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PHENOLOGICAL BEHAVIOUR OF SOME SELECTED PLANT SPECIES OF KASUBAI-HARISHCHANDRAGARH WILD LIFE SANCTUARY IN AHMEDNAGAR (MS) INDIA

MOHAN B.WAMAN

Dr. D.Y. Patil Arts,
Commerce and Science College,
AKURDI, PUNE- 411044 (M.S.) INDIA
(Affiliated to Savitribai Phule Pune University)
Email: wamanmohan19@gmail.com

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ABSTRACT

Phenological pattern of some selected plant species were monitored in the forest of Kasubai-Harishchandragarh Wildlife Sanctuary located in the northern part of Western Ghats, India. Vegetative and reproductive phenology of 85 plant species including 63 trees 4 climbers and 18 shrubs were recorded through frequent field visits in different seasons for three years. The phenological events were divided into vegetative and reproductive phases (flowering and fruiting). During summer season 64 plant species were reported in flowering while in winter 41 species have been recorded in flowering and 27 species were accounted in flowering during monsoon season.Similarly, 58 species in fruiting were noted in summer while 32 plant species documented to be in fruiting during winter and 30 plants were reported in fruiting throughout monsoon. Two species were reported to be in flowering and fruiting throughout the year. From the data it is observed that the peak period of flowering was in September to November (mostly shrubs) and March to May (trees).From such studies one can know the highest and lowest reproductive period of forest community.

Figure : 00 References : 06 Table : 01
KEY WORDS : Forest of Kasubai-Harishchandragarh, Phenology, Wildlife Sanctuary

Introduction

Phenology, the time of recurring natural phenomena in plants which deals with new foliage, leaf fall, flowering and fruiting-like events. It indicates the relationship between climatic factors and periodic phenomena in living organisms. Plant phenological studies helps to understand the forest as a resource base for other dependent populations or communities. In addition to that seasonal changes include variations in the duration of sunlight, precipitation, temperature and other life-controlling factors can be understood.

Moreover, phenology of herbs provide a clear background for obtaining detailed information on the changes occurring with time within the herb community due to non-woody and small plants. In addition to that different life forms such as trees, shrubs, herbs and climbers are correlated with different patterns of flowering and fruiting phenology. Furthermore, herbaceous plants go through reproductive phenology during the rainy season, whereas woody plants favour dry season for flowering and fruiting[1,2,5]. Furthermore, each plant life form shows particular association with particular climatic factors. Therefore, the present study aims to monitor and describe the vegetative and reproductive phenological events of some selected species occurring in the forest ecosystems of Kalsubai-Harishchandragad Sanctuary and to relate the role of biotic and abiotic factors in determining these events.

Materials and Methods

Kalsubai-Harishchandragad Sanctuary lies between 19^0 22' 30" and 19^0 36' 17" N latitude and 73^0 29' 54" and 73^0 54' 08" E longitude, at an elevation of about 1410 meters above the mean sea level and forms the boundaries of Ahmednagar, Thane, Pune and Nashik districts of Maharashtra

TABLE-1: Phenological diagram of selected plant species from the study area

Botanical Name	Common Name	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Clematis hedysarifolia	Morvel												
Clematis wightiana													
Dillenia pentagyna	Karvel												
Annona squamosa	Sitaphal												
Miliusa tomentosa	Humb												
Tinospora cordifolia	Gulvel												
Capparis rotundifolia													
Capparis spinosa	Wagati												
Casearia graveolens	Kirmira												

Botanical Name	Common Name	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Flacourtia indica	Tambat												
Thespesia populnea	Bhendi chezad												
Bombax ceiba	Savar												
Grewia abutilifolia	Chikan Kharata												
Grewia tiliifolia	Dhamon												
Sterculia guttata	Kandol												
Sterculia roxburghii	Kandol												
Aegle marmelos.	Bel												
Atalantia recemosa	Makad Limbu												

Botanical Name	Common Name	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Murraya koenigii	Kadhi Limb												
Balanites aegyptiaca	Hinganbet												
Garuga pinnata	Kakad												
Aglaia lawii	Murmi												
Cassine glauca	Bhutikesh												
Maytenus rothiana.	Yenkai												
Ziziphus caracutta	Ghatbor												
Ziziphus rugosa	Toran												
Cissus elongata	Ambal												
Leea asiatica	Dinda												
Leea indica	Dinda.												

Botanical Name	Common Name	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Sapindus laurifolius	Ritha												
Mangifera indica	Amba												
Spondias pinnata.	Ganer												
Butea monosperma	Palas												
Erythrina stricta	Pangara												
Erythrina variegata	Pangra												
Ougeinia oogeensis	Tiwas												
Pongamia pinnata.	Karanj												
Bauhinia racemosa	Apta												

Botanical Name	Common Name	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Cassia fistula	Bahawa												
Delonix regia	Gulmohar												
Acacia torta	Chilar												
Albizia amara	Tugli												
Combretum albidum	Madvel												
Terminalia bellirica.	Beheda												
Terminalia chebula	Hirda												
Terminalia crenulata	Sadada												
Syzygium cumini	Jamhul												
Careya arborea	Khambi												
Memecylon umbellatum	Anjan												

Botanical Name	Common Name	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Memecylon talbotianum	Karap												
Largerstroemia parviflora	Bondara												
Lagerstroemia microcarpa	Lendya												
Woodfordia fruticosa	Dhayati												
Canthium dicoccum	Lokhand												
Catunaregam spinosa	Gel												
Ixora brachiata	Bhoma												
Meyna laxiflora	Alu												

Botanical Name	Common Name	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Plumbago zeylanica	Chitrak												
Embelia tsjeriam-cottom	Wavding												
Madhuca longifolia	Moha												
Xantolis tomentosa	Kunvala												
Diospyros melanoxylon	Terbhumi												
Jasminum malabaricum	Kusar												
Olea dioica	Parj-ambhul												
Carissa congesta	Karwand												
Holarrhena pubescens.	Pandhara-kuda												
Wrightia tinctoria	Kalakuda												

Botanical Name	Common Name	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Cordia dichotoma	Bhokar												
Heterophragma quadriloculare	Varas												
Carvia callosa	Carvi												
Callicarpa tomentosa	Aisar												
Lantana camara	Ghaneri												
Vitex negundo	Nirgudi												
Tectona grandis.	Saag												
Actinodaphne angustifolia	Pisa												
Gnidia glauca	Rametha												

Botanical Name	Common Name	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Elaeagnus conferta	Ambal												
Santalum album	Chandan												
Bridelia retusa	Asana												
Macaranga peltata.	Chandandiva												
Mallotus philippensis	Shendri.												
Phyllanthus emblica	Avla												
Sapium insigne	Hura												
Holoptelea integrifolia	Vavli												
Ficus racemosa	Umber												

$:- Flowering Fruiting

state, India. The total area of the sanctuary is approximately 361.71 km^2, out of which, 17119.86 hectares are covered by forest, 2884.17 hectares protected forest and 16167 hectares non-forest area. The hill forts like Kalsubai (1646 M), Kulangarh (1470 M), Alangarh (1450 M), Ratangarh (1297 M), Ajoba dongar (1372 M), and Harishchandragarh (1424 M) are the various peaks situated in the study area. The soil from the study area shows clay, loamy, sandy loam and sandy clay textural groups. Forest type is of sub-tropical hill forest and the vegetation is stunted and typical evergreen patches are seen. The vegetation is represented by deciduous species in the foothill, gradually changing to mixed and semi-evergreen upwards[4]. The vegetation of the sanctuary is of semi-evergreen forest, moist deciduous forests, dry deciduous forests and ravine vegetation type[6]. The average rainfall of the study area is about 4182 mm per annum. The temperature rises up to 40 ^{0}C in midsummer to 7 ^{0}C in winter (in the month of December).

Phenological study

Phenological observations were made depending on the local conditions. These observations were assessed in the study area by frequent field visits. Flower blooming, fruiting, seed germination and growth of saplings were noted during field visits. Keeping tracts of life-cycle events, observations were noted.

Results and Discussion

Almost all plant communities of the subtropical and tropical dry zones have more or less well-defined seasonal aspects[3]. Cyclic events such as flowering, fruiting and leaf fall are tracked for specific plants from year to year so that comparisons and trends can be analyzed. For the phonological study observations are generally made at the same location and sometimes from the same individual plant. Obviously, there is a need for accurate record keeping of phenological data.

The seasonal aspects of selected plant species were observed in the study area. However, only broad phenophases such as flowering, fruiting and vegetative phases of the species have been recorded. Phenology of certain plant species was assessed quantitatively by periodic observations. The data are represented in a diagrammatic tabular form (Table-1). Such type of data is useful for beekeepers to observe the phenophases of plants and the biological cycle of the honeybee colony.

Number of species in flowering and fruiting in each season has been recorded. In all 85 plant species have been noted, out of which 63 are trees 04 climbers and 18 shrubs.

The year was divided into three seasons, monsoon (June to September), winter (October to January) and summer (February to May). During summer 64 plants were reported in flowering while in winter 41 species have been recorded in flowering. 27 species were reported in flowering during monsoon season.

Similarly, 58 species in fruiting were noted in summer; 32 plants documented to be in fruiting during winter and 30 plants were reported in fruiting throughout monsoon. Two species were reported to be in flowering and fruiting throughout the year. From the data it is observed that the peak period of flowering was in September to November (mostly shrubs) and March – May (trees).The table refers to the observations of seasonal variations in the plant community.

The length of the horizontal pink coloured strip next to each species name refers to the length of time of flowering and another horizontal green strip just below each pink colour strip represents the time of fruiting. The Table shows integration of the flowering and fruiting phases among the species in the study area. From such studies one can know the highest and lowest reproductive period of forest community. There was closer links between reproductive phenology and particular time of year in forest. From the data it can be said that the peak period of flowering was in September-November (most herbs) and March-May (trees and shrubs). Different peaks seen during different seasons for flowering and fruiting of plant species are adaptations to the surrounding abiotic and biotic environment.

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