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Floristic structure and ecological role of *Rourea afzelii* stand in three savannah ecosystems from Cameroon

Awé Djongmo Victor[1,*], Noiha Noumi Valery[1, 2], Zapfack Louis[3]

[1]Department of Biological Sciences, Faculty of Science, University of Ngaoundere, P.O. Box: 454, Ngaoundere, Cameroon.
[2]Higher Teacher Training College (ENS) of Bertoua, Department of Life Science, University of Ngaoundere, P.O. Box: 652 Bertoua, Cameroon.
[3]Department of Biology and Plant Physiology, Faculty of Science, University of Yaoundé I, P.O. Box: 812 Yaoundé, Cameroon.

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☒*Corresponding author:

Awé Djongmo Victor*
Department of Biological Sciences, University of Ngaoundere, Faculty of Science, PO Box: 454, Ngaoundere, Cameroon.
Email: awevictor20@yahoo.fr

Abstract

The present study investigated the floristic structure and ecological role of *Rourea afzelii* stands in savannah, forest galleries and swampy areas to Cameroon. An 80 m x 50 m transect method was undertaken to measure floristic diversity using Shannon index, Pielou equitability, Simpson's index and the importance value index. The structure of *Rourea afzelii* stands is determined by density, basal area and biovolume. The results of this study show that *Rourea afzelii* stands are more diversified in savannah with a Shannon diversity index (ISH =4 ± 0.03bit). The highest log stability of *Rourea afzelii* stands is observed in the savannah (EQ=0.75 ± 0.008). The Simpson index of the *Rourea afzelii* stands is larger in the forest gallery (D=0.088 ± 0.0022). *Rourea afzelii* Stands are denser in savannah (113 ± 2.54 individuals/ha). The basal area and biovolume of *Rourea afzelii* stands are very high in swamp area (St=15.75 ± 0.02 m^2/ha, Biov=9.08 ± 0.12 m^3/ha). The diametric structure has an asymmetrical "L" shaped appearance, indicating a strong regeneration of *Rourea afzelii* Stands in the three sites studied. *Rourea afzelii* Stands in forest galleries sequestered more carbon (26.41 ± 0.0015 ton C/ha) than those in savannahs and swampy areas. This value corresponds to sequestration of carbon dioxide of 96.92 ± 0.82 ton CO_2/ha. Economically, this corresponds to the CDM carbon price (290.77± 3.332 Euros/ha), a Voluntary Market Carbon Price of 455.54 ± 1.908 Euros/ha, a REDD + carbon price of 9692 ± 8.152 Euros/ha. In conclusion, the results of this study can be used in the context of protection and conservation as well as the domestication of such a species.

1. INTRODUCTION

Rourea afzelii is a tropical woody species with significant economic potential. It is a lianascent shrub to segmenting or small tree of 3-4m high. This species belongs to the family Connaraceae. It is generally found in savannas and Guinean forest galleries. In the Adamawa region, indigenous peoples use branches and gills as firewood. Its fruits are edible and marketed (Arbonnier, 2000). Usually used in medico-magic (specially to have a stable home). This species is importance socio-economic and environmental. According to the Red List of the International Union for the Conservation of Nature (IUCN), *Rourea afzelii* is listed in this list as a species with special status vulnerable. Species may be known in Cameroon and in some countries of the world for which no study has been discussed on its floristic diversity and carbon sequestration potential. This study will provide data to serve as a frame of reference. Hence the main objective of this work is to study the floristic structure and ecological role of the *Rourea afzelii* stands in the savannah, forest galleries and swamps area from Cameroon for a great importance to its great potential for conservation and sustainable management.

2. MATERIALS AND METHODS

2.1. Study area

The study was carried out in Adamawa region Cameroon, Vina Department, located between the 6th and 8th degrees of north latitude and the 11th and 16th degrees of east longitude. It has an area of 63138 km^2 (Noiha *et al.*, 2018b) (Fi.1). It consists, in the main, highlands of altitude ranging from 900-1900 m. Adamawa plateau (Cameroon water tower) is located in the center of the country with an average altitude of 1100 m (Noiha *et al.*, 2018b). The relief is very contrasted and compartmentalized. The climate of this region is tropical type with bimodal rainfall in the low savannahs of Central and Eastern and monomodal (a dry season and a wet season) in the northern part. Average annual rainfall ranges from 900-1500 mm and decreases as we move north. Temperatures vary between 22°C and 24°C (Noiha *et al.*, 2018b). The evaporation is less strong in the rainy season, on average 65 mm of the total value in

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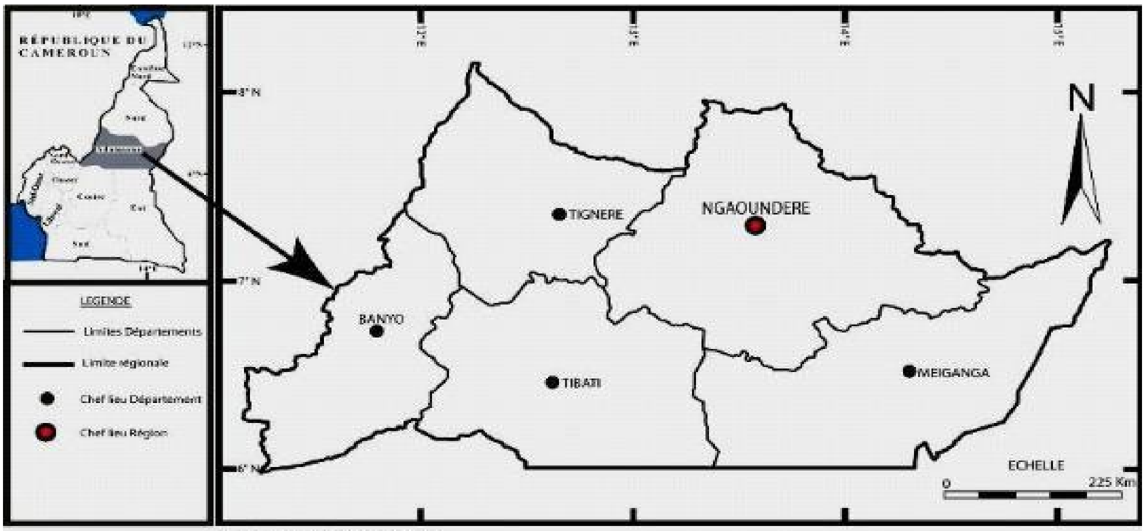
the month; it is, on the other hand, more intense when the rainfall is nil (152 mm). The soils of the region are ferruginous with intrusions of ferralitic soils that cover the basaltic, granitic and sedimentary rocks. The Adamawa plateau is the country's water tower on crystalline basement covered with granitic and basaltic rocks. The vegetation consists of a low elevation savannah dominated by *Daniella oliveri* and *Lophira lanceolata* (Letouzey 1985). Livestock and agriculture are the main activities of local populations (Noiha *et al.*, 2018b).



Source : Projet GESEP/MINEPIA, Juin 2005

Figure 1: Geographic location of the study area in Adamawa Region Cameroon

2.2. Data collection

2.2.1. Sampling

Sampling consists of transects ranging from 80 m long to 50 m wide. These transects were arranged in a North-South direction so as to cover most or all of the *Rourea afzelii* stands in the three sites studied. The sampling tapes were established using the wires and the compass. At the ends of each band, the milestones were marked equidistant 10 m from the base. At each distance of 10 m, only *Rourea afzelii* have been inventoried. Geographic coordinates were collected using GPS for each tree in the sample to determine its geographical location on the ground. All the trees were systematically counted and measured. Dendrometric data were based on dbh (Diameter of Breast height), height and trunk size. Thus, the circumferences of *Rourea afzelii* were measured using a tape measure at 1.3 m from the ground for large trees and 50 cm from the ground for shrubs and shrubs. All *Rourea afzelii* undergoing the dbh measurement were numbered with indelible markers to facilitate identification.

2.2.2. Data Analysis

The data have been encoded in the Excel Software and then analyzed using software Statgraphics plus 5.0. Testing the significance has been achieved thanks to the test of Duncan to 5%.

The analysis of the plant diversity focused on:

-The actual species richness (**N**) indicates the number of species responsible for the observed diversity. It is given by the formula: $N = 2^H$; 2 is the basis of the logarithm used to calculate the Shannon H diversity index.

- **Shannon Diversity Index** (**H**) (Frontier and Pichod-viale, 1992): $H = -\Sigma\ (ni/N)*Log_2\ (ni/N)$, with ni = number of species i, N = effective of all species; ISH is expressed in bit.

-**Equitability of Piélou** (**EQ**) (Pielou, 1969): $EQ = H/Log_2N$.

- **Simpson's index** (Colinvaux, 1986): $D = 1-[(ni\ (ni - 1))/(N\ (N - 1))]$.

- **Importance Value Index (IVI)** (Curtis and Macintosh (1950)): IVI = Relative Dominance (Species) + Relative Density (Species) + Relative Frequency (Species).

- **Density** (D): D = n/S; D: density (in trees/ha), n: number of trees present on the surface considered and S: surface area (ha).

-**Basal area** of a tree corresponds to the area occupied by the tree trunk at the level of the dbh. It is given by the formula: Basal area = $dbh^2 \times 0.25 \times 9$ (Dawkins, 1959).

-**Biovolume** is defined as the volume of wood provided by vegetation in a given area. It makes it possible to estimate the wood potential of the plant formation. It is given by the formula of Dawkins. (1959): V=0.53 ågi x hi x ni with gi: basal area (m^2/ha) with hi: height of the barrel (m); ni: number of individuals; V: biovolume (m^3/ha). According to Roger and Rabarison (2000), the biovolume is high when it is higher than 250 m^3/ha, average when it is between 50 and 250 m^3/ha and low when it is lower than 50 m^3/ha.

-Relative density = (total basal area for one species/total basal area of all species) × 100.

-Relative density = (number of individuals of the species/total number of individuals all species combined) × 100.

- Relative frequency = (frequency of species/sum of all frequencies of other species) × 100.

-Relative diversity = (number of species in the family/total number of species present) × 100.

- Importance Value Index (IVI) = relative dominance + relative density + relative frequency.

2.2.3. Estimation of the carbon stock

- Aboveground biomass: AGB = Expo (-3.114 + 0.9719*Ln (D^2H)) (Segura *et al.*, 2005) with Ba is the above-ground biomass of the tree in kg, D is the diameter at breast height in m and H the height of the tree in m. the amount of carbon (ton C/ha) is obtained by multiplying this biomass by a conversion factor: FC = 0.50; then it is converted into tons of carbon per ha.

-Below Ground Biomass: BGB = BGB = AGB × R (Chavan & Rasal, 2012) with: BGB = Below Ground Biomass (Kg). ABG=Aboveground biomass (Kg). R = Root to shoot ratio = 0.26. The amount of carbon (Kg/ha) will be obtained by multiplying this biomass by a 50% conversion factor (IPCC, 2006).

- Total Carbon stock: CE = Bt × FC (Ibrahima *et al.*, 2002) with CE=Carbon stored in total biomass (ton C/ha), Bt=total biomass (ton C/ha) and FC = Carbon fraction (%). FC = 50%.

2.2.4. Quantity of CO_2 and Economic Value

Given the economic challenge related to the carbon stock, we estimated the financial cost of the carbon content of the *Rourea afzelii* stands in the three sites studied. The total carbon stock in C/ha was converted to the equivalent amount of CO_2 absorbed using the ratio of 44/12 to the CO_2/C ratio. Several carbon markets have been in place since the 2000. However, we opted for CDM; Voluntary markets and REDD+ market prices. The average selling price of the forest credit is 3 euro/teq CO_2 for the CDM; 4.7 euro/teq CO_2 for voluntary markets (Chenost *et al.*, 2010) and 100 euro/ teqCO_2 (high value) for REDD + (Ecosystems Marketplace, 2017 *in* Noiha *et al.*,2018 b; Awé *et al.*, 2019).

3. RESULTS AND DISCUSSION

3.1. Index of floristic diversity of *Rourea afzelii* stand in savannah, forest gallery and swampy areas

Rourea afzelii stands are more diversified in savannah with a Shannon diversity index (ISH=4 ± 0.03bit) higher compared to that of the forest gallery and swampy areas. The statistical analysis shows a very significant variation (*P=0.002<0.05*) of the Shannon diversity index between *Rourea afzelii* stands in the three sites studied. The highest log stability of *Rourea afzelii* stands is observed in savannah (0.75 ± 0.008) with a slight significant variation (*P=0.049 ≤ 0.05*). The Simpson's highest index of *Rourea afzelii* stands is observed in the forest gallery (0.088 ± 0.0022) with highly significant variation in the three sites studied (*P=0.029≤0.05*). The species richness of *Rourea afzelii* stands is higher in savannah (20 ± 0.6 species/ha) than in the forest gallery and wetland area with a significant difference (*P= 0.01<0.05*) in the three sites studied. The number of stems per hectare of *Rourea afzelii* stands is higher in savanna (113 ± 2.54 stems/ha) than in the gallery and swamp area. The statistical analysis shows a very significant variation in the number of stems per hectare between the *Rourea afzelii* stands in the sites (*P=0.04 <0.05*) (Table 1).

Table 1: Index of floristic diversity of the *Rourea afzelii* stand in savannah, forest gallery and swampy areas

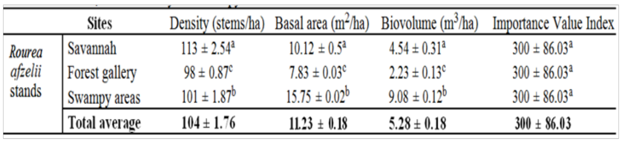
Dendrometric Parameter of *Rourea afzelii* stand					
Sites	ISH	EQ	D	RS	Number of stems per hectare
Savannah	4 ± 0.03^b	0.75 ± 0.008^b	0.077 ± 0.0015^b	20 ± 0.6^b	113 ± 2.54^b
Forest gallery	3.6 ± 0.04^a	0.67 ± 0.001^a	0.088 ± 0.0022^a	11 ± 0.4^a	98 ± 0.87^a
Swampy areas	2.70 ± 0.01^c	0.29 ± 0.006^c	0.074 ± 0.0003^c	15 ± 0.3^c	101 ± 1.87^c
Total average	**3.43 ± 0.026**	**0.57 ± 0.005**	**0.079 ± 0.001**	**15.33 ± 0.43**	**104 ± 2.08**

ISH: Shannon index; EQ: Pielou equitability; D: Simpson's index; RS: Specific richness. The assigned values of the same letter are not statistically different (p> 0.05, Duncan's test).

3.2. Structural index of *Rourea afzelii* stand in savannah, forest gallery and swampy areas

The statistical analysis shows a very significant variation (*P=0.032 <0.05*) of the density between the *Rourea afzelii* stands in the three sites studied. Stands in *Rourea afzelii* are denser in savanna (113 ± 2.54 individuals/ha) than in forest galleries and swamp area. The largest basal area of the stands at *Rourea afzelii* is observed in swamp area (15.75 ± 0.02 m^2/ha) with a very significant difference (*P=0.015 <0.05*) in the three sites studied. Statistical analysis shows a significant difference in the biovolume of *Rourea afzelii* stand between the three sites (P = 0.000 <0.05). The highest biovolume of *Rourea afzelii* stands was recorded in the swamp area (9.08 ± 0.12 m^3/ha). The statistical analysis does not show a significant difference in the importance value index between *Rourea afzelii* stands at the three sites (P = 0.27> 0.05). It is 300 ± 86.03 at the three sites (Table 2).

Table 2: Density, Basal Area, Biovolume, and importance value index of *Rourea afzelii* stand in Savannah, Forest Gallery and swampy areas



	Sites	Density (stems/ha)	Basal area (m^2/ha)	Biovolume (m^3/ha)	Importance Value Index
Rourea afzelii stands	Savannah	113 ± 2.54^a	10.12 ± 0.5^a	4.54 ± 0.31^a	300 ± 86.03^a
	Forest gallery	98 ± 0.87^c	7.83 ± 0.03^c	2.23 ± 0.13^c	300 ± 86.03^a
	Swampy areas	101 ± 1.87^b	15.75 ± 0.02^b	9.08 ± 0.12^b	300 ± 86.03^a
	Total average	**104 ± 1.76**	**11.23 ± 0.18**	**5.28 ± 0.18**	**300 ± 86.03**

The assigned values of the same letter are not statistically different (*p> 0.05*, *Duncan's test*).

The statistical analysis of the number of stems per hectare according class of diameter to *Rourea afzelii* stands in savannah, forest gallery and swampy area shows that there is a highly significant difference (p <0.05) at level of sites with higher values at the savanna level. This distribution has appearance of curve in dissymmetrical close with a predominance of the class 20-30 cm in number of stems. This distribution fits better with a polygonal function whose equation is: $y = 2.75x^3 - 25.25x^2 + 65x - 31.2$ and $R^2 = 0.9689$ (Fig.2).

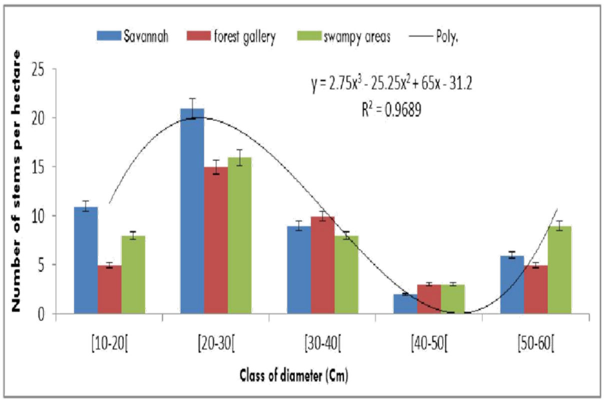


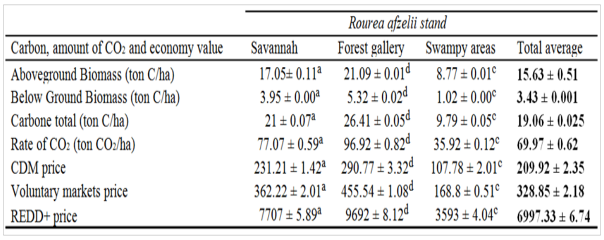
Figure 2: Distribution of the number of stems per hectare according to the diameter classes of *Rourea afzelii* stands in savannah, forest gallery and swampy areas. The assigned values of the same letter are not statistically different (*p> 0.05*, *Duncan's test*).

3.3. Carbon stock, ecological value and carbon prices

Aboveground carbon stocks varies very highly between of the *Rourea afzelii* stands in three sites studied (*P=0.0002 < 0.05*). The maximum value of aboveground carbon stock of the *Rourea afzelii* stand is observed in the forest gallery (21.09 ± 0.0011 ton C/ha). Then it decreases significantly in the savannah (17.05 ± 0.0014 tonC/ha) and in the swampy area (8.77 ± 0.001 tonC/ha) (Table 3). Analyze of variance reveals a highly significant difference (P = 0.0034 < 0.05) of belowground carbon stocks between of the *Rourea afzelii* stands in three sites studied. The belowground carbon stocks of the *Rourea afzelii* stand are maximum in the forest gallery (5.32 ± 0.002 ton C/ha), then decrease gradually in the savannah (3.95 ± 0.00 ton C/ha) and swampy area (1.02 ± 0.00 ton C / ha) (Table 3). The total carbon stock varies very highly between of the *Rourea afzelii* stands in three sites studied (*P = 0.0008< 0.05*). The maximum value of the total carbon stock of the *Rourea afzelii* stand is observed in the forest gallery (26.41 ± 0.0015 ton C/ha). Then it decreases significantly in the savannah (21 ± 0.0007 ton C/ha) and swampy area (9.79 ± 0.0005 ton C/ha) (Table 3).

The amount of CO_2 to *Rourea afzelii* stand is highest in the forest gallery (96.92 ± 0.82 ton CO_2/ha). It is followed by savannah (77.07 ± 0.59 ton CO_2/ha) and swamp area (35.92 ± 0.12 ton CO_2/ha) (Table 3). The analysis of variance, which shows a highly significant difference (*P = 0.00065 < 0.05*) of the amount of CO_2 between of the *Rourea afzelii* stands in three sites studied (Table 3). Analysis of variance shows a significant difference in economic value between of *Rourea afzelii* stands at the three sites (*P = 0.0000 <0.05*). The economic value of the *Rourea afzelii* stand is very important in the forest gallery at the CDM carbon price (290.77 ± 3.332 Euros / ha), a Voluntary Market Carbon Price (455.54 ± 1.908 Euros / ha) and REDD + carbon price (9692 ± 8.152 Euros / ha) (Table 3).

Table 3: Carbon, amount of CO_2 and economy value



	Rourea afzelii stand			
Carbon, amount of CO_2 and economy value	Savannah	Forest gallery	Swampy areas	Total average
Aboveground Biomass (ton C/ha)	17.05 ± 0.11^a	21.09 ± 0.01^d	8.77 ± 0.01^c	**15.63 ± 0.51**
Below Ground Biomass (ton C/ha)	3.95 ± 0.00^a	5.32 ± 0.02^d	1.02 ± 0.00^c	**3.43 ± 0.001**
Carbone total (ton C/ha)	21 ± 0.07^a	26.41 ± 0.05^d	9.79 ± 0.05^c	**19.06 ± 0.025**
Rate of CO_2 (ton CO_2/ha)	77.07 ± 0.59^a	96.92 ± 0.82^d	35.92 ± 0.12^c	**69.97 ± 0.62**
CDM price	231.21 ± 1.42^a	290.77 ± 3.32^d	107.78 ± 2.01^c	**209.92 ± 2.35**
Voluntary markets price	362.22 ± 2.01^a	455.54 ± 1.08^d	168.8 ± 0.51^c	**328.85 ± 2.18**
REDD+ price	7707 ± 5.89^a	9692 ± 8.12^d	3593 ± 4.04^c	**6997.33 ± 6.74**

The assigned values of the same letter are not statistically different (*p> 0.05*, *Duncan's test*).

3.4. Structural dynamics of vegetation

Investigations show that, *Rourea afzelii* stands are more diversified in the savannah with a higher Shannon diversity index compared to that of the forest gallery and the swampy area. In the forest gallery and the swampy area, the *Rourea afzelii* stands are not diversified because we note the intense development of market gardening and rain-fed activities accompanied by livestock farming, especially small ruminants in these areas. This causes the destruction of several feet of *Rourea afzelii*. According to Wezel. (2004 *in* Ousmane *et al.*, 2013) more than the climatic factor, it is the anthropic pressure that completes the disappearance of the species and therefore of biodiversity after climate change has led to the loss of density of ligneous species (Gonzalez, 2001). The vegetation of *Rourea afzelii* stands is very heterogeneous in the three sites studied, as evidenced by the relatively low level of fairness in all sites. Simpson's index of *Rourea afzelii* stands in the three sites studied is very low, the distribution of the flora is heterogeneous and the probability that two individuals are randomly selected belonging to the same species is low in these three sites. The highest basal area of *Rourea afzelii* stands observed in swampy areas compared to savannah and gallery forests can be explained by the more or less good development of trees because of the ecological conditions of this area. In fact, the marshy area is wetter than the savannah and the forest gallery, which is an important factor for the good development of the feet of *Rourea afzelii*. The high density of *Rourea afzelii* stands observed in savannah can be explained by the opening of the savannah shrub layer in the forest gallery and marsh area. This opening favors the development of the feet of *Rourea afzelii* through the penetration of solar rays on the ground, which is not the case in gallery forest and marsh area where there is competition in light of the species of the floor dominant. The biovolume value of the *Rourea afzelii* stands in the three sites studied is less than 50 m^3/ha, which shows that the three sites studied have a low potential for exploitable *Rourea afzelii*. The importance value index of *Rourea afzelii* stands does not vary between the three sites studied with a very high average value (IVI = 300), this could be explained by the strong presence of tall-topped trees in these sites. Three sites studied. This result follows the same trend as Akpo (1993 *in* Ngom *et al*., 2013), which states that tall trees contribute more to recovery and to a certain degree of recovery; they modify ecological conditions by reducing the evaporative power of the air, by promoting soil moisture balance and by improving fertility. The stand-level structure at *Rourea afzelii* stands shows a very large distribution of individuals at the second diameter classes. This indicates that, *Rourea afzelii's* feet are predominant in the savannah. This is due to the fact that all over the savannah, the feet of *Rourea afzelii* are very exploited by the populations and the domestic herbivores during the dry season. They are then destroyed irreversibly and the fragile overexploited pastures degrade (Diallo *et al*., 2012). This explains the scarcity of feet in *Rourea afzelii* in the areas studied. This rarity also reflects the inability of *Rourea afzelii's* feet to normally believe in thickness due to accumulated water deficits.

3.5 Ecological role: Carbon stock, CO_2 levels and different carbon prices

The carbon stock of *Rourea afzelii* stands found in the forest gallery (21.09 ± 0.0011 ton C/ha) is much higher than those found in the savannah (17.05 ± 0.0014 ton C/ha) and the marshy area (8.77 ± 0.001 ton C/ha). These results are in the intervals of 13-42 ton C/ha obtained by Schroth *et al*. (2002), at 7-25 ton C/ha obtained by Albrecht and Kandji (2003), at 2.86 to 24.45 ton C/ha found by Ananthi *et al*. (2016) in a plantation in *Manilkara zapota* in Taramani; at values 12-33 ton C/ha and 11-26 ton C/ha found by Noiha *et al*. (2017a and b) in a cashew tree and Eucalyptus agroecosystem, as well as those obtained in the agrosystems in the central Himalayas of India, in the agrosystems of the lowland tropical moist forests in Costa Rica and in young stands in *Annona reticulate* and *Annona squamosa* from the Aurangabad University Campus (Prakash & Lodhiyal, 2009, William *et al*., 2011, Chavan & Rasal, 2012). This superiority of the amount of aerial carbon of the *Rourea afzelii* stands found in the forest gallery can be explained by an increase in biomass per unit area resulting from undisturbed plant growth by man. The low values of the aerial carbon stocks of the *Rourea afzelii* stands found in the swamp area can be summed up by strong anthropogenic interventions which are explained by the fact that the aerial parts of the trees are exploited quickly and/or diminished by the accidental fires. But also with increasing exploitation of forest resources for wood and coal production (Zapfack *et al.,* 2013**;** Noiha *et al*., 2018a, 2018b; Awé *et al*., 2019).

The Belowground carbon stock of *Rourea afzelii* stands found in the forest gallery (5.32 ± 0.002 ton C/ha) is much higher than those found in the savanna (3.95 ± 0.00 ton C / ha) and the swampy area (1.02 ± 0.00 ton C/ha). These results do not corroborate the work of several authors: Chavan *et al*. (2012); Noiha *et al.* (2017a, 2017b); Palm *et al*. (2000). This difference could be explained mainly by the different textures and biochemical compositions of soils as well as anthropogenic factors (bush fires, logging, slash-and-burn cultivation) and biophysical factors (erosion, stripping of surface, mechanical action clearing and oxidation of organic matter) that destroy and reduce the organic restitution of the medium to the soil.

The total carbon stock of *Rourea afzelii* stands found in the forest gallery (26.41 ± 0.0015 ton C/ha) is higher than those found in the savannah (21 ± 0.0007 ton C/ha) and the swamp area (9.79 ± 0.0005 ton C/ha) .This result is close to those of Ananthi *et al*.(2016) in 10-year-old teak plantations (27.33 ton C/ha), 15 years old (29.51 ton C/ha) in India is in the range 17.93-365.87 ton C/ha obtained by Ananthi *et al.* (2016) in plantations at *Tectona grandis* in India, at the interval 16.78-524.22 ton C/ha given by Ananthi *et al.* (2016) in coconut plantations of India. The total carbon stock of *Rourea afzelii* stands found in savannah (21 ± 0.0007 ton C/ha) is similar to 21.27 ± 0.13 ton C/ha and 23.50 ± 0.38 ton C/ha found by Noiha *et al.* (2017b; 2018a) in Eucalyptus plantations and reforestation at *Gmelina arborea* in Cameroon; at 23.00 ton C/ha found by Ananth *et al.* (2016) in 5-year-old teak plantations in India. This is due to the different geographical areas studied, the sampling method and allometric equations used by the authors, dbh, basal area and tree density of the selected and studied plantations. The ecological and economic values of *Rourea afzelii* stands found in savannah, forest gallery and swamp area are very encouraging. It is necessary that the services in charge of rural development sensitize the populations for a better management of this species in the perspective of the reduction of greenhouse gases.

4. CONCLUSION

The main objective of this work was to study the structure, the floristic structure and ecological role of *Rourea afzelii* stand in the savannah, forest galleries and swamp area of Cameroon for great importance to its great potential for conservation and sustainable management. Each of the *Rourea afzelii* stand in the savannah, forest gallery and swamp area studied is each characterized by a structure and an ecological asset under the influence of edaphic, climatic and anthropic conditions. The latter have, in fact, revealed a number of stems feet per hectare, which is nonetheless negligible but exposed to an intense and continuous degradation, which risks in the near future the disappearance of the useful species for humans. Given its ecological importance, where it sequesters an average of 19.06 ± 0.025 ton C/ha, this makes of the *Rourea afzelii* stands contributory lungs to mitigate the mitigations of climatic disturbances. Finally, these results are also an important economic, ecological and dynamic informative value to serve as a basis for guiding any program of action aimed at the conservation and sustainable management of this species.

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