'PINTO SALTILLO' ADOPTION EFFECT ON DRY BEAN YIELD AND DIVERSITY CONSERVATION IN DURANGO, MÉXICO

Jesús López-Hernández, Rigoberto Rosales-Serna and Horacio González-Ramírez

Campo Experimental Valle del Guadiana, INIFAP. km 4.5 Carretera Durango-El Mezquital, C. P. 34170. Durango, México. Tel: 618-8260426, ext. 205, Fax: 618-8260433
e-mail: lopez.jesus@inifap.gob.mx

INTRODUCTION. Since 2006, when the government seed distribution program was implemented in Durango (Pajarito and Rosales, 2007), massive adoption of Pinto Saltillo bred cultivar has been occurring. Higher seed yield, grain market acceptance, seed coat darkening tolerance, and preferred prices had a significant influence in Pinto Saltillo adoption. The objective of the study was to evaluate the effect of Pinto Saltillo adoption on the grain yield average and the dry bean genetic diversity level in the State of Durango, México.

MATERIALS AND METHODS. A total of 100 random samples were taken from 2006 to 2008 in the main dry bean production areas in Durango, México. Sampled areas included Los Llanos, Valle del Guadiana, Canatlán, and Poanas. For each year, sampled plots were randomly located across dry bean production areas as georeferenciated points. Plots were visited after sowing and contact was established with the farmers for data collection about cultivars planted. Field trips were performed trough the crop season and morphological and agronomic traits were registered to corroborate cultivar identity under field conditions. Four sub-samples, consisting in two rows 5 m long and 76 cm apart, were randomly harvested at maturity in each plot for yield determination. Field sub-samples were sun dried, threshed and then the grain was weighed. Cultivar characterization was made considering seed traits recommended in *Phaseolus vulgaris* guidelines for the conduct of tests for distinctness, uniformity and stability (SNICS, 2001). Cultivar identification was made comparing plant and seed traits with those observed in main cultivars grown in Durango, such as: Pinto Saltillo, Negro San Luis, Pinto Villa, Flor de Mayo Media Oreja, and Canario. When difficulties were observed for cultivar identification, the seed's commercial class was used as a grouping trait. The frequency and seed yield for each commercial class and cultivar were then computed.

RESULTS AND DISCUSSION. Increments were observed in Pinto Saltillo frequency from 1 in 2006 to 21 in 2008, in contrast to results observed for Pinto Villa and black seeded cultivars. Other cultivars and seed classes observed during sampling period were Canario (small, yellow seeds), Pinto Nacional, Flor de Mayo (pink seeds), and Flor de Junio (pink striped seeds). Pinto Saltillo showed high yield variation among locations from 89 kg ha^{-1} (Amado Nervo, Dgo.) during 2008 to 2 062 kg ha^{-1} (Pánuco de Coronado, Dgo.) in 2007. Variation was also observed for average seed yield registered by Pinto Saltillo from 582 kg ha^{-1} in 2008 to 1 086 kg ha^{-1} in 2007 (Table 1). Variations registered in seed yield resulted from marginal lands sowings, hail damage and low density plantings observed in sampled plots. Other high yielding cultivar was Negro San Luis, mainly planted in sites with higher annual rain records (450-500 mm), such as southern Cuencamé and Guadalupe Victoria. Flor de Mayo and Canario registered high yields during 2006 due to good distribution of the rains and long-duration of the growing season. Yield average observed in 2008 was lower than those observed in 2006 and 2007 due to heavy rains, flooding and maturity delay observed in several dry bean plots.

In spite of abovementioned problems, in some locations Pinto Saltillo showed higher yields than the average and maintained commercial acceptance in Durango and other domestic markets. Considering

market class as a grouping criterion, Pinto was the most popular seed type planted in Durango during 2006, 2007 and 2008. Three main cultivars were found in this class: Pinto Saltillo, Pinto Villa and Pinto Nacional. Other cultivars and commercial classes found were Negro San Luis (rounded shiny black), Canario, and Flor de Mayo. Some commercial classes planted traditionally in Durango (such as Bayo, Río Grande, Bayo Rata) were not found in the samples. A reduction in frequency was also observed for Pinto Villa due to its accelerated seed coat darkening related to low grain prices. Rapid cultivar adoption registered for Pinto Saltillo was promoted by the government seed distribution program, higher seed yield, seed coat darkening tolerance, grain market acceptance, and preferred prices.

CONCLUSIONS. The rapid adoption of Pinto Saltillo has contributed to increase seed yield, in some areas, and grain quality but it has reduced the genetic diversity in Durango, México.

Table 1. Yield observed for dry bean seed classes and cultivars planted in Durango, México, 2006-2008.

Seed Class/Cultivar	(n)	Yield (kg ha^{-1}) Minimum	Maximum	Average
	2006			
Pinto Villa	12	372	1761	878
Negro	13	309	2304	1309
Flor de Mayo	3	1059	1923	1404
Canario	3	945	1582	1216
Flor de Junio	1	483	483	483
Pinto Saltillo	1	993	993	993
Average	Sum = 33	694	1508	1047
	2007			
Pinto Saltillo	11	214	2062	1086
Negro	10	476	1982	1120
Pinto Villa	5	806	1474	1081
Flor de Mayo	4	170	830	580
Pinto Nacional	3	1044	1428	1177
Canario	2	555	1126	841
Flor de Junio	1	399	399	399
Average	Sum= 36	523	1329	898
	2008			
Pinto Saltillo	21	89	1599	582
Negro San Luis	4	399	855	569
Pinto Nacional	3	107	582	350
Canario	2	90	211	151
Flor de Mayo	1	547	547	547
Average	Sum= 31	246	759	440

LITERATURE CITED

Pajarito R., A. and R. Rosales S. 2007. Adoption program of Pinto Saltillo bred cultivar in Durango, México. Ann. Rep. Bean Improv. Coop. (BIC) 50: 203-204.

SNICS (Servicio Nacional de Inspección y Certificación de Semillas). 2001. Guía técnica para la descripción varietal. Frijol (*Phaseolus vulgaris* L.). México. 21 p.