Management of Field Trials using Nordic Field Trial System

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Why international co-operation?

- Sharing of results across borders
- Common standards and methods
- Data stored in a secure and uniform way
- Cost reduction
  - Larger number of trials
  - Common development of equipment
  - Common data management system
Background

• A Danish field trial system developed since 1992
• Meetings and contacts between Nordic countries since 2002
• A common Nordic system developed 2005-2006 by Danish Agricultural Advisory Service
• *Nordic Field Trial System* introduced in 2006
Nordic co-operation status 2007

• Denmark: 1080 trials (DLBR)
• Norway: 275 trials (BioForsk/Forsøksringene)
• Sweden: 12 trials (SLU/HHS)
Nordic Field Trial System

Technician in field

Technician at field trial station

Exp. planner

NFTS server
Nordic Field Trial System

Modules:

• Internet applications (.NET)
• Specific NFTS applications (Delphi, download < 3MB)
• Hand terminal (.NET)
Nordic Field Trial System

Language:
- Terminology, calculations and standards etc. are adjusted to the need of the individual country.
Nordic Field Trial System

Editing look-up tables:

- Use of look-up tables is a central feature
- New crops, varieties, fertilizers, pesticides etc.
- New measurement parameters
Nordic Field Trial System

Experimental planning:

• Elaboration of ‘master experimental plan’
010010606 - Sowing date and sowing rates in winter barley

**Experimental design**

- **Number of treatment**
  - Factor 1: 5
  - Factor 2: 3
  - Factor 3: 0
  - Factor 4: 0

- **Experimental design**
  - **Plot distribution**: Split-plot, 2 factors
  - **Design owner**: PC-FieldTrial (local)
  - **Buffer**
  - **Replicates**: 5
  - **Rows**: 1
  - **Show design**

- **Plot demands**
  - **Gross plot min. m²**
  - **Harvest plot min. m²**: 30

- **Standard treatment (to harvest prognosis)**
  - Factor 1: 3
  - Factor 2: B
  - Factor 3: 
  - Factor 4: 

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010010606 Sowing date and sowing rates in winter barley

Landscentret, Planteavl
Udkærsvej 15, Skejby
8200 Århus N.

The trial plan has last been updated 25-05-2007
Distribution date: 17-08-2005

PURPOSE: To investigate the relation between sowing time and seed quantity in winter barley.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Scope</th>
<th>Amount/ha.</th>
<th>Man.samp. no.</th>
</tr>
</thead>
</table>

Payment: A fee is paid to trials that are carried out according to the trial plan and where all data are reported duly.

TRIAL CONDITIONS: The trial must be established in a field with winter barley.
Nordic Field Trial System

Administration of field trials:

- Assignment of single field trials to local field trial stations
- The master experimental plan is copied
- Individual randomization in each single field trial
Nordic Field Trial System

Entering data via PC-Field Trial:
• Can be done via hand terminal or directly to a PC
DESIGN HAS BEEN CONFIRMED

If you by a mistake have exchanged the treatments for a few plots, you must switch the treatment number in these plots.

This is done by moving the plot with the mouse to its new siting (in the trial map to the right). Thereby the treatment of the two plots are switched.

You can only switch treatments within the same block or split-block. If this is not enough you must contact the administrator.

If you have given a plot the wrong treatment it must be noted. This is done by right clicking the plot (in the trial map to the right) and choosing "Wrong treatment".

Experimental design type: Split-plot, 2 factors
Number of factors: 2
Randomized/non randomized: systematic
Buffer rows: Around row (before and after)
Number of replicates: 4
Number of treatments in factor 1: 5

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
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<td>3</td>
<td>A2</td>
<td>B2</td>
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<td>4</td>
<td>A3</td>
<td>B3</td>
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<td>B1</td>
<td>C1</td>
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<td>C2</td>
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<td>9</td>
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<td>B4</td>
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<td>B5</td>
<td>C5</td>
</tr>
<tr>
<td>12</td>
<td>C1</td>
<td>A1</td>
</tr>
<tr>
<td>13</td>
<td>C2</td>
<td>A2</td>
</tr>
<tr>
<td>14</td>
<td>C3</td>
<td>A3</td>
</tr>
<tr>
<td>15</td>
<td>C4</td>
<td>A4</td>
</tr>
<tr>
<td>16</td>
<td>C5</td>
<td>A5</td>
</tr>
<tr>
<td>17</td>
<td>A1</td>
<td>B1</td>
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</table>
### Assessment Results

**Date:** 16/09/2005  
**Growth Stage:** 12  
**Measuring Face:** 0.2

<table>
<thead>
<tr>
<th>Row</th>
<th>Plot</th>
<th>Replicate</th>
<th>Plot</th>
<th>Value</th>
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<tr>
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<td>4</td>
<td>1</td>
<td>A3</td>
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<td>1</td>
<td>5</td>
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<td>1</td>
<td>6</td>
<td>1</td>
<td>A5</td>
<td>91.0</td>
</tr>
</tbody>
</table>

**Assessments Time Table and Assessments**

- **C01:** Date 03/06/2006 At earring  
  - L* - Growth stage, crop

- **P01:** Gs. 00 At trial start  
  - F - JB number, estimated  
  - F - Reaction number, 0 - 25 cm depth  
  - F - P number, 0 - 25 cm depth  
  - F - Kt, 0 - 25 cm depth  
  - F - Mg number, 0 - 25 cm depth

- **P02:** Gs. 11-12 28 days after  
  - P - Plant population, plants/m²  
  - P - Weed, % of soil covered  
  - P* - Field pansy, % of surface covered
Nordic Field Trial System

Hand terminal:

- Registrations in tables automatically designed for the specific trial
- Upload of data in the field via the mobile net or any other network
- Easy navigation in the field
- OS: Windows Mobile 6
- Software programmed in .NET
Nordic Field Trial System

Results and reporting etc.:

- Access to various information via Internet
- Log-on required for certain categories
- Results from single trials published dynamically (html)
Overview

Nordic Field Trial System is a system to elaborate experimental plans and data management in field trials. From this page you have access to experimental plans, the location of the trials etc. Local advisors carrying out trials have access to their own results. Advisors, logged in with their advisor ID, can order materials needed in their trials. Info about the Nordic Field Trial System and the hand-held data collection equipment is also available here.

Trial plans
- National trial plans

Lokal trial plans
- Own trial plans
- Assign trials
- Data export

Single trials results and location
- Single trials results and location of the trials

My trials
- Preassigned trials
- Assigned trials
- Status list
- Trial subsidy

Materials ordering
- Order forms, signs and harvest labels
- Seeds, fertilizers and chemicals
- Order materials for trials

Results
- Table Summary

Other
- Trial messages
**010010606-003. Sowing date and sowing rates in winter barley**

Field Trial results can only be used under specific conditions - read about it [here](#).

**Trial location**

**Trial host:** Søren Færing

Vennelbjergvej 201

9800, Haring

Tel: 9880233/2044599

Email: 

**Location:**

**Utm Zone:** E2

**Easting:** 545.3431 m

**Northing:** 6.387.286 m

**District:** Haring

**Experimental design and randomization**

**General information**

Crop: Wt. barley, Variety: Carola, Previous crop: Wt. barley.


**General treatments**

<table>
<thead>
<tr>
<th>Date</th>
<th>Amount/ha</th>
<th>Treatment</th>
<th>hl/ha</th>
<th>Pl/ha</th>
<th>Kl/ha</th>
<th>TFI</th>
<th>Scope</th>
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<tr>
<td>02-11-2005</td>
<td>3 kg</td>
<td>Manganesef. rigen opt. om p.t.indhold</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Trial only</td>
</tr>
<tr>
<td>02-11-2005</td>
<td>0,5 l</td>
<td>Cestri CM</td>
<td></td>
<td></td>
<td></td>
<td>0,5</td>
<td>Trial only</td>
</tr>
<tr>
<td>03-11-2005</td>
<td>4 l</td>
<td>Stomp</td>
<td></td>
<td></td>
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<td>1</td>
<td>Trial only</td>
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<td>02-11-2005</td>
<td>0,03 l</td>
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<td></td>
<td>0,15</td>
<td>Trial only</td>
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<tr>
<td>22-11-2005</td>
<td>2,5 kg</td>
<td>Manganesef. rigen opt. om p.t.indhold</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Both trial and field</td>
</tr>
<tr>
<td></td>
<td>P10: At earring</td>
<td></td>
<td>P10: Before harvest</td>
<td></td>
<td>P10: At harvest</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
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<td>---</td>
<td>-------------------</td>
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<td></td>
</tr>
<tr>
<td>A</td>
<td>24-07-2006 ST. 90</td>
<td>20-07-2006 ST. 00</td>
<td>05-07-2006 ST. 00</td>
<td>06-07-2006 ST. 00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ball brown rust % covered</td>
<td>Powerdly mildew % covered</td>
<td>Leaf blotch % covered</td>
<td>Lodged plants score 0-10</td>
<td>Straw length cm</td>
<td>Straw breaking score 0-10</td>
<td>Yield kg grain</td>
</tr>
<tr>
<td>1</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>91.5</td>
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</table>

<table>
<thead>
<tr>
<th></th>
<th>P11: At harvest</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Yield kg grain</td>
</tr>
<tr>
<td>A</td>
<td>06-07-2006 ST. 00</td>
</tr>
<tr>
<td>1</td>
<td>90.3</td>
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<tr>
<td>2</td>
<td>92.4</td>
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<td>4</td>
<td>90.0</td>
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<tr>
<td>5</td>
<td>91.2</td>
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</table>

| B | 06-07-2006 ST. 00 | 26-07-2006 ST. 00 | 03-08-2006 ST. | 03-08-2006 ST. |
| 1 | 80.5 | 42.4 | 5.04 | 0 | 99.5 | 88.0 | 13.7 |
| 2 | 91.3 | 48.9 | 5.74 | 0 | 99.7 | 86.2 | 13.7 |
| 3 | 95.7 | 51.8 | 5.98 | 0 | 99.8 | 86.8 | 13.6 |
| 4 | 99.9 | 53.0 | 6.24 | 0 | 99.8 | 86.8 | 13.6 |
| 5 | 90.7 | 53 | 6.04 | 0 | 99.8 | 86.8 | 13.6 |

| C | 06-07-2006 ST. 00 | 26-07-2006 ST. 00 | 03-08-2006 ST. | 03-08-2006 ST. |
| 1 | 92.1 | 48.9 | 5.74 | 0 | 99.8 | 86.8 | 13.7 |
| 2 | 95.7 | 51.8 | 5.98 | 0 | 99.8 | 86.8 | 13.6 |
| 3 | 99.9 | 53.0 | 6.24 | 0 | 99.8 | 86.8 | 13.6 |
| 4 | 90.7 | 53 | 6.04 | 0 | 99.8 | 86.8 | 13.6 |
| 5 | 92.1 | 48.9 | 5.74 | 0 | 99.8 | 86.8 | 13.6 |
Conclusions / future perspectives

• *Nordic Field Trial System* is an effective field trial management system that enables fast publication of the results

• The fast publication has proven to be very valuable to breeders and farmers

• The use of the system requires standardized experimental methodology - and in return it ensures standardized and comparable data
Conclusions / future perspectives

• The system allows easy sharing of results across national and institutional borders

• The system may be adopted for use in more countries, and potentially for use in international variety testing etc.

• International cooperation enables a better implementation of new technologies, e.g. GPS, RFID
The 13th International Conference and Exhibition on mechanization of field experiments will take place from June 30th to July 4th 2008 in Denmark. The objective of the conference is to provide insight, knowledge and motivation as inspiration for organising and implementing scientific field experiments and trials. Believing field experimentation is the key to modern and sustainable agriculture, we – as field experimenters – are obliged to engage in the objective of this conference.

The conference will be a mixture of oral presentations on new developments in field experiment methodology and technology and an exhibition of machinery and equipment. The preliminary program is presented on the back of this paper.

Field experiment equipment and machinery will be presented at the conference giving the participants opportunities to see the new trends and developments.