

HOW TO USE A KEY

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Do you find botanical keys easy to use?—if the answer is "yes," you don't need to read any farther. If (like most of us) you think keys are hard, or impossible to use, then read on.

First the good news: anyone who reads the first two sentences of this item has already used a key. Basically, that is what a key is: pairs of questions, or rather statements, with yes or no answers. A "No" leads to the other statement in the pair; a "Yes" leads on to a new set of questions. If you have used a computer or filled out the type of questionnaire that says, "if your answer is no, skip the next questions and go to the following page," you will find that a botanical key is very similar. Each pair of statements gives you a yes-or-no, either/or choice; one of the two has to be correct. A "No" leads to the other statement in the pair; a "Yes" leads to a new set of questions, or the answer.

When we started doing our Penstemon key, we tried to make it as easy to follow as we could because of the difficulty we have had with complicated keys. People tell us they would like some explanation of how to use this key or any key. The easiest way to explain it is to talk ourselves through a search.

Suppose you find a flower that looks like a Penstemon and want to identify it. Look at the first section of the Penstemon key which came with the Summer 1986 APS Bulletin. The key itself starts on page 4 with a series of statements describing genus Penstemon. (If a flower does not fit this description, it has to be in a different genus.) Expanding the description makes it easier to read:

Penstemon [is a genus in the family] Scrophulariaceae. [A Penstemon is a] perennial shrub, subshrub or herb. [Its] leaves [are] opposite, [or] rarely sub-alternate or whorled. [Its] inflorescence [is] indeterminate [and made up] of determinate or indeterminate cymes; [each cyme is] one-to-many-flowered. [The Penstemon] flower is tubular with five lobes; [it has an] epistaminal nectary; four stamens [and] one large staminode, [which is] bearded or glabrous. [The] capsule [is] four-parted, [and splits] open. [Penstemons grow native throughout] North America [as far south as] Guatemala.

If your flower fits this description, it is a Penstemon, and you can go on to the first set of either/or statements in the key. Notice that these statements are labeled with letters of the alphabet: A and A are the first pair, B and B the second, and so on. (The paired statements are also indented the same distance from the left margin which makes them easier to locate.) Each pair of letters gives you an alternative, yes-or-no choice. Since only the first section of the key has been printed, we'd better pick a species which can be found in it to key out—let's say it is a species with glabrous anthers which open from the inner end, red-purple flowers and serrate leaves. Now follow the key (we have added the answers, "NO" or "YES (with directions)" after each statement.)

- A. Anthers woolly NO
- A. Anthers glabrous to more or less hairy YES (go on to B)
- B. Anthers open partway from one end YES
- B. Anthers open from end to end across connective NO (go back to the first B, and right under it will be found ...)
- C. Anthers open part way from inner end Yes
- C. Anthers open part way from outer end NO (go back to the first C and follow down under it)
- D. Anthers saccate, more or less parallel: See Group II YES
- D. Anthers more or less pouched, spreading NO (go back to the first D and follow instructions to see Group II)

(Now that you see how it works, we will just take the YES answers and follow them as we come to them)

GROUP II

- A. Corolla red NO
- A. Corolla not red YES
 - C. Corolla white or tinged violet NO
 - C. Corolla blue-purple to red-purple, or paler YES
 - D. Leaves more or less serrate to dissected YES
 - E. Leaves not all opposite; leaves medium width tapering to both ends NO
 - E. Leaves all opposite YES
 - G. Leaves broad at base, oblong to lanceolate YES
 - H. Anther and/or staminode filaments more or less hairy YES
Rest of plant essentially glabrous. Leaves broad, ovate, to 100 mm to 1/3 as wide. Cymes short, 2-3 flowered. Sepals often scarious erose. Corolla red-purple, to 35 mm & 1/3 as wide; corolla lobes ciliate at ends; staminode bearded. Anthers occasionally slightly hairy. Southeastern Washington, northeastern Oregon, west central Idaho.

This description is followed by the species name: VENUSTUS. You have your plant identified. Simple, isn't it? (well, until you get to some real hard problems!) And having got this far, we have to put in a warning. Penstemons vary and hybridize. In our own garden, the P. venustus seedlings do not have the hair on the filaments that is so distinctive in the wild. That is one reason we have put in all the characteristics of each species that can help identify it and with occasional cross references. Next time the Group II key is printed, we will have a cross reference after (I, serrulatus) to "see also H, venustus." And for those of you who may have had trouble with Group II a, there was one see-also reference left out there. The next printing will show after

"T, leonardii," the cross reference "see also I, laetus'." (P. laetus varies so much we've come to think one should check it against any difficult saccate in Group IIa!)

Now let us define some of the terms you have been using in the key.

Anther: the pollen bearing part of the stamen. In Penstemons it is two small "anther-sacs at the end of the stamen, usually brown.

Capsule: the seed pod of a Penstemon. It splits into four equal sections when it is ripe, releasing the seeds.

Ciliate: Bearing cilia, fringed with hairs, bearing hairs on the margin.

Corolla: the flower.

Cyme: a single stem of flowers. Usually there is one cyme on each side of a node.

Determinate: a flower head or branch of same that starts to bloom at the outer end, limiting the growth of the head to that length.

Epistaminal: referring to the location of the nectary on the lower portion of the stamens as opposed to one located on the floral disc.

Genus: a group of species that have almost all points of identification in common.

Glabrous: without hairs, smooth.

Herb: a plant with stems that are not woody or woody only at the base.

Indeterminate: a flower head or branch of same that starts to bloom from the bottom, allowing the head to keep growing. An indeterminate inflorescence can bloom for a longer period of time than a determinate one.

Inflorescence: the flower head.

Nectary: where the nectar is produced. Nectar attracts the bees, etc., which pollinate the flower.

Node: point on the stalk where leaves or flowers are borne.

Opposite: coming from the same node but on opposite sides of the stalk.

Saccate: a type of anther. In Penstemon, anther-sacs opening from the inner end and remaining parallel to the stamen

Serrate: with small teeth on the edges of the leaves. These tend to be pointed in Penstemon.

Shrub: in Penstemon, a plant with woody, branched stems that are persistent and usually bear evergreen leaves.

Stamen: the filament holding the anthers. In Penstemon it comes from the base of the petals and puts the anthers where the pollinator touches them as it enters.

Staminode: a sterile stamen, without anther-sacs. In Penstemon, the staminode is large and often bearded with hairs.

Sub-alternate: referring to the leaves at a node when they are not quite opposite,

Subshrub: a plant that is less woody than a shrub but more so than a herb.

Whorled: with more than two leaves or cymes to a node.