



ISTA
Seed Quality Assurance

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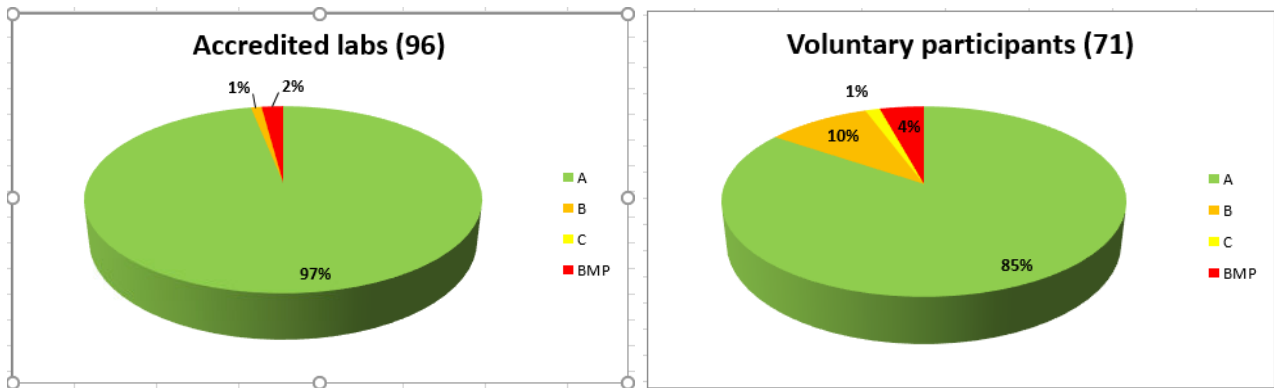
Summary report: PT 23-3 T.hyb

Species: *Trifolium hybridum*

Scope: PUR, OSD, GER, TSW

PURITY Ratings

Total number of participants = 167



Means and Standard Deviation

of the obligatory accredited participants
calculated for the category of pure seed

| Categories | Mean Values % | | | Standard Deviation | | |
|--------------|---------------|-------|------|--------------------|-------|-------|
| | Lot 1 | Lot 2 | Lot3 | Lot 1 | Lot 2 | Lot 3 |
| Pure seed | 99.3 | 99.3 | 99.5 | 0.17 | 0.17 | 0.15 |
| Other seed | 0.7 | 0.5 | 0.5 | - | - | - |
| Inert matter | TR | 0.2 | TR | - | - | - |

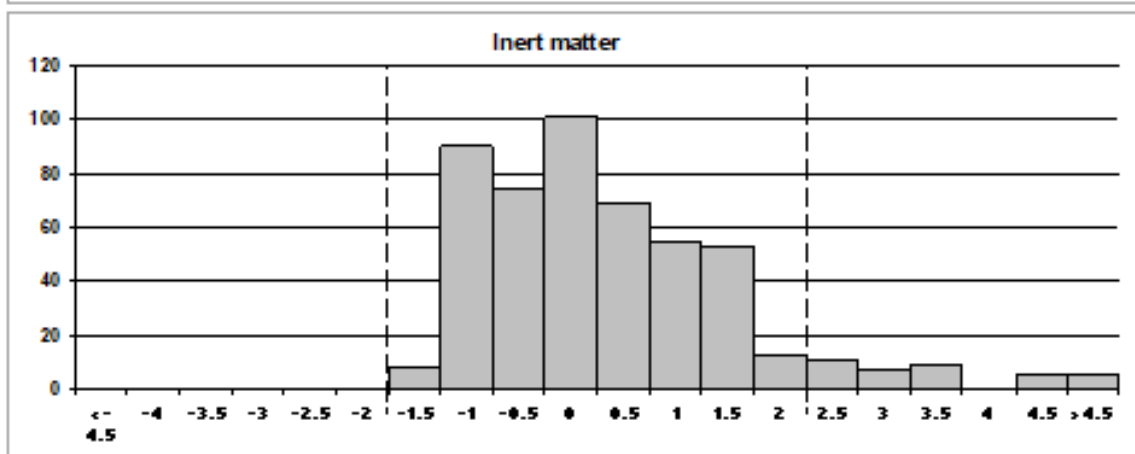
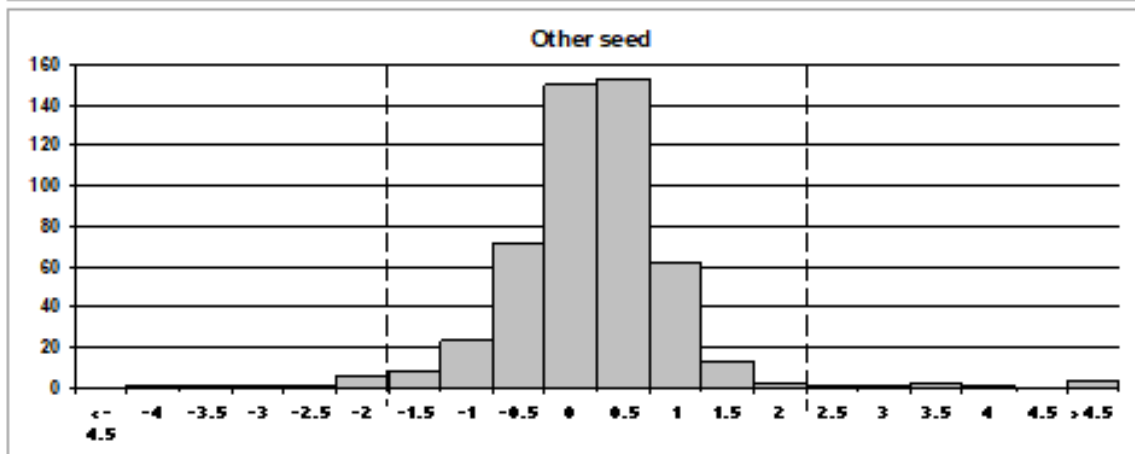
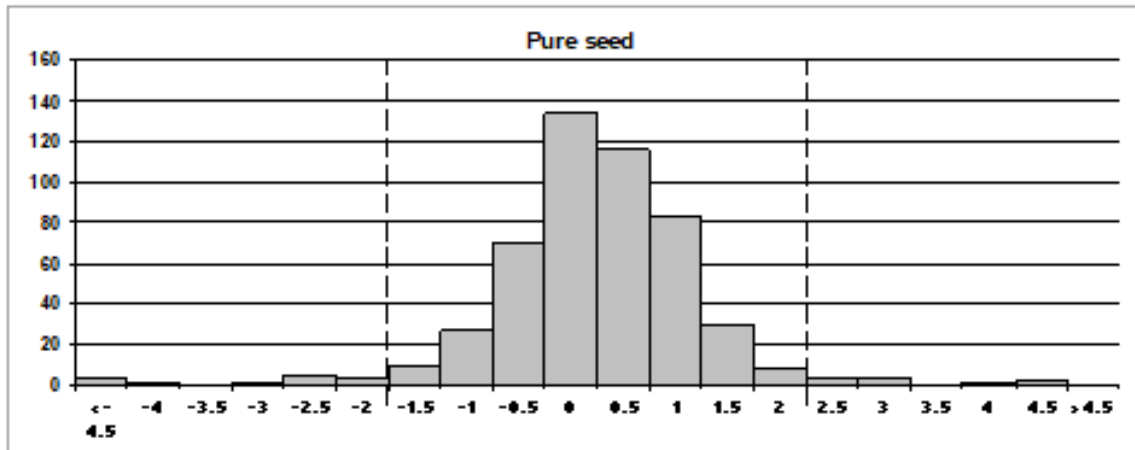
Z-score Distribution

Proficiency Test Report – Test Round 23-3 T.hyb

Species : *Trifolium hybridum*

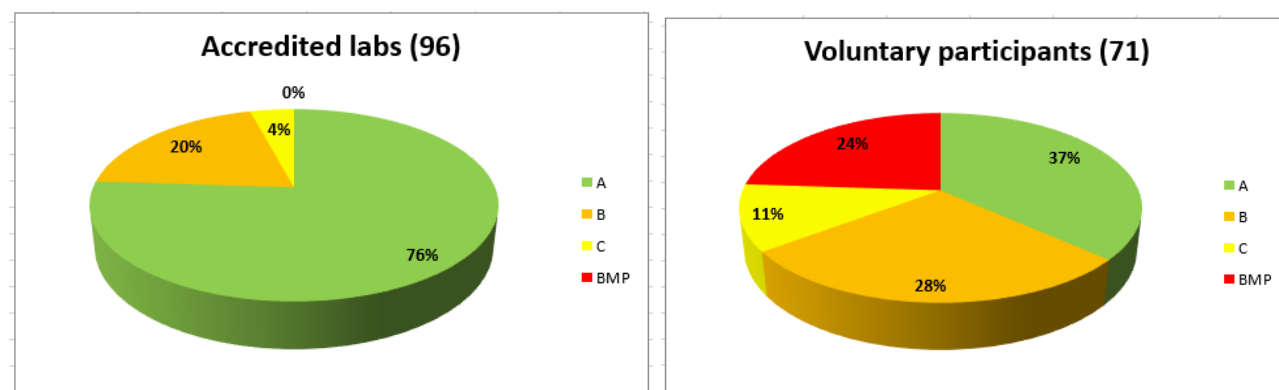
Scope: Purity

The following histograms show the frequency distributions of all participants Z-Scores for the relevant components, i.e. **Pure seed** and **Inert matter** and **Other seed**. The Z-Scores from all three samples are included in each histogram. For further explanations, please refer to the document 'The ISTA Proficiency Test Programme'



OSD Ratings

Total number of participants = 167



Retrieval rates

Proficiency Test Report - Test round 23-3 T.hyb

Species: *Trifolium hybridum*

Scope: Other Seed Determination

Average of seeds retrieved and identified correctly

The following table shows the retrieval rates of each species added by the test leader prior to sample dispatch. Every species that was added is assigned a value based on the actual retrieval rate of all seeds added. Thresholds are as follows:

- >=90 % -> 3
- >=85 % -> 2
- <85 % -> 1

This score is multiplied with the number of seeds your laboratory reported and identified correctly. The percentage of retrieved and identified seeds is then determined and does define the in-round rating. The thresholds are as follows:

- >=90 % -> A
- >=80 % -> B
- >=70 % -> C
- <70 % -> BMP

For further details please refer to the document: "The ISTA Proficiency Test Programme".

| Lot # | Species name | # of seeds added | Average # of seeds found | Retrieval rate [%] | Assigned factor |
|-------|------------------------------|------------------|--------------------------|--------------------|-----------------|
| Lot 1 | 1 <i>Lotus corniculatus</i> | 5 | 3.6 | 71.6 | 1 |
| | 2 <i>Melilotus spp.</i> | 3 | 2.5 | 83.9 | 1 |
| | 3 <i>Potentilla sp.</i> | 2 | 1.8 | 87.5 | 2 |
| | 4 <i>Thymus vulgaris</i> | 2 | 1.6 | 80.7 | 1 |
| Lot 2 | 1 <i>Medicago sativa</i> | 4 | 3.6 | 90.8 | 3 |
| | 2 <i>Origanum sp.</i> | 2 | 1.4 | 69.3 | 1 |
| | 3 <i>Reseda odorata</i> | 2 | 1.5 | 76.7 | 1 |
| Lot 3 | 1 <i>Cuscuta sp.</i> | 4 | 3.2 | 79.8 | 1 |
| | 2 <i>Lysimachia arvensis</i> | 2 | 1.5 | 77.3 | 1 |
| | 3 <i>Medicago lupulina</i> | 4 | 3.5 | 88.9 | 2 |
| | 4 <i>Mentha spicata</i> | 2 | 1.6 | 82.4 | 1 |

Information for the Lot 3:

Some laboratories (5 accredited and 7 non-accredited) reported *Anagallis arvensis* as synonym for *Lysimachia arvensis* which could not be accepted.

Information for the Lot 1:

Originally specified name of *Melilotus albus* is replaced with genus name *Melilotus* spp. as there was an indication that a possible mixture of *M. albus* and *M. officinalis* was spiked in the samples of the Lot 1.

Images of the *M. officinalis* and *M. albus*, for comparison between the species are provided herewith by the Purity Committee Chair with thanks to the Canadian Food Inspection Agency:

Longitudinal Plane Comparison

Melilotus albus

(white-blossom sweet clover)



Melilotus officinalis

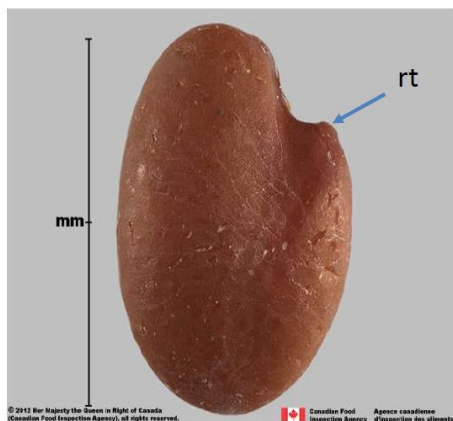
(yellow-blossom sweet clover)



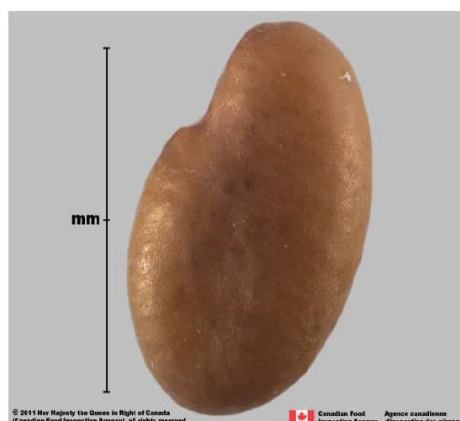
M. albus (compared to *M. officinalis*): Shorter distance between the hilum and the lens at the top of the seed. It is narrower, less rounded on the sides of the seed than *M. officinalis*. *M. albus* has an obvious radicle furrow.

Laying Flat on Side Comparison

Melilotus albus



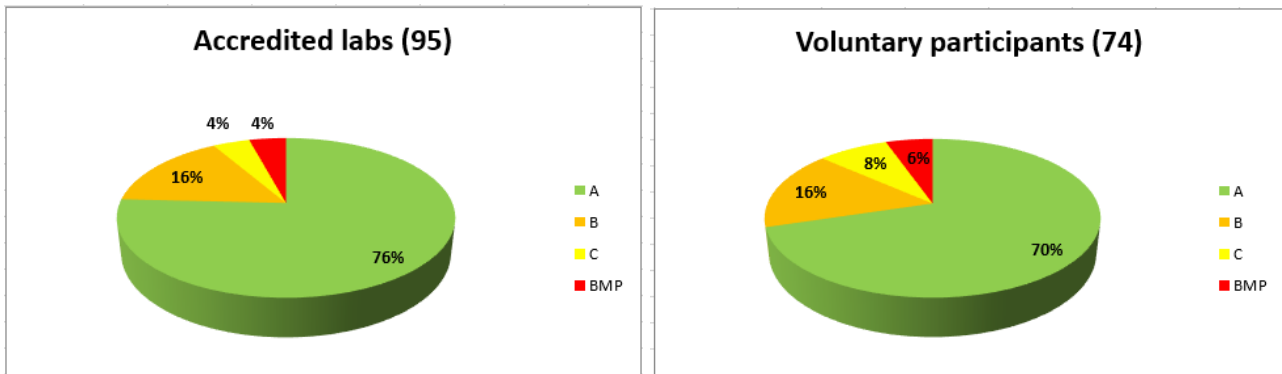
Melilotus officinalis



M. albus (compared to *M. officinalis*): More angular with a more pointed bottom. More prominent radicle furrow. The radicle tip (rt) over-hangs the hilum slightly. A bigger “bite” out of the oval. (note this curve)

GERMINATION Ratings

Total number of participants = 169



Means and Standard Deviation

of the obligatory accredited participants
calculated for the category of normal seedlings

| Categories | Mean Values % | | | Standard Deviation | | |
|---------------------|---------------|-------|------|--------------------|-------|-------|
| | Lot 1 | Lot 2 | Lot3 | Lot 1 | Lot 2 | Lot 3 |
| Normal seedlings | 86 | 93 | 87 | 2.59 | 1.75 | 2.80 |
| Abnormal seedlings | 4 | 3 | 4 | - | - | - |
| Non-germinated seed | 10 | 4 | 9 | - | - | - |

Method used

overview for all participants
presented for the temperature, substrate and pretreatment

| Temperature °C | # Users | | # Users TOTAL |
|----------------|-----------------|------------------------|---------------|
| | Accredited labs | Voluntary participants | |
| 20 | 94 | 74 | 168 |
| 20↔30* | 1 | | 1 |

* this temperature is not prescribed in the ISTA Rules

| Substrate | # Users | | # Users TOTAL |
|--------------|--------------------|---------------------------|------------------|
| | Accredited labs | Voluntary participants | |
| TP | 70 | 51 | 121 |
| BP | 16 | 17 | 33 |
| PP | 9 | 5 | 14 |
| Not reported | | 1 | 1 |

| Pretreatment | # Users | | # Users TOTAL |
|---|--------------------|---------------------------|------------------|
| | Accredited labs | Voluntary participants | |
| No Treatment | 53 | 43 | 96 |
| Prechill | 34 | 22 | 56 |
| Light / no light | 3 | | 3 |
| H ₂ O | 1 | 2 | 3 |
| Polyethylene envelop (with or without prechill) | 1 | 3 | 4 |
| Not reported | 3 | 4 | 7 |

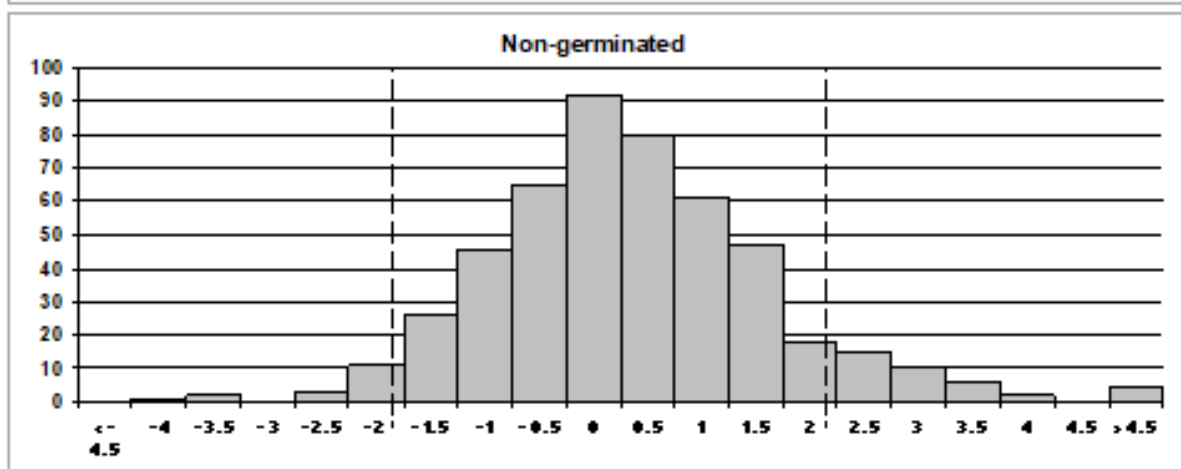
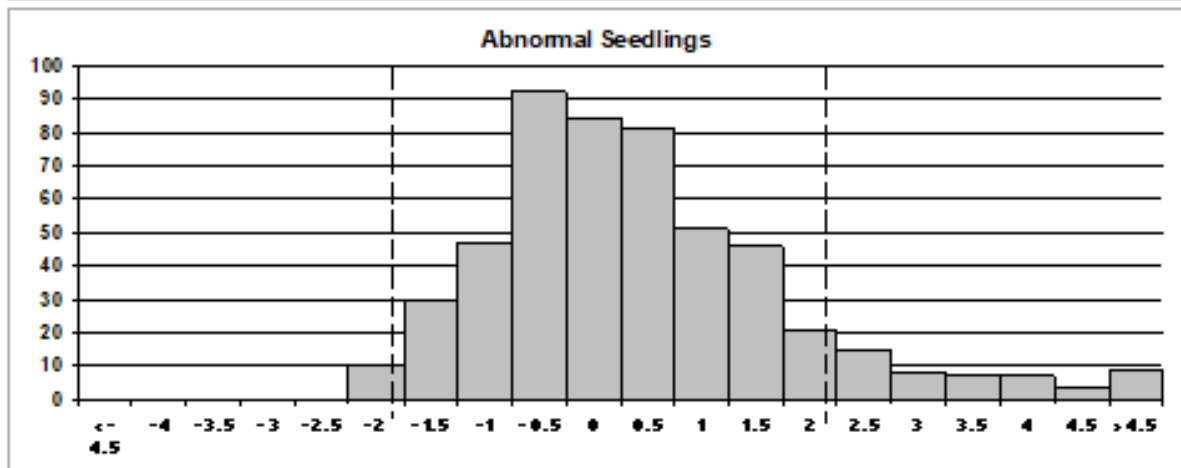
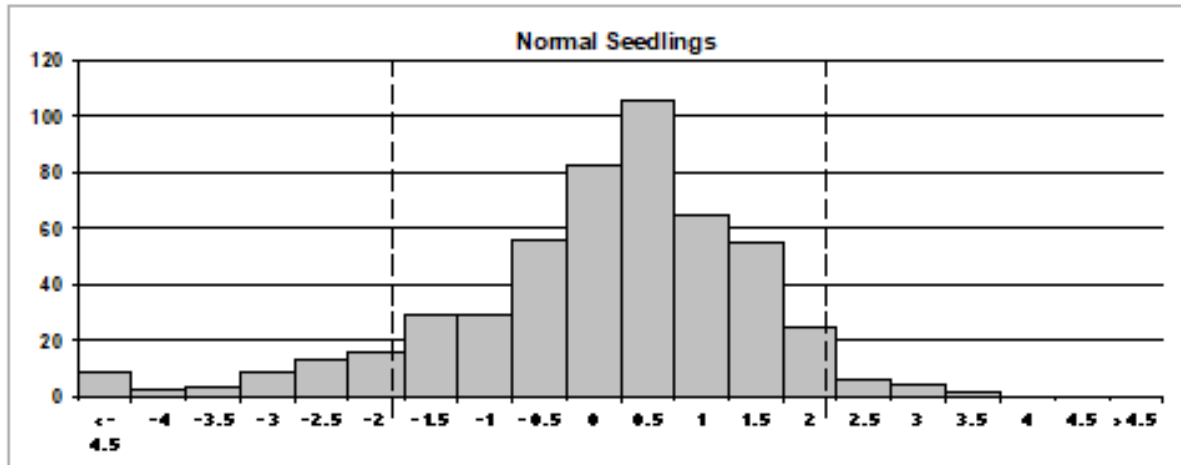
Z-score Distribution

Proficiency Test Report – Test Round 23-3 T.hyb

Species : *Trifolium hybridum*

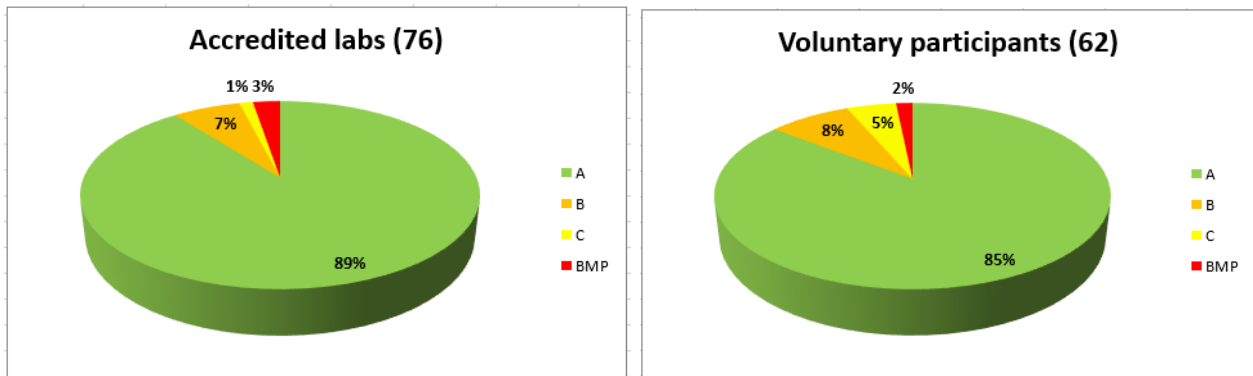
Scope: Germination

The following histograms show the frequency distributions of all participants Z-Scores for the relevant components, i.e. **Normal Seedlings** and **Abnormal Seedlings** and **Non-germinated Seeds**. The Z-Scores from all three samples are included in each histogram. For further explanations, please refer to the document 'The ISTA Proficiency Test Programme'



THOUSAND SEED WEIGHT Ratings

Total number of participants = 138



Means and Standard Deviation

of the obligatory accredited participants

| <u>Mean Values g</u> | | | <u>Standard Deviation</u> | | |
|----------------------|-------|-------|---------------------------|-------|-------|
| Lot 1 | Lot 2 | Lot3 | Lot 1 | Lot 2 | Lot 3 |
| 0.773 | 0.782 | 0.782 | 0.02 | 0.06 | 0.01 |

Method used

overview for all participants

| Method | # Users | | # Users TOTAL |
|------------------------------------|-----------------|------------------------|---------------|
| | Accredited labs | Voluntary participants | |
| Counting replicates | 62 | 54 | 116 |
| Count the whole pure seed fraction | 14 | 8 | 22 |

Z-score Distribution

Proficiency Test Report – Test Round 23-3 T.hyb

Species : Trifolium hybridum

Scope: Thousand seed weight

The following histogram shows the frequency distributions of all participants Z-Scores for the thousand seed weight test. The Z-Scores from all three samples are included in the histogram. For further explanations, please refer to the document 'The ISTA Proficiency Test Programme'.

