

AGROSTIS SWALALAHOS (POACEAE),
A GRASS ENDEMIC TO THE MOUNTAINS OF NORTHWEST OREGON, U.S.A.

Nick Otting

OSU Herbarium
Department of Botany and Plant Pathology
2701 SW Campus Way
Corvallis, Oregon 97331, U.S.A.

Barbara L. Wilson

Carex Working Group
2250 NW 13th Street
Corvallis, Oregon 97330, U.S.A.
bwilson@peak.org

ABSTRACT

We describe a new grass species, *Agrostis swalalahos*, endemic to several peaks in the northwestern Coast Range of Clatsop County, Oregon, U.S.A.

RESUMEN

Describimos una nueva especie de gramínea, *Agrostis swalalahos*, endémica de varios picos en la Cordillera de la costa noroeste del condado de Clatsop, Oregon, EE. UU.

KEY WORDS: *Agrostis swalalahos*, sp. nov., endemic, Poaceae

INTRODUCTION

“I’ve got this growing in my front yard!” laughed a botanist upon seeing a specimen of the species described here. We know the agrostology community will not be thrilled at the naming of yet another *Agrostis* superficially identical to most other *Agrostis* species. However, this bentgrass endemic to mountains in northwest Oregon is not quite like the grasses in one’s front yard. It is not quite like any other native or invasive *Agrostis* of the area, either. Previous botanists have occasionally recognized it as the “long-awned form” of *Agrostis pallens* Trin. (Detling 6974; ORE 8116) but seem not to have paid much attention to it. It doesn’t quite match any *Agrostis* in the principle references on identification of Pacific Northwest grasses (Hitchcock & Cronquist 1969, 2018; Roché et al. 2019; Wilson et al. 2015).

The failure of previous botanists to name this grass is not due to rarity, exactly. True, this species has a limited range, but it has been described as “common” (Chambers 3251; OSC 138301) or “very abundant” (Detling 6974; ORE 8116) where it grows. One of these sites is Saddle Mountain, which is much-visited and well explored botanically (Chambers 1973). No doubt this grass has been overlooked because of the distaste sane botanists feel for grasses distinguished, in part, by the presence or absence of a palea that is transparent and less than 0.5 mm long if present.

Here we describe this grass of Coast Range Mountains in Northwest Oregon as a species new to science, compare it to the species with which it has been confused, and provide an identification key for distinguishing it from all other perennial *Agrostis* in the region.

Agrostis is in subfamily Pooideae, Tribe Poeae, subtribe Agrostidinae (Soreng et al. 2022). In other words, *Agrostis* are very typical-looking grasses that have glumes longer than the single lemma. The number of *Agrostis* taxa depends on how much the genus is split (Harvey 2007). In North America, 22 native species are recognized (Harvey 2007; Peterson et al. 2011). We place this species in *Agrostis* not only because it looks superficially identical to every other *Agrostis* species with open panicles, but because it has traits typical of the genus including lemmas more delicate than the glumes and with veins extending to the apex, awns arising from the lemma backs, and paleas reduced or absent. In the similar genus *Calamagrostis*, the paleas are well-developed (Marr et al. 2007).

During summers of 2021 and 2022, N. Otting collected grass specimens in northwest Oregon, including what we now recognize as *Agrostis swalalahos* from Angora Peak. The species was also sought but not found on

Humbog Mountain and Tillamook Head (Clatsop County) and Cedar Butte, Elk Mountain, and Neahkahnie Mountain (Tillamook County).

Agrostis swalalaho Otting, *sp. nov.* (Figs. 1–5). TYPE: OREGON. Clatsop Co.: Angora Peak, Arch Cape Mill Road, 11 air km SE of Cannon Beach and 2.5 air km E of the Pacific Ocean, 45.79660° N, -123.93546° W, 490 m, 19 Jul 2022, N. Otting 9915 (HOLOTYPE: OSC; ISOTYPES: CAS, MO, NY, UC, US, UTC, V, WS, WTU).

Diagnosis.—*Agrostis swalalaho* has a short-rhizomatous, sod-forming habit, spikelets not crowded, lemma awns (3–)3.6–5 mm long arising at or a little below middle of lemma, lemma apices truncate, palea absent or minute, and anthers (1.2–)1.5–2 mm long.

Description.—**Plants** sod-forming, rhizomes to 5(–14) cm long, 0.6–1 mm diameter. Shoots extravaginal but often densely clustered, sometimes pseudointravaginal; cataphylls present, prophylls rudimentary. Culms 20–75 cm tall, erect or curved at the base, occasionally slightly geniculate, internodes 4–6, nodes yellowish, smooth, glabrous. **Leaves** basal and cauline; **sheaths** open to the base, margins overlapping, smooth; sheaths of the previous year shredding, veins persisting as slender fibers; **ligules** progressively longer on distal leaves, to 2(–3) mm long on proximal leaves, to 3.5(–4) mm long on uppermost leaves, longer than wide, smooth, more or less truncate, often longer on one or both sides than in the middle, minutely erose; **blades** 2.5–13 cm long, 0.8–3 mm wide, symmetrical, the centric midrib weakly developed, with about 5 veins on either side, flat, becoming folded to loosely involute on drying; margins minutely scaberulous; abaxial surface smooth; adaxial surface sometimes minutely scaberulous on veins, especially proximally. **Panicles** 10–22 × 1–8 cm, ovate to lanceolate, open when mature, well exerted from the sheath, with 70–200(–310) spikelets; **branches** 1–2(–6) per node, 2–8.5 cm long, spreading to erect, readily visible, branched near or above midlength, slender, terete or sometimes somewhat angled especially proximal to nodes, somewhat lax, spikelet-bearing in the distal third to half, smooth to very sparsely scabrous proximally, slightly less sparsely distally; scabers approximately 0.1 mm, slender, delicate, antrorse; **pedicels** 1.4–7(–10) mm long, 0.5–2(–3) times as long as the spikelet, distally expanded, 0.2–0.8 mm wide just below the spikelet, sparsely to very sparsely scabrous, scabers occasionally clustered. **Spikelets** (2.5–)3–5(–5.7) mm long, 1-flowered; rachilla extension absent; **glumes** (2.5–)3–5(–5.7) mm long, the upper 75–98% as long as the lower, 0.8–1.6 mm wide, lanceolate, scarious, purple but often green on and near midrib, senescing tan, 1-veined, laterally compressed, smooth except lower glume scabridulous on the midvein at least on distal half and sometimes also on sides distally; apex narrowly acute; margins hyaline; **callus hairs** 0.2–0.8 mm long, lateral; **lemmas** 2.3–3.1 mm long, smooth, translucent, white, obscurely 5-veined, apices truncate and very narrow, the veins excurrent to about 0.2 mm; awns (3–)3.6–5 mm long, originating 30–50(–55)% of lemma length above callus, geniculate, exerted 1–4 mm, scaberulous, persistent; **paleas** absent or to 0.2 mm long, hyaline, transparent, smooth; **anthers** 3, (1.2–)1.5–2 mm long, yellow to whitish, occasionally with a longitudinal band of purple speckles. **Caryopses** 1.5–2 × 0.5–0.7 mm, glabrous, somewhat adherent to the palea (if present), oblong, shallowly longitudinally grooved ventrally, slightly dorsiventrally compressed, light brown, translucent, embryo about 25% as long as the caryopsis, hilum dark and narrowly triangular at the apex, about 1/5 the length of the grain, endosperm soft.

Habitat, range.—Grassy balds and cliffs on mountains at northwestern edge of the Coast Range within 20 km of the ocean, elevation 460–975 m, Clatsop County, Oregon (Fig. 6). Associated species: *Acmispon parviflorus* (Benth.) D.D. Sokoloff, *Agrostis capillaris* L., *Agrostis castellana* Boiss. & Reuter, *Agrostis pallens* Trin., *Agrostis stolonifera* L., *Aira caryophylla* L., *Aira praecox* L., *Allium cernuum* Roth, *Arabis hirsuta* (L.) Scop., *Aruncus sylvester* Kosel ex Maxim., *Athyrium filix-femina* (L.) Roth, *Calamagrostis nutkaensis* (J. Presl) J. Presl ex Steud., *Cascadia nuttallii* Small, *Castilleja chambersii* M. Egger, *Castilleja hispida* Benth. ssp. *hispida*, *Cirsium edule* Nutt., *Cladothamnus pyroliflorus* Bongard, *Digitalis purpurea* L., *Equisetum arvense* L., *Erysimum capitatum* (Douglas ex Hook.) Greene var. *capitatum*, *Festuca rubra* L., *Holcus lanata* L., *Hypochaeris radicata* L., *Koeleria macrantha* (Ledeb.) Schult., *Lomatium martindalei* (J.M. Coult. & Rose) J.M. Coult. & Rose, *Montia parvifolia* (Moç. ex DC.) Greene, *Packeria flettii* (Wiegand) W.A. Weber & Á. Löve, *Polystichum munitum* (Kaulf.) C. Presl, *Rubus spectabilis* Pursh, *Sagina procumbens* L., *Poa stenantha* Trin., *Sedum oregonum* Nutt., *Selaginella oregana* D.C. Eaton, *Selaginella wallacei* Hieron., *Spiranthes porrifolia* Lindl., *Thalictrum occidentale* A. Gray, *Trifolium dubium* Sibth., *Trifolium longipes* Nutt.



FIG. 1. *Agrostis swalalaho* habit and habitat. The open, nodding panicles are typical.

Phenology.—Flowering mid-June through August.

Etymology.—Swala-lalhos is the interpretation given by early English-speaking explorers to an aboriginal name for what is now more widely known as Saddle Mountain (Giesecke 1991), the tallest mountain of the Coast Range between Roger’s Peak in Tillamook County, Oregon, and the Olympic Mountains of northwest Washington. It is the site of a Chinook origination story. The name has also been applied to the floristic area that encompasses all known populations of *Agrostis swalalaho* (Sayce 2010).

Additional *Agrostis swalalaho* specimens examined. **U.S.A. Oregon. Clatsop Co.:** Onion Peak, T4N R10W S22, SE-facing clope at the summit, 29 Jun 1971, K.L. Chambers 3166 (OSC); Onion Peak, T4N R10W S22, on the open summit, 21 Jul 1971, K.L. Chambers 3251 (OSC); Saddle Mt. State Park, T6N R8W S33, on Saddle Mt., along trail from campground to summit, 22 Jun 1972, K.L. Chambers 3479 (ORE); Saddle Mt. State Park, T6N R8W, by trail from campground to summit, 22 Jun 1972, K.L. Chambers 3495 (OSC); Saddle Mt. State Park, on Saddle Mt, T6N R8W S33, along trail from campground to summit, 3 Aug 1972, K.L. Chambers 3538 (OSC); Sugarloaf Mt, about 5 mi SE of Cannon Beach, T4N R10W S1, 11 Jun 1973, K.L. Chambers 3785 (OSC); Saddle Mt. (Middle Peak), 27 Jun 1951, L.E. Detling 6974 (ORE); Saddle Mt., 22 Jun 1952, J.T. Howell 28420 (OSC, US, WILLU, WTU); Angora Peak, Arch Cape Mill Road, 45.79545°N, -123.93600°W, 490 m, 10 Jul 2021, N. Otting 9628 (OSC); Angora Peak, Arch Cape Mill Road, 45.795847° N, -123.934842°W, 470 m, 26 Jul 2021, N. Otting 9642 (CAS, F, MO, NY, OSC, UBC, UC, US, UTC, V, WS, WTU); Angora Peak, Arch Cape Mill Road, 45.79647°N, -123.93542°W, 480 m, 6 Aug 2022, N. Otting 9939 (CAS, MO, NY, OSC, UC, US, UTC, V, WS, WTU); Angora Peak, Arch Cape Mill Road 45.79691°N, -123.93526°W, 490 m, 26 Aug 2022, N. Otting 9957 (CAS, MO, NY, OSC, US).

We also examined relevant *Agrostis* herbarium specimens, including all *A. pallens* specimens at ORE, OSC, WILLU, and WTU.

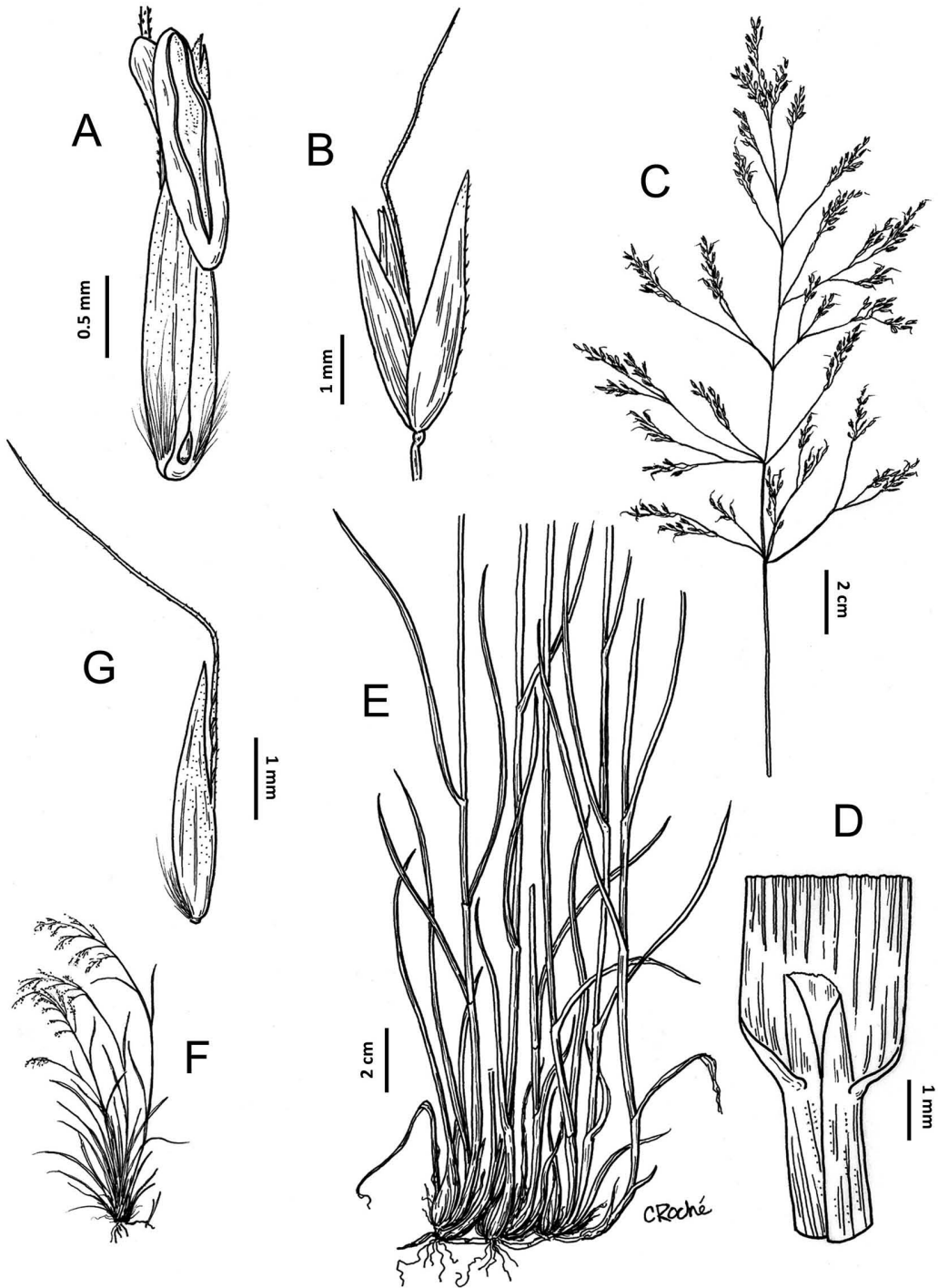


FIG. 2. *Agrostis swalalaho* morphology. A. Floret, showing lemma, anther, and callus hairs. B. Spikelet. C. Panicle, showing spikelets and branching mainly above middle. D. Ligule. E. Plant base, showing short rhizomes. F. Habit. G. Lemma with bent awns arising a little below middle and callus hairs.



Fig. 3. *Agrostis swalalaho*s ligule is more or less truncate and minutely erose.

KEY TO THE PERENNIAL SPECIES OF AGROSTIS IN OREGON AND WASHINGTON.
 NATIVE SPECIES IN **BOLDFACE**

1. Panicles dense, spikelets crowded, overlapping, panicle axes not clearly visible; lower branches usually < 3(5) cm.
 2. Leaf blades 0.5–2 mm wide, usually folded; panicles 0.2–1.2(2) cm wide; plants caespitose.
 3. Longest panicle branches < 0.5 cm; anthers 0.7–2 mm _____ **A. blasdalei** Hitchc.
 3. Longest panicle branches 0.5–1.5 cm; anthers 0.4–1 mm _____ **A. variabilis** Rydb.
 2. Leaf blades usually (1)2–10 mm wide, usually flat; panicles 0.4–4(6) cm wide; plant habit various.
 4. Plants stoloniferous or rhizomatous; anthers 0.7–2 mm; longest panicle branches 2–5 cm.
 5. Plants stoloniferous; paleas 0.7–1.4 mm _____ *A. stolonifera* L.
 5. Plants rhizomatous; paleas 0–0.2 mm _____ **A. pallens** Trin.
 4. Plants caespitose; anthers 0.3–0.7 mm; longest panicle branches 0.3–2(5) cm.
 6. Back of glumes fine-scabrous throughout; paleas 0.5–0.7 mm _____ **A. densiflora** Vasey
 6. Back of glumes usually glabrous except finely scabrous on the keel; paleas 0–0.5 mm _____ **A. exarata** Trin.
1. Panicles open, spikelets not crowded, not overlapping, panicle axes clearly visible; lower branches 0.5–12 cm.
 7. Paleas 0.6–1.4 mm.
 8. Ligules of the upper leaves longer than wide, 2–7.5 mm; panicle branches often spikelet-bearing to the base.
 9. Plants rhizomatous; panicles 8–30 cm, usually open after anthesis; longest panicle branches 4–9 cm; culms 20–120 cm _____ *A. gigantea* Roth
 9. Plants stoloniferous; panicles 3–20 cm, usually contracted after anthesis; longest panicle branches 2–6 cm; culms 8–60 cm _____ *A. stolonifera* L.
 8. Ligules of the upper leaves usually shorter than wide, 0.3–3 mm; panicle branches with spikelets confined to the distal 30–50%.
 10. Calluses glabrous or with a few hairs to 0.1 mm; lemmas usually awnless or with awns to 2 mm _____ *A. capillaris* L.
 10. Calluses hairy, hairs to 0.6 mm; lemma awns to 5 mm, often present on lemma of the terminal spikelet of a branch _____ *A. castellana* Boiss. & Reut.
 7. Paleas 0–0.2 mm.
 11. Rhizomes or stolons well developed.
 12. Plants from stolons, appearing loosely caespitose; lemmas 1–2 mm _____ *A. canina* L.
 12. Plants from rhizomes, sod-forming or shoots tufted or arising singly; lemmas 1.5–3.1 mm.
 13. Callus hairs conspicuous (0.8)1–2 mm; lemma awns absent _____ **A. hallii** Vasey
 13. Callus hairs absent or to 0.8 mm; lemma awns absent or present.



FIG. 4. Close-up of *Agrostis swalalohos* panicle at anthesis, showing well-developed anthers and conspicuous awns. The awns will become longer and geniculate by full maturity.

14. Lemma awns (3-)3.6-5 mm, geniculate; caryopses 1.5-2 mm; longest panicle branches 4-8.5 cm; Coast Range mountains of northwest Oregon _____ **A. swalalohos** Otting
14. Lemma awns usually absent, if present < 2.7 mm, usually straight; caryopses 1.0-1.5 mm; longest panicle branches 2-5 cm; widespread _____ **A. pallens** Trin.
11. Rhizomes and stolons absent, plants cespitose (or apparently cespitose because shoot spacing is dense and delicate rhizomes are often not collected).
15. Lemma awns (2)3-6 mm.
16. Panicles (2)3-10 cm; anthers 0.5-0.8 mm; subalpine to alpine; range N WA _____ **A. mertensii** Trin.
16. Panicles 10-25 cm; anthers 1.0-1.8 mm; lowlands to montane; range N OR.
17. Lemma awns inserted at 30-50(55)% of lemma length; leaf blades 0.8-3 mm wide; anthers (1.2-)1.5-2.0 mm; Coast Range mountains of northwest Oregon _____ **A. swalalohos**
17. Lemma awns inserted at 0-33% of lemma length; leaf blades 3-5 mm wide; anthers 1-1.3 mm; cliffs in the Columbia River Gorge _____ **A. howellii** Scribn.
15. Lemma awns usually absent, if present awns \leq 2 mm.
18. Wider leaf blades usually 2-7 mm wide, 5-30 cm long, flat _____ **A. oregonensis** Nutt. ex A. Gray
18. Wider leaf blades \leq 2 mm wide, 1-14 cm long, flat or folded.
19. Lower panicle branches 4-12 cm; plants 15-90 cm _____ **A. scabra** Willd.
19. Lower panicle branches 1-4 cm; plants 8-30(-40) cm _____ **A. idahoensis** Nash

DISCUSSION

Its open panicles make *Agrostis swalalohos* resemble many other *Agrostis*, including invasive species. Its habit can be difficult to determine; it produces delicate rhizomes and establishes a sod when the habitat permits,

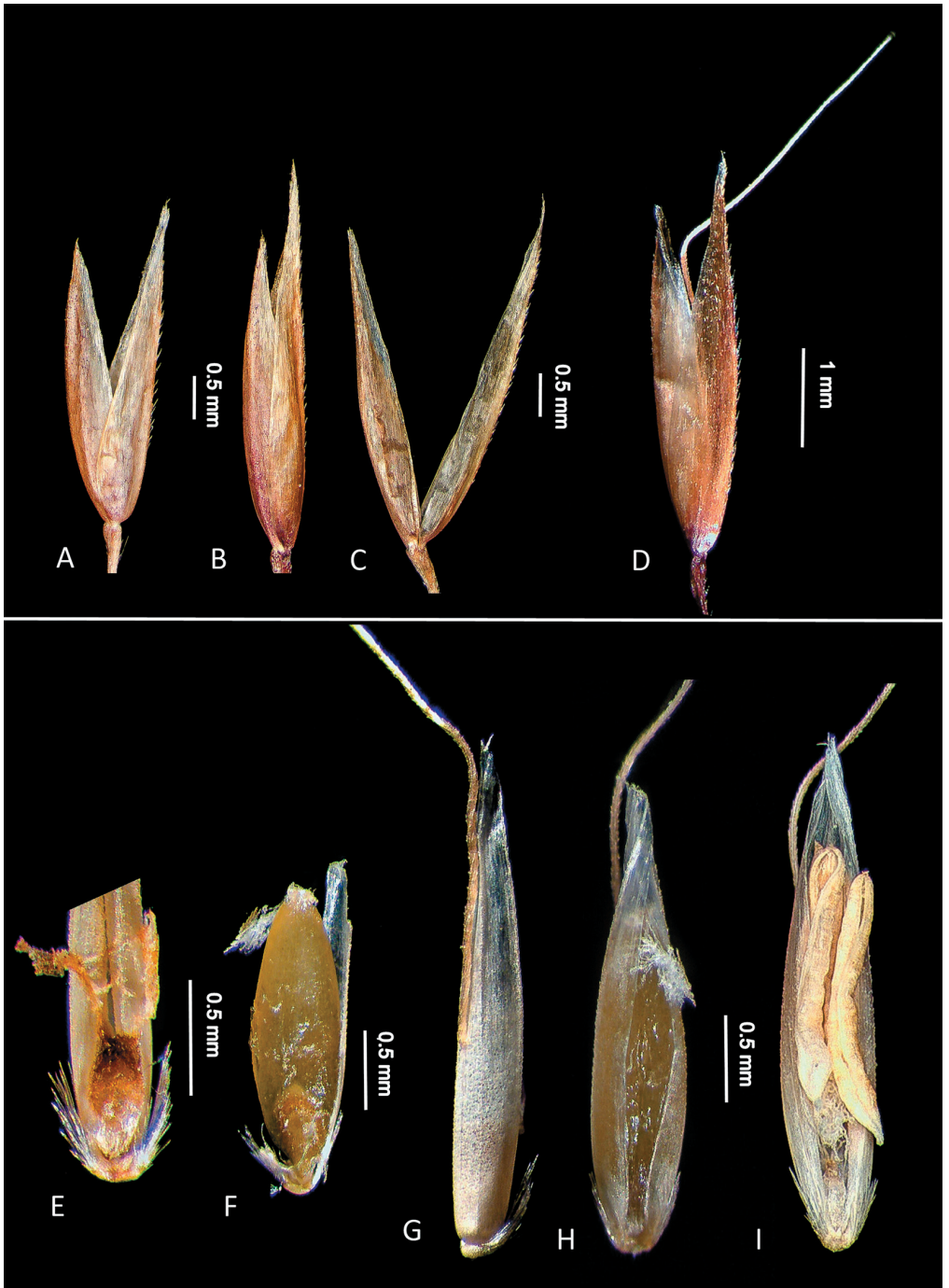


FIG. 5. Parts of the *Agrostis swalalohos* spikelet. **A–C.** Glumes, showing smooth sides and scabrous keel of upper glume. **D.** Spikelet, showing bent awn and the scabrous sides of upper glume in this individual. **E.** Floret; ventral surface of lemma, with callus hairs. Palea is short, about half as long as the brown ovary. **F.** Dorsal surface of caryopsis, showing embryo and translucent endosperm. **G.** Floret; side view of lemma, with geniculate awn inserted a little below the middle of the lemma back. **H.** Floret; ventral view of lemma showing well-developed caryopsis and very small palea. **I.** Floret; ventral view of lemma, ventral view, at anthesis, showing anthers as well as callus hairs and small palea.



FIG. 6. *Agrostis swalalaho* habitat on Angora Peak. A. Summer fog rolling in during the afternoon. B. Same cliff in sunshine. C. Distant view of type location, showing bald that provides additional habitat away from the road ditch.

TABLE 1. Morphological, elevation, and range comparison of *Agrostis swalalahas* to similar Washington and Oregon grasses *A. canina*, *A. howellii*, *A. mertensii* and *A. pallens*, which have open panicles and minute or no palea. Measurements for *A. swalalahas* come from the authors' research; those of *A. canina*, *A. howellii*, *A. mertensii*, and *A. pallens* come from Flora of North America (Harvey 2007) and The Jepson Manual (Peterson & Harvey 2012 & 2014).

Trait	<i>A. canina</i>	<i>A. howellii</i>	<i>A. mertensii</i>	<i>A. pallens</i>	<i>A. swalalahas</i>
Panicle length (cm)	3–10	10–25	(2)3–10	5–20	10–22
Glumes (mm)	1.7–3	2.3–3.5	2–4	2–3	(2.5–)3–5(–5.7)
Callus hairs (mm)	≤ 0.1	≤ 0.3	≤ 0.4	≤ 0.3(1)	0.2–0.8
Lemma length (mm)	1–2	2.5–3.0	1.6–2.6	1.5–2.5	2.3–3.1
Lemma tip	entire	veins excurrent	erose	entire or veins excurrent	veins excurrent
Lemma awn length (mm)	< 5	4–6	(2)3–4.4	if present usually < 2.7	(3–)3.6–5
Lemma awn insertion	near base	0–33% of Lemma length above callus	just below middle	near middle, if present	30–50(55)% of lemma length above callus
Anther length (mm)	1–1.5	1.0–1.3	0.5–0.8	0.7–1.8	(1.2–)1.5–2
Caryopsis length (mm)	0.8–1.2	1.2–1.6	1.4–2	1–1.5	1.5–2
Endosperm	hard	liquid	hard	hard	soft
Habit	stoloniferous	cespitose	densely cespitose	rhizomatous, shoots single or tufted	rhizomatous, sod-forming
Elevation (m)	< 500 (in Oregon)	≤ 150	450–1300	≤ 3500	460–975
Range	West of Cascades, B.C. to Oregon	Columbia River Gorge	Circumboreal, south to northern Washington	B.C. to Mexico, east to Montana	Northern Oregon Coast Range

but when it grows on ledges or in cracks on rocks, it can appear cespitose. Nonetheless, *Agrostis swalalahas* can be distinguished from all other *Agrostis* in North America by possessing the following combination of characters: a perennial, rhizomatous, sod-forming grass with panicle axes clearly visible, paleas absent or minute, lemmas awned, and anthers (1.2–)1.5–2 mm long.

Agrostis swalalahas cannot be identified using the key in the Flora of North America (Harvey 2007). It keys readily to couplet 28. At the first lead 28, it differs from *A. vinealis* Schreb. because *A. swalalahas* lemma awns originate at 30–55% of the lemma length, not near the base, and at the second lead 28 it differs from *A. pallens* because *A. swalalahas* awns are (3–)3.6–5 mm long and geniculate, while those of *A. pallens* are absent or if present, to 0.5(2.7) mm and often straight.

Despite its similar inflorescence, *Agrostis swalalahas* can be distinguished from the “Fearsome Foursome” of nearly ubiquitous introduced bentgrasses (*A. capillaris* L., *A. castellana* Boiss. & Reut., *A. gigantea* Roth, and *A. stolonifera* L.), because in those species the palea is 0.6–1.4 mm long. In *A. swalalahas*, the palea is 0.2 mm long if present. The introduced species are awnless or have straight or geniculate awns to 2(–3) mm long except in *A. castellana*, which grows near *A. swalalahas* on Angora Peak. In *A. castellana*, the terminal spikelets on a panicle branch are usually awned with awns to 5 mm long and awns on others are progressively shorter with the proximal lemmas awnless. In *A. swalalahas*, all lemmas are awned, the awns (3–)3.6–5 mm long.

Agrostis canina L., the other *Agrostis* introduced locally, has small or absent paleas, like *A. swalalahas*. However, it has smaller lemmas and is stoloniferous (Table 1).

Specimens of *Agrostis swalalahas* have usually been identified as *A. pallens*, a widespread native species. *Agrostis pallens* is strongly rhizomatous and similar to *A. swalalahas* in most ways, but it usually lacks lemma awns. When awns are present, they are usually < 2.7 mm long and very slender. *Agrostis swalalahas* awns are (3–)3.6–5 mm long (Table 1) and more robust than those of *A. pallens*. The glumes and lemmas of *A. pallens*

are shorter (Table 1). We have not seen awned *A. pallens* from the coastal strand or Coast Range of Oregon. The plants that we consider to be awned *A. pallens* are found on higher slopes of the west Cascade Range and on islands in northern Puget Sound. All herbarium specimens we consider *A. swalalaho*s are awned specimens collected on mountains at northwestern edge of the Oregon Coast Range.

*Agrostis swalalaho*s is most similar to the relatively long-awned native bentgrasses *A. howellii* and *A. mertensii*. We suspect that *A. swalalaho*s specimens were misidentified as *A. pallens* rather than either of these species because *A. swalalaho*s and *A. pallens* are rhizomatous and the range of *A. swalalaho*s is included with that of *A. pallens*, while *A. howellii* and *A. mertensii* are densely cespitose, have shorter anthers, and do not grow where *A. swalalaho*s does (Table 1). *Agrostis howellii* grows in the Columbia River Gorge, as close as 80 km east-southeast of the nearest *A. swalalaho*s populations. Its panicles tend to be more open, its leaf blades wider, its awn insertion lower on the lemma back, and its anthers smaller than in *A. swalalaho*s (Table 1). Also, it grows at lower elevations (to 150 m, vs. 460–975 m for *A. swalalaho*s). *Agrostis mertensii* is a circumboreal species ranging south in the Rocky and Appalachian Mountains to Mexico and perhaps South America. Its closest known population is 450 km northeast of the nearest *A. swalalaho*s population. Compared to *A. swalalaho*s its panicles are smaller and its anthers are much smaller (Table 1). Additionally, *A. mertensii* usually has fewer spikelets per panicle 15–60(–80) vs. 70–200(–310) for *A. swalalaho*s. The similarity of *A. swalalaho*s to *A. mertensii* in details such as the delicate scabers in the panicle, suggests to us that *A. swalalaho*s may have evolved from populations related to *A. mertensii* which became isolated in northwest Oregon when the glaciers retreated.

Most native North American *Agrostis* have narrow habitat requirements and many are western endemics (Harvey 2007). *Agrostis swalalaho*s is no exception. It joins diverse flowering plants and animals, as well as numerous rare bryophytes that are endemic or disjunct in northwest Oregon. In this area, unusual habitats are created by the combination of heavy winter rains, frequent summer fog, cool, moderate temperatures, and thin soils on breccia substrate formed from erosion of lavas that flowed into water. Such habitats can select for unusual taxa or provide refuge when taxa migrate north with the retreat of glaciers (Pielou 1991). They include local endemics including flowering plants *Castilleja chambersii* M. Egger & R.J. Meinke, *Cardamine pattersonii* L.F. Henderson, *Delphinium oregonum* Howell, *Dodecatheon austrofrigidum* K.L. Chambers, *Lewisia columbiana* var. *rupicola* (English) C.L. Hitchcock, *Packera flettii* (Wiegand) W.A. Weber & Á. Löve, and *Sidalcea hirtipes* C.L. Hitchcock, and animals such as *Dicamptodon copei* Nussbaum and *Speryeria zerene* subsp. *hippolyta* W.H. Edwards (reintroduced). Also found in the area are disjunct taxa with their main populations to the north, such as *Carex macrochaeta* C.A. Mey., *Elymus hirsutus* J. Presl, and *Erigeron peregrinus* (Banks ex Pursh) Greene subsp. *peregrinus*.

The conservation status of *Agrostis swalalaho*s is unclear. At this point, it appears to have a very limited range in Clatsop County, Oregon. Some potential habitats nearby may have been damaged or destroyed by logging activities (e.g., Cedar Butte, Tillamook County; Otting, pers. obs.). On the other hand, the main population on Saddle Mountain grows in a protected area and the Angora Peak population appears to be thriving in a road cut, suggesting it may tolerate a certain amount of disturbance. Similar habitats in western Washington should be searched for *A. swalalaho*s, though our preliminary examination of herbarium specimens from WTU did not reveal any from that area.

ACKNOWLEDGMENTS

We thank the herbarium at Oregon State University (James Mickley, Curator), and University of Washington (David Gibling, Curator) for use of specimens and space. Kathleen Sayce and Cathy Maxwell provided insights from their years of fieldwork in northwest Oregon and southwest Washington. We are grateful to Cindy Roché for the drawing (Fig. 2). She and Robert Korfhage provided the close-up photos (Figs. 3 and 5). Robert Soreng helped us understand the terminology for some of the more esoteric grass features; we hope we have applied the words correctly. We thank Paul Peterson and an anonymous reviewer for suggestions that improved the article.

REFERENCES

- CHAMBERS, K.L. 1973. Floristic relationships of Onion Peak with Saddle Mountain, Clatsop County, Oregon. *Madroño* 22(3):105–114.
- DETLING, L.E. 1954. Significant features of the flora of Saddle Mountain, Clatsop County, Oregon. *Northwest Sci.* 28:52–60.
- GIESECKE, E.W. 1991. Dana on Saddle Mountain, 1841. *Cumtux* 11(4):2–15.
- HARVEY, M.J. 2007. *Agrostis* L. In: M.E. Barkworth, K.M. Capels, S. Long, L.K. Anderton, and M.B. Piep, eds. *Magnoliophyta: Commelinidae (in part): Poaceae, part 1. Flora of North America north of Mexico*. Oxford University Press, New York, U.S.A. and Oxford, UK. 24:633–662.
- HITCHCOCK, C.L., A. CRONQUIST, M. OWNBAY, & J.W. THOMPSON. 1969. *Vascular plants of the Pacific Northwest, Part 1*. University of Washington Press, Seattle, U.S.A. 914 pp.
- HITCHCOCK, C.L. & A. CRONQUIST. 2018. *Flora of the Pacific Northwest: An illustrated manual, 2nd Edition*. D.E. Giblin, B.S. Legler, P.F. Zika, and R.G. Olmstead, eds. University of Washington Press, Seattle, U.S.A. 882 pp.
- MARR, K.L., R.J. HEBDA, & C.W. GREENE. 2007. *Calamagrostis* Adans. In: M.E. Barkworth, K.M. Capels, S. Long, L.K. Anderton, and M.B. Piep, eds. *Magnoliophyta: Commelinidae (in part): Poaceae, part 1. Flora of North America north of Mexico*. Oxford University Press, New York, U.S.A. and Oxford, UK. 24:706–732.
- PETERSON, P.M. & M.J. HARVEY. 2012. *Agrostis*. In: B.G. Baldwin, D.H. Goldman, D.J. Keil, R. Patterson, T.J. Rosatti, & D.H. Wilken, eds. *The Jepson manual: Vascular plants of California, second edition*. University of California Press, Berkeley, U.S.A. Pp. 1413–1417.
- PETERSON, P.M. & M.J. HARVEY 2014. *Agrostis*. In: *Jepson Flora Project*. eds. *Jepson eFlora, Revision 2*, https://ucjeps.berkeley.edu/eflora/eflora_display.php?tid=10111, accessed on December 03, 2022.
- PETERSON, P.M., R.J. SORENG, D. STYER, D. NEUBAUER, R. MORGAN, & V. YADON. 2011. *Agrostis lacuna-vernalis* (Pooideae: Poaeae: Agrostidinae), a new species from California. *J. Bot. Res. Inst. Texas* 5(2):422–426.
- PIELOU, E.C. 1991. *After the Ice Age: The return of life to glaciated North America*. University of Chicago Press, Chicago, Illinois, U.S.A. 376 pp.
- ROCHÉ, C.T, R.E. BRAINERD, B.L. WILSON, N. OTTING, & R.C. KORFHAGE. 2019. *Field guide to the grasses of Oregon and Washington*. Oregon State University Press, Corvallis, U.S.A. Pp. 1–460.
- SAYCE, K. 2010. Botanizing in the Swala-lahos floristic area. *Kalmiopsis* 17:17–28.
- SORENG, R.J., P.M. PETERSON, F.O. ZULOAGA, K. ROMASCHENKO, L.G. CLARK, J.K. TEISHER, L.J. GILLESPIE, P. BARBERA, C.A.D. WELKER, E.A. KELLOGG, D.Z. LI, & G. DAVIDSE. 2022. A worldwide phylogenetic classification of the Poaceae (Gramineae) III: An update. *J. Syst. Evol.* 60(3):476–521. <https://doi.org/10.1111/jse.12847>
- WILSON, B.L., R.E. BRAINERD, & N. OTTING. 2015. Poaceae, Grass family. In: Meyers, S.C., T. Jaster, K.E. Mitchell, & L.K. Hardison. *Flora of Oregon. Volume 1: Pteridophytes, Gymnosperms, and Monocots*. Botanical Research Institute of Texas, Fort Worth, Texas, U.S.A.