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The persistent threat of black-rot in vineyards: origins, symptoms, and management strategies

Vineyard Vigilance: Tackling the threat of Black-Rot

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The viticulture industry, with its deep-rooted traditions and evolving practices, faces a continuous battle against various diseases, one of which is black rot. This fungal disease, primarily found in vineyards, poses a significant threat to grape quality and yield. Originating from North America, black rot made its first documented appearance in France in 1885 and has since been a recurrent challenge in vine cultivation.

Historical Context and Resurgence

In the early 20th century, black rot caused considerable damage, particularly in Southwest France. For a time, its impact was mitigated through copper-based anti-mildew treatments. However, the disease has resurfaced periodically, showing particular virulence and rapid spread, especially near abandoned vineyards.

Identifying Black Rot: Key Symptoms

Black rot exclusively targets the green parts of the vine, including leaves, petioles, tendrils, shoots, and grape clusters. The disease manifests in several stages:

- On young leaves, an initial swelling turns grayish, followed by regular, dead-leaf colored spots bordered by a brown line. Small, shiny black dots (pycnidia) appear around the spots' periphery.
- Young shoots are less frequently affected but may display elongated brown spots with similar black dots.
- Petioles and tendrils often show smaller, similar spots.
- Grape clusters are affected post-flowering. Symptoms include a rounded, pale spot that rapidly engulfs the berry, followed by darkening and eventual shriveling of the fruit into a bluish, mummified state. The surface develops pustules, varying in nature depending on the infection stage.

It's essential to differentiate black rot from mildew in grapes, as the former's spots are round and occur on the berry's side, while mildew starts at the pedicel and radiates outwards without pycnidia.

Epidemiology and Lifecycle of Black Rot

Caused by the microscopic fungus Guignardia bidwellii, black rot survives winter in resistant organs called perithecia on grape remnants and prunings. These perithecia produce ascospores, leading to primary invasions. These spores, spread by rain onto young leaves, incubate for 8-20 days before developing into pycnidia. Pycnidiospores formed inside pycnidia cause secondary infections. The mucilaginous material surrounding these spores requires dissolution by rain for dispersal.

Favorable Conditions and Development

Black rot thrives with liquid water for spore maturation, spread, and germination. The fungus becomes active at temperatures around 9°C, with rapid progression at 15°C. The disease favors regions with warm, rainy climates and tends to be localized due to its moisture and temperature requirements.



Combatting Black Rot: Strategies and Challenges

The resurgence of black rot is attributed to changes in cultivation techniques, vineyard abandonment, and the selection of ineffective or improperly timed anti-mildew products.

Prophylactic Measures:

- Eradicating abandoned vineyards.
- Removing inoculum by burning prunings and clusters in winter; in spring, remove initial leaf infection sources.

Chemical Control:

- Fungicides must be preventive and timely to protect vines during their most receptive phase, from berry set to veraison.
- Dithiocarbamate-based fungicides (mancozeb, maneb, propineb) are effective but require reapplication after rain and do not protect new growth.
- Some Demethylation Inhibitors (DMIs) offer curative action if applied within three days of contamination. However, resistance concerns limit their use.

Integrated Management Strategy:

- Between bud break and flowering, follow agricultural advisory station recommendations, especially in high-risk situations.
- From berry set to cluster closure, ensure joint protection against black rot and other diseases like mildew or oidium.
- Alternate dithiocarbamates and DMIs to prevent resistance buildup.

The fight against black rot requires a multifaceted approach combining vigilant monitoring, cultural practices, and judicious chemical application. As viticulture evolves, so must our strategies to safeguard the health and productivity of our vineyards against this persistent fungal adversary.