

Analysis of growth rates among different genotypes of the blue-stain fungus, *Ophiostoma minus*

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Introduction

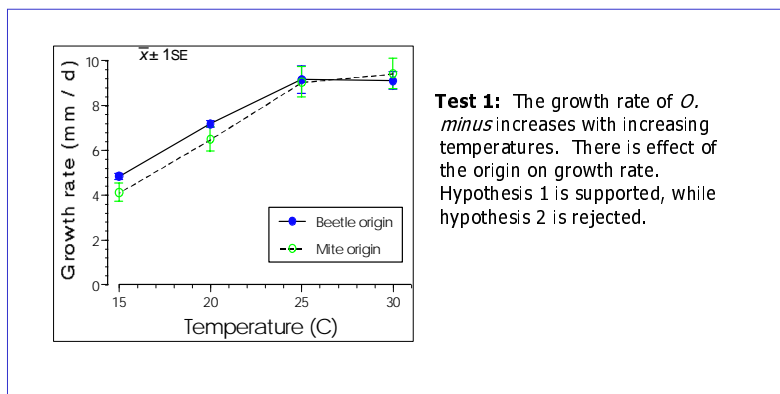
- *Ophiostoma minus* is a species of fungus found on the bark beetle *Dendroctonus frontalis* and the *Tarsonemus* mites that it carries.
- *O. minus* is harmful to *D. frontalis* because it competes with the mycangial fungi that *D. frontalis* larvae feed on, but it is beneficial to *Tarsonemus* mites because they are dependent on it for food.
- *D. Frontalis* typically live in southeastern US, where the weather tends to be relatively warm.

Hypothesis

1. The growth rates of *O. minus* will vary with temperature, with higher growth rates corresponding to higher temperatures.
2. The growth rates of *O. minus* will higher for genotypes of *O. minus* originating from the mite than those originating from the beetle.
3. Different genotypes of *O. minus* will react differently to changes in temperature.
4. There will be tradeoffs between high and low temperatures between different genotypes (i.e. A genotype that grows relatively quickly at low temperatures will grow relatively slowly at high temperatures and vice versa).

Tests

1. Compare growth rates of *O. minus* that come from either the beetle or the mite at four different temperatures.
2. Compare the growth rates of different genotypes to their response to different temperatures and analyze the data using ANOVA.
3. Compare growth rates of different genotypes at high temperatures (30 C) with those at low temps (15 C) using correlation.



Test 1: The growth rate of *O. minus* increases with increasing temperatures. There is effect of the origin on growth rate. Hypothesis 1 is supported, while hypothesis 2 is rejected.

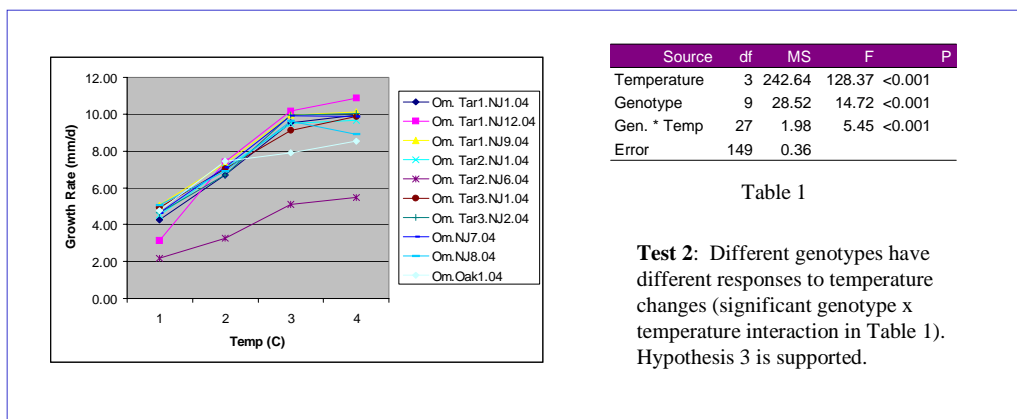
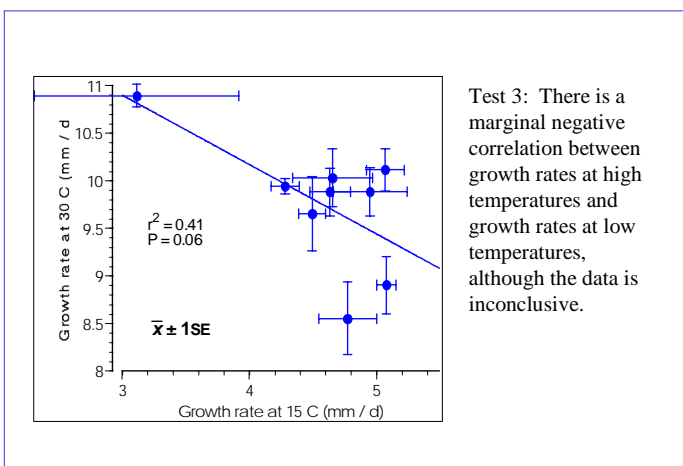


Table 1

Test 2: Different genotypes have different responses to temperature changes (significant genotype x temperature interaction in Table 1). Hypothesis 3 is supported.



Test 3: There is a marginal negative correlation between growth rates at high temperatures and growth rates at low temperatures, although the data is inconclusive.

Conclusions

- The growth rate of *O. minus* is strongly dependent on the temperature of the environment. It grows faster at higher temperatures
- The growth rate of *O. minus* is not dependent on the origin of the fungus. There is no visible different between *O. minus* that comes from mites and *O. minus* that comes from beetles.
- Different genotypes of *O. minus* respond differently to temperature changes. We can therefore determine whether or not there is a correlation between responses to low temperatures and responses to high temperatures.
- There was a suggestion of negative correlation among fungal genotypes between growth performance at high vs. low temperatures. If so, different thermal regimes would likely select for different genotypes. Further studies would be valuable.