**Description**

Cicer milkvetch (Astragalus cicer L.) is a cool-season, perennial legume introduced to North America by Eastern Europe. The name comes from the belief that a goat's milk supply increases by eating vetches. Once established in well-managed stands, this plant is competitive and can live anywhere from five to 20 years.

Cicer milkvetch begins to grow in the spring, about three weeks after alfalfa. It is less commonly used as a hay crop and is more suitable for planting on ranges and pastures. It can be grazed any time from early spring to late fall. Like most forage species, it needs rest to recover from heavy grazing. One big advantage is that it does not cause bloat.

Cicer milkvetch’s rooting system is made up of a short, branched taproot and a dense mass of thick rhizomes. Roots do not penetrate the soil as deeply as those of alfalfa, generally extending less than one metre (m) vertically. This means cicer milkvetch does not tolerate drought as well as alfalfa, and will go dormant during prolonged dry spells.

Rhizomatous growth allows new roots to emerge from the nodes along the rhizome; however, independent plants do not develop from these rhizomes. Cicer milkvetch plants can spread horizontally to 120 centimetres (cm) in diameter, under favorable conditions. As a result, they are effective at controlling soil erosion.

Cicer milkvetch stems are hollow, succulent, and grow upright early in the season. As they mature, the growing stems begin to bend, or trail, leaving the plants decumbent or prostrate. When grown in mixtures with grasses, stem growth tends to be more upright. The plant usually grows till about 70 cm high, although stems can reach a height of 1.2 m by the flower stage.

Cicer milkvetch is multi-foliate, with a single leaf consisting of 10 to 13 pairs of leaflets, attached to a midrib, plus one terminal leaflet. The leaf-to-stem ratio is generally higher in the cicer milkvetch than in the alfalfa; as well, the retention of leaves is better in mature plants. This means cicer milkvetch has a higher nutritional value, for late fall grazing, than alfalfa.

The inflourescence (flower head) is a spike of up to 60 pale yellow to white flowers. Seed pods change from a pale yellow to black as they mature. Cicer milkvetch flowers are cross-pollinated by bumblebees, honeybees and/or leaf cutter bees. The seeds are almost twice the size of alfalfa and are covered with a naturally thick coating that protects them from the environment. So, recommended seeding rates for a pure stand should be double those of a comparable seeding of alfalfa.
Inoculation

Legumes require inoculation with rhizobia bacteria to properly fix atmospheric nitrogen. Cicer milkvetch requires a specific strain of inoculant. This inoculant is called Astragalus and differs from the inoculants needed by alfalfa, sainfoin and other legumes. It also needs to be scarified by mechanical abrasion before planting, due to its hard seed coat.

Cicer milkvetch can fix as much as 63.5 kilograms per hectares per year (140 pounds per acre per year) of free nitrogen from the atmosphere. At $0.28 per kilogram ($0.65 per pound) of actual nitrogen, this totals $17.78 per hectare per year ($91.00 per acre per year) of free nitrogen.

Seed scarification

Cicer milkvetch seed contains a high percentage of hard seeds. This seed coat acts as a barrier, preventing microbial invasion that would otherwise penetrate and damage the seed germ. The coat also reduces the ability of the seed to absorb water, which means the seed is able to stay dormant for an extended time. The result is slow and uneven germination rates.

Mechanical, chemical or freeze-thaw processes can be used to scarify the seed coat on cicer milkvetch seed; however, seeding should occur within a week or so of scarification, because seed viability will start to decline.

Adaptation

Cicer milkvetch grows in moderately coarse, calcareous soils, silty loams or fine clay loams – but not in deep sandy soils. The plant adapts best to the black soil zone areas. Its salinity tolerance is low, preferring soils with an Electrical Conductivity (EC) rating below five deciSiemens per metre. It does not tolerate acidic soils (pH less than 6.0), but will tolerate moderately alkaline soils (pH less than 8.1). Cicer milkvetch is best suited to regions that receive moderate to high amounts of moisture. Cicer milkvetch is not flood-tolerant, but does have good winter hardiness and is moderately drought-tolerant, compared to alfalfa.

Seeding rates

Seeding rates for cicer milkvetch should be based on pure live seed (PLS). Suggested seeding densities range from 50 to 90 PLS seeds per metre of row (300 to 400 PLS seeds per m²) for broadcast seedings. The final bulk-seeding rate will be higher than this amount, reflecting variables such as row spacing, seed quality and the weight of seed amendments, such as seed coatings.

Table 1 provides an illustration of the PLS seed requirements for several seeding densities and row widths. (On average, it is recommended you seed at 3 kilograms per hectare (eight pound per acre).

<table>
<thead>
<tr>
<th>PLS Seeding Density per metre of row</th>
<th>15 cm</th>
<th>20 cm</th>
<th>25 cm</th>
<th>30 cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 PLS/m</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>50 PLS/m</td>
<td>12</td>
<td>9</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>75 PLS/m</td>
<td>18</td>
<td>14</td>
<td>11</td>
<td>9</td>
</tr>
<tr>
<td>100 PLS/m</td>
<td>24</td>
<td>18</td>
<td>14</td>
<td>12</td>
</tr>
</tbody>
</table>

PLS kg/ha: Canada Seeds Act standards are used for germination and purity to develop PLS seeding rates. PLS seed rate based on bare seed.

Establishment

Cicer milkvetch is challenging to establish. Many factors, such as seedbed conditions, seedling vigour, and competition during the seedling year may limit stand establishment. When seeding cicer milkvetch, it is important to prepare a firmly packed, weed-free seedbed. Soil temperature requirements for good germination and emergence (18 C) are higher for cicer milkvetch than other legumes, such as sainfoin or alfalfa.

Plant the seed no more than 1.3 to 1.9 cm (½ to ¾ inch) deep. Cicer milkvetch seeds continue to germinate up to three years after being planted. Some of the newer varieties have greater seedling vigour. Cicer milkvetch is a poor competitor in its establishment year. Consider establishing it without a cover crop and be sure to provide good fertility (phosphorus, potassium and sulphur).
Varieties Registered in Canada
Windsor; AC Oxley II; Oxley

Feed Quality and Quantity
Cicer milkvetch has a higher leaf to stem ratio than alfalfa, and, as a result, has higher protein levels. They average 14 to 16 per cent. Newer varieties yield 70 to 80 per cent of alfalfa under good management.

Cicer milkvetch’s digestibility is quite high at 60 to 62 per cent. It does not lose its leaves as early as alfalfa, and holds its quality quite well into fall and early winter. Because it can retain its quality for so long, cicer milkvetch can be stockpiled for fall or early winter grazing with good expected weight gains. When stockpiled, it can still provide a maintenance feed before growth begins in early spring.

For more information
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• visit www.manitoba.ca/agriculture