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# Weed growth and peppermint yield influenced by various doses of Oxyflurorfen

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**ABSTRACT**
Highest oil yield from both the cuttings (60 DAP and 45DAFC) was recorded from weed free treatment followed by oxyfluorfen @ 470 g ai/ha. Oil yield was increased with the increase in rate of herbicides during both the years. Pendimethalin at both the rates were equally good. Oil yield was reduced up to 44% during 2004 and 62.9% during 2005 in weedy check as compared to weed free. Non grassy weeds were high in numbers then grassy during both the years.

**Key words:** Oxyfluorfen, Fluchloralin and Pendimethalin

## INTRODUCTION

Today, India has emerged as the largest producer of menthol and mint oil in the world. The cultivation of mint has become popular among farmers progressively. Uttaranchal and UP growing mint in an area of considerable size. To grow mint as commercial crop needs proper care of the crop i.e. nutrients, irrigation, pest control and weed management. Amomg all the essential requirements, weed management is very crucial and important because, weed not only reduce the yield of mint but also reduce the quality of the oil. Kothari and Singh (1994) reported that the unrestricted weed growth significantly reduced mint oil yield by 58% to 73%. Since, mint crop is grown by propagates and needs frequent irrigations & thus weeds get congenial environment for germination, establishment and for their fast growth. The weeds compete the crop since very beginning and reduce the yield. The critical period of weed competition in menthol mint has been found to be in between 30-90 days after planting and 16-45 days after first harvest. To check the weed growth 4-5 manual weddings are required .To grow on large scale it needs more human resource which is very difficult to manage and also very costly affair due to higher wages of the labour. To solve the crisis of labour problem, weeds may be checked / managed by herbicides. Various herbicides i.e. Pendimethalin, Diuran etc. have already been tested. Oxyfluorfen is also a good herbicide to control weeds in mentha. Hence, the present study was undertaken to test the oxyfluorfen in various doses.

## MATERIALS AND METHODS

A field trial was conducted during two consecutive years i.e. winter session of 2004 and 2005 at Medicinal Plant Research and Development Center of Govind Ballabh Pant University of Agriculture and Technology, Pantnagar. Experiment was conducted in Randomized Block Design with 11 treatments. All the treatments were replicated three times. Treatments were consisted of various doses of Oxyfluorfen (88,176, 206, 235 and 470g ai/ha}, Pendimethalin (225 and 450g ai/ha), Fluchloralin (270 and 540g ai/ha) along with one weedy and weed free treatments. Oxyflurofen and Pendimethalin were applied a day after planting as pre-emergence (PE) while Fluchloralin was applied as pre-plant incorporation (PPI). Water was used @ 500 liter per hectare. *Mentha piperata* was planted at row spacing of 30 cm. in mid of January during both the years. The soil of experimental plots was sandy loam in texture having 0.75% organic carbon, medium in phosphorus (24.5kg/ha) and medium in available Potassium (173 kg/ha). Soil was in neutral (pH 7.0).

## RESULTS AND DISCUSSION

Weed spp. observed in the field at 60 days stage were grassy, non grassy and sedges. Population of weeds was higher during 2005 as compared to 2004. In general, the population of *Cyperus rotundus* was highest during 2005 against 2004 (Table-1). *Echinochloa colona* and *Digitaria sanguinalis* among grassy; *Solanum nigrum*, *Chenopodium album*, and *Ipomea* spps, *Eclipta alba* and *Commelina benghalensis* among non-grassy were predominant weeds irrespective of the treatments. Data given in table-1 revealed that all the weeds were suppressed due to higher doses of herbicides. There was good control of non-grassy weeds by oxyfluorfen @

Table 1 : Effect of treatments on weed density (No. $m^{-2}$) at 60 DAP

| Treatments | Dose | Grassy Weeds | | Non Grassy Weeds | | Sedges | |
|---|---|---|---|---|---|---|---|
| | (g ai $ha^{-1}$) | 2004 | 2005 | 2004 | 2005 | 2004 | 2005 |
| Oxyfluorfen | 88 | 30 | 20 | 49 | 13 | 10 | 491 |
| Oxyfluorfen | 176 | 16 | 19 | 24 | 7 | 10 | 461 |
| Oxyfluorfen | 206 | 13 | 19 | 18 | 4 | 10 | 453 |
| Oxyfluorfen | 235 | 8 | 19 | 9 | 6 | 5 | 433 |
| Oxyfluorfen | 470 | 2 | 14 | 3 | 1 | 2 | 426 |
| Fluchloralin | 270 | 23 | 10 | 45 | 352 | 16 | 422 |
| Fluchloralin | 540 | 13 | 16 | 23 | 347 | 15 | 475 |
| Pendimethalin | 225 | 21 | 28 | 56 | 272 | 30 | 524 |
| Pendimethalin | 450 | 8 | 19 | 25 | 215 | 16 | 494 |
| Weed-free | - | 0 | 00 | 00 | 00 | 00 | 00 |
| Weedy | - | 52 | 58 | 114 | 557 | 35 | 562 |

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206-470g ai/ha during both the years. Grassy weeds and sedges were also decreased with the increasing rate of oxyfluorfen during 2004 and effect was not much appreciable during 2005. There was no effect of oxyfluorfen on sedges. Data given in table-2 shows that at 60 DAP dry matter production of total weeds was lowest (8.0 g $m^{-2}$) in oxyfluorfen treated plot @ 470 g ai/ha and highest (130.6 g $m^{-2}$) in weedy check during 2004 and 52.5g $m^{-2}$ and 149.5g $m^{-2}$ in oxyfluorfen @ 470g ai/ha and weedy check respectively during 2005. Dry matter production of total weeds 45 days after I$^{st}$ cut follows the same trend.

However, all the herbicides reduced the dry matter production of weeds significantly as compared to weedy check. Percent reduction of oil yield at I$^{st}$ cut was higher (33.6%) in lower dose of oxyfluorfen (88 g ai/ha) during 2004 and 48.7% during 2005. As the rate of application of herbicides was increased the percent reduction in oil yield was less. Reduction in oil yield was similar in Fluchloralin and Pendimethalin treated plots in first cut. Reduction in oil yield as compared to weed free was higher in lower dose of herbicides. As the rate of application increased the reduction was reduced. Highest reduction 35.4% during 2004 and 70% during 2005 was recorded from weedy check plot in first cut. However, during second cut 59.0% during 2004 and 57.4% during 2005 was recorded. Oil yield was highest in weed free treatment (188.8 Kg/ha during 2004 and 387.2 Kg/ha during 2005) where as lowest was (109.6 Kg/ha during 2004 and 142.4 Kg/ha during 2005) in weedy check. Total oil yield of mint was increased with the increase in herbicidal rate. Highest herbage yield (first cut + second cut) was recorded in highest doses of oxyfluorfen @470 g ai/ha during both the years.

Table 2 : Effect of treatments on weed dry matter production and oil yield of Mentha

| Treatments | Dose (g ai $ha^{-1}$) | Total weed dry wt. (g $m^{-2}$) 60 DAP | | Oil yield at I$^{st}$ cut (Kg $ha^{-1}$) | | Reduction in oil yield (%) compared to weed free | | Total dry wt. at 65 DAFC (g $m^{-2}$) | | Oil yield at 2$^{nd}$ cut (Kg $ha^{-1}$) 65 DAFC | | Reduction in oil yield (%) | | Total oil yield (Kg $ha^{-1}$) (1$^{st}$+2$^{nd}$ cut) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2004 | 2005 | 2004 | 2005 | 2004 | 2005 | 2004 | 2005 | 2004 | 2005 | 2004 | 2005 | 2004 | 2005 |
| Oxyfluorfen | 88 | 49.7 | 77.9 | 90.4 | 92.8 | 33.6 | 48.7 | 120.3 | 152.8 | 25.6 | 140.8 | 51.5 | 31.8 | 116.0 | 233.6 |
| Oxyfluorfen | 176 | 30.0 | 76.5 | 99.2 | 98.4 | 27.0 | 45.6 | 105.2 | 152.8 | 25.6 | 148.0 | 51.5 | 28.3 | 124.8 | 246.4 |
| Oxyfluorfen | 206 | 26.0 | 75.5 | 104.2 | 100.4 | 22.9 | 44.7 | 108.8 | 149.4 | 24.8 | 142.4 | 53.0 | 31.0 | 129.6 | 242.4 |
| Oxyfluorfen | 235 | 10.0 | 73.7 | 121.6 | 104.0 | 10.6 | 42.5 | 106.0 | 140.0 | 27.2 | 140.8 | 48.5 | 31.8 | 148.8 | 244.8 |
| Oxyfluorfen | 470 | 8.0 | 52.5 | 130.4 | 112.0 | 4.1 | 38.0 | 104.3 | 129.4 | 27.2 | 171.2 | 48.5 | 17.0 | 157.6 | 283.2 |
| Fluchloralin | 270 | 41.6 | 141.8 | 100.0 | 60.8 | 26.5 | 66.4 | 115.3 | 192.2 | 24.8 | 130.4 | 53.0 | 36.8 | 124.8 | 191.2 |
| Fluchloralin | 540 | 24.0 | 115.0 | 104.8 | 66.4 | 22.9 | 66.3 | 120.4 | 187.8 | 23.8 | 124.0 | 56.0 | 39.9 | 128.0 | 190.4 |
| Pendimethalin | 225 | 36.3 | 116.4 | 104.8 | 77.6 | 22.9 | 57.1 | 107.4 | 164.4 | 23.2 | 152.8 | 56.0 | 26.0 | 128.0 | 238.4 |
| Pendimethalin | 450 | 22.0 | 99.9 | 105.6 | 79.2 | 22.3 | 56.2 | 117.3 | 142.8 | 24.0 | 152.8 | 54.5 | 26.0 | 129.6 | 232.0 |
| Weed-free | - | 00.0 | 00.0 | 136.0 | 180.8 | 00.0 | 00.0 | 00.0 | 00.0 | 52.8 | 206.4 | 00.0 | 00.0 | 188.8 | 387.2 |
| Weedy | - | 130.6 | 149.5 | 88.0 | 54.4 | 35.3 | 70.0 | 125.0 | 196.3 | 21.6 | 88.0 | 59.1 | 57.4 | 109.6 | 142.4 |
| CD at 5% | - | - | 30.9 | 17.6 | 26.4 | - | - | 15.3 | 36.1 | 4.8 | 35.2 | - | - | 22.4 | 61.6 |

**REFERENCE**

**Kothari, S.K. & Singh. (1994).** Chemical weed control in Japanese mint (Mentha arvensis) *J.Essential oil Res*. 6(1) 47-55

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