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Floristic composition of Gunadala hill, Krishna district, Andhra Pradesh, India

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Abstract
Gunadala hill is a part of Eastren Ghat which has an elevation of 220 m and occupies an area of ca 1.51 sq km. Its geographical coordinates lies between 16° 31' 0" North, 80° 40' 0" East. Floristic inventory and diversity studies help us understand the species composition and diversity status of forests, which also offer vital information for forest conservation. Quantitative inventories moreover, help identify species that are in different stages of vulnerability as well as the various factors that influence the existing vegetation in any region. Gunadala hill flourished with Dry deciduous type of vegetation, but due to human interference in the forest biota, most part of the hill is converted into the Scrub Jungle. Scrub vegetation is characterized by the predominance of *Annona squamosa*, *Capparis zeylanica, Carmona retusa, Cassia auriculata, Cassia occidentalis, Catunaregam spinosa, Opuntia stricta, Lantana camara* with isolated trees like *Butea monosperma.* Common undergrowth encountered within scrub forest is *Caralluma adscendens. Cassytha filiformis is* the common parasite. There has been tremendous increase in the population pressure and which is leading to increased fire occurrences and other related anthropogenic disturbances like grazing. Due to increased biotic pressure, loss of regeneration, invasion by edge species and alternation in community structure are a few manifestations affecting biodiversity. A systemic survey was done to explore the flora existing on the hill.

Keywords: Gunadala Hill, Floristic Composition, New records

Introduction
Beddome (1869-1872) [1]. Surveyed the hills of the Krishna district and incorporated his findings in *Flora Sylvatica for Southern India.* Even though the district Flora was completed in 1997 (Lakshminarayana *et al.,* 1997) [6]. Hill habitants are overlooked, except few collections from Kondapalli hills (Vijayawada) and Jammu Raidurgam hills (Triumvir) of Krishna district. No authentic evidences are available for supporting the detailed study of hill ranges. There has been tremendous increase in the population pressure on natural habitats and which is leading to increased fire occurrences and other related anthropogenic disturbances like grazing. Due to increased biotic pressure, loss of regeneration, invasion by edge species and alternation in community structure are a few manifestations affecting biodiversity. With numerous nomenclatural changes made by ICBN in course of time with the identification of new species from different geographical localities and biotic interferences made by anthropogenic activities, there is a need to revise and update the flowering plants of the hills & hillocks.

Materials and Methods
Floristically, Krishna district can be divided into Deltaic plain covers lower delta and plateau forms the part of the Deccan plateau of undulating terrain with hills and hillocks occurring in and around Vijayawada. Among the hills, Gunadala hill a Part of Eastern Ghats which has an elevation of 220 m and occupies an area of ca 1.51 sq km. Its geographical coordinates lies between 16° 31' 0" North, 80° 40' 0" East. During a period of 18 months a total of 30 field visits were done covering all seasons (Pre monsoon: February-May; Monsoon: June-September; and Post monsoon: October-January). The collected specimens were poisoned, pressed, dried and stitched on herbarium sheets according to the methodology described by Santapau (1955) and Jain & Rao (1977) [5].

Results
The total number of wild and naturalized species recorded in the present study is 197, belonging to 150 genera and 55 families. Of the 197 species, dicots comprise 175, and monocots 22. The results obtained from the present study are shown in Table-I.

Table 1: Analysis and Classification of Angiosperms

		No.of Families	No.of Genera	No.of Species
Dicotyledons				
	Polypetalae	28	60	83
	Gamopetalae	16	54	61
	Monochlamydae	6	19	31
Monocotyledons		5	17	22
Total		55	150	197

Table 2: Statistical synopsis of the Angiosperms of Gunadala hill

S.No.		Total	Monocots		Dicots		Ratio	
			No	%	No	%	Monocots	Dicots
1	Species	197	22	11.16	175	88.83	1	7.95
2	Genera	150	17	11.33	133	88.66	1	7.82
3	Families	55	5	9.09	50	90.9	1	10

The ratio of Monocotyledons to Dicotyledons is 1 : 10 of families (5 : 50), 1 : 7.82 of genera (17 : 133), 1 : 7.95 of species 22 : 175 (Table: II). The ratio of genera to species in

Angiosperms is 1: 1.32. In the Flora of British India (Hooker JD, 1987) it is 1: 7. This shows the small proportion of species to number of genera and families. In order to get an insight into the relations of the flora of Gunadala hill with neighboring floras, a comparative analysis of ten dominant families (in order of their frequency) of the flora of Gunadala hill, 'Flora of the Presidency of Madras' (Gamble JS and Fischer CEC, 1915-36) and 'Flora of India' is given below:

Table: 3: Principal Families of Gunadala hill

Rank	Gunadala hill (Present study)	No.of Species	Flora of the Presidency of	No.of Species
I	FABACEAE	16	FABACEAE	432
II	EUPHORBIACEAE	12	POACEAE	388
III	ACANTHACEAE	10	RUBIACEAE	226
IV	POACEAE	10	ACANTHACEAE	202
V	ASCLEPIADACEAE	9	EUPHORBIACEAE	199
VI	AMARANTHACEAE	9	ORCHIDACEAE	199
VII	MALVACEAE	8	ASTERACEAE	189
VIII	MIMOSACEAE	8	CYPERACEAE	172
IX	CAESALPINACEAE	7	LAMIACEAE	128
X	MORACEAE	7	ASCLEPIADACEAE	93

From Table-III among dicotyledons, Fabaceae and among monocotyledons Poaceae occupies dominant position on the hill.

Table 4: Sequence of the families based on species number

Sl.No	*Family*	*No.of Genera*	*No.of Species*
1	FABACEAE	11	16
2	EUPHORBIACEAE	6	12
3	ACANTHACEAE	8	10
4	POACEAE	8	10
5	ASCLEPIADACEAE	8	9
6	AMARANTHACEAE	8	9
7	MALVACEAE	5	8
8	MIMOSACEAE	6	8
9	CAESALPINACEAE	1	7
10	MORACEAE	2	7

As many as 08 families are represented by 08 or more species. They are given in Table-IV, indicating the sequence based on species number. Fabaceae is the most dominant family of the hill with 11 genera and 16 species. The various members of this family are abundantly grown and are very well distributed in the deciduous forest. A total of 197 flowering plants of which 175 species belonging to 133 genera of 50 dicotyledonous families and 22 species belonging to 17 genera of 5 monocotyledonous families were identified. The family Fabaceae occupies dominant position on the hill comprising 16 species belonging to 11 genera. 24 genera representing single species.

Conclusion

A total of 805 species Angiosperms and Pteridophytes belonging to 479 genera and 128 families have been enumerated in Flora of Krishna district. Of 197 collections from the Gunadala hill, 28 species are newly recorded which were not reported in the Flora of Krishna District (Lakshminarayana K. *et al*., 1997) [6]. Of which 18 are dicotyledons and 10 monocotyledons. Cayratia trifolia, Cyphostemma setosum of (Vitaceae), Lepisanthes tetraphylla (Sapindaceae), Buchanania lanzan (Anacardiaceae), Butea monosperma, Desmodium velutinum of (Fabaceae), Jasminum malbaricum (Oleaceae), Calotropis procera (Asclepiadaceae), Rivea hypocrateriformis (Convolvulaceae), Datura stramonium (Solanaceae), Dolichandrone falcata (Bignoniaceae), Sesamum alatum (Pedaliaceae), Elytraria acaulis, Peristrophe paniculata of (Acanthaceae), Leucas indica, Leucas nepetaefolia, Anisochilus carnosus of (Lamiaceae), Allmania longepedunculata (Amaranthaceae), are the new records among dicotyledons. Commelina forsskalaei, Commelina maculata, Cyanotis fasciculata of (Commelinaceae), Cyperus rubicundus, Fimbristylis schoenoides, Mariscus cyperinus, Pycreus flavidus of (Cyperaceae), Panicum brevifolium, Cymbopogon caesius of (Poaceae) are the new records among monocots.

Among dicotyledons Lamiaceae occupies dominant position with 3 new records where as in monocotyledons Cyperaceae with 5 new records. A total of 16 families (13 dicotyledonous and 3 monocotyledonous) representing new species. In the Flora of Krishna district, the family Bignoniaceae was discussed with only introduced and cultivated species with no record of any wild species. But the present study enriched with a new record of one wild species *(Dolichandrone falcata*) from this family. 10 genera are newly reported from the present study whereas 15 genera are reported with new species records. *Cyphostemma, Lepisanthes, Buchanania, Rivea, Dolichondrone, Elytraria, Peristrophe, Anisochilus, Mariscus, Pycreus* are the new genera reported in the present work.

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