Transactions of the Illinois Academy of Science
(1988), Volume 81, 3 and 4, pp. 261-266

NOTES ON THE ECOLOGY OF THE CENTRAL NEWT (NOTOPHTHALMUS VIRIDESCENS LOUISIANENSIS) IN SUBURBAN NORTHEASTERN ILLINOIS

Philip A. Cochran
Division of Natural Sciences
St. Norbert College
De Pere, WI 54115

ABSTRACT

1. Terrestrial newts from a population in northeastern DuPage County occurred primarily in oak/hickory forest rather than old field habitat, and 75% were found beneath boards or other anthropogenic debris.

2. Newts were found in terrestrial habitats only during August and September. This may represent a shift from aquatic habitats, which often declined drastically in late summer.

3. In all years, newts were separated into two major length (age?) classes.

4. Analysis of fecal pellets indicated that snails were a major dietary component. Snails occurred in every fecal pellet. Larger newts ate larger snails but continued to eat small snails as well. Oribatid soil mites and other small arthropods were also consumed.

5. Longterm observations from the mid-1960's to the present suggest that this newt population is subject to large fluctuations in abundance.

INTRODUCTION

Terrestrial stages of the central newt (*Notophthalmus viridescens louisianensis*) were reported by Pope (1964) and Vogt (1981) to be uncommon in the upper

Midwest (but see Smith, 1961). Discovery of a population with terrestrial individuals in DuPage County, northeastern Illinois, permitted collection of the length-frequency, dietary, and habitat information reported herein. Since the population represents one of the very few extant populations of central newts in DuPage County, I also provide suggestions for its future management.

METHODS

All newts were collected during daytime searches in August and September, 1980-1985, in oak/hickory forest and old fields near a wooded, semi-permanent wetland (T-40-N, R-11-E, S-22). This study area and its herpetofauna are more thoroughly detailed by Cochran (in press). Searches through the same habitat in April (1980, 1981, 1984) and June (1985-1987) were unsuccessful (surveys were not attempted in May or July).

Because central newts are considered rare in DuPage County (Forest Preserve District of DuPage County, 1986), they were not sacrificed to collect gut contents. Rather, fecal pellets were collected by housing newts overnight in individual containers (except for one instance when 3 pellets were collected from 5 newts held together), and the newts were released at their sites of capture. Analysis of fecal pellets underestimates the importance of soft-bodied prey but can be used to demonstrate use of prey with hard parts resistant to digestion. Prey items were measured under a microscope with an ocular micrometer, and body length, defined here as the distance from the tip of the snout to the posterior edge of the insertion of the hind limbs, was measured for each newt to the nearest millimeter.

Voucher specimens were placed in the University of Wisconsin-Madison Zoology Museum (UWZM-H22588-9).

RESULTS

Forty-eight newts were collected on 11 dates from 1980-1985. Thirty-nine newts were found in oak/hickory forest; the remainder occurred in shrubby old field habitat (always near an ecotone with wooded habitat). Twelve newts (25%) were collected beneath logs, bark, or other natural objects, whereas 36 (75%) were found beneath boards or other anthropogenic debris. Substrates ranged from moist to dry; cover objects were often "cemented" to the ground by earthworm castings.

In all years, newt body length fell within two discrete classes. Between 1 August and 7 September, all but one newt were within body length ranges of 19-23 mm (n=18) or 28-39 mm (n=23); a single 45-mm specimen possibly represented a third size (age?) class. A single collection on 26 September 1980 included one 27-mm newt and four within a range of 38-42 mm.

A total of 26 fecal pellets from at least 15 newts (1-3 pellets/newt) were analyzed. Snail shells, usually entire, were found in every pellet. Sixty "spire"-shaped snails (shell length: 1.2-6.9 mm) were found in pellets from at least 11 newts, whereas 53 "wheel"-shaped snails (shell diameter: 0.7-6.6 mm) were found in 13 newts. Among newts that contained more than one snail of a given type, newt body length was correlated with the maximum length for spire shells ($r=0.678$, $n=7$, $P<0.10$) and maximum diameter for wheel shells ($r=0.709$, $n=11$, $P<0.05$) but not with minimum values ($r=0.358$ and $r=0.163$, respectively). This suggests that larger

newts were capable of eating larger snails while retaining smaller snails in their diet. Other prey items found in fecal pellets included 21 oribatid mites (in 7 newts), 2 ants (in 2 newts), 1 beetle, 4 unidentified insect larvae (in 2 newts), and miscellaneous arthropod fragments (in 5 newts).

DISCUSSION

The smallest newts collected during this study probably represent efts recently transformed from the aquatic larval stage. I do not know whether larger newts represent older efts or adult newts that have shifted from the normal aquatic adult phase. I never collected terrestrial newts in the study area earlier than August. Since the wetland at the center of the study area in some years dries completely, or nearly so, in late summer, the newt population may shift between aquatic and terrestrial habitats in midsummer. Premo (1982) described a similar shift by a newt population in Michigan, although the shift was not associated with dessication of their aquatic habitat (see also Hurlbert 1969 and references therein).

Some evidence suggests that this newt population is subject to large fluctuations in abundance. During the period 1964-1975, when I lived at the edge of the study area and actively searched for reptiles and amphibians, I observed fewer than 5 newts (including 2 on 17 August 1969). During 1980-1983, as many as 11 individuals could be collected within a two-hour period. Only one individual was collected in 1985, and none on 9 October 1986. On 16 September 1987, 12 newts were collected in a wooded wetland north of the study area (Redmer, personal communication, 21 September 1987).

Snails were by far the most important prey item discovered in the fecal pellets; oribatid mites were a distant second. According to Drewes and Roth (1981), few vertebrates feed on snails, and few terrestrial vertebrates feed on snails without crushing the shells or removing and eating only the soft parts. For newts, consumption of snails (see also Smith, 1961 and Burton, 1976) may provide for dietary continuity between aquatic and terrestrial phases, since at least some Illinois populations rely heavily on snails as larvae (Brophy, 1980). The importance of soil mites in the diets of New York newts was discussed by Norton and MacNamara (1976).

Newts have declined in abundance in Illinois during historical times (Smith, 1961). In northeastern Illinois, Smith (1961) reported newts from northeastern DuPage County in the general vicinity of the present study area, and both he and Pope (1964) reported newts from Cook and Lake Counties. A specimen in the collection of the Illinois Natural History Survey (INHS 2303) was collected on 14 October 1942 in "Cook Co., Bensenville," (Larry M. Page, personal communication, 17 October 1980), whereas a specimen in the Field Museum of Natural History (FMNH 35761) was collected in Wooddale, DuPage County, probably prior to 1945 (Harold K. Voris, personal communication, 28 November 1980). More recently, newts have been reported from Cook County by Jessup (1981) and were listed for Cook, Lake, and Will Counties by Pentecost and Vogt (1976). The Forest Preserve District of DuPage County (1986) has recorded newts from three localities, including the present study area, since 1980.

The effects of humans on the herpetofauna of northeastern Illinois are varied. Most obvious is the obliteration of habitat by commercial, agricultural, and residential development. During my extended association with the study area, portions at

its periphery were converted to homes (Cochran, in press). Another impact, especially near residential areas, results from children who collect and move reptiles and amphibians (see Hurlbert 1969, p. 479), keep them for pets, or kill them outright. I was aware of one individual who collected and removed salamanders (including at least one newt) from the study area during the 1960's. A potential beneficial impact of humans in the study area results from the accumulation of anthropogenic debris, which provided cover for 75% of the newts collected during this study. Most of this debris resulted from two activities: (1) dumping of garden and other trash, usually in ecotones between field and woods, and (2) construction and abandonment of clubhouses by children. The latter activity resulted in two accumulations of boards that eventually served as cover for newts.

Much of the habitat used by newts during the present study has been recently acquired by the Forest Preserve District of DuPage County, although part of the wetland was not included in the acquisition and has been diminished by dumping of fill along part of its shoreline. Unfortunately, construction of a trail obliterated an accumulation of boards that accounted for the largest number of newt collections during this study. Although removal of anthropogenic debris is an understandable action following designation of an area as a natural preserve, such debris may serve as important cover for some species of reptiles and amphibians and may offer a way of monitoring abundance of species less easily collected in natural refuges. Management for newts in the study area should include placement of debris piles for use as shelter sites. These piles should preferably be placed in wooded habitat near the wetland where they will be shaded. Any such piles should not be separated from the wetland by intervening trails or roads and should be screened from casual observers by appropriate plantings.

Longterm management for newts in the study area may require efforts to offset obliteration of the wetland. Succession and encroachment by purple loosestrife (*Lythrum salicaria*) are reducing its surface area and depth. However, any deepening or enlargement of the wetland should not be followed by stocking of fish, a common practice in suburban forest preserves (and already scheduled for a borrow pit just south of the study site). Addition of fish to aquatic communities is often followed by loss of amphibian species, including *Notophthalmus viridescens* (Sexton and Philips, 1986).

ACKNOWLEDGMENTS

I thank Andrew and Mary Lou Cochran for support during my early observations, and Nick DeNicolo for hospitality during the later stages.

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