Chestnut Production in the Northwestern United States

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ADDITIONAL INDEX WORDS. **Castanea**

SUMMARY. The chestnut (*Castanea* Mill.) industry in the northwestern United States is in its relative infancy, with most orchards being less than 10 years of age. Currently there are an estimated 300 acres (121 ha) in Oregon and Washington. California has about 500 acres (202 ha) in chestnuts. Current worldwide production is over 500,000 tons (435,600 t). China is the leading producer with 40%, followed by Korea at 15%. Italy, Turkey and Japan grow 10% each, while France, Greece and Spain grow 4% each. The United States, Chile, Argentina, New Zealand and Australia each grow less than 1%. The value of chestnuts imported into the United States is estimated to be \$10 to 15 million annually. Domestic producers hope to displace some of the imported chestnuts in the marketplace. The leading variety being grown in the western United States is 'Colossal,' a hybrid between european chestnut (*C. sativa* Mill.) and japanese chestnut (*C. crenata* Gillet). 'Dunstan' hybrids are chestnut blight (*Cryphonectria parasitica* Murr.) resistant, and were bred in Florida using chinese chestnut (*C. mollissima* Blume) and american chestnut (*C. dentata* Marsh. Borkh.) parentage. Prices received by chestnut producers in the northwestern United States have ranged from \$1.20 to \$7.00/lb (\$2.64 to \$15.40/ kg). The marketing of chestnuts has been through brokers into wholesale markets, farmers markets, mail order and direct sales through catalogues and World Wide Web sites.

The chestnut industry in the northwestern United States is relatively new, with most orchards being less than 10 years old. Currently there are about 300 acres in Oregon and Washington. California growers produce chestnuts on about 500 acres, and orchards also exist in Idaho and Montana (P.M. Vossen, personal communication).

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The leading variety being grown in the western United States is 'Colossal' (Bhagwandin, 1994). Its parentage is european chestnut and japanese chestnut. It produces very large nuts, averaging 18 nuts/lb (39.6 nuts/kg). Although it is not resistant to chestnut blight, reports from California indicate that it tolerates infection. (P.M. Vossen, personal communication).

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The 'Dunstan' hybrids are chestnut blight resistant, but currently account for only a small percentage of the orchard planted to date. 'Dunstan' produces a medium sized nut, averaging 23 to 35 nuts/lb (50 to 77 nuts/kg). 'Dunstan' hybrids were developed by Chestnut Hill Nursery (Alachua, Fla.) from Chinese chestnut and American chestnut parentage (Wallace, 1993).

The most common orchard design in Oregon is a 20 × 20 ft (6.1 m) spacing, with 108 trees/acre (44 trees/ha) (Rackham, 1992). California growers have favored a higher density approach with spacings ranging from 15 to 18 ft (4.6 to 5.5 m), with about 150 trees/acre (44 trees/ha) (P.M. Vossen, personal communication). The natural spread of chestnut trees can reach 30 ft (9.1 m) at maturity. A maximum permanent spacing would be about 40 ft (12.2 m). Higher density plantings will require tree thinning as the orchard matures.

Chestnuts in most western United States growing districts require irrigation to insure optimum tree health and yield (Stebbins, 1990). The types of systems used include trickle, micro-sprinklers, and surface types. Mature chestnuts orchards should yield 1 to 2 ton/acre (2.24 to 4.48 t·ha⁻¹).

Although there are currently no standards for leaf tissue analysis for chestnuts, the nutritional requirements of the chestnut tree are thought to be similar to hazelnut (*Corylus avellana* L.). Current recommendations call for 100 lb/acre (112 kg·ha⁻¹) of actual nitrogen on a mature orchard. Boron and potassium are needed periodically in chestnut orchards of the northwestern United States. The recommended pruning practices are similar to English walnuts (*Juglans regia* L.) (P.M. Vossen, personal communication; Warner, 1999). Tree training styles used have been multiple leader, open vase and central leader (Ferrini and Pisani, 1993), with an emphasis on the renewal of fruiting branches.

To date, the most common insect problem in chestnut orchards in the Pacific Northwest has been the shothole borer (*Scolytus rugulosus* Muller; Van Steenwyk et al., 1999). This insect attacks trees that are under stress. There are one to three generations of this pest per year. In Oregon, the filbertworm [*Melissopus latiferreanus* (Walsingham)] has caused as high as a 10% infestation in chestnut orchards near hazelnuts.

Oregon maintains a quarantine against chestnut plant material with the following insect pests: large chestnut weevil (*Curculio proboscideus* F.), small chestnut weevil (*Curculio auriger* Casey), nut curculio [*Conotrachelus nenuphar* (Herbst)] and oriental chest gall wasp (*Dryocosmus kuriphilus* Yasumatsu) (Oregon Dept. Agr., 1987).

The most prevalent disease problem has been root and crown rot caused by ink disease [*Phytophthora* (Rands)]. Orchard site selection should place a premium on well-drained soils. In Oregon, the following diseases have been isolated from chestnut trees: bacterial blight [*Pseudomonas syringae* (van Hall)], cytospora canker [*Cytospora carnea* (E11. @Ev.)], cryptodiaportha canker [*Cryptodiaportha castanea* (Tul.) Wehm], fungal canker [*Diaporthe eres* (Nits.)], twig blight [*Botryosphaeria castanea* (SCHW. Ex Fr.)] and heart rot [*Schizophyllum commune* (Fries)]. Many northwestern United States chestnut growers have struggled to establish a uniform orchard due to a high incidence of early tree mortality.

Chestnut harvest is usually spread over 10 to 15 d in October, depending on location and weather conditions. Many small growers harvest exclusively by hand, picking up nuts every 3 to 5 d, to avoid moldy nuts. Hazelnut and walnut harvesters have been adjusted for chestnut harvest. One Oregon grower is using a vacuum type harvester that allows harvest of two rows at a time. Once harvested and washed (some growers use an ozone wash), the chestnuts are stored at 32 to 33 °F (0 to 0.6 °C).

Chestnuts are mostly sold in their shell. The prices received by western chestnut producers have ranged from \$1.20 to \$7.00/lb (\$2.64 to \$15.40/kg). Oregon growers have received up to \$4.00/lb (\$8.80/kg) on the wholesale market, working through produce brokers. One grower has developed a fancy pack in peat moss for the mail order business and has received up to \$7.00/lb (\$15.40/kg). The costs of handling and packaging for that pack have been about \$3.00/lb (\$6.60/kg). There are a few growers who have developed processed value added chestnut products for sale.

The per capita consumption of chestnuts in the United States is 0.1 lb (0.045 kg) per person, compared to 4.0 lb (1.8 kg) in Korea. Growers have the challenge of marketing a relatively unknown and under utilized commodity.

The successful marketing of chestnuts grown in the northwestern United States has been achieved through the use of multiple outlets. Some growers have worked the wholesale market through brokers. Mail order sales have been successful through catalogues, direct sales and World Wide Web sites. Specialty ethnic grocery stores and restaurants have been target markets. Farm direct sales will continue to be important for the future. Domestic production does not currently meet domestic demand for chestnuts. Import sales from Korea and Italy continue to compete with domestic chestnuts in U.S. markets, especially later in the season (Warner, 1999).

Like nearly any infant industry, the U.S. chestnut industry has problems to overcome. Some, such as marketing challenges, were anticipated from the outset. The disease and insect problems experienced by chestnut growers were not altogether anticipated. Growers have had to find pest management solutions on a crop that has a very limited number of registered plant protection materials. However, within this small industry there have been successes by individual growers that demonstrate a great potential for the industry as a whole to prosper in the future.

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