

Scarfig - a novel agonistic behaviour between a copulating and a competing male northern viper *Vipera berus*

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In the Spring of 2021, I was asked to help film the northern viper *Vipera berus* for a new wildlife series, Wild Isles. This highlights the natural history and habitats of the British Isles and was released in March 2023 by the British Broadcasting Corporation (BBC). Over the first two weeks of April, we captured on film the spring emergence, basking, sloughing, courtship, wrestling and breeding of vipers, but what made the trip unique was a behaviour between adult males that I have never observed before; ‘scarfig’ - not an official technical term, but rather the best description given by those who observed it.

Filming took place in northern England at a wild location chosen for its vastness, a glaciated upland valley of grassland, heather, bilberry and bracken and, most importantly, supporting a scattered, robust population of vipers. To capture numerous snake interactions and breeding behaviours meant travelling to a wild landscape location, perhaps a sad reflection on how fragmented a once widespread British snake species has become, certainly in the counties of lowland central and southern England, where many populations of vipers are now in small populations on sites under growing anthropogenic pressures (Gardner et al., 2019). In such places the chances of capturing widespread natural interactions is difficult and fraught with disturbance issues.

From the first day of arrival on site, 1 April, male sloughing, courtship and male combat were in full swing, earlier than reported at many other sites in England that year. This was happening despite overnight freezing temperatures, sleet, snow and rain. During the day, heather moorland on nearby hillsides was being burnt as part of moorland management but also to improve the habitat for game birds, particularly the red grouse *Lagopus lagopus* and common pheasant *Phasianus colchicus*. This burning was being undertaken whilst snakes over this landscape were emerging and attempting to breed.

The viper group on which we focused occupied a steep, rock strewn river valley, a less favourable area for moorland burning. Despite this it was still noted that some of the adult snakes had what appeared to be old burn scars and healed possible peck wounds from birds. Over 50 individual vipers were seen throughout the valley over two weeks filming, suggesting a robust, widely scattered population, possibly even benefitting from widescale control of local predators. Shooting estate moors have a reputation for low



Figure 1. A copulating male with neck encircled by the tail of a male interloper. This ‘scarfig’ could go on from a few seconds up to 4 minutes. The scarfig male would lose its grip and then re-assert its hold again. The scarfig male did not have its hemipenes everted during these interactions.

tolerance towards game bird predators, these include birds, especially corvids, mammals, such as mustelids and foxes, all of which are also viper predators. However, any benefit to vipers is likely offset by both widescale annual moorland burning and pheasant releases which can result in damage to the populations of both vipers and other reptile species (Graitson et al., 2022), in this case viviparous lizards *Zootoca vivipara* and slowworms *Anguis fragilis*; viviparous lizard are considered an important prey species for juvenile vipers.

Scarfig

For the first time, I witnessed courtship groups of male and female vipers where an interloper male intruded on a mating pair and wrapped his tail tightly, almost constrictor like, around the neck and head area of a copulating male (Figs. 1 & 2). The hold was positioned just behind the head and occasionally a little further down the body, but the head and neck area were the main focus. This unusual behaviour was given the name ‘scarfig’ due to its focus on the neck area. A second male, identified by its markings and scars, was observed scarfig in a separate courtship group (Fig. 3). Scarfig continued for just a few seconds up to 4 minutes until the copulating male could pull his head out from the hold after which the interloper again encircled the neck and head area; this happened over the 30–40 minutes that the snakes were mating.



Figure 2. The same pair of male snakes as in Figure 1 with interloper laid across the back of the copulating male and encircling tightly the other male's head and neck



Figure 3. Scarfing between a further pair of males at a different area of the site from that shown in Figures 1 & 2

Adult male vipers engage in vigorous combat bouts during the mating season, with larger males driving smaller individuals away from receptive females (Andr n et al., 1986; Madsen et al., 1988). A dominant and possibly larger snake usually pushes off a competitor, engaging in multiple combats, and then mates with the female. This is different from scarfing, which did not involve males in active combat and occurred when one of the males (the scarfed male) was already mating with a female.

So is scarfing a deliberate attempt to disrupt or dislodge the copulating male or simply an aspect of frenetic, confused courtship behaviour? At first I thought that the interloper male had confused the head of the copulating male with the female's tail and was trying to locate the female cloaca. However, the behaviour was repeated many times and would appear to involve deliberate encircling and gripping with the tail rather than attempts to frantically locate the cloaca with his tail. Hemipenes were never seen everted by the interloper males so it seems unlikely that the interloper males had confused the sexes. The behaviour appeared too deliberate and prolonged to be frantic confusion, but rather

an attempt to restrain the neck area of the male in coitus, perhaps to irritate, disrupt, even force the connected male snake to disengage from the female.

It is a puzzle that scarfing has remained undescribed for so long despite the fact that *V. berus* is one of the most intensively studied snake species. The behaviour may perhaps be rare and/or confined to certain populations. Its late description brings to mind the observation of death feigning (thanatosis) in northern vipers which was first described in only 2013 (Hodges, 2013). In that case, it was suggested that the rarity was due to it being a behaviour of last resort, perhaps that is also true of scarfing. Let's hope there are still more rare viper behaviours for the enthusiast to record.

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