

The Status and Biogeography of the Three-Toed Box Turtle, *Terrapene carolina triunguis*, in Illinois

Gary L. Paukstis
2489 Quail Court
Aurora, Illinois 60504

and

Fredric J. Janzen
Center for Population Biology
University of California
2320 Storer Hall
Davis, California 95616

ABSTRACT

The three-toed box turtle, *Terrapene carolina triunguis*, may now be established in the state of Illinois. While common in the adjoining state of Missouri, *T. c. triunguis* has not been considered as part of the natural herpetofauna of Illinois. A fourth confirmed Illinois specimen is described herein from Jackson County. This specimen, along with the three previously reported Illinois specimens, was collected in the Mississippi Border vegetational division of the state and was also in close proximity to the Mississippi River. *Terrapene carolina triunguis* is known to interbreed with *T. c. carolina*, which occurs in Illinois and is sympatric with the specimens of *T. c. triunguis* collected in Illinois. The status and biogeography of *T. c. triunguis* may have important implications for the population genetics of box turtles in Illinois.

INTRODUCTION

The three-toed box turtle, *Terrapene carolina triunguis*, is poorly known from within Illinois (Smith, 1961) and is not now considered native to the state (Morris et al., 1983). Although widely distributed throughout the adjoining state of Missouri (Johnson, 1987), the eastern distribution of the three-toed box turtle has apparently been limited by the Mississippi River (Smith, 1961). In addition to the *T. c. triunguis* reported by Smith (1961) from Calhoun County, Paukstis and Janzen (1988) described a specimen from Union County, and another was reported from Monroe County by Gilbert and Gilbert (1992). Both papers speculated on the possibility of naturally occurring populations of this subspecies in Illinois. Indeed, the discovery of the specimen reported herein raises further questions regarding the status and distribution of *T. c. triunguis* in Illinois. This paper reports another specimen from Illinois and discusses mechanisms by which *T. c. triunguis* may enter the state.

DESCRIPTION

An adult male *T. c. triunguis* was collected on 27 April, 1990 in Jackson County, Illinois. The specimen was found approximately 100 m south of Shawnee National Forest Route 787 (2.3 km west of the junction of Illinois Route 3 and Forest Route 787) on a heavily wooded slope in an area known as Fountain Bluff. The size of the specimen was as follows: straight line carapace length = 123 mm; straight line carapace width at mid-body = 93 mm; plastron length = 123 mm; plastron width at hinge = 70 mm. The plastron was solid yellow and white in coloration and there was a faint pattern on the carapace. The specimen had red eyes, extensive red markings on the head and there were three toes on each of the hind feet. Photographic slides of the specimen are in the herpetological collection of the Illinois Natural History Survey.

DISCUSSION

The site where this specimen was observed falls between the locations of two of the previously documented specimens of *T. c. triunguis* in Illinois and, as with the other two specimens, was in close proximity to the Mississippi River (see Figure 1). All three previously documented specimens were found within the Mississippi Border vegetational division (Vestal, 1931). Explanations for the presence of this subspecies in Illinois are: (1) more individuals are released into Illinois from captivity; (2) turtles cross the Mississippi River periodically but do not survive; (3) specimens are collected but are not properly identified or reported in the literature; (4) *T. c. triunguis* cross the Mississippi River but the characteristic traits become absorbed into the gene pool of existing populations of *T. c. carolina*.

The possibility that the specimen described herein, as with other reported Illinois specimens of *T. c. triunguis*, was introduced by humans cannot be overlooked. Several specimens of *T. c. triunguis* reported from northern Illinois were undoubtedly introduced (Dancik, 1974; Ludwig et al., 1992). Box turtles are often kept as pets and may be re-released at a later date. Additionally, *T. c. triunguis* appears frequently in pet stores and, as such, may be transported considerable distances between capture and release. One of us (GLP) has had conversations with the owner of a Chicago area pet store that regularly had *T. c. triunguis* in captivity. The owner would "rescue" box turtles that were in poor health from commercial pet distributors, keep them in captivity until healthy and release the healthy turtles in the state of Missouri, regardless of the turtles' origins. Similar situations may result in individuals being released into Illinois. The Fountain Bluff area, while not heavily travelled, is known for its scenic views of the Mississippi River Valley and may have been a likely site to release a pet turtle.

The lack of reports on *T. c. triunguis* in Illinois seems unlikely to be related to the inability of this subspecies to survive in the state. The shores of both sides of the Mississippi River are separated by less than 0.5 km in some places, so that climatic differences would seem minimal. Also, both areas are similar in having tracts of closed woodlands since pre-settlement times (Schroeder, 1981; Anderson, 1991).

Specimens of *T. c. triunguis* may be collected in Illinois but are not properly identified. Both *T. c. triunguis* and *T. c. carolina* are highly variable in coloration and commonly remain inside their shells for extended periods of time, making observation of the hind digits difficult (pers. obs.). Specimens of *T. c. triunguis* may also have been collected and identified, but not reported in the literature (see Paukstis and Janzen, 1988).

Finally, *T. c. triunguis* may cross the river and reproduce with *T. c. carolina*. Interbreeding could result in the *triunguis* phenotype being absorbed into the gene pool thereby masking *triunguis* characters and the frequency of the subspecies' occurrence in Illinois. Intergrades could result in the misidentification of turtles encountered in the field.

If *T. c. triunguis* occurs naturally in Illinois the question exists as to how this subspecies may cross the Mississippi River. Swimming and/or flooding provide the most obvious ways in which *Terrapene* could cross the Mississippi River. The swimming abilities of *Terrapene* have been documented (Lathan, 1916; Schwartz et al., 1984 for e.g.). *Terrapene c. triunguis* occurs along the entire length of Missouri bordering the Mississippi River (Johnson, 1987). Box turtles that enter the river and swim from west to east potentially have the entire length of the state to land while being carried downstream. Similarly, rafting on logs or other floating material could allow box turtles to disperse from Missouri to Illinois (e.g., Heger and Sherrin, 1991). Areas where the river meanders and flows to the east might help propel a swimming or rafting turtle toward Illinois. Numerous islands located in the river channel may also provide resting sites for turtles.

Islands in the river are of interest, because their positions may change due to modifications in the course of the main river channel. Some islands that formed from erosion and meandering of the river originate from land that was attached to Missouri. In some instances these islands later became attached to Illinois or were separated from Illinois by a relatively narrow body of water (for example, see location of Grand Tower Island on United States Geological Survey maps from 1924, Alto Pass quadrant, and 1978, Wolf Lake quadrant). This movement of land from Missouri to Illinois may provide a mechanism for box turtles and other organisms to be transported across the river.

The presence of this additional specimen does not prove that *T. c. triunguis* is now established in Illinois. However, the authors believe that it is likely to become established by natural mechanisms or through human intervention. Additional study of the biology and biogeography of *T. c. triunguis* would prove valuable. The distribution of *T. c. triunguis* in Illinois overlaps that of *T. c. carolina* and *T. ornata*, both of which may possibly interbreed with *T. c. triunguis* (Clark, 1935; Shannon and Smith, 1949; Smith, 1955; Milstead, 1969; Barbour, 1971). This interesting biogeographic arrangement may provide population biologists with an excellent opportunity to examine colonization, gene flow, and the genetic relationships of *Terrapene* in Illinois.

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Figure 1. Locality records for *Terrapene carolina triunguis* in Illinois. **A** = location of specimen reported in this study (Jackson County, 2 km from river). **B** = Gilbert and Gilbert, 1992 (Monroe County, 10 km from Missouri). **C** = Paukstis and Janzen, 1988 (Union County, 4 km from river). **D** = Smith, 1961 (Calhoun County, several meters from river). Note: the specimens reported by Dancik, 1974 and Ludwig et al., 1992, are not considered to be naturally occurring and have not been included on this map.

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