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Scentless Chamomile: Biology and Control

Scentless chamomile (*Matricaria perforata*) is a problem in Alberta. It spreads quickly along roadsides and fencelines and reduces yields in hay fields, pastures and cropland. This weed is of primary concern in hay land and pasture where control options are limited and there is little competition from slow establishing forages.

Origin and rate of spread

Scentless chamomile was introduced into Canada as a garden flower or seed contaminant from Europe, where it is also a major weed. Since its introduction in the 1930's, scentless chamomile has spread to most areas of the province.

Plant description

Scentless chamomile, also known as mayweed, scentless mayweed or daisy, is distinguished by its white daisy-like flowers and its finely divided fern-like leaves. The flowers are solitary at the ends of smooth, erect or semi-erect branches and measure 2 to 3 cm in diameter (see Figure 1).



Figure 1. Scentless chamomile flower



Figure 2. Scentless chamomile seedling

Plants range from 15 cm to over 1 m in height and tend to be bushy when not subjected to competition. The seeds are dark brown, 2 mm long, rectangular and have prominent wing-like ribs that are paler than the kernel. The root system tends to be large and fibrous but does not run or creep.

A similar plant, often mistaken for scentless chamomile, is ox-eye daisy. These plants can be differentiated by their leaves and growth habit. Scentless chamomile has finely divided leaves while those of ox-eye daisy are entire and notched but not divided. Scentless chamomile has several to many flowers on each flowering stem while ox-eye daisy has a solitary flower on each flowering stem.

Life cycle

Scentless chamomile is an annual, biennial or short-lived perennial that reproduces by seed.

Distribution

Scentless chamomile is mainly present in the central and northern areas of Alberta. This weed is found in urban areas, roadsides, drainage ditches, fence lines, various croplands, hay lands, pastures, farmyards and wastelands (Figure 3). It is more prevalent on disturbed sites and on Solonetzic soils in areas of higher moisture, such as around sloughs and in depressions.



Figure 3. Scentless chamomile infestation the year after underseeding a forage crop with a barley crop.

Germination

Scentless chamomile seed can germinate at temperatures between 3° and 40° C when the soil moisture is at more than 10 per cent of soil capacity. It can germinate at any time during the growing season, especially during cool, damp weather. Most scentless chamomile seedlings establish in the spring or fall.

The seed does not have a dormancy period. New seed requires light to germinate and will not germinate if buried in the soil. With time, scentless chamomile seed loses its requirement for light and will germinate in the dark. Buried seed can remain viable up to 15 years.

Scentless chamomile seed germinates readily under periodic flooding conditions, and this factor, along with the lack of competition, accounts for the growth around sloughs and other habitats prone to flooding. See Table 1.

Table 1. Seed germination

Treatment	Germination(%)
Seeds on surface of moist soil	84
Seeds on surface of soil saturated with water	82
Seeds buried 1 cm below soil surface	0
Seeds floating on water	70
Seeds on moist paper in a dish	94

Emergence and growth

Annuals emerge in spring or early summer. The biennial forms emerge in summer or fall and overwinter as rosettes. Short-lived perennials emerge in spring or summer and produce seed two years in succession early in the season.

Flowers

Scentless chamomile flowers from May to October. Flowers can be produced within 58 days of germination. In a non-competitive situation, annuals begin to flower in early July. In a competitive crop situation, flowering does not generally occur until the crop is removed. Overwintering biennials and short-lived perennials usually begin to flower in mid-May or early June.

Scentless chamomile has an indeterminate flowering habit; therefore, flowers and seed are continually formed. At any one time, a plant can have flowers, immature seed and mature seed. This growth habit makes eradication difficult.

Reproduction

Scentless chamomile reproduces only by seed. Abundant seed production and variable dispersal methods are this weed's key to success. The seed can be widely dispersed on equipment and as a contaminant in crop seed and feed. Dispersal by water is also common.

Facts about scentless chamomile seed

- A single plant can produce as many as a million seeds.
- In a dense stand, as many as 1.8 million seeds/m² may be produced.
- One flower head can have as many as 300 seeds.
- The seeds develop quickly. Seed is viable as soon as the flower is formed.
- Biennial and short-lived perennial forms set seed as early as mid-June.
- Flowering and seed production are best under high light intensity.
- The ribs on the small, light seed allow for ready spread by wind and water.
- The seed can float for at least 12 hours.
- As much as 26 per cent of seed fed to cattle remains viable in the manure.

Competition

Scentless chamomile does not grow well in a competitive crop. If scentless chamomile becomes established on bare soil or in weak plant stands, it can become very aggressive and cause significant crop yield losses.

Once scentless chamomile has overwintered in the biennial or short-lived perennial form, it becomes more competitive and more difficult to control. A single plant growing without competition may cover an area in excess of a square metre. Seedlings that emerge in the spring will often form a very dense carpet in low-lying areas and limit growth of seedlings of other species. See Table 2.

Management strategy: lines of defense

Prevent introduction into an area

Transportation networks such as road and railway systems serve as a major means of scentless chamomile spread. Therefore, unless drainage draws, road ditches and railway right-of-ways are kept weed-free, they serve as a source of infestation. The movement of equipment such as grain bins, which are manufactured or stored in an infested area, can also spread chamomile.

To prevent the introduction of scentless chamomile in your area:

- Use clean seed.
- Tarp (cover) grain trucks.
- Clean farm and industrial equipment before movement out of an infested area.
- Feed cattle feed contaminated with chamomile only in a contained area and treat the area annually to prevent seed production.

Prevent seed production of initial infestations

Pulling the first scentless chamomile plants in an area before the flowers are fully formed can prevent an ongoing, costly and troublesome problem in the future. Spot treatment in and around these small initial infestations with a residual selective herbicide will help prevent the establishment of scentless chamomile in new areas (see Table 3).

These initial infestations should be closely monitored over the next several years. Fencelines, headlands, drainage ditches, creeks and river banks, and waste areas kept free of scentless chamomile will help prevent the spread into cropland.

Table 3. Scentless chamomile seed viability at specific flowering stages

Flower stage	Germination (%)
Early flower	0
Full petal	71
Late flower	88
Early senescence	86
Seed set	86

Prevent establishment of overwintering scentless chamomile

Tillage or spraying of infestations in the late fall or early spring will control rosettes before they become more established and difficult to control. Fall spraying is especially important with reduced tillage management.

Table 2. Yield loss of wheat from scentless chamomile at 25 plants/m²

Form of scentless chamomile	Crop	Growth conditions	Yield loss (%)
Spring-emerging annual	Spring wheat	Cool, wet	55
Spring-emerging annual	Spring wheat	Drought	0
Fall-emerging biennial	Spring wheat	Moderately moist	60
Fall-emerging biennial	Spring wheat	Drought	20
Fall-emerging biennial	Winter wheat	Moderately moist	6
Fall-emerging biennial	Winter wheat	Drought	3

Use competition to advantage

Scentless chamomile will not compete with a heavy crop stand. The key is to establish a good crop stand as quickly as possible and maintain it in that state. The chamomile will be crowded out by a good forage stand as Figure 4 indicates.

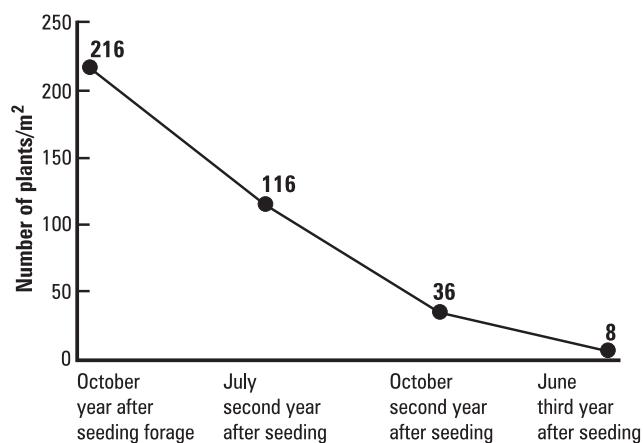


Figure 4. Scentless chamomile in alfalfa-timothy near Leduc, Alberta

Control mechanisms

Tillage

Tillage effectively controls scentless chamomile seedlings. Frequent shallow tillage will aid in the germination and destruction of seedlings. Deep cultivation should not be used because it buries the seed and slow germination over several years will result.

Once the plant has overwintered and developed a crown and an extensively branched fibrous root system, more thorough tillage followed by harrows is required to dislodge the soil from the root system. If possible, till on hot, dry days to ensure that the root system dries quickly. Perform tillage operations before flowering to ensure a reduction in the seed bank.

Pre-seeding tillage – Spring cultivation destroys seedlings and any scentless chamomile plants that overwinter. Cultivation should be followed in two days by harrowing to break up root balls.

Post-seeding tillage – In emergencies, harrow cereals after seeding to destroy later emerging weed seedlings. Post-seeding tillage should not be a substitute for pre-seeding tillage.

Fall tillage – Cultivate after harvest to prevent seed set of the weeds that have been suppressed by the crop. Fall tillage also destroys biennial and short-lived perennial forms of scentless chamomile.

Mowing

Mowing can be used to reduce seed production in pastures, hay land and non-cropland. The plants should be cut before the flowers are fully formed. Unfortunately, scentless chamomile will form new flowers below the cutting height of the swather or mower in the leaf axils.

Scentless chamomile needs to be mowed early and often, with each successive mowing lower than the previous one. However, repeated mowing can remove the forage competition and make the problem worse.

Hand-pulling

Hand-pulling and burning is the most effective method to prevent the spread of scentless chamomile into new areas. Pulling the first few plants along a roadside before they go to seed may prevent a new infestation.

Biological control

Two insects are being reared and made available for use in Canada as biological control agents. *Omphalapion hookeri*, a seed head feeding weevil from Germany, and *Rhopalomyia tripleurospermi*, a gall midge from eastern Europe, can provide biological control of scentless chamomile. *Omphalapion hookeri* was first released in Alberta in 1992.

Rotations

Scentless chamomile thrives when competition is weak. This weed is often a problem the year after under-seeding a crop with a forage. At this time, forage crop growth is usually slow, and there is a lack of available herbicide control options when a legume is present in the forage mix.

Any practice that aids in the establishment of the forage, such as seeding good forage seed shallowly into a firm, moist seedbed, will help in reducing scentless chamomile growth. As the forage crop matures, the forage usually provides sufficient competition to crowd out the scentless chamomile. A healthy grass stand provides effective competition and scentless chamomile can be selectively removed from grass stands with a herbicide.

In established forage stands, scentless chamomile will only be a problem where the forage is not growing well. This may be in an area of Solonetzic soil or where the stand is being overgrazed. Fertilizer will help maintain a competitive forage stand, but generally, cultivation and reseeding are required when the stand has deteriorated. Scentless chamomile is of low nutritive value and is not freely grazed by livestock.

Canola and cereal crops compete well with scentless chamomile, especially when seeded at slightly higher than normal seeding rates. However, infestations can develop when tillage or herbicides are not used to kill plants that overwinter and seedlings that emerge before or just after the crop. Lentils and flax do not compete effectively for light and, thus, scentless chamomile can be a serious problem in these crops.

Herbicides

Pre-seed, pre-harvest and fall application of total vegetation control herbicides such as glyphosate on annual cropland can be very effective at managing scentless chamomile seedlings and rosettes. Seedlings are relatively easy to control compared to plants that have overwintered.

The earlier the application of herbicide, the more effective the control of both forms. A herbicide application is not cost effective when most of the scentless chamomile is flowering because the seed has already been produced and the yield loss has occurred. Total vegetation control herbicides such as glyphosate should not be used to control scentless chamomile where other vegetation is growing. All vegetation will be controlled or suppressed, leaving no competition for new, emerging scentless chamomile.

Consult the current edition of Alberta Agriculture and Food's publication *Crop Protection*, Agdex 606-1, for herbicides registered for the control of scentless chamomile.

Multi-technique approach

A combination of tillage, herbicide and competitive cropping can be very effective in managing scentless chamomile. The goal is to prevent seed production and crowd out infestations through crop competition.

Summary

Scentless chamomile is an excellent example of a plant that is adapted to spread and survive. Wherever it appears, it has the potential of becoming a serious and persistent weed problem.

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