NATURAL BREEDING ECOLOGY

RMC Mate Compatibility Workshop

Ecology (i.e., the relations of organisms to one another and to their physical surroundings) influences the evolution of the mating system. The following questions were developed to start the thought process about what environmental, social, and behavioral factors may be required to increase mate compatibility in your species.

You may not know all answers but do your best to research these factors and critically think how they may impact reproductive behavior and mate compatibility. Even a general google search or Wikipedia page will often have these answers. The following resources may be a helpful starting point:

1. **Mammalian Species**: Mammalian Species is published by the American Society of Mammalogists. Each uniform account summarizes the current understanding of the biology of an individual species including systematics, distribution, fossil history, genetics, anatomy, physiology, behavior, ecology, and conservation. The accounts vary from 2-14 pages depending upon what is known about the species. https://academic.oup.com/mspecies

2. **Amphibian and Reptile Species**: The Catalogue of American Amphibians and Reptiles is maintained by the University of Texas Library Repository. It consists of accounts of taxa prepared by specialists, including synonymy, description, diagnosis, phylogenetic relationships, published descriptions, illustrations, distribution map, and comprehensive list of literature for each taxon. https://repositories.lib.utexas.edu/handle/2152/44116

3. **Bird Species**: The Cornell Lab maintains a repository of species accounts for birds. It provides detailed information on habitat, food, nesting, behavior, conservation status, identification, photos, natural history, sound recordings, and videos. https://www.allaboutbirds.org/news/an-index-to-our-updated-species-accounts/

Please fill out the following questions with the environment and factors of your focus species in their natural habitat in mind.

LIFE HISTORY TRAITS

Life history traits include such factors as the number, size and sex ratio of offspring, the timing of reproduction, age and size at maturity and growth pattern, longevity, etc. Life history patterns evolve by natural selection, and they represent an "optimization" of tradeoffs between growth, survival, and reproduction. Life history traits can be useful in studying the diversity of life history strategies and how species come to these strategies and thus, will be helpful in understanding the basic mating strategies employed by your species and may help explain differences in mate preference.

1. Species name (genus and species):

2. In general, per each reproductive bout, does your species produce large numbers of offspring and make relatively small energy investment in each (r strategists) or make few offspring with a large energy investment in each offspring and often provide lots of parental care (k strategist).

r strategist

- [ ] k strategist

3. How might the life strategy of your species (r vs. k) impact mate compatibility during breeding season? For example: Do species with multiple offspring production throughout the season pair with new mates, giving managers the opportunity to introduce another mate later in the season?

4. What is your species' social system?

Eusocial: cooperative brood care, division of labor into reproductive and non-reproductive groups, usually with only one individual (i.e., a queen) reproducing

- [ ] One male/ multi-female
- [ ] One female/multi-male
- [ ] Multi-male/multi-female
- [ ] Monogamous pair
- [ ] Solitary
- [ ] Unknown
- [ ] Other

5. What mating system is predominantly used?

Monogamy: Pair bond between one female and one male for the reproductive season, often shared parental care

- [ ] Polygyny: Several females mate exclusively with one male
- [ ] Polyandry: Several males mate exclusively with one female
- [ ] Polygynandry: Both sexes mate exclusively with a small set of members of the other sex
- [ ] Promiscuity: Short-term association between any female and male
- [ ] Polybrachygyny: Absence of pair bonds, no parental care by males, males are constantly seeking mating opportunities
- [ ] Lekking: Males aggregate in a display area where they defend small territories, females arrive at display area to find a mate
- [ ] Unknown

6. How might the mating system of your species impact mate compatibility during breeding season? For example: If the species is monogamous, are mates fixed for life? Or are new mates chosen each season?

7. Under what circumstances in the wild does re-pairing with a new mate happen?

8. At what ages (in years) does your species usually begin and end breeding?

BREEDING ENVIRONMENT

Environmental factors—for example, ambient color, temperature and lighting, predation, food availability, seasonal timing, or climatic events—can also influence mate selection and reproductive behavior.

9. What time of year does mating occur in the wild? (Check all that apply)

- [ ] Winter (December - February)
- [ ] Spring (March - May)
- [ ] Summer (June - August)
- [ ] Fall (September - November)
- [ ] Unknown

10. If different from the wild, what time of year does mating occur in your zoo? For example: Southern hemisphere animals like painted dogs will shift their breeding season once moved to the northern hemisphere. (Check all that apply)

- [ ] Winter (December - February)
- [ ] Spring (March - May)
- [ ] Summer (June - August)
- [ ] Fall (September - November)
- [ ] Unknown

11. At what time of day is the species most active?

- [ ] Diurnal (day)
- [ ] Nocturnal (night)
- [ ] Crepuscular (dawn & dusk)
- [ ] Unknown

12. What time of day does breeding typically occur?

13. Thinking of the species' sensory system, describe how light may impact the breeding behavior? For example: Can the species see in the infrared/ultraviolet spectrum?

14. Describe as much as possible what physical materials may be necessary in the wild for successful courtship and breeding. For example: Does the male need access to material for building a display (e.g., bower birds)? Does the female sequester at the top of a tree while males compete? Is it a canopy dweller?

15. Are males territorial?

- [ ] Yes
- [ ] No
- [ ] Unknown

16. Are females territorial?

- [ ] Yes
- [ ] No
- [ ] Unknown

17. Is territory/resource quality important for mate selection? For example: Do females of this species only select males with the best nest sites?

- [ ] Yes
- [ ] No
- [ ] Unknown

18.Do males and females need to be familiar with each other or can individuals be novel?

Familiar

- [ ] Novel
- [ ] Both
- [ ] Unknown

MATE SEARCHING

How a species finds and acquires a mate can be important for mate compatibility.

19. For this species, briefly describe the mate searching behaviors in the wild:

20. For this species, what sensory signals are involved in mate searching? (Check all that apply)

visual

- [ ] auditory/sound-based
- [ ] chemical/olfactory
- [ ] tactile/touch-based

21. Which sex usually "invades" the other's territory during mate searching and breeding?

Male comes to the female

- [ ] Female comes to the male
- [ ] Unknown

22. Which sex usually initiates breeding?

Male

- [ ] Female
- [ ] Unknown

23. How many females are typically present during courtship?

24. How many males are typically present during courtship?

25. Do females participate in mate searching?

Yes

No

Unknown

26. Does the female need to simultaneously evaluate mates (all or most mates presented at once) or is there sequential evaluation (one male after another in a sequence)?

Simultaneous

Sequential

Unknown

27. What is the time period (in days) that females have to search for a mate?

28. What is the time period (in days) that the female is fertile?

29. Does the male simultaneously court more than one female at a time?

Yes

No

Unknown

30. What is the time period (in days) that males have to search for a mate?

31. What is the time period (in days) that the male is in “rut”?

MATE CHOICE & COMPETITION

32. For this species, what sensory signals are involved in courtship? (Check all that apply)

visual

- [ ] auditory/sound-based
- [ ] chemical/olfactory
- [ ] tactile/touch-based

33. Is there female choice? i.e., are males with certain traits chosen more often for mating by the female?

Yes

- [ ] No
- [ ] Unknown

34. Do females choose males based on any of the following physical characteristics? (Check all that apply)

Body size

- [ ] Ornament size (e.g., antlers, tail feathers, etc.)
- [ ] Ornament color

35. Do females choose males based on any of the following behavioral characteristics? (Check all that apply)

Courtship vigor

- [ ] Winning male-male competition
- [ ] Acquiring territory or offering nuptial gifts
- [ ] Call/vocalization feature
- [ ] Engaging in parental care behaviors (e.g., nest building)

36. Is there female-female competition for males?

Yes

No

Unknown

37. Is there male choice? i.e., are females with certain traits chosen more often for mating by the male?

Yes

No

Unknown

SAVE

PRINT