



# Effect of winter cover crop grazing on animal performance and antibiotic resistance during pre-weaning period in beef cattle

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## INTRODUCTION:

Cover crops are used to improve soil fertility by adding organic matter to the soil, and reduce nutrient loss by preventing soil erosion.

Cover crops can also provide high quality forage for livestock compared to grass pastures.

Grazing of winter wheat pastures is commonly practiced in the Southern Great plains to provide a quality forage for stocker cattle.

We hypothesize that grazing would improve forage yield, soil fertility and animal performance.

This study is part of a multi-year project that is aimed at evaluating the economic benefits of integrated crop-livestock production system.

**OBJECTIVE:** The objective of this study was investigate the effect of winter wheat grazing on animal performance and the level of antibiotic resistant bacteria in beef cattle.

## APPROACH:

16 cow-calf pairs (8 cow-calf pairs per treatment group) were randomized to tall fescue (Control) or winter wheat cover crop (Treatment) pastures (Fig 1).

Animals were allowed to graze on the pastures for three weeks. Animals were supplemented with minerals and cracked corn mixture during grazing trial.

Body weights and fecal samples were taken on d 0, d 7, d 14 and d 21.

Fecal grab samples were cultured for tetracycline- and 3<sup>rd</sup> generation cephalosporin-resistant *Escherichia coli*.

Data were analyzed by accounting for repeated measurements of animals over time.

Tall fescue grass (3.6 ha)



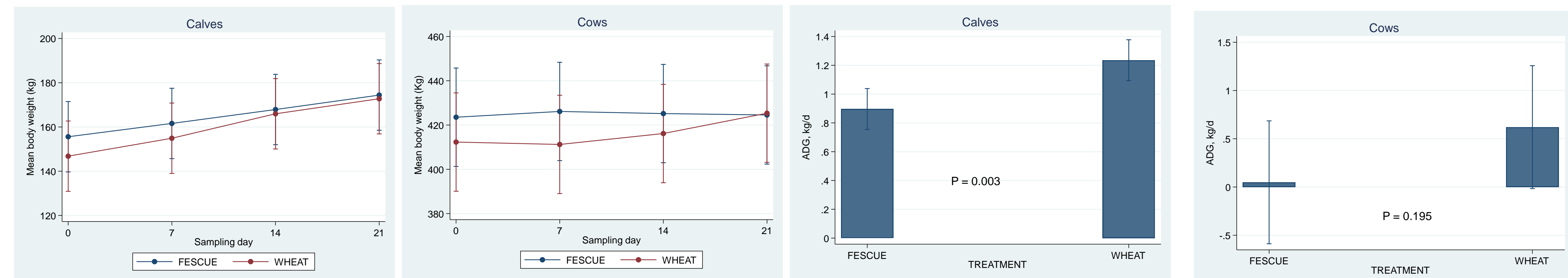
Winter wheat (3.6 ha)



Fig 1. Field plots showing treatment pastures.

## RESULTS

### Body weight



trt:  $P=0.474$   
day:  $P<0.0001$   
trt X day:  $P<0.0001$

trt:  $P=0.512$   
day:  $P=0.947$   
trt X day:  $P=0.0751$

Fig 2. Predicted mean body weights with 95% CIs.

Fig 3. Average daily gain (ADG) after 3 weeks of grazing.

### Antibiotic resistance

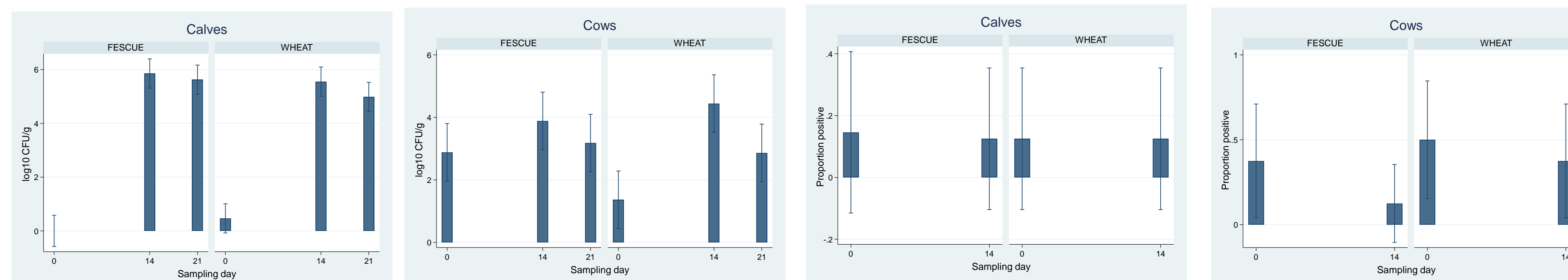


Fig 4. Tetracycline resistant *E. coli* concentrations

Fig 5. Prevalence of 3<sup>rd</sup> generation cephalosporin resistant *E. coli*

## CONCLUSIONS:

Mean body weight of the calves significantly increased over time with greater effects observed in the wheat group on days 14 and 21 (significant treatment by day interaction). No effect was observed in the cows (Fig 2).

Winter wheat grazing for 3 weeks resulted in increased average daily gains in the calves with no effect in the cows (Fig 3).

Tetracycline resistant *E. coli* concentration significantly ( $P<0.0001$ ) increased over time in the calves with no treatment effect. There was a 2 log<sub>10</sub> increase on day 14 in the wheat group compared to baseline (d 0) level (Fig 4).

The prevalence of 3<sup>rd</sup> generation cephalosporin resistant *E. coli* was not significantly ( $P>0.05$ ) affected by treatment or sampling day (Fig 5).

We conclude that the use of winter wheat as a cover crop also provides economic benefits by increasing average daily gain in beef calves, with no effect on antibiotic resistant bacteria.