

Perennial Pepperweed

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Perennial pepperweed (*Lepidium latifolium* L.) is an alien weed that is well established in New England, the far western United States, and Mexico. Range managers need to be aware of this species because it is well adapted to riparian and wetland areas and threatens hay and forage production from native meadows.

Plant Description. The plants are stiffly erect masses of stems 1 to 3 feet tall and occasionally to 8 feet under wet conditions (Figure 1). The base of the stem is semi-woody. The roots enlarge at the soil surface, forming a woody crown. Leaves form a basal tuft. The leaves, with 0.5 to 1.0 inch wide, toothed blades, taper to an elongated petiole. The upper leaves are much reduced in size and sessile, but do not clasp the stem. Abundant small white flowers are borne in clusters of 6 to 8, arranged in dense panicles (Figure 2). Dense infestations are brilliantly white with flowers in mid-summer. This has produced the frequently used common name of tall whitetop. Seeds are borne in individual very small, flattened pods (one eighth inch in diameter). The seeds are reddish brown in color and broadly oval in outline. Seeds do not dehisce from the pods at maturity, but fall at irregular intervals during the winter. The large amounts of semi-woody herbage produced by perennial pepperweed plants persist for several years and the accumulations of stems have a distinctive light tan color (Figure 3).

Relation To Other Plants. As stated above, a widely used common name for *Lepidium latifolium* is "tall whitetop". This is unfortunate because hoary cress (*Cardaria draba*), a noxious weed, is also commonly known



Fig. 1. Perennial pepperweed infestation along lower Susan River in Honey Lake Valley, California.

as whitetop. Hoary cress is widely distributed in meadows and hay fields in the Intermountain Area, Colorado Plateau, and Mountains States. The hoary cress is a very variable species that is often described as three separate subspecies or species. This group is usually much smaller in stature than perennial pepperweed and most forms have pubescent foliage compared to the glabrous leaves of perennial pepperweed. There are about 175 species of *Lepidium*, but none of the native or introduced species found in western North America are very similar in size and growth habitat to perennial pepperweed.

Current Distribution. We obtained an estimate of the range of perennial pepperweed in the far western United

States by distributing a questionnaire to state departments of agriculture and weed control agencies. Perennial pepperweed is found in all of the far western states except Arizona (Figure 4).

The distribution of perennial pepperweed corresponds to river systems where it infests riparian and wetland areas. The weed usually reaches fields by following irrigation ditches from riparian areas.

The weed is native to southeastern Europe and western Asia. It is thought to have been introduced to the United States as a contaminant of sugar beet seed. During the past two decades when this introduced pest spread very rapidly in the western United States, it has similarly spread through northern Europe.

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Fig. 2. Flower stalks of perennial pepperweed.

Range Of Adaptation. Perennial pepperweed has demonstrated a broad amplitude of adaptation. This is illustrated by it being reported as a pest in all counties in California except the coastal rain forest of the far northwest and the southeastern lower elevation deserts. In the Intermountain Area this weed has become established along river systems from the lower edge of coniferous forests to saline/alkaline deltas and sinks. Perennial pepperweed is very tolerant to salty soils. The weed is not restricted to salt influenced soils. It is adapted to stringer meadows characteristic of the big sagebrush zone. It is not yet a major pest in high mountain meadows in the coniferous forest zone.

Consequences of Perennial Pepperweed Invasion. This is a very competitive species that occurs in dense patches that are almost complete mono-cultures. In riparian zones it interferes with regeneration of willows and cottonwood species. In wetland areas the species composition and productivity of key herbaceous species is radically changed. The accumulations of semi-woody stems

negatively impacts nesting habitat for wildlife. An indication of the competitiveness of this species is provided by several examples of where it has replaced quackgrass.



Fig. 3. The semi-woody stems of perennial pepperweed persist for several seasons. They make it difficult to graze forage in the spring and interfere with herbicide application.

The greatest threat posed by perennial pepperweed is to native hay meadows. The weed is invading these meadows in areas such as the Humboldt River Valley of Nevada. The mode of invasion is along irrigation ditches from riparian areas. In the hay meadows perennial pepperweed lowers the quality of hay in terms of protein content and digestibility. In areas of meadows that are not mowed annually the accumulation of stems inhibits grazing. If grazing in the early spring is used to help suppress this weed the accumulations of old stems must be reduced by mowing, brush beating, or burning.

Potential As Poisonous Species.

Among livestock producers in areas infested with perennial pepperweed there have been persistent rumors that the weed may be poisonous. Most cases of suspected poisoning have occurred with horses being fed hay containing perennial pepperweed under confined conditions.

Several other species of the mustard family have been reported to be poisonous. Rape, which is widely cultivated in northern Europe and to an increasing extent in North America, is known to cause several disease problems in cattle. On the western range tansy mustard is commonly associated with

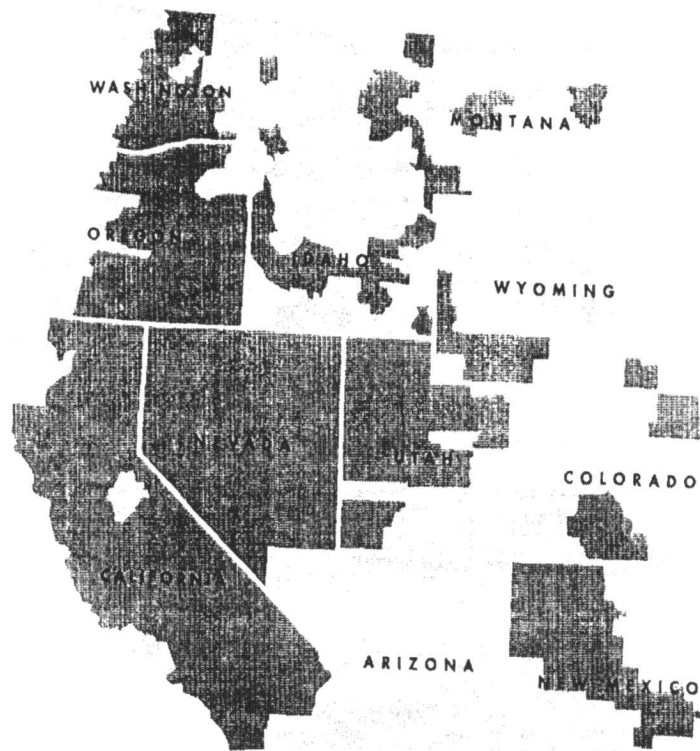


Fig. 4. Distribution of perennial pepperweed in the far western United States. Distribution shaded by counties. Only a small portion of any county may be infested.

poisoning of cattle. When consumed by cattle in large quantities over a prolonged period, blindness and the loss of the ability to use their tongue or swallow results. There is limited evidence that plants related to perennial pepperweed may be poisonous. *Lepidium latifolium* or shieldcress, is suspected of being poisonous to horses. A large number of horses became ill and many died in Utah after being fed hay consisting largely of shieldcress.

Based on the evidence of toxicity from other members of the mustard family and the persistent rumors of animal poisoning associated with perennial pepperweed it is worth while to investigate the toxic properties of the species under controlled feeding conditions.

Control Measures. Very small sections of the creeping roots of this weed contain buds that will sprout, producing vigorous new plants. This makes mechanical control measures very difficult. The weed is marginally susceptible to phenoxy herbicides. The tops are easily killed, but root and crown buds rapidly sprout and continue the infestation. Repeated treatments are necessary. The sulfonylurea compound chlorsulfuron has shown considerable promise for controlling perennial pepperweed. It does not appear that one treatment of any herbicide will be sufficient for adequate control. The location of infestations close to open water complicates the use of herbicides.

Potential For Biological Control. Through 1990, no classical biological control program, using the importation of a natural pest, had been reported in the world for weeds of the mustard family. Safety considerations for host-speci-

ficity is the reason for the lack of development of biological control procedures for mustard weeds. There are too many valuable crop species in the family.

Currently in the United States, a major concern with the development of biological control measures for exotic weeds is the influence of the control organism on closely related native plant species. There are 11 perennial species of *Lepidium* native to the western United States. One of these species is presently listed as an endangered species, and 6 others are under review. This is bad news for potential biological control measures.

What Can Range Managers Do About Perennial Pepperweed. The best way to handle this pest is to prevent infestations. The transportation of earth moving and tillage equipment from infested areas is apparently the major means of new introductions. Seed sources of revegetation species should be checked to make certain there is no contamination by perennial pepperweed. The smaller the infestation of perennial pepperweed the easier the control procedures. It is important to recognize the plant and promptly react to new infestations.