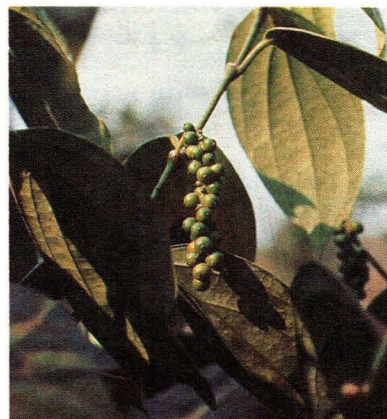


Pepper

Economic Fact Sheet #5
October 1989

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University of Hawaii

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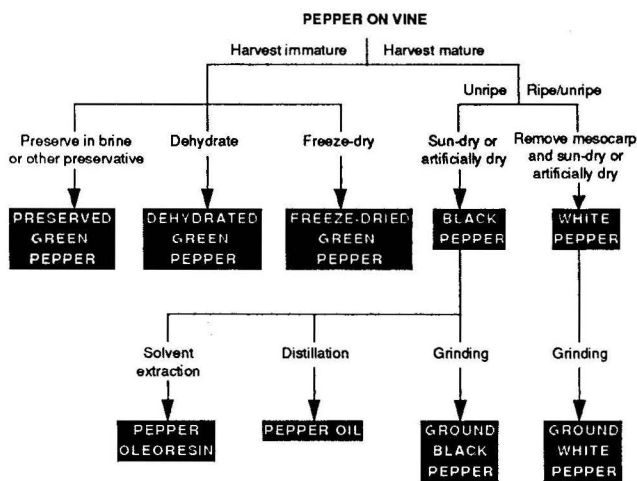
CROP PROFILE

SPECIES AND VARIETIES

- Pepper is a small berry of the tropical perennial vine *Piper nigrum*, a native of India. This crop, grown in Southeast Asia, Brazil, and other tropical areas, is found in various locations in Hawaii. It produces the black and white pepper spice and should not be confused with cayenne, chili, red, and sweet peppers belonging to the *Capsicum* spp.
- Balankotta and Kalluvalli are varieties grown on the Malabar Coast of southwestern India. Balankotta grows vigorously and has a reputation for high and regular yields. Kalluvalli is hardy, drought- and wilt-resistant, and regularly bearing.
- Panniyur-1, a hybrid variety, has yields three to four times higher than other varieties in India and is noted for high quality. Two promising new hybrids (known as No. 239 and No. 331) have recently been developed at the Pepper Research Station in India. These hybrids demonstrated a tolerance to various pests and diseases and produced larger yields than the Panniyur-1 variety in field trials.
- The Belantung variety is grown in Lampong, southeastern Sumatra, an island of Indonesia. It has large leaves and small berries and shows some resistance to foot rot, a major disease of pepper. The main variety grown in Indonesia for the production of white pepper is Muntok.
- Kuching and Sarikei are varieties grown in Sarawak, Malaysia. The high-yielding Kuching is very susceptible to foot rot.

PRODUCTS AND USES

- Black and white pepper are the two primary products of *P. nigrum* that are traded internationally. Black pepper is the dried unripe berry, while white pepper is the mature berry from which the mesocarp has been removed. Black pepper is used as a direct spice and is also processed into pepper oleoresin and oil. White pepper is used mostly as a direct spice. Black pepper is used in a wide variety of foods, particularly meat products, while white pepper is used in light-colored sauces, mayonnaise, and cream soups when dark particles are undesirable.
- Green pepper products are green, immature berries that have been freeze-dried, dehydrated, or canned in brine, vinegar, or citric acid. They are milder in flavor than black and white pepper and have a pungent taste. Green pepper products are served with steaks and are used in manufacturing pâté and cheese.
- Pepper oleoresin is obtained by solvent (e.g., acetone or alcohol) extraction of dried black pepper. Oleoresin yields of 10–13% have been reported from Indian Malabar pepper. This product has the aroma, flavor, and pungent properties of the spice and is used mainly to flavor processed foods. The extract offers certain advantages over natural spices, including consistency of quality, freedom from microorganisms, and ease of handling and storage. Pepper oleoresin is also used in certain pharmaceutical formulations.
- Black pepper oil is produced by steam-distilling crushed dried pepper. Yields of 1.5–3.5% are ob-



Processing of Pepper

tained in this process, and the oil is used in perfumery and in flavorings.

- Pepper is also used for various medicinal purposes. It has been used for ailments such as malarial fever, coughs, diarrhea, arthritis, constipation, and vertigo.

PRODUCTIVITY

- Pepper is a climbing vine that requires support. It may be trained to climb man-made supports, or it may be interplanted with other tree crops such as coffee, mango, cashew, and coconut.
- Pepper berries can be harvested two and one-half to three years after planting. Maximum yields are obtained between six and 12 years. The economic life of the pepper vine is usually 12–15 years, but production may continue for 25 years or longer.
- Pepper berries are hand harvested by nipping the spikes off the plant. The berries are then dried either by the sun or by artificial means. Approximately 25–28 lb of white pepper or 33–37 lb of black pepper are produced from 100 lb of newly picked mature fresh pepper.
- The average black pepper yields for major pepper producers India, Indonesia, Malaysia, and Brazil are 206 lb/ac, 474 lb/ac, 2369 lb/ac, and 2736 lb/ac, respectively. A yield of 12,000–16,000 lb/ac of fresh pepper has been obtained in a well-

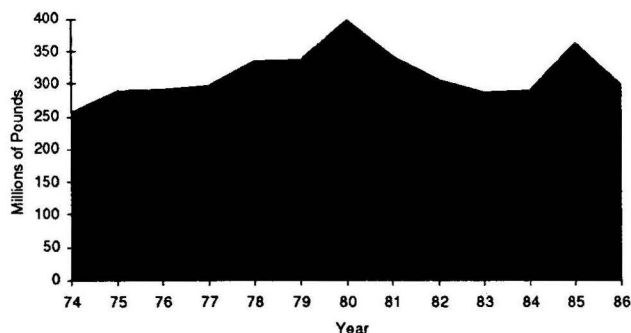
maintained, well-fertilized garden in Sarawak, Malaysia.

- The quality of black and white pepper is determined by its appearance, pungency level, aroma, and flavor, which depends primarily on the variety grown. Freedom from insect infestation and mold, and low levels of micro-organisms are also important. For black pepper that is intended for direct use as a spice, appearance is important; large, bold peppercorns with a uniform dark brown to black color command the best prices. A good uniform color, ease of grinding, and a mild flavor are the most important attributes for white pepper.
- Among the major diseases of pepper are foot rot, caused by *Phytophthora palmivora*, white root rot (*Fomes lignosus*), red root rot (*Ganoderma lucidum*), and die back, which is often caused by pink disease (*Corticium salmonicolor*) or by thread blight (*Marasmius scandens*). Some of the pests attacking pepper include pepper weevil (*Lophobaris serratipes*), *Dasynus piperis* and *Diconocoris hewitti* bugs, and pepper flea beetle (*Longitarsus negripennis*).

WORLD SUPPLY AND DEMAND

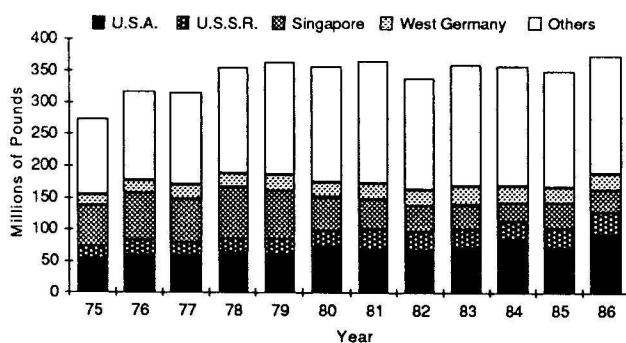
SUPPLY

- World pepper production increased from 257 million lb in 1974–75 to 296 million lb in 1986–87. Due to disease, adverse weather conditions, and the high cost of fertilizers and pesticides, production declined during the early 1980s. In 1986–87, India was the world's largest pepper producer, accounting for 29.7% (88 million lb) of the total world production. Other major producers were Indonesia (27.5%), Brazil (20.9%), and Malaysia (11.5%).



World Pepper Production

- India is also a major producer of pepper oil and oleoresin. In 1986–87, India exported about 464,200 lb of these products. Indonesia, Singapore, and Sri Lanka are among the other suppliers. Green pepper is also traded in limited amounts. Among the suppliers are Brazil, Madagascar, and India.
- Black and white pepper are normally marketed internationally according to geographic origin, based on the production area or port of shipment. The major types of black pepper are Malabar, Tellicherry, Lampong, Sarawak, and Brazilian. The major types of white pepper are Muntok, Sarawak, and Brazilian.
- Malabar and Tellicherry are the two principal types of Indian black pepper. Malabar is known for its aroma, pungency, and flavor. Tellicherry, which is large and consistent in size, is prized by gourmets. Lampong peppers compare well with Indian peppers in flavor, but are smaller and more pungent. Sarawak and Brazilian black peppers are milder in flavor than Indian and Lampong peppers.
- After several years of tight supplies and high prices, prices have recently declined. The annual average price of Tellicherry extra bold black pepper on the New York spot market increased from \$1.03/lb in 1980 to \$2.63/lb in 1987. During 1988, the average annual price dropped to \$2.21/lb.
- Prices vary among the different types of pepper. For example, during March 1989, the average prices on the New York spot market for Tellicherry extra bold black pepper, Lampong black pepper, and Brazilian black pepper were \$1.81/lb, \$1.63/lb, and \$1.59/lb, respectively.



World Pepper Imports

tively. Normally, the price of white pepper is higher than that of black pepper. During March 1989, the average price for Muntok white pepper was \$1.80/lb.

- In 1972, the International Pepper Community (IPC) was formed to stabilize prices, promote consumption, and ensure fair returns to growers. The members include India, Malaysia, Indonesia, and Brazil, and the IPC currently accounts for about 90% of world production.

DEMAND

- Pepper is the most important spice in the world in terms of the quantity traded. World pepper imports increased from 273 million lb in 1975, at a value of \$198 million, to 373 million lb in 1986, at a value of \$693 million.
- In 1986, the largest import market for pepper was the United States (93.2 million lb), followed by the U.S.S.R. (35.2 million lb) and Singapore (34.4 million lb). These countries together accounted for 43.6% of the total world pepper imports.
- Western Europe accounted for about 27.7% of the world's total pepper imports during 1986, at a value of \$215.8 million. West Germany imported the largest quantity (26 million lb) among Western European countries, followed by France (18.5 million lb) and the United Kingdom (10.5 million lb).
- Singapore is an important transshipment center for pepper, especially from Malaysia. Singapore channeled more than 57.9 million lb of pepper to the world market in 1986. Trade statistics indicate that Singapore exports more pepper than it imports. This occurs due to the various means by which products enter and leave the port of Singapore and the manner in which these transshipments are recorded. In addition, spices traded between Indonesia and Singapore are not officially recorded.
- *Spices: A Survey of the World Market*, published by the International Trade Centre UNCTAD/GATT, describes major spice markets. Names and addresses of importers, dealers, brokers, packers, grinders, and processors are included.

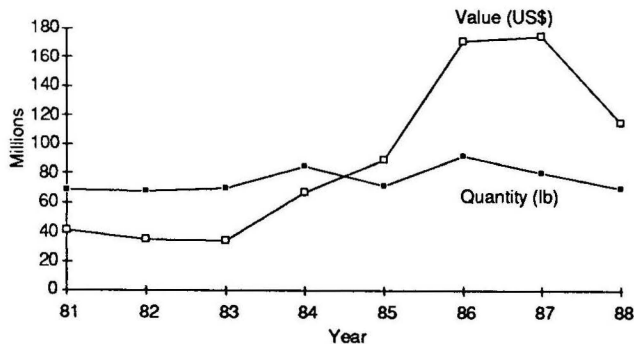
THE UNITED STATES MARKET

- In 1988, U.S. imports of specified condiments, seasonings, and flavoring materials were valued at \$349 million. The most significant of these is pepper, which accounted for 33% of the total value.
- The United States imported 100 times more unground pepper than ground pepper in 1988. Unground black pepper is the most popular pepper product imported.

1988 U.S. Imports of Pepper Products and Oleoresin

Product	Quantity (1000 lb)	FAS Value (\$1000)
Unground black pepper	59,267	95,161
Unground white pepper	9,518	19,276
Ground black and white pepper	682	774
Black pepper oleoresin	484	5,159

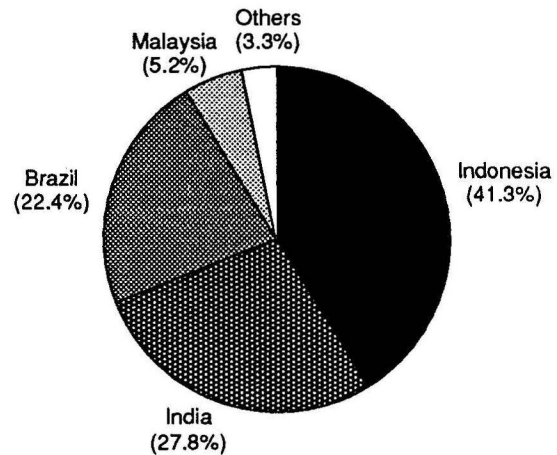
- The major suppliers of unground black pepper to the United States in 1988 were Indonesia (24.5 million lb), India (16.4 million lb), and Brazil (13.3 million lb). Indonesia was also the major supplier of unground white pepper, accounting for 96.4% of 9.5 million lb imported. The Republic of Korea and the People's Republic of China together accounted for 52.4% of the 682,000 lb of ground black and white pepper that were imported.
- While imports of ground and unground pepper remained relatively stable between 1981 and 1988, their value increased substantially, from \$41 million in 1981 to \$174 million in 1987, before declining to \$115 million in 1988.



Imports of Ground/Unground Black and White Pepper

Reference to a company or product name does not imply approval or recommendation of the product by the College of Tropical Agriculture and Human Resources, University of Hawaii.

Hawaii Agricultural Experiment Station, HITAHR, College of Tropical Agriculture and Human Resources, University of Hawaii at Manoa. Noel P. Kefford, Director and Dean.



Major Suppliers of Unground Black Pepper to the United States, 1988

- The quantity of imports of black pepper oleoresin reached a record high of 484,000 lb in 1988, at a value of \$5.1 million. Major suppliers were Singapore (53.5% of the total U.S. imports), India (29.7%), and Sri Lanka (11.0%).
- It has been estimated that approximately 60% of U.S. spice sales are directed to the food-processing sector and to institutional users, with the remainder sold through retail outlets. Statistics on the amount of pepper that is directed to various outlets are unavailable.
- In the food-processing sector, the largest users of spices are packers of meat products, such as Esmark, Armour Food Co., Hormel, and Oscar Mayer. Among the major grinders, processors, and packers for the retail sector are McCormick and Co., Inc., Durkee-French Foods, Inc., Spice Islands, Safeway Stores, Inc., and Lawry's Foods, Inc.
- In 1987, supermarket sales of spices and extracts totaled \$817.2 million. Sales of black pepper and white pepper amounted to \$78.8 and \$4.2 million, respectively.
- The American Spice Trade Association in Englewood Cliffs, New Jersey, conducts a nationwide program to promote spice consumption. It also educates the public and the food industry on the use of various spices. The members include growers, brokers, agents, importers, traders, processors, and distributors of various spices.