



## **Dandelion: Weed or wildflower?**

### **Exploring a common plant at home and with the Rocky Mountain Herbarium**

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Most of us know dandelions as a "weed," but why do we call it a weed?

Weed can mean many different things to different people. Which of these definitions do you use?

1. A plant that's not good for anything.
2. A plant that grows everywhere.
3. A plant that nobody planted.
4. An ugly plant.
5. A plant that shouldn't be here.
6. A plant growing where it's not wanted.

Many people say that a weed is a plant that spreads around, and that shouldn't be here, as in, it came from somewhere else. By that definition, the common dandelion is certainly a weed. It is native to Europe and Asia, and arrived in North America with the first European immigrants, perhaps as a food and medicinal plant, or perhaps the introduction was unintentional. Since then, it has spread across the continent, occupying suitable habitat in every state and province, and is also present in Mexico. It is considered a pest in lawns and agricultural settings.

But it has its attractions, too. It blooms for much of the year, often managing to flower even in winter if the microclimate is good, for example, on the south side of a building. It frequently presents the first flowers of the spring, making it a valuable resource for early pollinators and other insects, and the leaves are eaten by the caterpillars of a number of moth and butterfly species. Dandelion leaves have been and are eaten by people, too, as a salad green or pot herb, usually the first to be had in spring. Dandelion leaves are high in vitamins A, B, C, and D, as well as minerals, such as iron, potassium, and zinc. The roasted roots can be used as a (caffeine-free) coffee substitute. And dandelion flowers can be eaten as well, or made into wine (if you have other ingredients and lots of time).

Be cautious in use of the leaves, though—they are used as a diuretic to flush fluids from the body, leading to another common name for the plant: piss-in-bed. Dandelions are also known as cankerwort, a reference to its use as a remedy for boils, and it has also been used as remedy for fever, diabetes, diarrhea and liver ailments.

So, definitions 1 and 4 don't apply to dandelions, but neither does definition 5 apply all the time. In fact, there are several native species of dandelions in North America that are difficult to distinguish from the non-native common dandelion. In Wyoming, four species are recognized by botanists—two are introduced and two are native to the state.

The name dandelion is derived from the French term *dent-de-lion*, which means tooth of the lion, and refers to the jagged edges of the dandelion's leaves. The scientific name for dandelion is *Taraxacum*, a word derived from an old Persian name for the plant. *Taraxacum* is the genus; there are 60-2000 species (depending on whom you ask). Each species name includes *Taraxacum* plus another name. For example, common dandelion's scientific name is *Taraxacum officinale*, abbreviated to *T. officinale*.

### **Exercise 1: Dandelion specimens**

The University of Wyoming Rocky Mountain Herbarium

(<http://rockymountainherbarium.org/index.php>) has approximately 1200 specimens of dandelions in their database. Why is this valuable scientific information?

- Each specimen represents the vegetation at a particular place, at a particular time. This enables scientists to form understandings of the range and distribution of plant species, and how land use, management, and climate affect plant species.
- Each specimen represents the physical appearance of the plant, which provides scientists with information on morphological variation within and between species. Specimens can also be sampled for genetic material.
- Specimens may harbor unintended information about insects, fungi, or bacteria that were collected with the plant, providing insight into the taxonomy and ecology of ecologically and economically important plant-associated organisms.

Search the RM database (<http://rockymountainherbarium.org/index.php/research/how-use-rm-database>) for specimens of dandelions by typing *Taraxacum* in the Genus box. Limit the search to Wyoming by typing Wyoming in the State box. Click Search Specimens to see where specimens were collected and a list of the specimens.

Select a specimen image from the list, click on the image, and zoom in to see the specimen in detail and the information provided on the label. Older specimens do not have standardized labels, but newer specimens have labels that provide standard and more detailed information. When a specimen is imaged (photographed), additional information is included: a bar code is attached to the paper to link the image file with the file that includes the specimen number and label data, and a ruler and a color standard are placed on the specimen during imaging (these are not permanently attached to the specimen).

What information is provided on the label?

Scientific name, family name, date, location, collector's name and collection number; sometimes also associated species or habitat.

What additional information is found on the specimen sheet that is not included on the label?

The plant, of course, which is full of information on size, shape, color, associated microbes, etc. Herbarium accession number, sometimes name changes are indicated, or other notes or comments. If there's a db stamp, it means the specimen has been entered into the database.

## Exercise 2: Identifying dandelion species

Botanists use several traits of dandelion plants to distinguish the four species that reside in Wyoming, including leaf shape, color of the achene (the fruit, but generally called the seed, in this case), and features of the bracts that are located directly below the flower head.

All dandelion heads are made up of many (30-120) small flowers. Each flower has a single ray formed by the fusion of five petals. Each flower will produce an achene with the familiar feathery, umbrella-like appendage. Below the head are two series of bracts; the bracts of the inner series cover the head before the flowers mature and again before the achenes are released. These bracts may be tipped with a "horn," a small protuberance. The outer series are shorter; their position (erect, spreading or reflexed (bent backwards)) should be noted.

There are other plants that have flower heads that are similar in appearance to dandelion. The genus *Taraxacum* has a unique combination of features that includes:

- Milky sap
- No stem (all leaves from the base of the plant)
- One flower head per stalk
- Pappus of capillary bristles (not branched or feathery)
- Two series of bracts, the outer one much shorter than the inner series.

The four species found in Wyoming are:

*Taraxacum ceratophorum*, horned dandelion (has also been called *T. eriophorum*)

*Taraxacum erythrospermum*, red-seeded dandelion (has also been called *T. laevigatum*)

*Taraxacum officinale*, common dandelion

*Taraxacum scopulorum*, alpine dandelion (has also been called *T. lyratum*)

The key below will enable you to identify any dandelion found in Wyoming, or practice with the herbarium specimen images provided. To use a dichotomous key, start at number 1, and read both options (1a and 1b). Choose the option that best fits the specimen. At each step, read both options before making a decision. Have fun!

## Dichotomous key to Wyoming dandelion species

1a. Leaves lobed more than halfway to the midrib, outer bracts reflexed.....Go to 2

2a. Achenes olive to brown at maturity, leaves moderately cut, sometimes with a large terminal section; inner bracts usually not horned. *Taraxacum officinale*

2b. Achenes red, purple or reddish brown at maturity; leaves deeply cut, often to midrib, without large terminal section; inner bracts often horned. *Taraxacum erythrospermum*

1b. Leaves lobed less than halfway to midrib, outer bracts erect or spreading. Plants of or near the mountains.....Go to 3

3a. Achenes dark brown to black at maturity; inner bracts rarely horned, no longer than 13 mm; plant small (5 cm or less), collected at high elevation (alpine or subalpine).

*Taraxacum scopulorum*

3b. Achenes straw colored or olive or light brown at maturity; inner bracts often horned, 10-25 mm long.

*Taraxacum ceratophorum*

*T. scopulorum* (= *T. lyratum*)      Unknowns 2, 5, 6, 15; RM 341706, 556197, 907820, 262043

*T. ceratophorum* (= *T. eriophorum*)      Unknowns 1, 3, 12, 13, 16; RM 825338, 912313, 727798, 579115, 222635 shows horns!

*T. erythrospermum* (= *T. laevigatum*)      Unknowns 8, 9, 14, 16; RM 933933, 654000, 653863, 731558

*T. officinale*      Unknowns 4, 7, 11, 14; RM 654002, 844017, 727813, 933926

### Exercise 3: Learn more about dandelions in Wyoming

Use the Rocky Mountain Herbarium database search

(<http://rockymountainherbarium.org/index.php/research/how-use-rm-database>) to search for all *Taraxacum* specimens in the state.

1. How many specimens have been collected in Wyoming? 1196
2. How many species names have they been given? (Use the show checklist option to see this easily.) 6
3. Which names are included in the database that were not included in the key? *Taraxacum ammophilum* and *Taraxacum oblongeolatum*

- a. Search for each of these last two species separately. When, where, and by whom were they collected? All collected June 1, 1900 by Aven Nelson, Sand Creek, Albany County, WY
  - b. Notice that none of the specimens are indicated on the map. Why do you think that is? The given location is too vague to pinpoint on the map.
  - c. Why do you think these names are no longer used by botanists? No other plants have ever been collected and identified as *T. ammophilum*, and no one has studied these specimens carefully. *T. oblancheolatum* was never published (a requirement for a name to be official). Note that someone added a note in 1986 that the *T. oblancheolatum* specimen is really *T. dumetorum*, which is now considered to be the same species as *T. ceratophorum*. The short answer is: Botanists no longer consider these specimens unusual enough to need their own species names.
4. Search again for all *Taraxacum*, and look at the distribution map.
    - a. Are there places in the state where dandelions have not been collected? Some of the low dry places, and the Wind River Reservation.
    - b. Provide a hypothesis for why that is.
      1. There are no dandelions to collect there. Perhaps it's too dry.
      2. No collector has traveled to those places. (True for the Reservation, perhaps for the basins, too.)
  5. Compare the distributions of *Taraxacum scopulorum* and *T. ceratophorum*. Which is more widely distributed? How would you characterize the places where they are found? *T. scopulorum* is found only in the mountains. *T. ceratophorum* is found mostly in the mountains, but also at some lower elevation sites.

What information might you be able to get from the specimen labels to help you describe or distinguish the habitats of the two species? Look at the elevations where they were collected to see if *T. scopulorum* is at higher elevation. If associated species or habitat information is provided, determine if the two species have different habitat preferences.

#### Exercise 4: Make a collection

A good specimen will include as many of the diagnostic characteristics of a plant as possible (flowers, fruits, leaves, stems and roots), so choose carefully. Use a trowel to get the roots. In a field notebook, assign a specimen number to the plant, and record the information needed for the label. Remove as much dirt and debris as possible from the plant, then lay it on several sheets on newspaper. Lay out the plant so that the features are visible, i.e., some of leaves are flat, and at least one shows the bottom side; flower heads are flattened such that the bracts on the underside are visible; achenes, if present, are visible so that the color can be determined. Write the specimen number on the newspaper. Lay more sheets of newspaper on top and press with a stack of books or another, flat, heavy object.

For multiple specimens, assign a unique number to each, and press individually. Lay corrugated cardboard between specimens as needed to keep them flat.

Prepare a label for each specimen that includes all of the information from the field notebook.

When the specimen is dry, remove more dirt if needed, and glue it and its label to a sheet of paper. Herbaria use special paper that is made of cotton (instead of wood pulp), is acid-free, and 11.5 x 16.5 inches. The Rocky Mountain Herbarium uses Elmer's glue spread to a thin layer on a flat surface. The label is dipped in the glue and mounted on the paper, then the plant is laid gently in the glue before placing on the paper. Sometimes it is necessary to add tiny amounts of glue if parts of the plant were missed. Cover the specimen with waxed paper and place a gentle weight on it until dry.

Store your specimens away from sunlight and moisture, preferably in a tightly closed cabinet.

### **Last but not least: Visit the Rocky Mountain Herbarium or an herbarium near you!**

The Rocky Mountain Herbarium is located on the University of Wyoming campus, in Laramie Wyoming. It is open to the public M-W 8 am-4 pm. More information on visiting the RM is available at <http://rockymountainherbarium.org/index.php>. Many colleges and universities have herbaria that may be open for public visits—check one near you.