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Influence of different tuber weight on growth parameters of greater yam under Udaipur region

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Abstract

The present investigation was conducted to evaluate the effectiveness of different weight of tuber to improving of growth and yield of greater yam (*Dioscorea alata* L.) under Udaipur region. The study was carried out at Horticulture Farm, Department of Horticulture, Rajasthan College of Agriculture, Udaipur during June, 2017 to March 2018. The experiment were comprising with different weight of tubers (25g, 50g, 75g, 100g, 125g, 150g, 175g, 200g, 225g and 250g) and three replications. The vegetative growth parameters were significantly influenced by different weight of tubers. Seven parameters of growth namely days to sprouting maximum speed of emergence, no. of leaves per vine after four months, vine length after four months, girth of vines after four months were observed. The data were collected to identify the growth rate of tubers. The results revealed that the highest tuber weight (250gm) showed the maximum growth performance days to sprouting, speed of emergence, no. of leaves per vine after four months, vine length after four months, girth of vines after four months, while sprouting percentage (50g,100g) and survival percentage (225g) also significantly affected by tuber weight. As a conclusion, largest tuber weight of yam showed great potential to cultivate larger yam seed which may be used for larger yam production or direct consumption.

Keywords: *Dioscorea alata*, growth parameters, tuber weight

Introduction

Greater yam (*Dioscorea alata* L.) belongs to the family Dioscoreaceae. Which has chromosome number ($2n=2x=20$ & $2n=4x=40$). *Dioscorea alata* is one of the yam species popularly known as *ratalu*. It belongs to genus *Dioscorea* which contains about 600 species with 50-60 species of them cultivated as a food or medicine (Harijono T.E., 2013; Coursey, 1967) [5]. It is the third global agro-economic product after cassava and sweet potato (Harijono T.E., 2013). It contains anthocyanin pigment in its bright lavender colour tuber which can be extracted as food colourant (Jose *et al.*, 2015) [12]. It is a very nutritive vegetable and contains starch (27.88 g), energy (108 kcal), vitamin A (138 µg) protein (1.53 g) and fibre (0.65-1.40%) per 100 g of edible part. It is widely used for making vegetable, chips, puri and fried vegetable for canning, dehydration and flour manufacture.

Generally, researchers had discovered that larger seed yam produced better quality yam (Law-Ogbomo and Remison, 2009) [13]. However, if every farmer grows yam according to this standard, they will encounter shortage of yam planting material (Behera *et al.*, 2009). About 10,000 of seed yams will be required for a hectare of yam plantation (Law-Ogbomo and Remison, 2009) [13]. There are major problem is the scarcity of planting materials for cultivation and low multiplication ratio i.e.1:6, therefore, released varieties take a long time to reach to the farmer. The traditional method of producing of yams involves cutting a yam into small pieces called setts. Each set weighs 300-350g depending on location and tradition. The sets are planted and about 18-20 qt. sets are required for one-hectare area. This means large quantities of tuber are required for rapid propagation and marketable tubers are reserved for planting. The cost of planting materials is over 33 percent of the total outlay for yam production, so there is a need to improve the rate of yam multiplication (Okoli and Akorada, 1995) [15]. Due to this problem, some farmers started to separate the yam tuber into smaller part for yam plantation (Eyitayo *et al.*, 2010) [7].

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Research efforts are removing this problem in the development of minisett technique, which involve the use of sett of 25g (Okoli *et al.*, 1982) [14]. The minisett technique is a unique technique and fulfills the need of appropriate planting material. It was developed by National Root Crops Research Institute (NRCRI), Nigeria. The purpose of minisett technique is not to produce large tuber but to produce large number of healthy planting seed yams. The minisett technique is profitable due to lower materials cost and higher yield (Eyitayo *et al.*, 2010) [7]. It enhances the multiplication ratio (1:24) to large extent. Buds are spread all over the periderm (body surface) of yam tuber. Hence any portion of yam tuber having is capability to sprouting and producing a new plant (George *et al.*, 2004) [8]. The seed yam preferred for its earlier and more reliable sprouts; also, it usually matures earlier than other types of seed species (IITA, 1993 b; Hahm *et al.* 1987) [11]. Thus, keeping in this view, an experiment was conducted to assess the influence of different tuber weight of seed yam on growth parameters of white yam under Udaipur regions.

Material and Methods

An experiment was conducted at Horticulture farm, Department of Horticulture, Rajasthan College of Agriculture, Maharana Pratap University of Agriculture and Technology, Udaipur which is situated at South Eastern part of Rajasthan. This region falls under agro-climatic Zone IV a *i.e.* "South-humid Southern Plain and Aravalli Hills" of Rajasthan. Which at altitude of 582.17 meter above mean sea level, 24°35' latitude and 74°42' E longitude. This region has a typical sub-tropical climate, characterized by mild winters and summers. The annual rainfall of this area ranges from 592.5 mm to 620 mm per year. Maximum rainfall is received during mid-June to September with scanty showers during winter months. The experiment was laid out with Randomized Block Design with ten treatments and three replications.

In minisett technique, mother seed yam of 500-1000g that have broken dormancy are cut into pieces weighed of 25g, 50g, 75g, 100g, 125g, 150g, 175g, 200g, 225g, 250g. and tubers were treated with fungicide (12% carbendazim + 63% mencozeb). The tubers from each treatment were sown in pots filled with moist growing media containing 75% soil + 25% FYM. The pots watered regularly. The experimental field was

ploughed once with a mould board plough in the beginning followed by cross harrowing with disc cultivator and finally by planking to prepare the field to fine tilth. Basal application of well rotten FYM @ 3 tons ha⁻¹ was incorporated in experimental area before transplanting. The layout of experiment was made as per treatments and replications. Yam seedlings were ready for transplanting 2 months after sowing of tubers. Seedling were planted at 7.5 cm depth keeping 90 x 90 cm spacing and covered with soil. Irrigation may be given at weekly intervals in the initial stage and afterwards at about 10 days interval. Bamboo poles were used as staking material to support the trailing vines. Initially the vines were tied with the coir string. The data were recorded start after sowing of tubers is days to sprouting, sprouting percentage, survival percentage and speed of emergence (%). Then seedling transplanted in the field. Four months after transplanting the number of leaves per vine, girth of vines and length of vines were observed.

Result and Discussion

A perusal of data in Table 1 indicated that different weight of tubers were significantly affected the minimum time taken for day to sprouting (14.40 days) was recorded in treatment T₁₀ (250g) followed by T₄ and T₅ are slightly delayed. While, T₂ (50g) showed the slowest sprouting days (23.90 days), this happen due to larger tubers have larger surface area to retain water, this contributed to it to sprout faster compare to smaller tuber (Onwueme *et al.*, 1984) [18].

The maximum sprouting percentage (100%) were recorded in treatment T₂ (50 g) and T₄ (100 g), whereas, the minimum sprouting percentage (86.67%) were recorded in treatment T₁ (25g), T₆ (150g). Aswathy *et al.*, (2017) [2] reported that the increasing trend of sprouting with increasing weight of planting material in Kasturi turmeric. The maximum survival percentage (90.00) was recorded in T₉ (225g) followed by T₈ (200g) and T₆ (150g) and minimum survival percentage (40.00) was recorded in T₅ (125g). The maximum speed of emergence (81.50%) was found in treatment T₁₀ (250g) and minimum speed of emergence (60.50%) was recorded in T₄ (100g). The speed of emergence is related to minimum days to sprouting.

Table 1: Effect of tuber weight on days to sprouting, sprouting percentage, survival percentage and speed of emergence (%) in greater yam

Treatments	Days to sprouting	Sprouting percentage	Survival percentage	Speed of emergence (%)
T ₁	22.83	86.70	73.33	61.67
T ₂	23.90	100.00	66.66	62.86
T ₃	20.70	96.67	76.66	70.17
T ₄	16.60	100.00	50.00	60.50
T ₅	16.10	93.33	40.00	63.83
T ₆	19.37	86.70	86.66	72.53
T ₇	17.50	90.00	73.33	75.23
T ₈	17.00	90.00	86.66	73.70
T ₉	17.33	93.33	90.00	75.14
T ₁₀	14.40	86.70	66.66	81.50
SEm±	0.60	2.59	1.81	1.84
CD (0.05)	1.78	7.69	5.39	5.47
CV (%)	9.7	8.4	7.7	7.9

Figure 1 shows that the maximum number of leaves (96.00), girth of vines (6.06 cm) and highest length of vines (183.73cm) were recorded in T₁₀ (250g) followed by T₈ (200g) & T₉ (225g), While the minimum number of leaves (51.00), girth of vines (4.03cm) and length of vines (99.09cm) was recorded in T₁ (25g).

The present finding also supported with Onwueme (1972), Asadu *et al.*, (1987) [1] and Cyansa- Ameyaw *et al.* (1991) [6], Okonmah *et al.* (2009) [16], Ch'ng *et al.* (2017) [4] are reported that larger sets are quickly established and more vigorous as compared to small weight of seed yam and promote vegetative growth parameters such as number of leaves,

length of vines and basal portion of greater yam. The growth parameter increases when the size of the seed yam increases

(Law-Ogbomo and Remison, 2009) [13].

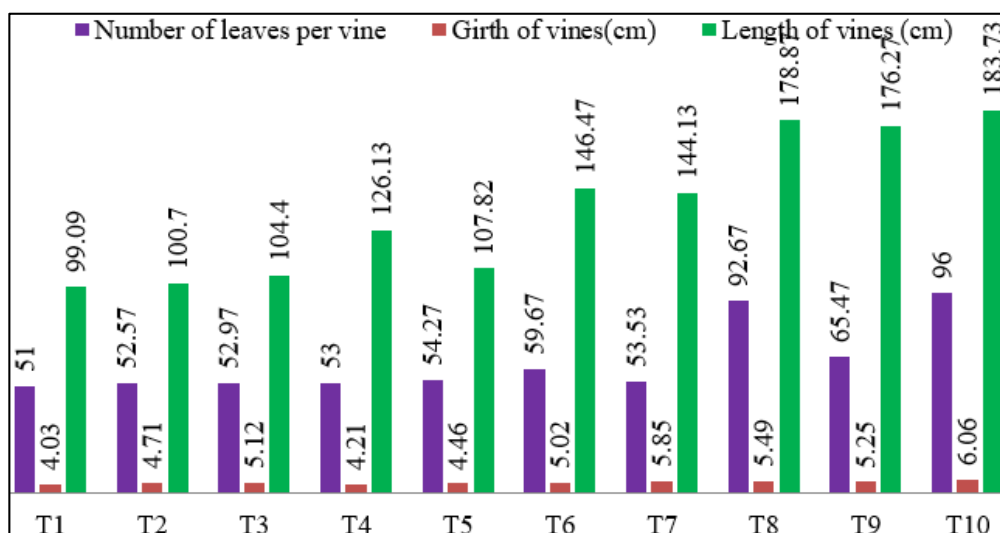


Fig 1: Effect of different tuber weight on number of leaves, girth of vines, length of vines after 4 months of greater yam.

Conclusion

The following silent findings are drawn on the basis of investigation. The vegetative growth characteristics like days to sprouting, speed of emergence (%), no. of leaves per vine, length of vines (cm), girth of vines (cm) were recorded superior in 200g weight of tuber. The sprouting percentage was recorded best in 50g, 100g weight of tuber and survival percentage found superior in 225g weight of tuber.

References

- Asadu CLA, Ezeumah HC, Nweke FI, Akammigbo FOR. The performance of size cultivars of white yam derived from three sources and evaluated across three zones in southern Nigeria, in: "Linking similar environment", cassava based cropping system. Research I, Ibadan, Nigeria. 16-19 Nov, 1987, 215-223.
- Aswathy TS, Jessykutty PC. Rapid multiplication of *kasturi* turmeric (*Curcuma aromatic* Solisab.) through minisett technique and nursery management. Journal of Spices and Aromatic Crops. 2017; 26(1):47-50.
- Behera KK, Sahoo S, Prusti A. Relative Agronomic Performance of different *Dioscorea* species found in different part of Orissa. Nature and Science. 2009; 7(3):23-35.
- Ch'ng HY, Yang KKY, Othman SB. Influence of minisett size of purple yam (*Dioscorea alata* L.) towards the seedling emergence and growth rate in production of seed yam. International Journal of Applied Research. 2017; 3(4):367-370.
- Coursey DG. Yam on the account of the nature, origins, cultivation and utilization of the useful members of the discoreaceae, Longman, London, UK, 1967.
- Cyansa- Ameyaw CE, Hahn SK, Alarez MM, Doku EV. Determination of optimal sett size for white guinea yam (*Dioscorea rotundata* Poir.) seed yam production: Trends in sprouting in pre-sprout nursery and field performance. In: Tropical root crops in developing economy Ofori, F., Hahn, S.K. (eds.), proceeding of the 9th Symposium of the International Society of Tropical Root Crops, 1991, 20-26 October.
- Eyitayo OA, Anthony TO, Therasas I. Economics of seed yam production using minisett technique in Oyo state, Nigeria. Field Actions Science Reports. 2010; 4(2):1-5.
- George J, Nair SS, Sree Kumari MT. Rapid multiplication of quality planting material in tuber crops. Central Tuber Crops Research Institute, Sreekariyan, Kerala. 2004, 30-33.
- Hahn SK, Osiru DS, Akoroda MO, Otoo JA. Yam production and its future prospects. Out-look on Agriculture. 1987; 16(3):105-110.
- Horijono TE. Physiochemical and bioactive characteristics of purple yam and yellow water yam (*Dioscorea alata* L.) tuber. International Journal of Pharma Tech Research. 2013; 5(4):1691-1701.
- IITA. Yam improvement at IITA, Ibadan, 1993b.
- Jose A, Muhammed R. Extraction and evaluation of anthocyanin from *Dioscorea alata* L. for its application as a natural food colour. The International Journal of Science and Technologies. 2015; 3(9):41-47.
- Law-Ogbomo KE, Remison SU. Influence of minisett sizes on dry matter accumulation and fresh tuber yield of white Guinea yam (*Dioscorea rotundata*). Annals of Applied Biology. 2009; 155(2):201-206.
- Okoli OO, MC, Igbokwe. Rapid multiplication of yam by minisett technique. Research Bulletin 2, N.R.C.R.I., Umudike. 12 p, 1982.
- Okoli OO, Akoroda MO. Providing seed tubers for the production of food yams. African Journal of Root and Tuber crops. 1995; 1(1):1-6.
- Okonmah LU, Akparobi SO. Effect of seed yam weight on growth and tuber yield of white yam. Ghana Journal of Agricultural science. 2009; 42(1):1-2.
- Onwueme IC. Influence of the weight of planted tuber on the growth and performance of white yam (*D. rotundata* Poir.) plants. Nigeria Agricultural Journal. 1972; 19(1):170-173.
- Onwueme IC. The physiology of yams. In: Physiology of Tropical Field Crops, ed. P. Goldsworthy & N. Fisher. John Wiley & Sons, Chichester, 1984, 669.