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ROOT SYSTEM DISTRIBUTION OF THE PEACH PALM DRIP-IRRIGATED[1]

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ABSTRACT: The incorporation of technologies has bringing a growing yield and more rational handle of the peach palm, being the irrigation an important tool to some producers regions. In this sense, some studies that go to the correct culture handle are extremely importants, as the deep root system estimation of the culture, indispensable to the correct irrigation management. The work objective was to appraise the effects of different irrigation levels, applied by drip irrigation over root system of the peach palm. This experiment was made in Ilha Solteira – SP, being installed on November 21, 1994, with a drip irrigation, with 2 drippers auto compensator of 2,3 liters/hour per plant, consisting of 4 treatment drip-irrigated corresponded to 0,50, 100 e 150% of evaporation in the class A pan. In November 1999 was made an analysis of the peach palm root system on a distance of 0.00, 0.50 and 1 m of the plant, with examples in two deepness, of 0 to 0.30 m and 0.30 to 0.60 m, by the volumetric analysis, concluding that the peach palm root system deep, used to the irrigation management, may be, at most 0.3 meter.
KEYWORDS: *Bactris gasipaes*, drip irrigation, management irrigation.

INTRODUCTION: In keeping with FLORI and D'OLIVEIRA (1995), the peach palm (*Bactris gasipaes* H.B.K.) represents the best cultivation alternative to the rational heart of palm production, considering its agronomics, industrial and commercials qualities. By AGRIANUAL (2000), the heart palm production profitability evinced pretty alluring, in handle systems or in the various rational culture systems. The adoption of irrigations practices must be with the sense to maximize the yield, avoing deficits and water excess that can cause a shorter economic feedback and damages to these agricultural systems sustainability. Looking it, the knowledge of the distribution root system in a culture is an important tool in this context. To BASSOI et al (1994), the grown of a root system in a culture is associated to chemical, physical and biological soil's factor and the knowledge of its distribution is important to the comprehension of water dynamic and the soil's nutrients. The irrigation management depends, of anothers, the roots deep, to have a water reposition on the soil film where can be ind the most part of the active root system, decreasing the loss by leachlization. In keeping FANTE JUNIOR et al. (1994), the avaliation in terms of explorated volumes, root length, root activity, etc, is hard work and great difficulties are found in any examples techniques, like the time wasted, the low information gotten and the rack of results found. Therefore, the work objective was to appraise the effects of different irrigation levels, applied by drip irrigation over the root system of the peach palm, in Ilha Solteira –SP.

METHODOLOGY: The experience was installed at the Agricultural Experimental Area of the Faculdade de Engenharia de Ilha Solteira (UNESP), with Geographic's coordinates 20º 25' 23"of

South latitude and 51º 21' 13" of west longitude and a medium height of 335 m. The region climate, by the Koppen classification is Aw, defined as wet tropical with rainy station during the summer and dry during the winter, with annual precipitation of 1,259 mm, medium annual temperature of 24.7 ºC and medium annual insolation of 7.4 hours/day (HERNANDEZ, 2007). The soil area was classificated *Argissolo*, and the granulemetry is on Table 1.

TABLE 1.Soil granulemetryc analysis.

Deep (m)	Sand (%)	Clay (%)	Silt (%)	Classification
0.00 – 0.15	85.5	10.5	4.0	Sandy
0.15 – 0.30	84.5	11.0	4.5	Sandy
0.30 – 0.45	82.0	14.5	3.5	Sandy
0.45 – 0.60	80.5	17.5	2.0	Sandy

The peach palm cultivation was installed in 1994, with the seedling planting on a space of 2.0 m x 1.0 m and the irrigation made by auto compensators drippers of 2.3 liters/hour per plant, the irrigated treatments had receiving fertirrigation. The experience was guided with 4 irrigations treatments, 3 distances plants and 2 deeps, with 4 repetitions, using the experimental outline whole casualizated in a factorial scheme 4x3x2. So, the implanted treatments were based on the evaporate reposition of the Class A pan (ECA) corresponding to no-irrigation (SI); 50% ECA, 100% ECA e 150% ECA. In 1999 was realized the analysis of the peach palm roots system, that were collected for 0.00, 0.50 and 1.00 m of the plant, between planting lines, in 2 deeps, of 0.00 to 0.30 m and 0.30 to 0.60 m. Was used a special tool, and the collected volume was put in a container, and later, transfered to another container of knowed volume (4,03 dm^3), washed in labs and dried in a conservatory. The results were expresses in grams of roots for decimeter cubic of soil ($g.dm^{-3}$). The datas were submitted to a variance analysis and the medias comparated by the Tukey test, 5% of probability.

RESULTS AND DISCUSSION: The drip irrigation system used, proportioned a high wetness on the watched zone which stays between the plant in the line plantation and the comprehension of the water movement on the soil trough vertical movement and plants extraction because of the treatment, have to pass over the roots system study and the wet bulb proportioned by the drippers. On the Table 2, can be seen that the dry mass of the root system had grown as the irrigation levels growing, and these results goes with REICHARDT (1993), that relates that the plant root system is proportional with the soil wetness and still, in base of REICHARDT & TIM (2004) the water quantity absorbed by the plants isn't just its function on the soil which are in contact, and in the soil's propriety on the supply and on the water transmission to the roots, in a proportion to satisfact the transpiration needs. Check as well that the treatment S1 had a better roots distribution (in percentage). In all analysed treatments (except S1), over than 90% of the roots were in a deep of 0 to 0.30 m, that says that 0.30 m is the efective deep of the root system to the irrigation management efects, being this value superior from the one found by BASSOI et al (1998), he recommended 0.20 m as the efective deepness of the peach palm root system irrigated with drill and microsprinkle but having roots up to the 0.60 deep, but with a great down, maybe this, according to the authors, because of the presence of a water sheet in 0.80 deepness. RAMOS & FOLEGATTI (1998) have considerate 0.40m of efective root system deep, drip-irrigated on the hydric balance. According to BASSOI et al (1998), the roots quantity keeps homogeneous in the way as they get distance from the plant, however, in the present experience, there's a root quantity decreasing as how they get close to the middle of the plants line (Figure 1). Facing the variance analysis, notice on Table 3, that there was an interaction effect between the irrigation treatment and deepness root and also for the irrigation and deepness root. The results caused different statistics for the interaction between the deep root treatment of 0.00 – 0.30 m had a linear answer, growing with the ECA growing, and the treatment of 150% ECA achieved the medium of 3.86 $g.dm^{-3}$, when the roots joined in a deep of 0.00-0.30m. VEGA et al. (2005) with the objective of appraise, using complementaries methods, the peach palm root system development, in filed, have shown that the root system with one year old concentrated, at most, on the superficial soil film (0-0.20 m deep), right like

the distances up to 0.50 m from the plant base.

TABLE 2. Dry root mass (g.dm^{-3}) referring to the irrigation treatment, distance and deep of the root system.

Distance (m)	Deep (m)	SI		50% ECA		100% ECA		150% ECA	
		g.dm^{-3}	%	g.dm^{-3}	%	g.dm^{-3}	%	g.dm^{-3}	%
0	0.00 – 0.30	1.78	35.79	4.23	52.05	4.11	43.61	8.19	65.62
	0.30 – 0.60	0.37	7.44	0.43	5.35	0.30	3.24	0.64	5.15
0.5	0.00 – 0.30	1.27	25.44	2.00	24.64	3.52	37.38	2.16	17.27
	0.30 – 0.60	0.55	11.04	0.23	2.84	0.19	2.02	0.08	0.68
1.0	0.00 – 0.30	0.86	17.31	1.10	13.55	1.17	12.47	1.23	9.88
	0.30 – 0.60	0.15	2.98	0.13	1.57	0.12	1.29	0.17	1.40
Total		4.98	100	8.12	100	9.42	100	12.48	100

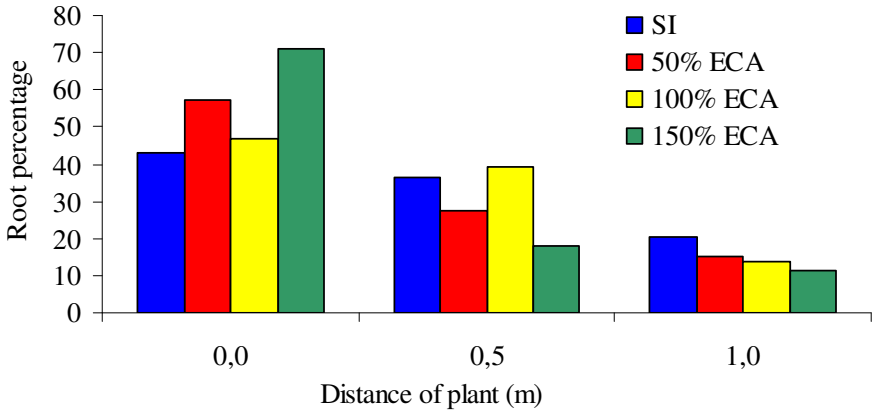

FIGURE 1. Percentage of roots in function of plant distance (m).

Observing the Table 3, the dry root mass, was influenced by the interaction between the irrigation and the deep of 0.00-0.30 and the irrigation treatment S1 had a shorter value, differing from anothers irrigations treatments, showing differences of 1.14, 1.63 and 2.56 g dm^{-3},in relation of the treatments 50% ECA, 100%ECA and 150% ECA, respectively. Could notice that the irrigation treatments didn't influenced on level of 5% of probability to dry root mass to the deep of 0.30-0.60 m (Table 3). With the irrigation treatment S1, 50% ECA, 100% ECA and 150% ECA, was found a root dry mass in percentage in order of 78.31, 90.37, 93.31 and 92.79% respectily, to the layer of 0.00-0.30 m. BASSOI et al. (1999) appraising the peach palm on soils with sandy and clayny texture on Vale do São Francisco, on the semi arid on Brazilian northeast, verifies that the root system of the peach palm cultivated on the space 2.0 x 1.0m under irrigation by drills showed root deepless and around 90% of the roots concentrated on 0.4 m deep.

TABLE 3. Interaction of the irrigation treatment and deepness of the root system of the peach palm, to the root dry mass (g.dm^{-3}).

Deep (m)	SI	50% ECA	100% ECA	150% ECA
	g.dm^{-3}			
0.00-0.30	1.30aC	2.44aB	2.93aAB	3.86aA
0.30-0.60	0.36bA	0.26bA	0.21bA	0.30bA

Medias followed by distinct small letters on the line and capital letter on the column are different between them, a level of 5% probability by the Tukey test.

CONCLUSION: Recommended that the efective deep of the root system, used to irrigation management of peach palm, be at most, 0.30 meters, when the drip irrigation is used.

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