Integrated flower *Thrips* control in field production of strawberry

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Flower *Thrips* control in the Netherlands

- Zero tolerance
- Until 2013 application pyrethroid deltamethrin (Decis) during blossoming
- From 2014 maximal 3 applications **before** blossoming
- Negative effect on natural enemies
- Developing biological alternatives is urgent

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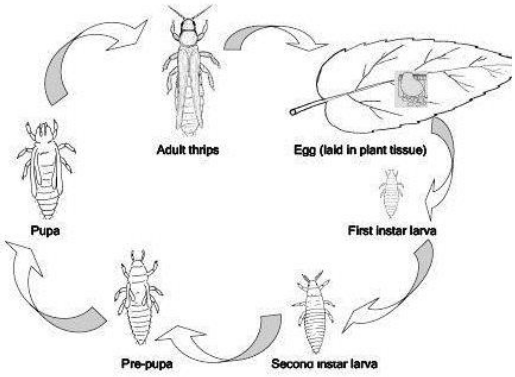
Thrips species

World wide many harmfull thrips species

- In leek and cabbage only 1 species: *Thrips tabaci*
- In strawberry also other species:
  - *Frankliniella intonsa*
  - *F. occidentalis*
  - *Thrips fuscipennis*
  - *T. major*



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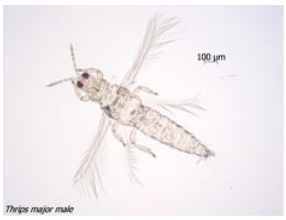
Thrips species in strawberry



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Thrips attack in cage trial on 29 june 2009

Assessment of thrips attack:

- 0 = none; 1 = very low
- 2 = moderate; 3 = heavy

- *F. intonsa:* 2,3 bc
- *F. occidentalis:* 2,5 c
- *T. fuscipennis:* 1,5 bc
- *T. major:* 1,4 ab
- *T. tabaci:* 0,4 a

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Field experiments 2011, 2012 & 2013

- 3-4 planting dates: April 10 to July 6, cv. Elsanta
- Spraying deltamethrin according practice
- Applying predatory mites or *Orius majusculus* bugs before first blossoming
- Mulching with white plastic film: UV reflection
- Lure & retain natural enemies with catch plant *Alyssum* and attractant

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Observations

- Monitoring thrips by blue sticky traps and attractant Lurem
- Counting and determination thrips in flowers
- Classify thrips damage in white fruit stage
- Detection and determination natural enemies

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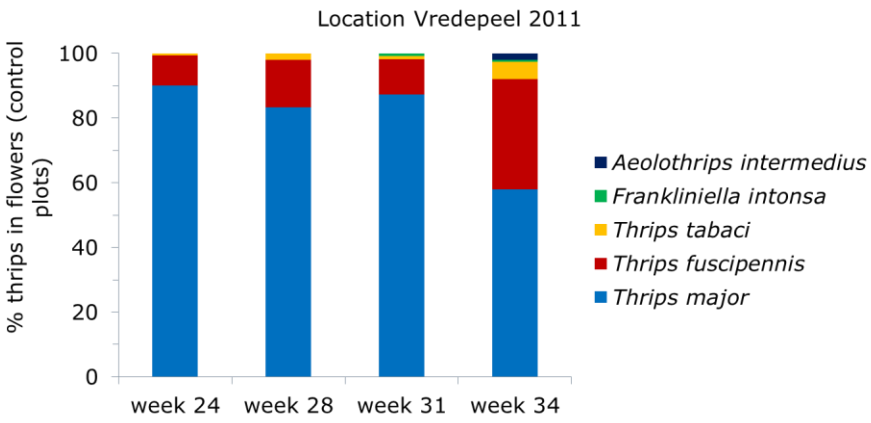
Thrips spp. in flowers



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Classification *Thrips* attack white fruit stage planting 1 on op 18 July 2012

Object	% none	% moderate	% not marketable
Untreated	63	23	14
Deltamethrin	83	10	7
Orius sp.	73	13	14
Mulching	85	12	3

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Classification *Thrips* attack white fruit stage planting 3 on 14 August 2012

Object	% none	% moderate	% not marketable
Untreated	78	22	0
Deltamethrin	98	2	0
Orius sp.	95	5	0
Mulching	94	6	0

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Effect of mulching on # thrips larvae in 20 flowers

Date (2012)	Plantation	# larvae Mulch	# larvae Untreated
July 12	1	5	16
July 31	2	35	107
August 6	3	120	206

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Classification *Thrips* attack white fruit stage planting 3 (avg. 13 & 20 august 2013)

Object	% none	% moderate	% not marketable
Onbehandeld	59	32	9
Decis	80	17	3
Orius sp.	68	28	4
Mulching	78	21	1

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Detection and determination of natural enemies

- Later in the season *Orius majusculus* and *O. niger* are mostly found in the flowers. Also *Orius* nymphs are detected
- After releasing predatory mites, only a few number were retrieved, mainly on strawberry leaves
- The *thrips* predatory fly *Platypalpus sp.* was detected regularly

Photo: Anton van der Linden

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Discussion & conclusions

- Later in the season fully biological control could be realized at presence of natural enemies: *Orius sp*., predatory mites and predatory flies
- Mulching with white plastic film reduces significantly the number of thrips larvae and subsequently thrips damage of the fruit
- Improvement of biodiversity near and in strawberry production fields, lure and retain strategies can enhance the population of natural enemies and sharply reduce the use of chemicals for thrips control
- The possible role of Entomopathogenic Fungi (*Beauvaria*, *Metarhizium etc.)* in thrips control can be evaluated further

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