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Morphological divergence among progeny of *Macroptilium lathyroides* accessions from the semi-arid region of Pernambuco, Brazil

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Introduction

Macroptilium is a legume genus with approximately 20 species, usually annual or biennial, herbaceous and distributed mainly in the Americas. It is widely used as a forage resource in grasslands and usually fixes atmospheric N.

Martins et al. (2001) indicated that half-sib family selection with progeny testing is the most common plant breeding method used in Brazil. In the scientific literature, however, there are few studies dedicated to *Macroptilium* spp.

This study evaluated morphological divergence among *Macroptilium* spp. progeny from accessions collected in 4 counties located in the semi-arid region of Pernambuco State, NE Brazil.

Methods

The experiment was carried out at the Animal Science Department of the Federal Rural University of Pernambuco (UFRPE), NE Brazil. Accessions of *Macroptilium lathyroides* were collected in Bom Jardim, Caetés, Sertânia and Tupanatinga counties, in the semi-arid region of Pernambuco State. Seeds originating from 15 progeny of these accessions were planted and morphological characteristics of the seedlings assessed from October 2012 to January 2013.

Seeds were planted in 20-L pots filled with soil (Ultisol) collected from the 0−20 cm soil layer in Arcoverde, PE. The soil presented the following chemical characteristics: pH (H_2O) = 6.6; Mehlich-I P = 57 mg/dm^3; K^+ = 0.41cmol$_c$/dm^3; Na^+ = 0.25 cmol$_c$/dm^3; Ca^{2+} + Mg^{2+} = 3.65 cmol$_c$/dm^3; Ca^{2+} = 2.9 cmol$_c$/dm^3; Al^{3+} = 0.0 cmol$_c$/dm^3; H^++Al^{3+} = 2.28 cmol$_c$/dm^3; organic C = 6.11 g/kg; soil organic matter = 10.53 g/kg. No lime was added. Before planting, seeds were scarified with sulphuric acid for 10 min.

A complete randomized design was used with 3 replications. Treatments were different accessions of *Macroptilium lathyroides*. The following response variables were assessed: average plant height (from ground level to the tallest leaf); leaf and leaflet dimensions (length and width; longitudinal and latitudinal measurements using a pachymeter); leaf number per plant; and general aspect of the plant (desirability) using a grading scale ranging from 1 (low) to 5 (high). These evaluations were performed every 45 days. Variance analyses were performed using the software GENES (Cruz 2001). The Scott-Knott test was used ($P<0.05$) for comparing means.

Results and Discussion

Only plant height, leaf number and desirability showed any variation between accessions ($P<0.05$). Four accessions (#2 from Bom Jardim; #12 from Tupanatinga; #14 and #15 from Caetés) showed highest values. In an evaluation of the legume genera *Calopogonium*, *Centrosema*, *Macrotyloma* and *Macroptilium,* Veasey et al. (1999) observed genetic variability for morphological characteristics within the *Macroptilium* genus. Garcia et al. (2003) assessed the genetic variability of *Macroptilium erythroloma* in Rio Grande do Sul, Brazil, and used a protein polymorphism test to reveal greater similarity among individuals from the same population than between populations, indicating populations with genetic activity.

Progeny presented heritability estimates ranging from 6.47 to 59.6% for leaflet width and plant height, respectively (Table 1). These heritability values are of low to medium magnitude, indicating that these plant responses may be highly affected by the environment.

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Table 1. Morphological traits and their estimated heritability of 15 *Macroptilium lathyroides* accessions collected in the semi-arid region of Pernambuco State, Brazil.

Accessions	PH[1]	LL	LW	LLL	LLW	LN	Des
			cm			N°	
1(BJ)[2]	64.98b[3]	5.67a	5.02a	3.16a	2.04a	9.85b	2.62b
2 (BJ)	105.83a	6.09a	5.83a	3.47a	2.30a	19.88a	3.94a
3 (BJ)	66.55b	4.88a	4.18a	2.78a	1.92a	6.85b	2.25b
4 (BJ)	79.97a	5.68a	4.94a	3.34a	2.15a	12.36b	2.94b
5 (BJ)	85.44a	4.92a	4.15a	3.00a	2.24a	10.19b	2.94b
6 (BJ)	81.92a	4.87a	4.48a	2.86a	1.76a	10.66b	3.00b
7 (BJ)	76.61b	4.26a	4.33a	2.62a	1.92a	10.07b	2.92b
8 (BJ)	66.01b	6.11a	5.34a	3.42a	2.39a	9.59b	2.95b
9 (BJ)	84.5a	5.79a	4.59a	3.11a	2.11a	8.94b	2.83b
10 (BJ)	65.58b	5.15a	4.87a	2.83a	2.12a	10.94b	2.69b
11 (BJ)	65.92b	5.66a	5.15a	2.87a	2.00a	11.91b	3.03b
12 (T)	97.33a	5.86a	4.69a	3.58a	1.92a	20.58a	3.66a
13(C)	66.33b	3.18a	3.05a	2.02a	1.47a	12.41b	2.66b
14(C)	95.00a	5.63a	5.26a	3.22a	2.11a	16.66a	3.50a
15 (S)	97.25a	4.87a	5.01a	2.96a	2.33a	17.14a	3.55a
Mean	78.90	5.22	4.75	3.01	2.06	12.20	3.01
CV(%)	18.23	16.36	15.87	15.36	17.36	35.47	17.28
h^2	59.60	52.26	45.80	39.74	6.47	55.35	48.67

[1]PH = plant height; LL = leaf length; LW = leaf width; LLL = leaflet length; LLW = leaflet width; LN = leaf number; Des = desirability (grading scale ranging from 1 to 5, where 1 is less desirable and 5 more desirable).
[2]BJ = Bom Jardim county; T = Tupanatinga county; C = Caetés county; S = Sertânia county.
[3]Means followed by the same letter within columns do not differ by Scott-Knott test (P>0.05).

Conclusion

The variation in plant height, leaf number and desirability among these accessions of *Macroptilium lathyroides* indicates that there is merit in collecting further germplasm of this species and determining if these characteristics can be reflected in increased dry matter production and forage quality.

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