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### **Early season UAN applications in sugar beets.**

Urea ammonium nitrate (UAN) fertilizer can be applied in-season on commercial sugar beet fields in Alberta through irrigation pivots. If applications are made, they are generally applied to fully canopied sugar beets in mid-June to mid-July. There was interest in evaluating preemergence, at planting and early season postemergence applications of UAN to assess effects on plant stand, early season vigor and final root yield. Root yield was used as the primary harvest metric since any response in extractable sugar/acre in these trials was generally driven by root yield. UAN applications between 5 and 60 lbs N/acre in addition to recommended preplant incorporated (ppi) urea rates were included in 13 trials over an 11-year period between 2014 and 2024 to assess root yield gains. In-furrow UAN applications of 5 and 10 lbs N/acre significantly reduced sugar beet stand in a 2014 trial and because of this phytotoxicity these treatments were not included in further testing. In trials after 2014, UAN applications of 20 lbs N/acre or more were broadcast preemergence or postemergence using a plot sprayer followed by irrigation water or rainfall for incorporation. Three trials had statistically significant root yield increases averaging 2.2 tons/acre when the best UAN + ppi urea treatment was compared to a ppi urea alone treatment. Three trials had non-significant root yield increases averaging 1.9 tons/acre when the best UAN + ppi urea treatment was compared to ppi urea alone. A further 4 trials had non-significant root yield increases averaging 0.6 tons/acre when the best UAN + ppi urea treatment was compared to ppi urea alone. Spring UAN applications did not have any effect on sugar beet root yield in 3 trials. In 3 trials that included UAN treatments applied without ppi urea in nitrogen deficient conditions, root yield was significantly increased by an average of 1.7 tons/acre with a 20 lb N/acre UAN application and by an average of 3.0 tons/acre with a 40 lb N/acre UAN application compared to an unfertilized check. No injury was observed to sugar beets in 2 trials where a UAN rate of 25 lbs N/acre was mixed with 31 oz/acre glyphosate and applied postemergence. Trials over 11 years suggested there was a 23% chance of getting a significant root yield response to early season UAN applications and a further 23% chance of seeing a non-significant but notably positive root yield response.