

Weed control with soil- and POST-applied herbicides in field pea

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Weed control and field pea response to selected soil- and POST-applied herbicides were evaluated in a randomized complete block design with three replicates. The experiment was conducted on a Heimdahl loam soil with 7.9 pH and 2.9% organic matter at Carrington, ND in 2003. The trial area was cultivated on May 15 with a Melroe culti-harrow. Herbicide treatments were applied at 18 gal/A and 30 psi through 8001 flat fan nozzles to 5 by 25 ft plots with a CO₂ pressurized hand-held plot sprayer. PPI treatments were applied on May 16 with 54 F, 86% RH, and 95% clear sky and immediately incorporated twice using a field cultivator plus harrow set at a 2- to 3-inch depth. On May 16, inoculated 'Integra' field pea was planted in 7-inch rows at pure live seed rates of 300,000 seeds/A. PRE treatments were applied on a dry soil surface on May 16 with 55 F, 92% RH, 10 mph wind, and 100% cloudy sky. A total of 1.12 inches of rainfall occurred during the 2-day period following application of PRE treatments. POST treatments were applied on June 10 with 62 F, 75% RH, 9 mph wind, and 100% cloudy sky to 3- to 5-inch tall field pea, 2- to 4-leaf yellow and green foxtail, 0.5- to 2-inch tall common lambsquarters, 0.5- to 1-inch tall redroot and prostrate pigweed, and 1- to 3-inch tall volunteer flax. Average plant density in untreated plots on June 13: field pea = 9/ft², yellow and green foxtail = 45/ft², common lambsquarters = 3/ft², redroot and prostrate pigweed = 12/ft², and volunteer flax = 2/ft². The trial was harvested with a plot combine on August 26.

Good to excellent foxtail, common lambsquarters, and pigweed control (88 to 99%) and good volunteer flax control (81 to 84%) was achieved with PPI ethalfluralin+metribuzin, ethalfluralin+imazethapyr, and pendimethalin+ imazethapyr (Table 1). However, ethalfluralin+metribuzin caused 20 to 25% pea injury and reduced seed yield (Table 2). Sequential soil-applied/POST treatments provided 86 to 99% control of foxtail, common lambsquarters, and pigweed, and pea yield of 52.3 to 58.2 bu/A but injury ranged from 9 to 21%. PRE pendimethalin+imazethapyr improved foxtail control compared to imazethapyr. POST imazethapyr and imazamox generally provided similar weed control and pea yield. Imazamox at 0.03 lb/A + bentazon or bentazon+sethoxydim provided 83 to 86% control of foxtail and 98 to 99% control of common lambsquarters and pigweed. Treatments that included bentazon+sethoxydim injured pea 9 to 21% but yield ranged from 48.0 to 58.2 bu/A. POST metribuzin at 0.19 lb/A provided 93% volunteer flax control but pea injury ranged from 28 to 33%.

Table 1. Weed control in field pea, Carrington, 2003.

| Treatment ¹ | Rate lb ai/A | 7/8 | | | | 7/30 | | |
|----------------------------------|---------------------|------------------------------|-------------------------------|------------------------------|--------------|-----------------|-------------------------------|-----------------|
| | | Foxtail spp. ² | Common lamb's- quarters | Pigweed spp. ² | Vol. flax | Foxtail spp. | Common lamb's- quarters | Pigweed spp. |
| | | ----- % control ----- | | | | | | |
| Untreated | x | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| <u>PPI</u> | | | | | | | | |
| Ethalfluralin+ | | | | | | | | |
| metribuzin | 0.75+0.38 | 88 | 99 | 98 | 81 | 92 | 98 | 97 |
| Etha+imazethapyr | 0.75+0.03 | 94 | 98 | 98 | 84 | 95 | 98 | 98 |
| Pendimethalin+imep | 0.52+0.03 | 90 | 98 | 98 | 82 | 91 | 98 | 99 |
| Imep+sulfentrazone | 0.03+0.19 | 73 | 99 | 99 | 73 | 70 | 99 | 99 |
| Pend/Bentazon+ | | | | | | | | |
| sethoxydim+ | 1.46/0.8+ | | | | | | | |
| imazamox+COC+ | 0.2+0.015+1%+ | | | | | | | |
| 28%N (POST) | 2pt | 96 | 99 | 99 | 76 | 98 | 98 | 99 |
| <u>PRE</u> | | | | | | | | |
| Imep | 0.03 | 72 | 98 | 99 | 67 | 70 | 98 | 99 |
| Imep+pend | 0.03+0.52 | 81 | 97 | 99 | 62 | 83 | 98 | 99 |
| Imep&glyphosate | 0.05&0.56 | 75 | 98 | 98 | 78 | 75 | 99 | 99 |
| Imep&glyt/Bent+seth+ | 0.05&0.56/0.8+0 | | | | | | | |
| COC (POST) | .2+2pt | 86 | 92 | 96 | 57 | 87 | 91 | 99 |
| Imep&glyt+glyt/ Bent+seth+COC | 0.03&0.37+ 0.28/ | | | | | | | |
| (POST) | 0.8+0.2+2pt | 90 | 92 | 93 | 69 | 89 | 93 | 95 |
| <u>POST</u> | | | | | | | | |
| Bent+seth+COC | 0.8+0.2+2pt | 85 | 99 | 58 | 33 | 84 | 97 | 67 |
| Imep+NIS | 0.03+0.25% | 80 | 52 | 99 | 33 | 80 | 67 | 99 |
| Immx+NIS | 0.03+0.25% | 78 | 63 | 99 | 33 | 79 | 70 | 99 |
| Immx+bent+NIS+ | 0.03+0.19+ | | | | | | | |
| 28%N | 0.25%+2pt | 85 | 98 | 99 | 33 | 83 | 98 | 99 |
| Immx+bent+seth+ | 0.03+0.3+0.075+ | | | | | | | |
| NIS+28%N | 0.25%+2pt | 86 | 98 | 99 | 43 | 86 | 99 | 99 |
| Immx+bent+seth+ | 0.015+0.8+0.2+0 | | | | | | | |
| NIS+28%N | .25%+2pt | 80 | 96 | 99 | 50 | 75 | 99 | 99 |
| Immx+bent+seth+ | 0.015+0.8+0.2+1 | | | | | | | |
| COC+28%N | %+2pt | 80 | 96 | 96 | 37 | 73 | 99 | 99 |
| Metr+seth+COC | 0.13+0.2+2pt | 82 | 99 | 76 | 60 | 78 | 99 | 82 |
| Metr+seth+COC | 0.19+0.2+2pt | 88 | 99 | 81 | 93 | 79 | 99 | 84 |
| LSD (0.05) | | 8 | 9 | 9 | 21 | 11 | 4 | 8 |

¹COC=Hasten, a methylated seed oil from Wilbur-Ellis, Fresno, CA; NIS=Preference, a nonionic surfactant from Agrilience, St. Paul, MN.

²Foxtail spp.=Yellow and green; Pigweed spp.=Redroot and prostrate.

Table 2. Field pea response to herbicide treatments, Carrington, 2003.

| Treatment ¹ | Rate lb ai/A | Crop injury | | Seed yield bu/A |
|---|----------------------------|---------------|-----|--------------------|
| | | 6/26 | 7/8 | |
| | x | ----- % ----- | | |
| Untreated | | 0 | 0 | 31.6 |
| <u>PPI</u> | | | | |
| Ethalfuralin+metribuzin | 0.75+0.38 | 25 | 20 | 45.3 |
| Etha+imazethapyr | 0.75+0.03 | 4 | 5 | 53.8 |
| Pendimethalin+imep | 0.52+0.03 | 0 | 0 | 60.4 |
| Imep+sulfentrazone | 0.03+0.19 | 17 | 13 | 55.7 |
| Pend/Bentazon+sethoxydim+ imazamox+COC+28%N (POST) | 1.46/0.8+0.2+0.015+1%+2pt | 21 | 18 | 52.3 |
| <u>PRE</u> | | | | |
| Imep | 0.03 | 0 | 0 | 52.7 |
| Imep+pend | 0.03+0.52 | 0 | 0 | 57.0 |
| Imep&glyphosate | 0.05&0.56 | 0 | 0 | 56.4 |
| Imep&glyt/Bent+seth+COC (POST) | 0.05&0.56/0.8+0.2+2pt | 11 | 12 | 54.0 |
| Imep&glyt+glyt/Bent+seth+COC (POST) | 0.03&0.37+0.28/0.8+0.2+2pt | 12 | 9 | 58.2 |
| <u>POST</u> | | | | |
| Bent+seth+COC | 0.8+0.2+2pt | 13 | 10 | 48.0 |
| Imep+NIS | 0.03+0.25% | 0 | 0 | 51.2 |
| Immx+NIS | 0.03+0.25% | 0 | 0 | 50.6 |
| Immx+bent+NIS+28%N | 0.03+0.19+0.25%+2pt | 0 | 3 | 44.5 |
| Immx+bent+seth+NIS+28%N | 0.03+0.3+0.075+0.25%+2pt | 19 | 15 | 54.9 |
| Immx+bent+seth+NIS+28%N | 0.015+0.8+0.2+0.25%+2pt | 16 | 12 | 50.5 |
| Immx+bent+seth+COC+28%N | 0.015+0.8+0.2+1%+2pt | 16 | 14 | 53.4 |
| Metr+seth+COC | 0.13+0.2+2pt | 17 | 14 | 48.6 |
| Metr+seth+COC | 0.19+0.2+2pt | 33 | 28 | 58.9 |
| LSD (0.05) | | 8 | 7 | 12.6 |

¹COC=Hasten, a methylated seed oil from Wilbur-Ellis, Fresno, CA; NIS=Preference, a nonionic surfactant from Agrilience, St. Paul, MN.