goat color genetics summary. Phil Sponenberg

Remember – final color and pattern are the result of summing the changes over ALL these loci! Most goats are "wild type" for most of these, and so we only "notice" the single locus that is changed. However, all of the loci are active in all goats – whether we can see the results or not.

Agouti Locus. determinant of tan and black symmetrical patterns. Tan areas dominate, so tanner patterns dominate blacker patterns. A summary for patterns (there are over 20) is:

white/tan	can be the cause of fading red, or white
wild type	rare and beautiful, tan with white belly and nice black stripes
badgerface	tan on top, black belly, black backstripe
san clemente	tan with black legs, black over front half
peacock	tan front, black rear, with dark legs
black and tan	black on top, tan belly and face stripes
toggenburg	black on top, white face stripes, legs, dark belly
black	solid black

Extension locus. interacts with Agouti to give important combinations.
dominant black - covers up *Agouti* locus, Sometimes it "leaks" to off-black
normal – allows *Agouti* expression.
recessive red – this one is very rare. results in solid red to white.

Brown. replaces all black areas with various shades of brown.
light brown. dominant. like most Toggenburgs
dark brown. Dark, cocoa brown, born barely "off black". Dominant to black
black - intermediate, and the most common of these alleles
brown - recessive. This is a medium bright reddish or liver brown.

"Red" This refers to the modification of tan areas to be dark, and is controlled by many genes.

Spots - Several different patterns, control is separate for each. all combinations possible.
belt - probably dominant
irregular spotting – likely recessive
flowery speckling - probably dominant
dark fronts, white rears - probably dominant, could be a big belt
barbari – dark extremities, white body/neck, head with small colored spots
algarve - ragged colored patches on a white background, colored ears and nose
goulet – white ears, tail, and flecked sides. color over eyes
roan - intermixing of white and colored hairs, probably dominant
frosted - roan ears and nose

Ticking - small pigmented spots in otherwise white areas. Grow in with age, and vary in extent and size. Probably dominant.

Moon Spots - Round, scattered light brown to cream spots on any background color. I'll bet dominant.

White Angora - The source of whiteness in Angora goats. Dominant, with some stray colored areas in some heterozygotes.

Cashmere Bearing Goats

Color can be important in goats used for cashmere production, because white cashmere is generally the most valued color in commercial production systems. Cashmere comes from secondary follicles, and as a result is usually much paler than the coarse hairs produced by the primary follicles. Consequently the cashmere from black goats is usually pale grey. Indeed the Altai breed is generally black with grey cashmere, and is one of the heaviest producers of cashmere among goat breeds.

A few breeders of cashmere producing goats favor dark cashmere, and select for it. The resultant colors are obviously "not white" but do tend to be relatively pale compared to darker mohair. Cashmere color usually follows the overall color of the coat, so that grey cashmere comes from black areas, tan cashmere from red or tan areas, pale or white cashmere from gold or white areas, and light brown from dark brown areas. Manipulating the color of cashmere is largely accomplished by selecting for overall color patterns of interest: white, tan, gold, black, or brown. Several of the *Agouti* locus patterns are generally black or tan on the body, and these can be used to good advantage because the cashmere produced from the "trim" color (black on blackbellies, tan on black and tan or toggenburg patterns) is inconsequential compared to that which comes from the larger, single-colored body regions.