Keeping Insects at Bay: Beyond DEET

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Keeping Biting Insects at Bay: Beyond DEET

Biting arthropods can quickly transform a pleasurable field excursion to one that is simply miserable. Adding insult to injury, mosquitoes, ticks, and other biting arthropods are also vectors for zoonotic diseases. When a field ecologist contracts a zoonotic disease, it translates to lost field time, project delays, and in some cases, a tangle of red tape. When an outstanding and uninsured field technician contracted Lyme disease a few years ago, it caused undue emotional stress and lost research time. Rather than analyze results, I filled out OSHA forms, answering questions like, “What measures have you put in place to prevent this kind of accident from occurring in the future?”

We all know that applying some DEET-based repellant before venturing out can make the field safer and more enjoyable. DEET effectively repels mosquitoes, ticks, chiggers, and biting flies in the families Tabanidae (horse and deer flies), Simuliidae (black flies), Phlebotominae (sandflies), and Ceratopogonidae (biting midges, no-see-ums, etc.).

However, some people do not like or cannot tolerate DEET. I know that I am somewhat sensitive to the repellent. During my summer fieldwork in 1996, mosquitoes were unusually abundant. As night fell, the high-frequency buzzing outside of my cabin was often so loud that I had trouble sleeping. A typical field day involved two applications of DEET. One day the mosquitoes were particularly thick, and I ended up applying DEET for a third time late in the day. Almost immediately I experienced nausea and ataxia, both common symptoms of DEET overexposure. From that day forward, I began looking for DEET alternatives. Here, I share what I have learned.

An excellent substitute for DEET is...a different DEET. In the early 1990s, the 3M Corporation developed a new formulation of the traditional insect repellent. Originally designed for the U.S. military, the product UltraThon was branded and marketed nationally beginning in 2003. It contains a 32% DEET formulation bound to a polymer that allows for a controlled time release. The slow release reduces the rate at which DEET is absorbed by the skin, and by extension reduces the number of adverse reactions to DEET application. A colleague of mine stopped using DEET because it caused contact dermatitis. I recently introduced him to Ultrathon, and he has used it without incident.
Picaridin is another DEET substitute. Developed by Bayer, it has been marketed worldwide since 1998, and in the United States since 2005. Like DEET, it is effective against several biting arthropods and is one of the few insect repellants endorsed by the Centers for Disease Control. Available in a 7% formulation, it is thought to be as effective as ~7% formulations of DEET. This may be too weak for field use in many areas, but suitable in some environments.

Instead of applying insect repellant to your skin, there now are products designed for application to clothing. Permanone is a 0.5% permethrin formulation sprayed directly on to clothing. It chemically binds to clothes, and will remain active on clothing for several weeks, regardless of washing. The “BuzzOff” clothing line is treated with permethrin, if you want to buy pre-treated clothes.

Two other products are worth mentioning. Cargo pants with zip-off legs can reduce the number of wood ticks that successfully attach to your body. If the wood tick gets on to your clothes below your thighs, it will crawl up and attempt to embed in the seam just above the leg zippers. It makes tick removal easy and painless. The last is a head net. These are a must-have wherever biting insects are thick. A colleague and fellow field researcher from northern Wisconsin put it best when he said, “It was the best three dollars I ever spent.”

If you spend any time in the field, you will get arthropod bites. With a few precautions, though, you can minimize your involuntary participation in parasite–host interactions.

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