

Evaluating Alfalfa Cultivars for Adaptability and Forage Yield Production under Wyoming's Conditions

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Introduction

Alfalfa (*Medicago sativa* L.) is one of the world's most important perennial forage crops, and the premier cash crop in Wyoming and other neighboring states. It is popularly known as the “*Queen of Forages*” due to its ability to produce high forage yield with exceptional quality, and it is preferred by livestock compared to forage grasses. In modern management for an efficient alfalfa forage system, the use of improved cultivars is one of the key players for improving alfalfa for a sustainable production. Under Wyoming's conditions, it is therefore necessary to identify alfalfa cultivars of higher productivity to help improve the forage production base of the region.

Objective

To evaluate the adaptability and forage yield potential of different cultivars of alfalfa under Wyoming's conditions.

Materials and Methods

The study was established in 2011 at the University of Wyoming James C. Hageman Sustainable Agriculture Research and Extension Center (SAREC). Treatments were ten cultivars of alfalfa: “Magnum 7”, “Magnum Salt”, “WL 354 HQ”, “AmeriStand 407TQ”, “6422Q”, “AmeriStand 405T RR”, “AmeriStand 433T RR”, “WL 319 HQ”, “Vernal”, and “Falcata”. The experiment was set up in a randomized complete block design with three replications under irrigated conditions. All limiting soil nutrients were managed for adequacy. Inoculated alfalfa seeds were planted on September 20, 2011 at a seeding rate of 20 pounds pure live seed per acre. Three cuts at 30 to 45 days interval (depending on plant growth) were made in each year. Forage samples were oven dried at 140°F for at least 72 hours to determine forage yield on dry matter basis.

Results and Discussion

Alfalfa forage yield did not vary among the cultivars. However, numerically, forage yield was highest (12.87 tons per acre) for AmeriStand 433T RR, and lowest (11.19 tons per acre) for

AmeriStand 407TQ when forage yields from 2015 to 2019 were summed (Table 1). On average, annual alfalfa forage yield was higher in 2016 (3.79 tons per acre) than in 2017 (2.43 tons per acre), 2015 (2.41 tons per acre), 2018 (1.67 tons per acre), and 2019 (1.64 tons per acre) (Table 1). This slight variation could be associated to abiotic stress and their influence on the plants due to variations in soil moisture, and temperature which is likely to have interrupted alfalfa's growth at certain stage of development in a particular year. Overall, results indicate that the cultivars have similar ability to maintain higher or comparable yields. This, therefore, suggests that the cultivars are adaptable to Wyoming's conditions and they have good potential of improving alfalfa forage production in the region.

Table 1. Forage yield of alfalfa cultivars at SAREC from 2015 to 2019

Cultivar	2015	2016	2017	2018	2019	Total
	Tons per acre†					
Magnum 7	2.50a‡	4.16a	2.59a	1.81a	1.78a	12.85a
Magnum Salt	2.28a	3.40a	2.57a	1.62a	1.69a	11.56a
WL 354 HQ	2.34a	4.33a	2.21a	1.54a	1.57a	11.99a
AmeriStand 407TQ	2.39a	3.40a	2.31a	1.50a	1.58a	11.19a
6422Q	2.55a	3.68a	2.47a	1.67a	1.79a	12.16a
AmeriStand 405T RR	2.32a	3.28a	2.27a	1.63a	1.78a	11.28a
AmeriStand 433T RR	2.53a	4.50a	2.49a	1.79a	1.56a	12.87a
WL 319 HQ	2.19a	3.63a	2.57a	1.92a	1.54a	11.85a
Vernal	2.40a	4.34a	2.43a	1.67a	1.65a	12.49a
Falcata	2.57a	3.15a	2.44a	1.59a	1.47a	11.21a
Average	2.41	3.79	2.43	1.67	1.64	11.94

† Values are averaged over all three harvests for each year.

‡ Within each column, means followed by the same lowercase letters are not significantly different at 0.05 probability level.

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