A taxonomic revision of the Paranoplocephala primordialis (Douthitt) complex
(Phylum: Eucestoda; Order: Anoplocephalidae) in voles and squirrels

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Abstract
This study redescribes Paranoplocephala primordialis (Douthitt) in the red squirrel, Tamiasciurus hudsonicus, describes two new, related species of Paranoplocephala Lühe from Microtus and Myodes (syn. Clethrionomys) voles, and summarizes the patterns of their host specificity and geographic distribution, particularly in Alaska and adjacent regions in Canada and north-eastern Siberia. Paranoplocephala nearctica n. sp. and Paranoplocephala alaskensis n. sp. are shown to be slightly, but consistently differentiated host-specific parasites of Myodes rutilus and Myodes gapperi, and Microtus miurus, respectively. The related Paranoplocephala sp. from Microtus oeconomus is also suspected to be specifically distinct, but the available material does not allow a description of a new species.

Paranoplocephala primordialis-like cestodes occur widely in rodents in North America, ranging from California to Labrador and Alaska, but also in north-eastern Siberia. The specific identity of the few Eurasian specimens could not, however, be confirmed. Paranoplocephala primordialis-like species seem to be rare in all host species and regions, maximum prevalences being 8%, 3%, 6.5% and 5% for P. primordialis, P. nearctica n. sp., P. alaskensis n. sp. and Paranoplocephala sp., respectively.

Key words: tapeworms, Anoplocephalinae, Paranoplocephala alaskensis n. sp., Paranoplocephala nearctica n. sp., Paranoplocephala primordialis, Tamiasciurus, Sciuridae, Microtus, Clethrionomys, Myodes, Cricetidae, Arvicolinae, Alaska

Introduction
Herman Douthitt’s (1915) pioneering study of anoplocephalid cestodes of North American rodents (and other hosts) included descriptions of four new species of Andrya Railliet from pocket gophers, voles and squirrels. These cestode taxa are now generally assigned to Paranoplocephala Lühe (see Tenora et al. 1986; Genov et al. 1996; Haukisalmi et al. 2002; Haukisalmi & Henttonen 2003; Wickström et al. 2005). Of these species, Paranoplocephala macrocephala (Douthitt) [syn. P. translucida (Douthitt)] is a relatively common and widespread parasite of pocket gophers and voles, particularly Microtus spp., in North America. The type material of P. macrocephala is fairly extensive, including both intact specimens and sections, and the taxonomy and phylogenetic relationships of P. macrocephala-like cestodes are now reasonably well understood (Haukisalmi & Henttonen 2003; Haukisalmi et al. 2004).

However, the other two taxa, Paranoplocephala primordialis (Douthitt) and Paranoplocephala communis (Douthitt), are evidently rather rare and sporadic, and their descriptions were based on a few incomplete, sectioned specimens. The latter species, described from contracted fragments only, has generally been regarded as a synonym of P. primordialis (see Baer 1927; Rausch & Schiller 1949; Spasskii 1951), which was suspected already by Douthitt (1915) himself. This synonymy means that P. primordialis would occur in two unrelated species of rodents, i.e. the red squirrel, Tamiasciurus hudsonicus (Sciuromorpha), (type host) and the southern red-backed vole, Myodes gapperi (syn. Clethrionomys gapperi) (Myomorpha).