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Rebuttal: Running the Gauntlet of Scepticism and Resistance in Scientific Research

G.J. Gonzales

Editor's Note: Readers may wish to refer to the paper "The Potential of two insects for controlling broom snakeweed," by G.J. Gonzles, *Rangelands* 9(2):59-61.

The comments concerning scientific research are the individual opinions of the authors and do not represent the official positions of the Society for Range Management or its representatives.

It is seldom possible to design an experiment that answers all research questions nor is it realistic to ignore potentially important oddities that may be observed in the course of scientific research. In a commentary on "The potential of two insects for controlling broom snakeweed", research which had been proposed on the biological control of broom snakeweed was questioned for various reasons.

The majority of concern in using the checkered beetle *E. coccineus* as a biological control agent is based on the premise that the augmentation method would be used. Although *E. coccineus* is native to the southwest, an extensive survey of insects associated with snakeweed in eastern New Mexico and western Texas revealed *E. coccineus* to be present in only 3 of 47 (6%) of the surveyed sites (Foster et al. 1981). This may indicate that *E. coccineus* is relatively "foreign" to snakeweed populations and, therefore, possibly should be researched as a classical biological control agent for the snakeweeds. In addition, in those sites in which *E. coccineus* was present its abundance was common. This may indicate that once invasion into snakeweed communites had occurred *E. coccineus* prospered. This warrants further consideration.

Assuming that *E. coccineus* would be used in an augmentation approach, Cuda (1988) concluded that the financial cost would be prohibitive compared to traditional herbicide control. Regardless of the approach of any pest control method, "cost" can no longer include only monetary values but must now consider environmental and health costs. Even rapidly biodegradable herbicides that have been used in very large volumes worldwide without causing health problems (Guthrie and Perry 1980, Ware 1978), are now suspect of causing health problems. For example, the National Cancer Institute indicates that farmers and workers exposed to herbicides face a much higher risk of lympathic cancer than others (NM Occupa, Health and Safety Bureau 1986). Farmers exposed to herbicides 20 or more days a year were 600% more likely to contract lympathic cancer. The highest cancer risk was associated with 2,4-D. Other carcinogens including cigarette smoke, radiation, and heredity were ruled out. Thus, even where the "total [financial] cost [of a biological control method] is similar to control with herbicides," biological control warrants further consideration.

The high correlation between dead or dying snakeweed plants and evidence of *E. coccineus* in snakeweed roots (Gonzales 1987) must be put into perspective. While the likelihood of this insect being herbivorous or omnivorous is minimal as discussed by Cuda (1988), the oddity of the correlation should not be ignored for reason of not being in accord with current beliefs. Furthermore, while not assuming that because the two factors were correlated the relationship was necessarily one of cause and effect, I could not rule out that possibility on the basis of instinctive mental resistance to new ideas.

In deciding whether a line of research should be followed, one should not be put off it merely because the idea has already been thought of or tried without leading to expected results (Beveridge 1957). If, for example, native snakeweed-destroying insects are being regulated by density-dependent natural control factor(s), it may be that their populations could be regulated using pheromone "confusion". Finally, while not encouraging abandonment of the critical attitude or hasty acceptance of ideas until they have been well proved and tried, successful research may include conventional and/or novel approaches (Beveridge 1957).

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Biological Control of Snakeweed

LAS CRUCES—Two hundred weevils were released northeast of Las Cruces this week (August 12) in a test of the biological control of snakeweed, a rangeland plant that forces out grasses and causes abortion in cattle.

"To my knowledge, this is the first time a foreign insect has been used to try to control a native weed in a continental area," said David Richman, college assistant professor of entomology in New Mexico State University's Agricultural Experiment Station.

Richman assisted C.J. "Jack" DeLoach, a United States Department of Agriculture research entomologist, with the release of the weevils from Argentina. DeLoach tested the weevils in quarantine at the Grassland, Soil and Water Research Laboratory at the USDA Agricultural Research Service in Temple, Texas, prior to the experiment.

"During the time we've been working on it, I've made four trips to Argentina looking for natural enemies," DeLoach said of the snakeweed control project. Among the insects he considered for a biological control experiment, the weevil known only as *Heilipodus ventralis* appeared to be the best candidate for the trial release.

The adult weevils feed on snakeweed foliage, but larvae attack the roots. Snakeweed has natural enemies here, but they are not sufficient to control its spread. Weevils and other insects have forestalled the takeover of rangeland by snakeweed in Argentina.

Twenty-five of the mottled-brown, long-snouted weevils were placed on snakeweed plants inside a net cage near Las Cruces this week, and 175 were released into the open nearby. Another 50 were to be released in Socorro County.

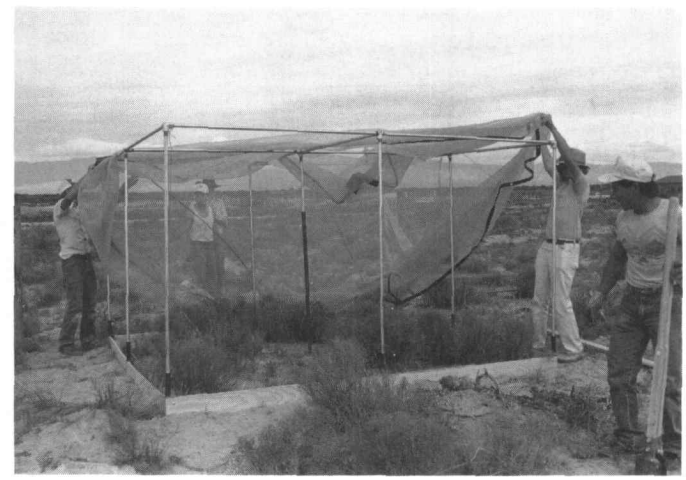
The weevils have a life-cycle of about a year. Richman said they will be monitored carefully during the next few months to see that they are surviving. They are expected to reproduce during the three-year test period.

"You can test them all you want to in the laboratory, but the proof of the pudding is out in the field," Richman said.

DeLoach said stringent controls are placed on foreign insects being considered for biological control projects in this country. These weevils underwent testing for five years before the trial release, and researchers feel confident they will not harm beneficial plants.

Snakeweed, which contains the poisonous substance Saponin, is beieved to have originated in North America, but spread thousands of years ago to Argentina, where the climate and plant life is similar to that of the American southwest.

While the proliferation of the weed is often blamed on overgrazing, scientists believe many factors contributed to its infiltration, not all of which are known. The plant is considered a severe threat to the cattle industry in southeast New Mexico, but also occurs in other areas of the state.



Workers from New Mexico State University's entomology department put up a screen enclosure around a stand of snakeweed near Las Cruces recently for an experiment using weevils from Argentina in the biological control of snakeweed. Snakeweed, a rangeland weed that forces out grasses, contributes to erosion and causes abortion in cattle, is an increasing problem here, with the worst concentrations in the southeast quadrant of the state. (NMSU Ag Info photo)