

Harmonization and Impact Statement:

The Federal Seed Act lists *Echinochloa esculenta* for the agricultural crop Japanese millet and provides testing methods for this species. The Canadian Methods and Procedures for Testing Seed uses the common name Japanese millet in association with both *E. esculenta* and *E. frumentacea* and uses the same purity working weights and germination test procedures for both species; however, the working sample weights are slightly different than the FSA methods due to the Canadian seed grading system testing requirements and the germination methods include more choices of substrata and temperature (see supporting evidence). The ISTA Rules do not include common names and neither species of *Echinochloa* is included in the ISTA Rules.

Supporting Evidence:

The common name Japanese millet in the AOSA Rules (2019) is misapplied to the scientific name *Echinochloa frumentacea* Link. According to the GRIN database and the Federal Seed Act, the correct scientific name associated with the common name Japanese millet is *Echinochloa esculenta* (A. Braun) H. Scholz. English common names for *E. frumentacea* in the GRIN database include Indian barnyard millet (Scholz, 1992), Siberian millet and white panic (Michael, 2003), and billion-dollar grass (Rehm, 1994) to name a few.

Both *E. esculenta* and *E. frumentacea* are cultivated for grain, fodder, and birdseed (Michael, 2003). The caryopses of *E. esculenta* are 1.2-2.3 mm long, brownish in color, and the embryos are 84-96% as long as the caryopses; whereas, in *E. frumentacea* the caryopses are 1.7-2.2 mm long, whitish in color, and the embryos are 66-86% as long as the caryopses. (Michael, 2003). Hybrids between *E. esculenta* and *E. frumentacea* are sterile, while hybrids between *E. esculenta* and *E. crus-galli* are fully fertile and hybrids between *E. frumentacea* and *E. colona* are partially fertile (Michael, 2003).

The proposal recommends the use of testing methods outlined in the Federal Seed Act as stated below:

Section 201.2 Terms defined.

(h) *Agricultural seeds*. The term "agricultural seeds" means the following kinds of grass, forage, and field crop seeds, that are used for seeding purposes in the United States:

Millet, Japanese—*Echinochloa esculenta* (A. Braun) H. Scholz

Section 201.46 Weight of working sample.

Table 1—Weight of Working Sample

Name of seed	Minimum weight for purity analysis (grams)	Minimum weight for noxious-weed seed examination (grams)	Approximate number of seeds per gram
Millet, Japanese	9	90	315

Section 201.58 Substrata, temperature, duration of test, and certain other specific directions for testing for germination and hard seed.

Table 2—Germination Requirements for Indicated Kinds

Name of Seed	Substrata				Additional directions
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		Temperature (°C)	First count days	Final count days	Specific requirements	Fresh and dormant seed
Millet, Japanese	B, T	20-30	4	10		

For comparison, below are the Canadian M&P testing methods for Japanese millet:

Note: the quality analysis for the Canadian seed grading system is completely different than the US requirements for purity analysis and noxious weed seed determination required under the Federal Seed Act and also required under the AOSA Rules for Testing Seeds.

TABLE 1:

1	2	3	4	5	6	7
Grade Table	Kind of Seed	First quantity (g)	Second quantity (g)	Third quantity (g)	Quantity for % purity (g)	Additional information
VIII	<i>Echinochloa esculenta</i> Millet, Japanese	12.5	12.5	25	2.5	
	<i>Echinochloa frumentacea</i> Millet, Japanese	12.5	12.5	25	2.5	

4.6.2 Table 5. Germination Methods

Kind of Seed	Substrata	Temperature (°C)	First Count (days)	Final Count (days)	Additional directions	
					General Requirements	Fresh or Dormant Seeds
<i>Echinochloa esculenta</i> Millet, Japanese	BP; S; RT	20-30; 25	4	7		Sharp alternations of temperature
<i>Echinochloa frumentacea</i> Millet, Japanese	BP; S; RT	20-30; 25	4	7		Sharp alternations of temperature

Note: BP = between paper, RT = rolled paper towels, S = sand

References

- Canadian Methods and Procedures for Testing Seed (M&P). 2016 Edition. Canadian Food Inspection Agency.
- Federal Seed Act Regulations, Part 201 – Federal Seed Act Requirements. 2020.
- Michael, P. W. 2003. *Echinochloa* P. Beauv. Pp. 390-403. In: Barkworth, M.E., K. M. Capels, S. Long, and M. B. Piep (eds.). Flora of North America. Vol 25, Magnoliophyta: Commelinidae (in part): Poaceae, part 2. Oxford University Press, New York, NY.
- Rehm, S. (ed.). 1994. Multilingual dictionary of agronomic plants. Kluwer Academic Publishers, Boston.
- Scholz, H. 1992. *Echinochloa esculenta*, comb. nov. – the correct name of the Japanese barnyard millet (Gramineae). Taxon 41:522-523.

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