

The factors which cause global decline in amphibians

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The global population of amphibians is declining at an alarming rate, according to recent scientific data. Since 1980 more than one third of amphibian species are globally threatened and it is thought that over one hundred and twenty are already extinct (1). Like many other endangered species such as the Siberian tiger and the brown pelican the rapid decline of amphibians are attributed to many factors. There are numerous hypothesis which try to explain the rapid drop in the amphibian populations such as; acid precipitation, disease, raised levels of air pollution, introduction of predators and global warming. However I will only discuss the most important causes such as the effects of global warming, human activity and their interference with local ecosystems.

Global warming is a major ecological issue at the moment and is thought to have the most serious effects on global animal populations. It was reported that since 1987 Golden toads and Harlequin frogs have completely disappeared from Montverde Cloud Forest Reserve in Costa Rica (2). The discovery of many other similar disappearances in places such as Australia lead scientist to believe that a new infectious agent, *Batrachochytrium dendrobatidis* may have been responsible. It was also revealed that periods of temperature change are statistically connected to the disappearance of a variety of species, suggesting that global warming was creating an optimum temperature for the chytrid. However in La Selva scientific data indicated 75% of both reptiles and amphibians had declined and that reptiles and amphibians were declining at the same rate (4.1% per annum)(3).

This proved that the amphibian specific chytrid was the not cause of the decimation of many amphibian populations, and instead a new theory was introduced.

Since the dramatic fluctuation of amphibians was primarily in cool mountane climates it is now believed that the decrease in leaf litter caused by global warming was responsible for these declines. The increased temperatures and precipitation in these mountane regions caused by global warming quickly decomposed the leaf litter. This leaves both amphibian and reptiles without shelter and prone to attack by natural predator and thus reducing their populations dramatically.



Another factor suggested for the decrease of amphibians is the introduction of alien predators into the environment. Alien predators such as the brook trout in Sierra Nevada have caused devastating effects with regards to the local frog populations. Experiments carried out showed that when trout were placed in the same container as the developing frog spawn, none survived in the enclosure. The spawn which developed outside the enclosure had a high survival rate. This simple experiment shows how the introduced species can dramatically reduce the frog populations.

Another study carried out in Europe with the Feral American mink showed similar

results. The mink which regularly preys upon both adults and spawn was removed from several control lakes. The results were striking. In the space of one year the number of female frogs increased by 462% and in the following year there was an increase of 119% (4). This data certainly shows how much alien predators can effect amphibian populations.

Finally I would like to discuss the huge effect that agricultural chemicals have on amphibians. Rigorous experiments on African clawed frogs and Leopard frogs have indicated the deadly effects that these chemicals have on these species. After being tested



with

nine pesticides, four herbicides and three insecticides, their effects were lethal. Average mortality of a single pesticide (excluding metalaxyl) was four percent. Metalaxyl caused a death rate of thirty five percent. The animals treated with all nine pesticides died within the first day of exposure. Seventy percent exposed to the nine compounds were not able to sit upright (5). Other symptoms included head tilting, circling, anorexia, increased susceptibility to disease and death.

Experiments on larvae showed serious effects, especially antrazine. Retardation of growth and size (which would make them more susceptible to predation) was evident. Another side effect was the chemical castration and feminisation of exposed males. The time to metamorphose took much longer which would be fatal in the wild as these species inhabit temporary water agricultural areas. It is obvious that these chemicals are lethal to amphibians. They are especially vulnerable because they reproduce and pass through critical development stages in water which is the higher risk area for being contaminated.



It is clear that the frightening decline and even extinction of amphibians globally does not have a single cause. I personally feel that we are responsible for their protection and conservation. Although factors such as global warming are almost impossible to address other factors such as alien predators and pesticides in agricultural use are easily resolved. Conservation parks with no non native predators should be set up as well as breeding programmes to help amphibian populations. Scientists and farmers should co operate and work with each other to find out which “chemical cocktails” of pesticides, herbicides and insectides are lethal and which are safe to use. Organic farming should also be encouraged. I fear that if no action is taken that many more amphibian species will face extinction and the future of amphibians will be in doubt.

References:

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