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Growth percentage of [*Pennisetum glaucum (L.)* R. Br.,] pearl millet in the selected tree canopy soil related with urban greening in nirmala college campus, Coimbatore District, 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, fresh weight and dry weight of *Pennisetum glaucum* (L.) R.Br, (Pearl millet) is calculated of the litter collected from the tree canopy in the college campus were analysed and the results were compared with the standard soil profile.

Keywords: Tree canopy soil, Pearl millet, Growth percentage

1. 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) [3]. There is need to plant trees that provide multiple benefits, particularly in house compounds for providing edible pods, flowers, fruits, leaves etc. Plant litter and residual quantity 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) [7]. Carbon sequestration involves the capture and storage of the carbon from the atmosphere which go on accumulating in the atmosphere. Carbon dioxide is captured and stored naturally by the plants through the process of photosynthesis where in CO_2 is sequestered in the form of sugars which contribute to organic matter in the soil (Phani Kumar, 2009). The estimation of the carbon content both in vegetation and soil becomes imperative to access the carbon sequestration potential.

The tree as they grow sequester the CO_2 in their body (trunk, branches and roots) and this results in an increase in their biomass, indicative of an increase in carbon sequestered by them. Soil vegetation systems play an important role in the global carbon cycle. Soil contains about three times more organic carbon than vegetation and about twice as much carbon is present in the atmosphere (Batjes and Sombrook, 1997; Kumar and Nair, 2006; Dinakaran, 2008) [1, 4, 2]. Calcium is essential for the formation of cell-walls, as calcium pectate forms part of the middle layer of the cell-wall. The middle lamella regulates the entry of only those nutrients which are not toxic to the plant. In root-tips calcium is very essential for the meristematic activity or formation of new tissues. It also helps to keep up sustained activity of the nodule bacteria in legumes. Besides its direct nutrient value, calcium when applied to acid soils increases the availability of other nutrients, like phosphorus, nitrogen and molybdenum. Excess of calcium in the calcareous soils depresses the uptake of potassium and magnesium. These are secondary effects of calcium on plant growth (Motsara, 2002) [6]. It maintains the dark-green colour of leaves and regulates the uptake of other materials, particularly nitrogen and phosphorus. It appears to play an important role in the transport of phosphorus, particularly into the seeds. It is also said to promote formation of oils and fats, possibly by increasing photosynthetic activity in the leaves (Motsara, 2002) [6]. When iron is not taken up in adequate quantity, the growth of plants is less vigorous, and seed and fruit

development suffer as a consequence of decreased photosynthetic activity in the leaves. Too much liming results in iron deficiency and results in chlorosis and leaves turn white and eventual leaf loss (Motsara, 2002) [6].

2. Materials and Methods

2.1 Study Area

Coimbatore is the 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

Fig 1: Study Area

Fig 2: Location Map

2.2 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 processed within 2 days in the laboratory.

2.3 Percentage 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 *Pennisetum glaucam (L.) R.Br.,* (Pearl millet) 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.

Growth percentage = Number of plantlets grown / Number of seeds sown*100

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

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

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

Fig 6: Sample 4, *Albizzia lebbeck, (L,)Benth.,*

Fig 6: Sample 5, *Peltophorum pterocarpum, (DC.*) *k.Heyne.,*

3. Results and Discussion

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

3.1 Growth percentage of Pearl millet in the selected tree canopy soil

The Growth percentage of Pearl millet in *Peltophorum pterocarpum (DC.) k, Heyne.,* was 97.37 and it was the highest when compared to the other samples, and the lowest is *Albizzia lebbeck* 92.86. In *Butea monosperma* the percentage of growth was 95.45, *Jacaranda mimosifolia* 94.12 and in *Cassia fistula* 94.12. In all the selected tree samples, *Peltophorum pterocarpum (DC.) k, Heyne.,*, and *Albizia lebbeck* can be considered as best suitable trees for urban greening.

Table 1: Growth percentage of Pearl millet in the selected tree canopy soil

S. No	Sample	Percentage
	Control	87.5
1	*Butea monosperma*	95.45
2	*Jacaranda mimosifolia*	94.12
3	*Cassia fistula*	94.12
4	*Albizzia lebbeck*	92.86
5	*Peltophorum pterocarpum*	97.37

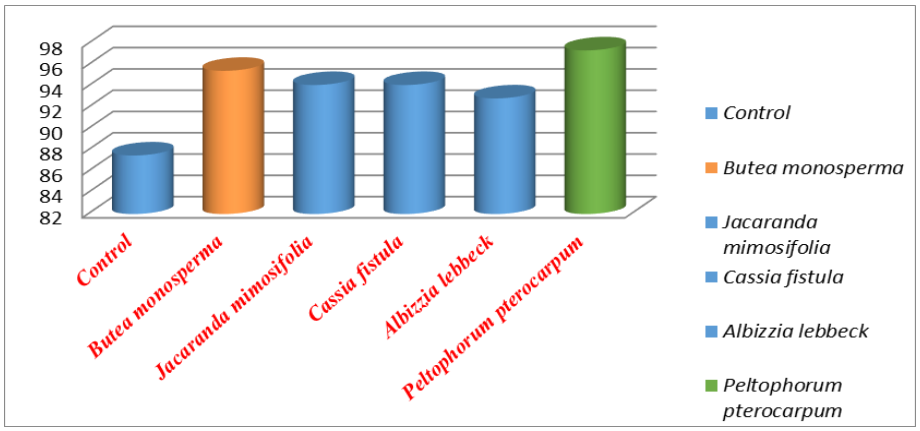

Fig 8: Growth percentage of Pearl millet in the selected tree canopy soil

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

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

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

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

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

Fig 14: Growth of Pearl millet in selected tree canopy soil sample *Peltophorum pterocarpum*

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