GENETIC VARIABILITY IN LIMA BEAN GENOTYPES (*PHASEOLUS LUNATUS*) FROM RIO GRANDE DO SUL, BRAZIL

Gilberto A Peripolli Bevilaqua[1], Violeta Bachieri Duarte[2], Regis Araujo Pinheiro[1]

[1]Embrapa Clima Temperado, BR 392, km 78, CxP 408, Pelotas, RS, Brazil; [2]Cooperativa Bionatur Sementes, Candiota, RS, Brazil. gilberto.bevilaqua@embrapa.br

INTRODUCTION: The introduction of alternative crops dual-purpose in order to produce biomass and grain in family-based agriculture is a fundamental strategy in sustainable agriculture. The plant is well suited to complex system, characteristic of family farming, defined as sequential arrangements or consortia of herbaceous, shrub and tree species in different strata (HENZ, 2009). This practice aims to disseminate experiences to enrich the diet of the population, currently restricted to little diversity of grains and cereals, with quality products.

The lima beans or fava beans, leguminous plant of the Fabaceae family, is characterized by its genetic diversity, high adaptability and productivity for being a kind of dual-purpose and can be used in human food, animal and green manure. In Brazil, the production of this species is concentrated in the northeast, where it is grown intercropped with maize, cassava, castor or tropical grasses, using them as a support (AZEVEDO et al, 2003). However in temperate region is great variability of this kind which can become an economically viable alternative.
The aim of the study was to describe the genetic and phenotypic variability of lima bean genotypes from temperate region.

MATERIAL AND METHODS: Embrapa Temperate Climate has a germplasm bank of lima beans composed of 70 cultivars collected throughout the southern region of Brazil and some coming from the northeast. These genotypes have been evaluated over the past few years and show a large variation between the grains, cycle and size. The soil where the genotypes were evaluated Haplaquult is typical of floodplains, presenting poorly drained and low fertility. After preliminary analysis of the soil with limestone correction was performed, and adding organic compost, rock phosphate powder and granodiorite rock, manually entered. For installation of observation units were sown in november, four lines of each variety, 6m long, spaced 0.50 m apart at a density 2 to 3 plants m^{-1}.

RESULTS AND DISCUSSION

The grain types showed high variability expressed for size and coat color, as showed in Figure 1. The grain production ranged of 2 to 7 ton ha^{-1}, and the red Canguçu variety (G1), showed highly significant values in relation to other cultures, which can be used in summer, as cowpea (*Vigna unguiculata*).

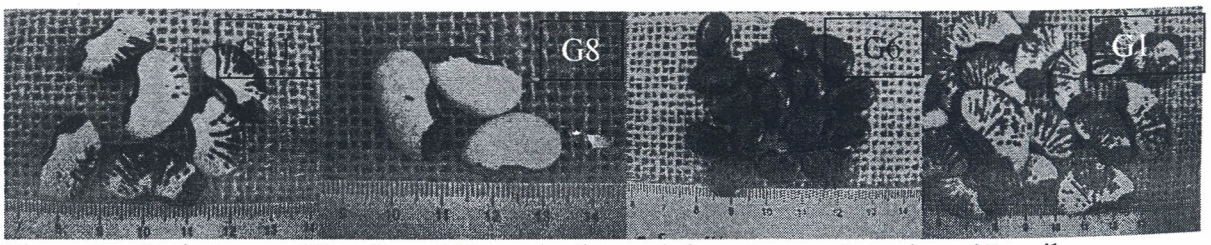

Figure 1 – Grain types of lima bean (*Phaseolus lunatus*) from temperate region of Brazil.

The vast majority of the varieties analyzed showed indeterminate growth habit. The date of flowering occurred between 90 and 98 days after emergence, extending to the beginning of

winter, in some varieties. Another aspect observed was the forage potential of the later varieties, due to its high strength and vegetative growth that lasted until the month of june. The flowering in black Canguçu (G11) and red Canguçu (G1), was considered late. The G6 variety were classified as early. The maturation of pods occurred between 126 and 140 days after emergence.

Table 1. Seed caracterstics in 27 lima bean genotypes (*Phaseolus lunatus*).

Genotypes	Background collor	Pattern collor	2ª pattern collor	Coat	Shape
G1	White	red	absent	9	12
G2	white	Purple red	absent	9	12
G3	white	Purple red	absent	9	12
G4	white	Dark brown	absent	9	12
G5	white	Purple red	absent	6	12
G6	Purple red	absent	absent	0	8
G7	white	red	absent	9	12
G8	white	red	absent	4	7
G9	white	Purple red	absent	9	10
G10	white	Purple red	absent	9	10
G11	withe	Black	absent	13	7
G12	white	Dark brown	absent	10	6
G13	white	absent	absent	0	7
G14	white	Dark brown	absent	8	11
G15	white	red	absent	13	10
G16	white	Purple red	absent	9	12
G17	gray	brown	black	5	6
G18	gray	brown	black	5	6
G19	gray	brown	black	5	6
G20	gray	brown	black	5	6
G21	gray	brown	black	5	6
G22	gray	brown	black	5	6
G23	gray	brown	black	5	6
G24	gray	brown	black	5	6
G25	gray	black	Absent	11	6
G26	white	brown	absent	10	6
G27	gray	black	absent	5	6

*Coat color and seed shape pattern according IPGRI (2001).

In some cases, the botanical descriptors used for seeds weren't efficient to differentiate the genotypes, as observed in the group G17 to G24. In this case is necessary to use complementary the plant descriptors.

CONCLUSION: the lima beans is a species with high genetic and phenotypic variability, very promising for use in intercropping diversified systems due to its versatility; the seeds botanical descriptors don't are effective to differentiate the genotypes.

REFERENCES: Azevedo, J.N.; Franco, L.J.D.; Araújo, R.O.C. Composição química de sete variedades de feijão-fava. Teresina, PI: Embrapa Meio-Norte, 2003. 4p. (Embrapa Meio-Norte. Comunicado Técnico, 152.)

IPGRI. Descritores de *Phaseolus lunatus*. Roma: International Plant Genetic Resources Institute, 2001. 42p.

Henz, T. Sistemas Agroflorestais e Agrobiodiversidade: Relatos do Grupo de Agroecologia da UFPel. Revista Brasileira de Agroecologia, 2009.