

# Effect of Complex Trace Minerals on Reproductive Performance of Beef and Dairy Cattle

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## Introduction

Providing balanced nutrients is critical for maintaining cow fertility. Adequate trace mineral intake and absorption is required for proper functioning of many metabolic processes associated with reproduction. Reproductive performance of cattle may be compromised if zinc, copper, or manganese status is in the marginal-to-deficient range. Common copper deficiency symptoms in cattle include delayed or suppressed estrus, decreased conception, infertility and embryo death. Inadequate zinc levels have been associated with decreased fertility, abnormal estrus, abortion and altered myometrial contractibility with prolonged labor. Manganese deficiency in cows results in suppression of conception rates, delayed estrus in both post-partum females and young prepuberal heifers, infertility, abortion, immature ovaries and dystocia. This study evaluated the effect on reproduction from feeding complex trace to beef cattle.

## Materials & Methods

Five beef cattle trials were conducted using treatments of iso-sulfate forms versus complex trace minerals. In three trials, Availa<sup>®</sup>4 or 4-Plex<sup>®</sup> was fed to provide amino acid complex forms of zinc, copper and manganese. The supplement contained cobalt glucoheptonate to supply at least the recommended levels of 125 mg copper, 360 mg zinc, 200 mg manganese and 12.5 mg to 25 mg cobalt per head daily. Copper amino acid complex and zinc amino acid complex were fed in a trial which evaluated ovulation rates in super-ovulated yearling heifers. In the fifth beef study, copper amino acid complex was fed to first-calf heifers. Reproduction parameters that were statistically analyzed as follows: two trials measured artificial insemination (AI)

conception rates, two trials measured postpartum days to conception, and one trial measured ova production in super-ovulated females.

Five dairy trials were conducted in which a control diet (adequate trace mineral levels according to National Research Council (NRC) was compared to a secpmd doet containing complex trace minerals from 4 plex. This diet supplied 360 mg zinc, 200 mg manganese, 125 mg copper and 25 mg cobalt per head daily. from 4-Plex<sup>®</sup>. The average number of cows assigned to the studies was 261. Days to first service, days open and services per conception were statistically analyzed.

## Results & Conclusions

Feeding complex trace minerals to beef and dairy cows enhances reproductive performance early in the breeding season. Research results in beef cattle fed complex trace minerals indicate that first-calf heifers have confirmed pregnancies 10 d earlier ( $P < 0.05$ ), a 35% improvement ( $P < 0.05$ ) in AI conception rates and an increase ( $P < 0.10$ ) in number of ova ovulated per heifer (6.3 versus 2.8), compared to those fed iso-sulfate forms. Summarized dairy data illustrates a 15-d reduction ( $P < 0.10$ ) in open days and an 8-d reduction ( $P < 0.01$ ) in days to first service. Strategic complex trace mineral supplementation in beef, cattle targets 60 d pre-calving through 80 d post-calving. Dairy producers can benefit from year round complex trace mineral supplementation, due to such additional effects as improved claw integrity, enhanced milk production and reduced somatic cell counts. Improving reproductive performance of beef and dairy cows by achieving confirmed conception rates early in the breeding period can enhance economic returns to the producer.