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### **Undulate Ray Breeding and Genetics**

Over a number of years, SEA LIFE have been leading a managed European breeding program for the endangered and fisheries protected undulate ray, *Raja undulata*. The undulate ray is a European species of skate whose population spreads from the southern coast of the UK to Southern Portugal. Numbers of the species have reduced dramatically over the last decade with the International Union for the Conservation of Nature (IUCN) reporting that fishery catches in some areas fell by between 60 and 8-per-cent between 1988 and 2004. This led to the species becoming classed as an 'Endangered' species and eventually protected from commercial fishing in 2009.

The European breeding program, initially established at Weymouth SEA LIFE Park, began by managing the captive population of undulate rays in UK aquariums before linking with the European Association of Zoos and Aquaria (EAZA) to develop a large breeding programme across many European countries. This has involved extensive record keeping, the pairing up of mature individuals and the rearing of juveniles while primarily focusing on the genetic health and sustainability of the captive population. This has led to a steady increase in the population. To further enhance this program, recent and ongoing genetic research is being undertaken for the first time on this species of skate. Collaborating with Manchester University UK, SEA LIFE has begun work to establish the genetic markers needed to allow the development of a concise pedigree and family tree of the existing aquarium population. This will allow each ray to be given a unique genetic signature to determine whether they are brothers, sisters, parents, or distantly related to one another. This in turn will aid the strategic mating of animals to maintain strong genetic diversity in the population and combat any previous inbreeding that may have occurred in the past. Inbreeding can result in frequent still births and shortened life spans and should be avoided at all costs.

As well as aiding the captive breeding of the species this unique genetic research will also contribute to wild conservation efforts and effective fisheries management, allowing scientists to investigate wild population variations and any evidence of hybridisation between species.

SEA LIFE has presented this research at both UK and European conferences in 2014 and a scientific paper is also in the process of being written.