

# Economic Cost of Clubroot

## The Potential Economic Impact of Clubroot with Shorter Rotations

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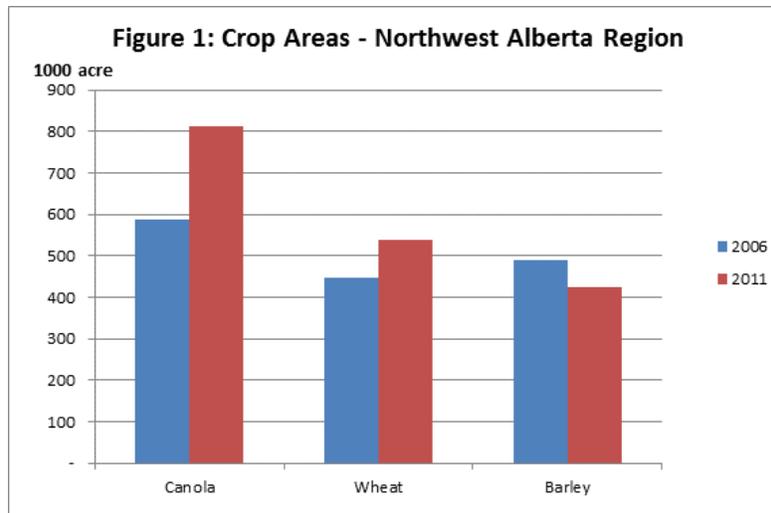


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## The Potential Economic Impact of Clubroot with Shorter Rotations

It is well known that canola prices have been very attractive in the recent past. As a result, canola acres have increased significantly at the expense of land devoted to other crops. Figure 1 shows canola, wheat and barley acreages for the 2006 and 2011 census years in Northwestern Alberta (Wetaskiwin to Barrhead).



The increase in canola acreage has occurred primarily by adopting shorter rotations. Agrologists recommend planting canola one in four years to reduce the risk of developing canola plant diseases such as Clubroot or Blackleg. However, favourable economics has greatly increased the adoption of shorter canola rotations. One in two years has become common practice.

In 2014, a new strain of the Clubroot disease appeared in Alberta, particularly in the northwest region, which is more virulent. Most of the Clubroot resistant varieties of canola are highly susceptible to this new strain. Moreover, when the new strain of Clubroot becomes endemic in a field, canola must be excluded from the crop rotation due to the longevity of the Clubroot spores. If Clubroot becomes widespread, significant canola acreage will be lost in future years.

The following is an economic assessment of the potential impact to Alberta farmers if Clubroot continues to spread and become more virulent. Three scenarios are developed: a baseline scenario that assumes Clubroot does not become an issue, and two scenarios that model potential Clubroot outbreaks. These two scenarios (medium and high disease outbreaks) assume that over a 12 year crop rotation, the disease gradually develops until it reaches levels that reduce canola yields by 35% and 75%, respectively. Although Clubroot often develops in patches throughout the field, this analysis assumes a more complete outbreak in the field, situations that have occurred in Alberta.

The three crop rotations modelled are:

Baseline: Spring Wheat – Barley – Canola – Spring Wheat  
Medium Outbreak: Spring Wheat – Barley – Canola  
High Outbreak: Spring Wheat – Canola

A representative farm is modelled with the three crop rotations using actual conditions in Northwestern Alberta over the 2003 – 2014 period. Crop prices and yields, as well as input costs for four main inputs – seed, chemicals, fertilizer and fuel – track actual conditions over the 12 year period. Figure 2 shows how volatile farm gross margins are over time. The chart shows that the shorter canola rotations with reduced yields have generally lower gross margins, and that the reduction in margins amplifies over time as the yield impact rises.

**Average Reduction in Gross Margin**

Going to one-in-three:

2007-10: \$19.00 per ac  
2011-14: \$16.00 per ac

Going to one-in-two:

2007-10: \$27.00 per ac  
2011-14: \$76.00 per ac

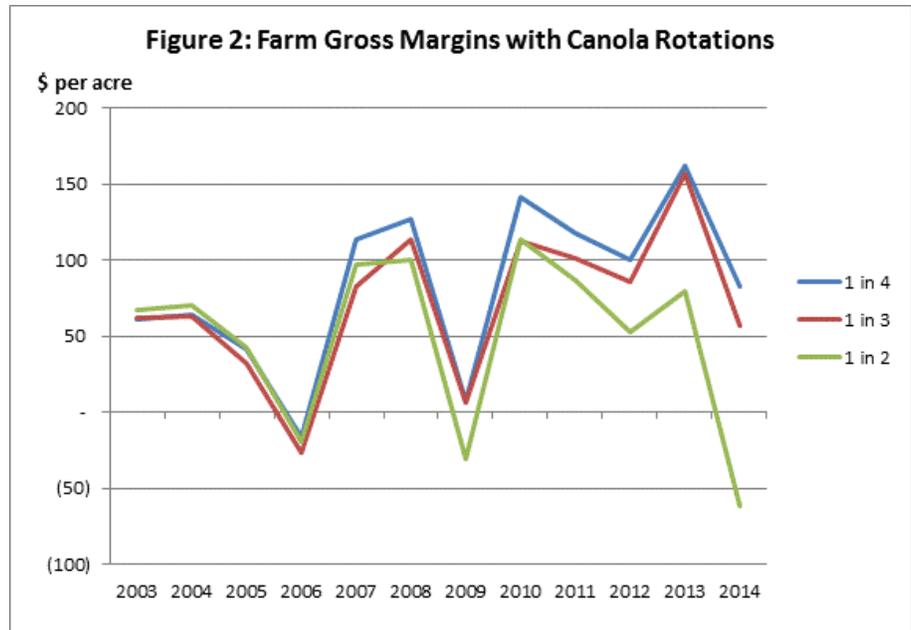


Figure 3 shows the yield impacts modelled by the three scenarios. In the medium outbreak scenario, yields decline to 65% of the baseline scenario by the last year in the modelling period – 2014. For the high outbreak scenario, the year 12 yields are only 25% of normal levels.

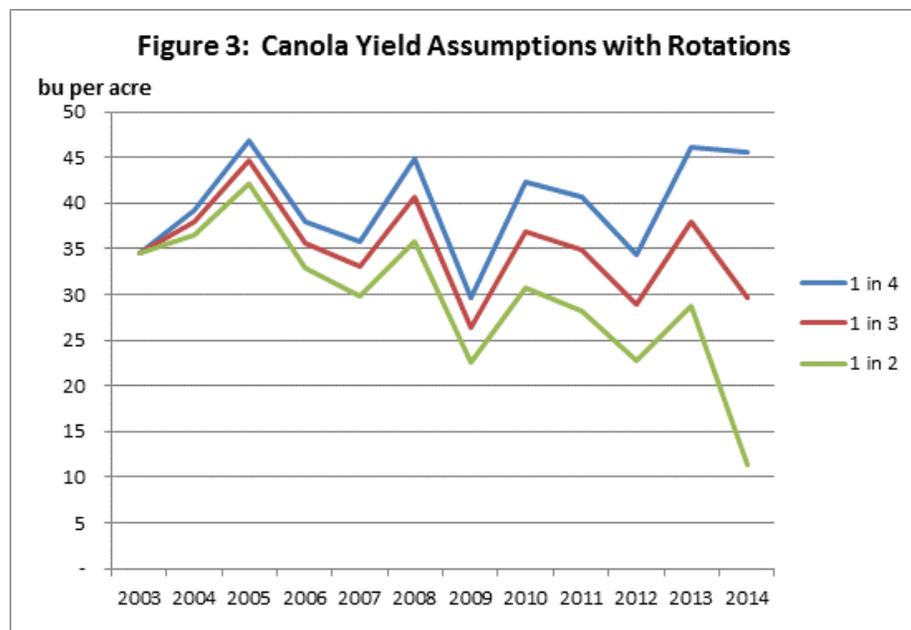
**Average Reduction in Yield**

Going to one-in-three:

2007-10: 4.0 bu per ac  
2011-14: 8.8 bu per ac

Going to one-in-two:

2007-10: 8.5 bu per ac  
2011-14: 18.9 bu per ac



The above charts show that the impact on yields appears to be larger than the impact on farm gross margins. The reason for this is that rising prices for canola, and to a lesser extent wheat, have reduced the impact of lower yields (Figure 4).

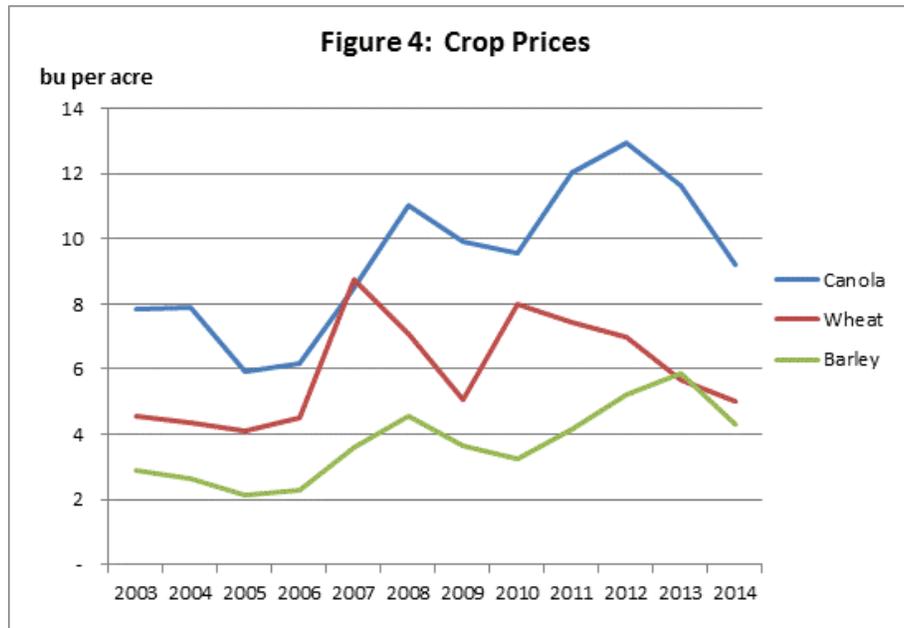
### Average Crop Price

2007-10:

Canola - \$9.74 per bu  
 Wheat - \$7.23 per bu  
 Barley - \$3.78 per bu

2011-14:

Canola - \$11.44 per bu  
 Wheat - \$6.28 per bu  
 Barley - \$4.90 per bu



Wheat prices first experienced a big increase in 2007. In the three-year crop rotation, this price effect dampened the effect of the declining canola yield due to Clubroot. In 2008, canola experienced a dramatic increase in prices that has continued through 2014. This helped to reduce the impact of the decline in yields during the middle part of the 12 year rotation. However, the continuing decline in canola yields, along with relatively lower canola prices, leads to significantly lower farm gross margins, particularly for the two-year rotation.

### Discussion

A new strain of Clubroot has developed that affects newer varieties of canola that were bred for resistance to Clubroot. This new strain has appeared in Northwestern Alberta. There is a real concern that it will continue to spread, greatly reducing farm profitability.

Although Clubroot often develops intermittently in fields, it can become more pervasive affecting the entire field. This analysis examined two scenarios of the development of Clubroot. It shows that the net economic impact could vary from \$16 to \$76 per acre during the mid and late stages of the 12 year rotation, and that the one-in-two year rotation has a significantly higher economic loss, assuming the disease prevalence assumption is realized.

Additional considerations:

- The premium of canola prices over wheat and barley may subside in future years;
- Additional agronomic considerations, such as adopting Alberta’s Clubroot Management Plan, can also impact farm profitability and farm management.