

PROGRAM ACTIVITY REPORT (PAR)



Baylisascaris procyonis - Project Update

NWDP initiated a nation-wide *Baylisascaris* species surveillance program during June, 2011. Nematodes in the *Baylisascaris* genus are large parasitic nematodes (i.e., roundworms) that are spread by one or more definitive hosts (e.g., raccoons, skunks, bears, badgers, etc.). These nematodes cause disease in numerous avian and mammalian species, including humans. The NWDP *Baylisascaris* surveillance program is monitoring prevalence rates of two species within this genus: *B. procyonis* and *B. columnaris*. Both species of nematode cause disease in the same intermediate hosts, but utilize different definitive hosts. *B. procyonis* primarily make use of raccoons and other procyonids as definitive hosts whereas *B. columnaris*, utilizes several species of skunks depending on the geographic region.

Globally there are eight recognized species within the *Baylisascaris* genus. The most widely recognized and researched species is *B. procyonis*. It is found throughout the United States. Prevalence rates in raccoon populations vary significantly among loca-

tions. In the upper Midwest and coastal western states, up to 90% of juvenile and 37-55% of adult raccoons can be infected.



Thus far, 730 samples have been submitted from across the nation and 313 have been examined. Among these samples, 22.4% were positive for nematodes. Nematode specimens are being examined based on morphologic characteristics and/or genetic sequence analysis using PCR. DNA must first be extracted using small sections (~ 1cm or less) of an individual worm placed in a 1.5 ml microcentrifuge tube. Next, a digesting agent is added, such as proteinase K, to process the cells in the tissue sample. After samples are incubated for 48 hours at 56°C, DNA is extracted using a Spin-Column Protocol. Once

the DNA has been isolated from the tissue samples, paired primers are added to amplify a particular section. Prepared samples are then placed in a thermo-cycler which runs a specifically designed program for selected primers. These cycles consist of repeated heating and cooling rounds which enable DNA melting (denaturation) and enzymatic replication. The samples are then run through an agarose gel electrophoresis containing a DNA ladder (a molecular weight marker) which enables specifically sized DNA fragments to be identified, isolated and sequenced. These DNA sequences are used to definitively identify nematode species as *B. procyonis* or *B. columnaris* when morphological identification is impossible. Morphological identification of *B. procyonis* can only be performed on male specimens. Males exhibit a pericloacal roughened area (area rugosa) and stout, uniform spicules, usually < 1mm long. These morphological characteristics distinguish them from morphologically similar species such as *Toxascaris leonina*.

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The original artwork on this page was created by the National Wildlife Disease Program's Erika Kampe and Sarah Goff

