



Wyre Forest Study Group

Review of Herpetofauna Behaviour correlated with Weather 2010

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Daily weather records have been taken at Knowles Mill, 31 metres above sea level, since 1981, at 9 a.m., G.M.T. Below average temperatures are frequently recorded, as the Dowles Valley acts as a frost pocket, with only a limited amount of sunshine. During reptile surveys, a digital thermometer is used to record temperature on site.

The cold weather of 2009/2010 began in mid-December 2009 and continued through January and February 2010. The mean temperature between December and the end of February was 2.1°C making it the coldest winter since 1978/79. The year ended with the coldest December for over 100 years.

JANUARY began with frequent snowfalls and hard night frosts which persisted for 12 days. There were 7 days when temperatures remained below freezing. Snow was lying until the 15th. The coldest night of the month fell on the 7th with both an air minimum and grass minimum of -14°C. The second half of the month was less cold with rain on 9 days. The wettest period was overnight on the 20th with 12.8mm of rain. The mildest day was the 22nd when an air temperature of 8.5°C was recorded. There were snow flurries on the 29th and 31st.

Mean Monthly Maximum 2.8°C
Mean Monthly Minimum -2.9°C
Total Rainfall 69.3mm., Mean Humidity (9am) 82%
Air Frosts 23, Ground Frosts 26
Snow/Sleet 9 days, Fog 4 days
Highest Barometric Pressure 1044/30.84 on 26th
Lowest Barometric Pressure 992/29.30 on 29th

FEBRUARY continued cold with ground frosts recorded on 24 nights of the month. The coldest night was on the 12th with a ground frost of -8°C. Snow fell on 7 days. Snow was still lying on north facing slopes when the first MALE ADDER was observed basking at 1pm on the 20th. While Air Maximum was only 4°C, in the sunshine a ground temperature of 20.5°C was recorded. FROGS were heard croaking on the 24th, which was the mildest day of the month with 9°C. The first FROGSPAWN seen on the 26th during a rainy spell. There were 18 rainy days, the wettest, the 18th, with 10mm recorded.

Mean Monthly Maximum 5.0°C
Mean Monthly Minimum 0.3°C
Total Rainfall 44.9mm., Mean Humidity 81%
Air Frosts 19, Ground Frosts 24, Snow on 7 days
Sleet on 2 days, Hail on 1 day, Fog on 2 days
Highest Barometric Pressure 1028/30.34 on 13th
Lowest Barometric Pressure 985/29.10 on 26th

MARCH. High Pressure was dominant for the first 18 days, producing dry, sunny days and cold nights. The coldest night was the 8th, with an air temperature of -8°C and -10°C on the ground. The warmest day was the 18th with an air temperature of 14.5°C. The first COMMON LIZARD was observed on the 7th, and the first FEMALE ADDER on the 14th, in an air temperature of 11.5°C, with ground temperatures reaching 36°C in the sun. SLOW WORMS were seen on the 18th, and GRASS SNAKES on the 21st. There were 10 rainy days in the last 12 days of the month. The wettest day was the 25th with 7.5mm of rain. The last day of the month was windy and cold with a hailstorm.

Mean Monthly Maximum 9.3°C
Mean Monthly Minimum 0.7°C
Total Rainfall 38.4mm., Mean Humidity 79%.
Air Frosts 19, Ground Frosts 22
Hail on 1 day, Fog on 1 day
Highest Barometric Pressure 1038/30.66 on 7th
Lowest Barometric Pressure 982/29.00 on 30th and 31st

APRIL continued wet and cool for the first few days, the wettest, the 1st with 9.0mm of rain. High Pressure moved in on the 5th giving 30 days of mostly dry, pleasant, warm days. Grass snakes were observed in copulation on the 4th. The first MALE ADDER SLOUGHED on the 13th. This was followed by ADDER COMBAT, COURTSHIP and COPULATION on the 14th in an air temperature of 13°C with a ground temperature of 21°C. The coldest night was the 22nd with an air frost of -2°C and ground frost of -4°C. The warmest day of the month was the 28th with an air temperature of 19.5°C. There were only 9 days with rain.

Mean Monthly Maximum 14.2°C
Mean Monthly Minimum 1.9°C
Total Rainfall 30.8mm., Mean Humidity 81%
Air Frosts 12, Ground Frosts 20
Highest Barometric Pressure 1030/30.41 on 9th and 10th
Lowest Barometric Pressure 995/29.38 on 2nd and 3rd

MAY began with a clear sunny dawn, but clouds soon gathered and later produced several hours of heavy persistent rain resulting in the wettest day of the month with 16.0mm of rain. However the remainder of the month was dry and sunny. The LAST ADDER COURTSHIP was seen on the 5th. Slow worms were seen paired, as if mating was imminent on 6th. The warmest day was the 23rd with an air temperature of 26.5°C. It was also the warmest day of the year.

Mean Monthly Maximum 15.6°C
Mean Monthly Minimum 5.4°C
Total Rainfall 41.1mm., Humidity 79%
Air Frosts 4, Ground Frosts 7, Hail on the 3rd



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Highest Barometric Pressure 1032/30.48 on 20th
Lowest Barometric Pressure 1005/29.65 on 14th and 29th

JUNE was dominated by High Pressure and was both drier and warmer than average. The FIRST FEMALE ADDER SLOUGH was found on the 4th. Despite bands of showers from the 6th until the 9th, rainfall for the month was below average. The wettest day was the 7th, with 21.5mm and there was negligible rainfall after the 9th. The FIRST GRASS SNAKE SLOUGH was found on the 12th and the FIRST MALE ADDER TO SLOUGH FOR A SECOND TIME was on the 21st. The warmest days were the 27th, 28th and 29th, when 26°C was recorded.

Mean Monthly Maximum 20.5°C
Mean Monthly Minimum 9.4°C
Total Rainfall 54.7mm., Humidity 81%.
No Frosts, Thunderstorms on 5th, 6th, 8th and 9th
Highest Barometric Pressure 1026/30.30 on the 15th
Lowest Barometric Pressure 995/29.46 on the 8th

JULY was changeable and unsettled, with rain on 15 days. The wettest was on the 14th with 12.2mm. The month was generally cloudy, warm and humid. The warmest day was the 10th with an air temperature of 25°C. A quiet month for adder observations, as dense bracken and vegetation provided ample cover for basking adders.

Mean Monthly Maximum 20.5°C
Mean Monthly Minimum 12.6°C
Total Rainfall 53.7mm., Mean Humidity 80%
Highest Barometric Pressure 1018/30.06 on 5th, 18th and 24th
Lowest Barometric Pressure 993/29.32 on 15th

AUGUST continued unsettled, cool and wet with 19 days of rain, heavy and persistent at times. The wettest day fell on the 25th with 27mm of rain. August was also the wettest month of the year. The warmest day was on the 17th with a temperature of 23°C, when 3 BABY SLOW WORMS were found under a refugia. The month ended with two cool, clear nights, followed by warm sunny days.

Mean Monthly Maximum 18.5°C
Mean Monthly Minimum 10.5°C
Total Rainfall 106.7mm., Mean Humidity 82%.
Thunder on 20th and 23rd
Highest Barometric Pressure 1023/30.21 on 31st
Lowest Barometric Pressure 994/29.25 on 23rd

SEPTEMBER began with several warm sunny days and cool nights. The warmest day was the 2nd, with an air

temperature of 20°C. Cooler, showery days followed after the 5th. There were 18 days with rain, the wettest day, the 6th with 11.5mm. The remainder of the month was unsettled. During the last 2 weeks, SLOW WORMS were still to be found under refugia, and both MALE AND FEMALE ADDERS were found basking near known hibernacula.

Mean Monthly Maximum 16.4°C
Mean Monthly Minimum 8.2°C
Total Rainfall 60.6mm., Humidity 78%
Air Frosts 0, Ground Frosts 2
Thunderstorm on 23rd, Fog on 4 days
Highest Barometric Pressure 1019/30.09 on 13th
Lowest Barometric Pressure 994/29.35 on 7th

OCTOBER began unsettled, with predominately wet weather, 54mm of rain being recorded during the first 6 days after which conditions improved with no rain from the 7th for 11 days. The warmest days fell on the 4th, 5th and 8th, with an air temperature of 18°C. Ground frosts were recorded from the 16th. The coldest night was the 25th with -5°C.

Mean Monthly Maximum 12.8°C
Mean Monthly Minimum 5.2°C
Total Rainfall 71.4mm., Mean Humidity 76%
Air Frosts 6, Ground Frosts 10, Fog on 4 days
Highest Barometric Pressure 1026/30 on the 25th
Lowest Barometric Pressure 990/29.23 on the 30th

NOVEMBER began with rain on 16 of the first 18 days, although it was quite mild. The warmest days fell on the 3rd and 4th with air temperatures of 15°C. The wettest day occurred on the 7th with 15mm of rain. From the 20th, cold northerly winds set in with exceptionally severe frosts from the 24th, dropping to -11.5°C on the 28th, which was the coldest night. Snow pushed south, giving flurries from the 26th to the end of the month when day temperatures remained below freezing.

Mean Monthly Maximum 6.7°C
Mean Monthly Minimum 0.6°C
Total Rainfall 60.2mm., Mean Humidity 72%
Air Frosts 13, Ground Frosts 16.
Snow on 5 days, Fog on 6 days
Highest Barometric Pressure 1017/30.03 on the 16th
Lowest Barometric Pressure 964/28.47 on the 8th

DECEMBER was exceptionally cold, the coldest for over a hundred years. It was also the sunniest. There were 19 days when temperatures stayed below freezing. Snow fell on 9 days, but with a maximum depth of only 9cm in the Dowles Valley. Due to the very cold weather the

snow lay for 29 days. The coldest nights fell on the 25th and 26th with air and grass minima of -14°C , causing the River Severn at Bewdley to freeze over. The only frost-free night was the 31st.

Mean Monthly Maximum 0.2°C

Mean Monthly Minimum -5.9°C

Total Precipitation 27.4mm., Mean Humidity 63%

Air Frosts 28, Ground Frosts 30

Snow on 9 days, Fog on 6 days

Highest Barometric Pressure 1034/30.53 on 15th

Lowest Barometric Pressure 986/29.11 on 18th

2010 Weather Summary

Total Rainfall/Precipitation 659.2mm (23.8inches)
(25.36mm = 1inch of rain)

Rain Days with $+0.2\text{mm}$ - 168 days

Rain Days with $+1.0\text{mm}$ - 110 days

Wettest Day with 27mm - 25th August

Wettest Month with 106mm - August

Hottest Day with 26.5°C - 23rd May

Coldest Nights with -14°C - 7th January & 26th December

BAROMETRIC PRESSURE

Lowest 964/28.47 on 8th November

Highest 1044/30.84 on 26th January

Table 1: Rainfall at Knowles Mill

Year	Total Rainfall		Days with minimum 0.2mm rainfall	Maximum daily rainfall (mm)	Date of maximum rainfall
	mm	inches			
1990	964.3	38	167	42.5	Jan-28
1991	633.5	24.9	158	33	Apr-30
1992	880.4	34.7	196	42.9	May-28
1993	785.9	30.9	177	38	Jun-10
1994	814	32	198	54.8	Aug-14
1995	625.9	24.6	164	41.3	Jul-10
1996	624.8	24.6	169	17.4	Apr-12
1997	753.7	29.7	161	32	Jun-25
1998	805.4	31.7	195	27.2	Jun-01
1999	968.6	38.1	212	45.6	Sep-19
2000	1011.6	39.9	223	36.8	Oct-29
2001	738.1	29.1	187	40.2	Jul-17
2002	843.7	33.3	191	22.8	Dec-20
2003	560.2	22.1	155	27.3	Oct-30
2004	849.6	33.4	209	46.3	Aug-03
2005	748.8	29.5	183	35.3	Jul-24
2006	652.5	25.7	191	20.1	Nov-24
2007	1046	41.25	184	74.7	Jul-20
2008	930	36.67	197	37.2	Sep-05
2009	724.5	28.6	184	25	Jun-06
2010	659.2	25.99	168	27	Aug-25

Table 2: Weather Conditions Relating to

Adder Surveying

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
2000	12	21	14	12	22	19
2001	Data incomplete due to FMD					
2002	10	12	14	18	13	20
2003	9	9	21	17	23	24
2004	20	17	9	15	17	20
2005	18	16	8	12	15	25
2006	20	13	7	20	11	24
2007	14	5	15	25	21	23
2008	19	23	15	11	16	23
2009	12	14	19	20	22	19
2010	12	9	15	22	19	25

Table 3: 2010 Phenological Data in Wyre Forest

	2004	2005	2006	2007	2008	2009	2010
Frogs Croaking	23-Jan	31-Jan	18-Jan	12-Jan	16-Jan	13-Feb	24-Feb
First Frogspawn	16-Feb	09-Feb	26-Feb	15-Feb	09-Feb	18-Feb	26-Feb
First Male adder	04-Mar	15-Feb	15-Feb	14-Feb	12-Feb	16-Feb	20-Feb
First common lizard	25-Mar	15-Feb	22-Feb	07-Mar	12-Feb	02-Mar	07-Mar
First Slow-Worm	16-Mar	18-Mar	25-Mar	07-Mar	01-Mar	25-Feb	18-Feb
First female adder	16-Mar	18-Mar	26-Mar	14-Feb	21-Mar	02-Mar	14-Mar
First grass snake	02-Apr	21-Mar	12-Apr	07-Mar	27-Mar	06-Mar	21-Mar
First grass snake copulation	N/S	04-Apr	N/S	N/S	01-Apr	21-Mar	04-Apr
First male adder slough	19-Apr	16-Apr	19-Apr	06-Apr	02-Apr	26-Mar	13-Apr
First adder courtship and combat	24-Apr	27-Apr	25-Apr	12-Apr	22-Apr	03-Apr	14-Apr
First adder mating	25-Apr	27-Apr	26-Apr	12-Apr	23-Apr	11-Apr	14-Apr
Last adder courtship	07-May	06-May	07-May	27-Apr	03-May	29-Apr	05-May
Last adder	05-Oct	16-Oct	20-Oct	02-Nov	21-Oct	26-Sep	23-Sep

Table 4: Cumulative Data for Adders

Year	First Sighting	Air Temp. (°C)	Grass Temp. (°C)	First Slough
1990	05-Feb	13	14	08-Apr
1991	23-Feb	14	17	19-Apr
1992	23-Feb	13	15	22-Apr
1993	17-Feb	10.7	12.5	16-Apr
1994	10-Feb	10	15	18-Apr
1995	12-Feb	11.4	11	10-Apr
1996	16-Feb	12.2	15	24-Apr
1997	15-Feb	8.6	11	08-Apr
1998	11-Feb	13.6	12.5	17-Apr
1999	16-Feb	8	9	16-Apr
2000	19-Feb	6.3	12.5	07-Apr
2001	07-Feb	10	11.5	17-Apr
2002	11-Feb	13.5	16	09-Apr
2003	23-Feb	11	23.8	31-Mar
2004	04-Mar	11	17.5	19-Apr
2005	15-Feb	10	14	16-Apr
2006	15-Feb	10	17.3	19-Apr
2007	14-Feb	11.3	19	06-Apr
2008	12-Feb	7	27	02-Apr
2009	16-Feb	11.7	13.7	26-Mar
2010	20-Feb	4	20	13-Apr

Table 5: Adder Numbers

Year	Sites Surveyed	Sites with Adders	Mature Males	Mature Females	Total
1990	56	50	185	55	240
1991	76	61	211	56	267
1992	78	55	159	33	192
1993	80	59	186	70	256
1994	76	50	153	29	182
1995	76	44	103	14	117
1996	80	41	112	32	144
1997	84	44	102	31	133
1998	85	42	103	34	137
1999	67	35	100	20	120
2000	87	24	69	13	82
2001	Data incomplete due to Foot & Mouth Disease				
2002	20	13	36	17	53
2003	20	9	26	10	36
2004	47	20	40	19	59
2005	54	25	40*	16* 38*	56*103*
2006	38	21	74	26	100
2007	28	19	67	24	101
2008	51	24	120	35	155
2009	55	22	96	30	126
2010	55	24	83	23	106

*Usual Sites without three new sites added

* Total when three new sites were added

Table 6: Other Reptiles Recorded in Wyre During Adder Census 2010

Year	Grass Snakes		Slow-Worms		Lizards	
	Mature	Juvenile	Mature	Juvenile	Mature	Juvenile
1990	30	6	23	3	22	2
1991	16	4	24	11	20	0
1992	22	8	27	8	10	3
1993	45	4	57	5	35	3
1994	18	2	36	10	22	1
1995	19	4	23	13	11	0
1996	18	4	32	16	15	0
1997	25	3	42	11	42	0
1998	20	1	34	8	37	0
1999	26	8	32	9	18	1
2000	11	1	21	3	23	0
2001	Data incomplete due to Foot & Mouth Disease					
2002	7	2	14	3	14	0
2003	5	0	10	0	26	0
Year	Grass Snakes		Slow-worms		Lizards	
2004	7		18		19	
2005	12/16*		53/71*		58/144*	
2006	11		49		70	
2007	12		45		52	
2008	34		129		169	
2009	18		156		98	
2010	28		124		90	

** the total with the three new sites added

Discussion

Although 2010 was the third and final year of the GROW WITH WYRE REPTILE PROJECT, a dedicated team of volunteers continued to survey their designated sites. While no additional adder sites were discovered, they were still found on 24 sites, giving a total of 106 individuals. Grass snakes were reported on 11 sites, with 28 individuals, slow worms on 24 sites, amounting to 124 individuals, and common lizard on 21 sites, with 90 individuals. However, the remaining adder sites are now confined to just four areas, each spatially separate from each other, which is obviously of great concern. Once again adder numbers were down this year (2010), which could be accounted for by prevailing weather conditions at the time surveys were undertaken. There were some very warm days in March and April, allowing reptiles to reach thermal equilibrium early on, hence they may already have retreated into cover by mid morning, and consequently were not easily visible. Another factor is the number of times each site was visited. Nevertheless, we must accept the figures for now, as only future years will reveal if there is a real recovery or further decline.

Due to increasing concern over the declining adder population in Wyre Forest, it was considered essential that we discover more about the habits of these enigmatic creatures. A telemetry project was suggested, and fortunately, Grow with Wyre still had sufficient funds available to purchase the necessary

equipment, which entailed eleven tiny transmitters, a Yagi (aerial), receiver and G.P.S.

The principal aim of this project was to ascertain how far a male adder might travel during mate searching and feeding, and also the habitat utilised. To test the equipment and methodology, an initial trial was undertaken in April 2010, on a sexually mature male. The tiny transmitter, only the size of a pea, was attached to the upper body using special surgical tape, leaving the underside free to allow full muscular movement. This would also ensure that the attendant aerial was positioned well clear of the cloaca. We observed the adder for two weeks, during which time he behaved perfectly normally, basking by day and retreating underground before nightfall to escape any frosts. This pattern continued until he sloughed his skin on April 17th, with the transmitter, which has a battery life of 8 week. Still intact, this was retrieved and subsequently re-used on another male. Reassured, that adders would not be hindered in anyway by the transmitter, it was decided to go ahead with the planned project. Two sites were chosen. The first, on Forestry Commission land, was predominantly a heathland habitat, planted up with Corsican pine in recent years, and dissected by several linear rides providing verge and vegetation well suited to basking reptiles. The second, on land owned by Natural England, comprised extensive bracken beds, heather clumps, Silver Birch scrub and grassy rides. By late April, transmitters had been attached to 4 males, 5 females (3 in breeding condition), and 2 juvenile females.

Results

As expected, initial results confirmed that females were rather more sedentary than males, at least during the spring season, as males were shown to cover considerable distances in the course of mate searching. One male in particular, travelled at least a kilometre from his original location to find a female in breeding condition. Ten days later he moved once again, returning in stages to a previously recorded position, utilising both high oak forest and ride verge vegetation. The other ten individuals, meandered rather haphazardly, although within a clearly defined home range which they appeared to know quite intimately, and indeed may well have travelled a similar distance. Males almost unerringly located females in breeding condition, indicating their ability to detect the scent of a female, possibly from 100 metres away or even more. In contrast, the juvenile females did not move far from their capture site, at least during the life of the transmitters. Similarly, non breeding females, having emerged from hibernation in April, did not immediately move off to feed, perhaps awaiting more settled, warmer weather,

to aid their digestion. This indicates that on occasion, feeding might be delayed until June or July. There is much still to be learnt about their behaviour.

It was previously assumed that male adders dispersed far and wide after mating, in order to find suitable prey, as few males are seen in the forest at this time of year. However, clear signals received from underground on repeated visits to the main sites, suggested that this was not necessarily always the case, and that some at least remained within the core area, negotiating vole and mouse burrows and ambushing the unwary occupants.

By the end of June both males and females had sloughed their skins, together with the transmitters, which remained in situ, all of which were later collected. These can be recharged by the manufacturers at a cost of £90 each or thereabouts. The telemetry project, in 2010, highlighted the fact that adders spend a considerable amount of time below ground in subterranean passages, especially during hot weather, and that there is a need for sensitive management on adder sites throughout the year, as heavy machinery can compact the soil and bury them underground. We would like to continue with our research in 2011, if funding is available, and in particular, track adders during the summer months, i.e. July, August and September.

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Young lizards sun bathing, Longdon , 7 September 2010 R. Winnall

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Radio tracking team, from left, Chris Bradley, Alonza Garbett, Nigel Hand, Sylvia Sheldon, 20 April 2010

Rosemary Winnall



Alonza Garbett locating adder with radio receiver, 20 April 2010

Rosemary Winnall