



# Wyre Forest Study Group

## WYRE FOREST ADDER CENSUS AND REPORT 1999 and ADDER POPULATION TRENDS THROUGH THE 1990s - CORRELATED WITH METEOROLOGICAL DATA

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### Introduction

The correlation between weather and reptile behaviour continues to interest and intrigue the herpetologist. Climatological records have been taken at Knowles Mill since 1982, and since 1991 have been sent to Birmingham University for inclusion in the monthly summary for the West Midlands region.

Reptile observations have been ongoing since 1978 in several sites within the vicinity of Knowles Mill. During the 1980's, concerted efforts were made to locate as many sites as possible in Wyre Forest. In 1988, 54 sites were surveyed, 39 were found to support Adders, giving a total of 208 mature individuals, with 142 males and 66 females. During the 1990's the discovery of additional sites has been accompanied by the loss of some of the original ones. In 1999, 67 sites were surveyed with only 35 supporting Adders, giving a total of 120 mature individuals, some 100 males and 20 females. Graph 1 illustrates the decline in Adder population during the 1990's and also shows the estimated numbers, to account for non-breeding females not seen outside of their breeding years.

### Review of Adder Behaviour and Weather Conditions - 1999

**January** was a very wet month with 120.5mm of rain and only 5 completely dry days. The month saw variable weather alternating between mild wet spells, cold frosty nights and several foggy mornings. The warmest day was the 5<sup>th</sup> with cloud drizzle and wind, reaching a temperature of 13<sup>o</sup>C. There were 15 air and 22 ground frosts. The coldest night was the 10<sup>th</sup> with a ground frost of -9.5<sup>o</sup>C.

Mean monthly maximum = 7.0<sup>o</sup>C

Mean monthly minimum = 0.4<sup>o</sup>C

**February** was much drier with 46.4mm of rain and snow. There were flurries of snow on the 7<sup>th</sup> which continued until the 10<sup>th</sup> with cold winds and frosty nights. The first male Adders were tempted above ground by the mid-day sun after the 16<sup>th</sup> dawned clear, cold and frosty. There was a keen wind, and the temperatures reached 8.0<sup>o</sup>C (air) and 9<sup>o</sup>C (ground). On the 17<sup>th</sup> frogspawn was reported in a garden pond near Bewdley. During the last two weeks of the month other Adders were seen in several sites during any warm, sunny spells. The warmest day was the 19<sup>th</sup> when a temperature of 14.0<sup>o</sup>C was recorded. There were 16 air and 19 ground frosts.

Mean monthly maximum = 7.4<sup>o</sup>C

Mean monthly minimum = 0.2<sup>o</sup>C

First Adder seen: 16<sup>th</sup> First frogspawn seen: 17<sup>th</sup>

**March** began with 12 days of cloud, showers and more persistent rain, but there were a few hours of brightness with sunny spells on the 9<sup>th</sup> when 4 sites were visited and 5 male Adders seen. From the 13<sup>th</sup> the weather improved, allowing surveys to be carried out on most days to the end of the month. A lizard and slow-worms were seen on the 15<sup>th</sup>, a toad on the 16<sup>th</sup>, and grass snakes on the 17<sup>th</sup>, which was the warmest day of the month with an air temperature of 17.0<sup>o</sup>C (29.0<sup>o</sup>C on the ground). A juvenile Adder was seen on the 24<sup>th</sup>. 35 sites were visited during the month, giving a total of 68 mature Adders in Wyre, plus 19 in other sites in Worcestershire. There were 11 air and 16 ground frosts, and 58.5mm of rain.

Mean monthly maximum = 10.2<sup>o</sup>C

Mean monthly minimum = 6.1<sup>o</sup>C

First Common Lizard, Slow Worm seen: 15<sup>th</sup>

First Common Toad 16<sup>th</sup>, Grass Snake seen: 17<sup>th</sup>

**April** was a mild wet month with 91.1mm rain and only 7 full dry days, but surveys were possible on 23 days, taking advantage of any fine spells. Tadpoles were seen in a forest pond on the 7<sup>th</sup>. The first male Adder sloughed skin was found on the 16<sup>th</sup>, other males sloughed over the following 11 days. Courtship and copulation were seen on the 22<sup>nd</sup>. By the end of the month a total of 67 sites had been surveyed in Wyre through March and April. Adders were found in only 35 of these, with a total of 107 mature individuals. Another 8 sites were covered in and on the boundaries of Worcestershire, these contained a further 29 Adders. The highest daily temperature of 18.7<sup>o</sup>C was recorded on the 1<sup>st</sup>; the coldest night was on the 7<sup>th</sup> at -7.0<sup>o</sup>C. In total there were 5 air and 10 ground frosts.

Mean monthly maximum = 13.5<sup>o</sup>C

Mean monthly minimum = 3.7<sup>o</sup>C

First Adder slough: 16<sup>th</sup>. First courtship: 22<sup>nd</sup>,  
First Frog tadpoles 7<sup>th</sup>

**May** began with several days of warm weather. Courtship and copulation continued to be recorded until the 4<sup>th</sup>. Females were seen alone after that date. The weather deteriorated on the 5<sup>th</sup> with 10 days of cloud and rain, followed by a more changeable spell which lasted for the rest of the month. There were thunderstorms on the 19<sup>th</sup>, 27<sup>th</sup> and 29<sup>th</sup> contributing significantly to the total rainfall of 68.5mm. The wet, warm weather accelerated the growth of summer vegetation, making Adder surveying very difficult. No night frosts were recorded, the warmest day being the 27<sup>th</sup>, when the air temperature reached 22.8<sup>o</sup>C.

Mean monthly maximum = 17.0<sup>o</sup>C

Mean monthly minimum = 7.3<sup>o</sup>C

Last courtship: 4<sup>th</sup>

**June** was wet and unsettled, with rain on 18 days leading to a total fall of 66.7mm. However there



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were 14 days with more than 5 hours of sunshine. Local sites were visited during suitable spells of weather. Grass snakes and juvenile Adders were glimpsed in the undergrowth, but the mature Adders could not generally be found, having moved away to feed. One individual who ought to have remained locatable was a 14 year old female, seen to breed in April, but she disappeared and was not seen again. The warmest day was on the 26<sup>th</sup>, with an air temperature of 24.5<sup>o</sup>C. There were two cold nights on the 8<sup>th</sup> and 9<sup>th</sup>, when the air temperature fell to 1.0<sup>o</sup>C and 0.6<sup>o</sup>C respectively.

Mean monthly maximum = 18.1<sup>o</sup>C

Mean monthly minimum = 6.9<sup>o</sup>C

**July** was the driest month of the year with only 27.6mm of rain. Three-quarters of this (20.8mm) fell during the first 5 days; but the weather then improved, making the last two weeks of July the only period of settled weather that could be said to constitute a British Summer. The warmest day was the last of the month, an air temperature of 28.0<sup>o</sup>C being recorded. Adders were not seen during the hot spell.

Mean monthly maximum = 22.6<sup>o</sup>C

Mean monthly minimum = 10.6<sup>o</sup>C

**August** was another wet month, with 105.5mm of rainfall. The first day of the month was both the hottest day of the month and of the year, the air temperature peaking at 29.0<sup>o</sup>C, and feeling very humid. Thunderstorms broke during the afternoon with more the following day. Unsettled weather persisted until the 26<sup>th</sup>. The last 5 days were dry sunny and warm. A very dark melanistic Adder was seen by the tenants of Lodge Hill Farm during the month.

Mean monthly maximum = 20.0<sup>o</sup>C

Mean monthly minimum = 10.1<sup>o</sup>C

The dry, sunny, and very warm spell continued into **September**. Rain fell on only three days of the first fortnight. This would seem to be ideal weather for pregnant females to give birth, but none were seen or reported. The last two weeks were very wet, making September the wettest month of the year, with a total of 135.5mm of rain. The wettest day of the year was the 19<sup>th</sup> when 45.6mm of rain fell. Overall, it was the warmest September since 1949. The warmest day was the 3<sup>rd</sup> with an air temperature of 25.0<sup>o</sup>C.

Mean monthly maximum = 18.1<sup>o</sup>C

Mean monthly minimum = 9.0<sup>o</sup>C

Last Adder record of the year (13<sup>th</sup>)

The first day of **October** was the wettest of the month, registering 27.6mm, over one third of the total of 75.0mm for the whole month. It was generally a mild month, however there was a cold spell with biting arctic easterly winds from the 17<sup>th</sup> to the 21<sup>st</sup>. There were 4 air and 6 ground frosts. No further Adder records were reported.

Mean monthly maximum = 18.1<sup>o</sup>C

Mean monthly minimum = 9.0<sup>o</sup>C

**November** was an unsettled month, alternating between mild wet spells and cold bright days with frosty nights. There were 9 air and 14 ground frosts. The rainy spells produced an accumulation of 69.0mm.

Mean monthly maximum = 8.5<sup>o</sup>C

Mean monthly minimum = 2.2<sup>o</sup>C

**December** ended the year as it began – very wet, with rain and snow falls giving a total precipitation of 104.5mm. Snow fell on 5 days, with the first flurries on the 5<sup>th</sup>. On the 13<sup>th</sup> there was a three hour fall which resulted in a ground cover of 3.0cm. Most of this thawed during the afternoon, but after nightfall the weather became very cold and frosty, causing icy conditions. Snow flurries, severe frosts, and freezing conditions continued until the 22<sup>nd</sup>, when a mild and very wet spell set in over Christmas. The last week of the month remained wet, but turned colder. The coldest night was on the 20<sup>th</sup> with an air temperature of -9.5<sup>o</sup>C. There were 21 air and 28 ground frosts.

Mean monthly maximum = 5.4<sup>o</sup>C

Mean monthly minimum = -0.7<sup>o</sup>C

## Weather - Highlights of the Decade

Average rainfall: 785.6mm (30.9 inches) per annum.

Driest year: 1996 – 624.8mm (24.6 inches).

Wettest year: 1999 – 968.6mm (38.1 inches).

Warmest Year: 1999 (also, globally, the warmest on record - subject to confirmation).

Wettest Day: 14<sup>th</sup> August 1994, with 54.8mm (2.2 inches).

Hottest Day: 3<sup>rd</sup> August 1990, with 37<sup>o</sup>C (99<sup>o</sup>F) recorded at Barbourne, Worcestershire. On this day a mere 33<sup>o</sup>C (92<sup>o</sup>F) was recorded at Knowles Mill.

Coldest Night: 10<sup>th</sup> February 1991, with an air temperature of -11<sup>o</sup>C (12<sup>o</sup>F) and a ground frost reaching -15<sup>o</sup>C (5<sup>o</sup>F).

Year	Rainy days (0.2mm or more)		Sunny days (5 hours or more)		No. of Survey Days	
	March	April	March	April	March	April
1990	6	12	15	20	21	22
1991	17	14	5	11	18	19
1992	24	18	2	9	18	20
1993	7	17	9	7	21	20
1994	22	15	12	12	22	23
1995	19	5	14	15	18	24
1996	15	15	1	8	9	25
1997	6	6	8	13	22	22
1998	13	25	6	10	20	20
1999	20	23	10	12	18	23

**Table 1 Weather Conditions relating to Adder Surveying**

Year	Total Rainfall		Days with Minimum of 0.2mm Rainfall	Maximum Daily Rainfall (mm)	Date of Maximum Rainfall
	mm	inches			
1990	964.3	38.0	167	42.5	28-Jan
1991	633.5	24.9	158	33	30-Apr
1992	880.4	34.7	196	42.9	28-May
1993	785.9	30.9	177	38	10-Jun
1994	814.0	32.0	198	54.8	14-Aug
1995	625.9	24.6	164	41.3	10-Jul
1996	624.8	24.6	169	17.4	12-Apr
1997	753.7	29.7	161	32	25-Jun
1998	805.4	31.7	195	27.2	01-Jun
1999	968.6	38.1	212	45.6	19-Sep

**Table 2 Rainfall at Knowles Mill**

## Adder



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## REPTILE DATA

Year	First Sighting	Air Temp. (°C)	Grass Temp. (°C)	First Slough
1999	16-Feb	8.0	9.0	16-Apr
1998	11-Feb	13.6	12.5	17-Apr
1997	15-Feb	8.6	11.0	08-Apr
1996	16-Feb	12.2	15.0	24-Apr
1995	12-Feb	11.4	11.0	10-Apr
1994	10-Feb	10.0	15.0	18-Apr
1993	17-Feb	10.7	12.5	16-Apr
1992	23-Feb	13.0	15.0	22-Apr
1991	23-Feb	14.0	17.0	19-Apr
1990	5-Feb	13.0	14.0	08-Apr

**Table 3 Emergence and Sloughing of Adders**

## Discussion

The 1999 Adder Census confirmed the decline in the Adder population during the past decade. Graph 1 shows the dramatic drop in numbers, both of Adders themselves and the sites where are now present.

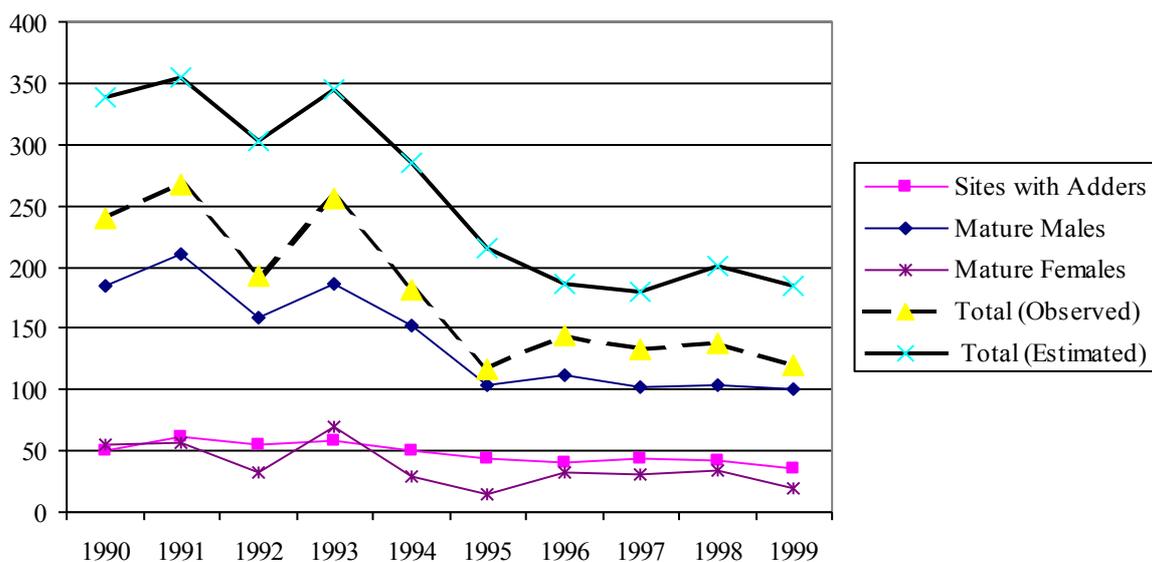
The relatively low numbers of female Adders recorded in the census was discussed in the Annual Report of 1993, when a study of ten females over a period of 11 seasons from 1983 onwards was completed. The data collected provided valuable information on the variable breeding cycle of each of these Adders.

Previous observers had indicated that females in the UK bred in alternate years. This was proven by the results not to be the case in Wyre Forest. The females studied (three survived the full study period) all bred four times. They had “rest” periods

to build up fat reserves of between one to four years. The data showed them breeding on average every three years.

In their non-breeding years the females tended to emerge from hibernation later than the breeding females, when the weather was generally warmer and more settled (and therefore more suitable for active hunting). They also tended to disperse from the hibernaculum areas very quickly, so that they were very difficult to observe. This knowledge explained the relatively low numbers of females observed during normal spring counts – the non-breeding females were generally not being seen. By adding the numbers of females from the previous two years to those observed for the current season, a more realistic estimate of the total can be obtained. This method has been used to prepare graph 1.

**Graph 1 Census Results - Sites and Numbers**





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1993 was the last time that Adder numbers were estimated to exceed 300 (345 estimated). In 1994 there were the first obvious signs of a decline, which continued through 1995 and 1996. The last three years show no signs of recovery towards former levels. This would, in any event, be a slow process given the limitation of the breeding frequency of the females

Since 1993 there has also been a sharp decline in the number of sites where Adders can be found, reaching an all-time low of 35 sites in 1999. 80 sites in all have been recorded since surveys began in 1985. However, at no time have all 80 sites been found to be used in one season. A number of sites became unsuitable in the late nineteen-eighties and into the nineties, and new sites were also discovered.

There are some sites where Adders are no longer found – Longdon Wood South, Longdon Orchard East, Earnwood, New Parks South, Wimperhill, Brand Wood, Sturt, Cleobury Woods and Cleobury Coppice North.

## Factors Contributing to the Decline

**Housing and Industrial Redevelopment** - sites particularly on the forest edge have been completely destroyed by heavy machinery involved in development work.

**Forestry practice** such as felling, scarifying, and replanting can be destructive to both Adders and habitat.

**Road Improvement, Drainage, and Water Pipeline Maintenance** – spoil deposited on active Adder hibernacula has buried many Adders alive.

They cannot excavate their own holes and are therefore trapped underground.

**Conservation Work for other Species** has in some cases destroyed Adder hibernacula. More liaison is required before embarking upon such projects.

**Intensive Pheasant Rearing** – these are not a native species, and are known to prey upon Adders, especially juveniles.

**Human Persecution** is always evident. Every year Adders are found battered to death. The formal protection offered by legislation, which makes it illegal to kill an Adder, is of little value in practice.

**Dog Walking** is an additional problem, especially in the Adder breeding season which coincides with the seasonal increase in human and dog numbers in the forest.

**Accidental Death** – Adders have been found to have fallen victim to cars, mountain bikes, and horses.

**Availability of Food** – this will influence the breeding cycle of females, who will take longer to regain body weight if food is scarce, and the winter survival of both sexes. In Wyre, Adders have been observed to feed mainly on bank voles and field voles.

**Disease** does not appear to be an issue, since there is no evidence of it in the existing population.

**Climate** – it is not known if a series of mild, wet winters has had an impact on Adders in hibernation.

**Natural Predation** – there has been a significant increase in the buzzard population in recent years. Although these are not considered a major threat, they have been known to take Adders