



Influence of planting patterns and weed control methods in direct seeded rice (DSR) on weed density and weed drymatter

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Abstract

An field experiment was conducted on ‘**Influence of planting patterns and weed control methods in direct seeded rice on weed density and weed drymatter**’ during *kharif* 2022 on the experimental farm of School of Agriculture, Lovely Professional University, Phagwara (Punjab). The treatments consisted of four methods of planting patterns (M1-Flat sowing, M2- two rows /bed ,M3-three rows/bed,and M4-two rows/bed and 1 row in furrow) in main plots and four weed control treatments (T1-pendimethalin + bispyribac,T2-pendimethalin + metsulfuron,T3-weed free upto harvest and T4-unweeded(control) were kept in subplots. The experimental field was clay loam in texture with normal pH and EC ,low in organic carbon and available nitrogen,medium in phosphorus and potassium.Among the planting patterns,the highest weed density and drymatter were observed in flat sowing(M1)in all the intervals at which the data was recorded.Among the weed control treatments,the highest weed density and weed drymatter was found in unweeded treatment (T4) in all the intervals i.e.30,60 and 90 DAS .The lowest weed count was observed in two rows per bed (M2) planting pattern when it was applied with pendimethalin+bispyribac (T1) at all the intervals i.e 30 ,60 and 90 DAS followed by pendimethalin + metsulfuron (T2).

Keywords:-Planting patterns,weed density,weed free,unweeded.

Introduction

India is the greatest rice exporter in the world, India is also the second-largest producer of rice worldwide. Producing 120 million tonnes in FY2020–21 represents an increase from 53.6 million tonnes in FY 1980.

Another important crop in India is rice. The largest area of rice cultivation is also found in this nation. because it is a major food crop. Actually, it's the country's main crop. One of the top nations for this crop production is India. As a tropical plant, rice grows well in hot, humid weather and is the staple food crop. The majority of rice-growing regions are rain-fed and have high annual precipitation rates. Because of this, in India it is essentially a *kharif* crop. A temperature of at least 25 degrees Celsius and more than 100 centimetres of rain are required. In regions that receive very little rainfall, rice is also farmed by irrigation. In eastern and southern India, rice is the primary food.

A variable water supply will have an impact on rice cultivated in raised beds with a flowing watertable system, which will then determine if its growth and yield differ from rice planted in paddy. In the last commercial crop, raised beds' water content decreased from saturation at the watertable's depth to a thin, dry crust on the soil's surface. The soil above the watertable

was covered with small, fibrous roots that lacked aerenchyma. Since just a portion of the root system grows in saturated soil, there may be less water available to rice grown in raised beds. Rice grows slower and produces less grain when the amount of water in upland soils declines.

Most rice is cultivated by manually transplanting seedlings into puddles of dirt, which results in a hard pan below the plough layer, reduces soil permeability, and degrades soil structure and soil quality for the following upland crops. Water is used up during puddling and transplanting processes, which can account for up to 30% of the total water needed for rice production.

This prompts the farmers to switch to direct seeded rice systems from manual transplanting. Direct seeded rice has the benefits of early maturity, simple mechanisation, minimal manpower and water usage. The most significant biological barrier to the development and utilisation of direct seeded rice systems, however, is the presence of weeds, which can reduce rice yields by as much as 50% to 91%. Weeds in direct seeded rice could be controlled manually by hand weeding. However, due to a lack of staff, rising labour prices, and the tedium involved, chemical weed treatment is replacing hand weeding.

Materials and methods

An field experiment was conducted on '**Influence of planting patterns and weed control methods in direct seeded rice on weed density and weed drymatter**' was conducted during *kharif* 2022 on the experimental farm of School of Agriculture, Lovely Professional University, Phagwara (Punjab). The treatments consisted of four methods of planting patterns (M1-Flat sowing, M2- two rows /bed ,M3-three rows/bed,and M4-two rows/bed and 1 row in furrow) in main plots and four weed control treatments (T1-pendimethalin + bispyribac,T2-pendimethalin + metsulfuron,T3-weed free upto harvest and T4-unweeded(control).the weed data has taken with the help of 30 cm quadrat in two places in plot and make it in to average weed count and weed drymatter accumulation.

Planting patterns



1.Flat sowing



2. Raised bed sowing

RESULTS AND DISCUSSION

1. Periodic weed count per square feet as influenced by planting patterns and weed control treatments in direct seeded rice (DSR).

Weed count indicates intensity of weed plants as well as type of weed flora present in a particular treatment and this parameter also indicates extent of yield loss due to weeds. The data on total weed count per sq.m as influenced by different planting patterns and weed control treatments were recorded periodically and presented in Table 4.1.1 and graphically depicted in Fig.4.1.1.

Total weed count per square metre recorded at 30 DAS was significantly less in three rows per bed (M3) than flat sowing (M1), two rows per bed (M2) and two rows per bed and one row in furrow (M4) (Tab 4.1.1). The differences in the weed count recorded at 30 DAS were found to be non significant. The weed count obtained in the flat sowing (M1), two rows per bed (M2) and two rows per bed and one row in furrow (M4) are similar. The lowest weed count was observed in three rows per bed (M3) than all other planting patterns. Among weed control treatments, unweeded (control) produced significantly more weed count per sq.m than all other weed control treatments. The differences in the weed count were found to be significant among weed control treatments. The lowest weed count was found in weed free upto harvest (T3).

The differences in weed count recorded 60 DAS were found to be non significant among planting patterns (Table 4.1.1). The highest weed count was observed in flat sowing (M1). The lowest weed count was observed in two rows per bed (M2). Among weed control treatments, the differences between pendimethalin + bispyribac (T1) and pendimethalin + metsulfuron (T2) are found to be statically at par with each other. The significantly lesser weed count is observed in weed free upto harvest (T3) as compared to all other weed control treatments. Unweeded (control) recorded significantly more weeds per sq.m than all other weed control treatments.

Weed count per sq.m recorded 90 DAS was also significantly influenced by planting patterns and weed control treatments (Tab 4.1.1). Among main plots, significantly less weed count was recorded in three rows per bed (M3) treatment as compared to all other planting patterns. The differences for weed count per square.m between flat sowing (M1) and three

rows per bed(M3) were found to be non significant. The differences between two rows per bed (M2) and two rows per bed and one in furrow (M4) are also non significant. The differences between two rows per bed (M2) and flat sowing (M1), two rows per bed and one row in furrow (M4) and three rows per bed(M3) were also found to be non significant. Whereas, the total weed count at 90 DAS was significantly affected by the weed control treatments. It was clear from the data that total weed count in unweeded (control) treatment was significantly more as compared to other weed control treatments. However weed free up to harvest resulted in the significantly less weed count than all other weed control treatments. Weed count in pendimethalin +bispyribac sodium (T1) showed significantly less weed count per sq.m.than pendimethalin + metsulfuron (T2).

Table 1. Periodic weed count per square feet as influenced by planting patterns and weed control treatments in direct seeded rice (DSR).

	Periodic weed count per square feet		
Main plots -Planting patterns			
Treatments	30 DAS	60 DAS	90 DAS
M1 - Flat sowing	6.25	8.5	16.7
M2 - 2 rows/bed	6.25	6.9	15.3
M3 -3 rows/bed	5.67	7.3	15.5
M4 - 2 rows/bed & 1 row in furrow	6.25	7.7	16.3
CD at 5%	NS	NS	1.9
Sub plots-Weed control treatments			
T1- pendimethalin + bispyribac sodium	4.2	6.3	12.1
T2- pendimethalin + metsulfuron	5.7	7.9	15.4
T3 - Weed free upto harvest	0	0	0
T4 - Unweeded (control)	14.6	16.3	39.5
CD at 5%	0.9	1.7	1.6
CD for interaction	NS	NS	NS

2.Periodic weed drymatter accumulation per square feet as influenced by planting patterns and weed control treatments in directseeded rice (DSR).

Recording dry matter accumulation by weeds is very important and valid indices for determining losses in crop yield due to weeds as compared to count per unit area. The periodic data for dry matter accumulation by weeds are presented in Table 4.1.2. At 30 DAS, the dry matter accumulation by weeds was found to be significant among planting patterns and weed control treatments. At 30 DAS, the highest weed dry matter was observed under flat sowing (M1) and three rows per bed (M3) which was at par with two rows per bed and one in furrow (M4). Two rows per bed (M2) recorded significantly less weed dry matter than all other treatments. Among sub-plots, unweeded (control) recorded significantly more dry matter than all weed control treatments. The differences of dry matter accumulation between pendimethalin + bispyribac sodium (T1) and pendimethalin + metsulfuron (T2) are found to be at par with each other. However, the lowest weed dry matter accumulation was observed in weed free up to harvest (T3).

At 60 DAS, the accumulation of dry matter by weeds was found to be non significant among planting patterns (Table 4.1.2). The highest weed dry matter accumulation was found in the flat sowing (M1). The lowest weed dry matter accumulation was observed in the two rows per bed and one in furrow (M4). Among weed control treatments, significantly more dry matter accumulation of weeds was recorded in unweeded (control) than all other weed control treatments. However, the differences between pendimethalin + bispyribac sodium (T1) and pendimethalin + metsulfuron (T2) are found to be non significant.

The differences in dry matter accumulation by weeds recorded at 90 DAS, was non significant for planting patterns (Table 4.1.2). The highest dry matter accumulation of weeds was found in two rows per bed and one in furrow (M4). The lowest weed dry matter accumulation was observed in two rows per bed (M2). Among weed control treatments, significantly more dry matter was recorded in unweeded (control). However, the differences between pendimethalin + bispyribac sodium (T1) and pendimethalin + metsulfuron (T2) are at par with each other. Weed free up to harvest recorded significantly less dry matter accumulation by weeds than all other weed control treatments.

Table 2. Periodic weed drymatter accumulation per square feet as influenced by planting patterns and weed control treatments in directseeded rice (DSR).

	Periodic weed drymatter per square feet		
Main plots -Planting patterns			
Treatments	30 DAS	60 DAS	90 DAS
M1 - Flat sowing	5.5	15.12	22.8
M2 - 2 rows/bed	3.7	13.2	21.0
M3 -3 rows/bed	5.5	13.9	22.5
M4 - 2 rows/bed & 1 row in furrow	5.1	13.7	23.3
CD at 5%	0.9	NS	NS
Sub plots-Weed control treatments			
T1- pendimethalin + bispyribac sodium	3.6	0.8	6.9
T2- pendimethalin + metsulfuron	4.1	1.2	8.03
T3 - Weed free upto harvest	0	0	0
T4 - Unweeded (control)	12.1	54.2	74.6
CD at 5%	0.7	1.6	1.34
CD for interaction	NS	NS	NS

Conclusion

From the experimental results it can be concluded that in the direct seeded rice, the highest weed dry matter was observed in (M1) flat sowing with control treatment or weedy check (T4). The lowest weed dry matter was observed in two rows per bed (M2) with keeping the crop weed free upto harvest (T3) followed by pendimethalin + bispyribac (T1). So, the cultivation of crop with planting pattern of two rows per bed (M2) and also keeping the crop weed free till harvest is beneficial to farmers in direct seeded rice .

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