

# Transmission of *Botrytis cinerea* by adult Mediterranean fruit flies (*Ceratitis capitata*) and disease expression at different positions on grape berries

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The occurrence of adult *Ceratitis* fruit flies in vineyards and their potential to transmit the bunch rot pathogen (*Botrytis cinerea*) were investigated. Sensus fruit fly traps were installed in orchards bordering on a vineyard in the Stellenbosch region, South Africa. Captured adult male fruit flies were plated on a semi-selective medium and the number of flies yielding the fungus was recorded. The Mediterranean fruit fly (*C. capitata*) and the Natal fruit fly (*C. rosa*) were trapped. Fruit fly patterns showed that early infestation of orchards may contribute to the infestation of adjacent vineyards later in the season. Fruit flies from all localities yielded *B. cinerea*.

Inoculum transmission and disease expression on grape at different phenological stages were subsequently investigated in perspex cages in the laboratory on surface disinfested grape bunch sections bearing five berries on a short rachis. *B. cinerea* decayed berries without sporulating colonies, or with sporulating colonies, served as sources of mycelial and conidial inoculum. Fly visitations to the sections were monitored by digital photography and the pathogen was detected on berry surfaces by histology, epifluorescence microscopy and isolation of skin segments. Disease expression on sound berries, and berries wounded on the cheek, was recorded after dry incubation. The flies visited the infected berries first. They preferred to feed on the macerated tissue, but also fed on the fungus thallus. Conidia were deposited mechanically, in faecal excrements and in feeding packages on sound berries. Mechanically transmitted conidia were found on the cheek, and occurred single, or in clusters of two to six conidia. Conidia in faeces occurred single, and in clusters of 2 to 15 conidia, and were spread with the faeces at various positions on the berry surface. Feeding packages contained approximately 10 to 50 tightly clustered conidia. Conidia in feeding packages were frequently deposited on the cheek at véraison, but occurred predominantly at the pedicel end of ripe berries. Individual, short mycelial fragments were occasionally observed. Wounds inflicted by female flies during oviposition were noted on the cheek of sound berries. Single conidia, and conidial clusters occurred on the fringe of some of the wounds. Sound and wounded berries decayed after dry incubation. Significantly more sound berries decayed at the pedicel end than at the cheek position or stylar end, and significantly more berries decayed at harvest than at véraison. The flies were attracted first to the wound sites on the cheek on wounded berries, and decay developed predominantly at the wound sites.

According to these findings, fruit flies may promote bunch rot outbreaks by transporting conidial clusters from an individual berry with sporulating *B. cinerea* colonies to susceptible tissue on sound berries in the same bunch and to those in other bunches.