UNITED STATES INTERNATIONAL TRADE COMMISSION

Mushrooms

Industry & Trade Summary

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PREFACE

The United States International Trade Commission (USITC) has initiated its current Industry and Trade Summary series of reports to provide information on the rapidly evolving trade and competitive situation of the thousands of products imported into and exported from the United States. From 1988 to 2008, U.S. international trade in goods and services rose by almost 350 percent, compared to an increase of 180 percent in the U.S. gross domestic product (GDP), before falling sharply in late 2008 and 2009 due to the economic downturn. During the same two decades, international supply chains became more global and competition increased.

Each Industry and Trade Summary addresses a different commodity or industry and contains information on trends in consumption, production, and trade, as well as an analysis of factors affecting industry trends and competitiveness in domestic and foreign markets. This report on mushrooms generally covers crop year (CY) 2003/04 through CY 2008/09.

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ABSTRACT

This report addresses trade through crop year (CY) 2008/09 and industry conditions for fresh and processed mushrooms for CY 2003/04 through CY 2007/08.

- Cultivated mushrooms are one of the highest-valued horticultural crops grown in the United States. Recent medical research and culinary practices have contributed to increasing demand for the U.S. fresh-mushroom industry. Fresh common and specialty mushrooms meet the needs of health-conscious consumers for fat- and cholesterol-free, low-sodium foods; contain several important nutrients and antioxidants; and are excellent alternatives for vegetarian-style meals.

- While demand for processed mushrooms has fallen, resulting in growers for processing and mushroom processors going out of business, demand for fresh common and specialty mushrooms has risen, with many U.S. growing operations expanding production of both types of fresh mushrooms.

- U.S. fresh-market sales are the largest market for mushrooms; an estimated 85 percent of total annual sales in CY 2007/08 were of mushrooms for the fresh market. An upward trend in specialty mushroom sales is driven by consumer preferences for the unique tastes, colors, and textures of specialty mushrooms. U.S. sales of common mushrooms for all uses amounted to 359,629 mt in CY 2007/08. U.S. sales of brown common mushrooms also have risen since CY 2003/04. There were 108 common mushroom growers in the United States in CY 2007/08, with about two-thirds of such growers located in Pennsylvania.

- Processed mushrooms are an important product in global trade, with the United States a net importer of these products since CY 2003/04. Global mushroom production was an estimated 3.4 million metric tons (mt) in 2007, with China holding a 47 percent share of production. World canned-mushroom exports were an estimated 458,137 mt in 2008, and China had 87 percent of the total. Global exports of fresh mushrooms amounted to 34,802 mt in 2008, with Canada and the United States accounting for the bulk of the total in 2008.

- Imports took a predominant and growing share of U.S. consumption of processed mushrooms during the report period (from 51.9 percent in CY 2003/04 to 55.2 percent in CY 2007/08). Imports (principally from China, India, and Indonesia) were valued at $108.4 million in CY 2008/09. U.S. imports of fresh mushrooms were valued at $82.9 million in CY 2008/09, with the bulk of the imports from Canada, Mexico, China, and Korea.

- U.S. exports of processed mushrooms, valued at $3.8 million in CY 2008/09, plunged after CY 2003/04; the principal export market was Canada. U.S. exports of fresh mushrooms, valued at $34.6 million in CY 2008/09, were exported principally to Canada.

INTRODUCTION

Cultivated mushrooms are fat- and cholesterol-free, low-sodium foods, rich in important nutrients (including some nutrients not usually found in great amounts in fresh produce) and containing antioxidants. Mushrooms satisfy the needs of health-conscious consumers and are a desirable alternative food, especially for vegetarians and flexitarians. A number of scientific studies conducted over the past 10 years have shown a direct relationship between the consumption of fresh mushrooms and a declining rate of breast and prostate cancer growth, as well as the suppression of a compound believed to play a role in cancer tumor development.[1]

Boosted by the results of these studies and other medical findings concerning fresh mushroom consumption, together with the domestic industry's use of more environmentally friendly production practices and increased consumer uses for mushrooms, the U.S. industry has continued to grow since CY 2003/04. Improvements in mushroom production and harvesting technology have resulted in greater production yields, and advances in packaging and transportation have resulted in increased product quality and distribution nationwide. The value of U.S. fresh-market sales of mushrooms in CY 2007/08 was $837.7 million; the value of sales for processing was $75.9 million in CY 2007/08. Sales for both uses in CY 2007/08 were 4 percent higher than sales in CY 2003/04.[2]

Mushrooms of greatest commercial importance in U.S. trade (production and imports) are common mushrooms and specialty mushrooms. Common mushrooms are predominately white and brown mushrooms, and are grown for fresh-market sales and for processing. Speciality mushrooms include shiitake and a number of other mushrooms, and are grown principally for fresh-market sales.[3]

Definition and Scope

This report covers fresh and processed mushrooms classified for tariff purposes under chapters 7 and 20 of the Harmonized Tariff Schedule of the United States (HTS). Mushroom growing is covered by North American Industry Classification System (NAICS) code 111411 (establishments primarily engaged in growing mushrooms under cover, in mines underground, or in other controlled environments). Mushroom processing is covered under

[1] Feeney, "Mushrooms: Intake, Composition, and Research," 2006, 219. Vegetarians do not eat any meat; flexitarians are people whose diet consists mostly of vegetarian foods but also includes occasional meat consumption. According to a research study at Tufts University in 2009, consumption of fresh mushrooms could increase a person's immunity against viruses, including influenza (flu) viruses, and tumors. "White Button Mushrooms Appear to Boost Immune Function," *Tufts Journal*, July 2007. Http://tuftsjournal.tufts.edu. *The Packer*, "Mushroom Marketing: Pink Tills Signal Support for Breast Cancer Awareness Month," August 17, 2009.

[2] Any year not specified as being a crop year is a calendar year. *The Packer*, "Mushroom Marketing: Firms Seek Economic Insulation with New Packs," August 25, 2008. *The Packer*, "Mushroom Marketing: Business Updates," August 25, 2008.

[3] Throughout this report, "Common Mushrooms" refers to *Agaricus* mushrooms. Lucier et al., "Factors Affecting U.S. Mushroom Consumption." USDA, NASS, *Mushrooms*, August 22, 2008.

NAICS code 311421 (establishments primarily engaged in manufacturing canned, pickled, and brined fruits and vegetables).[4]

The report provides information on the structure of the U.S. industry and product trade, including fresh and processed mushroom production, imports, exports, and consumption. It also provides information on certain foreign industries, domestic tariff and nontariff trade measures, and factors affecting the competitiveness of the U.S. industry. The report generally covers CY 2003/04 through CY 2007/08 (on an industry July–June crop-year basis),[5] hereafter the report period. Trade data are included through CY 2008/09.[6]

Mushrooms included in the scope of this report are common mushrooms and specialty mushrooms. Common mushrooms are sold primarily for the fresh market but also for processing. Fresh-market common mushrooms include white, off-white, creme, and brown mushrooms. Large brown common mushrooms are referred to as Portabella (or Portabello) mushrooms and small brown common mushrooms are crimini mushrooms. Common mushrooms are also the predominant mushroom canned domestically and traded globally.[7]

Specialty mushrooms are grown mostly for fresh-market sales. Shiitake mushrooms are the specialty mushrooms most commonly grown in the United States and traded globally. Many other specialty mushrooms, including oyster, maiitake, enoki, and others, are grown in the United States and in a number of other countries, but are traded globally in much smaller amounts than are common mushrooms.[8]

Competitive Position

Virtually all members of the domestic industry are U.S.-owned private enterprises. During the report period, the U.S. mushroom industry was characterized by substantial domestic fresh-mushroom production and competed successfully in Northern Hemisphere markets (principally the U.S. and Canadian markets) and some other global markets for fresh mushrooms. However, the United States had a sizeable trade deficit with its most important fresh-mushroom trading partners (except Japan and France) throughout the report period. In CY 2007/08, the U.S. fresh-mushroom trade deficit with Canada exceeded $46 million, although the deficit was under $5 million in that year for all other U.S. trading partners. Canada was the largest trading partner for both U.S. exports and imports of fresh mushrooms throughout the period mainly because of the close proximity of major markets in each country and because of established marketing and distribution channels between each country. Whereas the U.S. industry had a competitive strength in its greater supplies of fresh mushrooms, Canadian shipments to the U.S. market often benefitted from more favorable exchange rate differences.

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[4] Not included here is information on production of mushroom spawn, truffles, or wild mushrooms. Mushrooms are covered under the following HTS subheadings: fresh mushrooms under 0709.51.01, 0709.59.00, and 0709.59.90; frozen mushrooms under 0710.80.20; provisionally preserved mushrooms under 0711.51.00 and 0711.59.10; dried mushrooms under 0712.31.10, 0712.31.20, and 0712.32.00-0712.39.20; and canned (prepared or preserved) mushrooms under 2003.10.01 and 2003.90.00. *North American Industry Classification System: United States, 2007*, United States Office of Management and Budget, Washington, DC, 2007.

[5] Production data are usually published in late August of the second calendar year following the crop year.

[6] The bulk of the mushrooms important in international trade are fresh and processed mushrooms, and those are the products principally covered in this report.

[7] Lucier et al., "Factors Affecting U.S. Mushroom Consumption."

[8] USDA, NASS, *Mushrooms*, August 22, 2008.

The U.S. canned-mushroom industry lost some of its competitiveness and was characterized by declining domestic production and a growing import presence in the domestic canned-mushroom market. The trade deficit in canned mushrooms throughout the report period was even greater than that for fresh mushrooms, exceeding $80 million with China and $25 million with India and Indonesia in CY 2007/08. Trade in canned mushrooms was dominated principally by imports from China, India, and Indonesia.

The most important U.S. industry trends and developments that occurred during CY 2003/04 to CY 2007/08 included:

- a downward trend in U.S. sales volume of domestically produced common white mushrooms for fresh-market use and, especially, for processing;[9]
- upward-trending domestic sales of common brown mushrooms and specialty mushrooms;
- a major shift in the share of total fresh-mushroom imports from traditional supplier Canada to other suppliers (China and Korea); and
- a downward trend in U.S. consumption of canned mushrooms.

Major Industry Issues

The most important global issues facing the domestic industry during the report period included a decline in U.S. sales of fresh mushrooms to Canada and a growing presence of fresh and canned mushrooms from China in both U.S. and foreign markets. Canadian export sales of fresh mushrooms to the U.S. market slowed beginning in CY 2006/07 because Canadian production accounted for a greater share of consumption in its own market, which in turn reduced demand in Canadian markets for U.S. fresh mushrooms. Greater sales of lower-priced imported canned mushrooms in the U.S. market, in spite of existing antidumping duties assessed on such imports from China, India, and Indonesia, occurred at the expense of U.S. canned-mushroom sales. Also, the rise in Chinese canned-mushroom sales to other global markets, such as the European Union (EU) and Russia, depressed possible U.S. exports to such markets.[10]

The most important domestic issue facing the U.S. mushroom industry from CY 2003/04 to CY 2007/08 was a consolidation in the grower and canner segments of the industry. By the end of the report period, larger-volume growers were focusing on greater production for the fresh-market segment, raising mushrooms solely for fresh-market sales and leasing or purchasing some closed, smaller-volume growing operations. Also, growers were becoming more vertically integrated, taking charge of sales, handling, and distribution of the mushrooms they grow. Finally, growers were using new planting materials on which their

[9] The downward trend in sales volume of mushrooms for the fresh market occurred mainly from CY 2006/07 to CY 2007/08, and the drop in sales was not that significant; the downward trend in sales volume of mushrooms for processing, however, started in CY 2005/06, and the drop during the five-crop year period was significant.

[10] Antidumping duties of 47.8 to 198.7 percent were applied to imports in 1998; the duties have been lowered somewhat since then for some canners, but are still in effect for other canners (ranging from 113.8 to 198.7 percent). *Food News*, "Chinese Exports Begin to Slow," February 23, 2007.

common and specialty mushrooms were grown indoors, and were using improved handling techniques with fresh mushrooms to assure better quality control throughout the growing, harvesting, and distribution processes.[11]

U.S. INDUSTRY

Industry Structure

Overview

The U.S. mushroom industry encompasses firms engaged in the growing, processing, marketing, and distribution of mushrooms (figure 1). Fresh-market sales of common mushrooms are the most important part of this industry, in terms of both the number of firms and the value of sales. Also important are the production and sale of specialty mushrooms. Mushroom processing involves either canning mushrooms or, to a lesser extent, freezing them. The size of the canneries' segment of the industry has remained about the same since CY 2003/04 in the face of increasing amounts of lower-priced imports from Asia.[12]

Number, Concentration, and Geographic Distribution of Firms

As noted earlier, the total number of mushroom growers and processors has fallen in recent years, continuing a downward trend that started in the 1970s. The only increases in the number of mushroom growers after the beginning of the report period were among those growing shiitake specialty mushrooms and certified-organic common mushrooms (figure 2). Both of these types of mushrooms have experienced strong demand growth in recent years. There were six firms processing canned mushrooms and four firms processing frozen mushrooms in CY 2007/08, the same number as that in CY 2003/04.[13]

The mushroom-growing industry is very concentrated, with nine mushroom growers each selling at least 20 million pounds of mushrooms in CY 2007/08 (table A.1). In recent years, a large number of common-mushroom growers have started growing and selling specialty mushrooms, in conjunction with, or instead of, growing common mushrooms. The geographic distribution of firms in the U.S. mushroom growing industry remained about the same, with 64 percent of all growers located in Pennsylvania and about one-half of the remaining growers located in California in CY 2007/08 (table A.2). Some growers operated farms in a number of states; one grower also raised mushrooms in Mexico and in Canada.[14]

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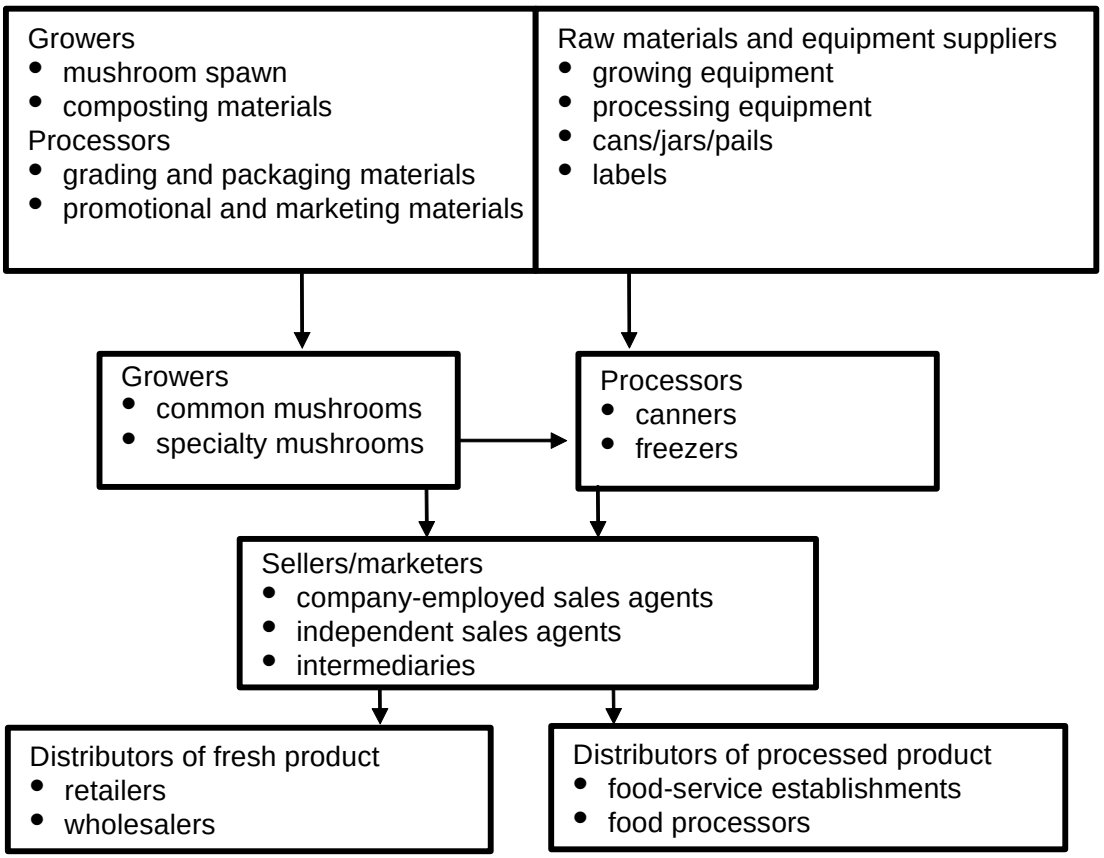
[11] *The Packer*, "Mushroom Marketing: Survivors Expand Production," August 21, 2006. Industry official, telephone interview with Commission staff, March 31, 2009.

[12] USDA, NASS, *Mushrooms*, August 22, 2008. Mushroom canners have testified that their firms have the ability to increase their production significantly under more favorable market conditions. USITC, hearing transcript, September 9, 2004, 17 (testimony of Mr. Bob Shelton, L.K. Bowman Co.). Industry official, telephone interview with Commission staff, November 13, 2009.

[13] See table A.1 for more detail. Many brown-mushroom growers and certified-organic mushroom growers are also growing common mushrooms. American Mushroom Institute Web site. http://www.americanmushroom.org/process.htm (accessed June 24, 2008).

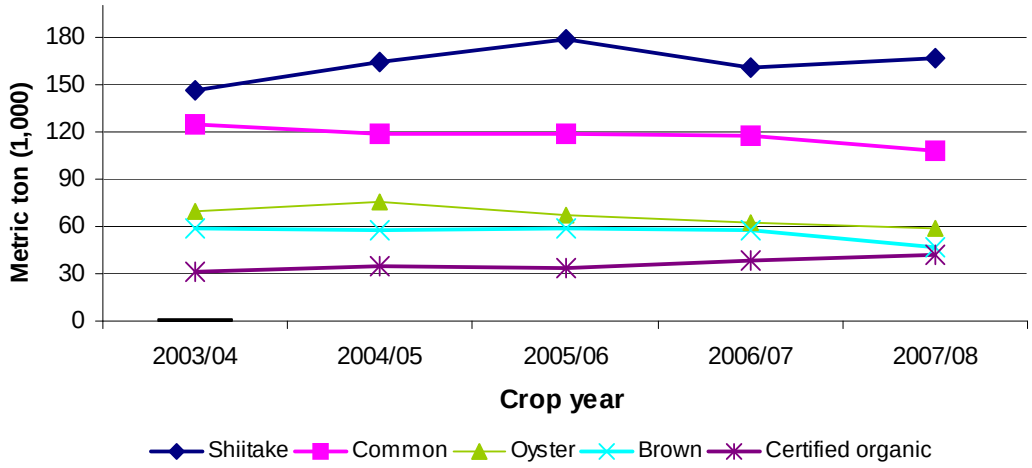
[14] USDA, NASS, *Mushrooms*, August 22, 2008. Industry official, telephone interview with Commission staff, November 17, 2009. Monterey Mushrooms Inc. Web site. http://www.montereymushrooms.com (accessed June 24, 2008).

FIGURE 1 Structure of the U.S. mushroom industry



Source: Prepared by Commission staff.

FIGURE 2 Number of mushroom growers, CY 2003/04 to CY 2007/08



Source: Compiled by the Commission from Mushrooms, NASS, USDA.

The U.S. mushroom-canning industry also is very concentrated, with two firms processing large volumes of canned mushrooms in CY 2007/08. Three mushroom canners owned mushroom-growing operations from which they were able to source most of their raw product for processing. Four firms operated mushroom-freezing facilities.[15] With U.S. producers' estimated annual capacity for processing canned mushrooms at about 200 million pounds (90,700 mt) in recent years, most canning firms were reported to be operating at an estimated capacity utilization rate of less than 50 percent.[16]

By the end of the report period, four mushroom canners were operating in Pennsylvania; one canner was operating in a number of states; and one firm operated a cannery and a freezing facility in Maryland. Firms located in Pennsylvania accounted for more than one-half of all domestically produced canned mushrooms and a majority of all frozen mushrooms. Also, one cannery operating in Pennsylvania was having some of its fresh mushrooms frozen in its parent company's vegetable freezing plant in Maryland.[17]

Vertical and Horizontal Integration

As previously noted, most U.S. mushroom-growing operations have purchased or leased additional growing facilities in recent years to increase production and improve their economies of scale. Some growers have integrated vertically into upstream stages of their production process (e.g., making their own compost), while others have integrated downstream into the packaging, marketing, and distribution of their mushrooms, handling most of their sales and deliveries themselves. Some growers have diversified by integrating horizontally into the production of specialty mushrooms; other growers have diversified by offering other vegetables for sale.[18]

By the end of the report period, three canning operations were vertically integrated into both raw-product production and processing, and three firms were both canning and freezing mushrooms. Some canners had diversified their product lines into additional styles of product cuts (i.e., varying thicknesses of slices) and product container sizes (i.e., industrial, institutional/food service, and retail), as well as diversifying into the production of other types of mushroom- and tomato-based sauces.[19]

Employment

No industrywide data are available on the total number of workers employed in U.S. mushroom growing or canning operations. There were an estimated 4,400 mushroom production workers in Pennsylvania in 2006; with production in Pennsylvania accounting for 60 percent of total U.S. production, Commission staff estimates that total employment

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[15] A new mushroom-freezing firm began operation in mid-2009. South Mill Mushrooms, Inc. Web site. http://www/southmill.com (accessed January 5, 2010).

[16] USITC, hearing transcript, September 9, 2004, (testimony of Mr. Patrick Magrath, Georgetown Economic Services). Industry official, telephone interview with Commission staff, November 13, 2009.

[17] Industry official, telephone interview with Commission staff, July 2, 2008. Hanover Foods, Corp., Hanover, PA, operates a vegetable freezing plant in Ridgely, MD.

[18] *The Packer*, "Mushroom Marketing: The Survivors Expand Production," August 21, 2006. Giorgio Foods, Inc., Web site. http://www.giorgiofoods.com/index.php?p=23 (accessed August 21, 2008). South Mill Mushrooms, Inc., Web site. http://www.southmill.com/aboutus.html (accessed January 7, 2010). *The Packer*, "Mushroom Marketing: Business Updates," August 27, 2007.

[19] Industry official, telephone interview with Commission staff, November 13, 2009. USITC, hearing transcript, September 9, 2004, 97 (testimony of Mr. Dennis Newhard, The Mushroom Co., and Mr. Shah Kazemi, Monterey Mushroom Co.).

industrywide was around 7,300 workers in CY 2007/08. Employment in the mushroom-growing industry has fallen slightly with the closing of additional small-volume growing operations, although many workers were able to continue their employment in the same growing houses operated by new owners.[20]

In CY 2003/04, there were an estimated 266 production and related workers in mushroom canneries. Job losses in the mushroom-canning sector during the report period were reportedly modest, given that the number of canners, operating the same facilities at nearly the same production levels, remained about the same. The Commission staff estimates a 10 percent reduction in employment from CY 2003/04 to CY 2007/08, based on reported declines in CY 1998/99 to CY 2002/03, for a total of 240 workers in CY 2007/08. No data are available on industrywide rates of productivity in mushroom growing or canning operations.[21]

Marketing and Distribution

Fresh mushrooms are usually marketed to wholesalers, re-packers, or grocery store produce buyers. Larger-volume growers generally market their mushrooms through in-house sales agents and distribute mushrooms through company-owned or leased trucks. Smaller-volume fresh-mushroom growers most often sell directly to an independent wholesaler, a wholesaler in which a grower maintains a financial interest, or to commission (sales) agents who market the mushrooms to food-service buyers, grocery store chains, or other retailers (figure 3). Fresh mushrooms are packed loose in bulk boxes or in food-service and retail packages, and are transported by refrigerated truck, with most sales distributed regionally but some larger-volume producers distributing nationwide.[22]

Canned mushrooms are marketed by processors directly to wholesale (i.e., institutional/food-service) and retail customers, generally through the same distribution channels as those used for most other canned foods. Institutional/food-service customers purchase mushrooms in bulk containers. Sales to retail customers include mushrooms in smaller containers (e.g., 4-, 6-, and 8-ounce cans, jars, or pouches) and are marketed to grocery store chains, discount chains, and independent grocers, along with independent brokers and distributors to these outlets. Some mushroom canners also market other forms of processed mushrooms, including frozen mushrooms, quick-blanched mushrooms, marinated mushrooms, and mushroom-containing products.[23]

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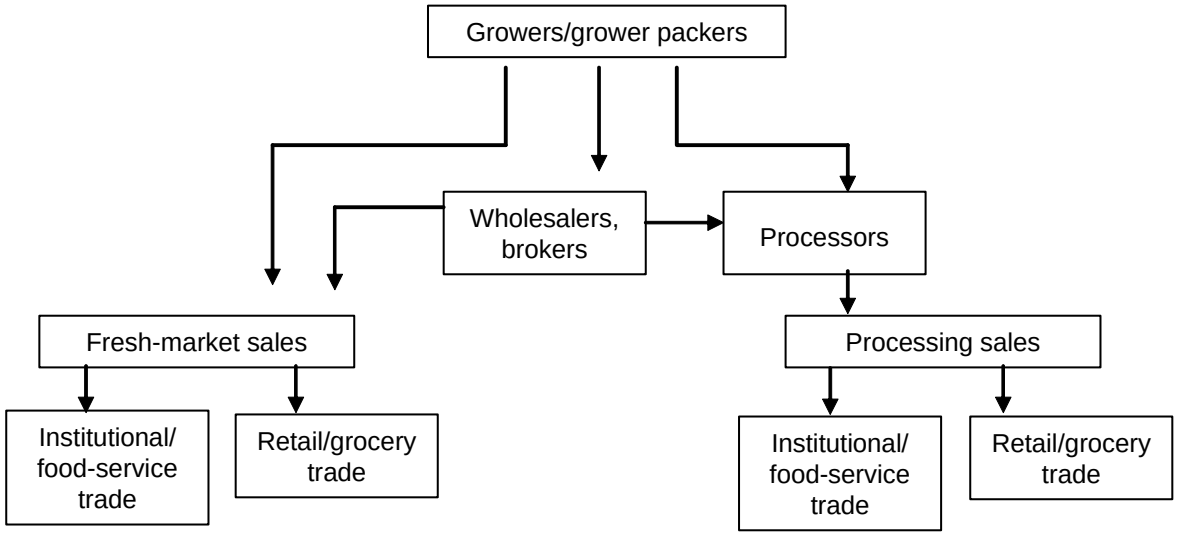
[20] Garcia, "Observations from the Field," June 2006. Industry official, telephone interview with Commission staff, March 13, 2009.

[21] The most recent marketing year for which data are available. USITC, *Certain Preserved Mushrooms*, 2004, III-4. Industry official, telephone interview with Commission staff, March 31, 2009. USITC, *Certain Preserved Mushrooms*, 2004, III-5.

[22] "*Fresh-Cut*, "To-Jo Mushrooms Wins Two Awards in Value-Added Line's First Year," Great American Publishing, Sparta, MI, February 2009. Industry official, telephone interview with Commission staff, November 17, 2009. Company Web sites of U.S. mushroom growers.

[23] USITC, *Certain Preserved Mushrooms*, 2004, II-2. Industry official, telephone interview with Commission staff, November 13, 2009.

FIGURE 3 Major distribution channels for mushroom sales in the United States



Source: Prepared by Commission staff.

Price Determination/Profit Margins

Ultimately, prices are set in the market place and profit margins are the result of supply and demand interactions. Price determination for mushrooms starts with growers calculating production costs, including the costs of raw materials (i.e., spawn, compost, inorganic supplements), labor, and energy to operate the growing house and cold storage rooms, then adding in the costs of harvesting and packing, marketing, and transportation. From these costs, growers construct a desired profit margin and set price points (lists of selling prices) against which they can begin sales negotiations. Since CY 2003/04, most growers' costs have continued to rise, especially the cost of fuel. Prices for fresh mushrooms generally move up or down over a narrow range and, since CY 2003/04, growers have received better prices by selling directly to supermarkets, restaurants, and farmers' markets.[24]

Desired prices for selling canned mushrooms are determined by canners calculating such major costs as the cost of fresh mushrooms for processing, energy and miscellaneous other costs to operate the cannery, and the cost of cans and other materials. Unlike labor costs for growers, such costs for canners are reported to be only a small share of total production costs (i.e., less than 10 percent). The price of cans and fuel costs have risen dramatically since CY 2003/04. Canned-mushroom prices also are affected by additional costs for storage and delivery of canned mushrooms to purchasers. With canners shipping their products to markets up to 3,000 miles from their cannery, rising fuel costs have added noticeably to their normal transportation costs. Additionally, canners are not able to spread out their processing

[24] Labor is reported to account for a significant share of production costs (i.e., over 25 percent). Staff telephone interview with U.S. mushroom industry official, November 17, 2009. *The Packer*, "Mushroom Marketing: Business Updates," August 27, 2007. *The Packer*, "Mushroom Marketing: Supply Improves Since Spring," August 27, 2007. Industry official, telephone interview with Commission staff, November 17, 2009. Beetz and Kustudia, "Mushroom Cultivation and Marketing," July 2004.

costs for mushrooms among a number of different canned products because most of the equipment used for canning mushrooms is not easily or economically converted to canning non-mushroom products.[25]

Globalization of the U.S. Industry

There is no known foreign ownership of U.S. mushroom growers. The U.S. mushroom industry is principally a North American industry, with U.S. mushroom growers (excluding Monterey Mushrooms) not integrated with foreign firms. Monterey Mushrooms, Inc., of Watsonville, CA, is a U.S.-owned firm that operates a mushroom-growing and mushroom-canning facility in San Miguel, Mexico, and a growing facility in Vancouver, British Columbia. There is no known foreign ownership in the U.S. processed mushroom industry. Two U.S.-owned multi-national companies have some ownership in canning operations in China and India. Other U.S. companies have established supply relationships with overseas producers and have some input in the foreign supplier's growing and/or processing operations.[26]

Production Processes

Growing

It normally takes 14 to 16 weeks, from the beginning of the composting process to the final steaming off (sterilizing) of the growing house after harvest has ended, to complete one life cycle (crop) of common mushrooms (see box 1 for more information on the process of growing mushrooms). Mushroom growers stagger their planting dates so as to have mushrooms ready for harvest every week of the year. Fresh mushrooms are taken from cold storage and either re-packed on site for immediate sale, sent to other re-packers, or sent to a processor. Mushrooms are often delivered to brokers or wholesalers at least once each day to ensure mushroom quality. Production methods for shiitake and other specialty mushrooms vary with the type of mushrooms grown.[27]

Processing

The bulk of common mushrooms processed are canned and the mushroom canning process, from receipt of fresh mushrooms to storage of finished products, normally takes less than 8 hours and includes three steps (see box 2 for more information on the process of canning mushrooms). Canners typically operate less than 5 days each week and often only once a week, depending upon the availability of fresh mushrooms for canning and market prices for canned mushrooms. There is little or no canning of specialty mushrooms, some

[25] Prices for fresh mushrooms to be processed often change dramatically from calendar-year to calendar-year, and also from one quarter to another quarter within the same calendar-year. A recent industry estimate of canning costs as a share of total production costs were as follows: mushrooms (45 percent); general, selling, and administrative costs (30 percent); and, materials (25 percent).

[26] Industry official, telephone interview with Commission staff,. November 13, 2009. Monterey Mushrooms, Inc., Web site. http://montereymushrooms.com (accessed June 30, 2008). USITC, hearing transcript, September 9, 2004, 150 (testimony of Mr. Duane Larson, General Mills). Industry official, telephone interview with Commission staff, February 20, 2009.

[27] Royse et al., "Six Steps to Mushroom Farming," September 10, 2007. Industry official, telephone interview with Commission staff, April 16, 2009.

BOX 1 How mushrooms are grown

A mushroom crop has six steps or operations which a grower completes, starting with the preparation and finishing (steps one and two) of compost (the growing media); compost is typically made of wheat straw and horse manure, or hay and wheat straw (without any manure), with the addition of inorganic nutrients. For growing organic mushrooms, organic nutrients would be used, and the use of pesticides would be restricted.

Compost is placed into beds and the third step (spawning) begins. Commercial spawn is mixed into the compost, and as it grows, it forms a mass of thread-like vegetative growth called mycelia, which fuse together to form thick strings upon which mushrooms will grow. Spawning typically takes 14 to 21 days. Once the bed is completely covered with mycelia, a layer of organic material (usually peat moss) is spread over the entire bed (casing layer, the fourth step) and watered to force the mycelia into a vegetative stage necessary to produce mushrooms.

The fifth step is the pinning stage. Through the introduction of fresh air into the growing house to lower carbon dioxide levels, immature mushroom-producing structures (pins) grow larger, passing through a button (tiny mushroom) stage to become mature mushrooms. The final step is the cropping or harvesting stage, where the mature mushrooms are picked and placed into cold storage.

Large clusters of mushrooms, called flushes or breaks, typically are harvested over a 3- to 5-day period and the beds left idle for 4 or 5 days while the next flush of mushrooms develops. These flushes repeat themselves 5 or 6 times over five to six weeks before production in those beds ends. The first two flushes generally account for the majority of mushrooms harvested from each bed. Once the mushrooms have been harvested, the beds are cleaned out, the entire house is sterilized, new compost is added to the beds, and a new crop is ready to be planted.

BOX 2 How mushrooms are canned

In the first step, upon delivery to a cannery, fresh mushrooms are inspected, cleaned, graded, and weighed. Roots or stems are trimmed off and the mushrooms are washed in water to remove any other materials (e.g., compost or dirt). The fresh mushrooms are then sliced or not depending upon the desired end product type (i.e., whole, sliced, or pieces and stems).

In the second step, the mushrooms are blanched (cooked to an internal temperature of 180 degrees for 7 to 8 minutes) in water. The mushrooms are then placed into cans or jars and the containers filled with a packing solution (usually water, a light salt-water solution, ascorbic acid, or other preservatives). The containers are then vacuum sealed and placed into a pressure cooker for a specified period of time until the products reach commercial sterility.

In the final step, the mushrooms are allowed to cool and the containers labeled, packed into boxes, placed on pallets, and stored until shipping. The normal shelf-life, or storage period, for canned mushrooms is 2 to 3 years.

production of canned portabellas and portabella sauce, and some limited production of dried specialty mushrooms.[28]

[28] A significant, but unreported, amount of mushrooms are frozen. Giorgio Foods, Inc., Web site. http://www.giorgiofoods.com (accessed July 1, 2008). Forest Mushroom Products, Web site. http://www.forestmushrooms.com (accessed July 1, 2008). J.R. Mushrooms & Specialities, Web site. http://www.gmushrooms.com (accessed July 1, 2008).

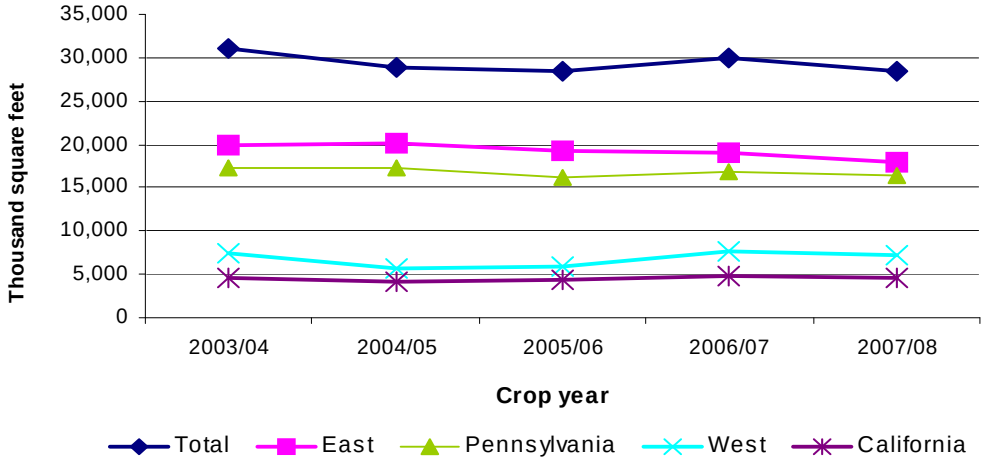
U.S. MARKET

Production

Production Trends

Total U.S. common mushroom-growing area (table A.3) has trended downward since CY 2003/04 (figure 4); most of the decline occurred in the eastern United States (principally Pennsylvania), where smaller, less profitable growing operations went out of business. An upward trend in growing area in the western United States (principally California) after CY 2003/04 (figure 4) resulted both from the expansion of existing operations and the opening of new ones. Nationwide, yields per square foot of growing area averaged about 5.7 pounds annually since CY 2003/04 (table A.3), with yields in Pennsylvania consistently the highest in the U.S. industry because of improved mushroom growing technology.[29]

FIGURE 4 Common mushroom growing area, CY 2003/04 to CY 2007/08



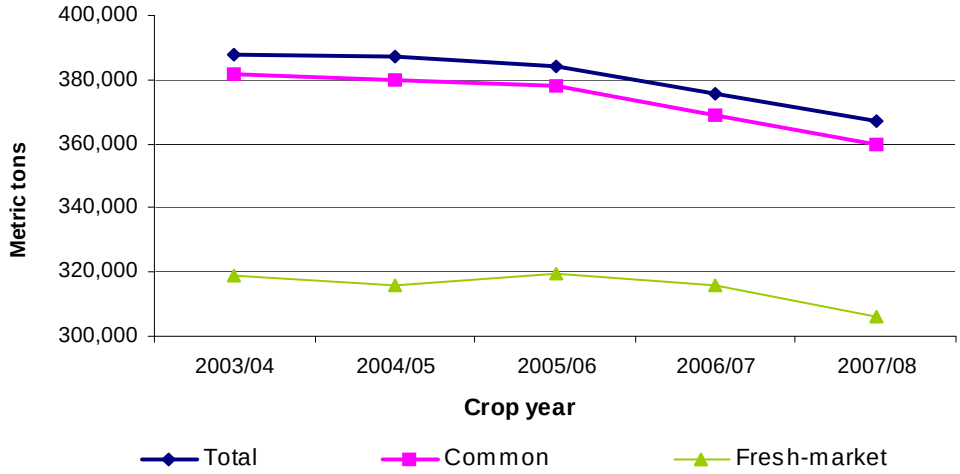
Source: Compiled by the Commission from *Mushrooms* , NASS, USDA.

Sales of all mushrooms fell since CY 2003/04 (figure 5), with declining sales of common mushrooms accounting for the bulk of all mushroom sales (table A.4). Sales of common mushrooms for the fresh market, also down from CY 2003/04, have accounted for the largest share of common mushroom sales since CY 2003/04 and were accompanied by declining sales of common mushrooms for processing. On the other hand, sales values for all mushrooms trended upward since CY 2003/04 (table A.4), the result of rising sales of higher-priced brown mushrooms, especially sliced ones. This report period also had an increase in sales of higher-priced precut mushrooms and mushrooms in more innovative packaging.[30]

[29] *The Packer*, "Mushroom Marketing: Supply Improves Since Spring," August 27, 2007. *The Packer*, "Mushroom Marketing: Survivor's Expand Production," August 21, 2006. *Mushroom News*, "Improving Efficiency," May 2007. *Mushrooms News*, "The Pinning Process," July 2008.

[30] Industry data are reported as sales, which are believed to approximate production. *The Packer*, "Mushroom Marketing: Food Service," August 25, 2008. *The Packer*, "Mushroom Marketing: Supply Improves," August 27, 2007.

FIGURE 5 Mushroom sales, CY 2003/04 to CY 2007/08



Source: Compiled by the Commission from *Mushrooms* , NASS, USDA.

The eastern United States (principally Pennsylvania) accounted for about 70 percent of annual U.S. production during the report period, followed by states in the western United States (principally California), which accounted for 19 percent annually (table A.5). With consistently higher annual yields, Pennsylvania's share of total production rose steadily. California, with yields consistently below those of Pennsylvania, saw its share of total production remain about the same.

Consumer demand for specialty mushrooms rose during the report period. The volume and value of all specialty mushroom sales rose by 21 and 23 percent, respectively, from CY 2003/04 to CY 2007/08, as shown in the following tabulation:[31]

Specialty mushrooms	2003/04	2007/08
Production area (1,000 sq. ft.)	2,389	3,042
Sales volume (1,000 lbs)	13,352	16,188
Sales value (1,000 $)	40,509	49,936

Source: *Mushrooms*, NASS, USDA, Washington, DC, Vg 2-1-2 (8-06), August 16, 2006, 10–11; Vg 2-1-2 (8-07) August 23, 2007, 10–11; and August 22, 2008, 10–11.

As shown above, the production area devoted to growing specialty mushrooms also rose since CY 2003/04; shiitake mushrooms accounted for between 55 and 60 percent of specialty mushroom sales volume and value annually (table A.4).

Factors Affecting Production

Availability of Raw Materials

There were no reported shortages of any of the most important raw materials for growing mushrooms during the report period, although the cost of each rose since CY 2003/04. Growers reportedly paid considerably higher prices for heating fuel in 2007 and 2008 than

[31] Included here are shiitake, oyster, and smaller amounts of other mushrooms.

in 2006. Further, although some growers were able to better contain costs by growing most of their composting materials (e.g., hay) themselves, other growers paid more for compost materials because hay farmers passed along their rising production costs to mushroom growers. Also, supplies of hay were tight because some hay farmers decided to grow less hay and more soybeans or corn to sell for making biofuels like ethanol; neither corn nor soybeans are acceptable for making mushroom compost.[32]

For mushroom canners, each of the main materials for canning (except mushrooms) was readily available and each (especially cans) rose in cost since CY 2003/04. Can costs rose 40 percent in early 2008 over those in late 2007. In addition, there were times since CY 2003/04 when fresh mushrooms, at prices canners could afford to pay and growers were willing to accept, were in shorter supply.[33]

Wage Rates and Labor Availability

Wages are a major share of production costs and a major concern for mushroom growers, but less so for mushroom canners. Wage rates vary among different growing operations and, in 2006, workers were paid from $1.00 to $1.35 per 10-pound box of harvested mushrooms and were often able to harvest 5 to 6 boxes an hour. Workers at some larger growing operations were paid a flat rate per hour of mushroom picking, with bonus payments for additional boxes of mushrooms harvested beyond a minimum number. Many of these workers were also provided with medical and other benefits.[34]

The availability of well-trained, reliable labor is critical to success in the mushroom industry, especially in the area of harvesting and packing fresh mushrooms. As mushroom farms have gotten larger, their operations have become even more dependent upon workers' skills and management. Most of the workers are immigrants, principally Mexicans and Mexican-Americans who have settled in mushroom growing areas with their families. According to industry sources, labor reform is necessary to insure the availability of labor in the mushroom industry in the near future.[35]

In May 2009, House and Senate bills (H.R. 2414 and S.1038, respectively) were introduced in Congress to address the problem of costly, localized labor shortages occurring throughout the agricultural sector, including at times the mushroom industry, since the early 2000s. The purpose of these bills is to reform the H-2A seasonal worker program and, if passed, to provide mushroom growers and other farmers with a legal, stable labor supply. It is believed that many experienced agricultural workers lacking proper work authorization documents would benefit from a streamlined worker application process and the designation of temporary legal status. As a result, mushrooms growers would be able to access a larger pool of legal workers, and workers that stayed in the program for five years could apply for U.S. citizenship. The bills have not yet been signed into law.[36]

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[32] Industry official, telephone interview with Commission staff, November 17, 2009. *Philadelphia Inquirer*, "Dark Days," February 17, 2008.

[33] Industry official, telephone interview with Commission staff, November 13, 2009, and March 31, 2009.

[34] Wage rates of from $7.00 to $7.50 per hour for a minimum of 6 boxes per hour were reported since CY 2003/04. Garcia, "Observations from the Field," June 2006.

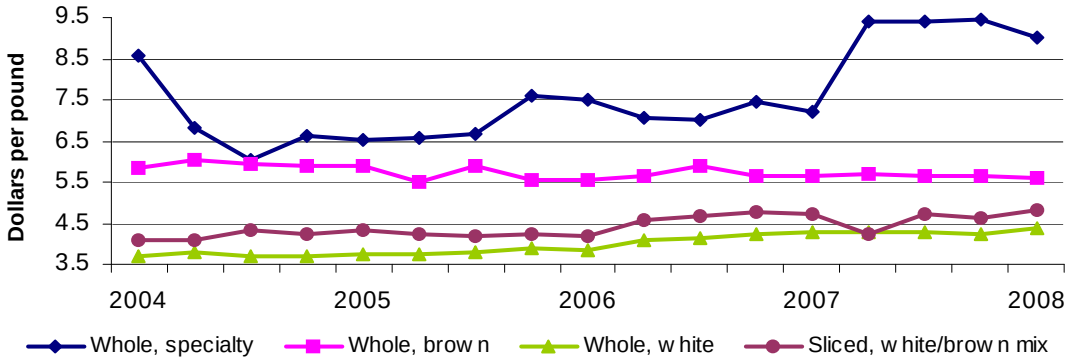
[35] Larson, "Crop Workers in the Eastern United States," June 14–15, 2006. *Mushroom News*, "Greetings," August 2008. *Mushroom News*, "Develop Your Team," March 2008.

[36] The bills are referred to as the Agricultural Job Opportunity, Benefits and Security Act (AgJOBS).

Prices

Extensive price data on wholesale and retail sales of fresh and canned mushrooms are not available. Limited pricing data (table A.6), however, were reported for mixtures of white and brown common mushrooms, whether whole or sliced, and for whole mushrooms (white, brown, and specialty). As shown in figure 6, these data reveal that prices of specialty and brown mushrooms consistently have exceeded prices for all other types of mushrooms since early 2004. Prices of whole specialty mushrooms, in particular, have trended higher since 2004 (table A.6), resulting in even greater price premiums over all other mushrooms since early 2007, in large part because of rising consumer interest in the unique flavors and appearance of specialty mushrooms. Further, prices for mixtures of sliced white and brown mushrooms, along with prices for whole white mushrooms, did the same starting in 2005.[37]

FIGURE 6 Fresh mushroom sales, first quarter 2004 to first quarter 2008



Source: Prepared by the Commission from IRI California supermarket sales.

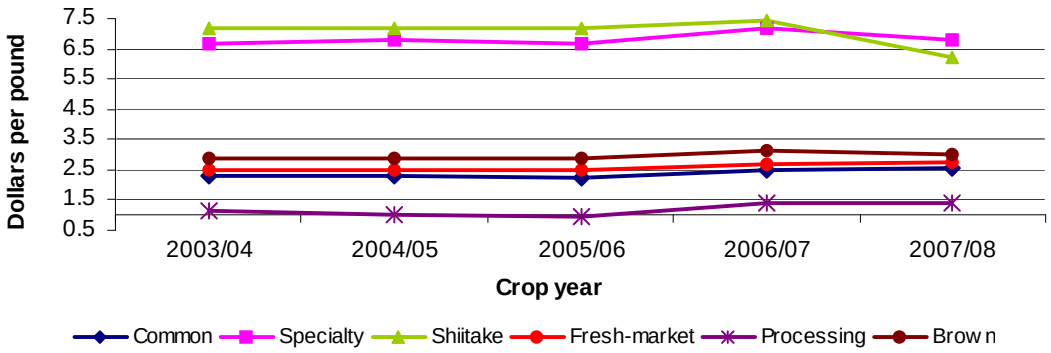
Farmgate prices for mushroom sales can be approximated using unit values of sales for raw-product prices (table A.4). According to these data, prices for white common mushrooms, both for fresh-market use and for processing, trended upward significantly from CY 2003/04 (figure 7). Prices for brown common mushrooms also rose since CY 2003/04 and generally were about 15 percent higher than prices for all other common mushroom sales because demand for these mushrooms has been strong since CY 2003/04.[38]

Throughout the report period, prices for all specialty mushrooms, and especially shiitake mushrooms, were about two - to three - times higher than prices for common mushrooms (figure 7). Industry sources report that demand for specialty mushrooms continues to grow and that industry production capacity is also rising. Prices of mushrooms for processing were

[37] USDA data are available on wholesale terminal market prices of fresh mushroom sales but these prices are for a limited number of sales transactions and the prices reported often change only marginally on a quarterly basis throughout the year.

[38] Prices for brown portabella mushrooms are generally higher than prices for white mushrooms for several reasons. For one thing, because they have been left in the growing bed longer they are larger and have developed a stronger taste than white mushrooms. In addition, they add variety to foods compared with using just white mushrooms; they are used as a substitute for meat in some sandwiches; and they are in great demand in the summer because of their popularity for grilling. *The Packer*, "Restaurants," January 15, 2007. *The Packer*, "Specialties Bring People to the Party," August 25, 2007.

FIGURE 7 Mushroom sales, CY 2003/04 to CY 2007/08



Source: USDA, NASS, *Mushrooms, v*arious annual publications.

up by 51 percent, from a recent low in CY 2005/06 to record highs in CY 2006/07 and CY 2007/08, following a decline in product availability for processing since CY 2005/06 (table A.4).[39]

U.S. Government Policy

Support of the U.S. mushroom industry through U.S. Department of Agriculture (USDA) programs is limited. Mushroom growers do not receive any major direct government payments, such as those available to producers of field crops, and mushroom growers have not benefitted from any programs aimed primarily at increasing exports, such as the Market Access Program. Mushroom growers are covered by the Mushroom Promotion, Research and Consumer Information Program, funded by the mushroom-growing industry, which provides funds to expand, develop, and maintain markets for mushrooms—primarily in the United States, but also in other countries. Growers can buy federal crop insurance and can sell mushrooms to the government under the Commodity Procurement for Domestic Feeding Programs.[40]

The growing and processing of mushrooms are subject to numerous state and federal regulations. For growers, regulations cover product grading, packaging, and labeling; waste-water discharge and sediment control; solid-matter disposal; and odor emissions. Other regulations cover mushroom-house and processing-plant construction and operation; labor practices, and minimum wage and benefits; and Occupational Safety and Health Administration (OSHA) regulations. The U.S. Department of Labor's Wage and Hour Division administers and enforces federal laws covering field sanitation standards for workers at mushroom-growing facilities. Also, pesticide usage in the mushroom industry is regulated by the U.S. Environmental Protection Agency under the federal statutes of the

[39] *Mushroom News*, "Specialty Mushroom Production," May 2009.

[40] Lucier et al., "Fruit and Vegetable Backgrounder," April 2006. Mushroom Council, San Jose, CA, established under the Mushroom Promotion, Research, and Consumer Information Act of 1990, Pub. L. 101-624, Title XIX, Subtitle B, 104 Stat. 3854, November 28, 1990, as amended by Pub. L. 102-237, 105 Stat., December 13, 1991. The U.S. Department of Agriculture, through its Farm Service Agency, purchases food throughout each year to distribute among its food assistance programs to school systems and other social service organizations in an effort to assist domestic producers by purchasing and removing surplus fruits and vegetables from normal marketing channels. David Tuckwiller, oral presentation, November 17, 2005. http://www.grapesociety.org/Meeting%20Proceedings/2005schoollunch.pdf.

Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and the Federal Food, Drug, and Cosmetic Act.[41]

Recent food safety problems on fresh vegetables, such as the *E. coli* outbreak on spinach in 2007, allegedly have affected all fresh produce industry members, including mushroom growers, shippers, processors, food-service operators, brokers, and retailers, and forced growers to address food safety issues. As a result, the U.S. mushroom-growing industry voluntarily established a Standards of Good Agricultural Practices program for fresh-mushroom production in 2007. These standards are intended to help growers adopt safe mushroom-growing practices to ensure that all U.S.-produced fresh mushrooms sold in the U.S. market after CY 2009/10 will be produced on farms operating according to Mushroom Good Agricultural Practices (MGAP). As of Novermber 2009, 40 mushroom growers, accounting for an estimated 70 percent of U.S. production, had passed MGAP certification.[42]

Research and Development

Although there are no industrywide data available on the amount of mushroom research and development (R&D) expenditures since CY 2003/04, mushroom grower/shippers have increased research expenditures in a number of different areas. One Pennsylvania mushroom grower is reported to have invested millions of dollars since CY 2003/04 in constructing research facilities and expanding its production capabilities. Another mushroom grower claims it has 15 to 20 R&D projects operating at any one time and that it engaged in 42 R&D projects during 2008. Some growers have developed new packaging materials (re-sealable packages for added convenience; packages that are recyclable, biodegradable, and can be composted) and increased expenditures on new presentations of mushrooms within the package (e.g., more sliced mushrooms and less whole mushrooms; smaller volumes of mushrooms within each package).[43]

In CY 2006/07, mushroom industry research conducted with scientists at Pennsylvania State University resulted in the development of mulch blended with mushroom compost that suppressed harmful fungi often growing in the mulch. Another industry research effort included the extended use of microbial testing in growing facilities to increase product safety. Finally, a recent industry/academic study showed the benefits of using mushroom compost to enhance the degradation of diesel oils in contaminated soils.[44]

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[41] *Mushroom News*, "Field Sanitation Standards," June 2009. Under FIFRA, pesticides are registered for use in the United States by the FDA, as are labeling and other regulatory requirements for preventing any unreasonable adverse effects on human health and the environment. Under the FFDCA, tolerances for pesticide residues in foods are established by the EPA. *Mushroom News*, "An Overview of Pesticide Registration," April 2009.

[42] *Mushroom News*, "Food Safety's Cost," September 2007. *Mushroom News*, "AMI Launches Food Safety Effort," September 2007. *Mushroom News*, "AMI's MGAP Sessions a Great Success," June 2009. *The Packer*, "Program Sets Up Standards Specific to Mushrooms," January 11, 2010.

[43] Phillips Mushroom Farms, Web site. "Phillips Mushroom Farms," http://www.phillipsmushroomfarms.com/pmqual.html (accessed August 27, 2009). South Mill Mushrooms, Inc., Web site. http://wwwsouthmill.com (accessed August 27, 2009). *The Packer*, "Consumers Drift to Resealable Packs," August 27, 2007. *The Packer*, "Mushroom Marketing: Monterey Mushrooms," August 17, 2009. *The Packer*, "Firms Seek Insulation with New Packs," August 25, 2008. *The Packer*, "Consumers Drift to Resealable Packs," August 27, 2007.

[44] *Mushroom News*, "Blending Landscape Mulch," November 2008. *Mushroom News*, "Food Safety," November 2008. *Mushroom News*, "A New Use," November 2009.

Technology and Innovation

Although there are no industry-wide data available on all technology and innovation expenditures since CY 2003/04, the mushroom-growing industry has implemented a number of technological advances and innovative practices for improving their production efficiency and cost effectiveness, as shown in box 3. A program for creating a safer workplace for company personnel and to decrease employee injuries was developed in September 2008 by an Alliance Committee formed by the American Mushroom Institute and the U.S. Occupational Safety and Health Administration. This program, the first of its kind in the mushroom industry, is intended to evaluate policies, procedures, and practices in growing operations through management-employee cooperation; analyze, identify, and control work site hazards; and institute health and safety training programs.[45]

BOX 3 Technology and innovation

During the study period, mushroom growers, packers, and processors reported implementing a number of innovations to improve quality, safety, and energy and cost efficiency. Examples include:

- the installation of post-harvest vacuum cooling units to extract heat from the mushrooms and cool them more rapidly;
- the replacement of truck engines with more efficient newer engines;
- the construction of a packing and shipping building with insulated panels to create an energy-saving building within a building;
- the construction of a large new growing house to replace older, less efficient houses;
- the installation of new, larger packing and cooling rooms that can accommodate 30 percent greater volume;
- the construction of new refrigerated loading dock, packing, and storage areas to keep mushrooms fresh longer;
- the construction of a new 12,000-square foot test kitchen for conducting product quality and integrity analysis;
- the retrofitting of equipment to increase their energy efficiency;
- the installation of new, automated mushroom-slicing lines for greater work area safety and to reduce hand labor requirements; and
- the upgrading of buildings to meet more stringent food safety standards.

Source: Compiled by Commission staff from a number of industry articles.

[45] *Mushroom News,* "OSHA Alliance News," November 2008. *Mushroom News,* "Principles of Safety," July 2008. Kaolin Mushroom Farms was the first U.S. mushroom grower to pass the new growing practices audit in December 2008. *Mushroom News,* "Kaolin Mushroom Farms," February 2009.

Environmental Constraints

The mushroom-growing industry has faced some serious environmental issues concerning compost odor discharge, waste material disposal, and nutrient dumping and sediment infiltration into waterways since CY 2003/04. Spreading community development in mushroom-growing regions has brought new neighbors into contact with old established mushroom farms, with homeowners objecting to odors commonly associated with mushroom composting operations. To diminish complaints and clear up any misunderstandings about mushroom growing, one Pennsylvania mushroom grower offers its new neighbors a tour of the mushroom farm so homeowners can better understand all that is involved in the growing process. That same grower offers to build fences and plant trees to shield its neighbors from the sight and sounds of its growing operation. Since CY 2003/04, researchers have identified ways to alleviate most odor problems, particularly via changes in growers' composting methods.[46]

The production of mushrooms generates large volumes of solid waste products. Over 700,000 cubic yards of mushroom compost are produced annually in Pennsylvania, and most farms generate quantities too large to be dumped in landfills. Since CY 2003/04, university researchers have developed numerous beneficial uses for mushroom waste, including use by gardeners, landscapers, and municipal parks workers; a number of firms are selling mushroom compost waste products. In addition, a recent report on experiments conducted at Pennsylvania State University since 2007 has shown that growers can reduce costs by reducing the number of times mushroom beds are harvested. By enriching the spent (used) compost with supplements and then reusing it, growers can spend less on compost disposal, save on the costs of raw materials, labor, composting equipment, and compost preparation time; and release fewer effluents and odors into the environment.[47]

One serious environmental issue for the mushroom industry has been the discharge of sediment and nutrients from growing operations into tributaries of the Chesapeake Bay (Bay). This issue affects all mushrooms growers operating in the Bay watershed (including Delaware, Maryland, New York, Pennsylvania, Virginia, West Virginia, and Washington, DC (most of these growers are located in Pennsylvania)). Officials from each of these states, the District of Columbia, and the EPA signed an agreement in 1983 pledging their assistance in protecting and restoring the Bay. In 2000, group members signed a new agreement with new goals and objectives. Members of this group established 2010 as the date to have reduced Bay water pollution.[48]

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[46] Community Awareness Committee Web site. "Farm Profile: Pietro Mushrooms," *The Truth About Mushroom Farming*. http://mushroomfarmcommunity.or/profiles.html. Beyer et al., Pennsylvania State University Web site. *Mushroom Substrate Preparation*, College of Agricultural Sciences, 2008.

[47] Mushrooms are grown on a mixture of organic materials that, after composting, are called mushroom substrate. Once all the mushrooms have been harvested, the remaining substrate, or used mushroom compost, is pasteurized and removed from the growing houses to a storage area outside. American Mushroom Institute Web site. *Mushroom Substrate Preparation*. http://www.americanmushroom.org/MshmSubstr.pdf (accessed January 4, 2010). An industry official estimated that about 13.6 million tons of mushroom substrate were produced globally in 2007. *Research News*, "New Use For Mushroom Production Leftovers," University of Guelph Web site. Www.uoguelph.ca (accessed August 7, 2009). The dumping of mushroom compost into landfills is no longer economically feasible because of the large volumes of materials. *Mushroom News*, "Blending Landscape Mulch," November 2008. American Mushroom Institute Web site. http://www.americanmushroom.org/spent.htm (assessed January 1, 2010). *Mushroom News*, "Double Cropping *Agaricus bisporus*," May 2009.

[48] *Mushroom News*, "Pennsylvania Nutrient Trading," November 2008.

One step in the new Bay cleanup plan was the implementation of a nutrient trading program to reduce the amounts of nutrients entering the watershed. Nutrient credits for nitrogen, phosphorus, and sediment can all be traded, and prices set for these credits will be market driven and negotiated between two companies. Farmers who have had their Best Management Practice (BMP) plans approved by the Pennsylvania Department of Environment Protection and are currently operating below the established maximum levels for nutrient discharge will be able to sell their credits to others.[49]

The Food, Conservation, and Energy Act of 2008 (2008 Farm Bill) provides new funding for programs applicable to mushroom growers through the Environmental Quality Improvement Program (EQIP), which enables growers to pay for certain conservation costs. Specifically, EQIP will aid growers in developing plans for improving soil conservation, water runoff, odor abatement, and other issues including the handling of mushroom compost. Additionally, under the 2008 Farm Bill, state departments of agriculture are eligible to apply for block grants for funding programs intended to increase the competitiveness of specialty crops. In 2008, Pennsylvania mushroom growers were able to secure Good Agricultural Practices audits that were partially subsidized by block grants from the Pennsylvania Department of Agriculture.[50]

Consumption

Consumption Trends

Consumption volumes of fresh and canned mushrooms were less in CY 2007/08 than in CY 2003/04. Fresh-mushroom consumption averaged about 343,000 mt annually during CY 2003/04 through CY 2006/07 (table A.7), but fell in CY 2007/08 as a result of decreased sales of domestically produced fresh mushrooms (prices rose, depressing sales) and increased export sales. U.S. supply was down from CY 2006/07 to CY 2007/08 because growers cut back on production primarily because of a drop in sales to food service customers in CY 2006/07. Canned-mushroom consumption dropped substantially from CY 2003/04 to the middle of the report period, but had partly recovered by the end of the report period because of a steady influx of lower-priced imports after CY 2005/06 (table A.8).[51]

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[49] This plan as discussed here is specific only to Pennsylvania growers; growers in other states will implement similar, if not identical, plans. *Mushroom News*, "Pennsylvania Nutrient Trading," November 2008. Examples of approved Best Management Practices include planting grass buffers, stream bank fencing, and no-till planting; credits also may be earned when nutrient-rich materials (e.g., compost manures and other organic matter) generated from within the watershed are removed to an area outside the watershed.

[50] *The Packer*, "Mushroom Marketing: Business Updates," August 25, 2008. Each state was eligible for a base grant of either $100,000 or one-third of 1 percent of the total available funds for fiscal year 2009. Since total available funds for 2009 were $49 million, the base grant was $160,000. Funds projected for fiscal years 2010 through 2012 amount to $55 million each year. 74 *Federal Register*, March 27, 2009, 13313-13314. Acceptable projects include, but are not limited to, increasing child and adult nutrition knowledge and consumption of specialty crops; improving efficiency and costs of distribution systems; investing in specialty crop research, including organic research to focus on conservation and environmental outcomes; and enhancing food safety. 74 *Federal Register*, March 27, 2009. *The Packer*, "Mushroom Marketing: Business Updates," August 25, 2008. *The Packer*, "Industry Vote on Food Safety Powers," June 15, 2009.

[51] *The Packer*, "Foodservice Feels the Downturn," August 25, 2008. Rising unit values for imports, based on the declared value of the products clearing U.S. Customs, could indicate that prices have risen, but are not necessarily representative of final sales prices, especially for products from lower-cost producers. Industry official, telephone interview with Commission staff, March 13, 2009. Industry official, telephone interview with Commission staff, November 13, 2009.

Import Penetration Levels

Import penetration levels for both fresh and canned mushrooms were up in CY 2007/08 from levels in CY 2003/04, although much more so for canned mushrooms than for fresh mushrooms. The average share of imports among fresh mushrooms consumed in the United States rose to 9.2 percent in CY 2005/06–CY 2007/08 (table A.7); the import penetration level based on import value followed a similar trend during the same period. The downward trend in import penetration level since CY 2005/06 was mainly because of a drop in U.S. sales coupled with a rise in U.S. exports.

During the first part of the report period, the share of imports in canned mushroom consumption trended downward, sliding from CY 2003/04 to CY 2005/06 (table A.8). This shrinkage reflected a large drop in imports, principally those from China. Imports from China were down because fewer Chinese raw mushrooms were available to be canned for export and because prices of raw mushrooms from China rose due to the appreciating Chinese currency and rising Chinese labor costs. However, the import penetration ratio soon recovered. It rose steadily from 47.2 percent in CY 2005/06 to 55.2 percent in CY 2007/08 as Chinese raw-product production for processing rebounded and greater volumes of canned mushrooms from China, bolstered by a significant drop in ocean freight costs, entered a number of global export markets, especially the United States.[52]

Factors Affecting Consumption

Characteristics of Consumers

The likelihood of consumers buying fresh mushrooms rises with rising income. Consumers with annual income levels of $100,000 or more were nearly twice as likely to purchase mushrooms as consumers with annual incomes of less then $25,000. Households in the latter group were more likely to spend a small income increase on frozen prepared foods because of convenience in food preparation, rather than on fresh, uncut vegetables like mushrooms that take additional time to prepare. Another consumer characteristic affecting mushroom demand was family size. Families with one or more children were likely to purchase mushrooms nearly 70 percent of the time they shopped for groceries, as opposed to families with no children, who were likely to purchase mushrooms about 50 percent of the time they shopped.[53]

Other consumer factors affecting mushroom demand included changes in the stores where consumers normally shop (e.g., small retail outlets vs. club stores) and changes in consumer lifestyles. Since CY 2003/04, mushroom purchases have risen dramatically in super centers (e.g., Wal-Mart) but fallen at large supermarkets and grocery stores. For many consumers, minimizing the amount of time needed to plan, shop for, and prepare a meal has become important in deciding what foods to buy. This is especially true for families where the principal meal preparers work full time outside of the household. As a result, consumers have purchased more value-added mushrooms (e.g., pre-washed, pre-sliced, and packaged mushrooms) since CY 2003/04 rather than whole mushrooms loose in bulk bins.[54]

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[52] *FoodNews*, "U.S. Mushroom Canners," January 26, 2007. *FoodNews*, "Massive Rise in Czech Imports," November 3, 2006. *FoodNews*, "Chinese Exports Begin To Slow," February 23, 2007. *FoodNews*, "China 2009: Transport Savings," April 2009.

[53] *The Packer*, "Fresh Trends 2009." *Amber Waves*, "Lower Income Households," June 2008. *The Packer*, "Fresh Trends 2009."

[54] Rose Research, "Fresh Mushroom Study Findings," May 2008. *Amber Waves*, "Working Parents Outsource," March 2009. *The Packer*, "The Push in Retail Packs," January 15, 2007.

Prices

In a study completed in 2003, the estimated short-run own-price elasticity for fresh white mushrooms was -1.072, indicating that, in the near term, a 1-percent rise in price would trigger a drop in consumption of at least a comparable amount; conversely, a 1-percent drop in price would be expected to result in about a 1-percent rise in fresh white mushroom consumption. In the same study, the elasticity for brown mushrooms was -2.799, meaning that a 1 percent drop in price could result in a rise in consumption of nearly 3 percent. Sales of agricultural goods with high elasticities normally are affected more strongly by slight decreases in prices. For example, price discounts from product promotions on most mushrooms often result in a larger proportional rise in sales volume.[54]

Substitutes

There are few foods that can substitute for fresh mushrooms in most prepared dishes, mainly because of a mushroom's unique flavor and texture as well as the versatility that allows it to be used in many different dishes. In recent years, there has been some substitution between forms of mushrooms (e. g., using fresh mushrooms rather than canned mushrooms), between mushroom types (e.g., using fewer common mushrooms and more specialty mushrooms, purchasing sliced and packaged mushrooms rather than mushrooms whole and loose in bins), and intended end uses. However, there are no vegetables other than fresh mushrooms that can substitute for canned mushrooms in a food preparation in which mushrooms are a specified ingredient. Whereas canned mushrooms normally cannot be used in some food preparations that specify using fresh mushrooms (e.g., fresh slices on salad bars), fresh mushrooms can be used in almost every food preparation where canned mushrooms are used.[55]

Other Factors Affecting Demand

Since CY 2003/04, the promotion of fresh mushrooms through the use of recognizable company names and logos has led consumers to demand those mushrooms more often than other fresh mushrooms. Weight Watchers International endorsed the nutritional benefits of using fresh mushrooms in their meal programs in 2008, allowing mushroom growers to put the Weight Watchers logo on packages of fresh mushrooms. Oakshire Mushroom Farm, Inc., reported steady growth in mushroom sales after the company became the sole supplier of fresh mushrooms under the Dole brand. The Mushroom Council entered into a licensing agreement with the Best Life Corp., the company founded by Oprah Winfrey's personal trainer, to include the Best Life sticker on their mushroom packages. Finally, in promoting mushroom consumption for a socially acceptable cause, mushroom growers and shippers packed their mushrooms in pink tills (pink Styrofoam containers) in 2009 with the City of Hope pink ribbon label to help raise consumer awareness of the mushroom industry's support in the fight against breast cancer.[56]

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[54] The most recent year for which such data are available. Patterson and Richards, "Estimates on Mushroom Demand Elasticities," January 23, 2003.

[55] *The Packer*, "Mushroom Marketing,"August 27, 2007. USITC, *Certain Preserved Mushrooms*, October 2004, II-6. *Mushroom News*, "Mushrooming Mushroom Sales," June 2007.

[56] *The Packer*, "Penn State Study," August 21, 2006. *The Packer*, "Mushroom Marketing: Weight Watchers' Zero," August 25, 2008. *The Packer*, "Mushroom Supply Improves," August 27, 2007. *The Packer*, "Mushroom Promotion Message," August 27, 2007. *The Packer*, "Pink Till's Signal Support," August 17, 2009.

U.S. TRADE

Overview

The United States had a sizable trade deficit in both fresh and canned mushrooms from CY 2003/04 to CY 2007/08. The deficit for fresh mushrooms, however, down by 17 percent during this time, was dominated by imports from, and exports to, Canada (table A.9). The deficit was affected more by a rise in U.S. exports than by a drop in U.S. imports since CY 2005/06. U.S. exports were growing, especially to Canada, Japan, and France. U.S. fresh-mushroom exports to Canada were up considerably in this period, in large part because of a weak U.S. dollar. U.S. imports from Canada fell during CY 2006/07 to CY 2007/08 as a larger share of Canadian production was sold in Canadian markets.

The U.S. trade deficit was even greater in canned mushrooms than in fresh mushrooms during the report period, with the overall canned-mushroom deficit for all countries up by 40 percent from CY 2003/04 to CY 2007/08 (table A.10). U.S. trade flows for canned mushrooms are dominated by imports, especially those from China, India, and Indonesia. The trade deficit trended irregularly downward for China, India, and Indonesia from CY 2003/04 to CY 2005/06 following the continuation of high antidumping duties on imports of canned mushrooms from each of these countries. By CY 2007/08, however, imports from China, India, and Indonesia had risen to a five-year high, in spite of the antidumping duties (table A.10).[57]

U.S. Imports

Principal Suppliers and Import Levels

Canada was the principal foreign supplier of fresh mushrooms to the U.S. market throughout the report period; other suppliers of note included China, Korea, and Mexico (table A.11). Imports of fresh mushrooms amounted to 30,299 mt in CY 2007/08, up by 12 percent from 27,145 mt in CY 2003/04 (table A.11); imports were up by 3 percent in quantity from CY 2007/08 to CY 2008/09. During this time, imports from Canada rose or fell as the U.S. dollar strengthened or weakened vis-à-vis the Canadian dollar.[58]

China, India, and Indonesia, principal suppliers of canned mushrooms to the U.S. market since CY 2003/04 (table A.12), are global exporters of canned mushrooms and have been very successful selling lower priced products into the U.S. market. Imports of canned mushrooms amounted to 64,867 mt in CY 2007/08, down by 2 percent from 66,212 mt in CY 2003/04; imports were down by 23 percent in volume from CY 2007/08 to CY 2008/09 (table A.12). Imports from China were down in CY 2005/06, not only because of having to pay antidumping duties already mentioned, but also because of a drop in Chinese production of fresh mushrooms resulting from high temperatures during the growing season and because of a fall in growing area in southern China. Also, China increased its exports to newer

[57] The antidumping duties established by the U.S. Department of Commerce and in effect in 2004 were as follows: China, 121.47 percent to 198.63 percent; India, 6.28 percent to 243.87 percent; and Indonesia, 0.0 percent to 11.26 percent. USITC, *Certain Preserved Mushrooms*, October 2004, 1–9.

[58] *The Packer*, "Mushroom Marketing: Supply Improves," August 27, 2007.

markets such as Russia in CY 2005/06. In CY 2006/07 to CY 2007/08, U.S. imports from China and Indonesia trended upward, but fell again in CY 2008/09.[59]

Imports of canned mushrooms also are reported separately for retail size cans (255 grams or less) and institutional size cans (over 255 grams) and, since CY 2003/04, imports in both can sizes have been dominated by products form Indonesia, China, India, Taiwan, and Malaysia (tables A.13 and A.14).

U.S. Exports

Principal Markets and Export Levels

U.S. exports of fresh and canned mushrooms are small relative to imports, amounting to 7,212 mt and 709 mt, respectively, in CY 2007/08, and 8,119 mt and 1,281 mt, respectively, in CY 2008/09. Canada, the principal market for U.S. exports of fresh mushrooms throughout the report period, accounted for nearly 90 percent of export volume annually since CY 2003/04 (table A.15). Fresh mushroom exports to Canada are mostly common mushrooms, with low average annual unit values of $2,400 to $3,400 per mt ($1.09 to $1.56 per pound). Mushroom exports to Japan and France, by comparison, are principally specialty mushrooms, with unit values consistently over $9,000 and $13,000 per mt ($4.08 and $5.80 per pound), respectively.

Canada, Singapore, Hong Kong, Philippines, and India were the principal U.S. export markets for canned mushrooms throughout the report period (table A.16). As noted earlier, exports of canned mushrooms trended downward from CY 2003/04 to CY 2007/08, amounting to 709 mt, valued at $2.2 million, in CY 2007/08 (table A.16). The United States has never exported appreciable amounts of canned mushrooms to any market because of intense competition in those markets from EU and Asian countries. Exports rose 31 percent in volume and 71 percent in value from CY 2007/08 to CY 2008/09, however, as competition in some markets from other global suppliers lessened.[60]

U.S. and Foreign Trade Measures

U.S. Tariff and Nontariff Measures

Tariff measures for imports of all mushrooms are provided for in the HTS (table A.17). Such imports enter under chapters 7 and 20, with ad valorem equivalent (AVE) duties ranging from about 3 to 30 percent. Imports of all of these products are eligible for duty-free or reduced-duty treatment under several preferential trade programs and free trade agreements (table A.17). There are no tariff-rate quotas on imports of any mushrooms. As mentioned previously, imports of canned mushrooms from some countries are subject to antidumping orders. Under the orders, certain manufacturers/exporters of canned mushrooms in Chile, China, India, and Indonesia must pay additional duties to enter products into the U.S. market.

[59] *FoodNews*, "Chinese Canned Mushroom Exports," February 23, 2007. *FoodNews*, "Canners Offer High Prices," January 26, 2007.

[60] U.S. exports of provisionally-preserved mushrooms were also reported starting in 2002 but were small relative to other exports, amounting to 57 mt and valued at $62,604 in CY 2002/03.

The duties may be reviewed by request and adjusted upward or downward based on recent sales of the respective foreign manufacturers/exporters.

During the report period, there was one trade-related investigation on preserved mushrooms. On November 3, 2003, the Commission gave notice of its intent to conduct a full review to determine whether a domestic industry would experience material injury as a result of a revocation of the existing antidumping duty orders on certain preserved mushrooms from Chile, China, India, and Indonesia. On October 18, 2004, the Commission determined that revocation of the antidumping duties on these mushrooms would likely lead to a continuation or recurrence of material injury to the domestic industry within a reasonably foreseeable time. On October 1, 2009, the Commission instituted its second reviews on processed mushrooms from Chile, China, India, and Indonesia, and on March 26, 2010, determined against revocation of the antidumping duties again. On October 1, 2009, Commerce initiated its sunset reviews on the antidumping duty orders. On December 18, 2009, Commerce published the results of its reviews.[61]

There are no U.S. nontariff measures applicable to imports of canned or fresh mushrooms, nor are mushrooms subject to any domestic content laws, guaranteed minimum prices, or requirements that imports be entered through certain ports. U.S. imports of fresh and canned mushrooms must be packaged and labeled correctly (e.g., country-of-origin labeling) and have all the necessary customs entry paperwork, according to existing regulations of U.S. Customs and other federal agencies (such as USDA's Animal and Plant Health Inspection Service (APHIS)). But these requirements are transparent, consistent, publically available, and applied equally to mushroom imports from all countries. There are no sanitary/phytosanitary measures affecting the entry into the U.S. market of any mushrooms.

Foreign Tariff and Nontariff Measures

Most countries apply tariffs to imported mushrooms but the Commission staff are unaware of any nontariff barriers in foreign markets that restrict entry of fresh or canned U.S. mushrooms. Under the North American Free Trade Agreement (NAFTA), shipments of fresh mushrooms between the United States, Canada, and Mexico are entered duty free in each respective country. During the report period, trade in fresh mushrooms between these three countries was affected mainly by differing exchange rates and rising transportation costs. Japan, an important U.S. fresh-mushroom export market, applies duties of from 3.0 percent

[61] A petition was filed concurrently with Commerce and the Commission on January 6, 1998, by the Coalition for Fair Preserved Mushroom Trade, alleging that an industry in the United States was materially injured, or threatened with injury, by reason of less than fair value (LTFV) imports of certain preserved mushrooms from Chile, China, Indonesia, and India dumped on the U.S. market. Subsequently, the Commission instituted antidumping investigations Nos. 731-TA-776–779 (preliminary) on January 6, 1998. Commerce made a final affirmative determination of dumping on imports from Chile on October 19, 1998, and another such determination on imports from China, India, and Indonesia on December 28, 1998. The Commission made its final affirmative injury determination on imports from Chile on November 27, 1998, and a final affirmative injury determination on imports from China, India, and Indonesia on February 11, 1999. Commerce issued antidumping orders on imports from all four countries on February 19, 1999. USITC, *Certain Preserved Mushrooms*, February 1998. USITC, *Certain Preserved Mushrooms*, October 2004. On October 1, 2009, the Commission instituted its second review investigation on *Certain Preserved Mushrooms from Chile, China, India, and Indonesia* (Inv. Nos. 731-TA-776-779) (Second Review)). *Certain Preserved Mushrooms*, October 2004. Indonesians were respondents in 2004, but not in 2010. USITC, *News Release 10-026*, March 26, 2010. The weighted-average margin, by country, ranged as follows (in percent): Chile (148.51); China (121.47 to 198.63); India (6.28 to 243.87); and Indonesia (7.94 to 11.26). 74 *Federal Register*, December 18, 2009, 67170–67172.

to 4.3 percent ad valorem, with the average duty around 3.65 percent. The EU applies duties of from 3.2 percent to 6.4 percent with the average ad valorem duty on imports of most fresh mushrooms around 5.4 percent; however, it is not a potential significant market for U.S. fresh-mushroom exports because of the growing size of mushroom industries in newer EU member states.

As with fresh mushrooms, duty rates on canned mushrooms traded between Canada, Mexico, and the United States are zero under NAFTA. In Singapore canned mushrooms enter duty free. Imports of canned mushrooms enter most other foreign markets at duties generally as high as, or higher than, those in the United States.

Other Trade Issues Affecting the Industry

The domestic mushroom industry has been affected by the entry of adulterated canned-mushroom imports in recent years, which negatively affect U.S. sales of products from all sources, including the domestic industry. Significant compliance problems affecting canned mushrooms from China and covering several years were identified during the report period. The Chinese government has initiated a number of programs since CY 2006/07 aimed at improving product safety, including additional inspections of production facilities for illegal substances and food additives. Further, in 2008, a memorandum of agreement was signed between China and the U.S. Department of Health and Human Services that establishes bilateral cooperative communication to cover current and future product certification and registration systems.[62]

FOREIGN MARKET PROFILES

Overview of Global Market

Fresh and processed common mushrooms and fresh specialty mushrooms are produced and consumed in many countries. Fresh mushrooms are perishable, so their global movement often has been restricted to transactions mainly between neighboring countries (e.g., between the United States, Canada, and Mexico, or between EU-member countries). The movement of fresh mushrooms on a more global scale increased, however, during the report period. Still, since canned mushrooms are shelf stable, with a shelf life of two to three years, they are the major mushroom product traded globally.

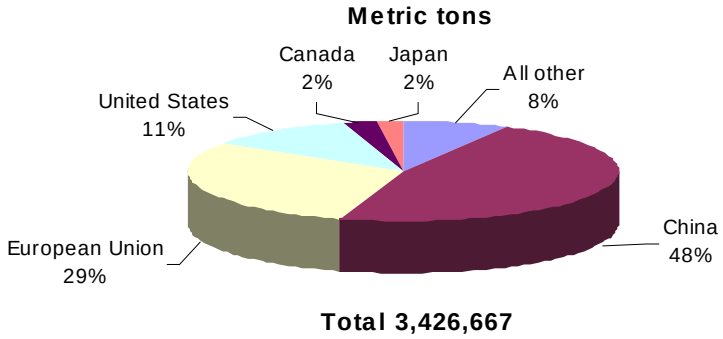
[62] Lumpkin, *Safety of Chinese Imports*, U.S. Senate, July 18, 2007. *FoodNews*, "China Safety Clampdown," January 23, 2009. *Agreement between the Department of Health and Human Services of the United States of America and the General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China on the Safety of Food and Feed*. http://globalhealth.gov/news/agreements/ia121107b.html. Becker, Geoffrey, *U.S. Food and Agricultural Imports*. February 2, 2008.

Global Trends In Production, Consumption, and Trade

Production

Global mushroom production amounted to 3.4 million mt in 2007, trending steadily upward since 2003 (table A.18). China remained the leading global producer of mushrooms for all uses (figure 8) and has been for the past five years. Since CY 2005/06, the Chinese national government increasingly encouraged Chinese growers to shift their agricultural production out of traditional crops to value-added crops like mushrooms for processing. The EU and the United States were the second and third largest global producers, respectively, in 2007; other important global producers included Canada, Japan, India, Australia, and Indonesia (table A.18). Countries showing noticeable increases in production included China, Spain, Poland, and Ireland; production in most of the remaining countries was down slightly or remained about the same.[63]

FIGURE 8 Mushrooms: Global production, 2007



Source: FAOSTAT, 2007.
Note: Data also include truffles which are believed to account for a small share of total production.

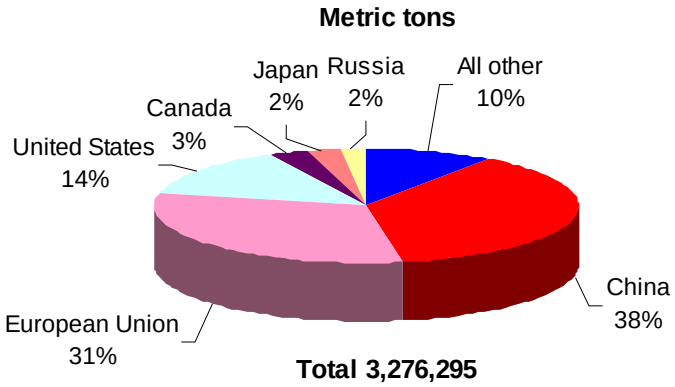
Consumption

In 2007, global consumption amounted to 3.3 million mt and China, the EU, and the United States were the leading global consumers of mushrooms (figure 9). Other major consumers included Canada, Japan, Russia, Australia, and India (table A.19). Virtually all consumption in China, the EU, and India was supplied from domestic production. On the other hand, virtually all Russian consumption was supplied by imports. Finally, consumption in the United States, Canada, Japan, and Australia was supplied mostly by domestic production but also by significant amounts of imports.[64]

[63] The most recent year for which such data are available. This was the continuation of a Chinese government program started in 2003–04. Patterson, "U.S. Fresh Mushroom Market Update," May 31, 2005.

[64] Commission staff chose to present data for only one year (2007) because it was the most recent year for which production data were available, because beginning and ending stocks by country are not available to calculate more accurate consumption levels, and because data for most countries are not reported separately for fresh and processed mushrooms, just mushrooms. Consumption may vary significantly on an annual basis in most markets because of unreported stocks in inventory each year.

FIGURE 9 Mushrooms: Global consumption, 2007



Source: FAOSTAT, 2007.
Note: Data also include truffles which are believed to account for a small share of total production.

Trade

Global exports of canned mushrooms amounted to 458,137 mt in 2008 (figure 10), up by 25 percent from 365,967 mt in 2004, with China accounting for 87 percent of total export volume in 2008 and for nearly all of the rise in global exports during the report period (table A.20). The increase in exports from China through 2008 resulted from a fall in freight rates from China to most global markets in 2007–08. Other major global exporters in 2008 included Indonesia and India, although export levels from Indonesia remained about the same throughout the 2004–08 period and exports from India during the same period were down because of intense competition from Chinese exports.[65]

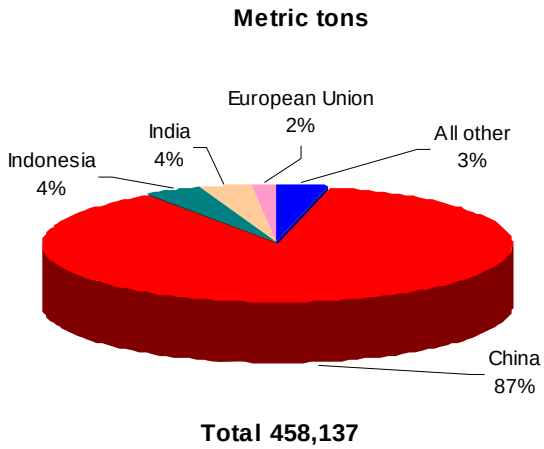
Global exports of fresh mushrooms averaged around 43,730 mt during 2004–07 before falling to 34,802 mt in 2008 (table A.20). Canada and the United States were the largest global exporters in 2008 (figure 11), together accounting for nearly 80 percent of the total, with most exports from both countries shipped to each other. Other major exporters in 2008 included Malaysia and Mexico. Most of the fall in exports of fresh mushrooms from 2007 to 2008 was accounted for by a drop in exports from China, where a greater share of fresh mushroom production was processed and mushroom growers in China switched into production of other crops. Exports from traditional supplier Canada also fell following a decision by Canadian shippers to concentrate greater sales in their home market as a result of an unfavorable change in the U.S.-Canada exchange rate.[66]

Global imports of canned mushrooms amounted to 292,267 mt in 2008 (figure 12), up by 12 percent from 260,944 mt in 2004 (table A.21) with the United States and Russia accounting for the largest individual shares of total import volume in 2008. The EU, Canada,

[65] Freight rates fell in response to a drop in demand for ocean freight and because some freight forwarders negotiated better rates for shorter periods of time rather than committing to long-term contracts. *FoodNews*, "Freight Transport: Transport Savings," April 2009.

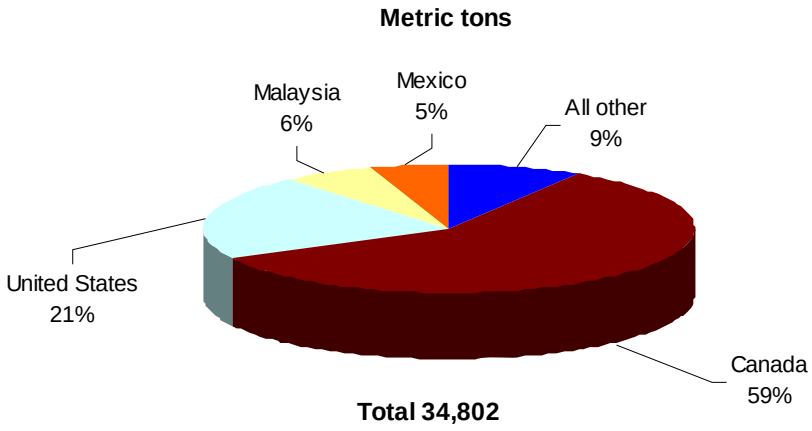
[66] Global exports of mushrooms are reported separately for fresh mushrooms and canned mushrooms, and such data are available for the 2004–08 period. *FoodNews*, "Russian Buyers Defaulting," February 27, 2009.

FIGURE 10 Mushrooms: Global exports, 2008



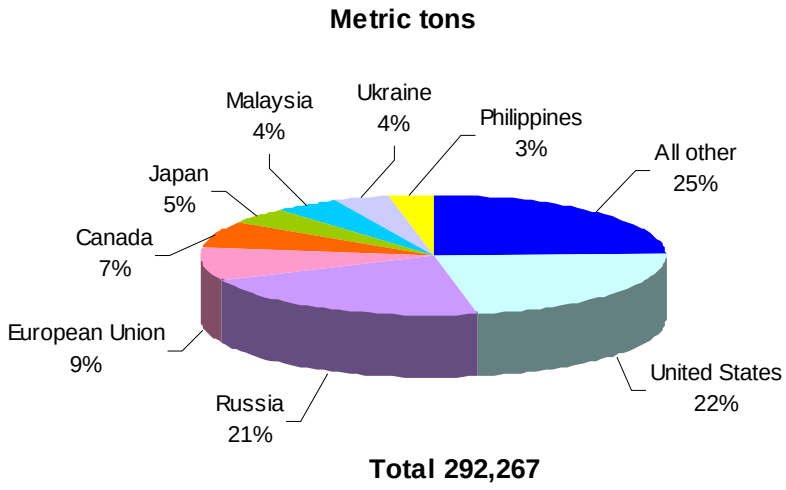
Source: GTIS, Global Trade Information Services database.

FIGURE 11 Fresh mushrooms: Global exports, 2008



Source: GTIS, Global Trade Information Services database.

FIGURE 12 Canned mushrooms: Global imports, 2008

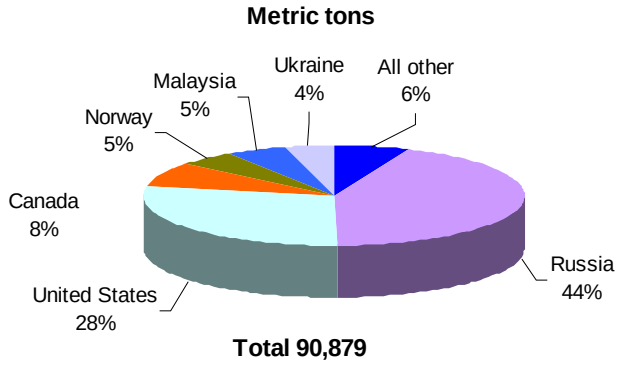


Source: GTIS, Global Trade Information Services database.

Japan, Malaysia, and Ukraine were also major global import markets in 2008 (figure 12). Russia, Ukraine, and Canada experienced significant growth in imports since 2004, while U.S. imports were back up to previous levels and import levels in Japan and the EU were down from 2004 to 2008.[67]

Global imports of fresh mushrooms amounted to 90,879 mt in 2008 (figure 13), up by 42 percent from 63,618 mt in 2004 (table A.21). Russia and the United States together were the most important global import markets in 2008 (figure 13); Canada, Norway, Malaysia, and Ukraine were other major markets. Most of the rise in imports from 2004 to 2008 was accounted for by a rise in Russian imports, with Russia becoming the primary market for Chinese mushrooms in 2007 and 2008.[68]

FIGURE 13 Fresh mushrooms: Global imports, 2008



Source: GTIS, Global Trade Information Services database.

FOREIGN INDUSTRY PROFILES

Asia

China, India, and Indonesia are the three most important global mushroom exporting countries in Asia (tables A.19 and A.20). All three countries became the major suppliers of canned mushrooms to the U.S. market since CY 2003/04 (table A.12), together accounting for 86 percent of total U.S. canned-mushroom import volume in CY 2007/08. All three countries have mushroom canning industries that are export oriented, all consider the U.S. market a primary destination for their production, and all face barriers to their exports in certain third-country markets.

[67] Global trade data on imports and exports do not match for the following reasons: the country of destination and country of origin are often not reported correctly because products may sit in bonded warehouses for months at a time; shippers who handle the movement of the products may not know the true country of destination; products may travel through a number of countries before arriving at their final destination, and some of those countries may record the products as imports but other countries as exports; and, some countries are more exact than others in their data collection and presentation. Global Trade Information Service. Industry official, telephone conversation with Commission staff, September 15, 2009.

[68] Global exports of mushrooms are reported separately for fresh mushrooms and canned mushrooms, and such data are available for the 2004–08 period. *FoodNews*, "Russian Buyers Defaulting," February 27, 2009.

China

China has become the leading global producer of mushrooms (table A.19) and exporter of canned mushrooms (table A.20 and figure 8) since 2004. China's dominance has occurred even though most Chinese growers are using growing methods considered rather primitive and low technology relative to those used in the United States and other major producing countries. China's common-mushroom industry consists of thousands of small-volume family-run growing operations nationwide, employing mainly family labor. Common and specialty mushrooms are grown in sheds made of bamboo, straw, and clay, or in caves, without any mechanical climate control which limits production to the cooler months of October–December and March–May.[69]

Since CY 2003/04, mushroom canning in China has taken place in a number of very modern facilities. The Bluefield Industrial Food Company started production in 2004 and is one of only a few canneries that export products which do not have to pay any antidumping duties. This cannery, with an estimated production capacity of 80,000 tons of canned foods including mushrooms, is reported to have received FDA registration for processing low-acid canned foods and Hazard Analysis and Critical Control Point (HAACP) quality control certification. COFCO Industrial Food import & Export Co., a subsidiary of COFCO Corporation, also operates a modern cannery and is reported to account for 10 percent of Chinese canned mushroom exports in recent years. Dujiangyan Xingda Foodstuff Co., another exporter of canned mushrooms to the United States, also operates 56 modern mushroom-growing houses.[70]

Because of the availability of low-cost labor, Chinese packers are more cost-efficient processing certain styles of canned mushrooms. In spite of rising consumption of many processed foods in China, as well as increases in the cost of processing raw materials there, Chinese food processors are expected to continue processing greater amounts of canned mushrooms each year. This in turn may exert greater competitive pressure on the canned-mushroom industries and processed-foods markets in the United States and EU in the future.[71]

India

The Indian mushroom-canning industry is made up of a few very modern growing and processing facilities. Agro Dutch Industries, a state-of-the-art, HAACP compliant, and ISO certified manufacturing facility that currently accounts for an estimated 85 percent of India's canned mushroom exports, is reported to be the largest integrated mushroom growing and canning company in the world. This firm also grows mushrooms in its fully climate controlled mushroom houses and produces cans for its own mushrooms and for sale to other canners. Agro Dutch has an estimated production capacity of 50,000 metric tons of fresh mushrooms for canning annually and, since CY 2003/04, has accounted for an estimated

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[69] "The Cradle of Chinese Mushroom Growing," Mushroom Business Information Center, December 2004. http://www.mushroombusiness.com/magazine_index (accessed July 16, 2008).

[70] Bluefield (Sichuan) Industrial Food Company Web site. Http://www.bluefield.cn/english (accessed May 4, 2010). COFCO Industrial Food Import & Export Co., Ltd. Web site. Http://www.cofco.com (accessed May 4, 2010). Dujiangyan Xingda Foodstuff Co., Ltd. Web site. Http://www.xdfoods.en.alibaba.com (accessed May 4, 2010).

[71] *FoodNews*, "Canned Mushroom Supply," February 22, 2008. *Food News*, "Will China Sell or Buy," April 1, 2007.

25 percent of all U.S. imports of canned mushrooms. Agro Dutch also has become a major supplier to Canada, Mexico, Israel, and Russia. A second Indian mushroom processor, Himalya International, is also a state-of-the-art, ISO certified, and HAACP compliant canned mushroom processing operation with an anticipated production of 9,000 metric tons of canned mushrooms annually.[72]

Indonesia

The Indonesian mushroom-canning industry has accounted for a major share of U.S. canned mushroom imports since CY 2003/04, with nearly all such imports in retail-size cans, and the U.S. market continues to be the principal export market for Indonesian products. ETIRA, an integrated mushroom growing, harvesting, and processing operation, grows 12,775 metric tons of fresh mushrooms annually for canning and export. A number of other firms, including Aneka Janur, Jamur Bersaudara Dara PD, Jamur TC 99 Toko, Indo Evergreen Agro Business Corp. PT, and PT Karya Kompos Bagas, are selling canned mushrooms produced in their own or other firms' canneries.[73]

European Union

The EU is a global producer of mushrooms (figure 8) and has been for a number of years (tables A.18 and A.19). EU countries with the greatest canned production in 2007 were the Netherlands, Spain, Poland, France, and Italy, with the Netherlands accounting for nearly one-fourth of total EU production in 2007. Most mushrooms produced in the EU are traded within member countries and the EU is not a global exporter to non-EU countries. Countries shipping the greatest share of canned mushrooms within the EU in 2007 were the Netherlands, Spain, Poland, France, and Germany.[74]

Since its entry into the EU, Poland has become the EU's largest-volume producer of fresh mushrooms, growing more than 500 million pounds of mushrooms annually. The mushroom industry in Poland is composed of more than 2,000 mushroom farms, ranging in size from many small family-run farms to some large operations. The mushrooms produced are of high quality and the production facilities are technologically advanced. The costs of labor (mainly Romanian workers), energy, and supplies are less than those in the United States, and the capital investment by Polish growers, especially in their composting operations, is high. The combination of high-quality product and low production costs has enabled mushroom growers in Poland to ship fresh mushrooms even to some non-EU member countries since 2006.[75]

Canada

Canada is not a major global producer of mushrooms (tables A.18 and A.19), but is an important producer and the world's leading exporter of fresh mushrooms (table A.20 and figure 11). An estimated 91 percent of Canadian mushroom production in 2008 was sold on the fresh market. As in the United States, the most commonly grown mushroom throughout

[72] Agro Dutch Industries Limited Web site. Http://www.agro-dutch.com (accessed March 12, 2010). Himalya International Web site. Http://www.himalyainternational.com (accessed March 12, 2010).
[73] PT. Eka Timur Raya (ETIRA) Web site. Http://www.etiramushrooms.com (accessed March 12, 2010).
[74] GTIS, Global Trade Atlas Database.
[75] *MushroomNews*, "Growers Visit Polish Farms," August 2006.

Canada is the common white mushroom. Mushroom production is located principally in two provinces, with Ontario and British Columbia accounting for 57 and 37 percent, respectively, of the total in 2008.[76]

In 2008, Canada was a net exporter of fresh mushrooms but a net importer of canned mushrooms, as shown in the following tabulation (in mt):

Canadian trade	Fresh	Canned
Imports	6,987	20,356
Exports	20,310	930
Net	13,323	–19,426

Source: GTIS database, 2009.

Canadian production of mushrooms in 2008 amounted to 191.7 million pounds, valued at $291.2 million. Although mushroom sales for processing and total harvested area were down in 2008 from 2004 levels, Canada's fresh-market sales area and its investment in land, buildings, machinery, and employment all rose from 2004 to 2008.[77]

Mexico

Although extensive data on the mushroom growing and processing industry throughout Mexico are not available, Mexico is growing in importance as a supplier of fresh and canned mushrooms to the U.S. market. Commercial mushroom production of common white, portabella, and cremini mushrooms is centered in the San Miguel de Allende area of Guanajuato state. A U.S.-owned facility in San Miguel de Allende that grows and processes mushrooms is described as the single largest growing operation in Mexico. The company covers about 90 acres and accounts for the growing and processing of about 20 million pounds of mushrooms annually. The facility is vertically integrated, consisting of a spawn center, large composting areas, growing rooms, cold storage for warehousing fresh mushrooms, and a cannery. The production of fresh mushrooms for shipment principally to the United States has risen since CY 2003/04, encouraged by the strength of the U.S. dollar vis-à-vis the Mexican peso and supported by U.S. investment from Monterey Mushrooms, Inc.[78]

[76] Statscan, Fruit and Vegetable Production, June 22, 2008.

[77] These figures do not match those shown elsewhere in this report because they come directly from a Canadian government source. Statscan, "Fruit and Vegetable Production," June 22, 2008.

[78] Graber, "Mushrooms Sprout in Mexican Dishes," July-August 2007. http://www.restmex.com/recipes/0704mushroom.shtml (accessed July 3, 2008). Montery Mushrooms Inc. Web site. http://monterymushrooms.com/profile.htm (accessed July 3, 2008).

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APPENDIX A
STATISTICAL TABLES

TABLE A.1 Mushrooms: Number of common mushroom growers ranked by sales volume, number of specialty mushroom growers identified by product grown, and number of brown mushroom growers and certified organic mushroom growers, CY 2003/04 to CY 2007/08

Mushroom types/size of operation	2003/04	2004/05	2005/06	2006/07	2007/08
Common mushrooms					
Number of growers selling—					
Over 20.0 million pounds	11	11	11	9	9
10.0 million to 19.9 million pounds	15	12	13	16	15
5.0 million to 9.9 million pounds	23	26	20	21	19
2.5 million to 4.9 million pounds	25	23	27	27	23
1.0 million to 2.4 million pounds	28	20	24	24	22
0.5 million to 0.9 million pounds	9	11	8	3	8
Less than 0.5 million pounds	14	15	16	17	12
Subtotal	125	118	119	117	108
Specialty mushrooms					
Number of growers raising—					
Shiitake	146	164	178	160	166
Oyster	70	76	67	62	59
Other	25	27	24	30	26
Subtotal[a]	170	193	206	191	191
Brown mushrooms	59	58	59	58	47
Certified organic mushrooms	31	35	33	38	42

Source: *Mushrooms*, NASS, USDA, Washington, DC, Vg 2-1-2 (8-04), August 16, 2004, 12; Vg 2-1-2 (8-05), August 16, 2005, 12; Vg 2-1-2 (8-06), August 16, 2006, 10 and 12; Vg 2-1-2 (8-07)a, August 23, 2007, 10 and 12; and Vg 2-1-2 (8-08), August 22, 2008, 10 and 12.

Note: Some common-mushroom growers are also raising specialty mushrooms.

[a]Those growers raising more than 1 type of specialty mushroom were counted separately for each mushroom type grown, but the subtotal shown here represents the actual total number of growers.

TABLE A.2 Mushrooms: Number of common mushroom growers, by regions and by selected states, CY 2003/04 to CY 2007/08

Region/state	2003/04	2004/05	2005/06	2006/07	2007/08
East					
Pennsylvania	76	76	76	73	69
All other	11	12	13	10	7
Subtotal	87	88	89	83	76
Central	9	7	7	7	7
West					
California	21	16	20	20	17
All other	8	7	7	7	8
Subtotal	29	23	27	27	25
Total	125	118	123	117	108

Source: *Mushrooms*, NASS, USDA, Washington, DC, Vg 2-1-2 (8-06), August 16, 2006, 4; Vg 2-1-2 (8-07)a, August 23, 2007, 4; and Vg 2-1-2 (8-08), August 22, 2008, 4.

Note: Production regions and their respective states are as follows: East-CT, DE, FL, MD, NY, PA, TN, and VT; Central-IL, OK, TX, and WI: West-CA, CO, MT, OR, UT, and WA.

TABLE A.3 Mushrooms: Common mushroom growing areas and yields, by regions and by selected states, CY 2003/04 to CY 2007/08

Region/state	2003/04	2004/05	2005/06	2006/07	2007/08
	Thousand (*square feet*)				
East					
Pennsylvania	17,211	17,363	16,752	16,761	16,364
All other	2,665	2,726	2,598	2,292	1,518
Subtotal	19,876	20,089	19,350	19,053	17,882
Central	3,799	3,105	3,174	3,239	3,232
West					
California	4,618	4,100	4,368	4,919	4,690
All other	2,746	1,611	1,530	2,690	2,613
Subtotal	7,364	5,711	5,898	7,609	7,303
Total	31,039	28,905	28,422	29,901	28,417
	Pounds (*per square feet*)				
East	5.84	6.02	6.13	5.90	6.22
Pennsylvania	5.88	6.17	6.24	5.94	6.36
Central	5.63	5.48	5.28	5.04	4.87
West	5.48	5.50	5.25	4.92	4.56
California	5.79	5.78	5.38	4.75	4.72
Total United States	5.74	5.86	5.85	5.58	5.67

Source: *Mushrooms*, NASS, USDA, Washington, DC, Vg 2-1-2 (8-06), August 16, 2006, 2 and 5; Vg 2-1-2 (8-07)a, August 23, 2007, 2 and 5; and Vg 2-1-2 (8-08), August 22, 2008, 2 and 5.

Note: Production regions and their respective states are as follows: East-CT, DE, FL, MD, NY, PA, TN, and VT; Central-IL, OK, TX, and WI: West-CA, CO, MT, OR, UT, and WA.

TABLE A.4 Mushrooms: Fresh-market and processing sales, by mushroom type and by market, CY 2003/04 to CY 2007/08

Mushroom type/market	2003/04	2004/05	2005/06	2006/07	2007/08
All mushrooms					
Volume (mt)	387,601	386,985	384,244	375,576	366,972
Value (1,000 $)	918,914	908,733	889,365	961,446	963,522
Price ($/kg)	2.37	2.35	2.31	2.56	2.63
Common mushrooms					
Volume (mt)	381,545	380,149	378,150	369,156	359,629
Value (1,000 $)	878,405	862,192	848,836	915,561	913,586
Price ($/kg)	2.30	2.27	2.24	2.48	2.54
Other					
Volume (mt)	337,549	334,550	324,945	324,165	312,064
Value (1,000 $)	751,370	732,023	696,798	775,662	770,151
Price ($/kg)	2.23	2.19	2.14	2.39	2.47
Brown mushrooms					
Volume (mt)	43,996	45,599	53,205	44,991	47,565
Value (1,000 $)	127,035	130,169	152, 038	139,899	143,435
Price ($/kg)	2.89	2.85	2.86	3.11	3.02
Fresh-market					
Volume (mt)	319,101	315,845	319,594	316,022	306,259
Value (1,000 $)	805,200	796,493	793,538	840,560	837,732
Price ($/kg)	2.52	2.52	2.48	2.66	2.74
Processing					
Volume (mt)	62,444	64,303	58,556	53,134	53,371
Value (1,000 $)	73,205	65,699	55,298	75,001	75,854
Price ($/kg)	1.17	1.02	0.94	1.41	1.42
Specialty mushrooms					
Volume (mt)	6,056	6,836	6,094	6,420	7,343
Value (1,000 $)	40,509	46,541	40,529	45,885	49,936
Price ($/kg)	6.69	6.81	6.65	7.15	6.80
Shiitake					
Volume (mt)	3,410	3,908	3,486	3,168	4,486
Value (1,000 $)	24,391	28,005	24,942	23,469	27,794
Price ($/kg)	7.15	7.17	7.15	7.41	6.20
Oyster					
Volume (mt)	1,898	2,326	2,070	2,293	1,929
Value (1,000 $)	8,714	12,035	9,827	11,185	12,206
Price ($/kg)	4.59	5.17	4.75	4.88	6.33
Other					
Volume (mt)	748	602	539	958	928
Value (1,000 $)	7,404	6,501	5,760	10,231	9,936
Price ($/kg)	9.90	10.80	10.69	10.68	10.71

Source: *Mushrooms*, NASS, USDA, Washington, DC, Vg 2-1-2 (8-06), August 16, 2006, 5, 6–7, and 10; Vg 2-1-2 (8-07)a, August 23, 2007, 5, 6–7, and 10; and Vg 2-1-2 (8-08), August 22, 2008, 5, 6–7, and 10.

Note: Data on the volume and value of canned-mushroom shipments are not available: quantities and values of processing mushrooms reported here are of fresh mushrooms intended for processing and may not accurately reflect actual shipments quantities and values of canned mushrooms.

Note: Shipments of specialty mushrooms are believed to be principally fresh-market sales.

TABLE A.5 Mushrooms: Common mushroom production volume, by regions and by selected states, CY 2003/04 to CY 2007/08 (million lbs)

Region/state	2003/04	2004/05	2005/06	2006/07	2007/08
East					
Pennsylvania	464.6	495.4	492.4	496.6	496.7
All other	101.5	99.4	101.5	76.4	68.1
Subtotal	566.1	594.8	593.9	573.0	564.8
Central	109.5	84.1	82.6	79.8	77.0
West					
California	123.5	118.6	117.9	117.9	114.3
All other	42.0	40.5	39.2	43.1	36.7
Subtotal	165.5	159.1	157.1	161.0	151.0
Total	841.1	838.0	833.7	813.8	792.8

Source: *Mushrooms*, NASS, USDA, Washington, DC, Vg 2-1-2 (8-06), August 16, 2006, 2; Vg 2-1-2 (8-07)a, August 23, 2007, 2; and Vg 2-1-2 (8-08), August 22, 2008, 2.

Note: Production regions and their respective states are as follows: East-CT, DE, FL, MD, NY, PA, TN, and VT; Central-IL, OK, TX, and WI: West-CA, CO, MT, OR, UT, and WA.

TABLE A.6 Fresh mushrooms: Prices of U.S. sales, by year, by quarter, and by type, first quarter 2004 to first quarter 2008 ($/lb)

	White/brown mix		Whole		
Year/quarter	Whole	Sliced	White	Brown	Specialty
2004					
First	3.77	4.10	3.69	5.83	8.59
Second	3.78	4.35	3.79	5.28	6.82
Third	3.77	4.21	3.69	6.02	6.04
Fourth	3.78	4.21	3.71	5.93	6.64
2005					
First	3.80	4.35	3.76	5.91	6.51
Second	3.80	4.24	3.73	5.51	6.58
Third	3.94	4.17	3.79	5.88	6.67
Fourth	4.02	4.21	3.87	5.57	7.59
2006					
First	4.01	4.16	3.85	5.54	7.48
Second	4.10	4.56	4.07	5.66	7.06
Third	4.16	4.66	4.14	5.88	7.02
Fourth	4.20	4.79	4.24	5.67	7.47
2007					
First	4.30	4.73	4.27	5.65	7.21
Second	4.37	4.74	4.30	5.71	9.41
Third	4.39	4.72	4.28	5.67	9.41
Fourth	4.38	4.61	4.23	5.65	9.44
2008					
First	4.52	4.80	4.40	5.61	9.03

Source: U.S. mushrooms council presentation, period ending March 30, 2008.

Note: Data are supermarket sales in California, collected by IRI, and are believed to be representative of sales in other major markets as well.

TABLE A.7 Fresh mushrooms: U.S. sales, exports of domestic merchandise, imports for consumption, apparent consumption, and ratio of imports to consumption, CY 2003/04 to CY 2007/08

Crop-years	Sales	Exports	Imports	Apparent consumption	Ratio of imports to consumption
		Quantity (*mt*)			Percent
2003/04	319,101	3,497	27,134	342,738	7.9
2004/05	315,845	3,734	28,290	340,401	8.3
2005/06	319,594	3,982	32,710	348,322	9.4
2006/07	316,022	5,253	31,245	342,014	9.1
2007/08	306,259	7,212	30,299	329,346	9.2
		Value (*1,000 $*)			
2003/04	805,200	16,040	73,205	862,365	8.5
2004/05	796,493	19,043	73,799	851,249	8.7
2005/06	793,538	16,698	86,746	863,586	10.0
2006/07	840,560	21,286	85,059	904,333	9.4
2007/08	837,732	36,923	81,487	882,296	9.2
		Unit value (*$/mt*)			
2003/04	2,523	4,587	2,698	2,506	([a])
2004/05	2,522	5,099	2,609	2,501	([a])
2005/06	2,483	4,193	2,652	2,479	([a])
2006/07	2,660	4,052	2,722	2,644	([a])
2007/08	2,735	5,120	2,689	2,679	([a])

Source: Sales data compiled from *Mushrooms*, NASS, USDA, Washington, DC, Vg 2-1-2 (8-08), August 22, 2008, 6–7; exports and imports compiled from official statistics of the U.S. Department of Commerce.

Note: Sales quantities converted by Commission staff from pounds to metric tons using a conversion factor of 2,204.62 pounds per metric ton.

[a]Not meaningful.

TABLE A.8 Canned mushrooms: U.S. sales, exports of domestic merchandise, imports for consumption, apparent consumption, and ratio of imports to consumption, CY 2003/04 to CY 2007/08

Crop-years	Sales	Exports	Imports	Apparent consumption	Ratio of imports to consumption
		Quantity (*mt*)			Percent
2003/04	64,444	1,012	66,212	127,644	51.9
2004/05	64,303	648	61,949	125,604	49.3
2005/06	58,556	1,068	51,380	108,868	47.2
2006/07	53,134	733	62,078	114,479	54.2
2007/08	53,371	709	64,867	117,529	55.2
		Value (*1,000 $*)			
2003/04	73,205	2,856	111,928	182,277	61.4
2004/05	65,699	1,712	94,921	158,908	59.7
2005/06	55,298	2,791	82,373	134,880	61.1
2006/07	75,001	2,106	122,309	195,204	62.7
2007/08	75,854	2,235	154,536	228,155	67.7
		Unit value (*$/mt*)			
2003/04	1,172	2,823	1,690	1,428	([a])
2004/05	1,022	2,642	1,532	1,265	([a])
2005/06	944	2,613	1,603	1,239	([a])
2006/07	1,412	2,873	1,970	1,705	([a])
2007/08	1,428	3,153	2,382	1,941	([a])

Source: Sales data compiled from *Mushrooms*, NASS, USDA, Washington, DC, Vg 2-2-2 (8-08), August 22, 2008, 6–7; exports and imports compiled from official statistics of the U.S. Department of Commerce.

Note: Sales quantities converted by Commission staff from pounds to metric tons using a conversion factor of 2,204.62 pounds per metric ton.

Note: Data on the quantity and value of canned-mushroom sales are not available; data reported here are the quantities and values of fresh mushrooms intended for processing and may not accurately reflect actual sales of canned mushrooms.

[a]Not meaningful.

TABLE A.9 Fresh mushrooms: U.S. exports of domestic merchandise, imports for consumption, and merchandise trade balance, by selected countries, CY 2003/04 to CY 2007/08

Market/source	2003/04	2004/05	2005/06	2006/07	2007/08	Percentage change 2003/04 to 2007/08
	Value (*1,000 $*)					Percent
U.S. exports						
Canada	7,360	8,894	10,423	15,535	20,535	179
China	0	0	0	177	56	-
Mexico	108	121	120	218	356	230
Korea	82	363	5	0	0	-
Japan	6,027	7,205	4,776	4,688	8,839	47
France	1,405	1,301	702	178	3,628	158
Netherlands	176	207	164	21	743	322
Switzerland	288	495	88	14	327	14
All other	594	447	420	455	2,439	311
Total	16,040	19,043	16,698	21,286	36,923	130
U.S. imports						
Canada	66,017	66,657	78,280	74,052	67,483	9
China	1,684	2,044	2,691	2,973	4,139	146
Mexico	2,802	2,961	2,391	3,831	3,722	33
Korea	95	96	269	799	2,708	2,751
Japan	498	490	956	1,115	1,837	268
France	364	269	349	590	267	-27
Netherlands	133	16	5	147	92	-31
Switzerland	0	2	0	0	0	-
All other	1,612	1,264	1,805	1,552	1,239	-37
Total	73,205	73,799	86,746	85,059	81,487	17
U.S. merchandise balance						
Canada	-58,657	-57,763	-67,857	-58,517	-46,948	-20
China	-1,684	-2,044	-2,691	-2,796	-4,083	142
Mexico	-2,694	-2,840	-2,271	-3,613	-3,366	25
Korea	-13	267	-364	-799	-2,708	20,731
Japan	5,529	6,715	3,820	3,573	7,002	27
France	1,041	1,032	353	-412	3,361	223
Netherlands	43	191	159	-126	651	1,414
Switzerland	288	493	88	14	327	14
All other	-1,018	-817	-1,385	-1,097	1,200	-61
Total	-57,165	-54,756	-70,048	-63,773	-44,564	-17

Source: Compiled from official statistics of the U.S. Department of Commerce.

TABLE A.10 Canned mushrooms: U.S. exports of domestic merchandise, imports for consumption, and merchandise trade balance, by selected countries, CY 2003/04 to CY 2007/08

Market/source	2003/04	2004/05	2005/06	2006/07	2007/08	Percentage change 2003/04 to 2007/08
	Value (*1,000 $*)					Percent
U.S. exports						
China	12	67	0	16	31	158
India	0	0	645	0	0	-
Indonesia	0	0	24	38	93	-
Taiwan	51	3	15	84	34	-33
Malaysia	101	85	67	101	146	45
Vietnam	0	12	7	18	0	-
All other	2,692	1,545	2,033	1,849	1,931	-28
Total	2,856	1,712	2,791	2,106	2,235	-22
U.S. imports						
China	39,784	39,998	31,994	69,267	80,312	60
India	23,949	15,926	18,840	25,463	28,443	46
Indonesia	21,527	23,855	16,268	16,805	27,178	29
Taiwan	3,089	2,453	2,220	2,577	6,339	29
Malaysia	1,972	1,450	1,186	403	2,924	26
Vietnam	146	160	1,233	1,427	2,893	388
All other	21,461	11,079	10,632	6,367	6,447	-70
Total	111,928	94,921	82,373	122,309	154,536	38
U.S. merchandise balance						
China	-39,772	-39,931	-31,994	-69,251	-80,281	102
India	-23,949	-15,926	-18,195	-25,463	-28,443	19
Indonesia	-21,527	-23,855	-16,244	-16,767	-27,085	26
Taiwan	-3,038	-2,450	-2,205	-2,493	-6,305	108
Malaysia	-1,871	-1,365	-1,119	-302	-2,778	48
Vietnam	-146	-148	-1,226	-1,409	-2,893	1,882
All other	-18,769	-9,534	-8,599	-4,518	-4,516	-82
Total	-109,072	-93,209	-79,582	-120,203	-152,301	40

Source: Compiled from official statistics of the U.S. Department of Commerce.

TABLE A.11 Fresh mushrooms: U.S. imports, by principal sources, CY 2003/04 to CY 2008/09

Source	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
			Quantity (*mt*)			
Canada	23,348	23,821	26,727	23,757	21,400	20,629
Mexico	1,295	1,335	1,188	1,796	1,667	2,793
China	1,957	2,537	3,677	4,052	4,635	4,697
Korea	37	56	195	1,016	2,083	2,733
Japan	287	247	462	381	322	329
Bulgaria	521	13	21	8	9	19
All other	189	281	439	234	185	114
Total	27,134	28,290	32,710	31,245	30,299	31,314
			Value (*1,000 $*)			
Canada	66,017	66,657	78,280	74,052	67,483	67,097
Mexico	2,802	2,961	2,391	3,831	3,722	5,459
China	1,684	2,044	2,691	2,973	4,139	4,114
Korea	95	96	269	799	2,708	3,452
Japan	498	490	956	1,115	1,837	1,685
Bulgaria	189	98	148	67	116	195
All other	1,921	1,453	2,011	2,222	1,482	924
Total	73,205	73,799	86,746	85,059	81,487	82,926
			Unit value (*$/mt*)			
Canada	2,828	2,798	2,929	3,117	3,153	3,253
Mexico	2,163	2,219	2,012	2,132	2,233	1,955
China	860	806	732	734	893	876
Korea	2,580	1,725	1,381	786	1,300	1,263
Japan	1,733	1,984	2,069	2,927	5,710	5,124
Bulgaria	8,945	7,487	6,930	8,237	12,947	10,095
All other	10,181	5,162	4,580	9,499	8,014	8,095
Average	2,698	2,609	2,652	2,722	2,689	2,648

Source: Compiled from official statistics of the U.S. Department of Commerce.

Note: Data are for fresh mushrooms (HTS numbers 0709.51.0100, 0709.59.0000, and 0709.59.9000).

TABLE A.12 Canned mushrooms: U.S. imports, by principal sources, CY 2003/04 to CY 2008/09

Source	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
	Quantity (*mt*)					
China	25,149	28,484	21,282	35,523	34,399	28,931
Indonesia	10,117	11,917	8,161	7,171	9,932	8,364
India	15,284	12,057	12,529	13,811	11,460	8,066
Taiwan	1,890	1,651	1,465	1,416	3,105	1,345
Malaysia	1,968	1,460	1,149	345	1,898	1,487
Canada	2,128	1,043	1,815	488	881	799
Vietnam	98	131	826	861	1,511	446
All other	9,577	5,206	4,153	2,462	1,681	780
Total	66,212	61,949	51,380	62,078	64,867	50,217
	Value (*1,000 $*)					
China	39,784	39,998	31,994	69,267	80,312	60,964
Indonesia	21,527	23,855	16,268	16,805	27,178	21,905
India	23,949	15,926	18,840	25,463	28,443	16,904
Taiwan	3,089	2,453	2,220	2,577	6,339	2,341
Malaysia	1,972	1,450	1,186	403	2,924	1,999
Canada	2,528	1,338	2,496	704	1,505	1,338
Vietnam	146	160	1,233	1,427	2,893	782
All other	18,932	9,740	8,136	5,663	4,941	2,210
Total	111,928	94,921	82,373	122,309	154,536	108,444
	Unit value (*$/mt*)					
China	1,582	1,404	1,503	1,950	2,335	2,107
Indonesia	2,128	2,002	1,993	2,343	2,737	2,619
India	1,567	1,321	1,504	1,844	2,482	2,096
Taiwan	1,635	1,486	1,515	1,820	2,041	1,741
Malaysia	1,002	993	1,032	1,167	1,541	1,344
Canada	1,188	1,283	1,375	1,442	1,709	1,676
Vietnam	1,481	1,221	1,493	1,658	1,914	1,755
All other	1,977	1,871	1,959	2,300	2,939	2,835
Total	1,690	1,532	1,603	1,970	2,382	2,159

Source: Compiled from official statistics of the U.S. Department of Commerce.

Note: Data are for canned mushrooms (HTS numbers 2003.10.0127, 2003.10.0131, 2003.10.0137, 2003.10.0143, 2003.10.0147, and 2003.10.0153). Not included here are small amounts of other canned mushrooms (HTS numbers 2003.90.0010 and 2003.90.0090).

Note: Data include small amounts of other canned mushrooms and do not match the sum of the other two canned-mushroom tables.

TABLE A.13 Retail-size canned mushrooms: U.S. imports, by principal sources, CY 2003/04 to CY 2008/09

Source	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
			Quantity (*mt*)			
Indonesia	9,881	11,513	7,731	6,854	9,544	8,144
China	11,147	11,546	8,139	10,771	8,225	5,326
India	3,819	4,446	6,178	6,503	2,551	2,542
Malaysia	165	137	139	0	787	523
Taiwan	559	449	382	319	900	275
Vietnam	67	45	135	633	1,118	180
Canada	1,118	828	299	157	185	220
All other	4,162	1,935	977	644	480	188
Total	30,919	30,901	23,979	25,882	23,791	17,399
			Value (*1,000 $*)			
Indonesia	21,219	23,269	15,665	16,270	26,336	21,487
China	20,097	18,361	13,943	21,397	19,232	10,999
India	5,522	5,770	10,184	12,447	6,840	6,561
Malaysia	170	130	141	0	1,693	983
Taiwan	950	701	680	672	1,896	578
Vietnam	109	54	229	1,054	2,176	397
Canada	1,328	1,061	387	208	317	385
All other	9,124	4,015	2,370	1,553	1,296	558
Total	58,520	53,361	43,599	53,601	59,786	41,948
			Unit value (*$/mt*)			
Indonesia	2,147	2,021	2,026	2,374	2,759	2,638
China	1,803	1,590	1,713	1,987	2,338	2,065
India	1,446	1,298	1,649	1,914	2,681	2,581
Malaysia	1,033	943	1,010	0	2,150	1,879
Taiwan	1,700	1,559	1,781	2,106	2,106	2,100
Vietnam	1,617	1,198	1,700	1,665	1,946	2,210
Canada	1,188	1,281	1,294	1,323	1,713	1,750
All other	2,192	2,075	2,425	2,410	2,700	2,959
Total	1,893	1,727	1,818	2,071	2,513	2,411

Source: Compiled from official statistics of the U.S. Department of Commerce.

Note: Data are for canned mushrooms in retail-size (255 g or less) containers (HTS numbers 2003.10.0127, 2003.10.0131, and 2003.10.0137).

TABLE A.14 Institutional-size canned mushrooms: U.S. imports, by principal sources, CY 2003/04 to CY 2008/09

Source	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
			Quantity (*mt*)			
China	14,002	16,938	13,144	24,752	26,174	23,605
India	11,465	7,611	6,351	7,308	8,908	5,524
Taiwan	1,331	1,202	1,083	1,097	2,205	1,070
Malaysia	1,803	1,323	1,010	345	1,110	964
Canada	1,010	215	1,517	331	696	579
Italy	145	87	61	48	59	62
All other	5,538	3,674	4,232	2,314	1,924	1,015
Total	35,293	31,048	27,398	36,197	41,076	32,818
			Value (*1,000 mt*)			
China	19,687	21,637	18,051	47,869	61,080	49,964
India	18,428	10,156	8,656	13,016	21,604	10,343
Taiwan	2,139	1,752	1,540	1,905	4,443	1,763
Malaysia	1,802	1,321	1,046	403	1,230	1,016
Canada	1,200	276	2,109	496	1,188	953
Italy	746	455	416	346	427	456
All other	9,404	5,962	6,940	4,672	4,778	1,999
Total	53,406	41,559	38,757	68,707	94,750	66,495
			Unit value (*$/mt*)			
China	1,406	1,277	1,373	1,934	2,334	2,117
India	1,607	1,334	1,363	1,781	2,425	1,872
Taiwan	1,607	1,458	1,421	1,736	2,015	1,648
Malaysia	1,000	998	1,035	1,167	1,108	1,054
Canada	1,188	1,289	1,391	1,499	1,708	1,648
Italy	5,159	5,233	6,788	7,133	7,293	7,373
All other	1,698	1,623	1,640	2,019	2,484	1,970
Total	1,513	1,339	1,415	1,898	2,307	2,026

Source: Compiled from official statistics of the U.S. Department of Commerce.

Note: Data are for canned mushrooms in institutional-size (more than 255 g) containers (HTS numbers 2003.10.0143, 2003.10.0147, and 2003.10.0153).

TABLE A.15 Fresh mushrooms: U.S. exports, by principal markets, CY 2003/04 to CY 2008/09

Market	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
			Quantity (*mt*)			
Canada	3,059	3,149	3,692	4,640	5,959	6,919
Japan	174	263	119	516	734	716
France	99	102	54	7	207	187
Switzerland	13	49	8	1	18	36
Netherlands	5	7	12	1	44	29
Spain	1	2	10	3	37	26
All other	146	164	88	85	213	205
Total	3,497	3,734	3,982	5,253	7,212	8,119
			Value (*1,000 $*)			
Canada	7,360	8,894	10,423	15,535	20,535	21,659
Japan	6,027	7,205	4,776	4,688	8,839	7,896
France	1,405	1,301	702	178	3,628	2,578
Switzerland	288	495	88	14	327	537
Netherlands	176	207	164	21	743	422
Spain	19	25	120	85	566	359
All other	764	915	424	765	2,285	1,121
Total	16,040	19,043	16,698	21,286	36,923	34,572
			Unit value (*$/mt*)			
Canada	2,406	2,825	2,823	3,348	3,446	3,130
Japan	34,583	27,386	40,206	9,076	12,037	11,028
France	14,242	12,778	13,096	26,885	17,554	13,748
Switzerland	21,975	10,203	11,733	21,667	17,965	15,026
Netherlands	36,231	29,985	13,549	23,556	16,788	14,501
Spain	15,373	14,064	12,137	33,691	15,421	13,766
All other	5,245	5,592	4,825	9,007	10,714	5,471
Total	4,587	5,099	4,193	4,052	5,120	4,258

Source: Compiled from official statistics of the U.S. Department of Commerce.

Note: Data are for fresh mushrooms (Schedule B numbers 0709.51.0100, 0709.59.0000, and 0709.59.9000).

TABLE A.16 Canned mushrooms: U.S. exports, by principal markets, CY 2003/04 to CY 2008/09

Market	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09
	Quantity (*mt*)					
Canada	316	210	419	179	156	307
Singapore	59	82	50	60	94	223
Hong Kong	0	6	12	39	39	182
Philippines	0	0	0	0	10	89
India	0	0	292	0	0	109
Taiwan	22	1	5	32	17	87
All other	614	348	291	422	393	283
Total	1,012	648	1,068	733	709	1,281
	Value (*1,000 $*)					
Canada	681	522	1,029	519	510	884
Singapore	262	328	237	299	429	812
Hong Kong	0	14	27	112	112	470
Philippines	0	0	0	0	68	332
India	0	0	645	0	0	255
Taiwan	51	3	15	84	34	183
All other	1,863	844	839	1,092	1,083	875
Total	2,856	1,712	2,791	2,106	2,235	3,811
	Unit value (*$/mt*)					
Canada	2,155	2,488	2,457	2,895	3,262	2,882
Singapore	0	0	0	4,944	4,582	3,642
Hong Kong	0	2,255	2,255	2,851	2,834	2,573
Philippines	0	0	0	0	6,957	3,721
India	0	0	2,209	0	0	2,336
Taiwan	2,270	2,082	3,388	2,625	1,962	2,108
All other	3,034	2,426	2,883	2,586	2,759	3,087
Total	2,823	2,642	2,613	2,872	3,153	2,975

Source: Compiled from official statistics of the U.S. Department of Commerce.

Note: Data are for canned mushrooms (Schedule B numbers 2003.10.0000, 2003.10.0100, and 2003.90.0000).

TABLE A.17 Mushrooms: Harmonized Tariff Schedule subheadings; description; U.S. col. 1 rate of duty as of January 1, 2010; U.S. exports, 2008–09; and U.S. imports, 2008–09

HTS subheading	Description	Column 1 rate of duty, as of January 1, 2010		U. S. exports, 2008–09	U. S. imports, 2008–09
		General	Special[a]	*1,000 dollars*	
	Other vegetables, fresh or chilled:				
	Mushrooms and truffles:				
0709.51.01	Mushrooms of the genus Agaricus	8.8¢/kg + 20%	Free (A+, CA, D, E, IL, J, JO, MX, P, PE) 1.7¢/kg + 4%(MA); 3.5¢/kg + 8% (CL, SG); 5.2¢/kg + 12% (BH); 6.3¢/kg + 14.4% (AU); 7.9¢/kg + 18% (OM)	23,026	74,248
0709.59	Other:				
0709.59.90	Other	8.8¢/kg + 20%	Free (A+, CA, D, E, IL, J, JO, MX, P, PE) 1.7¢/kg + 4% (MA); 3.5¢/kg + 8% (CL, SG); 5.2¢/kg + 12% (BH); 6.3¢/kg + 14.4% (AU); 7.9¢/kg + 18% (OM)	11,545	8,677
	Vegetables (uncooked or cooked by steaming or boiling in water), frozen:				
	Other vegetables:				
0710.80.20	Mushrooms	5.7¢/kg + 8%	Free (A+, AU, CA, D, E, IL, J, JO, MX, P, PE) 1.4¢/kg + 2% (SG); 1.1¢/kg + 1.6% (BH, MA); 2.2¢/kg + 3.2% (CL); 4.5¢/kg + 6.4% (OM)	([b])	10,924
	Vegetables provisionally preserved (for example, by sulfur dioxide gas, in brine, in sulfur water or in other preservative solutions), but unsuitable in that state for immediate consumption:				
	Mushrooms and truffles:				
0711.51.00	Mushrooms of the genus Agaricus	5.7¢/kg on drained weight + 8%	Free (A+, CA, D, E, IL, J, JO, MX, P, PE) 1.4¢/kg on drained weight + 2% (SG); 1.1¢/kg on drained weight + 1.6% (BH); 2.8¢/kg on drained weight + 4% (AU); 3.4¢/kg on drained weight + 4.8% (MA); 4.5¢/kg on drained weight + 6.4% (OM); See 9911.95.36-9911.95.40 (CL)	298	0
0711.59.00	Other:				
0711.59.10	Mushrooms	5.7¢/kg on drained weight + 8%	Free (A+, CA, D, E, IL, J, JO, MX, P, PE) 1.4¢/kg on drained weight + 2% (SG); 1.1¢/kg on drained weight + 1.6% (BH, MA); 2.8¢/kg on drained weight + 4% (AU); 4.5¢/kg on drained weight + 6.4% (OM); See 9911.95.36-9911.95.40 (CL)	41	22

See footnotes at end of table.

TABLE A.17—*Continued* Mushrooms: Harmonized Tariff Schedule subheadings; description; U.S. col. 1 rate of duty as of January 1, 2010; U.S. exports, 2008–09; and U.S. imports, 2008–09

HTS subheading	Description	Column 1 rate of duty, as of January 1, 2010		U. S. exports, 2008–09	U. S. imports, 2008–09
		General	Special[a]	*1,000 dollars*	
	Dried vegetables, whole, cut, sliced, broken or in powder, but not further prepared:				
	Mushrooms, wood ears (Auricularia spp.), jelly fungi (Tremella spp.), and truffles:				
0712.31	Mushrooms of the genus Agaricus*:*				
0712.31.10	Air dried or sun dried	1.3¢/kg + 1.8%	Free (A, AU, BH, CA, CL, E, IL, J, JO, MA, MX, OM, P, PE, SG)	958	6,041
0712.31.20	Other	1.9¢/kg + 2.6%	Free (A+, AU, BH, CA, CL, D, E, IL, J, JO, MA, MX, OM, P, PE, SG)	(c)	1,003
0712.32.00	Wood ears (Auricularia spp.)	8.3%	Free (A, AU, BH, CA, CL, E, IL, J, JO, MA, MX, OM, P, PE, SG)	325	326
0712.33.00	Jelly fungi (Tremella spp.)	8.3%	Free (A, AU, BH, CA, CL, E, IL, J, JO, MA, MX, OM, P, PE, SG)	79	27
0712.39	Other:				
	Mushrooms:				
0712.39.10	Air dried or sun dried	1.3¢/kg + 1.8%	Free (A, AU, BH, CA, CL, E, IL, J, JO, MA, MX, OM, P, PE, SG)	3,366	10,409
0712.39.20	Other	1.9¢/kg + 2.6%	Free (A+, AU, BH, CA, CL, D, E, IL, J, JO, MA, MX, OM, P, PE, SG)	(d)	2,166
	Mushrooms and truffles, prepared or preserved otherwise than by vinegar or acetic acid:				
2003.10.01	Mushrooms of the genus Agaricus	6¢/kg drained weight + 8.5%	Free (A+, BH, CA, D, E, IL, J, JO, MA, MX, OM, P, PE) 0.7¢/kg on drained weight + 1% (SG); 2.4¢/kg on drained weight + 3.4% (AU); See 9911.96.21-9911.96.50 (CL)	2,729	108,444
2003.90.00	Other	6¢/kg drained weight + 8.5%	Free (A+, BH, CA, D, E, IL, J, JO, MA, MX, P, PE) 0.7¢/kg on drained weight + 1% (SG); 2.4¢/kg on drained weight + 3.4% (AU); 3.6¢/kg on drained weight + 5.1% (OM); See 9911.96.51-9911.96.55 (CL)	1,082	6,603

See footnotes at end of table.

Source: U.S. exports and imports compiled from official statistics of the U.S. Department of Commerce.

[a]Programs under which special tariff treatment may be provided, with the corresponding symbols for such programs as they are indicated in the “Special “ subcolumn, are as follows: Generalized System of Preferences (A, A*, or A+); United States-Australia Free Trade Agreement (AU); United States-Bahrain Free Trade Agreement Implementation Act (BH); North American Free Trade Agreement (NAFTA), goods of Canada (CA); NAFTA, goods of Mexico (MX); United States-Chile Free Trade Agreement (CL); African Growth and Opportunity Act (D); Caribbean Basin Economic Recovery Act (E or E*); United States-Israel Free Trade Area (IL); Andean Trade Preference Act or Andean Trade Promotion and Drug Eradication Act (J, J*, or J+); United States-Jordan Free Trade Area Implementation Act (JO); Dominican Republic-Central America-United States Free Trade Agreement Implementation Act (P or P+); United States-Morocco Free Trade Agreement Implementation Act (MA); United States-Singapore Free Trade Agreement (SG); United States-Oman Free Trade Agreement Implementation Act (OM); United States-Peru Trade Promotion Agreement Implementation Act (PE).

[b]Not separately reported; included in item 0709.59.90.

[c]Not separately reported; included in item 0712.31.10.

[d]Not separately reported; included in item 0712.39.10.

TABLE A.18 Mushrooms: Global production, 2003–07 (mt)

Country	2003	2004	2005	2006	2007
China	1,309,455	1,360,501	1,409,678	1,504,698	1,605,000
European Union	1,082,436	1,103,412	1,057,312	1,022,374	1,009,821
Netherlands	263,000	260,000	245,000	225,000	245,000
Spain	129,205	138,782	137,764	150,000	160,000
Poland	120,000	150,000	160,000	137,000	138,000
France	165,647	165,466	138,541	115,846	125,000
Italy	96,090	94,152	88,361	100,100	100,000
Ireland	69,000	65,000	62,000	75,000	75,000
United Kingdom	81,000	74,000	74,000	68,000	72,000
United States	387,601	387,601	386,984	382,541	390,000
Canada	87,937	84,682	80,071	81,000	81,500
Japan	65,400	66,200	66,000	65,000	67,000
India	48,000	61,000	36,000	48,000	48,000
Australia	39,288	46,265	47,992	40,000	42,000
Indonesia	31,233	10,544	30,854	23,559	30,000
All other	139,981	147,422	149,488	154,928	153,346
Total	3,191,431	3,267,627	3,264,379	3,322,100	3,426,667

Source: FAO, FAOSTAT Production database.

Note: Data also include truffles which are believed to account for a small share of total production.

TABLE A.19 Mushrooms: Global production, exports, imports, and apparent consumption, 2007 (mt)

Country	Production	Exports	Imports	Consumption	Ratio of imports to consumption
China	1,605,000	379,110	661	1,226,551	0.1
European Union	1,009,821	10,066	31,914	1,031,669	3.1
United States	390,000	437	62,257	451,820	13.8
Canada	81,500	457	17,878	98,921	18.1
Japan	67,000	66	12,712	79,646	16.0
Russia	5,700	19	60,857	66,538	91.5
Australia	42,000	8	4,825	46,817	10.3
India	48,000	2,835	3	45,168	0.0
Korea	28,500	19	9,501	37,982	25.0
Iran	28,000	0	0	28,000	0.0
Viet Nam	18,000	0	0	18,000	0.0
Indonesia	30,000	18,234	1,473	13,239	11.1
Switzerland	7,500	2	4,381	11,879	37.0
Ukraine	5,000	78	5,053	9,975	50.7
Thailand	10,000	736	350	9,614	3.6
Israel	9,500	0	0	9,500	0.0
New Zealand	8,500	5	343	8,838	3.9
South Africa	8,500	158	359	8,701	4.1
Belarus	6,800	0	0	6,800	0.0
All other	17,346	9,271	58,562	66,637	87.9
Total	3,426,667	421,501	271,129	3,276,295	

Source: Compiled by Commission staff from FAO, FAOSTAT Production database.

Note: Data also include truffles which are believed to account for a small share of total production.

Note: Data are not reported specifically for fresh market or for processing.

TABLE A.20 Canned and fresh mushrooms: Global exports, 2004–08 (mt)

Country	2004	2005	2006	2007	2008
			Canned mushrooms		
China	295,478	315,572	305,122	379,110	399,754
Indonesia	17,398	18,709	16,446	18,234	17,735
India	23,244	15,371	27,048	2,835	16,814
EU	13,964	11,929	12,066	10,066	7,894
Taiwan	1,768	2,164	1,724	2,679	6,079
Malaysia	2,500	3,008	1,222	1,259	2,477
Chile	0	0	883	1,813	2,284
Canada	1,739	1,441	1,430	457	930
All other	9,876	9,081	5,858	5,048	4,170
Total	365,967	377,275	371,799	421,501	458,137
			Fresh mushrooms		
Canada	23,153	25,770	24,143	22,314	20,310
United States	3,021	3,181	4,526	7,112	7,428
Malaysia	508	1,725	2,152	2,343	2,133
Mexico	1,418	1,326	1,268	1,900	1,866
China	1,384	2,767	3,869	4,720	167
Indonesia	3,334	2,644	1,012	18	8
India	5,008	2,387	817	501	5
Ukraine	547	720	1,576	1,138	4
All other	6,065	4,628	3,050	2,894	2,881
Total	44,438	45,148	42,413	42,940	34,802

Source: Global Trade Information Services, Inc. (GTIS).

TABLE A.21 Canned and fresh mushrooms: Global imports, 2004–08 (mt)

Country	2004	2005	2006	2007	2008
			Canned mushrooms		
United States	66,064	60,157	49,781	62,257	65,250
Russia	35,517	43,254	44,929	60,857	61,628
European Union	38,738	30,420	26,696	31,914	26,770
Canada	14,471	17,739	11,258	17,878	20,356
Japan	15,787	14,931	13,981	12,712	13,235
Malaysia	17,868	13,968	9,902	11,868	12,696
Ukraine	51	881	4,515	5,053	11,704
Philippines	8,302	8,772	7,804	9,235	8,956
All other	64,146	61,827	53,011	59,355	71,672
Total	260,944	251,949	221,877	271,129	292,267
			Fresh mushrooms		
Russia	24,071	25,323	27,459	32,295	39,382
United States	24,659	27,193	25,602	26,424	25,685
Canada	3,455	3,375	4,701	5,234	6,987
Norway	4,373	4,392	4,812	4,479	4,623
Malaysia	2,892	4,715	4,820	4,540	4,460
Ukraine	0	362	3,490	2,416	3,861
Switzerland	754	862	1,144	1,109	1,339
Thailand	162	105	578	1,074	890
All other	3,252	3,631	3,385	3,338	3,652
Total	63,618	69,958	75,991	80,909	90,879

Source: Global Trade Information Services, Inc., (GTIS).