



Effect of drought stress on neutral detergent fiber degradation kinetics of corn for silage*

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Abstract: The objective of this study was to determine the effect of irrigation on in situ neutral detergent fiber (NDF) degradability of corn tissues from plants grown under controlled conditions in a greenhouse. Five commercial corn hybrids were planted in 6 pots that were placed in a greenhouse. Pots were randomly subjected to 2 irrigation regimens, which consisted of either abundant (A; 598 mm) or restricted (R; 273 mm) irrigation. At harvesting, leaf blades and stem internodes were collected from the upper and bottom portion of the plants. Tissue samples were incubated in the rumen of 3 rumen-cannulated cows for 0, 3, 6, 12, 24, 48, 96, and 240 h to determine in situ NDF degradation kinetics. Drought stress did not affect the concentration of undegraded NDF (uNDF) in upper or bottom internodes but slightly decreased it in upper leaf blades (17.5 and 15.7% for A and R, respectively). The concentration of uNDF differed substantially among corn hybrids in upper internodes (13.4 to 28.3% uNDF), bottom internodes (21.5 to 42.3% uNDF), and upper leaf blades (11.6 to 20.1% uNDF). No interactions existed between irrigation treatment and corn hybrid for uNDF concentration. Drought stress did not affect the fractional degradation rate (*kd*) of NDF in upper internodes, bottom internodes, or upper leaf blades. The *kd* of NDF differed among corn hybrids in upper (3.8 to 6.6%/h) and bottom internodes (4.2 to 6.7%/h) but did not vary in upper leaf blades (3.8%/h). No interactions existed between irrigation treatment and corn hybrids for the *kd* of NDF. Significant interactions existed between irrigation treatment and corn hybrids for the effective ruminal degradation (ERD) of NDF in upper and bottom internodes. This interaction did not exist for upper leaf blades. The ERD of NDF differed substantially among corn hybrids in upper leaf blades (32.5 to 39.1%). In conclusion, drought-stressed corn had a marginal increase of NDF degradability of leaf blades but not in stem internodes, and drought stress had no effects on ERD of NDF. The effect of drought stress on NDF degradability of corn for silage is still inconclusive and deserves further investigation.