

EVALUATION OF FCV TOBACCO ADVANCED BREEDING LINES FOR YIELD AND QUALITY UNDER NORTHERN BLACK SOILS OF ANDHRA PRADESH

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(Received on 25th November, 2011)

FCV tobacco in Andhra Pradesh is grown in an area of 40,000 ha under black soil conditions in East & West Godavari, Krishna, Guntur and Prakasam districts. The productivity of FCV tobacco under black soils is about 1800 kg/ha. In order to improve the productivity, a breeding programme was undertaken and the subsequently selections were made from the segregating generations. Nine selections viz., V-4377, V-4379, V-4380, V-4388, V-4391, V-4392, V-4393, V-4404 and V-4405 were advanced for testing under replicated trial along with three controls viz., Hema, VT-1158 and Siri at CTRI farm, Katheru, Rajahmundry for three seasons (2007-08 to 2009-10). Among the entries evaluated, V-4380 and V-4388 recorded significantly higher yields of 16 and 13% in green leaf, 17 and 14% in cured leaf, 18 and 13% in bright leaf and 18 and 14% in grade index respectively over the better control, Siri. The seasons and seasons x treatments interaction differed significantly. The best season for all the yield attributes was 2007-08. Lines V-4380 and V-4388 were in multi-location trials under All India Network Research Project on Tobacco.

INTRODUCTION

Flue-cured Virginia tobacco (*Nicotiana tabacum* L.) grown under black soils (Vertisols) is used as neutral filler in manufacture of cigarettes. The FCV tobacco grown in black soils are located in the districts of Khammam, Karimnagar, Warangal, East and West Godavari, Krishna, Guntur and Prakasam which constitutes the Northern Black soils (NBS). The productivity of NBS tobacco is around 1800 kg/ha (Tobacco Board, 2011). There is a need to increase the productivity of NBS tobacco from the present level to meet the ever increasing cost of production and to facilitate the release of additional land to non-tobacco crops (Sarala *et al.*, 2005). The aim of present breeding programme is development of a high yielding and better quality tobacco variety for NBS conditions.

MATERIALS AND METHODS

A number of selections were developed using KST-35, Hema, V-3886, Kanthi, Coker-123 and CY-142 as parents in a hybridization programme followed by pedigree methods of selection. Nine advanced selections from the breeding lines were evaluated in randomized block design along with three check varieties viz., Hema, VT-1158 and Siri at CTRI farm, Katheru during 2007-08 to 2009-10 with four replications. The lines evaluated are V-4377, V-4379, V-4380, V-4388, V-4391, V-4392, V-4393, V-4404 and V-4405. Observations recorded on yield parameters viz., green leaf, cured leaf, bright leaf yield and grade index. The yield data was analyzed statistically (Gomez and Gomez, 1984). Parameters of chemical quality viz., nicotine, reducing sugars and chlorides were also estimated.

RESULTS AND DISCUSSION

Results of combined analysis for yield characters revealed that the treatments differed significantly for all the yield characters (Table 1). The seasons, treatments and seasons x treatments interaction were also differed significantly. Among the selections, leaf yields of all types were significantly higher in V-4380 and V-4388 compared to the better control Siri (Table 1). Compared to all the entries and controls, maximum mean leaf yields were recorded by V-4380 followed by V-4388 (Table 1). The advanced breeding line V-4380 recorded maximum green leaf yield (13568 kg/ha), cured leaf (1958 kg/ha), bright leaf (1202 kg/ha) and grade index (1588) with an improvement of 16, 17, 18 and 18% over Siri respectively. Next better performer, V-4388 showed an improvement of 13, 14, 13 and 14% in green leaf (13156 kg/ha), cured leaf (1907 kg/ha), bright leaf yields (1155 kg/ha) and grade index (1533) respectively over Siri.

Table 1: Yield parameters in different seasons (2007-08 to 2009-10)

Entries	Green leaf (kg/ha)	Cured leaf (kg/ha)	Bright leaf (kg/ha)	Grade index
V-4377	11184	1685	980	1314
V-4379	12107	1778	1059	1402
V-4380	13568*	1958*	1202*	1588*
V-4388	13156*	1907*	1155*	1533*
V-4391	11536	1779	1091	1419
V-4392	12482	1799	1089	1445
V-4393	11058	1621	957	1258
V-4404	12120	1791	1061	1402
V-4405	11640	1728	1044	1372
VT-1158 (c)	9987	1523	906	1188
Hema (c)	9372	1422	972	1125
Siri (c)	11689	1673	1021	1340
Mean	11658	1722	1036	1366
SEm±	290	50	32	39
CD (P=0.01)	1055	182	118	143
CV (%)	8.61	10.04	10.81	9.97
Seasons				
2007-08	13343	1889	1132	1451
2008-09	10394	1677	1023	1377
2009-10	11238	1599	955	1269
SEm±	200	23	17	19
CD (P=0.01)	920	106	77	88
CV (%)	11.89	9.33	11.22	9.75

* Significantly superior to better control (P=0.01)

Seasons differed significantly for all the four yield characters studied. The best season for all the yield characters was 2007-08 with an overall means of 13343 kg/ha green leaf, 1889 kg/ha cured leaf, 1132 kg/ha bright leaf and grade index of 1451. The interaction between seasons and treatments were significant and the entries V-4380 and V-4388 performed better during all the seasons and exhibited more plasticity.

Nicotine, reducing sugars and chloride contents ranged from 2.35 to 2.91% , 11.36 to 16.71% and 0.94 to 1.37% respectively (Table 2). All these quality parameters were found to be in acceptable limits (Deo Singh *et al.*, 2003).

Based on the performance of the selections over three years, it was concluded that the selections V-4380 and V-4388 showed

significantly higher yields with an improvement of 16 and 13% in green leaf, 17 and 14 % in cured leaf, 18 and 13% in bright leaf and 18 and 14% in grade index, respectively over the better control Siri and were proposed for testing in the Initial Varietal Trial (IVT) under All India Network Research Project on Tobacco (AINRPT). Once the superiority of these lines is proved in AINRPT trials, these entries can be released for commercial cultivation. These selections can further be utilised in the breeding programme to increase the yield potential of tobacco.

ACKNOWLEDGEMENTS

The authors express thanks to the Director, CTRI and Rajahmundry for the constant encouragement and facilities provided during the course of investigation.

Table 2: Chemical quality characteristics of the advanced breeding lines

S.NO.	Entries	Nicotine (%)	Reducing sugars (%)	Chlorides (%)
1.	V-4377	2.41	16.39	1.00
2.	V-4379	2.72	14.69	0.94
3.	V-4380	2.91	11.36	1.37
4.	V-4388	2.87	14.42	1.05
5.	V-4391	2.40	13.83	1.33
6.	V-4392	2.62	13.33	1.29
7.	V-4393	2.72	13.24	1.03
8.	V-4404	2.55	14.02	1.21
9.	V-4405	2.42	12.02	1.20
10.	VT-1158 (c)	2.35	15.29	1.12
11.	Hema (c)	2.42	16.71	1.18
12.	Siri (c)	2.61	13.39	1.21

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