

# The Effect of Winter Wheat and Spring Oats Cover Crop Termination Timing on Corn Yield

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A cover crop termination study was established at the University of Missouri Graves Chapple Research Center located at Fairfax, Missouri. The trial objective was to measure the impact of termination timing of winter wheat and spring oats on corn yield. The cover crop treatments were tested using an experimental complete randomized block design with three replications. Corn was planted April 30, 2021, and 180 pounds of nitrogen in the form of urea coated with Agrotain top-dressed the same day. Cover crops were terminated at tiller, joint, boot and head flowering. All growth stages of the winter wheat occurred earlier than spring oats. Corn yield was reduced with each later termination timing in both spring oats and winter wheat with the largest yield losses occurring during the termination at the flowering stage. Termination timing of winter wheat and spring oats as cover crops with corn should be considered early.

## INTRODUCTION

Growers have experienced lower corn yields when planting into a cereal rye cover crop. Small grain cover crops are important to northwest Missouri growers as soils located in this part of the state are especially erosive. Winter wheat and spring oats were selected as a substitute for cereal rye as these crops have been grown historically.

The objective of the study was to measure the effect of termination timing of winter wheat and spring oats on corn yield.

## MATERIALS AND METHODS

The trial is comprised of winter wheat and spring oats planted in a complete randomized block design. The plots were 35 X 10 foot and replicated three times. Center two row harvested for yield. The winter wheat was drilled in fall of 2020 and spring oats were seeded in March of 2021.

Corn was planted April 30, 2021, at seeding rate of 32,400 planting population. Nitrogen was top-dressed at a rate of 180 pounds per acre as urea with Agrotain. Glyphosate was used to terminate cover crops.

Termination of both crops occurred during tiller, joint, boot and flowering.

ANOVA was used for statistical analysis.

### Termination Timings of Winter Wheat



Tillering stage shown on the above left and jointing on above right were targeted in terminating both winter wheat and spring oats cover crops.



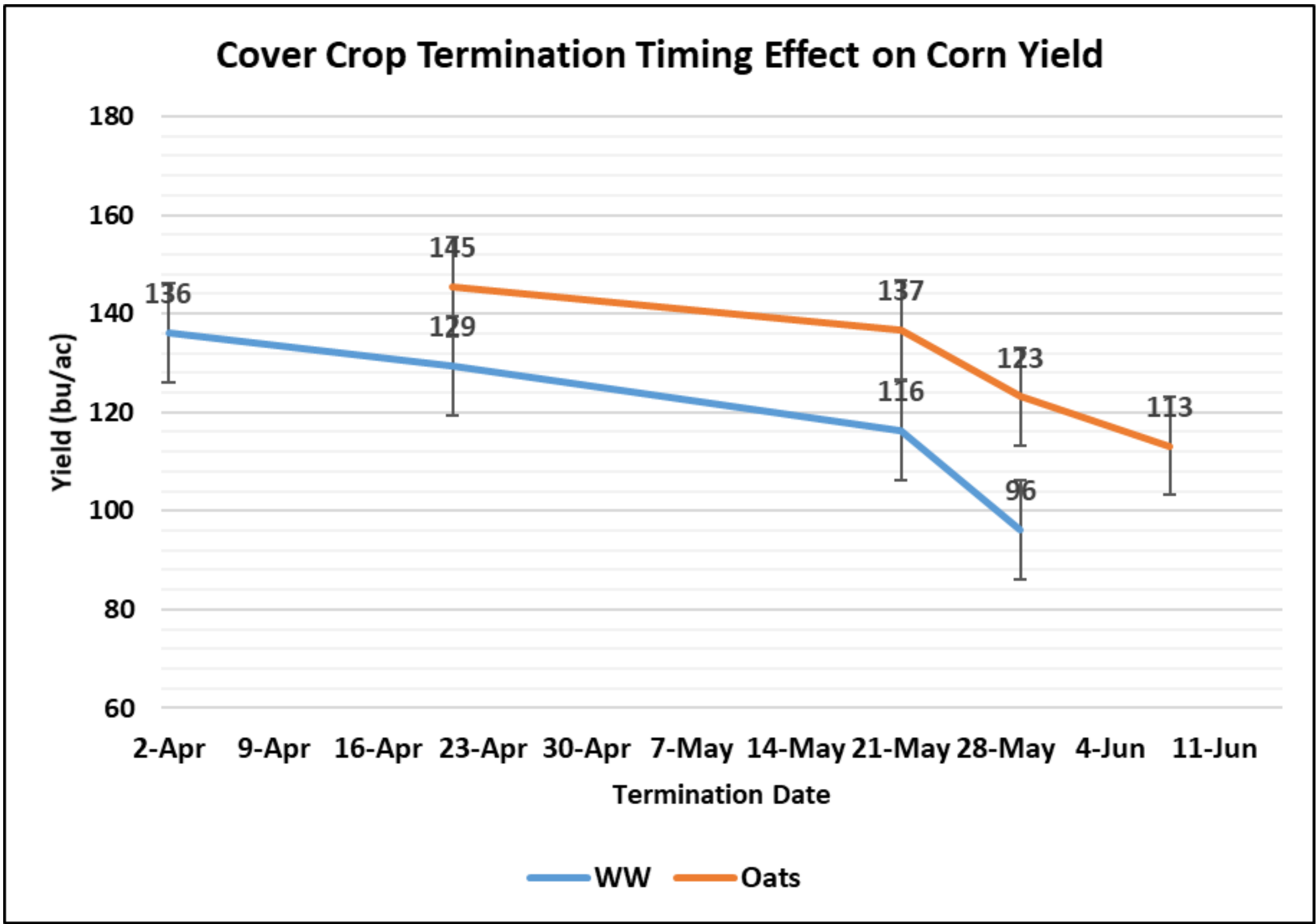
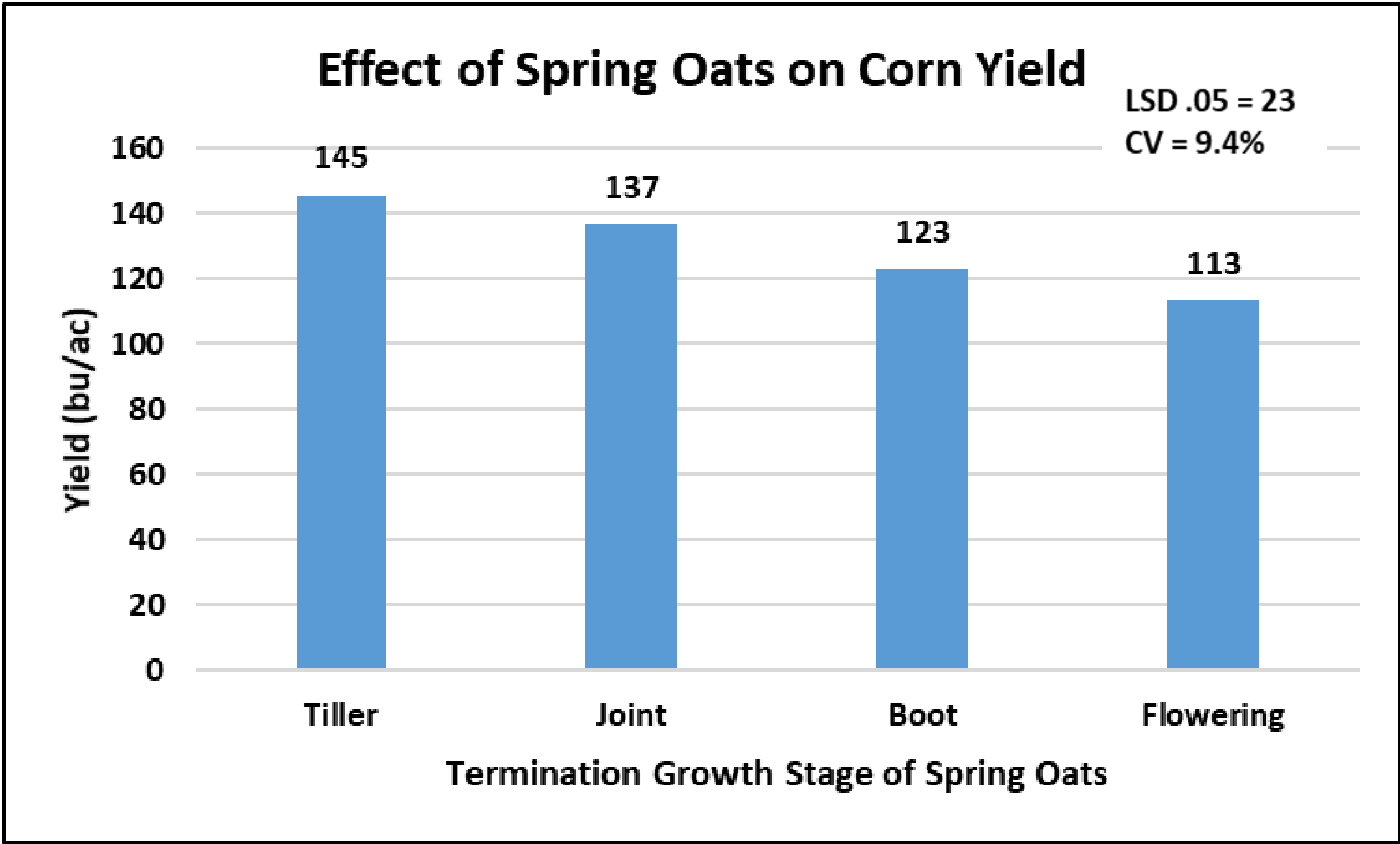
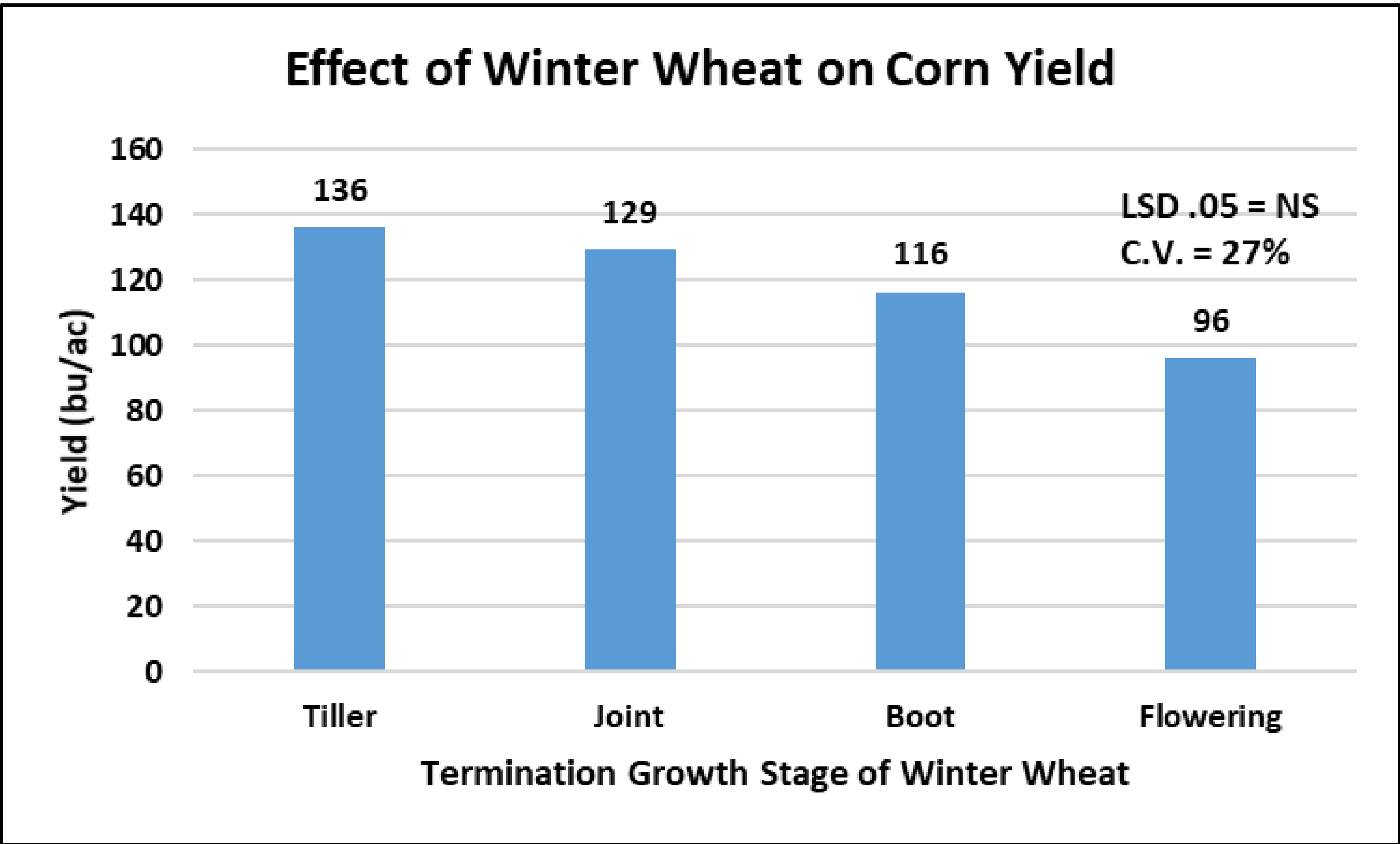
The boot stage on upper left and beginning flowering on right were targeted for termination of winter wheat and spring oats cover crops.



Above, spring oats are shown in lower part of picture and winter wheat in upper. Significant height differences in growth between fall planted winter wheat and spring oats occurred.

## RESULTS AND DISCUSSION

The winter wheat ANOVA indicated no differences in corn yield; however, spring oats was statistically different with last termination date. However, there is a trend of lower yields with later growth stages of termination with each of the cover crops.



When the two cover crops are compared, corn yield was less affected by spring oats. Winter wheat competed with the corn seedlings earlier and corn yields were lower.

A greater number of replications would have increased the ability to identify differences due to treatments.



The corn seedlings are competing for light, moisture and nutrients as shown in the above picture.

Typically yield differences of the impact of cover crops on corn yield have been attributed to competition for resources such as water and sunlight. A management consideration should be the timing of planting to growth of the cover crop. Spring oats was not as competitive as winter wheat. Winter wheat being a fall crop, had significant start to the growing season when corn was planted. Therefore, planting spring oats so corn can have less early season competition may be valuable.

## SUMMARY

Spring oats affected corn yields less than winter wheat. Winter wheat competed with corn with early spring growth which shaded the corn seedlings and competed for water. Early small grain termination is important when planting a corn into winter wheat or spring oats.