V. 8, n. 1, p. 01-03, jan - mar, 2012.

UFCG - Universidade Federal de Campina Grande. Centro de Saúde e Tecnologia Rural – CSTR. Campus de Patos – PB. www.cstr.ufcg.edu.br

Revista ACSA:
http://www.cstr.ufcg.edu.br/acsa/

Revista ACSA – OJS:
http://150.165.111.246/ojs-patos/index.php/ACSA

Leonardo F.Christro[1]

José F. T. do Amaral[1]

Bruno G. Laviola[2]

Lima D. Martins[1*]

Carlos F. Amaral[1]

AGROPECUÁRIA CIENTÍFICA NO SEMIÁRIDO – ISSN 1808-6845
Nota Técnica

Biometric analysis of seeds of genotypes of physic nut (*Jatropha curcas* L.)

ABSTRACT

The objective of this study was to investigate the morphology of seeds of different genotypes of *Jatropha curcas* L., due to the little existing literature regarding the biometric aspects of the seeds of this species. The experimental design was completely randomized in a simple, 15 levels of genotypes (Diamantina, Tominaga, Paradise, Jales, CNPAE - C2, CNPAE - 171, G - 2, AGE, 167, 200, 210, 315, 316 , 1501 and 8001) with four replications. The evaluations were made with portions of 100 seeds for each repetition, measuring the variables measured in mm in width (WIS), length in mm (LES) and seed weight of 100 g (WES) of seeds of *Jatropha curcas* L. Overall, for the 15 genotypes of Physic nut was investigated the formation of three distinct groups of averages for the biometric variables, highlighting the genotypes Paraiso and Jales and access CNPAE - C2 and AGE.

Keywords: access, width of seeds, length of seeds

Análise biométrica de sementes de genótipos de pinhão manso (*Jatropha curcas* L.)

RESUMO

Procurou-se investigar aspectos da morfologia das sementes de diferentes genótipos de pinhão-manso, em razão da pouca literatura existente em relação aos aspectos biométrico das sementes desta espécie. O delineamento experimental utilizado foi o inteiramente casualizado, em esquema simples, sendo 15 níveis de genótipos (Diamantina, Tominaga, Paraíso, Jales, CNPAE – C2, CNPAE – 171, G – 2, AGE, 167, 200, 210, 315, 316, 1501 e 8001), com quatro repetições. As avaliações foram realizadas com parcelas de 100 sementes para cada repetição, mensurando as variáveis: medida de largura em mm (LAS), comprimento em mm (COS) e massa de 100 sementes e g (MCS), de sementes de pinhão-manso. No geral, para os 15 genótipos de pinhão-manso estudados houve a formação de 3 grupos de médias distintas em relação as variáveis biométricas, destacando-se os genótipos Paraiso e Jales e os acessos CNPAE – C2 e AGE.

Palavras-chave: acessos, largura de sementes, comprimento de sementes

*Autor para correspondência
Recebido para publicação em 13/01/2011. Aprovado em 30/05/2012.
[1]Centro de Ciências Agrárias, Universidade Federal do Espírito Santo (CCA/UFES), Alegre, ES, Brasil. E-mail: *leonardo_fardim@hotmail.com, jftamaral@yahoo.com.br, deleon_lima@hotmail.com, carlos_famaral@yahoo.com.br;*
[2]Pesquisador da Empresa Brasileira de Pesquisa Agropecuária, Embrapa Agroenergia. Parque Estação Biológica – PqEB, Asa Norte. Brasília, DF. E-mail: *bruno.laviola@embrapa.br*.

INTRODUCTION

The concept of replacing part of petroleum diesel by biodiesel has gained widespread global attention in recent years (FRANCIS et al., 2005). This measure with the potential species for use in biodiesel production increases will provide a subsidy of social inclusion and family farming.

Among these species, *Jatropha curcas* L. comes with features that makes it a potentiator for the production of vegetable oil, such as hardiness, adaptation to adverse climate and soil, easy propagation, high oil content in seeds (30-40% weight seed) and the possibility of intercropping with crops and animals (ORHAN et al., 2004).

Thus, for the idealized results are achieved, it is necessary to intensify research, and these should start in basic research, but of paramount importance. Studies of morphological character and external, involving the fruit, seed, germination and early growth of physic nut can help to identify the species, and contribute to the knowledge of the biological cycle and its conservation (NUNES et al., 2009).

Biometric analysis is an important tool to detect genetic variability within and also between populations of a species. Biometrics can also be used to check the interaction between species and environmental factors, thereby contributing to genetic improvement programs (GUSMÃO et al., 2006). Another form of assistance programs for the selection of genotypes is the fruit of biometric verification, in order to obtain data in relation to income, making correlations to the productive potential of each access.

These studies, involving morphological analysis of seeds, may help in understanding the process of germination and characterization of vigor and viability of the culture under study (MATHEUS and LOPES, 2007).

Furthermore, knowledge of biometrics seeds is essential for the development of efficient agricultural machinery and for adequate facilities to store production (FERNANDES et al., 2009).

The objective of this study was to investigate the morphology of seeds of different genotypes of *Jatropha curcas* L., due to the little existing literature regarding the biometric aspects of the seeds of this species.

MATERIAL AND METHODS

The seeds of physic nut (*Jatropha curcas* L.) used in the study were provided by Embrapa Agroenergia, Brasília – DF, coming from the 2010 harvest, which have benefited from eliminating the immature seeds and deteriorated. The water content of seeds was maintained between 10-12%, packed and stored in refrigerator (3 ° C) until used.

The experiment was conducted at the "Laboratório de Tecnologia e Análise de Sementes" of the Centro de Ciências Agrárias da Universidade Federal do Espírito Santo (CCA – UFES).

The experimental design was completely randomized in a simple, 15 levels of genotypes (Diamantina, Tominaga, Paradise, Jales, CNPAE - C2, CNPAE - 171, G - 2, AGE, 167, 200, 210, 315, 316, 1501 and 08001) with four replications. The evaluations were made with portions of 100 seeds for each repetition.

Evaluations of the seeds were then dried to constant weight. The mass of 100 seeds (WES) was obtained in an analytical balance with accuracy of 0.01 g, and expressed in grams; the width (WIS) and length (LES) were obtained using a caliper with an accuracy of 0.01 mm and in mm.

Biometric data were subjected to analysis of variance ($p \leq 0.05$), using the statistical program SISVAR (FERREIRA, 2008), and when the sources of variation were significant, we used the Scott-Knott test ($p \leq 0,05$).

RESULTS AND DISCUSSION

Table 1 presents the results on the significance of the sources of variation. Note that there is significance to $p \leq 0.05$, for the biometric variables studied 15 genotypes of Physic nut.

Table 1 – Results of the F test, coefficient of variation (CV) and averages for the biometric analysis of 15 genotypes of *Jatropha curcas* L. Brasilia – DF, 2010.

Sources of variation	WIS1	LES2	WES3
Genotype	1504639,809*	6588117,428*	195954,661*
Error	223209,703	573983,851	11757,226
CV (%)	4,34	4,29	4,02
Overall Mean	10,87	17,64	-

* Significant at 5% by by F test; (1) Width of seeds (mm); (2) Length of seeds (mm); (3) Weight of 100 seeds (mm).

For the biometric variable width of seed (WIS) noted the formation of four groups of averages, as the group with the highest mean WIS, comprising accessions CNPAE – C2 and AGE with an average of 11.52 mm wide seeds. The second group was composed of genotypes Paradise, Diamantina and the 315 accessions, 1501 and G-2, with values ranging from 10.995 to 11.197 mm. The third group was composed of the largest average number of individuals with genotypes Tominaga and Jales, and accesses 167, 210, 316 and 08001, the group of lower middle was composed of CNPAE -171 and 210 (Table 2).

Table 2 – Comparison between means for WIS, LES and WIS of 15 genotypes of *Jatropha curcas* L. Brasilia – DF, 2010

Genotypes	WIS[1]	LES[2]	WES[3]
167	10.660 c	16.334 c	52.30 c
200	10.392 d	16.206 c	53.82 c
210	10.648 c	16.389 c	54.14 c
315	10.905 c	17.649 b	68.74 b
316	10.714 c	17.540 b	63.69 b
1501	11.124 b	17.978 b	54.56 c
08001	10.773 c	17.571 b	65.65 b
CNPAE - C2	11.504 a	18.493 a	70.05 a
CNPAE-171	10.094 d	17.760 b	65.20 b
G-2	11.197 b	18.086 a	64.41 b
AGE	11.553 a	18.698 a	65.00 b
Diamantina	11.097 b	17.429 b	59.25 c
Tominaga	10.830 c	17.436 b	65.37 b
Paraíso	10.995 b	18.577 a	76.03 a
Jales	10.671 c	18.502 a	71.20 a

Means followed by same letters in column are not significantly different by Scott-Knott test at 5% probability level; (1) Width of seed (mm); (2) Length of seed (mm); (3) weight 100 seeds (mm).

In the analysis of length of seed (LES), were found three distinct groups of average (Table 2). The group with the highest average was formed by CNPAE - C2, AGE and G-2, and the Paradise and Jales genotypes, with values ranging from 18.086 to 18.698 mm. The second group was formed by genotypes Diamantina and Tominaga, and by access CNPAE -171, 315, 316, 1501 e 08001. The group of lower middle was formed by genotypes named 167, 200 and 210.

For the weight of 100 seeds (WES) of physic nut were also found three groups of means (Table 2). The first group was composed of the genotypes CNPAE – C2, Paraíso and Jales, with values ranging from 70.05 to 76.03 g. The second was formed by genotypes Tominaga, CNPAE-171, 315, 316, 08001, AGE and G -2, with the average interval between 63.69 to 68.74 g. The group of lower mean weight of 100 seeds was formed by genotypes 167, 200, 210, 1501 and Diamantina, with averages ranging from 52.30 to 59.25 g.

These results are similar to those of Dias et al. (2007) reporting that the seeds of Physic nut in general are flat and relatively large, and when dry measuring 1.5 to 2 cm long by 1.0 to 1.3 cm wide, have hard seed coat and brittle with a white film covering the almond, rich in oil.

These results provide the breeding programs of culture on decision making in selecting varieties, can also be used as supplements in studies of germination, vigor and viability of the seeds of *Jatropha curcas* L.

CONCLUSION

For the 15 genotypes of the physic nut studied was the formation of three distinct groups of averages for the biometric variables, highlighting the genotypes Paraiso and Jales and access CNPAE - C2 and AGE.

REFERENCES

DIAS, L.A.S.; LEME, L.P.; LAVIOLA, B.G.; PALLINI FILHO, A.; PEREIRA, O.L.; CARVALHO, M.; MANFIO, C.E.; SANTOS, A.S.; SOUSA, L.C.A.; OLIVEIRA, T.S.; DIAS, D.C.F.S. **Cultivo de pinhão manso (*Jatropha curcas* L.) para produção de óleo combustível.** Viçosa, MG, 2007. v.1. 40p.

FERNANDES, J. D.; CHAVES, L.H.G.; DANTAS, J.P.; SILVA, J.R.P. Análise biométrica de frutos e grãos de pinhão manso cultivado sob diferentes fontes de adubação. **In:** I Congresso Brasileiro de Pesquisas de Pinhão Manso, Brasília-DF, 2009. p.1 – 5.

FERREIRA, D. F. SISVAR: um programa para análises e ensino de estatística. **Revista Symposium**, Lavras, v. 6, p. 36-41, 2008.

FRANCIS, G.; EDINGER, R.; BECKER, K. A concept for simultaneous wasteland reclamation, fuel production, and socio-economic development in degraded areas in India: Need, potencial and perspectives of Jatropha plantations. **Natural Resources Forum**, v. 29, p. 12-24, 2005.

GUSMÃO, E.; VIEIRA, F. A.; JÚNIOR, E.M.F. Biometria de frutos e endocarpos de murici (*Byrsonima verbascifolia* Rich. Ex. A. Juss.). **Revista Cerne, Lavras**, v. 12, n. 1, 2006.

MATHEUS, M. T.; LOPES, J.C. Morfologia de frutos, sementes e plântulas e germinação de sementes de Erythrina variegata L. **Revista Brasileira de Sementes**, vol.29. n 3. p 8-15. 2007.

NUNES, C.F.; SANTOS, D.N.; PASQUAL, M.; VALENTE, T.C.T. Morfologia externa de frutos, sementes e plântulas de pinhão manso. **Pesquisa Agropecuária Brasileira**, v. 44, n. 2, P. 207-210, 2009.

ORHAN, A. S.; DULGER, Z.; KAHRAMAN, N.; VERIZOGLU, T. N. Internal combustion engines fueled by natural gas-hydrogen mixtures. **International Journal of Hydrogen Energy**, v. 29, n. 14, p. 1527-1539, 2004