

Study on growth rate of *Pennisetum glaucum* (L.) R. Br., in the selected tree canopy soil related with urban greening in Nirmala college campus, Coimbatore, Tamilnadu, South India

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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 greenhouse 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 Pearl millet [*Pennisetum glaucum* (L.) R.Br.], 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.

Keywords: Tree canopy soil, Pearl millet, Root/Shoot ratio, Growth Para meters, Minerals

Introduction

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 accumulation is a major structuring force in prairies. 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. Soil properties in turn have strong impacts on plant community composition, diversity and productivity. 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). 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 28° c to 34° 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



Fig 1: Plate -1 Study Area



Fig 2: 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., *Albizia lebbek* (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 Pearl millet [*Pennisetum glaucam* (L.) R.Br.] 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 = $w_1 - w_2/w_1 * 100$



Fig 3: Sample: 1 -Plate 3: *Butea monosperma*, (Lamk.) Taub.,



Fig 4: Sample: 2 -Plate 4 *Jacaranda mimosifolia*, D. Don.,



Fig 5: Sample: 3 - Plate 5 *Cassia fistula*, Linn .,



Fig 6: Sample: 4- Plate 6 *Albizia lebbek*, (L,)Benth.,



Fig 7: Sample: 5 Plate 7 *Peltophorum pterocarpum*, (DC.) k.Heyne.,

Results and Discussion

The growth of Pearl millet in the selected tree canopy soil samples were represented in Table, Chart & Plates (8-13).

Shoot/Root ratio of Pearl millet in the selected tree canopy soil

In *Peltophorum pterocarpum* (DC) k. Heyne., the shoot/ root ratio was 5.81 and it was recorded as the highest. The control was 3.55 and it was the lowest.

Table 1: Shoot/Root ratio of pearl millet in the selected tree canopy soil sample

S. No	Sample	Shoot/Root(in cm)
	Control	3.55
1	<i>Butea monosperma</i>	5.02
2	<i>Jacaranda mimosifolia</i>	5.32
3	<i>Cassia fistula</i>	5.01
4	<i>Albizzia lebbeck</i>	4.11
5	<i>Peltophorum pterocarpum</i>	5.81

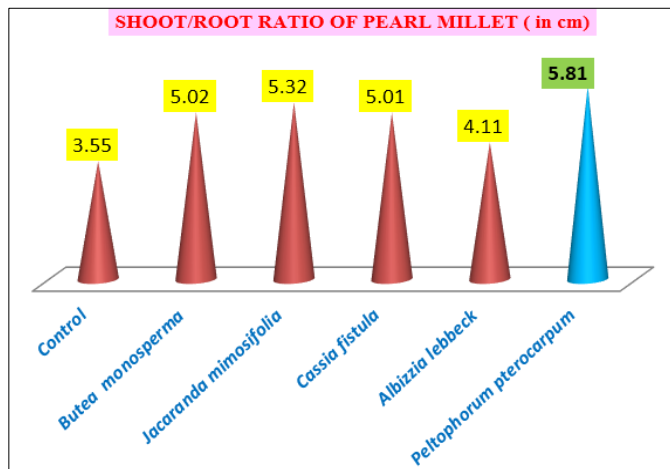


Fig 8: Shoot/Root ratio of Pearl millet in selected tree canopy soil sample



Fig 11: Growth of Pearl millet inselected tree canopy soil sample *Jacaranda mimosifolia*– Plate -10



Fig 9: Growth of Pearl millet in barren soil (control) - Plate -8



Fig 12: Growth of Pearl millet in selected tree canopy soil sample *Cassia fistula* – Plate-11



Fig 10: Growth of Pearl millet in selected tree canopy soil sample *Butea monosperma* - Plate -9



Fig 13: Growth of Pearl millet in selected tree canopy soil *Albizzia lebbeck* - Plate -12



Fig 15: Growth of Pearl millet in selected tree canopy soil sample
Peltophorum pterocarpum – Plate- 13

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