

Research Thrusts

➔ Molecular Genealogies of Pest Species: Why We Should Care

Purdue nematologist Virginia Ferris and her laboratory colleagues are leaders in molecular research in economically important plant parasitic cyst nematodes. Their goal is to determine the relationships of dozens of such nematodes to each other and to other well-studied nematode species for which no molecular data existed prior to their study.

The tools of functional genomics can help us understand the comparative molecular relationships of intensively studied model species to pest species that may be more difficult to study and can give us insight into the relationships of all closely related pest species to each other. It is important to understand these relationships because control measures based on increased knowledge of gene function in one species may also be exploited for use in managing other closely related pest species. This is especially true for pest species of cyst nematodes, which have many close relatives that do not cause damage to important agricultural plants, but which otherwise have many apparent similarities to the pest species.

The Ferris laboratory began the molecular study with soybean cyst nematode, the most destructive and economically important pest of soybeans. They soon expanded their work to include other cyst nematodes, many of which cause losses in cereals, root crops, and forage crops. A lot is known on a global basis about cyst nematodes, but the information heretofore had been largely restricted to knowledge about highly conserved elements of shape and form that mask important genetic differences among species and geographical isolates of nominal species.

The Purdue work reveals relationships on a molecular level among nematode species and also provides molecular data necessary for constructing molecular markers that can be used by regulatory agencies and others who need precise identifications for pest species. The Purdue research on cyst nematodes is global, with collaborators worldwide, and has revealed surprising relationships among these important nematode pests.

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Ferris, V. R., E. Krall, J. Faghihi, and J. M. Ferris. (1999) Phylogenetic relationships of *Globodera millefolii*, *G. artemisiae*, and *Cactodera salina* based on ITS region of ribosomal DNA. *Journal of Nematology* 31: 498-507.

Ferris, V. R. (1998) Evolution, Phylogeny and Systematics. Pp. 57-82 in *Plant Parasitic Nematodes*, ed. S. Sharma, Chapman Press.