

Biology

Bees and keepers tackle mite-y problem

If you find you've been paying a high price for honey lately, you can blame it in part on the varroa mite. It's the most destructive of the two kinds of mites that have infested and devastated honeybees across North America (SN: 6/29/96, p. 406). Like a tick ingesting human blood, the varroa mite feeds off the bee's bloodlike hemolymph. Ferried back to the hive, the mite seeks out a honeycomb cell and feeds on the eggs and pupae there.

"It's a serious problem," says Thomas E. Rinderer of the U.S. Department of Agriculture honeybee lab in Baton Rouge, La. "The solution is a ways off."

At a conference on honeybees last month in Memphis, researchers discussed what that solution might be. Several biological strategies are in the works, such as developing bees that groom to rid each other of the mites or infesting hives with a benign strain of varroa mites that could pre-empt the more virulent pests. Honeybees from the Primorsky region in eastern Russia seem to have a genetic resistance to varroa mites and, pending USDA approval, are to be imported this summer for quarantine, study, and possible use by U.S. beekeepers. Such methods could eliminate or minimize the use of chemical controls, to which varroa mites are already showing resistance.

Another biological strategy involves selectively breeding for "hygienic" honeybees. Bees with this naturally occurring behavioral trait cue into the presence of varroa mites in cells and evict them. Entomologist Marla Spivak of the University of Minnesota in St. Paul reported at the meeting and in the December 1996 *APIDOLOGIE* that in 2 out of 3 years her hygienic honeybees removed most of the infested pupae in test colonies. In three out of four commercial apiaries, the hygienic bees had fewer mites than nonhygienic bees did.

Rinderer says it will probably take several strategies in concert to vanquish the mite. Honeybees may eventually develop their own natural resistance, he adds. —C.M.

Varroa mites, the size of sesame seeds (red patches), feed on adult honeybees, then invade the nest and feed on developing pupae.



Dolphin deaths: A tributyl tin connection?

Added to marine paint, the compound tributyl tin checks the growth of barnacles and algae on the bottom of boats. In the late 1980s, many countries, including the United States, banned its use on small hulls after researchers began documenting the toxic effects of the so-called antifouling compound on other marine creatures, such as oysters and mollusks.

In 1995, researchers reported that dolphins found dead along Japanese coasts had accumulated a variety of butyl tin compounds, the breakdown products of tributyl tin. In the January *ENVIRONMENTAL SCIENCE & TECHNOLOGY*, a team of researchers headed by Kurunthachalam Kannan, now at Michigan State University in East Lansing, reports the first measurements of butyl tin accumulation in dolphins from U.S. coastal waters.

Over the past decade, dolphins along the Atlantic and Gulf Coasts, as well as in the Mediterranean Sea, experienced several mass die-offs involving hundreds of animals. Kannan and his colleagues took tissue samples from bottle-nosed dolphins that had died along the Florida coasts. The butyl tin concentrations they measured, notably in the liver, were generally higher than those in stranded dolphins from other locations and in a captive dolphin. Liver tissue from a smaller sample of two other species that range farther out to sea—the pygmy sperm whale and the Atlantic spotted dol-

phin—had butyl tin concentrations one-third to one-fourth those of the bottle-nosed dolphins.

The finding doesn't prove that tributyl tin killed the coastal-dwelling bottle-nosed dolphins, but there is other evidence that butyl tin compounds are potent immune system suppressors. The researchers suggest that the pollutants may have diminished the animals' ability to fight off the bacterial or viral infections thought to underlie the deaths. Other industrial pollutants that accumulate through the food chain have also been implicated in die-offs of marine mammals (SN: 7/2/94, p. 8).

The researchers noticed that butyl tin was lower in dolphins that died in 1994 than in those that died in earlier years, before the U.S. ban would have had an effect. A similar pattern has turned up in Gulf oysters. Exposure will continue because tributyl tin persists in sediments and is still allowed on large vessels and aluminum hulls, the researchers note. —C.M.

Genetics of Sumatra's at-risk rhino

In many cases, an endangered species can more accurately be described as a collection of genetically distinct endangered populations. To maximize diversity, each population needs to be managed separately—if there are enough individuals to keep the population alive.

The two-horned Sumatran rhinoceros typifies this dilemma. Only about 300 animals remain in the wild, and one population, on the island of Borneo, is down to about 50 animals. The Sumatran is considered the most ancient of rhinos. Unlike other species, the Sumatran rhino is hairy and relatively small, measuring 8 feet long and weighing less than a ton. The rhinos in the Bornean population are the smallest and have a distinct skull shape.

In an article slated for the April *CONSERVATION BIOLOGY*, Columbia University evolutionary geneticist Don J. Melnick and his colleagues quantify the genetic differences that go with the obvious physical differences. Analysis of DNA from mitochondria in the animals' cells revealed little difference between rhinos in eastern and western Sumatra but a 1 percent difference between the Bornean and other Sumatran populations, indicating an evolutionary divergence.

The Bornean rhino, which inhabits tropical forests, has been separate from the other rhino populations since at least 10,000 years ago, when the local terrain became an archipelago. Disappearing forest habitat and pressure from poachers in search of rhino horns have pushed all the Sumatran rhino populations to the edge of extinction. The researchers recommend that conservationists maintain the Bornean population separately, to preserve the set of genes best adapted to the island, but "unfortunately . . . we might not have the luxury." —C.M.



A young Sumatran rhino at a sanctuary in Malaysia.

FWS proposes protection for bog turtle

Last week, the U.S. Fish and Wildlife Service proposed categorizing the bog turtle (*Clemmys muhlenbergii*), one of the rarest turtles in the United States, as "threatened" on the endangered species list. The turtles are small, with a brightly colored patch on each side of their heads, which has made them a favorite of collectors. The number of these marsh dwellers has declined by 50 percent in the last 2 decades as their habitat has disappeared in the part of their range that is in the heavily developed Northeast corridor. —C.M.