

# BLACK ON WHITE OR WHITE ON BLACK ....

**MORE** on describing the colour of tiger from the article Colour variation in Tiger (*Panthera tigris tigris*). *Zoos' Print*, Sept 1996 : 20-22 by Prusty, B.C. and Singh. L. A. K. 1996.

## B.C. Prusty and L.A.K. Singh's response . . .

While commenting on our description of the melanistic tiger (Prusty and Singh, 1996) Ashraf (1996) suggests that one should "begin describing the pattern starting from the leg below the hock and knee joints". He also says that the "dominant colour (black in this case) need not always be the background" and that for the melanistic tiger he is inclined to "believe that the back ground is tawny and the black stripes have simply merged to form black patches."

Although there is no confusion, whatsoever with respect to the description of colour of tiger, these comments warrant a discussion to clarify on three points: (1) whether to describe the colour of a tiger or any quadruped from the body as it would appear at the first glance or from the limbs to ascend from ground upward, (2) in the case of melanistic tiger, whether the background colour of the body is yellow or black, and (3) whether black pigments have actually merged and formed the present pattern for the melanistic tiger.

### Discussion

For any animal the description of colour must begin with the colour which is prominent on its body-proper. This has been the normal method of description and there is no reason why the tiger should be an exception. Evolution of body colour has occurred for providing a colour not for the limbs on priority but to the body itself, i.e., the portion of the body which occupies a greater surface area and that will be immediately visible when the animal stands or rests in open.

Therefore, description of body colour of an animal must begin from its body proper and not the limbs (Point-1).

On the otherhand, by resorting to description of colour beginning from the limbs, one lands up in saying that the gaur (*Bos gaurus*) is white in colour but the colour changes to black above the knee.

Similar misleading conclusions can also emerge with cat species. For example, in the case of leopard, while the rosettes are there on the body, the patterns are spots on the legs. Thus by starting from the legs one starts with a belief that he is looking at a cheetah and not a leopard. Thus is only to stress the point that colour description of an animal must begin with its body-proper.

Description of body colour from limbs can start in the zebra species where the proportion of white and black are so much equal that it becomes difficult to explain to someone which is the stripe and which is the base colour.

In tigers, however, the base colour on the abdomen is so distinctly high in proportion that there is no confusion whatsoever, and, in our discussion we have used the term "background colour" for that colour which is dominant in terms of area it occupies on the coat on the back. Therefore, the mel-

nistic tigers have a black coat with yellow stripes (Point -2).

The presence of black stripes on the limbs of melanistic tiger calls for a totally different type of discussion which is partly covered below and requires further studies. It is based on ontogenic differentiation leading from genetic determination of colour distribution in terms of their point-to-point or region-to-region colour-type, pattern and extent.

It is obvious that the five possible conditions of coat colour in tiger are due to three primary colours of hairs, the yellow, white and black. Also, as regards the black melanin pigments, unlike the chromatophore pigments the melanosome pigments contained in melanocytes do not disperse or aggregate (Kent, 1969:102, 121).

Thus, the site, quantities, pattern and time of expression of the black melanin pigment during development of the embryo and young are fixed genetically at two levels, first for the species and then for the individual. It is the latter instances where genetic alternates segregate to produce aberrant colourations. There is no question of merging together of patterns (Point-3).

In view of the above explanations and at the present level of understanding of the subject we feel there is no scope to make any major change in the distribution curve on colour-pattern of the tiger's 'body proper'.

### References:

- Ashraf, N.V.K., 1996. Comments on 'Colour Variation in Animals'. *Zoos' Print* Vol. XI (9). Sept 1996 :23.  
Kent, G.C., 1969. *Comparative anatomy of the vertebrates*. Second Edition. The C.V. Mosby Company, Saint Louis and Toppan Company, Ltd, Tokyo, Japan.  
Prusty, B.C. and Singh. L.A.K. 1996. Colour variation in Tiger (*Panthera tigris tigris*). *Zoos' Print*, Vol. XI(9):Sept 1996 : 20-22.

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## N.V.K. Ashraf's\*\*\* rejoinder . . .

The controversy over the legitimacy of describing the color variations in tiger is proving to be an absorbing subject. Though I would prefer to react to the authors' reasoning very elaborately (particularly since they seem to misunderstand what I had written earlier (see Ashraf, 1996). I consider a brief response would suffice for the time being.

'For any animal, the description of colour must begin with the colour which is prominent on its body proper'. I suppose the

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authors are absolutely correct in making this statement. This has been the normal method of description and there is no reason why tiger should be an exception'. Absolutely correct again. However, this is not what I meant when I requested the authors to start describing the pattern starting from the leg. Only in this case, not in every species please! That too because the legs (part below the hock joint) were the only part that had similar patterns and background common to both the normal and melanistic tiger (see plate 3 on page 20 in article by Prusty and Singh, 1996)! To avoid confusion and to make my point (that background in the melanistic tiger is still yellow/tawny) easily understandable, I had suggested this 'start from the leg' comparison. The examples of gaur and leopard cited by the authors are very interesting to read but are unfortunately done without understanding my suggestion.

I still stand by my remark that 'the dominant colour need not always be the background'. Particularly in this case since we surely (without any doubt) know that the dominant colour (or the background) of a normal tiger is tawny. If the authors still maintain that the melanistic 'black' tigers have a black coat with yellow stripes, then let me request them to describe the colour and pattern as they move down the body towards the legs of the black tiger. ....broad yellow patches on thin layers of black background?.

As regards to the third point on the merger and dispersal of pigments, I have little information to comment upon. It could be true that melanocytes do not either disperse or segregate.

If it is so, I am not sure how one would describe the occurrence of stripes in cheetahs, domestic cats, leopards and the dark forms of jaguars and leopards. Lindburg (1989) in his article on King cheetah says 'All cat species appear to have the same complement of genes for colour variation, and one of these, known as the tabby gene, is responsible for the occurrence of dark pigments in stripes and spots'. He adds further that 'geneticists now believe that the remarkable coat of the king cheetah results from a mutation of the tabby gene' (which we all know is a heritable recessive mutant).

Here are few more examples from the animal kingdom for (the readers .....for a brainstorming exercise on the disputes of what actually is the colour of the background and what truly is the colour of their pattern: zebra, quagga, okapi, numbat, Libyan weasel, tamandua, giant panda, cuscus, indri, ruffed lemur etc.

**Editor's Note:** It may be of interest to readers that excerpts from the article on colour variation in tigers referred above appeared on the World Wide Web along with the Zoo Outreach Organisation telephone number. We had two phone calls from the United States in response requesting a copy of the entire article on this subject.

One of the callers ran a tiger breeding facility said she has bred as many as eight colour variations. She is sending a write up with some photos on how she got the colour forms. So this little debate, while not crucial to any conservation issue, may generate some interest of a "different colour and stripe."

### *Obituary*

*It is great sadness that we inform the untimely death of Mr. Clive Hollands, OBE. Mr. Hollands was a close guide and friend of Zoo Outreach Organisation while he was President of the Scottish Society for Prevention of vivisection (SSPV) later named as Advocates for Animals and Secretary of St. Andrew Animal Fund. In this latter designation, Mr. Hollands assisted ZOO obtain grants for bringing out the first Indian language ZOO SCHOOL packets as well as other activities.*

*Mr. Hollands was concerned that the number of animal welfare organisations work together to pressurise the government to act. In his capacity as leader of the above organisations he launched Animal Welfare Year in 1976, became the Chairman and garnered support from 67 other animal welfare societies. They used the year to arouse public interest and concern to urge sympathetic MPs to support government action to revise and update welfare legislation and introduce new legislation. Throughout his career with welfare organisations he became increasingly involved as advisor to government committees to improve animal welfare through legislation. He was a tireless public speaker and spread information and awareness all over the world in his presentations about the need for welfare improvements.*

*In recognition of his great service to animal welfare, Mr. Hollands was awarded the Order of the British Empire in the 1995 New Year's Honours List.*

*Clive Hollands was interested in all aspects of animal welfare. His approach was positive and constructive and he had a great faith in education as a means of improving attitudes towards animals. We were inspired by him and wish he had lived longer to inspire more people.*