

Multistate Project W5186

2024 Annual Meeting Minutes

Project/Activity Number: W5186
Project/Activity Title: Variability, Adaptation and Management of Nematodes Impacting Crop Production and Trade
Period Covered: 2024
Date of This Report:
Annual Meeting Date(s): November 7-8, 2024
Venue: University of Hawaii at Manoa, Honolulu, Hawaii

Officers:

Chair: Haddish Melakeberhan
Vice Chair: Simon “Niels” Groen
Secretary: Simon “Niels” Groen
NIFA Representatives: Amer Fayad and Vijay Nandula
USDA-NIFA Administrator: Jennifer Horton

W5186 Meeting Participants:

Siddique, Shahid (University of California-Davis)
Hodson, Amanda (University of California-Davis)
Gleason, Cynthia (Washington State University)
Lawrence, Kathy (Auburn University)
Melakeberhan, Haddish (Michigan State University)
Groen, Simon “Niels” (University of California-Riverside)
Beacham, Jacqueline (New Mexico State University)
Powers, Thomas (University of Nebraska),
Sipes, Brent (University of Hawaii)
Peter DiGennaro (University of Wisconsin)
Joana “Asia” Kud (University of Arkansas)
Tristan Watson (Louisiana State University)
Paulo Vieira (USDA-ARS, Beltsville)

Absent due to unforeseen circumstances: Dandurand, Louise-Marie (University of Idaho), Lei Zhang (Indiana University), Johan Desaegeer (University of Florida), Adrienne Gorny (North Carolina State University), Travis Faske (University of Arkansas)

Guests:

Koon-Hui Wang, Chair, PEPS (University of Hawaii)
Parwinder Grewal, Dean, CTAHR (University of Hawaii)
Roxana Myers (USDA-ARS, PBARC)
Arieta Faaulu (University of Hawaii)
Landon Wong (University of Hawaii)
Roshan Paudel (University of Hawaii)

Kekoa Larger (University of Hawaii)
Melanie Pitiki (University of Hawaii)
Ruka Kawasumi (University of Hawaii)

Brief summary of minutes of annual meeting:

Business Meeting November 7, 2024:

Following group introductions, Dr. Wang, Chair of PEPS, welcomed the group. The meeting started with a unanimous approval of the minutes from the last meeting (moved by Kathy Lawrence and seconded by Brent Sipes). Before moving to state and guest reports, the team extensively discussed the choice of a new Administrative Advisor. The team considered several candidates, including Dean Parwinder Grewal, University of Hawaii, and Dean Paula Aguilar, Clemson, who could be asked to serve in this role.

State Reports:

Paulo Vieira (MD) discussed the characterization of the genome, transcriptome, and effector-encoding genes of the root lesion nematode *Pratylenchus fallax*, a plant-parasitic nematode of economic significance in several crops.

Tristan Watson (LA) discussed the significance and distribution of the reniform and root-knot nematodes in sweet potato as well as the results of studies testing resistant cultivars and nematicides that include Telone and Velum.

Koon-Hui Wang (HI) discussed Integrated Pest Management strategies to control the sweet potato weevil stemborer complex as well as sweet potato infections by plant-parasitic root-knot and reniform nematodes. Combining the use of crop rotation, nematicide applications and biocontrol agents such as *Oscheius tipulae* and *Metarhizium anisopliae* showed promising results. The biocontrol agents performed better with improved soil health.

Peter DiGennaro (WI) discussed the effects of night-time warming on tomato infections by *Meloidogyne hapla*. His group is applying a dual RNA-seq approach in a tomato recombinant-inbred line population infected with nematodes to identify the genetic basis of this interaction. Studies on the role of nitrogen management in root-knot nematode interactions with potato and on a disease complex of root-lesion nematode with *Verticillium* fungi were also discussed.

Thomas Powers (NE) discussed the persistence of entomopathogenic nematodes from the genera *Heterorhabditis* and *Steinernema* in corn fields infested with different species of corn rootworm (*Diabrotica* spp.).

Cynthia Gleason (WA) discussed the characterization of the genome, transcriptome, and effector-encoding genes of *Meloidogyne chitwoodii*, a plant-parasitic nematode of economic significance in the Pacific Northwest, particularly on potato.

Jackie Beacham (NM) discussed geographical and seasonal patterns of root-knot nematodes of economic significance in chili pepper, corn, pecan, and grape, as well as results on variability in effectiveness of chemical control measures.

Landon Wong (HI) discussed results from comparative morphological and genetic analyses to resolve discrepancies in the literature on the occurrence of *Meloidogyne konaensis* and *M. paranaensis* in Hawaii and Brazil on crops such as coffee.

Amanda Hodson (CA) discussed the results from a 25-year experiment in which the effects of soil amendments with wood chips from recycled almond and walnut trees from old orchards on soil nematode communities were studied. Discovery of and extraction methods for chemicals with potential nematicidal effects from pistachio and almond hulls were discussed as well.

Joana “Asia” Kud (AR) discussed mapping novel sources of genetic resistance to root-knot and cyst nematodes in soybean using genetic and transcriptomic approaches. There was further discussion on the role of the potato cyst nematode effector RHA1B on targeting the potato immune receptors StNLR1 and StGpa2 and altering plant development and susceptibility to nematode infection.

Simon “Niels” Groen (CA) introduced his program - Evolutionary Systems Biology of Host-Parasite Interactions. In addition, he discussed how differences in effects of chemical defense-related genes in crop plants such as rice on plant responses to root-knot nematodes and leaf-chewing herbivores may shape phenotypic and genetic variations in populations of crop traditional varieties and wild relatives.

Parwinder Grewal, Dean of the College of Tropical Agriculture and Human Resources of the University of Hawaii at Manoa, provided an overview of research activities in the college.

November 8, 2024:

State Reports:

Shahid Siddique (CA) discussed three areas of the most basic aspects in his research program. These included constructing a *Pratylenchus vulnus* genome, constructing a *Meloidogyne hapla* genome relative to differential reactions in NemaSnap beans, and constructing reference genomes of *M. javanica* strains VW4 and VW5 as well as different strains of *M. incognita* relative to differential reactions in *Mi1* resistance in tomato.

Kathy Lawrence (AL) discussed the significance and distribution of reniform and root-knot nematodes in cotton and soybean, as well as the results of studies testing resistant cultivars and nematicides that include Velum and Aldicarb.

Haddish Melakeberhan (MI) discussed how nematode community analysis-based soil food web models can be used to describe soil health conditions, how the integrated productivity efficiency model identifies soil health outcomes as sustainable or unsustainable, and what additional measures are needed to get to sustainable outcomes.

Brent Sipes (HI) discussed the effects of the entomopathogenic nematode *Oscheius tipulae* on its target pest the sweet potato weevil and on non-target organisms. The nematode did not appear to affect the soil nematode and arthropod community. There was further discussion on an updated survey of plant-parasitic nematodes on coffee across the Hawaiian islands.

Business Meeting:

The following items were discussed,

Location: The University of Arkansas in Fayetteville was selected as a host for the November 2025 meeting. Joana “Asia” Kud will organize the venue and as potential dates a Monday and Tuesday in early November were proposed.

Officer’s Election: Brent Sipes was unanimously elected as secretary for 2025. Simon “Niels” Groen will move to become the chair.

Other Business: Thanks are given to Brent Sipes for organizing a wonderful meeting at a great venue.

The team further discussed the choice of a new Administrative Advisor. The team considered several candidates, who could be asked for this role.

The W5186 project web page that Shahid set up needs updating. Participants are encouraged to write contributions so that these can be added to the web page. Shahid will coordinate the additions and then Jacki will take over administration of the web page. In the future, the Secretary will gather new materials for the web page and part of the registration fees for the annual meeting will go towards covering the annual subscription payment for the web page.

Plans to meet with the Northeast Multistate project in 2026 were discussed. A joint meeting could potentially be held in the Washington, DC, area.

Respectfully submitted,
Simon C. “Niels” Groen
Recording Secretary
December 13, 2024