


## VOLUME 27, NO. 3 Fall 2009

Bats along the Jordan River  
Military bunkers are becoming bat houses  
Eran Levin



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Bunkers and bomb shelters dot the historic 60 miles (96 kilometers) of the Jordan River Valley between Israel and Jordan. Since the peace agreement of 1994, most have been abandoned “except by an assortment of bats, which roost precariously on the slick ceilings and walls of some bunkers. Giving a conservation twist to the notion of beating swords into plowshares, our team, with help from a BCI Global Grassroots Conservation Fund grant, converted these old bunkers into prime bat roosts.

The valley, no more than five miles (8 kilometers) wide, lies between the Dead Sea and the Sea of Galilee. Its climate varies from Mediterranean in the north, with warm, dry summers and relatively rainy winters, to extreme desert in the south. The valley, with its rich soil, warm climate and water from the river and frequent oases, is extremely fertile. It also hosts remarkably diverse flora and fauna, including at least 27 bat species (out of a total of 33 reported in Israel.)

Except for the Egyptian rousette fruit bat (*Rousettus aegyptiacus*), all are insect eaters. There are many farms on both sides of the river, including numerous organic date-palm plantations. These bats “as consumers of agricultural pests” are significant assets for farmers and increasing their numbers promises real benefits, a point we stressed in the education aspects of our work.

Roosting sites are probably a limiting factor for bat populations, since most natural caves in the Jordan Valley have been disturbed by human activities. The fact that bats colonized the military bunkers shortly after they were abandoned supports this hypothesis.

I had previously surveyed most of these bunkers, which are located between the river and Israeli border fences, as part of my Ph.D. research on greater mouse-tailed bats (*Rhinopoma microphyllum*). Each bunker consists of several tunnels leading to an underground room (roughly 13 by 40 feet [4 x 12 meters]). They are rarely visited; our surveys and modification work required permission from the Israeli military.

With help from the Israeli Defense Force and the Nature and Parks Authority, we located more than 20 abandoned bunkers and bomb shelters. Their metal ceilings and walls, however, are too slick for bats to easily cling to. We found bats hanging from aging electric cables and assorted braces and shelves. Some bunkers were almost filled with abandoned equipment and assorted rubbish, while the entrances to others were closed or blocked.

I identified 10 bat species using the structures as day roosts or maternity roosts. That total is now 12 species, including two listed by the IUCN as critically endangered in the Israel Region, three as endangered and five as vulnerable. These bats include species that are typically classified as European, African and Mediterranean.

For four species “the greater horseshoe bat (*Rhinolophus ferrumequinum*), Geoffroy's myotis (*Myotis emarginatus*), trident leaf-nosed bat (*Asellia tridens*) and Egyptian

slit-faced bat (*Nycteris thebaica*) – the bunker populations represent the first maternity colonies discovered in Israel since the mass decline in bat populations. During the 1950s, '60s and '70s, bats of many species were devastated in the region, largely because of misdirected and needless efforts to eradicate Egyptian rousette fruit bats (see "The Bats of Israel," BATS Spring 2003).

Our team included Eran Amichai of Tel Aviv University, Amit Dolev of the Society for the Protection of Nature in Israel and Aviam Atar of the Israel Nature and Parks Authority.

Our approach to converting these old bunkers into bat houses was to first clear trash and entrance obstructions, then to cover the slick, metal ceilings with bat-friendly materials that give the animals a rough surface they can grasp securely. We did this by applying plaster mixed with gravel, attaching plastic mesh, installing simple wood structures, stretching ropes or spraying a layer of lumpy, polyurethane foam.

We fully converted eight bunkers with a mix of treatments. The bats quickly embraced their remodeled roosts and began moving in almost immediately. The most common species using the bunkers during summer is the trident leaf-nosed bat, with several thousand individuals forming the species' only known maternity colony in Israel.

Trident leaf-nosed bats and Geoffroy's horseshoe bats seemed to prefer ceilings of polyurethane foam and plaster-and-gravel; greater horseshoe bats favored ropes; while mouse-tailed bats chose plastic mesh and wood structures.

We also positioned temperature dataloggers in each bunker to monitor conditions. Horseshoe bats typically chose cooler bunkers than other species.

We fully expect increasing numbers of bats, as well as additional species, to colonize these much-improved roosts – finding refuge in these military relics. The bunker bats will benefit farmers along both sides of the Jordan, a fact we will publicize with education and outreach.

Our project area is along Israel's border with Jordan and the Palestinian authority, and the work itself was possible as a result of the peace treaty with Jordan. We hope this project will strengthen the peace agreement with our neighbors and provide a basis for future cooperation in bat conservation.

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This project also received funding from the Society for Protection of Nature in Israel, Israel Nature and Parks Authority and the Jerusalem Biblical Zoo.

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