

## Research Note

Chemical Control of Canada Thistle  
*Cirsium arvense* (L.) Scop

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Canada thistle *Cirsium arvense*(L. Scop) is problem perennial weed found infesting wheat in certain areas of Punjab (India). Cultural and mechanical control measures adopted for its control are only partially effective. A successful control of *C. arvense* involve use of foliage applied herbicides translocating to all parts of the plant and capable of killing root/rhizome system. The experiment comprising eleven weed control treatments (Table-1) was laid out in a randomised complete block design with three replication to assess the efficacy of 2,4-D ethyle ester, dicamba, and isoproturon alone and in combinatins. Herbicides were sprayed when weed plants were in prebloting stage having 10-15 cm of height. The experiment plots were irrigated when required.

After 15 days of spray, severe toxicity to shoots was observed in plots where isoproturon 940 g + dicamba 400 g/ha was applied. Subsequently toxicity also developed in 2,4-D ethyl ester + isoproturon and 2,4-D ethyl ester + dicamba treatments. Toxicity in 2,4-D ethyl ester, isoproturon and dicamba alone though developed slowly but

these treatments also exerted good suppressing effect on the weed. Normal new re-sprouts of Canada thistle observed in 2, 4-D ethyl ester (225 g and 360 g/ha), and isoproturon (940 g/ha) treatments which subsequently entered into flowering. In dicamba at the rate of 400 and 600 g/ha now new re-sprout was observed and shoots showed severe toxicity. The combination treatments also did not allow any re-sprout.

The final observations were reported with 50 x 50 cm quadrat after two months of spray to record shoot population and underneath rhizomes. Two spots were randomly taken from each plot and after counting the population, shoots were cut from the surface to get the fresh weight and the spot was dug upto depth of 30 cm and the rhizomes were carefully retrieved from the soil. The rotted or killed rhizome fragments were discarded and after taking fresh weight the rhizomes were oven dried for their dry weight.

The data in table 1 show that all herbicides had marked suppressing effect on growth of *C. arvense*. Among the herbicides dicamba had significantly better suppressing effect on shoot growth than 2,4 D ethyl ester and isoproturon. The herbicides also reduced the rhizome population significantly which was 83.3 g/m<sup>2</sup> in isoproturon (940 g/ha) against 510 g/m<sup>2</sup> in control. The combination treatments had better kil-

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Table 1. Effect of herbicides on growth and development of *C.arvense*

Treatments	Dose g/ha	Shoot Population(m <sup>-2</sup> )	Shoot height (cm.)	Fresh wt. of shoot (gm <sup>-2</sup> )	Fresh wt. of rhizome (gm <sup>-2</sup> )	Dry wt. of rhizome (gm <sup>-2</sup> )
T <sub>1</sub> 2,4 - D ethylester	225	101.3(9.9)	17.5(4.2)	301.3(16.9)	225.3(14.8)	33.1(5.7)
T <sub>2</sub> 2,4 - D ethylester	360	74.0(8.6)	16.7(4.1)	240.0(15.4)	154.6(12.2)	26.0(5.7)
T <sub>3</sub> Isoproturon	940	50.6(7.1)	18.9(4.4)	160.0(12.3)	83.3(9.7)	14.4(3.8)
T <sub>4</sub> Dicamba	400	27.3(5.1)	7.6(2.8)	73.3(8.4)	130.0(11.2)	16.3(4.5)
T <sub>5</sub> Dicamba	600	8.6(2.9)	9.7(3.1)	24.6(4.7)	146.0(12.8)	13.7(3.7)
T <sub>6</sub> 2,4 - D ethylester + Isoproturon	225 + 940	46.0(6.6)	16.8(4.1)	118.6(10.6)	49.3(6.8)	6.8(2.6)
T <sub>7</sub> 2,4 - D ethylester + Isoproturon	360 + 940	32.0(5.4)	15.5(3.9)	85.3(9.1)	24.0(4.9)	4.0(4.9)
T <sub>8</sub> 2,4 - D ethylester + Dicamba	225 + 400	1.3(1.1)	5.9(2.2)	6.6(2.2)	52.6(6.8)	6.2(2.4)
T <sub>9</sub> 2,4 - D ethylester + Dicamba	360 + 400	0.6(0.9)	0.8(1.4)	1.3(1.1)	30.8(5.4)	3.8(1.8)
T <sub>10</sub> Isoproturon Dicamba	940 + 400	0.0(0.7)	0.0(0.7)	0.0(0.7)	0.0(0.7)	0.0(0.7)
T <sub>11</sub> Control (untreated) L.D.D(P = 0.05)		152.6(16.4) (2.6)	30.1(5.5) (0.9)	1820.0(42.6) (6.0)	510.0(22.0) (4.4)	57.6(7.4) (1.6)

The transformed values ( $\sqrt{x + 0.5}$ ) are given in parenthesis

ling effect on rhizomes than individual herbicides. The combinations of isoproturon 940 g + dicamba 400 g/ha resulted in complete killing of rhizomes. The killing with isoproturon 940 g + dicamba 400 g/ha was complete and at the end of season not even a small fragment of viable rhizome was found under this treatment. Similarly Bhatia et al. (1985) indicated that substituted urea herbicides namely isoproturon, metoxuron and methabenzthiazuron were quite effective against *C.arvense*. The combination of 2,4-D ester and dicamba was more effective than their individual treatments (Fechtig and Furtick, 1964). Dicamba has been reported to control *C.arvense* more effectively and for longer periods than 2,4-D (Gupta and Corns, 1968).

The present study indicated that combinations of herbicides are more effective against *C.arvense* than individual herbicide. The combinations of isoproturon and dicamba; 2,4-D ethyl ester and dicamba or 2,4-D ethyl ester and isoproturon can safely be used for control of *C.arvense* in wheat as these herbicides at the doses tested are safe for wheat.

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