

NORTHERN ILLINOIS UNIVERSITY

**GENETIC POPULATION STRUCTURE BY MICROSATELLITE DNA
ANALYSIS OF THE EASTERN MASSASAUGA RATTLESNAKE (*SISTRURUS
CATENATUS CATENATUS*) AT CARLYLE LAKE**

A THESIS SUBMITTED TO THE GRADUATE SCHOOL
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE
MASTERS OF SCIENCE

DEPARTMENT OF BIOLOGICAL SCIENCES

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DEKALB, ILLINOIS

MAY 2003

ABSTRACT

Data from molecular DNA markers can be of great value with respect to both population and conservation biology investigations. Microsatellite DNA markers in particular are an ideal molecule for these types of studies. They have several advantages over other types of molecular markers and can easily allow researchers to detect genetic variation between populations. This study investigates the genetic differences in three sub-populations of the endangered eastern massasauga rattlesnake (*Sistrurus catenatus ssp. catenatus*) and compares the results to two other eastern massasauga rattlesnake populations in the Midwest. This was done by analysis of variation at three microsatellite DNA loci specifically designed for the eastern massasauga. Analysis of variation allowed me to estimate (1) the degree of population differentiation, (2) levels of inbreeding, (3) rates of gene flow, (4) observed and expected heterozygosities, and (5) differences in allele and genotype frequency. The results helped determine the genetic structure of the eastern massasauga at Carlyle Lake. Based on the results, it was concluded that population structure and genetic differentiation are present between populations despite the geographic closeness of the populations. The causes of these genetic differences seen between populations are likely due to isolation of populations, mutation in the microsatellites, inbreeding, and limited movement pattern exhibited by the eastern massasauga rattlesnake.