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Changes in nutrient content of rye, triticale, and wheat whole-plant forages with maturity

Abstract

We compared upland and bottomland cereals seeded during 1991 at the KSU Agricultural Research Center - Hays. The five crops (three varieties of triticale, a winter wheat, and a winter rye) were harvested as whole plants during the latter part of the growing season. Crude protein (CP), acid detergent fiber (ADF), and neutral detergent fiber (NDF) were estimated using near infrared spectroscopy. Computer models were developed to describe nutrient changes. Crude protein content decreased whereas the two fiber components increased with maturity. Rye and wheat tended to have lower CP values when day 125 was used as the arbitrary harvest date. We observed only slight differences in nutritional components between upland and bottomland plantings.

Keywords

Cattlemen's Day, 1995; Kansas Agricultural Experiment Station contribution; no. 95-357-S; Report of progress (Kansas State University. Agricultural Experiment Station and Cooperative Extension Service); 727; Beef; Nutrient content; Triticale; Wheat; Rye; Hay

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**CHANGES IN NUTRIENT CONTENT OF RYE,
TRITICALE, AND WHEAT WHOLE-PLANT
FORAGES WITH MATURITY**

*K. L. Hanson, R. S. Schalles,
L. H. Harbers, and C. Thompson*

Summary

We compared upland and bottomland cereals seeded during 1991 at the KSU Agricultural Research Center -Hays. The five crops (three varieties of triticale, a winter wheat, and a winter rye) were harvested as whole plants during the latter part of the growing season. Crude protein (CP), acid detergent fiber (ADF), and neutral detergent fiber (NDF) were estimated using near infrared spectroscopy. Computer models were developed to describe nutrient changes. Crude protein content decreased whereas the two fiber components increased with maturity. Rye and wheat tended to have lower CP values when day 125 was used as the arbitrary harvest date. We observed only slight differences in nutritional components between upland and bottomland plantings.

(Key Words: Nutrient Content, Triticale, Wheat, Rye, Hay)

Introduction

Cereal crops have been used successfully for grazing and for preservation as hay or silage. Several previous studies conducted at different sites in Kansas have shown that nutritional components (i.e., CP, ADF, and NDF) vary greatly among both cereal species and the stages of maturity.

Experimental Procedures

Samples from both upland and bottomland plots were taken for Larned winter wheat and Bonel winter rye, as well as Tritical 2700 (spring triticale) and Presto and Pika winter triticales. Dried samples were ground with an impact mill, and CP, ADF, and NDF were estimated using a tilting-filter near infrared spectrophotometer (NIRS).

Data were analyzed using a general linear model constructed with unequal subclass numbers. The model for each nutrient was: $m + \text{land} + b_1(\text{date}) + b_2(\text{date}^2)$, where m = mean, land was upland or bottomland, and b_1 and b_2 were regression coefficients. The model allowed an accurate comparison to be made between species and variety within species.

Results and Discussion

All varieties on each land type showed the expected decrease in CP and increases in ADF and NDF with maturity (Figure 1). The analyses showed only slight variation between upland and bottomland growth. At the arbitrary harvest date (day 125 is May 6), triticale cultivars were higher in CP than Larned wheat or Bonel rye, and Pike triticale was unique because of its low NDF.

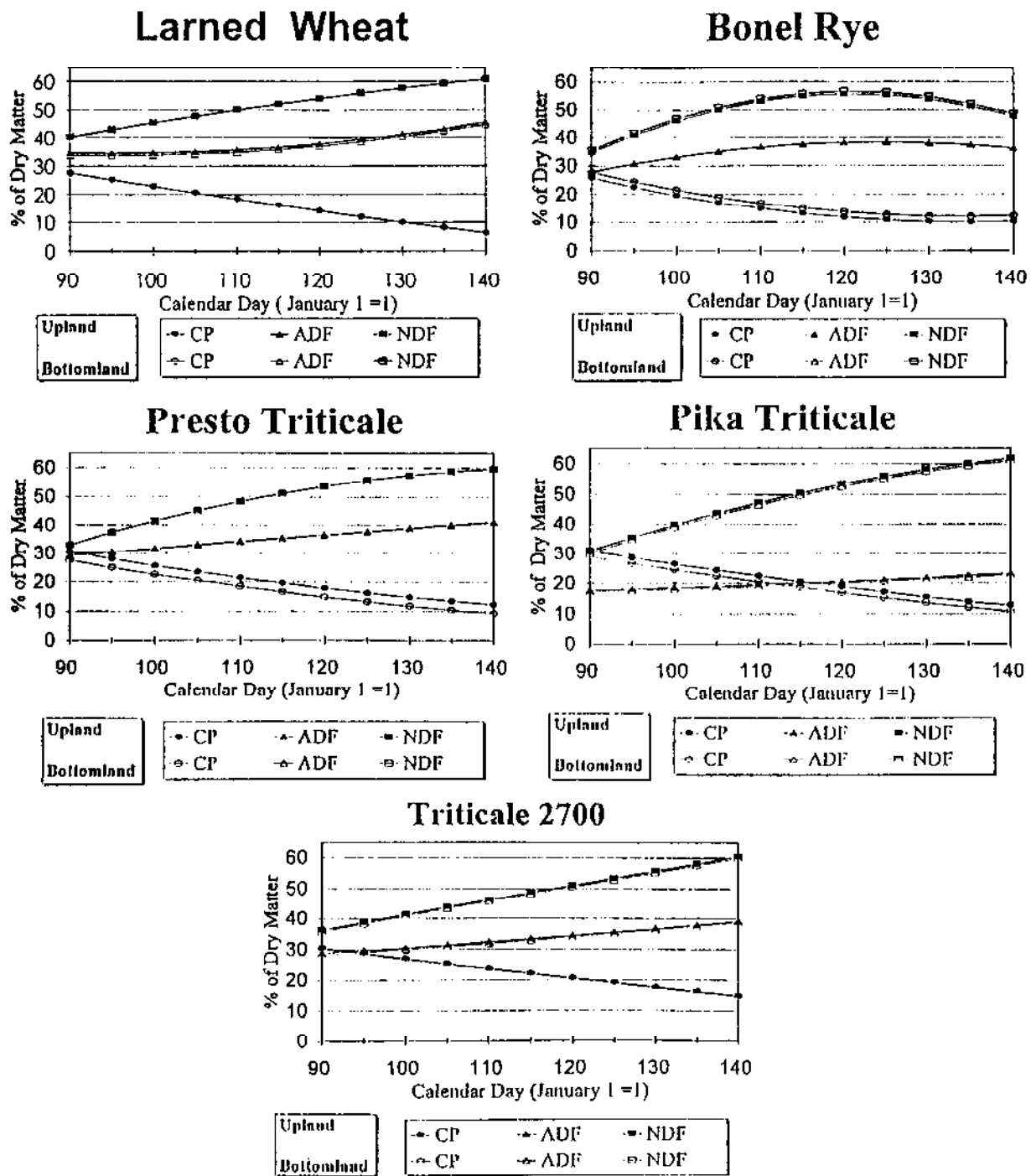


Figure 1. The Analyses Showed Only Slight Variation between Upland and Bottomland Growth. At the Arbitrary Harvest Date (Day 125 is May 6), Triticale Cultivars Were Higher in CP than Larned Wheat or Bonel Rye and Pike Triticale Was Unique Because of Its Low NDF