

Data sources for model validation – variety testing data from Finland, Iceland, Norway and Sweden

Magnus Halling¹, Markku Niskanen², Lauri Jauhiainen², Oiva Niemeläinen², Lars Nesheim³ and Gudni Thorvaldsson⁴

¹ *SLU Crop Production Ecology, Uppsala, Sweden*

² *MTT Agrifood Research Finland*

³ *Bioforsk Norwegian Institute for Agricultural and Environmental Research, Stjordal, Norway*

⁴ *Agricultural University of Iceland*

Official variety tests provide one and well organized data source for model validation. Some information of official variety testing experiments of forage crops in Finland and Sweden is presented in this paper. Information of the testing programme procedure and of the latest results are available for example in the publications of Dryler 2012, Halling 2012, Kangas et al. 2012 and Nesheim and Langerud 2013.

Number of trial sites and number of tested cultivars in Finland, Norway and Sweden

Table 1 gives a summary of the available variety testing data in Finland, Norway and Sweden. Background information of fertilizer application and soil type are saved for each trial. Number of cultivars by species in testing series is only given for timothy.

Table 1. Overview of recorded variety testing data

	Finland	Norway	Sweden*
Data record start from year	1972	1988	1955
Total number of trials sites	21	10	26
Number of trial sites in 2012	8	9	3(11)**
Age of stand (harvest years)	1-3	1-3	1-3
Number of cuts per season	2-3	2-4	2-3
Number of timothy cultivars tested over the years	191	96	185
Number of timothy cultivars in 2012 tests	18	15	21
Number of species in 2012	5 (7)	7	11
Southern most location, coordinates	60°23 N	58°47 N	55°54 N

Northern most location, coordinates	66°34 N	69°40 N	60°53 'N
Range in altitude, m	6 - 106	10-550	4-180
Number of replicates	3-4	3	3-4
Most common plot size	1,5 x 10 m	1,5 x 7 m	1,5 x 8 m
Plotwise data available	1998-2012	1988-2012	1999-2012

*South and middle Sweden; ** Three basic sites and total with additional sites in brackets

Characteristics recorded

Table 2. Variables recorded

	Finland	Norway	Sweden
Ground cover in spring	x	x	x
Winter damage percentage	x		
Date of heading	x		x*
Date of 1 st cut	x	x	x*
Date of each cut	x	x	x*
Date of final cut	x	x	x*
Botanical percentage of sown species	x	x	x
DM percentage at cut	x	x	x
DM yield at cut	x	x	x
Total DM yield per season	x	x	x
Quality characteristics	(from 2000)	X ²	

*Data are available on digital media from 1999. Earlier data are mainly on paper.

² Only in first year of ley

Data available from Iceland

In Iceland several experiments have been carried out during the last 60 years at the Agricultural University of Iceland with at least 6 species. The results are found either in paper reports or data files. These files are of different types with no standard system. Trials are usually cut twice a year for a three year period. Yield data and dates of harvests are available. Registration of winter survival is usually carried out. Weather observations are available from Korpa and some weather variables from the other locations. Data is available to be used for model testing but it will require work to collect them and put them into right format.

Type of data storage and weather data

Variety testing results are recorded in a data bank. In Finland Oracle based system is used. In Sweden results are at: <http://www.slu.se/faltforsk>

Weather data records are good in the Nordic countries and possibilities to connect weather data – especially temperature and precipitation – to cultivar testing data are quite comprehensive. However, some important parameter information like radiation data is available only for a very few locations.

Table 3. Weather data available for each trial site

Weather data	Finland	Norway*	Sweden
daily mean temp	x	x	x
daily minimum	x	x	x
daily max	x	x	x
degree days	x	x	x
radiation	From Jokioinen	x	x

* In Norway weather data available from 7 testing sites.

Weather data are in Sweden available at the Field Research Unit (<http://www.slu.se/faltforsk>).

Suggestions how to improve usefulness of variety testing system for model development and validation

Variety testing is designed for testing cultivar performance in relation to other cultivars. The testing has to be cost efficient. The testing does not provide so detailed information of specific parameters which would be important for model validation. These special measurements could be carried out on certain sites for a certain period of time and of limited number of cultivars – e.g. of one standard cultivar of each species. This extra work should be funded by special funding allocated for this purpose. The variety trial system would take care of the basic experimental work load and this way the approach would be cost efficient. The existing variety testing data has already been utilized as invaluable data source in several research studies. In Sweden special projects have been carried out to produce additional information of variety trials e.g. yield stability of *Festulolium* and perennial ryegrass (Halling 2012). Which parameters, from how many sites and for how long period of time should be discussed and decided by modeling experts and cultivar testing personnel, and additional funding should be applied for that task.

References

Dryler, K. 2012. Sortprovning 2011 vallgräs och vallbaljväxter. Sveriges lantbruksuniversitet. Institutionen för norrländsk jordbruksvetenskap. Nytt nr 5. 2012. 4 p. Available: http://pub.epsilon.slu.se/8625/7/dryler_k_120312_5.pdf

Halling, M. 2012a Vallväxter till slåtter och bete samt grönfoderväxter. Sortval för södra och mellersta Sverige 2012/2013 (Forage species for cutting, grazing and green fodder Varieties for south and central Sweden 2012/2013). Version 2012-09-10. Växtproduktionsekologi. Uppsala.

Available: <http://www.ffe.slu.se/FFE/Info/sortvall.htm>

Halling, M. 2012b. Yield stability of Festulolium and perennial ryegrass in southern and central Sweden. Grassland Science in Europe. 17: 114-116.

Kangas, A., Laine, A., Niskanen, M., Salo, Y., Vuorinen, M., Jauhiainen L., Nikander, H. 2012. Virallisten lajikekokeiden tulokset 2004-2011. MTT Kasvu 18: 170 s. 2. korjattu painos. Web publication updated. 27.3.2012. Available: <http://www.mtt.fi/mttkasvu/pdf/mttkasvu18a.pdf>

Nesheim, L. & A. Langerud. 2013. Resultater av offisiell verdiprøving i förvekster 2012 Results from the official variety testing in fodder crops 2012. A. Sorter som er ferdig testet. A. Varieties that have completed the testing program. Bioforsk Rapport – Bioforsk Report. Vol. 8 Nr. 6. 2013. 94 p. Available: http://www.bioforsk.no/ikbViewer/page/tjenester/publikasjoner/publikasjon?p_document_id=102169