

THE GENETIC EFFECT OF F1 WAGYU-BLACK ANGUS STEERS ON *LONGISSIMUS DORSI* MUSCLE IRON CONCENTRATION

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Meat colour is a primary factor used by Japanese consumers to determine meat quality. They rate meat colour as the most important consideration in their decision to purchase, followed by fat colour, marbling, price and drip loss. Australian beef is characterised by a deeper red colour compared to Japanese beef, which has a significantly paler appearance. Meat colour is derived from the meat pigment, myoglobin, and the iron-dependent heme. Previous research has shown a significant negative correlation ($r^2=0.79$) between muscle iron content and meat colour lightness (Zembatashi *et al.* 1999). The objective of this research was to determine whether genetic differences of F1 Wagyu-Black Angus steers influenced *Longissimus dorsi* iron concentrations after housing in a feedlot for a long period.

The study used 108 F1 Wagyu-Black Angus steers of known genetic background (4 Wagyu grandsires and 7 sires). Steers were introduced to feed on the 22nd March 2001 (initial weight 411 kg, s.d. 24.4) and fed a wheat-based diet for approximately 414 days (final weight 854 kg, s.d. 56.4) at the Queensland Department of Primary Industries, Brigalow Research Station feedlot facility. During chiller assessment at the Oakey abattoir, a sample of *Longissimus dorsi* muscle was removed from below the point of insertion of the 10th/11th ribs. Iron analysis was conducted on approximately 2.5 g of meat residue, which remained from intramuscular fat extraction from *Longissimus dorsi* samples. Meat samples were prepared by digestion with perchloric acid and analysed for iron in an Inductively Coupled Plasma Emission Spectrometer.

Table 1 shows that both Wagyu grandsires and sires had a significant effect on the iron concentration (ug/g fat free muscle dry matter) of the *Longissimus dorsi*. The grandsires, Ithohana and Kikuhana B, had significantly ($P<0.05$) higher iron concentrations than Kikuhana A and Terutani. Within sires, TW176 had the highest iron concentration, and TW221, TW167 and TW150 the lowest.

Table 1. The effect of Grandsire and Sire on iron concentration (ug/g fat free muscle dry matter) of the *Longissimus dorsi*.

	Grandsire				s.e.m			
	Ithohana	Kikuhana A	Kikuhana B	Terutani				
Iron	63.6 ^a	56.3 ^b	65.6 ^a	55.8 ^b	2.68			
	Sire						s.e.m	
	TW139	TW187	TW200	TW221	TW167	TW176		TW150
Iron	66.7 ^b	59.4 ^{bc}	61.4 ^{bc}	53.7 ^c	57.5 ^c	75.7 ^a	55.8 ^c	3.17

Means with different superscripts within rows are significant at $P<0.01$

Wagyu cattle have been shown to contain significantly lower *Longissimus dorsi* iron concentrations compared with Angus steers (Zembayashi *et al.* 1999). Previous research could not determine whether this effect was due to diet or genetics. Iron concentration has a direct effect on meat colour, however, fat content of muscle may also influence appearance of meat. The iron concentrations evaluated in this study were determined on a fat free basis. The results provide evidence that the iron concentration of muscle varies with genetic background, suggesting that there may be a heritable trait that could be used in selection to produce meat more acceptable to the Japanese market.

ZEMBAYASHI, M., LUNT, D.K. and SMITH, S.B. (1999). *Meat Sci.* **53**, 221-226.

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