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Acanthocephala of the Bald Eagle (*Haliaeetus leucocephalus*) in North America

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ABSTRACT: Examination of bald eagles (*Haliaeetus leucocephalus*) collected from several locations in North America contributed new information concerning the acanthocephalan fauna of this host. Representatives of *Arythmorhynchus brevis*, representing a new host record, were collected from eagles in Florida, New Hampshire, and Wisconsin. *Plagiorhynchus* sp. was collected from an eagle in Florida. *Corynosoma strumosum* was collected from an eagle in Alaska. *Andracantha phalacrocoracis*, representing a new host record, was collected from an eagle in Alaska. *Southwellina hispida*, representing a new host record, was collected from eagles in Maine and Virginia. The occurrence of gravid or mature females of *A. brevis*, *Plagiorhynchus* sp., and *S. hispida* suggests that the bald eagle may serve as a competent definitive host for these species.

Little information exists concerning acanthocephala of the bald eagle, *Haliaeetus leucocephalus* in North America. All existing reports of acanthocephalans from the bald eagle in North America are summarized as follows. Three immature individuals of *Andracantha mergi* from New Jersey and Nova Scotia were reported by Nickol and Kocan (1982). Single immature individuals of *Corynosoma strumosum* were collected in Alaska by Schiller (1952) and Robert Rausch (Van Cleave, 1953). Schiller (1952) reported the specimen he recovered as *Corynosoma* sp.; however, Van Cleave (1953) indicated this specimen was *C. strumosum*. Acanthocephalans taken from *H. leucocephalus* in Florida were reported by Tuggle and Schmeling (1982) as *Centrorhynchus* sp.; however, Richardson and Nickol (1995) determined these specimens to be *Plagiorhynchus* sp. Kocan and Locke (1974) reported *Centrorhynchus* sp. from eagles in Maine, Florida, Iowa, and New Jersey; however, these specimens are not available for examination.

Acanthocephalans collected from the intestines of North American bald eagles from 1986 through 1995 by the National Wildlife Health Center were examined in the course of this retrospective study. These specimens were collected during routine necropsy and determination of parasite burdens was not a standard procedure. Therefore, all numbers given refer to the number of worms collected and are not necessarily indicative

of the actual number present. Worms were stained with Semichon's acetocarmine or Mayer's carmalum and mounted in Canada balsam. Voucher specimens were deposited in the Harold W. Manter Laboratory, University of Nebraska State Museum (HWML). Remaining specimens are housed at the National Wildlife Health Center (NWHC). Accession numbers are given in parentheses.

Two to 41 specimens of *Arythmorhynchus brevis* (HWML nos. 38744, 38745, and 38747; NWHC nos. 7792–7794, 8028, 11014, 11219, and 13093) were collected from 9 eagles from Lake, Orange, Polk, and Seminole counties in Florida. Among these were from 1 to 17 gravid females in 6 of the 9 eagles. Two individual *A. brevis* (1 immature and 1 mature female) were collected from an eagle in Rockingham County, New Hampshire (HWML no. 38746; NWHC no. 11594), and 1 immature male specimen of this species was taken from an eagle in Vilas County, Wisconsin (NWHC no. 9824). This is the first report of *A. brevis* from *H. leucocephalus*. The repeated finding of gravid female *A. brevis* suggests that *H. leucocephalus* is a competent host for this parasite. *Arythmorhynchus brevis* occurs in a wide variety of piscivorous birds throughout North America (Van Cleave, 1945).

Five gravid females and 1 male (HWML no. 38748) of an unidentified species of *Plagiorhynchus* were collected from a single eagle in Lee County, Florida. These specimens of *Plagiorhynchus* and those reported by Tuggle and Schmeling (1982) (USNPC no. 76993) from Polk County, Florida were preserved too poorly to permit specific identification; however, both collections consisted of predominantly gravid females so it appears that the bald eagle may serve as a competent definitive host. Given the piscivorous nature of bald eagles, it is likely that these specimens of *Plagiorhynchus* utilize an aquatic intermediate host, and that eagles become infected by eating infected fish that serve as paratenic hosts for this parasite.

Sixty-two immature specimens of *C. strumosum* (HWML no. 38750 and NWHC no. 10697) were collected from a single

eagle taken from Glacier Bay National Park in Alaska. This parasite utilizes marine mammals as its normal definitive host and, as pointed out by Van Cleave (1953), it is likely that these occurrences constitute incidental infections obtained when the eagles fed upon infected marine fishes that serve as paratenic hosts for this parasite.

Two immature specimens of the genus *Andracantha* (HWML no. 38749) were collected from an eagle taken from Port Gavina, Alaska. Based on the nature of trunk spination and proboscis characters, these specimens were determined to be *Andracantha phalacrocoracis*; however, minor ambiguities were noted both in the nature of trunk spination and proboscis armature. Although the specimens of *A. phalacrocoracis* collected in this study lacked genital spines, as did most specimens examined by Schmidt (1975), trunk spines were found by Schmidt (1975) on 1 specimen from the type series and 3 females in his collection. Genital spines are often very difficult to observe when present (Van Cleave, 1945) and they may be lost from the female when the copulatory cap detaches (Van Cleave, 1920; Schmidt, 1975); thus, although the presence of genital spines is designated as a genus-level character, it is often of little use in specimen identification. This is the first report of *A. phalacrocoracis* from *H. leucocephalus*. *Andracantha phalacrocoracis* was originally described by Yamaguti (1939) from a pelagic cormorant in Japan and was also collected from the type host in Alaska (Schmidt, 1975); thus, it appears that this parasite is widely distributed.

Single individuals of *Southwellina hispida* were collected from 2 bald eagles. A mature female (HWML no. 38751) was collected from an eagle in Washington County, Maine and an immature female (HWML no. 38752) was collected from an eagle in Virginia. *Southwellina* is characterized by 2 fields of trunk spines, as is *Andracantha*. Because genital spines are not often a dependable character for generic diagnosis of representatives of the family Polymorphidae from piscivorous birds, reliance on other characters including the nature of trunk spination and egg morphology is necessary when dealing with a small number of specimens. In representatives of the genus *Andracantha*, the spineless zone between the fields of trunk spines is much wider ventrally, often narrowing and ending near the dorsal surface (Schmidt, 1975), whereas, in representatives of the genus *Southwellina*, the spineless zone between the fields of trunk spines is similar in width dorsally and ventrally. Eggs

of representatives of *S. hispida* exhibit conspicuous polar protrusions of the fertilization membrane that are lacking in representatives of the genus *Andracantha*. Proboscis hooks of *S. hispida* never exceed 65 μm in length, whereas those of representatives of the genus *Andracantha* all bear some proboscis hooks exceeding 65 μm . The specimens collected in this study conform in every detail to the description of *S. hispida* as given by Schmidt (1973). This is the first report of this species from a bald eagle and the occurrence of a mature female suggests that bald eagles may serve as definitive hosts for this parasite. *Southwellina hispida* has been reported widely from various species of piscivorous birds (Schmidt, 1973).

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