Preliminary evaluation of different insecticides against Philaenus spumarius

Dongiovanni E., Di Carolo M., Fumarola G., Tauro D., CAVALIERI v., Altamura G., Saponari M., Porcelli F.

FIELD LOCATION

TRIAL:	A	B	C
FIELD LOCATION:	Ruffano (Le)	Cisternino (Br)	Locorotondo (Ba)
CULTIVAR:	Cellina di Nardò	Cerasola	Ogliarola
DISTANCE BETWEEN ROWS (m):	6 x 6	5 x 5	5 x 5

TESTED PRODUCTS

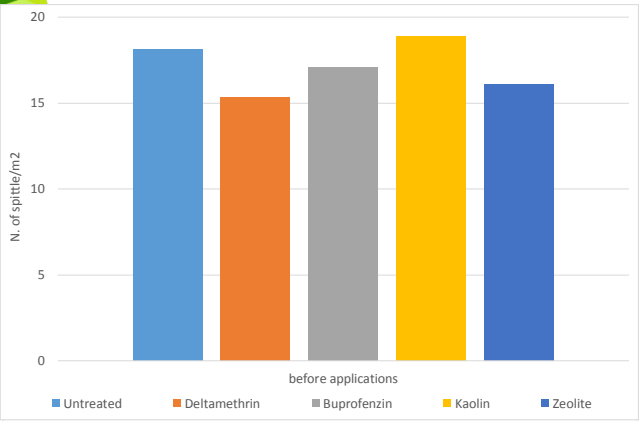
Thesis N.	Active substances (a.s.)	Comercial products	Concentration s.a. (g/L or %)	Rate (g or mL/hL)	Trial		
					A	B	C
2	Deltamethrin	Decis Evo	(2,42%) EWO	80	x	x	
3	Imidacloprid	Confidor 200 O-Teq	(200 g/L) OD	112		x	x (2 trt)
4	Buprofenzin	Applaud Plus	(25%) PB	150	x	x	
5	Kaolin	--	(95%) PB	4	x	x	x (2 trt)
6	Rock dust (zeolite)	Microlit Ultra	[Clinoptinolite + mordenite (65%) Quarzo + calcite + feldspato (35%)]	600	x	x	
7	Sweet citrus oil	Prev-AM	(6%) L	800		x	x (2 trt)

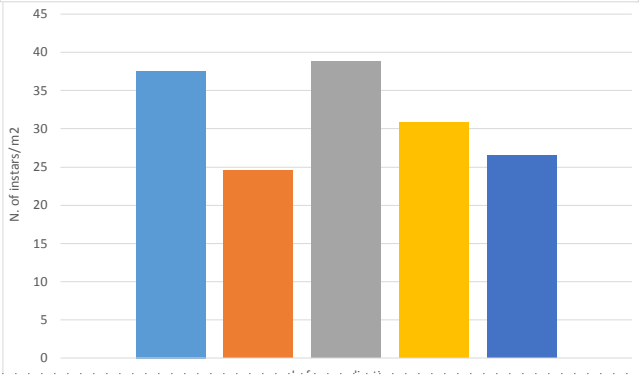
TRIAL SET UP AND ASSESSMENTS METHODS

- Treated area/treatment: 4 plot of: 20 m2
- In each plot were identified a sub-plot of 1 m2 (Trial A) or 0.25 m2 (Trial B and C) and were determined:
  - The percentage of infested weeds;
  - Number of spittle/single unit;
  - Number of juveniles of *P. spumarius*/single unit;

ASSESSMENTS BEFORE APPLICATION

TRIAL A





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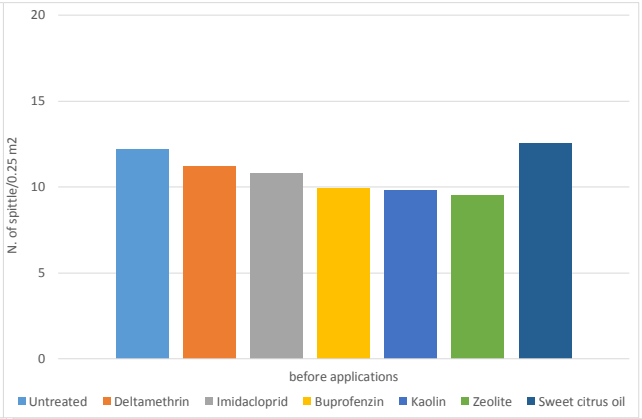
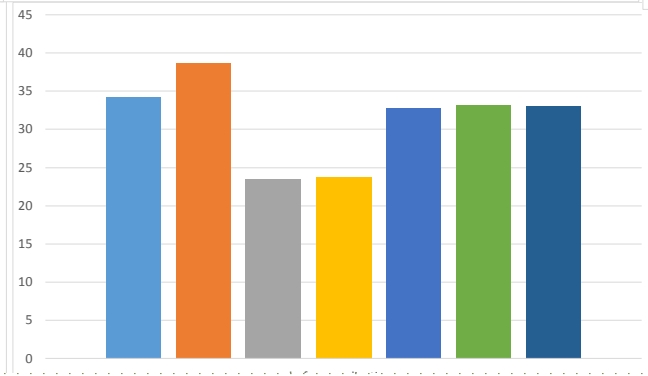
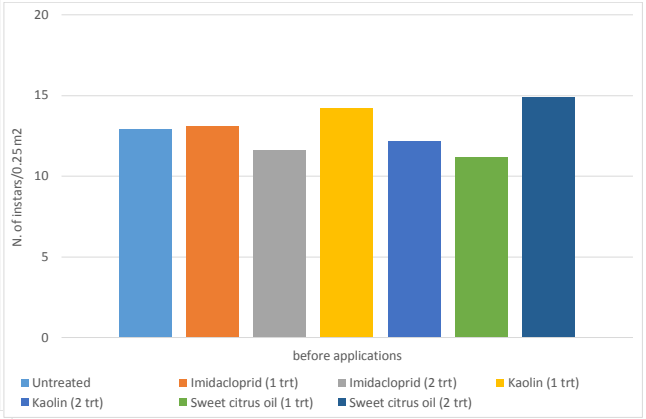
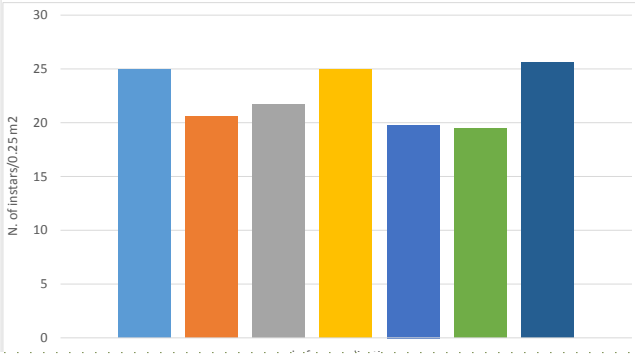




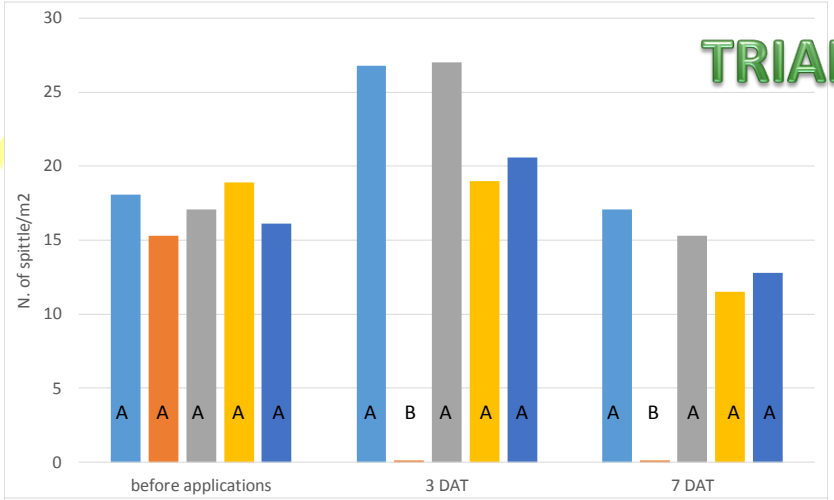
TRIAL C

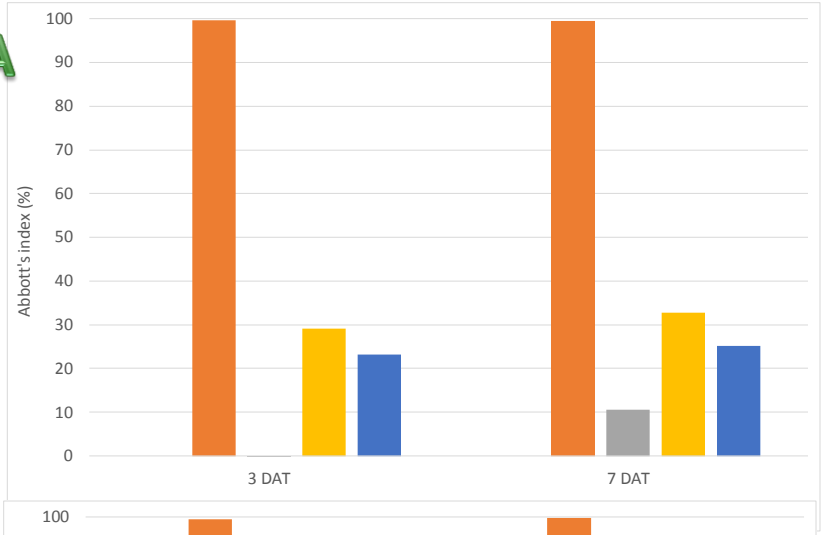


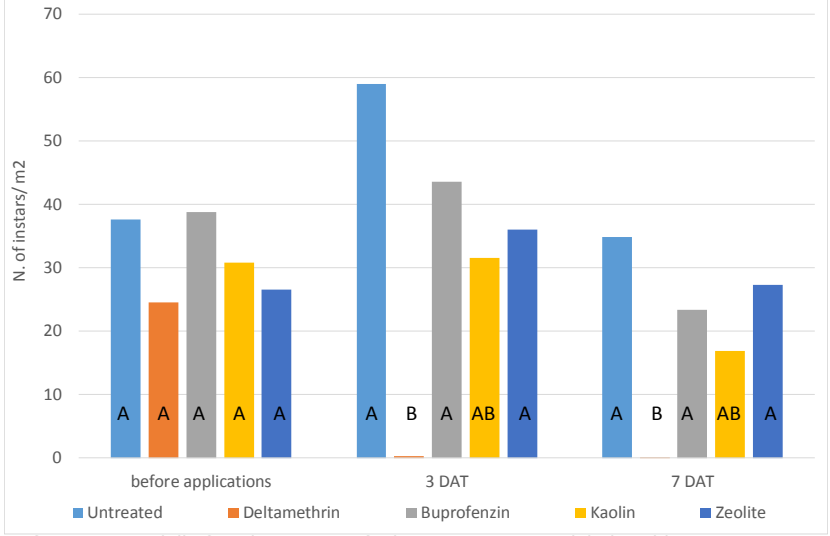


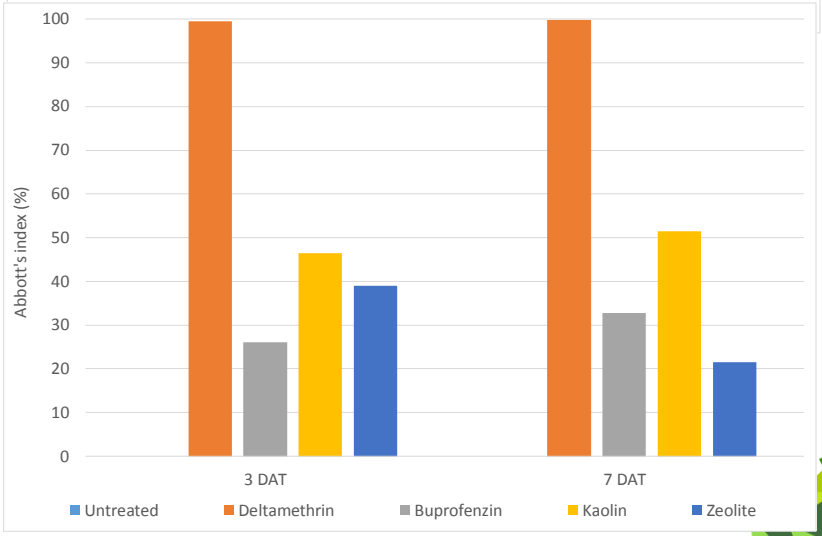
No statistical diferrences (p=0.01) has been observed among treatments, in each trials (A – B – and C) before start the applications, about: 1) number of spittle/single observed unit; 2) number of instars/single observed unit;

TRIAL A

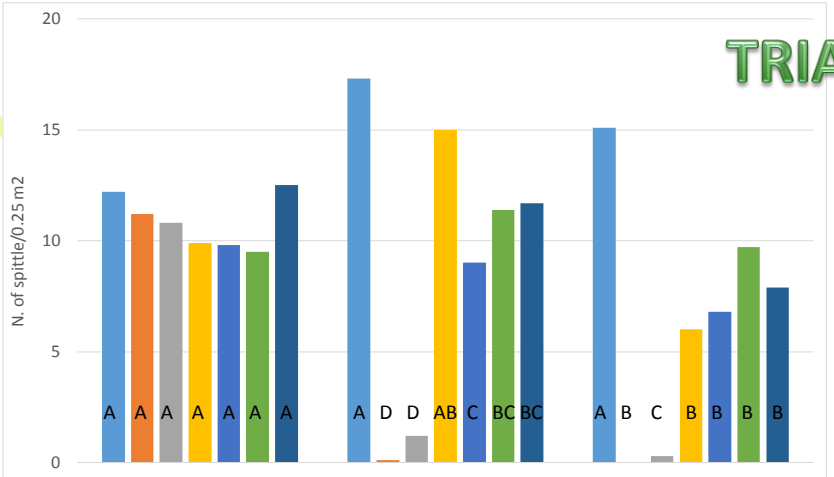

N. of spittle/m2
30
25
20
15
10
5
0
A A A A A
A B A A A
A B A A A
before applications
3 DAT
7 DAT

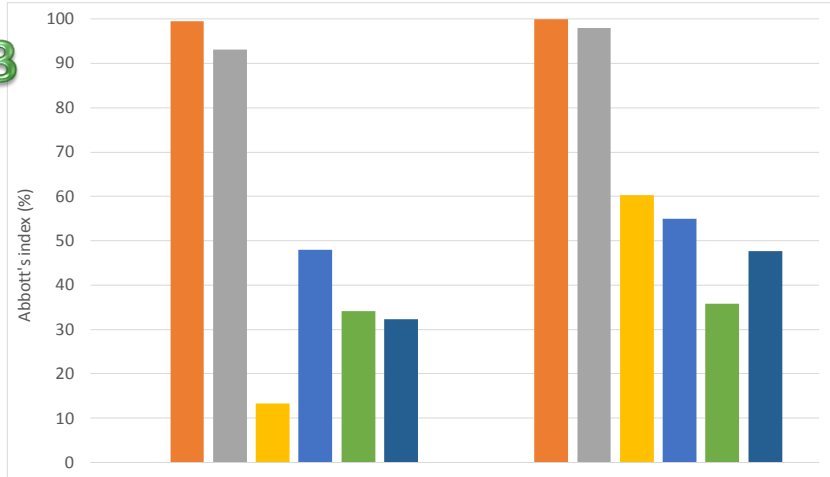

Abbott's index (%)
100
90
80
70
60
50
40
30
20
10
0
3 DAT
7 DAT

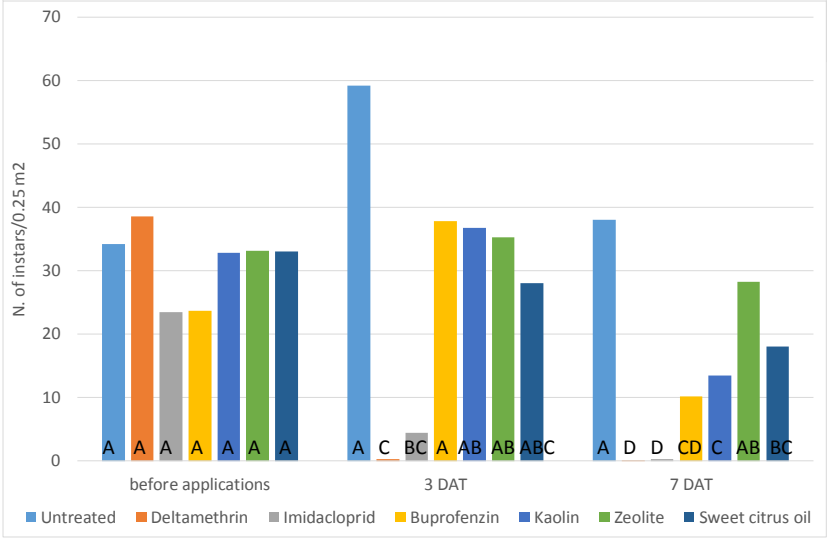

N. of instars/ m2
70
60
50
40
30
20
10
0
A A A A A
A B A AB A
A B A AB A
before applications
3 DAT
7 DAT
Untreated
Deltamethrin
Buprofenzin
Kaolin
Zeolite

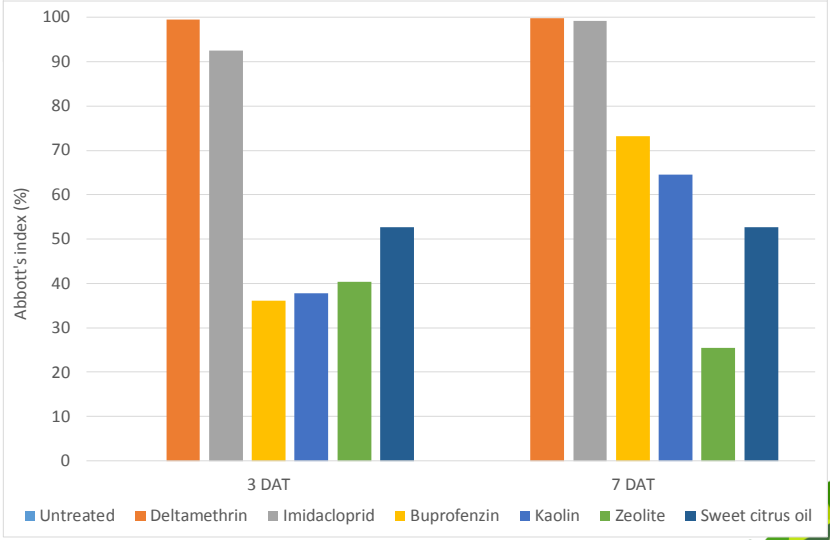

Abbott's index (%)
100
90
80
70
60
50
40
30
20
10
0
3 DAT
7 DAT
Untreated
Deltamethrin
Buprofenzin
Kaolin
Zeolite

TRIAL B

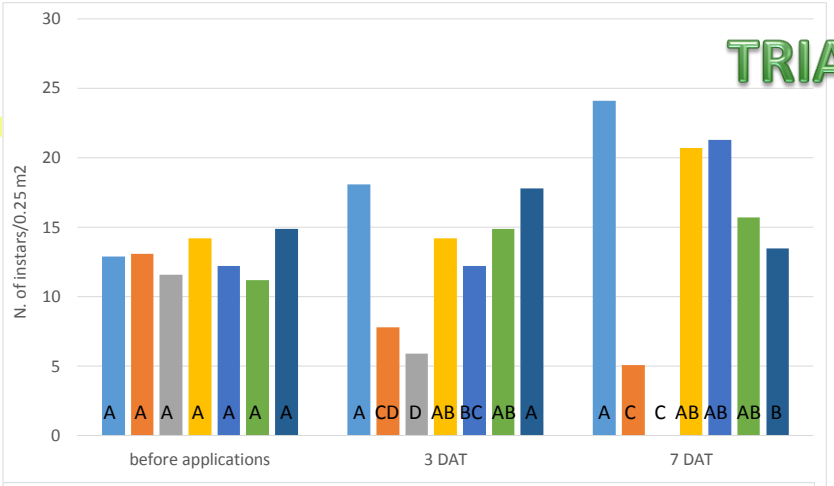

N. of spittle/0.25 m2
20
15
10
5
0
A A A A A A A
A D D AB C BC BC
A B C B B B B

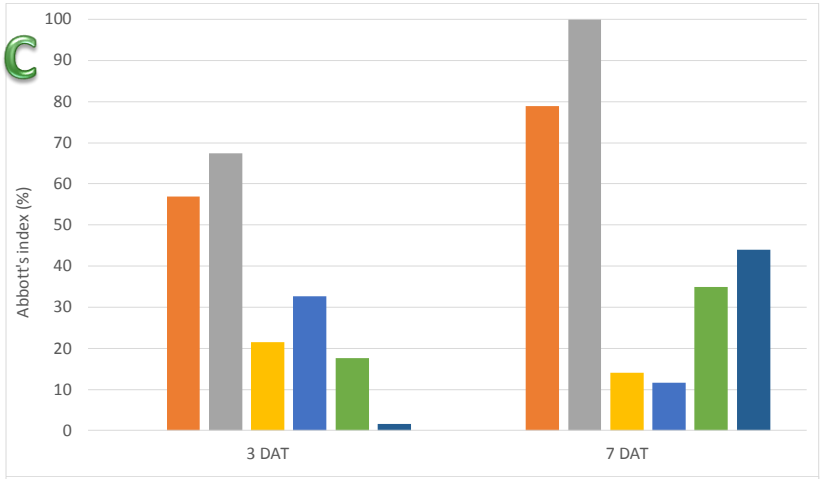

Abbott's index (%)
100
90
80
70
60
50
40
30
20
10
0

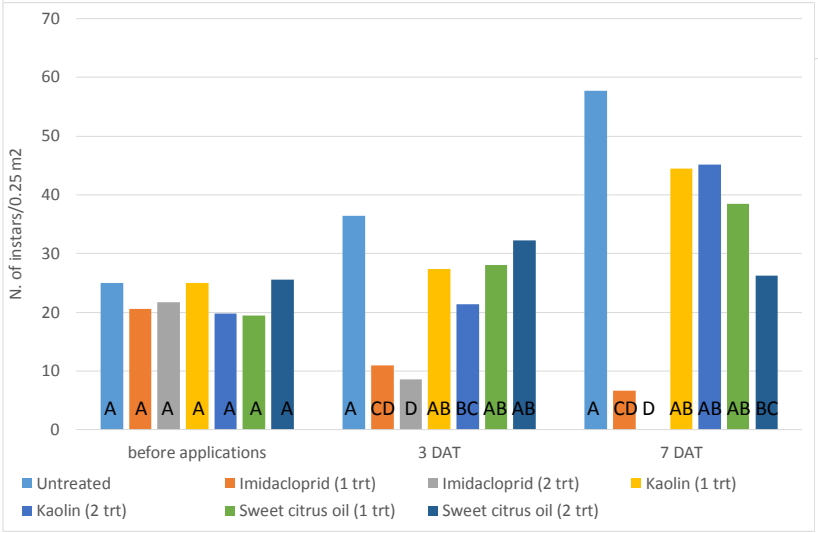

N. of instars/0.25 m2
70
60
50
40
30
20
10
0
A A A A A A A
A C BC A AB AB ABC
A D D CD C AB BC
before applications
3 DAT
7 DAT
Untreated
Deltamethrin
Imidacloprid
Buprofenzin
Kaolin
Zeolite
Sweet citrus oil

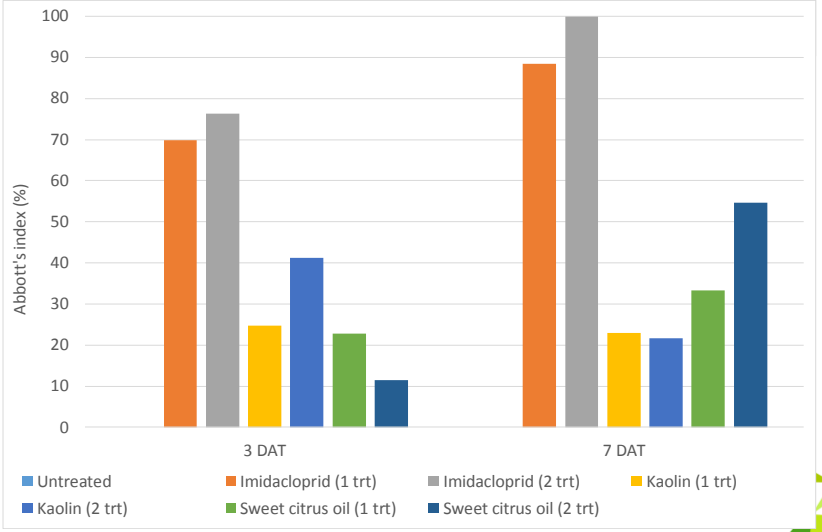

Abbott's index (%)
100
90
80
70
60
50
40
30
20
10
0
3 DAT
7 DAT
Untreated
Deltamethrin
Imidacloprid
Buprofenzin
Kaolin
Zeolite
Sweet citrus oil

TRIAL C


N. of instars/0.25 m2
30
25
20
15
10
5
0
A A A A A A A
A CD D AB BC AB A
A C C AB AB AB B
before applications
3 DAT
7 DAT


Abbott's index (%)
100
90
80
70
60
50
40
30
20
10
0
3 DAT
7 DAT


N. of instars/0.25 m2
70
60
50
40
30
20
10
0
A A A A A A A
A CD D AB BC AB AB
A CD D AB AB AB BC
before applications
3 DAT
7 DAT
Untreated
Imidacloprid (1 trt)
Imidacloprid (2 trt)
Kaolin (1 trt)
Kaolin (2 trt)
Sweet citrus oil (1 trt)
Sweet citrus oil (2 trt)


Abbott's index (%)
100
90
80
70
60
50
40
30
20
10
0
3 DAT
7 DAT
Untreated
Imidacloprid (1 trt)
Imidacloprid (2 trt)
Kaolin (1 trt)
Kaolin (2 trt)
Sweet citrus oil (1 trt)
Sweet citrus oil (2 trt)

FIELD LOCATION and TRIALS SETUP

FIELD LOCATION:	Taurisano (Le)	San Nicola (Le)	Taurisano (Le)	Alezio (Le)	Cisternino (Br)
CULTIVAR:	Leccino	Cellina di Nardò	Leccino	Cellina di Nardò	Cerasola
AGE OF PLANTS	20	100	20	100	18
TRAINING SYSTEM:	Open centre tree				
DISTANCE BETWEEN ROWS:	5 x 5	6 x 6	5 x 5	7 x 7	5 x 5
REPLICATIONS:	6 (each replication was a single olive branch on which a pre-fixed number of insects were confined in a net cage);				
N. OF PLANTS/PLOT:	2				
DATE OF APPLICATION:	June 8, 2015	July 27, 2015	June 29, 2015	October 2, 2015	June 26, 2017
WATER VOLUME:	1500 (2000) L/Ha				

TESTED PRODUCTS

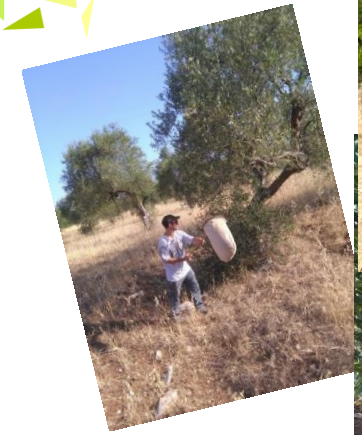
Active substances (a.s.)	Commercial products	Concentration a.s. (g/L or %)	Trial:				
			A	B	C	D	E
Acetamiprid	**Epic SL**	**50 g/L**	**S***	**S**			
Azadiracthin	Neemazal	10 g/L			S	S	
Buprofenzin	Applaud Plus	25%	S	S			
Deltamethrin	Decis Jet	15 g/L	S	S		S	
Chlorpyrifos-methyl	Reldan 22	21,4%					S
Chlorpyrifos-ethyl	Dursban 75 WG	75%					S
Dimetoathe	Perfektion	400 g/L	S	S			S – E**
	Rogor L 40	406 g/L		S			
Etofenprox	Trebon Up	280 g/L	S	S			
Imidacloprid	Confidor 200 O-Teq	200 g/L	S	S	S	S	S - E
Lambda cyalothrin	Karathe Zeon 1.5	15 g/L	S	S			
Pyrethrin	Pyganic	12.91 g/L			S	S	
Spinosad	Laser	44.2%					S
Sweet citrus oil	**Prev-AM**	**60 g/L**			**S**	**S**	
Pimetrozine	Plenum	25%	S	S			
Spirotetramat	Movento 48 SC	4.35%		S			
Thiamethoxam	Actara 25 WG	25%					S
Thiamethoxam+chlorantraniprole	Luzindo	20% + 20%					S

Mode of application: *spray; **endotherapy;

MODE OF APPLCICATION

Mode of application: *spray; **endotherapy;

TRIALS SETUP



TRIAL: A – B – C

First introduction of adults of P. spumarius in a cages

application

Before application | after 3 days | 7 days | 10 days | 15 days

I | II | III | IV

ASSESSMENTS

TRIAL: A – B – C

First introduction of adults of P. spumarius in a cages

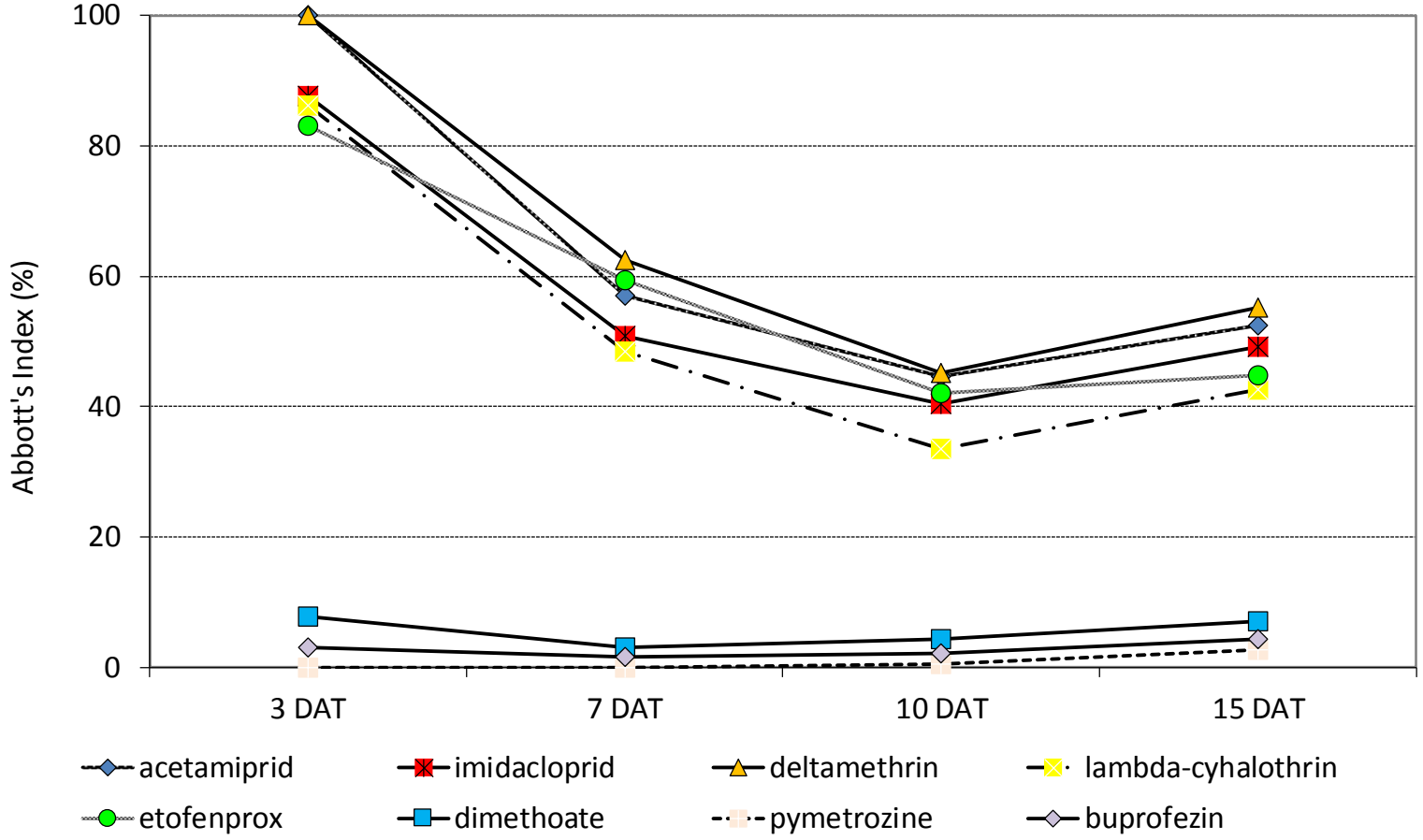
application

Before application | after 3 days | 7 days | 10 days | 15 days

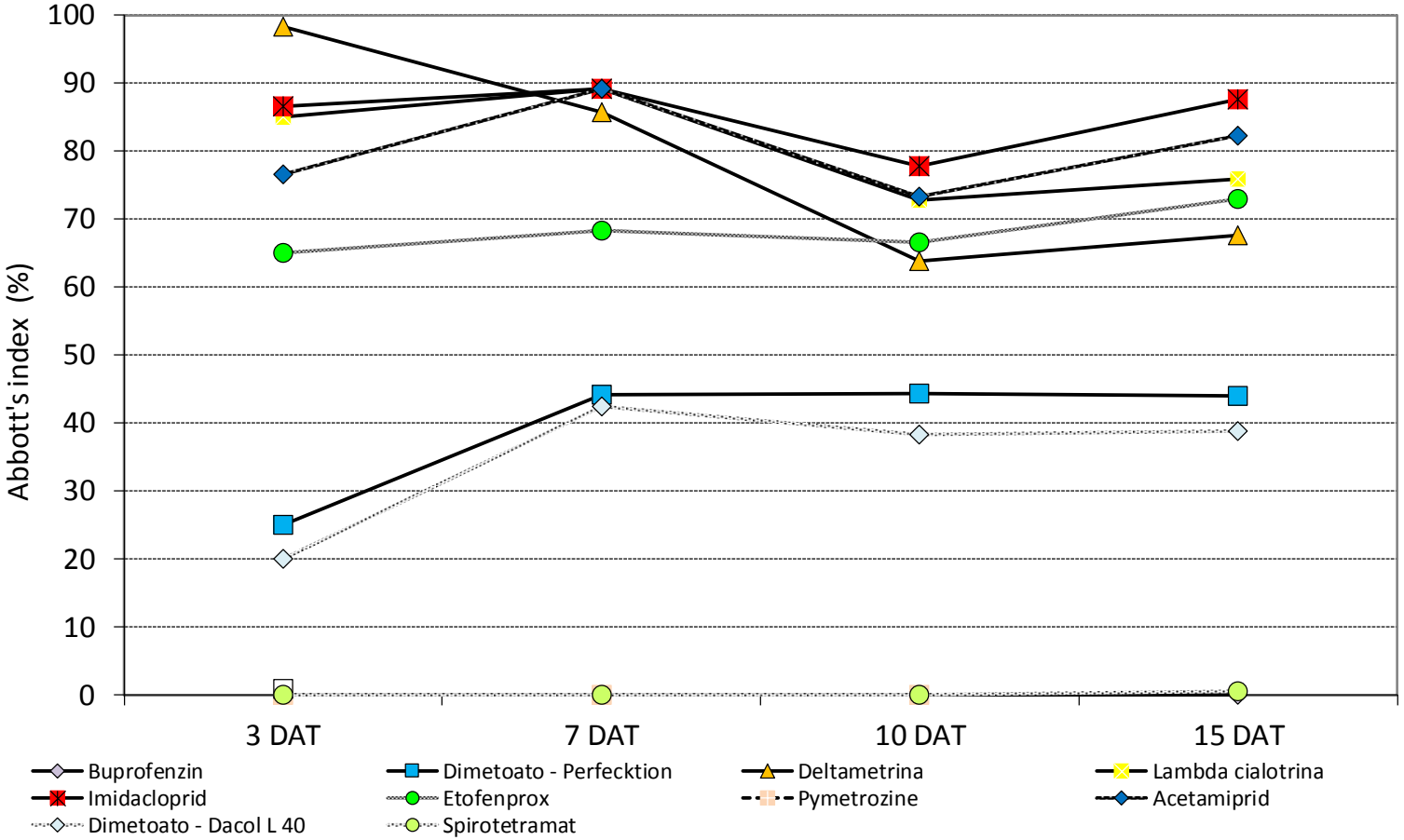
I | II | III | IV

ASSESSMENTS

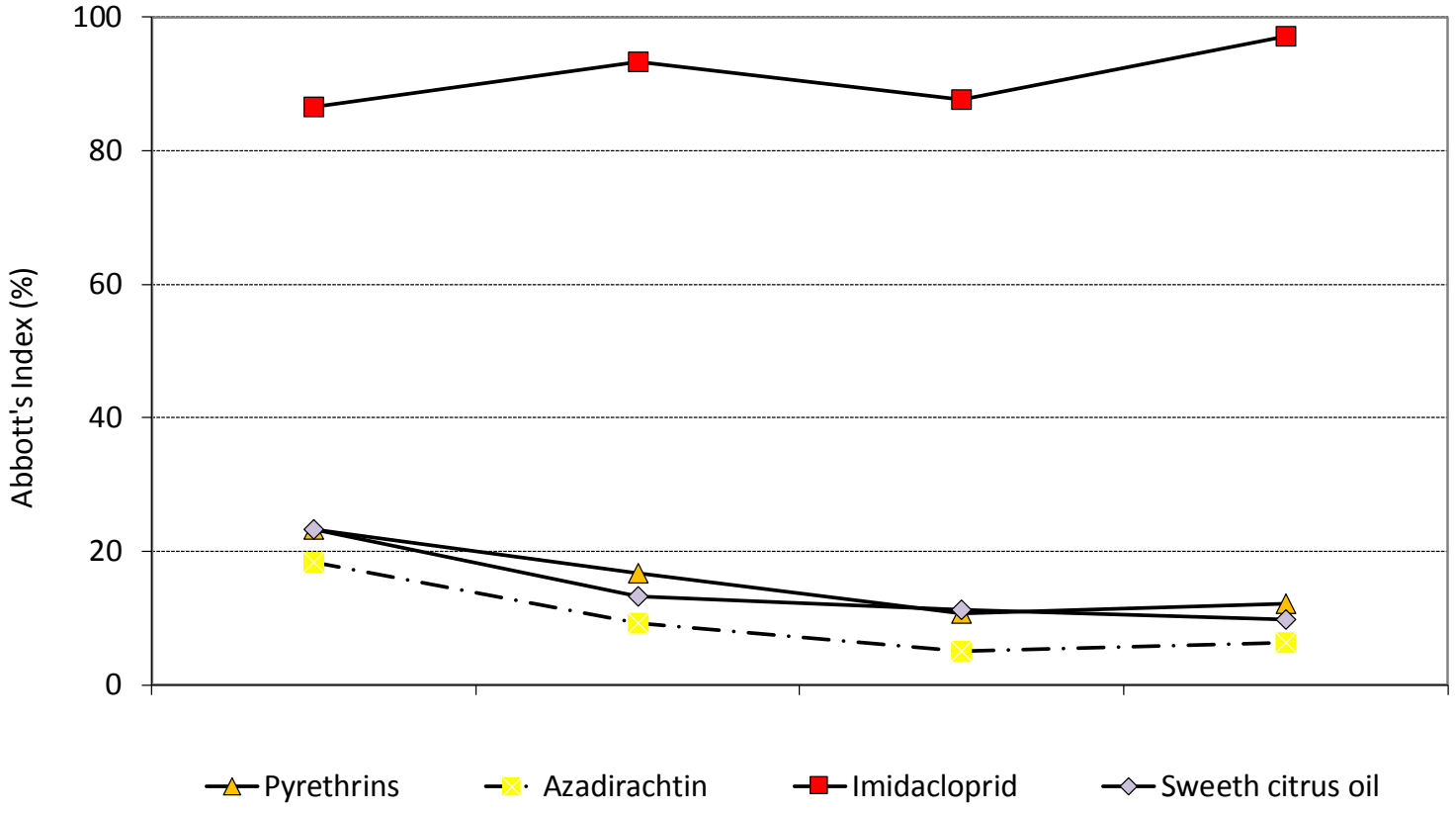
TRIAL A – ABBOTT'S INDEX



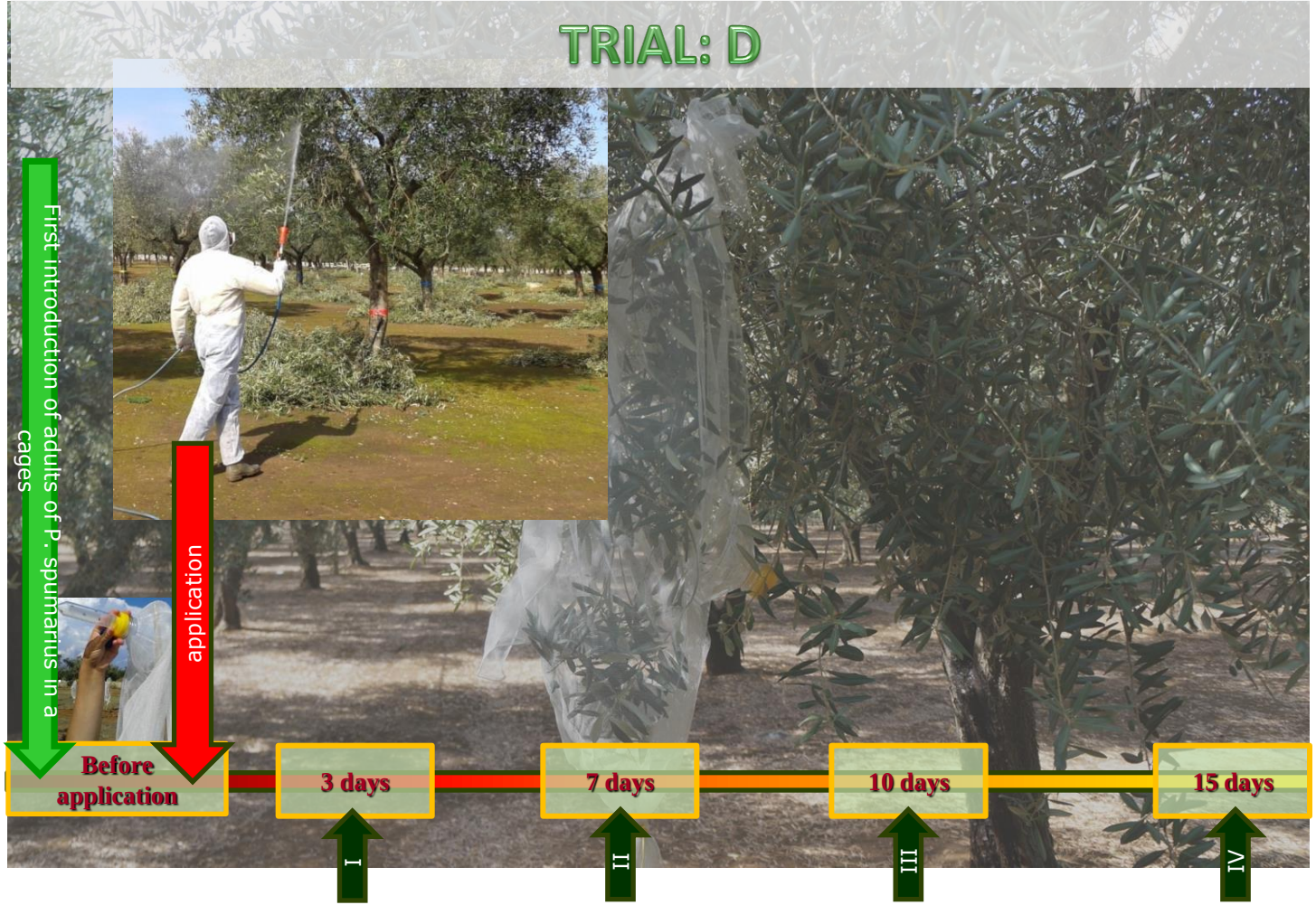
TRIAL B – ABBOTT'S INDEX



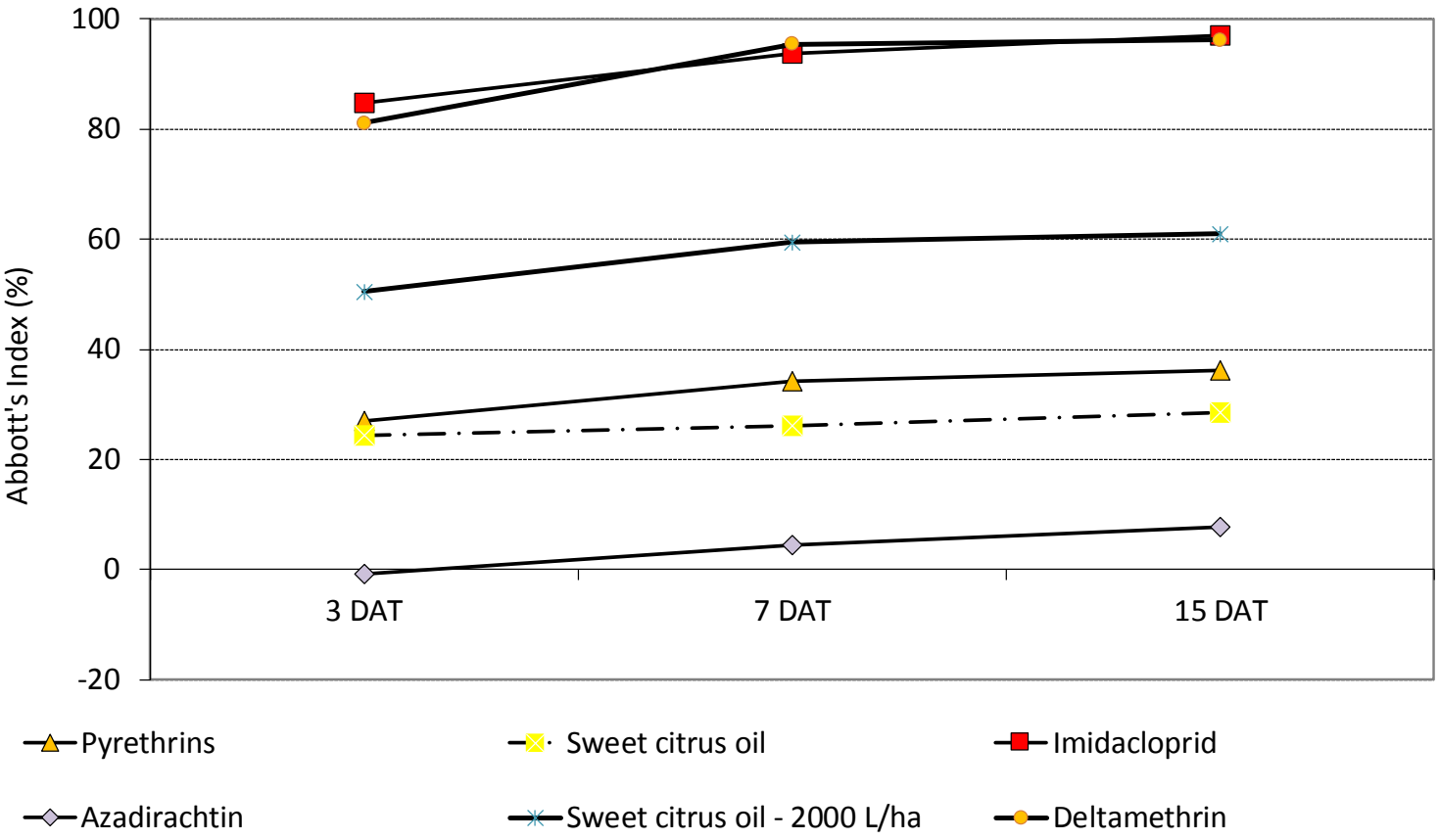
TRIAL C – ABBOTT'S INDEX



TRIAL: D


First introduction of adults of P. spumarius in a cages
application
Before application
3 days
7 days
10 days
15 days
I
II
III
IV
ASSESSMENTS

TRIAL D – ABBOTT'S INDEX



TRIAL: E

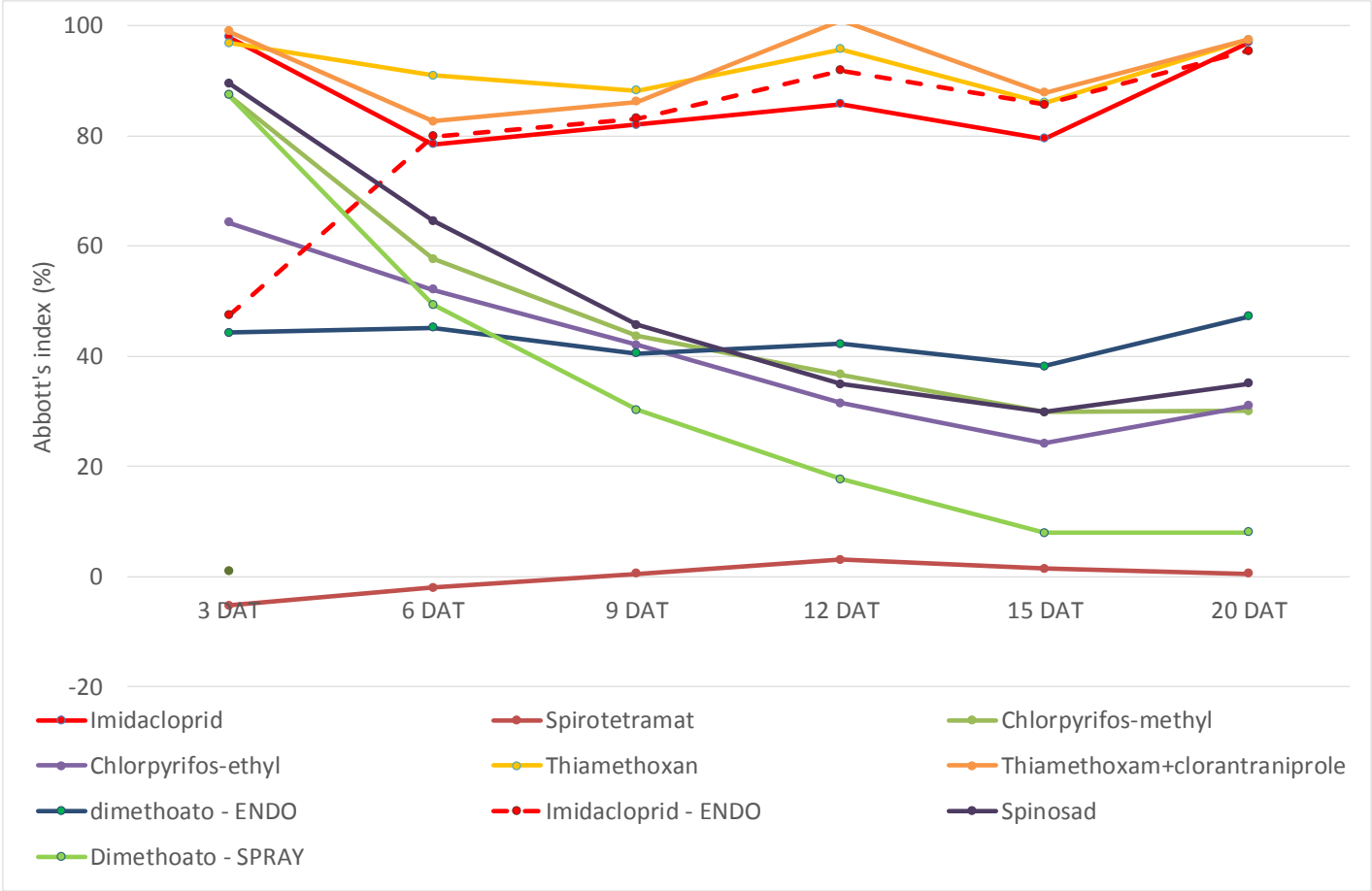
First introduction of adults of P. spumarius in a cages

application

Before application	after 3 days	7 days	10 days	12 days	15 days	20 days
I	II	III	IV	V	Vi

ASSESSMENTS

TRIAL E – ABBOTT'S INDEX



EVALUATION OF KAOLIN

Product name or code	Active substance (a.s.)	Content a.s. (% or g/L) and formulation	Formulate rate (kg/ha)	Mode of application	Trial			
					A	B	C	D
					Field	Pots in the cages		
Untreated control					X	X	X	X
Confidor 200 O-Teq	Imidacloprid	(200 g/L) OD	1.125	Spray	X	X	X	X
--	Kaolin	(80%) WG	40	Spray	X	X	X	X

TRIAL A: IN THE FIELD

- Starting trial: **2016**, young olive trees 3-years old; tested Xf-free;

- 3 replication;
- 24 plants/treatments;

- Applied volume: 1000 mL/ha;

- Time applications: May to October (2015 – 2016);

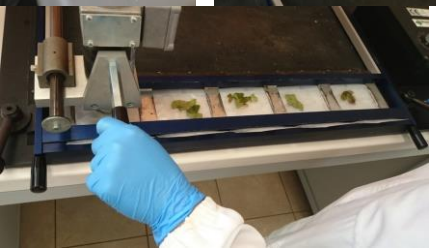
- Plants left to natural vector infection;

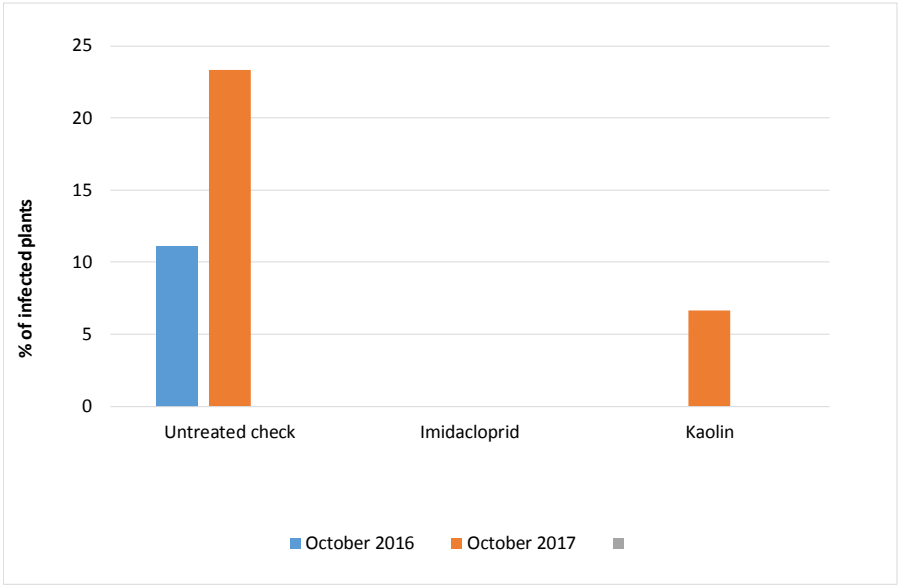
TRIAL A: IN THE FIELD

Untreated control

Imidacloprid

Kaolin





Trials A: cages in confined environment

Untreated control

- Starting trial: 2016;
- olive seedlings;
- Replicated 3 times (cages);
- 5 seedlings/treatments/cages;
- A single cages/treatments;

Imidacloprid

- 4 days AAP;
- 50 infected Ph introduced in each cages;
- A single application, before Ph introduction;
- 4 days IAP;
- PCR analysis 3 months after IAP; activities ongoing

Kaolin

Trials B: cages in the external field

- Starting trial: 2016;
- olive seedlings;
- Replicated 3 times (cages);
- 5 seedlings/treatments/cages;
- A single cages/treatments;
- 4 days AAP;
- 50 infected Ph introduced in each cages;
- A single application, before Ph introduction;
- 4 days IAP;
- PCR analysis 3 months after IAP; activities ongoing
-

Trial C: cages in the external field

- Starting trial: 2016;
- olive seedlings;
- Replicated 3 times (cages);
- 5 seedlings/treatments/cages;
- All treatments in the same cages;
- 4 days AAP;
- 35 infected Ph introduced in each cages;
- A single application, before Ph introduction;
- 4 days IAP;
- PCR analysis 3 months after IAP;

Kaolin

Untreated control

Imidacloprid

CONCLUSION: against juveniles of P. spumarius

- Neonicotinoids and pyrethroids tested, showed the highest efficacy, by completely eliminating the spittles and the insects on the sprayed vegetation;
- Applications of buprofenzin, reduced the nymphs-infested weeds, the number of spittles and nymphs, but proved to be less efficient and with inconsistent results;
- Among the inert compounds, zeolite decreased the infestations of about 20%; more effective is kaolin as compared to zeolite in decreasing the number of spittles and instars, with an effectiveness values that reach 60 to 70%, respectively;
- Extract of citrus oil, reducing the infestation nymphs up to 50%.

- No evident positive effects were observed increasing the number of application from 1 to 2;

CONCLUSION: against adults of P. spumarius

Among the synthesis tested products:

- **neonicotinoids** (acetamiprid, imidacloprid, thiamethoxam), **thiamethoxam** in mixture with **clorantraniprole**, **pyretroids** (deltametarin and lambda-cyhalothrin) showed a good knockdown effects and high mortality rates against adult of meadow spittlebug;
- **etofenprox** gave similar results even with slower action;
- generally the action of **dimethoate** was poor and slow in the time;
- similarly action, as **dimethoate**, showed the others two phosphoric ester tested; **chlorpyrifos-methyl** and **chlorpyrifos-ethyl**;
- **Buprofenzin**, **pymetrozine** and **spirotetramat** proved to be not effective;

- **Neonicotinoids**, **pyrethroids** and **etofenprox** showed a persistence ranged to 7-10 days up to 2 weeks;

- **Imidacloprid** applied in endotherapy do not increasing the efficacy, but showed similarly results as imidacloprid in spray, while **dimehoathe** in endotherapy has more efficacy and persistent as dimethoate in spray;

CONCLUSION

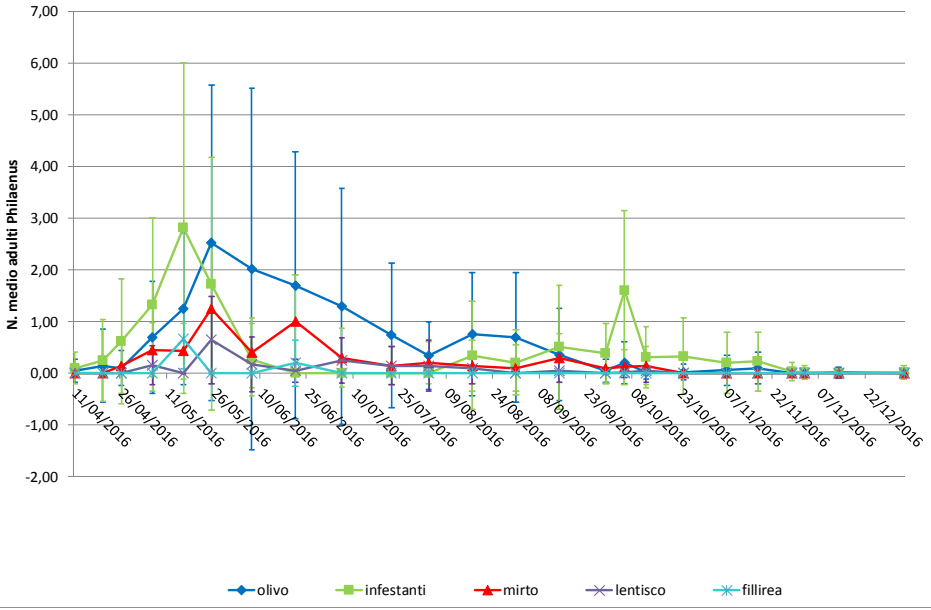
Among the organic compounds tested:

- **Spinosad** give the best results with high prompt effects and a persistence up to 1 week;
- **Sweet Citrus Oil** showed a good knockdown effect when applied at highest volume to wetting completely the canopy;
- Very low was the efficacy obtained with the formulation based on **natural pyrethrins**;
- No persistence was recorded for **sweet citrus oil** and **natural pyrethrins**;

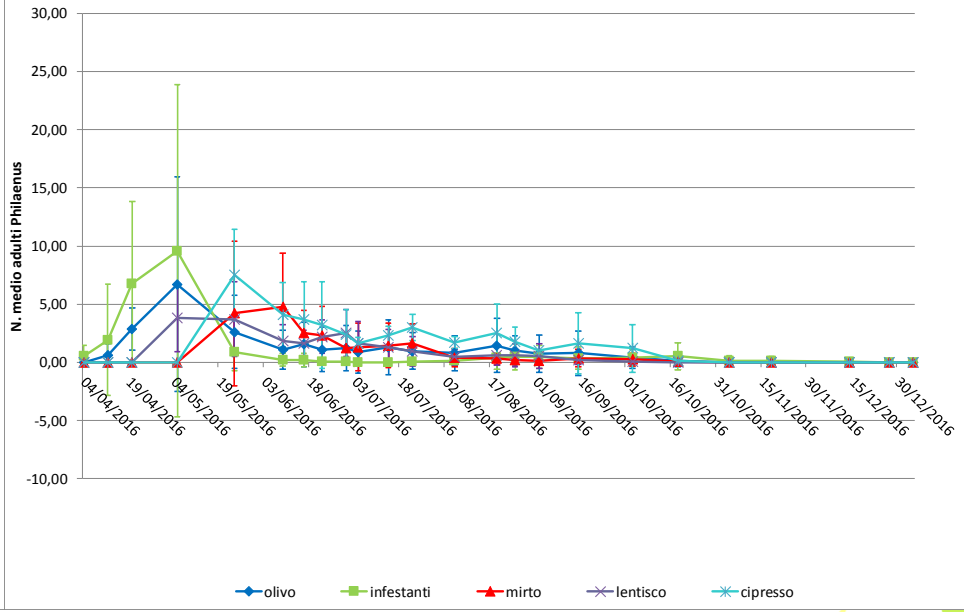
- **Kaolin** tested in open field reduced the percentage of infected plants as control, after 2 years of the exposure of healing plants to the natural infection of *P. spumarius*;

CONCLUSION

These results provide preliminary evidence on the efficacy of different formulations for their potential use for the control of *P. spuramius* and useful for the implementation of the containment strategies against *P. spumarius*.



Bari district



Lecce district

THANKS FOR YOUR ATTENTION!!!