

***PINUS PONDEROSA* VAR. *CUNNINGHAMIA* (PINACEAE),
A NEW VARIETY FROM LAKE COUNTY, OREGON**

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ABSTRACT

Pinus ponderosa* var. *cunninghamia S.C. Meyers, **var. nov.**, is described from the Lost Forest of Lake County, in south central Oregon. These plants are distinguished from other regional varieties of *P. ponderosa* in leaf and leaf sheath color. The plants are notable for their geographic isolation and existing at the extreme lower limit of annual precipitation needed for survival for members of the species.

Covering an area of approximately 9000 acres, the Lost Forest Research Natural Area (Wikipedia 2024) is dominated by a self-sustaining population of *Pinus ponderosa*, separated 64 kilometers from the nearest contiguous population of the species. This isolation has occurred for approximately 3000 years (Moir, Franklin, & Macy 1973). Although *P. ponderosa* is wind-pollinated and the Lost Forest population may theoretically occur within the maximum viable pollination distance (Williams 2010), no intermediates were observed among the approximately 100 samples surveyed for this study.

The Lost Forest pines are also notable for existing in area with an annual rainfall average of 22 cm, the lowest known extreme ponderosa pines are known to tolerate (Oliver & Ryker 1990). The tolerance of these trees to low rainfall is likely due to the unique soils within the Lost Forest. The upper layer (0.5-1.5 meters) is composed of porous, sandy soil, underlain by 7-15 cm layer of hard calcium carbonate caliche. The harder subsurface is largely impenetrable to water drainage, thus holding ground water near the surface. Locally, pine roots seldom penetrate this layer. Additionally, seeds from the Lost Forest have been found to germinate quicker than *Pinus ponderosa* seeds from other areas in the species range (Berry 1963).

The Lost Forest pines have experienced disturbance from several activities throughout the 20th century. These include intermittent homesteading, grazing, timber sales, and tank training by the US military during World War II (Berry 1963). Since the establishment of the Lost Forest Natural Research Area in 1972, these types of disturbances have been largely eliminated. Currently however, the Lost Forest and the adjacent sand dunes are a popular off road vehicle destination. While this activity does not appear to have had a large detrimental impact on the pines, continued monitoring is highly encouraged. Due to minimal threats, at this time we do not recommend conservation status.

Pinus ponderosa has been recognized to include 2–5 varieties (Kral 1993; Haller & Vivrette 2012; Potter et al. 2013, 2015; Meyers 2015). The morphological characters we use to distinguish var. *cunninghamia* are similar to the characters that differentiate the currently accepted varieties in type and magnitude. Thus, we have chosen the varietal rank, acknowledging, however, that some rationale exists for recognizing it as a species.

Four main races of ponderosa pine were identified in an analysis of mitochondrial DNA haplotype distribution patterns (Potter et al. 2013) — the North Plateau, Pacific Coast, Northern Rocky Mountain, and Southwestern races. The Lost Pines population belongs with the North Plateau race and was included among their samples — it has the same haplotype as other populations from central Oregon. Potter et al. noted that "patterns of haplotype occurrence across the range of ponderosa pine, the inferred evolutionary relationships among the haplotypes, and the partition of variance between varieties are all consistent with a long-existing separation between the Pacific variety (*P. ponderosa* var. *ponderosa* [North Plateau and Pacific Coast races]) and the interior Rocky Mountain variety (*P. ponderosa* var. *scopulorum* [Northern Rocky Mountain and Southwestern races])."

Potter et al. (2013) noted that within the broadly distributed var. *ponderosa* and var. *scopulorum*, geographically narrower population systems have been recognized at varietal and specific rank. To emphasize the morphological and geographic distinction of the Lost Pines population, we describe it at varietal rank.

PINUS PONDEROSA var. **CUNNINGHAMIA** S.C. Meyers, **var. nov.** **TYPE: USA. Oregon.** Lake Co.; ca. 300 meters E of Lost Forest Campground, ca. 28 air km NE of Christmas Valley, 43.3584° N, 120.3685° W, shallow sand dunes, 1320 m elev., S.C. Meyers *s.n.* (holotype: OSC; isotype: WTU).

Pinus ponderosa var. *cunninghamia* is similar to var. *ponderosa* in the Oregon area but differs in its whitish to light grey or light brown leaf sheaths (versus brown to dark brown) and light green leaves (versus greyish-green to dark green).

Trees to 15 m tall. **Trunks** to 2 m in diameter; bark greyish-brown to yellow- or reddish-brown, deeply furrowed, forming irregular, scaly plates; branches descending to ascending; twigs roughened by bud scars. **Leaves** in clusters of (2)3, straight, slightly twisted, (10)12–16(17) cm × (0.9) 1.1–1.8(1.9) mm, light green, tips acute; stomatal lines (12)16–25(27); sheaths persistent, 5–17(18) × (1.4)1.8–2.9(3.1) mm, light grey to light brown. **Pollen cones** lance-cylindrical, 2–3.5 cm long, yellow or reddish-brown. **Seed cones** nearly globose to ovoid or oblong, slightly asymmetric, 6–14 × 5–9 cm long, horizontal to pendant, stalks less than 2 cm long, maturing in 2 years, opening at maturity; umbos central, raised; prickles usually pointing down, sometimes in or out. **Seeds** ovoid, 4–8 mm long, brown, often spotted, wings approximately 4 times as long as bodies.



Figure 1. Comparison of leaf sheaths. Top: Var. *cunninghamia*. Bottom: Var. *ponderosa*.



Figure 2. Typical habitat of *Pinus ponderosa* var. *cunninghamia*. Off-road vehicle tracks are evident.

Etymology. *Pinus ponderosa* var. *cunninghamia* is named in honor of father and son foresters Earl “Bud” and Samuel Cunningham. We recommend Cunningham’s ponderosa pine, or Cunningham’s pine, as the common name.

Key to varieties of *Pinus ponderosa* in Oregon

- 1. Leaves light green, sheaths whitish to light grey or light brown var. **cunninghamia**
- 1. Leaves greyish-green to dark green, sheaths brown to dark brown.
 - 2. Leaves dark green; bark light or moderate yellowish-brown var. **benthamiana**
 - 2. Leaves greyish-green; bark moderate yellowish brown to dark red var. **ponderosa**

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