



BEE NEWS & VIEWS

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Beekeeper's Association Newsletter

November 2007

Dear Beekeepers,

The annual meeting of the Mississippi Beekeepers Association was great. Many of you missed a record crowd, great comradery, and a wealth of information. The meeting room was packed with 120 people registered. Next years meeting will be planned bigger and better. The location is yet to be decided but will likely be at Columbia or Mississippi State University.

Membership in MBA is growing. Membership is currently at 209 for 2008 and our records show that 87 have not yet renewed. Please renew membership and/or join MBA by completing the attached application. Remember, you can save enough on your subscriptions to American Bee Journal, Bee Culture, and The Speedy Bee to more than pay for your dues. You can renew your subscription to this newsletter, "Bee News & Views" by completing the form and paying \$5.00, whether you join MBA or not. Members do not get it free. The \$5.00 solely covers the cost of postage.

Of great interest now is the

status of the Russian Honey Bee breeding program. Dr. Tom Rinderer spoke at the meeting, saying USDA/ARS is ready to hand the ball off to the bee industry. Their work is just about finished, having developed a number of pure Russian lines. If the need arises, they could pursue bringing "fresh new stock" from Russia in the future. Their work will now focus on applied Russian Bee Research such as how to better manage them, how to get them to build up populations earlier in the spring, and just be a better bee than they already are. Industry has accepted the ball and has no intentions of fumbling it. Aspirations are to win the world championship. No other such breeding program exists, according to Rinderer, not even with any other animal species. The Russian Honey Bee Breeders Association has actually been organized with 14 or 15 members. The group met on November 1 in Hattiesburg prior to the MBA meeting. Members are being paired up so to speak and the perpetuation and propagation of one Russian line the sole responsibility of

each pair. In case one breeder has a problem, dies or otherwise fails, the other will be a backup. As membership increases, 3 or more breeders would be devoted to each line.

A rather complicated system has been devised for members to share queens in order to prevent inbreeding and to insure a pure stock of drones for mating and maintain enough drone source colonies in the vicinity of mating yards to insure purity of the "Breeders for the lines" and mother queens from which production queens will be sold to beekeepers.

Members of the Russian Honey Bee Breeders Association will be certified by the association under a strict protocol to produce pure Russian queens. Members will not be allowed to keep any non-Russian strains of honey bees in their operations.

Many queens are now being advertised and sold as Russian; however, they may be hybrids, having mated with non-Russian drones. Hybrids may be aggressive because "the aggressive trait" is transmitted

from the male. Also, they may not perform as pure Russians in regard to mite resistance, production and other traits.

The purpose of the association is to assure beekeepers that "A source of certified pure Russian production queens will be available always" as needed and desired by the industry. A heavy burden is upon these "Queen Breeders" to accomplish this goal.

Members will be allowed to advertise using the association's logo and trademark. Beekeepers wanting to purchase pure Russian queens should look for this logo. For more information, beekeepers in Mississippi may contact Hubert Tubbs in Mize, MS who is vice-president at (601) 382-2607.



Black Bears on the Rise in Mississippi

According to officials the black bear population in Mississippi is increasing. With that comes concerns of beekeepers that hives will be damaged. During the last 5 years bears have caused approximately \$300,000 in damages to hives and production. For 10 years, it approaches a half million dollars. Currently, very little support is given the beekeeping

industry to recoup damages from bears. The Louisiana Black Bear, common in south Mississippi, is a subspecies of the American Black Bear. Both are on the Federal and State lists of Endangered or Threatened Species. Accordingly, beekeepers can not harm a bear in any way which is damaging their bee colonies.

The Mississippi Farm Bureau has been contacted to help the bee industry. Accordingly, we as beekeepers must become more active in Farm Bureau. Beekeepers who are members of Farm Bureau should contact their local chapter and ask that a "Honey or Beekeeping" Committee be established to get the ball rolling. Also, in order to get support from our legislators, we must gain support of wildlife organizations such as Delta Wildlife, The Audubon Society, etc.



Hivaston® Status for Mite Control

The U.S. Environmental Protection Agency earlier this summer approved Mississippi's request to allow its use in Mississippi under a Section 18 Emergency Use. However, the manufacturer, Wellmark International, has halted production and sales due to unacceptable levels of bee

mortality from beekeepers that initially used it in Texas and Nebraska. Wellmark will continue to evaluate, reformulate and look at different dosages and application techniques in order to get the product back in the market place.



A Catch the Buzz Message

From Bee Culture Magazine.

For honey bee queens, multiple mating makes a difference.

The success of the "reign" of a honey bee queen appears to be determined to a large degree by the number of times she mates with drone bees.

That is what research by scientists
<<https://email.rootcandles.com/exchweb/bin/redir.asp?URL=http://www.phys.org.com/news111129057.html%23>> in the Department of Entomology and W.M. Keck Center for Behavioral Biology at North Carolina State University suggests. Dr. Freddie-Jeanne Richard, a post-doctoral research associate; Dr. David Tarpy, assistant professor and North Carolina Cooperative Extension apiculturist; and Dr. Christina Grozinger, assistant professor of

insect

<https://email.rootcandles.com/exchweb/bin/redir.asp?URL=http://www.phys>

org.com/news111129057.html%23> genomics, found that the number of times a honey bee queen mates is a key factor in determining how attractive the queen is to the worker bees of a hive. Their research was published Oct. 3 in the online scientific journal PLoS ONE.

A honey bee queen mates early in her life, Tarpay explained, but usually with multiple partners, the drones of another bee colony. Richard, Tarpay, and Grozinger found that the number of partners appears to be a key factor in making the queen attractive to the worker bees of a colony - the more partners, the more attractive the queen is and the longer her reign is likely to be.

The scientists also conducted experiments that suggest that the number of times a queen mates is a factor in altering the composition of a pheromone, or chemical signal, the queen produces. It is the composition of this pheromone that appears to attract the worker bees of a hive.

A honey bee colony consists of a single queen and several thousand sterile worker bees. Throughout most of her life, the queen's job is to lay eggs. However, early in a queen's life, she makes several mating flights. On these flights, she mates -- in midair -- with anywhere from one to more than 40 drones. The average number of drones with which a queen mates is 12. The queen stores the semen from her

mating flights for the remainder of her life, two to three years for a long-lived queen. However, some queens are not so long-lived. They are rejected by the workers of the hive. The research of Richard, Tarpay, and Grozinger sheds light on this rejection mechanism.

Because queens mate early in their lives and store semen, it stands to reason that queens that have mated multiple times and accumulate more semen might be more valuable to a colony. But Tarpay said researchers have not studied the impact of the number of times a queen mates on her physiology until now.

To determine the effect mating has on honey bee queens, the scientists artificially inseminated queens. It's difficult to determine the number of times a queen mates under natural conditions. Some queens were inseminated with the semen from one drone, others with the semen from 10 drones. The scientists put the queens in hives and observed them.

They found that worker bees paid more attention to the multiply inseminated queens. Worker bees demonstrate what is known as a "retinue response" to their queen; they lick her and rub their antennae on her. The retinue response to the multiply inseminated queens was more pronounced.

"This tells us the workers can tell how many drones the queen has mated with," said Grozinger.

Like many animals, honey bees use pheromones to

communicate. When Richard analyzed pheromone produced in the mandibular gland of honey bee queens, she found that pheromone composition changes dramatically after queens mate and that the number of times the queen mates appears to be a key factor in determining the extent of pheromone alteration.

Richard added that when worker bees were exposed to pheromone from queens inseminated with semen from one drone and queens inseminated with semen from multiple drones, the workers showed a preference for the pheromone from the multiply inseminated queens.

Richard added that an analysis of the mandibular gland pheromone found differences in the chemical profile of pheromone from once-inseminated and multiply inseminated queens. The scientists also found differences in the two types of queens in brain-expression levels of a behaviorally relevant gene.

"Our results clearly demonstrate that insemination quantity alters queen physiology, queen pheromone profiles and queen-worker interactions," the scientists write in the PLoS One paper.

Tarpay said the research could have implications for bee breeding and for beekeepers. The research suggests that queens that mate with multiple partners are superior, so breeders may want to select for this behavior.

At the same time, beekeepers usually buy mated queens when they re-queen their hives. Tarpay said it should be possible to devise a test to determine if a queen has mated few or many times. Such a test would help beekeepers determine the quality of the queens they buy.

Source: Public Library of Science

This CATCH THE BUZZ message brought to you by Bee Culture, The Magazine Of American Beekeeping. Bee Culture magazine won a Bronze medal at Apimondia 2007, and Bee Cultures Web Page, www.BeeCulture.com, won a silver medal. The ABC and XYZ Of Bee Culture won a GOLD medal at the same meeting.



Collison's Corner

Genetic Diversity In The Honey Bee Colony

As we learn more about the reproductive biology of the honey bee colony, we are discovering that there are biological advantages to queens mating with multiple drones. Virgin honey bee queens initiate mating very early in their lives, when they are approximately 1-2 weeks old, by taking multiple mating flights and mating with numerous males (drones) on each flight. On average, queens

are successfully inseminated by 12 males based on molecular genotyping of workers (Tarpay and Nielsen 2002), but mating number is highly variable among queens (range from 1 to 28). The factors that determine mating frequency are not fully understood (Tarpay and Page 2000, Schüns et al. 2005).

Mating also has profound and permanent effects on queen behavior, physiology, and resultant queen-worker interactions. Once they begin to lay eggs, mated queens will never mate again and will remain in the colony for the rest of their lives (unless they depart during colony swarming or absconding). Mating stimulates vitellogenesis and oocyte-maturation in the ovaries (Tanaka and Hartfelder 2004), which prompts the initiation of egg-laying of up to 1500 eggs/day (Winston 1987). Mating number comprises a host of factors that could impact the physiological changes in queens, including the number and duration of mating flights, the physical act of insemination, the volume of ejaculate, the quantity and viability of sperm, seminal proteins in the ejaculate, and the genetic diversity of sperm and seminal proteins. Studies have demonstrated that queens inseminated with low quantities of semen (less than 8 μ L) are more than likely to continue to take mating flights (Woyke et al. 1995).

When honey bee queens mate with numerous drones, the colony population is composed of a genetically diverse worker force. Recent research with honey bee colonies headed by

queens who were instrumentally inseminated with either one or ten drones indicated that multiple matings improves a colony's resistance to disease. These colonies were exposed to spores of *Paenibacillus larvae*, the bacterium that causes American foulbrood. On average the colonies headed by multiple-drone inseminated queens had markedly lower disease intensity and higher colony strength at the end of the summer relative to colonies headed by single-drone inseminated queens (Seeley and Tarpay 2007).

Virgin and mated queens differ dramatically in their pheromone profiles and these pheromones are important for regulating colony organization and worker behavior (Slessor et al. 1990; Plettner et al. 1997). Queens were instrumentally inseminated with semen from either a single drone (SDI) or 10 drones (MDI) and their interactions with workers were monitored in observation hives (Richard et al. 2007). Cage studies were used to monitor the attraction of workers to virgin, SDI and MDI queen mandibular gland extracts (the main source of queen pheromone). Richard et al. (2007) was able to demonstrate for the first time that insemination quantity significantly affects mandibular gland chemical profiles and queen-worker interactions. MDI queens elicited a stronger response than SDI queens in natural colony conditions, and their mandibular gland extracts were more attractive in preference assays with caged worker bees. Analysis of the mandibular gland chemical profiles revealed significant

differences between SDI and MDI queens. These results suggest that insemination quantity can have profound effects on queen physiology and behavior.

References

- Plettner, E., G.W. Otis, P.D.C. Wimalaratne, M.L. Winston and K.N. Slessor 1997. Species- and caste-determined mandibular gland signals in honeybees (*Apis*). *J. Chem. Ecol.* 23: 363-377.
- Richard, F-J., D. R. Tarpy and C.M. Grozinger 2007. Effects of insemination quantity on honey bee queen physiology. *PloS ONE* 2(10): e980. doi:10.1371/journal.pone.0000980
- Schlüns, H., R.F.A. Moritz, P. Neumann, P. Kryger, and G. Koeniger 2005. Multiple nuptial flights, sperm transfer and the evolution of extreme polyandry in honeybee queens. *Anim. Behav.* 70: 125-131.
- Seeley, T.D. and D.R. Tarpy 2007. Queen promiscuity lowers disease within honeybee colonies. *Proc. R. Soc. B.* 274: 67-72.
- Slessor, K.N., L.A. Kaminski, G.G.S. King and M.L. Winston 1990. Semiochemicals the honey bee queen mandibular glands. *J. Chem. Ecol.* 16: 851-860.
- Tanaka, E.D. and K. Hartfelder 2004. The initial stages of oogenesis and their relation to differential fertility in the honey bee (*Apis mellifera*) castes.

Arth. Struct. Dev. 33: 431-442.

- Tarpy, D.R. and D.I. Nielsen 2002. Sampling error, effective paternity and estimating the genetic structure of honey bee colonies (Hymenoptera: Apidae). *Ann. Entomol. Soc. Am.* 95: 513-528.
- Tarpy, D.R. and R.E. Page 2000. No behavioral control over mating frequency in queen honey bees (*Apis mellifera* L.): implications for the evolution of extreme polyandry. *Am. Nat.* 155: 820-827.
- Winston, M.L. 1987. *The Biology of the Honey Bee*. Cambridge: Harvard University Press.
- Woyke, J., Z. Jasinski and A. Fliszkiewicz 1995. Further investigations on natural mating of instrumentally inseminated *Apis mellifera* queens. *J. Apic. Res.* 32: 105-106.

Clarence Collison
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Africanized Honey Bee Action Plan

The AHB Task Force has just about completed the revision of the Action Plan with anticipation that AHB will migrate into Mississippi within the next two years; likely next year. Recent finds in New Orleans are proof they are established there. They are known to migrate 100 miles a year in favorable conditions.

As part of the plan, a list of beekeepers that are available and willing to be trained on

removal of feral swarms and colonies is being maintained. Please return the MBA application with a note on it, if you would like to be on the list. Also, if you are an MBA member already, please indicate if you would like a copy of our membership directory by returning the application with a note on it.



Mississippi Honey Labeling Law being Amended

The MBA has written a letter of support to legislation to be introduced which will give the Mississippi Department of Agriculture and Commerce authority to administer civil penalties for violations and seize honey found in violation. A recent incident of honey being adulterated with corn syrup in northwest Mississippi has prompted this legislation. MDAC and MBA do not want the problem to get out of hand again as it was in the 1980's. FDA will not get involved unless it is moved across state lines and our current law needs some teeth in it. If you see your state legislators, please ask for their support of the law change.

Until next month,

Harry R. Fulton
Secretary/Treasurer

