# NEWS RELEASE

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## Researchers Receive $1.59M Grant to Map Genome of Parasitic Worm

FOR IMMEDIATE RELEASE

North Carolina State University scientists, in collaboration with Orion Genomics LLC, have received a two-year, $1.59 million grant from the National Research Initiative of the U.S. Department of Agriculture's Cooperative State Research, Education and Extension Service (CSREES) through the National Science Foundation/CSREES Microbial Genome Sequencing Program to map the genome of one of the world's most common and destructive plant parasites – the microscopic, soil-dwelling root-knot nematode.

Dr. Charles Opperman, professor of plant pathology at NC State, co-director of the Center for the Biology of Nematode Parasitism and the primary investigator for the grant, says the research may help lead to novel means of managing the ubiquitous worm. The resulting sequence data will be made public, so other researchers interested in certain aspects of the root-knot nematode – how it develops, establishes a host-parasite interaction or evades host defenses, for example – will then be able to use the map of the parasite's genes as a tool to discover more specific information about the parasite. The root-knot nematode will be the first parasitic nematode to have its genome sequenced, Opperman says.

Arguably the single most important plant parasitic nematode, Opperman estimates the root-knot nematode causes more than half of the $100 billion in crop and plant damage caused by nematodes yearly. It infects some 2,000 plant species, causing galls or knots on the roots of its victims. It is also an ubiquitous pest for the home gardener.

"Root-knot nematodes invade behind the root tip and migrate to the area of the plant where water and nutrients are transported. A female root-knot nematode will then become sedentary and produce as many as 1,000 eggs in 30 days, which will hatch and re-infect the roots. So you can have multiple generations infecting plants in one season," Opperman says.

Above ground, infected plants will show stunted growth or become yellowed or wilted. The root-knot nematode does not discriminate, infecting peanuts, tomatoes and soybeans, just to name a few widely grown crops.

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Finding a way to manage or control the root-knot nematode population hasn't always been very successful to date, Opperman says, mostly due to the high costs of chemical nematicides.

"The root-knot nematode's tolerance to pesticides is quite robust, so in many cases the defenses against root-knot nematodes are more toxic to vertebrates than to the nematodes," he says. "There are also non-target effects of pesticides to worry about, like the groundwater and other environmental concerns."

NC State's Genome Research Laboratory will perform about half of the sequencing work, with collaborator Orion Genomics LLC performing the remainder. Collaborating with Opperman on the project are Dr. Bryon Sosinski, director of the Genome Research Lab, and Dr. David Bird, associate professor of plant pathology and co-director of the Center for the Biology of Nematode Parasitism. A variety of post-doctoral students, graduate students and undergraduates will be involved in the project.

"This project represents a significant step forward in the quest to understand the molecular and genetic basis of plant parasitic nematodes' ability to attack crop plants, and will provide an invaluable resource to researchers around the world," Opperman says.

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