

## **Effect of 2, 4-D on Morphological Changes of *Sidaacuta* Burm F.**

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### **Abstract:**

Herbicidal activity of 2,4-D on *Sidaacuta* Burm f. was studied. For this purpose the plants were sprayed with aqueous solution of 2,4-D at the concentration from 100 to 2000 ppm. At all concentrations 2,4-D showed epinastically curvature, swollen and bending of stem. The leaves turned yellowish and roots became swollen and got decayed. Vegetative growth of plants was retarded and subsequently the plants dried.

**Key Words:** 2,4-D; herbicide; *Sidaacuta*; morphological changes.

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### **I. Introduction:**

According to Jethro Tull (1731) who used the word 'weed' "A weed is a plant growing where it is not desired". Thakur in 1984 said, which is "An undesirable, injurious, unsightly and troublesome plant which interferes with cultivated crops and affect human affairs".

Weeds which interfere the utilization of land and water resource; adversely affect the quality of crop and ultimately the human health. Weeds cause poison or seriously slow down weight gains of livestock. They form a serious negative factor in crop production and are responsible for marked losses in crop yields. The majority of weeds are products of the survival of the fittest. The impact of the presence of weeds on crop production is very considerable. The estimates suggest that weeds are responsible for an overall reduction of more than 10 % in the yield of the major world crops representing a huge annual loss of food supplies. Though weed control is as old as agriculture itself, man has done so little to control this most persistent problem till today. That's why the eradication of weed, which is the thorn in the growth of crop yield, is necessary.

*Sidaacuta* is a common weed, belonging to family Malvaceae. It is a branched shrubby plant, growing up to the height of one feet. Its leaves are simple lanceolate. The flowers are yellow, solitary or occasionally in pairs. It is a pantropical weed and found in agricultural fields, causing heavy damage to the crop plants. During present study the effect of 2,4-D, (2,4-Dichlorophenoxy acetic acid)- which is a broad-spectrum systemic herbicide, was studied on this weed.

### **II. Materials and Methods:**

The seeds *Sidaacuta* Burm.f. were collected from naturally growing plants at different locations in Vidharbha region of Maharashtra state. From these seeds the plants were raised in earthen pots, as well in the fields. They were allowed to grow till initiation of flowering. At this flowering stage 2,4-D was sprayed at different concentrations i.e. from 100 to 5000 ppm. Small quantity of sodium lauryl sulphate as surfactant was added to herbicide solution before spraying.

Six pots for each concentration containing 5-8 plants were sprayed with herbicide - 2,4-D while on more set of six pots were sprayed with water, and considered as control. Field trials were also conducted on naturally growing plants in randomly designed plots. Spraying was done twice in an hour to make it more effective preferably in the evening when the wind was slow and temperature was comparatively lower. The fresh and dry weights of shoots and roots were recorded and morphological changes were observed daily till the plant dried.

### **III. Results and Discussion:**

Plants sprayed with herbicide showed morphological changes such as scorching and wilting of leaves and stems. Crumpling and yellowing of leaves and flowers was followed by drying off of all plant parts.

On the second day of spray, the growing parts of the shoot and roots bend towards soil in all concentrations of herbicides. On the fourth day of spray, lower leaves became yellow between 800-1000 ppm, showed marked chlorosis, which occurred first in the lower leaves and gradually upwards. On the fifth day of spray, almost all the flower buds became yellow in color. On sixth day, a few buds were dried and the intensity of crumpling of leaves increases. Leaves rolled inward and drying of leaves progressed from margin towards

midrib at the concentration of 800 ppm and onwards. On the tenth day of spraying, the chlorosis of leaves increased with increase in concentrations and ultimately leaves dried off. The twigs of plants were also dried off. On the fifteenth day, the lateral and apical vegetative growth of plants was inhibited following 2,4-D treatment. The inhibition of root growth also observed at 1200 ppm. The growth was reduced as the concentrations of herbicide in plants growing in plots and in pots, increased.

The fresh and dry weights of shoots and roots of treated plants decreased gradually with the increased dose of herbicide (table 1).

**Table 1:** Effect of herbicide on fresh and dry weights of *SidaacutaBurm.f.*

Herbicide	Conc. in ppm	Average shoot weight (g)		Average root weight (g)	
		Fresh	Dry	Fresh	Dry
2,4-D	Control	42.59	13.85	3.73	1.64
	100	19.40	8.14	2.81	1.49
	400	16.33	6.38	2.55	1.27
	800	9.72	4.39	1.78	1.02
	1200	9.33	2.79	1.30	0.58
	1600	3.22	0.97	0.81	0.41
	2000	1.55	0.69	0.60	0.35

\* Average weight based on four plants.

The herbicide was thus found to be effective in inhibiting plant growth. The stems and leaves showed epinastic curvature probably due to unequal elongation of cells caused by 2,4-D treatment. Similar observation was reported by Zimmarmann *et al.* (1942), Marth and Mitchell (1944) on *Datura*, Beal (1944b) on African weed, Hamner and Tukey (1946) on *Eichhorniacrassipes*, Weaver (1946) on *Cassia tora*, Asana *et al.* (1950) on some varieties of wheat, D'Amato (1957) on *Lupinusalbus*, Nikolaevskij (1959) on thornlessgladeschia, Mohan Ram and Satsangi (1963) on *Ricinuscommunis*, Khosla (1967) on *Cassia tora* and *Ruelliatuberosa*, Rubin and Gritsaonta (1968) on *Amaranthusretroflexus* and *Chenopodium album*, Coble and Slife (1971) on *Ampelamusalbidus*, Bakale (1976, 78, 79) on *Cressacretica*, *Alternantherapolygonoides* var. *erecta* and *Xanthium strumarium*, Kolhe (1979) on *Tephrosiahamitonii*, *Solanumsurattense* and *Coelosiaargentea*, Deshmukh (1981) on *Corchorusolitorius*, *Cassia occidentales* and *Lagascamollis*, Srinivasu (1986) on *Partheniumhysterophorus*, Dhanpalet *et al.* (1989) on several weeds, Ferrell *et al.* (1989) on *Euphorbia esula*, Kasera and Sen (1990) on *Chenopodium album*, *Chenopodiummurale* and *Plantago ovate*, Tripathiet *al.* (1992) on *Lantana camera*, Jain (1993) on *Chenopodium album*, Gopal (1993) on *Medicagosativa*, Bobde (1993) in *Crotalaria juncea*, Suresh Babu and Muniyappa (1994) on *Solanumelaeagnifolium*, Mukherji (1994) on *Abutilon indicum*, Kulkarni (1998) in *Crotalaria medicaginea*, Tulankar (1998) in *Amaranthuslividus*, Kamble (1999) on *Hibiscus cannabinus*, Dudhe (2002) in *Hyptissuaveoluns*, Taduwardi (2002) in *Cleome viscosa* and Kamble Sanjay (2007) on *Hibiscus cannabinus*.

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