Due to the paucity of biodiversity research currently developed, it is not possible to determine if the current infestation is adversely affecting any listed threatened species. Based on the current information provided and summarised above TSSC considers that there are currently no studies available which evaluate the effects of fire ants on listed species or ecological communities."



The commercial diet of chicken consist of corn and soybean oil, so why would wild poultry not eat this or any other birds.

Studies have found that s-methoprene is found in the tissue and eggs of chicken when consumed by chicken.

If cattle eat s-methoprene it is also contained in the tissue and in the milk.

There are a couple of moves that question the safety of this program.

What this means for organic and bio-dynamic producer

- We have worked with the Commonwealth DAFF to reduce production impacts for organic operators in our fire ant treatment areas.
- The waiting period for re-entry for organic and bio-dynamic products treated using products containing an [insect growth regulator](#) is now 3 weeks. This was previously 12 months.



APVMA changed the permit for s-methoprene

The second strange thing was that the APVMA changed the permit, PER90213, for s-methoprene

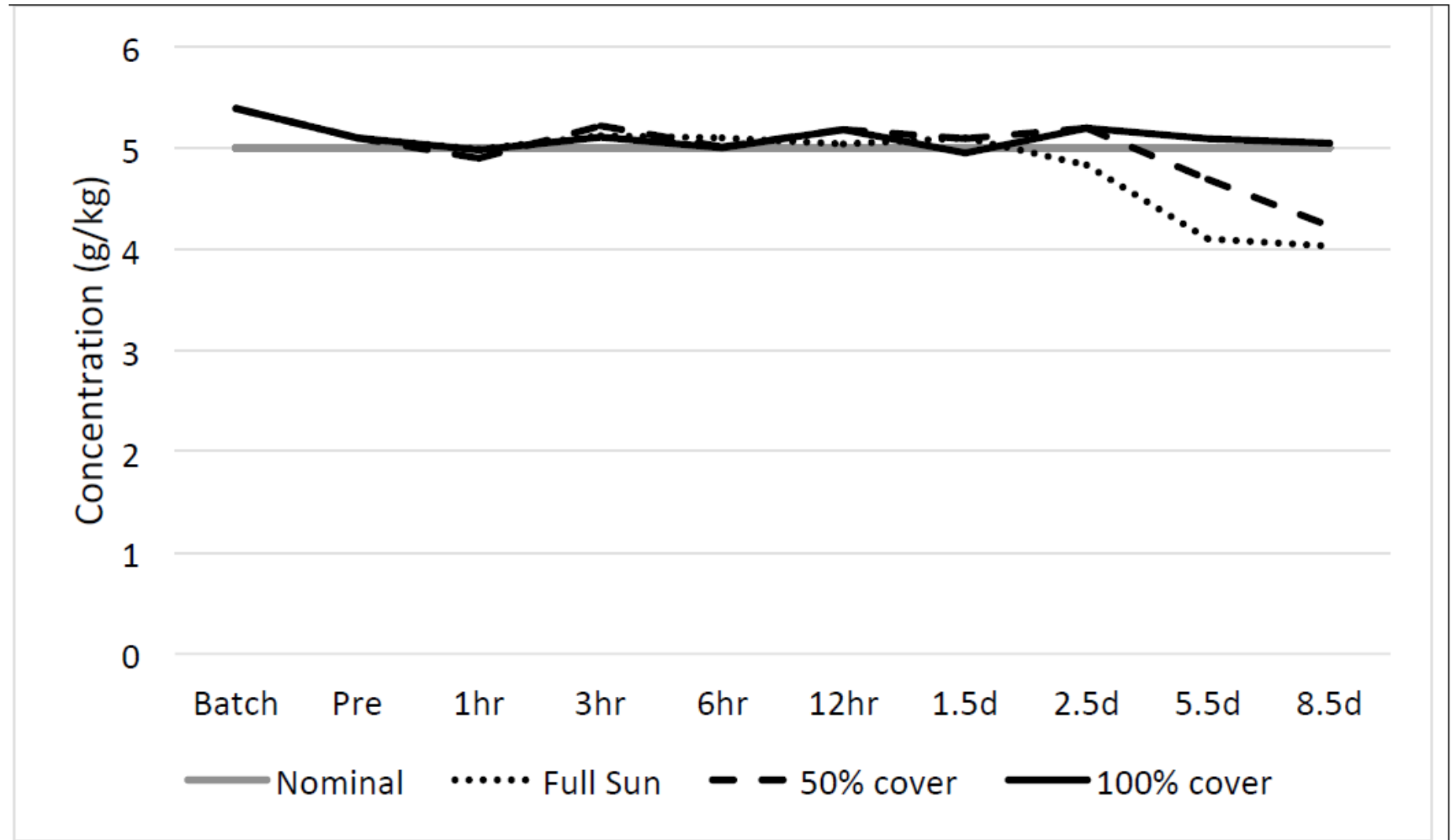
It used to say: “DO NOT apply if *fire ant populations are not evident or no longer evident.*”

They took this out. It now says: “**DO NOT apply where threatened invertebrate species and/or threatened ecological communities are present, except in the fire ant eradication zone**”.

Their claim is the insecticides degrade relatively quickly.

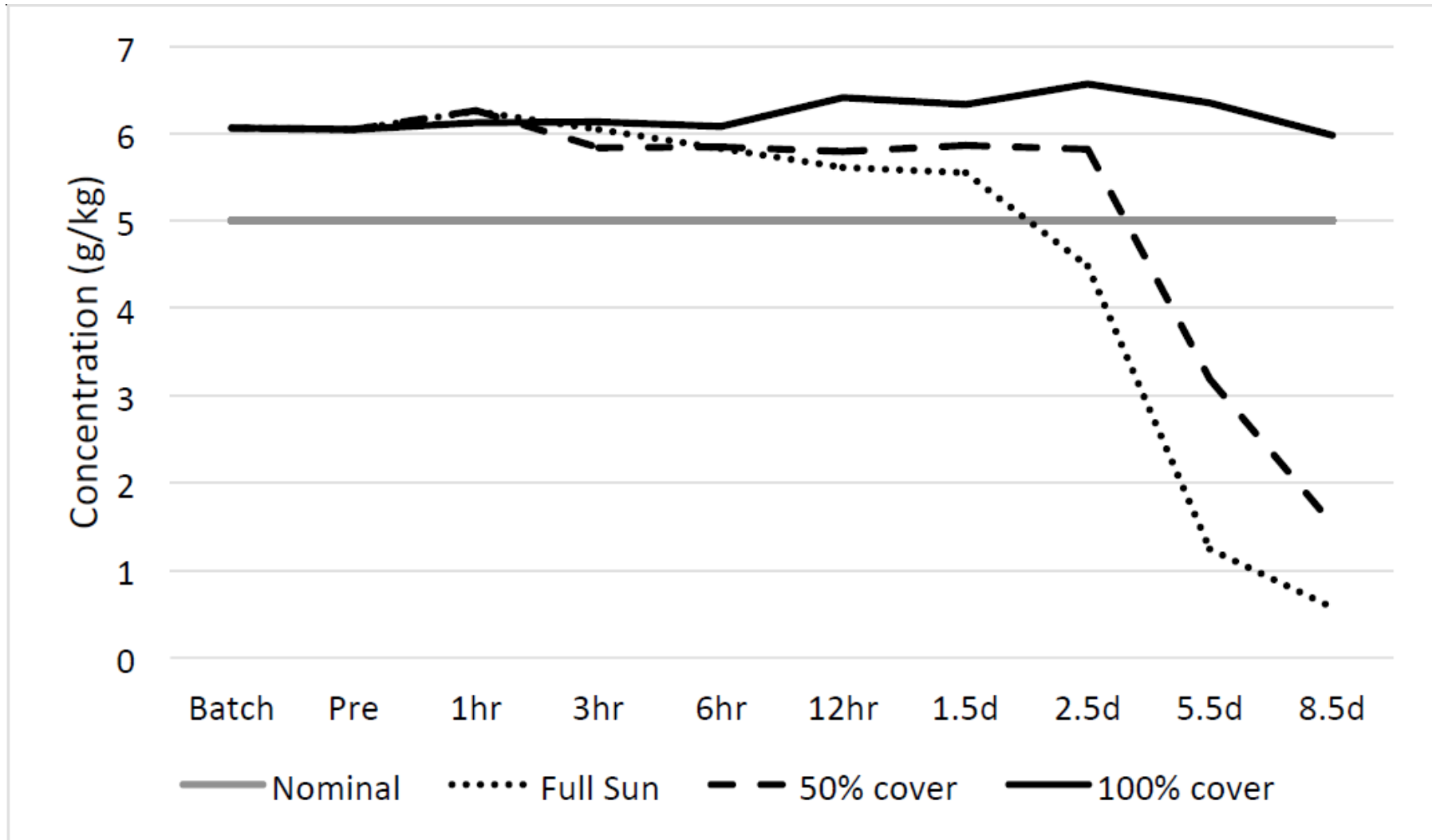
- A study assessed how quickly the active ingredients degrade when formulated into bait products. They looked at formulated baits containing the active ingredients pyriproxyfen, s-methoprene and hydramethylnon exposed to different levels of UV irradiation, rates of degradation varied substantially.
- The encapsulation of active ingredient within the bait matrix should provide some protection of the active ingredient from degradation processes, particularly UV exposure, but the extent of this protection has not been validated.

Degradation of active ingredient over time - pyriproxyfen. Pyriproxyfen was the most stable with relatively little decline in active ingredient content after 8.5 days - 10-20% from exposed and semi-exposed samples of Distance®



Degradation of active ingredient over time – s-Methoprene

Under fully shaded conditions, the concentration of s-methoprene in Engage did not decline at all. Under exposed and semi-exposed conditions significant decline occurred from 2.5 days onwards with declines of 91% and 75% respectively after 8.5 days.



Pyriproxyfen degrades into six metabolites most of which persisted for more than 30 days in soil. Metabolites C, E and F caused toxicity to soil enzymes. The toxicity of metabolites was far greater than the parent pyriproxyfen. Metabolites A, B, C, E and F are suggested to be “very toxic”; whereas, metabolites D has been counted under the “extremely toxic” category.

The degraded compounds of s-methoprene, such as S-methoprene acid, S-methoprene epoxide, 7-methoxycitronellal, and 7-methoxycitronellic acid affected the development of frog embryos while s-Methoprene did not.

There have been no proper studies done on the effect of these metabolites on the environment and the effect on animals.



Already out of the zone



Fire ants resurface as councils face up to \$15m containment bill

Fire ants have surfaced and been located northwest of Toowoomba by dogs trained to detect the foraging invasive pests.

The 1,275 described Australian ant species are essential for ecosystem health

- They help with soil aeration and turnover.
- Ants aid in seed dispersal by taking seeds into their tunnels.
- They consume organic material and provide food for other organisms.
- Ants control pest populations by preying on eggs and larvae.
- Their presence ensures a balanced flow of energy in ecosystems.



- A study spraying s-methoprene on wetland at 0.05 – 0.058 kg a.i/ha (fire ant program sprays at 0.008 to 0.010 kg a.i/ha) over three years six times during the spring and summer at 3-week intervals reduced insect density by 57 – 83% in year three, amounting to a biomass reduction of 50-83% during this test period (Niemi et al., 1999).
- Harmon et al. (1995) voiced concerns that s-methoprene and its derivatives, s-methoprene acid, may be able to affect vertebrate gene transcription. There is evidence that the compounds can bind to the retinoid X receptor. This would have developmental effects on amphibians, as retinoids act as ligands during vertebrate development.

In summary:

- This program is most likely to increase the fire ant populations
- It will have a detrimental effect on other ant species
- It is most likely to have a detrimental effect on other species, arthropods and higher order species, including birds
- As this toxin is stored in tissue and released in the milk it will affect grass eating animals.
- If it is found in the tissue, then it is most likely bio-accumulative. Which would mean over the constant spraying for two years the level will most likely be much higher than the “so called” safe levels
- The effect of growth regulators are not instant, and we will not see the effects instantly.

- Spraying a bait into an area where there are no fire ants will only increase the risk for non-target species.
- ‘The fire ant program website tells us that they will do monitoring after the two years of spraying via helicopter and ground crews.
- If they can find nests by helicopter, why can we then not have a targeted approach by just destroying the nests found during surveys?
- There are better ways to control fire ants, ways that do not endanger other species and do not harm the environment, which make sure our health is not affected.