

High-ranking baboons' fertility woes



Baboons grooming in Gombe National Park.

Being on top doesn't guarantee reproductive success, according to a long-term study of 138 wild baboons.

In the world of monkeys, females of a high social rank get first dibs on food and other scarce resources, and subordinates cower in their presence. Field studies have produced conflicting accounts of whether these dominant dames have more success bearing children

than their subordinates.

Researchers, including chimpanzee expert Jane Goodall, have followed five baboon troops living in the Gombe National Park in Tanzania for 25 years — the average length of a baboon's life span and a much longer period than any previous studies have covered. The researchers find no relationship between lifetime reproductive success and rank, they report in the Jan. 5 *NATURE*. Similar numbers of offspring from subordinate and dominant baboons survived.

Compared to low-ranking baboons, the powerful females had shorter periods between births. Also, their infants survived longer, and their daughters matured more quickly. However, their higher rate of miscarriages and fertility problems offset these advantages, says coauthor Craig Packer of the University of Minnesota in St. Paul.

The scientists collected data on the baboons' menstrual cycles, births, and deaths. They determined the animals' ranks each year by observing aggressive interactions and behaviors while eating. A baboon gets its first rank when a juvenile, but rank changes over a lifetime.

The reproductive difficulties of the dominant females ensure that baboons don't become a hyperaggressive species, the researchers note. The top-ranking females probably have high amounts of androgen, the male sex hormone, which causes their miscarriages and aggressive behavior, Packer suspects.

Stress probably does not contribute to the miscarriages, as subordinate animals experience the most stress, he adds.

Migrants stop mainly on the plains

Sandpipers, champions of the long-distance commute, fly from breeding grounds in the Canadian Arctic to winter homes in the southern and northern regions of South America.

These tiny birds cruise almost nonstop on their coastal routes, taking few — although fairly long — rests. Researchers had thought that sandpipers use the same approach on the Great Plains stretch of their trip. However, the birds appear to require many more stops when crossing the plains, Susan K. Skagen and Fritz L. Knopf of the National Biological Survey in Fort Collins, Colo., report in the November *CONDOR*.

The scientists monitored how long semipalmated and white-rumped sandpipers stayed at the Quivira National Wildlife Refuge in central Kansas and how much weight they put on during their visit. The birds' fat deposits wouldn't carry them to their breeding grounds, Skagen and Knopf determined.

Until recent decades, the Great Plains had many wetlands where a tired and hungry flock of migrating birds could stop and refuel. This study points to the importance of trying to save numerous wetlands in the Plains, not just a few large ones, Skagen says.



Sandpipers in Quivira refuge.

Agent Orange: Link to birth defects?

In 1969, a scientific study showed that Agent Orange — the herbicide used by U.S. military forces in Vietnam — causes birth defects in animals. Since then, the saga of Agent Orange and birth defects has continued to unfold.

A study published this month offers mostly good news for veterans exposed to Agent Orange. Joel E. Michalek of the Armstrong Laboratory at Brooks Air Force Base in San Antonio and his colleagues studied whether paternal exposure to Agent Orange increased the risk of adverse effects in children.

The researchers examined 872 veterans who had participated in Operation Ranch Hand, which sprayed defoliants over about 3.6 million acres in Vietnam. During the study, the team measured concentrations of Agent Orange's dioxin contaminant in each veteran's blood. The team also assessed Vietnam veterans who did not spray herbicides. In addition, the researchers collected a complete reproductive history from each man and his wife or partner.

The scientists found no evidence of reduced fertility among Ranch Hand veterans, compared to the control group. Furthermore, a father's dioxin exposure during the Vietnam War didn't seem to increase his partner's risk of suffering a miscarriage, the team reports in the January *EPIDEMIOLOGY*.

Michalek and his coworkers detected no consistent pattern of birth defects in children born to Ranch Hand veterans. However, they did uncover an increased incidence of nervous system defects in these offspring, compared to the children of the control group. Yet that finding was based on just a few children, Michalek cautions.

"The strength of this study is its use of medically verified pregnancy data and biological measurements of dioxin exposure," says Marja-Liisa Lindbohm of the Finnish Institute of Occupational Health in Helsinki. "Nevertheless, the book is not yet closed on the question of whether paternal dioxin exposure harms offspring," Lindbohm writes in an editorial that accompanies the study.

Enzyme marks the start of labor

Suspended in its watery home, the human fetus waits to be born. Often, the rupture of the amniotic sac, the membrane that surrounds the fetus, signals imminent birth. If that membrane breaks too soon, premature delivery results.

A preterm infant may suffer a variety of ill effects, including blindness, neurological damage, and even death. What causes the fetal membrane to break? Researchers now believe an enzyme called MMP-9 plays a key role in that rupture.

Jerome F. Strauss III, director of the Center for Research on Women's Health and Reproduction at the University of Pennsylvania in Philadelphia, and his colleagues focused on a family of enzymes called collagenases. Such enzymes degrade collagen, one of the structural components of the amniotic sac.

The researchers studied fluid or membrane specimens obtained from women who had undergone either vaginal delivery or a cesarean section.

Strauss' team discovered that MMP-9 is "barely detectable" before labor begins but rises to high concentrations in samples taken from women during labor or just after delivery. MMP-9 chews up the collagen that holds together the fetal membrane, causing the sac to rupture, the group suggests.

Strauss believes the presence of this enzyme can be used to predict premature labor. From their studies with rats, the researchers believe that MMP-9 rises about a week before a woman goes into labor. "If one can detect impending preterm labor, one has a better chance of treating it," he adds.

The researchers describe their results in the January *AMERICAN JOURNAL OF PATHOLOGY*.