REAL RESEARCH OR SHAM SCIENCE? A REVIEW OF JAPAN'S SCIENTIFIC WHALING

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Abstract

Centuries of unregulated hunting lead to the decimation of whale populations globally. A moratorium on whaling allowed some stocks to start recovering, but others are not as promising. The Japanese lethal research on whales is permitted under the International Whaling Commission's regulations allowing for scientific sampling of cetaceans, despite the 1982 moratorium on whaling. However, many in the scientific community suggest that the Japanese research is really a front for commercial whaling. The research programs in both the Antarctic and North Pacific (JARPA and JARPN) are not meeting their objectives and non-lethal techniques would be more effective. The Japanese government's agenda at the IWC is to restart commercial whaling and appears to be actively promoting the consumption of whale meat from the research vessels. Japans internal market is not properly regulated and meat packaged for consumption has been found with pathogens and extremely high levels of toxins and heavy metals. Genetic analysis has indicated whale meat in markets contains internationally protected species, as well as non-whale tissues. Due to the extreme deficiency in our knowledge of global cetacean populations and the lack of infrastructure to monitor and enforce quotas, whale conservation should take priority over premature harvesting or unscientific research.

Introduction

For centuries, aboriginal groups around the world have hunted whales for meat and oil. According to Best (1993) and Feldhamer et al. (2007), commercial whaling began as early as 1100 AD, and with advances in boat and hunting technology, whalers were soon killing significant numbers of whales for the valuable meat, oil, and baleen. Due to a completely unregulated industry, many whale stocks were severely overexploited, with many populations dropping below 10% of pre-whaling levels (Best 1993). In 1949, the International Whaling Commission (IWC) was established to manage international cetacean stocks. By the 1970s, many species had received protection under international laws due to critically low population levels. In 1982, the IWC passed a moratorium on all commercial whaling (Best 1993; Iliff 2007). Aboriginal sustenance (local use only) whaling is permitted by the IWC for native groups in the United States, St. Vincent and the Grenadines, Russia, and Greenland. However, some nations, primarily Japan, Norway, Greenland, and Iceland continue to legally hunt whales through reservations against the moratorium or for scientific research. Currently, Japan has two major research programs through the IWC's special permit clause: JARPA II (Antarctic research) and JARPN II (North Pacific research).

In the time since the moratorium was put in place, several whale species such as the North Atlantic Right whales (*Eubalaena glacialis*) and Blue whales (*Balaenoptera musculus*) have not demonstrated significant levels of recovery (Best 1993; Kraus and Rolland 2007). The IUCN (2008) currently identifies nine species as least concern, two as near-threatened, and one as vulnerable. Sei (*B. borealis*), Blue, Fin (*B. physalus*), and both North Atlantic and North Pacific species of Right whales (*E. glacialis* and *E. japonica* respectively) have been given endangered status. Thirty-one of the 48 cetaceans on the Red List are listed as Data Insufficient, so it is extremely likely that these numbers will rise as more information is gathered about different whale populations. Many others have shown signs of recovery, delighting both pro- and anti-whaling factions and fueling fierce debate about how whale stocks should be managed and conserved.

By drawing information from the primary literature in peer-reviewed journals, as well as technical documents and reviews, I hope to present and compare the arguments from both sides of the scientific whaling controversy, with a focus on the

science involved. In an attempt to use the most accurate and objective information possible, I have tried to avoid publications from lobby groups and NGOs on both sides and focus on work from scientists in the field. It is my intent to address flaws in the science as well as try to gain a perspective on how the science interacts with other aspects of this highly contentious and political issue. Through investigating the most recent primary literature regarding cetacean ecology and conservation from different species and oceans, I will examine Japan's scientific whaling program and compare their results with others from around the world.

Discussion

Japan recently completed an 18-year study in the southern ocean (JARPA I) to improve cetacean management by gaining information on Antarctic Minke whale (*B. bonaerensis)* stock structure, natural mortality rates, the effects of environmental changes on whales and the role of whales in the Antarctic ecosystem (IWC 2009) The JARPA II study is ongoing, with the stated purpose of studying Antarctic Minke, Humpback (*Megaptera novaeangliae*), and Fin whales to examine the ecosystem, study interspecific competition, monitor changes in population structure, and enhance Minke management. Likewise, JARPN investigated Minke whale population structure in the North Pacific. Now, Japan is on the second phase of the experiments looking at feeding ecology with special interest in competition between whales and commercial fisheries. Japanese researchers have lethally sampled 10,579 whales under special permits since the moratorium was enacted (IWC 2009). This is 86% of the 12,309 whales taken by all IWC members for research since the moratorium took effect.

Criticisms of the scientific whaling programs

These programs have received a great deal of criticism, from both within the IWC and without, as little more than commercial whaling disguised as science to exploit a loophole in the moratorium. In a letter to the journal *Nature*, members of the IWC's scientific committee outline numerous concerns about the JARPA II and JARPN II studies and their scientific relevance (Gales et al. 2005). They point out that 63 members of the scientific committee contested the claims of the Japanese scientific plans and have repeatedly urged Japan to use more effective non-lethal methods. In his critique of the Japanese scientific program, Corkeron (2009) indicates that the JARPA failed to provide any useful data on its objective of Minke mortality rates while other non-lethal studies have provided similar data for other species. He also describes how the JARPN II program was compromised due to improper sampling techniques, ignoring protocols to avoid sampling bias by collecting specimens off of transect lines and moving sample points to find more whales, artificially elevating estimates of abundance.

One main reason for lethal sampling is to obtain information on feeding ecology from stomach content analysis. However, stomach contents give a short term view of an organism's diet, and more and more ecological studies are using stable isotope analysis to gain a better understanding of long-term feeding and trophic interactions (e.g. Huckstadt et al. 2007). This technique effectively addresses the objectives of the JARPN II program and can be done with a simple, non-lethal, tissue sample. In 2001, the deputy director of Japan's Fisheries Agency, Joji Morishita, praised the use of non-lethal techniques and models in cetacean research, yet the Japanese government refused to incorporate them into JARPA II and JARPN II when the IWC scientific committee recommended using non-lethal techniques in 2005, instead doubling the previous catch limits and including endangered Fin whales and vulnerable Humpback whales in the quotas (Morishita and O'Regan, 2001; Gales et al. 2005).

Another common criticism of the Japanese research program is that, for a project that ran for more than 18 years, few publications have come out of it. Fukui et al. (2005) defend their work with JARPA and JARPN in an open letter published in the journal *Marine Mammal Science*, claiming that journals are refusing to publish the research due to the political and ethical nature of the whaling debate, rather than objectively reviewing their scientific contributions.

Beyond 'scientific' research

Each year at the IWC meetings, Japan pushes to lift the moratorium, openly expressing a desire to restart commercial whaling on sustainable stocks (IWC 2009). According to the Japanese government, Japan is culturally linked to the sea. (Morishita and O'Regan 2001). According to Morishita (2001), Japan is only 41% self-sufficient in food production, and whaling is a viable way to improve food security. He argues for managing cetacean stocks to protect

commercially-important fisheries and exploiting whales as a sustainable food source is a Japanese cultural right.

There is evidence in the literature that cetaceans feed at levels that impact human fisheries. Whales are viewed as apex predators in marine ecosystems, with Mysticeti species generally considered generalist predators, consuming large volumes of zooplankton (eg. Copepods, krill), fish, and squid. Kenney et al. (1997) found that each year, cetaceans off the east coast of North America consumed the equivalent of between one-third to just over three times the commercial harvest. They also suggest that if whales predate selectively on certain species, they could negatively affect fish stock recovery from over-exploitation. Witteveen et al. (2006) suggest that recovering Pacific Humpback whale populations are responsible for declines in pinniped and piscivorous bird populations off Kodiak Island, Alaska and the whales in the study area consume as much as 30% of the commercial harvest. However, the United Nations Food and Agriculture Organization (2008) found that 52% of fisheries are being exploited at their maximum while a further 28% are already over-exploited or collapsed wholly as a result of human actions. It further identifies anthropogenic over-fishing as the biggest threat to fisheries. Kenney et al. (1997) conclude that there is likely little direct competition between cetaceans and fisheries, as whales tend to feed at lower trophic levels than those commercial fisheries exploit. They also conclude that fisheries have a greater impact on primary productivity due to fisheries harvesting higher trophic levels.

An investigation by an independent journalist in Japan discovered that demand for whale meat has been declining, resulting in increasing levels of surplus whale meat going unsold, contradicting the government's assertion of the importance of whale meat to Japanese culture (Junko 2006). Despite the Japanese people buying less whale meat, the government approved higher quotas. Junko (2006) found that Japanese eat approximately 30g of whale meat per person per year, compared to ~27 kg of beef per person per year and the trend is decreasing. Public opinion polls seem to reflect her findings, with one major poll finding 61% of respondents had not eaten whale meat since they were children and only 8% supported the whaling industry, although it should be noted that a government poll found 77% supported whaling (Morishita and O'Regan 2001). I suspect the truth of public opinion lies somewhere in between.

The Japanese government may be acting overzealously in an attempt to create a domestic market for whale meat, and are not using precautionary science. Whale meat being sold in Japan is not being properly inspected and controlled. Parsons *et al.* (2006) report the discovery of the zoonotic pathogen *Brucella sp.*, in packaged whale meat from markets and in 38% of Minke Whales from the JARRPN study. Brucellosis can cause a range of health issues from joint and muscle pain and severe fever to meningitis and liver disease (Parsons *et al*. 2006). They found tissues containing organochlorines and mercury in whale meat at concentrations 18 and 22 times higher than government limits. The government started a whale meat lunch program for children in schools that critics say is to create a future market for whale products in the Japanese school children, but at the risk of feeding the children bacterially and/or chemically contaminated meat (Parsons et al. 2006). Genetic work by Baker et al. (2000) also found problems with Japanese control of domestic whale markets. They found haplotypes of internationally protected cetacean species, as well as non-cetacean meat packaged as whale meat. Baker (2000) and Parsons' (2006) work suggest that despite the government's desires, the Japanese marketplace is not prepared for the return to commercial whaling , as there is insufficient quality control of products to ensure consumer safety and to enforce quotas on species harvests.

Conclusions

The general consensus among scientists outside of Japan is that lethal sampling is unnecessary to answer the stated objectives of the Japanese program and is less efficient than current non-lethal techniques. The hard line the government has taken to restart commercial whaling and refusal to conduct non-lethal research despite international requests leads me to believe that the government is basing its research programs on motives beyond scientific interests, degrading the potential quality of their research. Little is known of whale biology, as shown by the vast proportion of data-deficient whales on the IUCN's Red List, so it is impossible to responsibly harvest cetacean populations commercially in a sustainable manner, or even to be lethally sampling critically endangered species when non-lethal alternatives are more effective for answering the same

questions. In the face of the uncertainty in the data available, to be a responsible resource manager, the IWC should adhere to the precautionary principle and work to prevent cetacean harvesting to ensure the long term survival of the different species. Unfortunately, little is likely to change in the near future on the whaling front. Unless the IWC undergoes significant internal changes, the highly polarized factions will continue to be at a stalemate, with the moratorium remaining and Japan whaling under the cover of pseudoscientific research.

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