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An occurrence of albino common frog (*Rana temporaria*) spawn at Pollok Country Park, Glasgow

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On the afternoon of 25th March 2018, whilst undertaking regular surveys of common frog (*Rana temporaria*) spawning grounds for the presence and number of spawn clumps, I discovered an unusual clump of spawn wherein the embryos were bright white (Fig. 1). Forty-two other clumps of spawn were present at the pond located within Pollok Country Park at NS 55268 62232, of which no others appeared different from typical spawn clumps. White embryos can be the result of two phenomena - infertility (Froglife, 2018) or albinism (Smallcombe, 1949).



Fig. 1. Amelanistic common frog (*Rana temporaria*) spawn clump *in situ* beside normally coloured frog spawn clumps at a Pollok Park, Glasgow pond on 25th March 2018. (Photo: E. Paterson)

A small sample of white eggs (*ca.* 100) was removed and maintained to ascertain the nature of the colour abnormality, the remainder of the eggs being left *in situ*.

The spawn was placed in a 10 litre plastic fish tank, in water that was collected both from the natal site and from a pond in East Kilbride, with a few strands of *Elodea* sp. algae, some *Lymnaea* sp. snails, and *Daphnia* sp. water fleas. The tank was located on a domestic windowsill and was subjected to direct sunlight. After the larvae developed and lost their gills, supplemental food was provided in the form of boiled cabbage and the algae growing in the water.

Eight days after collection, the eggs had developed to the “neural fold” or “rotation”, Gosner stages 14 and 15 (Gosner, 1960; Fig. 2). The larvae hatched and developed as expected. By the 19th day, the tadpoles had reached Gosner stage 23, were approximately 15 mm in length, and had begun to develop a darkened colouration (Fig. 3).

On the 29th day, all the larvae died for reasons unknown. However, with unusually warm weather the temperature of the tank water may have exceeded the critical thermal maximum for common frog larvae (Turriago *et al.*, 2015) owing to the small container size in which they were maintained being placed in direct sunlight. This unfortunate loss meant that the development of the larvae could not be observed through to metamorphosis.

The appearance of darkened colouration during the development of amelanistic tadpoles has been noted by other authors (Cahn, 1925; Smallcombe, 1949). This may result from the body wall of the larvae being transparent, and the darkened colouration being an attribute of the developing organs. This suggestion is supported by the observation that the tail of the tadpoles remained transparent. However, it has been noted that albinism in anuran larvae is a maternal defect, and that as the larvae grow their individual genetic material begins to develop chromatophores within the skin resulting in typical colouration through metamorphosis (Cahn, 1925; Smallcombe, 1949).

Albino or unusually coloured frogs are uncommon and are rarely reported. Mendel (1990) provides a useful review of records of albino frogs in England. More recently, albino spawn has been noted in Carmarthenshire, Wales (BBC, 2008) and a xanthochromic adult has been recorded in Cambridge, England (Allain & Goodman, 2017). However, this Scottish observation warrants note and further exploration in successive years as the presence, and persistence, of amelanistic animals, which often have a recessive mutation (Smallcombe, 1949), could be the result of a small gene pool and inbreeding which can cause population decline or eventual loss (Charlesworth & Charlesworth, 1987).

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Fig. 2. The amelanistic common frog (*Rana temporaria*) spawn maintained at the author's home eight days after removal from the wild, when they had reached Gosner stages 14 and 15, showing the "neural fold" or "rotation". (Photo: E. Paterson)



Fig. 3. The amelanistic common frog (*Rana temporaria*) larvae had become darker in colour by day 19 when they had reached Gosner stage 23. (Photo: E. Paterson)

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