

# GLOBAL WARMING AND ITS EFFECT ON ANIMAL LIFE

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Climate change, mainly global warming, is a reality, and not a myth (Verma, 2008). An analysis of aerial photographs of northeast Greenland reveals that, due to changes in ocean and atmospheric temperature, there has been an abrupt loss of ice cover in that area (Anonymous 1, 2012). Through examination of satellite photographs it has been inferred that a rapid melting of glacier ice in the Antarctica and Greenland at the rate of 300 billion tons per year is taking place; consequently a rapid rise of sea level may be foreseen (Anonymous 2, 2013). NASA Climatologist James Hansen says that these temperature changes have been mainly due to accumulation of greenhouse gases in the atmosphere (Tollefson, 2012). This climate change is producing adverse effects on animal life.

In two earlier communications (Verma, 2008; Verma, 2012), effect of global warming on animals have been discussed. In those communications two instances of warming climate affecting animal life have been described, namely that of freshwater seal in the lake Baikal in Siberia, and of three species of Penguins, Adelie, Gentoo, and Chinstrap, in the Antarctic Peninsula. In the former instance, the only known freshwater seal raises its young ones on floating ice masses in the lake. As ice is melting away due to general warming, the mother seal is forced to rear its pups on the shores, where the young ones are often attacked by predators. As a result, the population of the seal is continuously declining. Among the penguins in the Antarctic Peninsula, the Adelie lay their eggs on the undersurface of ice shelves, where the young ones, on hatching, feed on algae, growing in

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the fissures on the ice surface. Due to warming such shelves are melting away, and the Adelie population is declining, and those of Gentro and Chinstrap are increasing.

More and more cases of adverse effect of global warming on animals are coming to light.

Telemeco *et al.* (2013) have studied the effect of higher temperatures, within the tolerable range, during development of the turtle *Chrysemys picta*, while the development took place in their original nests. The young ones hatching out in such nests, showed some morphological abnormalities in their shells. Such abnormalities were found to be negatively correlated with survival and fitness.

Goodman *et al.* (2013) have studied populations of the lizard *Anolis carolinensis* in USA from the standpoint of body size and size of certain cells, muscle cells and red blood cells. They have noted that in southern locations the body size was larger, so also the muscle cells. The red blood cells, however showed no such correlation with the latitudinal position of the populations. Obviously, this species responds to warmer climate by increase of body size and of the size of certain cells.

Hongliang *et al.* (2013) have done experiments to see the effect of general warming on females of the oviparous skink, *Sciencella modesta*.

They reared at increased temperatures, mimicking the effect of global warming. Such treated females laid eggs earlier, the incubation period was reduced, and there was increase in embryonic mortality.

Among insects, effect of general warming has been detected in many species by Robinet and Roques (2010), they have also pointed out that warming may differentially affect the insects and their hosts. This situation may facilitate establishment and spread of invasive species.

Liu and Zhang (2013) have studied the effect of warming on the brown plant hopper (*Laodelphax striatellus*). They have exposed the insect to the warmth of 31° C and have noted :

- (1) that exposure of adults for 1 day during oviposition stage resulted in a very low survival of nymphs.,
- (2) that average longevity of females significantly increased.,
- (3) that exposure of nymphs to the warmth of 31° C for 2 to 15 days prolonged the oviposition period in adults.

Thus, exposure to a high temperature resulted in ups and downs in the life history of the insect.

Li *et al.*, (2010) have prepared a model for showing distribution of 63 species of fowl-like birds (Galliformes) in China. The model was based on

current distribution ranges of these birds, the current rate of climate change/ environmental variables and keeping in view of the limited dispersal capacity of the birds. On basis of this model, they have predicted that during the period 2071 – 2100, 29 species would have shifted their distribution ranges 50% and that Galliformes, living at higher elevations would have faced greater range shift.

Many song birds produce their song in the coolest hour at dawn. This behaviour has been experimentally studied by Beaulieu and Sockman (2013) in the Lincoln's sparrow (*Melospiza lincolni*). They recorded the male song, and played it at 1° C. and 16° C., these temperatures are experienced by the bird in the wild. They noted that females of the species remained 40% more time at the speaker at 1° C. than at 16° C. General warming will obviously affect this behaviour pattern.

Li *et al.* (2013) have reviewed the literature on decline of amphibian populations, but find paucity of evidence supporting the notion that the decline is due to climate change.

In the available literature, there is a glimpse of a positive effect on animals. Jiang *et al.* (2013) have studied small rodent populations in the semi-arid grasslands of Mongolia during the period 1982 – 2006. They have noted that

during this period the biodiversity of the rodents increased. It happened because rare species were benefited by the temperature rise and became more abundant.

Costello *et al.* (2013) have discussed the problem of discovering and naming all the species on our planet before they go extinct. They say that, keeping in view the rate at which species are going extinct and the rate at which new species are being recorded, they hope that all the species will have been described before they are lost through extinction. But, as they say, this hope will not be realized if the rate of extinction goes up. As noted above, global warming is driving several species to extinction.

### Conclusions.

Global warming is affecting animal species, mostly adversely. Hence to protect the existing biodiversity we have to use our technology to reduce the emission of greenhouse gases.

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