appears to reduce the emergence rate. This desiccation technique appears promising for field applications, as some desiccated cadavers produced significant numbers of IJ. Further investigations into the effects of this desiccation regime are underway.

ECOLOGY AND OVER-WINTERING ABILITY OF *ROTYLENCHULUS RENIFORMIS* ON COTTON IN ARKANSAS. **Still, J. A.,[1] and T. L. Kirkpatrick.[2]** [1]Department of Plant Pathology, University of Arkansas, Fayetteville, AR 72701 and [2]University of Arkansas, SWREC, Hope, AR 71801.

The reniform nematode, *Rotylenchulus reniformis*, was first reported in Arkansas in 1988. Incidence of this nematode in the state is greatest in cotton fields in east-central and southern Arkansas. In 1998, reniform nematodes were first detected in three fields in extreme northeastern Arkansas (Mississippi Co.). Soil samples submitted to the Arkansas Nematode Diagnostic Laboratory from production fields in this area of the state indicate an increase in incidence of the reniform nematode in this region. Preliminary investigations indicate that *R. reniformis* population densities in the spring in northeastern Arkansas are much lower than population densities in the southern part of the state at the same time of year. An experiment to evaluate the impact of soil texture and temperature on the temporal population dynamics and over-wintering survival of the reniform nematode on cotton in these two regions was initiated in 2005. Ten individual sampling points were established in each of the three soil types in a single production field in Mississippi Co., AR (MS) and in one soil type in a production field in Monroe Co., AR (MR) in June, 2005 with a Global Positioning System. The soil types in the MS field were: loamy sand (79% sand, 16% silt, 5% clay), sandy loam (63% sand, 27% silt, 10% clay), and sandy clay loam (63% sand, 17% silt, 20% clay). The soil type in the MR field was relatively uniform across the entire field and was a silt loam (19% sand, 70% silt, 11% clay). Monthly soil samples were collected from all sites from June, 2005–March, 2006. In addition, samples were collected vertically to a depth of 120 cm from each site in October, 2005 and in February and April, 2006. Nematode population densities in the MS field during the winter months stayed low in the soils where there was a higher percentage of sand and increased as clay content increased and had little variation over time. Nematode population densities in the MR field increased during the winter months and stayed high through March, 2006.

SOIL HEALTH BENEFITS FROM A SUGARANE FARMING SYSTEM INVOLVING CROP ROTATION, MINIMUM TILLAGE, CONTROLLED TRAFFIC AND TRASH RETENTION. **Stirling, G. R., A. L. Garside, M. J. Bell and B. G. Robotham.** Sugar Yield Decline Joint Venture, C/- Sugar Research and Development Corporation, Brisbane, QLD, Australia.

In 1993, the Australian sugar industry established a multi-disciplinary research team to identify reasons for a decline in the productive capacity of sugarcane soils. At that time, sugarcane was grown on beds 1.5 m apart, the wheel spacing of harvest machinery did not match crop row spacing and crop residues were often burnt rather than retained. After a plant and 2–4 ratoon crops, fields were ripped and cultivated to alleviate compaction and sugarcane was replanted. Initial studies showed that soils farmed in this manner were degraded from a physical and chemical perspective, while yield increases of 20–40% in fumigated soil indicated that biological constraints were also limiting productivity. Since yield responses of almost the same magnitude were obtained by breaking the sugarcane monoculture with legumes, a new cropping system was devised that included a legume crop in a short fallow. Soils were cultivated to remove existing compaction and permanent wide beds were established with separate cropping and traffic zones. Sugarcane and soybean were grown using minimum tillage techniques and crop residues were retained as mulch on the soil surface. This new farming system has been adopted by growers because productivity has been maintained while profitability and sustainability have improved. From a nematological perspective, losses from *Pratylenchus zeae* have been reduced because nematode populations are lower, damage thresholds have increased and suppressive biological control mechanisms are operating more effectively. Current studies aim to match nutrient availability from crop residues with the nutrient requirements of the crop and the free-living nematode community is being used as a biological indicator.

ENTOMOPATHOGENIC NEMATODES AND BIOLOGICAL CONTROL OF THE ROOT WEEVIL, *DIAPREPES ABBREVIATUS*, IN FLORIDA CITRUS: OPTIMIZING CONTROL ACROSS SITES AND SOILS. **Stuart, R. J.** University of Florida, Institute of Food and Agricultural Sciences, Citrus Research and Education Center, 700 Experiment Station Road, Lake Alfred, FL 33850.

Entomopathogenic nematodes (EPN) are being recognized as important elements for integrated pest management (IPM) in many fruit and nut crops. One of the best examples is the use of EPN in Florida citrus to control root weevils, especially *Diaprepes abbreviatus* (L.) (*Coleoptera: Curculionidae*). In citrus, larval feeding damages roots, reduces yield and kills trees by girdling or by facilitating infection by plant pathogenic *Phytophthora* spp. At present, the only recommended control for larvae is the application of EPN twice per year. Commercial nematode products have been successfully marketed in Florida citrus for weevil control for over 15 years, and many factors have contributed to this success. Biologically, the most important factor was the discovery of an EPN that could be applied to effectively control this weevil. Ecologically, Florida citrus groves have several important characteristics that facilitate EPN effectiveness including sandy soils, irrigation, and a limited shaded area under the canopy for application. Economically, *D. abbreviatus* is capable of killing trees and destroying groves, and so grower demand for effective control was high. Moreover, many chemical insecticides were eliminated due to regulatory pressures and the newer chemicals have not been able to compete with nematodes in price or efficacy. The relatively low cost of nematode application compared to the high value of the citrus crop was undoubtedly a key factor. However, certain citrus growing areas in Florida have a rich fauna of endemic EPN, and these populations can be responsible for considerable natural biological control of *D. abbreviatus*. Moreover, applications of exotic EPN can have a suppressive effect on endemic EPN. Thus, determining the best approach for using EPN in conservation biological control, and when, where, and how often to apply EPN for inundative biological control are current research issues being faced in an effort to optimize control of *D. abbreviatus*.

MOLECULAR PHYLOGENY OF THE ORDER TYLENCHIDA: ANALYSIS OF NUCLEAR RIBOSOMAL RNA GENES. **Subbotin, S. A.,[1] D. Sturhan,[2] B. J. Adams,[3] T. O. Powers,[4] P. G. Mullin,[4] V. N. Chizhov,[5] N. Vovlas,[6] and J. G. Baldwin.[1]** [1]Department of Nematology, University of California, Riverside; [2]Institut für Nematologie und Wirbeltierkunde, Münster, Germany; [3]Microbiology and Molecular Biology, Brigham Young University, Provo; [4]Department of Plant Pathology, University of Nebraska, Lincoln; [5]Institute of Parasitology, Moscow, Russia; [6]C.N.R. Istituto per la Protezione delle Piante, Bari, Italy.

To study the evolutionary relationships among more than 70 representatives of the order Tylenchida, datasets containing sequences of LSU D2-D3 expansion segments and partial sequences of the SSU were analyzed using maximum parsimony, maximum likelihood and Bayesian inference. Species included were selected to represent the known breadth of taxonomic and morphological diversity of the group. Phylogenetic analyses indicate that Tylenchida contains well-supported lineages that largely correspond to Siddiqi's (2000) Hoplolaimina and Criconematina. Several significant results also derived from our study include: (i) the basal position of groups that include entomoparasitic nematodes within tylenchid trees, (ii) paraphyly of the superfamily Dolichodoroidea *sensu* Siddiqi (2000) with placement of Merliniinae representatives outside Hoplolaimina; (iii) paraphyly of Tylenchoidea; (iv) paraphyly of the genus *Ditylenchus*; (v) evidence for a *Pratylenchus, Hirschmanniella* and *Meloidogyne* clade; (vi) lack of support for traditional placement of *Radopholus* within Pratylenchidae. Congruence and discordance of molecular phylogeny and traditional classifications and morphological-based hypotheses of phylogeny of tylenchids are discussed. It is suggested that in some cases phylogenetic reconstruction of Tylenchida using the SSU alone might be influenced by long branch attraction occurring as a result of unequal rates of evolution among independent tylenchid lineages. The need for a better understanding of informative morphological characters, and the need for additional representatives, particularly of some basal groups, is discussed.

HETERODERA GLYCINES AFFECTS SOYBEAN INFECTION BY *CADOPHORA GREGATA*. **Tabor, G. M., C. R. Bronson and G. L. Tylka.** Department of Plant Pathology, Iowa State University, Ames, Iowa 50011.

Growth-chamber experiments were conducted to assess the effects of *Heterodera glycines* on infection of soybean, *Glycine max*, by *Cadophora gregata* (formerly *Phialophora gregata*), the fungus that causes brown stem rot (BSR) of soybeans. Soybean cultivars with various combinations of resistance and susceptibility to *H. glycines* and *C. gregata* were inoculated with *C. gregata* alone or *C. gregata* plus *H. glycines* (1,200 eggs/100 cm^3 soil). In most *H. glycines*-susceptible soybeans, incidence and severity of internal stem discoloration characteristic of BSR disease was greater with *H. glycines* than without, regardless of the cultivars' susceptibility or resistance to *C. gregata*. The effect of *H. glycines* on BSR stem symptoms was less in cultivars resistant to both *C. gregata* and *H. glycines* than cultivars only resistant to *C. gregata*. *Cadophora gregata* colonization of *C. gregata*-resistant cultivars was increased by *H. glycines*, and stems of both a *C. gregata*-resistant and a *C. gregata*-susceptible soybean cultivar were colonized earlier by *C. gregata* when the plants also were infected with *H. glycines* than when plants were only infected with the fungus. Additional growth-chamber experiments were conducted to determine the effect of *H. glycines* population densities on incidence and severity of stem colonization by *C. gregata*. Soybean cultivars with three combinations of resistance and susceptibility to *H. glycines* and *C. gregata* were inoculated with *C. gregata* alone or with *C. gregata* plus one of two *H. glycines* population densities (1,500 or 10,000 eggs/100 cm^3 soil). There was earlier colonization of stems of *H. glycines*-susceptible soybeans by *C. gregata* with the higher *H. glycines* population density than the lower density. Severity of *C. gregata* stem colonization did not increase with increasing *H. glycines* population density in a *C. gregata*- and *H. glycines*-resistant soybean cultivar. Microplot experiments are being conducted to study the interaction of these organisms in the field.

SUSTAINABLE MANAGEMENT OF NEMATODES IN EAST AND SOUTHERN AFRICA REQUIRES CAPACITY BUILDING IN THE REGION. **Talwana, H. A. L.,[1] J. W. Kimenju,[2] Z. Sibanda,[3] W. J. Wanjohi,[4] S. R. Gowen,[5] D. J. Hunt,[6] and B. R. Kerry.[7]** [1]Department of Crop Science, Makerere University, P. O. Box 7062, Kampala, Uganda; [2]Faculty of Agriculture, University of Nairobi, Kenya; [3]Sibanda Consultancy, Harare, Zimbabwe; [4]School of Pure and