



ORGANIC FERTILIZATION AND PLANT POPULATION AFFECTS SHOOT AND ROOT BIOMASS OF CACTUS PEAR FORAGE (*OPUNTIA FICUS-INDICA* MILL.)¹



José Carlos B. Dubeux Jr.^{2,5}, Nalígia Gomes de M. e Silva³, Mércia Virgínia F. dos Santos^{2,5}, Márcio Vieira da Cunha², Djalma C. dos Santos⁴, Mário de A. Lira^{4,5}, Alexandre C. L. de Mello², Maria do Socorro de Caldas Pinto⁶

¹Research funded by IPA, UFRPE, and FACEPE, ²Professor UFRPE: mercia@dz.ufrpe.br ; dubeux@dz.ufrpe.br ; marciovc@msn.com, ³Graduate Student, PDIZ/UFRPE, ⁴IPA researcher. djalma@ipa.br; mariolira@terra.com.br , ⁵CNPq fellow, ⁶Capes fellow.

Introduction

Low soil fertility levels and the lack of use of fertilizers contribute to reduce the forage harvested from cactus field in the NE region of Brazil. Organic fertilization is an option and has been used by some farmers, however, the need of the organic fertilizer for cash crops like maize and beans reduce the amount available for use in the cactus plantations. Thus, it is important to improve manure use efficiency considering it as a scarce resource. Other important factor reducing the output of forage from this crop is the low plant density commonly found among the producer's fields.



Objective

Thus, this research evaluated the effect of organic fertilization and plant population on the shoot and root biomass yield of cactus (*Opuntia ficus-indica* Mill cv. IPA 20).

Materials and methods

- A split-plot arrangement in a complete randomized blocks design was applied; plots were formed by organic fertilization levels and split-plot formed by plant populations, with four replications per treatment.
- Treatments: four organic fertilization levels (0, 20, 40, and 80 Mg/ha of manure applied on a dry matter basis) and four plant population (20,000; 40,000; 80,000; and 160,000 plants/ha)
- The harvest was performed after two years of regrowth.



Results

Dry matter yield (DMY; t DM/ha after 2-yr regrowth), mother-cladode mass (MCM; g/plant), and root dry mass (RDM; g/plant) of cactus (*Opuntia ficus-indica* Mill cv. IPA 20) as affected by plant population; Caruaru-PE

Plant population	DMY (t/ha)	MCM (g/plant)	RDM (g/plant)
20,000	5,4 B	871,5 A	136,5 A
40,000	12,4 A	727,7 AB	124,7 A
80,000	10,7 A	499,0 B	79,9 B
160,000	14,2 A	568,6 B	76,7 B
Standard Error	1,4	68,7	11,6

Means followed by the same letter within each column do not differ ($P > 0.05$) by SAS LSMEANS using the PDIFF; MCM = mother-cladode mass; RDM = root dry mass;

Root dry mass (RDM; g/plant) of cactus (*Opuntia ficus-indica* Mill cv. IPA 20) as affected by plant population and organic fertilization; Caruaru-PE

Organic fertilization	Plant population (plants/ha)			
	20,000	40,000	80,000	160,000
0 t/ha	4.3 aA	1.4 cB	1.6 bAB	1.9 aAB
20 t/ha	3.3 aB	7.1 abA	6.9 aA	3.2 aB
40 t/ha	3.7 aA	4.6 bA	3.9 bA	3.6 aA
80 t/ha	4.7 aAB	7.2 aA	3.7 bB	3.0 aB
Erro padrão	0,93			

Means followed by the same letter, small letter within each column and capital letter within each row, do not differ ($P > 0.05$) by SAS LSMEANS using the PDIFF.

Conclusions

Root biomass per ha was negatively affected by increasing plant population in the absence of organic fertilization. When manure was added the fluctuation in root biomass per area was lower. These results have implications on plant persistence and drought tolerance. Regions more prone to drought and lower average rainfall should not have dense populations in order to maximize root development per plant.