

2009 Research Report
**Impact of Winter Wheat Management on
Processing Tomato Yield and Quality.**

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Executive Summary:

A field experiment was designed to evaluate the response of processing tomato yield and quality to typical winter wheat management practices of: 1) leaving the straw in the field –control plots, 2) physically removing straw after wheat harvest, or 3) leaving the straw in the field with a fall application of nitrogen fertilizer at 30 lb N/ac to encourage microbial breakdown of the straw. Sites were in Leamington with tomatoes in 2008 and 09 and in Ridgetown with tomatoes in 2007, 08, and 09.

Yields: At Leamington, the rye cover crop/windbreak likely masked any effect of straw management as there were no differences in yield between wheat plots in both years. At Ridgetown, both marketable and total tomato yields were significantly lower with removing straw compared to leaving the straw in the field. The plots where straw was left in the field with a fall application of N fertilizer had intermediate yields.

Quality: The wheat straw management had no impact on quality parameters of Agron colour, pH, or soluble solids.

Straw on soil surface: Differences in processing tomato yield appear to be related to differences in the quantity of straw residue on the soil surface the following spring. There was more straw visible in the control plots compared to the straw-removed plots, while wheat residue on the soil in the straw+fall N plots was inconsistent between years.

N Dynamics: Nitrogen treatment had a significant effect on processing yield, soil mineral N, and plant N but there was no N x straw-management interaction. In addition, there were no differences among wheat straw-management plots in soil mineral N (preplant, in-season, or at harvest) nor tomato shoot and fruit N (%N content and total kg N ha⁻¹). Differences in yield between straw-management plots could not be explained by observed differences in N dynamics.

Soil temperature and moisture: There were minor differences in the spring in soil temperature and moisture but results were not consistent between years and sites. It is unlikely that these differences were the driving factor in processing tomato yield differences.

Soybeans as previous crop: In 2008-09 season, soybeans were grown as a previous crop as separate plots along with the wheat plots at Ridgetown. There were no differences in yield or quality between soybeans and all wheat plots.

Recommendation: At Leamington, yield and quality were not affected by wheat straw management. At Ridgetown, for three contrasting years (2007, 2008, and 2009) the results indicate that removing wheat straw is not recommended because 1) there may be an added expense to this practice and 2) there is a yield penalty compared to leaving wheat straw in the field. The fall N applied to straw treatment provided an intermediate response and is not recommended. Yields and quality when soybeans was the previous crop were not different than any of the wheat treatments. Therefore, both soybeans and winter wheat are suitable crops to grow before processing tomato.