CRC for Premium Quality Wool

Genetic Variation in Staple Strength

Produced for the CRC for Premium Quality Wool undergraduate program by;
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Strain and environment effects

	Armidale, NSW		Bakers Hill, WA	
	Fine	Medium	Fine	Medium
Staple strength (N/ktex)	43.8	52.5	36.7	35.0
Minimum diameter (μm)	16.8	18.9	14.3	16.6
Along-staple variation (μm^2)	1.63	1.20	2.09	4.29
Rate of change (μm/mm)	0.19	0.13	0.09	0.11

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Source: Brown, Crook and Purvis (1999)

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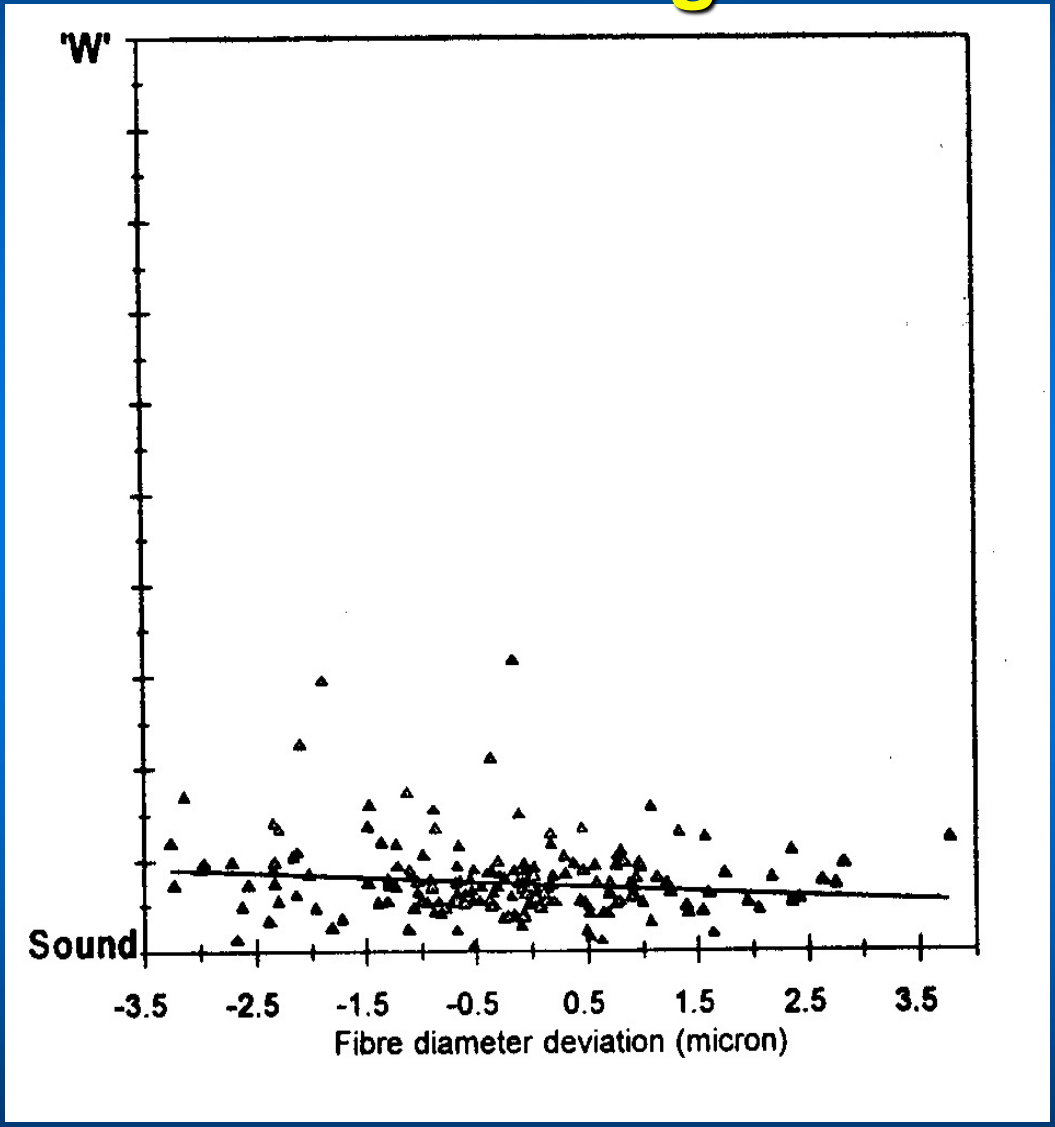
Between-flock variation in staple strength



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Source: Coelli et al. (1996)

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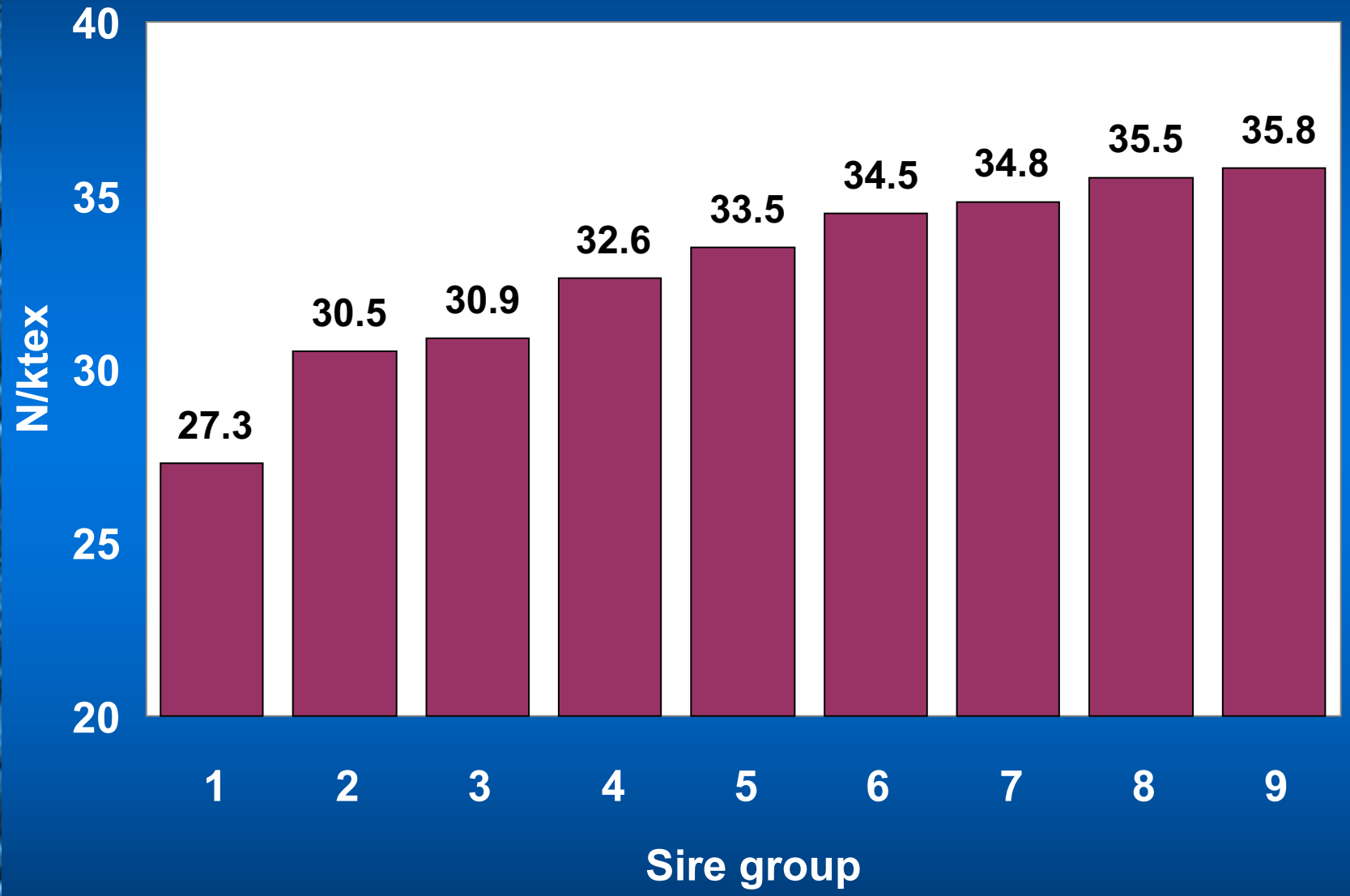
Between-sire variation



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Source: Denney (1990)

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Phenotypic variation in staple strength

FLOCK	St. deviation of SS (N/ktex)	Shorn
Great Southern Agricultural Research Inst. (WA)		
Hogget rams	6.40	Spr.
Commercial environment	7.32	Spr.
Stud environment	8.43	Spr.
Mature ewes	10.90	Spr.
Turretfield Research Centre (SA)		
10 mth of age (6 mth wool growth)	10.20	Aut.
16 mth of age (6 mth wool growth)	10.40	Spr.
CSIRO (Armidale)		
Fine wool (10 mth wool growth)	9.21	Spr.

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Source: Greeff (1996)

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Heritability estimates of staple strength

FLOCK	Herit.	Shorn
Great Southern Agricultural Research Inst. (WA)		
Hogget rams	0.51	Spr.
Commercial environment	0.31	Spr.
Stud environment	0.40	Spr.
Mature ewes	0.25	Spr.
Turretfield Research Centre (SA)		
10 mth of age (6 mth wool growth)	0.25	Aut.
16 mth of age (6 mth wool growth)	0.47	Spr.
CSIRO (Armidale)		
Finewool (10 mth wool growth)	0.23	Spr.
	0.30	

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Source: Greeff (1996)

Genetic gains in staple strength

Flock structure

	Age (years)					
	2	3	4	5	6	Total
Rams	5	3	-	-	-	8
Ewes	100	90	80	70	60	400

Number of ewe and ram hoggets available for selection = 340

Heritability of staple SS = 0.30

Standard deviation of SS = 8.00 N/Ktex

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Source: Greeff (1996)

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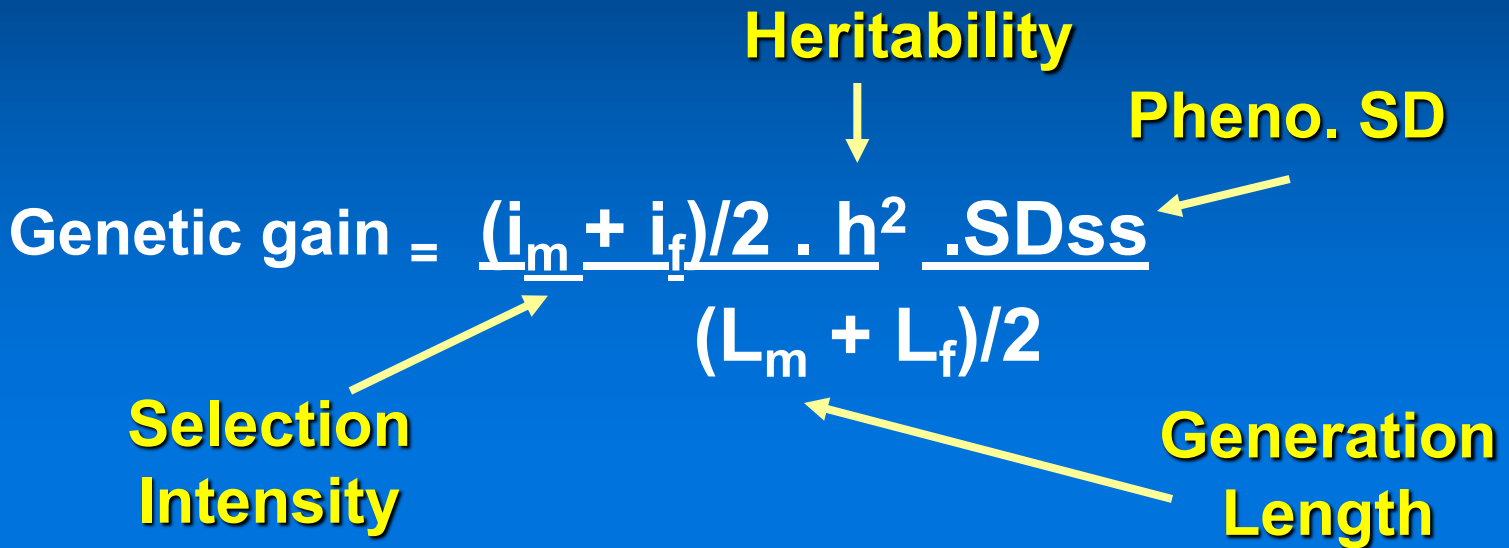
Genetic gains in staple strength



$$\text{Genetic gain} = \frac{1.4715 * 0.30 * 8.00}{3.06}$$

$$= \textit{1.15 N/ktex per year}$$

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Source: Greeff (1996)