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Methods and Strategies to Manage Invasive Species Impacts to Agriculture in Hawaii

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National Wildlife Research Center Scientists Assess Environmentally Sound Methods to Reduce Crop and Natural Resource Damage

Wildlife Services' (WS) National Wildlife Research Center (NWRC) is the only Federal research facility devoted exclusively to resolving conflicts between people and wildlife through the development of effective, selective, and acceptable methods, tools, and techniques. NWRC's field station in Hilo, HI, is ideally located to allow research biologists to develop methods needed to control invasive species damage to Hawaiian agricultural crops and native ecosystems.

Rodents cause significant damage to Hawaii's agricultural and natural resources, and pose a threat to public health and safety. Current management techniques provide inconsistent levels of protection from rodent damage. More effective methods of control are needed to resolve small mammal damage to agriculture, reforestation, native ecosystems, and property. This is why NWRC biologists conduct field and laboratory research to evaluate and improve methods to reduce and monitor rodent impacts on Hawaiian crops and natural resources. Collaboration with other State and Federal agencies and private organizations is needed, however, to develop techniques to reduce damage and manage rodents and other vertebrate species in natural areas.

Due to rapid diversification in Hawaiian agriculture, there is also a need to assess the economic impacts of damage to these new crops caused by rodents and other recently introduced vertebrate pest populations.

Major Research Accomplishments:

- WS continued to develop tools to manage invasive tree frogs. Over the past three years, NWRC's Hawaii Field Station has developed the registration data for the use of caffeine, citric acid, and hydrated lime to reduce invasive tree frog populations.
- WS obtained the data for the registration of aerial broadcast of rodenticides for use in conservation areas and to protect native ecosystems.



Applying Science and Expertise to Wildlife Challenges

Cost Effective Integrated Pest Management—NWRC scientists are assessing the effects of various techniques for protecting Hawaiian crops and natural resources. In addition, NWRC researchers are developing information and guidelines for producers to effectively minimize the quantities of pesticides used to manage rodent damage.

Alternative Baits—NWRC scientists are also identifying and evaluating alternative rodenticide baits in an effort to manage rodent damage in a more ecologically sound manner. As part of their research, NWRC scientists are compiling the necessary data to Federally register these baits. Field tests are being conducted on roof rats, a species that decimates native ecosystems as well as agricultural crops throughout the Pacific region.

Introduced Invasive Species—The negative impacts of introduced species on island ecosystems are severe. In Hawaii, a species of tree frogs was recently introduced from the Caribbean. In addition to its propensity for reproducing quickly and its piercingly loud night time call, the species eats the insects and snails that native forest birds rely on for survival and may have significant effects on forest dynamics. NWRC scientists are studying ways to manage frog populations, determine the effects of frogs on native ecosystems, and minimize their effects on agriculture.

Groups Affected by This Problem:

- Macadamia nut producers
- Farmers
- Horticulture industry
- Wildlife managers
- Natural resource managers

Major Cooperators:

- Hawaii Agriculture Research Center
- US Fish and Wildlife Service
- Kamehameha Schools Bishop Estate
- Tropical Fruit Growers of Hawaii
- MacFarms of Hawaii
- Hawaii Department of Land and Natural Resources
- Hawaii Department of Agriculture
- University of Hawaii

Selected Publication:

 Johnston, J. J.; Pitt, W. C.; Sugihara, R. T.; Eisemann, J. D.; Primus, T. M.; Holmes, M.; Crocker, J.; Hart, A. 2004. Probabilistic Risk Assessment For Birds, Snails and Slugs in Diphacinone Rodenticide Baited Areas on Hawaii. Journal of Environmental Toxicology and Chemistry.