2017 Rule Change Proposal 14

Purpose of Proposal: To add *Potentilla gracilis,* slender cinquefoil to Volume 1, Table 2A and change the classification of this species in Volume 3 of the AOSA Rules.

Present and Proposed Rule:

Volume 1. Principles and Procedures

Table 2A. Weights for working samples.

Pure Seed Unit #	Chaffy Seed [a]	Kind of seed	Minimum weight for purity analysis[b]	Minimum weight for noxious-weed seed or bulk examination	Approximate number of seeds per gram[c]	Approximate number of seeds per ounce[d]
			Grams	Grams	Number	Number
27		*Potentilla gracilis* Douglas ex Hook slender cinquefoil	0.7	7	3,802	107,779

Volume 3. Uniform Classification of Weed and Crop Seeds

NOMEN #	SCIENTIFIC NAME	COMMON NAME	FAMILY	SPP. CLASS	CONTAMINATING CLASSIFICATION						
					A	F	H	R	S	T	V
313631	*Potentilla gracilis* Douglas ex Hook	slender cinquefoil	Rosaceae	~~W~~ R	W	W	W	~~W~~ C	W	W	W

Harmonization and Impact Statement:
Potentilla gracilis is not in the Canadian M & P, the Federal Seed Act Regulations, nor the ISTA Rules. This is a commercially marketed species; therefore, adding working weights and a pure seed unit definition to the AOSA Rules will standardize seed testing procedures among laboratories. The proposal includes reclassification of the species classis from 'weed' to 'range and revegetation' and from 'weed' to 'other crop' as the contaminating classification under 'range and revegetation.'

Supporting Evidence:
Slender cinquefoil is a tufted native perennial growing from a short thick rhizome. This member of the rose family (Rosaceae) is composed of a taxonomically challenging complex of botanical varieties found in a wide variety of habitats from Baja California to Alaska in the west and eastward through the northern Great Plains and Great Lakes Basin and Quebec. Slender cinquefoil is an important component of many native meadow and prairie ecosystems serving as a nectar and pollen source for bees, butterflies, and other beneficial insects. The plant is also grown as an ornamental for its golden blooms in early summer and showy pink, orange, and yellow foliage in fall.

The seed unit consists of a dry indehiscent one-seeded fruit (achene) (Figure 1). Seed counts conducted at the Agri Seed Testing Lab on twenty commercial seed lots received from 2008 to 2016. The seed count method was in accordance to AOSA Rules, Section 13: Non-mechanical Seed Count and Working Weight Determinations (Figure 2). Refer to Appendix 1 of this proposal for replicate data. The coefficient of variation among replicates for each seed lot 1 – 3, 5 – 11, and 13 – 20 does not exceed 4.0; therefore, all eight replicates were included in the calculation of the recommended purity working weight for each seed lot. For lots 4 and 12, the

coefficient of variation for replicates 1 – 8 exceeds 4.0; therefore, an additional eight replicates were counted for this lot. For lot 4, an outlier exceeding two standard deviations from the mean of 16 replicates was eliminated in the calculation of the recommended purity working weight for his lot. For seed lot 12, no outliers exceeding two standard deviations from the mean of 16 replicates were found; therefore, all sixteen replicates were included in the calculation of the recommended purity working weights for this seed lots.

Figure 1. Fruits of *Potentilla gracilis* Douglas ex Hook. var. *nuttallii* (Lehm.) E. Sheld. U.S. National Seed Herbarium image\; collected by R. A. Allen from Nevada, United States [photographed by Tracey Slotta*] Photo source: https://npgsweb.ars-grin.gov/gringlobal/taxonomydetail.aspx?id=451976

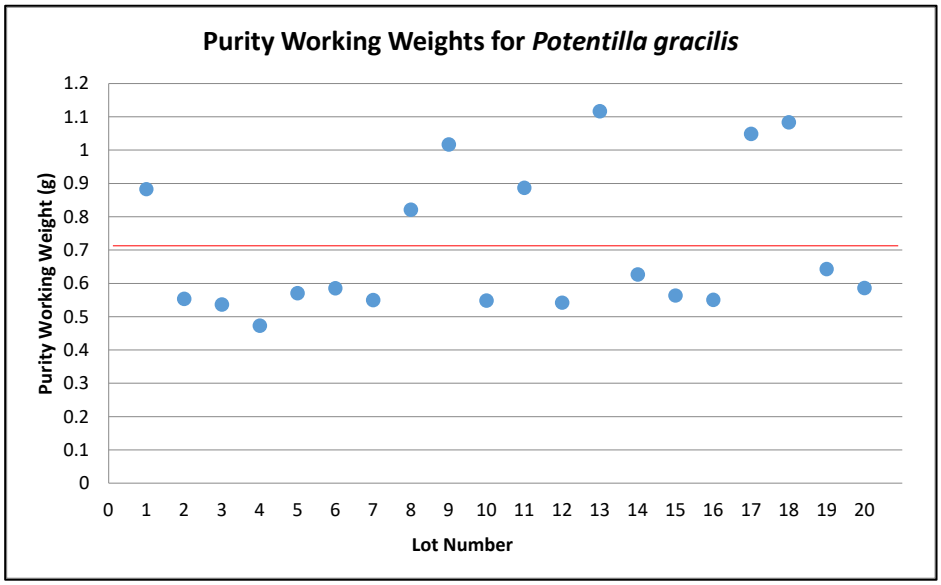

Figure 2. Purity working weights of eleven commercial seed lots of slender cinquefoil based on non-mechanical seed counts. The red line indicates the average purity working sample weight across all eleven seed lots is 0.7 grams.

Sources for general plant information provided above and additional information on this species can be found on the following websites:

FNA Editorial Committee. 2014. Flora of North America: North of Mexico. Vol. 9 Magnoliophyta: Picramniaceae to Rosaceae. Oxford University Press.
https://npgsweb.ars-grin.gov/gringlobal/taxonomydetail.aspx?id=313631
http://plants.usda.gov/core/profile?symbol=POGR9
http://www.heritageseedlings.com/page_578_52/potentilla-gracilis
http://plants.usda.gov/factsheet/pdf/fs_pogr9.pdf

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Appendix 1

Replicate data for eleven commercial seed lots of slender cinquefoil received from 2008 to 2016. Replicate weights (g) represent 100 seed units.

	Lot 1	Lot 2	Lot 3	Lot 4	Lot 5	Lot 6	Lot 7	Lot 8	Lot 9	Lot 10	Lot 11	Lot 12	Lot 13	Lot 14	Lot 15	Lot 16	Lot 17	Lot 18	Lot 19	Lot 20
rep 1	0.0338	0.0213	0.0213	0.0194	0.0232	0.0232	0.0228	0.0339	0.0412	0.0209	0.0359	0.0202	0.0441	0.0243	0.022	0.0218	0.0414	0.0445	0.0259	0.0221
rep 2	0.0334	0.0223	0.0209	0.0214	0.0222	0.0236	0.0216	0.0337	0.0386	0.0217	0.0353	0.0213	0.0454	0.0253	0.0228	0.022	0.042	0.0417	0.0258	0.0245
rep 3	0.0351	0.0232	0.0242	0.0178	0.0226	0.0242	0.0206	0.0342	0.04	0.022	0.0351	0.0203	0.0453	0.0257	0.0227	0.0211	0.0422	0.0425	0.0258	0.0225
rep 4	0.035	0.0215	0.02	0.0179	0.0233	0.0231	0.0224	0.034	0.0396	0.0224	0.0345	0.0206	0.0447	0.0254	0.0228	0.022	0.0416	0.0432	0.0263	0.0233
rep 5	0.0368	0.0214	0.0231	0.0199	0.0217	0.0231	0.0214	0.0312	0.0435	0.0223	0.035	0.0212	0.045	0.0245	0.0225	0.022	0.0424	0.0431	0.0263	0.0232
rep 6	0.0352	0.0229	0.0206	0.017	0.0235	0.024	0.0231	0.032	0.0408	0.0224	0.0353	0.0232	0.044	0.0253	0.0223	0.0223	0.042	0.0439	0.0254	0.0242
rep 7	0.0374	0.0218	0.0204	0.0195	0.0236	0.0232	0.0222	0.0323	0.0419	0.0225	0.0363	0.0224	0.0444	0.0254	0.0228	0.0225	0.0421	0.0443	0.025	0.024
rep 8	0.0358	0.0227	0.0212	0.0195	0.0225	0.0229	0.0219	0.0314	0.0398	0.0213	0.0364	0.0223	0.0445	0.0246	0.0224	0.0225	0.0419	0.0435	0.0253	0.0237
rep 9	x	x	0.0211	0.0197	x	x	x	x	x	x	x	0.0209	x	x	x	x	x	x	x	x
rep 10	x	x	0.0206	0.0194	x	x	x	x	x	x	x	0.0226	x	x	x	x	x	x	x	x
rep 11	x	x	0.0208	0.0185	x	x	x	x	x	x	x	0.0212	x	x	x	x	x	x	x	x
rep 12	x	x	0.0222	0.0203	x	x	x	x	x	x	x	0.0225	x	x	x	x	x	x	x	x
rep 13	x	x	0.0219	0.0186	x	x	x	x	x	x	x	0.021	x	x	x	x	x	x	x	x
rep 14	x	x	0.0209	0.0181	x	x	x	x	x	x	x	0.022	x	x	x	x	x	x	x	x
rep 15	x	x	0.0221	0.019	x	x	x	x	x	x	x	0.0229	x	x	x	x	x	x	x	x
rep 16	x	x	0.0222	0.0192	x	x	x	x	x	x	x	0.0223	x	x	x	x	x	x	x	x
mean reps 1-8	0.035313	0.022138	0.021463	0.01905	0.022825	0.023413	0.022	0.032838	0.040675	0.021938	0.035475	0.021438	0.044675	0.025063	0.022538	0.022025	0.04195	0.043338	0.025725	0.023438
stdev reps 1-8	0.001358	0.000739	0.001444	0.001407	0.00068	0.00047	0.000805	0.001243	0.001533	0.000588	0.000665	0.001094	0.000523	0.000515	0.000292	0.000453	0.000321	0.000932	0.000465	0.000831
CoVar	3.845604	3.336438	6.728659	7.386482	2.978361	2.009064	3.660633	3.785903	3.769401	2.679534	1.874385	5.10348	1.170768	2.056066	1.297681	2.055706	0.764514	2.150276	1.808431	3.547368
mean reps 1-16			0.021469	0.019075								0.021681								
stdev reps 1-16			0.001093	0.001077								0.000954								
2X stdev			0.002186	0.002153								0.001907								
mean reps 1-16 + 2X stdev			0.023654	0.021228								0.023589								
mean reps 1-16 - 2x stdev			0.019283	0.016922								0.019774								
sum			0.3435	0.2838								0.3469								
mean 1-16 w/o outliers* or mean 1-8	0.035313	0.022138	0.021469	0.01892	0.022825	0.023413	0.022	0.032838	0.040675	0.021938	0.035475	0.021681	0.044675	0.025063	0.022538	0.022025	0.04195	0.043338	0.025725	0.023438
# seeds/lb	1,284,531	2,049,012	2,112,838	2,397,463	1,987,295	1,937,427	2,061,818	1,381,348	1,115,181	2,067,692	1,278,647	2,092,130	1,015,333	1,809,875	2,012,646	2,059,478	1,081,287	1,046,669	1,763,265	1,935,360
purity wt. (g)	0.882813	0.553438	0.536719	0.473	0.570625	0.585313	0.55	0.820938	1.016875	0.548438	0.886875	0.542031	1.116875	0.626563	0.563438	0.550625	1.04875	1.083438	0.643125	0.585938
wt./seed (g)	0.000353	0.000221	0.000215	0.000189	0.000228	0.000234	0.00022	0.000328	0.000407	0.000219	0.000355	0.000217	0.000447	0.000251	0.000225	0.00022	0.00042	0.000433	0.000257	0.000234
# seeds/g	2831.858	4517.222	4657.933	5285.412	4381.161	4271.223	4545.455	3045.299	2458.513	4558.405	2818.887	4612.28	2238.388	3990.025	4437.049	4540.295	2383.79	2307.47	3887.269	4266.667
# seeds/oz	80283.19	128063.2	132052.4	149841.4	124205.9	121089.2	128863.6	86334.22	69698.83	129230.8	79915.43	130758.1	63458.31	113117.2	125790.3	128717.4	67580.45	65416.79	110204.1	120960

* Outlier indicated in red text.

Mean purity working weight across all seed lots = 0.7 grams

Mean number of seeds per gram across all seed lots = 3802

Mean number of seeds per ounce across all seed lots = 107,779