GROWTH ANALYSIS IN *MOGHANIA MACROPHYLLA* (WILLD) O. KTZE IN THE NURSERY

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Introduction

Moghania macrophylla (Willd) O.Ktze (syn. *Flemingia congesta* Roxb. var *semialata* Bak) grows about 2.5 m in height under cultivation and is found at the lower elevations throughout India and in Andaman Islands (Lal *et al.*, 1970; Krishnaswami *et al.*, 1959; Srinivasan, 1956). This plant species is gaining importance due to its capacity to produce superior quality (*kusmi*) lac, quick growing habit, thrive on poor lands, manageable shape and size and may be integrated with general agriculture (Lal *et al.*, 1970; Purkayastha *et al.*, 1981). Although some research on other aspects of this bushy host is available (Kumar and Purkayastha, 1972; Purkayastha, 1969; Srivastava and Kumar, 1982), the growth behaviour of bhalia seedling which affects the developmental stage of the plant has not been studied so far. Knowledge on physiological variables like RGR, CGR, NAR and LAR at various periods may be the useful tool for determining the proper growth and development of seedling raised in nurserybed. In view of the above, it is, considered of interest to carry out growth analysis on this plant species.

Materials and Methods

A field trial was conducted during summer seasons of 1988 and 1989 at the experimental farm of Indian Lac Research Institute, Namkum, Ranchi (23°23'N, 85°23', E and 650 m altitude) on loamy soil (sand 42.8%, silt 40.0%, and clay 17.2%) with pH 6.5. The experiment with eight treatments (Table 1) was laid out in randomised block design with three replications. Seeds were sown in nursery beds (3.4 x 1.2 m) at weekly interval, starting from first week of April and continued till last week of May. The seeds were sown in rows 15 cm apart and plant to plant distance of 10 cm was maintained by thinning. Irrigations were given daily till the monsoon broke. Samples of five plants were collected from the area ear-marked for destructive sampling for recording dry matter and leaf area at 60, 90 and 105 days after sowing (DAS). Then the plants were separated into root, stem and leaves. All components were dried at 80°C till the constant weights were obtained and the dry weight of individual plant parts were recorded. Growth parameters were calculated and analysed according to the standard procedures (Watson, 1952 and Noggle and Fritz, 1986).

Results and Discussions

Relative growth rate (RGR): Maximum RGR values were noticed in the early stage at 60-90 DAS which decreased with the advance of seedling growth between 90-105 DAS

Table 1

Effect of date of sowing on growth of M. macrophylla seedlings grown in nursery bed (pooled data for two years)

Sowing dates	Relative growth rate (mg/g/day)		Crop growth rate (g/m²/day)		Net assimilation rate (mg/m²/day)		Leaf area ratio (cm²/g)	
	60-90	90-105	60-90	90-105	60-90	90-105	60-90	90-105
6 April	75.50	20.33	8.00	6.44	0.224	0.074	333.7	285.2
13 April	73.50	20.33	8.56	6.56	0.217	0.071	336.2	291.3
20 April	66.67	19.17	8.90	7.03	0.207	0.070	317.5	286.1
27 April	66.50	17.33	9.12	6.14	0.207	0.067	327.3	290.4
4 May	60.67	17.67	8.06	5.99	0.194	0.066	314.3	271.8
11 May	51.17	16.00	7.62	5.47	0.166	0.061	305.5	261.8
18 May	51.50	15.83	6.67	5.20	0.160	0.056	322.4	256.8
25 May	50.67	16.67	5.12	4.47	0.160	0.054	316.9	300.3
CD 5%	12.92	NS	1.42	1.27	0.22	0.070	NS	NS

(Table 1). This might be due to concomitant decline in NAR and LAR. Eggles (1971) also observed that relative contribution of LAR and NAR to RGR varied with physiological stages of the development. Significant differences in RGR were recorded due to different date of sowing in nursery at 60-90 DAS whereas at 90-105 DAS the difference were not significant. maximum RGR was recorded at 60-90 DAS (75.5 mg $g^{-1}day^{-1}$) when sowing was done in the first week of April which was at par with subsequent sowing dates till first week of May. This might be due to the favourable weather conditions resulting in better and quicker growth of plant after 60 DAS and consequently produced more dry matter at later on (90 DAS). The values of RGR tended to decline probably because of less dry matter accumulation per unit in early sowing at 60 DAS than those of delayed sown crop.

Crop growth rate (CGR): The data presented in Table 1 showed maximum values of CGR at 60-90 DAS in all the treatments and thereafter declined with the advancement in the seedling age (90-105 DAS). Rapid increase in CGR at early stage could be due to congenial weather condition for growth resulted in increased accumulation of dry matter in different components of the seedling. Unlike RGR, CGR was significantly affected by sowing dates. The highest CGR at 90-105 DAS was recorded in crop sown in 3rd week of April while the crop produced the highest CGR values at 60-90 DAS when sown on last week of April. The minimum value of CGR during both the periods were recorded in plants sown on last week of May.

Net assimilation rate (NAR) : NAR is dependent upon the leaf area as well as the ratio of leaf area to total biomass which continuously changes with the growth of the plant (Gurumurti and Srivastava, 1980). NAR was higher at 60-90 DAS at each sowing date than the later stage (90-105). The decline in NAR values in the later part might be attributed for (i) excessive mutual shading and (ii) increase in the number of old leaves having low photosynthetic efficiency. This corroborates the finding of Kalubarme and Pandey (1979) and Watson

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1988). Unlike RGR, CGR and NAR were significantly affected by sowing dates. It was further observed that sowing of seeds on April first week recorded higher NAR at 60-90 DAS which was at par with subsequent sowing dates till first week of May. Similar trend was also observed at later growth periods (90-105 DAS).

Leaf area ratio (LAR) : The data on LAR in relation to different dates of sowing in nursery presented in Table 1 showed no significant difference among the different treatments. The variations in leaf area and leaf numbers per plant might be the probable reason for this. The LAR was more at 60-90 DAS, thereafter it declined at 90-105 DAS as advancement in seedling age. This could be observed due to slow growth rate of seedling at later period (after 90 DAS).

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SUMMARY

A Field experiment was conducted at the Indian Lac Research Institute, Namkum, Ranchi during 1988 and 1989. The growth analysis results revealed that various parameters had more values in first phase of 60-90 days after sowing (DAS) than advanced stage of the seedling growth (90-105 DAS). Relative growth rate (RGR). crop growth rate (CGR) and net assimilation rate (NAR) were significantly affected by different date of sowing in nursery during both the years except in the year 1988 at 90-105 DAS. However, variation in date of sowing did not affect LAR at different periods. The result indicated the need to adopt better management practices at early growth stages for better growth and development.

रोपणी में *मोघानिया मेक्रोफिल्ला* (विल्डे०) ओ० कुंत्ज की वृद्धि का विश्लेशण

वी०पी० सिंह व पी० कुमार

सारांश

भारतीय लाख अनुसंधान संस्थान, नामकुम, राँची में 1988 व 1989 के दौरान एक क्षेत्र संपरीक्षण किया गया । इसके वृद्धि विश्लेषणों से पता चला कि बोने के बाद 60-90 दिनों की प्रथम अवस्था में कुछ परिमापों की अर्हाएँ अधिक हैं बनिस्बत पौधे की वृद्धि की प्रगत अवस्था (बोने के 90-105 दिन) के । आपेक्षिक वृद्धि दर, फसल वृद्धि दर और शुद्ध सात्मीकरण दर में बोने के 90-105 दिन बाद की अवधि को छोड़कर दोनो वर्ष रोपणी में बोने की विभिन्न तारीखों का काफी प्रभाव पड़ा । पत्तियों, बोने की तारीखों के अन्तर का विभिन्न अवधियों की लाख संचयन दरों पर कोई प्रभाव नहीं पड़ा । ये परिणाम अच्छी वृद्धि और विकास प्राप्त करने के लिए बढ़ने की प्रारम्भिक अवस्थाओं में प्रबन्ध करने की श्रेष्ठतर विधियाँ अपनाने की आवश्यकता को दर्शाते हैं ।

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