



WOODY SPECIES COMPOSITION OF A *EUCALYPTUS CAMALDULENSIS* PLANTATION AT BUNUNU, TAFAWA BALEWA LOCAL GOVERNMENT HEADQUARTER BAUCHI STATE NIGERIA

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ABSTRACT

The study accessed the woody species composition within the one-hectare plantation located in Bununu Tafawa Balewa local government area of Bauchi state, Nigeria with the view of providing information on ecological impact of Eucalyptus camaldulensis on natural regeneration of indigenous species. Three quadrats of 10mx10m were selected and total species count conducted in each. Results from the study shows that, there are 236 tree stands in the three selected quadrats representing 18 tree species cutting across 10 families and 13 genera. Eucalyptus camaldulensis recorded the highest frequency and percentage frequency of 98 and 41.53% respectively followed by Acacia ataxacanta with frequency and frequency percentage of 34 and 14% while, Vitellaria paradoxa, Tamarindus indica, Paliostigma reticulata and Cassia singuriana have the least frequency and frequency percentage with 1 and 0.47% respectively. The family Fabaceae/Leguminosae recorded the highest frequency and percentage frequency of 5 and 45.45 while Myrtaceae, Sapotaceae, Apocynaceae, Ebenaceae, Oligocaceae and Zygophyllaceae recorded the lowest frequency of 1 and 1.23% each. Although the introduced Eucalyptus species is the dominant species natural regeneration could be said to be fair probably caused by periodical harvesting of the Eucalyptus species.

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

INTRODUCTION

Despite many uses of plantation forest, intensive monocultures of exotic plantations are widely viewed in a negative light in relation to biological diversity conservation (Carnus et al. 2003).

Among Eucalyptus, Pinus, and Tectona, which are the most commonly used species for plantation purpose throughout the world, Eucalyptus has attracted by far the most criticism (Evans 1992; FAO 2001), e.g, Eucalyptus spp. do not provide organic matter but deplete soil nutrients needed by agricultural crops, compete water resources with agricultural crops, suppress ground vegetation, and result in unsuitability to soil erosion control (Jagger and Pender 2000).

Some studies found that the number of seedlings, density of sapling, and the number of native species in Eucalyptus plantation forests were higher than those in their adjacent disturbed natural forests (Michelsen et al. 1996; Eshetu 2001). Eucalyptus were also found as a succession catalyst that facilitates the recolonization of some native flora through their influence on understory microclimate and soil fertility, suppression of dominant grasses, and provision of habitats for seed dispersing animals (Lugo 1992; Loumeto and Huttlee 1997; Parrotta et al. 1997; Eshetu 2001; Feyera and Demel 2001; Feyera et al. 2002; Mulugeta and Demel 2004; Mulugeta et al. 2004). Generally, all Eucalyptus species may not have equal negative effects on the environment, undergrowth vegetation, and soil fertility, etc. Their effect may vary within different geographical areas, rainfall regimes and within species. The objectives of this study were to investigate the regeneration status of indigenous woody plants in *E. camaldulensis* plantation

MATERIALS AND METHODS

Bununu the headquarters of Tafawa Balewa Local Government Area in Bauchi state lies on latitude 9.89° and longitude 9.72°. The climate is characterized into dry and wet season. The dry season usually starts from October – March, while the rainy season starts from April to September. Mean annual rainfall is about 937.9mm 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 Guinea savanna

Northern guinea savanna is characterized by open woodland or brush with shorter grasses while the southern guinea savanna has taller grasses. common tree and shrubs found in this region includes; *Adansonia digitata*, *Vitex doniana*, *Diospyros mespiliformis*, *Tamarindus indica*, *Khaya senegalensis*, *Acacia senegal*, *Acacia nilotica*, *Acacia seyel*, *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

Enumeration of the total number woody tree species within the selected quadrates was conducted. Identification of tree species was done with aid of local inhabitants. The data was analyzed using descriptive statistics. Spreadsheet package (Microsoft Excel) was used to plot histogram.

Results

The results obtained indicates that, there were two hundred and thirty-six tree stands (236) within the sampled area representing 17 woody species cutting across 10 families and 14 genera (Table1)

Table 1: Woody species composition of Bununu *Eucalyptus camaldulensis* Plantation

	Species	Family	Life form	frequency	% frequency
1	<i>Eucalyptus camaldulensis</i>	Myrtaceae	Tree	98	41.53
2	<i>Zizipus mauritiana</i>	Rhamnaceae	shrub	13	5.51
3	<i>Acacia ataxacantha</i>	Leguminosae		34	14.41
4	<i>Zizipus mucronata</i>	Rhamnaceae		3	1.27
5	<i>Diospyros mespiliformis</i>	Ebenaceae		10	4.24
6	<i>Vitellaria paradoxa</i>	Sapotaceae	Tree	1	0.42
7	<i>Zizipus spinochristi</i>	Rhamnaceae		3	1.27
8	<i>Anogeissus leiocapus</i>	Combretaceae		11	4.66
9	<i>Acacia hebecloide</i>	Leguminosae		25	10.59
10	<i>Acacia siebriana</i>	Leguminosae		4	1.69
11	<i>Balanites egyptiaca</i>	Zygopyllaceae		11	4.66
12	<i>Tamarindus indica</i>	Fabaceae		1	0.42
13	<i>Combretum glutinosum</i>	Combretaceae		17	7.20
14	<i>Ximeria americana</i>	Olacaceae	shrub	3	1.27

15	<i>Guiera senegalensis</i>	Combretaceae	shrub	4	1.69
16	<i>Piliostigma reticulatum</i>	Fabaceae	shrub	1	0.42
17	<i>Carissa edulis Vahl</i>	Apocynaceae	shrub	6	2.54
			total	236	

The highest frequency was recorded *Eucalyptus camaldulensis* (98) as well as percentage frequency 41.53%. *Acacia ataxacantha* has frequency of 34 and frequency percentage of 14%. *Acacia hebecloide* has frequency of 25 and frequency percentage of 10.59%. *Combretum glutinosum* have 17 frequencies and 7.20 frequency percentage. *Zizipus mauritiana* have 13 frequencies and 5.51 frequency percentage. *Anogeissus leiocapus* and *Balanites aegyptiaca* have frequencies and percentage frequencies of 11 and 4.66 respectively. *Diospyros mespiliformis* has frequency of 10 and percentage frequency of 4.24. *Carissa edulis* has frequency of 6 and percentage frequency of 2.54. *Guiera senegalensis* and *Acacia siebriana* have frequencies of 4 and percentage frequencies of 1.69. *Zizipus mucronata* and *Ximenia americana* have frequencies of 3 and percentage frequencies of 1.27. *Vitellaria paradoxa*, *Tamarindus indica* and *Piliostigma reticulatum* have frequencies of and percentage frequencies of 0.42

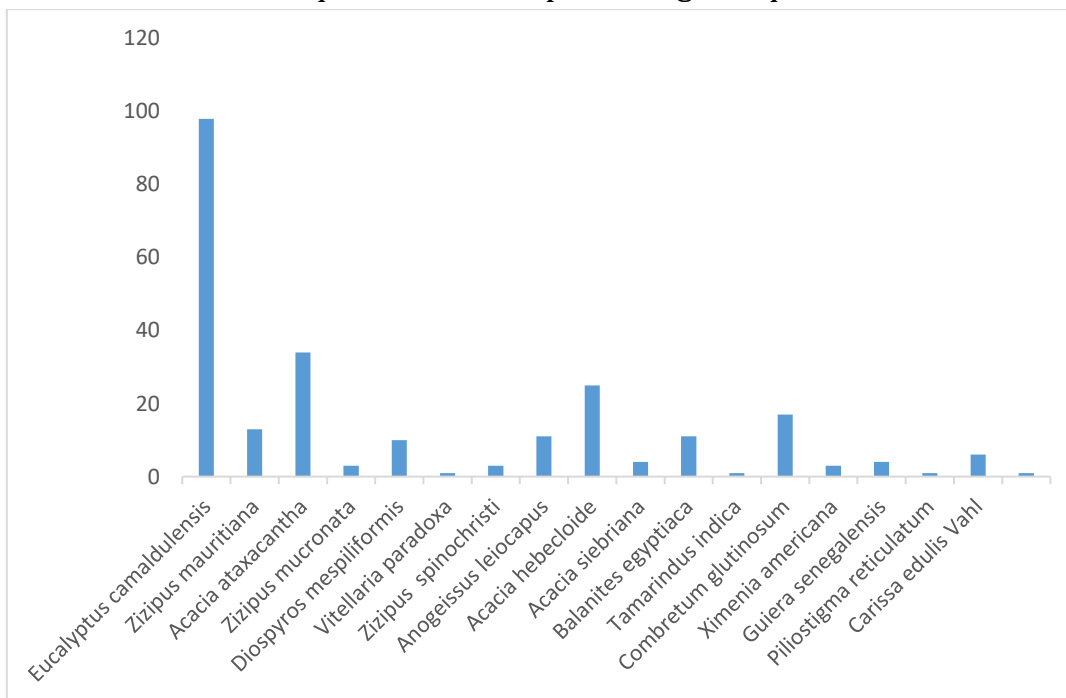


Figure 1: Species frequencies at Eucalyptus Plantation

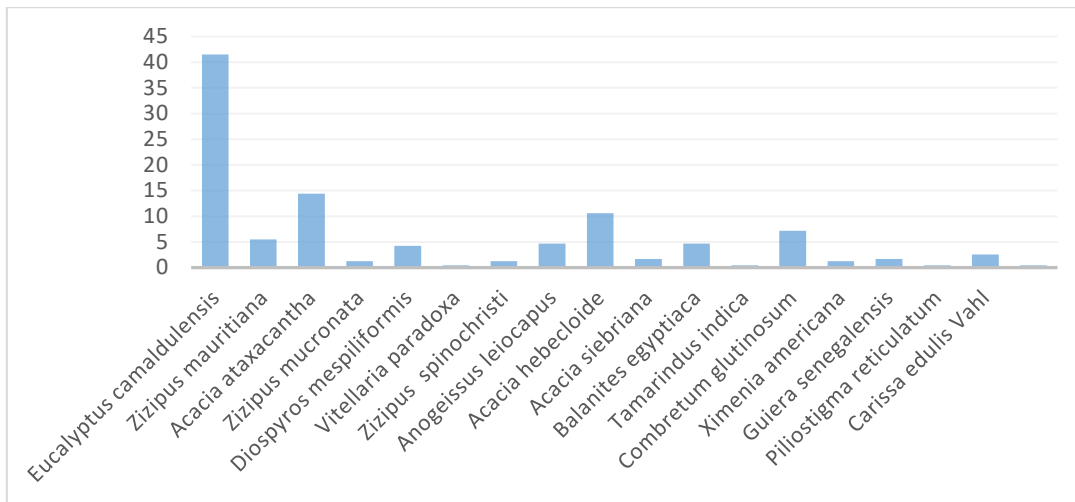


Figure II: Species Frequency Percentage at Bununu Eucalyptus camaldulensis Plantation

Discussion

The regeneration of the native species is fair this may probably be due to the Forest management practice employed in the plantation. The spacing used for plantation species is 4m x 4m this helps in reducing the amount of energy that penetrate the plantation thereby shortening the seed dormancy/seed germination period of the native species especially at the center of the plantation this confirms the finding of Kyereh et al. (1999), who reported that both germination percentage and speed of germination of many tropical forest tree species were adversely affected by high irradiance. Very high irradiances are very often confounded by many other adverse environmental factors such as high soil and air temperatures (Chazdon and Fetcher, 1984; Pritchett and Fisher, 1987; Brown, 1994) as well as rapid evaporation rates (Chazdon and Fetcher, 1984; Fetcher et al., 1985) on the forest floor. Other factors that may contribute in the paucity of native species saplings may include herbivores this is evident in the higher population of members of the genus *Acacia* as compared to other species *Acacias* have a special peculiarity in possessing thorns which helps in resisting browsing pressure by ruminant. The lower frequency percentage of *Vitellaria paradoxum* could be attributed to its palatability to herbivores, competition and the trampling effects of animals: same apply to *Termarindus indica*. *Eucalyptus* is known to do well in an exotic location even under poor soil and low moisture condition and can compete vigorously with the native species because of these reasons and absence of it prevalent natural insect pest. The status of regenerating native species in Bununu *Eucalyptus* plantation may be said to be moderate but further

studies on interaction of litter with seed germination process and effect of energy penetration on native species seed dormancy is highly recommended.

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