

Technical Information

PYFLUBUMIDE

Acaricide

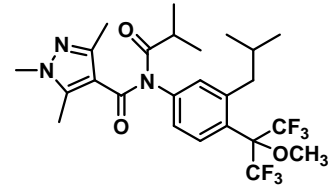


NIHON NOHYAKU CO., LTD.

■ Physico-Chemical Properties

Common name (ISO) : Pyflubumide
 Chemical name(IUPAC) : 3'-isobutyl-N-isobutyryl-1,3,5-trimethyl-4'-[2,2,2-trifluoro-1-methoxy-1-(trifluoromethyl)ethyl]pyrazole-4-carboxanilide
 Water solubility : 0.27 mg/L
 Partition coefficient : Log Pow = 5.34
 Formulation : 20%SC (w/w)

Structure formula:



■ Toxicology

Technical

20%SC

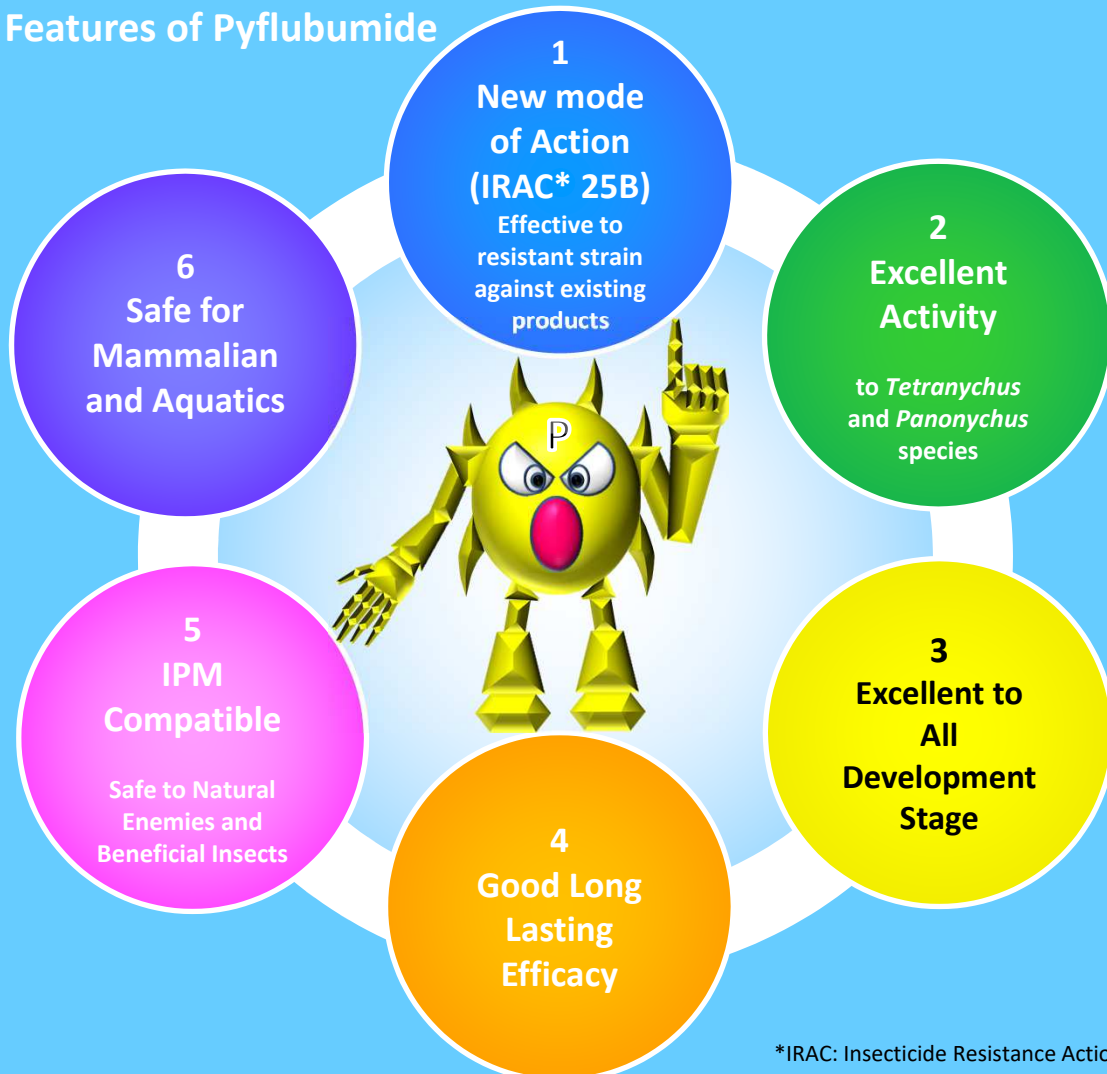
Mammalian toxicity

Acute oral LD ₅₀ (Rat)	:(female)	> 2000 mg/kg	(female)	> 2000 mg/kg
Acute dermal LD ₅₀ (Rat)	:(male, female)	> 2000 mg/kg	(male, female)	> 2000 mg/kg
Eye irritation (Rabbit)	:	Non irritant		Non irritant
Skin irritation (Rabbit)	:	Non irritant		Non irritant
Dermal sensitization	:(Mouse LLNA-test)	Negative	(Guinea pig)	Negative

Ecotoxicity

Carp, LC ₅₀ (96hr) :	0.61 mg/L
Daphnia, EC ₅₀ (48hr):	0.16 mg/L

■ Key Features of Pyflubumide



*IRAC: Insecticide Resistance Action Committee

Control Spectrum

Order	Species	Test Stage	LC ₅₀ (ppm)
Acari	<i>Tetranychus urticae</i> (Two-spotted spider mite)	Adult	1.2
	<i>Panonychus citri</i> (Citrus red mite)	Adult	1.3
	<i>Panonychus ulmi</i> (European red mite)	Adult	1.8
	<i>Panonychus mori</i>	Adult	1.1
	<i>Tetranychus kanzawai</i> (Kanzawai spider mite)	Adult	1.3
	<i>Phyllocoptura oleivora</i> (Citrus rust mite)	Adult	>100
	<i>Acaphylla theavagrans</i>	Adult	>100
	<i>Polyphagotarsonemus latus</i> (Broad mite)	Adult	>100
Lepidoptera	<i>Spodoptera litura</i> (Common cutworm)	3 rd instar larva	>500
Hemiptera	<i>Myzus persicae</i> (Green peach aphid)	All stage	>500
Thysanoptera	<i>Frankliniella occidentalis</i> (Western flower thrips)	1 st instar	>500
Diptera	<i>Liriomyza sativae</i> (Tomato leaf miner)	Egg	>200
Coleoptera	<i>Sitophilus zeamais</i> (Maize weevil)	Adult	>500
Nematoda	<i>Meloidogyne incognita</i> (Southern root-knot nematode)	2 nd instar larva	>500

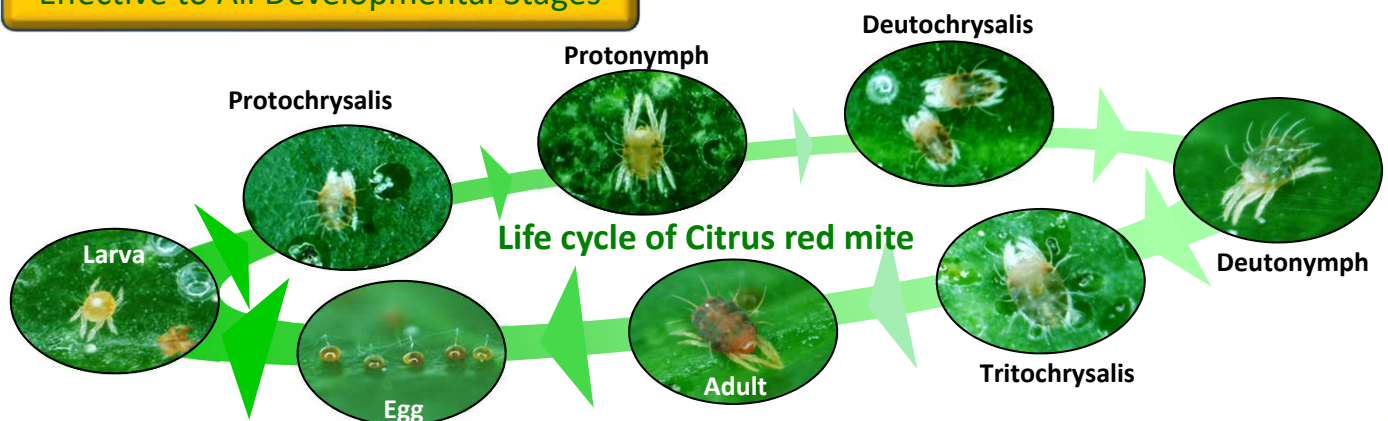


Stage Wise Activity

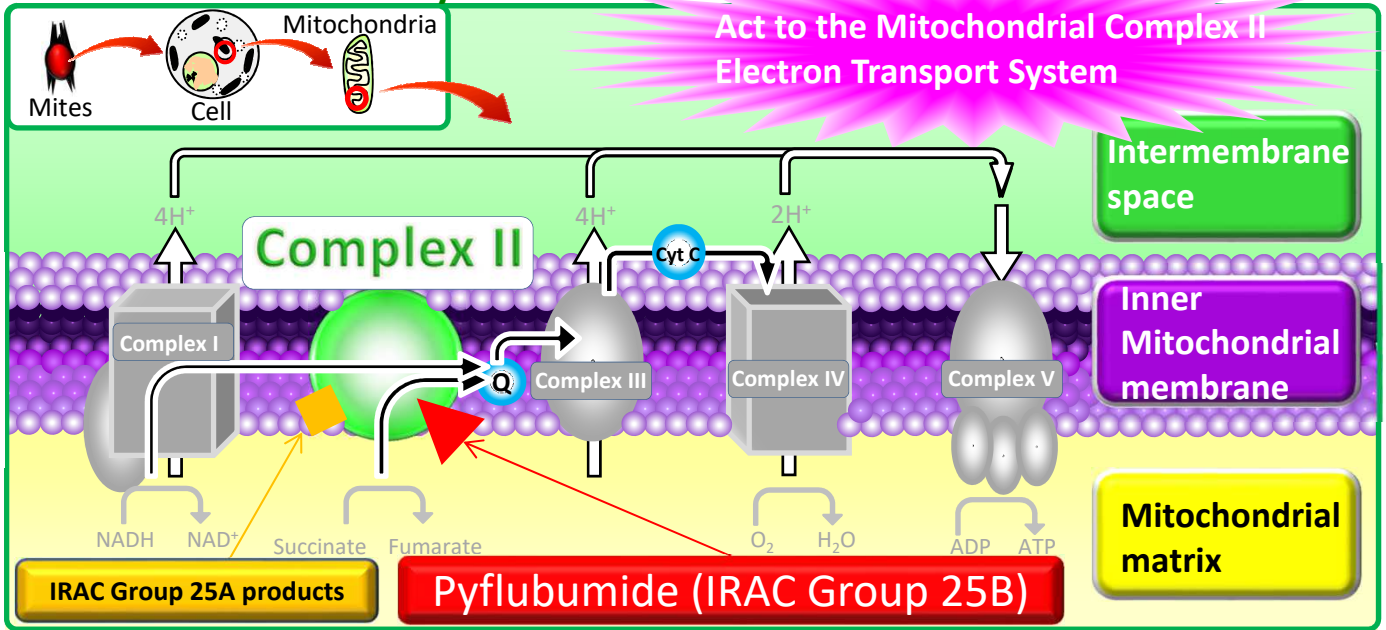
Species	LC ₅₀ (ppm)				
	Female Adult	Egg	Larva	Protochrysalis	Protonymph
	2 DAT*	7 DAT	6 DAT	5 DAT	5 DAT
Two-spotted spider mite	1.2	31	0.67	0.33	0.14
Citrus red mite	1.3	10.3	0.77	1.4	0.59

* DAT: Days After Treatment

Effective to All Developmental Stages



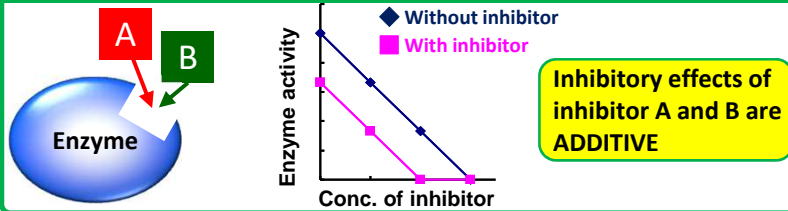
Mode of Action of Pyflubumide



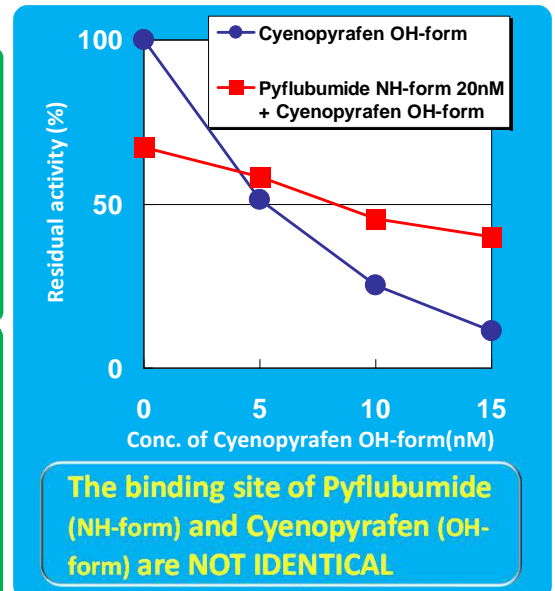
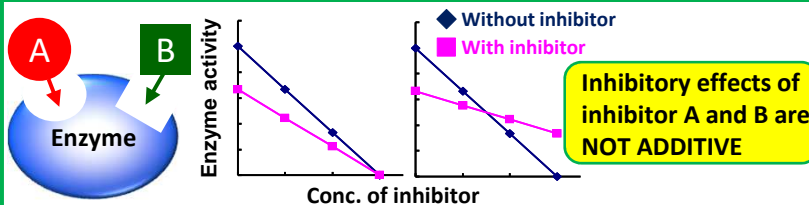
How Pyflubumide is different from Group 25A products

Inhibition of Mitochondria Complex II (Spider mite)

The binding sites are identical



The binding sites are not identical



Affected Symptom

	24 HAT*	48 HAT	72 HAT
Pyflubumide (IRAC Group 25B)			
Cyenopyrafen (IRAC Group 25A)			
Cyflumetofen (IRAC Group 25A)			

Pyflubumide



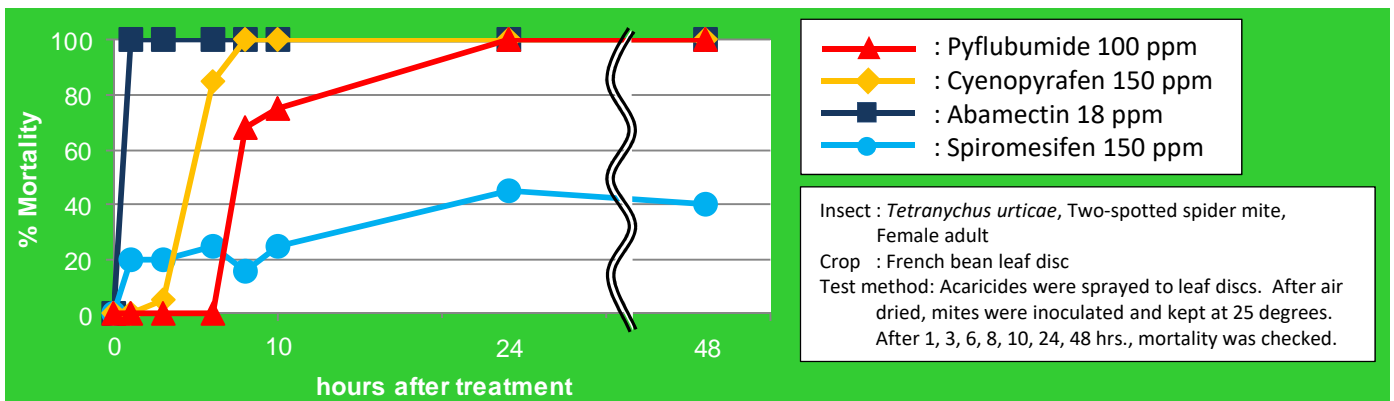
- No Color Change
- No Symptom of Excitation and Paralysis

IRAC Group 25A Products



Body Color Changes to Black

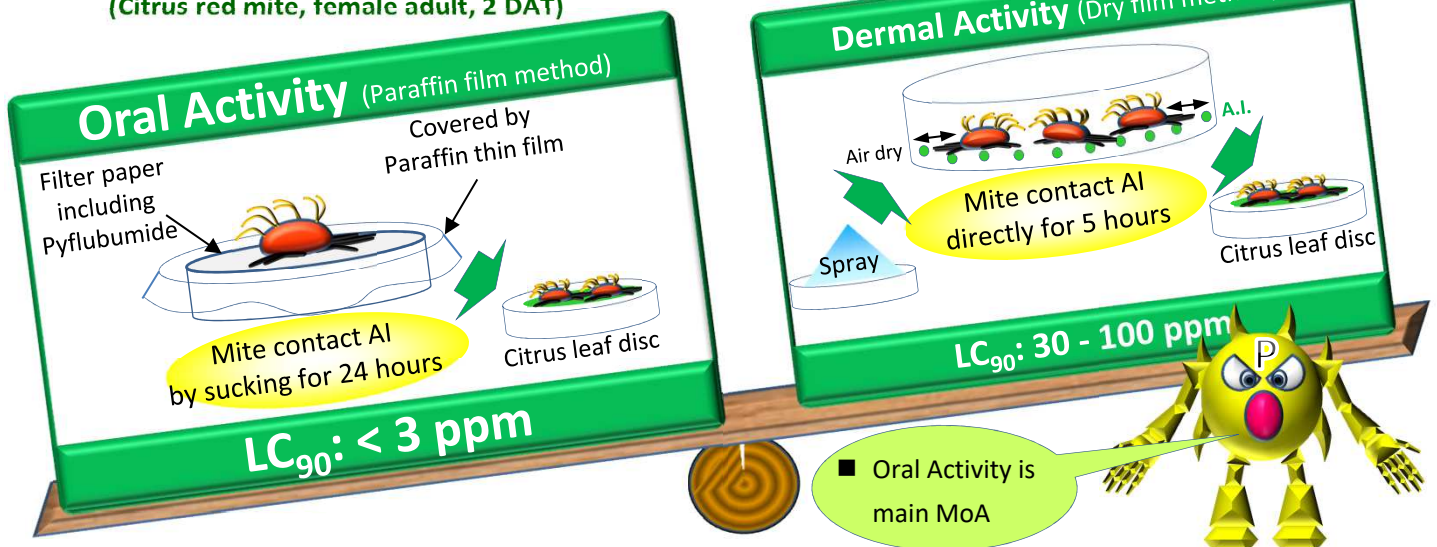
Quick knock-down activity of Pyflubumide (Vs. *Tetranychus urticae*)



- Compared with existing products, action speed of Pyflubumide is slightly slower
- After 8 hours of treatment, mortality was observed and it reached 100% at 24 HAT

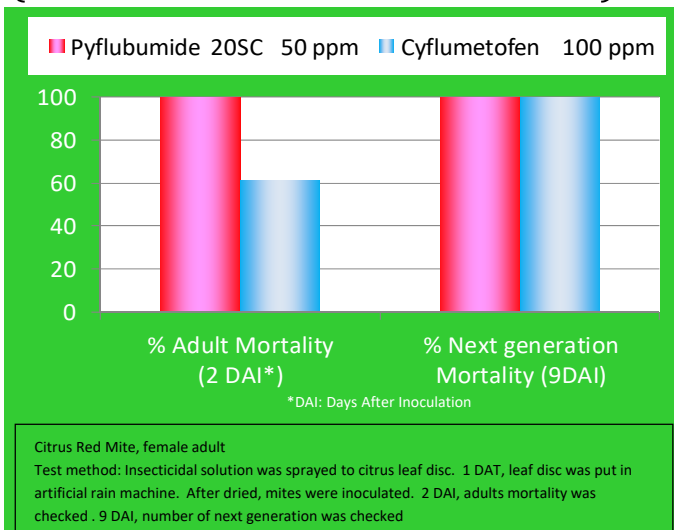
Efficacy by Uptake Pathway

(Citrus red mite, female adult, 2 DAT)



Rain Fastness

(Artificial rain test/ Citrus red mite/ Citrus leaf
 Rain condition: 10 mm/hr x 1 hr)



- After fully dried, Pyflubumide shows rain fastness

Influence by Temperature

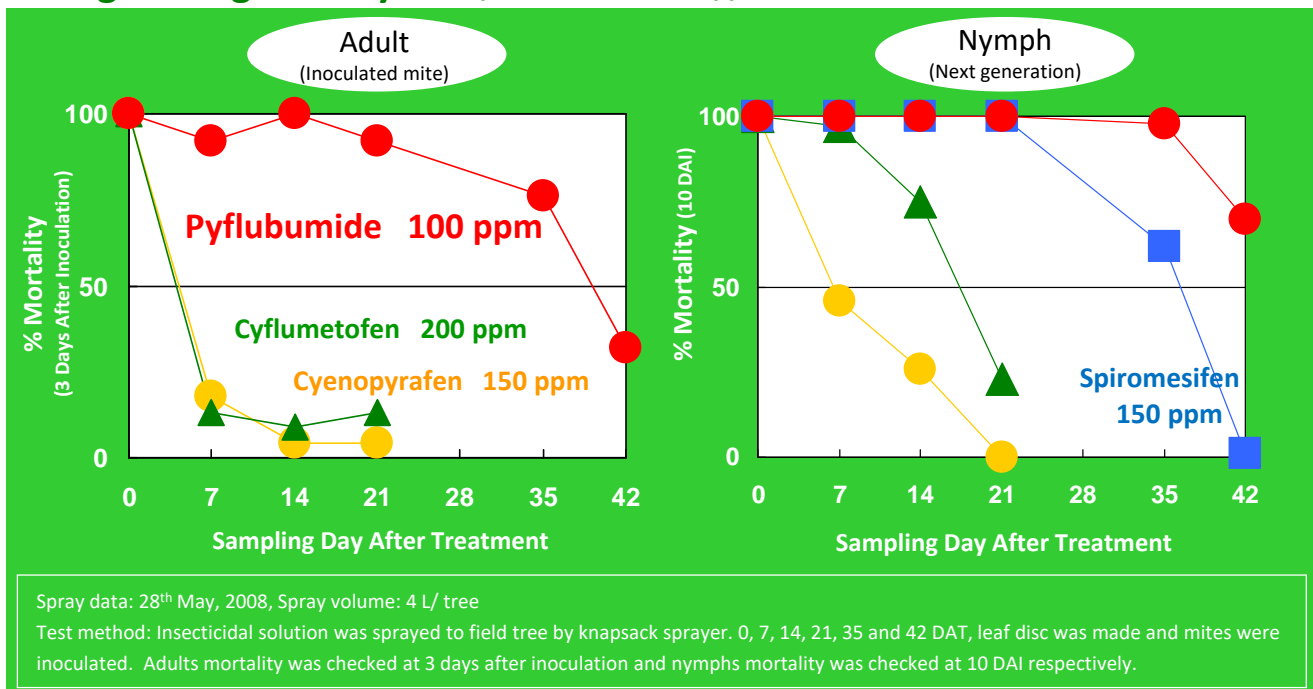
(Two spotted Spider mite, Female Adult,
 2DAT (20, 25, 30 degree), 5 DAT at 15 degree)

	LC ₅₀ (ppm)			
	15 °C	20 °C	25 °C	30 °C
Pyflubumide	0.55	0.70	0.31	0.29
Cyenopyrafen	1.0	0.84	0.49	0.53
Cyflumetofen	1.3	2.3	1.1	0.97
Spiromesifen	0.77	1.5	0.5	0.52

- Influence by temperature is less.

* But at low temperature, Pyflubumide sometimes takes few days to show the efficacy.

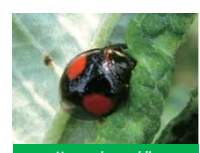
Long Lasting Efficacy (European red mite on Apple)



Pyflubumide shows excellent residual efficacy to Spider mite

Impact on Natural Enemies and Beneficial Insects

Insect	Stage	Method	Assessment timing	LC ₃₀ (ppm)
<i>Bombyx mori</i> Silkworm	4 th Larva	Food Dip	5 DAT*	> 100
<i>Apis mellifera</i> Western honey bee	Adult	Insect & Food Dip	5 DAT	> 200
<i>Osmia cornifrons</i> (Pollination bee)	Adult	Insect & Food Dip	5 DAT	> 100
<i>Phytoseiulus persimilis</i> (Predatory mite)	Egg	Insect & Food Dip	4 DAT	> 200
<i>Amblyseius californicus</i> (Predatory mite)	Adult	Insect & Food Dip	3 DAT	> 100
	Larva	Food Dip	3 DAT	> 100
<i>Amblyseius swirskii</i> (Predatory mite)	Adult	Insect & Food Dip	4 DAT	> 200
	Egg	Insect & Food Dip	4 DAT	> 200
<i>Oligota kashmirica benefica</i> (Predatory rove beetle)	Adult	Insect & Food Dip	3 DAT	> 100
<i>Harmonia axyridis</i> Asian ladybird beetle	Adult	Insect & Food Dip	5 DAT	> 100
	Larva	Insect & Food Dip	5 DAT	> 100
<i>Aphidoletes aphidimyza</i> (Predatory gall midge)	Larva	Insect & Food Dip	2 DAT	> 100
<i>Apanteles glomeratus</i> (Predatory bee)	Pupa	Insect Dip	6 DAT	> 200
<i>Encarsia formosa</i> (Predatory bee)	Pupa	Insect Dip	10 DAT	> 200
<i>Orius strigicollis</i> (Predatory bug)	Adult	Food spray	4 DAT	> 100
<i>Pardosa pseudoannulata</i> (Spider)	Larva	Food spray	2 DAT	> 200



*DAT: Days After Treatment

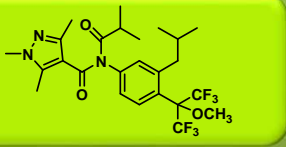
- Safe to Natural enemies and beneficial insects
- IPM compatible



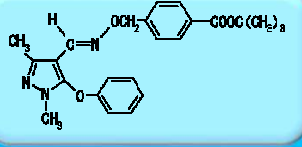
Combination Product (Pyflubumide 15% + Fenpyroximate 5% SC)



New A.I.
Pyflubumide
 ■ Spider mite efficacy
 ■ Long lasting efficacy
15%



Fenpyroximate
 ■ Spider mite, Broad mite and Rust mite efficacy
5%



Insecticidal spectrum



Tetranychus urticae



Panonychus citri



Panonychus ulmi



Polyphagotarsonemus latus



Phyllocoptruta oleivora

Pyflubumide: Spider mite
 Fenpyroximate: Spider mite, Broad mite, Rust mite

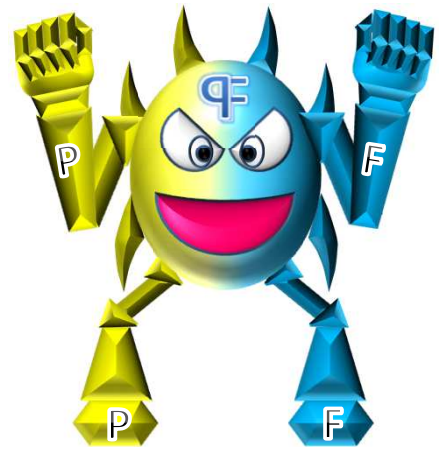
■ Toxicology of Combination product

Mammalian toxicity

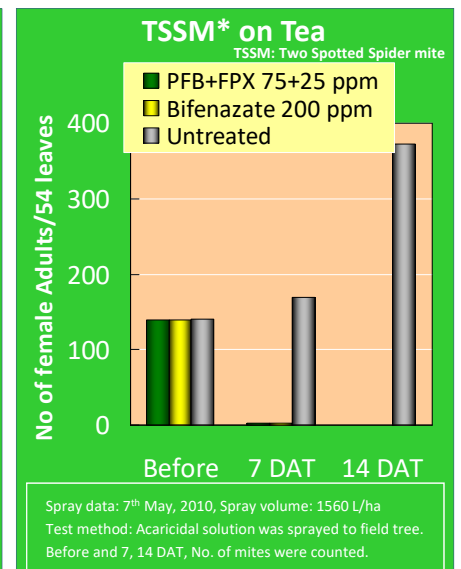
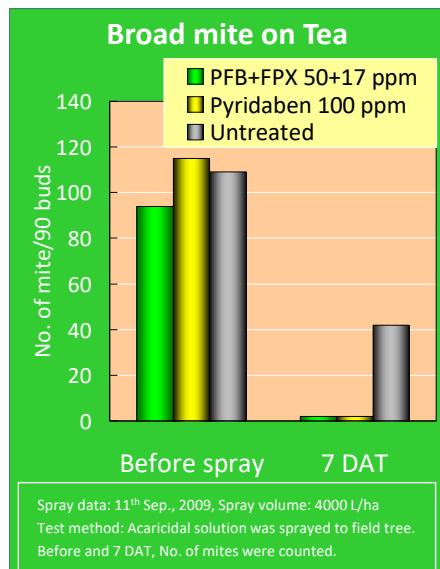
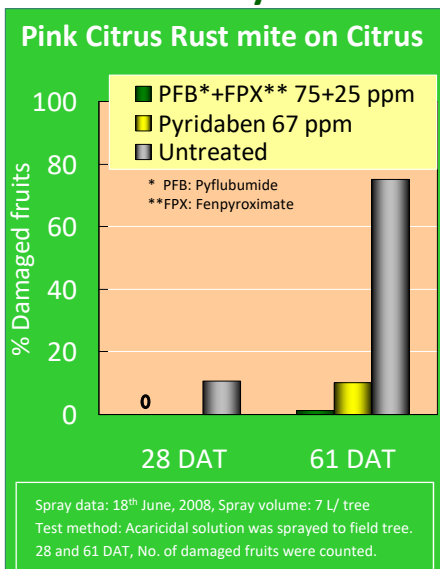
Acute oral LD ₅₀ (Rat)	:(female)	300 - 2000 mg/kg
Acute dermal LD ₅₀ (Rat)	:(male)	> 2000 mg/kg
Eye irritation (Rabbit)	:	Mildly irritant
Skin irritation (Rabbit)	:	Slightly irritant
Dermal sensitization	:(Guinea pig)	Negative

Ecotoxicity

Carp, LC ₅₀ (96hr)	:	0.18 mg/L
Daphnia, EC ₅₀ (48hr)	:	0.050 mg/L



■ Field Efficacy





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