



Aloha and thank you for your interest in the activities of the Hawai'i Department of Agriculture.

The administration and staff of the department remain dedicated as ever to supporting and growing agriculture in Hawai'i, while also maintaining our fiscal responsibilities as the economy has taken a heavy toll on state's budget. The decrease in state revenue has required all divisions to become more efficient and innovative in our mission to provide the best possible services.

Department staff realize that our services to the agricultural community are even more important during these difficult economic times and it is never far from our minds that the farmers, growers and ranchers are on the frontline of the economic challenges.

The Livestock Feed Revitalization Program has been vital in saving many livestock operations by disbursing nearly \$3.6 million to 26 livestock operations to help offset the high cost of imported feed. The message of the "Buy Local, It Matters" campaign resonates even louder as it encourages residents to support local agriculture. Work also continues in developing and maintaining our infrastructure assets, including irrigation systems on Maui, Kaua'i, Moloka'i, O'ahu and Hawai'i Island.

In an effort to save the native wiliwili trees, HDOA released a natural predator of the erythrina gall wasp in November 2008, which appears to be working well in controlling the pest and reviving the wiliwili population. In addition, pest management surveys and research continue for varroa mites, nettle caterpillar, fire ants and other pests.

Many more accomplishments by the department are contained in this report and we hope that it provides a greater picture of the important services that HDOA provides to the State of Hawai'i.

Sincerely,

A handwritten signature in black ink that reads "Sandra Lee Kunimoto".

Sandra Lee Kunimoto, Chairperson  
Hawai'i Board of Agriculture





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This annual report is accessible via the department's website at: <http://hawaii.gov/hdoa/>



## Planning & Development

The department actively seeks to protect existing farming areas and promote increased access to and productive use of the thousands of acres of prime agricultural lands and infrastructure vacated by sugar plantations throughout the state. The department, as principal advocate for agriculture among state agencies, offers consultative input into county, state, and federal land use planning and permitting, environmental program development and implementation, and undertakes broader planning and economic development efforts to ensure the availability of agricultural resources and the growth of agricultural businesses.

While modest in comparison to the visitor industry's \$11.2 billion in economic activity, the economic activity generated by diversified agriculture is solid and stable. Furthermore, characteristics associated with agricultural activity (scenic planted and open landscapes, locally-grown fresh produce, reduction in atmospheric carbon dioxide, groundwater recharge, responsible land stewardship) provide real value to Hawaii residents and visitors.

With the recent passage and enactment of the Important Agricultural Lands Incentives Act (Act 233, 2008 Session Laws of Hawaii), Alexander and Baldwin, Inc. voluntarily sought and received approval from the Land Use Commission for Important Agricultural Land (IAL) designation for two of their largest agricultural production areas, Kauai Coffee Company (3,773 acres) on Kaua'i and Hawaiian Commercial and Sugar Company (27,104 acres) on Maui.

Alexander and Baldwin now has access to a wide range of incentives made available exclusively to landowners and farmers who have their qualified agricultural land designated as IAL. The process and actions required of state and county agencies to identify potential Important Agricultural Lands (IAL) and have them designated are now set in motion, with the Department having a significant role in identifying and designating IAL and implementing some of the incentives such as the IAL Qualified Agricultural Cost Tax Credit. This tax credit is the most significant incentives as it encourages landowners/farmers to have their lands designated IAL and to establish and maintain their agricultural use by offsetting costs related to agricultural production including development, rehabilitation, and maintenance of agriculturally related roads and utilities, irrigation water facilities, leasehold agricultural housing for farmers and farm workers, equipment for crop cultivation, harvesting, and processing; and professional services necessary to obtain sufficient water and protecting a farmer's right to farm.

The department also reintroduced but failed to get sustained support from the 2009 Legislature for the Administration's "fake farm" measure that sought to mitigate problems arising from the proliferation of "fake farms" – subdivisions of agricultural land where there is little or no agricultural activity. A major impact of these subdivisions is that they increase the value of agricultural lands for residential use rather than agricultural production. The price of land is often far beyond what a farm income is able to afford.





Farmers seeking to lease lands often find lease terms and rents very short and expensive, respectively. The measure requires every lot in agricultural subdivisions approved after the bill's effective date to be used solely for agricultural activities, agribusiness, or subsistence farming; it requires the counties to require lot owners of subdivided agricultural lands applying for a building permit to substantially establish agricultural activity and submit farm plans, prior to approving building permits; and requires lot owners to have recorded deed restrictions that run with the land requiring agricultural use of the subdivided lots. These features are significantly more rigorous and descriptive than what currently exists in Chapters 205 and 46, Hawai'i Revised Statutes.

The department also supported the protection of agricultural lands and related infrastructure as well as the expansion of diversified agriculture development in general through a number of ongoing efforts. These

efforts included the submittal of testimonies and position statements before county councils and departments, state departments, State Land Use Commission, Public Utilities Commission, and other organizations on agriculture-related issues such as whether bed and breakfast operations and transient vacation rentals are appropriate in the agricultural district; minimizing any adverse impact of proposed interim instream flow standards, buffer zones to protect agricultural activities from encroaching non-agricultural uses, ensuring subdivisions of agricultural land result in the establishment and maintenance of substantial agricultural activity, county-level initiatives to protect prime agricultural lands, facilitating discussions between farmers and landowners on "good neighbor" and land tenure issues, amendments to County agricultural zoning and community plan ordinances, and amendments to state and federal environmental regulations affecting the use of agricultural land and water resources.



ADMINISTRATIVE SERVICES OFFICE



Keith Aragaki  
Administrator

The goals of the Administrative Services Office are:

- 1) **To meet the staff support needs of the department's programs and personnel by providing guidance, training, information, efficient equipment and vehicles, and adequate facilities, and facilitating the processing of their requests in order to enhance managers' decision making capabilities and employee productivity; and**
- 2) **To meet the needs of the public by assisting them in their requests or directing them to the appropriate entity to address their needs.**

The following is a list of projects that have been completed:

- Personnel staff attended a session on "Unlawful Harassment."
- Personnel staff attended a USERRA update briefing.
- Personnel staff attended training on the use of E-verify.
- Personnel staff attended teleconference on Leaves of Absence & Other Accommodations at the Disability Communication Access Board.
- Personnel staff attended sessions on furlough and reduction-in-force (RIF) procedures.
- Completed surveys on Vital Document's and Public Contact positions for the Office of Language Access.
- Completed the quarterly Limited English Proficiency (LEP) services report for the Office of Language Access.
- Completed survey on Worksite Wellness.
- Participated in monthly State Worksite Wellness Committee meetings.
- Conducted Labor Relations Workshops for supervisors.

- Secured the vehicle maintenance garage to protect the department's assets; installed an alarm system and physically secured the facility with gates and heavy gage window screens.
- Transferred all APPX applications to new server.
- Completed installation of new Plant Industry server at King Street location.
- Completed networking all required O`ahu and neighbor island offices to State's NGN.
- Developed online database to track property management requests for telecommunications and disposals.
- Developed online database to allow programs to view all pCard transactions charged to their program's appropriation codes.
- Developed a spreadsheet to project the Plant Quarantine inspection fees and monitor the programs financial status.
- Developed a simplified Small Business Set-aside procurement guideline to assist program administrators in meeting the State's small business set-aside goal.
- Developed a procurement training matrix for each program that shall allow them to manage the required SPO training requirements.
- Completed various repair and maintenance and capital improvement projects including re-roofing the Plant Industry building in Kahului and repairing and repainting buildings at the King Street facility.
- Completed the transition of the pCard system from PVS Net to Centresuite; procedures updated and training provided as required.

Major projects still in progress are:

- Develop a training program for time-keepers, instructing them on the use of the online Form 7, and various payroll forms such as time sheets, etc.
- Working with Administrators on the financial management of their programs; areas such as revenue projections and expense monitoring.
- Implement an inventory audit procedure, all programs to be audited annually to ensure inventory accuracy and accountability.
- Working with consultants to transfer Plant Quarantine on-line system to be housed at the State's Information & Communication Services Division under the Department of Accounting and General Services.
- Replacing Administration server at King Street location.



- Replacing Animal Industry server at Halawa location.
- Coordinating various capital improvement projects to correct safety concerns and other deficiencies, and make improvements at Department.
- Auditing leave records of program record keepers.
- Reviewing and rewriting internal personnel policies and procedures.
- Implementing procedures for processing contracts for services.
- Continuing to update the department's accounting manual with existing procedures and new guidelines and procedures for various procurement and purchasing processes.
- Attending State Procurement Office training sessions on various procurement methods and changes to the procurement law to provide improved guidance and support to programs.
- Attending HePS System Administrator training sessions to provide oversight for the solicitations conducted on HePS.
- Creating a travel handbook to provide the programs with a reference guide for Fiscal transactions related to travel.
- Providing training for managers on the Department of Agriculture Limited English Proficiency Plan. Conducting a survey to determine what kind of interpreter services and in what languages these services are needed.
- Developing department-wide safety plan including installation of proper signage and other improvements in compliance with OSHA requirements.
- Implementing the use of Grants.gov as a means of searching and applying for federal grants electronically.
- Other future projects include, establishing approval routing for solicitations conducted on HePS, and setting up journal vouchers in a shared network folder, which will allow the programs to access information and use as a tool for financial management, replacing administration server at King Street, modifying Animal Quarantine System application for web access, and developing a FAQ web page for major personnel functions.



## AGRICULTURAL DEVELOPMENT DIVISION



**Matthew K. Loke, Ph.D.,**  
*Administrator*

**The Agricultural Development Division (ADD) serves to promote the economic viability of commercial agriculture in Hawai'i by sponsoring joint marketing programs for agricultural products with high revenue growth potentials; facilitating the development and expansion of marketing opportunities for targeted agricultural and processed products; and providing timely, accurate and useful statistics.**

FY09 has been a challenging but rewarding period of the division. In addition to hosting a highly successful *Hawai'i Agricultural Conference 2008*, we were also successful in hosting a *Second Saturday at the Garden* event and the fifth anniversary celebration of the *Kapiolani Community College Farmers Market* with our partners, the Agricultural Leadership Foundation of Hawai'i (ALFH), University of Hawai'i College of Tropical Agriculture and Human Resources (UH-CTAHR) and the Hawai'i Farm Bureau Federation (HFBF). Other notable achievements in this fiscal year include the following:

- First Place Award in the Multiple-Booth Design Competition at the 2008 Hawai'i Lodging, Hospitality and Foodservice Expo (July 2008);
- Awarded \$124,765 for a proposal entitled *"Expansion of a Statewide Buy Fresh, Buy Local Program to Increase Visibility, Demand and Sustainability of Fresh Specialty Crops in Hawaii,"* submitted to the USDA-AMS Specialty Crop Block Grant Program-Farm Bill (SCBGP-FB) FY 2008 (September 2008);
- Jointly published with UH-CTAHR a widely distributed article entitled *"Economic Impacts of Increasing Hawaii's Food Self-Sufficiency."* (December 2008);

- Awarded \$117,906 for a proposal entitled *"An Integrated Approach to Increasing Food-Self Sufficiency by Growing Demand for Specialty Crops in Hawai'i,"* submitted to the USDA-AMS Specialty Crop Block Grant Program (SCBGP) FY 2008 (April 2009); and
- Awarded \$41,500 for a competitive proposal entitled *"The Competitive and Comparative Advantages of Hawaii's Agricultural Exports to the Japan Market,"* submitted to USDA-Federal State Marketing Improvement Program (FSMIP) (June 2009).

### MARKET DEVELOPMENT BRANCH

The mission of the Market Development Branch (MDB) is to facilitate the development of the agricultural industry, consisting of commodity groups of agricultural producers and food processors, through the expansion of new and existing markets.

#### Major Activities during FY09 were:

##### Matching Marketing Funds Program (MMFP)

This program is the vehicle for collaborative promotion of agricultural and value-added food products between HDOA and non-profit corporations or cooperatives in the state. The goals of this program are to improve the competitiveness and efficiency of Hawai'i's agriculture, targeting the distribution systems, access and expansion in local, domestic, and international markets, marketability of agricultural products, sales and promotional events, and industry capacity building.

Most of diversified agriculture segments competed to secure access to matching marketing funds including, flowers and nursery products, papayas, coffee, organic, vegetables and melons, and food manufacturers. Participating associations included the Hawai'i Export Nursery Association (HENA), Hawai'i Papaya Industry Association (HPIA), Kona Coffee Council (KCC), Ka'u Coffee Growers Cooperative (KCGC), Hawai'i Coffee Association (HCA), Landscape Industry Council of Hawai'i (LICH), Hawai'i Farm Bureau Federation (HFBF), Hawai'i Organic Farmers Association (HOFA), Hawai'i Food Manufacturer's Association (HFMA), and Hawai'i Forest Industry Association (HFIA). The RFP-based program attracted 27 proposals and the top18 were funded. HDOA contributed \$119,970, matched by \$119,970 of private industry contribution for an overall total of \$239,940. MMFP projects tend to generate \$25 in sales per \$1 of HDOA support.

##### Seals of Quality Program

MDB launched the Seals of Quality (SOQ) program in May 2006 with 12 companies representing the cream



of the crop of Hawai'i's agricultural producers. The SOQ program was established to protect the integrity and value of the marketing cachet for Hawai'i branded farm and "value-added products." Products with this seal represent genuine, Hawai'i-grown or Hawai'i-made premium products, a guarantee that is enforced by the State of Hawai'i.

In a short time period of three years, SOQ membership increased in numbers and diversity from its original 12 to the current 44 statewide, representing an increase of over 260 percent. Sales of SOQ labels to members increased to 2.5 million in FY09, an increase of 29 percent over the corresponding period in FY 08. Overall, the program facilitated over \$17 million in annual sales for its members.

Through partnerships with local media such as the Honolulu Magazine, the Honolulu Advertiser, Events International, Inc. and ShareYourTable.com, as well as participation in high profile "celebrity chef" events such as *Chefs du Jour* and the *Hale Aina Awards*, the SOQ program has received millions of impressions in pre and post media coverage. A retail event at Whole Foods Kahala (WFK), featuring chef demonstrations and product sampling resulted in a 37 percent increase in weekly sales of SOQ products.

For international marketing, the SOQ program focused on the Japan market during FY09. MDB conducted a campaign at Spa Resorts Hawaiian, a theme-park in Japan; sponsored SOQ booths at FoodEx Japan; and assisted in featuring SOQ products in the JTB gift catalog. Total dollar sales of \$315,000 were reported through these three Japan market activities.

**Livestock Feed Revitalization Program**

This program was established by Act 221, SLH 2007 to assist livestock producers of milk, poultry, beef and pork by reimbursing a portion of their feed cost excluding transportation up to a ceiling of \$250,000 per year. Access to the \$3 million allocated to the first year of the program was extended into FY10. Due to the severe state budget crisis at the beginning of this year, the FY10 allocation of an additional \$3 million was reduced to approximately \$816,000. A total of 26 companies actively participated in this program with total reimbursements of nearly \$3.8 million.

**USDA National Organic Certification Cost-Share Program**

The USDA Farm Bill included continued funding of this program under a new format. Funds were allotted on an annual basis of October 1, 2008 through September 30, 2009 to coincide with the federal fiscal year. A total of \$10,000 was allotted to Hawai'i through the USDA National Organic Program (NOP) to reimburse certified organic processors and handlers

for 75 percent of their certification costs up to a maximum of \$750. This was an increase of \$250 over the maximum reimbursement amount of the previous program. Hawai'i was added to the list of 17 states eligible to administer an organic certification cost-share reimbursement through the USDA Agricultural Management Assistance Program (AMA). A total of \$75,000 was allocated to Hawai'i to reimburse certification costs to organic growers and producers under the same terms as the NOP cooperative agreement. These two programs increased the available funding for USDA cost-share assistance to Hawai'i organic producers and handlers by \$45,000 over the previous program.

**Federal State Marketing Improvement Program (FSMIP) Organic Seed Project**

Today, the seed industry is the number one revenue earner of Hawai'i agricultural crops while organic production is the fastest growing segment of U.S. agricultural crop production. The organic seed project capitalizes on these growing trends with a focus on local specific fruits and vegetables. Local specific fruits and vegetables are sustainable, nature friendly, and well adapted to Hawai'i. The Organic Seed Project accomplished the following goals: (1) produced the first commercial certified organic papaya seed in the state; (2) developed a seed production protocol that ensures varietal purity, protection from cross-contamination and certified organic; (3) conducted the first seed-related organic farmer survey; and (4) produced and delivered an easy-to-understand teaching CD.

**Local Market Promotions and Activities**

**Buy Fresh, Buy Local "Call to Action" Campaign (BFBL)**

The BFBL campaign, conducted in partnership with the Hawai'i County Department of Research & Development, featured 12 Big Island farmers and their produce through the "Buy Fresh, Buy Local – Hawaii Island" project. Posters and rack cards of the featured farmers have been displayed at agriculture events and are available to the farmers at their marketing activities. The BFBL campaign has received funding from the USDA to continue promotions in Maui County, City and County of Honolulu, and Kaua'i County. Island Fresh Milk promotions were conducted at the KTA Superstore in Puainako, Hawai'i, and on KITV morning show segments during June, which is national dairy month. A link to BFBL segments shown on KITV can be found on the Department of Agriculture website.

**Made in Hawai'i Festival in Honolulu – August 15-17, 2008**

Coordinated the chef demonstrations at the 13<sup>th</sup> Annual Made in Hawai'i Festival at the Neal Blaisdell Center, which was huge again this year with 420



booths and attendance of 37,000. The chefs consisted of Derek Kurisu of KTA Superstores, Mark Ellman and Sergio Perez of Maui Tacos, Andy Nelson of Neptune Garden, Dr. Terry Shintani and Leslie Ashburn of Hawai'i Health Foundation, Grant Sato of Kapiolani Community College, Ed Kenney of Town Restaurant, Colin Hazama of Rumfire, Elmer Guzman of Poke Stop, and Mike Imada of Waikiki Hyatt Resort. Over 5,000 samples were served during the cooking demonstration where chefs prepared dishes made from Island Fresh products. The area was decorated with Hawai'i-grown fruits, vegetables, flowers and foliage from our local farmers and two ikebana schools providing decorations for the perimeter of the cooking demonstration area.

### **Hawai'i State Farm Fair, Bishop Museum in Honolulu — July 26-27, 2008**

The 2008 State Farm Fair departed from the amusement and ride concept to return to the promotion of Hawai'i-grown local produce. Accordingly, HDOA lent its support to educate the public on the various opportunities and places to buy Hawai'i agricultural products.

Under the HDOA interactive tent, the 15,000 or so attendees learned about farmers' markets across the Hawaiian Islands, the diversity, seasonality, and availability of local fruits and vegetables, the Buy Fresh, Buy Local "Call to Action" Campaign and the Seals of Quality Program, dedicated to the sales and promotion of Hawai'i's genuine and premium commodities and food products. Each consumer learning experience was rewarded with giveaways, such as calendar strips, bumper stickers, recipes, list of farmers' markets, and local produce seasonality chart collaterals.

Close to 20 percent of local produce is sold at farmers' market and the farm fair provided an excellent opportunity to survey the buying habit of residents and visitors. The survey revealed that 75 percent of the public seek local produce, 55 percent relied on packaging for local produce identification, and 85 percent visit local farmers markets. These results support the need for a symbol of local identification such as the Seals of Quality and the increasing efforts to promote farmers' markets in Hawai'i.

### **Hawai'i Lodging, Hospitality, and Foodservice Expo in Honolulu – July 9-10, 2008**

MDA and the Aquaculture Development Program (ADP) had adjoining booths at this event and coordinated the booth décor to create an eye-catching display that won the First Place Award in the Multiple Booth Design Category and a discount on 2009 booth space. Tom Asano, Sales Manager of Kulana Foods of Hilo, prepared and distributed samples of 21-day dry-aged, grass-fed beef and their newest product,

fresh lamb. Royal Hawaiian Pineapple distributed samples of their variety of sweet, low-acid pineapple. This event produces excellent exposure to restaurant and hotel chefs and buyers for new and innovative Hawai'i products.

### **Hawai'i FFA Foundation**

MDA partnered with the Hawai'i FFA Foundation to conduct the Hawai'i Agriscience Seminar Program that engaged six at-risk students, grades 9 -12, in a science-related, agriculture education program that focused on self and career development through a mentor based program that involved agriculture initiatives and academic achievement. The students attended a three-day residential program on the University of Hawai'i Hilo Campus, were provided internship opportunities at businesses in the agriculture industry, and learned the scientific inquiry method while preparing a project for the State Science Fair.

## **Mainland and International Promotions and Activities**

### **Natural Products Expo West Trade Show in Anaheim, CA – March 5-8, 2009**

Ten Hawaii companies participated in this international trade show featuring organic and healthy products. Exhibitors highlighted organic honey, noni products, chocolate, sports drinks and pet products. As one of the world's largest trade shows featuring natural and organic products, this event offers an opportunity for Hawai'i companies to step up to the next level in presenting their products to an expanding international market. Six of the 10 participants were repeat exhibitors, which indicated the high sales value of this event.

### **Produce Marketing Association Fresh Summit Trade Show in Orlando, FL – October 24-27, 2008**

Slowing economic conditions and the extended travelling distance resulted in a down-sizing of Hawaii's presence at this important agricultural trade show. Four organizations staffed a 20 ft. x 20 ft. island booth featuring a dramatic central display of tropical Hawaiian flowers and foliage. Exhibitors featured papayas, apple bananas, ginger root, longan, rambutan, Okinawan sweet potatoes, herbs and assorted vegetables. An estimated \$700,000 in sales was attributed to the event.

### **Teleflora Education Seminars**

Market Development staff coordinated with the Hawai'i Florists and Shippers' Association (HFSA) to provide fresh tropical flowers and foliage and educational materials for Teleflora demonstrations and educational seminars across six cities across the mainland U.S. in order to promote increased sales for this important industry.



**Western United States Agricultural Trade Association (WUSATA)**

Hawai'i companies received over \$400,000 in funding from WUSATA to conduct trade events and activities that target international markets. These included Export Readiness Training (ERT), activities conducted through the Branded and Generic Programs and the State Export Intern Program. Through the ERT program, Hawai'i companies were provided \$120,000 to assist export ready companies to implement their marketing plans.

Promotion of the Branded Program via webinar presentations and email correspondence resulted in eight Hawai'i companies joining the 2009 Branded Program and the awarding of \$123,500 in funds for marketing activities. WUSATA, which operates on a calendar year basis, reported Hawai'i Branded Companies sales of \$4,235,379 for CY 2008.

Generic Programs in Hawai'i's targeted markets of Canada, Japan and Taiwan provided \$152,000 in funding. The WUSATA State Export Intern Program provided Hawai'i with an intern to produce an export trade reference containing export requirements for Hawai'i Agricultural Products. This document will begin with some of the commodities that are ready for export, such as coffee, honey, macadamia nuts, chocolate macadamia nuts, and papayas to Canada, China, Hong Kong, Japan and Taiwan.

**MARKET ANALYSIS & NEWS BRANCH**

The Market Analysis and News Branch (MANB) is responsible for enhancing the effectiveness and efficiency of agriculture by conducting economic, market and business feasibility research, evaluating the efficiency and effectiveness of market development programs, collecting data on agricultural commodity shipments, supply, and wholesale prices and disseminating information through various media. Through these functions, MANB assists the state's agricultural industry in its development and expansion efforts and provides sound input for program planning and policy making within and outside the department.

MANB is tasked with two primary, yet distinct functions. The first involves research on all market aspects of agricultural products. Toward this end, MANB conducts some research annually. The second function is carrying out the market news program, jointly with the Market News Branch of the Agricultural Marketing Service (AMS), U.S. Department of Agriculture. This program provides up-to-date information on current market conditions, wholesale market prices throughout the state, movement of fresh fruits and vegetables, and supply and demand information on different products.

**Activities and accomplishments for FY 2009 included the following:**

- Published and disseminated 136 "Honolulu Prices" and "Neighbor Island Prices" reports, 53 weekly "Egg Report", 155 Intrastate Arrivals (barge) reports, and 42 Interstate Arrivals weekly reports.
- Completed annual estimation of Hawai'i's fresh fruit and vegetable imports in 2008 calendar year and submitted to the Hawai'i Agricultural Statistics Branch for publication in the "Statistics of Hawai'i Agriculture."
- Completed the development of a new pricing formula for the Hawai'i milk shed with a report titled "Proposed Milk Pricing Formula: Hawai'i Milk Shed" and a spreadsheet version of the formula, pre-programmed for deriving a new price. The report and the spreadsheet have been submitted to the Milk Control Section, Commodities Branch, Quality Assurance Division, HDOA.
- Provided non-confidential data, study briefs and specialized research to individual requests by the public and from government personnel, intra- and inter-departmental, such as:
  - Reviewed and edited the translation from English into Laotian language of a form titled "Application of Restricted-use Pesticides" for the Pesticides Branch, Plant Industry Division, HDOA.



- Compiled and submitted Hawai'i's fresh produce export data for 2007 to a faculty at the University of Hawai'i-Hilo.
- Compiled Hawai'i's agricultural products exported (direct) with a table summarizing top six agricultural products and water exported for 2004 – 2008 for an International Trade Analyst at the U.S. International Trade Commission.
- Reviewed and commented on the North American Industry Classification System (NAICS) agribusiness definitions requested by the Department of Business, Economic Development and Tourism (DBEDT).
- Compiled and analyzed fresh produce inshipment data for 2006 and 2007 for updating a data book tracking Hawai'i's fresh produce imports that dates back to the 1950s; the data book is maintained by a faculty at the CTAHR.
- Reviewed the Report to the Twenty-Fifth Legislature Regular Session of 2009 on "*Hawai'i-Grown Labeling and Inspection, and Economic Impact of Potential Changes to Minimum Content Requirements.*"
- Compiled taro and dasheen import data that include 2008 direct imports and submitted to the Plant Quarantine Branch.
- Sent studies, spreadsheets with formula, updated data of certain commodities to a number of Hawai'i agricultural industry members, university and government researchers (and university- and government-affiliated researchers).

### HAWAII AGRICULTURAL STATISTICS BRANCH

**Mark Hudson**, *State Agricultural Statistician/Director*

The Hawai'i Agricultural Statistics (HAS) Branch is a cooperative effort between the Hawai'i Department of Agriculture (HDOA) and the National Agricultural Statistics Service (NASS), U.S. Department of Agriculture. This partnership, spanning more than four decades, allows the efficient use of state and federal resources, while at the same time providing a comprehensive array of agricultural intelligence and reducing respondent burden.

Major activities of the branch included data collection, analysis, and timely publication of agricultural statistics of the state. The result of these efforts was a measure of total farm-gate estimated value of \$579 million during 2007. Most of the data collection efforts were in the diversified agriculture sector, lead by seed crops with a value of \$141 million.

Activities during FY09 included the following:

- Collected data for Census of Agriculture's Farm and Ranch Irrigation Study.
- Collected and compiled the agricultural impact of the seed industry for an economic impact study authored by Tom Loudat, PhD.
- Published 130 reports.
- Made over 15,000 individual contracts via personal interviews, telephone, and mail questionnaires.
- Distributed more than 40,000 releases to farmers, other individuals, businesses, universities, and governments worldwide.
- Answered more than 1,000 individual requests for information by mail, telephone, and office handouts.

Statistical reports are available on the HDOA website at: [www.hawaii.gov](http://www.hawaii.gov) or free e-mail subscriptions are available at: [http://www.nass.usda.gov/Statistics\\_by\\_State/Hawaii/Subscribe\\_to\\_HI\\_Reports/index.asp](http://www.nass.usda.gov/Statistics_by_State/Hawaii/Subscribe_to_HI_Reports/index.asp)



**AGRICULTURAL LOAN DIVISION**



**Dean Matsukawa**  
*Administrator*

**The Agricultural Loan Division operates the Agricultural Loan Program and Aquaculture Loan Program. The program’s primary objective is to promote the development of the state’s economy by stimulating, facilitating, and granting loans to qualified farmers, ranchers, aquaculturists and food manufacturers.**

The program works with private lenders through participation loans and providing of loan guaranties to increase the amount of loan funds that are available to the agriculture and aquaculture industries. The program provides direct financial assistance to those who are unable to obtain financing from conventional sources. The division also serves as a safety net for agriculture and aquaculture industries by providing financial assistance in times of emergency. The program is self-sufficient, operating through collection of interest on loans, and is able to achieve its objectives of growth,

development and preservation of the agricultural and aquacultural industries without the need for any taxpayer funding.

The Agricultural Loan Division is strongly committed to the growth, development, and well being of the agricultural and aquacultural industries in Hawai‘i. For fiscal year 2008, the division provided 35 loans totaling \$4,839,500 in low-interest financing for agriculture.

Loans funded a wide variety of projects including farm development, construction of farm labor housing and improvement of farm infrastructure.

The emergency loan program provided relief and assistance to farmers that were affected by the heavy rains and flooding in December 2007 and December of 2008. The division under a new renewable energy loan program provided funding for construction of a hydro-electric plant on the Big Island. The plant will provide renewable electrical power for the entire farm operation including the operation’s refrigeration units thereby reducing reliance on oil imported to the state.

Due to the downturn in the state’s economy the agricultural and aquaculture industries are facing tough economic conditions while energy costs have been somewhat mitigated from the prior year, crop input costs remain high. The tightening of credit by the commercial lenders has limited funding available to farmers and as a result the division has experienced strong demand for financial assistance. Loan approvals for the year exceeded the division’s budgeted funding ceiling. The division anticipates that loan demand will remain strong and will need to carefully manage its funds in order to continue to provide timely assistance.



***Left: A new alternative energy loan program was recently enacted to help farmers reduce dependence on imported fossil fuel by producing renewable energy.***

***Hamakua Springs Water, LLC, a hydronponic vegetable and banana grower on the Big Island, received financing to develop a hydroelectric facility to power its operations including 11 reefers.***



**Major activities and accomplishments of the program for FY 2009 were as follows:**

- Approved 35 loans for \$4,839,500 during FY09. The division's loans supported employment for 203 farm employees with a production area of 567.95 acres.
- The division's loan portfolio as of June 30, 2009 was valued at \$17.64 million with 215 loans booked. The loan breakdown by county is as follows:

Hawai'i County	\$6.88 million
O'ahu County	\$6.39 million
Maui County	\$2.89 million
Kaua'i County	\$1.48 million
- Collected \$2.284 million in FY08. Of the amount collected \$591,330 was in interest and \$1.693 million was in principal.
- The division with the assistance of the department's data processing systems analyst, computerized the division's reports, logs and tickler systems.

- Activated the Emergency Loan Program to assist farmers recover from flooding which affected the state in December of 2008.
- Received loan approval for a renewable energy project for an agricultural operation under the new renewable energy loan program.
- A loan was made for the re-establishment of a dairy operation on the island of O'ahu.

***Below: Won Hon Hin, Inc., a Waianae vegetable farm, received an emergency loan to help them recover from flood damage that occurred in December 2008. The funds helped them to quickly re-establish the farm and again provide quality Hawai'i-grown produce.***





**AGRICULTURAL RESOURCE  
MANAGEMENT DIVISION**



**Brian Kau, P.E.**  
*Administrator/  
Chief Engineer*

**The Agricultural Resource Management Division (ARMD) works to ensure that the State has adequate and reliable sources of agricultural water, farmland, infrastructure for farming, and agricultural-related processing facilities. The division provides administrative oversight over a majority of state agricultural land in production, processing facilities, and several irrigation systems statewide.**

**By maintaining and operating abandoned plantation irrigation systems, the division supports and encourages the development and expansion of diversified agriculture on former mono-crop plantation lands.**

**Activities for FY 2009 included the following:**

■ **Capital Improvements**

**Upcountry Maui Watershed – Kimo Rd. Lateral**

The department, with the assistance of the U.S. Department of Agriculture - Natural Resources Conservation Service (NRCS), State of Hawai'i Department of Land and Natural Resources, and the County of Maui Department of Water Supply, completed construction of the Upcountry Maui Watershed – Kimo Road Lateral project in April 2009.

The scope of work included installation of approximately 10,900 linear feet of eight-inch ductile iron pipe and four 5,000 gallon pressure break tanks at the 3,900, 3,520, 3,155, and 2,780 elevation marks.

The lateral connects to the recently installed 20-inch main distribution pipeline near the Omaopio Tank Site, runs adjacent to northern side of Kimo Rd., and ends prior to Lower Kula Rd. This lateral is the first of up to nine potential laterals to be installed in the Upcountry Maui Watershed Plan.

When completed, the total system could consist of up to 9.4 miles of main distribution pipeline and 18.5 miles of laterals. By the end of 2010, the department

anticipates completing installation of approximately four miles of the main distribution pipeline and 3.7 miles of the laterals. Design for another 3.3 miles of the main distribution pipeline and 1.4 miles of lateral is also anticipated to be completed in 2010.

The new agricultural water pipeline system will eliminate unnecessary water treatment requirements which will provide farmers in the Upper Kula region with less expensive non-potable irrigation water for their crops.

**East Kaua'i Irrigation System Improvements**

In March of 2009, the East Kaua'i Irrigation System received major upgrades to key components in its system. The department replaced a severely deteriorated 90-year-old redwood flume which was leaking and in risk of a catastrophic failure.

The project demolished and replaced the existing flume structure with new supports, headwalls, and a 150-foot long, 54-inch high-density polyethylene (HDPE) pipe. Included was a fiberglass grated walkway with steel pipe railings to provide additional safety when inspecting the new structure. Another improvement in this project was the restoration of a breached ditch located further downstream of the flume.

Over the years, the ditch embankment substantially eroded, limiting the capacity of the ditch. A 40-foot section of the ditch was rebuilt and lined with both HDPE and geotextile fabric. The department has an ongoing construction project that will demolish and replace severely deteriorated catwalk structures and control valves in both the Wailua and Upper Kapahi Reservoirs, stabilize other eroded ditch embankments, replace a short section of pipe, and install a new wooden gate and walkway with railings at the Kapahi Ditch diversion. These improvements will greatly reduce the possibility of a catastrophic failure and will allow the system to maximize the amount of irrigation water transported by eliminating the current leakage problem. With a more reliable supply of irrigation water, farming may increase as well as improve the community's overall economy.

■ **Non-Agricultural Park Lands Program**

The non-agricultural park lands program rules went into effect on December 6, 2007. During the past fiscal year, seventy-one general leases/revocable permits, and seven vacant parcels of agriculture zoned lands were transferred from the Department of Land and Natural Resources to HDOA by Governor's Executive Order, representing approximately 2,729 acres. We are currently awaiting the transfer of an additional 30 parcels. The division is in the process of examining additional parcels for acceptance into the program and hopes to begin the transfer process soon.



**Hawai'i Foliage Exports, Inc. – Panaewa Non-Ag Lot**

Hawai'i Foliage Exports grows and markets tropical plants under the Perfectly Hawaiian™ brand for use exclusively in the commercial interior landscape industry. Patrick McGrath, founder of Hawai'i Foliage Exports, Inc., has been operating since 1987 and has grown to four locations in Hilo. The nursery specializes in *Dracaena* varieties, *Rhapis* and *Caryota*, and is well-known for its cut-back *Dracaena Janet Craig*, *Hilo Girl™* and more.

Hawai'i Foliage Exports won the Exporter of the Year award in 2001 and also won the award for top Exporter of Fresh Commodities, and was among six other firms honored for outstanding achievements in exporting of Hawai'i products and services.

Mr. McGrath currently utilizes the 10.243 acres for the growing of *Rhapis* palms.

**Green Point Nurseries, Inc. – Panaewa Non-Ag Lot**

Harold Tanouye, President of Green Point Nurseries, started the business in 1957 as a part-time, backyard-type cottage industry. It was 42 years ago that he decided that he wanted to do it as a business.

Green Point Nurseries offers a complete selection of Hawai'i tropical flowers and foliage, which are harvested daily and sent to professional florists all over the world. The company's specialty is anthuriums and has received a number of awards for its anthuriums.

The farm is very clean and orderly. One of the main objectives of the Tanouye's is customer service; the customer truly does come first.

This portion of their farm consists of 30.34 acres of anthuriums.

**Seaside, Inc. (Pictured at right)**

This 50.887 acres is currently leased to Seaside, Inc., (a commercial seafood restaurant), surrounded by natural fish ponds. The Nakagawa family has been running this eatery since 1921. Colin Nakagawa runs the operation.

The premise is known as the Lokoaka Fishpond, and is easily accessible off Kalaniana'ole Avenue. The lease is an aquaculture use and the mullet raised here is used in the restaurant. The parcel is well-kept and fully developed and utilized.

People gather here from all over the world to check if their preferred fish is available.

■ **Agricultural Parks Program**

**Emil Yadao - Panaewa Ag Park**

Emil Yadao became a lessee of the Panaewa Ag Park soon after he received his degree in Horticultural Science from the University of Hawai'i at Manoa. A Hilo native, the decision to return to his hometown was an easy one.

Emil's nurseries in the Panaewa Ag Park support his landscape contracting business. His two nurseries produce plant materials for his projects. Emil also specializes in the production of large ornamental trees for the wholesale markets targeting primarily resort and commercial projects. Emil does most of his business with West Hawai'i clients.

**Resort Management Group LLC - Keahole Ag Park**

Resort Management Group (RMG) is a landscape construction and maintenance company that provides landscaping services for resorts, condominiums, shopping centers, private residences and businesses. Being a full service landscape company, RMG provides pre-construction services, which include project design, review and estimation, interiorscape services, landscape construction services and post-construction and maintenance services. As an attempt to maintain a ready supply of quality plant materials, RMG operates three nurseries in the Keahole Agricultural Park in Kailua-Kona for the production of various plant materials grown specifically for their West Hawaii Projects. Resort Management Group was founded by Max Yarawamai and Reed Kishinami in 2003 who met while working together at Kukio Golf & Beach Club.

Besides West Hawai'i, Resort Management Group maintains operations on Maui and on O'ahu.





*Bill Pfeil in his papaya fields on Moloka'i*

**Bill Pfeil - Moloka'i Ag Park**

One of the original lessees of the Moloka'i Agricultural Park, Bill Pfeil has been farming on Moloka'i for the past 30 years. Bill began his farming career as a vegetable farmer who during the last ten years made a successful transition from vegetable crops to fruit crops.

Bill leases two lots in the Moloka'i Agricultural Park. His 50-acre farm produces papayas and mangos interspersed with a summer crop of watermelons. While Bill's farm is technically not an organic farm, he employs many of the organic farming practices. For example, instead of using herbicides in his fields, Bill deposits the mowed grass clippings under the trees to improve soil consistency and nutrition, and promote the necessary soil microbes, all of which help produce better papayas and mango fruits.

To extend the harvest life of the trees, the papayas are harvested using a one-man operated "cherry picker," rather than the traditional "bump-and-catch" method. Bill markets the papayas to the U. S. Mainland as well as Canada. To meet quarantine requirements, the papayas undergo a hot water treatment in a privately funded USDA certified chamber located in the ag park before air freighted to the U. S. Mainland.

The mangos are intercropped with the papayas. After a six-year wait, Bill finally harvested his first crop of mangos four years ago. With four grafted varieties, Bill is able to extend his mango season from July to late October. Until the USDA approves quarantine treatment, the mangos will only be available in Hawai'i and Canadian markets.

■ **Irrigation Systems**

For almost the past three years, Hawai'i has experienced low rainfall totals throughout the year and the fiscal year ending June 2009 was no exception. During the year just ended, the Waimanalo Irrigation System, which had been hit the hardest during the previous fiscal year and had implemented a mandatory conservation measure requiring a 20 percent cutback in water use effective April 7, 2008, extended the cutbacks throughout the fiscal year. Unless rainfall and climate patterns improve, the mandatory cutbacks may remain into the new fiscal year commencing July 2009.

The Moloka'i Irrigation System (MIS) also experienced low rainfall totals during the year. The non-homestead users who make up approximately 20 percent of the total number of water users, utilize approximately 80 percent of the 3.0 million gallons per day delivered. However, they have continued their efforts to conserve and reduce usage 20 percent by maintaining a conservation plan that calls for a reduction in the acreage planted, watering at night and converting to drip irrigation as much as possible.

The Big Island of Hawai'i seems to be receiving near normal rainfall and has so far avoided the need to implement mandatory conservation measures. The Waimea and Honokaa-Paauilo Irrigation (Lower Hamakua Ditch) Systems, having completed the majority of capital improvement projects and earthquake repairs, have been able to meet the water demands of the ranchers and farmers even during the low rainfall periods.

The following are profiles of farm operations on HDOA irrigation systems:

**Hirako Farms, Inc. - Waimea Irrigation System**

Sejiro Hirako immigrated to Hawai'i from Japan in the early 1920's and in 1931 started a farm on the big island of Hawai'i growing a variety of truck crops. Son, Kiyotsugu, soon joined the operation around 1939 at the tender age of 15 and continues today in a limited capacity at 85-years young. Grandsons Roger and Jeffery Hirako joined the family farm in 1978 and 1980, respectively, after graduating from college and oversee six parcels of land in the Puukapuu and Lalamilo Farmlot Subdivisions totaling 145 acres.

The farm produces a variety of vegetables, such as head cabbage, chinese, red and mustard cabbages and also produces iceberg and romaine lettuce, celery and broccoli.

Hirako distributes its commodities to KTA Superstores on the island and to wholesalers such as Armstrong and Ala Moana Produce in Honolulu.

**Wong's Farm - Waimanalo Irrigation System**

Ronald and Shirley Wong started Wong's Farm in 1948 on four acres of land in Waimanalo along with a number of other small farming operations. Over the years, attrition and retirement of other farmers



gave the Wongs an opportunity to grow their farm and increase their acreage and the variety of crops grown, such as tomato, watermelon and corn.

In 1970, Ronald decided to produce a single crop and corn was it. The Wongs had no children to pass their farm to; however, many nieces and nephews periodically helped out on the farm and so niece and nephew-in-law, Shawn and Dominic Kadooka stepped up to take on the challenge of learning to operate the farm.

From 1991 to approximately 1999, Ronald taught Dominic and Shawn all he knew of growing corn and formally retired in 1999. Dominic and Shawn presently operate the 52-acre Golden Melon Farm, producing about 3,000 to 5,000 pounds of Waimanalo Sweet Corn weekly and selling it at roadside stands and the KCC and Kailua Open Markets. Dominic handles all the fieldwork and Shawn handles the sales and marketing. Golden Melon Farm is a member of the Waimanalo Irrigation System.

■ **Capital Improvement Projects for FY 2009**

**The following project was completed on the Big Island this year:**

Pre-Disaster Mitigation, Flood Proofing of the Lower Hamakua Ditch (LHD) – design

**The following projects are ongoing on the Big Island:**

Honomalino Watershed (South Kona) - planning  
Pre-Disaster Mitigation, Flood Proofing of the LHD – construction

Paauiilo Rendering Plant – construction  
Waimea Irrigation System (WIS), Bridge Replacement – construction

WIS, Lalamilo Distribution Pipeline Replacement, Phase 2 - construction

*Below: A flume that was replaced along the East Kaua`i Irrigation System*





**The following projects were completed on Maui this year:**

- Upcountry Kimo Road Lateral – construction
- Upcountry Phase IV Main Line Extension - design
- Upcountry Phase VIA Main Line Extension – design

**The following projects are ongoing on Maui:**

- Upcountry Phase V Main Line Extension - construction
- Upcountry Pulehuiki Lateral – construction
- Upcountry Phase VII –design
- Upcountry Kealahou Lateral - design

**The following project is ongoing on Moloka`i:**

- Irrigation System Electrical/Telemetry Improvements – construction

**The following projects are ongoing on O`ahu:**

- Waiahole Irrigation System Reservoir Improvements – design
- Waimanalo Irrigation System, Maunawili Valley & Misc. Improvements -design

**The following project was completed on Kaua`i this year:**

- East Kaua`i Irrigation System, Upper Kapahi Flume Replacement – construction

**The following project is ongoing on Kaua`i:**

- East Kaua`i Irrigation System, Miscellaneous Improvements - construction

**The following statewide project is ongoing:**

- State Irrigation System Reservoir Safety Improvements - design



ANIMAL INDUSTRY DIVISION



James Foppoli, Ph.D., DVM
Administrator/
State Veterinarian

The mission of the Animal Industry Division is to protect Hawai'i's livestock and poultry industries and public health by preventing disease introductions and detecting and controlling economically important diseases or pests within the state.

The division conducts: animal disease surveillance, epidemiology and control; inspection of all animals and birds entering the state; livestock brand registration, voluntary livestock disease certification and premise registration programs; laboratory diagnostic services; and dog and cat quarantine to reduce the risk of rabies introduction. An important focus of the division continues to be animal health emergency management, especially with respect to avian influenza virus or other highly contagious livestock and poultry diseases. Public health and environmental programs aimed at preventing the introduction of foreign animal diseases into the state continue to be important functions of the division.

Hawai'i's statuses for State-Federal Cooperative Disease Control Programs during FY09:

- Brucellosis Free, cattle and swine
• Pseudorabies Free, Stage V
• Bovine Tuberculosis, Accredited Free

Hawai'i is also recognized as free of bluetongue virus and anaplasmosis and surveillance programs for these diseases are ongoing to insure that the free statuses are documented and maintained. No actionable reportable livestock or poultry disease agents were detected during FY09.

The division continues to encourage livestock owners, through outreach sessions, to register their premises as part of the National animal traceability program. Voluntary certification programs for scrapie in sheep and goats and Johne's disease in beef and dairy cattle were maintained

during FY09 as were surveillance programs for avian influenza, classical swine fever in pigs and bovine tuberculosis in feral swine on east Moloka'i.

The division received cooperative agreement funds from the USDA-Animal and Plant Health Inspection Service, totaling \$184,420 during FY09.

The agreements supported specific activities such as the voluntary surveillance, control and certification programs for: Scrapie (\$10,000); Swine Health Protection (\$32,000); Classical Swine Fever (\$39,500); Foreign Animal Diseases (\$10,020); Avian Influenza (\$15,000), Bovine Tuberculosis on Moloka'i (\$31,300); and Animal Traceability (\$46,600). The cooperative agreements include funds to support a Veterinary Medical Officer (50 percent time) on Hawai'i and a Livestock Inspector (100 percent time) on O'ahu to assist with activities related to the agreements.

RABIES QUARANTINE BRANCH

Isaac M. Maeda, D.V.M., Program Manager

The Rabies Quarantine Branch processed 9,543 dogs and cats during FY09, slightly lower than the previous year by 1/2 percent. The number of arrivals still exceeded 8,966. The entries in FY09 represent an increase nearly double that of the 4,771 animals that entered Hawai'i prior to the start of the 5-Day-or-Less program in FY03. In addition, 357 animals transited through the state (approximate 11 percent increase from FY08) and approximately 297 guide and service dogs were processed resulting in approximately 10,107 dogs and cats that were managed by the program in FY09.

The following are rabies quarantine statistics for cats and dogs arriving between July 1, 2008 and June 30, 2009 (FY 2009):

Table with 3 columns: PROGRAM, NUMBER, PERCENT. Rows include 120-day, 5-Day-Or-Less Total\*, 5-Day-Or-Less Early Arrival, 5-Day-Or-Less, Airport Release, Total (9,453, 100), and Transiting Through Hawai'i (357).

\* Includes dogs and cats arriving early

Since the 5-Day-or-Less program was implemented in June 2003, the rabies quarantine program has transitioned away from a "quarantine only" system to one that permits the release of qualified dogs and cats directly from the



airport when specific pre-entry requirements are met. Such requirements include:

- Positive pet identification (electronic microchip);
- A minimum of two pre-entry rabies vaccinations;
- Rabies serological testing to measure vaccination response and 120-day waiting period after a passing test before entry into the state; and
- Inspection upon arrival.

The direct release of qualified dogs and cats at the airport has continued to challenge the veterinary, inspection, clerical and accounting staff with an increased workload. Staff and computerized databases are utilized to monitor and verify information relevant to qualification.

Considerable time is spent reviewing documents, pre-qualifying pets, processing payments, receiving and inspecting pets and addressing the needs, questions and concerns of the general public. The clerical, veterinary and inspection personnel spend an extensive amount of time e-mailing and speaking with pet owners on the phone or in person explaining program requirements. It is still estimated that about half of all submitted essential documents require follow-up contact with veterinarians or pet owners due to deficiencies.

Although approximately 7,763 dogs and cats were released at the airport in FY09, this number does not reflect the workload of the total number of pet documents processed, as the database contained more than 50,000 files of animals for the 5-Day-or-Less program alone.

Livestock Disease Control Branch staff, including the port veterinarian and livestock inspectors, provide critical support to the program by assisting rabies quarantine veterinary technicians in inspecting and processing dogs and cats released at the Airport Animal Quarantine Holding Facility seven days a week.

The 5-Day-or-Less program continues to be very successful, but it is labor intensive in documentation and verification. An estimated amount exceeding 8 percent of arriving pet owners do not submit the required pre-arrival documents beforehand resulting in additional screening and verification of these cases by the inspection staff at the airport facility. Pet owners that do not submit the required documents beforehand along with increasing numbers of animals arriving in the state contribute to the challenges faced by the staff.

The department routinely updates its website and information brochure dedicated to Hawai'i's rabies quarantine program that contain all of the information and forms relating to quarantine and the importation of cats and dogs. Pet owners may access pre-arrival FAVN rabies serological test results and 5-Day-or-Less quarantine-eligible dates at this HDOA website. Checklists for the 5-Day-or-Less program are available at the site to assist pet owners of both resident pets and non-resident dogs and cats with preparations to qualify for this reduced quarantine option. Enhancements to the computer system are ongoing to effectively manage the data and processing of 5-Day-or-Less dogs and cats.

Under the 5-Day-or-Less program, pets may be released at Honolulu International Airport if they complete pre-arrival requirements that include (but are not limited to):

- Two rabies vaccinations, with the last vaccination administered no more than 12 months prior to arrival if it was a one-year vaccine, or no more than 36 months prior to arrival if it was a three-year vaccine. (The two vaccinations may not be administered less than 30 days of each other; and the last vaccine must be administered no less than 90 days prior to the pet's entry into the state.)
- Microchip implantation for identification purposes;
- OIE-FAVN rabies blood test results with sufficient level of rabies antibodies;
- 120-day pre-arrival waiting period between the time the lab receives the blood sample and the earliest date the pet may enter the state (the pre-arrival waiting period is necessary due to the long and variable length of rabies incubation, where the virus may hide in an animal before clinical signs of the disease become apparent); and
- Pet owners must also submit required paperwork more than 10 days before the pet's arrival.

Pet owners who do not submit the required documents will have their pets held in quarantine for up to 120 days until all requirements are completed and documents submitted.

Approximately 93 percent of arriving dogs and cats qualified for the 5-Day-or-Less program in FY09. Furthermore, of the approximately 8,800 pets that qualified for the 5-Day-or-Less program, 7,763 pets (more than 82 percent) qualified for direct release upon arrival at Honolulu International Airport. In comparison only 6.9 percent (653) of the arriving animals were quarantined for 120 days. Midway in FY06, 30-day quarantine was eliminated as a distinct category since animals may qualify for quarantine periods between zero (airport releases) to 120 days under the early arrival provision in the 5-Day-or-Less program. Animals previously in the 30-day category are now included within the 5-Day-or-Less program as arriving early by 30 days. Modifications to the computer system that were completed in January 2008 permit the compilation of data on early arrivals.

The daily population of animals occupying the animal quarantine station at any given time during FY09 ranged slightly higher than FY08 and between 247 and 401 animals. The fluctuation in daily animal population at the station was lower and varied between 222 and 370 in FY08 and 182 to 341 dogs and cats during FY07. Although the average daily population was slightly higher in FY08 than FY09, the peak of 401 animals in FY09 was approximately eight percent higher than the peak of 370 animals in FY08.

In FY07, the department initiated a system that allows dogs and cats to enter Hawai'i directly at Kona International Airport at Keahole, Kahului Airport on Maui and Lihue



Airport on Kaua`i. Quarantine approved veterinary facilities serve as private contractors to inspect animals upon arrival at these airports because the rabies quarantine program does not have personnel on islands other than Oahu. A pet owner must apply for a Neighbor Island Inspection Permit (NIIP) to fly with their dog or cat directly to one of these airports from the continental U.S. The following are requirements to obtain a NIIP:

1. Every dog or cat must meet all the requirements listed on the "Checklist for the 5-Day-or-Less Program" except that all required documents must be submitted earlier (30 days or more before the date of arrival).
2. Pet owners must submit the following documentation to the Animal Quarantine Station 30 days or more ahead of the planned arrival:
  - Completed and notarized Dog & Cat Import Form, AQS 278;
  - Original rabies vaccine certificates for the two most recent vaccinations;
  - Payment of \$165 in cashier's check or money order made out to the HDOA;
  - Flight information; and
  - A letter from the owner requesting Direct Airport Release at either "Kona" or "Kahului" or "Lihue."
3. Owners must make reservations for inspection with an approved contractor. Contractors will then send a confirmation to the Animal Quarantine Station that they have agreed to perform the inspection and release procedure on the dog or cat. Owners are responsible for the additional fees to the contractor for this service.
4. A Kona, Kahului or Lihue, Neighbor Island Inspection Permit will be mailed to the owner once the Animal Quarantine Station has:
  - Received the above required documents, information and payment (see 2 above);
  - Confirmed the pet meets all of the requirements for the 5-Day-or-Less program and neighbor island inspection and release; and
  - Received confirmation from the approved contractor that they will meet the pet.
5. The original Neighbor Island Inspection Permit must accompany the dog or cat on the aircraft and be submitted to the inspector upon arrival in Hawai`i.

Pet owners are informed that all airlines may not be participating in flying dogs and cats with Neighbor Island Inspection Permits to Kona, Kahului and Lihue.

In addition to rabies exclusion, the quarantine program continues to monitor dogs and cats carefully for ticks exotic to Hawai`i. Animals were discovered that were carrying Rhipicephalus sanguineus ticks upon entry examination in FY09. Rhipicephalus sanguineus, the brown dog tick, is the only tick established in Hawai`i and associated with dogs.

## LIVESTOCK DISEASE CONTROL BRANCH

Jason D. Moniz, D.V.M., Manager

The Livestock Disease Control Branch prevents, investigates, conducts surveillance, controls and eradicates animal diseases that may have serious economic impacts on the state and nation's livestock and poultry industries, some of which impact public health. The branch inspects animals entering the state and insures compliance with division rules and laws pertaining to the control and eradication of animal diseases.

Below are some of the serious animal diseases that the department is conducting surveillance for. More statistical data is available on page 63.

### ■ H5N1 Avian Influenza (AI) and H1N1 Pandemic Influenza (Novel H1N1)

Highly pathogenic Avian Influenza (H5N1) continues to circulate in wild birds and poultry in Asia, Africa and Europe and continues to cause disease in humans closely associated with infected birds/poultry in those areas. The program participates with statewide efforts to monitor birds for AI by testing diseased poultry found on farms and imported to the state. To date, no positive highly pathogenic AI (H5N1) tests results have occurred in domestic or wild birds in Hawai`i or North America.

The program has conducted outreach with swine producers throughout the state to make producers aware of the potential threat Novel H1N1 poses to swine and provided biosecurity and other preventative recommendations to reduce the risk for swine herds becoming infected with Novel H1N1. No infected herds were detected or have been associated with Novel H1N1 infections in humans in FY09 in Hawai`i. Novel H1N1 has been found in swine in Minnesota and Indiana but has not caused significant disease in infected animals.

### ■ West Nile Virus (WNV)

Several preventive measures remain in place to reduce the risk of WNV from entering the state in imported birds. An embargo on the movement of poultry and birds, except for day-old chicks and hatching eggs through the U.S. Postal Service, remains in place. Also in place is an entry permit requirement for all poultry and birds along with a requirement for a seven-day pre-entry isolation period for susceptible species of birds. This year's high infection rate in Washington State posed an increased risk for Hawai`i. In FY09, 15 shipments of poultry or other birds were refused entry for failing to meet entry requirements. WNV arrived in the continental U.S. in 1999 and since then it has made its way westward and now affects all states except Hawai`i and Alaska.



**HDOA Maui veterinarian Rick Willer visits a Makawao pig farm to collect blood samples to test for brucellosis and pseudorabies. Animal Industry veterinarians conduct routine surveillance for certain diseases and will also assist farmers with animal health problems.**

#### ■ Bovine Tuberculosis (BTB)

##### **Bovine Tuberculosis free status maintained**

Hawai'i continues to maintain its "Bovine Tuberculosis Free Status."

BTB is a chronic, debilitating disease of cattle, bison, goats, cervids and other animals that can also cause a serious disease in humans. It is caused by the bacteria *Mycobacterium bovis*.

State and federal veterinarians continue to test cattle herds annually and manage hunter assisted surveillance of wildlife on the east end of Moloka'i, where bovine tuberculosis has been a recurrent problem for the past 65 years. The last BTB-infected cattle herd, located on eastern Molokai, was depopulated without further spread in 1997 and no new cases of BTB in cattle have been found. There is a resurgence of BTB nationally with infected herds being found in several states including NM, CA, WI, NE and MI.

A hunter-assisted survey for BTB in wildlife began in 1998 on Moloka'i to monitor the prevalence of infection in axis deer, feral swine, feral goats and mongoose. Since the surveillance began in 1998 the only species of wildlife found infected, to date, has been feral swine. From 1998 through June 30, 2009, 11 feral swine have been found infected. One infected feral swine was found in FY09. Trapping is also used to capture feral swine. Fifty-two were tested during FY09. To date, all infected feral swine have been found within a two-mile radius of Ualapue where the 1997 infected cow was found. The BTB infection appears to be maintaining itself in the feral swine population.

To prevent the potential spread of bovine tuberculosis from eastern Moloka'i, all cattle east of Kamalo are required to obtain a permit and have an annual negative BTB test to move. All herds are in compliance with established testing and movement requirements. In addition, feral swine movement out of areas east of Kamalo has been prohibited by a quarantine.

A USDA grant for \$30,000 has been received in FY09 to continue livestock and wildlife species surveillance on the east end of Moloka'i for support, preparation and shipping of samples to the National Veterinary Services Laboratories and to provide outreach to livestock producers, hunters and the community. The hunter-assisted program also reduces the feral swine population in the affected area thereby reducing the risk of transmission.

#### ■ Bovine Brucellosis

##### **Bovine Brucellosis class free status maintained**

Hawai'i has maintained a bovine-brucellosis-free status since 1983. Bovine brucellosis is an infectious disease of cattle, bison and elk caused by the bacteria *Brucella abortus*. Brucellosis can also infect humans.

During the fiscal year, 7,174 cattle were tested for brucellosis. One suspect and no reactors were found. The suspect was reclassified as negative after an epidemiological investigation was completed. In areas of the state where *Brucella suis* infected feral swine are found, infection occasionally spills over to cattle. In these cases herd epidemiological investigations, and herd tests when deemed necessary, are conducted to investigate the cause of serologic positive tests collected at slaughter. These investigations find that in areas where *B. suis* is endemic in feral swine, a single or few head may become transiently infected with *B. suis* but no cattle to cattle spread has been seen and no herd reproductive abnormalities have been found.

#### ■ Swine Brucellosis & Pseudorabies

##### **Hawai'i maintains free statuses for Swine Brucellosis and Pseudorabies**

A statewide quarantine order prohibits the introduction of feral swine into domestic swine herds and the inter-island movement of feral swine.

##### ***Brucellosis***

Hawai'i retained its free status for swine brucellosis during FY09.

Brucellosis in swine is caused by the bacteria *Brucella suis*. Infected swine experience reproductive problems including abortion and infertility. *Brucella suis* can also cause serious



infections in humans. Humans in close contact with infected swine can become infected. No domestic swine herds were found infected in FY09 and as a result Hawai'i maintains its Brucella suis free status.

Feral swine in Kona, Hamakua, Kohala (Hawai'i Island), Kahakuloa (Maui), Ft. Shafter westward through Waianae, the North Shore and Windward (O'ahu) are known to be infected with swine brucellosis. Exposure of domestic swine to infected feral swine and the practice of maintaining transitional herds of mixed feral and domestic swine have been the source of all domestic swine brucellosis infections in the past.

In addition to annual testing of all domestic sows and boars more than six months of age at slaughter, 25 percent of the herds in the state are randomly selected for testing to determine their brucellosis status. Surveillance for FY09 included 892 domestic swine, 12 transitional swine and 196 feral swine. Eleven percent of the feral swine tested statewide were reactors to swine brucellosis.

**Pseudorabies**

Hawai'i maintains a free status for pseudorabies in swine.

Pseudorabies (PRV) is a herpesvirus infection of swine which may cause respiratory disease and reproductive failure. Pseudorabies virus is not transmissible to humans; however, PRV infection of other species (such as dogs) is typically fatal.

Pseudorabies surveillance testing of 895 domestic swine during fiscal year 2009 found no infected domestic swine. No transitional herds (herds with exposure to feral swine) were determined to be infected. Feral swine on the islands of Hawai'i, Maui and O'ahu are known to be PRV-infected. Forty percent of the feral swine tested in FY09 were found positive for PRV. Infected feral swine are a constant threat to domestic swine herds.

■ **Transmissible Spongiform Encephalopathies**

A quarantine order is in place to require change of ownership identification requirements for certain classes of sheep and goats for Hawai'i to remain consistent in the National Scrapie Program.

■ **Scrapie**

Hawai'i continues to be recognized as consistent with the USDA Voluntary Scrapie Certification Program Standards.

Scrapie is a transmissible, insidious, neuro-degenerative disease affecting the central

nervous system of sheep and goats. Scrapie has not been diagnosed in goat or sheep flocks in Hawai'i.

Hawai'i received a \$10,000 grant in FY09 to continue providing sheep and goat flock owners with educational information, enroll flocks in the status program, conduct surveillance testing on cull and diagnostic animals and provide for some genotype testing.

■ **Other TSEs (Bovine Spongiform Encephalopathy, Chronic Wasting Disease in Cervids)**

During FY09, cooperative programs remain in place to conduct surveillance for these transmissible spongiform encephalopathies. No positives have ever been found in Hawai'i.

■ **Voluntary Johne's Disease Herd Certification Program (VJDHCP)**

The VJDHCP goal is to implement disease control measures to reduce or eliminate Johne's disease from cattle herds and conduct annual surveillance to verify a herd's status. A USDA cooperative grant of \$20,500 received in FY08 was used through FY09 to conduct Johne's testing of dairy and beef herds, conduct risk assessments, write up individual herd plans and provide outreach during the fiscal year. During FY09, 874 cattle were tested for Johne's disease. Thirty-six cattle tested suspect on blood or milk tests and four cattle cultured positive for Johne's.

■ **Importation/Exportation of Livestock, Poultry and Other Animals**

An embargo on the movement of poultry and other birds into Hawai'i through the U.S. Postal Service implemented in September 2002 remains in place. The embargo remains in place to prevent the entry of West Nile Virus, Avian Influenza and other avian diseases from entering the state with infected birds.

**Animals Inspected and Approved for Entry into the State:**

15,611 head of livestock; 6,493 poultry and other birds; 612,431 day-old chicks and hatching eggs; 11,007 dogs and cats; and 9,147 other animals.

The branch staff conducted 55 compliance investigations, 167 written warnings were issued and 13 animals were refused entry.

See animal importation statistical data on page 63.



## VETERINARY LABORATORY BRANCH

Crane H. Hahn, D.V.M., Program Manager

The Veterinary Laboratory (VL) provides a diverse range of animal disease diagnostic services in support of the division's goals and objectives. Samples are analyzed to provide vital information related to the presence or absence of specific diseases as well as general disease diagnosis. Certain disease surveillance activities allow the state to demonstrate disease-free statuses which influences the ease of moving animals or animal products to national or international markets. In some cases, disease surveillance supports public health goals. The VL also participates in supportive outreach functions related to livestock traceability and foreign animal disease surveillance.

In FY09, the VL performed more than 19,000 tests. Staff performed diagnostic procedures on a diverse array of samples, including: whole blood, serum, swabs, carcasses, feces, urine, milk, and tissue. Extensive training, proficiency testing, experience in dealing with the variety of samples, and an understanding of disease processes produced results meaningful for division veterinarians making decisions regarding disease investigations or management.

The VL is comprised of the Diagnostic and Microbiology Sections. The Microbiology Section performs serologic testing using serum to detect specific antibodies (immune response) against disease agents. Currently, the VL performs such tests to detect previous or current infections by anaplasmosis, bluetongue virus, *Brucella abortus*, *Brucella suis*, equine infectious anemia, *Mycobacterium avium subspecies paratuberculosis* and pseudorabies virus. The test modalities are enzyme link immuno-sorbent assay (ELISA), competitive ELISA, agar gel immunodiffusion (AGID), and plate or tube agglutination.

In FY09, the VL performed 11,637 serologic tests reflecting a decrease of 39 percent from FY08. The largest drop (84 percent) is seen in anaplasmosis surveillance testing which is performed on a proscribed triennial sampling schedule.

The Microbiology Section is also responsible for clinical pathologic examinations such as blood smears, urinalysis, and flotation techniques to identify intestinal parasites. In FY09, the VL performed 5,130 clinical pathology tests reflecting a decrease of 16 percent from FY08. Since most samples are submitted by the Rabies Quarantine Branch, submission numbers may vary based on age distribution of the station's animal population. Typically, as the number of mature animals increases, which are less likely to be infected with internal parasites, sample submissions will decrease. In addition, submission decision trees developed by Station veterinarians collaborating with operational staff

have resulted in more efficient management of submissions. Finally, operational policies for treating infected animals were modified resulting in more timely resolution of infections and fewer retests.

The Diagnostic Section provides gross and microscopic pathology services which entails necropsy, sample collection and processing, and histological examination of stained tissues to determine disease etiology. Total samples (1,973) examined increased by 45 percent from FY08. Additionally, the Diagnostic Section collects samples for submission to other laboratories (rabies, avian influenza, Exotic Newcastle's disease, classical swine fever, etc.) and serves as a disease information resource in collaboration with division veterinarians to assist producers in making appropriate control and management decisions to protect their livestock and livelihood.

Veterinarians in the Diagnostic Section had direct oversight over the division's animal traceability and classical swine fever (CSF) surveillance programs. CSF is a highly contagious viral septicemia affecting only swine. Although eradicated in the U.S., it is still endemic in much of the world. Federal cooperative agreement funds provided the opportunity to collect surveillance samples and educate producers about CSF. Federal funds also supported animal traceability outreach efforts aimed at educating producers on the need to quickly trace animals to their point of origin during a disease outbreak. The mainstay of the traceability effort is to encourage livestock producers to participate in the national premise registry program.



## AQUACULTURE DEVELOPMENT PROGRAM



**Todd Low**  
Manager  
(from September 2008)

**The Aquaculture Development Program (ADP) provides essential support services to encourage further growth and diversification of the aquaculture industry. ADP is a planning, development, and problem-solving organization whose goals are to assist in the start-up of production and service businesses, and to contribute to their success. Specific activities include planning and policy formulation, new business development, permit facilitation, marketing assistance, disease diagnosis and prevention assistance, and co-funding of statewide technical extension.**

The mission of ADP is to: prepare and implement state aquaculture plans and policies for the expansion of aquatic farming, and research and technology transfer business; coordinate statewide development activities; and directly assist both public and private sector interests in achieving their aquaculture-related goals, in order to create jobs and diversify the economies of all islands.

Major activities for FY08 were:

- Estimated wholesale product value for the industry was \$34.7 million for calendar 2008 according to Department statisticians, which represents a record 38 percent increase from 2007. The majority of the production, 80 percent, was produced on the Big Island. Algae continue to constitute high value and with finfish, ornamentals and shellfish amounted to 76 percent of the total value of the industry.
- Continued the joint implementation of the amended Chapter 190D, HRS, Ocean and Submerged Lands Leasing law with the Department of Land and Natural Resources by facilitating permit preparation for one new aquaculture project (Hawaii Oceanic Technology, Inc.) off the Big Island. Hukilau Foods, Inc. received a permit extension for a larger area. Prepared annual joint report to Legislature, with the Department of Land and Natural Resources (DLNR), on status of the ocean leasing.
- Continued to provide an internationally recognized Shrimp Surveillance and Certification Program to the growing shrimp broodstock industry. The aquaculture veterinarian provides third-party diagnostic sample collection with chain of custody documentation for all Hawai'i broodstock operations including the Oceanic Institution/US Marine Shrimp Farming Program stocks based on O'ahu. Provided expertise in preventing disease outbreaks and had one *specific pathogen* shrimp disease outbreaks on Kaua'i during the past year. At present there are eight shrimp broodstock export farms under the surveillance program and all are disease-free. Hawai'i's shrimp broodstock are as essential to the intensely competitive global shrimp production market in Asia, as bull and cow breeders are to the beef industry. To date, we have provided support to enable one local shrimp breeding facility to provide seedstocks to the food shrimp production sector. We have shipped 113,572 broodstock shrimp to 14 countries including the U.S. in support of global food shrimp production.
- Assisted farmers with import permits and export health documentation for aquatic species on O'ahu, Kaua'i, Maui, Moloka'i and Hawai'i. The aquaculture veterinarian is continuing to provide chain of custody sampling for a voluntary screening of imported koi stocks while in quarantine before being transferred to grow-out systems destined for export. This effort is contributing to the now significant numbers of koi being exported to the mainland and future expanding market into the European Union. Hawai'i is also one of the primary beta test sites for a new Koi Best Health Practices Program, which places emphasis on biosecurity and veterinary oversight. The Disease Prevention Program continues to provide health screens of land-based hatchery produced moi fingerlings before stocking into open ocean net-pens, and provides assistance for cooperation with federal oversight in developing new aquaculture drugs for food fish species.
- Promoted the local consumption of aquaculture products by participating in the Agriculture in the city, state Farm Fair at the Bishop Museum, Hawai'i Agriculture Conference 2009, and Made in Hawai'i Exposition. Worked with various Internet, television, radio and print media to provide background information, place stories and promote the industry. Continued ADP's electronic industry newsletter, *Aquaflashes*, to get out time-sensitive information to our farmers. Worked on new layouts for promotions of Hawai'i aquaculture products.
- Participated in the governing boards and advisory committees of the Center for Tropical and Subtropical Aquaculture, Western Pacific Regional Fishery Management Council, Ocean Resources Management Plan Work Group, and Hawai'i Aquaculture Association.



- Provided technical reviews of research and development proposals to the Hawai'i County Economic Development, Center for Tropical and Subtropical Aquaculture, U.S. Department of Commerce, and U.S. Department of Agriculture. Provided reviews of Aquatic Species Importation permits for the department's Plant Quarantine Branch.
- Provided limited extension services to farmers and start-up operations. Provided inspection services for the cooperative aquaculture facilities permit to DLNR. The aquaculture veterinarian provided critical diagnostic services to farmers for disease outbreak problems.
- Published an article on "Open Ocean Aquaculture in Hawai'i" in InfoFish International, a project of the Food and Agriculture Organization (FAO) of the United Nations.



PLANT INDUSTRY DIVISION



Lyle Wong, Ph.D.  
Administrator

The Division of Plant Industry consists of three branches, the Pesticides Branch, Plant Quarantine Branch, and Plant Pest Control Branch. Together, the branches work to protect Hawai'i's agricultural industries by preventing the entry and establishment of detrimental insects, weeds and other pests and by assuring the safe and efficient use of pesticides in Hawai'i.

PESTICIDES BRANCH

Robert A. Boesch, Manager

The Pesticide Program regulates the distribution and use of pesticides through a program of licensing pesticide products, testing the competency of restricted-use pesticide applicators, and educating and monitoring pesticides distribution and applicators. This is to ensure the efficient, effective and safe use of pesticides to minimize adverse effects on the environment.

Highlighted activities for the program in FY 2009 were as follows:

Pesticide Emergency Exemption Registration for Varroa Mite Eradication In Honey Bee Populations

Two Crisis Exemptions were declared pursuant to Section 18 of the Federal Insecticide Fungicide and Rodenticide Act (FIFRA) for the use of insecticides for the eradication of the varroa mite first detected in the Hilo port area in August of 2008. While foraging honey bees were attracted to feeding stations containing honey with micro-encapsulated chlorpyrifos (September to December 2008), the chlorpyrifos formulation was not sufficiently toxic to achieve knock down of feral hives which was required to prevent the spread of the mite from the Hilo port area one feral hive to another.

A second Crisis Exemption was declared in January 2009 to use fipronil insecticide in place of micro-encapsulated chlorpyrifos. While anticipating more effective knock of feral hives, the baiting was not successful with foraging bees more strongly drawn to flower trees and shrubs,

including, macadamia nut orchards, by early January. A pesticide use is allowed under a Crisis Exemption for a total 15 days. Thereafter, the use can be continued if an application for Specific Exemption is submitted with the concurrence of the registrant. An application for Specific Exemption was not subsequently submitted by the HDOA to EPA when further surveys for the mite in feral and managed hives in East Hawai'i showed infested hives in the Onomea and Pahoa as well as Hilo, therein, greatly expanding the known area of infestation beyond what was determined to be feasible for eradication with available resources.

Section 18 Specific Exemption for Hydrated Lime Use for Coqui Frog Control

HDOA withdrew its application to the U.S. Environmental Protection Agency for continued use of hydrated lime under a Specific Exemption (Section 18) for coqui frog control by nurseries as well as homeowners. The application will be amended and resubmitted to U.S. EPA for hydrated lime use solely by nurseries for the control of the frog in growing areas. Hydrated lime is milled to a very fine powder. The powder can be carried by wind currents and the use within residential areas poses a risk of exposure to non-target areas.

State Special Local Need Registrations

Using supporting data generated by the University of Hawai'i, College of Tropical Agriculture and Human Resources, issued a special local need registration incorporating the use of a herbicide and "paint ball" technology allowing conservation groups to target invasive plants in inaccessible forested areas via helicopter and for the use of newly developed formic acid fumigation strips for controlling varroa mites in honey bee colonies.

Unwanted Pesticide Disposal Program

Unwanted Pesticide Program provided an opportunity for affordable pesticide disposal to agriculture and small businesses statewide. Statewide, 9,406 pounds of pesticides and 392 pounds of poisonous gas were collected for disposal. The breakdown by island is as follows:

- O'ahu – 3,521 pounds of pesticides; 213 pounds of poisonous gas
- Maui – 2,608 pounds of pesticide; 183 pounds of poisonous gas
- Kaua'i – 885 pounds of pesticides
- Moloka'i – 345 pounds of pesticides
- Hawai'i Island – 2,047 pounds of pesticides

Precautions on Rodenticide Application

A large fish kill which occurred following aerial applications of rodenticide bait pellets to Lehua Island resulted in aerial permits being placed on hold. Pellets were suspected of entering the water and causing the fish kill along with the



beaching of a whale calf. Residue analysis of fish samples, both dead and live, did not reveal any evidence of the rodenticide.

#### Pesticide Registration and Enforcement Summaries

Data on branch activities may be found on page 64.

### PLANT PEST CONTROL BRANCH

Neil Reimer, Ph.D., *Manager*

**The primary function of the Plant Pest Control Branch (PPC) is to reduce population densities of plant pests that cause significant damage to agriculture and the environment to manageable levels. With Hawai`i's year-round mild climate and wide selection of available host plants, new immigrant plant pests (insects, mites, weeds, plant diseases, etc.) quickly become established. The overall objective of the Plant Pest Control Branch is to minimize the effect of these invasive plant pests in Hawai`i. This is accomplished through pests being detected, identified, delimited, contained, eradicated and/or controlled through biological, chemical, or mechanical means. The branch consists of the Biological Control Section and the Chemical/Mechanical Section.**

**Projects and Accomplishments of the PPC Branch included the following during FY 2009:**

#### Survey Program

The Survey Program conducts detection surveys to search for and uncover pests not known to be in the state. The Survey Program also conducts other delimiting, host range, damage, and natural enemy surveys to generate information on the potential severity of these pests. The program helps to provide information needed by administrators to determine the probability of success of eradication, containment, or controlling pests through biological means.

The Survey Program has been a participant in the USDA's Cooperative Agricultural Pest Survey (CAPS) Program since the 1980s. CAPS is a national program which brings together all U.S. states to conduct plant pest surveys. Pest data resulting from these surveys are entered into the National Agricultural Pest Information System (NAPIS) database maintained at Purdue University, Indiana. Data from all 50 states are consolidated into one major database.

Federal funds from the CAPS Program have supported the HDOA Survey Program since the mid 1980's. In the past seven years, Federal funding has substantially increased to fully support HDOA survey and detection activities and has provided HDOA ± \$250,000 each year.

For FY09, CAPS projects have included surveys for imported fire ants, citrus greening disease, honeybee pests, noxious weeds, and the light brown apple moth. CAPS funds have supplemented PPC general funds and

have allowed the purchase of vehicles, computer and GIS equipment, microscopes, cameras, supplies, travel, and provides for the salaries of the CAPS Entomologist and Pest Control Technician positions.

Six CAPS projects have been undertaken for the year:

- Core (Infrastructure). The purpose of the Core agreement is to provide funds for the infrastructure for the HDOA Survey Program. The Core provides funds for the CAPS Entomologist and data entry technician positions. Activities include conducting statewide general pest surveys, ant detection surveys, responding to pest calls, entering data into the national and local pest detection data bases, and the purchasing of equipment and supplies in support of the Survey Program. More than \$126,000 in CAPS Core funds was provided to HDOA this year.
- Imported fire ants. Statewide trapping for this high profile pest using Spam-baited vial traps was initiated in the 1980's and has continued ever since. Imported fire ants are not known to occur in Hawai`i. They are omnivorous with a painful sting. On the U.S. mainland, it has affected agricultural crops, electrical power boxes, and has been a huge nuisance to people who have inadvertently received a huge number of stings by this ant. This project is on-going with nearly \$10,000 being provided to HDOA.



**PPC survey entomologists Ron Heu and Cheryl Young conduct a survey for invasive ants in Waianae.**



- Honey bee pests. There are honey bee pests that are not known to occur in Hawai'i such as small hive beetle, tracheal mites, and the Africanized honeybee. The Africanized honey bee is known to be very aggressive and territorial, resulting in huge numbers of painful stings to people who have wandered near their nests or accidentally disturbed them. This project is ongoing with a funding level of more than \$24,000.
- Citrus Health. The main focus of this project is to conduct detection surveys for citrus greening disease, which is not known to occur in Hawai'i. This high profile disease has severely impacted the citrus industry in Florida. Current detection surveys involve the statewide examination of citrus trees for the vector Asian citrus psyllid insect and providing samples to the USDA for disease screening. Detection surveys for citrus greening disease have been ongoing since 2006. More than \$54,000 in CAPS funds were provided this year to HDOA.
- Noxious weeds. The purpose of this project is to detect noxious weeds which are not known to occur in the state. This is through statewide surveys conducted by the Chemical / Mechanical Section staff on all islands. This project is ongoing and is continuing in Federal FY09 at a funding level of \$24,000.
- Light brown apple moth (LBAM). The purpose of this six-month project is to conduct trapping surveys statewide for LBAM in order to determine its distribution in Hawai'i. Although LBAM has been established in Hawai'i for more than a hundred years, it has never been known as a plant or agricultural pest. The results of the trapping survey indicate that it is more of a high-elevation pest. \$30,000 in CAPS funds were provided this year.

#### **Foreign Exploration Program**

Foreign explorations were conducted by HDOA for potential natural enemies and pathogens against *Erythrina* gall wasp (EGW), ivy gourd, fireweed, and fountain grass. Field work was conducted in South Africa, Durbin, Tanzania, and Eritrea over a three-month period. Six shipments of specimens were sent to the HDOA containment facilities in Honolulu. A natural enemy of EGW, *Aprostocetus exterus*, identified during previous explorations and early host range testing as a promising agent for use against EGW, could not be found on this trip. A smut attacking the seed heads of fountain grass was recovered and attempts to propagate and rear are currently ongoing in Honolulu. Two rusts attacking fireweed were recovered and are also undergoing propagation and host range testing. The fly, *Trupanea inscia*, was also recovered and host range testing of this natural enemy has been initiated. In large



***PPC entomologist, Mohsen Ramadan sets a swarm trap on Lana'i to survey feral bees for varroa mites and other bee pests. So far, varroa mites have not been detected on Lana'i.***

part, recovery of specimens sent through priority mail and cargo did not fare well. Future exploration trips must include revised shipping methods for improving recovery of potential natural enemies.

#### **Projects On Specific Pests**

**Varroa Mite** [*Varroa destructor*]. Chemical/Mechanical (CM) Section personnel monitored honeybee swarm traps on all major Hawaiian islands since the 2007 discovery of varroa mites on O'ahu in order to allow for early detection and rapid response to any new infestations. In August of 2009, varroa mites were detected in a swarm trap located near Hilo Bay, Island of Hawai'i. CM, along with staff of the Biological Control Section, Plant Quarantine Branch, Hawai'i Department of Health-Vector Control Branch, USDA-ARS, USDA-APHIS, University of Hawai'i-CTAHR, and commercial beekeepers worked together to monitor and destroy swarms found in traps and feral honeybee hives. CM staff assisted in the chemical abatement of hives found to be infested with varroa mites. The spread of the varroa infestation in Hilo was slowed but not prevented. This did, however, prevent the loss of the macadamia crop in Hilo for that year. Management techniques are now being developed and implemented to allow beekeepers and growers to remain economically viable despite the presence of this new pest. The mite is restricted to the islands of O'ahu and Hawai'i. A 32-page report to the 2010 Legislature entitled "Report on the Study, Control and Mitigation of the Bee Mite Infestation: November 2009" explains in detail the activities in this program during FY09. The report can be found on the HDOA website.



**Coqui Frog** [*Eleutherodactylus coqui* Thomas]. Coqui frog control efforts and sprayer loan programs have continued on the islands of Hawai'i, Maui, O'ahu, and Kaua'i. Community groups, plant nurseries, and private individuals are allowed to borrow spray equipment from the HDOA at no charge on these islands. Kaua'i CM personnel have worked in the Lawai neighborhood to clear a ditch which is located between private property and the coqui infested site.

HDOA staff cleared the ditch and created an environment not favorable to the coqui frogs. This action caused the frogs to migrate back into the original infested area so that they could be treated with citric acid. Maui CM personnel responded to coqui frog reports and provided information on capturing or treating areas where coqui were reported. On O'ahu, HDOA personnel and O'ahu Invasive Species Committee (OISC) staff worked together in monitoring selected O'ahu commercial nurseries upon receiving reports of calling frogs at the sites. As needed, CM personnel worked with Plant Quarantine Branch (PQ) staff and treated infested nurseries with citric acid, sanitized cargo containers and nursery benches with live steam, trained nursery staff for coqui frog control, and also captured single frogs at commercial sites and private residences. On the Big Island, CM staff worked with researchers from the University of Hawai'i to test physical barriers to be used at nurseries to exclude coqui frogs from the outside.

**Banana Bunchy Top Virus (BBTV)**. Detection, containment and management practices for the banana bunchy top virus (BBTV) continued on the Islands of Hawai'i, Kaua'i, and Maui, with limited chemical control work on commercial farms by HDOA personnel. HDOA personnel traveled to Moloka'i to follow up on the progression of BBTV since it was discovered at the end of 2007 and to provide educational materials and technical expertise for residents on detection and treatment of diseased plants.

**Public Awareness Activities**. CM Section personnel participated in educational outreaches for public awareness at activities such as the Hawai'i County Fair, Maui County Fair, Honolulu Ag in the City, Ag Day at the State Capitol, Kaua'i Ag Awareness Day and the Kaua'i County Fair. Personnel also made visits to Chiefess Kamakahelei and Kapa'a middle schools, Kilauea and Kalaheo elementary schools to support agricultural awareness. Presentations and informational displays featured noxious weeds and weed seeds, little fire ants, nettle caterpillars, and coqui frogs.

**Seed Inspection**. Routine surveys of agricultural and vegetable seed vendors were conducted to ensure that seed packages sold to consumers were properly labeled. Examination of seed lots entering the United States from foreign ports was performed in the CM Control Section Seed Laboratory under an agreement with the

U.S. Department of Agriculture, Animal and Plant Health Inspection Service. Seed lots containing prohibited noxious weed seeds or seeds of quarantine status were refused entry into U.S. commerce. Germination tests were performed on vegetable and agricultural seed lots to ensure compliance with standards. Germination tests were performed upon request in the seed laboratory for Hawai'i seed distributors to ensure compliance with the Hawai'i Seed Rules.

**Nettle caterpillar** [*Darna pallivitta* Moore] [Lepidoptera: Limacodidae]. In September 2001, the stinging nettle caterpillar (SNC) was discovered in Pana'ewa on Hawai'i Island. Subsequently, it rapidly spread across the island then to the neighbor islands of Maui and O'ahu. It has been reported to infest 57 species of plants, representing 54 genera in 26 families including palm and foliage crops, ornamental and pasture grasses, indigenous plants and some weeds. Consequently, high economic value plants for out-of-state exports and local markets are at risks from pest infestation. In addition, and equally as important, is the harm inflicted on humans by the spiny caterpillar when they come in contact with the insect. The sting causes allergic skin reactions, such as, itchy rashes, welt formations, and burning sensations which may require medical attention. Plant nursery workers, commercial landscapers, and homeowners are especially at risk where SNC is present.

Monitoring for the presence of stinging nettle caterpillars was conducted on Kaua'i, Moloka'i, and Lana'i. No nettle caterpillars were detected on these islands. On Maui, CM staff worked with schools, nurseries, and homeowners in delimiting the boundaries of infested areas. O'ahu CM section personnel continued with monitoring and servicing nettle caterpillar traps containing pheromone lures to attract male moths. Approximately 332 traps were deployed in a 14 square mile area of Central O'ahu in an attempt to lessen populations in areas with higher densities of nettle caterpillars and to delay the movement of nettle caterpillars into the Mililani neighborhood where they would sting people. HDOA staff provided nurserymen with information on effective chemicals and loaned out a 100-gallon sprayer to apply insecticides.

Trap data further generated baseline information on the pattern of moth abundance over time. Moth catches over a 12-month period at Kipapa Gulch in 2008 suggested that the moth population spiked in numbers and was extremely abundant in summer. However, there was hardly any moth caught from November until March. For a few traps that ensnared moths, catches rarely exceeded >10 per trap. From April until October, the number of moths tallied in the traps increased by five to eight-fold. The moth data presented valuable information in planning and developing field strategies prior to, during, and after liberation of the parasitoid *A. dimerus*.

Nettle caterpillar is currently widely distributed on Hawai'i, O'ahu, and Maui. PPC is focusing efforts at controlling



this pest through biological control strategies. *Aroplectrus dimerus* Lin. (Hymenoptera: Eulophidae) is a promising natural enemy that has been proposed for biological control of SNC. The parasitoid was collected in October 2004 at Tien-wei in Taiwan during exploration for the natural enemies of the pest. In a risk assessment evaluation undertaken between 2004 and 2007, *A. dimerus* was determined to be highly specific to SNC and will not cause unintended impacts on non-target organisms. Of 25 lepidopterous species representing 13 families evaluated, none was found to have been parasitized by *A. dimerus*.

PPC has requested a permit from the state and federal regulatory bodies to liberate *A. dimerus* in Hawai'i. The whole process that requires approval from multi-agencies entails a comprehensive and time-consuming review of technical information to ensure that the biocontrol agent is safe to release in the natural habitat. Pending approval by the permitting agencies, the release of *A. dimerus* is anticipated to result in long-term control of SNC and alleviate the harm it inflicts on people.

Meanwhile, a mass-rearing protocol of *A. dimerus* is currently being developed. It should be underscored that laboratory colonization of the parasitoid does not present much of a problem compared to that of the host insect, *Darna pallivita*. The rearing of *D. pallivita* has proven to be a challenge. Besides an extended life cycle (egg to adult eclosion is about three months), a virus disease periodically infects the larvae thus, compromising sustained production of the hosts for use in parasitoid propagation. The host larval colony occasionally succumbs to the viral disease. A rearing method has been developed at the HDOA Hilo Insectary. Exercising caution and strict sanitation, sorghum (*Sorghum bicolor*) is sown and grown in pots. Twenty gravid moths are given access to a potted plant for egg-laying. The newly hatched larvae initially feed on sorghum but later provided with cut ti leaves (*Cordyline terminalis*) until they pupate. No more than 200 larvae are kept in a rearing cage otherwise the virus disease would set in and plague the culture. Moths that emerged are sexed then recycled back to the stock colony. This rearing method will be modified and streamlined further to sustain production of the host insect for large scale production of *A. dimerus*.

**Miconia** [*Miconia calvescens* DC] and **Clidemia** [*Clidemia hirta* (L.) D. Don]. Personnel at the Plant Pathology Facility continue to investigate the potentials of the gall-forming nematode *Ditylenchus gallaeformis* as a classical type of biocontrol agent for Miconia and Clidemia. Since large numbers of nematodes were needed for the studies, various methods were tried to increase the nematode population. These included attempts of growing the nematodes on various reported hosts (e.g., *Clidemia*), inoculating the nematode on different tissues of the plant, and culturing the nematodes on established callus cultures. However, these methods of propagation at the HDOA's Plant Pathogen Facilities were met with difficulties

such as contamination by other free-living nematodes, loss of the galling tissues (where nematode inhabited) by other defoliating pests in the greenhouse, and, most important of all, the decreasing breeding potential of the nematode over time due to inbreeding.

To avoid some of these problems, aseptic cultures of the nematode on different types of host tissues were attempted and the techniques of obtaining sterile nematode and plant tissues were established. The refined culturing system will be used for inoculation with fresh nematodes obtained from the wild, which will be shipped from Brazil in collaboration with Professor Robert Barreto at the Universidade Federal de Vicosa, Brazil, or hand-carried directly from Costa Rica by a USDA Forest Service entomologist. Currently, the importation of fresh nematodes has been hindered by the containment facility's lack of a biosafety cabinet class IIA, which is one of the new Importation Permit P526 conditions, set by the USDA-APHIS-PPQ. Greenhouse host range and efficacy tests can then be conducted with confidence once large amount of nematodes are established in the new culturing system.

Another potential biocontrol agent, the fungal pathogen *Coccodiella miconiae*, will also be imported from Costa Rica into the containment facility once the biosafety cabinet requirement is satisfied. Previously, this obligate parasite was hand-carried from Costa Rica along with the nematode to the HDOA facility but it failed to establish on the resident miconia plants, due to lack of biological information on the fungus. However, the Plant Pathology personnel have gained knowledge on *C. miconiae* through literature, which has advanced greatly on the subject since the previous importation, so that it is more likely that the fungus can be propagated and maintained in the greenhouse. This fungus causes pimpling of miconia leaves. The pimpling can be so numerous that the foliar photosynthetic process is significantly reduced. This fungus is effective in drier climates and may be a good biocontrol agent in areas where other control agents would not be effective.

**Fountain Grass** [*Pennisetum setaceum* (Forsk) Chiov.]. The biocontrol project for fountain grass with plant pathogens was initiated when seeds of Fountain Grass containing smut spores were collected at Dar Es Salaam, Tanzania by the HDOA's Exploratory Entomologist on October 5 & 7, 2008 and shipped and arrived at HDOA's containment facility on October 17, 2008. The Plant Pathology personnel determined the smut to be an *Ustilago* species, a member of the Basidiomycetes - Ustilaginales, based on morphological characteristics of the spores and sori. Since smut fungi are obligate parasites, attempts were made to culture and maintain this fungus on live fountain grass and selected cereal grass plants. This was conducted according to published methods by suction inoculation of the respective seeds with a suspension of the spores (1 x 10<sup>5</sup> to 10<sup>7</sup>/ml), followed by letting the seeds grow to their maturity on producing ripening seed heads. Suction inoculated seeds with just water acted as controls.



**Plant Pathologist Mann Ko (right) discusses with Pest Control Technician Christopher Lao (left) how to best isolate a fungal organism that is being used as a biological control agent to fight an invasive weed that dominates much of the wet forests in Hawai'i.**

The cereal grasses include wheat, barley, pearl millet, and maize. After three to five month's of growth, seed heads formed and matured on the tillers of all test plants except fountain grass. No smut spores formed on the seeds of the cereal grasses, as was expected of a smut fungus which is generally highly host specific. However, the inability to show that the fungus has infected the test fountain grass plants and transformed the seeds into smut spores has rendered the results of the experiment inconclusive. The inability of the fountain grass to form seed heads inside the containment facility also means the inability to propagate, maintain, and increase the fungal inocula for biocontrol studies. Luckily, smut spores remain viable for several years if stored in cool dry conditions, so that the Plant Pathology personnel are able to conduct research to elucidate the conditions for the fountain grass to produce viable seeds. In the meantime, the imported smut spores of the fountain grass are being sent to authorities for identification to species. Smuts of fountain grass have not been reported in any literature.

**Erythrina gall wasp** [*Quadrastichus erythrinae* Kim]. The erythrina gall wasp (EGW) was first described by Kim et al. In 2004, from specimens collected in Singapore, Mauritius, and Reunion. In May 2004, EGW was first discovered infesting a coral tree, *Erythrina variegata*, in Manoa on the island of O`ahu. The wasp causes gall formation and swelling of tissues on the leaves, petioles, stems and, practically, all green parts of the plant, including, flowers and seed pods. Within a short time, EGW decimated the native 'wiliwili, *Erythrina sandwicensis*, and other introduced species of *Erythrina* throughout the state. Various measures such as chemical injection, tree pruning, and germplasm conservation

through seed collection were instituted to alleviate the unprecedented devastation of *Erythrina* trees. The invasive wasp continued to spread unabated. A foreign exploration was undertaken by PPC to search for the natural enemies of EGW in its native habitat.

*Eurytoma erythrinae*, an ectoparasitoid collected from Tanzania, East Africa, is the first natural enemy of EGW that was approved for liberation in Hawai'i. Shortly after a release permit was secured, insectary propagation of the eurytomid parasitoid was commenced in order to sustain production of parasitoids for liberation on O`ahu and the neighbor islands.

The first parasitoid release was made in November 2008 at Lili`uokalani Botanical Garden in Honolulu, O`ahu. Subsequent releases were undertaken over pre-selected locations on O`ahu and the neighbor islands of Hawai'i, Maui, Moloka`i, and Kaua`i. To date, more than 8,000 laboratory-reared parasitoids have been liberated throughout the state. In concurrence with parasitoid releases, field evaluation and monitoring of the target pest, host trees, and parasitoid were likewise initiated to determine the impact of the biocontrol agent on the target pest. Photo images of the experimental trees were taken and wasp infestation on the trees was evaluated using an arbitrary rating scale. Galled shoots and/or foliage were sampled at random for dissection and for purposes of rearing out insects that may develop from the infested samples. Positive indicators of parasitized EGW consisted of host larvae which show egg-laying scars made by gravid parasitoids, presence of parasitoid immatures within the galls, or presence of adult parasitoid emergence holes on the galls.

Gall dissection data generated from gall collections made on O`ahu and neighbor islands demonstrate that the eurytomid parasitoid has been successfully established. Within four months after the parasitoid was liberated, 0 to 16 percent parasitization of the target pest was recorded from five collection sites on Hawai'i Island. Similar observations were obtained on Maui where rates of parasitization tallied from three sampling sites, i.e., Kamehameha Golf Course, Lahaina Luna and Makena, increased from 0 to 15 percent. On O`ahu, parasitization as high as 17 percent was recorded in Kane`ohe (Ho`omaluhia Botanical Garden).

The data further showed the extent with which the eurytomid parasitoid had continued to spread. On O`ahu, the parasitoid has been detected in locations remote from various release sites. Parasitoids were found on gall samples collected from places as far away as two to six miles from the nearest release sites. Moreover, as high as 30-60 percent parasitization of EGW was recorded on these locations. Field observations showed some unique attributes akin to *E. erythrinae*. The parasitoid displays persistence and resilience in getting established in least favorable habitat. Galls taken from a stand of tall, columnar *Erythrina* trees on a location in leeward O`ahu yielded a parasitization rate of five percent despite being routinely injected with a systemic pesticide.



**PPC entomologist Juliana Yalemara releases the natural predators of the Erythrina Gall Wasp in Kalaupapa on Moloka'i. The natural predators are crucial in saving native species of wiliwili.**

By the same token, the parasitoid appears to have a high searching ability and is capable of surmounting physical barriers. This was demonstrated on Kaua'i where a recent detection of the parasitoid was made at a botanical garden in Hanalei. The site is a remote location in the northern side of the island and fairly well isolated by the Wainiha Pali mountain range from west Kaua'i where previous and only parasitoid releases had been undertaken.

*Aprostocetus nitens* (Family Eulophidae) is the other promising natural enemy of EGW being researched for release by PPC. The parasitoid was identified by insect specialists affiliated with the Biosystematics Division, Agricultural Research Council, Plant Protection Research Institute, Queenswood, Pretoria, South Africa.. *A. nitens* is likewise an ectoparasitoid that was collected in Kenya, East Africa by the University of Hawai'i research collaborators. A gravid female lays an egg singly by inserting it into a gall which then hatches into a larva that feeds on a developing immature of EGW. It takes about 15 days for a parasitoid immature to reach the adult stage. Unlike *E. erythrinae*, the parasitoid utilizes only one host individual to complete its development.

The risk assessment evaluation of *A. nitens* has already been completed. Test hosts consisted of seven non-target gall-forming insects which included Hamakua pamakani gall fly, *Procecidochares alani* Steyskal, on Hamakua pamakani, *Ageratina riparia*; eupatorium gall fly, *P. utilis* Stone, on Maui pamakani, *A. adenophora*; lantana gall fly, *Eutreta xanthochaeta* Aldrich, on lantana, *Lantana camara*; banyan gall wasp, *Josephiella microcarpae* Beardsley & Rasplus, on Chinese banyan, *Ficus microcarpa*; a native psyllid, *Trioza sp.*, on ohia lehua, *Metrosideros polymorpha*; a eulophid wasp, *Ophelimus sp.*, on eucalyptus, *Eucalyptus spp.*; and, a scale insect, *Tectococcus ovatus* Hempel, on strawberry guava, *Psidium cattleianum*. Assays consisted of choice and no-choice tests. In a

choice test *A. nitens* was given access to choose plants infested by either the target (Erythrina wasp) or non-target gall-former for oviposition and development. In the no-choice test, *A. nitens* was only given the option of utilizing the non-target gall-former as host. At the end of the test, plant was held in a cage to determine if the parasitoid would successfully develop. Several galls from the test plant were dissected to check for the presence of *A. nitens* within the chambers.

Results show that *A. nitens* is host specific with no predilection for the seven non-target gall formers. Although Chinese banyan, Maui pamakani, Hamakua pamakani, eucalyptus, and strawberry guava were visited by the eulophid parasitoid more than once, these visits were deemed incidental or curiosity checks. Furthermore, even if *A. nitens* did parasitize the non-targets, its failure to yield any progeny at all confirmed our findings that none of the gall formers were suitable for its development. *Aprostocetus nitens* is the second natural enemy that will be proposed shortly for biological control of the EGW.

**Fireweed** [*Senecio madagascariensis* Poiret]. Madagascar fireweed or ragwort (Family Asteraceae), a native plant in Madagascar and South Africa, was inadvertently introduced into Hawai'i in the early 1980s from a consignment of carpet grass seeds that originated from Australia. Shortly thereafter, fireweed invaded pastures and range lands on the islands of Hawai'i and Maui. Subsequently, pocket infestations of fireweed were detected on Kaua'i, O'ahu, and Kaho'olawe. More recently, fireweed has been found in much higher elevations such as Mauna Kea and Mauna Loa on Hawai'i Island and Haleakala on Maui. To date, more than 400,000 acres of valuable pasture lands have already been invaded by fireweed on Hawai'i and Maui. On the island of Hawai'i alone, chemical control is estimated to exceed \$11 million if three herbicide treatments were applied on 350,000 acres of pasture lands.

Fireweed is a health hazard to livestock and humans alike because the plant is rich in senecionine, a toxic pyrrolizidine alkaloid which accumulates and causes irreversible damage to the liver. Although fireweed is not a preferred fodder by farm animals, it may be accidentally eaten by grazing animals in pastures or consumed from contaminated feeds. Moreover, long-term exposure to senecionine, a potential carcinogen in humans, may lead to development of cirrhosis in the liver.

The search for the natural enemies of Madagascar fireweed was undertaken in East Africa in 1999. Madagascar and South Africa were selected as the focal points because they were the native origins of fireweed. Phytophagous insects in these regions associated with the fireweed have shown the highest degree of specificity and greatest potential for effective suppression of the weed. Among the biocontrol organisms collected in Africa, the Madagascar moth, *Secusio extensa* (Butler) (Lepidoptera: Arctiidae), is one of the herbivores which



showed promise for biological control of fireweed. The moth larva is a voracious leaf feeder which has a unique ability to defoliate a fireweed plant indiscriminately. In a study conducted in 2009 in an outdoor cage to simulate the feeding damage of *S. extensa*, we found that leaf injury alone had a negative effect on plant productivity.

Test plants where foliage was trimmed by as much as 25, 50, 75 and 100 percent were not only stunted in height but the number of primary shoots produced over a four-week period was two, 12, 34, and 54 percent fewer, respectively, compared with undamaged plants. More importantly, the number of flowers produced by defoliated plants decreased by as much as 44, 78, 95 and 100 percent in response to increasing levels of defoliation. Most noteworthy is our finding that plants that were completely devoid of leaves (100 percent) did manage to produce a few flower buds but which later aborted development. Considering that a fireweed flower produces about 150 seeds or that a plant could yield as many as 30,000 seeds, these findings provided valuable insights on how the *Secusio* moth could potentially impact the fireweed population upon liberation in the natural habitat.

More than 70 species of endemic and naturalized plants in Family Asteraceae were evaluated to determine the host specificity of *S. extensa*. Our findings showed that it is highly specific to fireweed. Occasionally, the moth completed development on a few plants in the Tribe Senecioneae but these plants are noxious weeds with no endemic or native relatives in Hawai'i.

The Madagascar moth, *S. extensa*, is the first biological control agent proposed for release against fireweed. A permit to release *S. extensa* in Hawai'i has been requested from the state and federal regulatory agencies. Meanwhile, pre-release studies of the fireweed were undertaken in FY09 in order to formulate field release strategies in anticipation of the liberation of the biocontrol agent. The study generated information on (a) fireweed phenology (plant life history pattern), (b) ground survey of pest organisms that may have been fortuitously infesting fireweed, and (c) an exploratory study of a commercially available artificial diet for larval rearing of the moth.

Our study on fireweed phenology showed plant events that best describe the developmental stages of the plant. It took approximately two months from the seedling stage before a plant commenced to produce floral buds and blossoms. Then, two weeks later, the flowers assumed a ball-like shape from which seeds developed and later dispersed (often by wind). A month later, senescence, i.e., some leaves and branches in the plant began to dry and fade, set in. The same plant, however, continued to produce flowers and seed. Noteworthy is that barely two months after the plant had seeded, the first crop of seedlings began to appear in the ground. More importantly, this phenological event demonstrated that within six months after the parent plants emerged, the next generation of fireweed had already become established. It is not surprising that to date more than

400,000 acres of valuable range lands have already been taken over by the fireweed on Hawai'i Island and Maui.

A chronological measurement of plant height over time demonstrated the ability of fireweed to grow and crowd out an open space. During its lifetime, a plant could attain an average maximum height of 75 cms. As fireweed grows, more and more foliage and shoots are added thus, making the plant denser and heavier. Subsequently, the plant sags and lodges covering the open space in the ground. The encroaching ability of fireweed is critical in terms of displacing and overcrowding the forage grass in the pasture. Consequently, farm animals are denied access to forage on the grass.

Fireweed is a resilient and persistent weed. Plants grow aggressively and flower profusely then produce seeds when conditions are favorable. However, in an arid habitat, fireweed is present as patches of brown, dry-looking stumps in the pastures. The stumps which may appear dead are likely dormant and ready to bounce back should moisture become available. On the other hand, where rainfall is less pronounced fireweed tends to be stunted and very much suppressed in stature. Nevertheless, the weed compensates for such a hostile habitat by maturing early then producing flowers and seeds shortly. In addition, the plant is scrawnier in stand and foliage is narrower in size. On a wet habitat, fireweed is green, robust, and foliage is much broader hence, ideal sources of food for leaf-feeding insects like the *Secusio* moth larvae.

There is often an overlap in the developmental stages of fireweed in the natural habitat such that seedlings or plants at the vegetative, flowering, or seeding stages may be growing concurrently on the same area. Others, however, may have begun to senesce, dried-up, or could be already dead. The key to the liberation of the biocontrol agent is to locate habitats where the stand of fireweed would provide a good and continuous supply of food substrates for the *Secusio* larvae. The intent is to promote the establishment of "natural field insectaries" from which crops of moths are subsequently produced and spread.

A ground survey undertaken from January to November 2008 on the islands of Hawai'i and Maui showed that the likelihood of finding naturally occurring organisms infesting fireweed is remote. Aphids were found colonizing fireweed on several locations on the islands of Hawai'i and Maui.

At least two different color forms of aphids were recorded on the Big Island. The dark-colored form, tentatively identified as *Sitobion* sp. (Homoptera: Aphididae), was found in Waikii.

The other color form which appeared reddish was observed in North Kohala but has yet to be identified. On the island of Maui, only the dark form was observed on Makawao and Ulupalakua. Nevertheless, the presence of aphids on the different sites did not spread to adjacent fireweed habitats over time. Apparently, the presence of aphids on fireweed is no more than incidental or isolated



in nature. Hence, the impact aphids may have on fireweed would be very minimal or inconsequential.

Another exploration for natural enemies of fireweed was undertaken in East Africa between September to December 2008. As reported previously, one of the intents is to collect another arctiid moth, *Nyctemera apicalis*, in order to replace the colony that was lost earlier in the Insect Containment Facility. However, the search for the insect was unsuccessful. Nevertheless, another fireweed-infesting insect was collected from Cato Ridge, Kwazulu-Natal, South Africa (S 29°43.771, E 30°36.340). It was a tephritid fly that infests fireweed by laying eggs on the flowers. The larvae complete development to adults within the flower heads. Identified as *Trupanea inscia*, it is widespread in South Africa known to utilize various fireweed species of Senecio.

A starter culture of *T. inscia* was initially established in the Insect Containment Facility. At least four successive generations of the fly have been colonized to date. Preliminary information on the biology of the fly indicated that development is completed from as short as 16 d to as long 39 d with a mean of  $26.9 \pm 1.6$  d. Male to female sex ratio is 1:1. Risk assessment evaluation of at least 6 plant species in Family Asteraceae, namely, *Emilia fosbergii* (Tribe Senecioneae), *Crassocephalum crepidioides* (Tribe Senecioneae), *Ageratum conyzoides* (Tribe Eupatorieae), *Verbena enceloides* (Tribe Heliantheae), *Bidens alba* var. *radiata* (Tribe Heliantheae) and *Sonchus oleraceus* (Tribe Cichorieae), indicated that *T. inscia* is highly specific to fireweed and that none of the test plants supported development of the fly.

The fireweed biocontrol project using plant pathogens was initiated when the plants infected with what appeared to be “white rust” or/and “yellow rust” on the leaves, stems or flower heads (of fireweed) were collected near Durban Airport, South Africa by the HDOA’s Exploratory Entomologist in November 2008 and shipped and arrived at the HDOA’s containment facility about a week later. Personnel at the Plant Pathology Containment Facility were able to isolate the spores from the “white” or “yellow” fungal pustules on the infected fireweed tissues and made identifications based on the spores’ morphological features and dimensions. The “white” pustule was determined to be caused by the white rust *Albugo* sp., a member of the Oomycetes, and the “yellow” pustule was caused by the yellow rust *Puccinia lagenophorae*.

Because both imported fungi are obligate parasites, the plant pathology personnel attempted to establish and propagate the fungi on live fireweed plants inside the containment facility, according to published procedures.

1. Establishment of the *Albugo* sp. – Repeated attempts to inoculate leaves of resident fireweeds plants with sporangia isolated from the pustules of infected plants failed. There was no sign of infection on the fireweed leaves after extended incubation period in the humidity

chamber. The sporangia were incubated in a drop of water at different temperatures ranging from 4 °C – 25 °C in microscopic slides, in an attempt to see if zoospores, the infectious stage, were released from the sporangia. No viable zoospores were observed under any of these conditions. It is just believed that the sporangia inside the white pustules of the infected tissues were inactivated during the transit so that the spores were no longer viable. A former plant pathologist who just retired from the Plant Pathology section noted that she also failed to establish the white rust fungus at one point.

2. Establishment of *Puccinia lagenophorae* – *P. lagenophorae* has been tested by the former plant pathologist at the containment facility and found it to be unsuitable as a biocontrol agent because of the extended host range affecting other local economical or native species. However, there are different isolates of the fungus and it is not known if this S. African isolate would behave differently from the Australian isolate, which was used in the former testing. Therefore, attempts were made to establish the African isolate of the rust on resident fireweed inside the containment greenhouse with the purpose of conducting further testing. Inoculation of the leaves of resident fireweeds was successful and the rust was able to maintain itself well. However, the rust itself brought its own antagonist, which inhibits the rust’s growth and development. The antagonist was found to be a *Penicillium* species. The Plant Pathology personnel are in the process of cleaning up the latter so that a pure culture was available for further studies.

**Pickleworm** [*Diaphania nitidalis* Cramer]. In June 2003, the pickleworm (PW), *D. nitidalis* (Lepidoptera: Crambidae), was first found in Hawai’i on Leeward O’ahu. A pest of cucurbit vegetables in southeastern U.S. and the Caribbean, PW is a potential threat to Hawai’i agriculture because the damage inflicted by the larvae reduces the quality and market value of the produce by as much as 30 to 60 percent.

The PW survey supported with federal funds from the USDA- APHIS was undertaken from September 2006 until June 2007. As reported in FY08, PW had spread throughout the island of O’ahu and much of the neighbor islands, including, Kaua’i, Hawai’i and Maui. Ground survey of this nature has been a valuable tool not only in detecting PW infestation but in making predictions about the initial appearance of pickleworm, particularly on the flowers of a susceptible variety, e.g., zucchini. Consequently, this provides an opportunity to institute appropriate control measures before pest commences to tunnel in the fruits and vines of the host crop.

The semi-tropical climate in Hawai’i and the farming practice of cultivating cucurbit crops all year round ensures population outbreaks and continuous abundance of PW. Vegetable growers protect their cucurbit crops by using recommended chemical pesticides to mitigate persistent



infestation of the pest. Nevertheless, the risks associated with the pest developing some resistance to pesticides as well as the negative harm chemicals may cause the environment far outweigh the benefits and short-term returns from using them.

Biological control remains the only environmentally sound option the branch will continue to employ to mitigate the spread and crop damage caused by PW. As reported previously, except for lacewing, a general predator found preying on the larvae, no naturally occurring biocontrol agents of PW were found during our field survey. Nevertheless, overseas exploration for natural enemies of PW are planned in southeast Asia and Latin America where several natural enemies have been reported including Ichneumonid and braconid parasitoids.

**Glassywinged sharpshooter** [*Homalodisca vitripennis* (= *H. coagulata* (Say))]. The complete suppression of the glassywinged sharpshooter in Hawai'i is a classic example of fortuitous biological control by an immigrant natural enemy. The spread of a mymarid parasitoid, *Gonatocerus ashmeadi* Girault, in 2005 – 2006 resulted in a rapid decline and decimation of the pest population. To date, the pest could hardly be detected in the host habitat. Deemed completely controlled, the potential threat it once posed to Hawai'i agriculture and environment has been averted.

**Papaya mealybug** [*Paracoccus marginatus* Williams and Granara de Willink]. First detected on Maui, the papaya mealybug (PM) spread to neighboring islands of O'ahu, Hawai'i and Kaua'i. Shortly thereafter, PPC facilitated importation of natural enemies from a USDA rearing facility in Puerto Rico for biological control of the pest. At least three parasitoids were colonized at the HDOA Insect Containment Facility and initial risk assessment evaluation was commenced. Field surveys were undertaken to scout for naturally occurring organisms that may be impacting the pest population.

The frequency of pest calls received by PPC in relation to papaya mealybug (PM) infestation has continued to decline substantially. As reported previously there was a complex of naturally occurring natural enemies of the pest that has continued to impact the pest population. These included predaceous predators, brown lacewing, syrphid larvae and coccinellid beetles. More importantly, the parasitoid *Anagyrus joeckii* Noyes, one of several effective natural enemies of PM which had immigrated to Hawai'i together with the PM had been successfully established and is now widespread in the natural habitat.

**Little Fire Ant** [*Wasmannia auropunctata* (Roger)]. Personnel of the Chemical/Mechanical (CM) Control Section continued surveying nurseries on O'ahu for the presence of little fire ant (LFA). CM personnel have also surveyed ports and areas of high risk on the islands of Moloka'i, Lana'i, and Kaua'i. No detections of LFA have been made on Moloka'i, Lana'i, or O'ahu to date. CM staff continued to monitor and treat infestations of the LFA at

one location on the Island of Kaua'i. On Hawai'i Island, CM staff continued to assist nurserymen in detecting LFA and training nursery personnel to detect and treat infested property. Calls to the HDOA from residents in West Hawai'i are screened and personnel are dispatched as needed to verify non-presence of LFA in West Hawai'i. (LFA was detected in West Hawai'i in January 2010.) Chemical trials continued to be conducted jointly with UH-CTAHR-PEPS researchers to find effective insecticides for use at various LFA infestation sites, including plant nurseries, residences, golf courses, pastures, and fruit and nut orchards.

HISC funding was provided to the HDOA for the hiring of an invasive ant specialist. This position was designed to implement the Hawai'i Ant Plant. Components to be addressed by the position included prevention of movement of LFA as well as prevention of the entrance of Red Imported Fire Ant into Hawai'i, improving detection systems for invasive ant species throughout the state, and improve control programs for LFA within the state. The Invasive Ant Specialist was hired with HISC funds in January 2009. Since then additional funding has been secured through HISC and other extramural funding sources to keep this position active until July 2012.

Prevention activities have focused on preventing the spread of LFA both within East Hawai'i; from East Hawai'i to West Hawai'i; and to other islands. Ant awareness presentations were made by HDOA staff to the Big Island Invasive Species Committee, Kaua'i Invasive Species Committee, Hilo Master Gardeners, Kona Farm Bureau, Customs and Border Protection Honolulu, and UH-CTAHR Cooperative Extension Service - Kona.

A prevention and control workshop was delivered to the Big Island Association of Nurserymen in order to raise awareness of the impacts of invasive ants, the ease by which they can be trans-located via the sale and movement of potted plants, as well as training in survey methods and quarantine treatments of potted plants.

In April 2009, LFA were discovered at the county green-waste facility in Hilo. Green waste is chipped and distributed as mulch throughout east Hawai'i, and therefore the site posed a risk of vectoring the spread of this species. HDOA worked closely with the county and its contractor to develop a management plan that minimized the risk of further spread, provided training to contractors and assisted with ongoing survey activities.

Standardized survey protocols have been developed to allow consistent surveys to be carried out statewide. These protocols were used in early detection surveys for invasive ants at Hilo sea port, Hilo Airport and Kona airport. These surveys did not identify new ant species. This protocol has been adopted by other agencies and is currently in use for their detection programs. These agencies include HDOA's Cooperative Agriculture Pest Survey program which is funded by the USDA-APHIS.



Ant identification services have been provided to homeowners, residents, Kaua'i and Big Island Invasive Species Committees and the University of Hawai'i. These services include responses to the many calls received by HDOA offices state wide on a daily basis by residents affected by LFA or suspected LFA in their homes.

In addition, detection training has been provided to the following organizations:

- UH-CTAHR - Cooperative Extension Service Kona
- Master Gardeners, Hilo
- County of Hawai'i refuse contractors
- Kona Farm Bureau
- Big Island Association of Nurserymen
- Hawai'i Bamboo Society
- Hawai'i County Parks and Recreation seniors group
- HDOA pesticide inspectors
- U.S. Customs and Border Protection
- Kaua'i Invasive Species Committee
- Big Island Invasive Species Committee

An emergency response plan for new invasive ants has been developed in order to facilitate a rapid and cohesive response to incursions of new invasive ants into Hawai'i.

One of the major hurdles for effective control of LFA has been the lack of suitable baits that can be used in trees and vegetation. Two research projects have been initiated, one to identify new treatment chemicals, and another to develop application tools that simplify applying baits to taller trees. From this research two new bait formulations have been identified that show great promise for arboreal ant control. Additionally, two new application tools have been developed that allow applicators on the ground to apply bait on trees up to twenty feet high. This research has been published in the Proceedings of the Hawaiian Entomological Society journal.

Ants have begun to invade the Hilo urban area and as a consequence, many homeowners and residents are being stung in their homes as well as their yards. Two information sheets have been developed that provide clear advice to residents on control methods, which chemical products to purchase and how to apply them in an integrated control approach.

Recently, LFA have been discovered on Maui. HDOA has been active in conducting a treatment program and collaborating with the County and the Maui Invasive Species Committee to develop a holistic approach to managing the incursion and raising public awareness. Treatment of the affected site has commenced and an operational plan for eradicating LFA has been developed.

### New Pest Detection and Identification

#### Insects and other Arthropods

The HDOA Taxonomy Lab identified 609 samples of insects and other organisms. 478 specimens were added to the branch's Zoological Reference Collection. The collection now contains approximately 166,800 specimens. In addition, 564 samples of insect interceptions were identified for PQ and 480 calls regarding various pests from the general public were processed.

Eight newly established insects were recorded during the year. These were:

**Banded Cucumber Beetle**, *Diabrotica bateata* Leconte (Coleoptera: Chrysomelidae). Specimens of these agricultural pests were collected between the Kahului Airport and Kanaha Beach Park in wetland areas. The beetles have been noted to be feeding on *Bocopa monnieri*. The beetle is a serious agricultural pest in other parts of the world, feeding on a wide range of host material including but not limited to cucurbits. The Hawai'i populations have only been found to feed on *B. monnieri*. Multiple adult generations have been observed indicating this species is established on Maui, but egg, larvae, and pupae have not been detected.

**Rough Sweet Potato Weevil**, *Blosyrus asellus* (Olivier) (Coleoptera: Curculionidae) Specimens of this agricultural pest were originally sent to the University of Hawai'i Insect Diagnostic Clinic in November 2008. The specimens were collected as grubs damaging tubers of Okinawan sweet potato in Waipio. The adult insects were identified by Bishop Museum coleopterist Al Samuelson. The species appears to be limited to O'ahu but widespread on that island based on surveys conducted in sweet potato growing areas throughout the state.



*PPC taxonomist, Bernarr Kumashiro, makes the identifications of pests that are intercepted or found in Hawai'i.*



**Naio thrips**, *Klambothrips myopori* Mound and Morris (Thysanoptera: Phlaeothripidae) A researcher with the University of Hawai'i submitted galled leaves of naio, *Myoporum sandwicense*. The galls were found to be caused by a thrips species which was identified by California Department of Food and Agriculture as *Klambothrips myopori*. Subsequent statewide surveys by PPC revealed that the naio thrips is infesting West Hawai'i, extending from South Kohala to North Kona. Chemical treatments were developed in conjunction with the University of Hawai'i. HDOA is working in collaboration with the Department of Land and Natural Resources (DLNR) to detect any range expansion of this damaging pest from landscape areas into native plant habitat. Both HDOA and DLNR are seeking extramural funds for survey programs and to begin biological control work on this important pest species.

**A weevil**, *Apotomorphinus cribratus* Boheman (Coleoptera: Curculionidae). Adult specimens of this weevil were collected on a native Hawaiian shrub, *Myoporum sandwicense* (naio) at Pearl City Urban Garden Center, O'ahu, in May 2009. Adults have been observed feeding on the nectar of naio flowers, mating, and flying short distances. Subsequent surveys in August 2009 revealed its presence on Java plum, *Eugenia jambolana*, at additional sites on O'ahu. Eggs and larvae were also found in ripe Java plum fruit. This weevil is known from India, where its natural host is Java plum.

**A flower fly**, *Ocyrtamys dimidiatus* Fabricius (Diptera: Syrphidae). Specimens were collected in the Pawa area on O'ahu in December 2008. *O. dimidiatus* is common throughout the neotropics. Adults are flower feeders and larvae are generalist predators of many homopterans.

**An ant**, *Tetramorium lanuginosum* Mayr (Hymenoptera: Formicidae). Specimens of this ant were first collected in Honolulu in the Matson shipyard area in July 2008. Thought to be of Asian origin, *T. lanuginosum* are now widespread throughout the world, most likely because of human commerce activities.

**Fig wax scale**, *Ceroplastes rusci* (Linnaeus) (Hemiptera: Coccidae). A single specimen of this scale was first collected from a Macarthur palm (*Ptychosperma macarthurii*) leaf in March 2008 in Honolulu. Additional specimens were subsequently collected from *Alpinia* sp. leaves and stems in May 2009. This scale is a well known pest of figs in the Mediterranean region and is known to attack plants from at least 21 different families and other fruit crop species such as citrus, banana, mango, soursop, longan and coconut. In the U.S. it was first found in Florida in 1994 and 1995. It now has broad distribution including the Oriental, Ethiopian, Neotropical and Palearctic regions.

**An armored scale**, *Fiorinia phantasma* Cockerell and Robinson (Hemiptera: Diaspididae). Specimens of this scale were collected in Hawai'i Kai, O'ahu, in November

2008. This collection represents a new Hawai'i and new western hemisphere record. Specimens were subsequently collected from privet, *Ligustrum* sp., also on O'ahu.

#### **Plant Pathogens**

The HDOA Plant pathologist diagnosed 510 plant disease samples intercepted by the PQ inspectors and 47 local samples collected by staff or submitted by the public. About 35 percent of the PQ samples contained plant pathogens not known to occur in Hawai'i. Staff also reported the detection in the State of three new plant diseases, an unconfirmed report of one, and the resurgence of another. These were:

**A viral disease of sweet potato**, *Ipomoea batatas* Lam., caused by *Sweet potato virus G* (SPVG), was detected for the first time in Hawai'i. This disease has a world wide distribution. SPVG infected sweet potatoes are symptomless, and consequently, such tubers are likely to be the avenue of spread to many regions of the world. The economical importance of the virus is not yet known, but in one study, co-infection of SPVG with another virus, *Sweet potato feathery mottle virus* (SPFMV) reduced yield of sweet-potato cv. Beauregard by 14 percent, even though lone infection with either virus caused no significant yield loss. Therefore, there is a need to determine the economic significance of SPVG in view of its presence within many sweet-potato growing areas of the world.

**A Leaf Rust Disease of blueberry**, *Vaccinium corymbosum* L., caused by the fungus *Pucciniastrum vaccinii* (G. Wint.), was reported for the first time on blueberries at Waimea, HI by USDA-ARS and University of Hawai'i – Manoa plant pathologists at Hilo. *P. vaccinii* caused lesions on blueberry leaves that began as chlorotic flecks but later expanded and developed into reddish brown, necrotic spots with a chlorotic halo. In the course four months, yellowish orange pustules containing urediniospores first appeared on the abaxial side of older leaves and later on the new leaves. Defoliation occurred on plants where infection was severe, posing threats of yield losses on susceptible cultivars.

**A Late Leaf Rust (LLR) Disease of red raspberry**, *Rubus idaeus* L., caused by the rust fungus *Pucciniastrum americanum* (Fart.) Arth., was confirmed to occur in the state by the mycologists at the USDA-APHIS National Mycology Laboratory (NML) at Beltsville. The rust, first reported by a raspberry grower at Hilo on several of his red raspberry cultivars and samples, can infect various tissues of susceptible raspberry plants, including fruits, inflicting economic losses. As a preventive measure, the grower was advised to eradicate all his infected raspberry plants, since the status of the rust's distribution in other parts of the state is not known. Previously, the rust occurred only in the temperate provinces or states of Canada and the U.S.



**A Leaf Spot Disease of Maile, *Alyxia oliviformis* Gaud.,** caused by the fungus *Mycosphaerella alyxiae* was detected for the first time by a USDA -APHIS-PPQ inspector at Hilo Airport, on Maile leis being shipped from Hawai'i. The seller claimed that the infected lei materials were from the Kulani Forest Area in Waiakea Forest Reserve on the Big Island. This has not been confirmed. So far, the HDOA Plant Quarantine inspections has intercepted the fungus only once on maile imported from the Cook Island, and nobody else has reported the fungus since it was first found associated with *Alyxia buxifolia* in New South Wales, Australia on April 14, 1951. Consequently, at present, it is unconfirmed whether or not the disease is established in Hawai'i.

**Outbreak and eradication of Maize Chlorotic Mottle Virus (MCMV) on corn (*Zea mays* L.) fields in Kaua'i and O'ahu**

In the spring of 2009, there was an outbreak of maize chlorotic mottle virus (MCMV) in the corn fields of western Kaua'i after 20 years of dormancy. Shortly afterwards, the virus was also found on some corn fields in Waialua, O'ahu. The resurgence and spread of the virus beyond Kaua'i was of great concern because, in addition to MCMV's own damage, its mixed infections on corn plants with Wheat Streak Mosaic Virus or Maize Dwarf Mosaic Virus (that is already prevalent in the areas) can result in the Corn Lethal Necrosis disease, inflicting much more severe economic damages.

In addition, MCMV's occurrence was a serious international quarantine concern because countries in South America such as Argentina, where local corn companies conduct their additional rounds of corn seed productions in the winters, have zero tolerance for MCMV. Therefore, the companies joined force to eradicate MCMV from the islands by destroying the corn fields associated with positive finds. Thus far, the measure was successful on the island of O'ahu where the virus was newly found but not at Kaua'i where the virus was found years earlier. The viruses haven't been detected beyond the initial finds on O'ahu but still tested positive in some of the summer and winter crops at Kaua'i. At the moment, the companies are trying to contain the virus' spread from Kaua'i, where they are still trying to figure out the inoculum source for the virus as well as the vectors involved.

MCMV is also common in the corn growing areas of Kansas and Nebraska. Hosts of the virus include corn, sorghum, wheat, barley, rye, Johnsongrass, Teosinte, and several other native grass species. On the mainland, MCMV is vectored by several species of beetles and can be mechanically or seed transmitted, but on Kaua'i, thrips were associated with its outbreak 20 years ago. Initial symptoms on susceptible corn plants (hybrids or inbreds) appear as fine chlorotic stripes that run parallel to the leaf veins. Over time, the stripes merge, producing long chlorotic blotches (mottling) followed by necrosis. Affected leaves curl downward in the later stage of infection. Other symptoms include stunting, distorted tassels and decreased ear production.

**PLANT QUARANTINE BRANCH**

**Carol Okada, Manager**

The fiscal year started with the passage and enactment of the Biosecurity Act (Act 236, Session laws 2008). Upon enactment, the Biosecurity program that was initiated in 2006 became codified by law. Also enacted was the Pest Inspection, Quarantine and Eradication fund, which was established to fund the implementation of the Biosecurity program. During difficult fiscal times, this fund can be utilized to maintain core functions, as was seen towards the end of the fiscal year. The objectives of the biosecurity program are:

1. Establish a multi-dimensional system to prevent the entry into the State and interisland movement of pests and prohibited or restricted organisms without a permit; and
2. Respond effectively to eradicate, control, reduce and suppress incipient pest populations and established pests and seize and dispose of prohibited and restricted organisms without a permit.

Several actions were taken to achieve these objectives. Specifically the branch initiated:

- Improving cargo inspection and capabilities and methods, including enhancement of the content and submission requirements for electronic *manifests*;
- Perform *commodity risk assessments* to determine high, medium, and low-risk levels of agricultural products being imported into the State; and
- Develop and implement post-entry measures to suppress pests under *pest management programs*; and establish *incident command system* for emergency outbreaks.

**Electronic Manifest System**

The Import Manifest System allows the department to prioritize inspection prior to importation enabling the Plant Quarantine Branch (PQ) to utilize staffing more effectively. For maritime carriers, the manifest system allows for containers that are currently held at the docks for agricultural inspection to leave the docks sooner thereby alleviating congestion. Inspection will be done on-site or at destination for high- and medium-risk commodities depending on commodity allowing for better detection of pests. Low-risk commodities will be randomly selected for inspection.



# BIOSECURITY

**The Biosecurity program changes Plant Quarantine from a one dimensional focus to four basic program segments with multiple layers. In the past, we focused 90% of our resources on port-of-entry inspection. Now, our program segments incorporate:**

- Pre-entry inspection/treatments at the source (farm)**
- Port-of-entry inspection utilizing joint-inspection facilities**
- Post-entry detection, rapid response, control and eradication**
- Growth of agriculture to reduce the dependency on imports**

## Commodity Risk Assessments

Commodity risk assessments were performed as part of a series that will be done during the 2010 and 2011 fiscal years (one each quarter for two fiscal years), which will provide essential data necessary to implement HDOA's "Electronic Direct Release Program," which works in conjunction with the electronic manifest system.

The objectives of the commodity risk assessments were:

- Determine high, moderate, and low-risk agricultural imports by the number and kind of insects and diseases collected on the commodity;
- Compare insects and diseases found on domestic (mainland) versus foreign imports; and
- Determine the seasonality of insects and diseases found on the agricultural commodities.

Inspection procedures were carried out by inspecting 100 percent of at least one parcel of each commodity in each shipment. The commodity was removed piece by piece from its parcel and thoroughly inspected for any pests. Inspections of more parcels of the same type and shipment were done if insects, animals, or disease symptoms were found. All samples collected were prepared for shipment to Plant Quarantine on O`ahu for specialist identification.

## Pest Management Program:

In response to the possible embargo of Hawai`i agriculture products, certified nurseries were notified to develop Pest Management Programs (PMP) to reduce quarantine pest populations in the nursery premise. The objectives of the PMP are to: create and enforce a uniform certification program statewide; assist nurseries to meet "certified nursery standards; and provide post-harvest treatments to ensure "pest-free," yet quality commodities for export.

To prototype the system, PQ personnel provided assistance to a certified nursery to install a coqui frog barrier around his certified nursery. The nursery purchased the materials for a coqui frog barrier however did not have the resources to install the barrier. The coqui frog barrier was installed around the certified greenhouses by PQ personnel. After completion of the coqui frog barrier, treatments of orchid plants were conducted and effectiveness of the barrier to prevent re-infestation of certified area by coqui frogs will continue to be monitored. Preliminary finding indicate that it does lower the amount of re-infestation. However, prevention or exclusion is still the most cost-effective option for the coqui frog problem in certified nurseries.



*PQB Inspectors Mike Miyashiro, Stacey Chun, and Andrea Kawabata attach the frog-proof screening to the barrier supports.*



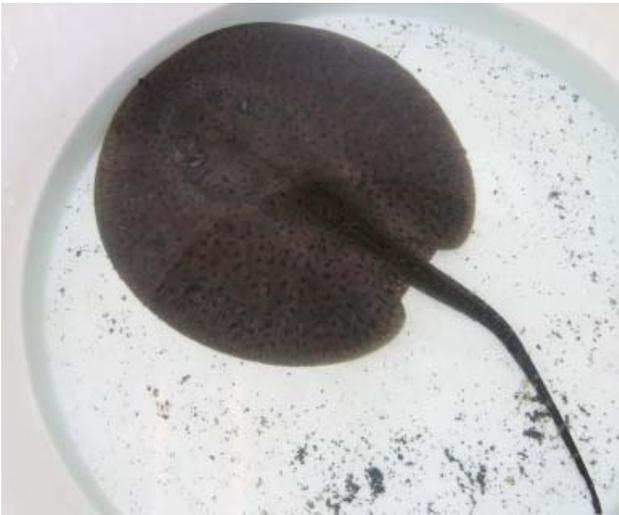
**Completed coqui frog barrier surrounds the certified nursery area.**

**Incident Command System**

Incident Command System (ICS) is a standardized management concept tool, designed to allow responders to any incident the ability to form a scalable, flexible organization structure which promotes the effective communication and planning required in resolving the incident. The base design of the organizational structure may appear complex, but the flexibility of ICS makes allowances for reduction or expansion of the overall structure form.

The standardization of ICS allows for personnel with limited or complete lack of experience to participate in the organizational structure and make contributions to the resolution of the emergency.

In FY08, HDOA personnel were introduced to the Incident Command System (ICS). In FY09, we have used the system for small and large rapid response operations. Used initially for snake sightings, the system is now being utilized for pest reports such as varroa mite and coqui frog reports on O`ahu.



**Program Updates:**

**Biotechnology Program**

Biotechnology program goals are to:

- Protect Hawai`i from the release of USDA regulated Genetically Engineered (GE) organism into the environment that may have a detrimental impact on the environment and/or natural resources.
- Insure containment of pollen of USDA regulated GE plants from native species, endangered species, weeds and other types of plants.
- Monitor and inspect USDA regulated crops on a regular basis to ensure they are in compliance with regulations.
- Work with industry, researchers, and the general public about concerns relating to GE crops in Hawai`i.

PQ uses a Geographical Information System (GIS) in monitoring regulated plantings. GIS is used to track the location and determine the acreage of each planting of a notification or permit. GIS also assists us with the protection of endangered species. If there is a species of concern near the proposed planting site, then that will be taken in consideration in approving the field release.

**Animal Confiscations**

The following notable enforcement actions involving invertebrate and aquatic biota were also taken during the 2009 fiscal year:

- On September 22, 2008, Oahu inspectors confiscated and destroyed one parcel containing twelve live bloodworms (*Glycera americana*) from a passenger arriving from San Francisco. Bloodworms are on the prohibited list of animals.

**Left: One of three freshwater stingrays (*Potamotrygon sp.*) intercepted and confiscated.**



**There were 32 pest reports for snakes. Among these, two snakes were recovered from a Kaimuki house, a Hybrid King Snake, *Lampropeltis getulus* (left) and a South American Tree Boa, *Corallus hortulanus* (right).**

- On October 9, 2008, a shipment consigned to a Wailuku business was intercepted at Federal Express in Kahului, Maui, which was found to contain a total of 17 juvenile piranhas (*Serrasalmus* sp.). The shipment was confiscated and the prohibited fish were destroyed.
- Throughout the month of February, the following were intercepted and destroyed: one lot, one parcel containing Shijimi Clams (*Corbicula* sp.), which is prohibited from entry; one lot, one parcel containing one Emerald Crab (*Dromidiopsis edwardsi*), which is an unlisted species, and is therefore, prohibited from entry; one lot, one parcel containing several prohibited fishes for a private individual, which included three turkeyfish (*Lo vulpinus*), three weedy scorpionfish (*Rhinopias frondosa*), one short dragonfish (*Eurypegasus draconis*), and one reef stonefish (*Synanceia verrucosa*); one lot, one parcel containing a giant clam (*Tridacna* sp.) and a lionfish (*Pterois* sp.) for a private individual, which is prohibited; one lot, one parcel containing one black lionfish (*Pterois volitans*), and one banded cat shark (*Chiloscyllium punctatum*), which are prohibited for private possession; one lot, one parcel containing two fairy shrimps (*Anostraca* sp.), without a valid import permit; and one lot, one parcel containing one live conch (Strombidae).
- Throughout the month of March, the following were intercepted and destroyed: one lot, one parcel containing 30 of the albino-form of the red tailed catfish (*Phractocephalus hemiliopterus*), which are prohibited; one lot, one parcel containing various catfishes (*Pseudoancistrus* sp, *Ancistrus ramunculus*, *Hypancistrus* sp.), which are unlisted and therefore prohibited; one lot, one parcel of snail shrimp (unknown species), which is prohibited; one lot, one parcel containing two red tailed catfish (*Phractocephalus hemiliopterus*), which is prohibited; one lot, one parcel containing the loricarid catfish (*Hypostomus unae*), which is not on the conditionally approved list of animals; one lot, one parcel of live shrimps (unknown species); and one lot, one parcel containing three freshwater stingrays, which are prohibited.
- Throughout the month of May, the following were intercepted and destroyed: one lot, one parcel containing one Sebae anemone (*Heteractis* sp.) and one giant clam (*Tridacna maxima*), which is prohibited for private possession; one lot, one parcel containing one snowflake eel (*Echidna nebulosa*), which is prohibited from entry; one lot, one parcel containing live coral (unknown species), which is prohibited for private possession; and one lot, one parcel containing 51-pounds of crayfish (unknown species).
- Throughout the month of June, destroyed two lots, two parcels containing 20 Hornet Tiger tilapias (*Tilapia* sp.) and 50 Tiger Botias (*Botia hymenophysa*) without a valid import permit; and one lot, one parcel containing 30 crayfishes without a valid import permit. Also, refused entry of one lot, four hermit crabs (unknown species), which is a prohibited entry.



QUALITY ASSURANCE DIVISION



John Ryan, Ph.D.  
Administrator

The Quality Assurance Division consists of two branches, the Commodities Branch and the Measurement Standards Branch. The branches provide services and enforce laws that help to improve the market quality of agricultural commodities, promote fair trade and honest business practices, and maintain stability in the dairy industry.

COMMODITIES BRANCH

Jeri Kahana, Manager

The Mission of the Commodities Branch is to “Set the Standards” and provide assurance that standardized, high quality, safe, and authentic Hawai`i agricultural products can be showcased in Hawai`i as well as throughout the world market through a fair and just agricultural business climate.

The Commodities Branch enhances the economic stability of Hawai`i’s agricultural industries by maintaining grade standards for locally produced fruits and vegetables, nuts, coffee, flowers and foliage, processed foods and other agricultural products. The branch provides unbiased, professional, and timely service-for-fee grade, condition, and origin certification and food safety audits, to add value and desirability to agricultural products. Under federal-state cooperative agreements, the branch provides federal certification for fresh and processed fruits and vegetables, eggs, seafood, and meat, which may not otherwise be available to local clients, as well as state certification for origin and quality of green coffee, and origin of certain products.

The branch provides just and unbiased enforcement to assure safety and fair business dealings in agricultural products, to protect the agricultural community as well as the general public.

The branch administers laws and rules pertaining to fresh fruit, vegetable, coffee, egg labeling and advertising; minimum export quality; licensing of dealers in agricultural products; certificate of ownership requirements on the movement of agricultural commodities to deter agricultural

theft; and sampling and testing of animal feed for label guarantee and adulteration.

The branch’s Milk Control Section regulates and maintains the stability of the dairy industry in the Honolulu and Hawai`i milk sheds by licensing producers and distributors of milk, establishing milk production quotas, setting minimum class 1 price paid to dairy producers, and conducting retail milk surveys and inspections. This special funded section is entirely self-funded through license fees assessed to milk producers and processors.

Listed below is a brief overview of developments that have impacted the branch’s activities (See page 63 for a detailed table of activities):

- Due to the closure of the state’s last pineapple cannery operation, the branch no longer conducts certification of canned pineapple products.
- Under a cooperative agreement with the U.S. Department of Agriculture (USDA), Agricultural Marketing Service the branch conducted Country of Origin Labeling audits at retail establishments on fresh fruits and vegetables, meat, fish, and shellfish products.
- Continued fee-for-service papaya non-transgenic testing program utilizing the “Identity Preservation Protocol” program for tighter control of non-transgenic papayas that are exported to Japan. Over 1.8 million pounds of papayas were checked and more than \$30,000 in fees were assessed during the year.
- Staff attended fresh fruits and vegetables, coffee, eggs and dairy industry meetings and conferences; and participated in “Island Fresh Buy Fresh Buy Local” promotion program.
- Celebrated “June is Dairy Month” by participating in Island Fresh milk promotion program to increase public awareness on importance of buying Island Fresh milk.
- Hosted supervisory visits by USDA official from the Poultry Programs.
- Attended meetings with the coffee industry to discuss coffee-grading certification and origin verification to ensure the quality of coffee being certified originated within the respective growing districts.
- Food safety coaching provided by the University of Hawai`i, College of Tropical Agriculture and Human Resources, contributed to an increased number of food safety audits conducted by the branch. A total of 41 food safety audits at farms, distributors, packing warehouse facilities were conducted.



- Staff inspected increased volume of fruit and vegetable inspections due to Defense Commissary Agency (DECA) implementing the use of a prime vendor for commissary orders.
- Increased number of fields of seed corn being planted attributed to a greater volume of seed corn certified by the branch.
- Branch fee assessments collected totaled \$778,439; approximately 2.2 percent greater than last year.
- The branch received and analyzed 217 packages for compliance with Hawai'i Package and Labeling laws.
- The compliance rate for stores inspected for price verification was 86 percent.

### MEASUREMENT STANDARDS BRANCH

**William Pierpont, *Manager***

The Measurement Standards Branch works to protect consumers, businesses, and manufacturers from unfair practices, based on a measurement process or subject to a standard of quality. The goal is to minimize losses and inaccuracies due to incorrect or fraudulent commercial measuring equipment, processes, or substandard products.

The Standards and Technical Services Section assures that state measurement standards conform to national standards. It performs metrological calibration of the enforcement standards used by the branch and the field standards used by registered service agencies in testing, repairing, and calibrating commercial devices.

The Standards and Trade Practices Enforcement Section has the responsibility of assuring the consumer that transactions involving measuring instruments, labeling, content of packaged commodities, and pricing are accurate and fair to all parties.

Listed below is a brief overview of the branch's activities (See page 63 for a detailed table of activities.)

- The State Metrologist received advanced training and certification from the National Institute of Standards and Technology (NIST).
- The metrology laboratory received re-certification by the National Institute of Standards and Technology.
- The metrology laboratory inspected and calibrated 178 mass test standards, 531 mass enforcement standards, and 886 field standards for service agencies conducting business in the State of Hawai'i.
- The metrology laboratory inspected and calibrated 10 volumetric test standards, nine volumetric enforcement standards, and 29 volumetric field standards for service agencies conducting business in the State of Hawai'i.
- The branch received and investigated three odometer complaints.



## AGRIBUSINESS DEVELOPMENT CORPORATION



**Alfredo Lee**  
*Executive Director*

**The Agribusiness Development Corporation (ADC) was established pursuant to Act 264, SLH 1994 to coordinate the development of Hawai'i's agricultural industry and to facilitate its transition from a dual-crop (sugar and pineapple) industry to a diversified, multi-crop and animal industry. One of ADC's major goals is to preserve agriculture land and infrastructure abandoned by former plantations for current or future agriculture use. For administrative purposes, ADC is attached to the Hawai'i Department of Agriculture (HDOA).**

The ADC is headed by a board of directors consisting of eight private-sector members appointed by the governor and three ex-officio members to include Chairperson of the Hawai'i Department of Agriculture, Chairperson of the Department of Land and Natural Resources (DLNR), and Director of the Department of Business, Economic Development and Tourism (DBEDT).

Board members: Wayne Katayama (Chair), Robert Sutherland (Vice-Chair), Robert Osgood, Robert Cooper, Christine Daleiden, Duane Lau, David Rietow, Brian Suzuki, Sandra Kunimoto (Ex-Officio), Ted Liu (Ex-Officio), and Laura Thielen (Ex-Officio).



The following summarizes ADC's various projects and activities during FY09:

### **Kekaha Agricultural Lands and Infrastructure**

A strong Kona weather system brought heavy showers and thunderstorms to Kaua'i and O'ahu in mid-December 2008. Record rainfall came down in a very short period of time and the Kaua'i Civil Defense authorized opening of all the drains on the west side of Kaua'i. The water level at the Kawaiiele pump station was recorded at +5 feet mean sea level, or seven feet over the normal level. All six pumps at the Kawaiiele and Nohili pumping stations were put into operation. There were widespread damages to the cane haul roads, three small reservoirs on the Mana plain, and intake structures of the Kokee ditch. Fortunately both ADC and Coop contractors had recently dredged and cleaned the drainage canals at the Pacific Missile Range Facility (PMRF) and around Kekaha Town. There were no reported damages at PMRF and from Kekaha residents. DLNR ordered closing of the nearby Polihale road, a public road cutting through the farming area, until further notice.

In September 2008, Gay and Robinson (G&R) announced that it was exiting the sugar business but would continue to negotiate with Pacific West Energy, LLC regarding ethanol production using its land and its Kaumakani plant. In November, ADC was given notice to terminate revocable permit S-7290 which was initially issued by DLNR for G&R to farm at Kekaha. About 544 acres of former sugar land on the Mana plain was returned to ADC.

Although no longer having G&R as a partner, Pacific West Energy has continued to express interest to license all available ADC land, both on the plain as well as on the slopes. Similarly a company interested in doing a biomass project has expressed interest to DHHL, DLNR, and ADC their desire to license or lease all available state land on Kaua'i for their project.

In a flood meeting convened by Kaua'i Mayor Bernard Carvalho, Jr., it was decided that the water level near Kekaha piggery area needed to be maintained and lowered in order to protect the town from flooding. ADC took action to work with the Kekaha Agriculture Association on a project to replace the antiquated "King Kong" pump with a new vertical pump at a more strategic location. In the meantime, ADC continues to work with CTAHR to isolate the piggery waste from the irrigation system.

In April 2009, Sunrise Capital LLC, an aquaculture tenant with 438 acres of land on permit and also a tenant at the HDOA Ag Park, was bought out by Integrated Aquaculture International. It is believed that under new management this company will have the technical and production expertise to move forward to become a major player in the aquaculture industry. At its June 24, 2009 meeting, the ADC Kekaha Committee consented to the transfer of ownership.

**Left: An old flume was replaced with PVC piping in Pahala, Ka'u, Hawai'i Island.**



**Above: O'ahu Reservoir 155 of the Waiahole Water System**

In September 2008, ADC finished a three-year contract with the U.S. Navy to operate and maintain the Kawaiele and Nohili pump stations and the related drainage canals. ADC was awarded a new five-year contract with a similar scope of work.

**Waiahole Water System (WWS)**

The same weather system that hit Kaua'i in mid-December 2008 also brought heavy rainfall on O'ahu. Central and west O'ahu were affected the most on December 11, as many stream flow gages set new records and over 10 inches of rain were recorded at numerous locations in less than eight hours. Two wooden flumes carrying storm water over the ditch collapsed and a few others were damaged. Gratings on one of the siphons and a gate were damaged. The Kunia section of the ditch was at maximum capacity (about 50 mgd) as storm water entered the ditch at various key locations. Fortunately reservoirs 225 and 155 did not sustain any damage. After assessing the water flow volume under such an extreme storm event, ADC installed two 36-inch culvert pipes downstream from Reservoir 155 to facilitate the draining of storm water into the ravines.

ADC was informed by DLNR that the pending transfer of the Kahana and Waiahole land parcels on windward O'ahu, previously leased to O'ahu Sugar Company, was not able to move forward because these were conservation land and only DLNR could manage conservation land. Subsequently, ADC agreed to take on an easement for these parcels.

The transition from pineapple to diversified agriculture was at its final phase as all but one of the Campbell land parcels in Kunia, previously farmed by Del Monte were sold. New landowners in the WWS's water distribution footprint include Monsanto, Pioneer, Hawai'i Agriculture Research Center (HARC), Ed Olson Trust, Syngenta, and Fat Law's Farm. Further up north near Schofield Barracks, two of the parcels were sold to Actus/Army Hawai'i Family Housing. Pioneer finished construction of their office and research buildings last year while HARC and Monsanto have construction projects at various stages of completion. In a few years it is expected that over 1,000 people will be working in the Kunia area at the various agribusinesses.

With the month of December 2008 being an exception, O'ahu rainfall had been below normal during this year. As a result demand for irrigation water remained stable and slightly above average.

The Reservoir 225 and 155 lining project, a 65/35 cost-sharing project between the U.S. Army Corps of Engineers (USACE) and the Department of Agriculture, the local sponsor, has been delayed due to cost escalation and dam safety issues. The project was further complicated as several items listed in the Phase I report on Reservoir 155, a regulated dam, needed to be addressed before the lining project can proceed. Because a permit had been issued by the Commission on Water Resource Management (CWRM) to account for the ditch's system loss, ADC was required to go through a ground water use permit modification process. An extension of the lining



project deadline was put on hold until ADC could present to the CWRM with an alternative plan to address system loss and to request a timeline from the USACE.

ADC offered comments to the Koa Ridge subdivision project environmental impact statement. A major concern to ADC is the potential loss of water delivery revenue as the land will be taken out from agriculture production. Another concern is safety as the ditch will run through the residential subdivision, similar to the setup at Mililani.

#### **East Kaua`i Irrigation System**

ADC continues to assist the East Kaua`i Water Users Cooperative to operate and maintain their irrigation system with a \$50,000 contract.

#### **East Kaua`i (Kalepa) Land**

In May 2008, the Board of Land and Natural Resources approved the issuance of a revocable permit to Green Energy Team LLC (GE) and the re-issuance of new revocable permits to members of the Kalepa Coalition (all other tenants) with reduced acreage. Under this arrangement the 1,000 acres for GE would come from an acre reduction agreement amongst the existing revocable permit holders. It was agreed that a map with new boundary lines would be drawn up by the Kalepa Coalition and forwarded to the DLNR Land Division staff to initiate the process. GE would plant eucalyptus trees for energy production and agreed to harvest existing, wild albizia trees for the other tenants. It was also agreed among the permit holders that GE would pay for fence relocation expenses for the ranchers. The set aside process to ADC would not start until the new revocable permits are issued.

#### **Ka`u Irrigation District**

An engineering firm was awarded a contract to survey and plot the various water source tunnels on a map which is required for the set aside of these tunnels from DLNR to ADC. This project would not have been possible without the commitment, dedication, and hard work from key members of the Ka`u master coop steering committee. The preparation work included the ranking and prioritizing of the tunnels from a list of more than 30, clearing of the over-grown trails leading to the tunnels, physically locating the tunnels and offering lodging assistance to the contractor's employees. Since the project has already been approved by the Board of Land and Natural Resources, the executive order documentation for the set aside can be prepared once the mapping is done.

#### **Farm and Ranch Land Protection Program**

ADC continued to work with the various agencies and the landowner, Hawai`i Agriculture Research Center (HARC), on the documentations relating to the purchase of the perpetual agriculture easement in Kunia. The perpetual agriculture easement will have a price tag of \$2.6 million

total, of which \$1.8 million will come from the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) and another \$1.1 million from Department of Land and Natural Resource's Legacy Land Conservation fund. Due to funding timeline, the easement purchase needs to be closed no later than the ending of September 2009.

It is important that the HARC property be preserved perpetually for agriculture use due to the tremendous development pressure being experienced as it is located on a busy intersection across Kunia road from major residential and shopping centers.

#### **Kaua`i Tropical Fruit Disinfestation Facility**

The \$250,000 legislative grant awarded to the Kaua`i Economic Opportunity, Inc., a non-profit organization, for the training of papaya farmers and treatment facility workers have provided opportunities for several new farmers to grow papaya on about nine acres of leased land. Several key pieces of equipment for papaya production and processing have also been purchased or refurbished. A request has been made to the USDA Animal and Plant Health Inspection Service (APHIS) for the re-certification of the treatment facility in the fall. The goal is to have the facility operational by the end of 2009.

In anticipation of the re-opening of the facility, ADC replaced a section of missing fence along the perimeter of the property and repaired roof leaks on the building.

Kaua`i's papaya production is still relatively low when compared to historical levels. A major increase in production volume will be needed before the facility can be operated profitably. The Kaua`i Farmers Association, a non-profit group, is leading the effort to increase papaya production on the island.

#### **Wahiawa Irrigation System**

During this past fiscal year there had not been any follow-up action relating to the gifting of the Wahiawa Irrigation System (WIS) from Dole Food Company to ADC. On December 11, 2008, when the strong Kona weather system hit O`ahu, it was reported that the Wahiawa reservoir (Lake Wilson) rose 14 feet overnight. One of the major siphons on the WIS was also washed away by flood water, leaving some of the fields without irrigation water. ADC was able to help by lending Dole several hundred feet of old pipes from the Waiahole ditch so that a temporary by-pass could be built. These incidents reminded all of us that running the WIS requires major resources and serious commitment from the owner's part.

#### **Galbraith Estate Land**

With \$13 million appropriated, Act 234, SLH 2008, authorized ADC to purchase the Galbraith Estate land on behalf of the state. Even with contributions from partners to include the City and County of Honolulu, U.S. Army and



**Above: Ag Day at the Hawai`i Agricultural Research Center property, which is to be protected by an agricultural easement.**

OHA, it was expected that total available funding would top at \$20 million for this project, which was being coordinated by the Trust for Public Land (TPL). Unfortunately the proposal from TPL was not entertained by the trustees. It was reported that a few of the parcels, including the Lake Wilson parcel with the spillway, have already been sold.

### **Demonstrative Projects**

Several on-going industry supporting projects contracted with various researchers from the University of Hawai`i's College of Tropical Agriculture and Human Resources include:

- Animal feed demonstrative project on Hawai`i;
- Waste stream handling project on Maui;
- Browse feeding study tour for the cattle industry.

The revised budget execution policy required all expenditures over \$10,000, with few exceptions, be first approved by the Governor. The expenditure request for a mobile slaughter house, approved by the ADC board and have broad support from ranchers statewide, was returned without action due to the state's budget crisis.

### **Miscellaneous**

ADC provided traveling funds for HDOA inspectors conducting food safety certification on farms. The program was primarily supported by federal funding and state in-kind efforts.