

SEM and systematic studies of *Steinernema abbasi* Elawad et al., 1997, and *S. riobrave* Cabanillas et al., 1994 (Rhabditida: Steinernematidae)

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Abstract

SEM studies of the two nematodes *Steinernema abbasi* and *S. riobrave* revealed that they have two horn-like structures on the labial region similar to those of *S. bicornutum*, *S. ceratophorum*, *S. pakistanense*, and *S. thermophilum*. The structures were not mentioned in the original descriptions. In addition, *S. riobrave* has the twelfth pair of genital papillae at the edge of the cloaca. The papillae at this position were reported only in *S. scapterisci*. The formula of the lateral field pattern of *S. abbasi* is 2, 6, 8, 7, 6, 2, and that of *S. riobrave* is 2, 7, 8, 6, 2. Phylogenetic trees from sequences of D2/D3, and ITS regions of *Steinernema* species show that the four species *S. abbasi*, *S. bicornutum*, *S. ceratophorum*, and *S. riobrave* comprise a monophyletic group. These relationships support the present morphological studies.

Key words: Entomopathogenic nematodes, D2/D3, ITS, morphology, *S. abbasi*, *S. riobrave*, systematics

Introduction

Morphological studies of *Steinernema abbasi* Elawad, Amad & Reid, 1997 and *S. riobrave* Cabanillas, Poinar & Raulston, 1994 showed that there are some structures which are important in taxonomy but were not reported when the nematodes were described. Since *S. abbasi* may have a good potential for biological control of insects in subtropical region, and *S. riobrave* may be used to control insect pests such as the citrus root weevils, mole crickets etc, accurate identification of these nematodes becomes important. The purpose of this paper is to present SEM structures of the two nematode species. Some of these structures are important for their differentiation.