Assessing the Applicability of Seed Pelleting Technology for Milkweed Establishment

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Abstract

The restoration of plant life in degraded environments is hindered by animal, particularly bird, feeding upon the seeds and, when not buried, surface exposure to the elements. Seed pelleting into "seedballs" is a potential means to address this problem. In the process of pelleting seeds are encased in a shell composed of clay and vermicompost that may also include organic polymers, termed hydrogels, to help retain water. For this study, we are assessing the effects that seedballs have on germination. Plots at three locations in Sonoma County, including two sites on the Sonoma State campus, were spotted with naked seeds and seedballs containing 0.5 g, 1.0 g or no hydrogel. Findings from this study will inform local restoration programs on the effectiveness of using seedballs.

Project partner Alaric Balibrera with research student Feline Howard at experimental plot within the Sonoma State Butterfly Garden.

Materials and Methods

- Seedballs composed of clay, vermicompost, and varying quantities of hydrogels.
- Narrow milkweed (*Asclepias fascicularis*) seeds and various pollinator seeds.
- Seeds were sown at Sonoma State central greenhouse, the composting area behind the tropical greenhouse, the SSU native plant garden, and Bulbs Bliss, Santa Rosa. The seeds were either naked, in seedballs with 0.5 g hydrogel, or in seedballs with 1.0 g hydrogel.
- In December 2022 the seedballs and the seeds were sprinkled in an even pattern on the soil surface and left to grow on their own. The goal is germination with minimal effort as restoration efforts can be across many square miles.
- Soil from beneath the seedballs and non-seedball areas were gathered in February 2023 and the microbial community enumerated.

Experimental plots at Bulbs Bliss, Santa Rosa (left) and at SSU behind the tropical greenhouse (right).

Results

Two months after setting up the experiment, populations of bacteria, fungi and nematodes were not significantly different between the two treatments (Figure 1). We will be monitoring the plots for milkweed germination throughout the spring and summer.

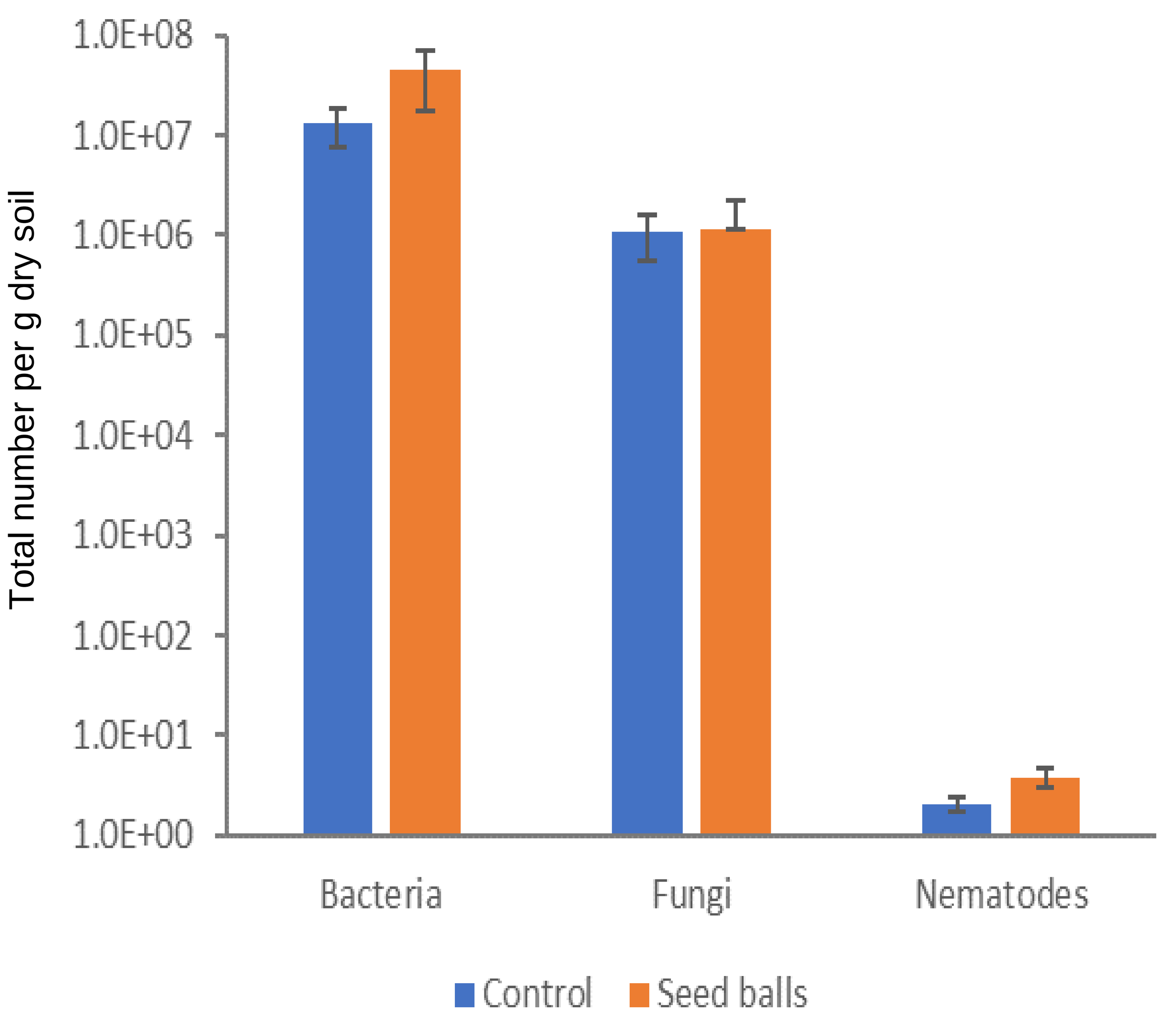

Figure 1. The density of bacteria, fungi, and nematodes in control soil compared to seedball-associated soil compared at the SSU greenhouse site.

Figure 2. Nematode under magnification

Figure 3. Seedball with sprout

Figure 4. Seedball with expanded hydrogel following a rain event

Future Prospects

- Results from this experiment should demonstrate whether seedball dispersal is an effective strategy for seeding disturbed environments with milkweed.
- If effective, methods for large-scale dispersal will need to be investigated.

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