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Study the Seed Germination and Seedling Survival of *Anogeissus pendula* through Pot Culture Experiments

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Abstract

The inorganic materials obtained from soil which are used as raw material for synthesis of different structural and functional substances by plants are called mineral nutrients. Growth and development of plants are also influenced by environmental factors, namely water, temperature, light and soil properties. In the present investigation, work on the pot culture experiments of *Anogeissus pendula* Edgew. has been done. The purpose of the present work is to study special growing conditions of *A. pendula* in pots.

Keywords: Inorganic materials, mineral nutrients, environmental factors, temperature etc.

Introduction

Some of the mineral nutrients are essential for plant growth, others are toxic and some absorbed by plants may play no role in metabolism. The various essential elements perform many important functions in the plant, some have role in osmotic phenomenon, some are also fundamental constituents of metabolic products and others may act catalytically in the regulation of certain biochemical processes within the cell. There is a very long list of mineral nutrients. Out of the list of mineral nutrients, intensive work has been done on nitrogen, phosphorus and potassium. Growth and development of plants are also influenced by environmental factors, namely water, temperature, light and soil properties. Soil moisture affects plant growth and metabolism. For the vital activities of plant an adequate supply of water in soil is essential.

Materials and Methods

Pot culture experiments were carried out for *Anogeissus pendula* Edgew. The seeds were sown in the earthen pots of 18 cm x 20 cm size, filled with four kg of soil consisting of garden soil, farmyard manure and river sand in 4:3:3 ratios. The following treatments were given:

- The seeds were sown at different depths 0.0, 0.5, 1.0, 3.0 and 5.0 cm.
- Pots were irrigated at intervals of 24, 48 and 72 hrs and water logged condition.
- Soil was amended with inorganic nutrients, namely NPK in the ratio of 0.1%, 0.5% and 1.0% per kg.

For each treatment three replicates were used. A set of pots, without any inorganic nutrient additives served as control. Irrigation was done after two days. Seed germination percentage was recorded for 20 days regularly. After a period of sixty days the data regarding seedling growth and seedling survival was recorded and statistically analysed.

Table 1: Showing the effect of irrigation intervals on seed germination (%), seedling survival (%) and biomass (g/plant) in *Anogeissus pendula* Edgew.

Growth Parameters	Interval (Hrs)				F Ratio
	24	48	72	Water logged	
Seed germination %	13.33	18.33	10.00	0.0	32.85*
Seedling survival %	87.50	100	83.33	0.0	70.12*
Biomass g/plant	15.54	20.88	17.40	0.0	483.31*

Table 2: Showing the effect of different depths on seed germination (%), seedling survival (%) and biomass (g/plant) in *Anogeissus pendula* Edgew.

Growth Parameters	Depth (cm)					F Ratio
	0.0	0.5	1.0	3.0	5.0	
Seed germination %	0.0	11.67	20.00	08.33	0.0	76.97*
Seedling survival %	0.0	85.71	91.67	80.00	0.0	88.20*
Biomass g/plant	0.0	13.45	19.54	11.88	0.0	517.43*

Table 3: Showing the effect of NPK on seed germination (%), seedling survival (%), and biomass (g/plant) in *Anogeissus pendula* Edgew.

Growth Parameters	Control	Concentrations (%)			F Ratio
		0.1%	0.5%	1.0%	
Seed germination %	15.00	16.67	20.00	20.00	1.26 NS
Seedling survival %	88.89	90.00	91.67	100	0.38NS
Biomass g/plant	15.34	16.05	18.99	20.14	63.80*

NS=Not significant, *=Significant

Results and Observations

- i). **Effect of Irrigation Interval:** Data on the effect of different irrigation intervals on seed germination, seedling survival and biomass are recorded in Table 1. 48 hrs irrigation interval was considered as control. Data showed that 48 hrs irrigation interval was the best in comparison to other irrigation intervals for seed germination percentage, seedling survival percentage and biomass. All these three parameters were nil in water-logged condition and increased up to 48 hrs, after that these decreases. Results were found to be significant when statistically analysed.
- ii). **Effect of Sowing Depth:** The observations were recorded in Table 2. Seeds spread on surface of soil were considered as control. Data showed that at 1.0 cm depth was the best in comparison to other sowing depth for seed germination percentage, seedling survival percentage and biomass. All these three parameters were nil in 0 cm depth and increased up to 1.0 cm depth, after that these decreases. Results were found to be significant when statistically analysed.
- iii). **Effect of NPK:** Among different concentrations (0.1%, 0.5% and 1.0%) of NPK in soil, maximum seed germination (20%) occurred at 1.0% and 0.5%. and maximum seedling survival (100%) occurred at 1.0%. Biomass was maximum (20.14 g/plant) at 1.0% concentration of NPK. Higher concentrations favoured seed germination percentage, seedling survival and biomass. Seed germination and seedling survival results were not significant whereas seedling biomass results were significant. (Table 3)

Discussion

Tripathi and Bajpai (1985) ^[5] tested the seeds of *Anogeissus pendula* to study the effect of the depth of sowing on germination. They observed that percentage germination increased as the depth of sowing increased from 5.0mm to 10mm and also enhanced the completion period of germination. Showing depth of 10 mm was found to have better germination. Similar findings were obtained in present study. Olajide *et al.* (2014) ^[3] investigated the effectiveness of three water regimes on growth performance of seedlings of *Dialium guineense*. They concluded that seedlings watered once every three days showed the highest seedling growth. According to Kumar (2014) ^[2] 48 hrs irrigation interval is the best for seed germination, seedling survival and biomass of *Calligonum polygonoides*. Similar results were obtained in the present study.

Isaiah (2013) ^[1] studied the effects of inorganic fertilizers on the growth of *Moringa oleifera*. He concluded that highest fertilizer rate of 120 kg N:P:K/ha produced the highest vegetative growth of experimental plant. Devi *et al.* (2003) found similar results for *Manilkara achras*. Similar results were also found in present study.

References

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