

# Molecular phylogeny of the cyst-forming nematodes (Tylenchida: Heteroderidae)



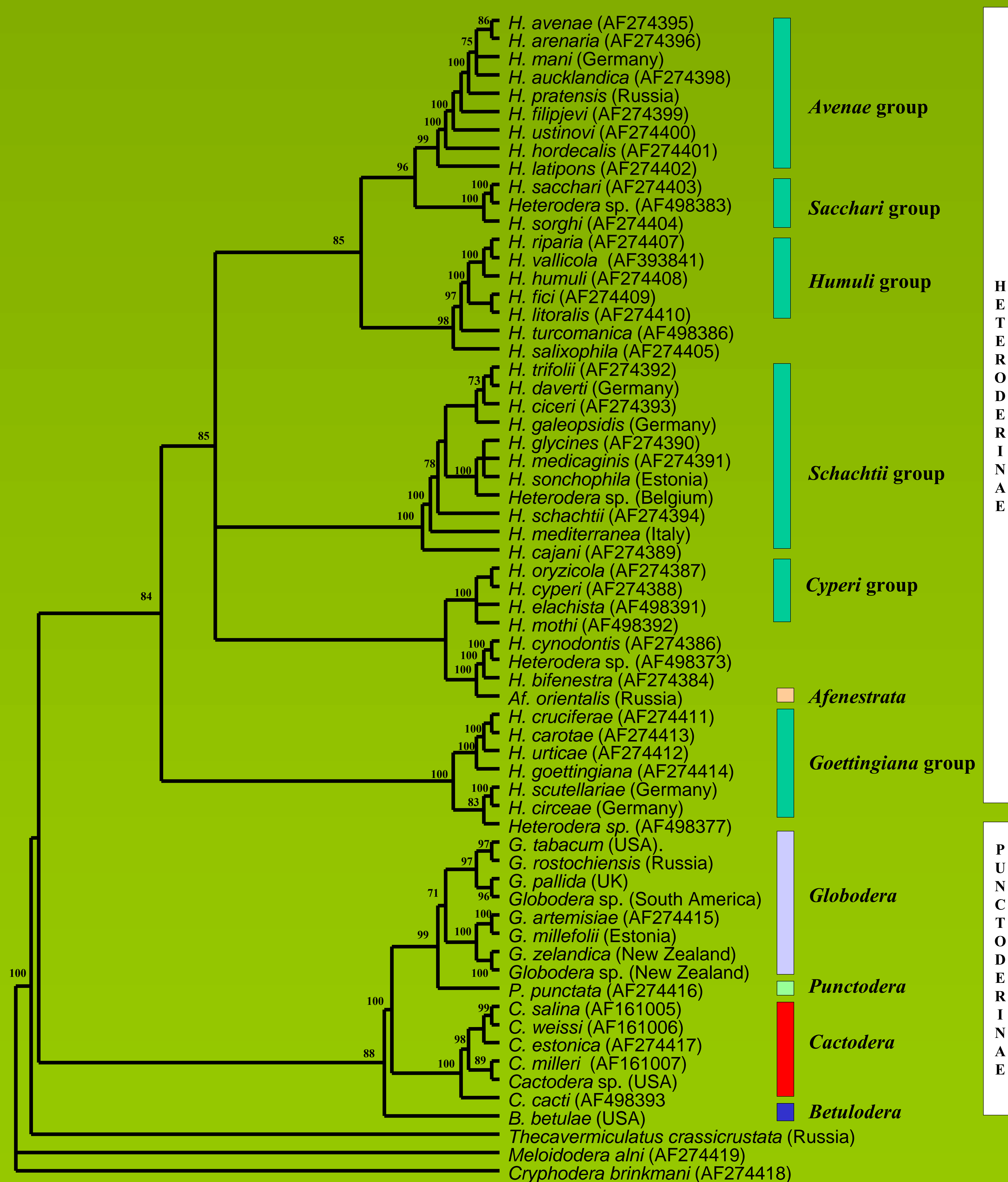
Sergei A. Subbotin<sup>1</sup>, Dieter Sturhan<sup>2</sup> and Maurice Moens<sup>3</sup>

<sup>1</sup>Institute of Parasitology of RAS, Leninskii prospect 33, Moscow, 117071, Russia, s.subbotin@clo.fgov.be,

<sup>2</sup>Biologische Bundesanstalt, Institut für Nematologie und Wirbeltierkunde, Toppheideweg 88, 48161, Münster, Germany,

<sup>3</sup>Crop Protection Department, Agricultural Research Centre, Burg. Van Gansberghelaan 96, 9820 Merelbeke, Belgium.

Sequences of the complete ITS and the D2-D3 expansion segment of the 28S gene of rDNA obtained from fifty-four valid and seven undescribed species of cyst forming nematodes from the genera *Afenestrata*, *Betulodera*, *Cactodera*, *Dolichodera*, *Globodera*, *Heterodera* and *Punctodera* and have been analysed using maximum parsimony. On the phylogenetic trees the species clustered in several major clades corresponding to the morphological grouping and present taxonomic division. The analysis yielded six main morphological groups within the genus *Heterodera*: Avenae, Sacchari, Humuli, Schachtii, Cyperi and Goettingiana. Phylogenetic relationships between some of the *Heterodera* groups were not well resolved. The Goettingiana group occupied a basal position within Heteroderinae. Molecular data strongly supported monophyly of the Punctoderinae containing the genera *Cactodera*, *Globodera*, *Punctodera*, *Betulodera* and *Dolichodera*. *Punctodera* and *Dolichodera* have sister relationships. Analysis of the D2-D3 expansion segment of the 28S gene only partly resolved relationships within basal groups of Heteroderidae.



Strict consensus of 27 equally parsimonious trees from analyses (unweighted parsimony analyses with gaps treated as missing data) of ITS sequence data for 64 species of Heteroderidae. Bootstrap value more than 70% is given on branches.

## REFERENCES

Subbotin, S.A., Halford, P.D., Warry, A., & Perry, R.N. 2000. Variation in ribosomal DNA sequences and phylogeny of *Globodera* parasitising solanaceous plants. *Nematology*, Vol. 2, N 6, 591-604.

Subbotin, S.A., Vierstraete, A., De Ley, P., Rowe, J., Waeyenberge, L., Moens, M., Vanfleteren, J.R. 2001. Phylogenetic relationships within the cyst-forming nematodes (Nematoda, Heteroderidae) based on analysis of sequences from the ITS region of ribosomal DNA. *Molecular Phylogenetics and Evolution*, Vol. 21, N 1, 1-16