a scope for improvement of these character by adopting suitable selection procedures. Other characters could be worked upon through hybridization as they exhibited high heritability estimates with low genetic advance. The high heritability for TSS as per the present study is in accordance with the earlier reports by Padda *et al.*, (1973) and Patil *et al.*, (1986). The value of heritability for pyruvic acid was observed to be low (14.99 per cent).

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EFFECT OF IRRIGATION LAYOUTS UNDER VARYING IRRIGATION REGIMES ON LABLAB VARIETIES

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ABSTRACT

Field experiments were conducted during monsoon (1991) and summer (1992) at the Tamil Nadu Agricultural University, Coimbatore to study the effect of different irrigation levels and irrigation layouts on lablab varieties (*Lablab purpureus* var. *typicus* (L) sweet) Co. 11 and Co.12 to get maximum returns. The results revealed that the irrigation treatment 0.6 IW/CPE recorded higher number of green pod yield and haulm yield under both the seasons. Among the irrigation layouts, paired (double) row furrow with a spacing of 90/2x15 cm performed better and among varieties, Co.12 was better than Co.11.

KEY WORDS : Irrigation regimes, irrigation layouts, green pod yield, WUE

Protein deficiency is a common phenomenon in India. Majority of people in the country meet their protein requirement from pulses. Irrigation management for water economy is important. The immence need for manifold increase in the yield of pulse vegetables, opens a new vista on efficient water use. Lack of scientific water management practices for pulse vegetables necessitates this study as more valid. Scheduling of irrigation to meet the crop demand will improve the efficiency of this scarce water resource. Finding suitable irrigation layout as well as interval to use the water economically without affecting the yield is essential. Selection of suitable variety to get higher yield and income is also necessary to be evaluated. In this context an attempt has been made to combine the effect of various layout as well as intervals of irrigation to enhance the water use efficiency of lablab.

MATERIALS AND METHODS

The field experiment was conducted during monsoon 1991 and summer 1992 in field No.36 of the Tamilnadu Agricultural University Farm, Coimbatore. The soil of the experimental site was sandy clay loam and sandy loam with less in available nitrogen, medium in available phosphorus and high in available potassium. Experiment was laid out in strip plot design with three replications accommodating irrigation regims in vertical strips

and field layouts and varieties in horizontal strips. The treatment details were :

a) Vertical strip treatments

Factor I. levels of irrigation

1. Irrigation at IW/CPW ratio of 0.30 (I_1)
2. Irrigation at IW/CPE ratio of 0.45 (I_2)
3. Irrigation at IW/CPE ratio of 0.60 (I_3)

b) Horizontal strip treatments

Factor II. Field layouts

1. Ridges and furrows : 45x15 cm (L1)
2. Paired (Double) row furrows : 60/2 = 30 x 22.5 cm (L_2)
3. Paired (Double) row furrows : 90/2 = 45x15 cm (L_3)

Factor III. Varieties

1. Lablab : Co.11 (V_1)
2. Lablab : Co.12 (V_2)

The gross plot size was 4.5 x 3.6 m^2 adopting the row spacing of 45, 60 and 90 cm for field layout L1, L2 and L3, respectively and plant spacing of 15 cm in L1 and L3; 22.5cm in L2, which maintained similar plant populations in all plots. The net plot size after discarding borders was 4.2x2.7m^2 for L1 and L3 and 4.05 x 3.0m^2 for L2. Viable seeds of lablab varieties Co.11 and Co.12 were sown in lines. Irrigation was given to the plots immediately after sowing and life irrigation on third day after sowing to all the treatmental plots. Subsequent irrigations were given as per the treatments. For scheduling the irrigation based on climatological approach evaporation values from USWB Class A open pan evaporimeter erected at Agricultural Meteorological observatory were recorded everyday. The depth of irrigation was fixed at 5 cm. The amount of water let into each plot was maintained at six litres per second using the costant irrigation module, fixed at the experimental field.

The recommended package of practices were followed for raising a healthy crop. The tender green pods were harvested six times at weekly intervals starting from 60 DAS. After the final picking, the haulm was removed. Five plants at random from net area of each plot were selected. For recording the parameters like number of pods per plant, greenpod yield, haulm yield, crude protein content, N uptake, P and K uptake. The data were statistically analysed following the procedure described by Panse and Sukhatme (1964) for strip plot design.

RESULTS AND DISCUSSION

Yield attributes and quality parameter

Irrigation regimes recorded significant effect on number of pods per plant. Irrigation given at IW/CPE ratio of 0.60 (I_3) recorded more number of pods per plant than 0.45 (I_2) and 0.30 (I_1) IW/CPE ratios and 0.30 IW/CPE ratio registered the lowest number of pods (Table 1). This was due to increased stress at flowering that reduced the number of pods considerably. In the case of varieties, Co.12 registered more number of pods per plant.

Green pod yield was significantly affected by irrigation levels. Irrigating the field at 0.6 IW/CPE (I_3) ratio recorded the highest green pod yield followed by 0.45 IW/CPE (I_2) and 0.30 IW/CPE (I_1). The treatment 0.6 IW/CPE produced significantly higher yield, which was 12.5 per cent and 25.8 per cent higher than I_2 and I_1 respectively. Increased yield was achieved due to the optimum soil moisture available to influence the yield components like number of flowers per palnt (11.5 and 24.2 per cent increase over 0.45 and 0.30 IW/CPE ratio). The treatment 0.6 IW/CPE ratio

Table 1. Effect of treatments on number of pods per plant, yield, haulm yield, crude protein content

Treat-ment	Number of pods per plant	Green pod yield (Kg ha^{-1})	Haulm yield (Kg ha^{-1})	Crude protein content (%)	Water use efficiency kg/ha/cm
I_1	13.7	5954	6430	1.93	292
I_2	15.3	6663	7150	1.92	271
I_3	17.0	7493	7951	1.90	260
SE_d	0.45	158.7	67.6	0.01	
CD	1.23	440.7	187.7	NS	
V_1	14.5	6315	6792	2.02	259
V_2	16.1	7092	7562	1.81	289
SE_d	0.20	76.9	91.2	0.02	
CD	0.45	171.3	203.2	0.05	
L_1	15.3	6778	7321	1.91	234
L_2	15.3	6715	7155	1.92	289
L_3	15.3	6618	7055	1.92	300
SE_d	0.25	94.2	111.7	0.03	
CD	NS	NS	NS	NS	

Treatment details as in the text

resulted in higher yields of greengram as reported by Prasad *et al.* (1990) and Iruthayaraj *et al.* (1988). The yield difference produced by the irrigation layouts, was not significant. Among varieties Co.12 had an increased yield over Co.11 by 12.3 per cent.

Increased haulm yield was recorded at 0.6 IW/CPE ratio. Among irrigation layouts, though the effect was not significant, higher haulm yield was registered at normal furrows. Regarding varieties, Co.12 (V.2) had more haulm yield than that of Co.11 (V.1). The increased leaf area index and dry matter production might have resulted in increased haulm yield.

Crude fibre content is a genetic trait and it was not significantly affected by irrigation levels and layouts. The variety Co.11 had the fibre content of 2.02 per cent.

Total water requirement

The total water used under different irrigation combinations varied from 184 mm to 344 mm.

The water use efficiency is expressed in terms of economic produce obtained for unit quantity of water used. The water use efficiency was higher at the irrigation level of 0.30 IW/CPE (I_1) than 0.45 IW/CPE (I_2) and 0.60 IW/CPE (I_3). Irrigations at lower regime of I_1 recorded the maximum water use efficiency of 292 kg pods per ha cm of water used. This was due to less water consumption in the treatment than 0.45 and 0.60 IW/CPE ratios. With regard to irrigation layouts, paired row furrow 90 cm (L_3) recorded higher WUE than paired row furrow 60 cm (L_2) and normal furrow (L_1). Saving of water in L_3 over L_1 was 28 per cent and L_2 recorded a saving of 24 pe cent as compared to L_1. Among varieties, V_2 (Co.12) was found to be better than V_1 in recording higher water use efficiency.

It is concluded that the treatment 0.6 IW/CPE scheduled at an interval of 20 days and 12 days for monsoon and summer season, respectively, with an irrigation depth of 5 cm accounting for a cumulative pan evaporation of 8.33 cm is useful in areas of adequate water availability. Regarding irrigation layouts, paired (double) row furrow - 90 cm performed better than paired (double) row furrow - 60 cm and normal furrows. Among varieties, Co.12 wass considered better than Co.11. The net income was also the highest under 0.6 IW/CPE ratio with the variety Co.12 under paired (double) row furrow of 90/2 = 45 x 15 cm.

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THE BIOLOGY OF POMEGRANATE FRUITBORER, *Deudorix isocrates*

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ABSTRACT

The biology of pomegranate fruitborer, *Deudorix isocrates* was studied at the Horticultural Research Station, Yercaud, Tamil Nadu. The females laid the eggs on flowers, fruits, stem, stalk and on leaves either singly or in groups of 2 to 7. The total developmental period from egg to adult emergence ranged from 33 to 41 days with 5 larval instars. The egg, larva, prepupa and pupal periods ranged from 4 to 7, 19 to 25, 2 to 3 and 7 to 10 days respectively. The adult longevity, preoviposition and oviposition period varied from 7 to 11, 3 to 5 and 3 to 6 days with an average fecundity of 31.4 eggs/female. The life table studies indicated that the net reproductive rate (Ro) was 14.68 and the mean generation time (Tc) was 44.72 days.

KEY WORDS : Pomegranate, biology, fruitborer, life table