

Mulch Promotes Spread on Native And Non-Native Orchids in Nature and Urban Environment



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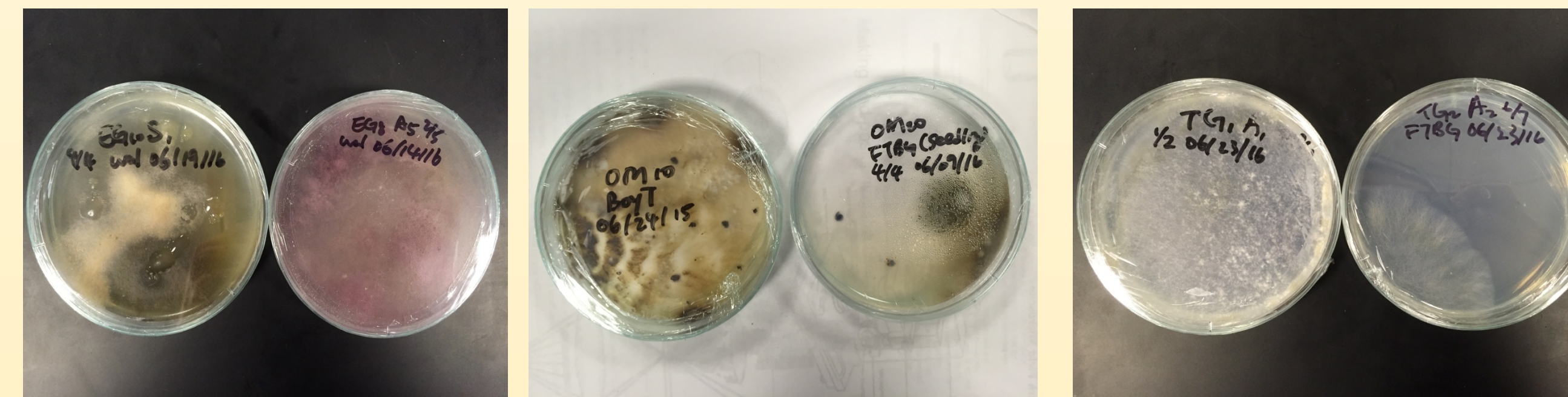
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Introduction

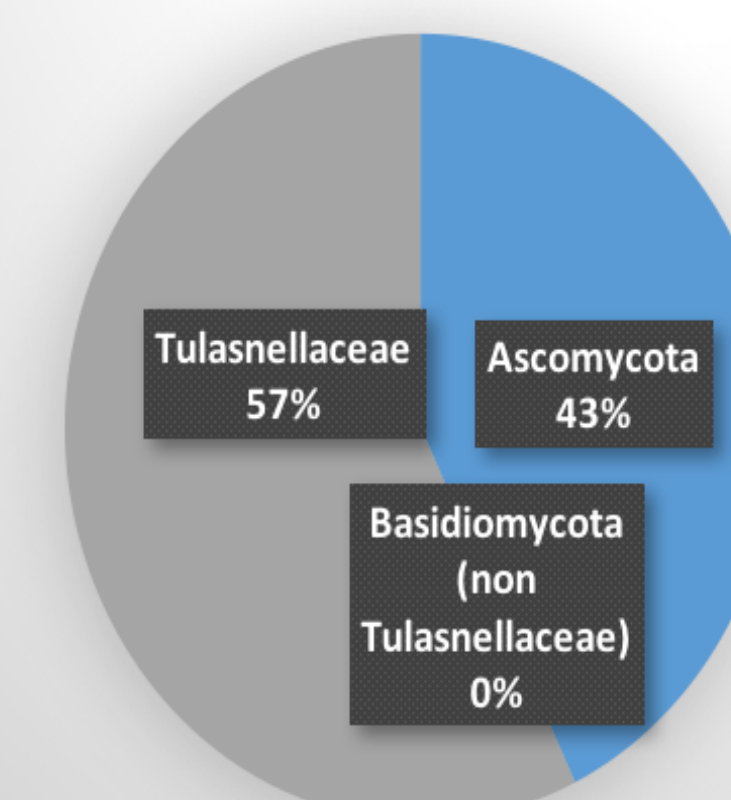
Fungal distribution within the environment can be heavily dependent on microhabitat conditions, which create mosaic-like fungal networks within that environment. Recent studies showed orchids that occur within close proximity to each other are likely to share similar fungi associations. Three orchid species *Eulophia graminea* (non-native), *Oeceoclades maculata* (non-native), and *Triphora gentianoides* (Native) are known to co-occur and are rapidly spreading in municipal mulch sources. In this study, we determine whether these orchids species are associating with similar groups of fungi, by sampling the fungi from the orchids roots collected in nature and urban disturbed environment (Zoo Miami, Boystown Pineland County Park, Fairchild Tropical Botanic Garden, and residential areas).

Fungal Isolation

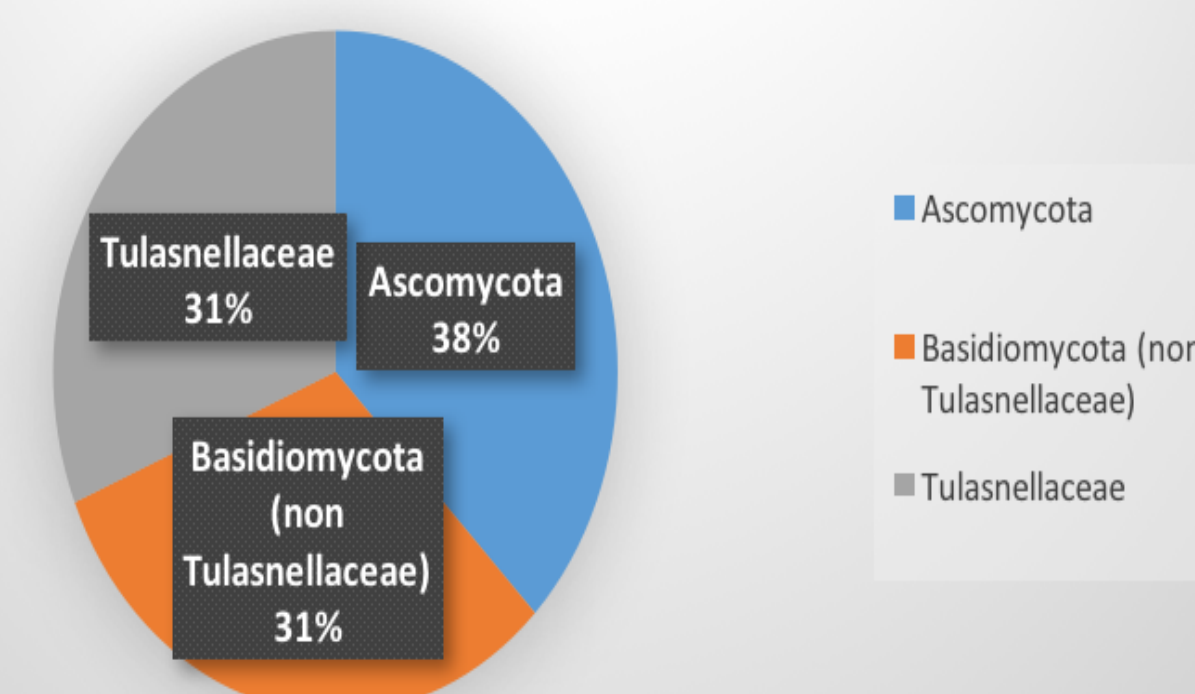


Nature Area VS Urban Disturbed Area

Nature (N=1 site; n=# individual)



Urban Disturbed (N=3 sites; n=# individual)



Native and Non-Native Orchid Species



Non-Native

Eulophia graminea
Native in tropical Asian countries



Oeceoclades maculata
Native in tropical west Africa

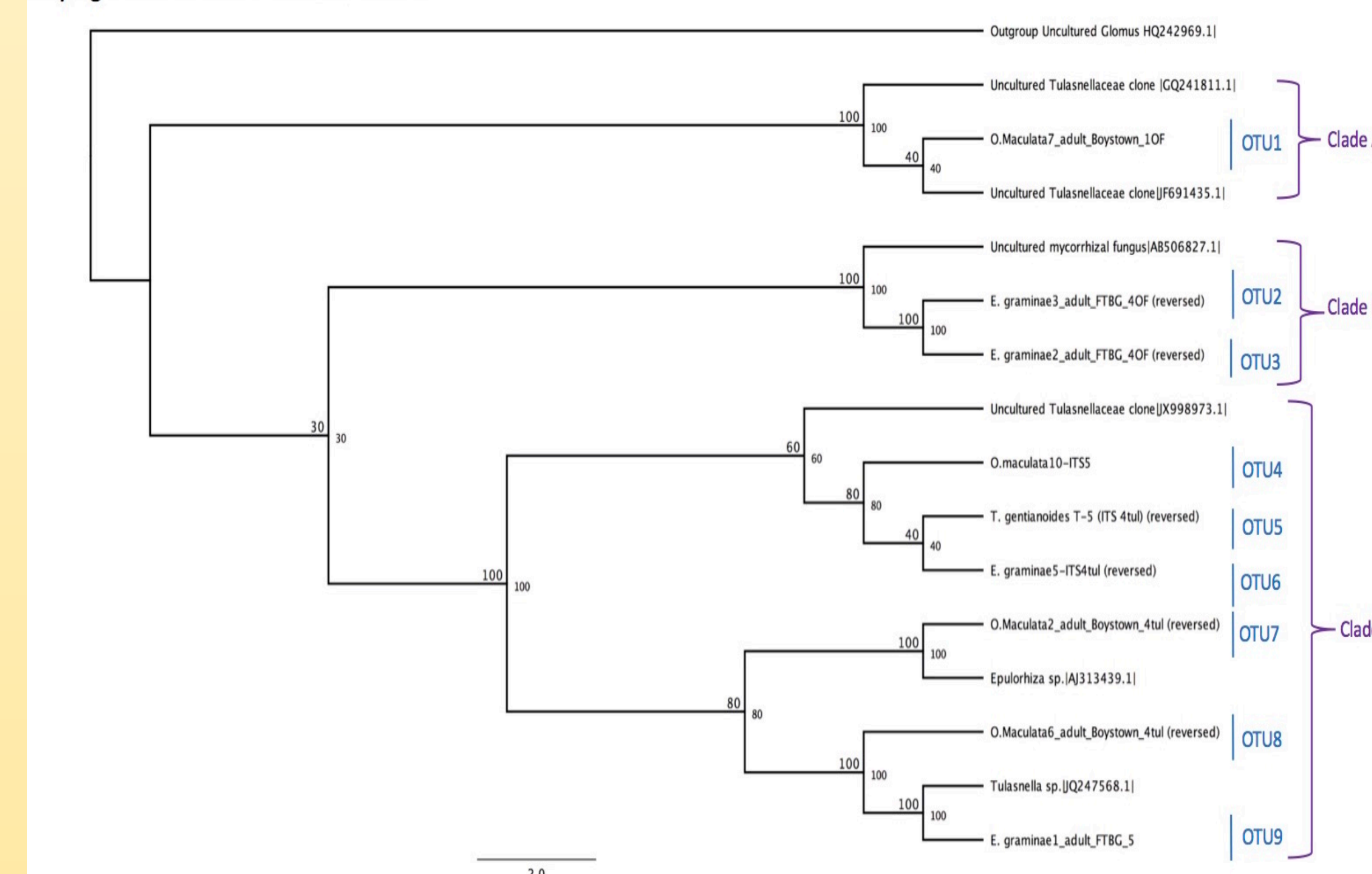


Native

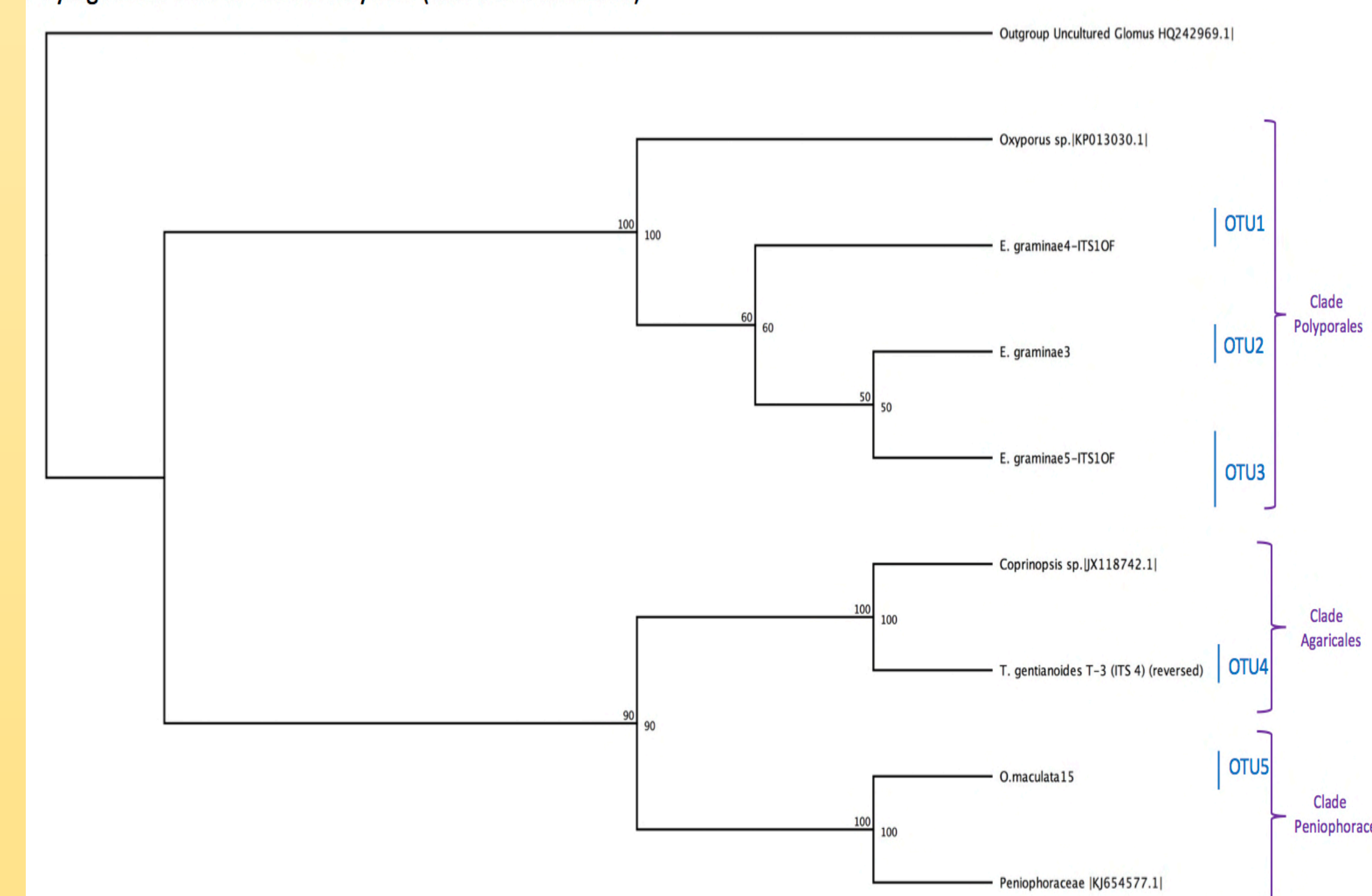
Triphora gentianoides

Phylogenetic Trees

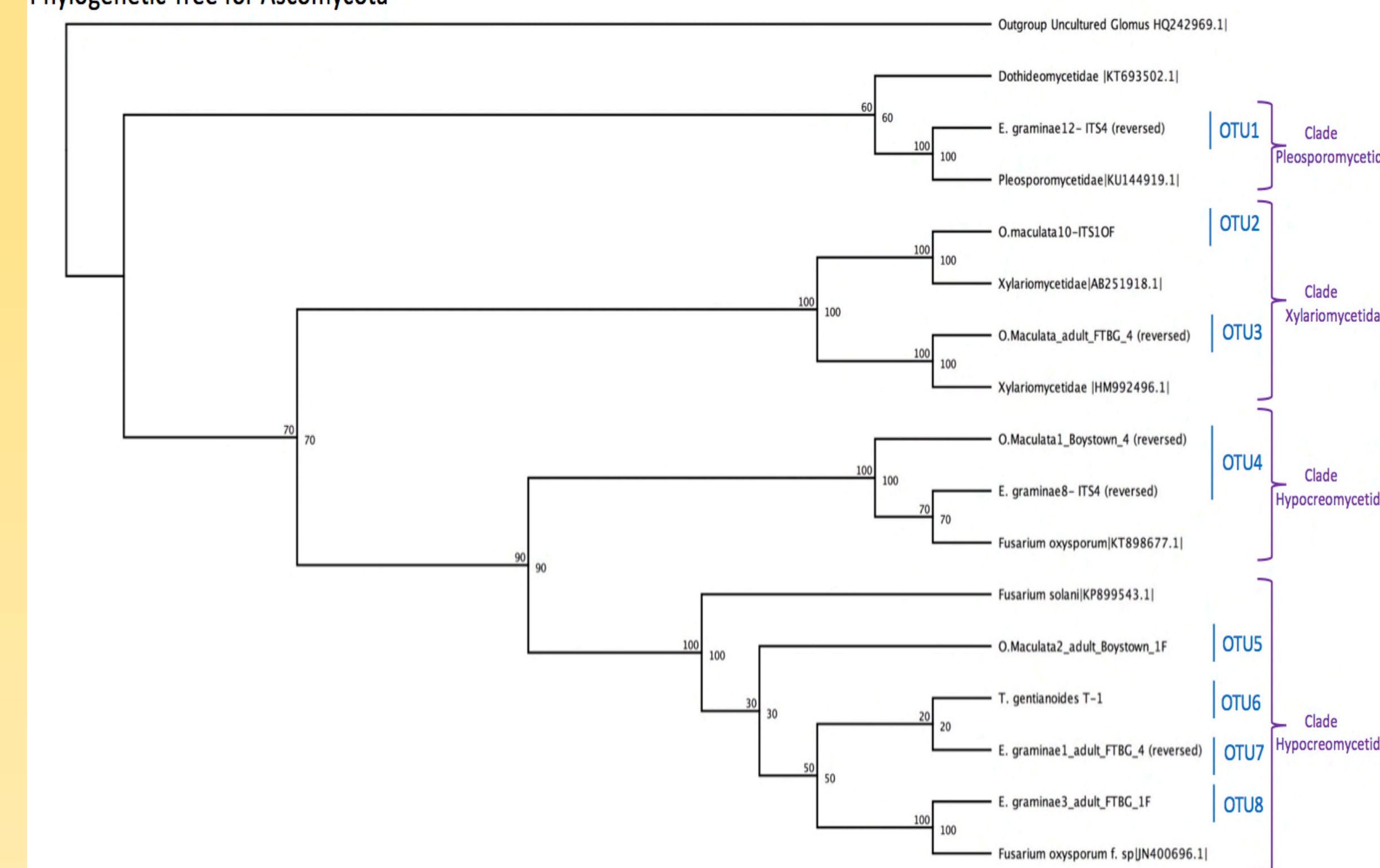
Phylogenetic Tree for Tulasnellaceae



Phylogenetic Tree for Basidiomycota (non Tulasnellaceae)



Phylogenetic Tree for Ascomycota



Mulch Study (Urban Disturbed Area)



Eulophia graminea



Oeceoclades maculata



Triphora gentianoides

Early Results & Conclusion

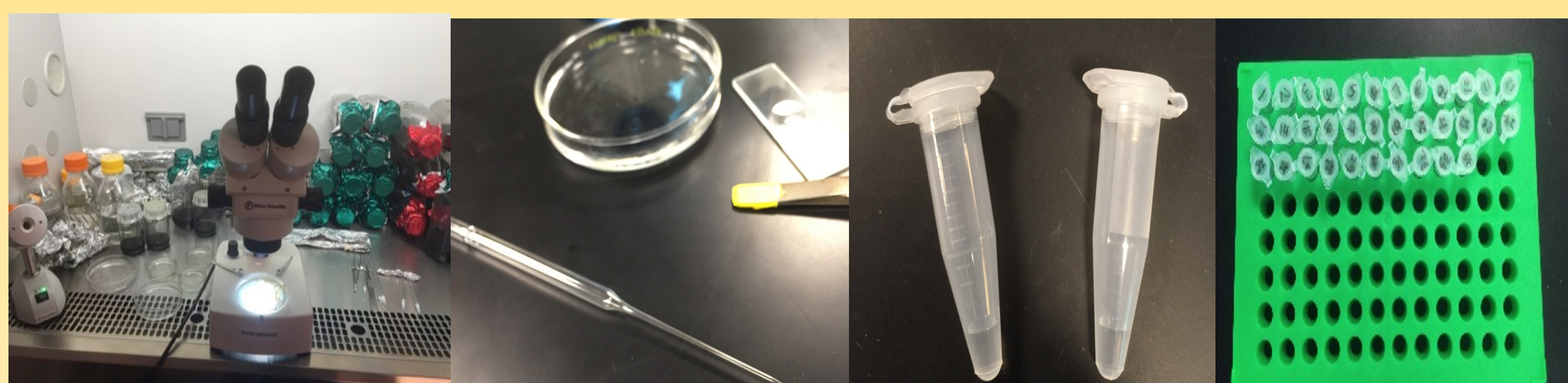
- 1) Total number of sequences (57) and fungal isolation were recovered and identified
- 2) All the species associated with each fungal group (Tulasnellaceae, Ascomycota, Basidiomycota (non Tulasnellaceae)), particularly the core group Tulasnellaceae which is the important orchids mycorrhizal fungi
- 3) Fungi differences in fungal composition and abundance and diversity between the nature and urban disturbed area
- 4) We successfully germinated seeds ex-situ on mulch collected in municipal urban area
- 5) Fungal niche partitions or enemy release may influence the abundance and distribution of native and non-native orchid

Research Objectives

- 1) Identify the mycorrhizal fungi associated with orchids
- 2) Determine how the orchids species utilize their mycorrhizal fungi
- 3) Investigate orchids seed germination ex-situ on various mulch

Methodology

- 1) **Fungal Isolation (Fungal identification and Seed germination):** Isolating the fungal peloton from the roots through serial dilution and grow the fungi on specific nutrient agar plates where fungal hyphae formed in a week.
- 2) **Molecular analyses (DNA extraction, PCR, and sequencing):** Using molecular techniques extracting DNA from roots, amplifying DNA from fungi specific primers, and analyzing DNA sequences using Geneious software and GenBank.



Future Directions

- 1) Seed germination study with fungal isolation: Test the mycorrhizal partners compatibility with the orchids species
- 2) Soil and mulch study: Study the microhabitat of the orchids species and their mycorrhizal fungi
- 3) DNA analysis from the mulch to predict the future spread of these non-native orchids species

Acknowledgments

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