

# Field Notes: Drought and Fall Root Growth in Native Plant Nurseries

By George Kral

*A hallmark of the Pacific Northwest's climate is a period of summer drought, however this year was exceptional in several ways. Temperatures in the 80's persisted well into October, setting records for several cities across the region. Rain also fell at record low levels, which allowed large fires to burn and smoke to linger in the air. In addition to impacts on fire behavior and related air quality issues, this delayed start to fall may also be having impacts on our native plant species. Read on for reflections from Scholls Valley Native Nursery Owner and Forester George Kral about how the late drought may be affecting seedling growth.*

There is surprisingly little basic research on root development and timing to inform nursery practice, even in Douglas-fir and essentially nothing on native hardwoods and shrubs. There is even less on this phenomenon in wild plants or outplanted seedlings. To get another perspective, I called my friend Kathy LeCompte at Brooks Tree Farm. She confirmed my sense of the importance of fall root growth, basically that it is critically important. She too was surprised that there isn't more literature on the subject.

This year, we pulled irrigation from part of our field to allow induction of drought dormancy, which halts shoot development and allows seedlings to "harden off" in advance of fall freezes. This prevents frost from killing tender shoots, which can render plants unsaleable. Typically, we have sufficient dry weather from late August through September to allow fields to dry out enough to induce fall dormancy. Also typically, we begin to see light precipitation and cooler temperatures in late September and October. These

fall rains, possibly in combination with lower temperatures and shorter days, trigger a spurt of new root growth. The combined cessation of shoot growth (hardening off) and simultaneous initiation of root growth during this fall transitional period changes the balance of seedlings, increasing the root:shoot ratio, with obvious benefit to seedling viability in the following year.

Unfortunately, neither substantial cooling nor precipitation materialized this year. September was hot and dry, and the first three weeks of October were extraordinarily hot and dry. I had to put an irrigation cannon on parts of our field in October just to keep stuff alive and to get fall root growth started on some species. Clearly, this wasn't an option for outplanted forestry and restoration seedlings, which probably did not start growing roots until late October or early November. If we soon have a series of freezes, winter dormancy will be triggered, which halts root

development. As a result, I would guess that fall root growth may be curtailed this year for many wildland plants that have to survive on what nature provides.

What this all means for restoration and reforestation success, and Northwest plant ecology in general, is all conjecture, but I do know that every perennial plant I have ever examined in the fall starts growing roots as soon as the soil is moist. Conifer trees, hardwood trees and shrubs, forbs, grasses, sedges, even bulbs of various lilies which have long since shed their leafy shoots, all of these plants grow roots as soon as fall rains start to wet the ground. Many annual and perennial herbs also germinate with fall rains, so it stands to reason that a delay in fall rains is having all kinds of impacts on all kinds of plants. The development of fungal hyphae and fruiting bodies also depends on fall rains, so the ecological impacts of potential long-term changes in fall rain patterns will likely be very broad.

