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Life form and biological spectrum of Dhansura Taluka, Aravalli District, North Gujarat, India

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Abstract
On the basis of current information available on the flora and vegetation of the Dhansura Taluka, spectra on life form where analyzed in the investigated area. The floristic list of Dhansura Taluka consists of 591 species belonging to 107 families. That includes 477 species of dicots belongs to 313 genera of 85 families and 114 species of monocots belongs to 77 genera and 22 families. The various life form classes as Phenerophytes are represented by 41.29% species followed by Chamaephytes 1.18% species, Hemicryptophytes 8.63% species, Cryptophytes 5.41% species and Therophytes are represented by 43.49% species of all the number of species. It indicates that Therophytes is dominant in the study area.

Keywords: life forms, biological spectrum, Dhansura Taluka, Gujarat

Introduction

Some older authors such as Kerner (1872) and Drude (1890), categorized vegetational kinds on a physiognomic basis and highlighted the reliance of life forms on the climate, while other, such as Warming (1909), emphasized the dependency of life forms on the environment. After that, Drude (1913) made a significant contribution to ecology. They evaluated the importance to species in vegetation, paying special attention to their longevity, protection, and propagation. Despite the fact that these authors contributed different essential aspects to the modern system of classifying vegetation on the basis of life forms, the most widely used is that of Raunkiaer (1934) [6, 26, 27], who grouped the life forms based on the kind of protection afforded to the growing point of perennating afforded to the growing point of perennating buds, which were responsible for renewal after unfavorable seasons.

The distributional behavior of the vegetational structure varied across the country, which might be related to changes in water resources, climatic conditions, edophic variables, and anthropogenic pressures along the elevation gradient (Hegazy *et al*., 2007). The vegetation's life form is determined climatic fluctuation. Biological spectra are also essential physiognomic features that have been employed extensively in vegetation study.

The structure and rate of change of composition are sensitive indicators of the entire environment; therefore studies are vital to identify the phytoclimate of the area. As a result, the biological system can be used to assess the health of a forest.

Biological spectrum, when calculated at regular intervals, can serve as a guide for eco restoration and community optimization. In view of this, the current research was carried out in the Dhansura Taluka forest range, with the goal of studying the assemblage of diverse life forms and preparing a biological spectrum to infer the areas existing phytoclimate.

In many places, a notable effort on Biological Spectrum has been completed, among which a few are C. Raunkiaer (1934) [6, 26, 27], Raunkiaer C (1934) [6, 26, 27], Bharucha *et al.* (1944), Cain (1950) [8], Braun-Blanquet, J. (1951), Murthy *et al*. (1957) [21], Dansereau, P. (1957) [12], Champion *et al.* (1968) [9, 10], H.G. Champion *et al*. (1968) [9, 10], Shah *et al.* (1978) [30], Shah *et al.* (1979) [29], BM Sharma *et al.* (1981) [31], Mehar-Homji *et al.* (1981) [20], Gupta VC *et al*. (1983) [14], Agrawal, K.B. (1984) [1], Asmus U (1990) [3], Sharma *et al.* (1995), O. S. Kotiwar *et al*. (1996), Pandey *et al.* (1999) [23], Katewa *et al*. (1999) [18], Devi *et al.* (2000) [13], C.R. Reddy *et al.* (2001) [7], Baruach *et al*. (2001) [4], D. Palit *et al.* (2002), M. Jhangir (2004), Pandit *et al.* (2005) [24], Jadeja *et al.* (2006) [15], Z. Sher *et al.* (2007), S.P. Subramani *et al.* (2007) [28], A.K. Raina *et al*. (2010) [25], M. Al-Yemni *et al*. (2010) [2], Jangid M.S. (2012) [16], Chavda N.H. *et al*. (2019) [11].

Study Area

Dhansura Taluka is known to have different natural sites and great biological diversity. Dhansura Taluka is situated on 23°21' 0" North latitude and 73°12' 0" East longitude of north Gujarat. Dhansura Taluka is 400.44 sq. km. in area. (Covers a total size of 400.44 sq. km. in area), total forest area is 49,688 hector and total population is 1,06,733 out of which 55408 were made and 51325 were female. The region of Dhansura Taluka is flat and consists of mainly sandy plains and some northern and eastern parts near Dhansura Taluka are covered by Aravalli hills range.

Material and Methods

At regular intervals, several field trips to various portions of the research region, varying in length from 0 to 12 days were made. The inquiry was based on a three year period of intensive and broad field observation, collection and identification, as well as the determination of living forms.

Therophytes

Annual seed bearing plants which complete their life cycle in one year and over winter; the unfavorable season by means of seeds or spores.

Geophytes

Perennating buds located below the surface of soil including plants with deep rhizomes, bulbs, tubers and corms, etc.

Hydrophytes
Submerged hydrophytes are those rooted in the muddy substratum. The above ground or upper parts die at the end of growing season.

Hemicrytophytes
Herbaceous perennial in which aerial portion of plant dies at the end of growing season, leaving a perennating bud at or just beneath the ground surface.

Chamaeophytes
Perennating buds located close to the ground surface (below the height of 25 cm). They include herbaceous, low woody trailing, low stem succulents and cushion plants.

Phanerophytes
They are shrubby and tree species whose perennating buds are borne on aerial shoot reaching a height of at least 25 cm or more above the ground surface.

After having assigned a life form to all the plants Raunkiaerian spectra was calculated as follows:

$$\text{Biological spectra} = \frac{\text{Number of species falling in a particular life form classes}}{\text{Total number of all the species for that community/stand}} \times 100$$

Results and Discussion
The floristic list of the study are observed 591 plant species during research work of these Dicots represented by 477 species belonging to 313 genera and 85 families while Monocots represented by 114 species belonging to 77 genera and 22 families.
The total percentage of the life forms of the spectrum is shown in table number 1. It shows that maximum number of species belonging to Therophytes. Table 2 shows a comparison of the biological spectrum of Dhansura Taluka with that of Raunkiaer's normal spectrum. Table 3 shows a comparison of the biological spectrum of Dhansura Taluka with different region of Gujarat State.
The highest percentage of Therophytes (43.49%) and less percentage of Chamaephytes (1.18%) are recorded in Dhansura Taluka. The current works outcome will be published in the local language (Gujarati) in the future, which will be beneficial to our society.

Table 1: Life form and Biological spectrum of study area in Percentage

Sr. no	Life forms	No of species represented	Percentage
1	Phanerophytes	244	41.29%
2	Chamaephytes	007	1.18%
3	Hemicryptophytes	051	8.63%
4	Cryptophytes	032	5.41%
5	Therophytes	257	43.49%
	Total	591	100.00%

Table 2: Comparison of Spectrum of study site with normal spectrum.

Sr no	Life forms	Normal spectrum	Present study
1	Phanerophytes	46%	41.29%
2	Chamaephytes	9%	1.18%
3	Hemicryptophytes	26%	8.63%
4	Cryptophytes	6%	5.41%
5	Therophytes	13%	43.49

Based on the above data, it can be stated that Therophytes are the most common in the area, while Chamaephytes, Cryptophytes and Hemicryptophytes are found in less percentage in this study.

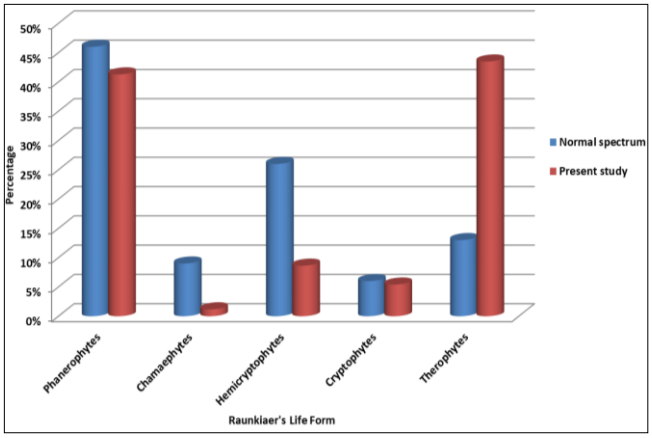

Fig 1: Comparison of Spectrum of study site with normal spectrum**.**

Table 3: Comparison of biological spectrum of Study area with different regions of Gujarat *= Ph: Phenerophytes; Ch: Chamaephytes; H: Hemicryptophytes; Cr: Cryptophytes; Th: Therophytes

Sr. No.	Regions	Ph*	Ch*	H*	Cr*	Th*
1	**Present work**	**41.29**	**1.18**	**8.63**	**5.41**	**43.49**
2	Bhandaria Forest area (Chavda *et al*., 2019)	40.98	4.86	4.63	5.09	44.44
3	Vadali Range forest (Desai *et al*., 2012)	31.44	9.28	2.26	2.94	54.08
4	Modasa taluka forest range (Jangid, 2012)	39.44	6.68	3.42	6.06	44.40
5	Sakkarbaug & Safari park (Solanki *et al*., 2008)	40.18	7.89	00	0.60	51.33
6	Gir forest (Pandit, 2003)	34.81	5.34	3.48	1.39	34.81
7	Victoria park (Patel, 1982)	25.26	7.51	6.48	9.21	51.54
8	Gujarat State (Shah, 1978)	4.90	17.80	1.40	4.60	43.80
9	Raunkiaer's Normal spectrum	46.0	09.0	26.0	06.0	13.0

Table-3 shows that among all life forms, Therophytes supplied the highest percentage in all region of Gujarat state, including the current study area.
Biological Spectrum can be used to compare geographically dispersed plant communities and these Physiogomic properties of the eco system are thought to be indications of biotic interaction, climatic change and habitat degradation. The presence of a comparable biological spectrum in different places indicates that the climatic conditions are similar.
The presence of Therophytes suggests a warm climate according to Dansereau (1957) [12]. The prevalence of Therophytes has been attributed to excessive grazing of biotic interferences by Bharucha and Dave (1944) [5], Pandeya (1964), and Agrawal (1984) [1].
Such biological Spectrums, which reflect the dominance of Therophytes, can be associated with the climatic conditions of the area Meherhomgi's (1981). As a result, Therophytes dominance can be traced to the semi-arid climate exists.
According to Raunkiaer (1934) [6, 26, 27], a regions climate is defined by life forms, while the regions biological Spectrum exceeds the percentage of the same life forms. The percentage of life forms may, change as a result of Therophytes such as annual weeds, biotic influences such as agricultural operations and grazing, deforestation and

trampling and other factors may significantly alter the biological spectrum. They have been frequently employed to better comprehend the flora and vegetation structure in connection to the current environment. Therophytes dominate the overall study region.

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