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Monarch: a new variety of cicer milkvetch

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Quick Facts

- Cicer milkvetch is a non-bloating forage legume that has forage quality equal to alfalfa.
- Cicer milkvetch is an excellent pasture plant because it can withstand grazing better than most legumes such as alfalfa.
- Monarch is a new variety of cicer milkvetch.
- Monarch has improved seedling vigor and better stand establishment than other varieties of cicer milkvetch.

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Cicer milkvetch (*Astragalus cicer L.*) is a relatively new forage species that shows promise as a grazing or hay crop in the western United States. It is a long-lived, perennial, herbaceous legume with a creeping root system. Crowns may increase by as much as 24 inches (61 centimeters) in diameter per year under favorable conditions. The plant's growth habit is semi-prostrate, reaching a height of about 36 inches (91 cm); however, when grown in a mixture with grasses, its growth habit is more upright. It produces a high quality forage, and no cases of bloat in grazing animals have been reported to date. The leaf-to-stem ratio is approximately 40 percent greater than in alfalfa, and leaf retention during hay curing is excellent.

Monarch cicer milkvetch was developed by the U.S. Department of Agriculture, Agricultural Research Service, and the Colorado State University Experiment Station. Parental clones of Monarch were selected for improved seedling emergence because the species has relatively poor seedling vigor. Monarch is easier to establish than the older cultivar Lutana because of its increased seedling vigor; however, it is not as easy to establish as alfalfa.

Adaptation

The area of adaptation of Monarch is similar to that of Lutana. Areas of adaptation include the central and northern Great Plains and intermountain regions up to 11,000-foot (3300-

meter) elevations that receive more than 16 inches (41 cm) of annual precipitation. However, establishing stands at higher elevations is slow.

Monarch does well on all soil textures but performs best on moderately coarse-textured soils. Under dryland conditions, it persists better on sandy soils than on loamy soils but is not as drought-tolerant as alfalfa. It is well-adapted to irrigated pastures in both the mountains and plains areas of Colorado.

Cicer milkvetch performs moderately well on poor, infertile soils; hence, it is one of the best legumes for revegetating high-altitude, disturbed sites. It tolerates slight acidity to moderate alkalinity. It is moderately salt-tolerant and withstands a higher water table than alfalfa.

Cicer milkvetch is very winter-hardy and has been more persistent than other forage legumes in western Canada. The below-ground crowns and rhizomes contribute to the plant's excellent winter hardiness. Also, cicer milkvetch is more frost-tolerant than alfalfa.

Stand Establishment

Seed scarification: Seed of Monarch cicer milkvetch has a very hard coat and must be properly scarified before planting. Germination of unscarified seed ranges from 1 percent to 25 percent; therefore, the seed coats must be fractured mechanically to permit moisture to penetrate so that germination can occur. Seed should not be planted without proper scarification.

Effectiveness of the scarification treatment can be evaluated by placing the scarified seed on a moist paper towel in a glass or plastic container at room temperature. If scarification is adequate, 60 percent or more of the seeds will have imbibed water after 24 hours. Those that have imbibed water will be about twice as large as the unscarified seed. If scarification was too severe, the swollen seeds will begin to break apart and the developing seedling will die. Usually, 48 hours

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are needed to evaluate seedling damage from over-scarification. When seeded in late fall at high elevation, scarification is not necessary.

Inoculation: Cicer milkvetch has the ability to fix atmospheric nitrogen; however, it requires a specific strain of *Rhizobium* inoculant that differs from the one needed for alfalfa or other forage legumes. The inoculant is called *Astragalus* and can be purchased from seed companies and farm supply outlets that market the seed. Inoculate the seed just prior to planting by mixing dry inoculant with the seed or by moistening the seed so that the inoculant will adhere better. (Follow directions on the label.)

Fertilization: The fertility requirements are similar to those for alfalfa. On soils low in phosphorus, 200 pounds per acre (225 kilograms per hectare) of phosphorus (P₂O₅) should be applied prior to seedbed preparation.

Seedbed preparation and seeding: A firmly packed, weed-free seedbed similar to that required for alfalfa or clovers is needed. The seed should be planted ½ to ¾ inch (1.3 to 1.9 cm) deep. Slightly deeper plantings may be made on light soils. A seeder with disc-furrow openers and packer wheels works best for proper seed placement and for firming the soil over the seed after planting.

Seeding rates vary depending upon whether the crop is planted alone or in mixtures. Under irrigated conditions, seeding rates of 8 to 10 pounds per acre (9 to 11 kg/hectare) on 12-inch (30.5-cm) spacings have given excellent stands when seeded alone. When seeding with a grass mixture, the seeding rate may be reduced by 50 percent. Cicer milkvetch may be seeded with most cool-season grasses, but such sod-forming grasses as smooth brome grass may be too competitive. Bunch grasses—meadow grama or orchardgrass—appear to grow well with milkvetch. Milkvetch seeded with grasses in alternate rows usually gives good results. Do not seed such companion crops as oats or barley with cicer milkvetch.

Date of seeding: In the plains area, cicer milkvetch should be planted in the spring at the same time as alfalfa (April 15 at Fort Collins). In the mountain meadows or where irrigation water is available, planting may be done later (mountain meadows usually are not seeded until mid-to late June); however, later plantings usually have greater competition from weeds. Seedlings must be well-established before winter. At higher elevations, seedings may be made in late fall or early winter just before the soil freezes. When late fall plantings are used, the seed generally will not germinate until spring.

Weed control: Weed competition may be a problem during the year of establishment. Currently, no chemicals are registered for use on cicer milkvetch although pre-emergence and post-emergence treatments recommended for other forage legumes have been used successfully in limited tests. Clipping the weeds one or more times to a 6-inch (15-cm) height reduces the weed

competition with relatively little damage to the crop.

Forage Production

Pasture production: Monarch is one of the best legumes for seeding irrigated pastures because it is bloat-free and is readily consumed by cattle and sheep. The regrowth from cicer milkvetch originates primarily from axillary buds on the stems rather than from crown buds located near or below the soil surface. This characteristic enables the plant to withstand frequent clipping better than such forage species as alfalfa. Simulated grazing studies at Fort Collins showed that cicer milkvetch may be clipped seven times annually without stand depletion.

Forage quality, as measured by crude protein percentage, in vitro dry matter digestibility and fiber content, has been similar to that of the more commonly grown forage legumes such as alfalfa. Grazing studies have shown the ability of cicer milkvetch to produce nutritious forage late in the season. During the year of establishment, the stand should not be grazed or harvested for hay until late in the growing season when the plants are well-established.

Hay production: Cicer milkvetch yields 75 percent to 80 percent of alfalfa when grown under irrigation at Fort Collins. The lower yields can be attributed to later initiation of spring growth and slower recovery after harvest. Two to three cuttings will give maximum production, depending on the area. The moisture content of cicer milkvetch forage is slightly higher than that for alfalfa; consequently, curing time is longer. Forage yields of Monarch have been equal to or greater than those of Lutana.

Seed Production

Cicer milkvetch is a cross-pollinated species that requires an insect pollinator. Native bumble bees are the most effective pollinators. Seed production potential is excellent with frequent yields greater than 500 pounds per acre (567 kg/ha). Seed yields of more than 1,000 pounds per acre (1134 kg/ha) have been reported in Montana.

The seeding rate should be approximately 1½ to 2 pounds per acre (1.7 to 2.3 kg/ha) for seed production. Row spacings of 30 to 36 inches (76 to 91 cm) are recommended. Seed fields should be cultivated during the year of establishment and grown under irrigation.

A seed crop cannot be produced in the seeding year because very few flowers are produced. Milkvetch has an indeterminate flowering habit; hence, mature seed pods and new flowers occur on the same plant. The seed crop will mature and be ready for harvest about the first or second week in August. A few flowers and green pods will be present at this time, but the majority of the seed pods will look black and leathery. The crop should be swathed and allowed to dry thoroughly at this time. When the pods are brittle and break easily at least one week in good drying conditions, the seed crop may be threshed.