GEORGESON BOTANICAL GARDEN

UNIVERSITY OF ALASKA FAIRBANKS

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Nitrogen Fertilizer from Plants

by
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Recently, interest in sustainable agriculture has been resurrected as commercial growers and home gardeners attempt to make use of renewable natural resources and minimize the use of manufactured fertilizers and pesticides. One very old practice that is gaining renewed attention is green manuring. This practice involves tilling plant materials into the soil. As they decay, they release nutrients that subsequent crops can use. This practice is particularly useful when certain legumes are used as the green manure. Plants such as alfalfa, sweetclover, favabeans and peas have the capability of forming associations with certain soil bacteria that can capture or "fix" atmospheric nitrogen and make it available for plant growth. Many of these crops are used as animal feed, in which case they are harvested, and most of the extra nitrogen benefits the animal and not the field. However, if the crop is tilled into the soil, the minerals found in the plant tissues including the nitrogen fixed by the bacteria, are made available to crops planted in subsequent seasons.

Alaska gardeners long have endured and debunked the myth that composting was impossible because of our cold temperatures and short growing season. Another myth has surrounded the soil bacteria and their ability to fix nitrogen. For years, practices such as green manuring were not recommended because no one believed that plants would fix sufficient quantities of nitrogen in our cold soils to make the practice worthwhile.

Agronomists at the Fairbanks Agricultural and Forestry Experiment Station, Drs. Steve and Elena Sparrow and Verlan Cochran conducted some experiments to find out just how true this myth was. They planted a variety of legumes in unfertilized fields in Delta Junction and Fairbanks. They harvested half the plots (emulating a mid summer harvest for animal feed), then tilled under all plots. During the next season, they planted barley on the soils where the green manure had been planted.

The barley grew better and had higher tissue nitrogen on soils that had been green manured. Plots that had been harvested before being tilled in, did not show the higher nitrogen. They showed that a crop of legumes that is completely tilled into the soils can provide part of the nitrogen needed by subsequent crops. The pounds per acre of nitrogen potentially returned to the soil if the crops are tilled under in fall is listed below for a variety of annual legumes:

alfalfa	52 lb/acre
red clover	109
sweetclover	98
fababeans	184
lentils	65
white lupin	146
peas	109

So what does all this mean for Alaska gardeners? If you wish to minimize the amount of manufactured fertilizers you use on your garden, one option is a green manure with one of the legumes listed above. The entire garden space would have to be planted with one or more ofvthese legumes, then tilled under in fall. For most gardeners it would require dividing the garden into sections so one part was sown into a green manure crop and the remainder into garden crops. Another possibility would be to interplant garden crops with legumes, then till everything under in the fall. But that's another experiment . . . !

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