



The Facts About Slime Molds and Fungi in Mulches

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The Horrors that Lurk within the Mulch

Photo: Thirunarayanan Perumal, Banaras Hindu University, Bugwood.org



You say EWW!
I say Cool!



So, what are we going to talk about?

What are these things in the mulch?

- Biology of these organisms
- An introduction to common mulch fungi

What do we do about mulch fungi?

- Real world management strategies
- Resources

What are fungi?

- A living, microscopic organisms
- Break down host tissue to obtain nutrients
- The body of a fungus is made up of tiny thread-like structures called hyphae
- Fungi reproduce using spores
- Some fungal reproductive structures are visible

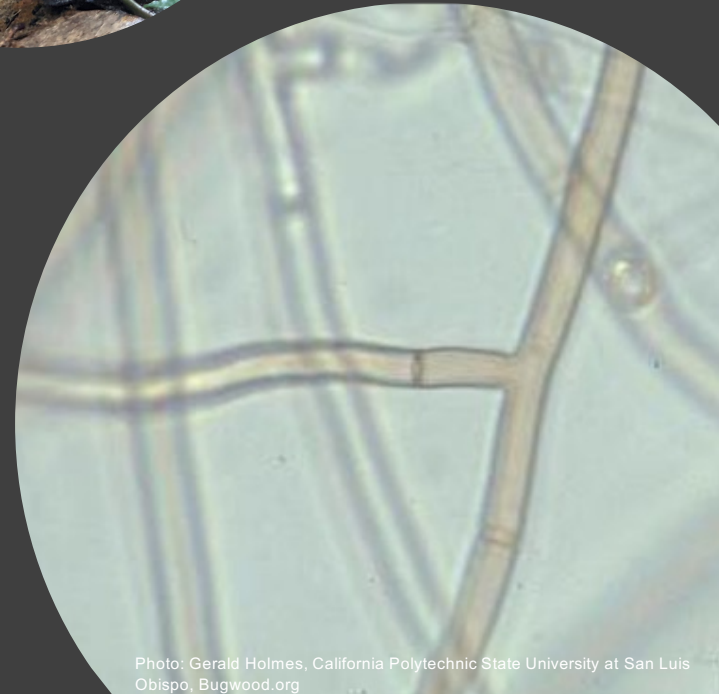


Photo: Gerald Holmes, California Polytechnic State University at San Luis Obispo, Bugwood.org

What are slime molds?

- Single-celled
- Amoeba-like organisms
- Also reproduce with spores



Photo: Sandra Jensen, Cornell University, Bugwood.org

Why do these organisms occur in mulch?

Organism

+

Food Source

+

Environment



What is a saprophyte?

- Also known as saprobes
- Organisms that decompose dead plant material
- Saprophytes DO NOT infect healthy plant tissue



A photograph of a single, bright yellow mushroom with a textured, slightly bumpy cap and a pale greenish-grey stem. It is growing from a forest floor covered in a thick layer of dry, brown, and grey leaves. The background is softly blurred, showing more of the leaf-covered ground.

Benefits of saprophytes

- Break down organic matter
- Restore nutrients to the soil to improve soil fertility

Disadvantages of saprophytes

- Most people feel they are unsightly
- Often create alarm that that living plants will be infected
- Some mushrooms can be harmful to humans or animals



Photo: John Hartman, University of Kentucky

Common mulch fungi

Stink horns

- Body is a mass of thread-like structures that often goes unseen
- First visual observation is an egg-like mass
- Reproductive structures may be foul smelling
- Spores are moved by insects
- Likely to develop in warm and moist conditions



Photo: Gerald Holmes, Strawberry Center, Cal Poly San Luis Obispo, Bugwood.org

Common mulch fungi

Puffballs

- Body is a mass of thread-like structures that often goes unseen
- First visual observation is the development of the reproductive structure
- When mature the reproductive structure releases spores in a “puff”
- Spores are released by touch and dispersed by wind
- Likely to develop in warm and moist conditions



Common mulch fungi

Birds nest fungi

- Body is a mass of thread-like structures that often goes unseen
- First visual observation is the development of reproductive structures
- Spores are released from nests when water splashes in
- Likely to develop in warm and moist conditions



Common mulch fungi

Artillery fungus

- Body is a mass of thread-like structures that often goes unseen
- First visual observation is the development of reproductive structures
- Masses of spores are ejected from reproductive structures
- Spores are small, black, and stick to surfaces
- Likely to develop in warm and moist conditions



Photo: Gary Emberger

Differentiating Birds Nest Fungi from Artillery Fungus



Photo: Thirunarayanan Perumal, Banaras Hindu University, Bugwood.org



Photo: Gary Emberger

Differentiating Birds Nest Fungi from Artillery Fungus



Photo: Nicole Gauthier, University of Kentucky



Photo: George Weigel, PennLive.com



Photo: Cheryl Kaiser, University of Kentucky

Photo: Sandra Jensen, Cornell University, Bugwood.org

Slime molds

- Also known as “dog vomit”
- Develop during periods of extended rain
- First appear slimy, then become darker and dry with a powdery appearance
- Spores are spread by wind and water

Do we need to manage these organisms?

- Some structures dry up and disappear quickly
- These organisms do not harm living plants
- Mulch fungi break down organic matter and improve soil fertility



The hard truth about management

- We don't know mulch fungi are present until reproductive structures appear
- Little research is being done in this area to provide effective solutions for management of mulch fungi



Why do these organisms occur in mulch?

Organism

+

Food Source

+

Environment



Management

Stink horns, Puffballs & Birds nest fungi

- Rake mulch regularly to improve air flow and prevent compaction
- Manage irrigation to limit conditions that favor fungal development
- Remove reproductive structures when they appear
 - Early removal prevents spread
- Cover with new mulch or replace with mulch that breaks down more slowly



Photo: Gerald Holmes, Strawberry Center, Cal Poly San Luis Obispo, Bugwood.org

Management

Artillery fungi

- Prevention is key!
 - Rake mulch regularly to improve air flow and prevent compaction
 - Manage irrigation to limit conditions that favor fungal development
 - Use mulches such as pine bark or pine straw
- Cover with new mulch or replace with mulch that breaks down more slowly



Photo: Gary Emberger

Research has shown that...

Artillery fungi

- Mixing mushroom compost with mulch MAY help to suppress artillery fungi.

Davis, D. D., Kuhns, L. J., & Harpster, T. L. (2005). Use of mushroom compost to suppress artillery fungi. *Journal of Environmental Horticulture*, 23(4), 212–215.
<https://doi.org/10.24266/0738-2898-23.4.212>

- Biological fungicides, *Trichoderma harzianum* and *Bacillus subtilis* can suppress artillery fungi when applied before or at the time of inoculation.

Brantley, E. A., Davis, D. D., & Kuhns, L. J. (2001). Biological control of the artillery fungus, *Sphaerobolus stellatus*, with *Trichoderma harzianum* and *Bacillus subtilis*. *Journal of Environmental Horticulture*, 19(1), 21–23. <https://doi.org/10.24266/0738-2898-19.1.21>

- A laboratory study found that some fungicides were effective against artillery fungus.

Fidanza, M. A., & Davis, D. D. (2009). *In vitro* screening of fungicides to control artillery fungi. *Journal of Environmental Horticulture*, 27(3), 155–158.
<https://doi.org/10.24266/0738-2898-27.3.155>



Photo: Gary Emberger

Management

Artillery fungi

- Early removal results in
 - Easier removal
 - Fewer stains
- Power wash (where appropriate)
- Scrub with soapy water or cleaner
- Allow to soak when possible



Photo: George Weigel, PennLive.com

Management

Slime molds

- Allow for slime molds to dry out and disappear
- Manage irrigation to limit conditions that favor development
- Rake mulch regularly to improve air flow and prevent compaction

Photo: Adam Leonberger

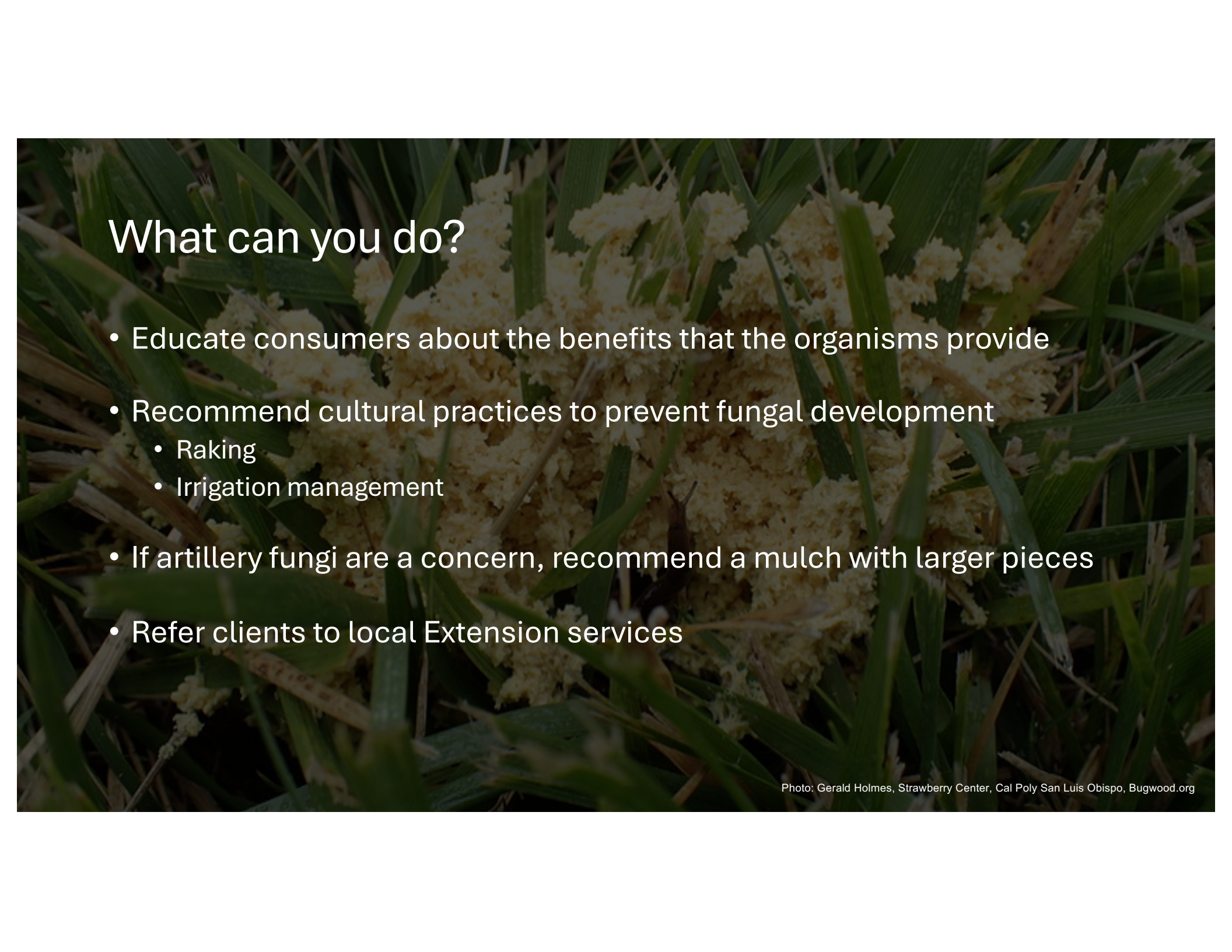
Management

Slime molds

- Cover with new mulch or replace with mulch that breaks down more slowly
- If slime molds appear powdery/fuzzy, cover with damp newspaper before removing mulch



Photo: Sandra Jensen, Cornell University, Bugwood.org



What can you do?

- Educate consumers about the benefits that the organisms provide
- Recommend cultural practices to prevent fungal development
 - Raking
 - Irrigation management
- If artillery fungi are a concern, recommend a mulch with larger pieces
- Refer clients to local Extension services

Additional Resources

- Cooperative Extension Service
- Local University Publications and Research
- University of Kentucky Extension Resources
 - Mulch Mushrooms, Slime Molds, & Other Saprophytes - <https://plantpathology.ca.uky.edu/files/ppfs-gen-06.pdf>
 - Nicole Gauthier YouTube Channel - @NicoleGauthier



Questions?
