ABSTRACT

The study accessed the tree species composition within the Kano State University of Science and Technology Wudil, Kano State, Nigeria with the view of providing information that will help in the management and conservation of tree species within the campus. The study area was stratified into four (4) sections from which total enumeration of tree species was carried out. Results from the study shows that, there are 8267 tree stands, representing 43 tree species cutting across 21 family and 37 genera. Azadirachta indica recorded the highest frequency and percentage frequency of 3959 and 47.89% respectively while Borassus aethiopum, Celtis integrifolia and Sclerocarya birrea recorded the lowest frequency and percentage frequency of 1 and 0.01% respectively. The family Fabaceae recorded the highest frequency and percentage frequency of 11 and 52.38% respectively while Anonaceae, Apocynaceae, Arecoideae, Balantiaeeae, Bignioiaceae, Ebenaceae, Lamiaceae, Rhamnaceae, Sapotaceae, Ulmaceae and Verbenaceae recorded the lowest number of representation of 1 and 4.76% frequency and percentage frequency respectively. Notwithstanding the large number of tree stands recorded, majority of which were exotic trees, the various distribution pattern of the various parameters accessed was typical of savanna vegetation. Concerted effort should be made for the conservation of these species, most especially the indigenous ones, some of which might be extinct in the campus if adequate measures are not taken.

Keywords: Tree species composition, Savanna, Indigenous tree species, Forest Conservation

INTRODUCTION

Trees are known to provide diverse benefits which ranges from ecological (soil erosion control, watershed management, windbreak and shelterbelt, desertification control, climate change mitigation) Socio-economic (source of income from the sale of fuel-wood, timber, edible fruits, and other non-timber forest products) and cultural (medical, spiritual, aesthetic, historical). Nigeria is endowed with
a rich biodiversity with an estimated plant species of about 7,895 from 338 families and 2,215 genera (FGN, 2006). However, these plants species are disappearing at an alarming rate owing largely to deforestation and other land use practices. For example in Africa 60 – 80% of the population were reported to depend solemnly on plants for their wellbeing (Adesuyi, et al., 2012), while about 85% of domestic energy use in Nigeria was reported to come from wood (FMEnv., 2006). In Northern Nigeria over 80% of the population depend on wood as their source of energy and fuel wood collection accounts for about 90% of forest removal in Nigeria (Abdulrashid and Yaro 2014; Adegbehin, 1990). With a large and ever growing population, it is expected that these figure will continue to rise unless a viable alternative devoid of irregularities in supply, affordable as well as accessible is provided.

The vegetation type of Kano state is mainly savanna, climatically defined into Northern guinea savanna and Sudan savanna. The vegetation is characterised with little vegetation of shrubs, tree and few trees. The vegetation cover is now altered as a result of climate change and human activities. Some part of the sudan has now become part of the semiarid region as a result of desertification attributed to firewood collection, overgrazing, urbanization, land clearing for agriculture and bush burning. Shrubs, grasses and few trees dominate the vegetation of Northern Nigeria landscape (Tukur, 2013).

Unless deliberate and consistent effort are made towards the management and conservation of our vegetation resources particularly in Northern Nigeria and other similar region worldwide, we might be face with a serious crisis in the near future occasioned by scarcity of resources. There is therefore the need for accurate and adequate information on the prevalence and composition of tree species as an important step towards the management and
conservation of our vegetation resources. However, such information are scarce (Zisadza-Gandiwa et al., 2013), it will not be surprising if species of plants that are thought to be abundant might actually be endangered while those thought to be endangered might be on the verge of extinction due to limited data on flora composition (Ikyaagba et al., 2015) hence the justification of this study, moreover we have not come across any documented material detailing the composition of tree species within Kano State University of Science and Technology which is vital for management and conservation purpose.

METHODOLOGY

Study area

Kano state lies between latitude 12°40' and 10°30' N and longitude 7°40' and 9°30' E. The climate is characterised into dry and wet season. The dry season usually starts from November – March, while the rainy season starts from May to September. Mean annual rainfall is about 690 mm while mean annual temperature ranges between a maximum of 33°C and a minimum of 19°C.

The vegetation is mainly savanna, climatically defined into Northern guinea savanna and Sudan savanna. Northern guinea savanna is characterized by open woodland or brush with shorter grasses while the southern guinea savanna has taller grasses. The Sudan savanna has scattered trees in open grassland. common tree and shrubs found in this region includes; Adansonia digitata, Vitex doniana, Diospyros mespiliformis, Tamarindus indica, Khaya senegalensis, Acacia senegal, Acacia nilotica, Acacia seyal, Faidherbia albida, Balanites aegyptiaca, Parkia biglobosa, Guiera senegalensis, Borassus aethiopum, Piliostigma thonningii, Ziziphus spina-christi, Hyphaene thebaica and Anogeissus leiocarpus.
Sampling procedure and data analysis

The entire university environment includes; the commercial secondary school, technical secondary school, main university campus and the university farm from which total enumeration of all trees was carryout. The data was analysed using descriptive statistics. Spreadsheet package (Microsoft Excel) was used to plot histogram.

RESULTS

Results obtained from this study indicates that, there were eight thousand two hundred and sixty seven tree stands (8267) within Kano State University of Science and Technology representing forty (43) species of tree cutting across twenty one (21) family and thirty seven (37) genera (Table 1). *Azadirachta indica* recorded the highest frequency (tree stands) of 3959 as well as percentage frequency of 47.89% while *Eucalyptus camaldulensis* recorded 2701 frequency and percentage frequency of 32.67%. *Khaya senegalensis* recorded 240 frequencies and a percentage frequency of 2.9% making it the indigenous tree species
with the highest frequency and percentage frequency (Table 1). *Psidium guajava* a fruit tree recorded 190 frequencies and 2.29% frequency followed by *Casuarina equisetifolia* with 122 frequencies and 1.48% frequency (Table 1). *Adansonia digitata* recorded 121 frequencies and 1.46% frequency (Table 1). *Borassus aethiopum*, *Celtis integrifolia* and *Sclerocarya birrea* recorded the least frequency and percentage frequency of 1 and 0.01% respectively (Table 1). The family Fabaceae recorded the highest frequency and percentage frequency of 11 and 52.38% respectively while *Anonaceae, Apocynaceae, Arecoideae, Balanitaceae, Bignoiaceae, Ebenaceae, Lamiaceae, Rhamnaceae, Sapotaceae, Ulmaceae, Verbenaceae* has the lowest number of representation with each recording 1 and 4.76% frequency and percentage frequency respectively (Figure 2 and 3).
Table 1: Tree species composition within Kano State University of Science and Technology Wudil, Kano State, Nigeria

<table>
<thead>
<tr>
<th>S/No</th>
<th>Species Name</th>
<th>Family</th>
<th>Life form</th>
<th>Frequency</th>
<th>% Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><em>Acacia nilotica</em></td>
<td>Fabaceae</td>
<td>Tree</td>
<td>85</td>
<td>1.03</td>
</tr>
<tr>
<td>2</td>
<td><em>Acacia senegal</em></td>
<td>Fabaceae</td>
<td>Tree</td>
<td>75</td>
<td>9.91</td>
</tr>
<tr>
<td>3</td>
<td><em>Acacia seyal</em></td>
<td>Fabaceae</td>
<td>Tree</td>
<td>30</td>
<td>0.36</td>
</tr>
<tr>
<td>4</td>
<td><em>Adansonia digitata</em></td>
<td>Malvaceae</td>
<td>Tree</td>
<td>121</td>
<td>1.46</td>
</tr>
<tr>
<td>5</td>
<td><em>Acacia seyal</em></td>
<td>Fabaceae</td>
<td>Tree</td>
<td>30</td>
<td>0.36</td>
</tr>
<tr>
<td>6</td>
<td><em>Anacardium occidentale</em></td>
<td>Anacardiaceae</td>
<td>Tree</td>
<td>9</td>
<td>0.11</td>
</tr>
<tr>
<td>7</td>
<td><em>Anogeissus leiocarpa</em></td>
<td>Combretaceae</td>
<td>Tree</td>
<td>2</td>
<td>0.03</td>
</tr>
<tr>
<td>8</td>
<td><em>Azadirachta indica</em></td>
<td>Meliaceae</td>
<td>Tree</td>
<td>3959</td>
<td>47.89</td>
</tr>
<tr>
<td>9</td>
<td><em>Balanites aegyptiaca</em></td>
<td>Balanitaceae</td>
<td>Tree</td>
<td>13</td>
<td>0.16</td>
</tr>
<tr>
<td>10</td>
<td><em>Borassus aethiopum</em></td>
<td>Arecaceae</td>
<td>Tree</td>
<td>1</td>
<td>0.01</td>
</tr>
<tr>
<td>11</td>
<td><em>Casuarina equisetifolia</em></td>
<td>Casuarinaceae</td>
<td>Tree</td>
<td>122</td>
<td>1.48</td>
</tr>
<tr>
<td>12</td>
<td><em>Ceiba pentandra</em></td>
<td>Malvaceae</td>
<td>Tree</td>
<td>3</td>
<td>0.04</td>
</tr>
<tr>
<td>13</td>
<td><em>Celtis integrifolia</em></td>
<td>Ulmaceae</td>
<td>Tree</td>
<td>1</td>
<td>0.01</td>
</tr>
<tr>
<td>14</td>
<td><em>Citrus aurantium</em></td>
<td>Rutaceae</td>
<td>Tree</td>
<td>34</td>
<td>0.41</td>
</tr>
<tr>
<td>15</td>
<td><em>Citrus sinensis</em></td>
<td>Rutaceae</td>
<td>Tree</td>
<td>2</td>
<td>0.03</td>
</tr>
<tr>
<td>16</td>
<td><em>Dalbergia sissoo</em></td>
<td>Fabaceae</td>
<td>Tree</td>
<td>52</td>
<td>0.63</td>
</tr>
<tr>
<td>17</td>
<td><em>Delonix regia</em></td>
<td>Fabaceae</td>
<td>Tree</td>
<td>17</td>
<td>0.21</td>
</tr>
<tr>
<td>18</td>
<td><em>Diospyros mespiliformis</em></td>
<td>Ebenaceae</td>
<td>Tree</td>
<td>44</td>
<td>0.53</td>
</tr>
<tr>
<td>19</td>
<td><em>Eucalyptus camaldulensis</em></td>
<td>Myrtaceae</td>
<td>Tree</td>
<td>2701</td>
<td>32.67</td>
</tr>
<tr>
<td>20</td>
<td><em>Faidherbia albida</em></td>
<td>Fabaceae</td>
<td>Tree</td>
<td>43</td>
<td>0.52</td>
</tr>
<tr>
<td>21</td>
<td><em>Ficus iteophylla</em></td>
<td>Moraceae</td>
<td>Tree</td>
<td>11</td>
<td>0.13</td>
</tr>
<tr>
<td>22</td>
<td><em>Ficus platyphylla</em></td>
<td>Moraceae</td>
<td>Tree</td>
<td>3</td>
<td>0.04</td>
</tr>
<tr>
<td>23</td>
<td><em>Ficus sycomoros</em></td>
<td>Moraceae</td>
<td>Tree</td>
<td>7</td>
<td>0.08</td>
</tr>
<tr>
<td>24</td>
<td><em>Ficus thornigii</em></td>
<td>Moraceae</td>
<td>Tree</td>
<td>17</td>
<td>0.21</td>
</tr>
<tr>
<td>25</td>
<td><em>Gmelina arborea</em></td>
<td>Lamiaceae</td>
<td>Tree</td>
<td>14</td>
<td>0.17</td>
</tr>
<tr>
<td>26</td>
<td><em>Hyphaene thebaica</em></td>
<td>Arecaceae</td>
<td>Tree</td>
<td>2</td>
<td>0.03</td>
</tr>
<tr>
<td>27</td>
<td><em>Khaya senegalensis</em></td>
<td>Meliaceae</td>
<td>Tree</td>
<td>240</td>
<td>2.9</td>
</tr>
<tr>
<td>28</td>
<td><em>Mangifera indica</em></td>
<td>Anacardiaceae</td>
<td>Tree</td>
<td>119</td>
<td>1.44</td>
</tr>
<tr>
<td>29</td>
<td><em>Nerium oleander</em></td>
<td>Apocynaceae</td>
<td>Tree</td>
<td>8</td>
<td>0.1</td>
</tr>
<tr>
<td>30</td>
<td><em>Parkia biglobosa</em></td>
<td>Fabaceae</td>
<td>Tree</td>
<td>19</td>
<td>0.23</td>
</tr>
<tr>
<td>31</td>
<td><em>Phoenix dactylifera</em></td>
<td>Aracaceae</td>
<td>Tree</td>
<td>9</td>
<td>0.11</td>
</tr>
<tr>
<td>32</td>
<td><em>Piliostigma reticulatum</em></td>
<td>Fabaceae</td>
<td>Tree/Shrub</td>
<td>3</td>
<td>0.04</td>
</tr>
<tr>
<td>33</td>
<td><em>Polyalthia longifolia</em></td>
<td>Annonaceae</td>
<td>Tree</td>
<td>101</td>
<td>1.22</td>
</tr>
<tr>
<td>34</td>
<td><em>Psidium guajava</em></td>
<td>Myrtaceae</td>
<td>Tree</td>
<td>190</td>
<td>2.29</td>
</tr>
<tr>
<td>35</td>
<td><em>Roystonea oleracea</em></td>
<td>Arecoideae</td>
<td>Tree</td>
<td>13</td>
<td>0.16</td>
</tr>
<tr>
<td>36</td>
<td><em>Sclerocarya birrea</em></td>
<td>Anacardiaceae</td>
<td>Tree</td>
<td>1</td>
<td>0.01</td>
</tr>
<tr>
<td>37</td>
<td><em>Senya siamea</em></td>
<td>Fabaceae</td>
<td>Tree</td>
<td>109</td>
<td>1.32</td>
</tr>
<tr>
<td>38</td>
<td><em>Stereospermum kanthianum</em></td>
<td>Bignoiaceae</td>
<td>Tree/Shrub</td>
<td>9</td>
<td>0.11</td>
</tr>
<tr>
<td>39</td>
<td><em>Tamarindus indica</em></td>
<td>Fabaceae</td>
<td>Tree</td>
<td>55</td>
<td>0.67</td>
</tr>
<tr>
<td>40</td>
<td><em>Terminalia catappa</em></td>
<td>Combretaceae</td>
<td>Tree</td>
<td>3</td>
<td>0.04</td>
</tr>
<tr>
<td>41</td>
<td><em>Vitellaria paradoxa</em></td>
<td>Sapotaceae</td>
<td>Tree</td>
<td>3</td>
<td>0.04</td>
</tr>
<tr>
<td>42</td>
<td><em>Vitex doniana</em></td>
<td>Verbenaceae</td>
<td>Tree</td>
<td>8</td>
<td>0.1</td>
</tr>
<tr>
<td>43</td>
<td><em>Ziziphus spina- christi</em></td>
<td>Rhamnaceae</td>
<td>Tree</td>
<td>5</td>
<td>0.06</td>
</tr>
</tbody>
</table>

Total 8,267
Figure 2: Frequency of family distribution of tree species within Kano State University of Science and Technology Wudil, Nigeria

Figure 3: Percentage frequency of family distribution of tree species within Kano State University of Science and Technology Wudil, Nigeria
DISCUSSION

Kano State University of Science and Technology Wudil house a large number of tree stands and tree species cutting across several family and genera. Although the total number of tree stands recorded is higher than that reported by Ikyeagba et al. (2015) and Nodza et al. (2013) both of whom assessed tree composition within some Nigerian universities, the number of tree species, family and genera is less. This could be attributed to the sampling intensity and the variation in ecological zones.

Vegetation cover varies from one ecological region to the other largely attributed to the difference in amount of precipitation (Aregheore, 2009). Surprisingly the number of tree stands, family as well as genera are higher than the figures recorded by Bello et al. (2013) in a forest reserve of Katsina State (Kogo forest reserve) which has similar climatic conditions with Kano State. Similar observation was reported by Zisadza-Gandiwa et al. (2013), they discovered communal land to contain more woody plant species diversity than protected area, a deviation from preconceived notion which suggest that protected areas contain large population of biodiversity than free or communal lands.

Forest reserve is expected to house many tree stand however the level of exploitation and sampling intensity could possibly be responsible for this observation. Moreover even though the University is not a protected area so to say, felling is not allowed which means the level of protection is higher and the level of awareness and condition of living of the university community is higher than people outside. This confirms the report which suggested that illiteracy and poverty are some of the factor responsible for overdependence on fuelwood as a source of energy (Naibbi and Healey, 2013) thereby increasing the rate of deforestation as a result of fuelwood collection. Adelusi et al. (2002) noted that area originally perceived as forest reserves have suffered from
overexploitation leading to massive decline in tree population. 

*Azadirachta indica* and *Eucalyptus camaldulensis* accounts for more than 80% of the total tree stands. This is not surprising because *Azadirachta indica* and *Eucalyptus camaldulensis* has become some of the choice species for planting in Northern part of Nigeria since their introduction in Nigeria. This is attributed to the ease of establishment, fast growth rate and adaptability of these species to the region. They are planted as avenue trees, for shed as well as desertification control in most part of Northern Nigeria.

It is gratifying that indigenous tree species like *Khaya senegalensis*, *Casuarina equisetifolia* and *Adansonia digitata* recorded an impressive number of stands signaling a bit of hope for the future of these species. However, species like *Borassus aethiopum*, *Celtis integrifolia* and *Sclerocarya birrea* recorded 1 tree stand each typical of savanna vegetation signaling the possibility of these trees disappearing in the campus in the near future if care is not taken. Similar results were reported by Tukur *et al.* (2013) when they carry out an inventory of indigenous tree species within Dutsin-Ma area in Katsina state which share similar climatic condition with Kano state. With the exceptions of Fabaceae and Moraceae, Anacardiaceae and Aracaceae, the family are poorly represented, this poor representation of tree species per family is similar to the observation made by Ikyaagba *et al.* (2015) and Nodza *et al.* (2013) implying a possible danger of such plant going into extinction in the near future (Ikyaagba *et al.* 2015) unless efforts are made towards their conservation in the campus.

**CONCLUSION AND RECOMMENDATION**

Kano State University of Science and Technology Wudil house a large number of tree stands. However, majority of the tree stands are exotic trees. Though some indigenous tree species such as *Khaya senegalensis*, *Adansonia digitata* and
*Casuarina equisetifolia* recorded an impressive number of stands, majority of the indigenous tree species recorded few numbers of stands signaling a possible danger of extinction in the campus in the near future if efforts towards the management and conservation of these species are not made. It is therefore recommended that campus tree committee which shall be saddle with the responsibility of conserving and managing tree species within the campus among other things should be constituted. There is also a need for further study in the future that will focus not only on composition but includes other parameters that will assess species richness, evenness, diversity and similarity. These will provide adequate information for conservation and management purpose.

**REFERENCE**


