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The characterization of germplasm based on environmental conditions of each collecting site by using GIS may help to understand the genetic variability of germplasm collections as well as associations with ecological adaptation. Ecogeographic analysis is needed to develop any conservation plan regarding distribution and representativeness. The genetic variability of domesticated species of *Phaseolus* spp. is well represented in germplasm banks. However, there is a deficit of seed from wild species and these accessions are poorly documented. The objective of this study was to determine the climatic adaptation of wilds species of *Phaseolus* throughout México.

The germplasm included 29 species and two subspecies of *Phaseolus* belonging to the germplasm bank of the Centro de Biotecnología Genómica-IPN at Reynosa, México. Sites of collection were geo-referenced by calculating latitude and longitude coordinates based on passport collection data. Data included 101 site coordinates matrix describing (i) climatic variables: monthly average temperature and precipitation; elevations (WorldClim, Hijmans *et al*., 2005); (ii) photoperiod (NOAA Solar calculator, http://www.esrl.noaa.gov/gmd/grad/solcalc/index.html); and (iii) climatic type (Medina-García *et al*., 1998). The environment information was obtained with the DIVA-GIS software ver. 7.1.7 (Hijmans *et al*., 2004; http://www.diva-gis.org).

Sites of collection (Table 1) represent the greatly natural geographic range of adaptation and distribution of the genus. The general sort of environmental features included photoperiod of 11.68 to 14.23 h; 8 to 3083 masl; mean annual temperatures ranged from 12.07 to 26.96 ºC; mean annual rainfall of 10.33 to 202.68 mm. The species show preferences for subtropical and tropical climates with arid to humid conditions. Subtropical sub-humid temperate climate included the most of species (11) followed by subtropical arid temperate (9 species). The ecogeographical analysis wild bean collection indicated the great adaptive variability of *Phaseolus* in México which also serves to represent the potential distribution of species, to assist and planning future collection expeditions and perform efficient strategies to acquire, manage, and conserve wild bean genetic resources.

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Table 1. Environmental descriptors obtained from GIS data bases for 29 *Phaseolus* species from México.

Taxon	Photoperiod (h)†			Altitude (m)‡			Mean annual temperature (ºC) §			Mean annual rainfall (mm) ¶			Climate types #
	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean	
P. acutifolius	11.5	14.5	13.0	9	2102	1206	12.1	29.2	20.2	4.5	184.7	54.4	10, 11, 13, 14, 15, 18, 26
P. albescens	11.8	14.1	12.9	1535	2125	1830	9.9	23.5	17.0	12.0	194.5	71.3	11, 15
P. albiviolaceus	11.6	14.4	12.9	322	971	647	15.4	28.5	21.7	12.5	191.5	71.6	13, 19
P. coccineus* subsp. *coccineus	11.8	14.1	12.9	1578	2825	1942	9.9	24.3	17.3	7.8	234.5	83.4	9, 10, 11, 14, 15
P. coccineus* subsp. *striatus	11.8	14.1	12.9	2861	2949	2905	4.9	19.3	12.4	9.5	236.5	86.6	11
P. esperanzae	11.7	14.2	12.9	971	2459	1715	9.7	24.7	17.2	6.0	115.0	43.1	9, 13
P. filiformis	11.4	14.5	13.0	31	2117	1227	12.0	29.3	20.2	2.5	60.3	20.5	9, 13
P. glabellus	11.7	14.2	12.9	170	1470	661	16.4	28.3	22.2	39.3	331.3	128.6	11, 19, 27
P. gladiolatus	11.6	14.3	12.9	2023	2023	2023	9.5	25.3	17.4	10.0	95.0	42.7	9
P. laxiflorus	11.8	14.1	12.9	1691	1691	1691	11.9	26.7	19.7	4.0	206.0	74.6	15
P. leptostachyus	11.8	14.1	12.9	2020	2165	2093	8.3	20.9	15.0	15.0	249.0	90.4	11
P. lunatus	11.7	14.1	12.9	8	358	133	19.4	30.3	24.6	25.0	261.0	103.8	26, 27, 28
P. maculatifolius	11.5	14.5	13.0	1386	1386	1386	10.9	26.8	18.6	14.0	111.0	46.5	9
P. maculatus	11.6	14.3	12.9	741	3083	2010	8.3	24.9	16.6	6.5	108.3	43.4	9, 11, 13
P. macvaughii	11.9	14.0	12.9	14	14	14	21.3	33.3	27.4	1.0	253.0	74.2	27
P. micranthus	11.8	14.2	12.9	530	1031	707	17.1	30.0	23.6	5.3	320.7	105.1	27
P. microcarpus	11.5	14.5	13.0	1334	1420	1377	12.6	29.8	20.9	2.5	107.5	32.7	13, 14
P. nodosus	11.8	14.1	12.9	1716	1716	1716	11.1	24.7	18.2	3.0	173.0	58.8	15
P. novoleonensis	11.4	14.6	13.0	1350	1639	1543	10.5	25.4	17.6	16.0	170.7	61.7	10
P. oligospermus	11.9	13.9	12.9	1203	1203	1203	15.4	28.1	21.9	12.0	248.0	98.0	23
P. palmeri	11.4	14.5	13.0	2356	2356	2356	7.4	27.1	16.8	18.0	75.0	38.0	9
P. parvifolius	11.9	14.0	12.9	2280	2280	2280	8.1	19.0	13.9	28.0	337.0	134.7	11
P. pedicellatus	11.7	14.2	12.9	2238	2238	2238	7.4	20.6	14.4	19.0	229.0	85.5	11
P. pluriflorus	11.7	14.2	12.9	2165	2165	2165	7.5	19.1	13.7	23.0	320.0	111.2	11
P. purpusii	11.6	14.4	12.9	2157	2157	2157	8.5	25.1	16.8	2.0	69.0	28.1	9
P. rotundatus	11.8	14.1	12.9	1705	2072	1908	9.1	25.9	17.7	5.7	193.3	59.2	10, 11, 15
P. vulgaris	11.8	14.1	12.9	964	2038	1538	12.6	27.2	20.2	10.4	236.0	87.3	11, 15, 19, 23, 27
P. xanthotrichus	11.9	13.9	12.9	1386	1386	1386	13.3	26.6	20.2	8.0	294.0	110.3	23
P. xolocotzii	11.9	14.0	12.9	1567	1567	1567	14.5	27.7	21.6	2.0	208.0	74.7	15
P. zimapanensis	11.6	14.3	12.9	1342	1768	1555	11.3	26.5	18.9	10.0	124.5	47.4	9, 10
Mean	**11.7**	**14.2**	**12.9**	**8**	**3083**	**1453**	**12.1**	**26.9**	**19.5**	**10.4**	**204.6**	**73.2**	

†, Mean monthly calculated on NOAA Solar Calculator (National Oceanic and Atmospheric Administration, http://www.esrl.noaa.gov/gmd/grad/solcalc/index.html).
‡, Hijmans *et al*. (2005).
§, ¶, Mean monthly based on series from 1950 to 2000 (Hijmans *et al*., 2005).
Climate types description (Medina-García *et al*., 1998).