

Glycinoeclepin A, extracted from kidney bean roots, reportedly stimulates hatching of *Heterodera glycines* eggs. A stable synthetic precursor of glycinoeclepin A was discovered to inhibit hatching of free *H. glycines* eggs in vitro. Fewer than 4% of eggs hatched over 28 days when incubated at 26 C in a 54 µg/ml aqueous solution of the inhibitory compound, whereas 20 to 30% hatched in deionized water and 40 to 60% hatched in 3 mM zinc sulfate. No other adverse effects of the inhibitory compound on *H. glycines* were detected. Second-stage juveniles hatched readily from eggs when eggs were transferred after 14 days from the inhibitory compound to deionized water or zinc sulfate. Infectivity of juveniles hatched from eggs incubated in the hatch inhibiting compound and fecundity of females developed from such juveniles were not significantly different from infectivity and fecundity of nematodes developing from eggs incubated in deionized water and zinc sulfate.

EMBRYOLOGICAL DEVELOPMENT OF FIELD AND GREENHOUSE POPULATIONS OF *HETERODERA GLYCINES*. **Wainwright, L. L., and G. L. Tylka.** Department of Plant Pathology, Iowa State University, Ames, IA 50011.

Flow cytometry was used to monitor embryological development of soybean cyst nematode, *Heterodera glycines*, under greenhouse and field conditions. During the summer of 1993, roots of susceptible soybean were collected weekly from four replicate plots in a naturally infested field. Ample quantities of females were not observed on roots until 74 days after planting (DAP). Eggs extracted from females and cysts recovered from roots were analyzed for development. At 74 DAP, most eggs were in early stages of development, whereas almost entirely mature eggs containing vermiform juveniles were observed at 110 DAP. It is likely that there was a single *H. glycines* generation in this field in 1993. Flow cytometric analysis of eggs collected from females and cysts on roots of susceptible soybean growing in replicate pots incubated at 26 C in the greenhouse revealed similar developmental trends occurring from 25 to 45 DAP.

[ USE OF POULTRY LITTER AND MANURE FOR *MELOIDOGYNE INCOGNITA* MANAGEMENT ON SQUASH. **Walker, N. R., B. A. Fortnum, and J. Camberato.** Department of Plant Pathology and Physiology, Clemson University, Clemson, SC 29634-0377.

Organic soil amendments (poultry litter and three types of poultry manure) were evaluated for suppression of *Meloidogyne incognita* on field grown summer squash 'Goldbar'. Organic amendments or fertilizer (10-10-10, N-P-K analysis) were added to soil, incorporated with a power driven rotary hoe and the rows covered with plastic mulch. Plots were irrigated as needed through trickle tubing. Fertilizer and manure provided comparable quantities of inorganic nitrogen when application of manure was based on 60% of organic nitrogen and 80% of ammonium nitrogen as available to the crop. Root galling was lower ( $P = 0.05$ ) in plots receiving litter amendments when compared to inorganic fertilizer applications. Poultry manure and litter amendments resulted in squash yields comparable to yields in plots treated with inorganic fertilizer. ]

ROTATIONS WITH WINTER COVER CROPS FOR THE MANAGEMENT OF ROOT-KNOT NEMATODES IN EGGPLANT. **Weaver, C. F., R. Rodríguez-Kábana, and D. G. Robertson.** Department of Plant Pathology, Auburn University, Auburn, AL 36849-5409.

A microplot experiment was conducted for 2 years to evaluate the effects of several winter rotation crops on population densities of *Meloidogyne arenaria* and yield of 'Black Beauty' eggplant. The winter crops evaluated were rye (*Secale cereale* cv. Wintergrazer 70), crimson clover (*Trifolium incarnatum*), ryegrass (*Lolium multiflorum* cv. Marshall), oat (*Avena sativa* cv.

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the 1st, 2nd, 4th, and the 16th rice crop after deforestation at one site and from the 8th rice crop at another site. Nematodes present were: *Helicotylenchus abunaamai*, *H. dihystra*, *H. retusus*, *Meloidogyne incognita*, *Pratylenchus zaeae*, *P. brachyurus*, and an unidentified species of *Meloidogyne*. *Pratylenchus* was present in 14% of the samples in 1-year old fields (YOF), 37% of 2-YOF, 44% of 4-YOF, 87% of 8-YOF, and 93% of 16-YOF. Similar trends were observed for *Helicotylenchus* and *Meloidogyne* spp. The composition of the nematode communities indicates that *Pratylenchus* and *Meloidogyne* did not share the same niche or were antagonistic.

**SUPPRESSION OF *MELOIDOGYNE INCOGNITA* ON COTTON BY CHICKEN LITTER.** Riegel, C., and J. P. Noe, Department Plant Pathology, University of Georgia, Athens, GA 30602.

Suppression of *Meloidogyne incognita* on cotton cultivar DPL50 in litter amended soils was investigated in the greenhouse and in microplots. In the greenhouse, litter at rates of 0, 0.125, 0.25, 0.5, and 1% by weight was added to field soil, with and without 5,000 *M. incognita* eggs/pot at 28, 14, and 0 days before planting. Soil was assayed for bacteria, fungi, and nematodes. Numbers of *M. incognita* eggs at harvest decreased linearly as litter rates increased from 6,424 eggs in the nonamended control to 4,413 at the 1% rate. Bacterial counts increased from  $2.63 \times 10^7$  to  $1.03 \times 10^8$  cfu as rates of litter amendments increased. Boll weight increased as litter rate and bacterial numbers increased. Microplot and greenhouse data showed similar trends. Fungi isolated from the soil-litter mixture included species of *Aspergillus*, *Aureobasidium*, *Fusarium*, and *Trichoderma*. The effects of bacteria and fungi on *M. incognita* are being investigated.

**RENIFORM NEMATODE RESISTANCE IN *HETERODERA GLYCINES* RACE DIFFERENTIALS.** Robbins, R. T., and L. Rakes. Nematology Laboratory, University of Arkansas, Fayetteville, AK 72701.

The cultivars and PI lines used to differentiate races of *H. glycines*, PI-437654 (resistant to all races), susceptible Braxton, and resistant Forrest were evaluated for resistance to *Rotylenchulus reniformis*. Reproductive indices were calculated by dividing the population at 60 days after inoculation (Pf) by the inoculation rate (Pi) (1,000 vermiform reniform nematodes/pot). Treatments were completely randomized and repeated four times with eight observations each. Composite analyses showed cultivars Lee and Braxton were susceptible; PI-88788 moderately susceptible, cultivars Forrest, Pickett, Peking, and PI-437654 and PI-90763 poor hosts. Cultivars Forrest, Peking, and PI-437654 and PI-90763 had at least one test with the standard deviation greater than the mean that suggests segregation.

**MOVEMENT OF *ROTYLENCHULUS RENIFORMIS* AND *MELOIDOGYNE INCOGNITA* IN RESPONSE TO CARBON DIOXIDE.** Robinson, A. F., and A. C. Bridges. USDA ARS, SCRL, College Station, TX 77845.

Movement of vermiform *Rotylenchulus reniformis* and *Meloidogyne incognita* through sand columns toward a point source of carbon dioxide was studied at 21 C in 4-cm-d, 7.2-cm-long acrylic tubes containing 82 cm<sup>3</sup> of moist sand. Nematodes were injected into the centers of tubes or applied to the sand surface on each end. Their distribution was examined at various intervals for 48 hours by sectioning each tube into 9 or 27 equal volumes and extracting nematodes. Carbon dioxide was pumped peristaltically at several flow rates between 3 and 300  $\mu$ l/minute through a needle inserted at 2.2 cm from one end of the tube. Optimal gas flow for attracting both species was between 5 and 20  $\mu$ l/minute. In this range, 90% of the nematodes moved toward