

## VII. PURITY ANALYSIS

The primary emphasis of the seed purity analysis in a seed testing laboratory is for physical purity. The separation of the seed sample into different portions such as pure seed, inert matter, other crop seed and weed seed are manual separations.

### Making the Separation

The working sample that was obtained from the mechanical divider should be examined quickly to determine if small inert sections can be removed by sieving or if certain light weight material might be removed by blowing. If the analyst can save time by following one of these two above mentioned procedures to make a rough separation in the beginning these should be followed. Screens of different sizes are available for sieving purposes.

The South Dakota Seed Blower may also be useful at this point in blowing out chaff and other light material. Detailed instructions are provided with the machine and should be followed carefully.

Purity separations can often be facilitated by taking advantage of the seed shape by allowing the seeds to roll down a slightly inclined surface. The round seeds can be separated from flat seeds and chaff in this manner.

Following any preliminary separation, the seed should be placed on the clean surface of a workboard to make the necessary separations with forceps. (Figure 53)

One of the first determinations made should be whether or not the sample confirms the kind of seed submitted.

All laboratories should have a good weed and crop seed collection to serve as a reference in identifying seeds found in samples submitted for purity analysis. The crop seed collection should include not only the major crops of the state but also the varieties under multiplication and maintenance in the seed certification program.



FIG. 53—Seed purity analysis requires experienced, competent analysts.

### Purity Definitions

Definitions have been developed and are in use throughout the world to help different seed analysts be as consistent as possible in determining what shall be called pure seed, other crop seed, weed seed and inert matter. The International Seed Testing Association has drafted a set of prescribed definitions that are recognized by all the member countries and are a guideline for future work. (para 3.3) Therefore, these definitions should be carefully studied and observed by the analyst.

In summary the International Rules indicate that *pure seed* shall refer to and include all varieties of each species under consideration as stated by the sender or found by laboratory test. In addition to the pure and damaged seed of each kind or variety under consideration, pure seed also includes undersized and shrivelled seeds as well as broken seeds of more than one-half of their original size. Seeds of leguminosae, cruciferae and coniferae with the seed coat entirely removed are regarded as inert matter. Free caryopses of grasses and cereals removed from the glumes, lemmas and paleas are considered pure seed.

*Other crop seed* include seeds of plants grown as crops. The classification for immature, damaged, diseased and empty seed of other crops is the same as that provided for pure seed.

*Weed seeds* are considered seeds, bulblets or tubers of plants recognized as weeds by laws, official regulations or by general usage.

*Inert matter* includes seed-like structures from crop and weed plants that are one-half the original size or less ; badly injured and undeveloped seed-like structures of weeds ; glumes, stems and other plant parts ; plus, sand, dirt and other related substances.

Additional specific points are also included in the detailed definitions of the International Seed Testing Association.

### **Use of Magnification**

Magnification is usually not necessary on seed where a working sample required is of 40 grams or more. Magnification may help in the specific identification of weed seed and inert matter. In samples of less than 40 grams all components, including pure seed, should be checked under magnification.

### **Weighing Components**

Weighing of the individual components should be done on a Torsion balance, the Cent-o-gram scale or an analytical balance. Weighing should be done to four significant figures. The number of decimal places is determined by the weight of the greatest component. Digits are significant whether they are before or after the decimal point. If the minimum weight of the working sample is 500 grams or more, it is not necessary to weigh the pure seed fraction ; but the inert matter, other crop seed and weed seed should be weighed and the percentages calculated on the basis of the original weight. The following table provides a guide in determining the number of decimal places when weighing the working sample and components to insure four significant figures.

TABLE 1

*Guide to the Number of Decimal Place for Weighing Working Samples and Components to Insure Four Significant Figures*

Working Sample		Components of Separation	
Weight Specified in Rules	Example	Number of Decimal Places	Example
<b>Grams</b> 0.5	<b>Grams</b> 0.5108	4	<b>Grams</b> P 0.4876 C .0014 I .0102 W .0031 ----- .5203
1-9	1.025 5.108 9.104	3	P 8.876 C .014 I .102 W .031 ----- 9.023
10-99	10.59 51.43 99.04	2	P 90.76 C .14 I 1.02 W .31 ----- 92.23
100-999	125.1 900.6	1	P 487.6 C 1.4 I 10.2 W 3.1 ----- 502.3
1000 or more	1000.	0	P 99.8 C .1 I .2 W .1 ----- 100.2

The components of the separation are indicated as follows : P-Pure seed ; C-Other crop seed ; I-Inert matter ; W-Weed seed.

### Calculating Results

The percentage result of a purity analysis should be given to at least one decimal place as stated in the International Rules for Seed Testing (para 3.6). The percentage by weight of each separation is determined by dividing the weight of the individual fractions by the total of the weight obtained. The only exception would be in the case of samples with a 500 gram working sample. The name and percentage of each species of a crop seed and weed seed present to the extent of 5 percent or more should be calculated separately and the percentage given. Components of less than .05% shall be reported as "Trace".

	Weight	Percentage
Pure seed	48.01	96.3
Other crop seed	.35	.7
Weed seed	.09	.2
Inert matter	1.40	2.8
	49.85	100.0

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*References :* (1) p. 42-53 ; (2) p. 417-44 ; (8) p. 482-487 ; (13) p. 42-58-63 ;  
(7) p 10-16.