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DISTRIBUTION OF GROUND ORCHIDS IN GRASSLANDS OF CHIKMAGALORE DISTRICT, KARNATAKA

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Abstract

Chikmagalore District lies in the west of Karnataka state, consists seven taluks and contributes a number of Shola grasslands. Statistical analysis of ground orchid diversity in grasslands were documented by laying four 2x100 m transect in selected grasslands of each taluk at random. A total of 18 species of ground orchids belonging to six genera were documented within the transects and outside the transects in all selected grasslands. *Habenaria* is emerged as dominant genus representing ten species. The statistical analysis of the recorded ground orchids in grasslands revealed that the *Habenaria heyneana* was the most abundant (64.80), frequently distributed (1.00) orchid and also had highest density (64.80) and SIV (161.02). The ground orchids in grasslands showed Shannon's diversity value of 1.07 and Simpsons species richness of 0.11.

Introduction

ORCHIDS BELONGING to the family Orchidaceae are known for their diversity of habits and habitats. Today, orchids are regarded as the largest family of angiosperms representing a culmination of evolution among the monocotyledons containing about 25,000 – 35,000 species belonging to 600-800 genera (Arditti, 1977). Orchids are found in diverse climatic situations. They are found at the sea level and at the mountaintops, in the tropical rain forests and in the torrid deserts and in the Arctic zone and in the equatorial part. They appear to have an innate ability to adjust, survive and reproduce in any of the environments. Therefore, except for true deserts and permanently frozen Tundra, there is no land habit where some orchids do not grow (Sanford, 1974).

The flower is typical of monocotyledons. The most intriguing feature of the orchid flowers is their striking resemblances to various forms of animals like bee, moth, butterfly, scorpion, spider, lizard, dove, etc. They are floriculturally significant due to their brilliances in colour, remarkable range of sizes and manifold shapes.

All orchids are associated with an endophytic symbiotic fungus, especially in their roots, whether they are terrestrial or epiphytic. The terrestrial forms include those inhabit the floor of the forests growing under dense shade, such as *Acanthophippium* and *Eulophia* which are evergreen with pseudobulbs. Those that grow in the open grasslands and stay underground during dry season are species of *Habenaria, Peristylus* and *Ipsea* (Abraham and Vatsala, 1981). The most curious of the terrestrial are the saprophytic species like *Epipogium roseum, Epipactis purpurata* and others in which the entire vegetative body is an underground mycorrhizic tuber or rhizome which puts forth an over ground inflorescence at the reproductive phase, when alone it is recognized in the field.

The present work deals with the distribution and species richness of ground orchids in Chikmagalore district, Karnataka.

Material and Methods

Study Area

Chikmagalore District lies in the west of Karnataka state, situated between 12°55' - 13°54'N and 75°5'-76°22' E (Fig.1) consisting both arid and a lovely, lush green Malnad (Hill area) area of Western Ghats. The district falls under the category "Western tropical evergreen" (Champion, 1936) and has significant extent of forest cover and contribute a number of Shola grasslands like Mullaiyyanagiri-the highest peak in Karnataka (2105 mm msl), Datta peeta, Chandradrona hill range (Bababudan), Meruthi hill (1817mm msl), Kuduremukha National Park and patches of Charmadi Ghats. Except Kaduru and Narasimharajapura taluks, remaining five taluks in the district harbor Shola grasslands. The two principal rivers of the district are the Tunga and Bhadra with many tributaries flowing all over the district.

Methodology

In the present work, Distribution of ground orchids in grasslands of Chikmagalore district, Karnataka was carried out during 2009-2010. Statistical analysis of ground orchid diversity in grasslands were documented by laying four 2x100 m transect in selected grasslands of each taluk at random. Frequency (F), Density (D), Abundance (A), Species Important Value (SIV),

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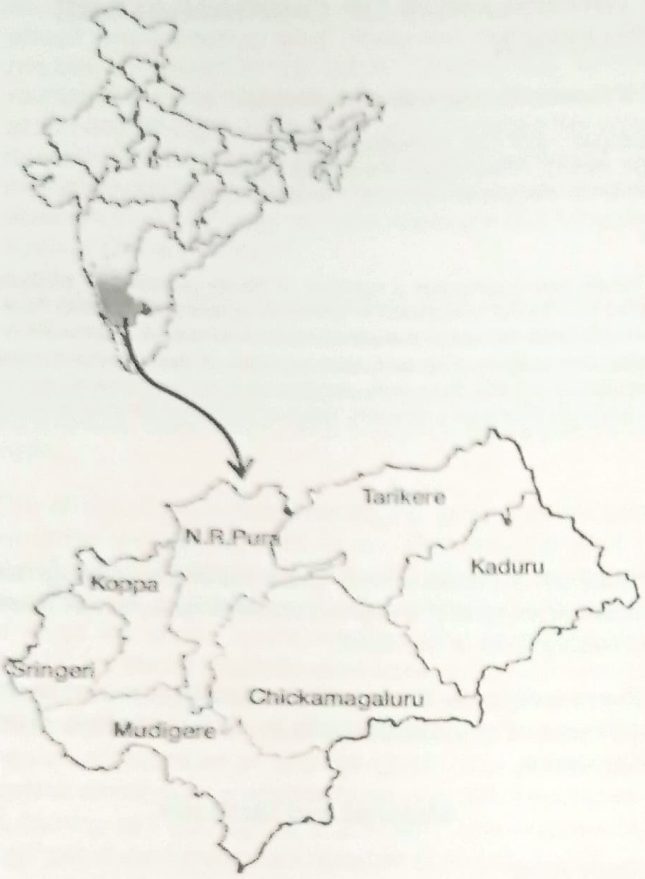

Fig. 1. Location of the Chikmagalore District in India.

Shannon's and Simpson diversity indices were calculated by using their respective formulas (Cottam and Curtis, 1956; Shannon and Wiener, 1963; Simpson, 1949). The ground orchids present outside the transect area were also recorded to analyze their richness. The documented orchids were photographed and identified by using available manuals and floras (Abraham and Vatsala, 1981; Gamble, 1935; Joseph, 1987; Rao, 1998).

Results and Discussion

A total of 18 species of ground orchids belonging to six genera were documented within the transects and outside the transects in all selected grasslands. *Habenaria* emerged as dominant genus representing ten species followed by *Peristylis* (3 spp.) and *Liparis* (2 spp.) (Table1). *Habenaria marginata*, *H.perrotettiana* ,and *Peristylis aristatus* were recorded only in grasslands of Sringeri taluk, where as *Habenaria plantagenia*, *Liparis nervosa*, and *L.wightiana* were documented only in Koppa taluk. The species *Habenaria elwesii*, *H.multicaudata* and *Malaxis conjesta* found in Mudigere taluk. *Habenaria grandifloriformis*, *H.heyneana*, *H.longicorniculata*, and *Satyrium nepalense* was the dominant ground orchid found in all selected grasslands. Among 18 species, Koppa, Sringeri and Mudigere taluk contributed ten species and Tarikere taluk had five species of ground orchids (Table 1).

A total of 435 individuals of ground orchids belonging to five species and four genera were documented with in the 20 transects. The statistical analysis of the recorded ground orchids in grasslands revealed that the *Habenaria heyneana* was the most abundant (64.80),

Table 1. Diversity and distribution of ground orchids in Chikmagalore.

Genus	Species	Taluks				
		Kp.	Sg.	Mg.	Cm.	Tk.
Habenaria	*H.crinifera*	+	-	-	+	-
	H.elwesii	-	-	+	-	-
	H.grandifloriformis	+	+	+	+	+
	H.heyneana	+	+	+	+	+
	H.longicorniculata	+	+	+	+	+
	H.marginata	-	+	-	-	-
	H.multicaudata	-	-	+	-	-
	H.perrotettiana	-	+	-	-	-
	H.plantagenia	+	-	-	-	-
	Habenaria spp.	-	+	-	-	-
Liparis	*L.nervosa*	+	-	-	-	-
	L.wightiana	+	-	-	-	-
Malaxis	*M.congesta*	-	-	+	-	-
Peristylis	*P. aristatus*	-	+	-	-	-
	P.densus	+	-	-	+	+
	P. spiralis	-	+	+	+	-
Platanthera	*P. susannae*	+	+	+	+	-
Satyrium	*S. nepalense*	+	+	+	+	+
	Total species	10	10	10	8	5

Kp, Koppa; Sg, Sringeri; Mg, Mudigere; Cm, Chikmagalore; Tk, Tarikere.

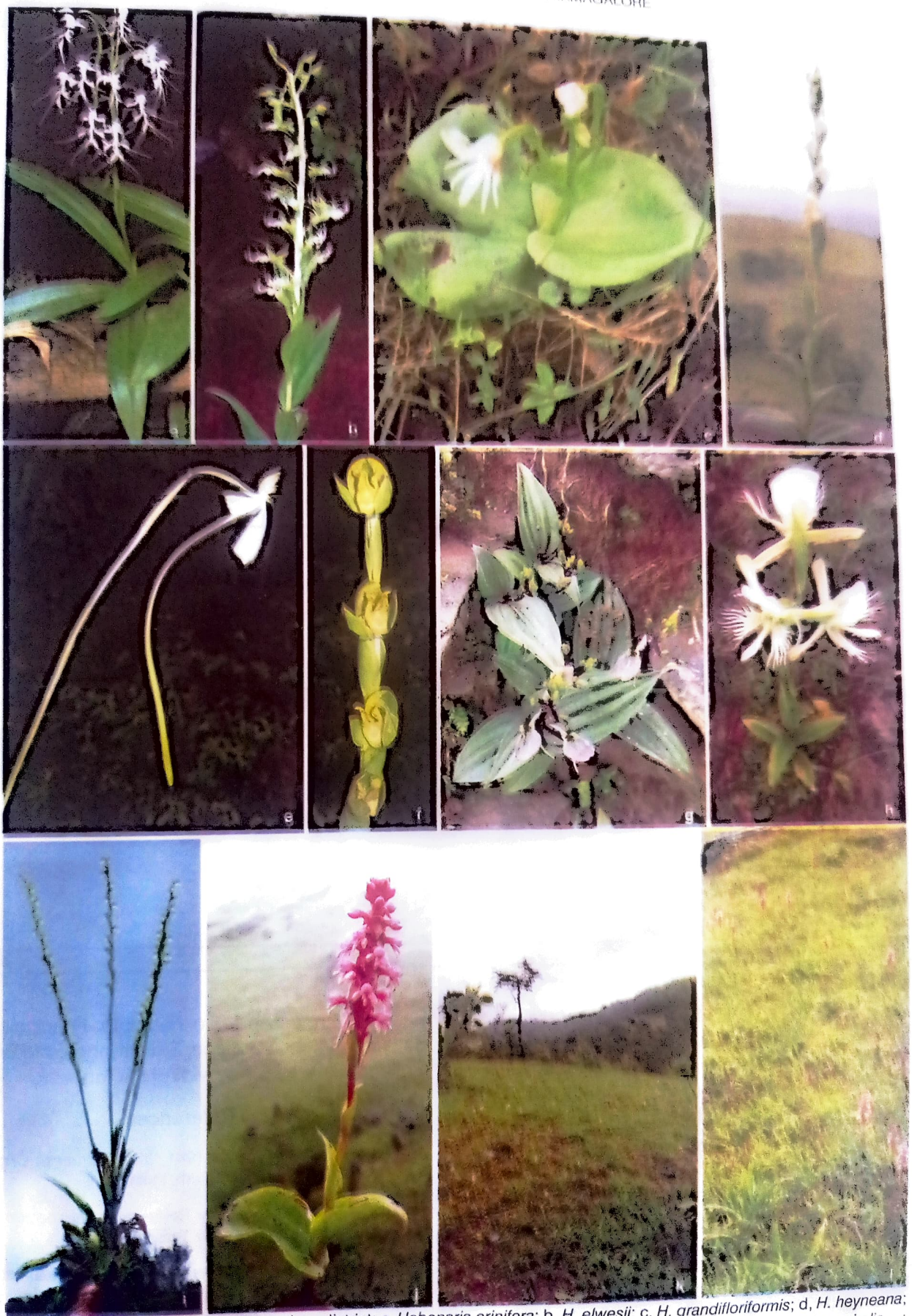

Fig.1a-l. Ground orchids of Chikmangalore district: a, *Habenaria crinifera*; b, *H. elwesii*; c, *H. grandifloriformis*; d, *H. heyneana*; e, *H. longicorniculata* ; f, *H. perrottetiana* ; g, *Liparis wightiana* ; h, *Platanthera susannae* ; i, *Peristylus spiralis* ; j, *Satyrium nepalense*; k, *H. grandifloriformis* in the grassland; l, *S. nepalense* in the granssland.

Table 2. Statistical analysis of some ground orchids.

Orchids	F	R F	D	R D	A	SIV
Habenaria grandifloriformis	0.60	60.00	11.40	10.73	19.00	70.73
H. heyniana	1.00	100.00	64.80	61.02	64.80	161.02
Peristylis densus	0.40	40.00	3.80	3.58	9.50	43.58
Platanthera susannae	0.40	40.00	2.00	1.88	5.00	41.88
Satyrium nepalense	0.80	80.00	24.20	22.79	30.25	102.79

F, Frequency; R F, Relative Frequency; D, Density; R D, Relative Density; A, Abundance; SIV, Species Important Value

frequently distributed (1.00) orchid and also had highest density (64.80) and SIV (161.02) (Table 2). The ground orchids in grasslands showed 1.07 Shannon's diversity value which indicates poor diversity and Simpson's species richness value, 0.11 that reveals good species richness in the grasslands of Chikmagalore district.

Table 3. Comparative list of ground orchids in grasslands of different taluks.

Genus	Species	Taluks			
		C F	H F	S F	P W
Habenaria	*H.crinifera*	+	+	+	+
	H.elwesii	-	+	+	+
	H.grandifloriformis	+	+	+	+
	H.heyneana	+	+	+	+
	H.longicorniculata	+	+	+	+
	H.marginata	+	+	-	+
	H.multicaudata	-	+	-	+
	H.perrotettiana	-	-	-	+
	H.plantagenia	-	+	-	+
	Habenaria spp.	-	-	-	+
Liparis	*L.nervosa*	-	-	-	+
	L.wightiana	-	-	-	+
Malaxis	*M.conjesta*	-	-	-	+
Peristylis	*P. aristatus*	-	+	+	+
	P. densus	-	-	-	+
	P. spiralis	-	+	-	+
Platanthera	*P. susannae*	-	+	+	+
Satyrium	*S. nepalense*	+	+	-	+
	Total species	6	12	7	18

C F, Chikmagalore flora; H F, Hassan flora; S F, Shivamogga flora; P W, Present work.

The four orchids *i.e. Habenaria crinifera, H. grandifloriformis, H.heyneana,* and *H.longicorniculata* are also recorded in the published flora of Chikmagalore district (Yoganarasimhan *et al.*, 1982) and the neighboring districts of Chikmagalore *i.e.* flora of Shimoga district (Ramaswamy *et.al.*,2001) and flora of Hassan district (Saldana, and Nicolson,1976) whereas *Habenaria perrotittiana, Liparis nervosa, L.wightiana, Malaxis congesta,* and *Peristylus densus* are new addition to the floras (Table 3) but the three species namely *Liparis biloba, Peristylus lawii,* and *P. plantageneus* that documented in Chikmagalore flora are not rerecorded during present survey. Among the eighteen ground orchids, 12 species are found in Hassan district and 12 species are addition to flora of Chikmagalore district (Table 3; Fig. 1a-l).

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