



Investigating Salal

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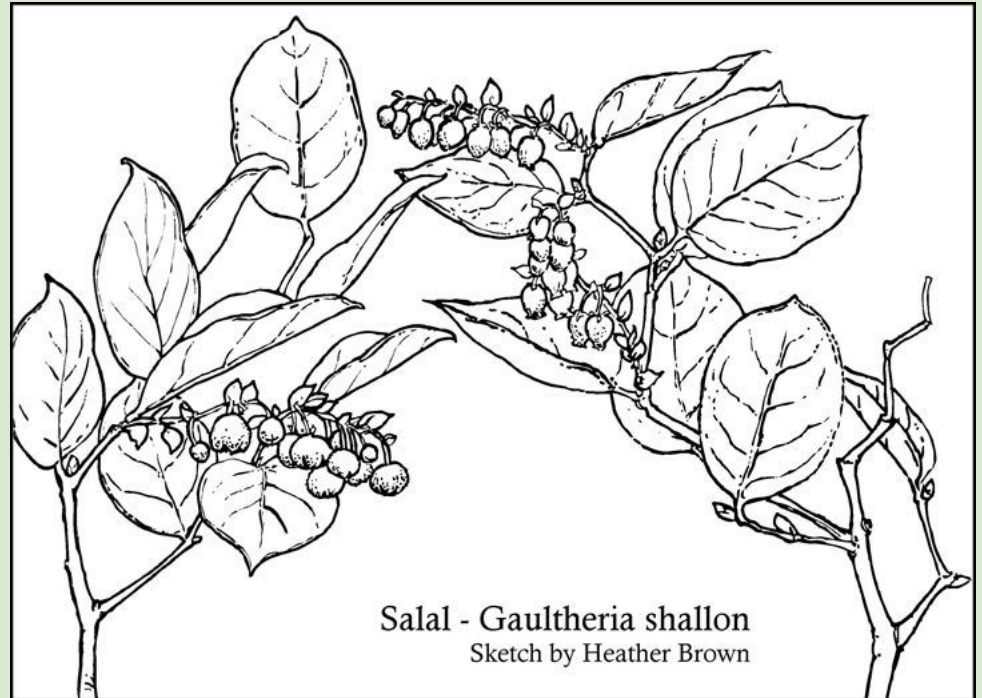
Background on Salal

Salal (*Gaultheria shallon*) is a common understory species native to the Pacific Northwest.

Though it is highly regarded as a shade plant, it is also sun-tolerant and provides many ecosystem and community benefits:

- ❖ Deep and wide root system that supports soil stabilization and filters run off
- ❖ Supports ecosystem biodiversity as a source of food and shelter for variety of wildlife
- ❖ Promotes nutrient cycling through nitrogen-fixing abilities

([Tirmenstein](#))



At our nursery, we are always learning!

Gaultheria shallon is currently labeled as a problem species in our nursery.

Because of its many repeat pest infestations, we've attributed its behavior and difficulties growing to the stress created by these repeat infections.

Through this project, we took a closer look at the conditions we treat our *Gaultheria shallon* with, and reached out to local nurseries to find possible changes we could make to source, healthier, happier plants to our community!

After a load of research and helpful collaborations, we are happy to share with you...

Young & healthy Salal found along
Central Oregon coast Feb 23'





Investigating Salal:
Is it really *just* a pest problem?



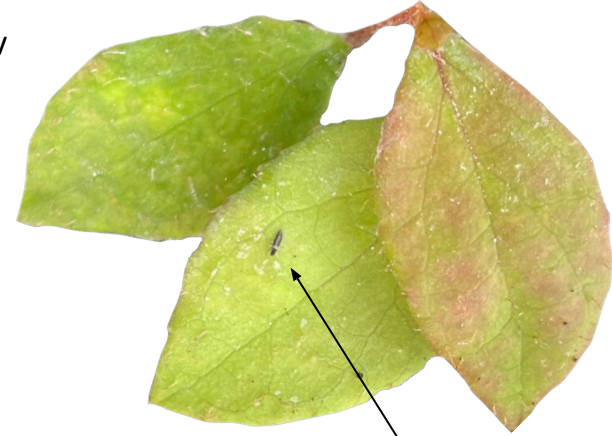
So here is the state of affairs:

Most of our *Gaultheria shallon* exhibits some kind of physical damage from pests. Among some signs are leaf discoloration from sugars being sucked out, pinhole-sized spots from the piercing of thrips, the presence of honeydew secretions, and of course, the pests themselves.



Application of Diatomaceous earth- acts as a razor against bugs that crawl over it

Honeydew left from aphids



Thrips!



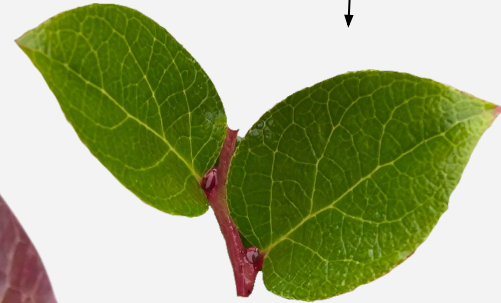
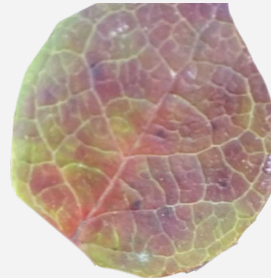
*left photo taken from hoop house, two others taken from greenhouse

Note to self:

Although leaf discolorations can indicate pathogen attacks, they can also signal nutrient deficiencies.

Nutrient deficiencies are difficult to diagnose from observation alone. A soil test can help to identify any deficiencies and guide you in taking appropriate action.

If you are located within King County, you can receive up to 5 soil sampling tests for free. Check it out [here!](#)



What Salal should look like



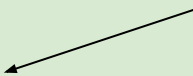
So is it the pests or is it a lack of nutrients?

We wish we knew the exact answer! When it comes to growing native plants, most places are just doing the best they can. The best we can do is amend our practices and observe what happens.

From our collection of information from local native nurseries, the best success in growing *Gaultheria shallon* appears to come from:

- **Adding aeration to the soil in the form of pumice or peat.**
 - Airy soil mediums allow for better drainage. Mediums that hold too much water can make plants more prone to pests and deplete available nutrients.
- **Keeping Salal outside right after propagation to adapt to natural light and temperature conditions.**
 - Staying outside can also help with pests as there is a natural predatory balance.
- **Applying some kind of media / product that encourages mycorrhizal development**

More on this in the next slides!

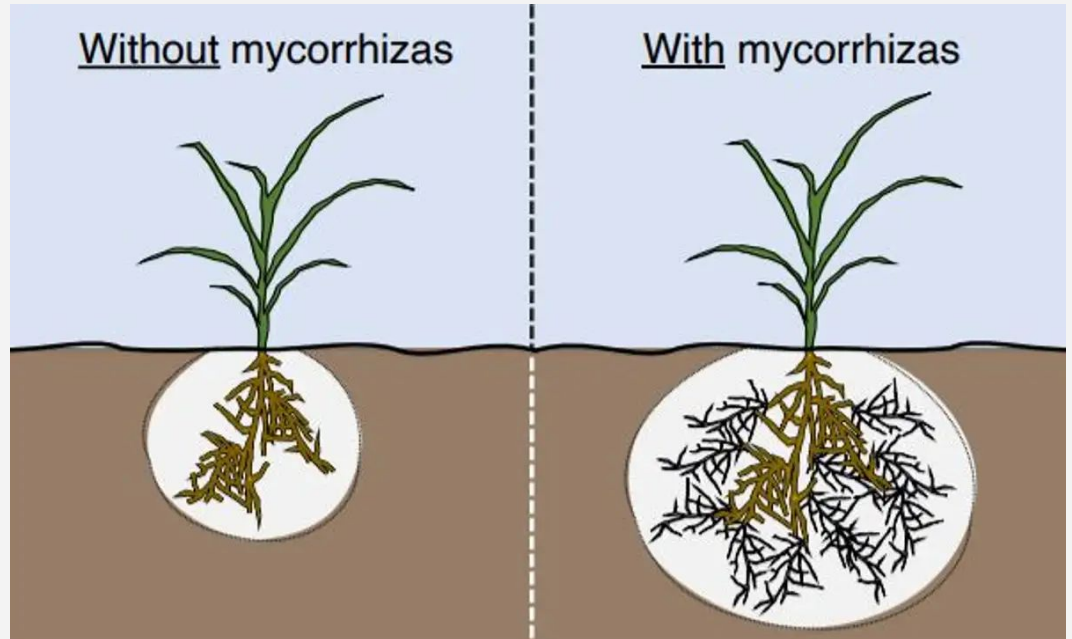


Background on Mycorrhizal Fungi

Mycorrhizal fungi are “**root fungi**” that form a network of filaments (hyphae) extending out from plant roots into the surrounding, untapped soil. They increase the surface area of roots and trade nutrients they reach to their host plant for fixed carbon in return.

As a member of the Ericaceae family, Salal is known to form mutualistic associations with Arbuscular Mycorrhizal Fungi (AMF), more specifically, Ericoid Mycorrhizal Fungi.

Ericoid fungi are adapted to grow in acidic and nutrient-poor soils and are able to help Ericaceae plants like Salal obtain nutrients like Nitrogen and Phosphorus.



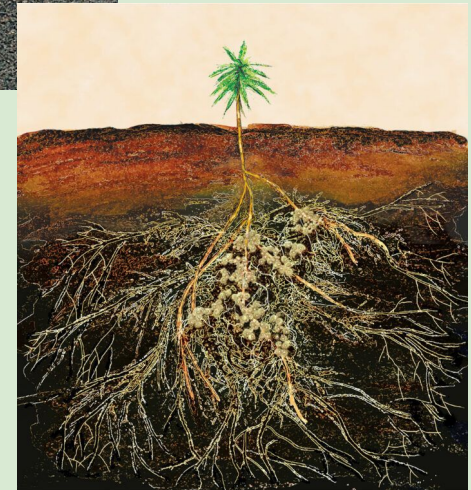
More on Mycorrhizal Fungi

Mycorrhizal fungi can help enhance plant performance by:

- Producing enzymes that breakdown organic complexes in soils, mobilizing nutrients otherwise unavailable to their host plants ([Read et al. 2004](#)).
- Facilitating the release of defense-related enzymes to neighboring plants ([Yu et al., 2022](#))
- Increasing plant tolerance of abiotic stresses like drought and soil salinity, and biotic stresses like pathogen infections ([Wei et al., 2022](#))



Arbuscular fungal communities are positively correlated with enzymes involved in nitrogen cycling ([Burke et al. 2011](#)). Compared to plants given no fungi connections, plants inoculated with Arbuscular Mycorrhizal Fungi (AMF) experience an increase in nitrogen content and a decrease in carbon content, lowering soil C : N ratios ([Yu et al., 2022](#)).



The Gist...

Overall, mycorrhizal fungi assist in creating more balanced nutrient cycling, limiting the attraction of pests and helping plants stay healthy enough to fight against pathogens.

Pot-grown plants can be colonized by mycorrhizae on their own, though inoculating plants with fungi can oftentimes see quicker results.

Whether it's the pests or the absence of essential nutrients, mycorrhizal fungi can assist in assuaging both issues.

Before buying just any mycorrhizal product, research the genus of your plant to see which fungi are most associated with it.

****A final note: Mycorrhizal fungi aren't a fix-all solution. Soil medium and conditions should still be addressed****



In the case of Ericaceous plants like Salal, ericoid mycorrhizal fungi are specialized in colonizing them.

Sources:

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Photos:

[AN 43 Fungi Figure 1.JPG](#)

[Thrips.jpg](#)

[41586_1997_Article_BF41426_Fig1_HTML.gif](#)

[FG96-soil-fungi-700x758.jpg](#)

*rest of photos taken by Jovanna Talarico at the nursery