



# The Dairy Business

By  
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**Soil Physiology**

Last time I tried to review some high school chemistry and apply it to the soil we work with every day. Now, let's try the same thing with another science, namely physics. The physical quality of the soil can have more impact on soil fertility and productivity than you can imagine.

For example, two identical soils with nearly identical chemical properties may, and often do, vary a great deal in crop response. Why is this, when we place so much emphasis on adding chemical fertilizers, and testing soils for nutrient levels? The answer is that plants must be able to unlock the physiology holds the key to the availability of nutrients to the plant.

**Compaction**

No need to debate the issue of soil compaction, and the ruinous effect it has on fertility. Terms like "Plow sole", or "hard pan", or "clay pan" are familiar to

everyone. You might even have a few other favorite names for a field that has been abused and ended up more like a parking lot, in mid-summer. Notice the word 'abused', because regardless of the circumstances leading to severe compaction, it all boils down to the fact that it was subjected to some unusual stress or abuse.

Of course, you can't help it sometimes. What can you do when the manure pit runneth over, and there is a foot of snow or three inches of rain? Why, you haul it on the nearest field, and let the tracks fall where they may. You already know how long the ruts last, and how hard the clods get when the field is tilled. Some of the effects may last for years, without being too obvious. Compaction actually results in the destruction or exclusion of two of the most important components of soil-air and water. So what? They are both cheap and plentiful, so why worry?

**Physics of Good Soil**

We usually only think of the mineral portion as being the true soil. But in fact, the productive topsoil of a good silt loam actually is only about 45 percent mineral. This mineral portion is of course the "backbone" of the soil, and forms the basis for the rest. But what is the other 55 percent of your soil made of? Simple - water 25 percent, air 25 percent, and organic matter about 3 to 5 percent. If you can maintain roughly those proportions through the growing season, you'll have a bumper crop of nearly anything you grow.

A heavy rain might saturate the soil with over 50 percent water, thus reducing the air content to nearly zero. If this condition persists very long, plants simply can't grow. You've seen the effect of waterlogging in those wet spots every spring, but how often do you recognize the marginal conditions which result from some partial exclusion of the necessary air space? We often overlook this phenomenon, and attribute the lack of growth to an insufficiency of plant food elements.

Of course, soils vary a great deal in the physiology of the mineral portion. The mineral portion of soil is classified according to the size of the particles, such as gravel and stone, sand of various sizes, silt particles, and clay. Clay is

especially interesting because the individual particles can only be seen with a very high powered microscope. The finest clay is so small that an electron microscope is required. This very fine clay holds the key to soil fertility, because of it's ability to control the nutrients required by plants. Also, because of it's extreme fineness, soils high in this type of clay must be more carefully managed. Obviously, it is the fine particles that compress more easily and result in the alteration of the soil's physical properties.

**Tread Lightly**

Suffice it to say that we must look at proven practices to preserve good physical condition in our soil. Anything that will increase organic matter, (or prevent its destruction), will help maintain

it. Cover crops, sod and hay crops, and plenty of manure are the obvious choices. Also, the less we disturb soil, the easier it is to maintain good physical condition, so no-till farming is gaining prominence for good reason. Worn out soil can be due to lack of fertility, but is just as often due to the physical breakdown of soil structure.

Success in the dairy business, as well as all other farm enterprises, depends on good soil husbandry. A basic knowledge and appreciation of its properties is essential for good management. Even Grandma recognized the importance of treading lightly when she laid her garden out in small plots separated by paths and even board walkways, to keep the soil as loose as possible.

**Bucks begins planter leasing**

DOYLESTOWN — In an effort to promote the use of no-till as a means of reducing soil loss and non-point source pollution, the Bucks County Conservation District has arranged to coordinate a No-Till Planter Lease Program with the Paul W. Hestand Company, of Doylestown.

Arrangements for leasing the planter can be made, on a first come-first serve basis, by contacting the Conservation District at 348-1166.

It is anticipated that requests will be for use on tracts of approximately 20 acres, so as to provide for the availability to as many farm operators as possible.

The planter will be a White 5100 Seed Boss - 4 Row - with 30" Spacing and will be available for lease at the rate of \$10.00 per acre.

Of specific importance, to the District program, are the three "priority" areas of Bucks County as delineated in the Mason-Dixon Erosion Control Targeted Area.

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