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# The effect of growth rate on age at 1<sup>st</sup> calving, fertility & milk production during the 1<sup>st</sup> lactation of Holstein-Friesian heifers on UK dairy farms

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# Introduction

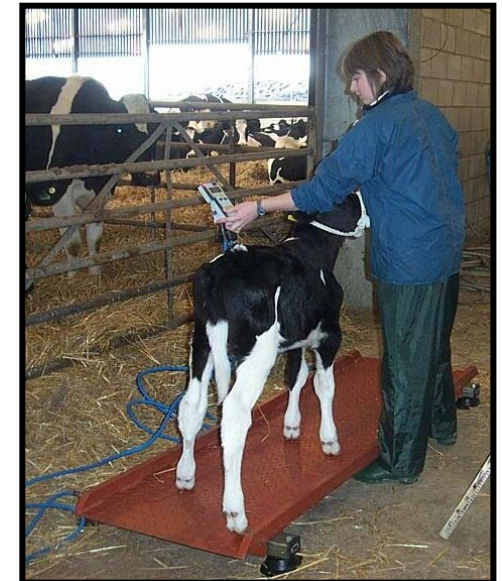
- ❑ The age & size of dairy heifers at 1<sup>st</sup> calving is important
  - length of non-productive period, fertility, milk production
- ❑ Recommended age at 1<sup>st</sup> calving for Holstein-Friesians is 24 mo
- ❑ Age at 1<sup>st</sup> calving is dependent upon:
  - age at 1<sup>st</sup> breeding - management (size at 15 mo), growth rate (timing of puberty)
  - age at conception - reproductive performance
- ❑ Extreme variability in growth rate

To determine the effect of growth rate  
age at 1<sup>st</sup> calving, & subsequent fertility  
lactation of Holstein-Friesian heif



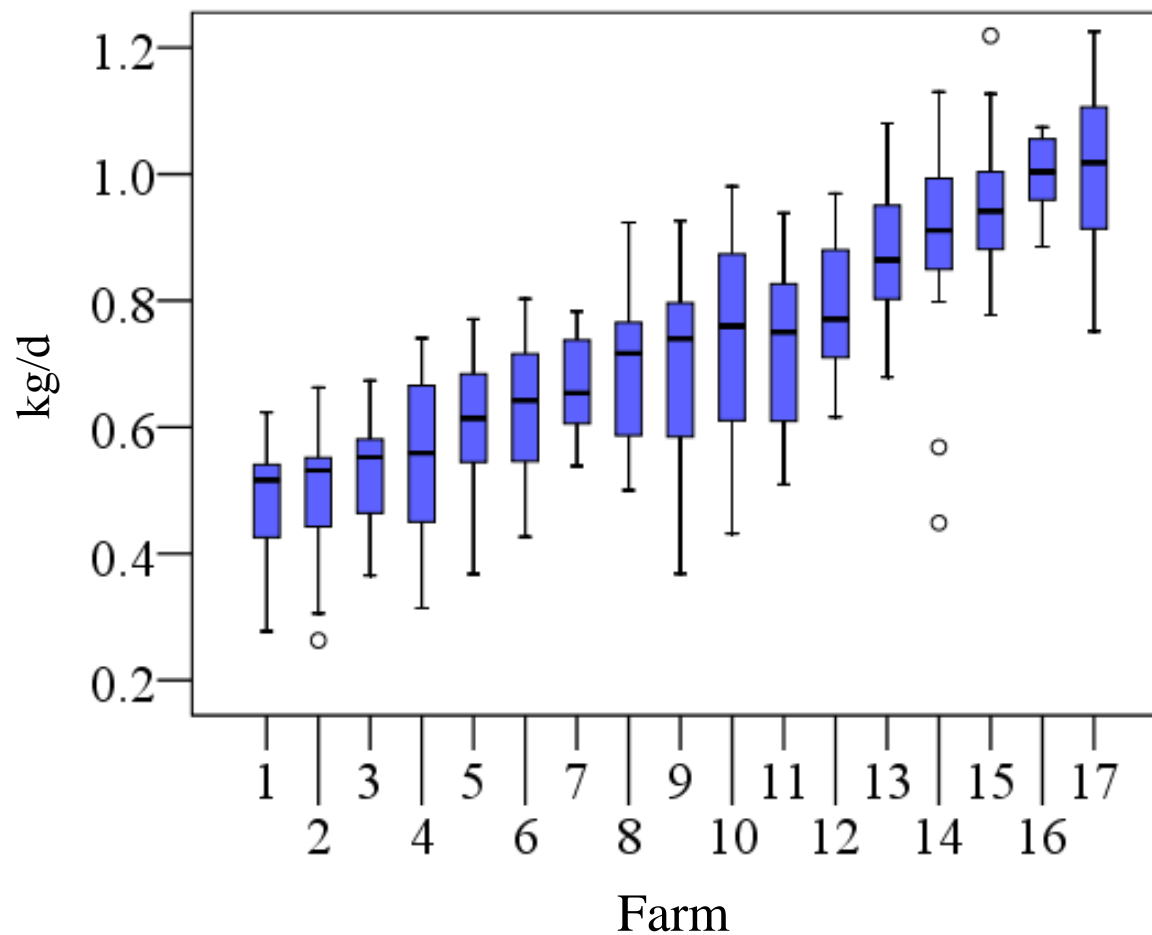
# Materials and Methods

- ❑ 17 farms recruited across southern England during 2003-2004
- ❑ Size parameters during rearing period
  - Body weight at 1 & 6 mo (growth rate from 1-6 mo)
  - Heart girth & height at withers at 1-2 wks before calving
- ❑ Fertility parameters during 1<sup>st</sup> lactation
  - Age at 1<sup>st</sup> calving
  - Days to commencement of luteal activity (P4 concentration)
  - Days to conception
  - Services / conception
- ❑ Milk production during 1<sup>st</sup> lactation
  - Days in milk
  - Milk / day
  - 305 d yield
  - Total milk yield
- ❑ Complete records for 283 heifers



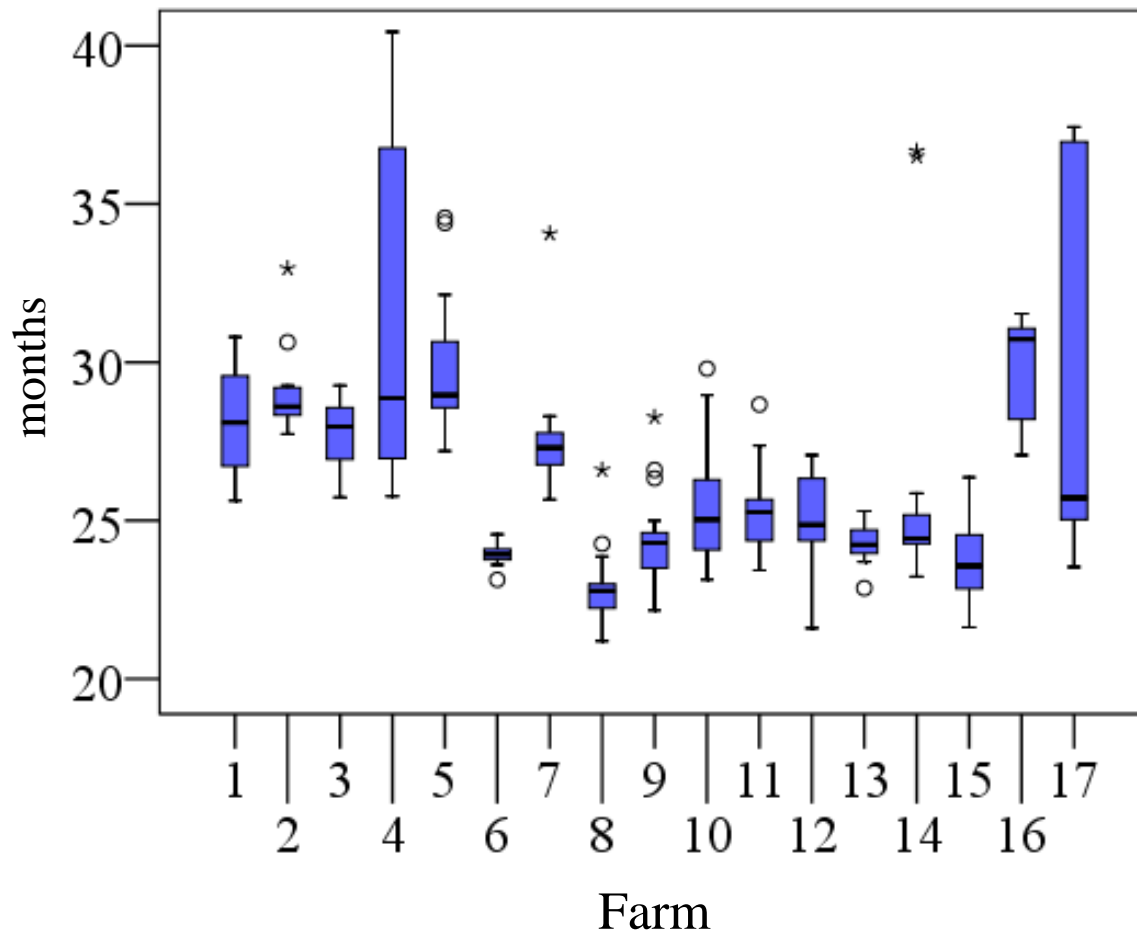
# Results: growth rate (1-6 mo)

- Mean body weight growth rate (n=283):  $0.76 \pm 0.01$  kg/d
- Range per calf: 0.26 to 1.23 kg/d



# Results: age at 1<sup>st</sup> calving

- Mean age at 1<sup>st</sup> calving (n=283): 26.0 ± 0.2 mo
- Range per heifer: 21 to 40 mo



# Results: size & age at 1<sup>st</sup> calving

□ Heifers with a growth rate <0.6 kg/d during 1<sup>st</sup> 6 mo were smaller but on average 3 mo older at 1<sup>st</sup> calving

	Growth rate (kg/d)			P-value
	<0.6	0.6-0.8	>0.8	
n	69	91	123	
Girth (cm)	198 ± 1 <sup>a</sup>	203 ± 1 <sup>b</sup>	203 ± 0.6 <sup>b</sup>	0.001
Height (cm)	137 ± 0.8 <sup>a</sup>	139 ± 0.7	141 ± 0.4 <sup>b</sup>	0.001
AFC (mo)	28 ± 0.5 <sup>b</sup>	26 ± 0.2	25 ± 0.3 <sup>a</sup>	0.01

Within rows a<b

# Results: fertility during 1<sup>st</sup> lactation

- Smaller but older heifers (weight gain <0.6 kg/d) tended to have a longer interval to CLA & fewer were pregnant at 200 d
- No significant difference in days to conception or number of S/C

	Growth rate (kg/d)			P-value
	<0.6	0.6-0.8	>0.8	
n	69	91	123	
CLA (d)	34 ± 4 <sup>b</sup>	24 ± 2 <sup>a</sup>	26 ± 1	0.06
% pregnant at 200 d	75%	85%	89%	0.04

RVC

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# Results: milk production during 1<sup>st</sup> lactation

□ No significant difference between the groups in 1<sup>st</sup> lactation milk production (days in milk, milk/d)

	Growth rate (kg/d)			<i>P</i> -value
	<0.6	0.6-0.8	>0.8	
n	69	91	123	
Total milk (kg)	9857 ± 510	9980 ± 327	9059 ± 196	0.11
305 d yield (kg)	9231 ± 310	9122 ± 232	8633 ± 147	0.12

# Results: failure to conceive

- No significant difference between the groups in the number of heifers failing to conceive before & after 1<sup>st</sup> calving

Failed to conceive	Growth rate (kg/d)		
	<0.6	0.6-0.8	>0.8
Before 1 <sup>st</sup> calving (n=19/418)	3%	4%	5%
After 1 <sup>st</sup> calving (n=24/367)	5%	8%	6%

# Conclusions

- ❑ Sub-optimum growth (<0.6 kg/d) during 1<sup>st</sup> 6 mo of life
  - Smaller & older at 1<sup>st</sup> calving
  - Reduced reproductive performance during 1<sup>st</sup> lactation - inadequate energy to support milk production, growth & reproduction?
  
- ❑ Optimum growth rates to maximise subsequent performance should neither be too fast nor too slow
  - High growth rate - high nutritional plane, milk production?
  - Low growth rate - increase length of non-productive period
  
- ❑ Important to monitor growth rate of heifers during the rearing period but in practise very few farms do
  
- ❑ Growth rate of between 0.6 and 0.8 kg/d during 1<sup>st</sup> 6 mo of life

# Acknowledgements

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