

Fruit-associated endophytes from olive cultivars with different levels of resistance to fruit fly and their relationship with pest infestation

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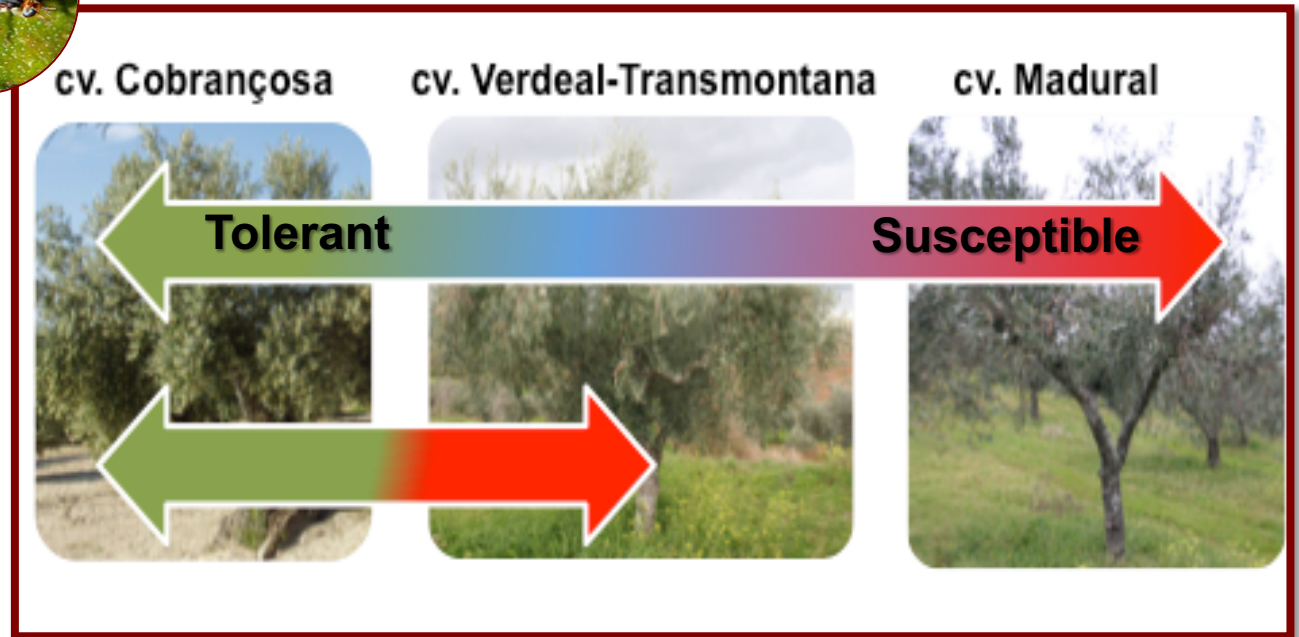
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Abstract

Different olive cultivars exhibit different propensities to fruit fly infestation and the causes are still unclear. We want to disclose the potential role of the olive endophytes in conferring such susceptibility differences. Accordingly, the endophytic microbial composition of infested and non-infested fruits from cultivars Madural (susceptible to olive fly) and Cobrançosa (less susceptible) were studied. A culture-dependent approach was used, being the isolates identified by sequencing of their internal transcribed spacer (for fungi) and 16S rRNA gene regions (for bacteria). Overall, there was a larger consortium of bacteria associated to olives than fungi. The microbial communities were mostly composed of *Proteobacteria*, *Actinobacteria*, Ascomycota and Basidiomycota. Both host cultivar and infestation level had a negligible effect on microbial community composition. Despite this, it was found a clear positive association of microbial consortia with the resistant cultivar (*Kocuria* sp., *Actinobacterium* sp., *Rhodococcus* sp., *Pseudomonas citronellolis*, *Aspergillus flavus*, *Stereum* sp., and *Cladosporium* sp.) and non-infested fruits (*Kocuria* sp., *Stereum* sp., and *Vishniacozyma victoria*). Their function roles on host cultivar susceptibility/resistance to fruit fly is a topic that requires further studies.

Keywords: *Bactrocera oleae* Rossi; susceptibility of olive cultivars; bacteria; fungi; biocontrol

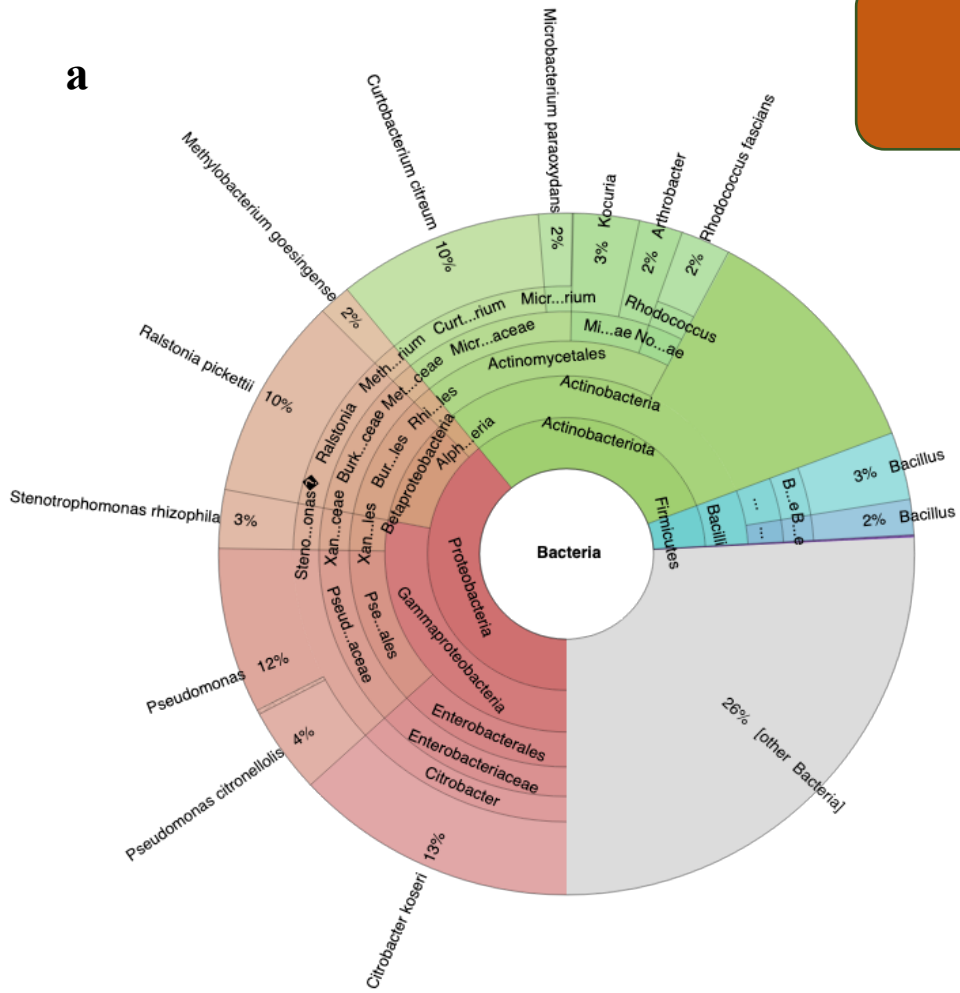
Susceptibility of Olive Tree Cultivars to Olive Fly Attack



The exact reason of differences on susceptibility is currently unknown.

Microbial diversity

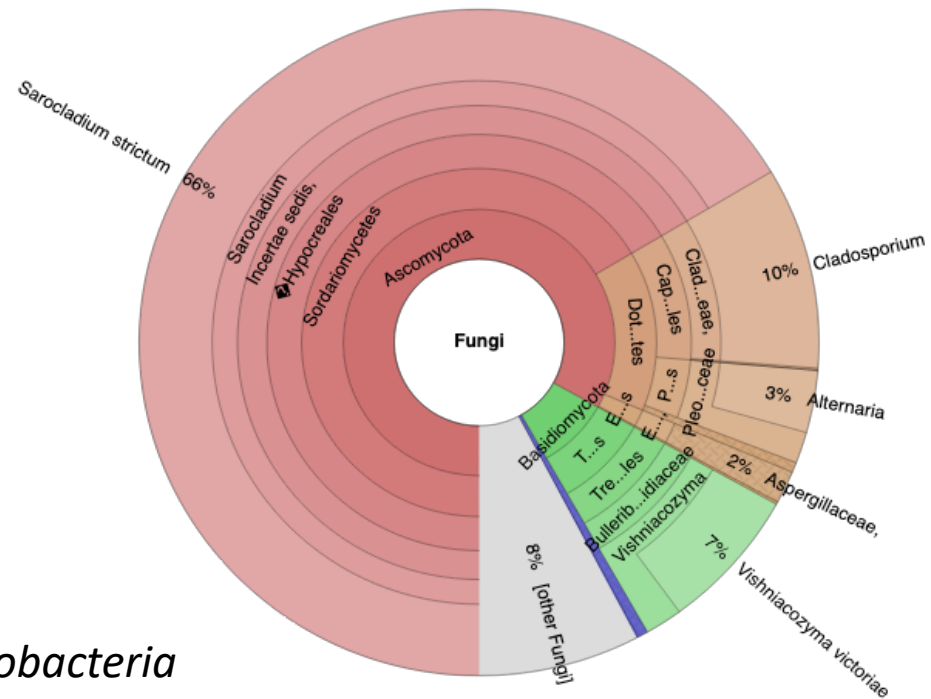
a



Major phyla:

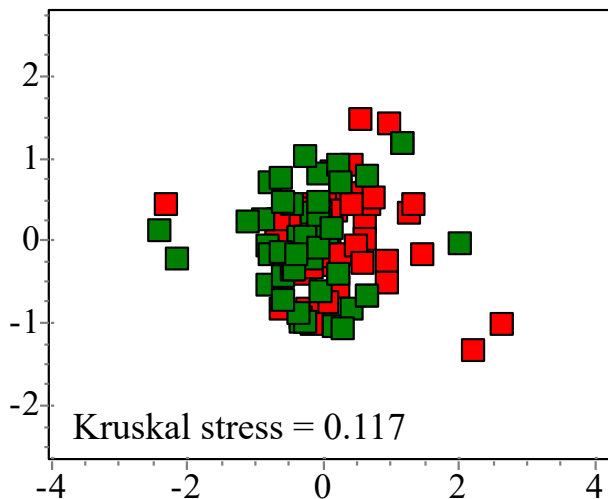
- Proteobacteria and Actinobacteria
- Ascomycota and Basidiomycota.

b

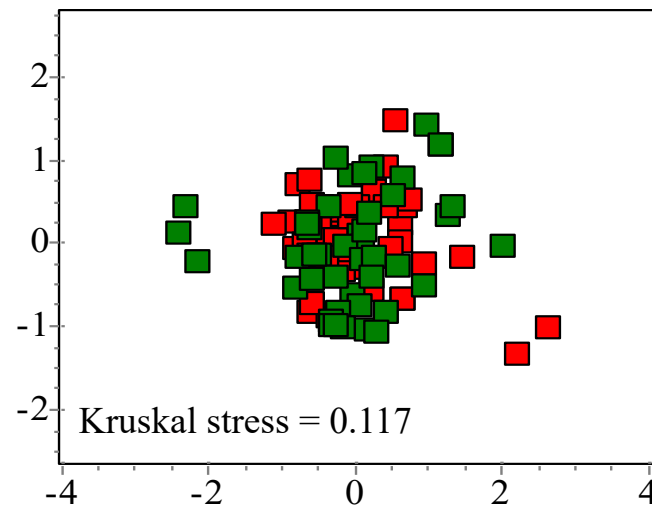


Cumulative curves reached asymptote emphasising the adequate sampling

Bacterial Community



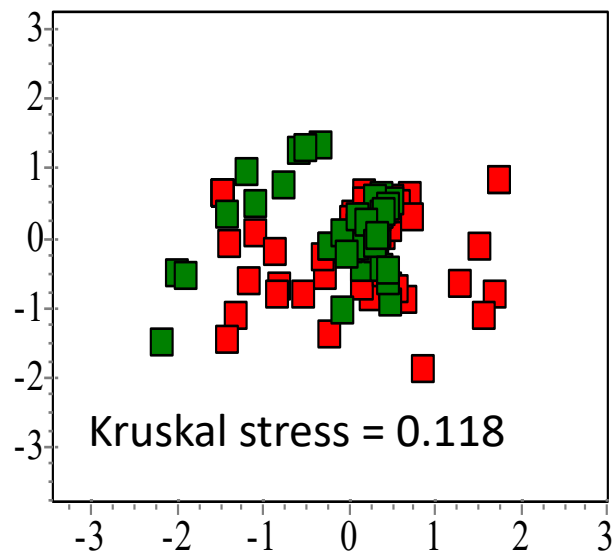
Cobrançosa vs. **Madural**



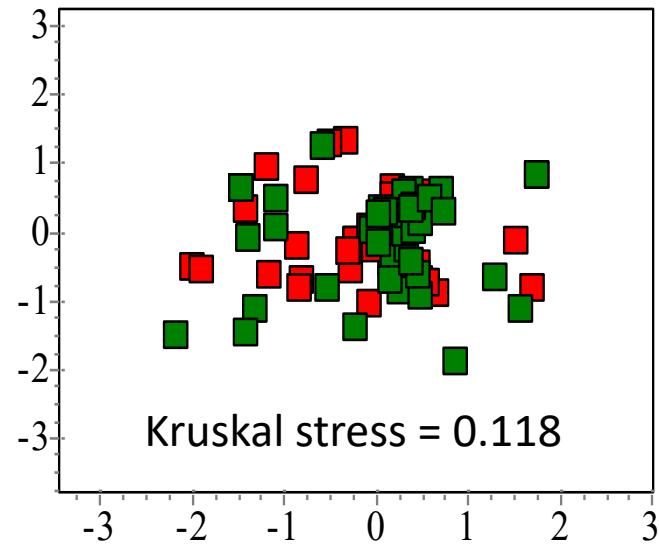
Infested vs. **Non infested**

	ANOSIM	PERMANOVA
Cultivar	0.225***	0,021**
Infestation level	0.210***	0,013 ^{n.s.}

Fungal Community



Cobrançosa vs. *Madural*

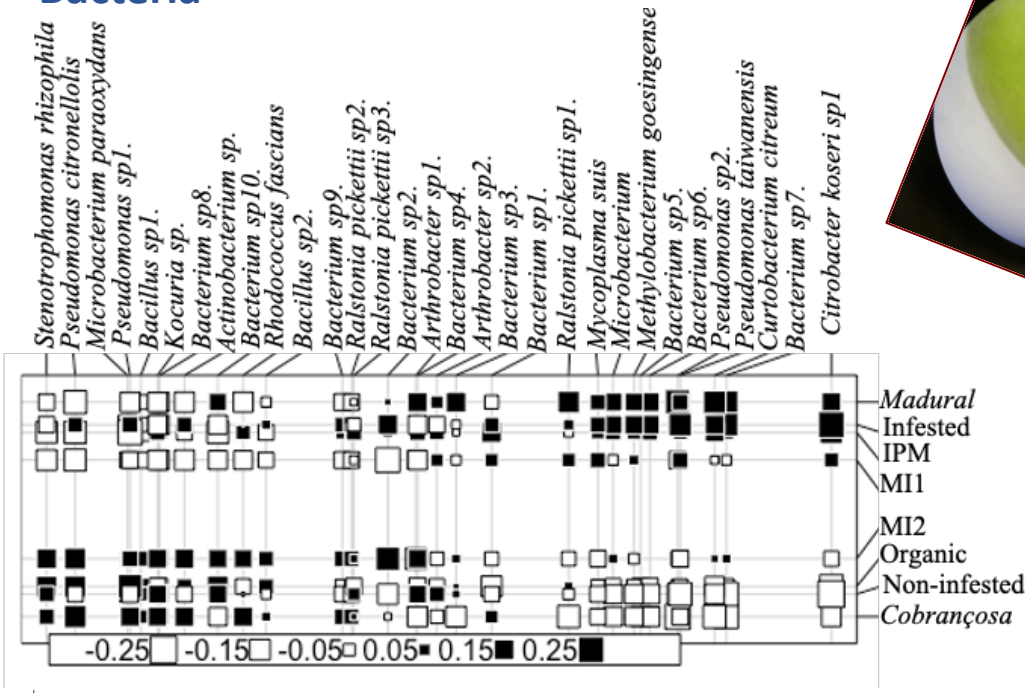


Infested vs. Non infested

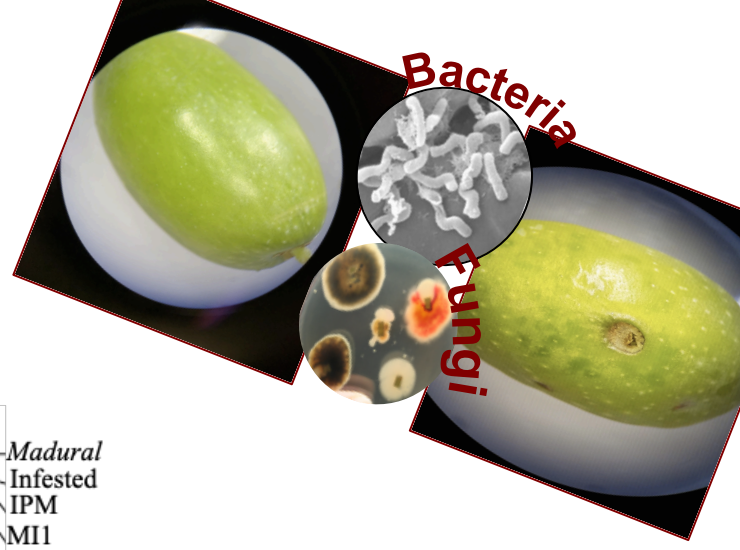
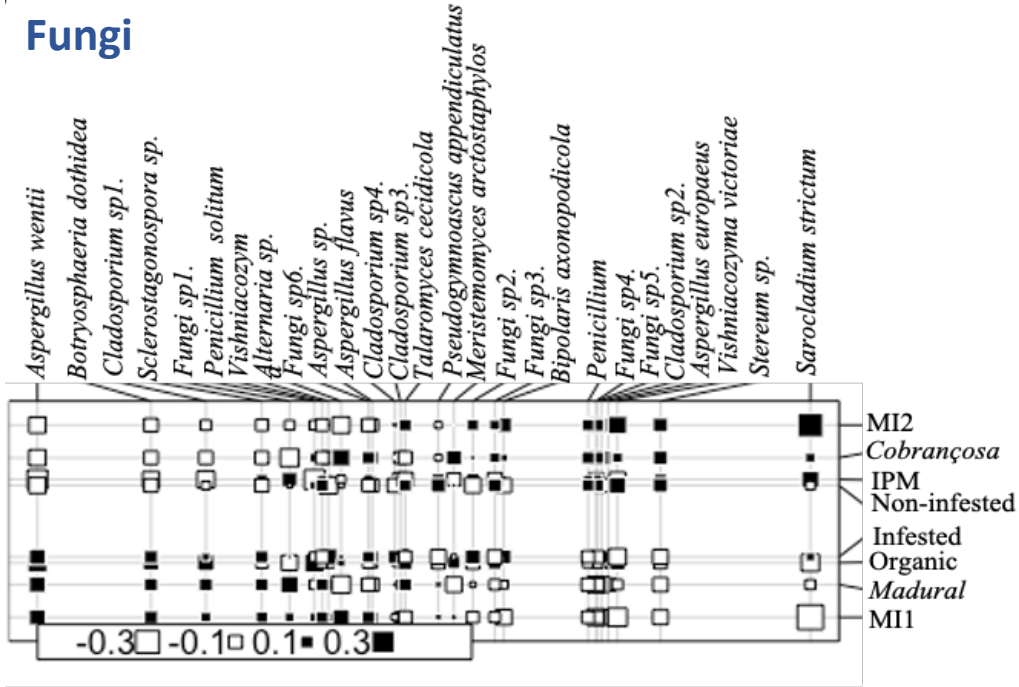
	ANOSIM	PREMANOVA
Cultivar	0.216***	0,023**
Infestation level	0.189***	0,012 ^{n.s.}

Olive fruit endophytes

Bacteria



Fungi



Olive fruit endophytes

Kocuria sp.
Actinobacterium sp.
Rhodococcus sp.
Pseudomonas citronellolis
Aspergillus flavus
Stereum sp.
Cladosporium sp.

positively correlated
with
cv. *Cobrançosa*

Kocuria sp.
Stereum sp.
Vishniacozyma victoria

positively correlated
with
non-infested fruits

Pseudomonas sp.
Curtobacterium citreum
Ralstonia pickettii
Aspergillus wentii

positively correlated
with
cv. *Madural*

Citrobacter koseri
Alternaria sp.
Sarocladium strictum

positively correlated
with
infested fruits

What can they do?

Most species are plant pathogen but some are able to promote plant growth and promote disease resistance.

Could they be useful?

Kocuria sp., *P. citronellolis* & *V. victoria* are potential olive biocontrol agents.

- ❑ No significant differences among the two types of cultivar and infestation level.
- ❑ Cultivar influences 2.1% and 2.3% of the bacterial and fungal composition respectively.
- ❑ *Kocuria sp.*, *P. citronellolis* & *V. Victoria* are found to be endophytes with potential biocontrol activities in olive tree. However future studies must be done to confirm.

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