Agri. Res. J. Kerala, 1982, 20 (1) 95—97

EFFECT OF LEAF AREA ON TUBER YIELD OF IRRIGATED TAPIOCA

A definite relationship between leaf area and tuber yield in tapioca was established by Ramanujam and Indira (1980). They further observed that leaf production, a major factor in influencing leaf area, was controlled by soil moisture availability and intensity of branching. Enyi (1972) indicated that an ideal plant should have rapid leaf development between the time of planting and the tuber initiation. The active vegetative phase as well as the tuber initiation stage of tapioca, planted in September–October, coincide with the dry months of November to May. So supplemental irrigation during this period is necessary for proper leaf production and enlargement. Therefore with a view to study the effect of supplemental irrigation on leaf area, tuber yield and their correlation in tapioca, variety Malayan-4, a trial was conducted at the Agronomic Research Station, Chalakudy during 1977-78.

The experiment was laid out in randomised block design with five treatments and five replications. The treatments consisted of scheduling irrigation (5 cm depth) at IW/CPE ratio of 1.0, 0,75, 0.5 and 0.25 and no irrigation control. The total numbers of irrigation were 12, 9, 6 and 2 at an interval of 12, 17, 26 and 50 days respectively (Table 1).

The tuber yield, the number of total and functioning leaves per plant and the leaf area per plant at the active vegetative phase were recorded (Table 2). The correlation coefficient between tuber yield and leaf area was also worked out.

An appraisal of the data reveals that the tuber yield increased progressively with increase in the ratio of irrigation schedule and the maximum was recorded at IW/CPE ratio of 1.0. However, it was on par with that at 0.75 and 0.50 IW/CPE ratios. The percentage increase in tuber yield due to irrigation over no irrigation was 62, 51, 46 and 26 at 1.00, 0.75, 0.50 and 0.25 IW/CPE ratios respectively. Similar trend was observed in the case ot leaf area per plant. There was significant positive correlation between leaf area and tuberyield ($r = 0.973$). This is in line with the findings of Sinha *et al*. (1971) Obviously the optimum water management practices helped the plant to maintain optimum leaf area with the result that the crop yield was increased through increased photosynthetic efficiency. Leaf area of a plant depends upon leaf life and the rate of leaf production (Ramanujam and Indira, 1980). The total and functioning leaves per plant were also favourably influenced by irrigation treatments. Higher levels of irrigation might have rendered the plant nutrients available for better plant growth. Larger plant surface due to proper supply of water and nutrients resulted in higher rate of photosynthesis and increased photosynthetic capacity for a larger duration ensuring the yield of photosynthates.

Table 1

Number, periodicity and quantity of water used as affected by various treatments

Irrigation schedules, IW/CPE ratios	Total No. of irrigation	Periodicity of irrigation, days	Total irrigation water used, cm
1.0	12	12	60
0,75	9	17	45
0.50	6	26	30
0.25	2	50	10
No irrigation	0	—	—

Table 2

Growth and yield characters as influenced by irrigation treatments.

Irrigation schedules, IW/CPE ratios	No. of leaves per plant	No. of functioning leaves per plant	Leaf area per plant, cm^2	Yield of tubers, t/ha
1.0	45.50	19.80	5462	44.60
0.75	51.60	18.40	4234	42.42
0.50	40.60	19,80	4448	39 87
0.25	32.00	13.40	2707	31.74
No irrigation	22 80	8.60	883	23.93
C. D. (0.05)	13.40	4.60	1789	5.96
SEm±	4.5	1.5	597	

The authors are thankful to Late Dr. U. P. Bhaskaran, former Director of Research, Kerala Agricultural University for encouragement and Shri. N.N. Ramankutty, Associate Professor, Kerala Agricultural University for the facilities rendered for this investigation.

സംഗ്രഹം

നനച്ചു വളർത്തിയ മരച്ചീനിയിൽ നിന്നുള്ള വിളവ് അതിന്റെ കായിക ദശയിൽ ഉല്പാദിപ്പിക്കപ്പെട്ട ഇലകളുടെ വിസ്തീർണ്ണവുമായി ബന്ധപ്പെട്ടിട്ടുണ്ടെന്നും ജലസേചനത്തിന്റെ തോത് കൂടുന്നതിനോടൊപ്പം മരച്ചീനിയിൽ നിന്നുള്ള വിളവും ഇലകളുടെ വിസ്തീർണ്ണവും കൂടുന്നതാണെന്നും ചാലക്കുടി അഗ്രോണമിക് റിസർച്ച് സ്റ്റേഷനിൽ നടത്തിയ പഠനങ്ങൾ തെളിയിക്കുകയുണ്ടായി.

P. K. Sushama
G. R. Pillai
T. P. George
Jose Mathew

Agronomic Research Station,
Chalakudy, Trichur, Kerala.

References

Enyi, B. A. C. 1972. Effect of shoot number and time of planting on growth, development and yield of cassava. *J, Hort. Sci.* **47** (4): 457-466

Ramanujam, T. and Indira, P. 1978. Linear measurement and weight methods for estimation of leaf area in cassava and sweet potato. *J. Root Crops* 4 (2) : 47-50.

Ramanujam, T. and Indira, P. 1980. Canopy structure on growth and development of cassava. Proceedings of the National Seminar on Tuber Crops Production Technology, TNAU, pp. 25-32.

Sinha, S. K. and Nair, T. V. R. 1971. Leaf area during growth and yield capacity of cassava. *Indian J. Gen. and P1. Breeding* **31** (1): 16-20.

[M. S. received on 6-11-1981]