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PRODUCTION OF CARÁ-ROXO (*DIOSCEREA TRIFIDA* L.F.) CULTIVATED UNDER DIFFERENT DOSES OF ORGANIC AND PHOSPHATE FERTILIZATION IN THE MUNICIPALITY OF ITACOATIARA – AM

Alex Costa Ribeiro
``Universidade Federal do Amazonas``, ``Instituto de Ciências Exatas e Tecnologia``, Itacoatiara, Amazonas
https://lattes.cnpq.br/5924626378175063

Arthur Antunes de Souza Cardoso
Professor at: ``Universidade Federal do Amazonas``, ``Instituto de Ciências Exatas e Tecnologia``, Itacoatiara, Amazonas
http://lattes.cnpq.br/2687437688573682

Elias Paulo Ednel Simas dos Reis
``Universidade Federal do Amazonas``, ``Instituto de Ciências Exatas e Tecnologia``, Itacoatiara, Amazonas
https://lattes.cnpq.br/6544480259175505

Arlen Costa Ribeiro
``Universidade Federal do Amazonas``, ``Instituto de Ciências Exatas e Tecnologia``, Itacoatiara, Amazonas
https://lattes.cnpq.br/3528032131335050

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Abstract: The species *Dioscerea trifida*, popularly known as "cará-roxo" is a highly appreciated species in the northern region of Brazil, representing great food and economic importance, especially in the state of Amazonas. However, there is a great lack of technological packages aimed at cultivating this species, especially in relation to fertilizer recommendations. Therefore, the objective of this study was to evaluate the production characteristics of purple yam under the influence of organic and phosphate fertilization in Itacoatiara-AM. The experiment was conducted in the experimental field belonging to the Institute of Exact Sciences and Technology – ICET/UFAM. The experimental design was in randomized blocks (DBC), in a 3x4 factorial scheme, with 3 doses of cattle manure (0, 10 and 20 t/ha) and 4 doses of phosphate fertilizer (0, 60, 120, 180 kg of P_2O_5/ ha), distributed in 3 replications and 5 plants per experimental unit, totaling 180 plants. Planting was carried out using whole and sanitized seed tubers, the holes measuring 0.40 x 0.40 x 0.30 m and during the crop cycle, irrigation was carried out with manual watering cans and regular weeding was carried out as necessary. Harvesting took place 9 months after planting and the variables analyzed were: average number of tubers per plant (NMTP), average tuber weight (PMT), total productivity of tuberous roots (PTRT), Commercial productivity (PC), length of tuberous roots (CRT), diameter of tuberous roots (DRT), dry biomass of roots (BSRT), dry biomass of leaves and stem (BSFC). The data were subjected to analysis of variance and comparison between means using the Tukey test at 5% probability. Regression analysis was performed depending on the P dosages for the evaluated characteristics. The analyzes were carried out with the aid of the statistical software R. From the results obtained, it is inferred that under the soil and climatic conditions of this experiment, fertilization with cattle manure and phosphate fertilizers did not significantly influence the productivity of the purple yam plant.
Keywords: Productivity; Cultivation; Feeding; Sustainability

INTRODUCTION

The yam or yam belongs to the *Dioscoreácea* family, genus *Dioscorea* and has approximately 600 species, of which around 50 are commercially cultivated for human consumption. One of the most cultivated species in the northern region of Brazil is the purple yam (*Dioscerea trifida L.f.*), whose purple color (REIS et al., 2010) is the result of the high concentration of anthocyanins, considered substances that have antioxidant properties.

In Amazonas, yam is cultivated by small farmers who maintain several varieties on their properties (CASTRO et al., 2012). In this region, yam cultivation develops well in areas called "firm land", being produced on a large scale by family producers in this region as a source of income and form of subsistence, contributing significantly to the agro-ecosystem (REGO et al, 2013). Therefore, in addition to its nutritional importance, yam cultivation is essential for the local economy (EMBRAPA, 2020).

Due to the low fertility of Amazonian soils, and the frequent cultivation in the "country side" system, the practice of which involves burning vegetation, rural producers use the area at most twice for the cultivation of species with tuberous roots. In this case, the purple yam contains a lack of studies and cultivation technologies that could increase productivity and improve the use of cultivation areas (EMBRAPA, 2020). Therefore, one of the key elements for better use of the area is the correct fertilization of the soil, aiming to minimize economic expenses

with inputs and productive, economic, social and environmental sustainability.

In the region there are many sources of organic fertilizer, such as cattle manure from farms. Cattle manure is considered an excellent source of nitrogen, one of the macro nutrients essential for plant development, and can be purchased more cheaply than chemical sources of this fertilizer.

In addition to minimizing environmental impacts through less use of chemical fertilizers. (LEONARDO et al., 2014)

Another nutrient of great importance for the plant is phosphorus, one of the essential elements for the good development of plants in general, as it participates in several metabolic processes, such as photosynthesis, respiration, processes involving energy transfer and gene transfers (BARBOSA et al., 2015).

Due to the scarcity of studies on nutritional deficiencies and the use of technologies in the cultivation of yam that aim to increase productivity in the lower Amazon region, this project aims to evaluate the effect of dosages of organic and phosphate fertilizers on the productivity of yam cultivation. purple (*Dioscerea trifida*) in the municipality of Itacoatiara-Am.

METHODOLOGY

The experiment was carried out in the experimental area of the Agronomy course at the Institute of Exact Sciences and Technology - ICET, at the ``Universidade Federal do Amazonas`` - UFAM, in the municipality of Itacoatiara – AM located at 3º08'31" S, 58º25'54" W and altitude 18m at sea level. The region's climate is classified as tropical rainy (humid) (ALVARES et al., 2013) with annual precipitation of 2,261mm and 29.9ºC and relative air humidity of 83% (INMET, 2021).

The experimental design was in randomized blocks (DBC), in a 3x4 factorial scheme, with 3 doses of cattle manure (0, 10 and 20 t/ha) and 4 doses of phosphate fertilizer (0, 60, 120 and 160 kg of P_2O_5/ ha), distributed in 3 replications and 5 plants per experimental unit, totaling 180 plants, where: T1 (control); T2 (0 and 60); T3 (0 and 120); T4 (0 and 160); T5 (10 and 0); T6 (10 and 60); T7 (10 and 120); T8 (10 and 160); T9 (20 and 0); T10 (20 and 60); T11(20 and 120); T12 (20 and 160). Initially, the soil was collected and sent to the Soil Analysis Laboratory at Embrapa Amazônia Oeste, for soil analysis, the methodology adapted according to (CAVALCANTE et al., 2017).

SOIL ANALYSIS

The chemical characteristics of the soil were determined at the beginning of the experiment, the soil fertility of the area was verified by collecting soil at a depth of 0-30 cm (Figure 2AB). In a single collection before installing the experiment, it was collected in a zig-zag fashion, totaling 10 sub-samples throughout the area, at the end the samples, which formed a composite sample.

SOIL PREPARATION AND FERTILIZATION

The soil samples were prepared and sent for analysis to the Soil Chemistry and Physics Laboratory of the ``Universidade Federal do Amazonas``, whose chemical characterization data are in the table below.

Cultivation was carried out in pits measuring 40x40x30 cm arranged in windrows. After preparing the windrows, the pH was corrected, increasing the base saturation to 70% and the respective doses of cattle manure and superphosphate were fertilized.

PREPARATION OF SEEDLING

Purple yam seedlings were made using whole seed tubers with an average weight of 105g.

Triple superphosphate was used as a source of phosphate fertilizer, applied in a single application, with an adjusted dosage following the values of the soil analysis mentioned above. 40 days after plant germination, top dressing was carried out with urea and potassium chloride adjusted according to the recommendations of EMBRAPA (2020).

CULTURAL TREATMENTS AND HARVESTING

With the growth of the purple yam branches, it was necessary to install stakes built with wooden posts and galvanized wire, in the espalier model.

Weeding was carried out manually with the aid of hoes and brush cutters depending on the appearance of weeds. Harvesting was done manually after 9 months of planting.

DATA COLLECTION

THE VARIABLES WERE EVALUATED:

Average number of tubers per plant (NMTP): obtained by the relationship number of tubers/number of plants per plot;

Average tuber weight (PMT): determined by dividing the total tuber production by the number of tubers per plot, and expressed in grams (g);

Total productivity of tuberous roots (PTRT): obtained by collecting and weighing all tuberous roots and estimating their productivity (t ha^{-1}) according to methodology adapted from RÓS (2017);

Commercial Productivity (PC): where all tuberous roots have commercial potential (RÓS, 2017), free from damage and attack by pests and diseases. Commercial roots were considered to be those that the local market normally absorbs, and that do not present tortuosity, cracks or very pronounced veins (DA SILVA et al., 2012).

Length of tuberous roots (CRT): obtained by measuring commercial roots per plot, measuring the longitudinal axis at the fusiform root using a caliper reading in millimeters (mm); Diameter of tuberous roots (DRT) - Measured by measuring commercial roots by plots in the central region of the root using a caliper with a reading in millimeters (mm).

Dry biomass of roots (BSRT): the roots were pre-washed to remove excess soil, and then the ends were discarded, weighing the central part. After weighing, this material was taken to a forced air circulation oven at 60°C for 72 hours to obtain the dry matter. The percentage of dry matter was calculated using the formula described by (CIP, 2008): %Dry matter= (Dry matter weight) / (Fresh matter weight) x100;

Dry biomass of leaves and stem (BSFC): total dry biomass was obtained with samples of approximately 200 g of leaves and stem from each plot. After weighing the fresh material, it was taken to the forced air circulation oven at 60 °C for 72 hours until constant weight (SANTOS NETO et al., 2017).

The percentage of dry matter was calculated using the formula described by (CIP, 2008): %Dry matter= (Dry matter weight) / (Fresh matter weight) x100. The data were subjected to analysis of variance and comparison between means using the Tukey test at 5% probability.

RESULTS/DISCUSSION

Table 2 shows the values: Average number of tubers per plant (NMTP); Average weight of tubers (PMT); Total productivity of tuberous roots (PTRT); Commercial Productivity (PC); Tuberous root length (CRT); Tuberous root diameter (DRT); Root dry biomass (BSRT);

Dry biomass of leaves and stem (BSFC).

For the analyzes of the cattle manure fertilization factor, there was no statistical difference, a similar result obtained in the analyzes of the phosphate fertilization factor, with the exception of the variable length of tuberous roots (TRC), the others did not show significant differences.

The variable dry biomass of tuberous roots (BSRT) presented better results in relation to the interaction analyzes between the factors cattle manure + phosphate fertilizer. The others did not show a statistically significant difference. As with the values for the Block, which also did not differ statistically.

Below are the average values of the factors Fertilization with cattle manure, phosphate fertilization, Average number of tubers per plant (NMTP); Average weight of tubers (PMT); Total productivity of tuberous roots (PTRT); Commercial Productivity (PC); Tuberous root length (CRT); Tuberous root diameter (DRT); Root dry biomass (BSRT); Dry biomass of leaves and stem (BSFC).

The only variable that showed a difference was the length of tuberous roots (CRT), at the level of 160 kg/ha, which obtained better averages compared to the others, being the treatment that presented the length of tuberous roots to 155.75 mm. It is believed that this result may be directly linked to the plant's efficiency in the use of nutrients, with, in many cases, natural levels of soil fertility being sufficient to result in high productivity responses (RODRIGUES, 2003).

CONCLUSION

According to the results obtained in this work, it is inferred that under the edaphoclimatic conditions at the time of carrying out this experiment, fertilization with bovine manure and phosphate did not significantly influence the productivity of the purple yam plant, which varied between 15.74 and 18,74 t.ha-1.

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