XII. NOTES ON THE PHENOLOGY OF MIDDLE WESTERN SPRING FLOWERS

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In order to make a comparison of the first flowering dates of spring flowers, lists were exchanged during the first five months of the year 1927 between the writer at the University of Oklahoma and correspondents at thirteen other Middle-Western colleges and universities. These lists were, for the most part, sent weekly, and consisted of the scientific and common names of the plants in bloom, the dates found, and a brief note as to the locality and habitat of each. Only the dates of first blooming are here considered. The nomenclature of Gray's Manual is used.

The number of flowering plants reported in common between the country around the University of Oklahoma and that around other schools depends partially upon the observation of the correspondents, since it would be practically impossible to note every species that blooms during the month of reporting. Most of the correspondence sent ample lists, and, on the whole, the cooperation received was splendid.

Those taking part in this exchange were: Edwin R. Bogusch of the University of Texas; Mrs. Hortense Winton of Texas Christian University; J. Paul Lusk of Texas Agricultural and Mechanical College; Eva Ruth Byers of Oklahoma College for Women; Dr. Robert Stratton of Oklahoma Agricultural and Mechanical College; Esther Hulpieu of Southwestern College at Winfield, Kansas; Edwin R. Henry of Kansas State Teachers College at Emporia; Racine Creasy of University of Missouri; Mildred Mathias of Washington University, St. Louis; Ruth Affolter of University of Colorado; Betty Blagg of Iowa Wesleyan College; Gertrude Pinny of Macalester College at St. Paul, Minnesota; and George Cross of South Dakota State College at Brookings.

Since the purpose of these lists was to find the average difference in time between the plants blooming at the University of Oklahoma and those blooming at other schools, only those reported from the University of Oklahoma and one or more other schools were used in the compilation. The more accurate averages are between the places that have the most plants in common. The school initials are used as abbreviations. The table follows:

OU is 33.7 days later than TA&M on a basis of 7 plants in common.
OU is 8.1 days later than TU on a basis of 22 plants in common.
OU is .9 days earlier than TCU on a basis of 29 plants in common.
OU is 4.1 days earlier than OA&M on a basis of 49 plants in common
UO is 4.2 days earlier than OCW on a basis of 31 plants in common.
OU is 11.7 days earlier than KSTC on a basis of 22 plants in common.
OU is 12.6 days erlier than SC on a basis of 48 plants in common.
OU is 23.6 days earlier than SC on a basis of 48 plants in common.
OU is 25.1 days earlier than WU on a basis of 35 plants in common.
OU is 25.1 days earlier than IWC on a basis of 30 plants in common.
OU is 29.7 days earlier than CU on a basis of 12 plants in common.
OU is 71.7 days earlier than MC on a basis of 7 plants in common.
OU is 85 days earlier than SDSC on a basis of 1 plant in common.

According to these averages a plant appearing in Norman in flower will have bloomed at Texas Agricultural and Mechanical College

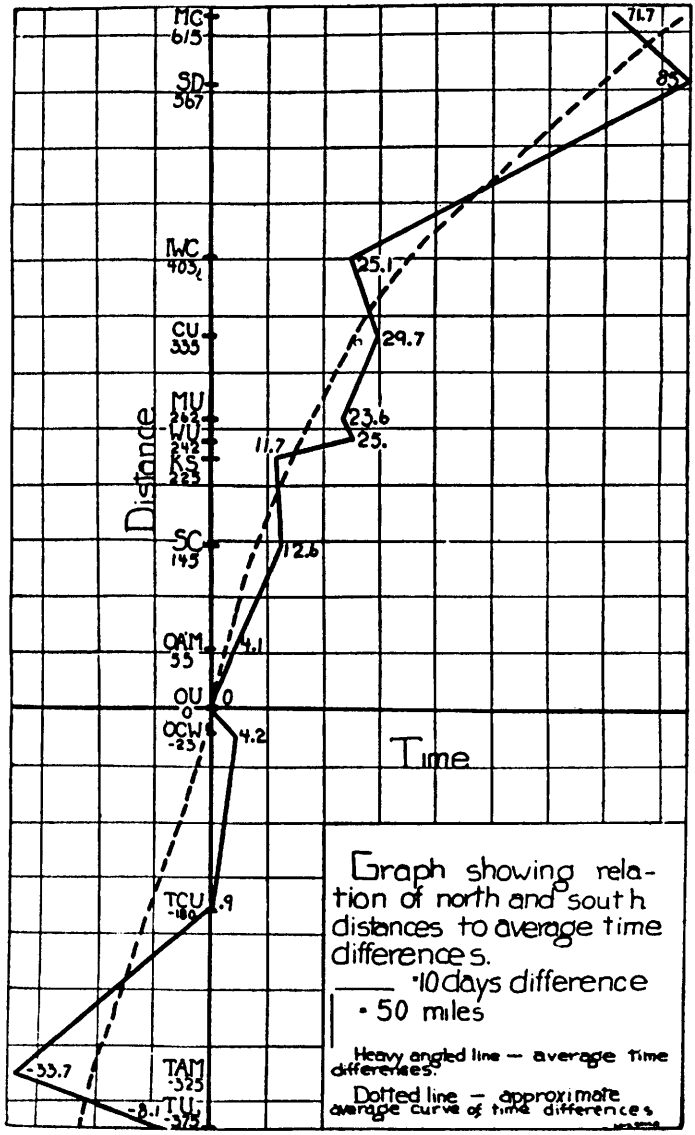
MC
615
SD
567
IWC
405
CU
333
MU
WU
242
KS
225
SC
145
OAM
55
OU
0
OCW
-251
TCU
-180
TAM
-525
TU
Distance
Time
71.7
85
25.1
29.7
23.6
25.
11.7
12.6
4.1
4.2
.9
-33.7
-8.1
Graph showing relation of north and south distances to average time differences.
10 days difference
50 miles
Heavy angled line — average time differences.
Dotted line — approximate average curve of time differences

PLATE XIV

33.7 days previously, at the University of Texas 8.1 days earlier, it will flower at Oklahoma Agricultural and Mechanical College 4.1 days later and at Washington University 25.1 days later. That this average does not hold exactly is shown by the dates on three of the most commonly reported plants.

	Capsella Bursa-pastoris	Claytonia virginica.	Ulmus americana
TU	1-31		
TA&M	1-21	1-25	
TCU		2-20	2-19
OCW	2-16		
OU	1-19	2-3	2-8
OA&M	1-6	2-1	2-7
SC	3-6	3-13	2-4
KSTC	2-17	4-3	2-17
WU	3-6	3-31	3-6
MU	3-14	3-14	2-24
CU	4-4		3-6
IWC	3-24	4-19	3-12
MC	5-1	5-1	5-3

Of the spring-blooming trees reported, the white elm *Ulmus americana,* and silver maple, *Acer saccharinum,* lead in distribution with reports from ten and nine stations respectively. The cottonwood, *Populus deltoides,* from eight stations, and redbud, *Cercis canadensis,* from seven, closely followed.

Most of the widely distributed plants are those which blossom during the early part of the flowering season. The seventeen plants most commonly reported are:

Capsella Bursa-pastoris, Shepherd's purse, from 12 stations;
Taraxacum officinale, Common Dandelion, from 10 stations;
Ulmus americana, White Elm, from 10 stations;
Claytonia virginica, Spring Beauty, from 10 stations;
Acer saccharinum, Silver Maple, from 9 stations;
Lamium amplexicaule, Henbit, from 9 stations;
Nothoscordum bivalve, Crow Poison, from 9 stations;
Oxalis stricta, Yellow Wood Sorrel, from 9 stations;
Oxalis violacea, Violet Wood Sorrel, from 8 stations;
Populus deltoides, Cottonwood, from 8 stations;
Viola Rafinesquii,, Wild Pansy, from 8 stations;
Cercis canadensis, Redbud, from 7 stations;
Melilotus officinalis, Yellow Sweet Clover, from 7 stations;
Stellaria media, Common Chickweed, from 7 stations;
Verbena bipinnatifida, Small-flowered Verbena, from 7 stations;
Lithospermum angustifolum, Yellow Puccoon, from 6 stations.
Oenothera laciniata, Cut-leaved Evening Primrose, from 6 stations.

The average time differences are prepared on a graph (Plate XIV) with the approximate north and south distances. In this graph Norman, Oklahoma, is used as zero, since all calculations are made with it as a base. The distances in miles are plotted up and down and the time differences across. The heavy angled line represents the line of average time differences. The dotted line is the approximate average curve of the angled line. The gradual upward curve of the dotted line was to be expected. That the curve should increase as it nears

the top of the graph was not expected. It seems to indicate that the average time difference increases with the distance north. This appearance might be due in part to the plotting of the South Dakota station which was based upon a single plant in common. Had more data been available, it is possible that the position might have been changed. Nevertheless, this opens a problem for work among northern stations.

It is interesting to note that the most widely distributed plants, according to the lists received, are those which are the earliest to bloom. Both are introduced plants. *Capsella Bursa-pastoris*, the Shepherd's Purse, is reported from twelve stations. From four of these it is listed as being the first plant blooming in the spring. *Taraxacum officinale*, the common dandelion, is reported from ten stations and blooms first at five. It undoubtedly blooms throughout the year at several stations but these first dates are probably those of the true vernal wave. *Lamium amplexicaule*, Henbit, and *Stellaria media*, common chickenweed, are plants which are also both widely found and early blooming.

The common dandelion, *Taraxacum officinale*, is reported from five stations as being the first flower to open in the spring; Shepherd's Purse, *Capsella Bursa pastoris*, from four; common chickweed, *Stellaria media*, from three; Henbit, *Lamium amplexicaule*, from two; the Pasque Flower, *Anemone patens*, from one; Skunk Cabbage, *Symplocarpus foetidus*, from one; White Elm, *Ulmus americana*, Silver Maple, *Acer saccharinum*, and several less-known plants from one station each. The apparent discrepancy of having more plants than stations is explained by the fact that several stations reported more than one plant on the first date given.

This survey has been but preliminary. It is the intention to continue it for several years with a greater number of stations. By so doing the average will become more accurate and the distribution of plants will become better known.