

Manipulating Avian Reproduction

A new research intern program has been established at White Oak Conservation Center in collaboration with the University of Florida. The first intern in this program is Dr. Martine de Wit, a veterinarian from the University of Utrecht in the Netherlands. Martine's research project at White Oak is on the hormonal control of reproduction in bird species.

Although conservation programs generally focus on reproductive goals to sustain captive populations and/or reintroduction in the wild, full scale reproductive potential may, from time to time be counter productive. For example, in the management of larger flocks, some birds may need temporary contraception. Also, in some avian species, such as cockatoos, breeding-related behavioral problems, such as aggression, are common and may require suppression. Breeding control plays an important role in the pet avian world, where reproductive diseases, such as chronic egg laying, are common in some species.

Recently, Lupron7® has become a popular treatment to suppress reproduction in birds. The advantage of this drug is that Lupron7® does not cause the serious life-threatening side effects in birds that has occurred with previously used drugs suppressing reproductive activity. However, its results are variable. To gain a better understanding of the effectiveness of Lupron7® in birds, a collaborative project was undertaken between the White Oak Conservation Center and the University of Utrecht. In this study, the effect of Lupron7® on avian hormones was measured in blood samples of breeding racing pigeons (*Columbia livia domestica*), a species commonly used as a model in bird studies. The results of the project did not demonstrate a suppressive effect of Lupron7®; hormone levels did not decrease after treatment and the pigeons continued to breed and lay eggs. Currently, studies are being developed to investigate the influence of species differences in sensitivity to Lupron7® and timing of treatment during the avian breeding cycle.



Researchers draw blood from a racing pigeon in order to study hormone levels. Racing pigeons are commonly used models in such bird studies.

Testosterone Concentrations in Male Rhinos

Relatively little investigative work has been done regarding the reproductive physiology of the male rhinoceros. Continuing with our collaboration with the University of Florida's College of Veterinary Medicine, Dr. Bruce Christensen, a veterinarian specializing in the study of reproductive physiology of larger mammals, is investigating hormone concentrations in rhino species, to try to determine if age, season or social settings change the concentration of circulating testosterone.

Understanding the endocrine profile of a species is key to understanding reproductive processes. Testosterone, for example, is essential for spermatogenesis, development of primary and secondary sexual characteristics, and libido, all of which play key roles in fertility. The overall hypothesis is that reproductive hormone concentrations in male rhinoceros reflect reproductive performance and can be used to assess potential reproductive success. The specific hypothesis for this study is that serum hormones related to reproduction in male rhinoceros will show variation with age, time of year, and socio-sexual status.



Staff members collect blood from a young male rhino for ongoing research.

Questionnaires and requests for serum samples were sent to 72 American Zoo and Aquarium Association institutions in the United States; responses were received from 63 of them. As of January 2004, 442 samples had been received from these collaborators. To date, samples have been analyzed for testosterone using enzyme immunoassays already validated for these species. Preliminary data collected from 382 black rhinoceros serum samples show a significant difference between testosterone concentrations in juvenile and adult samples. These data do not show a correlation between time of year and testosterone concentration. Preliminary findings show that individual black rhinoceros males may experience a change in testosterone concentration if their socio-sexual status changes. One male housed with a single female, for example, showed a significant rise in testosterone concentration when a second female was introduced. Further study is indicated to verify these relationships in black rhinoceros and to evaluate their influence on the white and the Indian rhinoceros.