

Missing winter: Notes from the farm

by [Terra Brockman](#) in the [April 18, 2012](#) issue



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As I was driving the few miles to our neighbor's farm to buy some of their organic pork and eggs, I passed through a mini-snowstorm. The whole sky was heavy and gray, except for one patch of blue in the north. And it was there, under a summery blue sky, that snowflakes were coming down almost horizontally. The sun shone so brightly through that driving snow that I thought I might see a snowbow. I wished for at least enough snow to blanket the bare soil.

But the snowbow never materialized, and none of the snow stuck. In fact, all the country roads have been completely passable this winter, a situation appreciated by most drivers and praised by cities and towns that haven't had to spend on snow removal.

But while others are relieved by this warm winter, my brother Henry is worried. A warm winter means that the eggs and larvae of insects will not be winter-killed, but will emerge ravenous this spring, right when our farm's tender transplants go into the ground.

Even more important, no snow means that the subsoil moisture has not been recharged. Unless we get a lot of rain real soon, plants will suffer this coming summer. In the Midwest, winter is indispensable to farming—at least for farms like ours that don't rely on irrigation. If you have good subsoil moisture and good soil

structure providing channels from the surface all the way down to the subsoil, then all the water that your vegetables need won't have to come from the rain. Instead, the plants' deep roots will pull up moisture stored down in the subsoil, just above the clay.

Winter is the time when the subsoil moisture stores are restocked. It is also the time for repairing and rebuilding soil structure. After last year's hot, dry summer and fall, the soil desperately needs its moisture restocked and its structure rebuilt.

Throughout the fall and into the winter Henry was digging burdock root, 20 or so pounds at a time. You can't pull burdock out of the ground like you can pull beets or carrots. Instead, you have to dig four feet straight down to ease the enormous roots from the soil. Luckily, Henry enjoys digging, and one of the job's joys is the opportunity to study the soil profile down 48 inches.

In the same way that tree rings tell about growing conditions over the previous years, soil profiles reveal many things about precipitation, drainage, organic matter levels and general soil health. The story Henry read in the burdock pit was of a long season of inadequate rainfall and of drained subsoil moisture reserves—with dry, dusty soil every inch of the way down. By the time rains finally came in December, the top few inches of soil had lost so much structure that they had trouble soaking up the precipitation. Without channels and cracks for water to run into and sink down, it stays on the dusty surface like milk that puddles atop cocoa powder.

We like it when the ground freezes and stays frozen, because it's easier to get around to collect firewood and take care of livestock when the ground is as hard as a rock. This year, though, we had hoped for cycles of freezing and thawing because this is the best way to pump water down into the subsoil. When soil freezes, it is actually the water in the soil that freezes, or crystallizes. And water crystals take up more space than liquid water, as you can tell if you fill your ice cube tray to the top and then notice that the flat surface of the water becomes convex and pillow-shaped on the frozen cubes.

What happens in the ground is that as the temperature of the soil drops, the H₂O molecules that are normally dancing and swirling around each other gracefully move more and more slowly and then suddenly, at 32 degrees, lock in place with outstretched arms. When all the dancers were moving, they fit easily on the ballroom floor, but when they stand frozen at arm's length, some are pushed up

hard against the walls. The instant the water freezes, it takes up a lot more space, and the ice pushes relentlessly against the surrounding soil. Finally the soil gives way, cracking along the fault lines of soil aggregates.

After a few days or a week, the cold front moves on. The soil warms, causing the water that was temporarily held captive in the frozen upper reaches of the soil to drain into the subsoil, leaving lots of empty space behind. Soon more water from rain or melted snow pours in to fill those spaces. Then another cold snap comes. The water freezes again, opening up more cracks and widening the ones already there. During a good winter, with plenty of cold weather and many freeze/thaw cycles, good soil structure is built, and the subsoil becomes saturated with water.

Henry and his farmhands know that when that first spring thaw comes and the soil is awash in water you can slip halfway to your knees in mud. Henry says it's possible for a foolish driver to bury a car in mud up to the axles. It's even possible for a farmer to bury a tractor up to the axles, but rarely is such a combination of foolishness and bad luck seen in the same person.

Spring mud is often roundly cursed by owners of stuck cars and muddy shoes, but deep mud is a sure sign of a soil well stocked with water for the growing season. Without the freezing of the soil that brings the spring mud, the dusty, unstructured soil of last summer and fall would enter springtime hard, cold, packed and dead as concrete.

Luckily, we had a few cold snaps this past winter. Thanks to that freezing weather and the expanding action of ice, we're fairly sure that our spring soil will be soft and warm, full of air and water and life.

Still, on sunny March days, I found myself pining for deep winter. I missed the full measure of the hunkering-down season that is necessary for revitalization and rejuvenation of the soil and of the soul.