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Entire proceedings

Paper in proceedings
Weed Control Efficacy of Herbicides in Unpuddled Transplanted Aman (Summer) Rice

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Introduction

Rice is generally grown by seedling transplanting on puddle land to facilitate easy crop establishment and weed control. Very recently, seedling transplanting is done in unpuddled land just after strip tillage (a form of conservation tillage that clears crop residues in a narrow zone of soil and loosen subsoil layers prior to planting, Mitchell et al., 2009) followed by irrigation. The unpuddled transplanted rice gives yield similar to that of puddle transplanted rice (Haque, 2009; Saharawat et al., 2009). The weed pressure during crop establishment is low in the puddle transplanted system, but weed is the major barrier in strip till unpuddled transplanted rice. The manual or mechanical weeding is no longer feasible because of scarcity of labourers and increased labour costs. This labour situation has forced the farmers to rely on herbicides as the best option for weed control. The continuous use of the same herbicide aids the development of herbicide resistance in weeds which make weed control difficult. Herbicide resistance can be managed by rotation of herbicides with alternate modes of action. Therefore, it is essential to study the efficacy of a number of herbicides with different modes of action for controlling weeds in unpuddled transplanted rice. The present study was aimed to evaluate the weed control efficacy of herbicides with different modes of action for sustainable weed management for unpuddled transplanted rice under the strip tillage system.

Materials and Methods

The experiment was conducted at the Agronomy Field Laboratory, Bangladesh Agricultural University, Mymensingh from June to November, 2013. The trial comprised eighteen weed control treatments shown in Table 1. The experiment was laid out in a randomized complete block design with three replications. Seven days before transplanting of rice seedling, pre-plant glyphosate was applied @ 75 mL/10 L water. Strip tillage was done with a Versatile Multi-crop Planter (VMP) and then the land was inundated to 3-5 cm standing water for 48 hours. Twenty five days old rice seedlings of variety BINA dhan7 were transplanted on 22 July 2013 and the fertilizers were applied as per recommended practice. The crop was harvested at maturity on 04 November 2013. Data on weed, grain yield and relevant attributes were recorded. Weed samples were taken from randomly selected three locations of 0.25 m² each at 35 and 50 days after transplanting (DAT). Data were subjected to ‘ANOVA’ and means were compared by DMRT using MSTATC.

Results and Discussions

Herbicide treatments exhibited significant effects on weed biomass at 35 and 50 DAT (Fig. 1a). At 35 DAT, pyrazosulfuron ethyl fb orthosulfamuron fb 2,4-D (T₁₆) treated plots produced the lowest weed biomass and highest (100%) weed control efficiency (WCE) compared to the weedy control plot (Fig. 1b). Lower weed biomass also observed in T₄, T₅, T₈, T₁₁, T₁₂, T₁₄, T₁₅, T₁₇ and T₁₈. But at 50 DAT, the highest weed control efficiency (85%) was obtained from Butachlor fb Orthosulfamuron fb 2,4-D (T₁₇) followed by T₄, T₅, T₇, T₁₀, T₁₁, T₁₂, T₁₃, T₁₅, T₁₆, T₁₇ and T₁₈. The highest grain yield and percent yield increase over control (YOC%) was obtained from T₁₆ followed by T₁₅, T₂, T₃, T₅, T₄ and T₁₇ (Fig 1c and 1d).
Therefore, pre-emergence application of pyrazosulfuron ethyl or pendimethalin or butachlor followed by orthosulfamuron followed by either (butachlor+ propanil) or 2,4-D can be used for effective weed control in unpuddled transplanted aman rice. However, repeated application of the herbicides having same mode of action should be avoided within the same crop to delay the evolution of herbicide resistance in weeds.

References


Table 1. Treatments used in the trial [‘fb’ stands for ‘followed by’, ‘HW’ stands for ‘hand weeding’]

<table>
<thead>
<tr>
<th>T&lt;sub&gt;1&lt;/sub&gt; = No weeding</th>
<th>T&lt;sub&gt;10&lt;/sub&gt; = Pretilachlor fb (aceta+bensul)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T&lt;sub&gt;2&lt;/sub&gt; = Weed free</td>
<td>T&lt;sub&gt;11&lt;/sub&gt; = Pendimethalin fb orthosulfamuron (orthosulfa) fb (butachlor+ propanil) (buta+propa)</td>
</tr>
<tr>
<td>T&lt;sub&gt;3&lt;/sub&gt; = Pendimethalin fb HW</td>
<td>T&lt;sub&gt;12&lt;/sub&gt; = Pyrazo ethyl fb orthosulfa fb (buta+ propa)</td>
</tr>
<tr>
<td>T&lt;sub&gt;4&lt;/sub&gt; = Pyrazosulfuron Ethyl (Pyrazo ethyl) fb HW</td>
<td>T&lt;sub&gt;13&lt;/sub&gt; = Butachlor fb orthosulfa fb (buta+ propa)</td>
</tr>
<tr>
<td>T&lt;sub&gt;5&lt;/sub&gt; = Butachlor fb HW</td>
<td>T&lt;sub&gt;14&lt;/sub&gt; = Pretilachlor fb orthosulfa fb (buta+ propa)</td>
</tr>
<tr>
<td>T&lt;sub&gt;6&lt;/sub&gt; = Pretilachlor fb HW</td>
<td>T&lt;sub&gt;15&lt;/sub&gt; = Pendimethalin fb orthosulfa fb 2,4-D</td>
</tr>
<tr>
<td>T&lt;sub&gt;7&lt;/sub&gt; = Pendimethalin fb (acetachlor+bensulfuron methyl) (aceta+bensul)</td>
<td>T&lt;sub&gt;16&lt;/sub&gt; = Pyrazo ethyl fb orthosulfa fb 2,4-D</td>
</tr>
<tr>
<td>T&lt;sub&gt;8&lt;/sub&gt; = Pyrazo ethyl fb (aceta+bensul)</td>
<td>T&lt;sub&gt;17&lt;/sub&gt; = Butachlor fb orthosulfa fb 2,4-D</td>
</tr>
<tr>
<td>T&lt;sub&gt;9&lt;/sub&gt; = Butachlor fb (aceta+ bensul)</td>
<td>T&lt;sub&gt;18&lt;/sub&gt; = Pretilachlor fb orthosulfa fb 2,4-D</td>
</tr>
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Figure 1. Effect of herbicides on (a) weed biomass at 35 and 50 DAT, (b) WCE (c) grain yield and (d) YOC of unpuddled transplanted aman rice in 2013 [Treatments are mentioned in Table 1].