**Naked mole rates**

**a. What are naked mole rats? Describe their ecology as well as social system.**

Naked mole rats are a species of rodent that live underground. They belong to the family *Bathyergidae*, and inhabit the hot and dry regions of Ethiopia, Somalia and Kenya. They exhibit a social hierarchy similar to that of insects, where the is a queen female mole rat that mates with a few males, and other members of the society are involved in non-reproductive tasks, such as burrowing, gathering food and defense against predators. This type of social classification is known as eusociality. The average colony size is 70-80 individuals. Naked mole rat societies are more similar to that of social insects than other mammals, or even other vertebrates. Only some males get to breed with the queen, but there is little aggression among them or other individuals, even when the queen is gone. Inbreeding in naked mole rat colonies produces a genetic effect similar to haplodiploidy in social insects, where individuals are more easily convinced to stick around and support the next generation because of the inclusive fitness they would gain.

**b. What factors are thought to be important in the evolution of altruistic society in general?**

Relatedness between individuals is helpful in the evolution of an altruistic society. In Isoptera and other social insects, inbreeding is thought to have strengthened the reason to support familial goals of producing highly related offspring. The cost-benefit analysis of staying with a natal group and helping to raise future offspring seems better for an altruistic society than going off and starting one’s own family.

**c. Why are females more related to one another in haploid/diploid systems?**

The daughters of monogamous mother have three-quarters of their genes in common. Females in haploid/diploid systems are diploid and males are haploid, meaning that if they share a father and a mother, there is a higher chance that sisters share the same DNA compared to a diploid system where individuals could only have half of their father and half of their mothers DNA.

**d. What factors (such as inbreeding and geographical isolation) are expected to be important in mole rats, termites and other non-haploid/diploid systems?**

Inbreeding is important in naked mole rat systems because it increases the relatedness of individuals and so the potential importance of kin selection. Geographic isolation leads to a restriction of resources available, and therefore a greater dependency of the individual on the group, making individual fitness even harder compared to group fitness.

**e. What information is given by comparative data on mole rats?**

Factors that contribute to eusociality in naked mole rats is given by comparative data on mole rats. The features of the subterranean niche, colony size, and the probablility of development of new colonies are important factors. For example, naked mole rates are the most eusocial in the clade but also the most isolated in terms of individual colonies and deal with the most in terms of widely spread scarce resources.

**f. Be able to compare the factors important in the evolution of eusociality in haploid/diploid systems (bees) versus non-haploid/diploid systems (termites and naked mole rats).**

Inbreeding and geographic isolation are important drivers of kin selection in non-haploid/diploid, while kin selection in haploid/diploid systems can be explained by their reproductive system.