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ORIGINAL ARTICLE **OPEN ACCESS**

Phenological Study of Trees Species in Palanpur Taluka of Banaskantha District (North Gujarat)

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ABSTRACT
Phenology is a term that refers to the dates of the first phenomenon of each natural event in its annual cycle. It entails searching how living organisms react to seasonal and climate changes in their surroundings. The present study aims to record the phonological diagrams of various tree species in Palanpur taluka. Which is located in the Palanpur taluka is situated in the Banaskantha district in the north Gujarat region of the Gujarat state. Here is a total of 13 species and 11 families for its month-wise phenological. The variations in phenophases are due to changes in environmental conditions, habitat, and soil availability, as well as the nutrient content of the soil, which was adapted to the habitats by the surrounding a biotic and biotic factors of this study area.
Keywords: *Phenology, Tree, Leaf fall, Flowering, Fruiting*

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INTRODUCTION

Phenology is the study of the correlation between climatic factors and cyclic phenomena in organisms. Outlines of phenological incidents are variously used to characterize of vegetation type [6]. The study of plant phenology provides information about the model of plant growth and growth as well as the effects of environs and choosy pressure on flowering and fruiting behavior [8]. It is the study of how the natural events in plants, such as vegetative growth, flowering, fruit formation, fruit maturation, and leaf fall, take place at specific times [4]. Ecological factors authority the phenological behavior of, species residents. These phenological events can be recorded diagrammatically month-wise and season-wise and provide important information. Such a diagram is called a phenogram. The study of phenology (Temporal Behaviors or Time relationship) is significant from the point of view of the protection of tree genetic resources and forestry management as well as for an improved thoughtful of the ecological adaptations in the community based on the information of cyclic production of plant parts [2]. Temperature is one of the most significant factors which affect the flowering and fruiting phenology of any species. However, many factors manipulate flowering and fruiting, including humidity, rainfall, and day length [5]. The requirement to assess phenological data of tree species has been felt long in the fields of botany. Attempts have been made by different workers such as Jadeja [3], Shah [7], Bhat [1] etc. to collect phenological data on tree species in various regions. The present study of a total of 13 species from 12 families was chosen at random for the study in Palanpur taluka.

MATERIAL AND METHODS

Palanpur taluka is situated in the Banaskantha district in north Gujarat in Gujarat State of India. As far as the geographical distribution of concerned Palanpur taluka is situated at 24^0 10' 12' N, latitude $72^0$25' 48' E longitudes. The total area of the Palanpur taluka is 4,574 km^2. Phenological observation was made of the selected tree species. A detailed examination was carried out at monthly intervals over two years between from March 2021 to 2023 for each tagged tree. The records were made of leaf fall, flowering, fruiting, and Vegetative. The phenological activity for each tree was evaluated as the sum of species with different phenological stages every month.

RESULT AND DISCUSSION

Phenological data of the following tree species were recorded month-wise and described with phonograms in table-1. Tree species concerning family found a particular area in shows table- 2. A total of 13 species 13 genera and 11 families are arranged in alphabetical order. The composition of genera and species of the trees in the study area shows in fig.-1. The monthly phenological observation of 13 tree species with a total of observations and characters are shown in table-3 and fig.-2.

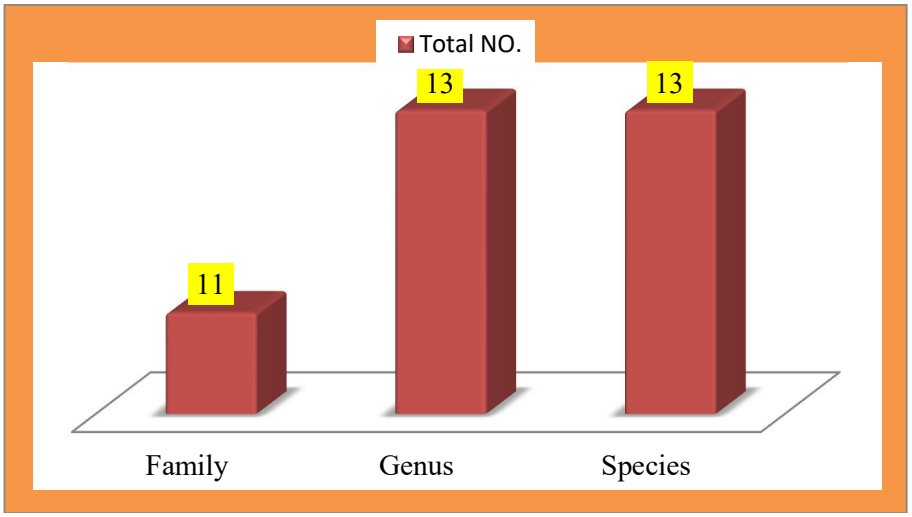

Fig.-1 Composition of tree species

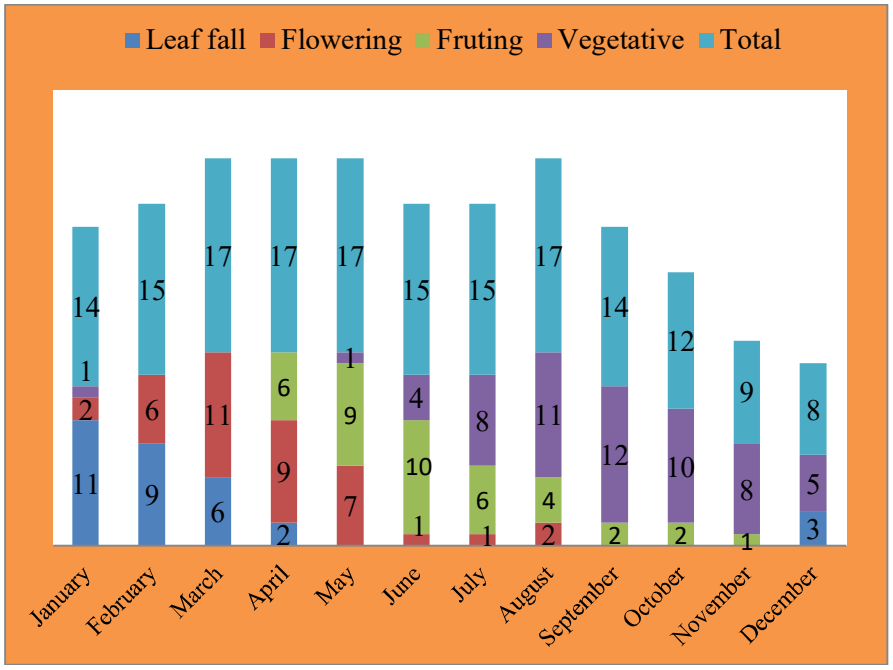

Fig.-2 Month wise Phenology

Table -1: Phenological diagram of tree species

Tree Species	January	February	March	April	May	June	July	August	September	October	November	December
Annona squamosa L.	▲	▼	▼	▼	♣	♣ ☼	♣ ☼	♣ ☼	▲	▲	▲	▲
Acacia nilotica (L.) Del.	▼	♣	♣	♣	☼	☼	☼	☼ ▲	☼ ▲	☼	☼	▼ ▲
Azadirachta indica A. Juss.	▼	▼	▼ ♣	▼ ♣	♣ ☼	▲	▲	▲	▲			
Bombax ceiba L.	▼	▼ ♣	▼ ♣	♣ ☼	♣ ☼	☼	▲	▲	▲	▲	▲	
Buteamono sperma (Lam) Taub.	▼	▼	▼	♣	♣	☼ ▲	▲	▲	▲	▲		
Cassia fistula L.	▼ ♣	♣	♣	♣	♣	☼	☼	▲	▲	▲	▲	
Citrus limon (L) Burm. F.	▼	▼	♣	♣	♣ ☼	☼	☼	▲	▲	▲	▲	▲
Cordia dichotoma Forst.	▼	♣	♣	♣ ☼	☼	☼	☼ ▲	▲	▲	▲	▲	▼
Crateva religiosa G. Forst.		♣	♣	♣ ☼	♣ ☼	▲	▲	▲	▲	▲	▼	▼
Dalbergia sissoo Roxb.	▼	▼	▼ ♣	☼	▲	▲	▲	♣ ☼	☼	☼		
Madhuca indica J.F. Gmel	▼	▼	♣	♣	☼	☼	▲	▲	▲	▲	▲	▲
Mangifera indica L.	▼ ♣	▼ ♣	♣	☼	☼	☼	▲	▲	▲	▲		
*Tamarindus indica*L.	▼	▼	▼ ♣	☼	☼	☼	☼	☼ ▲	▲	▲	▲	▲

Where, ▼=Leaf fall ♣ =Flowering ☼=Fruiting ▲=vegetative

Table-2: List of tree species with family wise

Sr No.	Scientific Name	Family
1	*Annona squamosa* L.	Annonaceae
2	*Acacia nilotica* (L.) Del.	Mimosaceae
3	*Azadirachta indica* A. Juss.	Meliaceae
4	*Bombax ceiba* L.	Bombacaceae
5	*Butea monosperma* (Lam) Taub.	Fabaceae
6	*Cassia fistula* L.	Caesalpiniaceae
7	*Citrus limon* (L) Burm. F.	Rutaceae
8	*Cordia dichotoma* Forst.	Ehretiaceae
9	*Crateva religiosa* G. Forst.	Capparaceae
10	*Dalbergia sissoo* Roxb.	Fabaceae
11	*Madhuca indica* J.F. Gmel	Sapotaceae
12	*Mangifera indica* L.	Anacardiaceae
13	*Tamarindus indica* L.	Caesalpiniaceae

Table-3: Month wise Phenological observation

Month	Leaf fall	Flowering	Fruiting	Vegetative	Total
January	11	2	-	1	14
February	9	6	-	-	15
March	6	11	-	-	17
April	2	9	6	-	17
May	-	7	9	1	17
June	-	1	10	4	15
July	-	1	6	8	15
August	-	2	4	11	17
September	-	-	2	12	14
October	-	-	2	10	12
November	-	-	1	8	9
December	3	-	-	5	8

CONCLUSION

The present phenological study shows that the phenophases namely the vegetative and reproductive phase study in Palanpur taluka. The phenological characters are due to changes in seasonal activity in tree species of the study area. This research found that a maximum number of leaf falls were recorded in January and February, and maximum flowering occurred from February to April. Most fruits occurred from April to July and the maximum vegetative growth of the plant occurred in July to November. The data obtained from these studies have botanical significance, particularly in the fields of students and researcher.

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