Cranberry Field Day

CHANGES IN ESTABLISHED PRACTICES!!

Cranberry Growers—please be advised that there will not be a Cranberry Farm Science Review this August. Instead, we are planning a Cranberry Field Day for June 10, 2010, from 9:00 am—12:30 pm. We are doing this so that we can focus on an important theme this year: “Growing Cranberries on a Budget”. I am still working on the final agenda, but likely topics will be:

- Pesticide Knock-Offs (Generic makers of chlorothalonil, glyphosate, etc.)
- Pesticide Shelf Life (How long is that pesticide effective?)
- How to Use Tensiometers
- Fireworm spray timings
- Fungicide Applications—how little can you get away with?
- Fertilizing for Less—what is needed to supply your beds with all the required nutrients without losing bed health or yield?
- There will also be updates about on-going bee research and fertilizer trials. Pesticide credits will be requested for this event.

For those of you who need your late season Meet and Greet with other growers, there will be a Core Pesticide Recertification Training in August (date to be scheduled) on Pesticide Storage.

AgriMet Meeting

On Friday, April 16th, from 1:00 pm until 3:00 pm, a meeting will be held to discuss the AgriMet Weather Station. We will be discussing how growers can utilize AgriMet weather data and how the information that the station generates is helpful to researchers. Speakers for the event will be Peter Palmer, the AgriMet Program Manager from the Bureau of Reclamation; Bernadine Strik, from OSU Department of Horticulture; David Bryla, from the USDA-ARS, Corvallis; and myself, Linda White. The meeting will be held at the Bandon Library Conference Room, 1204 11th St. SW, Bandon. The meeting is free to anyone.

Come and learn how the AgriMet Weather Station can be useful to you!

Contact the Coos County Extension office with any questions.

Cranberry Watch

This growing season has started out strangely. A cold and dry early December and a mostly warm and dry period from January through early March—then rain, rain, rain, with intermittent hail. It’s too early to tell how the frost and growing season will shape up, but as the weather (hopefully!) clears, here are some things to keep in mind.

Problem Weeds: Lotus (Lotus corniculatus), can be very susceptible to the herbicide, Callisto (mesotrione). However, it needs to be treated at a small stage, and two applications of Callisto should be used.

Perennial grasses (not sedges or rushes): For pre-emergent control, Devrinol can be very effective, however, it will most likely not last through the entire season. So for post emergent control of perennial grasses, consider Select, which works most effectively if applied when the plants are actively growing in the spring.

(Continued on page 2)
Cranberry Watch (cont.)

Yellow weed (*Lysimachia terrestris*) and Sheep Sorrel (*Rumex acetosella*) are both very difficult to control weeds. There is no silver bullet for the control of these weeds, however, Kim Patten of WSU is testing a few new promising herbicides. Casoron applications may help control or suppress these two weeds to a slight degree. Wiping with glyphosate products may also help, but can be difficult to achieve. Do your best to keep both of these plants from seeding.

Insect pests: Fireworm. Kim Patten has done a lot of research on control methods for fireworm. If you don’t want to use Diazinon, due to the new buffer zone requirements (see page 3), your options are Delegate, Assail, Intrepid, Avaunt, Confirm, or the two organic options of Success and Entrust. All of these products work best on small larvae—1st or 2nd instar, so correct timing is essential for the best control. Intrepid and Confirm are bee safe, while all the others are moderately or very toxic to bees.

Finally, on Black vine weevil control. For management of the adults, Assail and Avaunt show fair to good results, respectively. As with fireworm control, timing is extremely important with the use of these products. Use sweep nets at night to monitor for the first adult emergence and make your applications at that time.

Remember, to read and follow the label instructions as the label is the law. If you need more information on any of these products—or have questions, please feel free to contact me.

Spotted Wing Drosophila (SWD)

Spotted Wing Drosophila—is it a problem on the southern Oregon Coast? The short answer is “yes”. In 2009, the pest was found in blueberries in the area—and it may have been infesting other ripe fruit. The fly has the potential to seriously impact many Oregon crops, so Oregon, Washington, California, and USDA researchers are hard at work studying and monitoring, with the goal of controlling the pest. If you are interested in gaining more knowledge about the research efforts—or would like to learn more about the best, or potentially monitoring methods, OSU has a new web-site about SWD. It is: http://swd.hort.oregonstate.edu/

I will also be holding a short training about the insect, its lifecycle, and monitoring techniques on May 19, 2010, from 4:00 pm—5:30 pm at the Bandon Library meeting room. Please contact the Coos County Extension Office at (541) 572-5263 to register for the event.

I may also be looking for monitoring sites—specifically in cranberries and blueberries—but would be happy to consider other crops. I may also need some minimal help in the set-up and observation of the sites. Please contact me at (541) 572-5263 x285, if you are interested in more information.

New Publications

There is a selection of new and updated Extension publications on a variety of topics that may be of interest:

**EM 8995 E, Oregon Cranberry Practices Calendar.** 7pages, No charge, (online only).

**EM 8981 Oregon’s Bounty of Horticultural Crops and landscapes.** 40 pages, $15.00.

On-line publications can be obtained at; http://extension.oregonstate.edu/catalog/

These publications can also be obtained at the Coos County Extension Office.

Water Resources Open House

Oregon Integrated Water Resources Strategy is hosting an Open House in Bandon on April 22, 2010, from 4:00 pm to 7:00 pm. The event will be held in the Bandon Conference and Community Center—“The Barn”, 1200 11th St. SW, Bandon.
New Buffer Zone Requirements

History of the Issue

The Environmental Protection Agency (EPA) was sued by the Washington Toxics Coalition and other environmental and fishing groups for failure to consult with the National Marine Fisheries Services (NMFS) and in 2002 the court found that the EPA violated its obligations under the Endangered Species Act, and it ordered the EPA to complete an “effects determination” on 54 pesticides. In a separate ruling in 2004, the Court ordered that buffer zones be implemented as a protective measure to endangered species. These buffer zone regulations were not on any pesticide labels. The buffer zone specifications are for salmon-bearing streams, and were to remain in effect until the EPA consultations with NMFS were completed or it was determined that consultations with NMFS were not needed.

In 2004, EPA completed consultation with NMFS, but 2 problems arose. First, it was determined that 26 of the 54 pesticides slated for consultation under the Court ruling could “effect” listed salmon, and secondly, no biological opinions were issued the NMFS. Due to this lack of NMFS was sued to a “failure to consult” ruling. NMFS settled this lawsuit in 2008 by agreeing to complete consultations on 37 pesticides that would potential effect any salmon and steelhead listed on the endangered species list.

In November of 2008, NMFS released the first part of their biological opinion. This opinion related to Chlorpyrifos, Diazinon, and Malathion. NMFS stated that buffer zones should be in effect for 500 feet from streams by ground applications and 1000 feet from streams by aerial applications. In April 2009, further opinions were released on Carbaryl, Carbofuran, and Methomyl stating 50-600 foot buffers from streams by ground applications, and 1000 foot buffers by aerial applications.

The Saga Continues: The EPA did not fully agree with the NMFS opinions and responded by making their own actions based on internal data, risk assessments and models. This promoted EPA to six specific label changes. These label changes are:

1. Spray drift buffers – will vary based on spray droplet size, application rate, and water body size – but will not be less than 100 feet.
2. Wind speed restrictions – no applications when wind speed exceeds 10 mph and applications are to be made proceeding first from the body of water and then moving away.
3. Vegetative run-off buffer – the EPA states that no vegetative buffer is needed (but the NMFS indicated that there should be a 20 foot buffer adjacent to salmon bearing waters.
4. Soil moisture / 48 hour storm restriction - EPA will require that a pesticide may not be applied when fields are saturated or when a storm event likely to produce runoff is forecasted by NOAA/NWS to occur within 48 hours.
5. Fish mortality incident reporting requirement - EPA will require pesticide users to report all incidents of fish mortality that occur within four days of application and within the vicinity of the treatment area to the pesticide registrant (Not EPA).
6. Effectiveness monitoring program for off-channel habitats - EPA will require registrants of the organophosphate pesticides to fund, and conduct the monitoring study once the protocol is developed.

What this means for you. All of Coos and Curry counties are within the mitigation area and have buffer zone limitations. New pesticide labels will refer users/applicators to the on-line “Bulletins Live” system. On this site the user will need to enter the intended application information and the system will determine the legal buffer zone requirements, plus list any other restrictions. The web requirements are enforceable. The Bulletins Live website address is: http://www.epa.gov/espp/bulletins.htm

Over the course of the next two years, 31 other pesticides are slated to be litigated under the buffer zone requirements. Some of these pesticides are very commonly used and include 2, 4-D, triclopyr, chlorothalonil, captan, phorate, phosmet, and ethoprop, to name a few.

If you have questions or concerns, or need help with the Bulletins Live web-site, feel free to contact me, Linda White, at the Coos County Extension Office. Or you may go to the ODA website at: http://www.oregon.gov/ODA/PEST/buffers.shtml
Oregon cranberry (*Vaccinium macrocarpon*) growers face numerous challenges to achieve successful pollination of their crop. During cranberry bloom, typically an approximately six-week period between mid-May and mid-July, the southern Oregon coast experiences cool, windy, cloudy, and rainy weather conditions. These conditions are unfavorable to many pollinating insects, including the widely utilized European honey bee (*Apis mellifera*). Additionally, because of floral architecture, cranberry flowers are not effectively pollinated by nectar foraging insects (*Carpevai*). However, cranberry plants require pollination for sufficient fruit set.

Like many other producers of pollination-dependant crops, cranberry growers depend upon the services of the European honey bee. Unfortunately, honey bees prefer to forage in fair-weather conditions (in sunny conditions with temperatures of at least 55°F, low wind speeds, and no rain), and on some days during the crucial cranberry bloom, these pollinators hardly leave their hive (McKenney et al. 2010). When these bees do leave their hives, they seem to prefer other flowers, thereby leaving questionable efficacy of honey bees in cranberry pollination. To compensate for this inaptitude, growers rent large numbers of hives, usually two per acre, and saturate the area with honey bees. Recently, growers have also been contending with raising prices and decreasing availability of honey bee hives, perhaps in response to the infamous, Colony Collapse Disorder. Because domestication practices are well understood for honeybees and they are by far the most widely available pollinators used by growers, these insects are the most common pollinators used by growers.

Though native bees are very common, and are frequently seen visiting cranberry flowers, their impact on cranberry pollination is not well understood. Bumble bees (*Bombus* sp.) are the most frequently observed native visitor to cranberry plants. The impact on cranberry pollination is potentially great because they are highly adapted to local weather conditions. In fact, bumble bees are known to forage in the cool, wet conditions that typically keep honey bees indoors. Another advantage to bumble bees is that their large fuzzy bodies can hold copious amounts of pollen. In a typical visit, bumble bees will deposit 60 pollen tetads compared with honey bees which deposit 10 (Cane 2003). There are currently four abundant bumble bee species on the southern Oregon coast and all occur on cranberry farms; *B. vosnesenskii*, *B. melanopygus*, *B. mixtus*, and *B. californicus*. *Bombus occidentalis* was formerly the most common, but it now appears to be locally extinct. Bumble bees are not widely utilized (at least not intentionally) by growers because domestication of this genus is comparatively difficult and availability of reared bumble bees is currently scarce. Presently, commercial bumble bees cannot be introduced into Oregon as the species that are sold are not native.

Our objective was to compare pollination by bumble bees and honey bees in Oregon cranberry crops. With this quantifiable assessment, we can begin to evaluate whether bumble bees are a viable alternative to honey bees.

**METHODS**

To uniformly isolate the effects of each pollinator, we used sewn plastic mesh over cube-shaped PVC frames and covered one-square-meter plots of ‘Stevens’ variety cranberry plants during bloom. The cages were tightly secured to the ground using tent stakes and directly connected to hives with plastic tubing through a zipper. Cages were erected prior to bloom to exclude all visitors. On May 27, 2009 at about 10% bloom, we connected the hives to the cages. Outside the cages, 99% of flowers were gone by July 8, but inside the cages, flowers remained until July 22, at which point, we disassembled the cages.

Figure 1: Research site

The following treatments were compared: 1) bumble bees; 2) honey bees; 3) closed (no bees); and 4) open pollination (all bees). Two disparate cranberry beds each held two repetitions of the four treatments. Figure 1 shows the research site. The bumble bee hives, housing approximately 20 individuals, were the results of locally captured *B. vosnesenskii* queens reared in Corvallis, Oregon. Occasionally, when no bumble bees were observed within their respective cages, we caught three wild bumble bees and placed them within the caged area. Honey bee hives were nucs from Corvallis, Oregon which began the season with approximately 500-1000 individuals. All bumble bee and honey bee hives had two openings; one which lead to the interior of the cage and one which lead outside. The closed pollinated plots, enclosed by cages, were intended to experience no pollinator visitation by any species. Whereas, open pollinated plots had no surrounding cage, and could receive visits from any pollinator. The make-up of open pollinated plot visitors likely included not only honey bees and bumble bees, but a variety of other native pollinators. Although honey bees and bumble bees are most commonly observed visiting cranberry flowers, other native pollinators detected on cranberry farms were from the following genera: *Andrena*, *Apis*, *Ceratina*, *Melissodes*, *Synhalonia*, *Colletes*, *Agapostemon*, *Halictus*, *Lassioglossum*, *Megachile*, and *Osmia* (McKenney et al. 2009).

We evaluated pollination success using four parameters; yield (barrels per acre), number of berries per square foot, size of berries, and number of seeds per berry. All berries within a one-square-foot area from the middle of each plot were picked, weighed and counted to determine yield and number of berries per square foot. Later, sub-samples from each plot were taken from the previously picked berries; 25 were measured with calipers and 12 had the number of seeds counted. Though barrels per acre and berry count per square foot may be obvious indicators of good pollination and fruit set, research indicates that successful pollination may also be observed by larger fruit and high numbers of seeds (Ratti 2008, Cane 2003). Data were analyzed with an Analysis of Variance (ANOVA) using statistical
analysis software (SAS).

RESULTS

When evaluating on a per hive basis, all measurements of pollination success showed that bumble bees are not significantly different from honey bees in pollinating cranberries (See Figure 2). However, considering the disparate population numbers of the two types of hives, bumble bees perform an astoundingly higher amount of pollination in cranberries than do honey bees.

Though cages were tightly secured to the ground with many stakes on every side, bumble bees were found on multiple occasions inside the honey bee and “closed” cages. We suspect this is related to the tendency of bumble bees to crawl between cranberry flowers rather than fly. These bumble bees likely served to enhance the apparent pollination success of honey bees and closed pollination.

Because the cages blocked a certain amount of water, nutrients, and light from reaching nearby cranberry vines, they had a noticeable detrimental effect on the apparent health of the plants. Though the open pollinated plots were not surrounded by cages, they too suffered from resources being blocked by neighboring cages, and this can be observed in the yield data. The open pollinated plants in our study yielded about 222 barrels per acre. A typical Oregon ‘Stevens’ variety cranberry bed will yield 250-300 barrels per acre. The beds of the study normally yield about 300 barrels per acre.

DISCUSSION

Pollination services performed by native bumble bees are potentially significant. Our study shows that, in a captive setting, one nest of bumble bees can perform as well as one hive of honey bees, despite the great differences in the number of bees per nest/hive. Because of the abundance of bumble bees on cranberry farms, nests likely occur naturally on or nearby these operations. Thus, one free bumble bee nest may be doing the same amount of pollination work as one costly honey bee hive. Additionally, if the same data are analyzed on a per bee basis, one bumble bee in our study performed the same amount of work as 25-50 honey bees.

One limitation of this study is that the behavior of caged bees may not necessarily imitate the behavior of bees outside of captivity. Future studies need to determine the foraging preferences of unrestricted bumble bees to further evaluate their potential as cranberry pollinators. Options for encouraging bumble bees on cranberry farms by providing suitable nesting sites and season-long forage also should be explored.

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LITERATURE CITED


Upcoming Events and Workshops

April 16, 2010
AgriMet Weather Station Meeting
1:00 pm—3:00 pm
Bandon Library Meeting Room, Bandon

June 10, 2010
Cranberry Field Day
9:00 am—12:00 pm
Buses will leave from both Bandon and Langlois
More information will be forthcoming

May 19, 2010
Spotted Wing Drosophila—Updates and Monitoring
4:00 pm—5:30 pm
Bandon Library Meeting Room, Bandon

August, 2010
Core Pesticide Training - Pesticide Storage
Place, Date and Time TBA