

EXPLORE THE ISSUE BEING INVESTIGATED

Factors Limiting the Home Range of Male Voles

Out in the wild, many species of small animals maintain rather large populations, in which particular individuals stake out a bit of turf as their own--their home range. Ideally, they would have this turf all to themselves, but in reality one individual's home range usually "overlaps" several others.

This situation raises two competing influences:

1. The bigger the home range of a male, the more female home ranges it will overlap, providing access to more potential mates. This increases male fitness, and as a result one would predict that evolution would favor bigger home ranges.

2. The bigger the home range of a male, the more male home ranges it will overlap, resulting in more competition with other males. This decreases male fitness, and as a result one would predict that evolution will minimize competition by favoring smaller home ranges.

How does a male solve this dilemma? By reaching a balance, of course. Reproductive investments are different between males and females, with females typically providing greater parental care than males. Because of this difference in responsibilities, males and females utilize space very differently. Females tend to compete for food and a safe space to rear their young. Males, on the other hand, are not usually involved with rearing the young, only producing as many young as possible. As a result, males compete with each other for increased access to reproductive females.

These strategies have been well-documented in smaller mammals. Because all males have the same strategy, to have access to as many reproductive females as possible, there is a considerable amount of competition among males. Males then face two challenges to their reproductive success, finding females and competition with other males.

Most studies of male home range size have examined the two challenges independently. Clearly, the abundance of females and their distribution affects how males establish their home ranges. Fewer females, or females that cluster together, cause males to expand their home ranges and possibly create overlaps with the home ranges of other males. By contrast, increased competition from other males due to increases in male densities cause a reduction in home range size.

Of these two challenges, which has a greater influence? Studies on vole home range size have not examined the two challenges simultaneously, to test how the number of male



The gray-tailed vole (*Microtus canicaudus*). This male vole faces two challenges influencing his reproductive success: 1). access to females and 2). competition from males, but which is the stronger influencing factor? (Courtesy of Jerry Wolff)

competitors versus the number of females available for mating influences home range sizes of males and the tendency to overlap home ranges with other male or female home ranges.

Monica Bond of Oregon State University and Jerry Wolff of the University of Memphis set out to test these hypotheses using the gray-tailed vole (*Microtus canicaudus*). In gray-tailed vole populations, home range sizes are dependent upon population sizes in general. As the total population densities increase, male home range sizes decrease. It is not clear, however, if this reduced home range size is due to greater access to females or increased competition with other males.

Bond and Wolff set out to determine if the space used by male voles, the size of their home range, is influenced more by the number of male competitors or by the number of females available for mating:

1) if access to females is a stronger influence on male home range size then the home range size should increase in size when fewer females are available and decrease in size when more females are available;

2) if competition among males is a stronger influence on male home range size then the home range size should increase in size when there are fewer males with which to compete and decrease in size as the male population increases.