Lessons from evolution applied to national security and other threats

January 28 2008

Could lessons learned from Mother Nature help airport security screening checkpoints better protect us from terror threats? The authors of a new book, Natural Security: A Darwinian Approach to a Dangerous World, believe they can -- if governments are willing to think outside the box and pay heed to some of nature's most successful evolutionary strategies for species adaptation and survival.

"Biological organisms have figured out millions of ways, over three and a half billion years of evolution, to keep themselves safe from a vast array of threats," said Raphael Sagarin, a Duke University ecologist who co-edited the book with Terence Taylor, an international security expert.

"Arms races among invertebrates, intelligence gathering by the immune system and alarm calls by marmots are just a few of nature's successful security strategies that have been tested and modified over time in response to changing threats and situations," Sagarin said. "In our book, we look at these strategies and ask how we could apply them to our own safety."

The book, published next month by the University of California Press, is the result of more than two years of investigation and debate by a multidisciplinary working group of scientists and security experts led by Sagarin and Taylor.

Sagarin is associate director for ocean and coastal policy at Duke's Nicholas Institute for Environmental Policy Solutions and assistant

research professor at the Nicholas School of the Environment and Earth Sciences.

Taylor is president and director of the International Council for the Life Sciences. He previously worked with the United Nations as a Commissioner and Chief Inspector for Iraq on weapons of mass destruction, and was a career officer in the British army.

The working group included paleobiologists, anthropologists, psychologists, ecologists and national security experts who examined a wide array of evolutionary models and ideas and evaluated which could be applied to security issues such as weapons development, screening procedures, and risk assessment of newly emerging terror threats.

For instance, a report last year by the Government Accountability Office (GAO) found that despite heightened awareness and tightened restrictions, security screening checkpoints at U.S. airport were still vulnerable. GAO agents were able to sneak readily available materials that are precursors to improvised explosive devices through checkpoints at different U.S. airports on several occasions.

“The GAO report confirmed what most Americans already suspected: That the Transportation Security Administration (TSA) cannot possibly control all potential threats to airport security,” Sagarin said. “Biological organisms inherently understand this. They realize they can’t eliminate all risk in their environment. They have to identify and respond to only the most serious threats, or they end up wasting their resources and, ultimately, failing the evolutionary game.

“These models suggests that the TSA would be more effective by being much more selective in whom it considers for screening, rather than trying to eliminate all risks posed by liquids,” he said.

A biological assessment of the TSA's methods also found that the agency's well advertised screening procedures may lead to a kind of natural adaption by terrorists.

"A study of animal behavior suggests that advertising your security procedures and continually conveying to others that there is a state of elevated threat only helps inform potential terrorists of loopholes in the procedures, while keeping the general population uncertain and nervous," Sagarin said. Species such as marmots, which continually emit warning calls to each other even when no immediate threat is present, force the other animals in their group to waste time and energy trying to figure out if the implied threat is real, he noted.

Evolutionary models and ideas also can be applied to non-terrorism threats, such natural disasters and the spread of infectious diseases, he added.

"Whether you're dealing with al Qaeda or an emerging pathogen, studying animal behavior teaches us basic principles of survival," he said. "You can't eliminate all risks, so you have to focus on the big ones, while adapting to minimize risk from the rest. You have to be aware of your environment, understanding that it's constantly in flux. And when it comes to adapting and responding to threats, a centralized authority can get in the way. Individual units that sense the environment, with minimal central control, work best."

Source: Duke University