

# CTAHR **Beef Initiative**

2005 Accomplishments



**College of Tropical Agriculture  
and Human Resources**  
University of Hawai'i at Mānoa



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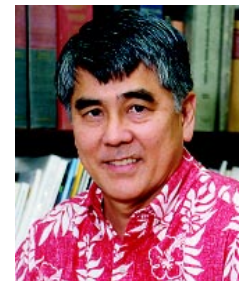
## Introduction

The CTAHR Beef Initiative is a major endeavor and commitment of the University of Hawai‘i at Mānoa’s College of Tropical Agriculture and Human Resources to partner with the Hawai‘i Beef Industry stimulating growth, economic diversification, and environmental sustainability for agriculture in the state. The initiative is inspired by Dean Andrew Hashimoto’s belief that the beef industry will continue to be a leader for the vision of agriculture in Hawai‘i and remain an important contributor to diversified agriculture, the state’s economy, and Hawai‘i’s cultural heritage.



The objectives of the program are to improve the competitiveness, profitability, and sustainability of the beef industry by

- Developing and implementing effective research and innovative extension programs for animal production in Hawai‘i and other tropical regions
- Improving communications between the beef industry, interagency partners, and CTAHR
- Supporting the industry on legislative and other governmental issues, policies, and partnerships.



*Andrew Hashimoto,  
Dean, CTAHR*

We are actively in Phase II and moving into Phase III of the program. Significant progress has been made in the first phase of the program. We encourage you to review our accomplishments for 2005. We also welcome input, comments, and suggestions from the communities we serve through this program. Please visit our Web site at [www.ctahr.hawaii.edu/paniolo](http://www.ctahr.hawaii.edu/paniolo).

### PHASE II

Pastoral Systems  
Genetics and Biotechnology  
Meat Science and Technology  
Outreach  
Mealani Research Station

### PHASE III

Pastoral Systems  
Genetics and Biotechnology  
Value-Added Product  
Development  
Outreach  
Mealani Research Station

### FUTURE AREAS

Emerging Technologies  
New Product Evaluation  
Feed Initiative

## Economics and Marketing

### Economic Analyses of Industry Production and Marketing Models

Linda J. Cox

Cooperators: Habein Livestock Co. (Rick Habein), Ponovalo Ranch, Ltd. (Pono von Holt), Bill Chambers Ranch, and Spencer Akana Ranch

The foundation for success of any business is an understanding and knowledge of expenses and revenues. While this financial information is a key component of effective decision-making, many producers find the process of assembling the information and putting it into a usable format to be formidable.

#### Objectives

1. Determine the estimated costs and benefits of various production and marketing strategies available to beef producers.
2. Assemble an expert-choice model that producers can use to evaluate their options as they make ranch and marketing decisions.
3. Develop benchmark information for the industry that individual producers can use for comparison purposes.



#### Activities, Progress, and Results

1. Develop flow-chart for production/marketing options. This was completed for production and marketing.
2. Cost the various options. This was completed for production. Cost fluctuations made it difficult to get stable cost information.
3. Develop Excel-based choice models. This was completed for production. Marketing model is not being tested.
4. Give presentations and workshops to validate the model and educate faculty and producers about the model.
5. Develop a field survey based on the model to collect benchmark data. Activity was discontinued at the request of industry.
6. Analyze the benchmark data and publish the results. Activity was discontinued at the request of industry.

#### Report Summary

Cost of production is a key piece of information needed to make the best economic decision when selling animals. When calculated, the cost of production helps determine the minimum selling price needed to avoid losing money. If the price the buyer pays is less than your cost of production, you will lose money.

The objective of this project was to determine the estimated costs and benefits of various production/marketing strategies available to beef producers. If more cost-effective alternatives to those approaches currently in use could be identified, then these were to be included in the analysis. This information would then be assembled into an expert choice model that producers could use to evaluate their options as they make decisions.

A cost calculator was developed and is described in the publication “Calculating the Cost of Production for a Cow-Calf Operation” (CTAHR publication LM -11). The calculator runs on Microsoft Excel and uses information that producers supply to figure the cost of producing a calf. The information needed by the calculator is described in the publication, and blank worksheets are provided for making notes.

Once the cost calculator was finished, personnel with the CTAHR Cooperative Extension Service were provided with training so that they could use the calculator with their clients. At the same time, plans were made to survey various producers across the state to establish cost-of-production benchmarks. To this end, a pre-test was deemed necessary to make sure the cost calculator was free of errors and understandable to producers.

The pre-test was completed in the first part of the year. Feedback from this effort resulted in changes to the calculator to correct some minor problems. At that time, producers became concerned about efforts to use the calculator as part of an effort to establish cost-of-production benchmarks.

As a result of the feedback from producers, the cost calculator was modified to become Calf-XL. Another publication to accompany the software has been drafted. An example that demonstrates the usefulness of the software to producers is now included. Efforts to complete a cost-of-production survey have been discontinued.

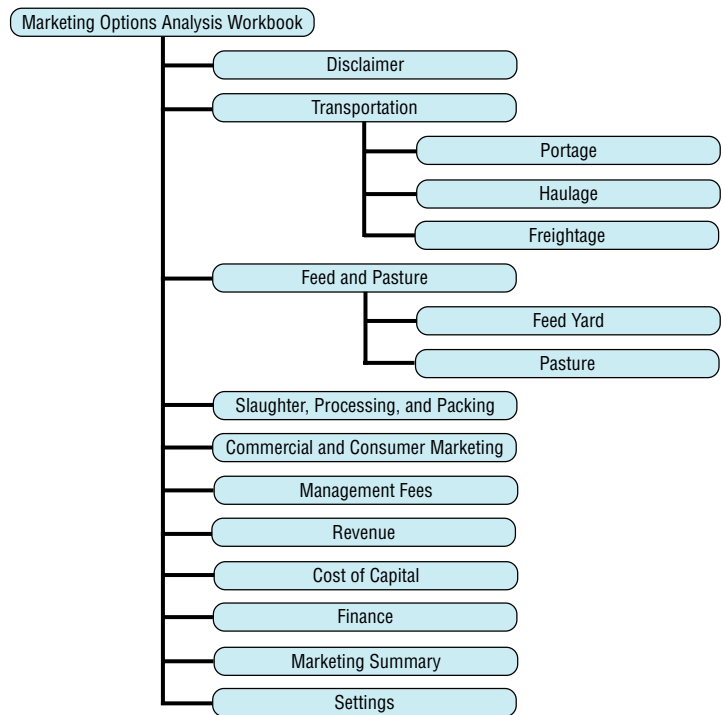
### Marketing Options

Efforts have been made to outline the marketing options available to producers. Figure 1 summarizes the worksheets that need to be developed for an Excel workbook that would become a marketing cost calculator similar to the cost-of-production calculator.

A number of challenges have been encountered in identifying the information needed to complete the workbook, which was difficult to obtain from producers’ records. At the same time, the dynamic nature of the marketing channel results in extensive cost fluctuations. In some cases, costs are not known until after the fact, and even then the costs vary widely.

Efforts to produce a manageable workbook will continue, although the funding for the project has expired. At this point, the cost structure is the factor preventing its completion. Then, the instrument will be tested and the documentation will be completed.

**Figure 1. Marketing Cost Calculator Outline**





## Special Marketing Feature

### Hawai‘i Department of Agriculture Launches 100% Hawai‘i Grown Beef Promotion Campaign

Dan Nakasone, Brainstorm Marketing, Inc.

#### Market Trends

Today’s consumer is more health conscious, and this is especially true of the aging “baby boomer” generation (born between 1948 and 1964). Demographically, the sheer size and nature of this market presents a unique opportunity to increase the Hawai‘i market for local beef. Consumers are more food savvy and sophisticated because of the growing number of food publications and broadcast media (example: the Food Channel). Trends show that people are eating out more often and requesting regional or locally grown foods. “Buy Local” campaigns across the country help to bring attention to such niche products and the farms that contribute to the local economy. Nationally, beef consumption is on the rise, calf prices are at historic highs, and demand in this new marketplace is creating opportunities that are trickling down to our island economy. The 100% Hawai‘i Grown Beef campaign is a timely promotion and collateral piece to the educational efforts carried on by CTAHR.

The objectives of the project are to educate consumers about Hawai‘i Grown Beef and to elevate the brand and value of the local beef products. Longer-term goals are to increase our market base for 100% Hawai‘i Grown Beef and increase local beef production.

#### Key Strategies

To keep cattle in Hawai‘i and bring them to market will cost more; ranchers will need to be compensated with a profitable return in order to fulfill the goals. To achieve this, 100% Hawai‘i Grown Beef must be positioned and marketed as a high-value specialty product. The 100% Hawai‘i Grown Beef is a niche-market product and will not replace imported commodity beef but rather offers alternatives in the Hawai‘i marketplace. Two distinct alternatives are available for the 100% Hawai‘i Grown Beef brand: natural beef produced from cattle that are finished with quality supplemental feed for consumers accustomed to marbled and tender grain-fed beef, and grass-finished beef targeting the health-conscious segment of the new marketplace.

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#### Actions

The industry needs a sustained marketing communication and promotional campaign that is focused on positioning 100% Hawai‘i Grown Beef as a high-value specialty product. The industry needs to increase the supply of quality beef to notable chefs and restaurants, as these chefs are the “gate-keepers” and have strong influence on the food-savvy consumer. They can help to position the product and offer great promotional opportunities.



#### *Natural grain-fed beef*

- broad appeal for its consistency in tenderness and juiciness
- raised under natural feeding program (no antibiotics, no hormones)

#### *Grass- or forage-finished beef*

- strong health-benefit appeal (omega-3 and conjugated linoleic acids)



## Pastoral Systems

### Best Management Practices for the Remediation of Former Sugarcane and Pineapple Land for Sustainable Livestock Production in Hawai‘i

*Mark Thorne, Jonathan Deenik, Harold Keyser, and Linda J. Cox*

*Cooperators: Bill Chambers Ranch, Olumau Angus Plus LLC*

Between 1992 and 2002 over 128,000 acres of land was taken out of sugarcane and pineapple production in Hawai‘i. Much of this former sugarcane and pineapple land was converted into non-agricultural uses or remains fallow today. The conversion of this land for sustainable agricultural enterprises is important to the state’s economy. Indeed, agriculture contributed \$536 million to Hawai‘i’s economy in 2002. This number could be sizably larger with the return of the former sugarcane and pineapple land to sustainable agricultural production. The alternative for these areas, urban development, is less attractive from an ecological and environmental standpoint.

Unfortunately, despite its availability, the former sugarcane and pineapple land is not being converted into sustainable agricultural production systems. In part, this is the result of the relatively low soil fertility levels and the assumed expense needed to bring the land back into production. Consequently, the trend for this land to be converted into non-agricultural uses will continue unless a feasible method for

remediation is developed to efficiently convert it for sustainable and productive agricultural enterprise. Beef cattle production is an efficient and low-intensity agricultural production system that is perfectly suited to utilizing former sugarcane and pineapple land. However, for the efficient remediation and conversion of such areas into sustainable grazing systems, there is an immediate need to develop a series of “best management practices” (BMPs). Current soil remediation recommendations (addition of fertilizer and lime) are based on maximizing crop production and are therefore not economical for livestock producers. Moreover, the recommended application levels, based on maximizing crop production, are typically greater than what is needed for sustainable forage production and livestock grazing systems. Thus, these BMPs would include appropriate and economical lime and fertilizer application levels and incorporating forage legumes in combination with rotational grazing to facilitate the remediation of this land for sustainable livestock production.



### Objectives

- Determine the most economical and efficient combination of treatments, including applications of lime and fertilizer, inter-seeding of legumes, and grazing management, that allows for the efficient conversion of former sugarcane and pineapple lands on the islands of Hawai‘i, Kaua‘i, and Maui into sustainable forage production systems.
- Determine the long-term effects and interactions among treatments on soil fertility, forage production, and animal production standards as they relate to sustainable forage production.
- Determine the long-term effects of the different treatments on the ecology of improved pasture ecosystems.
- Develop a series of recommendations or best management practices for livestock producers, county extension agents, and federal land-management personnel to efficiently remediate and convert former sugarcane and pineapple lands into sustainable forage production systems.

Work on this research project started in August 2005 and will terminate in August 2008. This project is funded through the USDA–CSREES Tropical and Subtropical Agriculture Research Grant Program in the amount of \$262,013.

### Hawai‘i Animal Nutrition and Forage Production Profiling Project

*Mark S. Thorne and James R. Carpenter*

Forage-based beef cattle production is an important factor in Hawai‘i’s economy and environment, with more than 1 million acres of grazing land dedicated to livestock production. Grazing lands are characterized as those lands capable of growing grasses and other forages. Forage quantity and quality are major limiting factors for the sustainable production of grazing animals. The quantity and quality of grazed forages is primarily a function of the species composition of the pasture, soil quality, and climatic conditions including amount and timing of precipitation, growing degree days, amount of photosynthetically active radiation (PAR), and relative humidity. In addition, past and current grazing impacts greatly affect forage quality and quantity. For the Beef Industry to remain sustainable in Hawai‘i, a better understanding of these soil-plant-animal interactions is needed. The primary goal of this project is to correlate various animal nutrition and performance indicators with key forage-production values. These associated indicators, or profiles, will help producers make proactive decisions about their management practices, allowing them to make changes rapidly without affecting animal performance.

### Objectives

- Determine the relationship between animal performance indicators (BCS, rate of gain, hair coat length) with tropical forage quality and quantity measures.
- Determine the effects of season and intensity of solar radiation on the photosynthetic rate of tropical forage grasses.
- Quantify and characterize the changes in forage quality with changes in growing season, solar intensity, and age of regrowth.

The results of this project will provide needed information that will assist Hawai‘i beef cattle producers to adopt sustainable grazing management practices. Specifically, it will provide informa-

tion on grazing management strategies that will help producers maintain high levels of forage quality and quantity throughout the production year for tropical pasture systems, information that is currently very limited. The results of this project will also be broadly applicable across the diversity of cattle operations in Hawai‘i including not only cow-calf producers but stocker-finisher and seed-stock operations as well. Additionally, the information gained from this project will be compiled into Extension outreach publications, research technical notes, and peer-reviewed publications and presented in workshops and field days. Funding for this project, \$17,110, is provided by the USDA Natural Resources Conservation Service through the Grazing Lands Conservation Initiative. Work on this project began in June 2005 and will terminate in May 2007. Project directors are Dr. Mark S. Thorne, Dr. James R. Carpenter, Joe May, NRCS State Range Conservationist, Hawai‘i, and Arnold Norman, NRCS Central Region Rangelands Specialist.

### **Maui Ranchers Take Action in Organizing the New Feed Source Task Force**

*Carl ‘Soot’ Bredhoff, Coordinator*

Imported roughage (hay) and concentrate (grain and supplements) costs represent the highest operating cost for confined livestock operations. Pastoral systems can greatly reduce these costs except during weather patterns of severe drought, as experienced in the late 1990s. In a proactive decision by the Maui Cattlemen’s Association, a New Feed Source Task Force was organized for cattle producers to work together with current and potential feed producers and the county, state, and federal government agencies to find and develop new, sustainable, and affordable sources of feed for beef cattle.

The purpose of the task force is to (1) provide roughage for Maui farmers and ranchers to feed to their cattle on pasture during times of drought, and (2) investigate alternative feedstuffs to replace the diminishing supply of pineapple waste used also by the farmers and ranchers for cattle feeding. The source of roughage that the task force is currently looking at is the sugarcane leaves that are deposited on the ground when the seed cane harvester goes through the field gathering “pula pula,” or cane stalks, for re-planting the cane fields. This project is a joint venture with HC&S Plantation. The ranchers can feed the green leaves, and the plantation can burn the older, drier leaves. It is hoped that this venture will be a win-win situation for both industries. Grant money awarded to assist the group includes Tri Isle RC&D, \$63,000, and County of Maui, \$50,000. These funds will be used mainly to purchase machinery to get the leaves from the sugarcane fields to the cattle in one form or another. To date no machinery has been purchased, but a small hay baler, owned by CTAHR, University of Hawai‘i at Mānoa, and coordinated by the CTAHR Beef Initiative Program, will be tried in the near future. The task force is represented by beef ranchers, the Maui Cattlemen’s Association, Tri Isle Resource Conservation and Development Council, Inc., County of Maui Office of Economic Development, UH-CTAHR Cooperative Extension Service, and Hawaiian Commercial and Sugar Company.

## Follow-Up: Tufted Beard Grass, Kaua‘i’s Dominant Invasive Pasture Weed

*Lincoln Ching and Mark Thorne*

*Cooperators: Tom’s Goats (Tom Runyan), Rocking W Ranch (David ‘Duke’ Wellington), and Princeville Ranch (Donn ‘Curly’ Carswell)*

Tufted beard grass, *Schizachrium condensatum* (Kunth) Nees, continues to be a noxious grass on Kaua‘i. Tufted beard grass is largely ungrazed by domestic livestock including cattle, goats, and sheep. It was first observed in higher-elevation conservation lands and has since expanded to mid-elevation pastures. Wind is seen as the primary factor in spreading it. There appear to be two strains of tufted beard grass. One has a much thicker clump, finer leaf blades, and a taller seed stalk without leaves, while the other does not form a dense clump, has fewer leaf blades, and has a shorter seed stalk with leaves.

Much of Kaua‘i’s newer pasture development is on recovered sugarcane lands with guineagrass establishment. Communication with producers including personal observation of marginal perimeter lands have shown increased expansion and establishment of tufted beard grass into guineagrass stands, apparently due to selective grazing of guineagrass by livestock. While exact control measures have not been established, it appears that management efforts should include timed mowing, even grazing pressure, and soil amendments to increase soil fertility. As a short-term relief, guinea-grass has been observed to outgrow tufted beard grass under timed mowing, especially during fall under adequate rainfall.

A previous pasture amendment trial comparing six treatments of lime and urea (46% N) applications with mowing and non-mowing comparisons were inconclusive. The cooperator’s inability to mow selective plots, including continuous grazing pressure on the existing guineagrass by livestock, resulted in the dominance of tufted beard grass over the trial.

Glyphosate, a postemergence herbicide, has been shown to kill tufted beard grass. Unfortunately it will also kill all other desirable forage species. Glyphosate should be applied to new growths of tufted beard grass as soon as it is observed. Once established, it is extremely difficult to eradicate and will dominate any given pasture.

## Future: No-Till Pasture Seed Drill Arrives

Through the CTAHR Beef Initiative program, a no-till pasture seed drill was purchased and will be used for pasture improvement demonstration projects at the Mealani Research Station and for use (rental charges and freight costs) by the livestock industry involved in cooperative pastoral improvement projects. We hope that the industry can benefit from the use of this new tool to enhance productivity of pastures in Hawai‘i. Please contact Glen Fukumoto or Milton Yamasaki for more information.





## Genetics and DNA Technology

### **Cattle Genetics and DNA Technology: A New Era in Cattle Selection in Hawai‘i**

*Jinzeng Yang, Michael DuPonte, Glen Fukumoto, and Robert Ferreira, Ranch Manager, Olumau Angus Plus LLC*

*Other Cooperators: Ponoholo Ranch, Ltd. (Pono von Holt), Makaweli Ranch (Alan Robinson)*

Among many factors supporting the Hawai‘i cattle industry, cattle breeds and the genetic makeup of the cattle population have significant impacts. An organized genetic program is necessary for the benefit of the entire industry. To develop an effective cattle genetic program, we believe DNA-based genetic markers for production traits have great potential. Animal production traits such as growth rate, reproduction, body frame and structure, and even adaptability to tropical environments are controlled by genes, or multiple genes in most cases. A gene is a fragment of DNA sequence that



encodes a protein sequence. Many important genes have been discovered to be involved in controlling animal production traits. Microsatellites are short, tandem, repeated DNA segments in the genome. Although microsatellites do not encode specific proteins, they have been used as molecular markers for animal genetic analysis and selection. The microsatellite markers vary among individuals sufficiently to have its pattern of inheritance tracked through families, which has several practical applications for cattle breeding, including individual DNA identifications, paternity testing, DNA markers for gene mapping and production traits, and predictions of hybrid vigor. The long-term goal of this project is to identify and test potentially useful cattle genes and microsatellite DNA markers, then to apply the DNA-based testing to cattle selection and crossing for better forage utilization and meat quality. The primary activities for the current year include (1) cattle sample collections and DNA isolation, (2) growth candidate genes and cattle DNA-based parentage test, and (3) cattle growth data analysis.

#### **Cattle Blood Sample Collections and DNA Isolations**

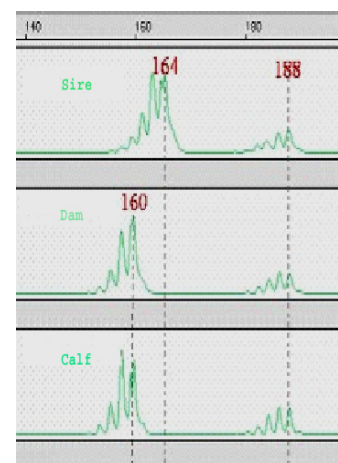
The project is an animal genetic project requiring both a large number of animals and quality laboratory analysis. We have worked on increasing the sample size by maintaining the Angus cattle population and collaborating with private seedstock cattle ranches. We have collected blood samples of more than 500 cattle from Hawai‘i and Kaua‘i. All of the genomic DNA isolations from these cattle have been completed and are ready for various DNA-based tests.

**Table 1. Collections of cattle blood samples.**

Cattle breed	Number of animals	Cattle ranch
Angus .....	33 .....	Olumau Angus Plus LLC
Angus Plus .....	140 .....	Olumau Angus Plus LLC
Angus .....	230 .....	Mealani Station (CTAHR)
Angus .....	36 .....	Ponoholo Ranch, Ltd.
Charolais .....	35 .....	Ponoholo Ranch, Ltd.
Makaweli (Devon x Shorthorn) .....	78 .....	Makaweli Ranch
<b>Total .....</b>	<b>552</b>	

**Candidate Genes for Growth Traits and Cattle DNA Parentage Test**

Several positional candidate genes have been well associated with animal growth performance in livestock, including myostatin, insulin-like growth factor-1 (IGF-1), Pit-1 gene, growth hormone and growth hormone receptor (GHR). Their mutations and/or single nucleotide polymorphisms (SNP) have been associated with growth traits in cattle, but in great variations. The DNA marker-based selection holds great promise for efficient and effective genetic programs for livestock animals due to accurate laboratory analysis technology. As a limited number of DNA markers are available for the economically important traits, it is important to realize that markers for complex traits like marbling are associated with one of the many genes that contribute to the phenotype traits. The presence or absence of the numerous other “unmarked” or unknown genes and their interactions with environment will actually determine the desired phenotype such as large weaning weight or increased marbling. In the development of DNA markers for beef cattle growth traits, we selected to study DNA polymorphisms of the candidate genes of GHR, IGF-I, and Pit-1 genes. Records from Hawai‘i ranches on breeding cattle for growth performance and other traits are necessary for our primary interest in establishing the genetic associations between DNA markers and growth traits. Our primary interest is to study their values and applications to forage-based cattle production. We are developing PCR and DNA fragment analytic laboratory procedures for these selected genes, and we are analyzing cattle samples. Based on our preliminary data, three alleles for Pit-1, four alleles for IGF-I, and at least four alleles for GHR are possibly present in our current cattle population.



For any one microsatellite marker, multiple possible variations may exist in the population. With a battery of 10 to 20 DNA microsatellite markers, we can produce a unique DNA profile or "fingerprint" for individual cattle. This profile remains as a permanent record of the individual's genetic identity. The polymorphic microsatellites can be accurately detected by multiplex PCR and polyacrylamide gel electrophoresis. By detecting 10 microsatellite markers in two panels of multiplex PCR, we have established a practical DNA-based method for cattle identification. We will be testing this method in a multiple-sire mating system and using it to verify breeding records for our experimental animals.



## Growth Performance Data Analysis (Angus Plus Cattle)

Angus Plus cattle are Brahman/Angus derivatives that have been derived from purebred lines (Red Angus, Angus, Brahman, Red Brangus) between 65% and 96% registered red or black Angus and a minimum of 4% registered Brahman. Angus Plus combines the genetic makeup of both breeds and is known to have great performance in tropical and subtropical environments. Angus cattle are known as early-puberty, fertile cattle with outstanding carcass traits. Coupled with the Brahman environmental adaptability, longevity, and efficiency, the resulting Angus Plus cattle offer the industry flexibility, including heat tolerance without the extra sheath and ear, reduced infections from parasite problems, overall hardiness, and better forage utilization. Angus Plus females are recognized as easy-calving fertile cows with consistent lactation performance, even in hot, humid environments. Angus Plus cattle are moderate-framed, deep-bodied cattle that offer uniformity and efficiency. The cattle are more consistent genetically. The maintenance requirements for Angus Plus cattle are economical due to their moderate frame and easy fleshing ability. Angus cattle start easily on feed and have outstanding appetites, and when processed hang high-quality carcasses that grade. In collaboration with Olumau Angus Plus LLC, we have been working on the growth performance of the Angus Plus cattle population in Kaua‘i. The herd has been selected for preweaning gain, daily gain on pasture grass after weaning, fertility, and mothering ability. H1 cattle have great growth performance on pastureland (Table 2).

**Table 2. Growth performance of Angus Plus on 100% pasture.**

Traits	Year 2003	Year 2004
Number of cattle .....	23 .....	62 .....
Birth weight, lb .....	81.7 ± 2.73 .....	76.4 ± 1.13 .....
Hip height at birth, inches .....	28.9 ± 0.18 .....	28.5 ± 0.09 .....
Weaning age, days .....	201.3 ± 19.86 .....	215.8 ± 4.19 .....
Weaning weight, lb .....	540.4 ± 19.32 .....	501.6 ± 8.53 .....
Weaning hip height, inches .....	43.2 ± 0.32 .....	44.2 ± 0.23 .....
205d-adjusted weight, lb .....	557.4 ± 14.62 .....	585.1 ± 8.69 .....
Average daily gain, lb .....	2.31 ± 0.06 .....	2.42 ± 0.29 .....
Postweaning weight (68 days), lb .....	623.1 ± 16.97 .....	692.2 ± 8.65 .....
Postweaning daily gain (68 days), lb .....	1.53 ± 0.14 .....	2.11 ± 0.08 .....

## Meat Science and Technology

### Nutritional and Eating Quality of Locally Produced, Forage-Finished Beef

Yong S. Kim, Glen Fukumoto, Michael DuPont, Jinzeng Yang

Cooperators: Kulana Foods, Ltd., J.J. Andrade Slaughterhouse, Inc.

Forage-finished beef has unique nutritional qualities that are positively associated with human health. Compared to grain-finished beef, forage-finished beef contains lower amounts of intramuscular fat, higher amounts of omega-3 fatty acids and unsaturated fatty acids, and a higher intramuscular content of conjugated linoleic acid (CLA). It thus appears that forage-finished beef produced in Hawai'i has the potential to be marketed as a natural, health-promoting food, particularly for those people seeking animal products that are raised in natural conditions without administration of growth-promoting agents or much intervention on the animals' dietary intake.



Forage-finished beef, however, is generally known to be less tender and less palatable than grain-finished beef, suggesting a need to improve the eating quality of forage-finished beef. Interestingly, our recent studies demonstrated that almost half of the steaks from Hawai'i forage-finished beef were as tender as the choicest steaks from grain-finished-beef. These results indicate that understanding the factors affecting the tenderness of forage-finished beef will be crucial in improving the palatability of locally produced forage-finished beef.

#### Objectives

- To examine the tenderness of forage-finished beef produced in Hawai'i
- To investigate the intrinsic and extrinsic factors affecting the tenderness of forage-finished beef produced in Hawai'i.
- To measure CLA content and polyunsaturated fatty acid composition in forage-finished beef produced in Hawai'i.

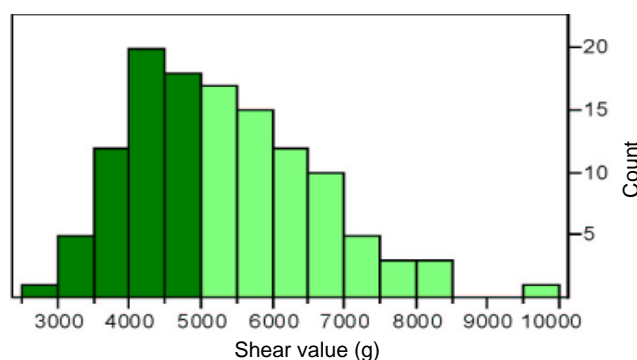
#### Progress

- Number of samples collected: 176 ribeye steaks from 12th rib
- Tenderness measured (2 wk aged): 124
- Proximate analysis (moisture, fat, and ash) completed: 124

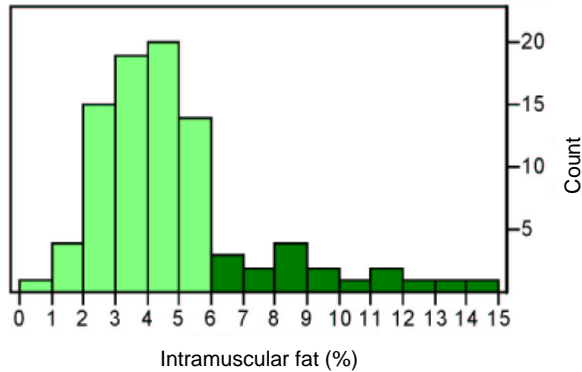
#### Preliminary Results

Figure 1 shows the distribution of the shear values of 122 samples analyzed. The shear values ranged from 2.29 kg to 9.72 kg with a mean value at 5.30 kg. According to a study by Miller et al. (JAS 2001, 79:3062–3068), shear values of 3.4, 4.0, and 4.3 kg would result in 99, 94, and 86% of consumer satisfaction for beef tenderness. About a quarter of our samples had shear values below 4.3 kg, suggesting that only 25% of the forage-finished beef produced in Hawai'i would provide enough tenderness for consumer satisfaction.

Figure 1. Distribution of shear value.



**Figure 2. Distribution of intramuscular fat content.**



**Figure 3. Relationship between fat content and shear value.**

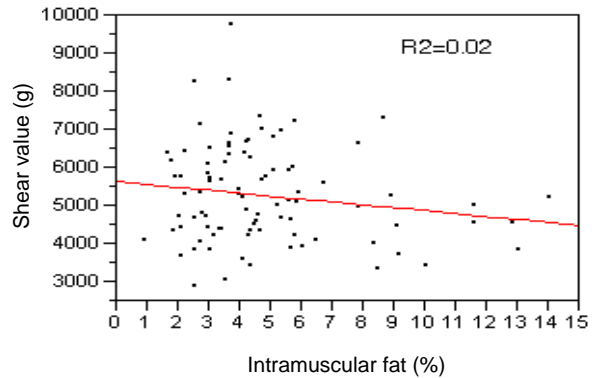
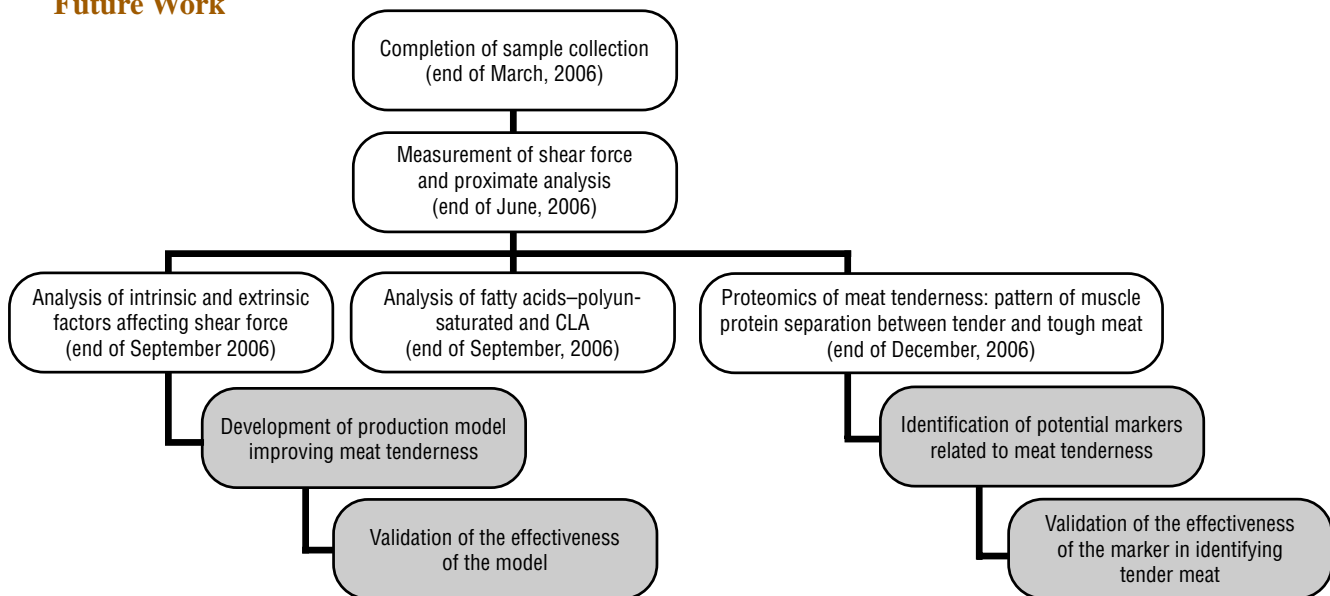


Figure 2 shows the distribution of intramuscular fat content of 90 samples analyzed. The fat content ranged from 0.95% to 14.1% with the mean at 4.88%. Intramuscular fat content of Choice grade is usually above 6%, and about 20% of our samples had more than 6% of intramuscular fat content, indicating that about 20% of the forage-finished beef can be graded as Choice if the cattle are below 3 yrs old.

Figure 3 shows the relationship between the intramuscular fat content and shear value. No significant relationship was observed between these two parameters.

**Future Work**



**Report Summary**

This study was designed to investigate the nutritional and eating quality of locally produced, forage-finished beef using about 200 ribeye steak samples collected from two local slaughterhouses. Currently, 176 samples have been collected, and measurement of shear force values and proximate analysis were completed on 124 samples.

## Mealani Research Station

### Engaging in Healthy-Foods Production Systems

*Milton Yamasaki*

The purpose of the research stations in the University of Hawai‘i System is to generate, access, disseminate, and encourage application of research-generated knowledge in tropical agriculture. The Mealani Research Station is one of only two UH facilities conducting agricultural research in livestock production systems. However, research activities at the Waimea facility involve more than beef cattle endeavors and also include innovative applied research on alternative crops suitable for the cool, up-country climate.

The “baby-boomer” generation is concerned about their health, and the demand for healthier foods labeled as “organic,” “natural,” and “foods as medicines” has led to a whole category of foods called “functional foods.” One of the visions of the research activities is to focus on the area of healthy-food production systems and contribute to the knowledge of functional food production in the temperate sub-humid zones in Hawai‘i.

Research work on alternative crops focuses on niche markets for specialty tea and blueberries. Tea is the most widely consumed beverage in the world. The interest in tea is due to the growing interest in the human health benefits of green tea, in which certain polyphenolic compounds are reported to have cancer-chemopreventive effects, cardio-vascular benefits, and high anti-oxidant qualities. Human health benefits of blueberries are related to the high anti-oxidants level in the fresh fruit. These anti-oxidants are thought to be effective in helping to prevent cancer and heart disease.

On the beef agenda, grass-finished beef is recognized as having many food-safety and human-health benefits and warrants continued research in the area of healthy foods production systems. Our vision for the Mealani Research Station is to be the leader and innovator in applied research for tropical forages and forage-based beef production systems, adapted technologies, and outreach programming. Dedicated to the mission and goals of CTAHR and the vision for the Mealani Research Station, the station’s hard-working agricultural technicians include Earl Arakaki, Damien Arruda III, Kelly Asai, Marla Fergerstrom, Lori Hasegawa, Roy Ishizu, and Aric Matsubara.



#### Functional foods

- Foods that provide a health benefit beyond basic nutritional needs
- Foods containing omega-3 fatty acids, CLA, anti-oxidants, and other compounds



## Activities, Progress, and Results

### Mealani's Genetic Improvement Program

*Michael DuPonte*

Currently, the genetic improvement program for the beef cattle herd at the Mealani Research Station is in its third year of implementation and is making significant progress toward industry acceptance. We continue to run a three-herd breeding program, with Angus, Polled Hereford, and Mealani composite lines, with the latter gradually being phased out and replaced with a “Black Baldy” commercial herd. In the past two years, several herd goals have been reached, including developing a uniform Angus-influenced cow herd, with the exception of the Hereford cow group; condensing dual breeding seasons into a single 40-day breeding season; and implementing an intensive culling program, including dispersal of composite cows and the Limousin herd. The use of artificial insemination (AI) was implemented with synchronization (CIDR technology) only on the purebred cattle, and natural service by Angus was used to cover the herd in the past year. Extremely proven sires within the Angus breed were selected for the AI program; criteria include top 2% and 90% repeatability for low birth weights, growth and carcass traits of rib-eye area, backfat, and marbling. This was done to strategically boost carcass quality traits in the herd in an effort to develop heritably expected progeny differences (EPDs) baseline data within the herd that were not bred artificially. To accomplish this goal, the whole herd has been enrolled into a computerized recordkeeping program (CHAPS, South Dakota State University) that will calculate these values, which will help to make sound decisions on genetic improvement goals. In addition, blood samples from the entire herd were taken to establish the baseline for ongoing DNA sequencing work and progress. Trait markers for rib eye area, marbling, and tenderness will be targeted in the herd. In other cooperative programs, the Mealani beef cattle herd is enrolled in Hawai‘i’s Voluntary Bovine Johne’s Disease Program (Hawai‘i Department of Agriculture, Division of Animal Industry, Livestock Disease Control Branch; USDA-APHIS Veterinary Services; and local cooperating veterinarians) with the hope to be adopted as the first certified-free beef herd in Hawai‘i.



The upcoming year's program will incorporate more of the same breeding scheme, with the exception that the whole herd will be exposed to the current synchronization protocol and single-service AI. More emphasis will be put on heat detection because that seemed to be a deterrent to last year's program as to the number of animal exposed to AI. Selected AI bull power will continue to concentrate on the top 2% of sires in the breed with proven carcass data and information. The American Angus Association has expressed interest in working with this herd to incorporate the use of embryo transplants. Our goal of making this a reality will depend on impacts achieved from CHAPS data and DNA sequencing results.

One of the goals of the genetic improvement program is to develop quality and adaptable beef cattle for the sustainable production of high-quality beef for subtropical environments and provide the genetics to interested producers in Hawai'i. A brief report on the performance records produced by the CHAPS program on the Mealani beef cattle herd is available in the 2005 Proceedings of the Mealani Forage Field Day.

### **The Use of Ultrasound Technology in Beef Production**

*Michael DuPont*

To achieve sustainable profitability, beef producers must develop production systems that are appropriate to their market targets. Currently, beef marketing acceptance is highly dependant upon backfat thickness, rib-eye area, marbling, and tenderness, the latter being the most important. Through the use of artificial insemination, specialized computer-based performance record systems, and the Warner-Bratzler shear force measurements, data on all of these parameters can be readily collected. Unfortunately, the major drawback of data collection on animal performance is that it can be accomplished only after slaughter. With the marketplace highly dependent on quality beef, this will be a key deterrent in developing a uniform product. The need for new technology addressing this challenge is paramount. Ultrasound technology (UT) in live young cattle (500 pounds or 7 months of age) has been used to predict an animal's "fit" into quality-based programs. This management tool enables producers to sort animals into separate groups, matching them with the appropriate market, thus alleviating the problem of an inconsistent product. Across the nation, a growing number of seed stock producers are having progeny of sires, rather than the sire itself, UT-scanned to determine what is actually transmitted to improving the genetics of the offspring. As an industry moves toward value-based marketing and carcass merit, the use of UT will be increasing useful in animal selection for making genetic improvement.

Through the CTAHR Beef Initiative Program, an ultrasound unit and software was proposed and granted. The team is in the process of developing an ultrasound technology workshop and introductory training. This project is in collaboration and partnership with Dr. Doyle Wilson, retired beef extension specialist from Iowa State University, who is the leader in adapting the ultrasound technology and software as a beef cattle selection tool. The goal of this project section is to utilize UT as a tool in selection based on rib-eye area muscling and marbling, embryo transplant and pregnancy diagnosis in the research programs at Mealani, and provide a certified, fee-based service to the industry.



## 100% Grass-Fed at Mealani, an Example

*Glen Fukumoto*

### “Tale of the Tape” for Angus steer # 3058

Age in days .....	837 days old (or 27.9 months)
Estimated age by teeth .....	2 years old
Maturity score .....	A 90
Carcass weight .....	826.0 pounds
Ribeye area .....	13.3 square inches
Fat thickness .....	0.25 inch
Marbling score .....	Moderate 0
Estimated USDA quality grade .....	High Choice
Calculated yield grade .....	2.31



## Other Activities

- In 2005, The Mealani Research Station attracted more than 600 visitors (not including field day and workshop activities)
- Completed 9th Mealani Forage Field Day
- Completed 1st Mealani Tea Educational Workshop
- Initiated development of a Strategic Plan for the Mealani Research Station.

## Future

Development of Mealani Research Station Web site to be used as a reference tool for the industries served through research activities.

## Follow-Up: Improving Pasture Value by Protein Banking

*Glen Fukumoto and Milton Yamasaki*

In the spring of 2005, the protein bank system was established in four 3-acre paddocks. The paddocks were planted with 4,000 seedlings *Leucaena leucocephala* cultivar KX2 developed by CTAHR horticulturist Dr. James Brewbaker. The objective of the project is to evaluate the technology’s ability to add higher levels of nitrogen to the pastoral ecosystem for improved beef production on established kikuyu pastures.

## Follow-Up: Perennial Peanut Planting

*Glen Fukumoto*

A small planting of perennial peanut (*Arachis pintoi*) was established by rooted and unrooted cuttings into a continuously grazed paddock in December 2003. The planting continues to contribute to the pasture forage mix, showing persistence through the continuous grazing pressures. We plan to install variable levels of the forage peanut in several paddocks utilizing the no-till seed drill.

## Outreach

### 9th Mealani Forage Field Day Spotlights Early Weaning

*Mark Thorne, Event Chairman*

The annual Forage Field Day is an educational outreach program that focuses on disseminating the latest information on forage-based livestock production and is coordinated under the leadership of CTAHR's Pasture and Range Specialist, Dr. Mark Thorne. The program has three primary goals that focus on creating a livestock industry in the state that is ecologically, economically, and socially sustainable: (1) to provide technology and information on development of sustainable forage production systems to Hawai'i's livestock industry (ecological sustainability); (2) to provide information on opportunities and incentives for market development of forage-based livestock products (economic sustainability); and (3) to provide information to producers, processors, retailers, and consumers about the benefits of forage-based animal production systems: healthy foods, healthy economy, healthy environment (socially sustainable).



The focus of this year's Mealani Forage Field Day was on "Improved Livestock and Forage Production Through Sustainable Management Practices," which introduced research work highlighting a management alternative for improving productivity of the cow herd. Keynote speaker Dr. John Arthington, a beef extension specialist from the University of Florida, presented a thought-provoking discussion on his research on the benefits of early weaning practices for tropical and subtropical beef production. Dr. C.N. Lee from UH-CTAHR provided a presentation on the effects of heat stress on animal performance. Both issues are critical for the continued sustainability of the Hawai'i cattle industry. A panel of CTAHR researchers and extension specialists and agents wrapped up the morning session with updates on their various projects and outreach efforts. The afternoon "round robin" session was well received by all participants, with three groups rotating between the forage demonstration gardens, a pasture walk, and business vendor and educational exhibits. At the forage gardens, participants saw a variety of alternative forage species available at the station and were told by Glen Fukumoto (CTAHR Livestock Extension Agent) about their characteristics and potential uses for livestock production in Hawai'i. The pasture walk conducted by Dr. Mark Thorne provided participants with an opportunity to look at the effects of different production trials, monitoring techniques, and sustainable grazing management practices. At the business vendor and educational displays, participants had an opportunity to visit with the various vendors and view educational displays including information on determining the cost of production for a cow/calf operation (provided by Dr. Linda Cox, CTAHR Agricultural Economics Specialist), using grazing to reduce the threat of wildfire (West Hawai'i Wildfire Management Organization), sheep production in Hawai'i (Hawai'i Sheep Producers Association), and how climate influences forage quality and quantity (Dr. James Carpenter, CTAHR researcher). In addition, there were displays provided by the NRCS, Society for

Range Management, Hawai‘i Grazing Lands Conservation Coalition, and other organizations. There were two primary goals for this year’s educational program:

- 1) to provide participants with information on sustainable management practices that will be used in their operations
- 2) to increase the awareness of the participants about the opportunities, trials, and needs to successfully implement sustainable management practices.

In response to the information provided on the benefits of early weaning, at least one Waimea ranch has started an early weaning program.

A proceedings of this year’s program was published and provided to participants. To request a copy, please contact Dr. Thorne. Funding was provided in part by the USDA Natural Resources Conservation Service through the Grazing Lands Conservation Initiative. Mahalo also to the Mauna Kea Soil and Water Conservation District, the USDA Farm Service Agency, R.R. Olson, BEI Hawai‘i, DuPont, Inc., United Agricultural Products, Allied Machinery, Kamuela Deli, J.J. Andrade Meat Market, Hawai‘i Johns, KTA Superstores, and Kamuela Farms for their support.

## Hawai‘i Grazing and Livestock Management Academy

*Mark Thorne. Cooperator: Haleakala Ranch*

### Purpose and Goals

The purpose of the Hawaiian Grazing and Livestock Management Academy is to provide an education program to livestock producers, state and federal land management personnel, and University of Hawai‘i faculty and extension personnel focused on sustainable grazing and livestock management practices. This program will provide approximately 40 hours of combined field and formal instruction to participants. Topics will be taught in modules to participants on Hawai‘i, Maui, Kaua‘i, and Moloka‘i from May through December 2006.

### Topics Covered Include

- economics of range-based livestock enterprises
- ecosystem processes
- individual plant and community responses to environment
- setting successful ranching goals
- grazing management principles
- monitoring methods
- animal nutrition
- animal reproduction
- supplementation



This educational outreach project is supported by the USDA Natural Resources Conservation Service. Funding amount for the project is \$53,152. The project began in October 2004 and will terminate in December 2006. The project director is Mark S. Thorne; project cooperators are Glen Fukumoto, Michael DuPont, Lincoln Ching, John Powley, and Glenn Teves; beef industry cooperator is Greg Friel.

## Livestock Production “Down Under”

*Lincoln Ching*

A CTAHR Beef Initiative team (Dr. Linda Cox, Glen Fukumoto, and Lincoln Ching) visited New Zealand in March 2005 to learn about their sustainable livestock production methods. New Zealand is considered the world leader in sustainable agricultural production and marketing systems. The team visited livestock production systems, slaughter and processing units, and universities.

With the removal of all agricultural subsidies in 1984, New Zealand’s agricultural production is intensive and focuses on profit. Much of the landscape has been altered to accommodate agriculture with the intent of producing a consistent supply of high-quality products for export.

With ample rainfall and good soils, excellent productivity is maintained in the hill country for cow and ewe herds. The fertile alluvial plains are where most forage finishing is done, and forage quality is the producers’ primary concern. Producers alternate agricultural crops with selected forages considering its quality, stocking rate, pasture performance, and animal nutrition, and they thoroughly understand the herd’s dry matter needs and the forage’s energy production.

Intensive grazing is evident. “Technosystem,” a patented intensive-grazing pasture system, finishes dairy bulls under an irrigation regime. It consists of narrow parallel grazing lanes separated by high-tensile electric fences, traversed over with an ATV adapted with special skids.

Almost all ruminants (sheep, beef cattle, and dairy bulls) are grass-finished. Some producers raise dams for calving and lambing in the spring. All wean-outs are marketed to other producers for forage-finishing.

Five million pounds of beef is produced annually with more than 80% exported. The annual NZ beef slaughter consists of one third Angus Hereford quality, grass-finished crossbreds, one third Holstein Friesian bull beef, and one third cull cows (beef and dairy). Meat inspected slaughter/processing facilities purchase cattle directly from producers and operate under the procedures and guidelines of the purchasing import countries including the USA, Japan, and Korea.

The “New Zealand Study Tour Report” can be requested by contacting Lincoln Ching by e-mail at [chingl@ctahr.hawaii.edu](mailto:chingl@ctahr.hawaii.edu) or by telephone, 808-274-3471.





## Community Outreach

### 10th A Taste of the Hawaiian Range Food Festival Sets New Attendance Record

*Glen Fukumoto, Event Chairman*

Nearly 2,250 hungry fans of forage-fed meat attended the A Decade of Mealani's A Taste of the Hawaiian Range Agricultural Festival, held at the Hilton Waikoloa Village on September 16. The Taste is an educational event providing a venue to raise public awareness of livestock agriculture and support for local agricultural products in Hawai'i. Thirty chefs donated their time and expertise to the event, which is sponsored by CTAHR's Cooperative Extension Service and Mealani Research Station. An additional 35 booths featured displays by vendors, agricultural associations, and the college. Twenty-four Big Island producers donated vegetables to complement the beef, pork, mutton, lamb, goat, poultry, and sausages provided by Hawai'i ranches and farms. In all, 89 individuals and businesses contributed to make the event possible.



This year's event featured awards to local producers in recognition of their dedication to the food show and the community. These went to rancher Rick Habein, who was named Outstanding Rancher, and to Wendell Kawano, Kawano Farms, Inc. Governor Linda Lingle recognized each award recipient with a proclamation. The event was featured on the Pacific Fusion television show, hosted by former Miss Universe Brooke Lee. Show #6 aired on *PACIFIC FUSION*, an innovative and dynamic weekly television magazine that explores and illuminates the diversity and flair of Asian-Pacific-American people and lifestyles in the major television markets of the San Francisco Bay area, Honolulu, and Seattle and other cable programs: ImaginAsianTV, America One TV, Dish Network Colours Channel, and Urban America TV. Food writers have rated this CTAHR event as one of the best-valued food events in the state of Hawai'i, attracting guest from all major Hawaiian islands, 22 mainland states, and 5 foreign countries.

A big mahalo to the many donors, sponsors, supporters, and volunteers from CTAHR and the community who make the Taste possible. Mahalo nui to Jane Testa, Diane Ley, and Margarita Hopkins of the Department of Research and Development, County of Hawai'i, and to the Hawai'i Tourism Authority for their support of the program. Thanks to all 19 produce farmers and 18 ranchers who provided the freshest and highest quality products on the island. Thanks also to Hilton Waikoloa for providing a wonderful venue for the event. Many thanks to the members of the Planning Committee, especially from the community and local businesses: Rick Habein (Habein Livestock Co.), Chef Willie Pirngruber (Hilton Waikoloa Village), Chef Miles Togikawa (Waikoloa Beach Marriott), Tom Asano (Kulana Foods, Ltd.), Mary Lelewi (Big Island Farm Bureau), and Craig Pagaduan, Len Hiraoka, Leanne Pletcher, Kenny Omiya, and Michael Blaksteen of the Hilton Waikoloa Village. CTAHR planning committee members included Merrissa Uchimura, Michael DuPonte, Mark Thorne, Randy Hamasaki, Milton Yamasaki, and Glen Fukumoto.

## Special Features

### Aloha ‘Dr. Phil’ on Your Retirement



As many in the ranching industry know, Dr. Philip Motooka, Extension Specialist in Weed Science, retired at the end of 2004. The Beef Initiative Group would like to take this opportunity to acknowledge his contributions and *mana‘o* to the entire extension team throughout the state of Hawai‘i about the exciting world of weeds and, most importantly, how to control them in our pastures, rangelands, and natural areas.

A Honolulu native and CTAHR alumnus, Motooka received BS and MS degrees in soil science from UH and a PhD in weed science from North Carolina State University. He served UH for more than 30 years on Kaua‘i, O‘ahu, and the Big Island. In his work for CTAHR, he established the herbicide susceptibility of many weeds and developed labor-efficient methods for weed control. He is the lead author of *Weeds of Hawai‘i’s Pastures and Natural Areas: An Identification and Management Guide* (UH-CTAHR, 2003), a valuable resource for ranchers, dairy farmers, land managers, and conservationists. Dr. Phil

remains committed to his profession and continues his work today...looking for the “perfect herbicide”...or is it the “perfect weed”?

As we bid aloha to Dr. Phil, CTAHR remains committed to raising public awareness of how invasive species threaten Hawai‘i’s pasture, rangelands, and natural areas and to developing innovative methods to address this threat.





## Water ... the heart of the ranch

Clouds the tradewinds bring  
The mountains they surround and embrace  
Dew form on the 'ōhi'a  
Droplets fall down into the lava

On the slopes emerge the springs  
Clear, crystal and cool, the water runs  
Bubbling, splashing down the open pasture  
Turning the land lush with green

The cowboy on his horse, the land he surveys  
Steward he must be, to the resources at bay  
Water, his horse and cattle vibrantly refresh  
A resource he treasures and nurtures to his best

Water, water all over the earth it surrounds  
Merely 0.3 percent for man is fresh and sound  
From irrigation to nourishment, this water serves  
Without it, all life perishes

So come to the mountains, visit the aina  
Where the wind blows and grasses dance in waves  
Rustling waters are melodies from the streams  
Sshh . . . listen, the abundance of life this water  
brings

CN Lee

## Scholarly Achievements

### Publications, Proceedings, and Other Reports

Proceedings: 2005 Mealani Forage Field Day, 2005. eds. Mark S, Thorne and Linda J. Cox. UH-CTAHR, 60 pp.

Cox, Linda J., Q.A. Edwards, M. Thorne, and G. Fukumoto. 2005. Calculating the Cost of Production for a Cow-Calf Operation. UH-CTAHR publication LM-11, 15 pp.

Cox, Linda J. 2005. Cost of Production and Marketing Options. Proceedings, 2005 Mealani Forage Field Day, UH-CTAHR, p. 31.

Ching, Lincoln. 2005. New Zealand Livestock and Forage Production Methods. Proceedings, 2005 Mealani Forage Field Day, UH-CTAHR, p. 32–33.

DuPonte, Michael. 2005. The Mealani Genetic Improvement Program Using Performance Records on the Beef Herd. Proceedings, 2005 Mealani Forage Field Day, UH-CTAHR, p. 36.

DuPonte, M., J. Dobbs, H.M. Zaleski, and Y.S. Kim. 2005. Eating quality of forage-finished beef produced in Hawai'i as compared to the imported mainland beef. *J. Anim. Sci.* 83[Suppl. 1]:159.

Fukumoto, G., L. Ching, and L. Cox. 2005. New Zealand Study Tour Report. CTAHR Beef Initiative Program, UH-CTAHR, 7 pp.

Fukumoto, G.K., and Y.S. Kim. 2005. Improving tenderness of forage-finished beef using a mechanical tenderizer. CTAHR Beef Initiative Program. UH-CTAHR.

Fukumoto, G.K. 2005. A decade of Mealani's A Taste of the Hawaiian Range, 1996–2005. Proceedings, 2005 Mealani Forage Field Day, UH-CTAHR, p. 34–35.

Kim, Y.S., M. DuPonte, G. Fukumoto, and J. Yang. 2005. Improving meat quality of forage-finished cattle grown in Hawai'i. Proceedings, 2005 Mealani Forage Field Day, UH-CTAHR, p. 39–42.

Kim, Yong Soo. 2005. Carcass Characteristics of Forage-Finished Cattle Grown in Hawai'i. Proceeding, International Joint Symposium: Current Trends and Issues in Animal Production. Jinju National University and University of Hawai'i at Mānoa, Honolulu, p. 147–164.

Lee, C.N. 2005. Heat Stress in Cattle: Knowledge and Applications. Proceedings, 2005 Mealani Forage Field Day, UH-CTAHR, p. 17–22.

Thorne, Mark S. 2005. Integrated Management for Control of Fireweed: An Adaptive Management Approach. Proceedings, 2005 Mealani Forage Field Day, UH-CTAHR, p. 23–30.

Thorne, M. S., J.S. Powley, and G.K. Fukumoto. 2005. Fireweed Control: An adaptive Management Approach. UH-CTAHR publication PRM-1, 8 pp.

Yang, J., M. DuPonte, B. Zhao, G Fukumoto, and R. Ferreira. 2005. Development of DNA markers for genetic improvement of forage-based beef cattle in Hawai'i. Proceedings, 2005 Mealani Forage Field Day, UH-CTAHR, p. 37–38.

## Project Web Sites

Fukumoto, Glen K., and Linda J. Cox. 2005. CTAHR Beef Initiative Program. UH-CTAHR. <http://www.ctahr.hawaii.edu/paniolo>

Fukumoto, Glen K., and Merrissa Uchimura. 2005. A Taste of the Hawaiian Range. UH-CTAHR. <http://www.ctahr.hawaii.edu/taste>

Thorne, M.S., E. Herring, and G.K. Fukumoto. 2005. Hawai'i Rangelands. UH-CTAHR. <http://rangelands.manoa.hawaii.edu>

## Extension Presentations, Seminars, Workshops, Facilitations, and Short Courses

Calf-XL. A one-hour workshop at the 2005 Mealani Forage Field Day, September 17, 2005, Kamuela, Hawai'i.

Cost of Production and Marketing Options. A half-hour presentation at the 2005 Mealani Forage Field Day, September 17, 2005, Kamuela, Hawai'i.

Extension Study Tour. A ten-day study tour in New Zealand to examine beef cattle production, March 12–March 22, 2005.

Calculating Your Cost of Production. A one-hour presentation at the Cowboy College sponsored by the Hawai'i Cattlemen's Council, November 19, 2004, Kailua-Kona, Hawai'i.

## Grant Proposals Funded

Thorne, M.S., L.J. Cox, J. Deenik, and H. Keyser. 2005. Best Management Practices for the Remediation of Former Sugarcane and Pineapple Lands for Sustainable Livestock Production in Hawai'i. Submitted to USDA, CSREES Special Grant for Tropical and Subtropical Agriculture Research. Proposal request \$262,013.

Thorne, M.S., and J. Carpenter. 2005. Hawai'i Animal Performance and Forage Production Profiling Project. USDA NRCS, \$17,110.

Thorne, M.S. 2005. Assessment of Fuel Loads and Natural Resource in the Pu'uwa'awaa Ahupuaa Management Area. West Hawai'i Wildfire Management Organization, approximately \$100,000.

Thorne, M. 2004. Mealani Forage Field Day Educational Outreach. USDA NRCS, Grazing Lands Conservation Initiative Program, \$10,500.

Thorne, M.S. 2005. Mealani Forage Field Day Educational Outreach. USDA NRCS, Grazing Lands Conservation Initiative Program, \$8,800.

Thorne, M.S. 2004. Hawai'i Grazing and Livestock Management Academy. USDA NRCS, \$53,152.

Thorne, M.S. 2004. Best Management Practices for the sustainability of Hawai'i's Range and Pasture Lands. USDA CSREES Integrated Hatch-Smith Lever, \$50,000.

Fukumoto, G.K. 2005. A Taste of the Hawai'ian Range Food Festival. County of Hawai'i, Department of Research and Development, and Hawai'i Tourism Authority. \$33,500.

## Pending Research Proposals

Thorne, M.S., C.N. Lee, and L.J. Cox. 2005. Forage and calf management considerations for optimizing the economic significance of early weaning in tropical environments – An inter-basin T-STAR research cooperation. Submitted to CTAHR for USDA-CSREES Tropical and Subtropical Agriculture Research Program funding. Proposal request: \$207,364.

## Team Members

### Agents and Specialists

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Dan Nakasone, Brainstorm Marketing, Inc.

### FUNDED BY

USDA CSREES Special Grant, 2004-34172-15187

Hawai'i Agricultural Diversification, New Crop/Product Development and Marketing

USDA, CSREES, Special Grant 2005-34172-16441

Hawai'i Agricultural Diversification, New Crop/Product Development and Marketing

### COOPERATING AGENCIES

Hawai'i Department of Agriculture

Hawai'i Department of Land and Natural Resources, Division of Fish and Wildlife

USDA, Natural Resources Conservation Service

Hawai'i Cattlemen's Association

Hawai'i Grazing Lands Conservation Initiative Coalition



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