TIGON : AN INTERESTING HYBRID CAT

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ALIPORE Zoological Garden of Calcutta has achieved certain remarkable success in breeding quite a few animals, Particular mention may be made about the sanghai or brow-antlered deer (*cervus eldi eldi*) of Manipur which is considered to be one of the rarest deer species of the world. Approximately 50 individuals of this species are reported to exist in Keibul Lamjo National Park of Manipur and another 96 sanghai deer thrive in the enclosures of different Indian zoos as per the census of 1985 (in Majupuria, 1986). It's true that breeding of sanghai satisfies one of the maior involvements of the zoological gardens and parks in conserving rare wild animals and protect them from being listed in the Re d Data Book.

But the tigon. a hybrid produced from the inter-breeding of a tiger and a lioness is more interesting for the visitors in a zoo. Indeed, a large crowd gathers every-day in front of Burdwan House where two tigon females entertain them. Presently, their attraction is divided. Another hybrid, almost lion-like litigon, adds a new attraction.

Naming

Even a school-student knows that a plant or an animal has a biological name. This Latin name is accepted all over the world. The scientific name of a tiger is *Panthera tigris* and that of a lion is *Panthera leo*. What should be the name of a tigon ? Again why should we call it a tigon and not a liger ?

The confusion should be cleared. Interspecific hybrids cannot be named scientifically. Because when we give a biological name to an organism, its independent biological status is emphasized. A tiger, for example, is not merely distinct from a lion in name but in many other features. These two large cats have many contrasting attributes that appear significant even to a layman.

As a matter of convention. the interspecific hybrids are names by amulgamating the names of two parental species. This practice has been adopted in naming the hybrid as tigon. But why not "liger" ?

There goes the second conventional practice. The name of the male-parent used in the cross is placed before the name of the female parent. In Alipore Zoological Garden hybrids were made by crossing a male tiger with a lioness. Clinging to the convention. the name 'tigon' is chosen.

Tigon—its long history

The first authenticated record of tigons dates

back to the early part of the nineteenth century from a circus which toured Britain. Queen Victoria saw the circus at Windsor Castle, and the latest litter of tigon-cubs produced by the captive tiger and a lioness were shown to her. Carl Hagenbeck of Germany bred many tigers with lions in his lifetime which produced tigons as well as ligers.

Hybridization experiments with tigers and lions in zoo conditions started in thirties'. In 1932, Dresden Zoo was successful in yielding a pair of tigons. Records are also available regarding tigon births in Vincennes Zoological Park, Paris.

In the Alipore Zoological Garden tigon production has been attempted since 1964. The pair used for the purpose of hybridization was a Bengal tiger 'Munna' and a African lioness 'Munni' of about the same age (a little over one year). The tiger was purchased from the local Calcutta market. The lioness was garden born. As expected, Munna did not show a compromising and friendly attitude to Munni at the initial stage but within a few days, they developed a mutual relation and were found to fight each other for any supremacy on rare occasions. Till 1972. that pair produced six litters. The first two pregnancies yielded two premature youngs that might be considered as miscarriages. The next two litters consisted of cubs with various malformations and died immediately after birth. Long eight years of experimentation thus produced no success.

In 1971, Munni conceived again. This fifth conception culminated in the birth of two cubs on the eleventh February, 1972 a still born cub and the other with deformed hind legs. The crippled cub was not fed and attended by Munni. The only maternal instinct that was manifest in that lioness was to protect the cub from any apprehended danger.

In the same year. on the 13th October. 1972. Munni gave the birth of a single female cub. She was named 'Rudrani'. She was exceptionally healthy from her birth and was fortunate in receiving mother's care including breast suck. She is still living and she has been mated with an Indian lion 'Debabrata' to produce litigons. Two years later, on the 8th March, 1974, a solitary female tigon cub was born to the experimental pair. She was named 'Rangini'.

Problems of hybridization

Hybridization in domestic and captive animals is an interesting endeavour to breeders. Certain hybrids such as mules are also important economically. Raising hybrids with zoo animals has two principal aspects; the thrilling experience of hybridization itself, and secondly the hybrids are of special exhibit value. From consideration of public attraction, tigon and liger are much valued.

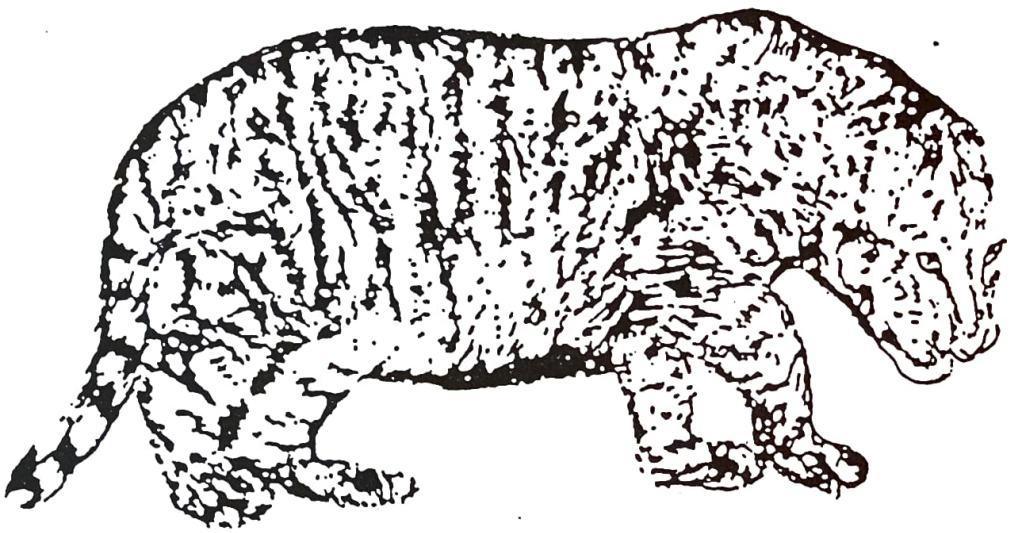
Tigon is intermediate between its parental species – tigon and lion in many respects. Through examinations of tigon-cubs from new-born stage to the attainment of adulthood revealed their closer resemblance to tiger, at least in morphology. They had a deep fawn pelt like a lion with broken brown stripes like tiger. Shape and colour of ears are, however, more lion-like yet having markings of a tiger. the shape of belly and waist also appear tiger like. The under-side is white like tiger. In temperament, tigons follow their tiger-parent but roar like lion.

Hybrids are, in general, weak and less adaptable. In nature such interspecific mating is prevented by structural, ecological and behavioural barriers. In fact, no authenticated records are available regarding the existence of a cat-hybrid. The chance of interbreeding of tiger and lion is especially very remote since the distribution range of these two large cats are separate and non-overlapping. Moreover, ecological and ethological patterns of these two species are not very identical. Tiger is found nowhere outside Asia while lion is predominantly African, excepting a few pockets in India.

Whether the cat-hybrids are able to thrive in nature is a subject of speculation. No such problem is expected to arise in the maintenance of those hybrids in zoo conditions. Hybrids are generally abandoned just after giving birth by their mother. The second major hazard of such hybridization is the birth of cubs with several physical malformations. Sometimes they are so much handicapped and delicate in internal consti-

tution that it becomes a herculian task to rear them.

One reason appears to be significant and explanatory for such an aberrant maternity. It is found that baby-animals have an odour characteristic for a species. Researches indicate that this olfactory signal may even be specific for a family. Mother recognises her cubs primarily by the chemical nature of the scent which is important to evoke her maternal instinct.



A curious experiment has been conducted by the keepers of the Moscow Zoo. They offered a batch of baby chicks to a female cat who has just given birth of a litter. Kittens were washed with warm water and the washings were sprayed on the baby birds. As a consequence. those chicks smelled like kittens. Although that smell escaped the notice of the zoo keepers, the very smell was recognised and appreciated by the cat-mother. She instantly started lapping chicks and acted like their foster-mother as if she had adopted a batch of feathery orphans.

Since the hereditary make-up of two species of animals essentially different. it is not illogical to think that the chemistry of odorous substance should be different for tiger and lion. Differences in morphology, ecology or behaviours are interpreted in terms of distinctive gene-systems. The question arises what should be the odour of a tigon cub ? Like tiger or like lion ? Considering an admixture of genes of the two species in the hybird, it may be presumed that a tigon would bear an intermediate body odour. This might render some clue towards the development of non-motherly attitude of Munni to her strange offspring.

Genetics of hybridization

As a hybrid, tigon has a gene-system intermediate between that of tiger and lion. Out of the total number of genes it possesses, half is expected to be inherited from tiger and the remainder half from the lion parent. The intermediate quality of a tigon in morphology and behaviour is thus noticeable as the function of the 'mixed' gene-system.

Early in the present century, in 1913, T.H. Morgan established the "gene-theory" accounting the integral relation of the mechanism of heredity to cells the structural units of the body. As the body of common animals are multicellular comprising many million cells, multiplication of cells is

inevitable. When a cell divides, paired thread-like structures, called the chromosomes, are visible under microscopic examinations. Genes are lodged on chromosomes.

Higher animals always have an even number of chromosomes, because two sets of chromosomes are present in each kind of body cells. Of these two sets, one set is paternal and the other is maternal. During reproduction sex-cells or gamates—sperm and eggs are produced in sex organs through special kind of cell division which is reductional. Therefore, chromosome number of a sperm or an egg of an animal will be half the number of chromosomes present in the body-cells. For example in man, total chromosome number is 46 and in a gamate, it is 23.

Fusion of sex-cell (called fertilization) indicates the starting point of embryonic development. The resultant cell or the zygote now restors the full chromosome number comprising two sets a paternal coming from the sperm and a maternal from the egg-cell. The zygotic-cell now multiplies very quickly and increases in size at an enormous pace. It then gradually differentiates into a foetus after anchoring on the wall of uterus in a mammalian mother. The mother at that time manifests symptoms of pregnancy which is culminated at the delivery of a baby in due course. The length of pregnancy, i, e.. gestation period is variable in different mammals but it is species-specific.

As a hybrid, tigon is expected to overcome several obstacles characterizing the "biological barriers" preventing interspecific mating. Some of these barriers operate at the initial stage, and an array of others follow during embryogenesis. The important ones may be summarized as follows :

(1) Behavioural barriers accounting for asynchrony in the mating behaviour of tiger and lion, at least in the minor details.

(2) Mechanical barriers preventing successful mating to ensure sperm transfer into the genital tract of the female of a different species.

(3) Zygote-mortality : It is observed in a number of hybridizing experiment but not in cats. Zygotes, although formed, cannot implant itself on the uterine wall and therefore dies instantly.

(4) Deformity and hybrid mortality : Both physical deformity as well as prenatal and perinatal death are recorded in five consecutive litters of Munni.

(5) Hybrid sterility : Available records indicate that male hybrids are invariably sterile. Curiously enough, the female-offspring of such interspecific mating is fertile. This contention could not be verified because both the viable offsprings of Munni were females.

Impairment in the development starting from fertilization is presumed to arise from the incompatibility of the tiger and lion genes. In tigon body-cells, both kinds of chromosomes and genes are present. Since the two gene-systems appear to be completely different and distinctive as indicated by the distinctness of the two big cats, they behaved differently during the process of cell-division. A normal chromosomal behaviour is very essential and obligatory to produce viable gamates. Eclipsed virility of a male hybrid trends to support this idea.

The question remains unanswered—why a female tigon is fertile ? When this female hybrid is mated with either of the parental species. she gives birth of a second generation of hybrids successfully. In Alipore Zoo Garden, 'Rudrani' has given birth of several litters of litigons.

In mammals, the sex-chromosome pair is XX females, and XY in males The Y-chromosome is smaller than the X-chromosome. Also it contains a fewer number of genes in comparison to the X. It is established that the XX-zygote developing into a female-baby is much more strong and viable than XY-zygote. An identical situation is observed in other mammals. Conception in female mule is not absurd although rare, one out of one thousand.

Conclusion

Present day scientists are not in a way to encourage hybridization. Rather they expect more active participation of zoos in conserving the wild

species. The question is raised with all seriousness —what is the fate of these hybrids ? Obviously there is no straightforward answer or argument that can be put in favour of hybridization. But what conclusion we can draw from such hybridizing experiment which has already exhausted the breeding potentialities of such fascinating big cats ? Perhaps. the only logical inference is that tiger and lion represent two true species. The only solution at hand is to find a possibility of breeding tigons with any of the parental species. Precisely, this is done in the Alipore Zoo. Rudrani is mated with the Indian lion. Since ligitons are products of cross between the tigon and a lion, they are expected to have one half tigon genes and one half lion genes. Again, tigon genes comprise one half tiger and one half lion genes. Therefore, in a litigon, the lion's gene-share comes to $\frac{3}{4}$th ($\frac{1}{2}+\frac{1}{4}$). Thus, after a few generations, tiger's contribution may be expected to be overweighed by lion's contribution.