Horticulture in the Tropics—Hawaiian Style

Hawaii’s location as the only state situated in the tropics provides unique opportunities for the state’s horticultural industries and for the study of tropical horticultural crops. Hawaii is the southernmost of the 50 states, located about lat.20°N. The eight main islands are part of the Hawaiian Islands chain that extends to Kure Atoll. About 80% of the 1.1 million people reside on the island of Oahu, with the remainder distributed between Niihau, Kauai, Molokai, Maui, Lanai, and Hawaii. Perhaps best known as a tourist destination, the state also has a large agricultural sector that complements the tourist industry. Hawaii’s topography provides opportunities for production of a wide variety of tropical, subtropical, and temperate crops. Its highest mountain peaks, Mauna Loa and Mauna Kea, exceed 3965 m (13,000 ft) in elevation and may be snow-capped until early summer. Haleakala, on Maui, reaches more than 3050 m (10,000 ft). On the slopes of these mountains may be found temperate fruit, vegetable, and ornamental crops.

Hawaii’s agriculture has long been dominated by its major crops—sugarcane and pineapple. These plantation crops are almost entirely farmed by corporate entities. Although these remain the largest agricultural crops, both are in decline. Urban pressure and the declining economic viability of sugar and pineapple have reduced the total hectarage of the declining economic viability of sugar and pineapple have reduced the total hectarage of the state to the current phasing out of pineapple on the island of Lanai. 9153 ha (22,600 acres) produce a crop with values in 1989 of $62.3 million. Well beyond this figure is the value of Hawaii landscaping service, which has recently been estimated at $312 million.

The visitor’s first encounter with Hawaii’s floriculture is usually the flower lei received upon arrival. Orchids, plumerias, ginger, tuberoses, jasmine, carnations, and roses are among the most popular of these flowers. The last decade has seen a new interest in lei-making that has created a demand for more exotic flowers. The cut flower industry is an important supplier to the tourist industry and export markets. Anthuriums and dendrobium orchids are the most important of these. The Univ. of Hawaii has played a major role in the success of these industries, providing them with new cultivars that meet the needs of the market. Other flowers of importance are proteas, heliconias, and gingers, which are increasing in popularity. Potted flowering plants, such as a wide variety of orchids, poinsettias, and chrysanthemums, are also important crops.

A major product of the ornamental industries is potted foliage plants, the production of which was valued at nearly $15 million in 1989. Many other ornamental and trees are produced for landscaping. Rapid growth in hotel construction has fueled the requirement for landscaping plants and services. Accompanying the hotel construction has been a rapid expansion of golf course development, also creating demand for ornamental plants and services. The major sites for production of floricultural and nursery crops are the islands of Oahu and Hawaii.

Fruit and nut crops

Undoubtedly the best known of Hawaii’s fruit crops is the pineapple, most of which is grown for processing. In recent years, increasing amounts of fruit are produced for the fresh market. Hectarage of pineapple has declined in recent years, the latest evidence of which is the current phasing out of pineapple on the island of Lanai.

The past 40 years have seen major commercialization of the macadamia nut in Hawaii. This native Australian tree was introduced to Hawaii in the late 19th Century. At present, 9153 ha (22,600 acres) produce a crop with farm value exceeding $40 million annually.

Development of the fresh fruit industries has been limited by plant quarantine restrictions on movement of many commodities to the U.S. mainland. Many fruits are host to several species of fruit flies that are found in Hawaii. Only with approved disinfestation treatments can these commodities be shipped to the U.S. mainland. Many fruits are among these fruits, and heat treatments are available to disinfest them. Papaya production is centered on the island of Hawaii, with a small amount grown on Kauai and Oahu as well. This $14 million industry markets 30% of its fresh fruit locally and exports 70%. About 15% of the total crop is processed. Bananas are grown primarily on Oahu and Hawaii for local market, with a farm value of $4 million. Brazilian and Cavendish types are grown to satisfy local preferences. Guava is grown entirely for the processed market, primarily on Kauai and Hawaii.

Although the United States is a major coffee-consuming nation, few are aware that it is also a producer—in Hawaii! Until recently, coffee production was limited to a small region of the island of Hawaii—the Kona district. The coffee produced in Kona is considered to be one of the world’s finest. Renewed interest in high-quality coffees and a desire to diversify the agriculture bases from sugarcane have resulted in an expanded coffee industry that has grown from 810 ha (2000 acres) to 2835 ha (7000 acres). Further expansion is expected in the next few years. Most of this new hectarage is on Kauai, with other new developments occurring on Maui and Molokai.

Vegetable crops

Nowhere in Hawaii’s agriculture is the state’s cultural diversity reflected better than in its vegetable industry. Nearly all of the vegetable production is destined for local market, but the state is far from self-sufficient in these crops, producing only 30% of all fresh-market vegetables. Asian, Southeast Asian, and Pacific Island ethnic markets create demand for a wide variety of vegetables. A few are exported to fill market needs on the U.S. mainland. Selected environments are used to produce temperate as well as tropical vegetables.

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The Univ. of Hawaii was established in 1907 as a land-grant college of agriculture and mechanic arts called the College of Hawaii. In 1912, the school was moved to its present location in Manoa Valley, and a College of Arts and Sciences was established in 1920. Since then, Colleges of Business Administration, Education, Engineering, Continuing Education and Community Service, Health Sciences, and Social Welfare have been added, as well as Schools of Law; Architecture; Hawaiian, Asian, and Pacific Studies; Library and Information Studies; Ocean and Earth Science and Technology; and Travel Industry Management. The Manoa campus remains the largest campus of a system that also includes community colleges. Two additional 4-year campuses are located in West Oahu and Hilo.

The Univ. of Hawaii’s Dept. of Horticulture is one of 11 departments in the College of Tropical Agriculture and Human Resources that is based on the Manoa campus in Honolulu. Twenty of its 26 faculty are located on the Manoa campus, and the remainder are located at experiment stations on Kauai, Maui, and Hawaii. This faculty, which is known internationally for its expertise in tropical horticulture, serves the horticultural industries and the people of Hawaii through programs in instruction, research, and extension.

Instruction. Through its undergraduate program, the department offers a BS in Tropical Horticulture, with options in science, business, and production. At present, 22 majors are in the program. The MS and PhD degrees are also offered in horticulture. These programs attract students with particular interest in tropical horticulture. At present, the graduate student population of 35 represents Latin America, Asia, and the Pacific region, as well as the United States. Numerous experiment stations are available for students to conduct their thesis and dissertation research, which is conducted under the advisement of graduate faculty members.

Research. Research programs of the department focus on ornamental, fruits and nuts, and vegetables, but also include work on turfgrass, N-fixing trees, and weeds. Faculty expertise includes physiology, culture and management, breeding, genetic engineering, tissue culture, and weed control. Research faculty have been recognized nationally and internationally for their contributions. Results of their research can be seen in the cultivars and practices of today’s horticultural industries both in Hawaii and abroad.

Well-equipped laboratories are located in St. John Plant Science Laboratory on the Manoa campus. A short distance away, faculty and students conduct experiments at the Magoon Horticultural Facility, which has greenhouses, shadehouses, and a headhouse. Two experimental farms are also located on Oahu, at Waimanalo and Poamoho. These provide differing environmental conditions for field tests.

Faculty and students also have access to several experimental farms on Kauai, Maui, and Hawaii that provide varying soil and climatic conditions.

Extension. Five extension specialists who are part of the faculty conduct programs in fruits and nuts, ornamental, floriculture, and vegetables. A newly created position will serve the landscape area. Specialists work closely with county extension agents to serve commercial producers. They also plan and conduct workshops and conferences for commodity groups. A unique responsibility of extension specialists in Hawaii is their role as coordinator in the Industry Analysis process, which is a commodity-based analysis that serves to guide future research and extension activities toward solutions of industry problems.

Invitation

The faculty, staff, and students of the Dept. of Horticulture of the Univ. of Hawaii extend a warm Aloha and invitation to you to attend the 1992 ASHS meeting in Hawaii from 2-6 Aug. 1992. Come early and enjoy the preconference tours, which will be held on 31 July–1 Aug. on the Neighbor Islands!

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