BIOLOGICAL CONTROL

Plan to Import Exotic Beetle Drives Some Scientists Wild

Some biologists worry that a U.S. plan to import Chinese beetles to munch on an invading tree will harm an endangered flycatcher

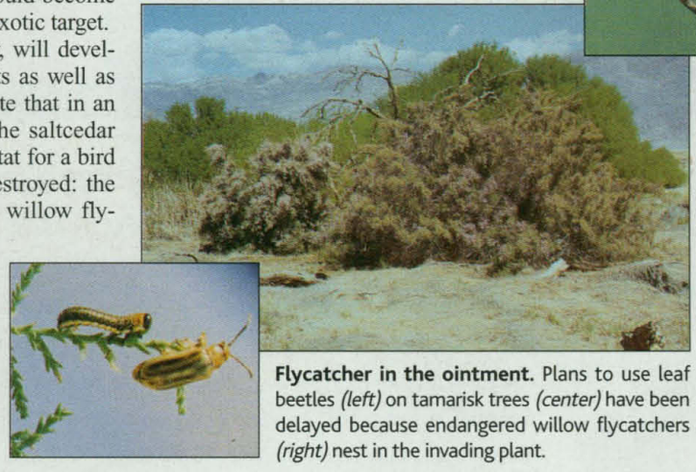
Next month, a handful of researchers across the western United States will receive some long-awaited express mail: cartons containing about 100 small yellow-and-black beetles. If field tests pan out, next year the Chinese leaf-eating beetles will be set free in what one scientist calls "one of the biggest and most controversial biological weed-control projects ever." The beetles' mission is to munch on saltcedar, an Asian import that ran wild last century and now forms dense thickets along many western waterways. But although biologists agree that saltcedar is an ecological menace, many fear that the imported insect could become just as troublesome as its exotic target.

The beetle, they worry, will develop a taste for native plants as well as for saltcedar. And they note that in an ironic twist of ecology, the saltcedar now provides nesting habitat for a bird whose native habitat it destroyed: the endangered southwestern willow flycatcher. These concerns stoked nearly 5 years of fierce debate within the U.S. Fish and Wildlife Service (FWS), the agency charged with both protecting the bird and uprooting the invading plant. The debate isn't over, but last week the government approved a scaled-back plan to introduce beetle swarms into seven states.

Originally introduced as a windbreak and to control erosion, saltcedar now covers almost 500,000 hectares in 15 states. Also known as tamarisk, it has thrived in part due to its ability to sink tap roots deeper into the dry soil than native species. It also possesses remarkable fecundity: A single tree can produce more than 500,000 seeds a year. But biologists say people have aided its spread by building flood-damping dams, pumping down water tables, and allowing livestock to overgraze stream banks. "Tamarisk is wonderfully adapted to the highly modified rivers we've created," says Rob Marshall, a biologist with the Nature Conservancy in Tucson, Arizona.

Saltcedar thickets have proved disastrous for many native species, crowding out the cottonwood trees and willows that provide food and shelter for bighorn sheep and many birds. Indeed, the plant's spread was one factor cited by the FWS for the decline of the flycatcher, a streamside resident declared endangered in 1995. Fears that saltcedar will drive more species to the edge have put the plant at the top of ecologists' hit list. But most efforts to oust saltcedar—using everything from chemicals to bulldozers—have proved fruitless or prohibitively expensive.

A dozen years ago, such problems prompted C. Jack DeLoach, a U.S. Department of Agriculture biocontrol researcher in Temple, Texas, to survey the hundreds of insects that attack saltcedar in its home range. After choosing 21 candidates, collaborators in Israel, China, and elsewhere in 1991 began to conduct "host range" studies designed to make sure the insects would not attack other plants, including valuable crops. In late 1994, government review panels approved the Chinese beetle for import and release.



Flycatcher in the ointment. Plans to use leaf beetles *(left)* on tamarisk trees *(center)* have been delayed because endangered willow flycatchers *(right)* nest in the invading plant.

The flycatcher's designation as endangered in early 1995, however, led some FWS biologists to worry that the beetles might eliminate too many nesting trees. In Arizona, for instance, nearly 90% of the state's 150 flycatcher pairs now nest in saltcedar. As a result, the FWS's southwestern office demanded further study. The controversy put the bird's advocates "in the unenviable position of defending tamarisk," says Marshall, the agency's former lead flycatcher biologist.

But others within the agency were firmly in the beetle's corner. Their views won out late last year, when FWS headquarters overruled its southwestern outpost and announced that the beetles' likely impact on tamarisk posed no significant threat to the flycatcher—and that their presence might even benefit dozens of other threatened species by slowing the spread of the shrub.

Last week, however, the agency decided to limit that endorsement after holding several days of sometimes testy staff meetings. In a compromise expected to be approved later this month, FWS officials agreed to let DeLoach deploy special outdoor observation cages at eight study sites. That's four fewer than originally planned, and keeps the beetle out of two sensitive river valleys in Texas and New Mexico. The agency also will require DeLoach's team to pass another environmental review next year before it can release the beetles.

The scaled-back plan hasn't pleased everyone. Some biologists say that even if the beetles work, there is no guarantee that native vegetation will return to soils made too dry or salty by decades of abuse. "You could scrape saltcedar off the face of the Earth, and native stuff still wouldn't come back" unless grazing and water-management practices change, says biologist Robert Ohmart of Arizona State University in Tempe. He and other scientists also worry that the beetles could follow other introduced insects and attack nontarget plants or become deadly competition for native insects (*Science*, 22 August 1997, p. 1058).

But DeLoach says critics have overstated the fears of opening Pandora's box. Few of the more than 250 insects or disease-causing organisms intentionally released in 55 nations over the last century have run seriously amok, he claims—and he notes that only about half have even had any success controlling their target plants. Indeed, he originally had planned to give the beetle a boost by releasing it together with a Middle Eastern mealybug that also has a taste for tamarisk.

For the moment, DeLoach is happy to be finally moving ahead with the caged tests. But even a supporter concedes that eventually setting the beetles loose is inherently risky. After all, says ecologist Jeff Lovich of the U.S. Geological Survey in Riverdale, California, "it's not like you can call the bugs back." —DAVID MALAKOFF

CREDITS: (LEFT TO RIGHT) C. J. DELOACH/USDA; J. RANDALL/THE NATURE CONSERVANCY; R. SIMPSON/VISUALS UNLIMITED