

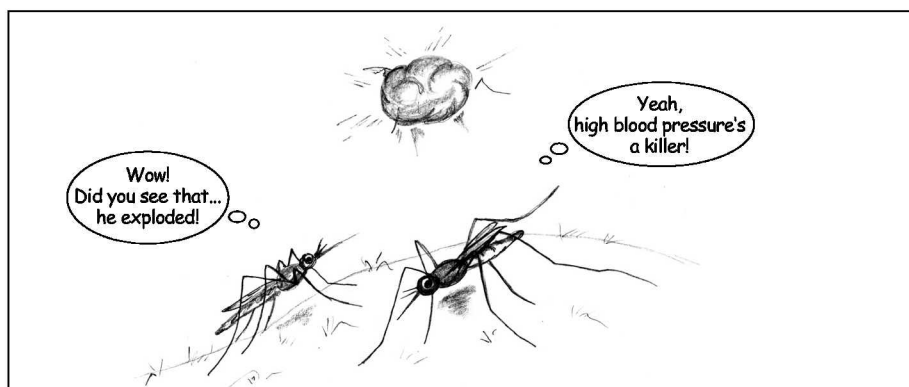


Mosquito myth exploded?

May Berenbaum

One indication of the depth of human animosity toward mosquitoes is the existence of the World Championship of Mosquito Killing in Pelkosenniemi, Finland. Basically, this is a competition open to all comers, who are challenged to kill as many mosquitoes as possible with their bare hands within a five-minute period in an area of 100-300 square meters (or 1,076-3,229 sq. ft.) (http://www.dailyfactoid.com/archive_question.php?id=40&year=2001&month=2). The current record of 21 confirmed kills is held by Henri Pellonpää, who in 1995 shattered the previous record of seven. All told, 370 mosquitoes bought the farm during the 1995 two-day slapfest. Although at first blush the number may appear low, particularly for the mosquito-friendly northern climes, the death toll is influenced by the fact that whenever a crowd of people assembles to cheer on the competitors, their various and sundry exhalations tend to draw the mosquitoes away from the main event (Cassingham 1997). Moreover, consumption of large quantities of Lapin Kulta, Karhu, and other Finnish beers in association with the festival probably doesn't contribute much to deadly accuracy.

The Mosquito Killing Championship (an invention of local businessman Kai Kullervo Salmijärvi in 1993) doesn't specify how the mosquitoes are to be killed—just that they must meet their fate free of insecticides and mechanical devices—but the likely method of choice is the basic, time-honored swat. Pellonpää's record was challenged at Italy's "first official mosquito swatting competition" in August 2000, during which contestants have 15 minutes to kill as many mosquitoes as they can. The winner of the "golden mosquito" was Christian Rizatto, who dispatched 23 mosquitoes in 15 minutes (<http://www.thenakedscientists.com/HTML/content/news/news/1205/>).



Despite the obvious efficacy of slapping, there are much more creative ways to kill mosquitoes, if you believe Internet sites such as "A medical professional guide to fascinating mosquito facts" (<http://www.articlesbase.com/health-articles/a-medical-professional-guide-to-fascinating-mosquito-facts-134643.html>). According to this medical professional (Josh Stone), "One way to kill a mosquito, if you happen to catch it biting you on a convenient location such as the bicep of the arm, is to tense your skin to trap its little proboscis in your skin, then flex your bicep muscle. This apparently causes the mosquito to burst because of the pressure from your blood vessel, kind of like if you tried to drink from a fire hose."

This story is widely distributed and even appears in otherwise authoritative sources, including an article in *Discover* magazine from August 1997, titled "Why Mosquitoes Suck" (Gadsby 1997). Because this article couched the description of this mode of execution in evasive language (with many qualifying words such as "maybe" and "supposedly"), Cecil Adams, at The Straight Dope site, which is noted for exploding urban legends, tackled the question, "If you flex your muscle when a mosquito bites you, will it swell up and explode?" head-on (22 Aug 1997). Although

Adams reached the conclusion initially that it is possible, he subsequently (18 Aug 2000) disavowed that conclusion ("Regardless of Lileth's insistent lies and perpetuation of an obvious myth in this Straight Dope column, trust me—it doesn't work") (<http://www.straightdope.com/columns/read/1150/if-you-flex-your-muscle-when-a-mosquito-bites-you-will-it-swell-up-and-explode>).

You can trust me, too; it doesn't work. I think this bit of popular wisdom persists because most people who have been on the wrong end of a mosquito proboscis find the image of an exploding mosquito so very satisfying. In fact, it was one of the very first animated images of an insect to appear on a movie screen: Winsor McCay's 1912 film "How a Mosquito Operates," one of the first line-drawing animated films ever made, depicts a dapper mosquito, with top hat and briefcase, who enters the room of a sleeping man to drink his fill, despite the futile efforts of the man to fend him off, until, filled to capacity (SPOILER ALERT), he explodes. The image of the exploding mosquito has legs, as it were; a more recent manifestation, aired on Superbowl Sunday 1999, was an advertisement for Tabasco hot pepper sauce that depicted a mosquito sucking the blood of a man eating a Tabasco-laden slice of pizza

before flying off and exploding in a burst of flames. This ten-year-old ad can still be seen in its entirety at Tabasco.com—in three formats, no less (Quicktime, RealVideo, or Windows Media).

If only blowing up a mosquito were as easy as flexing a muscle or wolfing down hot pepper sauce—the general scientific consensus is that it is indeed possible to cause a mosquito to explode, but doing so requires severing its ventral nerve cord (Klowden 1995). The ventral nerve cord transmits information regarding satiety to the mosquito's brain; when the cord is severed, the mosquito has no sense of consuming its fill, so it will continue to suck until it quadruples its body weight, whereupon it explodes. Moreover, even after the abdomen bursts, a mosquito will continue to suck blood, which spills freely out of what remains of the back end (Gwadz 1969).

Even though severing the ventral nerve cord is a sure-fire way to make a mosquito explode, it's unlikely to catch on, inasmuch as it's a little on the labor-intensive side to exact such a small measure of vengeance. As it turns out, even swatting a mosquito to dispatch it might be a Pyrrhic victory. A study published in the *New England Journal*

of Medicine (Coyle et al. 2004) reported the case of a 57-year-old woman who died of an infection of a microsporidial parasite called *Brachiola algerae*, which normally infects only mosquitoes. The unfortunate victim, who was taking a course of immunosuppressive drugs at the time to treat her rheumatoid arthritis, apparently acquired the infection as a consequence of slapping the mosquito against her skin, allowing the pathogen to gain entry into her system through the bite wound. To reduce the risk of acquiring a potentially lethal infection with this mosquito pathogen, the authors of this study accordingly recommend flicking mosquitoes rather than swatting them, although many entomologists argue that flicking allows mosquitoes to live to bite another day.


So there's no good way to kill a mosquito. The Buddhist solution—escorting any mosquitoes that enter one's home back outside (Landaw and Bodian 2002)—isn't likely to catch on any faster than severing ventral nerve cords. Maybe the best bet is to call in professional experts equipped with special weapons and tactics to deal with dangerous situations. After all, that's why they call them "SWAT" teams, isn't it?

References

- Cassingham, R. 1997. *This Is True: Glow-in-the-dark Plants Could Help Farmers*. Boulder: Freelance Communications (Volume 2: p. 13).
- Coyle C.M., L.M. Weiss, L.V. Rhodes III, A. Cali, P.M. Takvorian, D.F. Brown, G.S. Visvesvara, L. Xiao, J. Naktin, E. Young, M. Gareca, G. Colasante, M. Wittner. 2004. Fatal myositis due to the microsporidial *Brachiola algerae*, a mosquito pathogen. *New Engl. J. Med.* 351(1):42-7
- Gadsby, P. 1997. Why Mosquitoes Suck. *Discover* (August 1 1997). <http://discovermagazine.com/1997/aug/whymosquitoessuc1200>
- Gwadz, R.W. 1969. Regulation of blood meal size in the mosquito. *J. Insect Physiol.* 11: 2039-2044.
- Klowden, M.J. 1995. Blood, sex, and the mosquito. *BioScience* 45: 326-331.
- Landaw, J. and S. Bodian, 2002. *Buddhism For Dummies*. Wiley Publishing, Inc., New York, NY.



May Berenbaum is a professor and head of the Department of Entomology, University of Illinois, 320 Morrill Hall, 505 South Goodwin Avenue, Urbana, IL 61801. Currently, she is studying the chemical aspects of

interaction between herbivorous insects and their hosts. 

It's time to charge up your engines...and get ready to

CELEBRATE Colleagues, Science, and Ideas!

at ESA's 57th Annual Meeting
in Indianapolis, Indiana, December 13 – 16, 2009



For a four-day period, thousands of entomologists and professionals from related disciplines gather from around the world to exchange scientific information and ideas, enhance professional knowledge and skills, network with colleagues, and re-acquaint with old friends.

The ESA Annual Meeting agenda includes

- symposia,
- workshops,
- ten-minute papers,
- and poster presentations.

Typically, between 1,800 and 2,300 presentations are given annually.

New for 2009!

In addition to the opening plenary session on Sunday, December 13, there will be sessions on Monday, Tuesday and Wednesday mornings. These sessions will be hosted by exciting speakers within the scientific community. One speaker will be Mark Moffett, a Harvard-trained Ecologist and self-taught photographer, currently dividing time between *National Geographic Magazine*, *Smithsonian Institute*, and *University of California at Berkeley*.

Mark your calendar now for the 2009 ESA Annual Meeting and be a part of the excitement!

For more information visit: www.entsoc.org