

Periodic Research

Life-Forms and Biological Spectrum of Taharabad Forest of Nashik District, Maharashtra, India

Abstract

The present paper deals with the different life form categories and biological spectrum of Taharabad forest in Nasik district, Maharashtra. The flora recorded 343 wild species belonging to 233 genera in 80 families. Biological spectrum of the present study shows that Therophytes (46.35%) were the most dominating life-form, followed by Phanerophytes (41.12%), Hemicryptophytes (7.87%), Chamaephytes (3.20%) and Cryptophytes (1.46%). The comparison with Raunkiaer's normal spectrum depicts Thero-phanerophytic type of phytoclimate. This indicates dry climate and high anthropogenic disturbance in the region.

Keywords: Biological spectrum, Dry deciduous forest, Taharabad, Nasik district, Life forms



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Introduction

The life form is an important physiognomic attributes that have been widely used in vegetation studies and also it indicates micro and macroclimate as well as human disturbance of a particular area. Life form in a community is generally defined as the sum of adaptation of plant to climate. Different systems have been revised by many ecologists for the description and classification of plant life forms. However, the system of Raunkiaer is the most and worldwide accepted, which is based upon the principle of position and degree of protection of the buds during the adverse climatic conditions.

According to this system, plant species can be grouped into five main classes: Phanerophytes, Chamaephytes, Hemicryptophytes, Cryptophytes and Therophytes. The percentage of various life form classes put together is called as the biological spectrum. Therefore, it is important to study the floristic composition and life forms of different plants to find out phytoclimatic zones of the area. In India, several workers have studied life forms and biological spectrum of different regions. In Maharashtra, only few workers have studied life forms and biological spectrum of different regions. Besides, no work on life forms has so far been carried out in Nasik district, Maharashtra.

In view of the above applications for Raunkiaerian concepts, the presentation endeavour was initiated with an aim to (1) ascertain variation of life forms in different plant communities of different climatic zones and (2) elucidate the relationship between vegetation and an elevational role of anthropogenic activities and environmental factors on the observed trends.

Biological spectrum of the flora based on the life form was prepared by following Raunkiaer (1934) life form classes

Therophytes

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

Cryptophytes

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

Hemicryptophytes

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.

Chamaephytes

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

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They are shrubby and tree species whose perennating buds are born on aerial shoot reaching a height of at least 25 cm. or more above the ground surface (Table 1)

Study Area

The Nashik district is located between latitude 19° 35' and 20° 50' and longitudes 73° 35' and extend over the area of 15,587 sq. km. It is bounded on the north-west by the Dang and Surat district of Gujarat state on the north by Dhule district, on the east by Jalgaon and Aurangabad district, on the south by Ahmednagar and south-west by Thane district of Maharashtra state.

District is divided in to 15 revenue tehsils. The Taharabad forest is spreading into Baglan Tehsil. Taharabad is situated at 20° 59' north latitude and 74° 19' east longitudes. The Forest in this tract is located on extreme part of Western Ghats. The hill ranges have direction either West-East or South-West or North-West except that of Sahyadris. The elevation varies from 600 to 1400 meters above Mean Sea Level. The hill slopes are usually steep and in many places precipitous. In the East and South-East of the tract, areas are undulating to level.

Climate

There are four distinct seasons, viz. 1) Winter season (December - February), 2) Summer season (March-May), 3) Monsoon season (June-September) and 4) post monsoon season (October - November). The climate is characterized by dryness except in the South - West monsoon season.

Soil

The volcanic portion consists of compact, stratified basalt and in earthy trap. The basalt is most conspicuous geological feature. In some flows the basalt is columnar and then it weathers into the fantastic shapes. The formation at the base of the traps is chiefly amygdaloidal, containing quarts in vertical veins, crystals and zeolithic minerals, especially apophyllite that finally weathers into a grey soil. Laterite is absent. Basalt is either fine textured or coarse and nodular.

Material and Methods

The results embodied in this work are based on collection from 2007 to 2010 through well-planned exploration in this forest range. Numbers of extensive explorations of 3-5 days duration were made in ten different localities like Rahud, Chirai, Mahad, Bodhari, Taharabad, Salher, mulher, Babhulne, Narkol and Jakhod of the Taharabad forests. More emphasis has given on intensive rather than extensive explorations. Sampling was done to prepare a complete herbarium for future reference. All the collected specimens have been processed for herbarium by dry method as per the routine herbarium techniques recommended by Santapau (1955) and Jain and Rao (1976). Specimens were critically examined in the laboratory with the help of relevant floras and available revisions and monographs All the plant species were classified on the basis of life forms as defined by Raunkier to determine the phytoclimate of the area.

Results and Discussion

A total 343 wild species belonging to 233 genera in 80 families are reported from this area. Enumeration of species is shown in along with habit and life-form in Table 1.

Table I
List of Plant Species Present in Taharabad forest of Nashik District with Habit and Life-form.

Speices	HA	LF
RANANCULACEAE		
<i>Clematis gouriana</i> Roxb. ex. DC.	C	PH
DILLENACEAE		
<i>Dillenia pentagyna</i> Roxb.	T	PH
ANNONACEAE		
<i>Annona squimosa</i> L.	S	PH
MENISPERMACEAE		
<i>Cocculus hirsutus</i> L.	C	PH
<i>Cyclea fasssicalyx</i>		
Dunn in Gamble	C	PH
<i>Cyclea peltata</i> (Lam.) Hook. f.	C	PH
<i>Tinospora cordifolia</i> Willd.	C	PH
PAPAVERACEAE		
<i>Argemone mexicana</i> L.	H	TH
<i>Cardamine trichocarpa</i> Hochst.	H	TH
CAPPARACEAE		
<i>Capparis brevispina</i> DC.	S	PH
VIOLACEAE		
<i>Hybanthus enneaspermum</i>		
(L.) F. v. Muell.	H	HM
FLACOURTIACEAE		
<i>Casearia graveolens</i> Dalz.	T	PH
<i>Casearia tomentosa</i> Roxb.	T	PH
<i>Flacourtia latifolia</i> (Hook.f. & Thomos)		
T. Cooke.	T	PH
POLYGALACEAE		
<i>Polygala erioptera</i> DC.	H	TH
PORTULACACEAE		
<i>Portulaca tuberosa</i> Roxb.	H	TH
MALVACEAE		
<i>Abelmoschus ficulneus</i>		
(L.) Wight & Ann.	H	PH
<i>Abelmoschus manihot</i>	LH	PH
ssp. <i>tetraphyllus</i>		
(Roxb. ex Horn.) Borss.	H	PH
<i>Althaea ludwigii</i> L.	H	TH
<i>Floria vitifolia</i> (L.) Mattei.	H	PH
<i>Kydea calycina</i> Roxb.	T	PH
<i>Pavonia zeylanica</i> L.	S	PH
<i>Sida acuta</i> Burm. f.	H	PH
<i>Sida cordata</i> Burm. f.	H	TH
<i>Sida spinosa</i> L.	H	TH
<i>Urena lobata</i> L.	S	PH
BONBACACEAE		
<i>Bombax ceiba</i> L.	T	PH
STERCULIACEAE		
<i>Eriolaena quinquelocularis</i>		
(Wight & Arn.) Wight.	T	PH
<i>Firmiana colorata</i> Roxb.	T	PH
<i>Sterculia guttata</i> Roxb.	T	PH
TILIACEAE		
<i>Corchorus capsularis</i> L.	H	TH
<i>Corchorus tridens</i> L.	H	TH

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<i>Grewia serrulata</i> DC.	T	PH	<i>Dalbergia candenatensis</i> Dennst.	S	PH
<i>Triumfetta malabarica</i> Koen.	H	TH	<i>Dalbergia horrida</i> Dennst.	S	PH
<i>Triumfetta pilosa</i> Roth.	H	HM	<i>Dalbergia latifolia</i> Roxb.	T	PH
LINACEAE			<i>Dalbergia volubilis</i> Roxb.	C	PH
<i>Linum mysurense</i> Heyne ex Bth.	H	TH	<i>Derris brevipes</i> (Bth.)	C	PH
MALPIGHIACEAE			<i>Derris scandens</i> (Roxb.)	C	PH
<i>Aspidopteris cordata</i> Heyne.	C	PH	<i>Desmodium alysicarpoides</i>		
<i>Hiptage benghalensis</i> L	C	PH	van. Meeuwen.	H	TH
ZYGOPHYLLACEAE			<i>Desmodium procumbens</i>		
<i>Fagonia schweinfurthii</i> Hadidi	H	TH	(Mill.) Hutch.	H	TH
BALSAMINACEAE			<i>Desmodium ritchiei</i> Sanj.	H	TH
<i>Impatiens acaulis</i> Arn.	H	TH	<i>Desmodium triquetrum</i> (L.) DC.	S	PH
<i>Impatiens balsamina</i> L.	H	TH	<i>Desmodium velutinum</i> (Willd.) DC.	S	PH
RUTACEAE			<i>Flemingia strobilifera</i> (L.) Ait.	S	PH
<i>Aegle marmelos</i> L.	T	PH	<i>Geissaspis cristata</i> Wight & Arn.	H	TH
<i>Atalantia racemosa</i>			<i>Indigofera hendecaphylla</i> Jacq.	H	TH
Wight in Hookers	T	PH	<i>Indigofera linifolia</i> (L.) Retz.	H	CH
MELIACEAE			<i>Indigofera prostrata</i> Willd.	H	CH
<i>Aglaia lawii</i> (Wight) Sald.	T	PH	<i>Indigofera tinctoria</i> L.	S	PH
CELASTRACEAE			<i>Indigofera trifoliata</i> L.	H	TH
<i>Celastrus paniculatus</i> Willd.	C	PH	<i>Lablab perpureus</i> (L.) Sweet.	C	PH
RHAMNACEAE			<i>Macrotyloma uniflorum</i> Verdc.	C	PH
<i>Rhamnus hirsuta</i> Wight.	S	PH	<i>Mucuna pruriens</i> (L.) DC.	S	PH
<i>Ventilago denticulate</i> Willd.	S	PH	<i>Mundulea sericea</i> (Willd.)	S	PH
<i>Ventilago maderaspatana</i>			<i>Pongamia pinnata</i> (L.) Pierre.	T	PH
Gaertn.	C	PH	<i>Pycnospora lutescens</i>		
<i>Ziziphus rugosa</i> Lam.	S	PH	(Poir.) Schindl.	H	TH
VITACEAE			<i>Rhynchosia rothii</i> Bth.	S	PH
<i>Ampelocissus latifolia</i> Roxb.	C	PH	<i>Sesbania sesban</i> (L.) Merr.	S	PH
<i>Cayratia trifolia</i> L.	H	PH	<i>Smithia salsuginea</i> Hance.	H	TH
<i>Cissus elongata</i> Roxb.	C	PH	<i>Smithia sensitiva</i> Ait.	H	TH
<i>Cissus pallida</i> (Wight & Arn.)			<i>Taverniera cuneifolia</i> (Roth.) Arn.	H	TH
Planch.	S	PH	<i>Tephrosia purpurea</i> (L.) Pers.	H	TH
LEEACEAE			<i>Tephrosia tinctoria</i> (L.) Pers.	S	PH
<i>Leea asiatica</i> L.	S	PH	<i>Tephrosia villosa</i> (L.) Pers.	H	TH
<i>Leea macrophylla</i> Roxb.	H	TH	<i>Teramnus labialis</i> (L. f.) Spreng.	H	TH
SAPINDACEAE			<i>Vicia sativa</i> L.	H	TH
<i>Schleichera oleosa</i> Lour.	T	PH	<i>Vigna khandalensis</i> Sant.	S	PH
ANACARDIACEAE			CAESALPINIACEAE		
<i>Mangifera indica</i> L.	T	PH	<i>Bauhinia malabarica</i> Roxb.	T	PH
<i>Rhus mysorensis</i> G. Don,	S	PH	<i>Bauhinia purpurea</i> L.	T	PH
<i>Spondias pinnata</i> (L.f.)	T	PH	<i>Caesalpinia bunduc</i> (L.) Roxb.	S	PH
FABACEAE			<i>Caesalpinia decapitala</i> (Roth.) Alst.	S	PH
<i>Alysicarpus</i>			<i>Cassia fistula</i> L.	T	PH
<i>bupleuriformis</i> (L.) DC.	H	CH	<i>Cassia mimosoides</i> L.	H	TH
<i>Alysicarpus longifolius</i>			MIMOSACEAE		
Wight & Arn.	H	TH	<i>Acacia concinna</i> (Willd.) DC.	C	PH
<i>Alysicarpus tetragonolobus</i>			<i>Acacia nilotica</i> (L.) Willd.	T	PH
Edgew.	H	TH	ssp. <i>astringens</i>		
<i>Butea superba</i> Roxb.	C	PH	(Schum. & Thonn) Roberty.	T	PH
<i>Cajanus cajan</i> L.	S	PH	<i>Acacia torta</i> (Roxb.) Craib	C	PH
<i>Cajanus scarabaeoides</i> L.	H	TH	<i>Albizia procera</i> (Roxb.) Bth.	T	PH
<i>Canavalia africana</i> Dunn.	C	PH	<i>Prosopis cineraria</i> (L.) Druce,	T	PH
<i>Clitoria ternatea</i> L.	C		<i>Samania saman</i> (Jacq.) Merr.	T	PH
HM			COMBRETACEAE		
<i>Crotalaria calycina</i> Shrank,	H	TH	<i>Anogeissus latifolia</i> Roxb. ex DC.	T	PH
<i>Crotalaria mysorensis</i> Roth.	H	TH	<i>Terminalia bellirica</i> (Gaertn.) Roxb.	T	PH
<i>Crotalaria nana</i> Burm. f.	H	TH	<i>Terminalia chebula</i> Retz.	T	PH
<i>Crotalaria orixensis</i> Willd.	H	TH	<i>Terminalia cuneata</i> Roth,	T	PH
<i>Crotalaria pallida</i> Ait.	H	TH	LECYTHIDACEAE		
<i>Crotalaria retusa</i> L.	H	TH	<i>Careya arborea</i> Roxb.	T	PH
<i>Crotalaria spectabilis</i> Roth.	S	PH	LITHRACEAE		
<i>Crotalaria triquetra</i> Dalz.	H	TH	<i>Lagerstroemia microcarpa</i> Wight,	T	PH

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<i>Lagerstroemia parviflora</i> Roxb.	T	PH
<i>Rotala densiflora</i> Roth. Ex R. & S.	H	TH
<i>Rotala indica</i> (Willd.) Koehne.	H	TH
<i>Rotala rotundifolia</i> Buch.-Ham.	H	
CH		
<i>Woodfordia fruticosa</i> (L.) Kurz	S	PH
PASSIFLORACEAE		
<i>Passiflora foetida</i> L.	C	PH
CUCURBITACEAE		
<i>Momordica balsamina</i> L.	C	PH
BEGONIACEAE		
<i>Begonia crenata</i> Dryand.	H	TH
<i>Begonia picta</i> J.E. Sm.	H	TH
CACTACEAE		
<i>Opuntia elatior</i> Mill.	S	PH
MOLLUGINACEAE		
<i>Glinus lotoides</i> L.	H	CH
APIACEAE		
<i>Ammi majus</i> L.	H	TH
<i>Pinda concanensis</i> Dalz.	H	TH
RUBIACEAE		
<i>Canthium angustifolium</i> Roxb.	S	PH
<i>Canthium dicoccum</i> Gaertn.	T	PH
<i>Gardenia latifolia</i> Soland.	T	PH
<i>Hedyotis affinis</i> R. & S.	H	TH
<i>Hymenodityon orixense</i> (Roth.) Mabb.	T	PH
<i>Ixora brachiata</i> Roxb.	T	PH
<i>Ixora coccinea</i> L.	S	PH
<i>Ixora pavetta</i> Andr.	S	PH
<i>Meyna laxiflora</i> Robyns.	T	PH
<i>Neanotis lancifolia</i> Hook. f.	H	TH
<i>Pavetta crassicaulis</i> Bremek	S	TH
<i>Rubia cordifolia</i> L.	H	HM
<i>Tamilnadia uliginosa</i> (Retz.) Tirv. & Sastre.	T	PH
ASTERACEAE		
<i>Artemisia nilagirica</i> (C.B.Cl.) Pamp.	S	PH
<i>Blumea eriantha</i> DC.	H	
HM		
<i>Blumea malcolmii</i> C.B.Cl.	H	TH
<i>Blumea mollis</i> D.Don.	H	TH
<i>Caesullia axillaris</i> Roxb.	H	
CH		
<i>Conyza sumatrensis</i> Retz.	H	TH
<i>Cyathocline purpurea</i> Buch-Ham.	H	TH
<i>Eclipta prostrata</i> L.	H	TH
<i>Gnaphalium polycaulon</i> Pers.	H	TH
<i>Gynura bicolor</i> Roxb. ex Willd.	S	PH
<i>Launaea intybacea</i> (Jacq) Beauv.	H	TH
<i>Phyllocephalum scabridum</i> DC.	H	TH
<i>Pluchea lanceolata</i> (DC.) C.B.Cl.	S	PH
<i>Senecio bombayensis</i> Balakr.	H	TH
<i>Siegesbeckia orientalis</i> L.	H	TH
<i>Sonchus asper</i> (L.) Hill.	H	TH
<i>Synedrella nodiflora</i> (L.) Gaertn.	H	TH
<i>Tricholepis radicans</i> (Roxb.) DC.	H	TH
<i>Zinnia peruviana</i> (L.) Syst.	H	TH
MYRSINACEAE		
<i>Embelia basaal</i> (R. & S.) A. DC.	S	TH
SAPOTACEAE		
<i>Madhuca latifolia</i> (Roxb.) Chev.	T	PH

<i>Manikara hexandra</i> (Roxb.) Dub.	T	PH
<i>Mimusops elengi</i> L.	T	PH
OLEACEAE		
<i>Jasminum auriculatum</i> Vahl.	S	PH
<i>Jasminum multiflorum</i> Burm. f.	S	PH
<i>Nyctanthes arbor-tristis</i> L.	S	PH
APOCYNACEAE		
<i>Holarrhena pubescens</i> Buch-Ham.	T	PH
ASCLEPIADACEAE		
<i>Calotropis gigantea</i> (L.) Ait.	S	PH
<i>Ceropegia hirsuta</i> Wight.	H	PH
<i>Ceropegia sahyadrica</i> Ansari & Kulk.	H	TH
<i>Leptadenia reticulata</i> (Retz.) Wight & Arn.	S	PH
<i>Pergularia daemia</i> (Forrsk.) Choiv.	S	PH
<i>Tylophora dalzellii</i> Hook. f.	C	PH
<i>Tylophora indica</i> (Burm. f.) Merr.	C	PH
CONVOLVULACEAE		
<i>Convolvulus arvensis</i> L.	H	
HM		
<i>Ipomoea companulata</i> L.	S	PH
<i>Ipomoea carnea</i> Jacq. subsp. <i>fistulosa</i> (Mart. ex Choisy) Austin.	S	PH
<i>Ipomoea eriocarpa</i> R. Br.	H	TH
<i>Ipomoea mauritiana</i> Jacq.	S	
CH		
<i>Ipomoea nil</i> (L.) Roth.	H	TH
<i>Merremia aegyptia</i> (L.) Urb.	H	PH
CUSCUTACEAE		
<i>Cuscuta reflexa</i> Roxb.	H	PH
SOLANACEAE		
<i>Solanum anguivi</i> Lam.	S	TH
<i>Solanum virginianum</i> L.	H	
CH		
<i>Withania somnifera</i> (L.) Dunal.	H	TH
SCROPHULARIACEAE		
<i>Bacopa monnieri</i> (L.) Penn.	H	CH
<i>Sopubia delphinifolia</i> (L.) G. Don.	H	TH
<i>Striga densiflora</i> (Bth.) Bth. Comp.	H	TH
<i>Striga gesnerioides</i> (Willd.) Vatke.	H	TH
BIGNONOICEAE		
<i>Heterophragma</i> <i>quadrioculare</i> K. Sch..	T	PH
PEDALIACEAE		
<i>Sesamum orientale</i> L.	H	TH
MATRYNIACEAE		
<i>Martynia annua</i> L.	H	TH
ACANTHACEAE		
<i>Carvia callosa</i> (Wall.) Bremek.	S	PH
<i>Haplonthodes</i> <i>neilgherryensis</i> R.B. Muj.	H	CH
<i>Haplonthodes plumosa</i> Panigr. & G.C. Das.	H	CH
<i>Haplonthodes tentaculata</i> R.B. Mujumdar.	H	TH
<i>Hygrophylla serpyllum</i> (Nees) T. And.	H	TH
<i>Justicia betonica</i> L.	S	PH
<i>Lepidagathis cristata</i> Willd.	H	HM
<i>Lepidagathis cuspidata</i> Nees.	S	PH

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<i>Neuracanthus trinervius</i> Wight.	S	PH
<i>Nilgiranthus heyneanus</i> Bremek.	S	PH
<i>Nilgiranthus reticulatus</i> Bremek.	S	PH
<i>Thelepaepale ixiocephala</i> Bremek.	S	PH
VERBENACEAE		
<i>Gmelina arborea</i> Roxb.	T	PH
<i>Vitex negundo</i> L.	S	PH
LAMIACEAE		
<i>Acrocephalus hispidus</i> Nicols. & Siv.	H	TH
<i>Anisochilus carnosus</i> (L.) Wall.	H	TH
<i>Anisomeles heyneana</i> Bth.	H	PH
<i>Anisomeles indica</i> (L.) O. Ktze.	H	HM
<i>Anisomeles malabarica</i> R. Br. ex Sims.	S	PH
<i>Colebrookea oppositifolia</i> Sm. Exot.		
<i>Hyptis suaveolens</i> (L.) Poit.	S	PH
<i>Nepeta hindostana</i> Haines.	H	TH
<i>Orthrosiphon pallidus</i> Royle ex Bth.	H	TH
<i>Salvia plebeia</i> R. Br.	H	TH
AMARANTHACEAE		
<i>Achyranthus aspera</i> L. var. <i>porphyristachya</i> Hook.	H	TH
<i>Alternanthera pungens</i> Kunth.	H	TH
<i>Alternanthera sessilis</i> (L.) R. Br.	H	TH
<i>Amaranthus tricolor</i> L.	H	TH
CHENOPODIACEAE		
<i>Chenopodium album</i> L.	H	TH
<i>Chenopodium murale</i> L.	H	TH
POLYGONACEAE		
<i>Persicaria glabra</i> (Willd.) Gomez.	H	CR
<i>Polygonum plebium</i> R. Br.	H	TH
LAURACEAE		
<i>Actinodaphne angustifolia</i> Nees.	T	PH
ELAEAGNACEAE		
<i>Elaeagnus conferta</i> Roxb.	S	PH
LORANTHACEAE		
<i>Viscum articulatum</i> Burm. f.	S	PH
SANTALACEAE		
<i>Santalum album</i> L.	T	PH
EUPHORBIACEAE		
<i>Acalypha ciliata</i> Forssk.	H	TH
<i>Acalypha malabarica</i> Muell.-Arg.	H	TH
<i>Baliospermum montanum</i> Muell.-Arg.	S	PH
<i>Breynia retusa</i> (Dennst.) Alston.	S	PH
<i>Bridelia retusa</i> (L.) Spreng.	S	PH
<i>Emblica officinalis</i> Gaertn.	T	PH
<i>Euphorbia erythroclada</i> Boiss.	H	TH
<i>Euphorbia fusiformis</i> Buch.-Ham.	H	HM
<i>Glochidion ellipticum</i> Wight.	T	PH
<i>Homonoia riparia</i> Lour.	S	PH
<i>Jatropha curcas</i> L.	S	PH
<i>Mallotus philippensis</i> (Lam.) Muell.-Arg.	T	PH
<i>Phyllanthus fraternus</i> Webster.	H	TH
<i>Phyllanthus scabrifolius</i> Hook. f.	H	TH
<i>Phyllanthus urinaria</i> L.	H	TH
<i>Sapium insigne</i> Bth. var. <i>malabaricum</i> (Wight) Hook.f.	T	PH

<i>Securinega leucopyrus</i> (Willd.) Muell.-Arg.	S	PH
<i>Securinega virosa</i> (Roxb. ex Willd.) Baill.	S	PH
<i>Trewia polycarpa</i> Bth.	T	PH
URTICACEAE		
<i>Boehmeria macrophylla</i> Hornem.	S	PH
<i>Gigardinia diversifolia</i> (Link) Friis.	H	HM
<i>Laporteia interrupta</i> (L.) Chew.	H	TH
<i>Lecanthus peduncularis</i> Wedd.	H	TH
<i>Pouzolzia zeylanica</i> (L.) Benn.	H	HM
MORACEAE		
<i>Ficus amplissima</i> J. E. Sm.	T	PH
<i>Ficus exasperata</i> Vahl.	S	PH
<i>Ficus hispida</i> L.	S	PH
<i>Streblus asper</i> Lour.	T	PH
CERATOPHYLLACEAE		
<i>Ceratophyllum demersum</i> L.	H	CR
ORCHIDACEAE		
<i>Aerides crispum</i> Lindl.	H	TH
<i>Dendrobium aqueum</i> Lindl.	H	TH
<i>Dendrobium barbatum</i> Lindl.	H	TH
<i>Dendrobium ovatum</i> (Willd.) Kranzl.	H	PH
<i>Habenaria marginata</i> Coleb.	H	TH
ZINGIBERACEAE		
<i>Costus speciosus</i> (Koenig) J.E. Sm.	S	PH
<i>Curcuma inodora</i> Blatt.	H	TH
MUSACEAE		
<i>Ensete superbum</i> (Roxb.) Cheesm.	H	PH
AMARYLLIDACEAE		
<i>Crinum viviparum</i> R. Ansari & V.J. Nair.	H	TH
HYPOXIDACEAE		
<i>Hypoxis aurea</i> Lour.	H	TH
AGAVACEAE		
<i>Agave ingens</i> Berger.	H	TH
TACCACEAE		
<i>Tacca leontopetaloides</i> (L.) O. Ktze.	H	HM
LILIACEAE		
<i>Drimia indica</i> (Roxb.) Jessop.	H	TH
<i>Gloriosa superba</i> L.	H	HM
<i>Iphigenia indica</i> (L.) A. Gray	H	TH
<i>Iphigenia pallida</i> Baker.	H	TH
<i>Scilla hyacinthina</i> (Roth.) Mc Bride.	H	TH
COMMELINACEAE		
<i>Commelina attenuata</i> Koen.	H	TH
<i>Commelina benghalensis</i> L.	H	TH
<i>Commelina paleata</i> Hassk.	H	TH
<i>Commelina suffruticosa</i> Bl.	H	TH
<i>Murdannia nudiflora</i> (L.) Brenan.	H	TH
<i>Murdannia spirata</i> (L.) Brueck.	H	TH
TYPHACEAE		
<i>Typha angustifolia</i> L.	H	PH
ARACEAE		
<i>Arisaema murrayi</i> (Grah.) Hook.	H	TH
<i>Arisaema tortuosum</i> (Wall.) Schott.	H	TH
<i>Remusatia</i>		

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<i>vivipara</i> (Roxb.) Schott.	H	TH
ERIOCAULACEAE		
<i>Eriocaulon diana</i> e Fyson.	H	TH
<i>Eriocaulon margaretae</i> Fyson.	H	TH
CYPERACEAE		
<i>Cyperus alutatus</i> Kern.	H	TH
<i>Cyperus exaltatus</i> Retz	H	TH
<i>Cyperus nutans</i> Kern.	H	
HM		
<i>Eleocharis atropurpurea</i> J. & K. Presl.	H	TH
<i>Fimbristylis complanata</i> (Retz.) Link.	H	HM
<i>Fimbristylis ferruginea</i> (L.) Vahl.	H	HM
<i>Fimbristylis microcarya</i> F. v. Muell.	H	TH
<i>Fimbristylis tetragona</i> R. Br.	H	HM
<i>Juncellus laevigatis</i> (L.) C.B.Cl.	H	CR
<i>Kyllinga brevifolia</i> Rottb.	H	TH
<i>Rhynchospora wightiana</i> (Nees) Steud.	H	TH
POACEAE		
<i>Arthraxon hispidus</i> (Thunb.) Makino.m	H	TH
<i>Anthraxon lanceolatus</i> Hochst.	H	TH
<i>Arundinella metzii</i> Hochst.	H	TH
<i>Arundinella pumila</i> (Hochst. ex A. Rich.) Steud.	H	TH
<i>Coix gigantea</i> Koen.	H	TH
<i>Dendrocalamus strictus</i> (Roxb.) Nees.	T	PH
<i>Dichanthium caricosum</i> (L.) A. Camus.	H	HM
<i>Dichanthium foveolatum</i> (Del.) Roberty.	H	TH
<i>Dichanthium heugelii</i> (Hack.) Jain.	H	HM
<i>Dinebra retroflexa</i> (Vahl.) Panz.	H	TH
<i>Echinochloa colona</i> (L.) Link.	H	TH
<i>Eleusine coracana</i> (L.) Gaertn.	H	HM
<i>Eleusine indica</i> (L.) Gaertn.	H	TH
<i>Eragrostiella bifaria</i> (Vahl.) Bor.	H	HM
<i>Eragrostis ciliaris</i> (L.) R. Br.	H	TH
<i>Eragrostis gangetica</i> (Roxb.) Steud.	H	HM
<i>Eragrostis japonica</i> (Thunb.) Trin,	H	HM
<i>Eragrostis minor</i> Host.	H	TH
<i>Eragrostis viscosa</i> (Retz.) Trin.	H	TH
<i>Ischaemum rugosum</i> Salisb.	H	TH
<i>Iseilema anrhephoroides</i> Hack.	H	HM
<i>Panicum miliaceum</i> L.	H	TH
<i>Panicum psilopodium</i> Trin.	H	TH
<i>Paspalidium flavidum</i> (Retz.) A. Camus.	H	HM
<i>Sehima nervosum</i> (Rottl.)	H	HM
<i>Sorghum halepense</i> (L.) Pers.	S	PH
<i>Themeda quadrivalvis</i> (L.) O. Ktze.	H	TH
<i>Triplopogon ramosissimus</i> Bor.	H	TH
<i>Tripogon jacquemontii</i> Starf.	H	HM
<i>Urochloa panicoides</i> P. Beauv.	H	TH

HA = Habit; **LF** = Life form; **H** = Herb; **C** = Climber; **S** = Shrub; **T** = Tree; **PH** = Phanerophytes; **CH** = Chamaephytes; **HM** = Hemicryptophytes; **CR** = Cryptophytes; and **H** = Therophytes.

Analysis of the habit shows that herbs predominate with 192 species (56%) followed by shrubs with 70 species (20%), trees with 55 species (16%) and climbers with 26 species (8%) is shown in Figure 1. Major life form classes along with their number and percentage is given in Table II.

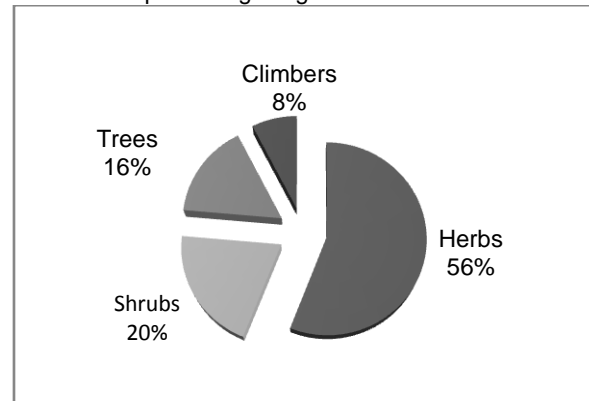


Fig. 1: Pie Diagram Showing Percentage Contribution of Various Plant Habits.

Life forms	Species recorded	% of species	Raunkiaer's normal % spectrum
Therophytes	159	46	13
Phanerophytes	141	41	46
Hemicryptophytes	27	08	26
Chamaephytes	11	03	09
Cryptophytes	05	02	06
Total	343	100	100

Table II: Different Life-form Classes of the Flora of Taharabad .

Comparison of the percentage of the life form classes of the Taharabad forest in Nashik district with Raunkiaer's normal spectrum indicates that Therophytes is the largest life form class and their percentage is more than 3 times higher than (46%) that of the normal biological spectrum (13%). The Phanerophytes forms the second highest class with (41%), which is somewhat equal to that of the normal spectrum (Figure 2). Thus, the area has a Therophanerophytic type of phytoclimate, which indicate hot and dry climate. Therophytes (annuals) are drought evaders in the sense that the whole plant is shed during the unfavourable conditions. Moreover, the high proportion of Therophytes in this study area facing biotic pressure like grazing, lopping and felling the trees

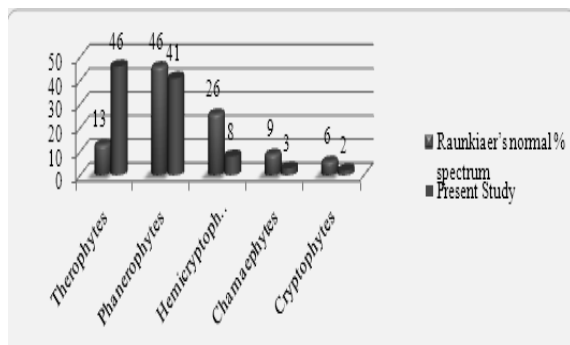


Fig. 2: Biological Spectrum of Life-forms of Present Study and its Comparison with the Raunkiaer's Normal Biological Spectrum Representing World Flora.

Conclusion

The phyto-spectrum of the present study shows variation from the normal biological spectrum of Raunkiaer (1934). The higher percentage of therophyte is recorded in the study area because of the general terrain of the district is typical of the Deccan plateau. Therophytes were found to be more adaptive and survive in adverse season. The dominance of therophytes indicates the biotic interference includes deforestation, intensive utilization of land for cultivation, over grazing, increase in human habitation while phanerophytes provide good evidence that their abundance is fact of an expression of monsoon climate. Thus, this character of Therophytes and Phanerophytes shows dominance over the other life forms.

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