

CHASING THE PAINTED LADY

A talk by Dr Eugenie Regan of the National Biodiversity Centre.
Given at the National Heritage Park June 6th 2013.

June, it seems is the month of the insect as club members got to attend two very interesting and involving events about our six legged friends and were allowed insights into their extremely fascinating, complicated and dramatic lives. On Thursday June 6th, Dr Eugenie Regan of the National Biodiversity Centre presented a talk on insights into the migratory lifestyle of the painted lady butterfly. On Saturday June 8th, several lucky field club members (field clubbers?) also attended a bumblebee identification workshop in Will Warren's wonderful Jamestown Nature Reserve given by Dr Regan's colleague, Una Fitzpatrick, but that's another story.

Eugenie Regan's talk took us from Ireland to Morocco and back through Spain, Brittany and Wales chasing, as she said, the Painted Lady. This butterfly, scientific name; *Vanessa cardui*, is one of the most widespread on the planet, ranging over Europe, Africa and Asia with 3 closely related sister species (also *Vanessa*) in the Americas and Australia. It is migratory, being unable to hibernate over winter, so it travels north in spring and summer and south in autumn to avoid extremes of heat and cold. The caterpillar is polyphagous –an eater of many kinds of plants- and that gives the painted lady an edge over other species of butterfly whose caterpillars only eat a narrow range of plants. Some only feed on one species and are totally reliant on the survival of that species. But the female *Vanessa cardui* can lay her eggs on many species, favouring thistle and mallow, two plants that are both common and widespread. She lays up to 600 eggs, each singly on a leaf. The life cycle, from egg to adult, of a butterfly is well-known but no less wonderful for that. The caterpillar hatches out as an eating machine, growing to several hundred times its original size, it then forms a protective cocoon around itself in which it pupates. The body tissues, apart from the brain, break down into a soup and then regenerate as a butterfly, the cocoon splits and out comes the new adult. This process, from egg to butterfly, takes from 30 to 60 days, being quicker in warmer climes as warmer temperatures power the metabolism along at a higher rate.

But too much heat is as bad as too little and the Painted Lady's migratory cycle begins in Morocco –if not further south- in early spring as adults hatch out from the growths of thistle and mallow. The rising heat drives them north, away from the 40+ degree temperatures of the North African summer. So begins the long range multi-generational migration cycle of the Painted Lady, from Africa to Europe –as far as the Arctic Circle 60 degrees of latitude away- and back. The question of where our Painted Ladies come from was studied by Spanish scientists including Constanti Stepanhescu; they connected the arrival of great numbers of butterflies in Catalonia with winds from North Africa as indicated by the Saharan sand that came with them.

The migration of 2009 was especially large, the second largest on record (after 1976) due to an exceptionally well-watered spring in northern Africa; and pooled data from enthusiastic surveyors –citizen scientists- in several countries gave the arrival times of butterflies at various places along the route; Spain, France, the UK, Germany and of course Ireland. They were observed further north as March, April and May rolled on. From Spain on March 21st - 27th to Ireland, large numbers arriving around May 23rd.

The Painted Lady has been identified in 50 sites in Ireland and is undoubtedly more widespread than that, but where do they come from? It seems that depends where in Ireland you find them. Those in Cork come from Brittany, travelling more west than north, while those here in Wexford come from Wales, both borne by winds rather than steering themselves. They can arrive singly, often escaping our notice and making them very hard to count, but can be seen in dense clouds. The butterflies fly high, up to a kilometre (3,300 feet) above the ground where the winds are fast and straight, not buffeted by trees and buildings, and maybe less patrolled by swifts, swallows and martins, busy pursuing insects in the more crowded skies nearer terra firma.

This migration is a multi-generational affair; if we consider the Moroccan generation that fly north as the first, then the generation that return to Morocco is the seventh. The generation that lands in Ireland from France or the UK in good condition, is the third, and it gives rise to the fourth. A few tattered individuals that arrive may be actual first-generation survivors from Morocco itself.

Arriving later in Ireland than France or Britain, the butterflies only have time to breed one generation; those in the UK arrive earlier and may be able to sneak in a second breeding cycle in late summer. In the 'boom' year 2009, the peak week for Painted Lady arrival in the UK was the last week of May. They began to mate and lay eggs, the next generation hatched and developed leading to a peak of emergence in the first week of August who themselves led to a third, far smaller peak emerging in a week in mid September. Most of the August generation would probably have opted to head back south on suitable winds.

Eugenie Regan was inspired by Constanti Stephenescu's findings in Catalonia, Spain and in Morocco to look for Painted lady laying and wintering sites in Morocco and, on acquiring grant support, headed there for a month. Her brief was to find wintering and breeding sites like the Souss valley that Stephanescu had found. Eugenie and her husband travelled around Morocco in February looking for suitable breeding sites for Painted Ladies, perhaps hoping to find lush remote valleys full of host plants with eggs and caterpillars while adults were thronging in the trees. But as often as not they find eggs and caterpillars thriving on clumps of thistle and mallow that were growing around dumps and along roadsides. Irrigated areas and their plants attracted butterflies also. Palmeries (palm tree groves) and oases offered resting and breeding places. Mallow grows abundantly in the shade of the palms whose deep roots allow them to grow in arid areas. As they were surveying oases in southern Morocco, on the northern fringe of the Sahara desert, an expanse of rock and sand the size of the USA, they found butterflies flying in from due south. So the journey may be even more amazing than we thought. Painted Ladies are known to live throughout sub-Saharan Africa, but whether they cross the world's largest desert regularly is still unknown.

Dr Regan also reared caterpillars in captivity to analyse how much they are attacked and affected by parasitoid wasps. These sinister insects lay their eggs in the bodies of their hosts, caterpillars being popular targets, the larvae develop in the host's body and burst out when grown, killing the host. One wasp species, as its name *Cotesia vanessae* suggests, specialises in the Painted Lady (*Vanessa*). Of the caterpillars that were raised, three quarters (74%) were free of parasites and matured successfully, 6% were parasitized while caterpillars and 9% were parasitized as adults. The remaining 11% died of other causes. Migration may be a way of avoiding the parasites, hatching in the same place as the previous generation did would expose you to attack by the wasps that hatched from that previous

generation. Moving on leaves lots of parasites and predators behind and that may be a big factor, though not the major factor, in an animal migrating rather than staying in one area.

For a long time, it was unclear whether Painted Ladies in northern Europe headed back south or just died in the cold of winter. Recent research including the use of radar, showed that indeed the butterflies do head south on similar routes to the northern journeys and using seasonal winds that now blow from the north. The radar station at Rothamstead research station in Hertfordshire, England indicated in 2009 that 11 million butterflies arrived in the UK in the spring of 2009 but that 29 million started the journey south that autumn. Just as earlier generations headed north away from the African and then the Mediterranean heat, so now they returned south to escape the European winter.

Climate and food supply may be the biggest factors for migratory animals; the main benefits could be avoiding extremes of heat and cold that don't suit either you or the plants and animals you feed upon, and timing your arrival to coincide with peak availability of your food. Examples include fresh grass for African wildebeest and their calves, winter feeding for our Greenland white-fronted geese, blooming flowers and lots of leaves for butterflies and their caterpillars and lots of insects for swallows to eat and feed to their young. Something nice to eat and somewhere nice to stay; rather like what we look for when we feel like travelling. Safety from parasites and predators would matter also but being able to feed year-round and to breed future generations would seem to be the major priorities.

Research into the phenomenon of the Painted Lady's migration involves specialist scientists, meteorological radar stations, international travel and communication –and lots of amateur nature enthusiasts like ourselves in the WNFC and similar clubs all over Europe doing surveys and noting the comings and goings of wildlife around us. This is true of so much wildlife research and a reminder that the butterfly landing on a bush in front of you as you stroll on a summer's day may have completed one of the planet's remarkable journeys.

John Kinsella