IJIRR

International Journal of Information Research and Review
Vol. 1, Issue, 12, pp. 211-214 December, 2014

Research Article

COMPARATIVE EFFECT OF THE SELECTED TREE CANOPY SOIL ON THE GROWTH OF *VIGNA RADIATA* (L.) R.WILCZEK (GREEN GRAM)

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ARTICLE INFO

Article History:
Received 05th October, 2014
Received in revised form
13th November, 2014
Accepted 28th December, 2014

Keywords:
Tree Canopy Soil,
Green Gram,
Growth Para Meters,
Minerals.

ABSTRACT

Trees contribute significantly to the aesthetic beauty of cities, thereby helping to maintain the psychological health of the inhabitants. The most explosive urban growth is expected in India. In urban environments human alter these soil-forming factors by impacts associated with urban infrastructure. Gardens also improve localized air-cooling, help mitigate hooding and provide a harem for wildlife. Less favourable aspects include contribution of gardens and gardening to green house gas emission, misuse of fertilizers and pesticides and introduction of alien plant species Effective environmental planning, including urban greening, can assist greatly in improving the quality of the urban environment and the livelihoods of the people who live in urban areas. As a result of impacts associated with urban infrastructure, arborists and urban landscape managers perform remedial management actions to make urban soils more suitable plant-growing environments, remedial soil management actions include irrigation, aeration, radial trenching, mulching, and fertilization, all of which further alter the physical, chemical and biological properties and thus the nitrogen status of urban soils. In the present study, Growth parameters of Green gram Vigna radiata (L.) R.Wilczek] is calculated of the litter collected from the tree canopy in the college campus were analysed and the result were compared with the standard soil profile.

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INTRODUCTION

Plant organs die and ultimately whole plants die but dead plant material or litter, continue to have powerful effects on ecosystem, drinking nutrient turnover, soil formation and atmospheric composition. Soil properties in turn have strong impacts on plant community composition, diversity and productivity. Litter accumulation is a major structuring force in prairies. Urban forestry is the art, science and technology of managing trees and forest resources in and around urban community ecosystems for physiological, sociological, economical and aesthetic benefits, trees provide for society (Miller, 1997). Litter has occupied the attention of ecologists at length for the reasons that it is an instrumental factor in ecosystem dynamics, is indicative of ecological productivity, and may be useful in predicting regional nutrient cycling and soil fertility. The rate of soil organic matter decomposition increases when the soil is exposed to cycles of drying and wetting compared to soils that are continuously wet or dry (James, 2010).

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There is need to plant trees that provide multiple benefits, particularly in house compounds for providing edible pods, flowers, fruits, leaves etc. Different land use patterns not only changed land cover types, e.g. surface vegetation. Plant litter and residual quantity but also directly affected soil nutrient supply and soil properties in urban areas. When the more barren lands are covered to urban use there is a less drastic reduction in vegetation with initial clearing, and then essentially the same transition assuming water is available to support the vegetation transition (Zhao and Wang, 2010).

MATERIALS AND METHODS

Study Area

Coimbatore is a city in Tamil Nadu, South India. It is the second largest city and urban agglomeration in the Indian state of Tamil Nadu after Chennai. It is the capital city in Kongu nadu region and is often been referred to as the Manchester of south India. The city is located on the banks of the Noyyal River surrounded by the Western Ghats and is administered by the Coimbatore Municipal.

Nirmala college academic campus is located in the southern parts of the Western Ghats. The total area of college campus is 20 acre. The temperature during both summer and winter varies between 28º c to 34º c. Soil in this area is red loamy soil which is more fertile than sandy soil. Its porosity allows high moisture retention and air circulation

Plate 1. Study Area

Plate 2. Location Map

Collection of tree canopy soil samples

For the present study five different trees of different genera were selected in the college campus to find out the parameters of tree canopy soil. The tree canopy soil samples were collected during the year, 2013. Soil with litter formation and ground vegetation from the corners and centre of the selected samples of *Butea monosperma*, (*Lamk.) Taub., Jacaranda mimosifolia, D. Don., Cassia fistula, Linn., Albizzia lebbeck (L), Benth., and Peltophorum pterocarpum (DC.)k. Heyne*., were collected separately in sterile bags. Barren land soil is taken from the same campus was kept as control. Soil was taken from the depth of 0-50cm. Soil samples were packed in sterile bags, and as soon as possible returned to the laboratory and processed within 2 days.

Growth parameters of the selected tree canopy soil

The experimental trays were filled with one third of the canopy soil of selected samples in each tray. Seeds of Green gram [Vigna radiata (L.) R.Wilczek] were collected from the Agricultural University, Coimbatore, Tamil Nadu. Seeds were sterilized with 0.1 % of mercuric chloride and soaked in water for 24 hours. Four replicates of 100 seeds were sowed from each selected samples. The growths of the plants were noted from 3rd day to 15 days. The growth parameters like shoot length, shoot length, number of leaf and leaf size were determined using the formula and the results were represented in table and chart.

Shoot weight = total height of 100 plants / 100
Shoot/ root ratio = total shoot length / total root length
Percentage of fresh weight and dry weight = $w_1 - w_2 / w_1 * 100$

SAMPLE 1. Plate 3.
Butea monosperma, (Lamk.) Taub.,

SAMPLE 2. Plate 4.
Jacaranda mimosifolia, D. Don.,

SAMPLE 3. Plate 5.
Cassia fistula, Linn .,

SAMPLE 4. Plate 6.
Albizzia lebbeck, (L,)Benth.,

SAMPLE 5. Plate 7.
Peltophorum pterocarpum, (DC.) k. Heyne .,

RESULTS AND DISCUSSION

The growth of the green gram in the selected tree canopy soil samples were represented in Table and Chart and Plates (8-13).

Table showing Growth of the green gram

S.No	Sample	Average height of the plant (cm)
	Control	20.53
1	*Butea monosperma*	25.13
2	*Jacaranda mimosifolia*	27.90
3	*Cassia fistula*	25.24
4	*Albizzia lebbeck*	27.18
5	*Peltophorum pterocarpum*	31.54

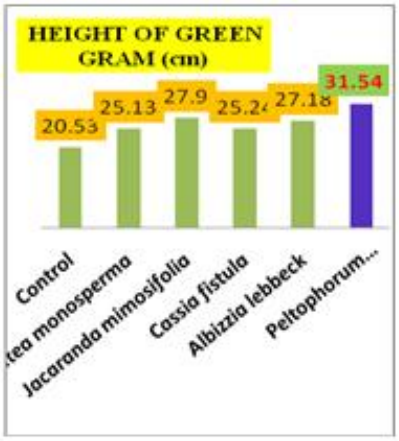
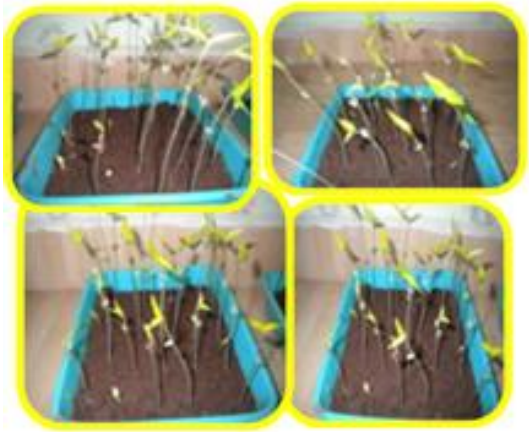


Chart - Height of Green gram in the selected tree canopy soil

Growth of Green gram in Barren soil (control) – 1 plate 8.

Growth of Green gram inselected tree canopy soil of *Butea monosperma* – Plate 9.

Growth of Green gram in the selected tree canopy soil of *acaranda mimosifolia* – Plate 10.



Growth of Green gram in selected tree canopy soil of *Cassia fistula* - Plate 11.

Growth of Green gram in selected tree canopy soil of *Albizzia lebbeck* - Plate 12.

Growth of Green gram in the selected tree canopy soil of *Peltophorum pterocarpum* - Plate 13.

The growth of Green gram in the selected tree canopy soil sample

The canopy soil from five different selected trees shows highest growth of green gram in *Peltophorum pterocarpum (DC.) k. Heyne.*, with the height of 31.54cm and the lowest growth was recorded in control. The canopy soil of *Cassia fistula, Linn., and Butea monosperma (Lamk.)Taub.*, in Green gram showed the height of 25.24cm and 25.13cm.

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