

## REPRODUCTIVE EXAMINATION OF GRAY SQUIRRELS BY LAPAROTOMY

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In the past, reproductive data such as ovulation rate, number of fetuses and ovarian and uterine size could be obtained on wild mammals only after they were sacrificed. Recently, it has become desirable and feasible to collect such data on live wild animals as well. During the course of studies designed to induce ovulation and breeding in captive wild species by the use of exogenous hormones, a technique for examination of the reproductive tract via laparotomy was developed for the gray squirrel, *Sciurus carolinensis*.

Squirrels were housed in outdoor pens, but all laparotomies were performed in the laboratory. Prior to the laparotomy, each squirrel was removed from the pens and placed in a wire mesh restraining cylinder and anesthetized with approximately 3 ml of methoxyflurane (Metofane, Pittman-Moore, Inc., Washington's Crossing, New Jersey), employing the same procedure used by Barry (J. Wildl. Manage. 36(3):992-993, 1972). The anesthetized animals were weighed and then tied by all four feet to a surgical table in a dorsally recumbent position. The lower abdominal area was shaved and disinfected with 70 percent ethyl alcohol. Surgical instruments were also disinfected in 70 percent ethyl alcohol. A single midventral abdominal incision of approximately 3 centimeters in length was made through the skin, 2 centimeters anterior to the vulva and extending anteriorly, exposing the external oblique muscle. Another slightly smaller incision was made through the external oblique, internal oblique, transversus abdominis and peritoneum, exposing the visceral organs. The ovaries were located by gently probing towards the lower latero-dorsal sides of the abdominal cavity with blunt forceps for the fat pads associated with the reproductive tract. The fat pads were gently manipulated through the incision and the ovaries located.

In our hormonal studies, the length, width, and depth of each pair of ovaries were measured and recorded as an index of ovarian development. The widths of both uterine horns adjacent to the utero-tubal junction were measured and recorded as an index of uterine development. Measurements were made using vernier calipers. Each ovary also was examined grossly for follicular growth and new ovulations (corpora lutea). In addition, the entire uterus could be exteriorized through the incision. This would make possible the examination of pregnant animals for number of fetuses and resorption sites.

The fat pads and reproductive tract were then placed into their original positions. The peritoneal edges and abdominal muscles were sutured with interrupted stitches using nylon thread (size 00) and the skin incision was closed with 11 mm metal wound clips. At the completion of each laparotomy, a subcutaneous injection of 0.2 cc antibiotic containing penicillin and dihydrostreptomycin (Combiotic, Charles Pfizer & Co. Inc., New York, N. Y.) was given

to each squirrel in the thigh area. Animals were then placed in small recovery cages until they regained consciousness and then were transferred to outdoor pens.

Fifty-two laparotomies were performed during this research, 45 of which were completely successful. None of the squirrels expired during the laparotomy. Of those that died during the recovery phase, two appeared to be in an emaciated condition before surgery, two died of complications resulting from two or more successive laparotomies performed on them at two day intervals, and three died as an apparent result of infections arising after loosening of their wound clips by chewing or scratching. The incision on the animals usually healed completely within 3 weeks.

Methoxyflurane proved to be a quite satisfactory anesthetic. None of the squirrels appeared to suffer complications because of its use. In a few instances during laparotomies an animal would stop breathing but maintain a heartbeat. This condition may have been brought on by periods of inadequate ventilation while administering the anesthesia. To restore normal breathing, a plastic tube was placed over the squirrel's mouth and nostrils and the investigator rhythmically blew air into the lungs. After each expansion of the lungs, the chest cavity was depressed by hand. This procedure continued until the squirrel regained its normal breathing pattern.

The average time taken to anesthetize each animal (from first exposure to the anesthetic until the animal lost consciousness) was approximately 8-9 minutes. Additional anesthetic was applied as needed during surgery. The average time to complete each laparotomy was 35 minutes and the average recovery time from the anesthetic after the operation was 32 minutes. The recovery time ranged from 9-60 minutes.

## **EXAMINATION OF OVARIES IN LIVING COTTON TAIL RABBITS BY LAPAROTOMY**

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Techniques which allow collection of data from wild animals without sacrifice of the subject animal are particularly useful in wildlife science as the animals studied frequently are difficult to acquire. Also, such techniques allow multiple sampling from individual animals. Laparotomy facilitates examination of the female reproductive organs in the living animal without sacrificing the animal. A laparotomy technique suitable for use with cottontail rabbits (*Sylvilagus floridanus*) is described. Prior to the operation each animal was restrained in a specially constructed wooden box in which the rabbit's head was exposed. An