

It is not only about the number of Indian tigers

Of the world's remaining wild tigers, 50 to 60 percent are found in the Indian subcontinent. The Indian tigers' population size dropped 50 percent in the last three generations, appearing only in seven percent of its historical geographical range. This is due to Anthropogenic habitat destruction and hunting. The tiger habitats had higher degrees of connectivity in the past. The Indian tigers now live in small populations that are spatially isolated, leading to low genetic variation. Despite the increase of the Indian tigers' population size from 1400 to 1700 between 2009 and 2011, Mondol et al. (2013) argued that management goals that aim for increasing population size without considering the gene flow of the population are insufficient. The authors predicted that the loss of habitat connectivity of Indian tigers is causing demographic isolation, increasing genetic differentiation, and reduction in genetic diversity due to genetic drift.

Mondol et al. (2013) analysed data from mitochondrial and genetic markers to answer whether: there is a loss of genetic variation through recent historical times, the decrease of population size alone causes the loss of variation, and the geographic partitioning of genetic variation has changed during this period. Most extant tigers in the Indian subcontinent were included in the modern samples, whereas historical samples were sourced from specimens of locally extirpated tigers found in Museums in Europe (specimens hunted before 1950). DNA extraction was performed, followed by amplification of microsatellite loci through polymerase chain reactions. Statistical data analyses and simulations were conducted to answer the authors' questions.

It was discovered that the Indian tigers have recently lost their mitochondrial but not nuclear genetic variation. There was only seven percent of historical mitochondrial haplotypes found in modern samples. As mitochondria are inherited from maternal parents, the result found could be caused by the tendency of tigers to live near their mothers in patches and the historical sampling in regions of extinct tigers. The overall data showed that modern tigers are higher in genetic variation than historical tigers but that could be due to oversampling of modern tigers in certain areas. After the authors used the data from smaller areas that are comparable, they found that genetic variation was lower in modern tigers. Another major finding is that the population structure of Indian tigers has increased. This is not a good sign, as increasing in population structures correlates with extinction (Lorenzen et al., 2011). Finally, the simulations using both mitochondrial and nuclear data suggested that the population size of Indian tigers are declining. The declining rate appears higher in semi-arid and Terai regions.

It is also possible that there were multiple declines in the Indian tiger population but it was not detected in this study as the microsatellite data may not have enough power to predict declines at the historical time scales.

In conclusion, signs of Indian tigers heading towards extinction can be observed and genetic variation must be considered in the conservation management of the tigers in addition to the population size. It is very apparent that semi-arid tigers are under threats of isolation as a result of habitat fragmentation and the two remaining tiger populations should be closely monitored for effective conservation. Maintaining genetic variation within the population and increasing population habitats' connectivity are highly recommended. Further historical samplings should be conducted to obtain more comparable data and more simulation models should be invented for better predictions of population trends. We have already seen effective conservations guided by genetic variation data (Madsen et al., 1999; Hogg et al., 2006; Johnson et al., 2010) so, present and future conservation efforts should consider genetic variation too.

Reference

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