

Farm to Market

Technical Information for the Commercial Vegetable Grower



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It's been a busy month here at UNL's Horticulture Department. We have meetings every other week to discuss the administrative combining of the two departments, Agronomy and Horticulture and prep work prior to the meetings (essentially a meeting a week for 1 hr to 3 hrs). The university is revising its perception of itself in response to the statewide listening sessions held last year and some internal reflection. New administrators bring different perspectives on priorities. There are many administrative openings in various stages of the process of being filled, and these areas of the university await new leadership. Some of this is good; for some, the jury is still out. Just like you, we are affected by many decisions made outside of our own day by day responsibilities. Rules, regulations, finances, hopes, dreams, desires. Not unlike farming.

It is important, no matter how busy you are in your world of daily responsibilities, to keep in touch with proposed changes that affect you and your community. Read the paper; really listen to the news, think about how this might affect you or your neighbor. For example, the legislative proposals on agricultural land taxes; funds to develop specific agricultural industries including support for the production of specific crops like grapes and other fruit, beginning or new farmer

programs and how these are defined in the legislation.

You are the ones who know the most about the effects of the various proposals. Will they achieve the stated objective? I believe most people have good intentions. But each of us has a different perspective based on our experience and knowledge. As adults and citizens, we share a responsibility to help each other achieve our goals, whether it is through the legislative process, through various organizations like the Nebraska Fruit & Vegetable Growers' Association or the developing Nebraska Farmers' Market Managers Association, or through our schools and our communities. A letter or phone call *can* make a difference. Believe me, most people won't ask you what you think. But we have a responsibility to let them know the strengths and limitations of proposals or activities as we see these. It's how we learn and how progress is made.

—Laurie Hodges

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Update on Vegetable Insecticides

Capture, an insecticide that contains the pyrethroid bifenthrin, is now labeled for use on sweet corn, peas, beans, broccoli, Brussels sprouts, cabbage, cauliflower, Chinese cabbage, kohlrabi, cucumbers, muskmelons, watermelons, summer and winter squash, pumpkins, and eggplant. It is effective against a range of insects pests and should be particularly useful against squash bugs in cucurbits and corn earworm, European corn borer, and fall armyworm in sweet corn. **BE SURE TO CHECK** the worker re-entry interval on the label to make sure that the time frame does not interfere with necessary field activities.

SpinTor is now labeled on potatoes, sweet potatoes, and sweet corn, in addition to crops on the label in 1999 (cole crops, leafy greens, eggplant, peppers, tomatoes, and tomatillos). SpinTor is effective against Lepidopterous larvae (caterpillars) and against Colorado potato beetle larvae, thrips, and leafminers.

Confirm (tebufenozide) is an insecticide that works as a growth regulator against Lepidoptera (caterpillars). Labeling for 2000 allows its use on cole crops, leafy vegetables, eggplants, peppers, and tomatoes. Target pests on the label include loopers, armyworm, European corn borer, and imported cabbageworm; labels do NOT list corn earworm or diamondback moth ... and yes, these pests are omitted from the label because Confirm does not control them consistently.

Proclaim is labeled for use on crucifers and lettuce. Proclaim is an avermectin related somewhat to Agri-Mek. Target pests are caterpillars.

—Rick Weinzierl (217-333-6651;
weinzierl@uiuc.edu) Illinois Fruit & Vegetable
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Managing Insects in Vegetables Without Insecticides

The proceedings of a late 1998 conference designed to provide farmer and scientist exchange of both experience and research have been published in 1999 as ALTERNATIVES TO INSECTICIDES FOR MANAGING VEGETABLE INSECTS. The 84-page, soft cover work was edited by K.A. Stoner and offers 28 summaries of papers, 10 discussion summaries, a glossary, and appendixes that include useful supplementary material. The conference was sponsored by the (U.S.) Northeast Region Sustainable Agriculture Research and Education Program, and addressed a variety of issues in general as well as challenges related to specific crops and insects. FMI: NRAES, Cooperative Extension, 152 Riley-Robb Hall, Ithaca, NY 14853-5701, USA. E-mail: <nraes@cornell.edu>. Fax: 1-607-254-8770. Phone: 1-607-255-7654. Web site: www.nraes.org

Ten Common Mistakes of a New Enterprise

1. **Lack of inventory.** Have you planned your planting and harvesting? Did you do a little informal (or formal) market research to find out what is popular,

what can't people find that they would like, what trends are developing.

2. **Uncertain hours** Discipline yourself to be where you say you'll be when you say you'll be there. If there are no customers or you have to wait, bring something to work on - fertilizer calculations, rotation or planting schedules, promotional ideas. Always have a small notebook and pencil with you to jot down ideas, field observations, or jobs to do so you won't forget. Don't rely on your memory!

3. **Inability to answer customer's questions.** This is a major turn-off for customers. If you, the grower, don't know what variety it is, how to prepare it, when it was harvested, or if you'll have more next week, who does? You need to know your business, both the part of it that is on your farm and what is happening locally, regionally, nationally, and internationally - in other words, the big picture as well as your little window.

4. **Under funding or over extending.** Either of these can do you in. Monitor your spending and buying (cash flow) and work toward having these at steady rate of flow. Are you building your assets or depleting them? There are many computer programs to help you. The two best known are Quicken and Microsoft Money. QuickBooks and other higher level programs for small businesses also substantial help with invoices, payroll, and taxes.

5. **Sloppy record keeping.** This goes hand in hand with the previous mistake of under funding or over extending yourself financially. It also can have some serious implications (both good and bad) on taxes. Get organized. If this isn't something you want to do yourself, find someone who will work with you on it. It is not something that can just be turned over to someone else. You must be actively and consciously involved in the on-going process if you expect to be successful.

6. **Inhospitality.** Be friendly or welcoming to your customers or buyers. Let folks browse but let them know you'll be glad to answer any questions they have (see #3). If working with a wholesale buyer or retail store, ask when it is convenient for them to see you.

7. **Poor directions.** Be sure customers know how to get to your market or how best to contact you. Be sure the dates and times the market is open are included on all signs and advertising.

8. No special ambiance. What distinguishes you from all the other vendors or sources of your product? Color, fragrance, a logo, distinctive clothing (a hat, a special shirt, a theme color, etc.), distinctive display, an antique truck, etc.

9. Going in too many directions at once. Taking on wholesale, retail, classes, lectures, interviews, farm tours, plus family, church, community activities can lead to a high stress, low productivity, unhappy situation for you and real problems in your business, especially if you have limited and/or insufficient help.

10. Forgetting the maxim: Start slow and grow. Above all else, stay healthy and enjoy what you are doing.

— Adapted from "Growing Your Herb Business" by Bertha Reppert, 1994., Storey Communications, Inc.

In ancient Athens, street vendors served hot pea soup to passers-by. In ancient Rome, the audience snacked on bags of fried peas at the circus and theater. Popcorn, grown and used widely in the New World, was unknown in Europe, although it was grown in China, Sumatra, and India years before Columbus reached the New World.

Please pass the peas



Water Needs of Vegetables - A Few Basics -

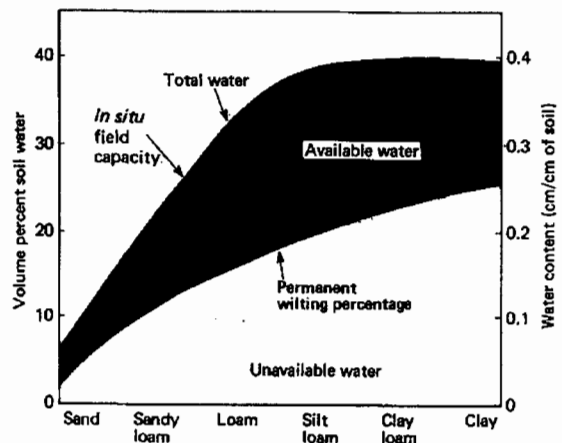


With the drought we are experiencing this winter through much of the state and the prospect of it continuing through the coming growing season, we need to closely consider irrigation of our vegetable crops. In the past several years, rain has been frequent enough so that chances are crops experienced only intermittent water stress. While we certainly had examples of blossom end rot and lower yields, most of the time growers were able to harvest some of the crop and may not have even noticed a yield reduction, especially if no records were kept from year to year. Since water issues in vegetable production are most likely to be the theme for several newsletters, some review of the basics will be helpful both for those for whom the terminology is new and as a review.

Water basics: Soil water is essential for plant growth. It is the solvent that carries nutrients so that they can be absorbed by plant roots. The amount of water in soil can be expressed according to how available this water is for plant uptake. Although the soil may have some moisture in it, it may be so tightly held by the soil particles that it is cannot be used by roots. When this level of moisture (or lack of available moisture) is reached, the plant wilts. If the conditions causing wilt continue to the point where the wilting cannot be reversed by adding water to the soil, it is called the permanent wilting point and the plant dies. The technical definition is the moisture content, on an oven-dry basis, at which plants (specifically sunflower) wilt and fail to regain turgor when placed in a dark humid atmosphere.¹ For practical purposes, this is found to be approximately 1.5 megapascals or -15 bars, although it is not a sharply defined point for any particular plant/soil combination. Many of the sensors used to determine soil moisture content are read in "bars" of moisture tension where the larger the negative number, the greater the plant water stress.

Another condition of soil moisture is when the soil is at field capacity. This is when the soil is at the maximum amount of moisture that is retained after the surface water is rained and after the water that passes out of the soil by gravity is gone. How much water this is depends on the soil texture (the ratio of sand, silt, and clay in the soil) with fine soils retaining more water than coarse soils. Moisture is retained as a thin layer on the surface of the soil particles.

When soil is saturated, all the pores in the soil are filled with water. Plant roots need oxygen to maintain the physiological activity necessary to take up water and nutrients. Root hairs die. As a consequence, the root cells are weakened and more susceptible to pathogens. Also, metabolites are



formed that are toxic to plant growth. Growth slows, the plant may wilt, especially on a sunny or windy day due to water loss by transpiration through the leaves without water uptake from the saturated soil. Most vegetables are sensitive to flooding.

Drought is the other extreme. Although many plant responses to drought mimic those of flooding, there are physiological differences which will be discussed at another time. The amount of injury caused by water deficiency depends on the stage of plant development. Even temporary water deficits can reduce plant growth in both cell enlargement and cell division. One reason corn growth is generally greater at night than during the day is because the daytime growth is inhibited by water deficits due to high transpiration rates in hot weather. However, if nights are cool enough, more growth may occur during the day as there are strong interactions among temperature, water status, and plant growth. Generally water deficits produce plants with smaller leaves and more compact internodes. Moisture stress can affect the early formation of reproductive structures, which in many crops is correlated with plant development. For example, tomato reproductive structure differentiation may occur as early as that of the fourth true leaf. It has been shown that the average number of tomato flowers per truss decreases as water stress increases.

The "ideal" amount of soil moisture depends on the type and depth of soil, the depth of rooting of the crop, rate of evaporative loss from the soil and transpirational loss from the plant, and both air and soil temperature. Often growers try to maintain soil at or near field capacity for optimum plant growth and maximum water use efficiency (WUE). The precise definition of WUE varies, depending on the purpose of the research or the subject discussed. In general, it is the relationship of water used by both evaporation and transpiration (evapo-transpiration) and plant dry weight. (Water used ÷ dry matter or crop yield).

Vegetables are very sensitive to moisture stress, in general. Even minor moisture stress can adversely affect quality before any stress is visible as color change or wilting or any yield reduction occurs. Irrigation should occur before 50% of the available water in the root zone is depleted. General reduction in plant vegetative growth is only a part of plant response to water stress. Even temporary water stress is quite detrimental if it occurs during seedling establishment, flowering, fruit set, and fruit sizing for vegetable crops.

If you have access to the Internet, the following two publications from North Carolina State are excellent: "Offsetting Drought for Small-Scale Vegetable

Production"

<http://www.ces.ncsu.edu/drought/dro-16.html>

"Drought Advisory for Vegetable Production"

<http://www.ces.ncsu.edu/drought/dro-13.html>

I'll be using these in future issues to address some of our concerns about this growing season and quality vegetable production. You can also contact me and I'll be happy to send you a printed copy of either publication.

Total Available Water of Various Soils	
Soil Class	Available water storage capacity in inches of water per foot of soil
Gravelly sandy loams	0.8 - 1.3
Sandy loams	1.2 - 1.5
Gravelly loams and gravelly silt loams	1.5 - 2.0
Loams and silt loams	1.75 - 2.25
Silty clay loams	1.8 - 2.0
Organic soils (muck, peat, >20% organic matter)	2.0 - 2.5
As a general rule, irrigation should occur before 50% of the available water in the root zone is depleted.	

(Table from Growing for Market, July 1999)

—LH

Irrigate to Establish Stand (Little things mean a lot . . .)

Prior to the drought years in the late 1980's, many vegetable growers in the southeastern states, with average annual rainfall in the 40-50 inch range, did not have irrigation or only irrigated during fruit development. They got by for years, and then learned: You can't grow quality vegetables without reliable irrigation. The water content of fresh vegetables ranges from 67% (lima beans) to 96% (crisphead lettuce)² with the majority being over 90% water. Growers have said, "Don't need to irrigate melons 'cause of their deep roots and I got water 3 or 4 feet down." Well, that may be fine if the roots ever get down through all that soil to reach the water without hitting a dry spell, and they didn't in the drought year, and won't even in a good year if the seedling root zone dries.

Repeated demonstrations on the value of irrigation to get the crop established sold a lot of irrigation equipment. When seedlings don't have the right amount of water, they don't thrive. Poor stands and erratic germination costs later in less efficient harvesting and possible re-planting costs. As growers increasingly plant hybrid cultivars for the advantages of yield, uniformity, and disease resistance, these re-planting costs and the cost of missing plants started getting their attention. When each hybrid watermelon seed planted but not producing a crop costs you close to 5¢, we know we can count those nickels to add up to dollars! And that doesn't include the couple of pennies in fertilizer, equipment costs, and other expenses.

Successful vegetable growers are set up to irrigate immediately after planting, regardless of type of irrigation used. If seed or transplants are set into moisture, the germination processes will be initiated well before any sign of germination is evident. There is only a small window when these processes can be suspended, and only for a limited time, without killing the embryo or young seedling. Much of vegetable production is now geared to precision planting for optimum stand, marketable yield, and quality of product. That 5¢ seed is expected to yield 1.25 melons worth at least \$1.00 each and hopefully at least \$2.00 each. At least one watermelon crop budget indicates a grower's net profit at 2% (net return to land, capital, and management)³ or roughly \$47.95/acre for a crop of 2000 melons per acre grown with drip and plastic.

Your little melon patch is 10 acres and you're peddling them for \$2.00 each and you're using overhead irrigation. So suppose you seed at 6 ft between rows and 8 ft in-row spacing (using drip irrigation and plastic mulch) for 907 seeds/acre but 100 don't come up $100 \times .05 = \$5.00/\text{acre}$ in lost seed costs $\times 10 \text{ acres} = \50.00 just thrown down the drain (I'll take that \$50 off your hands, thank you). It's not a matter of the other melons "compensating" for the missing plants. Maybe, maybe not. Fact is, if you had 'em, each plant would put at least \$2.00 in your hand (gross return) and, if you are the typical farm used in the enterprise budget cited, you'd have \$4991 of pure profit for the 10 acres *after* land taxes, expenses including harvest labor, depreciation on equipment, your own labor, etc. etc. were all paid (22% return to land, capital and management). So those 100 seeds per acre that didn't make it because the young roots never made it to that "sure water three feet down" means you're out \$50 for wasted seed cost and \$2500 in profit from melons (100 seeds \times 1.25 melons/plant \times \$2/melon) for a total of \$2550 for the year on the 10 acres. However, because your production costs and

fixed expenses are the same, your profit margin drops from 21% to 11%. See what a little water at the right time can do for you? This also illustrates why successful growers strive for perfection in each aspect of their operation, knowing that all the little losses add up and there are, inevitably, yields lost. Small losses in yield per unit area have a major impact on the "bottom line" of profit!

¹ Buckman and Brady, *The Nature and Properties of Soil*, 7th edition, p. 630.

² Knott's *Handbook for Vegetable Growers*, 4th edition, p. 38-40.

³Original & modified from <http://www.uky.edu/Agriculture>

/AgriculturalEconomics/publications/hort98.html#part5

—LH

Source of Untreated (Organic) Vegetable Seeds

Seedway, an exhibitor at the Great Plains Regional Vegetable Conference, is now offering untreated vegetable seed for organic growers, including seed for several of the high-yielding hybrid peppers and other hybrid crop varieties discussed at the conference. For a copy of their organic grower vegetable seed catalogue, call 800-952-7333.

Questions Asked

What trends do you see developing that will affect Nebraska vegetable growers?

Crops: shallots, sweet potatoes, winter squashes, specialty pumpkins, cole crops, tea, herbs, nutraceuticals (foods with higher content of health-promoting compounds), organic, Japanese style and cuisine, simple but perfect . . . in size, shape, color, flavor, aroma and nutrition, use of fewer ingredients in cooking (3-5 max). When you only have a few ingredients in a dish, the quality of each one needs to be very high. Aesthetics become even more important. Two levels of "food" - those quick, fast, sweet, fat and those quick, high quality, comfort foods of the past as the baby boomers age and think back to PB&J sandwiches, tomato soup, home cooking. Only now, with higher incomes than their parents, boomers want gourmet peanut butter - cashew butter, pecan butter, organic peanut butter, non-homogenized peanut butter - and tomato bisque (chunks of tomato in the soup), macaroni and cheese using baby Swiss or goat cheese, and other "up-scale" versions of old standards.

Consolidation of the supermarket chains will increase cost pressures on the produce industry, the most profitable area of the store. Issues of our society will result in consumer emphasis on flavor, local food systems, knowing where and how food was produced.

Tuesday Farmers' Market in Lincoln

A joint venture between UNL and the City of Lincoln and the Downtown Lincoln Association and the Lincoln Historic Haymarket Farmers' Market will bring a week-day evening market to downtown Lincoln. Located between the Lied Center and the Temple Building at 12th and R Streets from 5 p.m. to 8 p.m. from June 7th to July 28th, the new market will provide fresh, locally-grown produce and baked goods for customers working in the area and a great market opportunity for growers. Continuing the connecting theme of the theaters, the Sheldon, and the Sculpture Garden as links between "town and gown," the farmers' market adds the linkage between urban and rural citizens. The farmers' market will be a great attraction for the many people who attend the free evening concerts featured in "Jazz in June." University students in the arts will be featured entertainment during the market, adding to the wonderful atmosphere of summer evenings in downtown Lincoln.

For more information, contact Billene Nemecek at 402-435-7496.

—LH

Nebraska Fruit & Vegetable Growers' Association

The board of the NFVGA met in Lincoln on Sunday evening, January 23. The board voted to propose a change in the bylaws so that membership will run on a calendar year basis, from January to December, rather than the current March to February cycle. The March to February cycle was based on the Nebraska Vegetable Conference being held in February. With the change to a regional meeting the first Friday/Saturday in January, it would simplify recording keeping and memberships if changed to be on a calendar year. This requires a 2/3 vote of members present at the annual meeting in St. Joe on January 5-6, 2001.

Farmers' Market Managers Meeting

Farmers' Market managers are invited to meet with other managers on the last Monday of the month at the Holiday



Inn at Kearney, just off I-80. Meetings are from 12-2 p.m. in the restaurant. Two more meetings are scheduled before the season starts, on February 28 and March 27. For more information, contact Billene Nemecek on Wednesdays at 402-435-7496 or DeeAnn Dougherty by E-mail at deeannd@pld.com

Notes from The Packer 7 Feb. 2000

The European Union spends about \$15 billion a year into subsidies for its fruit and vegetable industry and other horticultural crops, according to an analysis done by the Western Growers Association. Four commodities – apples, tomatoes, wine, and pears – account for 50% of the money. The US industry has no history of price supports. The report was sent to a trade advisory committee at USDA and will be used to lobby Congress for export trade support programs.

Speakers at a conference on "Selling Food in the New Millennium" made the following points:

- Understand what motivates buying behavior
- Change is faster and faster. To cope, know the customer better than ever and be prepared to act.
- Know that taste rules. In the 1990s, there was a 13% *increase* in the number of people who say they rarely or never eat something they don't like just because it's good for them. People are looking for nutritional foods to fill in gaps from rushed lifestyles and eating habits. This means more produce eaten instead of reduced-fat or reduced-calorie foods.
- Foods consumers are trying to eat more of include: broccoli, oranges and orange juice, spinach and other dark leafy greens, tomatoes, garlic, beans, and sweet potatoes, oat bran, yogurt, and soy products.

40% of U.S. retailers have frequent shopper programs, which offer lower prices to cardholders and reward loyal customers. In exchange, the retailer uses the card to learn more about customer buying habits, which households are sensitive to price changes, and help target coupons and mailings.

How might you adapt these ideas to work for you?

—LH

Coming Events

March 9: The annual ARIZONA DIRECT FARM MARKETING AND TOURISM CONFERENCE will be in Phoenix, AZ on March 9, 2000. Details for the agenda and registrations are available at:

<http://ag.arizona.edu/arec/ext/dmkt2000.html> Please RSVP soon if you decide to attend.

March 16& 17 **GREENHOUSE TOMATO SHORT COURSE** Mississippi Agriculture & Forestry Museum, Jackson, Miss. This is an excellent opportunity if you grow or are interested in growing greenhouse tomatoes. You may remember Dr. Rick Snyder spoke at the GPRVC a few years ago and has extensive knowledge of greenhouse production plus there are growers, specialists, and industry reps on the program. March is well into spring -- crocuses, daffodils, and quince will be in full bloom and the early azaleas, dogwoods, grape hyacinth – like May in Nebraska. There is a crawfish boil & entertainment afterward so it will be a pleasant and educational trip. For details contact Rick at 601-892-3731 (fax:601-892-2056; e-mail at RickS@ext.msstate.edu) or check the web site <http://www.msstate.edu/dept/cmrec/GHSC.htm>

Oct 1-3 **15TH BIENNIAL NATIONAL PEPPER CONFERENCE** Hilton Lafayette & Towers, Lafayette, Louisiana. Registration & welcome reception Sunday Oct. 1, tour of pepper processing plants on Monday, Oct. 2. Trade show and educational sessions. Excellent opportunity to learn more about peppers, both fresh market & processing. Atmosphere is informal with many opportunities to talk with major growers, researchers, and extension specialists working with peppers. For more info., contact Laurie Hodges at UNL (402-472-1639, lhodges1@unl.edu) or Carl Motsenbocker at LSU (225-388-1036 cmots@unix1.sncc.lsu.edu)

January 5-6, 20001 **GREAT PLAINS REGIONAL VEGETABLE CONFERENCE.** Ramada Inn, St. Joseph, Mo. If you have ideas for topics or speakers, or trade show exhibitors you'd like to see, let us know! Plans will be developed on April 6 when the GPRVC Steering Committee meets at KSU.

Subscriptions to this newsletter run March-February with a minimum of 8 issues per year for \$10 to help cover costs. Please check your mailing label for subscription status. Unless you have very recently renewed your subscription, your name will be purged from our list effective March 1. Fully paid members of the Nebraska Fruit & Vegetable Growers Association (NFVGA) receive this newsletter plus American Vegetable Grower, and/or Vegetables West as a benefit of membership. A subscription renewal form is enclosed as well as a membership form for NFVGA. If you have questions, please call Kathy Bennetch at 402-472-8616. We are working toward being able to provide an index and possibly Internet access to past issues, including a search function. Don't hold your breath, but we are working on it. *Thank you!* Laurie Hodges