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Study on the Feasibility of Chickpea Cultivation in Ampara Area in Sri Lanka

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Abstract: *Chickpea is one of the main food crops in East Asia. As it contains high nutritional value, it has high demand in the world food market. Even though chickpea is mainly cultivated in India and China, Sri Lankan farmers did not trend to cultivate this crop. Therefore considerable amount of foreign exchange spent on import. This study will contribute to the country development in future.*

A study was conducted to study the feasibility of Chickpea cultivation in Ampara area. The research was done at Hardy ATI Farm, Ampara from 2nd December, 2015 to May, 2016. The land initially prepared and uniformly sized as 120 cm X 300 cm by having three replicates with the total of twelve beds which were used for testing plots. Three beds were used for establishing plants with (30 X 45) cm spacing recommended by the Department of Agriculture, India. Other 9 beds were planted with (25 x 40) cm, (35 X 50) cm, (35 X 40) cm. All the beds were provided with the same management practices such as seed planting, irrigation, weeding, pest & disease control and fertilizer applications. Germination time period (days), Germination percentage (%), plant heights (cm), Number of flowers were obtained for analysis. Complete Randomized Block Design (CRBD) was used with the Minitab database software.

From the study it was identified that Chickpea plants performed significantly (p-0.05) well under Ampara climatic condition up to flowering stage when a spacing of (50 X 35) cm was used where germination percentage of 48.00±6.85 %, maximum plant height of 51.8 cm, highest no of flowers at 20th week with flower count of 29. Further this study could be repeated in alternative climatic regions for the best performances and profitability of Chickpea cultivation and to check yield analysis.

Keywords: Chick Pea, Feasibility, Germination, Plant Height

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1. INTRODUCTION

Background and Justification

Chickpea (*Cicer arietinum* L.) is an important grain legume in Asia, and being a rich and cheap source of protein which can help people to improve the nutritional quality of their diet. It is mainly imported from India and other countries for usage. But Sri Lankan farmers do not trend to cultivate chick pea. Chickpea does best on fertile sandy, loamy soils with good internal drainage. Good drainage is necessary because even short periods of flooded or waterlogged fields reduce growth and increases susceptibility to root and stem rots. That shows the best soil conditions are available in Sri Lanka that mean it can grow successfully.

Objectives

1. To find out the feasibility of Chickpea Cultivation in Ampara area.
2. To identify the suitable planting spaces and climatic conditions for Chickpea Cultivation in Sri Lanka

2. LITERATURE REVIEW

Domesticated Chickpeas have been found in the aceramic levels of Jericho (PPNB) along with Cayony in Turkey and in Neolithic pottery at Hacilar, Turkey. They were found in the late Neolithic (about 3500 BCE) at Thessaly, Kastanas, Lerna and Dimini, Greece. In southern France Mesolithic layers in a cave at L'Abeurador, Aude have yielded wild Chickpeas carbon dated to 6790±90 BCE. By the Bronze Age, chickpeas were known in Italy and Greece. In classical Greece, they were called erebinthos and eaten as a staple, a dessert, or consumed raw when young. The Romans knew several varieties such as venus, ram, and Punic chickpeas. (Aguilera Y, 2009).

Ancient people also associated chickpeas with Venus because they were said to offer medical uses such as increasing sperm and milk, provoking menstruation and urine and helping to treat kidney stones."White cicers" were thought to be especially strong and helpful. Chickpea is grown in tropical, sub-tropical and temperate regions. Kabuli type is grown in temperate regions while the desi type chickpea is grown in the semi-arid tropics. Chickpea is valued for its nutritive seeds with high protein content, 25.3-28.9 %, after dehulling. A small proportion of canned chickpea is also used in Turkey and Latin America, and to produce fermented food. Carter J (1999)

Greater and more stable yields are the major goals of plant breeding programs. Chickpea yields usually average 400-600 kg/ha, but can surpass 2,000 kg/ha, and in experiments have

attained 5,200 kg/ha. Yields from irrigated crops are 20-28% higher than yields from rain fed crops. Hemalatha S, Platel K and Srinivasan K. (2007)

In United States and Europe, chickpeas are marketed dried, canned, or in various vegetable mixtures. In Europe, mashed chickpeas from the Mediterranean are sold canned. The major chickpea growing countries are India, Pakistan, and Turkey in Asia, Ethiopia in Africa, California and Washington State in the U.S., Mexico and Australia. Yang Y, Zhou L, Gu Y, (2007). Further increases in yield could be attained from the use of germplasm wild relatives, for identification of new genes, and from new combinations of favorable genes already existing.

Chickpeas mature in 3-7 months and the leaves turn brown/yellow during maturity. For dry seeds, the plants are harvested at maturity or slightly earlier by cutting them close to the ground or uprooting. The plants are stacked in the field for a few days to dry and later the crop is threshed by trampling or beating with wooden flails. Zia-Ul-Haq M, Iqbal S, Ahmad S (2008), Pittaway JK, Robertson IK and Ball MJ (2008).

3. MATERIAL AND METHODS

Hardy Advanced Technological Institute (ATI) farm was selected to cultivate the chick pea because the soil condition and climatic condition are suitable for other cultivation practices therefore it was selected as our testing place. One deep plough and a harrowing were done by land preparation. Twelve beds were prepared for testing plots where 3 replicated were used to eliminate the error. Large soil particles, stone, sticks and unwanted material were removed from the beds and prepared with smooth surface for seedling. Locally available chickpea in the market, Chemical fertilizers such as Urea, TSP and MOP, Straw, Sprinkler irrigation system and hand tools were used for land preparation. Chemical and organic fertilizers were used as basal dressing. Three beds were used for establishing plants with (30 X 45) cm spacing recommended by the Department of Agriculture, India. Other 9 beds were planted with (25 x 40) cm, (35 X 50) cm, (35 X 40cm) respectively with 3 replicates. All the beds were provided with the same management practices such as seed planting, irrigation, weeding, pest & disease control and fertilizer applications.

Germination time period (days), Germination percentage (%), plant heights (cm), Number of flowers were obtained for analysis. Complete Randomized Block Design (CRBD) was used with the Minitab database software. Large soil particles, stone, sticks and unwanted material were removed in the beds and prepared a smooth surface for seedling. Chickpea seed were soaked with adequate amount of water for 6 hours to stimulate the seed germination. Those seeds were planted in one 2.5 cm depth on Captan-treated bed. Three Chickpea seeds were planted in one hole. After seed planting, all the beds were covered by using straw to prevent external distortion. Germination of seeds was observed 5 to 6 days after seeding. Sprinkler irrigation system was used to irrigate Chickpea cultivation. The all beds were irrigated with two days interval. Straw mulch was not removed as it will help in soil moisture conservation. Weeding was done 14, 30 and 45 days after germination.

No control measures were adopted since pest and disease problems were not observed in the Chickpea cultivation. There were no fertilizer recommendations in Sri Lanka as growing Chickpea is not common here. Therefore fertilizer recommendation used in groundnuts was used for this research.

Fertilizer	Urea (kg/ha)	TSP (kg/ha)	MOP (kg/ha)
Basel Dressing	35	100	75
Top Dressing (at flowering)	30	-	-

4. RESULT AND DISCUSSION

Germination Percentage

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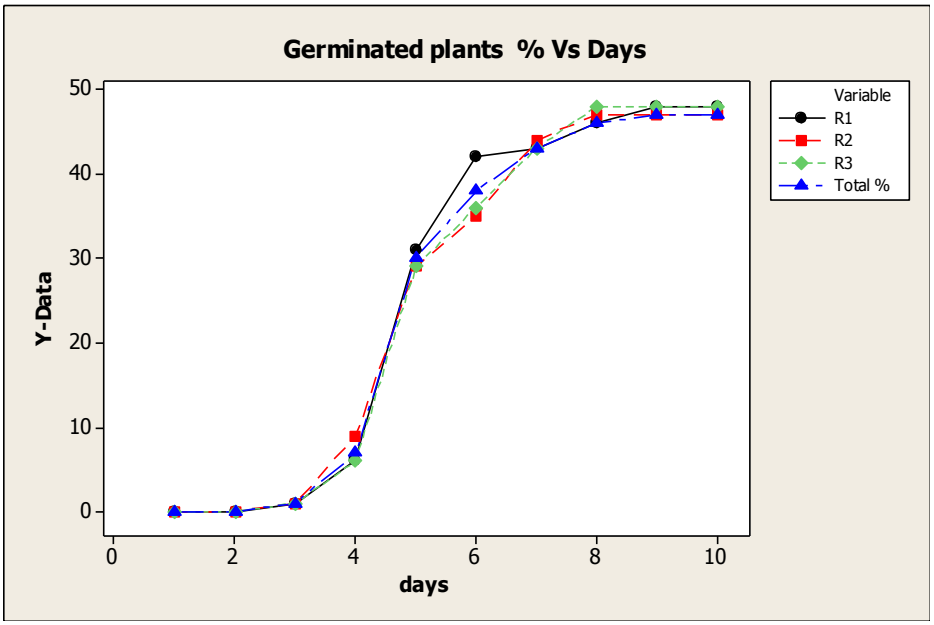


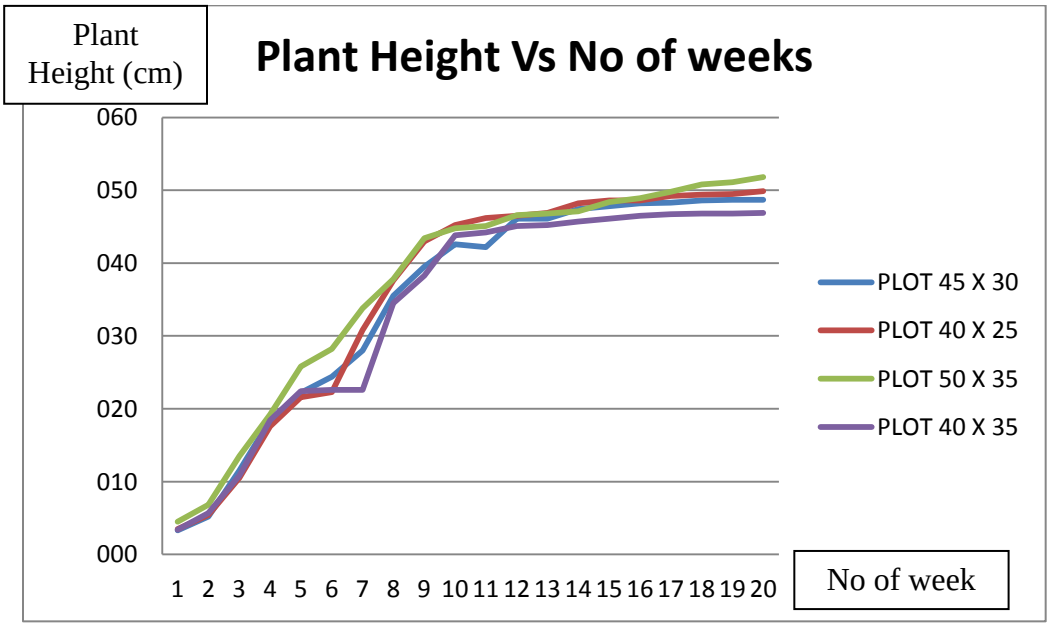
Graph 01: Germination Percentage of each replicates in the plot.

Germination percentage of the seeds were found to be 48.00±6.85 % in the replicates of the plot 3 (50 X 35) with the strong positive correlation (R3 = 0,949, P-Value = 0,000) while having the minimum percentage of 47.00 ± 6.67 % at plot 2 (40 X 25) with the strong positive correlation (R2 = 0,951, P-Value = 0,000).

Plot 3 (50 X 35) showed a highest germination percentage which is acceptable because each holes in the prepared beds were added with 3 seeds each. Therefore, due to poor quality of seeds which was purchased at local retail shop, competition for the nutrients and other factors relevant to germinations were the limiting factor that controlled the germination process.

Plant Height

Plot 2 and 3 were having the plant height of 48.80 cm and 49.90 cm respectively. it revealed that the HATI farm is having the possibility to grow chick pea and can obtain a maximum plant height of 51.8 cm if suitable soil and climatic conditions are given.



Graph 02: Plant height of each replicates in the plot.

Number of Flowers

Table 01: Weekly flower count of each replicates in the plot.

Plots Spacing	WEEKLY FLOWERING																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
45cm×30cm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	6	9	19	23	24
40cm×25cm	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	8	12	20	23	23
50cm×35cm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	10	14	26	28	29
40cm×35cm	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	7	11	22	27	28

Based on the result it revealed that Plot 3 (50 X 35) was having highest no of flowers at 20th week with flower count of 29 and plot 1 showed the lowest no of flowers (24). It revealed that the HATI farm is having the possibility to grow chick pea and can obtain a maximum flower count of 29 if suitable soil and climatic conditions are given.

5. Constraints

The following problems were faced during the study period such as lack of good quality seeds were used as planting material, lack of books and cultivation manuals or guide lines to gain the basic knowledge on Chickpea cultivation, and the farm was not having permanent proper irrigation system.

Even though the yield data could not be collected due to flower dropping due to prolonged drought condition and lack of irrigation water, the vegetative parameters such as germination time period, germination percentage, plant height and no of flowers showed better performances.

According to the above results the Chickpea cultivation has a potential to be cultivated under the dry zone of Sri Lanka. No major pest and disease problems were observed during this cultivation period.

6. Conclusion

The soil in Ampara area seems to be suitable for the growth of chick pea and comparatively plant growth and diseases were less in treatment 1, 2, 3 and 4. When comparing growth height of plant, it was observed that treatment 3 performed well compared to other treatments. Also under the flowering data, Spacing 3 is good than other treatments.

References

[1] Aguilera Y, Esteban RM, Benítez V et al. Starch, functional properties, and microstructural characteristics in chickpea and lentil as affected by thermal processing. J Agric Food Chem. 2009 Nov 25;57(22):10682-8. 2009.

[2] Carter J (1999) Chickpea Growers Guide: A Guide to the Production of Chickpeas (Agriculture Victoria - Horsham), (ISBN 0 7311 4479 1).

[3] Hemalatha S, Platel K and Srinivasan K. (2007) Influence of germination and fermentation on bioaccessibility of zinc and iron from food grains. European Journal of Clinical Nutrition. London: Mar 2007. Vol. 61, Iss. 3; p. 342-348. 2007.

[4] Pittaway JK, Robertson IK and Ball MJ (2008), Chickpeas may influence fatty acid and fiber intake in an ad libitum diet, leading to small improvements in serum lipid profile and glycemic control. J Am Diet Assoc. 2008 Jun; 108(6):1009-13. 2008.

[5] Yang Y, Zhou L, Gu Y, (2007) Dietary chickpeas reverse visceral adiposity, dyslipidaemia and insulin resistance in rats induced by a chronic high-fat diet. Br J Nutr. 2007 Oct;98(4):720-6. Epub 2007 Aug 1. 2007.

[6] Zia-Ul-Haq M, Iqbal S, Ahmad S (2008) Antioxidant potential of desi chickpea varieties commonly consumed in Pakistan. Journal of Food Lipids, Volume 15, Issue 3, pages 326-342, August 2008.