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Impact of Pre and Post Emergence Herbicide

Probing the impact of pre and post emergence herbicide on weed flora in maize (*Zea mays* L.)

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Abstract

A field experiment was conducted at Lovely Professional University, School of Agriculture;Phagwara in 2019 .The experiment was comprised with seven treatments laid out in randomized block design with threereplications. The texture of the experimental field soil was sandy loam having pH-6.69,EC-0.42mmhos/cm and available N (396.48 kg/ha), P (22 kg/ha) and K (112kg/ha). The dominant weed species found in experimental farm were*Cynodon dactylon (doob grass), Cyperus rotundus, Amaranthus virids,Anagallis arvensis,Argemone mexicana, Chenopodium album,Parthenium hysterophus,Trianthema prolacastrum.* Out of all these major density was *Cyperus rotundus.*Two hand weeding's performed one at 20 DAS and 40 DAS significantly reduced the flora of weeds i.e. grasses, sedges and broad leaf weeds as well as reduced the weight of weeds and increase the weed control efficiency at the different growth stages of crop. Among the herbicides in case of weed control oxyflurofen 25 EC at 3DAS show effective result which was followed by Stomp30EC at3 DAS. The highest weed control efficiency was recorded by oxyflurofen 25EC at the different growth stages of crop. Among the herbicides in case of weed control oxyflurofen 25 EC followed by hand weeding.

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The highest plant height, stem girth, number of leaves , flag leaf length ,chlorophyll content, leaf area index ,grain yield and stover yield was recorded highest by hand weeding followed by stomp30EC.

Keywords: Sedges, weed flora, EC, oxyflurofen, stomp30EC

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Introduction

Maize (*Zea mays*) is a monocot crop belongs to Poaceae family. It is grown as a grain crop as well as fodder cropand provides food to the human beings and feed to the cattle Due to its wider adaptabilityunder different agro climatic conditions it is the most versatile crop.After rice and wheat, maize is the third most important food crops in India. In maize C4photosynthetic pathway is present which is responsible for producing high biological yield as well as economic yield. Maize is also known as “King of Cereals”. In India, maize was cultivated in an area of 9.18 million hectares with a production of 24.17 million tonnes and average productivity of 2783 kg ha-^{1}during 2017-2018(AICRP on maize 2018) .In world India is one of the top 10 maize producers; globally it contributes around 2-3% of the total maizeproduced and is one of the top 5 maize exporters in the world contributing almost 14% of the total maize exported to different countries around the world. Now adays, maize is used as a fodder and for the production of bio ethanol. The yield limiting constrains like weeds, pests and diseases are very important to control to avoid heavy losses caused by them in maize yield and grain quality.Among other factors affecting production, weed is one the most important yield limiting factor. Critical period of crop weed competition is first 8 weeks after

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sowing. Competition for light, nutrients and CO_2 leads to reduction in yield by 47%.The losses in yield due to weed emergence vary from 28- 93% depending on weed flora type, their intensity, stage, nature and duration of crop weed competition (Srividya *et al.,* 2011). Among all, weed management plays significant role in increasing yield. Weed infestation is a major problem in maize, primarily at initial growth stages and more spacing, so weed control is necessary. In maize row to row spacing is more so maximum numberof weeds appears and compete with main crop. To get maximum production of maize weed management is compulsory. During early growth stages of maize due to continuous rainfall there was too much wetness in the field, so in this condition cultural and mechanical methods of weed control not possible. Chemical method of weedmanagementby use of pre or post emergence herbicides can be resulted to the efficient and economical method of weed control as compare to manual methods due to its more cost. So, here is an urgent need to find out the best herbicide for effective weed management in maize and hence this experiment was conductedwith following objectives.

- To study the effect of weed density on growth of maize.
- To find out the efficiency of Pre and Post emergence herbicides.
- To compare the mechanical methods of weed control with herbicides.

Materials and Methods

The trial was conducted in the experimental farm of agriculture in Lovely Professional university, Phagwara, Punjab in kharif 2019.Texture of the soil was sandy loam, pH6.69, available nitrogen. The soil of the experimental field was sandyloam in texture, alkaline in reaction (pH 6.69) and available nitrogen (396 kg/ha), phosphorus (22kg /ha) and potassium (112kg /ha).Randomized complete

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block design with 7 treatments and three replications were used. Maximum and minimum temperature recorded during trial was 39 degree C and 21 degree C. Relative humidity was70% during cropping period .Rainfall recorded during season is 300mm. Recommended dose of nutrients120 kg N, 60 kg P_2O_5 and 60 kg K_2O was supplied through urea, SSP and MOP, respectively. The whole quantity of phosphorus and potash was applied as a basal dressing, while nitrogen was applied in three equal splits–knee high stage, tasseling and silking stage. The herbicides were applied by a knap sack sprayer with flat fan nozzle using 500-800litres water per hectare. Weed density of major weeds was recorded at 30,60and 90 DAS by quadrate count method. The quadrate of $1m^2$ was randomly placed at five places in each plot and then total weed density was recorded.

Design	Randomized complete block design
No. of treatments	07
No. of replications	03
Total no. of plots	21
Net plot size	$4m*4m=16m^2$
Gross plot area	$400m^2$
Variety	Hybrid3033
Spacing	60*20cm

Treatments detail

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T1	Control(unweeded check)
T2	Hand weeding at 20,40DAS
T3	Stomp30EC on 3DAS
T4	Galigan(oxyflurofen25%EC)
T5	Atrazine@1kg/ha
T6	2,4-Dethyl ester @1.25 L/ha on 25 DAS
T7	Halosulfuron methyl 75% WG @67.5ga.i/ha on 25 DAS

Result and discussion

The weed species recorded at the experimental site were mainly comprised with grasses, sedges and broadleaf weeds. The major weed species were: Grasses–*Echinochloa crusgalli* (Swank), *Echinochloa colonum* (Barnyard grass) and *Ischaemum rugosum* (Wrinkle grass). Sedges were *Cyperus iria* (Chatri wala dila), *Cyperus rotundus* (Nut grass), *Cyperus difformis* (Dila motha) and *Cyperus compressus* (Motha). Broadleaf weeds*Eclipta alba* (Jalbhang grass), *Eleocharis atropuea* (Ghueen), *Euphorbia hirta* (Dhodhak)and *Ludwigia axillari*s (Gharilla) (Stanzen *et al.,* 2016). (Sidhu, 2008). Maximum reduction in the weed density was recorded in manual weeding. This practice helped in eradication of weeds. At crop harvest, hand weeding twice resulted in lower density of weeds which remained at par with T4 (Oxyfluorofen) and T3(stomp30EC). The highest weed density is observed in the Treatment 1(control) because there is no weedicide application in the plot and there is no removal of weeds manually. Kannan and Chinnagounder (2014) Therefore, weeds gave more competition to the maize plants. So, the weed density is more in it.Weeds were removed manually in T2, so the density of weeds is less. Weed Biomass

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also recorded at 30 and 60 DAS. (Madhavi *et al.,* (2014)Minimum weed biomass was recoded in oxyflurofen treated plots which was at par with hand weeding(Fig7)

The plant height was recorded at different intervals. The highest plant height is observed in T2 (92.6cm) followed by T3 (88.2cm)because there is no phytotoxic effect of the chemicals on the plants of maize. The lowest plant height is observed in T4 (44cm) fig1.Oxyflurofen inhibited the germination of the weeds as well as plants of the maize crop. The hand weeded plots showed the more plant height as compared to the treatments in which herbicides applied.The maximum stem girth is observed in the Treatment 3 (4.6cm)fig. 6 .The lowest stem girth is observed in the Treatment 4 (2.7) because it inhibited the germination of maize plants. Singh *et al.,* (2012) Stem girth was almost similar of the all of the plots except treatment 4 and treatment 1(control). Maximum number of leaves recorded per plant in T3 (5.3) which was at par with T 2 (4.6) Fig.3 The highest leaf length and width is observed in the Treatment 2(58.1cm,7.5cm)because of no phytotoxic effect of the weedicides on itFig.2,4. The lowest leaf length and width is observed in the Treatment 4(22.3cm, 58.1cm) because it has inhibited the germination of the maize plants as well as weeds. The treatments having weedicide application have less leaf length as compared to the treatment 1 and treatment 2 (hand weeding) because there is some negative effect of the chemicals on the maize plant. Arvadiya *et al., (*2012)The highest leaf area index is observed in the Treatment 2 (290.33cm). The lowest leaf area index is observed in the Treatment 4 (211.63 fig 8).The highest chlorophyll content is observed in the Treatment 7(29.2) The lowest chlorophyll content is observed in the treatment 4 (17.3) because of the negative impact on the growth of maize plants. Hand weeding shows better results as compared to the control, oxyflurofen, atrazine and 2,4-D (Abdullah *et al.*, 2016).

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Graphs and Figures

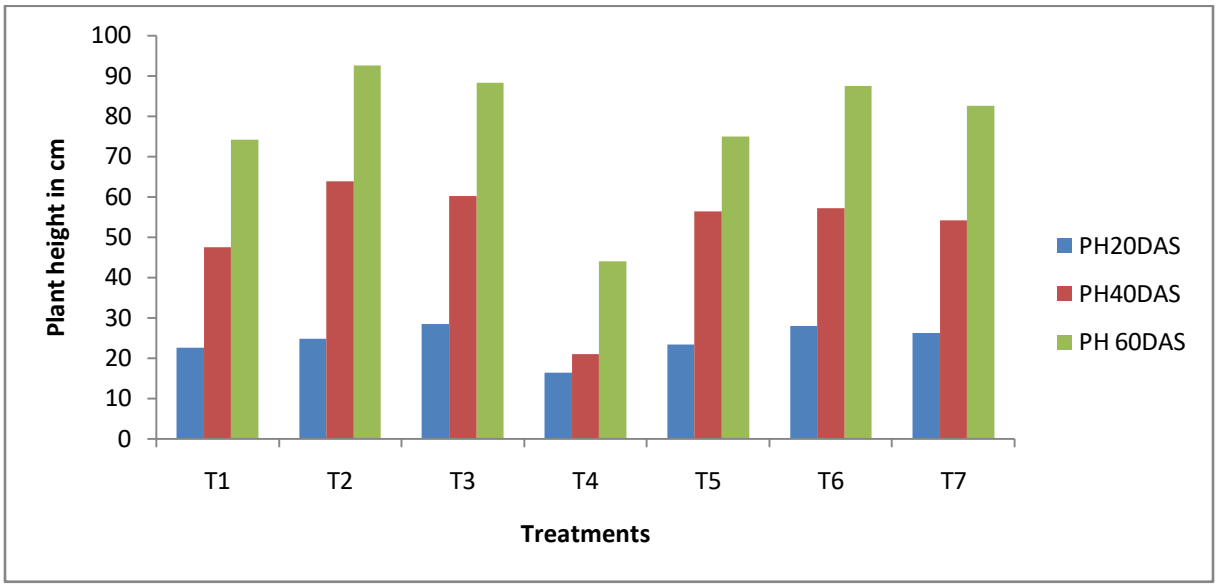

Fig1. Plant height in cm

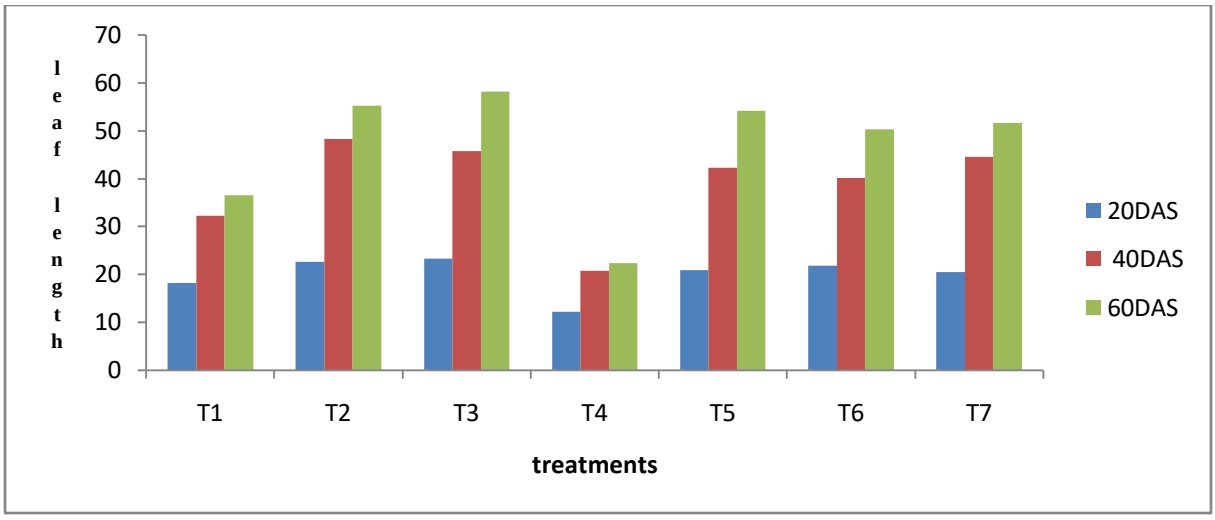

Fig2: Leaf length of maize in cm

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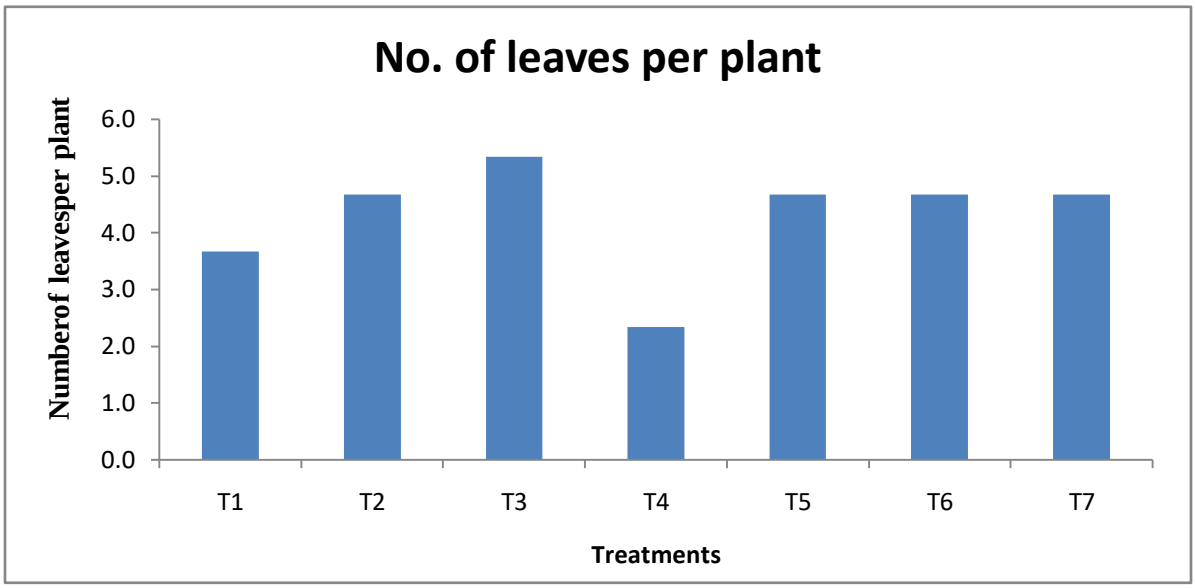

Fig 3-Number of leaves per plant

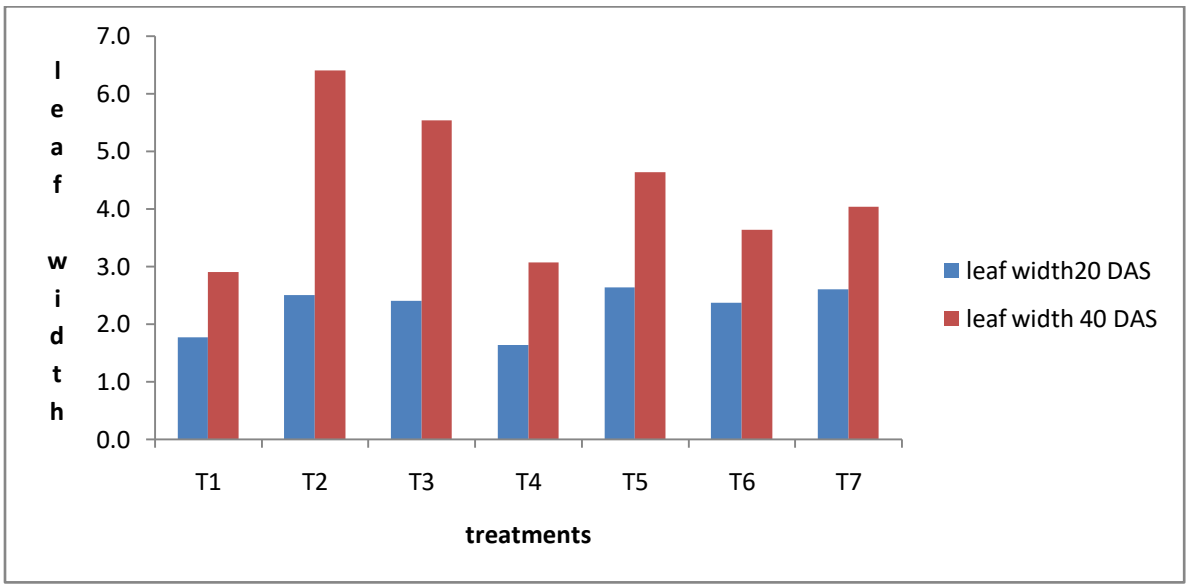

Fig4: Leaf width in cm

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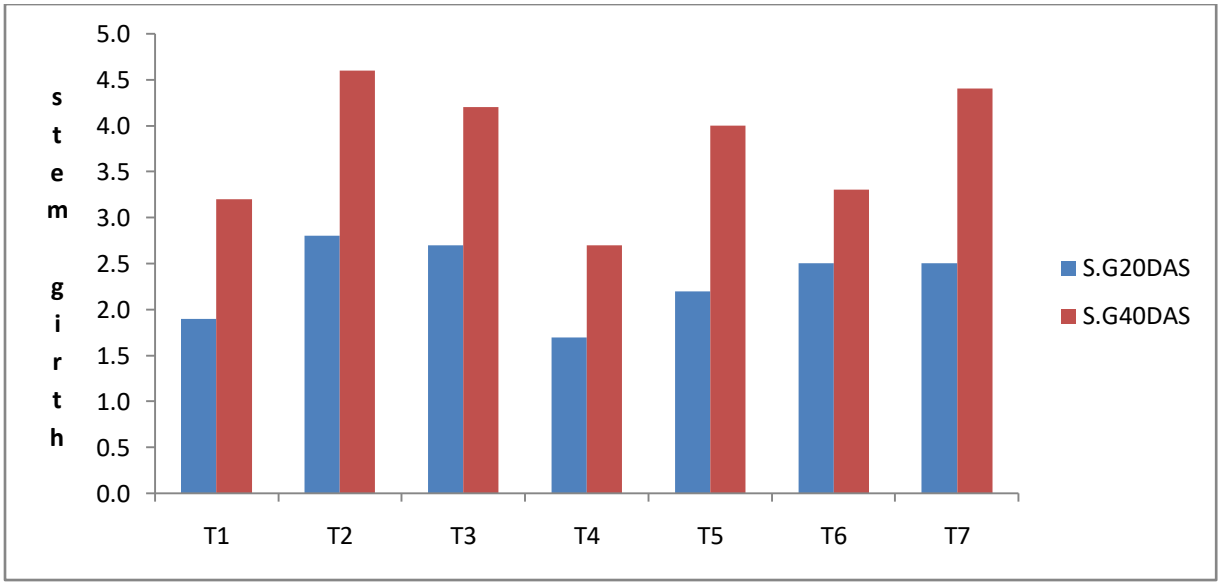

Fig5: Stem Girth cm

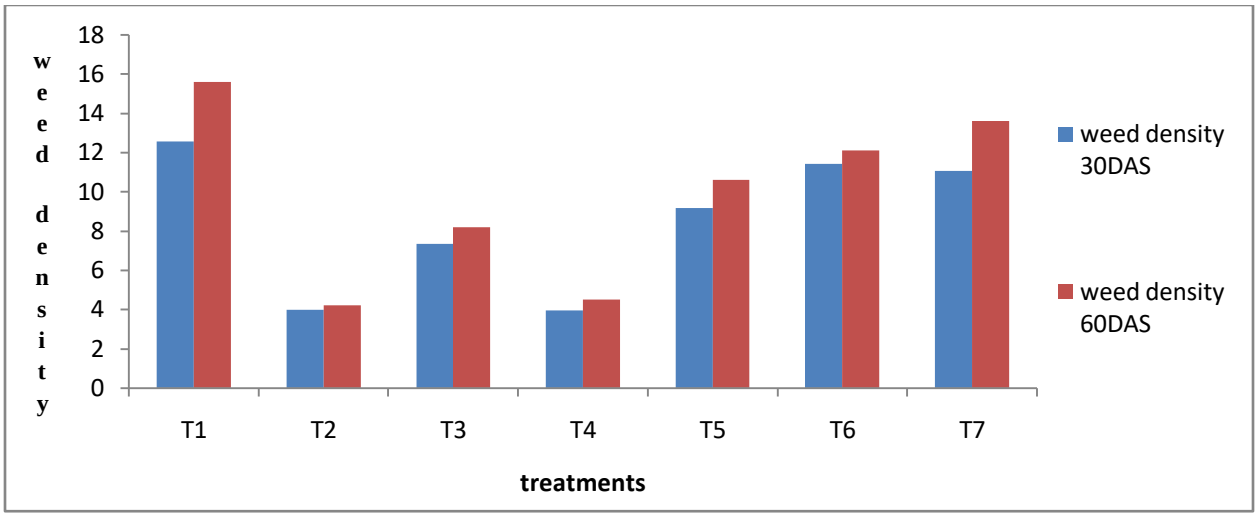

Fig6: Weed density per sq. m

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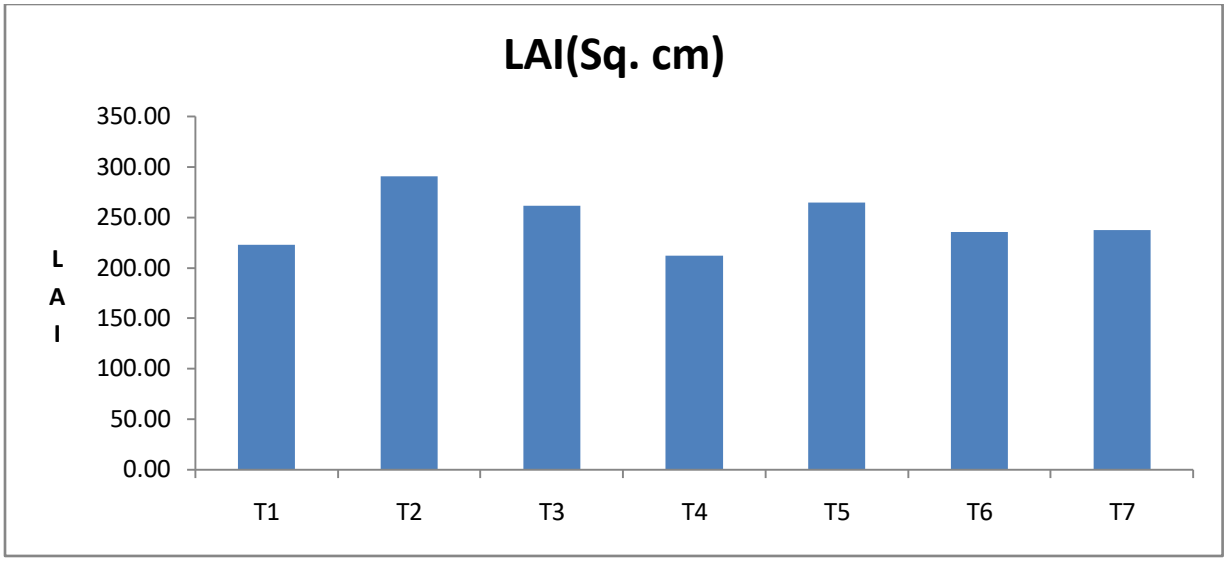

Fig7: Leaf area index

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