Effectiveness and Selectivity of Herbicides in Lentils
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Summary

Eight herbicides not yet registered for use in lentils (Lens culinaris), one (ethalfluralin) as PPI and 7 (pendimethalin, oxadiazon, prometryzamide, terbuthylazine, metribuzin, prometryn, and linuron) as PRE were tested in the field in comparison with propyzamide the only herbicide registered for use in lentils in Greece. Data obtained were: germination percentage, weed control, lentil plant height and dry weight per plant. Germination percentage in plots treated with herbicides was similar to that of the untreated control. Weed control was very good (over 85% for propyzamide) in all new herbicide tested. Plant height was significantly lower compared to Control at 35 but not at 65 days after sowing (DAS) and dry weight at 45 but not at 65 DAS only in plots treated with ethalfluralin.

Introduction

Lentil is an important grain legume all over the world. In Greece, lentils are known and used as a high nutritional value crop for more than 2,500 years, until late 1960. Today lentils are an important crop in four main agricultural regions in Central and Northern Greece and its cultivated area increased the last three years.

One of the major problems lentil farmers face in Greece is the difficulty in controlling weeds mechanically or culturally, mainly due to the close sowing space and the cost of hand labor. Weed control in lentils is crucial because lentils are a relatively non-competitive crop. Economic and effective control of weeds in lentils is only possible by using herbicides. However, there are no registered herbicides to control broadleaf weeds in lentils in Greece, except propyzamide.

The objective of this study was to evaluate the effectiveness against weeds and the selectivity to lentils of nine new herbicides.

Methodology

- The experiment was carried out at the University Experimental Farm in Velestino, Thessaly, Greece during Spring-Summer in 2012
- The experimental design used was a RCB with three replications per treatment
  - Plot size was 3 x 2 m with plant spacing 40 x 3 cm, in 5 rows
  - Small seed variety Samos was used
- Germination percentage at 18 DAS, Weed control at 35 DAS, Plant height at 35, 65 DAS and Dry weight at 45, 65 DAS were measured
- Weed density in control plots was 54 weeds/m²
- Main weeds were: Chenopodium album (50%), Papaver roeas (32%), Scandix pecten veneris (9%), Avena spp. (4%) and Anthemis arvensis (4%)

Results & Discussion

- Germination percentage in plots treated with herbicides was similar to that of the untreated control.
- Weed control was very good (over 85%) in all herbicide treatments
- Plant height was significantly lower at 35 but not at 65 days after sowing (DAS) and dry weight at 45 but not at 65 DAS only in plots treated with ethalfluralin.

<table>
<thead>
<tr>
<th>Herbicide</th>
<th>Rate, (kg a.i./ha)</th>
<th>Application time</th>
<th>Germination (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>-</td>
<td>-</td>
<td>100</td>
</tr>
<tr>
<td>Ethalfluralin</td>
<td>1.00</td>
<td>PPI</td>
<td>100</td>
</tr>
<tr>
<td>Pendimethalin</td>
<td>1.00</td>
<td>PRE</td>
<td>109</td>
</tr>
<tr>
<td>Oxadiazon</td>
<td>0.88</td>
<td>PRE</td>
<td>92</td>
</tr>
<tr>
<td>Bmetanilom</td>
<td>0.80</td>
<td>PRE</td>
<td>97</td>
</tr>
<tr>
<td>Terbutylazine</td>
<td>0.75</td>
<td>PRE</td>
<td>109</td>
</tr>
<tr>
<td>Metribuzin</td>
<td>0.21</td>
<td>PRE</td>
<td>101</td>
</tr>
<tr>
<td>Glyztrun</td>
<td>1.25</td>
<td>PRE</td>
<td>104</td>
</tr>
<tr>
<td>Linuron</td>
<td>1.25</td>
<td>PRE</td>
<td>108</td>
</tr>
<tr>
<td>Propyzamide</td>
<td>1.25</td>
<td>PRE</td>
<td>103</td>
</tr>
</tbody>
</table>

F-value: Non-Significant

<table>
<thead>
<tr>
<th>Herbicide</th>
<th>Rate, (kg a.i./ha)</th>
<th>Application time</th>
<th>Lentil height (cm)</th>
<th>Lentil dry weight (mg/plant)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>-</td>
<td>-</td>
<td>35 DAS 65 DAS</td>
<td>45 DAS 65 DAS</td>
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<tr>
<td>Ethalfluralin</td>
<td>1.00</td>
<td>PPI</td>
<td>12.5 41.6</td>
<td>1080 5063</td>
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<tr>
<td>Pendimethalin</td>
<td>1.00</td>
<td>PRE</td>
<td>16.6 40.2</td>
<td>1513 4236</td>
</tr>
<tr>
<td>Oxadiazon</td>
<td>0.88</td>
<td>PRE</td>
<td>15.7 41.1</td>
<td>1313 4820</td>
</tr>
<tr>
<td>Bmetanilom</td>
<td>0.80</td>
<td>PRE</td>
<td>16.4 40.2</td>
<td>1467 4010</td>
</tr>
<tr>
<td>Terbutylazine</td>
<td>0.75</td>
<td>PRE</td>
<td>16.4 39.4</td>
<td>1367 4380</td>
</tr>
<tr>
<td>Metribuzin</td>
<td>0.21</td>
<td>PRE</td>
<td>17.8 40.6</td>
<td>1467 4253</td>
</tr>
<tr>
<td>Glyztrun</td>
<td>1.25</td>
<td>PRE</td>
<td>16.9 39.0</td>
<td>1413 4693</td>
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<tr>
<td>Linuron</td>
<td>1.25</td>
<td>PRE</td>
<td>17.1 39.3</td>
<td>1467 4360</td>
</tr>
<tr>
<td>Propyzamide</td>
<td>1.25</td>
<td>PRE</td>
<td>16.8 40.1</td>
<td>1340 3607</td>
</tr>
</tbody>
</table>

LSD0.05 = 3.4 NS 189 381

Lentil plot

Herbicide Rate (kg a.i./ha)

ethalfluralin 1.00
pendimethalin 1.00
oxadiazon 0.88
bmetanilom 0.80
terbutylazine 0.75
metribuzin 0.21
glyztrun 1.25
linuron 1.25
propyzamide 1.25

Lentil height (cm)

Control 35 DAS 65 DAS
ethalfluralin 12.5 41.6 1080 5063
pendimethalin 16.6 40.2 1513 4236
oxadiazon 15.7 41.1 1313 4820
bmetanilom 16.4 40.2 1467 4010
terbutylazine 16.4 39.4 1367 4380
metribuzin 17.8 40.6 1467 4253
glyztrun 16.9 39.0 1413 4693
linuron 17.1 39.3 1467 4360
propyzamide 16.8 40.1 1340 3607

Lentil dry weight (mg/plant)

Control 35 DAS 65 DAS
ethalfluralin 1080 5063
pendimethalin 1513 4236
oxadiazon 1313 4820
bmetanilom 1467 4010
terbutylazine 1367 4380
metribuzin 1467 4253
glyztrun 1413 4693
linuron 1467 4360
propyzamide 1340 3607

LSD0.05 34 NS 189 381