

DOES YOUR TOBIANO HAVE POTENTIAL TO BE TRUE BREEDING FOR THE TOBIANO PATTERN?

The tobiano pattern of coat spotting in horses and ponies appears to be inherited as a simple dominant gene. A spotted foal can be produced by a tobiano x non-tobiano mating, but never from a non-tobiano x non-tobiano mating. Tobiano foals with only one spotted parent will not breed true for tobiano because they have received a "Not-tobiano" gene from their solid parent that they will pass on, at random, to half of their progeny. Matings between tobiano parents can produce true breeding (homozygous) tobiano horses. Breeders that can recognize homozygotes may use them to design subsequent matings so that **EVERY** foal has the tobiano pattern.

No direct genetic test for tobiano spotting, such as a DNA test, is available. Owners of tobiano horses interested to know whether their animals are homozygous for the tobiano spotting gene (TOTO) need to assemble several kinds of information. The following types of information taken together can be used to provide evidence for true breeding (homozygosity) for tobiano:

*Pedigree: both parents tobiano

*Phenotype: tobiano with secondary body spotting ("ink spots," "paw prints," "cat tracks")

*Test breeding: no solid color offspring from solid color mates

*Studbook data: No solid color offspring

*Genetic marker analysis: research at UC Davis has shown it may be possible to follow the inheritance of the tobiano chromosome in pedigrees through analysis of records of parents and offspring for linked genes (ALB and GC).

DETERMINING IF A TOBIANO PAINT IS HOMOZYGOUS FOR THE PATTERN GENE

MOST FREQUENTLY ASKED QUESTIONS

Q: What is the chance that a tobiano, with two tobiano parents, is homozygous for tobiano?

A: From Mendelian genetics, we predict that for every three tobianos from heterozygous tobiano parents, one is homozygous for tobiano and two are heterozygous.

Q: These are not very good odds to help me find a homozygous tobiano. Is there other information available to help me determine if a horse is homozygous?

A: A progeny test provides the best information. Any solid foal (regardless of the color of the other parent), provides evidence that the candidate homozygous tobiano is NOT homozygous. The odds that the candidate is homozygous increases with every spotted foal, as long as no solids are produced. The most efficient test to provide the information needed involves breeding to solid mates. Significant results require at least five foals, preferably more. In the long run, a progeny test is the only method to prove that a horse is homozygous.

Q: I am considering buying a yearling colt. Obviously he has no foals. Are there any tests that can tell me if he is homozygous for tobiano?

A: Genetic markers linked to tobiano may help, but they cannot prove homozygosity since they are not direct tests for the tobiano gene. The tobiano gene is very closely linked to the Albumin and GC genes. Most often the tobiano gene is marked by the "B" variant of Albumin and the "S" variant of GC, although exceptions do occur. These variants also appear in solid color horses, but the combination is significantly less frequent than in tobianos. A tobiano with tobiano parents that also has only the markers ALB-B and GC-S is five times more likely to be homozygous for tobiano than to be heterozygous.

If marker information from parents as well as offspring is available, the odds of homozygosity for tobiano offspring (by marker analysis alone) may change (up or down). If either parent is heterozygous for tobiano and homozygous for ALB-B and GC-S, then the marker testing is inconclusive. The horse could be homozygous, but the markers now provide only the information that the horse is equally likely to be homozygous or heterozygous.

If both parents are known to be heterozygous for tobiano, and both are ALB-AB and GC-FS, then their ALB-B and GC-S tobiano offspring is highly likely to be homozygous for tobiano (greater than 90% chance).

Without a direct test for tobiano homozygosity, some buyers and/or mare owners are appreciative of any information that increases the odds for predicting that a tobiano from tobiano parents is homozygous. Others find this information too complicated and are prepared to take their chances or wait for progeny test information.

The Homozygous "EE" Black Horse

What is the Homozygous Black Gene?

The red coat color in horses is inherited as a trait recessive to black. A blood test for the red factor, based on DNA analysis, provides the information to determine what color offspring a horse can throw. The absence of the red factor presents itself as "E".

"E" = no red factor detected. The horse can be assumed to be homozygous for black pigment (EE). It cannot have red foals (chestnut or sorrel) regardless of the color of the mate. The basic color of the horse will be black or bay, but depending on genes at the other color loci, the horse may be buckskin, zebra dun, grulla, perlino, gray, white or any of these colors with the white hair patterns tobiano, overo, paint, roan or appaloosa.

THE FOLLOWING IS A COPIED LETTER FROM: SHELTERWOOD LABORATORIES, INC., Carthage, TX. 75633 RE: PURE LUCK

ACCESS#: MFT980001 **DATE:** 01-18-98 **BREED:** MFT **SEX:** S

OWNER'S NAME: CHARLES & SHERRY HARTLEY

ANIMALS NAME: PURE LUCK -- 96-51195

RESULTS: Required genetic factors relating to homozygous tobiano coloration are homozygous B (BB) in the Albumin and homozygous S (SS) in the GC systems. PURE LUCK exhibited BB in the Albumin and SS in the GC systems. PURE LUCK meets the blood typing criteria for **being homozygous** in tobiano coloration. Since both parents are tobiano in coloration, it is **highly unlikely that solid colored offspring will be produced by this animal.**

ANALYZED BY: MSK, M.S. Ketchum, D.V.M.