

## Field Craft Lesson 3

### The Purple Emperor - rare or just elusive?

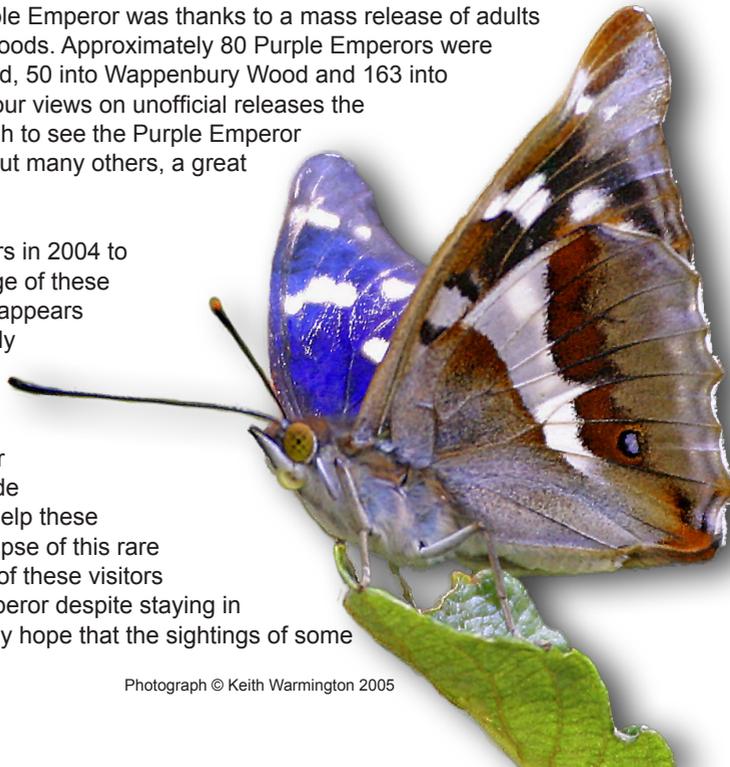
by Mike Slater

I might be described as having a passion for watching and observing butterflies in all their stages. Or as my long-suffering wife Diane says certifiably mad. Therefore, accepting that I am completely barking mad, it should not be hard to understand that observing butterflies for me is not just about going to a well known colony site to see a particular species. In short, I am not just about ticking off a species from the British list in the same way that bird twitchers would do. What I most enjoy is the challenge of testing my field skills and trying to learn new things about all species in all stages of their life cycle.

Hopefully then, this will explain that despite my 37 years interest in butterflies, I had only ever once seen the Purple Emperor before 2004. My one and only previous sighting was on a Branch field trip to the Butterfly Conservation Nature Reserve of Bentley Station Meadow (next to Alice Holt Forest). Literally, as I entered the wood, I saw my first Purple Emperor which pursued me at head height, flying with me for about a hundred metres, a truly magical experience. Soon after I found a so-called master tree and watched 3 or 4 males coming and going for a few minutes. I then moved off to explore other areas of the wood and to look for other species. I have since learned that I was extremely lucky. I have spoken to many people who have gone to much better Purple Emperor sites than Alice Holt forest and have never seen a Purple Emperor despite several attempts.

My next sighting of a Purple Emperor was thanks to a mass release of adults into three Warwickshire woods. Approximately 80 Purple Emperors were released in Oversley Wood, 50 into Wappenbury Wood and 163 into Ryton Wood. Whatever your views on unofficial releases the fact I was fortunate enough to see the Purple Emperor again gave not only me, but many others, a great deal of pleasure.

From the amount of visitors in 2004 to Ryton Wood the knowledge of these Purple Emperor releases appears to have spread very quickly across the Midlands Lepidoptera world. For me it just demonstrated the lure of this spectacular species. The only downside was that I wasn't able to help these visitors to see even a glimpse of this rare or elusive butterfly. Many of these visitors failed to see a Purple Emperor despite staying in the wood all day. I can only hope that the sightings of some



of the other Ryton Woods species like the White Admiral and Silver-washed Fritillary somewhat lessened their disappointment, but looking at their faces at the end of the day, I still have my doubts.

Feeling somewhat ashamed at not being able to help these visitors I became determined to improve my field craft. Selfishly I also wanted to improve my chances of seeing the Purple Emperor. Despite having spent most of my spare time in the wood during July I still failed to see a Purple Emperor on most of my visits.

This year, due to other conservation commitments, I spent much less time at Ryton Wood. Despite this, I saw a total of ten male Purple Emperors. I only failed to see a Purple Emperor on one occasion when visiting Ryton Wood and this was during poor weather. You are probably therefore asking how I managed to improve my success rate? Without doubt this was all down to me being able to replicate the groundbreaking work of Liz Goodyear and Andrew Middleton. Andrew's and Liz's work followed on from the many years of field observations by that renowned butterfly expert Ken Wilmott.

So what did I learn from their work? Here are the key findings from their research:

### **General Purple Emperor Observations**

1) Though Purple Emperors can be seen from late June to mid August the vast majority of sightings are concentrated in mid July between 7th to 17th July. The 13th July is the peak date. Purple Emperors quickly take advantage of any sunny spell to become active. This range of activities can include territorial behaviour, pairing and egg laying activity. In other words Purple Emperors are most active in good sunshine.

2) Purple Emperors are rarely seen using flowers to obtain nectar, however, Sweet Chestnut has been reported as a nectar source in some southern locations. Purple Emperors will use Aphid Honeydew and sap runs to obtain energy. Oak sap runs appear to be the Purple Emperor's favourite source of sap.

3) Many sightings of Purple Emperors are well away from woods. It is now thought that Purple Emperors may breed up to 5 kilometres from their congregation areas.

4) It is believed that by May between only 5 and 15 Purple Emperor larvae survive per 100 Sallow bushes. Broad-leaved Sallow (Goat Willow) *Salix caprea* is the preferred Sallow though the Purple Emperor will use Narrow-leaved (Common or Grey) Sallow *Salix cincia*. Sallows frequently hybridise between these two species. The Purple Emperor will use the hybrid. Any bush over 2 metres will be used, but trees between 15-20 years over 10 metres high seem to be preferred. It is not known how many Sallows are needed to sustain a Purple Emperor colony. This is due to the fact that it is not known for certain how far females will fly to find suitable willow bushes. The best estimate is 400 suitable Sallow.

5) Female sightings appear to occur over a longer time than males although male sightings are more frequent. Females can be seen throughout July (and occasionally into August). Male sightings are concentrated in the middle of the month of July.





Above: The pairing strategy. Females enter the established territories of males, are immediately challenged and if receptive, lead the male to a suitable lofty platform to copulate.

### Female Observations

1) Early observers have reported that female Purple Emperors only lay 100 eggs. It is thought that between 6 and 10 eggs are laid each day over a ten-day period. Female egg laying is more prevalent in good sunshine. The Purple Emperor takes up to 10 minutes to find a suitable location and to lay an egg. Breeders have told me that females can lay between 350 to 400 eggs in captivity. Observations of females in August indicate that egg laying might be spread over a longer period. Could this mean that females move away from woods during late July/August to lay more eggs? It is known that other butterfly species fly further away from the main breeding area when they have laid the majority of their eggs as they are lighter.

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Above: Early July is the best time to see grounded Purple Emperors

2) Grounded females only appear to take moisture. Such sightings are generally thought to be much rarer than male groundings. In 1987 Ken Wilmott saw 34 grounded males compared to only 4 grounded females. Liz and Andrew's study observed an approximate 50/50 split in sightings. All sightings were between 1200 and 1515 hrs. Female grounding can be in less sunny but warm conditions than males. Less sightings are seen in windier or cooler conditions, conversely more sightings are seen in drier conditions.

3) Peak female sightings are around 13th July. There is a much slower drop off of



Above: The sequence of activity of the male Purple Emperor from early morning until midday. Early morning on the ground, low elevation soaring, accumulation of height and establishment of territory.

sightings than males during the rest of July and into August.

4) Females favour sap runs near abundant Sallows. It is believed that they build up their energy reserves before egg laying.

5) Peak egg laying occurs between 1200 and 1400 hrs. The reason for this is that females need to ensure that the selected willow leaf will be in the shade for the rest of the season, thus preventing desiccation of the leaf and larval mortality. In total, egg laying has been observed between 1123 and 1512 hrs. Egg laying can occur in fairly dull weather but is more prevalent in full sunshine. During the study period, egg laying activity has been observed between 13th July and 31st July.

### Male Observations

1) Congregation trees are usually broad-leaved trees with wide leaves suitable for perching such as Oak, Ash and Beech. Wider leaved trees are favoured and are used like watch towers.

2) The peak time for seeing grounded males is 1030 to 1130 hrs. Grounded males have been seen between 0800 and 1215 hrs. Sightings later than 1300 hrs are rare, although an unusual sighting was seen during the study period at 1445 hrs. Early July, which is early in the flight period, is the peak time for seeing grounded males. The very warm summer of 1976 (the drought summer) was a very good year for seeing grounded males, probable the best in recent years. It is believed that males need to take salts (sodium) to make them fertile. Purple Emperors are commonly seen nectaring on dung (horse and dog droppings are commonly used) and dead animals. Many historical sightings have come from gamekeeper's gibbets where gamekeepers used to display so-called vermin on lines until they rotted. The hanging animals included weasels, stoats and birds of prey. Fortunately this practise is now rare.



3) Congregation areas within the tree canopy are normally around a tree that protrudes above the surrounding trees. These types of congregation area often go undiscovered because they are off the normal paths.

4) The majority of known congregation areas are along edges of rides or along a wood's edge. Most of these congregation areas have a half bowl shaped depression in the tree canopy. These allow for near perfect male patrol areas.

5) Male congregation activity is concentrated in the middle of the month in Hertfordshire. The peak date is 13th July. Normal peak activity time is between 7th and 17th July. Sightings at known congregation areas in late July and August are rare.

6) Males can be seen at pre-congregation areas (some times called warm up areas) which are near the congregation areas between 1125 and 1300 hrs. These areas are used on an ad-hoc, temporary basis.

Photographs © Keith Warrington 2005



Above: Congregation of Purple Emperors usually occurs in broad-leaved trees in open sun

7) Congregation areas (high level activity) is usually between 1300 and 1800 hrs. Peak activity is between 1510 and 1640 hrs. Patrolling flights are normally at temperatures around 22 degrees and are rarely later than 1900 hrs. South facing perches are favoured so that the males can face into the sun. West facing perches are used in the late afternoon.

8) The sight of clashing males (males that fly in combat at the same congregation area) is rare in small colonies. However, males will often pursue other insects, especially Purple Hairstreaks that also become more active in the evenings.

9) Males tend to perch at congregation areas in less favourable conditions. However, they quickly become active when conditions return to full sun especially in warm sunny spells of 15 degrees or above.

10) Temporary or warm up congregation areas may only be used for a short time in any one year. Permanent congregation areas (the old master tree definition) are used year

after year. Congregation areas are rarely consisting of just one tree (hence the change of name to congregation area).

11) Congregation areas are always at the highest point in the locality of the colony (they don't have to be in a wood). They have been noted in nearby hedgerows if this corresponds to the highest point.

### **How to see a purple Emperor**

My top ten tips for seeing a Purple Emperor are as follows:

1) First tip is don't bother looking in Ryton Wood for a Purple Emperor! Introductions are more prone to failure than success. It could be that no Purple Emperors will be seen in 2006. I would recommend going to Bentley Wood in Wiltshire, a renowned Purple Emperor site.

2) Males appear to be easier to locate than females so concentrate your effort on looking for males.

3) It is not possible to predict with any certainty where grounded males will be found. Historically butterfly collectors used a whole range of complicated lures to try and attract male Purple Emperors but even these lures did not succeed on every occasion. Therefore I recommend trying to find a male congregation area.

4) Congregation areas are found at the highest point in a wood. Therefore check your local ordnance survey map to locate the approximate highest point. If you can use a GPS device to find exactly where the highest point is then this should help narrow down your search areas.

5) Concentrate your searches around 13th July, the peak time for sightings.

6) Concentrate your searches between 1230 and 1640 hrs (12.30pm to 4.40pm), as this is the peak time for sightings.

7) Concentrate your searches along woodland rides. Remember to look out for that half bowl shaped depression in the canopy area.

8) Look up on the side of a woodland ride that faces south during the above times or west (in the late afternoon). Pause for about 5 minutes at each suitable location. Sometimes you can have two bowl shaped depressions in the canopy near each other. This is the situation at Ryton where one is used as a congregation, the other is never used. They appear identical so the reason for this is not known.

9) Concentrate your searches during times of full sun when temperature is above 22 degrees.

10) Use binoculars or a monocular to check out the male Purple Emperors when they return to their favoured perch. Remember these perches normally face into the sun. Good luck!



# Males	Location and time of observation	Date
2	Ride 15A (Start observations 14:40, finish 14:57hrs) Ride 1A (Start observations 13:33, finish 13:35hrs) No other details recorded	9/7
2	Ride 21 (Seen at 12:25 during transect survey) Ride 1A (Start observations 14:55 finish 14:57hrs) No other details recorded	10/7
1	Ride 15A (Start observations) Following times indicate start of patrolling flights 17:08, 17:12, 17:13, 17:16, 17:17, 17:19, 17:22, 17:22hrs Observer leaves area and returns 17:40hrs Following times indicate start of patrolling flights 17:42, 17:43, 17:43 (chase Purple Hairstreak), 17:44, 17:45, 17:45, 17:46 (chase Purple Hairstreak), 17:48, 17:50 (chase Purple Hairstreak), 17:53, 17:55, 17:55 (chase Purple Hairstreak) 17:57, 18:02hrs (Finish observations)	11/7
1	Ride 1A (Seen by Dave Cole) then me. Following times indicate start of patrolling flights 13:35, 13:44, 13:48 (chase Large White), 13:49, 13:50, 13:55hrs (Finish observations)	17/7
1	Ride 1A (Short check of sight 13:53hrs saw one patrolling flight)	19/7
1	Ride 15A (Start observations) Following times indicate start of patrolling flights 16:15, 16:16, 16:16, 16:18, 16:20, 16:20 (chase Purple Hairstreak), 16:21, 16:25, 16:28, 16:34hrs (Finish observations)	20/7
2	Ride 15A (Start observations) Following times indicate start of patrolling flights 15:01 (chase Purple Emperor two clashing males), 15:03 (chase Purple Emperor two clashing males)	23/7
1	Ride 22 Female seen at approx 17:30hrs by visitor from Cheshire	23/7

### Field Notes from the Ryton Wood 2005 Season

First Sighting on 9th July. Last sighting on 23rd July. Total sightings were over 15 days. Two congregation areas have been identified. I believe that two or maybe three other areas remain undiscovered.

A total of 11 sightings (10 by myself) were seen in 2005. Male congregation area sightings accounted for 9. One male was seen elsewhere. The only female sighting was in Sallow area where egg laying was seen in 2004.

No sighting of grounded males or females, no nectaring or use of sap run was seen.



1 sighting of clashing males was seen on 23rd July. Several episodes of other butterflies mainly Purple Hairstreak being chased were observed.

Site one - SP383 726 ride 1A. Height 97 metres

Site two - SP380 723 ride 15A. Height 99 metres

Site three - SP not confirmed ride 16. Height 99 metres approx.

### **References**

Hertfordshire Purple Emperor 'Apatura iris' Project, Liz Goodyear/Andrew Middleton, 2003.

Purple Emperor Project Progress Report for 2003, Liz Goodyear/Andrew Middleton, 2004.

The Purple Emperor Butterfly, Butterfly Conservation booklet, Willmott 1990.

Species Action Plan Purple Emperor 'Apatura iris', Butterfly Conservation, Bourn and Warren 2000.

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