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# EFFECT OF N AND K LEVELS ON PROPORTION OF LAMINA AND MIDRIB IN DIFFERENT LEAF POSITIONS OF FCV TOBACCO

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Flue-cured tobacco grown in Northern light soils is semi-flavourful and is essentially graded based on plant position, as the chemical and physical quality characters of leaf depend on the position of leaf on the plant. Particularly, lamina percentage is used as one of the several criteria for commercial release of varieties. The lamina or strip yield of cured leaf of flue-cured tobacco is important to the manufacturer of cigarettes as higher the proportion of lamina, the greater will be the economic value. Absolute values for percentage lamina reported in the literature generally range from 70 to 80% when averaged proportionately over whole plant and is generally higher in upper than lower stalk position leaves. Though the average figures are available for the proportion of lamina and midrib of cured leaf in the literature, the information available on the effect of good agricultural practices, weather conditions etc. on these aspects under irrigated Alfisols is very meagre.

Field experiment was conducted during winter (*rabi* ) season of 2007-08 and 2008-09 at the research farm of CTRI Research Station, Jeelugumilli (17 11' 30" N and 81 07' 50" E at 150 m above mean sea-level), West Godavari district in Andhra Pradesh under semi-arid tropical climate. The soil was sandy loam in surface layers (0-22.5 cm) and sandy clay in deeper layers (22.5-45 cm) and classified Typic Haplustalfs, with pH 6.30 (1:2.5) and electrical conductivity 0.20 dS/m (1:2.5). Treatments comprised combination of three nitrogen levels, viz. 90, 115 and 140 kg N/ha and two levels of potash viz. 120 and 140 kg $K_2O$/ha application, replicated five times in a randomized block design. Package of practices for growing FCV tobacco (cv. Kanchan) in Northern light soils (NLS) area were followed and N and K were applied as per the treatments in three splits. Cured leaf samples were collected from different primings and pooled according to the plant position viz., Priming (P), Lugs and Cutters (X), Leaf (L) and Tips (T). About 5 % of the leaves from each position were collected replication-wise, midrib was separated from the lamina and data were recorded for estimation of lamina : midrib percentage. The data were subjected to statistical analysis as per the standard methods and pooled data were presented.

Cured leaf yield increased with increase in levels of nitrogen and potassium (Table 1). Cured leaf yield at 140 kg N/ha being on a par with 115 kg N/ha was significantly higher than 90 kg N/ha. Cured leaf yield increased with increase in the levels of potassium at three levels of nitrogen. The overall cured leaf in P position ranged from 4.91 to 9.21% with a mean of 7.16%, while that of X position ranged from 15.36 to 21.14% with a mean of 19%, that of L position ranged from 49.28 to 52.46% with a mean of 50.98% and that of T position ranged from 20.57 to 27.25% with a mean of 22.86%. Among the treatments, the proportion of P and X position leaf decreased and L and T position leaf increased with increase in N dose. The proportion of cured leaf in P position was 8.09 and 6.01% while that in X position was 20.78 and 17.11% at 90 and 140 kg N/ha, respectively. Though, the increase in cured leaf proportion in L position due to different N and K levels was not significant there was an increase in the per cent cured leaf with increase in N level from 90 to 140 kg N/ha. However, the proportion of cured leaf in T position was significantly higher at 140 kg N/ha (24.81%) than that at 90 kg N/ha (20.89%). It is inferred that the higher per cent of cured leaf in P and X positions at lower N doses resulted in lower per cent of cured leaf in L and T positions and the lower proportion of cured leaf in P and X positions at higher N levels was compensated by higher proportions of cured leaf in T position.

**Table 1: Total cured leaf yield (kg/ha) and cured leaf (%) in P, X, L and T positions as affected by nitrogen and potassium levels (pooled)**

| N : $K_2O$ level (kg/ha) | Cured leaf (kg/ha) | Cured leaf in different plant positions (%) | | | |
|---|---|---|---|---|---|
| | | P position | X position | L position | T position |
| 90 : 20 | 2034 | 7.86 | 20.93 | 50.55 | 20.65 |
| 90 : 140 | 2127 | 8.31 | 20.63 | 49.92 | 21.13 |
| 115 : 120 | 2328 | 7.52 | 19.05 | 51.45 | 22.06 |
| 115 : 140 | 2411 | 7.24 | 19.15 | 50.04 | 23.69 |
| 140 : 120 | 2476 | 6.30 | 17.38 | 51.63 | 24.66 |
| 140 : 140 | 2549 | 5.72 | 16.84 | 52.26 | 24.95 |
| Mean | 2321 | 7.16 | 19.00 | 50.98 | 22.86 |
| **SEm ±** | **44** | **0.34** | **0.43** | **0.82** | **0.58** |
| **CD (P=0.05)** | **121** | **0.93** | **1.20** | **NS** | **1.61** |

In general, lamina per cent increased and midrib per cent decreased with increase in plant position from P to T. Lamina percentage increased from P to T position and ranged from 64 to 75.8% whereas midrib decreased from P to T position and ranged from 24.2 to 36% (Tables 2 and 3). Consequently higher per cent of lamina (72.6 to 75.4%) and lower per cent of midrib (34.6 to 27.4%) were recorded in top (T) position leaf. Jenkins *et al.* (1965) and Suggs (1975) also reported higher lamina per cent in upper position than in lower position leaves on the stalk. The lamina per cent decreased whereas midrib percentage increased in different plant positions with increase in N dose. In general, lamina per cent decreased and midrib per cent increased slightly at 140 kg $K_2O$/ha than at 120 kg $K_2O$/ha at the same level of N. Dawes (1994) also reported that excess N application increased leaf length, width and percentage of midrib for two of the three varieties tested for Zimbabwean tobacco. Akehurst (1981) reported 70-80% lamina and 23-35% midrib in Canadian tobacco whereas Jenkins *et al.* (1965) reported strip yield ranging from 70.8 to 80.2% with mean of 73.8%.

Increased N dose resulted in more proportion of cured leaf in L and T positions and lower proportion in P and X positions. The lamina per cent decreased, whereas midrib percentage increased in different plant positions with increase in N and K doses. Highest lamina per cent was

**Table 2: Lamina (%) in P, X, L and T positions as affected by nitrogen and potassium levels (pooled)**

| N : $K_2O$ level (kg/ha) | P | X | L | T |
|---|---|---|---|---|
| 90:120 | 67.6 | 66.6 | 70.6 | 74.4 |
| 90: 140 | 67.4 | 66.2 | 71.0 | 74.7 |
| 115:120 | 66.6 | 66.0 | 71.2 | 74.7 |
| 115: 140 | 65.8 | 64.6 | 71.1 | 73.5 |
| 140:120 | 65.3 | 65.5 | 68.9 | 73.7 |
| 140: 140 | 66.2 | 65.0 | 68.2 | 73.4 |
| Mean | 66.5 | 65.7 | 70.2 | 74.1 |
| **SEm ±** | **0.44** | **0.52** | **0.59** | **0.49** |
| **CD (P=0.05)** | **1.21** | **NS** | **1.62** | **NS** |

**Table 3: Midrib (%) in P, X, L and T positions as affected by nitrogen and potassium levels (pooled)**

| N : $K_2O$ level (kg/ha) | P | X | L | T |
|---|---|---|---|---|
| 90:120 | 32.4 | 33.4 | 29.4 | 25.6 |
| 90: 140 | 32.6 | 33.8 | 29.0 | 25.3 |
| 115:120 | 33.4 | 34.0 | 28.8 | 25.3 |
| 115: 140 | 34.3 | 35.4 | 28.9 | 26.5 |
| 140:120 | 34.7 | 34.5 | 31.1 | 26.3 |
| 140: 140 | 33.9 | 35.0 | 31.8 | 26.6 |
| Mean | 33.6 | 34.4 | 29.8 | 25.9 |
| **SEm ±** | **0.46** | **0.52** | **0.59** | **0.49** |
| **CD (P=0.05)** | **1.27** | **NS** | **1.62** | **NS** |

recorded in T position and lowest in P position.

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