

Resistance to Halo Blight, Common Bacterial Blight and Bacterial Brown Spot in Spanish Common Bean Core Collection

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Abstract: Halo blight (HB) caused by *Pseudomonas syringae* pv. *phaseolicola* (*Psp*), common bacterial blight (CBB) caused by *Xanthomonas campestris* pv. *phaseoli* (*Xcp*), and bacterial brown spot (BBS) caused by *Pseudomonas syringae* pv. *syringae* (*Pss*), are among the major constraints of common bean (*Phaseolus vulgaris* L.) production in the North Central part of Spain. Depending on environmental conditions of each year, these bacterioses can be found together or separately in this area.

The Spanish Plant Genetic Resources Centre hold the active bean collection which includes 2661 accessions collected in Spain. A core collection, based on seed morphology and passport data, which includes 211 accessions, has been stabilised.

The objective of this study was to evaluate the Spanish Core Collection against the three major bacterial pathogens in order to use it for breeding purposes.

Material and Methods

A total of 199 accessions included in the *Phaseolus vulgaris* Spanish Core Collection were screened separately against the HB (6 and 7 races), CBB, and BBS pathogens.

The symptoms in all cases, for both leaves and pods, were visually evaluated using the 1 to 9 scale described by Schoonhoven *et al.* (1987). Data were reported considering the plants with symptoms evaluated from 1 to 3 as resistant, 4 to 6 as moderately resistant and from 7 susceptible.

Results and Discussion

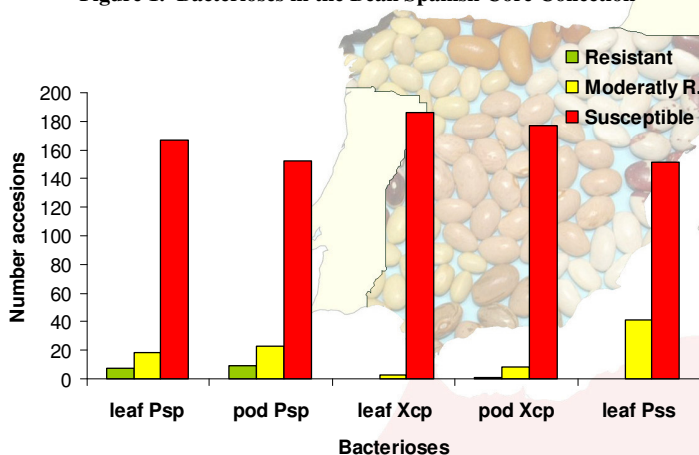
Figure 1 show the level of bacterioses in 199 entries of Spanish Core Collection screened against the three bean bacterial pathogens, the 13% (25 accessions) showed some degree of HB resistance in leaf, and the 17,4% (32 accessions) in pod. In CBB only the 1,6% showed moderate resistance in leaf (3 accessions), and the 4,8% in pod (1 accession resistant and 8 moderately resistant). Regarding BBS is shown only moderate resistance to leaf, but with a higher percentage than in the case of CBB and HB, the 21,4% (41 accessions).

Regarding the multiple resistance (Table 1), a total of 8 entries were rated with some resistance to HB (leaf and/or pod) and BBS in leaf. Moreover, 5 entries were rated resistant to HB (leaf and/or pod) and to CBB (only pod). Finally, 8 entries were evaluated with some degree of resistance, only to HB, in leaf and pod together. All the resistant entries represent a wide range of bean market classes based on seed color and size, and the majority of these material showed prostrate or semiclimbing growth habit. These results would indicate the difficulties existing in finding common bean germplasm resistant to bacterioses, which combine morphological characteristics, as color and size seeds, and determinate growth habit.

Table 1. Accession number, province of origin, growth habit, seed color, size and shape, *Psp*, *Xcp* and *Pss* reaction in leaves and/or pods, of 21 bean Spanish Core Collection accessions selected for showing some combination degree of *Psp/Xcp/Pss* or leaf/pod resistances.

CRF Accession ^a	Province	Growth habit ^b	Seed		Reactions ^c					
			Color	Weight (g)/100s	Shape	Psp		Xcp		Pss
BGE022831	Cantabria	IV	purple	49	kidney	5	2	7	7	6
BGE02108	Cantabria	III	green	37	oval	6	6	8	8	5
BGE028940	Madrid	IV	bi-coloured (brown/gray)	62	kidney	5	6	9	8	6
BGE028960	Albacete	IV	white	25	truncated	5	6	9	9	6
BGE011037	Navarra	IV	white	42	rounded	7	1	7	9	6
BGE001472	Teruel	III	white	29	cuboid	8	5	7	7	5
BGE013972	Albacete	IV	white	40	cuboid	7	6	9	9	6
BGE013965	Albacete	IV	brown purple	39	cuboid	6	9	9	9	6
BGE029592	Salamanca	IV	mixture (ochre, white, bicolored)	29	cuboid	1	2	7	5	.
BGE003261	Asturias	IV	winy brown	62	cuboid	6	5	8	6	8
BGE003283	Asturias	IV	black	59	oval	9	1	8	3	7
BGE029569	Salamanca	IV	purple	38	oval	9	5	7	6	7
BGE005439	Asturias	III	yellow	53	rounded	6	.	7	5	8
BGE003562	Asturias	IV	black	44	oval	3	3	7	7	7
BGE003997	Soria	III	brown	44	truncated	3	3	8	8	8
BGE002189	Pontevedra	III	brown	31	truncated	1	5	9	9	7
BGE003700	León	III	bi-coloured (purple/cream)	46	kidney	3	6	9	8	7
BGE011736	Cuenca	I	black	28	kidney	4	2	8	9	7
BGE004435	Salamanca	I	yellow	35	oval	5	5	7	7	7
BGE011731	Cuenca	I	ochre	26	kidney	5	6	9	9	8
BGE028947	Madrid	I	green	22	kidney	6	4	9	8	7

Figure 1. Bacterioses in the Bean Spanish Core Collection



^a Spanish Bean Core Collection number (CRF)

^b IV= indeterminate climbing, III= indeterminate, II= indeterminate upright, I= determinate upright.

^c Mean bacterial blight score for each pathogen: resistant (1 - 3), moderately resistant (4 - 6), susceptible (7 - 9) (Schoonhoven and Pastor-Corrales, 1987).

These results will be submitted to INIA at the conclusion of the RF2007-00014-C04-03 and CC06-053 Projects, and will be showed in the CRF web site (<http://www.inia.es>).