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Application of fertilizers without regard to sustainable nutrient management is coming under increased scrutiny with concerns raised over nutrient runoff and water-quality deterioration. Evidence in New Jersey suggests that a significant number of soils have built up excessive levels of P. On the basis of samples collected in 2004 from commercial grower fields, and received by the Rutgers Soil Testing Laboratory, 39% of soil samples had soil test P ratings in the very high (above optimum) range. Also, personal communication with Rutgers Cooperative Extension (RCE) county agriculture agents suggests that New Jersey soils that are used for vegetable crop production have substantially more than 39% of soil test P ratings in the very high range. Although at present there is much emphasis on controlling P application in nutrient management planning, other nutrients may receive greater attention in the future.

Understanding crop nutrient removal also is essential in developing efficient fertilizer use programs. Crop removal data gives a very detailed account of the quantity of nutrients needed to produce a high yielding crop; as a result better attention needs to be paid to efficient and judicious fertilizer use. If excessive use of fertilizers continues, legislation to control its use will soon follow.

Currently there are mandated comprehensive nutrient management plans in the mid-Atlantic region of the United States. These plans make it necessary to re-evaluate crop nutrient removal values for vegetable crops such as sweet corn. To be relevant, the nutrient removal values must be based on current cultural practices and production technology.

Over the course of the growing season, a crop will accumulate, in its biomass, certain amounts of each of the essential plant nutrients. Amounts of nutrient uptake and removal vary with crop species and variety, yield level, and production practice. Higher-yielding crops and crops that produce large amounts of harvestable material remove greater amounts of nutrients from the soil.

Knowing the typical amounts of nutrient removal by a crop provides useful information for sustainable soil fertility management.

In sustainable agriculture, nutrient management planning should ideally provide, over the long-term, a balance between nutrient inputs and outputs. In the establishment of a sustainable system, soil nutrient levels that are deficient are built up to levels that will support economic crop yields. To sustain soil fertility levels, nutrients that are removed from the system by crop harvest, or other losses, must be replaced annually or at least within the longer crop rotation cycle. Values for crop nutrient removal are useful for providing estimates of the amount of nutrients that must be applied to maintain soil fertility when levels have already been built up to the optimum range. These values are also useful for selecting crops of high nutrient removal for production on soils that have excessive nutrient supplies, such as P, and where there is a desire to draw down the fertility level. A similar situation with regard to phosphorous build-up in soils is evident in Texas.

Thus, accurate values for crop nutrient removal are an important component of nutrient management planning and crop production. To better address this issue a study was conducted to measure nutrient (N, P, K, S, Ca, Mg, Zn, Mn, Cu, B, Fe) removal by fresh sweet corn ears for a range of varieties grown in two site years on New Jersey soils.

The results from this study indicate that mineral nutrients in fresh ears varied significantly among sweet corn varieties for concentrations of Mg, S, Mn, and Cu in both years and for concentrations of N, P, Fe, and Zn in one of the two site years. The mean P concentration in the ear was nearly the same in the two site years, but the concentrations of some other nutrients varied substantially. The concentration of Mn among site years, for example, varied more than 2-fold. The concentration of K varied slightly among site years, and, as may be predicted, K varied inversely with concentrations of Ca and Mg. With the current emphasis in nutrient management on P, it is fortunate, for the purpose of writing nutrient management plans, that this nutrient appears to have relatively stable P concentrations in the ear. This stability in P concentration enables Certified Crop Advisors writing comprehensive nutrient management plans to more accurately predict P removal for different sweet corn varieties. Previous research found field corn grain samples to be much more variable in P concentration than the current study with sweet corn ears. Fresh sweet corn ears, which are harvested at an earlier growth stage than field corn grain, may not exhibit the variability in P concentration associated with late-season P accumulation during field corn seed fill.

Differences in ear size were associated with different varieties. As expected, the early maturing variety, ‘Early Choice’, had the smallest ear size. Varieties ‘Temptation’ and ‘Double Choice’ represented the midseason varieties, and ‘Sensor’, ‘Brocade’, ‘Silver King’, ‘Argent’, ‘Terrific’, and ‘Brilliance’ represented the late-season varieties. The different maturity groups were tabulated separately for the purpose of providing data to support the writing of nutrient management plans that include early, mid-, and late-season varieties. Although significant differences in ear size occurred among late-season varieties, nutrient removal values were averaged across

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J.R. Heckman

HortTechnology / January-March 2007

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Sweet Corn Nutrient Uptake & Removal Continued

vertices to represent late-season varieties as a category. The rationale for this grouping, despite differences in ear size, is that breeding programs will continue to develop new varieties of varying ear size; grouping them represents the best practical solution available for nutrient management.

Using the nutrient removal data obtained in this study and based on a typical sweet corn yield of 150 cwt/acre (or about 18,396 ears/acre, or about 368 crates), a full-season hybrid would be projected to remove 51 lb/acre N, 9.1 lb/acre P, and 34 lb/acre K. These mean values in the present study for late-season sweet corn obtained for N, P, and K removal agree fairly well with the “nutrient absorption” values of 55 lb/acre N, 8 lb/acre P, and 30 lb/acre K, in Knott’s Handbook for Vegetable Growers (Maynard and Hochmuth, 1997). A late-season variety at the 150 cwt/acre yield level would also be projected to remove (in lb/acre) 3.7 S, 2.0 Ca, 3.9 Mg, 0.024 B, 0.014 Cu, 0.09 Fe, 0.044 Mn, and 0.072 Zn.

With only 9.1 lb/acre or P or 20.8 lb/acre of phosphate (P2O5) removed by a typical sweet corn ear harvest, it is apparent that it may take many harvest years to draw down a very high soil test P level to the optimum range. A long-term study with field corn in North Carolina found that more than 13 years of grain harvest may be required to draw a very high soil test P level down to the range where the crop would respond to P fertilization. The application of high rates of P-containing starter fertilizers for early plantings of sweet corn on very high P testing soils will slow the rate of P withdrawal from the soil P reserve. Thus, on soils where it is desirable to draw down soil test P levels, starter fertilizers should supply either none or substantially less than 20.8 lb/acre of P2O5. However, when the soil test P level is in the optimum range, and it is desired to maintain this fertility level, a typical starter fertilizer application of 20 lb/acre of P2O5 should supply enough P for maintenance.

The data on nutrient removal by harvesting the plant residue (assuming 23,231 plants/acre) in 2004 showed that the remaining sweet corn biomass for the average full-season hybrid contained (in lb/acre) 126 N, 13.4 P, 173 K, 11.6 S, 20.6 Ca, 13.6 Mg, 0.05 B, 0.37 Fe, 0.30 Mn, 0.05 Cu, and 0.13 Zn. Alternatively, the data show that when fresh sweet corn crop residue is tilled into the soil, a significant quantity of nutrients is returned; this has been shown to provide some available N to subsequent crops.

This study provides nutrient removal values for just one crop, but data are needed for a fuller range of field-grown horticulture crops than is currently available. Determining nutrient removal values, as a part of conducting crop variety trials, affords an opportunity to gather additional useful data for nutrient management.

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Make Sure First Impressions Turn Consumers into Customers

By Mark Wade

The Grower / February 2004

Get ready for controversy. Who is the most important person in any organization? Well, dealings I’ve had with several organizations over the past few weeks would indicate that person is...the receptionist.

I know what you’re thinking, this person isn’t a major decision maker, isn’t key to new product development or the production process. And you are correct; he or she isn’t most likely those things; but a receptionist is the first contact many individuals will have with your organization, that first impression.

Now don’t get caught up in the terminology here. Maybe you don’t have a “receptionist,” but a secretary or assistant, operator, counter person or even a greeter. Regardless of the title, that special someone provides the initial contact with the company. Think of dealings you’ve had with other companies, and the first person you may have dealt with in trying to get a question answered or talk to a specific individual.

Were you treated with respect? As a valued customer? An asset? Or were you treated as a nuisance, bother or distraction to the real work at hand? Did you vow to never have anything to do with that company again? Now, think about the impression your receptionist presents.

Three basics of customer service

Regardless of the specific business you’re in, I think the three basic tasks of retailing apply. They are: 1) Get consumers into your store; 2) Convert them into customers and 3) Operate as efficiently as possible. Pretty good ideas whether you are in a retail business or not.

Customer service consists of all of the activities conducted by a business that eases the potential customer’s ability to learn about the company, conduct business, and aid in the ease of transactions and the customer’s satisfaction once the transaction has occurred.

Other individuals, like a sales representative, transportation specialist, customer service representative or accountant, can have a great deal to do with overall service to the customer and repeat sales, but the front-line person plays an equally important role as the initial contact responsible for getting consumers in the door and converting them into customers.

9 Ways to Ensure Your Front-line Contact is Up to the Task: Make sure your front-line contact is up to the task of creating a great first impression and converting consumers to customers. Here are a few points to consider:

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Consumers into Customers Continued

1. Hire someone who is friendly, outgoing and enjoys working with people. This is not the position for those tending to be moody, pessimistic or sarcastic. The individual should be pleasant, warm and inviting.

2. The person should be knowledgeable about the company, its products and services, operations, and key departments and personnel. When individuals call or visit for assistance, or just for information, they don’t want to play musical chairs, being forwarded from person-to-person. Direct assistance will impress and be appreciated.

3. Be respectful and eager to please. Treat everyone as if they were your biggest account-as if the company’s success depended upon this one individual. You never know that may be the case.

4. Be customer-centric. We often throw around the words, “the customer is king,” but do we truly create such an environment? Build a system where the main focus is service to the customer from the initial contact to service after the sale.

5. Telephone manners and etiquette. Believe it or not, there are proper ways to answer and communicate with others on the telephone. Unlike face-to-face communication (and the ability to communicate meaning through body language), telephone conversations rely more heavily on word selection, tone and voice inflection. Initial dealings between individuals tend to be much shorter and to the point, so the opportunity to provide outstanding customer service is much more intense. However, this short period often seems plenty long for many to alienate and infuriate potential clients and associates when handled improperly.

6. Provide proper training for the position. Just as with any other important position, a training program should be developed to assist the front-line employee in gaining the necessary skills for success.

7. Provide an opportunity for advancement. This position should be valued and not viewed as a dead-end job. Reward excellence here as you would other key positions.

8. Be professional, solutions oriented and dependable. It is important that the individual be able to develop a level of rapport quickly and easily—but professionally. The level of rapport should be warm and friendly, but not too hot.

9. Feel part of the team. Don’t isolate the “receptionist” from the rest of the team by sticking their desk in an out-of-the-way cubby hole. Where walk-in traffic exists, the desk should be located front and center.

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Piecing Together the Puzzle of Yellow Nutsedge Management

Onion World
May/June 2006

As growers attempt to fit together the pieces of the yellow nutsedge management puzzle, a good understanding of the weed’s growth and development may be helpful.

Corey Ransom delivered some helpful pointers during the 46th annula Idaho/Malheur County Onion Growers annual meeting held Feb. 7 at the Four Rivers Cultural Center, Ontario, OR.

Ransom explained how yellow nutsedge plants reproduce. Early on, they send out multiple rhizomes that develop into either basal bulbs from which shoots emerge or tubers on the ends. In their study, the researchers examined yellow nutsedge biology, assessing the significance of the problem. They also determined the number of tubers produced in the soil and documented the effect of yellow nutsedge on onion yield.

**Looked at Tuber Depth**

Among the goals cited were determining the depth that yellow nutsedge can germinate from and what its growth and reproductive capacity are under local conditions.

It didn’t take Ransom and colleagues long to reaffirm how serious the yellow nutsedge challenge is. Looking at tuber numbers in the soil in the years 1999, 2000 and 2001, the results were eye-opening. In their 1999 count, they identified 29,625,000 yellow nutsedge tubers in the first two inches of soil. That same count identified 23,287,000 at the 2-4-inch depth, 14,739,000 at the 4-6-inch depth, 6,632,000 at the 6-8-inch depth and 5,601,000 at the 8-10-inch depth. The overall count was 79,884,000 or nearly 80 million yellow nutsedge tubers.

The 2000 and 2001 counts were less severe but, nonetheless, revealed huge numbers. The overall counts in 2000 and 2001 were 38,579,000 and 41,784,000 tubers, respectively. In both cases, any grower would have his hands full trying to maintain adequate yellow nutsedge suppression.

Displaying a chart entitled “Yellow Nutsedge Growth Potential in One Season,” Ransom looked at shoot numbers, tuber numbers and tuber weight in 2003 and 2004 in test plots irrigated at three soil water potentials: 20, 50 and 80 kPa. Again, the news for growers worried about yellow nutsedge growth was less than comforting.

In 2003, shoot numbers averaged 2,968 at 20 kPa, 1,512 at 50 kPa and 974 at 80 kPa. In 2004, the numbers were 1,747 at 20 kPa, 444 at 50 kPa and 411 at 80 kPa.

In 2003, tuber numbers averaged 18,789 at 20 kPa, 14,572 at 50 kPa and 7,110 at 80 kPa. In 2004, the numbers were 19,508 at 20 kPa, 4,447 at 50 kPa and 5,826 at 80 kPa.

Tuber weight in 2003 averaged 4.8 ounces at 20 kPa, 3.4 at 50 kPa and 2.0 at 80 kPa. In 2004, tuber weight was 5.1 ounces at 20 kPa, 1.5 at kPa and 1.7 at 80 kPa.

Ransom noted that onions do not compete well with yellow nutsedge. Yields can drop 45 percent or more, and economic returns reduced 50 percent.

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Herbicide Controls
How effective are herbicides for controlling nutsedge problems?

Dual Magnum and Outlook may suppress yellow nutsedge but do not completely eliminate it, the researcher said. Combinations with Basagran are more effective, but Basagran is not registered for use in onions.

In their experiments, Ransom and colleagues found that different methods of applying Dual Magnum and Outlook increased yellow nutsedge control but, on the negative side, reduced onion yields. With few options of controlling yellow nutsedge within an onion crop, an integrated approach is needed for effective yellow nutsedge management, he said.

Looking at control in rotational crops, the speaker reported that herbicide combinations in dry beans produced 59 to 91 percent yellow nutsedge control and resulted in a +7 to -43 percent change in nutsedge tubers. There was a 77 percent increase in tubers in the untreated check. In corn, there was 79 to 97 percent control, and tubers showed a +2 to -68 percent change. There was a 55 percent increase in tubers in the untreated check.

Looking at fallow treatments for yellow nutsedge suppression following a wheat crop, Ransom’s initial yellow nutsedge tuber numbers averaged 45 per square foot, but with disking only that number increased to 79 per square foot later in the season when the final count was made. That represented a 94 percent increase.

In plots where disking was combined with use of Eptam, the final count totaled 48 tubers per square foot, up only 7 percent. Hence, disking plus Eptam provided significant suppression of yellow nutsedge.

What’s the Bottom Line?
So what have the scientists learned about yellow nutsedge in the Treasure Valley?

“In heavily infested fields, total yellow nutsedge tuber numbers in the top 10 inches of soil ranged from 38 to 80 million tubers per acre,” Ransom said. “ Marketable onion yield losses have been as high as 83 percent and averaged 48 and 41 percent, respectively. A single yellow nutsedge tuber can produce 2,000 to 3,000 shoots and more than 18,000 tubers in one season.”

Yellow nutsedge control with herbicides is marginal, the speaker stressed. However, tuber densities can be reduced with dry beans and corn crops used in rotation. Vapam efficacy is dependent on multiple factors. Yellow nutsedge tuber production following wheat harvest can be prolific and needs to be managed.

“What else have we learned?” Ransom asked, responding that Eptam applied as an idle land treatment is only effective if applied early. Oregon has a 24c Eptam label that includes these recommendations:

- Apply after crop harvest and before crop planting (June-September).
- Soil moisture is needed to germinate yellow nutsedge – wait 10-14 days and then shallow disk to dry the surface.
- Broadcast 3.5 to 7.0 pints/acre and immediately incorporate to the 2-6 inch depth. Seal surface with a leveling device.
- Leave as long as possible. Do not plant within 90 days of application.

Oregon research, at least in small trials, has also shown that MH-30 Extra can reduce tuber germination the following year, the presenter said.

“While the picture of yellow nutsedge management in the Treasure Valley is becoming clearer, there are still many pieces of the puzzle that are missing,” Ransom admitted. “We need to test different management strategies in complete crop rotations.”

Work on yellow nutsedge tuber dormancy and survival may be a key piece to completing the management puzzle, the speaker said.

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Fresh Vegetable Harvested Acreage Unchanged From Last Year
Spring Onion Planted Acreage Down 15 Percent
Strawberry Planted Acreage Up 3 Percent
Appearing in Vegetables
NASS Fact Finders for Agriculture, USDA

The prospective area for harvest of 11 selected fresh market vegetable during the winter quarter is forecast at 179,200 acres. This is unchanged from 2006 but 3 percent below 2005. Acreage declined for snap beans, carrots, celery, head lettuce, spinach, and tomatoes. Acreage increased for broccoli, cabbage, and sweet corn. Cauliflower and bell peppers remain the same.

Area planted for spring onions, at 34,600 acres, is down 15 percent from both 2006 and 2005. Georgia and Texas decreased planted acreage from 2006, while Arizona and California acreage remained unchanged.

Strawberry area planted for major States (California, Florida, and Oregon) in 2007 is forecast at 47,900 acres, up 3 percent from 2006 and 7 percent from 2005 in the same States.

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