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ÁGUA SALINA E ADUBAÇÃO FOSFATADA NA CULTURA DO AMENDOIM

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1 RESUMO

A adubação fosfata poderá mitigar o estresse salino em plantas de amendoim. Diante deste contexto, o objetivo deste trabalho foi avaliar o uso de água salina em diversos estágios fenológicos na produtividade da cultura do amendoim cultivado sob adubação fosfatada. O experimento foi realizado na área experimental da Unidade de Produção de Mudas Auroras, da Universidade da Integração da Lusofonia Afro-Brasileira, Redenção, CE. O delineamento experimental foi inteiramente casualizado, em esquema fatorial 6x2, com 5 repetições, sendo utilizadas seis estratégias de irrigação com água salina com condutividade elétrica de 4,0 dS m^{-1} aplicadas em diferentes estágios fenológicos da cultura: estresse salino na fase vegetativa (E1); na fase de florescimento (E2); no aparecimento do ginóforo (E3); na frutificação/formação de vagem (E4); no estágio final da floração (E5); sem estresse salino (E6) e duas doses de fósforo 3,1 e 6,2 g vaso-1, correspondendo a 50% e 100% da dose recomendada. As variáveis analisadas foram: vagens formadas, vagens mal formadas, número total de vagens por planta, comprimento de vagem, diâmetro de vagem, massa de vagens e a produtividade. O uso de água de maior salinidade na fase vegetativa evidencia menor diâmetro de vagem.

Palavras-chave: *Arachis Hypogaea* L.; Estresse Salino; Nutrição de plantas.

GUILHERME, J.M.S; SOUSA, G.G; SANTOS, S.O; GOMES, K.R; VIANA, T.V.A. SALINE WATER AND PHOSPHATE FERTILIZATION IN PEANUT CROPS

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2 ABSTRACT

Phosphate fertilization can mitigate salt stress in peanut plants. In this context, this work aimed to evaluate the use of saline water at different phenological stages in the productivity of peanuts cultivated under phosphorus fertilization. The experiment was carried out in the experimental area of the Aurora Seedling Production Unit, at the University of Integration of Lusofonia Afro-Brasileira, Redenção, CE. The experimental design was completely randomized, in a 6x2 factorial scheme, with 5 replications, using six irrigation strategies with saline water with electrical conductivity of 4.0 dS m^{-1} applied at different phenological stages of the crop: salt stress in the vegetative phase (E1); in the flowering stage (E2); in the appearance of the gynophore (E3); in fruiting/pod formation (E4); in the final stage of flowering (E5); without salt stress (E6) and two doses of phosphorus 3.1 and 6.2 g pot^{-1}, corresponding to 50% and 100% of the recommended dose. The variables analyzed were formed pods, malformed pods, total number of pods per plant, pod length, pod diameter, pod mass and productivity. The use of water with greater salinity in the vegetative phase shows a smaller pod diameter.

Keywords: Arachis hypogaea L., Salt stress, Plant nutrition.

3 INTRODUCTION

The peanut (*Arachis hypogaea* L.) has medium-sized pods and moderate constriction, containing two medium-sized, rounded seeds in each pod. It is of great economic importance because of its high nutritional value and can be used directly in human nutrition. It is considered one of the most important oilseeds worldwide, with an average productivity of 3,738 kg ha^{-1} (Vasconcelos et al., 2015; AMENDOIM, 2020).

Despite extensive production throughout the country, particularly in the Southeast Region, peanut production has stood out in the Northeast Region of Brazil, a region where salinity-related problems are common, whether due to inadequate water management or typical regional climate conditions. The use of this water can cause soil salinization and salt stress in plants, resulting in changes in water potential and nutritional imbalances (Sousa et al., 2022).

Some studies have used various saline water irrigation strategies to alleviate salinity problems in agriculture. Neves et al. (2015) reported that cyclical saline water irrigation strategies at different plant stages reduced the amount of good-quality water used in cowpea (*Vigna unguiculata* L.) irrigation by 47%.

Many studies have confirmed that mineral nutrition improves plant development, especially in unfavorable environments (Saifullah et al., 2018). However, the use of inferior water quality in crops fertilized with NPK is a reality in the semiarid region of Northeast Brazil. Notably, studies have revealed promising effects of phosphate fertilization in saline environments, as described by Bargaz et al. (2016). On the other hand, Lima et al. (2020), using doses ranging from 60 to 120% of the recommended P_2O_5, concluded that these doses did not mitigate the effects of salt stress in watermelon cv. Sugar Baby.

Given the above, the present work aims to evaluate the effects of the use of saltwater in different phenological stages on the productivity of peanut crops cultivated under phosphate fertilization.

4 MATERIALS AND METHODS

The experiment was carried out from September to November 2019 in the experimental area of the Auroras Seedling Production Unit (UPMA), which belongs to the University of Integration of Afro-Brazilian Lusophony (UNILAB), Redenção, Ceará. The city is located at a latitude of 04° 13' 33" S, longitude of 38° 43' 50" W, with an altitude of 88 meters. The climate of the region is Aw, according to the Köppen classification, characterized as tropical rainy, very hot, with prevalent rainfall in the summer to autumn seasons.

The experimental design was completely randomized (CRD) in a 6x2 factorial scheme with 5 replications, using six irrigation strategies with saline water, applied at different phenological stages of the crop: saline stress in the vegetative phase (E1: 14 DAS); in the flowering phase (E2: 29 DAS); at the appearance of the gynophore (E3: 36 DAS); at fruiting/pod formation (E4: 47 DAS); at the final flowering stage (E5: 60 DAS); and without saline stress (E6: 80 DAS) and two doses: 3.1 and 6.2 g pot $^{-1}$ simple super phosphate, which corresponds to 50% and 100% of the recommended dose, respectively.

The substrate material was obtained from a mixture of local soil and sand at a 3:2 ratio. To evaluate the soil chemical characteristics, a sample was collected before the start of treatments and sent to the Soil and Water Laboratory of the Department of Soil Sciences/UFC, where the results are presented in Table 1.

Table 1. Chemical attributes of the substrate used before the start of treatment.

Chemical characteristics									
MO	N	P	K	Mg	Here	In the	pH	PST	CEes
g kg $^{-1}$	g kg $^{-1}$	mg kg $^{-1}$	g kg $^{-1}$		cmol $_c$ dm $^{-3}$			%	dS m $^{-1}$
3.21	0.19	65	0.67	0.9	1.0	0.37	6.8	9	0.92

MO - organic matter; PST - percentage of exchangeable sodium; CEes - electrical conductivity of the saturated extract.

Peanut seeds, UNILAB accession 26, were sown in 11 L polyethylene pots. The seeds were planted at a depth of 2 cm, with 5 seeds per pot. Thinning was carried out 10 days after sowing (DAS), leaving only the most vigorous plant.

Saline water with an electrical conductivity of 4.0 dS m $^{-1}$ was prepared from the salts NaCl, $CaCl_2.2H_2O$, and $MgCl_2.6H_2O$, following the methodology of Rhoades et al. (2000), where the desired ECw was obtained at a ratio of 7:2:1. Irrigation with saline water was initiated according to the treatments, that is, on the basis of crop phenology, with a leaching depth of 15% according to Ayers and Westcot (1999), using a daily frequency, which was calculated according to the drainage lysimeter principle (BERNARDO et al., 2019). The volume of water to be applied to the plants was determined via the following equation (Eq. 1):

$$VI = \frac{(Vp - Vd)}{(1 - LF)} \quad (1)$$

where VI = volume of water to be applied in irrigation (mL); Vp = volume of water applied in previous irrigation (mL); Vd = volume of drained water (mL); and LF = leaching fraction of 0.15.

Fertilization doses were defined according to the recommendations of Fernandes (1993), which include 15 kg ha $^{-1}$ of N, 62.5 kg ha $^{-1}$ of P_2O_5 and 50 kg ha $^{-1}$ of K_2O. Considering a stand of 10,000 plants, the maximum dosage per plant $^{-1}$ in the cycle was as follows: 1.5 g of urea, 6.2 g of simple superphosphate as a phosphorus source and 5.0 g of potassium chloride as a potassium source.

At 80 DAS, the plants were harvested, and the following variables were analyzed: total number of pods per plant (NTV) by the sum of the pods, pod mass in grams (MV) measured on a precision scale, pod length and diameter (DV) measured with a digital caliper and productivity (PRODT) calculated by the ratio of the pot area (0.045 cm ^{2}) and grain mass in grams and transformed to the unit g pot $^{-1}$.

The data were subjected to analysis of variance (ANOVA) via the F test ($p \leq 0.05$) via the Assistat 7.7 Beta statistical program (Silva and Azevedo, 2016). When significant, the data were subjected to the mean comparison test via the Tukey test.

5 RESULTS AND DISCUSSION

According to the summary of the analysis of variance (Table 2), there was a significant response for the interaction between irrigation strategy and phosphorus fertilizer dose for the following variables: total number of pods (NTV), pod mass (MV), and productivity (PRODT), at the 1% significance level; and pod length (CV), at the 5% significance level. For the variable pod diameter (DV), only the irrigation strategy had an influence at the 5% significance level.

Table 2. Summary of analysis of variance for formed pods (VF), poorly formed pods (VMF), total number of pods (NTV), pod length (CV), pod diameter (DV), pod mass (MV), and productivity (PRODT).

FV	GL	Mean square				
		NTV	**CV**	**DV**	**MV**	**PRODT**
Strategies (E)	5	58.15**	7.69**	1.18*	32.90**	9375.85**
Fertilization (A)	1	1.07 ns	18.25**	0.85 ns	2.49**	174.16**
E x A	5	10.59**	6.32*	0.80 ns	4.82**	161.03**
Treatment	11	31.34**	8.03**	0.98*	17.37**	4350.78**
Residue	48	2.57	2.19	0.43	0.31	11:35
Total	59					
CV (%)		12.19	5.89	5.79	9.88	5.87

FV = source of variation; GL = degrees of freedom; * = significant according to the F test at 5%; ** = significant according to the F test at 1%; ns = not significant; CV (%) = coefficient of variation.

Table 3 shows no significant differences between E1, E3, and E4 for both phosphorus doses (50 and 100%) for the NTV. E2 and E5 were significantly greater at the 50% dose. In other words, E2 is the period of gynophore formation, during which the plant requires greater phosphorus nutrition. However, this phase had the longest irrigation time with saline water. It is possible that there was better compartmentalization of P2O5 under the conditions of this study. Moreover, E6 (control) was superior at the 100% dose, revealing a greater distribution of this nutrient when it was irrigated with relatively low salinity throughout the cycle.

Table 3. Total number of peanut pods as a function of the interaction between strategies and phosphate fertilization.

Total number of pods	**Phosphate Fertilization**	
Strategies	50%	100%
E1: 14 DAS	11.20 bA	11.00 cdA
E2: 29 DAS	12.20 bA	10.00 dB
E3: 36 DAS	16.40 aA	17.40 aA
E4: 47 DAS	11.20 bA	12.00 bcdA
E5: 60 DAS	16.80 aA	13.60 bcB
E6: 80 DAS	12.00 bB	14.20 bA
DMS C 3.10	DMS L 2.04	

Means followed by the same lowercase letter in the same column and uppercase letter in the same row do not differ statistically from each other according to the Tukey test.

Canjá et al. (2021), working in pot conditions with a 100% phosphorus dose with peanut crops, also reported a reduction in the total number of pods under saline stress in the reproductive phase. Similarly, Goes et al. (2021) reported a lower total number of pods in peanut crops irrigated with saltwater under field conditions.

In terms of pod mass, the E150% treatment resulted in a statistically better result (4.63 g) than did the 100% treatment (3.07 g), whereas E2 and E5 did not significantly differ. For E3, E4, and E6, the 100% dose was significantly greater than the 50% dose (4.48 g, 5.55 g, and 6.41 g), with values of 5.38 g, 6.98 g, and 8.67 g, respectively. This result reveals that plants that are irrigated with saltwater in the final phenological stages or that do not receive saltwater have lower agronomic performance (Lacerda et al., 2019).

Table 4. Peanut pod mass (g) as a function of the interaction between strategies and phosphate fertilization.

Green bean pasta	**Phosphate Fertilization**	
Strategies	50%	100%
E1: 14 DAS	4.63 cdA	3.07 dB
E2: 29 DAS	3.66 dA	3.20 dA
E3: 36 DAS	4.48 dB	5.38 cA
E4: 47 DAS	5.55 bcB	6.98 bA
E5: 60 DAS	7.68 aA	7.54 bA
E6: 80 DAS	6.41 bB	8.67 aA
DMS C 1.03	DMS L 0.70	

Means followed by the same lowercase letter in the same column and uppercase letter in the same row do not differ statistically from each other according to the Tukey test.

A similar trend for grain mass was reported by Canjá et al. (2021) when peanut crops were irrigated with saltwater during the reproductive phase. Similarly, Goes et al. (2021) reported a reduction in pod mass in peanut crops under saline stress.

For pod length (Table 5), there was no significant difference between strategies 2, 3, 4, 5, and 6. For E1 and E2, the 100% dose was statistically superior, with 27.43 and 25.94 mm greater than the 50% dose (24.60 and 22.80 mm greater, respectively).

These results showed that higher P doses increased pod length in peanut plants subjected to saline water irrigation in their early phenological stages. Notably, phosphorus acts in the transfer of cell energy in the form of adenosine triphosphate (ATP) and participates in several processes, such as respiration and photosynthesis (Taiz et al., 2017).

Table 5. Peanut pod length (mm) as a function of the interaction between irrigation and phosphate fertilization strategies.

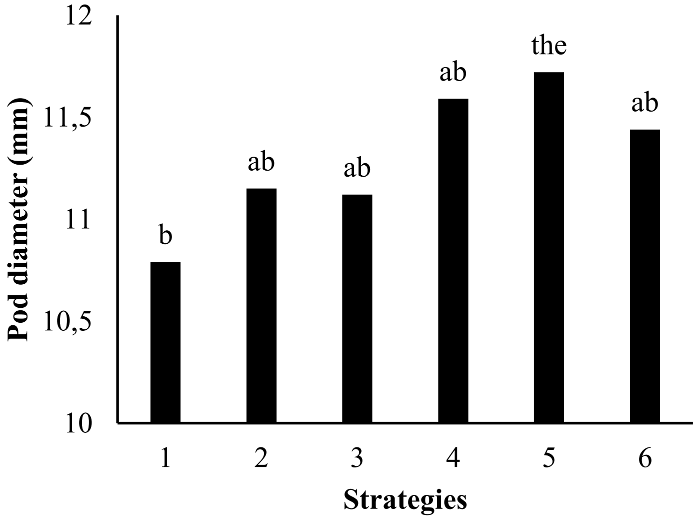
Pod length	**Phosphate Fertilization**	
Strategies	50%	100%
E1: 14 DAS	24.60 abB	27.43 aA
E2: 29 DAS	22.80 bB	25.94 abcA
E3: 36 DAS	24.17 abA	23.86 cA
E4: 47 DAS	25.07 abA	25.59 abcA
E5: 60 DAS	25.29 abA	24.61 bcA
E6: 80 DAS	25.65 aA	26.77 abA
DMS C 2.7810	DMS L 1.8860	

Means followed by the same lowercase letter in the same column and uppercase letter in the same row do not differ statistically from each other according to the Tukey test.

Similar results were reported by Canjá et al. (2021), who reported that the use of saline water after the reproductive phase negatively reduced the pod length of peanut crops. Similarly, Goes et al. (2021) reported that increasing the salinity of irrigation water reduced the pod length values of peanut crops.

According to Figure 1, only E1 differed statistically from the other strategies in terms of pod diameter. Notably, E1 promoted a greater degree of irrigation with saline water at the beginning of flowering, which compromised productivity from the formation of the gynophore and pod (Cruz et al., 2020).

Figure 1. Peanut pod diameter as a function of irrigation strategy.



The use of water with high salt concentrations affects plant metabolism, especially that of photosynthetic cells (Lessa et al., 2021), and, subsequently, the productive performance of agricultural crops, as described in this study. A similar behavior was reported by Goes et al. (2021) when peanut crops were studied under field conditions and irrigated with saltwater.

Table 6 shows that only in E1 did the 50% dose result in significantly greater productivity (32.05 g pot $^{-1}$) than the 100% dose (22.22 g pot $^{-1}$). For E3 and E5, there was no significant difference; however, for E2, E4 and E6, the 100% dose was statistically superior to the 50% dose, with values of 32.05, 60.67, and 109.20 g pot $^{-1}$ and 23.16, 48.31 and 101.38 g pot $^{-1}$, respectively. This result reveals the tolerance of the peanut crop to salt stress under pot conditions; that is, phases that correspond to the appearance and elongation of the gynophore and complete maturation of the pod can be supplied with lower-quality water and obtain similar productivities to those of the control (E6). Notably, plants under saline stress in the vegetative phase are more affected by a reduction in physiological processes such as photosynthesis (Taiz et al., 2017).

Table 6. Peanut productivity as a function of the interaction between strategies and phosphate fertilization.

Productivity (g pot $^{-1}$)	**Phosphate Fertilization**	
Strategies	50%	100%
E1: 14 DAS	32.05 dA	22.22 fB
E2: 29 DAS	23.16 eB	32.05 eA
E3: 36 DAS	49.02 cA	50.53 dA
E4: 47 DAS	48.31 cB	60.67 cA
E5: 60 DAS	80.44 bA	80.13 bA
E6: 80 DAS	101.38 aB	109.20 aA
DMS C 6.3207	DMS L 4.2866	

Means followed by the same lowercase letter in the same column and uppercase letter in the same row do not differ statistically from each other according to the Tukey test.

A similar result to that in this study was described in Cruz et al. (2020). These same authors reported a reduction in peanut crop productivity with increasing salinity stress. Similarly, Goes et al. (2021), when peanut crops were irrigated with saline water under field conditions, reported a decrease in peanut crop productivity.

6 CONCLUSION

The recommended 50% dose of phosphorus (3.1 g pot $^{-1}$) was more efficient for strategies 2 and 5 for the total number of pods and in strategy 1 for productivity.

The use of water with higher salinity in the vegetative phase results in a smaller pod diameter.

The use of water with relatively high salinity during the fruiting and pod formation phases and relatively low salinity throughout the cycle, associated with fertilization with 100% of the recommended dose of phosphorus (6.2 g pot $^{)}$greater productivity.

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8 REFERENCES

PEANUTS. **Monitoring the Brazilian Harvest** : grains, Brasília, DF, v.9, n. 9, p. 1-66, June 2020. 2019/2020 Harvest, Ninth survey. Available at: https://www.conab.gov.br/info-agro/safras/graos/boletim-da-safra-de-graos?start=10. Accessed on: December 30, 2020.

AYERS, RS; WESTCOT, DW **Water quality in agriculture** . 2nd ed. Campina Grande, PB: UFPB, 1999. 153 p.

BARGAZ, A.; NASSAR, RMA; RADY, MM; GABALLAH, MS; THOMPSOM, SM; BRESTIC, M.; SCHMIDHALTER, U.; ABDELHAMID, MT Improved salinity tolerance by phosphorus fertilizer in two recombinant inbred lines of Phaseolus vulgaris contrasting in their efficiency P. **Journal of Agronomy and Crop Science** , v. 202, n.6, p. 497-507, 2016.

BERNARDO, S.; MANTOVANI, EC; SILVA, DD da; SOARES, AA **Irrigation Manual** . 9th ed. Viçosa: Editora UFV, p.545, 2019.

CANJÁ, JF; SALES; JRD S, PINHO, LL; SOUSA, NI G; LACERDA, CF D; SOUSA, GGD Production and efficient water use of peanut under saline stress and soil cover. **Agronomic Science Journal** , v. 52 . 2021.

CRUZ, RI F; SILVA, GF D; SILVA, MM D, SILVA, AH S; SANTOS, J. A; SILVA, Ê. FD Productivity of peanut plants irrigated under pulse and continuous drip irrigation with saltwater. **Caatinga Journal** , v. 34, p. 208-218, 2021.

FERNANDES, VLB **Fertilization and liming recommendations for the State of Ceará** . Fortaleza: UFC, 1993.

FROSI, G.; BARROS, VA, OLIVEIRA, MT; SANTOS, M.; RAMOS, DG; MAIA LC & SANTOS, MG Arbuscular mycorrhizal fungi and foliar phosphorus inorganic supply alleviate salt stress effects in physiological attributes, but only arbuscular mycorrhizal fungi increase biomes in woody species of a semiarid environment. **Tree physiology** , vol. 38, p. 25-26,2018.

FURTADO, GF; SOUSA JUNIOR, JR; XAVIER, DA; ANDRADE, EMG; SOUSA, JRM Photosynthetic pigments and production of common bean Vigna unguiculata L. Walp. under salinity and nitrogen fertilization. **Green Journal of Agroecology and Sustainable Development** , Parnaíba, v.9, p.291-299, 2014.

GOES, GF; SOUSA, GG; SANTOS, SO; SILVA JUNIOR, FB; CEITA, EAR; LEITE, KN Peanut crop productivity under different irrigation suppressions with saline water. **IRRIGA** , v. 26, n. 2, p. 210-220, 2021.

LACERDA, Cassiano Nogueira. of. **Strategies for managing water salinity in the cultivation of sesame genotypes** . 2019. Final Course Work (Bachelor's Degree in Agronomy) - Federal University of Campina Grande, Center for Agrofood Science and Technology, Pombal, 2019.

LESSA, C.I. N; SOUSA, G.G; SOUSA, H.C; SILVA JUNIOR, F.B; SOUSA, J.T.M; LACERDA, C.F. Influence of mulch and salinity on gas exchange of peanut genotypes. **BRAZILIAN JOURNAL OF IRRIGATED AGRICULTURE-RBAI** , v. 15, p. 88-96, 2021.

LIMA, YB de; SÁ, FVDS; FERREIRA, M; PAIVA, EPD; GHEYI, HR Accumulation of salts in the soil and growth of cowpea under salinity and phosphorus fertilization1. **Revista Ciência Agronômica** , v. 48, p. 765-773, 2017.

LIMA, G. S; FÉLIX, C. M; DA SILVA, S. S; DOS ANJOS SOARES, L. A; GHEYI, H. R; SOARES, MD M; FERNANDES, PD Gas exchange, growth and production of mini-watermelon under saline water irrigation and phosphate fertilization. Semina: Agricultural Sciences , v. 41, n. 6Supl2, pp. 3039-3052, 2020.

NEVES, ALR; LACERDA, CF D; SOUSA, CHC D; SILVA, FLB D; GHEYI, H. R; FERREIRA, FJ Growth and yield of cowpea/sunflower crop rotation under different irrigation management strategies with saline water. **Rural Science** , Santa Maria , v. 45, n. 5, p. 814-820, May 2015.

RHOADES, JD; KANDIAH, A.; MASHALI, AM **Use of saline waters for agricultural production** . Campina Grande: UFPB, 2000. 117p. (FAO Studies Irrigation and Drainage, 48).

SAIFULLAH DS; NAEEM, A; IQBAL, M; FAROOQ, MA; BIBI, S; & RENGEL, Z. Opportunities and challenges in the use of mineral nutrition for minimizing arsenic toxicity and accumulation in rice: A critical review. **Chemosphere** , vol. 194, p. 171-188, 2018.

SILVA, FAS; AZEVEDO, CAV **The Assist Software Version 7.7** and its use in the analysis of experimental data. African Journal of Agricultural Research, [S. l.], v. 11, no. 39, p. 3733-3740, 2016.

SOUSA, G. G; SOUSA, H. C; SANTOS, M. F; LESSA, CI N; GOMES, SP Saline water and nitrogen fertilization on foliar composition and corn productivity. **Revista Caatinga** , v. 35, n. 1, p. 191-198, 2022.

TAIZ, L.; ZEIGER, E.; MOLLER, I. & MURPHY, A. **Plant physiology and development** . 6th ed. Porto Alegre: Artmed. 888 p. 2017.

VASCONCELOS, FMT; VASCONCELOS, RA; LUZ, LN; OLIVEIRA JÚNIOR, JOL; SANTIAGO, AD; SGRILLO, E. Adaptability and stability of erect peanut genotypes grown in the Northeast and Central-West regions. **Ciência Rural** , v. 45, n. 8, 2015.