



Canine Coat Color Genetics

Rev. 8/12

(Alleles which are likely to be absent in Australian Shepherds are in shaded boxes.)

Locus	Gene	Allele	Genotypes	Phenotypes
A <i>agouti</i>	ASIP agouti signal peptide chromosome 24	A ^y	A ^y A ^y , A ^y A ^w , A ^y a ^t , A ^y a	sable
		a ^w	A ^w A ^w , A ^w a ^t , A ^w a	wolf grey
		a ^t	a ^t a ^t , a ^t a	tan points
		a	aa	recessive "black" ¹
B <i>black (brown)</i>	TYRP1 tyrosinase related protein 1 chromosome 11	B	BB, Bb	black
		b ¹	bb	brown (liver, chocolate, red)
C <i>albino</i>	???	C	CC	full depth of tan pigment
		c	Cc	lightened tan pigment
		cc	cc	very light tan pigment
D <i>dilution</i>	MLPH melanophilan chromosome 25	D	DD, Dd	full black/brown pigment
		d	dd	diluted black/brown pigment
E <i>extension</i>	MC1r melanocortin receptor 1 chromosome 5	E ^m	E ^m E ^m , E ^m E ^g , E ^m E, Ee	yellow to red with mask
		E ^g	E ^g E ^g , E ^g E, E ^g e	grizzle/domino pattern
		E	EE, Ee	black (or brown if bb)
		e	ee	red, orange, yellow, fawn
G <i>greying</i>	???	G	GG, Gg	gradual greying
		g	gg	retains birth color
H <i>harlequin</i> ⁶	PSMB7 proteasome subunit beta type 7 chromosome 9	H	HH	embryonic lethal
		h	Hh	harlequin pattern
		hh	hh	no harlequin pattern
K <i>dominant "black"</i> ^{1,3}	CBD103 beta-defensin103 chromosome 16	K	KK, Kk ^{br} , Kk	no tan pigment
		k ^{br}	k ^{br} k ^{br} , k ^{br} k	brindle pattern
		k	kk	tan pigment possible
M <i>merle</i>	SILV silver chromosome 10	M	MM ⁵	eye/ear defects, often white
		m	Mm	normal merle pattern
		mm	mm	no merle pattern
S <i>spotting</i> ⁴	MITF chromosome 20 and probably others	S	SS	little or no white
		s ^p	Ss ^p	"flashy" pattern (boxers)
		LP?	proposed mutation - longer mutation = more white	
T <i>ticking</i>	???	T	TT, Tt	ticking
		t	tt	no ticking

1. There are actually three different recessive at TRYP1, all of which confer the brown phenotype in the absence of B.

2. Dominant (K) and recessive (aa) "black" are brown in a bb dog.

3. K will not express in dogs with an ee genotype.

4. Collie markings, which includes Aussies, are thought to be caused by a separate gene.

5. M is incompletely dominant over m; MM merles are often mostly white and usually have eye/ear defects, Mm merles are normal.