

Are sterile insects the future of pest control?



Adult Queensland fruit fly (Qfly) in production during egg laying. Inset: Qfly laying eggs in factory

The Sterile Insect Technique was successfully used to eradicate Queensland fruit fly from SA's Riverland region in 2019. The technology has the potential to target insect pests that threaten Australian viticulture, as **Cindie Smart** writes.

With pressure mounting on farmers to use fewer chemicals to control pests, the search for environmentally friendly pest control systems is intensifying.

The Sterile Insect Technique (SIT) is gaining momentum in Australia as a way to control fruit fly, with success eradicating outbreaks in South Australia, and reducing pest pressure in Western Australia, Victoria and New South Wales. And it may have applications to other pests that threaten viticultural industries.

SIT is a method of biological insect control that sees large numbers of sterile male insects bred and released into the wild to mate with females, who produce no offspring. As a result, the next generation's population is reduced. Repeated release of sterile males can

reduce and, in some cases, eliminate pest populations.

Raymond Bushland and Edward Knipling in the United States were among the first to use SIT in the mid-1900s to eliminate screwworm flies, which were infecting open wounds on cattle.

Knipling developed the theory of autocidal control – breaking the pest's reproductive cycle. Bushland and Knipling investigated ways to breed flies in a factory setting, and to find an effective way to sterilise them via x-ray. The program was a success and while the method has been refined, it is still used today.

SIT has been used to control outbreaks of Mexican fruit fly in northern Mexico, tsetse fly in Zanzibar, Mediterranean fruit fly in Chile, Argentina, Peru,

Mexico, Croatia, Israel, South Africa and Spain, codling moth in Canada, pink bollworm in the USA and Mexico, false codling moth in South Africa, cactus moth in Mexico, melon fly in Japan and onion fly in the Netherlands. It is also being used for mosquito control to reduce malaria and dengue fever.

In Australia, SIT was successfully used to eradicate Queensland fruit fly (Qfly) from the Riverland region in 2019. Millions of sterile flies were bred in the Port Augusta based National Sterile Insect Technology facility before being released aerially by plane into the region.

SIT releases, along with baiting and hygiene operations, comprised the eradication response undertaken by the department of Primary Industries and Regions South Australia. "An eradication response involving SIT, hygiene and

The Ultimate Pruning Wound Defence

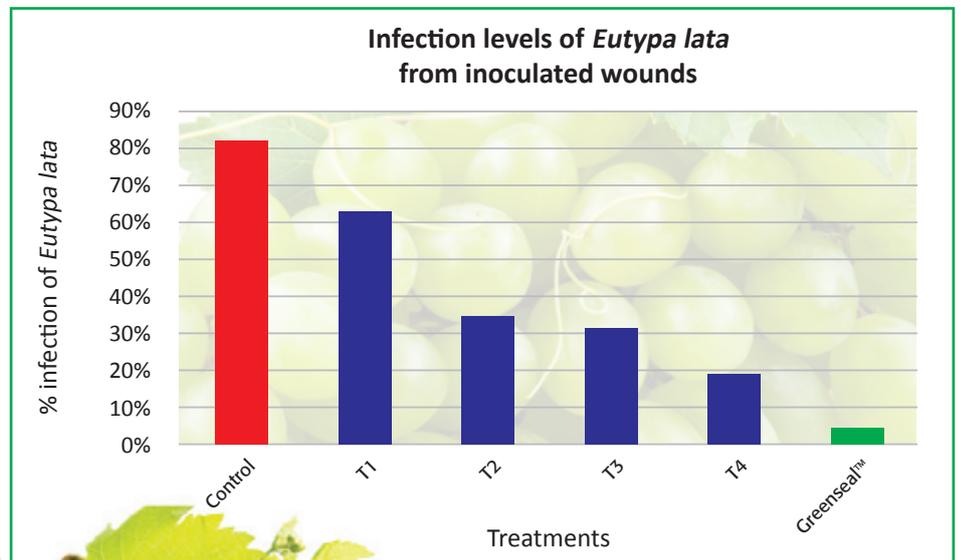


GREENSEAL™

Registered for *Eutypa* dieback of grapevines & silver leaf on apples & cherries.

Hand applicator included

- Fungicidal pruning/wound dressing for larger wounds
- Easy to apply, dries quickly
- Rainfast
- Flexible & tough rubber like acrylic resin
- Powerful fungicide



03 5133 9118

www.omnia.com.au



omnia
NUTRIOLOGY*

*the science of growing



Queensland fruit fly on a peach

baiting operations is regarded as the best method to effectively eliminate fruit flies,” said South Australia’s chief plant health manager, Dr Ross Meffin.

The technology has also been used in the Cobram region which straddles the Victorian and New South Wales border. Two million sterile Qfly have been released over Cobram each week from December 2019 until April 2020, in a bid to disrupt the pest and reduce its spread.

“Our SITPlus program is based on similarly successful international programs,” said SITPlus program director Dan Ryan.

“SIT really is the ultimate in pest management. We’ve managed to breed really healthy flies for release here in Australia. Our flies are surviving for up to six months or more in the wild, which is quite unusual. This longevity is the outcome of significant research into diet, rearing conditions and release protocols, as well as strict hygiene in the factory.

“And the success rate when used in outbreak situations has been great. Every time we’ve used them in Australia, we’ve been successful and in the minimum time.”

Absence of chemicals

Ryan says the biggest benefit is the absence of chemicals used in SIT, which means it can be used in urban environments where Qfly often hides before moving into horticultural regions.

“You can’t spray chemicals in urban areas and the community isn’t keen on baits, so this is an excellent tool,” Ryan said.

“The technology could easily be adapted to insects that pose a direct threat to the viticultural industries, such as brown marmorated stink bugs.

- Dan Ryan

“And we know from international experience that SIT can be used across a range of insects. The technology could easily be adapted to insects that pose a direct threat to the viticultural industries, such as brown marmorated stink bugs. We’re well equipped.”

As well as being used for eradication, SIT can be used for exclusion and suppression of pests.

“Sterile insects can be released around the boundary of an area we want to protect or to create a buffer zone, for example, between the Sunraysia and Riverland areas,” Ryan said.



SITPlus program larvae tray

“And another use for SIT is suppression in an area where there are established low numbers of fruit flies, such as Cobram.”

The SITPlus program is worth more than \$50 million and is managed by Hort Innovation, the grower-owned, not-for-profit research and development corporation for Australian horticulture, which contributes \$15.5 million to the program. Additional funding comes from SITPlus partners including the South Australian, New South Wales, Victorian, Tasmanian and Australian Governments; Macquarie University; Western Sydney University; the CSIRO; and the New Zealand Institute for Plant and Food Research.

It’s estimated that fruit flies cost the horticulture industry more than \$300 million in lost international or domestic markets annually.

More information about the SITPlus program can be found online: www.horticulture.com.au/hort-innovation/ 



The plane used to aerially release the sterile insects



SITplus facility

Fruit flies and wine

Winegrapes are a non-preferred host for Qfy and Medfly and in most situations, field damage is minimal.

However, winegrapes are often grown adjacent to other horticultural crops that are hosts for fruit fly and impacts on export markets are considerable.

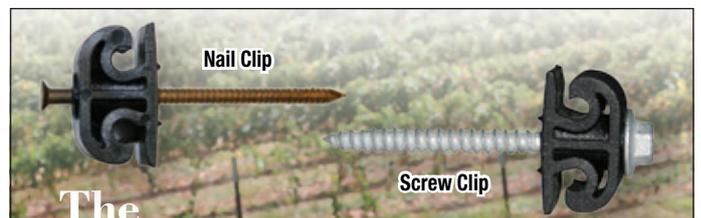
As a result, winegrapes are often part of quarantine measures to eradicate and limit spread of these flies. These quarantine measures can cause headaches for growers and wine companies, particularly during vintage.

In the event of an outbreak, a 1.5km quarantine area and a 7.5 or 15km suspension area is established and if this occurs in a wine region, movement conditions for winegrapes are put into place. These vary depending on both the location of the vineyard and that of the destination winery or processing facility.

These conditions can include the requirement for growers and wineries to obtain accreditation or certification even for grapes transiting through the area, increased focus on preventing spillage from grape trucks and on the cleaning of harvesters that move in and out of the quarantine areas. Traditional routes of travel between a vineyard and winery may also be impacted.

“A solution for quick eradication of fruit flies is good news for both horticulture and viticulture,” said Inca Lee, CEO of Vinehealth Australia.

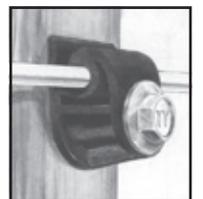
“It’s exciting to see this kind of innovative thinking around pest control in Australia occurring.”



The Vini Clip System

Specially developed for the viticulture industry to provide positive wire-to-post fastening.

- Clips are moulded from polyethylene UV stabilised plastic capable of resisting temperature extremes.
- Screws are protected by a high durability coating for longer life.
- Available in single or double ended clips.
- By design, the load is carried by the screw rather than the clip.
- Screw pull-out loads far exceed those of nails and staples.
- Screws can be driven into softer timbers without pre-drilling.
- Posts are not subjected to hammer shock when screw driving.
- Clips also available for nailing if preferred (recommend nailgun for best results).



Cost-effective wire-to-post fastening using the successful Vini Clip System.

All Products Proudly - Australian -

Automatic Flusher Valve for Irrigation Hose

Incorporating Spiralfast™ Tension Ties. Available in three sizes to fit Israeli & Australian 17mm and 13mm dripper irrigation lines.



Now you can allow air to evacuate from your dripper system and automatically shut off when the water reaches them. When water pressure is turned off the valve automatically opens, allowing flushing and drainage of lines. Also can be wedged open for power flushing.

PLASTIC PRECISE PARTS PTY. LTD.

61 2 9482 5663 • ppp@tpg.com.au

All products Proudly Australian and available from our warehouse in Sydney