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Comparison of Different Sowing Methods on The Growth Parameters of Maize

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Abstract

A current experiment was carried out during 2019 at agricultural farm of School of Agriculture at Lovely Professional University, Phagwara, Punjab, to study the comparison of different sowing methods on the growth parameters of maize. The experimental site having 7.8 soil pH and sandy loamy soil texture. The trial was carried out in four treatments with three replications. The line sowing, kera and dibbling methods were used for the sowing of the crop. On raised bed and flatbed the sowing method was line sowing and in furrows & ridges the sowing method was kera and dibbling. The results revealed that comparison of different sowing methods were performed much efficient in Furrows (kera) and ridge (dibbling) methods of sowingon growth parameters such as the plant height stem girth, number of leaves, length of flag leaf etc.**,** as compare to line sowing under (flat and raised bed system).

Introduction

Due to the wider versatility, maize (*Zea mays*) is grown as an important cereal grain crop all over the worldin extensive range of environment.Generally, maize is used as a food material

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by the people but at present time, it becomes the important material for animal food also .Now a day, it is an important source of food, fodder and various industrial products.

The scientific name of maize is *Zea mays.* It is also known as Indian cornand belongs to grass family poaceae/graminea. It is diploid with chromosome number 20. The domesticated crop originated in the America and one of the most widely distributed world food crops. The culm of maize is erect and grown up to 2-3 meter height with several nodes and internodes. The length of lower leave is generally 50-100 cm with 5-10 cm width. The culm ears and leaves are grown from internode areas. The male inflorescence is known as tassel which generally comes after 55 days of the sowing and female inflorescence is known as silk which generally appear after 10-15 days of tassels. The tassel is present at the top of the stem whereas silks are developed near the base of leaves. The silks are generally green in colour and at the maturity it turns red or yellow.

World production of the maize is around 790 million tonnes and it is cultivated on nearly 100 million hectares in 125 developing countries and its serve as staple food providing one third of the calories and proteins in some country. Maize is grown throughout the world, like in United State, China and Brazil being the top maize producing in the world. The total cultivated area of maize in India is over 9.0 million hectares with most state growing it. The states like Andhra Pradesh with share of 20.9 per cent, Karnataka 16.5 per cent, Rajasthan 9.9 per cent, Maharashtra 9.1 per cent, Bihar 8.9 per cent, Uttar Pradesh 6.1 per cent, Madhya Pradesh5.7 per cent and Himachal Pradesh4.4 per cent, contributes 80 per cent of total maize production in India.

The various products such as gluten, grain cake, lactic acid, corn starch, corn oil dextrose and acetone are made up by the maize grain and used invarious industries like food, fermentation

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and textile etc. The corn bread and various baked products are made up by maize flour. The starch which is made up from corn/maize kernel is act as thickening agent in soups.

The nutritional content of maize contain 18.7 grams of carbohydrates, 3.27 grams of protein, 1.35 grams of fat, 75.96 grams of water, 6.8 milligram of vitamin C, 89 milligram of phosphorus 270 milligrams of potassium 0.46 milligrams of zinc and 0.52 milligrams of iron.

Now days, due to urbanization, the land holding size of the farmers are decreasing day by day but at the same time the demand for cereals production are increasing to satisfy the hunger of people's. So it is very necessary to investigate the best sowing method for crop production. Generally, in maize the farmers are adopting kera and dibbling method. Dibbling is the process of placing seed in holes made in seed bed and covering them with soil. The equipment used of dibbling is called dibbler. The main advantages of dibbling are uniform population of plants can be maintained, better germination is there and seed rate can be reduced and the disadvantages are it is a costlier method, takes considerable time, and labour. Kera is very common method use in villages. A man drop seeds in furrow by hand. Its advantages are seeds are placed at desired depth, it is also a cheapest method and the disadvantage is more time is required. In dry areas and dry soils, it's simple to prepare a flat bed. The major benefit of this method is very less area subjected to sun and wind exposure which results in high retention of moisture in the soil. Raised beds are built up higher then surrounding path. .They results in remarkable high yield, so that it also known as an intensive raised bed gardening.So, keeping in view all this points, the present experimental work was conducted to study the comparison of different sowing methods on the growth parameters of maize accompanied byfollowingobjectives-

- To identify the appropriate sowing method in maize.

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- To study the effect of different sowing methods on growth parameters of maize.

MATERIALS AND METHODOLOGY

The field experiment was carried out inKharif season of 2019 at Lovely Professional University. The experiment was laid down in Randomized Block Design with 4 treatments and 3 replications. RASI-3033 variety was used for the sowing purpose. The treatments were T1- Ridge sowing (Dibbling method),T2- Furrow sowing (Kera method), T3- Raised bed sowing (Line sowing) and T4-Flat bed (Line sowing). The size of each plot was 12 square meters. The inter and intra row spacing of 60X20 cm were followed. The half dose of the N and full dose of the P2O5 and K2O were given at the time of sowing and further the 1/4 N was given according to the crop growth stages like knee high stage and later on tasseling stage respectively. The different growth parameters such as plant height, stem girth, number of leaves per plant, length of flag leaf were recorded at 15, 30, 45 DAS. 10 plants were taken randomly from every plot to record the growth parameters.

Result and Discussion

1. Growth parameters -

Plant height (cm) - The data was observed at different duration 15, 30, 45 days of sowing. There was a variation in plant height at different durations. At first 15 days, the maximum plant height was observed T4 - Flat bed (Line sowing), whereas at 30 and 45 DAS the maximum plant height was observed in T1- Ridge sowing (Dibbling method) , T2- Furrow sowing (Kera method) . The satisfactory result under ridge and furrow planting is due to good infiltration of water is done through furrows which enhance the

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accessibility of water to the crops and increase the storage of moisture in soil root zone. Ramakrichenin *et al.*(2012).

Stem girth (cm) - The reading was taken at different times 15, 30 and 45 days after the sowing. At the end the maximum stem girth is in T1- Ridge sowing (Dibbling method) and lowest in T2- Furrow sowing (Kera method). At the end effect of water stress on the stem girth in T2 was observed. Change in stem girth is largely due to cambial growth and change in water. Transpiration leads to substantial reduction leaf water potential. Stem girth is reduced with height on increase in density. Bakht *et al*. (2011)

Flag leaf length (cm) - The data was taken at different duration i.e. 15, 30 and 45 days of the sowing. The first leaf that arises on a corn plant is known as flag leaf. The flag leaf contributes more towards photosynthesis since the flag leaf is directly exposed to sunlight than other leaves, so it will add more through photosynthesis. On 15 days of sowing; the flag leaf length is performed well in T4- Flat bed (Line sowing) and less in T2- Furrow sowing (Kera method). At 30 days of sowing; the flag leaf length is good in T3- Raise bed (Line sowing) and less in T2- Furrow sowing (Kera method). On 45 days of sowing; the length of flag leaf is performed well in T1- Ridge sowing (Dibbling method) and less in T4- Flat bed (Line sowing). Farid Shekari *et al. (2012)*

Number of nodes and internode s- There is no emergence of nodes and internodes are present on 15 days of sowing. But at 30 &45 days of sowing, the nodes and internodes are present. The maximum node and internodes are found in T1- Ridge sowing (Dibbling method) and less was found in T4- Flat bed (Line sowing). This is due to that in flat bed there was more competition between the two plants but in ridge method there is proper spacing and good crop stand in the field. So the plant grows very well in ridge method as compare to flat method. Kumar and Chawla (2015)

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Numbers of leave - The maximum numbers of leave were found in T1- Ridge sowing (Dibbling method) and less was found in T4- Flat bed (Line sowing). This is due to that in flatbed the dense plant population was observed. Due to high plant population, there was less chance for leave to establish itself properly. Singh and Vashist (2015)

Chlorophyll content (SPAD unit) – The chlorophyll content of maize leaves were checked with the help of SPAD meter. The maximum value of chlorophyll was observed in T3- Raised bed (Line sowing) and least in T4- Flat bed (Line sowing) at 15, 30 and 45 DAS because in raised bed system the availability of nutrients was higher and growth of plant was better. Singh(2010).

Figure 1 - Plant height, stem girth and flag leaf length at 15 DAS

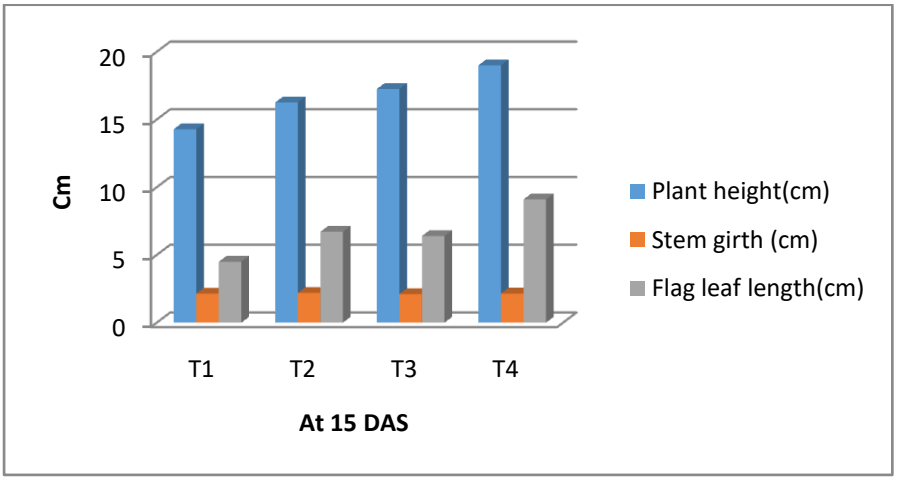

Figure 2- Number of leaves, nodes and internodes at 15 DAS

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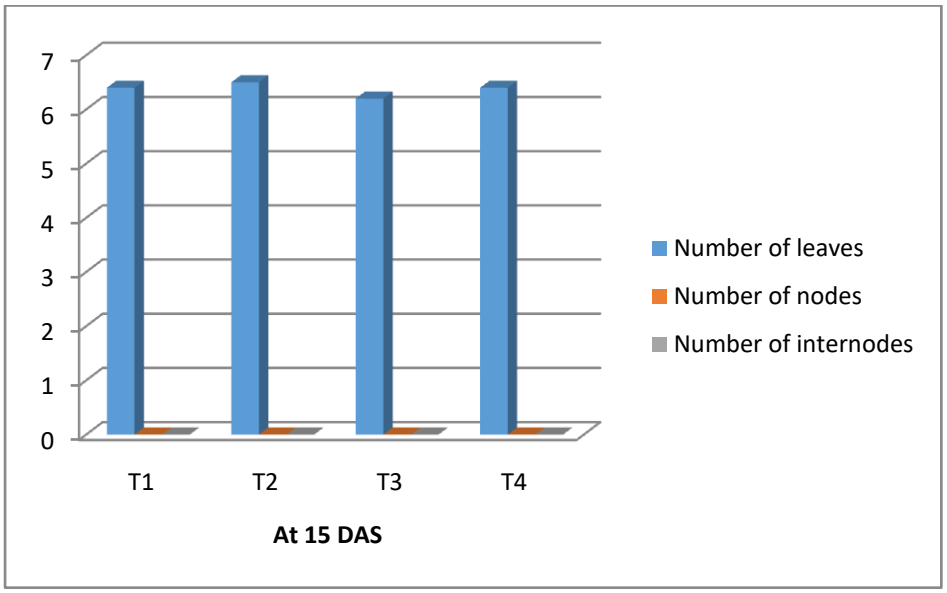

Figure 3- Chlorophyll content at 15 DAS

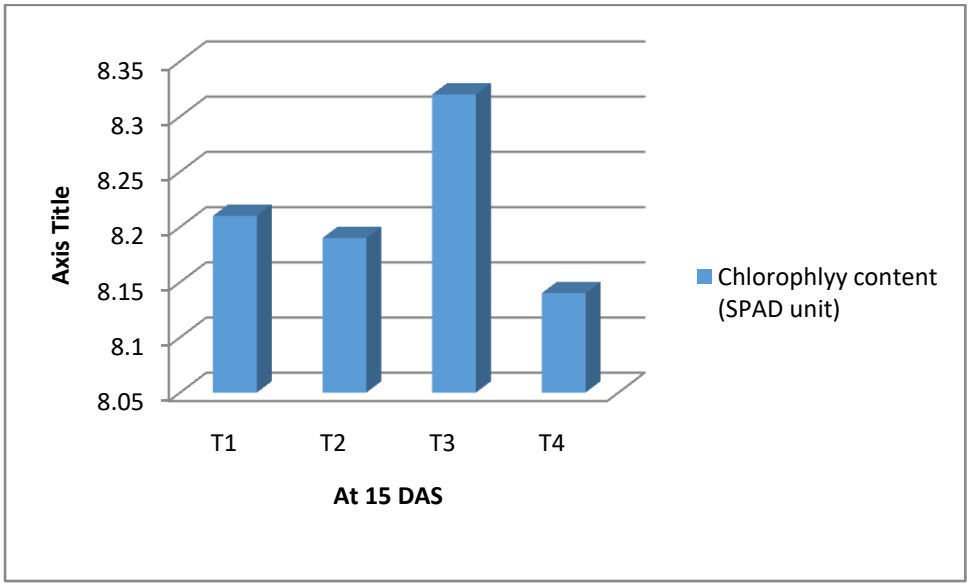

Figure 4- Plant height, stem girth and flag leaf length at 30 DAS

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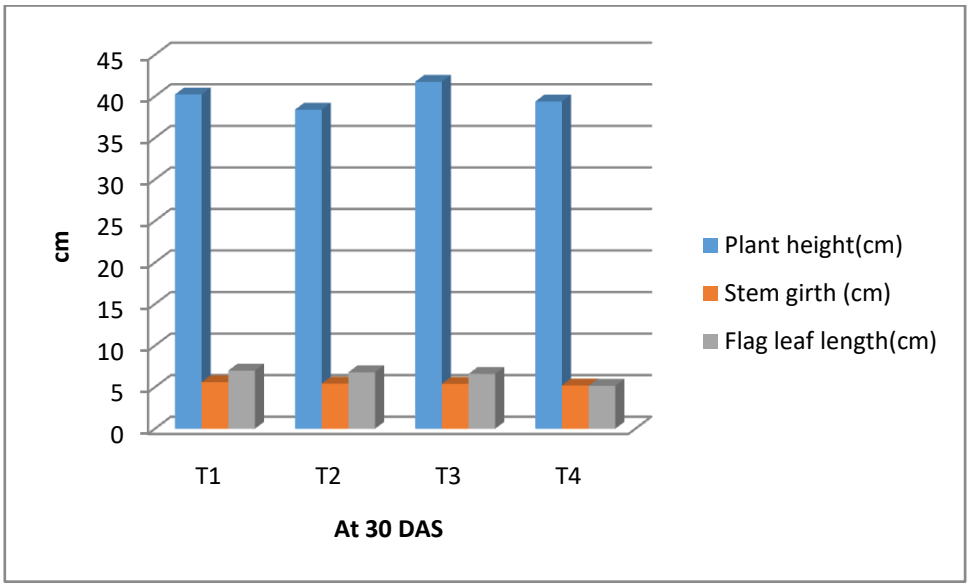

Figure 5 - Number of leaves, nodes and internodes at 30 DAS

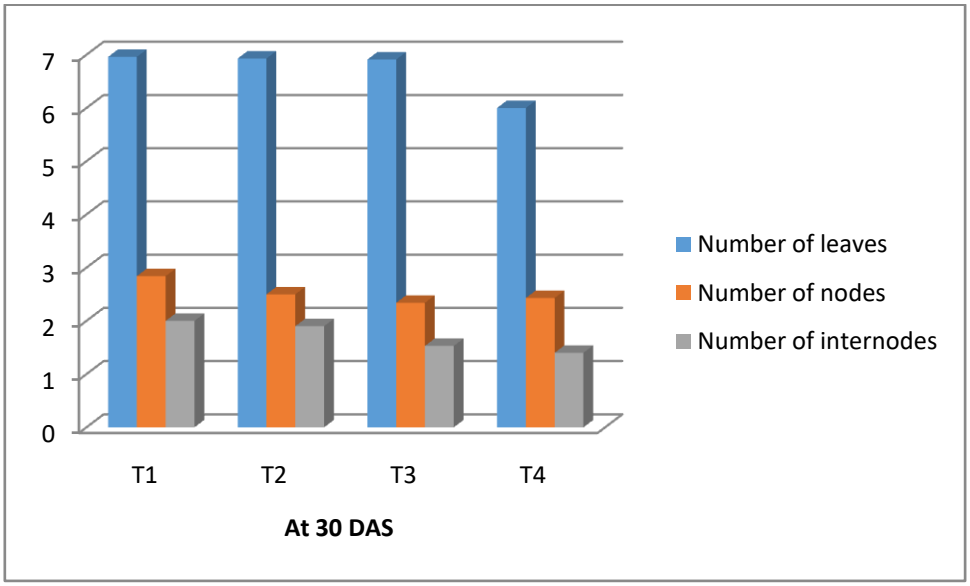

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Figure 6- Chlorophyll content at 30 DAS

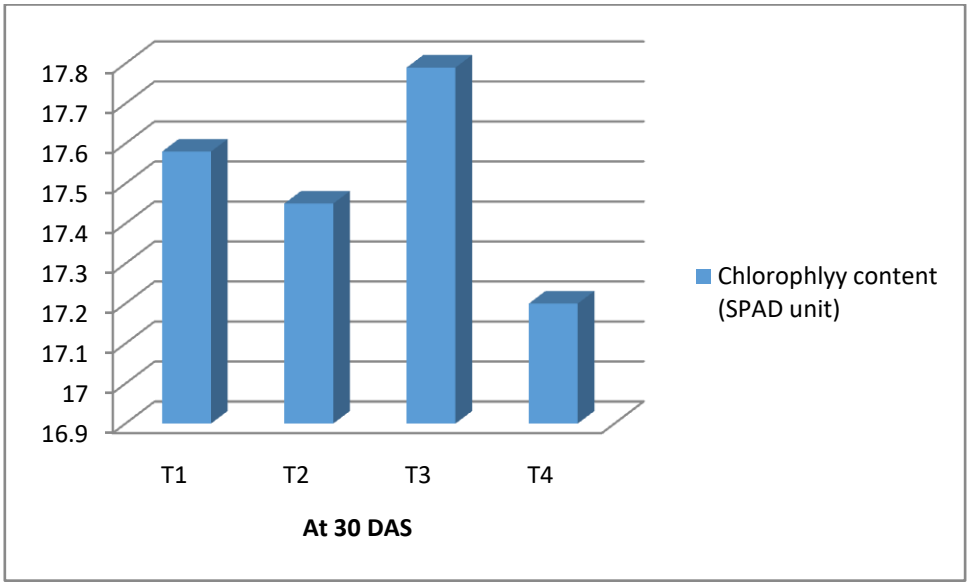

Figure 7- Plant height, stem girth and flag leaf length at 45 DAS

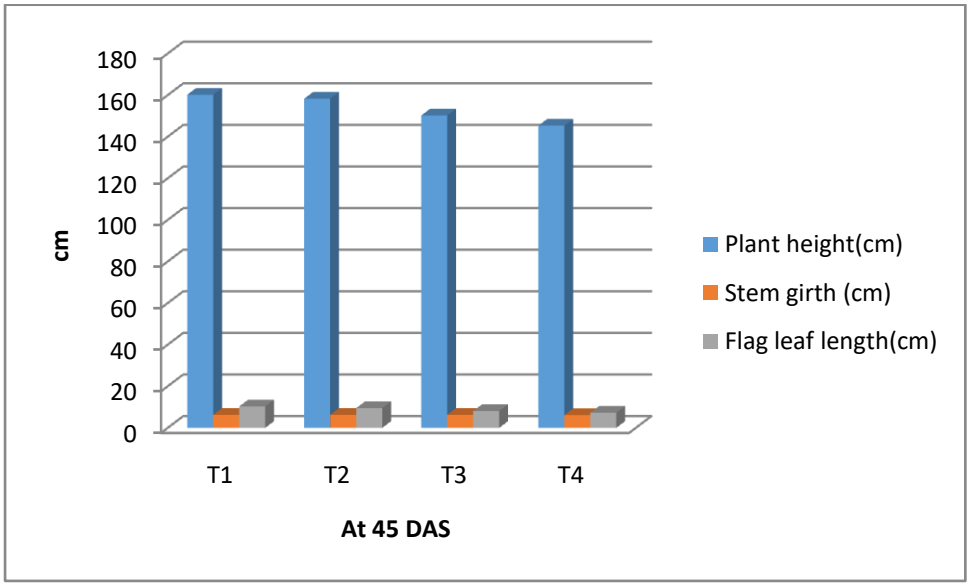

Figure 8- Number of leaves, nodes and internodes at 45 DAS

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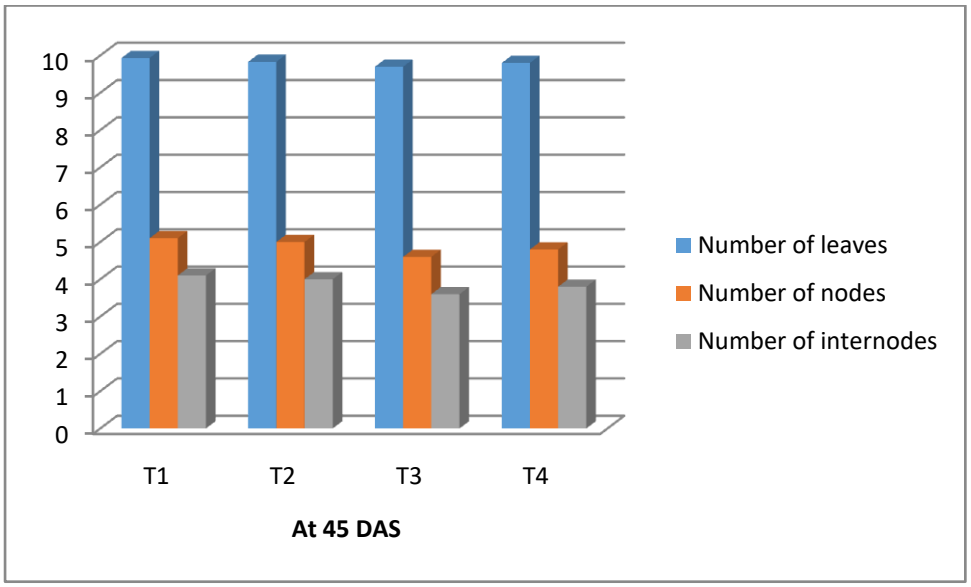
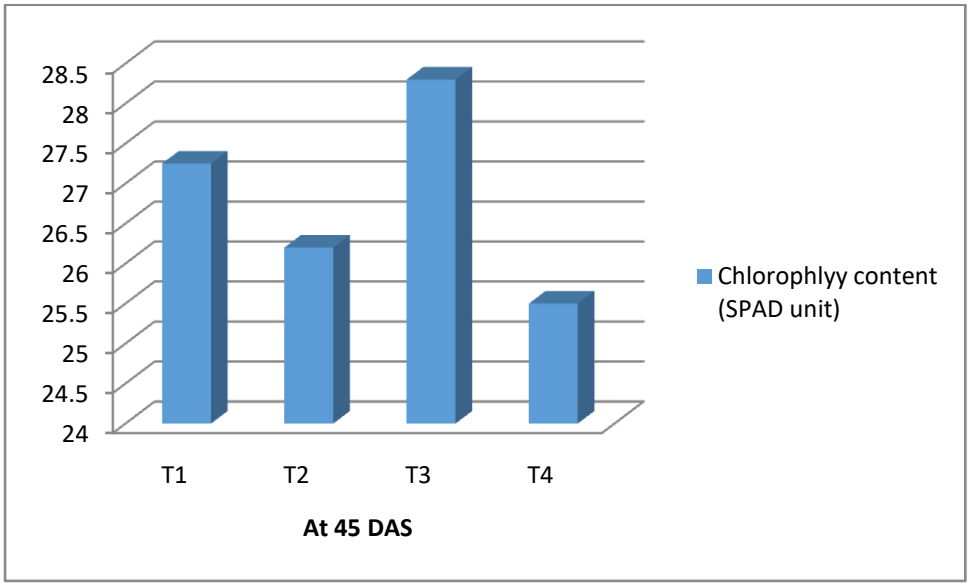


Figure 9- Chlorophyll content at 45 DAS



Summary and Conclusion

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The field experiment has been conducted at Lovely Professional University, Phagwara experimental area to study to study the comparison of different sowing methods on the growth parameters of maize. The different sowing methods we performed were dibbling(in ridges) , kera(in furrows) and line sowing (in raised bed and flatbed). The operation's we performed were the fertilizer application, application of herbicide, hand weeding and irrigation**.** At the end we came to know that the best sowing method in maize irrespective of different growth parameters is ridge planting(dibbling method) because the higher availability of nutrients, more circulation of the air and less water stagnation in the field.

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