Analysis of the US and UK Suffolk Horse studbook records

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Executive Summary

- The census size of the US Suffolk Horse population is 1.5 – 2 times larger than the UK population. This is reflected both in the numbers of registrations per year and the number of sires and dams used per year.
- The ratio of dams per sire per year is slightly less in the US, 1.9 compared with 2.4 in the UK. The maximum number of dams per sire per year has been 8 in the US and 15 in the UK.
- A greater proportion of horses are used for breeding in the US, 50% compared to the UK's 40%. This is particularly reflected in the use of males for breeding, where 36% of males become sires compared to only 20% in the UK.
- The numbers of offspring per sire are very similar in the US and UK. The numbers of offspring per dam are slightly higher in the US, with a greater variance in dam family size.
- Generation interval is almost identical between the UK and the US populations, at around 7 years.

- There was a global crash in population size just after the Second World War, which has affected the subsequent rate of inbreeding in both the UK and the US populations (Figures 1 and 2).
- Since 1960 average inbreeding in the US population has been greater than average coancestry (Figure 2), suggesting that either breeders have favoured linebreeding/inbreeding strategies or that there may be geographical sub-division of the population leading to increased inbreeding.
- In contrast, average inbreeding in the UK population has been below average coancestry (Figure 2), suggesting breeders have been actively seeking to minimize inbreeding coefficients in their mating decisions.
- In recent years, both average inbreeding and coancestry have declined in the US population (Figure 2). This may reflect the introduction of new strategies aimed at reducing the rate of inbreeding.
- The UK and US populations are related by coancestry (Figure 3). However, they represent a significant source of variation for each other and future breeding strategies to reduce the rate of inbreeding could usefully include exchange of genes between the two populations.

Summary of US and UK Suffolk Horse Studbook statistics

	US Studbook	**UK Studbook**
Years covered by electronic records	1864 - 2012	1955 - 2012
Total number of horses recorded	5745	1951
Total number of sires	637	181
Total number of dams	1719	703
Number of registrations per year		
Mean	52	28
Max	130	73
Min	7	9
Sires per year		
Mean	25	12
Max	55	19
Min	5	7
Dams per year		
Mean	52	28
Max	130	73
Min	7	9
Number of dams per sire per year		
Mean	1.9	2.4
Max	8	15
Proportion of horses used for breeding	0.50 (50%)	0.40 (40%)
Proportion of males used for breeding	0.36 (36%)	0.20 (20%)
Proportion of females used for breeding	0.63 (63%)	0.56 (56%)
Number of offspring per sire		
Mean	9.6	9
Max	89	83
Variance	134.01	160.28
Number of offspring per dam		
Mean	3.16	2.35
Max	17	11
Variance	5.56	2.69
Generation interval (years)		
Sires	6.81	6.83
Dams	7.58	7.23

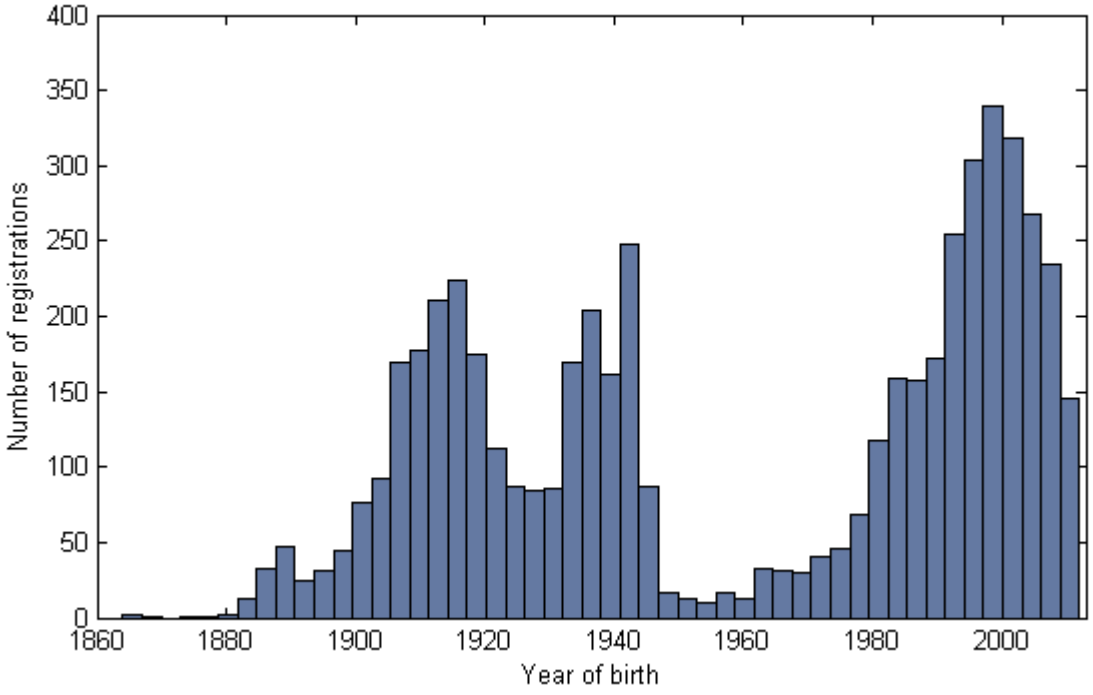

Figure 1(a) Number of registrations in US studbook

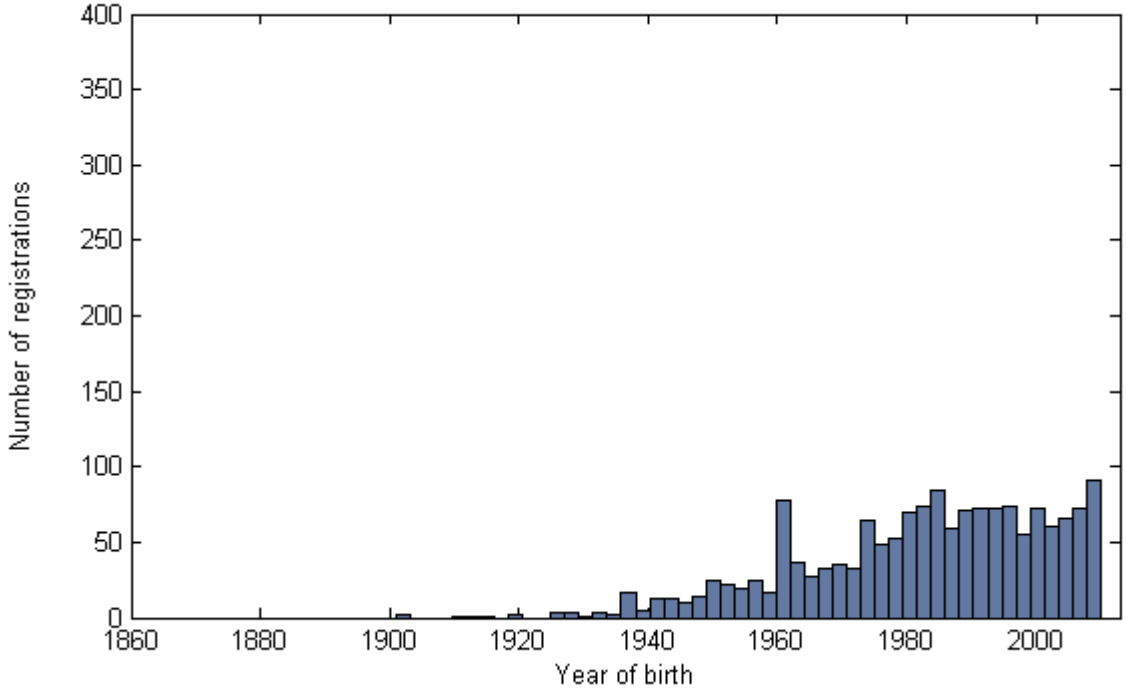

Figure 1(b) Number of registrations in UK studbook

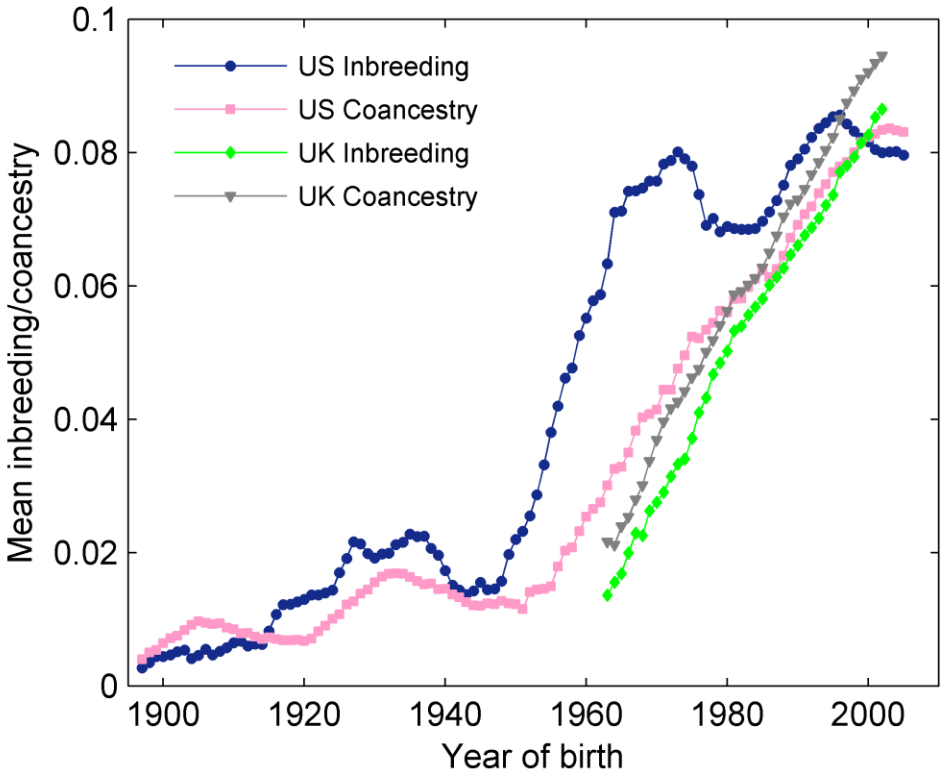

Figure 2 Change in average inbreeding and coancestry since 1900 in the US population and since 1960 in the UK population

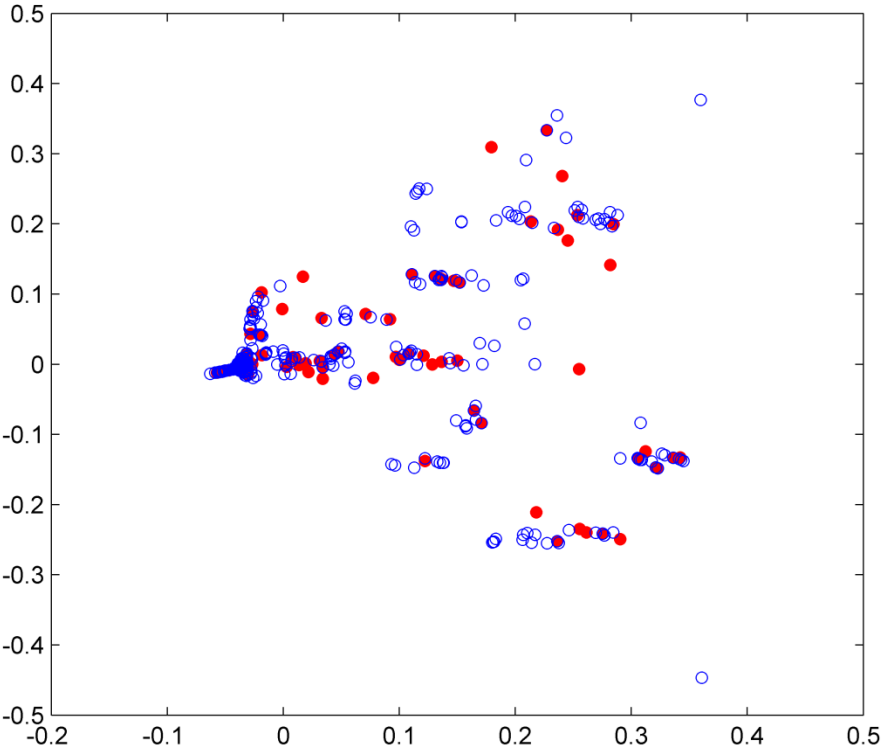

Figure 3 Multidimensional scaling 'map' illustrating coancestry between individuals born since 2000 in the US population (blue, open circles) and the UK population (red, closed circles)