Universidade Federal Rural do Semi-Árido
Pró-Reitoria de Pesquisa e Pós-Graduação
https://periodicos.ufersa.edu.br/index.php/caatinga

ISSN 0100-316X (impresso)
ISSN 1983-2125 (online)
http://dx.doi.org/10.1590/1983-21252022v35n215rc

BIOMETRICS OF MULUNGU SEEDS FROM DIFFERENT MOTHER PLANTS IN THE SEMI-ARID REGION OF PARAÍBA, BRAZIL[1]

ANA CAROLINA BEZERRA[2*], JOSÉ FLÁVIO CARDOSO ZUZA[3], LUANA DA SILVA BARBOSA[2], CAMILA FIRMINO AZEVEDO[4], EDNA URSULINO ALVO[2]

ABSTRACT - *Erythrina velutina* Willd. (Fabaceae) is drought tolerant and has the potential for reforestation in the semi-arid region. The response of its seeds to the environmental conditions of each production area influences their size, weight, physiological potential, and health. Thus, this study aimed to assess how the environmental conditions of the different regions of Paraíba influence the biometric characteristics of *E. velutina* seeds. Seeds from 19 mother plants collected in Juru, Sumé, Araçagi, Guarabira, São João do Cariri, Esperança, Queimadas, Cuité, Boa Vista, and Areia, in the state of Paraíba, Brazil, were used in this study. Water content, thousand-seed weight, and biometric characteristics (length, width, and thickness) were determined in the seeds from each location. The water content ranged from 3.11 to 6.84%, while the thousand-seed weight was higher in mother plants grown in Sumé and Cuité. Seed length ranged from 9.00 to 16.84 mm, being higher in mother plants grown in Juru. Seed thickness and width ranged from 5 to 12.99 mm and were larger in mother plants from Cuité. Temperature, humidity, solar radiation, wind, and precipitation caused variations in the length, width, and thickness of *E. velutina* seeds, with higher means observed in mother plants grown in Cuité.

Keywords: Morphometry. *Erythrina velutina* Willd. Fabaceae. Forest species.

BIOMETRIA DE SEMENTES DE MULUNGU DE DIFERENTES PLANTAS MATRIZES DO SEMIÁRIDO PARAIBANO

RESUMO - *Erythrina velutina* Willd. (Fabaceae) é tolerante à seca e com potencial para reflorestamento no semiárido, cuja resposta dessas sementes às condições ambientais de cada área de produção influenciam no seu tamanho, peso, potencial fisiológico e na sua sanidade. Desta forma, objetivou-se avaliar como as condições ambientais das diferentes regiões paraibanas influenciam nas características biométricas de sementes de *E. velutina*. Na pesquisa foram utilizadas sementes de 19 plantas matrizes coletadas em Juru, Sumé, Araçagi, Guarabira, São João do Cariri, Esperança, Queimadas, Cuité, Boa Vista e Areia, todas no estado da Paraíba, Brasil. Nas sementes de cada localidade foram determinados: o teor de água, peso de mil sementes e as características biométricas (comprimento, largura e espessura). O teor de água variou de 3,11 a 6,84% e o peso de mil sementes foi maior naquelas das plantas matrizes 2 (Sumé) e 14 (Cuité). O comprimento das sementes variou de 9,00 a 16,84 mm e foi maior naquelas da matriz 1, localizada no município de Juru. A espessura e largura das sementes variou de 5 a 12,99 mm e foram maiores na planta matriz 14 (Cuité). A temperatura, umidade, radiação solar, vento e precipitação causaram variação no comprimento, largura e espessura de sementes de *Erythrina velutina* Willd., com maiores médias na planta matriz 14 localizada no município de Cuité.

Palavras-chave: Morfometria. *Erythrina velutina* Willd. Fabaceae. Espécie florestal.

[*]Corresponding author
[1]Received for publication in 09/09/2020; accepted in 09/16/2021.
Paper extracted from the master's dissertation of the first author
[2]Department of Plant Science, Universidade Federal da Paraíba, Areia, PB, Brazil; acbezerra78@gmail.com – ORCID: 0000-0001-5071-7809; luanabarbosassb@gmail.com – ORCID: 0000-0001-6876-665X; ursulinoalves@hotmail.com – ORCID: 0000-0002-7709-3204.
[3]Departament of Soil, Universidade Federal de Santa Maria, Santa Maria, RS, Brazil; jose_flaviocardoso@hotmail.com – ORCID: 0000-0003-2191-9350.
[4]Department of Agroecology and Agriculture, Universidade Estadual da Paraíba, Lagoa Seca, PB, Brazil; camfiraze@bol.com.br – ORCID: 0000-0002-5614-9774.

INTRODUCTION

Sexually propagated forest species develop a genetic basis for future plant populations, but seed dormancy in many native species makes nursery planning and seedling production for reforestation programs difficult (MATOS; ATAIDE; BORGES, 2015).

The response of seeds to the environmental conditions of each production area influences their size, weight, physiological potential, and health (MARCOS FILHO, 2015), as reported for *Mimosa bimucronata* (DC) O. Kuntze, with a length of 0.71 mm, width of 1.50 mm, and thickness of 0.39 mm (MELO et al., 2018), and *Delonix regia* (Bojer) Raf., with variations in mass, number of seeds per fruit, and seed length and width (DUTRA et al., 2017b). In this sense, studies that correlate the biometric characteristics of seeds with variations in environmental conditions are of paramount importance.

The biometrics of native seed can provide useful information to (i) distinguish different species of the same genus (SANTOS et al., 2017), (ii) investigate seedling dispersal and establishment (CARVALHO; NAKAGAWA, 2012), (iii) allow the conservation and exploitation of species (GUSMÃO; VIEIRA; FONSECA JÚNIOR, 2006), (iv) enable genetic breeding programs (GONÇALVES et al., 2013), and (v) verify the presence of genetic variability of different seed lots necessary for in situ and ex situ conservation programs (LEÃO et al., 2018).

Erythrina velutina Willd. (Fabaceae) is a deciduous tree species, 12 to 15 m high (GILBERT; FAVORETO, 2012), widely occurring in the Caatinga, Atlantic Forest, and Cerrado (SANTOS et al., 2013). Its flowers are orange-red, flowering occurs from August to December, the fruit is simple, dry, and of the legume type, with one to four seeds per pod (AZEVEDO; BRUNO; QUIRINO, 2014).

This species has been used as ornamental plants (LORENZI; MATOS, 2008), in popular medicine (MACÊDO et al., 2018), and degraded area recovery programs due to its mechanisms of tolerance or adaptation to abiotic stresses, especially thermal, saline, and water stresses (RIBEIRO et al., 2014).

Thus, this study aimed to assess how the environmental conditions of the different regions of Paraíba influence the biometric characteristics of *E. velutina* seeds.

MATERIAL AND METHODS

Collection

Seeds of *E. velutina* were collected from 19 mother plants located in Juru, Sumé, Araçagi, Guarabira, São João do Cariri, Esperança, Queimadas, Cuité, Boa Vista, and Areia, state of Paraíba, Brazil (Figure 1).

The altitude and average temperature, humidity, wind, radiation, and rainfall data for 2017 were obtained through the website of the National Institute of Meteorology (Table 1).

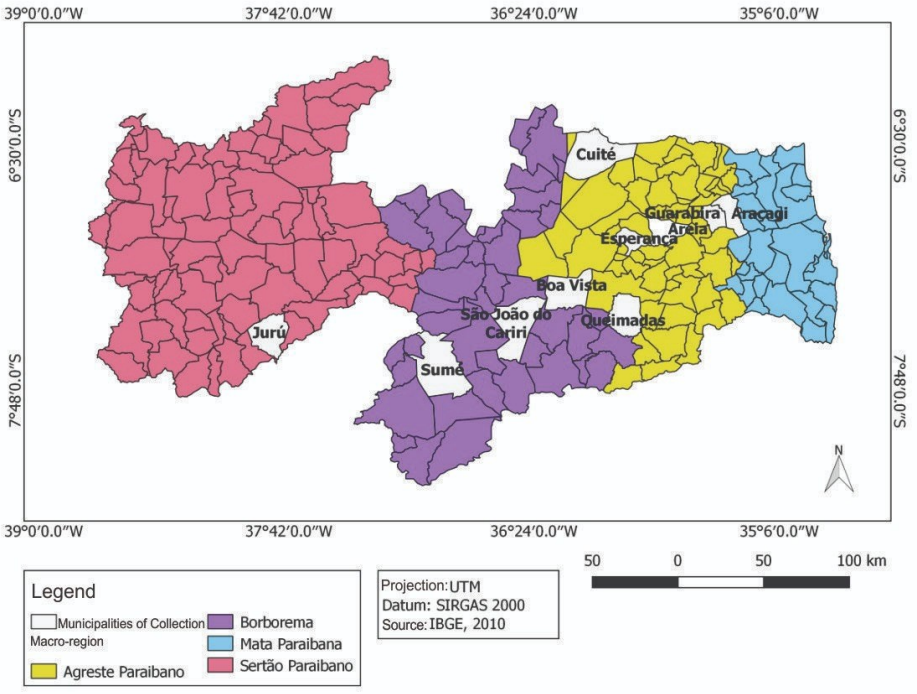

Figure 1. Location map of the collection areas of *Erythrina velutina* Willd seeds.

Table 1. Altitude, average temperature, relative humidity, wind, radiation, and rainfall data at the sites of occurrence of mother plants of *Erythrina velutina* Willd in 2017.

Municipality	Mother plant	Altitude (m)	Temperature (°C)	Humidity (%)	Wind (m/s)	Radiation (kJ/m^2)	Rainfall (mm)
Juru	1	657	28.1	43	3.4	1703.5	490.2
Sumé	2	548	25.1	59	3.2	1571.1	567.6
Araçagi	3	71	22.2	82	4.2	1189.6	398.4
Guarabira	4	128	22.2	82	4.2	1189.6	398.4
São João do Cariri	5	468	25.7	64	3.2	1482.1	114
Esperança	6	600	22.2	82	4.2	1189.6	398.4
	7	625	22.2	82	4.2	1189.6	398.4
Queimadas	8	496	23.6	77	3.5	1530.8	550.6
	9	496	23.6	77	3.5	1530.8	550.6
	10	495	23.6	77	3.5	1530.8	550.6
	11	496	23.6	77	3.5	1530.8	550.6
	12	500	23.6	77	3.5	1530.8	550.6
Cuité	13	605	22.2	82	4.2	1189.6	398.4
	14	614	22.2	82	4.2	1189.6	398.4
Boa Vista	15	482	25.7	64	3.2	1482.1	114
	16	485	25.7	64	3.2	1482.1	114
	17	487	25.7	64	3.2	1482.1	114
	18	488	25.7	64	3.2	1482.1	114
Areia	19	556	22.2	82	4.2	1189.6	398.4

The seeds were collected, taken to the Laboratory of Seed Analysis of the Center for Agricultural Sciences of the Federal University of Paraíba (LAS/CCA/UFPB), manually processed and homogenized, and separated according to each mother plant.

After processing, the length, width, and thickness of a random sample of 100 seeds from each location were determined with a digital caliper. The water content was determined according to Brasil (2009), using four subsamples of 10 seeds of each mother plant, and the thousand-seed weight was determined using eight replications with 100 seeds of each other plant, according to the Rules for Seed Testing.

Statistical analysis

The data were analyzed using descriptive statistics (mean, minimum and maximum values, variance, standard deviation, and coefficient of variation). In addition, the data were subjected to analysis of variance, and the grouping of means was performed using the Scott-Knott test at 5% probability, when there was significance in the F-test, calculated by the software Sisvar 5.6 (FERREIRA, 2011).

The water content of *E. velutina* seeds ranged from 3.11 to 6.84% in most mother plants and was higher in the mother plant 18 (10.15%), located in the municipality of Boa Vista. The thousand-seed weight differed ($p<0.01$) and was higher in the mother plants 2 (56.97 g) and 19 (56.18 g), located in Sumé and Areia, respectively, and lower in the mother plant 4 (29.12 g), located in Araçagi (Table 2).

E. velutina seeds are classified as orthodox, which can be subjected to dehydration of up to 5% (BEWLEY et al., 2013). Thus, the variation in seed moisture content was low and is probably due to the low water permeability of the seed coat, blocking the exchange of moisture between the seed and the environment. The water content of different lots should not exceed 2%, as wetter seeds are more sensitive to deterioration (CARVALHO; NAKAGAWA, 2012). In addition, a low variation in water content is important for standardizing assessments and consistent results (MARCOS FILHO, 2015).

The water content in two lots of *E. velutina* seeds from different locations ranged from 7.4 to 7.6% in a study conducted by Bento et al. (2010). Also, the water content in *E. velutina* seeds from eight mother plants located in Areia-PB ranged from 7.5 to 8.7% (GUEDES et al., 2009).

RESULTS AND DISCUSSION

Table 2. Water content and thousand-seed weight of *Erythrina velutina* Willd. from different mother plants and locations in the state of Paraíba, Brazil.

Collection site	Mother plant	Water content (%)	Thousand-seed weight (g)
Juru	1	4.51 ± 1.04 b	41.34 ± 10.65 e
Sumé	2	5.59 ± 2.49 b	56.97 ± 6.15 a
Araçagi	3	5.16 ± 1.33b	43.63 ± 6.10 d
Guarabira	4	5.45 ± 2.55 b	50.05 ± 1.23 b
São João do Cariri	5	6.84 ± 0.78 b	44.09 ± 3.82 c
Esperança	6	3.90 ± 1.35 c	38.50 ± 4.58 g
	7	5.67 ± 0.92 b	34.54 ± 0.80 j
Queimadas	8	4.12 ± 2.04 c	42.50 ± 3.21 d
	9	3.11 ± 1.71 d	47.76 ± 2.02 b
	10	4.07 ± 0.60 c	39.38 ± 2.29 f
	11	3.86 ± 0.56 c	32.54 ± 5.36 i
	12	5.26 ± 1.38 b	37.26 ± 1.98 h
Cuité	13	10.15 ± 0.75 a	35.56 ± 11.50 i
	14	5.46 ± 2.37 b	56.18 ± 4.79 a
	15	5.18 ± 2.15 b	29.12 ± 1.23 m
Boa Vista	16	6.24 ± 3,94 b	36.58 ± 2.74 i
	17	4.09 ± 2.45 c	30.43 ± 1.93 m
	18	4.72 ± 0.81 b	35.16 ± 1.61 j
Areia	19	3.50 ± 3.53 d	39.43 ± 0.91 f
CV (%)		19.92	3.72

Means followed by the same letter in the columns do not differ from each other by the Tukey test at a 5% probability.

The higher thousand-seed weight of the mother plants 2 and 14 is probably due to the genetic variability among individuals related to differences in the environmental characteristics of both sites where they are inserted. Sumé is located in the micro -region of Western Cariri of Paraíba, with weather marked by high temperatures (average of 25 °C), marked rainfall in 3 to 4 months with annual averages of 567.6 mm in 2017, average radiation of 1571.1 kJ/m^2, and average humidity of 59%. On the other hand, Cuité is located in the micro-region of Curimataú of Paraíba, with a tropical rainy climate marked by mild temperatures with averages of 22.2 °C, very humid in the winter until October, annual averages of 400 mm, average radiation of 1189.6 kJ/m^2, and relative humidity of 82% (Table 1). Moreover, the plant nutritional status, collection time, and fruit maturation stage cannot be disregarded, as these factors may also influence the variability of weight found between mother plants (FREITAS; VIEGAS; LOPES, 2014).

The lower thousand-seed weight in the mother plants 15 and 17 can be attributed to the environmental conditions, as these plants were subjected to less favorable conditions during their formation compared to the mother plants with higher weight, such as higher temperatures and lower precipitation. The metabolic processes occurring during the transfer stage of assimilated compounds between mother plants are affected by temperature (MARCOS FILHO, 2015) and water availability (ZAMAN-ALLAH; JENKINSON; VADEZ, 2011; BISPO et al., 2017), mainly determining seed size, weight, and physiological potential.

The thousand-seed weight in mother plants of *Peltophorum dubium* (Spreng.) Taub ranged from 21.61 to 27.03 g due to both climate and edaphic conditions at the collection sites (MÜLLER et al., 2016). The thousand-seed weight in mother plants of *Poincianella pyramidalis* (Tul.) LP Queiroz ranged from 97.29 to 196.01 g and can be explained by the variety of phenotypes, considering that the seeds were collected in different areas (LIMA et al., 2014).

The seed length of the different mother plants of *E. velutina* ranged from 9 to 16.99 mm, with the mother plants 1 (Juru), 2 (Sumé), 4 (Guarabira), 6 (Esperança), 8, 9, 10, and 12 (Queimadas), 14 (Cuité), 16, 17, and 18 (Boa Vista), and 19 (Areia)

showing the highest percentage in the range from 13 to 14 mm in length and 3 (Araçagi), 5 (São João do Cariri), 7 (Esperança), 11 (Queimadas), 13 (Cuité), and 15 (Boa Vista) showing the highest percentage in the range from 11 to 12.99 mm in length (Table 3).

The seed width ranged from 5 to 12.99 mm, and the mother plants with the highest frequency of distribution in the range from 7 to 8.99 were 1 (Juru), 2 (Sumé), 3 (Araçagi), 4 (Guarabira), 5 (São João do Cariri), 6 (Esperança), 8, 9, 10, and 12 (Queimadas), 13 (Cuité), 16 and 18 (Boa Vista), and 19 (Areia). The mother plants 14, 15, and 17, located in Cuité and Boa Vista, presented the highest frequency of distribution of seeds with widths ranging from 5 to 6.99 mm. The seed thickness ranged from 5 to 12.99 mm and reached the highest value in the mother plant 14 and the lowest value in the mother plant 15, located in Cuité and Boa Vista, respectively (Table 3).

Table 3. Frequency of distribution of biometric assessments (length, width, and thickness, in mm) of *Erythrina velutina* Willd. seeds from different mother plants and locations in the state of Paraíba, Brazil.

Collection site	Mother plant	Length				Width			Thickness		
		Frequency of distribution (%)									
		9-10.9	11-12.9	13-14.9	15-16.9	5-6.9	7-8.9	9-10.99	5-6.9	7-8.9	9-10.9
Juru	1	0.0	32.0	52.0	16.0	2.0	95.0	3.0	17.0	77.0	6.0
Sumé	2	0.0	15.0	8.0	5.0	0.0	76.0	24.0	3.0	75.0	22.0
Araçagi	3	3.0	72.0	25.0	0.0	2.0	75.0	23.0	0.0	9.00	1.0
Guarabira	4	0.0	7.00	83.0	1.0	1.0	78.0	21.0	4.0	96.0	0.0
São João do Cariri	5	1.0	49.0	37.0	13.0	1.0	94.0	5.0	2.0	77.0	3.0
Esperança	6	1.0	41.0	56.0	2.0	2.0	91.0	7.0	7.0	92.0	1.0
	7	1.0	59.0	4.0	0.0	0.0	1.0	0.0	24.0	76.0	0.0
Queimadas	8	0.0	1.00	65.0	34.0	4.0	96.0	0.0	1.0	99.0	0.0
	9	0.0	6.00	9.0	4.0	0.0	92.0	8.0	0.0	1.0	0.0
	10	0.0	8.00	9.0	2.0	0.0	99.0	1.0	49.0	5.0	1.0
	11	0.0	86.0	14.0	0.0	36.0	64.0	0.0	25.0	75.0	0.0
	12	0.0	11.0	83.0	6.0	26.0	74.0	0.0	22.0	78.0	0.0
Cuité	13	0.0	58.0	42.0	0.0	14.0	86.0	0.0	13.0	87.0	0.0
	14	0.0	1.00	62.0	37.0	0.0	44.0	56.0	1.0	44.0	55.0
Boa Vista	15	1.0	79.0	2.0	0.0	56.0	44.0	0.0	79.0	21.0	0.0
	16	0.0	2.00	76.0	4.0	29.0	71.0	0.0	7.0	93.0	0.0
	17	0.0	42.0	58.0	0.0	95.0	5.0	0.0	29.0	71.0	0.0
	18	0.0	33.0	67.0	0.0	43.0	57.0	0.0	2.0	8.0	0.0
Areia	19	0.0	15.0	82.0	3.0	0.0	93.0	7.0	3.0	97.0	0.0

The longest seed length in the mother plants 1 (Juru), 2 (Sumé), 4 (Guarabira), 6 (Esperança), 8, 9, 10, and 12 (Queimadas), 14 (Cuité), 16, 17, and 18 (Boa Vista), and 19 (Areia) can be explained by the occurrence of adequate conditions of temperature, humidity, solar radiation, wind, and precipitation at the time the seeds were formed, as reported for *B. forficata*, whose longest seed length reached 18.03 mm, and *Caesalpinia ferrea* Mart ex Tul., whose longest seed length reached 12.2 mm (DUTRA et al., 2016).

The higher frequency of distribution of seed width in the range from 7 to 8.99 mm is due to the genotype, which can also be a factor in the variation of biometric characteristics. The species may have genetic diversity among individuals and populations due to its ecological plasticity, as evidenced by the presence of these individuals in different regions. The highest seed thickness in the mother plant 14 and lowest seed thickness in the mother plant 15 can be attributed to variations in the morphological patterns defined during the seed maturation period

since the mother plant will give rise to seeds of varying sizes depending on the availability of resources necessary for their formation, that is, the difference in seed size within the same species may be associated with the environment where the mother plant is inserted (SILVA et al., 2017).

Silva Junior et al. (2012) observed similar results in a morphometry study with *E. velutina* seeds collected in the Caatinga and swamp areas of Pernambuco, with mean values of 10.6 and 13.4 mm for length, 6.3 and 9.2 mm for width, and 6.3 and 7.8 mm for thickness. Similar length, width, and thickness values were found by Bento et al. (2010), who assessed two seed lots of *E. velutina* from semi-arid regions of Rio Grande do Norte and obtained values of 13.0 and 13.4 mm for length, 8.0 and 8.6 mm for width, and 7.8 and 8.1 mm for thickness. Silva et al. (2008) used a lot of *E. velutina* seeds from Paraíba and observed average values of 12.54 for length, 8.15 for width, and 7.66 mm for thickness.

Biometric analysis can provide subsidies for the study of species differentiation, classification of ecological groups, genetic divergences in the same species (FONTENELLE; ARAGÃO; RANGEL, 2007), and the influence in the germination of the species (DUTRA et al., 2016). Thus, variations in the homogeneity observed in the biometric characteristics of *E. velutina* seeds are common in different mother plants, as seeds were influenced by biotic and abiotic factors in each collection region during seed development.

A small variation was observed between the maximum and minimum values for all the assessed characteristics of *E. velutina* seeds, in which the seeds of the mother plant 1 (Juru) had higher length and the mother plant 14 (Cuité) had higher width and thickness. Moreover, the mother plant 14 (Cuité) produced seeds with the highest average length (14.76 mm), width (9.01 mm), and thickness (9.02), while the seeds from the mother plant 11 (Queimadas) had the lowest average length (12.273 mm) and those of the mother plant 15 (Boa Vista) presented the lowest average width and thickness (Table 4).

In general, the standard deviation values of all variables were low. In this sense, the seed length data from the mother plant 5 (São João do Cariri) showed the highest standard deviation, whereas the mother plant 6 (Esperança) had the lowest seed length. Furthermore, the coefficient of variation of the seed length of the mother plant 5 (São João do Cariri) presented the highest value (12.3%), and the seed width of the mother plant 7 (Esperança) stood out with the lowest value (3.8%) (Table 4).

Table 4. Mean, minimum, and maximum values, variance, standard deviation, and coefficient of variation (CV) regarding biometric assessments (length, width, and thickness) of *Erythrina velutina* Willd. seeds from different mother plants and locations in the state of Paraíba, Brazil.

Mother plant	Measurement	Mean	Minimum	Maximum	Variance	Standard deviation	CV (%)
1	Length	13.6	11.73	16.84	1.23	1.11	8.15
	Width	7.94	6.69	9.44	0.22	0.50	6.36
	Thickness	7.51	6.32	9.35	0.44	0.67	8.89
2	Length	13.71	11.83	16.10	0.24	1.25	9.11
	Width	8.64	7.67	9.74	0.33	0.49	5.67
	Thickness	8.56	6.78	9.94	0.52	0.57	6.68
3	Length	12.55	10.24	14.13	0.52	0.72	5.74
	Width	8.57	6.75	9.85	0.32	0.57	6.61
	Thickness	8.37	7.13	9.78	0.27	0.52	6.16
4	Length	14.14	11.12	15.44	0.27	0.84	6.96
	Width	8.64	6.63	10.00	0.71	0.47	5.46
	Thickness	7.63	6.42	8.94	0.22	0.48	6.26
5	Length	13.27	10.8	16.61	2.68	1.64	12.33
	Width	8.05	6.97	9.50	0.29	0.54	6.72
	Thickness	7.60	6.25	9.10	0.46	0.68	8.94
6	Length	13.20	10.50	15.62	0.83	0.12	6.92
	Width	8.22	6.47	9.44	0.3	0.55	6.67
	Thickness	7.75	6.54	9.11	0.22	0.47	6.09

Table 4. Continuation.

Mother plant	Measurement	Mean	Minimum	Maximum	Variance	Standard deviation	CV (%)
7	Length	12.88	10.99	14.66	0.58	0.76	5.91
	Width	7.81	7.13	8.57	0.09	0.29	3.77
	Thickness	7.75	6.55	7.94	0.09	0.3	4.23
8	Length	14.71	12.34	16.43	0.4	0.63	4.3
	Width	7.671	6.59	8.76	0.14	0.38	4.94
	Thickness	7.59	6.82	8.44	0.12	0.35	4.58
9	Length	13.98	11.9	15.24	0.42	0.64	4.61
	Width	8.55	7.66	9.75	0.11	0.34	3.97
	Thickness	7.92	7.09	8.82	0.12	0.35	4.45
10	Length	13.77	11.87	15.44	0.37	0.61	4.41
	Width	7.05	6.13	9.95	0.24	0.49	6.98
	Thickness	8.05	7.11	9.10	0.18	0.42	5.23
11	Length	12.27	11.10	13.82	0.34	0.58	4.75
	Width	7.27	5.84	8.83	0.4	0.63	8.73
	Thickness	7.30	6.02	8.45	0.49	0.49	6.68
12	Length	13.87	11.76	15.65	0.59	0.77	5.55
	Width	7.29	6.45	8.45	0.17	0.41	5.60
	Thickness	7.33	5.73	8.19	0.26	0.51	6.96
13	Length	12.91	11.07	14.6	0.58	0.76	5.89
	Width	7.67	6.11	8.8	0.33	0.58	7.52
	Thickness	7.37	6.14	8.5	0.17	0.42	5.67
14	Length	14.76	12.22	16.45	0.54	0.73	4.96
	Width	9.01	7.67	10.03	0.21	0.46	5.15
	Thickness	9.02	6.87	10.20	0.22	0.47	5.22
15	Length	12.42	10.73	13.94	0.47	0.69	5.52
	Width	6.94	5.42	8.14	0.30	0.55	7.95
	Thickness	6.54	5.65	7.86	0.26	0.51	7.78
16	Length	13.54	11.65	15.38	0.60	0.77	5.7
	Width	7.27	6.3	8.40	0.19	0.43	5.91
	Thickness	7.60	5.96	8.44	0.19	0.44	5.81
17	Length	13.06	11.76	14.52	0.47	0.69	5.26
	Width	6.53	5.78	7.78	0.11	0.33	5.05
	Thickness	7.17	6.55	7.77	0.08	0.28	3.89
18	Length	13.25	11.4	14.84	0.40	0.63	4.79
	Width	7.07	6.17	8.28	0.18	0.42	6.02
	Thickness	7.33	6.20	8.40	0.19	0.43	5.89
19	Length	13.46	14.78	15.38	1.12	1.06	7.85
	Width	8.42	7.36	9.38	0.18	0.42	4.98
	Thickness	7.67	6.86	8.87	0.13	0.37	4.78

The low standard deviation and coefficient of variation for the assessed characteristics indicate that seed sampling was homogeneous, which is probably related to genetically determined traits for the species (DUTRA et al., 2017a). A study related to biometrics with a species from the family Fabaceae showed low values of standard deviation and coefficient of variation (DUTRA et al., 2017b).

The thickness of *D. regia* seeds showed lower variance and standard deviation than length and width, which may characterize little variability, possibly caused by genetic conditions and local environmental variations (DUTRA et al., 2017a). Seed size presents a great influence on the species establishment and dispersion, which is related to competition, predation, and spatial distribution (LUSK; KELLY, 2003).

Moreover, seed classification by size promotes uniformity in seedling emergence and the obtainment of standardized or vigorous seedlings (CARVALHO; NAKAGAWA, 2012), important characteristics for use in recovering degraded areas, commercial planting, and genetic breeding studies.

CONCLUSION

Temperature, humidity, solar radiation, wind, and precipitation caused variations in the length, width, and thickness of *Erythrina velutina* Willd. seeds, with higher averages for the mother plant 14, located in the municipality of Cuité.

REFERENCES

AZEVEDO, C. F.; BRUNO, R. L. A.; QUIRINO, Z. G. M. **Manual de frutos sementes e plântulas de espécies da caatinga**. Brasília: Kiron, 2014. 95 p.

BENTO, S. R. S. O. et al. Eficiência dos testes de vigor na avaliação da qualidade fisiológica de sementes de mulungu (*Erythrina velutina* Willd.). **Revista Brasileira de Sementes**, 32: 111-117, 2010.

BEWLEY, J. D. et al. **Seeds**: physiology of development, germination and dormancy. 3.ed., New York: Springer, 2013. 392 p.

BISPO, J. S. et al. Size and vigor of *Anadenanthera colubrina* (Vell.) Brenan seeds harvested in Caatinga areas. **Journal of Seed Science**, 39: 363-373, 2017.

BRASIL, Ministério da Agricultura, Pecuária e Abastecimento. **Regras para análise de sementes**. Secretaria de Defesa Agropecuária. Brasília, DF: MAPA/ACS, 2009. 395 p.

CARVALHO, N. M.; NAKAGAWA, J. **Sementes:** ciência, tecnologia e produção. 5. ed. Jaboticabal, SP: FUNEP, 2012. 590 p.

DUTRA, F. V. et al. Análise biométrica de frutos e sementes de *Bauhinia forficata* L. **Revista Verde de Agroecologia e Desenvolvimento Sustentável**, 11: 8-12, 2016.

DUTRA, F. V. et al. Biometrical characteristics of fruits and seeds of flamboyant. **Scientia Agraria Paranaensis**, 16: 127-132, 2017b.

DUTRA, F. V. et al. Morfobiometria de frutos e sementes de *Schizolobium amazonicum* Huber ex Ducke. **Agropecuária Técnica**, 38: 58-64, 2017a.

FERREIRA, D. F. Sisvar: a computer statistical analysis system. **Ciência e Agrotecnologia**, 35: 1039-1042, 2011.

FONTENELLE, A. C. F.; ARAGÃO, W. M.; RANGEL, J. H. A. Biometria de frutos e sementes de *Desmanthus virgatus* (L) Willd. nativas de Sergipe. **Revista Brasileira de Biociências**, 5: 252-254, 2007.

FREITAS, V. L. O.; VIEGAS, F. P.; LOPES, R. M. F. Biometria de frutos e sementes, germinação e desenvolvimento inicial de barbatimão (*Stryphnodendron adstringens*). **Revista Floresta**, 44: 21-32, 2014.

GILBERT, B.; FAVORETO, R. *Erythrina* sp. Fabaceae (Leguminosae, Faboideae). **Revista Fitos Eletrônica**, 7:185-197, 2012.

GONÇALVES, L. G. V. et al. Biometria de frutos e sementes de mangaba (*Hancornia speciosa* Gomes) em vegetação natural na região leste de Mato Grosso, Brasil. **Revista de Ciências Agrárias**, 36: 31-40, 2013.

GUEDES, R. S. et al. Resposta fisiológica de sementes de *Erythrina velutina* Willd. ao envelhecimento acelerado. **Semina: Ciências Agrárias**, 30: 323-330, 2009.

GUSMÃO, E.; VIEIRA, F. A.; FONSECA JÚNIOR, E.M . Biometria de frutos e endocarpos de murici (*Byrsonima verbascifolia* Rich. ex A. Juss.). **Cerne**, 12: 84-91, 2006.

IBGE - Instituto Brasileiro de Geografia e Estatística. **Índice de organização: malhas territoriais**. 2010. Disponível em: <https://www.ibge.gov.br/geociencias/organizacao-do-territorio/malhas-territoriais/15774-malhas.html?=&t=downloads>. Acesso em: 01 dez. 2018.

LEÃO, N. V. M. et al. Morphometric diversity

between fruits and seeds of mahogany trees (*Swietenia macrophylla* King.) from Parakana indigenous Land, Pará State, Brazil. **Australian Journal of Crop Science**, 12: 435, 2018.

LIMA, C. R. et al. Qualidade fisiológica de sementes de diferentes árvores matrizes de *Poincianella pyramidalis* (Tul.) LP Queiroz. **Revista Ciência Agronômica**, 45: 370-378, 2014.

LORENZI, H.; MATOS, F. J. A. **Plantas medicinais no Brasil**: nativas e exóticas cultivadas. 2. ed. Nova Odessa, SP: Instituto Plantarum de Estudos da Flora Ltda, 2008. 577 p.

LUSK, C. H.; KELLY, C. K. Interspecific variation in seed size and safe sites in a temperate rain forest. **New Phytologist**, 158: 535-541, 2003.

MACÊDO, M. J. F. et al. Fabaceae medicinal flora with therapeutic potential in savanna areas in the Chapada do Araripe, Northeastern Brazil. **Revista Brasileira de Farmacognosia**, 28: 738-750, 2018.

MARCOS FILHO, J. **Fisiologia de sementes de plantas cultivadas**. 2. ed., Londrina, PR: ABRATES, 2015. 659 p.

MATOS, A. C. B.; ATAÍDE, G. M.; BORGES, E. E. L. Physiological, physical and morpho-anatomical changes in *Libidibia ferrea* ((Mart. ex Tul.) LP Queiroz) seeds after overcoming dormancy. **Journal of Seed Science**, 37: 26-32, 2015.

MELO, L. D. F. A. et al. Biometric characterization and seed germination of giant mimosa (*Mimosa bimucronata* (DC) O. Kuntze). **Autralian Jouran Crop Science**,12: 108-115, 2018.

MÜLLER, E. M. et al. Maturação e dormência em sementes de *Peltophorum dubium* (Spreng) Taub. de diferentes árvores matrizes. **Iheringia. Série Botânica**, 71: 222-229, 2016.

RIBEIRO, R. C. et al. Activity of antioxidant enzymes and proline accumulation in *Erythrina velutina* Willd. seeds subjected to abiotic stresses during germination. **Journal of Seed Science**, 36: 231-239, 2014.

SANTOS, L. W. D. et al. *Erythrina velutina* Willd. - Fabaceae: árvore de múltiplos usos no Nordeste brasileiro. **Revista Verde de Agroecologia e Desenvolvimento Sustentável**, 8: 72-80, 2013.

SANTOS, S. A. et al. Biometria de frutos e sementes e determinação da curva de absorção de água de sementes de *Sesbania virgata*(Cav.) Pers. **Scientific Electronic Archives**, 10: 26-34, 2017.

SILVA JUNIOR, V. T. et al. *Erythrina velutina* Willd. (Leguminosae-Papilionoideae) ocorrente em caatinga e brejo de altitude de Pernambuco: biometria, embebição e germinação. **Revista Árvore**, 36: 247-257, 2012.

SILVA, K. B. et al. Morphology of fruits, seeds and seedlings of *Erythrina velutila* Willd., Leguminosaeae-Papilionoideae. **Revista Brasileira de Sementes**, 30: 104-114, 2008.

SILVA, R. M. et al. Aspectos biométricos de frutos e sementes de *Caesalpinia ferrea* Mart. Ex Tul. provenientes do semiárido baiano. **Revista de Agricultura Neotropical**, 4: 85-91, 2017.

ZAMAN-ALLAH, M.; JENKINSON, D.M.; VADEZ, V. Chickpea genotypes contrasting for seed yield under terminal drought stress in the field differ for traits related to the control of water use. **Functional Plant Biology**, 38: 270-281, 2011.