United States Department of Agriculture

Hoolehua Plant Materials Center FY2024 Report of Activities

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Plant Materials Centers (PMC) support resource conservation as part of the Natural Resources Conservation Service (NRCS). The Hoolehua Plant Materials Center (HIPMC) is one of 25 Plant Materials Centers that serve NRCS Field Offices around the country (Figure 1). The service area of each PMC is based on unique environmental conditions, and together, the PMCs cover the broad environmental ranges within the United States. PMCs select conservation plants and develop innovative planting technology to address today's natural resource challenges and help maintain healthy, productive farms and ranches. This report is a summary of activities the HIPMC conducted from October 1, 2023, to September 30, 2024.

Figure 1. The Hoolehua Plant Materials Center occupies 80 acres in the central part of the island of Molokai, Hawaii.

Studies

Monthly forage potential yield for tropical grasses, part II

Conservation planners across the Pacific Islands Area use the PIA Prescribed Grazing Tool to estimate available forage production in a client's pasture and recommend an appropriate stocking rate. Determining stocking rate is a critical management practice that seeks to balance the amount of forage livestock consume with the amount of forage available in a pasture to ensure enough grass is left unconsumed to cover the soil and prevent soil erosion. In a study conducted in FY2020-2022, the HIPMC successfully developed monthly forage yield curves for five of the major forage grass species grown in the PIA. These yield curves were incorporated into the PIA Prescribed Grazing Tool to improve the accuracy of available forage production estimates. A follow-up study was initiated this year to define monthly yield curves for an additional seven forage grass species recommended by NRCS.

Figure 2. J. Colon (Biological Science Technician) evaluates the health of a grass plot for the forage yield study at the HIPMC.

Establishment of the multi-species grass plots started with seedling production in November 2023. Sprigs of bahia (*Paspalum notatum*), bermuda (*Cynodon dactylon*), digit 'Mealani' (*Digitaria eriantha*), 'Mulato II' (*Urochloa ruziziensis x U. decumbens x U. brizantha*), St. Augustine (*Stenotaphrum secundatum*) and star 'Puerto Rican' (*Cynodon nlemfuensis*) grasses were planted into media-filled tray cells to produce a grand total of 4,300 plantlets. On March 6 – 8, 2024, the plantlets and seed of buffel (*Cenchrus ciliaris*) and Rhodes (*Chloris gayana*) were planted into plots 5 x 25 feet in four blocks (figure 2).

The grasses were well-watered and -fertilized for establishment over a period of eight months. Once-a-month yield evaluations will begin in December 2024 and continue for two years. The new monthly yield curves for the remaining seven species will be incorporated into the PIA Prescribed Grazing Tool to expand and improve the yield estimates. This improvement will help ranchers to better manage grasslands across the PIA.

Outreach

In the Pacific Islands Area, many ranchers are unlikely to have specialized equipment, such as a no-till drill or disc, to establish forage grasses. In Hawaii, 68% of beef cattle producers have less than 20 animals. In Guam, there are 21 cattle producers with a total of 97 animals. Therefore, the PIA State Grazing Land Specialist Carolyn Auweloa challenged the HIPMC to develop a method to establish grasses without the use of any specialized tillage and planting equipment.

From 2021 to 2023, HIPMC devised a method to establish forage grass using UTV-sized equipment to broadcast seed. HIPMC staff used well-known management practices such as selecting adapted varieties and species, using an increased seeding rate, controlling weeds prior to planting, managing residue, and synchronizing planting date with seasonal rain. After developing the method on small plots, it was successfully implemented on a larger 1.6 acres plot belonging to a cooperating rancher as reported in FY2023.

Figure 3. David Duvauchelle (Manager, HIPMC) explains the management practices to establish a 1.6 acre plot of forage grass (in background) to representatives of two neighboring ranches and the Department of Land and Natural Resources at a ranch in Kainalu, Hawaii.

This year, the cooperating rancher graciously allowed the Kaunakakai Field Office and HIPMC to hold a field day to display the 1.6 acres plot to neighboring ranchers. On February 15, 2024, four representatives from two local ranches and the Hawaii Department of Land and Natural Resources were shown the established forage grass plot (figure 3). The participants were surprised that such results could be obtained from broadcasting seed without the use of specialized equipment. This simple technique will be further refined to make it applicable to a wider range of environments and documented to share the findings with conservation planners and ranchers across the Pacific Islands Area.

Technologies

Plant Suitability Tool created using the Stage-Gate product development process

The Stage-Gate product development process to create customer-focused products was initiated last year at the HIPMC. The Stage-Gate process has five stages that begin with discovering customer problems and ends with launching products that resolve the customer problems. Between stages are decision points called gates where the decision to continue developing the product, or not, is made.

The product development process ensures each product is relevant to the customer by involving the customer at two key points. First, the customer problems are uncovered and second, the customer decides which solution fits them best in their day-to-day work challenges. Furthermore, oversight by the Assistant Directors for Technology and Field Operations ensures that the resources used to develop the product are used efficiently and expeditiously. The timeline for the development of the plant suitability tool, from Discovery Stage to Gate 4, is summarized in Table 1. The Discovery Stage and Gate 1 activities were completed from May to October 2023. Solution ideas were generated from November to December. The Field Office staff voted for solution ideas in January 2024. Product planning and development for the plant suitability tool was accomplished from March to September. The tool was launched in November 2024. Ten other solution ideas are in queue to be developed into conservation products. The overall assessment of this process is that time taken to understand Field Office concerns and collaborate with specialists on solutions are critical to make the end-product relevant and effective for the customers that HIPMC serves.

Figure 4. J. Colon (left, Biological Science Technician, HIPMC) and R. Ogoshi (right, Agronomist, HIPMC) collect a soil sample and observe presence/absence of five plant species near Puu Kaeo on Molokai Island, Hawaii, to test the accuracy of a recently developed plant suitability tool.

Table 1. Timeline for development of a plant suitability tool using the Stage-Gate product development process.

	2023								2024								
Stage/Gate	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S
Discovery Stage: Field Office staff challenges solicited	X	X	X	X	X												
Gate 1: HIPMC compile Field Office challenges					X	X											
Stage 1: HIPMC/specialists generate 24 solution ideas							X	X									
Gate 2: Field Office select 11 of 24 solution ideas										X							
Stage 2: Product development planning											X						
Gate 3: ADT, ADFO approval											X						
Stage 3: Develop and test product												X	X	X	X	X	X
Gate 4: ADT, ADFO approval of final product																	X
Stage 4: Launch product																	

Prescribed Grazing Tool revision

The PIA Prescribed Grazing Tool is essential for conservation planners who collaborate with ranchers to balance the amount of forage animals consume and the amount of forage available for consumption. Many factors must be considered simultaneously to achieve the balance such as stocking rate, livestock class, grass species, rainfall, number of paddocks, and rest period. The PIA Prescribed Grazing tool was revised with the aim to simplify its use. The major changes included re-ordering the factors that affect animal-forage balance and making information at critical decision points easily accessible. Implementation Requirement forms were also included in the tool.

The most important change was the inclusion of a climate database into the tool. In the prior tool, climate data needed to run the tool was obtained from a website hosted by the University of Hawaii. However, the University of Hawaii removed the website last year leaving no easily accessible source for this essential data. So, the HIPMC developed a new climate database based on data from the National Oceanic and Atmospheric Administration. The climate data was organized in such a way that made access only a few drop-down windows away. This change along with the previously mentioned changes put essential data to run the Prescribed Grazing Tool at the fingertips of conservation planners to help them produce results more efficiently than before.

Technology Transfer

- Plant Guide: Gliricidia
- Plant Suitability Tool, Vegetation Specification v.1.1
- PIA Prescribed Grazing Tool
- Final Study Report: Field plantings on forage establishment in the Pacific Island Area https://www.nrcs.usda.gov/plantmaterials/hipmcsr14129.pdf
- Final Report: Monthly yield potential for tropical forages https://www.nrcs.usda.gov/plantmaterials/hipmcsr14154.pdf

HIPMC Staff Change

Benson Bicoy (Biological Science Technician) left his position at the HIPMC for another job on February 21, 2024. He was a highly valued member of the HIPMC since September 12, 2022, performing every task he was given well (figure 5). He is a humble, hard-working man with a positive attitude. The HIPMC staff will sorely miss him and wish him well at his new post.

Figure 5. John Colon (left, Biological Science Technician) and Benson Bicoy (right, Biological Science Technician) measure cover crop height and weight per square foot at the Hoolehua Plant Materials Center. Mr. Bicoy was a highly valued staff member from September 12, 2022, to February 21, 2024.

Hoolehua Plant Materials Center - FY2024 Progress Report of Activities

Who We Are

The HIPMC is one of 25 centers operated by the NRCS. The HIPMC services the PIA which includes the State of Hawaii, American Samoa, Guam, Commonwealth of Northern Mariana Islands, The Federated States of Micronesia, The Republic of Palau, and The Republic of the Marshall Islands. The HIPMC was initially established on the island of Maui in 1957 and was later relocated to the island of Molokai in 1973.

What We Do

The mission of the NRCS Plant Materials Program is to assemble and test plant species for use in conservation programs to solve natural resource concerns. The program's vision is to function as the plant experts for NRCS, fully integrated and coordinated with technical and field office staff, developing, and delivering vegetative solutions and conservation technology for NRCS customers. In working with a broad range of plant species, including grasses, forbs, trees, and shrubs, the program seeks to address priority plant needs of the NRCS field offices and land managers in both public and private sectors. Where practical, the use of native plants to solve conservation problems and to protect and restore ecosystems is emphasized.

HIPMC Staff

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