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Effect of Seed Size and Position in Pod on the Early Seedling Growth of Fluted Pumpkin (*Telfaria occidentalis*) in Southwestern Nigeria

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ABSTRACT

Telfairia occidentalis is a vegetable crop that is widely cultivated in Nigeria diet for its nutritious and palatable leaves. This study was carried out between the period of 2011 and 2012 cropping season to investigated effect of seed size and seed position in pod on the early seedling growth of *Telfaria occidentalis* in South-western Nigeria. The pods were purchased from the market and were divided into three based on how the seed is being position in the pod (Top, Middle and Base). Seeds extracted from the pod were examined based on the physical properties. The seeds sizes were grouped into three sizes 9-14, 15-20 and 21-25 g. The results obtained show that using big size seeds and seeds positioned at top within the pod during the early seedling growth could enhance the proportion of seedling production in the early seedling production of *Telfairia occidentalis*.

Key words: *Telfaria occidentalis*, seed size, seed position, early seedling

INTRODUCTION

Fluted pumpkin (*Telfaria occidentalis* Hook) is a member of the Cucurbitaceae family. It is a native of West Africa and a perennial vine but cultivated as annual crops under the traditional farming system of West Africa. Fluted pumpkin is grown primarily for leaf which is popular for use in preparing assorted diet in many West African countries (Gill, 1988). The seeds can also be eaten whole, ground or fermented into "Ogiri" which serve as condiments for making soap and sauce. Asiegbu (1987) reported that the seeds contain about 30.1% oil and 47% protein. He also noted that the essential amino acid content compare favourably with those of other legumes such as groundnut and soyabean. Despite the importance of *Telfairia* in Nigerian diet, farmers are facing a lot of problems concerning its production on the field. Yield and quality of the leaves and seeds realized by farmers are usually lower than what is being reported under experimental conditions (Fashina *et al*., 2002). Seed size affects vigour, germination and seedling establishment. The viability varies from 63% for small seed (<11 g), up to 89% for seeds weighing up to 22 g. Germination takes about 14 days in natural soil, but only 7 days in a sawdust medium (Odiaka and Schippers, 2004). Due to the high productivity of the female plants, farmers prefer female to male. However, it has not been possible to separate seed into male and female that will

germinate into male or female plants. In fact, it is difficult to differentiate male plants from female plants before flower initiation in the crop. This has posed a serious problem and limitation to fluted pumpkin production. In their contribution, Ndukwu *et al.* (2005) reported that seeds that germinate to female plants are larger in size than those that germinate to male plants. It has been found that there are differences in seed quality of seeds born within a pod in some vegetables crops due to the stage of maturity which also resulted to differences in seed sizes within the pod. This study was, therefore, carried out to determine the interrelationship between the seed size and position in the pod on early seedling growth of *Telfairia occidentalis*.

MATERIALS AND METHODS

The investigation was carried out within the nursery of the National Horticultural Research Institute (NIHORT), Ibadan located in forest savannah zone of south-west Nigeria (Latitude 7°22'N, Longitude 3°50'E) between the period of 2011 and 2012 cropping season. *Telfairia occidentalis* seeds of various sizes were collected from pods purchased from the market. The pod were divided into three based on how the seed is being position in the pod (Top, Middle and Base). Seeds were extracted from the pod and were examined based on the physical properties. The seeds size were grouped into three sizes (9-14, 15-20 and 21-25 g) according to the way is being position in the pod. The seeds were sown directly into a tray filled with sawdust. The treatment are labeled as follow: T1-Top (9-14 g), T2-Top (15-20 g), T3-Top (21-25), T4-Middle (9-14), T5-Middle (15-20 g), T6-Middle (21-25), T7-Base (9-14 g), T8-Base (15-20 g), T9-Base (21-25 g). The nine treatment combinations fitted into a complete randomized design in three replication. The following data were collected; seedling emergence counts, vine length and number of leaf:

$$\text{Seedling emergence (\%)} = \frac{\text{No. of emerged seedling}}{\text{Total No. of seed sown}} \times 100$$

Data analysis: Data collected were subjected to analysis of variance according to the procedure outlined by Steel and Torrie (1980) for factorial experiments. Detection of differences between treatment means was carried out using the Fishers' LSD at 5% probability level.

RESULTS AND DISCUSSION

The mean effects of seed position and seed size on some agronomic features in *T. occidentalis* at 10, 12, 14 and 16 days after planting are given in the following tables.

The seed positioning and size of seed within the pod had significant effect on the seedling emergence, number of leaves and the vine length of ugu at the early seedling growth. Seeds from the top portion of the pod showed highest performances on seedling emergence (Table 1), vine length at first and second trail (Table 3) while at the first trial had the highest number of leaves and at the second trial had the lowest number of leaves (Table 2). The seed position at the middle produce the highest number of leaves (Table 2). Seeds obtained from the base portion of the pod recorded the lowest emergence percentage (Table 1) at the first and second trial. The leaves and vine length positioned at the base had the lowest value (Table 2 and 3). It, However, ranked second in the vine length at the second trial. Seeding emergence occurred at 10 days after sowing and seed position had influence on emergence,vine length and number of leaves. Schippers (2000) had reported that seed germination in *Telfairia* seeds occurs between 10-14 days after sowing. It will

Table 1: Effect of seed position in the pod on seedling emergence in the early seedling growth of *Telfaria occidentalis* at 10, 12, 14 and 16 DAS

	1st trial				2nd trial			
Seed position	10th	12th	14th	16th	10th	12th	14th	16th
Top	21.06	27.80	85.23	87.84	35.48	63.10	65.62	72.43
Middle	19.99	26.67	58.15	67.96	29.43	55.85	57.98	62.51
Base	16.24	19.94	37.82	56.11	37.25	50.67	53.78	59.23
L.S.D	9.24	9.90	11.10	11.19	8.23	2.06	2.74	2.60

Table 2: Effect of seed position in the pod on the No. of leaves in the early seedling growth of *Telfaria occidentalis* at 10, 12, 14 and 16 DAS

	1st trial				2nd trial			
Seed position	10th	12th	14th	16th	10th	12th	14th	16th
Top	3.00	3.22	4.67	5.70	3.89	5.00	7.00	7.78
Middle	2.22	2.44	4.67	5.11	3.11	4.00	7.00	8.33
Base	1.00	1.44	1.89	2.22	3.78	4.67	6.44	8.11
L.S.D	0.70	0.61	0.73	0.76	1.10	1.08	0.99	1.00

Table 3: Effect of seed position in the pod on vine length in the early seedling growth of *Telfaria occidentalis* at 10, 12, 14 and 16 DAS

	1st trial				2nd trial			
Seed position	10th	12th	14th	16th	10th	12th	14th	16th
Top	3.50	4.78	8.50	15.89	4.44	7.83	13.67	26.87
Middle	2.78	3.33	6.33	11.30	2.78	5.67	8.64	22.33
Base	0.72	1.63	2.74	6.43	5.00	8.17	14.50	25.44
L.S.D	0.86	1.08	1.71	2.04	2.61	2.51	3.32	3.87

Table 4: Effect of seed sizes on the seedling emergence in the early seedling growth of *Telfaria occidentalis* at 10, 12, 14 and 16 DAS

	1st trial				2nd trial			
Seed size	10th	12th	14th	16th	10th	12th	14th	16th
S_1	27.31	34.49	74.82	74.82	45.45	53.44	54.89	60.25
S_2	16.29	22.96	65.61	79.87	23.49	49.52	53.14	59.52
S_3	13.69	16.95	40.77	57.23	33.20	66.66	69.36	74.39
L.S.D	9.24	9.90	11.10	11.19	8.23	2.06	2.74	2.60

S_1: 9-14 g, S_2: 15-20 g, S_3: 21-25 g

also be noted that seeds used in the study were well matured irrespective of the size and position of the pod they were obtained. It was, however, to the findings of Agwu and Obiefuna (1987) that the tail portion produced more female plants than the head and middle portions.

Among the seed sizes the smallest seed size which ranges between 9 to 14 g had the longest vine length (Table 6) at the two trials and highest number of leaves at the second trial (10.78). The seed size S2 also had the highest emergence percentage (79.87%) though had the least emergence percentage (59.52%) at the second trial (Table 4). It, However, produced highest in the number of leaves at the first trial (5.00) and 6.67 were recorded the least number of leaves at the second trial (Table 5).

Table 5: Effect of seed size in the pod on the No. of leaves in the early seedling growth of *Telfaria occidentalis* at 10, 12, 14 and 16 DAS

	1st trial				2nd trial			
Seed size	10th	12th	14th	16th	10th	12th	14th	16th
S_1	2.56	2.67	3.78	4.44	6.00	7.44	9.00	10.78
S_2	2.11	2.56	4.11	5.00	2.22	3.22	5.56	6.67
S_3	1.56	1.89	3.33	3.59	2.56	3.00	5.89	6.78
L.S.D	0.69	0.61	0.73	0.76	1.10	1.08	0.99	1.00

S_1: 9-14 g, S_2: 15-20 g, S_3: 21-25 g

Table 6: Effect of seed size in the pod on vine length in the early seedling growth of *Telfaria occidentalis* at 10, 12, 14 and 16 DAS

	1st trial				2nd trial			
Seed size	10th	12th	14th	16th	10th	12th	14th	16th
S_1	2.56	3.56	7.41	13.44	7.61	12.22	16.50	31.98
S_2	2.11	4.39	6.44	11.98	2.28	4.50	10.50	21.11
S_3	1.56	1.80	3.72	8.20	2.33	4.94	9.81	21.56
L.S.D	0.86	1.08	1.71	2.04	2.61	2.51	3.32	3.87

S_1: 9-14 g, S_2: 15-20 g, S_3: 21-25 g

The biggest size (21-25 g) among the seeds was significantly higher than the other seeds sizes in the emergence percentage (74.39%) at the second trial (Table 4). It had the least value at the first trial in percentage of seedling emergence, number of leaves and the vine length, respectively. Seed size S2 recorded the best germination at the first trial while seed size S3 also had the best germination percentage over the period of sowing among the three different sizes. Odiaka and Schippers (2004) reported that the viability varies from 63% for small seed (<11 g), up to 89% for the 22 g and also seed size affects vigour, germination and seedling establishment.

CONCLUSION

The results obtained show that using big size seeds and seeds positioned at top within the pod during the early seedling growth could enhance the proportion of seedling production in the early seedling production of *Telfairia occidentalis*.

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