Session 4 – The importance of quality seed in agriculture

The evolution of seed testing

Michael Muschick,

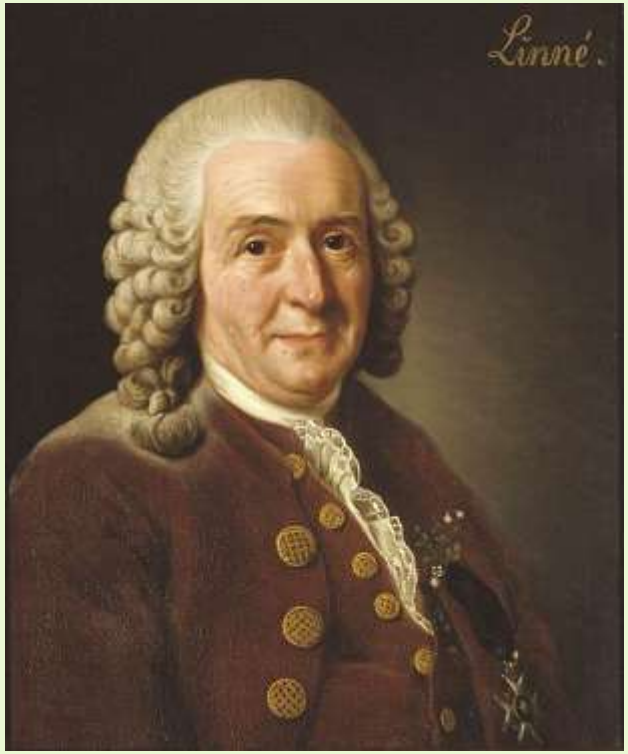
Secretary General of the International Seed Testing Association

The value of Seeds

Seeds have been undoubtedly the most important and the most crucial means of production since mankind is working in plant production and agriculture

Outstanding Scientists

Carl von Linné 1707-1778



Alexander von Humboldt 1769-1859

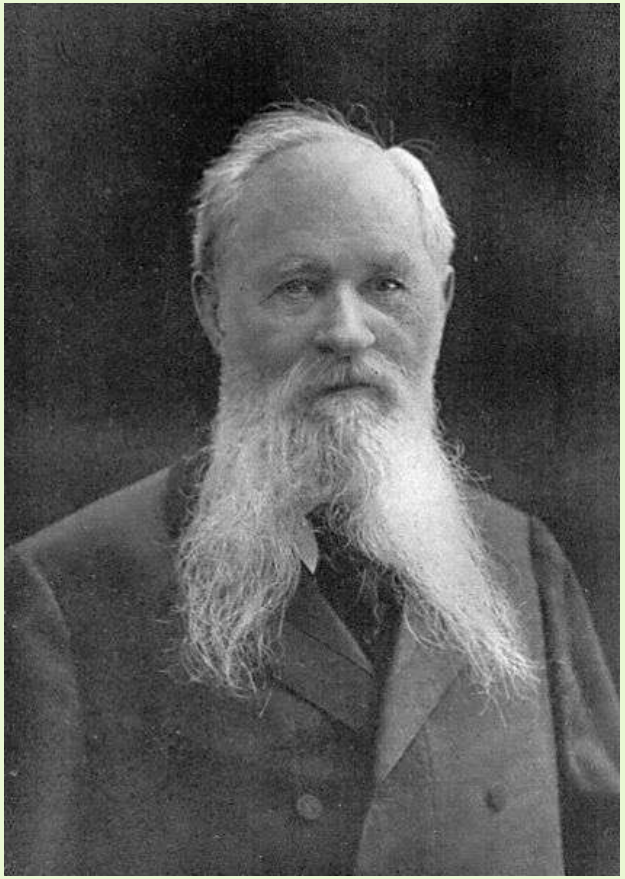
Outstanding Scientists

Justus von Liebig 1803-1873

Gregor Johann Mendel 1822-1884

Prof. Dr. Friedrich Nobbe (1830-1922)

The founder of seed testing
1869 in Tharandt,
Saxony, Germany



Nobbe's questions

- Is the seed sold to farmers of the desired botanical species?
- How many seeds are of the desired botanical species?
- What other botanical species can be found in the seed sold?
- Does the sold seed have the potential to produce a healthy plant?

Thoughts of Prof. Nobbe

- The establishments of any measures for the seed has to follow the principles of scientific work and has to take into consideration all available scientific knowledge
- A representative sample needs to be drawn from a seed lot
- Seed analysis need to be made in a laboratory
- Methods need to be available to analyse the physical purity and determine the other seeds
- Methods need to be available to analyse the Germination capacity of the seed

Thoughts of Prof. Nobbe

- The analysis of the seed needs to be done <u>before</u> the seed is sold to the farmer

Handbuch

der

Samenkunde.

Physiologisch-statistische Untersuchungen

über den

wirthschaftlichen Gebrauchswerth

der

land- und forstwirthschaftlichen, sowie gärtnerischen Saatwaaren.

Von

Dr. Friedrich Nobbe,

Mit 339 in den Text gedruckten Holzschnitten.

Berlin.

Verlag von Wiegandt, Hempel & Parey.

1876.

- **Introduction**

  Seed consumption in the German Empire
- **Physiological Part**
- **Statistical Part**
- **Practical Part**

International Spread of Seed Testing Labs

1869: Foundation of the first seed testing laboratory in Germany

1875: 12 seed testing laboratories in Germany, Belgium, Austria-Hungary, Denmark and the USA

1876/77: 20 new seed testing laboratories were founded

1896: already 119 seed testing laboratories exsist in 19 different countries

International Seed Testing Congress

1906: 1st International Seed Testing Congress, Hamburg, Germany

1910: 2nd International Seed Testing Congress, Münster/Wageningen, Germany/The Netherlands

1921: 3rd International Seed Testing Congress, Copenhagen, Denmark

1924: 4th International Seed Testing Congress,

Cambridge, UK and Foundation of the International Seed Testing Association (ISTA)

First Executive Committee of ISTA

- **Knud Dorph-Petersen, Denmark, President**
- **Dr. Franck, Netherland, Vice President**
- **Prof. M.T. Munn (President AOSA), USA**
- **Mr. W. V. Petery, Argentina**
- **Mr. A. Eastham, UK**

The first ISTA President (1924)
Knud Dorph-Petersen

Paragraph 1 of the 1924 ISTA Constitution

"Under the name of the International Seed Testing Association, a union of Official Seed Testing Stations with legal domicile at the residence of its President exists for the purpose of advancing all questions connected with the testing and judgment of seeds. The Association seeks to attain this object through:

- ***Comparative tests and other researched directed to achieving more accurate and uniform results than hitherto obtained.***
- ***The formulation of uniform methods and uniform terms in the analysis of seeds in international trade***
- ***The organization of international congresses attended by representatives of Official Seed Testing Stations for the purpose of mutual deliberation and information, the publication of treaties and reports on seed testing and mutual assistance in the training of technical officers"***

Dissemination and collection of information

International Harmonization of Reporting Results

International Standardization of Seed Testing Methodologies

Success factors for seed quality determination and seed trade

Training and Education on international level

International Harmonization of Laboratory Performance

INTERNATIONAL SEED TESTING ASSOCIATION (ISTA)

www.seedtest.org

2nd World Seed Conference 2009

Developments in Seed Science and Technology

ISTA Meetings and Congresses

ISTA Certificates

Dissemination and collection of information

International Harmonization of Reporting Results

Publications

Method Development

International Standardization of Seed Testing Methodologies

INTERNATIONAL SEED TESTING ASSOCIATION (ISTA)

Training and Education on international level

Workshops

Method Validation

International Harmonization of Laboratory Performance

Proficiency Test Programmes

Audit Programme

Accreditation Standard Development

The development and harmonization of seed testing methodologies following scientific principles

- **1931 Establishment:** Germination, Purity, Sanitary condition, Genuineness of variety, Provenance, weight determinations, determination of moisture content.
- **1966 Introduction of Seed Health Methods**
- **1966 Introduction of the topographical Tetrazolium test**
- **2001 Introduction of Vigour methods**
- **2004 Introduction of performance based methods for specified trait testing**

The uniform reporting of seed testing results

- **1931: The ISTA Certificates (Orange and Blue ISTA certificate) have been established creating a uniform way of reporting seed testing results.**
  - ISTA Orange Certificate reports the average quality of a whole seed lot
  - ISTA Blue Certificate reports the quality of a submitted seed sample
- **2001: only laboratories having fulfilled the requirements of the ISTA Accreditation Standard are entitled to issue ISTA certificates providing the confidence in the trueth and reproducibility of the reported test results.**

The international harmonization and monitoring of seed laboratory performance

- **The ISTA Proficiency Tests:**
  - Germination Proficiency Test
  - Purity Proficiency Test
  - Other seed determination Proficiency test
  - Moisture Proficiency Test
  - Vigour Proficiency Test
  - Seed Health Proficiency Test
  - GMO Proficiency Test

The international harmonization and monitoring of seed laboratory performance

- 1995 the ISTA Accreditation Standard
  - Establishment of Quality Assurance system in the laboratory.
  - Successful participation at the ISTA proficiency test.
  - Use of ISTA Rules for the analysis

The international harmonization and monitoring of seed laboratory performance

- **Results of the Proficiency Test**

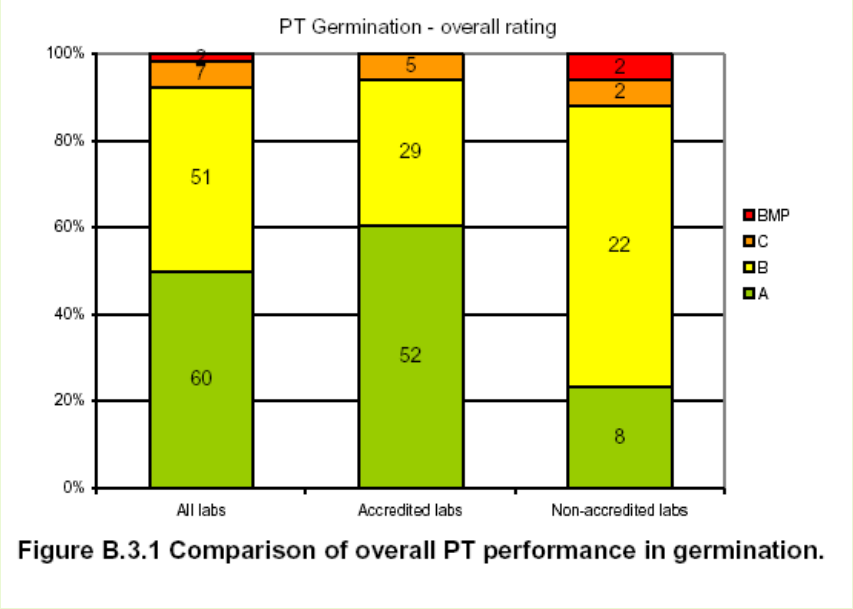


Figure B.3.1 Comparison of overall PT performance in germination.

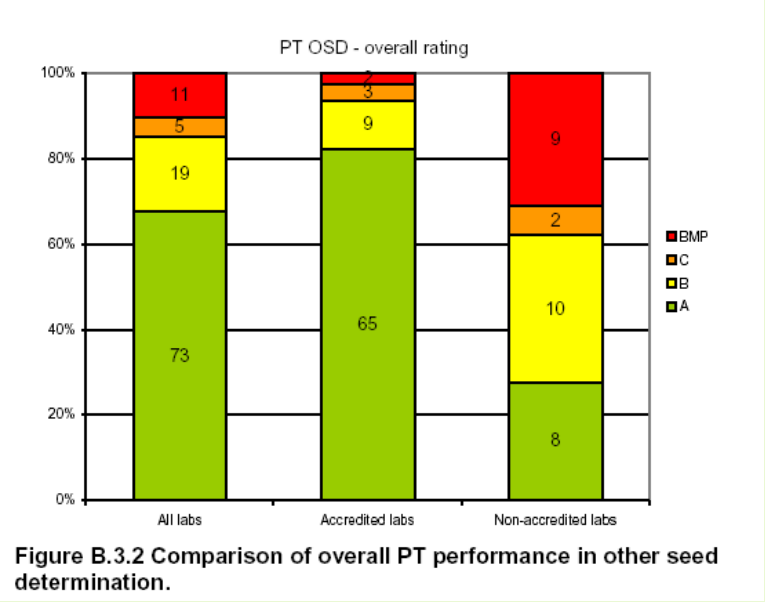


Figure B.3.2 Comparison of overall PT performance in other seed determination.

Recent developments

- Cuts at the universities reduces the progress in scientific research tremendously.
- International training programmes in seed technology for young academics at the university level have been closed down.
- Cuts in resources of the public stations reduces the work on applied seed science and on the international level.

Conclusions

- The determination of the seed quality, the seed testing, is the most important measure for the agricultural production.
- Seed Testing is depending on science, scientitic studies and the application of the principles of scientific work.
- The development of seed testing, as well as the international harmonization of seed testing procedures has been achieved rapidly through intensive work.
- Tremendous cuts in nearly all areas of seed testing over the last years is threatening the today internationally harmonised system.

Thank you for your attention