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WEED MANAGEMENT BY APPLICATION OF PENDIMETHALIN (STOMP) WITH SPECIAL REFERENCE TO SEED GERMINATION AND EARLY SEEDLING GROWTH IN WEED HYPTIS SUAVEOLENS L.

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Abstract:
Weeds are the plants which interfere with growth and development of desired plants by utilizing land and water. Weed Hyptis suaveolens L. belonging to family Lamiaceae growing luxuriantly on boundary of crop fields, on sides of railway tracks and road sides. In present study weedicide pendimethalin (stomp) was applied to germinating seeds to observe effects on germination and seedling growth. The results showed there is decrease in percentage of seed germination. Seedlings showed poorly developed radical and hypocotyl.

Keywords: Weedicide, Pendimethalin, weed management, Hyptis suaveolens L.

Introduction:

Weeds are those plants which interfere with the utilization of land and water resources and thus adversely affect human welfare. Weed competes with beneficial and desired vegetation. In agricultural practicesthe management of weed is an important factor because weed effect is greatest in agriculture. A weed *Hyptis suaveolens* L. belonging to family Lamiaceae is growing in Maharashtra especially in Vidarbha region. It is found growing luxuriantly on boundary of crop fields, on sides of railway tracks in all over India and road sides.

Traditionally weeds are controlled by two different methods i.e. manual and mechanical. But these methods are expensive and time consuming.One another approach to control the weed is by biological method. In these methods insects and pathogen are used control the weed. Above methods of weed management are slow in their results and cannot be employed for the crop management.To overcome these problems,quick and economically beneficial method to control weed is by application of chemicals.

The chemical used to control the weed is known as weedicide. Pendimethalin (stomp) is one of the effective weedicide interferes with weed seed germination and seedling growth. Chemical name of pendimethalin is [N-(l-ethylprophyl)-3-4-dimethyl-2,6-dinitrobenzeneamine]. It is a selective agrochemical dissolves freely in distilled water which effectively controls a wide spectrum of annual broad leaved weeds and grasses in many agronomic and horticultural crops. Pendimethalin checks the growth of weed during seed germination and seedling growth (Singh and Sigh, 2001).In present investigation seeds of weed *Hyptis suaveolens* L. were treated with Pendimethalin (stomp) to observe the effect on seed germination and seedling growth.

Materials and Methods:

For present investigation seeds of weed *Hyptis suaveolens* L. were collected from the plants growing naturally. Seeds were soaked in distilled water for 24 hours and kept for germination in petri dishes lined with moistens doubled layered filter paper. Germination of controlled seeds was observed for 7 days along with seeds treated with different concentrations of weedicide pendimethalin. Firstly the concentration of pendimethalin ranging from 50-1000 ppm was tried. Concentrations up to 1000 ppm does not found lethal subsequently higher concentration were tried.

To study the effects of pendimethalin on seed germination and seedling growth, 50 seeds of *Hyptis suaveolens* L. were soaked in 50 ml solution of different concentrations of pendimethalin ranging from 1,000-50,000 ppm for 24 hours. Seeds were washed with distilled water and allowed to germinate in petri disheslined with moistens doubled layered filter paper under laboratory conditions. Same number of seeds was soaked in distilled water for the same period used as control. The experiment was repeated four times for each treatment. Observations were recorded daily for seed germination and seedling growth in controlled and treated seeds.

Observation and Result:

The observation showed gradual decrease in the percentage of seed germination with increase in the concentration of weedicide pendimethalin. Seeds treated with lower concentrations below 1000 ppm of

pendimethalin, seed germination were found same as that of control. But above 1000 ppm concentration pendimethalin inhibits the seed germination gradually. Thus its gradual increase in concentration decreases seed germination and seedling growth.

The percentage of seed germination was 55.60, 53.20, 50.00, 35.20, 36.60, 26.00, and 23.20 at 1,000, 5,000, 10,000, 20,000, 30,000, 40,000 and 50,000 ppm. respectively as against 91.00 percent in control (Table no.1). There was gradual decrease in hypocotyl and radicle length, the swollen portion was seen at the transition zone of hypocotyl and radicle (Figure 1 and 2).The change in colour of cotyledon from greenish to yellow at higher concentration 30,000-50,000 ppm was observed (Table 1).

Table 1. Effect of different concentration of pendimethalin on seed germination of *Hyptis suaveolens* L.

Concentration in ppm	**Germination percentage**	**Standard Error (±)**
1000	55.60	4.32
5000	53.20	3.80
10000	50.00	5.88
20000	35.20	2.88
30000	36.60	4.08
40000	26.00	2.17
50000	23.20	1.96

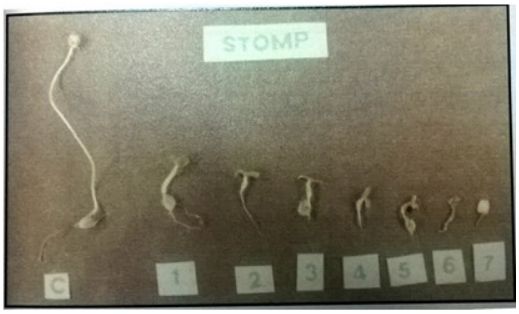

Figure 1: C- Control 1,2,3,4,5,6 and 7 seedling at1,000, 5,000, 10,000, 20,000, 30,000, 40,000 and 50,000 ppm respectively raised from seed treated with pendimethalin (stomp) showing progressive inhibition of growth.

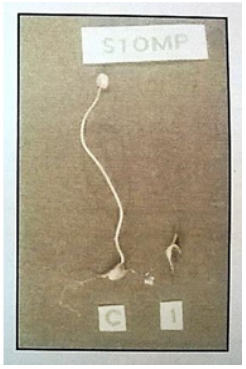

Figure 2: C- Control 1- seedling from a seed treated with 20000 ppm of pendimethalin (stomp) showing inhibition of growth, swelling at transition zone of radical and hypocotyl.

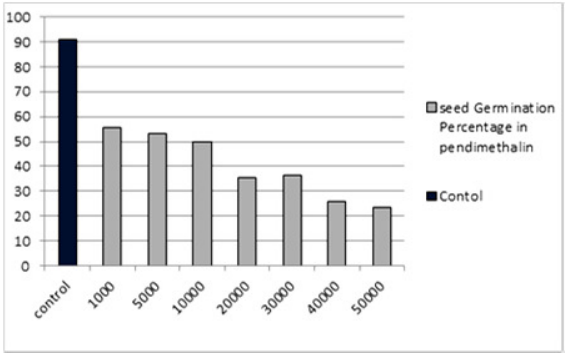

Figure 3- Graph showing decrease in the percentage of seed germination at different concentration of pendimethalin.

Discussion:

Weedicide pendimethalin found to be less effective in present study checking seed germination below the concentration of 1000 ppm stump had stimulating effects on seed germination but, however towards higher concentration i.e. from 1000-50000ppm there was gradual decrease in the percentage of germination.

In present investigation results revealed that there is a gradual check and inhibition on seed germination and seedling growth. Suchrelevant observations were recorded by Singh and Sigh (2001).In their investigation they reported the weed control in *Brassica* sp. with pre-emergence Weedicide pendimethalin which inhibit the seed germination inside the soil and paralysis of vital metabolic process of weed. Eleftherohorinos and Kotoula (1990) in their investigation reported that, pendimethalin was effective in pre emergence control of *Chenopodium album, Amaranthus retroflexus* and *Amaranthus blitoides* in sunflower.

Kalhapure *et al* (2014) studied pre-planting and post-emergence effects of

Weedicides for seed production in Onion (*Allium cepa* L.). Their results showed pendimethalin is effective in controling various broad-leaf and grassy-weeds and recorded lower weed density, weedbiomass, weed index and higher weed control efficiency. Akhtr *et al (*1986) stated pre emergence application of stomp (pendimethalin) at 5 liter per hector was most effective in controlling kharip weed resulted into higher yield of cotton.

In present investigation our result shows progressive inhibition on growth of hypocotyl and radicle was observed with increase in concentration of Weedicide. As far as the author is aware of literature available on the inhibitory effect of pendimethalin (stomp) is meager while that on the chemical of some dinitroaniline group on seed germination and seedling growth is considerable.

Thus from above discussion it is evident that, pendimethalin (stomp) is an efficient Weedicide in controlling the pre emergence seedling.

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