

PHENOLOGICAL STUDY OF SOME FOREST TREE SPECIES GROWING UNDER PESHAWAR CONDITIONS

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ABSTRACT

A study of 33 tree species belonging to 18 families indicated that majority of the species (14 out of 33) flowered in the month of April, followed by May (6 species), March (4 species), June and November (2 species each) and January, August, September and October (1 species each). Fruits of maximum species ripe (6 out of 33) in the month of June, followed by August and November (5 species each), July, September, October and December (3 species each), May (2 species) and February and March (1 species each). 16 species foliate in the month of March followed by February and April (5 species each), May (4 species) and June (3 species). Maximum species defoliate in deciduous tree species (12 species) in December while in evergreen trees leaves appear and fall simultaneously.

INTRODUCTION

Phenology is the study of the relationships between the climate of any place and the annual periods of the plants. Plants vegetate, bloom and fruit ripe at more or less definite seasons each after its kind (Bailey, 1935). Of all the phenological aspects, the most important ones are the flowering and fruit maturity period which is closely linked with forestry regeneration/afforestation programmes. For the conservation of fragile mountain ecosystems, degraded watersheds and natural regeneration of tree is a dire necessity. Similarly planting of tree on farmlands is must to maintain tree cover throughout the country. Large scale afforestation can only be carried out by a well organized programme of seed collection. This can only be possible if phenological information i.e., proper time of seed maturity are available. Lack of proper knowledge about the phenology of tree species would lead the field staff to collect the

fruit/seed either at immature stage or after the loss of their viability. Likewise observations have been recorded on foliation, defoliation, flowering and fruit maturity (Parker, 1918; Troup, 1921; Krishnaswamy and Mathauda, 1954; Ganapathy and Rangarajan, 1964; Kaul and Raina, 1980; Benival, 1987; Ansari, 1989; Benival and Singh, 1989 and Chaudhary, 1993). Thus, it is very important to know the proper time of fruit ripening of a particular tree species so that the seeds may be collected in time for raising the nursery which is one of the vital stage in raising plantations. Similarly, planting of seedlings specially deciduous species, in the field is related with the appearance of new leaves as seedlings are generally planted before the new leaves appear. Thus, the present study was taken up with a view to provide information about the fruit ripening and plucking besides other information.

Geographical location and climate of Peshawar.

Peshawar is situated 71°-25' and 72° east longitudes and 34° and 34° -35' north latitude with 325 m above sea level. It has a continental type of climate. Winters are very cold (minimum temperature below 30°F) and summer's are very hot (maximum temperature goes beyond 120°F sometimes). In early spring occasional hail storms and rainfall to the extent of 76 to 100 mm in the aggregate is not uncommon, the air in cold and bracing. During summer, air is densely heavy, occasional dust storms but rain rarely falls. The soil is light and porous and contains sand to the depth of 10 to 50 cm. Below this, 10 to 40 cm or more, its place has been taken by soft, indurated clay mixed here and there with nodular limestone. This formation is succeeded by beds of gravel and sand of unknown thickness (Quraishi and Khan, 1971).

MATERIAL AND METHODS

Phenological study of tree species growing at Pakistan Forest Institute, Peshawar, Campus was carried out in the February, 1994 through February, 1995. During this period, observations were recorded fortnightly on **foliation, defoliation, flower bud production, blooming, fruiting and fruit ripening** till the plants produced 50% of the specific characteristic. Information on **number of seeds/kg** (Ahmad, 1993; Sheikh, 1992) were added. The study covers 33 species comprises gymnosperms, angiosperms, evergreen and deciduous. All the species, covered by the present study are arranged in alphabetical order.

RESULT AND DISCUSSION

Observation details are shown in the table and data indicated that:

A. Flowering.

Majority of species flower (bloomed) (14 out of 33) in the month of April, followed by May (6 species), March (4 species), January, June and November (2 species each) and September and October (1 species each). It is amazing that *Alstonia scholars* do not flower whereas trees appears very tall (about 45 m) and 30 years old.

B. Fruiting.

Fruits of (6 out of 33 species) ripe in the month of June, followed by August and November (5 species each), July, September, October and December (3 species each), May (2 species) and February and March (1 species each).

C. Foliation and Defoliation.

Maximum foliation was observed in the month of March (16 species), followed by February, April (5 species each), May (4 species) and June (3 species) whereas maximum defoliation in deciduous tree species was (12 species) in December while in evergreen trees leaves appear and fall simultaneously.

CONCLUSION

The best season for fruit collection is June through October and extend to December.

SUGGESTIONS

Keep in mind the following points:

- I. Fruit ripening is delayed due to rains and advanced due to drought and high temperature.
- II. Foliation, defoliation, flowering and fruit maturity are late by 30-40 days in the northern part as compared to southern one.
- III. Fruiting period is prolonged and fruit availability period is extended in the species *Cassia fistula*, *Jacaranda mimosifolia*, *Pinus roxburghii* and *Terminalia arjuna* while *Bombax ceiba*, *Callistemon viminalis*, *Casuriana equisetifolia*, *Eucalyptus camaldulensis*, *E. citriodora*, *Morus alba* and *Tamarix aphylla* fruits become available only for a limited period (1-2 weeks) and thereafter ripe fruits become unavailable and therefore care should be taken to collect fruits/seeds timely. The pod of *Albizzia lebeck* remain attach for a long time.

ACKNOWLEDGEMENT

The authors are thankful to Dr. K.M. Siddiqui, Director General, Pakistan Forest Institute, for his guidance and encouragement.

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PHONOLOGICAL CALENDAR OF SOME FOREST TREE SPECIES

Key: FP-Flower bud production; B-Blooming; FR-Fruiting; FRR-Fruit ripening; FO-Foliation; DFO-Defoliation; 1W-First week; 2W-Second week; 3W-Third week; 4W-Fourth week

S.No.	Species	January	February	March	April	May	June	July	August	September	October	November	December	No. of seeds/kg	Remarks
1.	<i>Acacia ampliceps</i>	-	-	1W FO	1W DFO, 2W B	3W FR	2W FRR	-	-	-	-	-	2W FP	--	Evergreen
2.	<i>A. cyanophylla</i>	1W DFO	-	2W FO	-	2W FP	2W B	2W FR	-	2W RR	-	-	-	66000-77000	Evergreen
3.	<i>A. modesta</i>	-	-	3W FP, 3W FO	2W B	-	2W FR	-	-	-	3W FRR	-	4W DFO	25000-29000	Evergreen
4.	<i>A. nilotica</i>	-	2W DFO	2W FO	-	-	2W FP	2W B	2W FR	-	2W FRR	-	-	3600-11000	Evergreen
5.	<i>A. stenophylla</i>	-	-	3W FO	3W DFO	2W FR	-	2W FRR	2W FP	-	-	2W B	-	--	Deciduous
6.	<i>Albizia lebbek</i>	4W DFO	-	-	-	2W FO	2W FP	-	1W FR	-	2W FRR	-	-	1800-12300	Evergreen
7.	<i>Alstonia scholaris</i>	-	-	2W FO	2W FO & DFO	-	-	-	-	-	-	-	-	--	Evergreen
8.	<i>Bauhinia variegata</i>	-	2W FP	2W B	2W FR, 2W DFO	1W FO	2W FRR	-	-	-	-	-	-	1000-3500	Deciduous
9.	<i>Broussonetia papyrifera</i>	-	2W FP	2W B, 1 W FO	2W FR	-	-	2W FRR	-	-	-	-	2W DFO	1000-3500	Deciduous
10.	<i>Bombax ceiba</i>	1W B	-	-	2W FR	2W FO	-	-	3W FRR	-	-	-	2W FP, 4W DFO	25000-28000	Evergreen
11.	<i>Callistemon viminalis</i>	-	-	2W FP	2W B, 3W DFO	2W FR, 2W FO	-	-	-	4W FRR	-	-	-	350000-550000	Evergreen
12.	<i>Cassia fistula</i>	-	-	4W FP	4W FO, 2W b, 4W FR	3W DFO 4W FP	2W FRR 4W B, 3W FO	2W FR	-	-	-	4W FRR	-	3000-5500	Evergreen
13.	<i>Casuarina equisetifolia</i>	-	-	2W FP, 1W FO / DFO	3W B	2W FR	2W FRR	-	-	-	-	-	-	704200-750000	Evergreen
14.	<i>Cedrella toona</i>	-	3W FO	2W FP	2W B	2W FR	2W FRR	-	-	-	-	-	2W DFO	281000-422500	Deciduous
15.	<i>Dalbergia sissoo</i>	-	-	2W FO, 3W FP	3W B	-	2W FR	-	-	-	-	2W FRR	2W DFO	34700-49300	Deciduous
16.	<i>Erythrina suberosa</i>	-	-	-	2W FP 4W B	4W FR	3W FRR 2W FO	-	-	-	-	-	2W DFO	-	Deciduous
17.	<i>Eucalyptus calaldulensis</i>	-	-	2W FO	2W FP, 2W DFO	2W B	2W FR	-	-	2W FRR	-	-	-	150000-660000	Evergreen
18.	<i>E. citriodora</i>	-	-	2W FP, FO & 4W DFO	2W B	2W FR	-	-	-	-	2W FRR	-	-	57000-99000	Evergreen
19.	<i>Jacaranda mimosifolia</i>	-	FRR	2W FP & FO	2W V & DFO	-	2W FR	-	-	-	-	-	-	11000-55000	Deciduous
20.	<i>Leucaena leucocephala</i>	-	FO	4W DFO	2W FP	2W B	2W FR	-	2W FRR	-	-	-	-	26000-29000	Deciduous
21.	<i>Melia azedarach</i>	-	FO	2W FP	2W B	-	2W FR	-	-	-	-	2W FRR	2W DFO	1400-2750	Deciduous
22.	<i>Morus alba</i>	-	FO	4W FP	2W B & FR	2W FRR	-	-	-	-	-	-	2W DFO	52000-55000	Deciduous
23.	<i>Olea europea</i>	-	FO	2W FP & DFO	2W B	-	2W FR	-	-	-	4W FRR	-	-	-	Evergreen
24.	<i>O. ferruginea</i>	-	-	-	4W FO	2W DFO	-	-	-	2W FP	2W B	2W FR	4W FRR	9000-12000	Evergreen
25.	<i>Pinus roxburghii</i>	-	-	2W FP	2W FO & B	2W DFO	-	2W FR	-	-	-	2W FRR	2W FRR	6600-22000	Evergreen
26.	<i>Pistacia integerrima</i>	-	DFO	1W FO	2W FP	2W B & 4W FR	-	-	2W FRR	-	-	-	-	800	Deciduous
27.	<i>Platanus orientalis</i>	-	-	1W FO	2W FP	2W B	2W FR	-	2W FRR	-	-	-	2W DFO	-	Deciduous
28.	<i>Robinia pseud-acacia</i>	-	FP	2W B & 1W FO	2W FR	-	-	-	2W FRR	-	-	-	2W DFO	35200-77000	Deciduous
29.	<i>Sterculia diversifolia</i>	-	-	2W FP	2W FO	2W B	2W FR & DFO	-	-	-	-	2W FRR	-	12000-14000	Evergreen
30.	<i>Tamarix aphylla</i>	-	-	2W FO	-	-	-	2W FP	2W B	2W FR	-	2W FRR	2W DFO	600000-1000000	Evergreen
31.	<i>Terminalia arjuna</i>	-	-	2W FRR	-	2W FP	2W B, FO & DFO	-	1W FR	-	-	-	-	300-660	Semi evergreen
32.	<i>Woodfordia fruticosa</i>	-	FP	2W B & FO	2W FR	2W FRR	-	-	-	-	-	-	2W DFO	-	Deciduous
33.	<i>Zizyphus mauritiana</i>	-	-	-	2W FR	2W DFO	2W FRR & FO	-	-	2W FP	-	2W B	-	800-10000	Deciduous

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