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SHORT COMMUNICATION

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# Mass bathing in the slow worm *Anguis fragilis*

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There are few published accounts of slow worms *Anguis fragilis* swimming or bathing, and where there are reports they describe only single individuals in water. On 7 July 1967, one adult *A. fragilis* in Germany was described by Dathe (1971) swimming in a channel 10 m wide and 1 m deep. The water temperature was about 18 °C. Petzold (1971) writes that slow worms do not voluntary move into water, but if threatened they may swim well, with the head above water. Poivre (1980) reports that the slow worms bathe voluntarily and swim very well, but drown if they do not get to dry land fast enough; he doubts that they swim voluntarily. Gollman & Gollman (2008) reported an unusual diving behaviour of one juvenile slow worm in a puddle near Vienna, Austria, on a sunny day, 27 April 2008. They suggested that *A. fragilis* may dive into richly structured water bodies for both escape and foraging. Eggert (2016) observed a male slow worm swimming in a large pond in the evening of 10 May 2012, and he could not see any reason to believe that it was forced into the water. Badziukiewicz (2021) writes that slow worms can swim perfectly, however this is not normally mentioned in reptile field guide books (for example: Fog et al., 1997; Arnold & Ovenden, 2002; Speybroeck et al., 2016), though it is mentioned that the species is often found in damp or moist areas. However, on the internet there are a few photos and videos on YouTube that show slow worms bathing and swimming, and there is even a photo that documents a foraging slow worm swimming in water in Britain at the end of June 2019 (RSPB Wildlife, 2021). From these various reports of swimming slow worms, we may conclude that *A. fragilis* may forage in water.

However, these earlier observations show only one individual at a time, and the purpose might be foraging. Here we report mass bathing by up to 12 female slow worms *A. fragilis* together, and their purpose did not seem to be foraging. We also report repeated observations of mass bathing slow worms on three different dates at six sites. All the observations are made in the same area, at the centre of the island Karmøy, north of Stavanger city, on the south-western coast of Norway (Fig. 1). Karmøy is a relatively flat island of 177 km$^2$, the highest point is 132 m a.s.l., the open landscape consisting of rocks, swamps, heather, lakes and pastures. Climate is mild and moist, with most rain in October and the least in May, however the spring and summer of 2022 was warm and dry. On 18 August 2022 the second author went for a walk at Revsåna where he discovered two small, shallow puddles close together, with a total of 12 slow worms

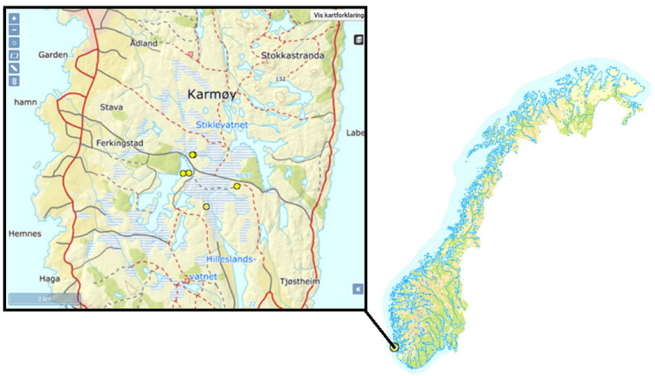


**Figure 1**. Map of Norway and Karmøy island on the south-western coast. The six locations with bathing slow worms *Anguis fragilis* are indicated with yellow dots. Two dots nearly overlap. The map is made in Artsobservasjoner.no.

**Figure 2**. Mass bathing by six female slow worms *Anguis fragilis* in a shallow puddle at Karmøy, Norway, 18 August 2022. There were 12 slow worms in two nearby puddles on that day.

in the water (59° 12'58.1978" N, 5° 14'57.6926" E, Fig. 2). This was first time the author observed such an aggregation of slow worms, and the first time to find slow worms in water (YouTube, 2022). These small, shallow puddles were about 10 cm deep with an area of 2 m$^2$. They were laying still in the water with the head above water, or swimming slowly around before laying still again. The author did not observe

**Figure 3**. Three female slow worms *Anguis fragilis* bathing together in a shallow puddle at Karmøy, Norway, 20 August 2022

**Figure 4**. Three female slow worms *Anguis fragilis* in a shallow puddle at Karmøy, Norway, 26 August 2022

any behaviour that could seem like foraging or diving, nor did the slow worms appear to be escaping from a predator. They were relaxed and enjoying a bath.

Two days later, on 20 August the second author went for another walk 1 km further south, on the southern shore of the lake Sandvatn (59° 12'40.6775'' N, 5° 14'51.6647'' E) where he found several bathing slow worms. A new location along Burmavegen the same day was also found, where several slow worms were bathing inside three small puddles (59° 12'28.5653'' N, 5° 16'20.1437'' E, Fig. 3 & YouTube, 2022). Their behaviour was similar, they were laying still in the water with heads up, seemingly enjoying their bath. This made the second author curious to see if the slow worms were still present in the first puddles at Revsåna observed two days earlier, and a further visit to that site showed seven slow worms in the two puddles, still relaxing in the water with heads up.

On 26 August the second author went for a walk to a new area at Karmøy, where he discovered a small puddle with three slow worms bathing (59° 12'09.2999'' N, 5° 15'23.6778'' E, Fig. 4). He also returned to Sandvatn and found a new puddle where four slow worms were bathing (59° 12'40.5327'' N, 5° 14'41.0577'' E).

In total, six localities were found with shallow puddles with several bathing slow worms in each, on 18, 20 and 26 August 2022. Apart from these summer time observations, there was a single slow worm observed in a puddle much earlier in the year, on the 19 March 2022 (59° 12'8.2577'' N, 5° 14'59.7690'' E).

Why were the slow worms bathing en mass in August? It appeared that all the slow worms were adult females with dark sides, a thin dark stripe on their backs and small heads (Smith, 1990). Also, their thickened bodies imply that they were gravid. In Norway, slow worms are known to give birth in August–September (Fog et al., 1997; pers.obs.) which means that the bathing females at Karmøy during the period of observation of 18 to 26 August were probably soon to give birth. Although slow worms are active at a range of body temperatures from 10 °C to nearly 40 °C (Fog et al., 1997) the optimal body temperature for slow worms, at least in France, is 28 °C (Poivre, 1980). However, it is not uncommon for gravid female reptiles to maintain higher body temperatures (Capula & Luiselli, 1993; Poivre, 1980; Fog et al., 1997), otherwise prolonged gestation periods would result in gravid females hibernating and giving birth the following year (Fog et al., 1997). In an alpine population of *A. fragilis* the mean body temperature of gravid slow worms was 27.0 °C compared to 25.2 °C in non-gravid females (Capula & Luiselli, 1993). August 2022 at Karmøy was mostly warm and dry except a few cold nights, and the vegetation was dry as there had been little rain from May to August. The temperature in the shallow puddles was not measured, but it is realistic to expect the water to have been nice and warm since it was only 10 cm deep and the surrounding open terrain was not shaded by trees. If the water in the puddles was warmer than the surroundings then the simplest explanation for this behaviour is that the gravid slow worms were bathing to raise their body temperature so increasing the rate of embryo development and shortening their pregnancy. This behaviour appeared to make the females very visible to predators on land and in the air, which is contrary to the usually very secretive behaviour of slow worms. The advantages of maintaining a higher body temperature would appear to outweigh the increased risk of predation (Capula & Luiselli, 1993). It will be interesting to see if mass bathing by slow worms at Karmøy will be observed in future years, if so then it may be possible to make some associations with prevailing climatic conditions.

## REFERENCES

Arnold, E.N. & Ovenden, D. (2002): *A field guide to the amphibians and reptiles of Britain and Europe*. London, Collins. HarperCollins Publisher. 288 pp.

Badziukiewicz, J. (2021). The proposal of monitoring of slow-worm *Anguis fragilis* L. and eastern slow-worm *Anguis colchica* (Nordmann, 1840) in Poland. *Folia Pomeranae Universitatis Technologiae Stetinensis, seria Agricultura,*

*Alimentaria, Piscaria et Zootechnica* 360(59)3: 19–30. Doi: 10.21005/AAPZ2021.59.3.02.

Capula, M. & Luiselli, L. (1993). Ecology of an alpine population of the Slow Worm, *Anguis fragilis* LINNAEUS, 1758. Thermal biology of reproduction. *Herpetozoa* 6 (1/2): 57–63.

Dathe, H. (1971). ZumSchwimmen der Blindschleiche, *Anguis fragilis*. *Aquarien-Terrarien* 18: 65.

Eggert, C. (2016). Observation d'un Orvet fragile *Anguis fragilis* Linnaeus, 1758 (Reptilia: Anguidae) nageant et grimpant à des branches. *Bulletin de la Societe Herpetologique de France* 158: 47–49.

Fog, K., Schmedes, A. & Rosenørn de Lasson, D. (1997). Stålorm. In *Nordens padder og krybdyr*. Gads Forlag. 290–297.

Gollmann G. & Gollmann B. (2008) – Diving in the lizards *Anguis fragilis* and *Lacerta agilis*. *North-Western Journal of Zoology* 4(2): 324–326.

Luiselli, L. (1992). The diet of the Slow Worm, *Anguis* f. *fragilis* Linnaeus, 1758,in the Tarvisio Forest (Carnic Alps, NE Italy) (Squamata: Sauria: Anguidae). *Herpetozoa* 5(3/4): 91–94.

Petzold, H.G. (1971). Blindschleiche und Scheltopusik. *Neue Brehm Bucherei* n°448, A. Ziemsen Verlag, Wittenberg Lutherstadt. 102 pp.

Poivre, C. (1980). Élevage et reproduction de l'Orvet. *Bulletin de la Societe Herpetologique de France*, 14: 7-21.

RSPB Wildlife (2021). Slow worm behaviour. https://community.rspb.org.uk/wildlife/f/all-creatures/205330/slow-worm-behaviour. Accessed March 2023.

Smith, N. (1990) The ecology of the slow-worm (*Anguis fragilis* L.) in southern England. PhD thesis. Dept. of Biology. University of Southampton, Southampton, UK. 229 pp.

Speybroeck, J., Beukema, W., Bok, B. & Van der Voort, V. (2016). *Field Guide to the Amphibians & Reptiles of Britain and Europe*. British Wildlife Field Guides. Bloomsbury. 432 pp.

YouTube (2022). Slow worm bathing behaviour. Filmed by Geir Inge Høines. https://www.youtube.com/watch?v=IUfUW2mwyBk).

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