

# Dimilin®

“First results from South Europe for  
*Tuta absoluta*  
control using diflubenzuron with  
adjuvant and with/without *Bt kurstaki*”

EPPO/IOBC/FAO/NEPPO Joint International Symposium  
on management of *Tuta absoluta* (tomato borer)  
Agadir, Morocco, November 16-18, 2011

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RTM Insecticides for Europe, Africa and Middle East  
Chemtura Agrosolutions



**First results from South Europe for *Tuta absoluta* control using diflubenzuron with adjuvant and with/without *Bt kurstaki*.**

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and E. Casagrande ([enzo.casagrande@chemtura.com](mailto:enzo.casagrande@chemtura.com))**

*Chemtura AgroSolutions*

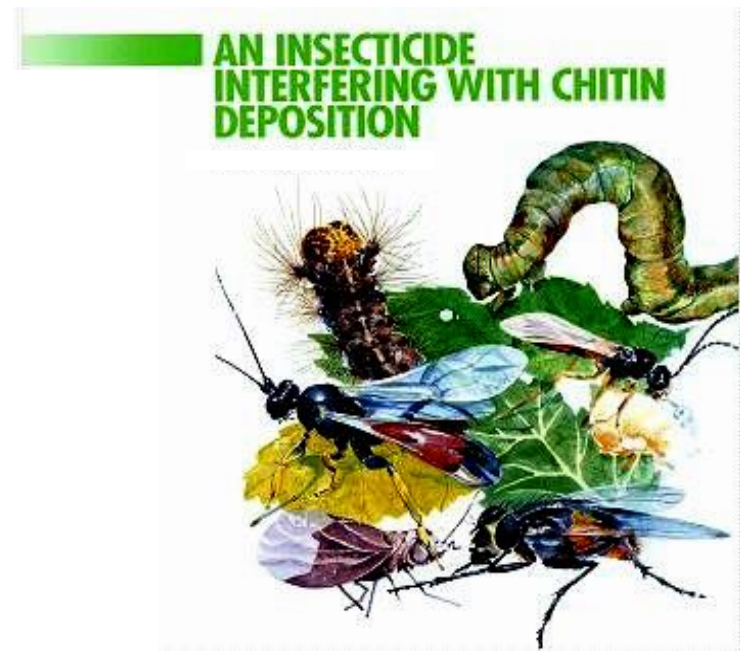
Considering the high number of generations developed by the South American Tomato Moth in glasshouse cultivation and the risk of quickly decreasing efficacy of agrochemicals if not properly alternated, it is very important to carefully evaluate all the actives / combinations belonging to different chemical families and modes of action in order to have a long term sustainable control of the pest.

Over the last two years trials have been conducted in Italy and Spain to evaluate the level of efficacy of diflubenzuron (dfb) (chitin inhibitor) for the control of *Tuta absoluta* (Meyrick) on greenhouse tomato. Different adjuvants and rates were tested during the first year in comparison with dfb used alone. In 2011 the combination with two different *Bt kurstaki* was also tested compared to the most effective products already on the market.

The results clearly show that the addition of an adjuvant significantly improves dfb performance. Furthermore, since on this pest dfb is presumably acting mainly as an ovicide, in case of overlapping of pest growth stages and/or very early and virulent attack, the combination with *Btk* is giving an important increase in *Tuta* control on both leaf and tomato fruit. Finally first observations were also made on the very positive interaction between dfb and *Btk* on another pest (*Heliothis armigera*) found on tomato in one of our trials on *Tuta*.

Keywords: diflubenzuron (dfb), *Tuta absoluta*, *Btk*, adjuvants

- The very first Insect Growth Regulator, discovered in the early 1970s;
- Europe Annex I listed within the 91/414/EC from 1/July/2008;
- Europe Annex III and re-registration activities on course (by 2011 end);
- In the IRAC Mode of Action List within group 15 (inhibitors of chitin biosynthesis, type 0)



# Dimilin®

*What done to verify if diflubenzuron works on Tuta*

- Tested alone
- in combination with adjuvants
- in combination with adjuvants and *Btk* (in the second year of trials)
- Compared with the best standards on the market and with *Btk* alone
- Vs Untreated control

Prevalent application scheme: 4 treatments, every 7 days;  
Assessments: before each treatment, 7 and 14 days after last one



Tomato leaf miner  
(*Tuta absoluta*)

# Dimilin® *Tuta absoluta* on Green House tomato

## 5 trials in South Europe during 2010:

**2 in Spain**  
(Murcia area)

**3 in Italy**

- i) 2 in Apulia
- ii) 1 in Sicily

## 6 trials in South Europe/Turkey during 2011:

**4 in Italy**

- i) 1 in Apulia \*
- ii) 1 in Apulia \*\*
- iii) 1 in Sicily
- iv) 1 in Campania

**2 in Turkey**

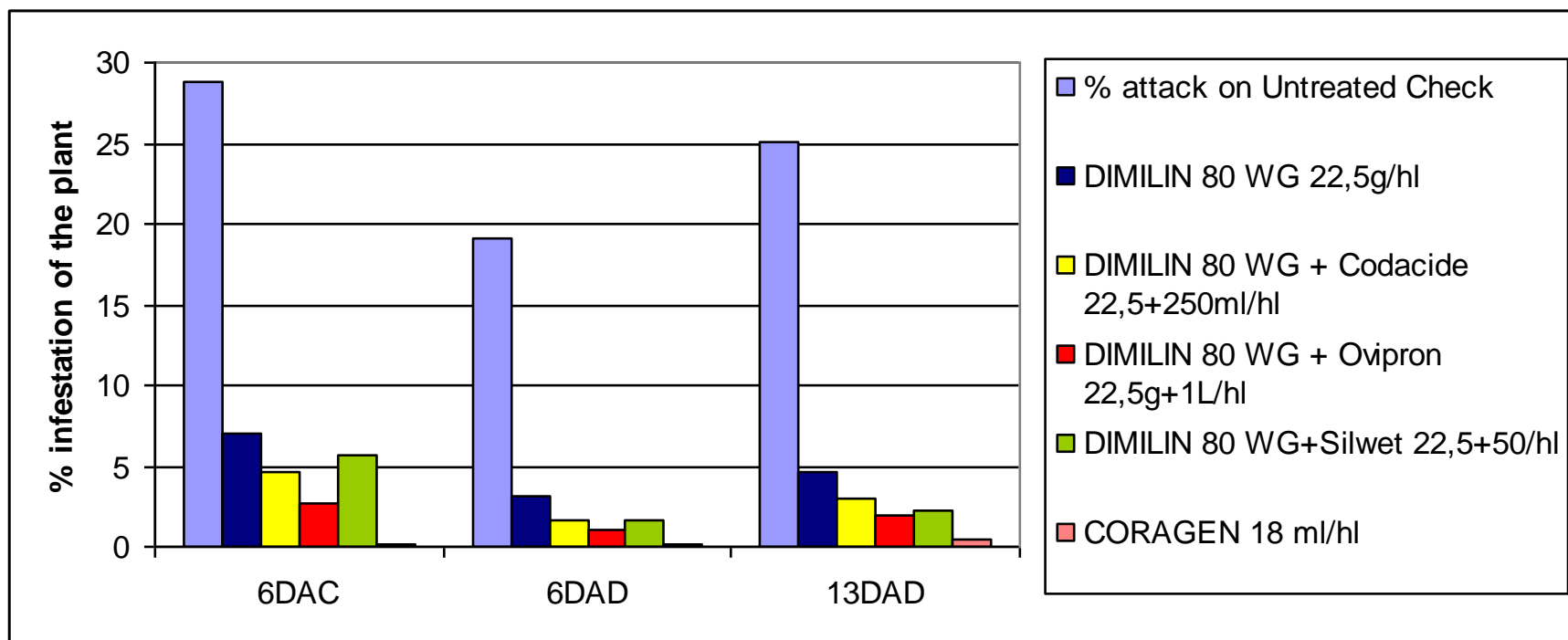
- i) 1 in Antalya

\*one in open field

- ii) 1 in Mersin
- \*\*one with a 2nd target (*Heliothis armigera*)

## GH Tomato – Molfetta (BA) - Italy 2010 – *Tuta absoluta*

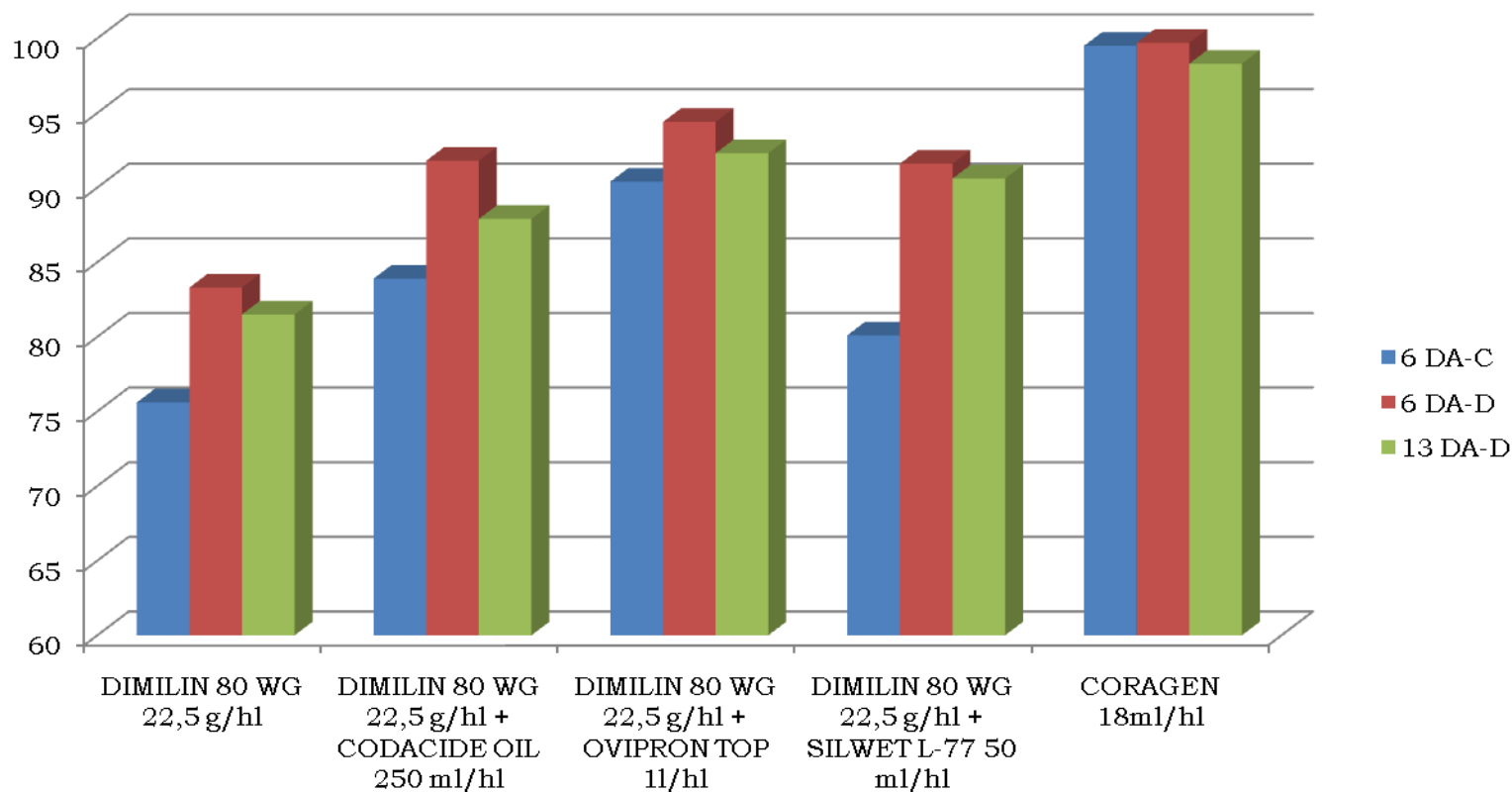
### % infestation on the plant



Application every 7 days: 1 July (A), 8 July (B), 15 July (C), 22 July (D)

## GH Tomato – Molfetta (BA) - Italy 2010 – *Tuta absoluta*

### % efficacy on plant infestation (incidence & severity)

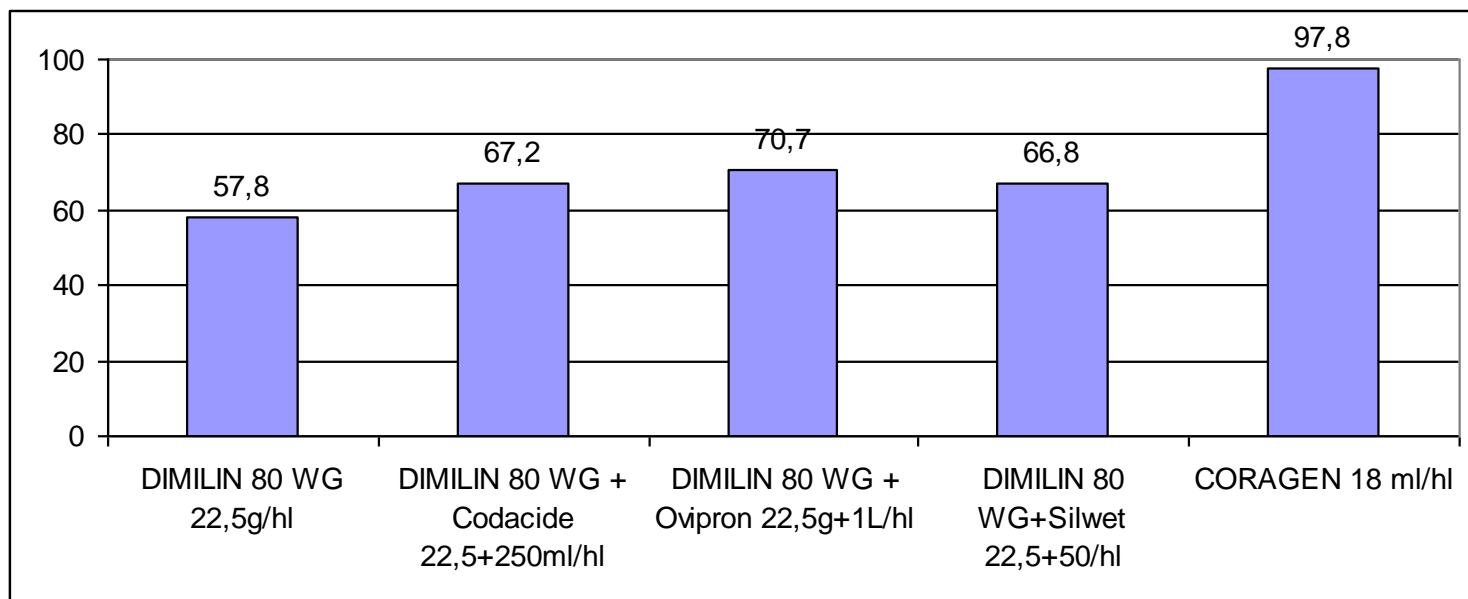


Application every 7 days: 1 July (A), 8 July (B), 15 July (C), 22 July (D)

## GH Tomato – Molfetta (BA) - Italy 2010 – *Tuta absoluta*

### % Efficacy on tomato fruits (healthy fruits)

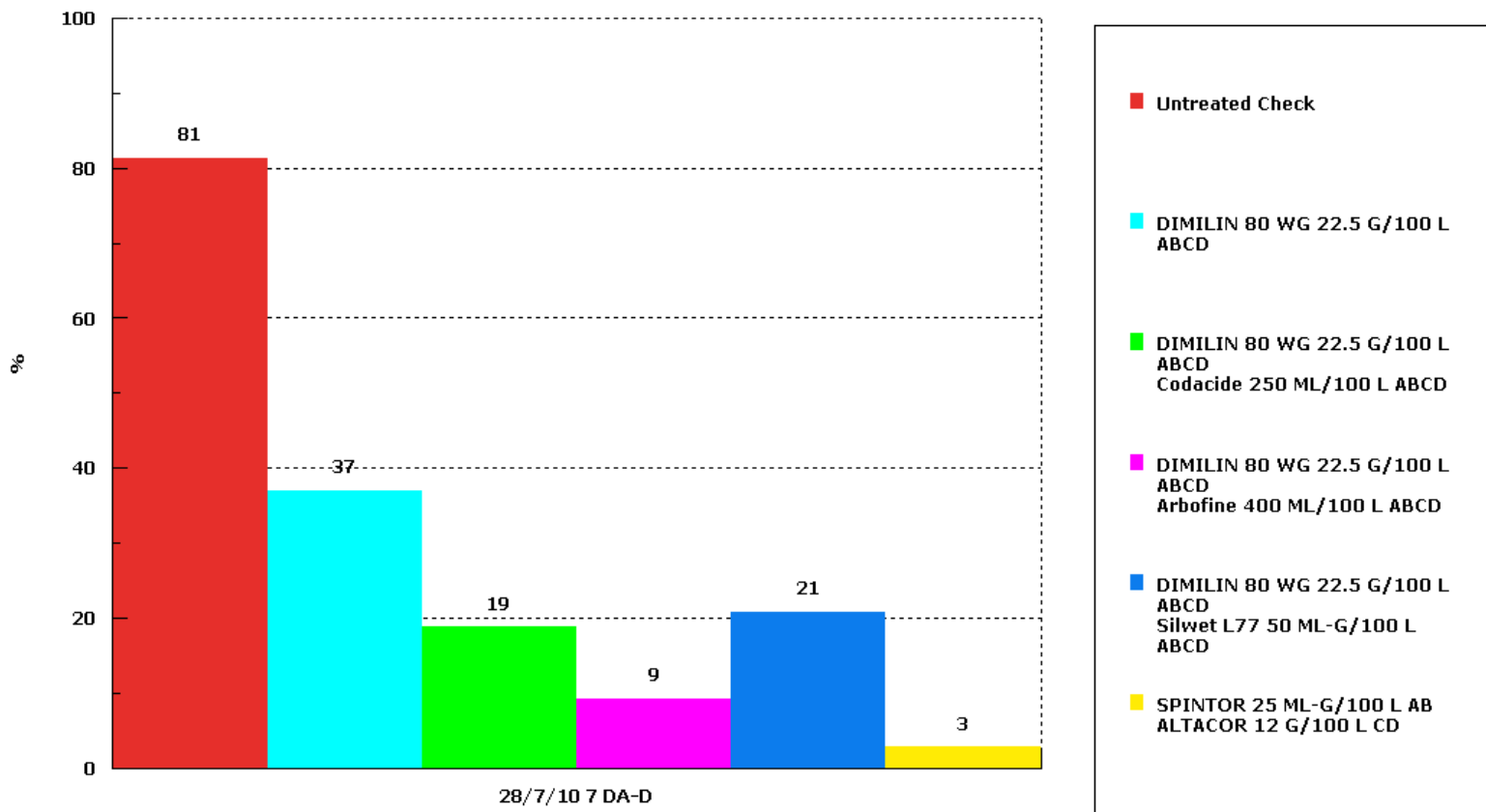
**Untreated**  
58%  
fruits attacked  
(20 DAD)



Application every 7 days: 1 July (A), 8 July (B), 15 July (C), 22 July (D)



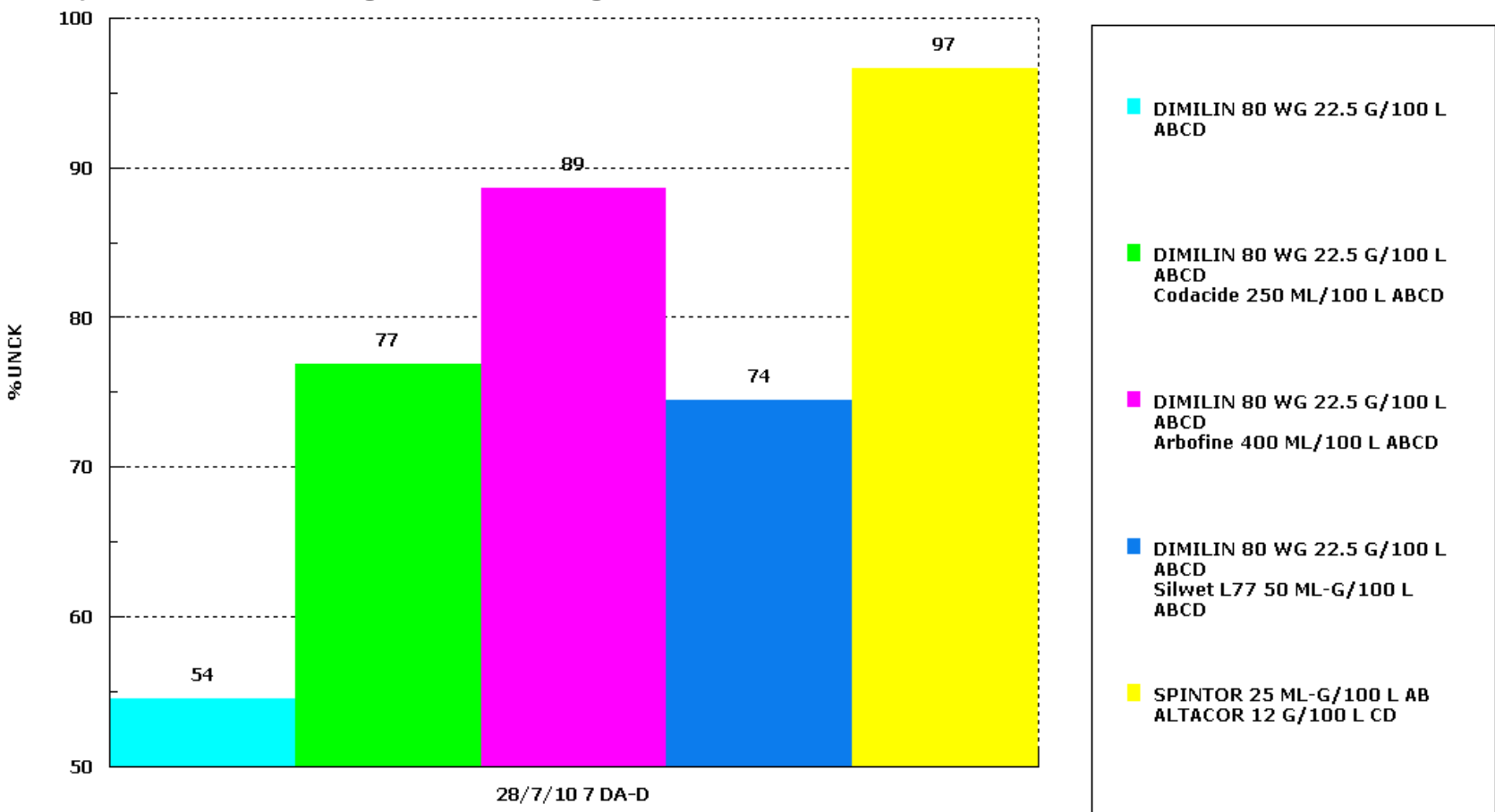
### Percentage of damaged foliar area per plant



Application every 7 days: 28 June (A), 5 July (B), 13 July (C), 21 July (D)

Water volume: 5 hl/ha  
Appl. Pressure: 600KPA

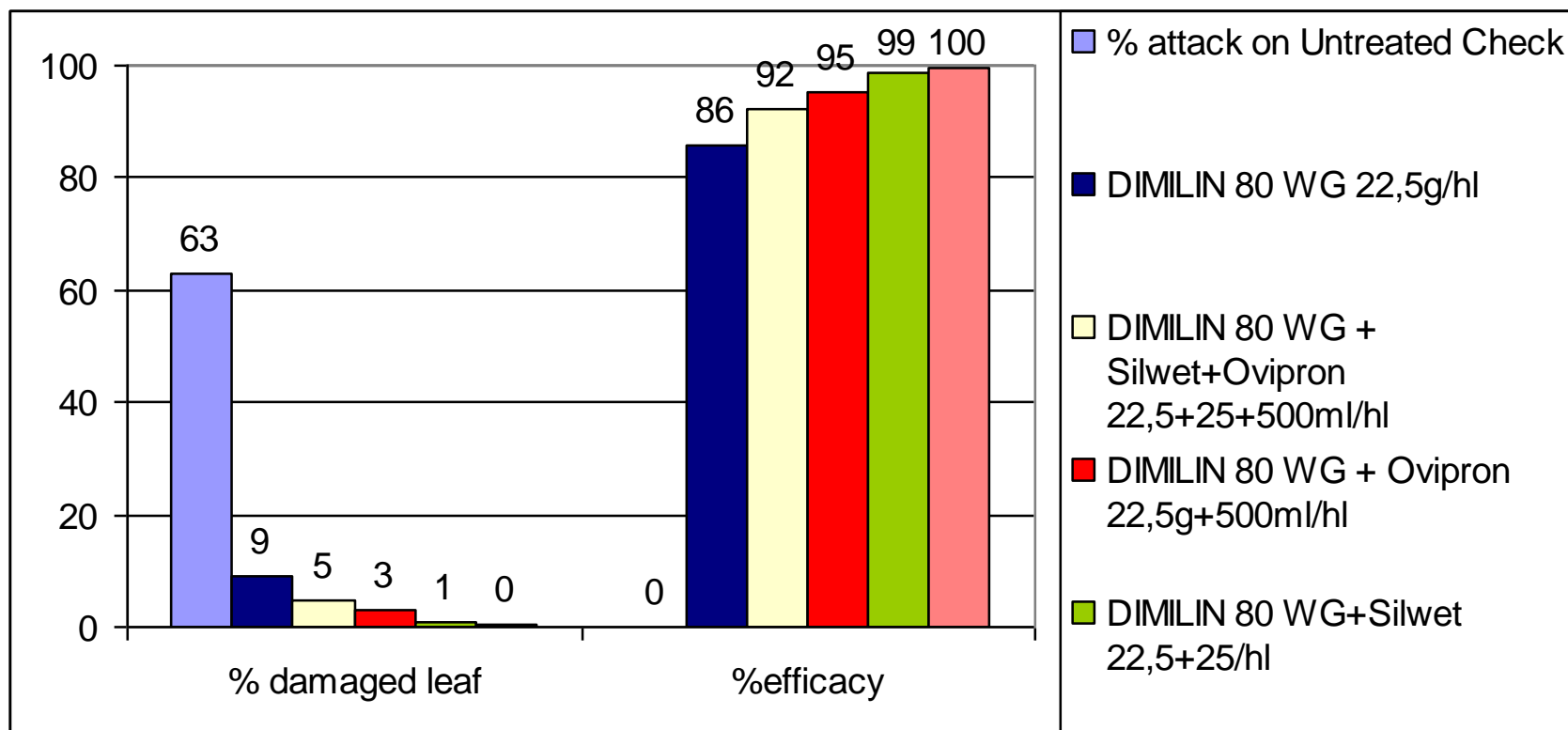
### Efficacy on percentage of damaged foliar area per plant



Application every 7 days: 28 June (A), 5 July (B), 13 July (C), 21 July (D)

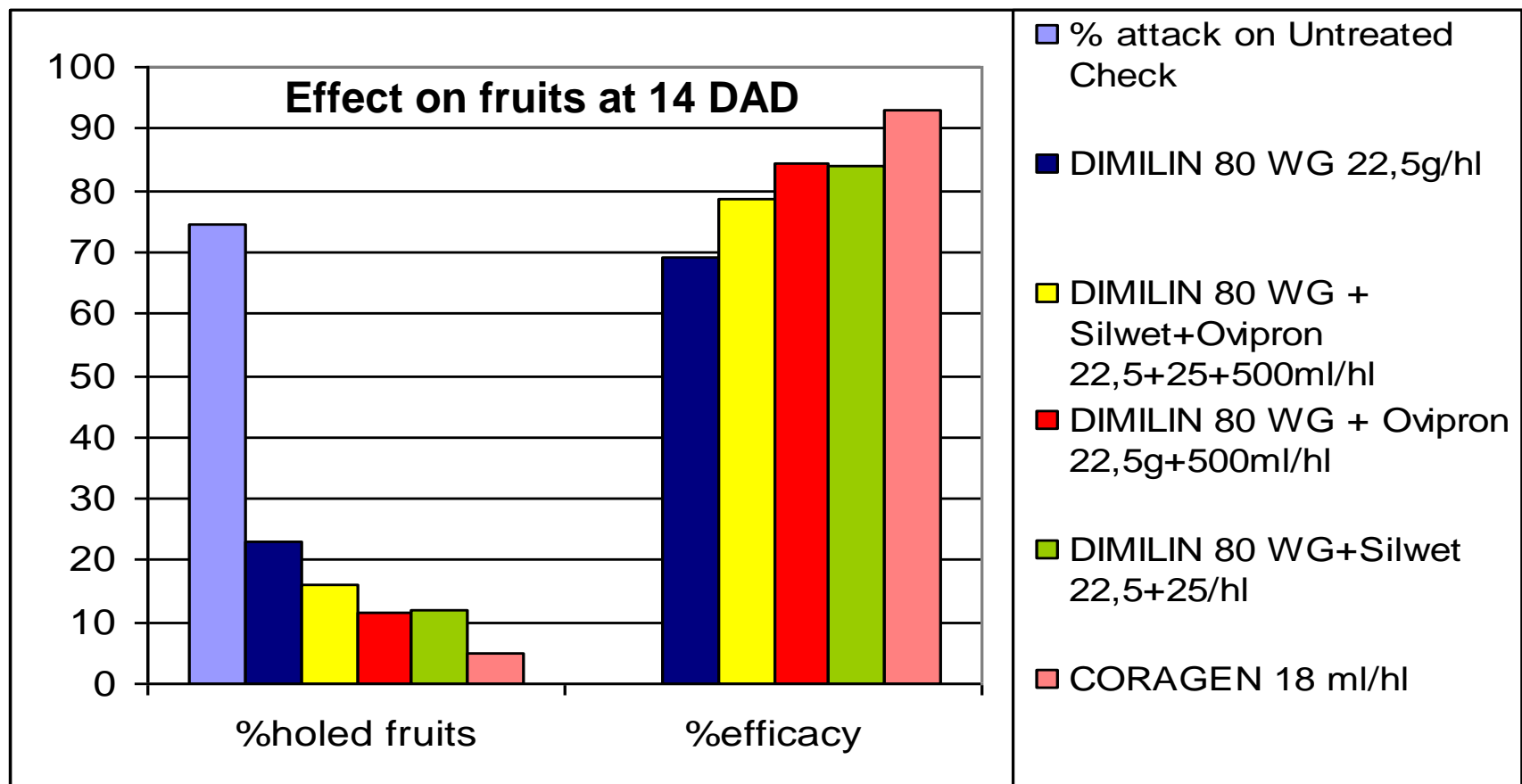
## GH Tomato – Giovinazzo (BA) - Italy 2010 – *Tuta absoluta*

**damage on 100 leaves at 6 DAD (incidence & severity)**



Application every 7 days: 27 October (A), 3 Nov. (B), 10 Nov. (C), 16 Nov. (D)

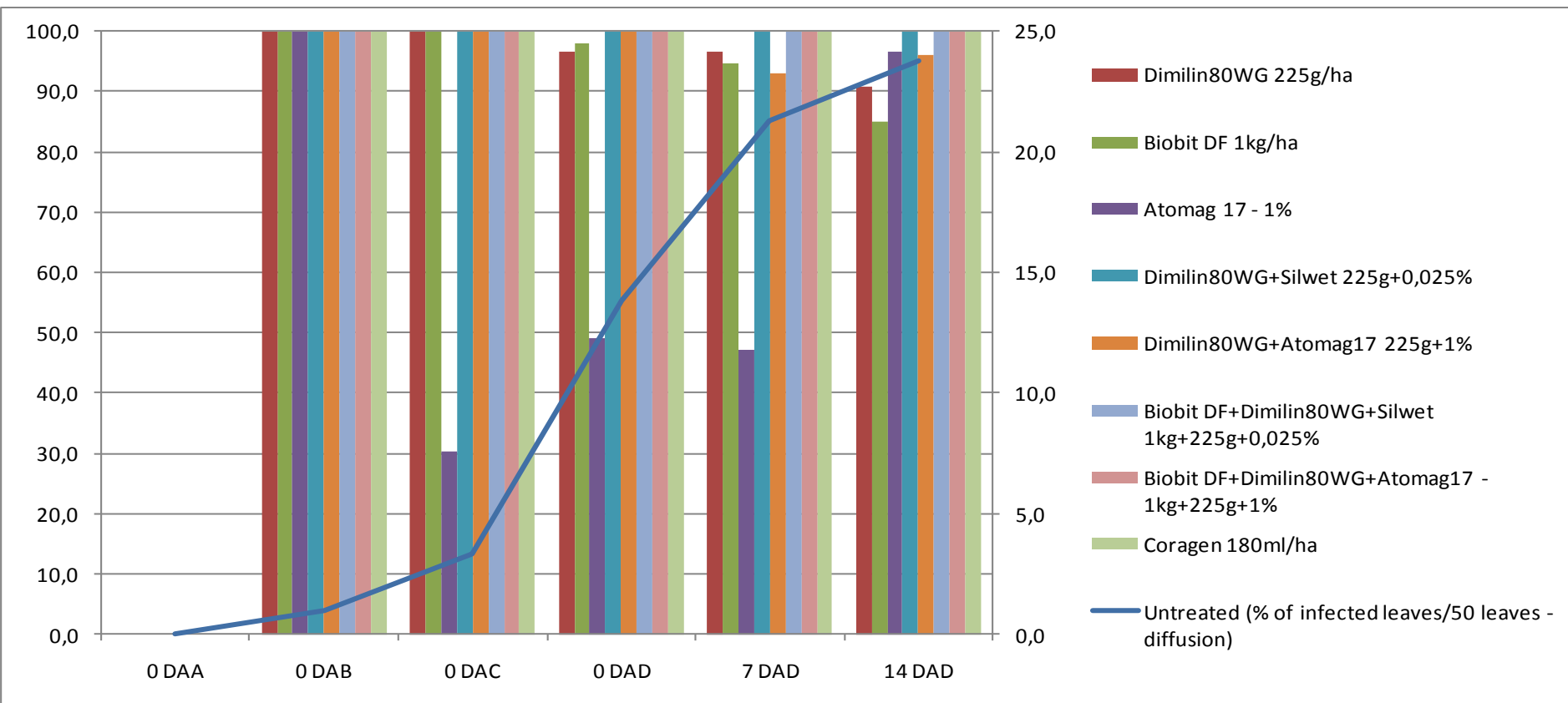
## GH Tomato – Giovinazzo (BA) - Italy 2010 – *Tuta absoluta*



Application every 7 days: 27 October (A), 3 Nov. (B), 10 Nov. (C), 16 Nov. (D)

## GH Tomato – Comiso (RG) – Sicily (IT) 2011 – *Tuta absoluta*

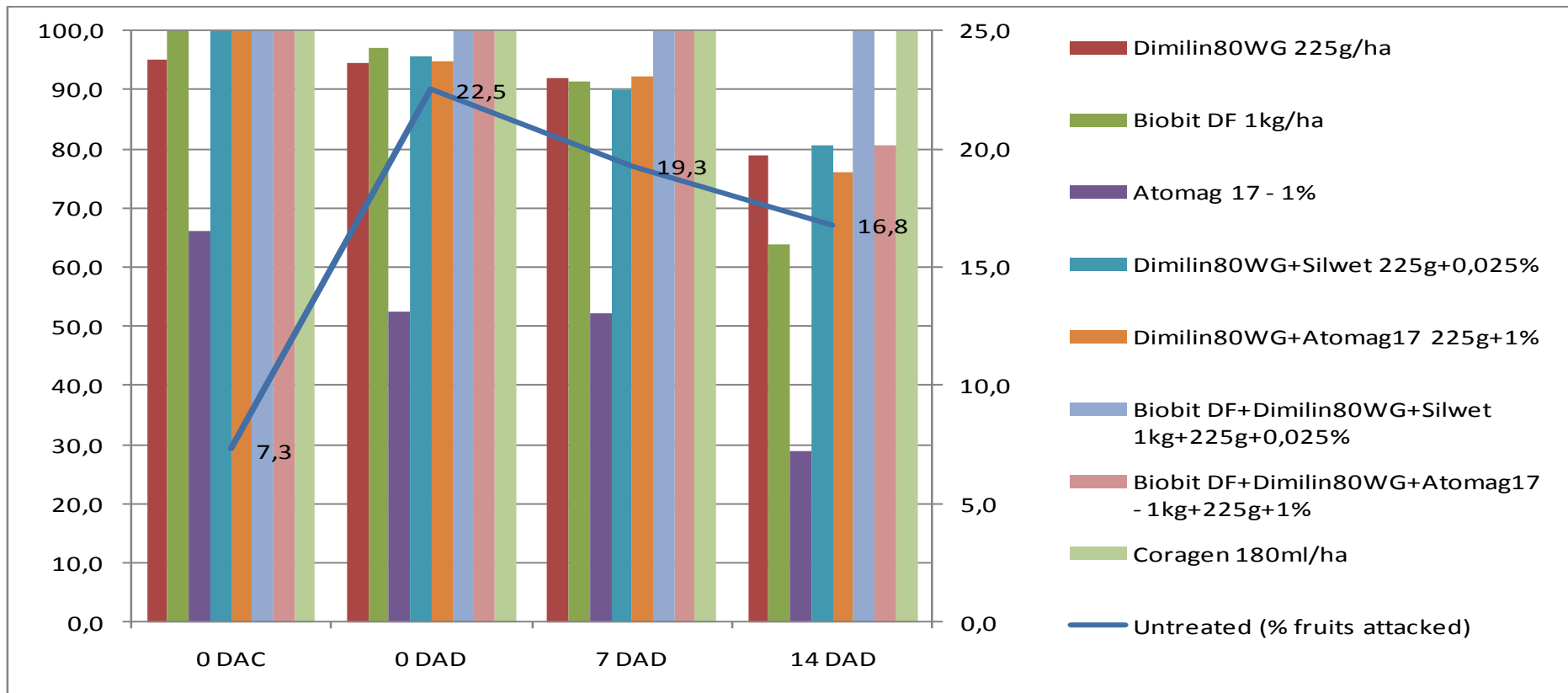
### Abbott efficacy on infected leaves



Application every 7 days: 10 June (A), 17 June (B), 24 June (C), 1 July (D)

## GH Tomato – Comiso (RG) – Sicily (IT) 2011 – *Tuta absoluta*

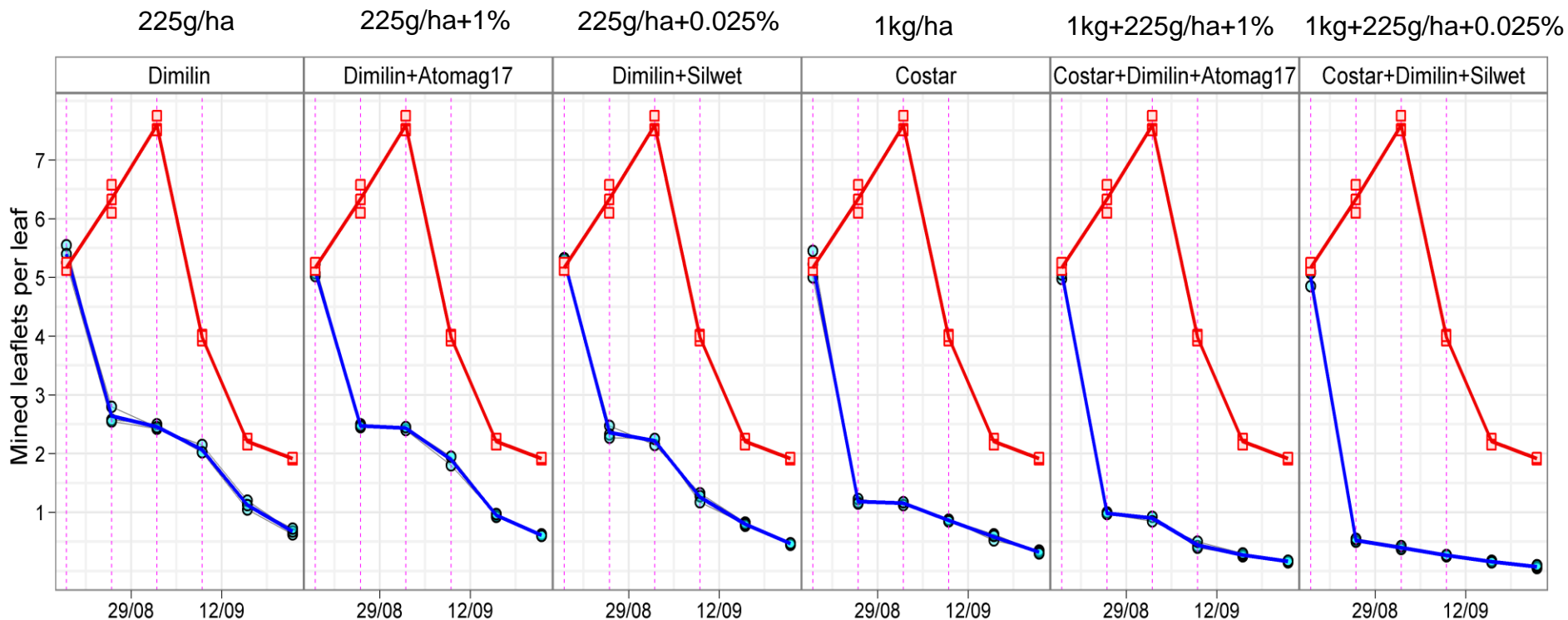
### Abbott efficacy on number of damaged fruits



Application every 7 days: 10 June (A), 17 June (B), 24 June (C), 1 July (D)

## GH Tomato – Piana del Sele (SA) – (IT) 2011 – *Tuta absoluta*

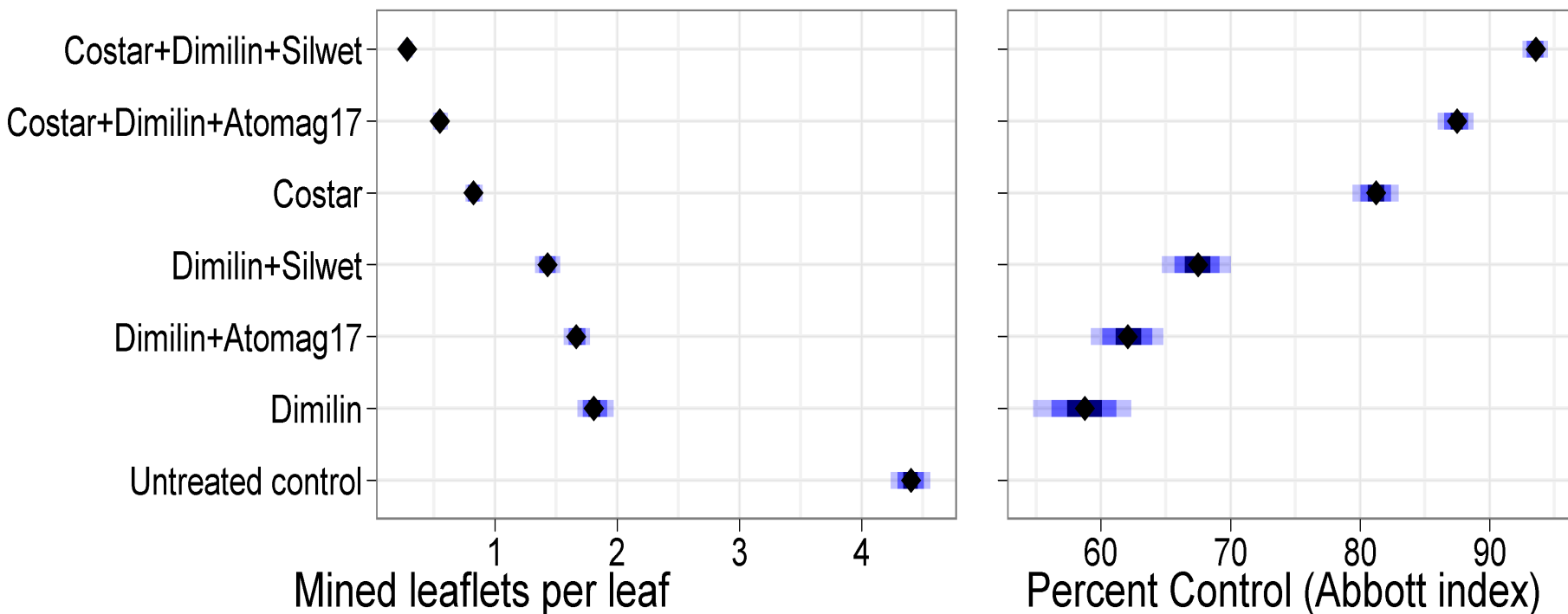
Attack trend by treatment. The replicated red line represents the untreated control.



Application every 7 days: 19 August (A), 26 August (B), 2 Sept. (C), 9 Sept. (D)

## GH Tomato – Piana del Sele (SA) – (IT) 2011 – *Tuta absoluta*

Average attack and control levels by treatment, with 95% confidence intervals



Application every 7 days: 19 August (A), 26 August (B), 2 Sept. (C), 9 Sept. (D)

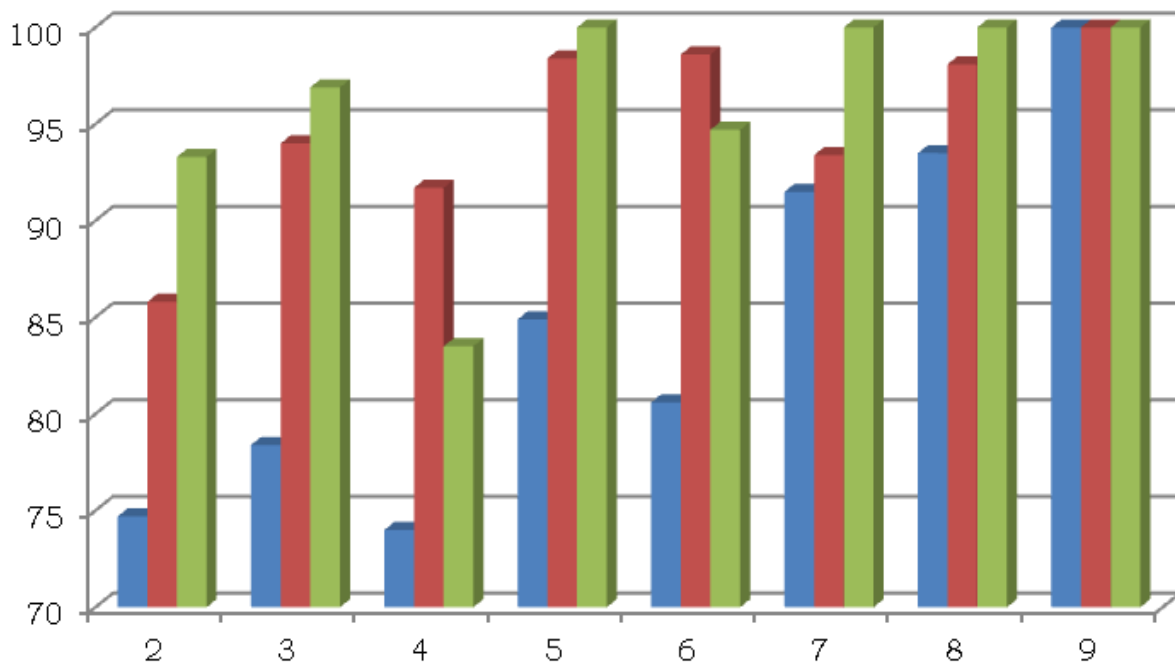


## GH Tomato – Fasano (BR) - Italy 2011 – *Heliothis armigera*

### Efficacy against larvae (Abbott's method)

Untreated (n.living larvae 25 plants):

■ 7 DA-C 59.5 ■ 7 DA-D 34.8 ■ 14 DA-D 16



Trt No.	Treatment Name	Form Type	Rate	Appl Code
1	Untreated			
2	DIMILIN 80 WG	WG	22, 5 g/hl	A÷D
3	BIOBIT DF	WG	100 g/hl	A÷D
4	ATOMAG17 EC	EC	1 l/hl	A÷D
5	DIMILIN 80 WG SILWET L-77	WG EC	22, 5 g/hl 25 ml/hl	A÷D A÷D
6	DIMILIN 80 WG ATOMAG17	WG EC	22, 5 g/hl 1 l/hl	A÷D A÷D
7	BIOBIT DF	WG	100 g/hl	A÷D
8	DIMILIN 80 WG SILWET L-77 BIOBIT DF	WG EC WG	22, 5 g/hl 25 ml/hl 100 g/hl	A÷D A÷D A÷D
9	DIMILIN 80 WG ATOMAG17 CORAGEN	WG EC SC	22, 5 g/hl 1 l/hl 18 ml/hl	A÷D A÷D A÷D

Application every 7 days: 6 Sept. (A), 13 Sept. (B), 20 Sept. (C), 27 Sept. (D)

### Summary of first two year trials' results:

- Dimilin alone is not performing consistently;
- Adjuvant significantly improves Dimilin efficacy; positive combinations are with:
  - i) paraffinic oil at 0,4-1% (Ovipron Top, Arbofine, Atomag 17);
  - ii) Silwet L77 at low rate (0,025%)
  - iii) Codacide at 0,25%
- Mixture with *Bacillus thuringiensis kurstaki* further increases performance/ making it more consistent especially with strong initial attack;
- Dimilin tends to better protect foliage than fruits; mixture with *Btk* improves fruit protection;
- Best standard products like rynaxypyr and spinosad are superior but the gap is reduced/nil when *Btk* is added.

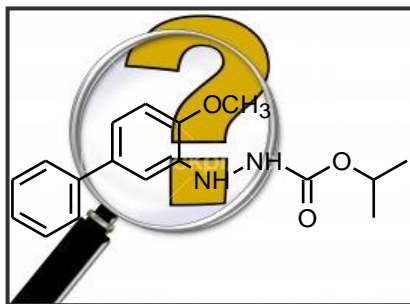
## First considerations on the use of Dimilin:

- valid tool for an anti-resistance strategy (many *Tuta* generations x year require many applications with different MoA to be properly controlled);
- to be used in mix with adjuvants;
- to be applied as ovicide (first application with low level of infestation);
- with high infestation/late application add *Btk* to the mixture;
- do not reduce the suggested rate per ha;
- Good coverage of both leaf surfaces key to good results.

In grateful recognition for the technical support and friendship to Colleagues, Contractors, Companies, Officials:

- Dr Luigi Sannino & C. – Ente CRA-CAT, Scafati (SA) / Italy – trial n.7;
- Dr Pasquale Lopolito & C. – ProAgri, Bisceglie (BT) / Italy – trial n.1, 5 and 8;
- Dr Giuseppe Tornello & C – Coragro, Grammichele (CT) / Italy – trial n. 4 and 6;
- Dr Antonio Guarino (Regione Puglia) & Coop. AgroLab / Italy – trial n.9;
- Dr Pedro Fuchs & C. – Kenogard & MSA – Murcia / Spain – trial n. 2 and 3;
- Dr Sami Dura (Chemtura) as coordinator in Antalya–Mersin/Turkey – trial n.10 and 11;
- Dr Arben Myrta (Certis Europe)–contributing in trials n.7 and 9 and with *Btk* Costar;
- Dr Michele Pizzi (Sumitomo Italia)-contributing in trials n.6 and 8 and with *Btk* BiobitDF;
- Cerexagri (Uniphos) – providing the experimental paraffinic oil “Atomag 17”
- Dr Mauro Nannini – Agris Sardegna / Italy “Preliminary evaluation in lab of Dimilin on *Tuta...*”
- Dr Eduardo Ucciero – Servizio Fitosanitario Campania Region /Italy, first observation in field
- Dr Enzo Casagrande and Nazario L. (Thank you All a Agrosolutions) for continuous support


# Thanks for your attention



For any further information do not hesitate to contact us

*Giancarlo Chiot*

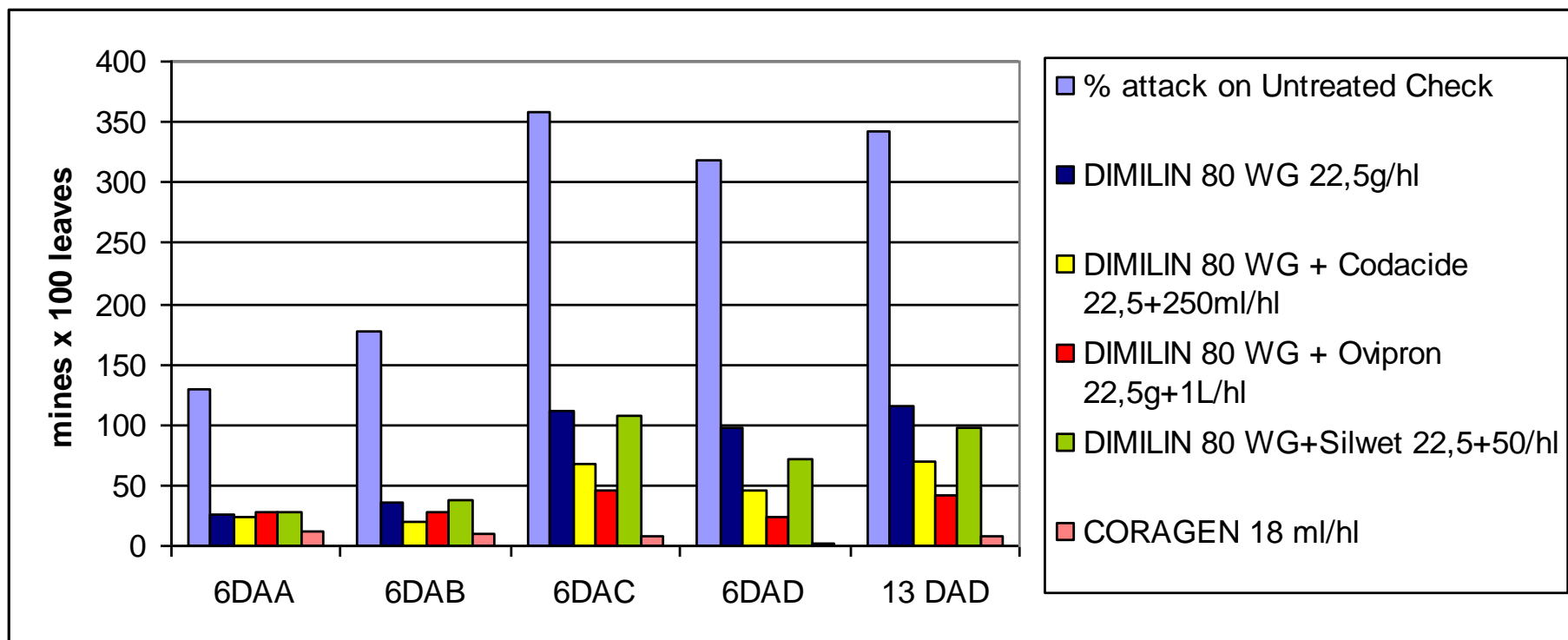
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It follows the complete presentation of the trials performed in the two years

## GH Tomato – Molfetta (BA) - Italy 2010 – *Tuta absoluta*

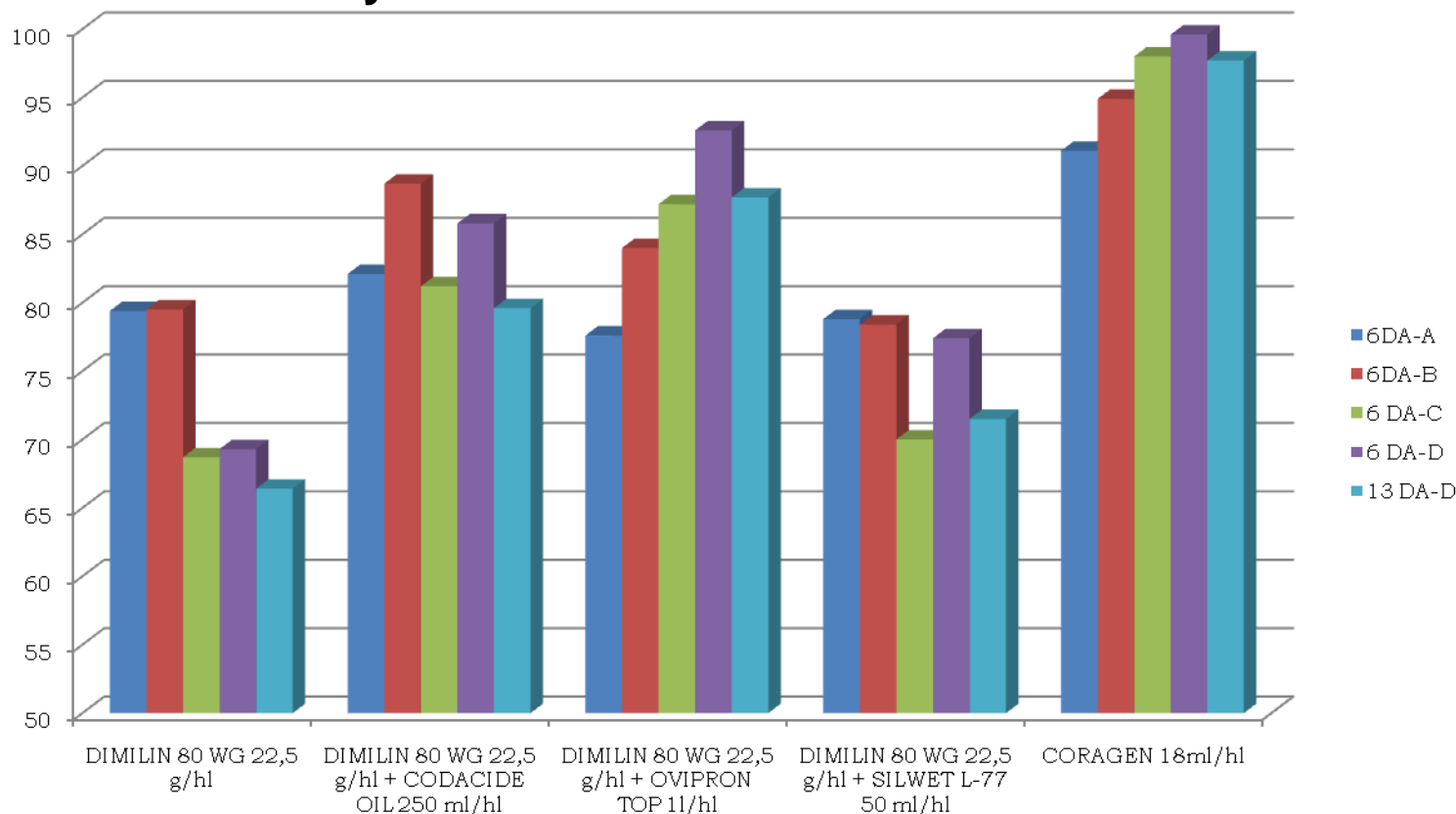
### Number of mines x 100 leaves



Application every 7 days: 1 July (A), 8 July (B), 15 July (C), 22 July (D)

## GH Tomato – Molfetta (BA) - Italy 2010 – *Tuta absoluta*

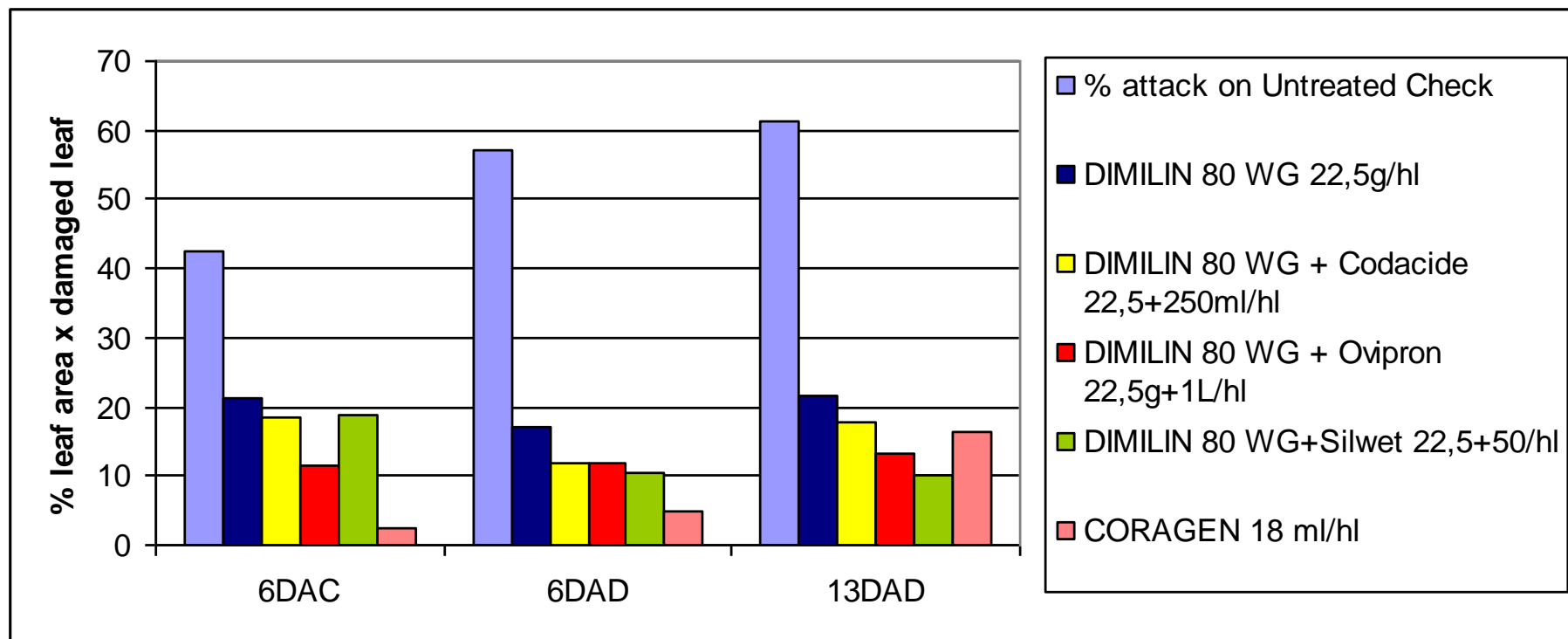
**% efficacy on number of mines x 100 leaves**



Application every 7 days: 1 July (A), 8 July (B), 15 July (C), 22 July (D)

## GH Tomato – Molfetta (BA) - Italy 2010 – *Tuta absoluta*

### Severity of the attack on the damaged leaf

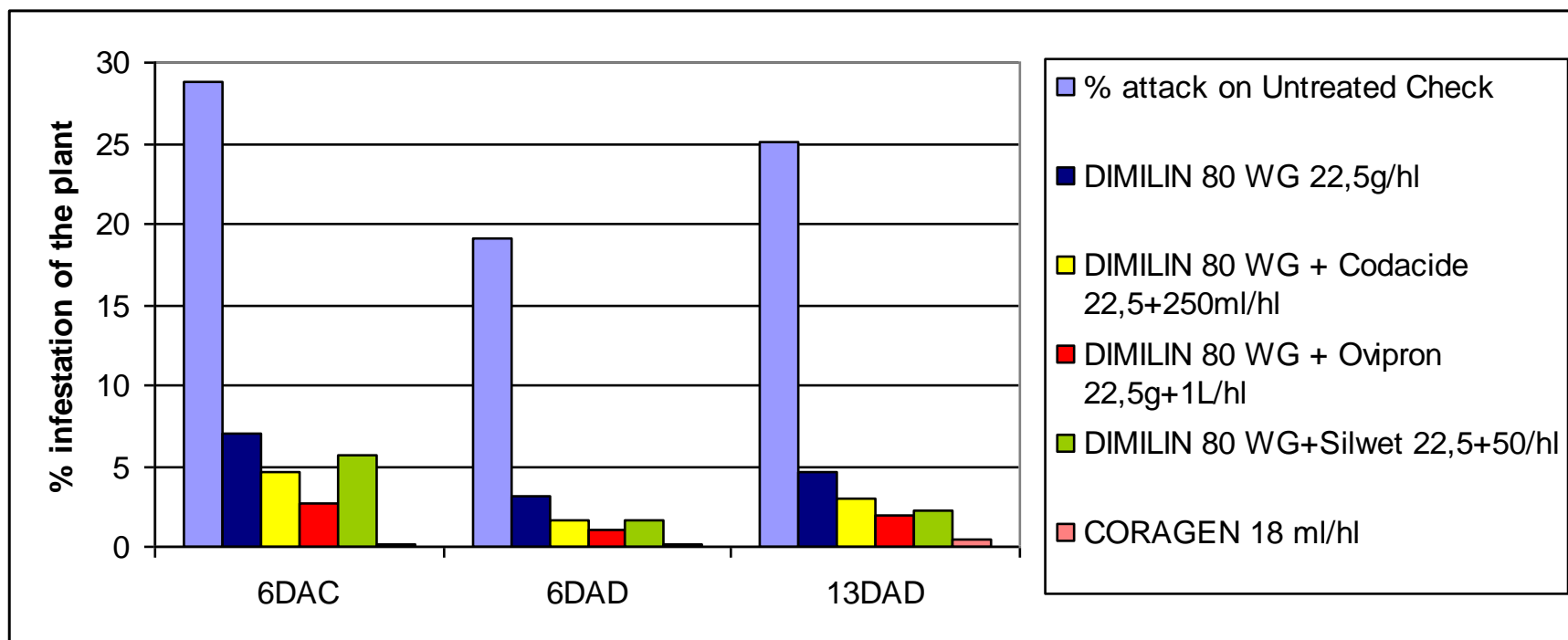


Application every 7 days: 1 July (A), 8 July (B), 15 July (C), 22 July (D)



## GH Tomato – Molfetta (BA) - Italy 2010 – *Tuta absoluta*

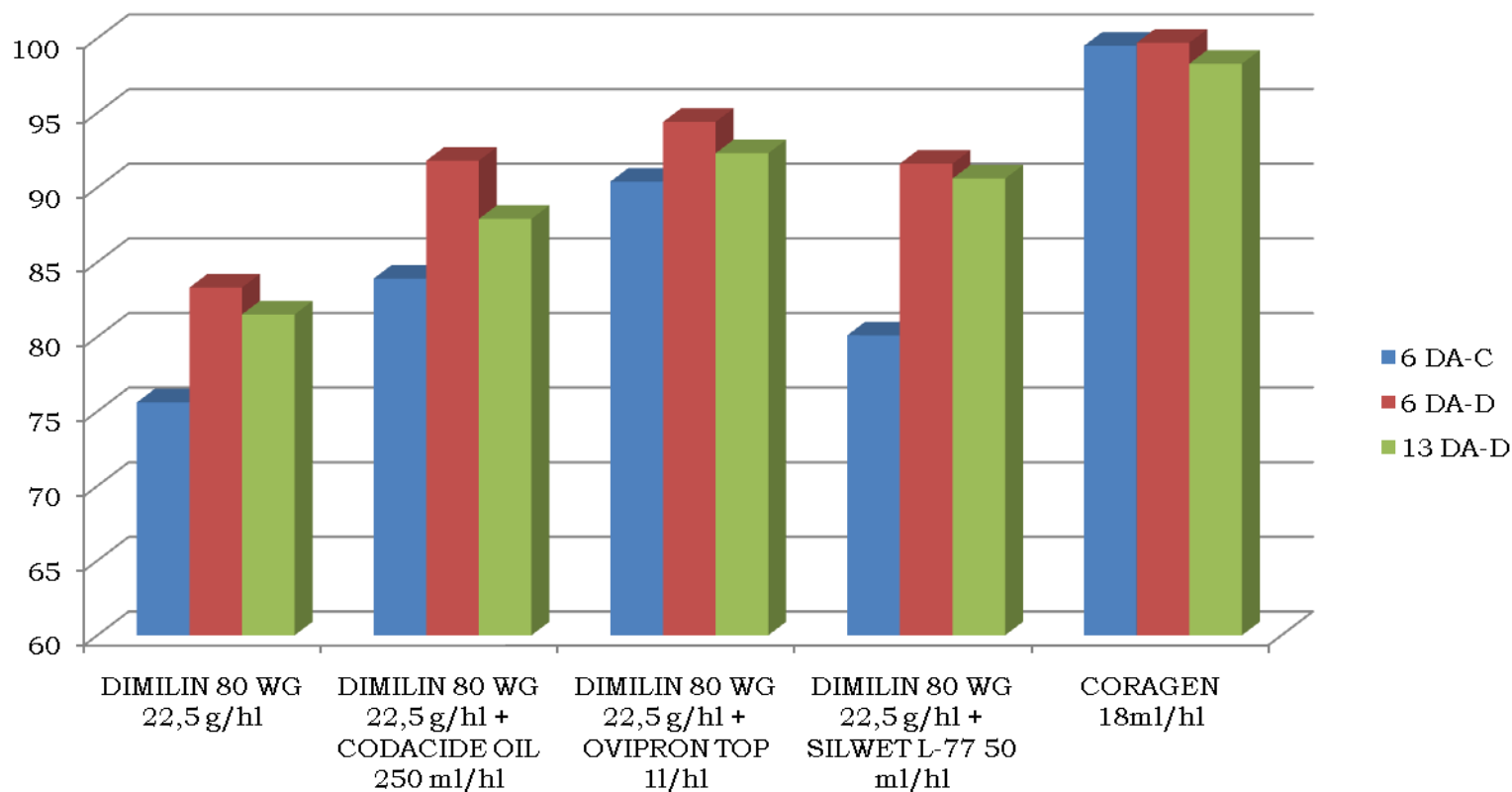
### % infestation on the plant



Application every 7 days: 1 July (A), 8 July (B), 15 July (C), 22 July (D)

## GH Tomato – Molfetta (BA) - Italy 2010 – *Tuta absoluta*

### % efficacy on plant infestation (incidence & severity)

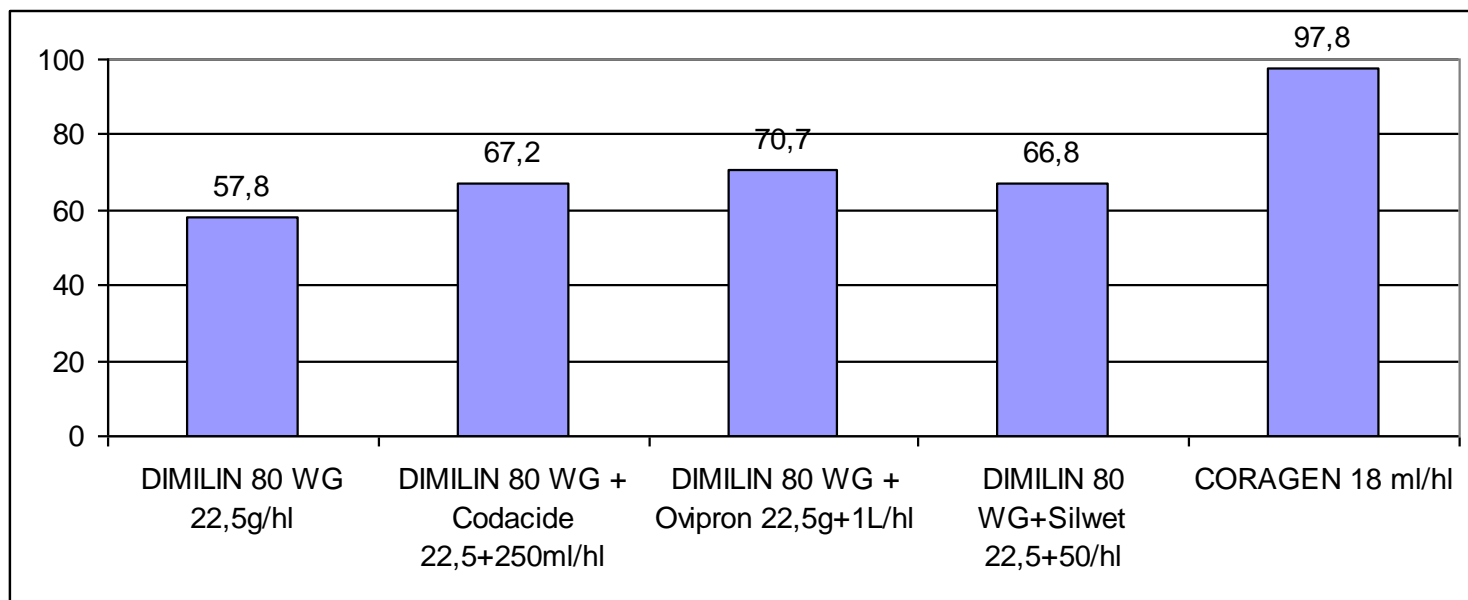


Application every 7 days: 1 July (A), 8 July (B), 15 July (C), 22 July (D)

## GH Tomato – Molfetta (BA) - Italy 2010 – *Tuta absoluta*

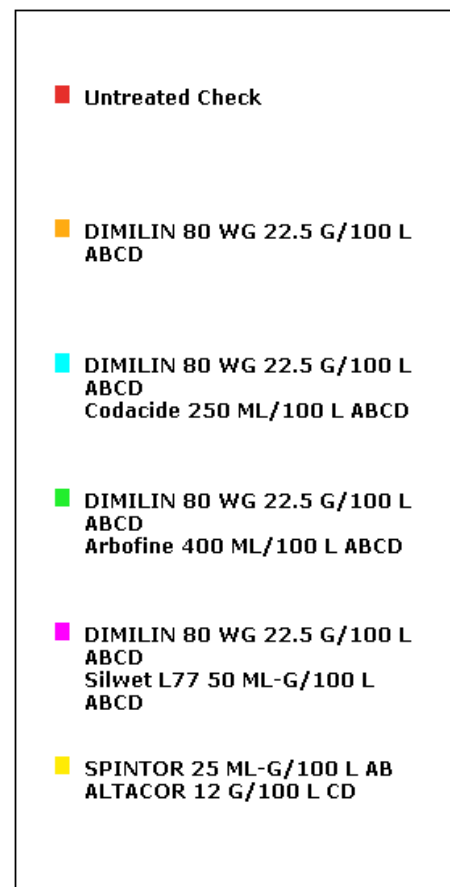
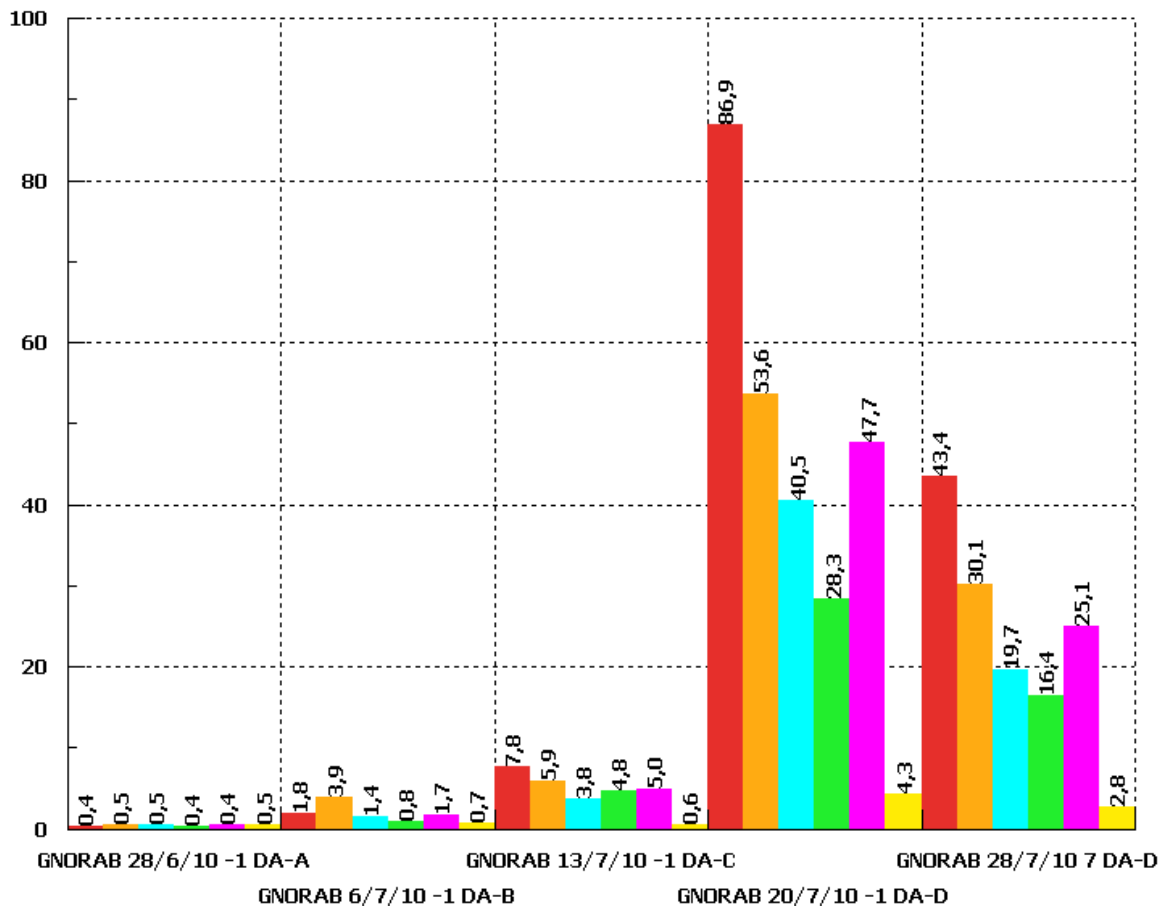
### % Efficacy on tomato fruits (healthy fruits)

**Untreated**  
58%  
fruits attacked  
(20 DAD)



Application every 7 days: 1 July (A), 8 July (B), 15 July (C), 22 July (D)

N° mines x plant

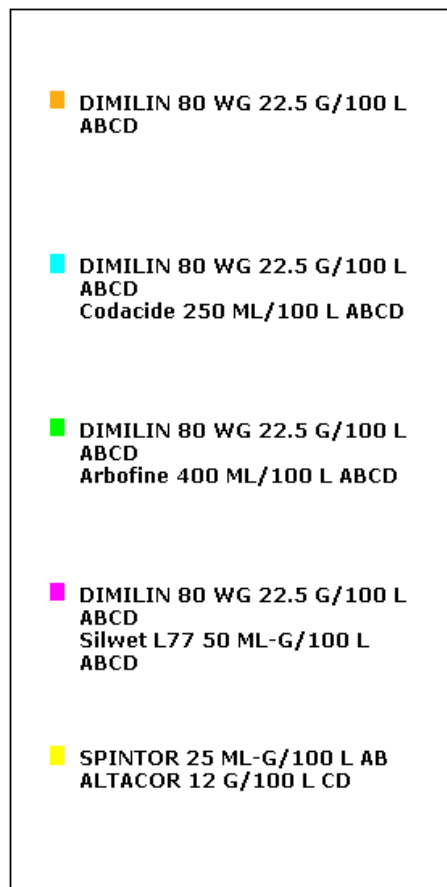
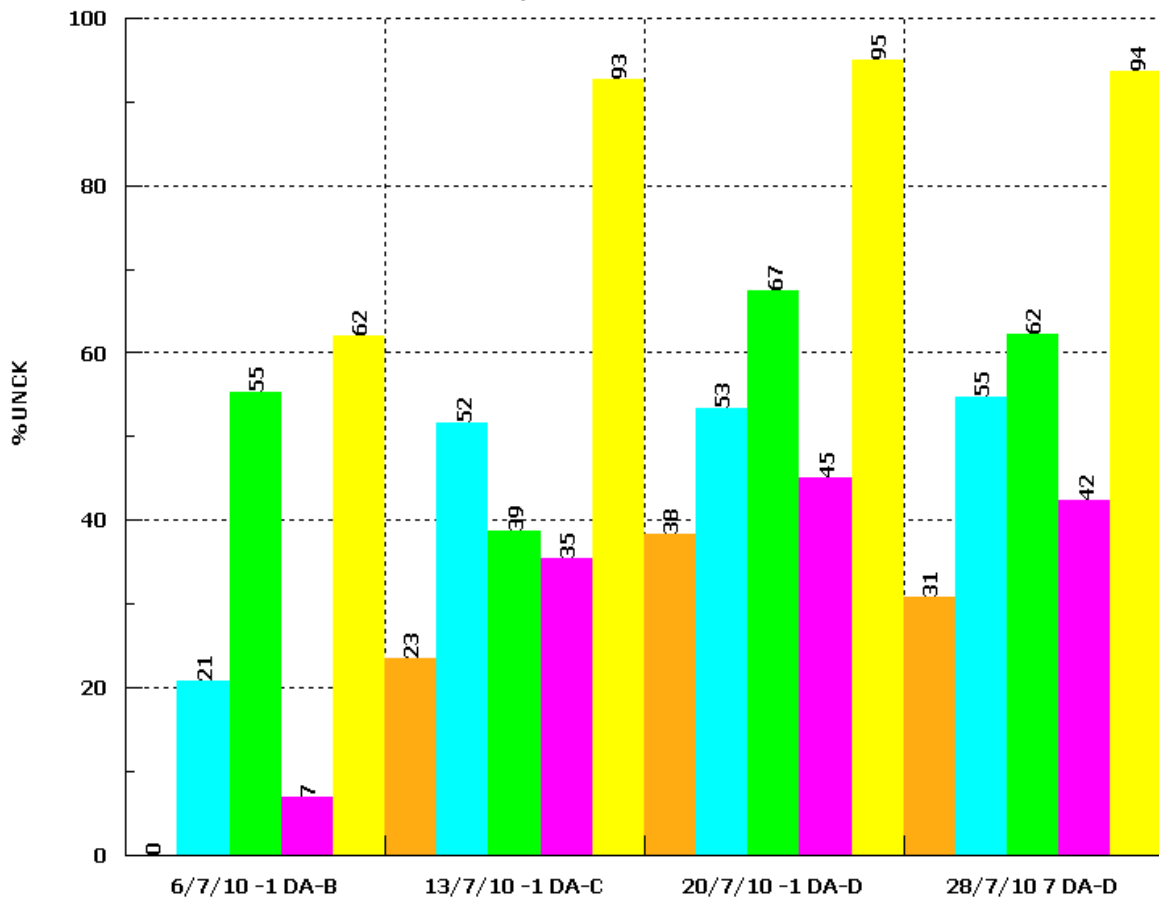


Application every 7 days: 29 June (A), 7 July (B), 14 July (C), 21 July (D)

## GH Tomato (cv Pera) – Mazarrón (Murcia) Spain-*Tuta absoluta*-2010

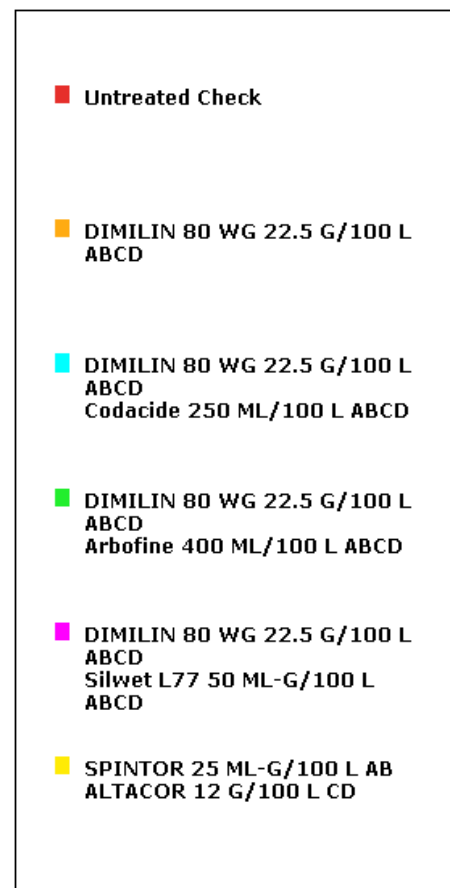
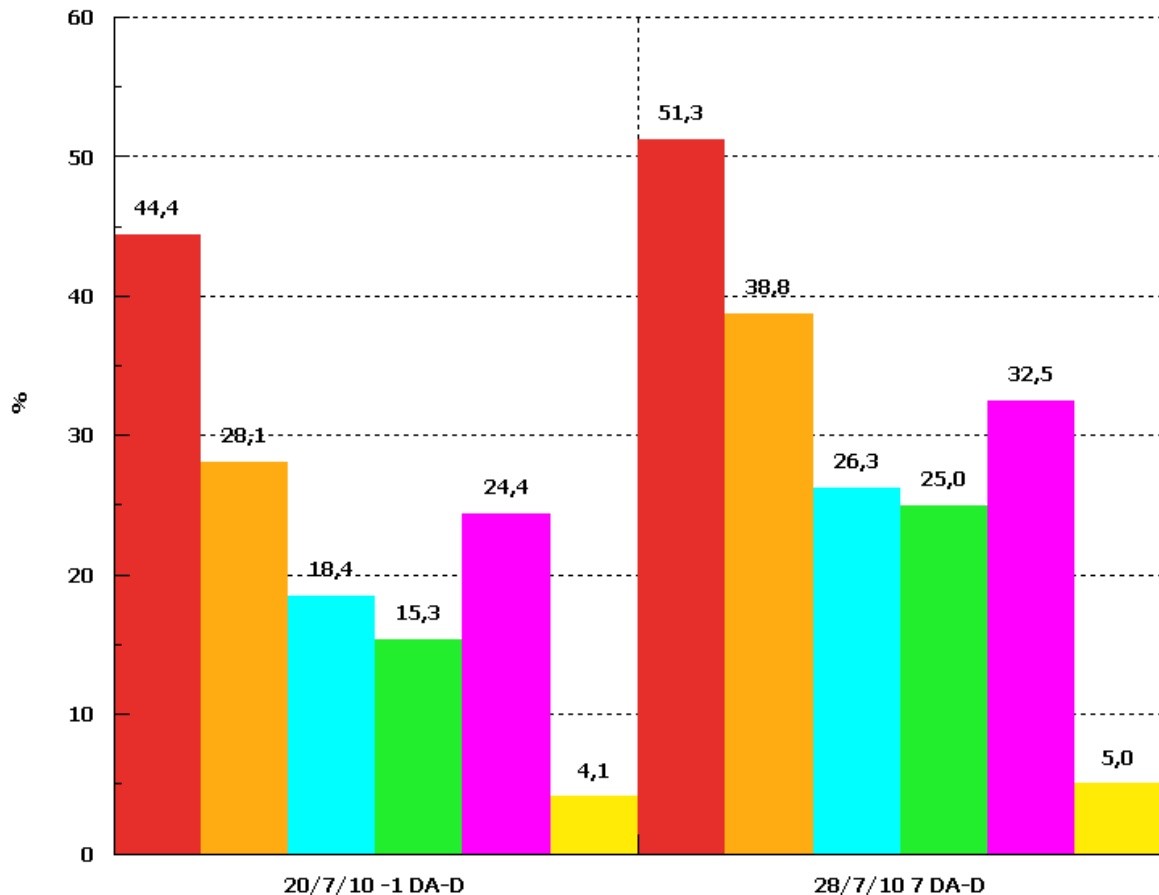
Water volume: 5 hl/ha  
Appl. Pressure: 400KPA

% Efficacy on N° mines x plant



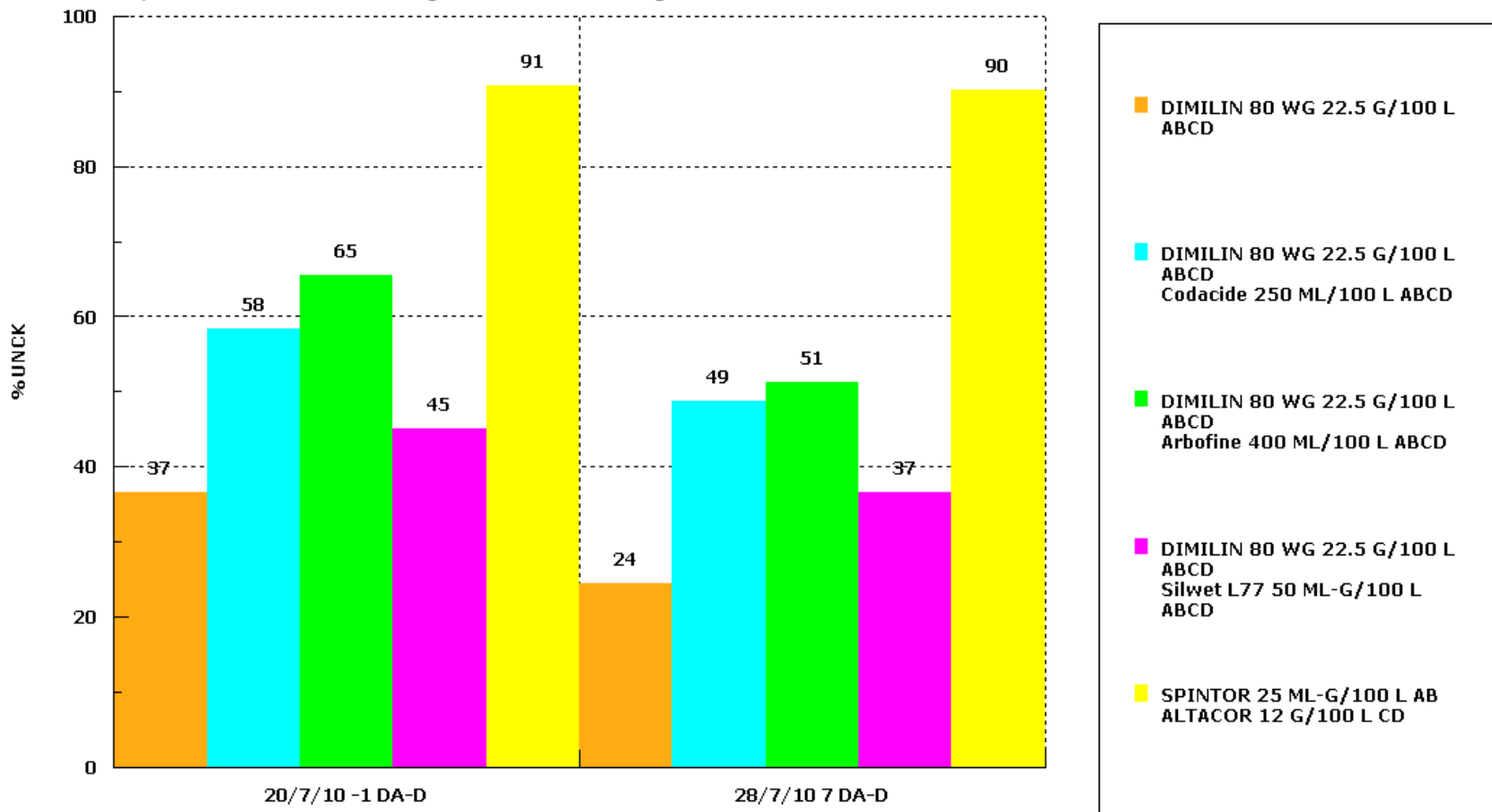
Application every 7 days: 29 June (A), 7 July (B), 14 July (C), 21 July (D)

### Percentage of damaged foliar area per plant



Application every 7 days: 29 June (A), 7 July (B), 14 July (C), 21 July (D)

### Efficacy on percentage of damaged foliar area per plant

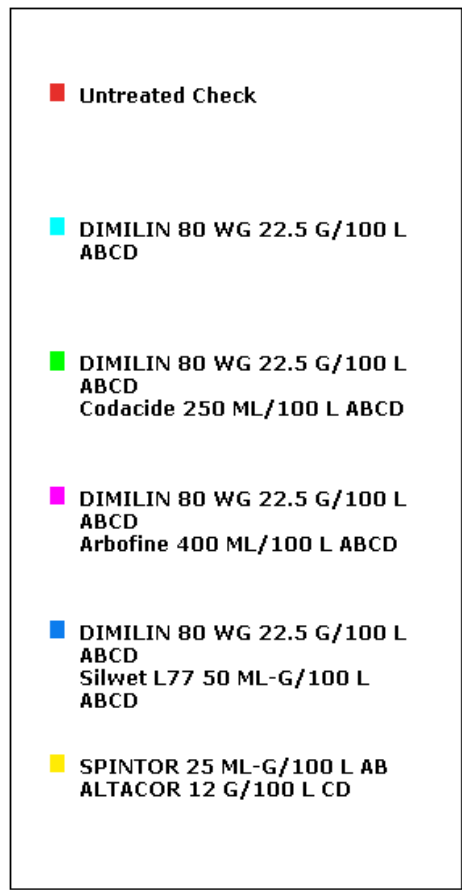
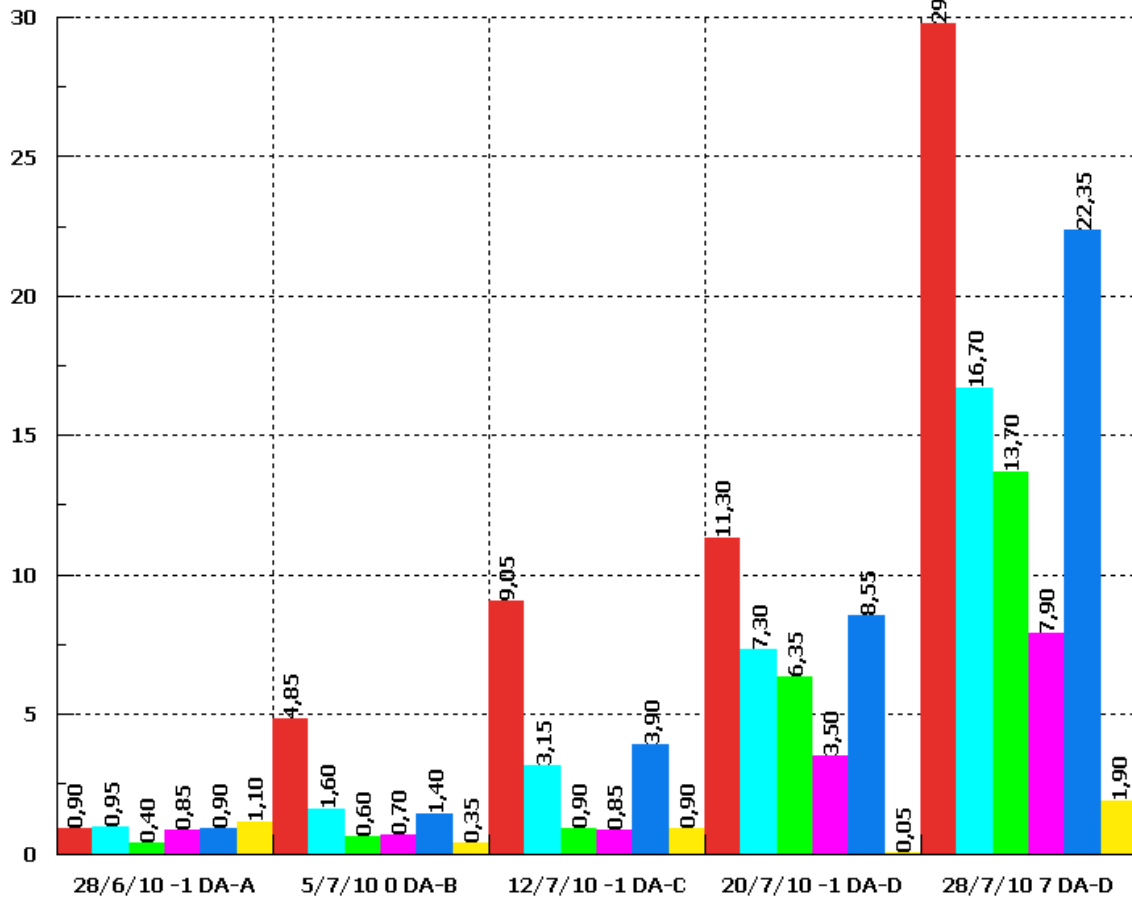


Application every 7 days: 29 June (A), 7 July (B), 14 July (C), 21 July (D)

## GH Tomato (cv Muchamiel) – Mazarrón (Murcia) Spain- *Tuta absoluta*-2010

Water volume: 5 hl/ha  
Appl. Pressure: 600KPA

N° mines x plant

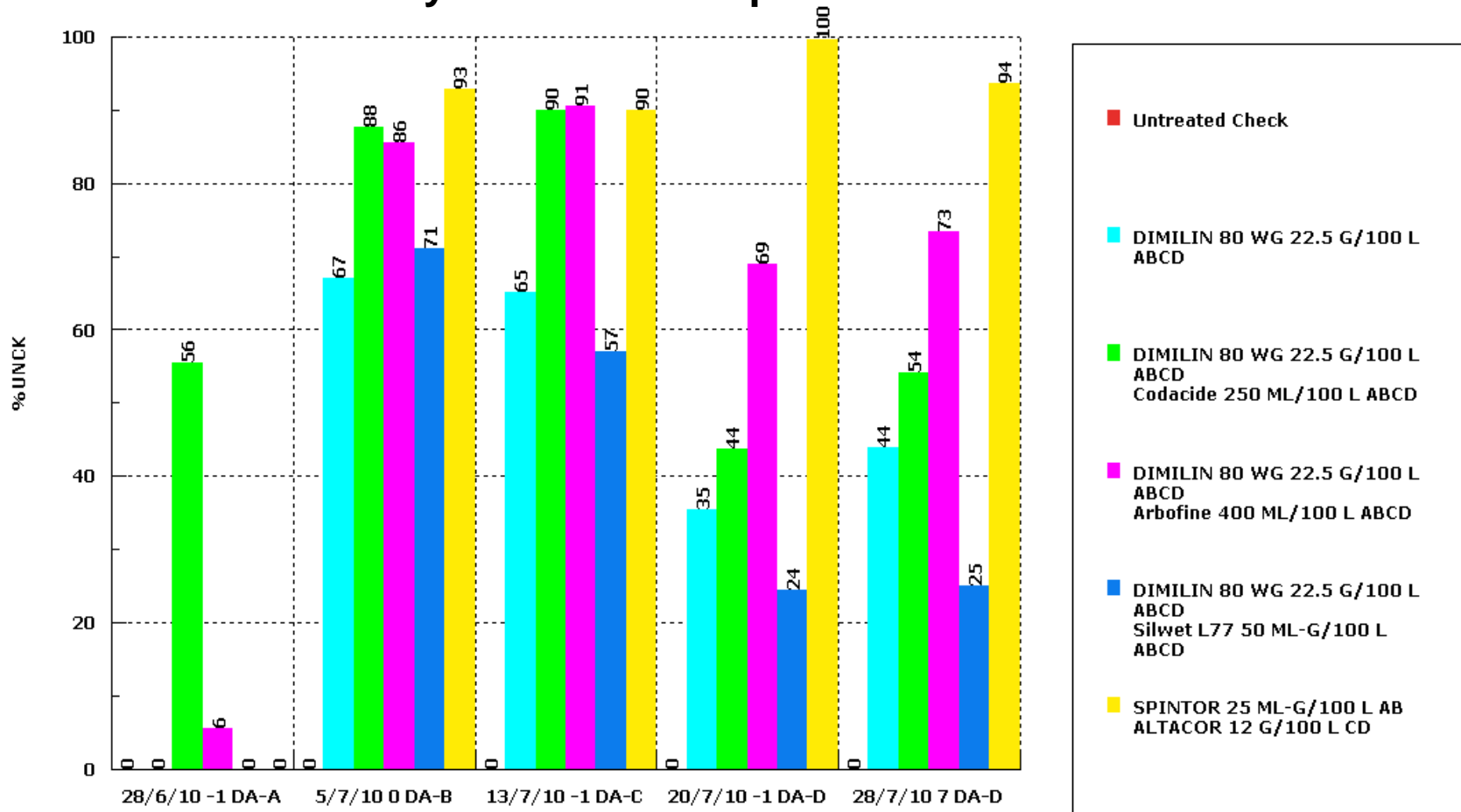


Application every 7 days: 28 June (A), 5 July (B), 13 July (C), 21 July (D)



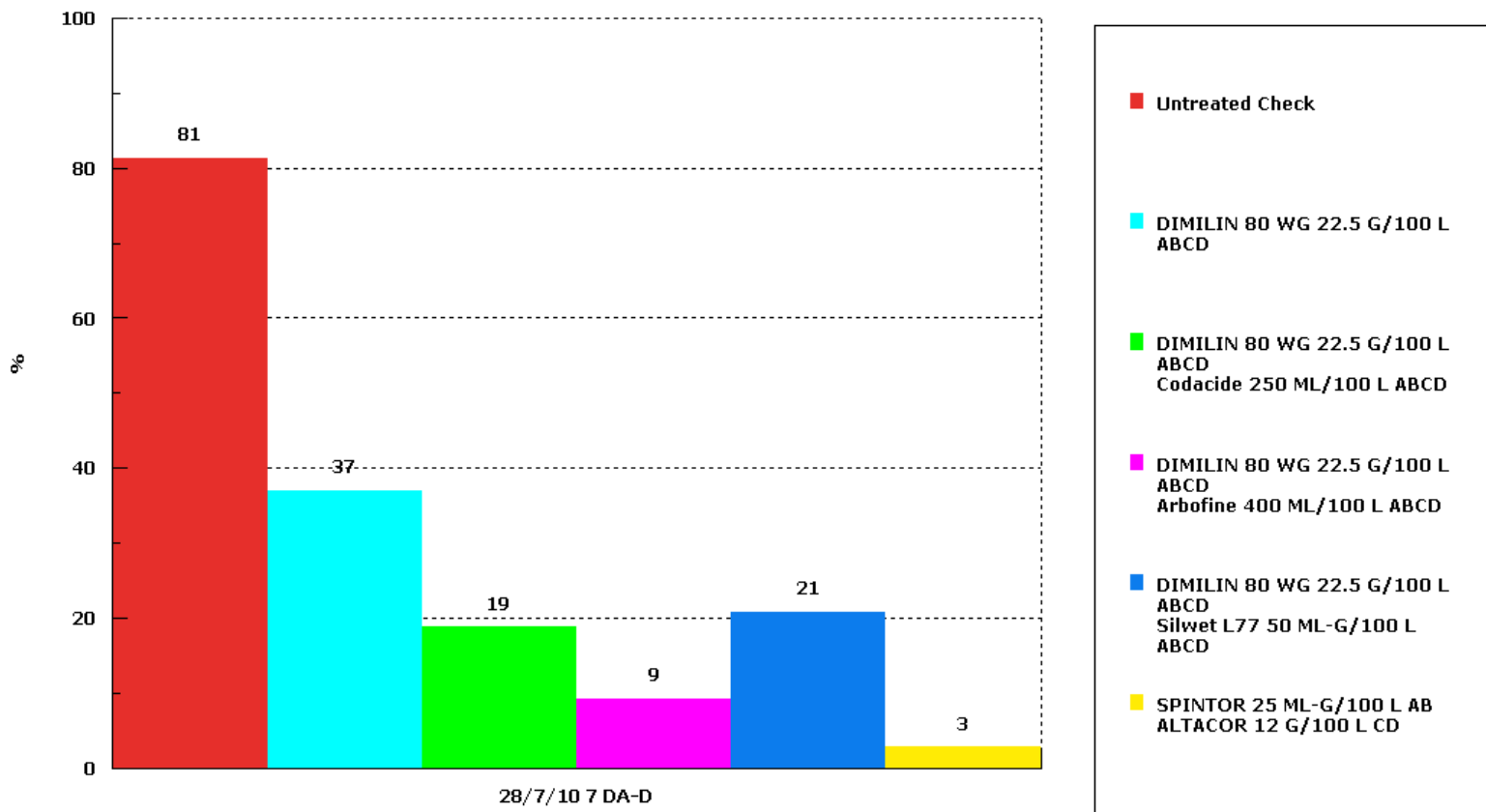
Water volume: 5 hl/ha  
Appl. Pressure: 600KPA

**% Efficacy on N° mines x plant**



Application every 7 days: 28 June (A), 5 July (B), 13 July (C), 21 July (D)

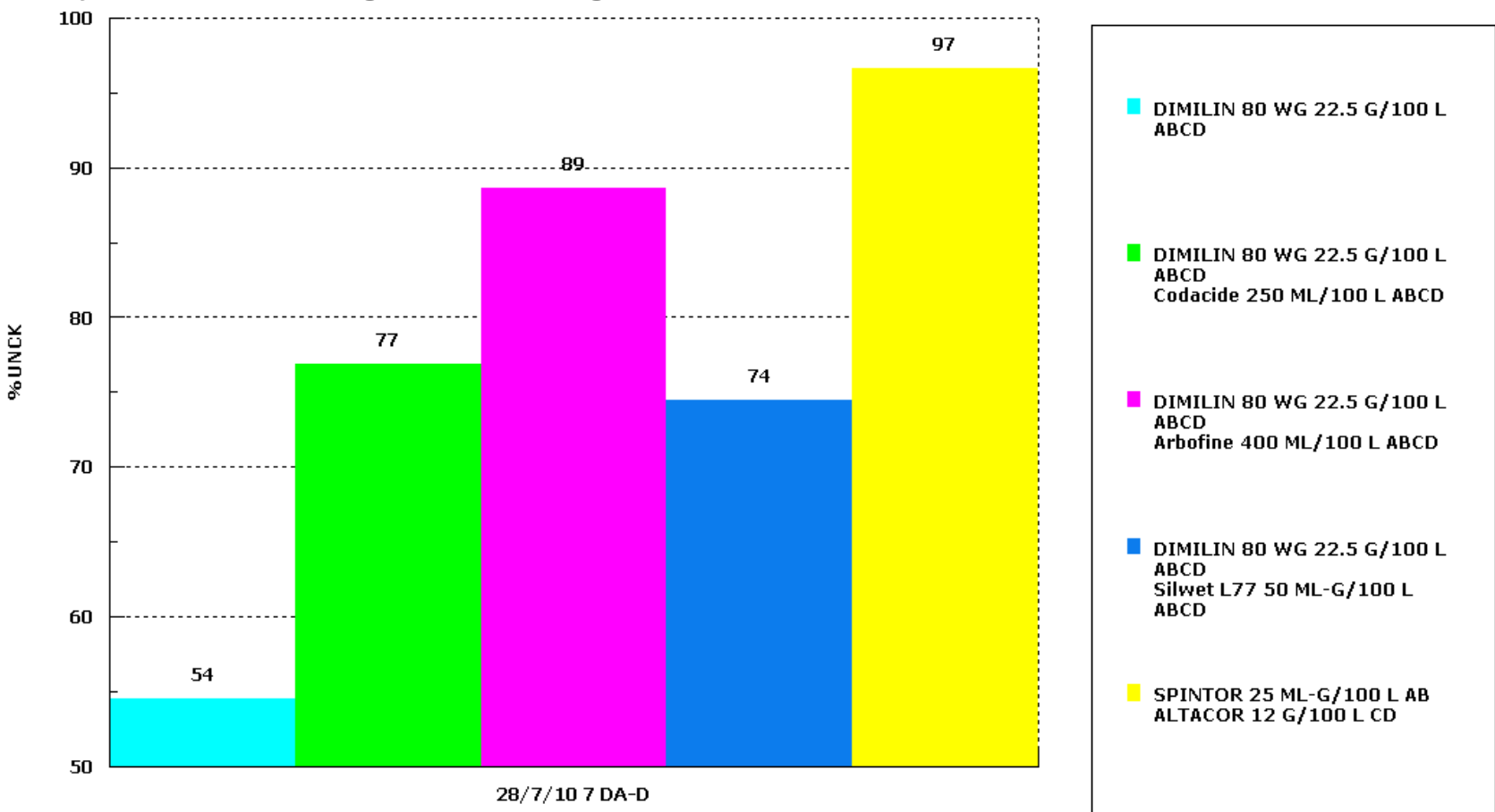
### Percentage of damaged foliar area per plant



Application every 7 days: 28 June (A), 5 July (B), 13 July (C), 21 July (D)

Water volume: 5 hl/ha  
Appl. Pressure: 600KPA

### Efficacy on percentage of damaged foliar area per plant

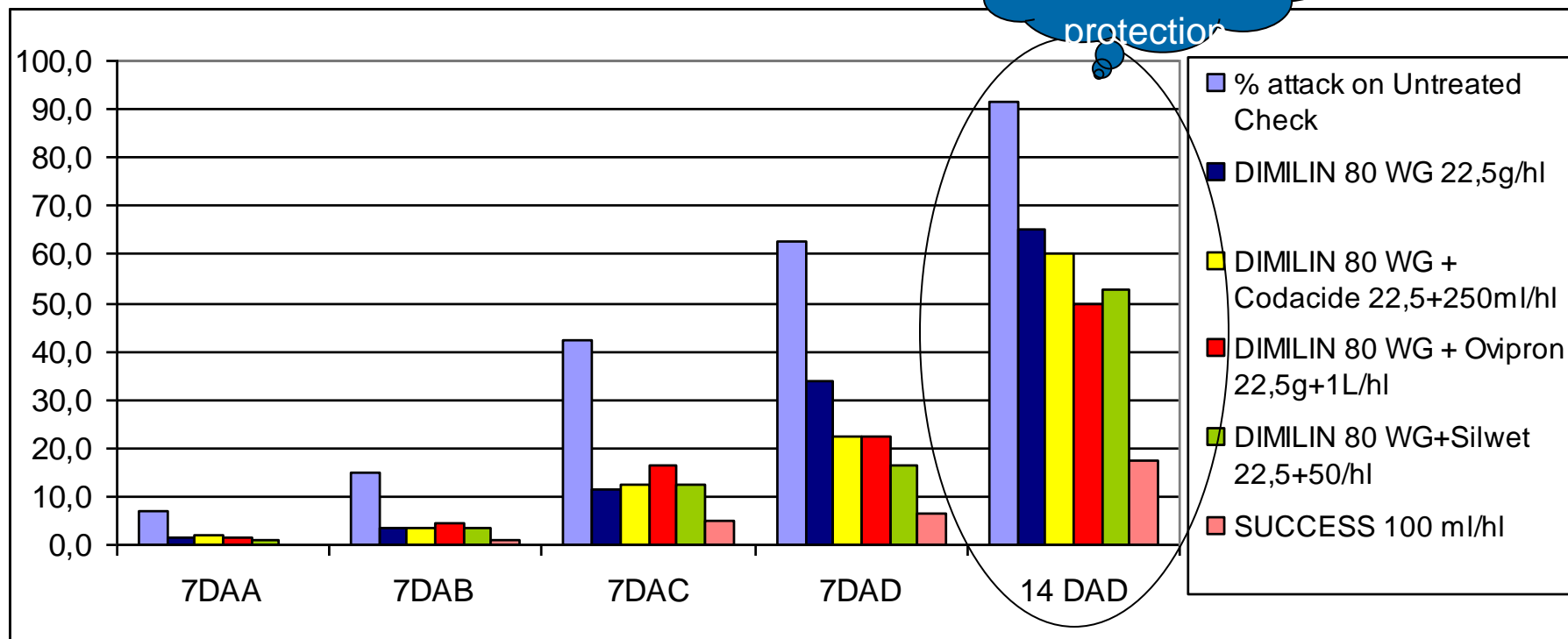


Application every 7 days: 28 June (A), 5 July (B), 13 July (C), 21 July (D)

## GH Tomato – Vittoria (RG) – Sicily (IT) 2010 – *Tuta absoluta*

% infected area x 50 leaves

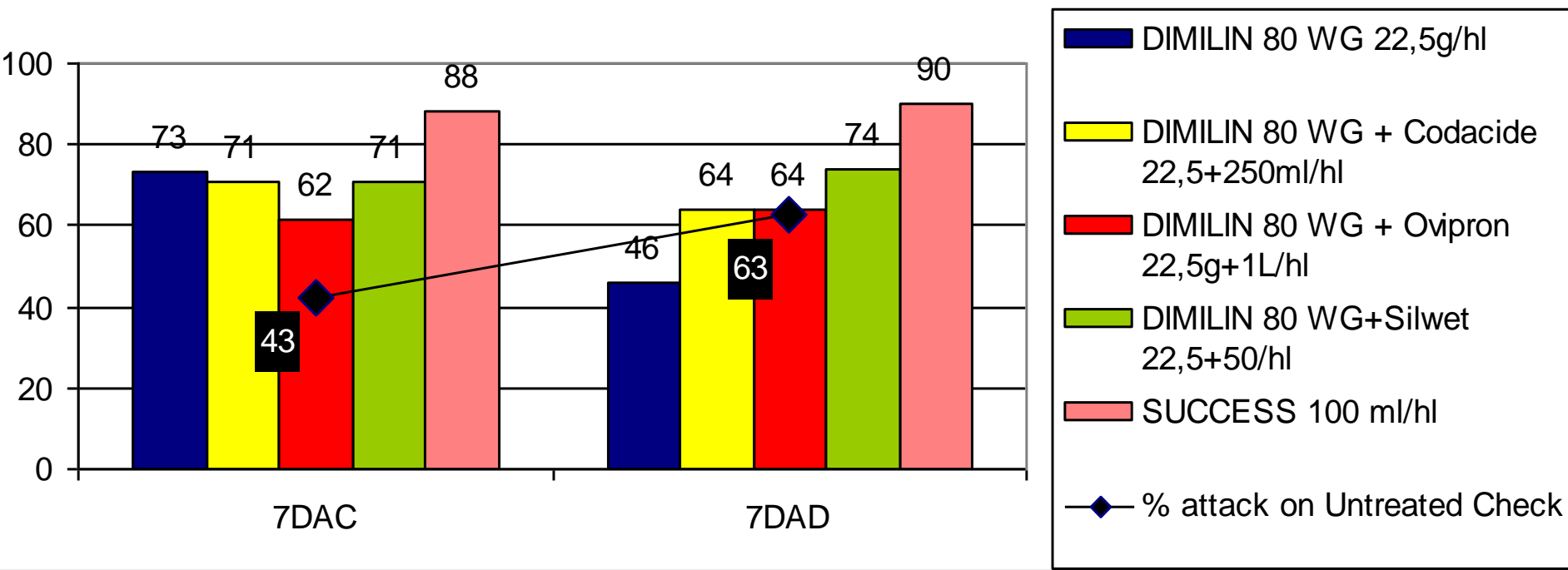
Without new protection



Application every 7 days: 2 July (A), 9 July (B), 16 July (C), 23 July (D)

## GH Tomato – Vittoria (RG) – Sicily (IT) 2010 – *Tuta absoluta*

**% efficacy on infected area x 50 leaves**



Application every 7 days: 2 July (A), 9 July (B), 16 July (C), 23 July (D)

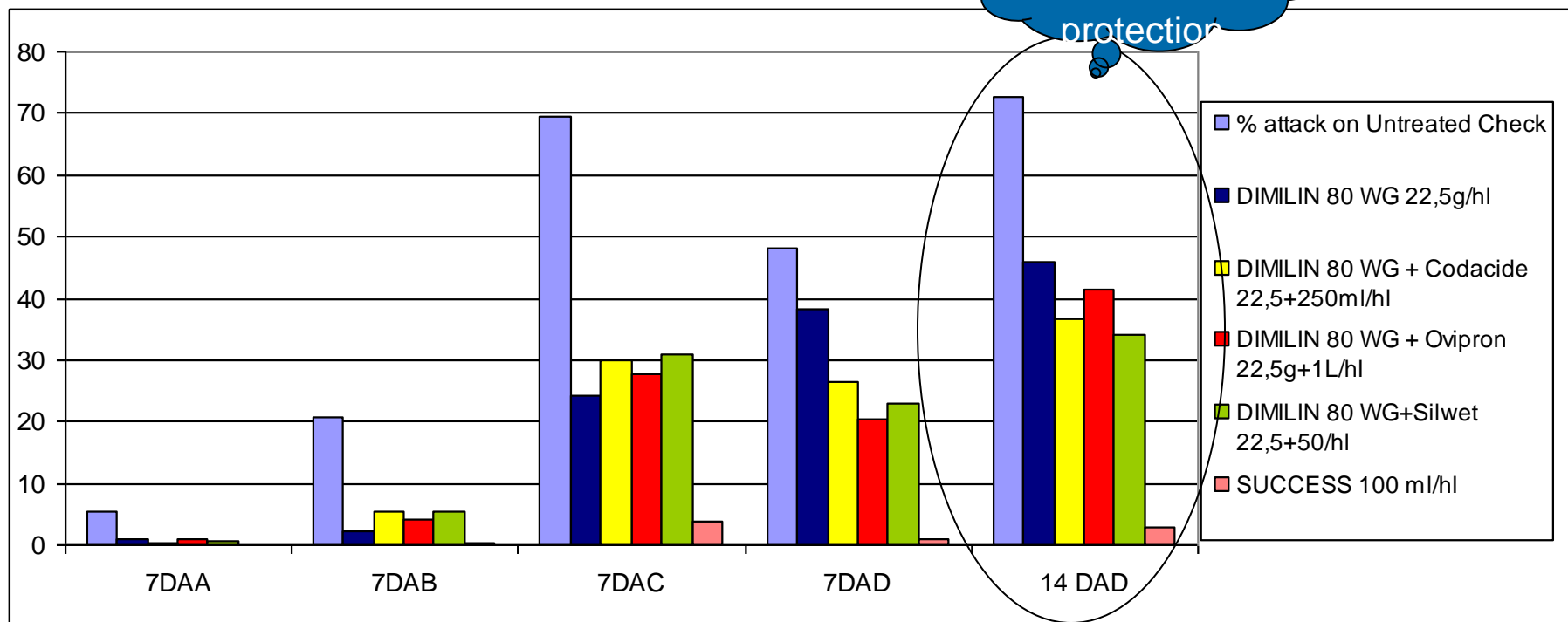
Cv: Tyty

Water volume: 10 hl/ha

## GH Tomato – Vittoria (RG) – Sicily (IT) 2010 – *Tuta absoluta*

% attacked fruits

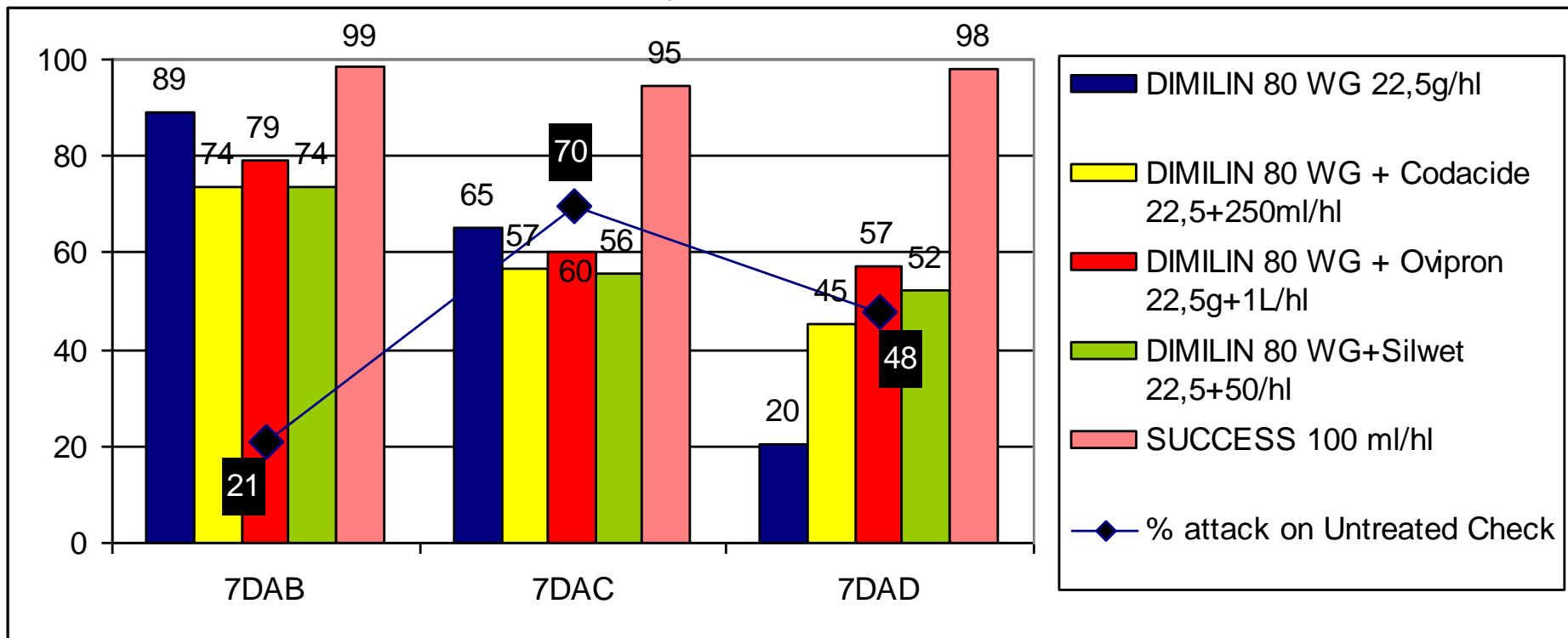
Without new protection



Application every 7 days: 2 July (A), 9 July (B), 16 July (C), 23 July (D)

## GH Tomato – Vittoria (RG) – Sicily (IT) 2010 – *Tuta absoluta*

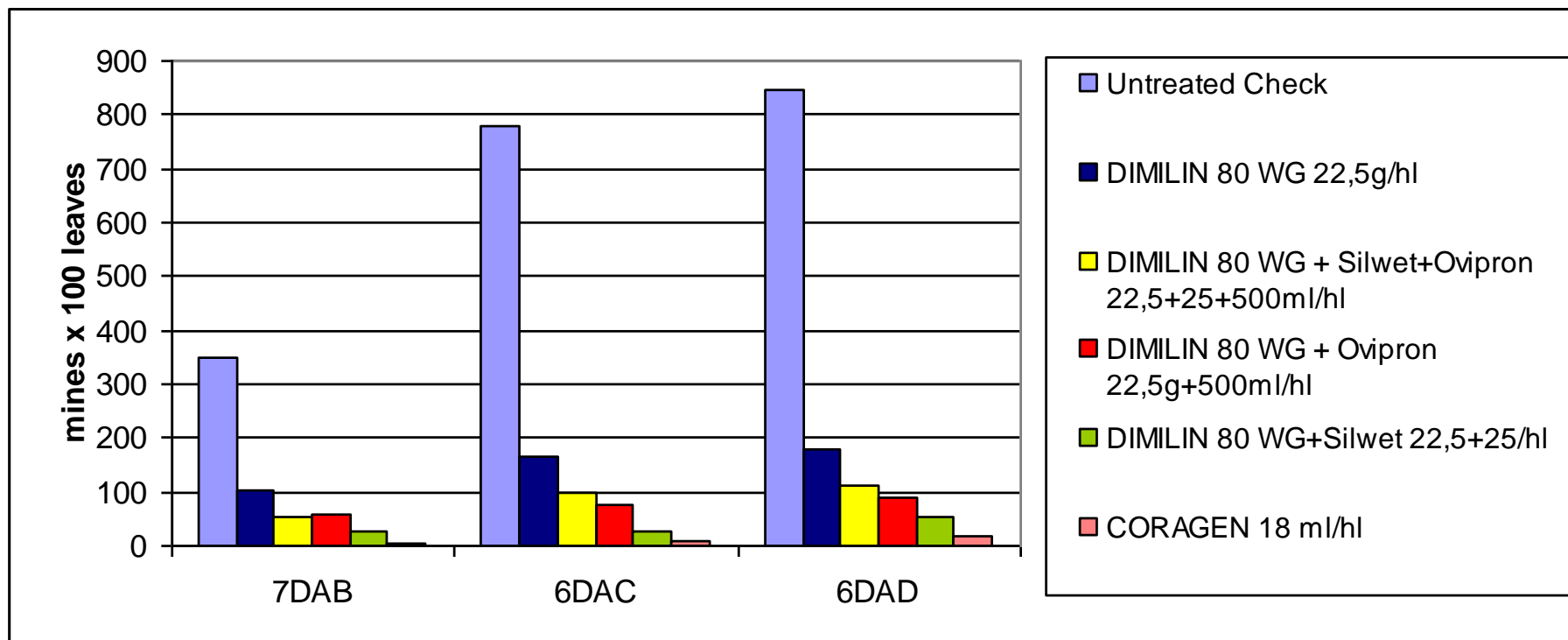
### % efficacy on attacked fruits



Application every 7 days: 2 July (A), 9 July (B), 16 July (C), 23 July (D)

## GH Tomato – Giovinazzo (BA) - Italy 2010 – *Tuta absoluta*

N° mines x 100 leaves

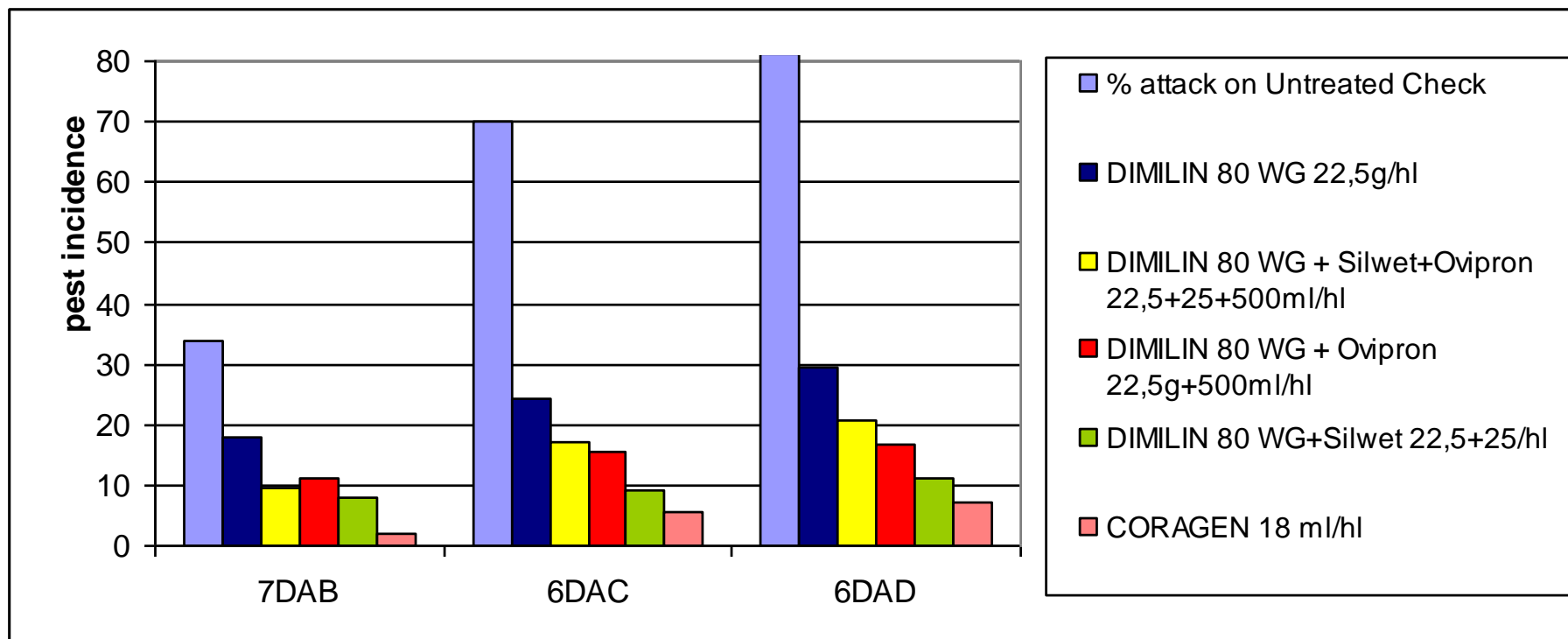


Application every 7 days: 27 October (A), 3 Nov. (B), 10 Nov. (C), 16 Nov. (D)



## GH Tomato – Giovinazzo (BA) - Italy 2010 – *Tuta absoluta*

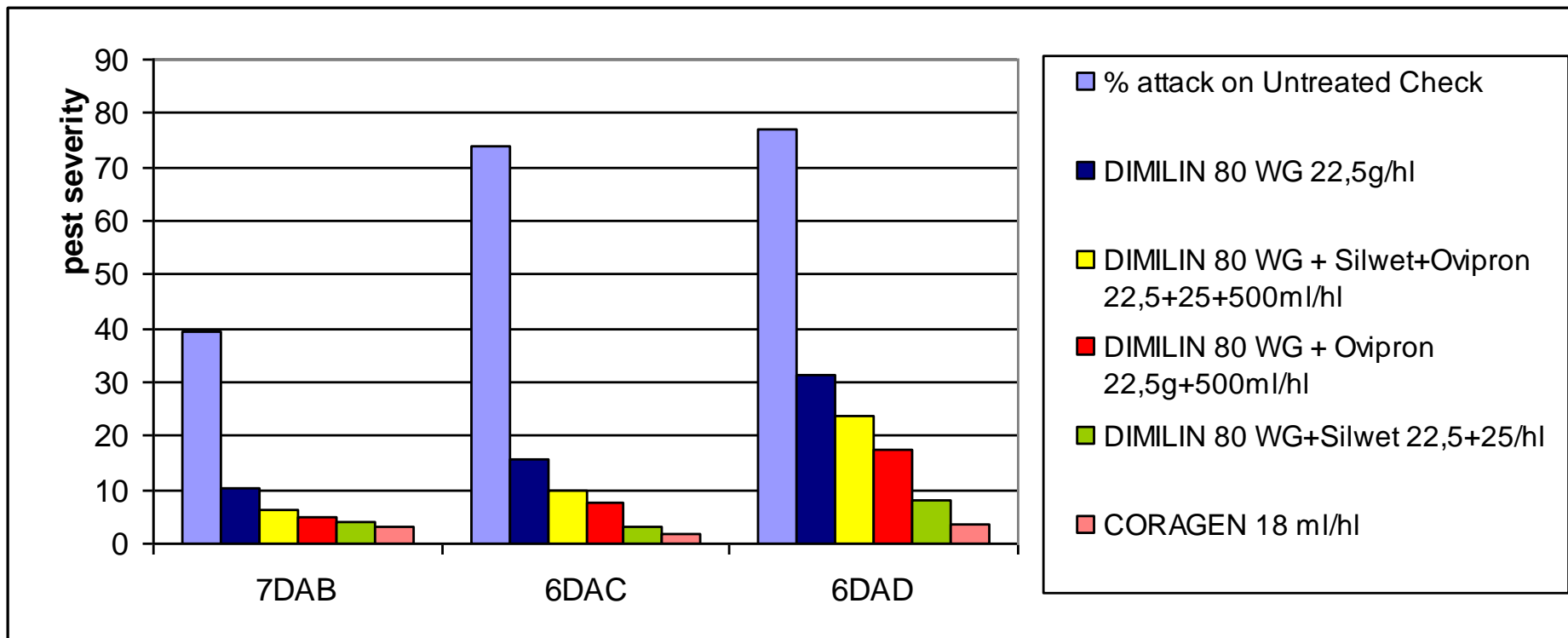
### Pest incidence on leaf



Application every 7 days: 27 October (A), 3 Nov. (B), 10 Nov. (C), 16 Nov. (D)

## GH Tomato – Giovinazzo (BA) - Italy 2010 – *Tuta absoluta*

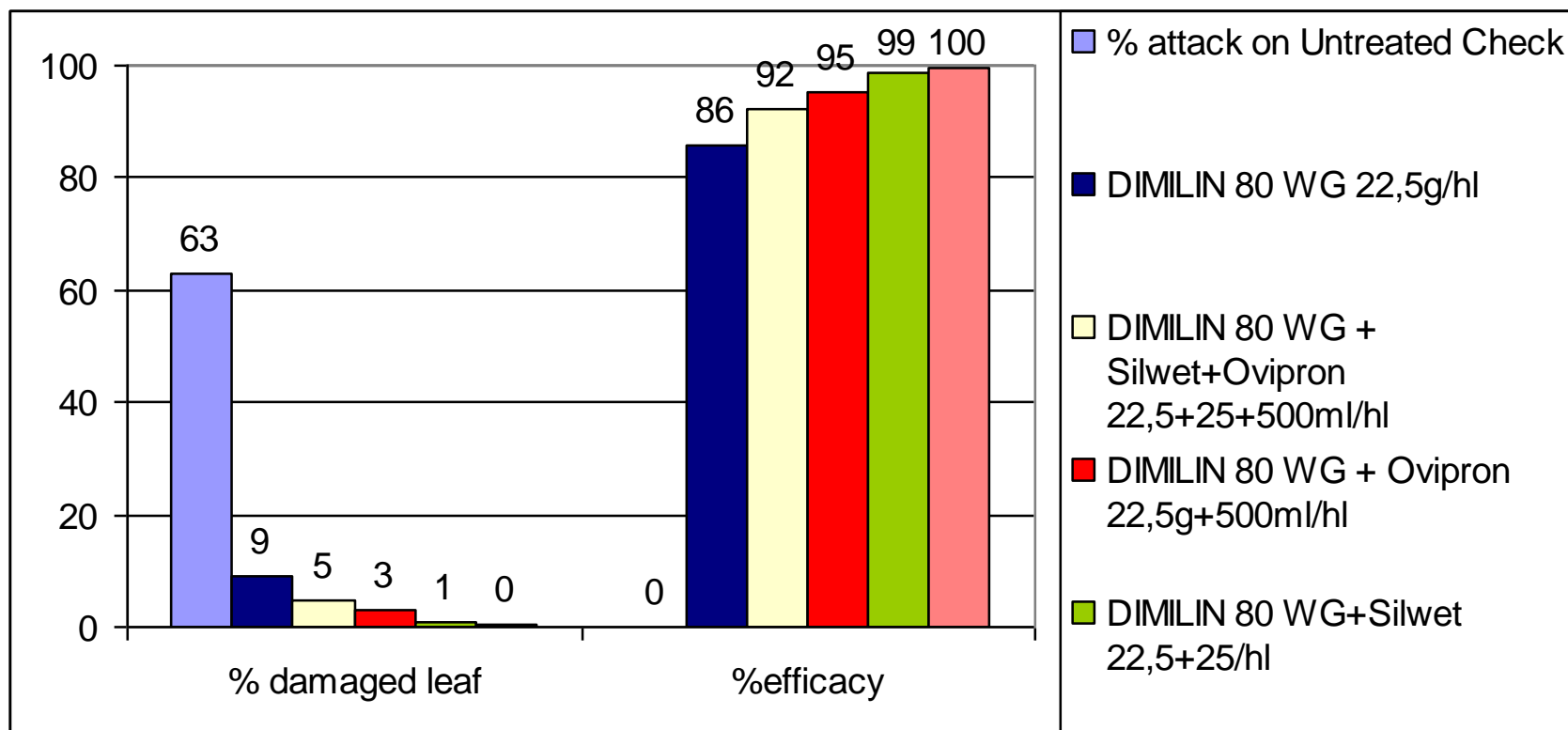
### Pest severity on leaf



Application every 7 days: 27 October (A), 3 Nov. (B), 10 Nov. (C), 16 Nov. (D)

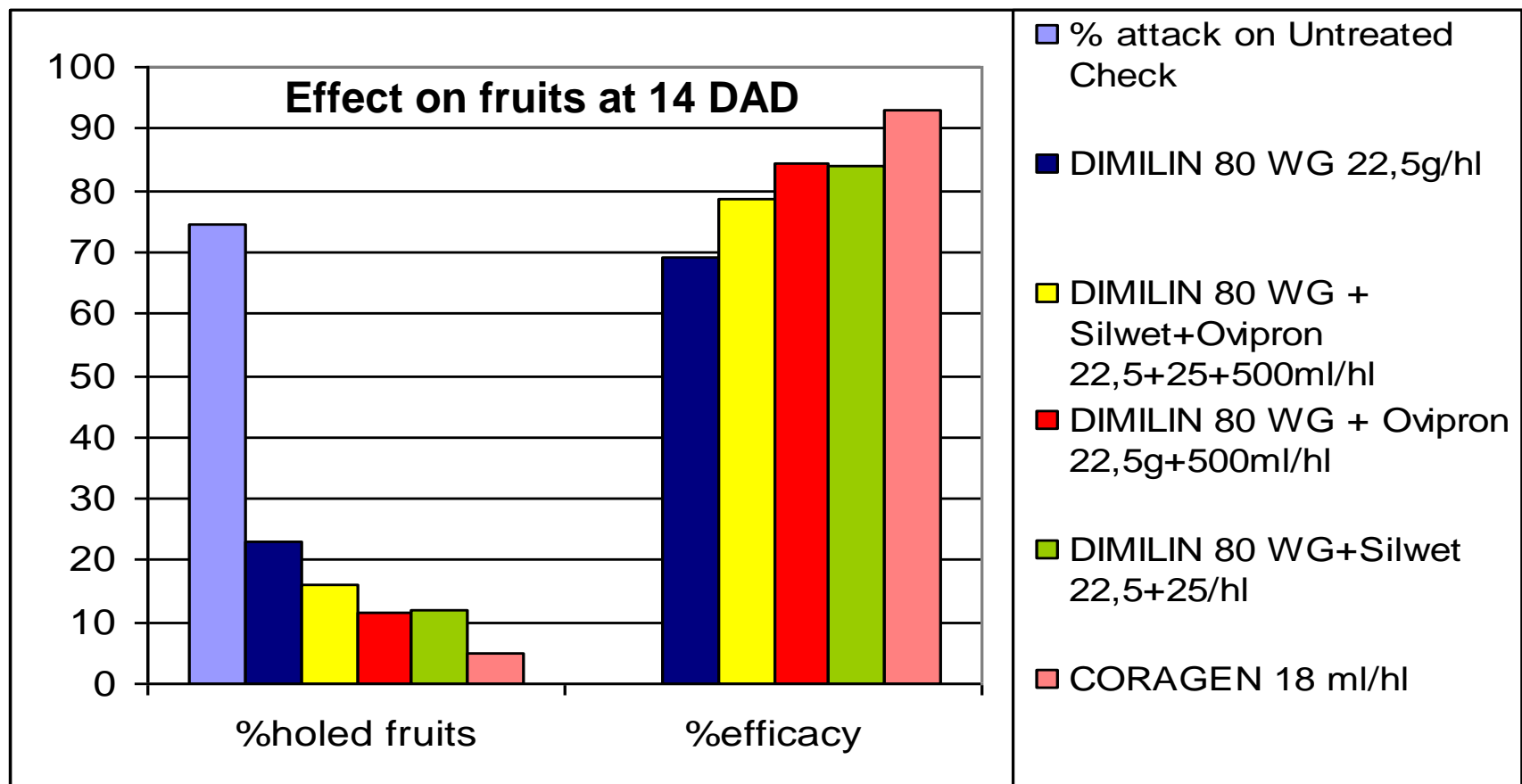
## GH Tomato – Giovinazzo (BA) - Italy 2010 – *Tuta absoluta*

**damage on 100 leaves at 6 DAD (incidence & severity)**



Application every 7 days: 27 October (A), 3 Nov. (B), 10 Nov. (C), 16 Nov. (D)

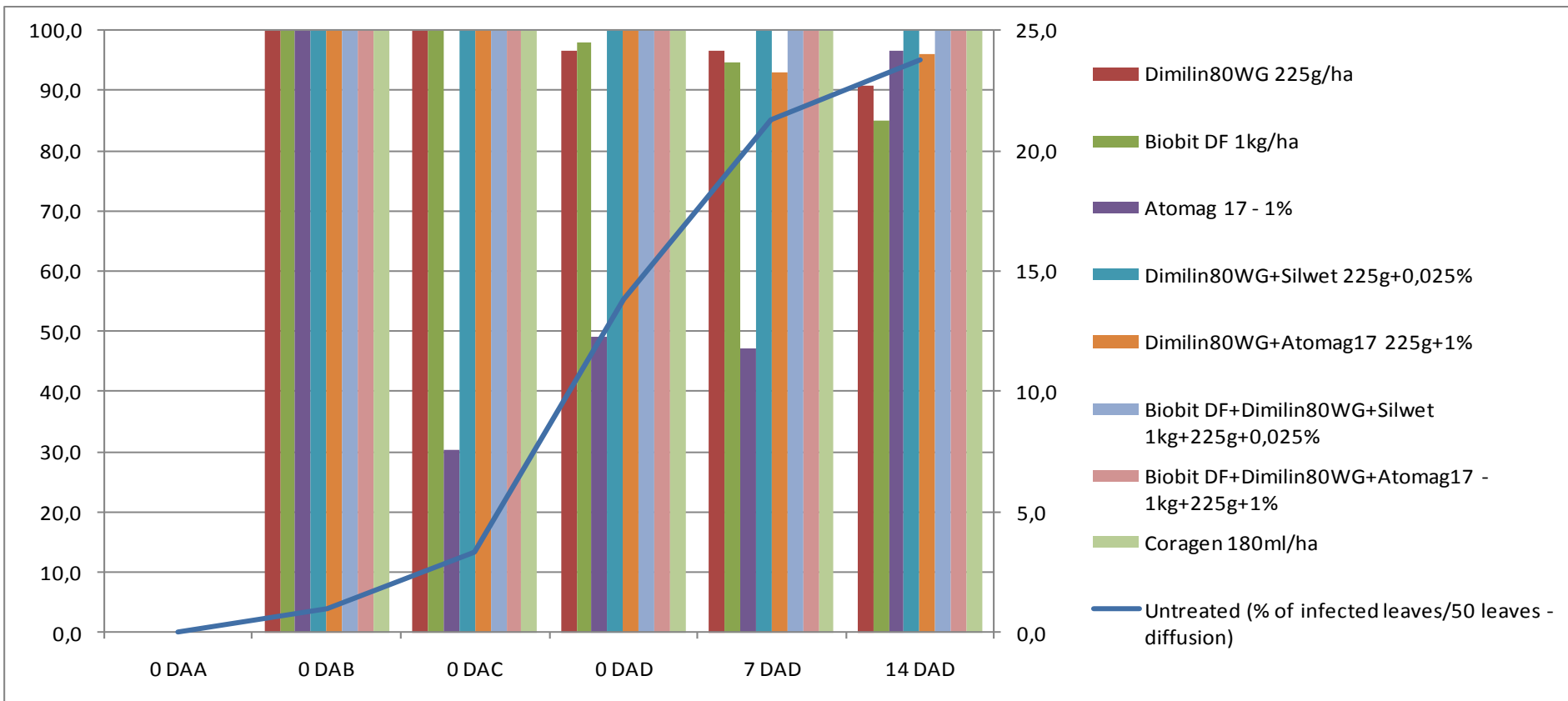
## GH Tomato – Giovinazzo (BA) - Italy 2010 – *Tuta absoluta*



Application every 7 days: 27 October (A), 3 Nov. (B), 10 Nov. (C), 16 Nov. (D)

## GH Tomato – Comiso (RG) – Sicily (IT) 2011 – *Tuta absoluta*

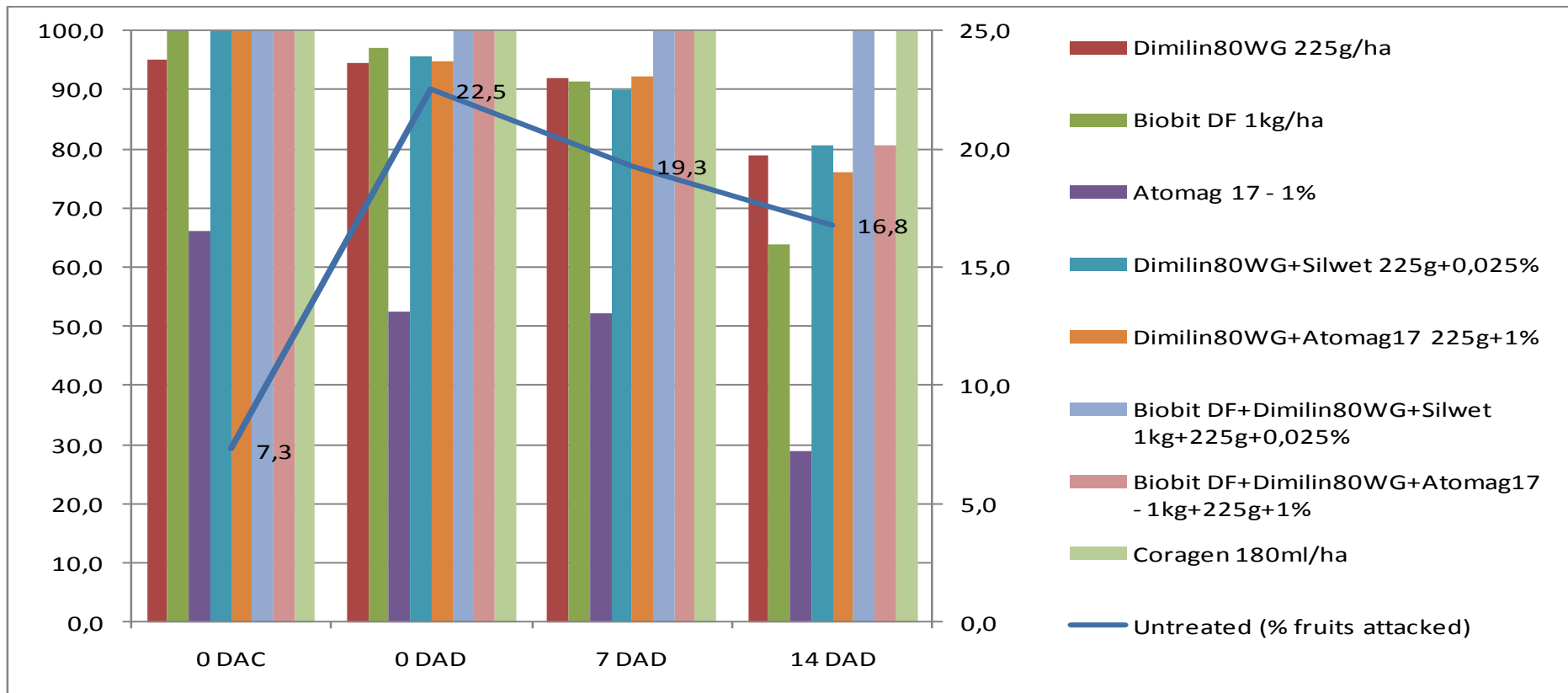
### Abbott efficacy on infected leaves



Application every 7 days: 10 June (A), 17 June (B), 24 June (C), 1 July (D)

## GH Tomato – Comiso (RG) – Sicily (IT) 2011 – *Tuta absoluta*

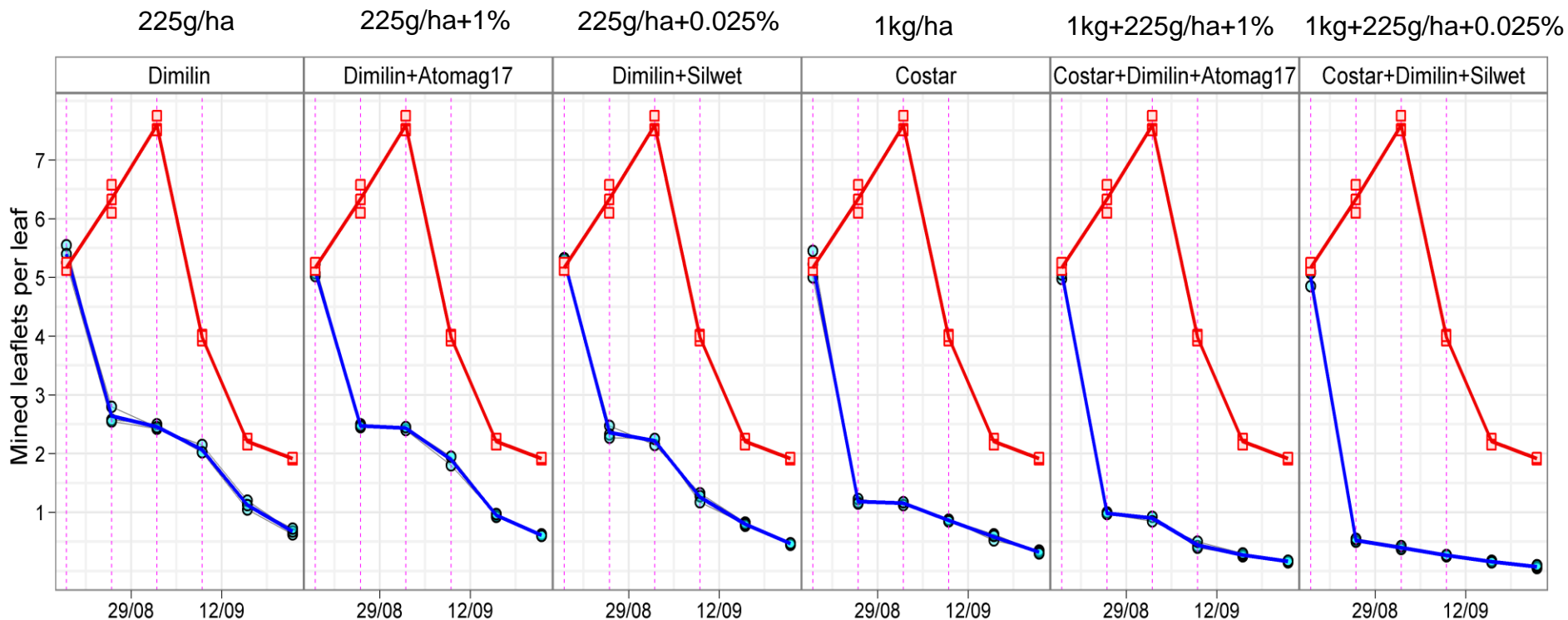
### Abbott efficacy on number of damaged fruits



Application every 7 days: 10 June (A), 17 June (B), 24 June (C), 1 July (D)

## GH Tomato – Piana del Sele (SA) – (IT) 2011 – *Tuta absoluta*

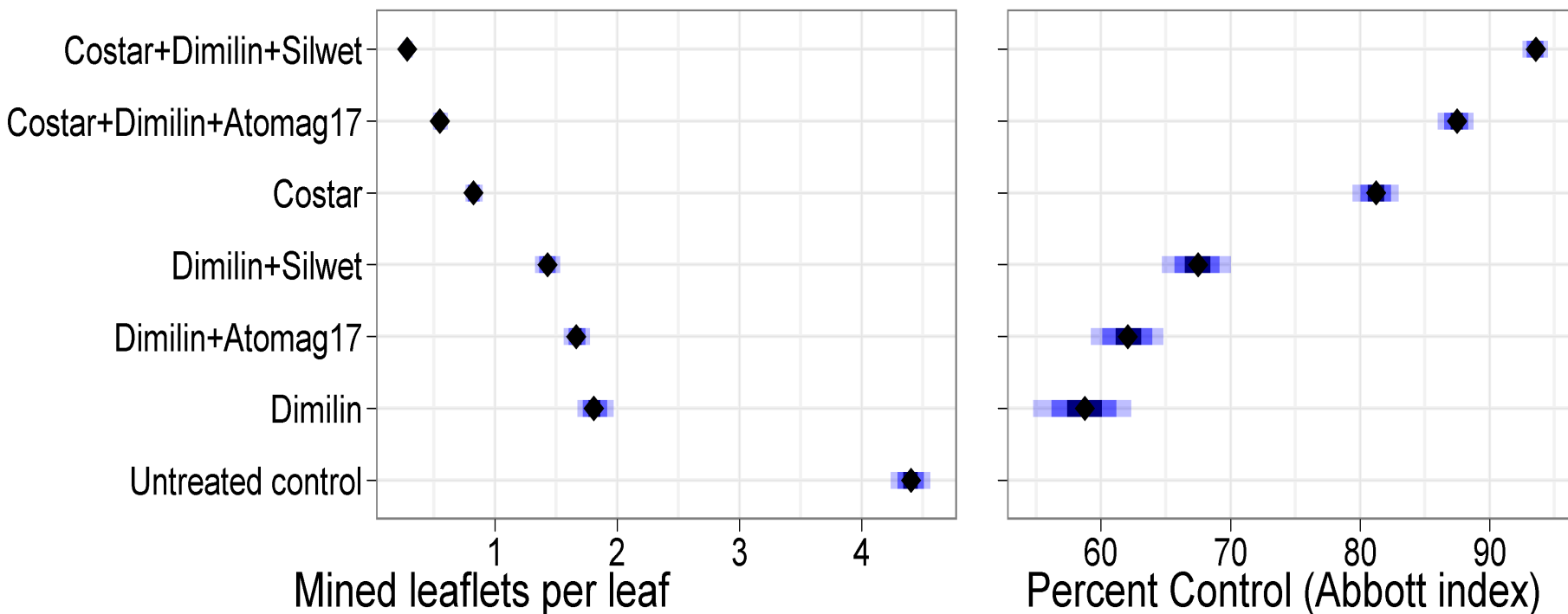
Attack trend by treatment. The replicated red line represents the untreated control.



Application every 7 days: 19 August (A), 26 August (B), 2 Sept. (C), 9 Sept. (D)

## GH Tomato – Piana del Sele (SA) – (IT) 2011 – *Tuta absoluta*

Average attack and control levels by treatment, with 95% confidence intervals

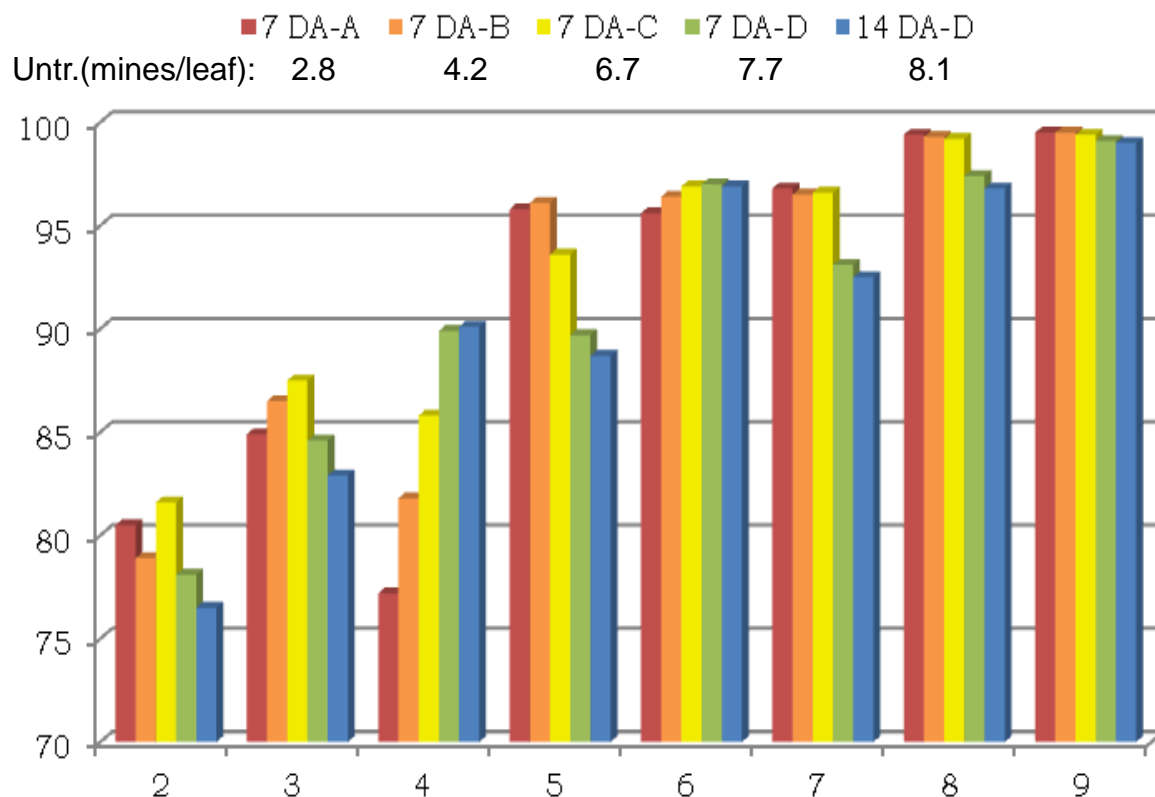


Application every 7 days: 19 August (A), 26 August (B), 2 Sept. (C), 9 Sept. (D)



## GH Tomato – Fasano (BR) - Italy 2011 – *Tuta absoluta*

### Efficacy on mines (Abbott's method)

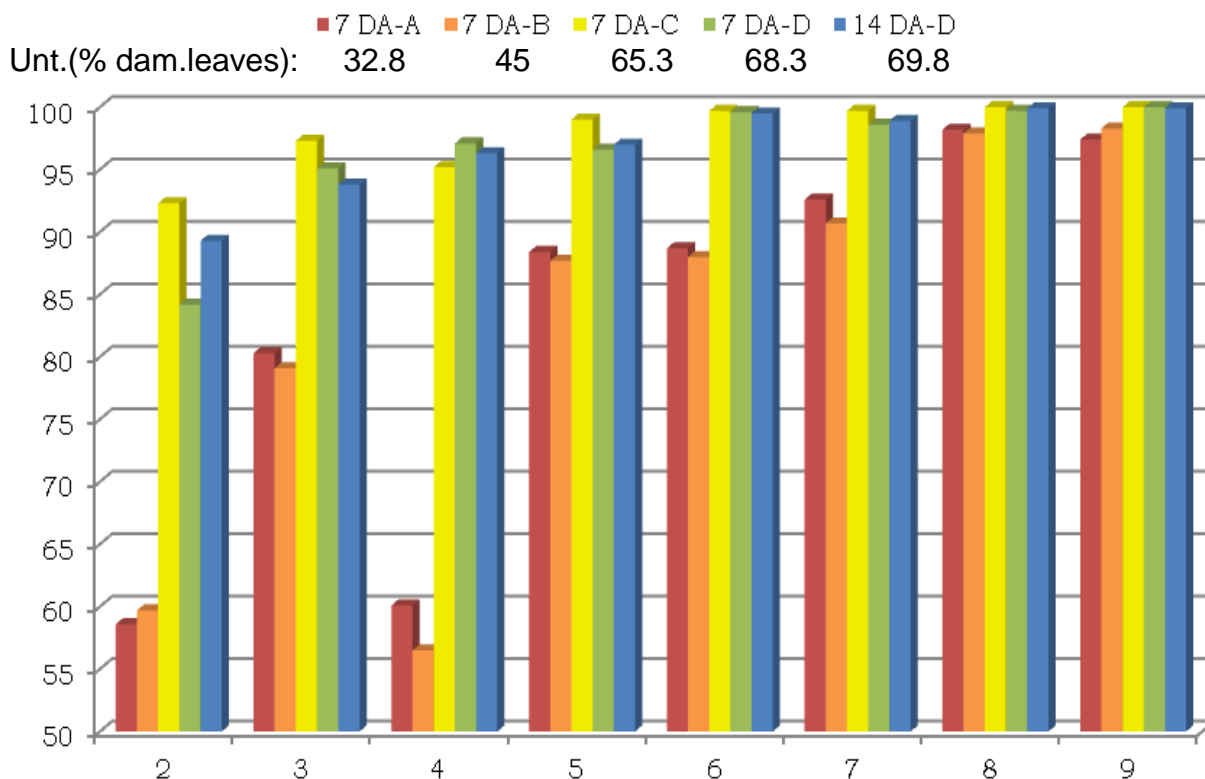


Trt No.	Treatment Name	Form Type	Rate	Appl Code
1	Untreated			
2	DIMILIN 80 WG	WG	22,5 g/hl	A÷D
3	BIOBIT DF	WG	100 g/hl	A÷D
4	ATOMAG17 EC	EC	1 l/hl	A÷D
5	DIMILIN 80 WG SILWET L-77	WG EC	22,5 g/hl 25 ml/hl	A÷D A÷D
6	DIMILIN 80 WG ATOMAG17	WG EC	22,5 g/hl 1 l/hl	A÷D A÷D
7	BIOBIT DF	WG	100 g/hl	A÷D
	DIMILIN 80 WG SILWET L-77	WG EC	22,5 g/hl 25 ml/hl	A÷D A÷D
8	BIOBIT DF	WG	100 g/hl	A÷D
	DIMILIN 80 WG ATOMAG17	WG EC	22,5 g/hl 1 l/hl	A÷D A÷D
9	CORAGEN	SC	18 ml/hl	A÷D

Application every 7 days: 6 Sept. (A), 13 Sept. (B), 20 Sept. (C), 27 Sept. (D)

## GH Tomato – Fasano (BR) - Italy 2011 – *Tuta absoluta*

### Efficacy on leaves (Abbott's method)

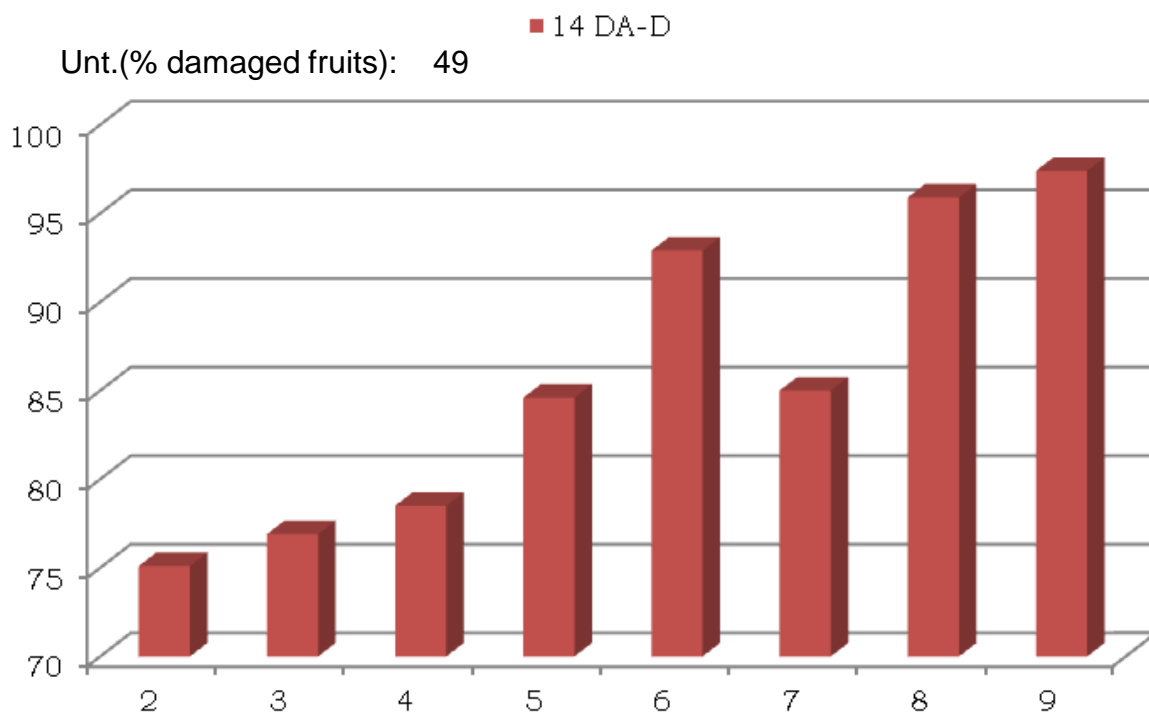


Trt No.	Treatment Name	Form Type	Rate	Appl Code
1	Untreated			
2	DIMILIN 80 WG	WG	22,5 g/hl	A÷D
3	BIOBIT DF	WG	100 g/hl	A÷D
4	ATOMAG17 EC	EC	1 l/hl	A÷D
5	DIMILIN 80 WG SILWET L-77	WG EC	22,5 g/hl 25 ml/hl	A÷D A÷D
6	DIMILIN 80 WG ATOMAG17	WG EC	22,5 g/hl 1 l/hl	A÷D A÷D
7	BIOBIT DF	WG	100 g/hl	A÷D
	DIMILIN 80 WG SILWET L-77	WG EC	22,5 g/hl 25 ml/hl	A÷D A÷D
8	BIOBIT DF	WG	100 g/hl	A÷D
	DIMILIN 80 WG ATOMAG17	WG EC	22,5 g/hl 1 l/hl	A÷D A÷D
9	CORAGEN	SC	18 ml/hl	A÷D

Application every 7 days: 6 Sept. (A), 13 Sept. (B), 20 Sept. (C), 27 Sept. (D)

## GH Tomato – Fasano (BR) - Italy 2011 – *Tuta absoluta*

### Efficacy on fruits (Abbott's method)

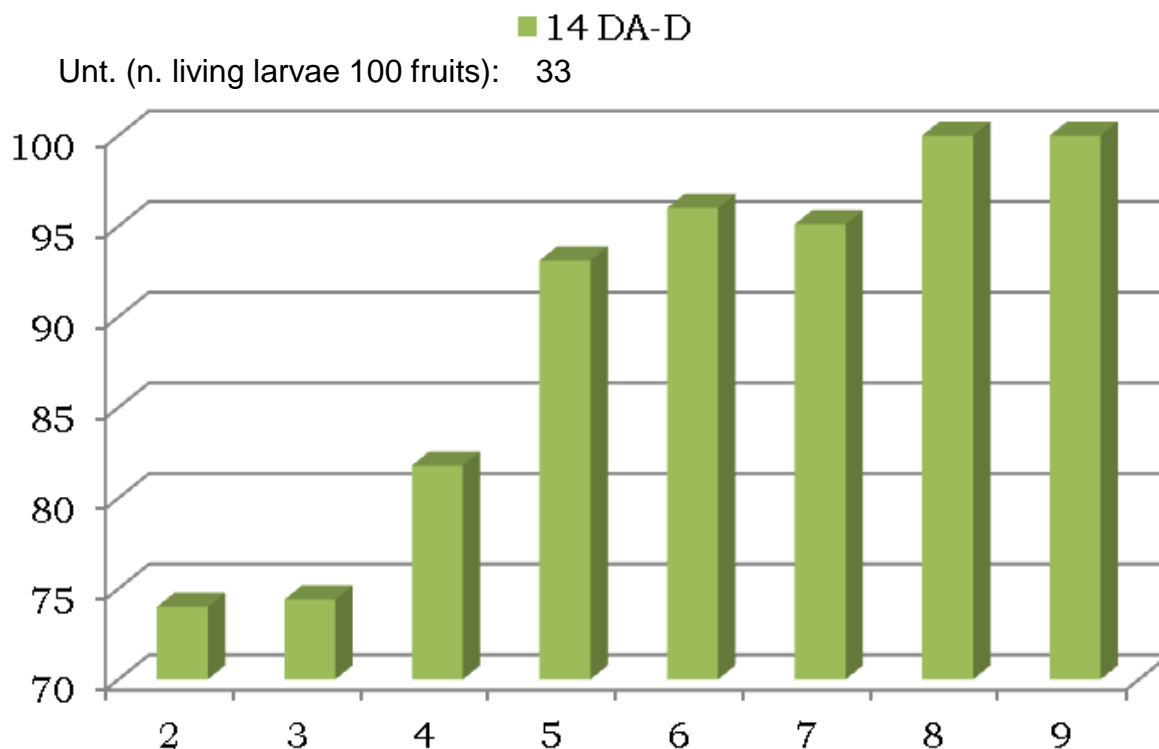


Trt No.	Treatment Name	Form Type	Rate	Appl Code
1	Untreated			
2	DIMILIN 80 WG	WG	22,5 g/hl	A÷D
3	BIOBIT DF	WG	100 g/hl	A÷D
4	ATOMAG17 EC	EC	1 l/hl	A÷D
5	DIMILIN 80 WG SILWET L-77	WG EC	22,5 g/hl 25 ml/hl	A÷D A÷D
6	DIMILIN 80 WG ATOMAG17	WG EC	22,5 g/hl 1 l/hl	A÷D A÷D
7	BIOBIT DF	WG	100 g/hl	A÷D
8	DIMILIN 80 WG SILWET L-77	WG EC	22,5 g/hl 25 ml/hl	A÷D A÷D
9	BIOBIT DF	WG	100 g/hl	A÷D
	DIMILIN 80 WG ATOMAG17	WG EC	22,5 g/hl 1 l/hl	A÷D A÷D
9	CORAGEN	SC	18 ml/hl	A÷D

Application every 7 days: 6 Sept. (A), 13 Sept. (B), 20 Sept. (C), 27 Sept. (D)

## GH Tomato – Fasano (BR) - Italy 2011 – *Tuta absoluta*

### Efficacy against larvae (Abbott's method)



Trt No.	Treatment Name	Form Type	Rate	Appl Code
1	Untreated			
2	DIMILIN 80 WG	WG	22,5 g/hl	A÷D
3	BIOBIT DF	WG	100 g/hl	A÷D
4	ATOMAG17 EC	EC	1 l/hl	A÷D
5	DIMILIN 80 WG SILWET L-77	WG EC	22,5 g/hl 25 ml/hl	A÷D A÷D
6	DIMILIN 80 WG ATOMAG17	WG EC	22,5 g/hl 1 l/hl	A÷D A÷D
7	BIOBIT DF	WG	100 g/hl	A÷D
8	DIMILIN 80 WG SILWET L-77	WG EC	22,5 g/hl 25 ml/hl	A÷D A÷D
9	CORAGEN	SC	18 ml/hl	A÷D

Application every 7 days: 6 Sept. (A), 13 Sept. (B), 20 Sept. (C), 27 Sept. (D)

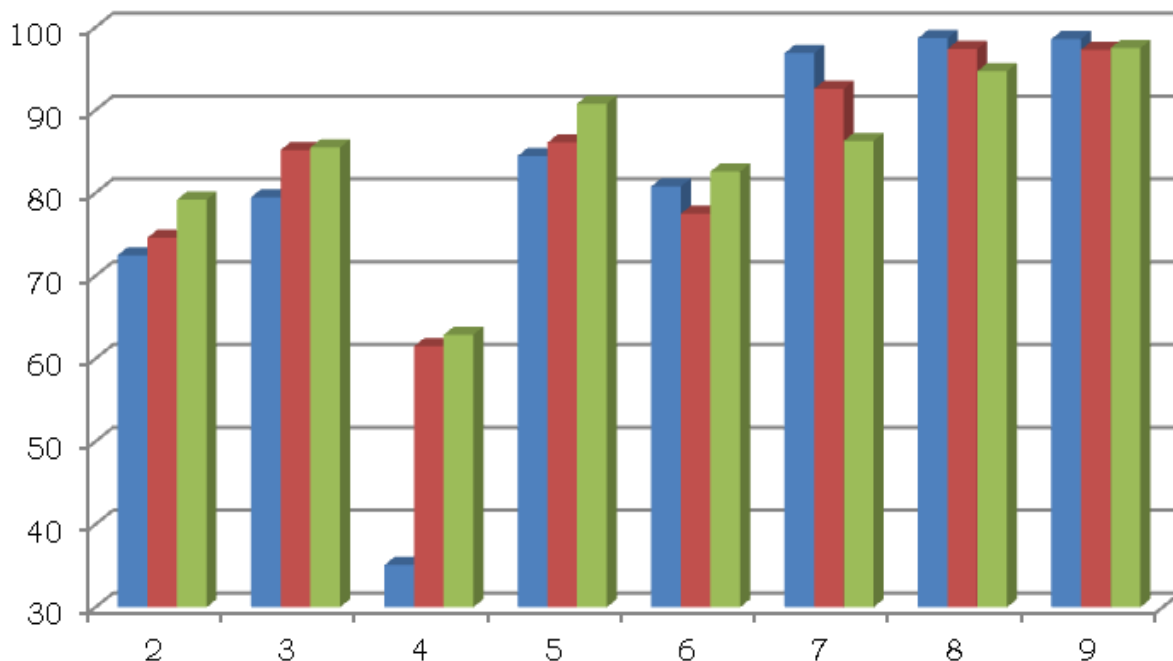
## GH Tomato – Fasano (BR) - Italy 2011 – *Heliothis armigera*

### Efficacy on leaves (Abbott's method)

(% total infestation on leaves: =%dam.leaf area x %dam.leaves)

■ 7 DA-C ■ 7 DA-D ■ 14 DA-D

Untreated (%):                      8.7            13.6            14.5



Trt No.	Treatment Name	Form Type	Rate	Appl Code
1	Untreated			
2	DIMILIN 80 WG	WG	22,5 g/hl	A÷D
3	BIOBIT DF	WG	100 g/hl	A÷D
4	ATOMAG17 EC	EC	1 l/hl	A÷D
5	DIMILIN 80 WG SILWET L-77	WG EC	22,5 g/hl 25 ml/hl	A÷D A÷D
6	DIMILIN 80 WG ATOMAG17	WG EC	22,5 g/hl 1 l/hl	A÷D A÷D
7	BIOBIT DF	WG	100 g/hl	A÷D
	DIMILIN 80 WG SILWET L-77	WG EC	22,5 g/hl 25 ml/hl	A÷D A÷D
8	BIOBIT DF	WG	100 g/hl	A÷D
	DIMILIN 80 WG ATOMAG17	WG EC	22,5 g/hl 1 l/hl	A÷D A÷D
9	CORAGEN	SC	18 ml/hl	A÷D

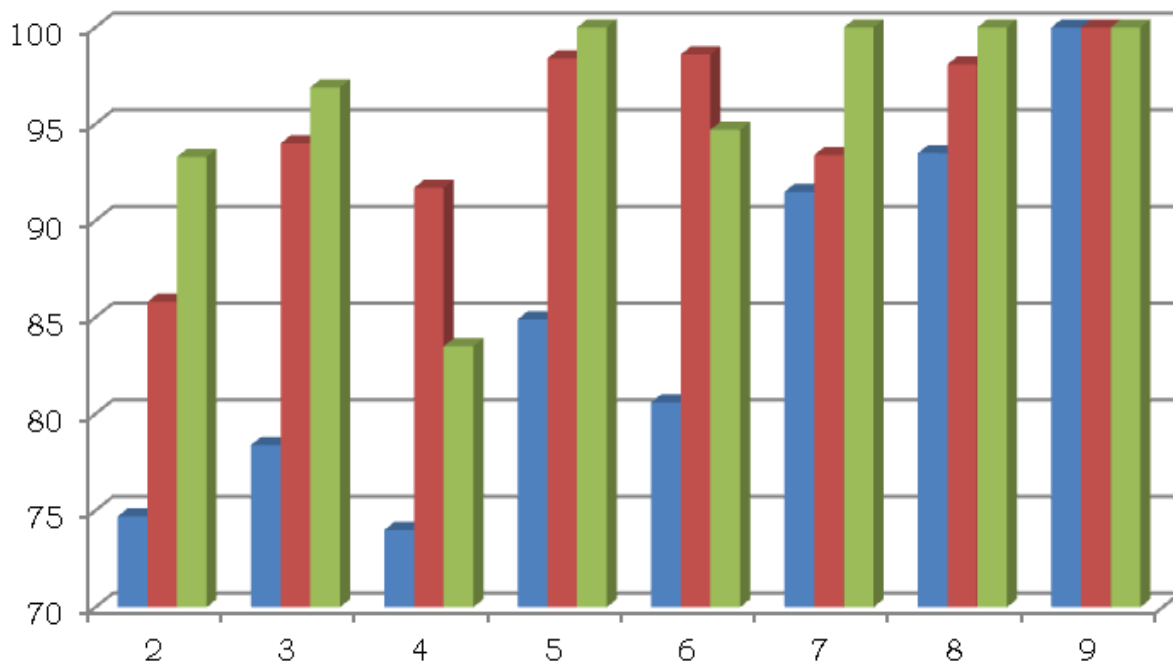
Application every 7 days: 6 Sept. (A), 13 Sept. (B), 20 Sept. (C), 27 Sept. (D)

## GH Tomato – Fasano (BR) - Italy 2011 – *Heliothis armigera*

### Efficacy against larvae (Abbott's method)

Untreated (n.living larvae 25 plants):

■ 7 DA-C 59.5 ■ 7 DA-D 34.8 ■ 14 DA-D 16

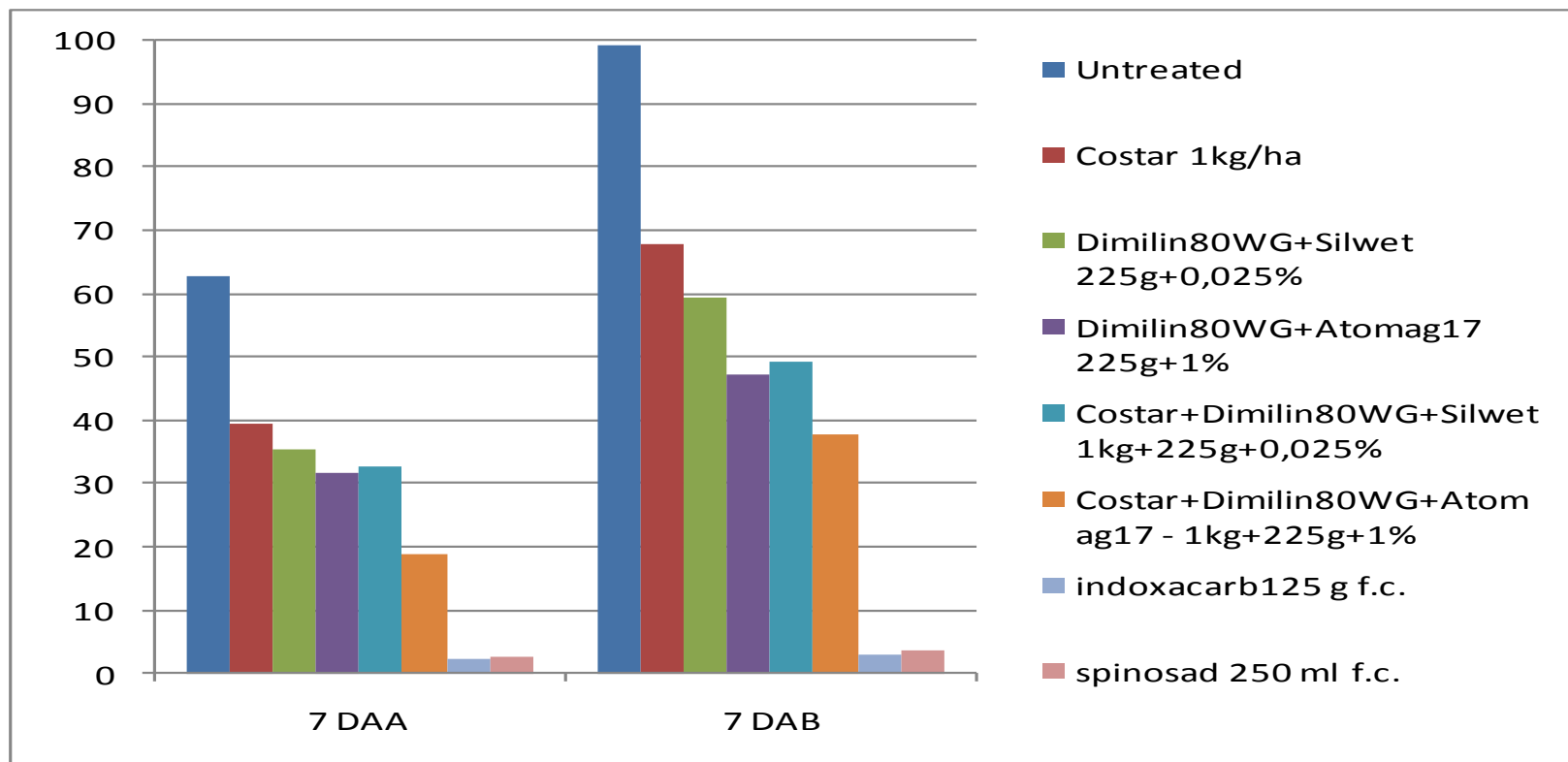


Trt No.	Treatment Name	Form Type	Rate	Appl Code
1	Untreated			
2	DIMILIN 80 WG	WG	22,5 g/hl	A÷D
3	BIOBIT DF	WG	100 g/hl	A÷D
4	ATOMAG17 EC	EC	1 l/hl	A÷D
5	DIMILIN 80 WG SILWET L-77	WG EC	22,5 g/hl 25 ml/hl	A÷D A÷D
6	DIMILIN 80 WG ATOMAG17	WG EC	22,5 g/hl 1 l/hl	A÷D A÷D
7	BIOBIT DF	WG	100 g/hl	A÷D
	DIMILIN 80 WG SILWET L-77	WG EC	22,5 g/hl 25 ml/hl	A÷D A÷D
8	BIOBIT DF	WG	100 g/hl	A÷D
	DIMILIN 80 WG ATOMAG17	WG EC	22,5 g/hl 1 l/hl	A÷D A÷D
9	CORAGEN	SC	18 ml/hl	A÷D

Application every 7 days: 6 Sept. (A), 13 Sept. (B), 20 Sept. (C), 27 Sept. (D)

## Open Field Tomato – Mesagne (BR) - Italy 2011 – *Tuta absoluta*

### % of infected leaves (diffusion)

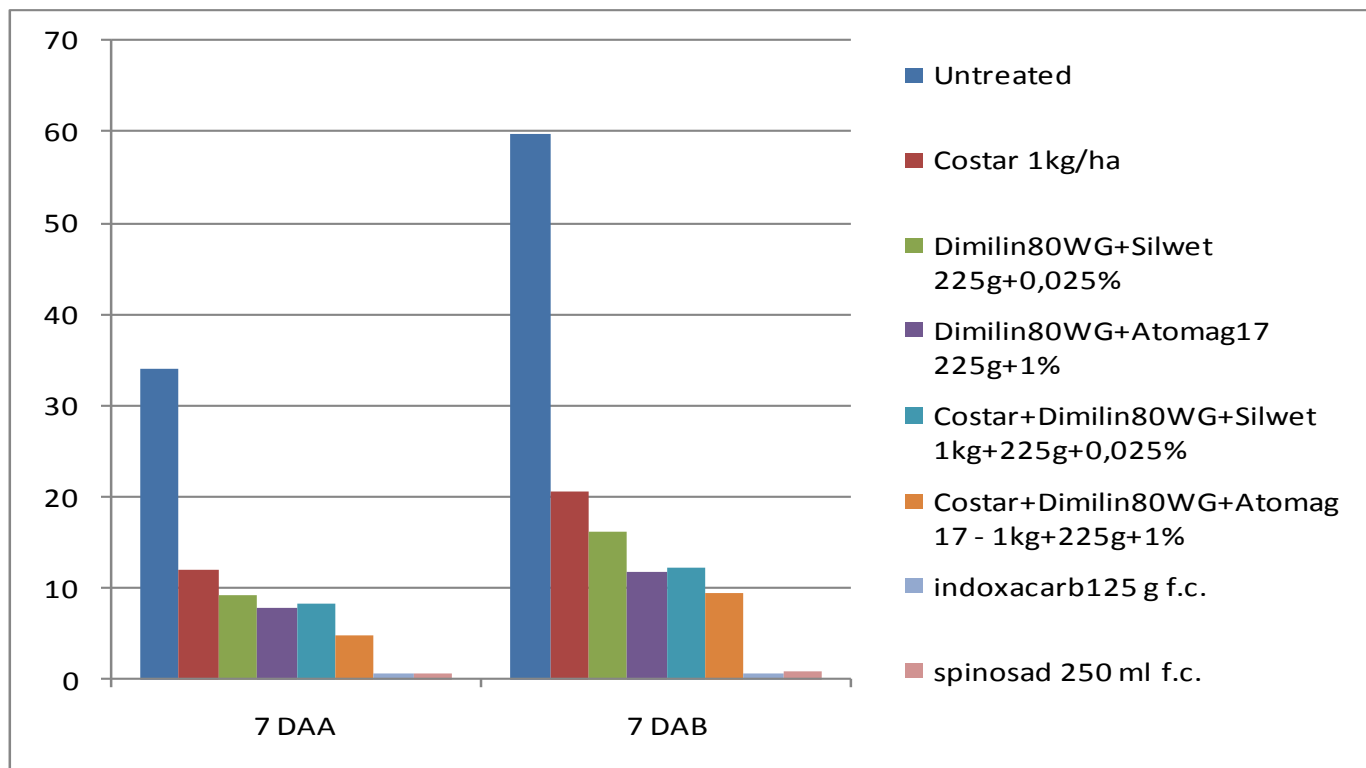


2 Applications every 7 days: 17 Sept. (A), 24 Sept. (B)

## Open Field Tomato – Mesagne (BR) - Italy 2011 – *Tuta absoluta*

### % attack intensity - Index of Mc Kinney

(indicating the level of damage in comparison with the maximum possible damage )

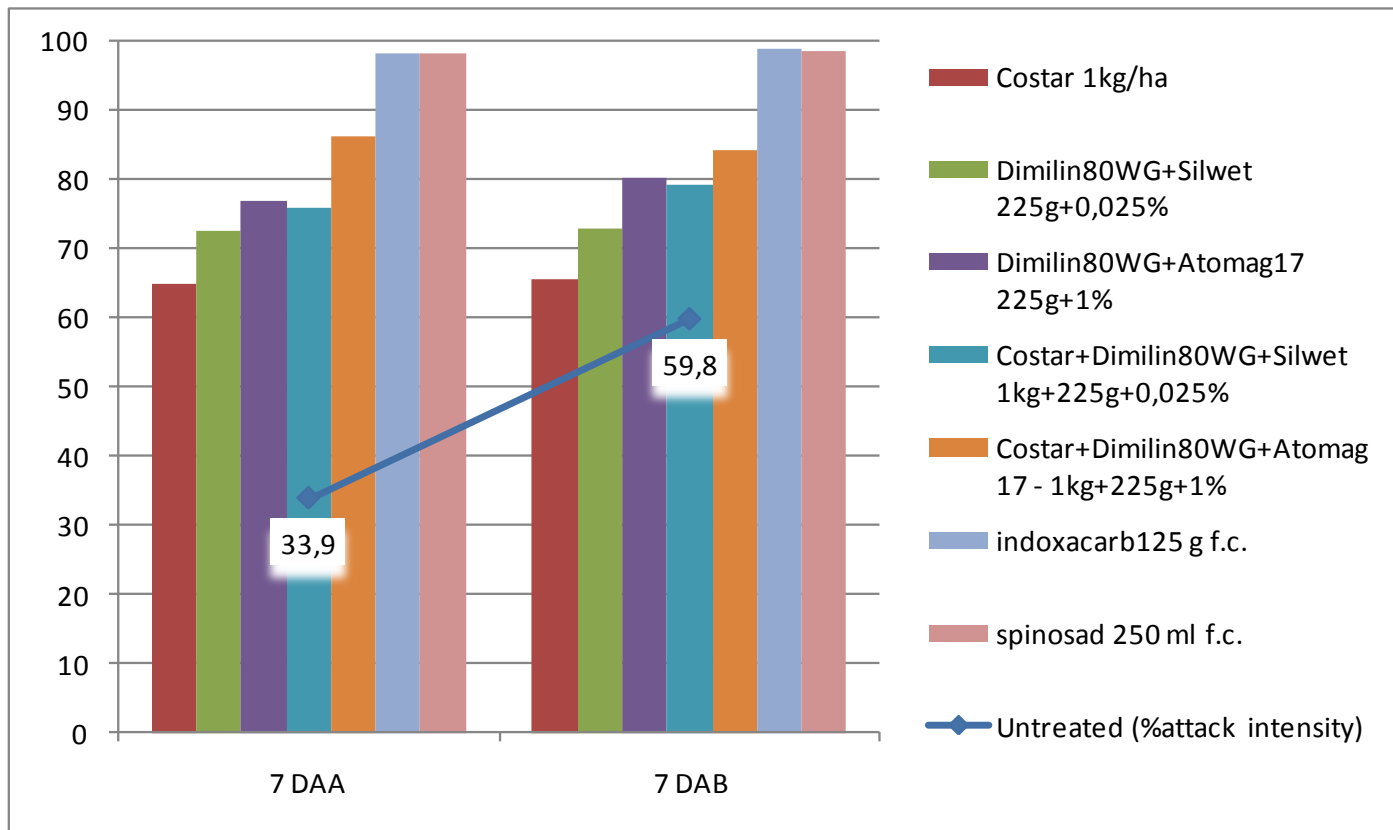


2 Applications every 7 days: 17 Sept. (A), 24 Sept. (B)



## Open Field Tomato – Mesagne (BR) - Italy 2011 – *Tuta absoluta*

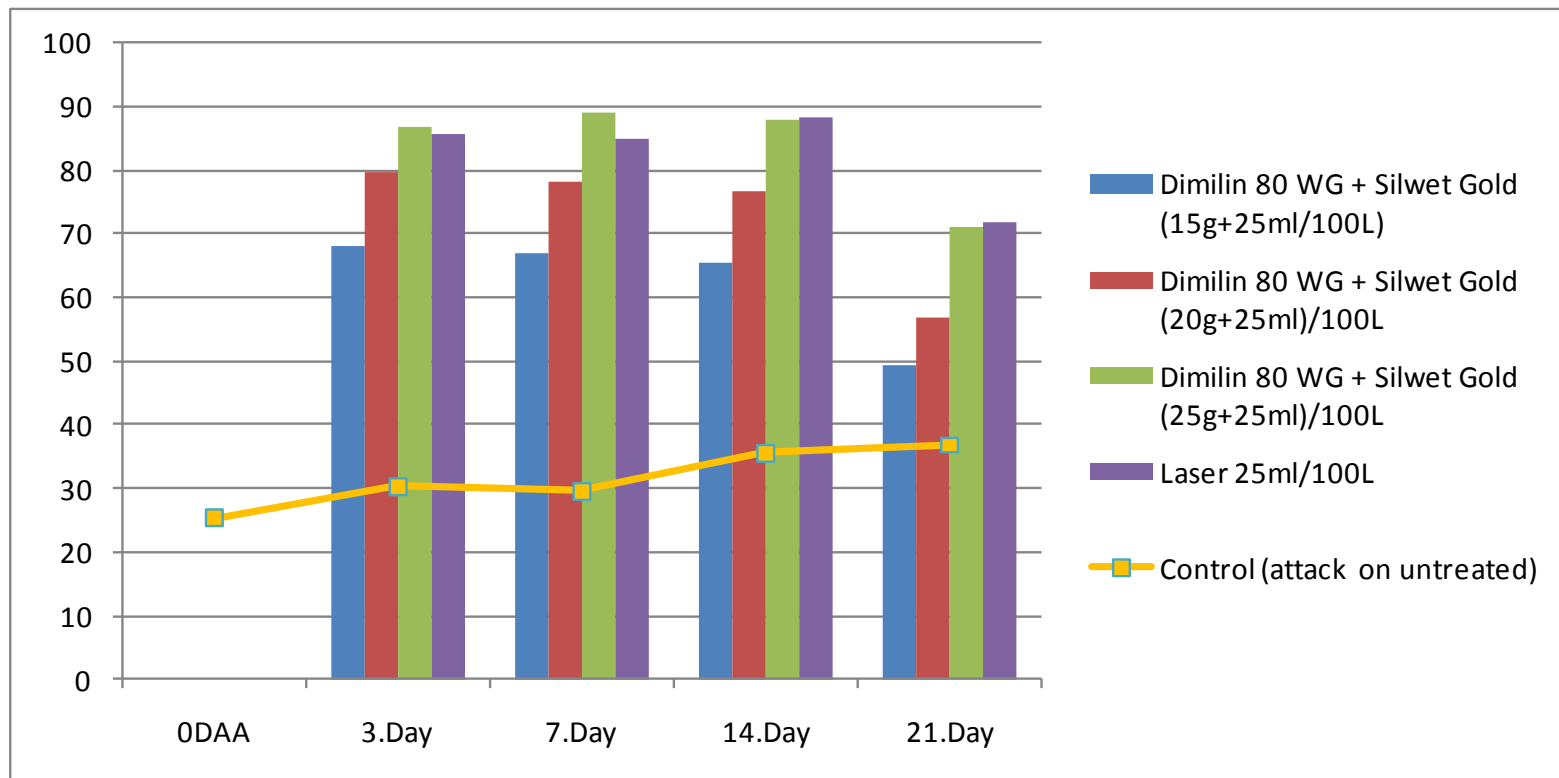
### Efficacy on leaves (Abbott's method)



2 Applications every 7 days: 17 Sept. (A), 24 Sept. (B)

## GH Tomato – Antalya / Kumluca – Turkey 2011 – *Tuta absoluta*

**Efficacy (Abbott's method); Control: n. mines with larvae-eggs-holes/5plants/rep.**

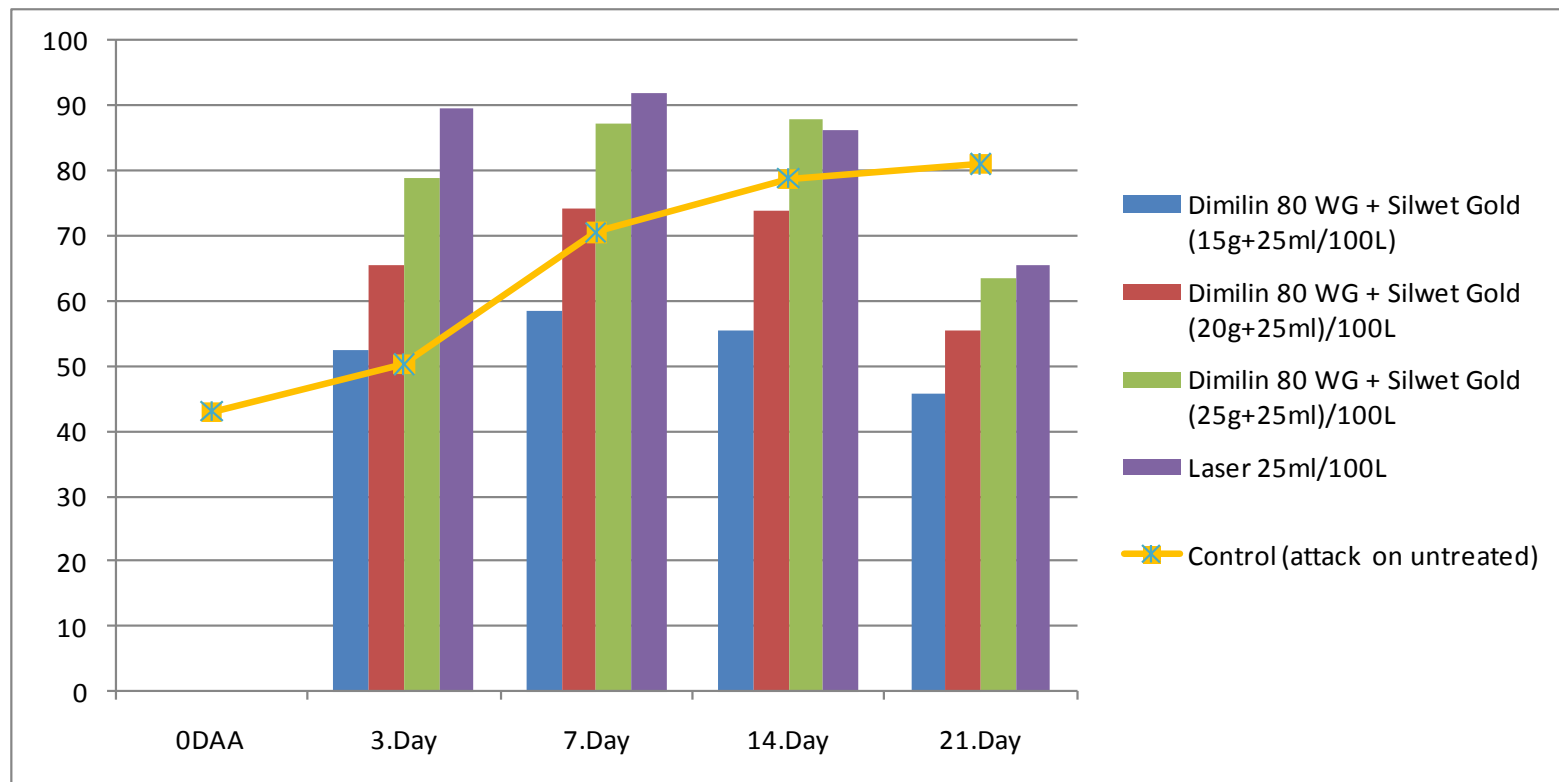


1 application on 12 June (Plant height: 120-140 cm; Growth Stage: flower-fruit)

5 assesments on 12, 15, 19, 26 June and 3 July

## GH Tomato – Mersin-Akdeniz – Turkey 2011 – *Tuta absoluta*

**Efficacy (Abbott's method); Control: n. mines with larvae-eggs-holes/5plants/rep.**



1 application on 4 May (Plant height: 120-140 cm; Growth Stage: flower-fruit)

5 assesments on 4, 7, 11, 18 and 25 May

## Next steps for 2012:

- i) further trials to complete the efficacy package;
- ii) Start and complete residue trials (one year is enough being a protected crop) and MRL establishment;
- iii) study on bumblebee (*Bombus*);
- iv) submission starting from 1Q 2013 in all the areas where the pest is a problem (e.g.: South Europe, Turkey, Middle East and North Africa).