Effects of Wheel Traffic on Alfalfa

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As a rule protocols for breeding alfalfa have not included selection for tolerance to any type of traffic. The most notable exception was in the development of the cultivar Alfagraze by Joe Bouton (1). In 1996 Alfagraze and two experimental cultivars also selected for tolerance to abusive grazing and animal traffic were included in a wheel traffic test in northern Japan. After two years of applying traffic after each harvest large positive differences were seen in yield and persistence of cultivars selected using the grazing protocol compared to those developed in Japan and the U.S. without frequent defoliation and animal traffic

In 2000 studies were established in Wisconsin and Iowa to examine the effects of wheel traffic on 10 cultivars selected for grazing tolerance and 10 selected for hay production only. Wheel traffic was applied 5 days after each harvest by a 100 hp tractor weighing 8100 – 8400 lbs. Following 3 harvests in 2000 and 4 or 5 in 2001 yields were reduced by an average of 12.8% overall and up to 70% on individual harvests. Yield of cultivars developed for grazing tolerance were reduced an average of 9% with an 18.3% reduction in those developed for hay production only. Cultivar differences between traffic and non-trafficked trials ranged from 0 to 31% at the two locations. Dry weather in Iowa reduced yields and probably also reduced effects of traffic.

Differences were seen in non-structural carbohydrates, crown size and placement, stem number, crown rot resistance, and persistence among the two types of cultivars.

References

1. J.H. Bouton, S.R. Smith Jr., D.T. Wood, C.S. Hoveland, and E.C. Brummer, 1991, Registration of ‘Alfagraze’ alfalfa. Crop Sci. 31:479.