

Taro

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Department of Agricultural and Resource Economics
College of Tropical Agriculture and Human Resources
University of Hawaii

By
Kevin M. Yokoyama, James R. Hollyer,
Stuart T. Nakamoto, and Kulavit Wanitrapha

CROP PROFILE

SPECIES

- There is a great deal of confusion surrounding the taxonomy of taro. Taro (cocoyam) is often used as a collective term for the edible aroids, of note the genera *Colocasia* and *Xanthosoma*. According to one classification scheme, there are two major varieties of *C. esculenta*, var. *esculenta* and var. *antiquorum*. The dasheen of the West Indies (which is generally referred to as taro in the Pacific) is considered var. *esculenta*, and the eddoe of the West Indies (generally referred to as dasheen in the Pacific and in Asia) is var. *antiquorum*. *Xanthosoma*, a Hispanic staple, has a similar appearance to *Colocasia* and is often confused with taro. Some common names for *Xanthosoma* are tannia, malanga, and yautia.
- In Hawaii, important varieties of taro are Chinese (Bun Long), poi (usually Lehua Maoli), Samoan (Niue), and Japanese taro (dasheen or araimo). The first three are varieties of *C. esculenta* var. *esculenta*; the fourth is a variety of *C. esculenta* var. *antiquorum*.

PRODUCTIVITY

- Taro is often categorized by the location where it grows, i.e., in the wet lowlands or the drier uplands. Wetland taro is planted like rice, while dryland taro is cultivated similarly to corn. The number of pieces of planting material required per acre ranges from 8100 to 16,200.
- Most taros mature six to 10 months after planting.
- FAO's 1987 worldwide production statistics for *Colocasia* note an average yield of 5200 pounds per acre.



- In experimental trials in Hawaii, intercropping dryland taro with other plants, especially legumes, appears to increase taro corm yields.
- Major diseases and pests of taro include *Phytophthora* leaf blight, *Pythium* rot, dasheen mosaic virus, and nematodes. *Phytophthora*, for example, can destroy up to 30% of a crop's final yield, and *Pythium* is capable of destroying the entire crop.

USES AND PRODUCTS

- The taro plant is widely used in the Pacific Islands, Africa, Asia, the West Indies, and Central and South America. The taro corm is fried, roasted, baked, or boiled.
- Nutritionally, the taro corm is high in carbohydrates and potassium, but low in calories and sodium.
- Taro has hypoallergenic properties that may make it appealing for the manufacture of specialty items such as baby food. The small starch grains (1 to 4 μm) are easily digested by those with stomach ailments.
- Some popular uses of the corm include the production of poi. This traditional Hawaiian food is considered a good first cereal for infants, and is sold fresh, dried, and in airtight containers. Yield of poi ranges from 25 to 60% by weight, depending upon the quality of the corms.
- Taro leaves can be eaten like spinach and the shoots like asparagus. A half cup of cooked leaves contains 97% and 39% of the U.S. RDA of vitamins A and C, respectively.
- Taro flour production was investigated in Hawaii as early as the 1800s, but successful commerciali-

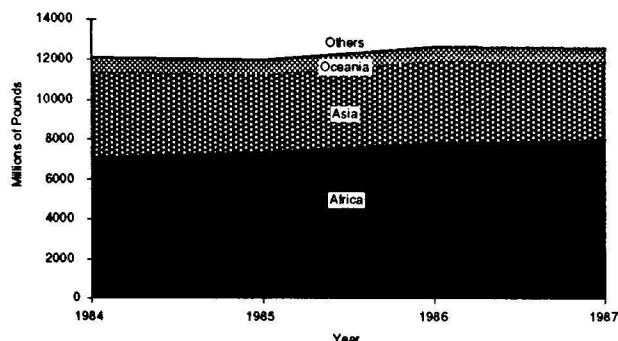
zation of this product has not yet occurred because of the availability of other inexpensive starches, e.g., cornstarch. The conversion yield of taro corm to flour is between 21 and 25%.

- Taro slices can be fried as chips. Approximately 30 pounds of chips can be made from 100 pounds of whole fresh taro. In Hawaii, Chinese taro is the preferred chipping variety because it can be fried without precooking, and the purple veins produce a unique-looking chip. However, due to the large and irregular shape of corms, large-scale production may be somewhat limited because of constraints in mechanization.
- In experimental trials, cooked taro packaged in airtight containers retained its original flavor and texture.
- Some other potential uses for taro corms include silage for animal feed, fabrication of cosmetics and plastics, and flavoring for ice cream.

WORLD SUPPLY AND DEMAND

TARO SUPPLY

- In 1987, 12.6 billion pounds of taro (*Colocasia*) were produced worldwide from 2,440,360 acres, according to the FAO Production Yearbook. Major producing regions are Africa (8 billion pounds), Asia (3.9 billion pounds), and Oceania (667 million pounds).
- In 1987, the countries of Oceania produced the following amounts, in millions of pounds: Papua New Guinea (411.4), Western Samoa (85.8), Tonga (66), Solomon Islands (52.8), Fiji (24.2), American Samoa (8.8), Kiribati (6.6), New Caledonia (6.6), Wallis (4.4), and Niue (2.2).



World Taro Production

TARO DEMAND

- Taro is consumed primarily in producing countries and is often the major dietary component.
- World trade statistics on taro are scarce because data are combined with those of other root and tuber crops. Limited information can be found under the Standard International Trade Classification (rev. 3) number 054.83.

U.S. MARKET

SUPPLY

- Domestic production of taro is limited, mostly to the states of California, Florida, and Hawaii. In 1988, the area under commercial cultivation was, in California, fewer than 20 acres of *Colocasia*; in Florida, 50 to 100 acres of *Colocasia* and 2000 acres of *Xanthosoma*; and in Hawaii, 430 acres of *Colocasia*.
- In 1986, 47.4 million pounds of fresh, chilled, or frozen taro (dasheen and tannia, TSUSA number 1360000) were imported to the United States. Major suppliers were the Dominican Republic (41,767,636 pounds), Costa Rica (1,995,663 pounds), Jamaica (1,219,104 pounds), and Western Samoa (888,202 pounds), accounting for 97% of the total. (Effective in 1989, the Harmonized Tariff Schedule of the United States number 0714.90 replaces TSUSA number.)
- Some producing countries have high quality standards for export taro. For example, the Dominican Republic sizes the corms, then individually wraps them in paper, and ships in boxes.
- Hawaii ships Chinese taro to the U.S. Mainland. The corms are ungraded, unsized, and shipped in 50-pound bags. Hawaii-grown Japanese taro is graded, but little if any is exported.
- Fresh and cooked taro leaves are supplied by Hawaii and countries such as Brazil, the Dominican Republic, and Jamaica.
- In Los Angeles, the price of taro root from Hawaii was 50 to 80 cents per pound on February 1, 1989. Taro from Costa Rica and the Dominican Republic was 50 to 75 cents per pound. For latest market information, contact the Federal-State Market News Service in Honolulu, (808) 548-7161; Los Angeles, (213) 894-3077; San Francisco, (415) 556-5587; Seattle, (206) 764-3753; New York City, (212)



Concentration of Asians, Pacific Islanders, and Hispanics: Present and Potential Markets for Taro

542-2225; Chicago, (312) 353-0111; Miami, (305) 326-1254; and Houston, (214) 767-5375.

DEMAND

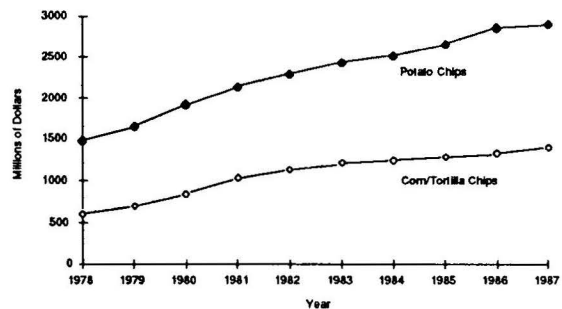
Corn and Leaf Market

- Taro corms are a traditional part of the diet for many immigrants to the United States. Some Asian, Hispanic, and Pacific island people prepare and eat them like a potato. Others consume them in soups or as a complementary vegetable.
- In some Oceanic countries, the edible aroids are the most widely consumed starchy staple, followed by sweet potato, cassava, and yam. For example, in Western Samoa, the average daily per capita consumption of taro is 1 to 1.5 pounds.
- Asian, Hispanic, and Pacific islander populations are heavily concentrated in California, Florida, Illinois, and New York. These locations and others are present and potential markets for fresh and processed corms and leaves (see map).
- A produce industry magazine, *The Packer*, lists buyers of taro root in California, Florida, New York, and Canada.

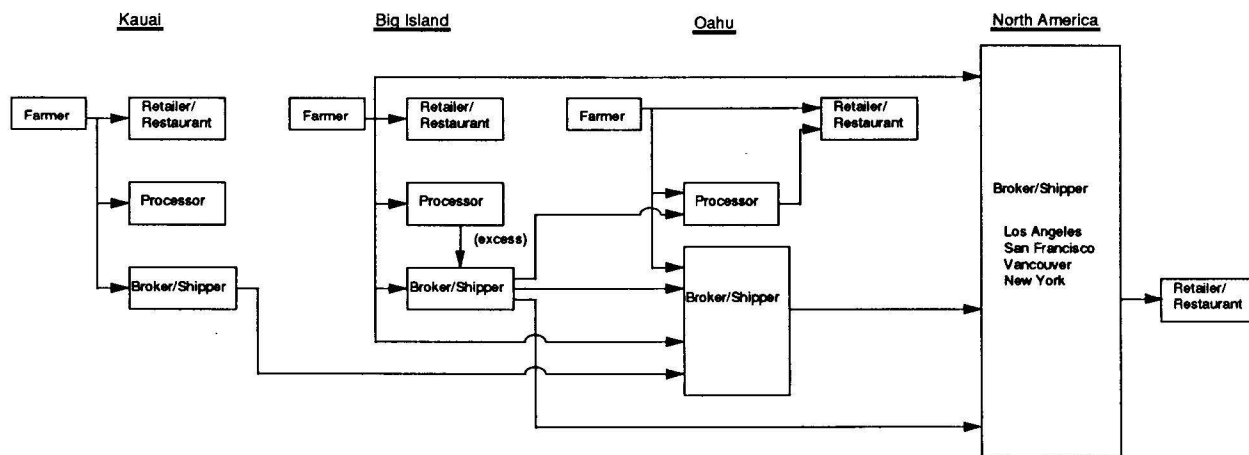
Possibilities: Snack Chip Market

- Eighty-three percent of all Americans snacked in 1987, and the snack food market is increasing despite the new health-conscious attitude. Estimated sales in this industry have grown from \$8.5 billion in 1978 to \$25.2 billion in 1987, up 4.2% from the previous year.

- In 1987, potato chips accounted for 11.5% of the total snack food sales, while corn/tortilla chips accounted for 5.6% of the market.
- Frito-Lay accounted for 33% of the \$2.9 billion potato chip market in 1987. Borden, Inc., sales were estimated at \$375 million. Other major manufacturers include American Brand, Eagle Snacks Division, Suncoa (Food Product) Division, and Heileman Baking Division.
- Chips are also made from various species of taro. For instance, in Western Samoa chips are made from *Xanthosoma*, while chips in Hawaii are made from *Colocasia*. Presently, there are five taro chippers in Hawaii.
- There is a potential for taro chips in the traditional chip market as well as in the novelty, upscale, and ethnic submarkets. Some examples are sweet-potato chips manufactured by Yammers (IHB Inc.) and Zapp's, and rainbow-colored potato chips marketed by Chips & Dips by Eula. Ethnic snacks include yucca, plantain, and cassava chips.



Potato Chips and Corn/Tortilla Chips Sales



Distribution Channels for Fresh Chinese Taro Corms in Hawaii

Possibilities: Baby Food Market

- Retail sales of baby foods in 1987 amounted to \$2.2 billion. Of this, cereals and vegetables accounted for 8% of the market, or \$16 million. Because taro is also a nutritious vegetable, it may be able to capture some of this valuable market.
- Up to 20 percent of the infants in the United States are said to be allergic to standard baby food made with eggs, milk, and cereals. Therefore, taro-based products, such as poi, may have a potential to satisfy some of this demand. Currently, there are 13 poi processors in Hawaii.
- Gerber Products Company had about 70% of the baby food market share in 1988. Other major manufacturers of baby foods include Beech-Nut Nutrition, and Heinz. The Thomas Grocery Register lists specialty baby food producers including Loma Linda Foods, Mead Johnson Laboratories, and Health Valley Natural Foods.

TARO IN HAWAII

- In 1988, there were 153 farms planting 420 acres of Chinese and poi taro in Hawaii. Total value for these two crops was \$1.9 million for the 6.8 million pounds harvested. An unknown number of farms planted 10 acres of Japanese taro in the same year, valued at \$147,000.
- Eighty farms grew the Chinese variety on approximately 110 acres. The value of the 1.1 million pounds produced was \$433,000. The average

statewide farm gate price for taro used in chipping and table consumption was 39 cents per pound. Typically, the higher quality table taro received 5 cents more per pound than did chipping taro.

- Chinese taro can be harvested in six to 12 months, poi taro in 12 to 18 months, and Japanese taro in seven to 10 months. The yields range from 8000 to 20,000 pounds per acre, 24,000 to 32,000 pounds per acre, and 20,000 to 25,000 pounds per acre, respectively.
- Nearly 50% of the Chinese taro was used for chip manufacture in 1988. The Big Island produced about 90% of this variety.
- Taro for poi was produced on 310 acres on 75 farms in 1988. The 5.7 million pounds were valued at approximately \$1.5 million, for an average farm gate price of 26.9 cents per pound. Sixty-one percent of the taro used for poi making was grown on Kauai.
- Hawaii consistently imports more taro for the fresh market than it produces. In 1988, Hawaii imported 615,000 pounds of fresh taro (*C. esculenta* var. *esculenta* Niue), accounting for 51% of the total supply. Major suppliers included American and Western Samoa, the latter accounting for the greater percentage. Sixteen percent of the total market supply of Japanese taro (43,000 pounds) was also imported in the same year.
- Hawaii exports taro primarily to the Los Angeles and San Francisco markets. Wholesalers on the West Coast cater to restaurants and retail outlets.