

Missouri Produce Growers Bulletin

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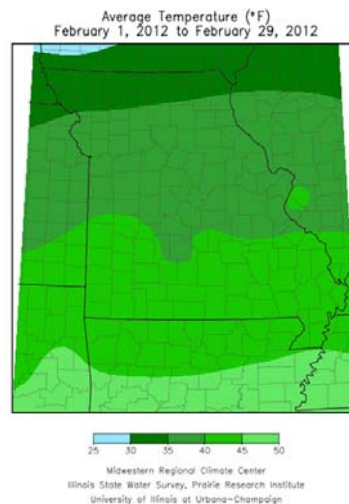
What Does This Warm Winter Mean for Insects?...by Jaime Pinero

This winter has been one of the warmest on record in many areas of the US including Missouri. According to Dr. Pat Guinan, State Climatologist for the Univ. of Missouri Extension, regionally, February temperatures averaged between 34-37°F over northern sections, 38-41°F across central MO and 40-43°F in the southern third of the state. Most days averaged above normal during the month with only 5-7 days recording below normal temperatures. Seasonally, about 70% of the days, from December through February, averaged above normal, and will rank the winter of 2011-12 in the "Top 5" mildest winters for MO, and the warmest since the

winter of 1991-92.

What does this mean in terms of insect's ability to survive and timing of appearance in the

farms? That question has been asked repeatedly but unfortunately the answer isn't clear. One may think that relatively warm weather may favor insect survival. However, many factors contribute to insect population dynamics. Spring and summer weather patterns, abundance of the insects' natural enemies, and crop growth and development are as big of influence on insect populations as winter weather. Mortality could actually be increased for insects that overwinter above ground due to a lack of snow cover, which can expose insects to days with below-freezing temperatures compared to years with adequate insulating snow cover. **Continued on page 3**



Lewis Jett Presents in N. Missouri.....by Tom Fowler (MU Extension)

Dr. Lewis Jett, former MU Extension Vegetable Crop specialist returned to Missouri to talk to growers at the North Missouri Produce Auction annual meeting in Jamesport. While in Missouri he did vegetable variety trials and work with high tunnel production. Dr. Jett left Missouri in 2007 and returned to his home state of West Virginia and is the State Extension Vegetable Crop Specialist at West Virginia University.

His research there is similar to what he was doing while here, and he shared some of what he has been doing and encouraged growers to think about expanding their production and marketing into the winter months.

The title of his presentation was *High Tunnel Salad Greens, Cukes, Blackberries and Other Profitable Crops*. Cucumbers were the first crop he discussed. There is a window for marketing cucumbers in the fall/winter when the prices are at their highest. The plants in the high tunnel must be trellised. Two methods of trellising were discussed. The most commonly used trellis system is the single string method of using one string per plant to train the plant up to an overhead wire. The other method is to use a mesh wire or netting method of training the plants. They are using high-density production in the tunnel with 12" between the plants and

each plant is pruned to one stem (lateral). From the trials he conducted, the recommendation is to use parthenocarpic varieties of cucumbers. These varieties produce fruit without pollination. See Table 1 for the results from Dr. Jett's cucumber variety trial.

He then discussed the vegetable crops that are being grown for Nov.-Dec. or Feb.-March harvest. They are growing salad greens and winter root crops. Some of the cold crops such as kale and mustards are being grown in single poly, unheated tunnels. Other cool crops such as lettuces and carrots are grown in high tunnels with low tunnels for added protection.

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Winter High Tunnel Crops Picking Up.....by James Quinn



Steven Kirk, Field Supervisor for the Commercial Vegetable Program at Lincoln University, stands behind a bed of mixed red and green lettuces in a Clark, MO high tunnel in early March.

Last year I encountered a few growers in Clark and Prairie Home who were growing winter crops in high tunnels. The number has expanded this year, and the crops are still a selection of lettuces and salad greens. For this winter it has increased to three in Clark with tunnels planted completely full, and two partially filled. There are four growers in Prairie Home with tunnels full. A couple of growers in Clark were kind enough to share information about their experience.

These sales arrangements started with distributors approaching them for supply. Some outlets these distributors use are restaurants, direct to consumers (e.g. farmers market), and stores. In some cases these distributors are regular customers at the produce auctions and are looking to continue supplying the demand for local foods through the winter. It's better to keep regular deliveries instead of totally shutting off their customers.

The market is driving what's

grown, which is the fresh cut and washed salad greens that have become so popular with consumers and restaurants as 'ready to use'. This product is generally sold by weight. Producing a 'whole head' of lettuce would be possible, but that type of product is not being requested. Spinach and other greens are sometimes sold in grocery stores in 'bunches'; this also has not been asked for. Generally a bed is formed and then the crops are planted in several rows (2 to 4), and these crops may be planted individually, or as a mixture. A number of seed companies sell mixes for this purpose now, such as Morgan County Seeds and Johnny Select Seeds. These are some common plantings:

- Lettuce individually
- Lettuce as a mixture of varieties
- Spinach individually
- Arugula individually
- Beet greens individually

- 'Greens' as a mixture, e.g. kale, arugula, cress, leaf broccoli, mustard (red or green), and Asian greens like mizuna, tatsoi, Chinese cabbage, or Pac Hoi (baby bok choy).

Many times the price is the same across all products. The price is higher if the grower needs to wash and spin it dry. The price per pound that I have heard growers receiving varied from \$3 to \$8 per pound, with the higher prices being direct sale prices like at farmers markets.

The beds are cut multiple times. While a bed may not be cut every week, a weekly pick up or delivery is generally desired. With a number of beds in production, having staggered harvests to meet this is ok. When the weather is warmer and days are longer (e.g. October or March), harvesting twice a week may be needed.

Continued on back page

Jett presentation (continued)by Tom Fowler

Growers in West Virginia are producing these crops and Dr. Jett believes there is potential to grow these crops in Missouri. He encouraged growers to research their potential and he also encouraged the auction managers to

offer some winter auctions to market these crops.

Small fruit is another crop with potential for the late season. They are harvesting berries from the last of August into the first part of Novem-

ber. Strawberry and raspberry production has been good. They are getting excellent production from their blackberries. Some of their growers are direct marketing but they are also having some late season auctions to market the crops. He suggested growers take a look at small fruits and considering trying them on their farm.

The NW Missouri growers had several questions for Dr. Jett and were glad he made the trip back to Missouri for their meeting. You can find high tunnel information by Dr. Jett on the West Virginia University web site. He can be reached by phone 304-293-2634 or email Lewis.Jett@mail.wvu.edu

Table I. Marketable Yield of a Short Season Crop-high tunnel cucumbers in West Virginia study from Oct. to Nov. 2011

Cultivar	Marketable cukes/plant (no.)	Avg. wt (lbs.)	Unmarketable cukes/plant (no.)
EXP 2856	5.9	0.5	0.7
Dasher II	2.5	0.4	0.7
Diva	2.0	0.4	0.4
P08040	6.3	0.7	0.7
P08051	4.9	0.6	0.7
Rocky	6.9	0.2	1.5
Socrates	5.2	0.5	1.3
Sultan	2	0.5	0
Tasty Green	2.8	0.8	0.8
Tyria	1.6	0.6	0.7

Nitrogen and Plant Nutrition...by Dave Trinklein

While plants need all of the essential mineral elements in order to grow, nitrogen is considered by many growers to be the most important. This is due in part to the large role nitrogen plays in the growth and reproduction of a plant, and the (relatively) short-lived nature of nitrogen in the soil. Two of the more important roles of nitrogen in the plant include the fact it is a major component of protein, and it is part of the pigment chlorophyll. The latter is responsible for intercepting the energy from light in the process of photosynthesis. Therefore insufficient amounts of nitrogen results in plants with a pale green color due to the lack of chlorophyll and reduced yields due to the lack of photosynthesis.

As an element, pure nitrogen is a gas and cannot be taken up by plants. Instead, plants take up compounds that contain nitrogen. As a fertilizer, nitrogen is available in two forms: nitrate (NO_3^-) and ammonium (NH_4^+). Given their preference, most vegetables (as well as other plants) would prefer to be supplied their nitrogen in the nitrate form. Nitrate nitrogen is readily available to the plant and typically has low salt index compared to fertilizers containing the ammonium form of nitrogen (e.g. ammonium nitrate or urea). Selecting fertilizers with low in salt indexes is especially important in

high tunnel production because of the tendency for salts to build in the latter. Unfortunately, a majority (by percentage) of the nitrogen found in many commercial fertilizers is in the ammonium form, due to its lower cost.

Fortunately, ammonium forms of nitrogen are converted to the nitrate form by nitrifying bacteria in the soil. However, this conversion is temperature-related and, in cool soil conditions typical of high tunnels or the spring of the year, the ammonium form of nitrogen can build up. For many vegetables the result is poor nitrogen nutrition; for sensitive species such as tomato ammonium toxicity can result. While fertilizers high in the ammonium form of nitrogen are acceptable for summer crops such as sweet corn, they are not acceptable for many vegetables, including tomato. Therefore it is to a grower's advantage to supply the majority of the nitrogen requirement of a crop such as tomato in the preferred nitrate form.

Along with a pre-plant fertilizer containing nitrogen, many commercial tomato growers choose to fertilize with calcium nitrate and alternate weekly with a fertilizer high in potassium (4-18-38). If phosphorus is adequate, then alternating

calcium nitrate with potassium nitrate is another possibility. Calcium reduces the occurrence of blossom-end rot and there is research that suggests potassium has a positive effect on fruit quality.

If a "general purpose" fertilizer is the primary source of nitrogen, be sure to check its label to determine the amount of nitrogen it contains in the ammonium form. For example, 20-20-20 is was one of the first water-soluble fertilizers available. However, it contains 72 percent of its nitrogen in the ammonium form which is not acceptable for tomato production. Most growers "fertigate", or apply nitrogen via a drip system as they irrigate. Most tomato roots will be concentrated in a 24- to 30-inch-wide section of the bed or row. Multiplying the root zone width by the length of each row and the total number of rows of tomatoes equals the effective bed width. Additional nitrogen often is at a rate of 8 to 10 pounds per acre per week, or 2.9 to 3.7 ounces per 1,000 square feet per week. Plant tissue testing is the best way to determine if a crop is being supplied with adequate amounts of nitrogen and should be conducted on a regular basis.

Warm winter and insects in 2012 (continued)....by Jaime Pinero

Mortality could actually be increased for insects that overwinter above ground due to a lack of snow cover, which can expose insects to days with below-freezing temperatures compared to years with adequate insulating snow cover.

In contrast, for insects that overwinter below ground (e.g., Japanese beetle grubs which can overwinter up to 10 inches deep into the soil) they will not likely be affected by a mild winter because soil temperatures are more constant. Another aspect that we need to consider regarding insect overwintering is that all insects develop based on ambient temperature. A warm winter day could cause some insects (e.g., woolly bear caterpillars) to become active when they normal-

ly should be dormant. This activity uses up stored fats they depend on to survive until the spring. And, without access to food, these active insects could starve to death before food becomes available.

Whether insect pest will be a problem this year in vegetable farms is therefore uncertain. For example, high populations of overwintering insect pests may cause little if any economic problems if spring weather isn't favorable, if natural enemy populations are high or if crop growth isn't favorable. Likewise, low overwintering populations may cause damage if conditions are good. Therefore, careful crop scouting for the insect, their damage

and natural enemies is necessary and will remain an important component of an IPM program. In 2011, preliminary monitoring of cucumber beetles indicated that a wave of striped cucumber beetles and a few spotted cucumber beetles appeared on one farm located in St. Charles, MO, on May 4, 2011. In 2012 we will be monitoring the timing of appearance of key insect pests of vegetables such as cucumber beetles, squash bugs, Japanese beetles, stink bugs, and tomato pinworm in various locations: St. Charles, Jefferson City, and Southwest MO. Updates on the observed timing of appearance in farms will be provided through this IPM Newsletter.

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M Extension



We'd like to thank the following agency for their financial assistance with our outreach activities, such as this newsletter and travel costs associated with educational activities.

EPA Region 7 Strategic Agricultural Initiative 901 N. 5th Street Kansas City, KS 66101 913-551-7003 or 800-223-0425

About this mailing list

You are being mailed this newsletter because you were involved in some type of MU Extension program recently. Names and addresses are only kept by your local specialist or James Quinn. They will not be shared with anyone else. If you would like to be removed please

let me know-

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Winter Crops (continued)....by James Quinn

Two or three crop cycles are possible in a given area. For three crops one will probably need to plant in early September. One can probably get one turn in the fall, plant again in late October or early November, harvest it in January and early February, and finish with a final planting to yield through March. With 3 crop cycles (as reported by a grower from Clark this year and last year from Prairie Home) the gross sales per square foot was about \$1. For growers wanting to plant tomatoes early (e.g. mid February or early March), only two crop cycles are feasible. Some growers have tried intercropping tomatoes with lettuce, basically having a lettuce row on the outside edges of the bed, with tomatoes down the middle, with the final lettuce harvest being at the end of March or early April. This can work, but the initial tomato growth may be suppressed and there is a risk of transferring the primary lettuce insect pest to those tomatoes.

As compared to tomatoes, the input costs are quite minor.....some seeds, a little fertilizer like compost, if any. Some extra cash in the off season, little expense, so what are 'cons' to these 'pros'? Time to harvest was mentioned, but with the qualifi-

cation that they aren't as busy in the winter. Two pests were bemoaned, aphids and chickweed. Surprisingly on aphids, a crop completely free of them isn't needed, as they are washed out during that cleaning and spinning process. Keeping the production area as weed free as possible is the best defense against both. Grouping the beds into sections to till under at the same time will help with aphids, as they will have to move further to that new food supply. Perhaps the biggest risk is reducing or delaying the following crop yield, which is typically tomatoes, as the gross sales for that crop is \$3 to \$4/sq foot.

Clearly the demand for local foods is driving this market. Otherwise it would be easier to order in the product rather than travel the back roads in the winter for product that is relatively low volume compared to the April to October products. Opportunity with the customers at a number of produce auctions may exist. If some of those customers know that a number of high tunnel growers would be willing to produce through the winter, they might in turn see if they can find outlets to support the sales for some interested growers.

MU's Plant Diagnostic Clinic has closed!!!

A starburst graphic with a black and white pattern, containing the text 'MU's Plant Diagnostic Clinic has closed!!!' in a serif font.

MU's Plant Diagnostic Clinic closes

As in 2010, the diagnostic clinic will be closed this growing season. Plans are underway to reopen it next year and restructure the financial support so this does not happen again.

There are quality diagnostic clinics in the states adjoining to growers receiving this newsletter -

Arkansas, Iowa, Kansas and Oklahoma.

Included as an insert is the form by which you would submit a sample to Kansas State University. This is not meant to be an endorsement of one diagnostic clinic over another, but for your convenience if you need. Other clinics use a similar form.

KSU's price is \$5 for routine analysis, and \$10 or \$20 additional tests needed, like for viruses. They suggest sending by Priority Mail US Postal Service. Send on a Monday or Tuesday. You will be billed for their service (no need to pay with sample submission).