About the Conference
The 5th Annual Conference of Postgraduate Studies and Scientific Research is organized by the Graduate College with the Faculties of Agriculture, Veterinary Medicine, Animal Production and Forestry and Institute of Desertification and Desert Cultivation Studies and Institute for Studies and Promotion of Animal Exports.

Objective
To present recent research pertaining to sustainable development of natural resources.

Dates and Venues
24-27 February 2014
Friendship Hall: Opening and closing sessions
Shambat Campus: Scientific sessions

Themes
1. Crop production, protection and Breeding
2. Tropical animal health and production
3. Food technology, safety and quality control
4. Sustainable management of natural resources (forests, wildlife, water and soil)
5. Combating desertification
6. Biotechnology in animal and plant production
7. Agriculture and livestock economics
8. Extension and rural development
9. Impact of climate change on livestock and plant production

Important dates
Last date to submit abstracts: 30/06/2013
Notification of acceptance of abstracts: 01/08/2013
Last date to submit full text: 01/11/2013

Language
English or Arabic

Conference Chair
Prof. Mohamed M. Ahmed Elnur

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Regeneration and Growth of *Acacia senegal* (L.) Wild. Seedlings in the Nursery as Affected by Tree Manures and NPK Fertilizer

By

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Contents

- Introduction and Objectives
- Materials and Methods
- Results
- Conclusions
Introduction
Trees and forests produce huge amounts of biomass, both in above- and underground parts of their growing space (Biogeochemical cycle).

Mineral content
(Kg/ha):
138471 Dry matter
610 N
53 P
383 K
542 Ca
76 Mg
Biomass input to soils and crops can be done naturally as litter (Agroforestry) or effectuated by human beings through pruning, trimming, pollarding and felling...etc.

Mineral content (kg/ha):
8015 Dry matter
89 N
4 P
32 K
132 Ca
28 Mg
The objectives

- Characterize tree foliage manures of *Albizia lebbeck*, *Azadirachta indica* and *Khaya senegalensis*;

- Assess the effects of the selected tree manures on growth of *Acacia senegal* seedlings in nursery mixtures with a clay soil and in comparison with NPK fertilizer;

- Screen the appropriate tree manures and the adequate doses suitable for good nursery stock raising.
Materials and Methods
The study was conducted in the nursery of the Faculty of Forestry, University of Khartoum, Shambat; during August 2008 and January 2009. Experimentation: Albizia lebbeck, Azadirachta indica and Khaya senegalensis manure powder (Ground dry leaves) plus NPK fertilizer mixed with clay soil and applied to A. senegal seedlings raised polythene bags. The designated treatments were:

1/ Control: without any addition;
2/ NPK: with addition of 6 g per month per bag (30 g in 5 months);
3/ AL1: with addition of 25 g of ground A. lebbeck foliage powder;
4/ AL2: with addition of 50 g of ground A. lebbeck foliage powder;
5/ AL3: with addition of 75 g of ground A. lebbeck foliage powder;
6/ AZ1: with addition of 25 g of ground A. indica foliage powder;
7/ AZ2: with addition of 50 g of ground A. indica foliage powder;
8/ AZ3: with addition of 75 g of ground A. indica foliage powder;
9/ KH1: with addition of 25 g of ground k. senegalensis foliage powder;
10/ KH2: with addition of 50 g of ground k. senegalensis foliage powder;
11/ KH3: with addition of 75 g of ground k. senegalensis foliage powder.
Parameters measured:

- Seed germination;
- Seedlings’ shoot height, root length, diameter and biomass.

Laboratory determinations included physicochemical characterization of soil and tree manures.

Statistical analysis:

- Graphical preparation of data was done by Excel worksheet;
Results

Soil characterization:

The soil used has the following properties:

- Sandy clay texture (45.7% clay and 43.2% sand);
- Neutral pH (7.5);
- Slightly saline, $E_{ce} = 5.0$ dS/m;
- Moderately sodic, $SAR = 7.5$;
- High content of $Ca + Mg$ (24 mmol+/l);
- Low organic carbon, nitrogen and phosphorus with values of 1.7%, 0.01% and 4.6 mg/l, respectively.
Characterization of tree manures used

<table>
<thead>
<tr>
<th>Tree species</th>
<th>OC (%)</th>
<th>OM (%)</th>
<th>Protein (%)</th>
<th>N (%)</th>
<th>C/N</th>
<th>Ca (%)</th>
<th>Mg (%)</th>
<th>K (%)</th>
<th>P (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Albizia lebbeck</em></td>
<td>47.7</td>
<td>95.4</td>
<td>20.5</td>
<td>3.3</td>
<td>14.5</td>
<td>2.1</td>
<td>0.8</td>
<td>2.0</td>
<td>1.1</td>
</tr>
<tr>
<td><em>Azadirachta indica</em></td>
<td>48.2</td>
<td>96.4</td>
<td>19.8</td>
<td>3.7</td>
<td>13.0</td>
<td>2.4</td>
<td>0.6</td>
<td>2.4</td>
<td>1.1</td>
</tr>
<tr>
<td><em>Khaya senegalensis</em></td>
<td>48.5</td>
<td>97.0</td>
<td>9.1</td>
<td>1.5</td>
<td>32.0</td>
<td>2.5</td>
<td>0.6</td>
<td>0.9</td>
<td>0.8</td>
</tr>
</tbody>
</table>

Effects on *A. senegal* seed germination

The *A. senegal* seed germination percentage in the clay amended media was:

- 60.5% in *Azadirachta indica*;
- 52.5% in *Albizia lebbeck*;
- 37% in NPK fertilizer;
- 32% in *Khaya senegalensis* and
- 35% in the control.
Treatment effects on *A. senegal* seedlings shoot height

*A. lebbeck*, *A. indica* and *K. senegalensis* manure doses are: 25, 50 and 75 g
A. lebbeck, A. indica and K. senegalensis manure doses are: 25, 50 and 75 g

Treatment effects on A. senegal seedlings root length
A. lebbeck, A. indica and K. senegalensis manure doses are: 25, 50 and 75 g

Treatment effects on A. senegal seedlings diameter
Treatment effects on $A. \text{senegal}$ seedlings shoot height

$A. \text{lebbeck}$, $A. \text{indica}$ and $K. \text{senegalensis}$ manure doses are: 25, 50 and 75 g
Treatment effects on *A. senegal* seedlings shoot height

*A. lebbeck*, *A. indica* and *K. senegalensis* manure doses are: 25, 50 and 75 g
Conclusions

- Results showed the great potential of tree manures (in comparison with NPK fertilizer and control treatments) which can be incorporated in the nursery growing media;
- *Azadirachta indica* tree manures applications induced the highest effects on *A. senegal* seedlings followed by *Albizia lebbeck*;
- *Khaya senegalensis* manure was however found unfavorable to *A. senegal* seedlings shoot height growth; but was inducive to root growth;
- Tree manures effects on *A. senegal* seedlings growth increased with increasing amounts of applications: 75 g > 50 g >> 25 g doses;
- Further work is needed to confirm these findings and to explore more combinations of other tree manures-seedlings treatments.
Bibliography


Hunter, I. (2001). Above ground biomass and nutrient uptake of three tree species (Eucalyptus camaldulensis, Eucalyptus grandis and Dalbergia sissoo) as affected by irrigation and fertiliser, at 3 years of age, in southern India. Forest Ecology and Management 144, 189-199.


