Native Legumes
Possibilities for Minnesota Agriculture

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Research with Indigenous Legumes
- Evaluation of Agronomic Potential

Species evaluated to date:

- Blue wild indigo (Baptisia australis)
- Wild senna (Senna hebecarpa)
- Illinois bundleflower (Desmanthus illinoensis)
- Hog peanut (Amphicarpaea bracteata)
- Round headed bush clover (Lespedeza capitata)
- Pale pea (Lathyrus ochroleucus)
- Veiny pea / Wild pea (Lathyrus venosus)
- Beach pea (Lathyrus maritimus)
- False indigo (Amorpha fruticosa)
- Leadplant (Amorpha canescens)
- Purple prairie clover (Dalea purpureum)
- White prairie clover (Dalea candidum)
Species evaluated to date (cont’d):

- Silky prairie clover (*Dalea villosum*)
- Wild licorice (*Glycyrrhiza lepidota*)
- Canada milkvetch (*Astralagus canadensis*)
- Ground plum (*Astralagus crassicarpus*)
- Small wild bean (*Strophostyles leiosperma*)
- Showy tick trefoil (*Desmodium canadense*)
- Wild lupine (*Lupinus perennis*)
- Scurfy pea (*Psoralea tenuiflora*)
- Breadroot (*Psoralea esculenta*)
- Prairie indigo (*Baptisia bracteata*)
- Dwarf false indigo (*Amorpha nana*)
- Partridge pea (*Chamaecrista fasciculata*)
- Maryland senna (*Senna marylandica*)
- American vetch (*Vicia americana*)
- Ascending purple milkvetch (*Astralagus striatus*)
Blue wild indigo  (*Baptisia australis*)

Plant type: perennial, herbaceous, erect, non-spreading

Potential use: grain, forage, biomass, horticulture
Blue wild indigo in large plot – full bloom
Wild senna  \((Senna \ hebecarpa)\)

Plant type:  perennial, herbaceous, erect, non-spreading

Potential use:  grain, biomass, fiber, wildlife
Illinois bundleflower (Desmanthus illinoensis)

Plant type: perennial, herbaceous, erect or prostrate, non-spreading (but readily volunteers)
Potential use: forage, grain, fiber, wildlife, cover, horticulture
Hog peanut  (*Amphicarpaea bracteata*)

Plant type: annual, herbaceous vine, spreading, functions as perennial through nutlet

Potential use: cover, natural food
Soybean with Hog peanut cover crop
Round headed bush clover (*Lespedeza capitata*)

Plant type: perennial, herbaceous, erect, non-spreading

Potential use: horticulture, fiber, wildlife
Pale pea  \textit{(Lathyrus ochroleucus)}

Plant type: perennial, herbaceous vine, rhizomateous, spreading

Potential use: forage, grain, biomass, cover
Veiny pea  (*Lathyrus venosus*)

**Plant type:** perennial, herbaceous vine, rhizomateous, spreading

**Potential use:** forage, grain, horticulture, cover
Beach Pea (*Lathyrus maritimus*)

Plant type: perennial, herbaceous vine, rhizomateous, spreading

Potential use: forage, cover
False indigo  (*Amorpha fruticosa*)

Plant type: perennial, woody, non-spreading

Potential use: silvopastoral, biomass, hort., wildlife, agro-forestry, pharmaceutics
Leadplant  (*Amorpha canescens*)

Plant type: perennial shrub, erect, non-spreading

Potential use: forage, horticulture, wildlife
Purple prairie clover  \textit{(Dalea purpurea)}

Plant type: perennial, herbaceous, non-spreading, erect

Potential use: forage, horticulture, wildlife
White prairie clover  *(Dalea candida)*
Plant type: perennial, herbaceous, non-spreading, erect
Potential use: horticulture, forage, wildlife
Silky prairie clover  *(Dalea villosum)*

Plant type: perennial, herbaceous, non-spreading, semi-erect

Potential use: horticulture, forage, wildlife
Wild licorice  *(Glycyrrhiza lepidota)*

Plant type: perennial, herbaceous, erect, aggressive spreading

Potential use: biomass, fiber, ground cover
Canada milkvetch  (*Astralagus canadensis*)

Plant type: perennial, herbaceous, semi-erect, non-spreading

Potential use: forage, wildlife
Ground plum  \((Astragalus crassicarpus)\)

Plant type: perennial, herbaceous, prostrate, non-spreading

Potential use: natural foods, wildlife, horticulture
Ascending Purple Milkvetch (Astralagus striatus)

Plant type: perennial, herbaceous, prostrate, creeping-spreader

Potential use: forage, wildlife
Small wild bean  (*Strophostyles leiosperma*)

Plant type: annual, herbaceous, creeping-prostrate

Potential use: forage, cover, companion crop
**Showy Tick Trefoil** *(Desmodium canadense)*

Plant type: perennial, herbaceous, upright, non-spreading (except through clinging seeds)

Potential use: horticulture, fiber, wildlife
Wild Lupine *(Lupinus perennis)*

**Plant type:** perennial, herbaceous, upright, non-spreading

**Potential use:** forage, grain, horticulture, wildlife
**Scurfy pea** *(Psoralea tenuiflora)*

- **Plant type:** perennial, herbaceous, upright, non-spreading
- **Potential use:** forage, grain, horticulture, wildlife
**Breadroot** (*Psoralea esculenta*)

Plant type: perennial, herbaceous, upright, non-spreading, large tuberous roots

Potential use: natural food, wildlife
Prairie Indigo \textit{(Baptisia bracteata)}

Plant type: perennial, herbaceous, quite prostrate, non-spreading

Potential use: horticulture, grain, hay
Dwarf/Fragrant False Indigo (*amorpha nana*)

Plant type: perennial, woody, non-spreading

Potential use: horticulture, wildlife, pharmaceutics
Perennial Native Legume
Plant Heights at Harvest

- False indigo
- Blue wild indigo
- Goats rue
- Pale pea
- Flat pea
- Tuberous vetchling
- Wild senna

[Bar chart showing plant heights for various legumes at different cuts.]
Perennial Native Legume
% Leaf Tissue

- False indigo
- Blue wild indigo
- Goats rue
- Pale pea
- Flat pea
- Tuberous vetchling
- Wild senna
- Alfalfa

1st cut 2nd cut Average

% Leaves
False indigo – cutting management
Perennial Native Legume Relative Palatability

Relative consumption (visual 0-10)

1998(30hr) 1999(90hr) Ave

False indigo
Blue wild indigo
Wild
Senna
Illinois bundle flower
Purple prairie clover
Birdsfoot trefoil
Alfalfa
LSD.10
Prior to palatability trial

24 hrs grazing by sheep

90 hrs grazing by sheep

Sheep with False indigo
Amorpha fruticosa Establishment
- 2nd year Dry Matter Yields

![Graph showing dry matter yields for different treatments of Amorpha fruticosa.](image-url)
Native Legume Establishment (30 DAP)
5 species seeded 6/16/99 @ 12.5 PLS/ft²
Native Legume Establishment (30 DAP)
5 species seeded 6/16/99 @ 12.5 PLS/ft²
Management of Native Legumes in Establishment Year (30 DAP)
False indigo
Blue wild indigo
Illinois bundleflower
Wild senna

Management of Native Legumes in Establishment Year (1 year AP)
Native Legume Establishment (30 DAP)
5 species seeded 6/16/99 @ 5 rates
Native Legume Establishment (30 DAP)
5 species seeded 6/16/99 @ 5 rates

Seeding rate PLS/ft²

plant count/ft²

0 5 10 15 20 25

LSD.05

1.25 6.25 12.5 25 50
Native Legume Establishment (30 DAP) 5 species seeded 6/16/99 @ 5 rates
Ongoing Programs

Ecological / Agronomic Effects:
- Adaptation to diverse environments (SE & W MN)
- Compatibility with other species (warm and cool season)
- Effective legume – rhizobium symbiosis (J. Byun)
- Establishment strategies
Evaluation of Diversity Among Ecotypes of *Amorpha fruticosa* and *Desmanthus illinoensis* (Lee DeHaan)

- 20 Ecotypes of each species
- Three locations
- Three years
- Measured traits: seed yield, biomass yield, height, width, maturity, winter survival, leaf width, leaf length, insect resistance, number of stems
- Most traits influenced heavily by location (environment) and ecotype
Indigenous plants, especially legumes, provide new possibilities for Minnesota agriculture, whether it be for fiber, fuel, forage, grain, natural foods, or pharmaceutics.