Restoration of biological soil crust in a warming climate

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US Geological Survey, Northern Arizona University, Rim to Rim Restoration
“Late successional”

mosses

lichens

“Early successional”

dark cyanobacteria

light cyanobacteria
Climate change may complicate restoration efforts
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Is assisted migration a viable solution?
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Biocrust communities across the western US show strong climate-associated community functional composition.
Is assisted migration a viable solution?
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Moss, lichen and cyanobacteria cultivated in the greenhouse show different growth patterns in response to water and shading.
Is assisted migration a viable solution?

After 2 months of bulking in the greenhouse, community functional composition and climate space mirrors that of the field harvest site.
Warming and “softening” trial:
- Biocrust grown under heat lamps.
- With shade and weed cloth
Biocrust nursery at Mayberry Native Plant Propagation Center

Mayberry is here

Two cleared, leveled 0.8 acre fields
Biocrust nursery at Mayberry Native Plant Propagation Center
1. Late successional biocrust on the Colorado Plateau are inhibited by warming.

2. Regional patterns of biocrust growth in relation to climate, and responses to greenhouse treatments suggest some suitability for assisted migration trials, we are still evaluating field warming-restoration for more a definitive answer.

3. In the meantime we are beginning to upscale our cultivation approaches to provide suitable material sources for larger scale restoration efforts.
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