

CORRESPONDANCE

CONSERVATION-GENETICS OF WHITE TIGER

HIT KISHORE GOSWAMI

Retired Professor of Genetics
24, Kaushalnagar, P.O. Misrod , Bhopal (MP) 462047
(hitkishoreg@gmail.com)

Keywords : Fertility and Survival; White Tiger and Zoos; Conservation-Genetics

The White Tiger, first discovered and caught wild in the forest near Rewa in Madhya Pradesh (Central, India) in May 1951 is one of the most majestic animals of the zoos all over the world. World over, the genes for white coat colour belong to the basic gene pool of the tiger named Mohan from Rewa area in India.

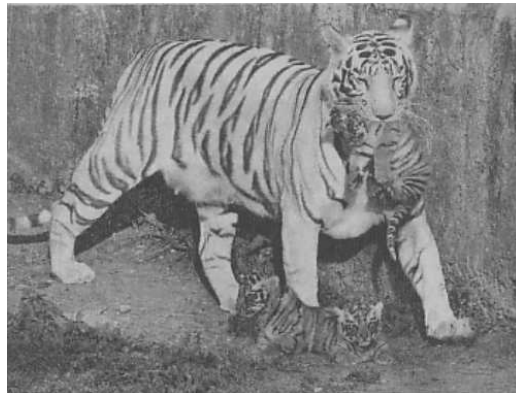
Background:

White tiger from Rewa forests (M.P., India) was named as "Mohan", on account of loving beauty of the tiger due to its white coat colour with a few blackish strips. I am one of those few lucky persons who have had seen two white cubs way back in 1951-52 at Govindgargh palace near Rewa.

On maturity, Mohan was mated with a normal tigress, named "Begum" who gave birth to 10 normal cubs in three litters. Later,



White Tigress with two normal coat colour cubs



White Tigress (mother) with three normal coat cubs

a tigress, of the second litter (named Radha) was mated on maturing with her father Mohan; who in her four litters produced 14 cubs of which 11 were white and 03 were of normal yellow coat colour. Before the death on

12.12.1969 Mohan had passed on his "magnificent" white coat recessive alleles to several generations. Obviously, all white tigers world over (Fig. 1 A-C) owe these genic combinations to Mohan. That white coat colour is on account of recessive alleles is proved when a normal coat tiger is mated with white tigress and the cubs are born with normal coat colour; sometimes a white cub is also born.

Comments:

The white coat colour with beautiful dark brown stripes is on account of recessive genes (**aa**) But due to inbreeding, white tiger has had faced survival crisis due to accumulation of different recessive genes; most of these combinations resulted in

stillbirths. This was recovered by back crosses with normal coat colour (**AA BB or Aa Bb**) tigers. On the basis of genic segregations (polygenes, **3 genes ABC** combinations) this has been possible to predict origin of pure white tiger without strips and an hypothesis is being advanced to conserve this species variant on the basis of genetic model for breeding. This will not only conserve this elegant variant *Panthera tigris* but the zoos will also be enriched in order to propagate love for animals among masses. White tiger is a rare treasure of nature.

Extremely rare though, we do come across white cubs born to many animals (Fig.2 A- C) and the very sight becomes very pleasant.



Fig. 2. White and Normal coat colour in Deer (A & B) and Camel (C).



Hypothesis

Inheritance of White coat Colour

AABB, (1)	AaBB, (2)	AABb (2)	AaBb (4)	=	9 (AB) Normal Yellow coat with stripes
Aabb, 1	Aabb, 2			=	3 (A) White with brownish stripes variables can be found
aaBB	aaBb			=	3 (B) —————do—————
aabb 1				==	1 (ab) White coat without stripes (Extremely Rare)

The variables which have been observed in distribution of stripes and white coat colour indicate that there have to be two genes independently shaping the colour. Monogenic inheritance can not explain them. Infact in almost all mammals we have encountered multiple gene inheritance for coat colour; even in man, skin colour is polygenic (Muntzing, 1967; Lewis, 1997).

II. Mortality Rate

During 1970s and early 80s the problem of infant mortality among white tiger was in news and caused worry to both forest personnel as well as zoo keepers. Sometimes, even white coat colour of the tiger was erroneously tagged with albinism but all these confusions were resolved by organized discussions . White coat colour is a normal trait, as explained above and lethality caused among the fetuses is on account of separate genes/alleles showing lethal combination. Since the progenies of white tigers have been reared up by inbreeding (brother-sister/ Father-daughter matings) often involving white coat-crossings, the recessive combinations become prevalent leading to early deaths of neonates/ causing

still births etc. (personal discussions with Roychoudhary, 1979) Inbreeding was pronounced among white tigers supporting lethality; which is a dogma of Mendelian Inheritance: recessive gene combinations become more prevalent among progenies of closely related individuals in humans as well, thereby enhancing inbreeding coefficients (Stern, 1960: Goswami, 1970).

This was immediately and properly attended by breeders in the Zoo and the genetic advice extended was to cross white tigress with yellow colour tiger (my argument was that inbred white tiger may not be very successful in mating with normal tigress who might be more ferocious). Various combinations must have been tried as now we have increased population of white tigers in most of the zoos abroad as well as in some zoos in India. At any rate, white coat colour genes make animals more attractive particularly in that genus where white individuals are rare Fig. 2. White and Normal coat colour in Deer (A & B) and Camel (C). Erroneously, some persons mistake it with the albino individual. Albinism is a disorder due to lack of melanin which makes an individual pale including eyes and other parts of body.

REFERENCES

- Goswami, H. K. (1970). Frequency of consanguineous marriages in Madhya Pradesh. *Acta Genet. (Roma)* **19(3)**: 486-490.
- Muntzing, A. (1967) *Genetics: Basic and Applied*. Lts Forlag. Stockholm.
- Stern, C. (1960) *Principles of Human Genetics*.
- Roychoudhury A K, Acharjyo L N. (1983). Origin of white tigers at Nandankanan Biological Park, Orissa. *Indian J Exp Biol.* 1983 Jun; **21(6)**: 350-352