Using the Grass Economic Index to Rank Perennial Ryegrass Cultivars

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Grass Economic Index

Collaboration between

- Teagasc, DAFM, Farmers, Seed Merchants, Co-ops

New approach to cultivar selection

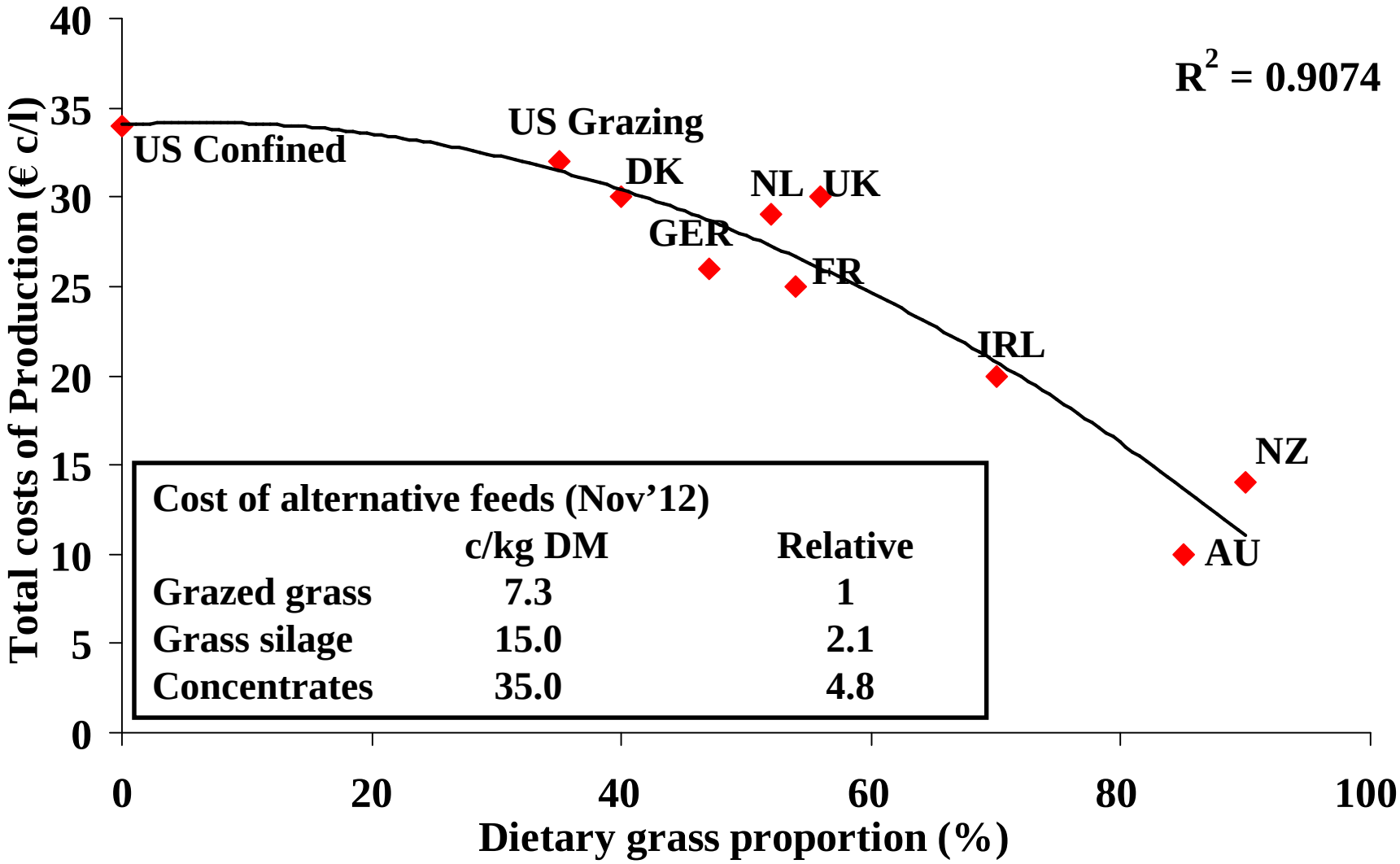
Quantifies economic effect of a change in cultivar performance on farm profitability

Supports objectives of Food Harvest 2020

- Efficiency, growth and utilisation

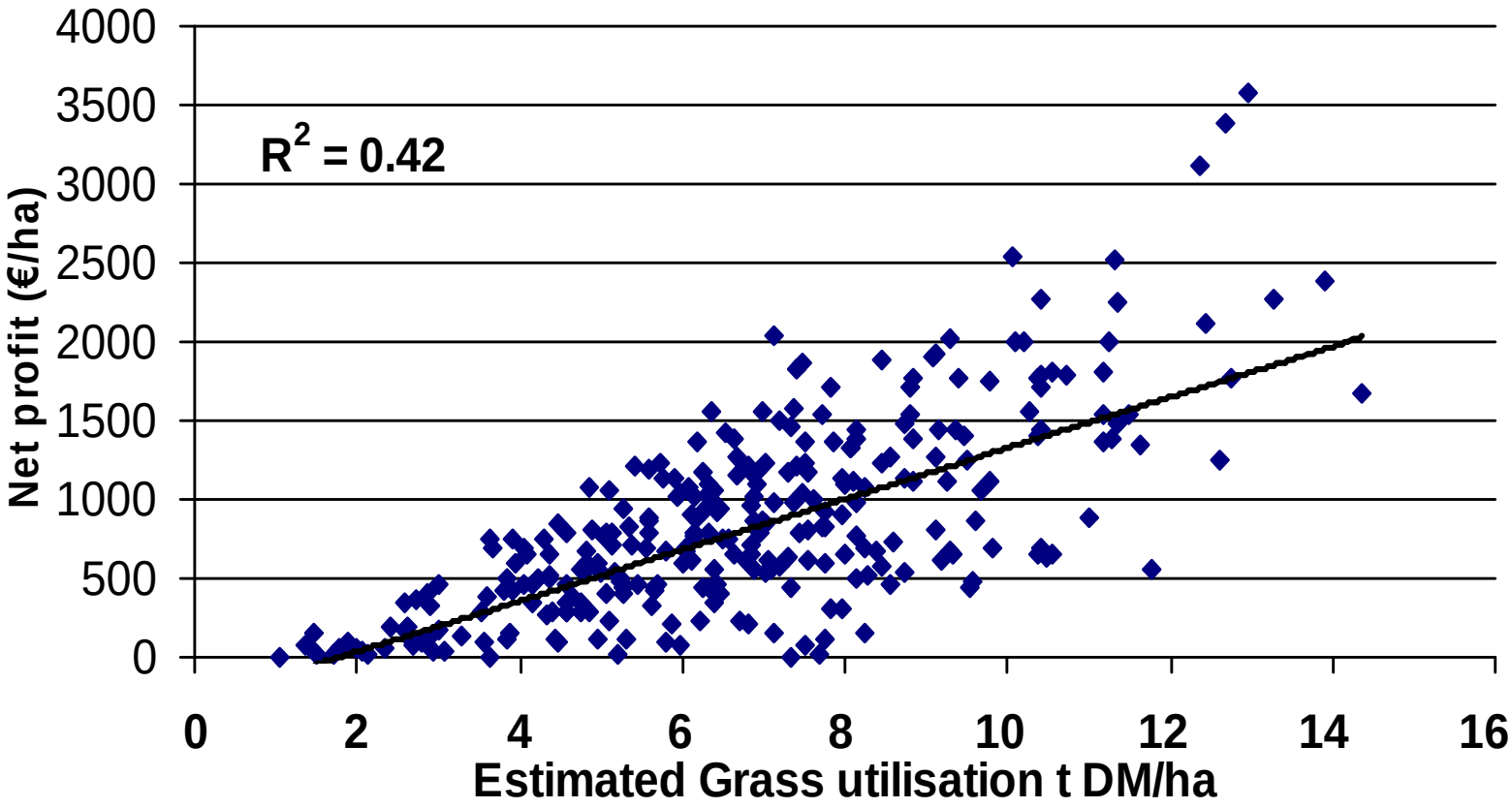
Grassland systems will continue to predominate

Each 10% increase in grass proportion in the diet reduces the cost of milk production by 2.5 € cents/l



Grassland systems will continue to predominate

Grass utilisation is critical to increasing farm profitability
each additional tonne utilised = €161/ha
(Shalloo et al., 2009)



Grass Economic Index?

Important traits influence profitability at farm level

Total merit index developed to assist in cultivar selection

- Assigns an economic value to important traits of grass performance
- Define the total economic merit of a cultivar (€ per ha per year)
- Rank cultivar's on Total Economic Merit

Traits of Importance

DM Yield

- Spring
- Mid-season
- Autumn

Quality

- April
- May
- June
- July

Silage yield

- 1st Cut
- 2nd Cut

Persistency

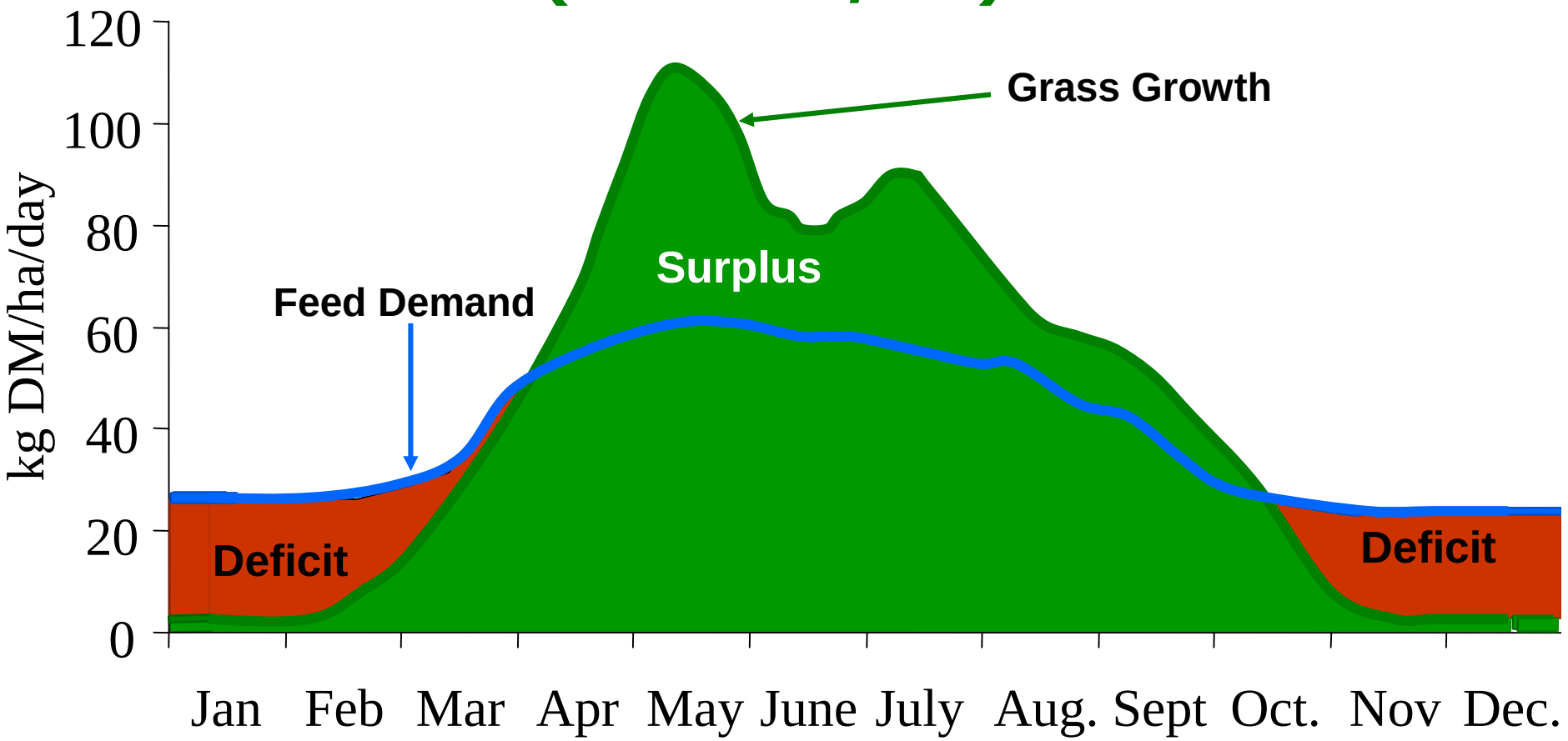
Calculating Economic Values

Moorepark Dairy Systems Model (MDSM)

- Simulates a model dairy farm across 12 months
- Includes
  - Herd parameters, nutritional requirements, land use
  - Total inputs and outputs
  - Receipts
  - Variable and fixed costs (Shalloo et al., 2004)
- Base assumptions
  - Spring calving herd
  - 365 day calving interval
  - Milk price of 27c/l
  - 40 ha farm

Grass Growth and Feed Demand Curve

(2.5 cows/ ha)



Grass Growth and Feed Demand Curve

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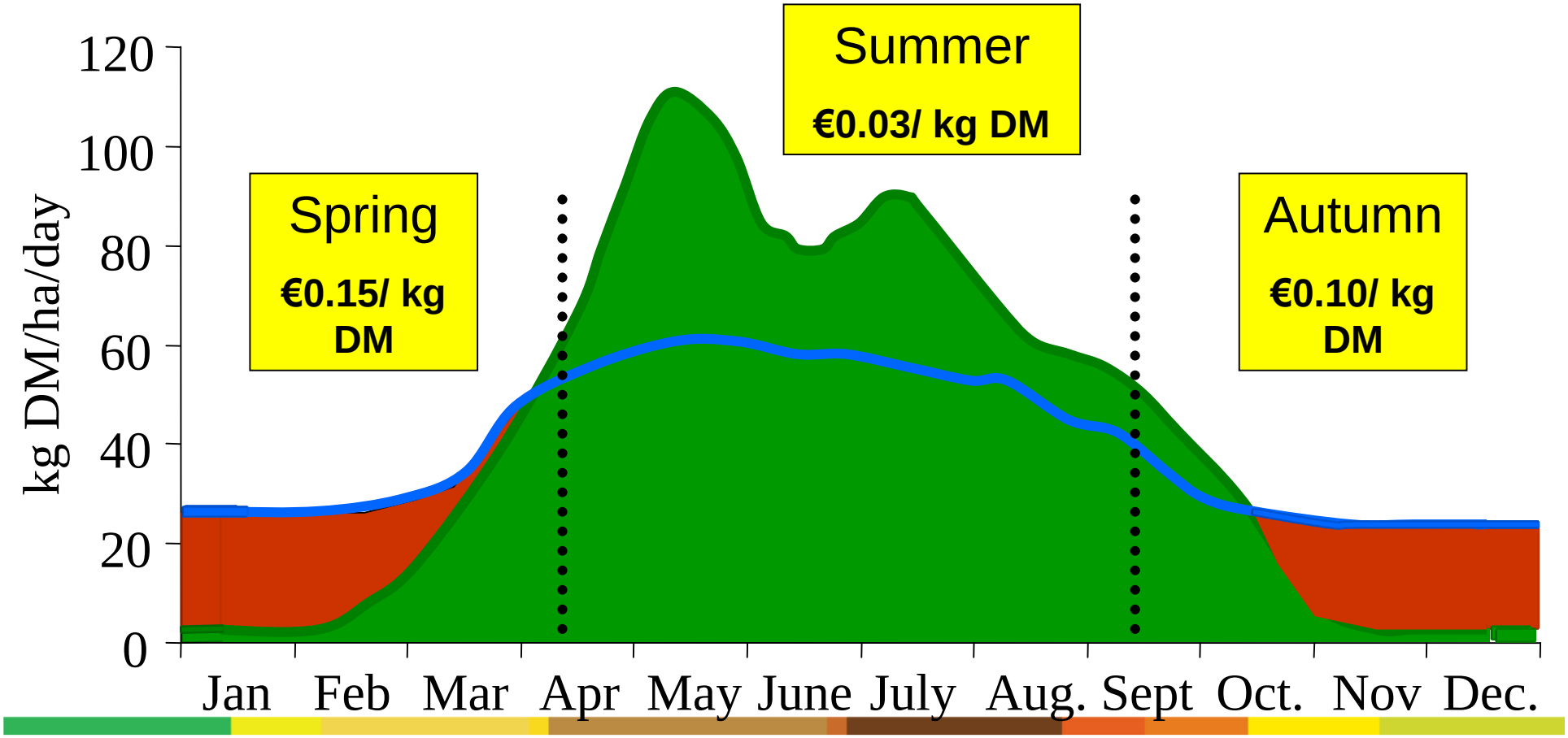

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Economic Value – Quality
(€ per unit change in DMD per kg DM)

Meet energy requirements – if not met Intake and performance affected

- April -€0.001
- May -€0.008
- June -€0.010
- July -€0.009

Economic Value – Silage

Increased yield reduces area required for harvesting

Extra grass conserved compared to base

- **1st cut silage** €0.03 per kg DM
- **2nd cut silage** €0.02 per kg DM

Economic Value – Persistency

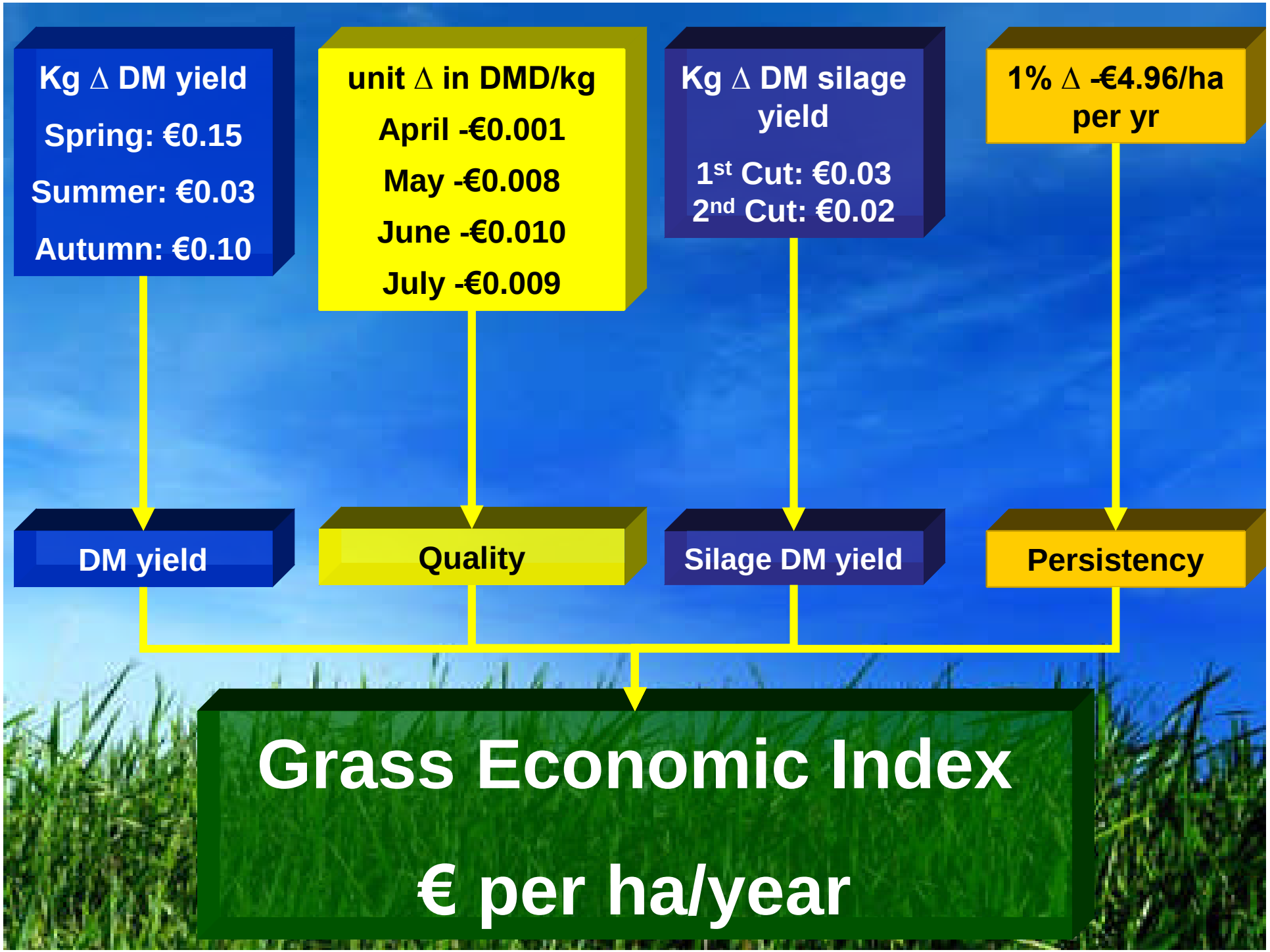
Calculated on a 1% change in sward lifetime relative to base

- Compared to standard 10-yr sward longevity
- Based on cost of reseeding

-€4.96 per % decrease in persistency per ha/ year

Measurement of persistency

- length of time before a sward must be reseeded again
- ground score change over time
- Total lifetime performance


Kg Δ DM yield
Spring: €0.15
Summer: €0.03
Autumn: €0.10
unit Δ in DMD/kg
April -€0.001
May -€0.008
June -€0.010
July -€0.009
Kg Δ DM silage yield
1st Cut: €0.03
2nd Cut: €0.02
1% Δ -€4.96/ha per yr
DM yield
Quality
Silage DM yield
Persistency
Grass Economic Index
€ per ha/year

Application

Apply economic values to biological data

Data generated in DAFM plot trials

- 2011 & 2012 harvest years
- 63 cultivars
- 3 reps per site
- 5 sites
  - 4 sites - frequent cutting (simulated grazing)
  - 1 site - general purpose (silage)

Combine biological data and economic values

- Determine total economic merit of a cultivar

Application

	DM yield (kg DM/ha)			Silage DM yield (kg DM/ha)	
	Spring	**Mid-season**	**Autumn**	**1st cut**	**2nd cut**
Base yield (kg DM/ha)	1449	5704	1847	3785	3684
IT30	1790	7050	2440	3575	3087
Difference	341	1346	593	-210	-597
Then multiply the difference by the economic value for each trait					
	0.15	0.03	0.10	0.03	0.02
€ /ha/ yr	52	41	61	-7	-14

Total Economic Merit

	Trait	Trait value	
Kg DM		**€ /ha/ yr**	
	Spring	52	
	Summer	41	
	Autumn	61	154
Silage			
	1st cut	-7	
	2nd cut	-14	-21
Quality			
	April	-1	
	May	-16	
	June	-23	
	July	10	-29

Cultivar *IT30*

Total Economic Merit*

€104

per ha/ yr

***persistency not included**

DM Yield (kg DM/ha)

Cultivar	Spring	Mid-season	Autumn	1st Cut	2nd Cut
ID08	2024	7320	2665	4080	3182
ID14	2150	6770	2330	4000	3376
ID18	2325	6840	2465	3885	3578
ID26	1665	7030	2275	3345	2844
IT05	1908	7210	2195	4600	3000
IT21	2099	6960	2430	4460	3991
IT28	2069	7010	2230	3905	3397
IT30	1790	7050	2440	3575	3087
LD03	1450	6790	2130	3510	4122
LD04	1479	6620	1970	3855	3856
LD21	1700	7010	2260	4065	3986
LD22	1481	6190	2040	3335	4542
LT09	1597	6905	2170	4075	4317
LT14	1766	7205	2470	4010	4169
LT17	1718	6980	2100	3695	3874
LT33	1848	7195	2300	3550	3967
Base production	**1449**	**5704**	**1847**	**3785**	**3684**

Cultivar	DMD (g/kg DM) April	May	June	July
ID08	860	852	806	837
ID14	839	832	787	815
ID18	833	828	806	817
ID26	831	826	784	813
IT05	848	843	809	824
IT21	848	841	814	826
IT28	851	850	821	830
IT30	838	834	797	819
LD03	855	859	823	790
LD04	853	852	817	783
LD21	856	855	809	808
LD22	844	848	819	792
LT09	858	851	822	803
LT14	872	874	831	807
LT17	870	871	828	820
LT33	863	863	831	808
Base DMD	**850**	**849**	**814**	**810**

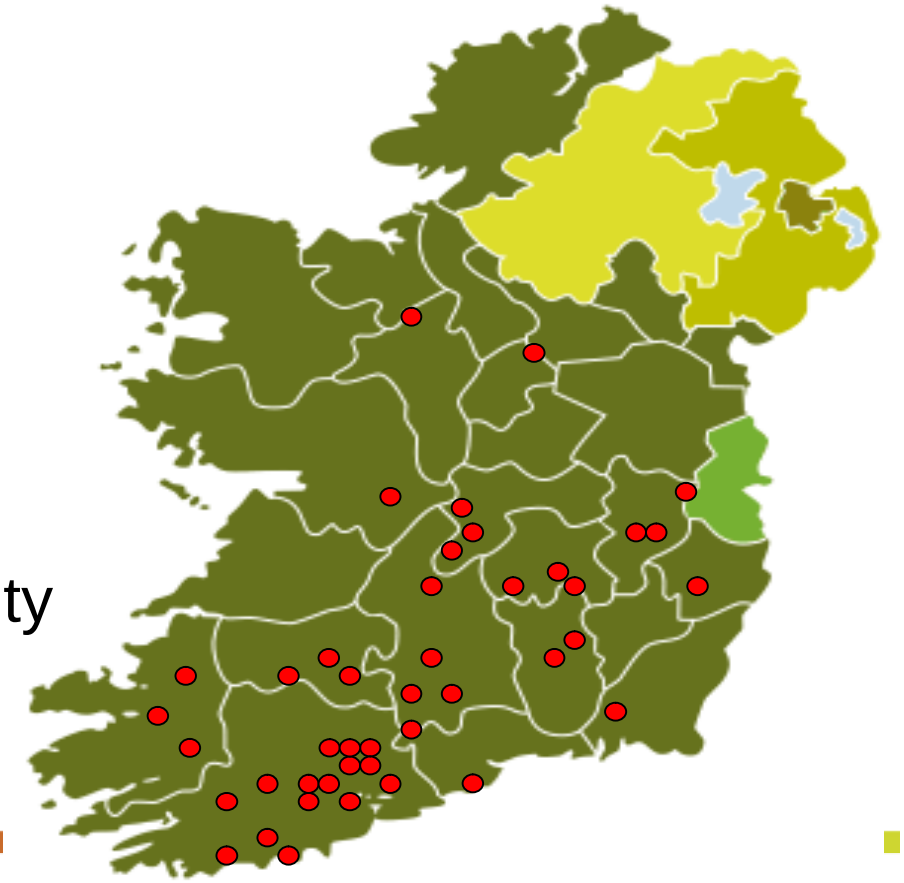
Total Economic Merit

	€ per ha per year				
Cultivar	**DM Yield**	**Quality**	**silage**	**Total**	**Rank Total**
ID08	220	25	-2	244	1
IT21	197	10	30	236	2
LT14	158	47	19	223	5
ID18	231	-27	1	205	7
IT28	173	34	-3	204	9
LT33	152	36	-1	187	13
LT17	106	55	1	162	19
IT04	166	7	-17	155	22
ID14	188	-50	0	139	27
LD21	120	-3	16	133	28
LT09	92	5	24	122	34
IT30	154	-29	-21	104	40
LD06	70	-23	5	52	55
LD02	61	-30	5	37	58
LD22	39	-18	5	26	60
ID26	117	-64	-34	19	63

Future developments

On farm cultivar assessment

- Persistency & yield measured
- Currently 45 farms involved
- Target >100 farms
- Quantify on-farm sward longevity
- Long term study



Conclusions

New DAFM protocol is a significant advancement in identifying the most suitable grazing cultivars

Grass economic index

- **Unique approach to cultivar selection**
- **Sub-indices will simplify cultivar selection**
- **Collaborative approach across Irish grassland industry**

Economic values will be combined with DAFM data to rank individual cultivars from 2014

Economic index will evolve over time

- **price information**
- **new traits**

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