North Dakota - Tractor Traffic Reduces Alfalfa Yield on Clay Soil in Fargo, North Dakota

by Dwain Meyer, North Dakota State University

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Wheel traffic from tractors and harvesting equipment reduces alfalfa productivity by crushing regrowth shoots and compacting soil; Wisconsin data demonstrated up to 20% yield loss. Data from Fargo, ND, indicates an average of about 10% reduced yield where alfalfa was driven over by a medium-sized tractor five days after cuttings.

The Fargo seedings were made in 2004, 2005, and 2006 and harvested 4 times/production year through 2007. In each seeding, replicated plots of 8-12 varieties were subjected to traffic (one pass with a medium-sized tractor) 5 days after each of the first 3 cuttings, or no traffic.

Table 1. *Influence of tractor traffic 5 days after cuttings on total season DM yields of 3 seedings of 8-12 alfalfa varieties (Fargo, ND)*

Seeding Year	Traffic Treatment	Harvest Year		
		2005	2006	2007
		--Total season DM Yield (T/ac)--		
2004	No traffic	8.5	5.9	7.7
	Traffic	7.5	5.5	7.1
2005	No traffic	NA	6.0	7.0
	Traffic	NA	5.6	6.5
2006	No traffic	NA	NA	6.6
	Traffic	NA	NA	6.2

In 2005, a wet year, the study shows traffic reduced the total season alfalfa yield by 1.0 ton/ac or 12%. In 2006, a dry year, traffic reduced the yield of both the 2004 and 2005 seedings by 0.4 ton/ac or 9%. In 2007, traffic reduced yields of all three seedings by about 9%. For the 2004 seeding, total forage yield reduction over 3 years of traffic was 2.0 ton/ac, or about 9%. All varieties responded similarly to traffic in all seedings and in all years.

Traffic treatments were harvested on the same dates even though trafficked alfalfa was slightly less mature. Had they been harvested at similar maturity, yield reductions due to traffic may have been less. In addition, producer fields are usually not trafficked over the entire field. However, more compactable soils than the shrink/swell Fargo clay could suffer greater yield reductions with traffic.