

TUBERIFIC TOPICS

by John P. Taberna, "The Tuber Talker"

Zone of Depletion Test

There are five growth stages in a potato. At growth stage 3 the plant begins transporting carbohydrates from the leaf to the tuber. In theory, once the stolen hooks you could yield 1,000 pounds of potatoes per acre per day until vine kill.

Dr. Don Hornick of Oregon State University has developed crop curves that show how much nutrition it took to maintain ten sacks, or 1,000 pounds, of potatoes per acre per day.

I spent twenty-five years developing a supply rate test that would meet the nutrient demand in the root zone for ten sacks per acre per day. It wasn't until Dr. Hornick's work came out that I knew I was on the right track. I can't tell you the trick, but I guarantee I am within eighty percent of being right.

Many of you know I have been a Soil Scientist/Plant Physiologist for over forty years. There are three ways nutrients are obtained by the roots:

- ◆ Mass flow
- ◆ Diffusion
- ◆ Contact exchange

A plant converts carbon dioxide and water into carbohydrates. One-half of the carbon fixed by plants is given off as organic acids by the roots into the soil solution. This stimulates fungi and bacteria to release nutrients to the roots. This area is called the rhizosphere. When a nutrient is taken in by the root the area where the nutrient has been removed is called the ZONE

OF DEPLETION. Potato roots occupy less than one percent of the soil mass they grow in. Therefore, diffusion, mass flow and weak exudates from the roots are the major ways the nutrients become available to the root.

How does the zone of depletion work? Actually, it is very simple. Take a soil probe eight to ten inches deep through the root zone. This test is a Polaroid picture of what is happening NOW – not in the past 24 hours. Each element has a different pathway to availability to the root. For example, phosphate fertilizer may be one hundred percent water soluble, but in some soil types it won't move more than one-half inch from the prill. This is why it took me twenty-five years to develop this system. It works best on sandy soils with low organic matter. At present I can only guarantee fabulous results on potatoes, onions, hops, mint, grapes, carrots, broccoli and cauliflower. Dr. Hornick is currently working on the daily requirements of watermelon. Once we get that database it will carry over into cantaloupe, cucumbers and pumpkins.

If you are happy with the way things are, don't let me get in your way. This is only for the pathfinders. Yields will not continually go up. Poor seed, over fumigation, over irrigation, viruses, nematodes, water rot and pink rot should keep you busy. Western Laboratories is there if you care!

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