Bad Plants and Good Bugs

LLOYD A. ANDRES

Bugs are bad, plants are good is an old myth that is rapidly dying out. Even the home gardener now recognizes the beneficial insects and watches for the first ladybug or green lacewing. He also realizes that gardening is another term for weeding out "bad" plants. Entomologists are further confounding the "bad bug-good plant" myth by importing "good" bugs to feed on weedy plants.

Klamath weed, once the scourge of the northwest range, was brought under control by bringing into this country and releasing two small beetles from Europe. This success sparked the formation of an investigations group within USDA's Entomology Research Division devoted exclusively to control of weeds with insects. Although their work offers little hope to the average suburbanite for controlling weeds in the quarter acre around his home, it does offer a new approach to control of over 250 weedy plants that have entered the United States from other countries.

Plant-feeding insects show a preference toward certain plants and are sometimes even restricted to a single species for food and shelter. This is also true for weed-feeding insects. Specialized feeding has been rigidly fixed through evolution, even to the extent that starvation occurs in the plant's absence. Entomologists are learning to search out and distinguish the specific weed-feeding insects in their native home and bringing them to the United States. If successful, the balance of nature is restored without the continuing need for pesticides.

A typical project is currently underway to control tansy ragwort, a poisonous range weed introduced from Europe. It occupies over 500,000 acres from California to British Columbia. Ragwort crowds out the useful forage plant species. Livestock forced to feed on it live poorly and often die. The rapid spread of ragwort to inaccessible areas made its control with chemicals uneconomical.

This prompted a survey of the weed in Europe where over 60 species of insects were recorded. Of these, the cinnabar moth, *Tyria jacobaea*, was thought most promising. It was studied and released at Fort Bragg, Calif., in 1959. From a release of 400 larvae, the number has increased to hundreds of thousands. These have already cleared the weed from many acres.

At the peak of the summer season, only bare stalks of the ragwort remain. In fact, there are often too many larvae on some plants, so that many wander off and starve to death. The fact that not a single larva has damaged other plants in the area confirms the host specificity testing conducted prior to introduction.

Although the cinnabar moth shows great potential for controlling the ragwort, it is too much to hope that a single insect can destroy ragwort over its entire range. Entomologists have also released a seedfly, *Hylemya seneciella*, whose larvae destroy the devel-

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oping flower heads. They are continuing to study the root-feeding *Longitarsus* beetle.

The investigations group is headquartered at Albany, Calif., and is responsible for weed control with insects throughout the entire United States. Its variety of projects support laboratories in Rome, Italy, and Buenos Aires, Argentina. The weeds under study include Canada thistle (*Cirsium arvense*), puncture vine (*Tribulus terrestris*), alligatorweed (*Alternanthera phylloxeroides*), and many others.

The entomologists are enthusiastic about reducing the annual damage by weeds with nature's own weapons—"good" bugs.

More Beef From Crossbreds

MAX B. HEPPNER

Dr. Keith E. Gregory, a tall, broad-shouldered cattle geneticist in the Agricultural Research Service, cuts an imposing figure with the broad-brimmed hat of the cattle rancher and the suit and tie of the college professor.

This combination, which Gregory wears without overcoat even in near-zero weather, symbolizes perfectly his occupation for 11 years. From 1955 to 1966, he was coordinator of the State and Federal North Central Beef Cattle Breeding Project, a post he relinquished to direct the new U.S. Meat Animal Research Center in Nebraska.

As coordinator, he interpreted ranchers' problems to scientists and scientists' findings to ranchers. He took a broad look at research so that State and Federal scientists could pull together on beef cattle breeding projects in which both were involved. In his "spare" time, he personally directed experiments supporting the aims of projects he coordinated.

One line of inquiry dovetailed ideally with all these duties: The longstanding question whether crossbreeding could increase the efficiency of production on cattle ranches. Stated as simply as possible, crossbreeding is systematically mating females of one breed to males of another breed to produce offspring with hybrid vigor.

Hybrid vigor results from the contribution of good genetic traits from the two breeds used in the cross. A successful match can generate so much hybrid vigor that crossbred offspring are not only more productive than the average of the two parents, but more productive than the superior of the two parents.

Practical use of hybrid vigor was first made by corn breeders and then by chicken and swine breeders; all of them found that crossbreeding could cut production costs considerably. But cattlemen did not follow their lead immediately.

One good reason for this lag was that cattle breeding stock represents a high investment because much time passes before a new generation reaches breeding age. So, it is quite expensive

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