Internal Parasitism in Free-Ranging Black Bears in the Pisgah National Forest

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Internal Parasitism in Free-Ranging Black Bears in the Pisgah National Forest

Abstract
A qualitative analysis of intestinal parasitism present in the American black bear, *Ursus americanus*, in western North Carolina has never been documented. A survey of endoparasitism was conducted in conjunction with research by North Carolina State University in Pisgah National Forest. The survey was carried out by fecal analysis. In this population, black bears were found to be infected with the endoparasite, *Baylisasaris transfuga*, at a rate of 50 percent.

Introduction
The black bear, *Ursus americanus*, is a large, omnivorous, free-ranging mammal. Globally, six out of eight species of *Ursidae* are experiencing population declines. Five of these species are endangered (Servheen, 1989). Isolated *Ursus americanus* populations in the south and southeastern regions of the U.S. are not stable. (Pelton, 1982; Servheen, 1989)

Black bears have been designated as an indicator species by the U.S. Forest Service in North Carolina (Clark, 1987). Extensive research has been conducted on the black bear population in the Pisgah Bear Sanctuary and adjacent areas of the Pisgah National Forest by North Carolina State University (Powell, 1987, 1990, 1996). This study was conducted concurrently on parasite infections of this population to increase understanding of the problems which may occur in captive populations.

The study area encompassed the Pisgah Bear Sanctuary and adjacent areas of the Pisgah National Forest located 35 km south of Asheville, North Carolina in the southern Blue Ridge Mountains. The western boundary of the area is the Blue Ridge Parkway which bisects the northern portion of the sanctuary (Powell, 1987). The area totaled over 400 km². Elevations ranged from 650 to 1770 m.

Average annual rainfall is from 165 cm in lower areas of the study area to over 230 cm in the mountains (Powell, 1990). The temperate, deciduous forest was predominantly oak (*Quercus* spp.), maple (*Acer* spp.), hickory (*Carya* spp.), tulip tree (*Liriodendron tulipifera*), eastern hemlock (*Tsuga canadensis*), and a few pine (*Pinus* spp.). The undergrowth was composed of blueberry (*Vaccinium* spp.), American chestnut (*Castanea dentata*), and a variety of heath shrubs. There were dense thickets of rhododendron (*Rhododendron* spp.) and mountain laurel (*Kalmia latifolia*).

Materials and Methods
The study was conducted May 30 through June 21, 1996. A total of 528 traps were set during the research period. Bears were captured using modified Aldrich foot snares with sardines as bait (Johnson, 1980). Snares were placed on trap lines established by previous research (Powell, 1987). Bears were immobilized with a ketamine hydrochloride/xylazine mixture, administered with a blow pipe or a pole syringe. The dosage was 1 ml of a 100-200 mg/ml solution per 22.7 kg animal weight, with animal weight estimated visually (Horner, 1990). Once immobilized, the animals were weighed, measured, and tattooed. Bears were outfitted with radio telemetry collars for ongoing research projects. A first premolar was extracted for age determination. Fecal samples were collected rectally. Eight scat samples were also collected. All samples were placed in screw-top glass vials and kept unrefrigerated for a period of two to four hours.

Samples were processed according to flotation techniques (Pratt, 1985) using a flotation solution. One gram of the sample and 15 mls of solution were macerated in a small cup, then strained through a two-layered gauze...
square into a conical 15 ml test tube. A plastic cover slip was placed on the meniscus. The sample was allowed to sit 10 minutes prior to examination. Samples with parasites were recorded and sent to the North Carolina State University School of Veterinary Medicine, Parasitology Department, for identification.

**Results**

Nine bears, three males and six females, were captured ranging in weight from 42 pounds to 310 or more (see Table 1). The weight of the largest bear was approximated due to the inability of the research team to lift the animal completely off the ground. There were seven recaptures and two first-time captures. Only eight fecal samples were collected, due to one fatality. A sample was not available from the carcass due to its condition. The parasite, *Baylisascaris trans-fuga*, was present in four samples. Of the positive samples, bear number 360 was a male, and numbers 396, 345 and 266 were females. The level of infection was estimated at less than 20 eggs per gram of feces by the University’s School of Veterinary Medicine, Parasitology Department. Results from the scat samples were difficult to interpret due to the number of soil nematodes and contaminants they contained, therefore the results were not included as part of the study.

**Discussion**

The fecal results show that 50 percent of the bears sampled carried *Baylisascaris trans-fuga*. The level of internal parasitism would be considered low, based on the estimated egg counts. *Baylisascaris trans-fuga* is an intestinal parasite of members of the Carnivora and Rodentia groups. It has a direct life cycle, with the infective stage developing in about a week and hatching in the stomach (Fowler, 1993). *Baylisascaris trans-fuga* has been documented in free-ranging black bears (Baker, 1983; Dieterich, 1981) and is also common in zoo Ursidae (Fowler, 1993).

Understanding the type and level of internal parasites in free-ranging bears can provide information to help us understand some of the problems seen in captive bears. This study should be considered the first step in future research to focus on internal parasitism and the role that diet may play in reducing that level in free-ranging bears.

**Table 1.**

<table>
<thead>
<tr>
<th>Date</th>
<th>Bear No.</th>
<th>Sex</th>
<th>Wt. (lbs.)</th>
<th>Results</th>
<th>Presence of <em>Baylisascaris</em> in Free-Ranging Black Bears in the Pisgah National Forest</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/31/96</td>
<td>394</td>
<td>F</td>
<td>85</td>
<td>X</td>
<td><em>Baylisascaris trans-fuga</em></td>
</tr>
<tr>
<td>6/4/96</td>
<td>396</td>
<td>F</td>
<td>56</td>
<td></td>
<td></td>
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<tr>
<td>6/7/96</td>
<td>345</td>
<td>F</td>
<td>50</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6/7/96</td>
<td>343</td>
<td>M</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6/7/96</td>
<td>229</td>
<td>M</td>
<td>310+</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>6/8/96</td>
<td>370</td>
<td>F</td>
<td>42</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>6/8/96</td>
<td>360</td>
<td>M</td>
<td>80</td>
<td></td>
<td></td>
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<tr>
<td>6/12/96</td>
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<td>F</td>
<td>116</td>
<td>X</td>
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<td>6/19/96</td>
<td>266</td>
<td>F</td>
<td>175</td>
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</tr>
</tbody>
</table>

**Acknowledgements**

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References


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