Influence of Seedling Age on the Growth of Tomato (*Lycopersicon esculentum* Mill.)

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Abstract:
The experiment was conducted at National Horticultural Research Institute; Bagauda Station which is located at latitude 11[0]33N and longitude 8[0]23E in 2017 to determine the influence of seedling age on the growth of tomato (Lycopersicon esculentum Mill.). The design used was Randomized Completely Block Design (RCBD) with 5 treatmentsi.eD1T (18days), D2T (22days), D3T (26days), D4T (30days) and D5T (34days) after planting which was replicated 5 times. The growth parameters plant height, stem girth, leaf area and leaf segment were recorded 2, 4 and 6 weeks after last transplant.From the result the longest plants were D1T (18 days) with 14.397, D4T (30 days) with 12.647 and D4T (22 days) with 12.507 which were similar. The shortest plant was D5T (34 days) with 6.625 at 2weeks after last transplant. At 4weeks D1T (18 days) with 23.060 was the longest plants. The shortest plant was D5T (34 days) with 10.21. At 6weeks D1T (18 days) with 41.333 andD4T (22 days) with 37.846 were the longest plants. The shortest plant was D5T (34 days) with 21.972. Stem girth was statistically the same for all the treatments at 2 weeks and 6weeks, D1T (18 days) with 2.5347 which was statistically similar to D4T (30 days) with 2.4993have the widest stem at 4 weeksand D5T (34 days) with 1.5408 has the narrowest stem. At 2 and 4weeks D1T (18 days) with 6.805 and8.111 has the largest leaf area and highest number of leaf segments while D5T (34 days) with 2.032 and 4.271 has the smallest leaf area and lowest number of leaf segment. There was no significant difference inleaf area and leaf segment parameters in all the treatments at 6weeks after last transplant.
Keywords: *Seedling age, Tomato, Transplant, Growth*

INTRODUCTION

Tomato (*Lycopersion esculentum* Mill.) belonging to the family Solanaceae, is one of the most popular and widely grown vegetable crop in the world. Tomato is warm season crop and highly susceptible to frost and high humidity and perishable in nature (Goto *et al.,* 2010). It is a staple fruit vegetable, one of the most important vegetables worldwide (Saeed-Awan *et al.,* 2012) considered as an important cash and industrial crop in many parts of the world (Ajagbe *et al.,* 2014) that has become popular over the last century. It is world's largest vegetable crop after potato and sweet potato(Abdullah et al., 2010). The people who eat tomato regularly reduced risk of cancer disease and it has detoxification effect in the body. It is high in water soluble vitamins and minerals, essential amino acids, sugars, dietary fiber, low in fat and calories; main source of vitamins A, B, C, iron, phosphorous, protein, edible oil and lycopene (Achoja and Okoh, 2014). Tomato

is a perennial crop butsome cultivars are grown as annual crop in some part of the world.

Few literatures and researches about seedlings right age for transplanting are available. The seedlings either die due to being very fragile and tender when transplanted at a very young age, or become susceptible to attack by pathogens and mechanical damage when transplanted at older age leading to high yield loss. Therefore, transplanting seedlings of proper age is of utmost importance. With this, optimal age of seedlings for transplant is essential to finding out the right stage of transplanting in tomato under the Sudan Savanna Agro climatic condition.

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MATERIAL AND METHODS

The experiment was conducted at National Horticultural Research Institute; Bagauda Station which is located at latitude $11^0$33N and longitude $8^0$23E in 2017 to determine the influence of seedling age on the growth of tomato (*Lycopersicon esculentum* Mill.). The station is located in Sudan savanna agro climate. Tomato variety Peto 86 was collected from seed unit in the station. The experiment comprised of five (5) treatmentsD1T (18days), D2T (22days), D3T (26days), D4T (30days) and D5T (34days) after planting which was replicated 5 times.

The nursery bed of 50cm x 50cm was prepared and tomato seeds were sown and watered. When the seedlings were about to be ready for transplanting, land preparation harrowing, ridging and other agronomic practices were carried out. The first transplant was carried out after 18 days after sowing, and then it was followed with subsequent set of transplants with intervals of four (4) days between each set. Data of growth parameters were recorded on five (5) tagged tomato plants two (2) weeks after the last set of transplant three (3) times at two (2) weeks interval. The design used was randomized completely block design and the plot size was $2m^2$. The data were first taken 2weeks after the last set of transplant and observations were analyzed statistically using SAS.

RESULTS AND DISCUSSION

The result obtained showed that different treatments of seedling of tomato influenced some of the growth parameters.

Plant Height

From the result in Table 1, 2 and 3, the longest plants were D1T (18 days) with 14.397, D4T (30 days) with 12.647 and D4T (22 days) with 12.507 which were similar. The shortest plant was D5T (34 days) with 6.625 at 2weeks after last transplant. At 4weeks D1T (18 days) with 23.060 was the longest plants. The shortest plant was D5T (34 days) with 10.21.At 6weeks D1T (18 days) with 41.333 andD4T (22 days) with 37.846 were the longest plants. The shortest plant was D5T (34 days) with 21.972.

Stem Girth

Stem girth was statistically the same for all the treatments at 2 weeks and 6weeks, D1T (18 days) with 2.5347which was statistically similar to D4T (30 days) with 2.4993have the widest stem at 4 weeks and D5T (34 days) with 1.5408 has the narrowest stem.

Leaf Area

At 2weeks D1T (18 days) with 6.805 has the largest leaf area while D5T (34 days) with 2.032 has the smallest leaf area. At 4weeks D1T (18 days) with 10.765 has the largest leaf area while D5T (34 days) with 4.099 has the smallest leaf area. There was no significant difference for leaf area parameters in all the treatments at 6weeks after last transplant.

Leaf Segment

At 2weeks D1T (18 days) with 8.111 has the highest number of leaf segments while D5T (34 days) with 4.271 has the lowest number of leaf segment. At 4weeks D1T (18 days) with 10.200 has the largest number of leaf segments while D5T (34 days) with 5.600 has the smallest number of leaf segment. There was no significant difference for leaf segment parameters in all the treatments at 6weeks after last transplant.

CONCLUSION

On the overall performance D1Twhich was the first transplant (18 days after sowing) though statistically similar with some of treatment is some parameter, it performed

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better in almost all the growth parameters observed. This makes it the best time to transplant among all the other treatments.

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Table 1: Growth of tomato at 2 weeks after last transplant as affected by seedling age

Day of transplant	Plant height 2weeks	Stem Girth		Leaf area2weeks	Leaf segment
D1T	(cm)	2weeks (cm)		(cm^2)	2weeks (cm)
D2T	**14.289a**	**0.9733**		**6.805a**	**8.111a**
D3T	**12.507a**	**1.0093**		**5.227ab**	**6.533ab**
D4T	**10.247ab**	**0.9187**	**1.0083**	**3.481ab**	**5.793ab**
D5T	**12.647a**	**0.8103**		**5.428ab**	**7.733a**
Mean	**6.625b**	**0.94397**		**2.032b**	**4.271b**
CV	**11.2627**	**18.6987**		**4.59453**	**6.48825**
SE±	**33.3034**	**0.17651**		**58.5608**	**25.5427**
Level of significance	**0.57427** *	NS		**2.69059** *	**1.65727** *

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Table 2:Growth of tomato at 4 weeks after last transplant as affected by seedling age

Day of transplant	Plant height 4weeks (cm)	Stem Girth 4weeks (cm)	Leaf Area 4 weeks(cm^2)	Leaf segment 4 weeks(cm)
D1T				
D2T	**23.060a**	**2.5347a**	**10.765a**	**10.200a**
D3T	**18.407ab**	**2.2347ab**	**7.027ab**	**8.333ab**
D4T	**14.795ab**	**2.0768ab**	**7.371ab**	**8.393ab**
D5T	**18.627ab**	**2.4993a**	**9.046ab**	**10.067a**
Mean	**10.213b**	**1.5408b**	**4.099b**	**5.600b**
CV	**17.0204**	**2.17726**	**7.66160**	**8.51866**
SE±	**36.8904**	**24.3584**	**48.5786**	**24.1555**
Level of significance	**6.27891** *	**0.53034** *	**3.72190** *	**2.05773** *

Table 3: Growth of tomato at 6 weeks after last transplant as affected by seedling age

Day of transplant	Plant height 6weeks (cm)	Stem Girth 6weeks (cm)	Leaf area 6weeks (cm^2)	Leaf segment 6weeks (cm)
D1T	**41.333a**	**3.2153**	**13.798**	**12.77**
D2T	**34.713ab**	**3.1843**	**9.949**	**31.33**
D3T	**30.333ab**	**2.8940**	**10.873**	**12.16**
D4T	**37.846a**	**3.4807**	**13.071**	**11.64**
D5T	**21.972b**	**2.5120**	**6.560**	**8.62**
Mean	**33.23947**	**3.05726**	**10.8504**	**15.3042**
CV	**31.7571**	**27.6731**	**55.1126**	**133.257**
SE±	**10.5559**	**0.84604**	**5.97994**	**20.3941**
Level of significance	*	NS	NS	NS

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