

# Characterization of Cranberry Fruit Rot Fungi from Massachusetts

Ethan Gioscia<sup>1</sup>, Salisu Sulley<sup>2</sup> and Leela S. Uppala<sup>2</sup>

1. UMass-Amherst-Stockbridge School of Agriculture; 2. UMass-Amherst-Cranberry Station



## Background

- Massachusetts is the second largest producer of the large American cranberry (*Vaccinium macrocarpon*) in the US.
- Cranberry fruit rot (CFR) is the most economically important disease in cranberry production.
- This disease complex, which is caused by several fungal species with varying population densities across location, environmental condition, and time, either in the field or in storage, could lead to 100% yield loss if not managed.
- Recent studies have shown that CFR can be caused more than 12 fungal species (Fig. 2).
- Based on 2021 studies conducted in Dr. Leela Uppala's lab from fruits collected at harvest from 46 different bogs, *Coleophoma empetri* was the most abundant disease/pathogen detected across Massachusetts cranberry bogs; followed by *Colletotrichum* spp, *Allantophomopsis cytispora* and *Botryosphaeria vaccinii* (Fig. 3)
- To date, there has been no research update on the progression and distribution of CFR fungi during various phenological stages (including Bloom, Pinheads, Blush stage, and Mature fruit stage).
- In the summer of 2023, we initiated a study aimed at characterizing CFR fungi across these distinct phenological stages.

## 2023 Summer Studies

- Fungal Characterization Study:** During 2023 Summer, samples were collected from 6 fields 3 of Stevens; 3 of Mullica Queen cultivars). These fields are situated in southeastern Massachusetts and were sampled during the Bloom and Pinheads stages.



A total of five, 1-ft<sup>2</sup> sampling squares were randomly selected in each bog and all Bloom and Pinheads were collected.



Fig. 1. Symptomatic Fruit Rot Berries



Fig. 4. Five bloom samples from a single bog

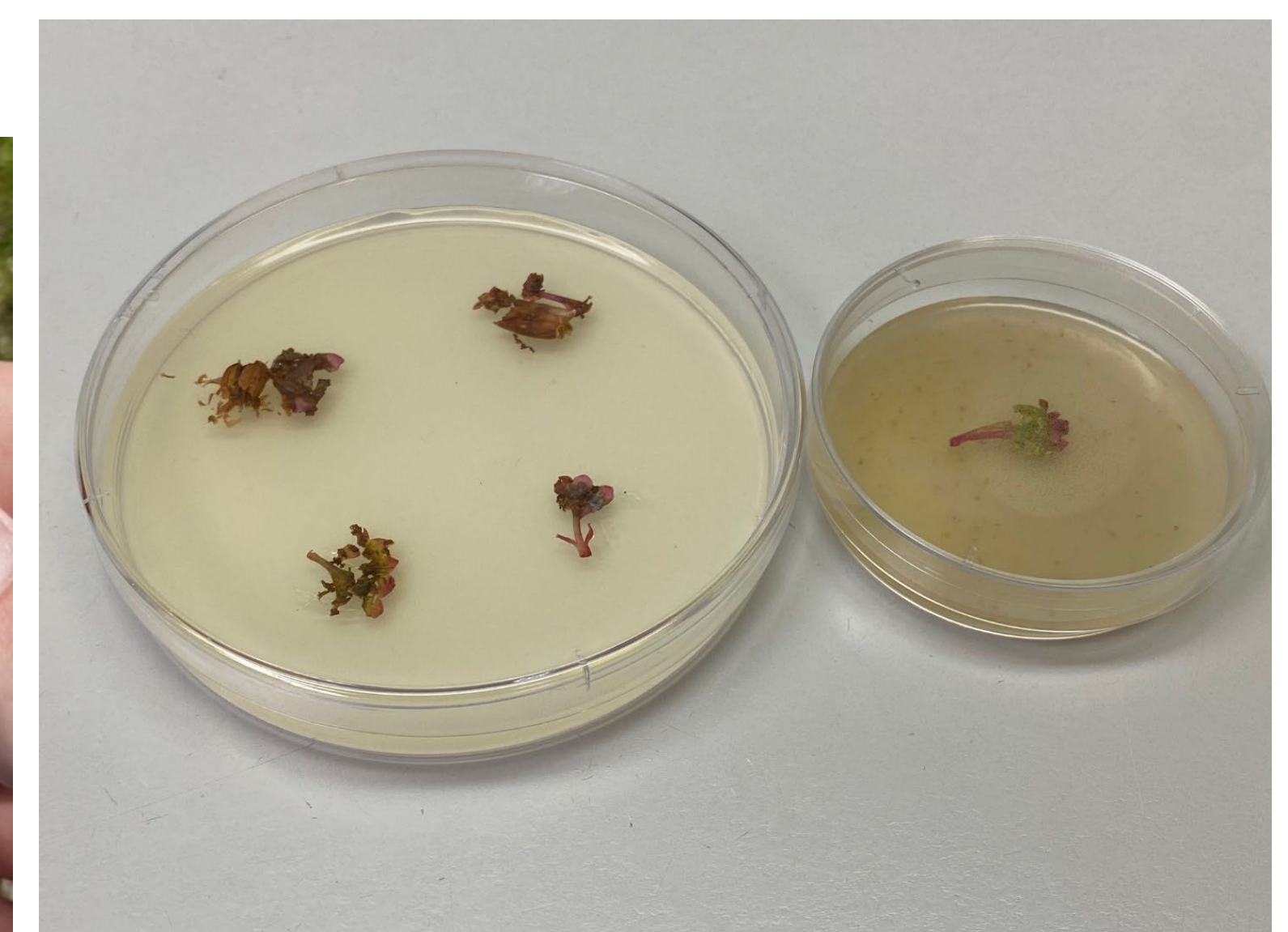


Fig. 5. Samples are plated in V8 media

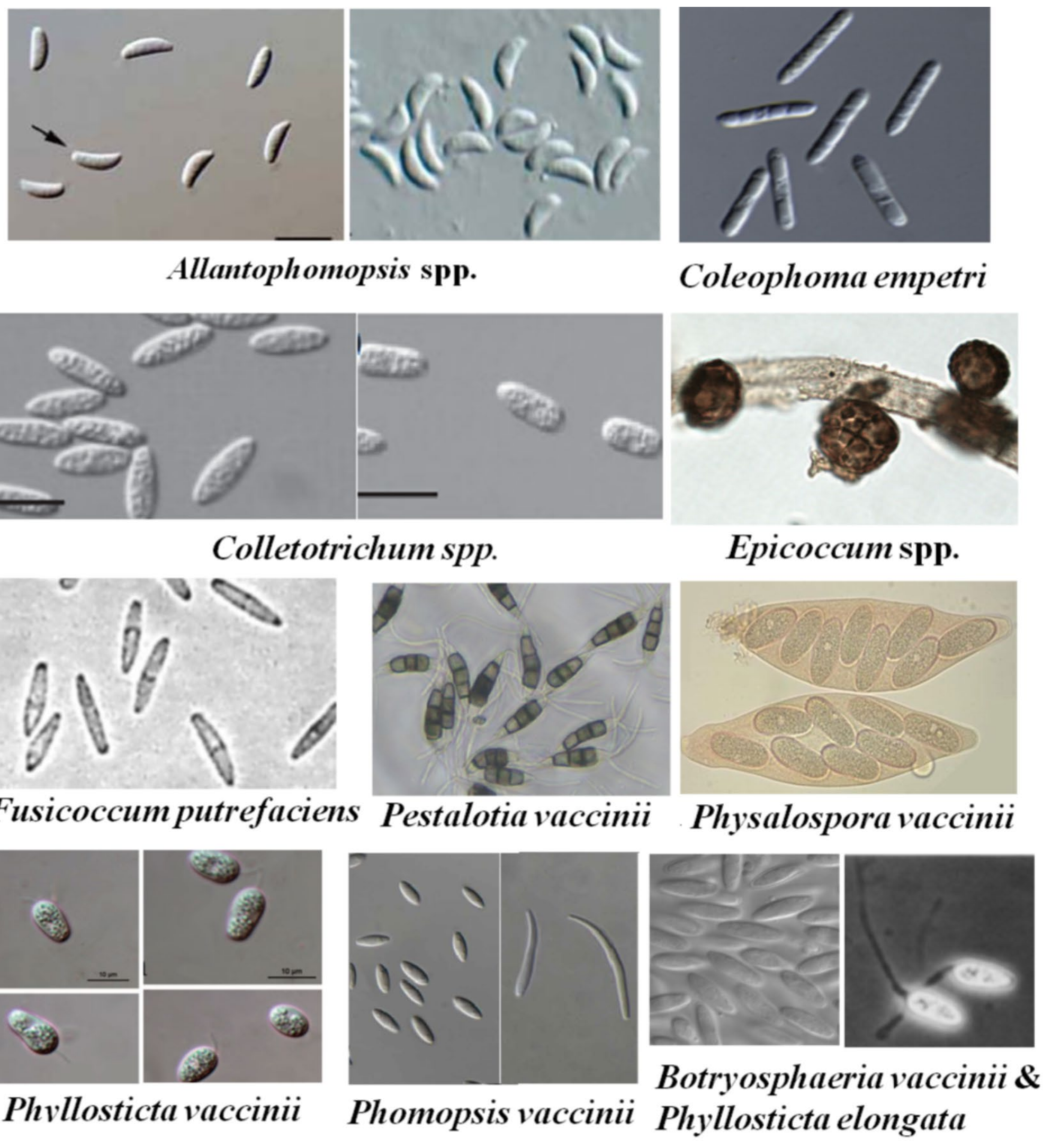


Fig. 2. Conidia of most common CFR fungi



Fig. 6. Morphologically distinct fungi were isolated; and pure cultures were established

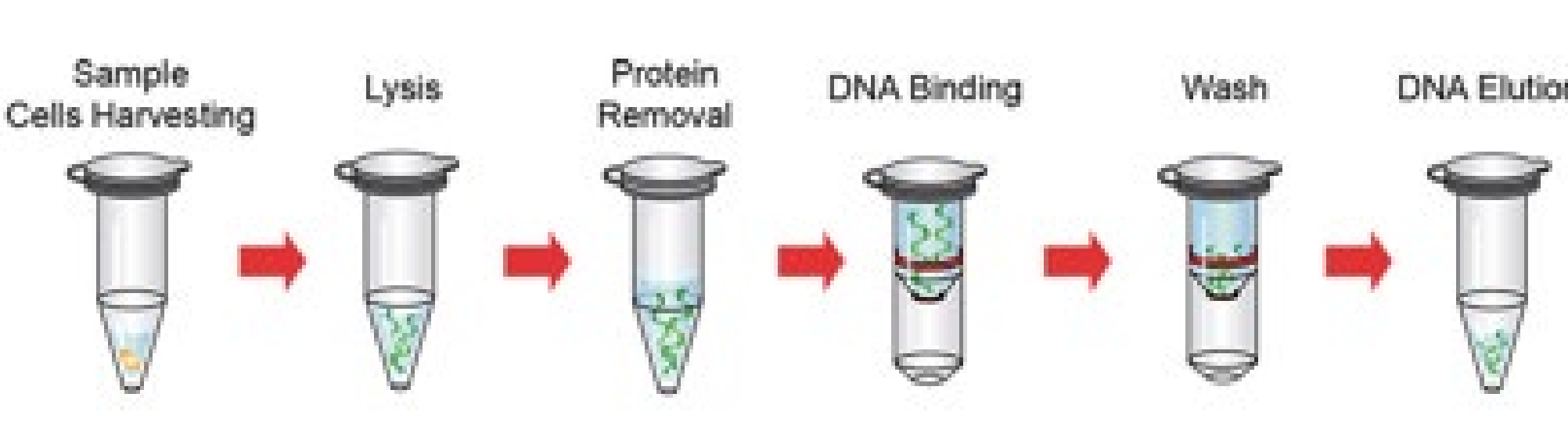


Fig. 7. DNAs were extracted from each pure culture for future sequencing and characterization

**Study 2:** Evaluate the impact of heat stress on cranberry fruit rot.  
**Hypothesis:** Fruit rot expression will increase when vines are heat stressed



Fig. 8. Shade structures were established on "Stevens" cultivar in the first week of September to understand the impact of heat stress on fruit rot.

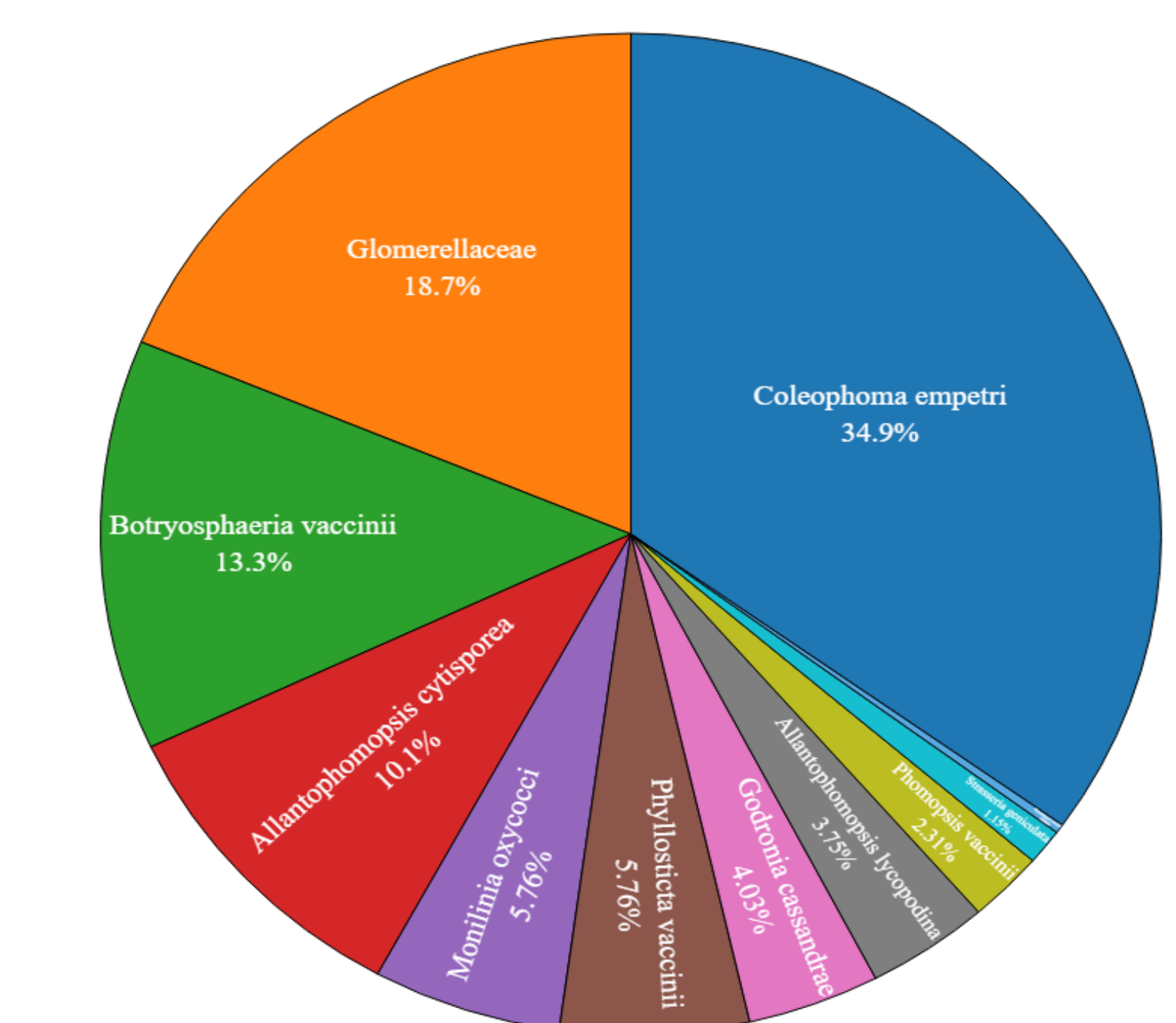


Fig. 3. Relative Abundance of CFR fungi from MA

- Fruit samples will be collected from beneath the shade structure at the point of harvest maturity. These samples will then be compared with control areas that are not under shade.
- The aim is to assess whether there are any discernible differences in rot expression and fungal prevalence between the two groups.