NORTH DAKOTA– Potassium Fertilization Does Not Increase Alfalfa Forage Yield in Seeding Year

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North Dakota contributes ~5% of the nation's annual alfalfa hay acreage, with ~190 million in value (NASS, 2018). Challenges of ice sheeting, alternation of freezing and thawing, and exposure to low temperatures cause alfalfa winter injury or winterkill. Potassium has been shown to increase alfalfa winter hardiness by improving energy reserves before dormancy. Clay minerals, smectite, and illite in the soil can cause unavailability of K (>3.5 ratio of smectite-to-illite). Study objective was to determine effect of K fertilization on alfalfa yield and forage nutritive value in the seeding year in sites with distinctive clay ratios. It was conducted at Milnor and Lisbon, ND (Lisbon smectite-to-illite clay ratio <3.5; Milnor smectite-to-illite clay ratio >3.5). The design was an RCBD with four replicates. Treatments included three varieties, three K rates, and two application timings. Potassium fertilization rates and timing did not have a significant effect on forage yield in the seeding year (Figure 1). Potassium fertilization treatments did not affect acid detergent fiber, acid detergent lignin, neutral detergent fiber, crude protein, and neutral detergent fiber digestibility. Ash content was significantly higher when fertilized with higher rates of K. Total digestible nutrients were significantly lower when treated with higher rates of K.

Figure 1. 2019 forage yields averaged across two locations.