Missouri Produce Growers Bulletin

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Progressive market steps taken by CMPA...by James Quinn

Central Missouri Produce Auction (CMPA) implemented a number of changes this year. The most significant is now two auction rings are occurring at the same time for the majority of the auction. This began right away with their early plug and plant sales. Starting right away has helped buyers to adapt. The auction rings are conducted nearby so that buyers can monitor both rings at the same time. It is more demanding on the buyers' attention though. One main advantage of this change was noticeable right from the beginning; the auctions are finishing much quicker, roughly in about ½ the time compared to previous years.

As the season progressed, growers began bringing their flats, hanging baskets, and other plants in on wagons. Thus a wagon auction ring occurred while a multitude of other flats and plants were auctioned off of rolling racks from an adjacent ring. With most plant sales having ended and the shift to produce, another significant change has ensued; products are no longer auctioned from wagons. Now products are unloaded onto carts on the auction floor. Two auctioneers work their way down parallel cart rows, proceeding about the same pace so that they are reasonably close. There are two main benefits to this, the produce is under cover and out of the sun and the growers can come early, drop their produce and return to their farms.

So why these changes this year and are they being used elsewhere? A catalyst for the change was the drought last year and the intense heat having a negative effect on the produce as it was out in the hot sun on wagons waiting to be auctioned. It was so hot that even when covered by box lids, some produce was affected and buyers (justifiably) raised concerns.

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Colony Collapse Disorder, the Varroa Mite, and Resources for Beekeepers.....by Travis Harper

There's no question that the biggest story in beekeeping since 2006 has been colony collapse disorder (CCD). Colony collapse disorder is a phenomenon in which workers bees abruptly disappear from a hive. Colony losses as high as 90% have been reported by beekeepers every year since 2006. There have been a number of agents blamed for CCD including: malnutrition, pathogens, immunodeficiencies, mites, fungus, pesticides, beekeeping practices, electromagnetic radiation, or a combination of the above. The exact cause is still unknown but most researchers agree that it is probably a combination of factors.

It has become easy and popular to blame the loss of bee hives on CCD. To be classified as CCD, there are three conditions that must occur simultaneously: there must be capped brood present, there must be food stores present that are not being robbed by other bees, and the queen bee must be present in the hive. **If these conditions are not met, it is not colony collapse disorder.** The fact is that most of the hive losses that do occur, especially those that occur under the watch of small or hobby beekeepers, are not due to CCD at all. There are a variety of reasons why a colony may die but most of these are related to a single pest, the varroa mite.

The varroa mite is today, and has been since the 1980's, the most serious pest of honey bees in the United States. Varroa mites will attach to bees and feed on their hemolymph, weakening the bee.

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Bees, Mites and CCD...continued

Varroa mites can be seen with the unaided eye but beekeepers should rely on one of the methods described in MU Extension Guide G7600 Beekeeping Tips for Beginners to accurately determine the level of hive infestation.

During this process the varroa mites will transmit a number of viruses to the bees, including deformed wing virus. The open wound left by varroa mite feeding also makes the bee more susceptible to a number of diseases. A weak, diseased colony will raise fewer bees and store less honey for winter. Varroa mite populations build quickly in the spring and summer causing a bee population crash and hive death from late fall through early spring, about the same time that most losses due to CCD are reported. Every honey bee hive in Missouri has varroa mite and, unfortunately, the majority of hobby beekeepers do nothing to control them.

A plastic strip impregnated with fluvalinate (sold under the brand name Apistan) was found to be very effective in controlling varroa mites. Unfortunately this product was used extensively, and often incorrectly, throughout the 1980's and 1990's resulting in a resistant population of varroa mites. A number of products containing coumaphos and thymol have been introduced since. These products have been shown to be effective but, like Apistan strips, cannot be used when honey supers are present. In addition, research and practical experience have shown that beekeepers should not rely on a single product for mite treatment. Varroa mite control should be approached from an integrated pest management (IPM) standpoint.

The first step in using IPM to control varroa is to determine whether the population of varroa mites warrants treatment (i.e. exceeds the economic threshold). University of Missouri Extension guide G7600 *Beekeeping Tips for Beginners* describes two methods for determining the level of mite infestation. This guide is available at every county extension office in the state. These "mite checks" should be performed monthly from March through October. If mite levels exceed the economic threshold and honey supers are not present, active controls such as Apistan, Apivar, or Apiguard (thymol) can be applied.

Many beekeepers are interested in minimizing the use of pesticides in their hives and taking a more natural approach to mite control. There are a number of strategies available that, when used properly, can be very effective in keeping mite levels low. These strategies include the use of drone cell foundation, screened bottom boards, or powdered sugar dusting. Ross Conrad's *book Natural Beekeeping* goes into great detail on these and other strategies for controlling varroa mites. This book is available for purchase from any of the major beekeeping suppliers. Taking advantage of honey bee genetics can also help with varroa mite. The Russian strain of honey bee has been shown to be resistant to mite infestations. Researchers in the United States have also taken advantage of a behavioral trait known as varroa sensitive hygiene (VSH) to breed entire lines of bees that are more resistant to varroa mites. Russian bees as well as VSH bees are available from most bee breeders across the country.

Keeping a colony of bees healthy is more difficult in the 21st century than it has been at any other time in history. Fortunately, the resources available to hobby beekeepers are greater than ever before. The Missouri State Beekeepers Association is an excellent source of expertise and assistance as are many of the local beekeeping associations found throughout the state. *Bee Culture* is a magazine geared specifically toward small and hobby beekeepers. Penn State Extension has a good online beekeeping course and many states have master beekeeper programs and/or researchers dedicated entirely to studying honey bees. The United States Department of Agriculture has honey bee research laboratories in Maryland and Louisiana. If you are looking for information regarding honey bees and beekeeping, it is out there. If you need assistance finding it, contact your county extension office.

Figure 1: A worker honey bee parasitized by a varroa mite

IPM shorts from around the state and other items of interest

IPM Shorts

- ⇒ Spotted wing drysophila has been found at Lincoln University traps near St. Louis & Springfield.
- ⇒ Cucumber beetle numbers seem low this year. Reason? Last year's drought or the heavy rains this year are the best guesses.
- ⇒ Detrimental herbicide drift from spraying on windy days seemed to be bad this year, or we just received more reports of it. The rainy spring time constrained many spring farming activities.
- ⇒ Zucchini issues fruit set problems. Likely causes are due to rainy conditions, either failure to pollinate or Choanephora wet-rot (blossoms & fruit).
- ⇒ Cucumber mosaic virus on tomatoes from Western Missouri.
- ⇒ Bacterial spot on peppers. ***To control a bacterial disease, use copper*** not a fungicide.

Update- Food Safety Modernization Act

- Just after the April newsletter went to the printer, the deadline for comments regarding the proposed rule were extended into September. The date in April was an error.

Also accompanying this newsletter

A publication from NC Cooperative Extension on herbicide carryover in manure, hay, compost, and grass clippings. A wide variety of incidences related to these type of highly persistent active ingredients occurred over the years, including:

- Commercially produced compost (2011 & 2013) with manure being the source.
- Pasture soil moved to build up a high tunnel.
- Commercial growing media! Theory is ground bark was contaminated by Tordon (brush killer), which contains picloram.
- Municipally produced compost; brush killer or a turf herbicide could be the source.

Tomato Fruit Ripening Disorders…..by Dave Trinklein

The journey of a tomato from an unopened flower to a mature, harvestable fruit is a tenuous one. Many things can happen along the way that can render the fruit of lesser value or, in some cases, totally worthless. A number of tomato ripening disorders have been witnessed this year and in recent past years. They include blotchy ripening, gray wall, white core and yellow shoulder. Collectively the literature refers to these as tissue ripening disorders.

First, it is important to remember that these are disorders—not diseases. Disorders normally are caused by environmental conditions whereas diseases are cause by plant pathogens. Disorders cannot be spread from an affect plant to a healthy one; diseases can. Symptoms of blotchy ripening, gray wall, white core and yellow shoulder often occur when the plant is under stress or when the environment changes rapidly. Periods of hot weather following unusually cool, raining example are a good example of the latter.

There are several keys to controlling tissue ripening disorders; the first being variety selection. For example, tomatoes with the "green shoulder" trait are more prone to develop yellow shoulder than those that have the uniform-ripening gene. Additionally, some varieties are more likely to develop white core than are others. Review University field trail data for ripening disorder ratings before selecting a tomato variety; new varieties should be grown on a limited scale the first year.

Second, proper management of the plants' leaves (crop canopy) is very important. Here we have a bit of a dilemma since yellow shoulder is more prone to develop in open canopies. The heat stress associated with fruit exposed to the sun has been indicated as a cause for yellow shoulder. In contrast, blotchy ripening often is associated with dense crop canopies. Fruit hidden from the sun in dense foliage are much more likely to develop blotchy ripening then those less shaded. A good crop canopy allows for air circulation which is important for preventing foliar diseases. It will be heavy enough to allow for shading of the fruit but without excessive vegetation.

Third, and (arguably) most important is potassium nutrition. Nearly all of the literature involving the afore-mentioned ripening disorders links them to potassium in some way. Tomatoes are very heavy potassium feeders and a shortage of the element during fruit development and ripening often leads to fruit ripening problems. Depending on soil test results, tomatoes should be supplied with about 200 pounds of potassium (expressed as K_20) per acre to grow a productive crop. One-half of this should be applied as "plow down", before the plastic is laid.

Additional potassium during the ripening period should be applied through the drip irrigation system. Beginning when the oldest tomato fruit are the size of a dime, begin applying potassium nitrate at the rate of between 10-12 lbs./acre/week. Double this rate when the oldest fruit are about 2 ½ inches in diameter until time of peak harvest. Finally, the rate can be stepped back to 10-12 lbs./acre/week just after peak harvest until the end of the crop.

The above recommendations are for potassium expressed as K_20. Make certain you know the percent potassium in the fertilizer used and adjust injection rates accordingly.

In summary, fruit ripening disorders must be prevented; they cannot be cured. Strategic variety selection, good manage-

Market Changes at Central Missouri's Auction…..continued

The length of time for a typical (busy) auction has been a concern for some time and the sentiment was that the auction could try and do more to appeal to buyers who are time constrained. These are often buyers who need larger quantities. So in the summer and fall of 2012 five different auctions were visited in PA, IA, and MO to consider options for changing the auction. In addition to the auction manager, individuals going on these visits included board members, growers, shareholders and employees.

They returned with the ideas to start two auction rings and to use the facility floor space to stage fresh produce, instead of on wagons. Larger auctions have been using more than one auction for some time; the auction in Leola, PA uses up to four! Discontinuing drive-thru is a relatively new concept, but was seen as the trend as more auctions see the benefit of letting growers unload and get back home to work. With these changes they had four goals in mind:

- Limit the time the produce out of the sun.
- Keep the auction selling time to under 3 hours, a time recommended by the experienced large auctions back east.
- Allow the growers return to the farm more quickly.
- Eliminates the huge burden of unloading produce off of wagons during sale time.

Another change will start in July to assist the sale of larger volumes. A 'large lots' auction will open the sales day. The auctioning of large lots will be conducted on the lower floor and will have the minimum size of 10 boxes or a bin.

Are there any negatives to these changes (besides the increased demand of buyers attention to concurrent auctions)? Of most concern is the lack of placing a personal connection of the grower to his product, which was very obvious when he would pull the load past on a wagon. To compensate growers are encouraged to stand by their product at least some of the time at some auctions. The food stand sales has decreased substantially, as buyers are often too busy to eat and the auction doesn't stretch across the lunch hour like it used to so often.

Thus far most everyone is enjoying spending less time at the auction and more at their farm or business. A good time to check out these changes is when the next Central Missouri farm tour will be held, which is August 28th. The auction begins at 10 and the tour will likely start at 11:30 since the auction is finishing so much quicker.

My appreciation to James Ramer, Manager of CMPA for his input and assistance with this article.

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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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MU's Plant Diagnostic Clinic is not open this summer

MELCAST– what is it and how to use it .....By Zelalem Marsha

(Editor's note– this continues a short article from the April edition.)

MELCAST – What for? MELCAST is a spray-advisory program to control Alternaria leaf blight, Anthracnose and Gummy stem blight diseases on watermelon and cantaloupe. It is NOT applicable to any other diseases like Bacterial blotch and Powdery Mildew. For more than 10 years, the system has been tested in different parts of the country and helped farmers to save 1-2 sprays of fungicides per season.

MELCAST – how does it work? In simple terms MELCAST advises farmers to start the first spray when the vines touch within a row and to continue their spray plans based on environmental favorability in that particular location. If you live within a 20-25 miles range of the four locations in Missouri, you would be able to get a value which technically is referred to as **Environmental Favorability Index (EFI)**. To learn more about using the MELCAST system and how to access the data please contact Zelalem Mersha (mershaz@lincolnu.edu, 573-681-5634), Sarah Denkler (denklers@missouri.edu, 573-686-8064) or visit the following website to get an update of the EFI values (http://btny.agriculture.purdue.edu/melcast/).

What is an EFI value? This is a value developed through many years of experimentation at Purdue University. These studies have developed models which assign a daily value in the scale of 1 (not favorable) to 10 (highly favorable) for a given location, at a particular time based on the prevailing weather. Growers will sum up these EFI values over a certain number of days to make an informed decision when to spray.

What are the rules to spray? The principles of the MELCAST's spray plan work similar to the mileage based service or oil- change of our cars.

1) Start to spray at or before the **vine-touch** with in a row and **record the EFI value** for the day that the fungicide was sprayed.
2) Calculate the threshold for the next spray by adding **20 (for Cantaloupe)** or **35 (for Watermelon)** EFI values to what was recorded in step 1, and then spray your next fungicide.
3) Make your next fungicide application based on the **20** or **35 EFI** cumulated values. If the thresholds are not reached within **14 days** after step 2, then spray your field.
4) Recalculate the EFI value based on the thresholds and continue the spray plan until the end of the season. Keep in mind the **14-days interval** if the thresholds are not achieved.
5) Make sure to follow the **REI (Re-entry Interval)** and **PHI (Pre-harvest interval)** of the fungicides in your spray plan to decide when to re-enter your field or to harvest your crop, respectively. For the comprehensive list of fungicides, please refer the Midwest Vegetable Production Guide 2013. You can either buy the book or download the electronic version from http://www.btny.purdue.edu/pubs/id/id-56/ or <mwveguide.org>.

To read more about MELCAST and other disease management topics on horticultural crops, visit the website:

http://www.extension.purdue.edu/extmedia/BP/BP-67-W.pdf .