K-Mag AGRI FACTS
Brought To You By IMC — Producers of Quality Crop Nutrients

Profitable, Intensive Alfalfa Production Requires Proper Soil Management

- **Deep, well-drained soils produce the best alfalfa stands**
- **When necessary, eliminate compaction and hardpans with deep tillage**

Many people mistakenly believe that a fertile soil is always a productive soil. However, soil properties that restrict root development will decrease nutrient uptake and reduce yields, regardless of the fertility status of the soil. Therefore, proper site selection and good soil management are extremely important for profitable alfalfa production.

Importance Of Site Selection

Alfalfa requires a deep, fertile, well-drained soil which has both good surface and internal drainage. One of the most frequent mistakes producers make in growing alfalfa is planting it on poorly-drained or droughty soils. The importance of this point is illustrated by the fact that alfalfa stands almost always first decline in sandy, or lower, wetter areas of fields. Productive upland soils and well-drained terrace and bottomland soils are most acceptable for alfalfa.

Importance Of Soil Compaction

Since hardpans caused by wheel traffic and by tillage tools are often found just below the plowing depth, they can drastically reduce the rooting depth of alfalfa, thus reducing growth and yield.

Past tillage practices may or may not produce hardpans. Hardpans are most likely to develop on sandier textured soils. Therefore, before you start thinking about ways to correct a pan, be sure you have one to correct. Many people waste energy and money needlessly correcting "pans" that do not exist.

Determining the presence and location of a hardpan in a field is the first step in solving the problem. Pans which cause a soil penetrometer to read above 300 pounds per square inch (psi) will most likely reduce crop yields. Roots are rarely found in soils with penetrometer readings above 500 psi.

If you do not have a penetrometer, you can make a testing rod by welding a handle to a 2½-foot piece of half-inch steel rod and sharpening the end. Tests with a penetrometer or rod should be made when soil moisture is right for plowing. Low soil moisture will make the pan harder to penetrate with the rod, and make the problem seem more severe.

To check your fields, slowly push the rod into the soil at a constant rate. The force required to move the rod into the soil will be fairly constant until a compacted zone is reached. At this point, more force will be required to penetrate the compacted layer. ***When the probe passes through the layer, the force required will drop sharply.*** A soil without a hardpan, but a heavier subsoil, will feel similarly except the force required will not drop back sharply.

To get an idea of the depth, thickness and strength of the pan, and the percentage of the field affected, the probe should be used at several locations across each field. Several penetrations should be made at each location.

Another way to identify a hardpan that is limiting yields is to dig a hole at least two feet deep and look for crop roots in the subsoil. If last year's crop roots penetrated the soil, next year's roots probably will also penetrate unless your tillage or machinery traffic system changes significantly. However, root growth could have been slowed and yields reduced even though roots eventually were able to penetrate the pan.

Correcting Your Compaction Problem
After you have accurately diagnosed your problem, till only deeply enough to penetrate the pan.

If the pan is shallow, you may be able to break it up by deep moldboard plowing. However, be careful not to turn up a large quantity of subsoil at one time. Subsoil may be acid or can cause other problems if a thick layer is turned up.

If the pan is not deeper than 12 inches, chisel plowing may be substituted unless special problems make moldboard plowing necessary. Spring-shanked chisel plows often ride on top of the pans. To determine if you are penetrating through the pan with a chisel, dig some holes in the slots.

If a compacted layer is deeper than 12 inches, subsoiling is the best way to shatter it. Subsoiling requires a large amount of power but it is profitable when needed.

Remember that deep tillage will not increase yields unless you have a compaction problem.
Carefully diagnose your soil conditions to determine your tillage needs. Chiseling or subsoiling without first determining the depth, strength, and thickness of a compacted layer can be wasteful.

There are a number of soils in different areas of North America that have naturally-occurring pans rather than tillage pans. If a soil survey is available in your county, these problem soils can be identified and avoided.

Importance Of Lime
The importance of liming acid soils for alfalfa production has often been emphasized. It is equally important that lime be thoroughly incorporated as deeply as possible. However, this is no easy task when large quantities of lime are needed for alfalfa production. Research shows there is a need for good contact of liming materials with the acid soil. Again, the idea is to uniformly mix the lime with the soil throughout the tilled section.

Importance Of Using The Soil Survey
Fortunately, many agricultural areas in North America have soil surveys available which indicate the relative soil productivity of several crops based on physical and chemical characteristics. Quite often soil-related problems result from using land beyond its capabilities. As was mentioned earlier, alfalfa is often planted on droughty or wet soils, resulting in poor stands and low yields. The proper use of the soil survey can help identify soils with certain limitations that may not be best suited for alfalfa production.

Together, good soil fertility and sound soil management practices encourage higher, more profitable yields and long stand-life of alfalfa.