

Survey and Vegetational Analysis of Nrupatunga Betta

Agadi S. N.¹, Emmi S. N.²

¹Professor of Botany, developmental Biology Laboratory, P.G. Dept. of Botany, Karnatak University Dharwad – 580003

²Assistant Professor of Botany, SSMS College, Athani-591304

Abstract: Hubli means flowering creeper (now called "Hubballi") is a famous tourist spot in Dharwad District of Karnataka, India. Hubli is also called "Chota Bombay" for being the commercial hub and important center of commercial activities. The city of Hubli is situated 15° 22' 36" N latitude and 75° 7' 44" E longitudes, just east of the famous Western Ghats and is surrounded by hills and lakes. Nrupatunga betta is having highest elevation level and undisturbed plant population. This hilly area is situated at the outskirts of Hubli in Northwestern place. This is the place for morning walkers and nature lovers. Many people visit to this place, by its typical topographical nature. Recently Karnataka government has improved the area for the public interest as a picnic spot. Entire hillock is fenced by forest department. After the development of this area become social forestry, many population species were also coming up. At the top Revu math temple and Darga, Saimandir and Hanuman temple at the base. During visit to these temples, disturbance to the natural vegetation is more. Thus the present study of survey and vegetation analysis of Nrupatunga betta has been done. Nrupatunga Betta hillock area consists of 34 Acres with red loamy soil texture. In few area hillock is disturbed because of road construction, building construction, etc. the soil is eroded, the vegetation is reduced. The study showed that Nrupatunga Betta is maintaining its maximum vegetation only during rainy season and part of the winter season with dominant herbaceous species. The trees and shrubs are lesser in number. Due to protection of the hillock and non-grazing of the animals, there will be increase in the biodiversity of Nrupatunga Betta.

Keywords: Nrupatunga, outskirts, hillock, loamy, grazing

1. Introduction

Nrupatunga betta is having highest elevation level and undisturbed plant population with a temple at the top of the hill. This hilly area is situated at the outskirts of Hubli in Northwestern place. This is the place for morning walkers and nature lovers. Many people's visit to this place, where attracted by its typical topographical nature. Recently Karnataka government has improved the area for the public interest as a picnic spot. After the development of this area becomes social forestry, many population species were also coming up. This hilly area is having temples at the top and at

the base. At the top Revumath temple and Darga, Sai mandir and Hanuman temple at the base which is situated at western part of the hill. During visit to these temples, disturbance to the natural vegetation is more. Thus the present study of survey and vegetational analysis of Nrupatunga betta is undertaken.

Nrupatunga betta hillock area consists of 34 Acres with red loamy soil texture. In few area hillock is disturbed because of road construction, building construction, etc. the soil is eroded, the vegetation is reduced.



Bird view of Nrupatunga betta



Vegetation along the sides of the road



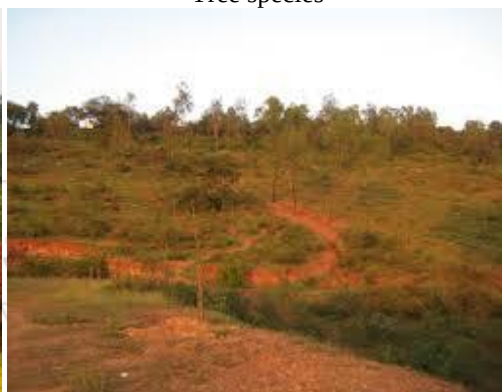
Bushy vegetation



Tree species



Gardening along the road side



Vegetation during winter



Vegetation during early monsoon



panoramic view from top of the hill



Vegetation at hill



vegetation during summer



Unkal lake view from Nrupatunga betta



Picnic spot of Nrupatunga betta

2. Materials and Methods

Present study was undertaken from the period of 2012 to 2014. Methodology adapted to this study was visiting to Nrupatunga betta seasonally, in selected spots, based on vegetation type quadrat and line transect method were used. In each season, five quadrat study have been carried out for herbaceous species and five transects were made for shrubs and tree species.

Quadrat Type

5 x 5 meter quadrates were made in different localities. Species diversity is studied by dividing in to 1 x 1 meter sub quadrat in each main quadrat. Hence result is given for 25 sub quadrates.

Line Transect type

In five (5) different localities 100 meter transect is made with the help of rope from top towards the base of the hillock. Three (3) feet either side, from the rope is considered for the calculation of tree species. From all these 5 transect, the considered trees were listed for qualitative and quantitative estimation.

Quadrat of herbs in rainy season

Sl. No.	Name of species	No. of Quadrates					Total No.	Density	Abundance	Frequency
		I	II	III	IV	V				
1	<i>Acalypha indica</i>	-	-	04	03	01	08	1.6	2.6	60
2	<i>Achyranthes aspera</i>	32	03	01	05	-	41	8.2	10.2	80
3	<i>Agave Americana</i>	01	02	-	02	-	05	01	1.6	60
4	<i>Alternanthera echinata</i>	02	03	-	04	-	09	1.8	03	60
5	<i>Andropogon contortus</i>	01	-	01	-	-	03	0.6	01	60
6	<i>Evolvulus alsinoides</i>	02	23	-	10	01	39	7.8	9.7	80
7	<i>Mirabilis jalapa</i>	06	-	03	01	04	10	02	3.3	60
8	<i>Pancratium spp.</i>	03	04	-	09	-	17	3.4	4.2	80
9	<i>Setaria italica</i>	02	-	03	-	01	09	1.8	03	60
10	<i>Sida cardifolia</i>	64	-	35	10	04	109	21.8	36.3	60
11	<i>Smilax aspera</i>	02	04	03	-	-01	10	02	2.5	80
12	<i>Trichodesma indicum</i>	01	03	-	-	03	07	1.4	2.3	60
13	<i>Tridax procumbens</i>	10	05	03	06	08	32	6.4	6.4	100

Quadrat of herbs in winter season

Sl. No.	Name of species	No. of Quadrates					Total No.	Density	Abundance	Frequency
		I	II	III	IV	V				
1	<i>Agave americana</i>	-	01	-	01	-	02	0.4	01	40
2	<i>Aloe vera</i>	01	01	01	01	01	05	01	01	100
3	<i>Andrographis echinoides</i>	01	01	-	02	01	05	01	1.2	80
4	<i>Andropogon contortus</i>	02	-	01	03	-	06	1.2	02	60
5	<i>Celosia argentea</i>	02	-	04	-	-	06	1.2	03	40
6	<i>Indigofera enneaphylla</i>	01	01	-	-	02	04	0.8	1.3	60
7	<i>Kalanchoe lanceolata</i>	-	01	01	-	-	02	0.4	01	40
8	<i>Leucas aspera</i>	03	-	02	-	01	06	1.2	02	60
9	<i>Salvia spp.</i>	02	-	-	01	01	04	0.8	1.3	60
10	<i>Setaria italica</i>	02	-	03	-	01	06	1.2	02	60
11	<i>Tridax procumbens</i>	05	04	03	05	04	21	4.2	4.2	100
12	<i>Vernonia cineria</i>	02	-	04	01	01	08	1.6	02	80

Quadrat of herbs in summer season

Sl. No.	Name of species	No. of Quadrates					Total No.	Density	Abundance	Frequency
		I	II	III	IV	V				
1	<i>Agave americana</i> .	05	03	-	01	09	02	1.8	03	60
2	<i>Eupatorium ayapana</i>	-	-	02	01	06	05	1.2	02	60
3	<i>Flueggea ssmicrocarpa</i>	05	02	01	01	07	05	3.5	1.7	80
4	<i>Polygonum glabrum</i>	04	03	-	-	10	06	12	3.3	60
5	<i>Ruta graveolens</i>	03	02	01	04	10	06	02	2.5	80
6	<i>Tridax procumbens</i>	04	02	04	04	16	04	13.2	3.2	100

Quadrat of Shrub in rainy season

Sl. No.	Name of species	No. of Quadrates					Total No.	Density	Abundance	Frequency
		I	II	III	IV	V				
1	<i>Annona squamosa</i>	01	-	-	-	01	02	0.4	01	40
2	<i>Anisomemles indica</i>	02	03	-	02	-	07	1.4	2.3	60
3	<i>Argemone mexicana</i>	04	02	-	01	-	07	1.4	2.3	60
4	<i>Bougainvillea spectabilis</i>	02	-	-	01	-	03	0.6	1.5	40
5	<i>Calotropis procera</i>	02	05	-	05	02	14	2.8	3.5	80
6	<i>Clerodendron inerme</i>	03	-	02	-	01	06	1.2	02	60
7	<i>Duranta plumeria</i>	01	-	03	-	02	06	1.2	02	60
8	<i>Euphorbia hirta</i>	07	08	05	12	16	48	9.6	9.6	100
9	<i>Euphorbia tirucalli</i>	10	15	08	05	18	56	11.2	11.2	100
10	<i>Hibiscus hirtus</i>	-	01	-	01	-	02	0.4	01	40
11	<i>Hibiscus trinonium</i>	01	01	01	-	-	03	0.6	01	60
12	<i>Lantana camera</i>	01	10	05	05	-	21	4.2	5.2	80
13	<i>Lawsonia inermis</i>	01	-	01	-	01	03	0.6	01	60
14	<i>Sesbania grandiflora</i>	02	-	01	-	02	05	01	1.6	60

Quadrat of Shrub in winter season

Sl. No.	Name of species	No. of Quadrates					Total No.	Density	Abundance	Frequency
		I	II	III	IV	V				
1	<i>Amaranthus spinosus</i>	-	01	-	-	04	05	01	2.2	40
2	<i>Boerhavia diffusa</i>	02	04	-	-	-	06	1.2	03	40
3	<i>Bougainvillea spectabilis</i>	02	-	-	01	-	03	0.6	1.5	40
4	<i>Coleus spp.</i>	02	-	04	-	01	07	1.4	2.3	60
5	<i>Crotalaria laburniafolia</i>	02	-02	04	-	-	06	1.2	03	40
6	<i>Datura innoxia</i>	03	08	-	01	04	10	02	2.5	80
7	<i>Euphorbia hirta</i>	01	-	04	10	15	38	7.6	7.6	100
8	<i>Flexia spp.</i>	-	01	04	05	07	17	3.4	4.2	80
9	<i>Indigofera tinctoria</i>	-	03	-	04	-	07	1.4	3.5	40
10	<i>Ixora parviflora</i>	01	-	02	-	01	04	0.8	1.3	60
11	<i>Lantana camera</i>	01	10	05	05	03	24	4.8	4.8	100
12	<i>Mimosa pudica</i>	05	01	01	06	04	17	3.4	3.4	100
13	<i>Ocimum sanctum</i>	-	01	-	02	-	03	0.6	1.5	40
14	<i>Phaseolus spp.</i>	03	-	01	-	01	06	1.2	02	60
15	<i>Zizyphus sssjujuba</i>	01	-	02	-	03	06	1.2	02	60

Quadrat of Shrubs in summer season

Sl. No.	Name of species	No. of Quadrates					Total No.	Density	Abundance	Frequency
		I	II	III	IV	V				
1	<i>Bougainvillea spectabilis</i>	02	-	-	01	-	03	0.6	1.5	40
2	<i>Calotropis procera</i>	02	04	-	03	01	10	02	2.5	80
3	<i>Euphorbia hirta</i>	01	08	04	05	15	33	6.6	6.6	100
4	<i>Euphorbia tirucalli</i>	10	15	08	05	18	56	11.2	11.2	100
5	<i>Ixora parviflora</i>	01	-	02	-	01	04	0.8	1.3	60
6	<i>Lantana camera</i>	01	10	05	05	-	21	4.2	5.2	80

Quadrates of Shrub in winter season

Sl. No.	Name of the plant species	No. of Quadrates					Total No.	Density	Abundance	Frequency
		I	II	III	IV	V				
1	<i>Albizzia lebbeck</i>	01	02	-	-	-	03	0.6	1.5	40
2	<i>Anacardium occidentale</i>	-	01	01	-	-	02	0.4	01	40
3	<i>Anthocephalus cadamba</i>	-	-	01	-	02	03	0.6	1.5	40
4	<i>Azadirachta indica</i>	-	01	01	-	01	03	0.6	01	60
5	<i>Bauhinia purpurea</i>	02	-	01	01	02	06	1.2	1.4	80
6	<i>Bignonia magnifica</i>	02	-	01	-	02	05	01	1.6	60
7	<i>Bridelia retusa</i>	01	-	01	-	01	03	0.6	01	60
8	<i>Cassia fistula</i>	05	01	-	04	-	10	02	3.3	80
9	<i>Casuarina equisetifolia</i>	-	01	-	-	-	01	0.2	01	40
10	<i>Dalbergia latifolia</i>	01	-	01	-	02	04	0.8	1.3	60
11	<i>Dodonea viscosa</i>	-	03	02	01	01	07	1.4	1.7	80
12	<i>Syzygium cumini</i>	-	-	01	-	01	02	0.4	01	40
13	<i>Ficus bengalensis</i>	01	-	01	-	-	02	0.4	01	40
14	<i>Ficus religiosa</i>	-	01	01	-	-	02	0.4	01	40
15	<i>Madhuka longifolia</i>	01	01	-	-	-	02	0.4	01	40
16	<i>Mangifera indica</i>	01	-	-	-	01	02	0.4	01	40
17	<i>Melia azadirach</i>	04	05	01	-	-	10	02	3.3	60
18	<i>Phoenix sylvestris</i>	01	02	-	-	01	09	1.8	2.2	60
19	<i>Pithecolobium dulce</i>	01	-	04	-	-	05	01	2.5	40
20	<i>Peltocarpus</i> spp.	01	-	01	02	-	04	0.8	1.3	60
21	<i>Pongamia pinnata</i>	02	01	-	02	01	06	1.2	1.5	80
22	<i>Psidium guajava</i>	01	02	-	-	02	05	01	1.6	60
23	<i>Pterocarpus</i> spp.	-	02	01	-	02	05	01	1.6	60
24	<i>Ricinus communis</i>	02	-	03	-	01	06	1.2	02	60
25	<i>Semecarpus</i> spp.	-	-	-	01	01	02	0.4	01	40
26	<i>Terminalia catappa</i>	02	01	-	-	01	04	0.8	1.3	60
27	<i>Trema orientalis</i>	01	-	01	01	-	03	0.6	01	60

3. Result

From the list, it is clear that most of the perennial herbs occur during rainy season and their vegetation is retained partly also. In summer due to xeric topographic condition most of the species vanish. Whereas, the shrubs and trees remain alive throughout the year. However it is noticed that shrubs are mostly distributed by the various activities like grazing of the animals like cows, sheep, goats etc. and for the collection of fuel wood. Their quantitative population decrease but sprout in rainy season.

4. Discussion

This study shows that Nrupatunga betta is maintaining its maximum vegetation only during rainy season and part of the winter season with dominant herbaceous species. Most of the plant species are of plantations. However, few natural species like *Dodonea viscosa*, *Semecarpus anacardium*, *Azadirachta indica* etc., show that this area was previously predominated by a moist deciduous forest. Though disturbance is negligible, its tree population would have been maintained by proper care, because of the grazing activities, most of the shrub species vanished whereas during rainy season they appear in patches.

Our result is evident that among the tree species recorded, the dominant species, density wise is as follows;

Melia azadirachta > *Cassia fistula* > *Phoenix sylvestris* > *Bauhinia purpurea* > *Pterocarpus marsupium* >

Though quantification was made, the qualitative richness and species diversity in Nrupatunga betta is not in considerable range because in most of the cases cultivated population of trees were made dominating.

Herbaceous species though had their dominance during rainy season, show the frequency index as follows;

Tridax procumbens > *Aloe vera* > *Achyranthes aspera* > *Evolvulus* spp. > *Fluggea* spp. > *Eupatorium* spp. >

However, biodiversity of herbaceous plants was in considerable range as the list of herbaceous plants though is 25, its qualitative and quantitative abundance is totally more than that of tree and shrubby species. Since, the total number of tree species, though quantified was more; they remained throughout the year, whereas during short period, herbaceous plants dominated. Hence, the qualitative dominance of tree species is not in considerable range.

Shrub represented by 20 species, mostly dominated in rainy season would have been retained throughout by stopping the grazing and fuel wood activities to maintain, the green scenario of Nrupatunga betta throughout the year.

References

- [1] Almeida, M.R. (1996). Flora of Maharashtra-Vol. 2. St. Xeviers College, Mumbai.
- [2] Cecil J. Saldanha and Ramesh, S.R. (1984) Flora of Karnataka Volume I. Oxford & IBH publishing Co., New Delhi.

- [3] Cecil, J. Saldanha, (1996). Flora of Karnataka Volume II. Taylor & Francis,
- [4] Cooke, T. C. I. E. (1905). Flora of the presidency of Bombay. Bot. Sur. Ind. Calcutta.
- [5] Gamble, J.S. (2012). Flora of the Presidency of Madras: Volume1, 2, 3. Pragun Publications.
- [6] Hooker, J.D., (1978). Flora of British India.
- [7] Manjunatha, B.K., Krishna, V., Pullaiah, T. (2004). Flora of Davanagere District. Regency Publications New Delhi.
- [8] Parimala. R. (2011). Flora of Dharwad district. Thesis of Karnatak University, Dharwad.
- [9] Ramaswamy S.V. and Razi, B.A. (1973). Flora of Bangalore District. Kapila power press, Nanjangud, Mysore.
- [10] Ramaswamy, S.N., Rao, M.R. and Govindappa, D.A. (2001). Flora of Shimoga District, Karnataka: Prasaraanga, University of Mysore, Manasagangothri, Mysore.
- [11] Ramesh, B.R. (1989). Flora of BR Hills, French Institute of Pondicherry.
- [12] Rao, R.R. (1981). A Synoptic Flora of Mysore District. Today and Tomorrow's Printers and Publishers, New Delhi.
- [13] Saldanha, C.J. and Nicolson, D.H., (1976). Flora of Hassan District Karnataka, India, Mohan Pramlani, Amerind Publishing Co. Pvt Ltd, New Delhi.
- [14] Santapau, H.S.J. (1967). Flora of Khandala on Western Ghats of India. Records of BSI.
- [15] Sharma, B.D., Singh, N.P., Raghavan, R.S., and Deshpande, U.R. (1984). *Flora of Karnataka Analysis*. BSI, Howrah.
- [16] Singh, N.P. (1988). Flora of Eastern Karnataka, Volume II. Mittal Publications, Delhi
- [17] Yadav, S. R. and Sardesai, M.M., (2002). Flora of Kolhapur District, Shivaji University, Kolhapur.
- [18] Yoganarasimhan, S.N., Subramnyam, K and. Razi. B.A. (1982). Flora of Chikmagalur District, Karnataka, India. International Book Distributors, Dehra Dun.