

Raspberry

Penelope Perkins-Veazie
South Central Agricultural Laboratory
USDA-ARS, Lane, OK

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. 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 with 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 raspberry) or fully-colored (black, purple, or yellow raspberry). 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’ retains a full red color. Cultivars known to change color rapidly are sometimes picked when pink, although 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 one-half pints (125 g), usually vented plastic clamshell containers, are the standard package. No minimum berry size is required.

Pre-cooling Conditions: Raspberries should be forced-air cooled to 1 °C (33.8 °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 + 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 of raspberries (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: Stimulation of *Botrytis cinerea* (gray mold) growth can occur on raspberries in the presence of ethylene; also, color can be adversely affected, darkening to a purple-red in red raspberries. Ethylene production is cultivar-dependent, from 1 to 12 $\mu\text{L kg}^{-1} \text{h}^{-1}$ 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 |

To get mL 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 per ton per day or by 61 to get kcal per metric ton per day. Data are from Haller et al. (1941), Perkins-Veazie and Nonnecke (1992) and Perkins-Veazie (unpublished).

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; Jennings, 1988).

Quarantine Issues: None known.

Suitability as Fresh-cut Product: Incorporated into mixed fruit cups.

Special Considerations: Damage easily; one of the most fragile and perishable of all fruits.

References:

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