Introduction

Extensive wild-weedy-cultivated complexes of common bean were observed during collection expeditions in regions of Colombia where wild and cultivated beans are sympatric. Interbreeding complexes may be important mechanisms for the generation of genetic variability in landraces. Such complexes have also been observed in Phaseolus vulgaris L. (in both Middle American and Andean gene pools (Beebee et al., 1987; Gonzalez et al., 2003; and Toro and Ocampo, 2004). The occurrence of introgression between the domesticated form and its wild ancestors in the Middle American and Andean gene pools seem very probable and has been proposed for this crop, as a consequence of intraspecific hybridization (Paredes and Gepts, 1999, and Chacon et al. 2002). Here, we report the finding of new complexes (wild-weedy-cultivated) of common bean in Colombian regions where these have not been reported previously. Additionally, we analyzed these complexes from a biochemical (phasaelin and isozyme markers) and morphological viewpoint to estimate the variability as a contribution towards their conservation and use.

Materials and Methods

Plant material. Ten wild-weedy-crop complexes were selected after a geographic sampling in Colombia. In addition three accessions were chosen as controls: two cultivated P vulgaris from the Andes and Mesoamerica (G4944 and G5773, respectively) and a Colombian wild (G24408). For the morphological and biochemical analysis, we only took the multiplied and conserved seed in the Phaseolus germplasm bank held in CIAT (Table 1).

Morphological analysis. For the analysis of morphological trails of seed phenotypes, we used five accessions: seed size, shape, 100-seed weight, color, and color pattern.

Biochemical analysis. The seed storage proteins were analyzed as described in the Material and Methods section for each analyzed seed. This variation was first analyzed in 10-SDS-PAGE (Brown et al. 1981) and confirmed later in 2D-IEF-SDS-PAGE (O’Farrel, 1975). For the isozyme analysis only a complex was selected (G50849), being used for it thirty scattered proteins. We used only two polymorphic enzymes: phosphatase (PXR, 1.11.1.7) and disphosphatase (DIA, 1.4.5.1). The methodology for isozyme analysis was the one reported by Ramirez et al. (1987).

Results

Seed morphological variation of the complexes. The original seed of these populations was collected and classified as cultivated material. However, during the initial seed increase, we observed segregation for seed size and color indicating possible wild-weedy-crop complexes. The materials (1,182 total) were classified as cultivated (642 [84%]), intermediate (432 [37%]), and wild 108 (9 %) (Table 1).

Phasaelin variation analysis of the complexes. For the isozyme analysis, both complexes (Mesoamerican and Andean) are found in the analyzed complex (G50849) (Table 2). The selected isolotios carry alleles from both Mesoamerican and Andean gene pools:

<table>
<thead>
<tr>
<th>Accession</th>
<th>Type</th>
<th>Protein band</th>
<th>Allele</th>
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<th>Isolate 2</th>
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<tr>
<td>G50849</td>
<td></td>
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</table>

References


Figure 1. Example of Seed morphological variation and biochemical for wild-weedy-crop complex G50632. In the right side of images shows 100 seed weight and down side is the phasicolin types.

Figure 2. One-dimensional SDS-PAGE (upper line) and 2D-IEF-SDS-PAGE (second line downwards) gels of wild-weedy-crop complexes showing phasaelin types found in them. For the 2D gels, arrows point to key peptides.

Figure 3. New map for the distribution of the wild-weedy-crop biological complexes of common bean in Colombia.

Table 1. Description of the wild-weedy-crop complexes from domicational origins of common bean.

Table 2. Allelozyme constitution and seed size of the wild-weedy-crop complex G50849.

Table 3. Distribution of wild-weedy-crop complexes of common bean in Colombia.

These segregating populations were considered to be complexes, since the involve wild and weedy segregated forms. These complexes showed a great diversity in seed size (small to large) and color (Figure 1).

Elevation (meters)
<table>
<thead>
<tr>
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<td>120</td>
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<tr>
<td>261-340</td>
<td>100</td>
</tr>
<tr>
<td>341-500</td>
<td>50</td>
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Figure 3. New map for the distribution of the wild-weedy-crop biological complexes of common bean in Colombia.