Palicella schizochromatica in California

Showcasing *Palicella schizochromatica* in California: a widespread and underappreciated species

Jason Hollinger
Herbarium, Western Carolina University, Cullowhee, NC
jason@waysoflenchenment.net

Tom Carlberg
1959 Peninsula Drive, Arcata CA 95521
tcarlberg7@yahoo.com

Jason Dart
Althouse and Meade, Inc., Paso Robles, CA
Hoover Herbarium, Cal Poly, San Luis Obispo, CA
Jason@alt-me.com

**INTRODUCTION**

*Palicella schizochromatica* (Pérez-Ortega, T. Sprib. & Printzen) Rodr. Flakus & Printzen has been collected in western North America by many lichenologists over the years. One of the first reports of the species in the literature is in Fink (1935) who misidentified it as *Lecidea carnulenta*. Since then it has fooled several other authors, masquerading as *Lecanora symmicta and Ramboldia elabens*, among others. Some authors have recognized that it was a problematic taxon and referred to it by herbarium names, i.e. *Lecanora* sp. 1, *Lecanora* sp. A and *Lecanora “meliocarpella”*. (See Pérez-Ortega *et al.* (2010) for a full list. It wasn’t until 2010 that Pérez-Ortega *et al.* formally described it in *Lecanora* (*L. schizochromatica* Pérez-Ortega, T. Sprib. & Printzen). Most recently, it was transferred to a newly erected genus, *Palicella*, by Rodriguez Flakus & Printzen (2014).

This checkered past in part reflects the astonishing outward variability of this interesting species. Its thallus is crustose and varies in development from verrucose-areolate to nearly immersed. The color of the apothecia is particularly variable, from pale yellowish to bluish gray to greenish black to reddish brown to jet black, often varying within the same thallus and even the same apothecium, resulting in a piebald pattern. The key to recognizing the species in the field is the apothecial margins, which are characteristically darker and shinier than the disks.

Microscopically, however, *P. schizochromatica* is quite consistent: the epihymenium has coarse golden-brown granules on top (clearing in K); a blue-green pigment is present in the upper exciple and/or epihymenium (Cinereorufa-green following Meyer & Printzen (2000), K+ green and N+ red); the exciple has strongly gelatinized, slender, branched, radiating hyphae with abruptly capitate, pigmented tips; the paraphyses are slender and unpigmented, with scarcely expanded tips; the asci are Lecanora-type with 8 narrowly ellipsoid, simple, hyaline spores with a distinct wall. Algae are restricted to the base of the proper exciple or sometimes completely absent from the apothecium.

The thallus and apothecia contain atranorin and usnic acid as major substances, typically giving K+Y and KC+Y reactions, especially when the thallus is well-developed, however spot tests are sometimes weak and can be missed.

*Palicella schizochromatica* is endemic to western North America where it is widely reported from coniferous forests in mountain regions of the Pacific Northwest in Oregon, Washington, Idaho, northwestern Montana, Alaska, and British Columbia. It is an epiphytic species occurring particularly on bark and wood of conifers. Reports from California are sparse, but it appears to be widespread west of the Sierra Nevada and Cascade Mountains, extending southward along the coast at least as far as Santa Barbara County. It is apparently absent from arid regions including the Central Valley, Mojave Desert.
and the Great Basin (Figure 1). Its affinity for more mesic regions may explain the apparent absence from much of Southern California.

In the discussion following its description, Pérez-Ortega et al. (2010) expressed reservations regarding two specimens cited from California, drawing attention to the inspersed hymenium of one specimen (Trinity Co., Sprille 18405, GZU) and swollen paraphyses in the other (Del Norte Co., Muggia s.n., TSB-38880). Three years later, Hutten et al. (2013) reported it to be “common on bark and wood” in Yosemite National Park, with no comments on aberrant or anomalous material. The present authors have encountered this species several times from a number of areas in California. Here we critically compare 7 collections from California to authentic reference material from the inland Pacific Northwest (see specimens examined).

1 The specimen from the Santa Rosa Range in Nevada on CNALH (Hollinger 7664c) is highly aberrant, and likely represents an undescribed species.

Figure 1. Distribution of Palicella schizochromatica in California. Black circles are specimens examined for this study. White squares are other specimens and literature reports.

METHODS
Morphology of specimens was studied with hand-cut sections mounted in water and 10% KOH using standard microscopy techniques. Asci were first mounted in water, then a drop of 10% KOH was added, then rinsed with a drop of water, then finally stained with ca. 10% Lugol’s solution. Spores were mounted in water and measured by eye with the aid of a reticle or were measured from calibrated photographs; only mature spores free of the ascus were considered. Spores without a distinct wall were considered immature and ignored. Twenty spores per specimen were measured where possible.

RESULTS AND DISCUSSION
Our California specimens show typical patterns of variation in the color and shape of apothecia and the development of the thallus (Figure 2). The structure of the proper exciple (Figure 3a) is identical to that of northern material, as are the slender, unexpanded paraphyses (Figure 3c), epihymenial granules and Cinereorufa-green pigment in the upper exciple (Figure 3b). We found no sign of swollen paraphyses in our material. All but one of our California specimens have a clear hymenium. The spores in our California material measure (9.0)9.5-[11.4±1.1]-13.0(13.5) × (3.0)3.2-[3.9±0.4]-4.5(5.2) µm (N=83 from 6 specimens, excluding TC 05725 for reasons discussed below; numbers are the range of 90% of spores, with extremes in parentheses, and means and standard deviations in square brackets). This is on the long side but overall consistent with the range of averages, 9.7–11.1 × 3.5–4.1 µm, reported by Pérez-Ortega et al. (2010).

One specimen (TC 05725) is unusual in a few respects. It has smaller spores than the rest (avg. 9.1 µm long), streaks of fine granules inspersing the hymenium from above, and what looks at first glance to be soredia growing on top of the thallus areoles. These “soredia” are minute, yellow-green, chain-like proliferations of globose cells (Figure 4). We are not certain the “soredia” even belong to the lichen, but we’ve never seen anything quite like it before, and are uncertain how to classify it. This aberrant specimen was collected from a much wetter locality than any of the other collections we’ve seen (inside or outside California). Average annual precipitation...
Figure 2. Habit and variability of *Palicella schizochromatica*. From the top, TC 05725, JH 15226, JD 1216.

Figure 3. a, b – Variation in pigmentation of exciple and ephymenium, mounted in water. c – Paraphyses, mounted in KOH. (a, c – JH 15226, b – TC 05725; scale bars 10 µm)
Palicella schizochromatica in California

Noell 1005, EWU). L. erodens is a smaller species whose conidia are typically darker, smaller, globose and nontruncate.

Outside of California, Palicella schizochromatica appears to be most common on conifer bark and wood. McCune (2017) also reports it on Alnus and Artemisia. It is no different in our California specimens, which were mostly collected on conifers, except for JD 1216 which was growing on Arctostaphylos glauca, and TC 05725 on Alnus rubra bark. We also have an unconfirmed record of a specimen growing on oak bark (JH 9150).

The relative dearth of specimens reported for California is notable, possibly as a result of the same morphological confusion which kept the species from being formally described until 2010. In California, Palicella schizochromatica, especially pale-fruited forms, is most likely to be confused with Cliostomum griffithii (Sm.) Coppins, a coastal crustose lichen on bark and wood that can have similarly colored piebald apothecia. However, C. griffithii apothecial rims are generally concolorous or paler than the disk and not as shiny as P. schizochromatica’s. In the lab, C. griffithii is readily distinguished by its two-celled spores. The range and ecology of the two species overlap, but C. griffithii is more or less restricted to the coast and it tends to prefer deciduous trees (Ekman 2004).

**Conclusion**

Although limited to a review of only a handful of collections, we found Palicella schizochromatica in California to be consistent in morphology, anatomy and ecology with published literature and specimens from the Pacific Northwest outside of California, with the exception of one aberrant specimen with unusually small spores. In California, P. schizochromatica is broadly associated with mesic forests in mountainous areas, but its range is still imperfectly known owing to the relatively few specimens reported. The species should be sought in coniferous forests throughout the state, and particularly in coastal Northern and Southern California where records are sparse.
Palicella schizochromatica in California

Specimens examined

CANADA. BRITISH COLUMBIA. Thompson-Nicola Reg.: Coldwater Creek, exit 256 of Coquihalla Hwy., on Pseudotsuga branches in dry Pinus–Pseudotsuga forest, JH 17905. U.S.A. CALIFORNIA. Del Norte Co.: Six Rivers N.F., headwaters of unnamed tributary of Jones Creek, near terminus of FS Road 16N02L, east of Ship Mountain, on Alnus rubra trunk bark in riparian old-growth Pseudotsuga menziesii / Chamaecyparbus lawsonii / Abies concolor forest, TC 05725; Monterey Co.: Los Padres N.F., White Oaks Campground, on pine trunk in high oak forest, JH 7368 (sub Lecidea rubrocastanea); San Luis Obispo Co.: Cuesta Ridge Botanical Area, on Cupressus sargentii, JD 1246; Santa Barbara Co.: transverse range above Santa Barbara, East Camino Cielo, on dead Arctostaphylos glauca, JD 1216; Shasta Co.: Harlow Place, ca. 750 m WSW of jct. of Hwy. 89 with Harlow Flat Rd., on Pseudotsuga branch in mixed forest with oak, ponderosa pine and incense cedar, JH 15036 (sub Vulpicida canadensis); Burney, just E of Hwy. 89 ca. 4 km NNW of jct. with Hwy. 299, on Pinus ponderosa branch in ponderosa-oak savanna, JH 15226; Siskiyou Co.: Mount Shasta, just S of jct. of Pilgrim Creek Rd. and Widow Springs Dr., on Pinus ponderosa branch at edge of pine plantation with scattered Abies concolor, JH 15376. IDAHO. Idaho Co.: Slate Creek Lookout, on conifer branch in montane forest on top of ridge, JH 17835. WASHINGTON. Spokane Co.: Turnbull N.W.R., on Pinus ponderosa twig in pine savanna, JH 7061. (JH = Jason Hollinger; JD = Jason Dart; TC = Tom Carlberg. All collections reside in the herbaria of the respective authors.)

Additional specimens not examined for this study.

U.S.A. CALIFORNIA. Eldorado Co.: Pollock Pines, on Pseudotsuga, JH 7582 (UBC); Placer Co.: Emigrant Pass, on Abies concolor, JH 9775 (UBC); Santa Cruz Co.: Big Basin Redwoods, on Sequoia sempervirens, Reese Naesborg 1489 (UC, det. T. Spribille 2017); Shasta Co.: Castle Crags, on oak, JH 9150 (EVE).

Literature cited


