# Conspicuous tail coloration in *Vipera berus*

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CAUDAL luring is a strategy used by snakes to entice potential prey through the movement of the distal portion of the tail (Parellada & Santos, 2002), which is often conspicuously coloured (Neill, 1960), resembling a vermiform invertebrate (Tiebout, 1997). Such behaviour is thought to be advantageous, in that it allows the snake to capture prey yet maintain the cryptic effect brought about by its pattern, coloration and relative immobility (Greene & Campbell, 1972).

Caudal luring is prevalent mostly in juvenile specimens (Neill, 1960) but also occurs in adult snakes (Greene & Campbell, 1972; Heatwole & Davison, 1976). It has been reported in many families, including Viperidae (Neill, 1960; Wharton, 1960; Greene & Campbell, 1972), Elapidae (Carpenter et al., 1978), Boidae (Mahendra, 1931; Murphy et al., 1978) and Colubridae (Tiebout, 1997). In the Viperidae caudal luring has been noted predominantly in the genus *Bothrops* (Greene & Campbell, 1972; Heatwole & Davison, 1976; Murphy & Mitchell, 1984), and *Agkistrodon* (Neill, 1960), with records also occurring in the genera *Cerastes* (Heatwole & Davison, 1976) and *Sistrurus* (Jackson & Martin, 1991).

Reports of caudal luring in the European genus *Vipera* are scarce (Parellada & Santos, 2002) although it has been observed in adults in Italian populations of *Vipera aspis* and *Vipera ammodytes* (Luiselli et al., unpublished data cited in Parellada & Santos, 2002). Further, more recent studies have reported observations of caudal luring in adult male and female *Vipera latasti* (Parellada & Santos, 2002). As far as the author is aware, caudal luring behaviour has not been recorded in the European Adder *Vipera berus*.

Many species of the genus *Vipera* have conspicuously coloured tails, including *V. berus*, *Vipera seoanei*, and *V. ammodytes* (Saint Girons, 1978), which has been suggested to be associated with caudal luring (Neill, 1960). During March, April and May of 2008 a large proportion of *V. berus* captured by the author in the Mendip Hills, Somerset exhibited a yellow or orange coloration to the underside of the distal portion of the tail. In most species, tails conspicuously marked in juveniles gradually become similarly coloured to the rest of the body before adulthood (Heatwole & Davison, 1976). Luring behaviour may cease in adulthood due to shifts in diet (Neill, 1960). In this instance conspicuous tail coloration was found in juvenile and adult female specimens (Fig. 1) although not in males. Yellow and green undersides to the tail have also been observed in neonate and immature Adders in Dorset, Surrey and Hampshire (T. Phelps, pers. comm.).

Some studies note that snakes that utilise caudal luring feed mostly on insectivorous foragers, such as lizards and frogs (Heatwole & Davison, 1976; Parellada & Santos, 2002) both of which occur within the diet of the Adder (Prestt, 1971; Andren & Nilson, 1983; Beebee & Griffiths, 2000). Thus caudal luring in the Adder should not be discounted. There may, nevertheless, be alternative functions associated with conspicuous tail coloration. Greene (1973) noted that tail displays can function defensively, either as a warning signal or to distract predators away from the head. Immature Adders have been observed with the distal portion of the tail raised from the ground and held in a horizontal plane, but no tail waving has been seen (T. Phelps, pers. comm.). The author suggests that studies on behaviour should focus on the feeding behaviour of neonates and immature specimens during the summer months following the dispersal of individuals from breeding sites. Due to the difficulty of observing behaviour in the field, observations from captive collections may also be useful.

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**Figure 1.** Conspicuous orange coloration of the distal portion of the tail in two adult female Adders.

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