

# Canada Milkvetch

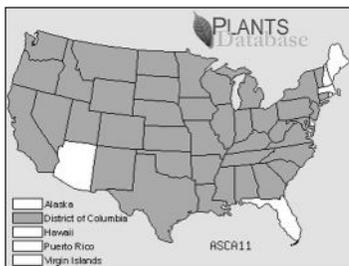
## *Astragalus canadensis* L.

Genus *Astragalus* Latin, from Greek astragalos, 'anklebone'; species *canadensis* Latin 'from Canada'.

**Family:** Bean (Fabaceae)

**Other Common Name(s):** Canadian milkvetch, Milk-vetch, Little Rattlepod

**Description:** Native perennial, 2-3 feet tall. Stem is branched above, lightly hairy. Leaves are alternate, odd-pinnately compound, with 10 or more pairs of leaflets, plus terminal leaflet. Leaflets are 1-4 cm long (1/2 – 1 1/2 inches) and 5–15 mm wide (1/4 – 5/8 inch), smooth or slightly hairy above and short hairs below. Flowers are a creamy greenish-white, crowded on racemes on leafless hairy stalks arising from leaf axils on upper portion of the plant.



### **Adaptation/Habitat:**

Wet-mesic to mesic soils, full sun. Moist, fertile, loamy soils preferred for seed production.

Threatened/Endangered Status: Endangered (MD); Threatened (MI, VT)

**General Comments:** Canada milkvetch is a short lived species, usually dying out in production plots after flowering and setting seed. Spreads prolifically from stolons the second year after establishment. It's usually found as small, somewhat stable colonies in prairies in disturbed areas, over a few years at least. Grazing or clipping prolongs the life-span of the plant, but of course this precludes seed production.

### **Establishment for Seed Production (Appendix A)**

#### **Direct seeding:**

Seeding rate (40 seeds/linear foot):

2.1 PLS lbs/acre for 30-36" rows

6.3 PLS lbs/acre for 7" rows and solid stands

Seeding Depth: 1/4 – 1/2 inch

Seeding Methods: drill

Time of Seeding: Dormant fall seeding of unscarified seed. Scarify and inoculate seed with *Astragalus* (Spec 1) inoculum for early spring planting.

Weed Control: Prepare clean, firm, weed free seedbed prior to seeding

#### **Greenhouse:**

Seed pre-treatment: Scarify seed (see text) and wet stratify 2 weeks at 40 F. Sow seed in greenhouse two months before last frost free date. Transplant mature seedlings into bare soil or weedbarrier in rows convenient for tillage equipment after all danger of frost is past. Use a temporary weedbarrier that can be removed before the second growing season to

accommodate plant spread from stolons.

### **Stand Management**

Weeds – Mow stand above seedling height during establishment year. Use tillage and hand-roguing to control weeds.

Pests – Seed predators may become a problem

Diseases – No serious diseases known.

Pollination: Insects, particularly bumblebees.



### **Seed Production (Appendix B)**

- First Harvest: Abundant flowering and seed set end of second growing season from greenhouse grown transplants and well-managed direct seeded stands.
- Yield/Acre: 100-200 bulk lbs/ac
- Stand Life: Peak harvests second year. Many plants die out after flowering and setting seed, usually the second or third year after planting.
- Flowering Date: Flowering occurs mid-July to early August
- Seed Maturity: Mid August to early September
- Seed Retention: Pods split partially open at maturity, and seeds will shake out of pods if disturbed by strong wind or passing animals.
- Harvest date range at TPC (2002-2006): August 11 to September 2
- Recommended Harvest Method: Combine at maturity

### **Seed Cleaning (Appendix C)**

Cleaning Process: Pre-clean air-dried material by scalping thru 1/2' and 1/4" mesh to remove large particles. If hand clipped, break up pods with brush machine. If combined then simply air-screen to clean (see appendix for settings).



# White Wild Indigo

## *Baptisia alba* (L.)

### Vent var. *macrophylla* (Larisey) Isely

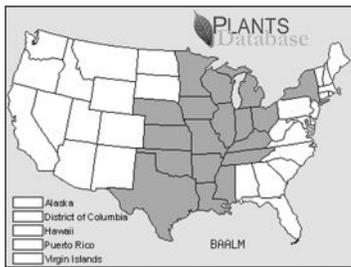
Formerly *Baptisia lactea* (Raf.) Thieret

Genus *Baptisia*, Latin; species *alba* Latin 'white', referring to flower color.

**Family:** Bean (Fabaceae)

**Other Common Name(s):** White false indigo, Large leaf wild indigo

**Description:** Native, deep rooted perennial, 2.5 to 3 feet tall in flower. Stem with shrub-like branching, smooth. Leaves are alternate, compound with three leaflets. Large white, showy flowers occur on erect racemes, up to 2' long. Secondary racemes may also be present. Petals drop after pollination, and large inflated green pods form.



#### **Adaptation/Habitat:**

Occurs and tolerates a range of soil conditions, from wet-mesic to dry. Full sun. Moist, well-drained soils preferred for seed production. Threatened/Endangered Status: Not listed

**General Comments:** Mature white wild indigo plants come up quickly, nearly fully formed like asparagus, in late spring when soil temperatures warm. The tissues expand quickly, becoming shrub-like in form and blooming by early to mid June. Tissues turn black if bruised, as do seed pods at maturity. Entire plant blackens with fall dormancy. Pods eventually split open, revealing orderly rows of attached seeds. Seeds are somewhat sticky, initially. Stem breaks off at ground level in late fall and plants will tumble with the wind, shaking out any seed remaining in the pods, aiding seed dispersal.

#### **Establishment for Seed Production (Appendix A)**

##### **Direct seeding:**

NOT RECOMMENDED FOR THIS SPECIES

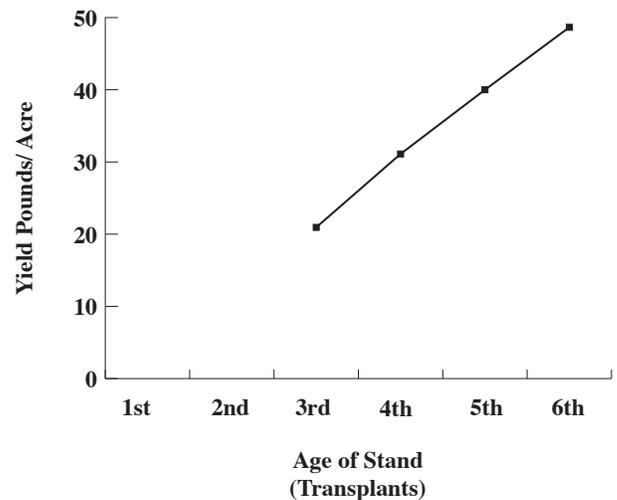
##### **Greenhouse:**

Seed pre-treatment: Scarify seed (see text) and wet stratify 2 weeks at 40 F. Inoculate seed with a *Baptisia* inoculum, if desired. Sow seed in greenhouse two months before last frost free date. Damping off (fungal pathogen) can be a problem on seedlings if soil is kept too moist, or seedlings are planted too thickly. Avoid excess moisture on soil surface by applying a thin layer of perlite over the top of the soil, improving air circulation with fans, thinning seedlings, and/or watering from the bottom of the containers only. Seedlings form a fleshy taproot with few lateral roots, unless allowed to grow until

taproot is air-pruned as it reaches the bottom drainage holes of the container. Use care when transplanting to keep soil intact around roots system. Transplant mature seedlings into bare soil in rows convenient for tillage equipment or into weedbarrier at 8" intervals after all danger of frost is past.

#### **Stand Management**

**Weeds** – Mow stand above seedling height during establishment year. Control weeds with tillage and hand rousing. The Tallgrass Prairie Center is currently experimenting with over-seeding tall dropseed (*Sporobolus asper*) as a companion crop to reduce competition from weeds and to provide a fuel matrix for annual burning, which enhances seed production and seems to reduce weevil predation. **Pests** – Seed production can be curtailed or even eliminated in some years by a seed-eating weevil (*Apion rostrum*). The weevil oviposits eggs in the developing fruit, and the larvae emerge a few days later inside the sealed pods and feed on the developing seeds. Plants may also selectively abort pods containing fewer seeds due to seed predation (Petersen 1994). It may take a few years for weevils to find and colonize a new production field. Deer are



known to eat the entire inflorescence while in bud. **Diseases** – No serious diseases known. Damping off can be serious in greenhouse environment (see above).

**Pollination:** Insects, primarily bumble bees.

#### **Seed Production (Appendix B)**

- **First Harvest:** Plants are slow to reach reproductive maturity. Some flowering and seed set may occur the third growing season under optimal conditions, but it may require 4 to 5 years for a full harvest.
- **Yield/Acre:** 50-150 bulk lbs/ac
- **Stand Life:** Plants appear to be long-lived, estimated stand life 10 years.
- **Flowering Date:** Flowering occurs mid-June to mid-July.



# Purple Prairie Clover

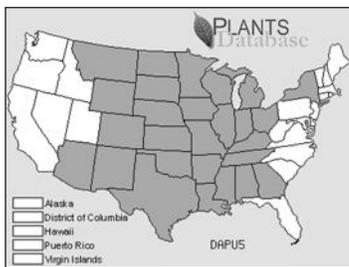
## *Dalea purpurea* Vent.

Genus *Dalea*; species *pupurea* Latin 'of a purple color'.

**Family:** Bean (Fabaceae)

**Other Common Name(s):** Violet prairie clover

**Description:** Native perennial 1.5-2.5 feet tall, stem, hairy. Purple flowers, each with 5 golden stamens are arranged on dense, oblong heads on stem tips 1-7 cm (1/2 – 3 inches) long. Flowers open first from the bottom of the head. Leaves are alternate, pinnately compound. Leaflets very narrow, usually 5 per leaf, smooth but with black dots on lower leaf surface. Seedhead elongate, compact head at stem tips. Crushed leaves have a strong citrus odor. Purple prairie clover has a woody, branched taproot.



### Adaptation/Habitat:

Found on mesic to dry upland sites, rocky and sandy soils, full sun. Very well-drained, loamy soil preferred for seed production.

**Threatened/Endangered Status:** Special Concern (KY); Extirpated (MI, OH); Endangered (TN).

**General Comments:** Purple prairie clover is an important component on mesic to dry upland prairies. It tends to increase following spring burning (Bidwell 1990), though burning production fields is usually not an option because of a lack of continuous grass fuels to carry fire. Purple prairie clover seed should be de-hulled when cleaned for the commercial market. Seed test are more accurate on de-hulled seed, and seed count per pound is higher.

### Establishment for Seed Production (Appendix A)

#### Direct seeding:

Seeding rates (40 seeds/linear foot):

2.0 PLS lbs/acre for 30-36" rows

6.0 PLS lbs/acre for 7" rows or solid stands

Seeding Depth: 1/4 inch

Seeding Methods: drill

Time of Seeding: Dormant fall seeding of unscarified seed. Scarify and inoculate seed (*Dalea*, F inoculum) for spring planting.

Weed Control: Prepare clean, firm, weed free seedbed prior to seeding

#### Greenhouse:

Seed pre-treatment: Scarify seed (see text). Moist stratification isn't required, but seed should be stored in cold, dry condition until planting time. Sow seed 1/4 inch deep in greenhouse two months before last frost free date. Damping off (fungal pathogen)

can be a problem on seedlings if soil is kept too moist, or seedlings are planted too thickly. Avoid excess moisture on soil surface by applying a thin layer of perlite over the top of the soil, improving air circulation with fans, thinning seedlings, and/or watering from the bottom of the containers only. Transplant mature seedlings into bare soil in rows convenient for tillage equipment or into weedbarrier at 8" intervals after all danger of frost is past.

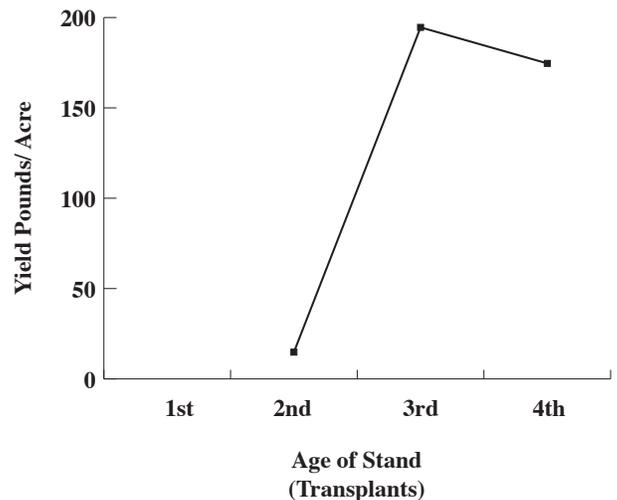
### Stand Management

**Weeds** – Mow stand above prairie clover seedling height during establishment year. Poast (sethoxydim) or Prowl (pendimethalin) herbicide after establishment can be used to control weedy grasses. Plateau is labeled for pre- and post-emergence application. Note: These herbicides may not be labeled for this species in your state, Always check the label and follow recommendations.

**Pests** – Herbivory by rabbits, deer, may be a problem. Weevils may infest seed heads.

**Diseases** – No serious diseases known. Damping off can be serious in greenhouse environment (see above).

**Pollination:** Insects, particularly bees, wasps, small butterflies, skippers, beetles.



### Seed Production (Appendix B)

- First Harvest: Flowering and seed set end of second growing season from greenhouse grown transplants and well-managed direct seeded stand.
- Yield/Acre: 50-200 bulk lbs/ac
- Stand Life: Five to ten years. Peak harvests third year.
- Flowering Date: Flowering occurs early July to early August.
- Seed Maturity: September
- Seed Retention: Shattering potential is low. Seed heads hold seed into October
- Harvest date range at TPC (2002-2006): Sept.. 20 to Nov. 5



# Showy Tick Trefoil

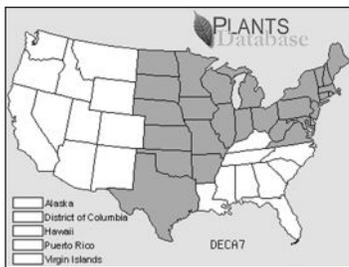
## *Desmodium canadense*, (L.) DC.

Genus *Desmodium*, Latin; species *canadense* Latin 'from Canada'.

**Family:** Bean (Fabaceae)

**Other Common Name(s):** Tick clover, Canadian tick trefoil

**Description:** Native perennial, 3-4 feet tall, stem usually unbranched, hairy. Pink flowers arranged on branched stalks from stem tip and upper leaf axils. Leaves alternate, divided into three leaflets with rounded base and pointed tips, hairy on upper and lower surfaces. Narrow, pointed bracts (stipules) on either side of leaf petiole. Fruits are jointed pods (loments) covered with hooked hairs that break apart and cling to passing mammals. Showy tick trefoil has a woody tap-root.



**Adaptation/Habitat:** Wet-mesic to dry-mesic soil conditions, full sun. Moist, fertile, well-drained loamy soils preferred for seed production.

**Threatened/Endangered Status:** Not listed

**General Comments:** Showy tick trefoil is an important component of black soil prairies, increasing with spring burning. Its seeds are an important food source for upland game birds.

### **Establishment for Seed Production (Appendix A)**

#### **Direct seeding:**

Seeding rate (12 pure live seeds/linear foot):

2.0 PLS lbs/acre for 30-36" rows

6.0 PLS lbs/acre for 7" rows and solid stands

Seeding Depth: 1/4 inch

Seeding Methods: drill

Time of Seeding: Dormant fall seeding of unscarified seed. Scarify and inoculate (*Desmodium* EL inoculum) seed for spring planting.

Weed Control: Prepare clean, firm, weed free seedbed prior to seeding

#### **Greenhouse:**

Seed pre-treatment: Scarify seed (see text). Moist stratification generally isn't required, but seed should be stored in dry, cold conditions until sowing. Sow seed in greenhouse two months before last frost free date. Inoculate seed with appropriate rhizobium at time of sowing, if desired. Seedlings form a fleshy taproot with few lateral roots, unless allowed to grow until taproot is air-pruned as it reaches the bottom drainage holes of the conetainer. Use care when transplanting to keep soil intact around roots system. Transplant mature seedlings into bare soil in rows convenient for tillage equipment or into weedbarrier

at 8" intervals after all danger of frost is past.

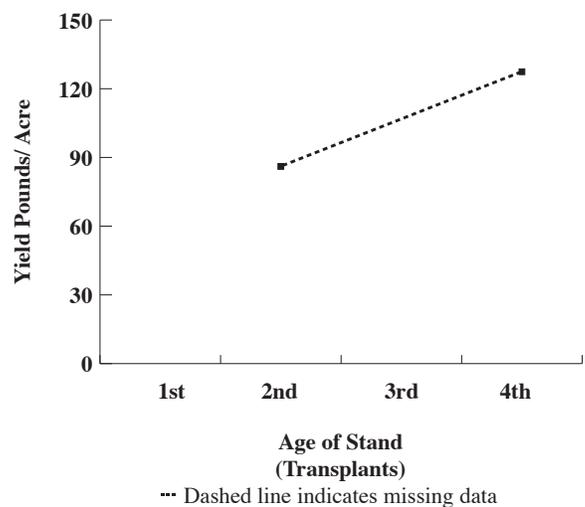
### **Stand Management**

**Weeds** – Mow stand above showy tick trefoil seedling height during establishment year to reduce weed competition and increase light to seedlings. Poast (sethoxydim) herbicide can be used for annual grass control, post emergence. Pursuit (imazethapyr) can be used post-seeding for broadleaf weed control. Note: These herbicides may not be labeled for this species in your state, Always check the label and follow recommendations.

**Pests** – Seed weevils may infest and seriously curtail seed production. Herbivory by deer, rabbits, groundhogs may be an issue on young plants.

**Diseases** – No serious diseases known. Powdery mildew may affect foliage.

**Pollination:** Insects, primarily bees.



### **Seed Production (Appendix B)**

- First Harvest: Seedling growth is vigorous, and flowering and seed set may occur at end of first growing season from greenhouse grown transplants and well managed direct seeded stands.
- Yield/Acre: 50-150 bulk lbs/ac
- Stand Life: Stand may persist for 5-10 years.
- Flowering Date: Flowering occurs mid-July to mid-August.
- Seed Maturity: September
- Seed Retention: Shattering occurs in late September into October.
- Harvest date range at TPC (2002-2006): Sept.. 18 to Oct. 10
- Recommended Harvest Method: Combine at maturity

### **Seed Cleaning (Appendix C)**

**Cleaning Process:** Use brush machine to remove hulls (loments). Re-brush any seed still in the hull, if necessary. Airscreen to clean (see Appendix C for settings).



# Roundheaded Bushclover

## *Lespedeza capitata* Michx.

Genus *Lespedeza*, after V.M. de Céspedes (misread as Léspedes; fl. 1785), Spanish governor of Florida; species *capitata*, Latin *capitatus*, having a head, due to the head-like flower/seed cluster.

**Family:** Bean (Fabaceae)

**Other Common Name(s):** Roundhead lespedeza, Bushclover, Rabbitfoot

**Description:** Native perennial, 2-5 feet tall. Stem is usually unbranched, with stiff hairs on upper portions. May be multiple stems from base. Flowers are small, cream to white petals with a purple throat, clustered into rounded heads at stem tip and in upper leaf axils. Leaves are alternate and compound, divided into three leaflets with a prominent mid-vein, somewhat hairy below, smooth above. Seeds form in one-seeded pods clustered in heads.



### **Adaptation/Habitat:**

Occurs in mesic to dry soil conditions, sandy soils, full sun. Very-well drained loamy soils preferred for seed production.

### **Threatened/Endangered**

**Status:** Special Concern (KY)

**General Comments:** Roundheaded bushclover

### **Establishment for Seed Production (Appendix A)**

#### **Direct seeding:**

Seeding rate ((40 seeds/linear foot):

4.0 PLS lbs/acre for 30-36" rows

Seeding Depth: 1/4 – 1/2 inch

Seeding Methods: drill

Time of Seeding: Dormant fall seeding of unscarified seed. Scarify and inoculate seed (EL inoculum) for early spring planting.

Weed Control: Prepare clean, firm, weed free seedbed prior to seeding

#### **Greenhouse:**

Seed pre-treatment: Scarify seed (see text) and wet stratify 2 weeks at 40 F. Sow inoculated seed in greenhouse two months before last frost free date.

Damping off (fungal pathogen) can be a problem on seedlings if soil is kept too moist, or seedlings are planted too thickly. Avoid excess moisture on soil surface by applying a thin layer of perlite over the top of the soil, improving air circulation with fans, thinning seedlings, and/or watering from the bottom of the containers only. Seedlings form a fleshy taproot with few lateral roots, unless allowed to grow until taproot is air-pruned as it reaches the bottom

drainage holes of the container. Transplant mature seedlings into bare soil in rows convenient for tillage equipment or into weedbarrier at 8" intervals after all danger of frost is past.

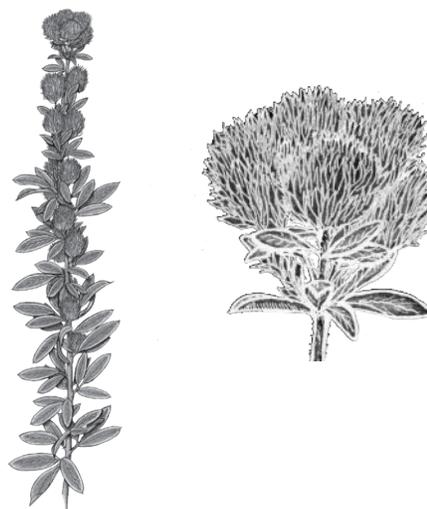
### **Stand Management**

**Weeds** – Mow stand above seedling height during establishment year. Poast (sethoxydim) herbicide can be used to control weedy grasses. Prowl (pendimethalin) after establishment for grass control. Plateau should NOT be used on this species.

**Pests** – Herbivory may be a problem.

**Diseases** – No serious diseases known. Damping off can be serious in greenhouse environment (see above).

**Pollination:** Insects, primarily bees.



### **Seed Production (Appendix B)**

- **First Harvest:** Though some plants may flower the first year, two growing seasons are required for stand establishment and seed production.
- **Yield/Acre:** 100 - 250 bulk lbs/ac
- **Stand Life:** 5-10 years, seed production decreases after 5 years.
- **Flowering Date:** Flowering occurs from mid-August to early September
- **Seed Maturity:** October
- **Seed Retention:** Shattering begins in late October into November
- **Harvest date range at TPC (2002-2006):** Oct. 16 to Oct. 23
- **Recommended Harvest Method:** Combine at maturity

### **Seed Cleaning (Appendix C)**

**Cleaning Process:** Use brush machine/huller-scarifier to remove hulls, then air-screen (see Appendix C for settings).

