

The Significance of Being an Older Turtle

The Questions

For 42 years, researchers* at the University of Michigan studied Blanding's, Painted and Snapping turtles on the University's E. S. George Reserve in Southeastern Michigan. The researchers sought to explore the reproduction pattern of female turtles as they grow older. The researchers asked:

- Do turtles get bigger as they age?
- Do older turtles increase their reproduction compared to younger turtles, and if so, by what means?
- Do turtles age and reproduce as predicted by the ***Relative Reproductive Rate Hypothesis***, which means that older turtles are more likely to survive and will reproduce more than younger turtles, or as predicted by the ***Senescence Hypothesis***, which means older turtles are less likely to survive and will reproduce less than younger turtles?
- If older turtles reproduce more than younger turtles, is it due to laying more eggs, or is it due to laying eggs more frequently?

The Study

The study involved 2,074 individuals and 615 nests of Blanding's turtles, 6,463 individuals and 2,564 nests of Painted turtles, and 3,180 individuals and 1,148 nests of Snapping turtles. The oldest turtles recorded as of 2008, were a 75 year old Blanding's turtle, a 60 year old Painted turtle, and a 50 year old Snapping turtle.

The Researchers' study approach:

- Humanly captured turtles by means that are harmless to the turtles
- Safely transferred turtles to research facilities
- Marked individual turtles for identification
- Measured and weighted individual turtles, noted injuries or abnormalities
- X rayed females who might be carrying eggs
- Determined or assigned an age for individual turtles (e.g. Ageing)
- Gave individual turtles temporary numbers
- Released turtles back to their location of capture

Simultaneously,

- Found and flagged turtle nests
- Monitored fate of nests
- In fall and spring, captured and marked hatchlings at nests and shallow water

The Conclusions

Adult turtles, who have reached maturity, grow throughout their lives but much slower than juveniles. Individual juveniles of the same species grow at different rates and reach maturity at different ages, which explains the difference in body size of individual adults of the same species. The researchers' conclusion was:

A bigger turtle does not mean an older turtle

Mature turtles have a higher chance of survival than juvenile turtles, which means they have longer reproductive life span. Once a turtle reaches maturity, she is much less vulnerable to predators than juveniles, and her chances of survival increase as she gets older.

An older turtle has a higher chance to reproduce for more seasons than a younger turtle

The researchers' conclusions support the *Relative Reproductive Rate Hypothesis*, as they found that older turtles nest more frequently and lay bigger eggs. The researchers concluded that:

Older turtles produce more eggs and of higher quality than younger turtles

The Implications

This study revealed that the older a turtle is, the more important she is in keeping the stability of her species' population. Turtles that reach older age and reproduce successfully carry their genes into the future and their offspring may also be able to reach old age and produce high quality eggs more frequently. Therefore,

Reproduction of older turtles increases the quality and life span of future generations

Increase in deaths of older reproducing adults, and in particular females, due to hunting and road mortality will result in decreasing population numbers. This means, there might be fewer turtles every year, until the species' disappearance. Turtles that live for over 70 years have an increased accumulation of threats to their survival year after year.

Hunting and road mortality of older turtles are not sustainable and put the survival of many species at risk

Just how many times can a turtle safely cross a road in her 75 years of life?

***The currency of life-history evolution: why old turtles are valuable, and how they got that way.** Justin D. Congdon, Savannah River Ecology Laboratory, Drawer E, Aiken, South Carolina, USA, and Institute of Ecology, University of Georgia, Athens, GA. March 19. At the **Toronto Zoo Turtle Stewardship and Management Workshop, March 17-19, 2008**