

# Early and Late Blight management in Italy

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# Early and late blight management in Italy

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- Potato and tomato growing areas in Italy
- Fungicides used
- IPM (reg.UE 1257/99, 2200/99)
- Late blight control strategy
- Early blight control strategy

# Tomato production in Italy



Growing areas

	Ha	Tons/ha	Total Yield (tons)
<b>ITALY</b>	<b>90,823</b>	<b>57</b>	<b>5,156,189</b>
Puglia	25,760 (28.3%)	69	1,775,950
Emilia-Romagna	23,496 (26%)	63	1,493,555
Sicilia	11,280 (12.4%)	20.77	234,260
Lombardia	5,905 (6,5%)	57.9	342,224
Campania	5,365 (6%)	58.9	316,124
Calabria	3,852 (4.3%)	53	204,092
Toscana	2,342 (2,5%)	60.2	141,070
Lazio	2,000 (2,2%)	70.7	141,450

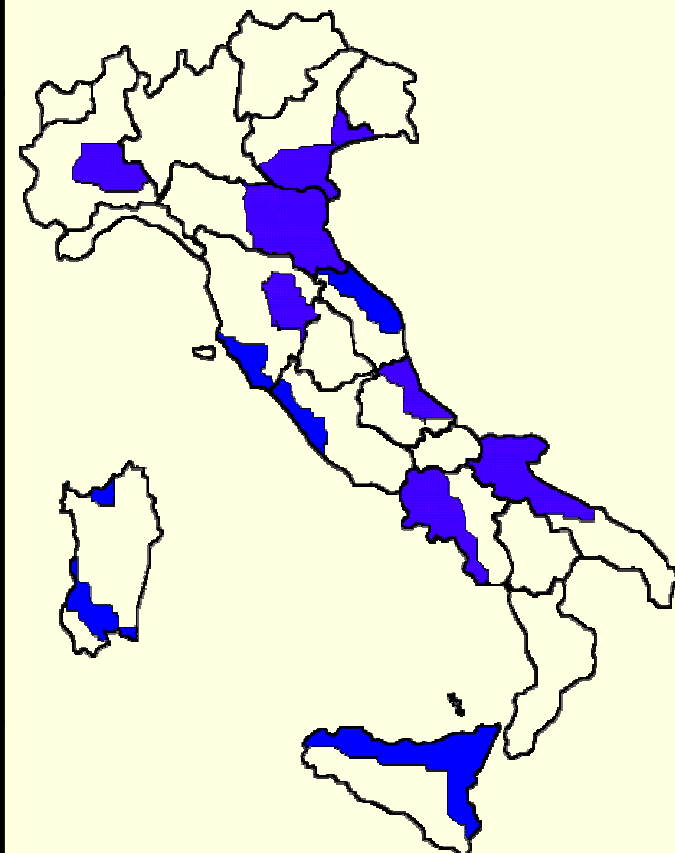


# Potato production in Italy



Growing areas

	Ha	Tons/ha	Total Yield (tons)
<b>ITALY</b>	<b>72,451</b>	<b>25.21</b>	<b>1,826,597</b>
Sicilia	11,358 (15.7%)	18	205,239
Campania	10,292 (14.2%)	33.4	343,683
Emilia-Romagna	7018 (9.7%)	35.66	250,264
Puglia	6088 (8.4%)	20.2	122,972
Toscana	5,453 (7,5%)	20.5	111,587
Abruzzo	4,404 (6.1%)	37.6	165,844
Veneto	3,549 (4,9%)	35.4	125,477
Sardegna	3,010 (4,2%)	16.9	50,970
Lazio	2,809 (3,8%)	25.3	71,040
Marche	2,003 (2,8%)	21.9	43,898
Piemonte	1,934 (2,7%)	25.1	48,561



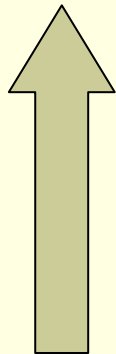
Source: ISTAT 2006



# Tomato competitors

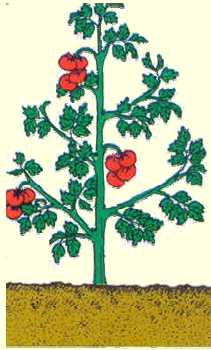
1. USA
2. Italy
3. Turkey

Spain  
China  
Brasil



# Tomato and potato crop cycles

Growing areas



April	May	June	July	August	September
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# Fungicides authorized to control tomato and potato late blight in Italy

## Potato

- Copper compounds
- Clorthalonil
- Mancozeb
- Fluazinam
- Zoxamide\*
- Benalaxyl-m\*
- Metalaxyl-m\*
- Cymoxanil
- Dimethomorph\*
- Iprovalicarb\*
- Famoxadone\*
- Fenamidone\*
- Cyazofamid

## Tomato

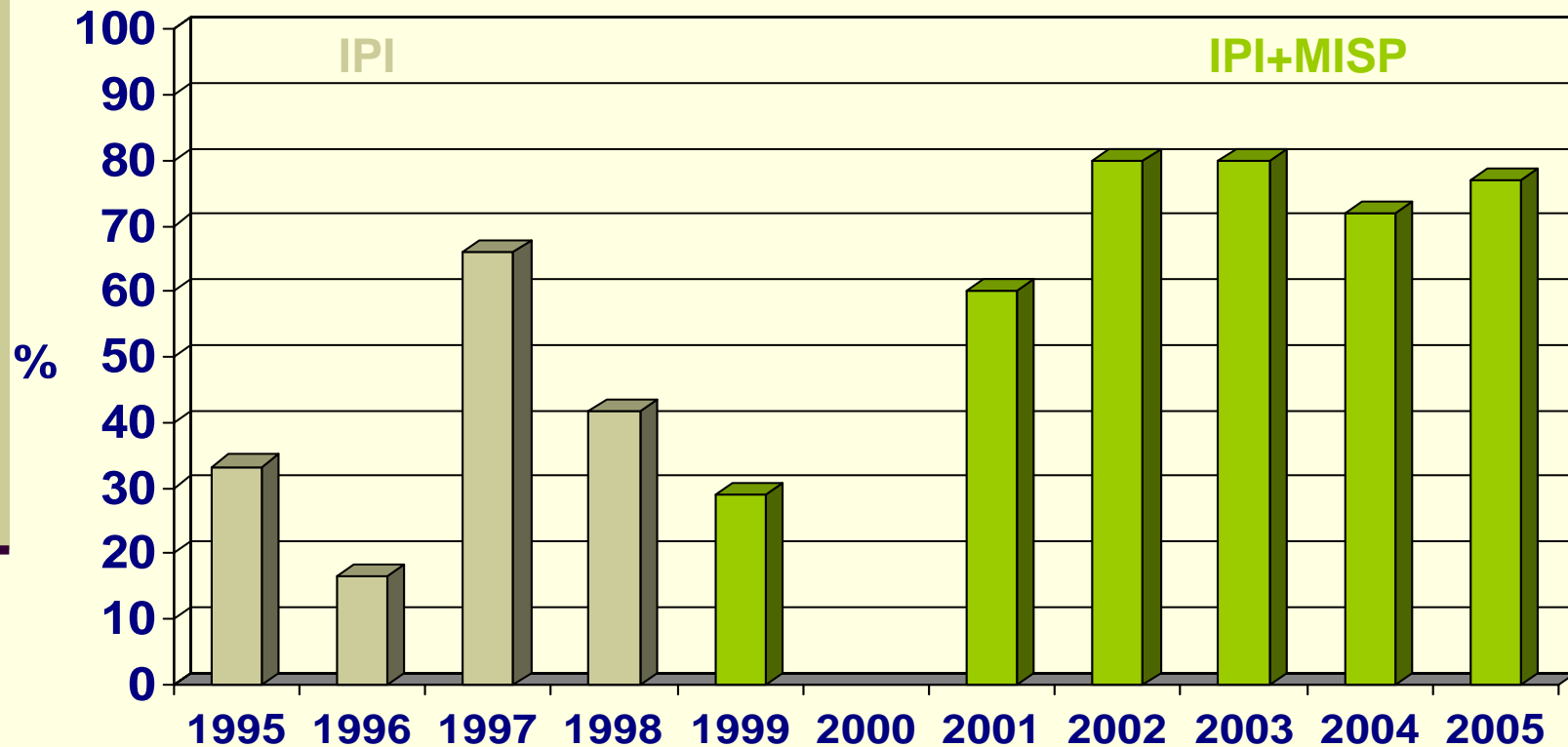
- Copper compounds
- Clorthalonil
- Mancozeb
- Methiram
- Zoxamide\*
- Benalaxyl-m\*
- Metalaxyl-m\*
- Cymoxanil
- Iprovalicarb\*
- Dimethomorph\*
- Famoxadone\*
- Fenamidone\*
- Azoxystrobin
- Pyraclostrobin\*
- Cyazofamid

\* Applied in mixture only

# Potato and tomato Integrated Production Guidelines for e.b. and l.b. (2007) (reg.CE 2200/96, L.R. 28/98, reg.CE 1257/99)

A.I.s	Potato l.b.	Potato e.b.	Tomato l.b.	Tomato e.b.	Limitations
Copper compounds	●	●	●	●	
Difenconazole				●	Max 3 appl./year
Dithianon	●		●		
Dodine	●		●		
Fosetyl-Al	●		●		
Fluazinam	●				
Mancozeb	●		●		Max 3 appl./year; Stop spraying 21 days before harvest
Metiram			●		
Iprovalicarb	●		●		Max 3 appl./year
Cymoxanil	●		●		Max 3 appl./year
Benalaxyl	●		●		Max 3 appl. with phenylamides./year
Benalaxyl-m + mancozeb	●		●		
Metalaxyl-m	●		●		
Dimethomorph	●		●		Max 3 appl./year
Azoxystrobin			●	●	Max 3 appl. with QoI /year
Pyraclostrobin+metiram			●	●	
Fenamidone			●	●	
Zoxamide+mancozeb	●		●		Max 3 appl./year

# Spray saving using forecasting models in Northern Italy



# Key-points for the I.b. control in Italy

- Epidemic pressure usually low-medium during the most of the crop growing season
- Low risk of isolates resistant to fungicides
- With high disease pressure, copper compounds and cymoxanil+cu ox. showed a poor activity both at 7 and 10 day intervals
- Metalaxyl still the most effective fungicide
- Good efficacy were obtained with other fungicides (cyazofamid, dimethomorph, fluazinam, iprovalicarb QoI, zoxamide)
- Revision of some a.i. toxicology will affect their use (tolylfluanide, mancozeb)
- Irrigation management influences the fungicide applications against I.b.



# Potato Late blight: control strategy

I.b. control strategy



**High risk**

Copper  
Fluazinam  
Mancozeb  
(Metalaxyl-m)

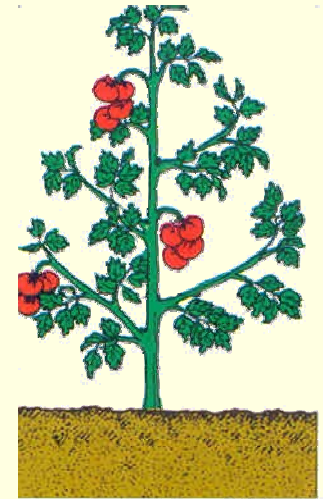
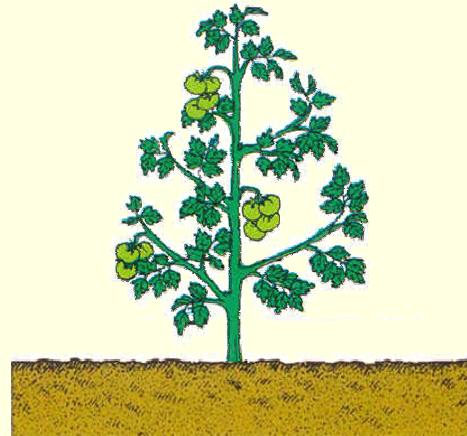
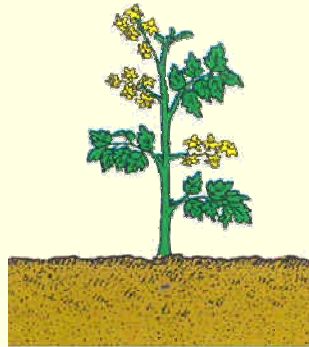
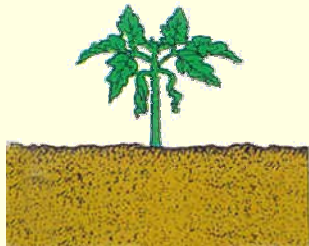
Metalaxyl-m  
Benalaxyl-m+mancoz.  
Cymoxanil  
Dimethomorph  
Iprovalicarb  
Fosetyl-AI  
Ciazofamid  
Zoxamide + mancozeb

Metalaxyl-m  
Benalaxyl-m+ mancoz.  
Dimethomorph  
Iprovalicarb  
Ciazofamid  
Zoxamide+mancozeb

Copper  
Fluazinam  
Mancozeb  
Fenamidone  
Famoxadone  
Ciazofamid

# Tomato late blight: control strategy

I.b. control strategy



**High Risk**

Copper  
Mancozeb  
(Metalaxyl-m)

Metalaxyl-m  
Benalaxyl-m+manc.  
Cymoxanil  
Dimethomorph  
Iprovalicarb  
Fosetyl-Al  
Zoxamide+mancozeb  
Ciazofamid

Metalaxyl-m  
Benalaxyl-m+manc.  
Cymoxanil  
Dimethomorph  
Iprovalicarb  
Zoxamide+mancozeb  
Ciazofamid  
Pyraclostrobin+methiram

Azoxystrobin  
Fenamidone  
Famoxadone  
Ciazofamid  
Pyraclostrobin+  
methiram



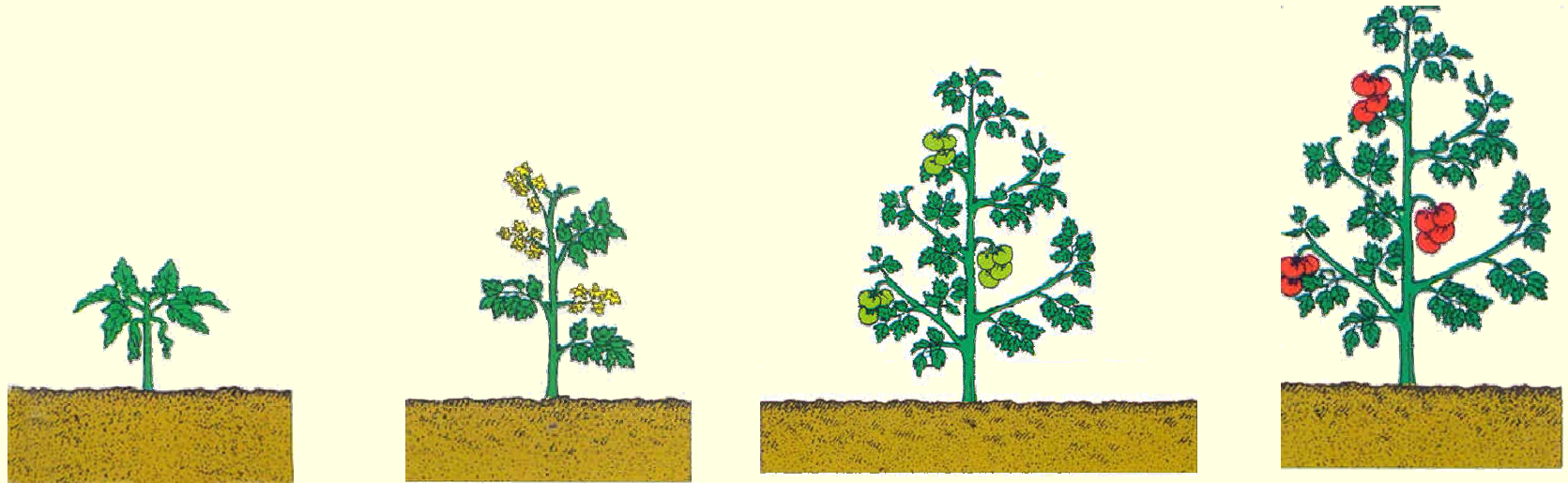
# Key-points for e.b. control in Italy

- Disease is rare on potato
- Early tomato varieties are the most susceptible
- E.a. occurs late in the season when crops start getting older
- No mancozeb residues are allowed by tomato processing industry
- Qols are among the most effective fungicides



# Tomato early blight: control strategy

e.b. control strategy



**High Risk**

Scouting for first symptoms when plants are 30 cm high

**Firs spray:**

In high risk areas: after bloom

In low risk areas: when first symptoms occur

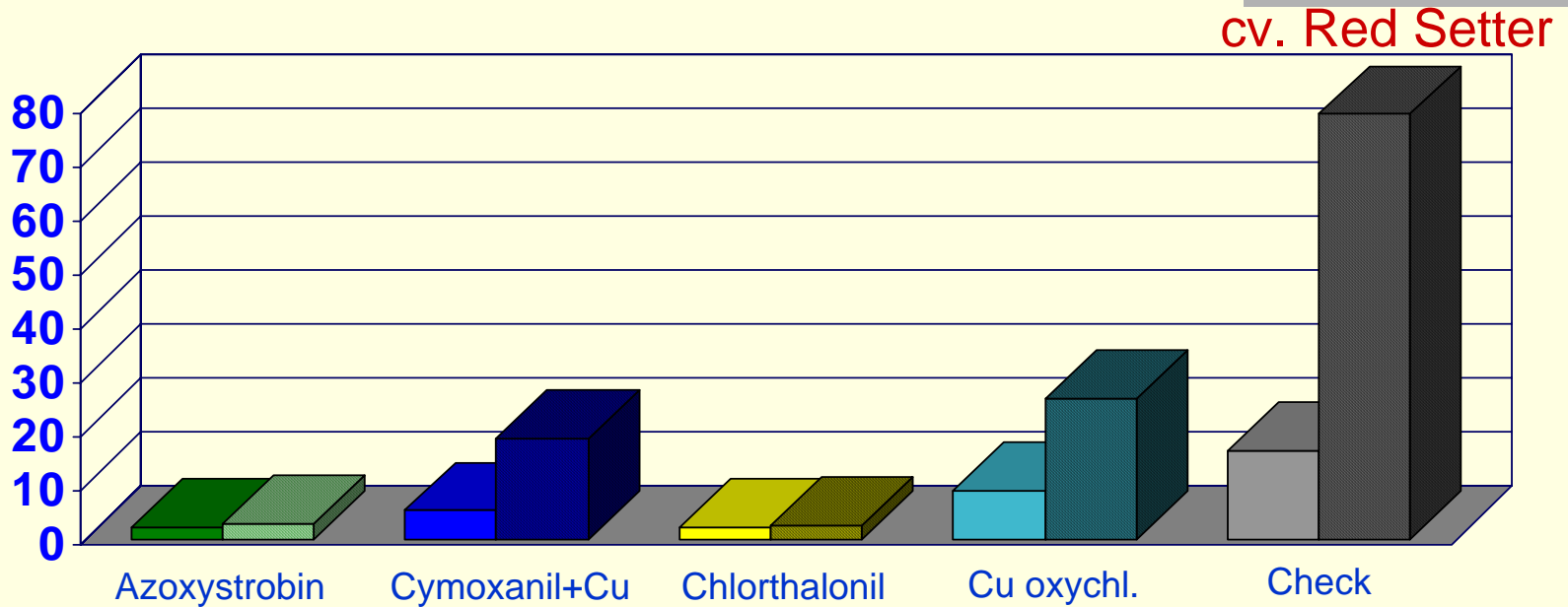
Shorten sprays intervals at the end of the season

Azoxystrobin  
Fenamidone  
Famoxadone



**Thanks for your attention !**

# Efficacy of some a.i. on tomato l.b. and e.b.



□ % leaf area affected  
**Early blight**

▨ % fruit affected  
**Late blight**

Year: 1997

Locality: Bologna

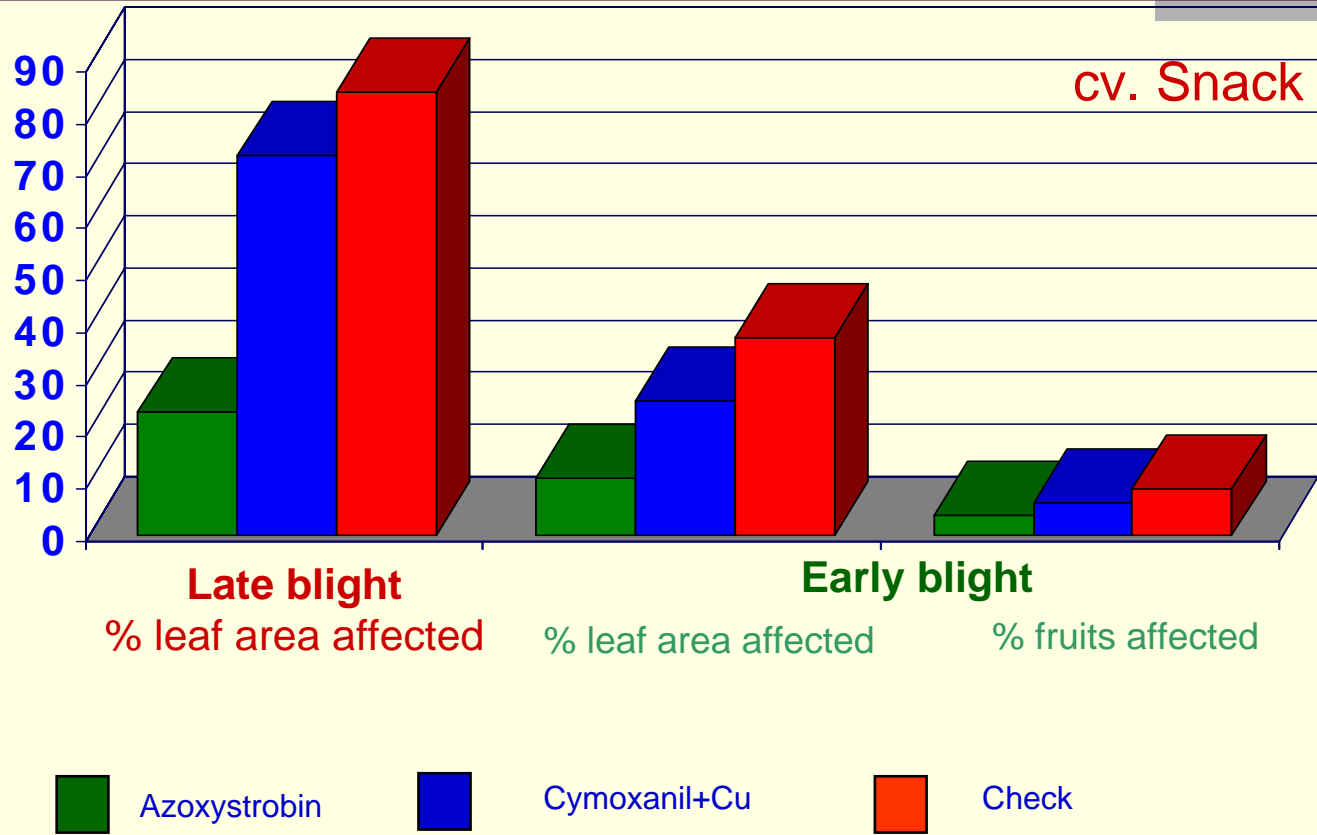
North Italy

DiProVal – Bologna University

Spray number: 3

Spray interval: 10 days

# Efficacy of some a.i. on tomato l.b. and e.b.



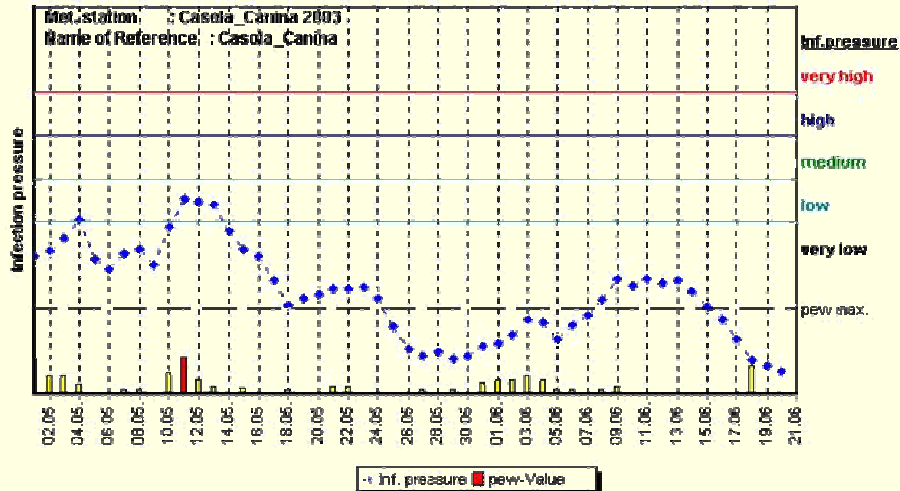
Year: 1996  
Locality: Foggia  
South Italy

Spray number: 8  
Spray interval: 7-10 days

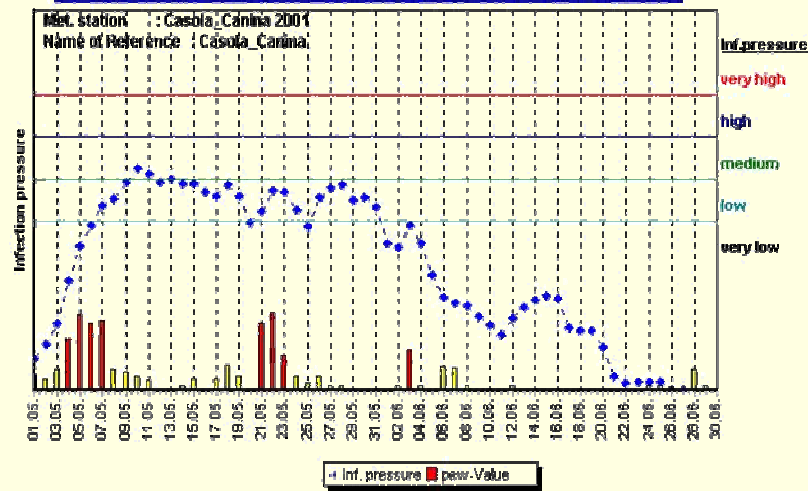
# Late blight epidemic pressure on potato

Growing areas

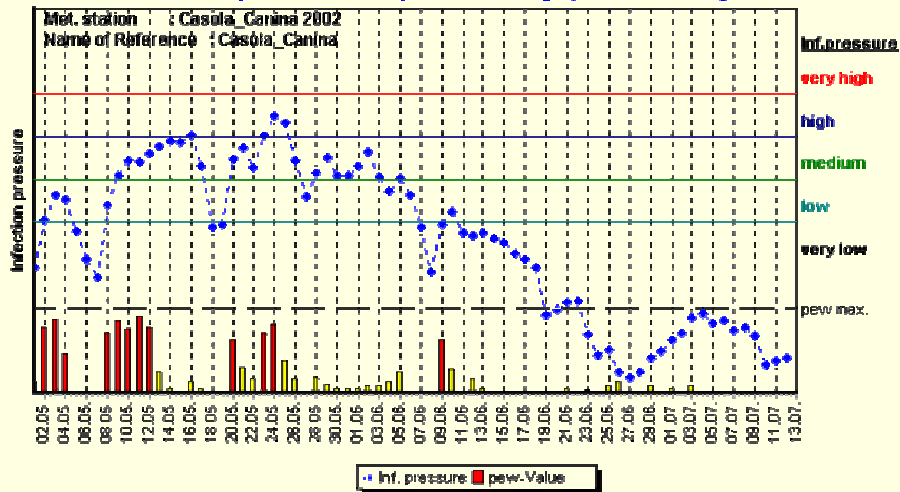
SIMPHYT3 - Weather-dependent infection pressure and Phytophthora-Efficiency-Value



SIMPHYT3 - Infection pressure and Phytophthora-Efficiency-Value

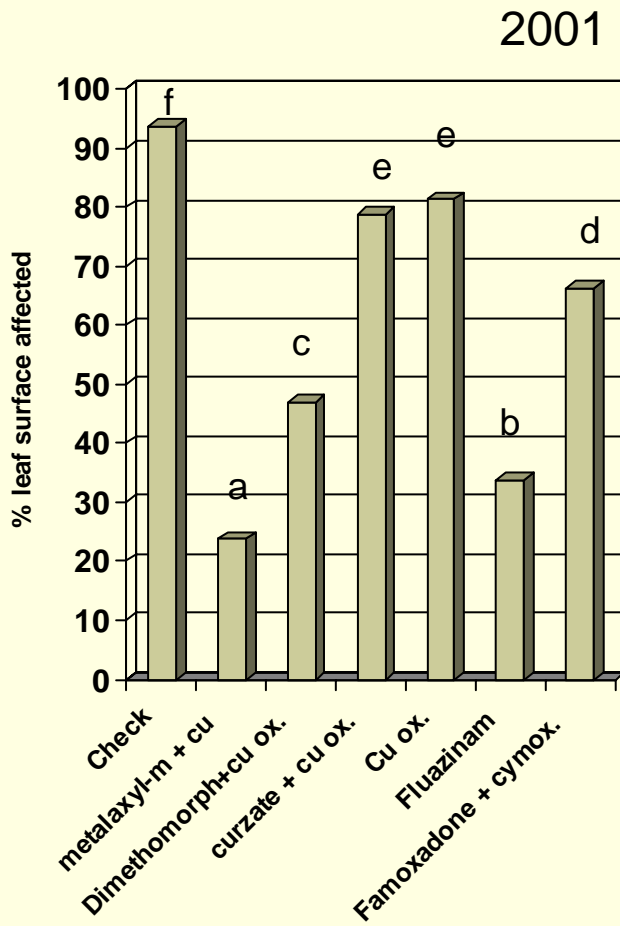


SIMPHYT3 - Weather-dependent infection pressure and Phytophthora-Efficiency-Value

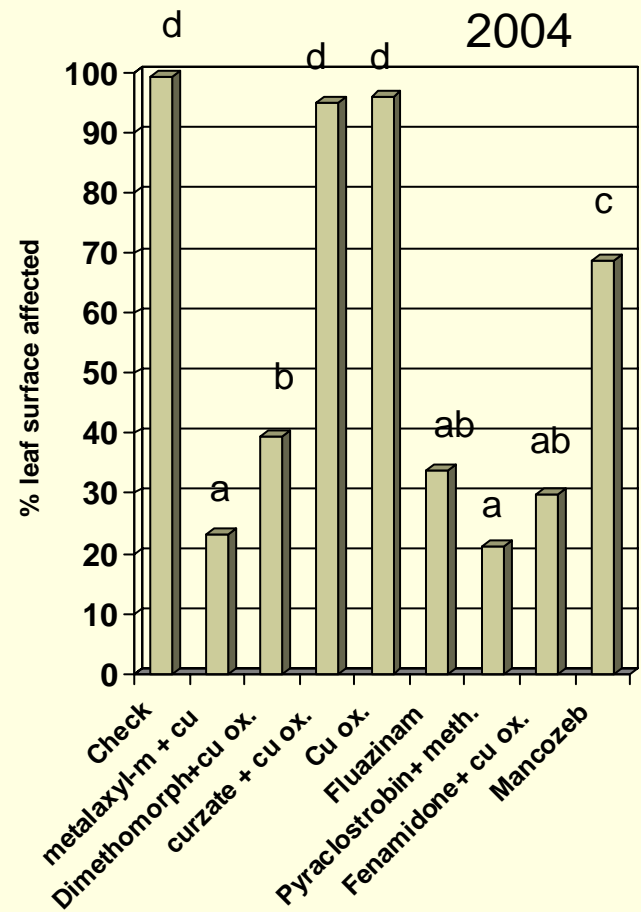


# Efficacy trials on potato I.b.

I.b. control strategy



Spray: 18/09; 27/09; 5/10; 15/10;



Spray: 30/08; 6/09; 13/09;