IMPACT OF FALL DORMANCY ON ALFALFA FORAGE QUALITY

Steve Norberg, WSU; Cesar Culma, UMN; Zhanyou Xu, ARS, Don Llewellyn, WSU, Long-Xi Yu, ARS; Guojie Wang, Penn State U; Steve Fransen, WSU; David Combs, UW; Glenn Shewmaker, UI; Sen Lin, WSU

Abstract

Alfalfa varieties with higher fall dormancy (FD) ratings are thought to negatively impact hay quality. To confirm this, we grew standard FD check varieties one through six grown at three locations including: Prosser, WA, (elevation 665 ft.), Union, OR (elevation 2,791 ft.) and Kimberly, ID (3,924 ft.) for all cuttings in 2019 and 2020. Traditionally, four hay cuttings are taken in Union and Kimberly, and five cuttings at Prosser. Data from the first four cuttings showed that the impact of FD was larger in the late season. In the first cutting no measured quality parameters were significantly affected by FD using regression analysis. Averaged over years, locations, the varieties with higher FD ratings had significantly less fat and neutral detergent fiber digestibility (NDFD) in the second, third and fourth cuttings. Averaged over all cuttings, NDFD linearly decreased from 53.4 to 49.7 as FD rating was increased from 1 to 6 (Figure 1.). Both quality adjustment for fiber fill and relative feed value was primarily improved by FD 1 with other fall dormancies with similar values At the fourth cutting the most influence of FD on alfalfa was observed and significantly influenced: acid detergent fiber, amylase neutral detergent fiber, lignin, water soluble carbohydrates, net energy for lactation, relative feed value, non-functional carbohydrates, total digestible nutrients, dry matter intake, relative feed quality, energy value, and fiber value. NDFD48 had the largest impact on total nutrient value per ton with an $R^2 = 0.93$ (Figure 2.). Our results show that NDFD was the major determining influence on total nutrient value and the trend of higher forage quality is found in lower FD varieties.

Acknowledgement: This work is/was supported in part by the USDA National Institute of Food and Agriculture, Award # 2017-70005-27095 and # 2019-70005-30362. I would also thank National Alfalfa and Forage Alliance for their work to make this and other grants available to forage researchers. This material is in the process of being put together to be submitted for a blind, peer reviewed scientific journal articles.

[1] S. Norberg (s.norberg@wsu.edu) Regional Forage Specialist, Washington State University, Pasco, WA, 99301; Sen Linn Postdoctoral Research Associate (lin1595@purdue.edu); Cesar Medina-Culma (medin297@umn.edu); L. Yu (longxi.yu@ars.usda.gov) Research Geneticist, USDA-ARS, Prosser, WA 99350; D. Combs (dkcombs@wisc.edu), Ruminant Nutritionist, University of Wisconsin, Madison, WI 53706; G. Shewmaker (gshew@uidaho.edu) Forage Specialist, University of Idaho, Kimberly, ID, 83341; G. Wang (Guojie.Wang@oregonstate.edu) Forage Agronomist, Oregon State University, La Grande, OR 97850; D. Llewellyn (don.llewellyn@wsu.edu), Regional Livestock Specialist, Washington State University, Kennewick, WA 99336; S. Fransen (fransen@wsu.edu), Forage Specialist, Washington State University, Prosser, WA; **In**: Proceedings, 2023 Western Alfalfa & Forage Symposium, Sparks, NV, December 12-14, 2023. Western Alfalfa & Forage Symposium, 1521 I Street, Sacramento, CA 95814. (See http://calhay.org/symposium/ for this and other alfalfa conference proceedings.)

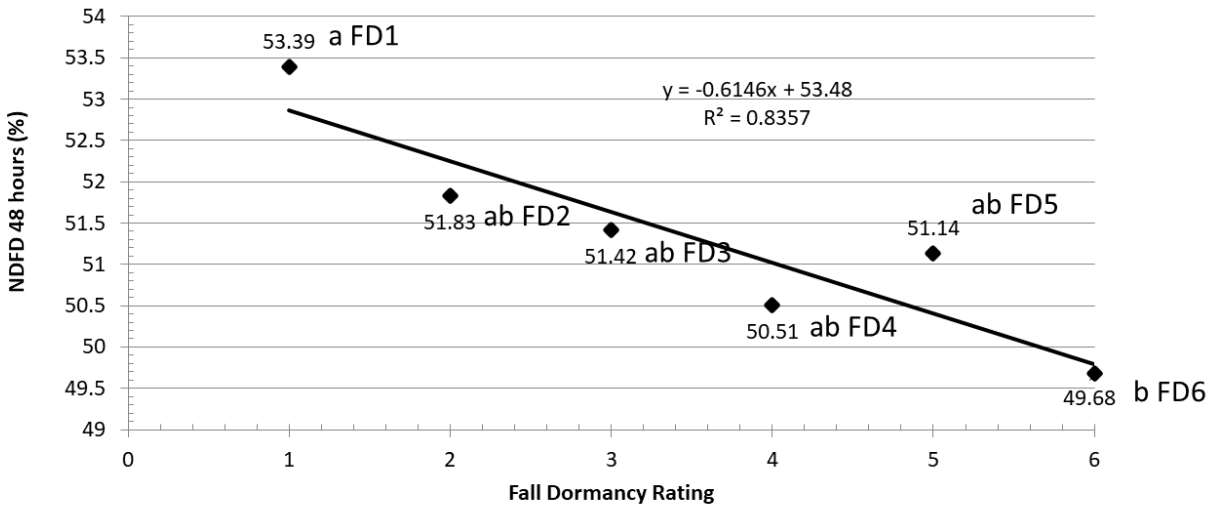

Figure 1. Impact of fall dormancy (using standard check varieties for fall dormancy) on NDFD 48 hrs. averaged over years, locations, and cuttings.

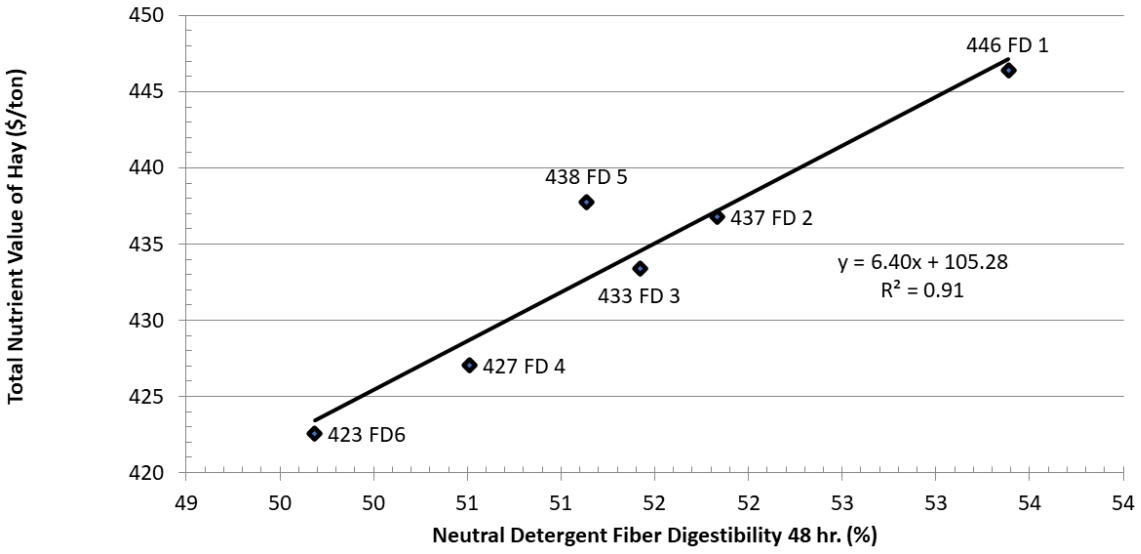

Figure 2. Impact of NDFD 48 hr. (using standard check varieties for fall dormancy) on Total Nutrient Value averaged over years, locations, and cuttings.