

Evaluate toxin exposure of bears with and without mange

The goal: To determine if bears with mange have elevated levels of selected toxins, in particular anticoagulant rodenticides (ARs). Some toxins may have long-term or indirect effects that are poorly understood. Multiple studies in California suggest that exposure of wildlife, specifically bobcats and cougars, to toxicants can increase their risk of clinical mange. Also, bobcats exposed to ARs had immune suppression and differential expression of immune-related genes. **We hypothesize that eastern black bear populations may be experiencing a similar phenomenon.**

Who can participate: States with large numbers of bear mange cases (i.e., states with only a few cases will not be able to collect enough bears that can be tested from a particular location). These numbers will be divided between the two major areas of bear mange: western US states (AR/MO/OK) and eastern states. Although we do not currently have funding for testing, we are banking samples for future testing now.

Bears to be sampled:

- Bears with mange and control bears *from the same site/county* that do not have mange lesions
 - Bears will be divided into 2 main groups:
 - Control Group (no mange lesions, but from a population with mange confirmed)
 - Mange Group, further subdivided by severity (mild, moderate, and severe)
- We aim to test at least 50 bears with mange and at least 25 control bears from the same counties so that their exposures to toxins are similar.

What we need from each bear:

- Four photos of the bear: 1x of the bear on its most affected side [both sides ideal], 1x of the face head-on [ensure ears are in picture], and 1x of the rump and back of legs head-on. We are requesting several angles to understand % of body impacted, severity of lesions, etc.
- A completed SCWDS Mange Research Submission Form which includes:
 - Basic information (age, sex, location [GPS Coordinates preferred but County adequate])
 - Qualitative assessment of mange severity (mild, moderate, severe, recovering).
 - Outcome (euthanized [please explain why], hit-by-car (HBC), hunter-killed, or found dead)
 - If found dead, please estimate how long it has been dead as mites may leave the bear after death.
- A completed “Mange Matrix” Score (see 2nd page)
- One piece of liver that would fit in a large Ziplock bag. Ideally, wrap the liver in aluminum foil before putting in the bag. Keep frozen until shipping.
- Multiple large sections of skin approximately 12”x12” are preferred, however a smaller section (~5”x5”) will usually suffice. The section must contain both abnormal mangy skin and adjacent “normal” skin (further instructions found in “Mange Surveillance” protocol). Freeze skin samples in a small/medium Ziplock bag. (**OR** – follow instructions for skin sampling from “Mite Burden” protocol if part of that project). Freeze (-20°C is fine) until shipping.

What we will be doing:

- Frozen liver samples will be tested for a suite of toxins including an anticoagulant screen, GC/MS & LC/MS screens that detect hundreds of diverse organic compounds from different chemical categories, including pesticides, environmental contaminants, drugs and natural products, and testing for 10 trace elements/metals (arsenic, cadmium, copper, iron, mercury, manganese, molybdenum, lead, selenium, and zinc).
- Skin will be used to confirm mange status via skin scrape +/- PCR.

To overnight ship: Label liver and skin bags with bear ID, site, and date. Double bag all samples and place in a Styrofoam cooler with abundant absorbent material (newspaper, etc.) and re-freezable ice packs (i.e., do not use wet ice) and ship to SCWDS with the Research Case Submission and Mange Matrix form(s).

Please email all photographs, submission forms, and mange matrix to raquel.francisco@uga.edu and myabsley@uga.edu

Mange Matrix score

Category	0	1	2	3	Category Severity (0-3)
Hair Loss	None	Hair missing from less than 1/3 of body	Hair missing from 1/3 to 2/3 of body	Hair missing from more than 2/3 of body	
Skin Condition	Normal	Skin not thickened or pigmented, areas of scaly skin small and diffuse	Patches of thickened, crusted, or black pigmented skin	Large areas of thickened, crusted skin, debris flaking from skin or on hair shafts; strong odor	
Body Condition	Normal	Below Average; vertebrae knobby, pelvic crest and ribs can be felt but not protruding	Poor; spinal vertebrae well defined, pelvic crest and ribs visible, skull structures felt but not visible	Emaciated; skeletal muscle gone, zygomatic arches visible, eyes sunken	
				Mange Severity Total Score (0-9)	

Instructions: Each animal should be assigned a score (0 to 3) for each category (hair loss, skin condition, and body condition) based on your observations; this can be written in the far right “Category severity” column. Add up the three scores to determine the “Mange severity total,” which will be between 0 and 9.