

Purshia tridentata Bitterbrush

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Photo: Drake Barton

Purshia tridentata (Bitterbrush)

July 6, 1806 was a busy day for Meriwether Lewis and his party of explorers. The expedition was on its way back to St. Louis and had split into three groups as it crossed Montana headed eastward. While hurrying across western Montana on his way to the Marias River, Lewis had time to collect plants that were new to him, press them and record botanical notes in his journal. In Ovando Valley, Lewis collected four plants in what he called the “prairie of the knobs.” The “knobs” are the many small, steep hills visible in the topography of the area. Lewis may have collected more plants, but four from that day still survive and are in the Lewis & Clark Herbarium at the Academy of Natural Sciences in Philadelphia.

One of the plants collected on July 6 was bitterbrush or *Purshia tridentata*, as it is known to botanists and other plant nerds. The original Lewis specimen, now housed in the Lewis & Clark Herbarium in Philadelphia, has a label by Frederick Pursh that reads, “A Shrub common to the open prairie of the Knobs. Jul. 6th 1806.” Bitterbrush is named in

honor of Frederick Pursh who used Lewis’s specimen to describe the species in 1814. In Pursh’s book, *Flora Americae Septentrionalis*, there is a beautiful hand-colored picture of bitterbrush. Pursh had given the plant another name, *Tigareia tridentata*, which was later demonstrated to be invalid, so to honor him, bitterbrush now carries Pursh’s name.

Bitterbrush is a deciduous shrub in the rose family (Rosaceae) and is usually from three to six feet tall, but can be much taller in some areas. There are two common ecotypes, both present throughout its range. There are multiple-stemmed, decumbent plants and single-stemmed, columnar plants. The decumbent, or prostrate form is more common at higher elevations. The leaves are wedge-shaped with three lobes, hence the name *tridentata* that means three-toothed. The leaves are green on the upper surface and appear to be gray-green on the underside. This is due to the presence of dense hairs. Bitterbrush has a long taproot or taproots that can be as long as 18 feet, as well as a few shallow roots. The flowers are yellow and very fragrant, helping to attract the insect pollinators needed to perpetuate the species. The shrub flowers early, while the leaves are just starting

to emerge, and often creates quite a show with brilliant yellow in an otherwise somewhat drab landscape. In our area, the flowers are gone by mid-June and the three-parted leaves are the most distinguishing feature. The same feature applies to big sagebrush, *Artemisia tridentata*, but if you are in doubt just take a sniff. Bitterbrush does not have the characteristic “sage” odor of big sagebrush.

Bitterbrush grows from British Columbia to New Mexico and throughout the Rocky Mountains and Great Basin, where it is distributed on over 340 million acres. Bitterbrush grows on all slopes and aspects, but is usually found on well-drained soils, from about 3,000 to 10,000 feet in elevation. Precipitation usually comes as snow and varies from 12 to 36 inches annually. Bitterbrush is able to survive on rocky and arid sites because of its long taproot and nitrogen-fixing capacity. Young seedlings can withstand very high surface soil temperatures, which aids their ability to regenerate from seed. Although bitterbrush is adapted to many harsh conditions, it does not tolerate saline soils. Look for bitterbrush on dry slopes in the valleys, foothills and montane forests. In Montana, bitterbrush is often found on south-facing slopes with bluebunch wheatgrass, Idaho fescue and needle-and-thread grass. It is also associated with sagebrush, so don't forget the sniff test.

Bitterbrush also goes by the common name antelope brush or antelope bitterbrush. It is an important browse plant and is favored by deer, pronghorn (antelope), elk, moose, mountain sheep and domestic livestock. Mule deer use of bitterbrush peaks in September, when it may compose 91 percent of the diet. Deer mice and kangaroo rats also use bitterbrush, and the seed is a large part of their diets. Because it is such a favorite, its vigor is often used to gauge the condition of rangeland. If land is overgrazed, the bitterbrush will be severely nibbled and stunted. Domestic sheep may be particularly damaging to bitterbrush since they prefer young and small plants. Bitterbrush also supports several insect populations. Especially important are Pogonomyrmex ants, which stash seeds and are one means by which bitterbrush regenerates, and tent caterpillars, which often cause bitterbrush to decline. You may have seen the large tents these caterpillars construct in the shrub branches. Birds, rodents and ungulates use bitterbrush for cover. Mule deer and pronghorn use bitterbrush stands of different heights for cover, and sage grouse and Lewis's woodpeckers also find

shelter in bitterbrush.

Rodents, as well as ants, are important for bitterbrush regeneration and rodent caches of seeds are often crucial to the natural regeneration of bitterbrush. Rodents and ants may stash the entire crop of seed, some of which sprout. It is a mixed blessing, however, since rodents also eat the young plants. Probably of greater concern is competition from cheatgrass (*Bromus tectorum*), a non-native, invasive, annual grass that is spreading rapidly in bitterbrush and sagebrush habitats. Cheatgrass invasion has increased the amount of fine fuels in big sagebrush and bitterbrush grasslands, and bitterbrush is not adapted to the more frequent, high severity fires resulting from increased fuel loads. Some studies have demonstrated that cheatgrass may out-compete bitterbrush after a fire event.

Bitterbrush has been used extensively in land reclamation and can be used on harsh sites where it aids in soil retention and deposits organic matter. In some habitats, bitterbrush fixes nitrogen and increases soil fertility. Bitterbrush is a good choice for native landscapes that encourage wildlife use, and requires little care once it is established on the site.



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Traditionally, bitterbrush had many medicinal uses among Native Americans. An infusion of the root was taken for lung problems and coughs. In Montana the dry, ripe fruits were used as an emetic. Some tribes chewed the leaves to bring good luck during hunting. The Shoshone, Sacagawea's people, used bitterbrush as a poultice for skin problems, as a general tonic, and as a cure for gonorrhea. Others used the outer seed coat to produce a purple dye used to stain items made of wood and the Navajo made arrows from bitterbrush wood.

As you begin to notice Montana's plant heritage, don't forget the man 200 years ago who first brought bitterbrush to the attention of western science, and remember also the importance of preserving bitterbrush habitat and curtailing the introduction and spread of non-native plant species.