



*Euroblight
Meeting in Arras,
5 May 2010*

Julien BRUYERE



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Who are we ?

The Regional Federation for Pest Control :

- *a professional body managed by a board of regional producers*
- *Its vocation is to provide for producers' needs about plant health*

FREDON has five areas of competence :

- *Organization of collective and compulsory pest control ; Survey and eradication of quarantine pests and pests of compulsory control*
- *Environment and preservation of water quality*
- *Experimentation*
- *Technical backing and advices for professionals*
- *Study Station of Biological, Integrated and Supervised Control*





- *The main problem in organic potato production in Nord Pas-de-Calais : **late blight***
- *What are the ways of fight applied today by the growers ?*
- *What are the perspectives for tomorrow, in particular to decrease use of copper ?*



The current situation

• *Most of organic growers use Copper to fight against late blight, with a variable efficiency :*

- Preventive action*
- Contact action by preventing first inoculations*
- No curative effect*
- Susceptible to rainfall*

3 types of copper are approved for organic use :

- ① Bordeaux Mixture**
- ② Copper hydroxide**
- ③ Copper oxychloride**



The current situation

- **Since 2006, in France, use of copper is restricted to a maximum of 6 kg of metal copper, by hectare and by year.**

- **Bordeaux Mixture (20% of metal copper)**
1 spray at 4 kg/ha = 800 g of metal copper

→ No more than 7.5 sprays

But Modulation of doses are possible (2 or 4 kg of B.M.)



Questionnaire survey of the current practices

ITAB - July– September 2009



- *To produce organic potatoes, during a year with low pressure*

*1.5 kg < metal copper / year < 3.5 kg,
average 3.4 kg*

*1 < nb of sprays < 9
average 4.2 sprays*



Questionnaire survey of the current practices

ITAB - July– September 2009



- To produce organic potatoes, during a year with high pressure

**6 kg < metal copper / year < 9.6 kg,
average 8 kg**

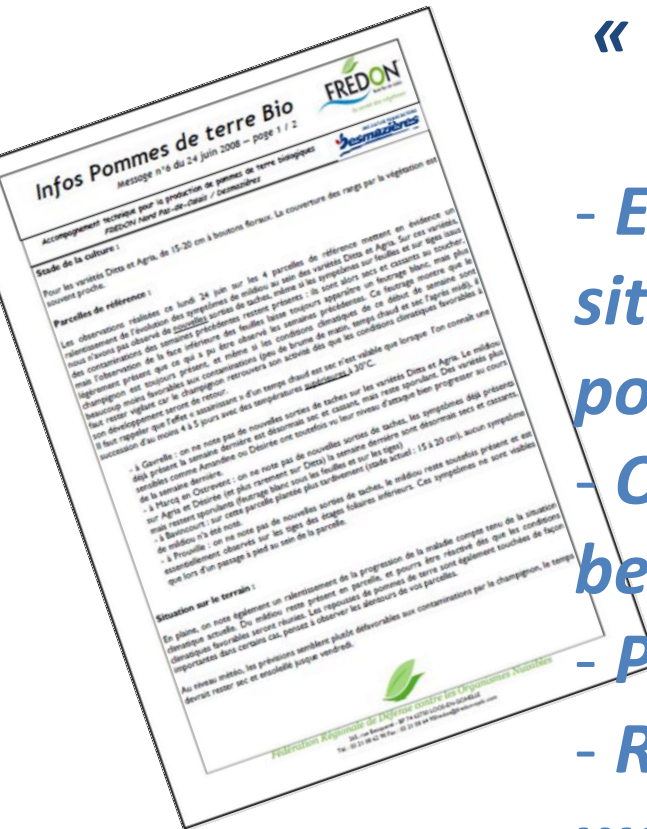
**3 < nb of sprays < 12.5
average 9.9 sprays**



A technical support for the organic growers is necessary



« Organic Potato news bulletin »



- Every week, a focus on the late blight situation in a network of organic potato plots in north of France
- Others observations : aphids, colorado beetle, useful insects...
- Preventive measures
- Result of trials (varieties, mechanical weeding ...)



Taking preventive measures to delay the arrival of late blight inside the plot

① What is late blight ?

Recognizing, understanding the conditions under which late blight is likely to occur and controlling its life cycle are necessary to prevent and to control late blight.



② Good management of cull or waste potatoes

In Nord Pas-de-Calais, regulations require that cull or waste pile must be managed if any foliage is present.



③ Check for volunteers potatoes, and remove them as much as possible

Volunteers are hosts for late blight inoculum, viruses, aphids, ...



Taking preventive measures to delay the arrival of late blight inside the plot

④ Check regularly the plots, in order to detect, remove and destroy first infected plants



⑤ Managing & reducing the use of copper (low doses, alternatives...)

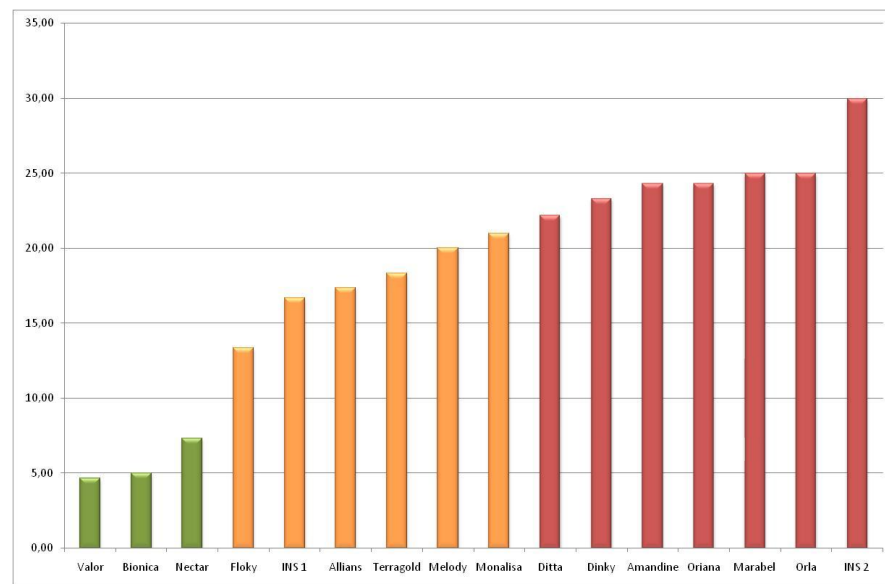
⑥ Use blight-resistant varieties where applicable.



Variety trials in organic potato production

Since 2002, every year, a variety trial is set up inside an organic plot

- Late blight severity is evaluated once a week
- For each variety : 24 tubers planted on 2 rows, with 2 repeats



Variety trials in organic potato production

Variety	Resistance to foliage blight
Agata	low
Agria	low
Albane	low to medium
Allians	medium to high
Almera	low
Alowa	high
Amandine	medium
Arielle	medium to high
Biogold	medium to high
Bionica	high
Charlotte	low
Cosmos	high
Derby	medium
Désirée	low to medium
Ditta	low to medium
Eden	high
Fanchette	low
Gasoré	high
Gourmandine	low to medium
Innovator	medium
Junior	medium to high

Variety	Resistance to foliage blight
Kuroda	medium
Maestro	medium
Marabel	low to medium
Marfona	medium
Marlen	medium to high
Melody	low to medium
Monalisa	medium
Nectar	high
Nicola	medium
Oriana	low to medium
Orla	low to medium
Raja	medium
Remarka	medium to high
Santé	low to medium
Sarpo Mira	high
Spirit	high
Terragold	medium to high
Toluca	high
Triplo	medium
Valor	high
Voyager	medium to high



Efficacy of alternatives to copper for late blight control

- From 2002 to 2006 : the effects of **37 various fungicides, mineral compound, bacteria or different compost extracts** were tested in detached leaf bioassays
- From 2004 to 2006 : trials on whole plants in experimental plots for **11 of these products**

•these trials take part of an Interreg program called « VETAB », between France & Belgium and partially financed by the European Union (ERDF).

CRA-W, CARAH, PCBT, SRPV & FREDON Nord Pas-de-Calais were the partners involved in potato trials for this program.



Efficacy of alternatives to copper for late blight control

Name	Type of products	Dose of metal copper	Efficacy observed on the field
Bordeaux Mix (B.M.) 3 kg/ha	Copper sulfate	600 g by ha	Reference
Ecoclearporx + B.M.	Stabilized hydrogen peroxide + B.M.	0 g/ha for ecoclearprox	No improvement
Glutex Cu 90	Copper hydroxide (reduced dose)	400 g/ha	Equivalent to the Bordeaux Mix
Mycosin	Sulphurized clay, extracts of Equisetum arvense	0 g/ha	No efficacy
Penta Cu 55	Copper sulfate pentahydrated	7 g /ha	No efficacy
Pom-PK + B.M.	Amino acid, oligosaccharids, flavonoïds	0 g/ha for Pom-PK	No improvement
PK2	Potassium phosphanate	0 g/ha	Equivalent to the Bordeaux Mix
PK2 + Solucuvivre	Potassium phosphanate + copper tallate	100 g/ha	Significantly more efficient than B.M.
Solucuvivre	Copper tallate	100 g/ha	Intermediate efficacy
Splinter + B.M.	Amino acid + B.M.	0 g/ha for Pom-PK	No improvement
Ulmasud B	Rock powder and clay	0 g/ha	No efficacy
Zonix	rhamnolipids	0 g/ha	Equivalent to the Bordeaux Mix



Efficacy of alternatives to copper for late blight control

Focus on the results

- Only 3 « alternatives » have a similar efficacy to the Bordeaux mix : PK2, Glutex Cu 90 et Zonix
- The association of PK2 and Solucuvivre offers a better efficacy than the Bordeaux mix in some trials
- Only PK2 & Zonix are copper-free



Fight against late blight in organic production

- **Low pressure** : Bordeaux Mix at **2 kg/ha**
- **High pressure** : Bordeaux Mix at **4 kg/ha**
- Keep new foliage covered, especially during June and early July : in a few day, many new leaves can appear (*“active growth”*).
- If many new leaf spots show up, copper hydroxide or oxychloride allow a fast liberation of the ions copper



Efficacy of alternatives to copper for late blight control

To conclude...

- Sanitation is the first line of defense against late blight in organic production
- At the present time, copper is still necessary but...
- ... Its usage has to (and can) be reasoned
- Effective alternatives to copper are still expected (fungicide, stimulation of natural defenses...)
- Focus on new varieties, especially created for organic farming

