# EVALUATION FOR RESISTANCE TO ANTHRACNOSE OF A CORE COLLECTION ESTABLISHED FROM THE CRF-INIA COMMON BEAN COLLECTION

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## Introduction

The CRF-INIA (Centro Recursos Fitogenéticos) preserves the largest bean collection in Spain, with accessions mainly collected in the Iberian Peninsula. Currently, this collection includes 2842 common bean accessions (*Phaseolus vulgaris* L.). A core collection was established by De la Rosa *et al*. (2000) including a total of 211 accessions. This core collection is being subjected to different characterizations and evaluations to assess the representation of genetic diversity and the lack of repetitions.

Bean anthracnose, caused by fungus *Colletotrichum lindemuthianum* (Sacc.&Magn.) Scrib., is a common disease in Northern Spain. Numerous pathogenic variants or races have been described in this pathogen (Mahuku & Riascos, 2004). Up to now, six races have been reported in the Iberian Peninsula (races 3, 6, 9, 19, 38 and 102). In this summary, we present the results of the anthracnose evaluation of this core collection (races 3, 6, 19, 38 and 102) in order to contribute to its utilization, validation and improvement.

## Material and Methods

A total of 202 accessions included in the core collection were evaluated. Races 3, 6, 19, 38 and 102 were used in these evaluations. These races were isolated from local cultivars grown in Northern Spain (Ferreira *et al*., 1998). The evaluations were carried out according to standard methods (Pastor Corrales *et al*., 1994), inoculating at least 16 seedlings of each accession with each race. The reaction was evaluated 7-9 days after inoculation using a scale from 1 to 9 (van Schoonhoven & Pastor Corrales, 1987) and considering three main types of reactions: resistant accessions (R), susceptible accessions (S), and accessions showing an intermediate reaction (I).

The accessions were grouped according to the seed phenotypes and market classes described by Santalla *et al*. (2001). The accessions having a seed phenotype different from these market classes, were included in the group "others".

## Results and Discussion

In the evaluation, the three types of reaction were identified in the five races, the susceptible reaction being the most common. The virulence of individual races (% of susceptible accessions), fluctuated from 84 % of race 19 to 57 % of race 102. Accessions with good resistance against all five races were not found.

Table 1 presents the different resistance spectra to the five races, considering the intermediate reaction as resistant. These results show that accessions included in the same market class can have different resistance spectra. Also, several accessions included into the same market class can have the same spectrum, suggesting the possibility of some repeated accessions being present. Additional work in characterization an evaluation, including molecular markers, will be necessary in order to test for redundancy in this set of accessions.

It is worth of mention that in the 196 accessions analyzed, not all possible resistance spectra were found. The possibility of independence between the reactions against the different races was considered. Table 2 shows the values of the contingency chi squares for the different reactions to pairs of races, considering the intermediate reaction (I) as resistant. In five cases (pairs of races 3-6, 3-19, 3-38, 6-38 and 19-38) a significant excess of accessions showing either resistance or susceptibility to the two races was found. Races 38 and 102 showed the opposite situation: an excess of accessions showing resistance to

only one of these two races was found. A possible reason for these deviations could be the presence of a relatively low number of loci involved in the resistances shown by this core collection.

Table 1. Number of accessions showing the different possibilities of resistance/susceptibility to anthracnose races 3, 6, 19, 38 and 102. R = resistant; S = susceptible. Intermediate reaction (I) was considered as resistant.

| Anthracnose races | | | | | | |
|---|---|---|---|---|---|---|
| **3** | **6** | **19** | **38** | **102** | **Accesions** | **Bean market classes (number of accessions)** |
| R | R | R | R | R | 2 | Other (2) |
| S | R | R | R | R | 1 | Negro brillante (1) |
| R | S | R | R | R | - | |
| R | R | S | R | R | 3 | L. great nothern (1); Other (1); Small yellow (1) |
| R | R | R | S | R | 4 | Azufrado (1); D. Red Kidney (1); Rosada (1); Other (1) |
| R | R | R | R | S | 6 | Black turtle (2); Canario bola (1); Great northern (1); L. great nothern (1); Small white(1) |
| S | S | R | R | R | - | |
| S | R | S | R | R | 3 | Large Cramberry (1); Manteca (1); Other(1) |
| S | R | R | S | R | - | |
| S | R | R | R | S | 1 | Rosada (1) |
| R | S | S | R | R | - | |
| R | S | R | S | R | 12 | Bayo gordo (2); Brown garbanzo (1); Fabada (2); L. great nothern (1); Negro brillante (1); Sangre de toro (1); Small red (1); Rounded caparron (1); White kidney (2) |
| R | S | R | R | S | 3 | Great northern (1); Other (1); Rosada (1) |
| R | R | S | S | R | 1 | Other (1) |
| R | R | S | R | S | 7 | Brown marrow (1); Brown mottled (1); Great northern (1); Other (4) |
| R | R | R | S | S | - | |
| S | S | S | R | R | - | |
| S | S | R | S | R | 5 | Bayo gordo (1); Canela (1); Fabada (1); Ojo de cabra (1); Small yellow (1) |
| S | S | R | R | S | - | |
| S | R | S | S | R | 14 | Cramberry (2); Great northern (1); Large Cramberry (1); L. great nothern (1); Rosada (4); Canela (1); Negro brillante (1); Sangre de toro (1); Other (2) |
| S | R | S | R | S | 7 | Brown garbanzo (1); Brown mottled (1); Great northern (2); Marrow (2); White kidney (1) |
| S | R | R | S | S | - | |
| R | S | S | S | R | 3 | Other (2); Sangre de toro (1) |
| R | S | S | R | S | 3 | Other (2); White kidney (1) |
| R | S | R | S | S | 3 | Great northern (1); Negro brillante (1); Rosada (1) |
| R | R | S | S | S | - | |
| S | S | S | S | R | 36 | Azufrado (1); Bayo gordo (1); Black Canellini (1); Brown mottled (1); Canela (2); Canellini (1); Dark garbanzo (2); D. red kidney (1); Fabada pinto (1); Great northern (1); Large Cramberry (1); L. red mottled (1); Light r. kidney (1); Marrow (4); Negro brillante (5); Ojo de cabra (1);Other (6); Rosada (3);Sangre de toro (1); White kidney (1) |
| S | S | S | R | S | 9 | Brown mottled (2); Great northern (2); Small white (1); Small yellow(1); Rosada(1); Other (2) |
| S | S | R | S | S | 1 | Other (1) |
| S | R | S | S | S | 19 | Azufrado (1); Black Canellini (1); Black motled (1); Brown garbanzo (1); Carioca (1); Marrow (3); Other (7); Red pinto (1); Rounded caparron (1); Small yellow (1); White kidney (1) |
| R | S | S | S | S | 2 | Canela (1); Sangre de Toro (1) |
| S | S | S | S | S | 51 | Azufrado (1); Bayo gordo (1); Black Canellini (3); Brown garbanzo (2); Brown marrow (2); Brown mottled (1); Canellini (1); Cramberry (1); Dark garbanzo (1); Fabada pinto (1); Marrow (2); Mulatinho (2); Negro brillante (1); Other (12); Red caparron (2); Red pinto (3); Rosada (7); Rounded caparron (5); Sangre de toro (1); Small yellow (2) |

Table 2. Contingency Chi-square values for the reactions against the different pairs of anthracnose races.

| | Race 3 | Race 6 | Race 19 | Race 38 |
|---|---|---|---|---|
| Race 6 | 4.32* | | | |
| Race 19 | 73.17** | 0.09 n/s | | |
| Race 38 | 25.01** | 26.35** | 3.37 n/s | |
| Race 102 | 1.78 n/s | 0.12 n/s | 7.93** | 12.46** |

*= 0.05>p>0.01; **= 0.01>p; n/s= not significant.

## References


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