Efficacy of Tribunil at Various Concentrations With and Without Surfactant for the Control of Weeds in Wheat

Muhammad Idrees', Mahboob Akhtar' & Muhammad Rafiq Ch.'

Department of Agriculture, Govt. of the Punjab, Lahore
2Departments of Agronomy and Irrigation & Drainage, University of Agriculture, Faisalabad

Investigation pertaining to the efficacy of tribunil herbicide at various concentrations with and without a surfactant for the control of wheat weeds was carried out at the University of Agriculture, Faisalabad. Addition of a surfactant improved the efficacy of tribunil herbicide spray by increasing retention of the spray solution and decreasing bounce off loss. Application of tribunil (g) 2 kg ha⁻¹ + 0.2 % surfactant resulted in better weed control and eliminated their competition with wheat crop by increasing weed mortality to the extent of 88.46 % as compared to control. It resulted in higher grain yield and maximized the net benefit among the tested treatments. Addition of a surfactant also increased net benefit over application of tribunil alone. All the weedicide treatments with or without a surfactant significantly decreased the weed flora. Application of tribunil and tribunil plus a surfactant also resulted in increased fertile tillers, number of grains per spike as well as grain weight as compared to other treatments.

Key words: efficacy of tribunil, surfactant, weeds in wheat

INTRODUCTION

In the modern agriculture, use of herbicides has become inevitable for the control of weeds. However, the efficacy of the herbicides is not fully realised as a lot of spray material is lost through run off, leaching and volatilization. Spray solution is repelled due to the presence of waxy cuticle on the plant leaf surface. Thus, the effectiveness of contact herbicides depends largely upon uniform and complete wetting of the plant. Without wetting agents, herbicide remains in the form of droplets. The addition of a surfactant increases the effectiveness of herbicides by lowering down the interfacial tension and improving uniformity of wetting of the plant foliage. It resulted in less bounce off which contributed to the increased effectiveness of the herbicides.

Hunter (1982) observed that the control of cow cockle weed (Laccaria segetulcis) with chlorsulfuron (a) 20 - 80 g ha⁻¹ was improved by the addition of a surfactant. It was observed that at 4 leaf stage of weeds, 5 g of chlorsulfuron ha⁻¹ + a surfactant was equivalent to 40 g chlorsulfuron without a surfactant. Walia and Gill (1982) advocated that various surfactants namely sandovit (m) 0.1 % and hyoxid (a), 0.25% enhanced weed control efficacy of metoxuron and isoproturon, applied (a), 1.2 and 0.75 kg ha⁻¹ respectively. It significantly increased the grain yield of wheat crop.

Gill and Mehra (1987) found that addition of hyoxid -x-IOO increased the efficacy of methabenzthiazuron against dumbi sitti (Phalaris minor) in enabling the rate to be reduced to 0.525 kg without impairing control and gave the highest yield. Ruiter et al., (1987) found that in winter wheat under controlled conditions, the addition of 0.5 % (v/v) armoblen T/2 or agrol LN enhanced the activity of both glyphosate and fluaizifop-p-butyl. Malik et al. (1989) reported that application of isoprotron, meioxuron and diclofop-methyl in wheat alone or with a non-ionic surfactant increased herbicide toxicity to wild pea (lathyrus flpegga), wild oats (avena sterilis sub sp. ludogigeria), common vetch (ltdo sativa) and Lambsquarter (Chenopodium album). Reduced rates of isopotron in combination with 2. 4-d+surfactant provided yields similar to those obtained from higher rates of isopotron alone.

Ruiter et al., (1990) reported that cationic and amionic surfactants enhanced the retention of spray material on plant species with a reflective leaf surface such as Solanum nigrum, Chamomilla recutita, Elymus repens, wheat peas and tomatoes. Donald and Prato (11191) studied that chlorsulfuron, metosulfuron and Ga-13ltll() (trisulfuron) to 10-20 g ha⁻¹ + an ionic surfactant generally controlled bgh kochia (Kochia scoparia) and wild mustard (Slnapus arvensus), equally well. The above given studies indicate that the addition of a surfactant improved the effectiveness of a herbicide in controlling the weeds associated with wheat crop.

Since wheat stands as a major cash crop in Pakistan, a quantitative assessment of the effectiveness of adding a surfactant in controlling weed growth associated with wheat crop under local conditions appeared to be a dire need for improving the wheat production. The reported study was thus conducted to locally evaluate the performance
The highest grain yield (1516.0 kg ha⁻¹) was recorded in plots receiving two hand-weedings. It was 21.7% higher than control. Three sorgaab sprays gave 18.8% higher grain yield (1480.0 kg ha⁻¹) over control (1246.0 kg ha⁻¹). The increase in grain yield may be attributed to regulation of plant height and weed control in improving leaf area per plant, number of pods per plant and number of grains per pod (Table 3). The effectiveness of any production practice is ultimately evaluated on the basis of its economics. Economic and marginal analyses (Tables 4 and 5) showed that three sorgaab sprays was termed as the most effective treatment in this regard with highest net returns of Rs. 2616.0 ha⁻¹ and 664.7% marginal rate of return. Although two hand-weedings gave the highest grain yield among all the treatments but due to higher costs involved, it was overshadowed by three sorgaab sprays which turned out to be rather cheap.

It was concluded that sorgaab (three sprays) may be used as a natural weed inhibitor in mungbean. The long term effects of sorghum mulch incorporation on soil physical conditions, pli, organic matter contents, etc. may be investigated in future studies.

Table 5. Marginal analysis.

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Costs that vary (Rs./ha)</th>
<th>Net benefit (Rs./ha)</th>
<th>Marginal rate of return (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T. = Control</td>
<td>0</td>
<td>22428</td>
<td>---</td>
</tr>
<tr>
<td>1° = sorgaab spray (IS DAS)</td>
<td>160</td>
<td>22304 D</td>
<td>---</td>
</tr>
<tr>
<td>1'3 = sorgaab spray (15 &amp; 30 DAS)</td>
<td>320</td>
<td>22972</td>
<td>170.3</td>
</tr>
<tr>
<td>1'4 = sorgaab spray (15,30 &amp; 45 DAS)</td>
<td>480</td>
<td>26160</td>
<td>664.7</td>
</tr>
<tr>
<td>1'5 = sorghum mulch (10 ton/ha)</td>
<td>2820</td>
<td>21228 D</td>
<td>---</td>
</tr>
<tr>
<td>1'6 = sorghum mulch (15 ton/ha)</td>
<td>4070</td>
<td>21238 D</td>
<td>---</td>
</tr>
<tr>
<td>1'7 = hand-weeding (15 DAS) + sorgaab spray (30 DAS)</td>
<td>960</td>
<td>24816</td>
<td>0</td>
</tr>
<tr>
<td>1'8 = hand-weeding (15 DAS)</td>
<td>800</td>
<td>24868 D</td>
<td>---</td>
</tr>
<tr>
<td>1'9 = hand-weeding (15 &amp; 30 DAS)</td>
<td>1600</td>
<td>25688 D</td>
<td>---</td>
</tr>
</tbody>
</table>

D = dominant; DAS = days after sowing; costs that vary (the cost that is incurred on the variable inputs for the production of a particular commodity).

**Marginal rate of return (%) =** \[\frac{\text{Change in income}}{\text{Change in cost}} \times 100\]

REFERENCES


