

TECHNOLOGY INVESTIGATION

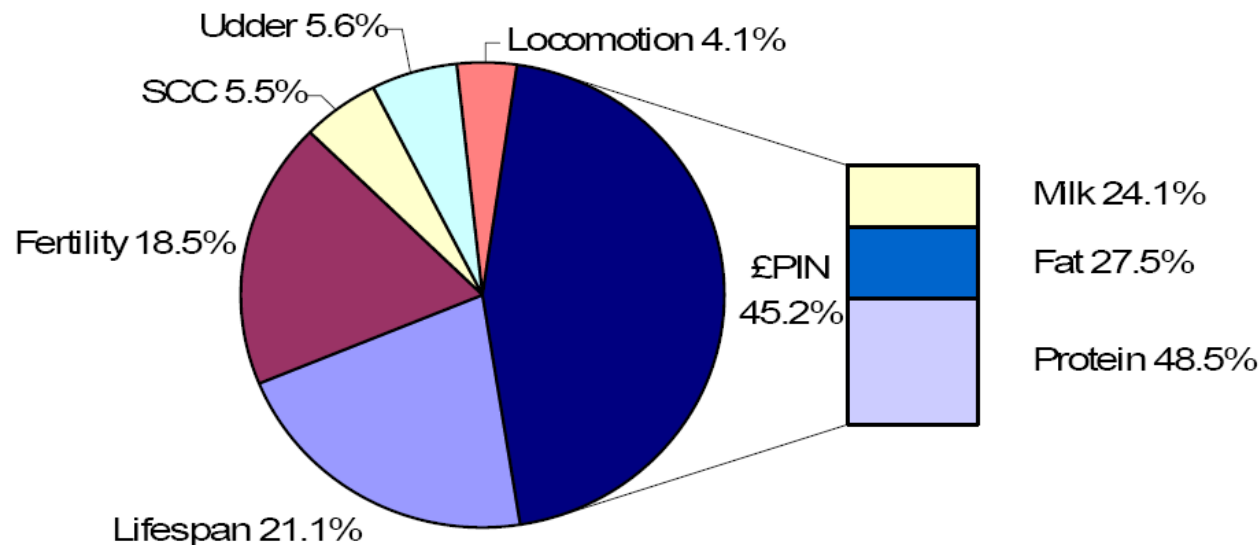
Effect of Sire Fertility Index on Daughter Calving Interval and Conception Rate

(Based on Future Herd fertility records from 2004-2011)

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BACKGROUND: - PROPORTIONS IN £PLI

- ◆ Traditionally £PIN was main genetic selection index but £PLI introduced to take account of management traits.
- ◆ Fertility Index launched in UK in May 2005 and incorporated into £PLI.
- ◆ £PLI revised substantially in 2007 to increase influence of management traits and improve lifespan.



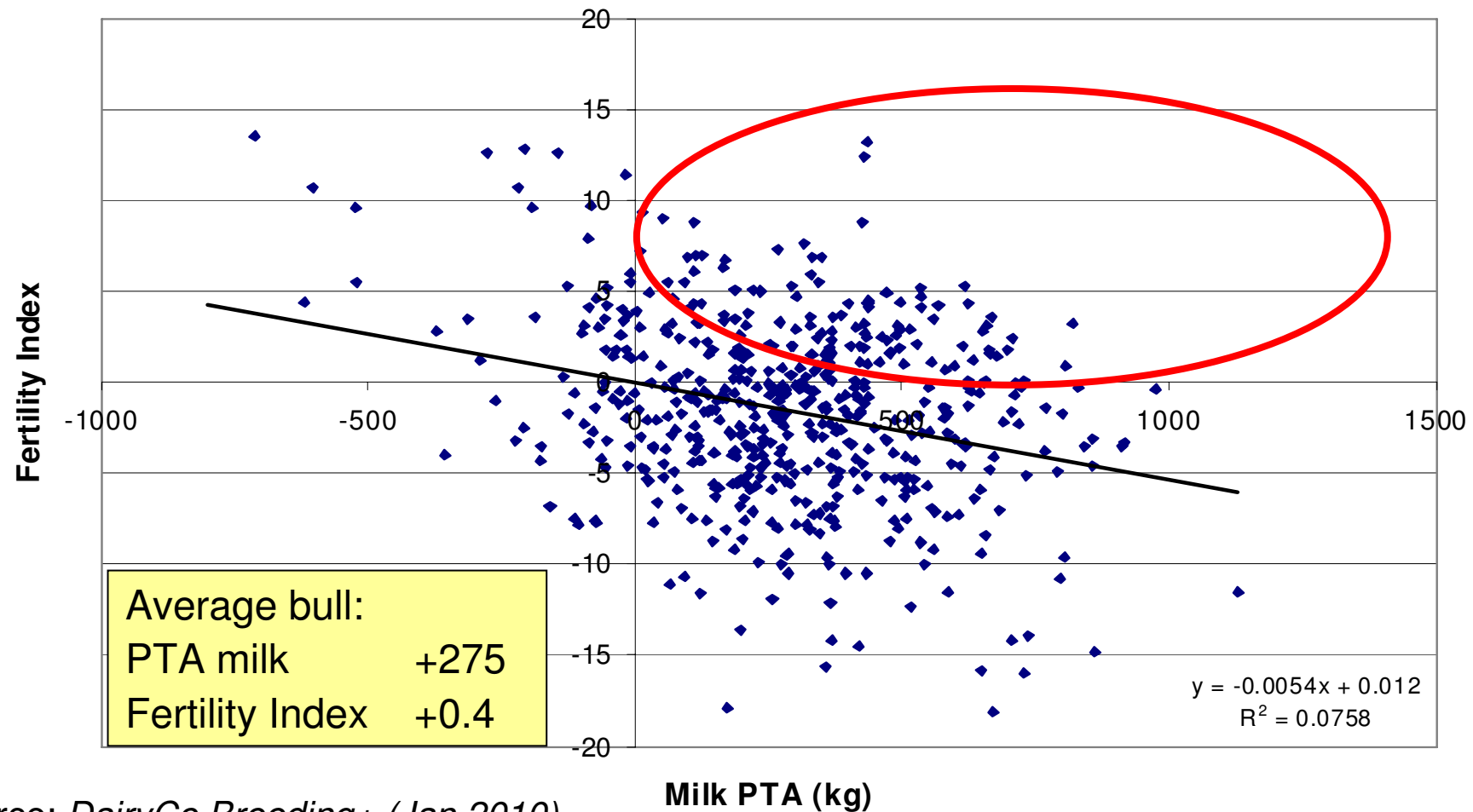
BACKGROUND: - FERTILITY INDEX

- ◆ Financial component of PLI first introduced in May 2005.
 - expressed on a scale from -15 to +15 where sires with higher figures have better fertility.
 - each 1-point increase in FI (e.g. from -3 to -2) is predicted to decrease daughter calving interval by 0.5 days and improve non-return rate by 0.5%.
- ◆ Practical tool based on 6 traits, which are either direct measures of fertility or have strong correlations with fertility:
 - Direct:
 1. Calving Interval
 2. Non return rate
 - Indirect:
 3. Body condition score
 4. Measure of milk yield around insemination
 5. Days from calving to first insemination
 6. No. inseminations needed to get a cow in calf.
- ◆ By using the best FI bulls, calving interval can be reduced in the average herd by around 7 days in one generation. These benefits accumulate over generations.

SIRE PROOFS

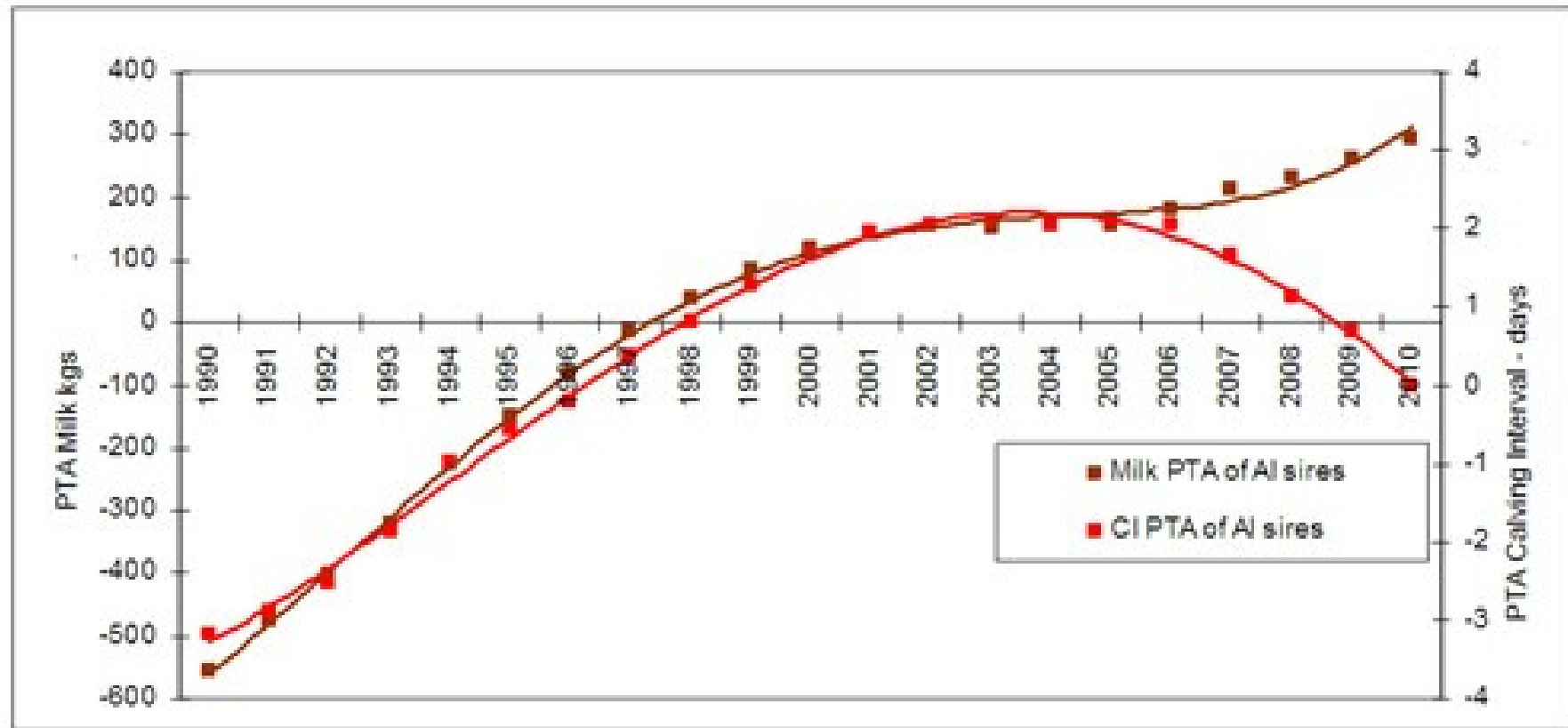
- Milk PTA vs Fertility Index

**Bulls can be selected with: 1) Good production
2) Good fertility**



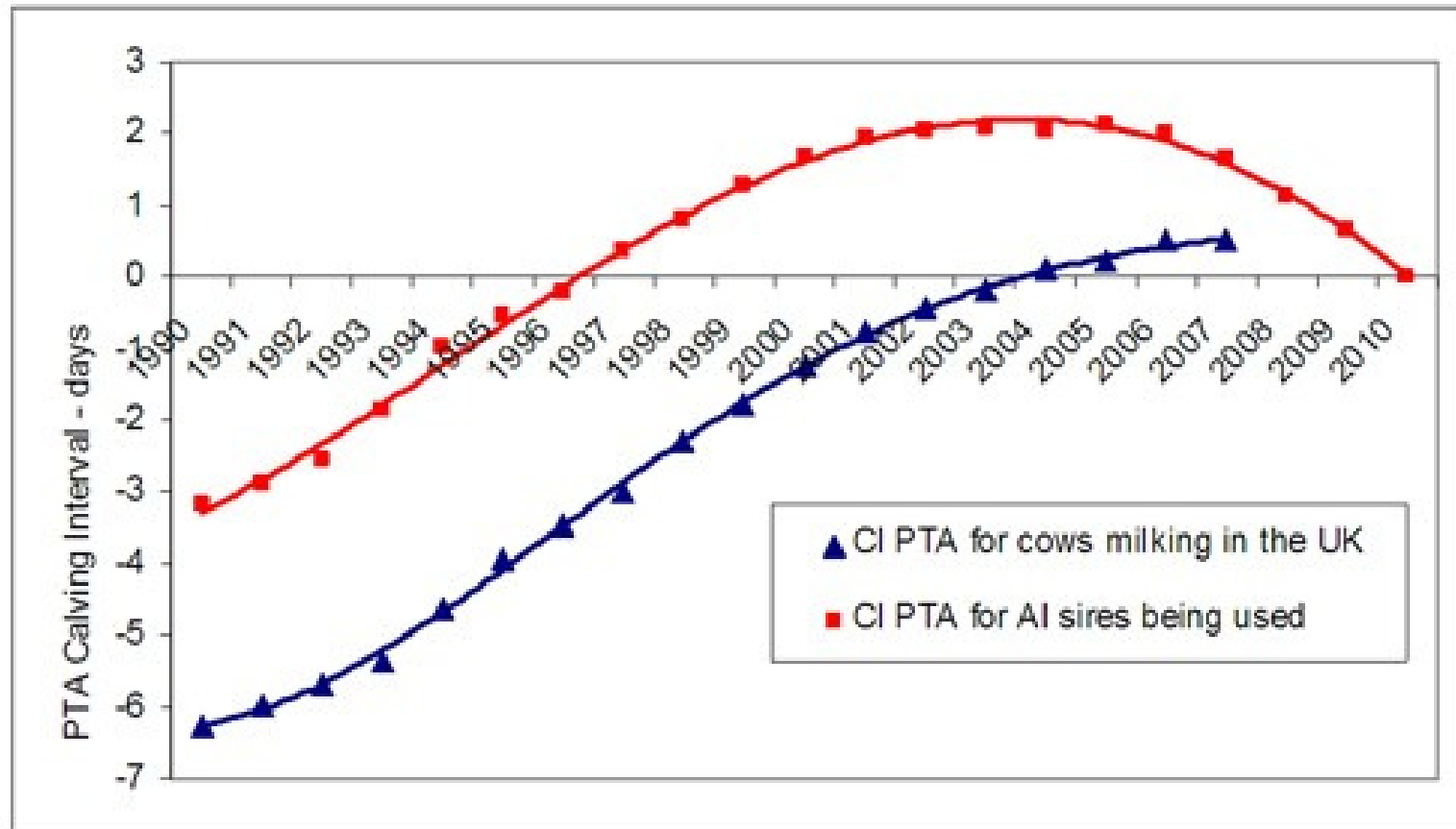
Source: DairyCo Breeding+ (Jan 2010)

PTA for Milk Production & Calving Int. amongst AI sires used in last 20 years



Since publication of sire Fertility Index time in 2005, there is divergence in selection – farmers have been selecting AI sires with increasing PTAs for milk whilst preferential selection of bulls with positive fertility PTA has caused decline in their average calving interval PTA.

PTA for Calving Interval in sires used and cows milking in last 20 years

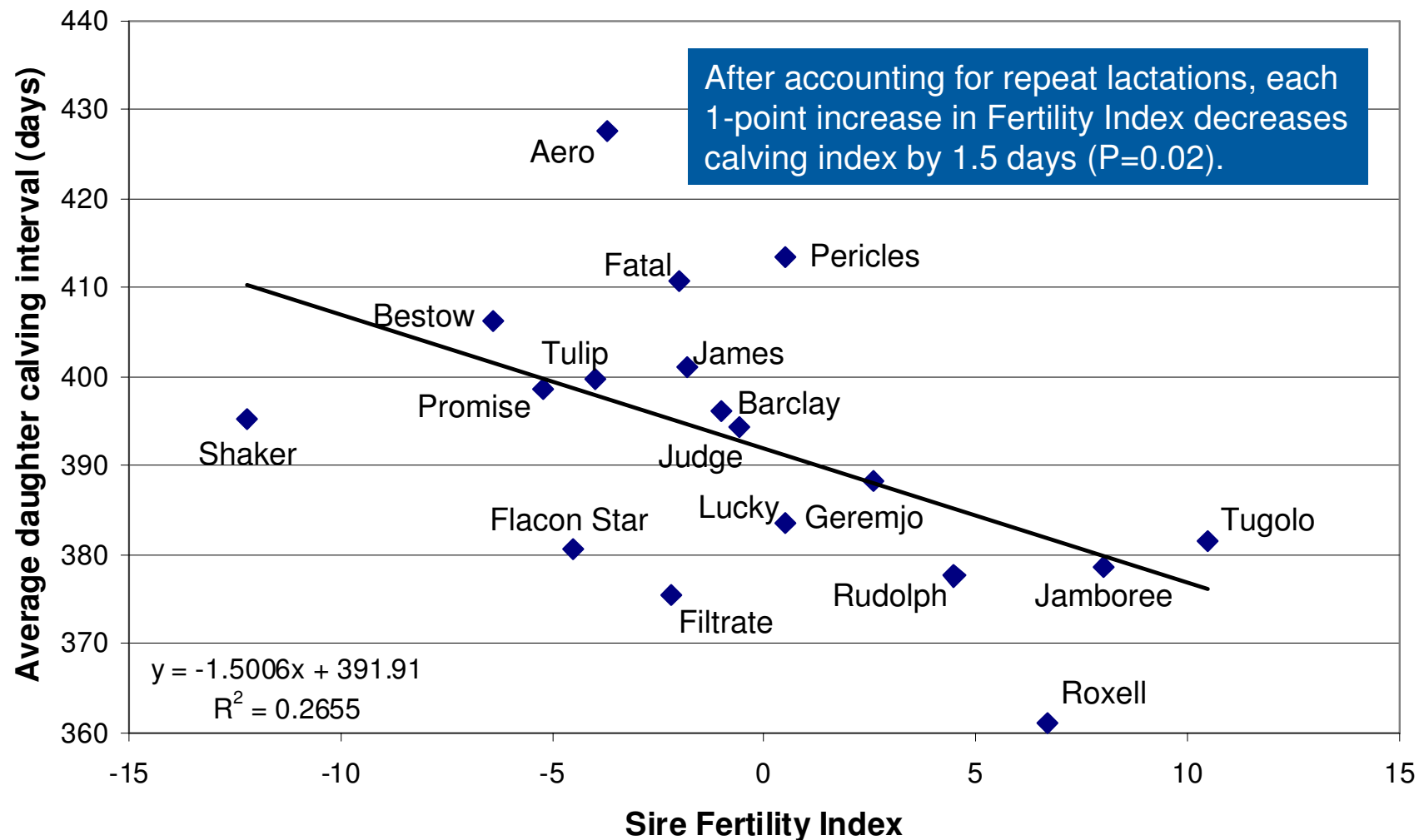


Calving interval PTA for sires used in UK (red line) has decreased since launch of Fertility Index in 2005. This is being followed by a decrease in the calving interval PTA of cows milking in the UK.

EFFECT OF SIRE FERTILITY INDEX ON DAUGHTER FERTILITY

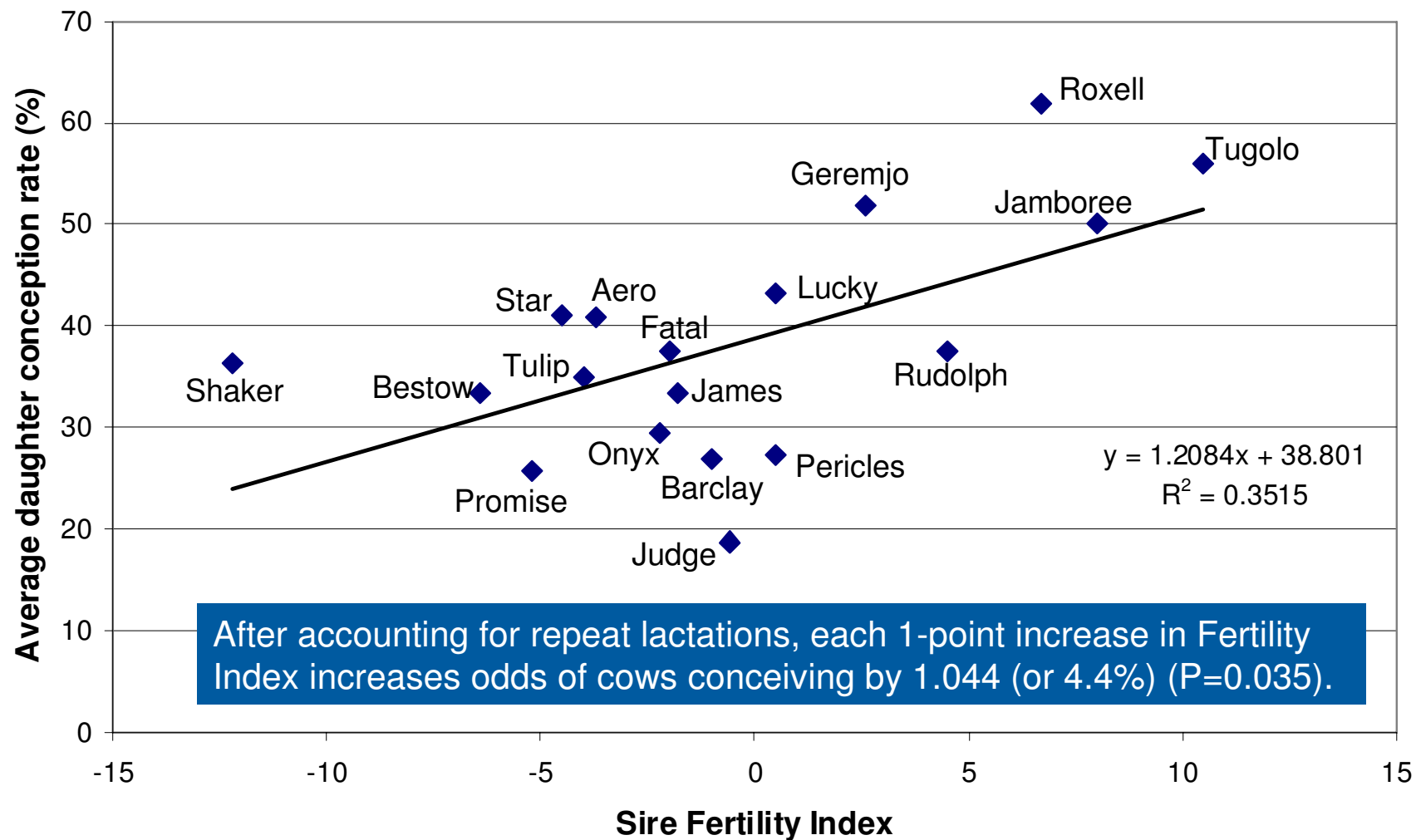
- ◆ Calving and service records of cows in Future Herd collated for breeding seasons 2004-05 to 2010-11.
- ◆ Sire of individual cows identified together with sire's Fertility Index (Aug 2011 proofs).
- ◆ Where sires had 15 or more daughter fertility records, statistically analysed effect of sire Fertility Index on daughter conception rate and calving interval while accounting for repeat records for subsequent lactations.
- ◆ Effects of sire Fertility Index on daughter fertility within the Future Herd were significant and exceeded those predicted by DairyCo, where each 1-point increase in sire Fertility Index:
 - decreased daughter calving interval by 1.5 days
 - increased daughter conception rate to first service by 1.2%

SIRE FERTILITY INDEX & DAUGHTER FERTILITY - CI



Note: Data taken from service records of cows in Future Herd in breeding seasons from 2004-05 to 2010-11. Records only included where sires had 15 or more daughter calving records.

SIRE FERTILITY INDEX & DAUGHTER FERTILITY – CR%



After accounting for repeat lactations, each 1-point increase in Fertility Index increases odds of cows conceiving by 1.044 (or 4.4%) (P=0.035).

Note: Data taken from service records of cows in Future Herd in breeding seasons from 2004-05 to 2010-11. Records only included where sires had 15 or more daughter calving records.

SIRE FERTILITY INDEX ***- THE REAL PRACTICAL BENEFIT***

Sire Name	Sire Fertility Index	Average daughter CR-1%	Average daughter CI (days)
<u>Lowest FI sires:</u>			
Shaker	-12.2	36.4	395
Bestow	-6.4	33.3	406
Promise	-5.2	25.7	399
	-9.6	33.1	397
<u>Highest FI sires:</u>			
Roxell	+6.7	61.9	361
Jamboree	+8.0	50.0	379
Tugolo	+10.5	56.0	382
	+8.4	54.4	376
Difference	18.0	21.4	-21.8
Difference/Unit FI		1.2	-1.2

Note: Weighted mean results from Greenmount Future Herd based on fertility records from 2004-2011.

Positive fertility bulls benefit daughter fertility

- ◆ It is possible to select for bulls with above average PTAs for both production and fertility.
- ◆ Fertility Index (or PTA Fertility) based on national milk records for all available AI sires.
- ◆ Each one point increase in a sire's fertility index should:
 - increase daughter conception rate by 0.5%
 - decrease daughter calving interval by 0.5 days
- ◆ Retrospective analysis of Future Herd fertility records over four breeding seasons has shown that each one-point increase has even better effects on daughter fertility.

Positive fertility bulls benefit daughter fertility