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Testing hypotheses of aging in long-lived painted turtles (*Chrysemys picta*)

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Abstract

For 38 of the past 50 years, Painted Turtles were studied on the University of Michigan's E.S. George Reserve in southeastern Michigan. We compared age specific body sizes, reproductive traits and survival of Painted Turtles ranging from 9 to 61 years of age to test contrasting predictions of the Relative Reproductive Rate and Senescence Hypotheses of aging. Indeterminate growth (i.e. continued body growth of adults) was important in increasing reproductive output of older turtles; however, growth rate of the oldest age-group was reduced compared to that of younger adults. Although clutch size and among year reproductive frequency did not increase with age, within year reproductive frequency (production of second clutches), egg size, and hatchling size did. Nest predation rates and the proportion of surviving nests that produced hatchlings were similar among age groups, and embryo mortality in nests was not related to age. Survivorship of males was less than that of females, and survivorship of the oldest group

of females was not statistically different from that of a younger group of females. No decline in reproductive output or survivorship was detected in the oldest females as predicted by the Senescence Hypothesis. Thus, the majority of data on reproductive traits and survivorship support the Relative Reproductive Rate Hypothesis. We also compared Painted Turtles to Blanding's Turtles, another species studied on the E.S. George Reserve. That Painted Turtles exhibit indeterminate growth whereas Blanding's Turtles do not, appears to be a primary mechanism for some differences between species in the relationships between reproductive traits and age. An important mechanism for increasing reproductive output in both species was increased reproductive frequency in older females. Painted Turtles also increased offspring quality (egg and hatchling size) with age, whereas Blanding's Turtles did not. Compared to younger individuals, there was no reduction in survivorship in the oldest Painted Turtles and survivorship increased in the oldest Blanding's Turtles.



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Keywords

Aging; *Chrysemys picta*; Longevity; Painted turtle; Reproduction; Senescence

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1 Deceased.

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