

## **Forage Pasture Species Selection and Nitrogen Fertilization Rates**

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Much of the pasture on Minnesota dairy farms was developed long ago. Continuous grazing and lack of upgrading the fences has led to low pasture production and poor confinement. Some pastures are little more than an exercise area after midsummer. Our previous research has shown that renovating a continuously grazed bluegrass-brome pasture to a legume-grass mixture and adopting an intensive rotation can easily increase production by 50 to 75% without fertilization or other additional inputs. The annualized cost of increased pasture production was less than \$8 per additional ton of dry matter. The legume fixes nitrogen that is utilized by the grass in the mixture. Grass pastures require additional nitrogen to achieve high production levels. Urea nitrogen is a common form of commercial nitrogen fertilizer.

The objective of the present study was to identify forage species and nitrogen (N) fertilization combinations for pastures to feed grazing dairy cows in the Midwest.

Five species-fertilizer combinations were studied with three replicates over three years. Combinations were Bromegrass with no N, Bromegrass with 50 lb/acre N in spring + 50 lb/acre N in summer, Bromegrass with 100 lb/acre N in spring, Bromegrass with 100 lb/acre N in summer and Bromegrass-Legume mixture but no nitrogen fertilization. Spring fertilization was before the first grazing of the year and summer fertilization was after the second grazing. The pasture was organized in forage species strips of 0.85 acre with fertilization plots of .07 acre.

Pastures were initially prepared by a glyphosate spray for weed control, fall moldboard plowing, spring disking and planting into a prepared seedbed. Bromegrass (Bounty) seeding rate was 62 seeds/ft<sup>2</sup>. Bromegrass-legume seeding rate (seeds/ft<sup>2</sup>) was Bromegrass (Bounty), 37; Alfalfa (Amerigraze421), 10; Birdsfoot trefoil (Noreen), 20; and Kura Clover (Endura), 20.

Pastures were grazed by lactating dairy cows 4 to 5 times per year for a 24 hr grazing period at a density of approximately 60 cows per acre. Utilization of the brome-legume combination was approximately 50%, whereas utilization of bromegrass ranged from 29 to 35%. Intake was determined by difference of quantity of forage by clipping before and after grazing. Annual total intake varied by year ( $P = 0.02$ ), and forage-fertilizer combination ( $P = 0.0001$ ). Grazing pressure was restricted the first year to increase the probability of maintaining stand.

No combination of N fertilization up to 100 lb/acre supported more than 40% as much forage intake as the bromegrass/legume combination pasture.

Forage species and fertilization effect on intake of grazing cows.

Species	Brome	Brome	Brome	Brome	Brome+ legume	
Fertilize May	0	50 N	100 N	0 N	0 N	
Fertilize July	0	50 N	0 N	100 N	0 N	Pr>F
May intake	0.26	0.61	0.81	0.65	1.63	0.0027
Sept. intake	0.44	0.43	0.43	0.59	1.82	0.0047
4-5 grazing	1.43	1.79	2.19	2.03	5.54	0.0001

Nitrogen application in lb/acre; dry matter intake in ton/acre.