

# History of Birdsfoot Trefoil Production in the Champlain Valley of New York and Vermont

- Birdsfoot Trefoil (*Lotus corniculatus* L.)
- Origin: Europe, Asia, Mediterranean Region, early 1900's
- Description:
  - A long lived deep rooted legume suitable for hay and pasture in areas with drainage problems or low soil Ph.
  - Will not out yield alfalfa on better drained soils.



# Description of Birdsfoot Trefoil

- Establishes slowly but is very vigorous once established.
- BTF is a non-bloating legume best suited for sheep, goats and cattle. Not preferred for horse pasture because of the presence of tannins.
- Not tolerant to early spring grazing or continuous grazing.
- Inoculants needed at seeding for quick nodule dev.
- BTF has nutritive value equal to or greater than alfalfa.

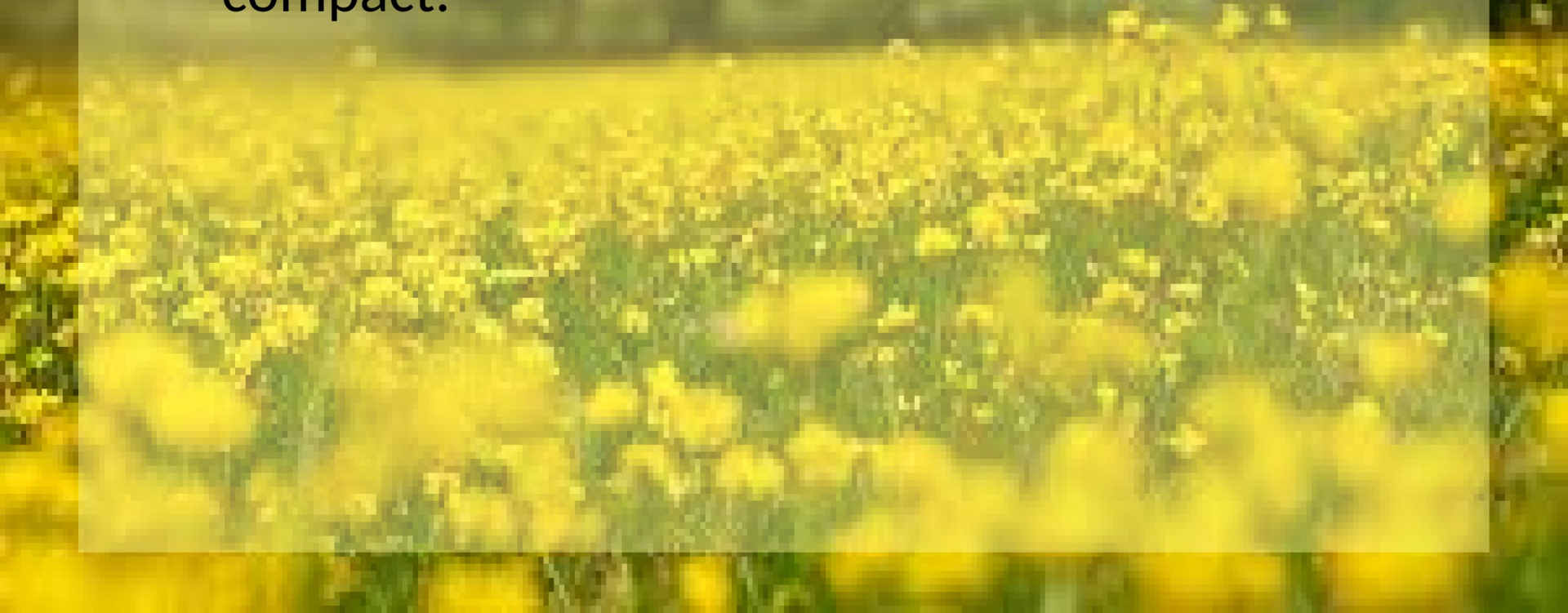


# Description of Birdsfoot Trefoil

- BTF has a higher feeding value as pasture, hay, or silage.
- As the plants mature, quality is maintained better.
- But will only allow two or three harvest per season.
- Regrowth of BTF occurs on the lower stems/leaves whereas Alfalfa occurs from the crown. If harvested too short (<5-6 inches) regrowth will be retarded.

# Description of Birdsfoot Trefoil

- Another difference is when BTF is harvested, the root nodules die. This further retards regrowth.
- Seed rate is 4-6 lbs./acres at  $\frac{1}{4}$  to  $\frac{1}{2}$  inch deep; compact.





# Description of Birdsfoot Trefoil

- **Flower**: Color varies from light to dark yellow.
- **Seed**: Ten to 15 seeds are borne in long cylindrical pods which turn brown to black at maturity. Average 5-6 pods (1-1.5 inches long) arranged at right angles to the flower stem, thus giving the appearance of a birds foot. Very small, rounded seeds approx. 385,000 per pound. A very narrow harvest window; seeds shatter easily.





# Description of Birdsfoot Trefoil

- **Stem**: Many well branched stems arising from a single crown. May reach a height of 25-35 inches and are smaller in diameter, and less rigid, than alfalfa.
- **Leaf**: Compound attached alternately on opposite sides of the stem and three leaflets attached to the terminal end of the petiole, and two large stipules at the base.





# Description of Birdsfoot Trefoil

## Varieties:

- Empire – Viking – Norcen – Pardee – Leo – Exact
- Empire: Low growing, often for pasture.
- Viking: Upright growth, suggested for hay production.
- Norcen: Often considered a hybrid for multiple use.
- Pardee: Variety developed by Bill Pardee (Cornell) and released in 2003. A high yielding and persistent trefoil variety that is resistant to Fusarium Wilt.



# Fusarium Wilt

- Fusarium Wilt is a soil borne disease resulting in the rapid wilting, root discoloration and plant death in seeding year stands of Birdsfoot Trefoil. The direct result of the decline of the once thriving trefoil seed industry in the Lake Champlain Valley of New York and Vermont in the 1970s and early 1980s. This disease showed up in Erie and Wyoming Counties (Western NY) in the 1990s.



# Fusarium Wilt

- It was not until 2009 when Cornell plant pathologist determined the characteristics and biology of the fungus that produced these symptoms in trefoil. This unique biological strain of “*Fusarium oxysporum*” they named as form species “*loti*” to denote its pathogenicity on trefoil.
- Isolates collected from wilted birdsfoot trefoil plants caused severe wilting and root discoloration in greenhouse grown BFT plants. A low level of disease in some pea plants but no disease in alfalfa, red clover, dry bean, or soybean plants.



# Fusarium Wilt

- Thus the trefoil wilt pathogen found in parts of NY and VT appears to be a unique biological strain with a limited host range. Movement of infested hay and soil will most likely occur in the future, resulting in spreading the pathogen to other regions.



# Champlain Valley Seed Growers Cooperative

- The “Champlain Valley Seed Growers Cooperative” was incorporated on June 11, 1948 in Essex, New York. Their headquarters was located in Westport, NY, Essex County. Membership consisted of both dairy and field crop producers on both sides of Lake Champlain. Chairman for many years was Richard Sherman and advisor was Ray Bender from Cornell Coop. Extension and UVM.
- Plantings of certified small grains (soft and hard winter wheat and oats) and certified Birdsfoot Trefoil (BTF) were their main emphasis.



# Champlain Valley Seed Growers Cooperative

- Planting of straight BTF or BTF with cool season grasses.
- First cutting for hay, second for seed production.
- Harvest timing very critical. Seed shatters easily.
- Yields may reach 300 lbs. per acre.
- Common varieties were Viking, Empire and unnamed.
- Seed marketed through the Co-op or used on farm.
- Fusarium Wilt decreased production in the Valley by the late 1970's, early 1980's.
- With BTF not being able to survive past the seeding year the cooperative disbanded in the early 1980s.



# Champlain Valley Milling Corporation

- Birth of “Champlain Valley Milling Corporation” in 1985.
- Largest certified organic mill in the Northeast. Their roller mill, hammer mill and stone milling provide a variety of flours and whole grains.
  - Whole grains are Wheat, Rye, Spelt, Emmer and Freekeh.
    - Spelt: Ancient wheat from 500BC.  
Hulled, hexaploid w.



# Champlain Valley Milling Corporation

- **Emmer**: A type of ‘awned’ wheat that is hulled, first crop domesticated in Near East. Tetraploid. ‘Farro’
- **Freekeh**: “green” wheat that is roasted.  
Ancient Middle Eastern cereal food.
- Whole flour (w/ bran), White Flour (w/o bran), Cracked Grains and Mixes.
- Marketed US and Canada with L. Champlain monster “Champy” as their logo.



CHAMPLAIN VALLEY MILLING



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# Alternative Forages for Grazing

- **Grazing Corn:** Specifically developed for grazing. Begin strip grazing when tassels appear. Stagger plantings.
- **Small Grains and Mixtures with Small Grains:**
  - Oats – Wheat – Rye – Barley : For Grain or Grazing
  - Forage Oats
  - Triticale
  - Oats plus Peas
  - Oats and Annual Ryegrass

# Alternative Forages for Grazing

- Summer Annual Grasses (BMR, non BMR, gene 6, etc.)
  - Forage Sorghum
  - Sorghum-Sudan
  - Sudangrass
  - Grain Sorghum
  - Millet (Pearl, Japanese)



# Alternative Forages for Grazing

- **Brassicas**

- Appin, Barkant, or Purple Top Turnips
- Rape
- Swede
- Above seeded with oats, triticale, wheat, etc.

- **Clovers**

- Crimson Clover
- Common Medium Red
- Others and combinations for cover crops or short tern.

# Alternative Forages for Grazing

- Cover Crops and Specialty Items
  - Annual Ryegrass
  - Italian Ryegrass
  - Daikon Radish, Nitro-Radish
  - Hairy Vetch
  - Chicory



Thank You  
Questions?

