

Oyster Fungi: Does the Addition of Mycelium to Soil Regulate pH?

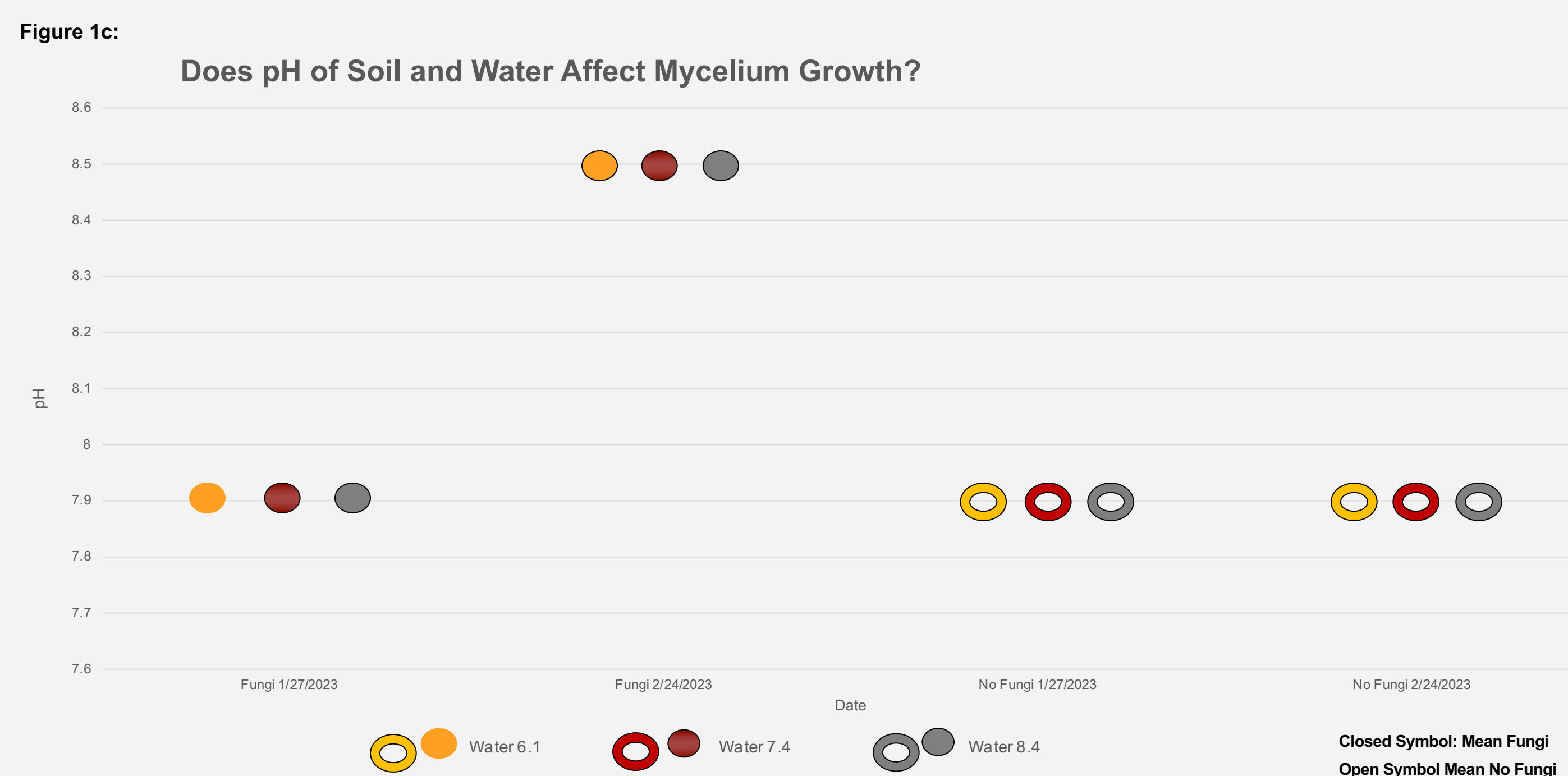
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Part 1: Does pH of Watering Solution Affect Mycelium Growth or Soil pH?



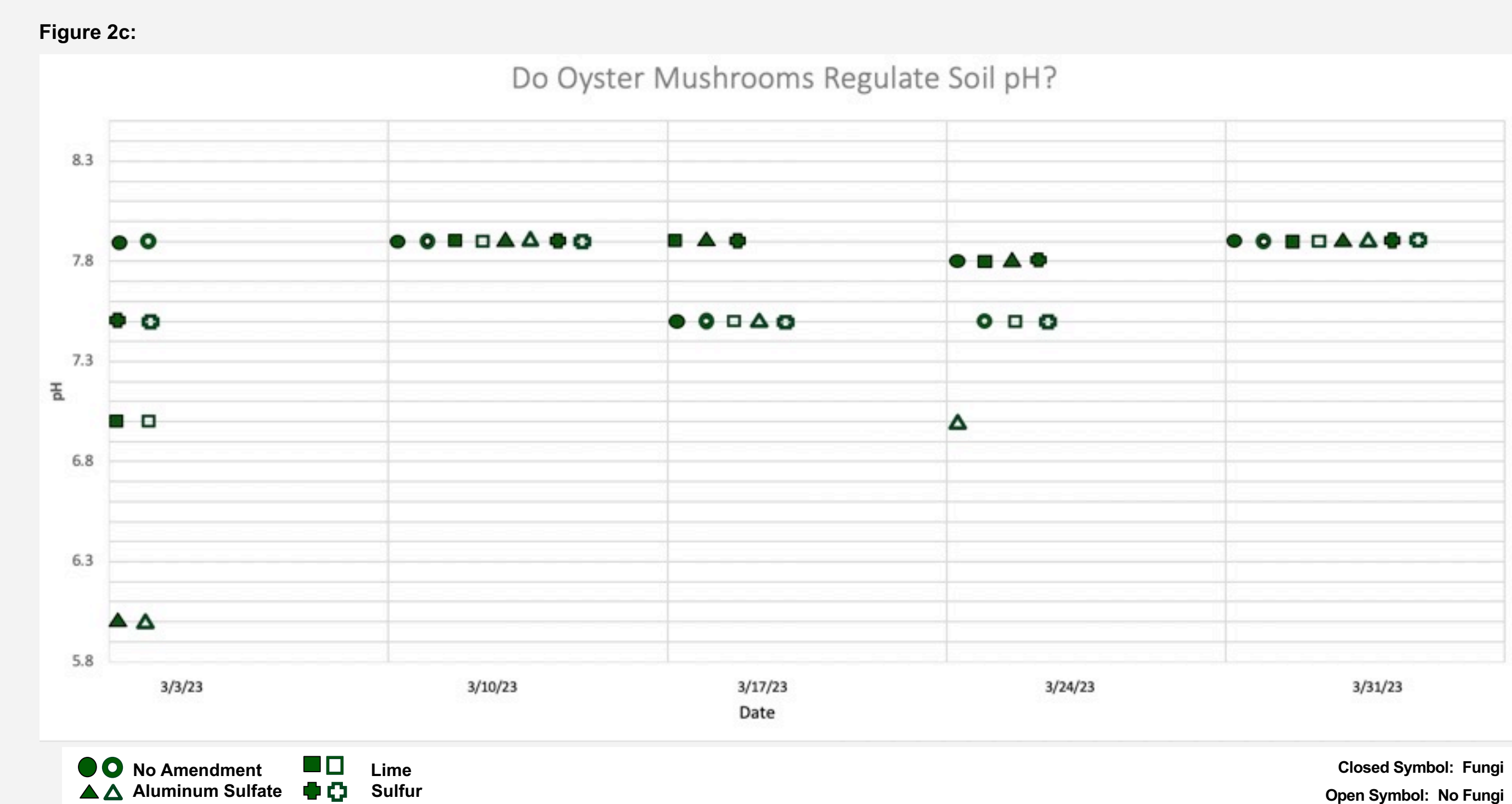
- Containers with and without fungal mycelium were watered for 4 weeks with PBS solution of pH 6.1, 7.4 or 8.4 (Fig. 1a).
- Discoveries:
 - Watering solution pH did not affect fungal growth or soil pH
 - Presence of fungi did affect soil pH (Fig. 1c), fungal growth was observed (Fig. 1b, ink caps)
 - Environmental contaminants a factor – soil autoclaving incomplete



Part 2: Do Oyster Mushrooms Regulate Soil pH?



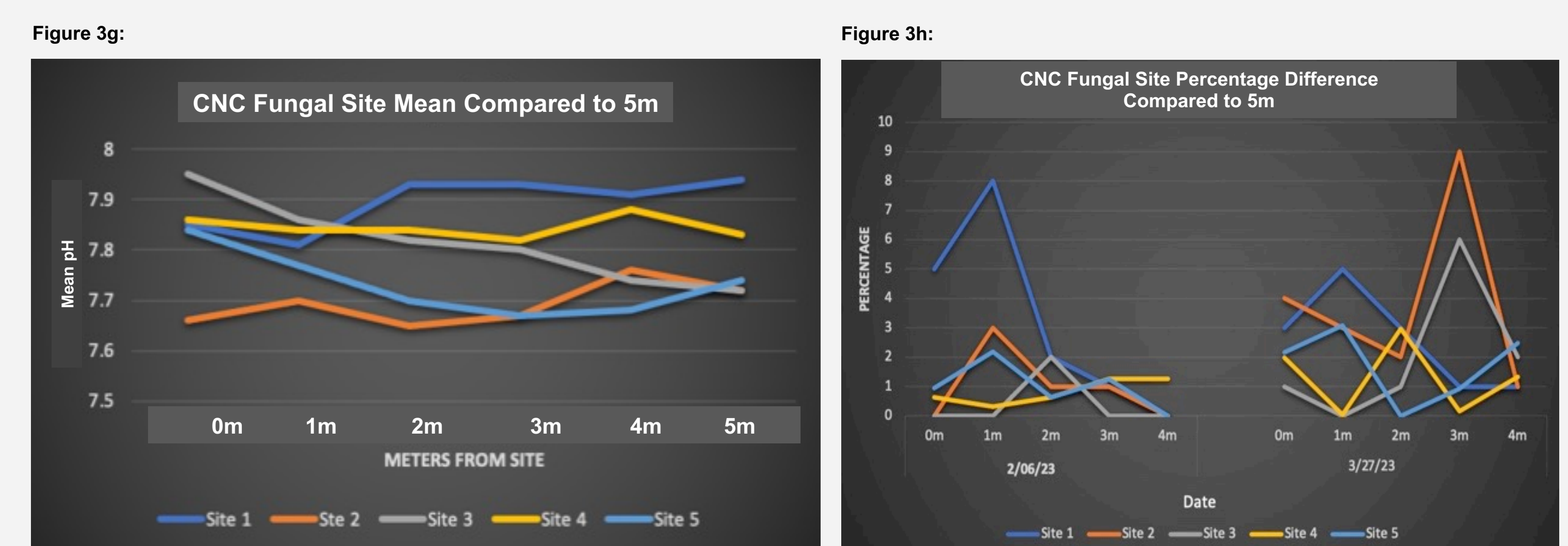
- Containers with and without fungal mycelium were amended with one of three soil pH conditioners (Figs. 2a & 2b)
- Based on previous results, control soil without fungi was autoclaved with moisture for sterilization. No fungal growth was observed.
- Discoveries:
 - Amendment type initially affected soil pH (Fig. 2c), but no lasting pH affect was achieved regardless of fungal mycelium presence
 - Soil amendment frequency matters – continued treatment needed to maintain desired soil pH, regardless of fungi presence.
 - Fungi may enhance rate of soil pH stabilization after soil amendment (Fig. 2c).



Part 3: How does the Presence of Fungi Fruiting Bodies Correlate to Soil pH in Nature?



- Five sites of fungal fruiting bodies were monitored at the Cincinnati Nature Center over six weeks (Fig. 3a-3f).
- Soil pH was measured along two transects at each site on six occasions (Fig. 3g-3h)
- Discoveries:
 - Large distance increment meant surrounding flourishing fungi affected results yielded
 - Precipitation affected soil pH observations more than proximity to fungi



Conclusion

Soil pH affects soil microbe abundance and diversity and nutrient concentrations and availability. Thus, factors affecting soil pH, like fungal growth, are critical, yet often overlooked, element for successful agriculture and gardening. My observations of interactions between oyster fungi (*Pleurotus ostreatus*) and soil pH yielded preliminary data on this key interaction. Initially, fungal mycelia were grown under varying watering conditions to determine how this would affect their growth and soil pH. Changes in soil pH or mycelium growth after watering with three different pH solutions were not observed. Fungal presence did affect soil pH (Fig. 1c), although not statistically significantly. Next, existing oyster mushroom mycelia were challenged to regulate soil pH by the addition of 3 different soil conditioners. Fungi presence moderated soil pH more quickly compared to treatments without fungal mycelia (Fig. 2c), although soil pH with and without fungi was identical by four weeks after amendment. In nature, soil pH does vary with distance from fungal fruiting bodies (Fig. 3g), but not with a consistent pattern across our sites. The percent change in soil pH with distance from fruiting bodies was also not significant nor showed a discernable trend. Overall, the null hypotheses is accepted that fungal presence does not regulate soil pH. However, the presence of fungi is clearly one factor in determining soil conditions.