Delphy
A Peterson Solutions company

Thrips management in strawberries

European IPM experience

Juliane Braun, Delphy

Focus for today

(1) Know the pest

(2) Start early

(3) Keep learning

Delphy
A Peterson Solutions company

What we don´t know about thrips

- A very ancient group of insects
- Only 10% of all trips species are harmful to plants
- Most of them feed on fungi
- Thrips are pollinators
- thigmotaxic behaviour – like to hide away in small cracks
- haploid males: develop from an unfertilised egg
- Rain and cold are the most dangerous abiotic factors for thrips

Delphy
A Peterson Solutions company

Why they are difficult

Behavior

Pollen supports reproduction. Flower/Fruits-inhabiting thrips can build inside the crop.

Speed

Warm weather shortens generation time, so a small population can become large quickly.

Shelter

Eggs are inside tissue; prepupae and pupae are protected or off the plant (soil, substrate).

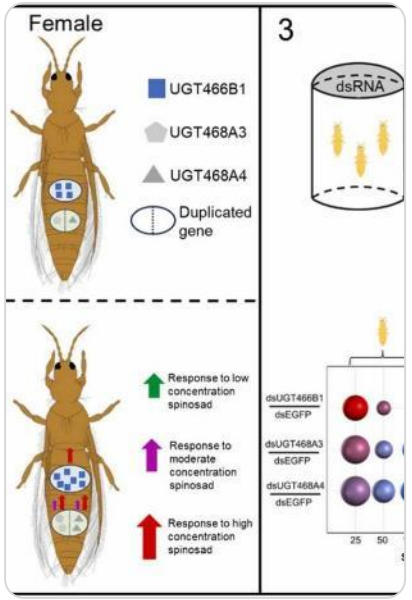
Resistance

Repeated insecticide use selects fast for less susceptible populations.



pmental Stage	Year	LT_{50} (°C)
AF	2010	38.9
	2016	40.0
	2022	39.6
AM	2010	36.9
	2016	39.7
	2022	40.5
L2	2010	36.9
	2016	40.2
	2022	41.0





Delphy
A Peterson Solutions company

Thrips species to confirm

Franklinella occidentalis – Western Flower Thrips (WFT)



- extremely polyphagous
- high potential for damage due to feeding on flowers, fruit and leaves
- rapid growth potential
- high resistance to insecticides
- able to defend itself against predators





References: Dr. Manfred R. Ulitzka, www.thrips-id.com

Delphy
A Peterson Solutions company

Thrips species to confirm

Franklinella intonsa – Intonsa Flower Thrips


female


2nd instar larvae

- a large influx via flowering plants (such as dandelions) possible
- summer dormancy during a drought (<30% relative humidity)
- polyphagous
- resistance to insecticides


male

References: Dr. Manfred R. Ulitzka, www.thrips-id.com

Delphy
A Peterson Solutions company

Thrips species to confirm

Thrips tabaci – Onion Thrips





- highly polyphagous
- a large influx in spring
- can displace WFT
- found more in leaves than in flowers
- body varying in colour from yellow to dark brown
- winter dormancy
- has developed resistance to nearly all major insecticide classes

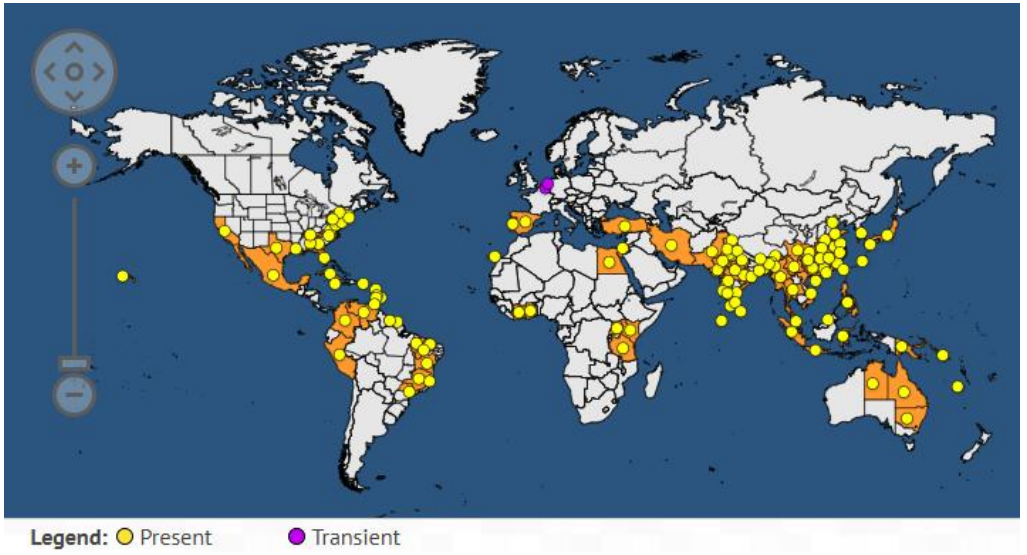
References: Dr. Manfred R. Ulitzka, www.thrips-id.com

Delphy
A Peterson Solutions company

Thrips species to watch for

Scirtothrips dorsalis – Chili Thrips





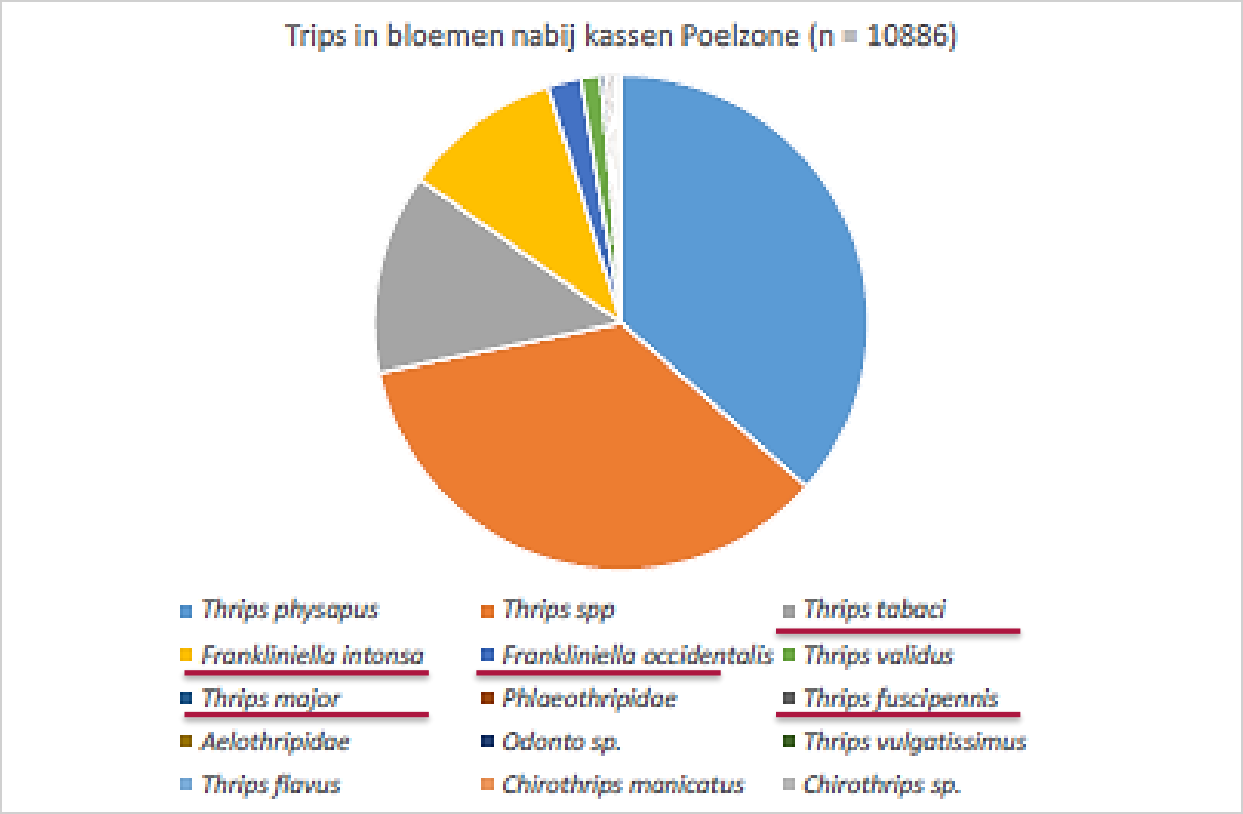
- ability to damage a wide variety of crops
- rapid reproduction (in 15 to 20 days) and widespread adaptability
- usually breeding on young leaves, but adults are sometimes collected from flowers

References: Dr. Manfred R. Ulitzka, www.thrips-id.com; https://gd.eppo.int/

Delphy
A Peterson Solutions company

Thrips cluster in Europe

Thrips species found in flowers nearby a greenhouse



References: Gerben Messelink, Wageningen University & Research

Delphy
A Peterson Solutions company

Damage pathway








Damage pathway



Leaf damage caused by *Thrips major*

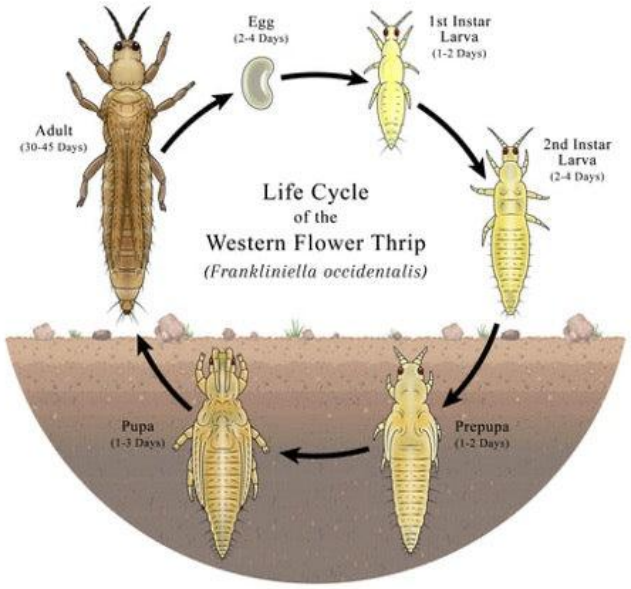


Confusion with Cyclamen Mite

Delphy
A Peterson Solutions company

Control windows

The life cycle tells us where each tool can act



Egg: poor spray exposure, beneficials (predatory mites)

Larva: in flowers, fruits – key predator target, does not fly

Pupa: substrate/soil, old leaves on soil/substrate, summer on leaves – predatory mites, nematodes, entomopathogenic fungi

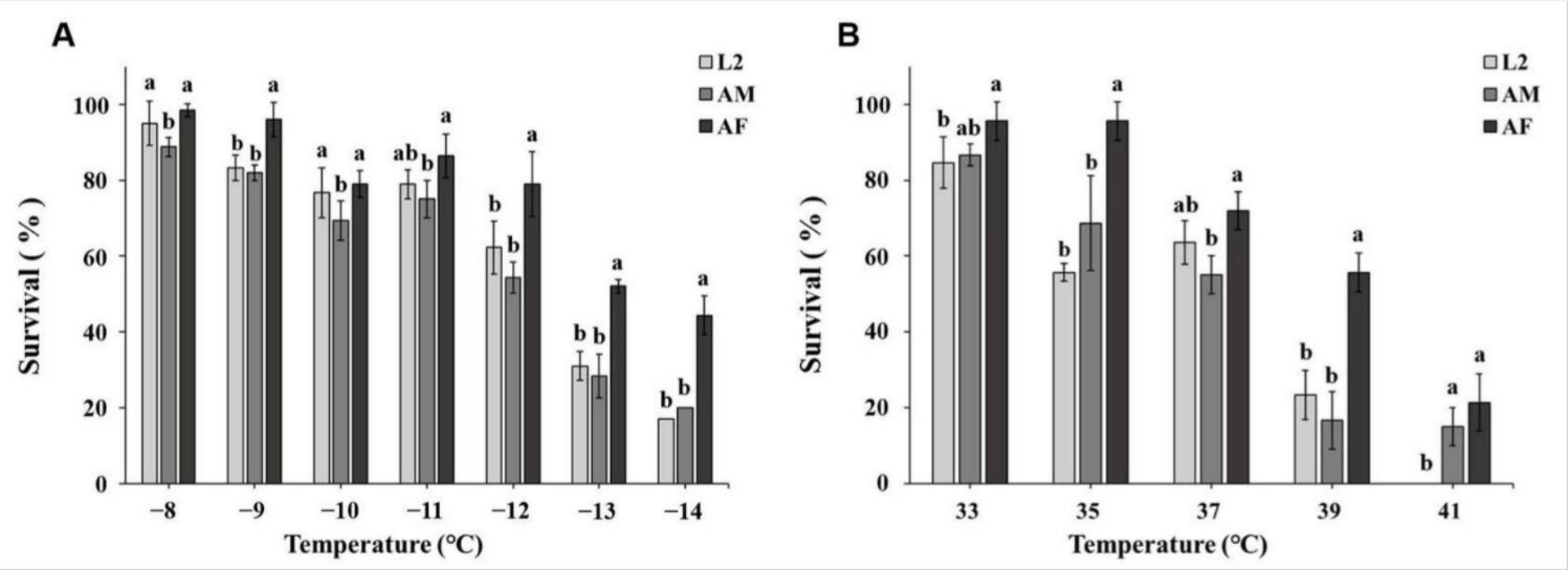
Adult: are weak flyers that rely on wind dispersal, trap-visible, spray contact is difficult, fly activity, strong predators are needed

Reference: https://soundhorticulture.com/blogs/news/thrips-control-and-intraguild-predation

Delphy
A Peterson Solutions company

Control windows

The life cycle depends on climate factors



Reference: Shu, L.; Li, H.; Chang, Y.; Du, Y. (2025):

Delphy
A Peterson Solutions company

Control windows

The life cycle depends on climate factors

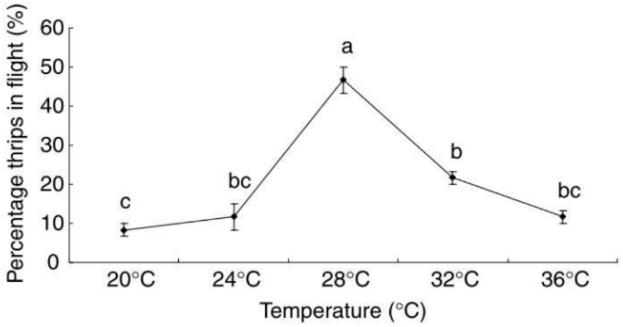


Fig. 6 The effect of temperature on the flight activity of *Frankliniella occidentalis* under 70% RH, 4 000 lux conditions. The percentage of thrips in flight is expressed as a ratio of flying thrips out of the total number (20 thrips = 100%). Each point represents the mean ± SE ($n = 3$). Data with different letters are significantly different by ANOVA and Tukey's test ($P \leq 0.05$).

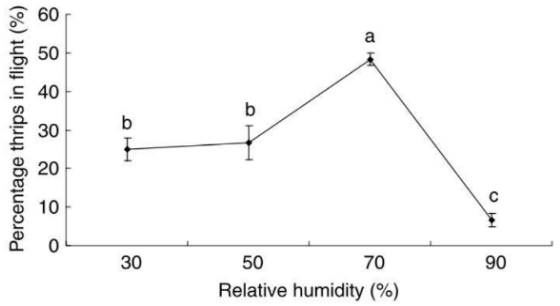


Fig. 7 Effect of relative humidity on the flight activity of *Frankliniella occidentalis* under 28°C, 4 000 lux conditions. The percentage of thrips in flight is expressed as a ratio of flying thrips out of the total number (20 thrips = 100%). Each point represents the mean ± SD ($n = 3$). Data with different letters are significantly different by ANOVA and Tukey's test ($P < 0.05$).

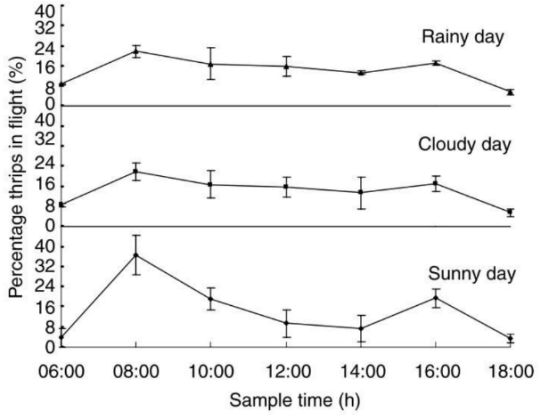


Fig. 2 Effect of weather on the flight activity of *Frankliniella occidentalis*. Each point represents the mean ± SE ($n = 3$) of the percentage of thrips in flight relative to the total thrips counted on all cards on each day.

Reference: Liang et al. 2010

Delphy
A Peterson Solutions company

Before pressure rises

A clean start buys time for biological control

- Inspect incoming plants and keep propagation areas separate from fruiting crops
- Remove old flowers, crop debris and volunteer host plants that maintain populations
- In open-field beds, map nearby flowering weeds and field edges
- Start with Monitoring: sticky traps/rolls (blue or yellow; + pheromones)

Biological control

Beneficials need to arrive early

- Predatory mites
  - need scheduling and protection
  - Release early, repeat and verify
- Anthocorid bugs
- Rove beetles and soil-dwelling predatory mites predate on thrips pupae in the soil
- Entomopathogenic nematodes (EPN) can be used to control thrips in the soil and on the leaves (*Steinernema feltiae*)
- Entomopathogenic fungi (EPF) can be used as foliar sprays in flowering crops to reduce adult thrips, if humidity conditions are high enough (Beauveria)

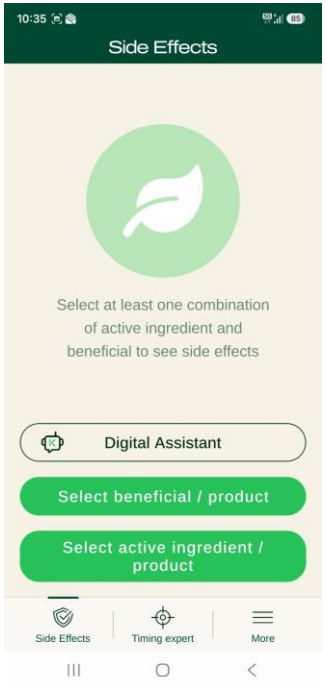
Delphy
A Peterson Solutions company

Biological control

Beneficials need to arrive early

- Check side effects of pesticides (example: use the side effect app from Koppert or Biobest)







Delphy
A Peterson Solutions company

Biological control

Wich predatory mite should I use?

Predatory mite species	Spider mite	Thrips	White fly	Pollen
Phytoseiulus persimilis	++++[1)]	-	-	-
Neoseiulus californicus	+++	+	+	++
Neoseiulus cucumeris	+	+++	+?	+++
Amblyseius swirskii	+	+++	+++	+++
Amblydromalus limonicus	+(+)	++++	++++	++
Transeius montdorensis	+	++++	++	+++
Amblyseius andersoni	+	+++	++	+++

Delphy
A Peterson Solutions company

Biological control

Wich predatory mite should I use?



Neoseiulus cucumeris



Amblyseius swirskii
T. montdorensis



Amblydromalus limonicus





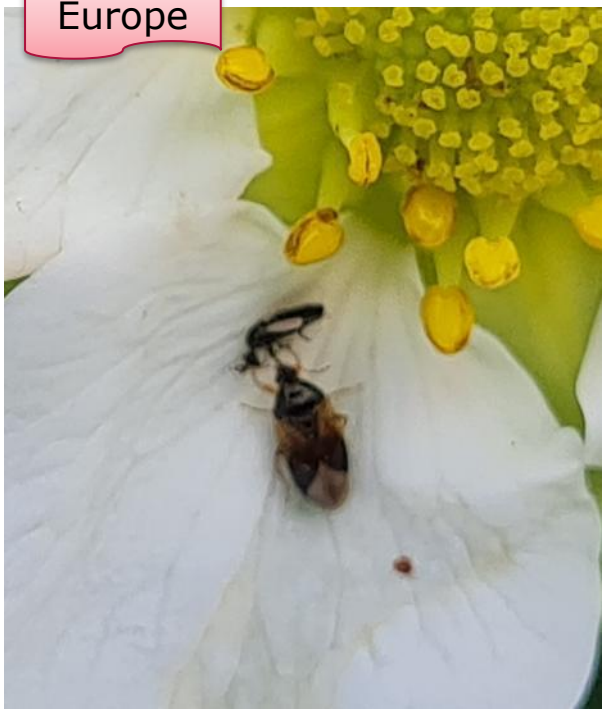


Delphy
A Peterson Solutions company

Biological control

Other predators – minute pirate bugs

Europe



Orius laevigatus



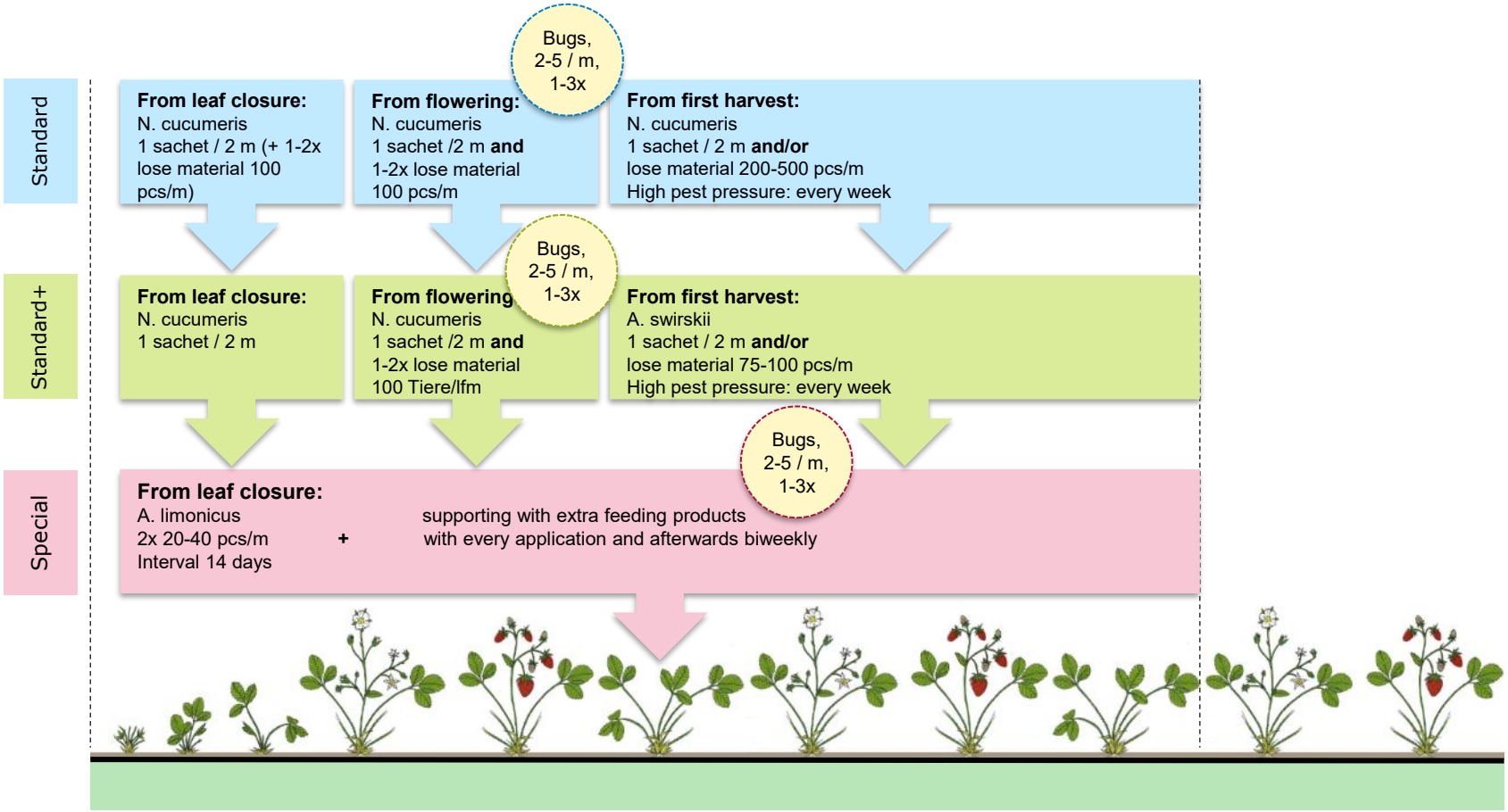
Buchananiella whitei

- Adults eat all thrips stages
- Nymphs only eat thrips larvae
- apply >18°C, in long day conditions (>12 h light)
- when strawberry flowers appear in large numbers (need pollen for development)

Delphy
A Peterson Solutions company

Thrips control in strawberry

Control program for everbearers/under cover



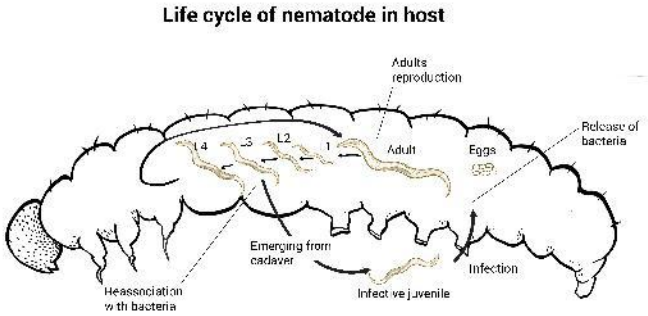
Delphy
A Peterson Solutions company

Thrips control in strawberry

Solutions for soil/substrate



Nematode *Steinernema feltiae*



Stratiolaelaps scimitus



- To control prepupa and pupa in soil
- Apply in spring, summer & early autumn
- Leaf application of nematodes is possible
- Optimal climate factors are needed
- Release once the predatory mite with 250/m^2

Delphy
A Peterson Solutions company

Biological control

Thrips are also beneficials

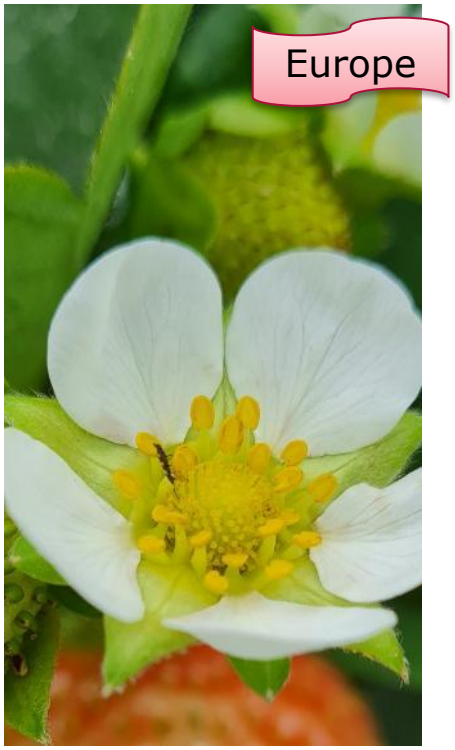
Franklinothrips vespiformis („Frankie“)





Aeolothrips intermedius





Delphy
A Peterson Solutions company

Biological control

Support through additional flowers









Delphy
A Peterson Solutions company

Cultural measures

Reduce the load on sprays

- Flowering weed control
- Sticky traps for adults (blue and yellow)
- Crop hygiene (canopy access)
- Physical exclusion (netting, closing doors, hedges)

Delphy
A Peterson Solutions company

Cultural measures

Reduce the load on sprays





Delphy
A Peterson Solutions company

Plant Protection Products

Timing, application technique and product rotation

- Use sprays for clear decision points: rising larvae, crop risk, (hot spots) or rescue situations
- Choose products by beneficial compatibility (if possible)
- Treat a generation (2-4 weeks), then change the selection pressure
- Enough water volume, correct nozzle
- adjuvants or additives, which can increase plant penetration (poor coverage can look like resistance!)
- Use chemical clean up sprays at the beginning and end of the season where appropriate

Delphy
A Peterson Solutions company

Strawberry withholding periods in NZ -- August 2026

STRAWBERRY GROWERS NZ

The following list of pesticides is not exhaustive, but is a guideline developed to assist NZ strawberry growers.

INSECTICIDE	Example product	Resistance group	WHP	Residue limit NZ (ppm)	Re-Entry (hours)	aphids	whitefly	caterpillars	thrips	mites	Effect on Persimilis	Effect on Cucumeris	Notes
											Mortality to predatory mites: 0–25%, 25–50%, 50–75%, 75–100%		
buprofezin	Ovation	16	BF	0.1*	12		✓						IGR, immatures only. *persimilis* -somewhat harmful; *cucumeris* -safe
clofentezine	Apollo	10A	BF	0.1*	12					✓			spider mite eggs (not cyclamen mite)
etoxazole	Paramite	10B	BF	0.1*	12					✓			eggs and immatures, adults; translaminar. Harmful to persimilis (kills eggs)
fenpyroximate	Pyromite	21	BF	0.1*	12					✓			Max 1 application/season (kills persimilis eggs)
pyriproxyfen	Admiral	7C	BF	0.1*	12		✓						IGR, immatures only. Slightly harmful to *persimilis* , short residual
pymetrozine	Chess	9B	BF	0.1*	12	✓	✓						feeding inhibitor, slow acting. (spray or drench)
spiromesifen	Oberon	23	BF	0.1*	12					✓			Also cyclamen mite.
spirotetremat	Movento	23	BF	0.1*	24	✓		✓		✓			systemic in plant
abamectin	Avid	6	3	0.02	12					✓			translaminar. Max 3 applications/season **Repeat every week, plant/fruit damage is possible**
azadiractin	Neem products	18B	1	exempt	4	✓	✓		✓				IGR, immature stages only. Slightly harmful to persimilis.
bacillus thuringiensis	Delfin	11B2	1	exempt	4			✓					spray in evening; sun inactivates
beauvaria bassiana		fungus	1	exempt	4	✓	✓		✓	✓	unknown		entomopathic fungus on insects and mites. Needs high humidity, 15–32°C. Not compatible with fungicides **Repeat several times**
carbaryl	Sevin	2	1	3	288	✓	✓	✓	✓				mirids; toxic to bees. REI 12 DAYS (NZ Worksafe)
cyantraniliprole	Benevia	28	3	0.1*	12	✓	✓	✓	✓				nontoxic to persimilis, some toxicity to cucumeris **Less effect on WFT/IFT**
milbemectin	Mit E Mec	6	3	0.2	12					✓			active on eggs
pirimicarb	Pirimor	1	1	1	when dry	✓							1 day whp on outdoor crops; under cover can take longer
pyrethrins	Pyganic	3	1	1	12	✓			✓				Use evening application. Harmful to predators but short residual **Temps <25°C, plant damage is possible**
spinetoram	Sparta	5	3	0.1*	4			✓	✓				**Harmful to beneficials, risk of resistance**
spinosad	Entrust	5	5	0.1*	4			✓	✓				Max 3 applications/year **Harmful to beneficials, risk of resistance**
sulfoxaflor	Transform	4C	7	0.1*	24	✓	✓						
sulfur	Kumulus	M2	1	exempt	24					✓			Moderately harmful to predatory mites; short residual

Abbreviations: **BF = use only BEFORE the first flowering** **0.1* = no residue level listed for strawberries. If no residue tolerance is established, the 'default' is 0.1ppm**

Delphy
A Peterson Solutions company

Decision Matrix

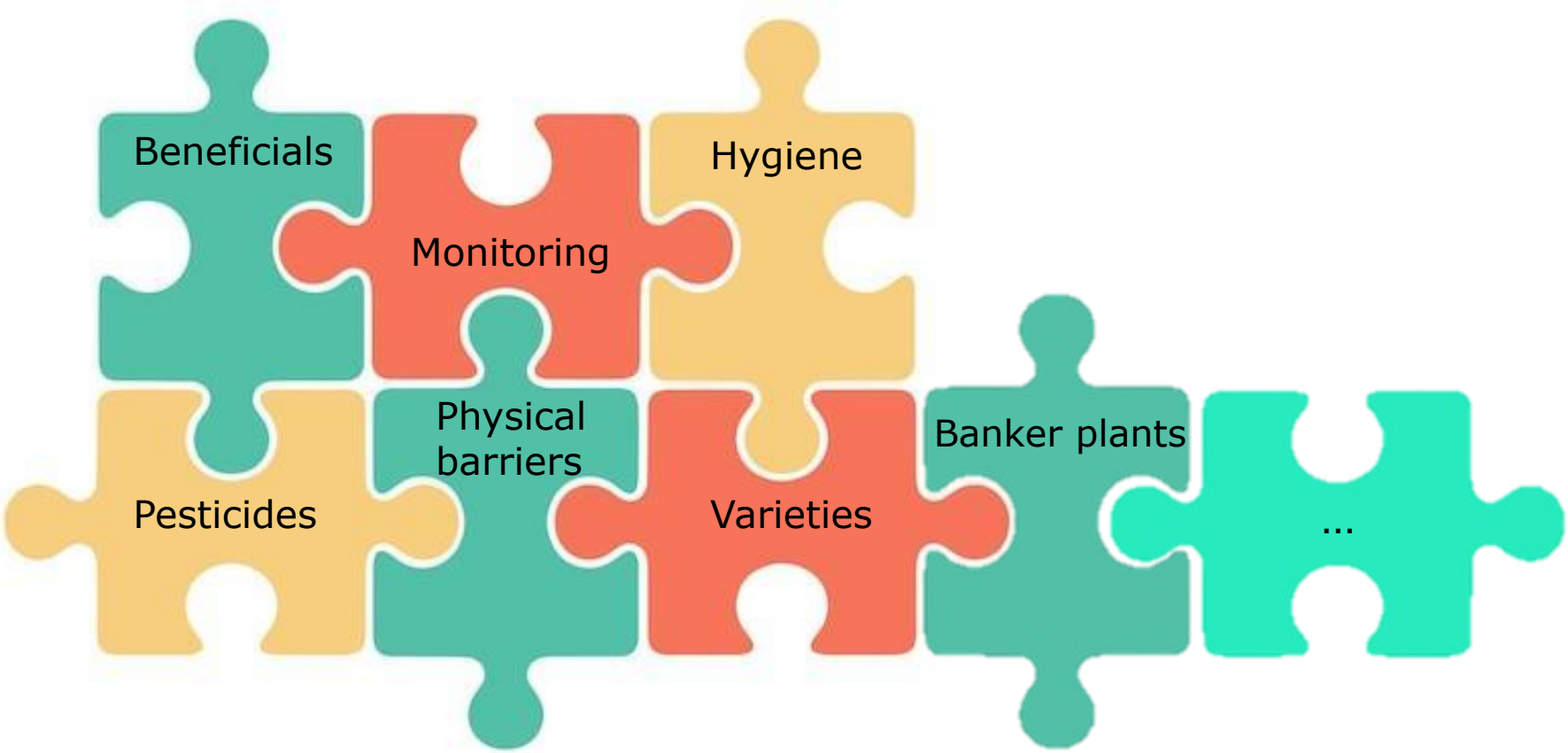
Keeps the programme disciplined

Situation	Biological response	Cultural / trap response	Chemical response
No/low thrips pressure	Maintain releases and verify establishment of beneficials	Continue routine monitoring, crop hygiene, weed managément, physical barriers	No thrips spray
Adults rising	Check predator levels and release timing	Review traps, weeds and crop edges, flower checks	Prepare option; do not panic spray
Larvae increasing, first damage	Increase or reinforce predators	Focus flower checks and hot spots	Spray with low risk products (not harmful to beneficials)
Strong damage appearing	Protect next flush; re-establish beneficials	Remove reservoir pressure where practical	Use labelled MoA; then rotate, spray in blocks

Delphy
A Peterson Solutions company

Combine puzzle pieces

Every grower has a different puzzle



Delphy
A Peterson Solutions company



Juliane Braun
Consultant Soft Fruit

+31 6 20 34 17 34
j.braun@delphy.nl
www.delphy.nl

Delphy
A Peterson Solutions company