Online Guide To
GRAPEVINE DISEASES
Virginia Tech

Botrytis Bunch Rot and Blight

Ashley L. Myers
Grape Pathology Extension Specialist, Department of Plant Pathology, Physiology, and Weed Sciences, Virginia Tech
AHS Agricultural Research and Extension Center, Winchester, VA

Introduction: Botrytis bunch rot occurs in vineyards all over the world, but is most common in regions with cool to moderate temperatures during the preharvest period. Once considered a secondary disease, Botrytis is now one of the major fruit rot diseases of grapes. Botrytis seriously reduces the quantity and quality of the crop by causing premature cluster drop and postharvest fruit rot. In winegrape production, the most serious damage results from modified chemical composition of diseased berries resulting in wines that have off-flavors, are fragile, and are more sensitive to oxidation and bacterial contamination. However, in certain cultivars and under certain weather conditions, a specific form of botrytis cluster rot, known as "noble rot", is a desired rot that contributes to the production of exceptionally sweet wines.

Symptoms and signs: Buds and young shoots may be infected in early spring, turn brown, and then dry out with drier weather. At the end of spring but before bloom, large, irregular, reddish brown patches appear on a few leaves of the vine and are localized near the edge of the leaf blade or on major veins (Fig. 1). During humid or wet weather, these lesions may be covered with gray moldy growth characteristic of Botrytis.

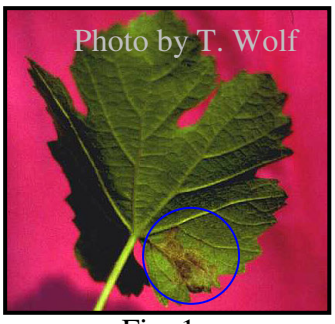

Fig. 1

Before bloom Botrytis may invade flower clusters, and if severe may cause entire clusters to dry out and fall off. At the end of bloom, the fungus develops on the caps, stamens, and aborted berries trapped or still attached to the cluster (Fig. 2). From there, Botrytis attacks the pedicel or the rachis, forming small brown lesions that eventually turn completely black. Near the end of summer, these lesions completely surround the pedicel or rachis and portions of the cluster below the necrotic area develop and drop off.

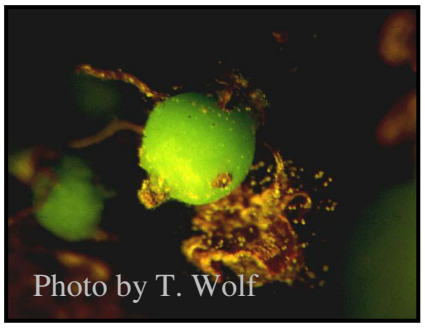

Fig. 2

Fig. 3

Beginning at

veraison, grapes are infected directly through the epidermis or old wounds. Botrytis progressively invades the entire cluster. Rot develops on compact clusters. White grapes turn brown and black grapes turn reddish. During dry weather, infected berries tend to dry out but in wet weather, infected berries remain plump and a fuzzy, brownish or gray mold forms on the berry surface (Fig. 3). With repeated rains, infection can spread rapidly and infection by secondary pathogens can lead to sour rot or other non-specific rots.

Pathogen life cycle and conditions for disease: The causal organism, *Botrytis cinerea*, is not specific to grapevines; it attacks many cultivated and wild plants. *Botrytis cinerea* is a "weak" pathogen that primarily attacks succulent, dead, injured, or senescent tissue. *Botrytis cinerea* is also capable of living as a saprophyte on necrotic, senescent, or dead tissue. The fungus thrives in high humidity or damp conditions and still air. The pathogen overwinters as sclerotia (survival structures, documented only in Europe), on canes formed in autumn, sometimes in mummies, and as mycelium on bark and in dormant buds. In the spring, the sclerotia and mycelium (vegetative structure) produce conidia (spores). Conidia are disseminated by rain and wind onto healthy tissue. Conidia germinate at temperatures between 33°F and 86°F (59-77°F is optimal). In water, germination is stimulated by the presence of nutrients from pollen or leaf exudates. Germination can occur in the absence of water if the relative humidity is at least 90%. At optimal temperatures, germination can occur in 15 hours.

Fruit infections are initiated near late-bloom. Hyphae (fungal filaments) from germinating spores penetrate through susceptible tissues such as senescing blossom parts, cap scars, and parts of old blossoms and facilitate infection. Fruit infections prior to veraison remain latent until fruit begins to ripen. Conidia become more numerous and berries become more susceptible to disease after veraison. As ripening berries become increasingly susceptible during preharvest, the fungus can spread rapidly through the cluster by berry-to-berry contact. Serious losses due to Botrytis can occur during the post-veraison/preharvest period.

Cultural control: Based on promoting good air circulation, increasing pesticide penetration, increasing sun exposure, and choosing clones with loose clusters.

- Practice shoot positioning and selective leaf pulling.
- Remove leaves that are directly touching clusters.
- Open eastern side of N-S oriented rows.
- Avoid excessive nitrogen (see Viticulture Notes Apr 2003).
- Choose a vineyard site with good air drainage.
- Avoid planting varieties particularly susceptible to Botrytis and varieties with highly compact clusters (e.g. Pinot noir, Riesling, Sauvignon blanc).
- Manage grape berry moth and other insect pest that can damage clusters and that would increase infection opportunities.

Chemical control: Cultural practices are more useful in controlling Botrytis than any other fungal disease; with this in mind, there are fungicides available which complement cultural control (VT 2006 Pest Management Guide). Fungicide applications at late-bloom, pre-bunch closure, veraison, and 2 to 3 weeks preharvest are especially important sprays for botrytis fruit rot control (see Viticulture Notes Apr 2001 for more detail). Bloom and cluster-close sprays limit the establishment of primary infections, while veraison and preharvest sprays limit the spread of the disease. Foliar lesions may appear in wet conditions but these usually dry out and do not spread if hot weather soon arrives. It is important with Botrytis control to rotate fungicides on a seasonal basis (if not within the season) to slow resistance development to any one fungicide. It is also important with Botrytis control to get thorough coverage (100 g/A).

- Cyprodinil (Vangard) and pyrimethanil (Scala) – Excellent Botrytis control. Absorbed by the fruit (not washed off). Limit applications to 2 per year (not two each but two total). Both have a 7 day PHI. Very important to practice resistance management!
- Fenhexamid (Elevate) – Good protectant Botrytis control (also rainfast). No PHI. A good rotation partner with Vangard or Scala.
- Iprodione (Rovral) – An older botrytis fungicide. Resistance has developed in some vineyards however; resistance is not stable, meaning that after a period of no Rovral applications, *Botrytis cinerea* populations may once again be controlled with the fungicide. However, use caution (only use 1 application per year) and do not count on it for complete control. Use in rotation with other Botrytis fungicides.
- The QoIs (e.g. Flint) have suppressive activity against botrytis. Use the highest recommended product rate per acre and do not exceed the label's recommended interval for repeat applications. Be aware of powdery mildew and downy mildew resistance issues with QoIs.
- Boscalid (Endura) – most likely provides good control at highest rate (8 oz/A) however, testing is limited at this point. Boscalid is one of the active ingredients in the QoI, Pristine (Pristine also control other pathogens).
- Thiophanate methyl (Topsin M) is also registered for Botrytis control. However, resistance development is an issue and the label recommends tank-mixing with another Botrytis fungicide. Topsin M should not be applied in areas where resistance to benomyl (Benlate) has developed.
- Captan and copper offer some botrytis protection and may help reduce foliar lesions.

Please refer to the 2006 VT Pest Management Guide at http://www.ext.vt.edu/pubs/pmg/hf3.pdf for current information.

Notes: For more detailed information on Botrytis see past Viticulture Notes and the Viticulture Notes' cumulative index at http://www.ext.vt.edu/news/periodicals/viticulture/03january/03january.html

References: see Viticulture Notes listed above

Pearson, R. C. and Goheen, A. C. 1988. Compendium of Grape Diseases. APS Press pg. 13-15.

Wilcox, W. 2005.Grape Disease Control. Dept. of Plant Pathology, Cornell University, NY State Agric. Expt. Station, Geneva, NY.