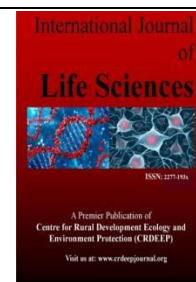


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Full Length Research Paper

Growth Responses of Nodal Cutting of *Jatropha tanjorensis* to Plant Growth Regulator Treatments

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ARTICLE INFORMATION	ABSTRACT
<p>Corresponding Author: Haruna Sani</p>	<p><i>Jatropha tanjorensis</i> is an herbaceous taxon belonging to euphorbiaceae family. The leaves are consumed as vegetables and source of medicine in the treatment of anaemia and malaria fever. The study was conducted in the department of biology Federal College of Education Kontagora, Niger State, Nigeria. The study investigated the effects of growth regulators on the cuttings of <i>Jatropha tanjorensis</i>. The treatments comprise gibberelic acid GA₃ 0.1g/ml, Naphthalene acetic acid NAA 0.5g/ml and Benzylaminopurine BAP 0.1g/ml and control. The cutting of <i>Jatropha tanjorensis</i> shoots was done from household gardens in Kontagora Niger, Nigeria. The experiment was set up in Completely Randomized Design (CRD). Foliar sprayed with different hormone concentrations of BAP, NAA and GA₃ and the control. Mean values evaluated on the effects of growth hormones on <i>Jatropha tanjorensis</i> cuttings showed that the GA₃ treated cutting had the highest number of leaves and stem elongations. The results showed that GA₃ had effect on stem elongations of the plant. Also, highest mean lengths stems and mean lengths of leaves were recorded in cuttings applied with GA₃. Highest widths of leaves were recorded in the control and cuttings treated by BAP respectively. The better performance of the untreated cuttings over hormone treated showed that the growth behavior of <i>Jatropha tanjorensis</i> can be achieved without the use of growth hormones. However, the control and the treated cuttings can be used as good propagating material for commercial production</p>
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<p>Key words: <i>Jatropha tanjorensis</i>, Growth Regulators, Medicine and cuttings</p>	

Introduction

Jatropha tanjorensis is an herbaceous taxon belonging to euphorbiaceae family commonly called hospital to far or catholic vegetable (Idu, 2009) The leaves are consumed as vegetables, and medicine in the treatment of anaemia and malaria fever (Omeregie, 2011) The taxon does not produce seeds and have been exploited for medicinal uses without any conversation strategies. Moreover, plant hormones have many practical uses, growers spray plants to promote growth. The destruction of natural ecosystems as a result of excessive bush burning, shifting cultivation and overgrazing is having widespread effects upon many woody plant species and thereby limiting their distributions. The negative effects on plants distribution have been largely due to the promotion of desert conditions which tends to erode many genetic biodiversity In addition, over exploitation, hostile environmental factors, habitat disturbances and reproductive failure threaten the survival and render plant species vulnerable to complete extinction (Rathore; Shekhawat; Kaur; Singh and Shekhawat, 2012).Biotechnological tools have several benefits with continuous supply of material from the elite lines. These can make significant contributions to the

exploitation of therapeutic properties of plants species and eliminate the need for harvest from the wild (Rathore, et al., 2016). This research will fill up some gaps in the existing literatures so that plant biotechnology together with conventional breeding methods could facilitate *Jatropha* improvement. Plant regulators are known to control plants physiological and biological processes. These includes control of dormancy, organ size, crop development flowering, fruit set, regulations of chemical composition of plants and mineral uptakes form the soil (Nickell, 1978). Plants growth regulators (PGR_s) play an essential role in determining the development pathway of plant cells tissues (Hussaini, Quarshi, Nasir and Illah, 2012) Plant regeneration is integral part of most plant transformation protocol. *J. tanjorensis* is medicinal plants regeneration is very important when the mass cultivation is taken into consideration. Delgad (2006) stated that culture of *Jatropha* will be important tool because of conservation of germplasm. The study on *J. tanjorensis* will be of great significance to pharmaceutical industries, botanist, agronomist, plant biotechnologists, engineers and horticulturists. The results could be helpful for developing

nurseries for commercial purposes and for sustainable prioritization, management and improved domestication of the plants. The study established a viable protocol on growth responses of cuttings of *Jatropha tanjorensis* to plant growth regulators.

Materials and methods

Study area

The study area was department of biology Federal College of Education Kontagora, Niger State, Nigeria. The area has two distinct seasons; wet and dry seasons. The wet season starts from April to October with the heaviest rainfall in August. The dry season lasts for 5-6 months starting November to March. The mean relative humidity is about 95% in August and 54% from December to February. The mean minimum temperature is about 30^oc to 35^oc and the mean annual rainfall varies from 1000 to 1,600mm (Ibrahim, Auta, and Balogun, 2009).

Plant collection

The cutting of *Jatropha tanjorensis* shoots was done from household gardens in Kontagora Niger state, Nigeria. Authenticated by botanist in the department of biology, Federal College of Education Kontagora, Niger state, Nigeria.

Experiment

The cuttings of grown *Jatropha tanjorensis* were harvested and grown into plastic rubbers contains loamy soils in the department of biology Federal College of Education Kontagora, Niger state, Nigeria. The experiment was set up in Completely Randomized Design (CRD). Each experiment was in four (4) replicates and were foliar sprayed with BAP, NAA, GA₃ and the control. According to the method of Adekpolo and Akpan (2012). The experiment was conducted for 10 weeks and number of leaves counted, lengths and widths of leaves were also measured, lengths of petioles and stems, measured, percentage survival of the cuttings and number of roots and lengths were counted and measured.

Results

Table1: Effect of Application of Growth Hormones on *Jatropha tanjorensis* at 2 weeks of planting.

Treatment	Numbers of leaves	Mean lengths(cm) of leaves	Mean lengths(cm) of petioles	Mean width(cm) of leaves
Control	13	4.8	3	4
GA ₃	16	3.2	3.3	4
BAP 0.1g/ml	7	7	2	4.2
NAA 0.5g/ml	-	-	-	-

Table 2: Effect of the growth Hormones on *Jatropha tanjorensis* at 4 weeks of planting

Treatment	Numbers of leaves	Mean lengths(cm) of leaves	Mean lengths(cm) of petioles	Mean width (cm) of leaves
Control	12	12.2	7.1	27.3
GA ₃	16	11.4	9.9	12.3
BAP 0.1g/ml	6	13.3	6.6	13.7
NAA 0.5g/ml	-	-	-	-

Table3: Effects of Growth Hormones on *Jatropha Tanjorensis* at 6 weeks of Planting

Treatment	Numbers of leaves	Mean number of shoots	Mean lengths (cm) of stems	Mean length(cm) of petioles	Mean length(cm) of leaves	Mean width(cm) of leaves
Control	16	3	6.8	2.8	4.3	5.4
GA ₃	12	4	17.5	1.7	14.8	3.4
BAP 0.1g/ml	15	5	3.6	2.1	3.0	3.5
NAA 0.5g/ml	-	-	-	-	-	-

Table 4: Percentage Survival at 4 Weeks of Planting

Treatment	Percentage
Control	1(1%)
GA ₃	3(100%)
BAP	3(100%)
NAA	0(0%)

Table 5: Mean Number of Roots and Roots Length at 10 weeks

Treatments	No. of roots	Root length
BAP 0.1g/ml	7	72
GA ₃	9	47
Control	4	58
Total	20	177

Discussion

Mean values evaluated on the effects of Growth hormones on *Jatropha tanjorensis* stem cuttings are presented one table 1 and 2. The control (untreated) and the GA₃ had the highest number of leaves while the least number is recorded on cuttings treated with BAP and NAA. The highest Average length of the leaves and width were also recorded in the control parameters. The better performance of the untreated cuttings over hormone treated showed that the growth behavior of *Jatropha tanjorensis* can be achieved without the use of growth hormones. The elongation of GA₃ treated cuttings showed that GA₃ has significance effect on stem elongations of the plant (Tables1). Also highest mean lengths stems and mean lengths of leaves were recorded in cuttings applied with GA₃. But highest widths of leaves were recorded in the control and cuttings treated by BAP 5.4cm and 3.5cm respectively. The cutting treated by NAA were all dead during the experiment (Table 2). Table 4 shows the survival percentage higher in GA₃ and BAP treated cuttings. Control (untreated) cutting only a cutting survived. The result also revealed that GA₃ Treated cuttings had highest number of roots 9(45%) then BAP and control treatments had 7(35%) and 4(32%) respectively. More so in the roots length BAP treated cuttings had highest mean of root lengths 72(41%) while control and GA₃ had 58(32%) and 47(27%). Therefore, BAP have significance effect on root elongation on the *J. tanjorensis* compared with the GA₃ and control (table 5).

Conclusion

The rest revealed that there were differences in stem elongation, widths and lengths of leaves of GA₃ treated cuttings compared to control and BAP treated cuttings. Higher percentage of survival in GA₃ and NAA treated cuttings was observed and the control had deeper roots. However, the control and the treated cuttings can be used as good propagating material for commercial production

References

- Adekola, O.F. & Apkan, I.G. (2012). Effects Of Growth Hormones on Sprouting And Rooting Of *Jatropha Curcas* Cuttings. *Journal of Applied Science and Environmental Management* 16(1)165-168
- Delgad, B. (2008). Phylogenetic Significance of Inter-Specific Hybridization in *Jatropha* (Euphorbiaceae) *Systematic Botany* 9(4): 467-478
- Hussain, A., Qarshi, A., Nazir, H. & Ullah, (2012). *Plant Tissue: Current Status and Opportunities*. Qarshi Industries (PVT) Ltd. Hatar Pakistan Pp1-21
- Ibrahim, B.U., Auta, J. & Balogun, J.K. (2009). An Assessment of The Physico-Chemical Parameters Of kontagora Reservoir, Niger State, Nigeria. *Bayero Journal of Pure And Applied Sciences*, 2(1): 64 - 69
- Idu, M., Erhabor, O.J. & Uro, O.O. (2014). Ethno medicinal Plants Used by the Idoma People Benue State, Nigeria. *American Journal of Ethno Medicine* 1(1): 72-88.
- Omiegie, S.M, I. & Agoreyo, F.O. (2014). The Effect of *J. tanjorensis* on Blood Electrolyte Concentrations of Albino Wistar Rats. *Nigerian Journal of Pharmaceutical and Applied Science Research* 1:50-53

- Omeregic, E.S & Sosiia, B.S. (2011). *In vitro* Antiplasmodial Activity and Cytotoxicity of Leaves Extracts of *J. tanjorensis*. *Pharmacology online* 2:656-673
- Rai, R. (2007) *Genetics and Breeding*. New Delhi.
- Rathore, M. S., Mastan, S. G. Yadav, P. Bhatt, V.D. Shekhawat, N.S. & Chikarara, J. (2016) Shoot Regeneration From Leaf Explants of *Withania Coagulans*. *South African Journal of Botany* 102;727-747.
- Rathore, M.S. Kaur, G, Singh, B.P. & Shekhawat, N.S. (2012). Micropropagation Of Vegetable Runner *Withania Coagulans*. *Journal of Sustainable Forestry* 31:727-747