

Checking panel performance How?

Per Lea

Nofima Food

(Formerly Matforsk – Norw. Food Res. Inst.)

Software

- Traditional statistical packages
- Spreadsheet
- Special programs
 - PanelCheck (Freeware)
 - http://folk.uio.no/henninri/div/Setup_PanelCheck_V1.3.1_rc1.exe

www.matforsk.no



The screenshot shows the Matforsk website interface. At the top is a dark blue header with a search bar and the Matforsk logo. Below the header is a navigation bar with links for News, Services, and Research. A Norwegian flag is visible on the left. The main content area is divided into two columns. The left column, titled 'On the Menu:', lists several articles. The right column features a large article titled 'New knowledge about salting meat and fish' with a corresponding image of a fish. Below this is a section titled 'NORWEGIAN FOOD RESEARCH' and 'EXCELLENT RESEARCH FOR TOMORROW'. At the bottom, there is a section for 'Research at Matforsk'.

Search:

MA

News Services Research

On the Menu:

- New knowledge about salting of meat and fish
- Health foods seen as unnatural
- Hungry for fullness and artificial sugar
- The Campylobacter Culprit
- SysDiet - healthy Nordic meals
- Salting is a big deal
- Changes views on food safety
- Italians demanding Norwegian lamb
- Old taste buds do not rust
- PanelCheck

New knowledge about salting meat and fish



The Norwegian international food industry is interested in the effects of sodium chloride (salt) on quality and human health. It is of particular importance to know the salting process when reducing the salt content of the product. [Read more](#)

NORWEGIAN FOOD RESEARCH
EXCELLENT RESEARCH FOR TOMORROW
Matforsk's task is to assist, and support, the food industry throughout the value chain. Our research is focused on: Effective production - Food, health and environment

Research at Matforsk
Matforsk's research is focused on: Effective production - Food, health and environment

Research

Research groups

PanelCheck

News

Problem areas

People

Industrial Partners


Courses

Downloads

PanelCheck

Quality Assurance and Optimal Utilisation of Descriptive Sensory Data

Welcome to the PanelCheck project.



Downloads

For Windows-users:

[Download PanelCHECK v. 1.3.0](#) for Windows

For other systems/platforms:

The source code (in Python) is available [here](#) at Sourceforge. To make the source code run on your platform you will need to install some packages listed on the next web page or below under **Credits**.

PanelCheck so far

- **560 registered users**
 - More than half are commercial companies
 - About 60% are from Europe
 - From 53 countries
- **Different businesses:**
 - Food
 - Spirits & beverages
 - Ingredients
 - Cosmetics
 - Tobacco
 - Electronics / entertainment
 - Car manufacturers

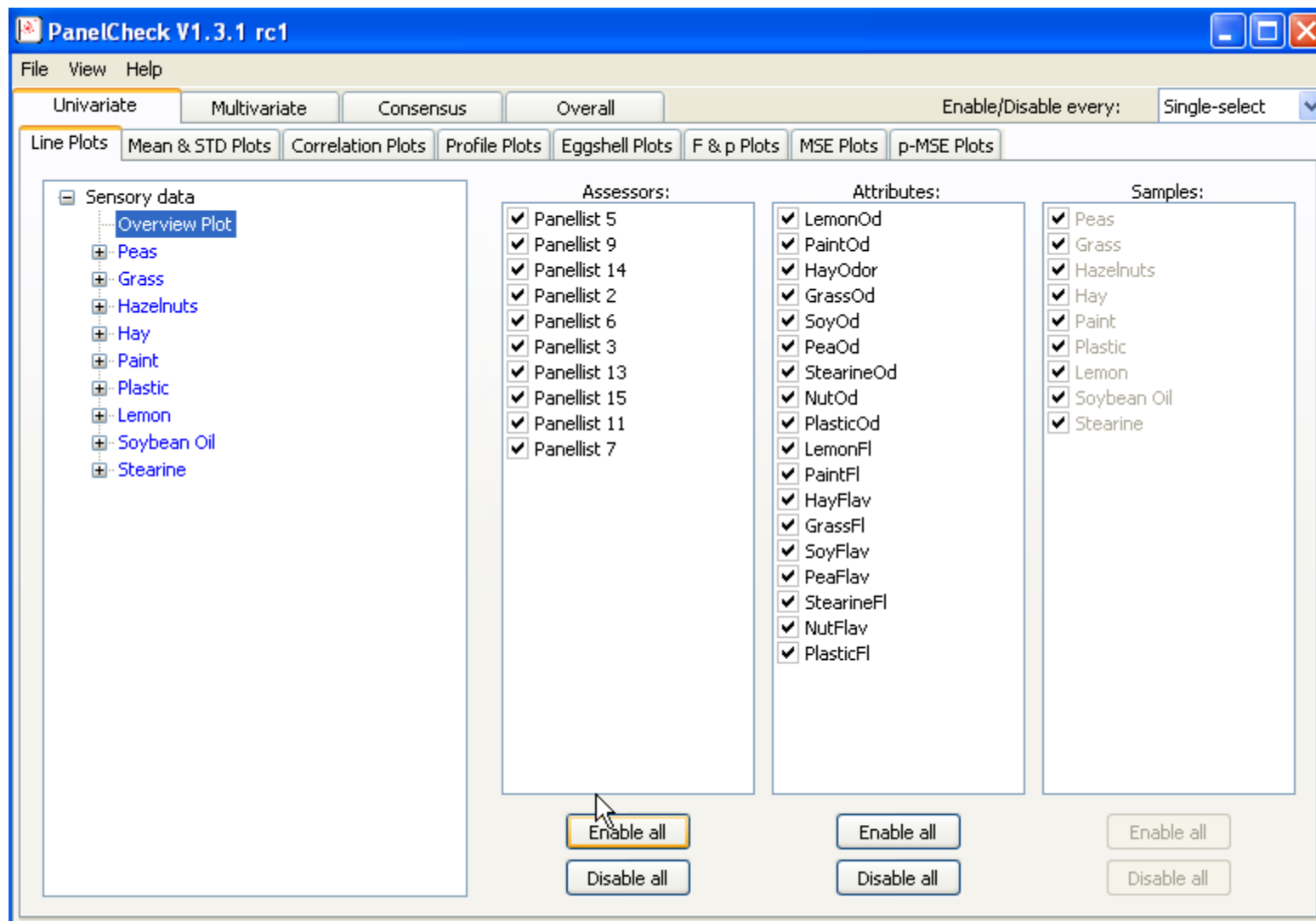
Basics of PanelCheck

- Import data
 - Excel-files
 - .txt-files (Tab, Comma or Semicolon delimited)
 - Previous PanelCheck data (default)
- Data structure
 - Columns: Assessor - Sample - Replicates - Sensory attributes
 - Extra columns possible

Assessor	Sample	Replicate	Colour Int	Whiteness	Hue	Sweetness	Saltiness
5	QZL	3	5.8	5.9	5.8	6.9	3.2
8	NKJ	1	5.0	5.0	4.6	4.2	4.4
5	NKJ	1	4.0	3.8	3.4	3.0	4.7
2	QZL	3	4.9	4.7	5.8	4.0	4.1
5	NKJ	3	3.5	3.9	3.6	4.5	4.8
4	PTW	3	4.5	4.6	3.3	4.9	5.0
2	AGH	2	2.2	1.7	3.7	3.9	3.5
9	PTW	1	6.1	6.2	3.7	5.2	3.2
3	AGH	1	2.5	2.2	3.7	3.5	3.8
.
.
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Restriction:

Character variables only accepted in columns 1-3



PanelCheck is NOT an attempt to replace stat programs!

- General overview
 - Univariate
 - Multivariate
 - Consensus
 - Overall

- Univariate
 - Line plots
 - Mean & STD plots
 - Correlation plots
 - Profile plots
 - Eggshell plots
 - F & p plots
 - MSE plots
 - p-MSE plots

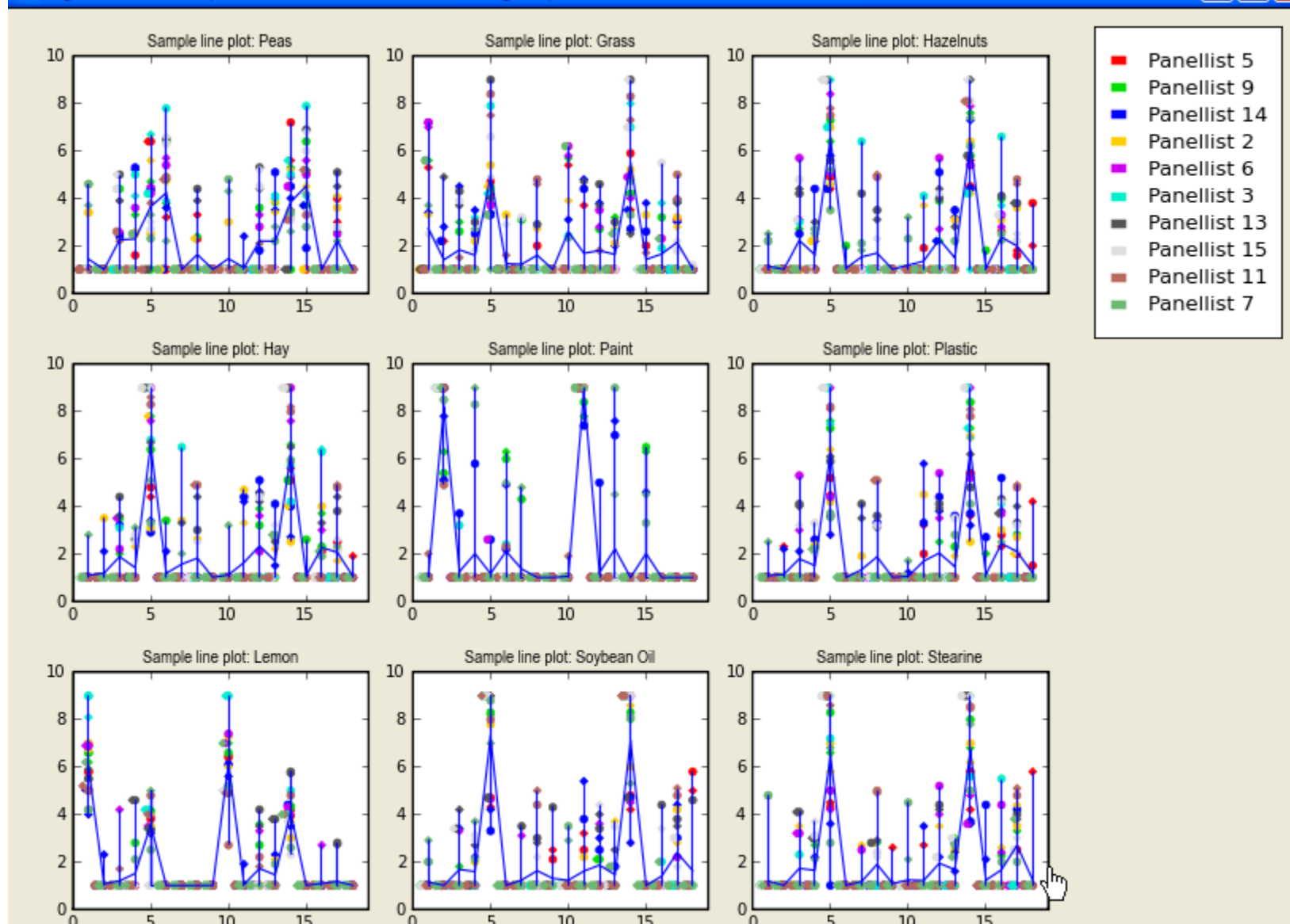


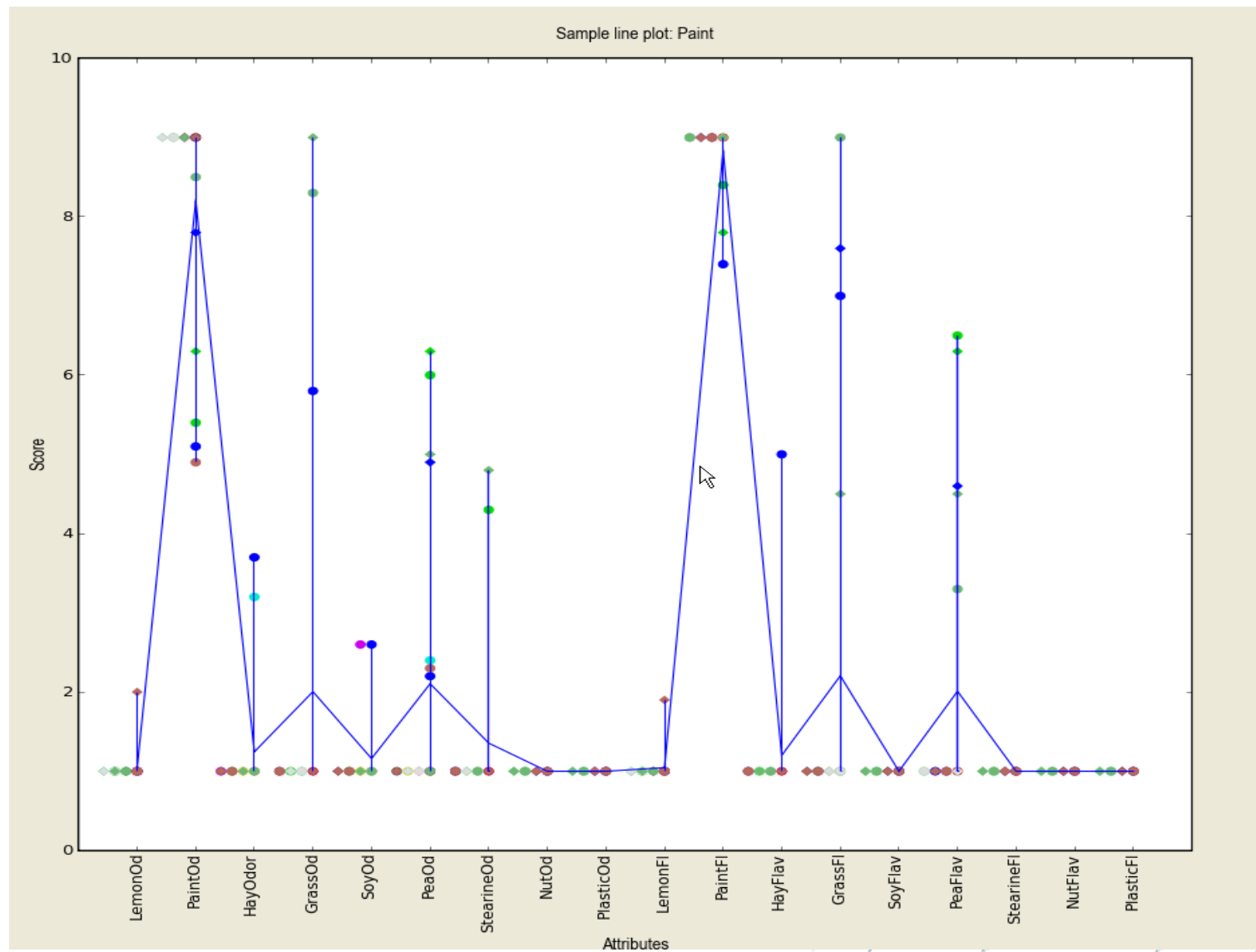
Basic idea

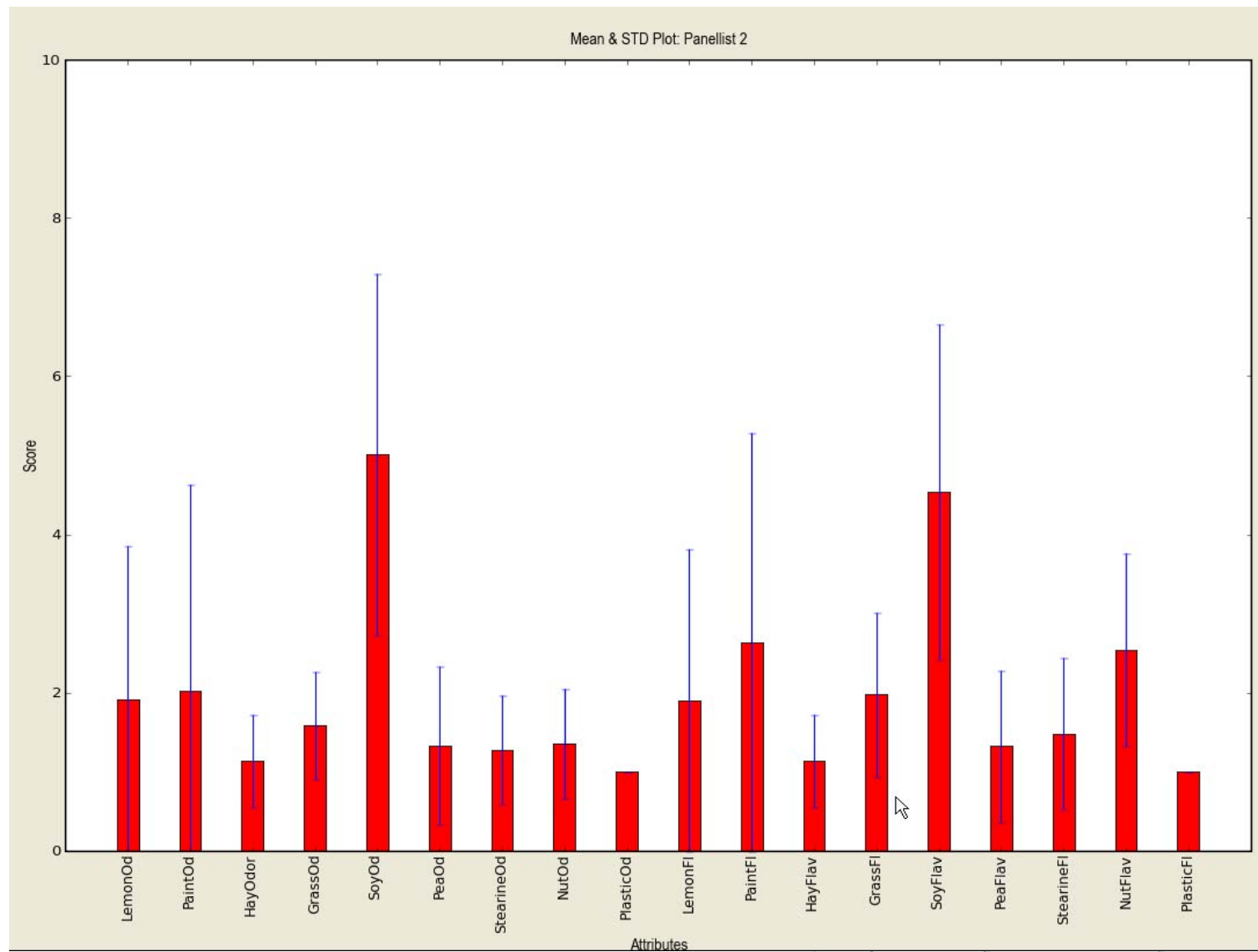
- Make quick overview
 - All assessors and samples
- Zoom in on interesting details

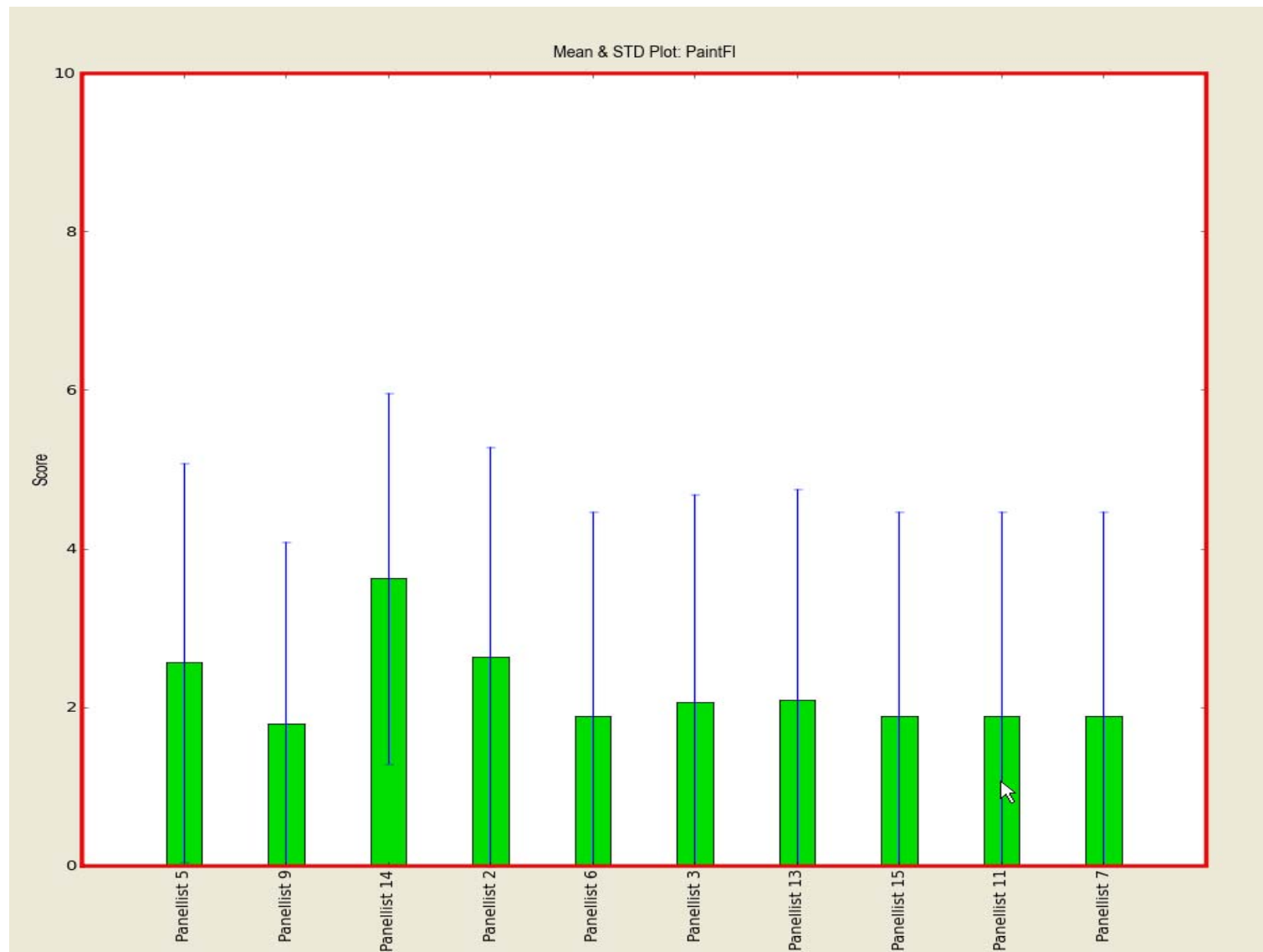


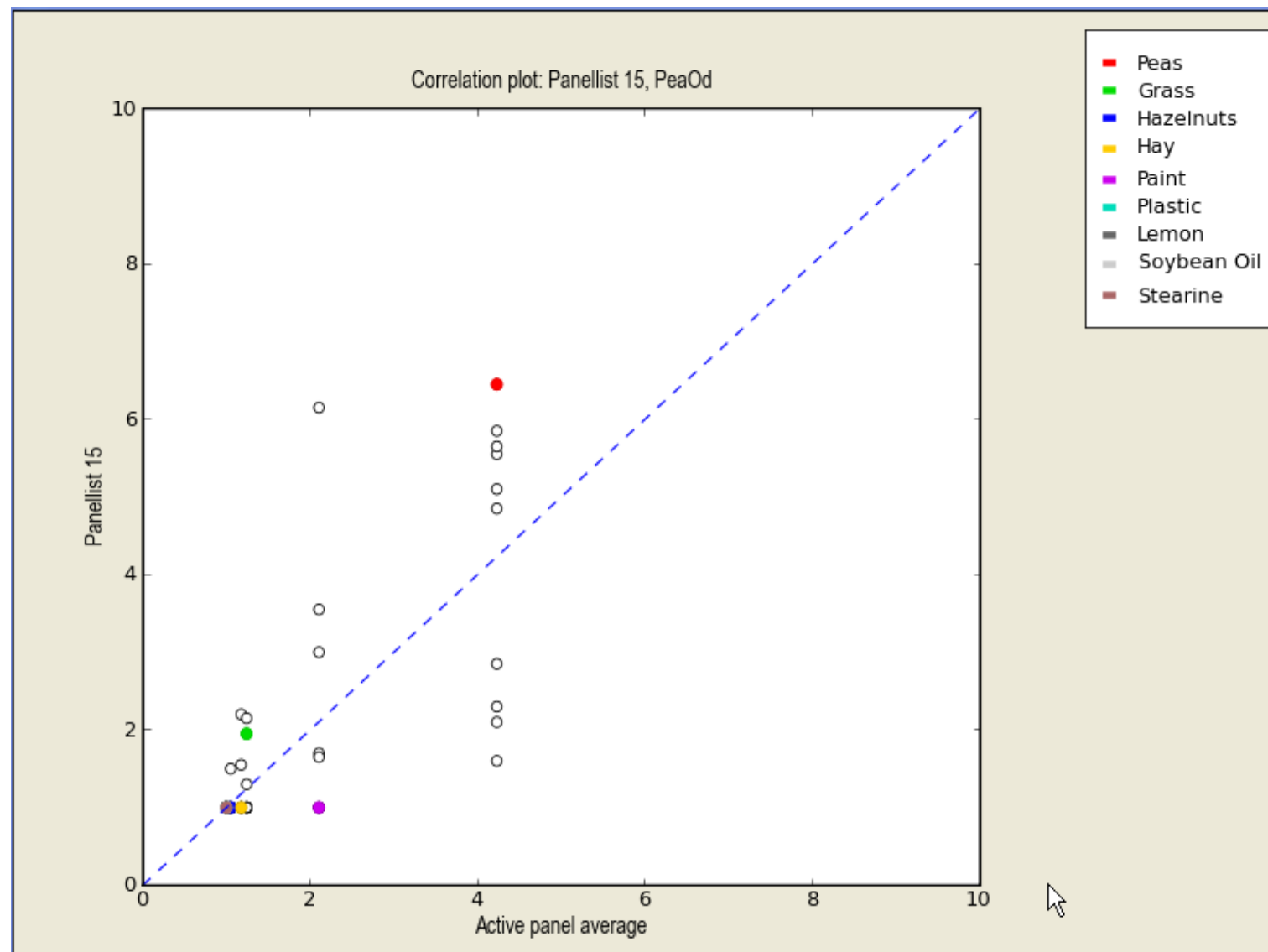
Fig. 1: Line Plot (F:\Sensometrics 2008\Trening.xls)

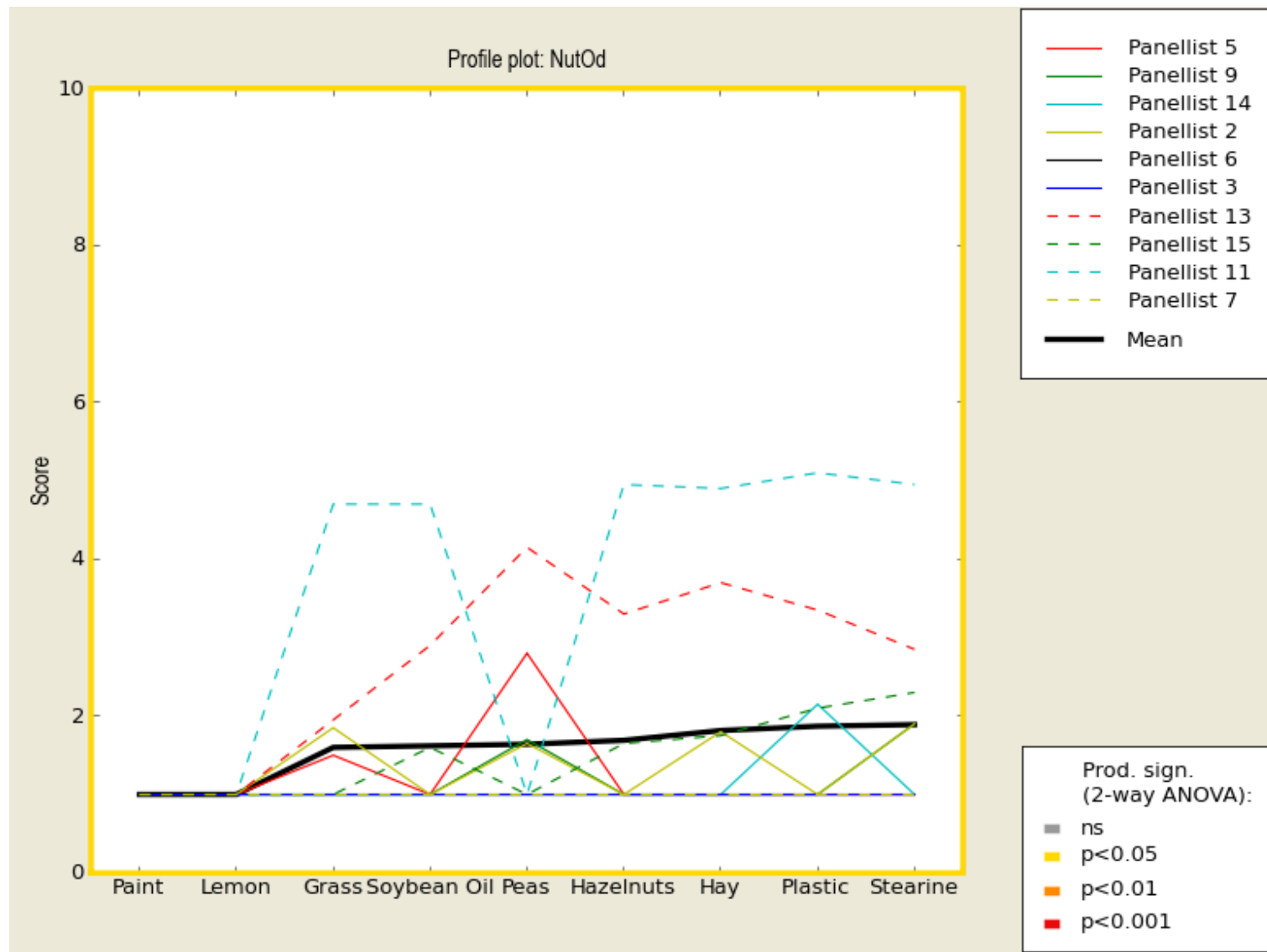


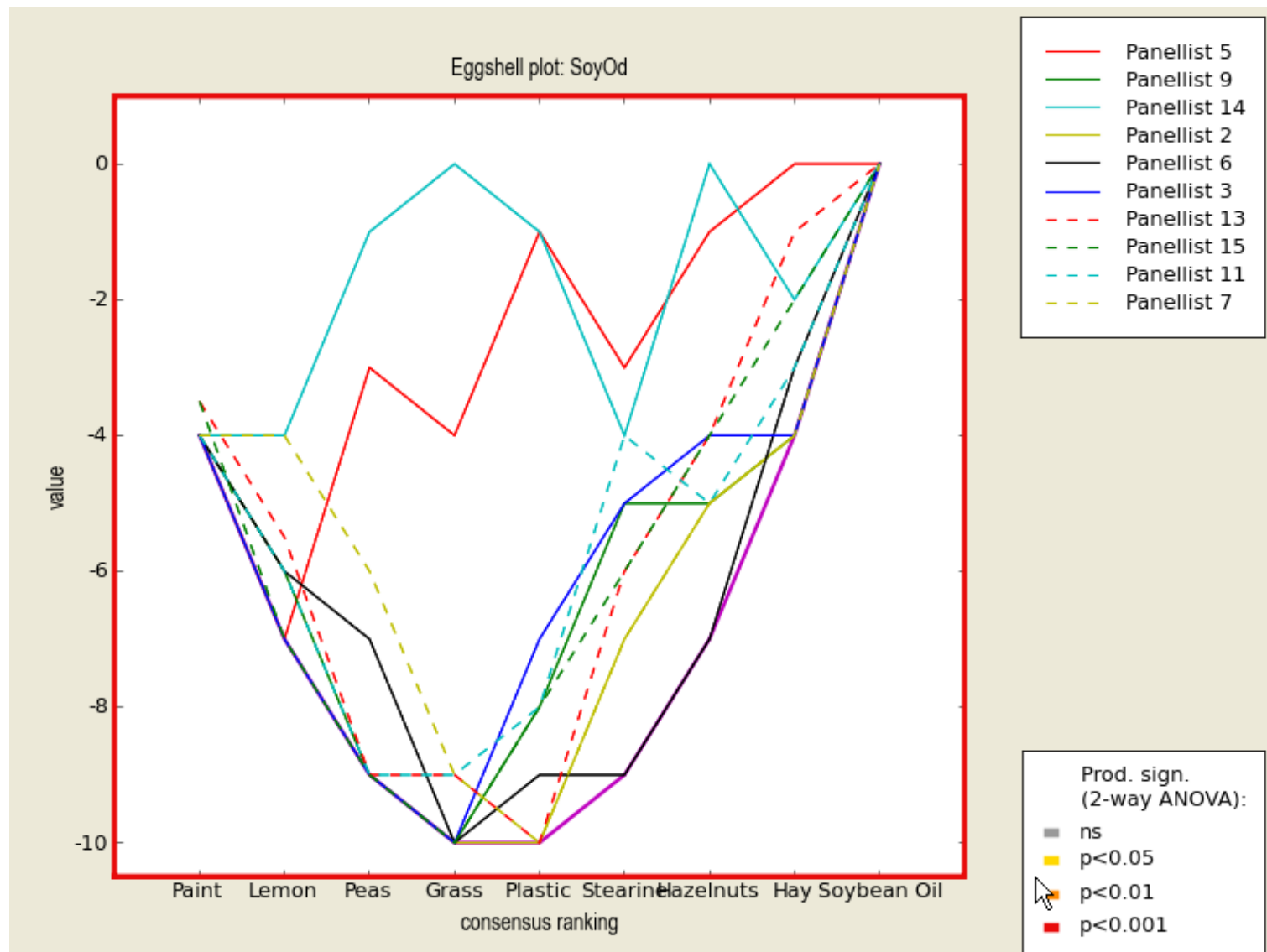


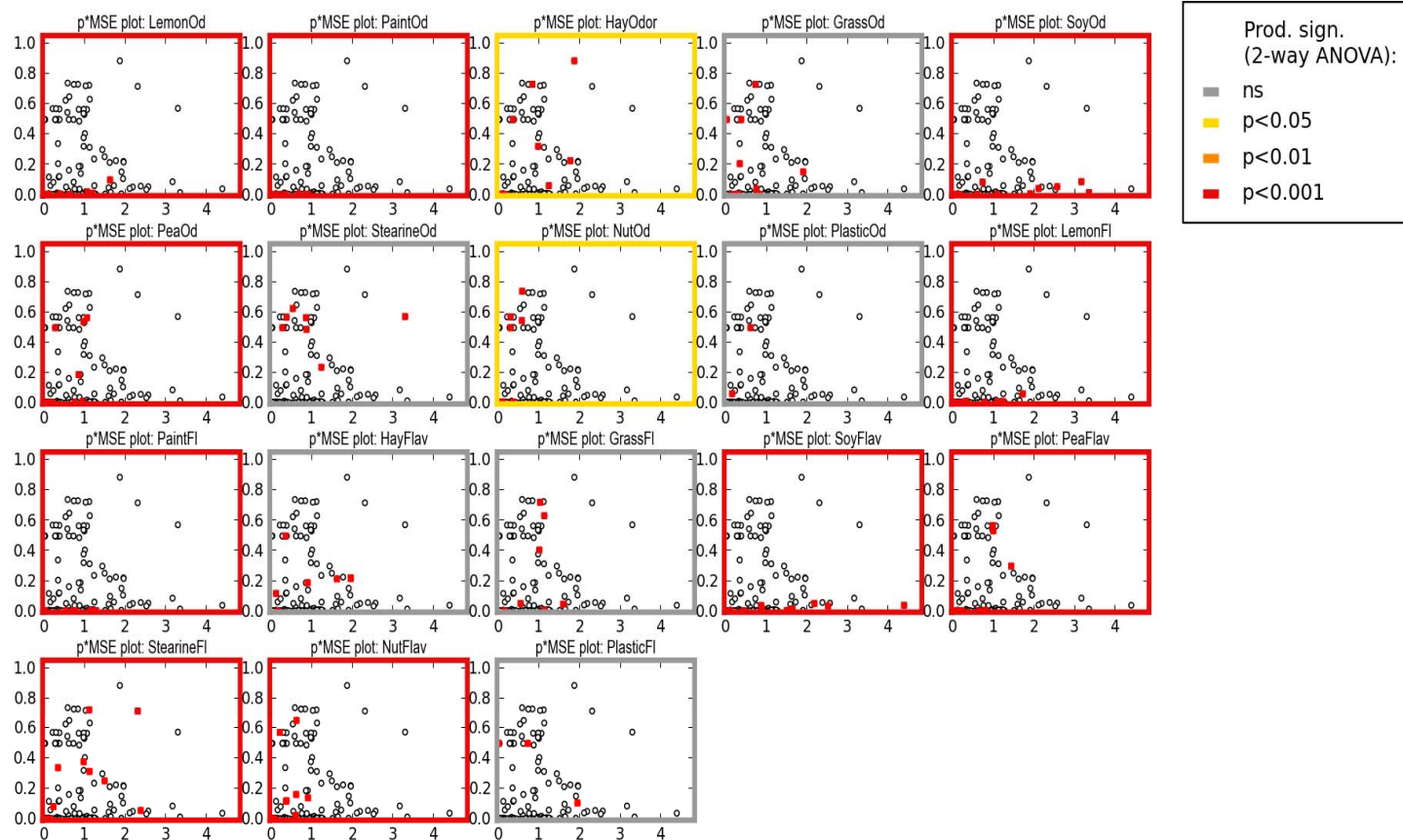


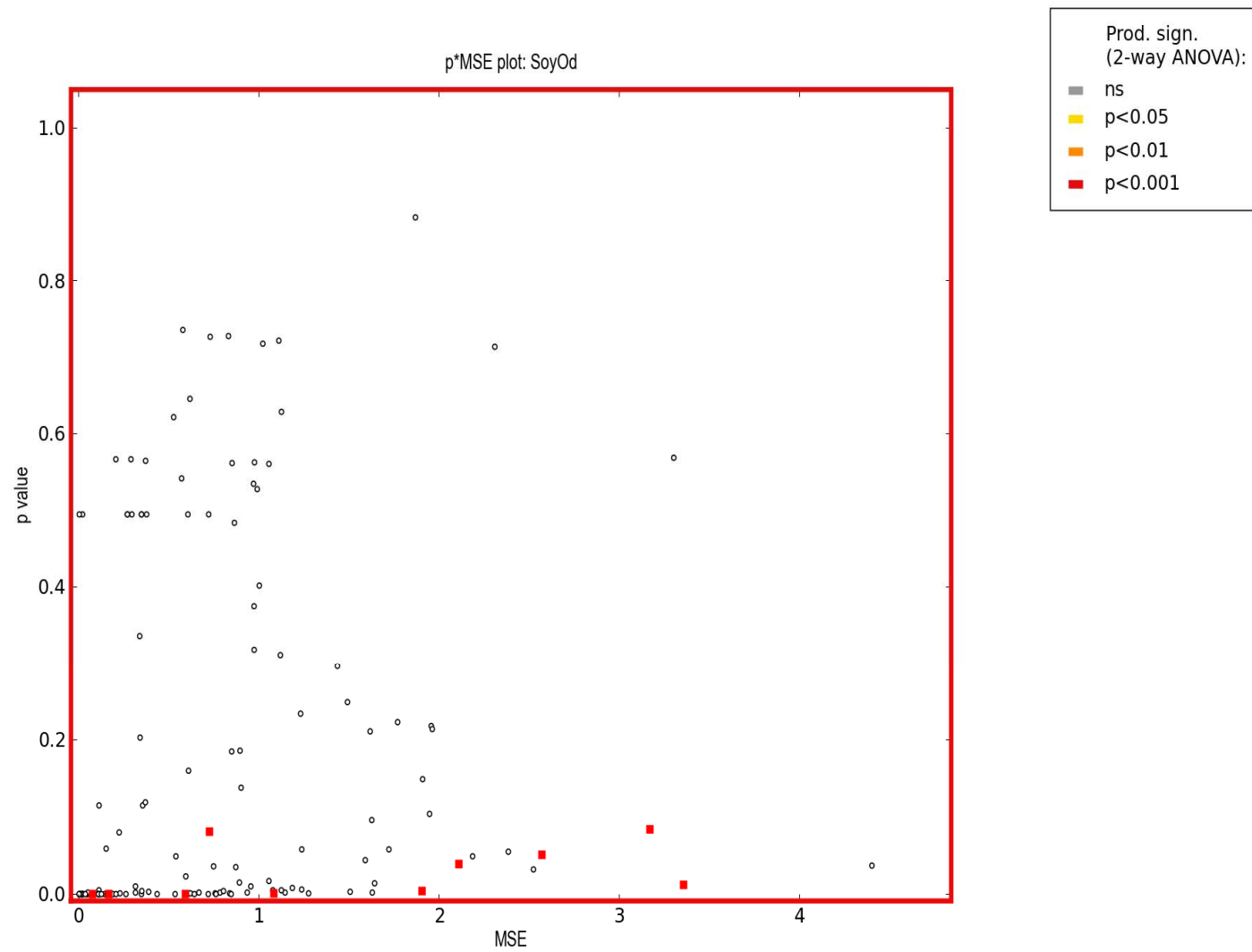


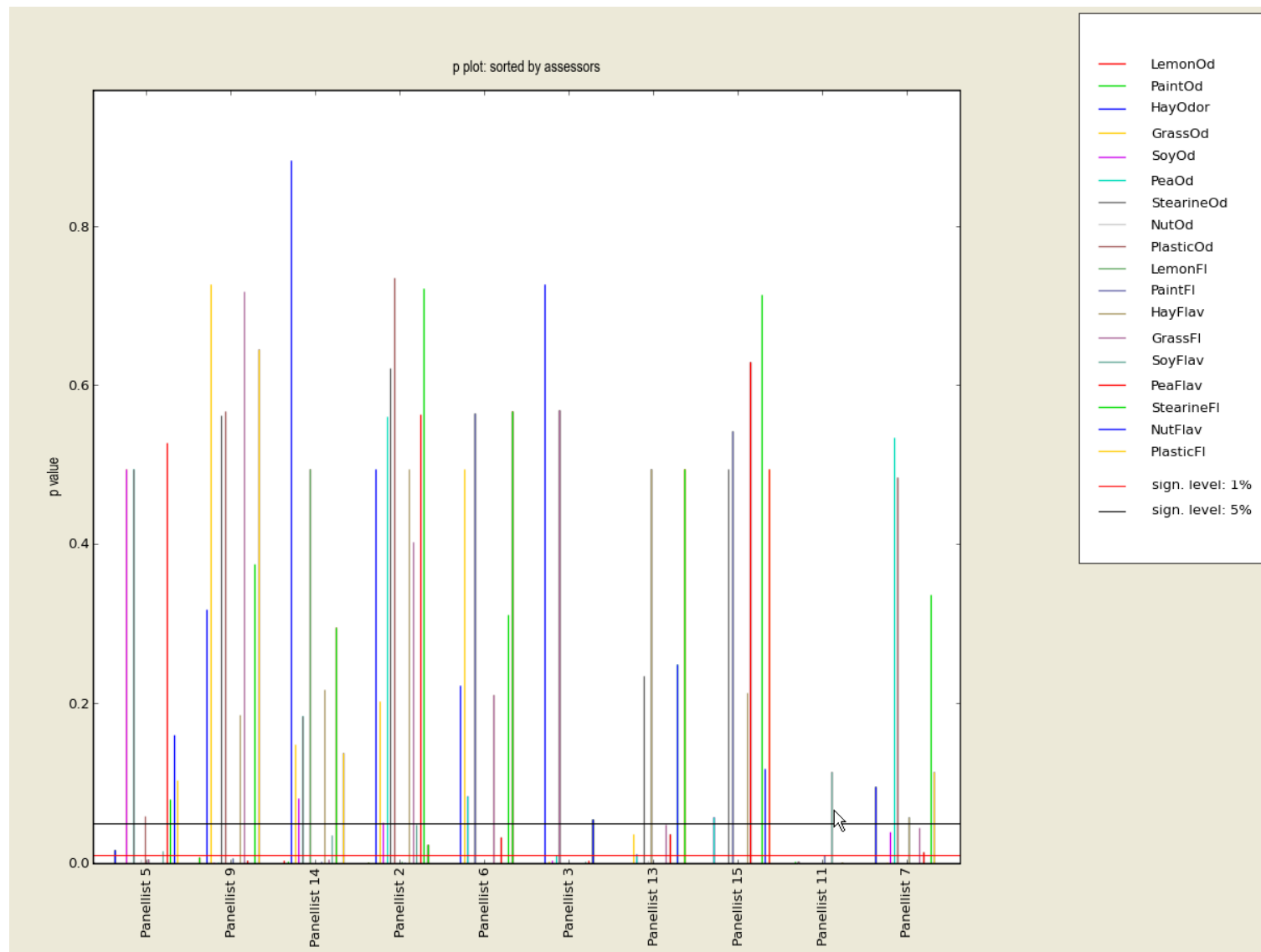


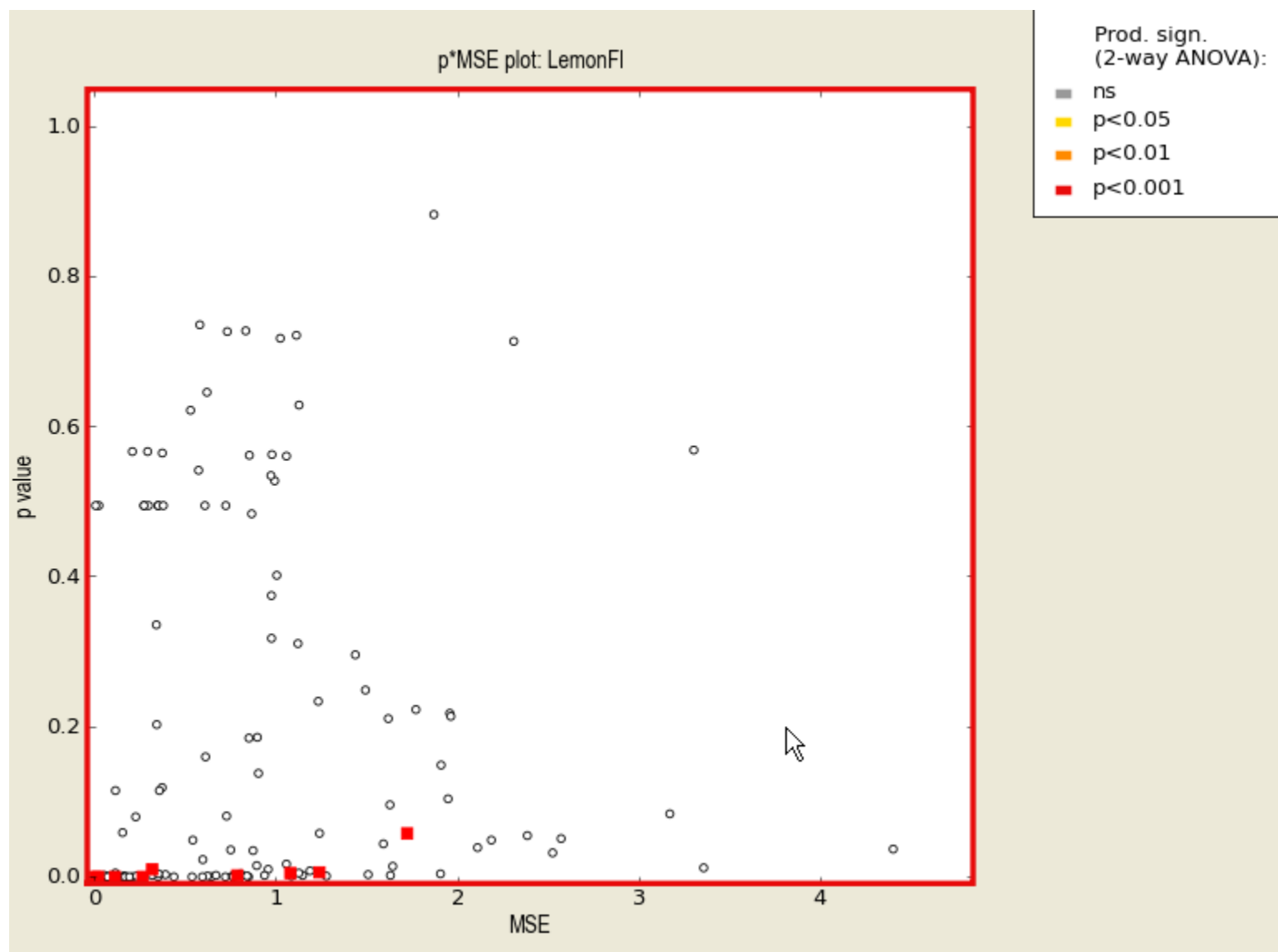












- Multivariate
 - Tucker-1
 - Manhattan plots
- Consensus
 - Original
 - Standardized
 - STATIS
- Overall
 - 2-way ANOVA (without reps)
 - 2-way ANOVA (reps)
 - 3-way ANOVA

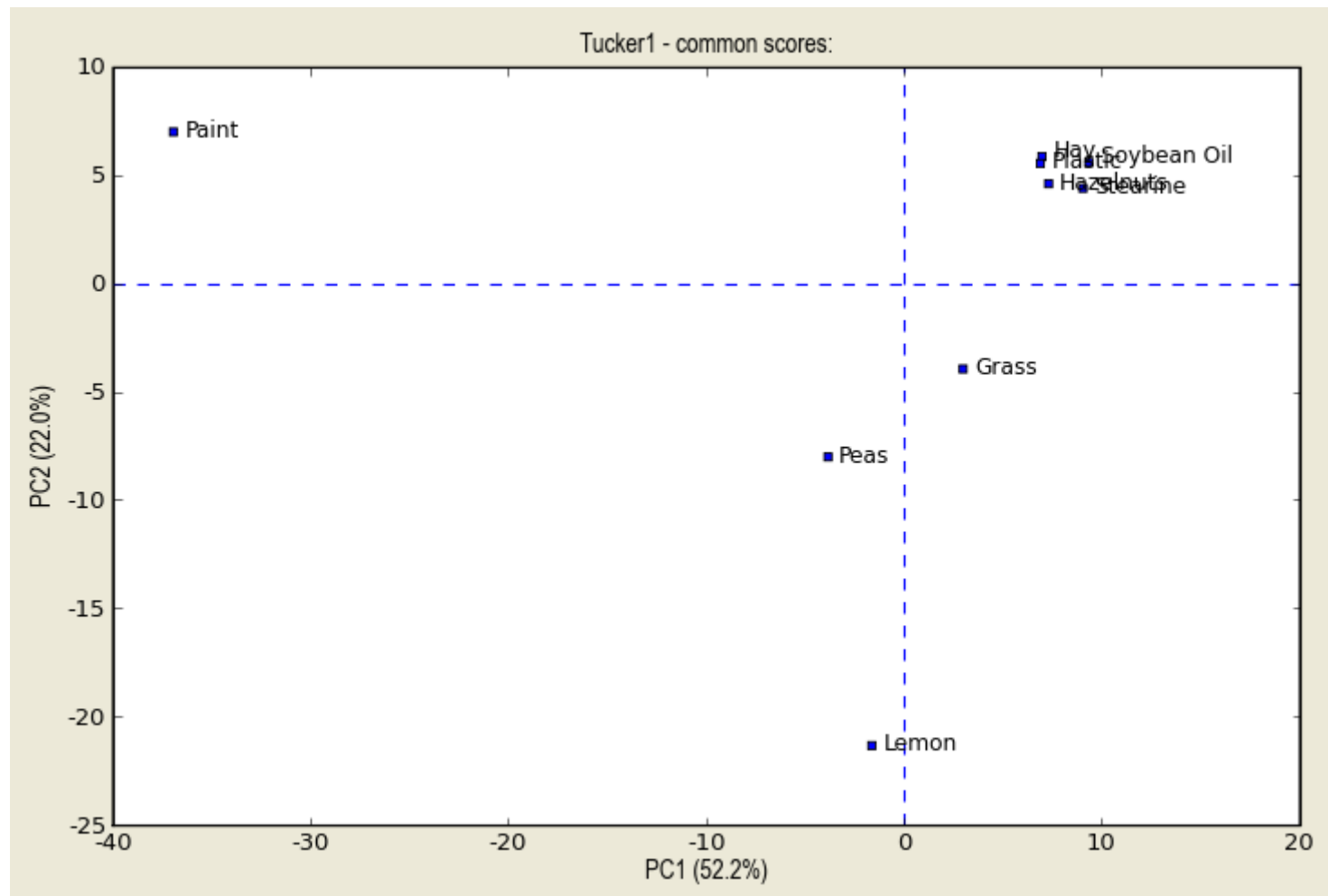
Tucker-1 (PCA)

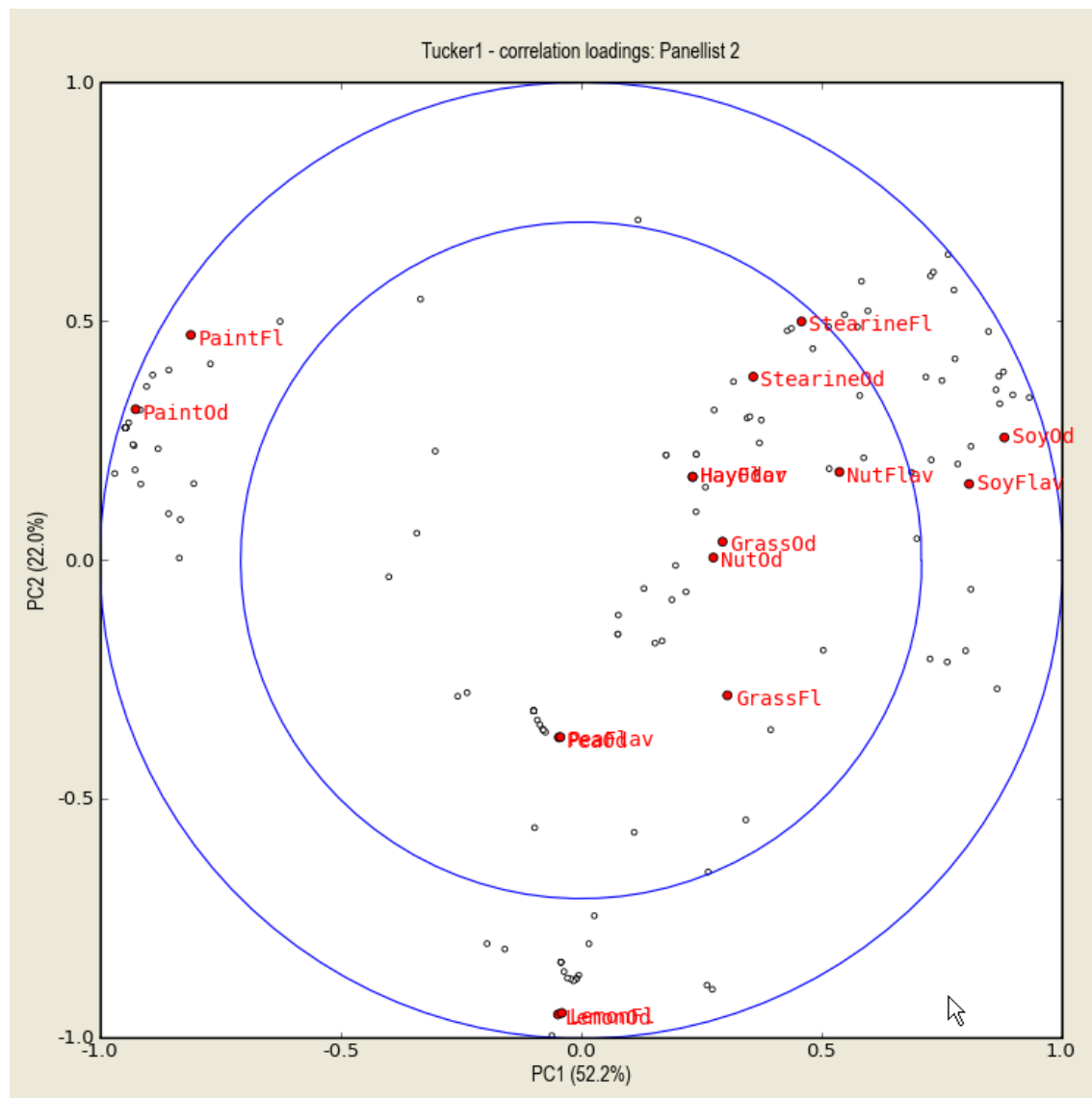
- *Unfolding* data matrix (from long-and-thin to short-and-fat):

Assessor 1
Assessor 2
- - - -
- - - -
Assessor k

Assessor 1	- - - - -	Assessor k
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A	3.5	1.4	3.2	4.6	1.1
B	5.6	3.7	3.5	3.7	6.0
C	2.2	1.0	3.6	8.9	2.4
D	8.0	8.6	2.9	1.3	7.9



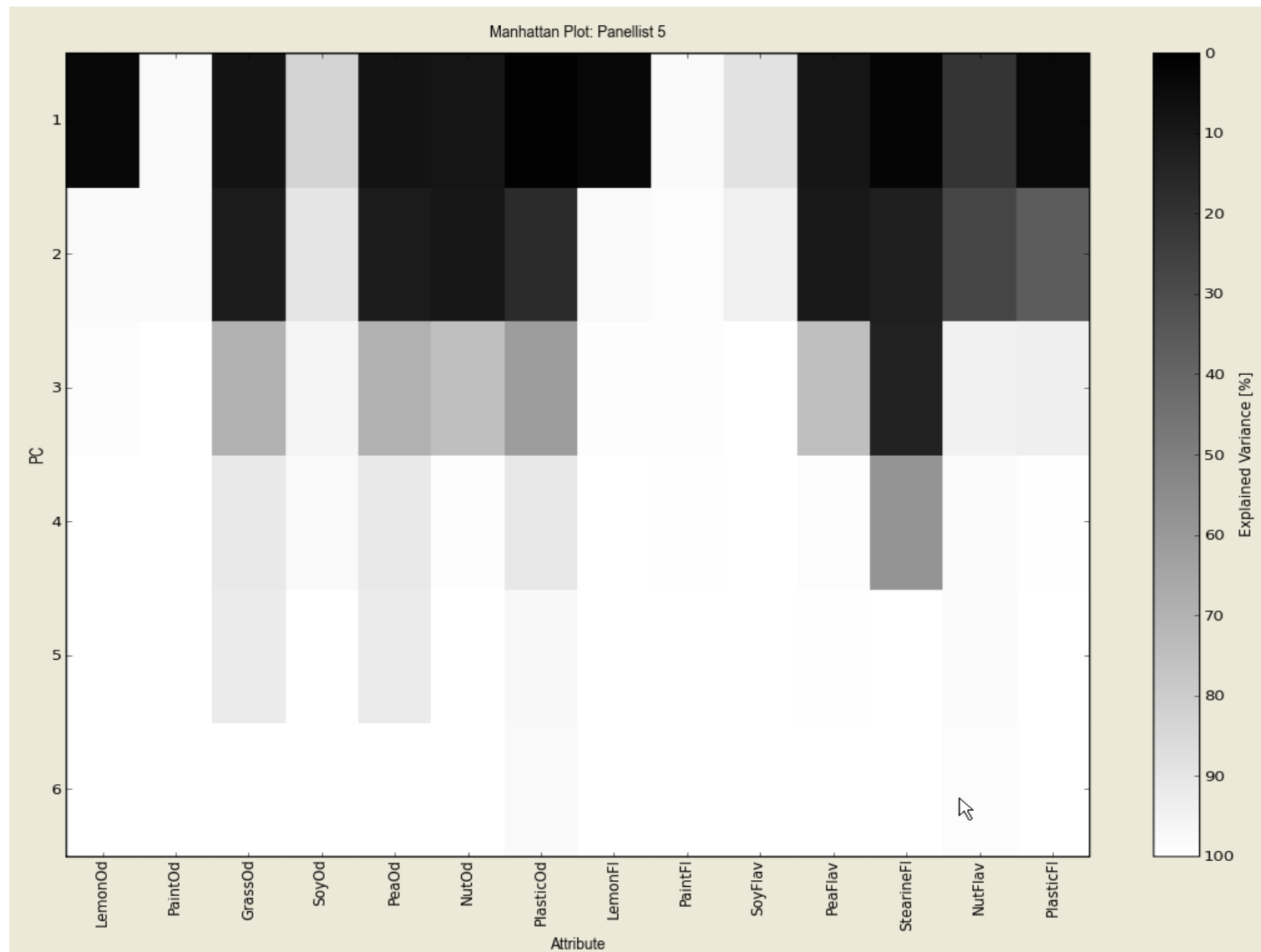


Manhattan plots

- PCA for each assessor separately
- Figure shows % explained variance for each PCA
- Large white areas: *good*
- Large black areas: *bad*

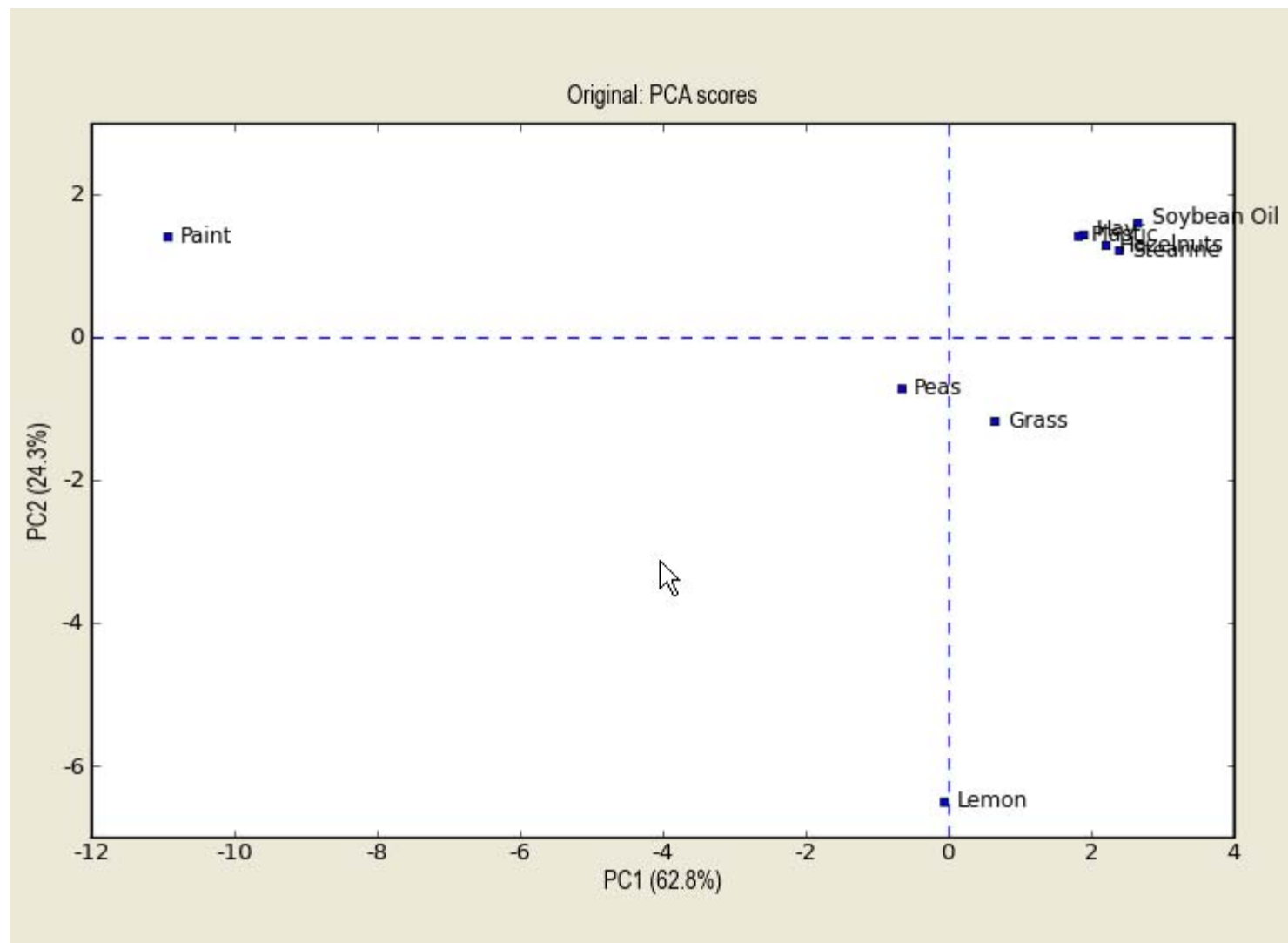


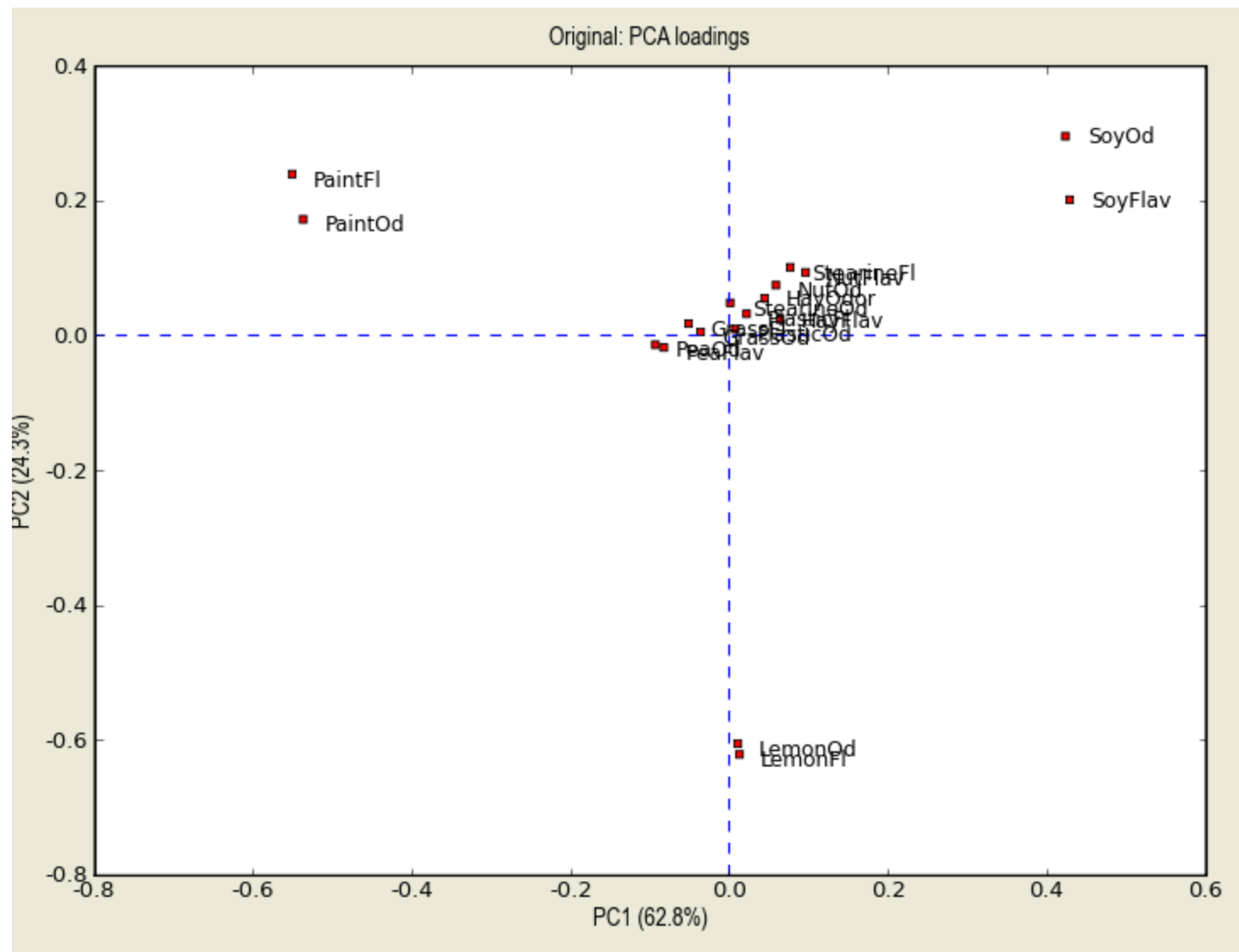




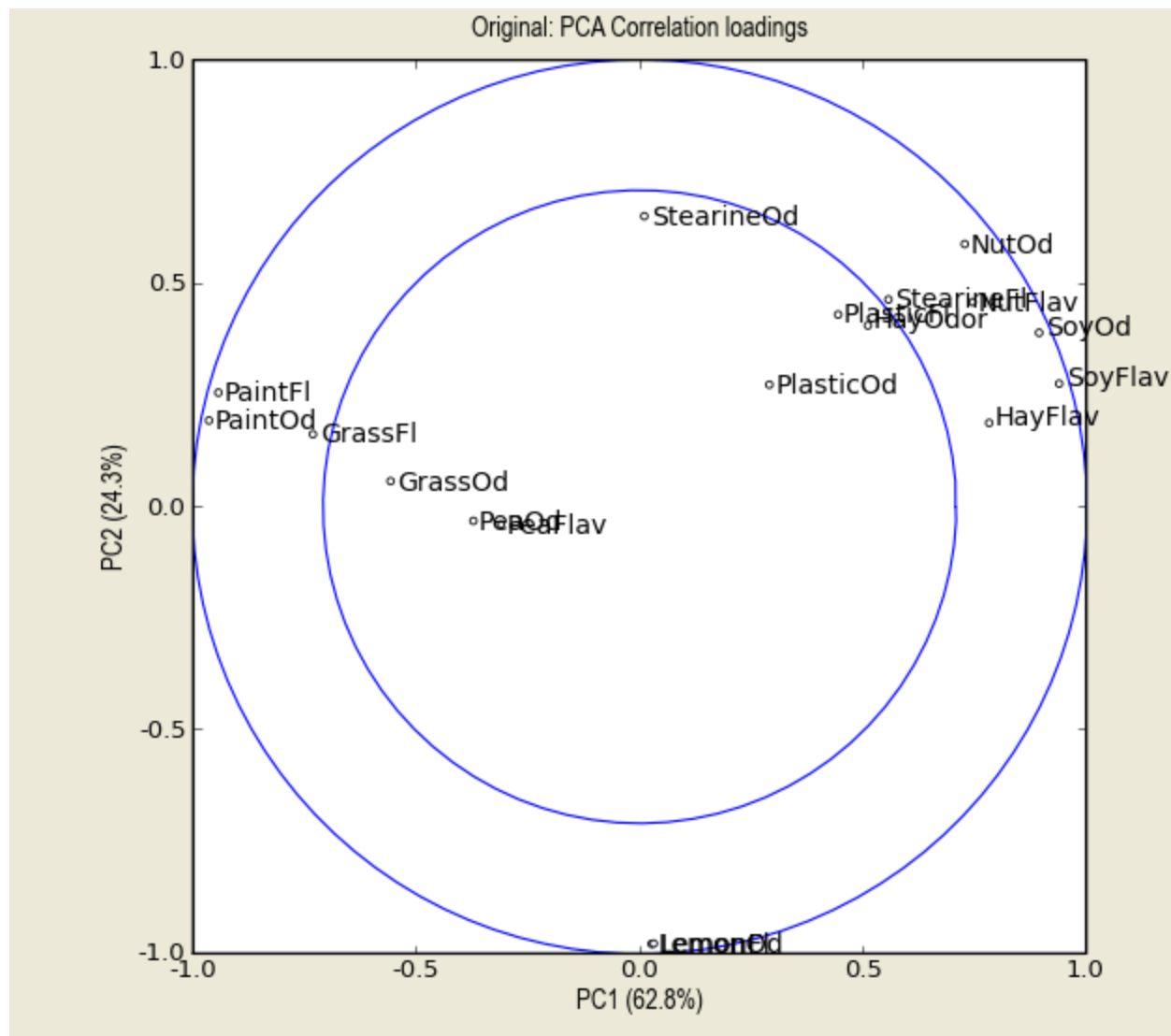
Consensus

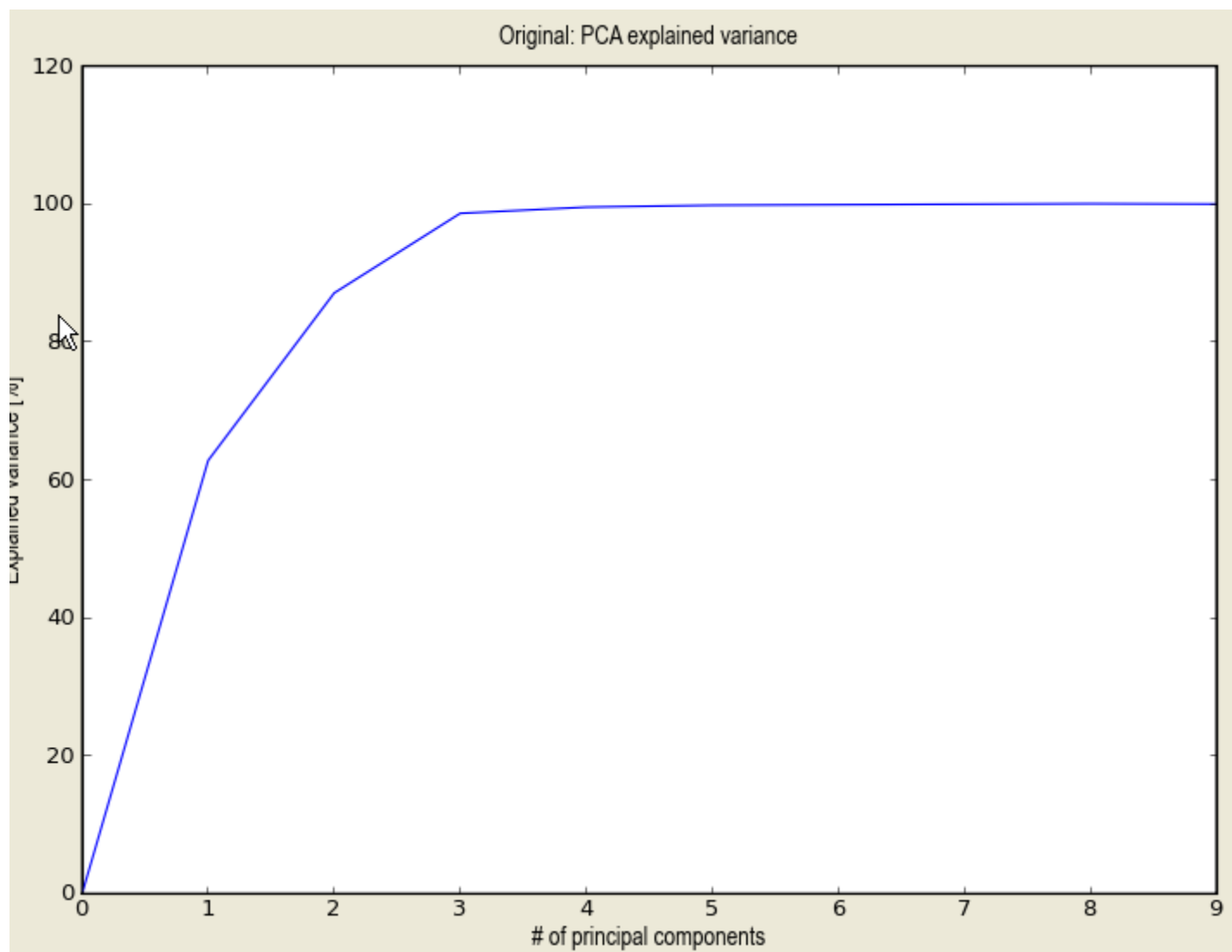
- Consensus Data (Mean values for each attribute and sample)
- PCA Scores
- PCA Loadings
- PCA Correlation Loadings
- Bi-Plot (Scores & Loadings in the same frame)
- PCA Explained Variance
- Spider Web (Mean values)

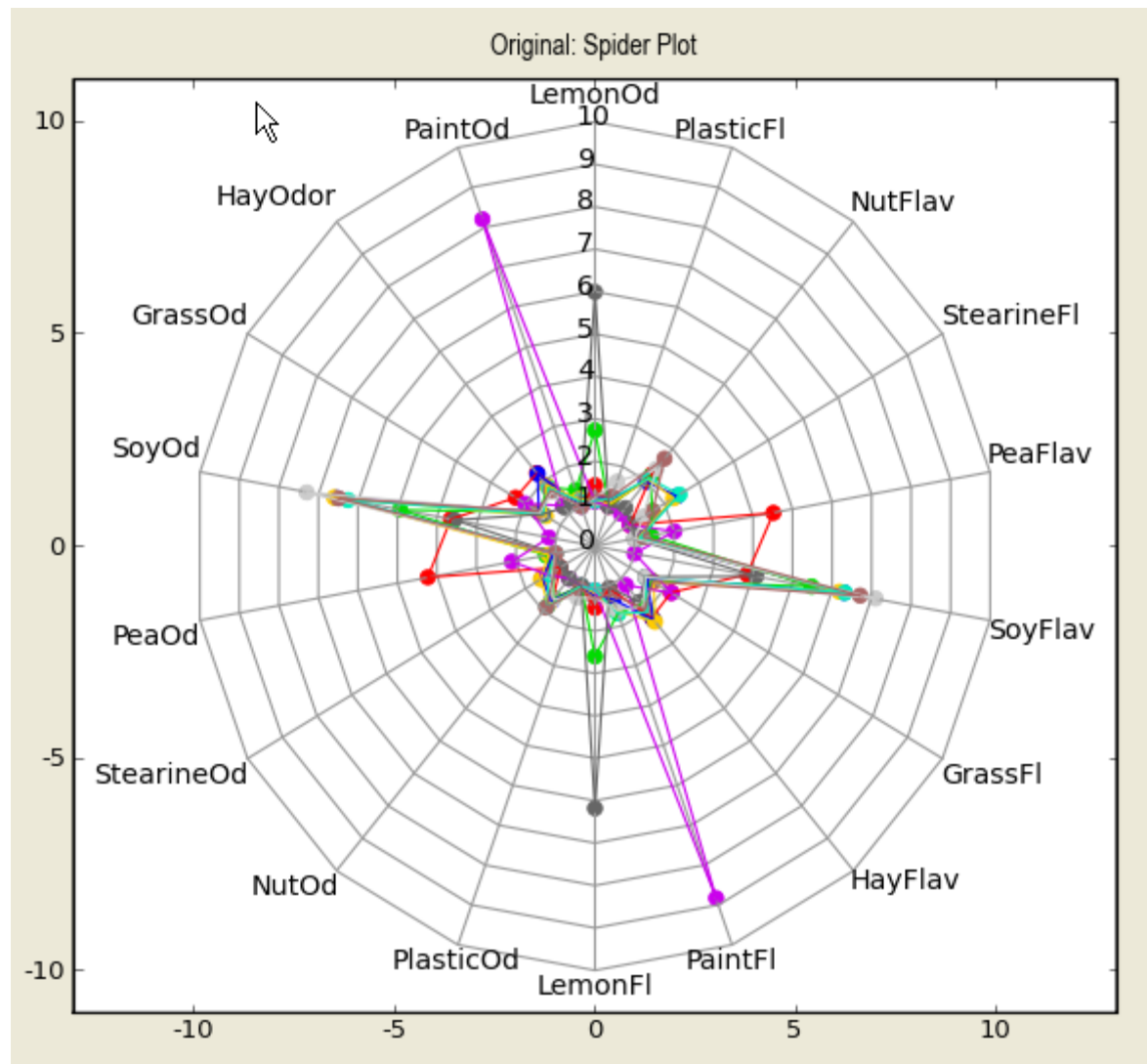






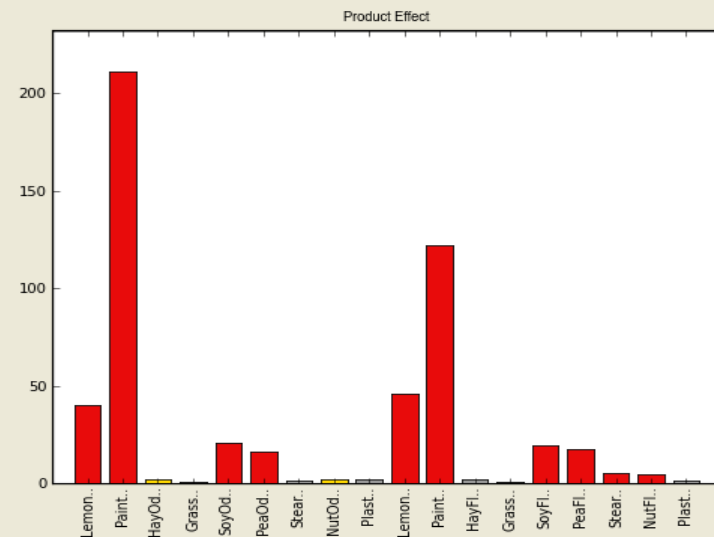
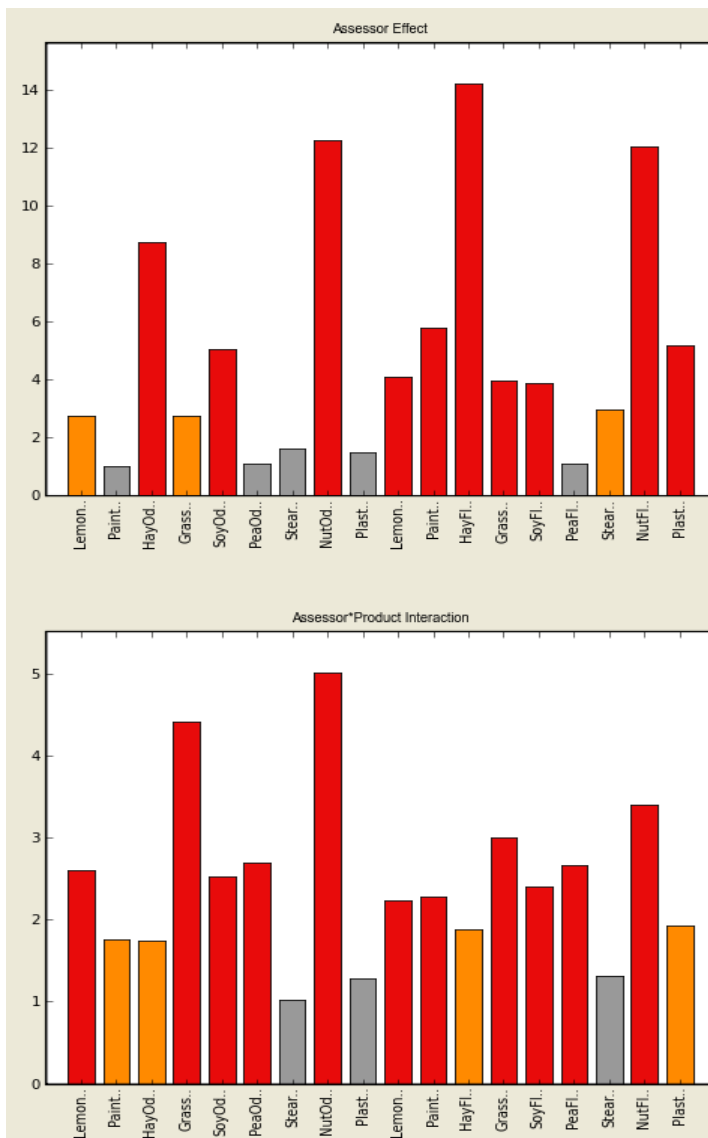






Overall

- 2-way (Sample - Assessor; no replicate: no interaction)
- 2-way (Sample - Assessor - (nested) Replicate: interaction)
- 3-way (Sample - Assessor - (crossed) Replicate: 2-factor interactions)



ANOVA output

Attributes	Sitronlukt	Malinglukt	Høylukt	Gresslukt
Assessor Effect (F values)	2.74	1.00	8.73	2.73
Significance	0.008	0.446	0.000	0.009
Product Effect (F values)	40.09	210.87	2.12	0.66
Significance	0.000	0.000	0.045	0.728
Assessor*Product Interaction (F values)	2.61	1.76	1.74	4.41
Significance	0.000	0.005	0.006	0.000
Sample means & LSD	0.73	0.46	0.71	0.97
Sample means & Bonferroni LSD	1.21	0.77	1.18	1.63

- Critical values for multiple comparisons: level 0.05
- Sample means & LSD: Based on SE for specified pair of means
- Sample means & Bonferroni LSD: Prevents experimentwise error from growing as the number of comparisons increase
- Personal wish:
 - Tukey's test (“...is the most useful pairwise comparison procedure Statistix performs”)
 - Select level of significance

In defence of using PanelCheck ANOVA

- At Nofima Food, ANOVA output is usually not included verbatim in project reports, but interpreted by the panel leader. The results are only presented in plain text, emphasizing important significant attributes. (Standard phrase in reports: “The ANOVA output is not included here, but may be obtained by contacting Nofima Food”)
- Still: most statisticians probably prefer ANOVA output from their favourite stat program

Some (weird...) problems

- Character variables only in column 1-3
- Multiple comparisons: only lowest p-value
- ANOVA models: restricted choice
- Frame colours: ANOVA model?
- Some univariate plots are not very meaningful when all assessors and/or attributes and/or samples are selected!

Can do some ANOVA and PCA models

- ANOVA models available
 - 1-way (separate analyses for each assessor)
 - 2-way (Sample - Assessor; no replicate: no interaction)
 - 2-way (Sample - Assessor - (nested) Replicate: interaction)
 - 3-way (Sample - Assessor - (crossed) Replicate: 1- and 2-factor interactions)
 - Output: Excel entries
- PCA model
 - Straightforward (unweighted, centered)
 - Output: Plots

