

BEAN ANTHRACNOSE IN WESTERN EUROPE

Jacques Hallard and Georges Trebuchet
Vilmorin Research Center - La Menitre,
F. 49250 Beaufort en Vallee, France

Bean anthracnose caused by Colletotrichum lindemuthianum Sacc. et Magn. (Bri. et Cav.) is a widely spread disease in European growing conditions.

The chemical methods of control appeared not to be recommended in practical agriculture.

The causal fungus is seed-borne, an effort has been done in the fifties by the Seed-Producers to deal disease free seeds, particularly coming from crops in the East African dry areas.

The study of pathotypes and the interactions with various beans cultivars has been done by Hubbeling (1957), Blondet (1962), Bannerot (1965, 1968) and Charrier (1970). In the same time the methods of control with genetic ways were initiated. The strain "Cornell 49-242" originated from Venezuela and reported by Hubbeling (1957) was used following the study of its resistance by Mastenbroek (1960). Many European breeders have therefore created cultivars bearing the dominant allele ARE of this strain.

Further on, other sources of resistance to all physiological races of anthracnose know till then were isolated from two Mexican lines No. 222 and No. 227 (Bannerot and Coll. 1971).

Nowadays, most of the cultivated varieties in Western Europe, have the monogenic resistance coming from "Cornell 49-242" which gives resistance to the designated pathotypes : alpha, beta, gamma, delta, lambda (alpha 5 N of Hubbeling), and epsilon.

This resistance is now broken off by new races of anthracnose. That is the case of "alpha Brazil" pathotype of brazillian origin and also of "Ebnet" pathotype isolated by Schnock (1975, a and b) in the South of the Federal Republic of Germany and designated as kappa race by Hubbeling (1975).

These two new races "alpha Brazil" and "Kappa Ebnet" have allowed Fouilloux (1975) to distinguish the Mexican lines No. 222 and No. 227 (Table 1) and to find a new group of resistant lines to all pathotypes known till now; for instance the line T0 (coming from a cross between a Mexican line from Acapulco and cv. "Tenderette") and the lines VUFO (coming from an interspecific cross Phaseolus vulgaris x Phaseolus for-
mosus, Le Marchand's collection).

Several west-European laboratories are deeply searching new genetical resistances to all the pathotypes of the fungus and intend to breed on this base new cultivars.

As to us, we carried out experimental inoculations on several hundreds of bean lines. These lines are composed of: a) ancient or new cultivars, b) lines coming from other laboratories and c) lines gathered by one of us in various states of the American continent. To cover the whole present variability of the pathogen, we used the ten following strains (origine*): Gamma strains G2 (1) and G8 (2); Delta strains F3 KK and F3 KR (1); lambda strain L4 (2); kappa strains Ebi (1), EbK (2), Eb S1 and Eb S2 (3), alpha Brazil (1). The technique of inoculation used is the one described by Bannerot (1965).

The analysis of our results leads us to these two major conclusions:

- 1 - Some lines may be classified as tolerant towards all the pathotypes. That is the case of the lines '1273' (Dickson, 1974) and PI 150414 (Patel and Walker, 1965). This reaction is probably caused by a susceptibility to a limited number of less aggressive strains.
- 2 - Other lines (as mentioned on Table No. 2) are highly resistant to all the present pathotypes.

We can confirm precisely the resistance of lines PI 165422 and PI 207262 already noted by Hubbeling (1975).

This material allow to study more deeply the host-pathogen relationship in the case of bean anthracnose and to enlarge the genetical basis with the purpose of breeding new cultivars which would be less vulnerable to the pathogen adaptation.

Table No 1

<u>Phaseolus</u> lines genes	<u>Anthracnose</u> races (strains)	<u>alpha, beta,</u> <u>gamma, delta</u> <u>epsilon</u>	<u>lambda</u> (alpha 5N)	<u>kappa</u> (Ebnet)	(alpha Brazil)
Cornell 49-242	Are	R	R	S	S
Mexique 227	-	R	R	S	S
Mexique 222	Mex. 1	R	R	R	S
TO	Mex. 2	R	R	R	R
VUFO	-	R	R	R	R

* origine : 1 = Mr Fouilloux, INRA Versailles ; 2 = Mr Hubbeling, I.P.O. Wageningen ; 3 = reisolated from Dr Schnock's strain, Asgrow G.m.b.h., Ebnet.

Table No 2

Bean lines	Seed color	Origin	
<u>Phaseolus multiflorus</u>			
Hammond Dwarf Scarlett	purple + black	Great Britain	Introduction 1965
<u>Phaseolus vulgaris</u>			
'355.BL'	white	Costa Rica	Introduction 1965
'334.M.1.1'	rose	Mexique	Introduction 1965
'345.M.3.1'	black	Mexique	Introduction 1965
'Marche de Taxco' (1)	rose + cream	Mexique	Introduction 1974
'1775'	rose	Bresil	Introduction 1974
'PI 165 422'	black	Mexique	Mr Hudson, R.P.I.S. Pullman, Wash.
'PI 207 262'	beige	Colombie	idem + Dr Coyne Un. Nebr.
'C-157.1.9'	brown	Costa Rica	Dr Pinchinat, Turrialba
'N-302'	black	Costa Rica	idem
'L-43' (1)	black	Bresil	Dr. Antunes, Pelotas

(1) = heterogen

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