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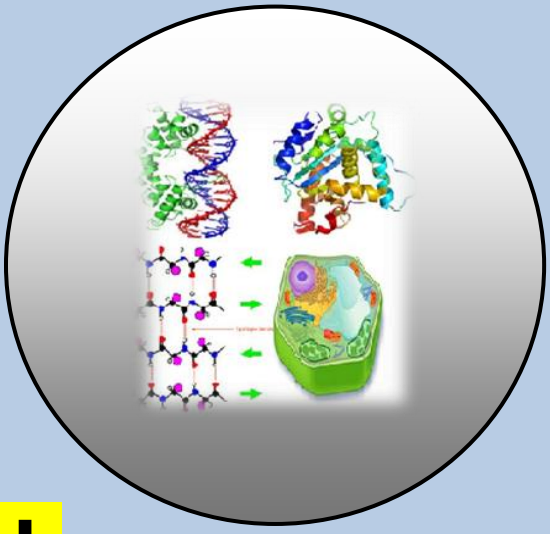

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RESEARCH PAPER

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Efficiency of Seed Treatments and Different Growth Media on the Germination of Seeds of *Xylopia aethiopica* (Dunal) A. Rich.

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ABSTRACT

Investigations were conducted on the efficiency of seed treatments and different growth media on the germination of seeds of tree spice Xylopia aethiopica obtained from the wild which show some degree of dormancy and thus make its germination impossible in the screen house of National Horticultural Research Institute, Ibadan, South Western Nigeria. The trial was laid out in a 4 x 7 factorial arranged in a randomized complete block design with three replications. The first factor was seed treatments (Seeds soaked in water for one day, two weeks, four weeks and direct sowing (control). The second factor was the growing medium (topsoil, cured poultry manure, sawdust, topsoil + cured poultry manure (1:1), topsoil + sawdust (1:1), cured poultry manure + sawdust (1:1) and topsoil + cured poultry manure + sawdust (1:1:1). Ten seeds were planted per pot. The results showed that the highest germination count was with seeds soaked in water for four weeks and the lowest with the control. Seeds soaked in water for four weeks emerged after two weeks of planting while the control emerged almost a month after planting. Seeds soaked in water for four weeks had the highest germination percentage of 80.9% and the least of 45.6% with the control. Regarding the effect of growth media on the emergence of seeds of X. aethiopica, the highest germination count was recorded when the growth media consisting of top soil + cured poultry manure+ sawdust was used, while the lowest stand count was obtained when sawdust alone was used. Furthermore, seeds planted on topsoil + cured poultry manure + sawdust emerged earlier than those planted on any of the other media. Seeds on sawdust alone took the longest time to germinate. However, seed treatment and growth media combined had significant effect on germination.

Highest percentage germination of 72.8% was recorded with the combination of topsoil + cured poultry manure + sawdust and the least germination of 30.3% with sawdust alone. Interaction between the seed treatments and the growing media was significant for stand count, days to seed emergence and percentage seed germination. An increase in production and availability of this wild indigenous species will only be possible when suitable production practices of its potentials are obtained through domestication.
Keywords: Domestication, Growing Media, Seed Treatment and Underutilized Spice.

INTRODUCTION

Forest tree species provide an array of medicinal, nutritional and industrial produce, which are of direct relevance to the well being of the people. The demands for some of these species are so intense that the natural process of regeneration and its attendant supplying regime cannot sustain the increase demand of its products; hence there is need for their artificial regeneration. In Nigeria*, Xylopia aethiopica*, family Annonaceae commonly called Eru (Yoruba), Uda (Ibo) and Kimba (Hausa) are found in the wild because they are not domesticated. It occurs mainly in evergreen forest, moist lowland forest, riverine and swamp forest. The species is widespread in tropical Africa, occurring in Senegal, Gambia, Guinea, Sierra Leone, Liberia, Cote D'voire, Togo, Nigeria, Principe, Zaire, Sudan, Uganda, Tanzania, Zambia, Mozambique and Angola with tall, evergreen and aromatic tree or shrub of 4.5- 30metres high. Folk medicinal uses include burning of open dried fruit without seeds, ground into powder and mixed with red palm oil as a treatment for coughs. A decoction of seven fruits of *X. aethiopica*, leaves of Alstonia boonei and Wissadula amplissima is used to bathe children as an anticonvulsant. A decoction of stem bark of Newbouldia leaves and fruit of *X. aethiopica* is drunk as a remedy for ammenorrhoea. A soup of ground fruits of *X. aethiopica*, *Piper guineense* and leaves of *Leptaspis cochleata* is taken as a remedy for dizziness. The fruits are often used as condiment in the Yoruba native decoction (Agbo).

According to Dalziel (1937), a fluid extract or a decoction of the fruit or bark, is useful in the treatment of bronchitis, and dysenteric conditions, and also as a medicine for biliousness. As a women's remedy it is taken to encourage fertility. A poultice of the leaves and fruit is applied as a cure for headache and neuralgia. The growth of most tree species begins with the germination of their seeds. Oni (1992) defined a seed as a fertilized ovule, essential to the survival of mankind. Seeds are crucial to the success or otherwise of both natural and artificial regeneration and often they carry genetic information, which are expressed in growing plants. The activation of metabolic machinery of the embryo leading to the emergence of a new seedling is referred to as germination (Hartmann e*t al*., 1990). Germination can be initiated in a seed if the seed is viable and appropriate environmental conditions provided. However, seeds of some species do not readily germinate even under favorable conditions until they have undergone a physical or physiological change. This state is called dormancy. This could result from unripe embryo mechanical resistance of testa, embryonic dormancy or other factors. Maideen *et al.,* 1990 reported that forest tree seeds almost always exhibit some degree of dormancy. Dormancy is a potent force of nature in correlating germination with the prevailing environmental conditions in the forest floor (Gbadamosi, 1995).

However, dormancy often results in delayed and irregular germination in the nursery or forest floors. In view of the aforementioned benefits derived from this medicinal plant necessitated the improve propagation of the crop by breaking the dormancy of the seeds to improve on its germination. Therefore, this study was carried out to determine the best treatment to hasten germination and growth media for growing the seeds of *X. aethiopica.*

MATERIAL AND METHODS

The trial was carried out in the screen house of National Horticultural Research Institute, Ibadan, Nigeria, the location lies $03^{o}35'$E, $07^{0}24$N, 168m above sea level in the rainforest transition zone of South western Nigeria. The first factor was seed treatments (Seeds soaked in water for one day, two weeks, four weeks and direct sowing (control). The second factor was the growing media (Topsoil, sawdust, cured poultry manure, topsoil + sawdust, topsoil+ cured poultry manure, cured poultry manure+ sawdust and topsoil+ cured poultry manure+ sawdust). The trial was laid using 4 x 7 factorial arranged in randomized complete block design, replicated three times. Ten seeds were planted per pot. Data collected includes stands count, days to seed emergence and percentage germination.

RESULTS

Seed germination

The effect of seed treatment on the germination of *X. aethiopica* is shown in Table 1.The commencement of germination and percentage germination varied with type of pretreatments and duration of treatment. Highest germination count was achieved with soaking in water for 4 weeks and the least with direct sowing into soil. Seeds planted directly into soil took the longest period to emerge (58days) while seeds soaked in water for 4 weeks germinated after two weeks (15 days) (Table 1).

Table 1. Effect of seed treatment on the germination of *Xylopia aethiopica.*

Treatment	Stand count	Days to emergence	Percentage germination
Direct sowing into soil(control)	3	58	45.6
Soaking in water overnight	3	32	52.3
Soaking in water for 2 wks	6	23	63.5
Soaking in water for 4 wks	9	15	80.9
LSD (0.05)	0.16	0.36	0.58

Growth Media

Table 2 shows the effect of growth media on the emergence of seeds of *Xylopia aethiopica*. Highest germination count was recorded in the media with topsoil + cured poultry manure + sawdust while the least was with sawdust alone. Similarly seeds planted on topsoil + cured poultry manure + sawdust emerged earlier than the other media. Seeds on sawdust alone germinated after 34 days being the longest days to seed emergence. The combination of topsoil, cured poultry manure and sawdust also gave the highest germination of 72.8%, followed by topsoil + cured poultry manure with germination of 60.2%. The least percentage germination was observed with sawdust alone (Table 2).

Table 2. Effect of growth media on the emergence of seeds of *Xylopia aethiopica.*

Media	Stand count	Days to emergence	Percentage germination
Topsoil (TS)	4	31	41.2
CPM	5	28	38.5
Sawdust (SD)	3	34	30.3
TS + CPM	5	29	50.6
TS + SD	4	28	35.2
CPM + SD	4	32	39.9
TS + CPM + SD	6	21	72.8
SD TRT X GM	*	*	*
LSD (0.05)	0.22	0.34	0.42

CPM= cured poultry manure, SD TRT= seed treatment, GM= Growing media.

DISCUSSION

The delay in germination of the seeds planted directly could be attributed to dormancy in the seeds resulting from its hard seed coat which curtail the appearance of the plumule of new seedlings for a long period of time. Gbadamosi *et al.* (2004) suggested treatment that will allow for the imbibitions of water for the production of seedlings (Table 1).

The highest germination recorded with topsoil+ cured poultry manure+ sawdust was in agreement with the findings of Miller(2002) and Adewale *et al.(*2009) who opined that good quality seedlings can be obtained from a variety of media that are well aerated and low in soluble salts, while the least percentage germination recorded with sawdust is also in agreement with the findings of Mason (2004) and Adewale *et al.*(2009) who suggested that a growth medium that lacks enough nutrients gives slow and uneven seedling growth. There was significant interaction in the seed treatments and growing media (Table 2).

CONCLUSION

The inference drawn from the studies showed that the soaking of seeds in water for four weeks and the use of topsoil+ cured poultry manure+ sawdust are effective in the germination of the seeds of *Xylopia aethiopica*.

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