International Journal of Agricultural Sciences ISSN: 2167-0447 Vol. 2 (3), pp.113- 115, March, 2012. Available online at www.internationalscholarsjournals.org © International Scholars Journals

Full Length Research Paper

Effect of germination media and seed size on germination and seedling vigour of fluted pumpkin (*Telferia occidentalis)* Hook. F

Ndor, E.[1]*, Dauda, N. S.[2], and Chammang, H.B.[3]

[1]Department of Crop Production Tech., College of Agriculture, Lafia. Nasarawa State, Nigeria.
[2]Department of Horticulture and Landscape Tech., College of Agriculture, Lafia. Nasarawa State, Nigeria.
[3]Department of Basic Science, College of Agriculture, Lafia. Nasarawa State, Nigeria.

Received December 18, 2011; March 22, 2012

A pot experiment was conducted in the green house at the college of Agriculture Lafia, located between lat.08.33N and long. 08.32E, to determine the effects of different germination media and seed sizes on germination and seedling vigour of fluted pumpkin (*Telferia occidentalis).* The treatments consisted of four (4) germination media (wood shaven, sawdust, river sand, and topsoil) and two seed sizes (small sizes: 20-24 cm and big sizes: 25-30 cm, diameter) forming eight treatments which were laid in a Completely Randomized Design (CRD) and replicated three times. The result showed that River sand has the shortest number of 10.17days to germination which is statistically the same with sawdust and topsoil that germinated at 10.67days and 10.67days respectively. However, wood shaven recorded a significantly longer period of 12.67days to germination. A significant difference was observed on the seed sizes, the smaller seeds germinated earlier (10.75 days) than the bigger seeds that germinated at 11.33 days latter. Sawdust significantly produced the best seedling vigour index of 340.37 which is statistically different from the other germination media. However, wood shaven produced seedlings with low vigour index of 162.18. On the other hand, the bigger seed statistically produced seedling of very high vigour index of 320.35 compare to the small seeds which produce seedling that have low vigour index of 301.38.

Key words: Germination, germination media, seed sizes, seedling vigour, fluted pumpkin.

INTRODUCTION

Telferia occidentalis also known as fluted pumpkin belong to the family of cucurbitaceae. The plant is unisexual, a strong climber with grayish fruits and edible seeds that are smooth and also have hard seed testa (schippers 2000). In Nigeria, *T. occidentalis* can be grown in all the agroecological zones, with the southeastern zone dominating the production of this plant (Ehiagbonare, 2008). The entire plant (seeds and leaves) have high nutritional values. The leaves can be used for preparation of vegetable soups and stews, the oil extracted from the seeds can be use for manufacture of cosmetics. While, the juice extracted from the leaves can be used by human and it is known to increase the heamoglobin levels of the human blood (Gills, 1992).

*Corresponding author. E-mail: ndors12@yahoo.com.

One of the most important criteria for successful germination is a reliable germination medium. The influence of the medium is felt even before the plant sprout, because of its water retention and aeration properties. Locally and readily available materials such as wood shaven, sawdust, rice hull, river sand, coconut fibre and mixture of these materials have been proven to be a good media for germination of many crops ((Ekwu and Mbah, 2003).

The seeds of *T. occidentalis* are the only known important propagation materials since the plant cannot be easily propagated vegetatively. However the seeds of this plant quickly loss their germination potentials especially when the seeds are poorly developed due to biochemical transformation that usually occurred in the seed at different moisture levels (Tairu and Bolounduro, 2006). The seeds of *T. occidentalis* are very delicate to handle because they do not undergo maturational drying and

Table 1. Effect of germination media and seed sizes on days to first germination, seedling height and number of leaves of *T. occidentalis.*

Treatments	Days to first germination	Seedling height (cm) @ 2WAS	Number of leaves @ 2 WAS
Germination media			
Wood shaven	12.67a	12.8b	8.05
Sawdust	10.67b	31.9a	9.33
River sand	10.17b	32.7a	9.00
Topsoil	10.67b	28.3a	8.33
LSD(0.05)	0.78	7.12	2.04
Seed sizes			
Big seeds	11.33a	29.8a	8.52
Small seeds	10.75b	26.6b	8.33
LSD(0.05)	0.55	2.33	1.42

WAS = Weeks after sowing. Means followed by the same letter within column are not significantly different at 5% probability level using F-LSD.

can not be dried without damage and also due to high moisture content of the seeds, it can not be stored for along period of time and still be viable (Tairu, 2003). However, Bradbeer (1992) recognized the use of seed sizes as a compensation for variation in environmental condition and the enhancement of the productive capacity in a plant. He also observed that large seeds were preferred by growers of *T. occidentalis*, since they germinate more vigorously and gave rise to large seedlings which may mean greater herbage yield.

T. occidentalis has attained an important status as a vegetable for all in Nigeria, but it has received a limited research attention by scientist. However most of the available research information relate to mostly on fruiting and seed production (Akoroda and Adejoro,1990), characteristics of sexes (Ajibade et al, 2006) as well as the nutritional values (Longe et al.,1983).There is limited information on the relationship between germination media and seed sizes on germination and vigour of *T. occidentalis.* The objective of this study is to identify the best germination medium and seed size of *T. occidentalis* that will germinate more vigorously and grow to give rise to a healthy plant.

MATERIALS AND METHODS

A pot experiment was conducted at the green house of college agriculture, Lafia , Nasarawa state, in the guinea savanna agroecological zone of north central Nigeria, located between lat.08.33N and long. 08.32E. The treatments consisted of four (4) germination media (wood shaven, sawdust, river sand and topsoil) and two seed sizes (small sizes: 20-24 cm and big sizes: 25-30 cm, diameter) forming eight treatments which were laid out in a completely randomized design (CRD) and replicated three times.24 plastics perforated buckets of 5 liters volume were filled with the various germinating media and the plastics buckets were watered sufficiently and allowed for 24 h to soaked the materials and also for the excess water to be drain out. A mature *T. occidentalis* fruit pod was obtained in lafia .the pod was split opened and the seeds extracted. A venier caliper was used to measure the sizes of the seeds into big seed (25-30cm) and small seeds (20-24cm). The seeds were sown into the different germination media in the plastic buckets.

The following parameters were assessed: days to first germination, seedling height, number of leaves, number of roots length of roots, seedling vigour was calculated using the formula as described by doijode (1997) (percentage germination multiply by seedling height.) The data collected were subjected to analysis of variance .The mean values were compared using Fishers- least significant difference (F- LSD) test at 5% level of probability.

RESULTS

From the result in Table 1, there was highly significant difference at 5% level of probability among the different germinating media on day's first germination and seedling height as seen in table 1. River sand has the shortest number of days (10.17 days) to germination and tallest seedling height of 32.7 cm, which is statistically the same with sawdust and topsoil that germinated at 10.67 days and 10.67days and also had the seedling height of 31.9 and 28.3 cm respectively. However, wood shaven recorded significantly more days (12.67 days) to germination and shortest seedling height of 12.8 cm. A significant difference was observed with the seed sizes; the smaller seeds germinated earlier (10.75 days), but recorded a shorter seedling height of 26.6 cm. However, the bigger seeds took more days (11.33 days) to germination, but grew significantly taller (29.8 cm) than the smaller seeds. There was no significant difference among the different germination media on the number of leaves, the same observation was recorded on seed sizes (Table 2).

There was a significant difference at 5% level of probability among the different germination media on number of roots and length of roots as shown on Table 2.

Table 2. Effects of germination media and seed sizes on number and length of roots of *T. occidentalis.*

Treatments	Number of roots (Per/seedling)	Length of roots (cm) (Per/seedling)
Germination media		
Wood shaven	18.87a	15.62a
Sawdust	13.50b	11.68b
River sand	17.67a	11.12b
Topsoil	13.50b	10.12b
LSD(0.05)	4.99	2.06
Seed sizes		
Big Seeds	16.55a	11.55b
Small Seeds	12.37b	12.77a
LSD(0.05)	0.67	0.89

Means followed by the same letter in each column are not significantly different at 5% probability level using F-LSD.

Table 3. Effects of germination media and seed sizes on the seedling vigour and stem girth of *T. occidentalis.*

Treatments	Seedling vigour	Stem girth (cm)
Germination media		
Wood shaven	162.18d	1.93
Sawdust	340.37a	1.98
River sand	332.56b	2.10
Topsoil	301.96c	1.87
LSD(0.05)	5.55	0.95
Seed sizes		
Big seed	320.35a	2.03
Small seed	301.38b	1.91
LSD(0.05)	1.45	0.86

Means followed by the same letter in each column are not significantly different at 5% probability level using F-LSD.

Wood shaven and River sand gave the highest number of 18.87 and 17.67 roots respectively and are statistically the same, both sawdust topsoil and river sand produced statistically same number of roots .Also, wood shaven significantly produced the longer roots of 15.62 cm which is statistically different from the other germination media. There was also a significant difference among the seed sizes on number of roots; the bigger seeds produced higher number of roots. A significant differences was also observed on the length of the roots produced, small size seeds significantly produced longer roots of 12.77 cm compared to the big seeds that produced shorter roots of 11.55 cm (Table 3).

There was a significant difference among the different germination media and various seed sizes on seedling vigour. Sawdust significantly produced the best seedling vigour index of 340.37 which is statistically different from the other germination media. However, wood shaven produced seedlings with low vigour index of 162.18. On the other hand, the bigger seed statistically produced seedling of very high vigour index of 320.35 compare to the small seeds which produce seedling that have low vigour index of 301.38.There was no significant difference among the different germination media and sizes of seeds on the stem girth. However, bigger seeds produced the best stem girth of 2.03 cm compare to the small seed that gave 1.91 cm.

DISCUSSION

The non significant difference observed with sawdust,

river sand and topsoil as compare to wood shaven which took more days to germinate could be that there is good seed - material contact and firmness, hence moisture availability to the seed, which was imbibed by the seed to trigger the germination. This agreed with work of Ekwu and Mbah (2003) who noted that materials like sawdust, river sand, rice hull, and their mixture allows seeds to sprout without forming a crust that will deter the seed from early sprouting. The earlier germination of the small seeds could be that the seeds required less moisture and nutrients to germinate. This is in agreement with findings of Pearson and Ison (1987), who stated that small seeds have small surface area and can, imbibed enough moisture at a short time and commenced the process of germination. The better seedling growth with sawdust, river sand, and topsoil could be as a result of the early germination recorded and the maintenance of continuous growth and vigour with these materials, during the period of observation. As the seed size increases there is more food reserved in cotyledon of the seed to sustain the seedling growth than the smaller seed sizes whose food reserved could be exhausted thus affecting the seedling growth and vigour. This also agreed with the work of Bradbeer (1992). The significantly higher number of roots and longer length of root obtained by wood shaven could be that there were enough macropores spaces within the germination media that allows roots growth, since there was no compaction of the media the will restrict the growth of roots. The more number of roots produced by the big seeds could be as a result of its radicles where roots can easily attach themselves, this tallied with the work of Tairu et al. (2007).

Conclusion

Sawdust proved to be the best germination medium compare to the other media used for this study and the bigger seeds also performed better than the smaller ones. Therefore, for optimum growth and vegetative yield of *T. occidentalis* sawdust should be used as germination medium, since it is readily available in sawmill as a waste product that has no commercial value.

REFERENCES

Ajibade SR, Balogun MD, Afolabi OD, Kupolati MD, (2006). Sex differences in Biochemical contents of *Telfairia occidentalis* Hook, F.*J. Food Agric. Evison:*4(1): 155-156.

Akoroda MO, Adetoro MA (1990). Pattern of Vegetative and sexual development of *Telfairia occidentalis* Hook, F. *J. trop. agric.* Trinidad. 67(3)243-248

Bradbeer LB (1992). *Vegetable Production and their Uses,* Africana Publication limited Lagos, Nigeria. Pp67-70

Diojode SD, (1997) Seed Quality and Seed Storage in Fruit for Short term Conservation of Germplasm in Mandarin, *J. trop. Agric.* 23(6): 156-164

Ehiagbonare JE (2008). Conservation Studies on Telferia occidentais. Hook, F. Indigenous plant used in ethnomedicinal treatment of anemia in Nigeria, *Afr. J. Agric. Res.* 3(1):74:77

Ekwu G, Mbah BN (2001). Effect of varying levels of fertilizer and some potting media on the growth and flowering response of Marigold, (Target erecta L). *Nig. J. Hort.* 5:105-109

Gill LS (1992). *Ethnomedical uses of plants in Nigeria,* Uniben Press, University of Benin, Benin City, Edo State, Nigeria. pp. 228-229.

Longe OG, Farinu GO, Fetuga BL (1983). Nutritive Value of fluted pumpkin (Telferia occidentais. Hook. F.). *J. Agric. Food Chem*. 31(5):989-992

Schippers RR. (2000*) African Indigene Vegetable*. An Overview of the cultivated species. Chatthan, U. K, NR/ACO. EU. Pp34-38

Tairu FM, Bolounduro A (2006). Influence of organo-fertilizer on yield and pod quality of fluted pumpkin (Telferia occidentais. Hook. F.) .NIHORT Ibadan, In- house review meeting

Tairu FM (2003).Studies and Pod characters and Quality of fluted pumpkin, (Telferia occidentais. Hook. F.). Proceeding of Hort. Society of Nigeria of the 21st Annual Conf. held at Lagos polytechnic , Ikorodu, Lagos.

Tairu FM, Adu AO, Adegbemile, C M (2007). Effects of Sowing Media and Depth on transplant quality of garden egg (Solanum gilo L).NIHORT Ibadan, In- house review meeting