

2024 Rule Proposal 2

PURPOSE OF PROPOSAL: To adjust the working weights for the purity analysis of sorghum (*Sorghum bicolor* subsp. *bicolor*) and sorghum-sudangrass (*Sorghum bicolor* nothosubsp. *drummondii*) in Table 2A.

PRESENT RULE:

Table 2A. Weights for working samples

Pure Seed Unit #	Chaffy (C) or Super Chaffy (SC)	Kind of seed	Minimum weight for purity analysis	Minimum weight for noxious weed seed or bulk examination	Approximate number of seeds per gram	Approximate number of seeds per ounce
15		<i>Sorghum bicolor</i> (L.) Moench subsp. <i>bicolor</i> sorghum (incl. grain, sweet, and forage cvs.)	50	500	30-80 (55)	850-2,270
15		<i>Sorghum bicolor</i> (L.) Moench nothosubsp. <i>drummondii</i> (Steud.) de Wet ex Davidse sorghum-sudangrass, shattercane	65	500	38	1080

PROPOSED RULE:

Table 2A. Weights for working samples

Pure Seed Unit #	Chaffy (C) or Super Chaffy (SC)	Kind of seed	Minimum weight for purity analysis	Minimum weight for noxious weed seed or bulk examination	Approximate number of seeds per gram	Approximate number of seeds per ounce
15		<i>Sorghum bicolor</i> (L.) Moench subsp. <i>bicolor</i> sorghum (incl. grain, sweet, and forage cvs.)	70	500	25-82 (37)	709-2324 (1055)
15		<i>Sorghum bicolor</i> (L.) Moench nothosubsp. <i>drummondii</i> (Steud.) de Wet ex Davidse sorghum-sudangrass, shattercane	70	500	29-59 (41)	822-1673 (1170)

HARMONIZATION/IMPACT STATEMENT:

Since there is no adjustment to the noxious examination weight, in most instances, this will not change the weight that needs to be submitted for lab testing.

The purity testing weights for the other testing rules are as follows:

	ISTA	Canada M&P	FSA
Sorghum	90 g	50 g	50 g
Sorghum-sudangrass	30 g	50 g	65 g

Due to variety of weights used between these two species, harmonization is difficult. This proposal does utilize a higher weight in all instances above except for ISTA sorghum.

SUPPORTING EVIDENCE:

The use of *Sorghum bicolor* is wide. Sorghum species are used as forage, ethanol product, birdseed, cereal grain, and syrup. Due to the nature of commercialized seed varieties available, it appears that the seed size of Sorghum species has adjusted over the years. Most commercial varieties of Sorghum species are trending to be hybrids (crossing of two parents) with the intention of creating more vigorous, uniform, and higher quality production (FAO 1995). Depending on the nature of the parents’ lines used in this cross, the sorghum seeds can be quite large. It appears from the count evidence presented, that a 50 gram purity for *Sorghum bicolor* is usually falling much short in reaching 2500 seeds.

Sorghums and sudangrass hybridize freely, resulting in mixed genetics unintentionally in the past (Wheeler 1950, p 654). Efforts to cross sorghums and sudangrasses started in the 1930s to increase forage quality and reduce disease (Hughes et al. 1953). In these crosses of sorghum-sudangrass, the offspring tends to take on the characteristics of the mother plant, which could be either sorghum or sudangrass or subsequent generations of a hybrid of the two (Schmidt et al. 2018).

It appears to be increasingly difficult to determine the genetics of the sorghum species visually. The language of what is a hybrid sorghum, or a sorghum-sudangrass isn’t always clear in samples received from the industry, as both types are often used for forage and the terms are sometimes used interchangeably.

Other large crop species in the AOSA Rules for Testing Seed, such as *Zea mays* and *Helianthus annuus*, utilize common working weights to account for all cultivars or varieties submitted for testing, even though the seed size and uses can be quite diverse among types. This rule proposal intends to use a similar approach taken with other cereal crops to ease the processing of these two sorghum species in a laboratory setting.

The Region 2 Referee Committee has discussed at the last two annual meetings about the same issues some labs were having about the types of sorghums received in the lab. We sought volunteers to help with creating supporting data for this proposal. Data was obtained from 6 different labs who submitted count data from samples in their lab.

Seed counts were performed using the Non-Mechanical Seed Count method as described in Section 13 of the Volume 1 of the *AOSA Rules for Testing Seeds*. Counts were performed on 41 samples of sorghum and 41 samples of sorghum-sudangrass. The sorghum samples were 12 forage types, 23 grain types, and 6 unknown, miscellaneous or multi-purpose use types. At least three of the samples were open-pollinated types. At least seven states/regions are represented in the sample set from at least 12 different sources. This produced a wide range of samples received from many different areas of the industry and the United States. The averages of all the counts were compiled below.

	# of samples	Mean of 100 seed reps (g)	Average seeds per gram	Mean purity weight (g)	Range of working weights (g)	Unrounded Working Weight Average*
Sorghum	41	2.838	37.21	71.69	30-99	76.95
Sorghum-sudangrass	41	2.499	41.29	62.48	42-84	66.99
		2.683	39.25	67.09		71.98

*This number based of the AOSA/SCST Statistics Committee *Purity Weight Calculator* using count data from 40 samples for each species

To see the full data, refer to the attached excel document.

SUBMITTED BY:

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October 2, 2023

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Schmidt, J. J., Yerka, M. K., Pedersen, J. F., & Lindquist, J. L. (2018). Growth, Fitness, and Overwinter Survival of a Shattercane (*Sorghum bicolor* ssp. *drummondii*) × Grain Sorghum (*Sorghum bicolor* ssp. *bicolor*) F₂ Population. *Weed Science*, 66(5), 634–641.

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