

An extraordinary large prey observed in the diet composition of *Natrix tessellata* (Squamata: Colubridae)

PETR VLČEK¹ & DANIEL JABLONSKI^{2*}

¹Slovanská 5, 736 01 Havřířov-Město, Czech Republic

²Department of Zoology, Comenius University in Bratislava, Mlynská dolina, Ilkovičova 6, 842 15 Bratislava, Slovakia

*Corresponding author Email: daniel.jablonski@balcanica.cz

INTRODUCTION

Dice snakes are a group of semiaquatic snakes that occur in Europe, Asia, and north Africa (Mebert, 2011a). The Dice snake, *Natrix tessellata*, is highly aquatic European species being predominantly piscivorous and diurnal. It employs both sit-and-wait and active foraging for hunting (Luiselli et al., 2007; Capula et al., 2011; Mebert and Trapp, 2011). To a lesser extent, *N. tessellata* is known to feed on amphibians (mainly frogs and their tadpoles), gastropods, insects, reptiles, birds and small mammals (Gruschwitz et al., 1999; Luiselli et al., 2007; Bakiev et al., 2011; Göcmen et al., 2011). Ponc (1978) photographically documented ophiophagy and even cannibalism. The diet composition of *N. tessellata* is thus one of the best documented among snakes of the Western Palearctic (see Gruschwitz et al., 1999; Mebert, 2011a; Šukalo et al., 2014; Weiperth et al., 2014 and references therein). In contrast to diet composition, very little is known about the quality and maximum sizes of food of *N. tessellata*.

METHODS

Field search to record *N. tessellata* was conducted either visually by walking through the Sušanka reservoirs (49.79725°N, 18.43720°E, 252 m a.s.l.; Czech Republic) from end of March to the beginning of October (from 2009 until the present). The locality is visited approximately five times per month each year. The Sušanka reservoir is a system of seven open water ponds which were used for sediment deposit and retreatment of water from the bituminous coal mines. The surface of the study area is circa 22.5 ha (1500×170 m). An estimated number of *N. tessellata* at the locality is >100 individuals. Snakes were measured using a tape measure (0-200 cm) and weighed with a Pesola spring balance (0 to 500 g = 5 g).

RESULTS AND DISCUSSION

During surveying we made three records of extraordinarily large prey of *N. tessellata* (see details in Vlček et al., 2010; 2011). On May 27th, 2016 we found a dead specimen of *N. tessellata* [female, total length (TL) = 101 cm; Fig. 1A] with a dead roach (*Rutilus rutilus*) in its mouth (Fig. 1B). The fish was hooked in the oesophagus of the snake, which

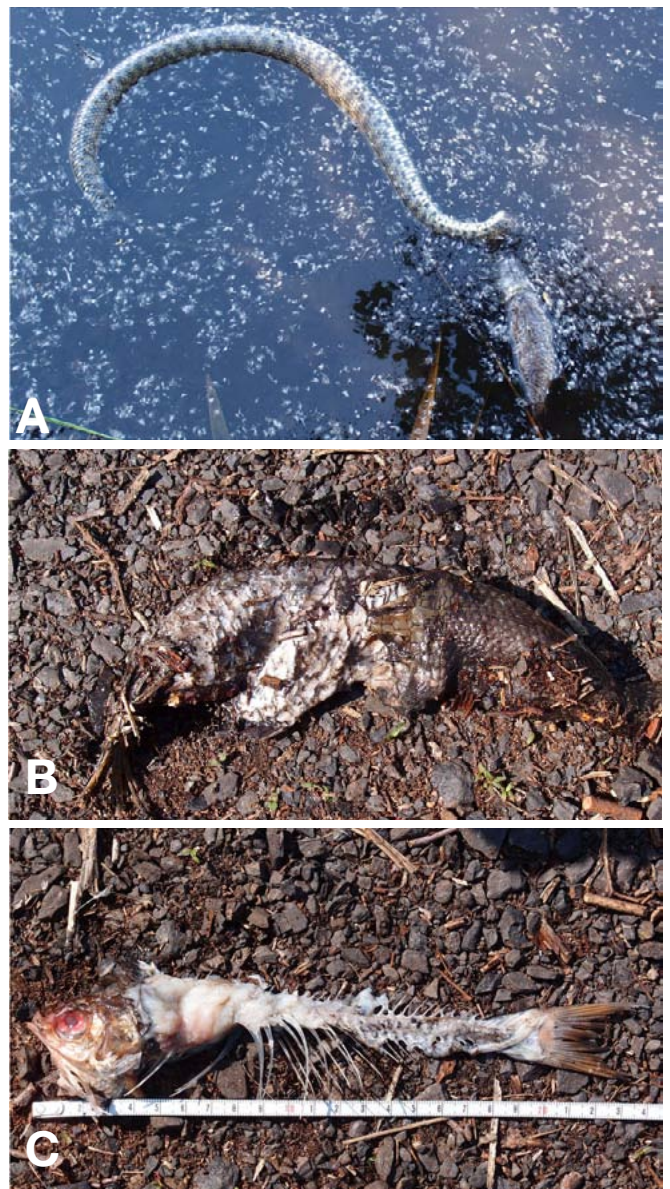


Figure 1. (A) Dead female *Natrix tessellata* with caught *Rutilus rutilus*; (B) prey removed; (C) length of the fish skeleton.

apparently resulted in suffocation. Due to the high degree of decomposition of the fish body, we only measured the skeleton. The length of the fish was 23.5 cm (Fig. 1C). Another large prey was recorded on April 22nd, 2016 when



Figure 2. (A) Female *N. tessellata* feeding on *Carassius auratus*; (B) the size of caught fish; (C) female *N. tessellata* with regurgitated specimens of *R. rutilus*; (D) the size of regurgitated fish.

a ~100 cm long female *N. tessellata* consumed a goldfish (*Carassius auratus*) which was 20 cm long and weighed 117 g (Fig. 2A, B). However, after several minutes, this prey was regurgitated and abandoned. Finally, on May 7th 2015 we observed a female *N. tessellata* with a length of 90.4 cm and a weight of 271 g. This female subsequently regurgitated four specimens of *R. rutilus*. Their total weight was 34 g with individual sizes ranging from 8 to 12 cm (Fig. 2C, D).

Laňka (1978) presented records of an adult specimen TL = 84 cm that consumed a 16 cm long *Rutilus rutilus* and a 17 cm long undetermined species of Pleuronectiformes. Probably the largest sized prey for *N. tessellata* was recorded by Kabisch (1966) with a 95 cm long female having consumed an individual *Gaidropsarus mediterraneus* (a coastal marine ground fish), which was 21.5 cm long and weighed 160 g. The largest prey items recorded by Göcmen et al. (2011) were a pike (*Esox lucius*, approx. TL 230 mm), a lizard (*Lacerta trilineata*, approx. TL 200 mm) and a mouse (*Dryomys nitedula*, approx. TL 320 mm), which were found in three large female *N. tessellata* (TL = 88.70; 85.80; 91.50 mm respectively). An explanation for such extraordinarily large prey is in the larger size of female *N. tessellata*. Females are larger than males and reach adult size at 80-130 cm, whereas males are usually <100 cm (Mebert, 2011b). Hence, females can consume larger prey, which provides more energy especially during vitellogenesis and when they are gravid (Gruschwitz et al.,

1999; Luiselli et al., 2007; Göcmen et al., 2011).

Related observation are rarely published despite their informative value regarding the feeding biology of this species. Mebert & Pölzer (2011) described a case in which the bullhead *Cottus gobio*, a bottom dwelling fish, killed an adult female *N. tessellata* after it locked its jaws around the snout of the snake in some type of defensive reflex. Our observations suggest that (i) female *N. tessellata* could have increased food requirements when gravid, (ii) they are not immune from miscalculating the size and defensive capacity of certain prey with an occasional fatal consequences.

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REFERENCES

- Bakiev, A., Kirillov, A., Mebert, K. (2011). Diet and parasitic helminths of Dice snakes from the Volga Basin, Russia. *Mertensiella* 18: 325-330.
- Capula, M., Filippi, E., Rugiero, L. & Luiselli, L. (2011). Dietary, thermal and reproductive ecology of *Natrix tessellata* in central Italy: A Synthesis. *Mertensiella* 18: 147-153.

- Göçmen, B., Cicek, K., Yildiz, M.Z., Atatur, M.K., Dincaslan, Y.E. & Mebert, K. (2011). A preliminary study on the feeding biology of the dice snake, *Natrix tessellata*, in Turkey. *Mertensiella* 18: 365-369.
- Gruschwitz, M., Lenz, S., Mebert, K. & Laňka, V. (1999). In *Natrix tessellata* (Laurenti, 1768) – Würfel-natter, 581–644. Böhm, W. (Ed.): Handbuch der Reptilien und Amphibien Europas, Vol.3/Schlangen II. AULA Verlag, Wiesbaden, Germany.
- Kabisch, K. (1966). Zur Lebensweise der Würfel-natter, *Natrix tessellata* (Laurenti) in Bulgarien. *Zoologische Abhandlungen Staatliches Museum für Tierkunde Dresden* 28: 273-276.
- Laňka, V. (1978). Variabilität und Biologie der Würfel-natter (*Natrix tessellata*). *Acta Universitatis Carolinae, Biologica* 1975-1976: 167-207.
- Luiselli, L., Capizzi, D., Filippi, E., Anibaldi, C., Rugiero, L. & Capula, M. (2007). Comparative diets of three populations of an aquatic snake (*Natrix tessellata*, Colubridae) from different Mediterranean streams with different hydric regimes. *Copeia* 2007: 426-435.
- Mebert, K. (Ed.) (2011a). *The Dice Snake, Natrix tessellata: Biology, Distribution and Conservation of a Palaearctic Species*. *Mertensiella* 18, DGHT, Rheinbach, Germany. 469 pp
- Mebert, K. (2011b). Sexual dimorphism in the Dice snake (*Natrix tessellata*) from the central Alps. *Mertensiella* 18: 94-100.
- Mebert, K. & Pölzer, W. (2011). Fatal hunting accidents killing dice snakes (*Natrix tessellata*) and bullheads (*Cottus gobio*). *Mertensiella* 18: 448-449.
- Mebert, K. & Trapp, B. (2011). Luring a Dice snake by wave action in the water – a predatory response to a moving aquatic prey? *Mertensiella* 18: 445-446.
- Ponec, J. (1978). Zo života plazov, Bratislava, ČSSR, Příroda. 195 pp.
- Šukalo, G., Đorđević, S., Gvozdenović, S., Simović, A., Anđelković, M., Blagojević, V. & Tomović, L. (2014). Intra- and Inter-population Variability of Food Preferences of two *Natrix* Species on the Balkan Peninsula. *Herpetological Conservation and Biology* 9: 123-136.
- Vlček, P., Najbar, B. & Jablonski, D. (2010). First records of the dice snake (*Natrix tessellata*) from the north-eastern part of the Czech Republic and Poland. *Herpetology Notes* 3: 23-26.
- Vlček, P., Zavadil, V., Jablonski, D. & Mebert, K. (2011). Dice Snake (*Natrix tessellata*) in the Baltic Sea Drainage Basin (Karvinsko District in Silesia, Czech Republic), *Mertensiella* 18: 177-187.
- Weiperth, A., Potyó, I., Puky, M. (2014). Diet composition of the dice snake (*Natrix tessellata* Laurenti, 1768) (Reptilia: Colubridae) in the Danube River catchment area. *Acta Zoologica Bulgarica, Supplementum* 7: 51-46.

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