

Zakynthos Trip for Research on Plastic Pollution and its Effects on Turtles

Report:

From the 27th May 2018- 3rd June 2018, I visited a small island called Zakynthos, which is located in the Ionian Sea, on the west side of the Greek mainland. The island is well known as a main nesting site for loggerhead sea turtles and is very close to the tiny island of Marathonissi (which is referred to by locals as Turtle Island). My aims for this trip were to see the effects of plastic pollution first hand, to collate photographic evidence for my EPQ, discover more about local and national projects put in place to prevent these effects and look into current legislation regarding plastic cups and straws. My EPQ dissertation focusses on the idea of Genetic Engineering being used to prevent plastic pollution- a media perpetuated topic, particularly after the BBC News report on the 16th April this year, claiming that scientists have now improved the enzyme PETase to break down plastic material in just a few days. A predominant part of my project also outlines the heart-breaking effects of plastic use, current protection schemes in place and how individuals can help to make a difference. From a young age I have had a strong interest in conservation of the environment and felt that this trip would be beneficial towards my EPQ research and the on-going projects of the Eco-Committee that I co-lead at school.

Throughout my trip I worked closely with ARCHELON- the Sea Turtle Protection Society of Greece and ZaCLEANthos- a group of volunteers who clear the coastline of litter. ARCHELON have been implementing management plans, habitat restoration, rehabilitating sick and injured turtles and raising public awareness of plastic pollution since 1983. They work with local authorities, NGOs, fisherman and the public to mitigate and prevent the population reduction of sea turtles. In Zakynthos they carry out extensive fieldwork to monitor the turtles and raise public awareness. I was able to visit their base camp on the island and interview the volunteers. Although many of them were able to speak some English, the language barrier was an issue so I had to learn the questions I wanted to ask in Greek and translate what they told me- not an easy task. By the end of my visit though I learnt all about the biology of turtles- from their anatomy to their nesting season. We spoke about the plastic bag tax implemented here in the UK and how in January this year an "Eco-Tax" was introduced in Greece with similar measures. The volunteers informed me that although the mainland is becoming more aware of the importance of sustainability, the small islands like Zakynthos are not as educated in such areas and arguably lack the resources and wealth to further reduce the population's plastic use.

Disposable Plastic cups and straws:

It takes 200 years for a single plastic straw to decompose and they can't be recycled in most places. In the USA alone, 500 million straws are used on a daily basis and these end up on landfills and in the ocean, entering marine organisms. Most of the rescued turtles here in Zakynthos suffered from injuries caused by plastic. An endangered species of sea turtle, with what was thought to have a parasitic worm blocking its airway, had to undergo a horrific ordeal to dislodge a plastic straw from inside it.

Here in Zakynthos I had hoped that the use of disposable plastic straws and cups would be reduced due to the large turtle population but found to my dismay that the very hotel I stayed in used an excess of both products. I found that the bins were overflowing with plastic and the heat meant that tourists used on average 8 plastic cups a day to stay hydrated (I gathered this numerical value from a short survey I conducted in the hotel reception area).

At school we now recycle the plastic cups that we use at meal times and I wondered if this could be the case at the hotel so spoke to my tour rep and some staff members, who agreed that the daily plastic waste is extortionate. I was told that being so close to Kalamaki beach, the plastic cup I used during my stay could enter the sea, becoming a choking hazard for turtles. I tried to use as little disposable plastic as I could during my stay but still felt hypocritical so decided to contact Thomas Cook because perhaps such big travel agencies could make it their policy to only advertise hotels that are environmentally friendly and perhaps have some sort of green badge? This became a project in progress and is still ongoing as I wait for further replies.

Alternatives to plastic straws:

- 1) Aardvark straws – paper straws rigid enough not to break down in your drink, made from renewable resources, biodegradable and compostable.
- 2) Bamboo straws- washable and reusable.
- 3) Lolistraws- edible, hypercompostable, marine degradable, made from seaweed-based material.
- 4) BeOrganic- glass straws, lifetime guarantee.
- 5) The Last STRAW Stainless Steel bendy straws- metal straw that you can bend any way you like to fit your drink.
- 6) Ice straws- mould made of food- grade silicon rubber.

Out of the alternatives that I researched into- ‘Last Straw’ seems to be the most popular and successful. Bon Appetit- a large food service company announced this week that it is banning plastic straws in all of its cafes and will change to paper straws by September 2019. Similar measures will be taking place in England too as plastic straws and cotton buds will be banned as part of the government’s bid to cut plastic waste. Theresa May said that plastic waste is ‘one of the greatest environmental challenges facing the world’. Indeed, we have already seen some changes with the plastic bag tax, ban on microbeads and the announcement in March this year regarding the introduction of a deposit return scheme for drinks containers in England so hopefully the number of plastic straws will be reduced in the near future too.

Nesting sites:

I was taken to see several nesting sites in Zakynthos, where every year from the beginning of May until mid-August, loggerhead females lay their eggs on these beaches.

My first trip was to the islet of Marathonissi (Turtle Island), which is located in the west of the Bay of Laganas. Whilst there I found out that this site produces mainly male sea turtles due to the pale colour of the sand, which strongly reflects solar radiation, causing a lower

temperature at the egg clutch depth. Visitors are only allowed to remain on the first 5m from the sea, as turtle nests are located at the back of the beach.

Turtle Island



Above are two photographs that I took when sailing in a boat to the island- I was able to visit beautiful underwater caves with golden sand and turquoise water. Some of the turtles swam alongside the boat, including a baby.

The last thing I wanted to do was to disturb the turtles whilst admiring them so here is how I made sure my tour was environmentally friendly:

I adhered by the following standards suggested by ARCHELON and leaflets that I collected from the National Marine Park:

1. The amount of time spent near the same turtle doesn't exceed 10-15 minutes.
2. There is a distance of 10-15 meters between the turtle and the observer.
3. A small number of observers are present at any one time (i.e. beach users should avoid crowding around the turtle, and there should be no more than two boats near the turtle at any one time).
4. The observers should remain calm and quiet (e.g. low-voiced conversation).
5. Observation boats should travel at a low speed (i.e. no more than two knots), in order not to disturb the turtle.
6. Any physical contact with the turtle **MUST** be avoided.
7. The animal **MUST** not be approached from the front, and the boats **MUST** not pass over it.
8. Observers move away on the first indication that the turtle is disturbed (e.g. sudden change of direction, acceleration, sudden diving while basking, often surfaces to breathe).
9. Observations are made **ONLY** during the day (and not during the night).

REF: http://www.archelon.gr/eng/habitat_zak.php

East Laganas beach - During my visit to this beach I also spoke to a member of the National Marine Park who gave me information leaflets about the wildlife around the island.



Kalamaki beach- I was told by a local that only 150 umbrellas and 300 sunbeds are allowed on the beaches of Laganas and Kalamaki and these must be removed every night so as not to interfere with the nesting turtles or hatchlings. Below are the photos I took of the areas near the nesting sites.



Beach Clean:

Kalamaki and Laganas beach had an accumulation of litter- the majority being plastic cups, bottles and straws. During the week we picked up litter along the coastline and made sure it was able to be recycled. I had previously done this task in England, working with the Lincolnshire Wildlife Trust and Marine Specialists.

The coast of Zakynthos is dominated by limestone in many areas so the water is turquoise in colour and the beaches where the tourist attractions are found seem to be relatively clean, free from an excess of plastic. I visited the shipwreck, blue caves and natural spa (similar to the blue lagoon in Iceland) and found that there was little litter to pick up. These areas were beautiful, showing how our coastlines, lakes, reservoirs etc. could potentially look if the world was free from plastic. Below are some photographs I took of the clear water, without a piece of plastic in sight. The underwater caves are habitats for a range of marine organisms that are able to flourish and reproduce successfully without the disruption of

litter. As plastic causes copious problems for wildlife, the absence of it here means that biodiversity can be maintained in this area. Below are some of the photos I took of the plastic free areas of the island.



Entrance archway to the blue caves



The natural spa, similar to the Blue Lagoon



The shipwreck

As a conclusion to my EPQ I focused on the possibility of engineering a microorganism to either biodegrade plastic or to produce a polymer that could be used as an alternative to plastics. This leaves me with the issue of whether it is best to first clean up the plastic already present by engineering a 'plastic-eating microbe' or if we should first create bioplastics to reduce plastic pollution in the long term. However, perhaps the first step is actually to simply raise awareness, whilst scientific solutions progress. Knowledge is power. You're more likely to conserve the environment if you know the dangers of not doing so. This can be done by organisations like ARCHELON, government agencies, advertising in the media or simply conversing about the importance of maintaining biodiversity. At this level we can educate one another about plastic pollution so that together we can do what is necessary to prevent or control it. My trip to Zakynthos helped me to see the effects of

plastic pollution first hand; not everyone will have the opportunity to see the impacts but by talking about the issue, we can all understand it better and support important campaigns. We can begin to change our own lifestyle, attempting to reduce the use of both the plastic we use and the waste that we generate. By starting on a personal and local scale we can move to a national scale: from choosing reusable bags over disposable to campaigning for new laws, every one of us can make a difference no matter how big or small.