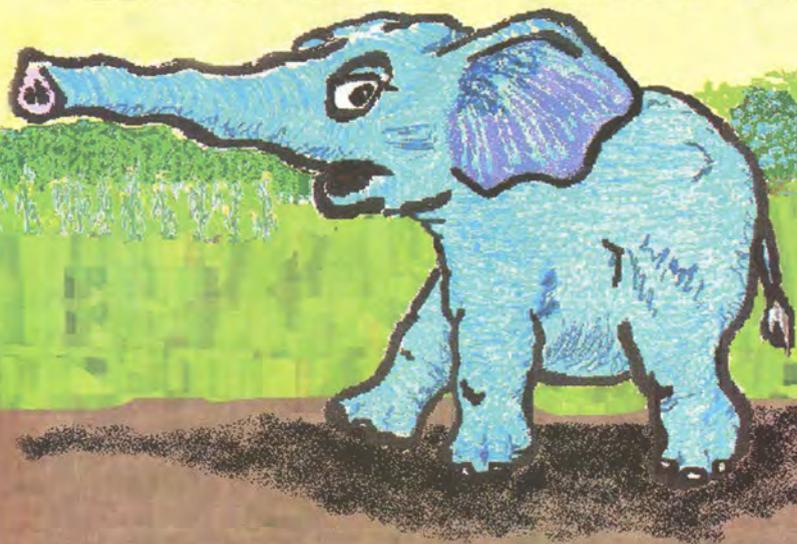


BEES FOR BABAR: PEACEKEEPING THROUGH BEEKEEPING



By CONRAD BÉRUBÉ

Over the past twenty years I have chronicled my experiences in apicultural development in the American Bee Journal. I have worked on projects to increase household income and improve agricultural yields in Ecuador, Paraguay, Guatemala, Tunisia, Ghana and Guinea.

Seven years ago I had the privilege of serving as the first volunteer in Ghana in the Farmer-to-Farmer project, funded by the United States Department of Agriculture. I wrote of this effort in "Beekeeping in Ghana: on the road in Africa doing developmental beekeeping demonstrations" published in the June and July issues of *American Bee Journal*¹. At that time I proposed using honey bee colonies as living barbed wire fences to repel elephants that raided subsistence farms surrounding Ghana's 4,840 km² wildlife reserve, Mole Park. I got the idea of using crop-guarding bees from an article I had seen by Fritz Vollrath and Iain Douglas-Hamilton, researchers working in Kenya with the "Save the Elephants" organization. They found that trees in which beehives were located were less likely to

be damaged by browsing elephants and, if they were browsed upon, suffered less damage². The obvious inference was that



As still evident in this recent photo from Mognori, elephants can damage shea trees, used for their edible fruits and oil they produce, and other crops that villagers depend upon for sustenance and income.



These first hives were installed in October 2008 to await occupation by passing bees during the swarm season.



Villagers of Mognori have been chosen as the first clients with whom to implement the "Bees for Babar" (BfB) project.



Villages in Mognori construct hives from the materials acquired in a rotating credit system.



In June 2008 carpenters in the town of Tamale began to cut wood to begin construction on KTBH's that will be loaned at cost to Mognori villagers on a rotating credit system.



August 20, 2008: Village leaders pitch in to unload wood delivered in preparation for training folks there to build hives. This approach stretches funds and fosters capacity building in the client community to make the project more sustainable.

when elephants browsed near hives the disturbed bees would sting and drive off the elephants. It was apparent that elephants were able to recognize hives even if they were unoccupied— as it became apparent that they learned to avoid trees containing empty hives. Subsequent research in which they were involved (along with Lucy E. King) indicated that elephants will even avoid areas in which the sound of angry bees is broadcast over loudspeakers³.

If this same principle could be applied to cultivated land, it could greatly reduce crop losses that contribute to human/wildlife conflicts around Mole Park. In studies conducted in Ghana, there was almost a 50% probability that if one's farm is raided by elephants, about half of the crop would be destroyed⁴. On average, about a hectare of crop was destroyed in raided farms. For a family that depends on its small land holdings to provide the great bulk of its sustenance this can be a catastrophic loss.

Given the problem of raiding elephants we believed that we had a possible solution, in the form of defending honey bees. That elephants can develop an antipathy

for bees is recognized in a folktale from Ghana:

Rooster and Elephant fell in love with the same beautiful girl. They decided to settle their differences on the battlefield. On the appointed day they summoned their respective armies to the fray. Elephant's troops were comprised of all the four-legged animals, while Rooster's allies were all the animals that flew. The two generals approached one another before their armies. "Ah, Brother Cocksure," said Elephant, "What do you expect to do here today with your butterflies and songbirds and bats? Flap us to death? Buffalo, Hippo, and I will stomp you into pieces and leave them for Lion and Leopard to chop! Why don't you just go home before we beat you proper?" Rooster just smiled his little chicken-lipped smile and waved a wing towards his friends the bees. The bees flew forth in their great numbers and began stinging all of their enemies. Very quickly all the other animals turned and began to run away leaving Elephant alone— looking like he was dancing, the way that he was jerking around trying to swat the bees. The honey-makers were

stinging the tender skin around his eyes, his great ears and even on the inside of his trunk. Soon, even Elephant had to take to his heels and flee—as he passed the young girl who had been watching the skirmish he waved his trunk and said "Goodbye, Mrs. Rooster!"

The resources available to the Ghanaian colleagues with whom I had been working at the non-government organization, OIC (formerly Opportunities Industrialization Centers) were modest. These funds were pretty well exhausted in assisting the growth of the beekeeping cooperatives being supported in the villages surrounding Tamale, the capital of the Northern Region. As a result, it had not been possible to explore the idea of protecting crops with honey bees in farther flung villages. (The client communities of the Tamale area are well removed from those areas to which elephants are confined.) Nonetheless, the idea of combining crop protection with apiculture still remained for me an intriguing idea. In July of 2007 I enlisted the assistance of my wife, Rabi Al-Hassan, and my friends, John Deniseger and June Bouchard, Eric and Samelia Agyekum, Brian Retzer and Connie



The villagers put up one third of the value of the lumber and receive the remainder of the lumber on credit from a rotary credit micro-financing venture. When they repay the loan following the sale of honey and beeswax harvested from the hives, the money will go back into the fund and be available for another round of clients.

In October of 2008 the completed hives were rubbed down with lemon grass and/or beeswax to attract passing swarms. Handles were added to facilitate transporting and hanging the hives. Roofs of corrugated zinc keep out the torrential rains of the rainy season and help deflect the pounding sun during hot weather, assisting the bees in keeping the hive cool. In tropical Africa, as in most hot climates,



it is advantageous to keep hives in an area where they will receive shade during the warmest times of day. That way the bees will not have to spend too much effort bringing in water and fanning to keep the hives cool.

Miller-Retzer, Hubert Bunce and Mohammed Ali Ibrahim (Ali) to form a charitable society to raise funds to get a project going. (In order to make every dollar count, society members are all non-paid volunteers, with intentions to keep it that way, so that all proceeds can be funnelled to field-work).

Our basic idea was to provide rotary credit to villagers for the purpose of installing hives around their subsistence farms near the Mole wildlife reserve. Sibu Abdulkarim, founder of Friends of Health, sent me a report from the National Park Service outlining elephant damage in the village of Mognori resulting in loss of cassava, maize (corn) and guinea corn (sorghum) crops. We decided that Mognori would be a good place to start as Enoch Amasa Ashie, projects coordinator for the Collaborative Resource

Management Unit of Mole National Park, and Daryl Bosu, projects manager of A Rocha Ghana (a Christian nature conservation organization) were already working in the community and had agreed to help promote and monitor our work. Mognori is just off the main “highway” from Tamale—about 140 km from Tamale and 6 km from the park boundary. If elephants attempted to raid the crops, they would upset trip-wired hives. The bees would then drive off the elephants—preserving both the crops and the elephants (who might otherwise be poached by the enraged farmers). This led to our mission statement: “Peacekeeping through beekeeping: reducing wildlife conflicts and increasing incomes with guardian hives.” That’s the theory at any rate.

We decided to call our group the “Bees for Babar Society” because the word “babar”, in the Gonja language of the Northern Region of Ghana, where the project is being initiated, means “come to my aid”. In addition, it is also Turkish for lion. Lions have long held an odd and almost mystical association with honey bees⁵. Thus, the society’s name reflects our aims to promote and integrate conservation, eco-tourism and beekeeping as an income-generating activity. (I feel obliged to mention that we are not affiliated, with the Mogul emperor, Babar, nor with other entities using that appellation.)

A few months after we formed our society and had started informing our friends and colleagues of our plans, a co-worker sent me an e-mail with a link to a website about a Zambian, Hammer Simwinga, who was implementing a project with goals and techniques very similar to ours. Mr. Simwinga was developing beekeeping and other income-generating activities in an effort, supported by the Owens Foundation, to conserve wildlife in the North Luangwa region of Zambia by providing to local people a means of livelihood other than poaching⁶. Mr. Simwinga and the people of the community with whom he worked found that bees kept the recovering elephant populations from damaging the local farmers’

crops. Once the bees detected elephants raiding the planted fields in which hives had been installed, they would chase the elephants away—often harassing them for several kilometres. For his efforts, Hammer Simwinga had been awarded the prestigious Goldman Environmental Prize and shared one sixth of the \$750,000 award with the other recipients. I remember thinking “Gold-man!” (or something of similar sounding syllables), “A couple of years late and \$125,000 short!”—such money can fuel a lot of development work. Encouraged rather than disappointed, I contacted Mr. Simwinga who gave us some useful advice—such as that repellence to elephants can be increased by soaking the trip-wire ropes that connect hives in an oil solution spiked with powerful local chilli peppers that are commonly grown in West Africa for making popular, piquant sauces.

By April of 2008 we had completed enough planning and paperwork to actually begin collecting money. By December we had collected approximately \$1,300—primarily from bake sales and other fundraisers contributed to by my very generous coworkers at the Ministry of Environment in Nanaimo and Victoria, BC. In September of 2008 we had been able to send the first infusion of cash to Ali—who coordinates implementation of the project at the Ghana end—in which he is supported by his colleagues at OIC Tamale, financial officer, Abukari Hathiramani (who volunteers his time to assist with bookkeeping and management of funds) and Benjamin Anomah (who has allowed Mr. Ali to combine his trips to Mognori with OIC micro-enterprise activities being conducted in the area). Donations have been used to establish a rotary credit fund from which loans can be drawn at non-profit interest rates indexed to inflation rates in Ghana. Ideally, after a year or two of participation, the clients will replace the value of the equipment they received into the rotary credit fund. Clients can:

- Return the equipment they received if unsatisfied with the results,
- Pay back the cost of new equipment from honey and beeswax earnings.
- Barter honey and/or wax with friends or family to construct new equipment to return to the project (this option might be more difficult to administer, but may be more practical in Mognori where the cash economy is still fairly undeveloped.)

The intention is for the pool of funds to remain at a constant real value. All repayments and revenues/donations coming in to the society will go into the rotary credit fund and towards the minor incidental costs for Ali to travel to and from the client communities to administer the program. If the fund grows, the programs will expand under the same model to other communities.

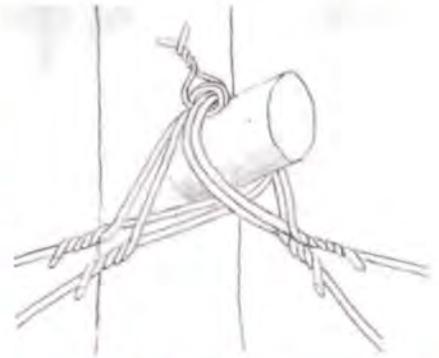
By June, Ali had consulted with the elders of the village of Mognori to complete a needs analysis and to determine whether the villagers were interested in pursuing the



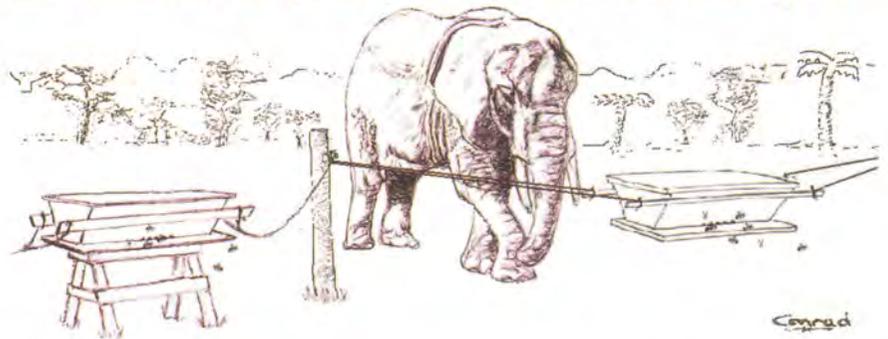
Villagers from Magnori pose near the boundary of Mole Park (the sign has been enlarged in the inset). Unfortunately for subsistence farmers, elephants do not always stay on their side of the boundary. “Guardian bee hives” will help to keep wandering elephants from raiding the crops necessary to feed villagers’ families—and will provide nutritious honey and and useful beeswax which can be utilized by the producers or sold to buy necessities.



In studies conducted in Ghana there was almost a 50% probability that if one's farm is raided by elephants, about half of the crop would be destroyed. Such fields can be protected by surrounding them with "living barbed wire fences". Kenya Top Bar Hives (KTBH's) can be placed around crops and connected with ropes. The ropes will be hung from pegs in such a way that elephants entering a field will push against the ropes, and, with their forward progress will overturn the hives. The disturbed bees will drive the elephants away and the elephants will learn to avoid areas containing hives—even those that are empty.



Note that the ropes are wired together so that an elephant entering on either side of a fence post will upset the hives on both sides of the post. Rope rather than wire is preferable for the purpose of connecting the hives because the ropes can be impregnated with chili pepper oil which will contribute to the repellency to wildlife touching or chewing on it.



scheme. Because even basic woodworking tools are at a premium at the village level, Ali lined up carpenters in Tamale whom he trained to cut the lumber necessary for the construction of Kenya Top Bar Hives (KTBH's). Top bars are cut or chiselled such that the bottoms of the bars are v-shaped in cross section. This guide encourages the bees to construct their comb along the bar, instead of across them, so that the bars, with comb can be removed from the hive. Each bar is the width of an average honey comb plus a bee space. This, of course, is the same idea used to determine the distance across the shoulders of standard Langstroth frames. However, for the smaller African strain of honey bee the width used is 32mm rather than the 34mm used for bees of European stock. This allows the bees to build a single comb from each top bar and still have a bee-space between each panel so they can move foodstuffs about and tend to the brood. The cavity of the boxes is an inverted trapezoid in cross section—which effectively eliminates the need for a surrounding frame for the combs since the bees live the comb largely free of attachments to the side walls. The combs can thus be removed for manipulation and harvest. Once ripe honey is harvested, it is sold in the comb or by squeezing and filtering. Plans for building KTBH's can be found on my website⁷.

By August, the wood had been delivered to Mognori in the course of Ali's other duties and by October he had trained the villagers to construct and hang the hives. The hives were "baited" by rubbing the insides of the boxes with beeswax or lemongrass

which makes the boxes smell like it has been previously occupied—which makes a nest site more attractive to a swarm looking to set up shop. It is obvious why beeswax would work for this purpose. Perhaps less apparent is why lemongrass should be put to this end. Lemongrass contains citral, the most attractive component of the pheromone produced in the Nasonov gland of honey bees, which they use to guide foragers back to the hive entrance.

Honey bees of African stock, both in Africa and the New World, have a marked propensity to produce reproductive swarms—as well as to abandon an established nest if forage in an area becomes scarce. This results in distinct swarm seasons that correspond with the period when floral resources are at their peak (and paradoxically, due to absconding, to a lesser extent during the dearth period). In addition to their propensity for swarming African bees are well-known for their strong defensive reactions; following a disturbance they will attack perceived threats to their nest-site with less provocation, with a greater percentage of the colonial population and will continue defensive flights for a longer duration and for at a wider radius from the hive than will their European sister-strains. In Kenya it has been observed that bees will chase elephants which have disturbed their nests for several kilometres. Since the swarm season begins in mid-February we are waiting with bated breath, as well as baited bee-boxes, to gauge the success of our first season with respect to swarm occupation of the hives. Other measures of success will be dictated by the

expected project benefits which are:

- Reducing elephant raids will preserve crops (elephants can destroy a farmer's entire harvest in a single visit and are a real problem in the project area).
- Pollination will increase the community's food production (many fruit and vegetable crops depend on honey bee pollination).
- Honey harvested from bee hives is a nutritious food that can be used by the family or can be sold to purchase other items.
- Beeswax and related products (such as candles and cosmetics) can be produced and sold to make a significant contribution to household income.

Therefore we hope to assess whether we are achieving our objectives by measuring:

- Reduction in numbers of elephant raids
- Increases in community food harvest (i.e. the increase in crop yields between years when elephants raid farms and when they have been reduced through guardian hives).
- Increases to household income attributable to yields of honey and wax.

A measure of crop yield increases due to better pollination would be beneficial, but would likely be difficult to assess since the vagaries of weather, especially rainfall, will have an effect that would be difficult to tease apart from pollination effects.

Although, like everybody else, we'd like to have greater financial resources to achieve our aims, I am quite satisfied with



Wild elephants can become habituated to human presence—good for tourism but potentially disastrous to local farming. Conrad Bérubé (r) and Mohammed Ali Ibrahim, BfB directors, pose in Mole Park with a pachyderm pal.

our progress so far—although it will take several more years to gather data on the effectiveness of repelling elephants from the farms in Mognori. I can, however, attest that I have had Kenya Top Bar Hives in my yard in Nanaimo, British Columbia for almost a decade—and my garden has not once been raided by elephants!

If you would like to read more about traditional beekeeping in West Africa and the Kenya Top Bar Hive, you can google “bees for babar” to find our webpage. There are even videos available outlining our work which you can find on www.youtube.com by searching there for “beekeeping in Ghana”, “beekeeping in Guinea”, “bees for babar”, “Conrad Berube”, or “beekeeping with the Kenya Top Bar Hive”. If you or your bee



Rural beekeepers can produce high quality honey using low cost KTBH's which can be used at home or sold to make a significant contribution to the family's income.

club would like to support Bees for Babar please contact me at the address below or through our website—ask about our designer label program—donate to a great cause and get a custom logo for your honey labels!

**Conrad Bérubé, 890 Eberts Rd, Nanaimo BC V9S1P6 CANADA
email: uc779@freenet.victoria.bc.ca
bees for babar society http://www3.telus.net/conrad/hmgghana/bees_for_babar.htm**

Footnotes

¹Beekeeping in Ghana: on the road in Africa doing developmental beekeeping demonstrations, Part 1. Conrad Bérubé. *American Bee Journal*. pp. 384-389. May 2003 http://www3.telus.net/conrad/hmgghana/beekeeping-appendix_2_part1.htm

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²African bees to control African elephants. Fritz Vollrath and Iain Douglas-Hamilton. *Naturwissenschaften*. Volume 89, Number 11, pp. 508–511. November 2002 <http://www.savetheelephants.org/files/pdf/publications/2002%20Vollrath%20et%20al%20%20African%20bees%20to%20control%20African%20elephants.pdf>

³African elephants run from the sound of disturbed bees. Lucy E. King, Iain Douglas-Hamilton and Fritz Vollrath. *Current Biology*. Volume 17 No 19/ 9 October 2007. <http://www.savetheelephants.org/files/pdf/publications/2007%20King%20et%20al%20African%20Elephants%20Run%20from%20sound%20of%20Bees.pdf>

⁴Elephant crop damage in the Red Volta Valley, north-eastern Ghana. Patrick Adjewodah, Paul Beier, Moses K. Sam and John J. Mason. *Pachyderm* Vol. 38, pp. 39-48. January- June 2005 <http://www.african-elfephant.org/pachy/pdfs/pachy38.pdf>

⁵The Bee-Riddled Carcass. Conrad Bérubé. *Griffith Observer: Journal of the Griffith Observatory*, July 1991 <http://www3.telus.net/conrad/bee-stars.htm>

⁶North Luangwa, 1997-2007 <http://www.owens-foundation.org/docs/nl-cpdesc2b.htm>

⁷<http://www3.telus.net/conrad/images/ktbh-plan.gif>
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