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Yield and Quality of Oriental Tobacco as influenced by Time of Planting and Method of Curing

P Ranga Nethaji, Y Reddi Ramu, V Sumathi and V Umamahesh
Department of Agronomy, S V Agricultural College, Tirupati 517 502

ABSTRACT

A field experiment was conducted during *rabi*, 2013 in farmer's fields of P.T.M. mandal, Chittoor district, Andhra Pradesh to study the effect of time of planting and method of curing on yield and quality of oriental tobacco. Planting of oriental tobacco during second fortnight of October and cured under 25 percent ventilated polyhouse curing method resulted in higher cured leaf yield and better leaf quality due to favourable weather parameters during crop growth period.

Key words : Curing methods, Oriental tobacco, Planting time, Quality, Yield.

Oriental tobacco is an important component of the world's premium blend cigarettes. In recent past due to increased awareness of ill effects of smoking the consumers shift their preference towards soft blended light type of cigarettes with consistent increase in demand for oriental tobacco all over world. Oriental tobacco is a low input requiring, labour intensive and remunerative crop grown in semi-starved soils with poor fertility under rainfed conditions. The farmers of Chittoor and Anantapur districts of Andhra Pradesh are growing oriental tobacco during *rabi* season as the agro climatic conditions are similar to those areas where world's finest quality oriental tobacco is produced. The popularity of blended cigarettes gaining importance for the production of oriental tobacco and efforts are being made to develop suitable agro techniques for the production. Therefore, oriental tobacco can be a potential crop to be in the introduced area after assessing the normal requirements of the crop. As the crop is grown under rainfed condition, it is important to explore optimum planting time and suitable curing method for obtaining higher yield and better leaf quality. In cognizance of the above, the present study was under taken to find out the optimum time of planting and suitable curing method for achieving best results.

MATERIAL AND METHODS

A field investigation was carried out during *rabi*, 2013 in farmer's fields of P.T.M. mandal, Chittoor district, Andhra Pradesh to study the effect of time of planting and methods of curing on yield and quality of oriental tobacco. The soil of the experiment field was sandy clay loam in texture having low in available nitrogen (263.4 kg ha^{-1}), organic carbon (0.42%) and medium in available phosphorus (49.0 kg ha^{-1}) and potassium (225.0 kg ha^{-1}), alkaline in reaction (pH 8.1) and EC of 0.40 ds m^{-1}. The field experiment was laid out in Randomized Block Design with factorial concept and replicated thrice. The experiment consists of 12 treatments with combination of four planting dates *viz*., T_1 (first fortnight of October), T_2 (second fortnight of October), T_3 (first fortnight of November) and T_4 (second fortnight of November and three curing methods *viz*., C_1 (open rack sun curing), C_2 (25 per cent ventilated polyhouse curing) and C_3 (50 percent polyhouse curing. The oriental tobacco *cv*., Izmir seedlings was transplanted using 50-60 days old seedlings at a spacing of 35 × 10 cm. The recommended dose of 20 kg N, 60 kg P_2O_5 and 60 kg K_2O ha^{-1} was applied through urea, single super phosphate and sulphate of potash. Full dose of nitrogen, phosphorus and potassium were applied as basal at the time of transplanting. Inter culture and weeding were followed as per requirements. Four primings were done in October planted crop and three primings in November planted crop and curing is done as per the treatments. Observations on cured leaf yield were recorded. Curing leaf samples were collected from each plot for chemical analysis. The samples were

Table 1. Cured Leaf Yield (kg ha^{-1}) of oriental tobacco as influenced by time of planting and method of curing.

Treatments	C_1	C_2	C_3	Mean
T_1	644	742	633	673
T_2	716	856	802	791
T_3	494	564	447	502
T_4	342	371	384	365
Mean	549	633	567	
		SEm ±		CD (P= 0.05)
Time of planting (T)		25.3		74.2
Curing(C)		21.9		64.2
T × C		43.8		NS

Table 2. Nicotine content (%) of oriental tobacco as influenced by time of planting and method of curing.

Treatments	C_1	C_2	C_3	Mean
T_1	1.00	0.68	0.82	0.83
T_2	1.06	0.75	0.90	0.90
T_3	1.17	1.12	1.39	1.22
T_4	1.76	1.44	1.69	1.63
Mean	1.25	0.99	1.20	
		SEm ±		CD (P= 0.05)
Time of planting (T)		0.032		0.10
Curing(C)		0.028		0.08
T × C		0.056		0.19

oven dried at 70°C and used for analysis of nicotine, total sugars and potassium content.

RESULTS AND DISCUSSION

Planting of oriental tobacco during second fortnight of October recorded the highest cured leaf yield (791 kg ha^{-1}) which was significantly superior to either early or later two plantings. This might be due to higher level of growth parameters which act as both source and sink. Better performance of crop planted during October second fortnight was due to favourable weather parameters resulting in higher marketable yield. Similar results were reported by Sannibabu *et al*. (1986) in FCV tobacco and Prasad Rao *et al.* (2002) in oriental tobacco. The lowest cured leaf yield (365 kg ha^{-1}) was recorded in the crop planted during November second fortnight which might be due to lesser rainfall received and lower moisture availability during the active growth stages of crop. The results were in accordance with the findings of Venkata Ramana Reddy (2000).

Among the different methods of curing the highest cured leaf yield was recorded in the 25 per cent ventilated curing method which was significantly superior to the other methods. This might be due to availability of better curing conditions *viz*., the favourable temperature and humidity in the polyhouse which prevent the excess drying of leaves (Bae, 1987). The lowest cured leaf yield was recorded in the open rack curing method due to direct exposure of leaves to sun during curing process. The leaves that were sundried had generally greater rate of weight loss indicating moisture release compared to those cured conventionally inside a curing house. Similar results

Table 3. Total Sugars (%) of oriental tobacco as influenced by time of planting and method of curing.

Treatments	C_1	C_2	C_3	Mean
T_1	19.20	21.61	19.23	20.01
T_2	18.10	21.50	18.97	19.52
T_3	14.37	18.77	16.67	16.60
T_4	13.10	16.33	15.10	14.84
Mean	16.19	19.55	17.49	
		SEm ±		CD (P= 0.05)
Time of planting (T)		0.170		0.51
Curing(C)		0.120		0.34
T × C		0.230		0.81

were reported by Dulay *et al*. (1987) in burley tobacco.

The interaction between the time of planting and curing method did not exert any significant effect on cured leaf yield.

Leaf nicotine per cent was significantly influenced by time of planting (Table 2). Early planting during first fortnight of October recorded lower amount of nicotine (0.83%) which was in comparable with the crop planted during October second fortnight (0.90%), whereas delayed planting during November second fortnight recorded the highest nicotine content (1.63%) which might be due to reduced moisture availability during post flowering period resulted in shortened duration of carbohydrate metabolism leading to increased accumulation of nicotine (Weybrew *et al*., 1983).

Among the methods of curing, the lowest nicotine content was registered in the 25 per cent ventilated polyhouse curing (0.99%) which was significantly lower than the other methods of curing. This might be due to favourable temperature and humidity conditions during curing results in production of cured leaves without excess drying (Bae, 1987). The highest nicotine content (1.25%) was recorded in the open rack curing method. Significant interaction effect between the planting time and method of curing revealed that planting of tobacco during first fortnight of October and cured under 25 per cent ventilated polyhouse registered the lowest nicotine content which was in comparable with crop planted in October first fortnight cured under 25 per cent ventilated polyhouse, whereas the highest nicotine content was registered in the crop planted during November second fortnight cured in open rack sun curing.

Total sugars content was high in early planted crop *i.e.*, first fortnight of October (20.01%) which was statistically on par with crop planted in October second fortnight (19.52%), while the late planting during second fortnight of November registered lower amount of total sugars (14.84%). This might be ascribed to low moisture availability during the post flowering period leading to delayed transition of N metabolism to carbohydrate metabolism.

The total sugars has shown significantly higher values in 25 per cent ventilated polyhouse curing method (19.55%) compared to other curing methods which might due to increase in the air temperature in polyhouse compared to other curing methods which have profound influence on the starch degradation which hydrolyzes to reducing sugars during curing.

Significant interaction effect was found between the time of planting and curing methods (Table 3). The highest amount of total sugars (21.61%) was recorded in the crop during October first fortnight cured with 25 per cent ventilated polyhouse curing compared to other treatmental combinations.

From the present study it can be concluded that planting of oriental tobacco during second fortnight of October and cured with 25 per cent ventilated polyhouse curing method is ideal for higher productivity and better leaf quality.

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