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E: ISSN NO.: 2455-0817 *Remarking An Analisation*

A Phenological Study of Some Tree Species of Bishnupur Forest of Bankura District, West Bengal

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Abstract

For the phytosociological analysis phonological study is one of the most important aspect.The morphological expression of physiological activities of the plants is called phenology. The study deals with the phenological information of some species randomly selected from the forest of Bishnupur, Bankura of West Bengal. The pheno-phases like germination, new leaf formation, flowering and fruiting and leaf senescence were studied during the month September, 2015 to March, 2017. From this study it was observed that the germination of the most species were restricted during the months of June to July. Formation of new leaf started in the months of May to June. Leaf senescence was observed in highest amount during the month of April but average amount of leaf senescence was occurred during the months February to May. Maximum numbers of species exhibits flowering during March to April and fruiting from the month of January to February.

Keywords: Phenology, Phenophases, Phytosociology, Senescence.

Introduction

Plants are responsive to various climate factor and their responses are expressed in forms of externally visible changes which are called phenophases. In the tropical climate which has distinct patterns of seasonality with functioning climate parameters such as rainfall, temperature, humidity etc. Vegetative growth, leaf senescence, flowering and ripening of fruits and other phenelogical descriptions provide ecologically valuable information about the natural plant communities. For a basic phanerophytic community like forest, study of phenology provides the analytical insight into the behaviour of primary producer compartment with respect to the ecosystem functioning. Although phenelogical information with respect to some forest regions of India have been made Kaul and Raina, 1980; Boojh and Ramkrishnan, 1981; Shukla and Ramkrishnan, 1982; Bisht et al., 1986; Sing and kushwaha (2005); Singh and Singh, 1992; Kikim and Yadava (2001); Mallick (2002), Barman et.al., 2014, Nakar and Jadeja, 2o15, but no work has been reported so far on Bishnupur of West Bengal..

Review of Literature

Several workers have been worked on different phonological events from time to time from different parts of the world. Attempts were made by various workers like Sagreiya, 1942; Kaul and Raina, 1980; Boojh and Ramkrishnan, 1981; Shukla and Ramkrishnan, 1982; Bisht et al., 1986Ma Singh and Singh, 1992; Kikim and Yadava (2001); Mallick (2002), ; Sing and kushwaha (2005); Yadav and Yadav,2008,Barman et.al., 2014, Gogoi et al.. 2014 and Nakar and Jadeja, 2o15.

Objectives of the Study

1. To study the vegetative and reproductive nature of the plants and to define the calendar of each phenophase
2. To study the morphological structures and forms in relation to adaptation to the environment
3. To provide proper information to the Taxonomists for their taxonomic works
4. To provide data for scientific study, resourse management. multiplication, propagation and conservation of species
5. To give idea for the conservation of germplasm

Study Area

Bishnupur is a subdivision of the district of Bankura under WB is situated between 22-23^{O} N latitude and between 86^{O} and 87^{O} E longitude. It covers an area of 1870.50sq km.The North and North East; South and West borders of the subdivision are demarcated by the districts of Burdwan, Hoogly, Paschim Medinipur and Purulia respectively. The climate is characterized by scorching summer heat, low humidity nearly throughout the greater part of the monsoon period. The winter starts from the middle November and lasts upto the factors that appear to be of greatest importance are rainfall, temperature, relative humidity and wind.The rainfall is mainy between June to Sep. The normal annual rainfall of the area is 230 mm of which max rainfall occurs from June to September. Temperature rises rapidly from about the beginning of March and become maximum temperature at 47^{O}C or 48^{O}C. The coldest month of the year is December when a mean daily temperature usually falls down to 12^{O}C to 13^{O}C. The Relative Humidity is generally high throughout the South-West monsoon and raised from 56% (December) to 94% (June). The major part of the area is covered by lateritic soil with pH 6.

Materials and Methods

Eight dominant tree species in the site were selected for the study.The phenoloical changes were observed over a period of two years (September, 2015 to March, 2017. During the study period seed germination, new leaf formation, leaf senescence, flowering, fruiting and ripening of fruits were noted. All the phenophases are represented by a phenogram in Fig.1 and it is followed for the depiction of results of eight species during different months of the year in fig.- 2 in tabular form.

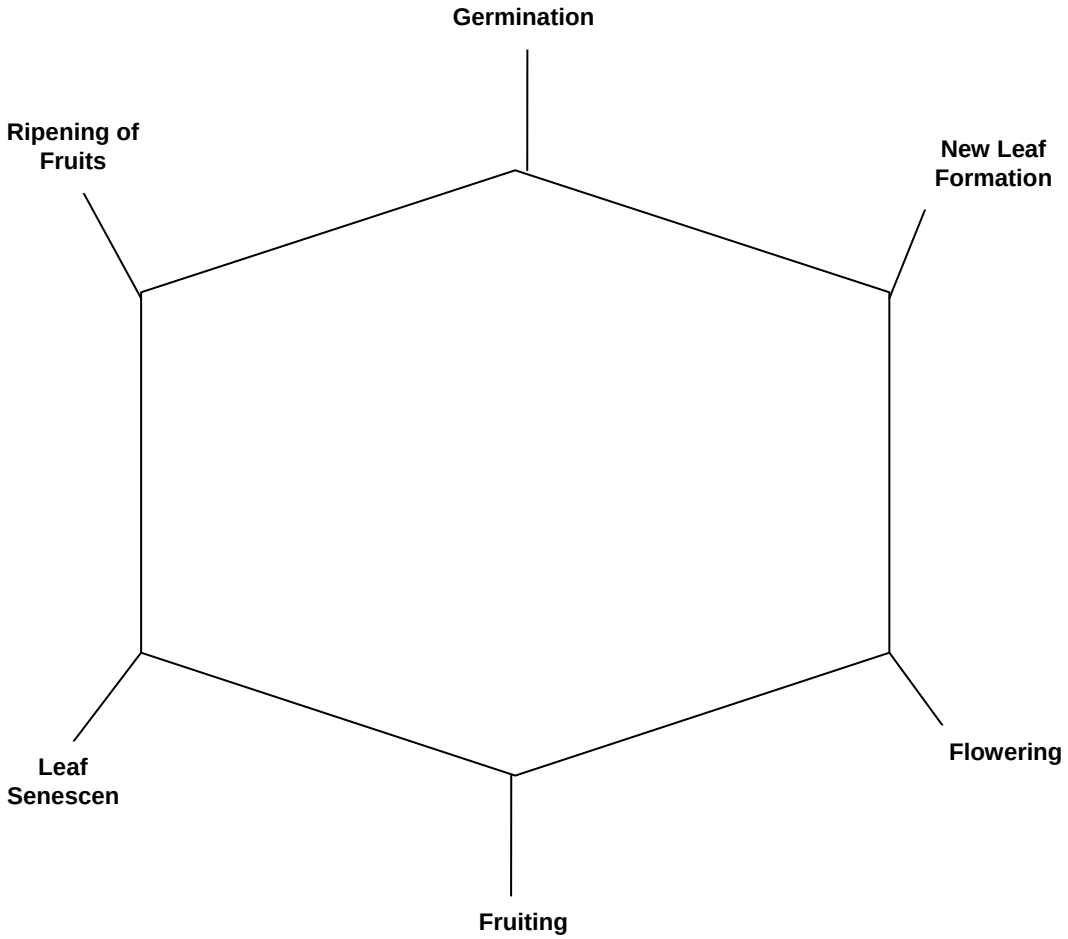

Fig. 1: Phenogram

Observations

Name of the tree

Tectona grandis L.f.

Family

Verbenaceae

Description

A deciduous tree; Leaves large ovate to elliptic, green; Flowers numerous in terminal, large pedicles, cymes; Fruits are subglobose.

Germination	June – July
New leaf formation	February – April
Flowering	July - October
Fruiting	November - January
Leaf Senescence	February - March

Name of the Tree

Bridelia retusa Spreng.

Family

Euphorbiaceae

Description

A deciduous tree, greenish,branches straight, hard; Leaves are elliptic to lanceolate, acute, subacute base, entire, dull to dark green in colour, globose and shining above; flowers creamy white, fruits are of drupes.

Germination	June
New Leaf Formation	May – June
Flowering	October – December
Fruiting	January – March
Leaf Senescence	April – May

Name of the tree

Ziziphus ***mauritiana*** **Lamk.**

Family

Rhamnacea

Description

A spiny small tree; Leaves are alternate, entire with three prominent basal veins, deciduous, Flowers are small, inconspecious, yellowish green, Fruits are edible drupes.

Germination	June- July
New Leaf Formation	April – May
Flowering	November – December
Fruiting	June – March
Leaf Senescence	March – April

Name of the Tree

Dalbergia sisso Roxb.ex DC.

Family

Fabaceae

Description

A medium deciduous tree, Leaver are leathery, alternate, pinnately compound, Flowers are whitish, Fruits are pods oblong, flat, thin.

Germination	June – July
New leaf formation	February – March
Flowering	March – April
Fruiting	May – July
Leaf senescence	January & February

Name of the Tree

Ficus benghalensis L.

Family

Moraceae

Description

A very large tree with branchers, many aerial roots, Leaves stalked , ovate, smooth, geasy ; Fruits in axillary pairs, a chery.

Germination	June – July
New leaf formation	April – May
Flowering	April – June
Fruiting	September – November
Leaf senescence	February & March

Name of the tree

Nyctanthes arbor-tristis L.

Family

Oleaceae

Description

A small tree, leaves are opposite, simple, entire, acute; Flowers are fragrant 5 lobed, white corolla with orange-red centre; Fruits are flate heart shaped round capsule, green.

Germination	June – July
New Leaf Formation	April – June
Flowering	September – November
Fruiting	December – January
Leaf Senescence	April – June

Name of the tree

Caesalpinia pulcherrima (L.) Sw

Family

Fabaceae

Description

A large tree, Leaves are pinnately compound ,bipinnate, opposite, oblong to ovate,entire,rounded at the apex, Flowers in recemes,each flowers with five orange to red petals, Fruits are pods.

Germination	June – July
New Leaf Formation	May – June
Flowering	February – May
Fruiting	April – June
Leaf Senescence	April – June

Name of the Tree

Premna latifolia Roxb.

Family

Verbenaceae

Description

A low bushy tree; Leaves are opposite, ovate to elliptic, entire, pubescent; Flowers greenish to yellow; Fruits are drupes

Germination	July
New Leaf Formation	June – july
Flowering	February – May
Fruiting	February – May
Leaf Senescence	May – June

Result

Observations of phenophases of the selected trees are shown in Table -1and percentages of different phenophases through out the study of different months are shown in Table -2. Phenophases are also depicted in the figure-2. Fig-3 revealed the graphical representation of different phenophases in percent. Phenological observations and analysis revealed no remarkable variation in the occurrence of phenophases of a particular species in comparison to the works of other observers in different studysites like Dani (1992), Mallick (2002).

Table.1
Different Phenophases of Eight Species

Name of the Species	Germination	New leaf foamation	Flowering	Fruiting	Leaf Senescence
Tectona ***g****randis* L.f.	June - July	February – April	July - October	November - January	February –March
Bridelia ***r****etusa* Willd.	June	May – June	October - December	January - March	April – May
Ziziphus ***m****ouritiana* Lamk.	June - July	April –May	November - December	January - March	March – April

*Dalbergia **s**isso* Roxb.	June - July	February – March	March - April	May - July	January – February
*Ficus **b**engh**h**alensis* L.	June July	April –May	April -June	September - November	February – March
*Nyctanth**e**s **a**rbor-tristis* L.	June - July	April –June	September - November	December - January	April –June
*Caesalpinia **p**ulcherrima* (L.)Sw.	June - July	May – June	February – May	April -June	April –May
*Premna **l**atifolia* Roxb	July	June – May	February – May	February – May	May – June

Name of the Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
*Tectona **g**randis* L.f.												
*Bridelia **r**etusa* Willd.												
*Ziziphus **m**ouritiana* Lamk.												
*Dalbergia **s**isso* Roxb.												
*Ficus **b**engh**h**alens is* L.												
*Nyctanth**e**s **a**rbor-tristis* L.												
*Caesalpinia **p**ulcherrima* (L.)Sw.												
*Premna **l**atifolia* Roxb.												

Fig: 2-Phenograms of Eight Species

Table 2. Percentage or Different Phenophases through out the Study of Different Months

Phenophases	JAN	FAB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Germination						87.5%	87.5%					
New leaf formation		25%	25%	37.5%	50%	50%	12.5%					
Flowering		12.5%	37.5%	37.5%	25%	12.5%		12.5%	25%	37.5%	37.5%	25%
Fruiting	50%	50%	37.5%	25%	25%	25%	12.5%			12.5%	25%	
Leaf senescence	12.5%	37.5%	37.5%	50%	37.5%	25%						

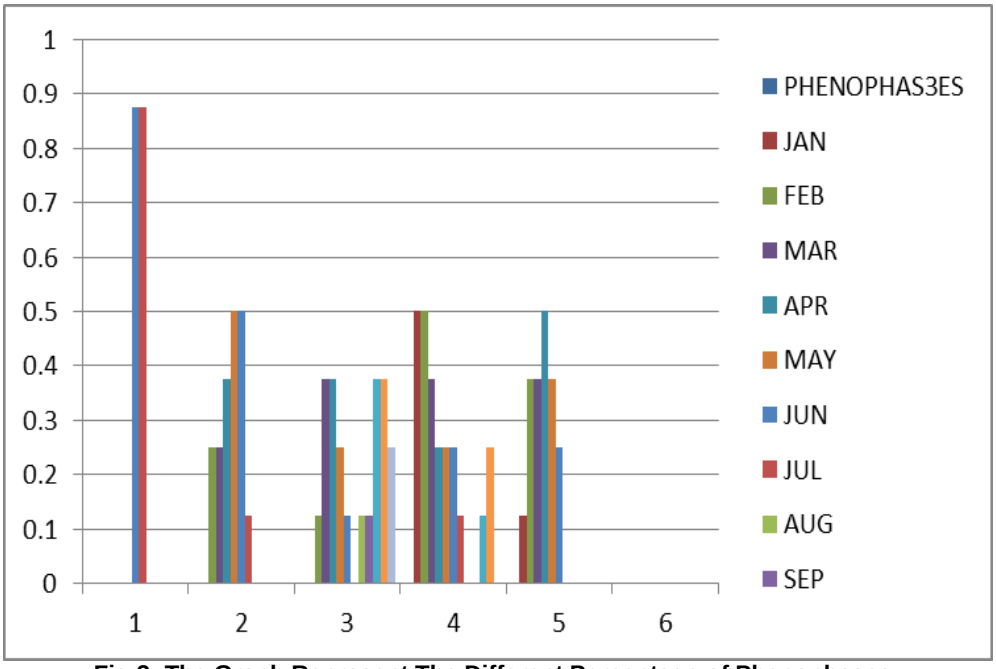

Fig.3- The Graph Represent The Different Percentage of Phenophases.

Discussion

The phenological study of 8 randomly selected tree species revealed that leaf senescence did not occur during the period June to September, otherwise the pheno phase was observed in rest of the period. This is in confirmation with the findings of Kikin and Jadav (2001). The phenophase flowering although occurred throughout the year maximum of the eight species exhibited the phenophase during March – May. This is in confirmation with the observation of Bhoojh and Ramakrishnan (1981). Fruiting was observed to occur throughout the year thogh the highest percentage showed during May – June. This observation confirms with the observations of Dani (1992). Germination is restricted during the period May – September. This is confirms with the observation of Dani (1992).

Conclusion

Phenological observations on different common dominant species were recorded in terms of different phenophases starting from seed germination to ripening of fruits in different study sites. Analysis of the vegetative growth phenophase indicated that the growth is not restricted to a specific period of the year, rather it occurs throughout the year.

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