

Relative Performance of Bidi Tobacco (*Nicotiana tabacum* L.) Varieties to Different Levels of Nitrogen and Topping under Rainfed Conditions in Vertisols of Andhra Pradesh

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ABSTRACT

A field experiment was undertaken at Regional Agriculture Research Station, Nandyal, Andhra Pradesh during 2017-18 on vertisols under rainfed condition to study the Relative performance of bidi tobacco (*Nicotiana tabacum* L.) varieties to different levels of nitrogen and topping. The treatments consisted of two varieties (ABD 119 and Nandyal Pogaku-1) as main plots, three nitrogen levels (90,110 and 130 kg ha⁻¹) as sub plots and three topping levels (12,15 and 18 leaf stage) as sub sub plots in split split plot design and replicated thrice. ABD-119 has recorded 1342 kg ha⁻¹ of cured leaf yield and Nandyal Pogaku-1 has recorded 1343 kg ha⁻¹ which was statically at par. Higher cured leaf yield of 1420 kg ha⁻¹ was recorded at 130 N kg ha⁻¹ which was at par with 110 N kg ha⁻¹ (1370 kg ha⁻¹). Among topping levels tested 15 leaf stage recorded 1394 kg ha⁻¹ which was at par with 18 leaf stage (1388 kg ha⁻¹). Higher net returns was observed at 130 kg N ha⁻¹ (Rs 70,575/ha) with BCR of 2.64 and at 15 leaf topping stage (Rs 68,745 ha⁻¹ and BCR of 2.61). Nicotine and reducing sugars were not influenced by different nitrogen levels as well as topping stages.

Key words: Nitrogen, Topping, Cured leaf yield, Economics, Leaf quality

INTRODUCTION

Tobacco (*Nicotiana tabacum* L.) is the most important non-food crop cultivated in more than 100 countries. It is one of the most important commercial crops of India, valued for its leaf containing nicotine. It is grown over an area of 0.46 million ha with production of 0.84 million tones with

productivity of 1842 kg/ha (Agriculture statistics at a glance 2016 at www.agricoop.nic.in & <http://eands.dacnet.nic.in>). In Andhra Pradesh, bidi tobacco is commercially cultivated under rainfed black soils in late rainy season i.e., September (2nd fortnight) month.

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Usually, farmers apply recommended fertilizer dose in two split doses i.e one at basal and one as top dressing at 30 days after transplanting (DAT). The package of production technology for bidi tobacco crop involves growing of improved varieties, key agronomic operations including application of optimum dose of nitrogen and topping. Nandyala pogaku-1 released during 2015 from All India Network Project on Tobacco, Regional Agricultural Research Station, Nandyal for cultivation in vertisols of Andhra Pradesh under rainfed condition. Hence, the present study was conducted to study the response of bidi tobacco varieties to levels nitrogen and topping.

MATERIAL AND METHODS

A field experiment was undertaken at Regional Agriculture Research Station, Nandyal, Andhra Pradesh during 2017-18 on vertisols under rainfed condition to study the Relative performance of bidi tobacco (*Nicotiana tabaccum* L.) varieties to different levels of nitrogen and topping. The soil of experimental site was medium deep black, moderately alkaline (pH-8.2), non saline (EC- 0.11 ds/m), low in nitrogen (152.3 kg ha⁻¹), medium in available P₂O₅ (32.5 kg ha⁻¹) and high in available K₂O (350.9 kg ha⁻¹). The treatments consisted of two varieties (ABD 119 and Nandyal Pogaku-1) as main plots, three nitrogen levels (90,110 and 130 kg ha⁻¹) as sub plots and three topping levels (12,15 and 18 leaf stage) as sub sub plots in split split plot design and replicated thrice. The row-to-row and plant to spacing was 75 cm. Crop management practices like land preparation, N, P and K fertilizer application, weed control, intercultivation, need based plant protection, de suckering and sun curing were followed as recommended for local area. The nursery was raised on 27-07-17 and healthy seedlings were transplanted on 09-09-17. The crop was harvested on 02-02-18. The experiment was conducted under rainfed condition. An amount of 519.6 mm of rainfall was received during crop season (July to December) during 2017. Rainfall distribution was highly erratic

coupled with prolonged dry spells i.e. 307 mm in 17 rainy days in nursery and 212.6 mm in 13 rainy days in standing crop after transplanting. The data were recorded for plant height, leaf length, leaf width and cured leaf yield at harvest. Leaf quality parameters like nicotine and reducing sugars were analysed at CTRI, Rajahmundry. The mean values of all the quantitative characters were subjected to statistical analysis by adopting Fisher's method of analysis of variance as outlined by Gomez and Gomez². The level of significance used in 'F' test was at 5 per cent.

RESULTS AND DISCUSSION

Response of varieties

The varieties did not significantly differed for growth parameters, cured leaf yield, economics and leaf quality (Table 1). Similar genetic constitutions of the varieties lead to insignificant results in the growth parameters of plant might have contributed for recording on par cured leaf yields. Similar results were also reported by Gupta *et al.*³, in bidi tobacco.

Response of varieties to nitrogen levels

Plant height did not differed due to nitrogen levels. Significantly higher leaf length (38.5 cm), leaf width (14.2 cm), cured leaf yield (1420 kg ha⁻¹), net returns (Rs 70,575/ ha) with BCR of 2.64 were recorded with application of 130 kg N ha⁻¹ which was at par with 110 kg N ha⁻¹ (37.6 cm, 13.8 cm, 1370 kg ha⁻¹, Rs 66,825/ha and 2.56 respectively). Patel *et al.*⁴, also reported that application of nitrogen upto 220 kg ha⁻¹ has significantly increased the growth score and leaf width of bidi tobacco. Gediya *et al.*⁵, concluded that A-119 bidi tobacco variety responds to higher level of nitrogen level compared to lower level of 180 kg N ha⁻¹.

Response of varieties to topping stages

Significantly higher plant height (70.8 cm) was observed when plants were topped at 18 leaf stage and significantly lower (49.7 cm) with 12 leaf stage topping. Among three topping stages tested, significantly higher leaf length (39.0 cm) and leaf width (14.2 cm)

were recorded with topping at 12 leaf stage. Significantly higher cured leaf yield (1394 kg ha⁻¹), net returns (Rs 68,745/ ha) with BCR of 2.61 were recorded with topping at 15 leaf stage and was at par with topping at 18 leaf stage (1388 kg ha⁻¹, Rs 68,265/ha and 2.60 respectively). Sangave *et al.*⁸, also concluded that topping at 16-18 leaf stage on main stem with recommended dose of fertilizer is better for getting higher yield and superior quality tobacco. Similarly Bglar and Behghan reported that topping at optimum growth stage and sucker control with chemicals enhanced tobacco leaf quality in field.

Leaf quality parameters

Leaf nicotine and reducing sugars did not differed with treatments. These results are similar to the finding of research results of Damodar Reddy¹⁴. This variation might be due to the similar genetic makeup factors of the cultivars. Sangave *et al.*⁸, reported that nitrogen, nicotine, chloride, potassium and ash increased with increase in fertilizer level or recommended dose of fertilizer whereas reducing sugar content decreased. However, Marowa *et al.*⁹, reported that there is still need to establish the nitrogen and priming levels which may vary with place and variety.

Table 1. Effect of different levels of N and toppings on growth, cured leaf yield, economics and leaf quality of bidi tobacco varieties

Treatments	Plant height (cm)	Leaf length (cm)	Leaf width (cm)	Cured leaf yield (kg/ha)	Gross returns (Rs/ha)	Cost of cultivation (Rs/ha)	Net returns (Rs/ha)	BCR	Nicotine (%)	Reducing sugars (%)
Varieties										
ABD-119	60.0	37.1	13.4	1342	107360	42775	64585	2.51	5.23	2.77
Nandyal Pogaku-1	61.7	37.6	14.0	1343	107440	42775	64665	2.51	4.95	2.84
S.Em±	2.96	0.46	0.39	23.4					0.08	0.18
C.D.(P=0.05)	NS	NS	NS	NS					NS	NS
N Levels										
90 Kg/ha	57.0	35.9	13.0	1237	98960	42525	56435	2.33	5.12	2.79
110kg/ha	62.0	37.6	13.8	1370	109600	42775	66825	2.56	5.10	2.79
130kg/ha	63.6	38.5	14.2	1420	113600	43025	70575	2.64	5.04	2.85
S.Em±	1.92	0.38	0.17	16.1					0.19	0.17
C.D.(P=0.05)	NS	1.2	0.6	52					NS	NS
Topping stage										
12 Leaf stage	49.7	39.0	14.2	1244	99520	42775	56745	2.33	5.11	2.88
15 Leaf stage	62.1	36.9	13.6	1394	111520	42775	68745	2.61	5.13	2.79
18 Leaf stage	70.8	36.2	13.3	1388	111040	42775	68265	2.60	5.02	2.75
S.Em±	1.05	0.42	0.25	22.9					0.13	0.08
C.D.(P=0.05)	3.1	1.2	0.7	67					NS	NS
Interactions	NS	NS	NS	NS					NS	NS

CONCLUSION

ABD-119 performing well on par with Nandyal pogaku-1 and responding to higher nitrogen levels and topping levels for higher cured leaf yield

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