

The enigmatic species status of nematodes of the genus *Syphacia* in voles on the British Isles

Jerzy M. Behnke¹, Alexander Stewart², Gemma Cooper¹, Anna Bajer³

¹ School of Life Sciences, University of Nottingham, University Park, Nottingham, NG72RD, UK; ² Faculty of Health and Medical Sciences, University of Surrey, Guildford GU2 7XH, UK; ³ Department of Parasitology, Faculty of Biology, University of Warsaw, Warsaw, Poland.

INTRODUCTION. In 1928 Baylis described a new *Syphacia* species which he named *S. nigeriana* from five species of rodents in Nigeria. Later on Quentin (1971) concluded that Baylis' description of *S. nigeriana* matched perfectly the morphology of worms isolated from holoarctic *Microtus* spp. In the meantime, in 1966 Bernard described *S. petrusewiczii* from Polish bank voles. It then became widely accepted that *S. nigeriana* is the *Syphacia* infecting *Microtus* spp., and *S. petrusewiczii* the main species in bank voles (*Myodes glareolus*).

AIMS. Using molecular techniques we have genotyped *Syphacia* species from voles on the British Isles trapped across the country in a wide range of locations, and included in our study also isolates from other European locations, N. America, W. Africa and Japan.

MATERIALS AND METHODS. Our study is based mainly on adult female worms obtained from recent field work, but also from museum collections in Scotland and in the USA. Parasites were genotyped using molecular markers and studied morphologically. PCR amplification, sequencing and phylogenetic analyses were conducted employing three genetic markers: rDNA, SSU and mt cytochrome oxidase subunit I (COI) gene fragment.

RESULTS. Our results indicate that in voles on the British Isles, there is only one genotype of *Syphacia* irrespective of whether the worms are derived from *Microtus agrestis* or *Myodes glareolus*. Isolates from *M. glareolus* from Poland and the Netherlands also fall well within the same genetic clade. Even some isolates from W. African *Mastomys* spp., carried a genotype of *Syphacia* that matched closely the genotype in European voles, suggesting that Quentin may have been correct. However, isolates from Russian and N. American *Myodes rutilus* generated a quite distant clade which is consistent with these worms being *S. petrusewiczii*. We show also that the *Syphacia* infecting three different species of N. American *Microtus* are very closely related genetically to the worms in European *Microtus* spp., insufficiently different to justify a different species identity.

CONCLUSIONS. Our results raise interesting questions about the host specificity of *Syphacia* in European voles and further afield in N. America and in W. African rodents. The evolutionary and geographic implications of our results will be discussed.