THE COMMON FROG *(Rana temporaria)* AND ITS BREEDING STATUS IN WYRE

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Common Frog (*Rana temporaria*) in garden pond Willow Bank, 16 June 2003

Male Common Frog (*Rana temporaria*) at spawning site, Discovery Centre 1 pond, April 1995

Introduction

The Common Frog is our commonest British amphibian. Most people would be able to identify the adult, but they may not appreciate the finer details of its fascinating life history. If one is prepared to make regular visits to a pond at night with a torch, especially in the breeding season, frogs can be observed, individuals identified and behaviour recorded. Consideration of environmental conditions of the site will provide an even broader picture.

A Common Frog could be mistaken for a Common Toad (*Bufo bufo*) at first glance, but there are several differences. A frog hops and can move quickly if disturbed. A toad only walks and tends to be fairly sluggish. A toad has dry, warty skin and glands behind the eyes that can give off a noxious liquid to deter predators. A frog's skin is smoother, there is no parotid gland and its skin is kept moist by mucous glands. The frog has a dark brown temporal mark behind each eye, some dark banding on its rear legs and two narrow longitudinal ridges of skin along its back (see photo).

Males and female frogs can be distinguished from each other on close examination. The females tend to be bigger, and in the breeding season they develop pearly granulations on their back, thighs and sides. It is this that enables the males to find them by touch in a murky pond. The males have swellings called nuptial protuberances on the 'thumbs' of their front feet, and these lumps darken in the breeding season. The throats of the males are bluey-white in the spring (see male frog with spawn in photo). Only the males croak (which sounds like 'grook, grook, grook'), although females may grunt when receiving unwelcome attention from a male. All Common Frogs can subtly change their colour according to their surroundings by contracting or spreading dark pigment cells beneath the outer skin. They also moult their skin regularly throughout their life in order to grow. Generally they eat the shed skin, but it is sometimes seen floating on the top of the pool (see photos).

Frog skin floating on pond, showing close-up of top of head with 'eyes', Willow Bank garden pool, Summer 2002

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Some frogs hibernate in their breeding pond and these are generally males, presumably so that they can attract the females to the breeding site. Frogs can absorb oxygen through their skin and so they do not need to surface to breathe when their metabolism is slowed. (Unfortunately their skin can also absorb certain toxins, so they are vulnerable to water pollution). Most females are said to hibernate away from water, under decaying vegetation, rocks, logpiles or in damp soil. Frogs do not usually breed until their third year and there are often sub-adult youngsters present at breeding sites. Common Frogs have been recorded living 8 years in the wild, and 12 years in captivity. In common with other cold-blooded animals, they will continue to increase their size and body weight throughout their life.

Breeding

When the external temperature reaches about 4ºC the frogs come out of hibernation and, if dispersed, gradually make their way to the spawning pools. Research has shown that they might travel up to 2 miles, sometimes passing other seemingly suitable ponds to reach their spawning pool. Although it is noted that frogs generally return to the pond where they developed as tadpoles, new water is sometimes colonised, and regular pools abandoned. Frogs seem to prefer pools that have water flowing in and out. Fascinating research has shown that frogs are attracted by the smell of glycollic acid that is produced by certain forms of algae (*Chlamydomonas pulsatilla* and a species of *Scenedesmus* in a study by Savage). This can be detected even when it is diluted to 1 part to 80 million! The frog tadpoles will feed on this algae when they emerge from the spawn.

A visit to the pond on a warm January night might result in the sight of frogs that have stirred from hibernation, down at the bottom of the pond. Frogs do not need to eat in the breeding season. Cold-blooded animals obtain their body heat from the environment and not from food as a warm-blooded creature would.

The start of the breeding season is influenced by several environmental conditions. Temperature, increasing day length, the amount of rainfall the previous month and altitude might all influence when the spawn is laid. In general, it has been found that the date of the first spawn is earlier at higher altitudes between 100 and 250 m above sea level, presumably because of frost. Spawning in deeper water is often later than that in shallow water nearby, and this may relate to the water temperature.

Males can be seen at the surface on a mild night in February and on suitable nights they start to croak to attract the females. The sound can be heard up to 50m. Once spawning starts there are often a few days of breeding frenzy, usually coinciding with warm wet weather. This might last 2 or 3 days in a small colony, and up to 10 days for larger ones. During this time the males may sometimes be heard croaking in the daytime, especially in the rain. (They can even croak underwater!) The males stick their heads out of the pool and their white throats are conspicuous in the dark. This might act as a visible signal to the approaching females.

When the females arrive (and they may be spotted some distance away, making their way to the pond), the males are waiting to pair up with the females in the position of amplexus, The male climbs onto her back and grips her underside with the special pads on his forelegs. The pair may remain in this position for several minutes or several days before spawning occurs. The male releases his semen onto the spawn as it emerges from the female. In a large colony females are occasionally drowned by the attentions of several males at once keeping her under the water.

The first spawn can stimulate much excitement and seems to trigger other females to spawn in the same place. It is noted that all the spawn tends to be just in one area of the pond and often this is the same area from year to year. It is usually recorded in water between 10 and 20cms deep, although can be found up to 60cms down. When it is first laid it is in a tight ball, but over the next few hours the jelly absorbs water and swells. The number of eggs per clump are said to range between 300 and 400, although some authors indicate much higher numbers. The development of the black embryos depends on environmental conditions and spawn is able to survive freezing conditions. The tadpoles usually emerge from the jelly anytime between 10 and 40 days after spawning. When the contents of the egg sac have been absorbed, the small tadpoles start feeding on algae. The tadpoles soon become a speckled brown colour, unlike toad tadpoles that remain black. As they grow and develop they will gradually take more animal food starting with tiny Protozoans, until, by the time they are ready to leave the pond, they have become carnivorous. There are many predators that will eat spawn and tadpoles including birds, mammals, reptiles and other amphibians.

The jelly soon dissolves after the tadpoles have emerged. The tadpoles usually metamorphose during a minimum of 10 weeks, leaving the pond at the end of May or beginning of June. If the food resources are low in a pool, the tadpoles may even overwinter.

When spawning is over, the females leave the pool and the males stay on to await more females. Feeding is always on land, the frog using its long tongue to capture invertebrates such as, woodlice, spiders, snails and earthworms. Studies have shown that they can locate earthworms by scent.

Common Frog numbers are showing a gradual decline in Britain, especially as a result of destruction of habitat, pollution and disease. It has

been noted that female frogs do not breed every year, and it might be as low as once every 4 years. Several diseases have killed large numbers of frogs in Britain recently, and it is now inadvisable to move spawn from pool to pool because of the risk of infecting healthy populations.

Frogspawn counts in Wyre

Mike Taylor started to record frogspawn numbers in several pools in Wyre in 1988, and from 1990 he kept annual records. When Mike moved from Wyre in 1999, Sylvia Sheldon, Phil Rudlin and Rosemary Winnall continued the study. Records for some of these pools now go back 15 years, and constitute important long-term data about the breeding of Common Frogs (*Rana temporaria*) in the Wyre area, (see charts below and over).