

Testing the Limits of Soil Aeration Technology

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Troubleshooting in crop production is akin to being an investigator or detective. Contemplating the experience which I am about to report has been a pleasant reminder of an old television show I used to watch as an adolescent. 'The show was "Dragnet The star, Jack Webb. Each show was part of what was to become a classic in television history. Perhaps, someday the same will be, said of the experiences reported of what farmers did in the early days when we were learning how use the soil aerator. A case in point. . .

It was Friday, February 17th. It had been a beautiful and unexpected glimpse of summer in mid-February. It lasted well over a week, It seemed as though winter might really forget to return this time. One client was even talking about seeding alfalfa if conditions - improved much more.

Larry and I had been at Nobles trying to hitch a six-row planter behind the 15ft Aerway. By 2 o'clock it was obvious the planter had to be hitched close to the tractor 3-point hitch. The planter hitch needed to be extended about 20".

Field conditions were much drier than normal for this time of year. Aerating alfalfa behind the barn required about 500lb. of rocks in order to get full penetration of the aerator tines.

My conscience began to prick me about an agreement to bring the aerator to Don Hoffman's that afternoon. So, at about 3:00 PM I drove to Dons' to see what his plans were.

An hour later I found myself sitting on the fender of his 3020 (strictly prohibited by OSHA rules and regs. of course). We turned from his mother's driveway into a field of alfalfa which was seeded with barley (taken as forage) in 1982. Starting on the north edge of the field he began to aerate the alfalfa (right next, to the road) where everyone could easily see that we had both started using air for brains.

When I turned from my precarious position the fender to look down the field, I could have died. I said "You aren't going to go through there, are you?"

He said yes and uttered a few other expletives which only served to make it more impossible for consultant and machine to expect to survive this test of credibility.

We started through the pond at about 7 miles an hour. When the front tire rims hit the water I turned to look at the aerator. The rollers had disappeared in the water. The pond which covered close to a third of an acre was about 8 inches deep in the middle. I wished I had brought a disguise when the first car went by. I hadn't played in the mud since I was a kid. Ironically the field was only muddy and soft under the water about one inch in depth.

After three passes, the length of the field we stopped at the east edge of the pond to survey the damage. I was still feeling disgusted and dismayed that I had let myself get into this mess in the first place, when Don said "Do you see that?" What? I said. Look at the water,

he, continued. When I still didn't see what he was seeing, he finally said "Look at the bubbles!"

Sure enough there were bubbles the size of quarters popping through the surface of the water. Then we saw the water was running from the south to the north side of the pond (where we had just aerated and watched the bubbles). Now my adrenalin was beginning to drip and my sense of embarrassment beginning to fade.

If this continued, (which I really didn't think it would for very long) some of those expletives Don had uttered were soon to haunt him . I would see to it, personally. You see the Sandy Creek is on the other edge of the field and there are swamps across the road feeding water south through the field and on toward the creek.

Well, the next time up the field I grabbed the camera. The rest of the story is history and is largely recorded on film and fortunately witnessed, by Nate Leonard one of our county agents. Thank goodness we had a witness. We might not have even believed it ourselves.

The consensus was that the field was absorbing about 10 gallons of water per minute. We measured the water at one location at 5:00 and again at 5:30. The water had dropped one inch. Don said the water had been standing in that spot for over a week. Nate took the follow-up picture (the slightly under exposed one) the next morning. (thanks, Nate.) He confided to us that the water was gone from the surface by 8:00 pm that same day.

We may have injured some plants in the wheel tracks. Don and I both figured that losing a few in the tracks was a cheap price to pay if the rest of the plants survived.

One very valuable lesson which I learned, again, "when you think you have the answers it's probably because you haven't asked yourself the tougher questions, yet." Keeping an inquisitive, open and questioning mind continues to lead to more and more applications of the aeration technology represented by the Aerway™.

Why did the water drain? During the last two years over 90" of rain equivalent had moved through the soil profile. As it moved it relocated silt sized soil particles with it. These particles became lodged in the arrangement of soil particles somewhere in the top six inches in the soil profile. The layer of silt which was formed in the soil disrupted the normal percolation of water.

When the water began to move more slowly through the soil and the snow melt and rain came faster than the soil could absorb it, the water began to accumulate on the surface. The water came up so fast it blocked air below the soil surface. The problem was like trying to run a full stream of tap water into a small necked bottle.

By tilling the silted layer the air was purged and the water began to enter the soil. Fresh air entered the profile behind the inflowing water and an oxygen-rich atmosphere was returned to the root zone.

Deep tillage which disrupted compaction below the plow layer had been done before the seeding was done, so it wasn't stopping the water. Now the water which might otherwise have suffocated the alfalfa plants, evaporated to be no longer available for plant growth in

1984, or runoff down the Sandy Creek would be available to plants from, the subsoil water reservoir.

When I checked in by phone today from the Northeast Farm Exposition in Rutland, to my office near Watertown, my partner Rick said that he had talked to Don earlier in the day. As fate would have it, Don had been out yesterday to check field conditions in our February play yard of alfalfa. He said that the aerated sections of the field had an inch of plant stem growth compared to none in the non-aerated check areas of the same field.