



# Breakthrough

Resistance like you've never seen before

## Breeder's Bullets

### NOT A DRAG

No other wheat variety currently grown in the Southern Plains is known to carry gene *Wsm1*. The USDA ARS variety, Mace, from Lincoln, Nebraska, was the first but has since fallen out of favor. Linkage drag for yield and quality traits can be the Achilles heel of *Wsm1* deployment. Linkage drag has not shown to be a serious detriment with Breakthrough, thus largely justifying its name.

### MATTER OF DEGREES

The exact breakpoint is not known, but *Wsm1* is generally effective up to about 75° to 81°F. Avoid planting too early when temperatures are high to reduce the amount of virus titer in the plant going into spring.

### NOT THE FIRST

In 2011, OSU pulled the plug at the last minute on OK05312, a high yielding Endurance derivative with exceptional curl mite resistance from gene *Cmc4*. Protection against the insect vector carried over to excellent protection against wheat streak mosaic. We held back in the interest of protecting this valuable gene against biotype shifts in curl mite populations that might render it ineffective. Future varieties from OSU will likely feature the combination of *Wsm1* and *Cmc4* via OK05312.



Dr. Brett Carver  
Oklahoma State Wheat Breeder

## GOING VIRAL

This is the breakthrough Oklahoma farmers have been waiting for, an adapted variety for the Oklahoma panhandle with highly effective resistance to the most yield-ravaging viruses in the High Plains – wheat streak mosaic and *Triticum* mosaic (*WSM/TM*). Breakthrough is the only variety adapted to Oklahoma with a gene called *Wsm1*, developed from a three-way collaboration among OSU, Kansas State University, and Colorado State University. Crucial to its development was finding competitive yield and quality combined with the virus resistance. Breakthrough is like Iba in those characteristics, but far better than Iba in *WSM/TM* protection.



## END-USE QUALITY

Overall Quality	Acceptable
Dough Properties	Good mix strength
Baking Quality	Good volume, below-average absorption
Milling Quality	Very good test weight, below average kernel weight

