



AGRONOMIC CROP SCIENCE REPORT

Research

Extension

A STUDY OF UNIFORMITY IN A LINN PERENNIAL RYEGRASS LOT

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Introduction

Lot uniformity is a basic requirement in all aspects of seed handling. It is assumed that all lots are uniform in sampling. It is required by state and federal law.

Lot of seed--The term "lot of seed" means a definite quantity of seed identified by a lot number, every portion or bag of which is uniform, within permitted tolerances, for the factors which appear in the labeling. (Federal Seed Act)

Failure of lots moving in trade to be uniform has been a topic of particular concern to all in the seed industry for many years.

Achieving and maintaining uniformity in seed lots and obtaining a representative seed sample from seed lots are very important considerations in the orderly marketing of seed. Recently, attention has been focused on reduction in maximum allowable seed-lot size as one method to facilitate uniformity.

A lot of Linn perennial ryegrass, *Lolium perenne*, was identified as a problem because of differing results from successive sampling. This was a 54,400-pound lot from the 1975 crop year and represented one of three lots from the same field that had passed the field inspection of the Oregon seed certification program. The lot had been rejected from certification because of too much annual ryegrass in the cleaned seed. A second seed lot from the field had been certified and shipped but subsequently was found to be in violation of state seed law labeling requirements in a consuming state. A third lot from the field was certified and was still in storage. This preliminary information suggested that seed from this field was representative of the problem of lack of uniformity within a lot. Therefore, one of the two lots in storage was chosen for this study and was examined for uniformity of annual ryegrass content.

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Procedure

To get an indication of annual ryegrass uniformity, samples were drawn from approximately six bags on each pallet in the lot, representing 150 of the 1,088 bags. The seed samples were taken using a 30-inch double-tube trier with nine slots. A representative cross-section of seed samples was drawn by probing diagonally from one corner to the opposite corner of the bag.

In general, standard fluorescence and germination procedures were used to determine perennial and annual ryegrass content using Association of Official Seed Analysts (AOSA) rules. The one exception was the use of only 100 seeds, rather than the normal 400 seeds required in regular germination and fluorescence tests. The percent of annual ryegrass was calculated for each bag sampled within this seed lot according to AOSA rules for a perennial ryegrass lot. In making comparisons it is assumed that the fluorescence and germination results from the 100-seed-count tests would be the same as the 400-seed-count tests.

As another part of the test, a sample of seed was taken by officially prescribed methods. It was subdivided with a Boerner-sampler divider and sent to three separate laboratories for analysis and comparison of the results. The average ryegrass percentage reported from these laboratories was used as the percent pure ryegrass in the seed lot when comparing samples within the lot.

Uniformity was further tested by determining the number of bags that would be in violation of labeling laws based on the tolerance levels prescribed in the AOSA rules which are used by most state regulatory agencies. In making this comparison, the average analysis of the three labs was used as a source for the label.

Results

The percent annual ryegrass in the 150 bags sampled ranged from a low of 0% to a high of 83.83% (see Table 1). The average annual ryegrass content of the 150 bags examined was 12.55%. There were 114 bags with an annual ryegrass percentage below 12.55% and 36 bags above the average.

Repeated sampling and testing of a non-uniform lot such as this will produce widely differing results as shown by the annual ryegrass test results that attracted attention to this lot (see Table 2). Official sampling procedures will give an indication of the overall average of a seed lot, but the results can be expected to vary on repeated sampling in seed lots that fail to meet standards of uniformity.

Each of three independent laboratories examined a split of the official sample and reported annual ryegrass percentage results within tolerances (see Table 3). This emphasizes the similarity of results from separate laboratories testing a properly divided sample.

Since these three laboratory results were within tolerance, the 9.44% would be a legitimate labeling figure, and we can assume that it could appear on a label in trade channels. We found 96.7% of the bags sampled to be in violation of state seed labeling laws if individually sampled for regulatory purposes.

Grouping the bags by pallets, we found four pallets with an average of more than 20 percentage points above the suggested label of 9.44% annual ryegrass (see Figure 1).

Table 1. Percent annual ryegrass in individual bags by pallet

Pallet	Bags					
1	3.54	6.00	4.91	0.00	3.90	3.54
2	2.71	4.91	1.42	5.89	2.96	1.83
3	10.39	2.71	1.62	2.63	1.69	2.63
4	10.72	6.85	4.00	1.91	1.35	9.29
5	18.66	20.25	14.08	17.44	8.33	14.50
6	68.62	33.30	53.01	57.10	51.64	24.49
7	72.61	68.49	79.45	67.39	67.39	78.99
8	0.00	0.00	0.00	0.76	0.52	0.00
9	0.00	0.00	0.00	0.00	0.00	0.89
10	1.98	0.70	0.00	1.83	1.10	1.83
11	16.74	14.57	4.80	17.36	6.00	9.44
12	41.80	39.19	32.23	44.43	29.75	16.55
13	76.68	83.83	80.93	61.99	75.06	59.30
14	1.83	0.52	21.08	40.32	47.11	60.13
15	0.00	0.70	0.64	3.14	0.00	0.64
16	0.00	0.64	3.72	0.00	0.00	0.00
17	0.00	0.52	0.00	3.81	3.23	0.00
18	0.00	0.00	0.00	1.76	2.06	0.00
19	1.55	0.00	0.00	1.83	2.71	4.10
20	1.98	0.00	0.70	0.00	0.00	0.00
21	0.00	0.00	0.00	0.00	0.96	--
22	0.58	5.78	6.12	0.52	0.00	--
23	0.64	0.00	6.12	1.62	0.00	--
24	1.55	1.55	0.35	0.00	0.35	--
25	1.91	1.83	0.25	3.63	0.52	--
26	7.49	0.46	0.00	1.91	0.00	--

Discussion

This study does not represent a survey of seed lots in the state, but is representative of one of the few lots that do create problems for seed handlers, seed control officials, and consumers. This particular seed lot was not uniform and failed to meet the legal definition of a seed lot. If it were to be labeled in a production area on the basis of the average of official sample and commercial tests, regulatory testing of individual bags or groups of bags would result in a violation of state seed law when checked in consuming areas.

Variation in crop or weed seed content within a lot such as this is frequently a cause of discrepancy in test results from repeated sampling and testing of a given lot. It is frequently the cause of violations in

seed labeling, especially when a lot is broken up into small quantities for retail sales. This is of concern to all in the seed business who find themselves facing costly delays in sales, discontented customers, and even fines as a result of lack of uniformity. The next logical question is, How does this variation occur and how can it be avoided?

Table 2. Results from laboratories testing three separate samples

Ryegrass	Sample 1 %	Sample 2 %	Sample 3 %	Average %
Pure Seed	99.51	99.58	99.24	99.44
Perennial	88.76	78.14	97.54	88.15
Annual	10.75	21.44	1.70	11.29

Table 3. Results from three laboratories testing one official sample

Ryegrass	Lab A %	Lab B %	Lab C %	Average %
Pure Seed	99.08	99.32	99.14	99.18
Perennial	89.13	89.71	90.37	89.74
Annual	9.95	9.61	8.77	9.44

Although this study did not examine causes of non-uniformity, there are several possibilities that can be suggested:

1. Variation in crop growth and maturity within the field.
2. Areas within the field more contaminated with weeds than others.
3. Failure to properly clean a seed lot.
4. Use of improper blending operations, including the blending of tailings back into the main lot either by dumping or by adding bags.
5. Failure to watch for and correct non-uniformity during the production and processing of seed.
6. Separation of components on the basis of density or seed coat characteristics in the processing and bagging operation.
7. Purposeful or accidental mixing of bags of processed seed from different lots or parts of lots.

Care must be used throughout the growing, harvesting, and processing of seed to assure the most uniform lots possible. Only when lots are uniform will the sample and the test results accurately represent each bag in the lot.

The use of improper sampling procedures, such as sampling only exposed parts rather than complete randomization of the whole lot, or probing an insufficient number of bags, will greatly aggravate non-uniformity problems.

There is a need for more work in the area of lot homogeneity and an examination and identification of factors contributing to lot variability in chaffy seeds. Once the factors that contribute to non-uniformity are identified, procedures can be examined to help alleviate the problem and assure increased lot uniformity.

Conclusions

Some quantities of seed moving in trade channels fail to meet the legal requirement of a seed lot. In the case of this particular lot, 96.7% of the bags would be in violation of state seed labeling laws if labeled based on the average of three independent laboratory reports. The seed laboratory test results from properly divided portions of the same sample were well within tolerance limits.

Figure 1. Deviation in average annual ryegrass content per pallet from the 9.44% used for labeling.

