

NOTE ON A SAND CULTURE TECHNIQUE FOR GROWING SLASH PINE

(*Pinus elliottii*) *

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1. A sand culture experiment was installed in order to find out the effects of the macronutrients N, P and K, and of their interactions, on growth, aspect, mineral composition, cellulose concentration, thickness of cell wall and length of cellulose fibers of slash pine seedlings. A 3 x 3 x 3 factorial design with two replicates is being used. The dressing for N, P, and K are as follows: N — 25, 50, 100 p.p.m., — P 5, 10, 20 p.p.m., K 25, 50, 100 p.p.m. The other macro and all micronutrients are supplied at uniform rates.

2. The experimental technique is diagrammatically shown in the accompanying illustration. For each treatment two clay pots internally covered with a layer of inert, water proof black paint were filled with 7 kg of pure quartz sand; the average diameter of the quartz particles is such that they pass sieve n. 10 being retained by n. 16; these particles are capable of retaining 19.66 per cent of moisture by capillarity. Two rectangular pieces of plywood on top of the pot prevent excessive evaporation. Through openings in their bottoms both pots communicate with a jar of nutrient solution which is located at a lower level. The left hand side of the illustration gives a detail of the system employed to supply nutrient solution into the pots. Compressed air which enters by an external side arm goes into the nutrient solution which is forced to raise through an

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inner plastic tubing and hence into the clay pots. Turning off the compressed air allows the solution to flow by gravity into the glass jar. This operation is repeated three times a day: 7 a.m., noon, and 5 p.m.; each time, the nutrient solution is allowed to be in contact with the root system during a period of 15 minutes. Every other week the solution is discarded, distilled water being put in the jar; compressed air is admitted to force it into the pots; when brought back to the jar it brings some of the salts which were adhering to the sand particles; these operations are repeated with fresh portions of water until a test made in an aliquot shows only a trace of chloride.

3. Judging by the measurements made so far this technique seems quite adequate for growing seedlings of slash pine in nutrient solution. After 6 months the average increases in height for the various levels of element supplied were the following :

N1 — 37.2 cm	P1 — 26.4 cm	K1 — 37.6 cm
N2 — 43.0	P2 — 48.4	K2 — 46.0
N3 — 46.3	P3 — 43.5	K3 — 42.6

Note added in proof: after this paper was sent to the printing shop a system of timer and solenoid valves was introduced in order to make the supplying of nutrient solution to the plants fully automatic.

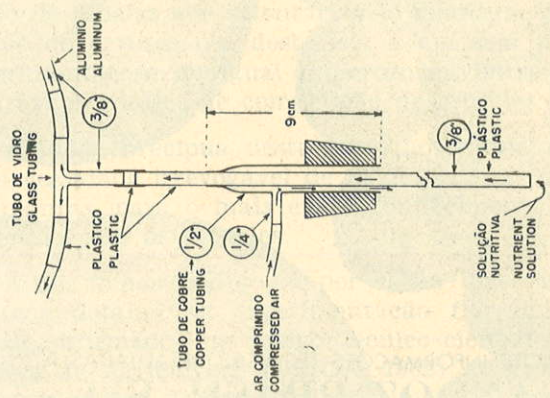
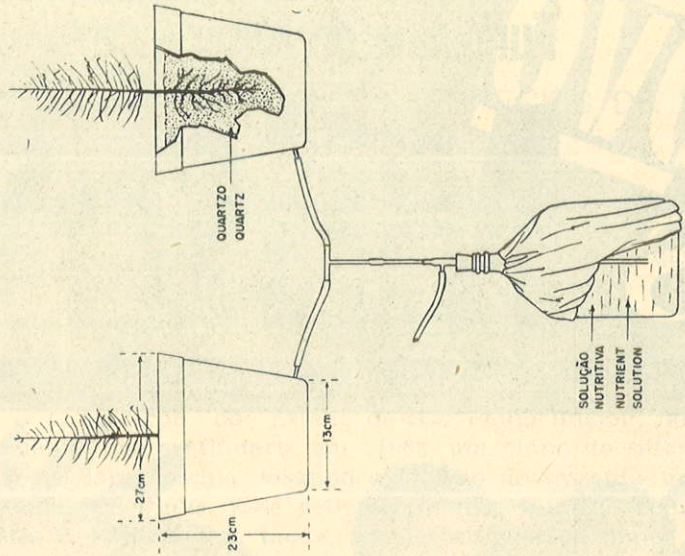
RESUMO

É descrita uma técnica para cultivar *Pinus elliottii* em areia com solução nutritiva.

Três vezes por dia a solução nutritiva contida em um balão de vidro é forçada com auxílio de ar comprimido até os vasos de areia que suportam as plantas; desligando-se o ar a solução volta ao recipiente, uma parte dela sendo, porém, retida pela areia graças à capilaridade.

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A simple system for growing slash pine in sand culture (see explanation in text)
 Um sistema simples para o cultivo de *P. elliotii* em solução nutritiva (explicação no texto)

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