REPRODUCTIVE CHECKLIST FOR CLINICAL HISTORY OF PRESUMED INFERTILITY

This tool was originally developed by the AZA Reproductive Management Center (RMC) in 2014 as part of an RMC-sponsored workshop on diagnosis, treatment, and prevention of infertility in zoo animals. The RMC later shared this worksheet with EAZA's Reproductive Management Group and the two groups co-developed it further. The goal of this worksheet is to stimulate conversation and fact-finding in cases of presumed infertility in zoo & aquarium animals that have been given the opportunity to breed but have not successfully produced offspring despite those opportunities. While not a diagnostic tool itself, this questionnaire should be useful in prioritising resources for diagnosis and remediation of cases of presumed infertility. The questionnaire should be completed for each individual in a pair.

GENERAL

Species Reproductive Biology

1. Is the species seasonal in terms of breeding?
2. What is the normal age of sexual maturity for the species in males and females?
3. What is the age of reproductive senescence for the species in males and females?
4. What is the species' mating system/reproductive strategy?
5. What is the typical litter size of the species?

Individual History

1. Age
2. Number of facility transfers to date
3. Did this animal come from another country or a non-AZA/EAZA facility?
4. Was this individual parent-reared (if applicable) or reared by other means. Please describe.
5. If the individual was hand-reared:
   a. Is this individual imprinted on humans?
   b. Does this individual demonstrate normal sex-specific reproductive and social behavior?
6. What is the individual's demeanour/temperament?
   a. Is this compatible with their potential mate?
7. Is there a history of aggression towards potential mates?

Individual Health

1. Weight
2. Body condition score
3. Vaccination and deworming history
4. Do they have any chronic conditions? Could any of these interfere with normal reproductive processes?
5. Have they received any of the following treatments?
   a. Assisted Reproductive Technologies?
   b. Glucocorticoid treatments?
   c. COX2 treatments?
   d. Contraception?
6. Do they have any skeletal abnormalities? Could any of these interfere with normal reproductive processes?
7. Has an infectious disease screening been carried out?
8. Does this individual have any known congenital abnormalities?

Individual Reproductive History

1. Has this individual produced offspring previously? Provide dates.
2. What was the age of first reproduction for this individual?
3. What are the results of past reproductive examination(s)?
    a. Is there a history of reproductive disease?
4. What type of mate access do they have and how long have they had mate access?
5. Have appropriate reproductive behaviours been observed?
    a. Copulation dates?
    b. What other reproductive behaviours have been observed?
    c. On what dates was the reproductive behaviours in (b) observed?
6. What types of breeding have been attempted in the past (natural vs. artificial)?
7. If behaviour has been appropriately monitored, has the animal been observed refusing to mate? If so, when?
8. If hormone analyses have been conducted to assess reproductive function, what were the results?
9. If applicable, has this individual demonstrated normal species-specific parental care previously?
    a. Has this individual shown evidence of killing or otherwise harming offspring?
10. Does the animal have a record of producing offspring that are stunted or show any congenital abnormalities?
11. Does the animal have a record of producing offspring who suffered neonatal deaths?
12. Are there any necropsy data from neonatal death/placentas?

Husbandry

1. Is the diet species-specific and nutritionally sound?
    a. Are they fed on a natural feeding cycle? This could mean carcass fed, intermittent feeding (e.g. 'fast days'), seasonal changes in diet, or other practices meant to approximate natural dietary dynamics.
    b. Are they fed supplements? Concentrates?
2. What is the enrichment they are given?
3. Do any potential stressors appear to be impacting the animal? For example:
    a. Presence of predators?
    b. Social stress?
    c. Stress from the public?
4. Are they in a single or mixed-species exhibit?
5. Do they have indoor/outdoor access?
6. Do they have access to UVB lighting, if needed?
7. Do they have access to heat source, if needed?
8. Is a natural light cycle being simulated?
9. Do they have access to a nest box, if needed?
10. Are hiding/escape areas provided?
11. What substrates do they have?
12. Does the enclosure have the appropriate humidity conditions?
13. Are the right environmental cues to induce mating/courtship provided?

Social Considerations

1. What is the typical social group for this species in the wild?
2. Does the social structure the target animal(s) live(s) in resemble natural history?
    a. Solitary, paired, grouped, harem, multi-male, multi-female?
3. What conspecifics are housed with the individual?
4. Has this individual typically lived in species-appropriate social groups?
5. Where is this individual in the group's hierarchy, if relevant?
6. Have new individuals been introduced recently that may have caused social disruption or may have introduced a pathogen?
7. If relevant, is the social unit the animal lives in generally compatible or are social issues like atypical levels of aggression present?

SEX-SPECIFIC QUESTIONS

FEMALES

Natural History

1. How long is the oestrous cycle for this species?
    a. How long are females receptive to mating during the oestrous cycle?
    b. What are the signs of receptivity?
    c. Has this female demonstrated receptivity? If so, when?
2. Are females of this species induced or spontaneous ovulators? Both?
3. What is the normal inter-oestrous interval?
4. What is the normal inter-birth interval for this species?

Individual Reproductive History

1. Has ovulation been confirmed in this female? If so, how and when?
2. Does the female have a record of spontaneous abortion?
    a. Are there any necropsy data for aborted foetuses?
3. Does she have a history of dystocia?
4. Does she have a history if stillbirths?
5. How are pregnancy and parturition monitored and diagnosed in this individual?
6. Does she have a history of false pregnancies?
7. What is the length of her inter-birth interval?
8. Have this female's previous litters been of typical size for the species?
9. What is the female's lactational history (i.e. has she lactated normally or experienced complications or insufficient lactation)?
10. Has she ever suffered from mastitis?

MALES

Natural History

1. Do we know what the normal range of testosterone concentrations is in breeding males of this species?
2. Do we know what normal semen characteristics look like in this species?

Individual Reproductive History

1. Is this male a proven breeder? If so, when?
2. Has this male had a formal fertility assessment with semen analysis?
    a. If so, what were the results?