REVIEW AND PERMIT PROCESS FOR BIOLOGICAL CONTROL RELEASES IN HAWAI'I

Neil J. Reimer
Hawai'i Department of Agriculture, Plant Quarantine Branch, 701 Ilalo St., Honolulu, HI 96813, U.S.A.
Email: ***nreimer@elele.peacesat.hawaii.edu***

ABSTRACT. A review of the permitting process for the introduction of biological control agents into Hawai'i is presented. The effects and results of the permitting process on the screening and establishment of host specific biocontrol agents are discussed.

Keywords: Biocontrol introductions, permit, host specificity.

INTRODUCTION

Hawai'i has had a long history in the use of biological control to reduce population levels of introduced pests (Funasaki *et al.* 1988). The first use of classical biocontrol in Hawai'i was in 1893 by Albert Koebele, entomologist for the Republic of Hawai'i, against the cottony cushion scale (*Icerya purchasi* Maskell (Homoptera: Margarodidae) (Timberlake 1926). The project was successful and the reaction to subsequent pest problems in Hawai'i often has been the introduction of natural enemies of the pest (Table 1). Diverse fauna and flora have been used to combat equally diverse pests. Examples include insects, fungi, viruses, bacteria, snails, bats, birds, fish, toads, and frogs to control insects, plants, snails, and other organisms (Table 2). Many of these introductions appear to have been successful in that the pest populations eventually did drop to acceptable levels, although scientific evaluations of the effectiveness of these introductions have been virtually non-existent.

The result of these introductions has been the establishment of 266 alien insect species. This is a small percentage (3%) of the total insect fauna of ca. 7700 species (Nishida 1994)); however, some of these introductions have had dramatic effects on a few of the 5000 endemic species (Howarth 1985). These negative impacts of biocontrol introductions primarily have been due to the lack of pre-release risk analyses, poor to nonexistent host specificity studies, and the absence of adequate import regulations.

REGULATION

The U. S. Department of Agriculture – Animal Plant Health Inspection Service – Plant Pest Quarantine (USDA-APHIS-PPQ) and the Hawai'i Department of Agriculture (HDOA) currently regulate the importation of biocontrol agents into Hawai'i. These two agencies have different jurisdictions and mandates, with some overlap.

The USDA has statutory authority under the Plant Quarantine Act (1912), the Federal Plant Pest Act (1957), and the Federal Noxious Weed Act (1974) to prevent the introduction and dissemination of plant pests (7 CFR 371.(c)(2)) The USDA only has the authority to regulate an organism if it feeds on, infects, or parasitizes living plant tissue or plant products, transmits plant pathogens, attacks a natural enemy of an herbivore or plant pathogen, attacks pollinators, or attacks organisms that control weeds. The agency does not have the authority to regulate biocontrol agents that are not plant pests.

All biocontrol agents imported for weed control attack plants and are by definition plant pests. They are, therefore, regulated by USDA.

The USDA requires separate permits for

1) Importation of a plant pest into the U.S.;
2) Movement of a plant pest between States; and
3) Release of a plant pest into the environment.

The federal permitting process requires the submission of PPQ Form 526 (Application for Release) that is forwarded to the HDOA for review and recommendations. All applications to date, for which HDOA has recommended rejection, have also been denied by the USDA. If approval is recommended by HDOA, USDA then reviews the application. This process usually involves review by the Technical Advisory Group; however, Hawai'i applications are exempt from TAG review due to the thoroughness of the HDOA review process. A draft environmental assessment (EA) is requested from the applicant for any requests for the release of weed biocontrol agents. The USDA prepares the final EA. If endangered or threatened species potentially are affected by the release of a biocontrol agent then the application is sent to the U.S. Fish and Wildlife Service for review. A release permit is issued if the evaluation of the EA produces a finding of no significant impact (FONSI).

The HDOA permitting system differs from the federal system, in part, because of fundamental differences in purpose as defined in the State statutes. In contrast to federal law, Chapter 150A of the Hawai'i Revised Statutes (HRS) regulates the importation of any plant or animal, regardless of whether or not it is a plant pest. The HRS addresses the importation of non-domestic animals (including reptiles, mammals, birds, arthropods, and mollusks), microorganisms, and plants. The HDOA permitting system was not designed specifically for the regulation of biocontrol agents, yet it does govern their importation and release. Specifically, the HRS prohibits the importation of all non-domestic animals and microorganisms unless approved by the Board of Agriculture.

The regulation of animal importations into Hawai'i has had a long history beginning in 1890 with the establishment of the "Laws of the Hawaiian Islands" by King David Kalakaua. This law included language to prevent the introduction of plants and animals that may become harmful to agriculture. Actual inspections of organisms proposed for importation were not conducted until 1902 and there were no official reviews of introductions between 1902 and 1944. In 1944, the Department of Agriculture and Forestry (now the HDOA) established a policy for Board of Agriculture (BOA) review of importation requests. This was followed in 1965 by a policy in which advisory subcommittees composed of specialists reviewed the importation applications and advised the BOA. In 1975, the HRS mandated that BOA review all importation applications; importation permits were based on the recommendations of a Plants and Animals Advisory Committee. This law was revised in 1990 to specify three lists of organisms to be reviewed prior to importation. These were the Prohibited, Restricted, and Conditionally-Approved Lists. Organisms were not allowed to be imported into Hawai'i until they had undergone review and had been placed on one of these lists.

Animals placed on the Prohibited List are not allowed into the State under any conditions. Those on the Restricted List may be imported by government agencies, municipal zoos and aquariums under fairly restrictive conditions. Organisms on the Conditionally-Approved List may be imported by all of the above organizations and additionally by businesses and individuals under specific conditions. Biocontrol agents always have been placed on the Restricted List. As a result, only government agencies have been able to import biocontrol agents since the list was established in 1990 (Table 1). This may change in the near future. There are discussions currently underway to

place host-specific agents already established in Hawai'i on the Conditionally-Approved List. If approved, this modification would allow anyone to import and release these agents into Hawai'i. A major concern in relaxing importation restrictions on biocontrol agents is controlling the quality and purity of shipments arriving from insectaries on the mainland. Mechanisms should be developed for verification of the species identity of the biocontrol agents shipped and for determination of stock purity for each shipment. This may be accomplished through either an insectary certification process or an import inspection procedure.

Table 1. Individuals and Agencies involved in the introduction of biocontrol agents into Hawai'i.

Year	Individual/Agency*	Number of introductions
1893-1900	ROH, sugar plantations, private individuals	68
1900-1909	HSPA, TOH	84
1910-1919	HDOA, HSPA	45
1920-1929	HDOA, HSPA	89
1930-1939	HDOA, PRI, USDA	81
1940-1949	HDOA, PRI, UH, UC, USDA	53
1950-1959	HDOA, HDOH	161
1960-1969	HDOA	101
1970-1979	HDOA	96
1980-1989	HDOA, UH, USDA Forest Service	45
1990-1999	HDOA, UH, USDA Forest Service	22

* HDOA = Hawai'i Department of Agriculture, HDOH = Hawai'i Department of Health, HSPA = Hawai'i Sugar Planters Association, PRI = Pineapple Research Institute, ROH = Republic of Hawai'i, TOH = Territory of Hawai'i, UC = University of California, USDA = United States Department of Agriculture.

The review process for a State importation permit application involves 6 steps. First, the application is submitted to the HDOA with all of required and pertinent information, including information on host specificity, distribution, preferred habitat, temperature requirements, etc. Host specificity studies may be carried out either in the country of origin or in one of the three approved containment facilities in Hawai'i. The Advisory Subcommittee then reviews the application. The recommendations from this subcommittee are passed on to the Plants and Animals Committee for their recommendations to the BOA. The BOA either approves or disapproves the application. If approved, the application is submitted to a public hearing process. Comments from the public are brought back to the BOA for discussion, followed by final approval or disapproval of the application. If approved, a State permit is issued. The organism may be imported and released if both State and Federal permits have been issued and permit conditions are met by the importers.

The HDOA review process for the introduction of biocontrol agents has evolved into an effective system that screens agents for host specificity and potential negative

impacts on other species. None of the agents introduced since the review process was initiated in 1975 have attacked any native or beneficial plant or animal species. This was not the case for introductions before 1975.

IMPORTATIONS

A total of 708 natural enemies were released between 1890 and 1999, of which 286 have become established (Table 2). The majority (237) of these established agents have contributed to the control of the target pest species. However, 33 (13.6%) also attacked a different pest or native and/or beneficial non-target species. Native insects were attacked by 20 (8.2%) of these introduced biocontrol agents. Before 1944, the year that the BOA began reviewing the applications, only 54.7% of the introduced agents were host specific. Between 1944 and 1975 when the BOA reviewed all permit applications, the percentage of host-specific agents introduced increased to 77.4%. After 1975 host specificity for all released biocontrol agents was 100%; in that year the three committees (Entomology/Microorganism Subcommittee, Plants and Animals Committee, and BOA) began reviewing all applications.

Table 2. Types of biological control agents introduced into Hawai'i between 1890 and 1999.

Type	Number Released	Number Established
Insects	664	266
-predators	257	63
-parasitoids	295	138
-phytophagous	83	55
-coprophagous	29	10
Others		
-pathogens	12	10
-snails	17	3
-bats	2	0
-birds	3	2
-fish	3	2
-toads	3	1
-frogs	4	2

This change in the host specificity record likely is not due exclusively to changes in the regulatory process. Public attitude to environmental concerns has changed dramatically since the 1970's and this also may have strongly influenced decisions made by the review committees. Prior to the 1970's, environmental impacts such as host specificity were of minor concern or of no concern to the BOA and subcommittees reviewing applications and were rarely if ever discussed. The Board focused on agricultural concerns almost exclusively. Environmental impacts and host specificity issues are now often the primary concerns addressed by these review committees.

The current review process has been effective in limiting introductions to host-specific biocontrol agents, but not very efficiently. The process can take from six months to one year after the application is received before a permit is issued. This delay is caused primarily by the requirement for a public hearing. The public hearing process currently is changing to a public notification process for which public hearings on each island will no longer be required, an expensive and time-consuming process. Instead a call for comments from the public can be made by a notification in the Hawai'i newspapers. This change is expected to decrease the duration of the review process from one year to 3-4 months. The results will be the retention of the same high quality of application review and, hopefully, the continuation of the excellent record of 100% host specificity in biocontrol agents released since 1975.

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