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Increasing Levels of Physical Disturbance Affect Soil Nematode Community Composition in a Previously Undisturbed Ecosystem

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Abstract

Soil is essential for the sustenance of life. Diverse soil organisms support several biological processes such as organic matter decomposition, mineralization, nutrient cycling, and controlling pests and diseases. Among multicellular soil organisms, nematodes are ubiquitous, functionally diverse, and abundant. Notably, agricultural practices have diverse impacts on plants, soils, and soil organisms. Tillage affects nematodes directly by altering pore size and disrupting the continuity of water films and indirectly by affecting the lower trophic groups such as bacteria and fungi. The primary goal of this study was to examine the effect of increasing levels of physical disturbance on nematode communities in an undisturbed forest ecosystem. The experiment included four treatments: control with no disturbance, surface litter removed with no litter and no vegetation, tilling the soil with a rototiller every 2 mon, and every 2 wk. Tillage significantly reduced the overall abundance and overall richness of nematode communities over time. Among nematode trophic groups, tillage significantly reduced the abundance and richness of bacterial feeders, predators, and omnivores over time. The abundance and richness of c-p 2, c-p 4, and c-p 5 class nematodes were significantly decreased by tillage. Unlike tillage, minimal disturbance such as removal of surface litter resulted in a significant decrease in the abundance of only three genera: *Acrobeles*, *Aporcelaimellus*, and *Boleodorus*. Nonmetric multidimensional scaling analysis revealed that nematodes of higher c-p classes such as Dorylaimida, *Aporcelaimellus*, *Alaimus, Clarkus*, and *Tripyla* were sensitive to physical disturbances. Bacterial feeders belonging to the c-p 2 class such as *Tylocephalus*, *Acrobeles*, *Ceratoplectus, Plectus, and Pseudacrobeles* were significantly reduced by tillage. Moreover, tillage significantly reduced the functional metabolic footprint of nematodes, which indicates decreased metabolic activity, reduced C inflow, and poorly structured soil food webs. Previous studies conducted in agricultural ecosystems determined that *Clarkus*, *Filenchus*, and *Plectus* were tolerant to tillage; however, they were found sensitive to tillage in our study. Overall, our study suggests that increasing levels of physical disturbance are detrimental to nematode community abundance and diversity that could affect soil ecosystem stability and sustainability.

Keywords
abundance, c-p class, ecology, ecosystem, litter, physical disturbance, richness, tillage, trophic group

Soil is indispensable for the sustenance of life. Soil provides essential resources for human activities such as agriculture, buildings, and industries (Brussaard, 1997). Several biological processes are continuously active in the soil and play an important role in the replenishment of soil resources and ecosystem maintenance (Young and Crawford, 2004). Biological processes in the soil are due to the dynamic interactions of diverse assemblages of living organisms including unicellular bacteria and protozoa to multicellular nematodes, earthworms, and arthropods (Giller *et al*., 1997; Bach *et al*., 2020). Diverse soil organisms support several biological processes such as organic matter decomposition, mineralization, nutrient cycling, and controlling pests and diseases (Brussaard, 1997; Heinen *et al*., 2018), which directly and indirectly affect crop growth and quality (Swift *et al*., 2004; Giller *et al*., 2005). Among multicellular soil organisms, nematodes are by far the most abundant (Porazinska *et al*., 2009; Lu *et al*., 2020; van den Hoogen *et al*., 2020). Nematodes are at the center of the soil food web by interacting with several other soil trophic groups in the lower hierarchy of the soil food web, with plants, bacteria, and fungi serving as food for nematodes; in turn, trophic groups in the higher hierarchy of the soil food web, such as predatory mites, eat nematodes (Moore, 1994; Roger-Estrade *et al*., 2010).

Nematodes play a pivotal role in organic matter decomposition (Freckman, 1988; Beare *et al*., 1992; Yeates and Coleman, 2021), mineralization (Yeates, 1979; Griffiths, 1989; Neher, 2001; Sikder and Vestergård, 2020), and uptake of nutrients by plants (Ingham *et al*., 1985; Gebremikael *et al*., 2016). Nematodes feeding on bacteria and fungi promote mineralization and release nutrients into the soil, thereby regulating decomposition (Ingham *et al*., 1985). Since nematodes are ubiquitous, functionally diverse, and abundant, they can be used to gauge the condition of structure and function of soil food webs (Bongers, 1990; Bongers and Bongers, 1998; Ferris *et al*., 2001; Neher, 2001). Nematodes have been categorized into different trophic groups such as bacterial feeders, fungal feeders, plant feeders, predators, and omnivores based on their stoma and esophagus morphology (Yeates *et al*., 1993). Additionally, a colonizer-persister (c-p) scale comprising five levels has been developed for nematodes ranging from colonizers (c-p 1) with high fecundity rate, short generation time, and toleration of disturbances, to persisters (c-p 5) with low fecundity rate, long generation time, and sensitivity to disturbances (Bongers, 1990). The c-p scale reflects the continuum of r- and K-strategists. Nematode community indices have been used to monitor ecological conditions of soil and the influence of agricultural activities on nematodes (Sohlenius *et al*., 1987; Bongers, 1990; Freckman and Ettema, 1993; Neher *et al*., 1995; Wardle *et al*., 1995).

Agricultural activities affect soil structure, biological activity, and processes such as decomposition, mineralization, and nutrient cycling by altering the physicochemical properties of soil (Stinner *et al*., 1984; Dick *et al*., 1988; Fraser *et al*., 1994). Notably, agricultural practices such as cultivation, crop rotation, tillage, and pesticide application have diverse impacts on plants, soils, and soil organisms (Elliott and Cole, 1989). Tillage alters soil properties such as moisture, temperature, aeration, and organic matter content and ultimately affects organisms that are living in the soil (Kladivko, 2001; Holland, 2004; Golabi *et al*., 2014). Furthermore, tillage disrupts the relationship between soil organisms by either killing or injuring them or exposing them to predators (Altieri, 1999; Roger-Estrade *et al*., 2010). Nematodes are more responsive to mechanical disturbance of soil than surface-dwelling invertebrates (Wardle *et al*., 1995). Tillage affects nematodes directly by altering pore size and disrupting the continuity of water films needed by nematodes and indirectly by affecting the lower trophic groups such as bacteria and fungi (Wardle *et al*., 1995).

Surface litter is essential for energy flow in the soil food webs (Attiwill and Adams, 1993). Removal of surface litter affects the dynamics of decomposition, which has a significant effect on the soil C pools (Wu *et al*., 2018). Surface litter removal decreases the resources available for nematodes, which affects the processes in the soil and alters the soil C distribution (Wu *et al*., 2021).

The effect of different types of physical disturbances on nematode communities has been previously investigated in agricultural ecosystems, i.e., those previously tilled or disturbed (Lenz and Eisenbeis, 2000; Okada and Harada, 2007; Rahman *et al*., 2007; Dong *et al*., 2013; Forge *et al*., 2015; Sánchez-Moreno *et al*., 2015; Zhang *et al*., 2015, 2019; Zhong *et al*., 2017; Wu *et al*., 2021). However, the effect of physical disturbances on soil organisms can be better evaluated by conducting experiments in undisturbed ecosystems, where soil organisms were never exposed to any kind of disturbances. Therefore, the main objective of this study was to examine the effect of increasing levels of physical disturbance on nematode communities in an undisturbed forest ecosystem. We hypothesized that the increase in the level of physical disturbance would negatively affect nematode communities.

Materials and Methods

Site description

A field experiment was conducted from April 2017 to May 2018 in a secondary mixed deciduous forest ecosystem dominated by nut-bearing oak and hickory species of trees in Farragut, TN, USA (35 ° 54′3″N, 84 ° 11′37″W; 311 m elevation). The experimental site is located in a temperate and seasonal climate with a mean annual temperature of 15.3°C and a mean annual precipitation of 1,224 mm. The soil at this site is classified as Minvale-Bodine-Fullerton complex. The experimental site had not been disturbed for at least 50 yr before the experiment was laid out. An understory was absent, and groundcover was negligible. The site sloped slightly toward the northwest.

Experimental design

The experiment included four treatments with increasing levels of physical disturbance. The first treatment was a control with no disturbance; the second treatment was surface litter removed (SLR) with no litter and no vegetation; the third treatment was tilling 15 cm deep with a rototiller every 2 mon after surface litter removal (R2M); the fourth treatment was tilling 15 cm deep every 2 wk after surface litter removal (R2W). Litter and vegetation were cleared every 2 wk from all the treatments except for the control. Each treatment was replicated thrice. Each plot was 2 m × 2 m and separated by a 2-m distance. The design of the experiment was a completely randomized design with repeated measures. The experiment was started in April 2017 and concluded in May 2018.

Soil sampling

Soil samples were collected from all the plots in April 2017 before starting the experiment and subsequently samples were collected every 2 mon: June 2017, September 2017, November 2017, January 2018, and May 2018. The interval between the tillage and sampling was 2 mon for R2M treatment and 2 wk for R2W treatment. At each sampling time, five soil cores, each having a 2-cm diameter and a 20-cm depth, were randomly collected from each plot. Soil samples from each plot were pooled into a plastic bag to prevent drying of soil, and then transported in a cooler to the laboratory where they were subsequently stored at 4°C before extracting nematodes on the next day.

Nematode extraction and identification were carried out as follows: Composite soil samples were thoroughly homogenized and 100 cm^3 of each soil sample was used for extraction of nematodes through a sugar flotation-centrifugation method (Jenkins, 1964). Extracted nematodes from each sample were counted and the first 150 nematodes were identified to genus level using a differential interference contrast microscope. Proportions of each taxon were extrapolated to the entire sample. The identified nematode genera were assigned to their respective trophic groups: bacterial feeders (BF), fungal feeders (FF), plant feeders (PF), omnivores (OM), and predators (PR) (Yeates *et al.*, 1993), and colonizer-persister (c-p) scale was established based on their life history characteristics and survival strategies associated with r- and K-selection. Nematodes with c-p 1 (enrichment opportunistic nematodes) and c-p 2 (mostly microbial and plant feeders) values are considered colonizers (r-selected), with small size, short life span, high fecundity, and high tolerance to environmental disturbances. Nematodes with c-p value 5 (mostly predators and omnivores) are persisters (K-selected), long-lived nematodes with low fecundity, slow development, and high sensitivity to environmental disturbances. (Bongers 1990).

Nematode ecological indices

The following ecological indices were calculated to assess the structure and functional role of nematode communities in soil food webs of increasing levels of physical disturbance: Simpson's dominance index (λ), $\lambda = \Sigma P_i^2$ (Simpson, 1949); Shannon–Weaver index (H′), $H' = -\Sigma P_i \ln P_i$, where P is the proportion of individuals in the i^{th} taxon (Shannon, 1948); maturity index (MI) for free-living taxa were computed as MI = Σ[CP-value (i) × f(i)]/[total numbers of nematodes], where i is the individual taxon and fi is the frequency of taxa in the sample (Bongers, 1990). MI is used to evaluate the functioning and condition of a soil ecosystem as a consequence of environmental disturbance. MI values range from 1 to 5. A high MI suggests more abundant and diverse nematodes of higher c-p classes and a less disturbed ecosystem. A low MI suggests more abundant and diverse nematodes of lower c-p classes and a highly disturbed ecosystem. Plant-parasitic index (PPI) was calculated for plant-parasitic genera (Yeates and Bongers, 1999). Nematode channel ratio (NCR) indicates the decomposition pathway of the soil food web (Yeates and Bongers 1999). NCR is calculated as NCR = bacterial feeders/ (bacterial feeders + fungal feeders) and ranges from 0 (fungi-dominated) to 1 (bacteria-dominated). Soil food web indices were calculated based on nematode functional guilds determined by the combination of c-p groups and trophic groups (Ferris *et al*., 2001). Soil food web indices include the Basal Index (BI), an indicator of the disturbed condition of soil food webs; Channel Index (CI), an indicator of decomposition of organic matter mediated by fungi; Enrichment Index (EI), an indicator of the predominance of bacterial feeders and enrichment conditions; and Structure Index (SI), an indicator of structured soil food webs with high trophic linkage (Ferris *et al*., 2001). Soil food web indices were calculated using the Nematode Joint Indicator Analysis tool (Sieriebriennikov *et al*., 2014).

Nematode metabolic footprints

Functional metabolic footprints (FMF) of nematode communities in soil food webs of increasing levels of physical disturbance were calculated using the Nematode Joint Indicator Analysis tool (Sieriebriennikov *et al*., 2014). FMF was calculated to evaluate the changes in the metabolic activity and flow of C into the soil food webs (Ferris, 2010). The total area of FMF is partitioned into enrichment footprint (efoot) indicating lower trophic groups (c-p 1–2) and structure footprint (sfoot) indicating higher trophic groups (c-p 3–5). The efoot is the metabolic footprint of lower trophic-group nematodes (c-p 1–2) whose population rapidly increases due to the increase in resources. The sfoot is the metabolic footprint of higher trophic group nematodes (c-p 3–5) with regulatory function. In an FMF graph, the y-axis represents the efoot, and the x-axis represents the structural footprint. In the FMF graph, the y-axis coordinates (EI– 0.5Fe/k and EI+ 0.5Fe/k) and x-axis coordinates (SI– 0.5Fs/k and SI+ 0.5Fs/k) were sequentially joined to depict the metabolic footprints of nematode communities. Fs indicates higher trophic groups (c-p 3–5) and Fe indicates lower trophic groups (c-p 1–2). The adjusted k value is 4 (Ferris, 2010).

Statistical analysis

Overall richness and abundance of nematodes were estimated for each sample. In addition, nematode richness and abundance for each trophic group and each c-p class at each time point were estimated. Statistical analyses were performed to compare the overall nematode richness and abundance as well as the richness and abundance of each trophic group and each c-p class across different treatments at different time points. Normality of residuals and equal variance were assessed using the Shapiro–Wilk statistic and visual observation of histograms and data were ln(x + 1)-transformed prior to statistical analysis. Analysis of variance with repeated measures was conducted with SAS (Glimmix procedure, SAS Institute, Cary, NC) and least square means were compared with Tukey's LSD with a significance level of $P < 0.05$.

Changes in community structure with increasing levels of physical disturbance over time were visualized by nonmetric multidimensional scaling (NMDS) ordination with the Bray–Curtis distance matrix. Permutational multivariate analysis of variance (PERMANOVA; Anderson, 2001) was used to assess the significance of the differences among nematode community composition of the four treatments. The similarity percentage analysis (SIMPER) was used to determine the contribution of nematode genera to dissimilarities between treatments with a significance level of $P < 0.05$. All analyses were performed using the functions metaMDS, adonis, and simper in the vegan package of R, version 3.3.3 (Oksanen *et al*., 2020).

Results

Nematode abundance and community composition

In total, 56 genera were identified at different levels of physical disturbance across different sampling times. Of the 56 genera, 26 most abundant genera are listed in Supplementary Table 1. The nematode genera with zero abundance in most of the treatments at different sampling times were not considered for individual nematode analysis. Rhabditidae*, Meloidogyne, Plectus, Filenchus, Aphelenchoides, Acrobeloides, Pseudacrobeles,* and *Gracilacus* were the dominant taxa for all treatments at all sampling times.

The effect of increasing levels of physical disturbance on nematode abundance was statistically significant during January 2018 and May 2018 ($P < 0.05$) (Fig. 1). The overall abundance of nematodes was significantly lower in R2M compared to the control, SLR, and R2W treatments in January 2018 ($P < 0.05$) (Fig. 1). In addition, the overall abundance of nematodes was significantly lower in R2W compared to the control, SLR, and R2M treatments in May 2018 ($P < 0.05$) (Fig. 1). Although the effect of tillage on nematode overall abundance was not statistically significant, nematode overall abundance was consistently lower in R2M and R2W compared to the control and SLR treatment since June 2017 (Fig. 1). Similarly, the effect of increasing

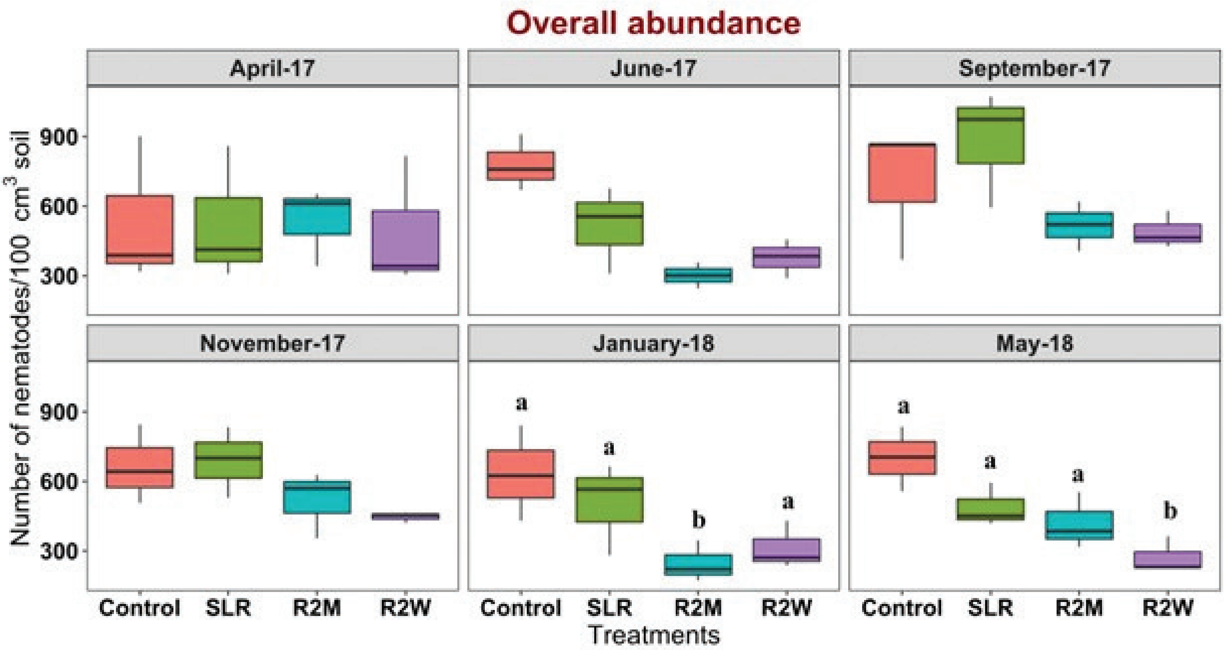

Figure 1: Effect of increasing levels of physical disturbance on genus-level nematode abundance. Box plots representing the number of nematodes per 100 cm^3 of soil in control, SLR, R2M, and R2W at each sampling time. Lower and upper box boundaries represent 25th and 75th percentiles, respectively; line inside the box indicates median; and lower and upper error lines represent 10th and 90th percentiles, respectively. Letters indicate significant differences among treatments at each sampling time at $P < 0.05$ (Tukey–LSD test). R2M, rototill for every 2 mon; R2W, rototill for every 2 wk; SLR, surface litter removed.

levels of physical disturbance on nematode richness was statistically significant during January 2018 and May 2018 ($P < 0.05$) (Fig. 2). Overall richness of nematodes was significantly lower in SLR, R2M, and R2W compared to the control in January 2018 ($P < 0.05$) (Fig. 2). The effect of tillage on nematode richness was more pronounced in the last sampling in May 2018 in which nematode richness was significantly decreased in R2M and R2W compared to the control and SLR treatments ($P < 0.05$) (Fig. 2). Although the effect of tillage on nematode overall richness was not statistically significant, the overall richness of nematodes was consistently lower in R2M and R2W compared to the control and SLR treatments from November 2017 (Fig. 2)

Among 56 genera, 20 taxa were bacterial feeders, 18 taxa were plant feeders, 7 taxa were fungal feeders, 6 genera were omnivores, and 5 taxa were predators. The effect of increasing levels of physical disturbance on nematode abundance and richness of each trophic group was analyzed. Increasing levels of physical disturbance significantly affected the abundance of bacterial feeders, fungal feeders, predators, and omnivores during the last two samplings (January 2018 and May 2018) ($P < 0.05$). However, the abundance of plant feeders was not significantly affected (Supplementary Table 2). Tillage significantly lowered the abundance of bacterial feeders, predators, and omnivores in R2M and R2W treatments compared to control during the last sampling in May 2018 ($P < 0.05$) (Supplementary Table 2). In addition, the abundance of fungal feeders was also significantly affected by the tillage treatments, R2M and R2W during the last two samplings, January 2018 and May 2018, respectively ($P < 0.05$) (Supplementary Table 2). On the other hand, tillage significantly affected the richness of bacterial feeders, predators, and omnivores, especially during the last two samplings (January 2018 and May 2018) ($P < 0.05$) (Supplementary Table 2). The richness of bacterial feeders was significantly lower in R2W compared to the control and SLR treatments during the last two samplings ($P < 0.05$). Additionally, the richness of predators was significantly lower in R2M and R2W compared to SLR treatment, whereas the richness of omnivores was significantly decreased in R2M and R2W compared to the control and SLR treatments ($P < 0.05$) (Supplementary Table 2).

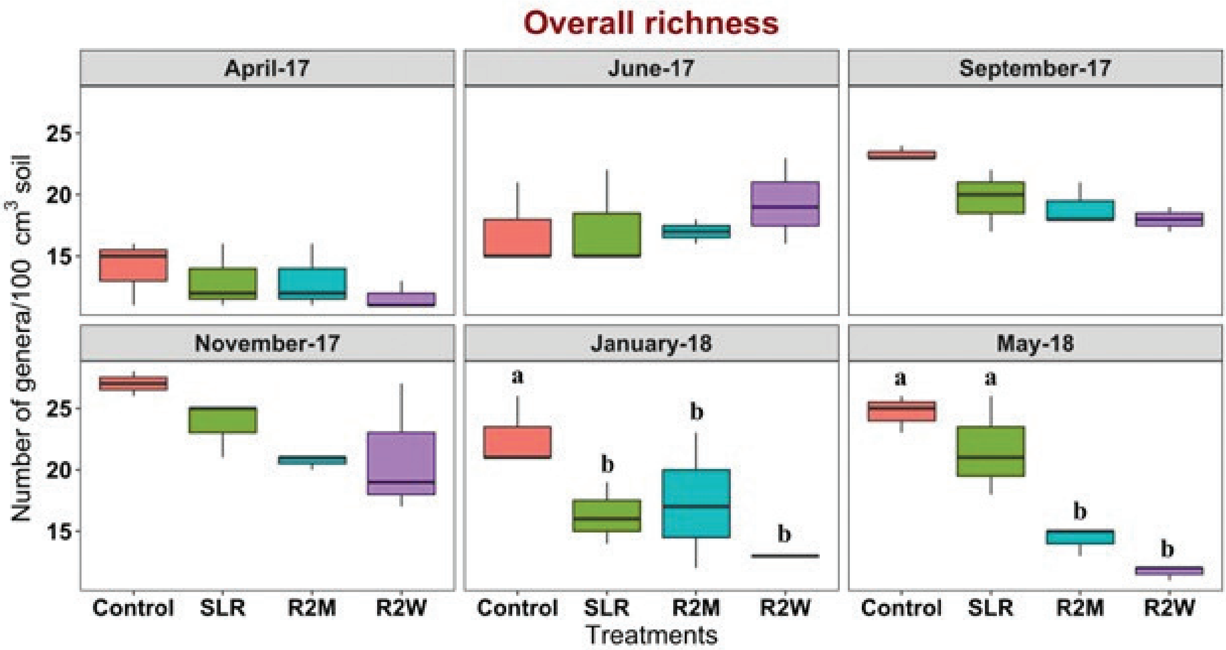

Figure 2: Effect of increasing levels of physical disturbance on genus-level nematode richness. Box plots representing the number of genera per 100 cm^3 of soil in control, SLR, R2M, and R2W at each sampling time. Lower and upper box boundaries represent 25th and 75th percentiles, respectively; line inside the box indicates median; and lower and upper error lines represent 10th and 90th percentiles, respectively. Letters indicate significant differences among treatments at each sampling time at $P < 0.05$ (Tukey–LSD test). R2M, rototill for every 2 mon; R2W, rototill for every 2 wk; SLR, surface litter removed.

Increasing levels of physical disturbance significantly affected the abundance of 10 genera, *Acrobeles*, *Alaimus*, *Aporcelaimellus*, *Boleodorus*, *Ceratoplectus*, *Clarkus*, Dorylaimida, *Filenchus, Prismatolaimus,* and *Tripyla* during the last two samplings of January 2018 and May 2018 ($P < 0.05$) (Supplementary Table 1). The abundance of *Acrobeles*, *Aporcelaimellus*, and *Boleodorus* was significantly reduced with the increase in the level of physical disturbance in May 2018 ($P < 0.05$) (Supplementary Table 1). Tillage significantly reduced the abundance of *Alaimus* in R2M and R2W compared to the control and SLR treatments during the last sampling of May 2018 ($P < 0.05$) (Supplementary Table 1). The abundance of *Ceratoplectus* and *Filenchus* was significantly lower in the tillage treatments, R2M and R2W compared to the control in January 2018 and May 2018 ($P < 0.05$) (Supplementary Table 1). The abundance of *Clarkus*, Dorylaimida, and *Tripyla* was significantly decreased in R2M and R2W treatments compared to the control during the last sampling, May 2018 ($P < 0.05$) (Supplementary Table 1). Tillage significantly reduced the abundance of *Prismatolaimus* in the R2W treatment compared to the control during January 2018 and May 2018 ($P < 0.05$) (Supplementary Table 1). Removal of surface litter resulted in a significant decrease in the abundance of *Acrobeles*, *Aporcelaimellus*, and *Boleodorus* compared to the control during the last sampling period, May 2018 ($P < 0.05$) (Supplementary Table 1).

The effect of increasing levels of physical disturbance on nematode abundance and richness of each c-p class was also analyzed. Increasing levels of physical disturbance did not affect the abundance of c-p 1 and c-p 3 class nematodes whereas the impact was significant in the cases of c-p 2, c-p 4, and c-p 5 classes ($P < 0.05$). The nematode abundance of the c-p 2 class was lower in R2M and R2W compared to the control in the last two samplings of January 2018 and May 2018 ($P < 0.05$) (Supplementary Table 3). Similarly, the abundance of c-p 5 class nematodes was lower in R2M and R2W than in the control during the last sampling, May 2018 ($P < 0.05$) (Supplementary Table 3). The abundance of c-p 4 class nematodes was decreased in R2M and R2W compared to the control and SLR treatments during May 2018 ($P < 0.05$) (Supplementary Table 3). Increasing levels of physical disturbance did not affect the richness of c-p 1, c-p 3, and c-p 5 class nematodes whereas they significantly affected the richness of c-p 2 and c-p 4 classes ($P < 0.05$) (Supplementary Table 3). The richness of nematodes in the c-p 2 class was significantly lower in R2M and R2W compared to the control during January 2018 and May 2018 ($P < 0.05$). Moreover, the richness of nematodes in the c-p 4 class was significantly reduced in R2W compared to the control in January 2018 ($P < 0.05$). In the last sampling, tillage significantly reduced the richness of c-p 4 class nematodes in R2M and R2W compared to the control and SLR ($P < 0.05$) (Supplementary Table 3).

Nematode ecological indices

A significant effect of increasing levels of physical disturbance was observed on the values of λ, H´, EI, and SI ($P < 0.05$) (Supplementary Table 4). The value of λ significantly increased with the increasing levels of physical disturbance. The value of λ was significantly lower in the control than in R2W in January 2018 and lower in the control compared to R2M and R2W during May 2018 ($P < 0.05$) (Supplementary Table 4). The value of H´ significantly decreased with the increasing levels of physical disturbance. The value of H´ was significantly lower in R2W compared to the control during January 2018, and lower in R2M and R2W than in the control during the last sampling, May 2018 ($P < 0.05$) (Supplementary Table 4). MI value significantly reduced with the increase in the level of physical disturbance. MI was significantly lower in R2W than in control treatment during January 2018, and lower in R2M and R2W compared to the control and SLR during May 2018 ($P < 0.05$) (Supplementary Table 4). PPI value was significantly higher in R2M and R2W compared to the control during the last sampling, May 2018 ($P < 0.05$) (Supplementary Table 4). EI value significantly increased with the increasing levels of physical disturbance. EI was significantly higher in R2W compared to the control during the last two samplings, January and May 2018 ($P < 0.05$) (Supplementary Table 4). In contrast, SI significantly decreased with the increasing levels of physical disturbance. SI was significantly lower in R2W compared to the control and SLR during January 2018, and lower in R2M and R2W than in the control and SLR during the last sampling, May 2018 ($P < 0.05$) (Supplementary Table 4).

Nematode metabolic footprints

A significant effect of increasing levels of physical disturbance was observed on efoot and sfoot ($P < 0.05$) (Supplementary Table 4). Tilling every 2 wk resulted in a significant reduction of efoot compared to the control and other treatments during May 2018 ($P < 0.05$) (Supplementary Table 4). The sfoot was significantly lower in R2W than in the control and SLR treatments during January 2018 and significantly lower in R2M and R2W treatments compared to the control and SLR treatments during the last sampling in May 2018 ($P < 0.05$) (Supplementary Table 4). The FMF area of nematode communities was decreased with the increasing levels of physical disturbance (Fig. 3). The area of FMF of R2M and R2W was decreased over time compared to the control and SLR treatments. All the treatments were clustered together in the same quadrat until November 2017 and started spreading out in January 2018. In May 2018, control and SLR treatments were located in quadrat B, which indicated a maturing ecosystem with enriched soil nutrients and a well-structured soil food web, while R2M and R2W were located in quadrat A, which indicated a disturbed and poorly structured soil food web. The FMF indicates the total area of the enrichment and sfoot as demonstrated in Figure 3.

The relationship between nematode abundance and treatments

NMDS analysis of nematode communities showed a significant differentiation in nematode communities with increasing levels of physical disturbance during January 2018 (Fig. 4; PERMANOVA: $R^2 = 0.42$, $F = 1.93$, $P = 0.044$, Stress = 0.08), and May 2018 (Fig. 4; PERMANOVA: $R^2 = 0.46$, $F = 2.32$, $P = 0.015$, Stress = 0.07). During January 2018, R2M and R2W treatments negatively impacted *Boleodorus,* Dorylaimida, *Acrobeles*, *Prismatolaimus*, *Ceratoplectus*, *Alaimus, Plectus*, *Gracilacus*, *Tylocephalus*, and *Helicotylenchus*. Conversely, *Aphelenchoides*, Rhabditidae, Diplogasteridae, *Ditylenchus*, *Acrobeloides*, and *Ecphyadophora* were positively associated with R2M and R2W (Fig. 4). Along with the aforementioned taxa, tillage negatively impacted *Aporcelaimellus*, *Clarkus*, *Tripyla*, *Filenchus*, *Pseudacrobeles*, and was positively associated with *Meloidogyne*, *Xenocriconemella*, and *Teratocephalus* during May 2018 (Fig. 4). SIMPER analysis revealed that the average dissimilarity of the nematode communities increased between the control and other treatments with increasing physical disturbance during January and May 2018 (January 2018: control vs. SLR = 43.2%, control vs. R2M = 49.5%, control vs. R2W = 49%; May 2018: control vs. SLR = 40.2%, control vs. R2M = 42.2%, control vs. R2W = 56.3%). According to the SIMPER

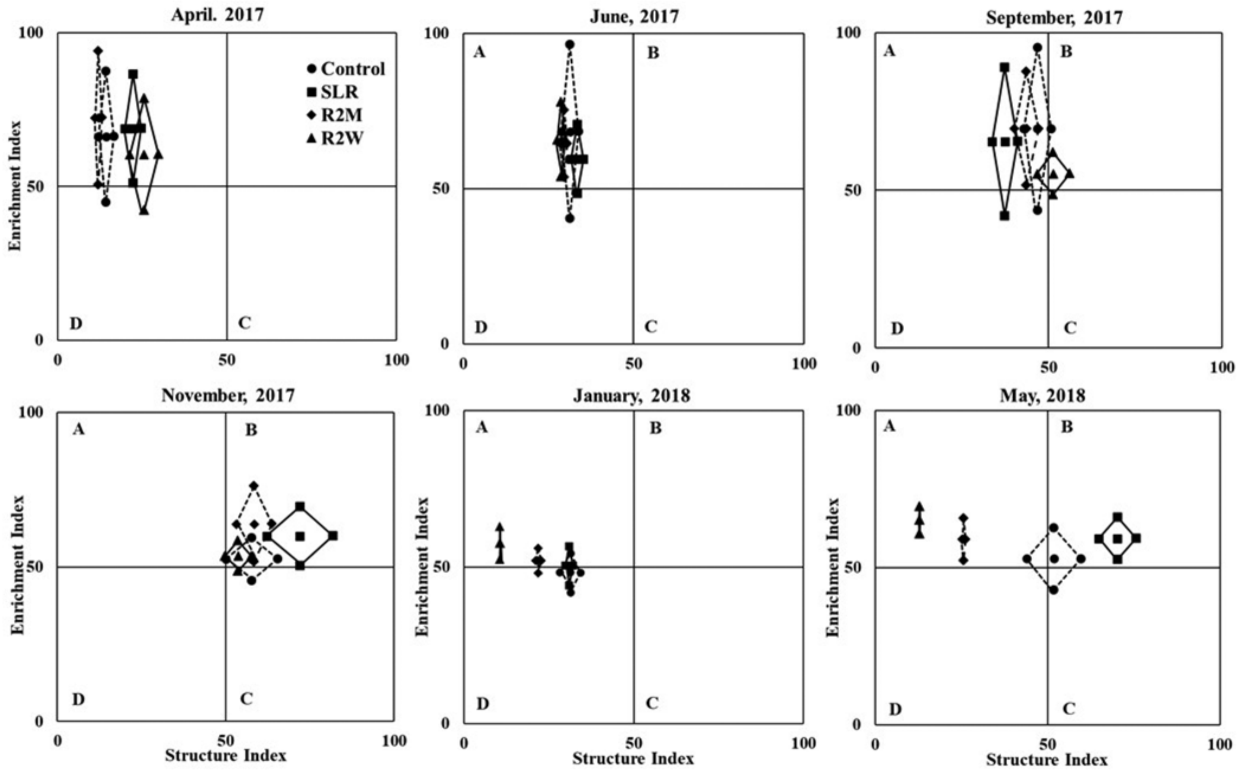

Figure 3: FMF of nematode communities subjected to different levels of physical disturbance: control, SLR, R2M, and R2W. The vertical axis represents the efoot, and the horizontal axis represents the sfoot. The FMF is depicted by sequentially joining points: (SI– 0.5Fs/k, EI); (SI+ 0.5Fs/k, EI); (SI, EI– 0.5Fe/k); and (SI, EI+ 0.5Fe/k). Fs represents sfoot and Fe represents efoot (Ferris, 2010). The adjusted k value is 4. FMF, functional metabolic footprints; R2M, rototill for every 2 mon; R2W, rototill for every 2 wk; sfoot, structure footprint; SLR, surface litter removed.

test, *Filenchus* contributed most to the dissimilarity followed by *Xenocriconemella, Gracilacus, Plectus, Pseudacrobeles, Ditylenchus, Meloidogyne, Prismatolaimus, Helicotylenchus,* and *Acrobeloides* between the control and other treatments during January 2018. Similarly, *Meloidogyne* contributed most to the dissimilarity followed by *Filenchus, Xenocriconemella, Acrobeles, Gracilacus, Helicotylenchus, Alaimus,* Rhabditidae, *Acrobeloides, Plectus, Prismatolaimus,* and *Ceratoplectus* between the control and other treatments during May 2018 (Supplementary Table 5).

Discussion

Increasing levels of physical disturbance on nematode abundance and community composition

Nematodes play a key role in maintaining and regulating several biological processes, crucial for soil and plant health (Yeates and Coleman, 1982; Liang *et al.*, 2009). Tillage is one of the most intensively used agricultural management strategies, affecting the most important players in soil biological processes such as decomposition, mineralization, and nutrient cycling (Stinner *et al.*, 1984; Dick *et al.*, 1988; Fraser *et al.*, 1994). Many studies have been conducted to evaluate the effect of different types of physical disturbances on nematode communities and other soil organisms in agricultural ecosystems (Lenz and Eisenbeis, 2000; Okada and Harada, 2007; Rahman *et al.*, 2007; Dong *et al.*, 2013; Forge *et al.*, 2015; Sánchez-Moreno *et al.*, 2015; Zhang *et al.*, 2015, 2019; Zhong *et al.*, 2017; Wu *et al.*, 2021). However, this report is the first on the effect of tillage in terms of increasing levels of physical disturbance on nematode populations in a previously undisturbed forest ecosystem.

Tillage significantly reduced the overall abundance and overall richness of nematode communities over time in R2M and R2W, which was attributed to the decrease in the abundance of bacterial feeders,

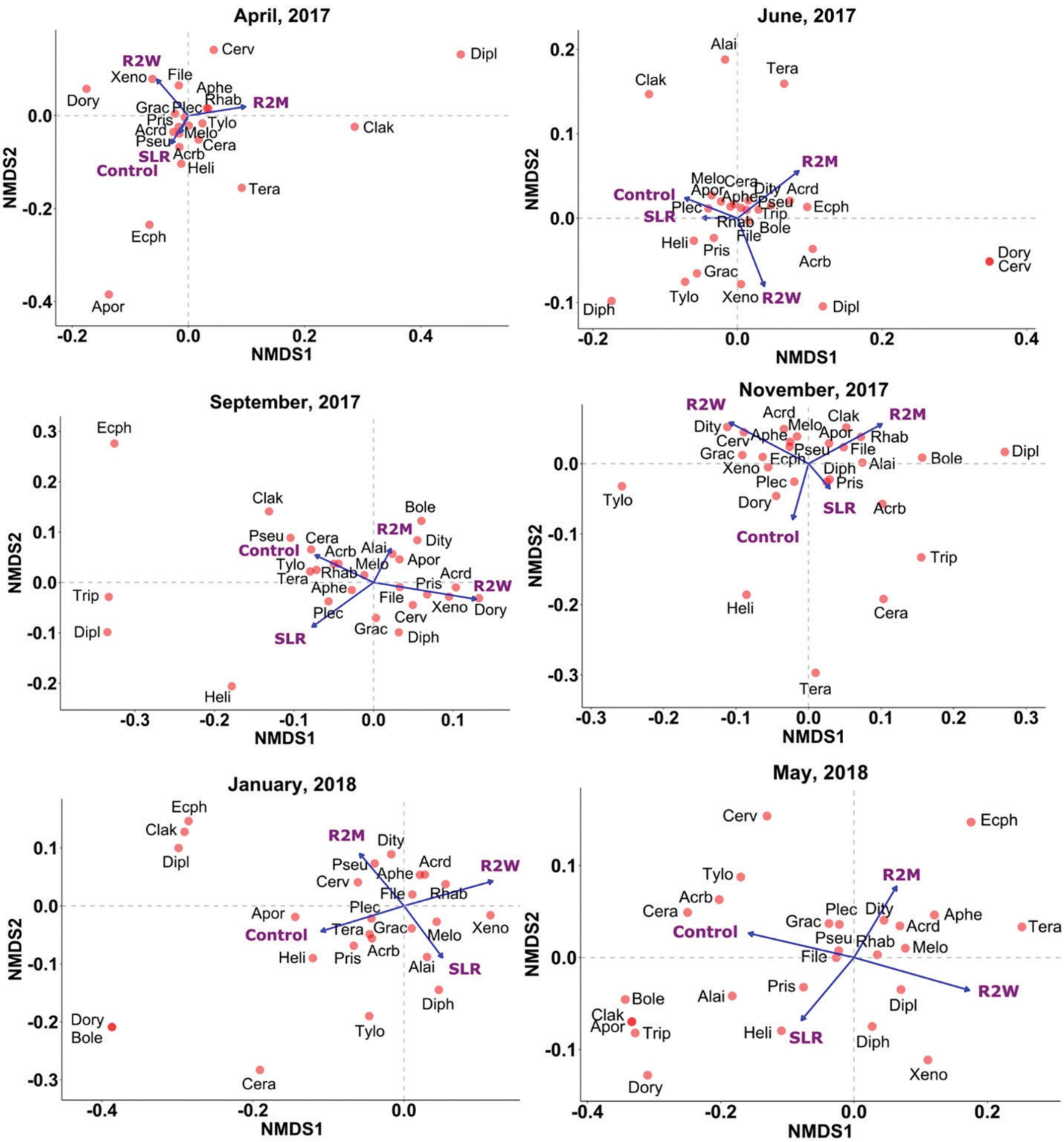

Figure 4: Biplot representing the NMDS performed on nematodes communities subjected to different levels of physical disturbance: control, SLR, R2M, and R2W in April 2017 (PERMANOVA: *P* = 0.92, NMDS; Stress = 0.05), June 2017 (PERMANOVA: *P* = 0.117, NMDS; Stress = 0.09), September 2017 (PERMANOVA: *P* = 0.075, NMDS; Stress = 0.11), November 2017 (PERMANOVA: *P* = 0.226, NMDS; Stress = 0.11), January 2018 (PERMANOVA: *P* = 0.044, NMDS; Stress = 0.08), and May 2018 (PERMANOVA: *P* = 0.015, NMDS; Stress = 0.07). Treatments are depicted using arrows while nematodes are depicted with dots. NMDS, Nonmetric multidimensional scaling; PERMANOVA, Permutational multivariate analysis of variance; R2M, rototill for every 2 mon; R2W, rototill for every 2 wk; SLR, surface litter removed.

fungal feeders, predators, and omnivores and a decrease in the richness of bacterial feeders, predators, and omnivores. Tillage directly affects nematode communities by abrasion and indirectly by changing the food web, temperature, moisture, and aeration of soil in tillage treatments compared to the control, which was undisturbed (Kladivko, 2001; Holland, 2004; Rahman *et al*., 2007; Golabi *et al*., 2014). Our findings are in agreement with the studies conducted by Freckman and Ettema, (1993), Fu *et al*. (2000), Okada and Harada, (2007), Treonis *et al*. (2010), Dong *et al*. (2013), Sánchez-Moreno *et al*. (2015), Zhang *et al*. (2015), Zhong *et al*. (2017), and Pothula *et al*. (2019), who reported that physical disturbances reduced nematode abundance in agricultural ecosystems. However, it should be noted that our tillage regime was far more intense than that of any agricultural system (1 or 2 times/monthly vs. 1 or 2 times yearly). In some studies, the effect of tillage in agricultural ecosystems was noticed immediately after the first tillage (Lenz and Eisenbeis, 2000); however, in our study, the tillage effect was significantly evident after 9 mon. This may be due to the differences in forest and agricultural ecosystems and their response to tillage regimes. Removal of surface litter, SLR, resulted in a significant decrease in the overall richness of nematodes compared to control during January 2018. Our outcomes are in agreement with the study conducted by Wu *et al*. (2021). However, the significance was not evident during the subsequent sampling. On the other hand, the higher overall abundance and overall richness of nematodes in the control treatment could be attributed to the large amount of litter content and the absence of physical disturbances in the control treatment.

Among nematode trophic groups, tillage significantly reduced the abundance and richness of bacterial feeders over time. Many studies conducted in agricultural fields have reported that tillage stimulated the bacterial feeding nematodes due to the probable increase in bacterial biomass with the incorporation of organic matter (Andren and Lagerlof, 1983; Parmelee and Alston, 1986; Ettema and Bongers, 1993; Lenz and Eisenbeis, 2000; Liphadzi *et al*., 2005; Sánchez-Moreno *et al*., 2006). However, the decrease in bacterial feeders in our study was attributed to the decrease in the abundance of *Acrobeles*, *Alaimus, Ceratoplectus*, and *Prismatolaimus*. Moreover, the decrease in bacterial feeders was also attributed to the declining trend of the abundance of *Plectus* and *Pseudacrobeles*, even though the difference was not statistically significant. This may be due to the fact that organic litter was periodically removed from the tillage treatments. Similarly, several studies have reported that *Prismatolaimus* is reduced by cultivation (Fiscus and Neher, 2002; Ferris and Bongers, 2006; Minoshima *et al*., 2007; Sánchez-Moreno *et al*., 2009; Zhao and Neher, 2013; Zhang *et al*., 2019).

Tillage significantly reduced the abundance but not the richness of fungal feeders. There is a discrepancy in reports on the response of fungal feeding nematodes to tillage practices. Some studies have reported that tillage increased the fungal feeding nematode communities (Parmelee and Alston, 1986; Liphadzi *et al*., 2005; Sánchez-Moreno *et al*., 2006; Dong *et al*., 2013). However, Okada and Harada (2007) found that fungal-feeding nematodes increased in a no-till system. This discrepancy may be due to a complex set of factors, including geographic location, type of vegetation, soil type, and ecosystem. Unlike the case in agricultural ecosystems, tillage decreased the abundance of *Filenchus* in our study. Studies conducted in agriculture ecosystems have noted that *Filenchus* has an excellent capacity to tolerate disturbances and occurs in soils with abundant organic matter (Fiscus and Neher, 2002; Okada and Kadota, 2003; Zhang *et al*., 2015, 2019). This disagreement may be due to the condition of the ecosystem that was undisturbed and plausibly due to the consistent removal of surface litter in our study.

Among nematodes belonging to the higher hierarchy of the soil food web, tillage significantly reduced the abundance and richness of predators and omnivores, which are sensitive to disturbances (Bongers 1990; Ferris *et al*., 2001). Similar results were reported by Dong *et al*. (2013), Zhang *et al*. (2015), and Zhang *et al*. (2019). The tillage treatments negatively impacted the abundance of *Aporcelaimellus, Clarkus*, Dorylaimida, and *Tripyla*, resulting in the decline of predators and omnivores. The sensitivity of *Aporcelaimellus* to tillage was previously reported in the agricultural ecosystem by Zhong *et al*. (2016, 2017). Similarly, Dorylaimida was also reported to be lowered by cultivation (Fiscus and Neher, 2002; Rahman *et al*., 2007; Zhang *et al*., 2012). Fiscus and Neher (2002) reported that *Clarkus* is tolerant to direct effects of tillage in agricultural ecosystems; however, in our study, the abundance of *Clarkus* was reduced with increasing levels of physical disturbance. This incongruity probably resulted as our study was carried out in an undisturbed forest ecosystem, where nematodes were not previously exposed to any physical disturbances and therefore may not have been selected for it. Unlike other trophic groups, the abundance and richness of plant-feeding nematodes did not differ significantly in tillage treatments compared to control. The response of plant-feeding nematodes to tillage practices is complicated to interpret as they are more closely associated with plants than with soil (Sánchez-Moreno *et al*., 2006).

The effect of tillage disturbances on nematode communities according to c-p classes was also assessed. The abundance and richness of c-p 2, c-p 4, and c-p 5 class nematodes were significantly decreased by tillage. Nematodes belonging to lower c-p classes are r-strategists, which are characterized by a high fecundity rate, short generation time, and tolerance to disturbances (Bongers, 1990; Ferris *et al*., 2001). Although c-p 2 class nematodes belong to lower c-p classes, the abundance and richness of c-p 2 class nematodes were significantly reduced by tillage. The decrease in c-p 2 class nematodes in tillage treatments was due to the decrease in the abundance of *Acrobeles*, *Boleodorus*, *Ceratoplectus*, and *Filenchus*. The abundance and richness of nematodes of higher c-p classes (c-p 4 and c-p 5) were significantly reduced by tillage disturbances as these nematodes are sensitive to disturbances in the soil ecosystem (Bongers, 1990; Lenz and Eisenbeis, 2000; Ferris *et al*., 2001).

The significant differences between the control and SLR were not reflected in trophic and c-p group analyses. However, individual nematode analyses revealed that removal of surface litter resulted in a significant decrease in the abundance of *Acrobeles*, *Aporcelaimellus*, and *Boleodorus*. These three genera belong to different trophic groups: bacterial feeder, omnivore, and plant feeder, respectively. Further research at the genus level is needed to explain the impact of surface litter on different nematode genera. Overall, these results indicate that the sensitivity of individual nematode genera to increasing levels of physical disturbances is different, and the sensitivity should be considered to foresee the function of soil organisms in the soil.

Increasing levels of physical disturbance on nematode ecological indices

The nematode ecological indices are often used to assess the condition of the soil food web. λ and H´ indicate the diversity of nematode communities. Increasing levels of physical disturbance increased the Simpson index (λ) and decreased the Shannon diversity index (H´). This agreement indicates the decrease in diversity of nematode communities with the increase in the level of physical disturbance. The NCR value decreased with increasing levels of physical disturbance, indicating the shift of the decomposition pathway from bacterial to fungal dominated. The higher value of NCR in the control treatment suggested the predominance of the bacterial decomposition pathway. Our results are in agreement with Zhang *et al*., 2015 but not in concurrence with Okada and Harada, 2007 and Treonis *et al*., 2010, who reported a fungal-dominated decomposition channel in no-tillage. Our results indicated that the change in the decomposition channel may be due to the continuous removal of surface litter, which reduced the surface organic matter and shifted the decomposition channel from bacterial to fungal dominated. MI and PPI are used to assess the effect of disturbances on soil food webs. Our results showed that tillage significantly decreased MI values in both R2W and R2M compared to the control and SLR treatments during the last sampling in May 2018. On the other hand, the removal of surface litter did not affect the MI value. This indicates a lower abundance and diversity of higher c-p class nematodes in tillage treatments due to heightened levels of physical disturbances (Djigal *et al*., 2012; Grabau and Chen, 2016; Zhong *et al*., 2016; Zhong *et al*., 2017). However, tillage did not significantly affect PPI values as the abundance of plant feeders was not affected much in the tillage treatments. Our results suggested that the EI value significantly increased with the increasing levels of physical disturbance. Although the abundance of bacterial feeders belonging to the c-p 2 class declined drastically, the abundance of enrichment opportunists (c-p 1 nematodes) slightly decreased with the increase in levels of physical disturbance, which resulted in higher EI values in tillage treatments. In contrast, SI significantly decreased with the increasing levels of physical disturbance. The lower SI values in tillage treatments indicate that the ecosystem was disturbed with fewer predators and omnivores, which are sensitive to disturbances (Korthals *et al*., 1996; Ferris *et al*., 2001). Similar results were reported by Sánchez-Moreno *et al*. (2009) and Zhang *et al*. (2015).

Increasing levels of physical disturbance on nematode FMF

Nematode FMF were calculated to indicate the structure and function of soil food webs with different levels of physical disturbance. The nematode trophic footprints suggested the changes in the metabolic activity and flow of C into the soil food web through their respective trophic channels (Ferris, 2010). The value of efoot is considered as an indicator of the flow of C and energy through r-strategists, which are lower c-p values (1–2) (Ferris *et al*., 2012). The value of sfoot indicates the flow of C and energy through higher c-p values (3–5), which may regulate the function of soil food webs (Neher *et al*., 2004; Ferris *et al*., 2012). The higher value of efoot in the control treatment indicated higher productivity and turnover rates of the r-strategists and adequate resources (Vonk *et al*., 2013; Ito *et al*., 2015; Zhang *et al*., 2015; Zhong *et al*., 2017). Similarly, tillage drastically reduced the values of sfoot, which indicates the decrease in metabolic activity of both predators and omnivores in R2M and R2W treatments (Zhong *et al*., 2016).

The FMF area of nematode communities decreased with increasing levels of physical disturbance. FMF with a larger area in the control treatment during May 2018 indicated a higher metabolic activity and inflow of C, which was used for nematode production (Ferris, 2010). The high availability of organic matter in the control treatment increased the abundance of predators and omnivores and activated a stronger pathway through the predator channel, which may promote the stronger metabolic process and stability of the soil food web (Ferris, 2010; Thakur and Geisen, 2019; Kou *et al*., 2020). On the other hand, the FMF area was smaller in tillage treatments, indicating that smaller quantities of C were used for nematode production and lower metabolic activity due to the low availability of resources and lower predator-omnivore numbers (Ferris, 2010). All the treatments were clustered together in the same quadrat until November 2017 and started spreading out in January 2018. In May 2018, control and SLR treatments were located in quadrat B, which indicated a maturing ecosystem with enriched soil nutrients and a well-structured soil food web, while R2M and R2W were located in quadrat A, which indicated a disturbed and poorly structured soil food web (Ferris, 2010).

The relationship between nematode abundance and increasing levels of physical disturbances

Soil nematodes have been used as bioindicators to assess the effect of physical disturbances (Yeates, 2003). Our study revealed that different nematode genera had varying sensitivities to the physical disturbances. NMDS analysis of nematode communities revealed that soil nematode genera were clearly separated by increasing levels of physical disturbance during January and May 2018. The dissimilarity between the treatments indicates the progressive decrease in the abundance of nematode communities at R2M and R2W treatments. These declining trends generated significantly different nematode assemblages at all treatments during January and May 2018, as emphasized by PERMANOVA. All the nematodes belonging to higher c-p classes (c-p 4 and 5) and bacterial feeders of the c-p 2 class were negatively affected by the R2M and R2W treatments, while nematodes of lower c-p classes including bacterial feeders except c-p 2 class, fungal feeders, and plant feeders were not impacted by the tillage treatments. Nematodes of higher c-p classes such as Dorylaimida, *Aporcelaimellus*, *Alaimus*, *Clarkus*, and *Tripyla* were sensitive to physical disturbances (Bongers, 1990; Lenz and Eisenbeis, 2000; Ferris *et al*., 2001). Although bacterial feeders of the c-p 2 class belong to lower c-p classes, the abundance of c-p 2 class nematodes such as *Tylocephalus*, *Acrobeles*, *Ceratoplectus, Plectus, and Pseudacrobeles* was significantly reduced by tillage. The decrease in c-p 2 class nematodes in tillage treatments may be due to the continuous removal of organic matter (Ferris and Bongers, 2006). Tillage negatively impacted only a few plant feeders such as *Helicotylenchus*, *Gracilacus*, and *Boleodorus*. This declining trend of plant-feeding nematodes was in agreement with Lenz and Eisenbeis (2000) and Rahman *et al*. (2007). However, *Meloidogyne*, *Xenocriconemella*, and *Ecphyadophora* are positively associated with tillage. The response of plant-feeding nematodes to tillage practices is complicated to interpret as they are more closely associated with plants than with soil (Sanchez-Moreno *et al*., 2006). Furthermore, SIMPER analysis also revealed that the above-mentioned genera lead to significant dissimilarity among treatments.

Overall, this study gives an insight into the effect of increasing levels of physical disturbance on nematode communities in an undisturbed forest ecosystem, indicating that tillage reduced the abundance and richness of nematode communities, which was consistent with previous studies in the literature that were conducted in agricultural ecosystems. However, in this study, bacterial feeding nematodes belonging to the c-p 2 class responded differently compared to those of agricultural ecosystems. Tillage significantly reduced the abundance and richness of bacterial feeding nematodes of the c-p 2 class along with predators and omnivores, which belong to higher c-p classes. Moreover, tillage significantly reduced the FMF of nematodes, which indicates decreased metabolic activity, reduced C inflow, and poorly structured soil food webs. Unlike tillage, minimal disturbance such as removal of surface litter resulted in a significant reduction of very few nematode genera. Previous studies conducted in agricultural ecosystems determined that *Clarkus*, *Filenchus*, and *Plectus* were tolerant to tillage; however, they were found sensitive to tillage in our study. To understand this incongruity, further studies are needed to investigate whether these species are adapted to the physical disturbances in agricultural ecosystems. Overall, our study suggests that increasing levels of physical disturbance are detrimental to nematode community abundance and diversity that could affect ecosystem stability and sustainability. Also, our results affirmed that soil nematodes are highly sensitive to physical disturbances and therefore could be used as indicators of stability and functioning of the soil ecosystem.

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Supplementary Tables

Table S1. Abundance (individuals per 100 cm^3 of soil) of nematode taxon in different treatments: control, SLR, R2M, and R2W at all sampling times. (mean ± pooled SE, *n* = 5).

Taxon	Abbreviation	Trophic groups	Time	Control	SLR	R2M	R2W
Rhabditidae	Rhab	BF	Apr-17	115.67 ± 34.19	96 ± 34.19	177.67 ± 34.19	96.67 ± 34.19
			Jun-17	147.67 ± 34.19	57 ± 34.19	56.33 ± 34.19	61.67 ± 34.19
			Sep-17	134.67 ± 34.19	120 ± 34.19	93.67 ± 34.19	30 ± 34.19
			Nov-17	30.67 ± 34.19	46.67 ± 34.19	60.67 ± 34.19	20.67 ± 34.19
			Jan-18	22 ± 34.19	27.33 ± 34.19	15.33 ± 34.19	23.33 ± 34.19
			May-18	46 ± 34.19	34 ± 34.19	33.33 ± 34.19	21 ± 34.19
Plectus	Plec	BF	Apr-17	55.67 ± 11.23	26.33 ± 11.23	29.33 ± 11.23	30.33 ± 11.23
			Jun-17	72.33 ± 11.23	40 ± 11.23	16.33 ± 11.23	20.33 ± 11.23
			Sep-17	50 ± 11.23	63 ± 11.23	10.67 ± 11.23	17.67 ± 11.23
			Nov-17	29.67 ± 11.23	22 ± 11.23	11.67 ± 11.23	12.67 ± 11.23
			Jan-18	40.67 ± 11.23	21 ± 11.23	10.33 ± 11.23	5.67 ± 11.23
			May-18	45.67 ± 11.23	24.67 ± 11.23	28 ± 11.23	6.67 ± 11.23
Acrobeloides	Acrd	BF	Apr-17	46.33 ± 12.83	53.67 ± 12.83	24 ± 12.83	30 ± 12.83
			Jun-17	18.67 ± 12.83	27 ± 12.83	28.33 ± 12.83	19 ± 12.83
			Sep-17	11.67 ± 12.83	31.33 ± 12.83	36.33 ± 12.83	37.67 ± 12.83
			Nov-17	14.67 ± 12.83	11.67 ± 12.83	15 ± 12.83	18 ± 12.83
			Jan-18	23.33 ± 12.83	22 ± 12.83	18.67 ± 12.83	18.33 ± 12.83
			May-18	22.33 ± 12.83	18 ± 12.83	32.67 ± 12.83	14 ± 12.83
Prismatolaimus	Pris	BF	Apr-17	7 ± 10.29	2.67 ± 10.29	2.33 ± 10.29	2.67 ± 10.29
			Jun-17	19 ± 10.29	28 ± 10.29	6 ± 10.29	12.33 ± 10.29
			Sep-17	28.33 ± 10.29	37.67 ± 10.29	20.67 ± 10.29	41.67 ± 10.29
			Nov-17	43.67 ± 10.29	37.33 ± 10.29	24.67 ± 10.29	13.67 ± 10.29
			Jan-18	24.67 ± 10.29^{a}	19.33 ± 10.29^{a,b}	6 ± 10.29^{a,b}	1 ± 10.29^{b}
			May-18	21.67 ± 10.29^{a}	30.67 ± 10.29^{a,b}	10 ± 10.29^{a,b}	1.67 ± 10.29^{b}

(Continued)

Table S1. Continued

Taxon	Abbreviation	Trophic groups	Time	Control	SLR	R2M	R2W
Pseudacrobeles	Pseu	BF	Apr-17	20 ± 5.28	22 ± 5.28	11.67 ± 5.28	11.33 ± 5.28
			Jun-17	18.67 ± 5.28	5.67 ± 5.28	6 ± 5.28	6.67 ± 5.28
			Sep-17	19.33 ± 5.28	8 ± 5.28	8.67 ± 5.28	1 ± 5.28
			Nov-17	15.67 ± 5.28	4.33 ± 5.28	10.33 ± 5.28	9.33 ± 5.28
			Jan-18	37.33 ± 5.28	2 ± 5.28	8.33 ± 5.28	12.33 ± 5.28
			May-18	14.67 ± 5.28	4 ± 5.28	2.67 ± 5.28	3 ± 5.28
Alaimus	Alai	BF	Apr-17	0 ± 8.85	0 ± 8.85	0 ± 8.85	0 ± 8.85
			Jun-17	10.33 ± 8.85	5.33 ± 8.85	6.33 ± 8.85	0 ± 8.85
			Sep-17	33.67 ± 8.85	13 ± 8.85	20 ± 8.85	16 ± 8.85
			Nov-17	31 ± 8.85	76.33 ± 8.85	44.33 ± 8.85	15.33 ± 8.85
			Jan-18	10 ± 8.85	8 ± 8.85	0.67 ± 8.85	3 ± 8.85
			May-18	24.33 ± 8.85[a]	38 ± 8.85[a]	6.67 ± 8.85[b]	0 ± 8.85[b]
Acrobeles	Acrb	BF	Apr-17	6.67 ± 7.02	2.67 ± 7.02	1.67 ± 7.02	1.33 ± 7.02
			Jun-17	1.67 ± 7.02	6.33 ± 7.02	5.67 ± 7.02	7.67 ± 7.02
			Sep-17	7.67 ± 7.02	12.33 ± 7.02	12.33 ± 7.02	2 ± 7.02
			Nov-17	21 ± 7.02	6 ± 7.02	12 ± 7.02	1 ± 7.02
			Jan-18	2.67 ± 7.02	16.67 ± 7.02	5.67 ± 7.02	0 ± 7.02
			May-18	32.67 ± 7.02[a]	9.67 ± 7.02[b]	5.67 ± 7.02[b]	0 ± 7.02[b]
Tylocephalus	Tylo	BF	Apr-17	16.67 ± 2.7	4.67 ± 2.7	9.67 ± 2.7	5 ± 2.7
			Jun-17	9.67 ± 2.7	7.67 ± 2.7	0.67 ± 2.7	6.33 ± 2.7
			Sep-17	5.67 ± 2.7	3.33 ± 2.7	1.33 ± 2.7	1 ± 2.7
			Nov-17	2.33 ± 2.7	1.33 ± 2.7	0 ± 2.7	3 ± 2.7
			Jan-18	9 ± 2.7	2.33 ± 2.7	0 ± 2.7	0.67 ± 2.7
			May-18	3.33 ± 2.7	0.67 ± 2.7	1 ± 2.7	0 ± 2.7
Ceratoplectus	Cera	BF	Apr-17	3 ± 2.79	2.67 ± 2.79	2.33 ± 2.79	1 ± 2.79
			Jun-17	5 ± 2.79	12.33 ± 2.79	7.33 ± 2.79	5.33 ± 2.79
			Sep-17	9.33 ± 2.79	5.33 ± 2.79	5 ± 2.79	1 ± 2.79
			Nov-17	8.33 ± 2.79	8.33 ± 2.79	1 ± 2.79	0 ± 2.79

(Continued)

Table S1. Continued

Taxon	Abbreviation	Trophic groups	Time	Control	SLR	R2M	R2W
			Jan-18	7 ± 2.79[a]	1.33 ± 2.79[a,b]	0 ± 2.79[b]	0 ± 2.79[b]
			May-18	15 ± 2.79[a]	3.33 ± 2.79[a,b]	1 ± 2.79[b]	0 ± 2.79[b]
Teratocephalus	Tera	BF	Apr-17	3 ± 2.62	1.67 ± 2.62	2.33 ± 2.62	0 ± 2.62
			Jun-17	0 ± 2.62	1.67 ± 2.62	0.67 ± 2.62	0 ± 2.62
			Sep-17	12.33 ± 2.62	7 ± 2.62	2.33 ± 2.62	2 ± 2.62
			Nov-17	3.33 ± 2.62	2.67 ± 2.62	0 ± 2.62	0 ± 2.62
			Jan-18	5.33 ± 2.62	2 ± 2.62	0.67 ± 2.62	0.67 ± 2.62
			May-18	1.33 ± 2.62	0 ± 2.62	0.67 ± 2.62	2.67 ± 2.62
Cervidellus	Cerv	BF	Apr-17	1 ± 1.61	0 ± 1.61	1 ± 1.61	1 ± 1.61
			Jun-17	0 ± 1.61	0 ± 1.61	0.67 ± 1.61	0.67 ± 1.61
			Sep-17	2.33 ± 1.61	3.33 ± 1.61	1 ± 1.61	3 ± 1.61
			Nov-17	1.67 ± 1.61	1 ± 1.61	1 ± 1.61	2.33 ± 1.61
			Jan-18	5.67 ± 1.61	1.33 ± 1.61	2 ± 1.61	1 ± 1.61
			May-18	5 ± 1.61	0.67 ± 1.61	3.33 ± 1.61	0 ± 1.61
Diplogasteridae	Dipl	BF	Apr-17	0 ± 1.21	0 ± 1.21	1.67 ± 1.21	0 ± 1.21
			Jun-17	1.67 ± 1.21	0 ± 1.21	0.67 ± 1.21	2.67 ± 1.21
			Sep-17	2.67 ± 1.21	3.67 ± 1.21	0 ± 1.21	0 ± 1.21
			Nov-17	1 ± 1.21	0 ± 1.21	1.67 ± 1.21	0 ± 1.21
			Jan-18	2.33 ± 1.21	0 ± 1.21	0.67 ± 1.21	0 ± 1.21
			May-18	2.33 ± 1.21	0 ± 1.21	0 ± 1.21	1 ± 1.21
Filenchus	File	FF	Apr-17	55.33 ± 26.02	52.33 ± 26.02	65.67 ± 26.02	113.67 ± 26.02
			Jun-17	158.67 ± 26.02	111.67 ± 26.02	75.67 ± 26.02	94.67 ± 26.02
			Sep-17	116.33 ± 26.02	196.33 ± 26.02	133 ± 26.02	123.33 ± 26.02
			Nov-17	106 ± 26.02	130.33 ± 26.02	142.67 ± 26.02	63.67 ± 26.02
			Jan-18	191.33 ± 26.02[a]	156.67 ± 26.02[a,b]	93.33 ± 26.02[b]	88.33 ± 26.02[b]
			May-18	130.67 ± 26.02[a]	76.67 ± 26.02[a,b]	49.33 ± 26.02[b]	25 ± 26.02[b]

(*Continued*)

Table S1. Continued

Taxon	Abbreviation	Trophic groups	Time	Control	SLR	R2M	R2W
Aphelenchoides	Aphe	FF	Apr-17	33.33 ± 9.81	26.67 ± 9.81	48.33 ± 9.81	27.67 ± 9.81
			Jun-17	29.33 ± 9.81	20.33 ± 9.81	12 ± 9.81	11.33 ± 9.81
			Sep-17	36 ± 9.81	48 ± 9.81	18 ± 9.81	16.67 ± 9.81
			Nov-17	17 ± 9.81	27 ± 9.81	16.33 ± 9.81	21.33 ± 9.81
			Jan-18	25.33 ± 9.81	9.33 ± 9.81	9.67 ± 9.81	16.33 ± 9.81
			May-18	15 ± 9.81	5.67 ± 9.81	23.33 ± 9.81	16.67 ± 9.81
Ditylenchus	Dity	FF	Apr-17	0 ± 5.13	0 ± 5.13	0 ± 5.13	0 ± 5.13
			Jun-17	16.67 ± 5.13	2.33 ± 5.13	5 ± 5.13	5 ± 5.13
			Sep-17	24.67 ± 5.13	4.33 ± 5.13	15.33 ± 5.13	13.33 ± 5.13
			Nov-17	21.33 ± 5.13	4.33 ± 5.13	10.67 ± 5.13	26.33 ± 5.13
			Jan-18	28 ± 5.13	9 ± 5.13	19.67 ± 5.13	13.67 ± 5.13
			May-18	24.33 ± 5.13	4.33 ± 5.13	9.67 ± 5.13	8.67 ± 5.13
Diphtherophora	Diph	FF	Apr-17	0 ± 3.54	0 ± 3.54	0 ± 3.54	0 ± 3.54
			Jun-17	13.33 ± 3.54	9 ± 3.54	0 ± 3.54	5 ± 3.54
			Sep-17	1.67 ± 3.54	8 ± 3.54	1.33 ± 3.54	3.67 ± 3.54
			Nov-17	6.67 ± 3.54	5 ± 3.54	4 ± 3.54	2 ± 3.54
			Jan-18	2.33 ± 3.54	1 ± 3.54	0 ± 3.54	0.67 ± 3.54
			May-18	2.67 ± 3.54	4.33 ± 3.54	0.67 ± 3.54	2.33 ± 3.54
Meloidogyne	Melo	PF	Apr-17	126.33 ± 31.95	191.33 ± 31.95	135 ± 31.95	104.33 ± 31.95
			Jun-17	165.33 ± 31.95	104.33 ± 31.95	46.33 ± 31.95	40.33 ± 31.95
			Sep-17	66.67 ± 31.95	97 ± 31.95	76 ± 31.95	33.67 ± 31.95
			Nov-17	47.33 ± 31.95	58.67 ± 31.95	51.67 ± 31.95	55 ± 31.95
			Jan-18	29.67 ± 31.95	42 ± 31.95	10.33 ± 31.95	16.33 ± 31.95
			May-18	135.33 ± 31.95	140.67 ± 31.95	190.67 ± 31.95	114.33 ± 31.95

(*Continued*)

Table S1. Continued

Taxon	Abbreviation	Trophic groups	Time	Control	SLR	R2M	R2W
Xenocriconemella	Xeno	PF	Apr-17	16 ± 26.89	8 ± 26.89	6.33 ± 26.89	29.33 ± 26.89
			Jun-17	29 ± 26.89	30.67 ± 26.89	9 ± 26.89	40.67 ± 26.89
			Sep-17	63.33 ± 26.89	41.67 ± 26.89	16 ± 26.89	92 ± 26.89
			Nov-17	95 ± 26.89	112 ± 26.89	38 ± 26.89	80.67 ± 26.89
			Jan-18	57.67 ± 26.89	108.67 ± 26.89	16.33 ± 26.89	93.67 ± 26.89
			May-18	18 ± 26.89	46.67 ± 26.89	10 ± 26.89	47.33 ± 26.89
Gracilacus	Grac	PF	Apr-17	11 ± 22.18	14 ± 22.18	8.67 ± 22.18	12.67 ± 22.18
			Jun-17	19.67 ± 22.18	13.67 ± 22.18	2 ± 22.18	12.67 ± 22.18
			Sep-17	24 ± 22.18	77 ± 22.18	17.33 ± 22.18	28.33 ± 22.18
			Nov-17	58.67 ± 22.18	64 ± 22.18	21.67 ± 22.18	72 ± 22.18
			Jan-18	49 ± 22.18	42.33 ± 22.18	11 ± 22.18	14.67 ± 22.18
			May-18	28.33 ± 22.18	4.33 ± 22.18	4.67 ± 22.18	3.67 ± 22.18
Helicotylenchus	Heli	PF	Apr-17	6.67 ± 18.12	7.67 ± 18.12	2.67 ± 18.12	1.33 ± 18.12
			Jun-17	20.67 ± 18.12	8.67 ± 18.12	2.33 ± 18.12	7.33 ± 18.12
			Sep-17	6.67 ± 18.12	74.67 ± 18.12	1 ± 18.12	2 ± 18.12
			Nov-17	56.67 ± 18.12	6 ± 18.12	1 ± 18.12	3 ± 18.12
			Jan-18	23.33 ± 18.12	2.33 ± 18.12	0.67 ± 18.12	1 ± 18.12
			May-18	22.33 ± 18.12	3.67 ± 18.12	0 ± 18.12	3.67 ± 18.12
Boleodorus	Bole	PF	Apr-17	0 ± 3.85	0 ± 3.85	0 ± 3.85	0 ± 3.85
			Jun-17	10 ± 3.85	10.67 ± 3.85	7.33 ± 3.85	6.67 ± 3.85
			Sep-17	13.33 ± 3.85	1 ± 3.85	10.33 ± 3.85	6 ± 3.85
			Nov-17	4 ± 3.85	14 ± 3.85	11.33 ± 3.85	1 ± 3.85
			Jan-18	6.33 ± 3.85	0 ± 3.85	0 ± 3.85	0 ± 3.85
			May-18	12.67 ± 3.85[a]	3 ± 3.85[b]	0 ± 3.85[b]	0 ± 3.85[b]
Ecphyadophora	Ecph	PF	Apr-17	1 ± 1.23	0 ± 1.23	0 ± 1.23	0 ± 1.23
			Jun-17	0 ± 1.23	3.33 ± 1.23	1.33 ± 1.23	0.67 ± 1.23
			Sep-17	5.33 ± 1.23	0 ± 1.23	0 ± 1.23	0 ± 1.23
			Nov-17	2.33 ± 1.23	1 ± 1.23	1 ± 1.23	1.67 ± 1.23

(*Continued*)

Table S1. Continued

Taxon	Abbreviation	Trophic groups	Time	Control	SLR	R2M	R2W
			Jan-18	6.67 ± 1.23	0 ± 1.23	3.33 ± 1.23	0 ± 1.23
			May-18	1.33 ± 1.23	0 ± 1.23	1.67 ± 1.23	1 ± 1.23
Clarkus	Clak	PR	Apr-17	0 ± 2.13	0.67 ± 2.13	3.67 ± 2.13	0 ± 2.13
			Jun-17	3 ± 2.13	2.33 ± 2.13	0.67 ± 2.13	0 ± 2.13
			Sep-17	2.67 ± 2.13	1.67 ± 2.13	4 ± 2.13	0 ± 2.13
			Nov-17	3.33 ± 2.13	6.67 ± 2.13	7.67 ± 2.13	3.67 ± 2.13
			Jan-18	3.33 ± 2.13	0 ± 2.13	1.33 ± 2.13	0 ± 2.13
			May-18	5.67 ± 2.13[a]	1.67 ± 2.13[a,b]	0 ± 2.13[b]	0 ± 2.13[b]
Tripyla	Trip	PR	Apr-17	0 ± 1.93	0 ± 1.93	0 ± 1.93	0 ± 1.93
			Jun-17	1.67 ± 1.93	1.33 ± 1.93	0.67 ± 1.93	0.67 ± 1.93
			Sep-17	3.67 ± 1.93	2.33 ± 1.93	0 ± 1.93	0 ± 1.93
			Nov-17	5 ± 1.93	5.33 ± 1.93	2 ± 1.93	0 ± 1.93
			Jan-18	0 ± 1.93	0 ± 1.93	0 ± 1.93	0 ± 1.93
			May-18	5 ± 1.93[a]	2.33 ± 1.93[a,b]	0 ± 1.93[b]	0 ± 1.93[b]
Dorylaimida	Dory	OM	Apr-17	3.67 ± 3.33	7.67 ± 3.33	0 ± 3.33	14.33 ± 3.33
			Jun-17	0 ± 3.33	0 ± 3.33	0.67 ± 3.33	0.67 ± 3.33
			Sep-17	3.33 ± 3.33	5.33 ± 3.33	4.33 ± 3.33	10.67 ± 3.33
			Nov-17	11.67 ± 3.33	13.67 ± 3.33	2.67 ± 3.33	5.33 ± 3.33
			Jan-18	2.33 ± 3.33	0 ± 3.33	0 ± 3.33	0 ± 3.33
			May-18	8.67 ± 3.33[a]	7.33 ± 3.33[a,b]	0 ± 3.33[b]	0 ± 3.33[b]
Aporcelaimellus	Apor	OM	Apr-17	0 ± 2	0.67 ± 2	0 ± 2	0 ± 2
			Jun-17	4.67 ± 2	2.33 ± 2	1.33 ± 2	1.33 ± 2
			Sep-17	3 ± 2	2.33 ± 2	3.67 ± 2	2 ± 2
			Nov-17	4 ± 2	7.33 ± 2	5.67 ± 2	3.67 ± 2
			Jan-18	4 ± 2	2.33 ± 2	2 ± 2	0 ± 2
			May-18	6 ± 2[a]	1.67 ± 2[b]	0 ± 2[b]	0 ± 2[b]

Letters indicate significant differences among treatments at each sampling time at $P < 0.05$ (Tukey–LSD test).

OM, omnivores; PF, plant feeders; PR, predators; R2M, rototill for every 2 mon; R2W, rototill for every 2 wk; SLR, surface litter removed.

Table S2. Abundance and richness of nematode trophic groups per 100 cm^3 of soil in different treatments: control, SLR, R2M, and R2W at all sampling times. (mean ± pooled SE, *n* = 5).

Trophic group	Time	Control	SLR	R2M	R2W
Abundance					
BF	Apr-17	274.33 ± 54.05	212.67 ± 54.05	264.67 ± 54.05	180 ± 54.05
	Jun-17	305.33 ± 54.05	191.33 ± 54.05	135 ± 54.05	145 ± 54.05
	Sep-17	318.67 ± 54.05	311.33 ± 54.05	212.67 ± 54.05	154 ± 54.05
	Nov-17	206 ± 54.05	220.67 ± 54.05	183 ± 54.05	97 ± 54.05
	Jan-18	195.67 ± 54.05	130 ± 54.05	73.67 ± 54.05	66.33 ± 54.05
	May-18	257.67 ± 54.05[a]	174 ± 54.05[a,b]	125.67 ± 54.05[a,b]	50 ± 54.05[b]
FF	Apr-17	88.33 ± 32.47	79.67 ± 32.47	114 ± 32.47	141.33 ± 32.47
	Jun-17	218.33 ± 32.47	143.67 ± 32.47	92.67 ± 32.47	116.33 ± 32.47
	Sep-17	181 ± 32.47	264 ± 32.47	167 ± 32.47	157.33 ± 32.47
	Nov-17	158.67 ± 32.47	169.67 ± 32.47	173.67 ± 32.47	114.67 ± 32.47
	Jan-18	249 ± 32.47[a]	175.33 ± 32.47[a,b]	122.67 ± 32.47[b]	119.33 ± 32.47[b]
	May-18	189.67 ± 32.47[a]	100 ± 32.47[a,b]	84.33 ± 32.47[a,b]	53.33 ± 32.47[b]
PP	Apr-17	170 ± 51.02	225.33 ± 51.02	153 ± 51.02	148.67 ± 51.02
	Jun-17	244.33 ± 51.02	171.67 ± 51.02	68.67 ± 51.02	109.33 ± 51.02
	Sep-17	186.33 ± 51.02	294 ± 51.02	122.67 ± 51.02	163.67 ± 51.02
	Nov-17	271 ± 51.02	259.67 ± 51.02	134 ± 51.02	216.67 ± 51.02
	Jan-18	175 ± 51.02	196 ± 51.02	44.67 ± 51.02	126.67 ± 51.02
	May-18	238.33 ± 51.02	207.67 ± 51.02	208 ± 51.02	169.67 ± 51.02
PR	Apr-17	0 ± 3.75	0.67 ± 3.75	3.67 ± 3.75	4.33 ± 3.75
	Jun-17	4.67 ± 3.75	5 ± 3.75	3.67 ± 3.75	0.67 ± 3.75
	Sep-17	7.67 ± 3.75	4 ± 3.75	5 ± 3.75	2.33 ± 3.75
	Nov-17	11 ± 3.75	14 ± 3.75	17 ± 3.75	4.67 ± 3.75
	Jan-18	3.33 ± 3.75	0 ± 3.75	2 ± 3.75	0 ± 3.75
	May-18	13.33 ± 3.75[a]	5.33 ± 3.75[a,b]	0 ± 3.75[b]	0 ± 3.75[b]
OM	Apr-17	3.67 ± 7.66	8.67 ± 7.66	0 ± 7.66	14.33 ± 7.66
	Jun-17	6.33 ± 7.66	2.33 ± 7.66	2 ± 7.66	5.33 ± 7.66
	Sep-17	7.33 ± 7.66	7.67 ± 7.66	9.33 ± 7.66	12.67 ± 7.66
	Nov-17	18.33 ± 7.66	23.67 ± 7.66	9.67 ± 7.66	13 ± 7.66
	Jan-18	8.33 ± 7.66	2.33 ± 7.66	2.67 ± 7.66	0 ± 7.66
	May-18	48.67 ± 7.66[a]	20.33 ± 7.66[a,b]	0.67 ± 7.66[b]	0 ± 7.66[b]

(Continued)

Table S2. Continued

Trophic group	Time	Control	SLR	R2M	R2W
Richness					
BF	Apr-17	7 ± 0.96	6.67 ± 0.96	7.33 ± 0.96	6 ± 0.96
	Jun-17	7.67 ± 0.96	8 ± 0.96	8 ± 0.96	9 ± 0.96
	Sep-17	10.33 ± 0.96	9.67 ± 0.96	9.33 ± 0.96	8.33 ± 0.96
	Nov-17	11 ± 0.96	9 ± 0.96	7 ± 0.96	7.67 ± 0.96
	Jan-18	10.67 ± 0.96[a]	9 ± 0.96[a,b]	8 ± 0.96[a,b]	6.33 ± 0.96[b]
	May-18	10.33 ± 0.96[a]	8.67 ± 0.96[a]	7 ± 0.96[a,b]	4.67 ± 0.96[b]
FF	Apr-17	2 ± 0.41	2 ± 0.41	2 ± 0.41	1.67 ± 0.41
	Jun-17	3 ± 0.41	3 ± 0.41	2.67 ± 0.41	4 ± 0.41
	Sep-17	4 ± 0.41	4 ± 0.41	3.33 ± 0.41	3.67 ± 0.41
	Nov-17	5 ± 0.41	4 ± 0.41	3.67 ± 0.41	3.67 ± 0.41
	Jan-18	4 ± 0.41	3.33 ± 0.41	3 ± 0.41	3.33 ± 0.41
	May-18	4 ± 0.41	4 ± 0.41	4 ± 0.41	3.67 ± 0.41
PP	Apr-17	4.33 ± 0.8	3 ± 0.8	3.33 ± 0.8	3.33 ± 0.8
	Jun-17	4.33 ± 0.8	5 ± 0.8	4.33 ± 0.8	4 ± 0.8
	Sep-17	5.33 ± 0.8	4.67 ± 0.8	4.33 ± 0.8	4.33 ± 0.8
	Nov-17	6.33 ± 0.8	5.33 ± 0.8	5.33 ± 0.8	5.67 ± 0.8
	Jan-18	6 ± 0.8	3.67 ± 0.8	4.33 ± 0.8	3.33 ± 0.8
	May-18	5.67 ± 0.8	4.33 ± 0.8	3 ± 0.8	3.33 ± 0.8
PR	Apr-17	0 ± 0.45	0.33 ± 0.45	0.33 ± 0.45	0.33 ± 0.45
	Jun-17	1 ± 0.45	1 ± 0.45	1.33 ± 0.45	0.33 ± 0.45
	Sep-17	1.67 ± 0.45	0.67 ± 0.45	1 ± 0.45	0.33 ± 0.45
	Nov-17	2 ± 0.45	2 ± 0.45	2.67 ± 0.45	1 ± 0.45
	Jan-18	0.33 ± 0.45	0 ± 0.45	1 ± 0.45	0 ± 0.45
	May-18	1.33 ± 0.45[a,b]	1.67 ± 0.45[a]	0 ± 0.45[b]	0 ± 0.45[b]
OM	Apr-17	0.67 ± 0.42	1 ± 0.42	0 ± 0.42	0.67 ± 0.42
	Jun-17	1 ± 0.42	0.33 ± 0.42	0.67 ± 0.42	2 ± 0.42
	Sep-17	2 ± 0.42	0.67 ± 0.42	1 ± 0.42	1.33 ± 0.42
	Nov-17	2.67 ± 0.42	3.33 ± 0.42	2 ± 0.42	3 ± 0.42
	Jan-18	1.67 ± 0.42	0.33 ± 0.42	1 ± 0.42	0 ± 0.42
	May-18	3.33 ± 0.42[a]	3 ± 0.42[a]	0.33 ± 0.42[b]	0 ± 0.42[b]

Letters indicate significant differences among treatments at each sampling time at $P < 0.05$ (Tukey–LSD test).

BF, bacterial feeders; FF, fungal feeders; PP, plant feeders; PR, predators; OM, omnivores; R2M, rototill for every 2 mon; R2W, rototill for every 2 wk; SLR, surface litter removed.

Table S3. Abundance and richness of nematode c-p classes per 100 cm³ of soil in different treatments: control, SLR, R2M, and R2W at all sampling times. (mean ± SE, *n* = 5).

c-p classes	Time	Control	SLR	R2M	R2W
Abundance					
c-p 1	Apr-17	115.67 ± 34.6	97 ± 34.6	179.33 ± 34.6	96.67 ± 34.6
c-p 1	Jun-17	149.33 ± 34.6	57 ± 34.6	57 ± 34.6	65 ± 34.6
c-p 1	Sep-17	137 ± 34.6	123.67 ± 34.6	94.33 ± 34.6	31 ± 34.6
c-p 1	Nov-17	32.33 ± 34.6	46.67 ± 34.6	62.33 ± 34.6	20.67 ± 34.6
c-p 1	Jan-18	25.33 ± 34.6	32.67 ± 34.6	17.67 ± 34.6	23.33 ± 34.6
c-p 1	May-18	51 ± 34.6	35 ± 34.6	33.33 ± 34.6	22 ± 34.6
c-p 2	Apr-17	258.33 ± 51.94	210 ± 51.94	202.33 ± 51.94	235.67 ± 51.94
c-p 2	Jun-17	361 ± 51.94	262.33 ± 51.94	168.67 ± 51.94	197.67 ± 51.94
c-p 2	Sep-17	332.67 ± 51.94	461.33 ± 51.94	268.67 ± 51.94	251.33 ± 51.94
c-p 2	Nov-17	304.67 ± 51.94	295.33 ± 51.94	263 ± 51.94	233.33 ± 51.94
c-p 2	Jan-18	432.33 ± 51.94[a]	283.67 ± 51.94[a,b]	187.67 ± 51.94[b]	172 ± 51.94[b]
c-p 2	May-18	359.67 ± 51.94[a]	158.33 ± 51.94[a,b]	165 ± 51.94[b]	79 ± 51.94[b]
c-p 3	Apr-17	158.67 ± 53.65	211 ± 53.65	150 ± 53.65	137.33 ± 53.65
c-p 3	Jun-17	249.33 ± 53.65	183 ± 53.65	65 ± 53.65	107.33 ± 53.65
c-p 3	Sep-17	184 ± 53.65	272.67 ± 53.65	119 ± 53.65	176 ± 53.65
c-p 3	Nov-17	260.33 ± 53.65	228.67 ± 53.65	121.33 ± 53.65	155 ± 53.65
c-p 3	Jan-18	148 ± 53.65	176.33 ± 53.65	34.67 ± 53.65	114 ± 53.65
c-p 3	May-18	208 ± 53.65	229.67 ± 53.65	212 ± 53.65	171.67 ± 53.65
c-p 4	Apr-17	3.67 ± 11.23	8.67 ± 11.23	3.67 ± 11.23	18.67 ± 11.23
c-p 4	Jun-17	15 ± 11.23	9 ± 11.23	10 ± 11.23	4.67 ± 11.23
c-p 4	Sep-17	44 ± 11.23	21.67 ± 11.23	30.33 ± 11.23	29.33 ± 11.23
c-p 4	Nov-17	56.33 ± 11.23	105.33 ± 11.23	61 ± 11.23	30.67 ± 11.23
c-p 4	Jan-18	19.67 ± 11.23	8 ± 11.23	3.33 ± 11.23	3 ± 11.23
c-p 4	May-18	49 ± 11.23[a]	54 ± 11.23[a]	7.67 ± 11.23[b]	0 ± 11.23[b]
c-p 5	Apr-17	0 ± 6.1	0.67 ± 6.1	0 ± 6.1	0 ± 6.1
c-p 5	Jun-17	4.67 ± 6.1	2.33 ± 6.1	1.33 ± 6.1	1.33 ± 6.1
c-p 5	Sep-17	3 ± 6.1	2.33 ± 6.1	3.67 ± 6.1	2 ± 6.1
c-p 5	Nov-17	11.67 ± 6.1	11.67 ± 6.1	9 ± 6.1	5.33 ± 6.1
c-p 5	Jan-18	6.33 ± 6.1	3 ± 6.1	2.67 ± 6.1	0 ± 6.1
c-p 5	May-18	32 ± 6.1[a]	10.33 ± 6.1[a,b]	0.67 ± 6.1[b]	0 ± 6.1[b]

(*Continued*)

Table S3. Continued

c-p classes	Time	Control	SLR	R2M	R2W
Richness					
c-p 1	Apr-17	1 ± 0.33	1.33 ± 0.33	1.33 ± 0.33	1 ± 0.33
c-p 1	Jun-17	1.33 ± 0.33	1 ± 0.33	1.33 ± 0.33	2 ± 0.33
c-p 1	Sep-17	1.67 ± 0.33	1.33 ± 0.33	1.33 ± 0.33	1.33 ± 0.33
c-p 1	Nov-17	1.67 ± 0.33	1 ± 0.33	1.33 ± 0.33	1 ± 0.33
c-p 1	Jan-18	2 ± 0.33	2 ± 0.33	1.67 ± 0.33	1 ± 0.33
c-p 1	May-18	1.67 ± 0.33	1.33 ± 0.33	1 ± 0.33	1.33 ± 0.33
c-p 2	Apr-17	9 ± 0.87	7.67 ± 0.87	7.67 ± 0.87	7 ± 0.87
c-p 2	Jun-17	9 ± 0.87	10.67 ± 0.87	9 ± 0.87	10.67 ± 0.87
c-p 2	Sep-17	12 ± 0.87	9 ± 0.87	9.67 ± 0.87	9 ± 0.87
c-p 2	Nov-17	11.67 ± 0.87	9.67 ± 0.87	9 ± 0.87	9.67 ± 0.87
c-p 2	Jan-18	11.33 ± 0.87[a]	8.33 ± 0.87[a,b]	9.33 ± 0.87[a,b]	7.67 ± 0.87[b]
c-p 2	May-18	12 ± 0.87[a]	9 ± 0.87[a,b]	8.33 ± 0.87[b]	6.33 ± 0.87[b]
c-p 3	Apr-17	3.33 ± 0.81	2.67 ± 0.81	3.67 ± 0.81	3 ± 0.81
c-p 3	Jun-17	4.33 ± 0.81	4.33 ± 0.81	4 ± 0.81	4.33 ± 0.81
c-p 3	Sep-17	5 ± 0.81	7 ± 0.81	5 ± 0.81	5 ± 0.81
c-p 3	Nov-17	7 ± 0.81	5.33 ± 0.81	4.67 ± 0.81	4 ± 0.81
c-p 3	Jan-18	5 ± 0.81	4.33 ± 0.81	3.67 ± 0.81	3.67 ± 0.81
c-p 3	May-18	4.67 ± 0.81	5.33 ± 0.81	3.67 ± 0.81	4 ± 0.81
c-p 4	Apr-17	0.67 ± 0.51	1 ± 0.51	0.33 ± 0.51	1 ± 0.51
c-p 4	Jun-17	1.67 ± 0.51	1 ± 0.51	2.33 ± 0.51	1.67 ± 0.51
c-p 4	Sep-17	4 ± 0.51	2 ± 0.51	2.67 ± 0.51	2 ± 0.51
c-p 4	Nov-17	4.67 ± 0.51	5.67 ± 0.51	4 ± 0.51	5 ± 0.51
c-p 4	Jan-18	3 ± 0.51[a]	1 ± 0.51[a,b]	1.67 ± 0.51[a,b]	0.67 ± 0.51[b]
c-p 4	May-18	5 ± 0.51[a]	4.67 ± 0.51[a]	1 ± 0.51[b]	0 ± 0.51[b]
c-p 5	Apr-17	0 ± 0.38	0.33 ± 0.38	0 ± 0.38	0 ± 0.38
c-p 5	Jun-17	0.67 ± 0.38	0.33 ± 0.38	0.33 ± 0.38	0.67 ± 0.38
c-p 5	Sep-17	0.67 ± 0.38	0.33 ± 0.38	0.33 ± 0.38	0.67 ± 0.38
c-p 5	Nov-17	2 ± 0.38	2 ± 0.38	1.67 ± 0.38	1.33 ± 0.38
c-p 5	Jan-18	1.33 ± 0.38	0.67 ± 0.38	1 ± 0.38	0 ± 0.38
c-p 5	May-18	1.33 ± 0.38	1.33 ± 0.38	0.33 ± 0.38	0 ± 0.38

Letters indicate significant differences among treatments at each sampling time at $P < 0.05$ (Tukey–LSD test).
R2M, rototill for every 2 mon; R2W, rototill for every 2 wk; SLR, surface litter removed.

Table S4. Nematode ecological indices in different treatments: control, SLR, R2M, and R2W at all sampling times. (mean ± pooled SE, *n* = 5).

Indices	Time	Control	SLR	R2M	R2W
λ	Apr-17	0.15 ± 0.03	0.2 ± 0.03	0.23 ± 0.03	0.2 ± 0.03
	Jun-17	0.16 ± 0.03	0.14 ± 0.03	0.12 ± 0.03	0.12 ± 0.03
	Sep-17	0.11 ± 0.03	0.14 ± 0.03	0.15 ± 0.03	0.15 ± 0.03
	Nov-17	0.1 ± 0.03	0.12 ± 0.03	0.14 ± 0.03	0.17 ± 0.03
	Jan-18	0.14 ± 0.03[a]	0.19 ± 0.03[a,b]	0.2 ± 0.03[a,b]	0.27 ± 0.03[b]
	May-18	0.11 ± 0.03[a]	0.17 ± 0.03[a,b]	0.26 ± 0.03[b]	0.24 ± 0.03[b]
H′	Apr-17	2.17 ± 0.14	1.99 ± 0.14	1.85 ± 0.14	1.89 ± 0.14
	Jun-17	2.19 ± 0.14	2.29 ± 0.14	1.83 ± 0.14	1.82 ± 0.14
	Sep-17	2.56 ± 0.14	2.28 ± 0.14	2.29 ± 0.14	2.24 ± 0.14
	Nov-17	2.65 ± 0.14	2.49 ± 0.14	2.37 ± 0.14	2.28 ± 0.14
	Jan-18	2.44 ± 0.14[a]	2.07 ± 0.14[a,b]	2.16 ± 0.14[a,b]	1.84 ± 0.14[b]
	May-18	2.63 ± 0.14[a]	2.27 ± 0.14[a,b]	1.88 ± 0.14[b]	1.82 ± 0.14[b]
NCR	Apr-17	0.72 ± 0.06	0.69 ± 0.06	0.69 ± 0.06	0.58 ± 0.06
	Jun-17	0.58 ± 0.06	0.57 ± 0.06	0.58 ± 0.06	0.55 ± 0.06
	Sep-17	0.61 ± 0.06	0.53 ± 0.06	0.56 ± 0.06	0.49 ± 0.06
	Nov-17	0.56 ± 0.06	0.57 ± 0.06	0.5 ± 0.06	0.46 ± 0.06
	Jan-18	0.43 ± 0.06	0.46 ± 0.06	0.36 ± 0.06	0.38 ± 0.06
	May-18	0.57 ± 0.06	0.64 ± 0.06	0.59 ± 0.06	0.48 ± 0.06
MI	Apr-17	1.78 ± 0.12	1.8 ± 0.14	1.65 ± 0.3	1.92 ± 0.29
	Jun-17	1.87 ± 0.28	2.02 ± 0.14	1.9 ± 0.2	1.89 ± 0.13
	Sep-17	2.01 ± 0.06	1.97 ± 0.09	2.02 ± 0.17	2.25 ± 0.13
	Nov-17	2.4 ± 0.35	2.56 ± 0.31	2.28 ± 0.12	2.31 ± 0.09
	Jan-18	2.12 ± 0.05[a]	2.1 ± 0.11[a,b]	2.05 ± 0.12[a,b]	1.92 ± 0.07[b]
	May-18	2.29 ± 0.16[a]	2.53 ± 0.28[a]	1.96 ± 0.08[b]	1.84 ± 0.14[b]
PPI	Apr-17	2.86 ± 0.08	2.88 ± 0.19	2.95 ± 0.05	2.92 ± 0.09
	Jun-17	2.87 ± 0.1	2.81 ± 0.09	2.85 ± 0.12	2.79 ± 0.18
	Sep-17	2.72 ± 0.1	2.77 ± 0.33	2.76 ± 0.05	2.8 ± 0.21
	Nov-17	2.75 ± 0.12	2.72 ± 0.08	2.61 ± 0.21	2.74 ± 0.36
	Jan-18	2.66 ± 0.24	2.81 ± 0.18	2.61 ± 0.07	2.86 ± 0.15
	May-18	2.76 ± 0.12	2.95 ± 0.04	2.96 ± 0.04	2.97 ± 0.05
BI	Apr-17	31.84 ± 3.48	28.58 ± 3.8	25.51 ± 7.97	31.75 ± 4.78
	Jun-17	26.42 ± 3.8	33.21 ± 3.33	30.42 ± 5.33	30.32 ± 5.23
	Sep-17	24.3 ± 3.48	28.84 ± 4.26	24.66 ± 3.71	29.98 ± 1.22
	Nov-17	27.25 ± 4.26	18.71 ± 1.24	24.36 ± 4.4	30.1 ± 1.72
	Jan-18	41.83 ± 1.14	39.89 ± 1.12	41.87 ± 1.95	40.39 ± 2.22
	May-18	31.21 ± 3.56	20.41 ± 3.99	35.71 ± 1.99	32.51 ± 0.24

(*Continued*)

Table S4. Continued

Indices	Time	Control	SLR	R2M	R2W
EI	Apr-17	66.2 ± 4.03	68.84 ± 4.25	72.27 ± 9.51	60.4 ± 9.64
	Jun-17	68.42 ± 5.79	59.54 ± 2.15	64.4 ± 7.33	65.84 ± 5.59
	Sep-17	69.49 ± 3.31	65.51 ± 5.09	69.57 ± 2.54	55.23 ± 2.49
	Nov-17	52.55 ± 2.30	59.96 ± 5.13	63.86 ± 5.17	53.52 ± 3.57
	Jan-18	48.21 ± 1.01[a]	50.34 ± 3.83[a,b]	52.04 ± 1.82[a,b]	57.65 ± 2.15[b]
	May-18	52.87 ± 2.16[a]	59.36 ± 3.97[a,b]	58.99 ± 2.40[a,b]	65.12 ± 1.81[b]
SI	Apr-17	14.27 ± 1.35	22.25 ± 6.9	12.07 ± 4.79	25.55 ± 7.8
	Jun-17	31.28 ± 4.61	33.43 ± 9.58	29.57 ± 2.75	28.73 ± 4.57
	Sep-17	46.73 ± 6.6	37.35 ± 3.69	43.58 ± 11.27	51.35 ± 3.55
	Nov-17	57.72 ± 10.05	72.03 ± 3.67	58.43 ± 7.41	53.67 ± 1.65
	Jan-18	31.26 ± 2.8[a]	30.91 ± 3.68[a]	21.91 ± 6.05[a,b]	10.53 ± 2.01[b]
	May-18	51.8 ± 6.82[a]	70.23 ± 6.86[a]	25.76 ± 4.36[b]	12.89 ± 8.01[b]
CI	Apr-17	21.48 ± 4.74	22.72 ± 7.87	24.39 ± 9.93	38.52 ± 9.49
	Jun-17	31.69 ± 8.96	38.64 ± 2.75	38.6 ± 13.91	36.74 ± 12.31
	Sep-17	28.38 ± 5.15	37.83 ± 8.57	30.54 ± 2.23	59.49 ± 7.66
	Nov-17	56.33 ± 6.78	52.89 ± 10.04	45.06 ± 7.52	62.05 ± 7.36
	Jan-18	71.5 ± 3.06	65.09 ± 5.06	67.81 ± 3.87	55.13 ± 9.72
	May-18	48.61 ± 3.56	42.47 ± 8.40	37.76 ± 1.83	36.75 ± 2.08
efoot	Apr-17	169.74 ± 65	141.14 ± 39.47	260.54 ± 90.16	145.4 ± 72.04
	Jun-17	224.54 ± 68.32	88.81 ± 22.33	86.28 ± 28.13	96.08 ± 30.17
	Sep-17	206.41 ± 56.66	188.21 ± 53.38	144.31 ± 2.46	53.65 ± 16.03
	Nov-17	55 ± 13.95	75.96 ± 26.93	97.97 ± 28.81	39.16 ± 9.96
	Jan-18	49.85 ± 2.51	49.46 ± 15.85	31.49 ± 6.76	41.54 ± 6.38
	May-18	79.35 ± 16.03[a]	53.59 ± 14.81[a,b]	53.52 ± 4.22[a,b]	34.6 ± 3.36[b]
sfoot	Apr-17	9.18 ± 3.48	18.84 ± 10.55	3.97 ± 2.48	33.54 ± 14.29
	Jun-17	20.55 ± 6.99	15 ± 6.66	8.13 ± 0.89	9.7 ± 2.07
	Sep-17	31.39 ± 10.5	29.61 ± 8.07	27.88 ± 9.77	37.59 ± 11.4
	Nov-17	61.17 ± 14.29	79.08 ± 16.43	42.2 ± 10.49	31.76 ± 8.49
	Jan-18	24.22 ± 4.3[a]	8.58 ± 2.8[a,b]	6.69 ± 1.86[b]	0.9 ± 0.2[b]
	May-18	62.77 ± 21.42[a]	43.13 ± 4.79[a]	3.55 ± 0.76[b]	0.79 ± 0.48[b]

Letters indicate significant differences among treatments at each sampling time at $P < 0.05$ (Tukey–LSD test).

λ, Simpson index; H´, Shannon–Weiner index.

BI, basal index; CI, channel index, efoot, enrichment footprint; EI, enrichment index; MI, maturity index; NCR, nematode channel ratio; PPI, plant parasitic index; R2M, rototill for every 2 mon; R2W, rototill for every 2 wk; sfoot, structure footprint; SI, structure index; SLR, surface litter removed.

Table S5. Similarity percentage analysis of the nematode communities between treatments: control, surface litter removed (SLR), rototill for every two months (R2M), and rototill for every two weeks (R2W) at all sampling times.

	Av.Diss	SD	Diss/ SD	Av.Abund	Av.Abund	Contrib (%)	cumsum (%)	p
Apr-17								
Control vs SLR	**Average dissimilarity = 39.35**							
Meloidogyne	9.66	9.12	1.06	126.33	191.33	24.54	24.54	0.195
Rhabditidae	7.98	4.82	1.66	115.67	96.00	20.29	44.83	0.952
Acrobeloides	4.94	2.92	1.69	46.33	53.67	12.55	57.38	0.076
Plectus	3.41	2.70	1.27	55.67	26.33	8.68	66.06	0.162
Filenchus	2.37	1.96	1.21	55.33	52.33	6.02	72.08	0.845
Gracilacus	1.81	1.91	0.94	11.00	14.00	4.59	76.67	0.345
Aphelenchoides	1.44	0.90	1.59	33.33	26.67	3.66	80.33	0.939
Xenocriconemella	1.36	1.01	1.34	16.00	8.00	3.44	83.77	0.805
Pseudacrobeles	1.18	0.75	1.58	20.00	22.00	3.00	86.77	0.593
Tylocephalus	0.98	0.81	1.22	16.67	4.67	2.49	89.26	0.395
Dorylaimida	0.88	1.01	0.88	3.67	7.67	2.25	91.51	0.639
Helicotylenchus	0.80	0.92	0.87	6.67	7.67	2.03	93.54	0.207
Prismatolaimus	0.64	0.52	1.24	7.00	2.67	1.63	95.17	0.091
Acrobeles	0.58	0.66	0.88	6.67	2.67	1.48	96.65	0.29
Ceratoplectus	0.45	0.33	1.38	3.00	2.67	1.14	97.79	0.362
Teratocephalus	0.43	0.46	0.93	3.00	1.67	1.09	98.88	0.372
Cervidellus	0.13	0.21	0.64	1.00	0.00	0.34	99.22	0.577
Ecphyadophora	0.13	0.21	0.64	1.00	0.00	0.33	99.55	0.213
Aporcelaimellus	0.09	0.14	0.63	0.00	0.67	0.23	99.78	0.2
Clarkus	0.09	0.14	0.63	0.00	0.67	0.22	100.00	0.635
Alaimus	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Boleodorus	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Diphtherophora	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Diplogasteridae	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Ditylenchus	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Tripyla	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Control vs R2M	**Average dissimilarity = 36.73**							
Rhabditidae	12.78	9.12	1.40	115.67	177.67	34.78	34.78	0.215
Meloidogyne	6.13	1.67	3.66	126.33	135.00	16.68	51.46	0.533
Acrobeloides	3.61	2.74	1.32	46.33	24.00	9.84	61.30	0.446
Plectus	2.59	0.98	2.65	55.67	29.33	7.04	68.34	0.574
Aphelenchoides	2.19	1.96	1.12	33.33	48.33	5.96	74.30	0.619

(*Continued*)

Table S5. Continued

	Av.Diss	SD	Diss/ SD	Av.Abund	Av.Abund	Contrib (%)	cumsum (%)	p
Filenchus	2.09	1.87	1.12	55.33	65.67	5.68	79.98	0.93
Xenocriconemella	1.17	0.95	1.24	16.00	6.33	3.19	83.17	0.872
Tylocephalus	0.97	0.71	1.37	16.67	9.67	2.63	85.80	0.439
Pseudacrobeles	0.87	0.44	1.99	20.00	11.67	2.36	88.16	0.927
Gracilacus	0.74	0.40	1.86	11.00	8.67	2.01	90.17	0.834
Helicotylenchus	0.62	0.50	1.24	6.67	2.67	1.69	91.86	0.598
Acrobeles	0.55	0.63	0.87	6.67	1.67	1.49	93.35	0.4
Prismatolaimus	0.54	0.35	1.54	7.00	2.33	1.48	94.83	0.289
Ceratoplectus	0.42	0.45	0.93	3.00	2.33	1.14	95.97	0.438
Teratocephalus	0.42	0.45	0.93	3.00	2.33	1.15	97.12	0.382
Clarkus	0.32	0.50	0.65	0.00	3.67	0.88	98.00	0.352
Dorylaimida	0.31	0.24	1.29	3.67	0.00	0.85	98.85	0.915
Diplogasteridae	0.15	0.24	0.65	0.00	1.67	0.42	99.27	0.298
Cervidellus	0.14	0.18	0.82	1.00	1.00	0.39	99.66	0.455
Ecphyadophora	0.12	0.19	0.65	1.00	0.00	0.34	100.00	0.279
Alaimus	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Aporcelaimellus	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Boleodorus	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Diphtherophora	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Ditylenchus	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Tripyla	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Control vs R2W	**Average dissimilarity = 42.92**							
Rhabditidae	9.32	6.32	1.47	115.67	96.67	21.72	21.72	0.822
Filenchus	6.44	5.87	1.10	55.33	113.67	15.01	36.73	0.205
Meloidogyne	5.14	3.07	1.68	126.33	104.33	11.98	48.71	0.611
Plectus	4.56	2.59	1.76	55.67	30.33	10.62	59.33	0.009
Acrobeloides	4.39	2.94	1.49	46.33	30.00	10.24	69.57	0.177
Xenocriconemella	2.43	1.67	1.45	16.00	29.33	5.66	75.23	0.082
Aphelenchoides	2.41	1.50	1.60	33.33	27.67	5.60	80.83	0.481
Pseudacrobeles	1.51	0.98	1.54	20.00	11.33	3.51	84.34	0.207
Gracilacus	1.39	1.38	1.01	11.00	12.67	3.25	87.59	0.644
Dorylaimida	1.31	0.92	1.42	3.67	14.33	3.05	90.64	0.166
Tylocephalus	1.30	0.86	1.51	16.67	5.00	3.02	93.66	0.044
Acrobeles	0.55	0.69	0.79	6.67	1.33	1.28	94.94	0.395
Helicotylenchus	0.55	0.69	0.79	6.67	1.33	1.27	96.21	0.723
Prismatolaimus	0.49	0.39	1.26	7.00	2.67	1.14	97.35	0.419
Ceratoplectus	0.43	0.52	0.83	3.00	1.00	1.01	98.36	0.403

(*Continued*)

Table S5. Continued

	Av.Diss	SD	Diss/ SD	Av.Abund	Av.Abund	Contrib (%)	cumsum (%)	p
Teratocephalus	0.41	0.64	0.64	3.00	0.00	0.95	99.31	0.385
Cervidellus	0.16	0.20	0.79	1.00	1.00	0.37	99.68	0.409
Ecphyadophora	0.14	0.21	0.64	1.00	0.00	0.32	100.00	0.141
Alaimus	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Aporcelaimellus	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Boleodorus	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Clarkus	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Diphtherophora	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Diplogasteridae	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Ditylenchus	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Tripyla	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
SLR vs R2M	**Average dissimilarity = 38.89**							
Rhabditidae	13.08	7.85	1.67	96.00	177.67	33.62	33.62	0.218
Meloidogyne	8.80	6.86	1.28	191.33	135.00	22.64	56.26	0.366
Acrobeloides	2.80	2.10	1.33	53.67	24.00	7.20	63.46	0.723
Aphelenchoides	2.62	2.19	1.19	26.67	48.33	6.74	70.20	0.356
Filenchus	2.33	1.67	1.39	52.33	65.67	5.99	76.19	0.871
Gracilacus	1.74	1.64	1.06	14.00	8.67	4.47	80.66	0.406
Plectus	1.40	1.19	1.18	26.33	29.33	3.60	84.26	0.986
Pseudacrobeles	1.21	0.65	1.87	22.00	11.67	3.12	87.38	0.553
Dorylaimida	0.84	1.11	0.76	7.67	0.00	2.17	89.55	0.682
Xenocriconemella	0.73	0.61	1.20	8.00	6.33	1.87	91.42	0.962
Helicotylenchus	0.70	0.62	1.14	7.67	2.67	1.81	93.23	0.395
Tylocephalus	0.62	0.29	2.11	4.67	9.67	1.59	94.82	0.811
Clarkus	0.36	0.43	0.84	0.67	3.67	0.93	95.75	0.244
Prismatolaimus	0.36	0.44	0.81	2.67	2.33	0.92	96.67	0.752
Ceratoplectus	0.34	0.23	1.51	2.67	2.33	0.88	97.55	0.634
Teratocephalus	0.32	0.35	0.94	1.67	2.33	0.83	98.38	0.609
Acrobeles	0.27	0.28	0.95	2.67	1.67	0.69	99.07	0.7
Diplogasteridae	0.15	0.24	0.65	0.00	1.67	0.39	99.46	0.298
Cervidellus	0.13	0.20	0.64	0.00	1.00	0.33	99.79	0.611
Aporcelaimellus	0.08	0.13	0.65	0.67	0.00	0.21	100.00	0.286
Alaimus	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Boleodorus	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Diphtherophora	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Ditylenchus	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Ecphyadophora	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Tripyla	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1

(Continued)

Table S5. Continued

	Av.Diss	SD	Diss/ SD	Av.Abund	Av.Abund	Contrib (%)	cumsum (%)	p
SLR vs R2W	**Average dissimilarity = 42.38**							
Rhabditidae	9.05	5.14	1.76	96.00	96.67	21.36	21.36	0.859
Meloidogyne	8.47	9.36	0.91	191.33	104.33	20.00	41.36	0.416
Filenchus	6.78	5.84	1.16	52.33	113.67	16.00	57.36	0.144
Acrobeloides	3.02	2.28	1.33	53.67	30.00	7.13	64.49	0.67
Plectus	2.67	1.92	1.39	26.33	30.33	6.30	70.79	0.552
Xenocriconemella	2.37	1.45	1.64	8.00	29.33	5.61	76.40	0.133
Aphelenchoides	2.32	1.20	1.93	26.67	27.67	5.47	81.87	0.547
Gracilacus	1.99	1.85	1.07	14.00	12.67	4.69	86.56	0.231
Pseudacrobeles	1.64	1.14	1.44	22.00	11.33	3.88	90.44	0.09
Dorylaimida	1.32	1.00	1.32	7.67	14.33	3.13	93.57	0.175
Helicotylenchus	0.64	0.83	0.77	7.67	1.33	1.50	95.07	0.545
Tylocephalus	0.62	0.37	1.68	4.67	5.00	1.46	96.53	0.814
Prismatolaimus	0.39	0.27	1.46	2.67	2.67	0.93	97.46	0.648
Ceratoplectus	0.28	0.26	1.06	2.67	1.00	0.65	98.11	0.783
Acrobeles	0.25	0.28	0.90	2.67	1.33	0.60	98.71	0.697
Teratocephalus	0.23	0.36	0.64	1.67	0.00	0.55	99.26	0.77
Cervidellus	0.13	0.21	0.64	0.00	1.00	0.30	99.56	0.592
Aporcelaimellus	0.09	0.14	0.64	0.67	0.00	0.22	99.78	0.144
Clarkus	0.09	0.14	0.64	0.67	0.00	0.22	100.00	0.585
Alaimus	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Boleodorus	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Diphtherophora	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Diplogasteridae	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Ditylenchus	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Ecphyadophora	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Tripyla	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
R2M vs R2W	**Average dissimilarity = 39.39**							
Rhabditidae	13.96	10.26	1.36	177.67	96.67	35.44	35.44	0.096
Filenchus	5.99	5.23	1.15	65.67	113.67	15.21	50.65	0.296
Aphelenchoides	3.29	2.56	1.29	48.33	27.67	8.36	59.01	0.116
Meloidogyne	2.97	1.58	1.88	135.00	104.33	7.53	66.54	0.929
Plectus	2.94	0.71	4.15	29.33	30.33	7.45	73.99	0.381
Xenocriconemella	2.26	1.66	1.36	6.33	29.33	5.73	79.72	0.152
Gracilacus	1.36	1.16	1.17	8.67	12.67	3.46	83.18	0.69

(*Continued*)

Table S5. Continued

	Av.Diss	SD	Diss/ SD	Av.Abund	Av.Abund	Contrib (%)	cumsum (%)	p
Dorylaimida	1.34	1.04	1.29	0.00	14.33	3.39	86.57	0.161
Acrobeloides	1.32	1.48	0.89	24.00	30.00	3.35	89.92	0.969
Pseudacrobeles	1.12	0.61	1.82	11.67	11.33	2.83	92.75	0.701
Tylocephalus	0.77	0.55	1.39	9.67	5.00	1.96	94.71	0.592
Prismatolaimus	0.36	0.24	1.50	2.33	2.67	0.90	95.61	0.755
Clarkus	0.33	0.51	0.65	3.67	0.00	0.85	96.46	0.315
Ceratoplectus	0.32	0.37	0.87	2.33	1.00	0.82	97.28	0.66
Teratocephalus	0.30	0.47	0.64	2.33	0.00	0.77	98.05	0.623
Helicotylenchus	0.27	0.23	1.16	2.67	1.33	0.68	98.73	0.816
Acrobeles	0.19	0.22	0.86	1.67	1.33	0.49	99.22	0.822
Diplogasteridae	0.16	0.24	0.65	1.67	0.00	0.40	99.62	0.212
Cervidellus	0.15	0.18	0.82	1.00	1.00	0.38	100.00	0.419
Alaimus	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Aporcelaimellus	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Boleodorus	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Diphtherophora	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Ditylenchus	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Ecphyadophora	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Tripyla	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Jun-17								
Control vs SLR	**Average dissimilarity = 39.91**							
Rhabditidae	7.60	6.68	1.14	147.67	57.00	19.05	19.05	0.418
Filenchus	6.40	4.25	1.51	158.67	111.67	16.03	35.08	0.448
Meloidogyne	5.97	5.02	1.19	165.33	104.33	14.95	50.03	0.593
Plectus	2.53	1.37	1.84	72.33	40.00	6.34	56.37	0.74
Xenocriconemella	2.05	1.53	1.34	29.00	30.67	5.14	61.51	0.851
Prismatolaimus	1.84	1.48	1.25	19.00	28.00	4.61	66.12	0.503
Aphelenchoides	1.72	1.04	1.66	29.33	20.33	4.32	70.44	0.311
Acrobeloides	1.44	0.93	1.54	18.67	27.00	3.60	74.04	0.813
Helicotylenchus	1.39	1.21	1.16	20.67	8.67	3.50	77.54	0.472
Diphtherophora	1.28	1.22	1.05	13.33	9.00	3.21	80.75	0.425
Ditylenchus	1.24	0.85	1.46	16.67	2.33	3.10	83.85	0.085
Pseudacrobeles	1.10	0.76	1.43	18.67	5.67	2.75	86.60	0.285
Boleodorus	0.98	0.94	1.04	10.00	10.67	2.44	89.04	0.776
Alaimus	0.81	0.71	1.14	10.33	5.33	2.04	91.08	0.515
Gracilacus	0.73	0.80	0.91	19.67	13.67	1.82	92.90	0.918
Ceratoplectus	0.71	0.64	1.10	5.00	12.33	1.77	94.67	0.638

(*Continued*)

Table S5. Continued

	Av.Diss	SD	Diss/ SD	Av.Abund	Av.Abund	Contrib (%)	cumsum (%)	p
Tylocephalus	0.40	0.29	1.39	9.67	7.67	1.00	95.67	0.833
Acrobeles	0.39	0.20	1.92	1.67	6.33	0.97	96.64	0.91
Aporcelaimellus	0.37	0.32	1.16	4.67	2.33	0.93	97.57	0.418
Clarkus	0.27	0.18	1.45	3.00	2.33	0.66	98.23	0.357
Ecphyadophora	0.25	0.21	1.20	0.00	3.33	0.64	98.87	0.376
Tripyla	0.16	0.19	0.87	1.67	1.33	0.41	99.28	0.622
Teratocephalus	0.15	0.23	0.66	0.00	1.67	0.39	99.67	0.503
Diplogasteridae	0.13	0.20	0.66	1.67	0.00	0.33	100.00	0.832
Cervidellus	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Dorylaimida	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Control vs R2M	**Average dissimilarity = 53.30**							
Meloidogyne	10.70	4.70	2.28	165.33	46.33	20.07	20.07	0.017
Rhabditidae	9.06	7.57	1.20	147.67	56.33	17.00	37.07	0.191
Filenchus	8.88	6.15	1.44	158.67	75.67	16.66	53.73	0.046
Plectus	5.19	1.10	4.70	72.33	16.33	9.74	63.47	0.007
Aphelenchoides	2.27	1.31	1.73	29.33	12.00	4.26	67.73	0.014
Xenocriconemella	2.18	1.34	1.63	29.00	9.00	4.09	71.82	0.796
Helicotylenchus	1.76	1.21	1.45	20.67	2.33	3.30	75.12	0.119
Gracilacus	1.66	1.11	1.50	19.67	2.00	3.12	78.24	0.057
Acrobeloides	1.53	1.02	1.50	18.67	28.33	2.88	81.12	0.697
Ditylenchus	1.26	0.89	1.42	16.67	5.00	2.37	83.49	0.08
Diphtherophora	1.26	1.90	0.67	13.33	0.00	2.37	85.86	0.433
Prismatolaimus	1.22	0.65	1.89	19.00	6.00	2.28	88.14	0.643
Pseudacrobeles	1.21	0.85	1.43	18.67	6.00	2.28	90.42	0.17
Boleodorus	1.02	0.96	1.07	10.00	7.33	1.92	92.34	0.74
Tylocephalus	0.81	0.38	2.11	9.67	0.67	1.52	93.86	0.123
Alaimus	0.79	0.60	1.33	10.33	6.33	1.49	95.35	0.544
Ceratoplectus	0.57	0.44	1.31	5.00	7.33	1.07	96.42	0.778
Acrobeles	0.56	0.65	0.87	1.67	5.67	1.06	97.48	0.79
Aporcelaimellus	0.40	0.37	1.08	4.67	1.33	0.76	98.24	0.281
Clarkus	0.27	0.18	1.47	3.00	0.67	0.50	98.74	0.356
Diplogasteridae	0.18	0.19	0.92	1.67	0.67	0.34	99.08	0.709
Tripyla	0.18	0.19	0.92	1.67	0.67	0.33	99.41	0.535
Ecphyadophora	0.13	0.10	1.31	0.00	1.33	0.24	99.65	0.841
Teratocephalus	0.07	0.10	0.66	0.00	0.67	0.12	99.77	0.79
Cervidellus	0.06	0.09	0.66	0.00	0.67	0.12	99.89	0.745
Dorylaimida	0.06	0.09	0.66	0.00	0.67	0.11	100.00	0.78

(Continued)

Table S5. Continued

	Av.Diss	SD	Diss/ SD	Av.Abund	Av.Abund	Contrib (%)	cumsum (%)	p
Control vs R2W	**Average dissimilarity = 49.23**							
Meloidogyne	10.62	4.58	2.32	165.33	40.33	21.56	21.56	0.012
Rhabditidae	8.27	7.16	1.16	147.67	61.67	16.79	38.35	0.326
Filenchus	7.69	5.45	1.41	158.67	94.67	15.62	53.97	0.152
Plectus	4.56	1.56	2.92	72.33	20.33	9.26	63.23	0.014
Xenocriconemella	3.30	2.58	1.28	29.00	40.67	6.71	69.94	0.544
Aphelenchoides	2.16	1.33	1.62	29.33	11.33	4.39	74.33	0.034
Helicotylenchus	1.55	1.24	1.25	20.67	7.33	3.14	77.47	0.325
Diphtherophora	1.33	1.42	0.93	13.33	5.00	2.70	80.17	0.369
Acrobeloides	1.28	0.77	1.66	18.67	19.00	2.59	82.76	0.899
Ditylenchus	1.17	0.76	1.54	16.67	5.00	2.37	85.13	0.141
Pseudacrobeles	1.14	0.64	1.79	18.67	6.67	2.32	87.45	0.211
Gracilacus	1.04	0.89	1.17	19.67	12.67	2.12	89.57	0.642
Alaimus	0.97	0.89	1.10	10.33	0.00	1.98	91.55	0.226
Boleodorus	0.90	0.77	1.16	10.00	6.67	1.82	93.37	0.835
Prismatolaimus	0.69	0.49	1.40	19.00	12.33	1.39	94.76	0.981
Acrobeles	0.60	0.56	1.08	1.67	7.67	1.22	95.98	0.781
Ceratoplectus	0.40	0.35	1.17	5.00	5.33	0.82	96.80	0.965
Aporcelaimellus	0.38	0.31	1.20	4.67	1.33	0.77	97.57	0.406
Tylocephalus	0.35	0.32	1.10	9.67	6.33	0.71	98.28	0.912
Clarkus	0.28	0.21	1.32	3.00	0.00	0.56	98.84	0.318
Diplogasteridae	0.22	0.19	1.16	1.67	2.67	0.45	99.29	0.483
Tripyla	0.17	0.18	0.93	1.67	0.67	0.34	99.63	0.589
Cervidellus	0.06	0.10	0.66	0.00	0.67	0.13	99.76	0.753
Dorylaimida	0.06	0.10	0.66	0.00	0.67	0.13	99.89	0.761
Ecphyadophora	0.06	0.08	0.66	0.00	0.67	0.11	100.00	0.995
Teratocephalus	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
SLR vs R2M	**Average dissimilarity = 40.41**							
Meloidogyne	6.59	5.33	1.24	104.33	46.33	16.30	16.30	0.5
Rhabditidae	4.87	3.00	1.62	57.00	56.33	12.05	28.35	0.798
Filenchus	4.78	3.85	1.24	111.67	75.67	11.83	40.18	0.8
Xenocriconemella	3.15	2.66	1.18	30.67	9.00	7.79	47.97	0.559
Prismatolaimus	3.09	3.08	1.00	28.00	6.00	7.65	55.62	0.048
Plectus	3.00	1.70	1.77	40.00	16.33	7.43	63.05	0.447
Acrobeloides	2.07	1.74	1.19	27.00	28.33	5.14	68.19	0.266

(*Continued*)

Table S5. Continued

	Av.Diss	SD	Diss/ SD	Av.Abund	Av.Abund	Contrib (%)	cumsum (%)	p
Gracilacus	1.42	0.22	6.62	13.67	2.00	3.52	71.71	0.192
Boleodorus	1.42	1.35	1.05	10.67	7.33	3.52	75.23	0.307
Ceratoplectus	1.11	1.01	1.10	12.33	7.33	2.73	77.96	0.139
Diphtherophora	1.03	1.00	1.03	9.00	0.00	2.55	80.51	0.527
Helicotylenchus	1.03	1.10	0.93	8.67	2.33	2.55	83.06	0.815
Aphelenchoides	1.02	0.80	1.27	20.33	12.00	2.51	85.57	0.789
Tylocephalus	1.00	0.79	1.26	7.67	0.67	2.47	88.04	0.02
Acrobeles	0.96	0.48	1.99	6.33	5.67	2.38	90.42	0.232
Alaimus	0.95	0.46	2.08	5.33	6.33	2.36	92.78	0.267
Pseudacrobeles	0.65	0.57	1.15	5.67	6.00	1.61	94.39	0.905
Ditylenchus	0.60	0.55	1.08	2.33	5.00	1.48	95.87	0.857
Ecphyadophora	0.34	0.23	1.46	3.33	1.33	0.84	96.71	0.048
Aporcelaimellus	0.32	0.33	0.97	2.33	1.33	0.79	97.50	0.595
Teratocephalus	0.29	0.34	0.85	1.67	0.67	0.71	98.21	0.082
Clarkus	0.28	0.31	0.93	2.33	0.67	0.71	98.92	0.311
Tripyla	0.18	0.18	0.99	1.33	0.67	0.44	99.36	0.516
Diplogasteridae	0.09	0.14	0.64	0.00	0.67	0.23	99.59	0.952
Cervidellus	0.09	0.13	0.65	0.00	0.67	0.21	99.80	0.53
Dorylaimida	0.08	0.12	0.65	0.00	0.67	0.20	100.00	0.611
SLR vs R2W	**Average dissimilarity = 39.48**							
Meloidogyne	6.83	5.03	1.36	104.33	40.33	17.31	17.31	0.435
Filenchus	5.12	3.61	1.42	111.67	94.67	12.97	30.28	0.759
Rhabditidae	4.60	3.00	1.54	57.00	61.67	11.65	41.93	0.84
Xenocriconemella	4.55	4.09	1.11	30.67	40.67	11.52	53.45	0.264
Prismatolaimus	2.81	2.43	1.16	28.00	12.33	7.12	60.57	0.132
Plectus	2.61	1.70	1.54	40.00	20.33	6.62	67.19	0.716
Acrobeloides	1.83	1.36	1.35	27.00	19.00	4.65	71.84	0.474
Boleodorus	1.28	1.04	1.23	10.67	6.67	3.24	75.08	0.479
Helicotylenchus	1.19	1.34	0.89	8.67	7.33	3.00	78.08	0.645
Aphelenchoides	1.04	0.84	1.23	20.33	11.33	2.63	80.71	0.738
Ceratoplectus	1.03	1.01	1.03	12.33	5.33	2.61	83.32	0.233
Diphtherophora	0.90	0.73	1.24	9.00	5.00	2.28	85.60	0.611
Gracilacus	0.83	0.48	1.72	13.67	12.67	2.10	87.70	0.858
Pseudacrobeles	0.78	0.70	1.10	5.67	6.67	1.96	89.66	0.779
Acrobeles	0.75	0.52	1.44	6.33	7.67	1.90	91.56	0.598
Ditylenchus	0.58	0.50	1.15	2.33	5.00	1.47	93.03	0.887
Alaimus	0.58	0.87	0.66	5.33	0.00	1.47	94.50	0.843

(Continued)

Table S5. Continued

	Av.Diss	SD	Diss/ SD	Av.Abund	Av.Abund	Contrib (%)	cumsum (%)	p
Tylocephalus	0.42	0.45	0.92	7.67	6.33	1.06	95.56	0.785
Ecphyadophora	0.35	0.27	1.27	3.33	0.67	0.87	96.43	0.035
Aporcelaimellus	0.30	0.22	1.33	2.33	1.33	0.76	97.19	0.679
Diplogasteridae	0.30	0.25	1.20	0.00	2.67	0.74	97.93	0.143
Teratocephalus	0.25	0.37	0.66	1.67	0.00	0.63	98.56	0.191
Clarkus	0.22	0.34	0.66	2.33	0.00	0.57	99.13	0.566
Tripyla	0.17	0.17	1.00	1.33	0.67	0.43	99.56	0.589
Cervidellus	0.09	0.13	0.65	0.00	0.67	0.22	99.78	0.517
Dorylaimida	0.09	0.13	0.65	0.00	0.67	0.22	100.00	0.45
R2M vs R2W	**Average dissimilarity = 35.56**							
Rhabditidae	6.37	4.68	1.36	56.33	61.67	17.91	17.91	0.588
Xenocriconemella	5.57	5.65	0.99	9.00	40.67	15.67	33.58	0.066
Filenchus	4.67	4.63	1.01	75.67	94.67	13.13	46.71	0.842
Acrobeloides	2.17	1.69	1.29	28.33	19.00	6.11	52.82	0.177
Gracilacus	1.60	1.09	1.47	2.00	12.67	4.50	57.32	0.077
Plectus	1.53	1.16	1.31	16.33	20.33	4.29	61.61	0.996
Meloidogyne	1.42	1.42	1.00	46.33	40.33	4.01	65.62	0.995
Prismatolaimus	1.42	1.09	1.31	6.00	12.33	3.99	69.61	0.552
Boleodorus	1.34	1.13	1.19	7.33	6.67	3.77	73.38	0.405
Acrobeles	1.20	1.09	1.10	5.67	7.67	3.36	76.74	0.063
Helicotylenchus	1.13	1.21	0.94	2.33	7.33	3.18	79.92	0.733
Pseudacrobeles	1.01	0.73	1.39	6.00	6.67	2.83	82.75	0.446
Alaimus	0.98	0.51	1.93	6.33	0.00	2.75	85.50	0.239
Ceratoplectus	0.89	0.62	1.42	7.33	5.33	2.50	88.00	0.382
Tylocephalus	0.85	0.12	6.83	0.67	6.33	2.37	90.37	0.077
Diphtherophora	0.72	0.64	1.12	0.00	5.00	2.02	92.39	0.732
Ditylenchus	0.69	0.57	1.20	5.00	5.00	1.93	94.32	0.803
Aphelenchoides	0.59	0.52	1.15	12.00	11.33	1.67	95.99	0.972
Diplogasteridae	0.35	0.25	1.41	0.67	2.67	0.98	96.97	0.035
Aporcelaimellus	0.27	0.18	1.48	1.33	1.33	0.76	97.73	0.771
Ecphyadophora	0.17	0.17	1.04	1.33	0.67	0.48	98.21	0.651
Tripyla	0.14	0.17	0.84	0.67	0.67	0.40	98.61	0.689
Cervidellus	0.14	0.17	0.83	0.67	0.67	0.39	99.00	0.073
Dorylaimida	0.14	0.17	0.82	0.67	0.67	0.39	99.39	0.09
Clarkus	0.11	0.17	0.66	0.67	0.00	0.30	99.69	0.934
Teratocephalus	0.11	0.17	0.66	0.67	0.00	0.31	100.00	0.516

(Continued)

Table S5. Continued

	Av.Diss	SD	Diss/ SD	Av.Abund	Av.Abund	Contrib (%)	cumsum (%)	p
Sep-17								
Control vs SLR	**Average dissimilarity = 43.89**							
Filenchus	5.62	3.43	1.64	116.33	196.33	12.80	12.80	0.039
Rhabditidae	5.48	3.60	1.52	134.67	120.00	12.49	25.29	0.648
Helicotylenchus	4.72	6.18	0.76	6.67	74.67	10.74	36.03	0.348
Gracilacus	4.39	5.11	0.86	24.00	77.00	10.00	46.03	0.477
Meloidogyne	3.42	3.53	0.97	66.67	97.00	7.79	53.82	0.622
Plectus	2.89	2.40	1.20	50.00	63.00	6.58	60.40	0.436
Xenocriconemella	2.78	1.86	1.49	63.33	41.67	6.32	66.72	0.878
Aphelenchoides	2.14	1.66	1.29	36.00	48.00	4.87	71.59	0.427
Prismatolaimus	1.94	1.46	1.34	28.33	37.67	4.43	76.02	0.694
Acrobeloides	1.51	1.11	1.36	11.67	31.33	3.43	79.45	0.814
Alaimus	1.49	1.17	1.27	33.67	13.00	3.39	82.84	0.486
Ditylenchus	1.34	0.60	2.22	24.67	4.33	3.05	85.89	0.182
Pseudacrobeles	0.80	0.54	1.48	19.33	8.00	1.81	87.70	0.479
Boleodorus	0.79	0.16	4.97	13.33	1.00	1.80	89.50	0.153
Teratocephalus	0.71	0.62	1.14	12.33	7.00	1.60	91.10	0.509
Acrobeles	0.69	0.47	1.48	7.67	12.33	1.58	92.68	0.742
Ceratoplectus	0.57	0.42	1.37	9.33	5.33	1.30	93.98	0.256
Diphtherophora	0.41	0.16	2.49	1.67	8.00	0.93	94.91	0.245
Dorylaimida	0.39	0.34	1.13	3.00	5.33	0.89	95.80	0.908
Ecphyadophora	0.38	0.31	1.23	5.33	0.00	0.87	96.67	0.101
Cervidellus	0.29	0.30	0.95	2.33	3.33	0.65	97.32	0.438
Diplogasteridae	0.28	0.23	1.22	2.67	3.67	0.63	97.95	0.192
Tylocephalus	0.27	0.21	1.30	5.67	3.33	0.62	98.57	0.531
Tripyla	0.24	0.24	0.99	3.67	2.33	0.54	99.11	0.322
Aporcelaimellus	0.23	0.22	1.06	3.00	2.33	0.52	99.63	0.78
Clarkus	0.16	0.14	1.17	2.67	1.67	0.37	100.00	0.745
Control vs R2M	**Average dissimilarity = 38.78**							
Rhabditidae	6.47	1.38	4.70	134.67	93.67	16.68	16.68	0.314
Xenocriconemella	4.56	3.29	1.39	63.33	16.00	11.77	28.45	0.456
Meloidogyne	3.63	2.71	1.34	66.67	76.00	9.35	37.80	0.553
Filenchus	3.31	2.50	1.32	116.33	133.00	8.52	46.32	0.613
Plectus	2.98	1.77	1.69	50.00	10.67	7.69	54.01	0.385
Acrobeloides	2.19	2.03	1.08	11.67	36.33	5.64	59.65	0.41
Prismatolaimus	2.13	1.48	1.44	28.33	20.67	5.49	65.14	0.543

(*Continued*)

Table S5. Continued

	Av.Diss	SD	Diss/ SD	Av.Abund	Av.Abund	Contrib (%)	cumsum (%)	p
Alaimus	2.00	1.58	1.26	33.67	20.00	5.17	70.31	0.106
Aphelenchoides	1.76	0.98	1.80	36.00	18.00	4.54	74.85	0.514
Acrobeles	1.08	0.88	1.23	7.67	12.33	2.80	77.65	0.364
Ditylenchus	0.99	0.92	1.08	24.67	15.33	2.56	80.21	0.674
Pseudacrobeles	0.99	0.77	1.28	19.33	8.67	2.54	82.75	0.15
Gracilacus	0.91	0.74	1.23	24.00	17.33	2.34	85.09	0.963
Teratocephalus	0.88	0.81	1.08	12.33	2.33	2.27	87.36	0.109
Helicotylenchus	0.78	1.09	0.71	6.67	1.00	2.00	89.36	0.645
Boleodorus	0.60	0.45	1.32	13.33	10.33	1.55	90.91	0.656
Ceratoplectus	0.51	0.35	1.45	9.33	5.00	1.31	92.22	0.511
Ecphyadophora	0.50	0.41	1.24	5.33	0.00	1.30	93.52	0.017
Dorylaimida	0.48	0.48	1.02	3.00	4.33	1.25	94.77	0.812
Aporcelaimellus	0.40	0.35	1.15	3.00	3.67	1.03	95.80	0.316
Tylocephalus	0.38	0.28	1.36	5.67	1.33	0.98	96.78	0.089
Clarkus	0.30	0.32	0.92	2.67	4.00	0.76	97.54	0.364
Cervidellus	0.28	0.35	0.79	2.33	1.00	0.72	98.26	0.485
Tripyla	0.27	0.22	1.21	3.67	0.00	0.70	98.96	0.197
Diphtherophora	0.21	0.25	0.84	1.67	1.33	0.53	99.49	0.962
Diplogasteridae	0.20	0.15	1.32	2.67	0.00	0.51	100.00	0.556
Control vs R2W	**Average dissimilarity = 44.55**							
Rhabditidae	8.50	5.02	1.69	134.67	30.00	19.08	19.08	0.035
Xenocriconemella	5.12	3.74	1.37	63.33	92.00	11.49	30.57	0.376
Meloidogyne	3.48	2.55	1.36	66.67	33.67	7.82	38.39	0.604
Filenchus	3.06	1.87	1.63	116.33	123.33	6.87	45.26	0.719
Prismatolaimus	2.86	2.40	1.19	28.33	41.67	6.41	51.67	0.119
Gracilacus	2.85	1.81	1.57	24.00	28.33	6.41	58.08	0.635
Plectus	2.52	1.80	1.41	50.00	17.67	5.66	63.74	0.526
Acrobeloides	2.43	2.26	1.08	11.67	37.67	5.45	69.19	0.248
Aphelenchoides	1.88	1.05	1.79	36.00	16.67	4.21	73.40	0.504
Alaimus	1.85	1.25	1.48	33.67	16.00	4.15	77.55	0.188
Pseudacrobeles	1.65	0.48	3.46	19.33	1.00	3.70	81.25	0.004
Ditylenchus	1.48	0.76	1.95	24.67	13.33	3.31	84.56	0.089
Teratocephalus	0.90	0.84	1.07	12.33	2.00	2.03	86.59	0.077
Dorylaimida	0.84	0.65	1.30	3.00	10.67	1.89	88.48	0.193
Helicotylenchus	0.81	1.01	0.80	6.67	2.00	1.81	90.29	0.622
Ceratoplectus	0.66	0.48	1.37	9.33	1.00	1.49	91.78	0.102
Boleodorus	0.63	0.46	1.37	13.33	6.00	1.42	93.20	0.511

(*Continued*)

Table S5. Continued

	Av.Diss	SD	Diss/ SD	Av.Abund	Av.Abund	Contrib (%)	cumsum (%)	p
Acrobeles	0.59	0.47	1.26	7.67	2.00	1.33	94.53	0.833
Ecphyadophora	0.52	0.42	1.24	5.33	0.00	1.16	95.69	0.012
Tylocephalus	0.39	0.28	1.37	5.67	1.00	0.87	96.56	0.053
Diphtherophora	0.32	0.25	1.26	1.67	3.67	0.72	97.28	0.719
Cervidellus	0.31	0.12	2.46	2.33	3.00	0.69	97.97	0.307
Tripyla	0.28	0.23	1.21	3.67	0.00	0.62	98.59	0.182
Aporcelaimellus	0.23	0.15	1.53	3.00	2.00	0.51	99.10	0.773
Clarkus	0.20	0.15	1.33	2.67	0.00	0.45	99.55	0.604
Diplogasteridae	0.20	0.15	1.33	2.67	0.00	0.45	100.00	0.553
SLR vs R2M	**Average dissimilarity = 40.47**							
Helicotylenchus	5.18	7.14	0.73	74.67	1.00	12.80	12.80	0.154
Gracilacus	4.84	5.83	0.83	77.00	17.33	11.95	24.75	0.315
Filenchus	4.51	2.83	1.60	196.33	133.00	11.15	35.90	0.241
Rhabditidae	3.61	3.10	1.17	120.00	93.67	8.93	44.83	0.941
Plectus	3.57	3.34	1.07	63.00	10.67	8.82	53.65	0.114
Meloidogyne	2.92	2.61	1.12	97.00	76.00	7.20	60.85	0.796
Xenocriconemella	2.62	2.34	1.12	41.67	16.00	6.47	67.32	0.903
Aphelenchoides	2.16	2.38	0.91	48.00	18.00	5.35	72.67	0.424
Acrobeloides	1.71	1.09	1.57	31.33	36.33	4.23	76.90	0.755
Prismatolaimus	1.58	1.25	1.27	37.67	20.67	3.91	80.81	0.904
Alaimus	1.09	1.18	0.93	13.00	20.00	2.69	83.50	0.768
Acrobeles	1.05	0.80	1.32	12.33	12.33	2.61	86.11	0.418
Ditylenchus	0.90	0.60	1.50	4.33	15.33	2.22	88.33	0.822
Boleodorus	0.73	0.50	1.47	1.00	10.33	1.81	90.14	0.249
Pseudacrobeles	0.55	0.36	1.51	8.00	8.67	1.35	91.49	0.922
Ceratoplectus	0.51	0.21	2.45	5.33	5.00	1.26	92.75	0.516
Dorylaimida	0.49	0.55	0.89	5.33	4.33	1.22	93.97	0.816
Diphtherophora	0.47	0.23	2.04	8.00	1.33	1.18	95.15	0.083
Teratocephalus	0.43	0.20	2.15	7.00	2.33	1.06	96.21	0.557
Aporcelaimellus	0.34	0.34	1.00	2.33	3.67	0.85	97.06	0.482
Clarkus	0.29	0.27	1.08	1.67	4.00	0.71	97.77	0.403
Cervidellus	0.26	0.30	0.85	3.33	1.00	0.63	98.40	0.649
Diplogasteridae	0.23	0.35	0.67	3.67	0.00	0.57	98.97	0.381
Tripyla	0.21	0.32	0.66	2.33	0.00	0.53	99.50	0.443
Tylocephalus	0.20	0.16	1.23	3.33	1.33	0.50	100.00	0.698
Ecphyadophora	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1

(*Continued*)

Table S5. Continued

	Av.Diss	SD	Diss/SD	Av.Abund	Av.Abund	Contrib (%)	cumsum (%)	p
SLR vs R2W	**Average dissimilarity = 47.26**							
Rhabditidae	6.43	4.63	1.39	120.00	30.00	13.60	13.60	0.278
Gracilacus	5.58	5.42	1.03	77.00	28.33	11.81	25.41	0.142
Helicotylenchus	5.23	7.21	0.73	74.67	2.00	11.07	36.48	0.126
Meloidogyne	5.09	3.58	1.42	97.00	33.67	10.76	47.24	0.098
Filenchus	5.06	2.75	1.84	196.33	123.33	10.70	57.94	0.083
Xenocriconemella	4.26	3.71	1.15	41.67	92.00	9.01	66.95	0.593
Plectus	3.23	3.32	0.97	63.00	17.67	6.83	73.78	0.26
Aphelenchoides	2.36	2.33	1.01	48.00	16.67	5.00	78.78	0.281
Prismatolaimus	1.82	1.44	1.26	37.67	41.67	3.85	82.63	0.724
Acrobeloides	1.80	1.21	1.49	31.33	37.67	3.81	86.44	0.747
Acrobeles	0.83	0.67	1.24	12.33	2.00	1.75	88.19	0.582
Ditylenchus	0.82	0.87	0.95	4.33	13.33	1.74	89.93	0.909
Dorylaimida	0.75	0.64	1.18	5.33	10.67	1.59	91.52	0.426
Pseudacrobeles	0.50	0.43	1.15	8.00	1.00	1.06	92.58	0.972
Alaimus	0.50	0.45	1.11	13.00	16.00	1.05	93.63	0.972
Teratocephalus	0.44	0.21	2.08	7.00	2.00	0.93	94.56	0.533
Boleodorus	0.43	0.31	1.39	1.00	6.00	0.91	95.47	0.969
Ceratoplectus	0.40	0.50	0.81	5.33	1.00	0.85	96.32	0.763
Diphtherophora	0.39	0.25	1.57	8.00	3.67	0.82	97.14	0.325
Cervidellus	0.32	0.13	2.42	3.33	3.00	0.68	97.82	0.258
Aporcelaimellus	0.25	0.21	1.19	2.33	2.00	0.53	98.35	0.694
Diplogasteridae	0.24	0.35	0.67	3.67	0.00	0.49	98.84	0.387
Tripyla	0.22	0.33	0.67	2.33	0.00	0.47	99.31	0.401
Tylocephalus	0.21	0.14	1.45	3.33	1.00	0.44	99.75	0.635
Clarkus	0.12	0.18	0.67	1.67	0.00	0.25	100.00	0.92
Ecphyadophora	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
R2M vs R2W	**Average dissimilarity = 39.04**							
Xenocriconemella	7.54	5.70	1.32	16.00	92.00	19.32	19.32	0.016
Rhabditidae	6.56	2.40	2.73	93.67	30.00	16.80	36.12	0.261
Meloidogyne	4.42	2.85	1.55	76.00	33.67	11.32	47.44	0.228
Gracilacus	3.06	2.75	1.11	17.33	28.33	7.85	55.29	0.538
Prismatolaimus	2.67	1.86	1.44	20.67	41.67	6.85	62.14	0.161
Acrobeloides	2.52	2.16	1.17	36.33	37.67	6.46	68.60	0.209
Filenchus	1.66	0.80	2.07	133.00	123.33	4.25	72.85	0.949

(*Continued*)

Table S5. Continued

	Av.Diss	SD	Diss/SD	Av.Abund	Av.Abund	Contrib (%)	cumsum (%)	p
Alaimus	1.54	1.27	1.21	20.00	16.00	3.93	76.78	0.45
Ditylenchus	1.30	0.89	1.45	15.33	13.33	3.33	80.11	0.245
Acrobeles	1.13	1.29	0.88	12.33	2.00	2.89	83.00	0.285
Aphelenchoides	0.96	0.68	1.42	18.00	16.67	2.46	85.46	0.936
Dorylaimida	0.94	0.74	1.28	4.33	10.67	2.42	87.88	0.103
Boleodorus	0.83	0.55	1.51	10.33	6.00	2.12	90.00	0.114
Pseudacrobeles	0.80	0.55	1.46	8.67	1.00	2.04	92.04	0.444
Plectus	0.69	0.35	1.95	10.67	17.67	1.77	93.81	0.979
Aporcelaimellus	0.44	0.39	1.13	3.67	2.00	1.12	94.93	0.171
Clarkus	0.44	0.39	1.10	4.00	0.00	1.11	96.04	0.026
Ceratoplectus	0.40	0.17	2.36	5.00	1.00	1.03	97.07	0.784
Diphtherophora	0.36	0.33	1.08	1.33	3.67	0.92	97.99	0.48
Helicotylenchus	0.24	0.28	0.87	1.00	2.00	0.62	98.61	0.921
Cervidellus	0.21	0.16	1.32	1.00	3.00	0.54	99.15	0.758
Tylocephalus	0.17	0.18	0.92	1.33	1.00	0.44	99.59	0.909
Teratocephalus	0.16	0.15	1.08	2.33	2.00	0.41	100.00	0.999
Diplogasteridae	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Ecphyadophora	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Tripyla	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Nov-17								
Control vs SLR	**Average dissimilarity = 34.96**							
Alaimus	4.21	3.08	1.36	31.00	76.33	12.03	12.03	0.292
Xenocriconemella	4.16	3.50	1.19	95.00	112.00	11.91	23.94	0.922
Meloidogyne	3.55	1.46	2.42	47.33	58.67	10.15	34.09	0.514
Helicotylenchus	3.47	4.40	0.79	56.67	6.00	9.91	44.00	0.485
Rhabditidae	2.46	2.07	1.19	30.67	46.67	7.04	51.04	0.743
Prismatolaimus	2.21	0.85	2.61	43.67	37.33	6.32	57.36	0.587
Gracilacus	2.16	1.31	1.65	58.67	64.00	6.18	63.54	0.932
Filenchus	1.88	1.76	1.07	106.00	130.33	5.38	68.92	0.987
Aphelenchoides	1.38	1.21	1.14	17.00	27.00	3.94	72.86	0.41
Ditylenchus	1.31	0.60	2.20	21.33	4.33	3.76	76.62	0.521
Acrobeles	1.28	1.24	1.03	21.00	6.00	3.68	80.30	0.571
Pseudacrobeles	1.16	1.01	1.14	15.67	4.33	3.31	83.61	0.371
Boleodorus	0.93	0.62	1.51	4.00	14.00	2.67	86.28	0.258
Acrobeloides	0.69	0.62	1.12	14.67	11.67	1.98	88.26	0.86
Plectus	0.67	0.45	1.48	29.67	22.00	1.91	90.17	0.901
Tripyla	0.53	0.50	1.06	5.00	5.33	1.53	91.70	0.311

(Continued)

Table S5. Continued

	Av.Diss	SD	Diss/ SD	Av.Abund	Av.Abund	Contrib (%)	cumsum (%)	p
Dorylaimida	0.53	0.39	1.34	11.67	13.67	1.50	93.20	0.837
Diphtherophora	0.45	0.28	1.62	6.67	5.00	1.29	94.49	0.479
Ceratoplectus	0.42	0.28	1.52	8.33	8.33	1.20	95.69	0.778
Aporcelaimellus	0.37	0.37	1.00	4.00	7.33	1.05	96.74	0.652
Teratocephalus	0.30	0.33	0.90	3.33	2.67	0.86	97.60	0.218
Clarkus	0.28	0.28	1.01	3.33	6.67	0.80	98.40	0.903
Tylocephalus	0.17	0.14	1.27	2.33	1.33	0.50	98.90	0.737
Ecphyadophora	0.16	0.12	1.36	2.33	1.00	0.46	99.36	0.548
Cervidellus	0.14	0.15	0.96	1.67	1.00	0.41	99.77	0.744
Diplogasteridae	0.08	0.12	0.66	1.00	0.00	0.23	100.00	0.741
Aphelenchus	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Control vs R2M	**Average dissimilarity = 43.16**							
Xenocriconemella	5.71	3.34	1.71	95.00	38.00	13.22	13.22	0.437
Helicotylenchus	4.38	4.92	0.89	56.67	1.00	10.14	23.36	0.008
Meloidogyne	4.06	3.20	1.27	47.33	51.67	9.39	32.75	0.289
Filenchus	3.60	2.07	1.74	106.00	142.67	8.35	41.10	0.705
Rhabditidae	3.42	2.80	1.22	30.67	60.67	7.93	49.03	0.476
Alaimus	3.29	2.70	1.22	31.00	44.33	7.62	56.65	0.66
Gracilacus	3.16	1.06	2.97	58.67	21.67	7.32	63.97	0.733
Prismatolaimus	2.88	1.91	1.51	43.67	24.67	6.67	70.64	0.133
Acrobeles	1.80	1.38	1.30	21.00	12.00	4.18	74.82	0.137
Plectus	1.53	0.52	2.96	29.67	11.67	3.54	78.36	0.023
Pseudacrobeles	1.32	1.07	1.23	15.67	10.33	3.05	81.41	0.193
Acrobeloides	1.15	0.77	1.49	14.67	15.00	2.66	84.07	0.381
Ditylenchus	0.98	0.79	1.24	21.33	10.67	2.27	86.34	0.691
Dorylaimida	0.87	0.58	1.50	11.67	2.67	2.01	88.35	0.08
Aphelenchoides	0.80	0.58	1.39	17.00	16.33	1.86	90.21	0.784
Boleodorus	0.73	0.36	2.03	4.00	11.33	1.70	91.91	0.72
Ceratoplectus	0.70	0.41	1.69	8.33	1.00	1.62	93.53	0.094
Clarkus	0.60	0.62	0.96	3.33	7.67	1.38	94.91	0.448
Tripyla	0.48	0.48	1.01	5.00	2.00	1.11	96.02	0.43
Diphtherophora	0.39	0.39	0.99	6.67	4.00	0.91	96.93	0.618
Aporcelaimellus	0.34	0.30	1.12	4.00	5.67	0.77	97.70	0.753
Teratocephalus	0.25	0.38	0.66	3.33	0.00	0.59	98.29	0.34
Tylocephalus	0.19	0.17	1.17	2.33	0.00	0.45	98.74	0.632
Diplogasteridae	0.19	0.22	0.89	1.00	1.67	0.45	99.19	0.27
Ecphyadophora	0.19	0.15	1.29	2.33	1.00	0.44	99.63	0.281

(*Continued*)

Table S5. Continued

	Av.Diss	SD	Diss/ SD	Av.Abund	Av.Abund	Contrib (%)	cumsum (%)	p
Cervidellus	0.16	0.17	0.94	1.67	1.00	0.37	100.00	0.674
Aphelenchus	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Control vs R2W	**Average dissimilarity = 44.59**							
Gracilacus	7.54	4.60	1.64	58.67	72.00	16.90	16.90	0.188
Xenocriconemella	4.61	4.00	1.15	95.00	80.67	10.35	27.25	0.837
Helicotylenchus	4.37	5.12	0.85	56.67	3.00	9.80	37.05	0.006
Filenchus	4.35	2.55	1.71	106.00	63.67	9.75	46.80	0.432
Meloidogyne	4.19	2.23	1.88	47.33	55.00	9.40	56.20	0.222
Prismatolaimus	3.26	1.91	1.71	43.67	13.67	7.32	63.52	0.036
Alaimus	2.59	2.54	1.02	31.00	15.33	5.81	69.33	0.909
Acrobeles	2.02	1.46	1.39	21.00	1.00	4.53	73.86	0.07
Rhabditidae	1.92	1.66	1.16	30.67	20.67	4.31	78.17	0.838
Plectus	1.55	0.92	1.69	29.67	12.67	3.47	81.64	0.023
Pseudacrobeles	1.28	1.02	1.25	15.67	9.33	2.87	84.51	0.208
Ditylenchus	1.16	1.10	1.06	21.33	26.33	2.61	87.12	0.589
Ceratoplectus	0.82	0.40	2.08	8.33	0.00	1.84	88.96	0.024
Dorylaimida	0.68	0.50	1.35	11.67	5.67	1.52	90.48	0.491
Acrobeloides	0.59	0.41	1.45	14.67	18.00	1.33	91.81	0.932
Aphelenchoides	0.58	0.42	1.37	17.00	21.33	1.29	93.10	0.939
Diphtherophora	0.53	0.40	1.34	6.67	2.00	1.20	94.30	0.19
Tripyla	0.49	0.58	0.84	5.00	0.00	1.09	95.39	0.37
Boleodorus	0.46	0.57	0.80	4.00	1.00	1.03	96.42	0.981
Clarkus	0.32	0.23	1.37	3.33	3.67	0.71	97.13	0.853
Cervidellus	0.27	0.31	0.86	1.67	2.33	0.60	97.73	0.409
Teratocephalus	0.26	0.39	0.67	3.33	0.00	0.59	98.32	0.253
Tylocephalus	0.25	0.19	1.32	2.33	3.00	0.56	98.88	0.323
Aporcelaimellus	0.23	0.19	1.18	4.00	3.67	0.51	99.39	0.851
Ecphyadophora	0.18	0.13	1.39	2.33	1.67	0.39	99.78	0.408
Diplogasteridae	0.10	0.14	0.67	1.00	0.00	0.22	100.00	0.508
Aphelenchus	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
SLR vs R2M	**Average dissimilarity = 37.03**							
Xenocriconemella	6.87	3.94	1.75	112.00	38.00	18.55	18.55	0.12
Alaimus	3.85	3.53	1.09	76.33	44.33	10.41	28.96	0.458
Rhabditidae	3.48	3.06	1.14	46.67	60.67	9.39	38.35	0.429
Gracilacus	3.47	2.55	1.36	64.00	21.67	9.36	47.71	0.614
Meloidogyne	3.12	2.09	1.49	58.67	51.67	8.43	56.14	0.735

(*Continued*)

Table S5. Continued

	Av.Diss	SD	Diss/ SD	Av.Abund	Av.Abund	Contrib (%)	cumsum (%)	p
Filenchus	2.35	0.96	2.43	130.33	142.67	6.34	62.48	0.939
Prismatolaimus	1.81	0.96	1.89	37.33	24.67	4.87	67.35	0.894
Aphelenchoides	1.74	1.27	1.37	27.00	16.33	4.71	72.06	0.127
Acrobeloides	1.26	1.13	1.12	11.67	15.00	3.39	75.45	0.308
Acrobeles	1.15	1.08	1.06	6.00	12.00	3.10	78.55	0.719
Dorylaimida	0.92	0.52	1.76	13.67	2.67	2.48	81.03	0.06
Boleodorus	0.90	0.36	2.48	14.00	11.33	2.45	83.48	0.315
Plectus	0.84	0.45	1.89	22.00	11.67	2.28	85.76	0.695
Ditylenchus	0.84	0.63	1.33	4.33	10.67	2.26	88.02	0.829
Pseudacrobeles	0.67	0.66	1.01	4.33	10.33	1.81	89.83	0.81
Clarkus	0.67	0.49	1.38	6.67	7.67	1.80	91.63	0.336
Ceratoplectus	0.60	0.46	1.30	8.33	1.00	1.61	93.24	0.263
Helicotylenchus	0.50	0.45	1.12	6.00	1.00	1.36	94.60	0.91
Tripyla	0.48	0.53	0.90	5.33	2.00	1.28	95.88	0.44
Aporcelaimellus	0.47	0.46	1.01	7.33	5.67	1.26	97.14	0.376
Diphtherophora	0.35	0.21	1.67	5.00	4.00	0.95	98.09	0.728
Teratocephalus	0.20	0.31	0.66	2.67	0.00	0.55	98.64	0.612
Diplogasteridae	0.17	0.25	0.66	0.00	1.67	0.45	99.09	0.468
Ecphyadophora	0.12	0.15	0.82	1.00	1.00	0.33	99.42	0.881
Cervidellus	0.11	0.14	0.83	1.00	1.00	0.30	99.72	0.82
Tylocephalus	0.10	0.15	0.66	1.33	0.00	0.28	100.00	0.943
Aphelenchus	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
SLR vs R2W	**Average dissimilarity = 44.30**							
Gracilacus	7.45	4.77	1.56	64.00	72.00	16.81	16.81	0.207
Filenchus	6.06	2.35	2.58	130.33	63.67	13.67	30.48	0.045
Alaimus	5.75	3.18	1.81	76.33	15.33	12.97	43.45	0.035
Xenocriconemella	5.70	3.69	1.54	112.00	80.67	12.86	56.31	0.406
Rhabditidae	2.91	2.86	1.02	46.67	20.67	6.57	62.88	0.602
Prismatolaimus	2.15	0.96	2.25	37.33	13.67	4.86	67.74	0.621
Ditylenchus	2.03	1.49	1.36	4.33	26.33	4.57	72.31	0.05
Meloidogyne	1.93	1.42	1.36	58.67	55.00	4.36	76.67	0.99
Aphelenchoides	1.64	1.16	1.42	27.00	21.33	3.71	80.38	0.186
Boleodorus	1.16	0.82	1.42	14.00	1.00	2.61	82.99	0.033
Acrobeloides	0.90	0.85	1.06	11.67	18.00	2.04	85.03	0.593
Plectus	0.87	0.78	1.12	22.00	12.67	1.97	87.00	0.656
Dorylaimida	0.76	0.47	1.61	13.67	5.67	1.71	88.71	0.282
Ceratoplectus	0.71	0.44	1.62	8.33	0.00	1.60	90.31	0.071

(*Continued*)

Table S5. Continued

	Av.Diss	SD	Diss/ SD	Av.Abund	Av.Abund	Contrib (%)	cumsum (%)	p
Pseudacrobeles	0.60	0.46	1.31	4.33	9.33	1.36	91.67	0.87
Helicotylenchus	0.54	0.42	1.29	6.00	3.00	1.22	92.89	0.852
Aporcelaimellus	0.50	0.39	1.28	7.33	3.67	1.13	94.02	0.236
Acrobeles	0.49	0.33	1.46	6.00	1.00	1.10	95.12	0.932
Clarkus	0.46	0.28	1.67	6.67	3.67	1.04	96.16	0.59
Tripyla	0.43	0.64	0.67	5.33	0.00	0.96	97.12	0.591
Diphtherophora	0.42	0.34	1.24	5.00	2.00	0.95	98.07	0.56
Tylocephalus	0.26	0.22	1.14	1.33	3.00	0.58	98.65	0.306
Cervidellus	0.25	0.28	0.88	1.00	2.33	0.55	99.20	0.473
Teratocephalus	0.21	0.32	0.67	2.67	0.00	0.48	99.68	0.528
Ecphyadophora	0.14	0.12	1.17	1.00	1.67	0.32	100.00	0.753
Aphelenchus	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Diplogasteridae	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
R2M vs R2W	**Average dissimilarity = 47.64**							
Filenchus	8.23	3.22	2.56	142.67	63.67	17.28	17.28	0.001
Gracilacus	7.35	8.75	0.84	21.67	72.00	15.43	32.71	0.227
Xenocriconemella	6.52	4.92	1.33	38.00	80.67	13.69	46.40	0.163
Rhabditidae	4.21	4.07	1.03	60.67	20.67	8.84	55.24	0.154
Meloidogyne	4.07	2.64	1.54	51.67	55.00	8.53	63.77	0.286
Alaimus	3.44	2.52	1.36	44.33	15.33	7.23	71.00	0.583
Prismatolaimus	1.87	1.58	1.18	24.67	13.67	3.91	74.91	0.816
Ditylenchus	1.79	1.69	1.06	10.67	26.33	3.77	78.68	0.183
Acrobeloides	1.45	0.84	1.72	15.00	18.00	3.04	81.72	0.111
Acrobeles	1.21	1.66	0.73	12.00	1.00	2.55	84.27	0.655
Boleodorus	1.10	0.34	3.27	11.33	1.00	2.30	86.57	0.068
Aphelenchoides	0.94	0.79	1.19	16.33	21.33	1.98	88.55	0.663
Pseudacrobeles	0.90	0.64	1.42	10.33	9.33	1.89	90.44	0.61
Plectus	0.80	0.59	1.37	11.67	12.67	1.69	92.13	0.755
Clarkus	0.80	0.72	1.11	7.67	3.67	1.68	93.81	0.102
Aporcelaimellus	0.49	0.32	1.54	5.67	3.67	1.03	94.84	0.278
Dorylaimida	0.42	0.29	1.44	2.67	5.67	0.88	95.72	0.955
Diphtherophora	0.38	0.20	1.86	4.00	2.00	0.80	96.52	0.653
Helicotylenchus	0.36	0.43	0.83	1.00	3.00	0.75	97.27	0.99
Tylocephalus	0.32	0.29	1.12	0.00	3.00	0.68	97.95	0.06
Cervidellus	0.29	0.34	0.85	1.00	2.33	0.61	98.56	0.219
Diplogasteridae	0.21	0.32	0.67	1.67	0.00	0.45	99.01	0.133
Tripyla	0.20	0.30	0.67	2.00	0.00	0.42	99.43	0.845

(Continued)

Table S5. Continued

	Av.Diss	SD	Diss/ SD	Av.Abund	Av.Abund	Contrib (%)	cumsum (%)	p
Ecphyadophora	0.17	0.15	1.15	1.00	1.67	0.36	99.79	0.478
Ceratoplectus	0.10	0.15	0.67	1.00	0.00	0.21	100.00	1
Aphelenchus	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Teratocephalus	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Jan-18								
Control vs SLR	**Average dissimilarity = 43.28**							
Filenchus	8.38	6.27	1.34	191.33	156.67	19.36	19.36	0.832
Xenocriconemella	6.54	3.87	1.69	57.67	108.67	15.11	34.47	0.807
Gracilacus	3.99	2.78	1.43	49.00	42.33	9.20	43.67	0.448
Pseudacrobeles	3.09	1.83	1.69	37.33	2.00	7.14	50.81	0.053
Plectus	2.33	2.17	1.07	40.67	21.00	5.37	56.18	0.532
Ditylenchus	2.05	2.06	1.00	28.00	9.00	4.74	60.92	0.317
Prismatolaimus	1.91	1.21	1.58	24.67	19.33	4.40	65.32	0.533
Helicotylenchus	1.88	1.46	1.29	23.33	2.33	4.35	69.67	0.087
Acrobeloides	1.86	1.60	1.16	23.33	22.00	4.30	73.97	0.71
Aphelenchoides	1.59	1.22	1.30	25.33	9.33	3.67	77.64	0.316
Rhabditidae	1.55	0.82	1.89	22.00	27.33	3.58	81.22	0.673
Meloidogyne	1.46	1.13	1.30	29.67	42.00	3.38	84.60	0.89
Acrobeles	1.37	1.71	0.80	2.67	16.67	3.17	87.77	0.49
Tylocephalus	0.83	0.76	1.09	9.00	2.33	1.91	89.68	0.249
Ceratoplectus	0.62	0.75	0.83	7.00	1.33	1.43	91.11	0.362
Boleodorus	0.62	0.58	1.07	6.33	0.00	1.43	92.54	0.089
Ecphyadophora	0.59	0.36	1.64	6.67	0.00	1.36	93.90	0.321
Cervidellus	0.48	0.37	1.30	5.67	1.33	1.12	95.02	0.257
Teratocephalus	0.47	0.43	1.09	5.33	2.00	1.07	96.09	0.4
Alaimus	0.43	0.22	1.93	10.00	8.00	1.00	97.09	0.916
Aporcelaimellus	0.34	0.30	1.17	4.00	2.33	0.79	97.88	0.603
Clarkus	0.26	0.39	0.66	3.33	0.00	0.60	98.48	0.509
Diphtherophora	0.24	0.28	0.86	2.33	1.00	0.56	99.04	0.409
Dorylaimida	0.22	0.33	0.65	2.33	0.00	0.50	99.54	0.422
Diplogasteridae	0.20	0.17	1.20	2.33	0.00	0.46	100.00	0.203
Tripyla	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Control vs R2M	**Average dissimilarity = 49.59**							
Filenchus	10.97	4.62	2.38	191.33	93.33	22.12	22.12	0.239
Xenocriconemella	4.87	4.21	1.16	57.67	16.33	9.82	31.94	0.929
Gracilacus	4.61	4.77	0.97	49.00	11.00	9.29	41.23	0.299

(*Continued*)

Table S5. Continued

	Av.Diss	SD	Diss/ SD	Av.Abund	Av.Abund	Contrib (%)	cumsum (%)	p
Plectus	3.34	2.96	1.13	40.67	10.33	6.74	47.97	0.046
Pseudacrobeles	3.33	2.15	1.55	37.33	8.33	6.72	54.69	0.031
Helicotylenchus	2.40	1.85	1.30	23.33	0.67	4.84	59.53	0.018
Meloidogyne	2.39	1.34	1.78	29.67	10.33	4.82	64.35	0.429
Prismatolaimus	2.37	2.02	1.17	24.67	6.00	4.78	69.13	0.144
Acrobeloides	2.13	1.97	1.08	23.33	18.67	4.29	73.42	0.544
Ditylenchus	2.12	2.23	0.95	28.00	19.67	4.28	77.70	0.314
Aphelenchoides	2.06	1.67	1.24	25.33	9.67	4.16	81.86	0.097
Alaimus	1.19	0.54	2.19	10.00	0.67	2.41	84.27	0.056
Tylocephalus	1.18	1.15	1.03	9.00	0.00	2.38	86.65	0.013
Rhabditidae	0.98	0.82	1.20	22.00	15.33	1.99	88.64	0.956
Boleodorus	0.81	0.72	1.11	6.33	0.00	1.62	90.26	0.01
Ceratoplectus	0.81	1.01	0.80	7.00	0.00	1.63	91.89	0.034
Acrobeles	0.76	0.67	1.13	2.67	5.67	1.54	93.43	0.736
Cervidellus	0.59	0.38	1.57	5.67	2.00	1.19	94.62	0.068
Ecphyadophora	0.58	0.45	1.30	6.67	3.33	1.17	95.79	0.373
Teratocephalus	0.51	0.58	0.89	5.33	0.67	1.03	96.82	0.22
Clarkus	0.39	0.35	1.13	3.33	1.33	0.80	97.62	0.086
Aporcelaimellus	0.39	0.25	1.57	4.00	2.00	0.78	98.40	0.445
Diphtherophora	0.28	0.42	0.66	2.33	0.00	0.56	98.96	0.282
Dorylaimida	0.28	0.42	0.66	2.33	0.00	0.56	99.52	0.025
Diplogasteridae	0.24	0.19	1.28	2.33	0.67	0.48	100.00	0.062
Tripyla	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Control vs R2W	**Average dissimilarity = 49.09**							
Filenchus	10.40	5.81	1.79	191.33	88.33	21.18	21.18	0.359
Xenocriconemella	8.59	9.06	0.95	57.67	93.67	17.50	38.68	0.605
Gracilacus	4.08	4.45	0.92	49.00	14.67	8.31	46.99	0.437
Plectus	3.33	2.86	1.17	40.67	5.67	6.78	53.77	0.062
Pseudacrobeles	2.94	1.88	1.56	37.33	12.33	5.99	59.76	0.074
Prismatolaimus	2.39	2.22	1.08	24.67	1.00	4.87	64.63	0.154
Helicotylenchus	2.22	1.67	1.33	23.33	1.00	4.53	69.16	0.03
Acrobeloides	2.22	1.54	1.45	23.33	18.33	4.53	73.69	0.441
Ditylenchus	2.13	2.09	1.02	28.00	13.67	4.34	78.03	0.263
Meloidogyne	1.57	1.04	1.50	29.67	16.33	3.19	81.22	0.825
Aphelenchoides	1.29	0.89	1.44	25.33	16.33	2.63	83.85	0.497
Tylocephalus	1.05	0.97	1.08	9.00	0.67	2.14	85.99	0.034
Rhabditidae	1.03	0.77	1.34	22.00	23.33	2.09	88.08	0.945

(Continued)

Table S5. Continued

	Av.Diss	SD	Diss/ SD	Av.Abund	Av.Abund	Contrib (%)	cumsum (%)	p
Alaimus	0.80	0.41	1.95	10.00	3.00	1.63	89.71	0.409
Ceratoplectus	0.74	0.93	0.80	7.00	0.00	1.51	91.22	0.082
Boleodorus	0.74	0.67	1.10	6.33	0.00	1.51	92.73	0.026
Ecphyadophora	0.70	0.41	1.70	6.67	0.00	1.42	94.15	0.142
Cervidellus	0.57	0.38	1.53	5.67	1.00	1.17	95.32	0.077
Teratocephalus	0.48	0.54	0.88	5.33	0.67	0.98	96.30	0.325
Aporcelaimellus	0.44	0.33	1.31	4.00	0.00	0.89	97.19	0.234
Acrobeles	0.32	0.30	1.05	2.67	0.00	0.65	97.84	0.788
Clarkus	0.30	0.45	0.66	3.33	0.00	0.60	98.44	0.356
Diphtherophora	0.28	0.34	0.81	2.33	0.67	0.56	99.00	0.268
Dorylaimida	0.25	0.38	0.66	2.33	0.00	0.52	99.52	0.126
Diplogasteridae	0.23	0.19	1.22	2.33	0.00	0.48	100.00	0.063
Tripyla	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
SLR vs R2M	**Average dissimilarity = 52.55**							
Xenocriconemella	12.82	5.49	2.34	108.67	16.33	24.39	24.39	0.183
Filenchus	12.77	4.88	2.62	156.67	93.33	24.30	48.69	0.068
Meloidogyne	4.90	2.73	1.79	42.00	10.33	9.33	58.02	0.002
Gracilacus	4.70	2.43	1.93	42.33	11.00	8.93	66.95	0.254
Rhabditidae	2.48	1.50	1.66	27.33	15.33	4.72	71.67	0.138
Acrobeles	2.21	2.29	0.96	16.67	5.67	4.20	75.87	0.081
Acrobeloides	2.08	2.38	0.87	22.00	18.67	3.95	79.82	0.607
Plectus	1.69	1.16	1.47	21.00	10.33	3.23	83.05	0.602
Prismatolaimus	1.66	0.92	1.81	19.33	6.00	3.16	86.21	0.567
Ditylenchus	1.63	1.24	1.31	9.00	19.67	3.09	89.30	0.53
Alaimus	1.24	1.12	1.11	8.00	0.67	2.36	91.66	0.034
Pseudacrobeles	0.96	0.74	1.29	2.00	8.33	1.82	93.48	0.94
Aphelenchoides	0.79	0.61	1.28	9.33	9.67	1.50	94.98	0.909
Ecphyadophora	0.52	0.63	0.81	0.00	3.33	0.98	95.96	0.488
Aporcelaimellus	0.41	0.32	1.29	2.33	2.00	0.78	96.74	0.361
Helicotylenchus	0.30	0.35	0.87	2.33	0.67	0.58	97.32	0.883
Teratocephalus	0.30	0.32	0.94	2.00	0.67	0.57	97.89	0.657
Tylocephalus	0.28	0.21	1.31	2.33	0.00	0.53	98.42	0.766
Cervidellus	0.28	0.24	1.14	1.33	2.00	0.53	98.95	0.885
Clarkus	0.19	0.16	1.19	0.00	1.33	0.36	99.31	0.563
Ceratoplectus	0.15	0.23	0.66	1.33	0.00	0.29	99.60	0.64
Diphtherophora	0.13	0.19	0.66	1.00	0.00	0.24	99.84	0.631
Diplogasteridae	0.08	0.13	0.64	0.00	0.67	0.16	100.00	0.856

(*Continued*)

Table S5. Continued

	Av.Diss	SD	Diss/ SD	Av.Abund	Av.Abund	Contrib (%)	cumsum (%)	p
Boleodorus	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Dorylaimida	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Tripyla	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
SLR vs R2W	**Average dissimilarity = 47.81**							
Xenocriconemella	12.65	5.45	2.32	108.67	93.67	26.46	26.46	0.22
Filenchus	11.72	6.94	1.69	156.67	88.33	24.51	50.97	0.181
Gracilacus	4.31	2.28	1.90	42.33	14.67	9.02	59.99	0.352
Meloidogyne	3.53	2.10	1.69	42.00	16.33	7.40	67.39	0.053
Rhabditidae	2.28	1.69	1.35	27.33	23.33	4.76	72.15	0.196
Prismatolaimus	2.18	0.73	2.98	19.33	1.00	4.57	76.72	0.33
Acrobeloides	2.10	1.77	1.18	22.00	18.33	4.38	81.10	0.54
Plectus	1.84	0.93	1.98	21.00	5.67	3.85	84.95	0.54
Acrobeles	1.79	2.45	0.73	16.67	0.00	3.76	88.71	0.309
Pseudacrobeles	1.29	1.13	1.14	2.00	12.33	2.70	91.41	0.853
Aphelenchoides	1.09	1.00	1.09	9.33	16.33	2.27	93.68	0.681
Alaimus	0.78	0.83	0.94	8.00	3.00	1.63	95.31	0.448
Ditylenchus	0.68	0.57	1.20	9.00	13.67	1.41	96.72	0.951
Helicotylenchus	0.31	0.32	0.99	2.33	1.00	0.66	97.38	0.849
Teratocephalus	0.27	0.29	0.91	2.00	0.67	0.56	97.94	0.711
Tylocephalus	0.24	0.17	1.44	2.33	0.67	0.51	98.45	0.814
Aporcelaimellus	0.24	0.37	0.66	2.33	0.00	0.52	98.97	0.893
Cervidellus	0.21	0.23	0.90	1.33	1.00	0.43	99.40	0.952
Diphtherophora	0.15	0.16	0.90	1.00	0.67	0.31	99.71	0.566
Ceratoplectus	0.14	0.21	0.66	1.33	0.00	0.29	100.00	0.696
Boleodorus	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Clarkus	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Diplogasteridae	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Dorylaimida	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Ecphyadophora	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Tripyla	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
R2M vs R2W	**Average dissimilarity = 39.42**							
Xenocriconemella	13.46	15.76	0.85	16.33	93.67	34.14	34.14	0.148
Filenchus	7.11	4.32	1.65	93.33	88.33	18.03	52.17	0.946
Rhabditidae	2.41	1.95	1.24	15.33	23.33	6.12	58.29	0.155
Acrobeloides	2.33	1.30	1.80	18.67	18.33	5.92	64.21	0.392
Gracilacus	2.02	1.05	1.93	11.00	14.67	5.12	69.33	0.931

(*Continued*)

Table S5. Continued

	Av.Diss	SD	Diss/ SD	Av.Abund	Av.Abund	Contrib (%)	cumsum (%)	p
Ditylenchus	1.79	0.65	2.77	19.67	13.67	4.54	73.87	0.484
Aphelenchoides	1.64	1.53	1.07	9.67	16.33	4.17	78.04	0.281
Meloidogyne	1.43	0.97	1.48	10.33	16.33	3.64	81.68	0.92
Pseudacrobeles	1.37	1.22	1.13	8.33	12.33	3.47	85.15	0.83
Plectus	0.98	0.89	1.10	10.33	5.67	2.49	87.64	0.961
Prismatolaimus	0.96	0.50	1.90	6.00	1.00	2.43	90.07	0.934
Acrobeles	0.91	1.37	0.66	5.67	0.00	2.30	92.37	0.647
Ecphyadophora	0.68	0.81	0.84	3.33	0.00	1.73	94.10	0.182
Alaimus	0.58	0.46	1.25	0.67	3.00	1.47	95.57	0.782
Aporcelaimellus	0.39	0.39	1.02	2.00	0.00	1.00	96.57	0.411
Cervidellus	0.34	0.27	1.26	2.00	1.00	0.86	97.43	0.771
Clarkus	0.25	0.20	1.25	1.33	0.00	0.64	98.07	0.472
Helicotylenchus	0.24	0.29	0.83	0.67	1.00	0.62	98.69	0.908
Teratocephalus	0.18	0.21	0.82	0.67	0.67	0.44	99.13	0.832
Tylocephalus	0.13	0.20	0.66	0.00	0.67	0.34	99.47	0.935
Diplogasteridae	0.11	0.16	0.66	0.67	0.00	0.27	99.74	0.686
Diphtherophora	0.10	0.15	0.66	0.00	0.67	0.26	100.00	0.768
Boleodorus	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Ceratoplectus	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Dorylaimida	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Tripyla	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
May-18								
Control vs SLR	**Average dissimilarity = 40.20**							
Meloidogyne	7.31	5.99	1.22	135.33	140.67	18.17	18.17	0.85
Filenchus	4.87	3.14	1.55	130.67	76.67	12.12	30.29	0.822
Xenocriconemella	3.72	3.58	1.04	18.00	46.67	9.24	39.53	0.749
Acrobeles	2.66	1.74	1.53	32.67	9.67	6.60	46.13	0.116
Gracilacus	2.10	0.94	2.24	28.33	4.33	5.22	51.35	0.057
Helicotylenchus	2.03	2.48	0.82	22.33	3.67	5.05	56.40	0.414
Rhabditidae	2.02	1.56	1.30	46.00	34.00	5.02	61.42	0.525
Plectus	2.01	1.40	1.44	45.67	24.67	4.99	66.41	0.669
Prismatolaimus	1.78	1.53	1.17	21.67	30.67	4.43	70.84	0.538
Ditylenchus	1.76	1.30	1.35	24.33	4.33	4.37	75.21	0.054
Alaimus	1.69	1.07	1.59	24.33	38.00	4.20	79.41	0.871
Ceratoplectus	1.08	0.63	1.72	15.00	3.33	2.68	82.09	0.127
Acrobeloides	0.98	0.70	1.40	22.33	18.00	2.44	84.53	0.96
Pseudacrobeles	0.96	0.43	2.23	14.67	4.00	2.38	86.91	0.09

(*Continued*)

Table S5. Continued

	Av.Diss	SD	Diss/ SD	Av.Abund	Av.Abund	Contrib (%)	cumsum (%)	p
Aphelenchoides	0.92	0.63	1.47	15.00	5.67	2.29	89.20	0.822
Boleodorus	0.90	0.52	1.73	12.67	3.00	2.22	91.42	0.091
Aporcelaimellus	0.51	0.35	1.44	6.00	1.67	1.26	92.68	0.141
Tripyla	0.50	0.44	1.15	5.00	2.33	1.26	93.94	0.261
Dorylaimida	0.47	0.35	1.34	8.67	7.00	1.15	95.09	0.79
Clarkus	0.46	0.31	1.45	5.67	1.67	1.14	96.23	0.12
Cervidellus	0.44	0.31	1.42	5.00	0.67	1.09	97.32	0.37
Diphtherophora	0.37	0.29	1.28	2.67	4.33	0.93	98.25	0.595
Tylocephalus	0.27	0.22	1.23	3.33	0.67	0.68	98.93	0.262
Diplogasteridae	0.20	0.29	0.66	2.33	0.00	0.49	99.42	0.473
Ecphyadophora	0.12	0.18	0.66	1.33	0.00	0.29	99.71	0.83
Teratocephalus	0.12	0.18	0.66	1.33	0.00	0.29	100.00	0.735
Control vs R2M	**Average dissimilarity = 42.25**							
Meloidogyne	7.81	5.32	1.47	135.33	190.67	18.47	18.47	0.762
Filenchus	7.76	2.49	3.12	130.67	49.33	18.37	36.84	0.083
Acrobeles	2.93	2.17	1.35	32.67	5.67	6.94	43.78	0.052
Gracilacus	2.17	1.19	1.82	28.33	4.67	5.13	48.91	0.041
Helicotylenchus	2.07	2.89	0.72	22.33	0.00	4.91	53.82	0.374
Alaimus	1.84	1.47	1.25	24.33	6.67	4.36	58.18	0.828
Plectus	1.69	1.40	1.21	45.67	28.00	4.00	62.18	0.845
Acrobeloides	1.63	0.81	2.01	22.33	32.67	3.86	66.04	0.609
Xenocriconemella	1.49	1.50	0.99	18.00	10.00	3.52	69.56	0.887
Ceratoplectus	1.38	0.70	1.96	15.00	1.00	3.27	72.83	0.012
Rhabditidae	1.37	1.48	0.92	46.00	33.33	3.25	76.08	0.855
Ditylenchus	1.35	1.29	1.05	24.33	9.67	3.19	79.27	0.433
Prismatolaimus	1.31	1.19	1.11	21.67	10.00	3.11	82.38	0.771
Boleodorus	1.18	0.34	3.48	12.67	0.00	2.79	85.17	0.011
Aphelenchoides	1.16	0.94	1.24	15.00	23.33	2.75	87.92	0.749
Pseudacrobeles	1.13	0.31	3.68	14.67	2.67	2.67	90.59	0.011
Dorylaimida	0.79	0.44	1.80	8.67	0.00	1.87	92.46	0.093
Aporcelaimellus	0.59	0.51	1.16	6.00	0.00	1.41	93.87	0.042
Clarkus	0.53	0.43	1.24	5.67	0.00	1.26	95.13	0.036
Cervidellus	0.48	0.38	1.28	5.00	3.33	1.14	96.27	0.227
Tripyla	0.44	0.66	0.66	5.00	0.00	1.04	97.31	0.429
Diphtherophora	0.30	0.37	0.80	2.67	0.67	0.70	98.01	0.841
Tylocephalus	0.28	0.25	1.11	3.33	1.00	0.67	98.68	0.195
Ecphyadophora	0.21	0.24	0.88	1.33	1.67	0.49	99.17	0.534

(Continued)

Table S5. Continued

	Av.Diss	SD	Diss/ SD	Av.Abund	Av.Abund	Contrib (%)	cumsum (%)	p
Diplogasteridae	0.20	0.31	0.66	2.33	0.00	0.48	99.65	0.329
Teratocephalus	0.15	0.15	0.94	1.33	0.67	0.35	100.00	0.621
Control vs R2W	**Average dissimilarity = 56.30**							
Filenchus	11.48	1.83	6.26	130.67	25.00	20.38	20.38	0.001
Meloidogyne	7.47	4.99	1.50	135.33	114.33	13.27	33.65	0.837
Xenocriconemella	4.27	3.64	1.17	18.00	47.33	7.59	41.24	0.663
Plectus	4.23	1.51	2.80	45.67	6.67	7.51	48.75	0.002
Acrobeles	3.57	2.73	1.31	32.67	0.00	6.35	55.10	0.013
Alaimus	2.77	1.63	1.70	24.33	0.00	4.91	60.01	0.239
Rhabditidae	2.62	1.77	1.48	46.00	21.00	4.65	64.66	0.1
Gracilacus	2.59	1.22	2.12	28.33	3.67	4.60	69.26	0.003
Helicotylenchus	2.36	3.04	0.78	22.33	3.67	4.19	73.45	0.124
Prismatolaimus	2.06	1.44	1.43	21.67	1.67	3.67	77.12	0.482
Ceratoplectus	1.70	0.79	2.14	15.00	0.00	3.01	80.13	0.001
Ditylenchus	1.64	1.49	1.10	24.33	8.67	2.92	83.05	0.12
Boleodorus	1.35	0.36	3.72	12.67	0.00	2.40	85.45	0.001
Pseudacrobeles	1.28	0.40	3.19	14.67	3.00	2.27	87.72	0.003
Acrobeloides	1.08	0.77	1.40	22.33	14.00	1.92	89.64	0.927
Aphelenchoides	1.02	0.81	1.26	15.00	16.67	1.81	91.45	0.813
Dorylaimida	0.90	0.49	1.84	8.67	0.00	1.60	93.05	0.032
Aporcelaimellus	0.69	0.60	1.15	6.00	0.00	1.23	94.28	0.009
Clarkus	0.61	0.49	1.26	5.67	0.00	1.08	95.36	0.009
Cervidellus	0.56	0.44	1.27	5.00	0.00	1.01	96.37	0.116
Tripyla	0.50	0.75	0.66	5.00	0.00	0.88	97.25	0.27
Diphtherophora	0.40	0.32	1.24	2.67	2.33	0.70	97.95	0.551
Tylocephalus	0.36	0.30	1.17	3.33	0.00	0.64	98.59	0.021
Teratocephalus	0.35	0.39	0.89	1.33	2.67	0.62	99.21	0.436
Diplogasteridae	0.27	0.30	0.90	2.33	1.00	0.48	99.69	0.131
Ecphyadophora	0.18	0.20	0.90	1.33	1.00	0.31	100.00	0.573
SLR vs R2M	**Average dissimilarity = 38.70**							
Meloidogyne	9.87	6.15	1.60	140.67	190.67	25.52	25.52	0.292
Xenocriconemella	4.48	5.67	0.79	46.67	10.00	11.58	37.10	0.566
Filenchus	4.14	4.30	0.96	76.67	49.33	10.69	47.79	0.924
Alaimus	3.62	1.96	1.85	38.00	6.67	9.35	57.14	0.055
Prismatolaimus	2.29	2.25	1.02	30.67	10.00	5.93	63.07	0.384
Acrobeloides	2.25	1.49	1.51	18.00	32.67	5.82	68.89	0.16

(*Continued*)

Table S5. Continued

	Av.Diss	SD	Diss/SD	Av.Abund	Av.Abund	Contrib (%)	cumsum (%)	p
Rhabditidae	1.88	1.17	1.62	34.00	33.33	4.87	73.76	0.59
Aphelenchoides	1.88	1.38	1.36	5.67	23.33	4.86	78.62	0.143
Plectus	1.32	0.70	1.89	24.67	28.00	3.42	82.04	0.96
Acrobeles	1.06	0.86	1.24	9.67	5.67	2.75	84.79	0.825
Ditylenchus	0.86	0.55	1.58	4.33	9.67	2.23	87.02	0.631
Dorylaimida	0.78	0.42	1.87	7.00	0.00	2.03	89.05	0.119
Gracilacus	0.72	0.36	1.98	4.33	4.67	1.85	90.90	0.969
Diphtherophora	0.50	0.35	1.42	4.33	0.67	1.29	92.19	0.158
Helicotylenchus	0.45	0.68	0.66	3.67	0.00	1.16	93.35	0.819
Pseudacrobeles	0.43	0.36	1.18	4.00	2.67	1.11	94.46	0.97
Ceratoplectus	0.37	0.36	1.03	3.33	1.00	0.95	95.41	0.908
Cervidellus	0.37	0.43	0.84	0.67	3.33	0.95	96.36	0.551
Boleodorus	0.30	0.46	0.66	3.00	0.00	0.78	97.14	0.918
Tripyla	0.29	0.23	1.27	2.33	0.00	0.74	97.88	0.538
Ecphyadophora	0.22	0.33	0.66	0.00	1.67	0.56	98.44	0.527
Aporcelaimellus	0.21	0.17	1.23	1.67	0.00	0.53	98.97	0.744
Clarkus	0.18	0.14	1.29	1.67	0.00	0.48	99.45	0.79
Tylocephalus	0.13	0.14	0.96	0.67	1.00	0.35	99.80	0.755
Teratocephalus	0.08	0.12	0.66	0.00	0.67	0.20	100.00	0.869
Diplogasteridae	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
SLR vs R2W	**Average dissimilarity = 48.26**							
Meloidogyne	9.87	6.17	1.60	140.67	114.33	20.44	20.44	0.322
Filenchus	7.28	5.61	1.30	76.67	25.00	15.09	35.53	0.142
Xenocriconemella	6.11	6.25	0.98	46.67	47.33	12.67	48.20	0.124
Alaimus	5.12	1.94	2.64	38.00	0.00	10.62	58.82	0.002
Prismatolaimus	3.69	2.43	1.52	30.67	1.67	7.65	66.47	0.005
Rhabditidae	2.54	1.42	1.79	34.00	21.00	5.27	71.74	0.141
Plectus	2.51	1.93	1.30	24.67	6.67	5.19	76.93	0.339
Aphelenchoides	1.63	1.40	1.17	5.67	16.67	3.38	80.31	0.356
Acrobeloides	1.47	1.10	1.33	18.00	14.00	3.05	83.36	0.726
Acrobeles	1.23	1.03	1.19	9.67	0.00	2.54	85.90	0.793
Ditylenchus	0.98	0.49	2.02	4.33	8.67	2.03	87.93	0.55
Dorylaimida	0.93	0.49	1.91	7.00	0.00	1.92	89.85	0.03
Gracilacus	0.72	0.28	2.59	4.33	3.67	1.49	91.34	0.973
Helicotylenchus	0.69	0.59	1.16	3.67	3.67	1.42	92.76	0.575
Pseudacrobeles	0.52	0.42	1.24	4.00	3.00	1.08	93.84	0.894
Diphtherophora	0.49	0.32	1.54	4.33	2.33	1.02	94.86	0.186

(Continued)

Table S5. Continued

	Av.Diss	SD	Diss/ SD	Av.Abund	Av.Abund	Contrib (%)	cumsum (%)	p
Ceratoplectus	0.49	0.45	1.09	3.33	0.00	1.02	95.88	0.79
Teratocephalus	0.39	0.59	0.66	0.00	2.67	0.80	96.68	0.399
Boleodorus	0.35	0.53	0.66	3.00	0.00	0.74	97.42	0.855
Tripyla	0.35	0.27	1.28	2.33	0.00	0.71	98.13	0.501
Aporcelaimellus	0.25	0.20	1.24	1.67	0.00	0.51	98.64	0.665
Clarkus	0.22	0.17	1.30	1.67	0.00	0.45	99.09	0.75
Diplogasteridae	0.12	0.18	0.66	0.00	1.00	0.25	99.34	0.714
Ecphyadophora	0.12	0.18	0.66	0.00	1.00	0.25	99.59	0.776
Cervidellus	0.10	0.15	0.66	0.67	0.00	0.21	99.80	0.915
Tylocephalus	0.10	0.15	0.66	0.67	0.00	0.20	100.00	0.906
R2M vs R2W	**Average dissimilarity = 37.48**							
Meloidogyne	11.64	7.20	1.62	190.67	114.33	31.06	31.06	0.099
Xenocriconemella	5.22	5.87	0.89	10.00	47.33	13.93	44.99	0.323
Filenchus	3.88	2.25	1.72	49.33	25.00	10.35	55.34	0.941
Plectus	3.08	0.83	3.69	28.00	6.67	8.22	63.56	0.093
Acrobeloides	2.99	1.58	1.89	32.67	14.00	7.96	71.52	0.014
Aphelenchoides	1.90	1.40	1.36	23.33	16.67	5.08	76.60	0.135
Rhabditidae	1.73	0.85	2.04	33.33	21.00	4.61	81.21	0.703
Prismatolaimus	1.27	0.88	1.44	10.00	1.67	3.39	84.60	0.815
Gracilacus	0.90	0.99	0.91	4.67	3.67	2.40	87.00	0.873
Alaimus	0.88	0.75	1.18	6.67	0.00	2.35	89.35	0.997
Acrobeles	0.69	1.04	0.66	5.67	0.00	1.85	91.20	0.943
Helicotylenchus	0.55	0.58	0.96	0.00	3.67	1.48	92.68	0.663
Ditylenchus	0.51	0.45	1.14	9.67	8.67	1.35	94.03	0.971
Teratocephalus	0.45	0.56	0.81	0.67	2.67	1.21	95.24	0.189
Cervidellus	0.41	0.61	0.66	3.33	0.00	1.09	96.33	0.453
Pseudacrobeles	0.35	0.33	1.07	2.67	3.00	0.94	97.27	0.987
Diphtherophora	0.33	0.32	1.03	0.67	2.33	0.88	98.15	0.761
Ecphyadophora	0.32	0.38	0.84	1.67	1.00	0.85	99.00	0.118
Diplogasteridae	0.13	0.20	0.66	0.00	1.00	0.35	99.35	0.6
Ceratoplectus	0.12	0.18	0.66	1.00	0.00	0.32	99.67	0.997
Tylocephalus	0.12	0.18	0.66	1.00	0.00	0.33	100.00	0.781
Aporcelaimellus	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Boleodorus	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Clarkus	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Dorylaimida	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1
Tripyla	0.00	0.00	NaN	0.00	0.00	0.00	100.00	1