FOREST RESEARCH NOTES

U.S.DEPARTMENT OF AGRICULTURE
FOREST SERVICE
CALIFORNIA FOREST AND RANGE
EXPERIMENT STATION *

STEPHEN N. WYCKOFF, Director

No. 54 September 10, 1947

DATES AND PLACES OF POLLEN COLLECTION BY THE INSTITUTE OF FOREST GENETICS

By John W. Duffield, Geneticist

During the past few years, the Institute of Forest Genetics has received an increasing number of requests for pollen of various species of pine. Many of these requests have been fulfilled; others which stipulated arrival in time for specific crossing operations could not be fulfilled. The accompanying table is compiled to furnish cooperating pine breeders with the dates and places of pollen collection from various pine species and hybrids. This table will be revised and expanded to cover more species and additional genera as circumstances permit.

Some notes on the pollen collection techniques used at the Institute of Forest Genetics[1/] will add to the usefulness of the table which follows. Catkins, or twig-tips bearing catkins are picked when the first catkins on a tree are starting to open. Complete extraction of the pollen requires from one to five days or rarely longer. Thus it is usually possible to ship pollen from one to five days after it is collected. The extraction techniques result in pollen samples of high purity in spite of the fact that the pollen parents are almost invariably surrounded by many other pines of the same or different species, many of which are shedding pollen freely at the time when catkins are collected. Pressure of work during the pollination season seldom permits tests of pollen germinability immediately following pollen extraction.

1/ W. C. Cumming and F. I. Righter, Pinus: methods of controlling pollination. Unpublished manuscript.

* MAINTAINED AT BERKELEY, CALIFORNIA, IN COOPERATION WITH THE UNIVERSITY OF CALIFORNIA.

Most pine pollen shows high germinability for many months following extraction if: (1) extraction humidity has been sufficiently low to prevent molding of the pollen; (2) pollen has been stored at 25 percent to 50 percent relative humidity in a cool place.[2/]

The table which follows has been compiled from the past 10 years' breeding records of the Institute of Forest Genetics. Many of the pines, other conifers, and taxads growing in the Eddy Arboretum[3/] have been producing pollen for some years, but since they have not yet entered into the Institute's breeding program as pollen parents, they do not appear in the table.

Naturally, the vast majority of trees in the Eddy Arboretum are derived from trees located in many parts of the Northern Hemisphere. When known with any degree of certainty, the original sites of trees from which pollen producers were derived are given in the table. Pollen from some species is collected from "wild" trees growing at the original site. Pollen of other species is collected from trees growing at Eddy Arboretum near Placerville, at Berkeley, and at Fresh Pond, California. Some of the high montane species of pines do not flower in the Eddy Arboretum. Therefore pollen of these species and of others located at some distance from the arboretum is collected only when exceptional circumstances justify the required travel.

The table column showing the number of years in which pollen was collected is a rough index of reliability.

2/ Duffield, J. W. and A. G. Snow, Jr. Pollen longevity of Pinus strobus and Pinus resinosa as controlled by humidity and temperature. Amer. Jour. Bot. 28:175-177. 1941.

3/ Weidman, R. H. Trees in the Eddy Arboretum. Forest Research Note No. 53, California Forest and Range Experiment Station. 1947.

DATES AND PLACES OF POLLEN COLLECTION

BY THE INSTITUTE OF FOREST GENETICS

O, indicates pollen-producing trees growing at original site;
E, at Eddy Arboretum, Placerville, California, Lat. 39°N, Long. 121°W, Alt. 2700 feet;
B, at Berkeley, California, Lat. 38°N, Long. 122°W, Alt. 200 feet; and
F, at Fresh Pond, California, Lat. 39°N, Long. 121°W, Alt. 3700 feet.

Species	Original site			Growing at	Pollen collection dates			No. of Years
	Lat. (N)	Long.	Altitude (feet)		Earliest	Latest	Mean	
Pinus:								
apacheca (see *P. latifolia*)								
aristata Engelm.	37	117W	10,000	O	June 30	July 16	-	1
arizonica Engelm.	32	109W	-	E	Apr. 15	May 10	-	2
do.	32	109W	-	O	-	-	May 22	1
Armandi Franch.	-	-	-	E	Apr. 25	May 15	May 5	5
attenuata Lemm.	39	121W	3,000	C	Mar. 20	Apr. 12	Apr. 4	3
do.	38	122W	2,000	O	-	-	Mar. 8	1
x attenuradiata Stockwell & Righter	-	-	-	E	Mar 12	Apr. 15	Mar. 22	6
attenuata X *attenuradiata*	-	-	-	E	-	-	Apr. 21	1
ayacahuite Ehren.	32	109W	-	O	-	-	May 22	1
Balfouriana Grev. & Balf.	37	117W	10,000	C	-	-	July 12	1
Banksiana Lamb.	-	-	-	E	Mar. 20	Apr. 21	Apr. 6	6
Bungeana Zucc.	32	119E	-	E	-	-	Apr. 24	1
canariensis C. Smith	28	16W	-	E	-	-	May 3	1
do.	28	16W	-	B	Apr. 5	Apr. 10	-	2
caribaea Morelet	-	-	-	E	-	-	Mar. 31	1
contorta var. *latifolia* Engelm.	39	120W	6,000	C	June 5	June 28	-	2
do.	39	120W	7,000	E	-	-	Apr. 19	1
do.	49	115W	-	E	-	-	Apr. 9	1
do.	51	119W	1,000	E	-	-	Apr. 14	1
contorta var. *latifolia* x *Banksiana*	-	-	-	E	Apr. 11	Apr. 23	Apr. 16	3
Coulteri D. Don.	33	117W	-	E	Apr. 21	May 15	-	2
do.	34	116W	5,000	O	-	-	June 8	1
do.	37	121W	4,000	C	-	-	June 5	1
do.	38	122W	2,000	E	-	-	Apr. 25	1
echinata Mill.	33	93W	-	E	Apr. 3	Apr. 23	Apr. 11	3
do.	31	93W	-	E	-	-	May 9	1
echinata x *caribaea*	-	-	-	E	-	-	Apr. 18	1
echinata x *taeda*	-	-	-	E	Mar. 31	Apr. 24	Apr. 14	4
excelsa (see *P. Griffithi*)								
flexilis James	-	-	-	E	-	-	May 8	1
glabra Walt.	-	-	-	E	-	-	Apr. 15	1
Griffithi McClell.	27	81E	-	E	Apr. 24	May 29	May 9	4

Species	Original site: Lat. (N)	Long.	Altitude (Feet)	Growing at	Pollen collection dates: Earliest	Latest	Mean	No. of years
halepensis Mill.	–	–	–	E	–	–	Apr. 15	1
halepensis var. *brutia* Elw. & Henry	–	–	–	E	–	–	Apr. 21	1
Jeffreyi Grev. & Balf.	34	116W	5,000	O	–	–	June 8	1
do.	37	121W	4,000	O	May 21	June 5	–	2
do.	39	120W	5,000	C	–	–	June 21	1
do.	39	120W	6,000	O	June 12	June 26	June 18	3
do.	39	120W	7,000	O	June 22	July 1	June 25	3
do.	40	121W	5,000	O	–	–	June 11	1
Jeffreyi x *Coulteri*	34	116W	5,000	O	June 4	June 6	June 5	3
do.	37	121W	4,000	O	–	–	May 21	1
Lambertiana Dougl.	34	116W	5,000	O	–	–	June 8	1
do.	39	120W	5,000	O	–	–	July 8	1
do.	39	120W	6,000	O	July 1	July 9	July 6	3
do.	–	–	–	E	–	–	May 21	1
latifolia Sarg.	32	109W	–	C	–	–	May 24	1
do.	32	110W	–	E	Apr. 25	May 13	May 6	2
leiophylla Schl. & Cham.	–	–	–	E	–	–	May 20	1
longifolia (see *P. roxburghii*)								
Montezumae Lamb.	–	–	–	E	–	–	Apr. 24	1
monticola Dougl.	39	120W	6,000	O	June 8	July 15	July 4	2
do.	48	114W	–	E	May 8	May 12	–	1
muricata D. Don.	–	–	–	E	–	–	Apr. 23	1
nigra var. *austriaca* Asch. & Graeb	–	–	–	E	Apr. 29	May 10	Apr. 30	3
nigra var. *calabrica* Schneid.	–	–	–	E	May 5	May 10	May 7	2
nigra var. *cebennensis* Rehder	44	4E	–	E	–	–	May 14	1
patula Schl. & Cham.	–	–	–	E	–	–	Mar. 20	1
pinaster Ait.	–	–	–	E	Apr. 1	Apr. 19	Apr. 12	4
pinaster "des Landes"	–	–	–	E	–	–	Apr. 1	1
pinaster var. *gigantea*	–	–	–	E	–	–	Apr. 11	1
pinea L.	–	–	–	E	Apr. 30	May 20	–	2
ponderosa Laws.	35	112W	–	E	–	–	May 27	1
do.	37	122W	0	O	–	–	May 8	1
do.	37	122W	0	E	–	–	May 6	1
do.	39	123W	2,000	E	–	–	May 16	1
do.	39	121W	1,000	O	–	–	May 2	1
do.	39	121W	2,000	O	Apr. 21	May 14	May 4	4
do.	39	121W	3,000	O	Apr. 15	May 28	May 11	4

Species	Original site: Lat. (N)	Long.	Altitude (feet)	Growing at	Pollen collection dates: Earliest	Latest	Mean	No. of years
ponderosa Laws.	39	121W	4,000	O	Apr. 25	May 30	May 21	2
do.	39	120W	5,000	O	June 3	June 11	June 6	2
do.	39	120W	6,000	O	June 14	June 27	June 20	2
do.	42	121W	–	E	–	–	May 26	1
do.	42	123W	–	E	–	–	May 27	1
do.	42	124W	–	E	–	–	May 5	1
do.	43	122W	–	E	–	–	May 2	1
do.	46	114W	4,000	E	–	–	May 3	1
do.	47	121W	2,000	E	–	–	May 4	1
do.	48	113W	–	E	–	–	May 5	1
ponderosa var. *scopulorum* Engelm.	37	113W	–	E	–	–	Apr. 18	1
do.	40	105W	–	O	–	–	May 25	1
do.	40	107W	–	O	–	–	May 24	1
do.	42	107W	–	E	–	–	Apr. 16	1
do.	43	99W	–	E	Apr. 16	May 4	Apr. 25	4
pungens Lamb.	40	78W	–	E	Mar. 25	Apr. 25	Apr. 10	2
radiata D. Don.	34	112W	0	E	Feb. 27	Mar. 21	Mar. 12	3
resinosa Ait.	–	–	–	E	Apr. 17	Apr. 22	Apr. 18	3
rigida Mill.	–	–	–	E	Apr. 8	Apr. 29	Apr. 19	2
rigida x *taeda*	–	–	–	E	Mar. 26	Apr. 17	Apr. 4	2
roxburghii Sarg.	–	–	–	E	Mar. 6	Mar. 13	–	1
Sabiniana Dougl.	39	121W	3,000	C	Mar. 24	Apr. 24	Apr. 8	3
x *Sondereggeri* H. E. Chapman (Fx)	–	–	–	E	Mar 22	Apr. 5	Mar 29	2
strobus L.	44	72W	–	E	May 2	May 15	May 9	2
sylvestris L.	–	–	–	E	Apr. 18	May 3	Apr. 23	3
tabulaeformis Carr.	–	–	–	E	–	–	Apr. 14	1
taeda L.	–	–	–	E	Mar. 20	May 10	Apr. 11	6
Thunbergii Parl.	–	–	–	E	Apr. 8	Apr. 19	Apr. 14	2
Torreyana Parry	33	117W	0	E	–	–	Apr. 5	1
do.	33	117W	0	E	–	–	Feb. 20	2
virginiana Mill.	–	–	–	E	–	–	May 8	1
washoensis Mason & Stockwell	39	120W	8,000	O	June 13	July 12	July 3	3