



# Navigating pesticide usage in South Africa

2160

# Context

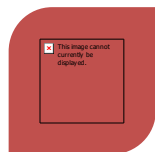
South African Legislation  
International Conventions & Legislation  
Restricted Agricultural Remedies  
Pesticide LC80 Testing Capability  
SA Potato Pesticide Registrations  
Pesticide Development

# The Impact

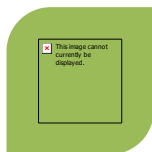
Woolworths Soft Citrus Customer Complaints  
Fungicide Usage Concerns  
Pesticide Usage Concerns  
*Phthorimaea operculella* vs *P. absoluta*



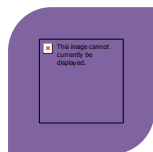
# South African Legislation



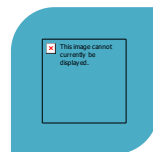
1. DEPT OF  
AGRICULTURE



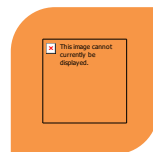
2. DEPT OF HEALTH



3. DEPT OF  
EMPLOYMENT AND  
LABOUR



4. DEPT OF FORESTRY,  
FISHERIES AND THE  
ENVIRONMENT

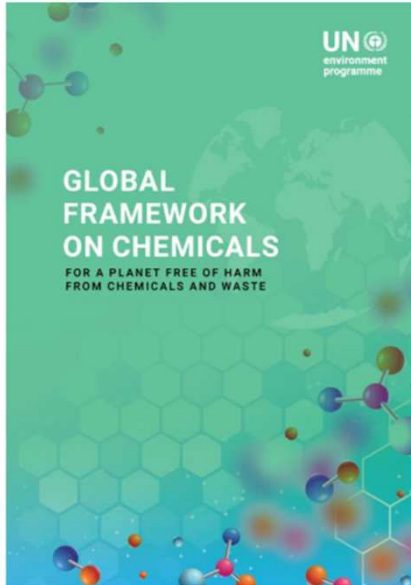


5. DEPT OF TRADE AND  
INDUSTRY (NMISA)

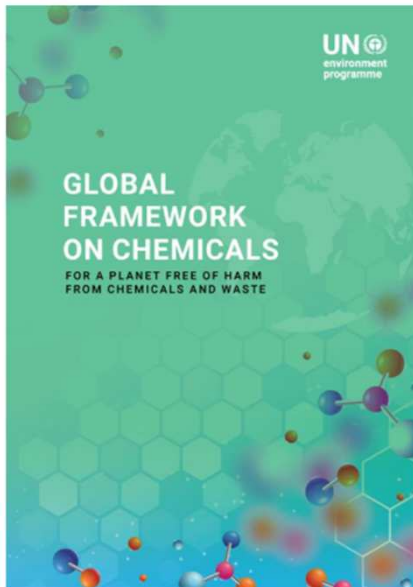
DFFE: Chair of the Multi-stakeholder Committee on Chemicals Management



# International Conventions & Legislation



# Global Framework on Chemicals



## The Global Framework on Chemicals - For a Planet free of Harm from Chemicals and Waste

- Adopted at ICCM5 in Bonn in September 2023 – is a new voluntary global agreement with five strategic objectives and 28 targets to ensure the sound management of chemicals and waste worldwide.
- The GFC replaces the Strategic Approach to International Chemicals Management (SAICM).

### Targets

Target A7 – By 2035, stakeholders have taken effective measures to phase out highly hazardous pesticides in agriculture where the risks have not been managed and where safer and affordable alternatives are available, and to promote transition to and make available those alternatives.



# GHS CMR Phase-out Pesticides

List of CMR Products registered in South Africa

| Name of company                         | Name of product            | Reg No/ L No. | Active ingredient        | GHS classification                        | Expiry date |
|-----------------------------------------|----------------------------|---------------|--------------------------|-------------------------------------------|-------------|
| Bayer (Pty) Ltd                         | Kacumin Kat and Mouse Bait | L4284         | Coumatetralyl            | Reproductive toxicity 1B                  | 30-Jun-25   |
| Farm-Ag International (Pty) Ltd         | Sulcoron                   | L10573        | Diuron                   | Carcinogenicity 1B                        | 30-Jun-25   |
| Meridian Agrochemical Company (Pty) Ltd | Zimbo                      | L9429         | Carbendazim              | Mutagenicity 1B, Reproductive toxicity 1B | 30-Jun-25   |
| Meridian Agrochemical Company (Pty) Ltd | Thiostar                   | L10069        | Thiodicarb               | Acute Toxicity 1                          | 30-Jun-25   |
| Meridian Agrochemical Company (Pty) Ltd | Diuron 80WG                | L9653         | Diuron                   | Carcinogenicity 1B                        | 30-Jun-25   |
| Meridian Agrochemical Company (Pty) Ltd | Qwest SC                   | L7508         | Diuron                   | Carcinogenicity 1B                        | 30-Jun-25   |
| Meridian Agrochemical Company (Pty) Ltd | Nirvana                    | L9838         | Glufosinate-ammonium     | Reproductive toxicity 1B                  | 30-Jun-25   |
| Meridian Agrochemical Company (Pty) Ltd | Mancozeb 800 WP (L9169)    | L9169         | Mancozeb                 | Reproductive toxicity 1B                  | 30-Jun-25   |
| Meridian Agrochemical Company (Pty) Ltd | Topstar                    | L8375         | Thiacloprid              | Reproductive toxicity 1B                  | 30-Jun-25   |
| Meridian Agrochemical Company (Pty) Ltd | Excellon                   | L10666        | Epoxiconazole            | Reproductive toxicity 1B                  | 30-Jun-25   |
| Meridian Agrochemical Company (Pty) Ltd | Fluzoxy                    | L10731        | Flusilazole              | Reproductive toxicity 1B                  | 30-Jun-25   |
| Meridian Agrochemical Company (Pty) Ltd | Cymax M WP                 | L7680         | Mancozeb                 | Reproductive toxicity 1B                  | 30-Jun-25   |
| Meridian Agrochemical Company (Pty) Ltd | Agrithal flo               | L10627        | Chlorthal-dimethyl       | Reproductive toxicity 1B                  | 30-Jun-25   |
| Meridian Agrochemical Company (Pty) Ltd | Clout Xtra                 | L10466        | Carbendazim, flusilazole | Mutagenicity 1B, Reproductive toxicity 1B | 30-Jun-25   |
| Syngenta South Africa (Pty) Ltd         | Bion                       | L6512         | Acibenzolar-S-Methyl     | Reproductive toxicity 1B                  | 30-Jun-25   |
| Syngenta South Africa (Pty) Ltd         | Instrata                   | L10301        | Propiconazole            | Reproductive toxicity 1B                  | 30-Jun-25   |
| Universal Crop Protection (Pty) Ltd     | Extend 800 WDG             | L9108         | Diuron                   | Carcinogenicity 1B                        | 30-Jun-25   |
| Universal Crop Protection (Pty) Ltd     | Swift 250 SC               | L10613        | Epoxiconazole            | Reproductive toxicity 1B                  | 30-Jun-25   |
| Universal Crop Protection (Pty) Ltd     | Buzzard 450 SC             | L9649         | Flusilazole              | Reproductive toxicity 1B                  | 30-Jun-25   |
| Universal Crop Protection (Pty) Ltd     | Newzeb 455 SC              | L9175         | Mancozeb                 | Reproductive toxicity 1B                  | 30-Jun-25   |
| Universal Crop Protection (Pty) Ltd     | Newzeb 480 SC              | L9178         | Mancozeb                 | Reproductive toxicity 1B                  | 30-Jun-25   |

# Restricted Agricultural Remedies

Agricultural remedy active ingredients and their formulations fulfil the restricted agricultural remedy criteria when such agricultural remedy have one or more of the characteristic:

- Acute Toxicity: The remedy must be classified as acutely toxic according to the World Health Organization Recommended Classification of Pesticides by Hazard or the Globally Harmonised System of Classification (GHS).
- Rotterdam Convention: The remedy must be listed in Annex III of the Rotterdam Convention.
- Additional Criteria: Pesticide active ingredients and formulations that have shown a high incidence of severe or irreversible adverse effects on human health or the environment.

These remedies are commonly referred to as 'Highly Hazardous Pesticides'.

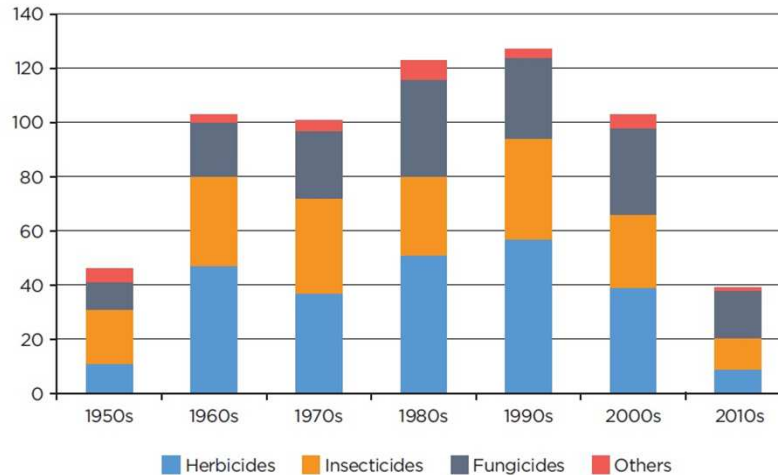
Why mention this?

The Acephate anomaly: one of the metabolites of Acephate (which is not classified as an HHP), is methamidophos, a HHP...

This may result in loss of Acephate when the registrations for methamidophos are withdrawn. It could also result in additional registration burden, as SA legislators might align with international standards that look at both parent compound and metabolite for registrations.

# Pesticide Development

Number of new active ingredients introduced per decade: 1950s to present day



Source: Phillips McDougall Database



# Woolworths Soft Citrus Complaints YTD

- Rots account for 87% of all soft citrus complaints at Woolworths.
- Local retailers can be seen as the 'canary in the coal mine' and provide exporters with a good idea of how the fruit will arrive in export markets..

| Week               | 2025_26   | 2026_27   |
|--------------------|-----------|-----------|
| 1                  | 3         | 7         |
| 2                  | 4         | 3         |
| 3                  | 3         | 2         |
| 4                  | 0         | 6         |
| 5                  | 2         | 4         |
| 6                  | 2         | 7         |
| 7                  | 3         | 5         |
| 8                  | 1         | 7         |
| 9                  | 1         | 3         |
| 10                 | 3         | 5         |
| 11                 | 3         | 6         |
| 12                 | 3         | 9         |
| 13                 | 3         | 2         |
| <b>Grand Total</b> | <b>31</b> | <b>66</b> |

# Fungicide Usage Concerns

| Imazalil | % of Imazalil SA MRL (5ppm) | % of Imazalil EU MRL (5ppm) | TBZ   | % of TBZ SA MRL (6ppm) | % of TBZ EU MRL (7ppm) | Pyrimethanil | % of Pyr SA MRL (10ppm) | % of Pyr EU MRL (8ppm) | Azoxystrobin (Ortiva) | % of Azoxystrobin (Ortiva) SA MRL (10ppm) | % of Azoxystrobin (Ortiva) SA MRL (15ppm) |
|----------|-----------------------------|-----------------------------|-------|------------------------|------------------------|--------------|-------------------------|------------------------|-----------------------|-------------------------------------------|-------------------------------------------|
| 0        | 0.0%                        | 0.0%                        | 2.2   | 36.7%                  | 31.4%                  | 1.9          | 19.0%                   | 23.8%                  | 2                     | 20.0%                                     | 13.3%                                     |
| 0.13     | 2.6%                        | 2.6%                        | 0.49  | 8.2%                   | 7.0%                   | 1.6          | 16.0%                   | 20.0%                  | 0.38                  | 3.8%                                      | 2.5%                                      |
| 2.8      | 56.0%                       | 56.0%                       | 2.8   | 46.7%                  | 40.0%                  | 1.5          | 15.0%                   | 18.8%                  | 0.27                  | 2.7%                                      | 1.8%                                      |
| 1.7      | 34.0%                       | 34.0%                       | 1.5   | 25.0%                  | 21.4%                  | 1.5          | 15.0%                   | 18.8%                  | 0.33                  | 3.3%                                      | 2.2%                                      |
| 0        | 0.0%                        | 0.0%                        | 0.065 | 1.1%                   | 0.9%                   | 0.018        | 0.2%                    | 0.2%                   | 0.049                 | 0.5%                                      | 0.3%                                      |
| 0.16     | 3.2%                        | 3.2%                        | 0.14  | 2.3%                   | 2.0%                   | 1.2          | 12.0%                   | 15.0%                  | 0.12                  | 1.2%                                      | 0.8%                                      |
| 1.4      | 28.0%                       | 28.0%                       | 1.3   | 21.7%                  | 18.6%                  | 0.83         | 8.3%                    | 10.4%                  | 0.15                  | 1.5%                                      | 1.0%                                      |
| 1.4      | 28.0%                       | 28.0%                       | 1.2   | 20.0%                  | 17.1%                  | 0.96         | 9.6%                    | 12.0%                  | 0.42                  | 4.2%                                      | 2.8%                                      |
| 1.6      | 32.0%                       | 32.0%                       | 0.81  | 13.5%                  | 11.6%                  | 0.98         | 9.8%                    | 12.3%                  | 0.63                  | 6.3%                                      | 4.2%                                      |
| 0        | 0.0%                        | 0.0%                        | 3     | 50.0%                  | 42.9%                  | 1.2          | 12.0%                   | 15.0%                  | 2.3                   | 23.0%                                     | 15.3%                                     |
| 0.25     | 5.0%                        | 5.0%                        | 0.5   | 8.3%                   | 7.1%                   | 1            | 10.0%                   | 12.5%                  | 0.37                  | 3.7%                                      | 2.5%                                      |
| 1.6      | 32.0%                       | 32.0%                       | 1.5   | 25.0%                  | 21.4%                  | 1.1          | 11.0%                   | 13.8%                  | 0.4                   | 4.0%                                      | 2.7%                                      |

# Fungicide Usage Concerns

- EC50 = how much fungicide is needed to slow disease by 50%.
- Low EC50: Only a small amount of the pesticide is needed to produce 50% of the maximum effect.
- High EC50: A high value, particularly above 1, indicates a lower potency substance, i.e. the disease is harder to control.
- It is best measured over time and results compared.



# Fungicide Usage Concerns

Fungicide susceptibility testing: *Penicillium* Job 2026-Q05

EC50 values of different fungicides against *Penicillium* isolates

| Isolates   | Crop        | Thiabendazole | Pyrimethanil | Imazalil | Hypercide |
|------------|-------------|---------------|--------------|----------|-----------|
| CPF 2412   | Soft Citrus | 0.357         | R            | 0.023    | 0.023     |
| CPF 2413   | Soft Citrus | 0.358         | R            | 0.022    | 0.022     |
| CPF 2422   | Soft Citrus | 2.46          | R            | 0.021    | 0.021     |
| CPF 2419   | Soft Citrus | 0.537         | R            | 0.014    | 0.014     |
| CPF 2416   | Soft Citrus | 0.371         | R            | 0.015    | 0.021     |
| CPF 2426.1 | Soft Citrus | 0.241         | R            | 0.023    | 0.023     |
| CPF2426.2  | Soft Citrus | 0.118         | R            | 0.022    | 0.022     |

R – no effect on fungal growth at highest fungicide concentration (resistance phenotype)

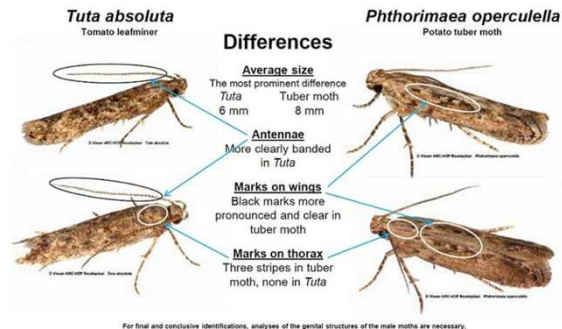


# Pesticide Usage Concerns



# *Phthorimaea operculella* & *P. absoluta*

Both PTM (*Phthorimaea operculella*) and Tuta (*Phthorimaea absoluta*) share similar host preferences...



## Abstract

The tomato pinworm *Tuta absoluta* (Lepidoptera: Gelechiidae) is native to South America and has now become the main tomato pest in Europe, Africa and Asia. The wide range of host plants attacked by this pest has been reported as one of the main reasons for the success of this important insect species. However, the information currently available on the biological performance of *T. absoluta* on Solanaceae has been obtained from a limited number of host species. The Solanaceae family is composed of thousands of species, many of which are potential hosts for *T. absoluta*. Our results showed that the highest oviposition rates occurred on cultivated tomato plants, potato and wild tomato. The lowest rates occurred on "gilo", "jurubeba", green pepper and pepper. The highest survival rates of the immature stages occurred on potato and the lowest on pepper, green pepper and "jurubeba". Female fertility, following infestation of the different plant species, was highest for insects that developed on tomato or potato and the lowest rates were seen on American black nightshade. The net reproductive rate and the intrinsic growth rate were highest on

# Pesticide LC80 Testing Capability

## Potato Pest Sensitivity Shifts

| Insecticides At Risk                            | Group         |
|-------------------------------------------------|---------------|
| Organophosphates represented by Azinphos-methyl | IRAC Group1B  |
| Pyrethroids represented by Lambda-cyhalothrin   | IRAC Group 3A |
| Benzylureas represented by Lufenuron            | IRAC Group 15 |

From: Prof Hannelene du Plessis

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Potatoes ZA must be commended for this work. It should be included as yearly routine practice across the grower base.



# SA Potato Pesticide Registrations

## South African Potato Pesticide Registrations: Phthorimaea

|                                                             | Number    | Comments                       |
|-------------------------------------------------------------|-----------|--------------------------------|
| Total Registrations                                         | 182       |                                |
| Phthorimaea Registrations                                   | 97        |                                |
| Active Ingredients (Less Pheromones)                        | 30        |                                |
| IRAC Groups                                                 | 12        |                                |
| Phthorimaea Registrations (Less RAR's)                      | 62        | (27 are Group 3A, Pyrethroids) |
| IRAC Groups (Less RAR's)                                    | 11        |                                |
| <b>Phthorimaea Registrations (Less RAR's &amp; At Risk)</b> | <b>24</b> |                                |
| <b>IRAC Groups (Less RAR's &amp; At Risk)</b>               | <b>8</b>  |                                |

From: Agri-Intel



# The Future?

- Primary focus of pest control for the last 80 years has been the disruption of critical biochemical pathways in the target species.
- **Pesticides = 'Convenience Chemistry'**. They are synthetic shortcuts designed to solve complex ecological problems with rapid, predictable efficiency.
- **Synthetic pesticides** have brought **enormous benefits** and **enabled increased global food production**. While they have played a massive role in scaling-up the modern food supply, that convenience often comes with **major ecological and health trade-offs**.
- A further drawback: pesticide usage has given a false or exaggerated feeling of confidence..
- **If it can go wrong, it will go wrong**: site-specific pesticides prone to resistance, and the unintended consequences of pesticide use often exacerbates the target pest.
- **Further assistance is needed**: targeting the innate (pheromones, mating disruption, visual lures, ultrasound) and adaptive (bait aversion, trap avoidance, behavioural resistance) behaviour of insect pest species is key.





**South African Bioproducts Organisation**

Connecting bioproducts users, industry and government bodies to advance the quality, credibility and regulatory processes of agricultural biological solutions.



[SABO.org.za](http://SABO.org.za)

# Tom Murray

Woolworths Produce & Horticulture  
Technical Manager: Fruit, Cut Fruit, Fresh Juice &  
Horticulture

[tommurray@woolworths.co.za](mailto:tommurray@woolworths.co.za)

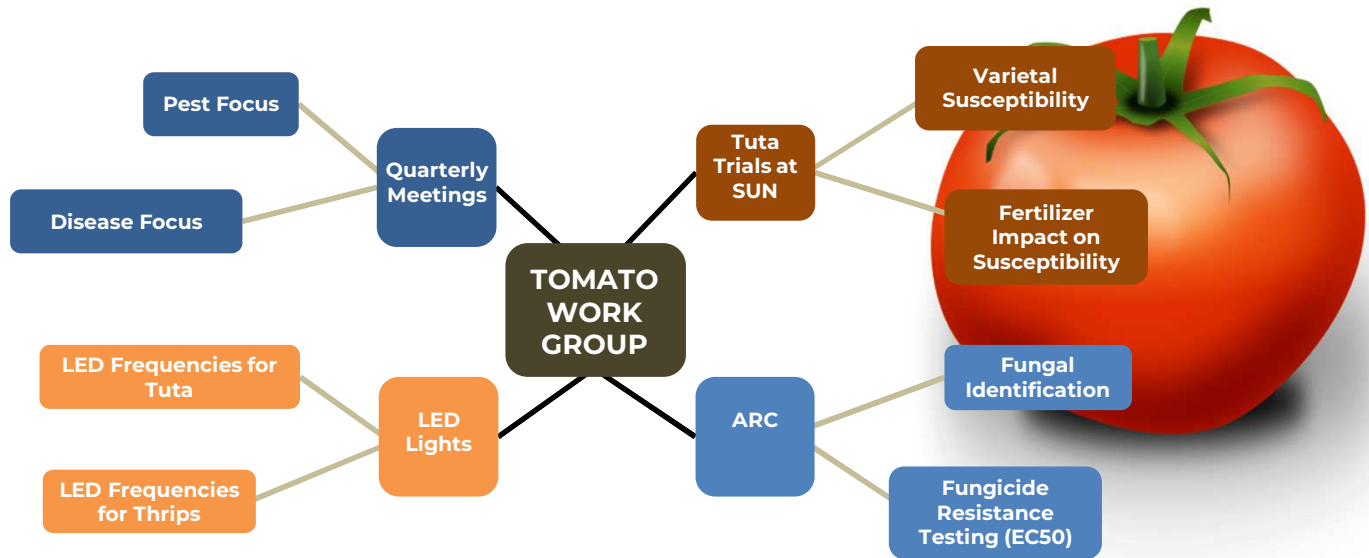


**Tom Murray**

WhatsApp contact



# Woolworths Approach..



# Woolworths Stakeholder Projects

## **Stellenbosch University (SUN)**

Project Objectives:

Varietal susceptibility, Effect of nitrogen on plant health, Diagnosis and Recommendation Integrated System (DRIS), Assessment of tuned LED lights.



## **Agricultural Research Council (ARC)**

Project Objectives:

Identification of common fungal pathogens causing rot in tomatoes & peppers  
Fungicide resistance testing (EC50)



## **Dropsight**

Project Objectives:

Sprayer efficiency testing across all workgroup growers



# Woolworths Stakeholder Projects

## **SOILTECH**

Project Objectives:

DNA/PCR identification of fungal isolates up to species level

Conduct lab, field & post harvest trials using SOILTECH biological products

Develop IPM and biological treatment plans



## **Labserve**

Project Objectives:

Development of pesticide residue dashboard allowing all growers to compare their results down to product level



## **Oasys IPM Lighting Solutions**

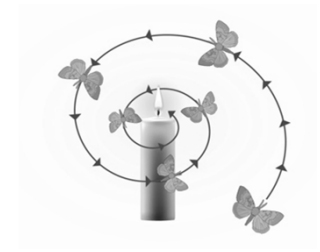
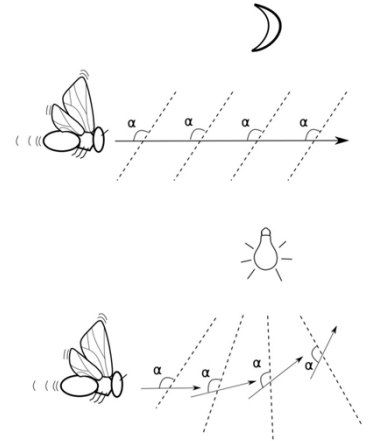
Project Objectives:

Fatal Attraction 360 Perimeter and Indoors: Develop tuned LED lighting as an addition to current control methods, Testing of different light frequencies on pest species (storage pests, moths, stinkbugs, thrips)

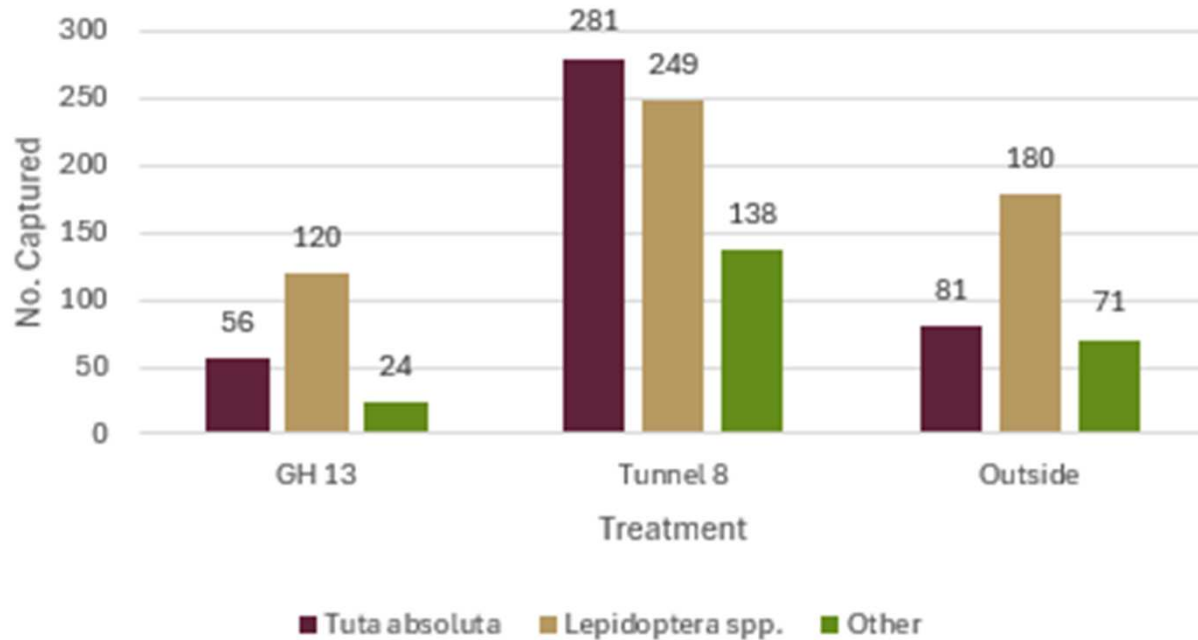


# The Science Behind Fatal Attraction

- Nocturnal flying insects use the stars, the Milky Way, and the moon as natural compasses to navigate and maintain a steady flight path. Specific frequencies are used across the pest species (e.g. Tuta with its opsin mutation is attracted to both 365nm and 390nm).
- The 'Dorsal Light Response' is a key requirement for flying insects to keep themselves 'right side up' while flying. It is a masterpiece of natural navigation, perfected over millions of years.
- Secondly, by maintaining a constant angle to the parallel lines of light rays reaching earth from the moon and the stars, nocturnal insects can fly for kilometres in a straight line (also known as 'transverse orientation').
- Humans hacked this system by inventing artificial light. Constant angle rules can't be applied by an insect to a lightbulb radiating in all directions. Resulting in continuous inward adjustment in flight..
- The dorsal light response and the transverse orientation behaviour has resulted in an 'evolutionary glitch' that hasn't been fully exploited in agriculture.
- Tuned LED lights to the exact wavelength preference of the pest species presents an opportunity to exploit this glitch even further.



# Fatal Attraction Indoors & Perimeter



Tuta capture percentage across the 3 environments

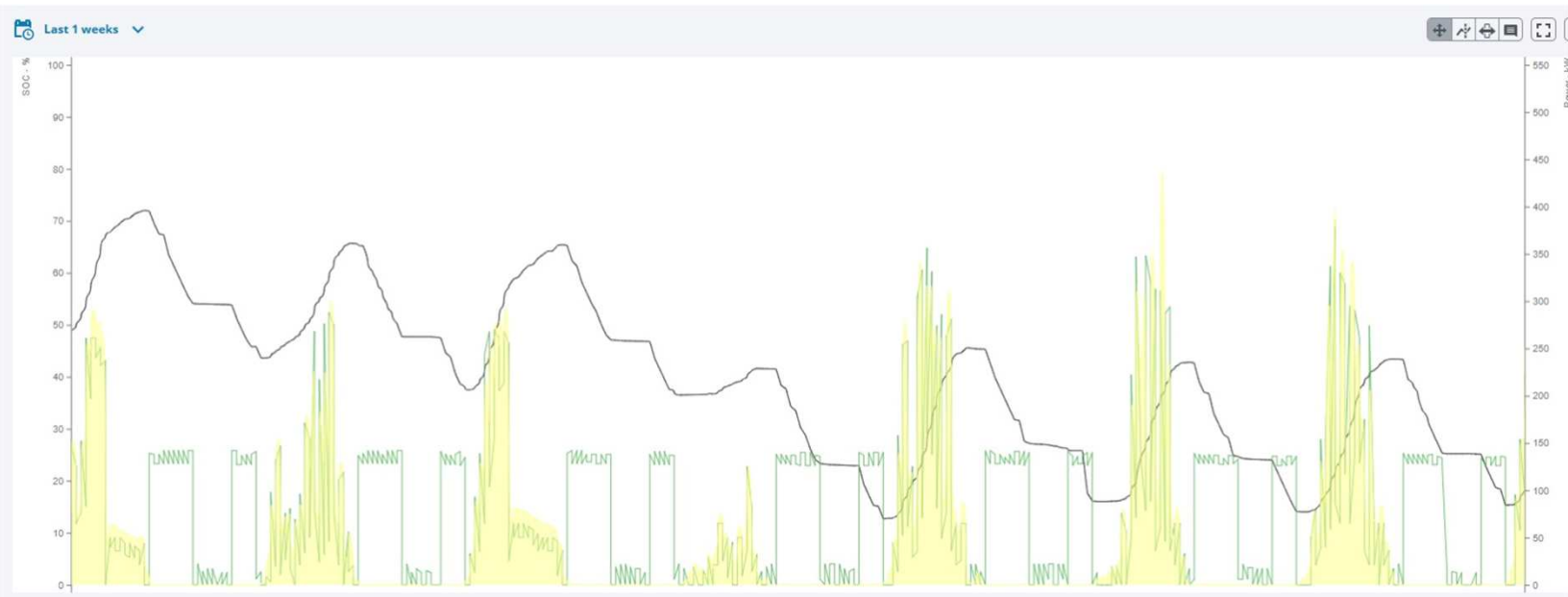
# Fatal Attraction Stinkbug



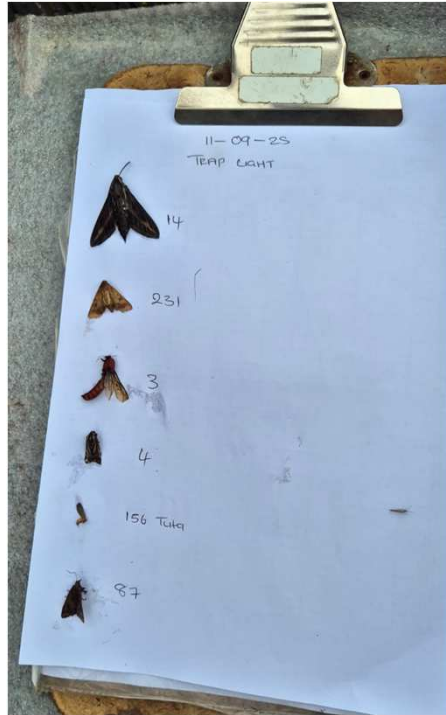
# Fatal Attraction 360 Solar



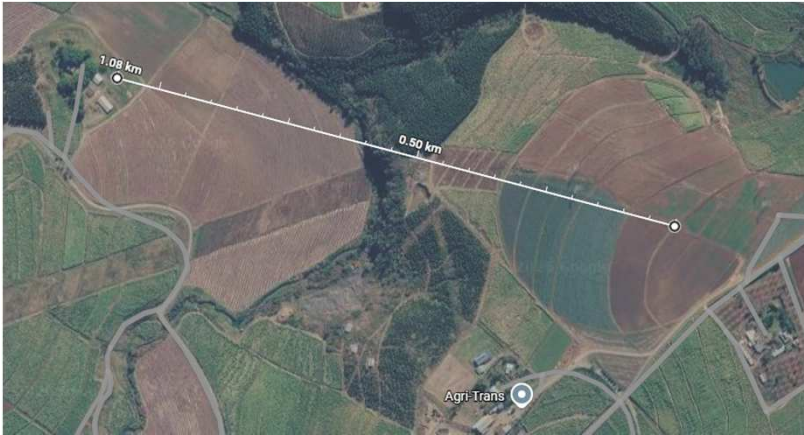
# Fatal Attraction 360 Solar



# Photos



# Fatal Attraction Perimeter: Range



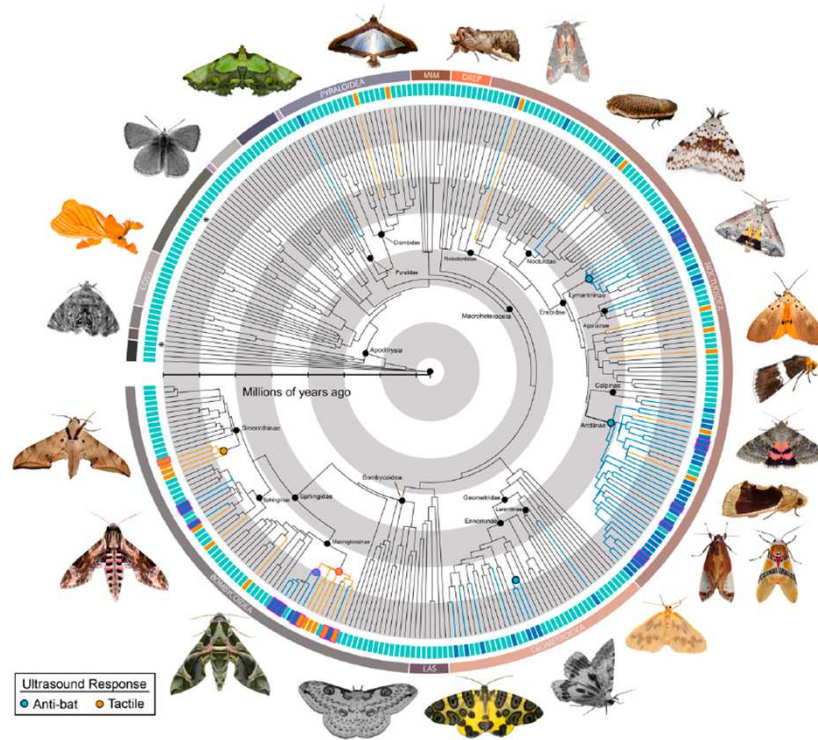
# Fatal Attraction Indoor



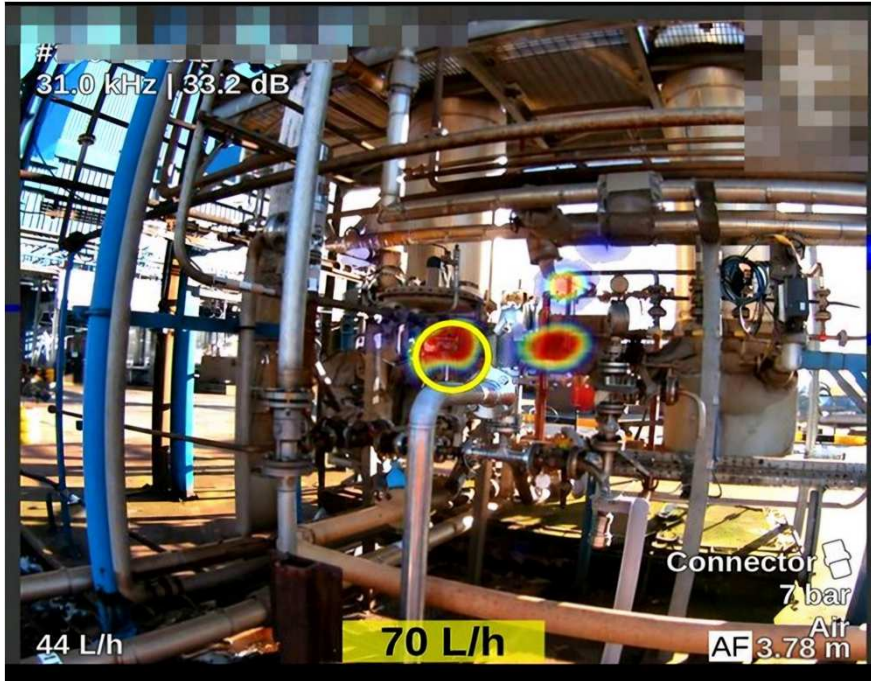
# The Future: XAG Rover?



# The Future: Ultrasound?



# The Future: Ultrasound?



03:33

49 all 5G



**Dean Williams...nstNDT)** • 1st  
QA/QC NDT Inspections Engineer @ S...  
18h • Edited •

#001 SGS LDAR Field Notes – Acoustic  
Hotspot or Confirmed Leak?

## Scenario:

During an industrial LDAR survey, an acoustic imaging camera was used alongside OGI to assess areas where conventional visual inspection alone could not readily identify the source of a suspected leak. The acoustic survey was primarily aimed at locating compressed-air and nitrogen losses across operating plant.

## Discovery:

The acoustic camera identified a number of distinct ultrasonic sources across the plant, including several from elevated or difficult-to-access locations. In one case, an indication initially detected from a distance was



Add a comment...

