# Efficacy evaluation of different fungicides for the control of potato late blight in Italy

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Two new fungicides (dimethomorph+pyraclostrobin and fluopicolide+propamocarb) were recently authorized in Italy for the control of late blight on solanaceous crops. Their toxicological properties and environmental impact make them suitable to be introduced in the list of fungicides allowed in the Integrated Production Guidelines for the disease control in Italy. Therefore, two field trials were setup over the years 2007-2008 with the aim to evaluate and compare the efficacy of new formulations introduced in the italian market for the control of Phytophthora infestans (Mont.) de Bary, the causal agent of potato late blight.

Materials and methods of the field trials and features of the tested formulations are summerized in **tables 1 & 2**. Times of the applications and fungicide dosage are indicated in the result tables. Fungicides were applied respecting the safety period. Disease incidence and seventy on the potato canopy were assessed on the central part of the plots, calculating the percentage of infects leaves and the percentage of

		Trial 1	Trial 2	
	Year	2007	2008	
	Locality	Imola (Bologna)	Sala di Cesenatico (Forlì)	
	Variety	Primura	Bologna	
	Sowing date	27/3	26/8	
	Experimental design	Complete randomized block design (4 replicates)		
	Plot dimension (sqm)	24,0	21,0	
	Spray equipment	knapsack boom sprayer ECHO SHR 150 SI		

Š	Commercial name	Firm	Formulation	Safety period (days)	Active ingredient	A.i. in the formulated product (% or g/l)
TOP OF UNITED	Cabrio Duo	Basf	SC	3	dimethomorph + pyraclostrobin	72 + 40
	Electis	Dow	WG	7	zoxamide + mancozeb	8,3 + 66,7
	Forum R	Basf	WP	20	dimethomorph + copper oxychloride	6 + 40
	Melody compact	Bayer	WP	20	iprovalicarb + copper oxychloride	4,2 + 20,3
	Ridomil Gold R	Syngenta	WP	20	metalaxyl-m + copper oxychloride	2,5 + 40
	Volare	Bayer	SC	7	fluopicolide+	62,5 + 625

Trial 1 (2007) – Disease occurred at the end of May and developped rapidly affecting more than 90% of the check plot. All the tested formulations effectively protected the crop. However, formulation containing metalaxyl-m + copper oxychloride (Ridomil Gold R), again, confirmed to be the best to contain the disease (table 3). No tuber blight was recorded.

Trial 2 (2008) – Disease symptoms occurred on 10 October. All the formulations showed a good efficacy. The efficacy on foliage of formulations recently introduced on the market fluopicolide+propamocarb (Volare) and dimethomorph-pyraclostrobin (Cabrio Duo), was similar to that provided by metabayl-m+copper oxychloride, still considered the best chemical reference. On the contrary, with high disease pressure (more than 87% of inteced leaf area in the unsprayed check) the mixture zoxamide+mancozeb (Electis) and iprovalicarb+copper oxychloride (Melody compact) proved to be less effective (table 4). No tuber blight was recorded at harvest.

Table 3 - results of field trial n. 1 (2007)

	Treatments a.i. and formulation dose (g or ml/ha)		% of infected leaves		
9			18 June (T4 + 7)	26 June (Ts + 7)	3 July (Ts + 14)
	1	Unsprayed check	61,3 a	80,0 a	91,0 a
	2	zoxamide + mancozeb (1750)	3,38 b	2,61 c	2,36 bc
	3	dimethomorph + copper oxychloride (3250)	4,06 b	3,94 bc	1,98 c
	4	iprovalicarb + copper oxychloride (3500)	4,59 b	6,36 b	3,78 b
	5	metalaxyl-m + copper oxychloride (4000)	0,23 c	0,82 d	1,31 c

Treatments with the same letter are not statistically different for p ≤ 0,05 (Test LSD)

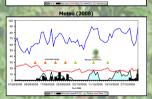
Time of chemical applications: 7-May (T1), 18-May (T2), 30-May (T3), 11-June (T4), 19-June (T5)

## Table 4 - results of field trial n. 2 (2008)

i	Treatments	% of infected leaf area		
	a.i. and dosage (g or ml/ha)	15 October (T <sub>2</sub> + 5)	22 October (T <sub>3</sub> + 5)	31 October (T <sub>3</sub> + 14)
u	1 Unsprayed check	35,4 a	65,6 a	87,5 a
	2 zoxamide + mancozeb (1750)	3,3 bcd	22,7 bc	38,0 b
	3 Dimethomorph + copper oxychloride (3250)	1,9 cd	16,8 cd	28,8 bc
	4 metalaxyl-m + copper oxychloride (4000)	0,2 d	11,5 cd	25,3 c
	5 iprovalicarb + copper oxychloride(3500)	10,7 b	30,1 b	40,0 b
	6 dimethomorph + pyraclostrobin (2500)	1,3 cd	9,6 d	23,8 c
Ē	7 fluopicolide + propamocarb (1600)	1,4 cd	13,3 cd	22,0 c

Time of chemical applications 1-October (T1), 10-October (T2), 17-October (T3)

Meteo (2007)



### CONCLUSIONS

Under medium and severe disease pressure in 2007 and 2008 respectively, metalaxyl-m+copper oxychloride (Ridomil Gold R) confirmed to be the best chemical reference in controlling late blight on foliage. New formulations, fluopicolide+propamocarb (Volare) and dimethomorph+pyraclostrobin (Cabrio Duo) showed, allthough in a single trial, an efficacy similar to that provided by the best chemical references, metalaxyl-m+copper oxychloride and dimetomorph+copper respectively. Iprovalicarb+copper oxychloride and zoxamide+mancozeb proved to be less effective.





