

Raspberry

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Scientific Name and Introduction

Raspberries (*Rubus idaeus* L.) are a member of the Rosaceae family, grown as a perennial crop. Raspberries are available commercially in red, yellow, purple, and black forms. The red or yellow raspberry is classified into two subspecies: *R. idaeus* subsp. *vulgatus* Arrhen. (European red raspberry) and *R. idaeus* subsp. *strigosus* Michx. (American red raspberry). Black raspberries found in eastern North America are *R. occidentalis* L.; *R. glaucus* L. is a South American tetraploid black raspberry. Purple raspberries (*R. neglectus* Peck.) result from crosses of black and red raspberries.

All commercially important raspberry species are prized for their unique and delicate fruit flavor and are often used in fresh desserts. The berries are compound fruits, made up of many drupelets and a hollow center where the fruit detaches from the receptacle. Berries are soft, juicy, and have a distinct aroma. Important cultivars include 'Meeker,' 'Heritage,' 'Tulameen,' 'Willamette,' 'Chilliwack,' and 'Munger.'

Quality Characteristics and Criteria

High-quality raspberries are free of injury, decay, and sunscald; are uniformly colored; and appear turgid.

Horticultural Maturity Indices

For fresh market, raspberries are best harvested when bright red (red raspberries) or fully colored (black, purple, or yellow raspberries). Berries should pull or shake easily from the receptacle yet be firm, not mushy. Color development after harvest is highly cultivar-dependent; 'Heritage' berries turn purple-red quickly while 'Nova' retain a full red color. Cultivars known to change color rapidly are sometimes picked when pink, though acid levels are higher and flavor low or lacking at this color stage.

Grades, Sizes, and Packaging

Raspberries are graded as U.S. No.1 or No.2 based on freedom from mold, decay, sunscald, over-ripeness, and injury. A limit of 1% of berries for mold and 10% total for defects separates No. 1 grade from No. 2. No. 2 fruit can have no more than 2% berries with decay. Trays holding 12 half pints (125 g), usually vented plastic clamshell containers, are the standard package. No minimum berry size is required.

Precooling Conditions

Raspberries should be forced-air cooled to 1 °C (34 °F) within 12 h of harvest (Moore and Robbins 1992).

Optimum Storage Conditions

Raspberries should be held no more than 2 to 5 days, depending on cultivar, at -0.5 to 0 °C (31 to 32 °F) with >90% RH.

Controlled Atmosphere (CA) Considerations

Raspberries benefit from 10 to 20% CO₂ and 5 to 10% O₂ (Kader 1997). CA storage slows respiration, ethylene production, softening, color change, and growth of molds. Levels of CO₂ >20% can cause discoloration, softening, and off flavor (Agar and Streif 1996).

Retail Outlet Display Conditions

Raspberries should be stored and displayed at the coldest refrigeration temperature possible without freezing. As little as 1 day at 20 °C (68 °F) can result in growth of gray mold (*Botrytis cinerea* Pers.).

Chilling Sensitivity

Raspberries are not known to be chilling sensitive.

Ethylene Production and Sensitivity

The presence of ethylene can stimulate growth of *Botrytis cinerea* (gray mold) on raspberries; also, color can be adversely affected, darkening to a purple-red in red raspberries. Ethylene production is cultivar-dependent, from 1 to 12 μL kg⁻¹ h⁻¹ at 20 °C (68 °F) (Burdon and Sexton 1990, Perkins-Veazie and Nonnecke 1992).

Respiration Rates

Temperature	mg CO ₂ kg ⁻¹ h ⁻¹
2 °C	16 to 18
4 to 5 °C	18 to 27
10 °C	31 to 39
15 to 16 °C	28 to 55
20 to 21 °C	74 to 175

Data from Haller et al. (1941), Perkins-Veazie and Nonnecke (1992), and Perkins-Veazie (unpublished).

To get mL CO₂ kg⁻¹ h⁻¹, divide the mg kg⁻¹ h⁻¹ rate by 2.0 at 0 °C (32 °F), 1.9 at 10 °C (50 °F), and 1.8 at 20 °C (68 °F). To calculate heat production, multiply mg kg⁻¹ h⁻¹ by 220 to get BTU ton⁻¹ day⁻¹ or by 61 to get kcal tonne⁻¹ day⁻¹.

Physiological Disorders

Shriveling (water loss), leakers (berries with leakage of juice), and UV damage (white drupelets) are the primary disorders found in raspberries.

Postharvest Pathology

The most common postharvest diseases are gray mold (*Botrytis cinerea* Pers.) and rhizopus rot (*Rhizopus stolonifer* Ehrenb.:Fr.) (Ellis et al. 1991).

Quarantine Issues

There are no known quarantine issues.

Suitability as Fresh-Cut Product

Raspberries are incorporated into mixed fruit cups.

Special Considerations

Raspberries damage easily; they are one of the most fragile and perishable of all fruits.

References

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Acknowledgments

Some information included was taken from the University of California, Davis, website on “Produce Facts” at http://postharvest.ucdavis.edu/produce_information.

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