There probably isn’t a farmer out there who hasn’t wished for a bigger hammer to use in fighting weeds. You can’t blame a guy for wanting a more effective herbicide or a wider cultivator to balance the odds when just one person is protecting all those acres against tough weeds.

But maybe you’re not as alone as you think. You might not be cozy with crickets or mice, but if the enemy of your enemy is your friend, these little fellows can provide hundreds of thousands of allies per acre in the weed war.

**Little hammers.** Those two weed seed predators are part of what Iowa State University scientists call the “little hammers” approach to weed control. “We believe that a combination of weed management techniques and ecological processes can help a farmer maintain effective weed control with a lighter touch,” says Matt Liebman, an Iowa State agronomist. “That approach can help slow down evolutionary resistance to herbicides, protect soils from erosion due to excessive cultivation, and protect

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**Right:** The white-footed mouse and its cousin, the prairie deer mouse, are tireless seed predators, eating or burying weed seeds deep below the surface. **Below:** Scientists offered velvetleaf seeds on test cards in plots and predators removed one-third of seeds within 48 hours.

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**THE ENEMY OF MY ENEMY**

Natural predators and competitors can reduce weed pressure in corn and soybean fields

By Dean Houghton
water quality through judicious use of herbicides. And it may help farmers lower their production costs.”

A series of plots on Iowa State’s Marsden Farm in central Iowa were set up to allow researchers to study the effect of crop management systems of populations of velvetleaf and giant foxtail. Scientists study such things as weed seed longevity in soil, weed seedling emergence and survival, and seed loss to insect and animal predators.

**Mice matter.** Research in those plots has shown that mice are willing workers when it comes to gathering up weed seeds. Scientists set out seed cards containing either giant foxtail or velvetleaf seeds and monitored activity in fields. Mice removed an average of a third of the velvetleaf seed and about half of the giant foxtail seed within a 48-hour period.

“There were times when mice removed up to 40 percent of the seeds in a single night,” says Brent Danielson, an Iowa State biologist. “Mice can take a tremendous amount of weed seeds out of fields and do it relatively quickly if seeds stay on the soil surface and are not tilled under. Mice don’t always eat the seeds right away, but bury them underground in caches at depths from which seeds can’t germinate.”

The prairie deer mouse, one of North American’s most abundant vertebrates, lives in the middle of fields. Its cousin, the white-footed mouse, is commonly found near field borders. These two species work year-round against weed seeds and insect pupae, never stopping to hibernate. Researchers are studying seasonal patterns of weed seed removal to see how much effect predators have between harvest and spring planting when seeds are the most vulnerable.

**Similar destruction of weed seeds is credited to crickets that appear in fields each fall.** Boone, Iowa farmer Dick Thompson stumbled across the significant role that predators can play a few years back when working with Iowa State on a fertility study. Researchers found a precipitous drop in the weed bank found in the plow layer following the oat year in Thompson’s crop rotation. “I hadn’t used any herbicides or tillage that could have affected it,” he says. “But when I looked at the recent research on seed predators, the light came on for me.

Iowa State scientists have followed up their plot work with field-scale studies that indicate similar effects of predators in commercial scale fields. Additional studies on length of rotations and timing of tillage will help scientists develop practical suggestions for farmers who want to encourage “little hammers” to help with weed control.

**Competitive edge.** In the meantime, Iowa State agronomist Bob Hartzler reminds growers that competition from a healthy crop is one of the strongest weed suppressants available. “Providing the crop a competitive advantage over weeds can greatly reduce weed seed production,” he says. For example, waterhemp that emerged two weeks after the soybean crop produced 80 percent fewer seeds than the same weed that emerged simultaneously with the sprouting soybean crop.

Hartzler predicts that growers won’t be able to rely on new “big hammers” in the future. “Advances likely will depend on our understanding of weed biology and our ability to develop alternative control strategies,” he says.