VegNet Vol. 9, No. 26, December 18, 2002

Vegetable Crop Nutrition

The last article of a three part series on vegetable crop soil and plant nutrition is at end of this newsletter.

Vegetable Calendar - January

Jan 9 Greenhouse Meeting, Toledo Area Flower and Vegetable Growers Association, Monclova Community Center, Toledo, Ohio.
Contact: Norm Moll 419-213-4253 or .
Jan 9 (begins at 9 a.m.) - 10 (begins at 8 a.m.) - Muck Crop School, Moose Lodge, Willard,
Contact: Gary Bauer, 419-627-7631, bauer.3@osu.edu
Jan. 15-17 Ohio Fruit & Vegetable Growers Congress, Ohio Roadside Marketing Conference and Ohio Christmas Tree Association Winter Meeting, SeaGate Convention Center, Toledo.
For complete convention details on the program, directions and pre-registration
Contact: Jennifer Hungerford, 614-249-2424,
http://www.ohiovegetables.org
Jan.16-17 Greenhouse Food Production Short Course in conjunction with the Ohio Fruit & Vegetable Growers Congress, SeaGate Convention Center, Toledo.
Contact: Jennifer Hungerford, 614-249-2424,
http://www.ohiovegetables.org

New Insecticide Registrations

C. Welty

Cruiser 5FS is a new commercial seed treatment for sweet corn, registered in October 2002. Cruiser contains the active ingredient thiamethoxam, which is in the neonicotinoid family. It is made by Syngenta. Thiamethoxam has systemic activity and is the same A.I. found in Actara and Platinum. Target pests of Cruiser include corn flea beetle as well as wireworms, seedcorn maggot, white grubs, and chinch bug. Cruiser is similar to Gaucho and like Gaucho is intended for use by seed companies not individual farmers; farmers should check with their seedsman for availability of Cruiser-treated seed.
Baythroid 2EC registration was expanded in September 2002 to include cole crops (0-day preharvest interval), leaf and head lettuce (0-day PHI), dry peas (7-day PHI), and southern peas (3-day PHI). Baythroid is a pyrethroid with the active ingredient cyfluthrin, made by Bayer. Target pests include caterpillars such as cutworms, loopers, imported cabbageworm, and corn earworm; as well as potato leafhopper, thrips, flea beetles, Japanese beetle, stink bugs, tarnished plant bug, spittlebug, and grasshoppers.

Intrepid 2F registration was expanded in September 2002 to include tomato, pepper, and eggplant (1-day preharvest interval); cole crops and leafy vegetables (1 day PHI); and sweet corn (3-day PHI). Intrepid is an insect growth regulator with the active ingredient methoxyfenozide, made by Dow. Intrepid is an improved version of Confirm, which contains tebufenozide. Target pests of Intrepid include beet armyworm, fall armyworm, loopers, European corn borer, hornworms, tomato fruitworm. It is used at a rate of 4 to 16 fluid ounces per acre.

SpinTor 2SC continues to add crops to its label. In September 2002, registration was approved for the root vegetables including radish, turnip, rutabaga, carrot, and parsnip, all with a 3-day PHI; and for herbs, with a 1-day PHI. SpinTor contains the active ingredient spinosad, made by Dow. Target pests include armyworms, loopers, European corn borer, flea beetles, thrips, and dipteran leafminers.

The items listed above will not appear in the 2003 Ohio Vegetable Production Guide but will be added to the 2004 guide.

New Insecticide Restrictions

The label for Actara 25WDG will be shrinking if EPA agrees to manufacturer Syngenta's voluntary request to cancel some uses. Tomatoes, eggplant, squash, pumpkins, melons, and cucumbers will no longer be registered, although peppers and potatoes will remain registered. Actara is used for control of aphids, whiteflies, stink bugs, flea beetles, and Colorado potato beetle. Its active ingredient is thiamethoxam.

2002 Sweet Corn Hybrid Disease Nursery Report - Now Available Jerald Pataky, Phil Michener, Andrea Campana, And Loyd Wax Dept. of Crop Sciences, University of Illinois& USDA ARS, Urbana, IL

Jerald Pataky, Phil Michener, Andrea Campana, And Loyd Wax Dept. of Crop Sciences, University of Illinois& USDA ARS, Urbana, IL

A very important part of sweet corn management and variety selection is choosing varieties with disease resistance. Dr. Pataky's report contains the following information. Sweet corn hybrid reactions to Stewart's wilt, northern leaf blight - race 0, gray leaf spot and three herbicides (Callisto, Aim and Permit) were assessed in the 2002 trials. Trials with other pathogens were not successful due to drought. The hybrid summary report is also available

How To Get The Reports:

1. 2002 Midwestern Vegetable Variety Trial Report. Each year, these reports are published in this bulletin, from Purdue University. The bulletin is usually available by mid- January and I will announce when it is ready.
2. Hard Copies.

For those who make early decisions, I can copy the reports and mail them to you. The reports are too large to be faxed. My phone number is 614-292-3857. If I am not in, just leave you name and address or email me: precheur.1@osu.edu with your request.

3. Electronic copies via E-Mail.

I have copies of the reports in MS Word file format. If you work with this file format, I can e-mail them to you as a file attachment. To request the reports, e-mail me at: precheur.1@osu.edu

4. Univ. of Illinois website.
The reports are to be posted on the Illinois Extension website. The report can be accessed at: http://www.sweetcorn.uiuc.edu

Vegetable Crop Nutrition
Compiled by Robert J. Precheur
This is the last article of a three part series on basic soil and plant nutrition for vegetable crops. These articles reviewed some of the fundamental principles that produce high crop yields for the lowest possible costs.

The major fertilizer elements, nitrogen, phosphorus and potassium are required by vegetables in large amounts. Most soils do not contain sufficient amounts of these elements for efficient and profitable crop production. Therefore, they are usually added in large amounts. The large requirement and low availability of some of these elements often results in limitation of crop growth,
Nitrogen deficiencies occur because of the high crop requirement and loss from the soil by leaching, runoff, fixation and volatilization. A reliable soil test for long term nitrogen needs has not been developed for the region. A pre-sidedress nitrate test (PSNT) has been developed in Michigan and NJ that helps determine the proper rate of nitrogen to apply to at that time in crops like sweet corn. While these tests have not been calibrated for OH soils and conditions, vegetable growers may find them useful in fine tuning their sidedress program. This will require some cautious experimentation on the grower's part. Nitrogen needs depend on the crop to be grown, yield goal and previous management. Give credit to all nitrogen sources present in a crop management system. This includes: manures, cover crops and previous crops such as soybeans, alfalfa, etc. Nitrogen recommendations for most vegetables can be found in the Ohio Vegetable Production Guide or by contacting a member of the OSU Vegetable team. Several nitrogen carriers are suitable for vegetables and research at MSU show yield and quality to be best when nitrogen is present in both the ammonium and nitrate form. For plants growing in cold soil or on recently fumigated land, nitrate fertilizers are preferred. Once soils are above 50 degrees microbial conversion of nitrogen from ammonium to nitrate occurs rapidly. For most vegetable situations the various nitrogen carriers are equally effective. Band and sidedressing application improve nitrogen efficiency. Fall application of nitrogen is not recommended for vegetable crops.
Organic Soils: Nitrogen is a constituent of soil organic matter. Nitrogen content in MI soils ranges anywhere from 1 to 2.5%. When organic matter decays, nitrogen is mineralized and eventually forms nitrate nitrogen. Studies on vegetable muck land in NY showed an annual mineralized rate of 300 to 500 lbs of N per acre. Studies in MI showed about 17 pounds of nitrate nitrogen per year were transported in the drainage water but the water was always less than 7ppm. The greatest discharge was in early spring.
Suggestions for reducing nitrate nitrogen in lechable and drainage water Include: 1) Do not apply nitrogen fertilizer in the fall or winter.
2) Reduce nitrogen rates in preplant fertilizer and apply the balance when plants are actively growing.

3) Because of a high decomposition rate when the soil temperature is high, nitrogen fertilizers for muckland crops is seldom needed or can be reduced during July and early August.
4) Grow cover crops to utilize available nitrogen after harvest.
5) Keep the soil water level at sufficient depth to obtain good crop yields and yet allow for the least amount of soil decay.
Phosphorus deficiencies are related to cold soils in the spring or acid soils which are capable of fixing it in an unavailable form. Every tomato grower has experienced the transplant with purple color on the undersides of the leaf. Phosphorus builds up in fields when you add large amounts of manure or other phosphate fertilizer every year. Many fields contain so much phosphorus that crops won't grow better with more overdoses of phosphate fertilizer. Fertilizer recommendations are usually based on soil test data. Phosphorus is most beneficial to small seedlings in early spring when the soil is cold. With soils below 55 degrees, a band (up to 100 lb P2O5/A) is placed 1 inch to the side and 1-2 inches below the seed. This decreases fixation and stimulates early growth. When soil test levels are above 180 lb of P per acre, additional phosphate fertilizer usually does not improve quality or yield. There are some exceptions with potatoes. Today, dry phosphorus fertilizers are more than 90 percent soluble. Concentrated superphosphate (0-46- 0) has a low salt index but can delay seed germination because it absorbs water. Placement is critical under dry conditions. Ammonium phosphates have high salts and must be placed away from the seed or transplant. More caution is needed with diammonium DAP (18-46-0) than with MAP, monoammonium phosphate (11-48-0).
Organic soils: tend to be low in phosphorus but those in constant vegetable farming may have levels similar to those found in inorganic soils. Test soils to determine proper fertilizer rate. Apply starter fertilizer near the seed or plant.
Potassium
Soils vary in potassium content and the best way to determine availability is by a soil test. When soil test levels are high, additional potassium will not improve yield or quality. Potassium fertilizer can be applied in the fall on fine textured soils (clay and silt loams) for buildup. Fall application is not recommended on loamy sand, sand and organic soils because of leaching. Young seedlings and transplants require less potassium than phosphorus but when they reach their rapid growth stage they use very large amounts. Crop removal is particularly heavy with celery, cabbage and lettuce. Potassium can be effective in fertilizer bands but remember the upper limit of 50 lb K2O per acre.
Secondary Nutrients
Magnesium.
Apply magnesium when the exchangeable magnesium is below 75 lb/A or when potassium exceeds magnesium as a percent of the base saturation (see below) or when soil magnesium level as a percent of the total bases is less than 3 percent. On acid soils, magnesium is easily supplied by applying dolomitic or high magnesium lime. On non acid soils, magnesium can be supplied by using soil applied magnesium sulfate or finely ground magnesium oxides. Magnesium can also applied as a foliar spray using Epsom salts (magnesium sulfate).
Mineral Soils: Magnesium deficiency is likely to occur on acid soils that are very sandy in texture.

Organic Soils: High calcium levels in organic soils contribute to magnesium deficiency in responsive crops. Apply magnesium on soils having a Mg soil test less than 150 lb/A.
Magnesium responsive crops: Crops not tolerant of magnesium deficiency in soils include: cabbage, corn, cucumber, eggplant, muskmelon, pepper, potato, pumpkin, rutabaga, tomato and watermelon.
Calcium:
Deficiency leads to such disorders as blossom-end rot in tomatoes and peppers, black heart in celery, and internal tip burn of cabbage and lettuce. These disorders can occur on soils high in calcium and usually related to environmental factors that influence calcium uptake and movement. Calcium deficiency is usually preceded by a period of moisture stress. Very high K levels in the soil can contribute to calcium related disorders.
Mineral soils: Soils with proper pH contain high levels of available calcium. Vegetable crops grown on sandy soils with a soil test of less than 500 lb/A available may benefit from applying supplemental calcium.
Organic soils: Organic soils contain high levels of exchangeable and water soluble calcium.
Manganese (Mn)
Mineral soils: Deficiencies are likely to occur on soils with a pH of above 6.5. Since Mn availability decreases as soil pH increases, liming can induce a Mn deficiency on acid soil.
Organic soils: Deficiencies are likely to occur on organic soils with a pH above 6.0. Very acid soils that have been limed usually show a greater need for supplemental Mn than do soils with a naturally high pH. Organic soils quickly fix Mn so broadcast applications are useless.
Boron (B)
Plants need a small amount of boron to grow but too much boron makes crops grow poorly. Boron recommendations are based on crops response and soil pH. Deficiencies occur on a soil with a pH above 6.8. For broccoli, cauliflower, celery, table beets, turnips and rutabaga, 3-4 pounds of boron/A are recommended. Vegetables that need a medium level, 1-2 lb/A are cabbage, carrot, lettuce, parsnip, radish, spinach and tomato. Never apply boron for snap beans, cucumbers, and peas as they are subject to boron injury. Applying higher than the recommended rates leaves the possibility of significant residual boron carryover which could injure sensitive crops. Usually occurs in dry weather.
Zinc (Zn)
Vegetables responsive to zinc are snap beans, spinach, onions and sweet corn.
Mineral soils: Zinc deficiency is most common in responsive crops grown on alkaline soils with a pH above 7.0.
Organic soils: Most likely to occur on nearly neutral or alkaline organic soils.
Other Items on the Soil Test Report
Percent Saturation and Ratios
Percent saturation is the concentration of each element expressed as a percent of the CEC (Cation Exchange Capacity). A balanced soil will generally fall into the following ranges: K - 1 to 5%; Mg - 10 to 15%; Ca - 60 to 80%. Sometimes K is often greater than 5% of the CEC. Such high values are usually considered undesirable, particularly when not in good balance with other nutrients. At excessive K levels, plants tend to take up more K at the expense of Ca or Mg. A wide range of Ca is permissible. Excessive calcium saturation indicates that most of the soil colloid is occupied with Ca at the expense of K and Mg. Normally a 10 % Mg saturation is desired. Magnesium application is recommended when percent saturation is

less than 10 % or when the Mg to K ratio is less than 2 to 1. The Ca to Mg ratio should be about 6 to one. When greater than 10 to one the soil is out of balance.

References

Interpreting Soil Tests for Horticultural Crops and Potatoes. 1978. ST 3. The Pennsylvania state University. University Park, PA

Maynard, D and C. L. Thomson. 1970. Nutrition of Vegetable Crops in Massachusetts. Univ. Of Massachusetts, Cooperative Extension Service. Publication No. 63.

Otto, H. W. and R. Branson. 1981. Guide for Fertilizing Vegetables. Orange County Cooperative Extension. University of California.

Warncke, D. R., D. R. Christenson, L. W. Jacobs, M. L. Vitosh and B. H. Zandstra. 1992. Fertilizer Recommendations for Vegetable Crops in Michigan. Michigan State University. Cooperative Extension Service. Extension Bulletin E550B.

What's New At The VegNet Web Site

Problem Of The Week

A pictorial comparison of Squash Vine borer damage and Bacterial Wilt in pumpkins. While the symptoms are similar, there are some key differences.

Check it out. Click on the 'Problem of the Week' button of the left side.

Highlights From the Pumpkin and Muck Crops Field Days

Couldn't make it to Celeryville on July 25th or forgot about The Pumpkin Field Day on August 7th, then take a look at just a few of the highlights from these two field days.

Click on the 'Talk Between The Rows' button on the VegNet homepage.

2001 Slide Presentations

Pepper Variety Slides 2001 | HTML Slide Show

Pumpkin Variety Slides 2001 | HTML Slide Show

Go to the Library Section under Research Reports.

VegNet Vegetable Schools

A series of slide presentations are now available in order to update you on the latest pumpkin and sweet corn research. We begin with 6 pumpkin topics in Pumpkins 101 and have 10 slide presentations available in Sweet Corn 101. In sweet corn. Powerpoint presentations and html online slide shows are available now. Go to the VegNet homepage.

Pumpkins 101

The use of trap crops and Admire for cucumber beetle control and New varieties for 2001. We have presentations on cover crops for disease control and pumpkin fungicide use.

Perimeter Trap Cropping. Online html slide show | Perimeter Trap Cropping. PPT, 7 Mbytes

See also the Research Results section on the home page for text version of the report.

Pumpkin Variety Slides 2001 | HTML Slide Show

Sweet Corn 101

Presently only Powerpoint presentations availabe. Coming Soon: Online HTML slide shows. Check back often Nine topics including:

Aspects of Variety Selection based on Disease Control [ppt 40 KB]

Internet Link To "Reactions of Sweet Corn Hybrids to Prevalent Diseases" Dr. Jerald Pataky www.sweetcorn.uiuc.edu

Producing Early Sweet Corn [ppt 3.5 Mbytes]

Managing Weeds in Sweet Corn [ppt, 9 Mbytes]
Sweet Corn Heribicies & Variety Sensitivity. [ppt 2Mbytes]
Sweet Corn Development and Critical Periods for Irrigation Management [ppt 1.6 Mbytes]
Flea Beetle Management in Sweet Corn [ppt 510 KB]
How To Keep Worms Out of Sweet Corn Ears [ppt 8.3 Mbytes]
Role of Bt Transgenic Hybrids in Sweet Corn Pest Management. [ppt 21.2 Mbytes]
Bt Sweet Corn Efficacy in OH, 1999-2000 [ppt, 208 KB]

Return to Vegetable Crops Homepage | Ohio State University Extension

We appreciate very much the financial support for thisseries of vegetable reports which we have received from the board of growers responsible for the Ohio Vegetable and Small Fruit research and Development Program. This is an example of use of Funds from the "Assessment Program".