# Research Trials-Moorepark and DEXCEL-implications for breeding

Dairy Production Department

Teagasc

Moorepark

# Overview

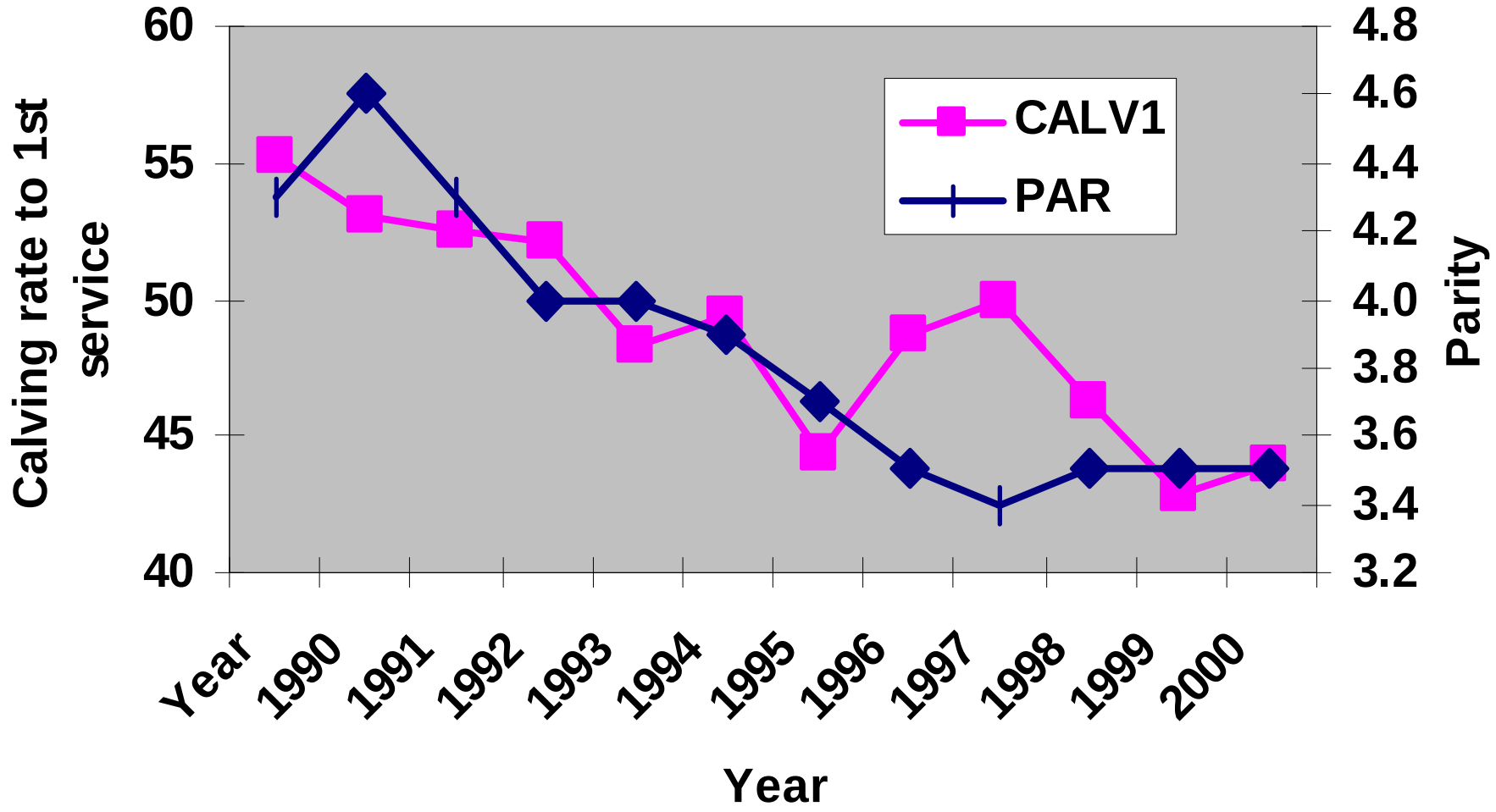
- **Background**
- **Influence of EBI on farm profitability**
- **Use of alternative breeds/crossbreeding**
- **Lessons for Dairy Cattle Breeding in Ireland**
- **Conclusions**

# Drivers of Change

- Reduction in fertility of Irish dairy herds
- Lower milk price in future
- Seasonality of milk supply
- Reduction in dairy farm numbers
- Farmers Preference
- Nitrate directive

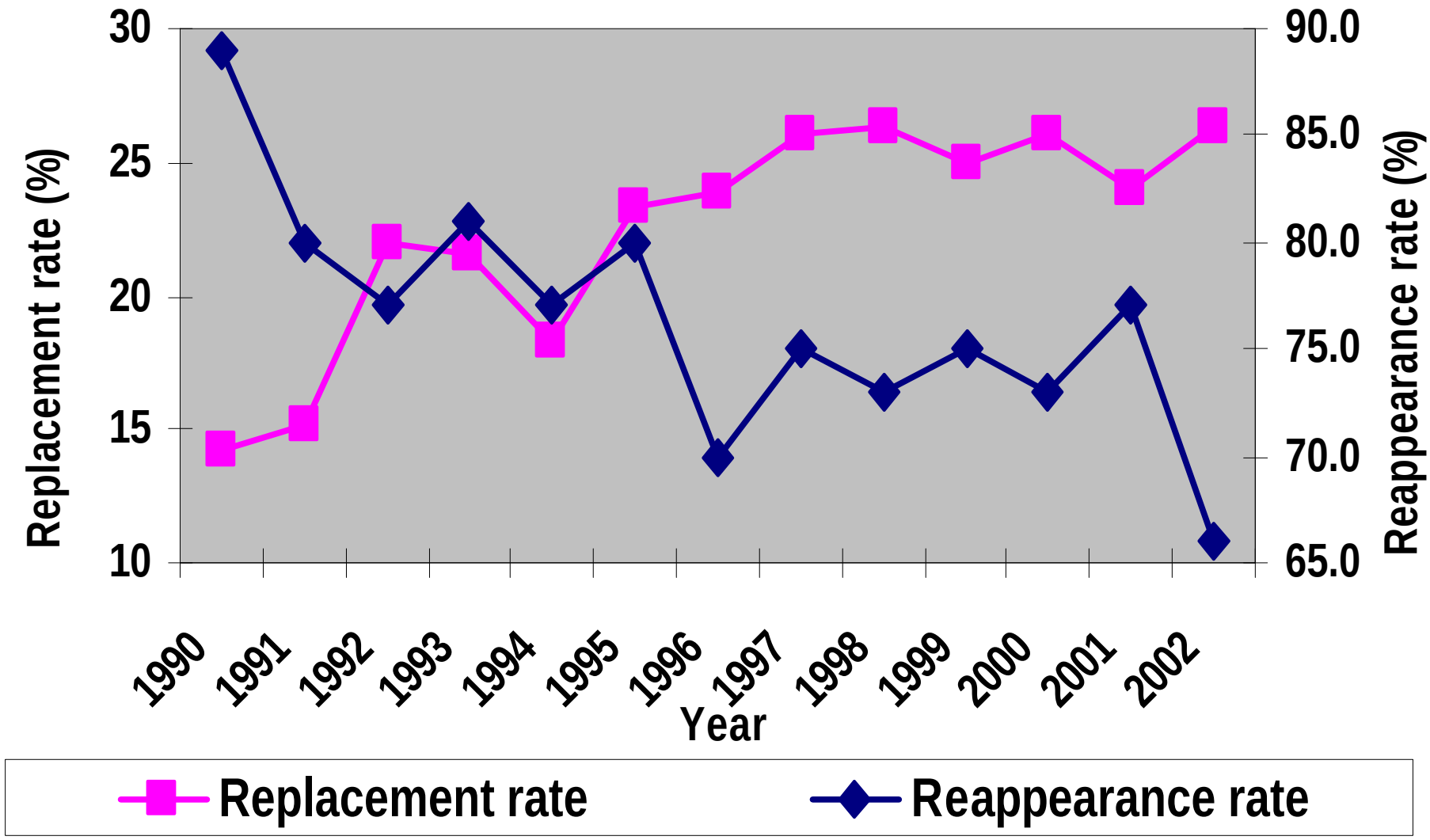
# Decline in Fertility 1990-2000

## (DairyMIS FARMS)



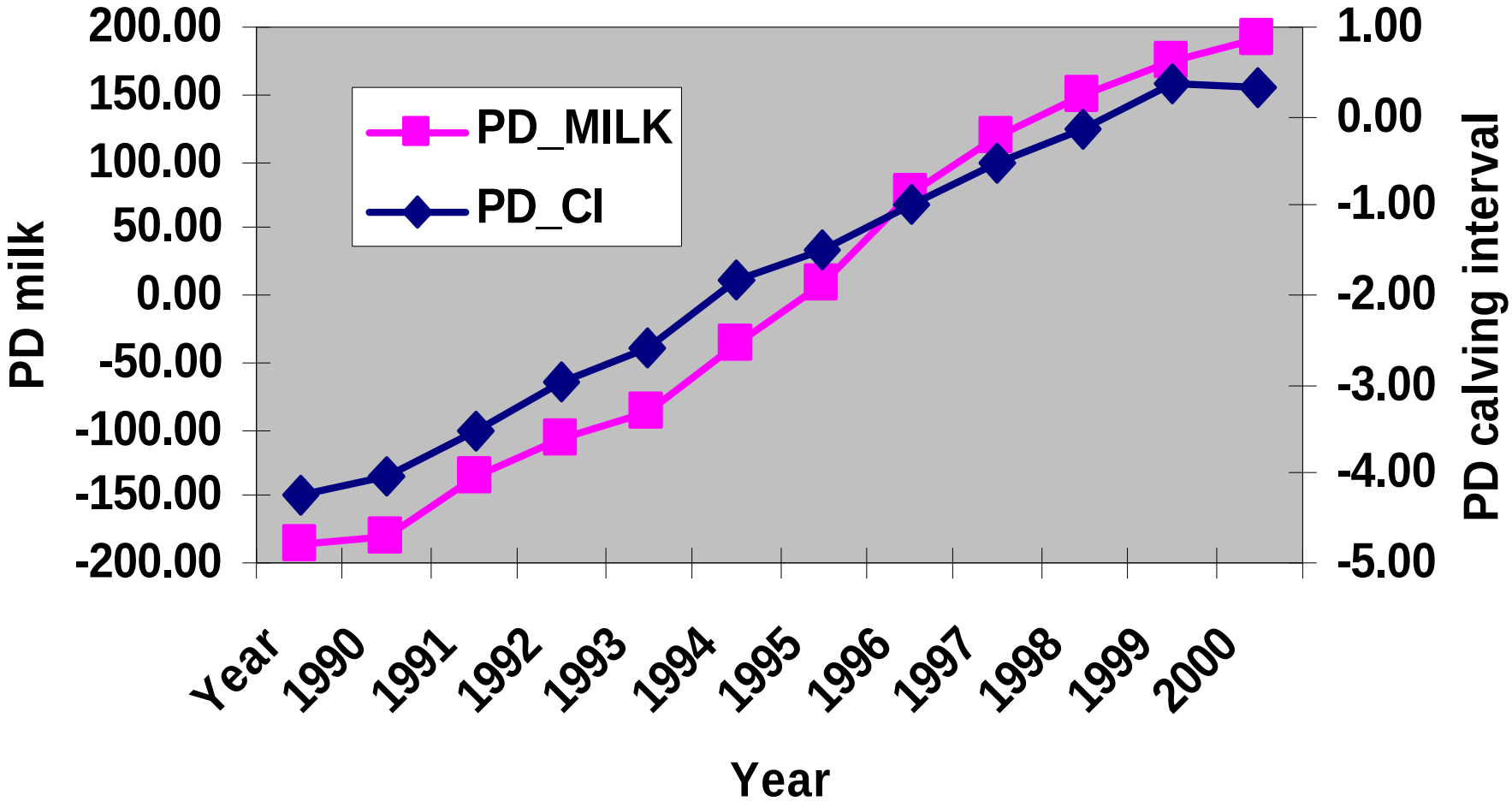
# Decline in Fertility 1990-2002

## (DairyMIS FARMS)



# Decline in Fertility 1990-2000

## (DairyMIS farms)



# Holstein-Friesian Strain Trial Review

# Strain comparison

| | EBI (€) | Milk (kg) | Fat (kg) | Prot. (kg) | Calving Interval | Survival |
|---|---|---|---|---|---|---|
| HP | 44 | 253 | 12.1 | 10.2 | -0.57 | -0.60 |
| HD | 42 | 106 | 7.8 | 6.7 | -1.86 | 0.10 |
| NZ | 51 | 30 | 9.7 | 5.0 | -3.24 | 0.89 |

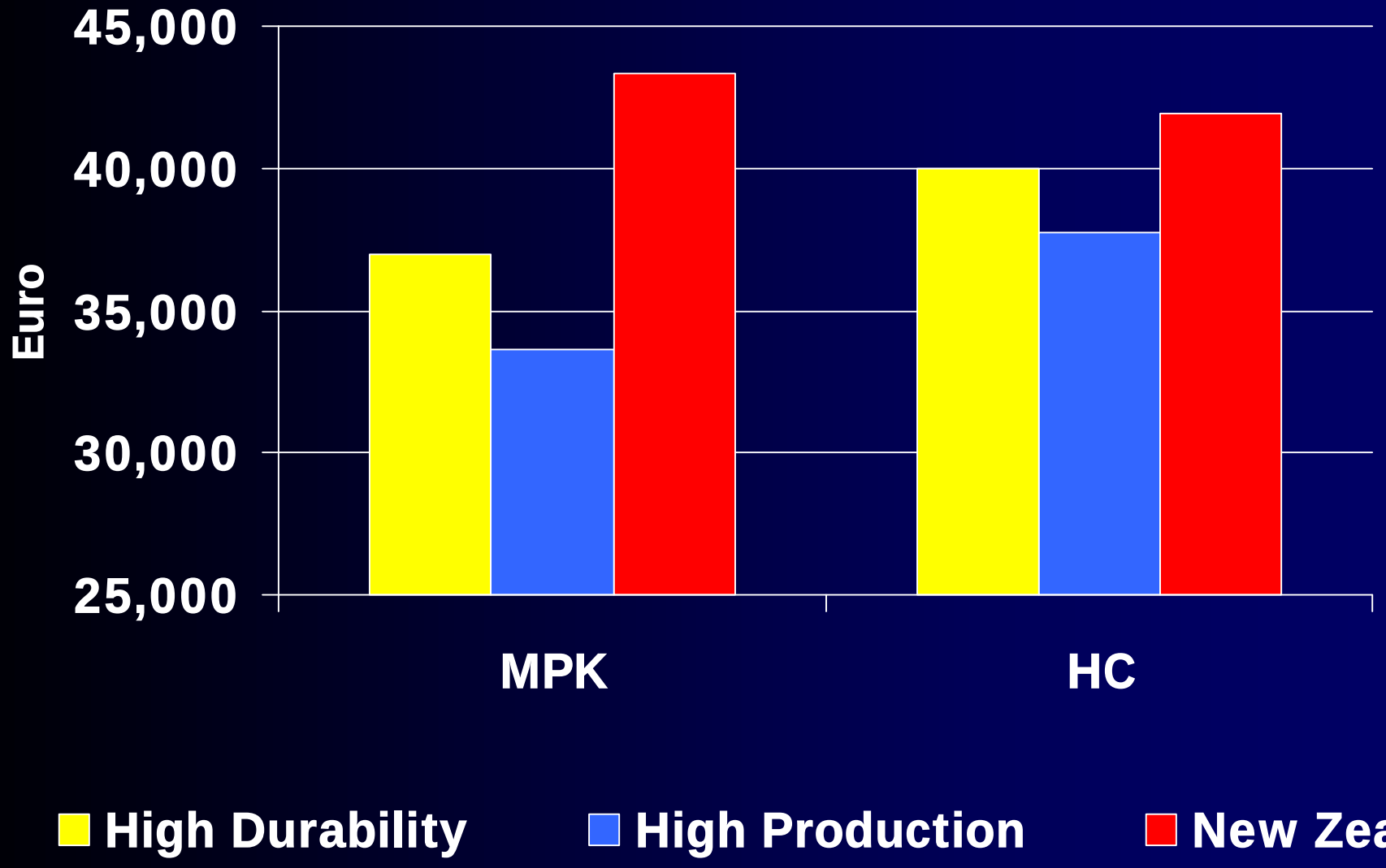
# Strain Comparison

| Feed | MP | | | HC | | |
|---|---|---|---|---|---|---|
| Strain | HP | HD | NZ | HP | HD | NZ |
| Milk (gals) | 1389 | 1312 | 1299 | 1652 | 1548 | 1436 |
| Fat (%) | 4.11 | 4.02 | 4.44 | 3.98 | 4.32 | 4.53 |
| Protein (%) | 3.44 | 3.47 | 3.55 | 3.47 | 3.47 | 3.62 |
| Milk solids (kg) | 491 | 460 | 486 | 576 | 564 | 548 |
| 42-Day in-calf(%) | 60 | 66 | 73 | 60 | 66 | 73 |
| Preg rate (%) | 80 | 85 | 93 | 80 | 85 | 93 |

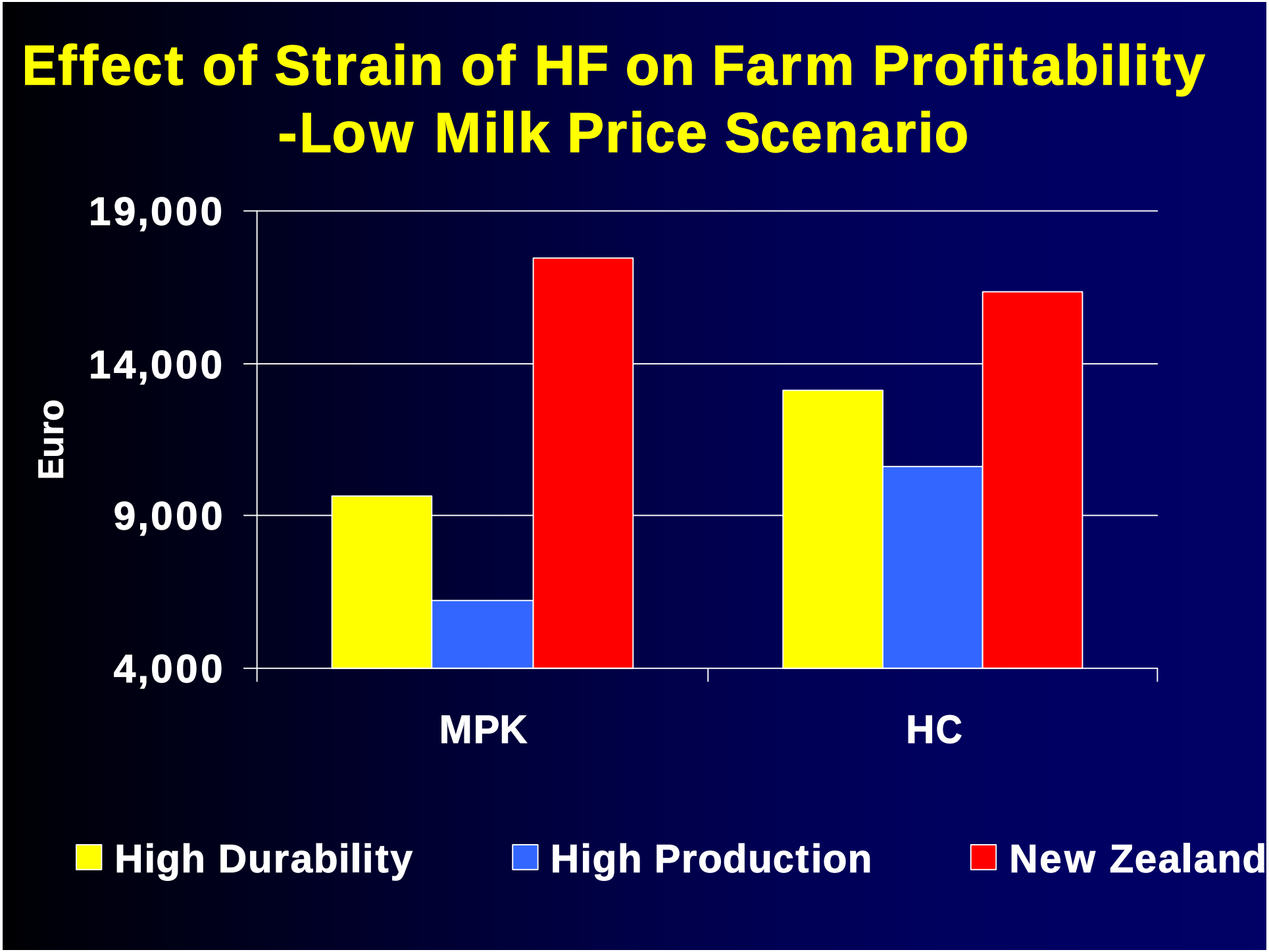
# Key Assumptions

- **Farm Size- 40(ha)**
- **Quota- 468,000l (100,000gals)**
- **Milk price (c/l)- High 26.7; Low 22.3**
- **Cull cow price (€)- High 381; Low 270 (NZ-13)**
- **Calf price (€)- High 208;Low 102 (NZ -45)**
- **Concentrate (€)- High 200/t; Low 180/t**
- **Full costs including labour**

# Effect of Strain of HF on Farm Profitability- High Milk Price Scenario



# Effect of Strain of HF on Farm Profitability -Low Milk Price Scenario



# Strain trial indications

- ↑ BCS
- ↑ Grass intake
- ↑ Energy balance
- ↑ Persistent milk production

→ ↑ Milk solids

→ ↑ Fertility

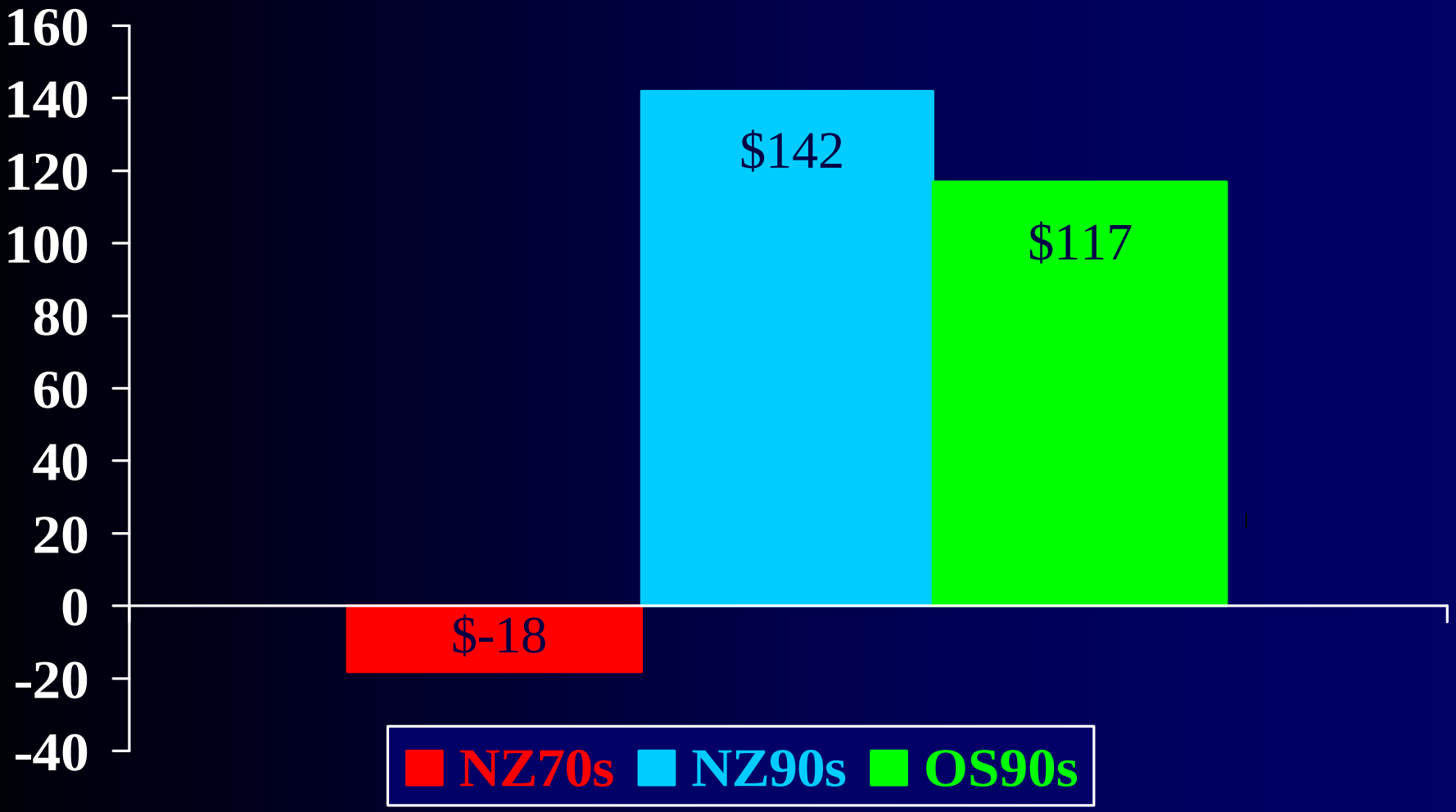
# Results from New Zealand

# The Strains

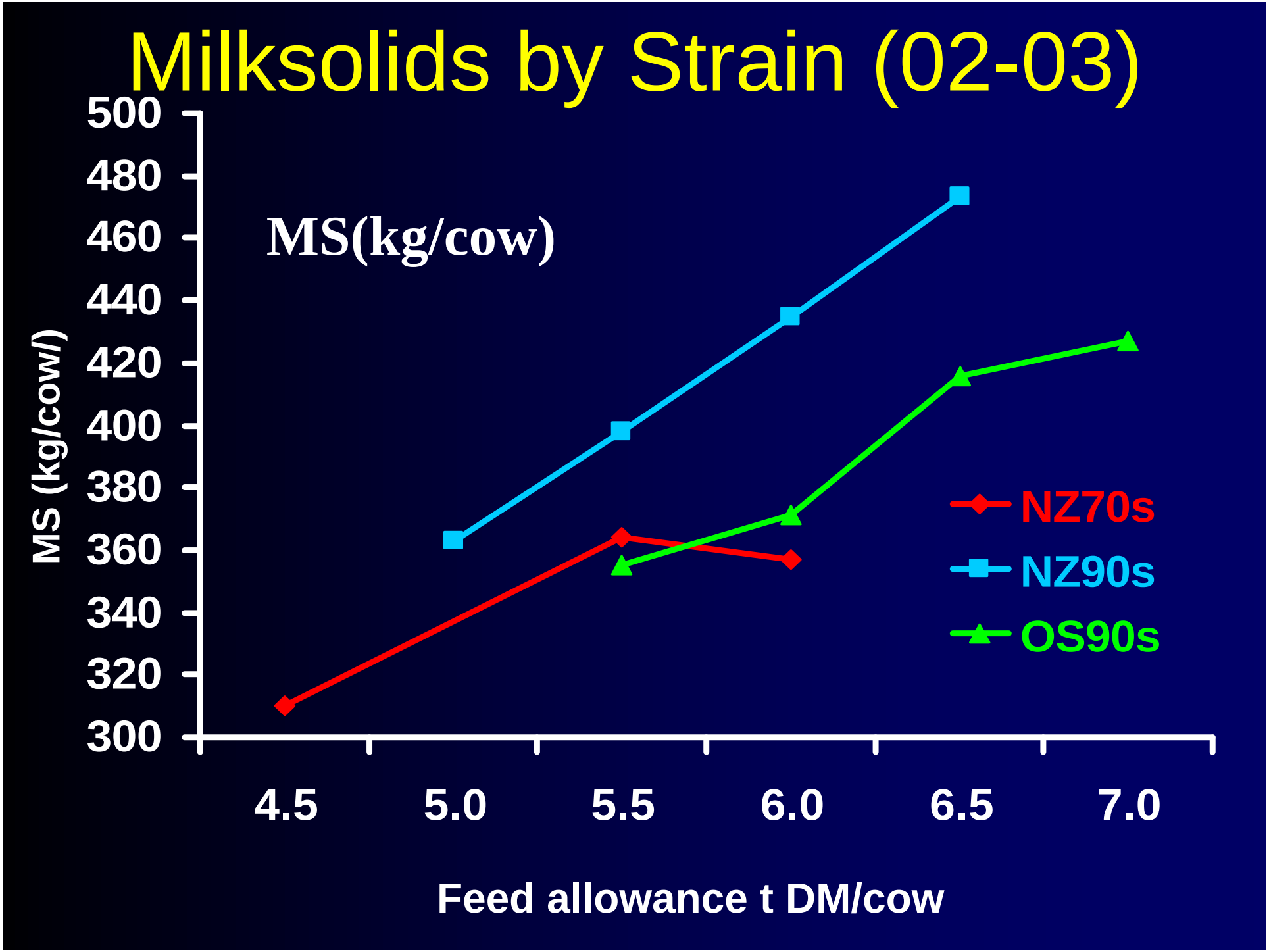
- **NZ90s = New Zealand High; high BW, sired by NZ sires, low overseas Holstein**
- **NZ70s = NZ 1970s strain; Sired by 1970s bulls, foundation dams were low BW**
- **OS90s = Overseas High BW; high BW, sired by high N. American Holstein %, founder dams high overseas %, but NZ born**

# Current Average BWs

**Top 5% of herds in NZ have $BW > 120 (Dairy Stats, 02/03)**

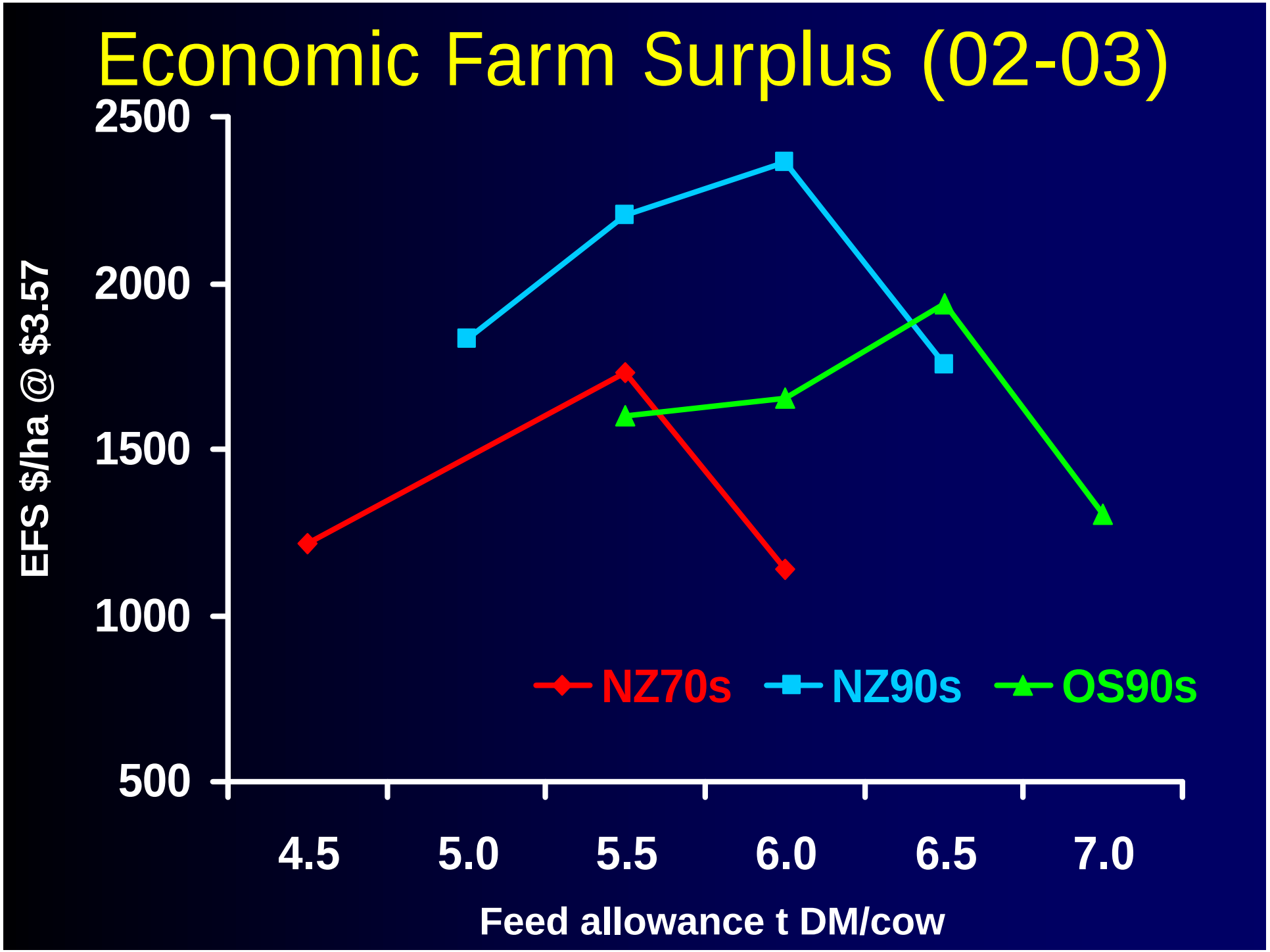


# Milksolids by Strain (02-03)



# Reproductive Performance 01-02

| Strain | OS90s | NZ90s | NZ70s |
|---|---|---|---|
| 6-week | 56 | 70 | 70 |
| 12-week | 83 | 90 | 93 |


Economic Farm Surplus (02-03)
2500
2000
1500
1000
500
EFS $/ha @ $3.57
NZ70s
NZ90s
OS90s
4.5
5.0
5.5
6.0
6.5
7.0
Feed allowance t DM/cow

# Crossbreeding

# Heterosis or Hybrid vigour

| F1 Cross | NZHF*J | Hol*J | NZHF*Hol |
|---|---|---|---|
| Protein (kg) | 5.5 | 6.2 | 2.1 |
| Fat (kg) | 7.5 | 9.6 | 2.6 |
| Milk (kg) | 147 | 157 | 67 |
| Incalf (%) | 6.8 | 10.1 | 3.3 |
| Survival 2$^{nd}$ (%) | 3.4 | 8.8 | 2.7 |
| Survival 5$^{th}$ (%) | 9.6 | 18.3 | 6.3 |

# Why Crossbreed ?

- “Narrow” selection - Reduction in health and reproductive traits of Holstein-Friesian
- Other breeds better selected for health traits
- Complementarity of breeds
- Hybrid vigour

# What do farmers need to know before embarking on crossbreeding?

1. **Are there at least two breeds of near equal merit for profitability?**

2. **How big are the heterosis or crossbreeding effects for profit-related traits?**

3. **What happens in advanced generations of a crossbreeding plan?**

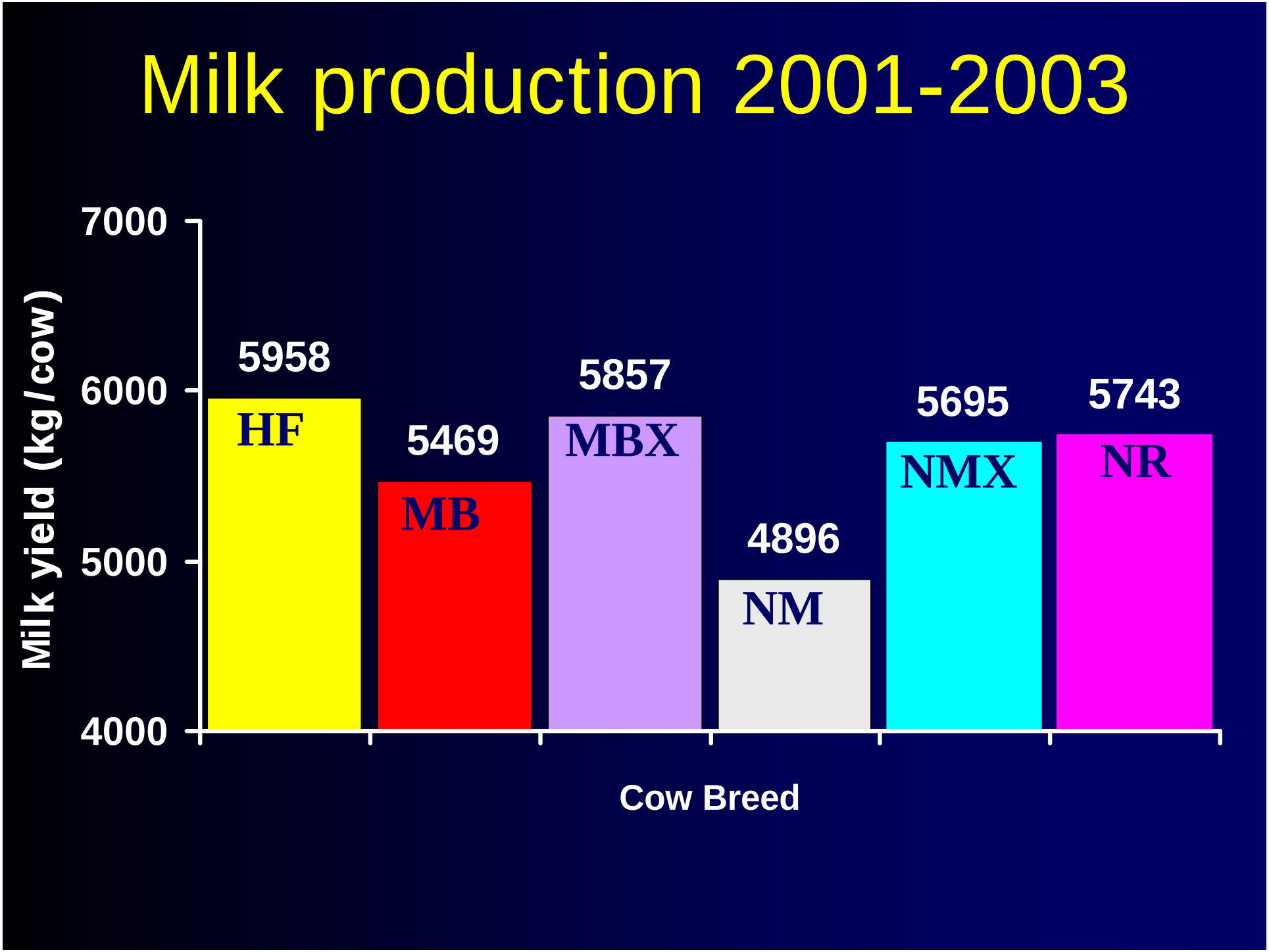
# CHOICE SOURCING OF ALTERNATIVE BREED(S)

- Montbeliarde
- Scandanavian Red
- Jersey

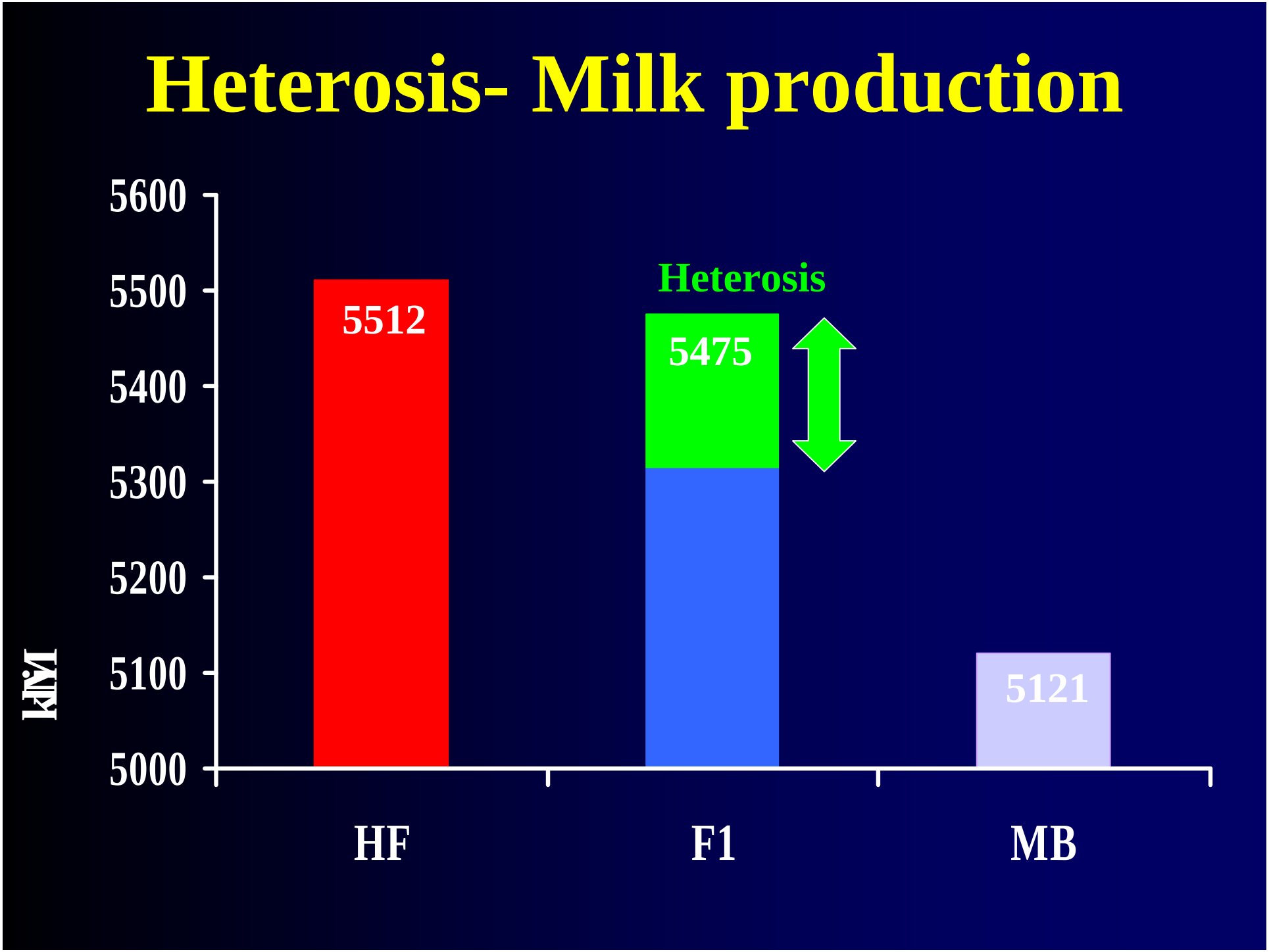
# Ballydague Experiment

- **Breeds compared**
  - Montbeliard
  - Norweigan Red
  - Holstein Friesian
  - Normande
  - Montbeliard* Holstein Friesian
  - Normande*Holstein Friesian
- **Feeding Systems**
  - 500kg V 1000kg/cow

# Milk production 2001-2003



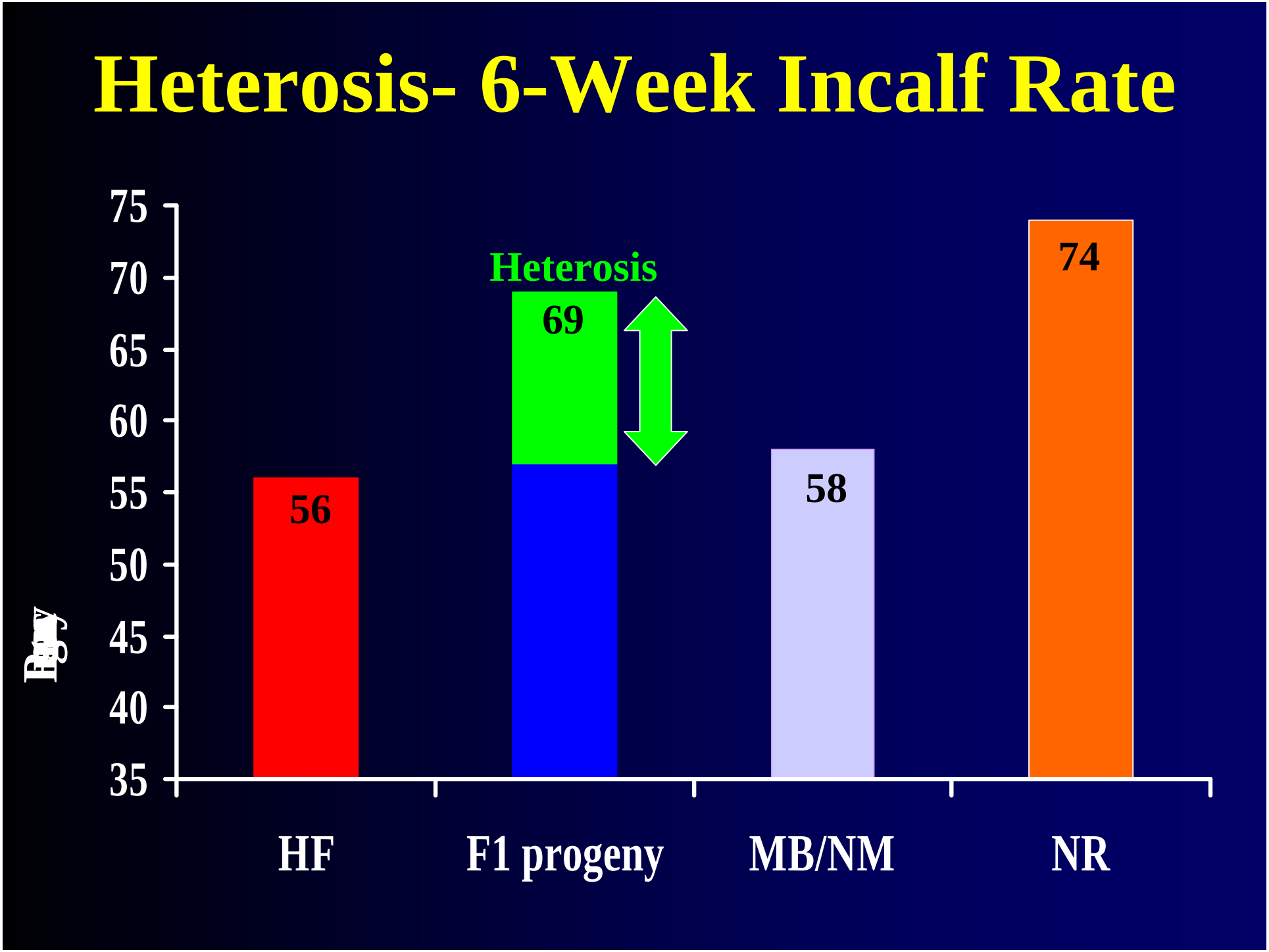
# Heterosis- Milk production



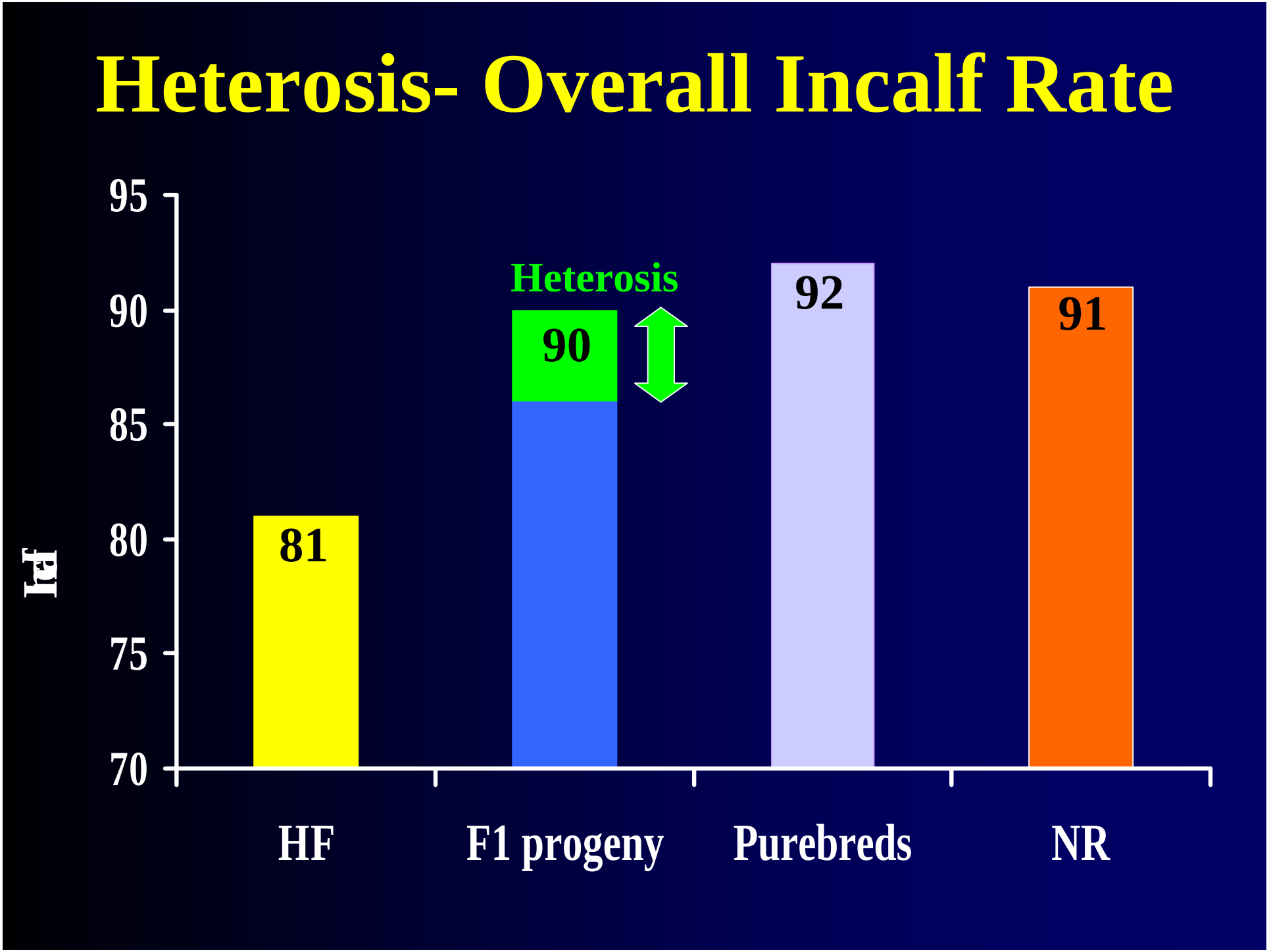
# Reproductive Performance (Ballydague 01-03)

| Cow Breed | HF | Pure-breds | F1 progeny | NR |
|---|---|---|---|---|
| CSI (days) | 76 | 75 | 75 | 74 |
| CCI (days) | 95 | 96 | 90 | 87 |
| No. Services/cow. | 1.93 | 1.87 | 1.74 | 1.67 |
| CR - 1st service (%) | 42 | 44 | 56 | 61 |
| 6 week incalf rate (%) | 56 | 58 | 69 | 74 |
| Empty rate (%) | 19 | 8 | 10 | 9 |

# Heterosis- 6-Week Incalf Rate



# Heterosis- Overall Incalf Rate



# Preliminary conclusions (1)

- **Genetic selection in Ireland must be based on the traits that have the greatest impact on farm profit → High health status**
  **→ High milk solids**
- **The results demonstrate the importance of progeny testing future sires within the environment they are to be used-IRELAND.**

# Preliminary conclusions (2)

- **For crossbreeding to be successful the alternative breed must be be genetically high in traits such as: milk solids, fertility, survival, calving ease, mastitis resistance and beef merit**
- **To use an alternative breed successfully it must be ranked within the same index as Holstein-Friesian**