

Contaminants in Yukon Moose and Caribou - 2004

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INTRODUCTION

This project is part of the ongoing monitoring of contaminants in Yukon wildlife that started in 1992 with a study of the Finlayson caribou herd (Gamberg 1993), continued with a comprehensive look at contaminants in country foods (Gamberg 2000a), and is now monitoring temporal and geographical trends using moose and caribou as key species (Gamberg 1997, 1998, 1999, 2000b, 2001, 2002).

METHODS

Collections

Yukon hunters were requested to submit kidney, liver and muscle samples, as well as an incisor, from moose and caribou killed during the 2004 hunting season. The program was advertised in the YTG Hunter Synopsis, the Outdoor Edge magazine (Fish and Game Association) and through posters and newspaper ads.

Each hunter that submitted samples had their name put into a draw, once for each tissue they submitted. The draw was for a charter flight on Alpine Aviation of Whitehorse, up to a value of \$1000, and took place on the CBC radio morning show on Dec. 1st, 2004. The winner was Chuck Young of Portage la Prairie.

Hunters submitted their samples to their local Renewable Resources office where a YBS (Yukon Biological Submission) form was filled out for each submission. Samples were labeled with the YBS number and stored in -20^o C freezers until processed.

Each hunter submitting samples was sent a letter thanking them, giving them the age of their animal if they submitted a tooth and telling them what the project was about. A brief background of cadmium in Yukon wildlife was included, as well as the consumption recommendations from Health Canada (Appendices 1 and 2).

Tissue Processing and Analysis

If incisor bars or entire jaws were submitted, an incisor was extracted and cleaned of extraneous tissue. If possible, age was determined from tooth eruption patterns. Otherwise, incisors were aged using the cementum technique. Moose teeth were aged by the author and caribou teeth were aged by a Yukon Environment technician.

Kidneys were cleaned of extraneous tissue and the kidney capsule removed. If the kidney was damaged (i.e. sliced or in pieces), or the capsule was torn or missing, the tissue was rinsed with distilled water. Partial kidneys were discarded. The samples were then stored in Whirl-paks. Outer portions of each liver and muscle sample were removed leaving 'clean' subsamples, which were then archived in polyethylene vials. Kidneys were stored at -20^o C until analyzed. Liver and muscle samples were stored at -80^o C for possible future analysis of inorganic contaminants. If enough liver tissue was available, a portion was stored in chemically cleaned glass jars and stored at -80^o C for possible future analysis of organic contaminants. 'Clean laboratory practices' were used throughout tissue processing.

RESULTS and DISCUSSION

Hunter Response

Samples were submitted from 84 moose, 71 caribou, 6 mule deer, 1 elk and 4 Dall sheep. Of these, samples from the mule deer, elk, and 2 caribou were taken by YTG personnel from road-killed animals. Samples from 10 Finlayson caribou were submitted from game guardians. Hunters contributed the remaining 4 sheep, 84 moose and 59 caribou samples.

Of the 166 submissions, 84% included liver, 76% included kidney, 75% included muscle, 66% included a tooth, and 45% included all four tissues. 3% of submissions only included teeth.

Contaminants Analysis

Although this project was undertaken with the intent of analyzing tissue samples for contaminants, funding was unavailable for laboratory analysis of the tissues. Samples have been archived at -80°C for potential future analyses. Those concerned about the consumption of contaminants from wild game should refer to the health advisory issued by Health Canada (Appendix 2).

ACKNOWLEDGEMENTS

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Appendix 1. Cadmium in Yukon Wildlife

Ongoing research on contaminants in wild foods has shown that, for the most part, mammals, birds and plants in the Yukon are free from contamination. However, some animals do have high levels of cadmium in their livers and kidneys.

Cadmium is a toxic heavy metal that is found in abundance in natural ecosystems in the Yukon. Our unique geology that makes mining so profitable here, also means that certain metals work their way into some ecosystems. Cadmium is one of those troublesome metals. The cadmium works its way into the soil, and then into plants through the roots. Animals eating those plants will then absorb the cadmium.

Once it is in the body, the liver and kidney work at removing the cadmium. They are effective to a degree, but if the animal (or person) takes in more cadmium than these organs can get rid of, it will accumulate in the liver and kidney over the lifetime of the animal. For this reason, older animals (or people) tend to have higher levels of cadmium than younger ones. If cadmium levels reach a threshold level in the kidney, there is potential for kidney dysfunction.

The World Health Organization (WHO) has determined the level of cadmium intake that is considered safe for humans. Health Canada has used this level, along with concentrations found in Yukon wildlife, to recommend limiting consumption of kidneys and livers of certain animals. For some, the limit is quite high - 485 snowshoe hare kidneys per person per year, and 382 Mountain Goat kidneys. For caribou the recommendation varies among herds, but ranges from 7-32 kidneys/person/year, and 4-16 livers/person /year. The recommended limit for moose liver and kidney is one of each per person per year. It should be noted that cadmium does not accumulate in the meat or the muscle tissue of any animal, and Health Canada has not recommended limiting consumption of meat from any species.

While health advisories of this sort are relatively new to the Yukon, advisories against eating livers and kidneys of certain species have been issued in other provinces of Canada. Manitoba has a health advisory for moose and elk, Ontario for moose and deer, Quebec for moose and caribou and Newfoundlanders have been advised that the consumption of moose liver or kidney would probably result in their exceeding the WHO standard intake limits for cadmium for that week of consumption. Most of these advisories do not recommend limiting consumption, but advise avoiding consumption completely. Health officials in the Yukon have attempted to be sensitive to the culture and desires of Yukoners, and gone through the extra step of determining what a safe level of consumption would be.

The federal Northern Contaminants Program is conducting an ongoing program to monitor contaminant levels in Yukon moose and caribou. The conclusion after ten years of the program is that cadmium, the major contaminant of concern, is stable and levels do not appear to be changing.

Anyone with further concerns or questions about levels of contamination in Yukon wildlife should contact Yukon Health and Social Services, or their local Yukon Environment Office.

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Appendix 2. Health Advisory

Health Advisory for Yukon Wild Game

Caribou Herd	Maximum # of Organs Recommended for Consumption/Year	
	Kidneys	Livers
Bonnet Plume	32	16
Nahanni	28	13
Porcupine	25	12
Forty-mile	20	12
Wolf Lake	15	8
Finlayson	8	5
Tay	7	4
Moose	1	1
Sheep	178	no limit
Goat	382	26

There are no limitations on the amount of muscle (meat) that can be consumed from any animal!

For further information please call Health and Social Services at 667-5302