

**Table S1.** The taxonomic status of nematode species for testing the specificity of four COI primer pairs.

Species	Taxon status	Source	Number of nematodes
<i>Plectus</i> sp.	Chromadorea, Plectida, Plectidae	Soil extraction	1
<i>Ditylenchus</i> sp. 2	Chromadorea, Rhabditida, Anguinidae	Soil extraction	1
<i>Aphelenchus</i> sp. 2	Chromadorea, Rhabditida, Aphelenchidae	Soil extraction	1
<i>Aphelenchoides</i> sp. 2	Chromadorea, Rhabditida, Aphelenchoididae	Soil extraction	1
<i>Bursaphelenchus xylophilus</i>	Chromadorea, Rhabditida, Aphelenchoididae	Soil extraction	1
<i>Acrobeloides</i> sp.	Chromadorea, Rhabditida, Cephalobidae	Soil extraction	1
<i>Merlinius brevidens</i>	Chromadorea, Rhabditida, Dolichodoridae	Soil extraction	1
<i>Pristionchus</i> sp.	Chromadorea, Rhabditida, Dolichodoridae	Soil extraction	1
<i>Helicotylenchus</i> sp.	Chromadorea, Rhabditida, Hoplolaimidae	Soil extraction	1
<i>Pratylenchus</i> sp. 2	Chromadorea, Rhabditida, Pratylenchidae	Soil extraction	1
<i>Rhabditis</i> sp.	Chromadorea, Rhabditida, Rhabditidae	Soil extraction	1
<i>Labrys</i> sp.	Chromadorea, Rhabditida, Tylenchidae	Soil extraction	1
<i>Paratylenchus neglectus</i>	Chromadorea, Rhabditida, Tylenchulidae	Soil extraction	1
<i>Xiphinema brevicollum</i>	Enoplea, Dorylaimida, Longidoridae	Soil extraction	1
<i>Allodorylaimus</i> sp.	Enoplea, Dorylaimida, Qudsianematidae	Soil extraction	1
<i>Alaimus</i> sp.	Enoplea, Enoplida, Alaimidae	Soil extraction	1
<i>Tripylina</i> sp.	Enoplea, Enoplida, Trischistomatidae	Soil extraction	1
<i>Prionchulus</i> sp.	Enoplea, Mononchida, Mononchidae	Soil extraction	1

**Table S2.** The taxonomic status of nematode species for testing the specificity of the mock community.

Species	Taxon status	Source	Number of nematodes
<i>Ditylenchus</i> sp. 1	Chromadorea, Rhabditida, Anguinidae	Lab culture	7
<i>Aphelenchus</i> sp. 1	Chromadorea, Rhabditida, Aphelenchidae	Soil extraction	3
<i>Bursaphelenchus xylophilus</i>	Chromadorea, Rhabditida, Aphelenchoididae	Lab culture	14
<i>Aphelenchoides</i> sp. 1	Chromadorea, Rhabditida, Aphelenchoididae	Lab culture	12
<i>Cephalobus</i> sp.	Chromadorea, Rhabditida, Cephalobidae	Lab culture	5
<i>Pseudodiplogasteroides</i> sp.	Chromadorea, Rhabditida, Diplogasteridae	Lab culture	5
<i>Helicotylenchus</i> sp.	Chromadorea, Rhabditida, Hoplolaimidae	Soil extraction	4
<i>Rotylenchulus</i> sp.	Chromadorea, Rhabditida, Hoplolaimidae	Soil extraction	6
<i>Rotylenchus</i> sp.	Chromadorea, Rhabditida, Hoplolaimidae	Soil extraction	13
<i>Pratylenchus</i> sp. 1	Chromadorea, Rhabditida, Pratylenchidae	Lab culture	7
<i>Caenorhabditis elegans</i>	Chromadorea, Rhabditida, Rhabditidae	Lab culture	5
<i>Oscheius</i> sp.	Chromadorea, Rhabditida, Rhabditidae	Soil extraction	3
<i>Boleodorus</i> sp.	Chromadorea, Rhabditida, Tylenchidae	Soil extraction	2
<i>Aporcelaimellus</i> sp.	Enoplea, Dorylaimida, Aporcelaimidae	Soil extraction	1
<i>Axonchium</i> sp.	Enoplea, Dorylaimida, Beloniridae	Soil extraction	1
<i>Mesodorylaimus</i> sp.	Enoplea, Dorylaimida, Dorylaimidae	Soil extraction	6
<i>Longidorus</i> sp.	Enoplea, Dorylaimida, Longidoridae	Soil extraction	5
<i>Xiphinema</i> sp.	Enoplea, Dorylaimida, Longidoridae	Soil extraction	2
<i>Dorylaimoides</i> sp.	Enoplea, Dorylaimida, Mydonomidae	Soil extraction	4
<i>Eudorylaimus</i> sp.	Enoplea, Dorylaimida, Qudsianematidae	Soil extraction	8
<i>Labronemella</i> sp.	Enoplea, Dorylaimida, Qudsianematidae	Soil extraction	1
<i>Miconchus</i> sp.	Enoplea, Mononchida, Anatonchidae	Soil extraction	1
<i>Mylonchulus</i> sp.	Enoplea, Mononchida, Mylonchulidae	Soil extraction	10
<i>Triplonchium</i> sp.	Enoplea, Triplonchida, Diphtherophoridae	Soil extraction	4
<i>Tripyla</i> sp.	Enoplea, Triplonchida, Tripylidae	Soil extraction	1

**Table S3.** The newly generated 28S and COI sequences in this study.

Order	Species	Code	GenBank accession number		
			28S	COI	
Dorylaimida	<i>Aporcelaimellus obtusicaudatus</i>	D1	ON927900	ON937578	
	<i>Aporcelaimellus obtusicaudatus</i>	D8	ON927903	OP120789	
	<i>Aporcelaimellus</i> sp. 1	D22	ON927901	OP120792	
	<i>Aporcelaimellus</i> sp. 2	D3	ON927902	ON937579	
	<i>Aporcella</i> sp.	D5	ON927910	ON937580	
	<i>Axonchium</i> sp. 1	D18	ON927906	OP120791	
	<i>Axonchium</i> sp. 2	D6	ON927907	ON937581	
	<i>Discolaimium</i> sp.	D2	ON927904	OP120787	
	<i>Epidorylaimus</i> sp.	D12	ON927914	ON937583	
	<i>Labronemella</i> sp.	D10	ON927905	ON937582	
	<i>Nevadanema</i> sp.	D4	ON927908	OP120788	
	<i>Prodorylaimus</i> sp. 1	D21	ON927911	ON937584	
	<i>Prodorylaimus</i> sp. 2	D7	ON927872	OP120814	
	<i>Xiphinema brevicollum</i>	S12	ON927912	OP120796	
	<i>Xiphinema hunaniense</i>	D16	ON927909	OP120790	
	<i>Xiphinema</i> sp.	S22	ON927913	OP120799	
	Enoplida	Unidentified Alaimidae	S10	ON927895	ON937586
		<i>Alaimus primitivus</i>	S34	ON927926	OP120801
		<i>Tripylina arenicola</i>	S37	ON927897	OP120802
		<i>Tripylina zhejiangensis</i>	S21	ON927899	OP404165
Mononchida	<i>Iotonchus</i> sp.	S98	ON927919	OP120807	
	<i>Miconchus</i> sp.	S40	ON927920	OP120804	
	<i>Mononchus</i> sp.	S147	ON927918	OP120810	
	<i>Mylonchulus sigmaturus</i>	S83	ON927922	ON937593	
	<i>Prionchulus oleksandri</i>	S26	ON927923	OP120800	
	<i>Prionchulus</i> sp. 1	S1	ON927916	OP120793	
	<i>Prionchulus</i> sp. 2	S157	ON927917	OP120811	
Rhabditida	<i>Panagrolaimus</i> sp.	S33	ON927890	OP394116	
	<i>Psilenchus hilarulus</i>	S164	ON927879	OP120813	
	<i>Acrobeles</i> sp.	S68	ON927885	ON937589	
	<i>Aphelenchoides</i> sp. 1	S7	ON927873	OP120795	
	<i>Aphelenchoides</i> sp. 2	S73	ON927874	ON937592	
	<i>Aphelenchus avenae</i>	S78	ON927882	OP404163	
	<i>Aphelenchus avenae</i>	S87	ON927880	ON937594	
	<i>Aphelenchus</i> sp. 1	S112	ON927881	ON937596	
	<i>Aphelenchus</i> sp. 2	S5	ON927883	OP120794	
	<i>Bursaphelenchus xylophilus</i>	S6	ON927875	ON937585	
	Unidentified Cephalobidae	S13	ON927887	OP120797	
	<i>Cruznema tripartitum</i>	S42	ON927892	ON937587	
	Unidentified Diplogasteridae	S16	ON927876	OP404164	
	<i>Ditylenchus</i> sp.	S75	ON927886	OP120805	

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<i>Filenchus</i> sp.	S59	ON927884	ON937588
<i>Merlinius brevidens</i>	S19	ON927877	OP120798
<i>Mesocriconema</i> sp.	S15 9	ON927871	OP120812
<i>Mesorhabditis</i> sp.	S72	ON927894	ON937591
<i>Oscheius tipulae</i>	S12 9	ON927893	OP120808
<i>Panagrolaimus detritophagus</i>	S13 6	ON927889	OP120809
<i>Panagrolaimus</i> sp. 1	S71	ON927888	ON937590
<i>Panagrolaimus</i> sp. 2	S91	ON927891	OP120806
<i>Pratylenchoides leiocauda</i>	S69	ON927878	OP394117
<i>Rotylenchulus reniformis</i>	S94	ON927870	ON937595

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