Chapter 3

Tabular keys to species of Steinernema and Heterorhabditis

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As of the end of 2015, 95 valid species of Steinernema and 16 species of Heterorhabditis have been described or are in press. As the number of species increases, the identification of individual species becomes progressively more difficult. The identification of species based on one stage may not be accurate because there are few differentiating morphological characteristics between species, and morphometric ranges of several species overlap. Characteristics of males, females and infective juveniles (IJ) must be used for accurate identification. Diagnostic characteristics of various stages of the different species are presented in this part so as to help in the identification of species of entomopathogenic nematodes. Morphological and morphometrical characteristics can be used to identify species of Steinernema, but they are less reliable for species differentiation in Heterorhabditis. Molecular characterisation is necessary for final confirmation of identity.

Morphology of the families Steinernematidae and Heterorhabditidae

The morphology of this group of nematodes is presented in detail by Nguyen (2007).

Identification of Steinernema and Heterorhabditis species

The diagnostic characters for the identification of species of Steinernema are presented in Table 3.1 and those for Heterorhabditis in
Table 3.2. The nematode morphometrics are arranged in descending order of body length of IJ and characters considered important are in boldface.

**Ratios and abbreviations used in the keys**

- \( L \) = body length,
- \( MBD \) = max. body diam.,
- \( EP \) = distance from anterior end to excretory pore,
- \( NR \) = distance from anterior end to nerve ring,
- \( ES \) = pharynx length,
- \( T \) = tail length,
- \( a = \frac{L}{MBD} \),
- \( b = \frac{L}{ES} \),
- \( c = \frac{L}{T} \),
- \( D\% = \frac{EP}{ES} \times 100 \),
- \( E\% = \frac{EP}{T} \times 100 \),
- \( ABD \) = anal body diam.,
- \( SL \) = spicule length,
- \( GL \) = gubernaculum length,
- \( IJ \) = infective juvenile,
- \( SW\% = \frac{spicule \ length}{ABD} \times 100 \),
- \( GS\% = \frac{gubernaculum}{spicule} \times 100 \),
- \( MUC \) = mucron,
- \( A \) = absent,
- \( P \) = present,
- \( na \) = not available.

**How to use the tables for identification**

To identify a nematode, the following steps should be followed:

- The nematode should be reared in *Galleria mellonella*.
- Make measurements of ten IJ and ten males of the target nematode.
- Match the IJ body length of the nematode with nematodes that have a similar body length in the key.
- Compare the collected data with the measurements in **boldface** letters and **specific characters** of selected nematodes.
- Decide which nematodes in the key are most similar to the one being identified.
- Compare with the original descriptions to confirm the identity.