The objective of this study was to evaluate the effects of supplementing a xylanase enzyme (Ronozyme WX) on production performance of dairy cows consuming diets containing corn or sorghum silage as the forage source. Four primiparous (BW 581 ± 47 kg, DM 47 ± 14 d) and 20 multiparous (BW 707 ± 67 kg, DM 51 ± 14 d) Holstein cows were assigned to 1 of 4 diets in a replicated 4 × 4 Latin square design with 19-d periods. With a 2 × 2 factorial arrangement (i.e., silage type and xylanase), treatments consisted of (1) corn silage-based diet (CORN-XYL), (2) corn silage-based diet with xylanase (CORN+XYL), (3) sorghum silage-based diet (SORG-XYL), and (4) sorghum silage-based diet with xylanase (SORG+XYL). Diets contained (DM basis) 33% silage (either corn or sorghum), 8% grass hay, and 59% concentrate. Xylanase was included at a rate equal to 1.5 g product/kg DM. Cows were fed once daily by means of a Calan gate system. All variables were analyzed using the MIXED procedure in SAS, and the model included the fixed effects of silage, treatment, and square by treatment interaction, and the random effects of period, cow within square, and the random residual error. XYL did not affect any of the variables of production performance (P > 0.09). Xylanase supplementation did not interact with silage type (P > 0.19). Dry matter intake was greater for CON than for SORG (P < 0.01; 28.8 vs. 25.5 kg/d). Similarly, milk yield was greater for CON than for SORG (P < 0.01; 51.6 vs. 48.9 kg/d). Milk fat concentration (P < 0.01; 3.84 vs. 3.30%) and milk fat yield (P < 0.01; 1.81 vs. 1.68 kg/d) were greater for SORG than for CON. Silage type did not affect milk protein (P > 0.59) or milk lactose (P > 0.50) concentrations (2.90 and 4.79%, respectively). CON yielded more milk protein (P < 0.01; 1.48 vs. 1.36 kg/d) and more milk lactose (P < 0.01; 2.45 vs. 2.29 kg/d) than SORG. CON resulted in lower milk urea nitrogen than SORG (P < 0.01; 12.3 vs. 14.1 mg/L). Silage type did not affect 3.5% fat-corrected milk (P > 0.24; 50.0 kg/d). In conclusion, xylanase supplementation did not affect production performance when feeding either corn-based or sorghum-based diets to high-producing dairy cows.

Key Words: xylanase, corn silage, sorghum silage

Effects of a brown midrib corn silage hybrid with enhanced starch digestibility on production and nutrient digestibility in lactating dairy cows. A. Tebbe* and W. Weiss, Ohio Agricultural Research and Development Center, The Ohio State University, Wooster, OH.

Feeding corn silage hybrids selected for high fiber digestibility can increase energy intake and milk production, but these hybrids often have reduced starch digestibility. A hybrid with enhanced fiber and starch characteristics may improve feed efficiency. The objective was to determine the nutritional value of corn silage from a brown midrib (bm3) hybrid selected for floury endosperm (bm3-Plus; Unified, Dow AgroSciences, Indianapolis, IN) compared with an isogenic bm3 and a conventional dual-purpose (DP) hybrid. Twenty-one Holstein cows averaging 105 DIM were used in 7 replicated 3 × 3 Latin squares with 28-d periods. Two of the 7 squares were used to measure nutrient digestibility via total collection of urine and feces. Cows were blocked by parity and randomly assigned to 1 of 3 diets formulated to contain similar concentrations of corn silage (46% of DM) and nutrients (34.3% NDF, 23.2% starch, and 17.0% CP) but contain different corn silage hybrids: (1) DP (38.6% NDF, 36.9% starch), (2) bm3 (40.2% NDF, 29.9% starch), and (3) bm3-Plus (41.0% NDF, 29.8% starch). Based on in vitro digestibility, the bm3 hybrids had less digestible starch (3 h incubation) and higher NDF digestibility compared with DP; however, between bm3 hybrids, in vitro starch digestibility was similar. Hybrid did not affect DMI (average 25.7 kg/d; P > 0.10) or in vivo NDF digestibility (average 51.5%; P > 0.10). Feeding bm3-Plus increased (P < 0.09) yields of milk and milk energy about 2 kg/d and 1.6 Mcal/d, respectively, compared with DP and bm3 hybrids. The bm3-Plus diet increased (P < 0.01) feed efficiency nearly 6% compared with bm3 and DP (milk energy/DMI; 1.10 vs 1.04 Mcal/kg) likely from greater (P < 0.04) total-starch digestibility (88.3 vs 85.0%). Compared with standard bm3, corn silage hybrids had less biohydrogenation intermediates in milk fat and greater milk fat content (3.1 vs 2.9%; P < 0.04) indicating potentially better rumen conditions. Feeding silages with both enhanced fiber and starch digestibility had improved nutritional value compared with a conventional hybrid or a hybrid selected for greater fiber digestibility.

Key Words: corn silage hybrids, digestibility, brown midrib

Composition and digestibility of cell walls from corn stems and corn leaves according to plant cutting height. G. Ferreira* and C. L. Teets, Department of Dairy Science, Virginia Tech, Blacksburg, VA.

The objective of this study was to compare cell wall (CW) composition and in vitro neutral detergent fiber digestibility (IVNDFD) of stems and leaf blades from phytomers positioned at different cutting heights within corn plants. Five corn plants from 14 diverse corn silage hybrids (95 to 120 relative maturity) were obtained from a corn hybrid testing trial performed by Virginia Cooperative Extension. Plots consisted of 4 4-m-long rows separated by a 76-cm inter-row space. Tissues were harvested at a single day, when the crops were at 1/4- to 3/4-milkline stage of maturity. Stem internodes (STEM) and leaf blades (BLADE) from the 2th (BASAL) and the 4th (UPPER) phytomers positioned above the nodal roots were obtained. After grinding samples with a cyclone mill (2-mm screen), IVNDFD were determined using a DaisyII Incubator. After re-grinding samples with a cyclone mill (0.5-mm screen), cell walls were extracted and protein-free lignin concentration was determined using the acetyl-bromide procedure. Data were analyzed using the MIXED Procedure of SAS, and the model included the random effect of hybrid and the fixed effects of tissue, phytomer, and their interaction. BLADE had greater CW concentrations than STEM (P < 0.01; 55.1 vs. 48.4% DM, respectively). BASAL blades had greater CW concentrations than UPPER blades (60.4 vs. 49.9% DM, respectively), while stems had similar CW concentrations among phytomers (P > 0.10). BLADE had greater IVNDFD than STEM (P < 0.01; 73.9 vs. 48.9% NDF, respectively). UPPER stems had greater IVNDFD than BASAL stems (P < 0.01; 50.9 vs. 46.6% NDF, respectively), while blades had similar IVNDFD among phytomers (P > 0.34; 73.9% NDF). STEM had greater lignin concentrations than BLADE (30.2 vs. 25.5% CW). Lignin concentrations, in either stems (P > 0.50) or blades (P > 0.88), did not differ among phytomers. Lignin concentration in the CW did not correlate with IVNDFD in either blades (r = 0.02; P > 0.78) or stems (r = 0.19; P > 0.33). In conclusion, cutting height can affect the IVNDFD...
of the stem but not the blade, and the difference in IVNDFD of the stem at different cutting heights is not related to lignification of the CW.

**Key Words:** cutting height, lignin, fiber digestibility

### 75 Fermentation quality, and in vitro digestibility of alfalfa and red clover silages treated with pre-fermented juice.

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This study was conducted to evaluate the effects of pre-fermented juice (PFJ) prepared from red clover (RC) or alfalfa (AF) on fermentation quality and in vitro digestibility of RC and AF silages. The RC (Experiment 1) and AF (Experiment 2) were harvested at the early-bud stage, chopped to 1–2 cm lengths, mixed with distilled water (1:9 ratio) and ensiled in anaerobic jars for 48 h at 30°C. Subsequently, lactic acid bacteria (LAB) in the RC and AF PFJ filtrates were counted. In Experiment 1, RC was chopped, wilted to 40% DM and ensiled in vacuum-sealed plastic bags (18 × 26 cm) in triplicate for 60 d after applying following treatments: (1) Control (deionized water), (2) PFJ-RC (1 × 10^6 cfu of LAB/g fresh weight); and (3) PFJ-AF (1 × 10^6 cfu of LAB/g fresh weight). In Experiment 2, AF was treated and ensiled similarly. Data were analyzed using GLM procedure of SAS. Compared with the control, treating RC silage with PFJ-RC reduced (P < 0.05) pH (4.63 vs. 5.31), NH3N/total-N (4.5 vs. 10.6%) and acetic acid concentration (0.6 vs. 1.4%) but increased (P < 0.05) DM (39.3 vs. 38.4%), WSC (2.4 vs. 2.0) and lactic acid (LA) concentrations (4.2 vs. 8.8%) as well as LAB counts (8.2 vs. 6.1 cfu/g) and in vitro DM digestibility (IVDMD, 66.4 vs. 62.4%). Compared with PFJ-AF, treating RC with PFJ-RC reduced (P < 0.05) pH and IVDMD but increased NH3N/total-N and LA concentrations and LAB counts. Compared with the control, AF silages treated with PFJ-AF had lower (P < 0.05) pH (4.3 vs. 5.4) and NH3N/total-N (3.1 vs. 10.6%), and higher (P < 0.05) DM (38.1 vs. 37.1%) and LA concentrations (4.5 vs. 9.9%) as well as LAB counts (8.2 vs. 6.3 cfu/g) and IVDMD (71 vs. 63%). Compared with PFJ-RC, applying PFJ-AF to AF silages reduced (P < 0.05) pH and NH3N/total-N and increased (P < 0.05) LA concentration, LAB counts and IVDMD. Overall, ensiling red clover or alfalfa with PFJAs improved the fermentation quality and IVDMD and reduced proteolysis. For red clover or alfalfa, applying PFJ prepared from the same forage was more effective at improving fermentation quality than using PFJ prepared from the other forage.

**Key Words:** alfalfa, red clover, pre-fermented juice

### 77 Mycotoxin occurrence in southern US pasture grasses.


A survey was conducted in the southern United States to investigate the occurrence of mycotoxins in pasture grasses. An initial survey in south central Florida indicated zearalenone (ZEN) in common Bermudagrass (Cynodon dactylon) as the major challenge. The survey was expanded to cover a greater geographic area and additional grass species to further explore mycotoxin exposure in grazing livestock. Grass was hand-plucked to simulate cattle foraging behavior. Samples comprised of 25–30 subsamples collected throughout each pasture were screened for the presence of mycotoxins at Activation Laboratories (Ancaster, ON, Canada; 15 mycotoxins) or Romer Labs (Union, MO; 17 mycotoxins) by the liquid chromatography tandem mass spectrometry method. Mycotoxin levels for positive samples are presented on a dry basis in parts per billion (ppb). A total of 291 samples were collected from March 2016 through January 2018, with 271 being bermudagrass, 12 were limpograss (Hemarthria altissima), 5 were bahiagrass (Paspalum notatum), one was stargrass (Cynodon spp.), and 2 were unidentified. One or more mycotoxins were detected in 200 (68.7%) samples overall. The main mycotoxin detected was ZEN in 179 (61.5%; mean of positives 1459 ppb; found in all species) of total samples and 175 (64.6%; mean 1484 ppb) of bermudagrass samples. ZEN did not occur as frequently in limpograss samples (16.7%; mean 135 ppb), but 11 (91.7%; mean 3508 ppb) tested positive for type B trichothecenes (B-Trich; includ
ing deoxynivalenol, nivalenol, and fusarenon X). Only 9 (3.3%; mean 200 ppb) of bermudagrass samples had detectable levels of B-Trich. However, type A trichothecenes (T-2 or HT-2 toxin) were detected in 43 (15.9%; mean 1492 ppb) bermudagrass samples. The preliminary results of the mycotoxin survey in Southern US grasses indicate that a variety of mycotoxins can occur at levels that may pose challenges to cattle reproduction, health, and performance. Further research is needed to better understand if specific mycotoxins are associated with certain grass species, the potential for seasonal patterns of contamination, and the greater scope of this potential challenge to grazing livestock.

Key Words: mycotoxin, pasture, zearalenone