Title

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Abstract

The Panda Bear, *Ailuropoda melanoeuca*, are found in the mountainous ranges of China in the provinces of Sichuan, Shaanxi, and Gansu. The female Panda bears can weigh up to 100 kilograms and eat as much as 10,000 kilograms a day. Although their diets consist of 99% bamboo they are also known to eat field mice and other mammals when bamboo isn’t readily available to them. It is said they live up to 25 years in the wild and 30 years in captivity. On very rare occasions, Pandas have become prey to leopards although humans are their greatest enemy. The Panda can only take care of one cub at a time which will leave its mother at about 18 months. For the Panda Bear we find a high probability of starvation but a low probability for predation.
Introduction

The Panda Bear spends most of its time in solitary except for the occasional run-in or during mating time which falls between March and May. Both the male and female Panda bears become sexually mature between the ages of 5 to 6 years old. A female will have a litter (if successful the previous year) every two years. This means that a female will only produce about 8 cubs in her lifetime. The gestation period for a female Panda bear is about 48 days however there is a delayed implantation of about 2-4 months to increase the rate of survival for the newborn. The litter size range from 1-2 cubs rarely 3 however the mother will only take care of 1 cub at a time and will abandon any others born.

The newborn cub is born extremely dependent of the mother, weighing about 0.01-0.14 kg. At about 18 months, the cub now weighs about 45.4 kg and is ready to leave its mother. Due to their slow reproduction rate and their fight for food and space, Panda Bears are considered endangered and are heavily protected by the Chinese Government with punishments being as serve as death for killing a Panda.

Method

Offspring number and relative offspring body-size were plotted on the inner “x” and “y” axes. The outer “x” and “y” axes are qualitative probabilities of predation or starvation. The relative body size of offspring at independence and thus the probability of starvation was estimated as $S = \frac{m}{M}$ where $S$ = expected probability of offspring mortality based on cycles of food scarcity; $M$ = mass of mother at the time of offspring independence; $m_x$ = mass per offspring at the time of its independence.

The expected probability of offspring mortality by predation was estimated as $P = 1 - \left(\frac{2}{N}\right)$ where $P$ = expected probability of predation; $2$ = expected lifetime fitness per mother; $N =$
the number of offspring produced by a mother per clutch or lifetime. The expected probability of offspring mortality in multiple-risk environments is estimated as PS.

**Results**

Offspring quality was estimated using 45.4 kg as the average weight of offspring at independence. Maternal weight was estimated as 100 kg. Relative offspring quality represents the probability of offspring mortality by starvation, which was calculated as $45.4/100 = 0.45$. Offspring quantity was estimated at 8 in a lifetime. The probability of offspring mortality by predation was calculated as $1 - [2/8] = 0.75$. To summarize here, the percent of offspring that will die of predation (75%) far exceeds the percent of offspring that will die of starvation (45%; Fig. 1).
**Figure 1:** The maternal investment strategy by the Giant Panda Bear has likely been shaped by their environment with > .45 probability of death by predation, but < 0.75 probability of starvation in a mother’s lifetime.

**Discussion**

The Giant Panda Bear is omnivorous however its main diet consists of bamboo which they spend about 14 hours a day feasting on. When bamboo isn’t available to them, they are also known to eat field mice and other smaller mammals. They have a small list of predators which consist of leopards on rare occasions and humans. We see from our results that Panda bears have a higher probability of starvation than with being preyed on. I conclude that these numbers may be inaccurate due to human interactions. The relatively new fight for space and food with humans isn’t allowing Panda bears to evolve quickly enough putting them on the endangered species list. The Chinese government has since taken great steps to reducing such acts.
References


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