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Diversity and Nutritional analysis of genus *Alternanthera* Forssk. in the area of Western Ghats, Karnataka, India

Sathisha A.M., Abhijit H. U.* and Kalleshappa. K.M.

Department of PG Studies & Research in Applied Botany, Kuvempu University Jnanasahyadri, Shankaraghatta, Shivamogga, Karnataka, India

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ABSTRACT

Present communication provides the diversity of *Alternanthera* genus of family Amaranthaceae by conducting extensive and intensive field survey from July 2018- July 2021, in the different parts of Chikkamagaluru district of Karnataka. A total of 6 species were documented and their nutritive values were determined.

Key words : Amaranthaceae, Micro & Macro nutrients, Central Western Ghats, Distribution.

Introduction

The family Amaranthaceae is commonly distributed in tropical and temperate regions, globally represented by a total of 2500 species belonging to 175 genera and in Indian scenario 50 species belonging to 18 genera (Christenhusz and Byng, 2016). The genus *Alternanthera* contains 80 species globally (Siqueria and Guimaraes, 1984) and it generally treated as weeds, grows commonly on agricultural lands, road sides, water logged area and waste lands (Ngugi, 1978) but this has good medicinal property and commonly used in traditional medicine practices and also Indian system of medicine.

Nature has a very rich botanical wealth with diverse types of plants which are grown in various parts of the country. Plants are used as food, drug and medicinal extract from dates back to the modern day of man on earth. Local medicinal plants and wild herbs of great significance to the sustainable health of individuals and its geo-communities (Ramani *et al.*, 2017).

Materials and Methods

Study area: The Chikkamagaluru district (12° 55' and 13° 54'N to 75° 05' and 76° 22') located in the west part of Karnataka State. It consists of both wet and dry habitats include tropical evergreen forests, tropical deciduous forests and scrubby forests. The elevation ranges from 550- 1925 m.

Methods: The samples were collected by conducting field survey during the period of July 2018 to July 2021 in the different habitats of study area. Collected samples were identified by available flora (Saldanha and Nicolson, 1976; Yoganarasimhan and Razi, 1981; Saldhanha, 1884; Gamble, 1998; Ramaswami *et al.*, 2001; Puneckhar and Lakshminarasimhan, 2011; Bhat, 2014) and herbarium prepared by using standard method (Rao and Sharma, 1990). The herbarium samples of documented species were deposited in Herbarium, Department of Applied Botany, Kuvempu University Shivamogga, Karnataka (KUAB 4690- KUAB 4695).

Nutrition analysis: The fresh plants which were good condition were thoroughly washed with wa-

ter. The plants were collected and chopped in small pieces and dried in shades on laboratory at ambient temperature for one or two week to ensure that they were completely dried. About 200 gm leaves were pulverized in a grinder for 3 min and stored in dark bags to protect them for humidity and light and next to be prior to analysis (Khan, 2016).

Results and Discussion

A total of 6 species were documented from different sites of Chikkamagaluru district. Among them maximum number of species were found in Ajjampura, Tarikere and Kadurtaluks (6 species), followed by Chikkamagaluru and N. R. Purataluks (5 species), Koppa and Mudigeretaluks (4 species), and less number of species in Sringeri and Kalasataluks (3 species) (Table 1).

Artificial key for the identification of Species of *Alternanthera* Forssk.

- 1a. Aquatic or semiaquatic 2
- 1b. Terrestrial 3
- 2a. Stem-Hallo.....*Alternanthera philoxeroides* (Mart.) Griseb.
- 2b. Stem Normal *Alternanthera sessilis* (L.)R.Br. ex DC.
- 3a. Ornamental.....*A. brasiliiana*(L.) Kuntze

- 3b. Wild 4
- 4a. Flowers numerous *Alternanthera bettzickiana* (Regel) G.Nicholson
- 4b. Flowers few 5
- 5a. Tepals equal and distinct... *Alternanthera pungens* Kunth
- 5b. Tepals Unequal..... *Alternanthera ficoidea* (L.) P. Beauv.

Elemental Composition of *Alternanthera* Forssk. Species

The macronutrient Nitrogen was maximum in *Alternanthera philoxeroides* (5.28%), followed by *Alternanthera pungense* (2.69%), *Alternanthera abettzikiana* (2.59%), *Alternanthera sessilis* (1.89%), and less in *Alternanthera ficoidea* (0.42%). The phosphorus was maximum in *Alternanthera pungense* (0.28%), fol-

Table 3. Micro nutrients composition in five species of *Alternanthera*

Sl No.	Species name	Micronutrients in ppm (Mean ± St.Dev)			
		Fe	Mn	Zn	Cu
1	<i>A. bettzikiana</i>	606.06	161.35	37.95	11.35
2	<i>A. ficoidea</i>	2.99	80.85	25.35	9.65
3	<i>A. philoxeroides</i>	434.2	302.8	16.8	10.01
4	<i>A. pungense</i>	682.5	61.5	42.42	11.4
5	<i>A. sessilis</i>	486.6	156.5	46	9.7

Table 1. Taluk wise distribution of species.

SL.No	Taluks	<i>A. bettzikiana</i>	<i>A. brasiliiana</i>	<i>A. ficoidea</i>	<i>A. philoxeroides</i>	<i>A. pungense</i>	<i>A. sessilis</i>
01	Chikkamagaluru	*	*	*	-	*	*
02	Tarikere	*	*	*	*	*	*
03	Mudigere	*	*	*	-	-	*
04	Sringeri	-	*	*	-	-	*
05	Koppa	-	*	*	*	-	*
06	N. R. Pura	*	*	*	*	-	*
07	Kadur	*	*	*	*	*	*
08	Kalasa	-	-	*	*	-	*
09	Ajjampura	*	*	*	*	*	*

Table 2. Macro nutrients composition in five species of *Alternanthera*.

Sl. No.	Species name	Macronutrient in % (Mean ± St.Dev)				
		N	P	K	Ca	Mg
1	<i>A. bettzikiana</i>	2.59	0.132	2.26	0.298	0.073
2	<i>A. ficoidea</i>	0.42	0.167	2.89	0.314	0.072
3	<i>A. philoxeroides</i>	5.28	0.18	2.53	0.312	0.074
4	<i>A. pungense</i>	2.69	0.28	1.99	0.305	0.074
5	<i>A. sessilis</i>	1.89	0.25	2.52	0.308	0.072

lowed by *Alternanthera sessilis*(0.2%), *Alternanthera philoxeroides* (0.18%) *Alternanthera ficoidea* (0.167%) and less in *Alternanthera bettzikiana* (0.132%). The Potassium was found normal in all the species but little bit maximum in *Alternanthera ficoidea* (2.89%) and minimum in *Alternanthera pungense* (1.99%). The Calcium and Magnesium were found normal in all the species of *Alternanthera*.

The micronutrient Iron was maximum in *Alternanthera pungense* (682.5 ppm) followed by *Alternanthera bettzikiana* (606.06 ppm), *Alternanthera sessilis* (486.6 ppm), *Alternanthera philoxeroides* (434.2 ppm) and less in *Alternanthera ficoidea* (299 ppm). The Manganese was found maximum in

Alternanthera philoxeroides (302.8 ppm) followed by *Alternanthera bettzikiana* (161.35 ppm), *Alternanthera sessilis*(156.5 ppm), *Alternanthera ficoidea* (80.85 ppm) and less in *Alternanthera pungense* (61.5 ppm). The Zinc was found maximum in *Alternanthera sessilis* (46 ppm), followed by *Alternanthera pungense*(42.42 ppm), *Alternanthera bettzikiana* (37.95 ppm), *Alternanthera ficoidea* (25.35 ppm), and less in *Alternanthera philoxeroides* (16.8 ppm). The Copper was found normal in all species.

Summary and Conclusion

Sidanand and Kotresha (2011), reported 4 species in

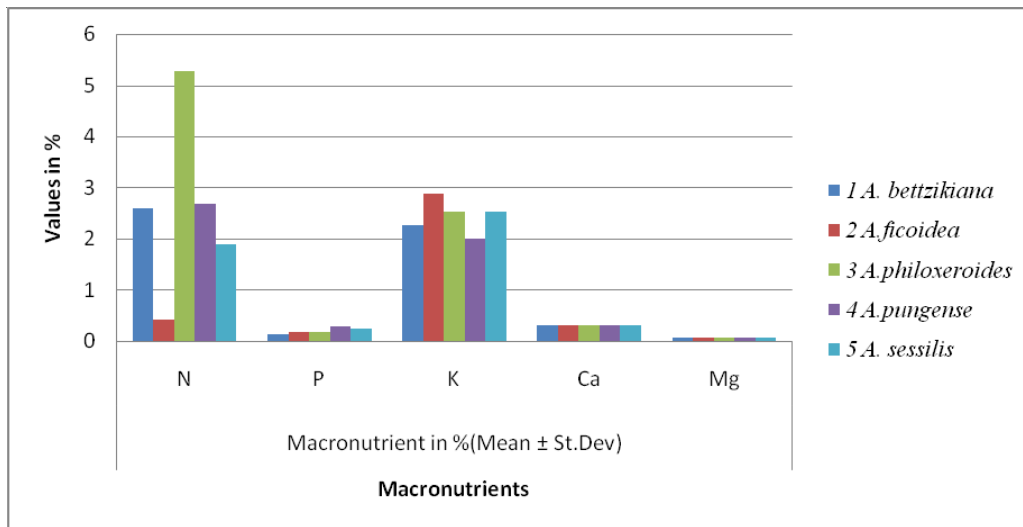


Fig. 1. Macro nutrients composition in all species of *Alternanthera*.

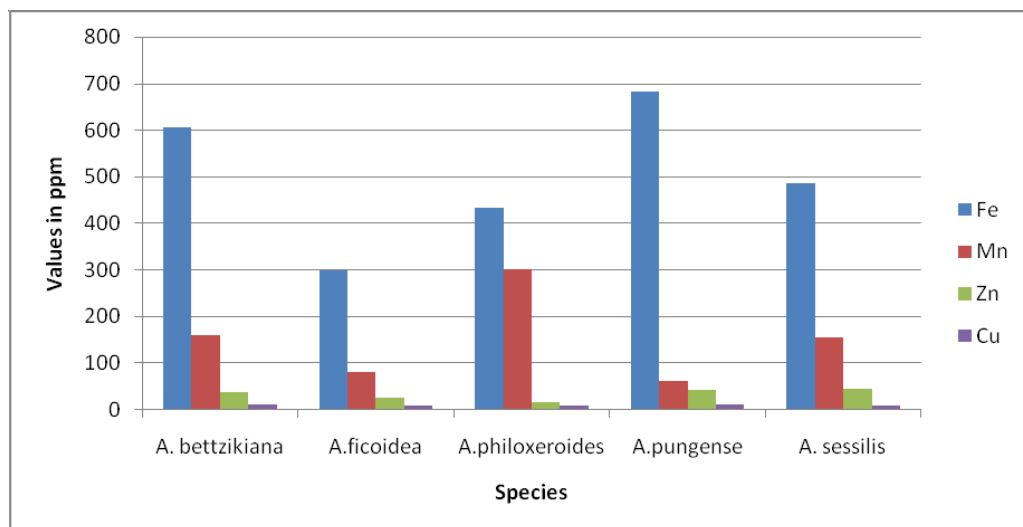
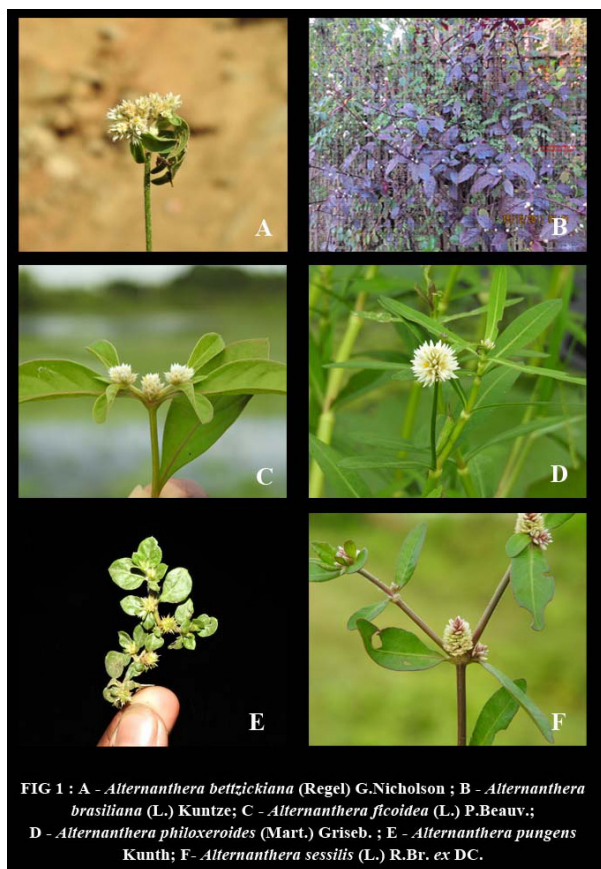


Fig. 2. Micro nutrients composition in all species of *Alternanthera*.



Alternanthera genera in Gadghat district and Prashanth, *et al.* in (2015), reported 1 species in *Alternanthera* genus of wild medicinal plants from Hasan district. Singh *et al.*, (2019) reported 2 species of *Alternanthera* genus in underutilized weeds of Jarkhand. In the present study we documented the six species of *Alternanthera* Forsk from Chikkamagaluru district. And also analyzed the nutritional value of all five species except *Alternanthera brasiliana*.

The plants mainly contain some elemental composition of macro and micronutrients. These elements contribute to the structural and functional properties of the plants. Generally the nitrogen and phosphorus of macro elements and Iron and manganese of micro nutrients are high in all species of *Alternanthera*. They generally serve dual purpose, used as edibles in the form of pot herbs, but at times they are also used for to cure various ailments like Stomach and gastric problems, possess anti-ulcer activity and diarrhea, leprosy, skin disease and fever.

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