

Minnesota Bee Research and Extension

Malcolm T. Sanford



"Good things keep coming from the Land of 10,000 Lakes."

I have many good memories of Minnesota. My parents were born and grew up in the Twin cities area. When I was a kid, we would travel from Texas at Christmas time into the cold north, arriving by Rock Island Lines into a foreign land, dominated by snow, ice and mittens drying on my grandmother's radiator. That was way before a swarm of honey bees entered and transformed my life. My graduate school professor, Dr. Al Dietz was trained in Minnesota; while I was at the University of Georgia, he still drove his 1960s era Mercedes Benz that he purchased through honey sales, while in graduate school. He also told me about his professor (M. Haydak) and experiences with fellow students like Basil Furgala. Later, I met Dr. Furgala, "Mr. Nosema," at one of the first meetings of the American Association of Professional Apiculturists (AAPA)¹. He invited me to address the beekeepers in Minnesota; my Aunt Irmagene from Edina, MN accompanied me on that occasion and still talks about the experience. I also gave the keynote address to the 1984 Convention of the American Beekeeping Federation in Minneapolis on "Beekeeping and the Information Age." That meeting is still remembered by several who found their engine blocks cracked by 80 below zero temperatures, even in the confines of an underground garage and guarded by antifreeze protection.

Recently, I found myself again in Minnesota visiting Dr. Marla Spivak, the current, resident bee researcher on the St. Paul Camus.² Marla and I go way back as professional colleagues. And most recently, we shared the honor of receiving two of the Eastern Apiculture Society's most coveted awards, the James Hambleton for research was awarded to her and the Roger Morse for teaching and extension was presented to me at this year's meeting in Maine. We spent a pleasant time talking about beekeeping research and education in Minnesota over the years.

Marla showed me a photograph of the beekeeping short course of 1944, including a separate picture of

the women in the course.³ Many are not aware of the role women have played in beekeeping over the years, not just as spouses and observers, but active participants. These include both Marla and her colleague, Sue Cobey, who I profiled in this magazine in January of this year.⁴

The tradition of beekeeping short course education continues in Minnesota with the 2004 short course already being planned for March 19-21.⁵ Marla teaches it using the principles developed by Basil Furgala during his tenure in Minnesota as graduate student and professor. She can't say enough about the help that Basil gave her during her orientation when she replaced him at his retirement. After his untimely death, Basil was also remembered by his colleagues on the University senate:

"Basil Furgala, who served as a USDA National Research Program leader and as National Extension Apiculture Program leader in Washington, died May 11, 1996. Basil's research focused on Minnesota's beekeeping industry, though his findings benefited beekeepers around the world. Basil received his bachelor's and master's degrees from the University of Manitoba. He earned his Ph.D. in entomology from the University of Minnesota in 1959. He was a research scientist with the Canada Department of Agriculture from 1959-67 when he returned to the University of Minnesota to accept a position as associate professor of agriculture. During his career, Basil received the J.I. Hambleton Award, a USDA Certificate of Appreciation, the Apiculture Research Award, and the Outstanding Service of Beekeeping Award, among others. He will long be remembered as a scientist with great enthusiasm, insurmountable optimism, an appreciation for experimental design, and a true devotion to the industry he served."

As I noted previously, Basil was an expert on

1. American Association of Professional Apiculturists Home Page, accessed November 23, 2003 <http://entomology.ucdavis.edu/aapa/index.cfm>.

2. University of Minnesota Faculty Directory, accessed, November 23, 2003, <http://mash.cbs.umn.edu/BBBG/directory/spivak.html>.

3. University of Minnesota Department of Entomology Beekeeping Web site, accessed November 23, 2003 <http://www.entomology.umn.edu/Beekeeping/1944beeclaspictures.htm>.

4. Sanford, M.T. 2003. Sue Coby and Her New World Camiolans. *Bee Culture*, Vol. 131, No. 1, pp. 21-23.

5. University of Minnesota Department of Entomology Beekeeping Web site, accessed November 23, 2003 <http://www.entomology.umn.edu/Beekeeping/index.html>.

nosema disease. His considerable research on the subject led to the current chemotherapy practices using fumagillin. His student, Dr. Eric Mussen, is currently California's extension apiculturist, who writes one of the longest running beekeeping extension newsletters, *From the UC Apiaries*.⁶

Before Basil, The University of Minnesota had another one of beekeeping's pioneers on its faculty, Dr. Mykola H. Haydak, a world-renowned authority on beekeeping. He wrote more than 200 papers and a textbook dealing with this subject according to *The Ukrainian Weekly*, February 8, 1998, No. 6, Vol. LXVI, which detailed contributions of Ukrainian-Americans to U.S. Agriculture.⁷ A search on the electronic bibliography of beekeeping associated with the Beltsville, MD USDA-ARS bee laboratory shows the majority deal with nutritional resources.⁸ Much of Dr. Haydak's research is the basis for the pollen supplements/substitutes now in use. He was also a prolific writer for the popular bee journals. In 1961, he wrote an account of the considerable amount of bee research at The University of Minnesota (1913-1960) in the *Minnesota Beekeeper*.⁹

Nutrition no longer dominates Minnesota beekeeping. New challenges, including mites and small hive beetles, along with traditional diseases like American foulbrood, are mostly on beekeepers' minds. This preoccupation meshes well with the interests of the University's relatively-new bee researcher. Equally at home in the "Ivory Tower," as her writings are categorized by the Minnesota Beekeepers Association in its newsletter, or in the bee yard, Dr. Spivak seems quite successful in catering to not only those in the land of ten thousand lakes, but also the region in general, which includes the Dakotas, Iowa and Wisconsin.

Marla is also blessed with the help of Mr. Gary Reuter, an on-the-ground, practical beekeeper, who routinely keeps her on track from the practical side of bee culture. They team up beautifully not just in the laboratory, but in beekeeper education. This approach is clearly seen in the workshop on beekeeping in northern climates given each March.¹⁰ They also teach a queen rearing course each year and have produced a queen-rearing educational suite through the U.S.D.A.'s Sustainable Agricultural Network. A "copyrighted, 13-minute-long, VHS-format video demonstrates the Doolittle method of queen rearing. Takes the viewer, step-by-step, through the entire pro-

cess, from selecting breeder stock to ensuring successful mating. A companion 'Successful Queen Rearing Manual' (item MI-6346-SAN), which goes into more detail, is also available. For hobby and commercial beekeepers and professionals who work with apiarists."¹¹

Marla comes from a background rooted in studying the infamous Africanized honey bee in the Americas. Her landmark book, *The African Honey Bee*, cooperatively edited by Drs. David Fletcher and Michael Breed, is a must read for anyone interested in this important and controversial insect.¹² Her resume speaks volumes, including stints in commercial beekeeping and as a research assistant at the USDA labs, as well as study under the tutelage of Dr. Chip Taylor at the University of Kansas. She's a "no nonsense" kind of person that is refreshing to hear and speak to.

In accepting the Hambleton award, Marla said honey bees are in crisis and beekeepers are not helping them much. Bees are certified "junkies" and beekeepers have become their "pushers." A new set of rules is necessary to get the bees off the chemical/pesticide treadmill. Her advice was direct and to the point:

1. Stop right now any preventative feeding of antibiotics.
2. Cull combs to remove AFB spores and pesticide/antibiotic residues.
3. Leave mites in colonies; do not try to eliminate them all; in some cases bees can sustain 10% to 15% infestation with little harm.
4. Pesticides "pamper" bees; let them use their own innate defense mechanisms. Use selective breeding to give bees tools to work with and then leave them on their own. This includes incorporating hygienic behavior, SMR and characteristics of other stocks (Russians).
5. Use IPM now! This means thinking before acting; apply pesticides only as a last resort. Use soft chemicals when possible. Again, leave mites in the colony so the bees have a long-term fighting chance on their own.

She concluded that none of the above will be easy, but beekeepers must quickly learn what other farmers now take for granted. Integrated pest management (IPM) is here to stay and is the best option to save the bees and beekeeping industry in the long run.

Marla also walks the IPM walk by concentrating on breeding bees for resistance or tolerance to diseases and pests. Her tool of preference is "hygienic behavior," a term coined by Dr. Walter Rothenbuhler for a set of genes that helps honey bees keep a dis-

6. University of Davis, CA Department of Entomology Web site, accessed November 23, 2003 <http://entomology.ucdavis.edu/faculty/mussen/news.cfm>.

7. Ukrainian Weekly Web Site, accessed November 23, 2003 <http://www.ukrweekly.com/Archive/1998/069815.shtml>.

8. USDA-ARS Beekeeping Bibliography on the Web, accessed November 23, 2003 <http://alembic.nal.usda.gov/8088/>.

9. Haydak, M. 1961. Bee Research At The University Of Minnesota (1913-1960), *Minnesota Beekeeper* 13:3-5, 12, 14-15.

10. University of Minnesota Entomology Web page, accessed November 23, 2003 <http://www.entomology.umn.edu/Beekeeping/index.html>. See also <http://www.extension.umn.edu/units/dolitem.html?item=06684>.

11. Sustainable Agricultural Network, USDA Web site, accessed November 23, 2003 <http://www.sare.org/sourcebook/book/MN0328.html>. Also see <http://www.extension.umn.edu/abstracts/nonweb/abstract.html?item=06347>.

12. Amazon.com Web site, accessed November 23, 2003 http://www.amazon.com/exec/obidos/tg/detail/-/0813372097/qid=1069613939/sr=1-1/ref=sr_1_1/102-7444767-2418542?v=glance&s=books.

ease-free brood nest. Marla and Dr. Martha Gilliam of the Tucson, AZ USDA-ARS Bee Laboratory,¹³ wrote a summary of this research several years ago.¹⁴ I wrote a summary of this publication in my September 1998 *Apis* newsletter.¹⁵

There is more and more evidence that hygienic behavior also affects *Varroa* mite loads in colonies. In a recent paper, Marla and Gary reported that honey bees bred for hygienic behavior performed as well if not better than other commercial lines of bees and maintained lower mite loads for up to one year without treatment.¹⁶

Marla's work and results are now being recognized all over the world, including the United Kingdom,¹⁷ Australia,¹⁸ Canada,¹⁹ and elsewhere. With all this attention, the pressure continues to be enormous to produce and release this stock. This

was acknowledged by Marla who said, "After careful thought, I have decided to have Tom and Suki Glenn, of Glenn Apiaries maintain and sell breeder queens from the hygienic line of bees that I have bred here at the University of Minnesota."²⁰ She concluded: "The breeder queens from the Minnesota Hygienic line demonstrate good resistance to AFB and chalkbrood, and some resistance to *Varroa*. I am defining resistance as the ability to defend themselves against these diseases and mites better than unselected colonies. Naturally mated daughters of the breeder queens will still require treatments for *Varroa*, however at less frequent intervals. If left untreated, especially when mite invasion pressure is high (when many colonies are located in one location for pollination or in migratory beekeeping) even the most hygienic colonies eventually will collapse. Don't be fooled by the word resistance!"

While visiting with Marla, she told me that right now there is every indication that this stock is taking hold and making a difference in midwestern beekeeping outfits. Time will tell if she is correct, but my bet is that she's right on. If so, this will be another "successful" page added to the already rich history of Minnesota bee research. **BC**

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13. USDA Tucson Bee Lab Web page, accessed November 23, 2003 <http://gears.tucson.ars.ag.gov/home/gilliam/>

14. Spivak, M. and M. Gilliam. 1998. "Hygienic behaviour of honey bees and its application for control of brood diseases and varroa. Part I. Hygienic behaviour and resistance to American foulbrood," *Bee World*, September 1998, vol. 79, no. 3, pp. 124-134(11) International Bee Research Association, Cardiff, UK, Web page accessed November 23, 2003 <http://www.ibra.org.uk/beeeworld.html>.

15. Sanford, M.T. 1998 *Apis* Newsletter Web site, accessed November 23, 2003 <http://apis.flas.ufl.edu/apis98/apsep98.htm#1>.

16. Spivak, M. and G. Reuter, "Varroa destructor Infestation in Untreated Honey Bee (Hymenoptera: Apidae) Colonies Selected for Hygienic Behavior," *Journal of Economic Entomology*, Vol. 94, No. 2, pp. 326-331.

17. Dave Cushman's Web site, accessed November 23, 2003 <http://website.lineone.net/~dave.cushman/hygenequeen.html>.

18. University of Sydney Social Insects Lab Web site, accessed November 23, 2003 http://www.bio.usyd.edu.au/Social_InsectsLab/Hygentic_bees.htm.

19. Allen Dick's Web site, accessed November 23, 2003 <http://www.honeybeeworld.com/misc/hygentic.htm>.

20. Glenn Apiaries Web site, accessed November 23, 2003 members.aol.com/queenb95/minn.html.