



KrishiKosh (कृषिकोश)

(/) An Institutional Repository of Indian National Agricultural Research System



Advanced Search (/advanced-search)

[Krishikosh \(/\)](#) / [Birsa Agricultural University, Ranchi \(/handle/1/93542\)](#) / [Thesis \(/handle/1/93550\)](#)

Please use this identifier to cite or link to this item: <http://krishikosh.egranth.ac.in/handle/1/5810022136>

Authors: Birua, Bibek (/browse?type=author&value=Birua%2C+Bibek)

Advisor: Singh, S.K. (/browse?type=author&value=Singh%2C+S.K.)

Title: TREE-SOIL INTERACTION STUDIES ON DIFFERENT SPECIES IN ARBORETUM

Publisher: Birsa Agricultural University, Kanke, Ranchi, Jharkhand

Language: en_US

Type: Thesis

Pages: 91

Agrotags: null

Keywords: TREE-SOIL INTERACTION STUDIES ON DIFFERENT SPECIES IN ARBORETUM

Abstract: The present experiment entitled “Tree-Soil Interaction Studies on Different Species in Arboretum” has been conducted in Arboretum of Faculty of Forestry, Birsa Agricultural University, Ranchi planted in the year 2006. The work is planned with the objective such as to study the physiochemical properties of soil in selected tree species, growth parameter of different tree species, and to know-how the interrelation between soil properties and tree growth. Plantation which is seven years old in the arboretum had been done in block and since the blocks are not equal. The random sampling method has been adopted. The five tree species like Khair (*Acacia catechu*), Teak (*Tectona grandis*), Anola (*Embllica officinalis*), safeda (*Eucalyptus tereticornis*), and Karanj (*Pongamia pinnata*) have been selected in the present studies. The soil physical properties such as soil texture, bulk density, soil porosity, water holding capacity and particle density have been analyzed. The chemical properties viz. soil pH, soil organic carbon, available nitrogen, available phosphorous and available potassium have been determined. Besides these the growth parameters like height, diameter, and crown width have been recorded. The maximum value(1.611gm cm^{-3}) of Bulk Density was found in *Eucalyptus tereticornis* followed by *Tectona grandis*, *Acacia catechu*, *Embllica officinalis*, and minimum (1.506gm cm^{-3}) in *Pongamia pinnata*; while the maximum value(2.530gm cm^{-3}) of particle density has been shown in *Embllica officinalis* followed by *Acacia catechu*, *Eucalyptus tereticornis*, *Tectona grandis*, and minimum (2.329

gm cm⁻³) in *Pongamia pinnata*. In soil porosity, the maximum value (38.75%) in *Emblica officinalis* followed by *Eucalyptus tereticornis*, *Acacia catechu*, *Pongamia pinnata*, and minimum (35.35%) in *Tectona grandis*. Whereas the maximum value (38.6 ml/cm³) of water holding capacity was found in *Tectona grandis* followed by *Acacia catechu*, *Eucalyptus tereticornis*, *Pongamia pinnata*, and minimum (32.8 ml/cm³) in *Emblica officinalis*. The maximum value (62.6%) of percentage of sand was found in *Pongamia pinnata* followed by *Eucalyptus tereticornis*, *Emblica officinalis*, *Tectona grandis*, and minimum (57.2%) in *Acacia catechu*; while the maximum II value (28.9%) of percentage of silt has been found in *Acacia catechu* followed by *Emblica officinalis*, *Eucalyptus tereticornis*, *Tectona grandis*, and minimum (25.3%) in *Pongamia pinnata*; whereas in case of percentage of clay, the maximum value (15.7%) has been found *Tectona grandis* followed by *Acacia catechu*, *Eucalyptus tereticornis*, *Pongamia pinnata* and minimum (11.5%) in *Emblica officinalis*. Statistically, the bulk density has been found significantly higher in *Eucalyptus tereticornis* followed by *Pongamia pinnata*, *Tectona grandis*, *Acacia catechu*, and *Emblica officinalis*; while Particle Density is significantly higher only in *Tectona grandis* and other species are non-significant. The Porosity has been found significantly higher in *Acacia catechu* followed by *Pongamia pinnata*, *Tectona grandis* and rest are non-significant. The Water Holding Capacity is found significantly higher in *Acacia catechu* followed *Pongamia pinnata* and *Tectona grandis*, but other are non-significant. The sand percentage is found significantly higher in *Acacia catechu* and *Tectona grandis*; while others are non-significant; whereas in case of Percentage of Silt, it has been found significantly higher in *Eucalyptus tereticornis* followed by *Pongamia pinnata* & *Emblica officinalis* but *Tectona grandis* and *Acacia catechu* are non-significant. The Clay Percentage has been found significantly higher in *Emblica officinalis*; whereas other species are non-significant. Thus, a physical property of soil has been showed improvement in planted area. The results showed that the soil pH, Organic carbon (OC), available nitrogen (N), and available potassium (K) have increased in planted area than unplanted area; whereas available phosphorous (P) the higher value in unplanted area than planted area except *Eucalyptus tereticornis*. The maximum value (5.74) of soil pH has been found in *Pongamia pinnata* followed by *Tectona grandis*, *Eucalyptus tereticornis* and minimum (5.24) in *Acacia catechu*; whereas in the soil organic carbon, the maximum value (0.40%) in *Acacia catechu* and *Pongamia pinnata* followed by *Tectona grandis*, *Emblica officinalis* as well as *Eucalyptus tereticornis* having minimum value (0.39%)., the maximum value (273.02 kg/ha) of available nitrogen has been found in *Tectona grandis* followed by *Acacia catechu*, *Eucalyptus tereticornis*, *Pongamia pinnata* and minimum (262.48kg/ha) in *Emblica officinalis*; while available potassium had III shown maximum value (504.97kg/ha) in *Pongamia pinnata* followed by *Eucalyptus tereticornis*, *Tectona grandis*, *Emblica officinalis* and minimum (445.22kg/ha) in *Acacia catechu*. In case of available phosphorous, it has been found more value in unplanted area than planted area except *Eucalyptus tereticornis*. It was found maximum (10.47kg/ha) in *Eucalyptus tereticornis* followed by *Emblica officinalis*, *Acacia catechu*, *Tectona grandis*, and minimum (6.91kg/ha) in *Pongamia pinnata*. It has been found the nutrient status in all the species of planted area have the order like K>N>P. In statistical analysis, the soil pH is found significantly higher in *Emblica officinalis* followed by *Acacia catechu*, *Tectona grandis*, *Pongamia pinnata* and *Eucalyptus tereticornis*; while, the soil organic carbon is significantly higher in *Pongamia pinnata* followed by *Eucalyptus tereticornis*, *Acacia catechu*, *Tectona grandis*, and *Emblica officinalis*. The available nitrogen is found significantly higher in *Eucalyptus tereticornis* followed by *Acacia catechu*, *Pongamia pinnata*, *Emblica officinalis*, and *Tectona grandis*; whereas, the available phosphorous has been found significantly higher in *Eucalyptus tereticornis* followed by *Tectona grandis*, *Emblica officinalis*, *Acacia catechu*, and *Pongamia pinnata*; while, the available potassium is found significantly higher in *Eucalyptus tereticornis* followed by *Acacia catechu*, *Emblica officinalis*, *Tectona grandis*, and *Pongamia pinnata*. Both diameter & height have been found maximum (16.32 cm & 14.8 m respectively) in *Eucalyptus tereticornis* which is fast growing exotic species, followed by *Tectona grandis*, *Pongamia pinnata*, *Emblica officinalis* and minimum (5.56 cm & 4.01 m) in *Acacia catechu*. The crown width has been found the maximum (4.38 m) growth in *Pongamia pinnata* followed by *Eucalyptus tereticornis*, *Tectona grandis*, *Emblica officinalis* and minimum (1.73 m) in *Acacia catechu*. Thus, it may be concluded that physical properties of soil have improved in planted area than unplanted area; The pH, soil organic carbon(OC), available nitrogen(N), available potassium(K) in the planted area is significantly higher than unplanted area; whereas in case of available phosphorous, it is lower in planted area than unplanted area except *Eucalyptus tereticornis*. It may be said that soil pH is increasing in the plantation area showing betterment for tree growth.

Description: TREE-SOIL INTERACTION STUDIES ON DIFFERENT SPECIES IN ARBORETUM

Subject: Natural Resources Management

Theme: TREE-SOIL INTERACTION STUDIES ON DIFFERENT SPECIES IN ARBORETUM

These Type: M.Sc

Issue Date: 2014

Appears in Thesis (/handle/1/93550)

Collections:

Files in This Item:

File	Description	Size	Format
1477 Bibek Birua.pdf		1.79 MB	Adobe PDF



[View/Open \(/displaybitstream?handle=1/5810022136\)](/displaybitstream?handle=1/5810022136)

[Show full item record \(/handle/1/5810022136?mode=full\)](/handle/1/5810022136?mode=full)

[Statistics \(/handle/1/5810022136/statistics\)](/handle/1/5810022136/statistics)

Items in DSpace are protected by copyright, with all rights reserved, unless otherwise indicated.