EFFECT OF POST EMERGENCE HERBICIDES ON GROWTH AND YIELD OF TRANSPLANTED RICE

RAMESH KANNAN, B., S. MANIMARAN, G. BARADHAN, and S. M. Sureshkumar
Department of Agronomy, Faculty of Agriculture, Annamalai University, Annamalai Nagar.

ABSTRACT
Field investigation was conducted to study the “post emergence herbicides on growth and yield of transplanted rice”. The experiment was laid out in Randomized Block Design with eight treatments and replicated thrice. The eight treatments viz., T1 - Unweeded control, T2 - Twice hand weeding (20 and 40 DAT), T3 - Triasulfuron 40 g ha\(^{-1}\) on 20 DAT, T4 - Triasulfuron 50 g ha\(^{-1}\) on 20 DAT, T5 - Triasulfuron 60 g ha\(^{-1}\) on 20 DAT, T6 - Triasulfuron 120 g ha\(^{-1}\) on 20 DAT, T7 - Metsulfuron methyl 20 g ha\(^{-1}\) on 20 DAT, T8 - Ethoxy sulfuron 100 g ha\(^{-1}\) on 20 DAT. The experimental field soil was clayey loam texture. Experiment was conducted during late samba (October to January) using the long duration rice.

The treatments significantly influenced the weed biometrics, crop growth parameters and yield of rice. Treatment T6, post emergence application of triasulfuron 120 g ha\(^{-1}\) at 20 recorded the highest growth parameters viz., plant height (cm), LAI, DMP (kg ha\(^{-1}\)), yield parameters viz., number of panicles m\(^{-2}\), number of filled grains panicle\(^{-1}\) and yield grain & straw (kg ha\(^{-1}\)). It was on par with triasulfuron 60 g ha\(^{-1}\) at 20 DAT (T5). The unweeded control (T1) recorded the least growth parameters viz., plant height (cm), LAI, DMP (kg ha\(^{-1}\)), yield parameters viz., number of panicles m\(^{-2}\), number of filled grains panicle\(^{-1}\) and yield grain & straw (kg ha\(^{-1}\)).

KEY WORD: Plant height, DMP, LAI, Grain yield, Triasulfuron

INTRODUCTION
In India rice growing an area of about 44.6 million hectares with production of 90 million tonnes (Shekawat et al., 2010), but the productivity level is very low (2.97 t ha\(^{-1}\)) and assures food security in India for more than half of the total population. About 90 percent of all rice grown in the world is produced and consumed in the Asia region. In recognition to these important traits, the United Nations declared the year 2004 as the International Year of Rice. To feed the exploding population, projection of India’s rice production target for 2025 AD is 140 million tonnes, which can be achieved only by increasing the rice production by over 2.0 million tonnes per year in the coming decade. Tamil Nadu, rice is grown in an area of 2.2 million hectares resulting in production of 8.65 million tonnes with the productivity of 3.93 t ha\(^{-1}\) (TNAU, 2013).

Rice crop suffers from various biotic and abiotic constraints. Weed competition is one of the primary yield-limiting biotic constraints in rice. Weeds complete with rice for moisture,
nutrients, light, temperature and space. Uncontrolled weeds have caused yield reduction of 28 to 45 per cent in transplanted rice (Manhas et al., 2012). Infestation of weed is one of the most important causes for low yield of rice. Weeds grow profusely in the rice fields and reduce crop yields drastically. The chemical weed control is effective to control weeds economically and is also gaining popularity in rice culture due to their rapid effects and less cost involvement compared to traditional methods. The pre-emergence herbicides are very effective for grasses and lesser effective against sedges and broad-leaved weeds. Further, these herbicides are effective for controlling weeds upto 20 DAT. There are several post emergence herbicides viz., triasulfuron, metsulfuron-methyl, Ethoxy-sulfuron for controlling the weed in transplanted rice.

MATERIALS AND METHODS:

The field experiment was conducted to study the “post emergence herbicides on growth and yield of transplanted rice”. The soil of the experimental field was clay loam in texture. The experiment was laid out in a randomized block design with eight treatments and replicated thrice. The eight treatments viz., T₁ - Unweeded control, T₂ - Twice hand weeding (20 and 40 DAT), T₃ - Triasulfuron 40 g ha⁻¹ on 20 DAT, T₄ - Triasulfuron 50 g ha⁻¹ on 20 DAT, T₅ - Triasulfuron 60 g ha⁻¹ on 20 DAT, T₆ - Triasulfuron 120 g ha⁻¹ on 20 DAT, T₇ - Metsulfuron methyl 20 g ha⁻¹ on 20 DAT, T₈ - Ethoxy sulfuron 100 g ha⁻¹ on 20 DAT. Herbicide treatment, required quantities of herbicides were sprayed as per the treatment schedule. Experiment was conducted during late samba (October to January) using the long duration rice. The nutrient management and plant protection measures for the crop were taken up as per the recommendations.

RESULTS AND DISCUSSION

GROWTH PARAMETERS (Table 1)

The growth parameters viz., plant height (cm) at 60 DAT, LAI at flowering, DMP (kg ha⁻¹) at harvest were recorded. The herbicide treatments significantly influenced the growth parameters. Among the treatments, post emergence application of triasulfuron 120 g ha⁻¹ at 20 DAT (T₆) registered the highest plant height (83.01cm), LAI (6.33) and DMP (11,533 kg ha⁻¹). It was on par with triasulfuron 60 g ha⁻¹ at 20 DAT (T₅). The unweded control (T₁) recorded the least plant height of 68.19, LAI of 3.89 and DMP of 7688 kg ha⁻¹. In general, post emergence application of triasulfuron was found more effective in reducing weed density, these herbicides can be considered as growth inhibitors of weeds and also increase the plant growth characters viz., plant height, LAI and crop dry matter production. This was in conformity with the findings of Srivastava et al. (2008).

YIELD PARAMETERS (Table 1)

The yield parameters like number of panicles m⁻² and number of filled grains panicle⁻¹ were recorded at harvest. There was significant difference between treatments with regard to yield parameters. Among the various herbicide tested, post emergence application of triasulfuron 120 g ha⁻¹ at 20 DAT (T₆) recorded the highest number of panicles m⁻² 543 and number of filled grains panicle⁻¹ 88.09. It was on par with application of triasulfuron 60 g ha⁻¹ (T₃). The unweded control (T₁) recorded the least number of panicles m⁻² of 382 and filled grains panicle⁻¹ of 64.39. The better
control of weeds at early stage favoured the vigorous growth of seedling, without any crop weed competition and sustained nutrient availability leads to better uptake of NPK by the crop might have contributed to the increased yield attributes

**GRAIN AND STRAW YIELD (Table 1)**

The grain and straw yield were recorded at harvest. All the treatments significantly altered the grain and straw yield of rice. Among the treatments, post emergence application of triasulfuron 120 g ha\(^{-1}\) at 20 DAT (T\(_6\)) registered the highest grain yield of 4599 kg ha\(^{-1}\) and straw yield of 7876 kg ha\(^{-1}\). It was on par with post emergence application of triasulfuron 60 g ha\(^{-1}\) (T\(_5\)) with grain yield of 4540 kg ha\(^{-1}\) and straw yield of 7768 kg ha\(^{-1}\). The unweeded control (T\(_1\)) recorded the least grain yield of 2392 and straw yield of 4638 kg ha\(^{-1}\). The best performance of triasulfuron herbicides can be attributed to the best control of weeds which reduced weed competition and enable increased flow of nutrients towards the grains and ultimately increased the grain yield. The results are in line with the findings of Khan Bahadar marwat et al. (2014).

**CONCLUSION**

It may be concluded that the application of post emergence herbicide triasulfuron 60 g ha\(^{-1}\) at 20 DAT was promising in controlling weeds of transplanted rice and gave a higher grain and straw yield during the late samba season (long duration).

**REFERENCE:**


TNAU. 2013. Rice area, yield and production Tamil Nadu Agricultural University.
### Table 13. Effect of post emergence herbicides on plant height (cm) at 60 DAT

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Plant height (cm) at 60 DAT</th>
<th>LAI at flowering</th>
<th>DMP at harvest</th>
<th>Number of panicles m²</th>
<th>Number of filled grains panicle⁻¹</th>
<th>Grain yield (kg ha⁻¹)</th>
<th>Straw yield (kg ha⁻¹)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T₁ - Un weeded control</td>
<td>68.19</td>
<td>3.89</td>
<td>7688</td>
<td>382</td>
<td>64.39</td>
<td>2392</td>
<td>4638</td>
</tr>
<tr>
<td>T₂ - Twice hand weeding (20 and 40 DAT)</td>
<td>76.86</td>
<td>5.57</td>
<td>10258</td>
<td>490</td>
<td>81.28</td>
<td>3876</td>
<td>6834</td>
</tr>
<tr>
<td>T₃ - Triasulfuron 40 g ha⁻¹ on 20 DAT</td>
<td>70.12</td>
<td>4.96</td>
<td>9012</td>
<td>426</td>
<td>75.97</td>
<td>2982</td>
<td>5733</td>
</tr>
<tr>
<td>T₄ - Triasulfuron 50 g ha⁻¹ on 20 DAT</td>
<td>80.89</td>
<td>5.88</td>
<td>10898</td>
<td>513</td>
<td>84.33</td>
<td>4265</td>
<td>7376</td>
</tr>
<tr>
<td>T₅ - Triasulfuron 60 g ha⁻¹ on 20 DAT</td>
<td>81.39</td>
<td>6.12</td>
<td>11496</td>
<td>528</td>
<td>87.22</td>
<td>4540</td>
<td>7768</td>
</tr>
<tr>
<td>T₆ - Triasulfuron 120 g ha⁻¹ on 20 DAT</td>
<td>83.01</td>
<td>6.33</td>
<td>11533</td>
<td>543</td>
<td>88.09</td>
<td>4599</td>
<td>7876</td>
</tr>
<tr>
<td>T₇ - Metsulfuron methyl 20 g ha⁻¹ on 20 DAT</td>
<td>72.85</td>
<td>5.28</td>
<td>9608</td>
<td>472</td>
<td>78.58</td>
<td>3358</td>
<td>6328</td>
</tr>
<tr>
<td>T₈ - Ethoxy sulfuron 100 g ha⁻¹ on 20 DAT</td>
<td>70.92</td>
<td>5.01</td>
<td>9128</td>
<td>449</td>
<td>76.15</td>
<td>3010</td>
<td>5859</td>
</tr>
<tr>
<td>S.Ed</td>
<td>1.43</td>
<td>0.11</td>
<td>163.34</td>
<td>11.75</td>
<td>0.91</td>
<td>68.57</td>
<td>186.40</td>
</tr>
<tr>
<td>CD (P=0.05)</td>
<td>3.12</td>
<td>0.25</td>
<td>354.46</td>
<td>25.51</td>
<td>1.99</td>
<td>148.81</td>
<td>404.50</td>
</tr>
</tbody>
</table>