

Weeds of rainy season in plantations of five lac host species

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ABSTRACT

Established plantations of five important lac hosts viz. *Butea monosperma* (palas), *Zizyphus mauritiana* (ber), *Schleichera oleosa* (kusum), *Flemingia macrophylla* (bhalia) and *Flemingia semialata*, have been found predominated by grassy weeds (72.07%) of total accumulated weeds, followed by broadleaved weeds (23.17%) and sedges (4.76%). Important weed flora in these plantations consisted of *Eleusine indica* (L) Gaertn, *Echinochloa* spp (L.), *Cynodon dactylon* (L.) Pers., *Dactyloctenium aegyptium* P.Beauv, *Digitaria sanguinalis* (L.) Scop, *Brachiaria remosa* (L.) among grasses, *Ageratum conyzoides* L., *Alternanthera sessilis* (L.), *Emilia sonchifolia* and *Spilanthes acmella* among broadleaved weeds and *Cyperus iria* and *C. rotundus* among sedges. Among these weed species, *Ageratum conyzoides* (L), *Brachiaria remosa* (L) and *Echinochloa* spp. (L) were common in all the lac host plantations. The *A. conyzoides* was the most predominant weed species in numbers with relative frequency values, ranging between 24.0 to 64.2% in all plantations except in *F. semialata* (9.1%).

Key words : Lac host species, Weeds in plantation

Weeds are an integral part of each and every agrophytocoenosis. Thus, their interference with plants is natural. Because of their high competitive ability and allelopathic interference, weeds cause an irreversible damage to plants (Siddiq *et al.* 1985). In the lac ecosystem, health of host plants play an important role on productivity of lac resin and important resin of commerce secreted by lac insect (Homoptera: Tachardiidae) thriving and cultivated on these host plants. The adverse impact on lac host plantations is generally seen in two stages. They retard growth rate of plants due to competition for space, soil moisture, light and plant nutrients particularly, during raising of new plantations. Weeds continue to affect shoot growth after coppicing in case of bushy lac hosts and establishment of plantation in case of tree as well as bushy host species. They increase the expenditure on labour, equipments, render operational difficulty, reduce growth, harbour insect, fungal, viral and bacterial diseases, some of which are poisonous to human being and livestock (Anon. 1967). The losses due to them are more than either disease or insect and they create problem in intensive cultivation (Paradkar *et al.* 1989, Singh 1990). The available literature indicates that huge biomass of weeds were accumulated in *Flemingia macrophylla* nursery and also resulted in lanky seedlings (Singh 1990). Thus, proper knowledge on the composition of weed flora in the area of lac host plantations along with their identification, characterization and assessment are necessary to generate information to formulate effective measure for their control.

MATERIALS AND METHODS

The present experiment was carried out to find out weed floral composition in lac host plantations in the plateau region of the Chhotanagpur, Jharkhand. The study was conducted at IINRG Research Farm, Namkum, Ranchi located at 23°23'N latitude; 85°23'E longitude with mean altitude of 650 m above MSL. It receives an annual rainfall of more than 1300 mm and maximum rainfall occurs between June and September. The intensity of rainfall then gradually decreases up to October and there is only occasional rainfall during rest of the year. The maximum and minimum temperature varies between 38°C and 6°C. The study was conducted during September, 2007. Soil of the experimental site is predominantly sandy clay loam with pH range 5.0 to 5.8. Nitrogen and organic carbon content of the soil were low and phosphorus and potassium content were medium.

Data were recorded from the field of three major lac host plantations viz. *B. monosperma* (Palas), *Z. mauritiana* (ber), *S. oleosa* (kusum) and two promising lac hosts i.e. *F. macrophylla* (bhalia) and *F. semialata* (semialata). All the plantations were full grown except that of *F. semialata*, where plantation was of 6 month old. Major lac hosts i.e. palas, ber and kusum were planted at 3.6 x 3.6 m, 3.0 x 2.5 m and 6.0x6.0 m spacings, respectively, whereas bhalia were planted at 2.0 x 1.5 m and *F. semialata* planting pattern was at paired row system adopting row to row distance of 0.5 m and plant to plant 1.0 m, leaving 2.0 m

space between two paired rows. Weeds intensity incidence was recorded by using a quadrat of 50x50 cm placed at two random spots in each host fields from earmarked area. Collected weeds were counted, identified species-wise, segregated into grasses, broad leaved weeds and sedges and then oven dried at 65°C till the constant weight was obtained. Thereafter, dry matter accumulation values were converted into tonnes per hectare. The quantitative parameters i.e relative frequency was determined by using formula to express dominance of individual species (Mishra 1968).

$$\text{Relative frequency (\%)} = \frac{\text{Number of occurrences of the species}}{\text{Total number occurrences of all species}} \times 100$$

RESULTS AND DISCUSSION

The weed dry matter accumulation (t/ ha) during rainy season, in the year 2007 in five lac hosts plantations viz. Palas, Ber and Kusum, Bhalia and Semialata revealed that grassy weeds were predominant in the field constituting

72.07% of total weeds accumulation followed by broad leaved (23.17%) and sedges (4.76%) (Table 1). Similar results were reported by Singh (1990) in Bhalia (*Flemingia macrophylla*) nursery.

The number and type of weed varied in different host plantations under study. On the basis of the sampling made from the earmarked area of field in five lac host plantations during rainy season, 21 weed species were recorded, out of which 8 were grasses, 10 were broad leaved and 3 were sedges. The weeds occurring in five lac host plantations constituted of *Eleusine indica* (L.) Gaertn., *Cynodon dactylon*, (L.) Pers, *Digitaria sanguinalis* (L) Scop, *Echinochloa* spp. (L) Link., *Dactyloctenium aegyptium* (L) P. Beauv., *Brachiaria remosa* Linn., *Setaria verticillata* Linn. among grasses, whereas *Ageratum conyzoides* Linn., *Alternanthera sessilis* (L) R. Br. GEx. Roth, *Emilia sonchifolia* Dc, *Spilanthes acmella*, *Stellaria media*, *Oldenlandia corymbosa*, *Commelina benghalensis* Linn., *Phyllanthus niruri* Linn. and *Desmodium triflorum* Linn.

Table 1. Dry matter of weeds accumulated in different lac host plantations

| Host | Dry matter (t/ha) | | | |
|-----------------------------------|-------------------|--------------|------------|-------|
| | Grasses | Broad leaved | Sedges | Total |
| Palas (<i>B. monosperma</i>) | 1.52 (53.4) | 1.07 (37.5) | 0.26 (9.1) | 2.85 |
| Ber (<i>Z. mauritiana</i>) | 0.69 (58.5) | 0.46 (39.0) | 0.03 (2.5) | 1.18 |
| Kusum (<i>S. oleosa</i>) | 1.81 (86.2) | 0.15 (7.1) | 0.14 (6.7) | 2.10 |
| Bhalia (<i>F. macrophylla</i>) | 0.94 (81.0) | 0.20 (17.3) | 0.02 (1.7) | 1.16 |
| Semialata (<i>F. semialata</i>) | 2.91 (80.2) | 0.65 (17.9) | 0.07 (1.9) | 3.63 |

Values in parenthesis are percentage of total dry matter accumulation

Table 2. Important weed species present in different lac host plantations

| Name of weed | Habit | Family | Relative frequency (%) | | | | |
|---------------------------------|-------|-----------------|------------------------|------|-------|--------|-----------|
| | | | Palas | Ber | Kusum | Bhalia | Semialata |
| Grasses | | | | | | | |
| <i>Brachiaria remosa</i> | A | Poaceae | 0.7 | 3.8 | 4.4 | 1.3 | 2.7 |
| <i>Cynodon dactylon</i> | P | Poaceae | - | 4.6 | - | 20.7 | 11.8 |
| <i>Dactyloctenium aegyptium</i> | A | Poaceae | -- | 6.1 | 0.5 | 1.7 | 8.1 |
| <i>Digitaria sanguinalis</i> | A | Poaceae | 6.7 | 7.3 | 2.7 | 5.0 | 9.1 |
| <i>Echinochloa colonum</i> | P | Poaceae | 6.0 | 8.8 | 3.8 | 1.0 | 6.4 |
| <i>E. glabrescens</i> | P | Poaceae | 2.1 | - | - | - | - |
| <i>Eleusine indica</i> | A | Poaceae | 9.2 | 0.4 | - | - | 3.6 |
| <i>Setaria verticillata</i> | A | Poaceae | - | - | 4.9 | 0.7 | - |
| Broadleaved | | | | | | | |
| <i>Ageratum conyzoides</i> | A | Asteraceae | 46.5 | 25.4 | 24.0 | 64.2 | 9.1 |
| <i>Alternanthera sessilis</i> | A/P | Amaranthaceae | - | 16.9 | 4.4 | 3.4 | 11.8 |
| <i>Commelina benghalensis</i> | A | Commelinaceae | 0.7 | - | 16.9 | - | 0.5 |
| <i>Desmodium triflorum</i> | P | Papilionaceae | - | 0.8 | - | - | 0.5 |
| <i>Emilia sonchifolia</i> | P | Asteraceae | 8.1 | 8.8 | - | - | 0.5 |
| <i>Hedyotis corymbosa</i> | A | Rubiaceae | - | - | 3.3 | - | - |
| <i>Oldenlandia corymbosa</i> | A | Leguminosae | 7.4 | 13.1 | 16.9 | - | 6.4 |
| <i>Phyllanthus niruri</i> | A | Euphorbiaceae | 1.4 | 0.8 | 3.3 | 0.7 | - |
| <i>Stellaria media</i> | A | Caryophyllaceae | 2.1 | - | - | 0.7 | 3.2 |
| <i>Spilanthes acmella</i> | A | Asteraceae | 1.4 | - | - | - | 1.1 |
| Sedges | | | | | | | |
| <i>Cyperus iria</i> | P | Cyperaceae | 5.6 | 0.8 | 9.8 | - | 28.5 |
| <i>Cyperus rotundus</i> | P | Cyperaceae | 2.1 | - | 3.8 | 2.7 | 1.1 |
| <i>Cyperus deformis</i> | P | Cyperaceae | - | - | 1.1 | - | 1.6 |

A: Annual, P: Perennial, absence of weed species in respective field.

among broad leaved and *Cyperus iria* Linn., *Cyperus rotundus* Linn and *Cyperus difformis* L. was among sedges. Amongst these 3 weed species i.e. *Ageratum conyzoides*, *Brachiaria remosa* and *Echinochloa colomum* were present in all the five lac host plantations. Relative frequencies (RF) of different weed species in 3 major lac hosts (Palas, Ber and Kusum) as well as rest 2 promising bushy lac hosts are given (Table 2). The relative frequency values also varied among the host species, however, the highest value recorded with *A. conyzoides*, ranging between 24.0- 64.2% in all lac host plantations except in *F. semialata* (9.1%). While among grasses, the highest RF values were 20.7% with *Cynodon dactylon* in bushy lac hosts i.e. Bhalia and 11.8% in Semialata. This species was totally absent in Palas and Kusum plantations. Apart from above, other weed species were also observed in the plantation in the rainy season. However, these did not appear into sampling purview due to less abundance. These included *Lantana camara*, *Saccharum spontaneum*, *Andropogon gayanus*, *Euphorbia hirta*, *Mimosa pudica*, *Parthenium hysterophorus*, *Achyranthes aspera*, *Cassia tora*, *Phyllanthus urinaria*, *Sorghum halepense*, *Setaria glauca*, *Corchorus acutangulus*, *Leucas aspera*, *Ludwigia parviflora* etc. The present study provides useful information on floristic com-

position of five important lac hosts for planning their control measures.

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