



Managing Canada Thistle

Canada thistle (*Cirsium arvense*) is a perennial that has plagued farmers in America since European settlement, and is a Noxious Weed in Pennsylvania. It is adapted to a wide range of soil conditions, and spreads vigorously by wind-borne seeds and by way of its extensive, creeping root system.

Not Your Average Thistle

The key to Canada thistle's weediness is its root system. The roots of Canada thistle spread aggressively, and can increase the width of a thistle patch 6 to 10 feet in a season. As the root system spreads, it gives rise to new shoots. If left unchecked, a single Canada thistle plant eventually turns into a patch containing thousands of stems.

Although thistle may serve as a food source for some insects and provide seed to some bird species, it has a negative impact on wildlife habitat quality in your CREP planting. Canada thistle grows in dense patches and reduces the vigor and establishment of grassland plantings and riparian buffers that are planted to improve wildlife habitat.

The plants you are most likely to confuse Canada thistle with are other thistles. The common, weedy thistles in PA include bull thistle (*Cirsium vulgare*), musk thistle (*Carduus nutans*), and plumeless thistle (*Carduus acanthoides*). All these thistles grow erect, have spiny foliage, and bear prominent pink flowers that produce seed attached to downy



Figure 2. A 'patch' of Canada thistle emerging in the spring. A patch is often one plant, with hundreds or thousands of stems arising from a shared root system.



Figure 1. A flowering stem of Canada thistle showing flowers ranging from the pea-like bud stage to nearly ready to disperse ripened seed. The stems of Canada thistle are smooth, while the other common weedy thistles in Pennsylvania have spiny 'wings' on their stems.

'umbrellas' that carry them on the wind, much like dandelion seed.

Bull, musk, and plumeless thistles are biennials. They have a single, strongly-taprooted crown, and reproduce only by seed. You can distinguish Canada thistle from the biennial thistles because it has small flowers (less than 1 inch) and smooth stems between the leaves (Figure 1). The biennial thistles all have spiny 'wings' - tissue that looks like a continuation of the leaf - along their stems. Another distinguishing feature is that well-established Canada thistle grows in distinct patches (Figure 2) that are easily seen early in the spring as the thistle is emerging.

The typical growth pattern for Canada thistle begins with emergence of the new shoots in the first few weeks of spring. This first flush of growth enters the flower bud stage in late May to mid-June when the plants are 3 to 4 feet tall. The scaly flower heads are the size of a large pea. The heads open showing pink flowers up to 1 inch in diameter, then close after fertilization to shelter the ripening seed. When the seed is ripe, the flower opens again and releases the 'summer snow' that carries the seed away.

Canada Thistle Control Measures

To eliminate Canada thistle you must injure and exhaust its root system, and do it repeatedly. A successful control program requires multiple seasons, and multiple treatments within a season (Table 1).

A well-established groundcover, particularly a grassland

planting, greatly aids your control efforts by competing with the thistle as you suppress it.

The most important opportunity for control is the fall when thistle is recharging its root system for the next growing season. Fall is the ideal time to maximize injury to the thistle's root system because systemic herbicides move through plants with the sugars being sent to the roots. As the thistle is stocking up its root reserves for the winter, it will send fall-applied herbicides to where they can do the most damage. Product selection is more important in the fall as only a few herbicides available for use in CREP plantings are truly effective Canada thistle control products (Table 1).

Late spring, when thistle is at the bud-to-early-bloom stage is the second important opportunity for control. Much of the energy to produce the spring flush of growth comes from stored reserves in the root system, causing a seasonal-low of stored energy at bloom stage. This is an ideal time to eliminate the top growth and force the plant to use its scarce reserves to regrow.

An herbicide application at bloom stage will serve as a 'chemical mowing'. The choice of herbicide treatment in the spring is not as critical as it will be in the fall. The spring application acts somewhat like a burndown treatment, eliminating the top-growth, but injury to the root system is limited. Well-established Canada thistle will eventually regrow after a spring application, regardless of the treatment.

What is important is that the treatment effectively eliminates the existing top growth.

In grassland plantings, there are many inexpensive herbicide products that will selectively eliminate the aboveground thistle growth and leave grasses intact. In tree plantings, spot treatments using *glyphosate* reduce the risk of injuring the trees with broadleaf herbicides through root absorption.

An alternative to a late-spring herbicide treatment is a mowing timed for bud to early-bloom stage. This mowing should be as low to the ground as practical. After the grassland cover or riparian buffers are established, only spot mowing can be allowed by the FSA County Committee - and only approved on an annual basis.

After seed set, Canada thistle produces a second flush of growth. Some of it comes from buds on the spring stems, and a lot of it comes as new shoots from the root system. Instead of growing tall and flowering, the second flush of growth produces just enough foliage to 'recharge' the root system. This is the target of the critical fall herbicide application.

There is no 'silver bullet' for Canada thistle control. Once you accept that you need multiple treatments for multiple seasons, you will find it is a species you can successfully manage.

Table 1. Managing Canada thistle requires treatment in the spring to prevent seed set and eliminate the first flush of growth, and in the fall to maximize injury to the root system. Choose one spring treatment and one fall treatment. The spring treatment is applied at bud to early-bloom stage. Herbicide choice is less critical in the spring because no treatment will prevent regrowth. The spring treatments listed below are just a few examples - any herbicide treatment that will kill the top growth is useful. The fall herbicide treatment maximizes injury to the root system, so only products known for their activity against Canada thistle are recommended.

| timing | treatment | product rate (oz/ac) | comments |
|-------------|---------------------|----------------------|--|
| late spring | Roundup Pro | 64 | Roundup Pro is just one of many <i>glyphosate</i> products. A spot treatment with <i>glyphosate</i> is the recommended herbicide alternative in tree plantings because there is no soil activity that could lead to herbicide injury through root absorption. |
| late spring | broadleaf herbicide | varies | In grassland plantings, there are many relatively inexpensive products that will provide burn-down of Canada thistle. Examples include 'Weedmaster' and 'KambaMaster' (<i>dicamba</i> + 2,4-D), |
| late spring | mowing | -- | If mowing once, mow at bud to early bloom stage to maximize root system depletion. Spot mowing may be necessary in grassland plantings. |
| fall | Milestone | 6 | Milestone (<i>aminopyralid</i>) is very active against thistles and legumes. This treatment will not injure established grasses, but should not be used in close proximity to desirable trees. |
| fall | Forefront R&P | 32 | Forefront is a mixture of <i>aminopyralid</i> plus 2,4-D, and provides a broader spectrum of control if other broadleaf weeds are present. This treatment will not injure established grasses, but should not be used in close proximity to desirable trees. |
| fall | Telar | 2 | At lower rates, Telar XP (<i>chlorsulfuron</i>) is safe to grasses, but this rate will cause significant injury to most grasses. |
| fall | Roundup Pro | 128 | Roundup Pro (<i>glyphosate</i>) is non-selective, and this rate will severely injure all contacted vegetation. This is the best option - as a spot treatment - for use in hardwood plantings and riparian forest buffers because <i>glyphosate</i> has no soil activity. |
| fall | Vanquish | 48 | Vanquish is a less-volatile formulation of <i>dicamba</i> , the active ingredient in the 'Banvel' products. This treatment will not injure established grasses, but should not be used in close proximity to desirable trees. |

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