

AN EXCEPTIONAL IMMIGRATION OF LEPIDOPTERA ON LUNDY, JUNE 1996

By

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Each year, numbers of Painted Lady butterflies (*Cynthia cardui*) fly to Britain from the continent as do numbers of other moths and butterflies. In June 1996, an exceptionally large immigration of Painted Ladies and other Lepidoptera occurred which coincided with the Society's 50th Anniversary week on Lundy.

By June 1st, numbers of Painted Ladies were becoming frequent in southern England and, by the 6th, these were increasing and Humming-bird Hawk Moths (*Macroglossum stellatarum*) were appearing in Dorset and Somerset and Rush Veneers (*Nomophila noctuella*) and Diamond-backed Moths (*Plutella xylostella*) were becoming numerous.

On arrival on Lundy, just after midday on the 8th, it was obvious that a major movement of Lepidoptera was in progress. Many Painted Ladies were visible over the Landing Bay and along the adjacent coast and one Humming-bird Hawk-moth was seen. A check on the southernmost part of the island revealed a large number of Painted Ladies (160 were counted in South-west Field and many were still arriving). A few Red Admirals (*Vanessa atalanta*) were present with these. Silver Y moths (*Autographa gamma*) were common, Rush Veneers were abundant and there appeared to be an extremely high number of Diamond-backed Moths.

With such an exceptional immigration, it seemed important to obtain some idea of the total numbers involved. There are three methods of counting which might help to indicate totals for each species. Firstly, a straight count. If the insects are present in large numbers, all over the island, this is impractical. Secondly, sample counts of various parts of the island and extrapolation from these. Such counts would need to involve various habitats and to take into account variations in local climatic conditions (eg. exposure to wind or to sun). Thirdly, comparative counts (ratios) between the various species involved might help in assessing totals for some species.

A few quick checks and samples were made in the later part of the 8th but most of the counts had to be made, quite quickly, on the morning of the 9th. Speed was necessary since a deterioration in the weather was forecast and, indeed, rain commenced at midday. Nevertheless, it was possible to count and sample areas on the top and on both east and west sides, as far north as Middle Park.

Painted Lady : counts on open grassland (with ground vegetation only) gave an average of 1.0 per hectare and on medium/tall field vegetation (eg. rushes and bracken) an average of 4.0 per hectare. This gave an approximate total of 1,050 on the 9th. However, general impressions were that there were many more butterflies present on the afternoon of the 8th than on the morning of the 9th and only forty were found in South-west Field on the 9th, suggesting that the total on the 8th may have been up to four times that on the 9th, ie. up to about 4,000. Presumably many of these continued their journey and left the island during the afternoon of the 8th.

Red Admiral : only a small number was present in comparison with the Painted Lady. Sample counts on the 9th suggested an overall total of about 100 and the ratio of Painted Ladies to Red Admirals was exactly ten to one, which supported this. Although the number of Red Admirals present on the 8th may have been higher than this, counts in South-west Field on the 8th (nine) and the 9th (four) suggest that the total on the 8th was unlikely to have been much more than 200.

Silver Y : these only occurred where there was medium/tall field vegetation or scrub and there were few on the west side or the more open areas on the top. Sample counts on the 9th suggested that there were about 1,000 in the St John's Valley/ Millcombe

Valley/ St Helen's Copse area; about 750 along the east side north of here; about 200, scattered, on the top of the island; and about 100 along the south and west coasts, giving an overall total of just over 2,000. It is impossible to say whether there were more than this present the previous day. My impressions, from a quick search of several areas in the hour before dusk on the 8th (when large numbers were feeding at bluebells) was that numbers were probably about the same.

Rush Veneer : this is a small, brown moth but with a distinctive (very pointed) shape and markings. There were very few present in open turf areas and numbers on the west side were low but numbers in areas of medium/tall field vegetation were high. Approximately two square kilometres of the island held Rush Veneers at an average density of 3.7 moths per 100 square metres, a total of about 54,000 moths. The highest density, in Halfway Bay, was 11.0 moths per 100 square metres. Numbers in other parts of the island were almost irrelevant compared to these figures and are unlikely to have added more than about 1,000 moths to the total - a theoretical total of about 55,000.

Diamond-backed Moth : this tiny, elongate moth is about a centimetre long and has pale, angular markings along the top edge when the wings are closed. With a moth of this size, occurring mainly in grassland and field vegetation, straightforward counts are not possible so sample areas of one square metre were swept with a net. Highest densities (up to five per square metre) were in medium grassland with few in the shortest turf. The average density over the sampled areas was 2.0 per 100 square metres. Thus, although the average density of this species, over a large area, was lower than that for the Rush Veneer, the Diamond-back was present over a much wider area of the island and the overall total was estimated at about 70,000 on the 9th.

Udea ferrugalis : this has no 'official' English name but has been known as the Rusty Dot. It is a small, rather pointed, rust-coloured moth with a dark 'eye-spot' and other, slight, dark markings. Numbers were relatively low on Lundy. None were seen on the 8th but they were fairly frequent on the east side on the 9th with a density of about 0.4 per hectare over perhaps 250 hectares, giving a theoretical total of around 100 moths.

Humming-bird Hawk Moth : at this stage, the only record was of the one seen in the Landing Bay on the 8th.

The generally lower counts for all species on the west coast were probably the result of a moderate south-westerly wind. Survival rates of these insects seemed likely to be low. Wheatears and House Sparrows were feeding on Painted Ladies, Stonechats on Silver Y's and, undoubtedly, many of the smaller moths would fall prey to pipits, larks, wagtails and other birds. Weather conditions deteriorated from midday on the 9th (sporadic rain), were moderate on the 10th (fog for much of the day) and were appalling on the 11th (gale-force winds and torrential rain). Nevertheless, a count of South-west Field on the 12th initially gave the impression that there were more Painted Ladies than there had been two days previously. My first thought was that more were arriving on the island but I could find no evidence of this along the south coast and further investigation revealed that a large percentage of the butterflies was engaged in feeding (an eager 'refuelling'), primarily at thrift flowers, and that numbers away from potential feeding areas were actually lower than previously. I moved north along the west coast, counting butterflies at each suitable feeding site and attempted to work out densities for various parts of the island south of Three-quarter Wall. 204 Painted Ladies were recorded feeding at discrete patches of thrift and a further 268 were counted in the area covered, away from such sites, giving an average density of 1.2 per hectare away from 'feeding areas'. This suggests that there were approximately 420 plus 204 Painted Ladies present. The time involved in counting, combined with considerable movements of butterflies, made the counts rather unreliable but it seems likely that there were somewhat more than 600 Painted Ladies present which suggests a survival rate of about 60% (it is unlikely that any butterflies would have attempted to leave the island between midday on the 9th and the morning of the 12th). This seemed surprisingly high given the appalling weather and the suspected predation rate.

Numbers of the other species involved were markedly lower on the 12th. Red Admirals were scarce with a total count of eighteen. However, none of these were at thrift flowers and half of them were in Millcombe/ St John's Valley area which would

seem to indicate that the pattern of behaviour was slightly different to that of the Painted Ladies. It is unlikely that more than a few dozen Red Admirals were present on the island. A single Humming-bird Hawk-moth (presumably a second individual) was present in St John's Valley on the 12th. Very few Silver Y's could be found and it appeared that there were no more than a hundred or so present. Rush Veneers were relatively scarce except on the East Sidelands where there were about 2.5 per 100 square metres, the total being probably no more than 2,000. Diamond-backed Moths appeared to be extremely low in numbers with no more than a few hundred, at most (the vegetation proved too wet for successful sampling by net). This suggests that either most of the moths may have moved on at night on the 9th (which did not appear to be an ideal night) or that predation and/or the effects of the weather were far more destructive to the moths than to the butterflies. Certainly, the smaller moths would be easier prey to pipits and other insectivorous birds than the butterflies would be.

Examination of the movement had to cease on the morning of the 13th as the wind had gone round to the east and a few more insects started to arrive on the island, almost certainly of a different origin. These included a few more Red Admirals, Dark Sword-grass moths (*Agrotis ipsilon*) and a few hoverflies.

Weather on Lundy during the period 8th to 13th June, inclusive :

8th :	wind 2 - 3 s-w;	cloud less than 15%;	precipitation nil.
9th :	wind 4 s-w;	cloud 80 - 100%;	precipitation moderate, 1200 - 1500 hours.
10th :	wind 4 s-w;	cloud 110% (fog, much of day);	precipitation nil.
11th :	wind 6 - 8 s-w;	cloud 110% (fog all day);	precipitation heavy, intermittent, all day.
12th :	wind 2 - 3 n-w;	cloud less than 5%;	precipitation nil.
13th :	wind 2 - 3 e;	cloud less than 5%;	precipitation nil.

All the species in the primary movement are known itinerants and periodic eruptions of large numbers of one or more of them are not abnormal although the scale of this event does seem to have been rather unusual. Eyewitness reports from Spain and France during the previous two to three weeks suggest that the origin of at least some of these insects was probably the Mediterranean region with vast numbers of Painted Ladies being reported from Atlantic coastal areas (although only moderate numbers further inland in France). The numbers of Painted Ladies were the most obvious and spectacular feature of the immigration which was noticed over much of Britain and which received a mention on the national news on the 14th.