Effect of dates of sowing and mulching on grain yield, straw yield and harvesting index of Summer Mash (Vigna Mungo)

Sukhdeep Singh, Narpat Singh and Ramandeep Kumar

Abstract
The present investigation entitled, “Effect of dates of sowing and mulching on grain yield, straw yield and harvesting index of Summer Mash (Vigna Mungo)” was carried out at Experimental Farm, Mr Yadwinder Singh at VPO-Bhangala Tehsil Abohar District Fazilka - Punjab during kharif 2014. The experiment comprising of different dates (5th and 25th April) for sowing in main plot, three mulch levels (0, 3 and 6 t/ha) in sub plot was laid out in split plot design. The treatment combinations were replicated four times. The date of sowing showed beneficial effect on grain yield, straw yield and harvesting index of Summer Mash. The findings can be useful for improving productivity and profitability of Summer mash. The sowing of Summer mash on 5th April significantly gave 21.9% higher grain yield and 17.7% straw yield over 25th April sown crop. The mulch application at 3 and 6 t/ha increased grain yield to the extent of 8.1% and 30.6% respectively over no much application. The percent harvest index was higher i.e. (41.9) in case of 5th April sown crop. The interaction effect between sowing time and mulch levels showed non-significant effect on harvest index.

Keywords: mulching on grain yield, harvesting index of Summer Mash.

Introduction
Pulses a poor man’s meat in developing world provide a balance diet for the people when taken in combination with wheat, rice and other cereals. They are also used as feed to animal in the form of hay and straw (Maqsood et al. 2001) [3]. In addition, the legumes also included in cropping system and have the ability to provide nitrogen through nitrogen fixing rhizobacteria and increasing soil fertility. The legume crop partially replaces expensive nitrogenous fertilizers. Vigna mungo commonly referred to as urd bean, urd black gram, black lentil is grown in southern Asia. Black gram is originated from central Asia and India. It is grown worldwide as a pulse crop and India tops in production. In Punjab, it is cultivated in 2.2 thousand hectares with an average grain yield of 464 Kg/ha during 2012-13. Mash bean is one of the commonly grown pulse crop in many countries of the world. The importance of Mash is based on its high protein content (24%), carbohydrates (66%) and fats (Ali et al. 2002) [1]. Moreover, it is also recommended for diabetics.

Out of several factors time of sowing and mulching are crucial and assumes greater importance in cultivation of mash. Timely sown crop has mark able effect on growth as well as yield and delay in sowing beyond optimum, usually result reduction in yield (Vange and Obi. 2006) [8]. The application of mulch effects the absorption of solar radiation and decrease the thermal admittance of the surface relative to that of bare soil (Tanner et al. 1987) [6]. Application of sugarcane trash in summer mungbean (Trivadi et al. 1994) and use of water hyacinth in tomato (Rehman et al. 2006) [4] increased the plant growth.

Sandhu et al. (1992) [5] studied the effect of mulching on Summer Mungbean and reported 98% higher mungbean yield with 6t/ha rice straw application over no treatment during 1982 and 1985 in loamy sand soil. Choudary et al. (1989) concluded that the date of planting resulted in significant variation in seed and Stover yield of urd bean. The highest seed (12.0 t/ha) and Stover (38.12 t/ha) was
recorded in crop planted on 6 July. However, information is available on the effect of date of sowing and use of mulch material on performance of meagre summer Mash in south western parts of Punjab. Keeping in view the above facts the present investigation was undertaken with following objectives to study the effect of dates of sowing and mulching on grain yield, straw yield and harvesting index of Summer (Vigna Mungo).

2. Material and Methods
The present investigation was carried out at experimental farm, Mr Yadavinder Singh VPO-Bhangala Tehsil Abohar District fazilka - Punjab, during kharif 2014. The experiment comprised of two dates of sowing (5th April and 25th April) and three straw mulch levels (0, 3 & 6 t/ha) in Summer mash-1008. The details of the experiment are described below.

2.1 Observation recorded
2.1.1 Grain yield and straw yield (kg/ha)
The crop was harvested at maturity. The grain and straw yield was recorded and expressed in Kg/ha.

2.1.2 Harvest index (%)
The percent harvest index was calculated as under.

\[ HI (\%) = \frac{\text{Grain yield}}{\text{Straw yield} + \text{Grain yield}} \times 100 \]

2.1.3 Statistical analysis
The statistical analysis of calculated data was done by using EDA (Electronic design automation), software in statistical package. The treatment comparisons were made at 5 per cent level of significance.

Table 3.1: Effect of date of sowing and mulch levels on grain yield and straw yield (kg/ha)

<table>
<thead>
<tr>
<th>Sowing date</th>
<th>Mulch level (t/ha)</th>
<th>Mean</th>
<th>Sowing date</th>
<th>Mulch level (t/ha)</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>3</td>
<td>6</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>5th April</td>
<td>890.7</td>
<td>960.1</td>
<td>1225.8</td>
<td>1025.5</td>
<td></td>
</tr>
<tr>
<td>25th April</td>
<td>762.6</td>
<td>827.3</td>
<td>932.9</td>
<td>840.9</td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>826.5</td>
<td>893.7</td>
<td>1079.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CD at 5%</td>
<td>Sowing date = 168.7; Mulch level = 90.7; Sowing date * Mulch = NS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Results and Discussion
The results of the experiment found clear support for effect of dates of sowing and mulching on growth parameters.

3.1 Grain Yield (kg/ha)
The data (Table 3.1) revealed that there was significant effect of sowing time on grain yield of Summer mash. The 5th April sown crop resulted in 21.9% increase in grain yield over 25th April sown crop. Similarly increase in mulch level significantly increased the grain yield. The increase in grain yield was to the extent of 8.1 % and 30.6 % with 3 and 6 t/ha mulch application, respectively over control. There was 20.8 % increase in grain yield with 6 t/ha mulch application over 3 t/ha mulch application. The increase in grain yield with 3 t/ha mulch application showed non-significant effect over control. The increase in grain yield in timely sown crop may be due to increased yield attributes and soil temperature which checks the weed population. The interaction effect between different dates of sowing and mulch levels on grain yield was non-significant.

3.2 Straw Yield (kg/ha)
The presented data (Table 3.1) concluded that sowing of Summer mash on 5th April resulted in significantly higher straw yield (1398.3 kg/ha) as compared to 25th April sown crop. Findings revealed that straw yield increased with increase in level of mulch application. The maximum straw yield (1421.5 kg/ha) was recorded with 6 t/ha mulch application as compared to other treatments. The minimum straw yield (1189.6 kg/ha) was recorded in no mulch application. The interaction effect between dates of sowing and mulch levels on straw yield was non-significant.

3.3 Harvest Index (%)
It is an important parameter which indicated the efficiency in partitioning of dry matter to the economic part of crop. Higher harvest index, better is the economic return of the crop. The data presented in table 3.2 showed that sowing time has non-significant effect on percent harvest index of Summer mash and the maximum value was 41.9 in 5th April sown crop. The increase in mulch application resulted in significant higher percent harvest index and was 42.9 at 6 t/ha mulch application. The data further showed that interaction effect between sowing date and mulch levels was non-significant on harvest index.

Table 3.2: Effect of date of sowing and mulch levels on percent Harvest Index

<table>
<thead>
<tr>
<th>Sowing date</th>
<th>Mulch level (t/ha)</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>5th April</td>
<td>41.0</td>
<td>41.2</td>
</tr>
<tr>
<td>25th April</td>
<td>40.4</td>
<td>41.1</td>
</tr>
<tr>
<td>Mean</td>
<td>40.7</td>
<td>41.1</td>
</tr>
<tr>
<td>CD at 5%</td>
<td>Sowing dates = NS; Mulch level = 1.3, Sowing date * Mulch level = NS</td>
<td></td>
</tr>
</tbody>
</table>

Conclusion
Present investigations concluded that with recommended seed rate i.e. 20 kg/ha and Kera method at 22.5 cm row spacing. The salient findings of the investigation are summarized that the The sowing of Summer mash on 5th April significantly gave 21.9% higher grain yield and 17.7% straw yield over 25th April sown crop. Application of straw mulch at the rate of 6 t/ha significantly increased both yield parameters as well as grain yield as compared to 3 t/ha and no mulch application. The maximum grain yield of Summer mash was recorded in
5th April sown crop at 6 t/ha mulch application. The percent harvest index was higher i.e. (41.9) in case of 5th April sown crop. The interaction effect between sowing time and mulch levels showed non-significant effect on harvest index.

References