PRELIMINARY STUDIES ON CHEMICAL WEED CONTROL IN EUCALYPTUS (HYBRID) NURSERY

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Introduction

Weeds in the forest nurseries always come in the way of raising quality seedlings. Removal of weeds by handweeding is time consuming, difficult and expensive. Sometimes young seedlings are also uprooted along with weeds causing measurable loss to the nursery. Weeds compete with nursery seedlings for water and nutrients and adversely affect their growth during the critical stages. Hence the weeds have to be controlled by some other less expensive and more effective means in order to obtain better growth of seedlings. Number of workers have tried chemical weedicides for controlling weeds in forest nurseries. Pre- or post emergence weedicides have been widely used for conifer nurseries and occasionally for poplars and container grown Eucalypts with satisfactory results (MeCavish 1977, Bacon 1979, Biggin 1979, Weatherspoon 1981, Donald 1982, Magnani 1976, Haramaki, 1978). Attempts are also made to control weeds by sterilizing the soil with chemicals (Aguir 1975). *Eucalyptus* nursery beds normally contain large number of both dicot and monocot weeds which are difficult to control by hand weeding. A trial was, therefore, carried out to study the feasibility of using suitable chemical weedicides for effective control of weeds in *Eucalyptus* nursery beds.

Material and Method

The trial was carried out in the forest nursery located at GKVK Campus of the University of Agricultural Sciences, Bangalore. Sunken beds of 10' x 4' dimension were prepared in early December and incorporated with well decomposed farm yard manure. After covering the beds with a layer of fine sand, measured quantities of seeds were sown uniformly by broadcasting. The beds were then watered with rosecan. The following day beds were again watered and aqueous solutions of weedicides viz., Simazine at 1 kg/ha, Basalin (Profluralin) at 1.5 kg/ha, Pendimethaline (Stemp 30 EC) at 1.5 kg/ha and Ronster (Oxadiazon) at 0.5 kg/ha were sprayed on to the bed according to treatment. The trial consisted of five treatments including control replicated four times. Observations on weed density and other growth parameters were made at regular intervals.

Results and Discussion

Germination : Maximum germination of *Eucalyptus* seeds (80%) was obser-

ved in control as compared to other treatments followed by Basalin treated plots. But Pendimethaline and Ronster treatments reduced the germination percentage to a greater extent (See Table 2). Simazine was proved to be lethal to both weeds & *Eucalyptus* seedlings as it did not show any germination. Basalin treatment indicated that this weedicide is not harmful to the germinating *Eucalyptus* seeds but was selective against germination of weed seeds. Pendimethaline and Ronster which significantly reduced germination of *Eucalyptus* seeds are, therefore not suitable for *Eucalyptus* nurseries.

Weed population : Observations on individual weed species in each treatment (Table 1) indicated that among the 22 dicot weeds recorded, *Euphorbia geniculata, E. hirta, Ecliota alba* and *Ageratum-conyzoides* dominated over other weeds in all the treatments. However, these weeds were more sensitive to Basalin than other weedicides. *Eclipta alba* and *Euphorbia hirta*, however, were more sensitive to pendimethaline. *Borreria stricta* which was found in maximum number in control plots was completely suppressed with Basalin treatment and also its population was significantly reduced in other treatments. The population of *Oldenlandia umbellata, Amaranthes viridis* & *Oxalis corniculata* was considerable in control plots. But all these weeds were found to be sensitive to weedicide treatments. Other dicot weeds were sparsely distributed in different treatments and their number was not significant. As compared to dicot weeds monocot weeds were few in number in most of the treatments. Out of the 10 species of monocots *Eragrostis* sp. and *Digitaria marginata* were conspicuous in control plot by their presence in large numbers. Most of the monocot weeds were found to be sansitive to all the weedicides used and were effectively controlled.

Seedling density : Density of *Eucalyptus* seedlings per sq. ft in the Basalin treated plots was comparable to that of control indicating that Basalin while being least harmful to the young seedlings was also effective in reducing weed competition. In other two treatments seedling density was significantly reduced due to reduced germination percentage under these treatments.

Density of Weeds : It may be noted from Table 2 & 3 that density of both dicot and monocot weeds was highest in control plots followed by Ronster. Comparatively number of dicot weeds in Basalin and Pendimethaline treatments was minimum. In addition, these two treatments completely suppresed monocot weeds. The results indicate that Basalin is most effective against all types of weeds. Pendimethaline though effective in controlling weeds had some adverse effect on *Eucalyptus* seed germination and seedling growth.

Growth of seedlings : (Table 3) Average height of seedlings was significantly higher in Basalin treated plots followed by Pendimethaline. In addition seedlings were healthy as indicated by their vigour. Seedling

Table 1

Weeds and their density per plot (10 Sq. ft.)
(Average of four replications per treatment)

Weeds	Treatments				
	T_1	T_2	T_3	T_4	T_5
(A) Dicots :					
Amaranthes viridis	-	-	-	-	6.75
Amaranthes spinosus	-	-	-	-	3.75
Ageratum conyzoides	-	4.5	13.25	22.75	56.75
Acanthosperum hispidum	-	0.25	0.5	0.25	2.50
Blumea sp.	-	1.0	2.25	5.0	1.25
Borreria stricta	-	-	0.25	7.75	406.25
Cocculus hirsutus	-	0.50	0.50	-	-
Conyza ambigua	-	0.50	-	-	0.75
Eclipta alba	-	81.25	52.0	189.25	495.50
Emilia sonchifolia	-	1.75	0.25	1.25	-
Euphorbia geniculata	-	83.5	210.5	128.00	337.50
Euphorbia hirta	-	45.75	12.25	245.25	196.00
Gelinsoga parviflora	-	-	0.25	-	-
Lagascea mollis	-	1.50	-	0.75	1.25
Mimosa pudica	-	0.5	-	-	1.00
Oldenlandia umbellata	-	-	-	-	18.25
Oxalis corniculata	-	-	-	-	6.25
Passiflora foetida	-	0.25	0.25	-	2.25
Phyllanthus niruri	-	3.5	0.25	0.5	4.50
Rothia trifoliata	-	-	-	-	1.00
Stachytarpita indica	-	1.0	0.25	-	1.75
Solanum nigrum	-	-	-	-	1.00
(B) Monocots :					
Commelina benghalensis	-	-	-	0.50	4.00
Cyperus rotundus	-	-	-	-	2.00
Cynodon dactylon	-	-	-	-	5.50
Dactyloctenium egyptium	-	-	-	1.25	14.50
Digitaria marginata	-	-	-	2.75	32.50
Echinochloa sp.	-	-	-	-	5.50
Eragrostis cilianensis	-	3.50	0.25	0.50	4.50
Eragrostis sp.	-	-	-	-	149.00
Panicum sp.	-	-	-	0.5	2.50
Setaria pallide-fusca	-	-	-	-	4.00

T_1 - Simazine. T_2 - Basalin. T_3 - Pendimethaline. T_4 - Ronster. T_5-Control

Table 2

Per cent germination of Eucalyptus seeds and dry weight of weeds per plot

Treatment	Per cent germination of *Eucalyptus*	Dicot weeds	Monocot weeds	Dry wt. of weeds (g)
Simazine	-	-	-	-
Basalin	79.0	299.0	-	195.0
Pendimethaline	40.0	292.25	-	192.0
Ronster	58.0	611.0	14.75	655.0
Control	80.0	1595.25	215.0	1410.0

Table 3

Effect of weedicides on the density growth of weeds and seedlings

Treatment	Weed density/ plot	*Eucalyptus* seedling density/ sq. ft.	Height of Euc. plants (cm)
Simazine	-	-	-
Basalin	299.0	152.00	23.43
Pendimethaline	*292.50*	*37.25*	13.20
Ronster	825.75	75.75	10.12
Control	1810.25	148.12	10.52
CD at 5%	195.83	50.20	1.13
1%	274.56	70.38	1.59

growth in other treatments was significantly reduce. Reduction in growth vigour was maximum in control probably due to high concentration of weeds and consequent competition for nutrients and water. Ronster chemical adversely affected the growth of seedlings.

Dry weight : Maximum dry weight of weeds (1410 g) in control is indicative of luxurient growth of weeds at the cost of seedling growth. Dry weight of weeds in Ronster treatment was also higher (655 g) but it was almost half that of control indicating reduced concentration of weeds. The value for dry weight in Basalin and pendimethaline treated plots was negligible due to low density and poor growth of weeds.

Comparative analysis of qualitative and quantitative characters clearly indicate that Basalin (Profluralin) is a promising weedicide for effective control of weeds in *Eucalyptus* nursery. This chemical was selective against most of the weeds and was least harmful to the young *Eucalyptus* seedlings. Pendimethaline (Stemp 30 EC) though effective against weeds had adverse effects on germination and growth of *Eucalyptus* seedlings. Ronster (Oxadiazon) was least effective against weeds and Simazine proved to be lethal for both weeds and *Eucalyptus* seedlings, hence it is not desirable to use these latter chemicals for *Eucalyptus* nurseries.

Summary

Weeds adversely affect the germination and growth of seedlings in the Eucalyptus hybrid nursery beds. Manual weeding which is generally followed is time consuming, difficult and less effective. In order to overcome this problem a study was undertaken for effective control of weeds in Eucalyptus hybrid nursery by means of pre-emergence weedicides viz. Basalin (Profluralin), Pendimethaline (Stemp 30 EC), ronster (Oxadiazen) and Simazine. They were applied to nursery beds as pre-emergence spray, at 1.5, 1.5, 0.5 and 1 kg/ha respectively. Basalin was most effective in controlling both dicot and monocot weeds followed by pendimethaline and Ronster. Simazine was lethal to both Eucalyptus and weed seed germination. Seedlings of Eucalyptus in Basalin treated plots were more in number (15 2/sq ft.), taller (24 cm) and healthier compared to other weedicide treatments. Maximum number of dicot and monocot weeds were found in control plots, consequently seedling growth was very much supperessed. The studies indicated that pre-emergence chemical weedicides could be effectively used to control nursery weeds and that Basalin weedicide is more effective in controlling both dicot and monocot weeds and appears to be a suitable chemical weedicide for Eucalyptus hybrid nurseries.

[संकर] युकेलिप्टस रोपणी में खरपतवार के रासायनिक नियंत्रण का प्रारम्भिक अध्ययन

एन० स्वामी राव, वासप्पा व सी० डी० सिंह

सारांश

संकर युकेलिप्टस, की रोपिणी की क्यारियों में पौधों के अंकुरण और उसकी वृद्धि पर खरपतवार का बहुत प्रभाव पड़ता है। आमतौर से मजदूर लगाकर निराई कराई जाती है जो समय खपाऊ, मुश्किल और कम प्रभावकारी रहती है। इस समस्या पर पार पाने के लिए संकर युकेलिप्टस की रोपणी में अंकुरण पूर्व खरपतवार नाशी उदा० बैसेलिन (प्रोफ्ल्यूरेलिन), पेण्डिमिथेलीन [स्टॅप 30 ईसी], रोस्टर (ग्रावसे-

डायजीन), और साइमाजीन द्वारा खरपतवार नियन्त्रण करने का अध्ययन शुरू किया गया। अंकुरणपूर्व छिड़काव के लिए उन्हें क्यारियों में क्रमशः 1.5, 1.5, 0.5 और 1 किग्रा० प्रति हैक्टेयर की दर से उपयोग किया गया। द्विबीजपत्र और एकबीजपत्र दोनों के नियन्त्रण में डैसेलिन सबसे अधिक प्रभावशाली रही, उसके बाद पेंडिमिथेलिन और रौन्टर रहे। साइमाजीन युकेलिप्टस और खरपतवार दोनों के बीज-अंकुरण के लिए घातक रही। अन्य खरपतवार-नाशी उपचारों के मुकाबले में डैसेलिन उपचारित क्षेत्रों में युकेलिप्टस के पौधे अधिक संख्या में (152/वर्गफुट), अधिक लम्बे (24 सेमी) और अधिक स्वस्थ रहे। द्विबीजपत्र और एकबीजपत्र खरपतवारों की अधिकतम संख्या नियामक क्षेत्रों में निकली, इसीलिए उसमें पौधे की वृद्धि बहुत दबी हुई पाई गई। इस अध्ययन से पता चलता है कि अंकुरणपूर्व रासायनिक खरपतवारनाशी रोपणी के खरपतवार का नियन्त्रण करने के लिए प्रभावकारी ढंग से उपयोग किए जा सकते हैं तथा द्विबीजपत्र और एकबीजपत्र दोनों तरह के खरपतवार का नियन्त्रण करने में डैसेलिन खरपतवारनाशी संकर युकेलिप्टस रोपणियों के लिए उपयुक्त रासायनिक खरपतवारनाशी प्रतीत होती है।

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