

Undergrads

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According to his advisor, soil chemist Dr. Donald L. Sparks, Jardine's research provides the first available U.S. data on the thermodynamics of potassium exchange in a soil system. In fact, very little prior work on the subject has been done anywhere in the world. What they're finding out is providing some much needed answers.

Mark Loux, another advisor of Sparks, is trying to answer a different question—what ingredient in the soil is most likely to keep boron from leaching. This ingredient is difficult to use as a fertilizer because it is applied in such small amounts—2 to 3 pounds per acre—and leaches so quickly from the soil. If a heavy rain occurs soon after application, boron may leach out before it's of any benefit to plants, especially in sandy soils like those of lower Delaware.

Basically, Loux is looking at the effect that organic matter, iron oxides, and magnesium in an Evesboro sandy loam have on boron (B) adsorption. This calls for some very exacting laboratory procedures.

In setting up the experiment, he first had to remove all of the native boron from the soil so that this B wouldn't get confused with the B added when he started testing adsorption rates on test tube samples.

Loux ran into trouble early in the experiment when he discovered that there was more boron in solution at the end of the procedure than when he started, even using boron-free soil. He finally tracked the problem down to minute amounts of B in the distilled water he was using to make the solution. Now he removes the boron from the water first.

It also took him time to determine the best technique for measuring B. The first methods he tried proved too inconsistent. So he switched to one which is more sensitive to small amounts of B in solution. The only problem is that the reagent—azomethine hydrogen—required for this colorimetric technique costs \$125 to 25 grams (less than 1/8 pound). Fortunately, only minute amounts are needed and the results are nicely reproducible.

One of the questions Loux is trying to answer is what effect magnesium has on boron availability in the soil. A lot of farmers have been using

dolomitic limestone (magnesium carbonate) to do their liming and as a result there are high magnesium levels in many Delaware soils.

Does this magnesium sometimes tie applied boron in a form not readily available to plants? If so, this could explain why growers don't always get a yield response when they apply boron. How they apply it could also make a difference on sandy soils.

Loux and his advisor are also interested in finding out what role organic matter plays in reducing leaching of B from these soils. In the absence of much clay, organic matter could provide important sites for boron adsorption. When they have enough data, they plan to publish their findings in a scientific journal.

Of all the elements essential for plant growth, boron is the most difficult to work with, says Sparks, who's pleased with the way his advisee has stuck with this project in spite of numerous delays and frustrations that would have caused many other students to throw in the sponge. "That's the mark of a good researcher—discipline, patience and the ability to accept failure without giving up. Both Mark and Phil have these qualities," he says. They're essential, especially in basic research where you always go in with a lot of questions and seldom come out with immediate answers."

Sparks considers the obstacles they've encountered to be an important part of the training for a scientific researcher. If degree with distinction students learn nothing else than that you're going to have problems with research every day, and learn to cope with them, they'll have gained a lot, he says. "It's a nice maturing experience that prepares them for later graduate research. The research process itself is often more important than coming up with any usable results, though it's always nice if you get these, too."

Both Phil's and Mark's projects are so important that once they've run out of available time themselves, a graduate student will be called in to pick up the work.

Even if they succeed in answering the questions they've asked, there will always be more to ask, says Sparks. This kind of basic research is very much like solving a murder case—once you've eliminated one suspect, there are always other clues to follow up on.

Potato growers to vote on spud checkoff

HARRISBURG — Pennsylvania potato growers will vote next month to determine whether to continue the five-year-old Potato Research Program, according to State Agriculture Secretary Penrose Hallowell.

Hallowell said all Pennsylvania growers with 25 or more acres of potatoes will be eligible to vote during the referendum period from March 6 to March 19. The Potato Research Program was initiated by growers in 1976 in an effort to develop improved potato varieties.

Pennsylvania potato growers now assess themselves as one cent per hundredweight on all potatoes sold. The assessment is used to support research for development

lapped to Pennsylvania growing conditions, and is administered by a board composed of affected growers.

Hallowell said, The Potato Research Program has made tremendous progress in the past five years. The research farmland now approaches 100 acres, with irrigation facilities particularly valuable for the thousands of hand transplanted seedlings.

With the strides that have been made, it is still important to find better potato varieties to fit Pennsylvania's varying soil and weather conditions, and to combat production problems. Pennsylvania ranks in the top ten states in the nation in potato production, and the Potato Research Program is helping growers maintain that

position," he said.

Ballots for the referendum will be mailed March 5. They will go to all Pennsylvania producers with 25 or more acres of potatoes. The deadline for receipt of ballots at the Agriculture Department is 4 p.m. March 19.

Ballots will be counted by a teller committee of potato growers. If passed by a two-thirds vote, the program will be continued for another five years.

Any potato grower who wishes more information should contact the Bureau of Markets, Pennsylvania Department of Agriculture, 2301 North Cameron Street, Harrisburg, PA 17110, telephone, 717/787-4210.

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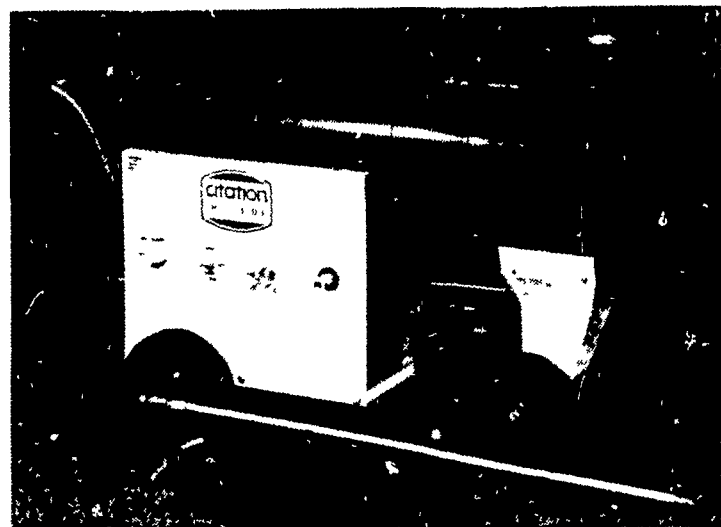
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