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EFFECT OF SEEDLING SIZE AND IRRIGATION ON PLANT SURVIVAL IN *FLEMINGIA SEMIALATA* - AN IMPORTANT BUSHY LAC-HOST PLANT

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Abstract: *Flemingia semialata* is an important bushy lac host plant, which can not withstand water stress during summer season. Experiments were conducted to study the effect of seedling size and irrigation on plant survival and its growth attributes. It was found that plants raised from larger seedlings and under weekly-irrigated conditions could survive well.

Key words: Lac host-plant, *Flemingia semialata*, irrigation, seedling size

Lac cultivation is an important source of subsidiary income for the forest inhabiting tribal farmers of lac growing regions of Jharkhand, Chhattisgarh and West Bengal. Rapid deforestation and handsome profits from lac cultivation have attracted farmers to fast growing lac-host plants. *Flemingia semialata* is an important quick growing lac-host plant, which is suitable for intensive lac cultivation. Both the strains of lac insect *i.e.* *rangeeni* and *kusmi* of lac insect can be grown on this bushy plant (KUMAR *et al.*, 1997). However, during summer season, it can not be used for lac culture as plants suffer heavy mortality due to water stress. Lac insects being phloem feeder put additional stress on the plants. In drought-prone areas like Purulia that face extended hot season and intensive heat, the problem becomes more acute. Therefore, experiments were conducted during 2002-03 at the premises of West Bengal Lac Artisans Cooperative Society, Balarampur (Purulia) to study the effect of seedling size at the time of transplanting on plant vigour using initial height of the seedling before transplanting as parameter to reflect its vigour.

For experimentation 15 plants each of same age from the three categories *i.e.* big (30-35 cm), medium (20-25 cm) and small (10-15cm) plants were selected and transplanted in the field in July. Shoot length and number of shoots per bush were then recorded in the month of December when water stress starts and (ii) the effect of different irrigation intervals on survival of the plant. The plot of *F. semialata* was divided into four sets, each of which contained 18 plants. Plants were grown in furrows and to avoid seepage contamination during irrigation, band channel was made in between two furrows. Irrigation was applied to different sets of plants at different irrigation interval *i.e.* at 7, 14, 21 and 28 days from December onwards when water stress starts. Mortality of the plants was recorded in the month of May. Shoot lengths of the plants were also recorded.

It was found that larger seedlings performed better as compared to smaller ones. Total number of shoots & shoot length/bush recorded, was highest with the plants raised from large sized seedlings while converse was true with the plants raised from smaller sized seedlings. Number of shoot grown/plant was lowest (2.60/plant) when small seedlings were used for transplanting and highest (4.26/plant) in those raised from large seedlings. Length of the developed shoot was also higher (52.72cm/plant) in these plants whereas the respective value for the plants raised from small seedlings was 30.50 cm only. Higher number of shoots of greater length provides more space for lac insect settlement, which ultimately affects the yield of lac. Average shoot length in plants

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developed from large seedlings was almost three times more than the plants raised from small seedlings.

Table 1. Growth attributes as affected by the initial size of the seedlings at the time of transplanting.

Seedling size (cm)	Average No. of shoots/plants	Average length of shoots /plant (cm)	Total average shoot length/plant (cm)
Large (30-35)	4.26	52.72	224.6
Medium (20-25)	3.66	49.86	182.5
Small (10-15)	2.60	30.50	79.3

Table 2. Influence of irrigation interval on plant survival and plant growth attributes.

Irrigation interval (days)	Plant Mortality (%)	Average no. of shoots per plant
7	16.6	3.9
14	50.0	3.2
21	61.1	2.8
28	72.2	2.0

To combat mortality due to water scarcity, the vigorous plants had extended their root systems deep in to the soil horizon, which is reflected in increased shoot length and also higher number of shoots/plant. A vigorous plant has advantage to exploit natural resources better on one hand and withstand stress created due to continuous phloem sap intake by the lac insects on other hand. Larger and healthy seedlings at the time of transplanting may prove to be effective in raising healthy & vigorous plant stand, which can negotiate water stress situation effectively.

Lowest plant mortality (16.6%) occurred in the most frequently irrigated plants *i.e.* at weekly interval. When the frequency of irrigation was reduced to 28 days, only 27.5% plants survived. As the interval between irrigation increased, plant mortality increased progressively. The frequently irrigated plants had higher shoot length & more number of shoots/plant. Average number of shoots was 3.9/plant in weekly irrigated plants whereas number of shoots/plant reduced to 2.0 when irrigation was provided at 28 days interval as earlier reported by GHOSAL *et al.* (2002). Thus larger size seedlings at the time of transplanting & irrigation at weekly intervals were suggested to harvest better lac yield during summer.

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