

Sexless in the city: A nonlethal management strategy for controlling eastern gray squirrel (*Sciurus carolinensis*) reproduction and population in an urban area

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The eastern gray squirrel (*Sciurus carolinensis*; gray squirrel) is a common wildlife species in urban and suburban communities within the eastern United States. Negative human-squirrel interactions are on the rise due to increasing gray squirrel populations and damage they cause to trees and shrubs by gnawing limbs and stripping tree bark. This study involved two phases. In the first year, 2011, the two objectives were: 1) to determine when peaks in both testosterone and progesterone levels of gray squirrels on Clemson University's campus were achieved, and 2) to determine if gray squirrels on campus had two breeding seasons per year as literatures states. This information was imperative for establishing the proper timeframe for dispensing the DiazaCon™ contraceptive bait to gray squirrels. In the second and third year of the study, 2012 and 2013, the objective was to evaluate the effectiveness of DiazaCon™ in reducing gray squirrel reproduction on Clemson University's main campus.

DiazaCon™ blocks the conversion of desmosterol to cholesterol and with contraception, desmosterol concentrations increase and cholesterol concentrations decrease. Cholesterol is the precursor for the synthesis of steroid reproductive hormones; therefore this blockage may reduce sufficient production of all steroidal hormones to inhibit the reproductive system in both males and females.

The first year of the study, gray squirrels were trapped monthly and blood samples were collected to determine their breeding periods and to collect baseline desmosterol and cholesterol data. In years two and three of the study, DiazaCon™ coated sunflower hearts were placed in four treatment sites across campus. DiazaCon™ can persist in the liver for up to four months; therefore, following each administration, each month for four months, up to 10 males and 10 female gray squirrels were trapped in the treatment and control sites. Serum samples were analyzed for progesterone (female) or testosterone (male), desmosterol, and cholesterol levels.

Results from this study confirmed a DiazaCon™ effect on both desmosterol and cholesterol concentrations of gray squirrels in treatment locations. The DiazaCon™ effect was represented in the results of the population estimate which showed a reduction in gray squirrel treatment populations and conversely an increase in the population of the control. Gray squirrel populations are typically managed by lethal control but non-lethal methods may be more socially acceptable. Controlling gray squirrel reproduction and population with a non-lethal alternative such as an effective and reversible contraceptive like DiazaCon™ could offer a mutually beneficial outcome satisfying both stakeholders and managers.