Towards a system of non-chemical flower *Thrips* control in strawberry production

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Current practice in flower Thrips control NL

- Zero tolerance
- Application pyrethroid deltamethrin (Decis) during blossoming
- Up to 3 sprayings a week; from 2013 limitation in # sprayings
- Negative effect on natural enemies
- Developing biological alternatives highly recommended





Thrips control

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





Thrips species in strawberry











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





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 bugs before first blossoming
- Mulching with white plastic film
- Lure & retain natural enemies with catch plant Alyssum and attractant





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







Thrips spp. on sticky traps





Thrips spp. in flowers



Location Vredepeel 2011

- Aeolothrips intermedius
- Frankliniella intonsa
- Thrips tabaci
- Thrips fuscipennis
- Thrips major



Thrips spp. in flowers





Classification *Thrips* attack white fruits planting 1 on 25 July 2011

Object	% none	% moderate	% not marketable
Untreated	33	36	31
Deltamethrin	83	12	5
N. alpinus	37	26	37
N. reductus	36	30	34



Classification *Thrips* attack white fruits planting 3 on 22 August 2011

Object	% none	% moderate	% not marketable
Untreated	68	26	6
Deltamethrin	76	17	7
N. alpinus	66	24	10
N. reductus	75	21	4



Classification *Thrips* attack white fruits 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



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



Detection and determination of natural enemies

- From plantation 2 or 3 Orius majusculus and O. niger are abundant in the flowers. Also Orius nymphs are detected
- After applying, the predatory mite Neoseiulus reductus was retrieved on strawberry leaves
- The thrips predatory fly Platypalpus sp. was detected during 2011



Photo: Anton van der Linden



Discussion & conclusions

- Only at the first plantation an effective thrips control by Deltamethrine was realized compared to biological control: It needs time to establish natural enemies
- Later in the season from plantation 2 or 3 fully biological control could be realized at presence of natural enemies: Orius sp., predatory mites and predatory flies
- Mulching with plastic film is also a possibility to reduce significantly the number of thrips larvae and damage
- Development of effective monitoring methods, lure and retain predatory bugs and other natural enemies can sharply reduce the use of chemicals against thrips



Future outlook

- Further development of application methods predatory bugs, mites or flies
- Improvement of systems for `lure & retain' Orius spp.
- Construct and design of alternative cultivation systems with mulching in combination with natural enemies





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