




Agrolab

RESULTS THROUGH KNOWLEDGE

NORBARAG

13-14 March 2025

Insecticide testing

Challenges are the same for maintaining current products and future biocontrol products.
 No GEP trials in the Northern EU Regulatory Zone – no product approvals
 Conducting valid GEP insect trials is an increasing challenge

IRAC
Insecticide Resistance Action Committee
The Key to Resistance Management

More information on IRAC and the Mode of Action Classification is available from: www.irac-online.org or enquiries@irac-online.org

<p>Group 1: Acetylcholinesterase (AChE) inhibitors (para-oxonamide of the para-oxonamide)</p> <p>1A Carbamates 1B Organophosphates</p>	<p>Group 15: Inhibitors of chitin biosynthesis, type 9</p> <p>15 Benzoylureas</p>
<p>Group 2: GABA-gated chloride channel antagonists</p> <p>2A Cyclodiene Organochlorines 2B Phenylpyrazoles (Spinos)</p>	<p>Group 16: Inhibitors of chitin biosynthesis, type 1</p> <p>16 Spinetriazoles</p>
<p>Group 3: Sodium channel modulators (para-oxonamide of the para-oxonamide)</p> <p>3A Pyrethroids 3B DDT, Methoxychlor</p>	<p>Group 17: Inhibitors of chitin biosynthesis, type 2</p> <p>17 Cyromazine</p>
<p>Group 4: Nicotinic acetylcholine receptor (nAChR) agonists</p> <p>4A Neonicotinoids 4B Nicotine 4C Sulfoxarbor</p>	<p>Group 18: Endocrine receptor agonists</p> <p>18 Diacylhydrazines</p>
<p>Group 5: Microtubule non-specific (anti-tubulin) inhibitors</p> <p>5A Alkyl halides 5B Chlorophenols 5C Sulfonyl fluoride 5D Benzoxazinoids 5E Triterpene saponins</p>	<p>Group 19: Octadecanoic acid receptor agonists</p> <p>19 Amitraz</p>
<p>Group 6: Nicotinic acetylcholine receptor (nAChR) allosteric modulators</p> <p>6A Imidacloprid 6B Acetamiprid 6C Thiamethoxam 6D Clothianidin 6E Deltamethrin</p>	<p>Group 20: Mitochondrial complex II electron transport inhibitors</p> <p>20A Hydantoinyl 20B Acetylcholinesterase 20C Fluoropyrimidines</p>
<p>Group 7: Juvenile hormone mimics</p> <p>7A Juvenile hormone analogues 7B Fenoxycarb 7C Pyriproxyfen</p>	<p>Group 21: Mitochondrial complex I electron transport inhibitors</p> <p>21A METI acetamides and insecticides 21B Rotenone</p>
<p>Group 8: Selective serotonin reuptake inhibitors</p> <p>8A Fenoxycarb 8B Fenoxycarb 8C Fenoxycarb 8D Fenoxycarb 8E Fenoxycarb</p>	<p>Group 22: Voltage-dependent sodium channel blockers</p> <p>22A Indoxacarb 22B Metafluzixone</p>
<p>Group 9: Selective serotonin reuptake inhibitors</p> <p>9A Fenoxycarb 9B Fenoxycarb 9C Fenoxycarb 9D Fenoxycarb 9E Fenoxycarb</p>	<p>Group 23: Inhibitors of acetyl CoA carboxylase</p> <p>23 Telenon 23a Telenon acid derivatives</p>
<p>Group 10: Mite growth inhibitors</p> <p>10A Clofentazine, Hexythiazox 10B Etoxazole</p>	<p>Group 24: Mitochondrial complex IV electron transport inhibitors</p> <p>24A Phosphorothioates 24B Cyanoacrylates 24C Cyanoacrylates 24D Cyanoacrylates</p>
<p>Group 11: Microbial disruptors of insecticidal</p> <p>11A Bacillus thuringiensis 11B Bacillus sphaericus</p>	<p>Group 25: Mitochondrial complex II electron transport inhibitors</p> <p>25 beta-Nitrovinyl derivatives</p>
<p>Group 12: Inhibitors of mitochondrial ATP synthase</p> <p>12A Diafenthiuron 12B Organotin insecticides 12C Propargyl 12D Tetradifon</p>	<p>Group 26: Spinosyn receptor modulators</p> <p>26a Spinosyn receptor modulators 26b Spinosyn receptor modulators</p>
<p>Group 13: Uncouplers of oxidative phosphorylation via disruption of proton gradient</p> <p>13 Pyriminyl, Oxidopyriminyl, Sulfoxarbor</p>	<p>Group 27: Compounds of unknown or uncertain mode of action</p> <p>27a Chloranil 27b Chloranil 27c Chloranil 27d Chloranil</p>

2023 AG BIOLOGICALS LANDSCAPE

The Mixing Bowl
CONNECTING INNOVATORS IN FOOD, AG & IT

BIO-BASED SUBSTANCES

BIOCONTROL

growth regulators

semiochemicals

post-harvest

LIVING ORGANISMS

biopesticides

macrobials

inoculants

biostimulants

biofertilizers

www.MixingBowlhub.com
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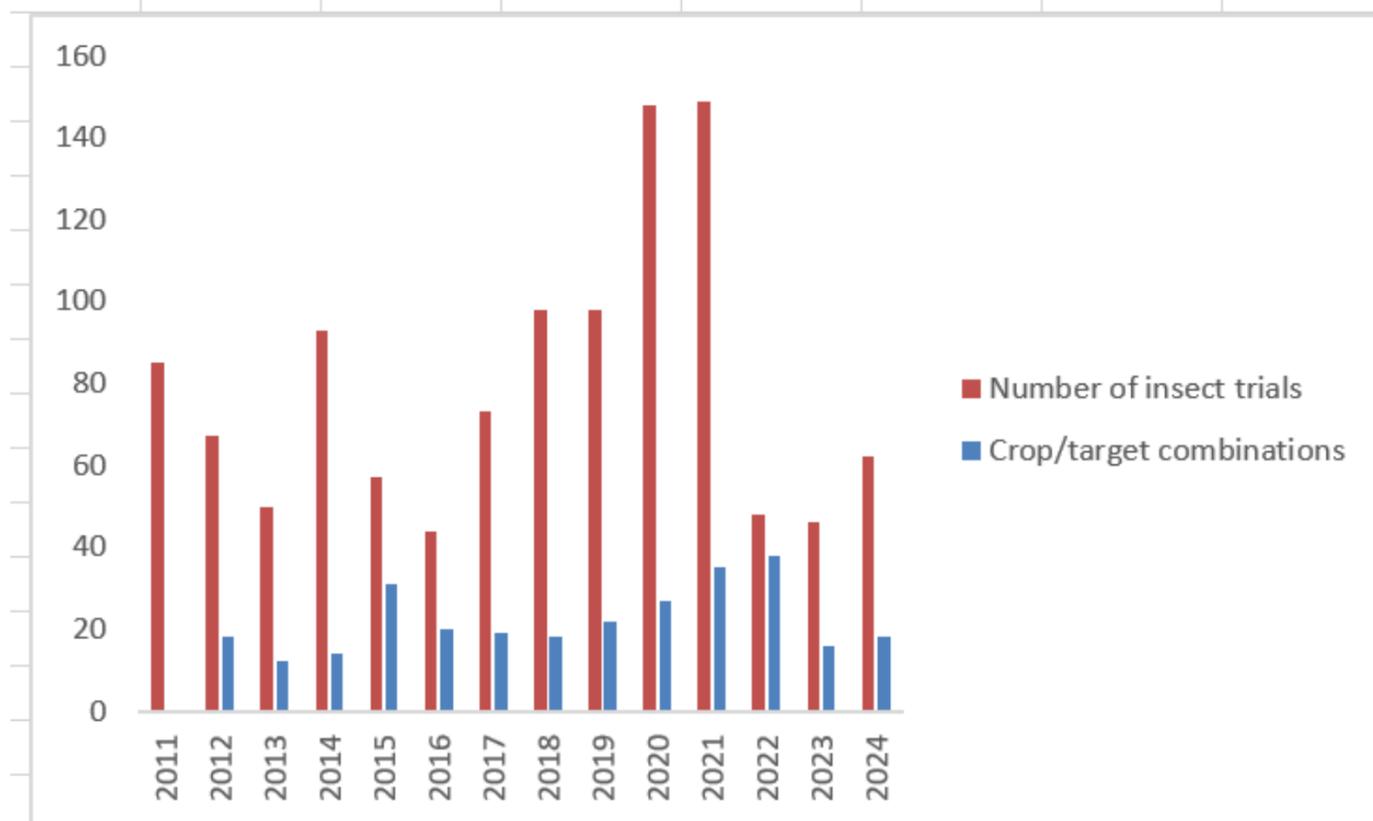
WESTERN GROWERS

Companies appear on the landscape only once, although some may offer products in multiple segments. Overlapping areas are meant to imply this, however, logo positions are not necessarily indicative of any specific or limited product offerings.



Insecticide testing

- GEP trials according to regulations and guidelines.
- EPPO Standard test guidelines
 - 137 insect crop/target combinations.



EPPO database on PP1 Standards

Search by number or in the title [advanced search...](#)

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Home Approval procedure List of EPPO Standards Version history Subscription plans Useful links

Standards: Insecticides - Acaricides

Number	Title	Year of approval	Version	Action
<input type="text" value="Search.."/>	<input type="text" value="oscinella"/>	- select	- sele	
PP1/011(4)	Moths of grapevine	2024	4	<input type="button" value="View"/>
PP1/131(4)	Diaspididae scales on pome and stone fruits	2024	4	<input type="button" value="View"/>
PP1/334(1)	Evaluation of mating disruption techniques against Lepidopteran pests in vegetable and ornamental crops under protected conditions	2024	1	<input type="button" value="View"/>
PP1/335(1)	Seed wasps in almonds, pistachios and plums	2024	1	<input type="button" value="View"/>
PP1/007(4)	Cydia pomonella	2023	4	<input type="button" value="View"/>

Insecticide testing - challenges



- Trial site finding strategy and timing in terms of different threshold drivers:
 - EPPO/protocol – challenging infestation
 - EU – 27 member state consideration
 - Scandinavia, Baltics and Finland are small markets - impact trial design driver
 - Economical thresholds – avoid challenging infestations
- Regional differences in pest pressure – hot spots
- Tracking populations and access to trial sites in time, population crashes
- Locked down (reserved trial area) vs. staying mobile
- Northern Regulatory zone (NEU) guidance document reduces requirements for number of trials/use.





Insect trial thresholds

Need for clarification and adaptation of suitable field trial thresholds.

EPPO	Crop/Target	Year of first approval	Threshold in guideline	Financial thresholds for applications (DK)	Efficacy evaluator thresholds for valid field trial	NEU guidance doc
PP1/220(1)	Dasineura brassicae	2002	Not specified, sufficient and active	Confirmed flight	Not publicly available, refer to local thresholds	Challenging level of infestation in untreated, 5% infestation for pests
PP1/178(3)	Meligethes aeneus on rape	2004	Not specified, sufficient density	4-8 beetles pr plant early stage, 5-10 beetles/plant late stage		
PP1/007(4)	Cydia pomonella	2023	Not specified	At risk of flight/egg laying		
PP1/073(4)	Psylliodes chrysocephala on oilseed rape	2020	Not specified	10 % plant damage at BBCH 14, larvae stage 25 adults over 3 week period in catch trays (11 cm radius)		
PP1/281(1)	Drosophila suzukii	2013	Not specified	At detection in traps		
PP1/020(3)	Aphids on cereals	2006	Not specified	25-40 % tillers with aphids, 100 % in late stages		
PP1/107(3)	Ceutorhynchus assimilis	2002	Not specified	6 adults/plant		
PP1/217(1)	Oscinella frit	2001	Not specified	Confirmed flight		
PP1/070(4)	Aphid vectors of Barley yellow dwarf virus	2017	In autumn, not specified, local thresholds. In spring-sown cereals, at least 5% of tillers infested.	2 %, 2024 recommendation was to spray at first sight		
PP1/229(1)	Aphids on leguminous crops	2004	Beans, when 5-10% of plants are infested. Population crash above 25 degrees	Peas 50 % of plants with aphids		
PP1/230(1)	Aphids on potato	2004	180 aphids per 100 leaves, with numbers increasing.	Confirmed presence in field		
PP1/237(1)	Thrips on cereals	2004	1-3 thrips/stem	1 thrips/tiller		
PP1/228(3)	Aphids on beet, including aphid vectors of virus	2022	10% of plants are infested, 1 aphid per beet for Myzusand, 1 small colony of 3 to 10 aphids per 2 beets for Aphis). Aphid vectors of virus, at first sign of infection.	At first appearance of aphids		
PP1/236(1)	Oulema spp. on cereals	2004	0.5 larvae/tiller	0.5-1.0 larvae/tiller		

Insect trial thresholds



Threshold driver is to reduce the use of insecticide (Pollen beetle). Will farmers wait that long?

Threshold driver to prevent crop damage (Aphids in potato). Pests in 10 out of 10 fields.

High infestation for a homogenous population in field trial area, should be reached for validity

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Threshold overlap, early application – challenging scenario for field trials

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Areas of interest



New methodology and updated EPPO guidelines



Developing NEU catalogue of thresholds for insecticide field testing



Climate change and impact on agronomical pest populations – research?



Insect field trial network.



Define acceptable efficacy levels for pests

