Common Coulee Plants

of Southern Alberta

John Bain ◆ June Flanagan ◆ Job Kuijt

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About the Authors

John Bain is a botanist at the University of Lethbridge and is the successor to Job Kuijt in that position and as director of the University of Lethbridge herbarium. His quests for enlightenment on all matters relating to *Packera* (ragwort) species have compelled him to travel extensively in western North America and helped him to become familiar and enamoured with the plants of that region.

June Flanagan is a botanist, environmental horticulturist, author and photographer. She enjoys opportunities that combine professional work with her passion for native plants, and she enthusiastically explored southern Alberta's natural landscapes to capture the images for this guide.

Job Kuijt is professor emeritus at the University of Lethbridge. He lives on Vancouver Island and continues to pursue his passion for mistletoes and their hosts.

Preface to the Second Edition

As the joint authors and revisers of this new edition of *Common Coulee Plants of Southern Alberta*, we share a love of local floras and the books that help unlock their secrets and beauty.

Simple, useful tools for local plant identification are surprisingly hard to find. We have always enjoyed working with Job Kuijt's first edition of this book, and we felt that it was a great candidate for updating and digitization.

These days, most of us who venture out in search of plants and wildlife already carry some sort of compact electronic device wherever we go. These devices can help us identity plants in the field, by displaying pictures and drawings, as well as allowing easy navigation to plant descriptions that minimizes the page turning and thumbing of traditional books. Our revision and digitization of this book makes use of these electronic advantages, while preserving the key elements that appeared in the first print edition.

A major strength of the original book was Kuijt's inclusion of simple, but accurate line drawings that captured the essence of each species he featured. His drawings remain a valuable part of this new edition, complemented by the addition of colour images of the plants in their natural environment. Every photograph was intentionally composed to reflect Kuijt's corresponding line drawing of the same plant.

We kept Kuijt's original organization of the book, with the plants divided into sections according to flower colour. The plant descriptions remain in Kuijt's relaxed, conversational style, with his use of imperial measurement units, although some descriptions were slightly condensed to fit the digital layout.

How to use the EPUB edition of this book

In the electronic edition, we have incorporated numerous tools to help you navigate the book. Links throughout the Table of Contents, Plant Flowering Times Chart and Index quickly connect you to relevant entries in the book. The Table of Contents is readily accessed from the List icon in the menu on your device.

At the beginning of every flower colour section, Kuijt's line drawings appear as a set of thumbnails, depicting all the plants in that section. These thumbnails can help you make a preliminary plant identification. A single tap on any thumbnail in the group takes you

directly to the corresponding plant description.

Each plant description also contains a line drawing and a photograph to help you confirm the plant's identity. A double tap on either image enlarges it to fill the screen of your device. A double tap on the full screen view returns you to the plant description page. Kuijt included a one-inch (2.54 cm) scale bar next to each line drawing to help you estimate the plant's size.

Pages of the book can be accessed with one tap or a swipe near the edge of the screen, or by the menus in your device that appear near the top and bottom of the screen. Links are also included in relevant places in the text so that you can easily and quickly compare characteristics of similar plants in other entries.

If your device does not behave in exactly the way described, we encourage you to experiment or consult the Users manual as we have noticed some variation across platforms in how results are achieved.

Why are there new names for old familiar plants?

Every plant species is identified by a unique scientific name that is used all over the world, no matter what language is spoken. Ongoing research into plant evolution and classification has revealed many new relationships, especially amongst the grasses and composites (daisies), so it is inevitable that some familiar plants will show up in this edition with new names.

We include both updated scientific names along with older names to make it easier for you to get information about the plants from new and older field guides. The plant descriptions are still listed under the same scientific names that were used in Kuijt's original book, but in cases where a scientific name has changed, we added it below the old familiar name, and identified it as a current name. Common names are listed in parentheses, with the current officially accepted name listed first, followed by other commonly used local names if they exist

Our source of official scientific and common plant names is the Database of Vascular Plants in Canada (VASCAN). It is linked to the Flora of North America project, an organization that synthesizes information within the botanical community in Canada and the United States.

Finally, plant names aren't the only changes that have occurred since the original publication of the book. We believe that the coulee

flora has also changed as a result of increased pressure on the landscape exerted by human activity. In the original introduction, Kuijt remarks that "it is interesting to see . . . how little the natural, undisturbed coulee habitat has been invaded by introduced weeds", but we feel that this is no longer true. Large tracts of coulee have been disturbed and have succumbed to invasions of crested wheatgrass, leafy spurge, and other noxious weeds. Once the soil is broken, no natural controls exist to prevent non-native weeds from outcompeting our native species. It is our hope that this book will foster an appreciation of native plants and a desire to protect our natural landscape from future degradation.

Also, it was an ambitious project for us to find and photograph all the plants Kuijt featured in this book at the appropriate time of year in their natural habitat. Some plants may be absent in some years, and others might be less common than they were at the time the first edition of this book was written. However, out of one hundred twenty-four featured species, only nine remain to be photographed in the coulees. We included photos of pressed plants from the collection at the University of Lethbridge herbarium for these nine species. We will replace the herbarium images with photos taken in the coulees as they are acquired

John Bain
June Flanagan

Introduction to the First Edition

The coulee areas of southern Alberta provide one of the most distinctive natural habitats in the province and, indeed, in Canada. Long ignored by many as sterile and barren waste-lands, undisturbed coulees are places of great and subtle beauty. Yet, it has remained very difficult for the naturalist to identify the many colourful and unusual kinds of plants that grace the coulee slopes. This little book is written for such people.

There are two other books that are useful. The "Flora of Alberta" of E.H. Moss attempts to treat all plants that have been reported for the province. It is a technical work, however, lacking any illustrations, and has no appeal to any but the most advanced botanical amateur. It also tends to be very superficial when speaking of habitat preference and geographical occurrence of species. It represents the standard botanical survey of Alberta, however and becomes more indispensable when one's acquaintance with Alberta plants grows. The other book, "Wild Flowers of Alberta", by R.G.H. Cormack, complements Moss' book, being a collection of colour photographs accompanied by semi-popular descriptions. From the point of view of our needs in the Alberta coulee lands it is too unwieldy a collection of illustrations, and in some respects lacks accuracy. Furthermore, nearly one-half of the species that I have selected as the most common or obvious for the coulees are not illustrated or mentioned in Cormack's book. Both books, nevertheless, have undoubted usefulness for more advanced students and amateurs who turn their attention to Alberta plants in general.

I make no pretense that all native coulee plants are treated in these pages. A truly complete listing would have required many years of work, and would have been only slightly more useful to all but the professional botanist. Instead, I have focused my attention on three pivotal areas: Dinosaur Provincial Park, Lethbridge, and Writing-on-Stone Provincial Park. These three areas provide a triangle reaching the periphery of the Alberta coulee region, and also represent the three areas where this sort of treatment will be most useful. Meanwhile, there is no reason to believe that the other coulee lands within or near this triangle will have a significantly different plant cover. The more knowledgeable amateur who takes special delight in ferreting out the uncommon native or introduced plants is referred to

the literature listed in the bibliography.

Coulees are here defined as semi-arid, treeless valleys, usually of smooth but often rather steep contours. The best developed coulees in the province are found along the Oldman River from Monarch to Taber. In the Drumheller area the resistant rock of certain layers, along with the unusual qualities of soft layers, has prevented the formation of smooth contours, resulting in the striking topographical features exemplified by Dinosaur Park. Further south, the Milk River Ridge contains many well preserved coulees. The extraordinary rock formations of Writing-on-Stone Park again illustrate the way in which particular sedimentary layers can dictate the appearance of the landscape.

Coulees normally are tributary valleys to rivers. On the whole, therefore, we find them to be approximately perpendicular to the river valley. This is not always true; for example, in the Lethbridge area a series of long, parallel coulees runs at a considerable slant towards the Oldman River. Since the course of especially the Oldman River is quite convoluted, the associated coulees may therefore run in any direction of the compass.

The mature, smooth contours of the coulees are frequently interrupted by unstable sections where natural erosion is very rapid, or where different sedimentary layers vary greatly in the rapidity of erosion. Examples from Dinosaur and Writing-on-Stone Parks have already been mentioned. It stands to reason that massive erosion is caused by the meandering of rivers. Along the major curves of the Oldman River, for instance, nearly perpendicular cliffs are present. Where the supporting layers lack such strength, large-scale slumping may occur. Large slumps frequently carry great portions of natural vegetation downward where they continue to flourish in their new location and can eventually contribute a degree of stabilization.

Atmospheric humidity and precipitation in this part of Alberta is very low, and it is no great exaggeration to call it a semi-desert. Annual precipitation ranges from 12 to 16" on the average but only about 9" of this falls during the growing season. The amount of water actually available to plants, of course, is far less than that as the area is one of the sunniest and windiest in Canada and much water therefore evaporates quickly.

The animal world of the coulees is also much richer, even today,

than it would at first appear. White-tailed and mule deer, porcupines, skunks and raccoons find protection within them, and are directly or indirectly sustained by the varied vegetation. There are reports of bobcat and even cougar, although perhaps not recently. In the early days of the West, bighorn sheep, elk, and probably grizzly bear roamed the coulees and ventured out onto the neighbouring prairies. In turn, many of the more typical prairie animals, including buffalo and pronghorn antelope, were to be encountered in varying numbers on the coulee slopes. Bird-life is similarly varied in the summer, although probably again less so than in the past.

It soon becomes obvious to the observant naturalist that the vegetation on the coulees is by no means uniform or homogeneous. The two overriding factors determining the distribution of plant growth are slope direction and wind, especially the south-westerly Chinook winds. It stands to reason that south-facing slopes are warmer, and therefore drier than north-facing slopes. Wind directions during the growing season are predominantly from the west-southwest, so slopes facing that way desiccate most, and those facing toward the north-east hold their moisture longest. We see, therefore, that the two dominant environmental factors (aside from precipitation) have very nearly the same compass direction.

The two slopes facing each other across an east-west coulee may thus have a very different vegetation cover. On the exposed slopes we find cacti, cushion milk-vetch, moss phlox, and many other low, drought-resistant herbs. The protected slopes, in addition to having many drought-sensitive smaller plants are characterized by low shrubs of several species and a far more dense vegetation cover. In the species treated in this book I have indicated such ecological preferences wherever they seemed meaningful.

Three typical views of coulees (Lethbridge)

1. The coulee landscape bordering the Oldman River valley provides a diversity of habitats including a riparian zone in the bottom of the river valley as well as slopes of diverse aspect and therefore diverse moisture regimes.

2. View west. The north-facing slope (left) supports much lusher vegetation than the south. Saskatoon, chokecherry and golden currant grow on these slopes, but few shrubs inhabit the dry south-facing slopes.

3. View northeast. The south-facing slope has much sparser vegetation than the north-facing slope. Skunkbush and various sages are the major shrubby components in the dry grass-dominated landscape.

In addition to exposure to sun and chinooks, local topographical features may influence plant distribution in indirect ways. Deep snowdrifts, for example, tend to accumulate each year in the same places just below the brow of a ridge or hill. Not only are plants in such snow drifts protected from the caprice of the chinook in the wintertime, but they also profit from a more extended supply of moisture in the spring. Saskatoons, chokecherries and other shrubs flourish here, and reach their greatest height. The very existence of such shrubs increases the catchment effect.

In selecting the species in this book, much difficulty was encountered in the lower river bottoms and largest coulees. It is in such moister places that our coulees permit, as it were, the invasion of some elements that really belong to the vegetation of the more forested areas, or to the specialized flora associated with permanent rivers in the prairie region. Most prominent among these natural "interlopers" are moisture-loving trees and shrubs such as poplars, willows, red-osier dogwood, hawthorn, black birch, and western clematis. Many of the more humble plants in these low places are also in this category, for example some horsetails, and occasional species such as veiny meadow rue, small leaved alum root, silverweed, prickly rose, western Canada violet, water hemlock, and many others. The intricately dissected topography of Writing-on-Stone Park proved particularly difficult in the selection of species, as it contains many protected niches for plants that are not coulee plants in any way. Among these I might mention Menzies campion, fairy bells, fragile bladder fern, and Canadian buffaloberry. Aside from these "natural interlopers", introduced weeds often find a ready access to valley floors and coulee bottoms, especially because of intensive use by man and grazing animals.

Introduced weeds may cause confusion in other coulee areas also. Weedy species are sometimes subject to rapid changes in numbers; they may appear and disappear rather quickly, although many others are now permanent residents along roads and in other disturbed sites. It is interesting to see, however, how little the natural, undisturbed coulee habitat has been invaded by introduced weeds. I exclude from this book plants that grow only in disturbed areas, whether roadsides, heavily travelled trails and paths, or overgrazed range lands. For more accurate identifications of such plants the reader is

referred to the works by Budd and Best or Moss, as cited in the bibliography.

Job Kuijt

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Links to Plants

Plants with **white** flowers
Plants with **yellow** flowers
Plants with **pink, orange, red or blue** flowers
Plants with **green** or **inconspicuous** flowers or **lacking** flowers altogether

Plants with **white** flowers

1. *Achillea millefolium* L. (yarrow, milfoil)

A single-stemmed plant, usually about a foot tall, growing from a somewhat creeping, underground stem, the upright stem with feather-like, very finely dissected leaves, the basal ones with petioles, the upper ones without. Flowers in very small heads, these grouped in a more or less flat-topped mass. Each flower head has 3-5 white, petal-like flowers and a yellow and white heart. An aromatic plant found around the northern hemisphere, sometimes into alpine areas. Sparsely in the coulees, mostly on north-facing slopes

Flowering time: Mid-summer

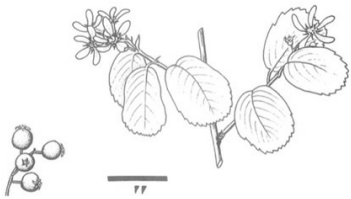
2. *Allium textile* Nelson & MacBr. (prairie onion)

A slender-leaved onion with the characteristic onion smell. A single stem grows from a small fibrous bulb to about 6-8" where two papery leaf-like organs protect a dozen or more white or pale pink flowers. The leaves are about the same length as the flowering stem. Flowers with six petals, that bleach and stay around the developing fruit until the end of the summer.

The prairie onion has a tendency to grow in small clusters, and is rather generally distributed through the coulees. The only other coulee onion is *A. cernuum*, with a nodding stem just below the flowers, leaves much shorter than the stem, and a much later flowering period. Native onions can be eaten but are of a strong flavour.

Flowering time: May and early June

3. ***Amelanchier alnifolia*** **(Nutt.) Nutt. (saskatoon, serviceberry)**

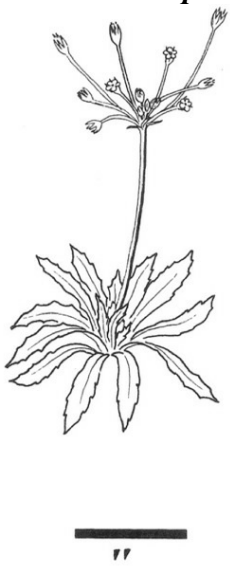


A small shrub, becoming a small tree up to 15 feet high in moist, protected places, forming colonies by "suckering" from the ground. Bark of young twigs shiny reddish-brown, becoming grey in age. Leaves attached singly by means of a petiole, leaf-blade broadly elliptic, with marginal teeth at the upper half of the leaf only; tip of leaf blunt. Flowers on short, leafy shoots growing from last year's branches, about half a dozen in each group. Petals white, slender, five, stamens many more. The fruit is a dark blue berry-like pome of sweet taste and rather large seeds.

The saskatoon is the best known native prairie fruit which bears abundantly in the coulees in some years but fails in others. The First Nations people of the plains ground fruits and seeds together and incorporated them in their pemmican, and had many other ways of eating them. Great quantities of berries were dried for use in the winter, and the wood was used for arrows. The berries mature in the coulees in late June and early July. The only similar coulee plant is the chokecherry that has pointed leaves and long, many-flowered groups of flowers. Protected slopes.

Flowering time: Late May to early June

4. *Androsace septentrionalis* L. (northern fairy-candelabra)



A minute plant ranging from one to several inches high. A whorl of rather long, slightly toothed leaves is formed one year, flat on the soil surface. The next spring, one or a few stems spring up, dividing themselves into many very slender stems, all quite leafless, and each with a single small five-lobed white or pinkish flower. In exposed sites, the stems become reddish-green. The plant is rarely seen, probably because of its inconspicuous appearance.

Flowering time: May

5. *Anemone multifida* Poir. (cut-leaved anemone)

A hairy plant with long-petioled, deeply cut, fan-shaped leaves coming from a stout root-stock. The stems are one or several, a foot or more high, leafless to about the middle where two or three petioleless leaves are attached. From here a long one-flowered stalk rises, often accompanied by one or more later stalks, that again bear very small leaves halfway up the stalk, and a single flower. Flower about ½" large, usually creamy white inside, often pink or purple outside. The fruits form a small white-woolly mass that is globular in shape.

Flowering time: Late May to early June

6. ***Antennaria microphylla*** **Rydb. (little-leaved pussytoes, neat everlasting)**

A small silvery-grey plant forming loose mats of creeping stems. The leaves are less than an inch long and are broadest above the middle. From the creeping stems, flowering stems up to 5 or 6" high grow upward, with small stem leaves. Flowers minute, in several to many small white or pink flower-heads, surrounded by papery, scale-like leaves. Fluffy "seeds" develop later, to be blown away by the wind.

Most common on protected slopes.

Another species of everlasting, *Antennaria parvifolia* Nutt., is also present here and there in the coulees and is very similar. It is generally much shorter, 3” being a normal height, with a stouter stem and somewhat larger flower-heads and papery scale-like leaves.

Flowering time: Mid-summer

7. *Aster pansus* (Blake) Cronq. (tufted white prairie aster)

Current name: *Symphyotrichum ericoides* (L.) G.L. Nesom var. *pansum* (S.F. Blake) G.L. Nesom

Stems often lodged, only rarely upright, several from a common root-stock. Leaves less than an inch long, narrow. The upper part of the stem with many side branches, each bearing numerous flower-heads about ½" in diameter Flower-heads white with yellow heart.

Protected slopes and especially coulee bottoms.

Flowering time: Late July to August

8. *Astragalus crassicarpus* Nutt. (ground plum milk-vetch, buffalo bean)

A stout, several-stemmed plant with lodged stems usually no higher than 5 or 6 inches. Leaves with many elliptical leaflets. Each stem with several separate flowering stalks bearing half a dozen flowers or more. Flowers creamy white with purple centre. Fruit a nearly spherical pod about an inch in diameter, red and fleshy when young, brown and hard when mature. Grassy areas, usually in lower coulees.

The name "ground plum" derives from the edible qualities of the young pod. This is a non-poisonous milk vetch to livestock.

Flowering time: Mid-summer

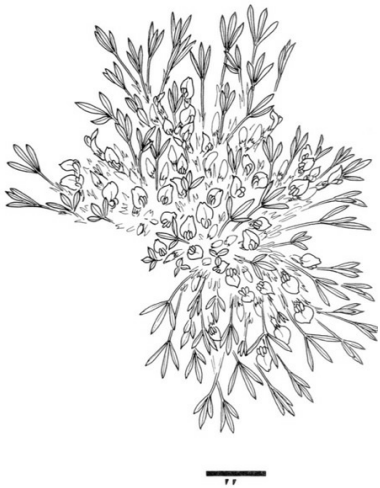
9. *Astragalus drummondii* Dougl. (Drummond's milk-vetch)

A grey-hairy upright plant with several stems per root-stock. Leaves with many elliptical leaflets, hairy below and almost smooth above. Each stem with 3 or 4 upright flowering stalks, bearing many creamy white, somewhat drooping flowers. Fruit a hanging, slender, hairless pod.

Grassy coulee bottoms; occasionally on north-facing slopes.

Flowering time: June

10. *Astragalus gilviflorus* Sheld. (plains milk-vetch, cushion milk-vetch)



A dense cushion-like plant up to 8" in diameter. The silvery-grey leaves reach no more than two inches from the ground, and are divided into 3 long, pointed leaflets. Flowers about an inch long, nearly stemless, facing up, creamy white, and in dense masses. Fruit a silky, short pod with few seeds.

The plains milk-vetch prefers coulee ridges, and adjacent upper slopes. It is a very attractive plant.

Flowering time: May

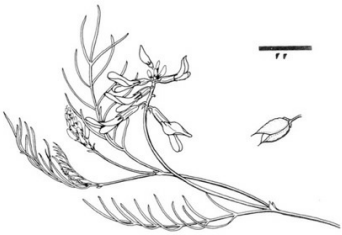
11. ***Astragalus kentrophyta*** **Gray (prickly milk-vetch)**

A low, dense and much-branched plant with 5- (sometimes 7-) parted leaves, the leaflets narrow and sharply pointed. Flowers very small, yellowish-white, often with a pink tinge, in small groups in the axils of the leaves. Fruit a short, rather flat pod about ¼" long.

Fairly common among the cliffs at Writing-on-Stone Provincial Park, but not seen from Lethbridge or Dinosaur Provincial Park.

Flowering time: Mid-summer

12. *Astragalus pectinatus* (Hook.) Dougl. (narrow-leaved milk-vetch)



Several, partly lodged stems from a common root-stock, the stems about a foot long but reaching upwards for about 8". Leaves divided into extremely long and narrow, pointed leaflets. Flowering stalks with a dozen flowers or more, these creamy white. Fruit a small, hanging pod, nearly solid and cylindrical, becoming hard and woody. Poisonous to livestock, but only rarely eaten by them.

Grassy ridges, north-facing slopes, and dry coulee bottoms.

Flowering time: Late May to early June

13. ***Astragalus tenellus*** **Pursh (slender milk-vetch)**

A slender milk vetch with several thin stems springing from each root-stock, very thinly hairy or quite hairless. Leaflets rather thin and narrowly elliptic, less than ½" long. Flower-stalks one per leaf axil, commonly with a second smaller one, each with six or more flowers loosely strung along the stalk. Flowers pale creamy-white. Fruit a small, flattened pod pointed at both ends. Grassy coulee sides and ridges.

Flowering time: June to early July

14. *Cerastium arvense* L. (field chickweed, mouse-ear chickweed)

In the coulees, this plant is a slender, sparsely branched perennial. Leaves in pairs, short-hairy, about an inch long, the lower ones usually having tufts of small leaves in the axils. Flowers several per stem, usually on rather long, slender stalks. Petals five per flower, deeply cleft so as to appear to be ten, pure white.

Among grasses on protected slopes and coulee bottoms.

Flowering time: Mid-summer

15. *Chamaerhodos erecta* (L.) Bunge (rose chamaerhodos)

A reddish-green, biennial plant usually no more than 8" high, with finely divided leaves, the leaflets long and narrow with many short hairs. In its first year a whorl of leaves is formed only; in the second season a single, branched stem arises with many rather inconspicuous, white, five-petalled flowers, each with five bristly sepals.

Rather common in open places in Writing-on-Stone Provincial Park, and found also in coulee bottoms at Monarch; apparently rare at Lethbridge and Dinosaur Provincial Park.

Flowering time: Mid-summer

16. *Clematis ligusticifolia* Nutt. (western white clematis)

An unruly woody climber on other bushes and trees, with long, pliable but strong stems. Leaves in pairs, each with 5-or 7-toothed stalked leaflets. The leaves may wrap themselves around other stems. Flowers pale creamy-white, in small loose groups on short axillary shoots, less than an inch in diameter, with four petals and many stamens or stamen-like organs. Fruits many per flower, provided with long, feather-like attachments. The plants are either male or female, only the latter producing fruits.

Not strictly a coulee plant, but often conspicuous in shrubby areas nearby and in the protection of cliffs, as in Writing-on-Stone Provincial Park.

Flowering time: Mid-summer

17. *Comandra umbellata* (L.) Nutt. (bastard toadflax)

A hairless, blue-green plant, with rather stiff stems about 6-8" high, from a white underground root-stock. The upper part of flowering stems is branched, bearing numerous white or pink, five-pointed flowers in a rounded arrangement. Several leafy, sterile, unbranched branches often grow from the lower part of the flowering stem. Fruit a dry, green berry-like drupe with one very large seed.

Very common on ridges and coulee sides. This plant is parasitic on many of its neighbours, attacking their underground organs by means of small, white, clamp-like organs. The only other common parasites in the coulees are *Orobanche fasciculata* (see No. 27) and *Orthocarpus luteus* (No. 56).

Flowering time: Mid-May to the end of June

18. *Cryptantha celosioides* (Eastw.) Pays. (cock's-comb cryptantha)

Grey-hairy plants, biennial or short-lived perennials, with one or several leafy flowering stems arising from a dense cluster of leaves. Lowest leaves somewhat spoon-shaped, the upper ones becoming narrower. Flowers in a rather compact, elongated arrangement, white with yellow heart, five-petalled and in the shape of a forget-me-not, with very sweet perfume.

A strikingly handsome plant that is rather common on ridges and south-facing slopes.

Flowering time: Late May and June

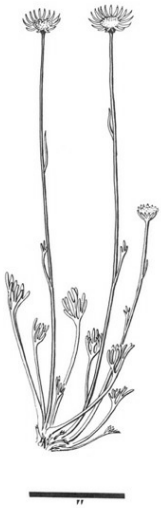
19. *Erigeron caespitosus* Nutt. (tufted fleabane)

A plant with several upturned, leafy flowering stems that are rather densely covered with short white hairs, and may reach half a foot or slightly more in height. Leaves also hairy, the stem-leaves narrowed at the base but without distinct petiole, the ones growing directly from the root-stock with petioles nearly half of the total leaf length. One or often several daisy-like flower-heads per stem, nearly white or pink with yellow heart.

Common in all but the most exposed coulee areas, but never in great numbers.

Flowering time: June to mid-July

20. *Erigeron compositus* Pursh (cut-leaved fleabane)



A small, tufted perennial, rarely taller than 6". Leaves divided into many narrow segments, the petioles accounting for at least half of the total leaf length; these leaves all growing from the root-stock. Flower-heads single, elevated above the leaves on stalks that are leafless except for 1-3 small, narrow, and usually simple leaves, white to very faintly pink with yellow heart.

Common on many exposed sites, but almost totally absent in grassy areas.

Flowering time: Late May and early June

21. ***Fragaria virginiana*** **Miller (wild strawberry)**

A trailing plant with long-petioled leaves divided into three more or less equal divisions with toothed margins. From the root-stock emerge slender, long, creeping, red stems from which small daughter plants develop. Flowering stems also from the root-stock, practically leafless, with several long-stalked, five-petalled white flowers with yellow hearts containing many stamens. Fruit a small strawberry.

Not a plant of exposed coulee areas, the wild strawberry prefers rather shaded habitats among shrubs and other high vegetation along intermittent water courses or in river valleys.

Flowering time: Late May to early July

22. *Galium boreale* L. (northern bedstraw)

A single-stemmed, upright, hairless plant from a slender underground stem. Leaves in whorls of four, lacking petioles. Stems profusely branched above, the branches slender and bearing numerous small, white, four-parted flowers in a loose elongated mass above the leaves. Plants either male or female, the latter producing small, double, hairy dry fruits.

Very common along the south rim of Writing-on-Stone Provincial Park and probably elsewhere; present in Dinosaur Provincial Park. Not to be expected on dry, exposed sites.

Flowering time: Late May to early June

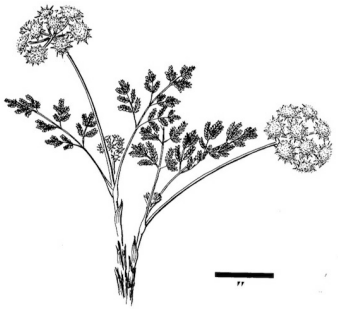
23. *Glycyrrhiza lepidota* Pursh (wild licorice)

A stout, upright plant, usually in well-spaced colonies, covered with short hairs that are slightly sticky when fresh. In river valleys the plant may reach three feet in height, but in coulees two feet is more usual. Leaves divided into numerous, sharply pointed leaflets an inch or more long, dotted on the lower surface. Flowering stalks stout and single in the leaf axil, the creamy white flowers crowded into an elongated mass. Fruits burr-like pods armed with hook-like stiff bristles, normally staying on the dead plant through most of the winter.

Normally common in coulee bottoms, but occasionally flourishing on protected upper slopes, and even south-facing slopes in the Lethbridge area.

Flowering time: Late June and July

24. *Lomatium macrocarpum* (Hook. & Arnott) Coult. & Rose (large-fruit desert-parsley, white prairie parsley)



Plants low and apparently stem-less, growing from an upright fleshy root. Leaves parsley-like but rather flat, finely hairy, with the petioles widening into a sheath below. Flowering stems lodged at least in part, leafless, the small, whitish, five-parted flowers in umbrella-like groups of separate, loose heads, the latter supported by green, narrow leafy organs extending beyond the flowers. Fruits flat, double, long-elliptical, with two thin, wing-like margins.

A rather inconspicuous plant found on ridges and exposed coulee sides.

Flowering time: Early May

25. *Mentzelia decapetala* (Pursh) Urban & Gilg (ten-petalled blazing star, ten-petalled evening star, sand-lily)

Stout, leafy, biennial plants with a sandpaper-like texture, forming only a rather flat, dense whorl of leaves the first year and a single two- or three-feet tall branching flowering stem the second year. Leaves several inches long, with deeply and coarsely toothed margin. Flower 2 or 3" in diameter with ten pointed pale-yellow petals and innumerable slender stamens, the flowers opening in the evening. The fruit is cylinder-like, opening at the top to release the numerous seeds, that have two-narrow and thin-winged margins.

The ten-petalled evening star (the more descriptive of the three common names) grows on dry banks and roadsides, often where erosion is rapid.

Flowering time: Late June to early August

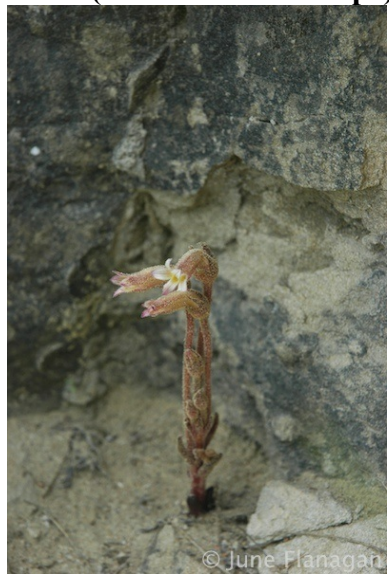
26. *Oenothera cespitosa* Nutt. (tufted evening primrose, butte primrose)

A stemless plant with numerous long, shallow-toothed, pointed leaves, the petioles being almost half the total leaf length. Flowers on single, unbranched stalks, about 2" with four large, notched petals and eight stamens. The petals are white at first but turn pink and even dark red in age. The flowers open at night and have a sweet and pleasant perfume. The fruit is short-cylindrical, splitting open into four valves.

A handsome plant rather common in some exposed areas.

Flowering time: Early and mid-summer

27. *Orobanche fasciculata* Nutt. (clustered broomrape)



Annual plants lacking all green colourations with half a dozen or more long-stalked flowers from a fleshy, tuberous and scaly stem, attached to and parasitic on thin roots of sage-brushes (most commonly *Artemisia frigida*). Flowers slightly curved and tubular, with five rather pointed petals, creamy-white but sometimes rose-pink.

Flat areas, but also on some coulee slopes where its host is common.

This species, the yellow owl's-clover, and the bastard toadflax are the only common true parasites among our native coulee plants, although these three are not related to each other. The clustered broomrape is extremely abundant in some years, yet totally absent in the same area the next; this fluctuation is probably due to differences in early-summer rainfall.

Another broomrape, *Orobanche ludoviciana* Nutt., is also native to the prairies, but appears to be less common. It may be distinguished from the clustered broomrape by its usually stout, above-ground stem, on which the normally purplish flowers, each nearly without a separate stalk, are crowded together.

Flowering time: June

28. *Oxytropis sericea* Nutt. (white locoweed, early yellow locoweed)

A tufted plant of light grey-silky appearance, the leaves divided into seven or more sharply pointed leaflets. Several leafless flowering stalks usually grow from a single root-stock, the flowers being crowded together along the upper part of the stalk. Flowers light creamy-yellow, in the shape of that of a pea, about ½" long, later growing into short-hairy pods.

Ridges and other more or less exposed sites.

This very attractive plant is poisonous to livestock.

Flowering time: May to early June

29. *Penstemon albidus* Nutt. (white beardtongue)

Stems upright, rather leafy, usually one per plant, reaching a height of a foot at most. Leaves in pairs, the clustered ones with petioles but those on the stem without, long-elliptical in shape, with smooth or inconspicuously toothed margins. Flowers clustered along the top one-half of the unbranched stem, tubular, with five rounded petals, white with blue or purple lines on the lower inside. The throat of the flower is hairy.

An attractive plant of dry ridges and upper slopes.

Flowering time: May and early June

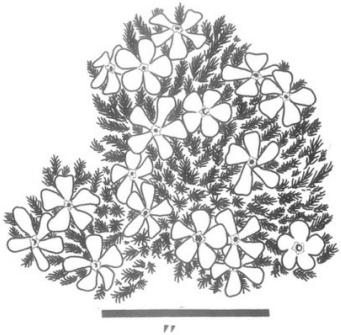
30. *Petalostemon candidum* Michx. (white prairie-clover)
Current name: *Dalea candida* Michx. ex Willd. var. *candida*

A slender, hairless, straight-stemmed plant, often lodged or prostrate with several branched stems from a common root-stock. Leaves with about five elliptic but blunt-tipped leaflets. Flowers are crowded together in long-stalked, elongated, dense heads, very small, white, the stamens sticking well out of the flowers.

Ridges and other, more or less exposed areas.

Flowering time: Early June to early August

31. *Phlox hoodii* Rich. (Hood's phlox, moss phlox)



Cushion-like plants with leaves in the form of soft, stout spines, these in pairs, crowded along short stems. Flowers white or sometimes pink, nearly stemless, with five rounded petals fused into a tube below, the flowers less than ½" in diameter.

The moss phlox grows in any of the most exposed areas of the coulees (as long as they are stabilized) and, more sparsely, on protected slopes. Confusion is possible with the low whitlow-wort which, however, has inconspicuous, greenish flowers.

Flowering time: This species is one of the four earliest native plants to come into flower (the other three being the prairie crocus, the yellow bells and the prairie townsendia). In sheltered, south-facing localities its flowers may be found in the last week of April, depending on weather conditions. The last flowers, on north-facing slopes, fade less than a month afterwards.

32. *Prunus virginiana* L. (chokecherry)

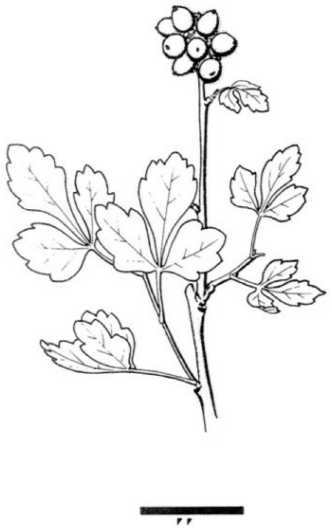
A shrub or, in moist coulee bottoms, a small tree up to 12 feet high, with shiny reddish-brown bark on most branches. Leaves broadly elliptical, with a distinct petiole and sharply tapered leaf-tip, the entire margin finely toothed. Flowers occur on side-branches that have one or two small leaves first, followed by an elongated rather dense cluster of stalked flowers most of which may be seen open at the same time. Many flowers develop into small, very dark red shiny cherries about ¼" in diameter.

The fruits are rather too astringent to be pleasant, but were used by Blackfoot people in much the same way as saskatoon (*Amelanchier alnifolia*) (No. 3). They are also eaten in great numbers by mourning doves and other fruit-eating birds.

Lower, protected coulee slopes and moist coulee bottoms.

Flowering time: May

33. *Rhus trilobata* Nutt. (fragrant sumac, skunkbush)
Current name: *Rhus aromatica* Aiton var. *aromatica*



Small, spreading and much branched shrubs, the twigs short-hairy. Leaves no more than two inches long, each at least one third petiole, the leaf blade divided into three leaflets that are lobed at the tip and sharply tapered below. Flowers in small, rather dense clusters, very pale yellow, opening before the growth of the leaves. Fruit a one-seeded dry berry, brightly orange-red, with a sticky hairy covering.

Skunkbush, so-called because of its faint but rather unpleasant smell, prefers the most exposed ridges and south-facing slopes. It is a close relative of the poison ivy, (which is also known from Writing-on-Stone Provincial Park, but not elsewhere in coulee areas) but appears to be totally harmless. Because of its bright fruits and purplish-red fall colouration, it is nevertheless an attractive dwarf shrub.

Flowering time: First three weeks of May

34. *Smilacina stellata* (L.) Desf. (star-flowered false Solomon's seal)

Current name: *Maianthemum stellatum* (L.) Link

A smooth, single-stemmed plant springing from a horizontal, underground root-stock. Stems unbranched, with half a dozen or more somewhat clasping leaves characterized by many parallel veins and tapering leaf tips. Flowers about as many as the leaves, in a loose group above them, stalked, with six white petals. Fruit a ¼" berry, first green with purplish stripes, eventually turning nearly black.

This species, a member of the lily family, is not a typical coulee plant, but turns up occasionally in surprisingly large numbers in well protected, lower north-facing slopes, among various shrubs. It is common especially in lower, shrubby slopes at Writing-on-Stone Provincial Park.

Flowering time: Late May to early June

35. *Townsendia hookeri* Beaman (Hooker's townsendia, prairie townsendia)

An extremely small, stemless plant, with short hairs on the clustered leaves, these narrow and about ½" long. The flower-heads, practically stemless, are nestled among the leaves, and are white to light pink with a pale yellow heart. The root-stock frequently branches, giving several leaf-clusters crowded together, each with one or two flower heads.

The prairie townsendia is one of our most curious and inconspicuous coulee plants. It prefers dry, exposed ridges. It is one of the four earliest native flowers, the others being the yellow bells, the moss phlox, and the prairie crocus.

Flowering time: The second week of April until early May

36. *Zigadenus venenosus* Watson (death camas)

Current name: *Toxicoscordion venenosum* var. *gramineum* (Rydberg) Brasher

A bulb-producing plant with several flat, grass-like leaves and a single flowering stalk growing to about a foot in the coulees. The greenish-white, six-petalled, stalked flowers are distributed along the upper part of the stalk in an elongating mass. Fruit a small, three-parted upright pod, opening at the top.

In lower, grassy coulee areas. The death camas is exceedingly poisonous to livestock, being especially dangerous to sheep, who appear to graze it as if it were grass.

Flowering time: Mid-summer

Plants with **yellow** flowers

37. *Chrysopsis villosa* (Pursh) Nutt. (hairy golden aster)
Current name: *Heterotheca villosa* (Pursh) Shinners var. *villosa*

Several hairy (not sticky) and rather stiff, branching stems arising from the same plant. Lowest leaves with short petiole, those disappearing in upper ones; leaves at least three times as long as wide. Flower-heads numerous and rather widely spaced, golden yellow (even the heart). "Seeds" with a crown of long, hair-like bristles.

Open exposed slopes; very common.

Flowering time: Mid-July into September

38. *Elaeagnus commutata* Bernh. ex Rydb. (wolf-willow, silverberry)

Upright branched shrub several feet high with flexible branches. Leaves single, short-petioled, broadly elliptical with rounded tip, often warped, strikingly silver-coloured. Flowers in twos or threes in leaf axils, somewhat nodding, elongated, with four pointed, golden-yellow petals. Fruit a silver-coloured, soft mealy berry containing a single, grooved stone.

The wolf-willow can grow to at least ten feet outside, but remains much smaller in the coulees, where it prefers north and east-facing slopes. The flowers have a strong and sweet fragrance, attracting many insects. The only other silver-leaved coulee shrub is the thorny buffaloberry, which can be distinguished by its thorns, paired leaves, orange and juicy berries, and early flowering time.

Flowering time: June

39. *Eriogonum flavum* Nutt. (yellow buckwheat, yellow umbrella-plant, sulphur plant)

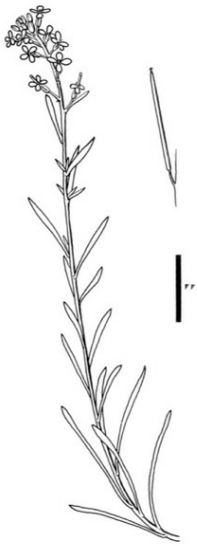
A low, tufted plant, in our area about 6" tall, consisting of one or more stems from a leafy root-stock, this often with several branches. Leaves long-elliptical, about half of it petiole, rather leathery, white felty when young, the upper surface becoming smooth and dark green. Stems unbranched, leafless except for several small leaves directly below the flowers. Flowers sulphur-yellow, in small globular groups themselves placed in a rounded arrangement. The old flowers often turn somewhat orange-red in age.

Open, exposed places, especially on ridges.

Not to be confused with the umbrellawort, a pink-flowered plant of similar sites.

Flowering time: June

40. *Erysimum inconspicuum* (Wats.) MacM. (small-flowered wallflower, small-flowered rocket)

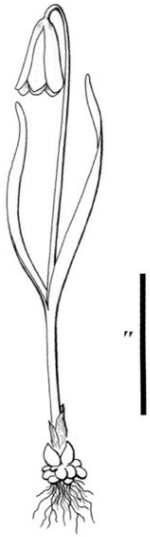


A perennial reaching one or two feet in height, the smaller ones unbranched, the larger ones with several to many branched flowering stalks. Leaves very narrow, up to about 2" long, only the lower ones with obvious petioles. Both the stems and the leaves have the texture of fine sandpaper and appear grey-green, except for the often purplish lower stem. The flowers have four petals, the broad part of each petal being about ⅛" long, bright yellow. The fruit is a straight pod, rigidly upright or slightly spreading, from one to two inches long, releasing the brown seeds by means of two long flaps.

A very common plant on somewhat more exposed sites. The related prairie rocket (*Erysimum asperum* (Nutt.) DC.) might also be encountered occasionally; it has petals nearly twice as large, and pods that are considerably longer than those of the small-flowered wallflower.

Flowering time: June and July

41. ***Fritillaria pudica*** **(Pursh) Spreng.**
(yellow fritillary, yellow bells)



A small, smooth plant about 8 or 9" tall, springing from a small white bulb that bears many small bulbs on its side. Leaves broadly linear, 1-3" long, two to several, blunt-tipped. A single, unbranched stem bears one nodding, six-petalled, bell-shaped flower nearly an inch long. Many plants have a dark, yellow-brown spot at the base of each petal, some are pure yellow. Fruit a small, stout, three-parted pod.

The yellow bells seems to be very uneven in distribution in our area. It has not yet been reported from Dinosaur Provincial Park. In the Lethbridge region it is generally infrequent but locally abundant on some protected upper slopes. In Writing-on-Stone Park it is abundant at least on the south-facing coulee slopes directly above and between the rock formations. The yellow bells, moss phlox, prairie crocus, and prairie townsendia are the four earliest native coulee flowers, followed closely by the thorny buffaloberry. The yellow bells is an attractive little plant.

Flowering time: Mid-April to mid-May

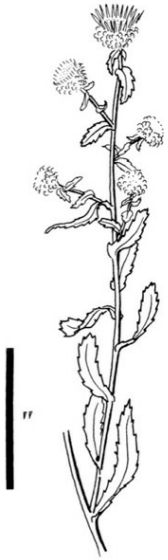
42. *Gaillardia aristata* Pursh (great blanketflower)

Perennial plant, rough-hairy to the touch, first with a whorl of leaves at ground-level, from which one or more flowering stalks reach upward for a foot or more. The basal leaves with long petioles, the blades long-elliptic with only slightly lobed margins, withering when the plant is in flower. Flowering stalks mostly unbranched, with coarsely toothed leaves lacking petioles. Flower-heads very large (up to 3" across), borne high above the leaves, with many three-lobed "petals", yellow with a reddish-brown base, around an orange-brown "heart".

Lower parts of coulees; in our area, the plant does not grow very tall, except in disturbed areas. A very attractive and ornamental plant.

Flowering time: June to mid-August

43. *Grindelia squarrosa* (Pursh) Dunal (curly-cup gumweed)



Coarse, much-branched perennial with shiny and sticky green surface, reaching a foot or more in height in the coulees. Many stems from a common root-stock. All upper leaves without petioles, rather rigid, clasping the stem somewhat, broadly elongate and blunt-tipped, with toothed margins. Numerous widely spaced flower-heads at the tips of branches, with green, curved, and exceedingly sticky narrow leaf-like bracts below, and with narrow, yellow "petals" and yellow heart above.

A weedy plant along roadsides and in other disturbed areas, but also a native of the coulees, where it may be encountered in lower parts as well as dry slopes and ridges.

Flowering time: End of July into fall

44. *Gutierrezia sarothrae* (Pursh) Britton & Rusby (broom snakeweed, broomweed)

Many-stemmed, nearly hairless plant mostly 6-8" tall in our area, woody below with many slender branches above. Leaves very narrow, about an inch long. Flower-heads very small, upright, each with about half a dozen yellow "petals", the numerous heads of all stems forming a somewhat flat-topped arrangement.

Dry ridges and similarly exposed sites.

Flowering time: Late July into the fall

45. *Haplopappus spinulosus* (Pursh) DC. (lacy tansy-aster)

Current name: *Xanthisma spinulosum* (Pursh) D. R. Morgan & R. L. Hartman

Many-stemmed plants growing 6-8" tall in our area. Leaves deeply divided into many narrow, sharp-tipped divisions, even the margins of these divisions with prickles, but leaves otherwise normally hairless and smooth. Stems sparsely branched, all flower-heads at about the same height above the ground. Flower-heads yellow throughout, with rather narrow "petals".

Dry ridges and exposed slopes.

Flowering time: July to mid-September

46. *Helianthus laetiflorus* Pers. (rhombic-leaved sunflower)

Current name: *Helianthus pauciflorus* subsp. *subrhomboideus* (Rydberg) O. Spring & E.E. Schilling

Rather coarse and stiff plants with a sandpaper-like texture, sometimes reaching two or three feet in height, but often much less in undisturbed areas. The leaves are broadly elliptical, with a shallowly toothed margin, and tapering at both ends. The petiole is short and rather stout. All leaves except some very small ones just below the flowers are paired. The flower heads are usually about 2" across or less. The yellow-brown heart is fringed by half a dozen or more rather narrow "petals" that are not obviously notched at the tip. The fruit is quite small.

Two other sunflowers are annual, *Helianthus annuus* L. and *H. petiolaris* Nutt. *Helianthus annuus*, with hearts sometimes 5" across, is the largest and coarsest of them all but rarely grows in undisturbed areas; it is from this species that our cultivated sunflowers have been bred. Its largest leaves are single, not paired. A very narrow-leaved, perennial species, *H. nuttallii* T. & G., may be seen on river-flat habitats in Writing-on-Stone Provincial Park. In the Lethbridge area, *H. laetiflorus* appears to be the most common in undisturbed habitats.

Flowering time: July and August (and later, in disturbed areas)

47. *Hymenoxys acaulis* (Pursh) Parker (stemless four-nerved daisy, butte marigold)

Current name: *Tetraneuris acaulis* (Pursh) Greene var. *acaulis*

Dwarf plants, the roots with white-milky juice growing in small clusters, with silvery, hairy, rather pointed leaves up to 2" long, with smooth margins, and all crowded at the base of the plant. Flowering stalks single, unbranched, and leafless, 3-5" high. Flowering heads usually about an inch in diameter, yellow throughout, the "petals" often slightly more golden-yellow and with two notches.

Exposed, higher areas of the coulees.

Flowering time: Mid-May to early June. Sometimes a few flower-heads develop again in late August or early September, but these perhaps set no seed.

48. *Hymenoxys richardsonii* (Hook.) Cockerell (Richardson's bitterweed, Colorado rubberweed)

A slender, tufted plant usually less than a foot high with long-petioled leaves that are divided into three or five narrow worm-like divisions. Flowering stalks sparsely branched, the flower-heads on long separate stalks, yellow throughout, the "petals" up to a dozen and three-lobed at the tip.

Exposed slopes and ridges, often growing with the butte marigold. The roots contain a rubbery, milky fluid which during World War II began to interest commerce.

Flowering time: Late May and June; overlapping, but slightly later than the butte marigold

49. *Lesquerella ludoviciana* (Nutt.) Wats. (silver bladderpod)

Current name: *Physaria ludoviciana* (Nuttall) Al-Shehbaz & O'Kane

A small, greyish-green, perennial plant with a whorl of inch-long leaves in the shape of a narrow spoon. From the centre, several to many lodged flowering stalks grow out, upturned at the end, with several small, narrow leaves each. Flowers half a dozen or so on each stalk, on slender separate stalks, with four bright yellow petals and four long and two short stamens. Fruit a small, spherical pod, the long, spine-like style still attached at the end.

South-facing slopes, and on ridges; in Writing-on-Stone Provincial Park seen on rocky ledges. Another similar species, *Lesquerella alpina* (Nutt.) Watson, is sometimes found, especially in Writing-on-Stone Provincial Park. It can be distinguished by its pointed (not spherical) pods and more narrow lower leaves.

A rust fungus infects some plants of this species, causing it to expand prematurely (April and early May) into brightly golden-yellow, leafy, upright shoots, later brown-dotted. These shoots are easily mistaken for flowers, but never produce any real flowers.

Flowering time: Mid-May to early June

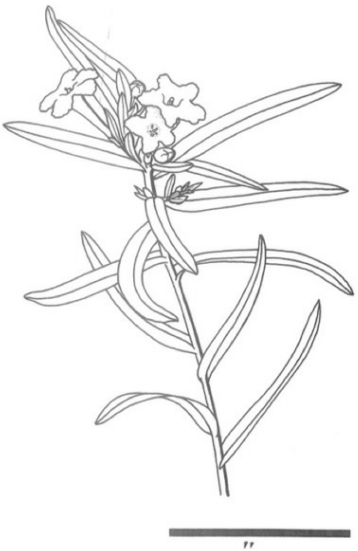
50. *Linum rigidum* Pursh (large-flowered yellow flax)

An olive-green, stiff, hairless, much-branched annual growing to about a foot in height. Leaves few, linear and pointed, about ½" or slightly longer. Flowers separated over the rather flat top of the plant, flat, yellow, sometimes with an orange-brown heart, about ½" in diameter, with five rounded, smooth-margined petals that fall off as a unit. Fruit dry and globular, splitting open above into ten parts.

The large-flowered yellow flax may be found all through the drier and more exposed parts of the coulees. It shows some superficial similarities to the narrow-leaved puccoon, which has rough-hairy, broader leaves, tubular flowers with wavy-margined petals.

Flowering time: Late June to August, some plants flowering as late as September

51. *Lithospermum incisum* Lehm. (narrow-leaved puccoon, narrrow-leaved stoneseed)

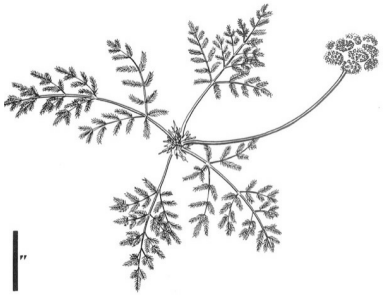


Several-stemmed perennial with rather numerous long (up to 2") narrow and pointed leaves with a somewhat rough texture, the plants commonly about a foot high in our area. Stems not branched at first, bearing all flowers near the top. Flowers golden-yellow, with a long tube and five wavy-margined petals, the whole flower nearly ½" across. Later in the season the plants begin to branch and apparently produce different, very inconspicuous flowers that also produce fruit. Fruit 1-4 per flower, shiny and extremely hard. See comments under large-flowered yellow flax *Linum rigidum* (No. 50).

Dry, exposed sites, but also on grassy flats.

Flowering time: Mid-May to mid-June

52. *Lomatium foeniculaceum* (Nutt.) Coult. & Rose (fennel-leaved desert-parsley)



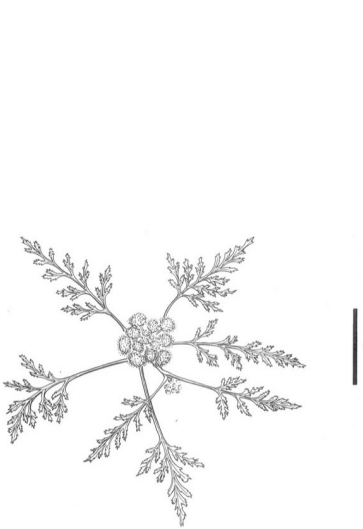
A low, stemless plant, often appressed to the ground. Leaves with long petioles, but the blade extremely divided, covered with short, soft hairs. Flowering stems up to 4-5" long, lodged at the base, topped with a rounded arrangement of small yellow, head-like groups of flowers. Fruits double, each unit with two prominent, flat wing-like margins.

This species may easily be confused with *Musineon divaricatum*. The latter has more dark green, shiny leaves that are not quite as finely divided, and has a tendency to branch somewhat, especially later in the flowering season. The fruit of *Musineon* lacks a thin, flat margin.

Dry coulee bottoms. Common locally (for example, Six-Mile Coulee, Lethbridge) but infrequent in general.

Flowering time: May

53. *Musineon divaricatum* (Pursh) Nutt. (leafy wild parsley)



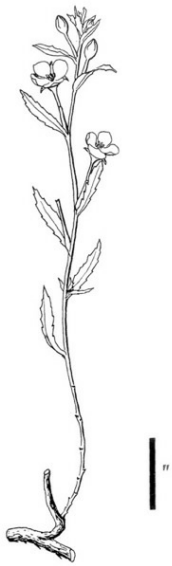
A small, often appressed plant with dark green and somewhat shiny leaves, these divided as those of parsley, but rather flat. From the root, one central flower-stalk grows out, usually followed by more (as many as twelve) later in a circle around the first. Flower stalks one or several inches long, sometimes branching below and then with one or two small stem-leaves. The golden-yellow, umbrella-shaped flower groups consist of separate but crowded smaller units. Fruit double, without flat, thin margin, ridged.

May be confused *Lomatium foeniculaceum* (see comments under No. 52).

Dry and exposed valleys, slopes and ridges.

Flowering time: May to early June

54. *Oenothera serrulata* Nutt. (serrate-leaved evening primrose, shrubby evening primrose)



Perennial with woody stems near the ground, from which several slender herbaceous branching stems grow up to about a foot in height. Leaves narrowly elliptic but pointed at both ends, with slightly toothed margin, all along the stems. Flowers bright yellow, nearly an inch across, individually in the axils of upper leaves, with four rounded petals and eight stamens. The flowers seem to be stalked but this stalk is really the young pod that becomes about an inch long and splits into four parts when ripe.

Locally common in Lethbridge coulees, although inconspicuous when not in flower; perhaps more rare in Dinosaur and Writing-on-Stone Provincial Parks. Another yellow evening primrose, *Oenothera biennis* L. is common in southern Alberta, but seems limited to disturbed areas. It is a biennial, much larger in all ways, and lacks a woody base.

Flowering time: June and early July

55. *Opuntia polyacantha* Haw. (plains prickly-pear cactus)

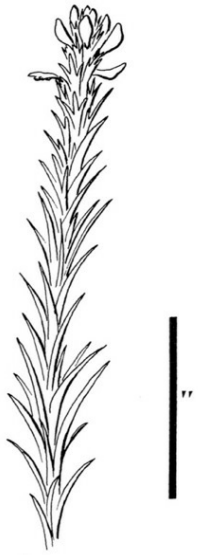
The stems of this cactus are large, pear-shaped or round but flattened units growing out of one another. On these stems there are clusters of spines some reaching an inch in length. The flowers are large, about 2" across when open, with a green, spiny base that becomes the fruit: petals broad, about a dozen or more and bright yellow, sometimes with a bronze or reddish base; stamens numerous, often orange-red.

The plains prickly-pear prefers dry ridges and exposed slopes. In over-grazed rangeland it may form large masses. During the winter the stems become somewhat wrinkled and red, to become green and full again during the early summer. On bright, sunny days the stamens will move sluggishly when touched, perhaps to aid in pollen transfer to visiting beetles and other insects.

This is the only prickly pear in our coulee area, except that *Opuntia fragilis* (Nutt.) Haw. has been reported as far south as Dinosaur Provincial Park. Since the stems of *O. polyacantha* often remain small and cylindrical under poor growing, conditions, the report needs to be confirmed. *O. fragilis* has smaller, rounder stem segments that readily fall to the ground, forming unruly masses.

Flowering time: June

56. *Orthocarpus luteus* Nutt. (yellow owl's-clover)



Small, rigidly upright leafy annual, only the largest plants branched, in the coulees rarely more than 6" tall, bright green to reddish green. Leaves linear, the lowest ones soon withering, about an inch long, sharply pointed, those in the flowering part of the stem deeply cleft. Flowers bright yellow, ½" long, club-shaped and apparently closed.

Grassy, more or less level areas. Never in great masses, but here and there fairly abundant. This plant is one of the three native, common parasites of the coulees, the others being *Orobanche fasciculata* and the *Comandra umbellata*. It has very small, sucker-like attachments to the roots of other plants.

Flowering time: July and August

57. *Potentilla concinna* Richardson (early cinquefoil)

Low-growing plant, often from a somewhat branched root-stock. Leaves several, long-petioled, the blade divided into five separate leaflets, each with a toothed margin, the leaflets 1-2" long, more white-hairy below than on top. Flowering stalks one to several, lodged, with few very small leaf-like organs and several flowers. The flowers on individual stalks, with five separate, shallowly lobed broad petals that are golden yellow.

Here and there in grassy, protected places. In grassy prairie lands another species, *Potentilla pensylvanica* L., may sometimes be found. It is taller, and has a rather thick hairy covering and leaves, that instead of the fan-like arrangement of *P. concinna*, have a more feather-like arrangement of leaflets, these leaflets themselves being deeply lobed or toothed.

Flowering time: May to early June

58. *Ratibida columnifera* (Nutt.) Wooten & Standl. (upright prairie coneflower)

A tall, several-stemmed perennial reaching two feet in height. Stems very straight, branching sparsely. Leaves two or three inches long, deeply divided into narrow and pointed segments, spread along the lower part of the stem. Flower-heads very long-stalked, with five or six very broad and slightly notched, bright yellow "petals" that tend to hang down. The heart of the flower-head is a brown cylindrical structure.

Protected sites, but especially in coulee bottoms or disturbed areas.

Flowering time: July and August

59. *Ribes aureum* Pursh (golden currant)

Shrubs reaching 4-5 feet in height, profusely branched, without spines or thorns. Leaves smooth and rather shiny, the petiole about as long as the blade, the latter deeply cleft and the margins lobed. Flowers in groups of half a dozen or so, stalked, often somewhat hanging, golden yellow, sometimes tinged with bright orange-red. The base of the flower is tubular, from which five petal-like organs extend sideways, the five true petals being very small and pointing forward. Fruit a rather strongly but not unpleasantly flavoured blackish-purple berry.

Low and moist places and creek embankments, usually with other shrubs. In the coulees, hummingbirds may be seen to visit the flowers. The only other species of this genus in our area is *Ribes oxyacanthoides* L., the wild gooseberry. It is usually quite spiny along the stem, especially near the leaf-bases, and has greenish-yellow flowers. Being a moisture-loving shrub, it is rare in the coulees where it is confined to moist, shaded places, often among other shrubs.

Flowering time: May and early June

60. *Senecio canus* Hook. (woolly groundsel, prairie groundsel)

Current name: *Packera cana* (Hook.) W.A. Weber & Á. Löve

A white hairy plant with one to several flowering stalks reaching up to a foot in height. Largest leaves long-petioled the blade elliptic but pointed; stem leaves usually deeply lobed or toothed, the petiole disappearing upwardly. Flower-heads several, on long separate stalks, well above the leaves, the heads golden yellow including the heart.

A common plant on many dry and exposed sites. A much taller and greener groundsel, *Senecio integerrimus* Nutt., is occasionally encountered in moist and protected places in the Lethbridge coulees.

Flowering time: May and early June

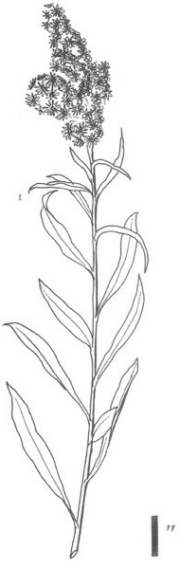
61. *Shepherdia argentea* (Pursh) Nutt. (silver buffaloberry, thorny buffaloberry)

A strong and thorny shrub that in protected and moist sites may easily reach 10-12 feet in height. The shorter side-branches are usually thorn-tipped. Leaves in pairs, silvery green, about an inch long. Flowers with four yellow petals and eight stamens, in small clusters that form short side-branches on the lower, thorny branches. The buds are formed in the previous fall and may be recognized during the winter as small brown globules. Fruit a smooth, juicy, orange-red berry, somewhat strong to the taste but not unpleasant.

This shrub may form impenetrable thickets in lower coulees and near water-courses, but is also scattered along many north-facing slopes. The only other silver-leaved coulee native is the wolf willow, distinguished by its single (not paired) leaves, flexible branches, absence of thorns, silver-green and mealy fruit and later flowering time. Another thorny coulee shrub is the hawthorn (*Crataegus columbiana* Howell, also called *C. chrysocarpa* Ashe) the branches and thorns of which are single, not paired. Its thorns are often 2" long, dark brown and somewhat curved back.

Flowering time: Late April to mid-May

62. *Solidago missouriensis* Nutt. (Missouri goldenrod)



A goldenrod reaching about a foot in height in the coulees, growing from a creeping root-stock but not usually in large colonies. The leaves are smooth, narrow and pointed, the larger lower ones with a rather broad petiole. Flower-heads numerous, small, without "petals" in a branched or elongated group above the leaves. Usually on drier, higher sites than *Solidago mollis*. One or two other, larger goldenrods are commonly found along rivers and in other low places, and these may be difficult to tell apart from *Solidago missouriensis*. Readers not content with what is provided here should pursue the goldenrods in Moss (1959) or Hitchcock et al. (1955) as listed in the Bibliography.

Flowering time: Late summer

63. *Solidago mollis* Bartl. (velvety goldenrod)

A rather small goldenrod a foot in height or slightly more, single-stemmed and rigidly upright, but often in extensive colonies. Leaves of a rough-hairy texture, rarely more than twice as long as wide, margins smooth or with very few small teeth, the leaf-tip rather blunt. The leaves decrease in size in the direction of the flowers. Flower-heads bright yellow, numerous and small, lacking "petals", on short side branches above the leaves, together forming a somewhat elongated, rounded mass.

Grassy coulee bottoms. This goldenrod is rather easily separated from others because of the combination of its broad, short-hairy leaves and general small stature.

Flowering time: Late summer

64. *Thermopsis rhombifolia* (Nutt. ex Pursh) Richards. (prairie golden bean)

Rather stocky, erect, nearly unbranched, smooth plants up to about a foot in height. Leaves with three elliptical, pointed leaflets with smooth margins; in addition there are two green leafy organs (stipules) at the base of the leaf. The flowers are those of a pea, nearly ¾" long, golden yellow, grouped above the leaves. Fruit a flat, curved, pointed bean, somewhat constricted between the seeds.

Common in certain exposed places, often where the soil is unstable; also a common weed along embankments . A very attractive spring flower.

Flowering time: May

65. *Viola nuttallii* Pursh (Nuttall's violet, yellow prairie violet)

A low plant, without obvious stems, with a tuft of long-petioled leaves of broadly elliptical shape. The flowers arise almost directly from the root-stock on long, slender, leafless stalks. Flowers of typical violet ("pansy") shape, with five petals, the lowest, broadest one with fine purple veins and extending into a bulbous spur behind the flower, the upper two with a brownish-purple back surface. Fruit a small, thick pod that splits into three parts when ripe.

Flowering time: May

Plants with **pink, orange, red or blue** flowers

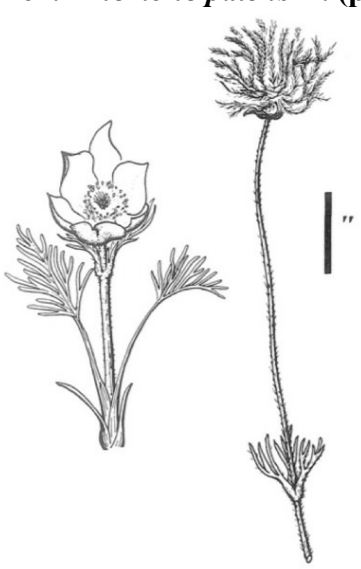
66. *Allium cernuum* Roth. (nodding onion)

A bulb-producing plant with several soft, grass-shaped leaves and a single flowering stalk nearly a foot in height, the plants sometimes grouped in small clusters but more often single. The flowering stalk nods obviously just below the dozen or more pink flowers, all of which have slender stalks of about the same length attached to the same point on the end of the main stalk. The plant has a strong onion smell, especially when crushed.

Lower coulees, especially more protected, grassy areas. The only other coulee onion, the prairie onion (*Allium textile*), lacks the nodding stem, is shorter, and flowers earlier. Both can be eaten but are somewhat strong.

Flowering time: Late July and early August

67. *Anemone patens* L. (prairie pasqueflower, prairie crocus)



A white-hairy plant that flowers before the regular leaves develop. The flowering-stalk may only be 2 or 3" high at first when in flower but continues to elongate. It bears a whorl of deeply divided, petioleless leaves within which a single flower nestles, this an inch or more in diameter, usually purple-blue on the outside of its six petals and somewhat creamy-white inside. In many plants the inside of the petals is just as purple as the outside. Later on, the stalk directly below the flower elongates greatly while the cluster of small fruits develops, each of which has a long feathery tail. The leaves develop late, are long-petioled and divided into numerous linear segments.

Common on protected upper coulee slopes. The prairie crocus (not a true crocus at all, but rather an anemone) is so well known that it scarcely needs to be described, and cannot be confused with other local plants. It is one of the four earliest native spring flowers, the others being the yellow bells, the prairie townsendia, and the moss phlox.

Flowering time: Mid-April to early May

68. *Apocynum androsaemifolium* L. (spreading dogbane)

Single branched stems growing from a deep root-stock. All branches leafy, the leaves short-petioled, in pairs, hairless, up to 2" long, oval with smooth margin, often somewhat nodding. At the tips of the branches, on small side branches, there are few-flowered clusters of pink and white, bell-shaped flowers, each with five pointed petals that are often curved back. Fruit two, long (2-3"), thin, pointed pods with numerous white-hairy seeds.

The dogbane in our area may be found in exposed lower areas, often where erosion is taking place. It is abundant only here and there, being more common in lower mountain valleys. When broken or cut, the stems and leaves pour forth a great deal of milky fluid. The only other native milky coulee plant with paired leaves is the related milkweed that has far larger leaves, spherical flower clusters, but lacks leafy side branches. The dogbane might also be mistaken for the snowberry which differs in being woody, not milky, and with a large, white berry.

Flowering time: Mid-summer

69. *Asclepias speciosa* Torr. (showy milkweed)

A very stout, unbranched plant growing from a deep root-stock to reach up to 3 or 4 feet in height, soft-hairy throughout. Leaves often 6" long, narrowly egg-shaped but pointed; petiole very short. The top of the plant has two to several large, spherical clusters of flowers, these with five petal-like organs sticking down and five curved, horn-like organs pointing forward. The flower is a combination of pink, light purple, and white. Each plant produces several large rough-surfaced pods with many seeds.

The showy milkweed, because of its copious white juice and paired leaves, could possibly be confused with *Apocynum androsaemifolium* (see comments under No. 68).

Flowering time: Mid to late summer

70. *Aster laevis* L. (Geyer's aster, smooth blue aster)

Current name: *Symphyotrichum laeve* (L.) Á. Löve & D. Löve var. *geyeri* (A. Gray) G.L. Nesom

A rather stout plant reaching one or two feet in height, and usually having several more or less erect flowering stalks. The leaves are smooth and very dark green, often slightly blue-green. There is often a cluster of large leaves from the root-stock; these leaves have petioles about the length of the blade, with green flanges, the blade being somewhat oval. The stem-leaves lack petioles, and the base of the leaf (even the upper, very small leaves) seems to clasp the stem. The large stem-leaves are an inch or more wide and tend to be twisted. The flower-heads are in a loose much-branched arrangement; each is slightly less than an inch across, blue-purple with a yellow heart.

A common plant in the prairies, in coulee areas especially on protected slopes and grassy valleys.

Flowering time: August to September

71. *Astragalus adsurgens* Hook. (ascending purple milk-vetch)

Current name: *Astragalus laxmannii* Jacq. var. *robustior* (Hook.) Barneby & S.L. Welsh

Several- to many-stemmed plant, only slightly hairy, the stems lodged below, usually not branched. Leaves with more than a dozen elliptical leaflets. Flowering stalks several for each stem, often curved upwards, with a dozen or more faintly lilac-coloured, pea-like flowers crowded in a rounded head that may elongate considerably later in the season. Fruit a short, hairy pod, deeply grooved below.

This milk-vetch may be seen almost anywhere in grassy areas, but not often in much exposed sites. Since there are other, somewhat similar pea-like plants in our area, the reader is referred to comments under *Hedysarum boreale* Nutt. (No. 83).

Flowering time: June and July

72. *Astragalus bisulcatus* (Hook.) Gray (two-grooved milk-vetch)

A rather erect, many stemmed plant growing to two feet in height. Stems normally unbranched, the lower leaves withered at flowering time. Leaves scarcely hairy, with more than a dozen elliptical leaflets, petiole very short. Flowering stalks several per stem, with a dense, blunt-topped mass of rather narrow, often somewhat nodding flowers that are a deep blue-purple. Fruit a smooth, slender, pointed pod, nodding, not quite an inch long, with two grooves on top.

Grassy coulee sides and valleys, sometimes venturing out on dry slopes.

Compare with other like-coloured milk-vetches, and with *Hedysarum boreale*

Flowering time: June and July

73. *Astragalus flexuosus* (Hook.) Dougl. ex G. Don (flexible milk-vetch)

Many-stemmed, very slender and usually lodged plant, with branches 1-2 feet long, often branched below. Leaves with very short petiole, about 15 leaflets or more, narrowly elliptic below, becoming nearly linear near the flowers. Flowers in slender, long groups, in the shape of that of a pea flower, varying from pink to light purple, not very conspicuous. Fruit a pointed or flattened pod less than an inch long, nearly hairless, not grooved.

Rather dry sites, often among grasses. This plant is similar in its slender appearance to *Astragalus tenellus* Pursh, which, however, has pale cream-coloured flowers and flattened pods.

Flowering time: June and July

74. *Astragalus missouriensis* Nutt. (Missouri milk-vetch)

A low, several-stemmed plant, with a silver-hairy but not really woolly surface. Stems usually lodged below, unbranched. Leaves with a dozen or more leaflets that are oval in outline, and with several flowering stalks bearing half a dozen or more flowers at the top. Flowers a deep rose-purple, in the shape of that of a pea flower. Fruit a straight and somewhat inflated pod, not grooved.

Ridges and other rather exposed places.

This beautiful milk-vetch may be confused with another, *Astragalus purshii* Dougl. ex Hook., especially in Writing-on-Stone Provincial Park where the latter seems to be more common than further north. *Astragalus purshii* is more woolly-hairy, especially the (slightly grooved) pod, and is more dense, even cushion-like, and generally smaller; its flower is partly purple, partly yellow. Compare also with *Hedysarum boreale* (No. 83).

Flowering time: May to early June

75. *Astragalus spatulatus* Sheld. (tufted milk-vetch)

A dwarf plant, cushion-like, without obvious stems. Leaves commonly narrow, pointed, becoming a petiole below, but sometimes with three narrow leaflets, always silky grey, usually reaching no higher than an inch above ground. Flowering stalks slender, 1-3" long, with a few small pea-like flowers ranging from pale pink to purple. Fruit a more or less upright pod, less than ½" long, slightly curved.

Exposed ridges, where it is conspicuous only when in flower. There are only three common cushion-like milk-vetches in the coulees. *Astragalus kentrophyta* is unmistakable because of its spine-tipped leaves and nearly hidden flowers; *Astragalus gilviflorus* is also easy to identify because of its densely crowded, large flowers and lack of flowering stalks. The third one is *Astragalus spatulatus*, much finer in structure and with most leaves undivided, as compared to *Astragalus gilviflorus*.

Flowering time: May

76. *Campanula rotundifolia* L. (bluebell, harebell)

A slender, smooth, many-stemmed perennial, the stems usually not branched, from a creeping or nearly underground root-stock. The lowest leaves may have nearly round leaf-blades with petioles more than twice the blade-length, but these leaves often wither before flowering time. Higher leaves are narrow, up to two inches long, becoming much smaller below the flowers. Flowers on slender stalks, several on each flowering stem, bell shaped with five petals, a pure bright blue, about ¾" long.

Grassy, protected places. Not common in the Lethbridge and Dinosaur Park areas, but more so in Writing-on-Stone Park. This is the "Bluebell of Scotland" which in reality grows all around the Northern Hemisphere. The only other coulee plant with blue, somewhat bell-shaped flowers is the beardtongue (*Penstemon nitidus*), which is a stouter plant with broad leaves and a many-flowered, dense flower arrangement; its flower is not as clearly bell-shaped as the bluebell.

Flowering time: Mid-summer

77. *Cirsium undulatum* (Nutt.) Spreng. (wavy-leaved thistle)

A large, spiny plant, producing only a stemless group of leaves the first year, and a 2-4 foot tall flowering stalk the next; it may continue to flower for one or two years afterwards. Leaves 6-8" inches long, becoming smaller higher up, the stem-leaves mostly without petiole and somewhat clasping but not running down the stem, deeply lobed, the tips of the lobes as well as the bays between them provided with stiff spines. The surfaces of stems and leaves are thinly white-woolly. Flower-heads large, stalked, at least an inch across when in flower, pink to light purple, the green base being nearly spherical and covered with a regular arrangement of narrow, spine-tipped leaves.

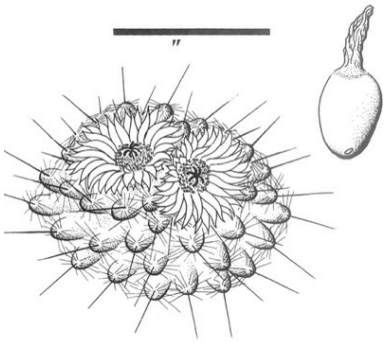
Occasional in many parts of the coulees, but never in great numbers.

The large-flowered thistles are much maligned, but really quite handsome. A closely related species, *Cirsium flodmanii* (Rydb.) Arthur, has more of a creeping root-stock and is more slender. Another thistle that has established itself, *Cirsium arvense* (L.) Scop., has more but smaller heads, and produces large colonies from creeping roots, especially in low and disturbed places.

Flowering time: Mid-summer

78. *Coryphantha vivipara* (Nutt.) Britt. & Rose (pincushion cactus, ball cactus)

(older name: *Mammillaria vivipara* [Nutt.] Haw.)



An unmistakable, leafless ball of spine-tipped finger-like projections from a fleshy central mass. The plant may be single, or may grow into a branched, compact colony of a dozen or more stems. The whole plant is rarely more than an inch above soil-level and sometimes nearly flush with it. Flowers several on larger plants, brilliant rose-purple, with many sharply pointed petals, short-lived. Fruit a smooth, greenish-red berry about ¾" long, with the withered petals still attached, nearly hidden by the surrounding spines, and containing many small seeds.

Dry ridges and south-facing slopes.

The pincushion cactus is one of our most beautiful and interesting native flowers. The flowers appear to open only for a few hours in the afternoon, even when the morning is sunny. The fruits often drop off the plant when mature, and ripen on the ground.

Flowering time: Early and mid-June

79. *Delphinium bicolor* Nutt. (flathead larkspur, low larkspur)

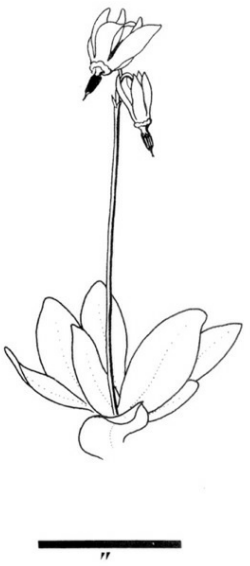
A single-stemmed perennial from a small group of fleshy roots, growing to nearly a foot in height. Stem erect, with two or several long-petioled leaves below and one or more smaller leaves above. Blade of the leaf smooth, deeply cut into flat, narrow segments, together forming a more or less circular outline. Flowers dark blue, about ½" across, on slender stalks, and arranged in a loose group of half a dozen or more at the top of the flowering stem. Each flower consists of five large outer segments, the upper one lengthened into a long spur at the back; in the centre there are four smaller petals, the lowest pair flat and hairy, and often lighter blue than the others. The fruit is an erect, triple pod, opening above.

In some areas of Writing-on-Stone Provincial Park, the flathead larkspur is fairly common, and certainly very striking when in flower. It may be absent from the Lethbridge and Dinosaur Park regions.

Flowering time: Mid-May to June.

80. *Dodecatheon radicatum* Greene (darkthroat shootingstar)

Current name: *Primula pauciflora* (Greene) A.R. Mast & Reveal var. *pauciflora*



Small, stemless plants with all leaves clustered at the base. Leaves smooth, 2 or 3" long, narrowly elliptical, tapering into a rather long petiole. A single flowering stem reaches up about 6" and bears several flowers at the very end, each on a slender stalk. The flowers have five reddish-purple petals that are bent back; at the centre there is a cone-like structure with a complex, delicate colour pattern bearing, among other things, the pollen. The fresh flower nods but soon becomes erect when withering. The fruit is in the shape of a smooth, erect cylinder, splitting open at the top.

An unmistakable plant that is common in lower, grassy areas of Writing-on-Stone Provincial Park (for example, near the mouth of Police Coulee) but may be absent from coulees further north. The leaves shrivel up even before the fruits mature.

Flowering time: Early May

81. *Gaura coccinea* (Nutt.) Pursh (scarlet gaura, scarlet butterfly plant)

Current name: *Oenothera suffrutescens* (Seringe) W.L. Wagner & Hoch

Low, nearly hairless perennial with many branching, lodged stems from a common centre. Leaves without petioles, long-elliptic, with shallowly toothed margins, about an inch long or shorter. Flowers in loose, elongating groups above the leaves. Each flower with four petals standing out like wings and eight rather long stamens. The flower seems to be attached to a short, stout petiole below, in reality the young fruit that later becomes more or less round with four ridges on top. The flower is a combination of scarlet and creamy yellow, somewhat variable, possibly with the season.

Dry ridges and exposed slopes.

The flowers expand fully at night but are not really closed in the daytime.

Flowering time: June and July

82. *Geum triflorum* Pursh (three-flowered avens, old man's whiskers, prairie smoke)

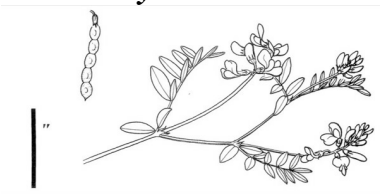
A perennial that in the coulees rarely reaches more than a foot in height. All large leaves clustered at the base, from a stout root-stock, hairy especially along the midrib and petiole, with many leaflets of variable size and form; usually small leaflets alternate with large ones that are deeply cleft at the tip. Normally a single flowering stalk arises from the root-stock, bearing a pair of small leaves at least half-way up and almost invariably three flowers, the middle of which matures first. The flowers are nodding, somewhat bell-shaped, reddish-purple on the outside with five rather small, pinkish-yellow petals inside. Old flowers soon become erect and develop a cluster of "seeds" each bearing a long, feathery tail, giving rise to the common names. This cluster of "seeds" is very similar to that of *Anemone patens* (see No. 67).

Protected slopes.

The leaves have a tendency to die off completely at the beginning of the hot part of the summer.

Flowering time: May

83. *Hedysarum boreale* Nutt. (northern hedysarum)



A perennial with several to many somewhat lodged flowering stalks from a branched base, usually reaching no more than a foot in height in our area. The leaves and stems are very finely silver-hairy. Each leaf is divided into 9-13 elliptical leaflets that are hairy on both sides. The flowering stalks are rather slender, with about a dozen bright, rose-purple pea-like flowers crowded near the tip. The fruit is a flat pod that has peculiar constrictions between the seeds, breaking into one-seeded portions.

Coulee ridges and drier slopes.

Confusion is possible with three or four species of milk-vetches. The best way to be certain of the identity of the northern hedysarum is to find a pod, even a young one, with its typical constrictions not shared with any milk-vetches. If there are no fruits at all, the following points are suggested to help distinguish the northern hedysarum from: *Astragalus adsurgens* -has rather narrow, pale lilac flowers and far more than 13 leaflets per leaf; *A. bisulcatus* - is a large, rather upright plant with up to 25 leaflets per leaf and massive groups of narrow, often drooping flowers; and *A. missouriensis* -is silver-haired but otherwise very similar. The reader is also advised to check the comments made under these three milk-vetches.

Flowering time: Late May and June

84. *Liatris punctata* Hook. (dotted blazing-star)

A perennial from a heavy root-stock reaching about a foot in height or less. Leaves long and narrow, like stiff, slightly twisted ribbons with bristly margins, several inches long below, becoming shorter above, and lacking petioles. There may be one or several flowering stalks, never branched, from each root-stock. Flowers in small flower-heads that are spread along the upper part of the stem, and that flower from the top of the stem downward. Each individual flower is a brilliant purple five-pointed star with two long, joined, tongue-like style-branches hanging out. The "seeds" have a feathery crown.

Dry ridges, slopes and coulee bottoms.

This is one of our most striking wild flowers, the more so since it flowers at a time when not many others do on the drier slopes.

Flowering time: Late July and August

85. *Linum perenne* L. (perennial flax, wild blue flax)
Current name: *Linum lewisii* Pursh

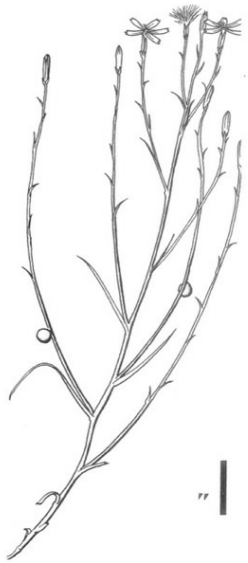
A very slender, graceful perennial with one or more flowering stems reaching up to 1½ feet in height. Leaves smooth, very narrow, about an inch long or less. Flowers on long, slender pedicels in a loose group of half a dozen or more at the top of the stem, the buds nodding. Petals sky-blue, rounded at the tip, five per flower, forming a rather flat flower. The fruit is nearly spherical, splitting open above to show ten seed-containing cavities.

Protected and grassy places.

This is one of our two native flaxes, the other being the large-flowered yellow flax with rigidly erect stems and yellow flowers. The cultivated flax, *Linum usitatissimum* L., is a clearly annual species that otherwise is very similar to the wild blue flax, but apparently does not become established in undisturbed coulee areas.

Flowering time: June and July

86. *Lygodesmia juncea* (Pursh) D. Don (rush skeletonplant)



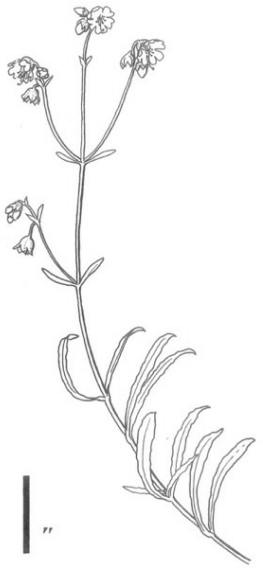
A plant seemingly to consist of only stiff, smooth, green stems but which on closer inspection has some narrow, pointed leaves about an inch long below. The stems arise from an extremely deep root-stock and branch, reaching usually no more than 6-8 inches in height. Flower-heads single at the end of branches, very narrow when in bud, producing at the top five strap-like bright pink organs that resemble petals. The "seed" has a crown of white hairs somewhat like those of a dandelion.

The skeletonplant grows on ridges and other dry areas, and has a remarkable persistence as a weed, probably because of its deep root-stock. It frequently has small, spherical insect galls on its stems.

Flowering time: July and August

87. *Mirabilis hirsuta* (Pursh) MacM. (hairy four-o'clock, umbrellawort)

Current name: *Mirabilis albida* (Walter) Heimerl



One or several stems per plant, usually lodged at the base, up to about a foot in height. Leaves in pairs, mostly on the lower part of the stem and lacking petioles, rather long (up to 2") and narrow. Top of plant rather "leggy", with several loose groups of pink to rose-purple, cup-shaped, five-petalled flowers, clustered in threes within shallow green cups.

Exposed, dry ridges and slopes.

The flowers are fully expanded only at night and in the early morning. The slender stems and other organs near the flowers are extremely sticky.

The umbrellawort is not to be confused with the yellow umbrella-plant, a smaller yellow-flowered plant.

Flowering time: July into early September

88. *Monarda fistulosa* L. (wild bergamot)

A perennial with many erect, unbranched stems, sometimes 1.5 or 2 feet tall, from a creeping root-stock. Leaves paired, with very short petioles, broadly elliptical but tapering at the end, the margin toothed. Flowers lilac-purple, in a single head above the leaves, often more than an inch long, at least the lowest half tubular, the rest divided into two parts, the lower lip hanging down.

Lower, usually grassy areas.

Flowering time: Mid-summer

89. *Penstemon nitidus* Dougl. ex Benth. (wax-leaved beardtongue, smooth blue beardtongue)

A blue-green, hairless perennial with one or several flowering stalks arising from a cluster of coarse, shallow roots. Leaves paired, growing from the root-stock, rather narrowly elliptic, with obvious petioles; those on the stem lack petioles and almost clasp the stem, at least in more vigorous plants. Leaves are always smooth-margined and rather succulent. Flowers many, crowded at the top of the plant, consisting of a tube and five petals, sky-blue but often with some purple. The fruits are sharply pointed pod-like structures.

Occasional in some of the driest and most exposed sites. The plants die back after the seeds are ripe, but leaf out somewhat in the late fall.

Another blue beardtongue is *Penstemon eriantherus*, with somewhat toothed leaves and fewer, larger, more bell-shaped flowers with a "tongue" covered with long yellow hairs. It is quite rare in the coulee area. A third blue-flowered species, *Penstemon procerus* Dougl., with much more slender flowers, is known from moist prairie areas.

Flowering time: May and early June

90. *Petalostemon purpureum* (Vent.) Rydb. (purple prairie-clover)

Current name: *Dalea purpurea* Vent. var. *purpurea*

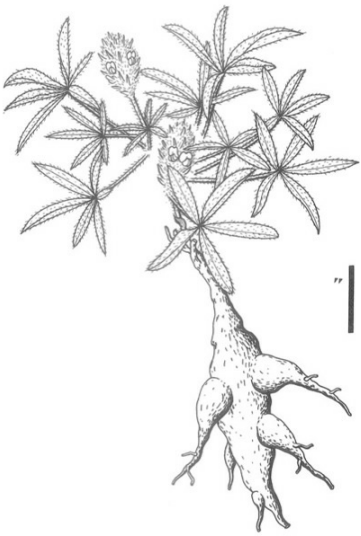
A several-stemmed, hairless perennial plant from a deep, woody root-stock. The stems are usually about a foot high, sometimes with several smaller branches above but more commonly unbranched. Leaves about an inch long, slender and divided into five very narrow leaflets. Most leaves have a couple of small three-parted leaves in the axil. The flowers are in a compact, oval head that later elongates somewhat; they are five-petalled, brilliantly purple and mature from the bottom of the head upward. Except for the purple flowers, the head is silvery-hairy.

The purple prairie-clover is a rather common plant in the more exposed coulee areas. The white prairie-clover (*Petalostemon candidum*) (No. 30) is not nearly so striking. Without flowers the two prairie-clovers can still be distinguished, as the white prairie-clover has broader leaflets.

Flowering time: July and August

91. *Psoralea esculenta* Pursh (Indian breadroot, prairie turnip)

Current name: *Pediomelum esculentum* (Pursh) Rydb.



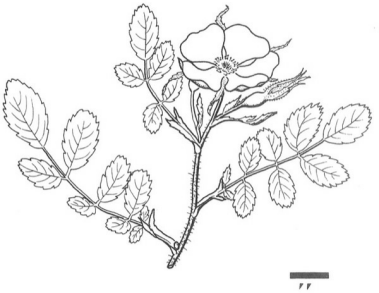
A compact, hairy perennial, often somewhat branched, commonly one to several-stemmed from a swollen vertical root just below the soil surface, reaching usually no more than a foot in height. Leaves with petioles one or two inches long, the blade divided into five elliptical leaflets in a fan-like manner. Flowering stalks stout, the upper one-half occupied by a dense, hairy group of small flowers. The flowers are pea flower shaped, pale green and blue-purple.

A fairly common plant on dry ridges and slopes, at least in the Lethbridge area but easily missed. Indian breadroot was an important food for the Blackfoot who ate the starchy roots in a variety of ways.

There are two lupines known from our area, *Lupinus argenteus* Pursh (for example, in Writing-on-Stone Provincial Park and near Picture Butte) and *Lupinus pusillus* Pursh (Dinosaur Provincial Park) that have very similar leaves, and that may be confused with the Indian breadroot. The very obviously blue flowers of the lupines would identify them. They also have silvery, smooth hair and lack the tuberous root; in fact, *Lupinus pusillus* is an annual.

Flowering time: June and early July

92. *Rosa arkansana* Porter (prairie rose)



A small shrub usually no more than 6-8" high, springing from a deep root, and often dying back to just above ground level during the winter. Stems with fine prickles, the ones at the leaf base not obviously larger than those elsewhere. Leaves divided into 9 or 11 (sometimes fewer) broadly and pointedly elliptic leaflets, their margins being toothed. Flowers about 2" across, a five-petalled pink (very rarely white) rose. The prairie rose can be distinguished from small plants of the Common Wild Rose (*Rosa woodsii*) (No. 93) by the fact that in the latter the stem prickles are very prominent at the leaf-bases. The prairie rose is also much shorter, on the average has two more leaflets per leaf, and has slightly larger flowers than the common wild rose.

Flowering time: June and early July

93. *Rosa woodsii* Lindl. (Woods' rose, common wild rose)

A shrub commonly reaching 2 or 3 feet in height in the coulees but somewhat higher in moist areas. The stem is prickly, but the stem prickles are either restricted to or obviously largest at the base of the leaves. The leaves have five, seven, or nine bluntly elliptical leaflets with toothed margins. Flowers pink or red, a rose with five petals, normally less than 2" across.

The common wild rose develops best in lower, protected coulees, but occasionally becomes established as a small shrub on coulee slopes as well. It may there be confused with the prairie rose (*Rosa arkansana*) from which it differs in various ways (see comments under No. 92). The common wild rose does not die back as the prairie rose does. A third species, the prickly rose (*Rosa acicularis* Lindl.), is the floral emblem of the province of Alberta. It is more common further north but does occur in sheltered areas in southern Alberta. It is very similar to the common wild rose, from which it may be separated by the former's densely prickly stem (not merely or most pronounced at the leaf bases). Identification of the wild roses may be especially difficult where all three intermingle.

Flowering time: Early June and July

94. *Sphaeralcea coccinea* (Pursh) Rydb. (scarlet globe-mallow, apricot mallow)

A low, sprawling, grey-green perennial, growing from a branching root-stock, often in extensive colonies. Stems often branched, about a foot long or less, mostly reclining. Leaf petiole and leaf-blade each about an inch long, the blade divided into 3 or 5 leaflets, the larger ones cleft at the tip, joined in a fan-like manner. Flowers in groups of about six at the tips of branches, bright apricot orange, with five broad, slightly notched petals.

The apricot mallow grows in any of the more exposed sites, and may become weedy along roadsides. It is the only apricot or orange flower in the coulees and can scarcely be mistaken.

Flowering time: June and early July

95. *Symphoricarpos occidentalis* Hook. (western snowberry, buckbrush; wolfberry)

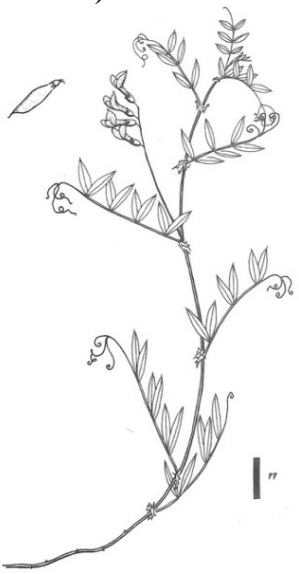
A branching, nearly hairless shrub reaching two feet in height in drier sites, higher in certain coulee bottoms. It spreads from the roots and therefore tends to form large colonies. Leaves in pairs, usually oval but sometimes with a few lobes, fairly thick, up to 2" long. Flowers in small clusters near the branch-tips, like a shallow, five-petalled cup, the five stamens sticking well out of the hairy mouth of the flower. Fruit a white, round berry ½" across, very soft and rather dry inside.

Protected slopes and lower coulees.

In general appearance the plant may be mistaken for *Apocynum androsaemifolium* which, however, has a milky juice, is not woody, and has a slender double pod for fruit.

Flowering time: Mid-summer

96. *Vicia americana* Muhl. ex Willd. (American vetch, wild vetch)



A deep-rooted perennial with several or many slender stems up to a foot in length, lodged at the base. Leaves divided into about a dozen narrowly elliptical leaflets, and a frequently forked tendril at the tip, allowing the plant to use others as a support. Several flower stalks develop in the upper part of the stem, each with about half a dozen purple, pea-like flowers. The fruit is a small, sharply pointed pod.

Not very conspicuous, but fairly common in rather protected areas, and sometimes on ridges.

The wild vetch may become weedy along road-cuts and paths. In such places, it is easily confused with an introduced weedy vetch, *Vicia cracca* L., which is larger in all ways, having more than a dozen flowers per stalk that tend to point all to one side.

Flowering time: Early and mid-summer

Plants with **green** or **inconspicuous** flowers or **lacking** flowers altogether

97. *Agropyron cristatum* (L.) Gaertn. (crested wheatgrass)

A bunched grass growing to a height of somewhat more than a foot in undisturbed coulee areas, but considerably taller under better growing conditions. The ear is 2-3 inches long and clearly two-sided, the side-units (spikelets) being arranged in two rows and standing out rigidly at an angle of about 45°. The spikelets at the top of the spike are usually more clearly bristle-tipped than the ones below.

Crested wheatgrass is unmistakable because of its stiff spike. It is not really a native, but is an introduced forage grass of considerable value for drier regions. It has however proven to be an aggressive weed and has become established in many coulee areas, usually in grassy coulee bottoms.

Flowering time: Late June and July

98. *Agropyron smithii* Rydb. (western wheatgrass)

Current name: *Pascopyrum smithii* (Rydb.) Barkworth & D.R. Dewey

Blue-green rather stout and erect grass with a creeping root-stock, reaching one or two feet in height. Leaves rather stiff. The ear is narrow and fairly long (about 3") and consists of flattened groups of green, chaffy organs (spikelets). The spikelets are appressed to the main stem of the ear, and are arranged in two longitudinal rows.

Western wheatgrass is common especially in the flatter areas of the coulee bottoms, but also on level areas higher up. It forms extensive patches that are not, however, very dense.

There are other wheatgrasses that resemble this species to varying degrees, for example northern wheatgrass (*A. dasystachyum* [Hook.] Scribn.), and my description and illustration are not sufficient to provide a reliable identification. The more persistent reader is referred to the *Flora of Alberta* or other works cited in the Bibliography.

Flowering time: Late June and July

99. *Aristida longiseta* Steud. (red three-awn grass, three-awn)
Current name: *Aristida purpurea* var. *longiseta* (Steudal) Vasey

A tufted grass, with rigidly erect but slender stems a foot or less in height. The flowers or "seeds" are in a loose group that has slender side branches also pointing rigidly upwards. The "seed" has three long, straight bristles (awns) that spread out widely; these awns are about 1 or 2" long.

Red three-awn grass is a quite unmistakable grass, one of the most striking native ones because of its remarkable triple awns. It is an open question whether this grass is common at Dinosaur or Writing-on-Stone Provincial Parks. In the Lethbridge coulees, it is rather often seen on bare ridges, and is very obvious where it grows in late summer.

Flowering time: June and July

100. *Bouteloua gracilis* (H.B.K.) Lag. ex Griffiths (blue grama)

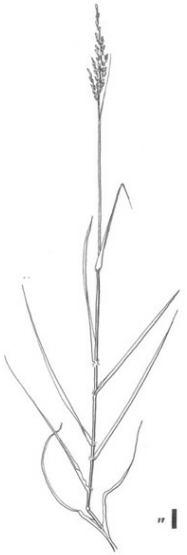
A slender, tufted grass, often spreading somewhat. Most leaves grow from the tuft, but one or two are present on the stalk that may reach a foot in height. At the top of the flowering stalks there are 1-3 spikes, without separate stalks, and spaced well apart. Each spike reaches out at a rather sharp angle and is reddish-purple in colour; it is completely one-sided, with all the stiff, bristle-like organs extending down at an angle at first. Later on in the season the spikes lose their straightness and curl back in such a way that the bristle-or chaff-like organs stand up.

It is difficult to confuse this grass with others when its spikes are visible. It grows on ridges and other exposed places. When blue grama is in flower, the curious observer will find that all stamens hang down from the bristly side of each spike, while the feather-like pollen-receptors (stigmas) reach up above the straight, stiff back of the spike.

First Nations people are said to have forecast the winter on the basis of the number of spikes per stalk - the more spikes, the more severe the winter would supposedly become.

Flowering time: June and early July

101. *Calamovilfa longifolia* (Hook.) Hackel (prairie sandweed, sandgrass)



One of the tallest grasses that may be found in the coulees (usually two to three feet high), forming large, but not very dense patches that, because of their yellowish-green color, can often be recognized at a distance. The larger leaves are nearly a foot in length and stand out rather rigidly from the upright stalk. The flower-bearing part of the stalk is about 6" long and has many slender side-branches that tend to be very erect. The chaffy scale-like organs around the "seeds" are papery and white, often with a distinct green line on the back of each.

Prairie sandweed, as the name suggests, is very common in sandy areas on the prairies. In some of the more unstable dunes it gives a measure of stability as it invades such sites easily. In the coulees it is also quite common in various grassy areas, not too exposed, either in coulee bottoms or some rather level north-facing slopes.

Flowering time: July

102. *Carex filifolia* Nutt. (thread-leaved sedge)

A tufted plant with very slender but rather wiry leaves from the base of the equally slender stalks, and reaching about as high. The bottom 1" of older leaves forms a brown, leafy sheath at the base. Flowering stalks 4-8" high, nearly as thin as the leaves but somewhat three-sided. The flowers are crowded onto the upper one inch or less of the stalk, the female in the lower half of the spike, in the axils of broad stem-scales; the male flowers (with stamens) are above, and have more narrow scales. The top of the spike is therefore obviously thinner than the bottom. The stem-scales of the spike have a brown back and translucent papery margin.

This sedge, one of about a thousand species, may be the only one that has truly adapted itself to coulee conditions, as most sedges are moisture-loving plants. It may be seen on some of the driest south-facing slopes. Although grass-like in appearance, the description of the spike given above will identify it as a sedge.

Flowering time: Mid-May to early June

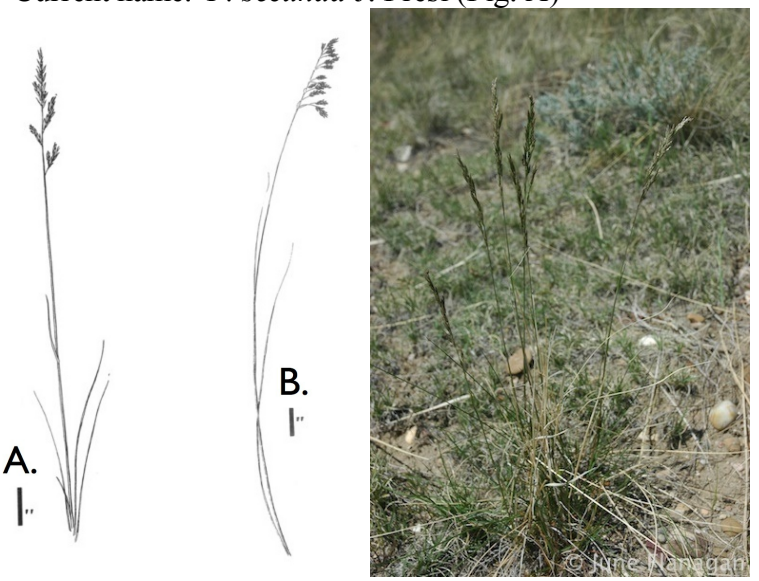
103. *Elymus canadensis* L. (Canada wildrye)

A tall, slender grass that forms small clumps, and reaches 3-4 feet in height. The leaves are somewhat blue-green and are nearly all on the upright stem. The ear is very rye-like, often slightly nodding, and rather dense except the very lowest part where the stem is still visible, and is about 6" long. The individual flower-units are stalk-less and consist of about 6 or more green, long, chaff-like organs that taper out into long, curved bristles (awns), many of the bristles being an inch long.

The most common place to find Canada wildrye is on grassy river flats and lower coulee bottoms. Where it occurs it is very striking because of its height and often slightly nodding, rye-like ear. There are a number of other wild rye grasses in Alberta but none with such long and curved awns.

Flowering time: July

104. *Poa sandbergii* Vasey (Sandberg's bluegrass)
Current name: *P. secunda* J. Presl (Fig. A)



A tufted, rather small grass, usually about a foot in height, with rigidly erect stalks. The leaves are slender and nearly all at the base of the stem. The flowering part of the stalk is only two or three inches long, rather narrow and slender, with several small side branches below, bearing fairly compact spike-like units that drop off at the end of the season, leaving only the lowest two chaffy organs.

Sandberg's bluegrass is a common grass found on ridges and other exposed places. A larger bluegrass, Kentucky bluegrass (*Poa pratensis* L.) is one of the few introduced plants truly established in undisturbed coulee hollows, and an illustration of this species is therefore added (Fig. B). It is taller than Sandberg's bluegrass, and not tufted but spreading by rhizomes (and therefore of great use as a lawn grass). The stalk is less rigid and often bends to one side later in the season. Also, the flowering portion of the stalk is somewhat larger, with more and longer-stalked side branches.

Flowering time: Mid-summer

105. *Koeleria cristata* Pers. (Junegrass, prairie Junegrass)
Current name: *Koeleria macrantha* (Ledeb.) Schult.

Rigidly erect, tufted plants reaching about 1.5 feet in height. The leaves are rather thin and short, only a few small ones being on the lower half of the flowering stalk. The ear is 2-3" long, soft and flexible, very compact, usually about ⅜" thick, and lacks any bristle-like organs. The lower part of the stem is often purple, the ear a mixture of purple, green, and papery chaffy organs.

Junegrass is generally distributed in the coulees, even on some of the drier ridges. It may perhaps be confused, on some river flats of similar sites, with small plants of reed grass (*Calamagrostis inexpansa* Gray or *C. montanensis* Scribn.) that, however, have their smallest flower units with distinct bristles (awns).

Flowering time: June and early July

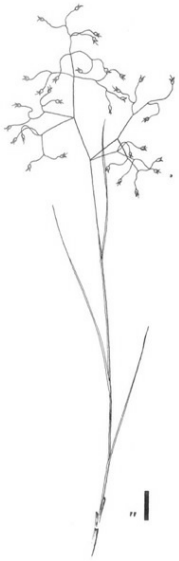
106. *Muhlenbergia cuspidata* (Torrey) Rydb. (plains muhly)

A slender, tufted grass standing about a foot high or slightly more. There are often two or three smaller flowering stalks, each in the axil of a lower leaf of the main stalk. Flowers in a very narrow, slender arrangement, 3-4" long, with several side-branches (not, perhaps, at first obvious) pressed tightly against the main stalk. There are no true bristles or awns, although some of the chaffy bracts can be sharply pointed. It is very common in our area to have many "seeds" swollen up, the chaffy organs strongly bent to the side (as in the drawing), somewhat like a minute bird's head. This malformation is apparently caused by a small insect.

The plains muhly, by no means an obvious plant, is nevertheless a common plant of dry slopes and ridges in the coulee area. The small flowering stalks in the axils of larger leaves provide an easy recognition mark. When some kernels are parasitized and occupy the peculiar sideways position we can be quite certain of the identity of this small grass.

Flowering time: July

107. *Oryzopsis hymenoides* (R. & S.) Ricker (Indian ricegrass)
Current name: *Achnatherum hymenoides* (R. & S.) Barkworth



A tufted grass about two feet tall, usually with many old, dead leaves at the base. The leaves are slender, the tips of the uppermost ones reaching well into the flower area. Flowering stalks slender, at the top dividing into a profusion of hair-like and often curved, branching smaller stems. The flowering units themselves are also long-stalked and consist of two chaffy bracts between which one "seed" develops. The "seed" is quite dark when ripe but covered by many straight, white hairs, and topped by a stiff bristle (awn) at least as long as the "seed" but dropping off easily.

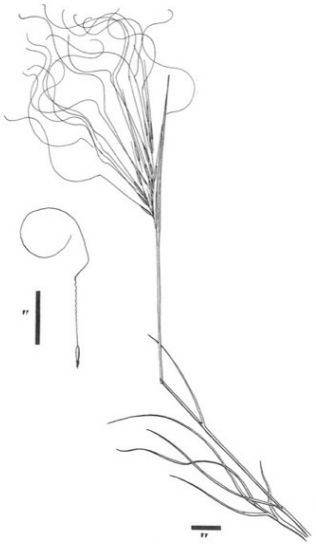
Indian ricegrass cannot be mistaken for other coulee natives, with the possible exception of Richardson's needlegrass (*Stipa richardsonii* Link). The latter has an awn that is twice bent and about ½" long, and may occur only on the western fringes of our coulee area. Indian ricegrass avoids the most exposed sites and does best in more level areas, small gullies or disturbed areas like gravel pits.

The common name is rather fanciful; there seem to be no substantiated reports of First Nations people making much use of the grass. It does not appear to grow in sufficiently massed stands to have much food potential.

Flowering time: June and early July

108. *Stipa comata* Trin. & Rupr. (needle-and-thread grass, speargrass)

Current name: *Hesperostipa comata* (Trinius & Ruprecht) Barkworth

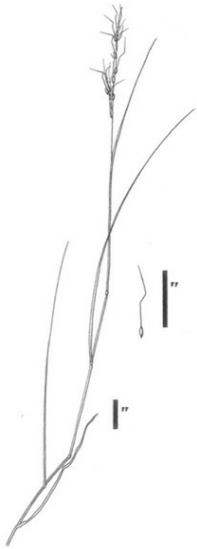


A tufted grass with unruly stems often two feet long that are partly lodged, partly bent, and partly more or less erect. The uppermost leaf tends to be a sheath-like organ from which the flowering portion of the stalk emerges. The "seeds" are somewhat yellow and hairy, sharply cigar-shaped, a little less than ¼" long, and have an extremely long, stiff, tightly twisted bristle (awn). This awn, which may be 4" or longer, is coiled, curved, or merely bent, depending on weather conditions.

Needle-and-thread grass is common in many grassy areas of the coulees, especially where the sod is not very dense, and does well even on top of many dry ridges. The awn is hygroscopic, twisting and untwisting with changing moisture conditions. This continual movement drives the "seed" to or even into the soil. Needle-and-thread grass, because of its enormously long awn cannot really be confused with even other species of *Stipa*.

Flowering time: July

109. *Stipa viridula* Trin. (green needlegrass)
Current name: *Nassella viridula* (Trin.) Barkworth



A tufted, slender grass reaching two feet or more in height, the long and slender leaves reaching well into the flower area. The latter is 3-5" long and has many side branches that are not at first obvious as they are somewhat appressed against the main stalk. The chaffy organs of the flower units are sharply pointed and enclose a single, dark, spindle-shaped "seed" that has fine, short white hairs and a 1-2" long barb (awn) at the end. The awn is usually bent once or twice.

Green needlegrass is a fairly common plant of grassy coulee areas and occasionally on top of ridges. There are one or two other needlegrasses that may cause confusion, aside from needle-and-thread grass (No. 108). Western needlegrass (*Stipa occidentalis* Thurb. ex Wats., also referred to as *Stipa columbiana* Macoun), for example, is extremely similar but its "seeds" are more slender and usually yellowish. The more comprehensive works such as Hitchcock's treatment of grasses, should be consulted by persistent botanists.

Flowering time: June and early July

110. *Artemisia campestris* L. (field wormwood, field sage)

A tall perennial, often with several stems from a low cluster of leaves, occasionally reaching two feet in height. The lowest leaves have a petiole as long as the leaf blade, the blade being divided into many long and narrow divisions. The whole leaf is about three inches long and lightly smooth-hairy. Upwardly the leaves become smaller and less divided until, near the flowers, the leaves are simple and narrow. Stems are much branched, all the branches being obliquely erect. Flower-heads small and many, loosely arranged on the smallest side branches.

In the lower coulees and on protected slopes, sometimes becoming established on disturbed ground. The field wormwood does not have as pronounced a sage scent as some other species.

Flowering time: Late July into September

111. *Artemisia cana* Pursh (silver wormwood, silver sagebrush)

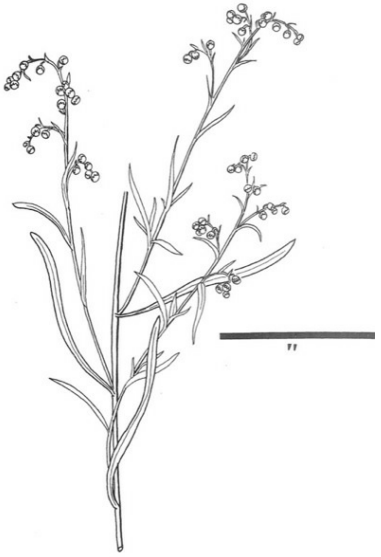
An often gnarled shrub up to 3 or 4 feet high, with fibrous, shredding bark, the leaves and young stems soft-hairy, giving the plant a greyish white colour. The leaves are rather narrow, about an inch or more long, some of the low ones sometimes cleft or lobed at the tip. Flower-heads small and clustered on small side branches at the end of larger branches.

Occasional on sandy and exposed areas, but especially abundant on low flats.

An unmistakable plant because of its twisted woody base and obvious sage smell. A closely related sagebrush, *Artemisia tridentata* Nutt., reported from the southwestern part of our area, has consistently three-lobed, more wedge-shaped leaves.

Flowering time: July and August

112. *Artemisia dracunculus* L. (dragon wormwood, dragonwort)



A slender, smooth and much branched perennial, growing to a height of three feet or more. The leaves are 2 or 3" long at most, narrow, slowly tapering to a sharply-pointed tip. Some of the largest leaves are rarely deeply cleft into three narrow divisions. The small, often nodding and stalked flowering heads are loosely distributed over the tips of all branches.

The dragon wormwood in southern Alberta is perhaps most commonly found on steep river banks and other unstable areas, although it may also be seen in more grassy areas.

Flowering time: July and August

113. *Artemisia frigida* Willd. (prairie sagebrush, pasture sage)

A rather small, soft, silver-green perennial forming small patches because of its branching, creeping stem. The leaves are less than an inch long and divided into thin, filament-like divisions. Most leaves are clustered on low, short branches. Flowering stalks reaching about a foot or slightly more in height, with upright side branches bearing many, rather well-spaced and often nodding flower-heads.

Prairie sagebrush is one of the most common coulee plants and is found on almost all sites. It is a very fragrant species.

Flowering time: July and August

114. *Artemisia ludoviciana* Nutt. (silver wormwood, prairie sage)

A colony-forming perennial with many erect stems from creeping root-stocks, growing to about 2 feet high in the coulees. Stems unbranched below, with many white-felty leaves that are pointedly elliptic, about 2-3" long. A rather compact, elongated group of small flower-heads develops at the top of each stem.

In our area the silver wormwood is commonly seen in grassy coulee bottoms. It is one of our most aromatic sages.

Flowering time: July and August

115. *Atriplex nuttallii* Wats. (Gardner's saltbush, moundscale, salt sage)

Current name: *Atriplex gardneri* (Moquin-Tandon) D. Dietrich

A perennial that branches along the ground before the tips of the branches grow up to a foot or less. All leaves and young stems have a silver-grey appearance because of a covering of minute scales; hairs absent. Leaves elliptic, tapering down to the petiole, about an inch long. The lower stem leaves usually have clusters of small leaves in their axils, but the upper ones have dense clusters of greenish flowers.

On very exposed sites, but also on saline flats.

The name "salt sage" is based on appearance only, as it is not related to the true sages, and has none of their scent. It can be distinguished from, for example, the silver sagebrush by the fact that it is not woody, and is completely hairless. The hairless characteristic also serves to separate it from *Ceratoides lanata* (No. 116). The silver saltbush (*Atriplex argentea* Nutt.), sometimes also called silverscale, may be more easily confused but can be separated by means of its somewhat arrow-shaped leaves that have a distinct petiole. It is also an annual, while the salt sage is perennial.

Flowering time: July and early August

116. *Ceratoides lanata* (Pursh) J.T. Howell (winterfat)

(Older name: *Eurotia lanata* (Pursh) Moq.)

Current name: *Krascheninnikovia lanata* (Pursh) A. Meeuse & Smit

A small, white-hairy perennial with several erect stems from a rather woody base. The plants rarely reach more than 1½ feet in height under coulee conditions. Leaves strap-shaped, narrowing to the rounded tip, lacking petioles. The largest leaves (about one inch long) usually have clusters of small leaves in their axils. The inconspicuous yellow (or red) and green flowers form an elongated, loose arrangement at the top of the branch sometimes with some side branches. Fruits provided with fluffy, white hair.

Dry ridges and other exposed places, but also in more grassy sites.

The name “winterfat" is based on the high esteem ranchers have for this plant, which remains a valuable feed even during the winter months, especially for sheep.

Flowering time: Late June and July

117. *Iva axillaris* Pursh (povertyweed)

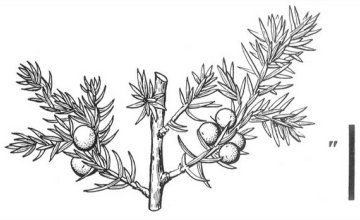
An inconspicuous, deep-rooted perennial, smooth or nearly so, sometimes with many branches and reaching a height of 1.5 feet, but often much smaller and sparsely branched. Even the largest leaves are without petiole and no more than an inch long, elliptical in shape. The lowest leaves are paired but the upper ones are single. Flower-heads like small, green, nodding bells, one in the axil of each of the upper leaves.

Povertyweed may spread into rather large patches, and can become weedy. Under natural conditions it may be most common on steep, eroding slopes and riverbanks.

This species may easily be overlooked and, even when noticed, it may be mistaken for a small species of sage. Its paired lower leaves and nodding, single flower-heads identify it with certainty

Flowering time: Mid-summer

118. *Juniperus communis* L. (common juniper)



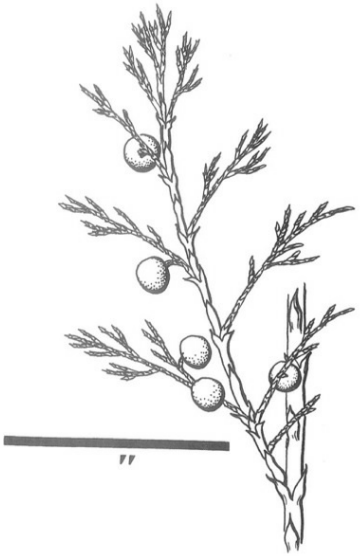
A profusely branched, spreading evergreen shrub with resinous smell, up to two or three feet high in more shaded places, lower when fully exposed. Leaves densely crowded along the stem but in whorls of three, flattened and sharp, 5 pointed, curved forward, olive green, ½" long. The blue grey resinous "berry" is actually a fleshy cone, and is found among the leaves.

Rather common and obvious among rock formations in Writing-on-Stone Provincial Park, and also known from Dinosaur Provincial Park, but perhaps not present in the Lethbridge area.

This is one of two evergreen shrubs in the coulees, both being junipers. The leaves in the other, the creeping juniper, are much smaller and more narrowly needle-shaped or awl-shaped, and its stems creep on the ground.

Pollen is shed in the spring; the plants are either male or female.

119. *Juniperus horizontalis* Moench (creeping juniper)

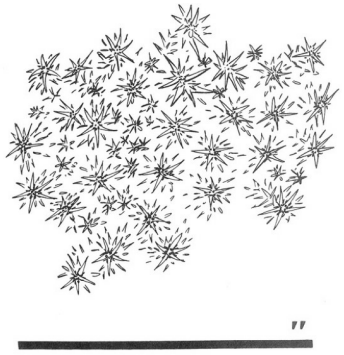


A much-branched, mat-forming evergreen shrub with branches spreading along the ground and often rooting there. The shrub rarely reaches a foot in height. Most leaves scale-like and in pairs, overlapping each other. As in other junipers, the so-called "berry" is really a fleshy cone, as the plant is a conifer.

The creeping juniper may grow between and over rocks or ledges, or may form very large; flat patches on grassy coulee slopes. It may be confused with *Juniperus communis*. See comments under that species (No.118).

Plants are either male or female, the pollen being shed in the spring.

120. *Paronychia sessiliflora* Nutt. (creeping nailwort, low whitlow-wort)



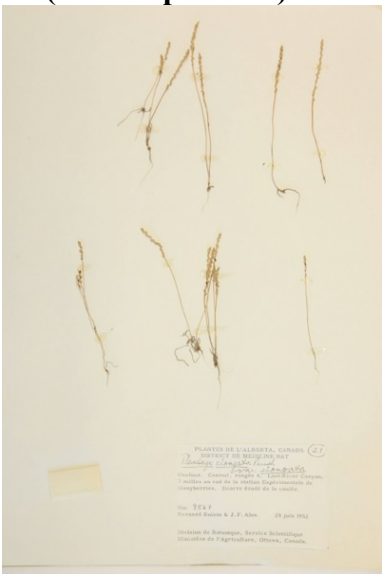
A very low, olive-green, hairless perennial growing in small cushions about half a foot across. The leaves are small, needle-like organs joined with leaf-like papery straps (two for each leaf), and are so crowded that it is difficult to see that they occur in pairs. The flowers are minute, green, five-pointed stars without any stalk.

This species is common on very dry and exposed ridges and slopes, where it usually grows together with the moss phlox. In fact, after the flowers of the latter are gone the two are very difficult to tell apart, and we have to rely on the dry petals remaining on many phlox flowers, the papery leaf-straps (stipules) in *Paronychia* and its green, star-like flowers. In general appearance *Astragalus kentrophyta* is also similar, but not quite as dense; a good look at the divided leaf and possibly the small pea-like flowers and pods will identify it.

Related, European plants were at one time thought to provide a cure for whitlow, an inflammation at the base of fingernails and toenails.

Flowering time: June

121. *Plantago elongata* Pursh (slender plantain)



A small annual plant with a cluster of narrow, pointed, two-inch long leaves that are only slightly hairy, mostly at the base. Flowering stalks unbranched and leafless, several, and reaching 3 or 4" in height. The flowers are very small and greenish and form a slender spike on the upper half of the stalk. The fruit is very small, and contains several smooth, pointed seeds.

Common in some of the low, flat areas of Dinosaur Provincial Park, but apparently not common in, or possibly absent from the Lethbridge coulees and Writing-on-Stone Provincial Park.

There are one or two other wild plantains native to the coulees (see comments under No. 122).

Flowering time: June and early July

122. *Plantago patagonica* Jacq. (woolly plantain)

Very similar to *Plantago elongata* (No. 121) in size and appearance, but covered with rather long, grey hairs on all visible parts, including the small fruits. The flowers and fruits are also crowded together more densely at the tips of the stalks, of which there may be many.

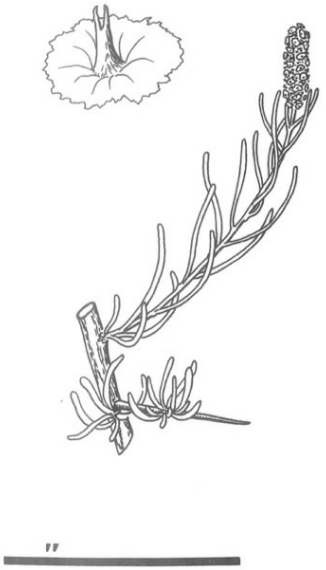
Common throughout the coulee area on flats and exposed places, becoming larger and slightly weedy in some disturbed places.

This is one of a group of unrelated species that occurs both in western North America and southern South America, but not in the intervening tropics. Since collections from the tip of South America were named first, we are "stuck" with the unlikely name *P. patagonica* for a native Alberta plant.

At Dinosaur Provincial Park some plants of *P. patagonica* have long, green, narrow leaf-like organs sticking out from the spike. These are thought to be hybrids with another plantain, *Plantago aristata* Michx. Since the latter species has never been reported in Alberta, however, the supposed hybrids (sometimes called *Plantago spinulosa* Desne.) are very puzzling plants.

Flowering time: June and early July

123. *Sarcobatus vermiculatus* (Hook.) Torrey (greasewood)



Thorny shrub reaching about 3 or 4 feet in height under most coulee conditions. The stems are much branched, many of the lower branches being transformed into thorns. Upper branches lack thorns and bear narrow, fleshy leaves about an inch or less in length. At the branch tips there are cone-like spikes with yellowish green organs shaped like umbrellas between which the very inconspicuous male flowers develop. Just below these spikes, in the axils of some of the nearest leaves are the minute and very inconspicuous female flowers. Neither type of flower has obvious petals. The fruits are about ¼" across and have a very striking umbrella-like rim at the middle.

Greasewood is a rather unmistakable shrub because of its thorns and peculiar "cones" and fruits. It is common on flats, and some quite exposed hillsides at Dinosaur and Writing-on-Stone Provincial Parks, but may well be absent from the Lethbridge area.

Flowering time: June and early July

124. *Selaginella densa* Rydb. (prairie spikemoss)

A matted flower-less dwarf plant usually mistaken for a moss. The plant branches finely and creeps along the soil surface. The leaves are densely crowded, shaped like curved, flat needles no more than ⅛" long. The tip of the leaf runs into a long, white bristle. From somewhat short of the margin of the plant a number of four-sided erect cones develop, reaching about an inch in length. Within these cones small, orange structures may be seen that contain the spores.

The prairie spikemoss is very common in the grassy areas of Writing-on-Stone Provincial Park, but less so in Dinosaur Provincial Park. It is sporadic but present on the Lethbridge coulees.

###

Plant Flowering Times

early spring

31. moss phlox (*Phlox hoodii*)
35. prairie townsendia (*Townsendia hookeri*)
41. yellow bells (*Fritillaria pudica*)
61. thorny buffaloberry (*Shepherdia argentea*)
67. prairie crocus (*Anemone patens*)

late spring -early summer

2. prairie onion (*Allium textile*)
3. saskatoon(*Amelanchier alnifolia*)
4. northern fairy-candelabra (*Androsace septentrionalis*)
5. cut-leaved anemone (*Anemone multifida*)
10. plains milk-vetch(*Astragalus gilviflorus*)
12. narrow-leaved milk-vetch (*Astragalus pectinatus*)
17. bastard toadflax (*Comandra umbellata*)
18. cock's-comb cryptantha (*Cryptantha celosioides*)
20. cut-leaved fleabane (*Erigeron compositus*)
21. wild strawberry (*Fragaria virginiana*)
22. northern bedstraw (*Galium boreale*)
24. white prairie parsley (*Lomatium macrocarpum*)
26. butte primrose (*Oenothera cespitosa*)
28. early yellow locoweed (*Oxytropis sericea*)
29. white beardtongue (*Penstemon albidus*)
32. chokecherry (*Prunus virginiana*)
33. skunkbush (*Rhus trilobata*)
34. star-flowered false Solomon's seal (*Smilacina stellata*)
47. butte marigold(*Hymenoxys acaulis*)
48. Colorado rubberweed (*Hymenoxys richardsonii*)
49. silver bladderpood (*Lesquerella ludoviciana*)
51. narrow-leaved puccoon(*Lithospermum incisum*)
52. fennel-leaved desert-parsley (*Lomatium foeniculaceum*)
53. leafy wild parsley (*Musineon divaricatum*)
57. early cinquefoil (*Potentilla concinna*)
59. golden currant (*Ribes aureum*)
60. prairie groundsel (*Senecio canus*)
64. golden bean (*Thermopsis rhombifolia*)
65. yellow prairie violet (*Viola nuttallii*)

74. Missouri milk-vetch (*Astragalus missouriensis*)
75. tufted milk-vetch (*Astragalus spatulatus)*
78. pincushion cactus (*Coryphantha vivipara*)
79. low larkspur (*Delphinium bicolor*)
80. darkthroat shootingstar (*Dodecathcon radicatum*)
82. three-flowered avens (*Geum triflorum*)
83. northern hedysarum (*Hedysarum boreale*)
89. smooth blue beardtongue (*Penstemon nitidus*)
102. three-leaved sedge (*Carex filifolia*)

summer

1. yarrow (*Achillea millefolium*)
6. little-leaved pussytoes (*Antennaria microphylla*)
8. ground plum milk-vetch(*Astragalus crassicarpus*)
9. Drummond's milk-vetch (*Astragalus drummondii*)
11. prickly milk-vetch (*Astragalus kentrophyta*)
13. slender milk-vetch (*Astragalus tenellus*)
14. field chickweed (*Cerastium arvense*)
15. rose chamaerhodos (*Chamaerhodos erecta*)
16. western white clematis (*Clematis ligusticifolia*)
19. tufted fleabane (*Erigeron caespitosus*)
23. wild licorice (*Glycyrrhiza lepidota*)
25. ten-petalled blazing star (*Mentzelia decapetala*)
27. clustered broomrape (*Orobanche fasciculata*)
30. white prairie-clover (*Petalostemon candidum*)
36. death camas (*Zigadenus venenosus*)
38. wolf-willow (*Elaeagnus commutata*)
39. yellow buckwheat (*Eriogonum flavum*)
40. small-flowered wallflower (*Erysimum inconspicuum*)
42. great blanketflower (*Gaillardia aristata*)
50. large-flowered yellow flax (*Linum rigidum*)
54. serrate-leaved evening primrose (*Oenothera serrulata*)
55. plains prickly pear cactus (*Opuntia polyacantha*)
68. spreading dogbane (*Apocynum androsaemifolium*)
69. showy milkweed (*Asclepias speciosa*)
71. ascending purple milk-vetch (*Astragalus adsurgens)*
72. two-grooved milk-vetch (*Astragalus bisulcatus*)
73. flexible milk-vetch (*Astragalus flexuosus*)

76. harebell (*Campanula rotundifolia*)
77. wavy-leaved thistle (*Cirsium undulatum*)
81. scarlet gaura (*Gaura coccinea*)
85. wild blue flax (*Linum perenne*)
88. wild bergamot (*Monarda fistulosa*)
91. Indian breadroot, prairie turnip (*Psoralea esculenta*)
92. prairie rose (*Rosa arkansana*)
93. common wild rose (*Rosa woodsii*)
94. scarlet globe-mallow (*Sphaeralcea coccinea*)
95. western snowberry (*Symphoricarpos occidentalis*)
96. wild vetch (*Vicia americana*)
97. crested wheatgrass (*Agropyron cristatum*)
98. western wheatgrass (*Agropyron smithii*)
99. red three-awn grass (*Aristida longiseta*)
100. blue grama (*Bouteloua gracilis*)
101. sandgrass (*Calamovilfa longifolia*)
103. Canada wildrye (*Elymus canadensis*)
104. Sandberg's bluegrass (*Poa sandbergii*)
105. Junegrass (*Koeleria cristata*)
106. plains muhly (*Muhlenbergia cuspidata*)
107. Indian ricegrass (*Oryzopsis hymenoides*)
108. needle-and-thread grass (*Stipa comata*)
109. green needlegrass (*Stipa viridula*)
115. Gardner's saltbush (*Atriplex nuttallii*)
116. winterfat (*Ceratoides lanata*)
117. povertyweed (*Iva axillaris*)
120. low whitlow-wort (*Paronychia sessiliflora*)
121. slender plantain (*Plantago elongata*)
122. woolly plantain (*Plantago patagonica*)
123. greasewood (*Sarcobatus vermiculatus*)

late-summer early fall

7. tufted white prairie aster (*Aster pansus*)
37. hairy golden aster (*Chrysopsis villosa*)
43. curly-cup gumweed (*Grindelia squarrosa*)
44. broom snakeweed (*Gutierrezia sarothrae*)
45. lacy tansy-aster (*Haplopappus spinulosus*)
46. rhombic-leaved sunflower (*Helianthus laetiflorus*)

47. butte marigold (*Hymenoxys acaulis*)
56. yellow owl's-clover (*Orthocarpus luteus*)
58. prairie coneflower (*Ratibida columnifera*)
62. Missouri goldenrod (*Solidago missouriensis*)
63. velvety goldenrod (*Solidago mollis*)
66. nodding onion (*Allium cernuum*)
70. smooth blue aster (*Aster laevis*)
84. dotted blazing-star (*Liatris punctata*)
86. rush skeletonplant (*Lygodesmia juncea*)
87. hairy four-o'clock (*Mirabilis hirsuta*)
90. purple prairie-clover (*Petalostemon purpureum*)
110. field wormwood (*Artemisia campestris*)
111. silver sagebrush (*Artemisia cana*)
112. dragon wormwood (*Artemisia dracunculus*)
113. pasture sage (*Artemisia frigida*)
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94. Sphaeralcea coccinea (Pursh) Rydb. (scarlet globe-mallow, apricot mallow) 112
95. Symphoricarpos occidentalis Hook. (western snowberry, buckbrush; wolfberry) 113

96. Vicia americana Muhl. ex Willd. (American vetch, wild vetch) 114

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97. Agropyron cristatum (L.) Gaertn. (crested wheatgrass) 116

98. Agropyron smithii Rydb. (western wheatgrass) 117

99. Aristida longiseta Steud. (red three-awn grass, three-awn) 118

100. Bouteloua gracilis (H.B.K.) Lag. ex Griffiths (blue grama) 119

101. Calamovilfa longifolia (Hook.) Hackel (prairie sandweed, sandgrass) 120

102. Carex filifolia Nutt. (thread-leaved sedge) 121

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104. Poa sandbergii Vasey (Sandberg's bluegrass) 123

105. Koeleria cristata Pers. (Junegrass, prairie Junegrass) 124

106. Muhlenbergia cuspidata (Torrey) Rydb. (plains muhly) 125

107. Oryzopsis hymenoides (R. & S.) Ricker (Indian ricegrass) 126

108. Stipa comata Trin. & Rupr. (needle-and-thread grass, speargrass) 127

109. Stipa viridula Trin. (green needlegrass) 128

110. Artemisia campestris L. (field wormwood, field sage) 129

111. Artemisia cana Pursh (silver wormwood, silver sagebrush) 130

112. Artemisia dracunculus L. (dragon wormwood, dragonwort) 131

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114. Artemisia ludoviciana Nutt. (silver wormwood, prairie sage) 133

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