



Salinity - Boron Interactions on Production and Forage Quality of Tall Wheatgrass (*Thinopyrum ponticum*, cv. 'Jose'): Implications on Ruminant Mineral Nutrition

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'Jose' tall wheatgrass was found to be extremely tolerant to boron even though some tissue samples exceeded 2,000 mg/kg dry weight. There was no significant salinity-boron interaction as found in other crops. Some mineral concerns related to ruminant nutrition are discussed.

Tall wheatgrass (*Thinopyrum ponticum*, cv. 'Jose') has been identified in a previous research project from the UC Salinity Drainage Program as a salt-tolerant forage that has high nutritional value and shows considerable promise for reducing saline drainage volumes in California's San Joaquin Valley (SJV). This drainage water also contains high concentrations of boron, Se and Mo, which may affect the production potential and mineral nutritional value of the forage. A greenhouse study was conducted on the UC Davis campus with soil-filled pots using irrigation waters that vary in boron (0.7 to 20 mg/L) and sodium-sulfate dominated salinity (0.5 to 20 dS/m), a quality characteristic of the SJV, with a constant background of 500 µg L Se and Mo. Our experiment confirms that Tall wheatgrass cv 'Jose' is very tolerant to salinity. For example forage production in treatments with irrigation water with an EC_w of 10 dS/m (EC_e of 16.8 dS/m) was 74% of those irrigated with non-saline water. We found that the stable carbon isotope fractionation served as good cumulative stress indicator of the crop as the discrimination value (Δ) decreased with increased salinity and reduced shoot biomass. Moreover, this forage crop is extremely tolerant to boron, tolerating up to 20 mg/L in the irrigation water without a significant reduction in

cumulative biomass. Tissue boron concentrations increased with increased boron to values above 2,000 mg/kg dry wt. However as salinity increased within a particular boron treatment, tissue boron decreased.

The forage quality, from a ruminant mineral nutrition perspective, raised some concerns. Forage samples contained high levels of Se, Mo and sulfur near or above the recommended maximum tolerable concentrations. Therefore, ruminants consuming forage of this quality may have to be monitored for signs of Se accumulation in liver tissue, excess sulfur consumption and molybdenum-sulfur induced Cu deficiency. Nevertheless, forage of this quality has potential as a forage supplement.

Collaborative Efforts

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