

**Supplementary Table 1.** The correlations of soil properties with the abundances of hatched *Heterodera glycines* J2, *Aphelenchus* and *Ecumenicus* based on the entire data along soil profile. Pearson's r value and p-value

Soil properties	r/p	<i>Heterodera</i> J2	<i>Aphelenchus</i>	<i>Ecumenicus</i>
Moisture	r	-0.1632	-0.0767	-0.0588
	p	p=0.342	p=0.657	p=0.734
Sodium	r	-0.3290	-0.1205	-0.1633
	p	p=0.050	p=0.484	p=0.341
Potassium	r	0.0336	-0.2034	0.5805
	p	p=0.846	p=0.234	p=0.000***
Calcium	r	-0.3898	-0.1805	-0.3356
	p	p=0.019*	p=0.292	p=0.045*
NH <sub>4</sub> -N	r	-0.2692	-0.1738	-0.3605
	p	p=0.112	p=0.311	p=0.031*
NO <sub>3</sub> -N	r	-0.0419	-0.0050	-0.2703
	p	p=0.808	p=0.977	p=0.111

**Supplementary Table 2.** The correlations of soil properties with the density of the soybean cyst nematode (SCN) *Heterodera glycines* estimated with real-time PCR, abundance of hatched *Heterodera glycines* J2 or abundance of *Aphelenchus* and *Ecumenicus* in the lower layer soil. Pearson's r value and p-value

Soil properties	r/p	SCN density	<i>Heterodera</i> (J2)	<i>Aphelenchus</i>	<i>Ecumenicus</i>
Moisture	r	0.7730	-0.6135	-0.2332	0.6974
	p	p=0.015*	p=0.079	p=0.546	p=0.037*
Sodium	r	0.4645	-0.5527	-0.0634	0.5334
	p	p=0.208	p=0.123	p=0.871	p=0.139
Potassium	r	0.8474	-0.3725	-0.2582	0.6479
	p	p=0.004**	p=0.324	p=0.502	p=0.059
Calcium	r	0.5127	-0.5673	-0.0734	0.6033
	p	p=0.158	p=0.111	p=0.851	p=0.085
Available P	r	0.7690	-0.5037	-0.0418	0.5674
	p	p=0.015*	p=0.167	p=0.915	p=0.111
NH <sub>4</sub> -N	r	0.4954	-0.3629	0.3504	0.1734
	p	p=0.175	p=0.337	p=0.355	p=0.655
NO <sub>3</sub> -N	r	-0.0630	-0.1226	0.0941	0.0736
	p	p=0.872	p=0.753	p=0.810	p=0.851
<i>Ecumenicus</i>	r	0.8025	-0.6146		
	p	p=0.009**	p=0.078		