



DEPARTMENT:

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PROJECT TITLE:

Dictyostelium discoedum Consumes
Several *Streptomyces* Bacteria Strains

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ABSTRACT

Dictyostelium discoideum is a soil dwelling amoeba that is commonly studied due to its unique life cycle in which starving amoeba aggregate to form multicellular reproductive structures, called fruiting bodies. Although the life cycle has been studied extensively in the laboratory, less is known about the biology of these amoebae in soil. I have assessed whether *Dictyostelium* amoebae consume *Streptomyces* bacteria to understand the role of these social amoeba in soil. *Streptomyces* are filamentous spore-producing bacteria found in virtually all soils, that are known for their production of secondary metabolites. These metabolites have antibacterial and antifungal activities. My experiments show that *Dictyostelium* amoebae, along with other social amoebae, are capable of growing when spores from one of several *Streptomyces* species are supplied as the only food source. All strains tested support growth of the amoebae. These experiments suggest that *Streptomyces* spores may be a major food source of amoebae in soil. They also propose that the amoebae may be a good model to understand microbiological predator-prey relationships in soil.

Lifecycle of Social Amoebae

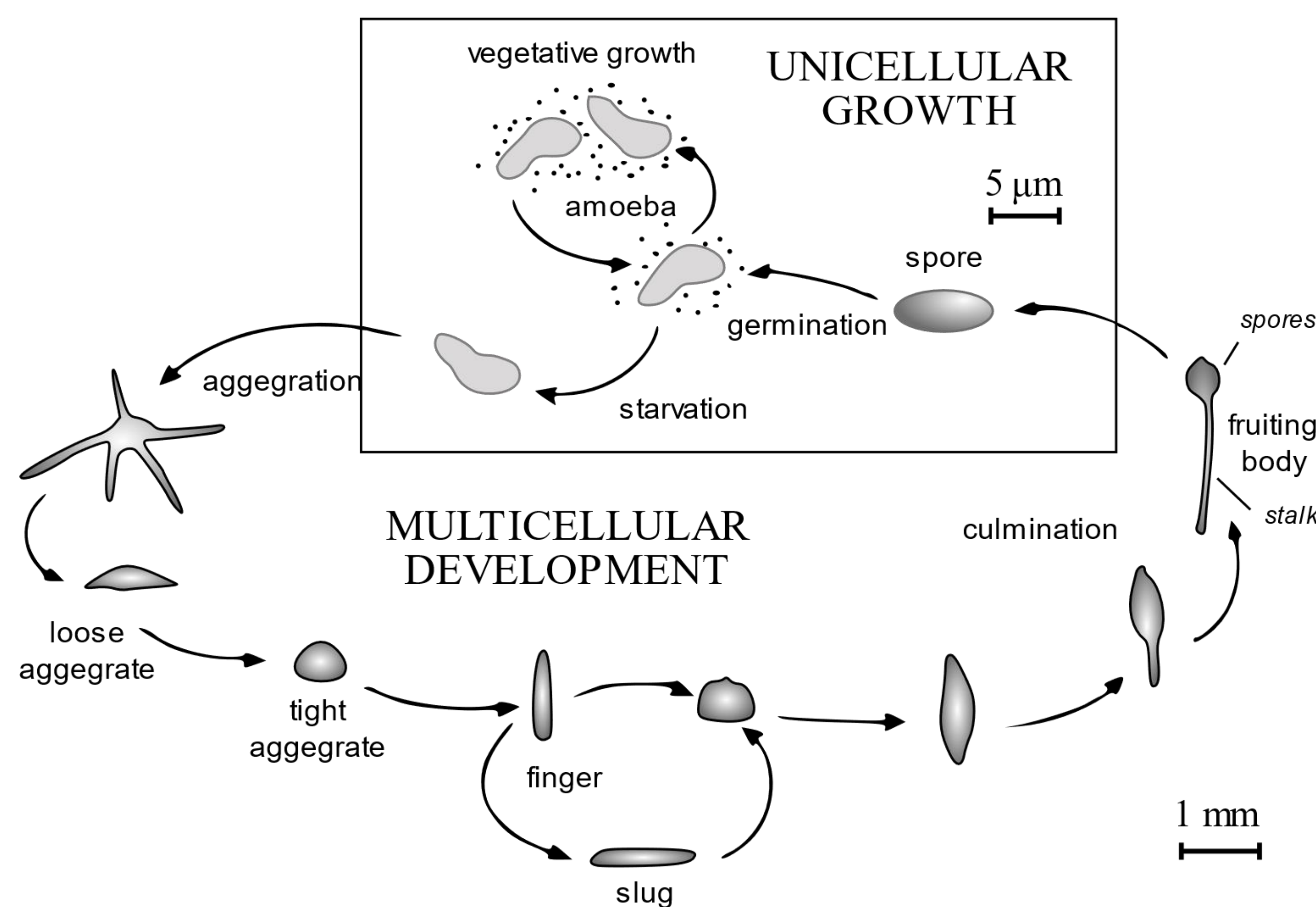


Figure 1. Lifecycle of Social Amoebae

Seen above is the life cycle of most social amoebae. Single cells will aggregate as a result of lack of food to form the finger structure. The finger structure grows perpendicularly from the surface, then eventually falls to form the slug. The slug is able to move on top of the surface. At a certain point, the slug will begin to form the fruiting body, which will initiate the life cycle all over again.

Dictyostelium Grows on Streptomyces Spores

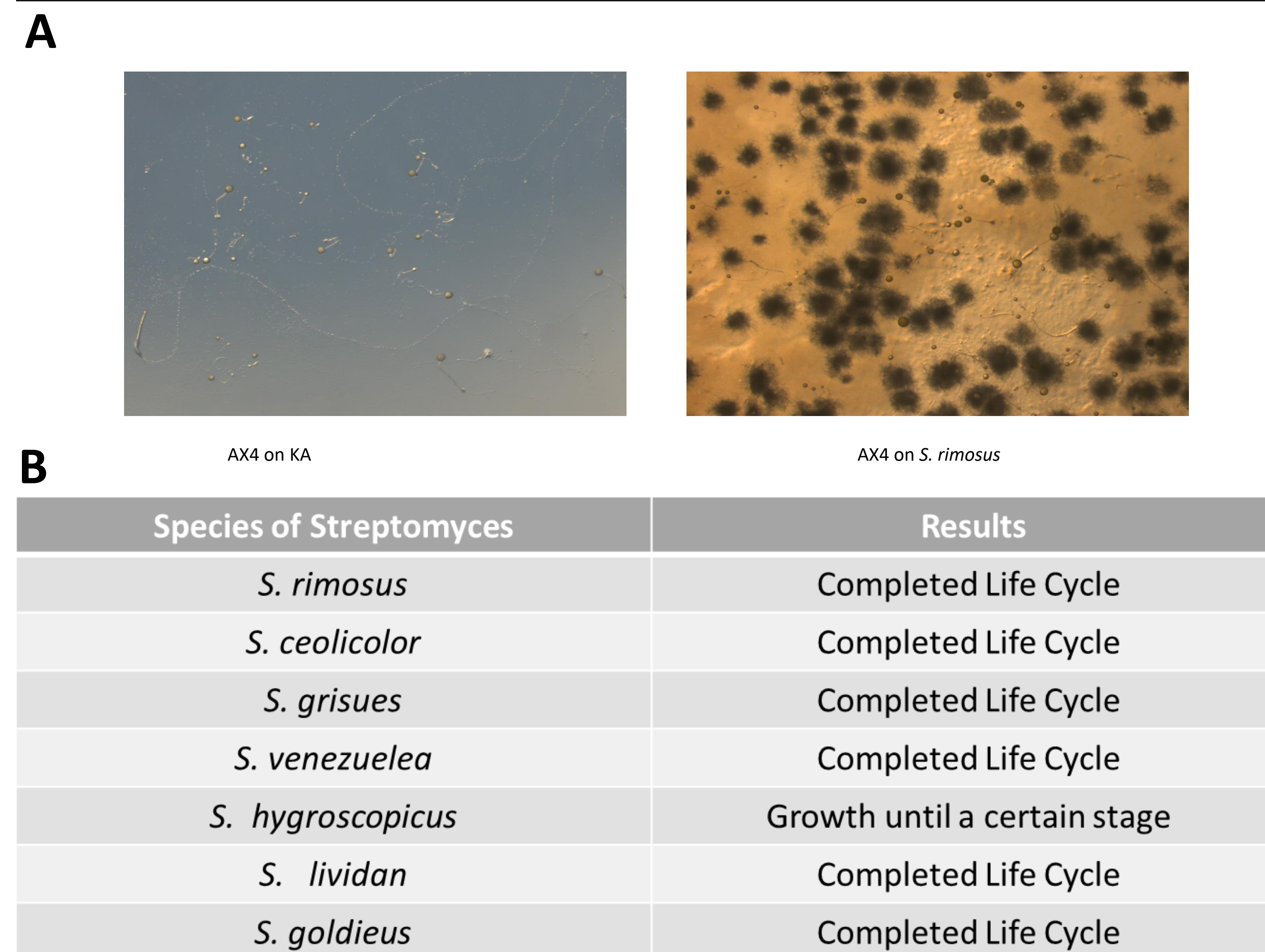


Figure 2. Dictyostelium Grows on Streptomyces Spores (A) *Dictyostelium Discoideum* was plated on *Klebsiella pneumoniae* and grown for 6 days, as a control **(B)** *Dictyostelium discoideum* was plated on *Streptomyces rimosus* spores and grown for 6 days

Dictyostelium Growth on Streptomyces rimosus

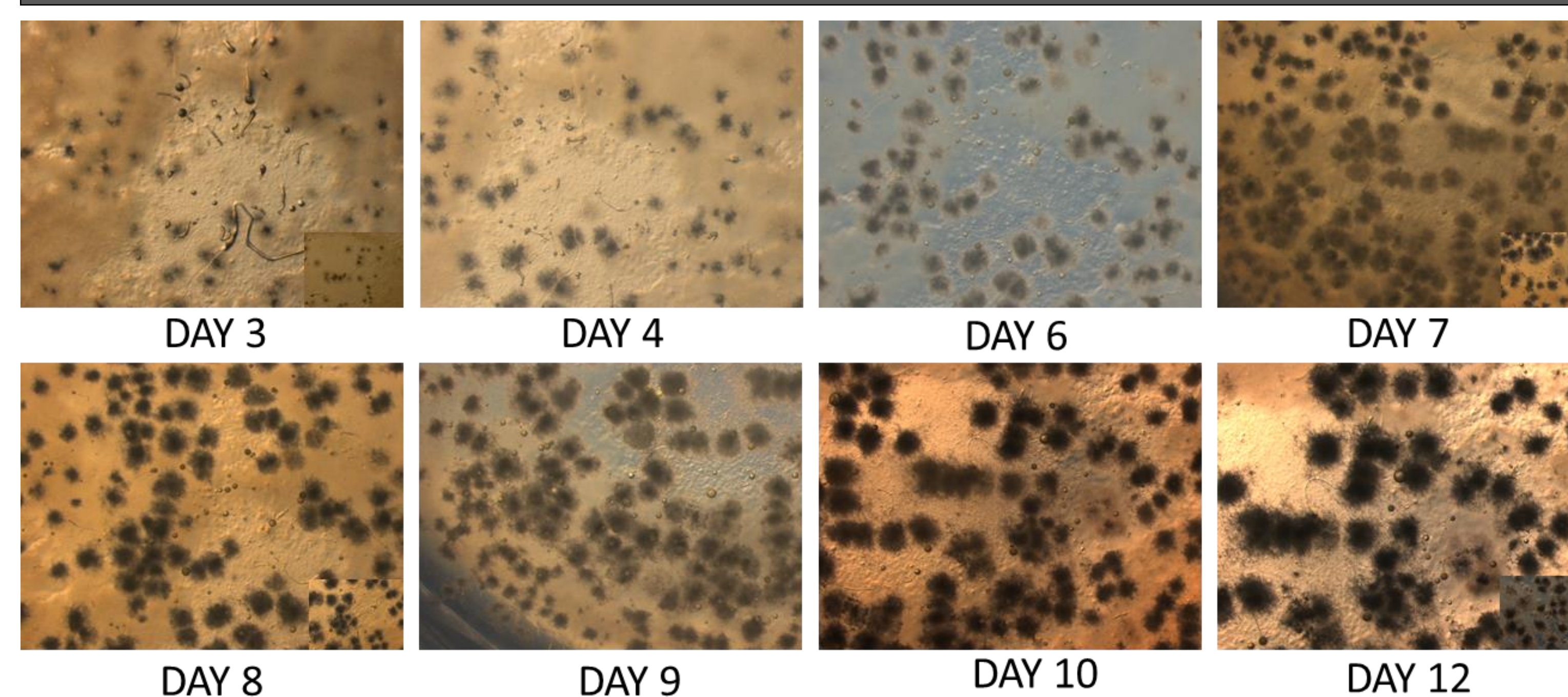


Figure 3. Dictyostelium Development on Streptomyces rimosus *Dictyostelium discoideum* cells were plated on *Streptomyces rimosus* spores and observed for 12 days. Growth was not seen until Day 3.

Other Social Amoebae Consume Streptomyces Spores

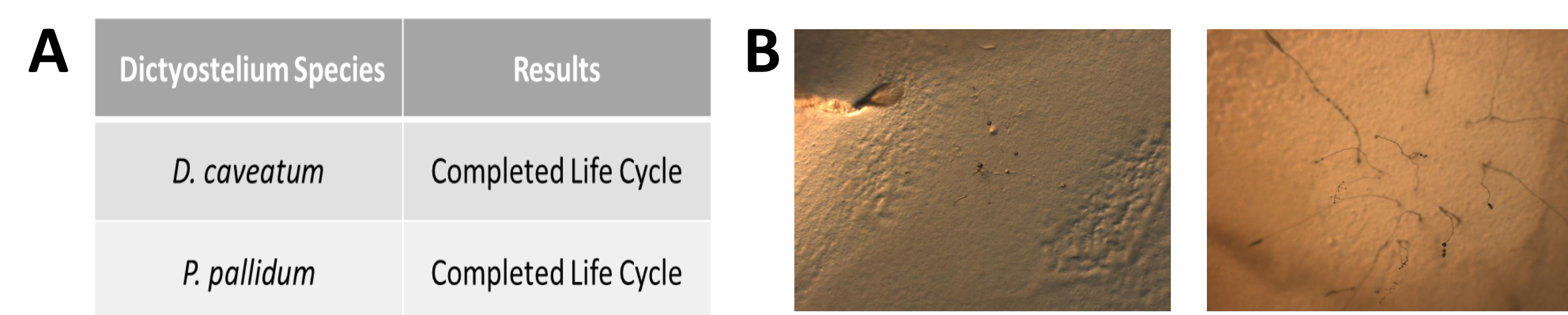


Figure 4. Other Social Amoebae Consume Streptomyces Spores (A) *Dictyostelium caveatum* and *Polysphondylium pallidum* both consumed *Streptomyces rimosus* **(B)** Both species were plated on *Streptomyces rimosus* spores and observed for 7 days.

Discussion

Dictyostelium discoideum, among other social amoeba, have been shown to consume and metabolize various strains of *Streptomyces* bacterial spores. All experiments were performed using laboratory species. When the spores were supplied as the only food source, growth similar to the control was observed in the lab setting. Please see [Interactions of Natural Isolates of dictyostelids with Streptomyces](#) by Christian Cherry to further understand the interaction of social amoeba and *Streptomyces* in soil.

Conclusion

My findings demonstrate that *Dictyostelium discoideum* is able to grow and consume various species of *Streptomyces* bacteria. These results also illustrate the ability of other social amoeba to consume *Streptomyces* as well. There seems to be potential for an interaction between social amoebae and *Streptomyces* species in soil.

Future Directions

- Use *Dictyostelium discoideum* to test consumption of spores using other *Streptomyces* species.
- Determine if other social amoebae are able to consume *Streptomyces* spores
- Complete growth assays to determine preference in feeding habits of the social amoebae

Future <i>Streptomyces</i> to test <i>Dictyostelium</i> Species	Future Social Amoebae Experiments
<i>S. ceolicolor</i>	<i>D. aureo-stipes</i>
<i>S. Venezuelea</i>	<i>D. discoideum</i> – wild type
<i>S. griseus</i>	<i>P. pallidum</i>
<i>S. rimosus</i>	<i>D. caveatum</i>

Acknowledgements

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