# Assisted Reproduction in the Female Cat

Aime K. Johnson, DVM

**KEYWORDS**

• Feline • Queen • Ovulation induction • In vitro fertilization • Cryopreservation • Embryo transfer

**KEY POINTS**

- There have been great advances in assisted reproduction in the female cat in the past 10 to 20 years.
- Consistent ovulation induction and artificial insemination are vital to any assisted reproduction program.
- Many of these techniques developed in the domestic cat can be used to assist in the conservation efforts of the non-domestic cat.

## INTRODUCTION

As a general reminder of the cat's reproductive cycle, the female cat is a seasonal polyestrus-induced ovulator. The queen requires more than one mating to achieve enough stimulation for the luteinizing hormone surge necessary for ovulation. Ovulation occurs in approximately 50% of queens after one mating, but approaches 100% of queens allowed to mate 4 or more times.[1] Observation of breeding episodes is helpful to evaluate the number of times the tom attempts to copulate and also to evaluate the female for the classic "after reaction" that confirms copulation took place. If the after reaction does not occur, penetration of the penis into the vagina was unlikely. Appropriate breeding management is often the key to good fertility in a cattery. Minor changes in procedures may have an enormous impact on pregnancy rate and litter size. When presented with a queen or cattery, a detailed history and observation of protocol are as essential as a complete physical examination. Because the queen is a long day breeder, maintaining the animals under artificial lighting for at least 14 hours per day reduces seasonal variation, but in the author's experience, even cats maintained under this lighting system experience a decrease in pregnancy rates during the shorter days of the year. A queen will typically show estrus within 1 to 2 months after initiating an artificial lighting period.

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Department of Clinical Sciences, Auburn University, 1500 Wire Road, Auburn, AL 36849, USA
*E-mail address:* akj0001@auburn.edu

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When presented a specific queen for breeding management, a general and reproductive physical examination (with blood chemistries and endocrine testing when indicated) should be performed to rule out obvious causes of infertility dealing with physical limitations (vaginal stricture) or generalized diseases (such as renal disease, diabetes, or hyperthyroidism). If physical/genital abnormalities are present or if there is no other obvious cause for the infertility, a karyotype of one or both members of the breeding pair may be necessary to confirm the genetic makeup of the animal is normal.

Use of a high-quality ultrasound unit will allow imaging of the uterus by starting at the bladder and moving cranially. The uterus should be evaluated for size, symmetry of the horns, the presence of thickened endometrium (**Fig. 1**) or cystic structures, and fluid within the lumen (**Fig. 2**). Ovaries can usually be detected immediately caudal to the kidneys and can be evaluated for the presence of follicles or cysts (**Fig. 3**).

Because cats are induced ovulators, successful induction of ovulation is critical for any assisted reproduction technique. One group has shown consistent results inducing estrus and ovulation using a combination of equine chorionic gonadotropin (eCG) and human chorionic gonadotropin (hCG) in a timed artificial insemination protocol.[2] Treatment is initiated in nonestral, nonluteal queens as determined by observing for behavioral estrus and a serum progesterone level less than 1 ng/mL. Queens received an initial injection of eCG (100 IU intramuscularly [IM]) followed by an injection of hCG (75 IU IM) 85 hours later. Insemination is performed 31 to 33 hours after the hCG injection, and ovulation is expected between 25 to 30 hours after hCG. Using this protocol, 100% of queens ovulated with a 75% pregnancy rate (6/8 queens) when inseminated with either laparoscopic intrauterine or laparoscopic oviductal inseminations.[2] This protocol can be modified to substitute porcine luteinizing hormone (pLH) for hCG. The estrus induction method used by this author is directly adapted from Conforti and colleagues.[2] Cats must be nonluteal and not in estrus before beginning the induction protocol (low progesterone and <50% cornified on vaginal cytology). Alternatively, cats can be placed on supplemental altrenogest (Regumate; 0.088 mg/kg orally) once daily for 38 days. After a withdrawal period of 5 days, the cats receive 100 IU eCG followed by pLH 85 hours later. Insemination should occur 30 to 33 hours later.

An alternate method is to allow the queen to come into a natural estrus and administer hCG intravenously twice daily on days 2 to 4 of estrus. The ovulation rate using this protocol was 95.6% (43/45 queens).[3] In this study, queens were inseminated at

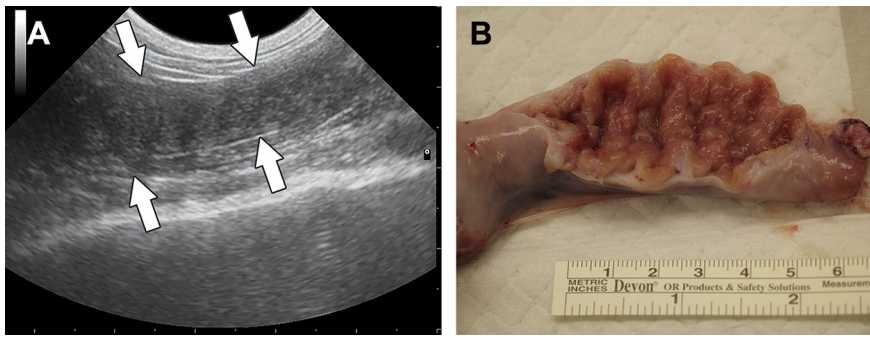


**Fig. 1.** (*A*) A longitudinal ultrasound image of the uterine horn in a 7-year-old queen. Note the light and dark linear striping along the uterus indicating thickened endometrium. The margins of the uterus are marked by arrows. (*B*) The same uterus after removal. Note the thickened folds of the endometrium.