Supplementary Materials

Supplementary tables

Table S1. Absolute abundance, trophic classification and colonizer-persister (cp) values of soil nematode genera across fertilization treatments at day 5 of incubation.

Table S2. Absolute abundance, trophic classification and colonizer-persister (cp) values of soil nematode genera across fertilization treatments at day 15 of incubation.

Table S3. Absolute abundance, trophic classification and colonizer-persister (cp) values of soil nematode genera across fertilization treatments at day 30 of incubation.

Table S4. Absolute abundance, trophic classification and colonizer-persister (cp) values of soil nematode genera across fertilization treatments at day 60 of incubation.

Table S5. Absolute abundance, trophic classification and colonizer-persister (cp) values of soil nematode genera across fertilization treatments at day 105 of incubation.

Table S6. Results of two-way ANOVA examining the effects of incubation time, fertilization treatment (within each organic amendment type), and their interaction on soil nematode community characteristics (*F*- and *P*-values).

Table S7. Linear regression results for the dose-response relationships between organic amendment application rate and soil nematode community characteristics, analyzed separately for each amendment type across the incubation period.

Table S8. Results of two-way ANOVA examining the effects of incubation time, fertilization treatment (within each organic amendment type), and their interaction on soil organic carbon and microbial necromass carbon (*F*- and *P*-values).

Table S9. Linear regression results for the dose-response relationships between organic amendment application rate and soil carbon components, analyzed separately for each amendment type across the incubation period.

Supplementary figures

Figure S1. Schematic diagram illustrating the six-step approach for quantifying the energetic structure of soil nematode food webs.

Figure S2. Non-metric multidimensional scaling (NMDS) ordination of soil nematode community composition in response to organic amendment type, application rate, and incubation time.

Figure S3. Effects of organic amendment type and application rate on soil nematode diversity over a 105-day incubation.

Figure S4. Effects of organic amendment type and application rate on the relative energy flux through trophic groups within soil nematode food web over a 105-day incubation.

Figure S5. Redundancy analysis (RDA) of nematode trophic structure in response to

organic amendment properties and input quantities.

Table S1. Absolute abundance, trophic classification and colonizer-persister (cp) values of soil nematode genera across fertilization treatments at day 5 of incubation.

Genus	Trophic group	cp	Nematode abundance at day 5 (inds. 100g^{-1} dry soil)										
			S1	S2	S3	B1	B2	B3	L1	L2	L3	F	CK
Tylenchorhynchus	PP	3	14.53	22.10	26.14	12.47	17.66	8.45	8.93	2.96	3.02	0.00	14.85
Tylenchus	PP	2	16.72	5.48	26.66	11.58	7.29	0.00	0.00	4.91	0.00	15.65	10.99
Psilenchus	PP	2	25.15	30.91	22.92	10.48	54.26	25.76	3.66	9.82	18.09	17.83	32.36
Hirschmanniella	PP	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pratylenchus	PP	3	23.17	13.79	16.86	20.70	15.49	8.45	5.28	4.01	6.57	0.00	21.37
Helicotylenchus	PP	3	21.65	12.08	33.68	28.65	34.47	57.40	45.87	37.47	33.84	6.49	34.29
Pararotylenchus	PP	3	9.97	0.00	16.92	3.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rotylenchus	PP	3	6.50	4.33	10.91	0.00	6.04	19.20	8.93	5.50	4.95	0.00	5.49
Hemicycliophora	PP	3	0.00	10.02	2.74	0.00	0.00	10.82	0.00	0.00	0.00	0.00	8.33
Criconema	PP	3	0.00	3.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.57	0.00
Criconemoides	PP	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heterodera	PP	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Boleodorus	PP	2	0.00	2.27	14.60	5.14	0.00	0.00	0.00	0.00	0.00	1.38	1.93
Meloidogyne	PP	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aglenchus	PP	2	10.38	5.48	15.17	19.53	18.94	19.13	23.56	13.83	15.07	4.30	36.10
Neopsilenchus	PP	2	0.00	4.54	0.00	5.14	6.50	2.03	5.27	0.00	1.40	3.57	7.72
Malenchus	PP	2	0.00	4.54	0.00	8.57	10.83	8.45	11.77	10.83	7.00	15.75	20.99

Merlinius	PP	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dolichorhynchus	PP	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Longidorus	PP	5	0.00	0.00	6.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Longidorella	PP	4	0.00	2.06	11.43	0.00	9.52	0.00	3.66	1.48	3.55	0.00	5.32
Paratylenchus	PP	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Filenchus	FF	2	28.15	19.41	77.83	38.86	43.89	33.73	36.55	12.44	16.47	14.36	45.74
Ditylenchus	FF	2	8.66	23.95	17.34	51.33	18.97	34.49	34.93	31.29	7.97	21.56	18.71
Aphelenchus	FF	2	77.37	89.01	105.23	62.57	74.09	58.30	49.54	75.67	92.91	128.64	66.09
Aphelenchoides	FF	2	27.28	60.62	76.04	36.26	24.04	8.93	10.95	21.70	44.01	29.01	36.10
Tylencholaimus	FF	4	8.04	0.00	0.00	0.00	4.27	4.88	0.00	3.64	3.25	0.00	5.67
Doryllium	FF	4	1.51	25.04	0.00	20.08	6.04	5.94	3.65	0.00	9.62	0.00	21.80
Alaimus	BF	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rhabdolaimus	BF	3	0.00	0.00	11.49	1.71	0.00	0.00	0.00	1.48	0.00	2.92	1.93
Panagrolaimus	BF	1	0.00	7.54	11.91	18.43	16.81	4.05	9.34	1.27	0.00	7.45	12.92
Chiloplacus	BF	2	13.43	9.25	15.17	19.27	15.46	11.23	2.03	19.20	9.37	13.37	25.66
Acrobeloides	BF	2	14.97	11.73	60.34	1.71	7.29	4.47	8.93	11.30	5.17	14.68	0.00
Mesorhabditis	BF	1	41.61	43.37	95.54	58.40	83.58	49.92	112.44	73.42	78.72	66.22	63.69
Rhabditis	BF	1	26.84	27.93	15.17	30.91	106.88	76.26	31.26	35.95	23.34	41.94	60.59
Caenorhabditis	BF	1	0.00	2.27	0.00	3.43	2.17	16.56	4.87	4.44	4.20	8.52	6.52
Eucephalobus	BF	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cephalobus	BF	2	26.84	32.68	43.47	42.76	36.57	24.15	43.43	24.95	46.23	44.86	43.81

Chronogaster	BF	3	46.31	56.78	45.69	37.96	0.00	32.87	41.83	43.98	25.71	23.94	47.94
Plectus	BF	2	1.51	2.27	8.64	4.52	9.46	0.00	2.03	0.00	0.00	0.00	0.00
Anaplectus	BF	2	1.75	3.77	3.27	0.00	0.00	4.40	5.29	4.35	15.07	0.00	0.00
Monhystera	BF	2	1.72	0.00	2.69	6.51	0.00	6.35	0.00	0.00	3.55	2.19	0.00
Dorylaimoides	OP	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dorydorella	OP	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Enchodelus	OP	4	12.58	2.27	2.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Epidorylaimus	OP	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Laimydorus	OP	4	0.00	0.00	11.91	0.00	4.30	6.91	0.00	1.48	0.00	8.84	0.00
Opisthdorylaimus	OP	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pungentus	OP	4	14.30	25.87	14.70	25.49	24.07	8.86	0.00	0.00	0.00	1.38	12.19
Mesodorylaimus	OP	4	4.98	7.75	11.43	3.71	8.17	0.00	0.00	0.00	3.02	0.00	0.00
Microdorylaimus	OP	4	9.76	20.18	6.01	8.49	23.28	21.16	7.31	8.00	14.84	1.54	24.20
Thornia	OP	4	11.48	10.96	9.22	32.08	38.74	63.75	1.62	6.05	5.17	7.45	33.99
Thorneella	OP	4	0.00	10.58	0.00	1.71	0.00	0.00	0.00	0.00	1.40	1.38	9.18
Miconchus	OP	4	0.00	0.00	2.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aporcelaimellus	OP	5	0.00	0.00	0.00	0.00	0.00	0.00	5.28	0.00	0.00	0.00	0.00
Thonus	OP	4	0.00	0.00	8.64	1.71	2.17	8.45	7.31	0.00	1.40	7.30	10.26
Oxydirus	OP	4	0.00	0.00	22.45	0.00	3.02	2.03	1.62	0.00	0.00	1.38	1.93
Mononchus	OP	4	0.00	4.33	5.95	0.00	0.00	0.00	10.15	0.00	0.00	0.00	0.00
Nygolaimus	OP	5	8.45	8.31	11.43	12.75	5.15	6.35	6.89	0.00	11.30	8.84	12.19

Aporcelaimus	OP	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Discolaimium	OP	4	0.00	0.00	2.69	0.00	0.00	0.00	0.00	3.30	0.00	5.85	1.93
Eudorylaimus	OP	4	7.57	6.81	9.22	8.23	29.25	20.74	0.00	4.91	3.32	4.30	16.78

Fertilization treatments included three types of organic amendments——straw (S), biochar (B), and liquid organic fertilizer (L)——applied at low (1), moderate (2), and high (3) rates, along with mineral fertilizer (F) and an unfertilized control (CK) as references. Trophic groups: PP, plant parasites; FF, fungal feeders; BF, bacterial feeders; OP, omnivores-predators.

Table S2. Absolute abundance, trophic classification and colonizer-persister (cp) values of soil nematode genera across fertilization treatments at day 15 of incubation.

Genus	Trophic group	cp	Nematode abundance at day 15 (inds. 100g^{-1} dry soil)										
			S1	S2	S3	B1	B2	B3	L1	L2	L3	F	CK
Tylenchorhynchus	PP	3	29.78	12.49	113.36	12.30	13.91	0.00	9.17	6.74	9.98	11.15	20.76
Tylenchus	PP	2	13.32	70.94	51.13	16.63	6.03	12.40	0.00	13.39	3.91	5.95	16.11
Psilenchus	PP	2	35.02	24.98	61.22	42.04	29.05	38.61	15.98	11.29	9.06	39.38	32.53
Hirschmanniella	PP	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pratylenchus	PP	3	17.16	54.03	164.72	11.66	31.61	14.71	0.00	13.62	8.37	13.99	29.67
Helicotylenchus	PP	3	30.48	6.58	82.55	43.79	39.69	66.14	59.08	51.56	37.46	22.54	74.64
Pararotylenchus	PP	3	17.30	0.00	61.99	12.22	2.56	0.00	16.26	0.00	5.52	25.14	0.00
Rotylenchus	PP	3	0.00	0.00	31.19	0.00	14.42	5.75	4.63	11.25	2.30	3.11	0.00
Hemicycliophora	PP	3	0.00	6.58	0.00	6.56	0.00	2.45	0.00	0.00	2.30	8.81	0.00
Criconema	PP	3	0.00	0.00	51.60	0.00	0.00	0.00	0.00	4.51	0.00	0.00	0.00
Criconemoides	PP	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heterodera	PP	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Boleodorus	PP	2	0.00	0.00	0.00	8.38	0.00	2.45	4.92	0.00	0.00	5.19	9.40
Meloidogyne	PP	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aglenchus	PP	2	0.00	21.45	0.00	9.99	6.03	0.00	4.44	0.00	2.30	17.61	38.10
Neopsilenchus	PP	2	11.92	0.00	30.57	0.00	2.76	0.00	2.46	0.00	2.30	0.00	0.00
Malenchus	PP	2	51.33	13.17	0.00	14.94	11.04	0.00	7.19	4.51	0.00	0.00	3.51

Merlinius	PP	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dolichorhynchus	PP	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Longidorus	PP	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Longidorella	PP	4	8.51	0.00	0.00	6.64	0.00	5.75	2.17	0.00	0.00	13.48	12.34
Paratylenchus	PP	2	0.00	0.00	20.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.94
Filenchus	FF	2	33.33	82.75	10.47	64.47	43.47	58.93	30.16	13.62	36.16	44.33	50.35
Ditylenchus	FF	2	46.52	120.56	71.85	42.82	14.83	48.13	20.61	47.41	22.40	48.72	26.16
Aphelenchus	FF	2	463.56	684.39	1046.70	72.80	96.65	22.34	107.68	123.38	90.98	99.23	100.22
Aphelenchoides	FF	2	68.35	300.92	193.30	32.61	25.58	29.98	40.83	29.56	34.55	55.17	40.30
Tylencholaimus	FF	4	13.32	40.19	0.00	9.51	8.39	0.00	0.00	0.00	0.00	0.00	9.00
Doryllium	FF	4	12.62	21.79	0.00	29.74	2.76	20.60	31.86	0.00	0.00	15.02	28.36
Alaimus	BF	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rhabdolaimus	BF	3	0.00	24.98	0.00	11.74	0.00	0.00	0.00	2.23	2.30	0.00	0.00
Panagrolaimus	BF	1	3.97	0.00	0.00	0.00	2.76	0.00	0.00	2.23	24.43	3.11	6.54
Chiloplacus	BF	2	17.58	0.00	0.00	26.46	23.62	15.55	0.00	18.08	7.75	8.80	53.95
Acrobeloides	BF	2	43.39	75.15	143.93	23.26	36.12	33.42	9.17	44.77	9.06	14.26	21.33
Mesorhabditis	BF	1	140.68	248.25	328.90	153.05	127.13	111.96	86.97	85.12	87.79	136.00	79.46
Rhabditis	BF	1	60.26	41.88	122.83	62.65	88.57	58.79	29.59	42.54	31.63	41.73	49.30
Caenorhabditis	BF	1	0.00	0.00	0.00	2.79	0.00	12.97	9.84	0.00	0.00	2.60	0.00
Eucephalobus	BF	2	0.00	0.00	20.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cephalobus	BF	2	44.37	83.09	175.20	34.52	67.42	45.40	66.65	36.02	51.36	58.28	66.86

Chronogaster	BF	3	47.92	116.35	328.28	73.42	42.36	91.22	63.36	67.27	54.03	96.67	103.56
Plectus	BF	2	0.00	0.00	0.00	3.28	2.76	0.00	0.00	2.14	1.61	0.00	0.00
Anaplectus	BF	2	0.00	14.19	10.09	6.64	0.00	0.00	8.79	4.60	4.53	5.95	3.03
Monhystera	BF	2	8.93	0.00	0.00	2.79	6.03	0.00	2.17	0.00	0.00	0.00	0.00
Dorylaimoides	OP	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dorydorella	OP	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Enchodelus	OP	4	0.00	0.00	10.47	0.00	10.24	0.00	4.92	0.00	2.30	15.83	9.40
Epidorylaimus	OP	4	8.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Laimydorus	OP	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.54
Opisthdorylaimus	OP	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pungentus	OP	4	17.86	34.28	0.00	8.38	20.68	20.46	2.46	8.97	24.49	0.00	24.28
Mesodorylaimus	OP	4	17.86	0.00	0.00	6.64	0.00	0.00	11.63	0.00	0.00	2.60	0.00
Microdorylaimus	OP	4	13.61	0.00	0.00	31.08	58.30	20.46	18.24	17.99	21.65	23.06	15.54
Thornia	OP	4	51.90	0.00	0.00	35.89	15.13	25.22	16.17	15.62	12.97	46.37	38.50
Thorneella	OP	4	3.97	0.00	0.00	5.59	0.00	10.51	0.00	0.00	2.30	0.00	0.00
Miconchus	OP	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aporcelaimellus	OP	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thonus	OP	4	8.65	6.58	20.33	22.62	21.37	5.18	0.00	0.00	2.30	2.60	3.51
Oxydirus	OP	4	4.26	19.07	0.00	2.79	2.56	0.00	2.46	0.00	0.00	0.00	2.94
Mononchus	OP	4	4.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nygolaimus	OP	5	0.00	0.00	40.89	12.63	8.79	0.00	27.89	6.88	14.51	8.55	6.45

Aporcelaimus	OP	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Discolaimium	OP	4	0.00	14.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.51
Eudorylaimus	OP	4	3.97	6.58	40.89	26.76	19.54	22.49	6.90	22.45	22.20	2.60	6.54

Fertilization treatments included three types of organic amendments——straw (S), biochar (B), and liquid organic fertilizer (L)——applied at low (1), moderate (2), and high (3) rates, along with mineral fertilizer (F) and an unfertilized control (CK) as references. Trophic groups: PP, plant parasites; FF, fungal feeders; BF, bacterial feeders; OP, omnivores-predators.

Table S3. Absolute abundance, trophic classification and colonizer-persister (cp) values of soil nematode genera across fertilization treatments at day 30 of incubation.

Genus	Trophic group	cp	Nematode abundance at day 30 (inds. 100g^{-1} dry soil)										
			S1	S2	S3	B1	B2	B3	L1	L2	L3	F	CK
Tylenchorhynchus	PP	3	0.00	0.00	95.36	0.00	0.00	0.00	0.00	2.45	2.67	0.00	15.96
Tylenchus	PP	2	6.19	85.05	0.00	23.13	32.12	14.98	16.26	15.20	9.07	23.82	11.00
Psilenchus	PP	2	41.22	64.44	40.99	58.19	27.32	18.26	8.29	15.20	10.40	17.20	58.81
Hirschmanniella	PP	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pratylenchus	PP	3	47.40	62.79	54.36	0.00	0.00	0.00	0.00	0.00	0.00	10.47	47.84
Helicotylenchus	PP	3	141.37	189.70	177.08	67.17	81.16	46.07	27.79	14.69	13.77	54.58	148.94
Pararotylenchus	PP	3	0.00	0.00	0.00	18.64	0.00	18.26	13.99	0.00	1.34	20.57	0.00
Rotylenchus	PP	3	29.68	51.99	0.00	18.79	26.07	22.54	8.29	14.69	12.24	0.00	58.81
Hemicycliophora	PP	3	0.00	0.00	40.91	0.00	26.52	0.00	0.00	19.69	0.00	0.00	15.96
Criconema	PP	3	0.00	0.00	0.00	4.49	0.00	0.00	5.38	0.00	0.00	13.83	0.00
Criconemoides	PP	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heterodera	PP	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Boleodorus	PP	2	0.00	0.00	13.46	0.00	0.00	18.21	0.00	0.00	0.00	0.00	0.00
Meloidogyne	PP	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aglenchus	PP	2	6.19	0.00	0.00	0.00	0.00	0.00	0.00	5.00	3.86	6.62	42.34
Neopsilenchus	PP	2	0.00	0.00	0.00	0.00	0.00	13.98	0.00	0.00	1.34	0.00	0.00
Malenchus	PP	2	17.73	0.00	40.37	13.16	0.00	12.93	5.38	0.00	0.00	9.99	36.86

Merlinius	PP	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dolichorhynchus	PP	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Longidorus	PP	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Longidorella	PP	4	0.00	0.00	0.00	0.00	0.00	9.65	0.00	0.00	0.00	0.00	0.00
Paratylenchus	PP	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Filenchus	FF	2	64.70	146.51	109.70	150.84	225.27	210.00	35.96	32.24	25.82	54.58	197.29
Ditylenchus	FF	2	11.95	41.86	109.62	231.17	71.99	112.44	27.73	27.75	16.94	68.58	80.25
Aphelenchus	FF	2	782.33	1359.72	1772.32	73.78	239.69	179.01	107.49	101.82	110.62	153.71	179.75
Aphelenchoides	FF	2	69.64	463.45	710.63	29.58	21.27	41.74	99.39	91.82	54.69	59.08	73.68
Tylencholaimus	FF	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Doryllium	FF	4	0.00	20.60	0.00	29.58	10.01	8.61	0.00	0.00	0.00	3.37	42.81
Alaimus	BF	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rhabdolaimus	BF	3	0.00	0.00	0.00	0.00	38.17	5.32	11.21	12.55	1.34	0.00	0.00
Panagrolaimus	BF	1	0.00	0.00	0.00	23.13	26.07	37.47	11.21	10.10	8.56	17.14	79.65
Chiloplacus	BF	2	0.00	0.00	94.83	16.42	42.14	32.14	19.31	35.00	21.50	3.37	21.44
Acrobeloides	BF	2	34.61	52.33	149.72	39.55	36.48	46.07	60.97	39.48	16.29	54.85	41.76
Mesorhabditis	BF	1	142.20	391.52	449.61	242.12	268.25	217.61	162.89	153.75	74.20	218.66	234.58
Rhabditis	BF	1	58.95	32.39	0.00	124.37	75.11	112.49	0.00	17.24	13.39	27.35	47.30
Caenorhabditis	BF	1	11.54	0.00	0.00	38.41	31.28	0.00	0.00	0.00	0.00	0.00	0.00
Eucephalobus	BF	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cephalobus	BF	2	41.63	125.91	135.91	58.19	26.07	55.68	19.18	7.14	15.42	41.07	42.32

Chronogaster	BF	3	77.07	53.32	122.36	56.06	90.72	62.05	135.74	117.02	85.44	146.40	58.25
Plectus	BF	2	0.00	0.00	13.90	4.49	15.66	0.00	0.00	0.00	0.00	0.00	0.00
Anaplectus	BF	2	0.00	31.07	13.55	5.47	0.00	8.61	0.00	0.00	0.00	13.62	0.00
Monhystera	BF	2	0.00	30.73	27.80	8.83	12.10	0.00	0.00	0.00	0.00	0.00	0.00
Dorylaimoides	OP	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.31	0.00
Dorydorella	OP	4	0.00	0.00	0.00	0.00	0.00	0.00	2.79	0.00	0.00	0.00	0.00
Enchodelus	OP	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Epidorylaimus	OP	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Laimydorus	OP	4	0.00	0.00	0.00	0.00	4.81	4.33	11.21	2.35	0.00	10.25	10.44
Opisthdorylaimus	OP	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pungentus	OP	4	87.37	11.13	0.00	19.77	0.00	33.19	11.08	5.00	5.20	10.25	20.90
Mesodorylaimus	OP	4	0.00	0.00	0.00	0.00	0.00	0.00	2.92	0.00	0.00	0.00	0.00
Microdorylaimus	OP	4	0.00	31.73	0.00	28.60	79.07	10.65	16.39	9.69	7.69	3.31	42.32
Thornia	OP	4	52.34	53.32	109.17	61.69	85.52	55.72	11.40	2.65	2.03	10.25	10.98
Thorneella	OP	4	0.00	0.00	0.00	4.33	0.00	13.93	0.00	0.00	12.24	0.00	10.46
Miconchus	OP	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aporcelaimellus	OP	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Thonus	OP	4	58.94	11.13	0.00	4.33	26.92	22.54	0.00	0.00	7.23	10.25	5.48
Oxydirus	OP	4	0.00	0.00	13.46	0.00	12.10	4.33	0.00	0.00	0.00	0.00	5.50
Mononchus	OP	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nygolaimus	OP	5	23.91	20.60	0.00	0.00	32.52	0.00	22.09	14.90	5.02	0.00	21.42

Aporcelaimus	OP	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Discolaimium	OP	4	0.00	0.00	0.00	14.30	0.00	13.93	5.38	2.35	1.34	0.00	0.00
Eudorylaimus	OP	4	54.00	0.00	0.00	32.94	22.11	0.00	11.08	12.24	6.54	10.25	10.44

Fertilization treatments included three types of organic amendments——straw (S), biochar (B), and liquid organic fertilizer (L)——applied at low (1), moderate (2), and high (3) rates, along with mineral fertilizer (F) and an unfertilized control (CK) as references. Trophic groups: PP, plant parasites; FF, fungal feeders; BF, bacterial feeders; OP, omnivores-predators.

Table S4. Absolute abundance, trophic classification and colonizer-persister (cp) values of soil nematode genera across fertilization treatments at day 60 of incubation.

Genus	Trophic group	cp	Nematode abundance at day 60 (inds. 100g^{-1} dry soil)										
			S1	S2	S3	B1	B2	B3	L1	L2	L3	F	CK
Tylenchorhynchus	PP	3	0.00	0.00	27.37	0.00	0.00	0.00	0.00	0.00	0.00	2.81	0.00
Tylenchus	PP	2	31.50	36.46	84.50	34.89	27.99	18.22	7.65	8.26	0.00	13.00	37.87
Psilenchus	PP	2	37.24	44.42	65.96	27.03	4.59	0.00	0.00	0.00	0.00	28.81	34.46
Hirschmanniella	PP	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pratylenchus	PP	3	21.39	6.61	37.07	6.19	0.00	0.00	0.00	8.57	0.00	12.40	4.59
Helicotylenchus	PP	3	105.52	110.84	121.90	52.33	23.21	105.44	0.00	15.01	6.61	45.15	161.82
Pararotylenchus	PP	3	21.39	0.00	0.00	15.44	0.00	9.53	0.00	0.00	0.00	3.37	37.89
Rotylenchus	PP	3	38.22	58.98	17.66	0.00	18.72	9.53	12.75	12.65	1.64	38.93	19.52
Hemicycliophora	PP	3	0.00	0.00	0.00	0.00	14.00	4.76	0.00	0.00	0.00	0.00	0.00
Criconema	PP	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Criconemoides	PP	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heterodera	PP	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Boleodorus	PP	2	0.00	0.00	0.00	0.00	0.00	80.25	0.00	4.01	0.00	0.00	0.00
Meloidogyne	PP	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aglenchus	PP	2	0.00	0.00	0.00	5.76	0.00	0.00	0.00	0.00	0.00	10.19	0.00
Neopsilenchus	PP	2	0.00	0.00	0.00	3.49	28.01	0.00	0.00	0.00	0.00	3.37	0.00
Malenchus	PP	2	20.41	30.58	0.00	0.00	9.19	0.00	10.07	4.63	4.96	16.37	0.00

Merlinius	PP	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dolichorhynchus	PP	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Longidorus	PP	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Longidorella	PP	4	6.71	29.35	10.03	3.49	14.02	0.00	0.00	0.00	0.00	0.00	3.46
Paratylenchus	PP	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Filenchus	FF	2	131.29	224.89	149.48	51.54	88.53	141.34	38.53	21.46	19.80	83.51	72.32
Ditylenchus	FF	2	116.61	110.12	122.23	72.75	32.60	36.48	45.90	37.94	18.16	38.33	112.37
Aphelenchus	FF	2	466.25	655.77	986.10	81.03	228.96	127.82	152.94	77.64	97.36	147.87	80.37
Aphelenchoides	FF	2	86.27	94.21	123.97	38.20	228.98	67.77	71.03	71.20	36.29	40.58	47.04
Tylencholaimus	FF	4	0.00	0.00	0.00	0.00	0.00	0.00	12.89	4.25	3.30	0.00	0.00
Doryllium	FF	4	16.82	29.24	38.60	43.87	23.31	49.15	10.33	12.89	1.66	0.00	42.45
Alaimus	BF	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rhabdolaimus	BF	3	0.00	0.00	0.00	0.00	0.00	4.37	0.00	6.75	0.00	0.00	8.05
Panagrolaimus	BF	1	57.19	36.46	27.37	20.84	4.59	4.76	22.82	19.33	14.86	6.78	16.09
Chiloplacus	BF	2	4.57	35.85	0.00	29.49	23.33	85.81	17.85	13.31	8.25	40.01	68.89
Acrobeloides	BF	2	44.74	7.34	0.00	42.65	32.95	32.70	73.73	32.41	37.95	31.62	27.57
Mesorhabditis	BF	1	207.63	201.13	391.43	109.46	228.64	166.35	117.25	128.78	97.34	213.76	120.36
Rhabditis	BF	1	30.06	35.85	58.01	34.89	74.92	64.41	15.43	21.27	11.56	94.75	50.52
Caenorhabditis	BF	1	0.00	0.00	0.00	8.46	0.00	4.76	0.00	0.00	0.00	3.37	3.46
Eucephalobus	BF	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cephalobus	BF	2	26.94	72.42	86.57	55.21	83.80	63.62	40.95	47.24	18.15	29.37	80.39

Chronogaster	BF	3	119.64	79.65	204.44	66.38	144.72	182.52	33.45	42.68	69.28	80.14	19.55
Plectus	BF	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Anaplectus	BF	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.44	1.65	0.00	0.00
Monhystera	BF	2	0.00	0.00	29.77	14.65	0.00	0.00	0.00	2.31	1.66	0.00	0.00
Dorylaimoides	OP	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dorydorella	OP	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Enchodelus	OP	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Epidorylaimus	OP	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Laimydorus	OP	4	0.00	20.56	8.83	3.49	0.00	0.00	0.00	0.00	3.29	0.00	0.00
Opisthdorylaimus	OP	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pungentus	OP	4	21.39	37.08	57.13	36.10	9.31	40.81	17.72	15.20	8.24	0.00	19.52
Mesodorylaimus	OP	4	0.00	0.00	0.00	0.00	0.00	8.73	0.00	0.00	4.94	0.00	0.00
Microdorylaimus	OP	4	60.59	152.58	123.97	26.61	37.32	40.42	38.39	32.11	16.51	0.00	42.50
Thornia	OP	4	77.41	136.78	76.00	37.50	51.42	58.89	28.06	19.45	13.20	10.19	33.23
Thorneella	OP	4	6.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Miconchus	OP	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aporcelaimellus	OP	5	0.00	0.00	0.00	0.00	4.59	0.00	0.00	0.00	0.00	0.00	3.43
Thonus	OP	4	0.00	15.91	8.83	6.37	0.00	4.76	0.00	0.00	0.00	0.00	0.00
Oxydirus	OP	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mononchus	OP	4	0.00	0.00	8.83	3.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nygolaimus	OP	5	10.11	7.95	27.69	9.07	0.00	9.13	23.10	0.00	14.86	3.37	16.09

Aporcelaimus	OP	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Discolaimium	OP	4	0.00	0.00	0.00	0.00	0.00	13.68	0.00	0.00	0.00	0.00	0.00
Eudorylaimus	OP	4	0.00	28.51	105.76	11.77	32.70	0.00	12.75	12.89	8.26	9.03	41.35

Fertilization treatments included three types of organic amendments——straw (S), biochar (B), and liquid organic fertilizer (L)——applied at low (1), moderate (2), and high (3) rates, along with mineral fertilizer (F) and an unfertilized control (CK) as references. Trophic groups: PP, plant parasites; FF, fungal feeders; BF, bacterial feeders; OP, omnivores-predators.

Table S5. Absolute abundance, trophic classification and colonizer-persister (cp) values of soil nematode genera across fertilization treatments at day 105 of incubation.

Genus	Trophic group	cp	Nematode abundance at day 105 (inds. 100g^{-1} dry soil)										
			S1	S2	S3	B1	B2	B3	L1	L2	L3	F	CK
Tylenchorhynchus	PP	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.26
Tylenchus	PP	2	59.03	60.92	31.35	6.51	12.09	4.21	13.27	6.19	4.44	5.75	8.90
Psilenchus	PP	2	27.76	0.00	23.47	31.61	17.86	19.49	9.38	3.67	0.99	0.00	26.30
Hirschmanniella	PP	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pratylenchus	PP	3	8.74	11.96	0.00	1.93	0.00	0.00	0.00	7.53	0.00	1.90	0.00
Helicotylenchus	PP	3	63.87	25.17	23.47	28.76	21.02	13.12	11.13	0.00	4.44	19.26	77.90
Pararotylenchus	PP	3	3.91	0.00	0.00	0.00	8.93	0.00	3.89	0.00	0.99	6.76	26.68
Rotylenchus	PP	3	17.49	0.00	0.00	1.93	7.06	3.74	0.00	6.19	5.78	4.85	14.46
Hemicycliophora	PP	3	0.00	0.00	0.00	1.63	1.62	0.00	0.00	0.00	0.00	4.85	0.00
Criconema	PP	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Criconemoides	PP	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Heterodera	PP	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Boleodorus	PP	2	0.00	0.00	0.00	3.66	0.00	1.19	0.00	0.00	0.00	0.00	0.00
Meloidogyne	PP	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Aglenchus	PP	2	12.65	0.00	0.00	3.56	0.00	0.00	0.00	0.00	6.77	8.24	0.00
Neopsilenchus	PP	2	8.74	31.04	23.47	3.96	0.00	1.36	0.00	0.00	0.00	8.96	16.13
Malenchus	PP	2	9.87	0.00	39.24	1.93	0.00	0.00	0.00	0.00	0.00	0.74	21.92

Merlinius	PP	3	0.00	43.22	0.00	1.63	0.00	0.00	0.00	0.00	0.00	0.00	18.00
Dolichorhynchus	PP	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Longidorus	PP	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Longidorella	PP	4	0.00	18.26	30.98	1.93	0.00	3.74	0.00	0.00	0.00	1.48	0.00
Paratylenchus	PP	2	0.00	0.00	0.00	2.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Filenchus	FF	2	39.29	96.95	70.55	26.54	21.35	36.19	20.91	9.88	7.12	10.30	36.85
Ditylenchus	FF	2	57.70	49.09	55.30	25.53	20.44	18.23	9.66	9.90	24.04	22.23	30.82
Aphelenchus	FF	2	256.68	239.80	624.98	27.86	28.90	42.25	37.93	63.73	66.39	54.17	39.96
Aphelenchoides	FF	2	220.68	268.71	241.72	31.30	36.54	14.22	31.50	38.89	31.70	23.07	11.78
Tylencholaimus	FF	4	0.00	0.00	0.00	18.68	27.24	0.00	18.12	0.00	0.00	0.00	0.00
Doryllium	FF	4	17.49	60.92	62.09	18.71	10.47	12.40	3.75	3.96	4.79	0.89	3.31
Alaimus	BF	4	0.00	0.00	0.00	12.20	4.07	0.00	0.00	2.36	0.00	0.00	0.00
Rhabdolaimus	BF	3	0.00	0.00	0.00	0.00	0.00	0.00	8.31	2.50	4.65	0.00	0.00
Panagrolaimus	BF	1	0.00	0.00	0.00	11.28	4.86	13.75	0.00	1.20	18.53	0.00	0.00
Chiloplacus	BF	2	0.00	18.05	0.00	13.42	6.65	14.79	19.04	6.19	0.00	6.01	15.13
Acrobeloides	BF	2	23.45	24.82	23.47	16.47	6.65	14.95	29.10	29.68	10.50	10.60	3.92
Mesorhabditis	BF	1	248.13	208.89	196.12	109.09	115.03	106.68	99.87	72.65	48.48	39.11	60.84
Rhabditis	BF	1	14.50	6.09	62.38	22.46	13.21	9.80	57.24	6.19	11.35	7.97	28.98
Caenorhabditis	BF	1	13.58	0.00	0.00	16.47	0.00	0.00	0.00	0.00	0.00	22.11	2.27
Eucephalobus	BF	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cephalobus	BF	2	86.80	147.49	186.75	27.96	37.67	17.24	14.21	14.89	22.97	10.32	18.44

Chronogaster	BF	3	138.73	42.66	77.62	24.39	59.97	14.22	89.29	52.62	9.37	19.74	84.44
Plectus	BF	2	8.74	0.00	0.00	0.00	0.00	1.19	0.00	0.00	0.00	0.00	0.00
Anaplectus	BF	2	0.00	0.00	0.00	0.00	3.74	1.36	0.00	0.00	0.99	0.89	1.67
Monhystera	BF	2	0.00	0.00	0.00	3.96	1.70	1.19	0.00	0.00	0.00	0.74	0.00
Dorylaimoides	OP	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Dorydorella	OP	4	0.00	0.00	0.00	0.00	0.00	0.00	22.65	0.00	0.00	0.00	0.00
Enchodelus	OP	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.32	0.00	0.00	0.00
Epidorylaimus	OP	4	0.00	0.00	0.00	0.00	0.00	0.00	4.29	0.00	0.00	0.00	0.00
Laimydorus	OP	4	0.00	0.00	38.62	0.00	0.00	0.00	4.29	1.32	0.00	0.00	0.00
Opisthdorylaimus	OP	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pungentus	OP	4	8.74	49.30	62.33	12.81	9.43	7.56	3.75	2.50	4.79	0.00	11.18
Mesodorylaimus	OP	4	4.83	0.00	0.00	0.00	0.00	7.56	0.00	0.00	0.00	2.06	0.00
Microdorylaimus	OP	4	0.00	203.09	78.20	15.15	10.71	6.93	5.89	15.96	18.74	0.00	2.27
Thornia	OP	4	27.56	72.54	156.83	20.34	19.31	12.56	11.53	1.20	12.69	0.74	2.27
Thorneella	OP	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Miconchus	OP	4	0.00	0.00	0.00	0.00	0.00	0.00	34.72	0.00	0.00	0.00	0.00
Aporcelaimellus	OP	5	0.00	0.00	0.00	0.00	14.37	3.18	0.00	0.00	0.00	0.00	0.00
Thonus	OP	4	27.36	104.96	77.67	5.69	16.49	22.90	0.00	8.58	9.23	0.00	2.27
Oxydirus	OP	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.27
Mononchus	OP	4	0.00	0.00	0.00	1.93	9.09	0.00	0.00	0.00	0.99	0.00	0.00
Nygolaimus	OP	5	12.65	0.00	93.16	9.86	1.70	10.11	26.40	11.22	7.90	0.00	10.58

Aporcelaimus	OP	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Discolaimium	OP	4	0.00	0.00	7.89	5.19	1.62	3.18	2.15	0.00	1.13	0.00	0.00
Eudorylaimus	OP	4	27.96	147.36	171.60	18.71	12.75	20.05	13.00	7.38	22.84	0.00	0.00

Fertilization treatments included three types of organic amendments——straw (S), biochar (B), and liquid organic fertilizer (L)——applied at low (1), moderate (2), and high (3) rates, along with mineral fertilizer (F) and an unfertilized control (CK) as references. Trophic groups: PP, plant parasites; FF, fungal feeders; BF, bacterial feeders; OP, omnivores-predators.

Table S6. Results of two-way ANOVA examining the effects of incubation time, fertilization treatment (within each organic amendment type), and their interaction on soil nematode community characteristics (*F*- and *P*-values).

Amendment group	Nematode community characteristics	Incubation time (df = 4)		Fertilization (df = 4)		Time × Fertilization (df =16)	
		F	***P***	***F***	***P***	***F***	***P***
Straw (S)	Abundance	318.16	<0.001	493.52	<0.001	32.99	<0.001
	BF%	5.14	0.001	54.80	<0.001	4.48	<0.001
	FF%	33.64	<0.001	87.14	<0.001	9.37	<0.001
	PP%	4.26	0.004	41.56	<0.001	5.96	<0.001
	OP%	21.08	<0.001	24.76	<0.001	22.74	<0.001
	Genera number	24.16	<0.001	7.18	<0.001	3.86	<0.001
	Shannon diversity	51.52	<0.001	34.07	<0.001	7.47	<0.001
	Margalef richness	50.56	<0.001	19.63	<0.001	4.55	<0.001
	Total energy flux	63.28	<0.001	187.81	<0.001	16.58	<0.001
	Energy flow uniformity	7.86	<0.001	7.65	<0.001	6.24	<0.001
	Fi-BF%	2.19	0.084	54.49	<0.001	5.86	<0.001
	Fi-FF%	31.70	<0.001	85.59	<0.001	8.29	<0.001
	Fi-PP%	4.33	0.004	28.32	<0.001	7.72	<0.001
	Fi-OP%	19.03	<0.001	17.72	<0.001	22.37	<0.001
Biochar (B)	Abundance	157.64	<0.001	15.40	<0.001	9.73	<0.001
	BF%	4.73	0.003	12.48	<0.001	2.12	0.022
	FF%	3.69	0.010	22.49	<0.001	5.09	<0.001
	PP%	4.25	0.005	28.87	<0.001	5.96	<0.001
	OP%	12.68	<0.001	50.64	<0.001	7.80	<0.001
	Genera number	8.11	<0.001	5.70	<0.001	1.47	0.148
	Shannon diversity	18.58	<0.001	38.24	<0.001	3.92	<0.001
	Margalef richness	19.95	<0.001	3.65	0.011	1.30	0.238
	Total energy flux	73.80	<0.001	22.46	<0.001	3.72	<0.001
	Energy flow uniformity	5.50	<0.001	10.03	<0.001	3.47	<0.001
	Fi-BF%	4.85	<0.001	24.24	<0.001	4.00	0.008
	Fi-FF%	10.50	<0.001	1.31	0.27	3.74	<0.001
	Fi-PP%	3.90	<0.001	52.94	<0.001	9.08	<0.001
	Fi-OP%	13.13	<0.001	34.67	<0.001	8.68	<0.001

Liquid organic fertilizer (L)	Abundance	85.57	<0.001	73.72	<0.001	3.65	<0.001
	BF%	3.24	0.089	23.01	<0.001	4.34	<0.001
	FF%	2.81	0.034	29.84	<0.001	5.50	<0.001
	PP%	6.13	<0.001	93.83	<0.001	11.68	<0.001
	OP%	30.49	<0.001	71.67	<0.001	27.66	<0.001
	Genera number	7.10	<0.001	4.37	0.004	0.56	0.890
	Shannon diversity	11.87	<0.001	23.34	<0.001	2.45	0.008
	Margalef richness	8.96	<0.001	1.33	0.271	0.68	0.798
	Total energy flux	34.66	<0.001	66.13	<0.001	9.86	<0.001
	Energy flow uniformity	11.97	<0.001	12.18	<0.001	4.57	<0.001
	Fi-BF%	5.93	<0.001	35.31	<0.001	5.43	<0.001
	Fi-FF%	7.08	<0.001	16.04	<0.001	5.95	<0.001
	Fi-PP%	13.14	<0.001	88.07	<0.001	10.30	<0.001
	Fi-OP%	7.42	<0.001	70.02	<0.001	22.87	<0.001

The five fertilization treatments within each amendment group included: low, moderate, and high application rates of the respective organic amendment, along with an unfertilized control (CK) and a mineral fertilizer (F) treatment. Samples were collected at five time points (days 5, 15, 30, 60, and 105) during the incubation. Trophic group relative abundance (%): BF, bacterial feeders; FF, fungal feeders; PP, plant parasites; OP, omnivores-predators. Relative energy flux to trophic groups (%): Fi-BF, bacterial feeders; Fi-FF, fungal feeders; Fi-PP, plant parasites; Fi-OP, omnivores-predators.

Table S7. Linear regression results for the dose-response relationships between organic amendment application rate and soil nematode community characteristics, analyzed separately for each amendment type across the incubation period.

Amendment type	Nematode community characteristics	Incubation time				
		Day 5	Day 15	Day 30	Day 60	Day 105
Straw (S)	Abundance	0.810***	0.968***	0.978***	0.848***	0.942***
	Community composition	0.011	0.001	0.037	0.462*	0.611*
	BF%	0.014	0.627*	0.343	0.007	0.014
	FF%	<0.001	0.007	0.696**	0.415	0.044
	PP%	0.018	0.023	0.504*	0.317	0.567*
	OP%	0.031	0.816***	0.808***	0.228	0.618*
	Genera number	0.442*	0.368	0.667**	0.082	0.002
	Shannon diversity	0.245	0.207	0.430	0.271	0.015
	Total energy flux	0.607***	0.829***	0.732***	0.842***	0.895***
	Energy flow uniformity	0.0001	0.031	0.859***	0.364	0.085
	Fi-BF%	0.041	0.171	0.726**	0.006	0.784**
	Fi-FF%	0.015	0.142	0.792**	0.074	0.731**
	Fi-PP%	0.006	0.203	0.478	0.386	0.694**
	Fi-OP%	0.027	0.233	0.895***	0.570*	0.808***
Biochar (B)	Abundance	0.005	0.459*	0.007	0.642**	0.365
	Community composition	0.362	0.015	0.452*	0.002	0.040
	BF%	0.005	0.614*	0.127	0.038	0.007
	FF%	0.323	0.210	0.611*	0.002	0.076
	PP%	0.001	0.030	0.183	0.001	0.045
	OP%	0.446*	0.274	0.09	0.049	0.001
	Genera number	0.070	0.486*	0.062	0.307	0.200
	Shannon diversity	0.062	0.584*	0.030	0.316	0.561*
	Total energy flux	0.431	0.492*	0.204	0.172	0.169
	Energy flow uniformity	0.166	0.334	0.367	0.067	0.363
	Fi-BF%	0.076	0.497*	0.510*	0.059	0.338
	Fi-FF%	0.617*	0.397	0.491*	0.001	0.184*
	Fi-PP%	0.454*	0.070	0.012	0.011	0.289
	Fi-OP%	0.002	0.084	0.315	0.064	0.590*

Liquid organic fertilizer (L)	Abundance	0.037	0.208	0.774**	0.933***	0.721**
	Community composition	0.641*	0.167	0.320	0.003	0.243
	BF%	0.570*	0.317	0.290	0.805**	0.816**
	FF%	0.912***	0.046	0.773**	0.089	0.631*
	PP%	0.825***	0.213	0.024	0.212	0.215
	OP%	0.132	0.013	0.095	0.537*	0.025
	Genera number	0.043	0.001	0.076	0.083	0.059
	Shannon diversity	0.010	0.009	0.008	0.224	0.001
	Total energy flux	0.283	0.079	0.882***	0.801***	0.628*
	Energy flow uniformity	0.055	0.177	0.001	0.522*	0.169
	Fi-BF%	0.002	0.001	0.121	0.554*	0.552*
	Fi-FF%	0.524*	<0.001	0.515*	0.526*	0.904***
	Fi-PP%	<0.001	0.463*	0.024	0.090	0.004
	Fi-OP%	0.191	0.330	0.179	0.015	0.132

Values in the table represent coefficients of determination (R^2) from linear regression analyses. The five fertilization treatments within each amendment group included: low, moderate, and high application rates of the respective organic amendment, along with an unfertilized control (CK) and a mineral fertilizer (F) treatment. Asterisks denote statistical significance: *$P < 0.05$, **$P < 0.01$, ***$P < 0.001$. Trophic group relative abundance (%): BF, bacterial feeders; FF, fungal feeders; PP, plant parasites; OP, omnivores-predators. Relative energy flux to trophic groups (%): Fi-BF, bacterial feeders; Fi-FF, fungal feeders; Fi-PP, plant parasites; Fi-OP, omnivores-predators.

Table S8. Results of two-way ANOVA examining the effects of incubation time, fertilization treatment (within each organic amendment type), and their interaction on soil organic carbon and microbial necromass carbon (*F*- and *P*-values).

Amendment group	Soil carbon components	Incubation time (df = 4)		Fertilization (df = 4)		Time × Fertilization (df =16)	
		F	***P***	***F***	***P***	***F***	***P***
Straw (S)	SOC	21.99	<0.001	54.73	<0.001	2.86	0.002
	ROC	172.86	<0.001	74.04	<0.001	16.08	<0.001
	MNC	1432.02	<0.001	1413.94	<0.001	35.49	<0.001
	BNC	214.41	<0.001	123.24	<0.001	2.94	0.002
	FNC	1594.34	<0.001	1668.25	<0.001	67.71	<0.001
	FNC:BNC	159.10	<0.001	34.24	<0.001	10.12	<0.001
Biochar (B)	SOC	225.10	<0.001	68.22	<0.001	3.55	<0.001
	ROC	124.49	<0.001	25.37	<0.001	13.07	<0.001
	MNC	781.13	<0.001	180.14	<0.001	35.46	<0.001
	BNC	97.83	<0.001	13.63	<0.001	6.72	<0.001
	FNC	896.15	<0.001	364.76	<0.001	102.42	<0.001
	FNC:BNC	35.81	<0.001	46.76	<0.001	26.58	<0.001
Liquid organic fertilizer (L)	SOC	7.43	<0.001	14.90	<0.001	0.76	0.715
	ROC	48.92	<0.001	24.96	<0.001	2.30	0.013
	MNC	633.75	<0.001	884.48	<0.001	67.13	<0.001
	BNC	142.48	<0.001	29.38	<0.001	9.69	<0.001
	FNC	794.30	<0.001	1320.74	<0.001	131.54	<0.001
	FNC:BNC	193.85	<0.001	28.68	<0.001	18.78	<0.001

The five fertilization treatments within each amendment group included: low, moderate, and high application rates of the respective organic amendment, along with an unfertilized control (CK) and a mineral fertilizer (F) treatment. Samples were collected at five time points (days 5, 15, 30, 60, and 105) during the incubation. SOC: soil organic carbon; ROC: readily oxidizable carbon; MNC: microbial necromass carbon; BNC: bacterial necromass carbon; FNC: fungal necromass carbon; FNC:BNC: the ratio of bacterial to fungal necromass carbon.

Table S9. Linear regression results for the dose-response relationships between organic amendment application rate and soil carbon components, analyzed separately for each amendment type across the incubation period.

Amendment type	Soil carbon components	Incubation time				
		Day 5	Day 15	Day 30	Day 60	Day 105
Straw (S)	SOC	0.681**	0.408*	0.536*	0.976***	0.010
	ROC	0.436*	0.511*	0.877***	0.208	0.801***
	MNC	0.988***	0.947***	0.998***	0.950***	0.964***
	BNC	0.947***	0.940***	0.919**	0.772**	0.933***
	FNC	0.950***	0.781***	0.993***	0.976***	0.884***
	FNC:BNC	0.926***	0.757**	0.110	0.282	0.816***
Biochar (B)	SOC	0.065	0.042*	0.694**	0.641**	0.608**
	ROC	0.237	0.110	0.668**	0.125	0.069
	MNC	0.799***	0.613**	0.227	0.313	0.480*
	BNC	0.255	0.155	0.927***	0.790***	0.718**
	FNC	0.849***	0.584**	0.762**	0.626**	0.403*
	FNC:BNC	0.146	0.087	0.929***	0.775***	0.175
Liquid organic fertilizer (L)	SOC	0.056	0.245	0.506*	0.735**	0.198
	ROC	0.040	0.045	0.512*	0.417*	0.647**
	MNC	0.889***	0.989***	0.593**	0.957***	0.981***
	BNC	0.189	0.837***	0.978***	0.859***	0.937***
	FNC	0.904***	0.957***	0.951***	0.931***	0.989***
	FNC:BNC	0.401*	0.282	0.971***	0. .595**	0.969***

Values in the table represent coefficients of determination (R^2) from linear regression analyses. The five fertilization treatments within each amendment group included: low, moderate, and high application rates of the respective organic amendment, along with an unfertilized control (CK) and a mineral fertilizer (F) treatment. Asterisks denote statistical significance: *$P < 0.05$, **$P < 0.01$, ***$P < 0.001$. SOC: soil organic carbon; ROC: readily oxidizable carbon; MNC: microbial necromass carbon; BNC: bacterial necromass carbon; FNC: fungal necromass carbon; FNC:BNC: the ratio of bacterial to fungal necromass carbon.

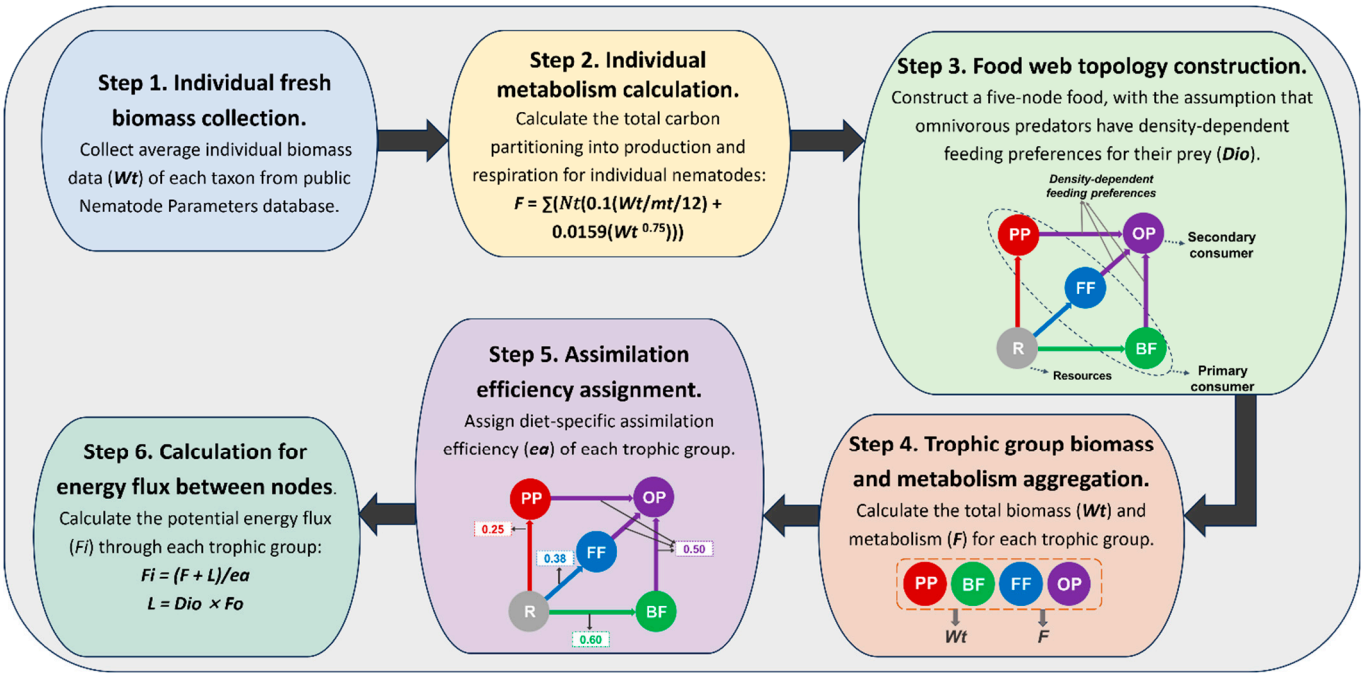


Figure S1. Schematic diagram illustrating the six-step approach for quantifying the energetic structure of soil nematode food webs. **Step 1**: The average fresh biomass (*Wt*) for nematode individuals within a given taxon (*t*) was collected from the Nematode Ecophysiological Parameters database (http://nemaplex.ucdavis.edu, accessed on November 21, 2025), and the total biomass of each taxon was calculated by multiplying average individual biomass by nematode abundance. **Step 2**: The individual nematode metabolism (*F*) was determined by calculating carbon partitioned into production (Pc) and respiration (Rc), incorporating cp-class normalization to account for life-history strategies. In the calculation formula, *Nt*, *Wt* and *mt* are the number of individuals, the fresh biomass and the cp class of taxon *t*, respectively. **Step 3**: A five-node food web was constructed, with the assumption that omnivores-predators have density-dependent feeding preferences for their prey (*Dio*, the density-dependent feeding preference of omnivores-predators for lower trophic group *i*). **Step 4**: The biomass and metabolism of each node were calculated as the sum of the total biomass and metabolism of all nematode individuals within the respective trophic group. **Step 5:** Trophic group-specific assimilation efficiencies (*ea*) were assigned based on established ecological parameters (0.25 for herbivores, 0.60 for bacterivores, 0.38 for fungivores, and 0.50 for omnivores-predators). **Step 6**: The energy flux (*Fi*) through each trophic node was calculated using the formula $F_i = (F + L)/ea$, where *L* is the energy loss to higher trophic levels ($L = Dio \times Fo$).

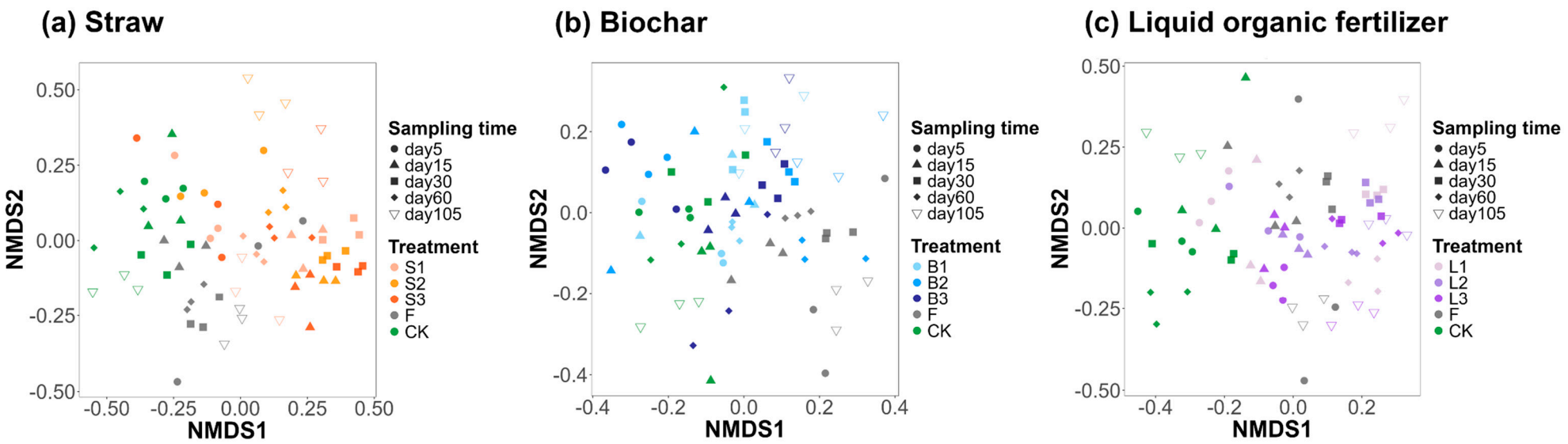


Figure S2. Non-metric multidimensional scaling (NMDS) ordination of soil nematode community composition in response to organic amendment type, application rate, and incubation time. Ordinations are shown separately for (**a**) straw (S1-S3), (**b**) biochar (B1-B3), and (**c**) liquid organic fertilizer (L1-L3), with mineral fertilizer (F) and unfertilized control (CK) included in each panel. Amendments were applied at low (1), moderate (2), and high (3) rates. Symbol color represents fertilization treatment; symbol shape corresponds to sampling time (days 5, 15, 30, 60, and 105). The goodness-of-fit for each NMDS ordination was quantitatively assessed using stress values (<0.2 for all NMDS panels).

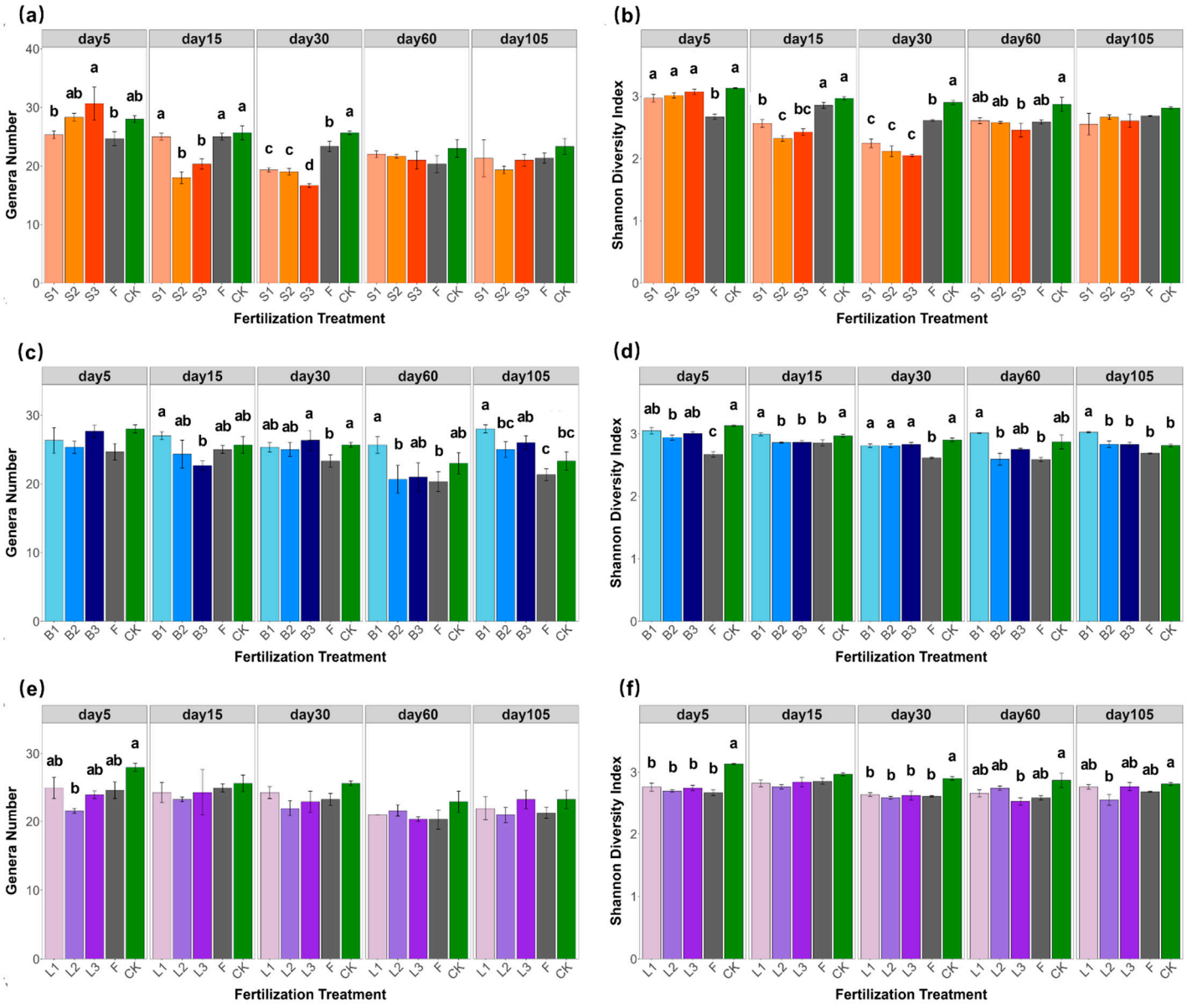


Figure S3. Effects of organic amendment type and application rate on soil nematode diversity over a 105-day incubation. (**a**), (**c**), (**e**): Genera number. (**b**), (**d**), (**f**): Shannon diversity index. Amendments are straw (S; **a–b**), biochar (B; **c–d**), and liquid organic fertilizer (L; **e–f**), applied at low (1), moderate (2), and high (3) rates. Mineral fertilizer (F) and an unfertilized control (CK) are included for comparison. Error bars represent standard errors. Lowercase letters above error bars indicate significant differences among treatments within a sampling time ($p < 0.05$, Tukey's HSD test).

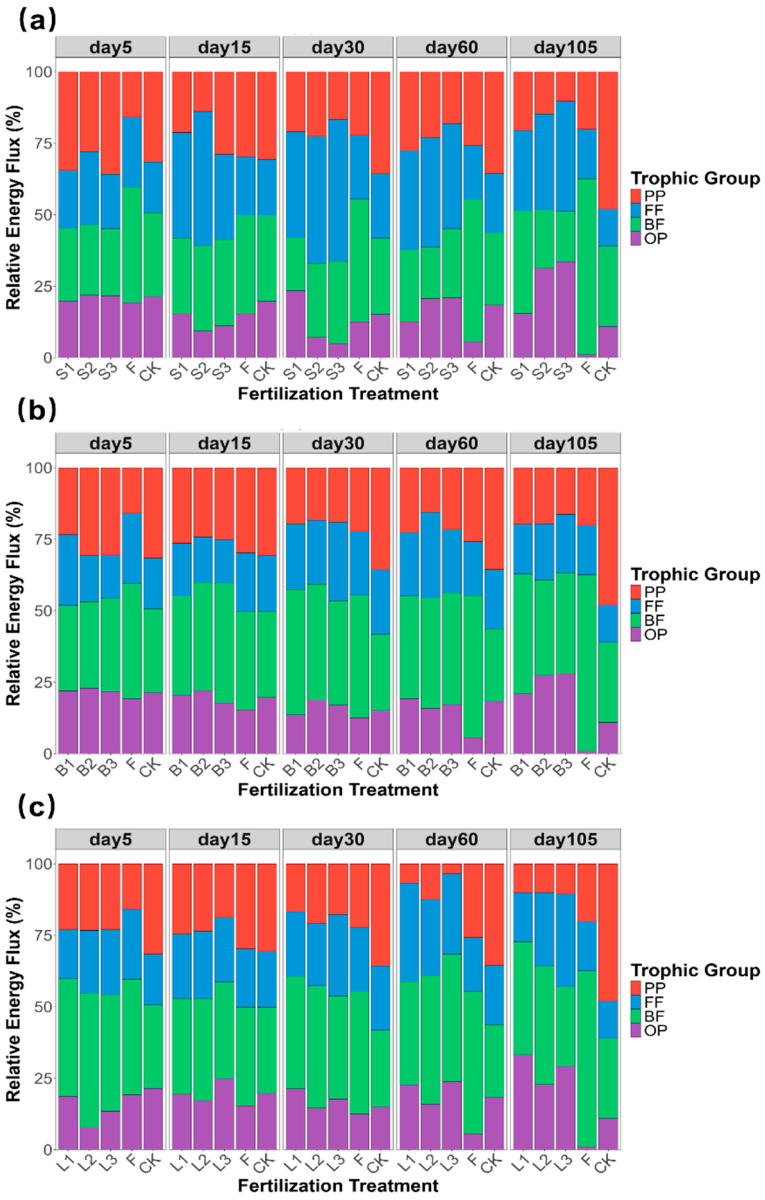


Figure S4. Effects of organic amendment type and application rate on the relative energy flux through trophic groups within soil nematode food web over a 105-day incubation. (**a**): straw (S); (**b**): biochar (B); (**c**): liquid organic fertilizer (L). Amendments were applied at low (1), moderate (2), and high (3) rates. Mineral fertilizer (F) and an unfertilized control (CK) are included for comparison. Trophic groups: PP, plant parasites; FF, fungal feeders; BF, bacterial feeders; OP, omnivores-predators.

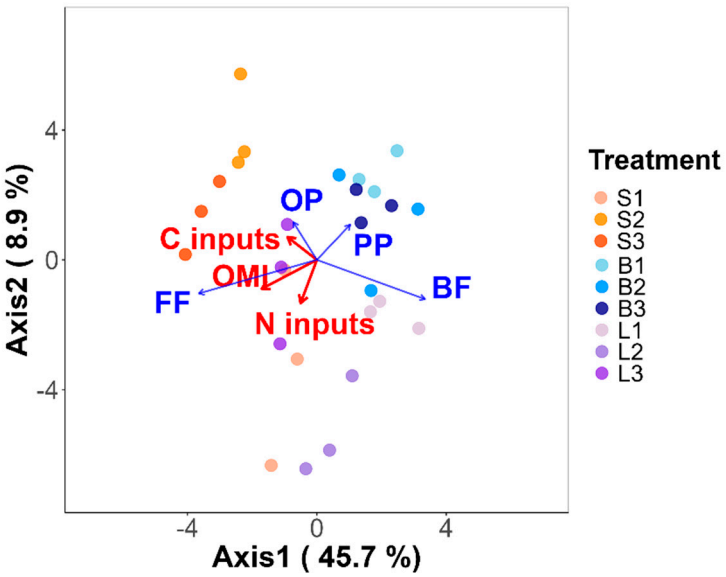


Figure S5. Redundancy analysis (RDA) of nematode trophic structure in response to organic amendment properties and input quantities. The biplot illustrates the relationships between explanatory variables (red arrows) and nematode trophic groups (blue arrows). OMI denotes the first principal component derived from amendment intrinsic properties including chemical stoichiometry ratio ($(C:N)^{-1}$) and pH deviation from neutrality (-|pH-7|); C input and N input refer to carbon and nitrogen addition rates. Samples are colored by amendment type: straw (S1–S3, orange), biochar (B1–B3, blue), and liquid organic fertilizer (L1–L3, purple). The first two axes explain 54.6% of the total variance (Axis1: 45.7%; Axis2: 8.9%). The analysis was performed using data from day 105.