with chicken manure + MeloCon. *Verticillium dahliae* infection in potato stems significantly increased from July 13 to August 11 ($p < 0.001$), where the greatest infection was under the Vydate treatment (70%). Although there were no significant differences between treatments, *P. penetrans* root infection was the lowest in potato plants treated with chicken manure + Vydate ($p = 0.0237$). Regarding disease severity, it was highest in the untreated plants (65.112) and the most effective treatment overtime was LAB + MeloCon (% control = 63.6%). Lastly, tuber yield was the highest under LAB treatment (403 CWT/ac) and the lowest vascular discoloration presence was on tubers from LAB + MeloCon plots (11.6%). Thus far, our results allow us to conclude that in combination with chicken manure or LAB, *P. lilacinum* is effective on managing PED.

A-29

MANAGEMENT OF PLANT-PARASITIC NEMATODES AND SOIL HEALTH USING SORGHUM/SORGHUM-SUDANGRASS HYBRIDS AS A COVER CROP. **Paudel, Roshan, K.-H Wang, and P. Waisen.** Plant and Environmental Protection Sciences, University of Hawaii at Manoa, Honolulu, HI 96822.

Sorghum and Sorghum-sudangrass hybrids (SSgH) are used as cover crops to increase soil organic matter and suppress root-knot nematodes in various cropping systems. A wide range of SSgH varieties that include forage sorghum, energy sorghum, sudangrass, and sorghum-sudangrass hybrids were examined to identify the most efficient varieties in tropical climate for 1) plant-parasitic nematode suppression, 2) soil water conservation, and 3) soil microbiome enhancement. It is hypothesized that different age of SSgH will have different allelopathic performance. Greenhouse tube bioassays were conducted to compare the amendments of 10 SSgH varieties to sunn hemp and an unamended control against *Meloidogyne incognita* infection on mustard green 'Hirayama' (*Brassica juncea*) using sterile sand: soil mix. Soil was amended with chopped tissues at 1% (w/w, dry weight basis) collected from 1- and 2-month old plant tissues grown in open field. Each dibble tube was inoculated with 220 second-stage juveniles (J2) of *M. incognita* on the same day. Results showed that the one-month-old tissue in Trial I was most suppressive to *M. incognita* female formation by 'NX2', 'LA' and 'CV', but only 'NX2' and 'LA' remained suppressive along with '512' to root-knot when using the 2-month old tissues. Bioassay results from Trial II identified 'LA' and 'CV' to be highly suppressive to root-knot females, followed by 'NX2', '512', and 'MII', all of which were significantly more suppressive than the unamended control ($P < 0.05$). Using the greenhouse results, a field trial was initiated at Poamoho Experiment Station on May 28, 2020 to compare 7 SSgH varieties to a fallow control in 3.6×1.2 m^2 plots in a randomized complete block design with four replications. Cover crop was terminated at 2.5 months after planting using a flail mower, and eggplant seedlings were transplanted 2 weeks following the termination of SSgH cover crops. Energy sorghum variety NX2/NX-5D61 had the highest plant biomass, soil organic carbon, soil moisture, soil microbial respiration (using Solvita CO_2-burst reader), and microbial biomass (using Total Phospholipid Fatty Acids, TPLFA). Canonical correspondence analysis (CCA) showed higher SSgH biomass led to higher microbial biomass, nematode enrichment index, microbial respiration, and gravimetric and volumetric soil moisture. Soil carbon was positively related to nematode structure index, volumetric soil moisture, abundance of omnivorous nematodes, all of which are indicatives of a less disturbed soil food web. The plant-parasitic nematodes were positively related to Gram-positive/Gram-negative bacteria which indicated their association with less stress conditions, but negatively related to SSgH biomass, nutrient enrichment, or structured soil food web, as well as total microbial biomass. Both greenhouse and field experiments suggested that NX2 was the most effective SSgH cover crop variety for root-knot nematode suppression, and soil health improvement in Hawaii.

S-30

POPULATION DYNAMICS OF *BURSAPHELENCHUS XYLOPHILUS* ASSOCIATED WITH PINE FOREST DECLINE. **Pires, David[1], J. Campôa[2], J. Branco[1], I. Miranda[3], T. Calvão[2], M. Mota[1], and C. Pimentel[3]**. [1]Mediterranean Institute for Agriculture, Environment and Development (MED), University of Évora, Portugal; [2]Center for Environmental and Sustainability Research (CENSE), Faculty of Science and Technology, New University of Lisbon, Portugal; [3]Forest Research Centre (CEF), School of Agriculture, University of Lisbon, Portugal.

The pinewood nematode (PWN), *Bursaphelenchus xylophilus*, is a quarantine organism in the European Union and the causal agent of pine wilt disease (PWD), a serious threat to pine forests worldwide, leading to rapid decline and death. In Europe, this invasive pest was first reported in Portugal in 1999, on *Pinus pinaster*. Due to its economic importance and worldwide distribution, an enormous effort has been devoted to research on *B. xylophilus* and PWD. However, relating the presence and abundance of this pest with actual forest decline and mortality is not straightforward. In the present work, we assess the interaction between *B. xylophilus* populations and pine decline at the tree and landscape level. To test this, we determined PWN population densities from different sections of healthy and declining *P. pinaster* – considered very susceptible to PWN – and *P. pinea* – considered resistant, in two consecutive years. The studied site was Herdade da Apostiça (Sesimbra, Portugal), a 4 thousand ha forest that exhibits areas of moderate to severe decline. An approximate 500 m long transect was set in four different areas of the experimental site, along which healthy and declining *P. pinaster* trees were randomly selected. Wood samples from lower (DBH), middle (M) and upper (T) sections of trees were retrieved whenever possible, and kept in individual plastic bags to avoid cross contamination. Twigs from the canopy were also sampled. When present, samples from *P. pinea* were collected as well. Nematodes were extracted from wood material using a modified Baermann tray method, and counted under a stereoscopic microscope. With only few exceptions, M and T sections consistently displayed the lowest PWN densities, although samples collected at breast height (DBH) also had relatively low numbers of *B. xylophilus*. On the other hand, twigs had the highest numbers of nematodes in all areas. Surprisingly, nematodes were extracted from the canopy of apparently healthy *P. pinaster* trees, including the PWN, although in low densities. Expectedly, areas with no visible tree decline had low population densities of *B. xylophilus*, and declining trees tended to present higher numbers. *P. pinea* samples were mostly free of the PWN. To further understand the complex dynamics shaping pine forest decline caused by the PWN, more sampling will be carried out in the upcoming months. This will allow us to build predictive models on the spread and damage of PWD.