A seasonal guide to the

Flowering Plants of the Kamloops area



Introduction

I had originally thought to call this photo album "Wildflowers of the Kamloops area", but "wildflower" is a very elastic term, with no precise meaning: for some it is restricted to herbaceous plants; others would include woody shrubs; still others would also include flowering trees— if perhaps only the smaller ones. So I wanted a more inclusive name to cover all of these.

I settled on calling it "Flowering Plants of the Kamloops area", although that too is problematic, because "Flowering Plants", is a phrase corresponding to the technical term Angiosperms, which means all plants with true flowers— yet this album excludes many such plants: the sedges, grasses and rushes, as well as most broadleaf trees. In the end I realized there was no easy way around the naming problem, so understand that this is simply a collection of plants united only by having, in the main, eye-catching flowers.

In the next pages there is an overview of what is included in this guide—
the number of species included, how many of them are native vs. alien, notes on their habitats
& seasonal appearance, the geographical scope of the survey, and the numerical breakdown
of the sample into their respective plant families— a sort of plant diversity profile.

Then follows a series of eight pages showing comparisons of several groups of easily-confused species, as an aid in distinguishing them.

From p. 16 on, is the main part of this photo-guide, with one page per species in order of their seasonal appearance. The entire list is broken into three blocks, as explained two pages below here. **Finally**, there are pages concerning plant evolution and classification

383 species from 60 families are recorded in this 2020 edition of the guide.

Those species deemed native to BC are named in green (274 spp. 72%);
non-native (a.k.a. alien or exotic) species are named in orange (109 spp. 28%).

This status follows that given in e-Flora (ibis.geog.ubc.ca/biodiversity/eflora/),
but authorities occasionally differ on status (and on species names too— so beware!)

This album is far from complete. I expect to add further species in years to come. Some errors in previous editions are corrected; some species names have changed; some species have been allocated to other genera and / or families; new species are added.

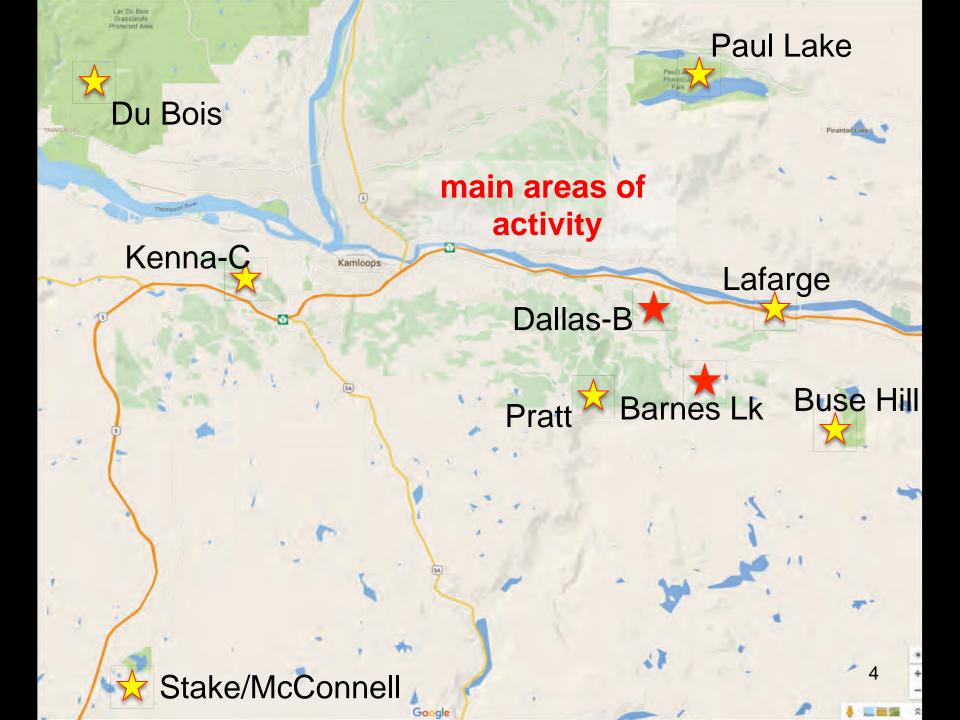


= Known to be present in the *Dallas-Barnhartvale Park* and/or *Blackwell* and/or *Barnes Lake Trails* areas – see map on the next page

On each species page, primary habitats are indicated by symbols, as follows:

- shores, riverbanks, moist areas in other habitats e.g. seeps, springs, pools;
- grasslands &/or scrublands &/or rocky slopes in other general habitats;
- open dry parklands with grasses, shrubs and scattered trees;
- open pine douglas-fir mixed woodlands;
- douglas-fir or mixed forest; can be dry to moist, open to closed;
- disturbed areas, roadsides, pastures, farmlands, etc.
- mountains, subalpine or alpine

(NB: invasive exotics are often found scattered in many other habitats where the native vegetation has been disturbed) ©



a By-The-Season structure

As in earlier editions, species are arranged according to the timing of their *local onset of flowering*, from early spring, when Sagebrush Buttercup appears, through to early fall, when Rabbit-brush blooms. In this edition, fuller information is again provided on the *calendar extent* of species' flowering seasons.

Species don't replace one another in strict linear sequence, of course; rather, there will often be substantial overlap among them: many begin flowering at more or less the same time; some will have short, but others prolonged, blooming periods; some species bloom more than once, sometimes repeatedly; and flowering always depends on the local conditions of individual plants and the rate of advance of a given year's temperatures. But bearing these complications in mind, species may still be arranged pretty reliably by their probable flowering onset, even if they might differ greatly in how long they linger thereafter.

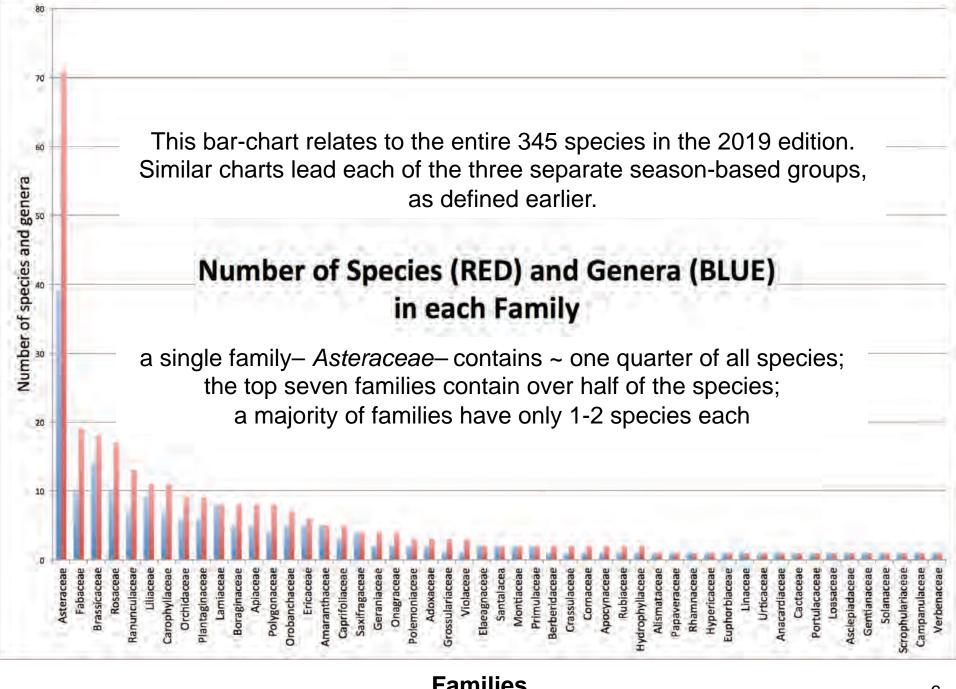
Since 2018, I have felt able to draw up a chart showing where the flowering period of each species is located in the calendar. This multi-page chart follows all the species-pages; it shows my estimate of each species' *local* flowering peak, plus an indication of when early individuals and late stragglers might be found. This chart also shows published species limits taken from sources, such as websites of the *Flora of North America*, the *Burke Museum* & the *Jepson Herbarium*.

New to this edition, flowering calendar bars for individual species appear on each species' page, like this:



Based on this flowering season chart, I have broken up the total of ~350 species into three groups:

1. Species that start BEFORE the end of April; 2. Species that typically start AFTER the end of April; and 3. Species that usually start flowering AFTER the end of May. Inspection of each subgroup permits us to see how the composition of the flowering community might change through the year— in terms of family affiliations and exotic vs. native species. This is shown numerically and as bar-charts.



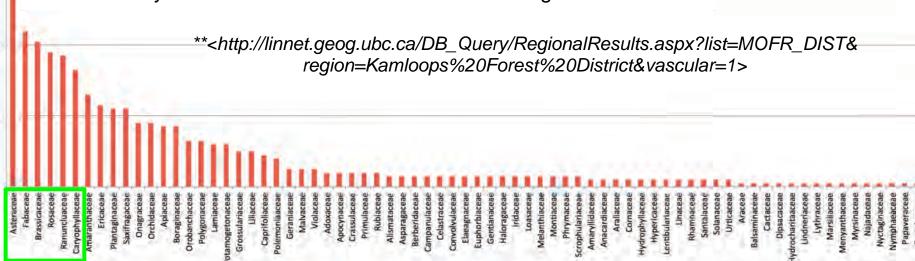
Family affiliation of the 700+ species recorded in Kamloops Forest District

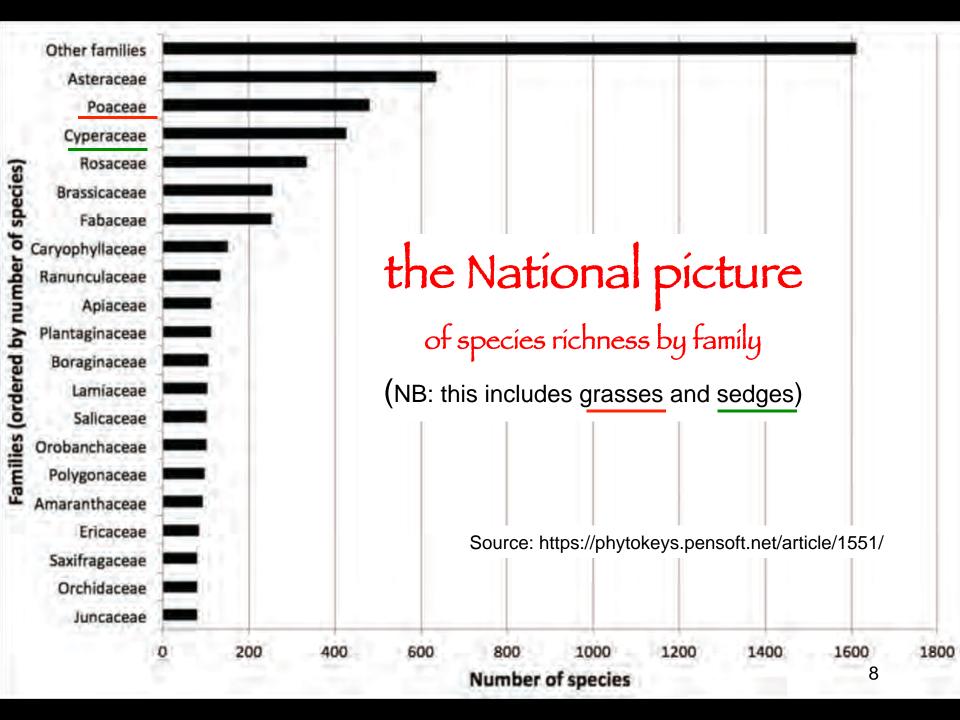
170

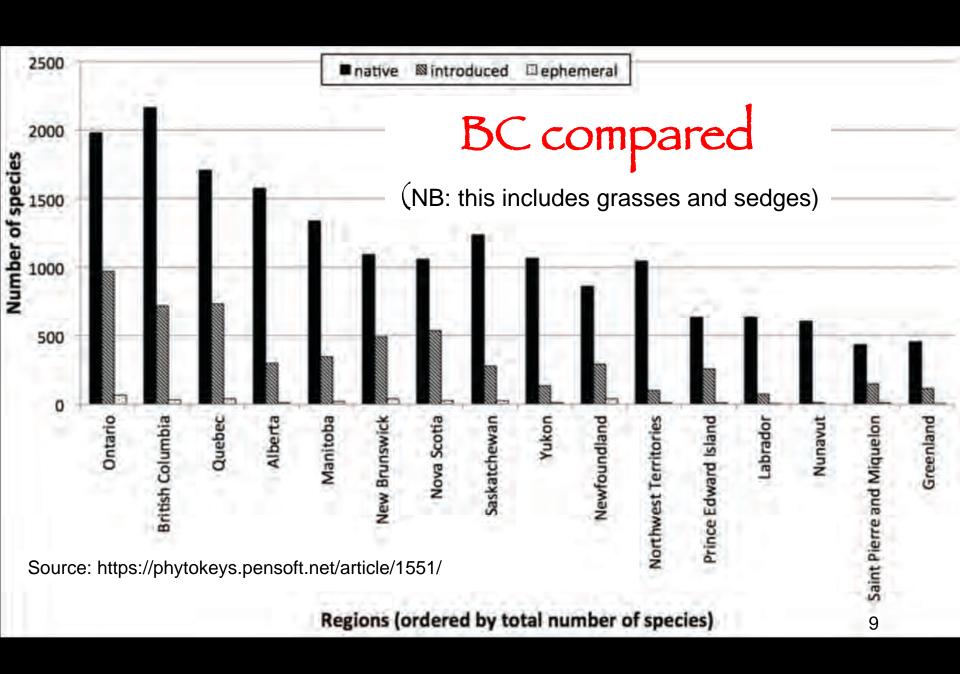
for this plot, I took the species list for the Kamloops Forest District**
then stripped out the plant groups that I exclude from my album
(grasses, sedges, rushes, most trees, ferns, etc.) so as to
make the two lists refer to the same kind of plants (but no attempt was
made to remove species from high elevations).

The similarity of this profile to that of my sample of our local flora on the previous page is obvious, with the same families (green box) dominating the sample. This lends confidence that the album provides a reasonably unbiased reflection of the flora of the region as a whole.









Comparison of mat-forming Antennaria species



osea





very compact discs, arcs or rings, tight to the ground; tiny narrow leaves; flower heads single per stem, not in clusters





open irregular mats, on or close to the ground; leafy stolons; spoonshaped greenishgrey leaves; several to many flower heads per

in round clusters



loose groups; dark woody stems often visible; clusters of silver-grey wedge-shaped leaves usually raised 1" or so off the ground; few to several flower heads per stem in compact brown-edged clusters

rosea leaves usually distinctly broader than in umbrinella

Comparison of Lomatium Desert Parsley species

usually <u>branched</u>, erect <u>smooth</u> stems; open umbels usually <u>yellow</u>, occ. white or purplish, no involucels; leaves <u>usually</u> basal, divided 2-3 times into narrow linear leaflets; fruits narrow, linear, w/ <u>narrow or absent</u> wings

















<u>simple</u> erect stems; small compact umbels white or occ. purplish; all leaves basal, <u>dark</u> <u>green</u>, dissected & fern-like; fruits oblongelliptical w/ rather <u>wide</u> <u>wings</u>

tríternatum



macrocarpum



single erect hairy
stems; open yellow
umbels, involucels
present; leaves
mostly basal, perhaps
also on stems, divided
2-3 times into narrow
linear leaflets; fruits
oblong – broad
elliptical, wings narrow
to broad





stems branched near base, spreading or erect; large compact umbels, creamy white, occ. purplish; all leaves basal, greyish-green, dissected fern-like; fruits oblong-elliptical w/ narrow wings

Comparison of small Erigeron daisies: 1

compositus







simple erect flowerheads, 3-25 cm tall; 20-60 ray florets, usually white (can be pink or blue); leaves divided 1-4 x into 3s

[May - Aug]

simple to muchbranched erect flower-

heads, 5-30 cm tall;

50-100+ ray florets,

usually white, (can be

pale pink or blue);

leaves lanceolate;

whole plant v. hairy





erect flower-heads, usually simple, 5-30 cm tall; 20-45 ray florets, bright or pale yellow; leaves linear

[May - July]

pumilus





flagellarís 🥛



erect flower-heads, usually simple, 3-15 cm tall; 40-125 ray florets, white; leaves broad-lanceolate; trailing leafy stolons

[May - Aug]

[May - July]

© Paul Handford, 2016

Comparison of small Erigeron daisies: 2



corymbosus

simple or branched erect flower-stems, 10-50 cm tall; 35-65 ray florets, usually deep blue, or perhaps pink; leaves long, linear and tapering, mostly basal

[April - July]



simple or branched erect flower-heads, 10-50 cm tall; 15-50 ray florets, usually blue to purplish, can be pink or white; leaves linear to thread-like

[May - July]







divergens

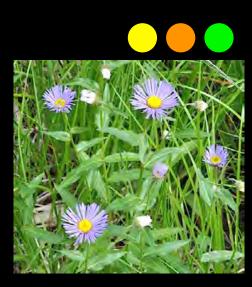
simple or multiple from base, erect to spreading hairy flowerstems, 10-40 cm tall; 75-150 ray florets, white to lilac, buds *nodding*; leaves hairy, spatulate

[April - July]

speciosus

simple or branched erect flower-heads, 15-80 cm tall; 75-150 ray florets, blue to purple, rarely whitish; basal leaves lanceolate to spoonshaped, stem leaves often broader but with pointed tip

[June - Aug]



Tricky Crepis and Hieracium species



C. atribarba

C. tectorum





erect stems, 15-70 cm, branched distally; flower heads have ~8-12 separated bright yellow ray florets,; lvs. linear, deeply cut into narrow segments

erect stems, 30-100 cm, branched distally; flower heads have many bright yellow ray florets; basal lvs. in short-lived flat rosette, stem lvs. linear, entire, clasping stem



[May - July]

[June - July]



H. cynoglossoides

H. umbellatum





erect stems, 30-100 cm, branched distally; flower heads have few to many bright yellow ray florets; lvs. lanceolate, stalked, grey-green usually densely hairy, basal lvs. persistent

[June - Aug]

erect stems, 30-100 cm, branched distally; flower heads have many bright yellow ray florets; basal lvs. soon wither, persistent stem lvs. lanceolate, entire or toothed, unstalked, often clasping

[July – Sept]



Comparison of chickweeds, sandworts, and others: 1

Holosteum umbellatum





Stellaría media

simple erect flowerstems, 5-35 cm tall; 2-16 flowers in terminal cluster; flowers white, 5-7mm, raggedly frilled edge; 1-2 cm oblonglanceolate leaves mainly in basal rosette





stems often prostrate, usually branched, forming mats, 7-50 cm long; white flowers single or in terminal clusters, petals deeply cleft, 2-3mm; leaves ovate to elliptical, 5-45mm long, hairy [Feb-Oct]

[Apr-May]

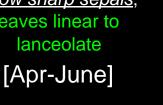






Cerastium arvense

simple to few-branched erect flower-stems, 3-25cm tall; white flowers in small clusters, petals deeply cleft, shorter than narrow sharp sepals; leaves linear to







often forms mats or clumps; erect to prostrate flower-stems, usually branched, 5-40 cm long; white flowers in small open clusters, petals 8-12mm, strongly cleft; leaves linear to lanceolate

[Apr- Aug]

Comparison of chickweeds, sandworts, and others: 2

Moehringia lateriflora 🛑 🛑 🛑





much-branched flowerstems, 4-20cm tall; white flowers in small clusters, petals eggshaped, 4-8mm; leaves elliptical to oblong, 3-30mm long





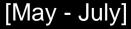
flower-stems branched, 3-30 cm tall; single to few white flowers in open cluster, petals deeply cleft, 3-8mm long; leaves pointed, linear to lanceolate, rather stiff & shiny

[May - Aug]

[May - Aug]

Arenaría serpyllífolía

usually much-branched flower-stems, erect to prostrate; flowers white, petals narrow, ovate, ~2mm; leaves opposite, ovate to lanceolate, sharppointed







Silene menziesii



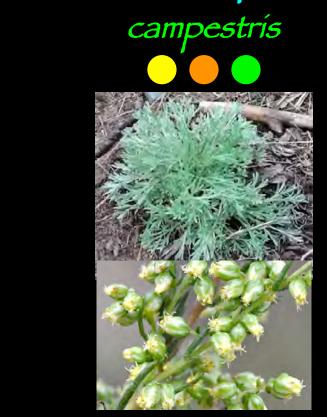
flower-stems curving up or down, branched, 5-70 cm long; flowers white, 2-3mm, cleft halfway or more, in open clusters; leaves lanceolate with long points, 2-20cm long

[March - Sept]

Comparison of the smaller upland Artemisia species

dracunculus

plant slightly to *strongly* aromatic; stems simple, erect, *brown*, 50-150 cm; many greenish flower heads in long *open-branched* inflorescence; leaves *green*; early basal leaves strap-like, often 3-divided, soon lost; *stem leaves green*, *abundant*, *linear to oblong*



plant slightly to non-aromatic; stems simple, erect, grey-green turning red-brown, 10-100 cm; many yellow-green flower heads in narrowly branched inflorescence; leaves greyish green, largely basal, fairly long, 2-3 times cut into fine segments



plant strongly aromatic; stems simple erect, usually white-grey, 10-40 cm; several to many whitish flower heads with bright yellow florets; basal leaves soon lost; stem leaves silvery greyish green divided 2-3 times into short, very fine linear to thread-like segments

comparison of Astragalus species: leaf-length; leaflet number, size, & form



4-10 cm; 11-23; 5-20 mm.; elliptic



5-15 cm; 11-25; 10-20 mm.; rounded



3-9 cm; 11-21; 10-20 mm.; oblong; red-brown stems



3-15 cm; 7-21; 5-30 mm.; linear



2-15 cm; 5-19; 5-20 mm.; lanceolate, pointed, white-woolly



5-12 cm; 7-19; 10-30 mm.; narrow-oblong



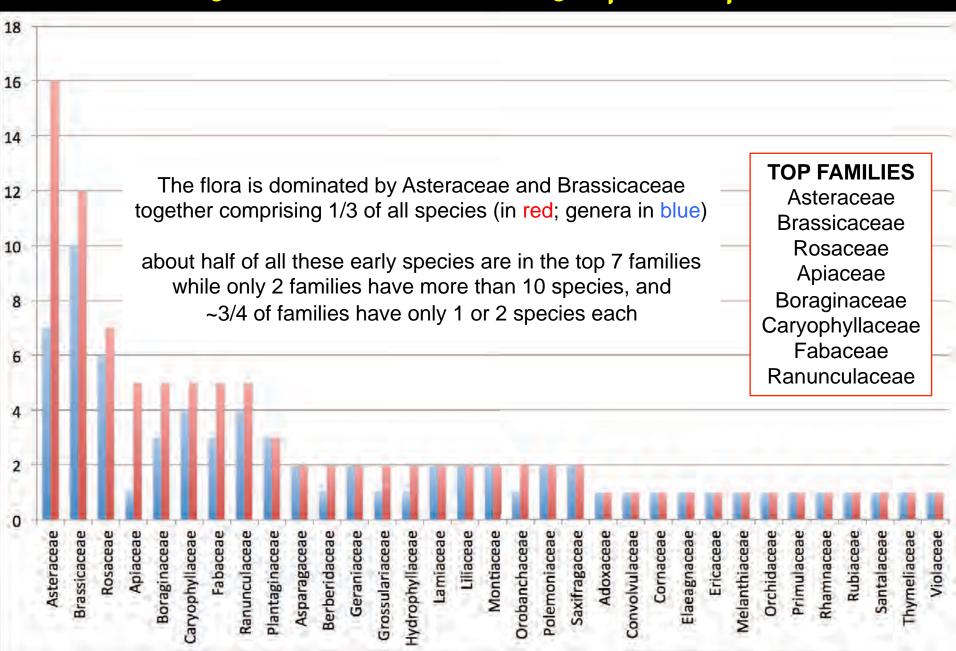
3-8cm; 9-25; 8-25 mm.; narrow-lanceolate; red-brown stems

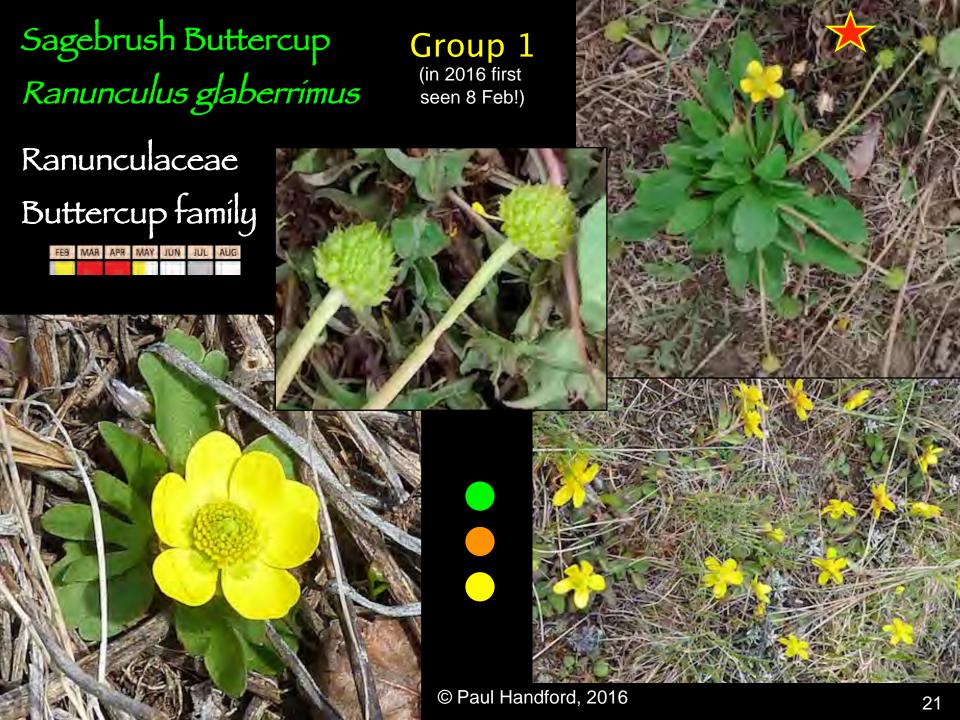
Group 1 species begin flowering before end-April

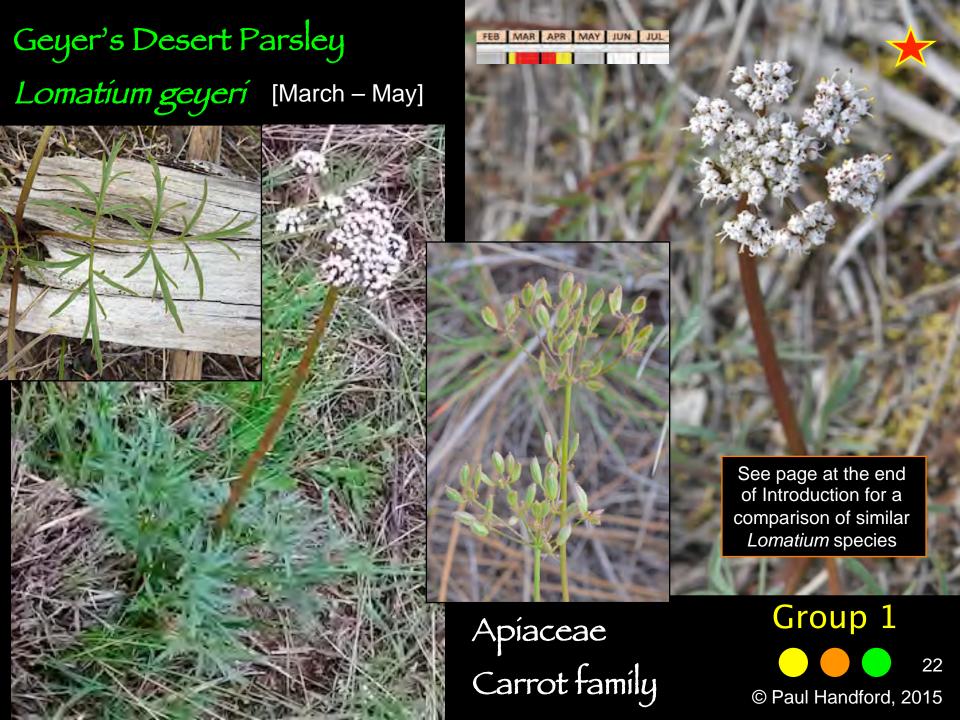
Of these 109 species, 86 are native (79%), and 23 are alien (21%)

Some species begin flowering from as early as mid-February, though most flower strongly in April & May, with some reaching well into June, and a few as far as July, with some stragglers lingering into fall.

Family Breakdown of Early Spring Species









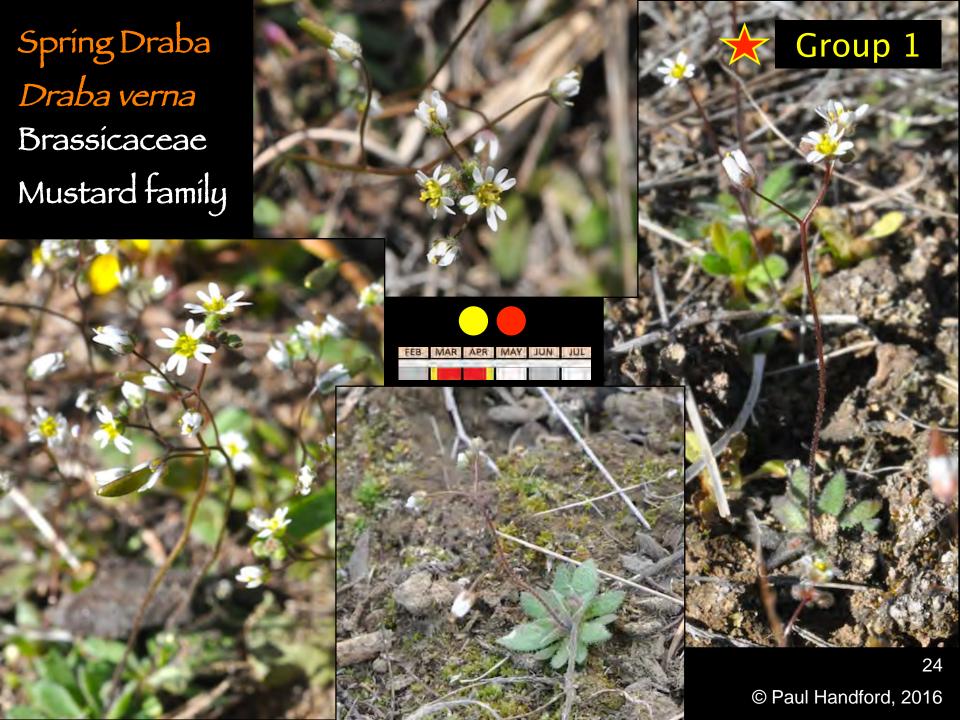
Group 1 🜟





one month after flowering

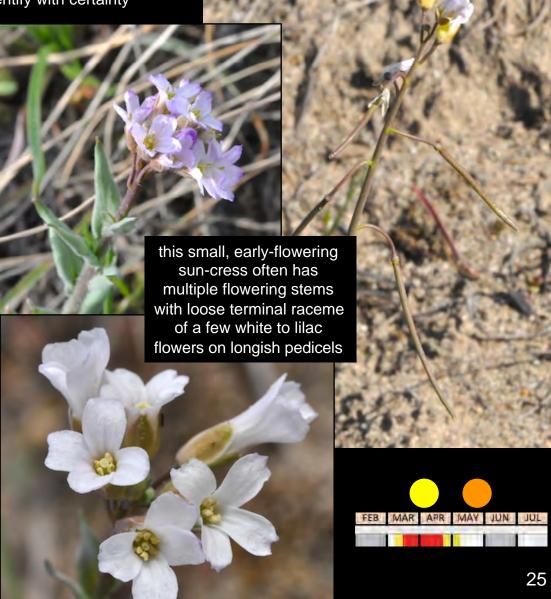
23 © Paul Handford, 2016



Collins' Sun-cress Boechera collinsii

Brassicaceae Group 1 Mustard family





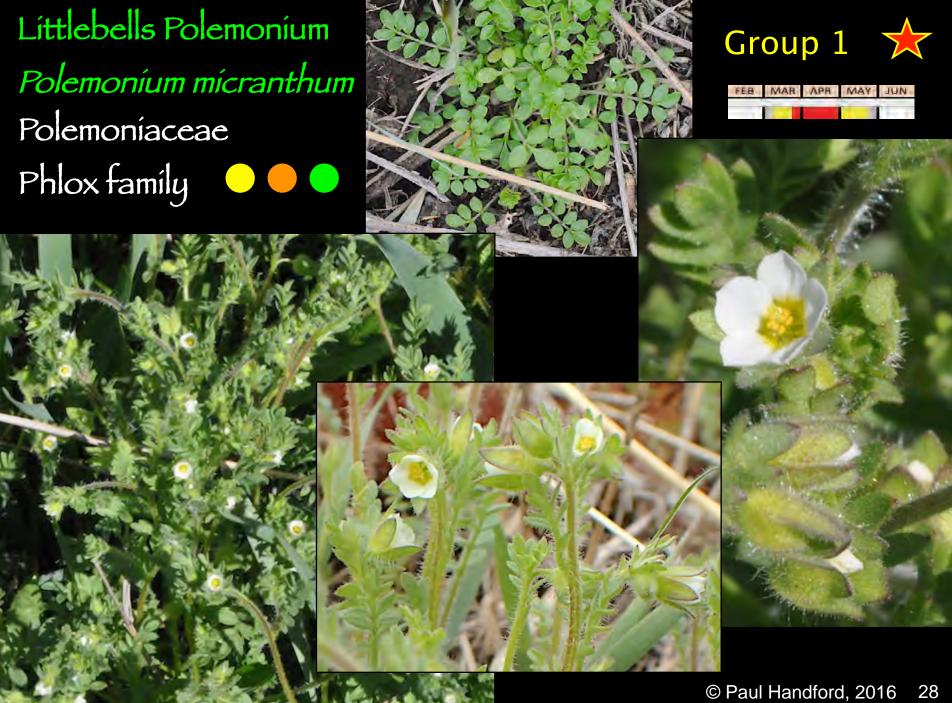


Hornseed Buttercup Ranunculus testiculatus

Ranunculaceae

Buttercup family





Small-flowered Blue-eyed Mary

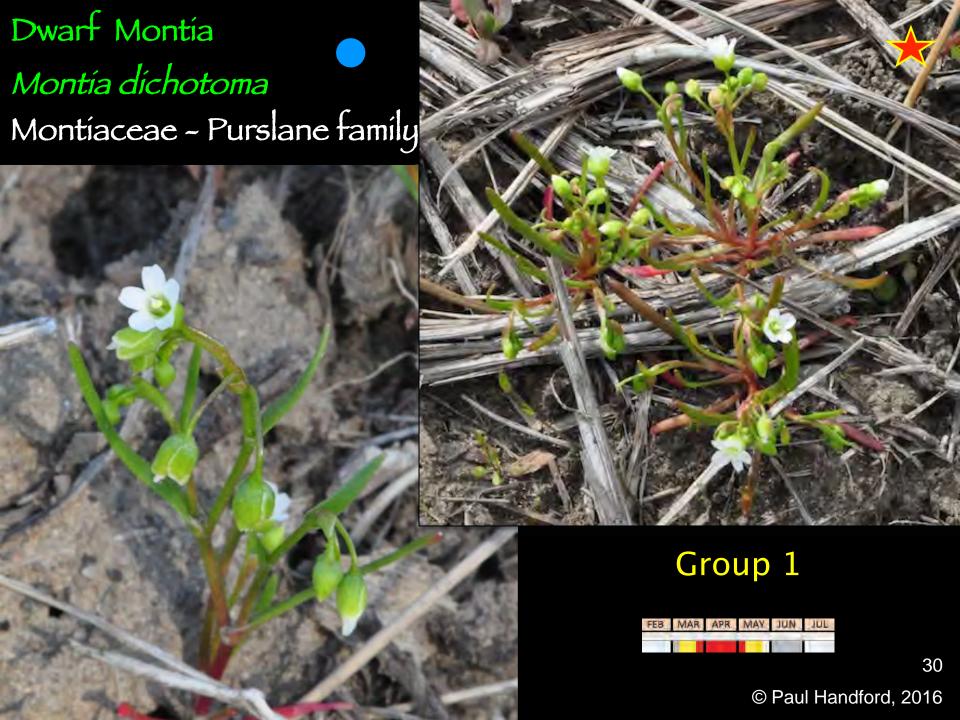
Collinsia parviflora

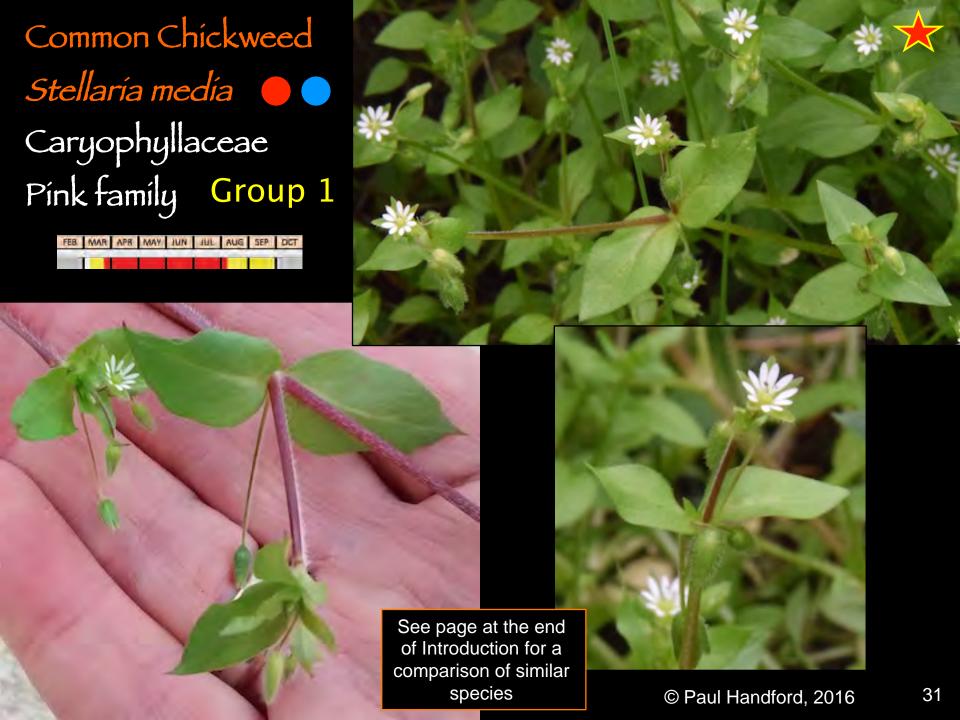
Plantaginaceae Group 1

Plantaginaceae Plantain family

recently moved from Orobanchaceae







Avalanche Lily Erythronium grandiflorum

Liliaceae Lily family









© Paul Handford, 2016

Blue Mustard

Chorispora tenella

Mustard family







Western Spring Beauty Claytonia lanceolata

Group 1

Montíaceae

Purslane family

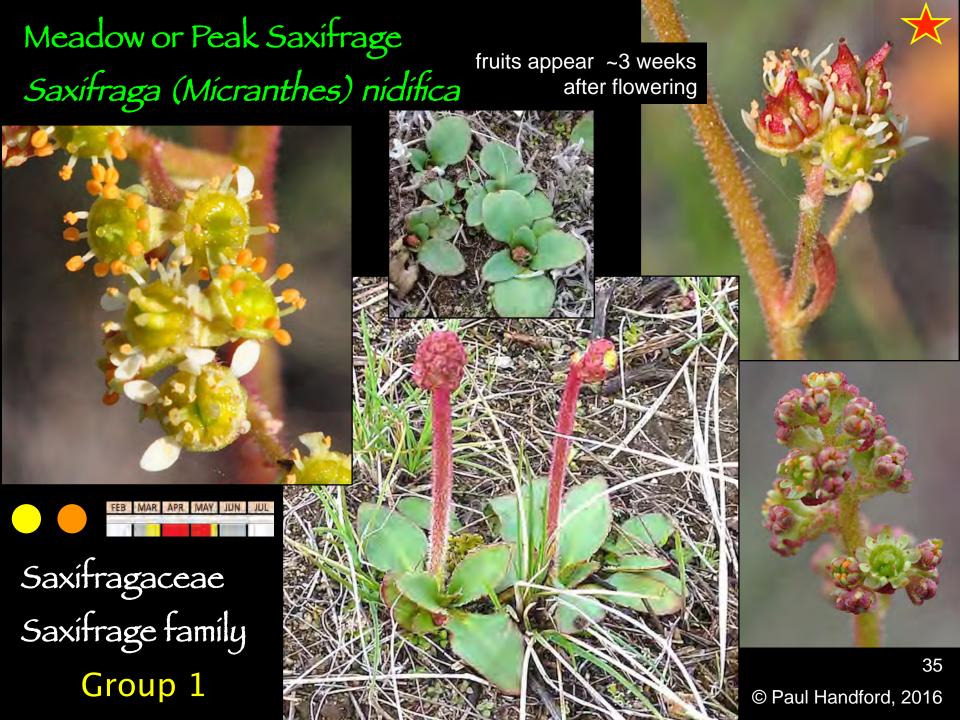
FEB MAR APR MAY JUN JUL AUG











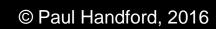
Dandelion Taraxacum officinale

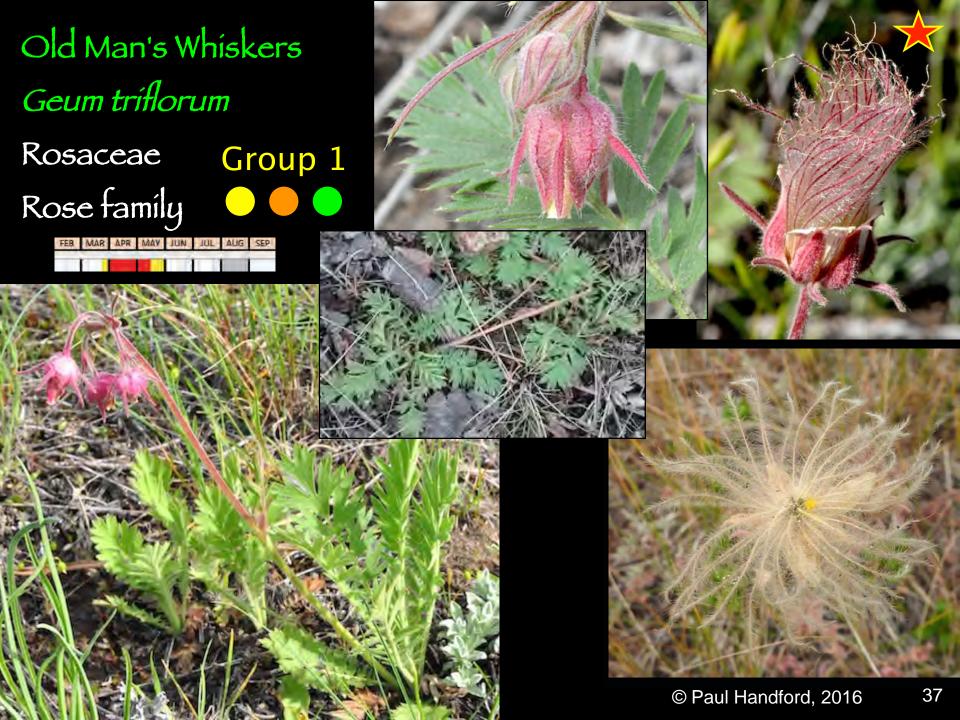
Group 1

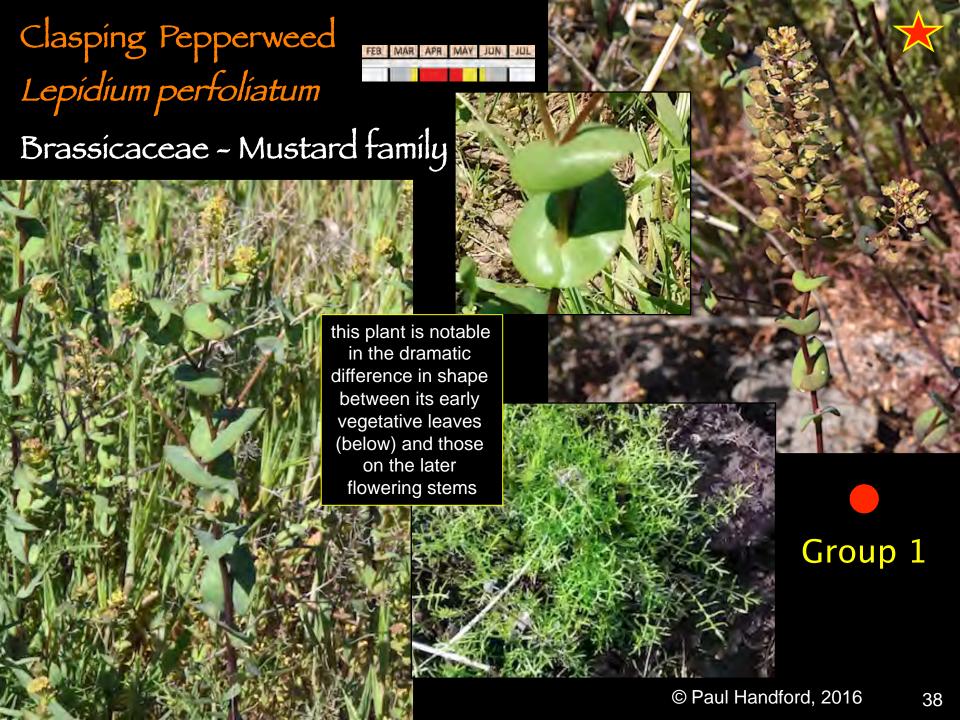
Asteraceae Sunflower family











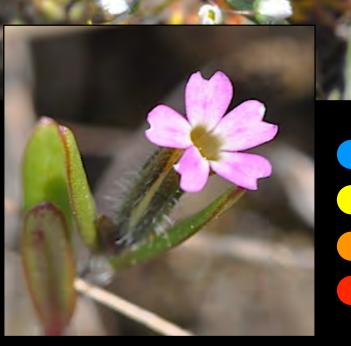
Pink Twink, Slender Phlox

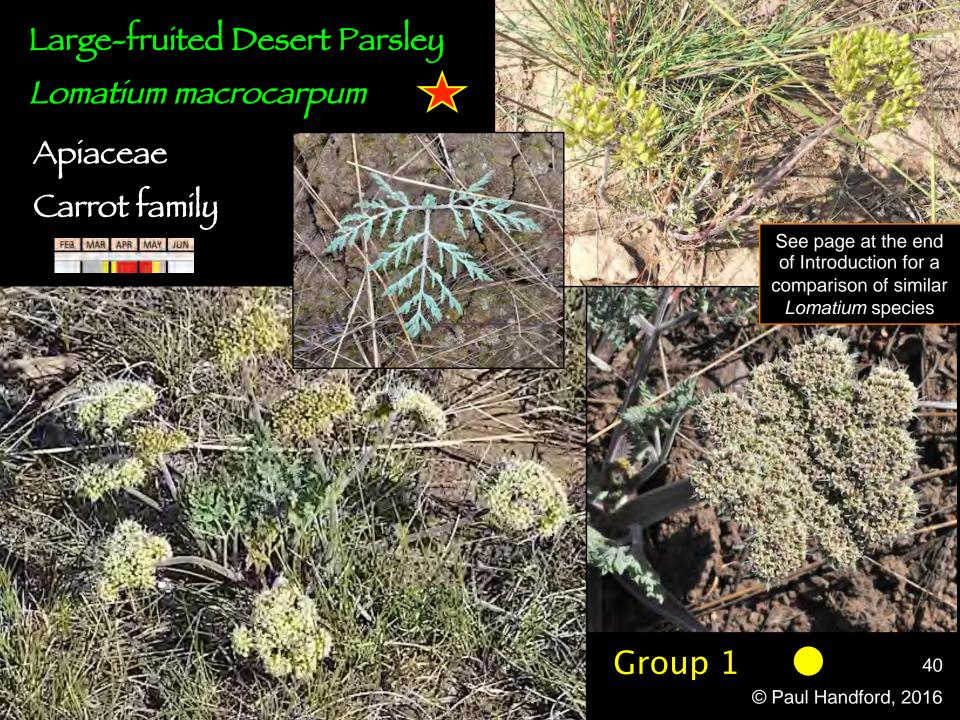
Microsteris (Phlox) gracilis

Polemoniaceae Group 1

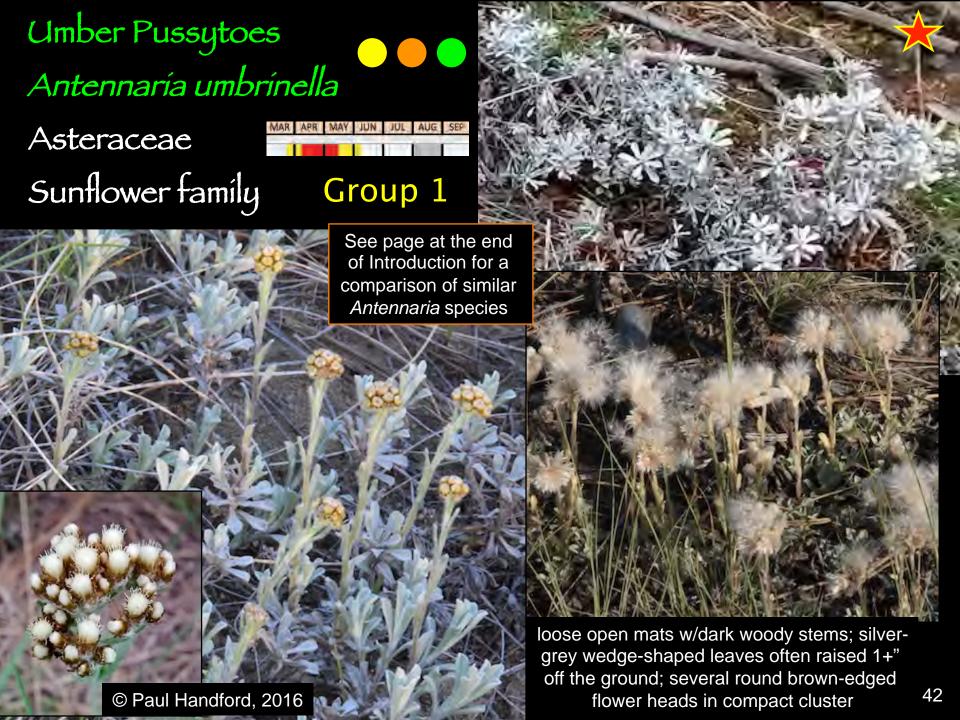
Phlox family [March – June]

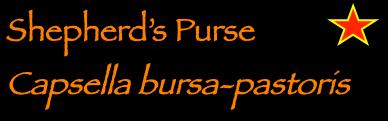












Brassicaceae Mustard family



Group 1

43

© Paul Handford, 2016





Long-flowered Bluebell Mertensia longiflora

Boraginaceae Borage family









Woodland Draba *Draba nemorosa*

Brassicaceae Mustard family

Group 1



FEB MAR APR MAY JUN JUL





Rosy Pussytoes



Group 1

Asteraceae

Sunflower family

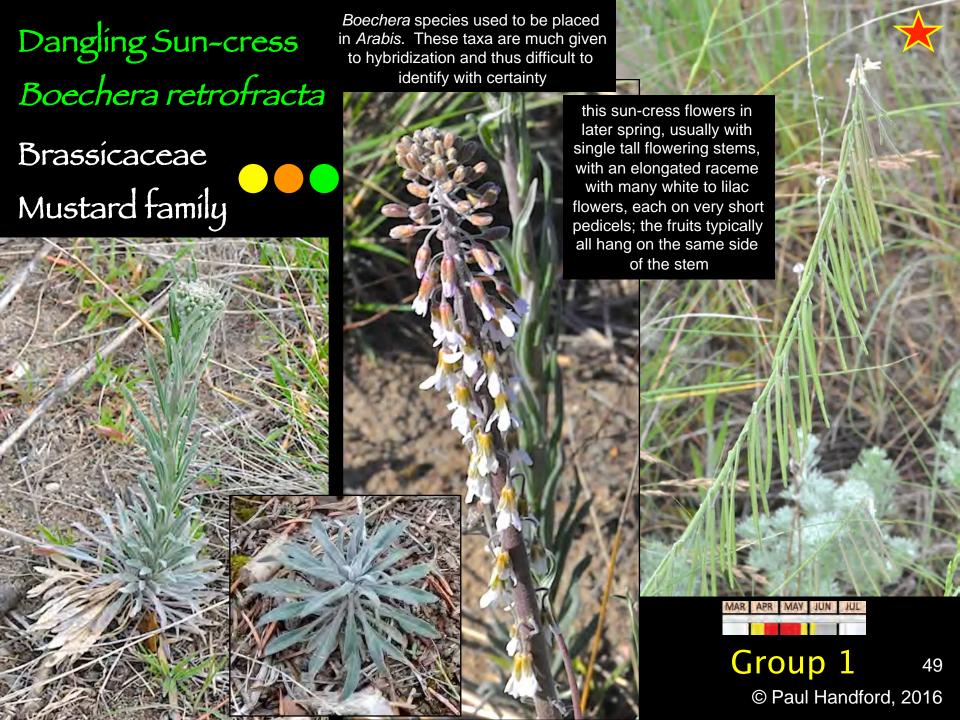


open mats, on or close to the ground; spoon- or wedgeshaped greenish leaves; several to many ellipsoidal silvery-white or pink flower heads in compact clusters



Some would merge this species with A. microphylla

See page at the end of Introduction for a comparison of similar *Antennaria* species



Dangling Suncress Boechera retrofracta

Brassicaceae Mustard family

[April – June]





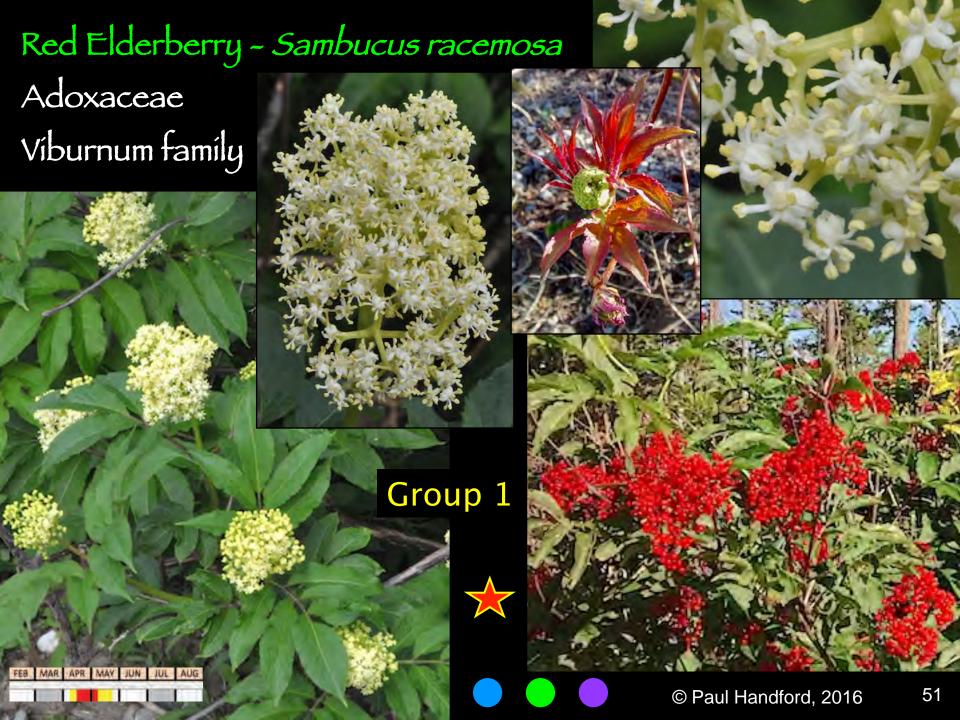


Boechera can become infected with the rust fungus Puccinia monoica, which sterilizes the plant, so it can produce no flowers. It also causes the host plant to turn its leaves into bright yellow pseudoflowers, which also reflect UV light, visible to bees.

These pseudo-flowers secrete nectar that attracts insects, which distribute fungal reproductive structures among receptive plants, advancing the fungal life-cycle, next leading to the infection of *Stipa* grasses, the alternate host plant species, where the rust eventually produces spores that once again infect *Boechera* individuals, completing the rust life cycle.

this species usually produces its own genuine flowers in April, but these yellow pseudo-flowers often appear early in March, along with sagebrush buttercups & yellowbells





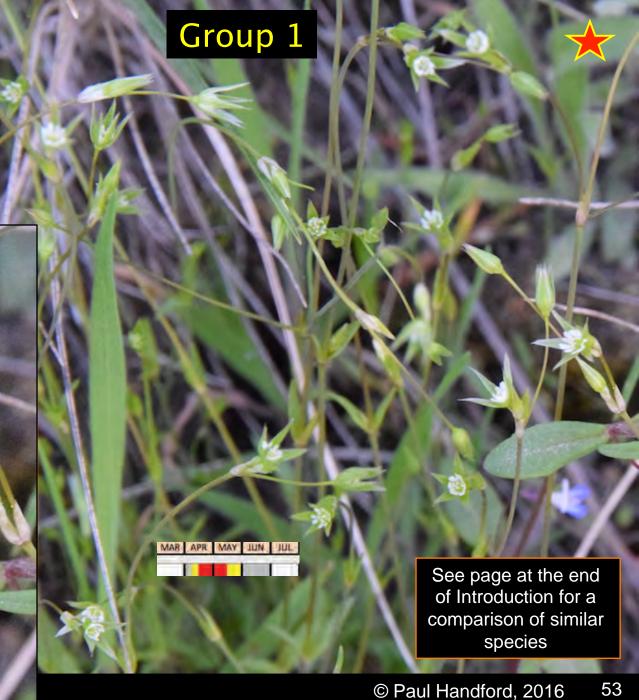
Golden Currant Ríbes aureum Grossulariaceae Currant family

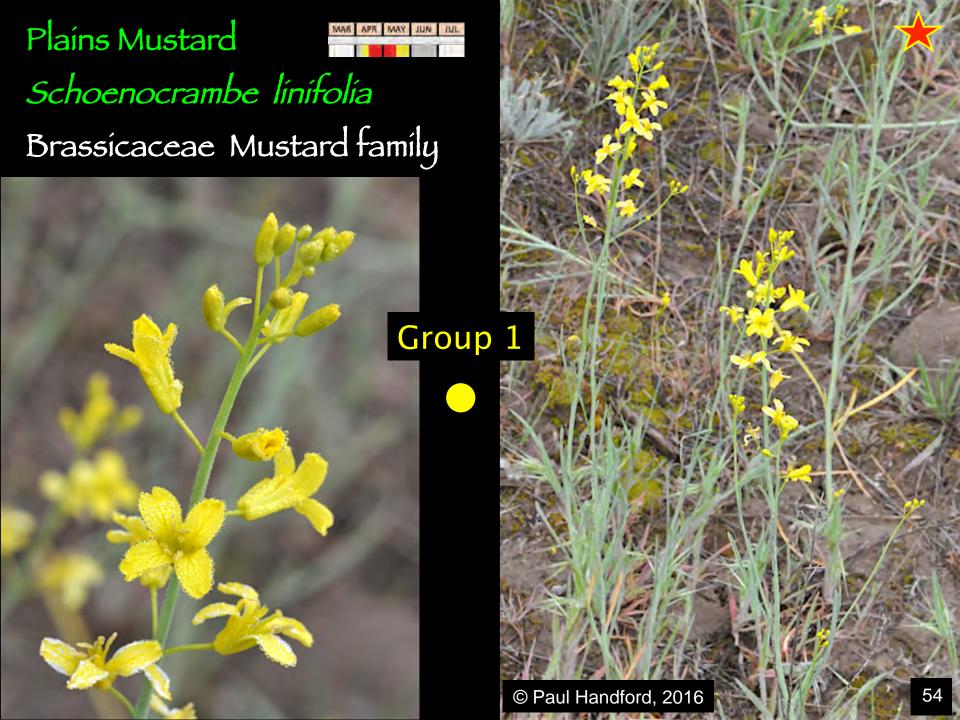






Shiny Starwort Stellaria nitens Caryophyllaceae Pink family







Blue Forget-me-not

*Myosotis stricta*Boraginaceae

Borage family



















Arrow-leaved Balsamroot *Balsamorhiza sagittata*

Asteraceae Sunflower family



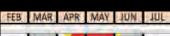




Fairyslipper Calypso bulbosa

Orchidaceae Orchid family





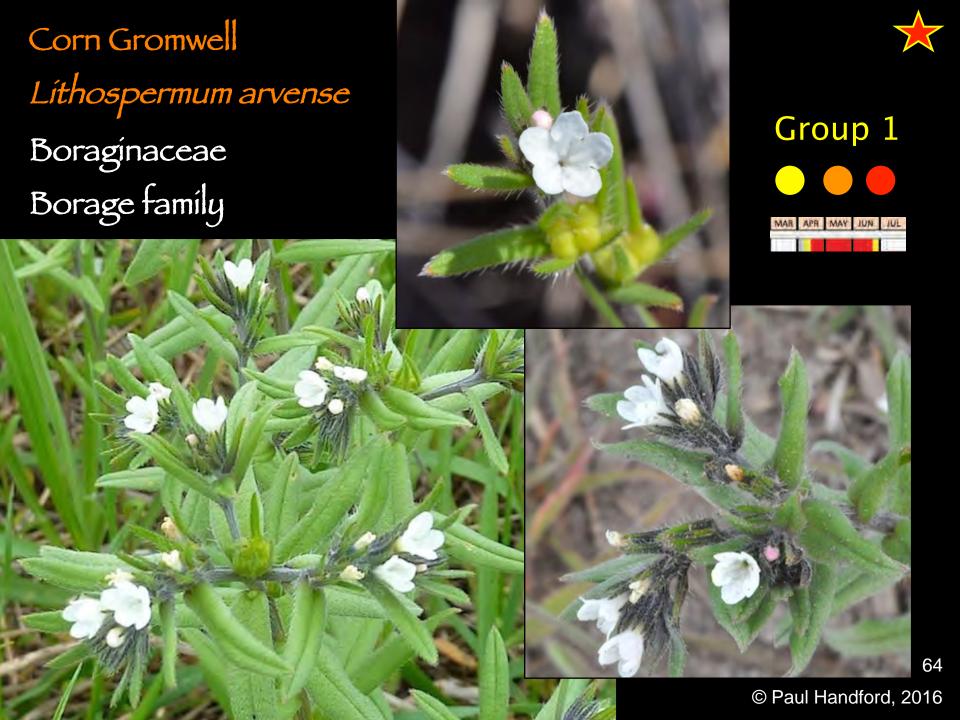


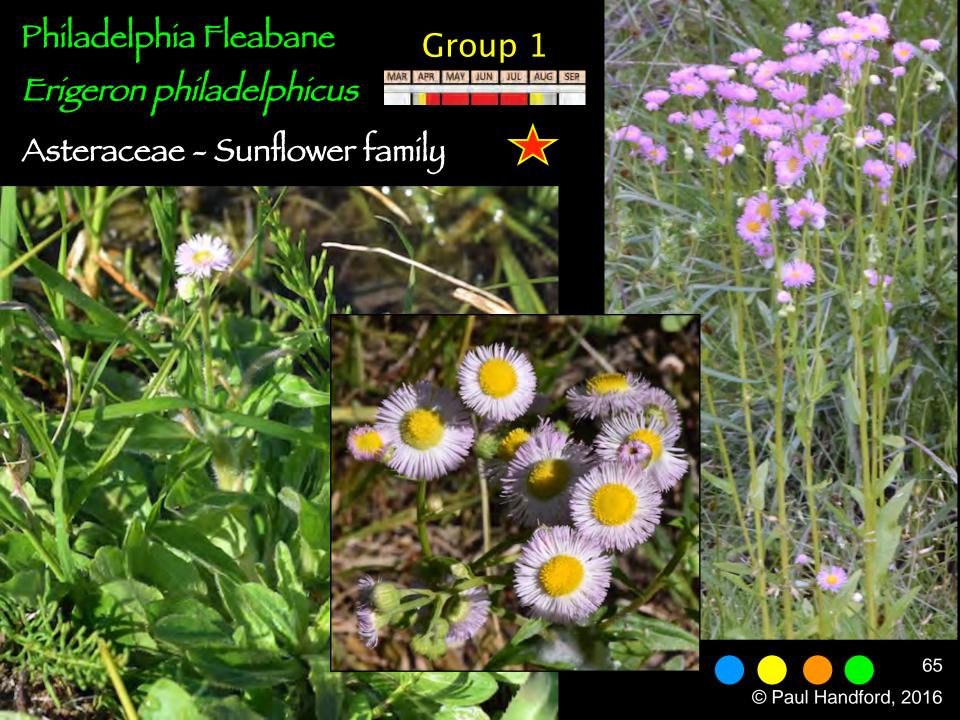


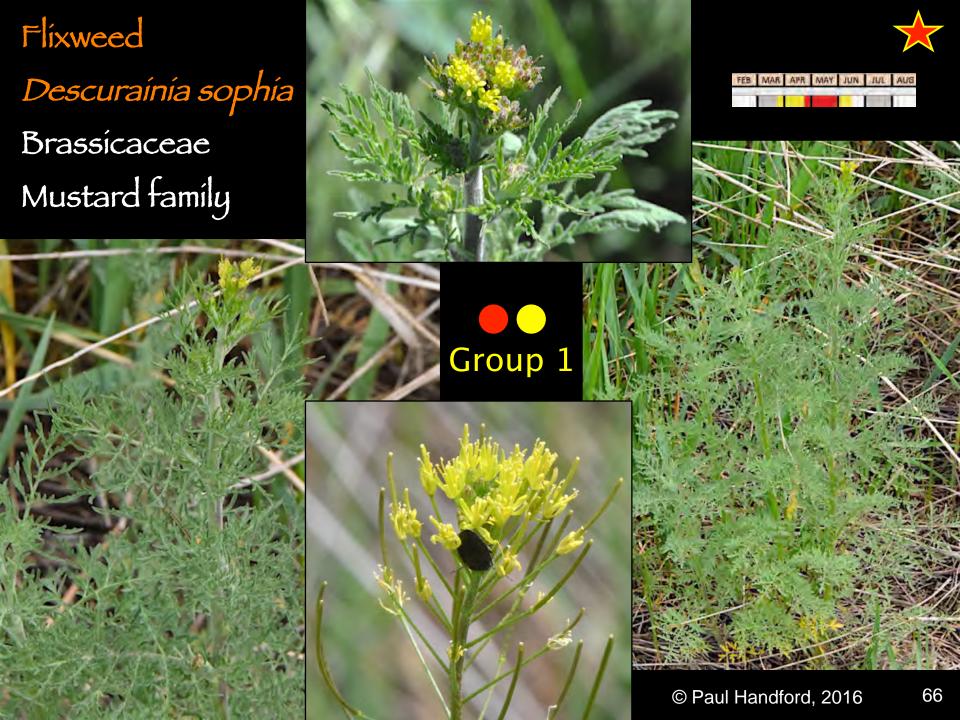




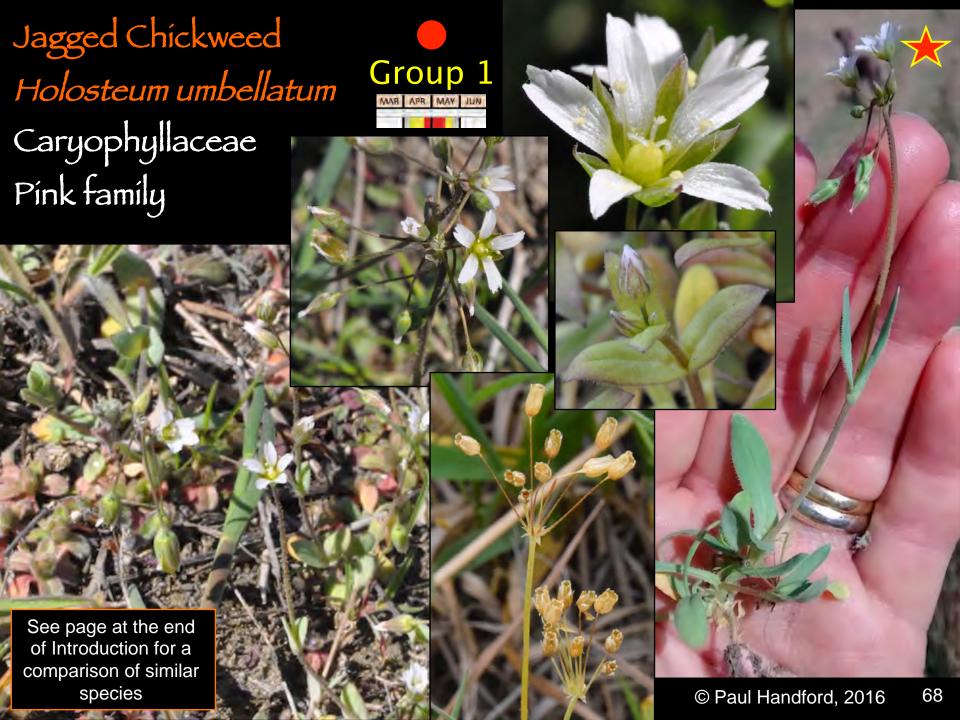


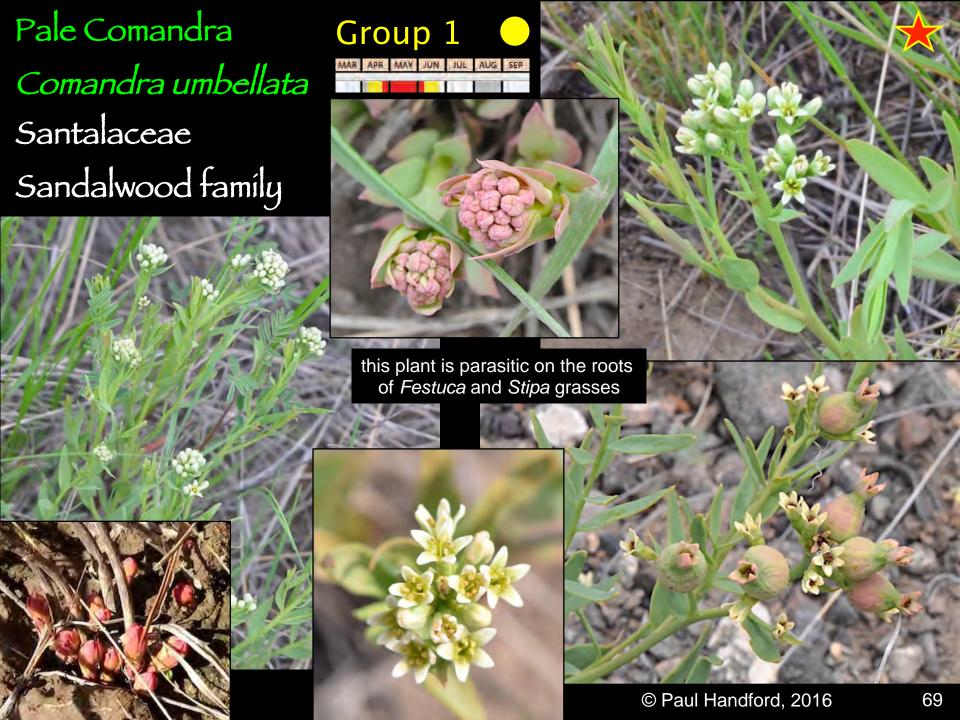


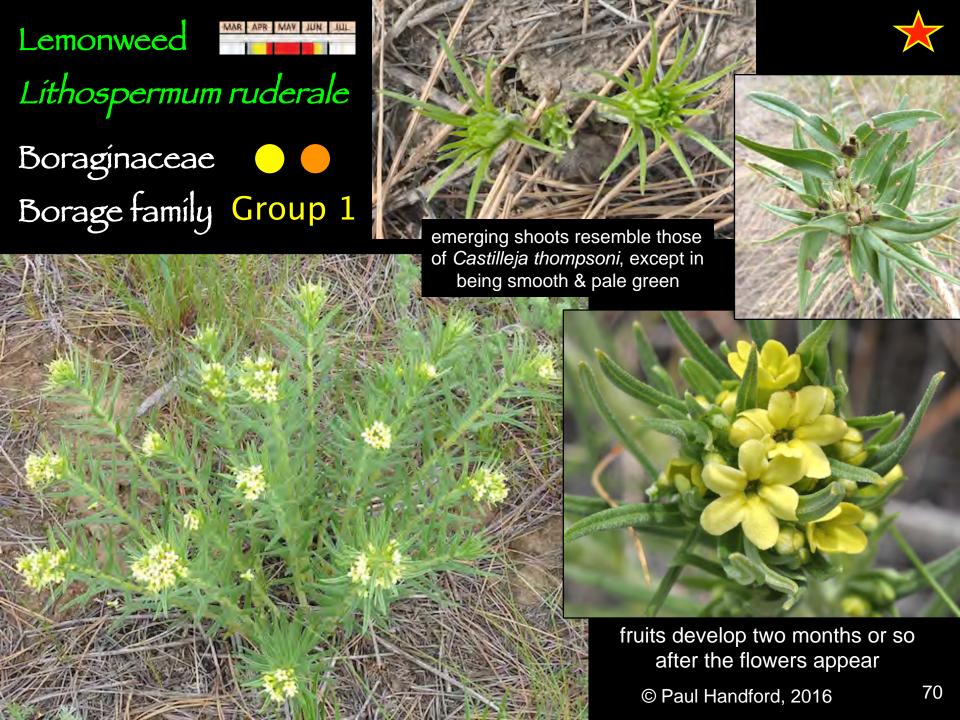












Grape Hyancith Muscari botryoides

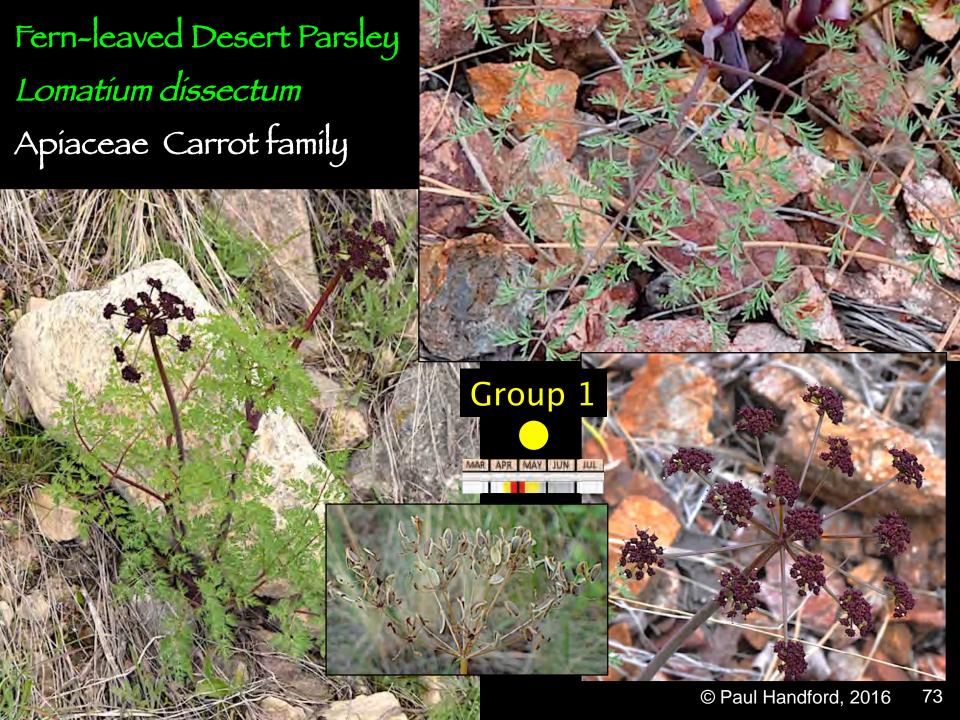
Asparagaceae Asparagus family

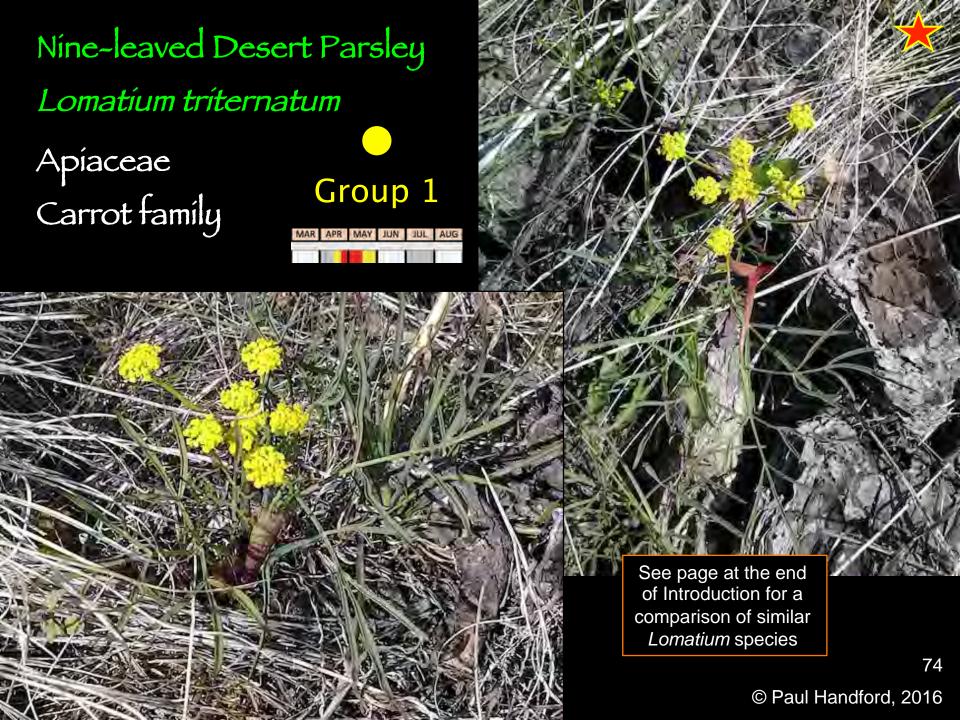




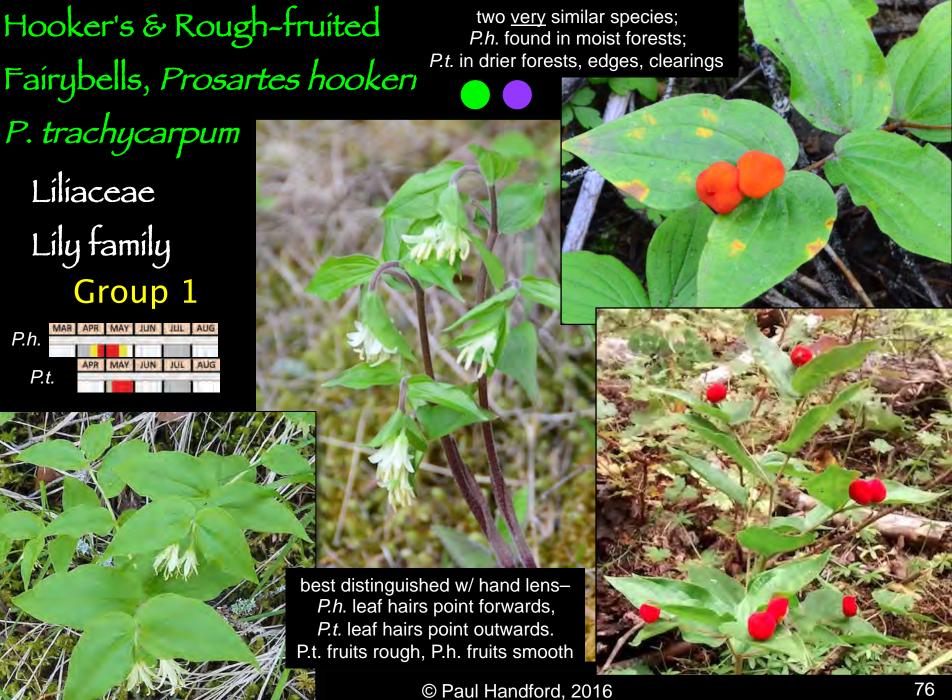


Creeping Oregon Grape Mahonía repens fruits develop ~2 months after the flowers appear Berberidaceae Barberry family Group 1











Mountain, or Sticky Tansy-mustard Descurainia incisa Brassicaceae - Mustard family Group 1 © Paul Handford, 2016

Common Dead-nettle Lamium amplexicaule

Lamíaceae Mint family





Soopaalie MAR APR MAY JUN JUL AUG

Shepherdía canadensis

Elaeagnaceae

Oleaster family

















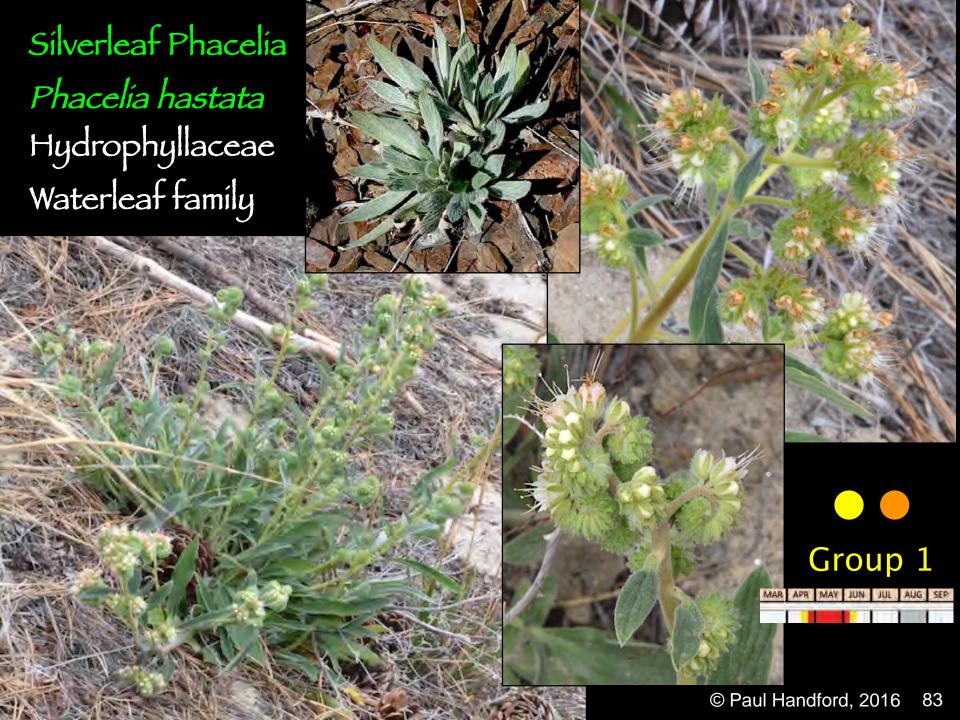
Swale Desert Parsley Lomatium ambiguum

Apiaceae Carrot family

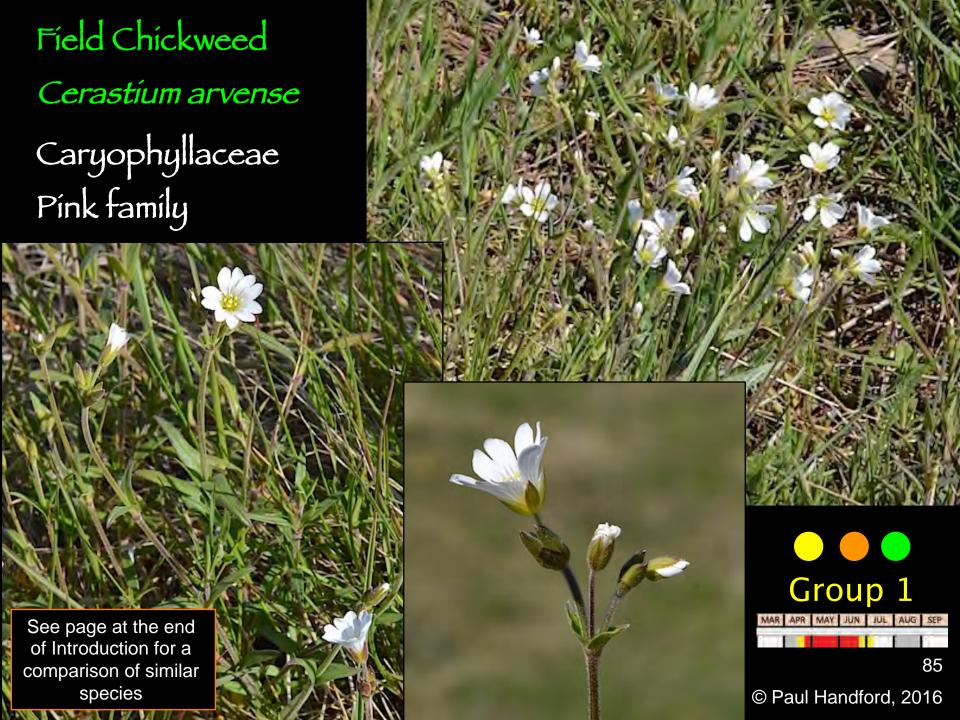
See page at the end of Introduction for a comparison of similar *Lomatium* species







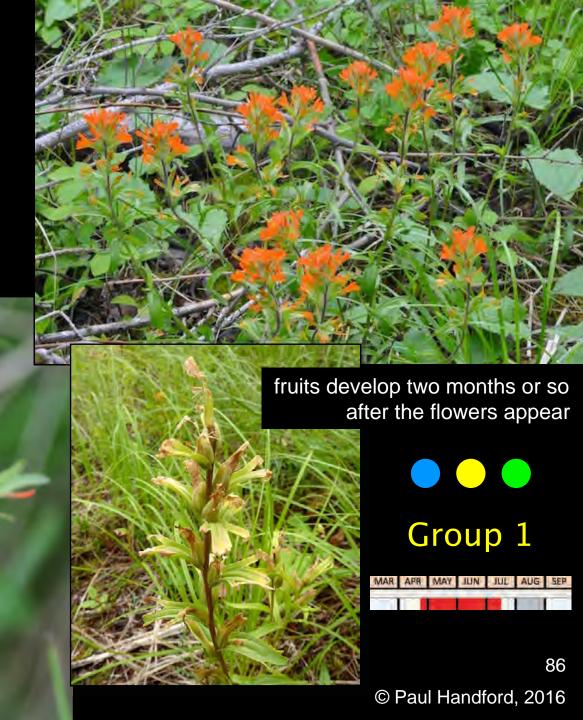




Harsh Red Paintbrush

Castilleja hispida

Orobanchaceae Broomrape family





Common Yarrow

Achillea millefolium

Asteraceae
Sunflower family
Group 1

MAR APR MAY JUN JUL AUG SEP OCT



yarrow flower-heads are usually brilliant white, but occasionally they can be pale to deep pink or cream



Field Pennycress Thlaspi arvense Group 1



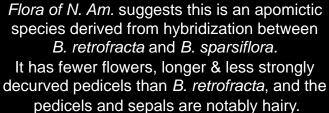
Mustard family



Fuzzy Sun-cress
Boechera pauciflora

Brassicaceae Mustard family





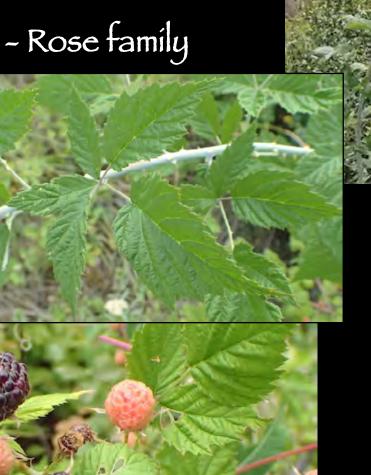








Rosaceae - Rose family





Common Speedwell Veronica officinalis Plantaginaceae

Plantaginaceae Plantain family











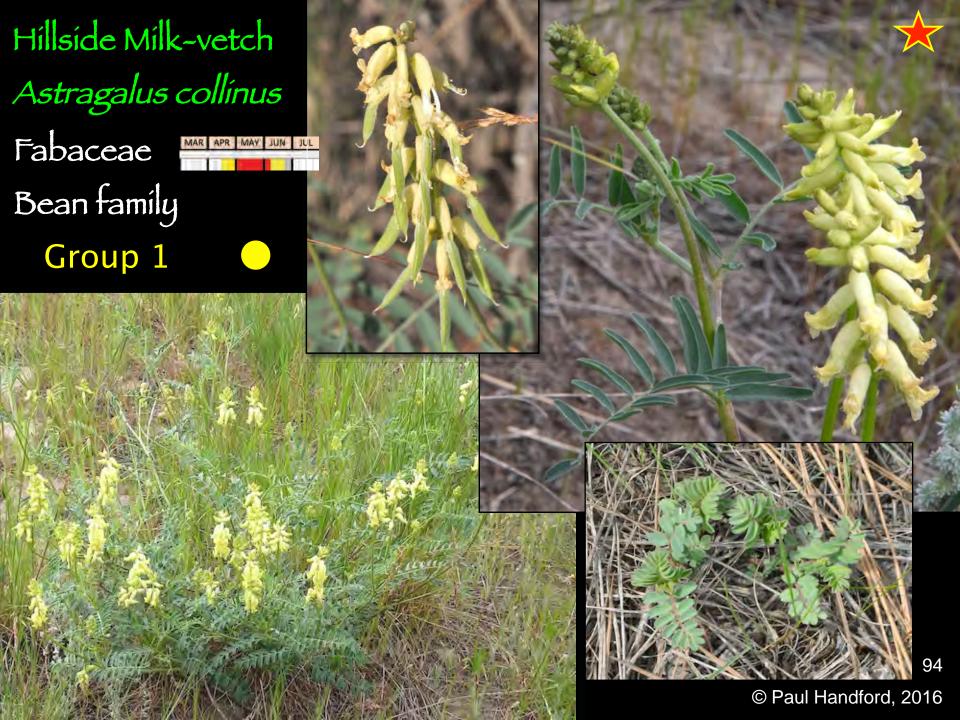
Mountain Sweet-cicely Osmorhiza berteroi

Apiaceae - Carrot family









White Currant

Ribes cereum

Grossulariaceae

Currant family



Group 1 ₉₅

Western Stickseed

Lappula occidentalis (L. redowskii)

Boraginaceae Borage family



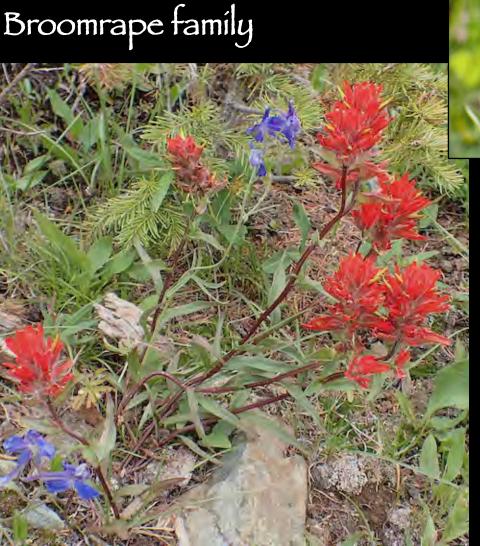


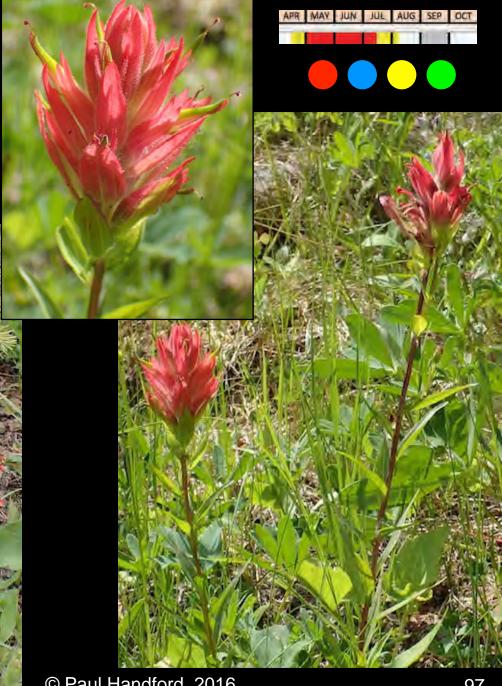




Group 1

Common Red Paintbrush Castilleja miniata Orobanchaceae Group 1





Robert's Geraniumn, or Herb Robert *Geranium robertianum*





Racemose Pussytoes

Antennaría racemosa





Asteraceae

Sunflower family



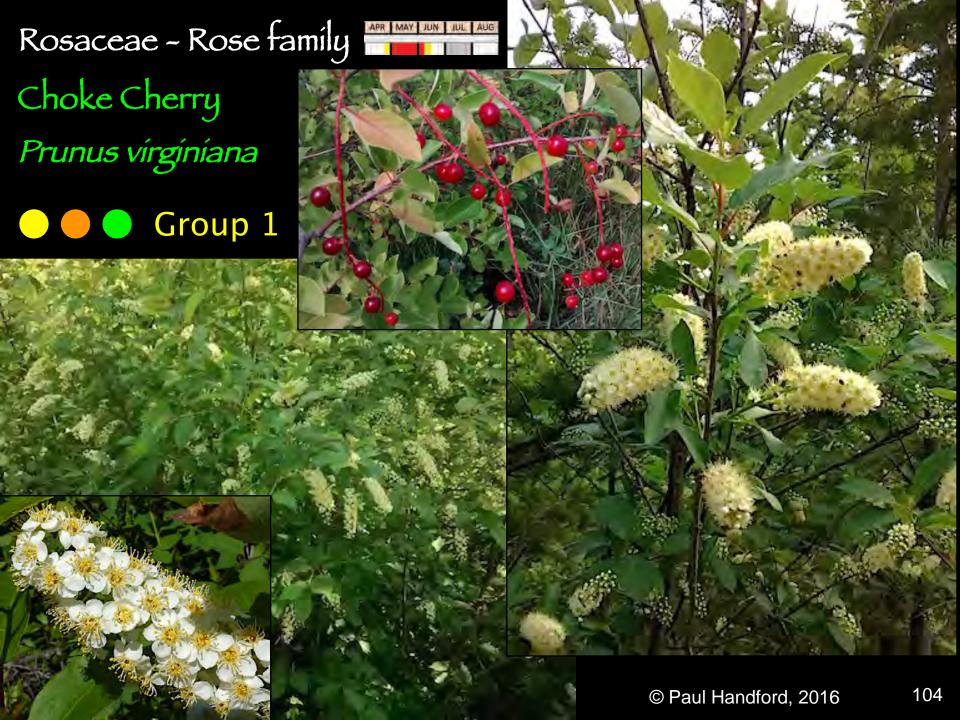
Group 1

100









Shaggy Daisy Erigeron pumilus

Asteraceae Sunflower family



See page at the end of Introduction for a comparison of similar *Erigeron* species

Group 1

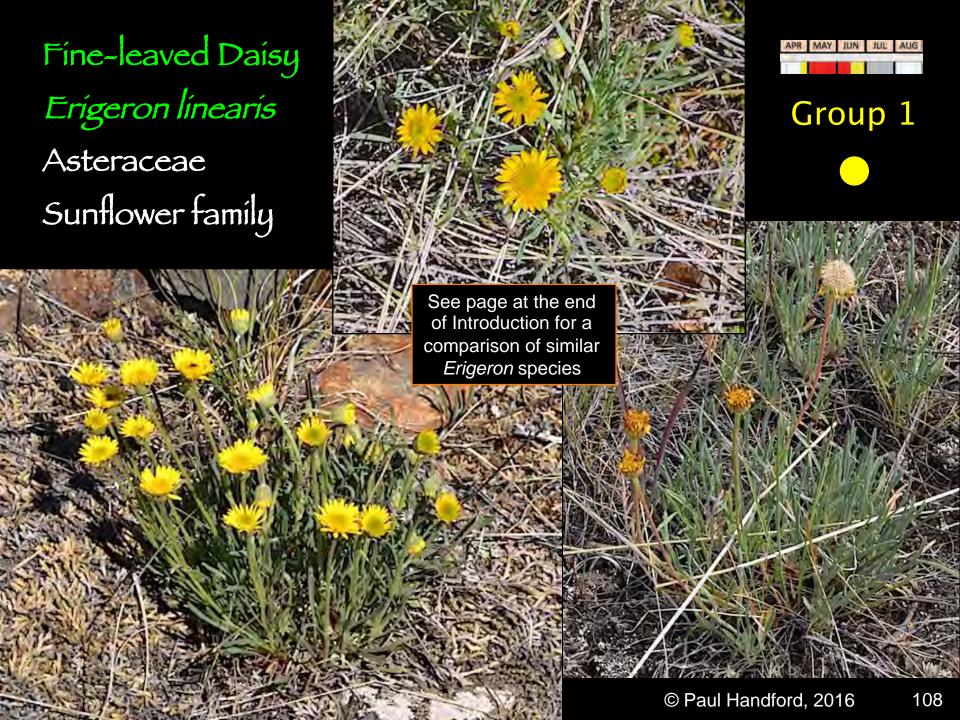


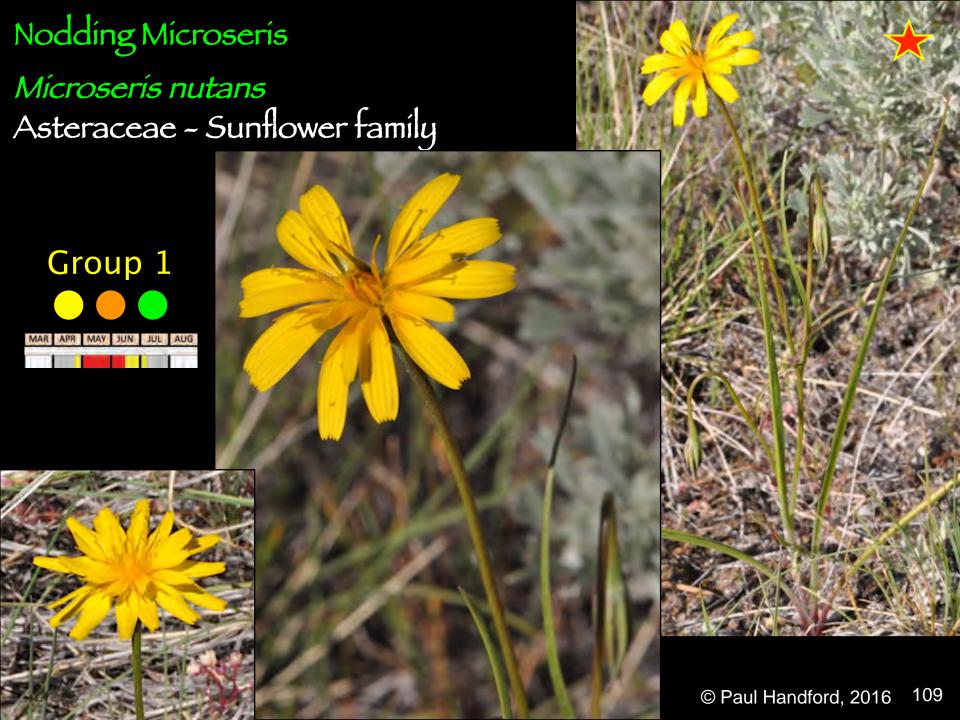


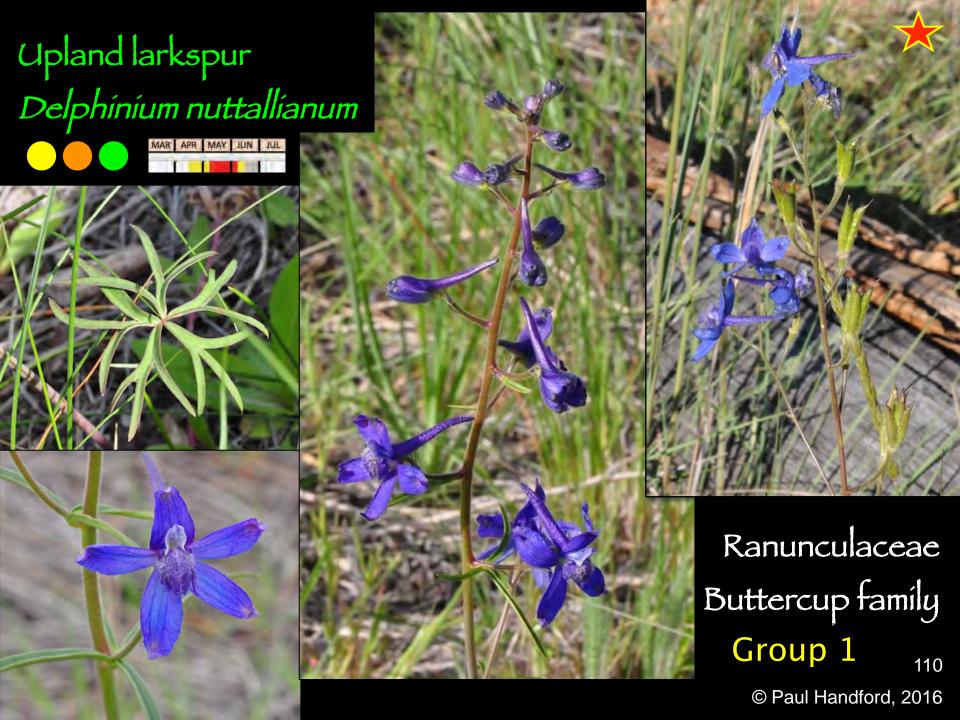
105













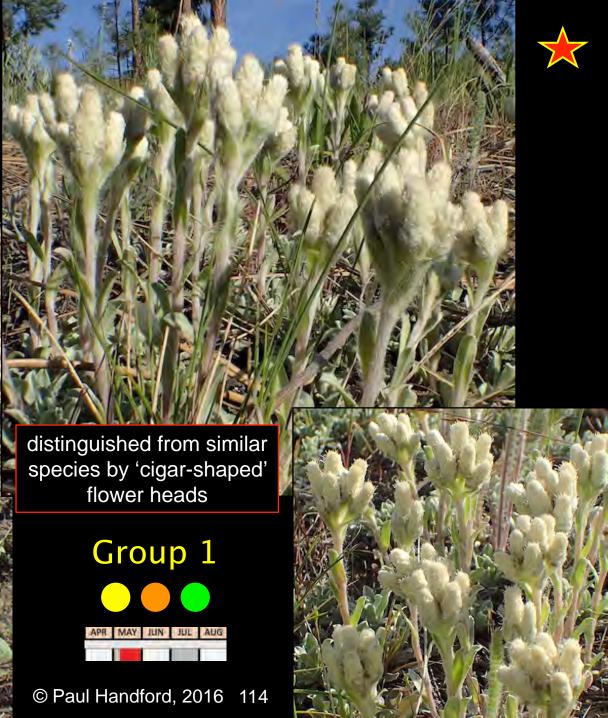




Nuttall's Pussytoes Antennaria parvifolia

Asteraceae Sunflower family



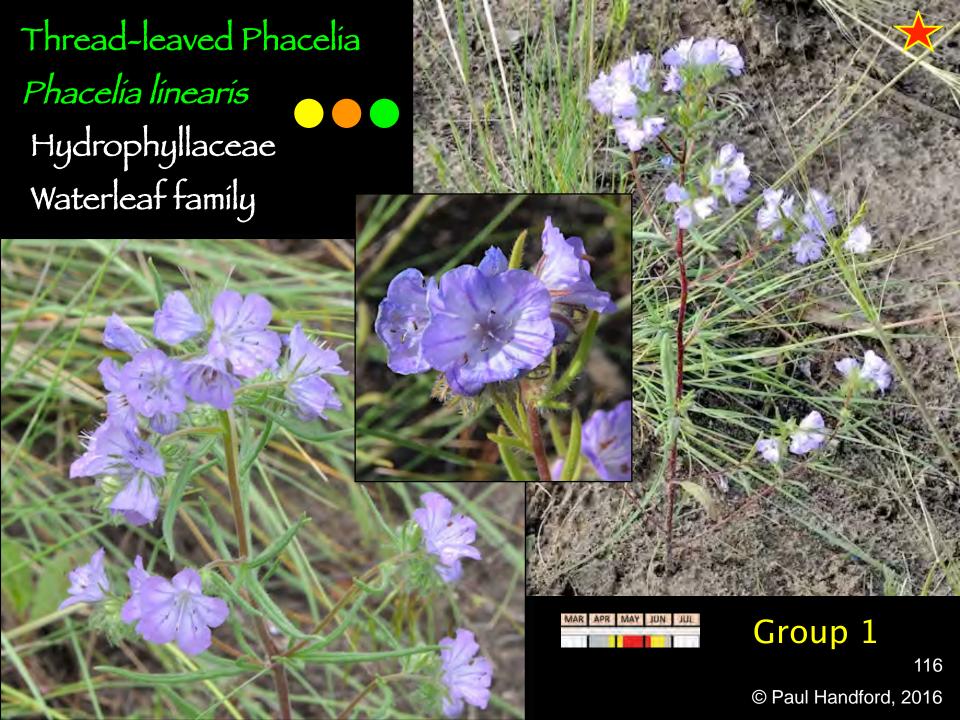


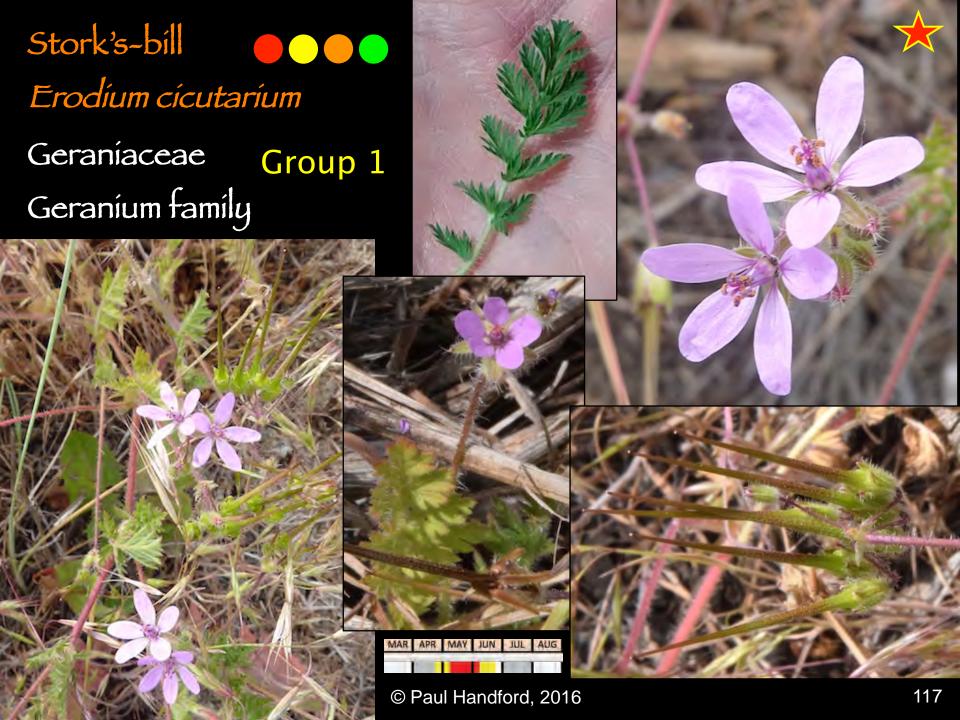
Common Bugle

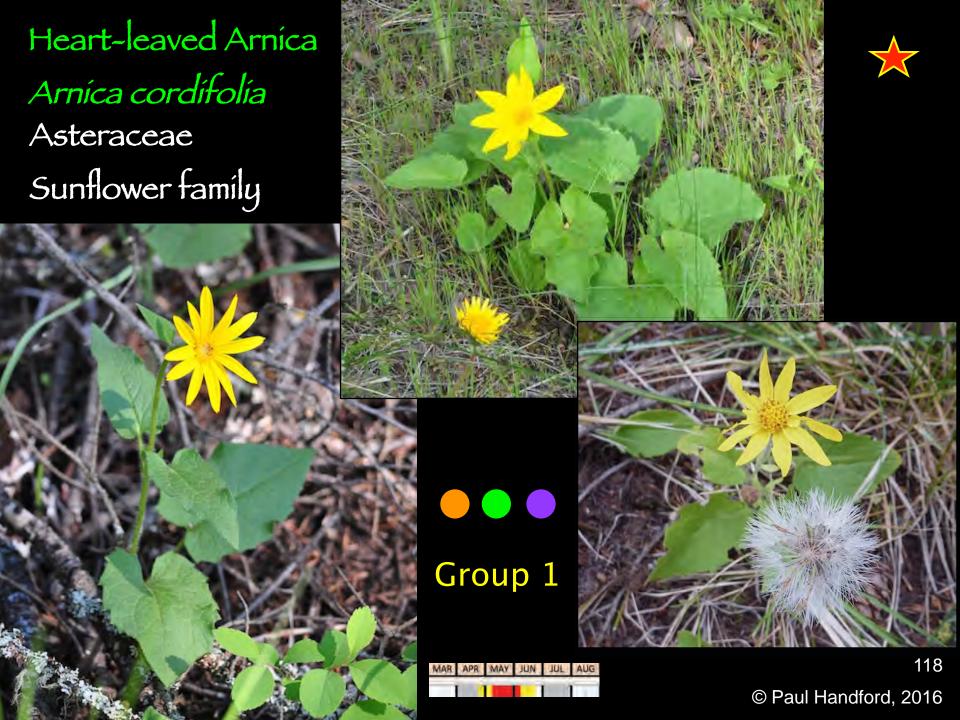
Ajuga reptans

Lamíaceae Mint family

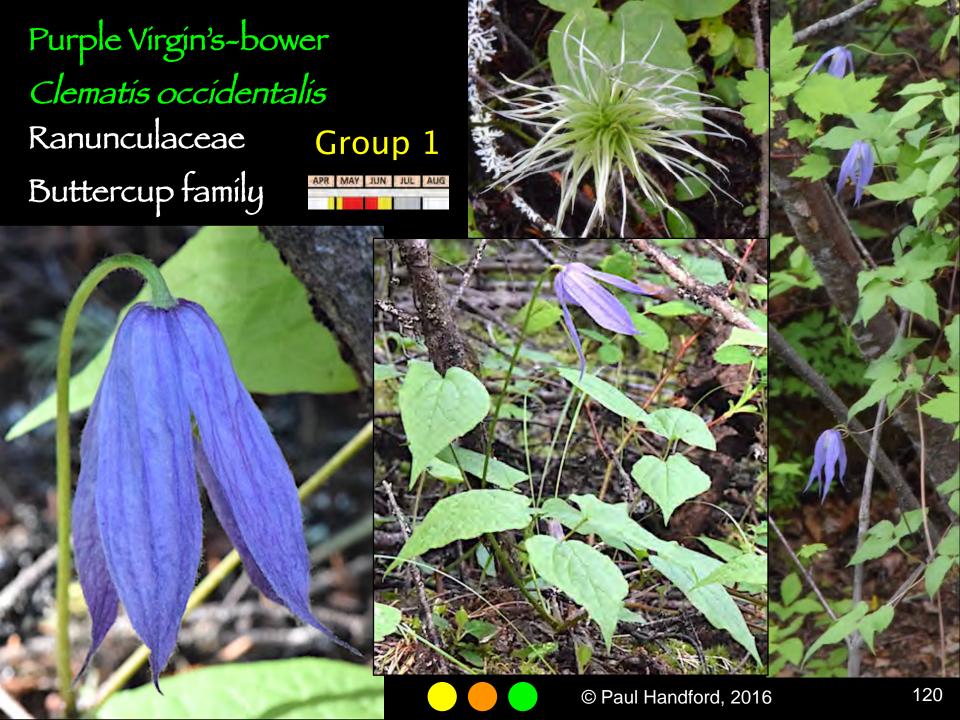


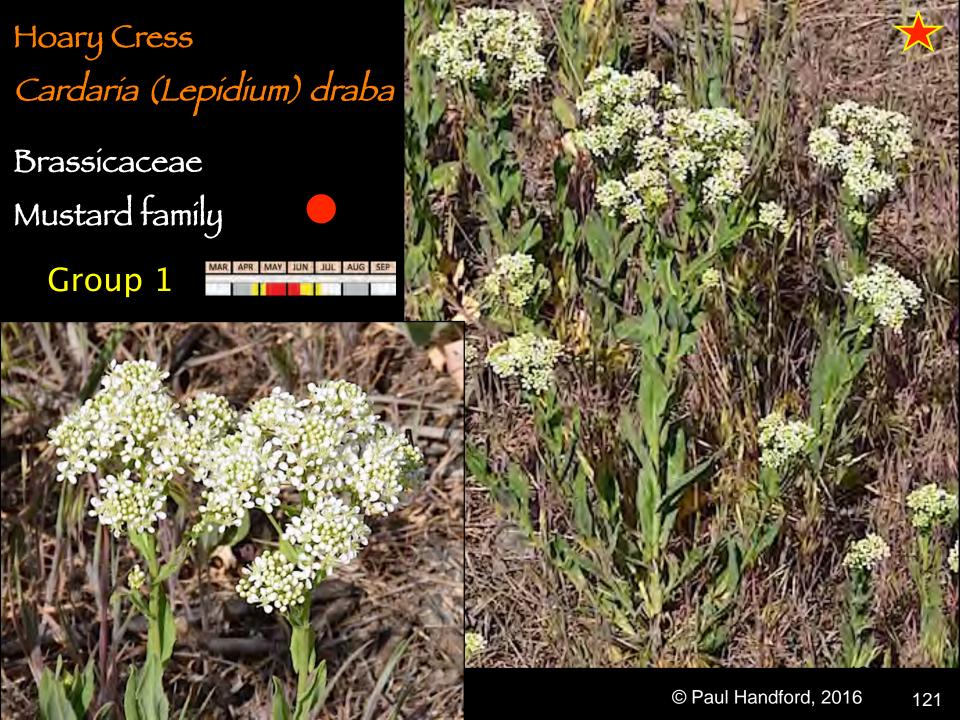


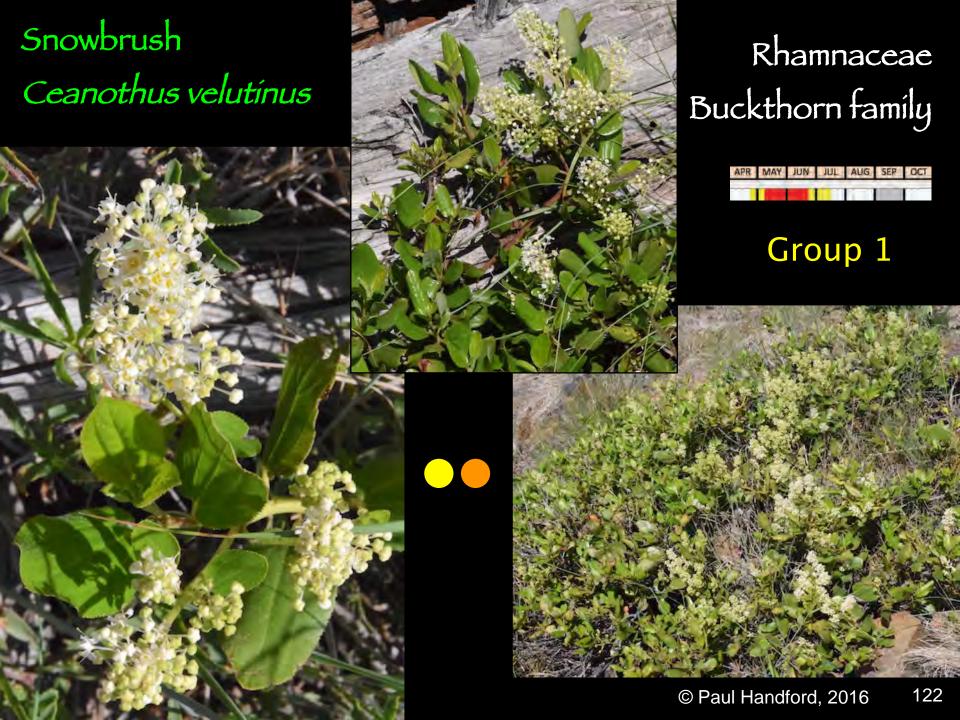


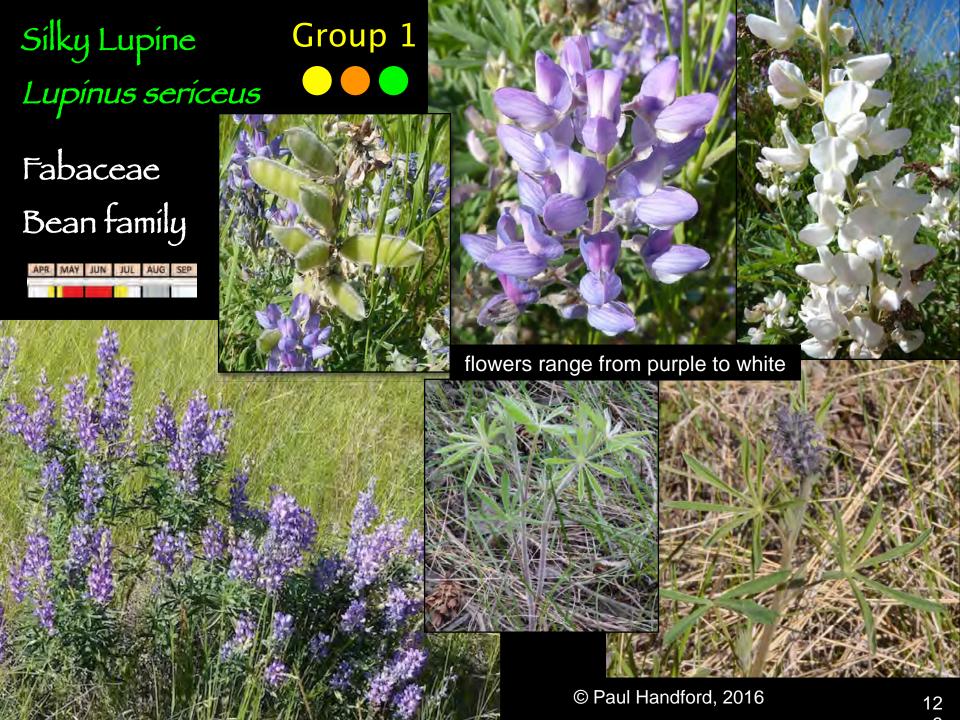










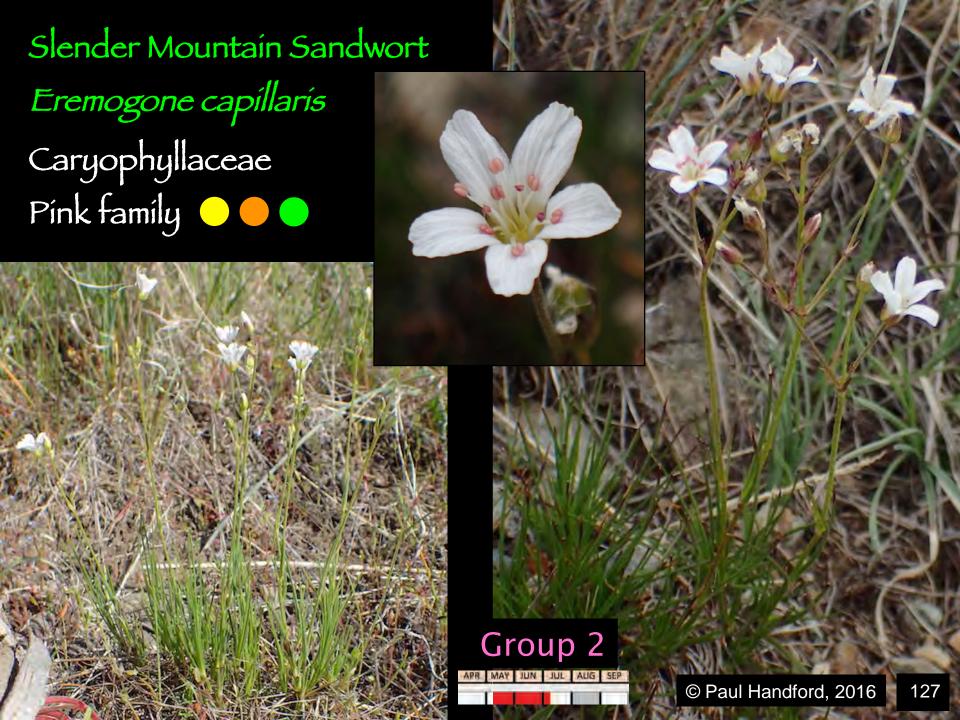




© Paul Handford, 2016







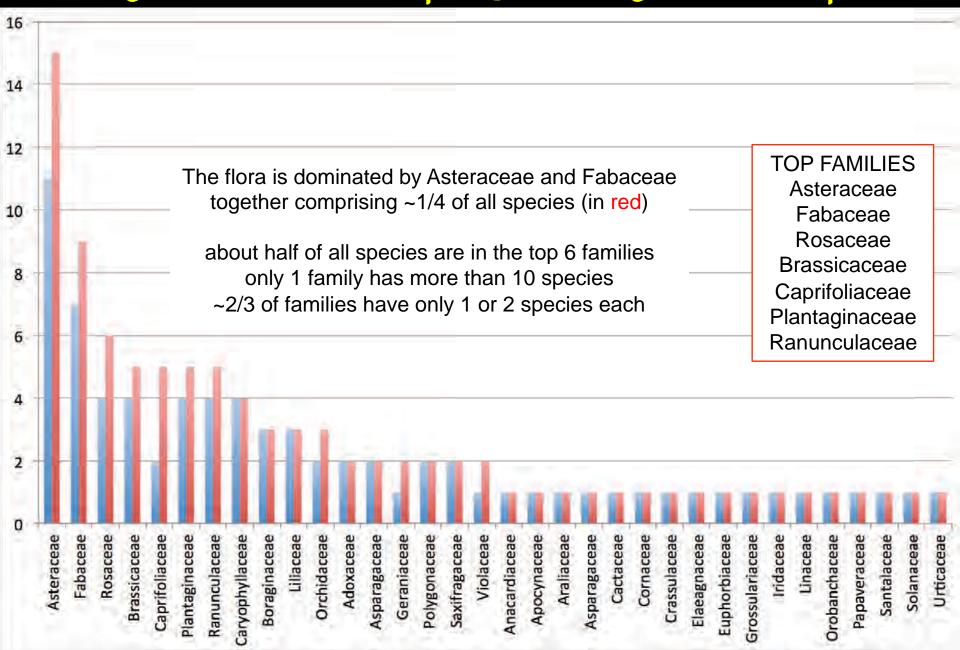


Group 2 species begin flowering after end-April

Of these 102 species, 69 are native (68%), and 33 are alien (32%)

These species are rarely seen in flower before the beginning of May; they flower primarily in May and June, but several extend into July, and a few into August

Family Breakdown of Spring to Early Summer Species

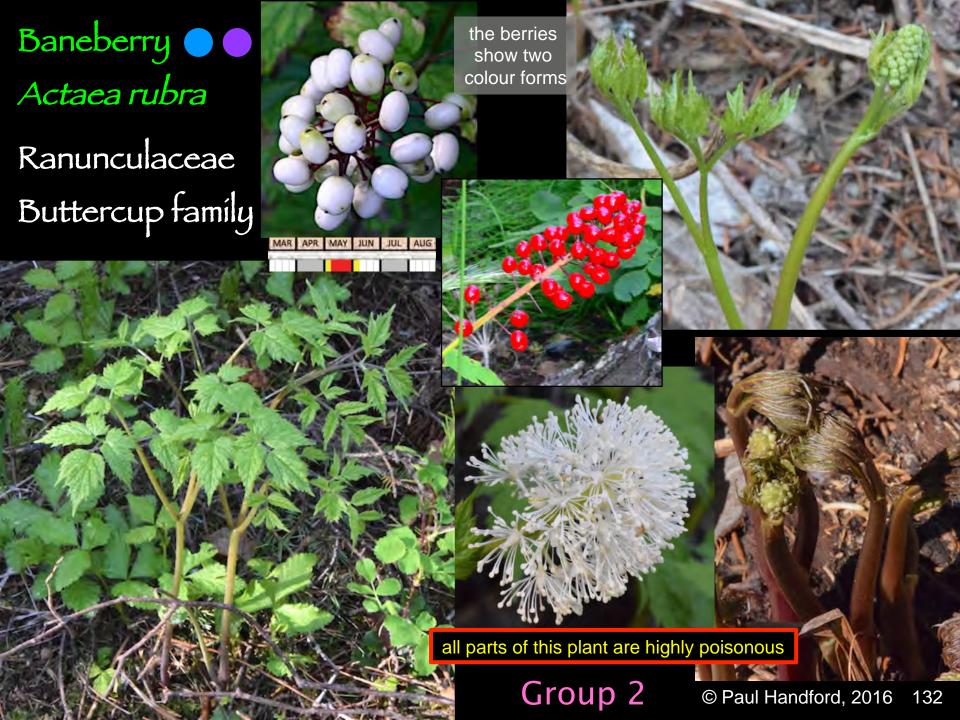


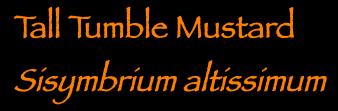
Siberian Honeysuckle Lonicera tatarica

Caprifoliaceae Honeysuckle family









Brassicaceae Mustard family



Group 2







False Toadflax Geocaulon lividum Group 2 APR MAY JUN JUE AUG

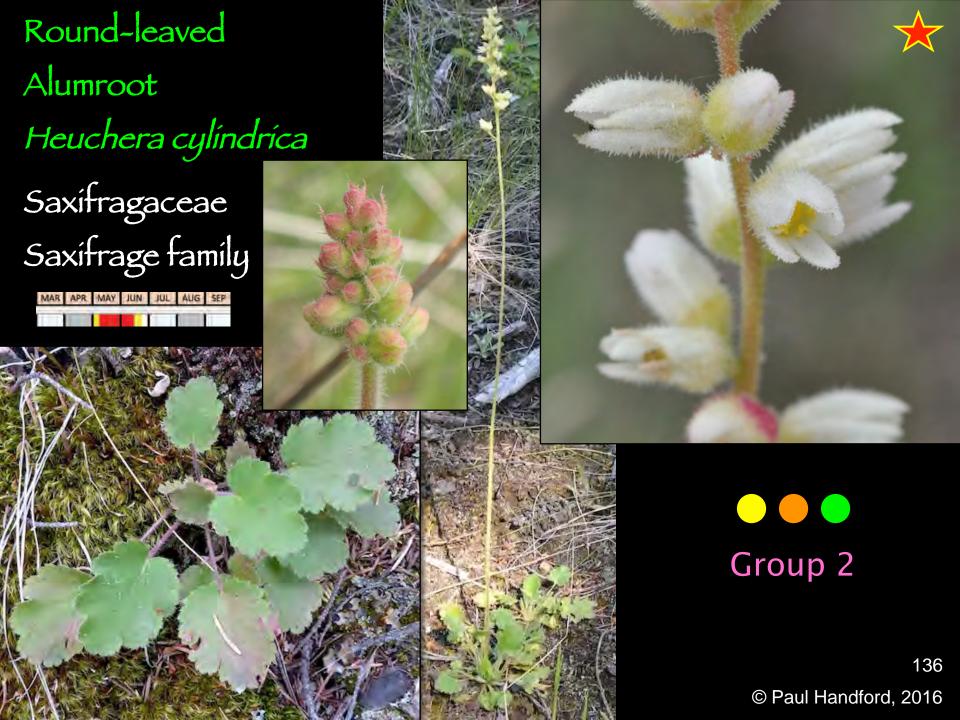
Santalaceae Sandalwood family

this plant is parasitic on the roots of several species of forest tree



© Paul Handford, 2016

pine's Comandra blister rust 135













Woolly Groundsel

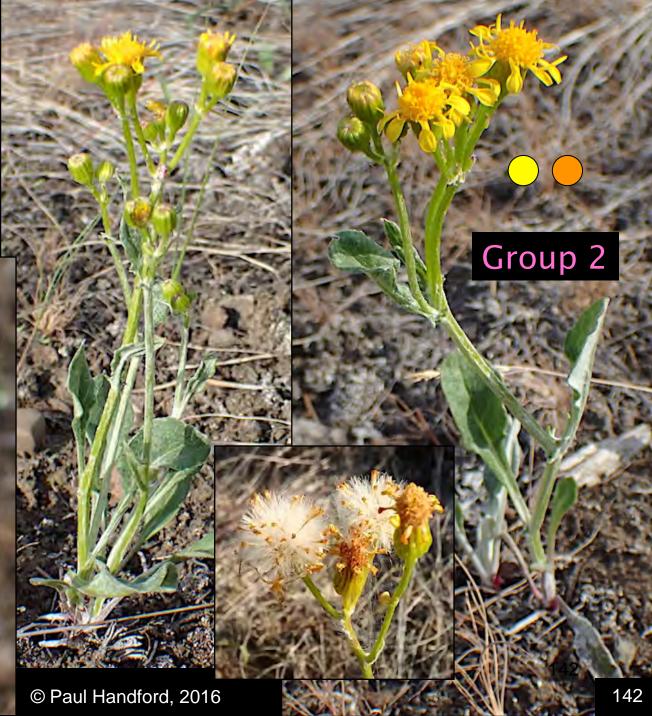
Packera cana

Asteraceae

Sunflower family







Striped Coralroot Corallorhiza striata

Orchidaceae Orchid family







Group 2

143

Twin Arnica Group 2

Arníca sororía

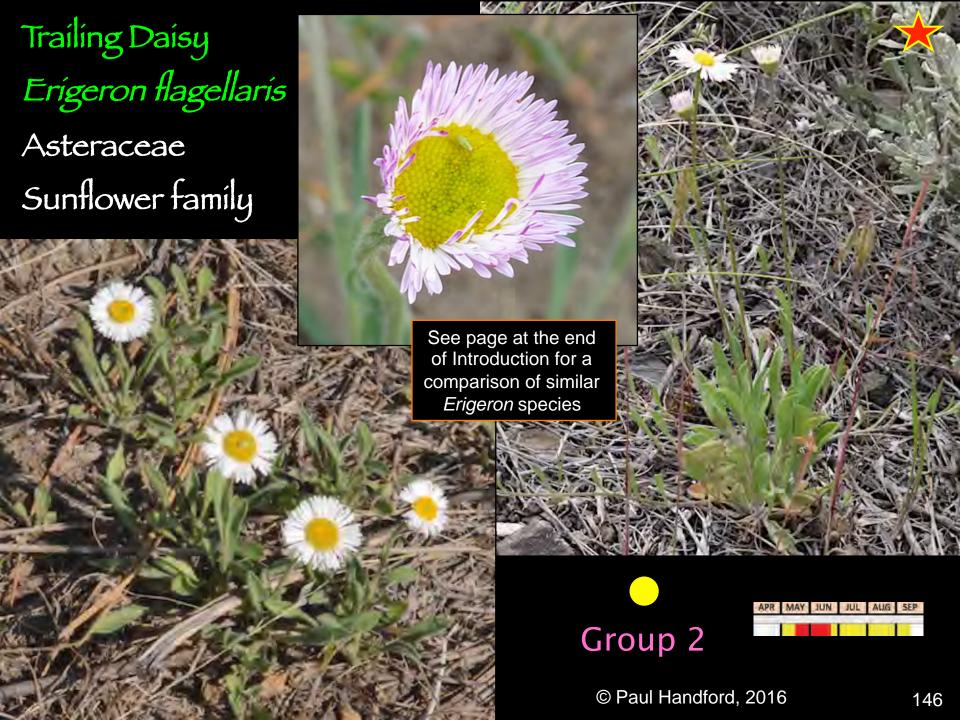
Asteraceae Sunflower family \(\tag{ \tag{ }}











Bitterroot Lewisia redivivus

Montiaceae APR MAY JUN JUL AUG SEP

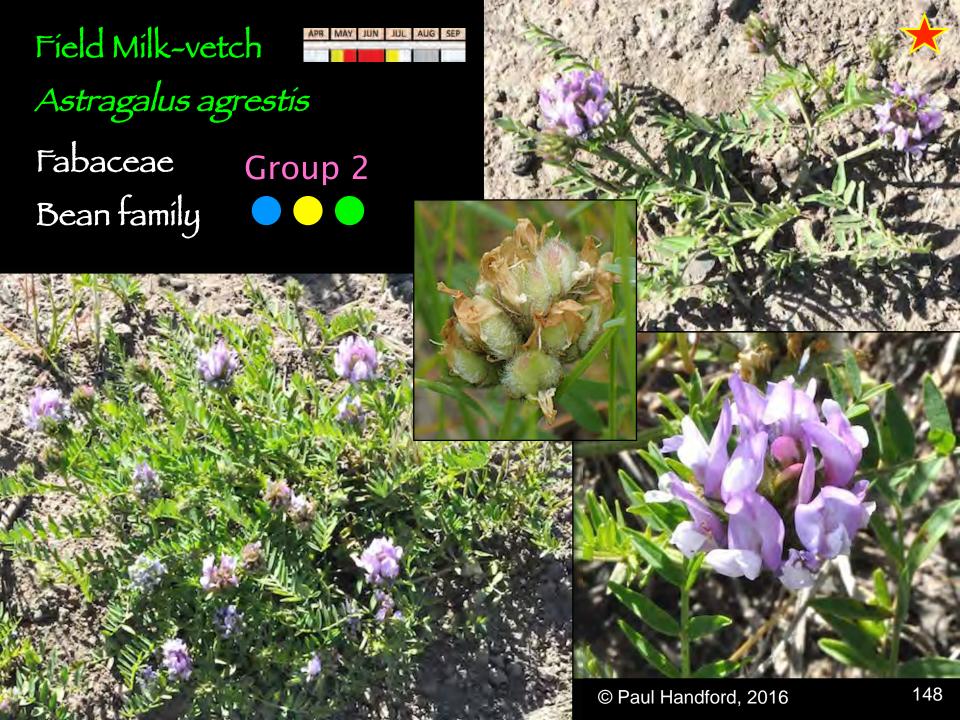












Black Twinberry

Lonicera involucrata

Caprifoliaceae Honeysuckle family







Narrowleaf Plantain Plantago lanceolata

Plantaginaceae

Plantain family









Maíanthemum

stellatum

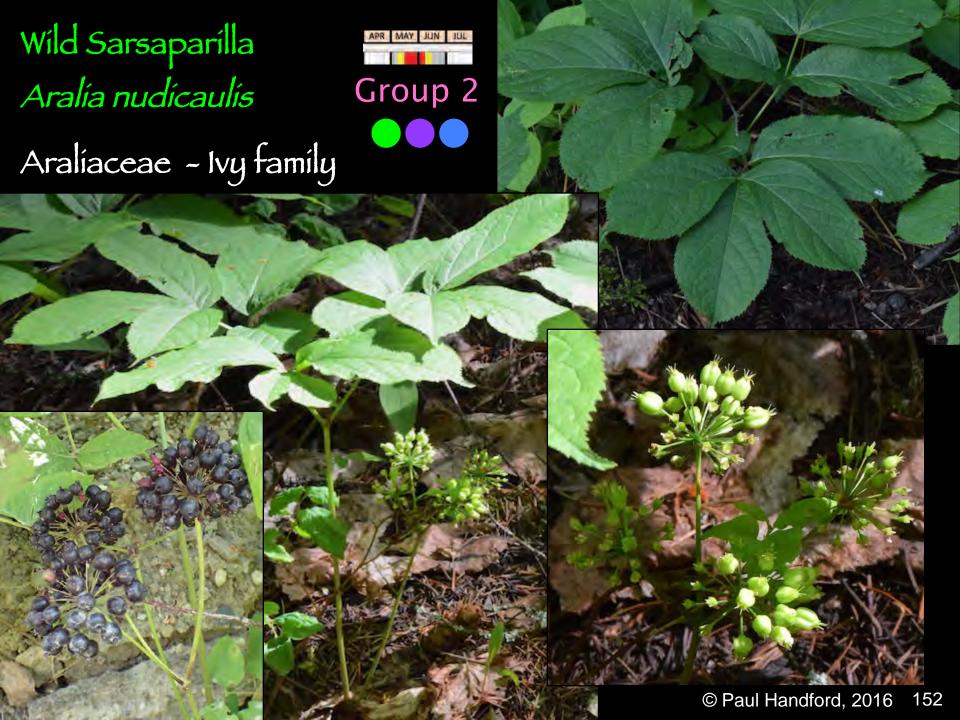
Group 2

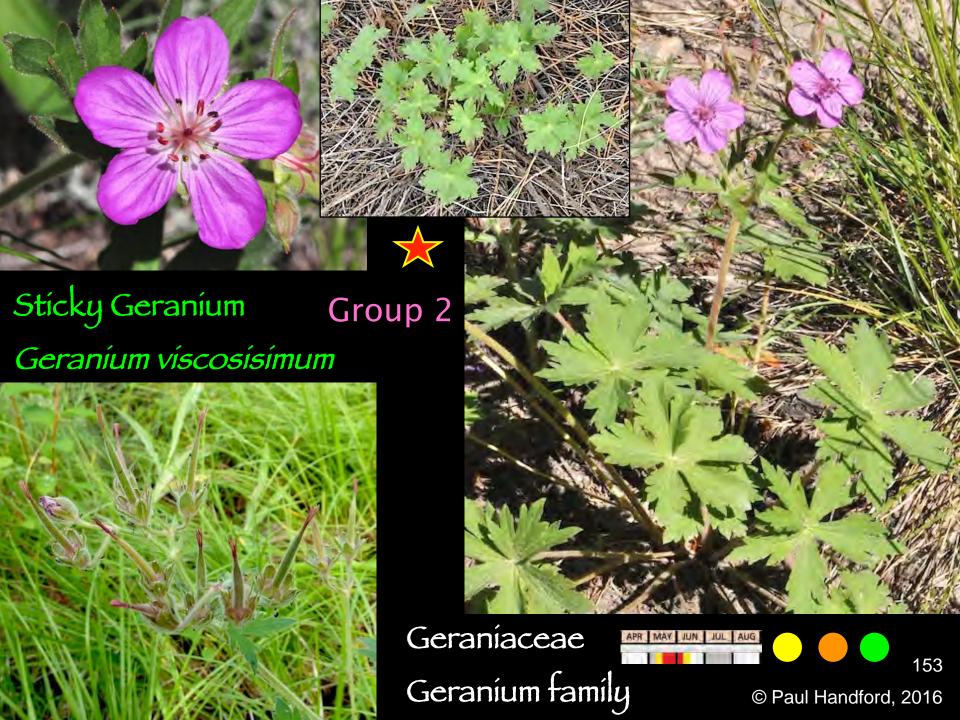


Asparagaceae Asparagus family









Hairy, or
Littlepod Flax
Camelina
microcarpa
Brassicaceae
Mustard family





Red Raspberry Rubus ídaeus

Rosaceae

Rose family







Chocolate
or Checker Lily
Fritillaria affinis
(used to be F. lanceolata)

Liliaceae Lily family









Group 2



fruits develop ~2 months after the flowers appear

156

© Paul Handford, 2016

Sheep Sorrel - Rumex acetosella



Group 2



Polygonaceae Buckwheat family



157

© Paul Handford, 2016

Woolly Plantain Plantago patagonica Plantaginaceae

Plantain family





Canada White Violet Viola canadensis

Violaceae Violet family







Leafy Spurge Euphorbia esula (E. virgata)











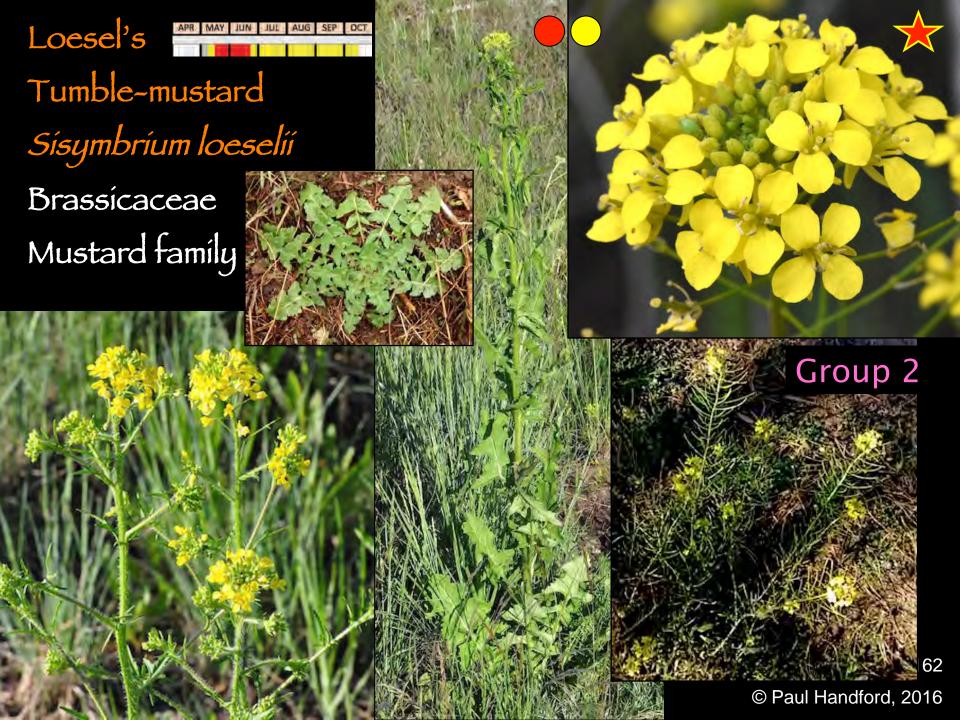


Thyme-leaf Speedwell Veronica serpyllifolia

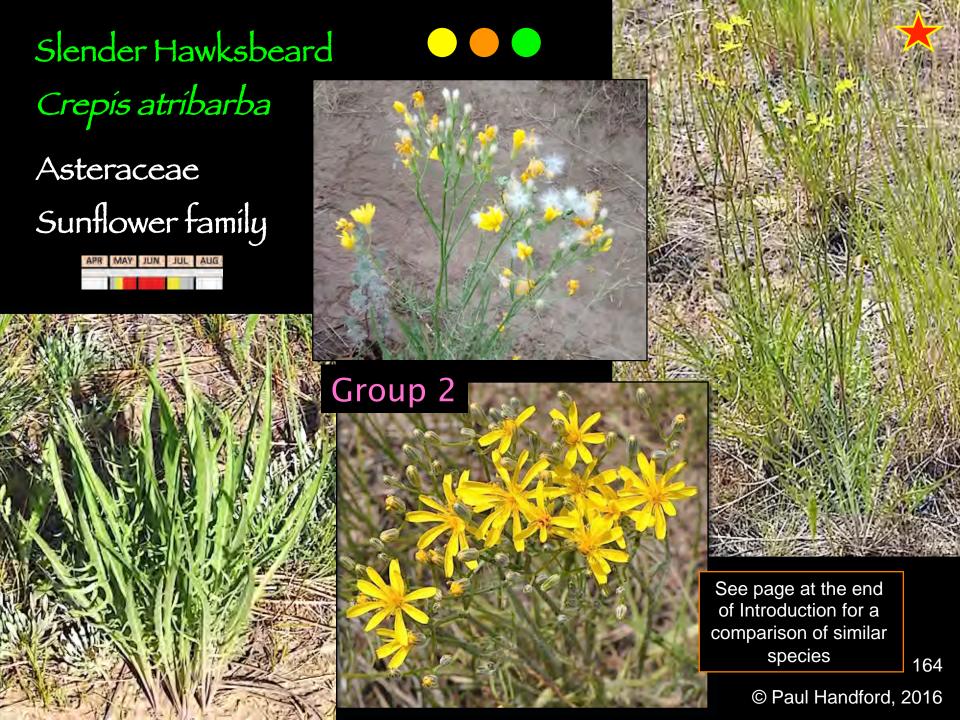
Plantaginaceae
Plantain family
Group 2











Blunt-leaf Sandwort Moehringia lateriflora

Caryophyllaceae Pink family





Group 2



See page at the end of Introduction for a comparison of similar species









White Clover
Trifolium repens

Fabaceae Bean family



Brown-eyed Susan Gaillardia aristata Asteraceae Sunflower family Group 2





© Paul Handford, 2016



Black Gooseberry *Ribes lacustre*

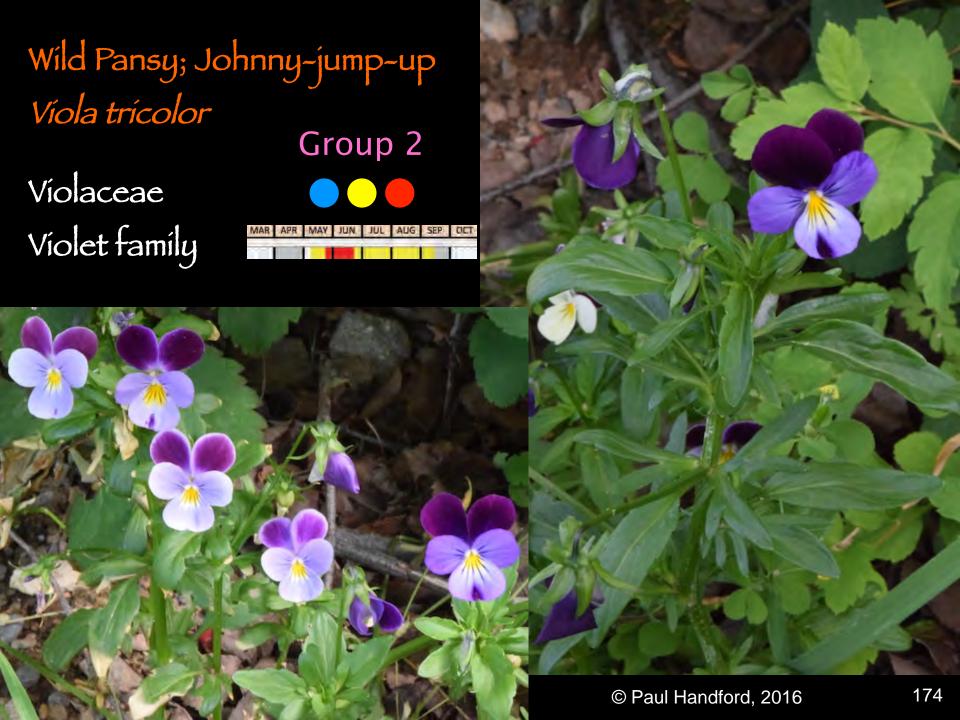
Grossulariaceae

Currant family













Small Wallflower *Erysimum*

ínconspícuum







Brassicaceae Mustard family





Group 2

© Paul Handford, 2016 177



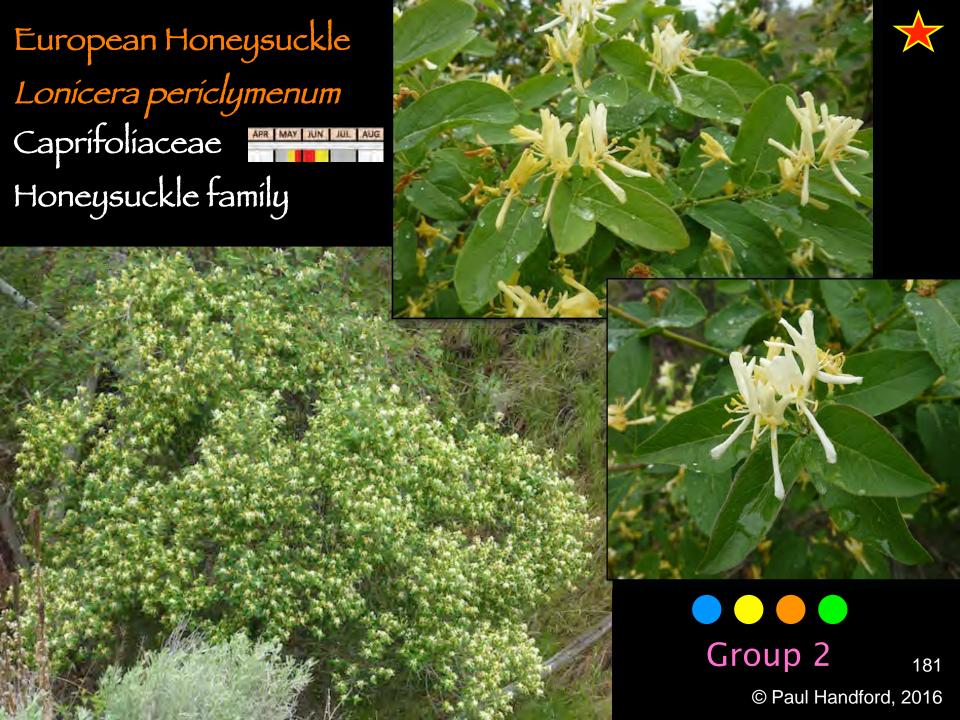
Prickly Rose Rosa acícularís Group 2 Rosaceae Rose family © Paul Handford, 2016

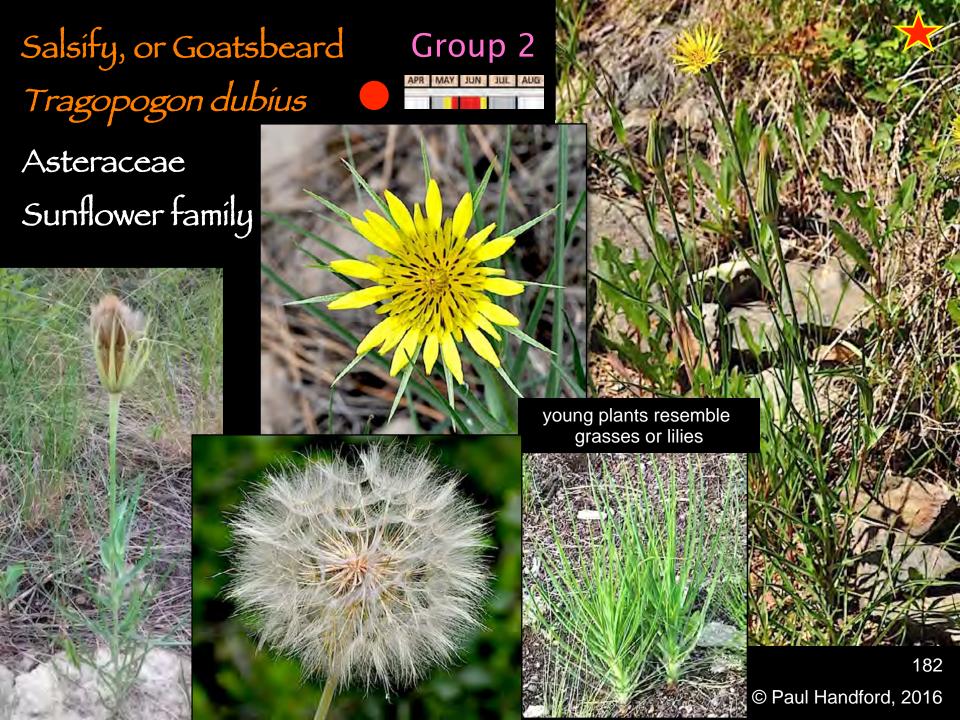
Orange Honeysuckle Lonicera ciliosa Group 2 Caprifoliaceae Honeysuckle family









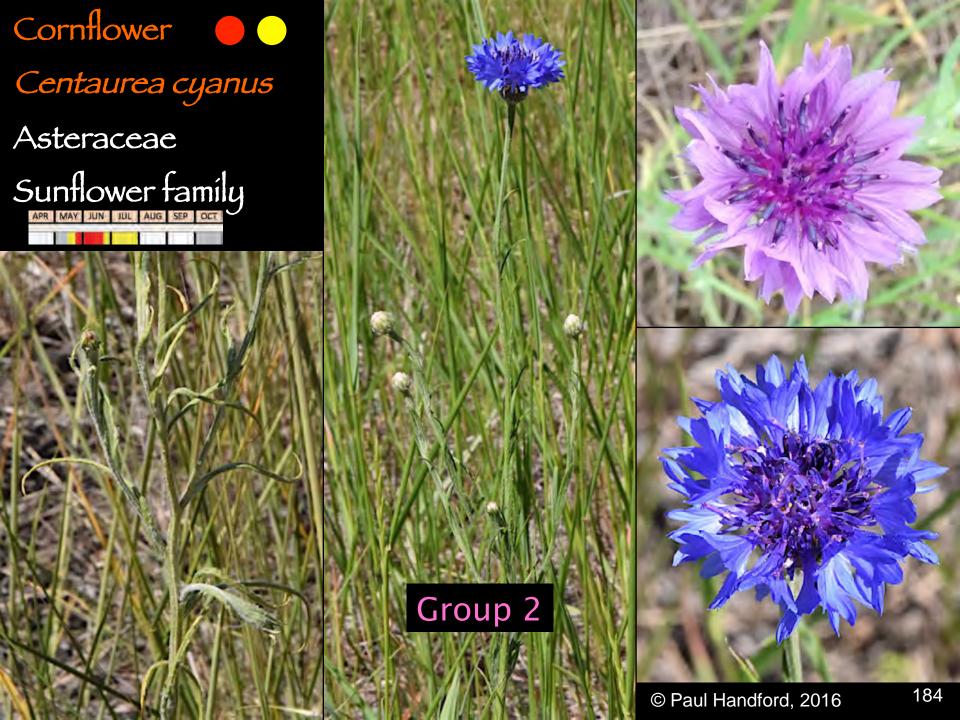


Poison Ivy Toxicodendron radicans

Anacardíaceae Sumac family poison ivy ALWAYS
has three leaflets;
the terminal leaflet
has a much longer
petiole (stalk) than
the base pair





















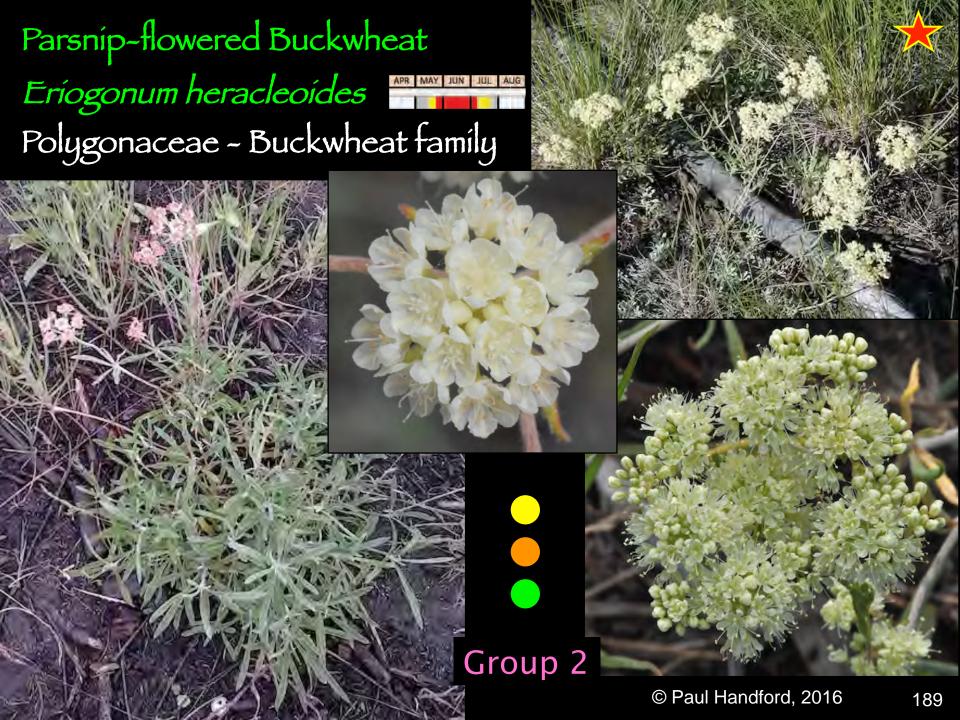
Cornus canadensis

Cornaceae Group 2

Dogwood family









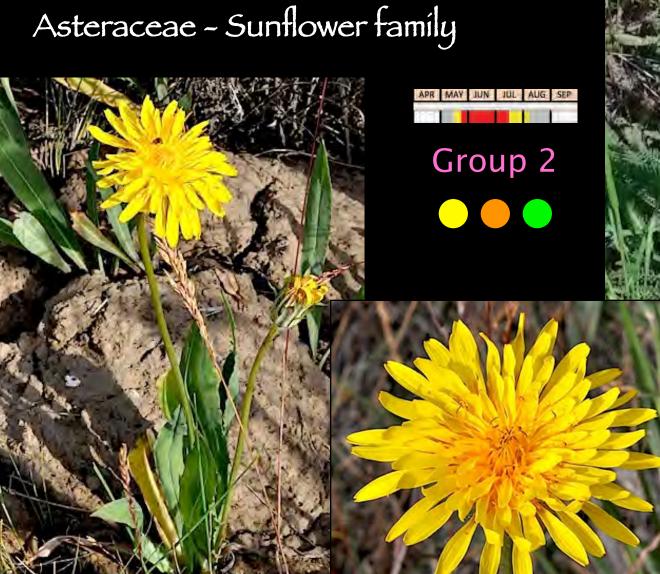
Cut-leaf Anemone Anemone multifida

Ranunculaceae
Buttercup family





Prairie Agoseris - Agoseris glauca





Yellow Avens MAY JUN JUL AUG SEP OCT



Geum aleppicum

Rosaceae Rose family

Group 3



Yellow and Large-leaf Avens are often rather tough to distinguish. The main differences lie in the relative sizes of the leaflets of the **basal** leaves, the form of the leaflet margins, the shape of the calyx lobes, and in the shape of the petals:

aleppicum: terminal leaflet only a bit larger than lateral ones, cleft to ~1/2 depth; leaflet margins double-toothed; calyx lobes lanceolate; petals unnotched

macrophyllum: terminal leaflet much larger than lateral ones, often deeply 3lobed; leaflet margins blunt-toothed; calyx lobes triangular; petals with shallow notch

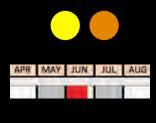


Western Groundsel or Lambstongue Ragwort Senecio integerrimus

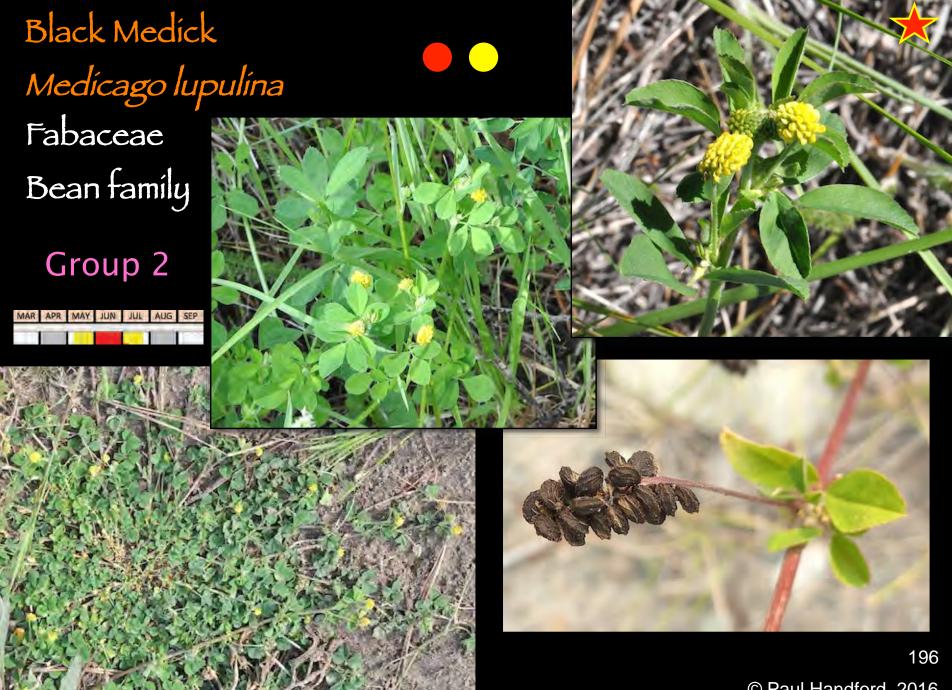
Asteraceae
Sunflower family







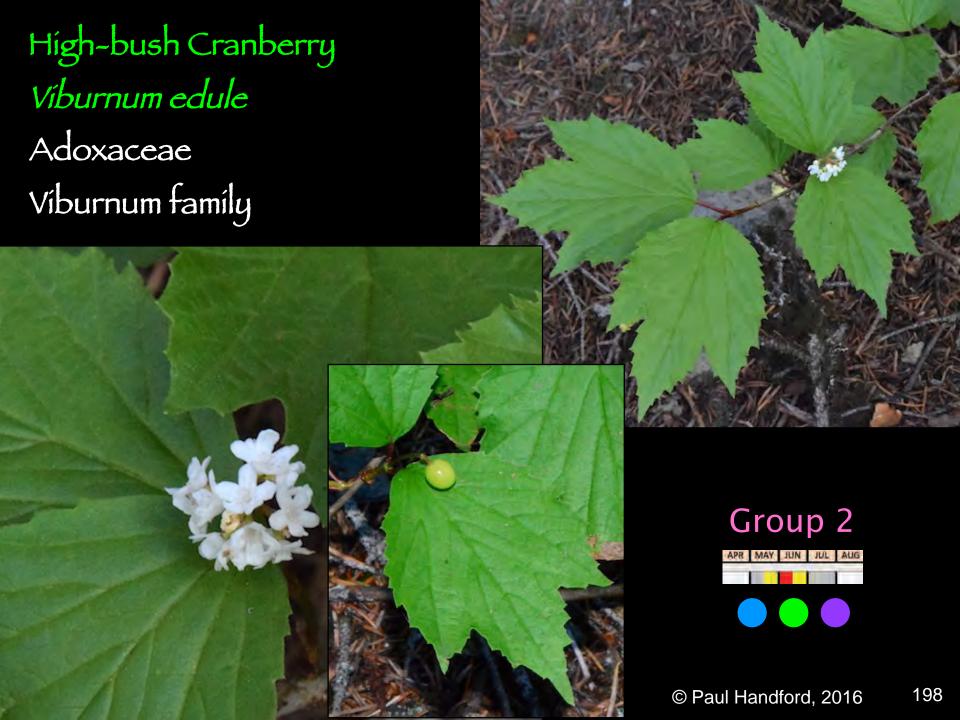




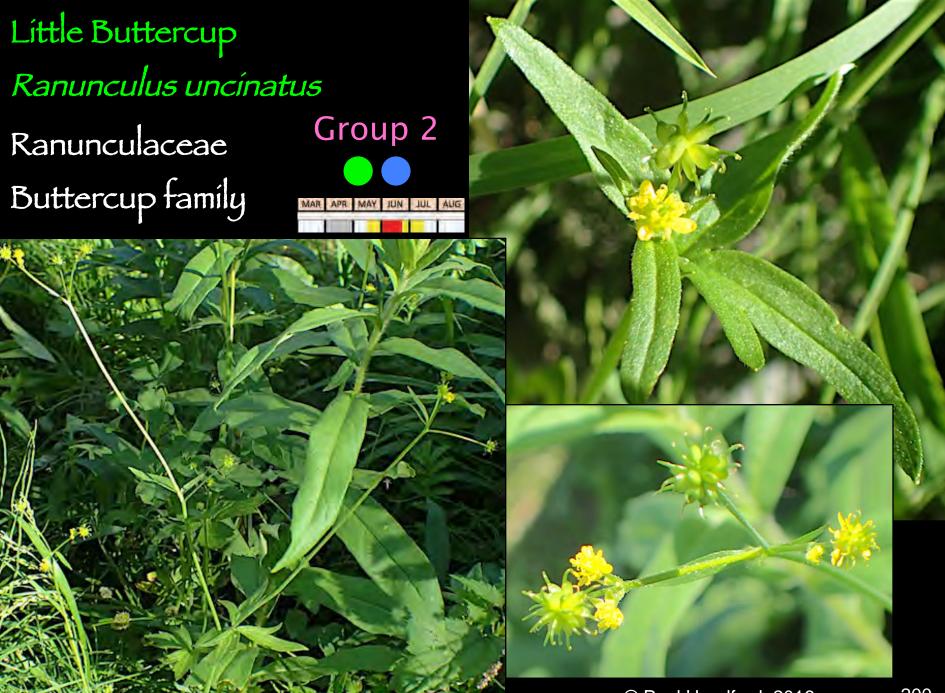
Bristly Stickseed Lappula squarrosa Boraginaceae Borage family APR MAY JUN JUL AUG SEP Group 2











Creamy Peavine

Lathyrus ochroleucus

Fabaceae - Bean family





Group 2





201 © Paul Handford, 2016



Madwort

APR MAY JUN JUL AUG

Asperugo procumbens

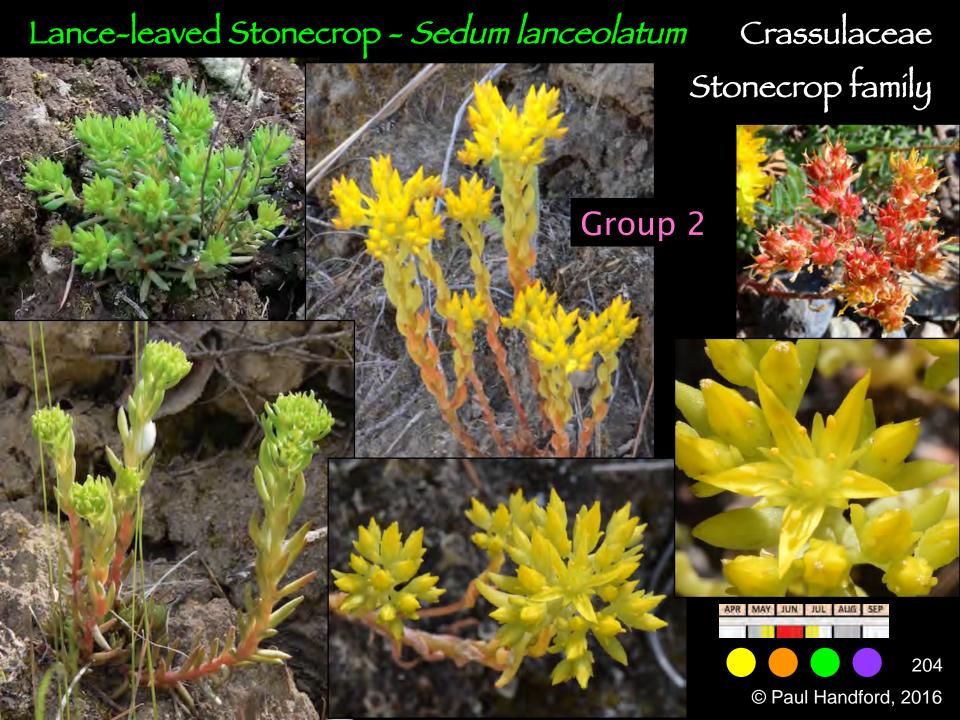
Boraginaceae



Borage family Group 2



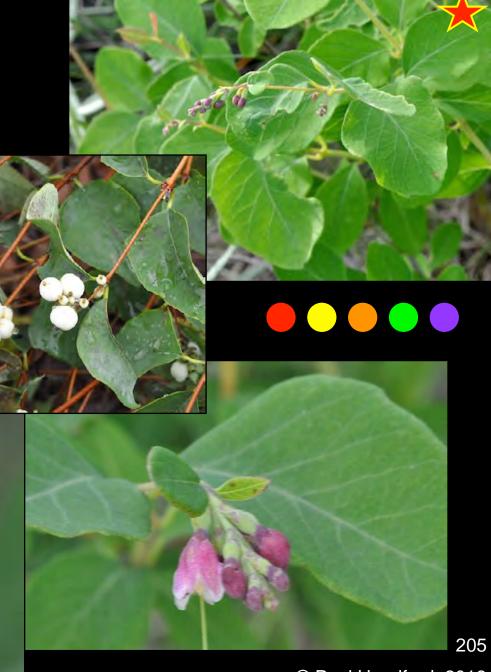




Common Snowberry
Symphoricarpos albus

Caprifoliaceae
Honeysuckle family
Group 2







Queen's Cup Clintonia uniflora

Liliaceae - Lily family







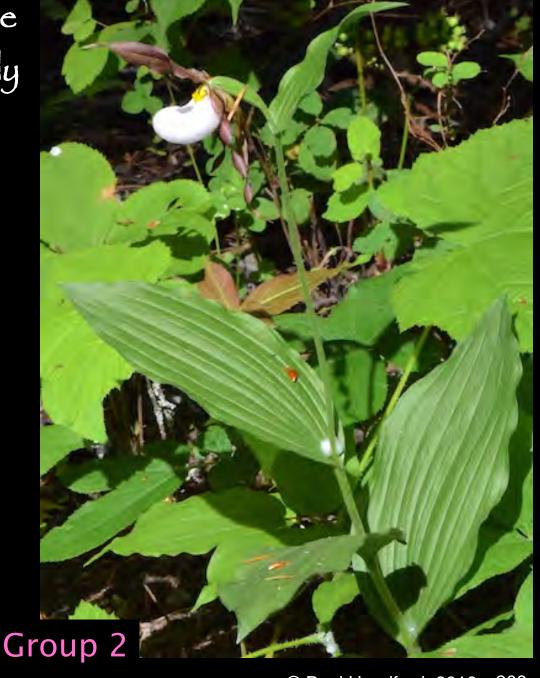
Orchidaceae Mountain Lady's slipper Orchid family Cypripedium

montanum





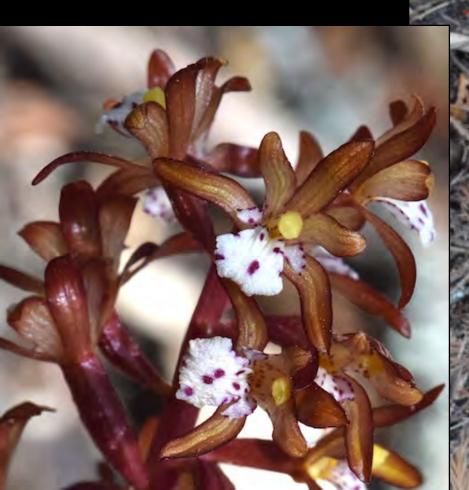




Spotted Coralroot Corallorhiza maculata

Orchidaceae APR MAY JUN JUL AUG SEP Orchid family







Group 2

© Paul Handford, 2016



Meadow Buttercup Ranunculus acris

Ranunculaceae
Buttercup family













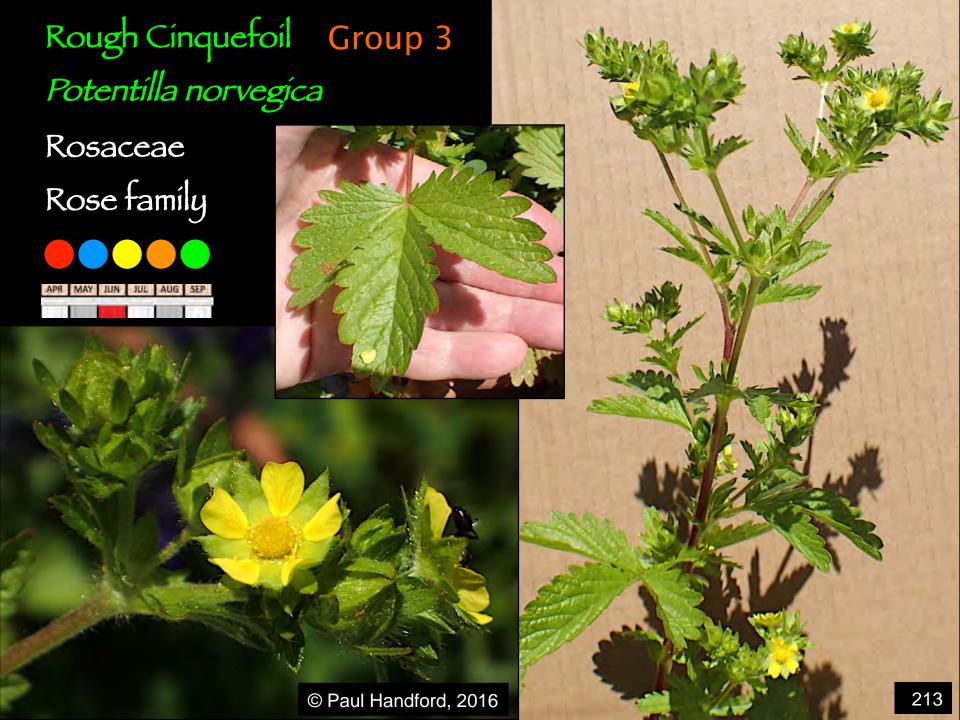
BlackElderberry
Sambucus nigra

Adoxaceae

APR MAY JUN JUL AUG





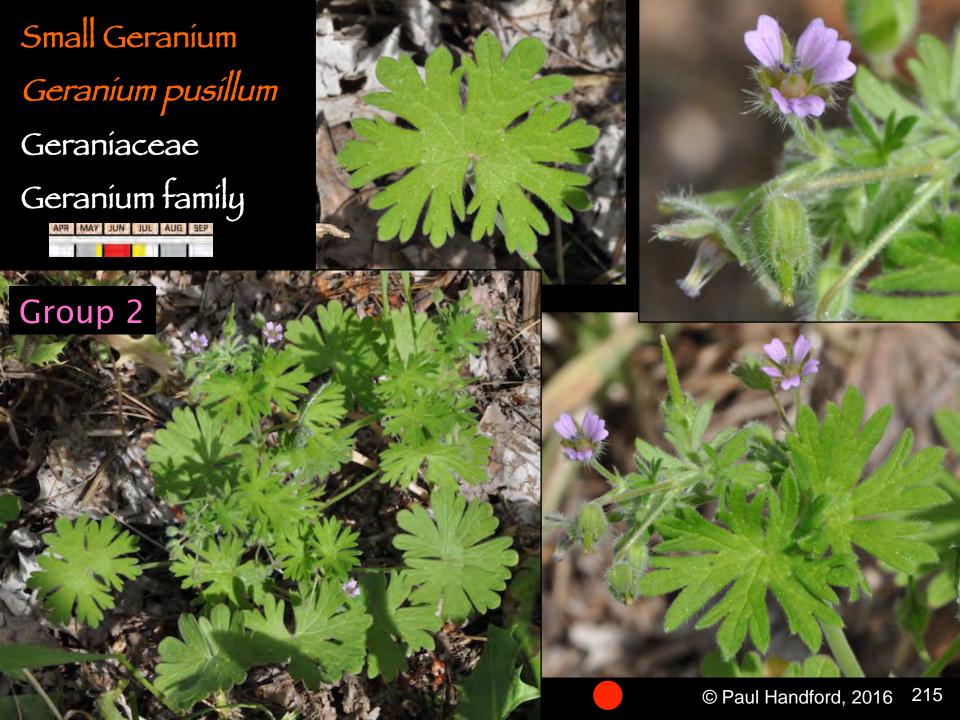


Meadow Bird's-foot Trefoil Lotus denticulatus

Fabaceae Bean family







Small-flowered Penstemon Penstemon procerus Group 2 Plantaginaceae Plantain family 216 © Paul Handford, 2016





Showy Milkweed

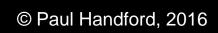
Asclepias speciosa

Apocynaceae Dogbane family

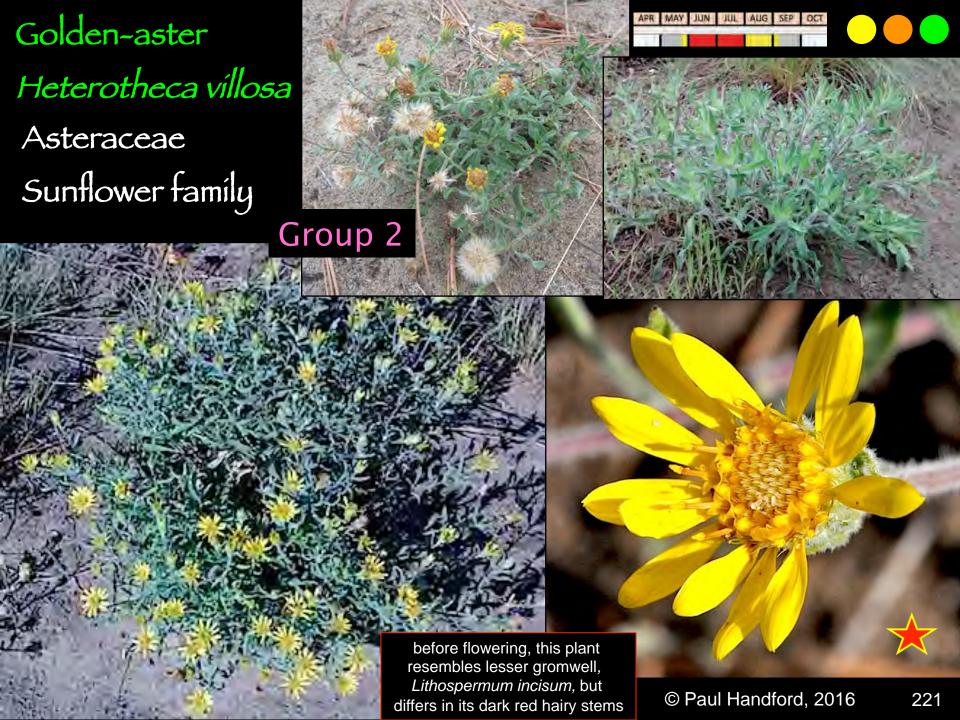


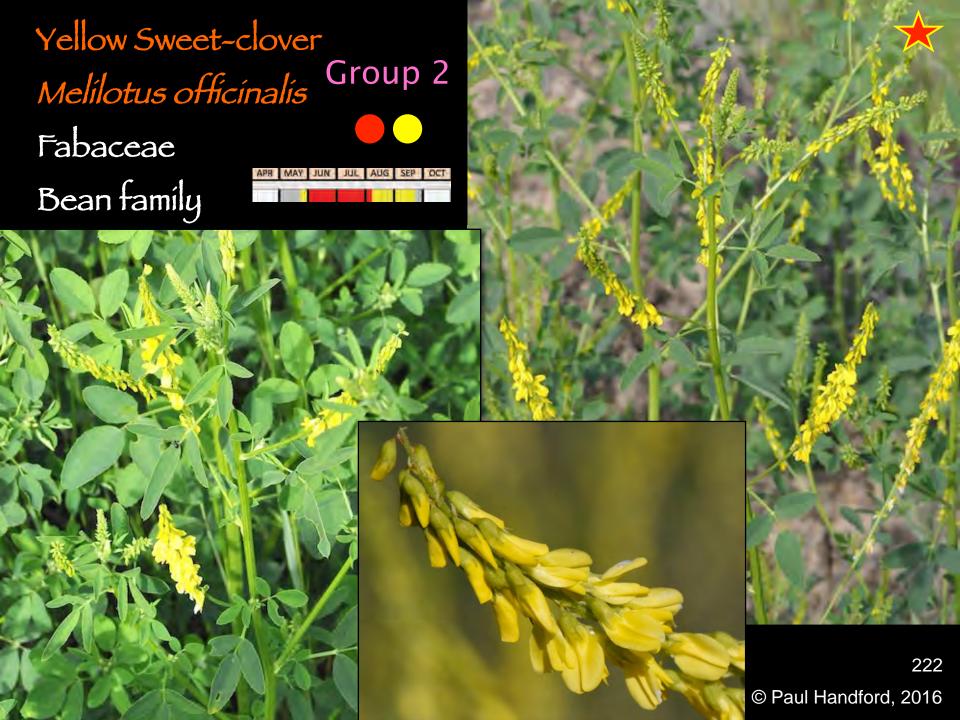












White Sweet-clover Melilotus albus

Fabaceae Bean family

this plant is essentially the same as Yellow Sweet Clover, *M. officinalis*, (previous page) but with white flowers. The two species often grow together







Straight-up Suncress

Boechera strícta

Brassicaceae Mustard family









Group 2

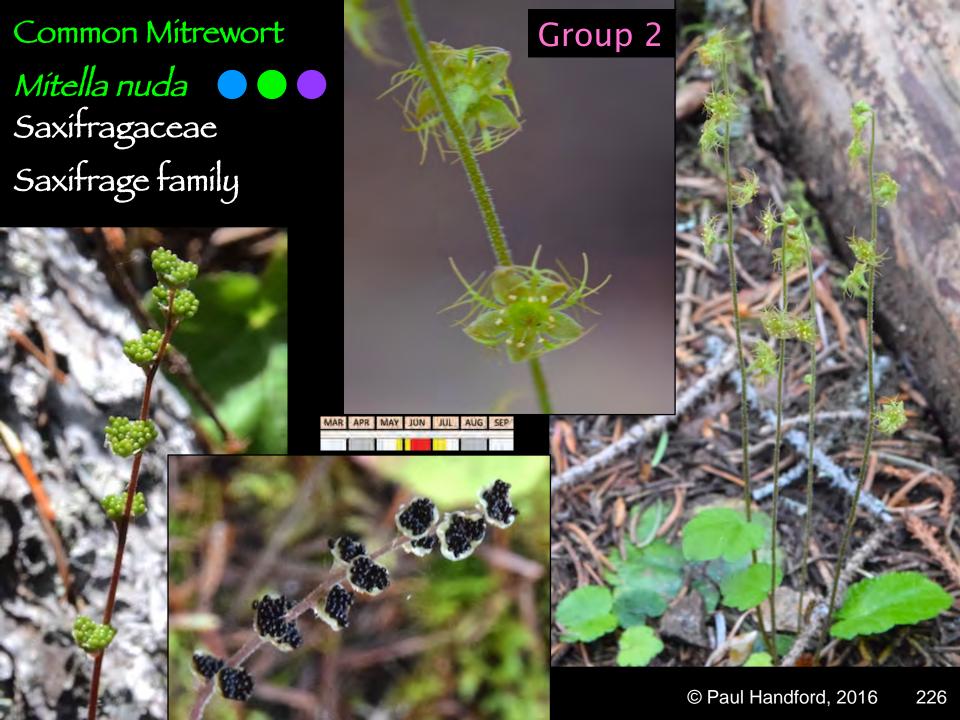
© Paul Handford, 2016

Tall Cinquefoil Potentilla arguta

Group 2

(a.k.a. Drymocallis arguta) Gre Rosaceae - Rose family







Red (Sitka) Columbine

Aquilegía formosa

Ranunculaceae
Buttercup family





Common Silverweed

Potentilla anserina





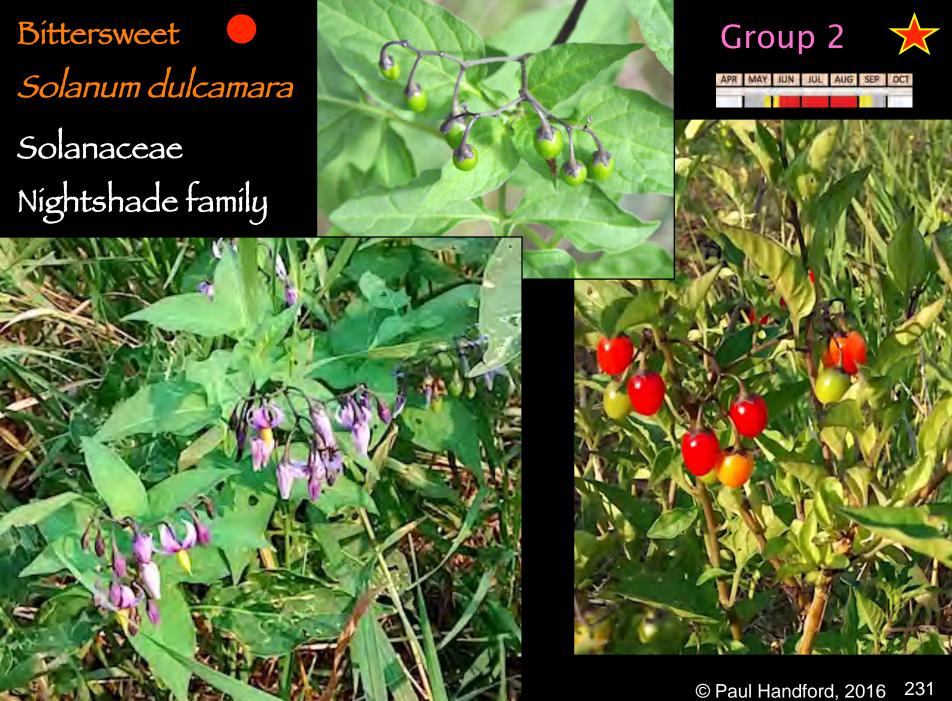
Rosaceae - Rose family Group 2

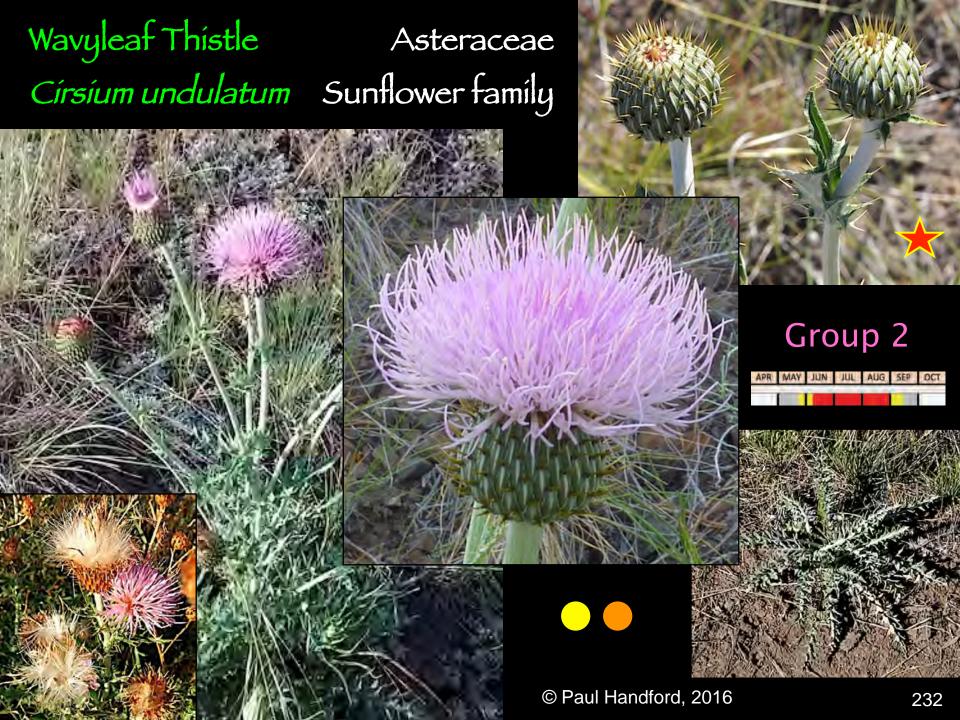


Long-stalked Starwort Group 2 Stellaría longípes Caryophyllaceae Pink family See page at the end of Introduction for a comparison of similar species







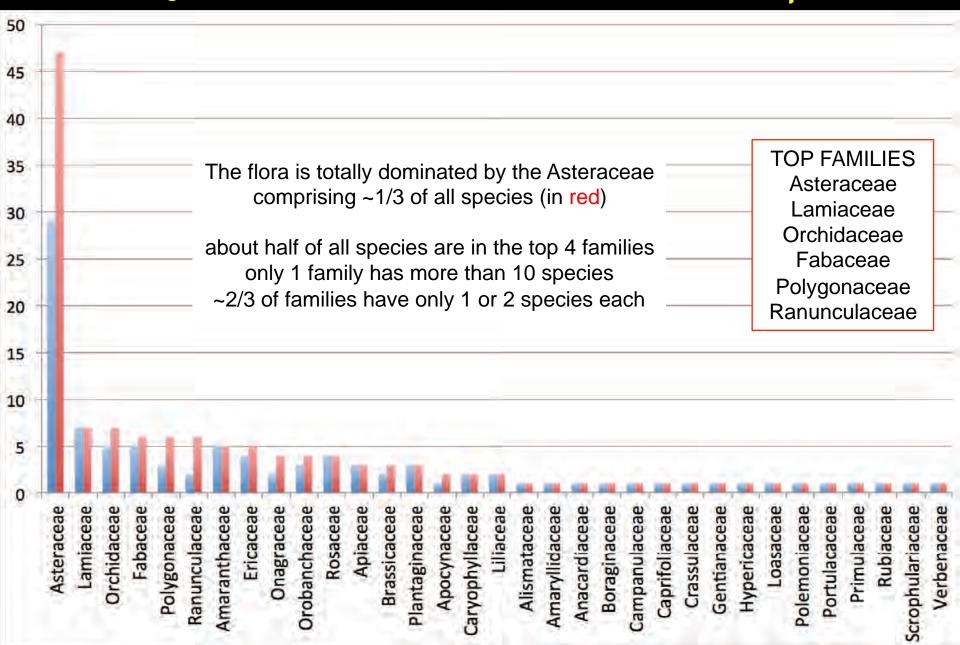


Group 3 species begin flowering after end-May

Of these 172 species, 119 are native (69%), and 53 are alien (31%)

The species are rarely seen in flower before early June; while most flower strongly in July & August many often extend in to September, and a few into October

Family Breakdown of Mid-summer to Fall Species



Sticky Groundsel Senecio viscosus Asteraceae Group 3 Sunflower family © Paul Handford, 2016

235



Pulse Milk-vetch *Astragalus tenellus*

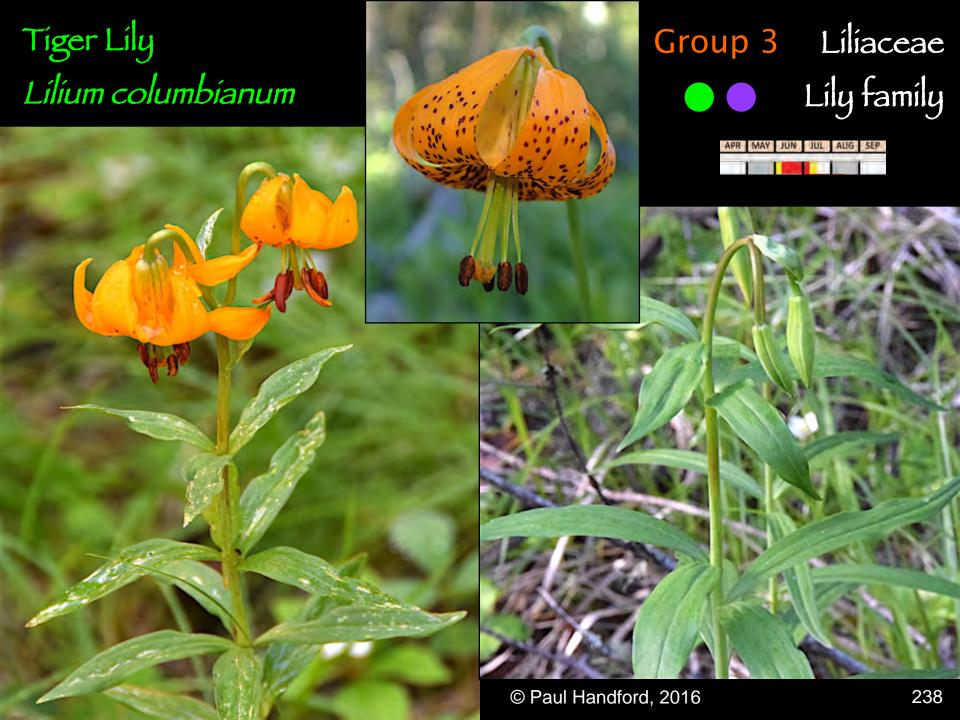


Fabaceae - Bean family



a.k.a. Loose-flowered Milk-vetch, A. multiflorus)

Group 3



Orange Agoseris

Agoserís aurantíaca

Asteraceae Sunflower family











Common Chamomile Anthemis arvensis

Asteraceae Sunflower family



Group 3



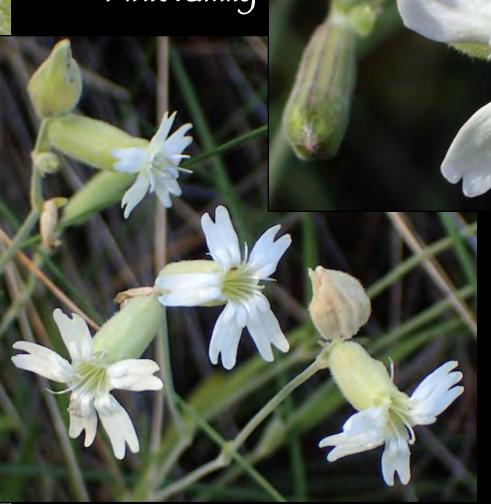




Douglas' Campion

Silene douglasii Caryophyllaceae

Pink family



Group 3









Yellow-dot Saxifrage Group 3

Saxifraga bronchialis

(a.k.a. S. vespertina)

(a.k.a. S. vespertina)
Saxifragaceae - Saxifrage family



Sitka Valerian Caprifoliaceae

Valeriana sitchensis Honeysuckle family









Pennsylvanía

Bittercress

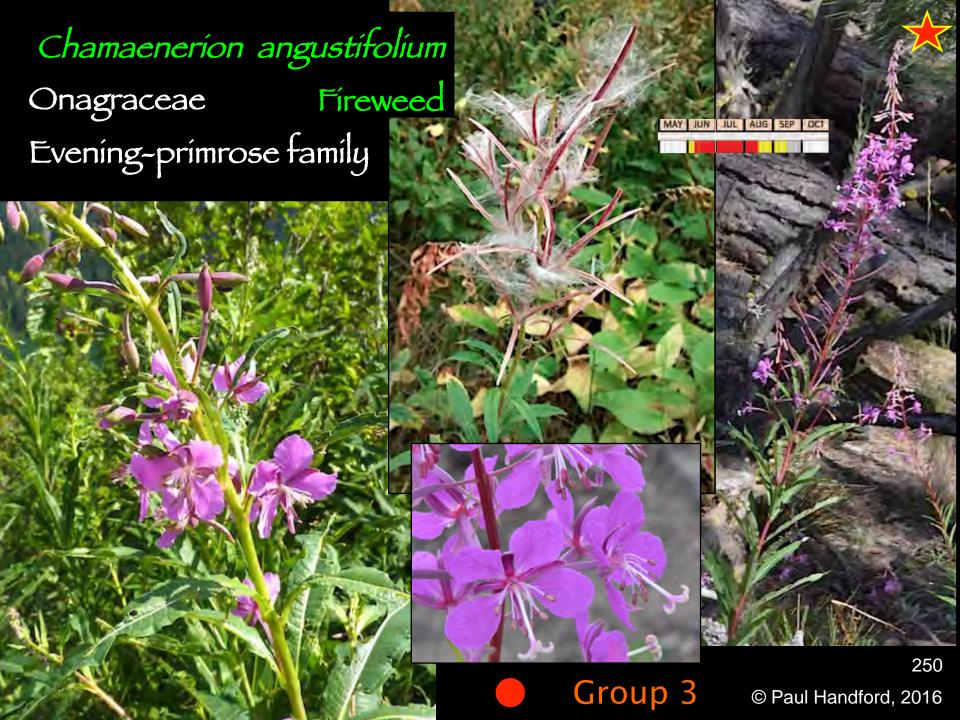
Cardamine pennsylvanica

Brassicaceae Mustard family









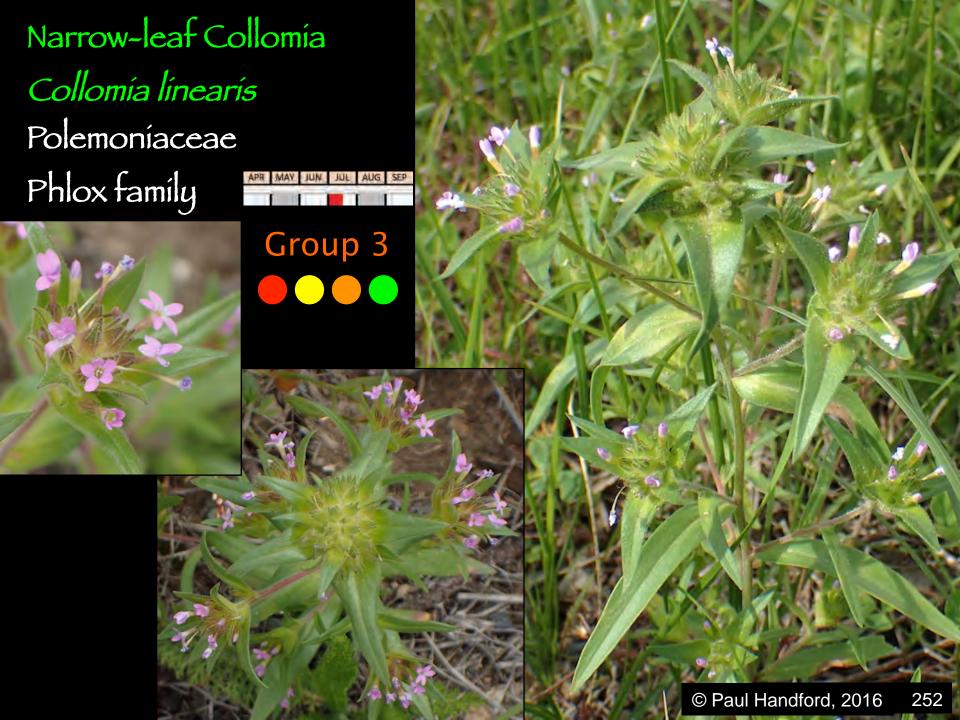
Rocky Mountain Sunflower Helianthella uniflora

Asteraceae Sunflower family





251



Thimbleberry ••• Rubus parviflorus

Rosaceae Group 3 Rose family







Birch-leaved Spiraea Spíraea betulifolía Group 3 Rosaceae Rose family

© Paul Handford, 2016 255



Houndstongue Hawkweed Hieracium cynoglossoides

Asteraceae
Sunflower family









Group 3







Four-part Gentian Gentianella propinqua Gentianaceae Gentian family







very similar to *G. amarella*, but *G. propinqua* has only four petals, and no fringe in the corolla throat



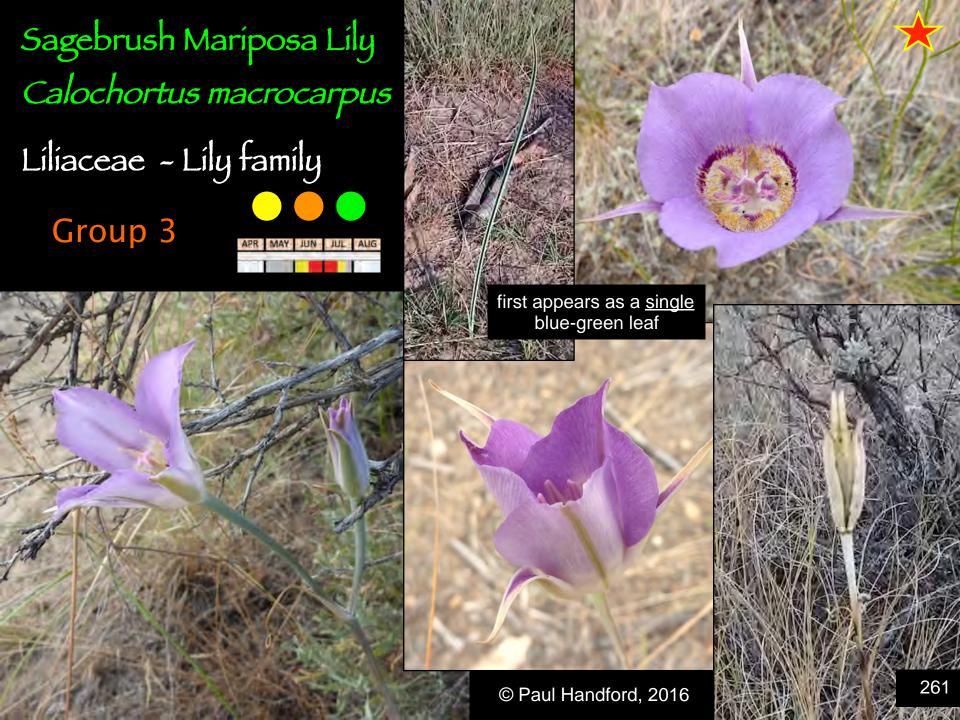
Tufted Vetch

Vicia cracca

Fabaceae

Bean family



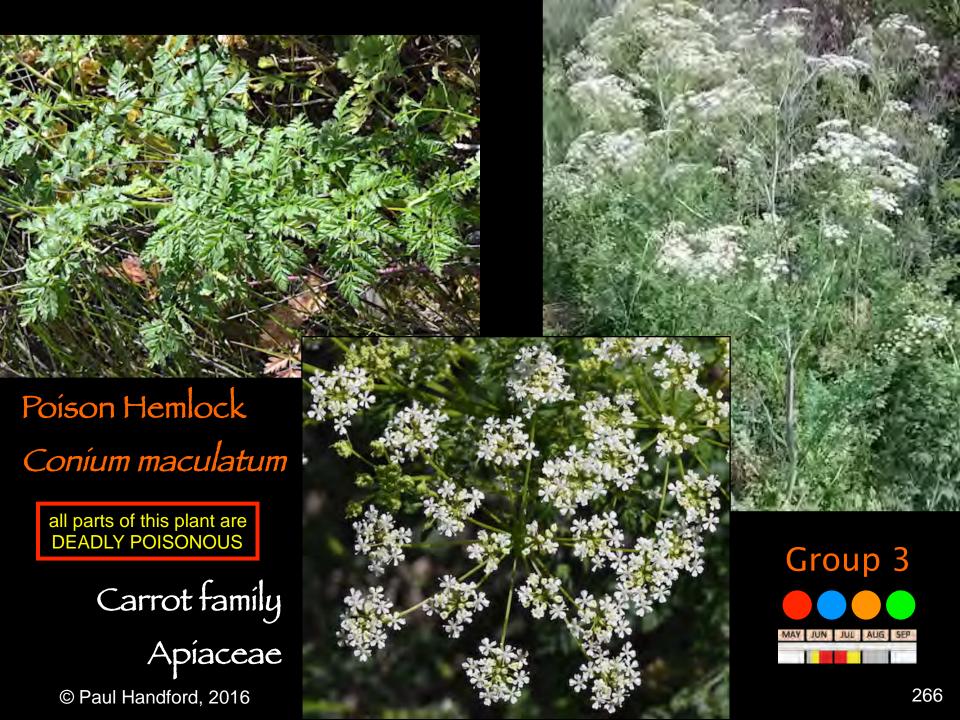




Meadow Hawkweed Hieracium caespitosum Asteraceae Sunflower family Group 3







Common Harebell Campanulaceae Bellflower family Campanula rotundifolia basal leaves can be round to heartshaped; stem leaves linear Group 3 JUN JUL AUG SEP OCT © Paul Handford, 2016 267

Twinflower Línnaea borealís Caprifoliaceae Honeysuckle family Group 3 268 © Paul Handford, 2016

Common Toadflax Plantaginaceae Linaria vulgaris Plantain family



Group 3







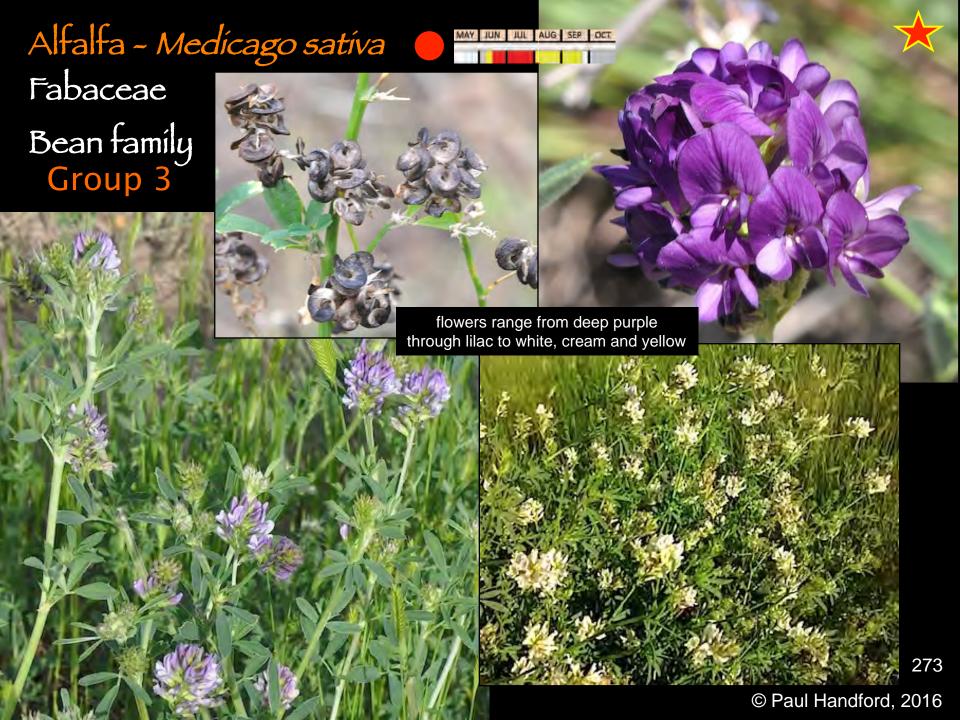
Sickletop Lousewort Group 3 Pedicularis racemosa Orobanchaceae Broomrape family © Paul Handford, 2016 Cow-parsnip Carrot family

Heracleum maximum Apiaceae









One-sided Wintergreen Orthilia secunda

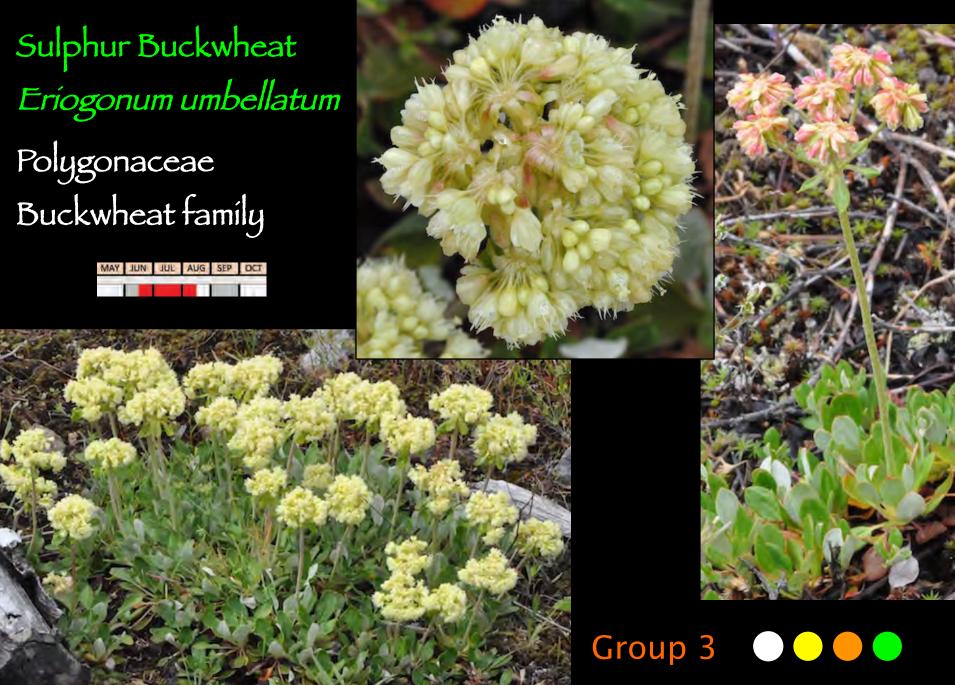
Ericaceae Heath family



Pink Wintergreen
Pyrola asarifolia

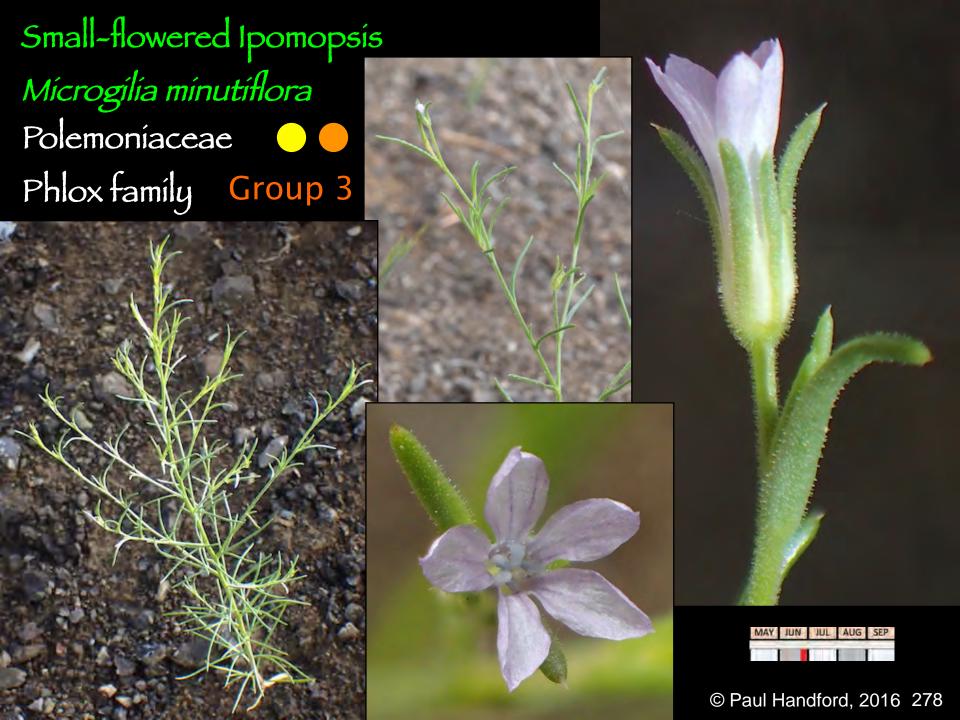
Ericaceae Heath family





Arctic Lupine







Stellaría borealis/ calycantha

Caryophyllaceae Pink family

these two species are poorly differentiated and their taxonomy is problematic. Perhaps further samples will permit resolution



Common St. John's-wort Hypericum perforatum

Hypericaceae

301 302 303

Mangosteen family





Group 3

Red Clover Trifolium pratense

Fabaceae Bean family



Green Wintergreen Pyrola chlorantha
Ericaceae - Heath family







Musk Mallow

Malva moschata

Malvaceae Mallow family







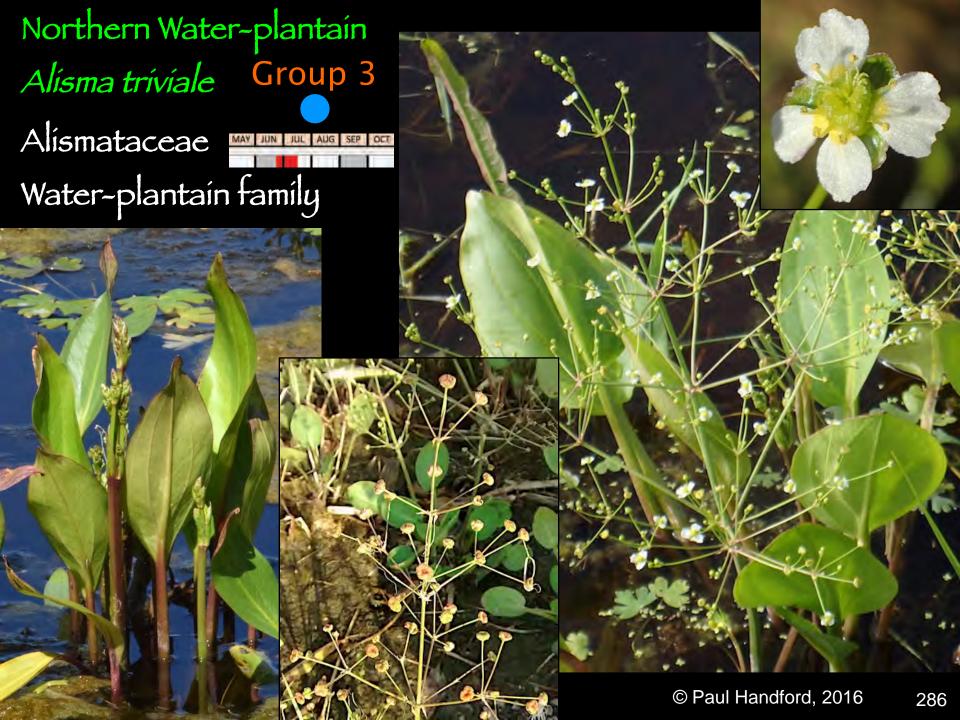
Lesser Wintergreen Pyrola minor

Ericaceae-Heather family









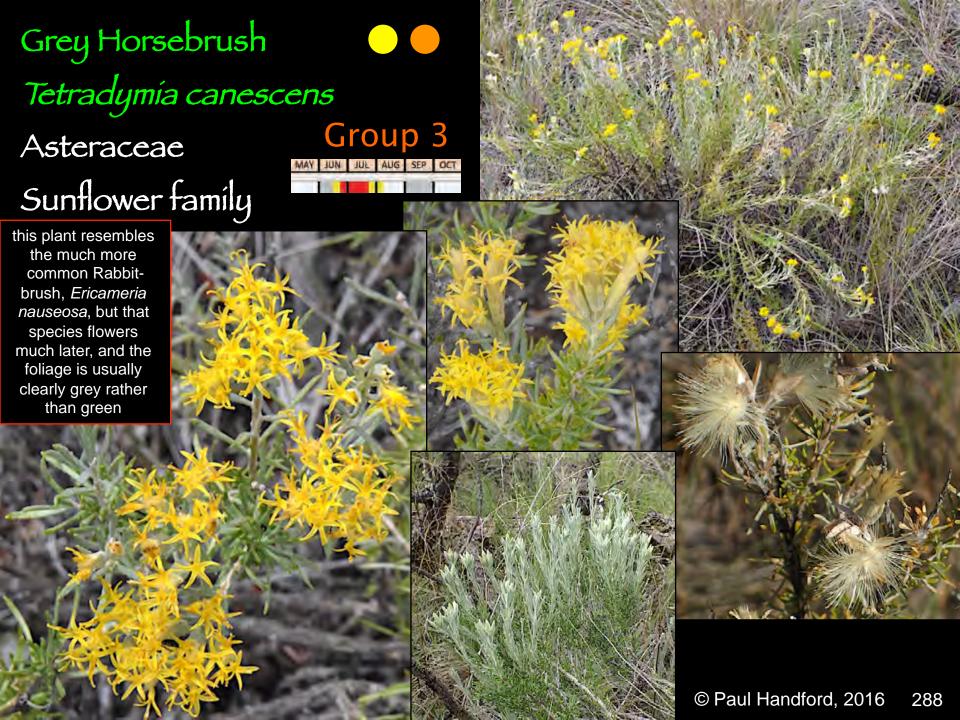
Hemp Dogbane

Apocynum cannabinum

Apocynaceae Group 3 Dogbane family







Hooker's White Thistle Cirsium hookerianum

Asteraceae Sunflower family





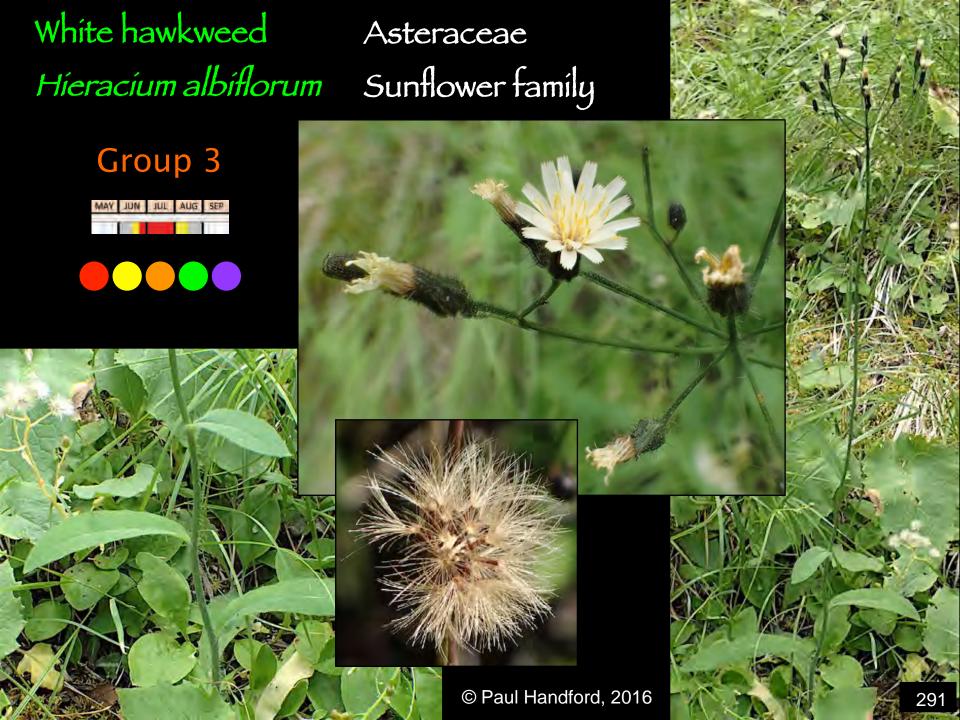
Northern Gentian

Gentianella amarella

Group 3

Gentianaceae - Gentian family





Showy Polemonium Polemonium pulcherrimum

Polemoníaceae

Phlox family





Group 3





Nodding or Musk Thistle

Carduus nutans

Asteraceae Group 3

Sunflower family



Large-leaf Avens Geum macrophyllum

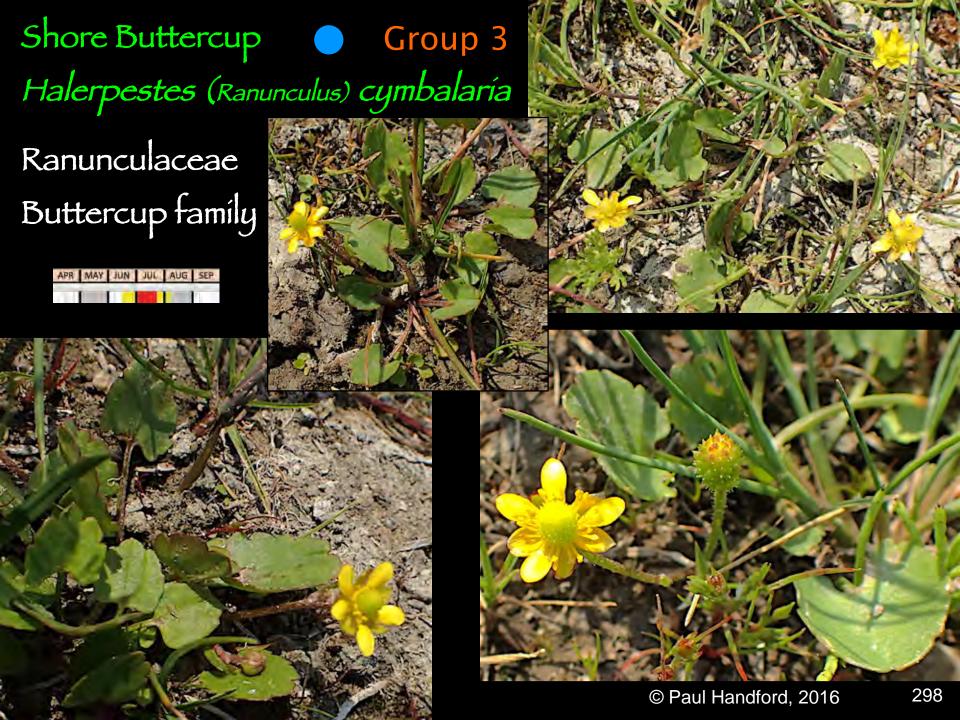
Rosaceae Group 3
Rose family







Three-leaf Foamflower Tiarella trifoliata Saxifragaceae Saxifrage family Group 3 © Paul Handford, 2016 296 Dyer's Greenweed Genista tinctoria Fabaceae - Pea family Group 3 © Paul Handford, 2016 297



Yellow Clover Trifolium aureum

Fabaceae Pea family





Glandular Baby's-breath

Gypsophila scorzonerifolia

Caryophyllaceae - Pink family







Orange Hawkweed Hieracium aurantiacum

Asteraceae Sunflower family





Common Purslane

Portulaca oleracea

Portulacaceae

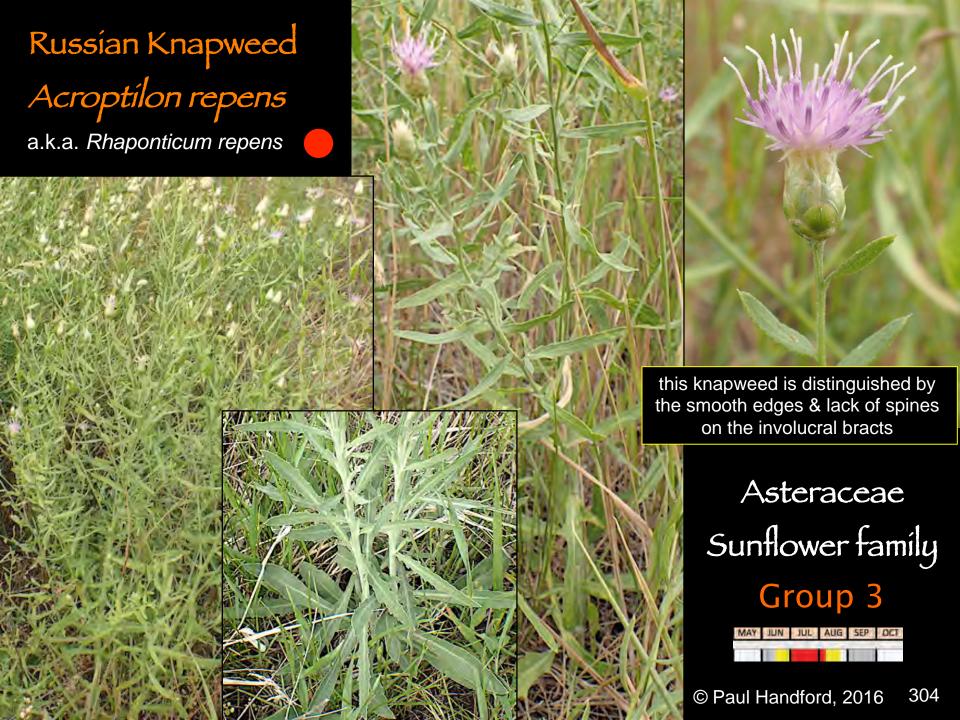
Purslane family







Group 3



Crown Vetch

MAY JUN JUL AUG SEP

Coronilla varia

Fabaceae Bean family

Group 3





Arrow-leaf Groundsel Senecio triangularis

Asteraceae Sunflower family



Blue Lettuce Mulgedium pulchellum a.k.a. Lactuca tatarica

Asteraceae

Sunflower family

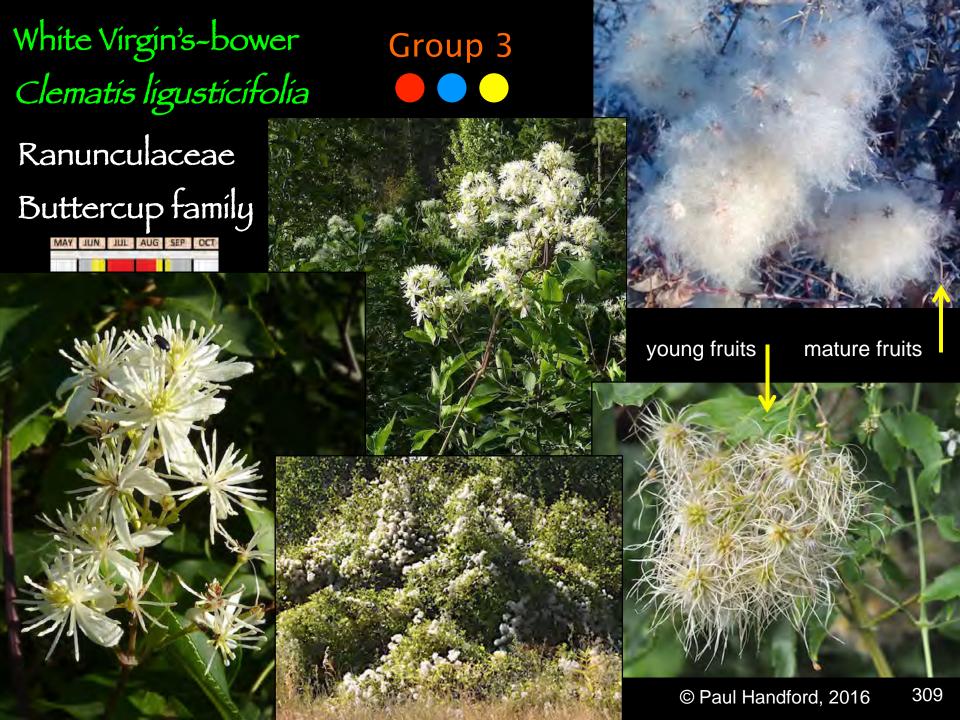


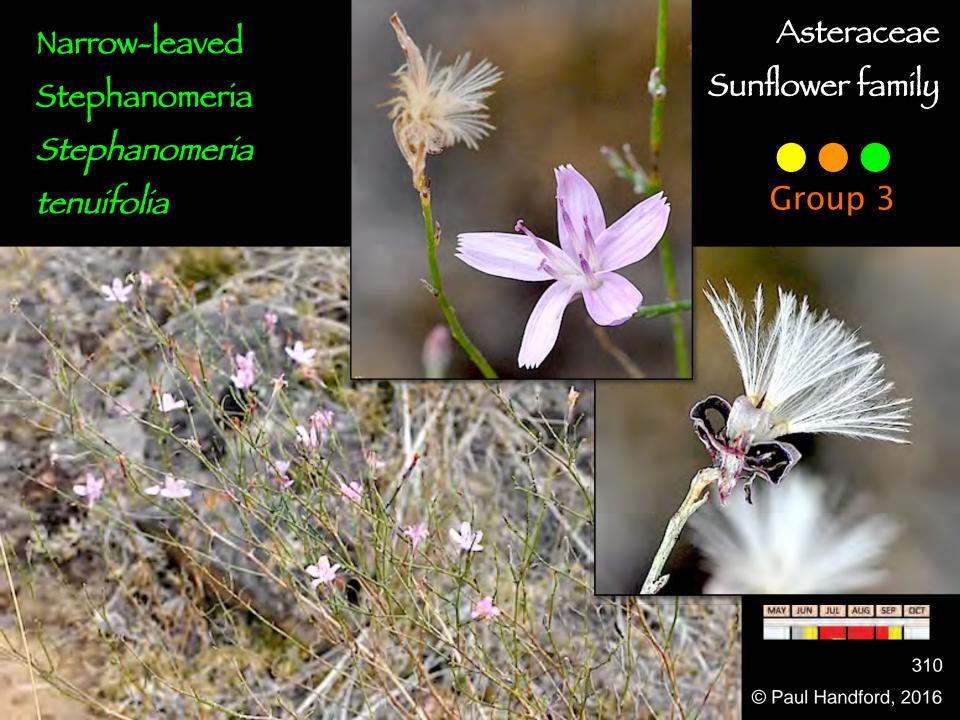




307









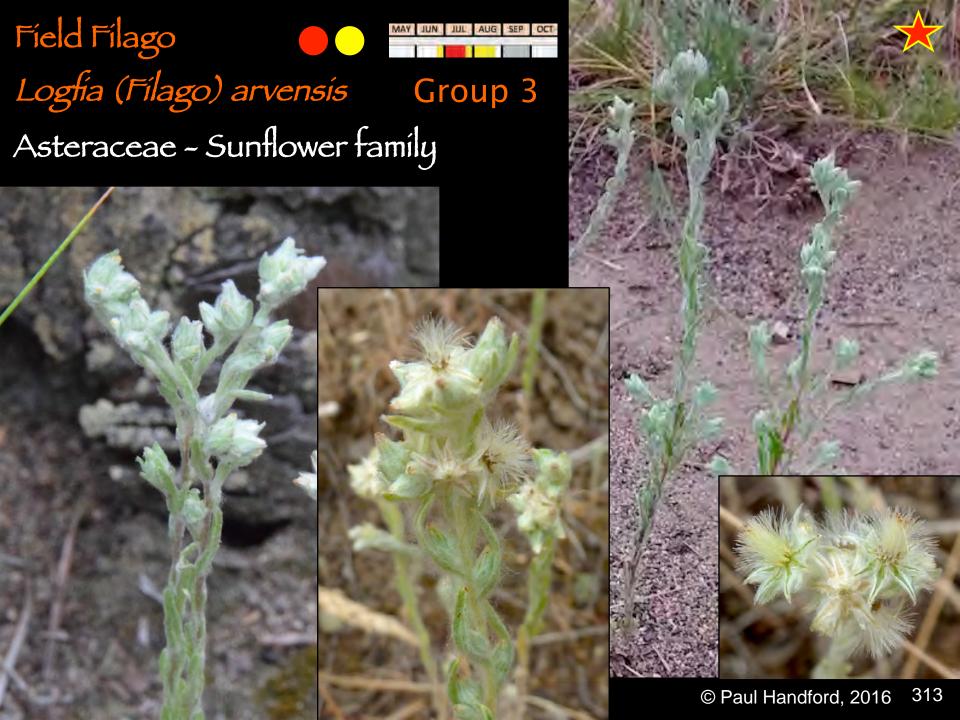
Alaska Rein-orchid Píperia unalascensis



Orchidaceae Orchid family



312





Orobanchaceae Broomrape family







Streambank Groundsel Packera pseudaurea

Asteraceae Sunflower family



Hairy evening-primrose Oenothera villosa

Onagraceae Evening-primrose family







Yellow Rattle Rhinanthus minor Group 3









MAY JUN JUL AUG SEP OCT

Apocynum androsaemífolium

Group 3









Apocynaceae Dogbane family Mullein

Verbascum thapsus

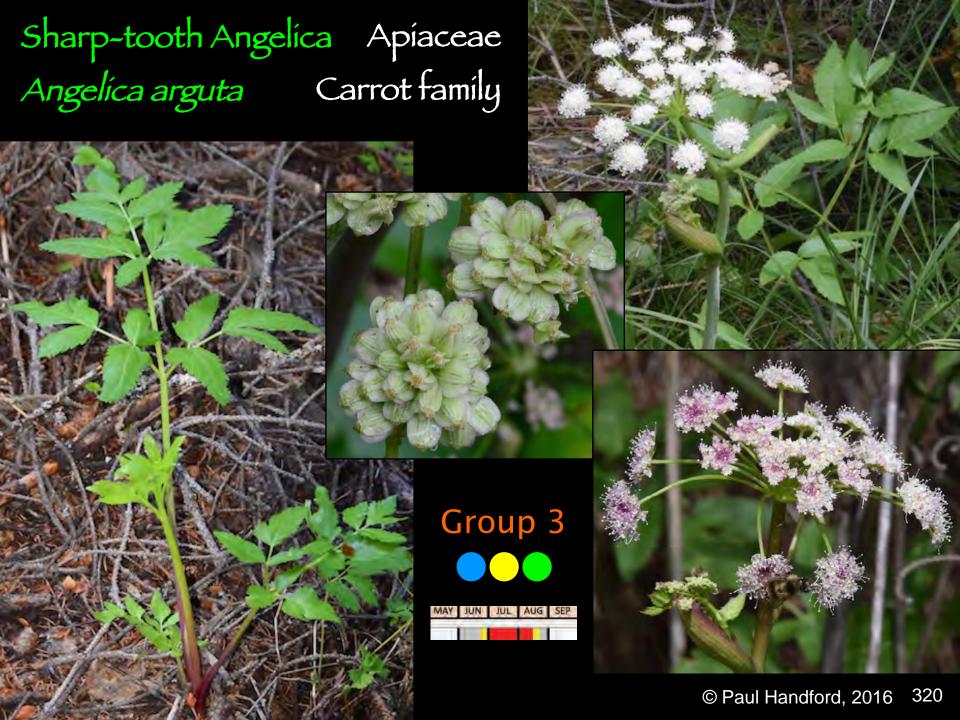
Scrophulariaceae

Figwort family











Western Yellowcress Rorippa curvisiliqua

Brassicaceae Mustard family

APR MAY JUN JUL AUG SEP OCT







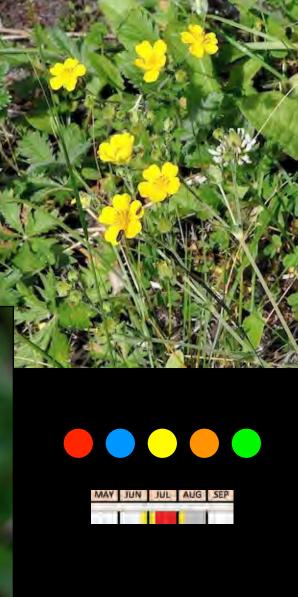


Graceful Cinquefoil
Potentilla gracilis

Rosaceae Rose family

Group 3





Narrowleaf Hawkweed





of Introduction for a comparison of similar species

325

© Paul Handford, 2016

False Hellebore Veratrum viride Group 3 Melanthiaceae Trillium family © Paul Handford, 2016 326

Three-tooth Mitrewort

Mitella trifida

Saxifragaceae

Saxifrage family





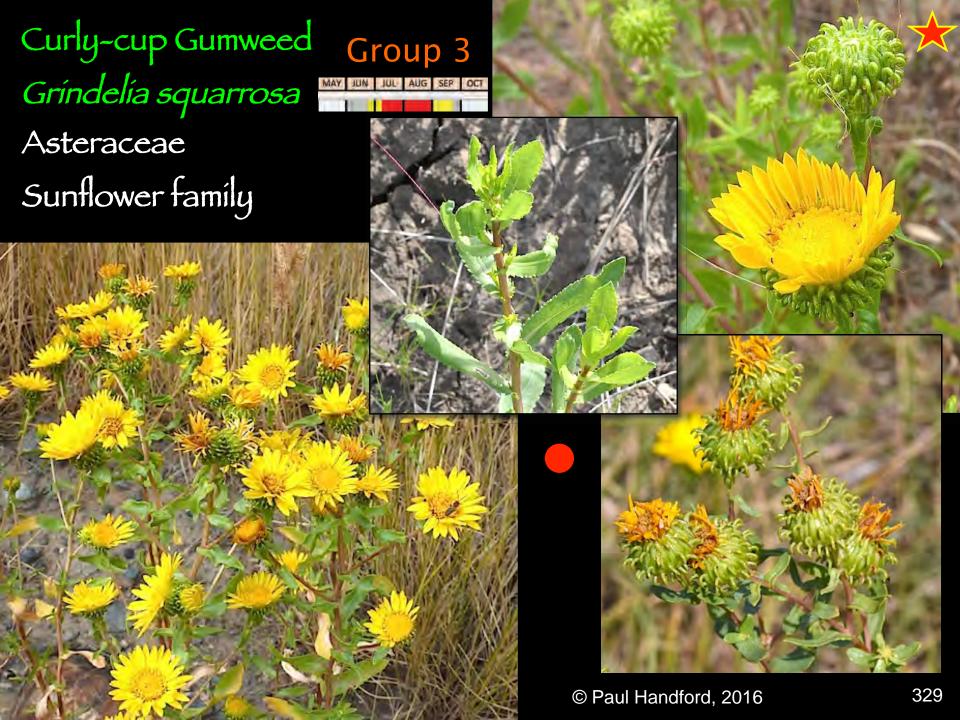


Self-heal Prunella vulgaris

Lamiaceae Mint family





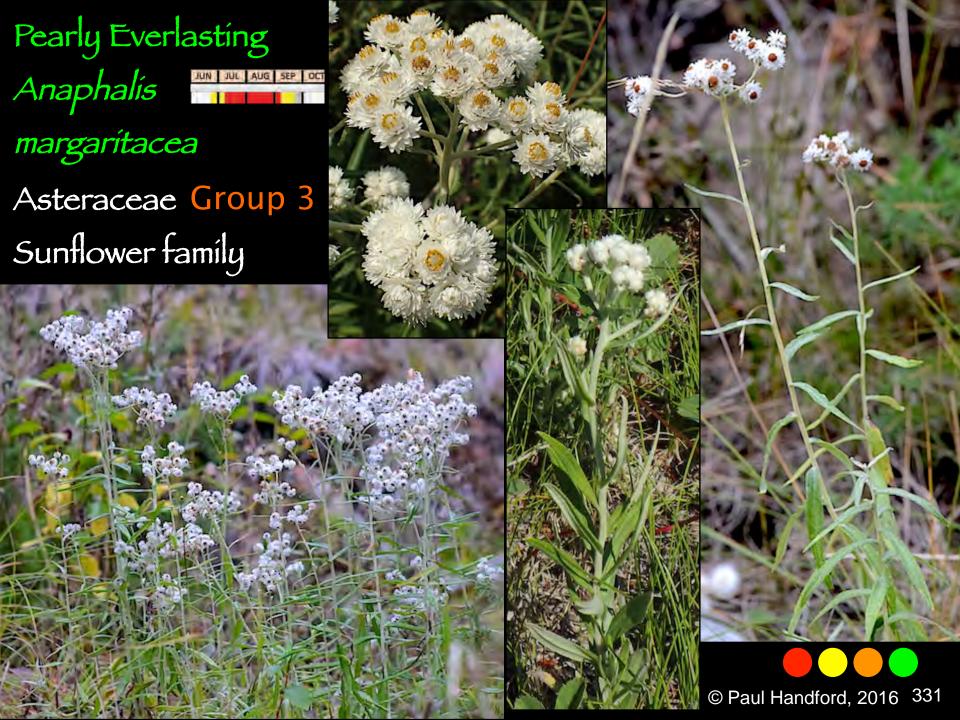


Common Eyebright Euphrasía nemorosa

Orobanchaceae Broomrape family







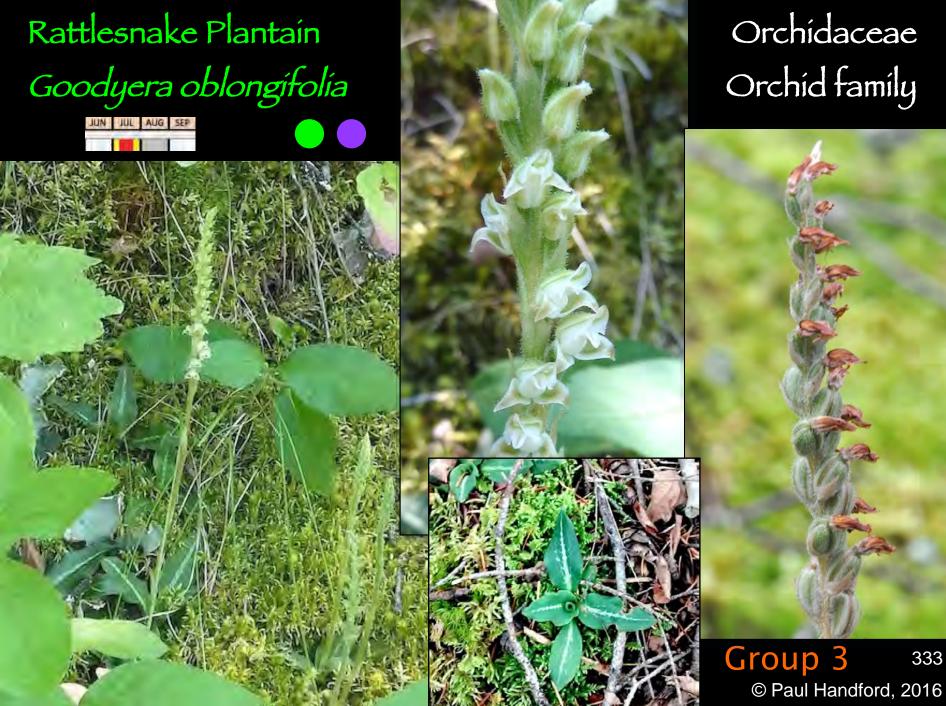
Celery-leaved Buttercup *Ranunculus sceleratus*

Ranunculaceae
Buttercup family









Orchid family

333



Prairie Fleabane Erigeron strigosus Asteraceae Sunflower family



Chicory Cichorium intybus Asteraceae Group 3 Sunflower family 336 © Paul Handford, 2016 Bull Thistle Asteraceae Cirsium vulgare Sunflower family



Asteraceae Sunflower family





Group 3

Autumn Willowherb



Epilobium Jul Aug SEP brachycarpum

Group 3

Onagraceae

Evening Primrose family









Showy Aster Group 3

Eurybía (Aster) conspicua
Asteraceae - Sunflower family





Lady's Thumb



Persicaria maculosa

Polygonaceae - Buckwheat family



Group 3







Common Horehound Marrubium vulgare

Lamíaceae



Group 3

345

© Paul Handford, 2016

Spikelike Goldenrod - Solidago spathulata Sunflower family Group 3

Group 3



Asteraceae

a.k.a. Solidago simplex







© Paul Handford, 2016



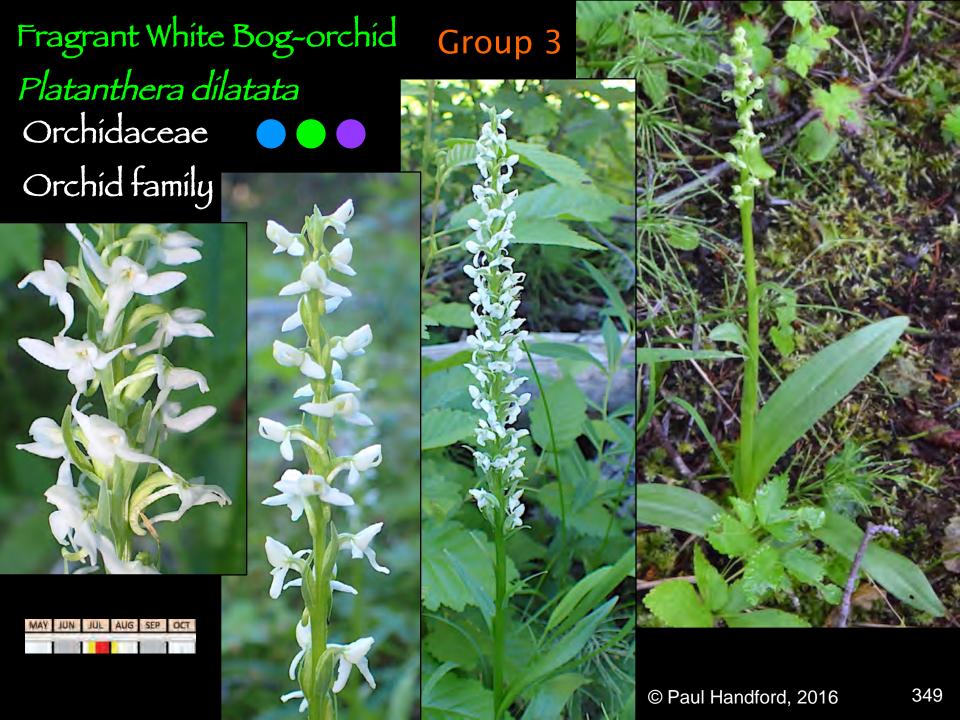
Lamb's Quarters Chenopodium album

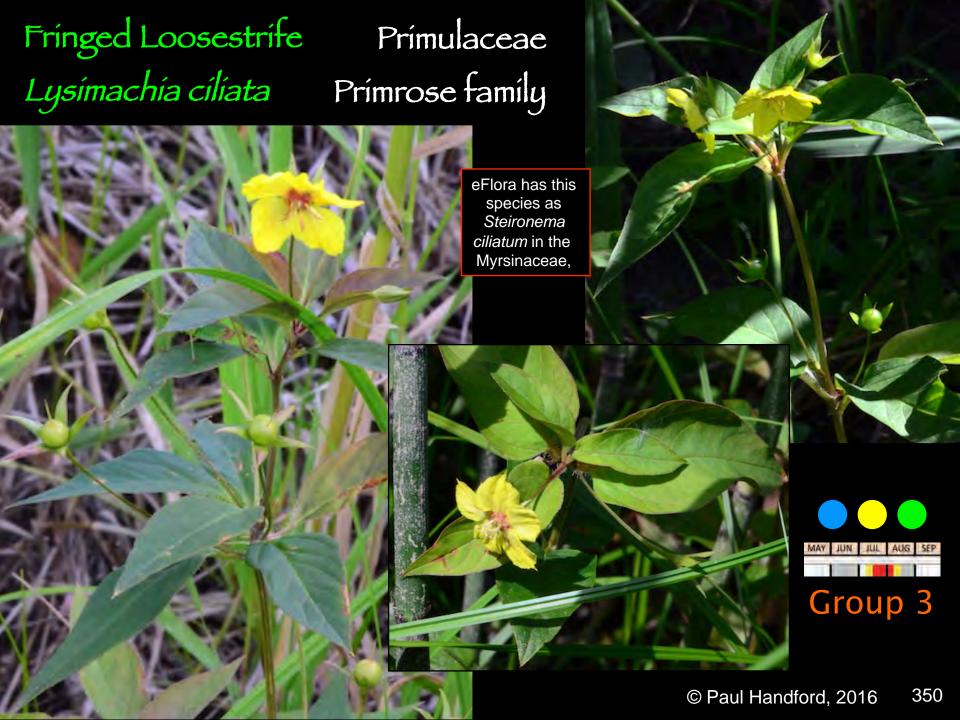
Amaranthaceae Amaranth family











Spear-leaf Fleabane

Erigeron lonchophyllus

Asteraceae Group 3

Sunflower family



Hemp-nettle Galeopsis tetrahit

Lamíaceae Mint family









AsteraceaeSunflower family

© Paul Handford, 2016

353

Blake's Knotweed

Polygonum achoreum

Polygonaceae Buckwheat family







Subalpine Daisy

Erigeron peregrinus

a.k.a. E. glacialis

Asteraceae Sunflower family







Yellow Owl-clover Orthocarpus luteus

Orobanchaceae Broomrape family







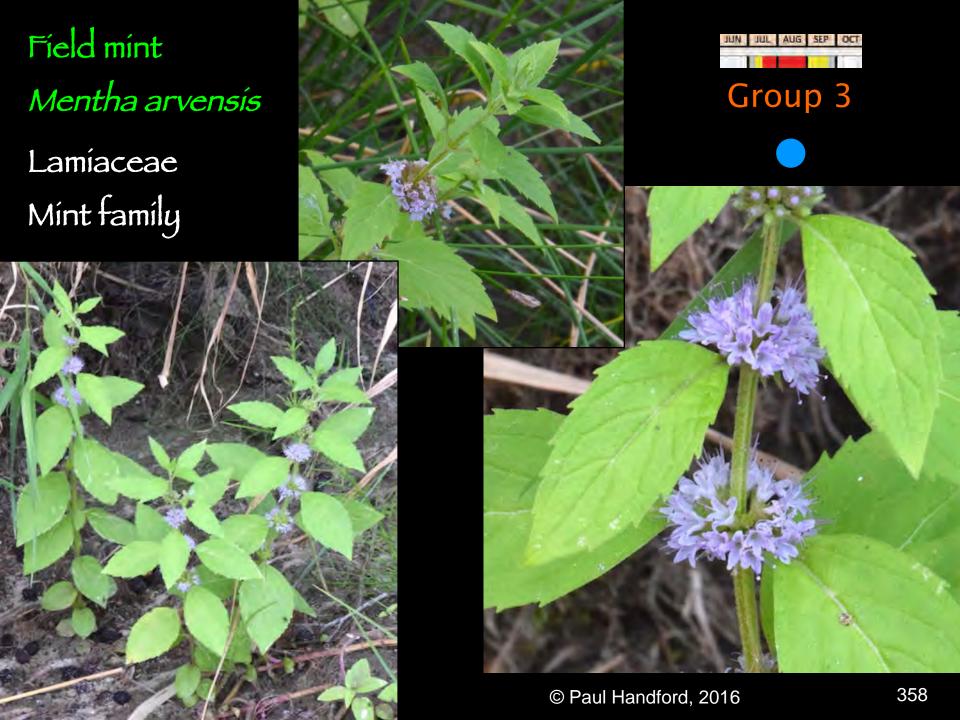
Tall Rein-orchid *Piperia elongata*

Orchidaceae Orchid family









Wild Marjoram (Oregano) Origanum vulgare

Lamíaceae Mint family









Purple Dragonhead Physostegia parviflora



Lamíaceae













Western Meadow Aster Symphyotrichum campestre Group 3 Sunflower family

Asteraceae







Common Tansy Tanacetum vulgare

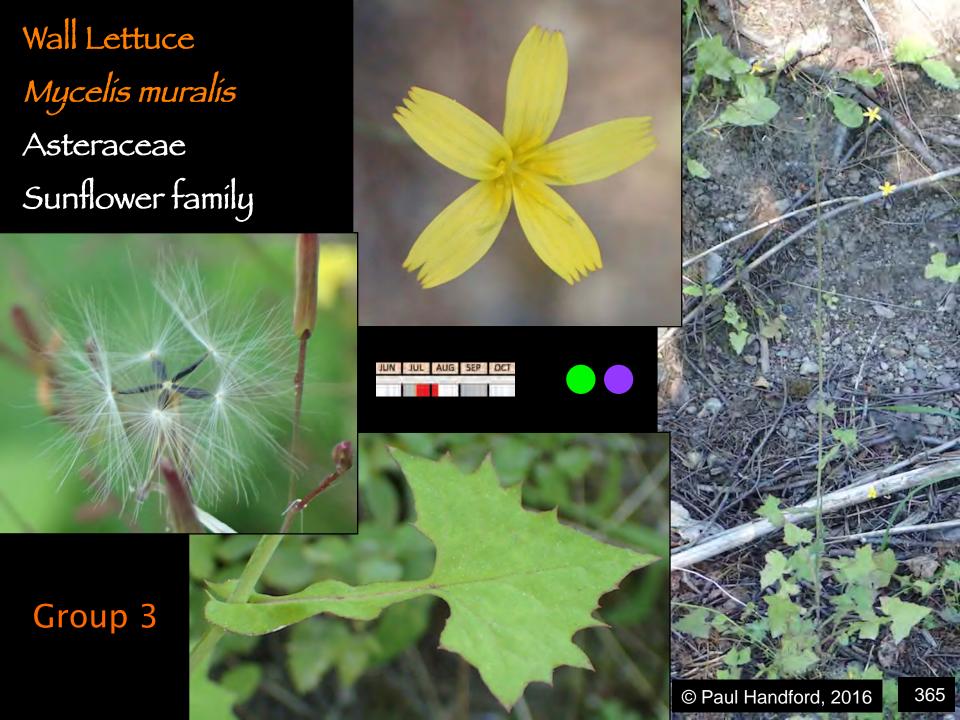
Asteraceae - Sunflower family











Blue-leaf Cinquefoil Potentilla diversifolia

(P. glaucophylla)

Rosaceae

Rose family









Pink Agoseris

Agoserís lackschevítzíí





Siberian Aster

Eurybia sibirica





Parry's Arnica Arnica parryi

Asteraceae
Sunflower family

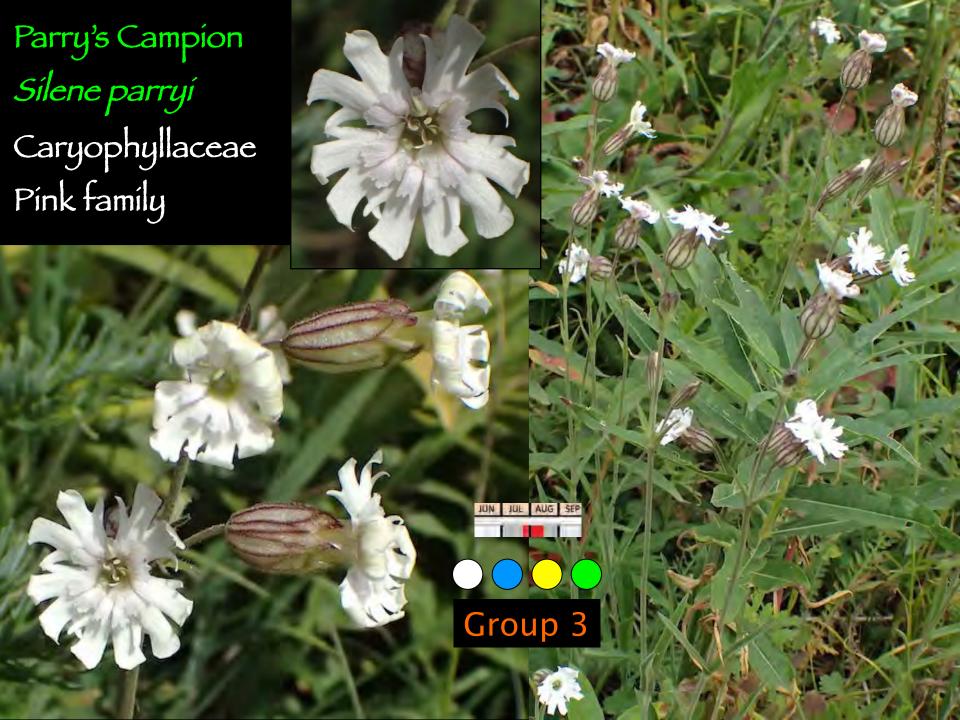


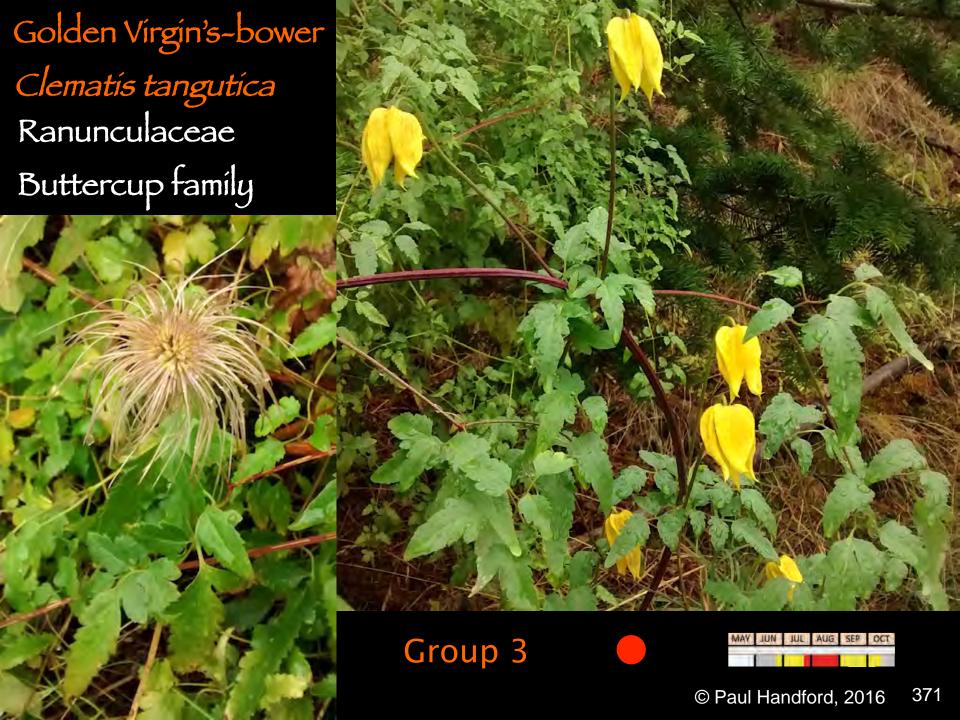


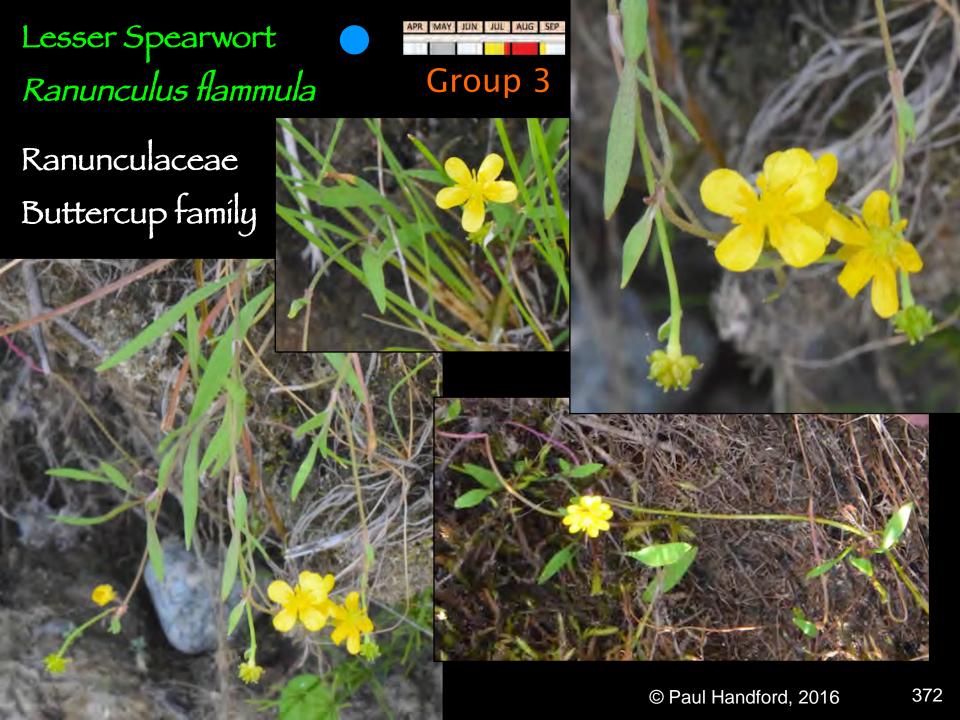


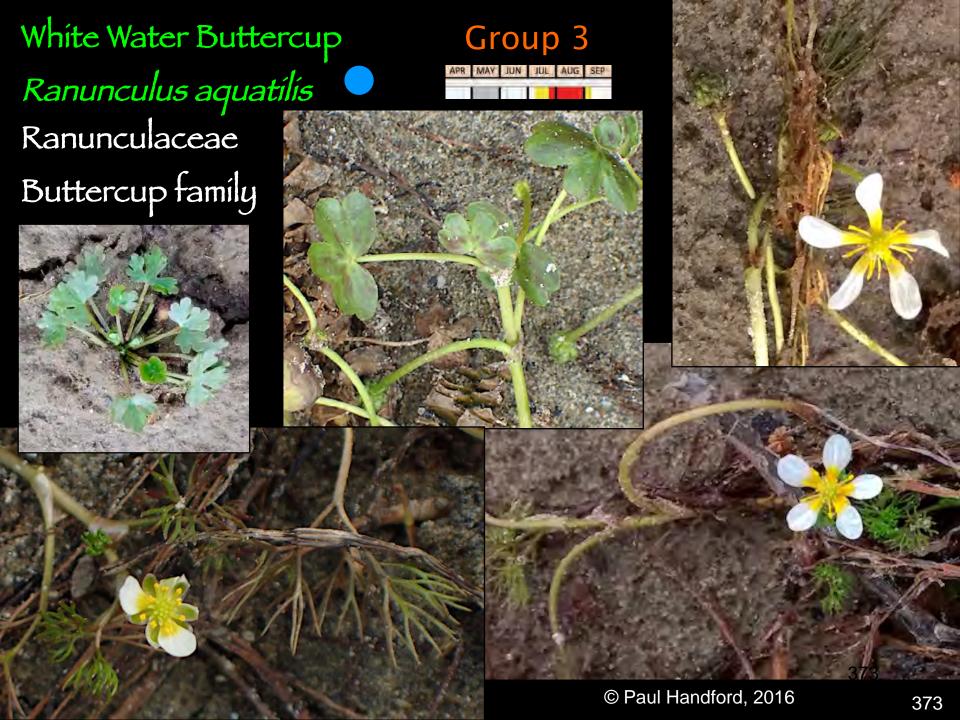


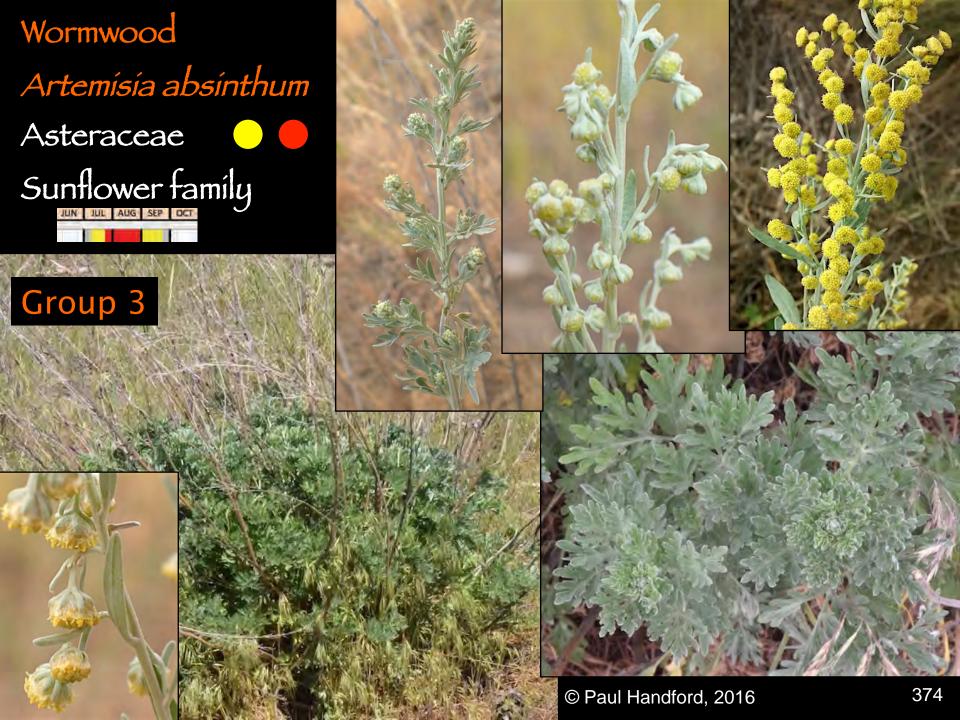












Water Smartweed

Persicaria amphibia Group 3

Polygonaceae Buckwheat family







Golden Dock Rumex fueginus

Group 3

Polygonaceae Buckwheat family





Canada Goldenrod Solidago canadensis, Solidago altissima



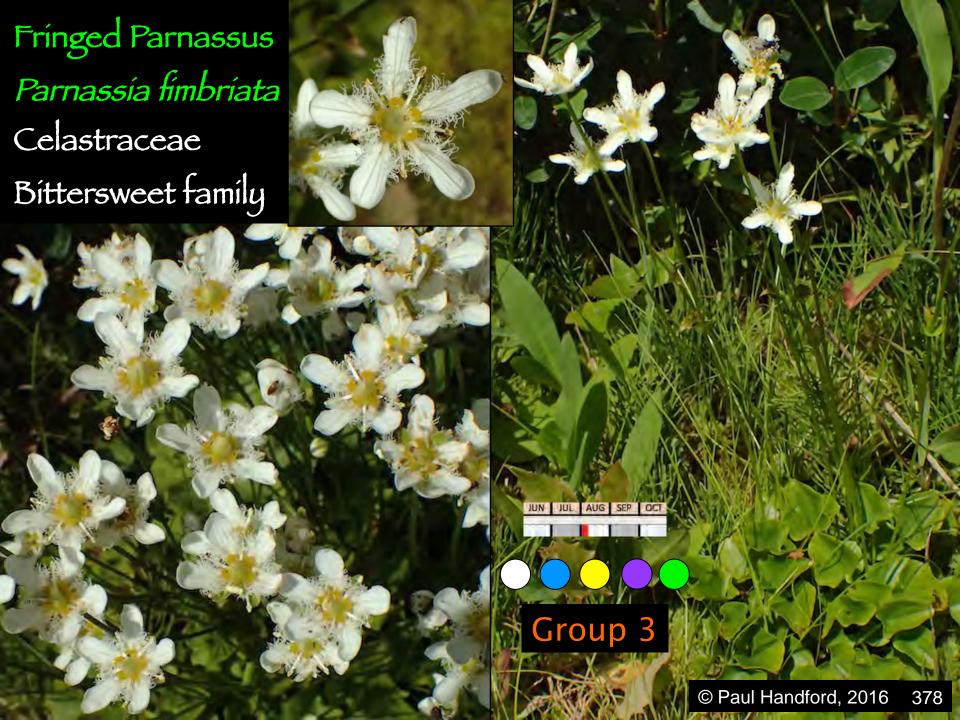












Alpine Speedwell

Veronica wormskjoldii

Plantaginaceae

Plantain family









Broadleaf Willowherb - Chamaenerion latifolium







Great Burdock

Arctium lappa



Asteraceae - Sunflower family





Group 3

382



Prickly Lettuce Lactuca serriola









True Forget-me-not

Myosotis scorpioides

Boraginaceae Group 3

Borage family





Hemlock water-parsnip Síum suave Apíaceae Group 3 Carrot family © Paul Handford, 2016 386

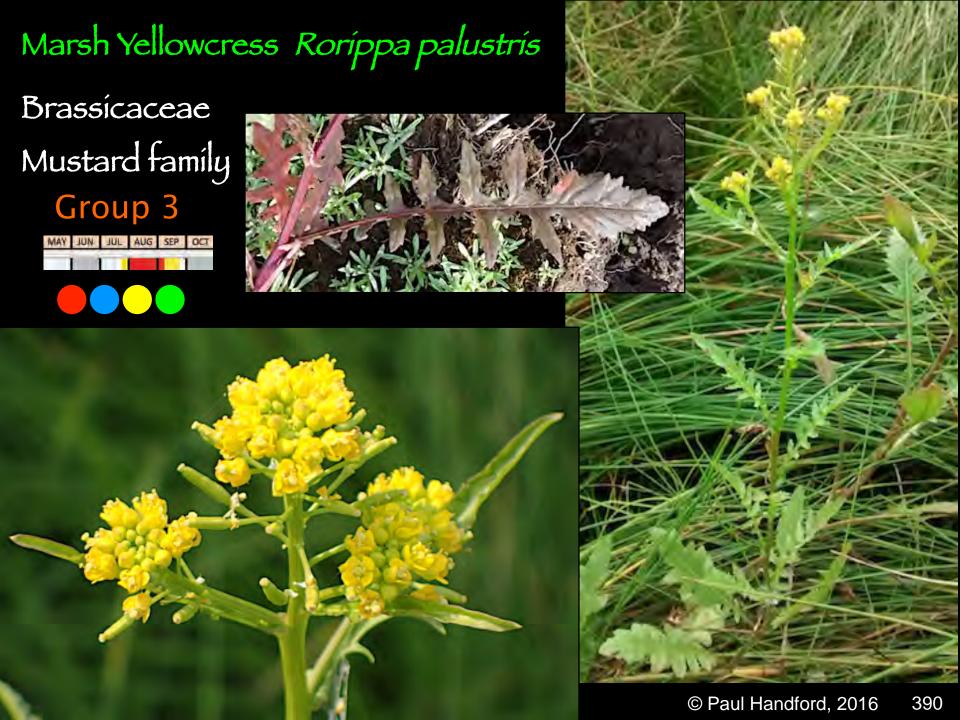


Arum-leaf Arrowhead or Wapato Sagittaria cuneata

Alismataceae Water-plantain family







Rough Pigweed

Amaranthus retroflexus

Amaranthaceae

Amaranth family















August – September bloomers include several species generally known as **asters**, that have showy white-to-blue-to-purple flowers. Most of these species used to be allocated to the genus *Aster*, but the majority are now in the genus *Symphyotrichum*, while others now appear in *Canadanthus*, *Eucephalus* & *Eurybia*.

The local flora includes up to ten hard-to-distinguish species of *Symphyotrichum*. Identification to species is complicated by the fact that some show substantial variation in form, while at least some of the species hybridize, producing mixes of characters.



The next few pages show my current understanding of these problematic plants.

I continue to explore these species through submission of photographs to *e-Flora*, and in 2016
I began collecting pressed dried specimens to be sent to the folks at e-Flora for formal identification.

Until I can understand these plants better, I reckon I might be best advised to simply to refer to them all as "aster species in the genus Symphyotrichum"

Western Mountain Aster

JUN JUL AUG SEP OCT

Symphyotrichum spathulatum

v. similar to *S. eatonii* & *S. lanceolatum*, which are also found in waterside habitats

Group 3





Willow Aster Symphyotrichum lanceolatum

Group 3



very similar to *S. eatonii* & *S. spathulatum,* which are also found in waterside habitats

in late 2015, I photographed lots of asters along the S. Thompson River, and submitted many of them to e-Flora, UBC, as Symphiotrichum lanceolatum, my tentative ID- expecting that some or all might prove to be of other, very similar species.

Indeed, some of the photos were eventually identified at e-Flora as S. eatoni & S. spathulatum (see adjacent)

The seeding individual shown here is the only photo deemed to be *S. lanceolatum*. Other photos were interpreted as hybrids.



Asteraceae
Sunflower family



Sunflower family Eaton's Aster
Asteraceae Symphyotrichum eatoni





v. similar to
S. lanceolatum &
S. spathulatum,
which are also found
in waterside habitats



© Paul Handford, 2016



Asteraceae Sunflower family



Columbia River Wormwood Artemisia lindleyana Group 3

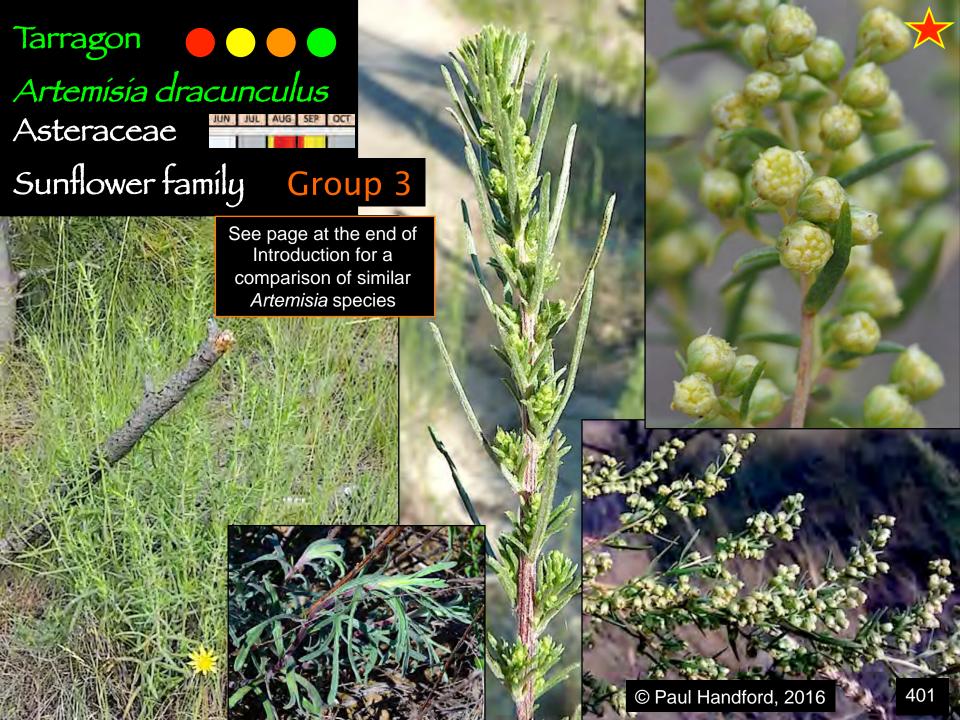






© Paul Handford, 2016

400



Cotton-batting Cudweed Pseudognaphalium stramineum

Asteraceae - Sunflower family



Group 3





Hooded Ladies' Tresses
Spiranthes romanzoffiana



Group 3







Orchidaceae Orchid family



Western Goldentop *Euthamía occidentalis*

Asteraceae Sunflower family







Prostrate Knotweed
Polygonum aviculare
Polygonaceae
Buckwheat family







species new to this edition

Erythronium grandiflorum

Mertensia longiflora

Draba nemorosa

Antennaria parvifolia

Boechera pauciflora

Castilleja hispida

Lewisia rediviva

Gentianella propinqua

Potentilla arguta

Senecio integerrimus

Valeriana sitchensis

Potentilla biennis

Rubus leucodermis

Boechera stricta

Potentilla diversifolia

Lupinus arcticus

Saxifraga bronchialis

Eriogonum umbellatum

Tiarella trifoliata

Veronica officinalis

Trifolium aureum

Malva moschata

Gypsophila scorzonerifolia

Genista tinctoria

Pyrola minor

Orthocarpus luteus

Prosartes trachycarpum

Parnassia fimbriata

Veratrum viride

Erigeron peregrinus

Eurybia sibirica

Mitella trifida

Agoseris lackschevitzii

Arnica parryi

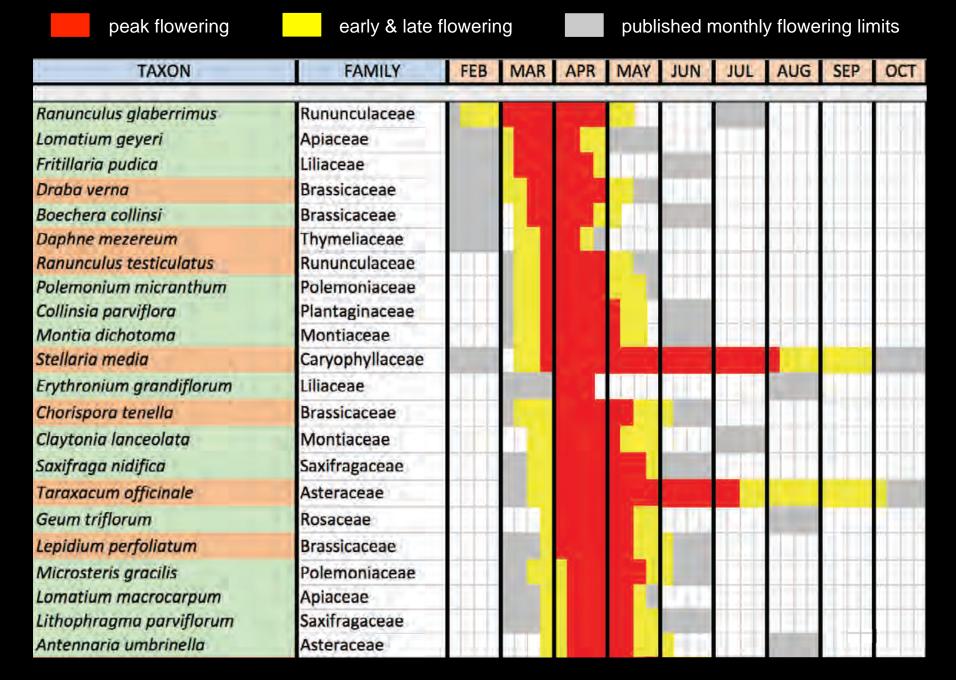
Silene parryi

Chamaenerion latifolium

Veronica wormskjoldii

Osmorhiza berteroi

Group 1: start flowering BEFORE end-April. 109 species Page 1.



Group 1: start flowering BEFORE end-April. Page 2.

TAXON	FAMILY	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
Capsella bursa-pastoris	Brassicaceae									III
Mahonia aquifolium	Berberidaceae						TH			
Antennaria dimorpha	Asteraceae									
Mertensia longiflora	Boraginaceae							1-1-1		
Draba nemorosa	Brassicaceae		CONTRACT				111			
Antennaria rosea	Asteraceae									
Boechera retrofracta	Brassicaceae				-					
Sambucus racemosa	Adoxaceae		The same							
Ribes aureum	Grossulariaceae									
Stellaria nitens	Caryophyllaceae	1 - 1						1 -1 [
Schoenocrambe linifolia	Brassicaceae							1144		
Amelanchier cusickii	Rosaceae									
Amelanchier alnifolia	Rosaceae				100					
Myosotis stricta	Boraginaceae							100		
Galium aparine	Rubiaceae									
Astragalus purshii	Fabaceae									
Balsamorhiza sagittata	Asteraceae									
Calypso bulbosa	Orchidaceae				9					
Lithospermum Incisum	Boraginaceae						Ш			
Astragalus beckwithii	Fabaceae									
Dodecatheon pulchellum	Primulaceae									
Lithospermum arvense	Boraginaceae						14-1			

Group 1: start flowering BEFORE end-April. Page 3.

TAXON	FAMILY	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
Erigeron philadelphicus	Asteraceae	Î								
Descurainia sophia	Brassicaceae									
Alyssum alyssoides	Brassicaceae									1111
Holosteum umbellatum	Caryophyllaceae						177			
Comandra umbellatum	Santalaceae									
Lithospermum ruderale	Boraginaceae							1.1.1		
Muscari botryoides	Asparagaceae									
Mahonia repens	Berberidaceae				100					
Lomatium dissectum	Apiaceae									
Lomatium triternatum	Apiaceae					177				
Arctostaphylos uva-ursi	Ericaceae				1.0				11-11	
Prosartes hookeri	Liliaceae									
Viola adunca	Violaceae				100					
Descurainia incisa	Brassicaceae									
Lamium amplexicaule	Lamiaceae									
Shepherdia canadensis	Elaeagnaceae									
Toxicoscordion venenosum	Melanthiaceae				7					
Lomatium ambiguum	Apiaceae									
Phacelia hastata	Hydrophyllaceae						HH			
Maianthemum racemosum	Asparagaceae									
Cerastium arvense	Caryophyllaceae						5 3-1			
Castilleja hispida	Orobanchaceae									

Group 1: start flowering BEFORE end-April. Page 4.

TAXON	FAMILY	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
Erigeron compositus	Asteraceae						131			
Achillea millefolium	Asteraceae				1 4					
Thlaspi arvense	Brassicaceae				1		111		-11-11	1
Boechera pauciflora	Brassicaceae								****	
Rubus leucodermis	Rosaceae									
Veronica officinalis	Plantaginaceae									
Osmorhiza berteroi	Apiaceae									
Astragalus collinus	Fabaceae									
Ribes cereum	Grossulariaceae									
Lappula occidentalis	Boraginaceae									
Castilleja miniata	Orobanchaceae					1				
Geranium robertianum	Geraniaceae									
Crataegus douglasii	Rosaceae			160					41.4.	
Antennaria racemosa	Asteraceae									
Fragaria virginiana	Rosaceae					- 100				
Oxytropis campestris	Fabaceae		HI-L		7	71		1		144
Thalictrum occidentale	Rununculaceae						114			
Prunus virginiana	Rosaceae									
Erigeron pumilus	Asteraceae						13			
Penstemon fruticosus	Plantaginaceae						101			
Antennaria howelli	Asteraceae									
Erigeron linearis	Asteraceae									

Group 1: start flowering BEFORE end-April. Page 5.

TAXON	FAMILY	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
Microseris nutans	Asteraceae	TITE								
Delphinium nuttalli	Ranunculaceae									
Silene menziesii	Caryophyllaceae	1111	CONTRACT OF							
Plantago major	Plantaginaceae		TIT			161				
Convolvulus arvensis	Convolvulaceae									
Prosartes trachycarpum	Liliaceae									
Antennaria parvifolia	Asteraceae									
Ajuga reptans	Lamiaceae		16 61							
Phacelia linearis	Hydrophyllaceae									
Erodium cicutarium	Geraniaceae									
Arnica cordifolia	Asteraceae		1-1-					4-11		
Cornus stolonifera	Cornaceae									
Clematis occidentalis	Rununculaceae									
Cardaria draba	Brassicaceae									
Ceanothus velutinus	Rhamnaceae									
Lupinus sericeus	Fabaceae					1				
Antennaria anaphaloides	Asteraceae									
Potentilla argentea	Rosaceae						70			
Castilleja thompsonii	Orobanchaceae							11		
Eremogone capillaris	Caryophyllaceae								444	
Erigeron filifolius	Asteraceae									

Group 2: start flowering AFTER end-April. 102 species Page 1.

TAXON	FAMILY	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
Lonicera tatarica	Caprifoliaceae									
Actaea rubra	Rununculaceae									
Sisymbrium altissimum	Brassicaceae						117			111
Corydalis aurea	Papaveraceae									
Geocaulon lividum	Santalaceae						1000	111		
Heuchera cylindrica	Saxifragaceae									
Petasites frigidus	Asteraceae						100	1.1-1.		
Erigeron corymbosus	Asteraceae					2.7				
Sorbus aucuparia	Rosaceae									
Crepis modocensis	Asteraceae									
Vaccinium caespitosum	Ericaceae		+						14-14	
Packera cana	Asteraceae									
Corallorhiza striata	Orchidaceae									
Arnica sororia	Asteraceae									JIT
Cynoglossum officinale	Boraginaceae							777		
Erigeron flagellaris	Asteraceae									
Lewisia rediviva	Montiaceae									
Astragalus agrestis	Fabaceae									
Lonicera involucrata	Caprifoliaceae							11.		
Plantago lanceolata	Plantaginaceae							1000		
Maianthemum stellatum	Asparagaceae									

Group 2: start flowering AFTER end-April. Page 2.

TAXON	FAMILY	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	ОСТ
Aralia nudicaulis	Araliaceae									
Geranium viscosissimum	Geraniaceae									
Camelina microcarpa	Brassicaceae									
Rubus idaeus	Rosaceae									
Fritillaria affinis	Liliaceae									
Rumex acetosella	Polygonaceae									
Plantago patagonica	Plantaginaceae						4.1			
Viola canadensis	Violaceae									1111
Euphorbia esula	Euphorbiaceae				18					
Veronica serpyllifolia	Plantaginaceae									
Sisymbrium loeselii	Brassicaceae				1					
Linum lewisii	Linaceae					F				
Crepis atribarba	Asteraceae									
Moehringia laterifolia	Caryophyllaceae									
Linaria genistifolia	Plantaginaceae									
Silene latifolia	Caryophyllaceae									
Astragalus miser	Fabaceae									
Berteroa incana	Brassicaceae						. =			
Trifolium repens	Fabaceae									
Gaillardia aristata	Asteraceae									
Erigeron divergens	Asteraceae									

Group 2: start flowering AFTER end-April. Page 3.

TAXON	FAMILY	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
Ribes lacustre	Grossulariaceae									
Viola tricolor	Violaceae									
Trifolium hybridum	Fabaceae									
Asparagus officinalis	Asparagaceae						C INC	Time!		
Erysimum inconspicuum	Brassicaceae							1111		
Opuntia fragilis	Cactaceae						FIT			
Rosa acicularis	Rosaceae					-				
Lonicera ciliosa	Caprifoliaceae									
Lonicera periclymenum	Caprifoliaceae									
Tragopogon dubius	Asteraceae									
Toxicodendron radicans	Anacardiaceae									
Centaurea cyanus	Asteraceae			4						
Potentilla recta	Rosaceae					- 3				
Orobanche fasciculata	Orobanchaceae									
Crepis tectorum	Asteraceae									
Cornus canadensis	Cornaceae									
Eriogonum heracleoides	Polygonaceae							TIAL		
Streptopus amplexifolius	Liliaceae									
Anemone multifida	Ranunculaceae	1 4								
Agoseris glauca	Asteraceae									

Group 2: start flowering AFTER end-April. Page 4.

TAXON	FAMILY	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	ОСТ
Geum aleppicum	Rosaceae	Time		77-17						
Senecio integerrimus	Asteraceae						Trial			
Potentilla biennis	Rosaceae	1111		7.						
Medicago lupulina	Fabaceae									
Lappula squarrosa	Boraginaceae									
Viburnum edule	Adoxaceae				100					
Potentilla pensylvanica	Rosaceae							1000		
Ranunculus uncinatus	Rununculaceae				3.4					
Lathyrus ochroleucus	Fabaceae					- 12	1000			
Vicia americana	Fabaceae									
Asperugo procumbens	Boraginaceae							11/1/19		
Sedum lanceolatum	Crassulaceae						14			
Symphoricarpos albus	Caprifoliaceae						-2			
Matricaria discoidea	Asteraceae									
Clintonia uniflora	Liliaceae									
Cypripedium montanum	Orchidaceae									
Corallorhiza maculata	Orchidaceae									
Iris missouriensis	Iridaceae									
Ranunculus acris	Rununculaceae									
Sambucus nigra	Adoxaceae									

Group 2: start flowering AFTER end-April. Page 5.

TAXON	FAMILY	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
Potentilla norvegica	Rosaceae									
Lotus denticulatus	Fabaceae							11111		
Geranium pusillum	Geraniaceae						1	12.55		
Penstemon procerus	Plantaginaceae									
Urtica dioica	Urticaceae									
Arenaria serpyllifolia	Caryophyllaceae	1, 1, 1, 1, 1, 1								
Asclepias speciosa	Apocynaceae									
Erigeron speciosus	Asteraceae				143			THE REAL PROPERTY.		
Heterotheca villosa	Asteraceae									
Melilotus officinalis	Fabaceae									
Melilotus albus	Fabaceae						200			
Boechera stricta	Brassicaceae									
Potentilla arguta	Rosaceae						UV			
Mitella nuda	Saxifragaceae				4.0	1				
Elaeagnus angustifolium	Elaeagnaceae				100				Ш	
Aquilegia formosa	Rununculaceae									
Potentilla anserina	Rosaceae				111					
Stellaria longipes	Caryophyllaceae				Time I					
Solanum dulcamara	Solanaceae									
Cirsium undulatum	Asteraceae								1	

Group 3: start flowering AFTER end-May. 172 species Page 1.

TAXON	FAMILY	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
Senecio viscosus	Asteraceae									
Corallorhiza trifida	Orchidaceae						1	The same		
Astragalus tenellus	Fabaceae		01-1-10	1000	1.1.	-			7 1	
Lilium columbianum	Liliaceae							STATE OF THE PARTY.		
Agoseris aurantiaca	Asteraceae									
Anthemis arvensis	Asteraceae							THE	1000	
Allium cernuum	Amaryllidaceae								100	
Silene douglasii	Caryophyllaceae				THE			Section 2		
Moneses uniflora	Ericaceae			1111				16.11	711	
Galium boreale	Rubiaceae									
Saxifraga bronchialis	Saxifragaceae		11-1-12							
Valeriana sitchensis	Valerianaceae						22.7		TII	
Mentzelia laevicaulis	Loasaceae						1.00		COO.	
Cardamine pennsylvanica	Brassicaceae								111	
Leucanthemum vulgare	Asteraceae								777	
Chamaenerion angustifolium	Onagraceae									11-1-1
Helianthella uniflora	Asteraceae								LIT	
Collomia linearis	Polemoniaceae								711	
Rubus parviflorus	Rosaceae								III.	
Astragalus robbinsii	Fabaceae				11/15				Tim	
Spiraea betulifolia	Rosaceae							1000		
Onobrychis viciifolia	Fabaceae							1 1 1		
Hieracium cynoglossoides	Asteraceae						No.			
Rhus glabra	Anacardiaceae							1 = 1	TTE	
Gentianella propinqua	Gentianaceae							No.		

Group 3: start flowering AFTER end-May. Page 2.

TAXON	FAMILY	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
00.5										
Vicia cracca	Fabaceae									
Calochortus macrocarpus	Liliaceae						Щ	L-1.		
Veronica beccabunga	Plantaginaceae									
Hieracium caespitosum	Asteraceae		1:11:				36		44	
Verbena bracteata	Verbenaceae									
Sedum acre	Crassulaceae							1.20		
Conium maculatum	Apiaceae									
Campanula rotundifolia	Campanulaceae								1000	
Linnaea borealis	Caprifoliaceae							111		
Linaria vulgaris	Plantaginaceae									
Pedicularis racemosa	Orobanchaceae							THE REAL PROPERTY.	111	
Heracleum maximum	Apiaceae								111	
Gypsophila paniculata	Caryophyllaceae									
Medicago sativa	Fabaceae									
Orthilia secunda	Ericaceae								T.	
Pyrola asarifolia	Ericaceae									
Eriogonum umbellatum	Polygonaceae	11								
Lupinus arcticus	Fabaceae									
Microgilia minutiflora	Polemoniaceae									
Stellaria borealis / calycantha	Caryophyllaceae									
Hypericum perforatum	Hypericaceae						П			
Trifolium pratense	Fabaceae						-			
Pyrola chlorantha	Ericaceae									
Platanthera aquilonis	Orchidaceae								777	
Malva moschata	Malvaceae									

Group 3: start flowering AFTER end-May. Page 3.

TAVON	PARAILSZ	FFR	MAAR	ADD	MANUE	11.151	16.16	ALIC	CED	DOT
TAXON	FAMILY	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	ОСТ
Pyrola minor	Ericaceae									
Alisma triviale	Alismataceae									
Apocynum cannabinum	Apocynaceae									
Tetradymia canescens	Asteraceae		A I I I I							
Cirsium hookerianum	Asteraceae							1900		
Gentianella amarella	Gentianaceae						199			
Hieracium albiflorum	Asteraceae							- 100		
Polemonium pulcherrimum	Polemoniaceae			1111		3				
Carduus nutans	Asteraceae									
Geum macrophyllum	Rosaceae									
Cirsium arvense	Asteraceae		7 - 4 1	1-1-1						
Tiarella trifoliata	Saxifragaceae					4				
Genista tinctoria	Fabaceae						7			
Halerpestes cymbalaria	Rununculaceae								110	
Trifolium aureum	Fabaceae				10.0			100		
Gypsophila scorzonerifolia	Caryophyllaceae									
Hieracium aurantiacum	Asteraceae							111		
Epilobium ciliatum	Onagraceae									
Portulaca oleracea	Portulacaceae									
Acroptilon repens	Asteraceae									
Coronilla varia	Fabaceae									
Senecio triangularis	Asteraceae									l î
Mulgedium pulchellum	Asteraceae									1000
Polygonum majus	Polygonaceae					1				
Clematis ligusticifolia	Rununculaceae									

Group 3: start flowering AFTER end-May. Page 4.

TAXON	FAMILY	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
Stephanomeria tenuifolia	Asteraceae									
Platanthera obtusata	Orchidaceae						1		100	
Piperia unalaschensis	Orchidaceae		1 5							
Logfia (Filago) arvensis	Asteraceae					117				
Pedicularis bracteosa	Orobanchaceae								777	
Packera pseudaurea	Asteraceae									
Oenothera villosa	Onagraceae					-	K-			
Rhinanthus minor	Orobanchaceae									
Apocynum androsaemifolium	Apocynaceae									
Verbascum thapsus	Scrophulariaceae									
Angelica arguta	Apiaceae									
Centaurea stoebe	Asteraceae			13.1						
Rorippa curvisiliqua	Brassicaceae		1 - 1			10			Taxable (H H
Nepeta cataria	Lamiaceae		1 - 6		1111					
Potentilla gracilis	Rosaceae					10				
Hieracium umbellatum	Asteraceae		17-6			111				
Veratrum viride	Melanthiaceae			177						
Mitella trifida	Saxifragaceae			TT		14 8 17				
Prunella vulgaris	Lamiaceae									
Grindelia squarrosa	Asteraceae									14 11
Euphrasia nemorosa	Orobanchaceae								H 7	
Anaphalis margaritacea	Asteraceae					7.7				
Ranunculus sceleratus	Rununculaceae									
Goodyera oblongifolia	Orchidaceae									
Hippuris vulgaris	Plantaginaceae									

Group 3: start flowering AFTER end-May. Page 5.

TAXON	FAMILY	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
Erigeron strigosus	Asteraceae	1		HIT	H					
Cichorium intybus	Asteraceae					-176			111	
Cirsium vulgare	Asteraceae			1						
Centaurea diffusa	Asteraceae									
Epilobium brachycarpum	Onagraceae									
Eurybia conspicua	Asteraceae					111		-		
Mimulus guttatus	Phrymaceae							17.1		
Persicaria maculata	Polygonaceae		Thirt I							
Rumex stenophyllum	Polygonaceae									
Atriplex micrantha	Amaranthaceae				1.12					
Marrubium vulgare	Lamiaceae									
Solidago spathulata	Asteraceae									
Chimaphila umbellata	Ericaceae									
Chenopodium album	Amaranthaceae									
Platanthera dilatata	Orchidaceae							ALTERNATION OF		i de la
Lysimachia ciliata	Primulaceae									
Erigeron lonchophyllus	Asteraceae					111				
Galeopsis tetrahit	Lamiaceae									
Artemisia norvegica	Asteraceae							100		
Polygonum achoreum	Polygonaceae					AII				
Erigeron peregrinus	Asteraceae									
Orthocarpus luteus	Orobanchaceae									
Piperia elongata	Orchidaceae									
Mentha arvensis	Lamiaceae					1971				
Origanum vulgare	Lamiaceae									

Group 3: start flowering AFTER end-May. Page 6.

TAXON	FAMILY	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT
Physostegia parviflora	Lamiaceae		1111							
Conyza canadensis	Asteraceae					-				
Sonchus arvensis	Asteraceae									
Symphyotrichum campestre	Asteraceae									
Tanacetum vulgare	Asteraceae								_	
Mycelis muralis	Asteraceae					E.J.		100		
Potentilla diversifolia	Rosaceae							- 10		
Agoseris lackschevitzii	Asteraceae								10 ()	
Eurybia sibirica	Asteraceae					6.14				
Arnica parryi	Asteraceae									
Silene parryi	Caryophyllaceae	11-11-11	4114						111	
Clematis tangutica	Rununculaceae									
Ranunculus flammula	Rununculaceae									
Ranunculus aquatilis	Rununculaceae								111	
Artemisia absinthum	Asteraceae								110	
Persicaria amphibia	Polygonaceae							C 1		
Rumex fueginus	Polygonaceae									Table
Solidago canadensis	Asteraceae							C-4		
Parnassia fimbriata	Celastraceae									Hall
Veronica wormskjoldii	Plantaginaceae									.) [4]
Chamaenerion latifolium	Onagraceae						1-1-1-			
Artemisia ludoviciana	Asteraceae							1000		
Arctium lappa	Asteraceae									
Amaranthus blitoides	Amaranthaceae									

Group 3: start flowering AFTER end-May. Page 7.

TAXON	FAMILY	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	ОСТ
Lactuca serriola	Asteraceae									
Myosotis scorpioides	Boraginaceae									
Sium suave	Apiaceae									
Salsola tragus	Amaranthaceae							Ε.		
Sagittaria cuneata	Alismataceae					1.1.1				
Helenium autumnale	Asteraceae							100		
Rorippa palustris	Brassicaceae			11		333	120	-		
Amaranthus retroflexus	Amaranthaceae			4		7.1.				
Artemisia campestris	Asteraceae									
Kochia scoparia	Amaranthaceae									
Symphyotrichum ericoides	Asteraceae									
Symphyotrichum spathulatum	Asteraceae					- (1)				
Symphyotrichum lanceolatum	Asteraceae					7.11				
Symphyotrichum eatoni	Asteraceae									
Artemisia tridentata	Asteraceae					+14			91	
Artemisia lindleyana	Asteraceae									
Artemisia dracunculus	Asteraceae									
Pseudognaphalium stramineum	Asteraceae						E			
Spiranthes romanzoffiana	Orchidaceae					-1.1.				
Euthamia occidentalis	Asteraceae									
Artemisia frigida	Asteraceae					1101				
Polygonum aviculare	Polygonaceae									
Ericameria nauseosa	Asteraceae									

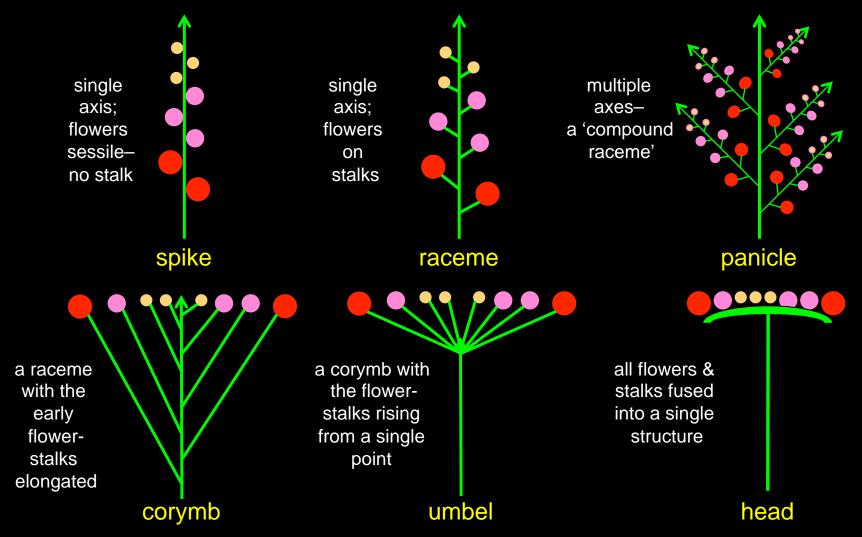
the form of inflorescences

- An inflorescence is that part of a plant that bears the flowers, be they single or multiple.
- Flowers are arranged on inflorescences in a variety of ways, depending on the manner in which the plant's body-parts— shoots, leaves & flowers develop and grow.
- These various arrangements are usually characteristic of species, and often of whole groups, such as Families,
 - e.g. umbels in Apiaceae, compound heads in Asteraceae.
 - Inflorescence form is therefore often of utility in plant identification.
 - There are two primary classes of inflorescence: "determinate" vs. "indeterminate",
 - depending on whether the main axis of the inflorescence ends in a terminal flower or a continuously-elongating growing point.
 - Within these two groups, inflorescences vary depending largely on the extent and pattern of branching shown by the flowering stem

The next two pages diagram some of the main kinds of inflorescence ···

indeterminate inflorescences

There is no terminal flower: all flowers are formed from lateral buds as the stem elongates. Here, flowers & stalks are shown arranged alternately, but they could also be opposite or spiral. Just as racemes can be compounded as panicles, there are compound coymbs & umbels too.

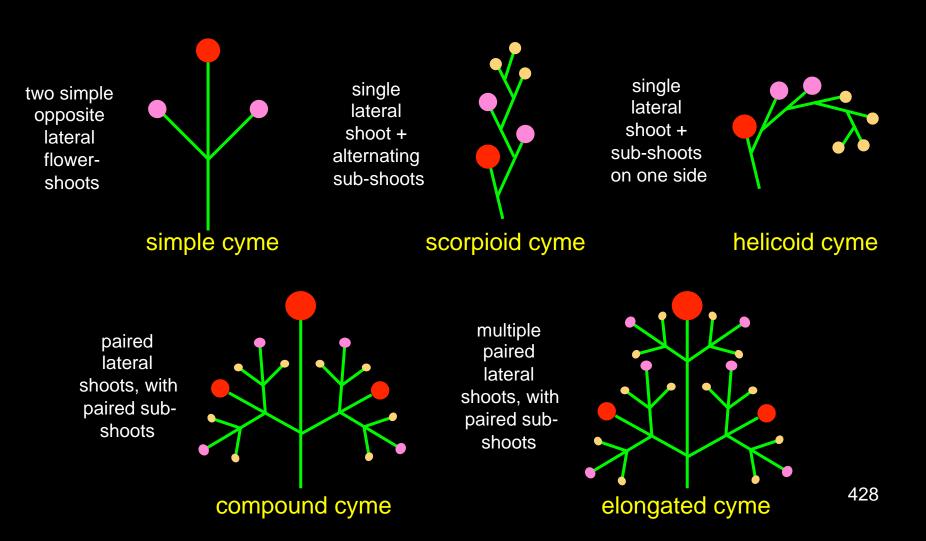


determinate inflorescences

The flowering stalk ends in a terminal flower: younger flowers form on lateral shoots below.

Lateral shoots may themselves have further sub-shoots of various sorts.

Inflorescence types result from the degree & pattern of lateral branching and sub-branching.



Changes in Names & Arrangement

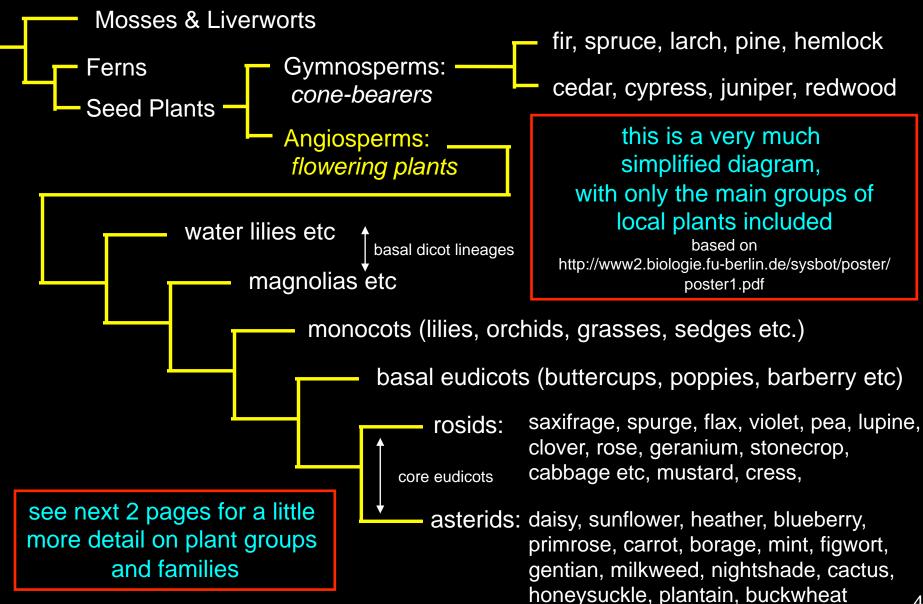
As the evolutionary relationships among plant species and lineages become further clarified, much through the analysis of DNA-sequence data, it is sometimes necessary to make changes to their naming and to their arrangement into a classification— this is because the naming & classification system is intended to be a precise representation of our best understanding of the evolutionary (genetic, historical, genealogical) affinities among species— that is, the closeness of the descent relationships among species and species groups, or lineages.

Today's generally accepted plant classification is that of the **Angiosperm Phylogeny Group**, first published in 1998; its most recent version is known as **APG IV** (2016); see following pages and http://www.kew.org/blogs/kew-science/apg-classification-consensus for details.

Here are examples of some of the changes that have been made to this list because of advances in our understanding of genealogical evolutionary relationships:

- ❖ Disporum hookeri is now moved to a different genus, as Prosartes hookeri
- Smilacina species are now shifted into Maianthemum.
- Several species of Arabis have been moved into the genus Boechera.
- Some genera (Collinsia, Penstemon) have been moved from Orobanchaceae (Broomrapes) into Plantaginaceae (Plantains).
- Though opinion is split on this matter, e-Flora has opted to separate *Phacelia* from the Boraginaceae (Borages, Forget-me-nots) into the Hydrophyllaceae (Waterleaf, Scorpionweed).
- All genera but Portulaca have been moved out of family Portulacaceae to other families; in our flora, Montia has been moved to Montiaceae.
- The Liliaceae has been broken into several families: Amaryllidaceae (Allium), Asparagaceae (Asparagus, Maianthemum, Muscari), Iridaceae (Iris), Melanthiaceae (Toxicoscordion, a.k.a. Zigadenus), and Liliaceae (Calochortus, Clintonia, Fritillaria, Lilium, Prosartes, Streptopus).

Evolutionary Relationships of Plants



As mentioned above, our understanding of the evolutionary relationships of Angiosperm plants and their corresponding arrangement in their classification has changed substantially in the last 25 years or so. Before that, flowering plants were seen as comprising two clearly distinct lineages – monocots & dicots – based on physical characters such as flower and leaf structure (while the relationships among their constituent families was often poorly understood.)

From the study of DNA-sequence data, we now know that the monocots are actually nested among several lineages of dicot plants, meaning that some dicots are more closely related to the monocots in evolutionary terms than they are to other dicots, despite their morphological similarities, as shown in the preceding tree diagram. The standard modern picture of evolutionary relationships among plant groups is that provided by the Angiosperm Phylogeny Group (APG IV, 2016), followed here and in UBC's e-Flora

water lily group: Nymphaeaceae

magnolia group: Magnoliaceae

basal dicots

monocots:

"Liliaceae", Orchidaceae, Poaceae, Cyperaceae, Juncaceae

basal eudicots:

Ranunculaceae, Berberidaceae, Papaveraceae

core eudicots:

a full picture of the evolutionary classification of families in this album is on the next page rosids et al: Saxifragaceae

fabids: Euphorbiaceae, Linaceae, Violaceae, Fabaceae,

core eudicots Elaeagnaceae, Rosaceae

malvids: Geraniaceae, Onagraceae, Brassicaceae

asterids et al: Santalaceae, Cactaceae, Caryophyllaceae, Montiaceae,

Polygonaceae, Ericaceae, Primulaceae

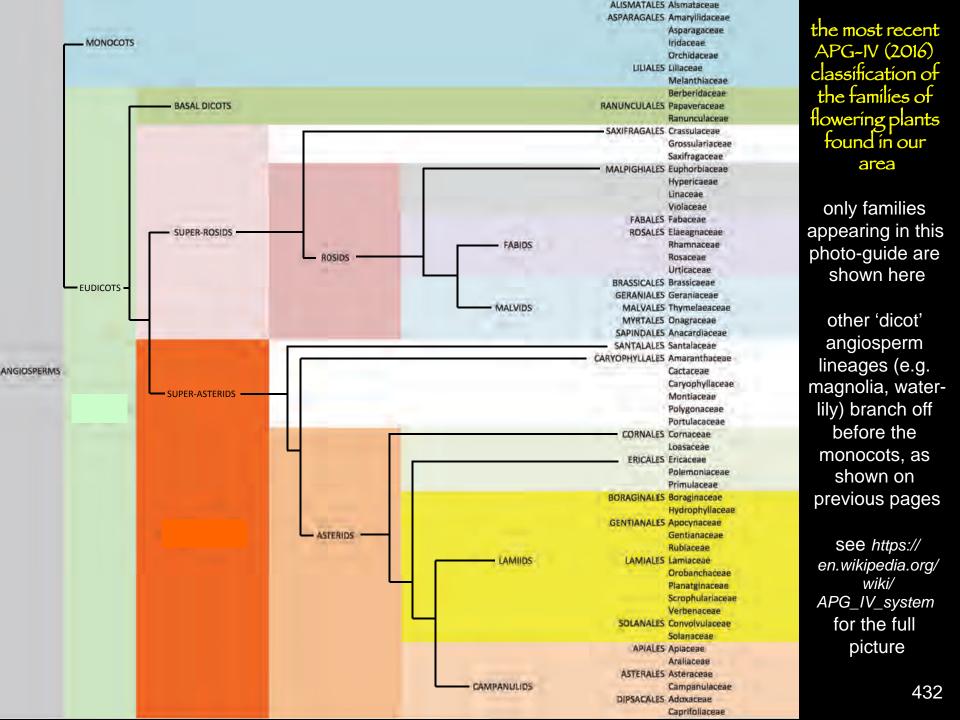
lamiids: Boraginaceae, Apocynaceae, Asclepiadaceae,

Gentianaceae, Rubiaceae, Orobanchaceae,

Solanaceae Planataginaceae, Scrophulariaceae

campanulids: Asteraceae, Apiaceae, Caprifoliaceae,

Campanulaceae



Why use scientific ("Latin") names? or: What's wrong with common names?

there are two primary reasons why it is more useful to use scientific names in biology:

- common names are neither unique nor standardized; rather they vary and overlap;
 but scientific (systematic) names are unique, precise & universal
- common (a.k.a. vernacular, or vulgar) names are simply labels (albeit sometimes descriptive);
 but scientific names both identify AND carry information about evolutionary relationships

as an example, take the vernacular name "robin". what kind of bird is being referred to? depending on where you are, you might be pointing to quite different, totally unrelated birds; all they have in common is some red, or reddish, feathers on their chests (and sometimes not even that). "Robin" really says little to nothing about who or what these birds really are; but their scientific names do.



Erithacus rubecula, the 'original' robin is a member of the large family of Old World flycatchers, the Muscicapidae



Turdus migratorius, the American 'robin' is actually a thrush in the wide-ranging family Turdidae, which is fairly closely related to Muscicapidae



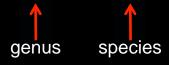
Petroica goodenovii, the Australian Red-capped 'robin', is in the strictly Australasian family Petroicidae, only distantly related to the other two here

the same confusion of vernacular names applies even more severely to plants, where the same species might be known by several very different names in different places— or even in the same place! Further, the very same name might be applied to quite different species. These vernacular names rarely give any clear indication of relationships



lemonweed puccoon, western stone-seed, Columbia gromwell, western gromwell, Columbia puccoon

Lithospermum ruderale





narrowleaf stoneseed, yellow gromwell, fringed gromwell, narrowleaf puccoon, plains stone-seed

Lithospermum incisum

corn gromwell, field gromwell, bastard alkanet



Lithospermum arvense

this example refers to three closely related species, well known in our area.

their most frequent vernacular names (around here at least) are given in **this colour**; those names provide no hint that the three species might be closely related to each other

white text provides alternative vernacular names, offering the possibility of further confusion

on the other hand, the unique scientific names, in yellow, unambiguously refer to one species ONLY, and show these species' close relationship though their being in the same genus; the uniqueness of the names leaves no room for ambiguity over what plant is being referred to.

The scientific naming system - Carl Linnaeus



dressed for fieldwork



dressed for marriage

its foundations were laid in the mid-eighteenth century, based in careful observation of the details of anatomy, initially of plants

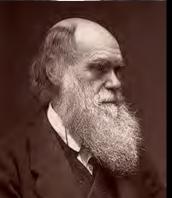
- systematic naming of species began with Linnaeus (1707 1778), a Swedish physician, botanist and zoologist, following his extensive fieldwork in Lapland
 - he saw a 'natural order' in the degrees of resemblance shown by organisms
 - his hierarchical grouping & naming system attempted to reflect this order
- his classification system of species, nested successively within genera, within families, within orders, classes, phyla & kingdoms, is based on the degree of sharing of similar structure in flowers & fruits
- species are more structurally similar to members of their own group than they are to members of any other groups at the same level in the classification
 - as we have seen, all species have a two-part name: genus + species
 - species within a given genus are the most similar of all
- Latin was the universal language of 'scientists' (but they also used Greek terms; now we use words from many languages)

but Linnaeus was not an evolutionist; he offered no <u>explanation</u> for the existence of the patterns he described

Why, then, is there a hierarchy of similarity?







this was the primary question addressed by the theory of evolutionary change

- Linnaeus saw the pattern of similarity but didn't know WHY it was there
- like other natural philosophers, he saw it as expressive of 'Divine Providence'
 - this changed dramatically with Charles Darwin; he developed a <u>natural</u> <u>explanation</u> for the hierarchy of structural resemblance among organisms
 - he proposed that all life is <u>related by descent</u>; that <u>close similarity</u> reflects <u>close descent from a recent common ancestor</u>
- the branching structure of descent thus explains the hierarchical, tree-like, pattern of similarity among organisms: closer relatives are more similar to one another than they are to more distant relatives
 - we have seen that all species have a two-part name: *genus* + *species*
 - species within any given genus are thus each other's closest relatives through evolutionary descent
 - so scientific names are unique, universal, AND directly informative of evolutionary relationships

at left, we see, from top to bottom, images of Charles Darwin in his early 20s, ready for the Beagle voyage; at 50, when The Origin of Species was published; and as the venerable patriarch, in his 70s.

Revisions to the Tree of Life & Classification



Cactaceae New World cacti



Euphorbiaceae Old World spurges

- similarity of morphological characters can reflect both close evolutionary descent relationship (recent common ancestry) and adaptation to similar conditions, producing evolutionary convergence of form. At left is a striking example of convergence in structure between two unrelated groups of plants in response to the exigencies of life in very arid desert environments: cacti in the New World, spurges in the Old World (there are no native cacti in the Old World).
 - sorting out the 'meaning' of characters can therefore be very tricky even with the floral characters that Linnaeus used
- analysis of DNA has been very helpful in sorting out this matter, and it has given us new pictures— sometimes strikingly distinct ones— of the structure of life's tree
 - these new pictures of descent relationships have required revisions in both naming and in grouping— to the question of "who belongs with whom"?
 - thus, many species have been moved to other genera
 - many genera have been moved to other families
 - and so on, up the hierarchy of life's tree

Descent with Modification was Darwin's answer to the structure of organismal diversity;

Natural Selection was his answer to the close fit of organisms to conditions

Changing Neighbours

Scrophulariaceae— the figwort family— used to embrace many local species:



but recent DNA work has shown that most of our members of this family properly belong with (are more closely related to) two other families— *Orobanchaceae *Plantaginaceae

leaving one species in the Scrophulariaceae – Verbascum thapsus, mullein

