

## ANALYSIS OF PLANT TYPE IN *LASIURUS SINDICUS* HENR.

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### ABSTRACT

Internode patterns in 18 genotypes of *Lasiurus indicus* grown in a replicated trial were analysed by using the ideograph technique. Six patterns were recognised depending upon the pattern of change of relative size of the successive internodes from the base upwards. A few genotypes exhibited only one growth phase e.g. accelerated growth, while others exhibited a combination of any two or three growth phases e.g. accelerated, uniform and retarded. Genotypes differed in the presence of one or more growth phases and their sequence. The genotypes with two or more growth peaks had higher dry matter yield than those with single or no growth peak. The utility of different internode patterns from the point of view of association with forage yielding ability and leaves position has been discussed.

### INTRODUCTION

*Lasiurus indicus* Henr., popularly known as 'sewan', is one of the promising grasses of Rajasthan desert. It is extremely drought resistant and thrives even in very low rainfall regions receiving 100 mm to 300 mm annually. This grass naturally grows on extensive areas in far west of Rajasthan desert where it forms the principal component of desert pastures.

In nature, *Lasiurus indicus* is represented by several morphological types. The importance of plant types to select high yielding forage genotypes has been reported in maize (William et al., 1965), gram (Rohelwal et al., 1966), sorghum (Mehra and Dixit, 1969) and *Pennisetum pedicellatum* (Singh and Yadav, 1971). In the present study, an attempt has been made to determine, how the pattern of growth of successive internodes governs varietal differences in culm length and plant type, with special emphasis on the distribution of length among the various internodes and to classify the genotypes into groups based on the internode pattern.

### MATERIAL AND METHODS

Eighty one genotypes of *L. indicus*, mostly from indigenous sources, were grown in a 9x9 lattice design. The internodes on a well developed tiller were numbered from base upwards in a successive manner along the culm length and the data on their lengths were recorded at maturity in five plants selected at random in each

replication. Ideographs were prepared by following Anderson and Schregardus (1944).

## RESULTS AND DISCUSSION

Genotypic differences in plant types based on internode patterns (Fig. 1) revealed three growth phases, i.e. accelerated (successive increase in internodal length), retarded (successive decrease in internodal length) and uniform. The genotypes had distinct number and pattern of the internodes showing one or more growth phase.

### Pattern A

Long uniform phase relatively small accelerated phase (Fig. 1-A). Genotypes in the group were 15; dry matter yield 27.5 g per plant.

### Pattern B

Only one accelerated growth phase (Fig. 1-B), genotypes in the pattern 12; dry matter yield 37.4 g/plant.

### Pattern C

Two growth phases i.e. accelerated and retarded with single growth peak (Fig. 1-C). Number of internodes in the accelerated phase 8 to 11 and in retarded 3-4; long accelerated phase and small retarded phase; genotypes in the pattern 10; dry matter yield 44.9 g/plant.

### Pattern D

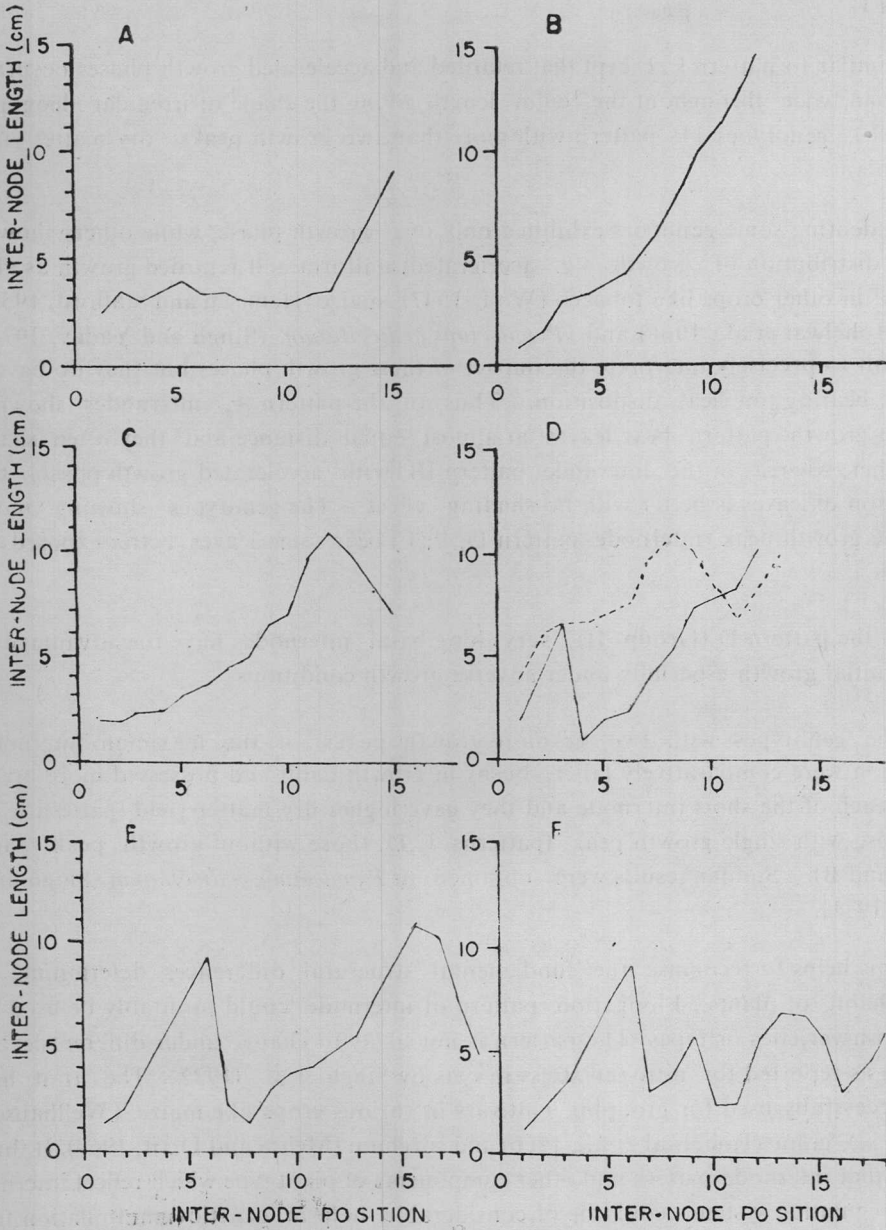
Sequence of three growth phases present (accelerated, retarded and again accelerated, Fig. 1-D) genotypes in the pattern 21. Genotypes of internodes in each phase further divided into two groups based on relative proportion.

Group I : Two to five long basal long internodes (accelerated), followed by retarded and then accelerated growth peaks in the beginning of the curve. Genotypes in the group 10; dry matter yield 46.0 g/plant.

Group II : Longer accelerated phase; retarded phase onward middle of curve followed by accelerated phase; growth peak in the end of curve; long internodes either at the middle or top of the culm length; genotypes in the group 11; dry matter yield at par with the group I.

### Pattern E

Two growth peaks of the maximum internode lengths, each preceded and followed by accelerated and retarded phases, genotypes differed in relative proportion of internodes exhibiting the two growth phases in each of the two such repeats (Fig. 1-E), genotypes in this pattern 9; dry matter yield 52.3 g per plant.



**FIG-1. LASIURUS SINDICUS INTERNODE PATTERNS Fig ( A to F )**

### Pattern F

Similar to pattern E, except that retarded and accelerated growth phases occurred more than twice throughout the culm length giving the shape of irregular ideograph (Fig. 1-F); genotypes 14; pattern with more than two growth peaks; dry matter yield 57.8 g/plant.

Indenting some genotypes exhibited only one growth phase, while others showed uneven distribution of growth e.g. accelerated, uniform and retarded growth as also reported in other crops like tobacco (Wolf, 1947), maize (Heimsch and Stafford, 1952); gram (Rohelwal et al., 1966) and *Pennisetum pedicellatum* (Singh and Yadav, 1971). It is difficult to precisely interpret the impact of these growth phases but they do have a definite bearing on leaf disposition. Thus in the pattern A, internodes showing uniform growth pattern bear leaves at almost equal distance and they often shade each other, whereas in the internode pattern B with accelerated growth phase, the disposition of leaves is better with no shading effect. The genotypes showing more than one growth peak (internode pattern D, E, F) bear some leaves better exposed to sunlight.

In the pattern D (Group II), very long basal internodes have the advantage of quick initial growth especially under adverse growth conditions.

The genotypes with two or more growth peaks of the maximum internode elongation were comparatively taller, bushy in growth habit and possessed more branches at each of the short internode and they gave higher dry matter yield (pattern E,F) than those with single growth peak (patterns C,D) those without growth peak (patterns A and B). Similar results were obtained in *Pennisetum pedicellatum* (Singh and Yadav, 1971).

This helps to recognise the fundamental structural differences determining of growth habits of plants. Elongation pattern of internode could profitably be used to distinguish varieties or types. The pattern is not likely to change under different levels of stress as reported for nitrogen stress in oats by Singh et al. (1972). The trait has been successfully used for grouping cultivars in various crops like maize (Wellhausen et al. 1952), gram (Rohelwal et al., 1966) and sorghum (Mehra and Dixit, 1969). It thus appears that internode pattern and other components of plant type which reflect internal growth regulating system, could be of considerable help in genetic manipulation for the selection of cultivars suited to arid regions.

### REFERENCES

- Anderson, E., and Schregardus, D. 1944. A method for recording and analysing variations of internode patterns. *Annals of the Missouri Botanical Garden*. 31 : 239-347.