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A STUDY ON WEED MANAGEMENT BY AGRO-CHEMICAL PENDIMETHALIN IN AGRICULTURAL LAND OF CHANDRAPUR DISTRICT, MAHARASHTRA WITH SPECIAL REFERENCE TO HYPTIS SUAVEOLENS L.

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ABSTRACT:
Chandrapur district of Maharashtra state is the most popular for the forest; despite of that agriculture continues to be the most important sector of villagers for their livelihood and generating economy, as well as providing employment to the labors and farmers. Weed invading largely in agriculture land and at the present movement weeding is the drudgery for farmers due to many reasons including unavailability of agriculture labours, expensive, time consuming. In accordance with this research in weeding has investigated various techniques varying from mechanical, chemical and biological. Due to the fact that chemical method have produced excellent results. The agrochemical pendimethalin (stomp) proved to be most efficient weed controller in agriculture land of broad leaved weeds, the agrochemical stomp has low to moderate acute toxicity towards animals and humans. In this study various concentrations of stomp in ppm were applied on weed *Hyptis suaveolens L.* to observe the effects. The results revealed that higher concentration dose of stomp was lethal to the weed.

Keywords: - Weed Management, *Hyptis Suaveolens L.*, Agrochemical, Pendimethalin, Stomp And Weed.

INTRODUCTION :

Weed invades the crop field simultaneously and continues to be an important constraint in crop production. Weed and crop plants are almost similar in demanding certain things from the environment for their growth. Weed has high adaptability to grows anywhere and shape themselves under changed circumstances. Weeds harbor insects and pests during off season and then later attack to the crop field after sowing and damage them. Despite the good efforts made in research and extension in the field of weed science, the farmers continue to experience heavy losses in crop yield due to weed interference.

Traditional approach to control weed is manual and mechanical methods. Manual method include hand weeding, digging, cheeling, sickling and mowing while mechanical method include tillage, hoeing, inter row cultivation, Eco fallow system, burning, flooding, mulching (Mandumbu *et al.*, 2011). An integrated approach to weed management is necessary to effectively control weeds in a less costly and environment friendly manner (Thembani, 2002). Yadav *et al* (2015) studied Efficacy of chemical and non-chemical methods of weed management in rainfed potato (*Solanum tuberosum* L.). The success of biological weed control by insects and pathogens is directly or indirectly affecting on crop plants. By mechanical and biological methods, urgent weed management is not achieved, so chemicals can provide a fast, quick, and economically advantageous method of controlling weed. Employing chemicals for weed control referred as chemical weed control method, it commonly uses the chemicals referred as herbicides, weedicides or agrochemicals, it constitute the principal component of weed management.

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Although the herbicides have been in use for over three decades, use has increased only recently (Yaduraju, 2012), the share of herbicides is nearly 20% and is growing. Pendimethalin (stomp) is a selective herbicide which effectively controls a wide spectrum of annual broad leaved weeds and grasses in many agronomic and horticultural crops. Present investigation aims to study the effect of Pendimethalin on the growth of *Hyptis suaveolens* L.

MATERIALS AND METHODS :

For the present investigation plant species *Hyptis suaveolens* L. belonging to family Lamiaceae was used. Healthy plants species growing in the field were selected and sprayed with different aqueous concentration of stomp between 1000-50000 ppm with the help of aspee-poly sprayer of 1 liter capacity. Randomly designed plots of size approximately 2/2 square feet were prepared. To avoid contamination of different concentrations at low temperatures in the evening, each plot was covered on four sides by card board. Spraying of herbicide stomp (Pendimethalin) was done twice in an hour to make more effective penetration. In evening period herbicide solution reduces the evaporation and consequently more absorption by the plants takes place. Morphological responses were recorded daily till the death of plants. Fresh and dry weight of shoot and root of control as well as treated plants were taken to determine the desiccation of plants.

RESULTS :

Plants sprayed with stomp showed morphological changes at 50000 ppm concentration, the growth of plant inhibited and stunted as compared to control (Fig. No. 1 and 2). The plant showed morphological abnormalities after five days of spraying. The most prominent feature observed was curling nature of leaves, inhibition of lateral root formation and photosynthetic activity.

On the fifth day of spraying percentage of curly nature of margin in leaves increased as the concentration of stomp increases. Some other important morphological observations were the crumpled leaf margin, colour changed green to pinkish brown and flower buds dried off following the treatment of this herbicide. The lateral growth and apical growth completely ceased on 10th day of treatment at concentration of 50000 ppm. Therefore 50000 ppm considered to be lethal dose for plant. After the treatment of stomp, plant death occur after 13 days , it might be due to the physiological and biochemical toxicity of stomp.

The root system was damage and inhibition of lateral roots was observed at higher concentration 50000 ppm (fig. 3 and 4; Table no. 1). The root colour changed creamy to brown as compared to control. The fresh and dry weight of shoot and root of treated plants were found to be decreased gradually with the increased dose of herbicide.

DISCUSSION AND CONCLUSION :

Herbicide Stomp induces morphological changes after spray on *Hyptis suaveolens* L. plant such as crumpling of leaves, later on necrosis and then chlorosis of leaves tissue followed crumpling of leaves, drying of flowers, stunted growth of plants and inhibition of lateral roots which resulted in death of plants.After the treatment of stomp plant death occur after 13 days, it might be due to the physiological and biochemical toxicity of stomp similar observations were recorded by several workers including Shabana *et al* (2001). Curling of leaves due to chlorophyll disintegration or killing of some mesophyll and epidermal cells. The killing of cells might be due to plasmolysis of leaves. Singh *et al* (1987) reported the decrease in chlorophyll content of leaves in rice plant after the treatment of pendimethaline. Some other observed that the higher concentration of pendimethaline inhibites the structure and

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function of chloroplast. In a weed *Chenopodium album,* stomp affects on chlorophyll activity and leaves showing yellowing, scorching and later necrosis were observed by Jain (1993). Below the ground i.e. root was shows some morphological responses, inhibition of lateral root formation. Jordan *et al* (1978) reported pendimethaline reduces the length of tap root system in cotton, Donald and Joseph (1989) reported the inhibition of lateral root development in some weed and same result reported in *Chenopodium album,* Jain (1993). In present study, the reduction in growth of treated plant was confirmed by fresh weight and dry weight of shoot and roots. The fresh weight of plants of all concentration decrease as concretion increase, proportionate the dry weight of shoot and root of treated plants were also observed. These results indicate that the desiccation of plant found progressive with increase in concentration of herbicide.

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Table 1 -Effect of various doses of stomp on the weight of the weed

Herbicide	Concentration	Shoot fresh weight	Dry weight	Root fresh weight	Dry weight
	Control	27gm	12gm	11gm	5gm
Stomp	100 1000 5000 10,000 20,000 3o,000 4o,000 50,000	25.00 20.00 22.00 19.08 18.00 17.00 17.00 16.00	8.00 7.00 7.5 6.2 6.00 5.20 4.00 4.00	10.40 10.00 10.00 9.00 7.00 6.00 5.02 5.00	5.0 4.00 4.02 4.00 3.00 2.00 2.02 2.00

Fig.1 Control, 1, 2 and 3 showing spray application of stomp at 50000, 10000 and 20000 ppm

Fig. 2 Control, 4, 5 and 6 showing spray application of stomp at 300000, 40000 and 50000 ppm.

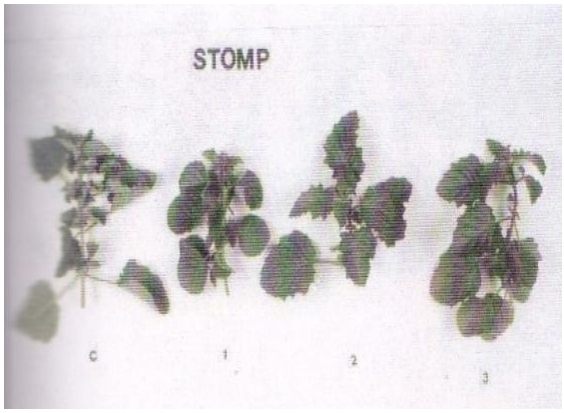

Fig. 3 Control, 1, 2 and 3 twig of plant after spray application of stomp at 100000, 30000 and 50000 ppm

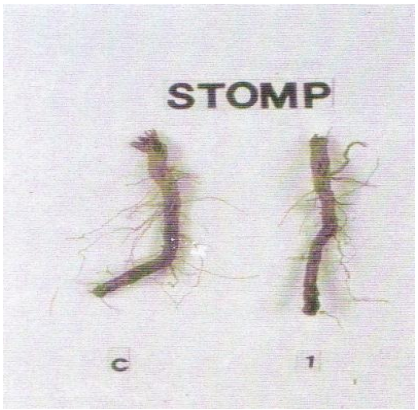

Fig. 4 C-Control, 1-Root of plant after spray application of stomp at 50000 ppm showing inhibition of lateral root formation

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