

Effect Of Pre- Sowing Seed Treatment Of *Moringa oleifera* On Sandy Loam Soil

*¹Abdulrashid I., ¹R.B Mukhtar, ²H. Bilyaminu, ¹A. Abubakar, ³A. Auwal and ⁴M. S. Gude

1. Department of Forestry and Wildlife Management, Bayero University Kano, Nigeria

2. Department of Forestry and Wildlife Management, ADUSTH, Wudil

3. Department of Forestry and Wildlife Management, FUDMA

4. Department of Agronomy, Bayero University Kano

Email of correspondence: inuwaabdulrashid@gmail.com

Abstract

Sowing seed treatments have been reported to have influence on the germination percentage and growth performance, which could affect crop yield when transplanted to the field. Replacing chemically expensive and laborious pre-treatment with physically pre-treatment with physically pre-treated seed reduce the cost of producing moringa by resource poor farmers. Therefore a Nursery experiment was conducted at the Department of Agronomy, Bayero University Kano, to examined effect of three pre sowing seed treatment, dry seed with complete coat (DSCC), dry cracked seed with complete coat (DCSC), soaked seed with complete coat (SSCC,) soaked cracked seed coat, (SCSC), on the germination percentage and growth indicator of *moringa* plants. The treatment was replicated three time in a completely randomized design, the result indicated that DCSC had significantly higher ($P=0.05$) seed germination percentage; than SCSC and SSCC however the highest seed germination percentage was observed under DSCC. By 55.5%, 44.4%, 33.3%, and 88.9% respectively at 1 week after sowing (WAS). The experiment provides information about sowing seed treatment of *moringa oleifera* which could replace the chemically expensive and laborious sowing seed treatment technique for optimal *moringa* production. in term of germination. Percentage sowing seed treatment have no significant effect on *moringa* seed germination percentage, this indicate that the resource- poor farmers there is no need to treat *moringa* seed before sowing into sandy loam soil.

Introduction

Moringa oleifera is among the world's most useful plants. its grown throughout the tropics for human food, like stock forage, medicine, dye and water purification. It is known by names in different countries, but is popularly called the "drumstick tree" for its pod that are used by drummer and the "horse radish tree" for the floor of its roots, it is also one of the world's most nutritious crops. The leave of *Moringa* have more beta carotene than carrots, more protein than peas, more vitamin C than orange, more calcium than Milk, more potassium than banana, and more iron than spinach. Native to south Asia, it is a vital source of nutrition in this region, where most of the poor people live. The multiple uses of *Moringa* have attracted the attention of the researchers, development workers, and farmers, (Igbal et. al, 2006). *Moringaoleifera* belong to the monogenetic family of shrub and trees, Moringaceae. *Moringaoleifera*is cultivated throughout the Middle East and in most of the tropic belt. It was introduce in eastern Africa from India at beginning of the 20th century. *Moringaoleifera* is a medium – sized tree that reaches about 10m in height. It has straight traced about 10 – 30cm thick with bark that is whitish grey, carry with longitudinal cracks. It also has a tuberous tap root to tolerate hash conditions. The umbrella shaped tree comes with a loose crown of feathery foliage. The foliage is over green or decisions depending on the environment. Scented flowers arranged in drooping panicles. Flower are insect pollinated and required a large number of insect visitations, with bees the most common (Fuglie, 2001) Globally, agriculture play a key role on improving livelihood especially in rural communities. Crop production is the main stay of agriculture commodity. It provide up to 50% of the value of agricultural output globally and one third in developing countries (Delgado et. al, 1999). During the past 3 decades, rapid increase and development in the crop production sector has led to "Crop revolution" or "food revolution" due to rapid technology invasion in this sector, and especially crop improvement of crop industry. This increase in crop production has emerged to be more impressive – than animals production (Sanoncy, 1995) to meet the demand for nutritionally balanced food for the worlds increase population and relieve the intense pressure on land used and natural resources, plants spices used as food must be diversified, inclusion of a wide array of indigenous vegetable species in cereal, tubers and livestock – based agriculture will be crucial to contribute to food and nutritional security and diversification for stake holder in the subsistence farming system that predominate in the under developed and developing world, therefore, improving the genetic potential of vegetable like (*MoringaSpp*) is of paramount importance it has considerable area under cultivation in Africa and India with huge socio-economic potential. *Moringais* called Zogale in Hausa, English *Moringa* tree, ben oil tree, cabbage tree, clarifier tree, horse raddish tree west India ben in Ibgo (OkweOyrbo), Yoruba (Ew)The ultimate importance of nursery establishment is to produce *Moringa* seedling that when planted and managed will improve the living condition of the people in affected area through the provision of basic certain requirement and by



reserving the environment degradation, (Hajji, 2011).Nursery establishment as new technology introduce for former adaptation and subsequent seeding production in improving germination rate particularly in extreme northern Nigeria, however it is said to rate that people's knowledge about seed and their socio- economic benefic have found inadequate, the ultimate important of nursery establishment is to produce seedling that when planted and managed will improve the living condition of the people in affected areas .

Pre sowing seed treatment is the influence on germinate percentage and growth performance which could affect the crop yield when transplanted to the field ,Is the replacing the chemically expenses and laborious pre –treatment with physically pre-treated seed could reduce the cost of reducing *moringa* by resource poor farmers.

Seed treatment method : some of these crop are propagated by seed while some are vegetatively propagated most of these forage crop are perennials, that is why most of the paddocks generate every rainy season and most of the paddocks are maintained for over 70 days Back. The purpose of seed treatment is to break seed dormancy so as to improve seed germination and emergence, some method are hot water method, mechanical method, acid/chemical method, rhizobium inoculation. The seed are said to be dormant if it does not germinate after 15 days.Sandy loam is a types of soil used for gardening. The types of soil are made up of sand along with varying amount of soil and clay sand soil are used for gardening because the soil organic matters and moderating water retention.

Given high nutritive value of *Moringa* and its implication as important human food supplement, it become imperative that studies into the most ideal condition for its initial establishment in the nursery are carried out, such study will ensure high established rates of the seeds sown out, as the seed has also proven to be very difficult to acquire, high initial seedling establishment result in increased production levels, thus availing more *moringa* produce to those in need of it as a food source and also identify the most ideal seed priming method for optimum germination and initial seedling establishment and growth because seed priming increase germination percentage and initial seedling establishment.

Moringa is one of the vegetable plant with high nutritive value and it is produced in small quantity by local farmers in Nigeria therefore there is need to encourage the farmer to used specific seed treatment which help in faster germination rate and grow and harvest earlier.

Methodology

Experimental Site

The experiment was conducted in the nursery site, Department of Agronomy faculty of Agriculture, Bayero University, Kano, located within latitude 13^o53' N – 10^o 25' N and longitude 7^o 40'E – 10^o 53' E situated in Sudan savannah ecological zone of Nigeria (Olofin, 2007). The zone characterized by distinct dry and wet season the rainy season started in May/June and end in September/October. The dry season start from November to April with occurrence of hamattan in November to January. The ambient temperature range from 16.7^oC – 22 8^oC in the month of January to June and 23.9^oC to 26.7^oC in July to December (Anon, 2010) an Average month rainfall of 0 to 300mm recorded in January to June and 780mm to 1320mm in July to December (KNARDA, 2001). The relative humidity range between 40 to 50% (Olofin, 2007).

Experimental Design

The experiment was laid out in completely randomize design(CRD), the pre-sowing seed treatment are as followed (i) dry seed with complete coat (DSCC) (ii) dry cracked seed coat (DSC) seed coat was cracked using pliers before sowing (iii) soaked seed with complete coat (SSCC) – seed was soaked with water in a container for 24 hours prior to sowing. The seed sowing was done in poly-bag, (V) soaked cracked seed coat (SCC) seed were cracked using plier and soaked with water for 24 hours before sown. 2kg soil capacity, the treatment was replicated three times in a nursery. The sowing was done with the aid of a calibrated stick to ensure uniform sowing depth of 2cm for all treatment (Oshunsanya, et,al 2017).

Data Collection:

The data was collected for the following parameters:

Germination percentage, Plant height (cm); the height of the plant will be measured weekly from the ground level to the tip of terminated bud, with the aid of meter rule, and this will be carried out for 1,2,3,4,and 8 (WAS).

Stem girth: the stem girth was measured by tighten a thread round the Circumstance of the plants; meter rule was used to determine the length of the measured Circumstances from the thread. **Number of leaf:** the total number of the leaves was obtained by direct counting of the leaves.

Data Analysis

The data collected was subjected to analysis of variance using Genstat (2018) software version 11. The means were separated using Students Newman Keul Test (SNK).



Results and Discussion

Table 1. Effect of Pre-Sowing seed treatment on plant height (cm) of *Moringa oleifera*

Treatment	WEEKS AFTER SOWING							
	1	2	3	4	5	6	7	8
DSCC	14.00	28.50	34.80	42.50	45.40	49.10	59.40	53.00
DCSC	13.13	20.40	33.70	39.40	44.20	59.40	49.13	52.40
SSCC	8.83	20.70	29.60	30.60	43.30	48.50	48.47	50.70
SCSC	2.17	15.70	21.90	31.90	43.30	44.00	44.00	47.30
SED	1.69	5.72	3.91	5.39	4.29	7.41	8.06	5.28

SED= standard error differences. Means with the same letters are not significantly at 5% level of probability using Student Newman Keul. DSCC: Dry seed with complete coat, DCSC: Dry cracked seed with complete coat, SSCC: Soaked seed with complete coat, SCSC: Soaked cracked seed with complete coat

Table 2. Stem diameter (MM) of *Moringa oleifera* at BUK

Treatment	WEEKS AFTER SOWING							
	1	2	3	4	5	6	7	8
DSCC	1.13	1.03	1.27	1.33	1.77	2.43	2.53	2.73
DCSC	1.30	1.00	1.17	1.53	1.83	2.50	2.50	2.77
SSCC	1.17	1.00	1.17	1.367	1.90	2.00	2.17	2.30
SCSC	0.90	1.00	0.17	1.37	1.90	2.00	2.17	2.30
SED	0.22	0.21	0.14	0.14	0.23	0.98	0.31	0.23

SED= standard error differences. Means with the same letters are not significantly at 5% level of probability using Student Newman Keul. DSCC: Dry seed with complete coat, DCSC: Dry cracked seed with complete coat, SSCC: Soaked seed with complete coat, SCSC: Soaked cracked seed with complete coat

Table 3. Number of leaves of *Moringa oleifera*

Treatment	WEEKS AFTER SOWING							
	1	2	3	4	5	6	7	8
DSCC	11.33	24.33	50.33	50.33	97.30	139.70a	122.30a	147.00
DCSC	11.00	25.33	51.00	51.00	115.7	122.30ab	139.70ab	131.00
SSCC	6.00	17.67	21.00	21.00	104.30	67.30c	67.30c	104.70
SCSC	10.00	22.67	42.67	42.67	91.70	97.00bc	97.00bc	75.70
SED	1.72	4.61	11.11	8.90	23.33	13.21	13.21	13.50

SED= standard error differences. Means with the same letters are not significantly at 5% level of probability using Student Newman Keul. DSCC: Dry seed with complete coat, DCSC: Dry cracked seed with complete coat, SSCC: Soaked seed with complete coat, SCSC: Soaked cracked seed with complete coat.

Discussions

Germination percentage at first WAS

The seed germination percentage as affected by the various pre-sowing seed treatment as presented above, the germination percentage per treatment was significantly ($p < 0.05$) higher under DCSC (55.5%) then SCSC (44.4%) and SSCC (33.3%) however the highest seed germination percentage (88.9%) was observed under DSCC. This was in lined with finding of (Oshunsanya, 2015) who observed that the *moringa* seed without sowing treatment (DSCC) fastened the seed germination, this confirm that, in spite of the treatment, achieved high germination percentage. This result supports the claim that considers pre germination seed treatment unnecessary.

Effect of pre sowing seed treatment on plant height (cm) of *Moringa oleifera*

The result as presented in (Table 1) shows that there is no significant difference ($p > 0.05$) in term of plant height between the treatments in all the weeks. This finding indicates that sowing seed treatment do not have effect in plant height. Although, some scientific results show that soaking is an option for improving the *Moringa* seed germination, other reports consider it unnecessary (Padilla, C., Fraga, N. and Suarez, M. 2012).

Effect of pre sowing seed treatments on stem diameter (mm) of *Moringaoleifera*

The result as presented in (Table 2) showed that there is no significant differences ($p > 0.05$) in term of stem diameter between the treatment in all the weeks, this indicate that sowing treatment do not have effect on stem diameter. The non significance differences were attributed to the genetic constituent of the variety and



environmental condition. This finding indicate pre sowing treatment have no influence in stem diameter of the *moringa* plant Sogbo, (2006).

Effect of pre sowing seed treatment on leave number of *Moringa olifeira*

The significant differences was observed only in week 6 and 7 as presented in (Table 3.) in which at week 6 DSCC has the highest means value followed by DCSC then SSCC. The least mean value was observed in SCSC. But there were no statistical differences between DSCC and DCSC. At week 7 they have shown the same effect. This difference was attributed to managements such as pest attacked and may be attributed to the genetic makeup of the variety. This are in line with the finding of Raja (2013). That pre sowing treatment have influence in determining growth parameters (leaves numbers).

Conclusion

The experiment provides information about pre-sowing seed treatment of *moringa oleifera* which could replace the chemically expensive and laborious pre-sowing seed treatment technique for optimal *moringa* production in term of germination. Percentage pre-sowing seed treatment have no significant effect on *moringa* seed germination percentage, this indicate that the resource- poor farmers there is no need to treat *moringa* seed before sowing into sandy loan soil.

Recommendation

From the studies carried out, dry seed with complete coat which is control (DSCC) have proven to have significant effects on germination percentage of the *moringa* plants. Therefore in addition further research should be conducted to examine more about pre-sowing seed treatment

References

- Brawbaker J.L., Hedges, N., Jones , R.J. , Lowery J.B., Moog, F and Vandembeldth, R. 1985, Leucaena Forage production and the uses., NFTA, HAWAII, pp.39.
- Church world service, 2000, *moringaoleifera*. The miracle tree. church world services pp3.
- Delgado C. Rosegrant M. Steinfeld H, Ehi S. Courbois C. (1999). Livestock to 2020 the next food revolution food, agriculture and the environment discussion paper 28. IEPRI/FAO/ILRI.
- Foidl, N., Makkari, Hps and becker, k. 2001. The potential of *moringaoleifera* for agricultural and industrial uses. In (ED. Lowell J fuglie). The miracle tree. The multiple attribute of moringa: CTA . USA.
- Fugh L.J 1999. *Moringaoleifera* . the miracle tree. Church world services. Pp 1-5.
- Fungli L. J. (2000) new uses of moringa studied in Nieragua ECHO development note no 68, june 2000.
- Fungli L.J. (1999) The miracle tree *moringaoleifera* natural nutrition for tropics. Church world service Dakar.
- Fungli low J.ed (2001). The miracle tree: *moringaoleifera*: natural nutrition for tropic training manual ... church world service. Dakar, senagal. [www.moringatree.org/moringa/miracle tree May 2002](http://www.moringatree.org/moringa/miracle%20tree%20May%202002).
- Ghai, S.K, D.L.N. and Batra, L. 1985. Effect of salinity and alkalinity on seed germination of 333 three tree types sesbanias, nitrogen fixing tree species 3:10-12.
- Hansen; E.H and munns, D.N 1985. Screening of sesbania species for Nacl tolerance. Nitrogen fixing tree species. Report 3: 60-61.
- Hartwell, J.L 1967- 1971. Plant used against cancer, A survey. L loygodia 30-34.
- Igbalshahid, bhangar, M.I (2006) " Effect of season and production location on antioxidant activity of *moringaoleifera* leave grown in Pakistan " journal of food composition and analysis 19, (6-7): 544.
- Mahn, N., Dung, N. X and Khan, V.I 2003 biomass production of some legume in the area of think bien district, An Giang province. In proceedings of final national seminar workshop on sustainable livestock production on local feed resources.(editors : regpreston and brain ogle) HUAFSAREC, hue city 25- 28 march; 2003 . retrieved, from <http://www.meka.org/sarec03/manhhcanthod.htm>.
- Medina, M.G., Garcia, G. Claero, T.Y, Iglesia, J.M (2007), Estodio cooperation the *moringaoleifera* J lencaenalencecephala durable in germination J la elapaincial de crecementszootacma Trop 28:83.
- Mirchandani, T. and khan, A.R. 1953. Green manuring, Indian council of agricultural research review series no.6.
- Musa Aliyu (2019) Nursery growth and performance of erotic and local namely of *moringa* seeding, project 2015.
- OshunSanya, S.O Fagbaro, J.A Aliku, .O and Oke., O.A 2015) Nursery establishment of *moringaoleifera* as affected by presowing seed treatment in a conse texture soil. 3rd African organic conference.
- Price, M.L. 1985. The *moringa* tree. Echo tech. Notes reviewed, 2000 from email: Echo a echonet. Org: [website<http://www.echonet.org/>](http://www.echonet.org/)
- Ramachandran, C., Peter, K.V and Gopalakrisham, P.K 1980. Drumstick (*MoringaOleifera*): a multipurpose tree Indian vegetable. Economic Botany: 34 (3): 276-283.
- Sanoncy R. (1995). Livestock – a drawing force for food security and sustainable development. World animal review. F.A.O, rome. Available at <http://www.fao.org/docrep/v8180t/v8180t07.htm>.
- Verma, S.C., Banerji., R., Misra, G and Nigan, S.K 1976, nutritional value of *moringa* current sci. 45 (21) : 769-770.
- Wilson, G. 1992. *Moringaoleifera* (the kelor tree) . Agrovision publishing. Mans field, Queens land.

