



Biennial Winter Canola Grown Under Irrigation for Seed and Silage

2015 PNW Oilseed & Direct Seed Cropping Systems Conference

Don Llewellyn, Ph.D.
Regional Livestock Specialist
WSU/Benton County Extension
January 21, 2015

Background

- **Traditionally, winter Canola:**
 - **Important source of omega-3 essential oils and feedstock for biodiesel**
 - **Canola meal is an excellent protein-rich feed for ruminants (beef and dairy rations)**
 - **Research emphasis (40 years), largely for seed production**

Chemical composition of some oilseed meals in the PNW

Component (% of DM)	Commercial Canola meal	On-farm Canola meal	On-farm Camelina meal	Commercial soybean meal
Crude protein	39.9	27.8	37.1	51.6
NDF	25.4	33.8	22.3	8.9
ADF	19.7	29.3	14.7	5.7
Ash	8.7	6.8	6.6	8.0
TDN	72.5	75.4	77.7	80.1
Crude fat	3.4	18.3	12.8	1.0

Biennial winter Canola

- **Seeded in August**
- **Harvest forage crop in October**
- **Regrows in fall and spring**
- **Harvest Canola for seed the following year**

What can we expect with Canola silage?

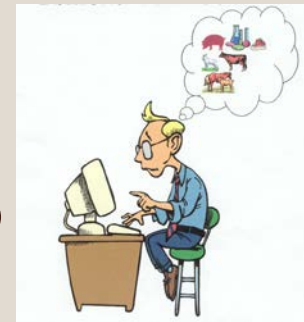
- **16 – 17% CP**
- **Low in fiber**
- **Canola crops are high in moisture (75 to 80% or more)**
 - **Can be ensiling and seepage problems when moisture is > 70%**
- **Absorbents**
 - **Can alternate layers of Canola and other dry feeds**
- **Ensiling reduces nitrate 30 – 70%**
- **Add bacterial inoculants**

Canola silage

- **Can cause scours; may need to limit feed to 50 – 60% of total daily DM intake**
- **Canola can accumulate high levels of sulfur (0.5% to 1.3% of DM)**
 - **NRC of Beef Cattle; dietary sulfur should not exceed 0.4% of DM**
 - **Haemolytic Anaemia, S-methyl-L-cysteine sulphoxide**
 - **Inhibit trace mineral absorption (Cu and Se)**
 - **Polioencephalomalacia (PEM) from hydrogen sulfide gas formation in the rumen causes lesions in the brain**
 - **Also need to check the water (cumulative)**

Objectives

- 1. To determine silage fermentation characteristics of winter Canola forage depending on field rates of N and S**
- 2. To determine the effect of absorbents to reduce effluent losses and change fermentation characteristics of Canola silage**
- 3. To determine the composition of silage effluent from Canola silage through field nutrient applications or absorbents**



Field treatments for winter Canola silage

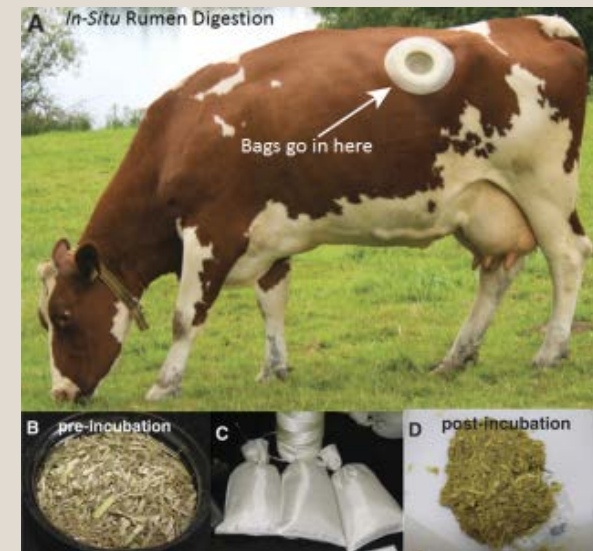
- Winter RR Canola planted in August (2014 and 2015)
- 8 lbs. PLS/acre
- Plot dimensions = 11 ft. x 25 ft., 4 reps/trt
- N and S, applied 1/3:2/3, fall:spring
 - 100-0; 100-20; 100-40
 - 200-0; 200-20; 200-40
 - P and K based on soil tests
- Harvest in mid October 2014 and 2015 leaving 4 in. stubble height

Silage treatments

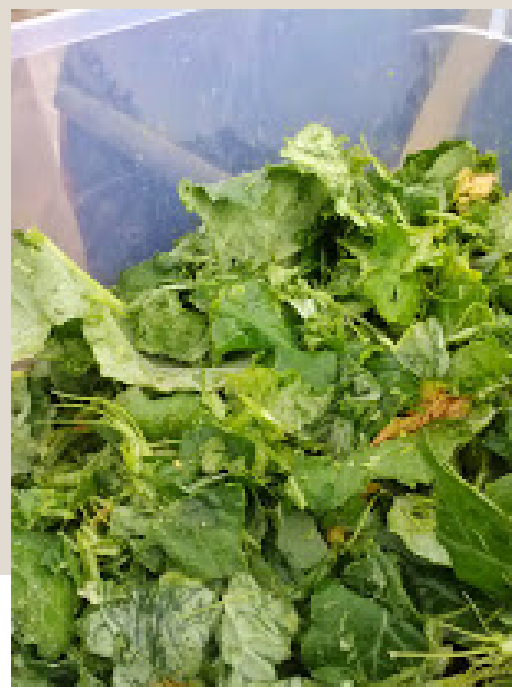
- **N and S levels follow field treatments**
- **With and without absorbents (alfalfa cubes)**
 - 12 treatments x 4 replications
 - Fill 48 silage mini silos
- **Fresh forage is inoculated with 9×10^{10} CFU/lb. of wet forage (lactic acid producing bacteria)**
- **10 lbs. of fresh forage packed into tube silo**
- **Absorbent treatments; increase DM to 35%**
- **Allow to ensile 45 days**

What we hope to find out:

- Forage quality (chemical composition)
- Fermentation characteristics (VFAs)
- *In situ* degradability of forages and silages
 - Rates and extents of degradation
 - Protein
 - Fiber
 - Fats
- Does removal of a forage crop affect seed/oil/meal quality the following year?



Plot harvest



Ensiling—simulates mid-depth of bunker silo



Background

- **Conserved forage (hay or silage) research with Canola has been limited**
 - **Canadians have recommended ensiling Canola after hail damage**
 - **WSU researchers reported excellent quality Canola silage and positive dairy animal response when intercropped with peas (Kincaid et al., 2012)**
 - **Some direct grazing information is available (Boyles et al., 2012)**

Field objectives (Fransen)

1. Quantify grain yield and grain quality of irrigated winter Canola at different N:S fertility ratios
2. Compare 5:1 N:S ratios with and without Agrotain® nitrogen stabilizer for Canola forage and grain productivity
3. Compare early Canola stand establishment and winter survival by fertility and management trts
4. Determine forage yield and quality of irrigated winter Canola grown at different N:S fertility ratios
5. Produce adequate forage for ensiling in laboratory tube silos
6. To determine if removing forage crop affects Canola

Silage objectives (Llewellyn and Fransen)

- 1. To determine the silage fermentation characteristics and feed quality of winter Canola forage depending on field rates for N and S, and to predict feed quality and utilization through NIRS forage testing and *in situ* degradation techniques (an estimate of digestion)**
- 2. To determine the effects of absorbents to reduce silage effluent losses and change fermentation characteristics of Canola silage**
- 3. To determine the composition of silage effluent from Canola silage related to field nutrient applications or absorbents during the ensiling process**