

Manx Shearwater Plastic Ingestion Study

by Ellie Ames

Plastic pollution is currently a major threat to marine life. Previous research has found high rates of plastic ingestion by Procellariiformes including a study in southern Brazil (Colabuono *et al* 2009) which found 60 % of Manx Shearwaters (of a sample of 25) had ingested plastic, making up 83% of the total items found in the dissection (plastic and prey combined). The Skomer team were keen to discover the extent of plastic ingestion in the island's Manx Shearwater population.

I dissected 13 Manx Shearwater carcasses which had been collected over the 2018 season between April and September. Of these, two were chicks, one was a fledgling (probably with puffinosis) and the rest were adults. In each dissection I isolated the gastrointestinal tract and examined the proventriculus (the stretchy sack that adults use to collect food for their chicks) and the ventriculus (muscular stomach or gizzard), and rinsed and filtered the contents. After drying, I examined each sample under a dissecting microscope. I also collected additional samples to facilitate other studies including pectoral muscle samples for DNA analysis as part of the OxNav research, and samples of prey items and pre-faeces (the final 5cm of the gastrointestinal tract) for a micro-plastics study at the University of Gloucestershire.

Most of the carcasses I collected were not as heavy as is usual for a healthy adult shearwater and there were not many prey items or food found inside them. Six individuals had a black tarry substance coating the gizzard lining, whereas individuals that were presumed otherwise healthy and had died from sudden trauma had yellow gizzard linings.

I did not find any macro-plastic (items >5mm) in either the pro-ventriculus or the ventriculus of any individual. I found small plastic items (<5mm) in four individuals, and possible plastic items in a further three. The most common items found in the ventriculus were squid beaks, with fish bones, otoliths, grit, sand and plant fibres also found. The plastic items found were microbeads in three different individuals, a small piece of green plastic mesh, a fibre and several small white plastic fragments.

A full micro-plastics analysis was not feasible during my study without full lab facilities, so it will be interesting to see what the Gloucestershire study finds. I would recommend future studies consider using: hydrogen peroxide to digest biological material and remove it from the analysis; a dye to stain plastic items; a hot needle to test potential plastic items; a compound microscope to enable more confident identification of materials found; and cotton overalls, glass containers and petri-dishes, and plastic-free filter paper to reduce potential sources of cross-contamination. Future studies could compare plastics found in adults versus fledglings to see if plastic retention is greater in fledglings which do not regurgitate food.

Overall, visible plastic was found in 30% of individuals in this small sample. This percentage is likely to increase with more rigorous testing and identification of small particles and more detailed lab-based micro-plastics analysis.