

IDENTIFICATION OF NEW WILD POPULATIONS OF *PHASEOLUS VULGARIS* IN WESTERN JALISCO, MEXICO, NEAR THE MESOAMERICAN DOMESTICATION CENTER OF COMMON BEAN

Daniel Zizumbo¹, Roberto Papa², Matthew Hufford³,
Shelby Repinski³ and Paul Gepts³

¹Centro de Investigación Científica de Yucatán A.C., Mérida, México; ²Università Politecnica delle Marche, Ancona, Italia; and ³University of California, Davis, CA, USA

Recent research on microsatellite marker diversity has provided confirmation for two major features of genetic diversity of the Mesoamerican gene pool of common bean (Kwak et al. 2009). First, the Mesoamerican domesticated gene pool resulted from a single domestication and, second, this domestication took place in a small region located in the Lerma-Santiago basin, primarily in the state of Jalisco in west-central Mexico (Fig. 1). Earlier research already had posited a single domestication in the Mesoamerican gene pool based on phaseolin and AFLP data (Gepts et al. 1986; Gepts 1988; Papa and Gepts 2003). Furthermore, phaseolin data also provided evidence for a center of domestication in Jalisco (Gepts 1988).

The identity of the putative region of domestication is of particular interest to understanding the adaptation of Mesoamerican common bean to biotic and abiotic environmental conditions. The domestication area is located between the Transverse Neovolcanic Axis to the south and the southern edges of the Sierra Madre Occidental and Altiplano Mexicano to the north. Altitudes of the different wild populations that are part of the domestication group range from 1400 to 2100 m. The climate of this region is characterized as subtropical (temperature of the coldest month between 5 and 18°C), sub-humid (between 4 and 6 mo of humidity), and semi-warm (average annual temperature between 18 and 22°C) (López Soto et al., 2005). The original vegetation changes gradually from a conifer-oak forest at the western end through a dry deciduous forest in the central part to a drier thorn forest at the eastern end of this area (Rzedowski, 1981).

The authors recently conducted an exploration in the states of Colima and Jalisco to visit wild *P. vulgaris* populations in this area, particularly the westernmost wild population implicated in the Mesoamerican domestication of common bean. A number of findings resulted from this exploration. First, all of the wild bean populations that had been collected in years past in this region are still in existence. This is particularly the case for the westernmost population of the putative domestication area just mentioned. This population, located near the town of Mascota, Jalisco, was collected by D.G. Debouck in 1978. Second, many of the wild bean populations are actually more extensive than what can initially be perceived as shown in Fig. 2. To gauge the actual size of a population, a more extensive local survey needs to be conducted. Third, 13 additional wild bean populations not yet included in germplasm banks (as far as we can tell) were identified (Fig. 1). Thus, wild *P. vulgaris* populations are in a good state of conservation.

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Figure 1. Location of the presumed Mesoamerican domestication area and distribution of newly identified wild *Phaseolus vulgaris* populations in the states of Colima and Jalisco, Mexico. Large (red) dots: presumed wild beans ancestral to the Mesoamerican domesticated gene pool. Smaller (green) dots: other wild bean populations. Flags (yellow): newly identified populations (December 2008).



Figure 2. Distribution of plants (white flags) in a previously undescribed wild bean population encountered in December 08. The horizontal white bar in the left lower corner represents 25 m. The aerial photo shows an extensive distribution of this population. However, the actual boundaries of the population could not be defined because of time limitations.