Another case of dicephalism in *Vipera aspis francisciredi* (LAURENTI, 1768), from northern Italy

Dicephalism (two-headedness) is a congenital malformation with several cases reported in snakes (WALLACH 2007; SAYYED 2015). It is rarely encountered in the wild because of the high mortality rate of the individuals affected, mostly due to feeding complications such as physical impediment in swallowing prey (WALLACH 2007). Indeed, most reported cases of dicephalism refer to juvenile and newly hatched snakes (DE ALBUQUERQUE et al. 2013; PEZDIRC et al. 2013).

In the Palearctic genus *Vipera*, observations of dicephalic specimens are documented in four species: *V. ammodytes* (LINNAEUS, 1758), *V. aspis* (LINNAEUS, 1758), *V. berus* (LINNAEUS, 1758) and *V. ursinii* (BONAPARTE, 1835) (LEIGHTON 1901; PAYEN 1991; NAULLEAU 1997; TÓTH et al. 2005; PEZDIRC et al. 2013), with the greatest number of reports for *V. berus*, likely due to its vast natural distribution range (WALLACH 2007). In Italy, DE BETTA (1865) described a dicephalic juvenile *V. aspis francisciredi* (LAURENTI, 1768), collected on October 26, 1861, near Schio, Province of Vicenza, northern Italy. The same author (1865, 1874) reported another case of dicephalism in an Asp Viper collected by the naturalist Antonio ORSINI, in the mountains near Ascoli Piceno in central Italy, that was described in BONAPARTE (1833). There are no further reports of dicephalism in wild *V. aspis* from Italy.

Here, the authors describe one more case of dicephalic juvenile *V. aspis francisciredi* in northern Italy (Fig. 1). The individual was found and photographed by one of the authors (N. M.) on August 17, 2015, at 5:50 pm along a path in the forest near Pove del Grappa, Province of Vicenza (45°48' 16.6"N 11°43'54.8"E), approximately 350 m a.s.l., about 30 km from Schio, in the same area from where DE BETTA's (1865) dicephalic juvenile *V. aspis francisciredi* originated. The snake was not collected, and the description of its morphology is based on the photographs only. The individual measured 18-20 cm in length, consistent with the size of a hatchling and the typical reproductive ecology of the species in north Italy, with common late-summer births (GENTILLI 2005). The juvenile has

Fig. 1: Two aspects of the juvenile dicephalic *Vipera aspis francisciredi* (LAURENTI, 1768) from Pove del Grappa, northern Italy. Photo: N. Mischischia.

two heads, closely attached to one another in the posterior head and nape region, with a postoccipital transition into a common single neck, body and tail. The outer lateral eyes appear fully developed, whereas the median eyes are not. The upper side of the left head (right head in frontal view) shows a longitudinal indentation, where a molting residue was present. It was unclear whether the viper had a dominant head, as it opened both mouths when stimulated, suggesting that both heads might have been functional. The viper had no apparent problems of locomotion but the neck presented a permanent pronounced flexure to the left side.

Numerous are the factors that promote axial bifurcation in which incomplete longitudinal division of a single embryo seems to be the most frequent process leading to the existence of prodichotomous snakes (reviewed in Wallach 2007). A documented cause is suboptimal temperature during incubation or gestation (Bakken & Bakken 1987; Andrade & Abe 1993). This is particularly relevant to *V. aspis* as the embryos are extremely susceptible to low temperatures in the gestation period (Lourdais et al. 2004). However, one cannot exclude the possibility that inbreeding, due to contraction of natural populations and habitat reduction and fragmentation (Gentilli & Scali 1999) or environmental pollution in the area (Nimis et al. 2002), might be responsible for axial bifurcation in the viper observed. It is interesting that two out of a total of three cases of axial bifurcation in *V. aspis* reported in the literature were noted in the same area (De Betta 1865; this observation). It would be of interest to study the occurrence of axial bifurcation of *V. aspis* particularly in this area and determine the possible causes of these abnormalities.

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