

EFFECT OF DIFFERENT SEED TREATMENTS OF MAGARYA (*ZIZIPHUS MUARITIANA*.) AND SEEDLING MORPHOLOGICAL CHARACTERISTIC

* Yahya.Y.A¹, Sadiq M.S², Muhammad, I.R³

1. Department of Animal Husbandry Services, Federal Ministry of Agriculture and Rural Development, Area 11 Garki Abuja.
2. Department of Animal Science, Faculty of Agriculture, federal University, Kashere
3. Department of Animal Science, Faculty of Agriculture, Bayero University, Kano.

*Corresponding Author: e-mail: yakububgr@yahoo.com. 08030554258.

ABSTRACT

The study was conducted in the nursery unit of Faculty of Agriculture, Teaching and Research Farm, Bayero University, Kano. Completely randomized design was used to evaluate the effect of seed treatment on seedling propagation, four (4) different pre-planting seed treatments were used in a completely randomized design with twelve 12 replications per treatment, the objective of the study was determined the effect of seed treatment on its seedling propagation, the germination percentage of abrasion and acid scarified seed at 2 weeks were recorded as 100%, while Acid scarification, hot and cold water stratification were recorded as 60%. The result showed that abrasion method of seed treatment has a significant effect ($P < 0.05$) on plant height and leaf number. The result also revealed an increasing trend on plant height ($P < 0.05$) from week 3 to week 9. The effect of period on the number of leaf was significant ($P < 0.05$) only at week 9, while others were comparable. Plant Regression analysis result showed significant ($P < 0.01$) increase in height as described by equation $Y = 1.17 + 0.316x$. While leaf number tend to declined as described by the equation $Y = 1.17 - 0.09x$. The study is therefore important in making recommendations to improve *Ziziphus muaritiana* and other hard coated seeds propagation.

INTRODUCTION

Browse plants constitute a vital component in livestock productivity in the arid and semi-arid zones. They supply goats and camels with the bulk of their nutritive requirements and complement the diet of cattle and sheep with protein, vitamins and minerals in which bush straw is deficient during the dry season Paterson *et al.*, (1998). Several researches conducted using the shrubs and tree fodder to supplement either native grass or crop residues have shown positive responses with respect to the productivity of cattle, sheep and goat (Norton, 1998), as milk enhancers (Garba and Muhammad, 2008). The *Ziziphus* comprising of about 40 species distributed throughout the tropical and sub-tropical regions of the world Vikas *et al.*, (2018). Consequently, it is widely distributed and evergreen plant ; perhaps it could play an important role in fodder production. But lack of technical knowledge on how to improve propagation or germination for those species with hard fruit coat, present a major hindrance to farmers and nursery operators wishing to grow these species. The dormancy in seeds might be due to hard seed coat which resulted in impermeability to water and gases, physiological immaturity of embryo, deficiency/ excess of some endogenous growth promoters/inhibitors Vikas *et al.*, (2018). Methods of seed scarification like mechanical abrasion, water soaking and chemical treatments are used for breaking dormancy to improve seed germination. Soaking duration varies from overnight to 3 or 4 days depending on the nature of seed coat ,while scarification is the process of removing the hard seed coat by any means to accelerate the water absorption and improve gaseous exchange for hastening the process of germination. This can be achieved by mechanical scarification or by acid scarification Vikas *et al.*, (2018). Therefore, the objective of the study was determined the effect of seed treatment on its seedling propagation.

MATERIALS AND METHODS

Study area

The research was conducted at the Teaching and Research Farm of Bayero University, Kano. The farm is located in the new Campus of the University. Kano State lies on longitude 9° 30' and 12° 30' North and latitude 9° 30' and 8° 41' East. It is characterized by tropical wet and dry climate, Annual

rainfall and temperature ranges between 787 to 960 mm and 21°C to 39 °C respectively (KNARDA, 2001). The vegetation of Kano is the tropical type composed of a variety of trees (such as *Adansonia digitata*, *Tamarindus indica* and *Moringa oleifera*) scattered over an expanse of grassland (Ahmed, 1998). Commercial agricultural products include grain of pulses and cereals and varieties of ruminant and non-ruminant livestock species (Muhammad *et. al.*, 2008).

Experimental design

Ziziphus muaritiana (Magarya) seed was purchased from Kurmi market in Kano state Nigeria, potting mixture 3:2 sand to goat manure was used, then polythene bags were filled and wetted for seven days, before commencement of sowing the sown poly bags were watered every other day. four (4) different pre-planting seed treatments were compared in a completely randomized design with twelve 12 replications per treatment: Abrasion method of seed scarification was done using stones to crack the seed coat to extract the seeds to fasten germination and the seeds were sown immediately. Concentrated Sulphuric acid scarification was achieved by submerging the dehulled seed into a conical flask containing 20mls of 5% concentrated acid and stirred for 15 minutes and seed were removed and wash with water for four minutes and sown immediately. Soaking in Hot water at 80-100°C was used by allowing the water to boil before submerging the seed in the container until it cooled and sown immediately. Soaking in cold water over night stratification was achieved by allowing the submerged seed for 24 hours and sown immediately. Seedling assessment was carried out at fortnight intervals beginning from the 21 DAS (3 Week). Parameters assessed include: seedling height (using meter rule), numbers of leaves, were counted manually, record of day of emergence, plant height and number of leaves were taken fortnightly

RESULT AND DISCUSSION

Table 1 present the result showed that abrasion method of seed treatment has a significant effect ($P<0.05$) on plant height. Acid scarification, hot water and cold water stratification treatments are comparable ($P>0.05$). Also, number of leaf reveals significant ($P<0.05$) differences between treatments with abrasion method with higher leaf number. The result revealed an increasing trend on plant height ($P<0.05$) from week 3 to week 9. The effect of period on the number of leaf was significant ($P<0.05$) only at week 9, while others were comparable.

Table 1. Effect of seed treatment and growth period on plant height and leaf number

Seed treatment	HT (Cm)	Leave No.
Abrasion	17.46 ^a	10.13 ^a
Acid	13.76 ^b	7.5 ^b
Hot water	13.23 ^b	7.5 ^b
Cold water	11.23 ^b	5.67 ^c
Growth Period (Week).	—	—
3	6.1 ^d	6.26 ^b
5	11.65 ^c	7.39 ^b
7	16.89 ^b	6.07 ^b
9	21.63 ^a	11.01 ^a

Mean in the same column having different superscript(s) are significantly different $P<0.05$

Plant regression analysis

Table 2 present plant Regression analysis result showed significant ($P<0.01$) increase in height is described by equation $Y = 1.17 + 0.316x$. While leaf number tend to declined as described by the equation $Y = 1.17 - 0.09x$.

DISCUSSION

The early germination of acid scarified seeds over other treatments is probably due to water and gases entering the embryo earlier through the cracks and causing a series of enzymatic breakdown resulted in the transformation of the embryo into a seedling early enough than other seed treatments (Odunfa

1989). The difference observed in the germination percentage of seeds subjected to the different treatments implies a significant impact of the various pre-treatments on breaking the seed dormancy. The mechanical scarification had the highest speed of germination, which agrees with the report of Tomlinson *et al.*, (2000) that seed dormancy resulting from an impermeable seed coat may be overcome by peeling off the coat. The variations observed among the seedling growth characteristics such as plant height and number of leaves can be attributed to the effect of the treatments the seeds were subjected to. Seedlings with the highest plant height and number of leaves may be as a result of the early germination by the seedlings induced by the method of dormancy breakage despite the same soil condition provided. These parameters may be very useful in the promotion of rapid production of vigorous seedlings for nursery establishment or species for plantation establishment.

Table 2 Regression analysis on plant height and leaf number

Parameter	Estimate $\pm$ SE
Constant	1.17 $\pm$ 0.04
Height (Cm)	0.33 $\pm$ 0.03
Leaf No.	- 0.09 $\pm$ 0.06
R ²	0.76

CONCLUSIONS

Therefore, it's concluded that: Abrasive Scarification by crushing appears to be the best method for maximising germination resulted in the best germination percentage and emergence of *Ziziphus muaritiana*.

REFERENCES

- Ahmed, K. (1998). The Kano Physical Environment. Retrieved on 16/04/2019 from <http://www.kanostate.net/physical>
- Garba, Y. and Muhammad, I. R. (2008) Sabara (*Guiera senegalensis*) as browse and a potential milk enhancer in ruminants in the semi arid environment. Research Journal of Animal Sciences 2(4):123-127
- KNARDA, (2001). Kano Agricultural and Rural Development Authority Meteorological Station: Temperature Record Book and Management Unit 11: 1-3
- Muhammad I. R., Mohammed B., Mustapha, A., Ahmad M. Y. and Abdurrahman L. S. (2008). Use of legume in the improvement of ensiling quality Columbus Grass (*Sorghum alnum* Parodi) Research Journal of Animal Sciences., 2 (4) 109- 112. www.medwellonline.net
- Norton, B.W. (1998). The nutritive value of tree legumes. In: Gutteridge, R.C., Shelton, H.M. (Eds.), *Forage trees legumes in Tropical Agriculture*. Tropical Grassland Society of Australia Inc., St Lucia Queensland,
- Odunfa, S. A. (1989) Essentials of biology production Text production, Ibadan. pp. 133-137.
- Paterson, R.T., Karanja, G.M., Roothaert, R.L., Nyaata, O.Z. & Kariuki, I.W. (1998). A review of tree fodder production and utilization within smallholder agroforestry systems in Kenya. Agroforestry Systems 41, 181-199.
- Tomlinson H, Ng'andwe M, Nikiema A (2000). Field and *in vitro* methods of propagation of the African locust bean tree (*Parkia biglobosa* (Jacq)(Benth.). Journal of Horticultural Sciences and Biotechnology, (75): 42-49.
- Vikas S., Mukesh K., Vijay, S. S. and Pathak, D.V. (2018). Effect of Seed Scarification Treatments on Ber (*Ziziphus rotundifolia* Lamk.) Seedling Biomass. Retrieved on 17/01/2021 from <http://www.ijcmas.com> (7) 12