

### Abstract

In eight commercial prune (*Prunus domestica* cv. French) orchards, 43 to 69% of brown rot (caused by *Monilinia fructicola* or *M. laxa*) infections occurred in clustered fruit as opposed to solitary fruit. Fruit-to-fruit contact surfaces had cracked and thin cuticles and larger micro-cracks (up to 2,255  $\mu\text{m}$  in length) surrounding the lenticels than those of non-contact surfaces (cracks up to 351  $\mu\text{m}$  in length). Furthermore, fruit-to-fruit contact surfaces retained greater proportions of methylene blue, indicating absence of epicuticular wax, than the non-contact surfaces. Carbohydrate content of exudates in water placed on fruit-to-fruit contact surfaces was 15 and 22 mg/ml, while those of non-contact surfaces were 13 and 19 mg/ml after 15 and 28 h, respectively. Conidia of *M. fructicola* germinated faster and at higher rates, and the incidence of infection was significantly higher on fruit-to-fruit contact than on non-contact surfaces. Densities of fungal CFU were greater (27 to 98 CFU/cm<sup>2</sup>) on fruit-to-fruit contact compared to those of non-contact surfaces (7 to 29 CFU/cm<sup>2</sup>). In four experiments, after spraying to runoff with distilled water, surfaces of solitary fruit dried after 7 to 8 h at  $23 \pm 1^\circ\text{C}$  compared to 12 to 14 h for groups of 5 to 6 fruit. After spraying the same mature fruit with  $1.2 \times 10^5$  conidia/ml of *M. fructicola* and incubating at  $24^\circ\text{C}$  and  $>97\%$  relative humidity, 26 to 70% and 38 to 100% of fruit placed in groups of 5 to 6 were infected after 3 days and 5 days, respectively, whereas only 2 to 13% and 21 to 65% of solitary fruit became infected. These results suggest that fruit-to-fruit contact surfaces predispose prune fruit to infection by *M. fructicola*, and that it might be possible to reduce fruit losses from brown rot in prune orchards by thinning fruit to reduce fruit clustering, applying early summer fungicide sprays before fruit contact occurs, and ultimately, by selection for non-clustering cultivars in prune breeding programs.