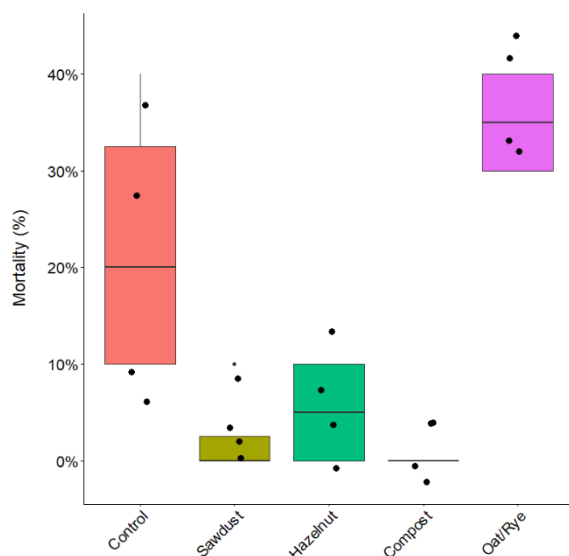


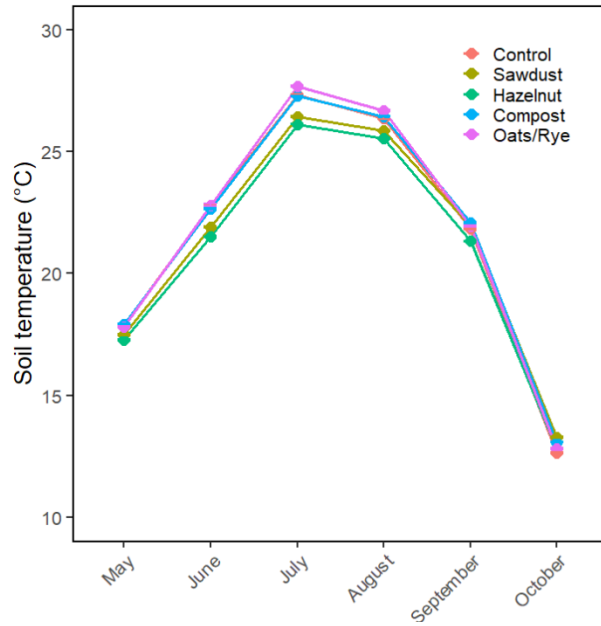
Mulch improves seedlings survival by possibly retaining soil moisture and lower temperatures

Priya Rajarapu and Judy Kowalski, Oregon State University

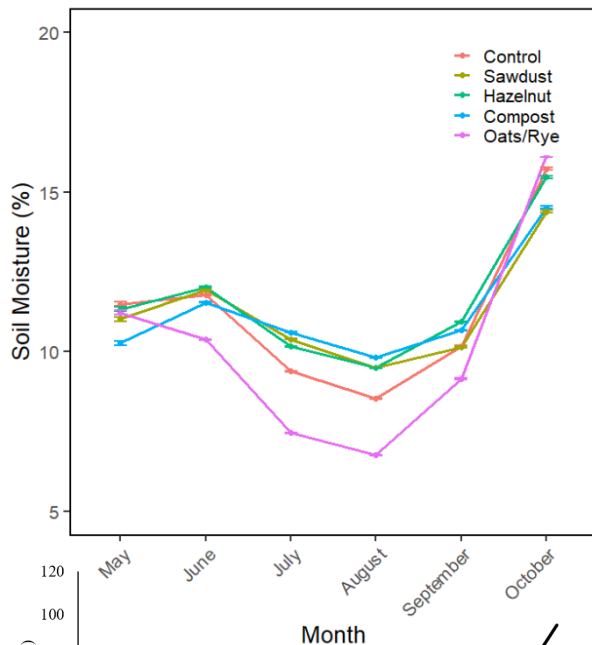
Rising temperatures and drought conditions in the Pacific Northwest continue to challenge seedling transplantation success. Within commonly planted Christmas tree species noble fir appears to be more susceptible to hot and dry summers relative to other species widely planted in the valley such as Douglas-fir, Nordmann fir, and Turkish fir. OSU Christmas tree extension program has conducted several trials over the years to evaluate various cultural practices to improve survival. These include foliar sprays, shade screens, root dips (polymers, bio-stimulants, mycorrhizae), and organic mulches. Among all these approaches organic mulches like wood chips improved seedling survival by significantly reducing soil temperature. **Alternative organic mulches including sawdust, compost, hazelnut shells, and annual oat and rye cover were evaluated on transplantation success of noble fir (two-year plugs) in Summer 2025.** Seedlings were donated by Kirk Stroda and are all from same family (same mother tree). **The experiment was conducted at North Willamette Research and Extension Center, Aurora, Oregon. Each treatment was replicated four times with five seedlings per treatment. In total, there were 20 seedlings per treatment. Overall, mulching significantly increased seedling survival by 30-40% relative to no mulch treatments.** There was a significant effect of treatment (presence or absence of mulch) on soil temperature during the duration of the experiment. Soil temperatures at 15cm depth with mulch were at least 1°C lower than the soil without mulch (control) during the hottest months of the growing season although they were not significantly different. Soil moisture was 11-15% more in seedlings covered with mulch relative to without mulch during August.



Irrespective of the mulch material used, seedlings with mulch showed significantly greater survival than the seedlings without any mulch or planted between oats and rye crops.



Treatments have no effect on soil temperature at 15 cm depth early or late in the growing season. Clear differences appear in mid-season (July and August). Seedlings planted between oats/rye had relatively higher temperatures. Hazelnut and sawdust lowered the temperature relative to control or oats/rye but were not significantly different. Compost and Control (no mulch) had similar temperatures.



Soil moisture patterns follow precipitation patterns. However, mulch appeared to improve moisture retention in months with 11 mm precipitation. Later in the season, as the precipitation increases soil moisture in seedlings planted between oats/rye and without mulch have higher soil moisture; sawdust and compost treatments had relatively lower soil moisture as they obstruct the water infiltration through the mulch.

