

Estimation of indigestible NDF (iNDF) in forages

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The challenge - feed evaluation



Future models are ration evaluation models → but feed evaluation will still be based on individual feeds

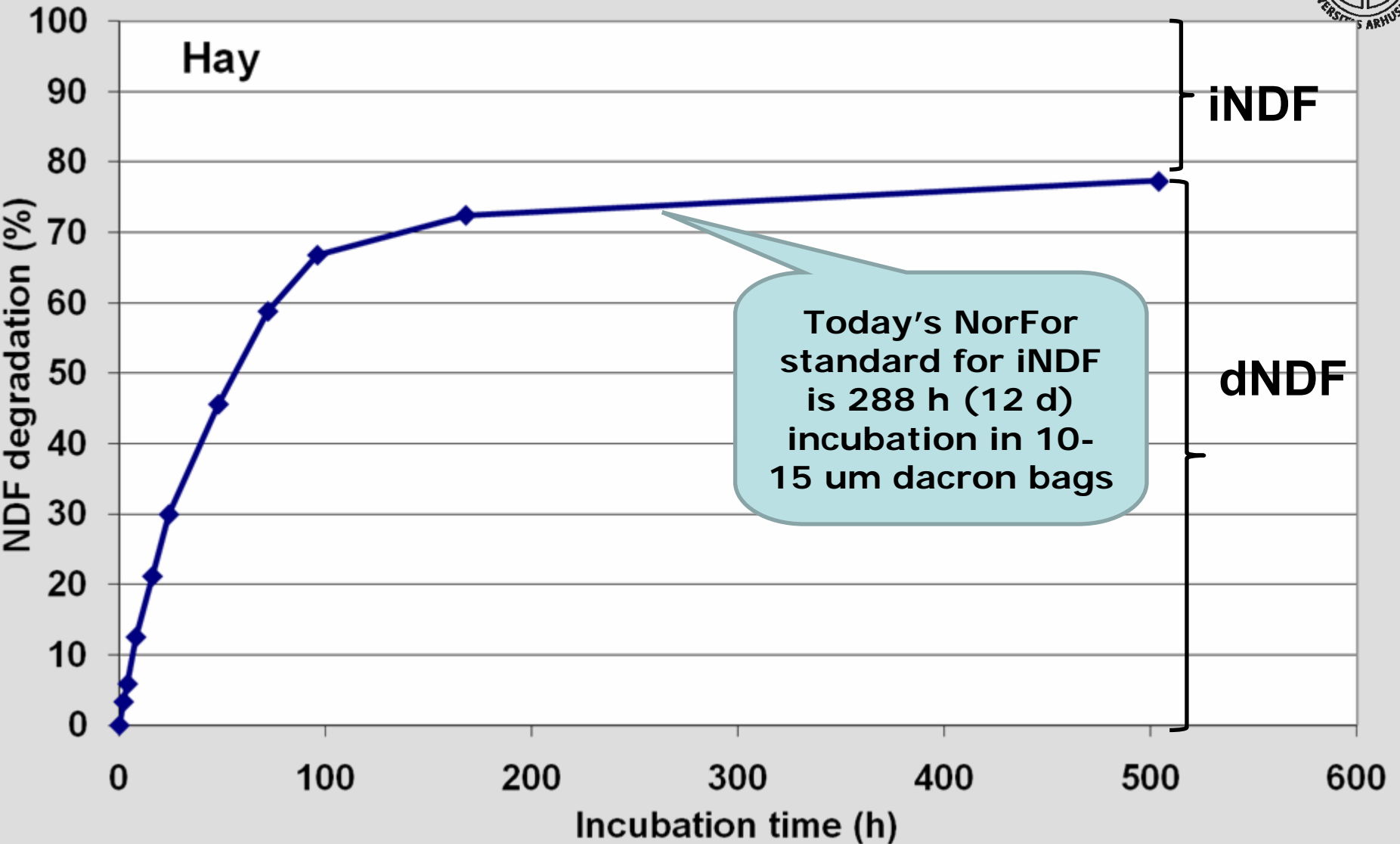
The challenge → provide data for potential digestibility and rate of digestion for main nutrients

Need for tabulated values as default values

Greatest challenge → to develop analytical tools for estimation of these feed characteristics on samples from practical agriculture

This presentation will focus on iNDF

iNDF = indigestible NDF



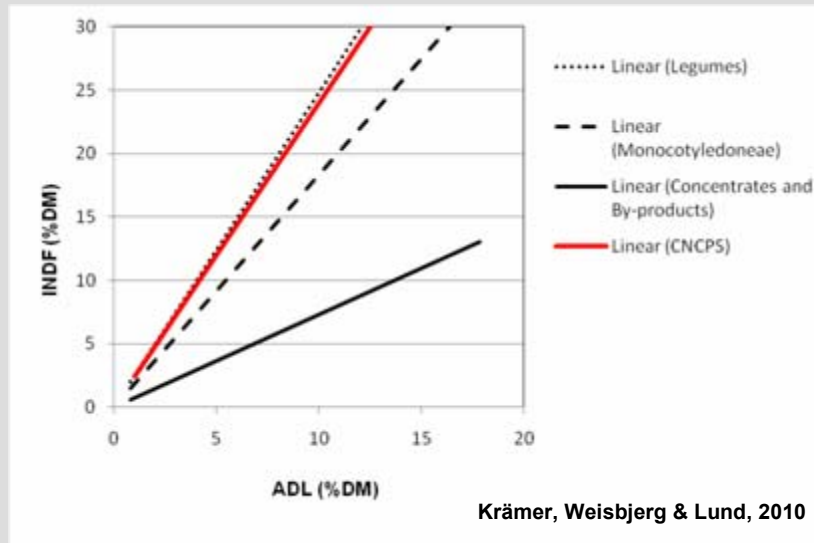
Estimation of indigestible NDF (iNDF)

iNDF is predicted as 2.4 times ADL (CNCPS)

iNDF concentration is highly correlated with organic matter digestibility (Huhtanen et al., 2006)

This supports the idea of simple prediction equations based on these well known feed characteristics

However, in our lab, feed type influence these relationships



→ makes simple universal prediction models problematic

Aim of present experiment



To examine potential laboratory methods for iNDF estimation on grasses and legumes

Material and methods



Twenty one different forage species:

13 perennial ryegrasses

2 hybrid ryegrasses

2 festuloliums

1 cocksfoot

1 lucerne

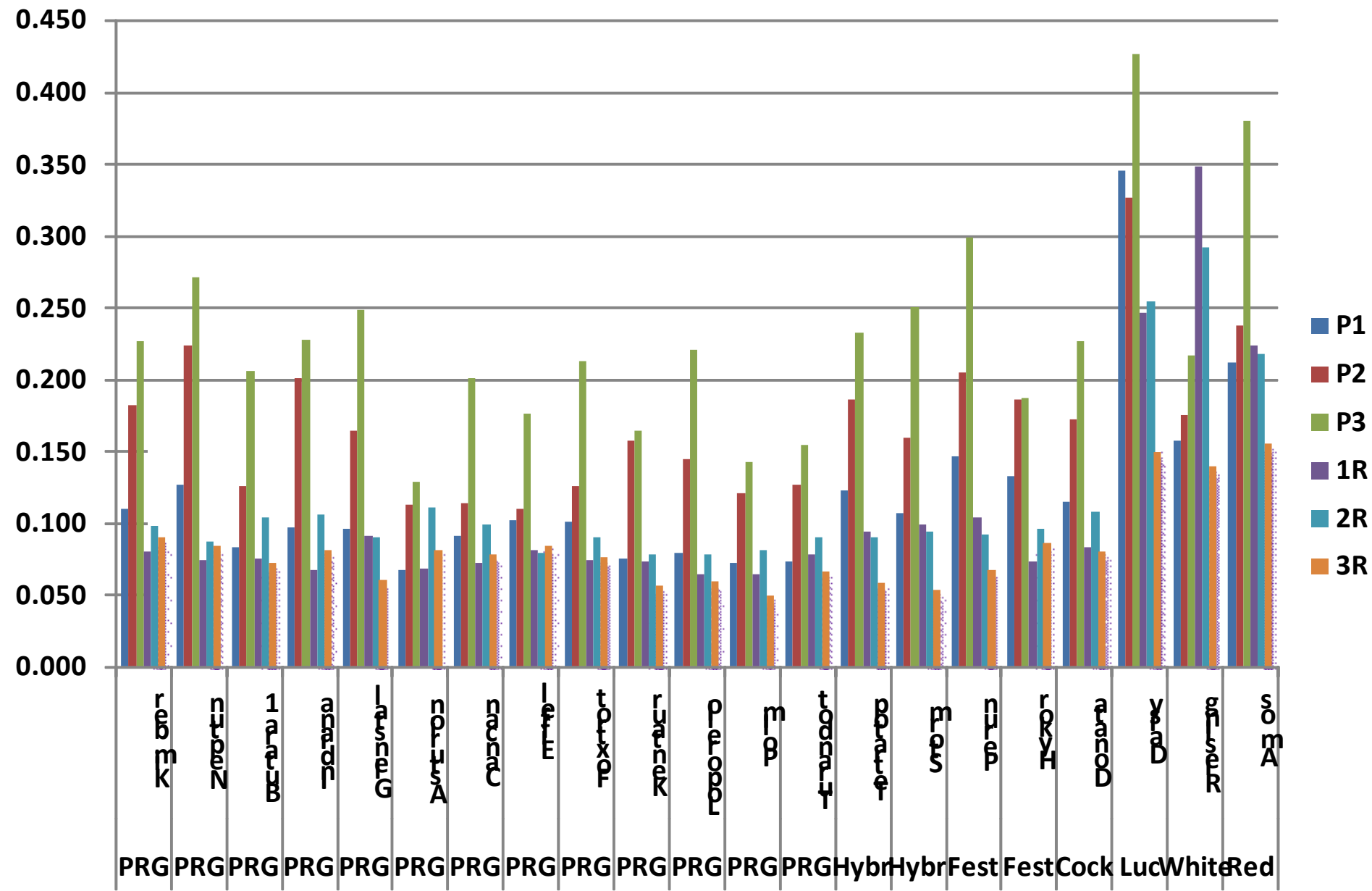
1 white clover

1 red clover

Harvested at 3 harvesting times in the primary (P1, P2, P3) growth, and once in first (1R), second (2R), and third (3R) regrowth in 2008

total of 126 samples

INDF/NDF ratio



Variation in main parameters, grasses and legumes



	<u>Mean</u>	<u>Min.</u>	<u>Max.</u>
NDF (%DM)	45.3	17.9	59.8
ADL (%DM)	2.17	0.79	6.21
ADL (%NDF)	5.07	1.64	21.3
IVOM (% OM)	72.7	62.3	83.3
iNDF (%DM)	6.12	2.35	16.12
iNDF (%NDF)	13.7	5.1	42.7
iNDF/ADL ratio	2.79	1.22	4.57
Indig/iNDF ratio	5.39	2.17	11.31

Indig = indigestibility of organic matter (%OM) = 100-IVOM

Variation in ratios, by forage type



	<u>Mean</u>	<u>Min.</u>	<u>Max.</u>
<u>Grasses</u>			
iNDF/ADL ratio	2.85	1.27	4.57
Indig/iNDF ratio	5.63	2.26	11.31
<u>Legumes</u>			
iNDF/ADL ratio	2.39	1.22	3.59
Indig/iNDF ratio	3.94	2.17	6.97

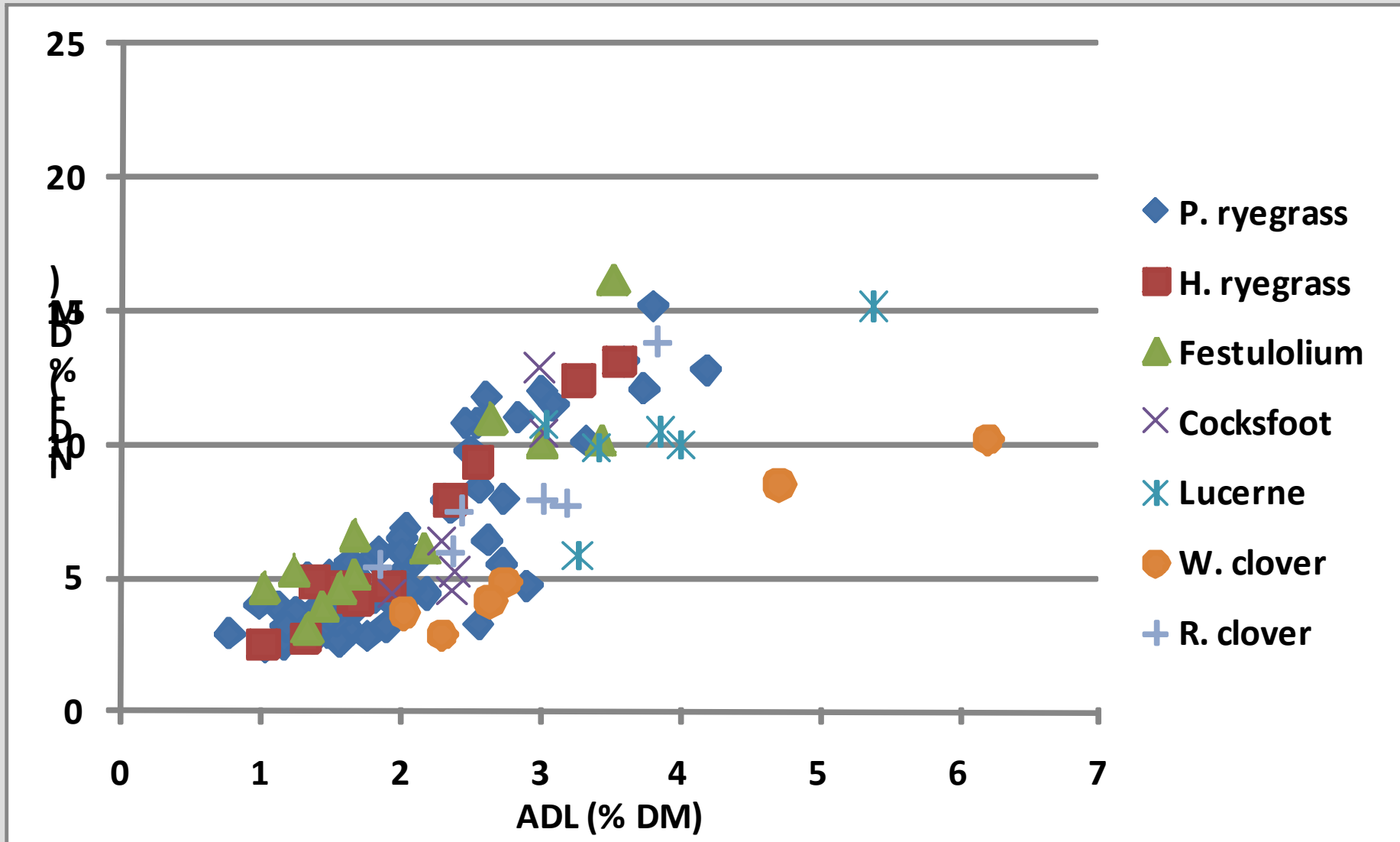
Indig = indigestibility of organic matter (%OM) = 100-IVOM

Correlations, grasses and legumes

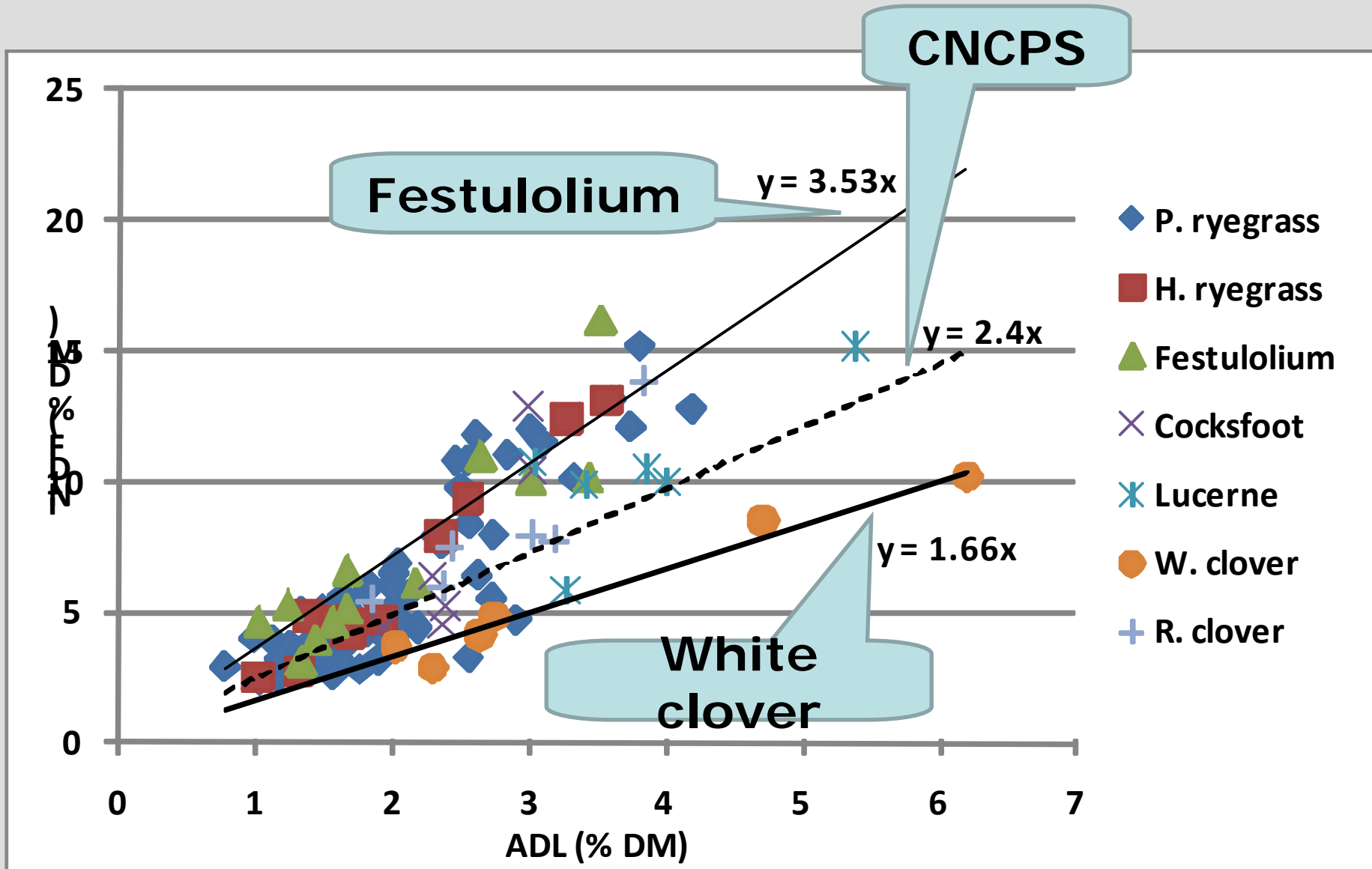


	<u>Correlation to iNDF</u>	
	<u>(% DM)</u>	<u>(% NDF)</u>
NDF (%DM)	0.28	-0.17
ADL (%DM)	0.81	0.89
ADL (%NDF)	0.51	0.80
IVOM (% OM)	-0.73	-0.51
iNDF (%DM)	1	0.88
iNDF (%NDF)	0.88	1

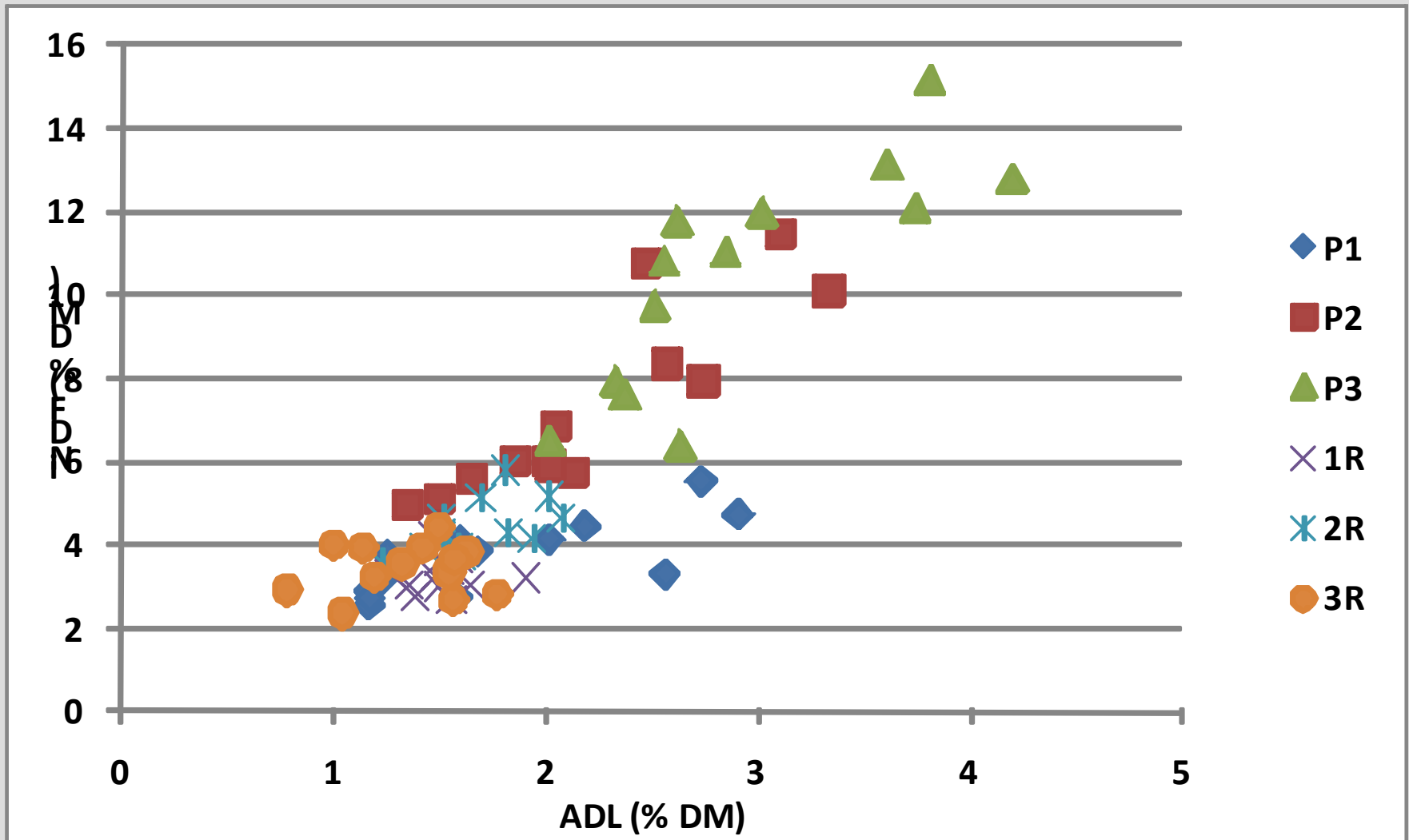
All samples – effect of forage type



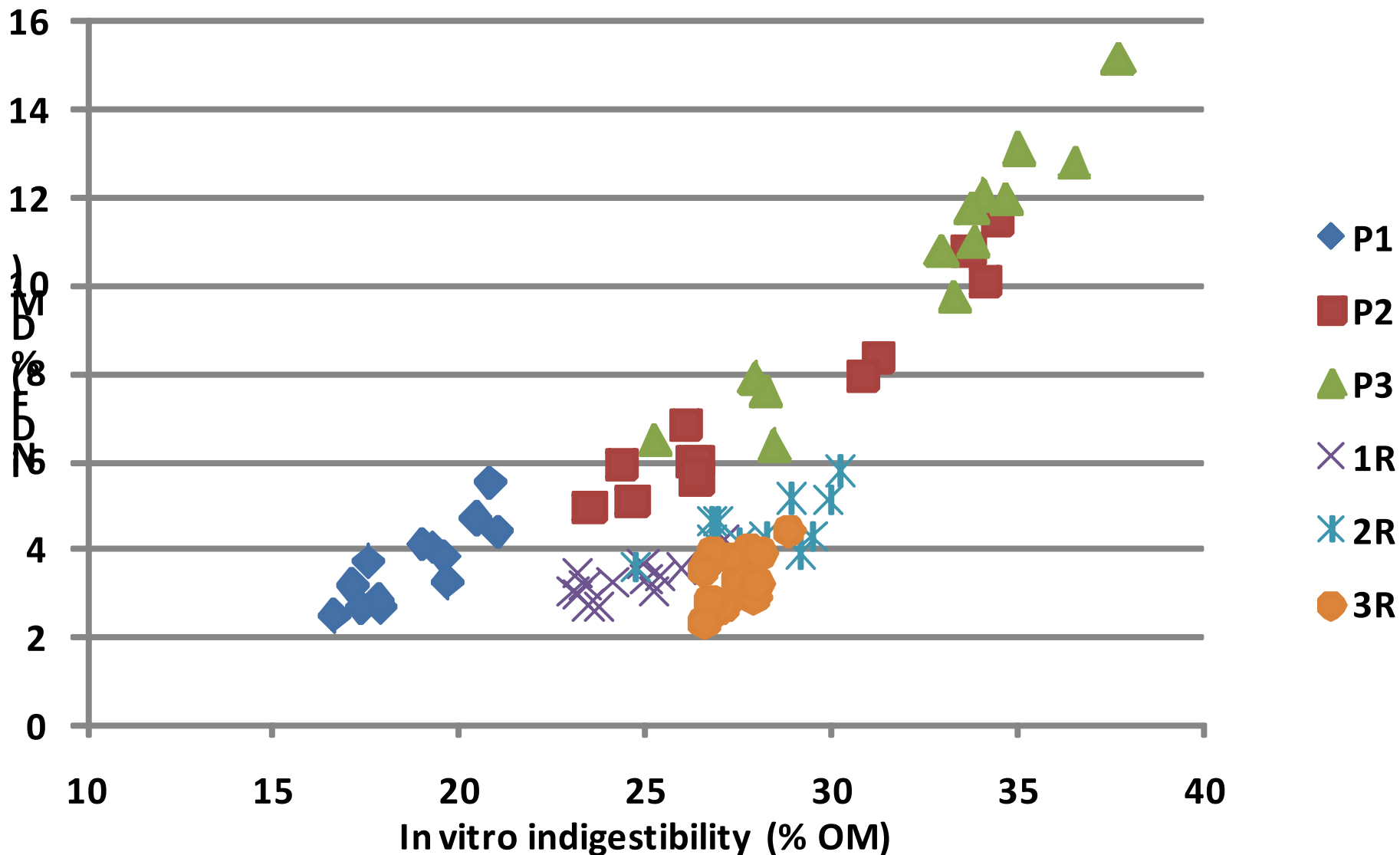
All samples – effect of forage type



Perennial ryegrass only – effect of growth and maturity



Perennial ryegrass only – effect of growth and maturity





Multiple regressions, all samples

Stepwise multiple regression analysis →

- In vitro OM digestibility**
- ADL and NDF concentration**
- ADL/NDF ratio - were found to be the four most important predictors for iNDF concentration**

Increased R^2 of the prediction model

However systematic effects of forage type and harvest time on residuals were still significant

Ex: Mean predicted – observed

Festulolium: -1.13 (%DM)

Primary growth 3rd harvest time: -0.7 (%DM)

Conclusion



Multiple instead of simple regressions reduced systematic bias when predicting iNDF

But results were not yet fully satisfactory for universal prediction equations for iNDF across feed types, and across growths within feed type

Important research area in coming years

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**It does not necessarily reflect its view
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