



Seed Regulatory and Testing Division Winter 2022



ITEMS OF INTEREST IN SEED

EDITOR'S NOTES

Welcome to the newly formatted Items of Interest in Seed! The IOI will now be published quarterly in a newsletter format in order to provide updated information to our readers. We will still have articles featuring topics on seed testing, regulatory issues, and annual industry meeting reviews.

Recently, our laboratory staff have received some questions on the differences between oat fatuoids and wild oat; Botanist Anitra Walker has written an explanation. Additional articles discuss the oat variety fluorescence test and variety testing according to the Federal Seed Act.

As always, please let me know if you have suggestions for future topics by sending an email to elizabeth.stewart1@usda.gov.

On behalf of the SRTD staff, I hope you enjoy these articles and continue to find them informative.

Elizabeth Stewart, IOI Editor

CHARACTERISTICS OF AVENA FATUA

Avena fatua, also known as 'wild oat', is a weed seed in the Poaceae family. *Avena fatua* is commonly found in cultivated oats. The seeds of *Avena fatua* vary in color from yellowish to brownish to red, and the surface is granular. The seed is narrowly elliptical and has an in-rolled lemma which usually obscures the upper palea of the seed. The lemma can be hairy or glabrous, and the basal hairs around the cavity can be long and spreading or short and stubby.

All florets have the twisted awns which leave an impression on the lemma as well as the enclosed caryopsis. The apex of the rachilla is triangular and sometimes has long, stiff hairs. The basal cavity (callus) is thick with a smooth rim, also known as a 'sucker-mouth'. The sucker-mouth is formed by disarticulation from the spikelet in a complete abscission of the florets. This break occurs when the florets are at maturity. Similar seed that have a complete abscission and form a 'sucker-mouth' as well are the homozygous fatuoids, 'false wild oats.'



Avena fatua, Steve Hurst, USDA-NRCS PLANTS Database

Fatuoid oats, or 'false wild oats', are often mistaken for the *Avena fatua* (wild oat) in certain varieties of cultivated oats. They have many similarities such as the sucker-mouth, hairy base, rough lemma, and the twisted awn. In general, differences include: a wider body similar to *A. sativa* and an exposed palea that is not as obscured as the *A. fatua*. Therefore, when trying to distinguish between the two, every characteristic should be analyzed to determine if it's *A. fatua*. Sometimes, they are indistinguishable.

So, what to do if you cannot distinguish the fatuoid oats from the wild oats? According to the Association of Official Seed Analysts Rules for Testing Seeds, Volume 3. Uniform Classification of Weed and Crop Seeds section named 'CAUTIONS' #4:

"4. When seeds of indistinguishable species are found as contaminants and may be classified either as weed or other crop depending on the species they belong to, they shall be regarded as weeds. For example, the seeds of lettuce, *Lactuca sativa*, cannot always be distinguished from seeds of weedy species of *Lactuca*."

The same rule applies if you cannot distinguish the fatuoid from the wild oat. They shall be regarded as weed seeds.



Avena fatua – Sandy Dawson USDA AMS



Avena sativa, fatuoid homozygous, Sandy Dawson USDA AMS

References:

- (2021). *Association of Official Seed Analysts Rules for Testing Seeds*.
- USDA – ARS Germplasm Resources Information Network (GRIN) www.ARS-grin.gov
- USDA Handbook N0. 30, 1952, "Testing Agricultural and Vegetable Seeds"
- USDA Handbook N0. 219, 1963, "Identification of Crop and Weed Seeds"
- The USDA-NRCS PLANTS Database, <http://plants.usda.gov>

For more information regarding this article, contact Botanist Anitra Walker (704) 810-7269; anitra.walker@usda.gov.

OAT FLUORESCENCE TEST

When performing a purity test on oat seeds, a fluorescence test is sometimes requested. According to the AOSA Rules, a fluorescence test determines the presence of varieties with fluorescent lemmas and paleas. It is performed by placing at least 400 seeds on a black background under ultraviolet light. Florets are then considered to be fluorescent, or a "white type" variety, if the lemma or palea fluoresce or appear light in color.

The oat fluorescence test began in 1933 in Sweden at the Central Seed Testing Station. It was found that white, yellow, grey, and black grained oats showed different characteristics when exposed to ultraviolet light. In 1952, the procedure was written in the International Rules for Seed Testing as a cultivar test to distinguish between white and yellow oats. Later, several studies were published in determining fluorescent characteristics for different varieties, this led to listings of varietal descriptions which are still maintained by different State crop improvement associations, universities, and private seed companies.

The Seed Regulatory and Testing Division (SRTD) uses the oat fluorescence test as a way to identify the presence of off-type varieties. According to the Federal Seed Act Regulations 201.58a(e), "In determining the varietal purity, the fluorescence test may be used." This section also

describes ‘partially fluorescent’ seeds are to be considered fluorescent.

The oat fluorescence test works best on freshly harvested, untreated seeds. Fluorescence can become diminished in older seeds. Caryopses should not be included in this test since they do not fluoresce.

SRTD botanists will use a description of the variety of the oat being tested to compare to the results of the fluorescence exam.

For example, the oat variety Ogle is described as a yellow, non-fluorescent floret. When testing this variety in a 400-seed separation test, any seed that fluoresces will be considered an off-type.

This number is calculated into the purity data, by using the 400-seed separation procedure 3.1c in the AOSA Rules.

Purity Analysis	Percent by Weight
Pure Seed (Oat)	98.67
Other Crop	0
Inert Matter	1.33
Weed Seed	0

If 30 non-fluorescence seed are found in a 400-seed separation:

Kind	Weight (g)
30 FL Oat	.912
370 NFL Oat	11.08

Kind	% by Weight	% of Sample
30 FL Oat	7.61 X .9867	7.51
370 NFL Oat	92.39 X .9867	91.16

Florescence oats found in an Ogle variety purity test will be classified as “other crop.” In this example 7.51% is enough to classify this as a mixture of varieties.



Oat 400- seed separation test without ultraviolet light



Oat 400-seed separation test with ultraviolet light showing fluorescence (left) and non-fluorescence seeds (right)

References:

- (2021). *Association of Official Seed Analyst Rules for Testing Seeds*.
- Crommert, J. V. de. (1983). Fluorescence in Oats and its Value as a Varietal Purity Indicator. Electronic Theses and Dissertations - South Dakota State University , 4327.
- *Federal Seed Act Regulations* (2020).

For more information regarding this article, contact Botanist Elizabeth Stewart (704) 810-8873; elizabeth.stewart1@usda.gov.

ENFORCEMENT OF THE VARIETAL LABELING PROVISIONS OF THE FEDERAL SEED ACT

The Agricultural Marketing Service's current policy statement is entitled, "Enforcement of the Varietal Labeling Provisions of the Federal Seed Act" in the Federal Register (Vol. 67, No. 185). The purpose of this policy statement is to make clear that AMS has a comprehensive compliance program in place that monitors and tests seed shipped in interstate commerce for truthful varietal labeling.

The Federal Seed Act (FSA) is enforced in cooperation with State seed control programs as authorized under cooperative agreements between State Departments of Agriculture and USDA's AMS. Each year, the Seed Regulatory & Testing Division (SRTD) conducts Trueness-to-Variety field tests to determine the accuracy of varietal labeling of seed lots shipped in interstate commerce. Varietal identification may be based on seedlings, growing plants, mature plants, seeds, or fruit characteristics (7 CFR 201.58a). The authority for conducting tests and applying tolerances to determine the accuracy of labeling is contained in section 403 of the FSA (7 U.S.C. 1593). The kinds of seed tested include field crops, vegetables, forages, and turf-grasses.

For more information regarding this article, contact Regulatory Supervisor Roger Burton (704) 810-7265; roger.burton@usda.gov.

USDA AMS MARKET MONITORING PROGRAM

Each year, the USDA Agricultural Marketing Service's (AMS) Seed Regulatory and Testing Division (SRTD) conducts a wide variety of activities, under the Federal Seed Act (FSA) program, that promote compliance with Federal and State seed laws. One of these activities is the national Trueness-to-Variety (TTV) grow-out trials for select agricultural and vegetable seed kinds. SRTD's TTV trials and other regulatory activities involve cooperating with State partners to collect, inspect, and test agricultural and vegetable seeds to ensure the FSA is being applied uniformly across State lines.

FSA sampling and testing activities, were once conducted exclusively by the Federal Seed Act program but have recently been performed by State inspectors and seed analysts. However, due to resource constraints amid ever tightening State budgets, some States have had to reduce their cooperative activities with AMS. These programs have also experienced reduced staff, elimination of seed laboratories, and priority shifts away from seed to fertilizer and other fee-based programs.

In the spirit of working collaboratively, SRTD is in a position to step in and help out! To this end, SRTD will start conducting some sampling and monitoring activities to help ensure truthful seed labeling and promote a level playing field across the nation. Such joint efforts with States will enhance enforcement of the FSA and achieve a comprehensive market monitoring program. All businesses in the U.S. seed industry play an important part in maintaining the high-quality seeds that U.S. consumers are accustomed to buying and selling.

For more information regarding this article, contact SRTD Director Ernest Allen (704) 810-8884; ernest.allen@usda.gov.

OECD SEED SCHEMES ASSESSMENT FEES

Implementation of the Organization for Economic Cooperation and Development (OECD) Seed Schemes in the United States is administered by the USDA-AMS Seed Regulatory & Testing Division (SRTD), which serves as the National Designated Authority. The program helps U.S. seed producers export seed to many international destinations.

Administration of the U.S. OECD Seed Schemes program is funded by assessment fees which SRTD collects quarterly from Seed Certifying Agencies (SCAs) based on the quantity of seed certified under the program. SCAs charge the seed companies accordingly along with their other normal charges for inspections and testing. Assessment fees are necessary to cover program costs. Major costs include the annual country participation fee to OECD, salary and benefits for the U.S. OECD Seed Schemes Program Manager, partial salary and benefits for

a Seed Marketing Specialist who serves as the program assistant, travel related to program delivery, share of facility costs at the Gastonia office, and S&T and AMS overhead.

Current assessment fee rates are 26 cents per hundredweight (cwt) for corn and 15 cents per hundredweight for all other crop species, which will remain through June 30, 2022. Effective July 1, 2022, the rates will increase by 3 cents/cwt across the board. The new rates will be 29 cents/cwt for corn and 18 cents/cwt for all other species.

SRTD will continue to monitor program costs and revenue so that we can continue to effectively manage the OECD Seed Schemes program on behalf of the U.S. seed industry. Questions regarding the new fee schedule, or program policies and procedures, may be addressed to the program manager, Dr. Steve Malone at stephen.malone@usda.gov or by phone at 980-308-4617 (mobile) or 704-810-8888.

CALENDAR OF EVENTS

- Association of Official Seed Analysts/ Society of Commercial Seed Technologist (AOSA/ SCST) Annual Meeting – Evanston, IL
June 4-9, 2022
- Organization for Economic Cooperation and Development (OECD) Seed Schemes Annual Meeting – Tallinn, Estonia
June 13-17, 2022
- Association of Official Seed Certifying Agencies (AOSCA) Annual Meeting – Seattle, WA
June 2022
- AASCO Annual Meeting –Geneva, NY
July 2022
- 33rd International Seed Testing Association Congress – Cairo, Egypt
May 8-11, 2022
- SRTD Seed School – Gastonia, NC
August 2022

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