East African Scholars Journal of Agriculture and Life Sciences
Abbreviated Key Title: East African Scholars J Agri Life Sci
ISSN 2617-4472 (Print) | ISSN 2617-7277 (Online) |
Published By East African Scholars Publisher, Kenya

OPEN ACCESS

Volume-2 | Issue-1 | January-2019 |

Original Research Article

The role of Acacai nilotica trees age and geographical distribution on Seed polymorphism and productivity in Sunt forest – Khartoum state

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Abstract: Seeds poly morphism one of the factors that may affect the seedlings production and a forestation efforts accordingly and though the bulk seeds that produced by the trees, which define the availability of the seeds for regenerate. So the goal of this study to determine the effect of the environmental factors and tree age on seeds poly morphiism and tree seed production. Three geographical location were selected (North, west and south) and five dph diameter as age indicator (-40 cm, 41-60cm, 61-80cm, 81-100cm and above 101cm). The results showed that the diffeenrt factors do not affect the seeds size or tree production.

Keywords: Poly morphism, production, tree age, geographical location.

INTRODUCTION

Seed size is greatly affects the reproductive success of plants. It has been theoretically argued that germinability is associated with life history attributes such as seed size, seed dispersal syndrome and life form (Czarnecka & Władyka 2007; Bu et al. 2009 and Fagundes et al, 2013). Generally, it is assumed that smaller seeds germinate faster and present a competitive advantage in unpredictable habitats (e.g., early successional stages). Conversely, larger seeds germinate more slowly but present higher germination percentage. Therefore, larger seeds are favored in more predictable habitats (e.g., late successional stages) especially because they have more nutrient reserves (Fagundes et al, 2013). However, some studies also suggest the absence of a relationship between seed size and seed germinability. Seed size can also affect seedling performance in an ecological and historical context. In fact, larger seeds commonly produce more vigorous and resistant seedlings .However, the outcome of the interaction between seed size and seedling performance can be affected by microhabitat characteristics. Therefore, seed size may be part of synchronized sets of plant life history traits, which govern the distribution of new seedlings in space and time.(Fagundes et al , 2013). So the goal of this study to determine the effect of the environmental factors and tree age on seeds poly morphiism and tree seed production

MATERIALS AND METHODS

The study was conducted at the Khartoum Sunt forest which is located on the eastern bank of the White Nile within latitude 15 ˚ 34'N -15 ˚ 35'N, and longitude 32˚ 30'E – 32 ˚ 29'E, and occupies an area of about 459.5 feddans. The seeds samples were selected from three locations in the forest (North, South and West directions). Within each locations five categories of tree age were selected according to the diameter at breast height (DBH) as indicator of age (20-40, 41-60, 61-80, 81-100, 101 and above). In each category 3 trees were selected.

Analysis (ANOVA) was done by JMP package (Programm improved from SAS Package). The means compared done by Tucky- Kramer.

RESULTS AND DISSECTION

Seeds poly-morphism:

The results showed that neither the environmental factors nor the age of the trees affected the A. nilotica seeds mass (length and width)(tables 1,2

Quick Response Code

Journal homepage:
http://www.easpublisher.com/easjals/

Article History
Received: 14.12.2018
Accepted: 25.12.2018
Published: 12.01.2019

DOI: 10.36349/easjals.2019.v02i01.001

and 3). Although another study revealed that number of seeds per kilogram in the north direction was less than the other direction(Eltoum, 2016) so we assume that must be appears in the seed size. But it seems that it affect the mass rather than the shape. It is mean that the seeds in all direction have the same size but in the north direction they were lighter.

Table-1: Effect of direction on seeds length and width

Direction	Seed length /mm	Seeds width / mm
North	11.9 a	11.4 a
West	12.1 a	12.1 a
South	12.3 a	12.1 a
Mean	12.1	11.8
P	0.5	0.1
SE	0.2	0.2
CV	7	8

Table-2: Effect of tree age on seeds length

Tree age(Trunk diameter)	North seeds length / mm	West seeds length / mm	South seeds length / mm
20-40	11.5 a	11.9 a	12.1 a
41-60	14.5 a	12.1 a	11.7 a
61-80	12.4 a	12.2 a	12.3 a
81-100	11.7 a	11.9 a	13.3 a
101 ≤		12.4a	12.5a
Mean	8.9	12.1	9.9
P =	0.4	0.8	0.5
SE ±	2	0.4	0.6
CV =	34	5	8

Table-3: Effect of tree age on seeds width

Tree age(Trunk diameter)	North seeds width / mm	West seeds width / mm	South seeds width / mm
20-40	11.9 a	11.5 a	11.9 a
41-60	10.8 a	11.8 a	11.9 a
61-80	11.8 a	12.8 a	12 a
81-100	11.4 a	11.9 a	12.4 a
101 ≤		12.2 a	12 a
Mean	11.4	12.1	12.1
P =	0.4	0.5	0.9
SE ±	0.5	0.5	0.7
CV =	9	8	9

Tree Seeds productivity:

The location of the trees in the forest were not affected the seeds productivity (fig 1). There no significant between the production of the trees in north, west or south. The effect of tree age on seed production in various tree species have been studied by many researchers but there is no regular trend on tree age and seed production. For example,the seed production of Pinus pinaster and Pinus sylvestris increased steadily with tree age. Pinus echinata and Abies normandiana produced more quantitative and qualitative seeds during the mid-age period, respectively. Contrary, there were no significant differences on seed weight and viability among difference tree ages for Pinus pongence ,Pinus longaera and Cistus albidus(Missanjo et al, 2015).on the other hand Cone and seed production increased steadily with age or basal area at both the tree and stand level, with no evidence of declining seed production in trees older than 150 years. Using published seed:seedling ratios, we estimated that postfire recruitment will be limited by seed availability in stands for up to 50 years (on high-quality seedbeds) to 150 years (low-quality seedbeds) after fire. By quantifying these age and seed productivity relationships, we can improve our ability to predict the sensitivity of conifer seed production to a range of disturbance frequencies and thus anticipate changes in boreal forest resilience to altered fire regime.(Viglas et al, 2011). But there no significant differences in the seed productivity between the different trees (fig 1).

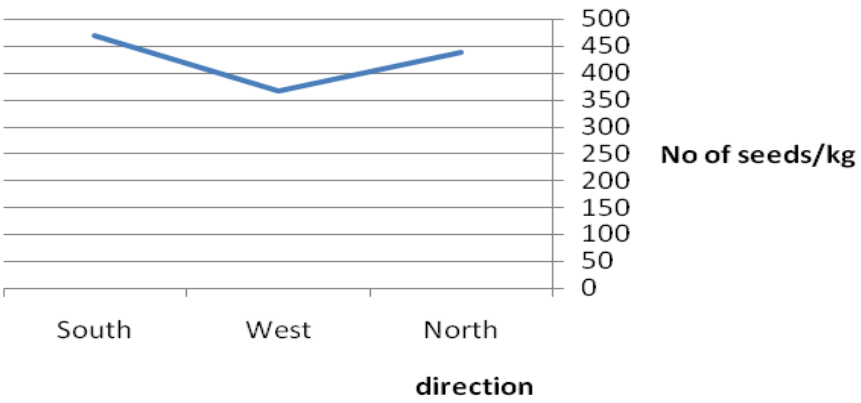

Fig-1: Effect of direction on tree seed productivity

CONCLUSION

The environmental factors correlated with the location of the A. nilotica trees inside the forest do not produce polymorphic seeds and so the age of the trees. The tree seed productions also do not affected by the mentioned factors.

ACKNOWLEDGMENTS

This work was funded by Forestry and gum Arabic Research Centre –Soba.

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