



OCCURENCE OF LATE BLIGHT IN ALGERIA DURING 2009 AND EVALUATION OF POTATO CULTIVARS FOR RESISTANCE TO *PHYTOPHTHORA INFESTANS*

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Summary:

Several prospections carried out in various areas production of potato in Algeria during 2008-2009 showed a strong development of late blight, especially in the West area (Mostaganem) and in Ain Defla and Mitidja with less degree. In Mascara area, the fields prospected showed few symptoms. Tests of varietal behavior in field and laboratory conditions have shown great susceptibility of the most cultivars and a interesting resistance of Sarpo Mira. However, this cultivar, newly introduced in Algeria, is not frequently cultivated in this country.

1. INTRODUCTION

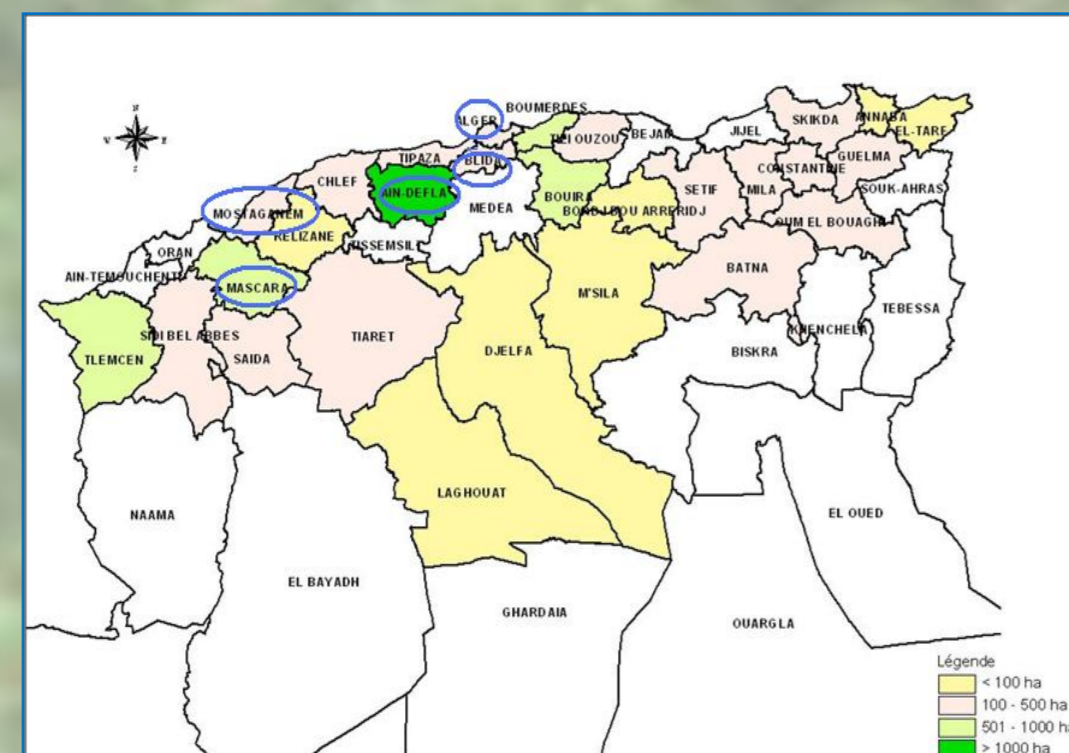
In the last decade, the potato cultivated areas in Algeria have known a large extension. Late blight caused by *Phytophthora infestans* remains one of the most widely distributed disease. Since 2007, the disease incidence increased and caused drastic losses in the yields, particularly in the regions where climatic conditions are highly favourable.

In this situation, it was necessary to evaluate the importance and intensity of this disease in Algerian production areas during 2008/2009. On the other hand, we don't have any knowledge about the resistance level to *P. infestans* of the potato cultivars grown under various conditions in Algeria. Experiments were carried out : 1) field trials under natural conditions of infection and 2) *in vitro* detached leaflets with artificial inoculations.

2. MATERIAL AND METHODS

2.1. Prospections and late blight occurrence

The prospections were carried out during 2008-2009 in the two areas : the central West (Mitidja and Ain Defla) and the West (Mostaganem and Mascara) of Algeria. These areas have a high potential of potato crop, where they yield nearly 60% of the national production.



Late blight occurrence was estimated by the attacked fields frequency, the disease severity (estimated on a scale from 1 to 9) and the attacked plants percentage.

3. RESULTS

3.1. Late blight occurrence in Centre and West of Algeria (2009)

A total of 52 fields were prospected during May and April 2009. The disease occurrence evaluated by the late blight frequency and the severity of the attacks are given in the table below.

	Mean Area of field (ha)	cultivars	Frequency of late blight	Severity
Center (Mitidja)	5 ha	Spunta, Fabula	100 %	5
West Center (Ain Defla)	7 ha	Spunta	75 %	5
West : Mostaganem	1 ha	Spunta, Kondor, Desiree	50 %	7
Mascara	3 ha		10 %	3

2.2. *In vitro* resistance test (detached leaflets)

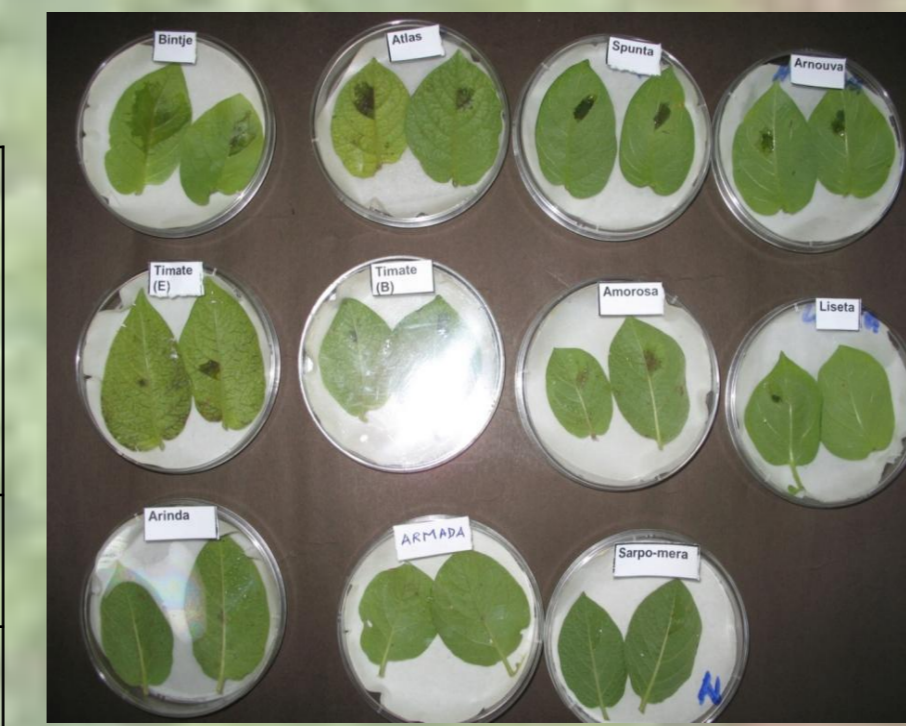
The resistance test was carried out by artificial leaflets inoculation in Petri dishes. Eight potato cultivars : Spunta, Atlas, Timate, Arnova, Amorosa, Armada, Arinda, Sarpo Mira were selected. Each of these cultivars was inoculated with two *P. infestans* isolates (Z1 and Z5) having two different virulence patterns previously characterized by Beninal et al. (EuroBlight, 2008).



Isolates Z1 and Z5 were respectively not virulent to R9 and virulent to R9. They overcome all the other R-genes of Black's differential. The potato cultivar Bintje was used as susceptible cultivar. The necroses diameter and the sporulation intensity were estimated 4 days after incubation at 18°C

3.2. Results of *In vitro* resistance test

Cultivars	Diameter necrosis (mm)		Intensity of sporulation (10 ⁵ spores/ml)	
	Isolate Z1	Isolate Z5	Isolate Z1	Isolate Z5
Spunta, Bintje	2,0-2,5	2,25-2,7	1,4-1,7	1,7-2,0
Amorosa, Atlas	1,15-1,5	1,4-1,6	1,0-1,3	1,0-1,6
Timate, Arnova, Armada	0,4-0,6	1,0-1,4	0,3-0,7	0,9-0,9
Sarpo Mira, Arinda	0,0-0,8	0-1,0	0,0-0,2	0,0-0,8



Cultivars inoculated with isolate Z1



Cultivars inoculated with isolate Z5

2.3. Field trials

The late blight attacks were quantified weekly by estimating the disease severity and the foliage proportion attacked by *P. infestans*. The attack was evaluated by a scale from 1 to 9 and by the number of attacked plants in each micro field.



Notations:

An index of attack (IAM) was calculated in order to evaluate the disease intensity in each cultivar according to the formula:

$$IAM = \frac{\text{Somme des degrés d'attaque}}{\text{nombre total de plants par micro parcelle}}$$

3.3. Results of field trials

The index of attack (IAM) showed that :
- Sarpo Mira was the most resistant cultivar.
- Atlas, Arinda, Arnova, Amorosa and Kondor were fairly resistant;
- Timate and Fabula were fairly susceptible.
- the most susceptible cultivars were Spunta, Desiree and Bintje.

Cultivars
Spunta, Desiree, Bintje
Timate, Fabula
Atlas, Arnova, Amorosa, Kondor
Arinda et Sarpo Mira

Late blight in Mostaganem field



The necrose size and the sporulation intensity showed that :
- Sarpo Mira and Arinda were the most resistant cultivars to the two *P. infestans* isolates (with two different virulence patterns).
- Timate, Armada, Arnova presented a fairly resistance to the two *P. infestans* isolates.
- Amorosa and Atlas were fairly susceptible.
- Spunta and Bintje were the most susceptible cultivars.



Symptoms on Fabula



Symptoms on Desiree



Symptom on Spunta



Symptoms on Sarpo Mira

CONCLUSIONS

Our prospections showed that the climatic conditions during 2009 increased the development of late blight especially in the West area of Algeria (Mostaganem), in contrast to the central area (Ain Defla and Mitidja) where the disease development was less important. The fields prospected in the Mascara region (West part of Algeria) were the least attacked.

The *in vitro* resistance test where the two virulence patterns were used, confirms the behaviour of the major cultivars in the field trials as, for example, the resistance of the Sarpo Mira cultivar. These results confirm previous investigations, e.g. resistance of Arinda cultivar has to be confirmed.

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