

&lt;Case Report&gt;

## Reproductive System of Giraffe (*Giraffa camelopardalis*)

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### ABSTRACT

Two postmortem male and female reticulated giraffes were examined. The adult male giraffe showed sigmoid flexure of penis similar to most ungulates. Epididymis was well-developed and divided with head, body and tail parts. On the tip of penis, there was a urethral process. At the necropsy of a 20-month-old and nulliparous giraffe, ovaries, oviducts, two uterine horns with a septum and a cervix were distinctively shown. Understanding reproductive organs of giraffes would be beneficial to succeed in artificial breeding on this species especially in the difficult situation of importing hoofed animals.

(Key words : giraffe, ovary, reproductive, testis, uterus)

### INTRODUCTION

The giraffe is the largest, tallest and even-toed browser mostly living on savanna regions of Africa. This species is regarded as “Least Concern” from a conservation status by the International Union for Conservation of Nature (IUCN). Giraffes breed throughout the year and usually produce a single offspring after a gestation period of 15 months (Clevenger, 1980). Over the centuries, captive breeding and husbandry of giraffe have been studied in advanced countries (Langman, 1978; Calle and Bornmann, 1988; Fischer *et al.*, 1997; Bashaw *et al.*, 2001). Like elephant and rhinoceros, giraffe also has been one of megavertebrate mammals aimed at developing methods of artificial breeding (Foxworth *et al.*, 1991; Hermes *et al.*, 2009; Thongtip *et al.*, 2009).

The purpose of this retrospective study is to understand reproductive system of giraffe and to prepare for trials of artificial breeding.

### CASE REPORT

Male reproductive organs were shown in Fig. 1. The penis was extended outward maintaining S-shaped appearance called as sigmoid flexure (Fig. 1A). The urethral process in the white-lined box is considered as a sort of sensory structure. When a giraffe stands, testes perpendicularly face the ground. Two black-lined boxes show tails of epididymis (Fig. 1A). The heads of epididymis are shown in black-lined boxes (Fig. 1B). A white

arrowhead indicates a ductus deferens and two black arrows show the body part of epididymis (Fig. 1B).

A 20-month-old, nulliparous female giraffe showed its reproductive organs (Fig. 2). Like cows, uterine horns are divided by a septum (Fig. 2H). The dissected ovary showed corpora lutea or luteinized cystic follicles (Fig. 2C). Artificial insemination sheath used for cows was readily penetrated into the cervix (Fig. 2E~2G).

### DISCUSSION

Okapi (*Okapia johnstoni*) has 46 chromosomes and belongs to Giraffidae. All types of giraffes have 30 chromosomes (Taylor *et al.*, 1967; Hösli and Lang, 1970; Koulisher *et al.*, 1971). Numerous hybrids have been born between the various subspecies and most of them are fertile.

Giraffe cows can conceive again several months after parturition, the minimum carving interval is 16 months. Even though a postpartum estrus has been observed, a lactational anestrus of several months is normal (Clevenger, 1980).

Female giraffes become sexually mature at 3 and half years and the males at 4 and half years (Bashaw *et al.*, 2001; Bercovitch *et al.*, 2006). Before conception, giraffes had an estrous cycle of 14.7 days and regularly show multiple ovarian cycles (Clevenger, 1980; Bercovitch *et al.*, 2006).

The giraffe placenta is polycotyledonary (Yong *et al.*, 2009). The number of cotyledons is different according to subspecies and researchers. But the number and diameter of cotyledons

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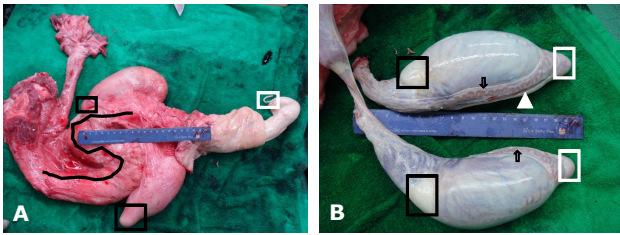


Fig. 1. Reproductive organs of a male giraffe. (A): Sigmoid flexure of penis is extended like a S-shaped line. A urethral process is in the white-lined box. Two black-lined boxes show tails of epididymis. (B): Two black-lined boxes show heads of epididymis while two white-lined boxes show tails of epididymis. Two arrows indicate bodies of epididymis and a white arrowhead shows a ductus deferens.

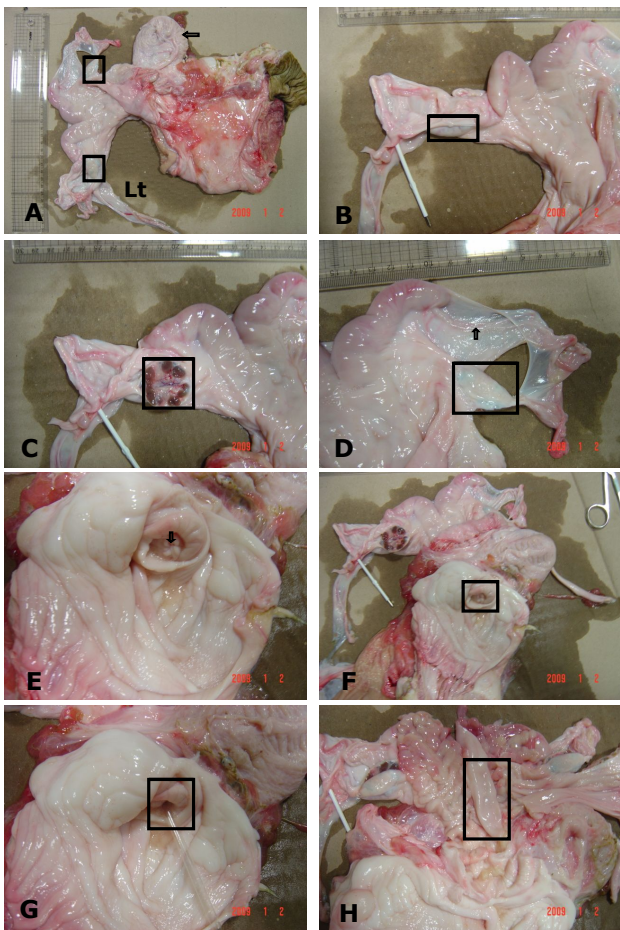


Fig. 2. Reproductive organs of a female giraffe. (A): Two ovaries are in the boxes. The arrow indicates a bladder. (B): Left ovary is in the box. (C): Left ovary is cut and shown in the box. (D): Right ovary is in the box and the arrow indicates an oviduct. (E): The arrow indicates cervix os. (F): The cervix os is in the box. (G): The cervix os is in the box with an AI sheath used in cows penetrated into the cervix. (H): A septum between two uterine horns is in the box.

are ranged 120 to 190 and 2 and 25 cm, respectively (Hall-Martin *et al.*, 1978; Deka *et al.*, 1980). Corpora lutea-like structures were found in the ovary of a nulliparous, juvenile giraffe in this study (Fig. 2C). Even in the sexually immature giraffes showed multiple follicles of which the larger ones luteinized to form pseudo-corpora lutea (Lueders *et al.*, 2009).

Semen collection via electric shocks using a domestic bull probe has never been conducted on physically restrained male giraffes in Korea (Foxworth *et al.*, 1991). Rectal palpation and ultrasound examination on nonsedated giraffes have never been imagined for trials in Korea because of lacks and indifferences about artificial breeding of this species. The day we could do artificial insemination on live and estrus-synchronized giraffes might not be far if we move our concerns to artificial breeding more than captive breeding in infertile zoo animals that have been born in captive environments.

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