



International Seed Testing Association

What kind of performance data do I have to submit to ISTA and how will performance data be graded?

ISTA STA-GMO TF
S GREGOIRE

Presence of seeds with
specified trait(s)

Performance Data Evaluation

- Introduced at ISTA Bangkok meeting
- Published as draft on the web summer 2005
- Improved from comments received end 2005
- Entered into force begin of 2006
- Some labs have already submitted PDE data



Outline

Presence/absence data

data

grade

Quantitative data

data

grade

Purity of source seeds



Presence/absence data 30 blind samples

10 samples of 400 seeds are to be prepared in which 3 seeds contain the specified trait(s) and 397 do not contain this trait(s) (spiking level 0.75%).

sample	1	2	3	4	5	6	7	8	9	10
result	P	P	P	P	P	P	P	P	P	P

10 samples of 400 seeds are prepared in which 2 seeds contain the specified trait(s) and 398 do not contain this trait(s) (spiking level 0.5%)

sample	1	2	3	4	5	6	7	8	9	10
result	P	P	P	P	P	P	P	P	P	P

10 samples of 400 seeds where the trait(s) is absent

sample	1	2	3	4	5	6	7	8	9	10
result	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP



Presence/absence data 30 blind samples

- Grade 1: all 30 samples correctly identified
- Grade 2: 1 or 2 samples wrongly identified
- Grade 3: more than 2 samples wrongly identified



Quantitative data 7 levels of presence 28 blind samples

For each of 7 levels, 4 samples of 2000 seeds

3 levels for all laboratories

1. 0.1% (2 seeds spiked),
2. 0.5% (10 seeds spiked),
3. 1% (20 seeds spiked).

4 levels differing for each PDE submission

1. [0.1%, 0.5%[level in number of seeds (2 to 9 seeds spiked)
2. [0.5%, 1%[level in number of seeds (10 to 19 seeds spiked)
3. [1%, 2 %[level in number of seeds (20 to 39 seeds spiked)
4. [2 %, 3%] level in number of seeds (40 to 60 seeds spiked)



Quantitative data sample description

		0.1% level	blind level 1	0.5% level	blind level 2	1% level	blind level 3	blind level 4
number of spiked seeds	sample 1							
number of spiked seeds	sample 2							
number of spiked seeds	sample 3							
number of spiked seeds	sample 4							
weight of spiked seeds	sample 1							
weight of spiked seeds	sample 2							
weight of spiked seeds	sample 3							
weight of spiked seeds	sample 4							
weight of seeds without trait(s)	sample 1							
weight of seeds without trait(s)	sample 2							
weight of seeds without trait(s)	sample 3							
weight of seeds without trait(s)	sample 4							



Quantitative data sample results

		0.1% level	blind level 1	0.5% level	blind level 2	1% level	blind level 3	blind level 4
result in % number of seeds	sample 1							
result in % number of seeds	sample 2							
result in % number of seeds	sample 3							
result in % number of seeds	sample 4							
result in % weight of seeds	sample 1							
result in % weight of seeds	sample 2							
result in % weight of seeds	sample 3							
result in % weight of seeds	sample 4							
result in % other unit	sample 1							
result in % other unit	sample 2							
result in % other unit	sample 3							
result in % other unit	sample 4							



Quantitative data grade

Accuracy

Grade 1: all 28 samples have the accuracy within -0.25 and $+0.5$

Grade 2: no samples have the accuracy smaller than -0.5 or greater than 1

Grade 3: some samples have the accuracy smaller than -0.5 or greater than 1

Repeatability

Grade 1: Repeatability std-dev in % of the mean is below 20%

Grade 2: Repeatability std-dev in % of the mean is below 30%

Grade 3: Repeatability std-dev in % of the mean, excluding 0.1% level, is greater 30%



Grades

Grade 1: No problem is detected from the experiment

Grade 2: Improvement is possible

Grade 3: There is serious problem

The values that are used have been defined looking at the state of the art in seed testing.

If techniques/ laboratories improve, the values can be adapted to the current status of the art, each year



Purity of source seeds

The samples used must be seeds.

In case checks are performed on flour, the ability to obtain homogeneous and fine flour from seeds is one of the key elements to obtain a result which is representative from the sample.

In case checks are performed on living plants the percentage of germination shall be taken into account to obtain enough plants.

Samples are prepared from 2 sources of seeds which shall be in principle 100% seeds with absence of specified trait(s) on one hand, and 100% seeds with the specified trait(s) on the other hand.



Purity of source seeds

ISTA recommend a 400 seeds check for the source of seed with specified trait(s) and the check of 30 000 seeds for the source of seed with absence of the specified trait(s).

ISTA recommend an individual seed test check for the source of seed with specified trait(s) with no absence of trait as a result. In that case the lower bound of purity of the seeds with the trait(s) is 99.25% with 95% confidence.

ISTA recommend pools size of no more than 1000 seeds for the source of seed with absence of the specified trait(s), with no presence as a result. In that case the lower bound of purity of the seeds with no trait(s) is 99.99%.



Purity of source seeds

The fact that the 2 sources are pure enough shall be assessed by the laboratory.

This can be done by a check as recommended by ISTA, or by other means at the initiative of the laboratory.

ISTA recognise the difficulty that laboratories encounter to obtain seeds



The computations are made according to the unit used in reporting the results

% number of seeds

% weight of weeds

other unit such as % DNA copies