

EVALUATION OF SIX NOPAL (*Opuntia* SPP.) VARIETIES FOR FODDER PRODUCTION IN THE SEMI-ARID NORTHEAST, BRAZIL¹.

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ABSTRACT

The main problems associated with production of fodder nopal in the Sertão region, Semi-arid Northeast, Brazil, are poor soils, high minimum temperature (above 20.5° C), and the armored scale insect (*Diaspis echinocacti* - Bouchè). A field trial was established in Petrolina, State of Pernambuco (average rainfall 552.2 mm, 80% available from December to April) in April 2000. Six varieties were tested: three local varieties, ‘Gigante’, the most cultivated, ‘Redonda’ (both *Opuntia ficus-indica*) and ‘Doce’ (*Nopalea cochenillifera*); the Clone IPA-20, furnished by IPA, a local research institution; two varieties provided by the Universidad. Autónoma de Chapingo, Mexico, COPENA F1 and COPENA V1. The experimental design was a CRB , with three replications. The plots had 16 m² (four rows with eight plants/row) planting density was 20.000, plants/ha, for evaluation, only six plants of each central line were considered Manure was applied on biannual basis, at the rate of 2.86 kg/m. Weeding was performed manually. After four years (May 2004), the first harvest was done, collecting all fresh material except the basal cladode and the first layer of pads.. Annual fresh matter (FM) production was calculated dividing total yield by four. Mean production was 65.36 ± 22.99 ton FM/ha/year (CV = 35.17%). Varieties yields were: ‘Gigante’ nopal, 103.80 ton; ‘Redonda’ nopal, 78.04 ton; COPENA F1, 77.54 ton; Clone IPA-20, 74.15 ton; COPENA V1, 34.19 ton; ‘Doce’ nopal, 24.40 ton. ‘Gigante’ nopal was significantly superior (P<0.05) to the two last varieties, and ‘Doce’ nopal was inferior to all varieties. Height, longitudinal and transversal canopy diameters were, respectively: ‘Gigante’ nopal, 1.54, 1.09 and 1.08 m; ‘Redonda’ nopal, 1.07, 1.07 and 0.98 m; COPENA F1, 1.73, 1.08 and 0.90 m; Clone IPA-20, 1.38, 1.11 and 0.99 m; COPENA V1, 1.28, 0.91, 0.76 m; ‘Doce’ nopal, 1.06, 1.07, and 0.99 m. Other data that, such as, protein and fiber levels, might indicate that highest production does not assure the best variety for the region. COPENA F1 having shorter canopy diameter, in comparison to ‘Gigante’ nopal (0.90 vs. 1.08 m) would make it more suitable for intercropping with annual crops.

PRODUCTIVE PERFORMANCE OF 20 VARIETIES OF FODDER NOPAL (*Opuntia* spp.) IN THE SEMI-ARID NORTHEAST, BRAZIL².

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Abstract

Due to poor soils and high minimum temperature (above 20.5° C), the 'Sertão' region, located in the Brazilian Semi-arid Northeast, is probably one of the harshest cropping environments in the world, in which nopal is grown for fodder production. Recently, another problem appeared, the armored scale insect (*Diaspis echinocacti* - Bouchè). A field trial with twenty varieties was started in April 2000 in Petrolina, Pernambuco, (average rainfall 552.2 mm, 80% available in December through April). The varieties tested were: three local cultivars, 'Gigante', the most cultivated, 'Redonda' (both *Opuntia ficus-indica*) and 'Doce' nopal (*Nopalea cochenillifera*) and Clone IPA-20, eight varieties of highest performance in a preliminary evaluation³, that are identified by a number such as, 1258 - Additional Cv.; eight varieties provided by IPA, and identified by a number such as, IPA-90-73, and never tested in the region.. The experimental design was, a randomized complete block, with four replications, in plots of 3.5 m², made up of one seven-plant line, for evaluation, only five plants/line were considered. Planting density was 20.000 plants/ha. Manure was applied on biannual basis at the rate of 2.86 kg/m.. Weeding was done with hoes. In May 2004, the first harvest was done, collecting all fresh material except the basal pad and the first layer of pads. Annual fresh matter (FM) production was calculated dividing total yield by four. Mean production was 75.24 ± 33.61 ton FM/ha/year (CV = 44.7 %). The eight most productive varieties, with FM production/ha/year, height and transversal canopy diameter in parenthesis were: **1258 - Additional cv.** (115.25 ton; 1.50 and 0.96 m); **IPA-90-73** (106.75 ton; 1.53 and 1.16 m); **Clone IPA-20** (101.12 ton; 1.46 and 1.09 m); **1278 - Mexico Fodder** (99.00 ton; 1.68 and 0.88 m); **IPA-90-155** (96.75 ton; 1.50 and 1.05 m); **IPA-90-75** (86.92 ton; 1.32 and 1.00 m); **1311 - Marmillon Fodder** (85.55 ton; 1.64 and 0.78 m); **1267 - Algeria Fodder** (85.25 ton; 1.18 and 1.18 m). 'Gigante' nopal (68.00 ton; 1.43 and 1.05 m) stayed in 13^o position, as in research cited below. There was no difference (P<0.05) among these treatments, due to high CV. Other data, such as, protein and fiber levels, that are still under analysis, might indicate that highest production does not assure the best variety for the region. Shorter transversal canopy diameter such as in **1278 - Mex...** and **1311 - Mar...**, would make these varieties more suitable for intercropping with annual crops.

PRELIMINARY EVALUATION OF 30 VARIETIES OF NOPAL (*Opuntia spp.*) FOR FODDER PRODUCTION IN THE SEMI-ARID NORTHEAST, BRAZIL⁴.

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Abstract

The main problems associated with cultivation of fodder nopal in the Sertão region, Semi-arid Northeast, Brazil, are poor soils, high minimum temperature (above 20.5° C), and the armoured scale insect (*Diaspis echinocacti* - Bouchè). An experiment with 30 varieties was established in December 1994 at Petrolina, State of Pernambuco, a site with 552.2 mm of rainfall (80% available in December-April). There were: 3 local varieties:- 'Gigante' (the most cultivated), 'Redonda' and 'Doce', nopal; .6 varieties introduced from South Africa in 1982 - Algerian, Corfu, Directeur, Fusicaulis, Guayaquil and Skinners Court; 19 varieties introduced from Texas (USA) in 1986.; 2 varieties furnished by IPA: Clone IPA-19 and Clone IPA-20. Except 'Doce' (*Nopalea cochenillifera*), all varieties were *O. ficus-indica*. The experiment was organized, in a RCBD, with four replications. After disk plowing, the area was furrowed and manure was distributed, at the rate of 2.86 kg/m. The varieties were planted at the density of ca. 7,143 pads/ha. In September 1995, it was detected the armored scale in the first plots, which spread to other plots. In November 1996, a visual evaluation was performed by two technicians, and scores varying from 0 (no attack) to 10 (highest attack) were adopted. In May 1997, a test was performed with four products, each product for one block, and all of them controlled the insect. In January 1998, the first triennial harvest was done, leaving the basal-pad, all first order pads, and one second order pad in each first order pad. Average yield was 2.46 ± 1.86 ton DM/ha/year (CV = 75.5 %). The 12 most productive varieties, with DM production/ha/year and scale insect attack level in parenthesis were: **1317 - Chile fruit**

³ See in this congress annals: Albuquerque, S.G. de. Preliminary evaluation of nopal (*Opuntia spp.*) varieties for fodder production in the Semi-arid Northeast, Brazil.

⁴ Approved for congress by Embrapa Semi-Árido Publishing Committee.

(6.07 ton; 1.50); **1327 - Marmillon Fodder** (4.18 ton; 2.0); **1267 - Algeria Fodder** (4.14 ton; 0.50); **1294 - Mexico vegetable** (4.02 ton; 4.25); **1278 - Mexico Fodder** (4.02 ton; 7.00); **1258 - Additional cv.** (3.92 ton; 3.75); **1311 - Marmillon Fodder** (3.70 ton; 1.50); **Algerian** (3.65 ton; 2.00); **Clone IPA-20** (3.55 ton; 2.50); **Clone IPA-19** (3.37 ton; 2.75); **1316 - Chile fruit** (2.89 ton; 2.50); **'Gigante'** (2.85 ton; 7.00). Even with that difference in performance between varieties, due to high CV, only **1317 - Chile fruit** was superior ($P < 0.05$) to **'Gigante' nopal**. The local varieties were highly susceptible to scale insect, a trait that needs further research, ($CV = 89.0\%$, due to block effect). In contrast to **1267 - Algeria Fodder**, which, presented high yield, and showed low susceptibility to the scale insect, maintaining the stand above 90% of initial population, six years after planting and three years after first harvest.