

Bio. 3302 Introduction to Evolution
Study Guide
Evolution of Social Behavior

Important terms and Concepts

Actor/instigator
Altruistic social behavior
Bees
 $B_r - C > 0$
Castes
Coefficient of relatedness "r"
Cooperative breeding
Cooperative social behavior (mutualism)
Dominance hierarchy
Eusociality
Full Siblings
Group living
Half Siblings
Hamilton's Rule
Haplodiploidy
Inclusive Fitness
Inbreeding
Kin Selection
Naked mole rats
Parental-Offspring conflict
Recipient
Reciprocal altruism
Selfish social behavior
Siblicide
Social interactions
Spiteful social behavior
Termites
Wasps

Discussion Questions

1. Many animals display social behavior. What are some benefits of cooperative behavior?
2. What are the four general types of social interactions? Give examples.
3. Why is altruistic behavior difficult to explain by natural selection? Do humans display this behavior?
4. Some animals cry out and warn others when they see a predator approaching. In some cases this can be dangerous, so why would they sacrifice themselves this way?
5. What is Hamilton's rule? What are its three mathematical terms, and how are they calculated?
6. Should sibling rivalry be more or less common in species that are monogamous or polygamous? Why?
7. What is meant by the statement "I'd jump in a river to save two brothers, or 8 cousins?"

8. Describe inclusive fitness and give examples of animal behaviors that seem to be operating under this principle.
9. What is meant by the term "eusociality"? What are some examples of eusocial animals? What do they have in common?
10. Why did Darwin find it difficult to explain the evolution of insect castes, workers who sacrifice their own reproduction for others?
11. What is haplodiploidy, and why was this seen as a possible mechanism for the development of eusociality? How closely are haplodiploid ant, bee, and wasp workers related to each other? What are some problems with this hypothesis?
12. What about the case of naked mole rats? What kind of social behavior do they exhibit? Unlike bees and wasps they are diploids. How might their society develop?
13. Are humans eusocial to any extent? Can you think of any cultures that might fit the description (non-reproductive worker castes)?