SEPTEMBER 2013
NEWSLETTER OF THE ALAMANCE COUNTY BEEKEEPERS

Remember…
****
What's Blooming?
Sumac, Alsike clover, Ladino, (white clover), Sweet Clover, Sourwood

I

Alamance County Beekeepers

This month's meeting...

. Our Thursday, September 19th meeting at the Alamance County Extension building will begin at 6:00 pm with a cover dish meal. At 7:00 pm, Dr. John T. Ambrose, Professor of Entomology, Distinguished Undergraduate Professor Emeritus & Dean Emeritus of Division Undergraduate Academic Program will discuss "Honey Standard – Background, Where we are and Where we would like to go"

from Debbie Roos, Agricultural Extension Agent Chatham County Cooperative Extension:

"If you want to attract more pollinators to your farm or garden, or if you just want to expand your perennial garden and provide resources for pollinators and other wildlife, then Chatham County Cooperative Extension has a workshop just for you, and just in time for the fall planting season! Learn how to create a pollinator paradise like the one found at Extension's pollinator garden at Chatham Marketplace in Pittsboro: <http://go.ncsu.edu/pollinator-garden>
Wednesday September 25: Pollinator Conservation Workshop and Garden Tour from 2:00-5:00 pm
The Chatham County Center of North Carolina Cooperative Extension will offer a pollinator conservation workshop and garden tour as part of its *Enhancing Sustainability Series* on Wednesday**,** September 25, from 2:00-5:00 p.m. in the auditorium of the Agriculture Building in Pittsboro.

Chatham County Agricultural Extension Agent Debbie Roos will give an overview of North Carolina pollinators and discuss the role of native bees and managed bees in crop pollination. Participants will learn about the principles of planting a pollinator garden and - just in time for fall planting - how to select trees, shrubs, herbaceous perennials, herbs, vines, and grasses to attract a diversity of pollinators. Debbie will emphasize native plants but also include a few other plants that provide good resources. The workshop will include a tour of Cooperative Extension's demonstration pollinator garden at Chatham Marketplace, about half a mile from the Agriculture Building. The garden is comprised of ~140 different species and cultivars, 85% of which are native to the piedmont of North Carolina.

**** I have partnered with Chatham County's **Mellow Marsh Farm** to be able to offer each workshop participant several perennial butterfly weed plants (*Asclepias tuberosa*) to take home to plant for pollinators! This species is great for both bees and monarch butterflies.

Take a virtual tour of the pollinator garden to see how it progresses through the seasons: <http://go.ncsu.edu/pollinator-garden-virtual-tour>

Advance registration is required by September 19. Visit the Growing Small Farms website at <http://go.ncsu.edu/gsfworkshops> to download a registration form. Space is limited so register early!
Advance registration is required by September 19. Space is limited so please register early to reserve your spot. The cost of the workshop is $15 and includes a CD of resources and perennial butterfly weed plants. Call 919-542-8202 or email Debbie Roos for more information. To register, download the registration form and mail with your check.

by Eric Mussen, UC Davis Department of Entomology and Nematology
published in the July/August 2013 Apiculture Newsletter from the UC Apiaries, University of California Cooperative Extension.

Pollens and Honey Bee Nutrition

You, no doubt, have lost track of how many times I have stated that malnutrition is a leading factor in our unacceptable annual bee colony loss numbers. I have also stated innumerable times that our synthesized bee diets just cannot match the value of nutrients obtained by bees from a mixture of quality pollens. My concern has been that although we have a very good idea of the protein requirements for honey bees; the ratios of essential amino acids honey bees require; and their required vitamins and minerals, etc., we still cannot feed bees on our best diets and keep them alive much more than two months in confinement. Thus, we still are missing some very critical components in our synthesized diets. If we could find those components, could we formulate a diet that would sustain our bees in a healthy condition during "feedlot beekeeping?" I know that feedlot beekeeping is an anathema to many of my readers, but it may become a reality of beekeeping, if it really hasn't become so already.

A recent study on the effects of honey in the diet of honey bees determined that a component found in honey, ρ-coumarin, stimulates the honey bee immune system to work better. Actually, that chemical is a contaminant of honey that comes from pollen grains that are mixed into the honey during the bees' processsing cycle. Thus, the bees need only to con-sume the pollen to obtain the desired results. How many other minor chemicals are there in pollens that are so useful to honey bee health?

Also related to the health aspects of pollens are the microbes which become affiliated with pollens and contribute to the health of honey bees. As new studies add to the information from previous studies, we can see that honey bee food is a dynamic substance with many things to consider. While nectar and honey have roles to play in providing energy to the bees and reducing the quantity and variety of potentially detrimental microbes within the hive, it is the microbial activity in the pollens that is of greater importance.

Floral pollens have microbes on them that originate from various places in the envir-onment. We haven't done much work on the viruses, but we have taken a good look at the bacteria and fungi. Among other things that we have learned is the fact that we can "plate" (grow in culture) only a very low percentage of the species that occur in nature. We are finding out just how many species we are missing when we conduct metagenomic studies on bee pollens. We find genetic sequences from many organisms that have not even been named. What happens when those organisms are brought back to the hive and incorporated into the pollen stores remains mostly a mystery.

What is known, however, is that the microbes continue to secrete their digestive enzymes as they attempt to solubilize food so that they can absorb the nutrients through their cell walls. In studies on hand-collected, pollen trap-collected, and stored pollen, scientists found that the microbial composition changes rather quickly after the bees collect the pollens, but in a predictable manner. The common, environmental fungi that are found in fresh pollens appear to do some pretty major digestion of pollen very early on. Then, their numbers decline and replacement fungi and bacteria work on the pollen. Those organisms were inoculated into the pollen when it was collected by the bees. The inoculum comes from having eaten stored pollen before the bees became foragers. When they regurgitate a bit of nectar or honey to keep the pollen pellets coalesced, they inoculate the pollen load.

After the initial breakdown of major components, more subtle digestion takes place and the acidity of the newly forming bee bread becomes more intense. Eventually, the acidity inhibits any further biological activity, although live microbes still exist in the stores. In that condition, stored pollen can exist for many months or sometimes years and still provide the bees with important nutrients when the pollen is consumed. Additionally, some of the microbes move into the intestinal tract of the adult honey bees and assist in their digestive process-ses. As far as we know, honey bee eggs, larvae (at least after their single larval defecation), pupae and newly emerging adults have no mic-robes in their bodies. As soon as the newly emerged bees consume some pollen, they have inoculated themselves for life.

If these microbes are really so important to the nutritional needs of honey bees, what are we doing when we introduce antibiotics and fungicides into the system? We do not know too much about that yet, but some pieces are showing up. Recently, researchers at the USDA bee lab in Tucson compared the fungal microbial populations in pollen trap-collected pollens and stored pollens from field colonies that were located in heavy agricultural areas and in a pesticide-free area around Tucson. Briefly, colonies located near agriculture, even colonies placed on organic almond orchards, had significant amounts of fungicides in their pollen stores. The number of species and the amounts of fungal growths in cultures were very much reduced in locations where honey bees had encountered fungicides. The results were pretty similar, regardless of which fungicides were involved. However, Jay Yoder and his co-authors included the following statement in their paper: "In our study, given the types of fungicides that were sprayed at the approved concentrations that were applied in the field, as long as the bees were provided the opportunity to recover, and perhaps given supplemental food, the colonies could recover."

The exact effects of these pesticide exposures and reduced microbial levels are yet to be determined, but a number of beekeepers are reporting higher incidences of infections with chalkbrood, a fungal disease of larval honey bees, following fungicide exposures. How can that happen in the presence of fungicides? In addition to the nutritional benefits of the normal fungal assembly, those tend to produce chemical compounds that inhibit other fungi from growing. This can provide immunity to infections that bees cannot adequately provide for themselves, such as chalkbrood.

As researchers continue to try to im-prove upon our supplemental bee feeds, they may have to consider the possibility of inoculating a semisolid formulation of the diet with fresh pollen and stored pollen so that a natural microbial complex can do its things and make the food appropriately fit for consumption by honey bees. A previous study using only a single species of *Lactobacillus* to ferment a supplemental feed led to a fermented diet that the bees refused to consume.