

FLOWERING PHENOLOGY IN SELECTED PLANT COMMUNITIES OF GRAND TETON NATIONAL PARK

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◆ INTRODUCTION

In the course of data collection for studies examining plant-animal species interactions within ecological communities, many various and diverse types of field data are collected. However, one such class of field data which are seldom systematically collected and reported is that of the natural flowering phenology of a particular plant community. These flowering phenology data describe the time sequence of flowering (initiation, duration, termination) for all of the plant species occurring in that community. The dearth of such data is surprising in light of its importance for the testing of models describing the factors influencing timing of plant reproduction events within communities and for investigating the possible evolutionary selection pressures which may have acted to modify plant phenologies. Limited sets of flowering phenology data have been presented for only a few scattered communities, including tall-grass prairie (Anderson and Schelfhout, 1980); dry, tropical forest (Frankie, Baker, and Opler, 1974); spring woodlands (Schemske et al., 1978); Canadian marshes/bogs (Pojar, 1974); and subalpine meadow (Holway and Ward, 1965). These reports have consisted of limited data sets collected for narrowly explicit studies. The present report summarizes the results of a flowering phenology survey of selected communities within the Grand Teton National Park ecosystem for the first half of the flowering season (June - July) of 1996.

MATERIALS AND METHODS

The flowering status of species within each examined community was determined by direct observation while hiking a fixed path through each community at approximately 5-day intervals. The flowering status of each species was scored as: 1) first flowers noted, 2) early flowering, 3) peak flowering, 4) late flowering, and 5) last flowers noted. The following communities were examined:

(1) A riparian canyonside: Paintbrush canyon from Leigh Lake (6880') to the switchbacks at 8560'. This area represented both Conifer Forest and Subalpine Meadow,

(2) Conifer Forest/Sagebrush Scrub ecotone: the area surrounding the University of Wyoming/National Park Service Research Center (AMK Ranch),

(3) Sagebrush Scrub: Sagebrush flats along the road south of Signal Mountain (connecting with RKO Road).

◆ RESULTS

The results of the community flowering phenology surveys are summarized in Tables 1-3. For each date indicated, the flowering status of tabulated species is recorded as:

- 1-first flowers observed
- 2-early flowering

- 3-peak flowering
- 4-late flowering
- 5-last flowers observed

◆ DISCUSSION

Before the data presented in this report can be critically and usefully analyzed, the corresponding community flowering phenology data for the remainder (second half) of the flowering season (July-September) must be collected.

When compared with anecdotal flowering phenology reports for Grand Teton National Park (Craighead, 1994), the present data suggest that the initiation of the 1996 flowering season was delayed by approximately 5 weeks. This was most likely due to an uncommonly high snowfall and late winter storms during the 1995-1996 season. However, by mid-June, the flowering phenology was consistent with reported dates (Craighead, 1994). This observation suggests that an extended winter has the effect of "telescoping" the early flowering season timing into a shorted interval, rather than shifting the entire season to later flowering dates. By mid season (mid-June), physiological mechanisms have "reset" flowering phenology back to a standard, "normal" schedule.

◆ LITERATURE CITED

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Table I

FLORAL PHENOLOGY: Conifer forest/Sagebrush scrub scotone

Location: Research Center/ AMK Ranch

Plant species	Date: 6/1	6/4	6/6	6/11	6/17	6/22	7/1	7/7
<i>Fritillaria pudica</i> (Pursh) Spreng.	3	4	-	-	-	-	-	-
<i>Claytonia lanceolata</i> Pursh var. <i>lanceolata</i>	3	4	4	-	-	-	-	-
<i>Viola nudiflora</i> Pursh	3	4	4	4	-	-	-	-
<i>Viola purpurea</i> Kell. var. <i>venosa</i> (Wats.) Brans	-	3	4	5	-	-	-	-
<i>Hydrophyllum capitatum</i> Dougl. ex Benth.	2	2	3	4	-	-	-	-
<i>Mahonia repens</i> (Lindl.) G. Don	1	2	3	4	4	-	-	-
<i>Lonicera utahensis</i> Wats.	1	2	2	3	4	5	-	-
<i>Vaccinium scoparium</i> Leib. ex Cov.	1	2	4	5	-	-	-	-
<i>Arnica cordifolia</i> Hook.	1	2	3	4	4	5	-	-
<i>Wyethia hololeuca</i> Nutt.	1	3	4	-	-	-	-	-
<i>Collomia parviflora</i> Lindl.	1	3	4	5	-	-	-	-
<i>Lomatium nudicaule</i> (Nutt.) Coulter & Rose	1	2	2	3	4	5	-	-
<i>Lithophragma glabrum</i> Nutt.	1	4	4	4	5	-	-	-
<i>Balsamorhiza sagittata</i> (Pursh) Nutt.	1	3	4	4	4	5	-	-
<i>Delphinium nuttallianum</i> Pritzel ex Walpers	1	2	4	4	5	-	-	-
<i>Microsteris gracilis</i> (Hook.) Greene var. <i>Gracilis</i>	1	2	4	5	-	-	-	-
<i>Arabis boliviensis</i> Hornem.	1	2	3	4	5	-	-	-
<i>Fragaria vesca</i> L.	3	4	4	5	-	-	-	-
<i>Geranium viscosissimum</i> P. & M.	1	2	3	4	4	-	-	-
<i>Fritillaria striatopurpurea</i>						1		
<i>Amelanchier alnifolia</i> (Nutt.) Nutt. ex Roem.	1	2	2	4	-	-	-	-
<i>Hackelia micrantha</i> (Eastw.) Gentry	1	4	5	-	-	-	-	-
<i>Androsace septentrionalis</i> L. var. <i>subulifera</i>	2	3	4	5	-	-	-	-
<i>Lupinus argenteus</i> Pursh			1	2	3	4	-	-
<i>Thlaspi arvense</i> L. [Introduced]			1	2	-	-	-	-
<i>Potentilla gracilis</i> Dougl. ex Hook.			1	2	2	3	-	-
<i>Trifolium longipes</i> A. Nels.			1	2	3	4	-	-
<i>Ageratum glaucum</i> (Pursh) Raf.				4	-	-	-	-
<i>Phacelia heterophylla</i> Pursh				2	3	4	-	-
<i>Cryptantha torreyana</i> (Gray) Greene				1	2	3	-	-
<i>Chorispora tenella</i> (Pallas) DC.				1	2	3	-	-
<i>Castilleja linariifolia</i> Benth.				1	2	3	-	-
<i>Senecio integerrimus</i> Nutt.				2	5	-	-	-
<i>Galium aparine</i> L.				2	2	3	-	-
<i>Eriophyllum lanatum</i> Pursh					3	3	-	-
<i>Angelica pinnata</i> Wats.						3	-	-
<i>Linanthus septentrionalis</i> Mason						4	4	-
<i>Ipomoea aggregata</i> (Pursh) Gray [Gilia aggregata]				1	2	2	-	-
<i>Eriogonum umbellatum</i> Torrey				1	2	3	-	-
<i>Gayophytum diffusum</i> T. & G.				2	3	3	-	-
<i>Poastrum cyathulus</i> Hook.				1	3	5	-	-
<i>Erysimum cheiranthoides</i> L.				1	2	2	-	-
<i>Comandra umbellata</i> Dougl. ex Hook.					2	4	-	-
<i>Collomia linearis</i> Nutt.				2	2	3	-	-
<i>Valeriana edulis</i> Nutt. ex T. & G.					3	4	-	-
<i>Anemone multifida</i> Poir.					1	2	-	-
<i>Achillea millefolium</i> L.					1	3	-	-

Table I (Continued)

Plant species	Date: 6/1	6/4	6/6	6/11	6/17	6/22	7/1	7/7
<i>Stellaria longifolia</i> Muhl. ex Willd.								3
<i>Tragopogon dubius</i> Scop. [Introduced]							1	2
<i>Chrysanthemum leucanthemum</i> L. [Introduced]							1	2
<i>Heuchera villosa</i> (Nutt.) T. & G.							1	3
<i>Senecio strophianthifolius</i> Greene							1	3
<i>Spiraea beauvoisii</i> Pallas								1

Table 2

FLORAL PHENOLOGY: Conifer Woodland/Subalpine Meadow

Location: Leigh Lake/Paintbrush Canyon

Plant species	Date:	6/4	6/12	6/23
<i>Claytonia lanceolata</i> Pursh var. <i>Lanceolata</i>		3	4	5
<i>Lonicera utahensis</i> Wats.		1	2	5
<i>Kalmia microphylla</i> (Hook.) Heller		2	-	
<i>Vaccinium membranaceum</i> Dougl. ex Torrey		3	5	
<i>Ribes viscosissimum</i> Pursh		1	4	
<i>Valeriana edulis</i> Nutt. ex T. & G.		1	4	
<i>Hydrophyllum capitatum</i> Dougl. ex Benth.		2	5	
<i>Fritillaria pudica</i> (Pursh) Spreng.		2	-	
<i>Calypso bulbosa</i> (L.) Oakes		1	3	
<i>Vaccinium scoparium</i> Leib. ex Cov.		2	5	
<i>Arnica cordifolia</i> Hook.		1	2	
<i>Balsamorhiza sagittata</i> (Pursh) Nutt.		1	2	
<i>Arabis holboellii</i> Hornem.		1	3	
<i>Mabonias repens</i> (Lindl.) G. Don		1	2	
<i>Menziesia ferruginea</i> Smith			1	
<i>Castilleja angustifolia</i> (Nutt.) G. Don [<i>Castilleja chromosa</i>]		1		
<i>Ranunculus eschscholtzii</i> Schlecht.			1	
<i>Antennaria racemosa</i> Hook.			1	
<i>Clematis occidentalis</i> (Hornem.) DC. var. <i>grosseserrata</i> (Rydb.) Pringle			1	
<i>Pedicularis bracteosa</i> Benth.			1	
<i>Thalictrum fendleri</i> Engelm. ex Gray			2	
<i>Geranium viscosissimum</i> F. & M.			1	
<i>Fragaria vesca</i> L.			1	
<i>Erysimum cheiranthoides</i> L.			1	
<i>Lomatium nudicaule</i> (Pursh) Coulter & Rose			1	
<i>Actaea rubra</i> (Ait.) Willd.			1	
<i>Collomia parviflora</i> Lindl.			1	
<i>Viola nuttalliana</i> Pursh			1	
<i>Antennaria dimorpha</i> (Nutt.) T. & G.			1	

Table 3

FLORAL PHENOLOGY: Sagebrush scrub

Location: Near RKO Road, south of Signal Mountain

Plant species	Date:	6/1	6/8	6/13	6/20	6/26
<i>Dodecatheon conjugens</i> Greene		2	3	-	-	-
<i>Viola nuttalliana</i> Pursh		2	3	-	-	-
<i>Viola purpurea</i> Kell. var. <i>venosa</i> (Wats.) Brans		2	3	-	-	-
<i>Claytonia lanceolata</i> Pursh var. <i>Lanceolata</i>		3	5	-	-	-
<i>Fritillaria pudica</i> (Pursh) Spreng.		3	5	-	-	-
<i>Lomatium nudicaule</i> (Nutt.) Coulter & Rose		1	2	3	4	
<i>Collomia parviflora</i> Lindl.		2	4	4	-	
<i>Lithophragma glabrum</i> Nutt.		3	4	5	-	
<i>Delphinium nuttallianum</i> Pritzl ex Walpers		1	3	4	4	
<i>Arabis holboellii</i> Hornem.		1	4	-	-	
<i>Malanthemum stellarum</i> (L.) Link [<i>Smilacina stellaris</i>]		2	2	2	5	
<i>Senecio insegerrimus</i> Nutt.		2	3	-	4	
<i>Castilleja cicutaria</i> Greene				1	2	
<i>Fritillaria atropurpurea</i> Nutt.				4	-	
<i>Lupinus sericeus</i> Pursh.				1	2	
<i>Purshia tridentata</i> (Pursh) DC.				1	3	
<i>Collomia linearis</i> Nutt.				1	4	
<i>Zigadenus paniculatus</i> (Nutt.) Wats.				1	3	
<i>Geum triflorum</i> Pursh				2	4	
<i>Crepis arabica</i> Heller					3	
<i>Eriogonum glabellum</i> Nutt.					2	
<i>Eriogonum umbellatum</i> Torrey					1	
<i>Eriophyllum lanatum</i> Pursh					2	
Lower portion of road— East of RKO Road junction						
<i>Balsamorhiza sagittata</i> (Pursh) Nutt.		1	2	2	4	
<i>Microseris gracilis</i> (Hook.) Greene ex Walpers		2	2	3	-	
<i>Lithospermum ruderale</i> Dougl. ex Lehmann		1	2	2	-	
<i>Fragaria vesca</i> L.		1	2	3	-	
<i>Lomatium coulteri</i> (Wats.) Coulter & Rose		2	2	2	3	
<i>Viola acuminata</i> Smith		2	2	3	4	
<i>Gnaphalium palustre</i> Nutt.		2	-	-	-	
<i>Malanthemum stellarum</i> (L.) Link [<i>Smilacina stellaris</i>]		2	2	2	5	
<i>Ranunculus cymbalaria</i> Pursh var. <i>alpinus</i> Hook.		2	4	-	-	
<i>Ipomopsis aggregata</i> (Pursh) Gray					1	2
<i>Allium brevistylum</i> Wats.					1	3
<i>Aster occidentalis</i> (Nutt.) T. & G.					1	2
<i>Agoseris glauca</i> (Pursh) Raf.					3	4
<i>Anemone multifida</i> Poiret					1	2
<i>Achillea millefolium</i> L.						1
<i>Linanthus septentrionalis</i> Mason						1