

Report to
Council for Burley Tobacco

2016 Grant Funding for
TSNA Accumulation in Controlled Curing Environments, 2017

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Rationale

Many of the factors that are known to affect TSNA accumulation in burley tobacco, including nicotine to nornicotine conversion, absolute nicotine concentration, nitrogen fertilizer rate, spacing, and time of topping and harvest, can be controlled to some extent. Curing conditions, however, are also critical. Experiments have demonstrated that the curing conditions optimal for high quality leaf are also those that favor TSNA, but the specific effect of temperature, relative humidity and airflow have not been defined. It is loosely assumed that the most conducive conditions are at temperatures >86°F and relative humidity >80%. This previous work has been done by correlating TSNA with the ambient environmental conditions in commercial barns on farms, with or without various configurations of fans and vents, or in smaller experimental structures covered with plastic. Fassino *et al.* (2012) developed a model based on the number of hours during the third to fifth week of the cure that the temperature and humidity were above predetermined limits. Limited data from a survey of curing conditions and corresponding TSNA in Kentucky showed a good correlation with both humidity and temperature (Pearce, pers. com).

This approach is severely limited by the confounding of the three environmental factors, and by the range of varieties, fertilizer rates and growing conditions across the large volume of tobacco necessary to fill a commercial barn and furthermore, one barn provides a single data point with no replication. The effect of temperature, relative humidity and air flow, alone or in combination, on the accumulation of TSNA can now be studied by curing the tobacco in small purpose-built curing chambers in which each of the three factors can be manipulated independently of each other and across a range of conditions to determine the critical levels of each environmental component.

The results of the first three seasons of tests, from 2012 to 2014, showed that relative humidity affected TSNA accumulation more than temperature. These tests did not include testing the effect on air movement, which was included in the 2015 test.

Progress

As was communicated to the Council previously, electrical issues with the temperature, humidity and fan control devices on the curing chambers could not be resolved by the time the crop was to be harvested in 2016. These issues were rectified during the spring of 2017 and this test has been done this year. The crop is in the curing chambers, and to date, the system is operating as expected. Sampling of will be done in December.