

# Apply Nitrogen To Grass Stands To Increase Yields

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Applying nitrogen (N) to productive grass hay fields can substantially increase yields. With tight forage inventories and high hay and land prices, spreading nitrogen on grass hay fields is a simple and cost effective strategy to increase much needed forage supplies. It is usually more economical in the long term to establish legumes in a grass mixture than to apply nitrogen. However, there are circumstances where this is not feasible, such as when there is the specific need for grass hay (eg. for horses, calves, etc), or possibly following alfalfa winterkill when there is an immediate need for forage. In situations where grass hay is preferred over alfalfa, N application easily pays for itself.

## Economic Returns

Nitrogen deficiency in grasses shows up as a light-green to yellowing colour, and stunting of plants. If an alfalfa stand is uniformly thin or weakened but the grass content is good, the application of nitrogen can significantly increase yields as well as the forage protein level. Healthy stands of productive cool-season grass species (such as orchardgrass, bromegrass, timothy, tall fescue, etc) can have a significant yield response to large amounts of N to optimize yield. (Figure 1) Research shows that 1 lb of N can yield an additional 25 – 40 lbs of hay. In other words, if we value hay at a very modest 8¢/lb, applying 1 lb of N worth 70¢ will result in an extra 25 – 40 lbs of hay worth \$2.00 to \$3.20.

## How Much?

As a general rule, 60 lbs/ac N should be applied to stands with one-third to one-half legume. For stands with less than one-third legume, nitrogen recommendations have been developed using growth response (yield) curves to various N rates and nitrogen / hay price ratios. Assuming urea at \$675/tonne and hay at a 8¢/lb, current nitrogen / hay price ratios are about 10:1. (Table 1) These rates reflect optimum conditions of a uniform, vigorous grass stand with no other yield limitations, such as lack of rainfall, low P and K, bare patches, excessive weeds, or a delayed application. Nitrogen rates for less productive stands should be adjusted downward accordingly. For many stands this spring, an initial application of 90 lbs/ac N may be optimal.

Table 1- Nitrogen Recommendations For Improved Grass Stands Under Optimal Conditions (adapted from Table 3-6 OMAFRA Agronomy Guide, Publication 811)

## Application

Number	N required lbs/ac (kg/ha)
1	125 (140)
2	100 (110)
3	80 (90)

## When?

Nitrogen applications on hay fields should be split for optimum response. The first application should be made just as the grass is starting to green-up, early in the spring. This is the largest application to take advantage of the large first-cut yield potential. In many pasture situations, the initial application is skipped because there may already be more early spring pasture growth than can be utilized, unless this growth is being cut for stored forage.

Without rain, yield response to nitrogen will be limited. If rain is not limiting, a second application can be made right after the first-cut, and a third application after the second-cut. Each of these applications is about 20% less than the one preceding it. To avoid nitrate toxicity, never apply more than 170 kg/ha (150 lb/ac) of N at one time.

When manure is applied to a field to be used for hay or haylage, N application should be reduced according to the type and amount of manure. In pasture situations, reduce N rates in the Table by one-third, because of N recycling through manure and urine.

