

## Correspondence

### It's not just poor science – Japan's "scientific" whaling may be a human health risk too

In their editorials ("Antarctica", Marine Pollution Bulletin 52: 357–388) and viewpoint articles ("Propoganda and pretext", Marine Pollution Bulletin 52: 363–366) Brian Morton and Sidney Holt mention some of the controversy surrounding the whaling issue (see also Morton, 2002). Japan currently hunts northern minke (*Balaenoptera acutorostrata*), Bryde's (*Balaenoptera edeni*), sperm (*Physeter macrocephalus*) and sei whales (*Balaenoptera borealis*) (100, 50, 5 and 100 in 2005) in the North Pacific and Antarctic minke whales (*Balaenoptera bonaerensis*) and fin whales (*Balaenoptera physalus*) (850 and 10, respectively in 2004/2005) in the Southern Ocean in "scientific research" programmes called JARPN and JARPA, respectively. As Morton (2006) notes, the take of minke whales in the Southern Ocean has just been doubled, with a plan to extend this whaling to humpback whales in the near future. In a recent commentary article in the journal *Nature* Gales et al. (2005) notes the scientific controversy surrounding this Japanese "scientific research" programme, and questions whether this programme deserves to be called science or is just another form of commercial whaling. Regardless of the arguments about its avowed scientific merit, the sale of whale meat from this programme is controversial from a human health perspective.

For example, in a 2003 paper, which used samples collected in Japan's North Pacific whaling programme, 38% of minke whales were antibody positive in serum tests for the pathogen *Brucella* spp. (Ohishi et al., 2003). The presence of *Brucella* in marine mammals is not new; several studies have described its prevalence in marine mammals (Ewalt et al., 1994; Foster et al., 1996; Ross et al., 1996; Jepson et al., 1997; Foster et al., 2002; Maratea et al., 2003). It is unique, however, that the meat of these potentially infected whales was processed and packaged for human consumption.

*Brucella* spp. pathogens are a health concern as they are known to cause brucellosis in humans, livestock and domesticated animals. Symptoms in humans include fever, headaches, chills, depression, weakness, joint and muscle pain, weight loss, epididymitis, and orchitis or inflammation of the testes (UW-Madison School of Veterinary Medicine, 2004). Other long term health effects include sacroiliitis, endocarditis, colitis, hepatic disease and menin-

gitis (UW-Madison School of Veterinary Medicine, 2004). There is already evidence of at least one contraction of brucellosis in a human by exposure to an infected marine mammal (Brew et al., 1999).

There is little evidence that the potential human health implications of *Brucella* infection have been considered in the Japanese whaling programme; not only is there a risk of exposure through ingestion of contaminated meat, but the bacteria can be transferred by direct contact with infected tissues, blood or urine (Corbel, 1997). This poses a clear risk to workers during the flensing and meat processing of contaminated animals.

Whilst Japanese "scientific" whaling is largely conducted in pelagic whaling operations, it is also legal in Japan to butcher, process and sell for consumption whales that have become accidentally entangled in coastal set fishing gear. There have been no studies conducted on whether animals caught in this way are also infected with *Brucella* or other zoonotic diseases, but some of these animals come from the same stock as the infected whales noted above (Lukoschek et al., 2005). Additionally, cetacean products have been utilized in the production of livestock feed (Environmental Investigation Agency, unpublished data) which expands the potential for infection to non-human animals: marine mammal *Brucella* spp. have been shown to induce infection and cause abortions in livestock (Rhyan et al., 2001).

Incidence of *Brucella* requires notification to authorities in many countries, including Japan (OIE, 2002) and the UK (DEFRA, 2006) and typically requires the quarantine and slaughter of infected animals. Reports in the Japanese media have highlighted several cases of *Brucella* infection: in 2002, one infected Holstein cow was destroyed in Chiba prefecture and in 2001 five zoo workers in Kawasaki contracted brucellosis after exposure to an infected moose (Hanquet, 2001). In the US, *Brucella* is even considered to be a potential bioterror weapon (Dallas County Online, 2003).

The issue of *Brucella*-contaminated minke whale meat follows several published papers by Japanese researchers documenting high levels of mercury and organochlorine pollutants in cetacean meat products being sold for human consumption, and warnings about the potential health risks of consuming these products. For example, researchers found that in cetacean meat samples collected from Japanese markets, mean contamination levels in red meat

were 22 and 18 times higher than levels permitted by the Japanese government for total mercury i.e., 0.4 ppm, with health safety levels being exceeded by a factor of up to 200 times (Endo et al., 2002, 2003a, 2004, 2005; Simmonds et al., 2002). Mercury levels in boiled liver were even higher, up to 1980 ppm (wet weight) with mean mercury levels in boiled cetacean liver being considered to be high enough that “a single ingestion of the boiled whale [meat] may cause an acute intoxication” (Endo et al., 2003b, p. 416). Moreover, rats fed portions of this contaminated meat showed signs of kidney abnormalities ingesting just a single dose (Endo et al., 2003b). Levels of mercury were so high the researchers stated that they “could pose a health problem for not only to pregnant women but also for the general population” (Endo et al., 2005, p. 5703) and that “[m]ore attention must be paid to the recommendation that whale [organs] should not be eaten at all” (p. 416, Endo et al., 2003b). There is also a high degree of organochlorine contamination in cetacean meat products (up to 7.5 ppm wet weight for DDT and 8.9 ppm for PCBs; Simmonds et al., 2002).

Far from warning Japanese people of the escalating health risks associated with consuming contaminated cetacean products, the Japanese Government is actively promoting expansion of the market. Somewhat alarmingly, one of their marketing initiatives is to provide whale meat to elementary schools for school lunch programs (Kher and Sekiguchi, 2006). Presumably this marketing is to generate an interest in consuming cetacean products in the young, which they presumably believe will be maintained as these children grow older. However, the ethical and moral implications of encouraging consumption of meat products known to be contaminated with mercury, organochlorines and potentially pathogens, to children who do not have a choice in the consumption of the products, is staggering. This is particularly so when one considers that studies in such areas as the Faeroe Islands have linked mercury toxicity, in which consumption of mercury-contaminated cetacean meat may play a major part, to brain stem damage, mental retardation, and neurological and heart abnormalities in children (Grandjean et al., 1997; Steuerwald et al., 2000; Grandjean et al., 2004; Murata et al., 2004).

The Japanese “scientific” whaling programme has produced very few peer-reviewed articles (Gales et al., 2005), so it is ironic when data published in one of these articles are overlooked, or perhaps wilfully ignored, by the Japanese government.

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