Biological control, according to an IPM system, of western flower thrips *Frankliniella occidentalis* on rose under greenhouse conditions in Liguria Region, Italy

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Research Unit for floriculture and ornamental species was established on 1925 in order to enhance the development of floricultural crops in the Italian Riviera and to assist farmers.

Since 1999 the Institute belongs to CRA (Agricultural Research Council) depending on Ministry for Agricultural Politics (MiPAAF), with national characters.

A. Old building
B. Experimental greenhouses,
C. New buildings
D. Physiology Laboratory

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Research carried out with the financial support of Italian Ministry of Agriculture, Flordefender Project

- Objectives

The project aims at increasing the diffusion of alternative control measures applied on flower and ornamental crops against key pests and diseases.

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2. Evaluation of the activity of a nematode (*Steinernema feltiae*) based formulation to be applied on flowers and leaves for the control of thrips (*Frankliniella occidentalis* and Thrips tabaci) two of the most dangerous and widespread pests in open field and greenhouse crops, both TSWV vectors.

Rose cultivation in Liguria Region (2011)*

- 65 he under greenhouse
- 5 he in field
- 32.5 millions pieces from greenhouse
- 1.7 millions pieces from field

* ISTAT 2011, temporary processing by Dr. F. Gimelli, Floricultural Service Centre, Liguria Region.

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Greenhouse trials 2009- 2010

Host: Rose cv Pretty woman, soilless system

Target: *Frankliniella occidentalis*

Material and methods:

28 randomized blocks (7 treatments,4 replicates)

9 roses /block

5 spraying treatments applied weekly

Trial 1: 2009 Trial 2: 2010

Berlese funnel modified according to Bournier (sampling through spirit of turpentine)

Treatments

Product	Active compound	Amount/hl
Nemasys	*Steinernema feltiae*	250000000 nem.
Naturalis	*Beauveria bassiana* strain ATCC 74040	125ml
Naturalis	*B. bassiana strain ATCC 74040* applied into the soilless substrate (2009)	1,5 l/ha
Naturalis + Neemazal	*B. Bassiana* strain ATCC 74040 + Azadiractine applied into the soilless substrate (2010)	125 ml/hl + 150 ml
Neemazal T/S + Pyganic	Azadiractine + Pyrethrins	300ml + 250 ml
Laser	Spinosad	20ml
Test	-	-

Results 2009

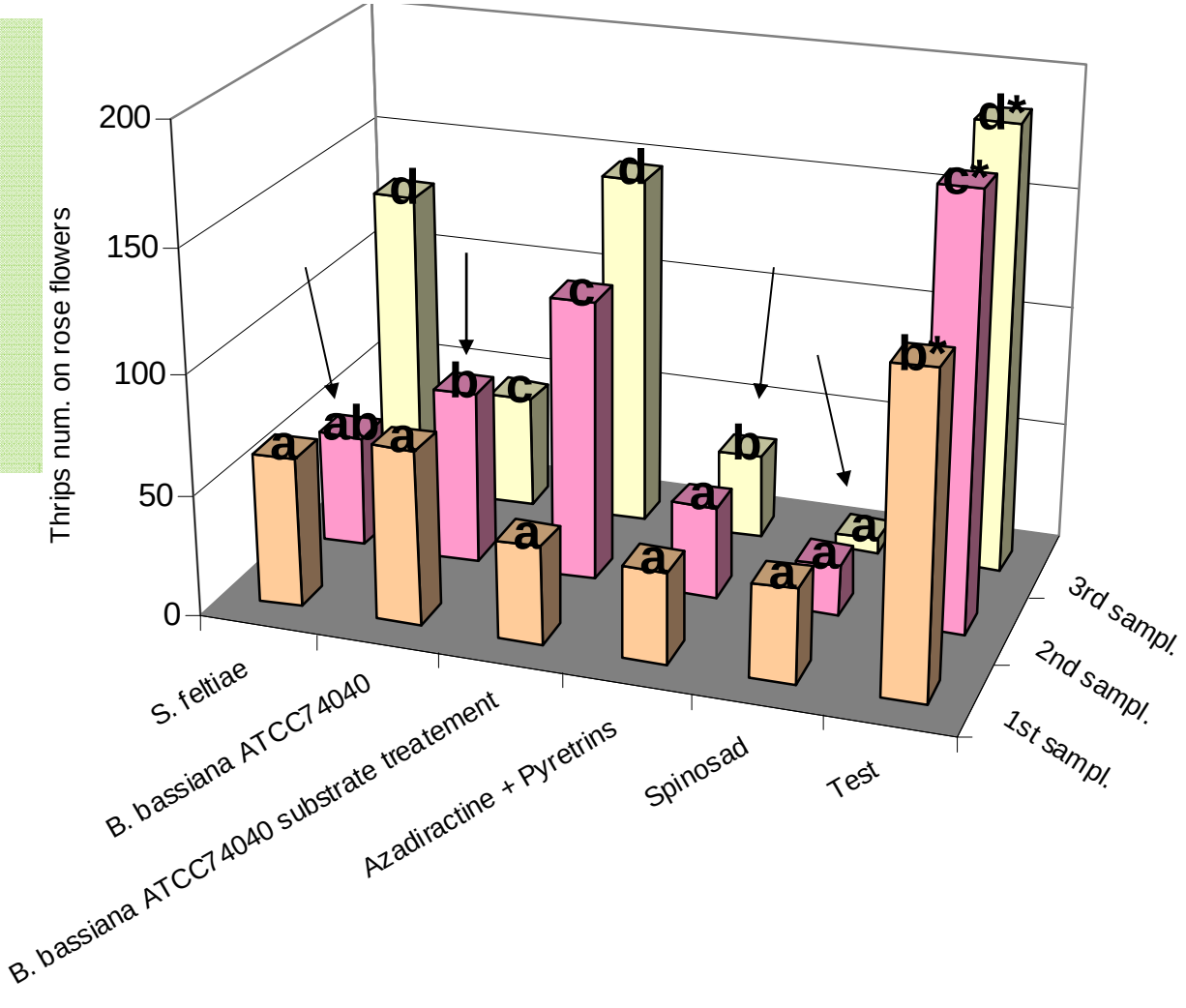
3 samplings since first treatment:

1st week

4th week

8th week

Thrips damages on rose.



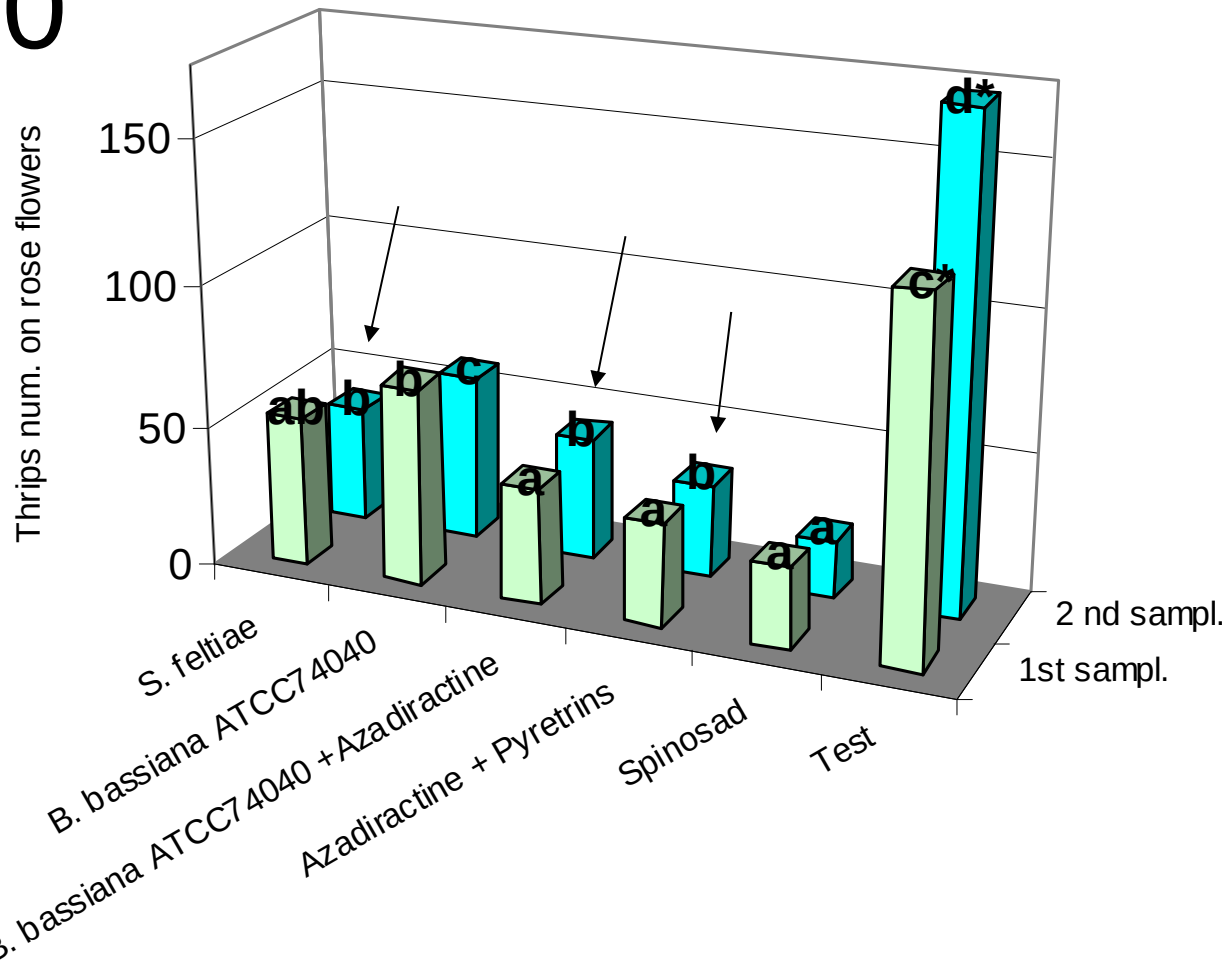
*Values of mean no. thrips followed by the same letter are not significantly different according to Tukey Test(P= 0.05).

Results 2010

2 samplings since first treatment:

11 days

4 weeks



Thrips adults

*Values of mean no. thrips followed by the same letter are not significantly different according to Tukey Test (P= 0.05).

CONCLUSION

- treatments with Spinosad and Azadiractine in combination with pyrethrins provided the lowest thrips infestations both in 2009 and 2010 for all the duration of trials.
- between biological pest controls, application of *S. feltiae* (2009 and 2010) and *B. bassiana* ATCC 74040 (2009) did result in significant lower thrips populations at 4 weeks from first treatment.
- *B. bassiana* ATCC 74040 in combination with Azadiractine showed more significant decrease of thrips infestations than when it was applied alone (year 2010).
- results recorded with *B. bassiana* trials could be basically comparable to those assessed with Azadiractine in combination with pyrethrins.

SAPONINS

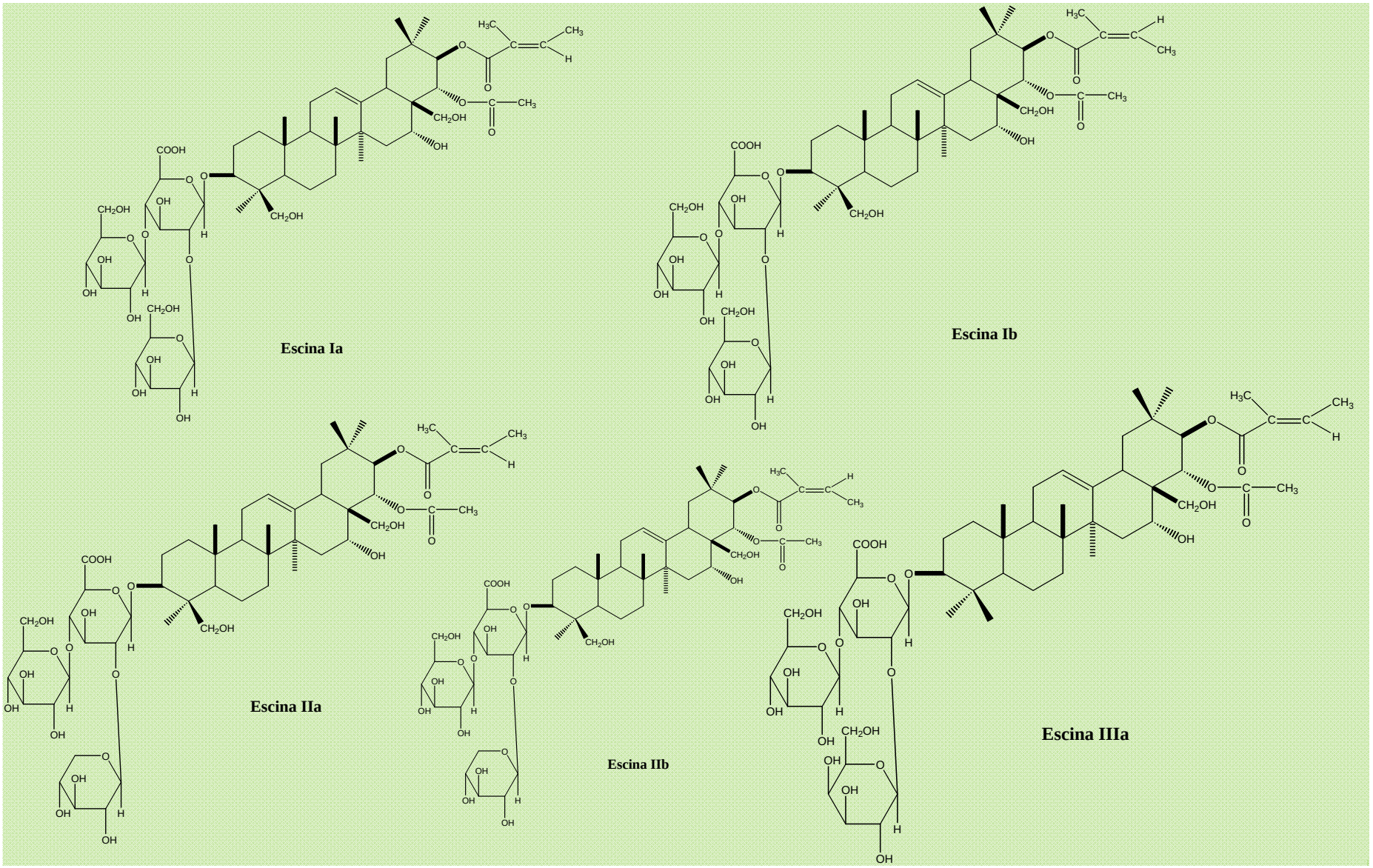
***Aesculus pavia* foliar saponins: defensive role against the leafminer *Cameraria ohridella*.**

C. Ferracini, P. Curir, M. Dolci,V. Lanzotti and A. Alma (**2010**)
Pest management Science 66: 767–772

Among the Aesculus genus, A. pavia L. HBT genotype, characterized by red flowers, showed an atypical resistance towards *C. ohridella*.

The aim of the work was to isolate and identify *A. pavia* HBT genotype leaf saponins and test their possible constitutive defensive role in this plant against C. ohridella by assaying their effect on the common *C. ohridella* - susceptible A. hippocastanum in order to prevent leafminer attack.

Aesculus pavia



Chemical structure of Saponins from *A. pavia* extract.

RESULTS Spectroscopic analyses showed that *A. pavia* HBT genotype leaves contained a mixture of saponins, four of which were based on the same structure as commercial escin saponins, The mixture showed a repellent effect on *C. ohridella* moth. The number of mines detected on the leaves of *A. hippocastanum* plants treated with *A. pavia* HBT saponins through watering and stem brushing was significantly lower than the control, and in many cases no mines were ever observed.

CONCLUSION: The results showed that the exogenous saponins were translocated from roots/stem to the leaf tissues, and their accumulation seemed to ensure an appreciable degree of protection against the leafminer.

A. pavia

Preliminary saponins greenhouse trials

Host: Rose cv “Micol” growing in plots, soilless system

Target: *Frankliniella occidentalis*

Material and methods:

28 randomized blocks (7 treatments,4 replicates)

sampling 8 flowers /block

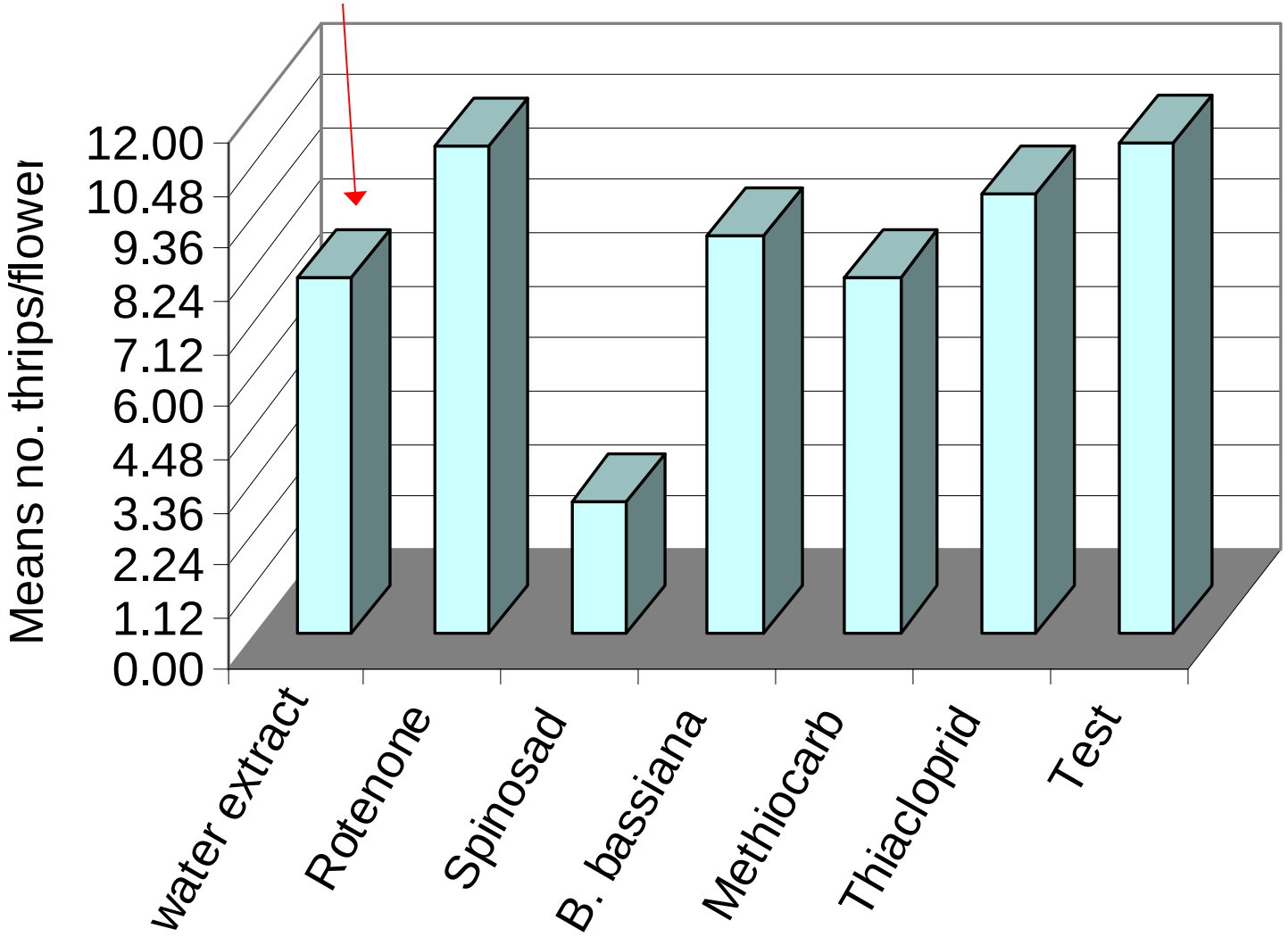
9 treatments by spraying weekly

2 months trial

Treatments

Active compound	Amount (g/l)
A. pavia leaves water extract	63 ppm/l
Rotenone	15
Spinosad	12
B. bassiana	8,6
Methiocarb	100
Thiacloprid	12
Test	-

Results


Means no. thrips/flower
12.00
10.48
9.36
8.24
7.12
6.00
4.48
3.36
2.24
1.12
0.00
water extract
Rotenone
Spinosad
B. bassiana
Methiocarb
Thiacloprid
Test

Greenhouse trials (University of Turin, DIVAPRA, Prof. A. Alma and dr. C. Ferracini)

Host: Rose cv “Baccarat” growing in plots
Target: *Frankliniella occidentalis*

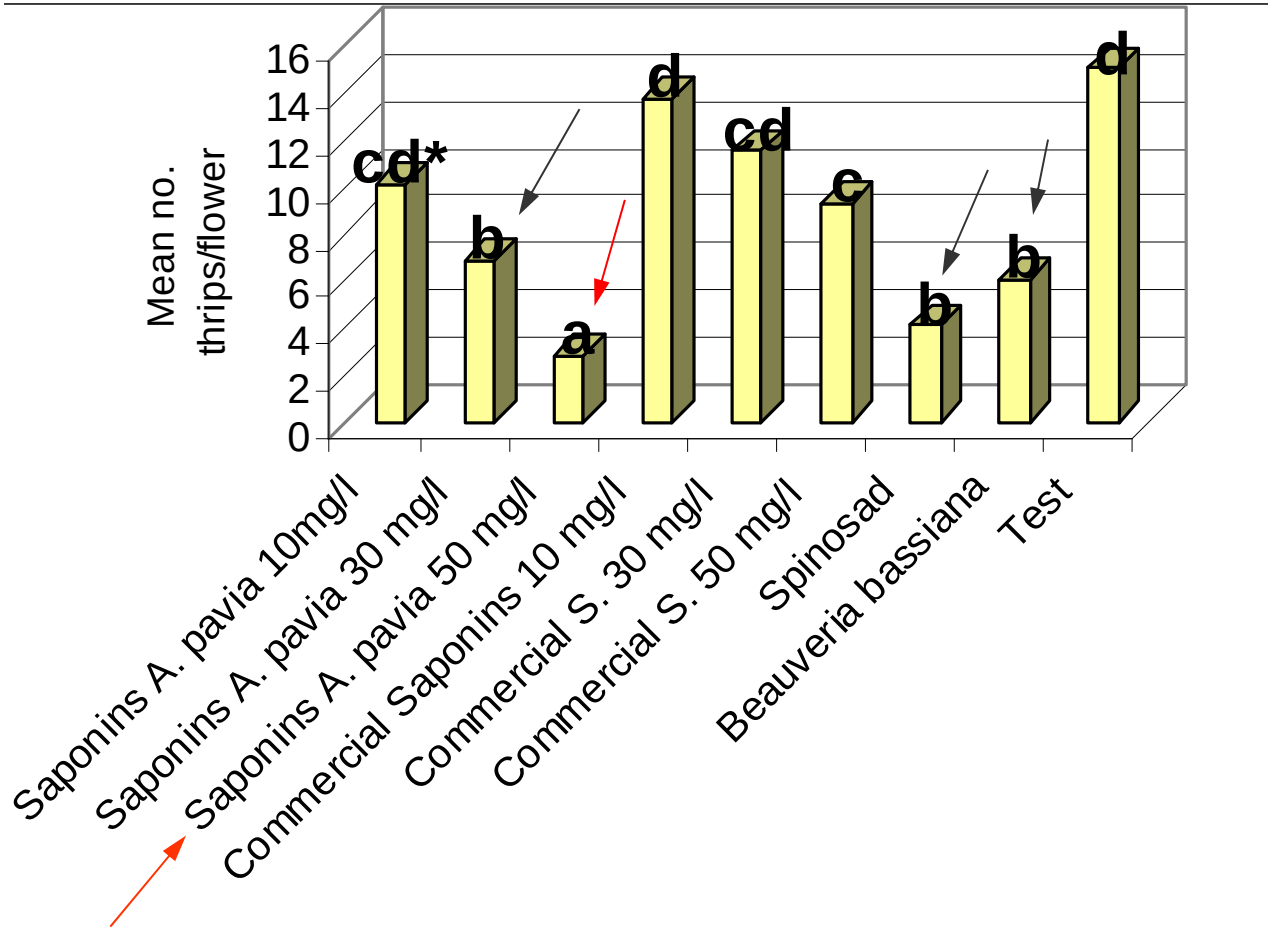
Material and methods:
20 randomized blocks (5 treatments, 4 replicates)
sampling 100 flowers /block
sampling 7, 14 and 21 days after treatment
Trial: 30 days (march – april)

Treatments

Active compound	Amount (mg/l)
Saponins Aesculus pavia	10
Saponins Aesculus pavia	30
Saponins Aesculus pavia	50
Commercial Saponins Quillaia	10
Commercial Saponins Quillaia	30
Commercial Saponins Quillaia	50
Spinosad	12
Beauveria bassiana	8,6
Test	-

Results

Lowest mean number of thrips per flower after treatments with Saponins applied at 50 mg/l. *B. bassiana*, Spinosad and Saponins (30 mg/l) application showed a lower insecticidal activity but significantly higher than test and Commercial saponins.



* Values of mean no. thrips followed by the same letter are not significantly different according to Tukey Test (P= 0.05).

Conclusion

- Results confirm the possible and successful application of non chemical methods for pest control.
- Set up of integrated strategies based on the validation of protocols through experimental trials in semi-commercial scale.
- **Biopesticides** applied in combination provided a satisfactory pest control in rose cultivation (Azadiractine and Pyrethrins, *B. bassiana* and Azadiractine, Spinosad).
- **Flordefender Project** will lead to a reduction of the rate of pesticides applied for pests and pathogens control on flower and ornamental crops and, therefore, to an increased sustainability of such crops.

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Conclusion

•After this promising result, further investigations will be carried out to study in detail the influence of this **saponin** on *C. ohridella*, with particular attention to its possible antifeedant, growth inhibitory or oviposition-deterrent activity.


THANK YOU FOR THE ATTENTION!
ANY QUESTIONS?