



Summary of research underpinning IHFA High Milk Production Listing

Introduction

IHFA High Milk Production Listing

- ◆ EBI with independent threshold levels for milk traits agreed as a way forward in selecting animals for high input systems which require high milk volume and solids yields.

Objectives of presentation:

- ◆ Review work examining the relationships between milk trait PTAs and phenotypic milk production data - basis for selecting independent culling levels

Average performance of cows within 1660 IHFA herds used in study

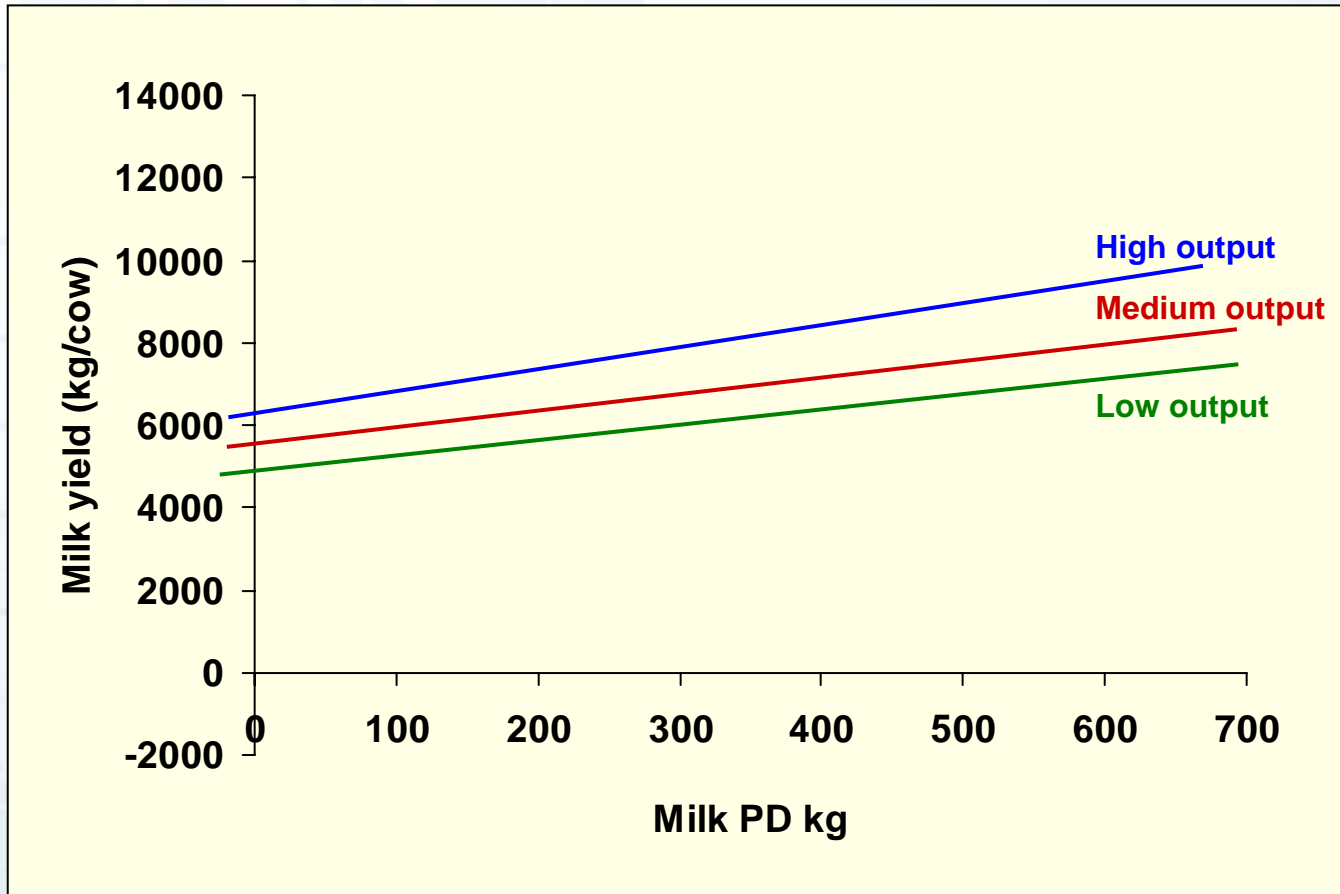
PARITY	1	2	3	4	5	Average
No. of cows	93250	67108	42837	24124	10437	237756
Average performance						
Milk yield (kg)	6171	7111	7496	7628	7516	6882
Protein yield (kg)	207	241	253	258	253	232
Fat yield (kg)	236	268	284	288	284	261
Milk trait genetic information						
Milk kg PD	146.7	140.1	133.7	127.6	115.7	139.2
Protein kg PD	5.6	5.4	5.1	5.0	4.6	5.4
Fat kg PD	5.0	4.6	4.4	4.3	3.9	4.7

Relationship between cow PDs & output within different systems

- ◆ Relationship was examined between individual cow PDs and performance within each of the IHFA herds with the following information:- (1) EBI reports (2) Calving and fertility report (3) Milk recording
- ◆ On each herd examined the relationship between genetic merit for milk traits and output in 1st lactation heifers (Data adjusted for month and year of calving)
- ◆ Using relationship determined for each herd able to calculate projected milk output from a first lactation heifer with a milk PD of +137 kg
- ◆ Milk output at the same level of genetic merit for milk production allowed evaluation of level of herd inputs
- ◆ Ranked all herds on this basis, and divided into top, middle and bottom
- ◆ Examined the relationship between genetic merit and milk output within high, medium and low output systems

Relationships within low, medium and high output herds between milk PDs and 1st lactation milk yield

(illustrative purposed only graph not to scale)



Strong association within herds between milk PD and first lactation milk yield (over 70% of variation accounted for)

First lactation milk yields within low, medium and high output herds adjusted to the same level of genetic merit (milk PD=137 kg) (553 herds in each category)

Herd Category	Mean (kg)	Range (kg)
Low	5216	3734-5594
Medium	5869	5594-6153
High	6684	6154-9520

At the same genetic merit, high output herds on average produced 28% more milk/cow

Relationships between milk yield and genetic merit within low, medium and high output herds

Herd Category	Milk yield at milk PD=0 kg	Yield response to +1 kg Milk PD
Low	4839	3.4
Medium	5494	3.5
High	6260	3.9

Average milk PDs and performance of first lactation heifers (corrected for month of calving) within low, medium and high output herds

305-d milk yield	Low	Medium	High
5,000	47	-141	-323
6,000	341	146	-67
7,000	-	430	190
8,000	-	-	446

- ◆ 8,000 litre output associated with 1st lactation milk yield of 7120 kg - milk PD of 220 kg within high output herds
- ◆ Milk PD of 220 kg associated with 6230 litres i.e. a 7,000 litre system within medium output herds

Relationships between fat yield and genetic merit within low, medium and high output herds (1st lactation heifers)

Herd Category	Fat yield at fat PD=0 kg	Fat response to +1 kg fat PD
Low	188	3.4
Medium	213	3.6
High	239	4.2

Average milk fat yield PDs and performance of first lactation heifers (corrected for month of calving) within low, medium and high output herds

305-d fat yield	Low	Medium	High
200	3.5	0	-9.4
225	18.1	3.3	-3.4
250	-	10.3	2.6
275	-	-	8.6
300	-	-	-

- ◆ 8,000 litre output @ 3.85 % butterfat- associated with 1st lactation fat yield 275 kg - milk fat PD of 8.6 kg for high output herds

Relationships between milk protein yield and genetic merit within low, medium and high output herds

Herd Category	Prot yield at prot. PD=0 kg	Prot. yield response to +1 kg ProtPD
Low	160	3.3
Medium	183	3.4
High	208	3.8

Average milk protein yield PDs and performance of first lactation heifers (corrected for month of calving) within low, medium and high output herds

305-d prot yield (kg)	Low	Medium	High
175	4.6	-2.2	-8.6
200	12.0	5.10	-2.2
225	-	12.4	4.4
250	-	-	10.9
275	-	-	-

- ◆ 8,000 litre output @ 3.4% protein - associated with 1st lactation protein yield 240 kg - milk protein PD of 8.5 kg for high output herds



Implications

Within high output herds, 8000 litre plus cows are associated with:

- ◆ Milk PD 220 kg+
- ◆ Milk Fat PD 8.6 kg +
- ◆ Milk Protein PD 8.5 kg +

Moving onto between herd analyses

- ◆ Not the same as within herd analyses
- ◆ Within a herd, higher genetic cows get better feeding, but differences in feeding between cows is not that big
- ◆ Between herds, feeding accounts for a lot more of the variation i.e. some producers can get a lot of milk out of average merit cows and vica versa

Relationships between milk yield and genetic merit between herds

Herd Category	Milk yield at milk PD=0 kg	Yield response to +1 kg Milk PD
Low	4873	3.64
Medium	5622	3.78
High	6311	4.86

High output herd category:

- ◆ Milk PD of 220 kg associated with herds with 8,200 litre herds

Conclusions

- ◆ There is a strong association between genetic merit for milk traits and actual milk production
- ◆ Within high output herds, milk PDs of 220 kg+, milk fat PD of 8.6+ kg and milk protein of 8.5 kg+ associated with cows producing 8,000 litres plus
- ◆ These threshold levels also associated with 8,000 litre plus high output herds