

## **Grimmia vaginulata Kellman – Madroño 58: 190-198. 2011.**

**Type:** U.S.A., California, Santa Cruz Co. Big Basin Redwoods State Park, dry vertical walls of calcareous sandstone boulders, above Basin Trail and below China Grade Road, ca. 1 mile beyond the northern intersection with SR 236, alt. 685 m. Kellman, Vitt & Shevock 5869, holotype CAS.

**Distribution:** Am. 1, endemic to California.

### **Description**

*Grimmia vaginulata* is growing in scattered to very loosely tufted, simple, or with a short, tightly appressed branch; green when young, tan or white in age; julaceous wet or dry. The leaves are short ovate, 1:1, mucous, increasing in length upwards. Upper stem and perichaetial leaves obovate or elliptical, soft when moist, weakly keeled, concave, unistratose throughout, with at least some portion of the leaf margin hyaline, most common at the base and often extending to midleaf or slightly beyond; 1-1.65 mm long x 0.4-0.75 mm wide; the keel is even less pronounced in transverse section, appearing more convex, even tubular, especially on non-sporophytic plants; apex acute or occasionally slightly acuminate; basal juxtacostal cells short rectangular with thin to moderately thick, straight; relatively uniform across the base, but outer basal cells often somewhat narrower in 1 to 3 marginal rows; distal and medial cells decreasing in length gradually from the base to the apex, 1-1.5 (2.5):1, 12-16 (26)  $\mu$  long x 7-13  $\mu$  wide; margins weakly recurved on one or on both sides, unistratose; costa narrow, to 40  $\mu$  wide at the base, broadening toward the apex, excurrent in a hyaline, weakly toothed awn, decurrent at most 1-2 cells down the margin, and those often projecting as short, blunt teeth; gonioautoicous or cladautoicous; calyptra irregularly crenate at the base, conical or campanulate; vaginula measured with ochrea 0.5-0.9 mm long; seta straight, attached to the center of the capsule, 0.5 mm long; capsule immersed with only the operculum exposed, irregularly wrinkled when dry, slightly wrinkled when wet, obloid, 0.9 mm long x 0.6 mm wide, abruptly contracted to the seta; annulus of 3 rows of thick-walled enlarged and elongated cells; operculum mammillose to low conical, crenulated to erose at the base, exothecial cells irregularly rectangular to hexagonal, thin-walled, stomata present, peristome of 16 orange-red cribose-dissected teeth, irregularly divided nearly to the base into 3-4 strongly spiculate filaments, ca. 185  $\mu$  long, spores smooth, 10-13  $\mu$ .

### **Discussion:**

*G. vaginulata* is a thermophilous species, growing on calcareous sandstone, the enlarged obovate perichaetial leaves have hyaline basal cells and hyaline upper parts, which continue into hair-points. Characteristic are richly fruiting plants, growing in scattered to very loosely tufted, simple, or with a short, tightly

appressed branch. *G. vaginulata* may be confused with *G. anodon*, *G. pseudo-anodon*, *G. plagiopodia*, *G. curviseta*, and especially with the Mediterranean and Asian *G. capillata*. It differs from all these species by its extremely tiny habit and present peristome teeth. Both gametophytically, and sporophytically, *G. vaginulata* appears most closely related to *G. capillata* De Not.. They share the keeled, entirely unistratose lamina with the margins at least somewhat recurved on one or two sides, a costa that broadens in the distal half of the leaf, perichaetial leaves with proximal hyaline areas, and autoicous sexuality. Sporophytically, the two taxa are very close. Lastly, both prefer calcareous substrates. However, *G. vaginulata* is a much smaller plant that stays tightly julaceous wet or dry, and it is not growing in dense tufts, like *G. capillata*, but in dispersed plants.

The discovery of this new *Grimmia* shows that the bryoflora of California is still insufficiently known. It also shows that the state is exceptionally rich in endemic *Grimmias*: *G. hamulosa*, *G. mariniana*, *G. nevadensis*, *G. serrana*, *G. shastae*, *G. torenii*, and now *G. vaginulata*.