Supplementary materials

Supplementary Table S1. The number of coffee farms, the values of sand, silt, clay, pH, and OC (organic carbon) of the examined soils. NS and * indicate the associated effect is not significant or significant at P<0.05, respectively. ** Number of farms in each of eight combinations of the three experimental factors. SCL = sandy clay loam; SD = standard deviation.

Soil	Shade trees	Reproductive stage	No. of farm **	Sand (%)		Silt (%)		Clay (%)		pH		OC (%)	
				Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
SCL soil	Yes	Young stage	12	54.17[a]	0.94	20.25[b]	0.79	25.58[b]	1.26	4.24[b]	0.04	1.44[b]	0.04
		Old stage	19	54.40[a]	0.71	20.32[b]	0.50	25.28[b]	0.85	4.24[b]	0.05	1.44[b]	0.03
	No	Young stage	12	54.37[a]	0.80	20.16[b]	0.66	25.48[b]	1.11	4.24[b]	0.04	1.42[b]	0.03
		Old stage	13	54.32[a]	0.94	20.46[b]	0.74	25.22[b]	1.36	4.24[b]	0.04	1.43[b]	0.03
Clay soil	Yes	Young stage	10	28.63[b]	1.45	31.40[a]	1.28	39.97[a]	1.06	4.51[a]	0.04	1.86[a]	0.06
		Old stage	28	28.79[b]	1.16	31.05[a]	0.88	40.17[a]	1.01	4.53[a]	0.05	1.89[a]	0.07
	No	Young stage	15	29.04[b]	0.93	30.82[a]	0.84	40.14[a]	0.98	4.54[a]	0.04	1.89[a]	0.07
		Old stage	24	28.08[b]	1.15	31.36[a]	1.18	40.56[a]	0.81	4.53[a]	0.04	1.89[a]	0.07
Tested effects													
Reproductive stage (1)				NS		NS		NS		NS		NS	
Shade trees (2)				NS		NS		NS		NS		NS	
Soil (3)				*		*		*		*		*	
(1) x (2)				NS		NS		NS		NS		NS	
(1) x (3)				NS		NS		NS		NS		NS	
(2) x (3)				NS		NS		NS		NS		NS	
(1) x (2) x (3)				NS		NS		NS		NS		NS	

Supplementary Table S2. The concentration of TKN, total P, total K, available P and K, and CEC of the examined soils. NS and * indicate the associated effect is not significant or significant at P<0.05, respectively. SCL = sandy clay loam; SD = standard deviation; TKN = Total Kjeldahl nitrogen.

Soil	Shade trees	Reproductive stage	TKN (%)		Total P (%)		Total K (%)		Mehlich-1 P (mg kg^{-1})		Available K (mg kg^{-1})		CEC (cmol(+) kg-1)	
			Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
SCL soil	Yes	Young stage	0.136^{b}	0.01	0.131^{b}	0.015	0.33^{b}	0.03	44.4^{b}	2.8	85.0^{b}	3.18	6.99^{b}	0.71
		Old stage	0.139^{b}	0.02	0.135^{b}	0.011	0.32^{b}	0.03	44.3^{b}	2.4	87.9^{b}	3.02	6.58^{b}	0.97
	No	Young stage	0.132^{b}	0.01	0.127^{b}	0.010	0.32^{b}	0.04	42.9^{b}	4.3	87.4^{b}	3.02	6.28^{b}	0.85
		Old stage	0.133^{b}	0.01	0.134^{b}	0.011	0.32^{b}	0.03	42.8^{b}	2.6	86.5^{b}	3.22	6.53^{b}	0.83
Clay soil	Yes	Young stage	0.179^{a}	0.01	0.150^{a}	0.006	0.52^{a}	0.04	117.2^{a}	14.5	88.8^{a}	3.54	12.84^{a}	0.55
		Old stage	0.181^{a}	0.01	0.152^{a}	0.009	0.52^{a}	0.03	115.5^{a}	10.3	89.7^{a}	4.41	13.22^{a}	0.66
	No	Young stage	0.177^{a}	0.01	0.147^{a}	0.008	0.52^{a}	0.03	118.2^{a}	13.4	88.7^{a}	4.06	12.97^{a}	0.66
		Old stage	0.185^{a}	0.01	0.151^{a}	0.009	0.51^{a}	0.03	112.9^{a}	12.9	88.9^{a}	3.74	12.97^{a}	0.76
Tested effects														
Reproductive stage (1)			NS		NS		NS		NS		NS		NS	
Shade trees (2)			NS		NS		NS		NS		NS		NS	
Soil (3)			*		*		*		*		*		*	
(1) x (2)			NS		NS		NS		NS		NS		NS	
(1) x (3)			NS		NS		NS		NS		NS		NS	
(2) x (3)			NS		NS		NS		NS		NS		NS	
(1) x (2) x (3)			NS		NS		NS		NS		NS		NS	

Supplementary Table S3. The concentrations of selected micronutrients in the examined soils. NS and * indicate the associated effect is not significant or significant at P<0.05, respectively. SCL = sandy clay loam; SD = standard deviation.

Soil	Shade trees	Reproductive stage	Cu (mg kg^{-1})		Zn (mg kg^{-1})		Bo (mg kg^{-1})		Mo (mg kg^{-1})		Co (mg kg^{-1})	
			Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
SCL soil	Yes	Young stage	19.35^{b}	0.40	22.90^{b}	0.87	2.58^{b}	0.32	0.13^{b}	0.01	4.05^{b}	0.30
		Old stage	19.04^{b}	0.52	23.04^{b}	0.69	2.44^{b}	0.26	0.12^{b}	0.01	3.82^{b}	0.35
	No	Young stage	18.79^{b}	0.63	23.35^{b}	0.80	2.62^{b}	0.32	0.12^{b}	0.01	3.86^{b}	0.38
		Old stage	19.40^{b}	0.55	22.66^{b}	0.77	2.40^{b}	0.21	0.13^{b}	0.01	3.79^{b}	0.42
Clay soil	Yes	Young stage	38.74^{a}	0.77	29.10^{a}	0.47	4.19^{a}	0.10	0.33^{a}	0.02	4.58^{a}	0.14
		Old stage	37.93^{a}	0.97	29.08^{a}	0.52	4.20^{a}	0.14	0.34^{a}	0.03	4.62^{a}	0.13
	No	Young stage	38.24^{a}	1.16	29.25^{a}	0.53	4.15^{a}	0.11	0.33^{a}	0.03	4.59^{a}	0.19
		Old stage	38.05^{a}	0.72	29.20^{a}	0.46	4.23^{a}	0.12	0.33^{a}	0.03	4.63^{a}	0.13
Tested effects												
Reproductive stage (1)			NS		NS		NS		NS		NS	
Shade trees (2)			NS		NS		NS		NS		NS	
Soil (3)			*		*		*		*		*	
(1) x (2)			*		NS		NS		NS		NS	
(1) x (3)			NS		NS		*		NS		NS	
(2) x (3)			NS		NS		NS		NS		NS	
(1) x (2) x (3)			NS		NS		NS		NS		NS	