

## Abstract

Resistance of mature berries of grapevine cultivars and selections to postharvest infection by *Botrytis cinerea* was assessed. Little or no resistance existed in most popular table grape *Vitis vinifera* cultivars, except in moderately resistant ‘Emperor’ and ‘Autumn Black’. Highly resistant grapes were *V. rotundifolia*, *V. labrusca*, or other complex hybrids. Morphological, anatomical, and chemical characteristics of 42 genetically diverse cultivars and selections with various levels of resistance to *B. cinerea* were examined to determine which features were associated with resistance. We quantified the (i) density of berries within a cluster; (ii) number of pores and lenticels on the berry surface; (iii) thickness and number of cell layers in the epidermis and external hypodermis; (iv) amount of cuticle and wax; (v) berry skin protein content; (vi) total phenolic content of the skin before and after *B. cinerea* inoculation; and (vii) catechin and *trans*- and *cis*-resveratrol contents of the skin before and after inoculation. The number of pores was negatively correlated with resistance. Highly resistant cultivars had few or no pores in the berry surface. The number and thickness of epidermal and hypodermal cell layers and cuticle and wax contents were positively correlated with resistance. Other characteristics evaluated were not associated with resistance. *trans*-Resveratrol and *cis*-resveratrol were induced by *B. cinerea* inoculation only in sensitive and moderately resistant cultivars and selections.