

## Supplementary materials

**Table S1:** *p*-values generated from fitting soil aggregate fractions as a function of duration of cultivation, tree species and tree zone using linear mixed models.

Soil aggregate fraction <sup>†</sup>	Factors affecting weight and distribution of soil aggregate fractions					
	Duration of cultivation	Tree species	Tree zone	Duration × Species	Species × Zone	Duration × Species × Zone
LM	0.736	<0.001	0.989	0.247	<b>0.050</b>	0.677
SM	0.481	<b>0.002</b>	0.416	0.161	<b>0.050</b>	0.833
m	0.413	<0.001	0.497	<b>0.010</b>	0.716	<b>0.050</b>
s+c	0.259	0.415	0.907	0.253	0.139	0.112
cPOM	0.651	0.765	0.907	<b>0.008</b>	<b>0.016</b>	0.467
mM	0.749	0.322	0.318	<0.001	<b>0.007</b>	<b>0.059</b>
s+cM	0.227	0.070	0.892	0.090	0.243	0.073

<sup>†</sup> LM = large macroaggregates (> 2000 μm), SM = small macroaggregates (250-2000 μm), m = microaggregates (53–250 μm), s+c = silt and clay (<53 μm), cPOM = coarse particulate organic matter (>250 μm), mM = microaggregates-within-macroaggregates (53–250 μm), s+cM = silt and clay within macroaggregates (<53 μm).

**Table S2:** Soil aggregate fraction weight distribution (overall means  $\pm$  (SE)) as influenced by the duration of cultivation and tree species.

Soil aggregate fraction (g 100 g <sup>-1</sup> soil) <sup>†</sup>	Tree species			Duration of cultivation		
	<i>Croton megalocarpus</i>	<i>Eucalyptus grandis</i>	<i>Zanthoxylum gillettii</i>	10 years	16 years	62 years
LM	<b>42.5 (1.2)<sup>a</sup></b>	<b>47.0 (1.5)<sup>a</sup></b>	<b>27.6 (1.1)<sup>b</sup></b>	39.0 (1.5)	42.4 (1.6)	37.8 (1.3)
SM	<b>53.9 (1.2)<sup>b</sup></b>	<b>48.7 (1.4)<sup>b</sup></b>	<b>62.8 (1.0)<sup>a</sup></b>	55.4 (1.4)	52.3 (1.4)	55.8 (1.1)
m	<b>3.1 (0.2)<sup>c</sup></b>	<b>3.9 (0.2)<sup>b</sup></b>	<b>9.4 (0.3)<sup>a</sup></b>	5.2 (0.3)	5.0 (0.3)	6.1 (0.4)
s+c	0.5 (0.1)	0.3 (0.1)	0.2 (0.0)	0.4 (0.1)	0.4 (0.0)	0.4 (0.1)
cPOM	<b>12.8 (0.5)<sup>a</sup></b>	<b>13.9 (0.7)<sup>a</sup></b>	<b>11.0 (0.4)<sup>b</sup></b>	<b>10.8 (0.6)<sup>b</sup></b>	<b>14.4 (0.6)<sup>a</sup></b>	<b>12.4 (0.5)<sup>b</sup></b>
mM	71.8 (0.6)	70.1 (0.8)	69.8 (0.5)	<b>72.3 (0.7)<sup>a</sup></b>	<b>70.1 (0.6)<sup>ab</sup></b>	<b>69.7 (0.6)<sup>b</sup></b>
s+cM	<b>11.7 (0.2)<sup>a</sup></b>	<b>11.8 (0.4)<sup>a</sup></b>	<b>9.6 (0.3)<sup>b</sup></b>	<b>11.3 (0.4)<sup>a</sup></b>	<b>10.1 (0.2)<sup>b</sup></b>	<b>11.5 (0.3)<sup>a</sup></b>

Within rows, means in bold followed by different superscript lowercase letters are significantly different at  $p < 0.05$ . Separation of means for the two factors (tree species and duration of cultivation) is done independently. <sup>†</sup> LM = large macroaggregates (> 2000  $\mu\text{m}$ ), SM = small macroaggregates (250-2000  $\mu\text{m}$ ), m = microaggregates (53–250  $\mu\text{m}$ ), s+c = silt and clay (<53  $\mu\text{m}$ ), cPOM = coarse particulate organic matter (>250  $\mu\text{m}$ ), mM = microaggregates-within-macroaggregates (53–250  $\mu\text{m}$ ), s+cM = silt and clay within macroaggregates (<53  $\mu\text{m}$ ).

**Table S3:** Soil aggregate fraction weight distribution (means  $\pm$  (SE)) in the soil as influenced by the duration of cultivation, tree species and tree zone.

Soil aggregate fraction (g 100 g <sup>-1</sup> soil) <sup>††</sup>	Tree species														
	<i>Croton megalocarpus</i>					<i>Eucalyptus grandis</i>					<i>Zanthoxylum gilletii</i>				
	Tree zone														
	A	B	C	D	Mean <sup>†</sup>	A	B	C	D	Mean <sup>†</sup>	A	B	C	D	Mean <sup>†</sup>
<b>10 years of cultivation</b>															
LM	42.5 (2.6) <sup>ab</sup>	40.0 (2.6) <sup>b</sup>	45.3 (2.5) <sup>ab</sup>	53.2 (2.9) <sup>a</sup>	42.6 (2.6) <sup>A</sup>	48.4 (4.0)	46.0 (5.4)	43.3 (5.0)	45.5 (5.1)	45.9 (2.4) <sup>A</sup>	21.8 (1.3) <sup>b</sup>	26.2 (3.3) <sup>ab</sup>	21.6 (1.3) <sup>b</sup>	33.6 (4.9) <sup>a</sup>	23.2 (1.7) <sup>B</sup>
SM	54.4 (2.2) <sup>ab</sup>	57.2 (2.4) <sup>a</sup>	51.6 (2.3) <sup>ab</sup>	44.7 (3.8) <sup>b</sup>	54.4 (2.5) <sup>B</sup>	45.2 (3.6)	48.2 (5.0)	51.9 (4.5)	49.5 (4.5)	48.4 (2.2) <sup>B</sup>	69.5 (1.3) <sup>a</sup>	64.3 (2.8) <sup>a</sup>	69.3 (1.4) <sup>a</sup>	59.1 (4.2) <sup>b</sup>	67.7 (1.4) <sup>A</sup>
m	2.2 (0.4) <sup>a</sup>	2.0 (0.4) <sup>a</sup>	2.2 (0.4) <sup>a</sup>	1.3 (0.2) <sup>b</sup>	2.1 (0.2) <sup>C</sup>	6.3 (1.6)	5.6 (0.6)	4.6 (0.6)	4.9 (0.6)	5.5 (0.5) <sup>B</sup>	8.9 (0.8) <sup>a</sup>	9.1 (0.8) <sup>a</sup>	8.9 (0.7) <sup>a</sup>	7.1 (0.6) <sup>b</sup>	9.0 (0.4) <sup>A</sup>
s+c	0.9 (0.4)	0.7 (0.3)	0.9 (0.4)	0.5 (0.2)	0.8 (0.2)	0.1 (0.0)	0.1 (0.0)	0.2 (0.1)	0.1 (0.0)	0.1 (0.1)	0.2 (0.1)	0.4 (0.3)	0.2 (0.0)	0.2 (0.0)	0.3 (0.1)
cPOM	8.7 (1.1)	8.9 (1.1)	9.3 (1.2)	9.4 (1.4)	9.0 (0.6) <sup>B</sup>	18.6 (4.0)	17.0 (2.9)	9.9 (1.0)	11.1 (1.5)	15.2 (1.4) <sup>A</sup>	7.4 (1.3)	6.6 (0.8)	12.6 (1.7)	10.1 (2.0)	8.9 (0.8) <sup>B</sup>
mM	77.2 (1.5)	79.0 (1.3)	76.6 (1.4)	76.8 (1.5)	77.6 (0.7) <sup>A</sup>	62.5 (4.3)	64.0 (3.6)	69.1 (2.3)	72.7 (1.8)	65.2 (1.6) <sup>C</sup>	73.4 (1.0) <sup>a</sup>	73.5 (1.2) <sup>a</sup>	69.7 (2.0) <sup>b</sup>	72.7 (2.2) <sup>ab</sup>	72.2 (0.9) <sup>B</sup>
s+cM	10.9 (0.7)	9.3 (0.7)	10.9 (0.6)	12.1 (1.0)	10.4 (0.4)	12.5 (1.7)	13.2 (1.9)	16.2 (2.5)	11.3 (1.1)	14.0 (0.9)	10.4 (1.5)	10.3 (1.4)	8.7 (1.6)	9.9 (1.6)	9.8 (0.8)
<b>16 years of cultivation</b>															
LM	46.5 (4.5)	44.5 (3.8)	43.1 (2.5)	47.6 (3.4)	44.7 (1.6) <sup>B</sup>	52.2 (6.5)	55.3 (5.7)	54.0 (5.8)	52.7 (5.5)	53.8 (2.9) <sup>A</sup>	29.9 (3.8) <sup>ab</sup>	32.4 (3.5) <sup>a</sup>	27.3 (3.4) <sup>ab</sup>	23.3 (4.5) <sup>b</sup>	29.9 (2.1) <sup>C</sup>
SM	50.5 (4.3)	52.4 (3.7)	53.3 (2.3)	49.1 (3.2)	52.1 (1.7) <sup>B</sup>	44.0 (5.9)	41.0 (5.2)	42.6 (5.4)	44.5 (5.3)	42.5 (2.6) <sup>C</sup>	61.6 (3.3)	59.4 (4.8)	63.3 (2.7)	65.5 (2.6)	61.4 (1.7) <sup>A</sup>
m	2.6 (0.4)	2.7 (0.3)	3.3 (1.0)	3.0 (0.4)	2.9 (0.3) <sup>B</sup>	3.4 (0.6)	3.4 (0.4)	3.3 (0.6)	2.6 (0.6)	3.4 (0.3) <sup>B</sup>	8.3 (0.8) <sup>b</sup>	7.9 (1.0) <sup>b</sup>	9.0 (0.9) <sup>ab</sup>	11.8 (1.3) <sup>a</sup>	8.4 (0.5) <sup>A</sup>
s+c	0.5 (0.2)	0.4 (0.2)	0.4 (0.2)	0.3 (0.2)	0.4 (0.1)	0.5 (0.3)	0.4 (0.2)	0.1 (0.0)	0.2 (0.1)	0.3 (0.1)	0.3 (0.1)	0.4 (0.1)	0.3 (0.1)	0.4 (0.1)	0.3 (0.1)
cPOM	13.4 (1.3) <sup>b</sup>	14.1 (1.9) <sup>b</sup>	14.6 (1.3) <sup>b</sup>	17.8 (1.8) <sup>a</sup>	14.0 (1.0) <sup>A</sup>	18.9 (2.6)	18.3 (2.7)	19.0 (2.7)	18.2 (2.8)	18.7 (1.3) <sup>A</sup>	10.2 (0.8) <sup>a</sup>	9.8 (0.5) <sup>a</sup>	10.6 (0.3) <sup>a</sup>	8.4 (0.5) <sup>b</sup>	10.2 (0.4) <sup>C</sup>
mM	71.8 (1.5)	72.2 (2.1)	70.8 (1.2)	66.2 (1.8)	71.6 (1.1)	67.3 (2.8)	68.5 (3.0)	67.6 (3.1)	70.5 (2.8)	67.8 (1.4)	71.5 (0.9) <sup>a</sup>	71.4 (1.0) <sup>ab</sup>	70.4 (1.3) <sup>ab</sup>	66.9 (1.2) <sup>b</sup>	71.1 (0.6)
s+cM	11.8 (0.6)	10.6 (1.1)	11.0 (0.6)	11.6 (0.8)	11.2 (0.4)	10.0 (1.0)	9.5 (0.6)	9.9 (0.6)	8.5 (0.6)	9.8 (0.4)	9.7 (0.5)	10.5 (0.4)	9.7 (0.6)	9.5 (0.5)	10.0 (0.3)
<b>62 years of cultivation</b>															
LM	38.6 (3.0) <sup>ab</sup>	45.3 (2.4) <sup>a</sup>	37.0 (3.2) <sup>b</sup>	44.4 (2.6) <sup>ab</sup>	40.3 (1.9) <sup>A</sup>	47.4 (5.0)	41.3 (4.5)	35.6 (3.9)	39.9 (5.9)	41.4 (2.4) <sup>A</sup>	30.8 (2.2)	28.6 (2.3)	30.1 (3.2)	36.6 (3.2)	29.8 (2.1) <sup>B</sup>
SM	56.8 (2.7) <sup>a</sup>	50.3 (2.3) <sup>b</sup>	58.3 (2.9) <sup>a</sup>	50.5 (2.3) <sup>b</sup>	55.1 (1.8)	49.5 (4.6)	54.8 (4.2)	60.9 (3.7)	55.8 (5.6)	55.1 (2.3)	58.5 (2.5)	60.3 (2.4)	58.9 (2.4)	54.4 (3.2)	59.2 (1.7)
m	4.3 (0.4)	4.1 (0.5)	4.5 (0.3)	4.8 (0.7)	4.3 (0.2) <sup>B</sup>	2.6 (0.5)	3.2 (0.5)	3.3 (0.4)	3.0 (0.4)	3.0 (0.2) <sup>C</sup>	10.5 (1.1)	10.9 (1.0)	10.9 (0.9)	10.6 (1.2)	10.8 (0.5) <sup>A</sup>
s+c	0.4 (0.1)	0.3 (0.1)	0.2 (0.1)	0.3 (0.1)	0.3 (0.1)	0.5 (0.3)	0.6 (0.4)	0.3 (0.1)	1.3 (0.9)	0.5 (0.3)	0.2 (0.04)	0.2 (0.1)	0.2 (0.01)	0.5 (0.3)	0.2 (0.1)
cPOM	15.7 (1.1) <sup>b</sup>	15.1 (0.9) <sup>b</sup>	15.6 (0.8) <sup>b</sup>	17.3 (0.7) <sup>a</sup>	15.5 (0.6) <sup>A</sup>	8.5 (0.8)	7.0 (0.7)	7.8 (0.5)	7.3 (0.5)	7.8 (0.3) <sup>C</sup>	13.0 (2.0)	14.0 (1.2)	14.3 (1.7)	13.0 (1.5)	13.8 (0.8) <sup>B</sup>
mM	67.2 (1.0) <sup>a</sup>	66.3 (0.9) <sup>ab</sup>	65.5 (1.0) <sup>ab</sup>	62.0 (1.5) <sup>b</sup>	66.3 (0.6) <sup>B</sup>	76.1 (1.3)	78.4 (1.3)	77.2 (0.8)	76.1 (1.2)	77.2 (0.6) <sup>A</sup>	66.3 (1.8)	66.2 (1.4)	65.8 (1.8)	66.8 (1.3)	66.1 (0.8) <sup>B</sup>
s+cM	12.5 (0.7)	14.2 (0.7)	14.2 (0.9)	13.5 (0.4)	13.6 (0.4)	12.4 (1.1)	10.7 (1.0)	11.4 (0.9)	12.3 (0.9)	11.5 (0.5)	9.9 (0.8)	8.6 (0.4)	8.8 (0.5)	9.2 (0.9)	9.1 (0.3)

<sup>†</sup>This mean gives aggregate tree effect, calculated as an average of 12 monoliths (zone A, B, C) sampled below each tree. Within rows, means in bold followed by different letters in superscript are significantly different at  $p < 0.05$ . Uppercase letters indicate differences based on tree species while lowercase letters indicate the differences between sampling zones. <sup>††</sup> LM = large macroaggregates ( $> 2000 \mu\text{m}$ ), SM = small macroaggregates (250–2000  $\mu\text{m}$ ), m = microaggregates (53–250  $\mu\text{m}$ ), s+c = silt and clay ( $< 53 \mu\text{m}$ ), cPOM = coarse particulate organic matter ( $> 250 \mu\text{m}$ ), mM = microaggregates-within-macroaggregates (53–250  $\mu\text{m}$ ), s+cM = silt and clay within macroaggregates ( $< 53 \mu\text{m}$ ).

**Table S4:** *p*-values generated from fitting whole soil and aggregate-associated C as a function of duration of cultivation, tree species and zone using linear mixed models

Soil aggregate fraction <sup>†</sup>	Factors affecting C content in soil aggregate fractions					
	Duration of cultivation	Tree species	Tree zone	Duration × Species	Species × Zone	Duration × Species × Zone
WS	<b>&lt;0.001</b>	0.281	<b>&lt;0.001</b>	<b>0.042</b>	0.758	0.757
TM	<b>0.008</b>	0.584	<b>0.008</b>	<b>0.058</b>	<b>0.050</b>	0.236
m	0.766	<b>&lt;0.001</b>	0.567	<b>0.045</b>	<b>0.044</b>	0.299
s+c	0.250	0.163	0.625	0.182	0.971	0.621
cPOM	<b>0.017</b>	0.513	0.569	0.507	<b>0.050</b>	0.277
mM	<b>&lt;0.001</b>	0.618	0.280	0.446	<b>0.015</b>	0.085
s+cM	0.230	<b>0.025</b>	0.318	0.388	0.612	0.129

<sup>†</sup> WS = whole soil, TM = total macroaggregates (> 250 μm), m = microaggregates (53–250 μm), s+c = silt and clay (<53 μm), cPOM = coarse particulate organic matter (>250 μm), mM = microaggregates-within-macroaggregates (53–250 μm), s+cM = silt and clay within macroaggregates (<53 μm).

**Table S5:** Distribution of whole soil and aggregate-associated C (overall means  $\pm$  (SE)) as influenced by duration of cultivation and tree species.

C content in the fraction (mg g <sup>-1</sup> soil) †	Tree species			Duration of cultivation		
	<i>Croton megalocarpus</i>	<i>Eucalyptus grandis</i>	<i>Zanthoxylum gillettii</i>	10 years	16 years	62 years
WS	47.6 (1.3)	47.1 (0.9)	40.7 (1.0)	<b>58.9 (0.6)<sup>a</sup></b>	<b>38.4 (0.6)<sup>b</sup></b>	<b>35.1 (0.6)<sup>b</sup></b>
TM	<b>48.2 (1.3)<sup>ab</sup></b>	<b>47.5 (1.1)<sup>a</sup></b>	<b>39.7 (1.1)<sup>b</sup></b>	<b>60.0 (0.6)<sup>a</sup></b>	<b>36.8 (0.8)<sup>b</sup></b>	<b>36.6 (0.8)<sup>b</sup></b>
m	<b>1.5 (0.1)<sup>b</sup></b>	<b>2.1 (0.1)<sup>b</sup></b>	<b>4.2 (0.1)<sup>a</sup></b>	<b>3.2 (0.2)<sup>a</sup></b>	<b>1.9 (0.1)<sup>b</sup></b>	<b>2.5 (0.1)<sup>ab</sup></b>
s+c	0.3 (0.0)	0.2 (0.0)	0.2 (0.0)	0.2 (0.0)	0.2 (0.0)	0.3 (0.0)
cPOM	1.2 (0.1)	2.4 (0.3)	1.4 (0.1)	<b>3.4 (0.2)<sup>a</sup></b>	<b>0.9 (0.1)<sup>b</sup></b>	<b>0.8 (0.1)<sup>b</sup></b>
mM	39.7 (1.2)	37.6 (0.8)	33.3 (0.9)	<b>48.7 (0.6)<sup>a</sup></b>	<b>30.6 (0.7)<sup>b</sup></b>	<b>29.9 (0.7)<sup>b</sup></b>
s+cM	<b>6.9 (0.2)<sup>a</sup></b>	<b>7.5 (0.2)<sup>a</sup></b>	<b>5.1 (0.1)<sup>b</sup></b>	<b>7.8 (0.2)<sup>a</sup></b>	<b>5.3 (0.1)<sup>b</sup></b>	<b>5.9 (0.2)<sup>b</sup></b>

Within rows, means in bold and followed by different letters in superscript are significantly different at  $p < 0.05$ . Separation of means for the two factors (tree species and duration of cultivation) is done independently. † WS = whole soil, TM = total macroaggregates (>250  $\mu\text{m}$ ), m = microaggregates (53–250  $\mu\text{m}$ ), s+c = silt and clay (<53  $\mu\text{m}$ ), cPOM = coarse particulate organic matter (>250  $\mu\text{m}$ ), mM = microaggregates-within-macroaggregates (53–250  $\mu\text{m}$ ), s+cM = silt and clay within macroaggregates (<53  $\mu\text{m}$ ).

**Table S6:** Distribution of whole soil and aggregate-associate C (means  $\pm$  (SE)) as influenced by duration of cultivation, tree species and tree zone.

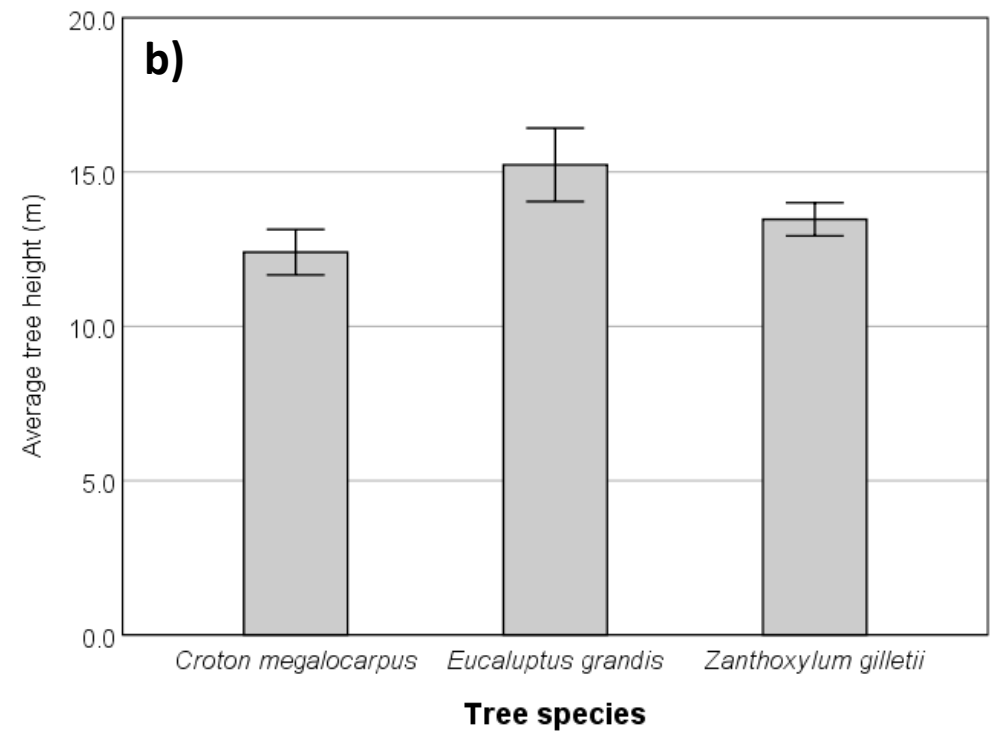
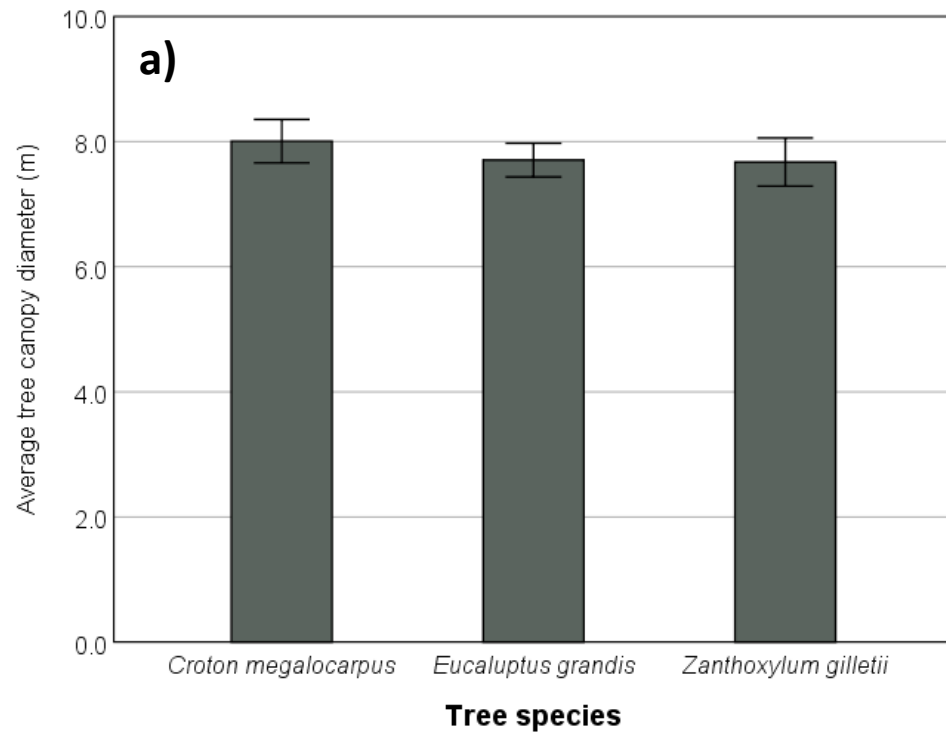
C content in the fraction (mg g <sup>-1</sup> soil) <sup>††</sup>	Tree species														
	<i>Croton megalocarpus</i>					<i>Eucalyptus grandis</i>					<i>Zanthoxylum gillettii</i>				
	Tree zone														
	A	B	C	D	Mean <sup>†</sup>	A	B	C	D	Mean <sup>†</sup>	A	B	C	D	Mean <sup>†</sup>
<b>10 years of cultivation</b>															
WS	<b>66.1 (3.1)<sup>a</sup></b>	<b>65.6 (3.0)<sup>a</sup></b>	<b>62.2 (4.8)<sup>ab</sup></b>	<b>57.5 (3.0)<sup>b</sup></b>	<b>64.6 (2.5)<sup>A</sup></b>	65.2 (3.1)	60.7 (5.8)	60.5 (1.5)	61.0 (4.9)	<b>62.1 (3.6)<sup>A</sup></b>	54.5 (2.4)	54.5 (2.5)	54.6 (2.1)	52.4 (3.2)	<b>54.5 (2.8)<sup>B</sup></b>
TM	<b>66.2 (0.4)<sup>a</sup></b>	<b>64.8 (2.5)<sup>ab</sup></b>	<b>62.9 (2.1)<sup>ab</sup></b>	<b>59.5 (1.6)<sup>b</sup></b>	<b>64.6 (1.5)<sup>A</sup></b>	62.2 (6.1)	65.7 (6.8)	60.7 (3.9)	63.0 (0.9)	<b>62.9 (2.2)<sup>A</sup></b>	54.8 (1.4)	53.3 (2.4)	53.9 (3.2)	53.3 (6.2)	<b>54.0 (2.0)<sup>B</sup></b>
m	<b>1.4 (0.5)<sup>a</sup></b>	<b>1.3 (0.2)<sup>a</sup></b>	<b>1.4 (0.3)<sup>a</sup></b>	<b>0.7 (0.1)<sup>b</sup></b>	<b>1.4 (0.3)<sup>C</sup></b>	<b>3.9 (0.6)<sup>a</sup></b>	<b>3.6 (0.3)<sup>a</sup></b>	<b>2.8 (0.4)<sup>b</sup></b>	<b>3.1 (0.1)<sup>b</sup></b>	<b>3.4 (0.4)<sup>B</sup></b>	4.6 (0.9)	5.6 (0.8)	5.7 (1.0)	4.2 (1.3)	<b>5.3 (0.9)<sup>A</sup></b>
s+c	0.5 (0.4)	0.5 (0.4)	0.5 (0.3)	0.2 (0.1)	0.5 (0.3)	0.1 (0.0)	0.1 (0.0)	0.1 (0.1)	0.1 (0.0)	0.1 (0.0)	0.2 (0.1)	0.4 (0.3)	0.1 (0.0)	0.2 (0.1)	0.2 (0.1)
cPOM	3.0 (1.2)	3.9 (1.2)	2.7 (0.3)	2.8 (0.5)	<b>3.2 (0.8)<sup>AB</sup></b>	6.9 (2.6)	7.0 (3.0)	2.5 (0.4)	3.3 (1.0)	<b>5.5 (2.1)<sup>A</sup></b>	1.6 (0.9)	1.4 (0.8)	3.7 (0.5)	2.4 (1.0)	<b>2.3 (0.9)<sup>B</sup></b>
mM	<b>55.6 (1.4)<sup>a</sup></b>	<b>55.5 (3.8)<sup>ab</sup></b>	<b>52.7 (2.3)<sup>ab</sup></b>	<b>49.3 (3.8)<sup>b</sup></b>	<b>54.6 (2.8)<sup>A</sup></b>	45.8 (7.9)	47.4 (8.9)	46.7 (4.9)	51.8 (0.4)	<b>46.4 (5.6)<sup>AB</sup></b>	46.0 (0.9)	45.2 (3.2)	44.3 (3.2)	44.5 (5.3)	<b>45.2 (3.0)<sup>B</sup></b>
s+cM	7.6 (0.6)	5.4 (1.1)	7.5 (0.7)	7.4 (1.1)	<b>6.8 (1.0)<sup>B</sup></b>	9.5 (0.9)	11.3 (1.3)	11.4 (1.9)	7.9 (0.3)	<b>10.7 (1.2)<sup>A</sup></b>	7.1 (1.7)	6.6 (0.8)	5.9 (1.5)	6.4 (1.7)	<b>6.5 (1.1)<sup>B</sup></b>
<b>16 years of cultivation</b>															
WS	<b>48.9 (3.9)<sup>a</sup></b>	<b>48.4 (1.3)<sup>a</sup></b>	<b>39.9 (2.2)<sup>b</sup></b>	<b>36.1 (2.6)<sup>b</sup></b>	<b>45.7 (2.0)<sup>A</sup></b>	38.6 (2.5)	38.8 (2.8)	38.6 (2.4)	36.1 (3.1)	<b>38.7 (3.5)<sup>AB</sup></b>	33.3 (3.0)	32.1 (2.5)	31.2 (3.6)	30.5 (2.3)	<b>32.2 (3.1)<sup>B</sup></b>
TM	<b>47.2 (8.4)<sup>a</sup></b>	<b>49.4 (4.0)<sup>a</sup></b>	<b>38.6 (3.9)<sup>b</sup></b>	<b>36.1 (5.0)<sup>b</sup></b>	<b>45.1 (6.0)<sup>A</sup></b>	36.6 (5.0)	39.8 (2.4)	37.4 (4.3)	35.0 (5.0)	<b>37.9 (3.8)<sup>AB</sup></b>	32.3 (2.0)	30.7 (1.5)	30.1 (1.7)	28.5 (1.1)	<b>31.0 (3.8)<sup>B</sup></b>
m	1.4 (0.3)	1.4 (0.2)	1.2 (0.3)	1.2 (0.3)	<b>1.3 (0.3)<sup>B</sup></b>	1.5 (0.4)	1.5 (0.3)	1.4 (0.2)	1.2 (0.2)	<b>1.5 (0.3)<sup>B</sup></b>	2.8 (0.2)	2.8 (0.3)	3.0 (0.4)	3.5 (0.3)	<b>2.9 (0.6)<sup>A</sup></b>
s+c	0.2 (0.1)	0.2 (0.1)	0.2 (0.1)	0.2 (0.1)	0.2 (0.1)	0.4 (0.3)	0.2 (0.1)	0.1 (0.0)	0.1 (0.0)	0.3 (0.1)	0.2 (0.0)	0.2 (0.0)	0.2 (0.0)	0.2 (0.0)	0.2 (0.0)
cPOM	<b>1.5 (0.4)<sup>a</sup></b>	<b>1.0 (0.3)<sup>ab</sup></b>	<b>0.9 (0.2)<sup>b</sup></b>	<b>0.7 (0.2)<sup>b</sup></b>	1.1 (0.5)	1.0 (0.3)	0.9 (0.1)	1.1 (0.3)	0.8 (0.1)	1.0 (0.2)	<b>0.9 (0.2)<sup>a</sup></b>	<b>0.5 (0.2)<sup>ab</sup></b>	<b>0.6 (0.1)<sup>ab</sup></b>	<b>0.4 (0.2)<sup>b</sup></b>	0.7 (0.2)
mM	<b>38.7 (3.7)<sup>a</sup></b>	<b>41.6 (3.2)<sup>a</sup></b>	<b>31.9 (1.4)<sup>b</sup></b>	<b>29.5 (3.2)<sup>b</sup></b>	<b>37.4 (3.2)<sup>A</sup></b>	29.9 (4.4)	32.8 (2.6)	30.7 (4.1)	29.9 (4.6)	<b>31.1 (3.5)<sup>AB</sup></b>	27.2 (2.7)	25.7 (2.1)	25.4 (2.2)	23.9 (0.6)	<b>26.1 (2.2)<sup>B</sup></b>
s+cM	7.0 (1.0)	6.8 (1.6)	5.9 (0.9)	5.7 (0.6)	<b>6.6 (1.0)<sup>A</sup></b>	5.7 (0.8)	6.1 (0.3)	5.6 (0.7)	4.4 (0.6)	<b>5.8 (0.8)<sup>AB</sup></b>	4.2 (0.8)	4.5 (0.5)	4.3 (0.6)	4.1 (0.5)	<b>4.3 (0.4)<sup>B</sup></b>
<b>62 years of cultivation</b>															
WS	34.9 (3.6)	31.4 (2.9)	31.7 (1.7)	33.5 (1.4)	32.7 (2.4)	40.1 (1.8)	39.7 (1.2)	42.1 (1.2)	40.4 (2.0)	40.6 (2.2)	35.4 (4.5)	33.8 (4.2)	36.7 (3.0)	35.2 (3.6)	35.3 (2.8)
TM	35.9 (2.6)	33.4 (1.9)	35.9 (2.2)	31.5 (1.9)	35.0 (2.9)	43.3 (1.5)	41.0 (2.6)	41.2 (1.0)	40.8 (2.0)	41.8 (1.7)	33.4 (4.3)	32.3 (5.2)	36.6 (9.3)	33.5 (7.6)	34.1 (5.7)
m	1.9 (0.5)	1.6 (0.5)	1.6 (0.5)	1.6 (0.5)	<b>1.7 (0.3)<sup>B</sup></b>	1.2 (0.2)	1.5 (0.3)	1.4 (0.3)	1.4 (0.3)	<b>1.4 (0.4)<sup>B</sup></b>	4.4 (0.7)	4.4 (1.0)	4.5 (1.1)	4.3 (0.9)	<b>4.4 (0.8)<sup>A</sup></b>
s+c	0.2 (0.0)	0.2 (0.0)	0.1 (0.0)	0.2 (0.0)	0.2 (0.0)	0.3 (0.2)	0.4 (0.3)	0.2 (0.0)	0.8 (0.6)	0.3 (0.3)	0.1 (0.0)	0.2 (0.0)	0.1 (0.0)	0.2 (0.2)	0.2 (0.1)
cPOM	0.8 (0.2)	0.5 (0.1)	0.7 (0.1)	1.2 (0.7)	0.7 (0.3)	0.8 (0.2)	0.4 (0.0)	0.5 (0.0)	0.6 (0.1)	0.6 (0.3)	1.3 (0.8)	0.9 (0.3)	1.3 (0.7)	1.1 (0.4)	1.2 (0.5)
mM	28.3 (1.4)	25.6 (1.1)	27.8 (1.7)	23.2 (1.4)	<b>27.2 (2.1)<sup>B</sup></b>	36.0 (1.2)	35.2 (2.6)	34.8 (1.3)	33.8 (1.2)	<b>35.3 (1.5)<sup>A</sup></b>	27.8 (3.2)	27.2 (4.6)	30.8 (8.3)	27.9 (5.6)	<b>28.6 (5.0)<sup>AB</sup></b>
s+cM	6.8 (1.7)	7.3 (1.8)	7.4 (0.6)	7.1 (1.0)	<b>7.2 (1.3)<sup>A</sup></b>	6.4 (0.2)	5.4 (0.6)	5.8 (0.6)	6.4 (1.0)	<b>5.9 (0.4)<sup>A</sup></b>	4.4 (0.3)	4.3 (0.4)	4.6 (0.5)	4.6 (0.8)	<b>4.4 (0.4)<sup>B</sup></b>

<sup>†</sup> This mean gives aggregate tree effect, calculated as an average of 12 monoliths (in zone A, B, C) below each tree. Within rows, means in bold and followed by different letters in superscript are significantly different at  $p < 0.05$ . Uppercase letters indicate the differences based on tree species while lowercase letters indicate the differences between sampling zones. <sup>††</sup> WS = whole soil, TM = total macroaggregates (>250  $\mu\text{m}$ ), m = microaggregates (53–250  $\mu\text{m}$ ), s+c = silt and clay (<53  $\mu\text{m}$ ), cPOM = coarse particulate organic matter (>250  $\mu\text{m}$ ), mM = microaggregates-within-macroaggregates (53–250  $\mu\text{m}$ ), s+cM = silt and clay within macroaggregates (<53  $\mu\text{m}$ ).

**Table S7:** Earthworms species distribution as affected by the three tree species in soils after 10, 16 and 62 years of cultivation. Source: Kamau et al. (2017a).

Soil macrofauna description			Tree species											
			<i>Croton megalocarpus</i>				<i>Eucalyptus grandis</i>				<i>Zanthoxylum gillettii</i>			
Family	Ecological group <sup>†</sup>	Genera/Species	Sampling zone											
			A	B	C	D	A	B	C	D	A	B	C	D
<b>10 years of cultivation</b>														
<b>Termites</b>														
Termitidae	G II (FWLG)	<i>Microtermes sp.</i>	58.7 (54.4)	26.7 (26.7)	2.7 (1.8)	24.0 (13.1)	22.7 (19.8)	8.0 (5.4)	1.3 (1.3)	2.7 (1.8)	6.7 (6.7)	44.0 (37.1)	0	12.0 (8.2)
<b>Earthworms</b>														
Acanthodrilidae		<i>Dichogaster modiglianii</i>	0	5.3 (2.3)	0	0	5.3 (3.5)	0	2.7 (2.0)	2.7 (2.3)	1.3 (1.2)	4.0 (3.5)	1.3 (1.0)	0
Eudrilidae	Epigeic	<i>Eminoscolex violaceus</i>	2.7 (1.3)	2.7 (1.7)	13.3 (11.5)	1.3 (1.3)	1.3 (1.0)	0	1.3 (1.3)	4.0 (2.5)	0	0	1.3 (1.0)	1.3 (1.2)
		<i>Polytoreutus annulatus</i>	1.3 (1.2)	0	1.3 (1.2)	1.3 (1.2)	0	0	2.7 (2.3)	1.3 (1.3)	1.3 (1.2)	0	1.3 (1.3)	0
<b>Total epigeic earthworms</b>			4.0 (1.8)	8.0 (3.6)	14.7 (11.5)	2.7 (3.6)	6.7 (4.7)	0	6.7 (4.7)	8.0 (4.0)	2.7 (1.6)	4.0 (3.5)	4.0 (1.8)	1.3 (1.2)
Ocnerodrilidae	Endogeic	<i>Nematogena lacuum</i>	4.0 (2.5)	22.7 (9.9)	14.7 (5.0)	8.0 (2.7)	20.0 (6.8)	36.0 (16.1)	20.0 (5.9)	16.0 (6.0)	5.3 (2.6)	16.0 (5.0)	9.3 (4.0)	2.7 (2.3)
<b>Total endogeic earthworms</b>			4.0 (2.5)	22.7 (9.9)	14.7 (5.0)	8.0 (2.7)	20.0 (6.8)	36.0 (6.1)	20.0 (5.9)	16.0 (6.0)	5.3 (2.6)	16.0 (5.0)	9.3 (4.0)	2.7 (2.3)
<b>Total earthworms count</b>			8.0 (3.6)	30.7 (9.4)	29.3 (5.5)	10.7 (3.6)	26.7 (7.5)	36.0 (6.7)	26.7 (7.1)	24.0 (5.8)	8.0 (3.2)	20.0 (6.7)	13.3 (4.1)	4.0 (2.5)
<b>16 years of cultivation</b>														
<b>Termites</b>														
Termitidae	G II (FWLG)	<i>Microtermes sp.</i>	0	2.7 (1.8)	2.7 (2.7)	0	197.3 (117.2)	20.0 (11.2)	29.3 (20.7)	65.3 (32.1)	18.7 (6.8)	58.7 (24.8)	34.7 (24.8)	1.3 (1.3)
<b>Earthworms</b>														
Acanthodrilidae	Epigeic	<i>D. modiglianii</i>	17.3 (8.3)	14.7 (4.7)	1.3 (1.3)	5.3 (2.6)	0	1.3 (1.2)	0	2.7 (2.5)	0	2.7 (2.3)	10.7 (5.6)	16.0 (3.6)
		<i>D. bolau</i>	6.7 (4.0)	0	1.3 (1.0)	2.7 (2.3)	4.0 (2.5)	4.0 (2.5)	13.3 (3.5)	6.6 (2.6)	16.0 (13.9)	5.3 (4.6)	0	0
Eudrilidae	Epigeic	<i>E. violaceus</i>	6.7 (4.0)	10.7 (7.1)	2.7 (2.3)	4.0 (3.2)	0	0	0	0	0	0	0	0
		<i>P. annulatus</i>	2.7 (1.6)	2.7 (1.6)	6.7 (5.8)	2.7 (2.3)	5.3 (2.0)	1.3 (1.3)	0	5.3 (3.1)	0	0	0	1.3 (1.2)
<b>Total epigeic earthworms</b>			33.3 (8.4)	28.0 (7.5)	12.0 (5.9)	14.7 (5.0)	9.3 (2.7)	6.7 (2.7)	13.3 (8.5)	14.7 (5.0)	16.0 (13.9)	8.0 (5.0)	10.7 (5.2)	17.3 (5.7)
Ocnerodrilidae	Endogeic	<i>N. lacuum</i>	33.3 (18.1)	14.7 (4.8)	14.7 (6.4)	28.0 (11.1)	76.0 (26.4)	85.3 (18.2)	76.0 (15.2)	53.3 (19.3)	368.5 (48.6)	362.8 (69.4)	404.0 (62.7)	169.3 (36.8)
<b>Total endogeic earthworms</b>			33.3 (18.1)	14.7 (4.8)	14.7 (6.4)	28.0 (11.1)	76.0 (26.4)	85.3 (18.2)	76.0 (15.2)	53.3 (19.3)	368.5 (48.6)	362.8 (79.4)	404.0 (62.7)	169.3 (36.8)
<b>Total earthworms count</b>			62.7 (22.6)	42.7 (10.8)	26.7 (7.1)	42.7 (10.4)	85.3 (25.5)	92.0 (17.5)	89.3 (13.3)	68.0 (18.1)	381.3 (51.6)	370.7 (79.5)	414.7 (63.1)	186.7 (36.0)
<b>62 years of cultivation</b>														
<b>Termites</b>														
Termitidae	G II (FWLG)	<i>Microtermes sp.</i>	8.0 (4.6)	10.7 (10.7)	68.0 (36.0)	25.3 (17.3)	20.0 (20.0)	1.3 (1.3)	12.0 (5.6)	12.0 (10.6)	1.3 (1.3)	0	9.3 (9.3)	5.3 (4.1)
<b>Earthworms</b>														
Acanthodrilidae	Epigeic	<i>D. modiglianii</i>	4.4 (1.0)	2.7 (2.2)	0	14.7 (9.3)	9.3 (5.0)	27.0 (18.5)	2.6 (1.2)	6.7 (5.8)	0	4.0 (3.5)	6.7 (3.2)	9.4 (1.6)
		<i>D. bolau</i>	1.3 (1.2)	2.7 (2.4)	0	0	5.3 (3.1)	2.7 (1.6)	10.7 (4.3)	2.7 (2.3)	0	0	0	0
Eudrilidae	Epigeic	<i>E. violaceus</i>	22.3 (8.4)	5.3 (4.6)	17.3 (10.2)	5.3 (4.6)	0	0	0	0	2.7 (2.3)	1.3 (1.2)	0	0
		<i>P. annulatus</i>	10.7 (4.3)	1.3 (1.2)	8.0 (3.2)	4.0 (1.8)	2.7 (1.6)	5.0 (1.3)	1.3 (1.2)	2.7 (2.3)	0	0	0	1.3 (1.3)
<b>Total epigeic earthworms</b>			38.7 (8.1)	12.0 (5.2)	25.3 (10.7)	24.0 (9.7)	17.3 (6.0)	34.7 (18.1)	14.7 (4.0)	12.0 (6.2)	2.7 (2.3)	5.3 (3.6)	6.7 (3.2)	10.7 (4.3)
Ocnerodrilidae	Endogeic	<i>Gordiodrilus wemanus</i>	0	0	0	0	4.0 (2.5)	2.7 (2.0)	5.3 (2.6)	2.7 (1.6)	0	0	0	0
		<i>N. lacuum</i>	184.0 (84.1)	81.3 (22.7)	73.4 (31.6)	137.3 (33.2)	45.3 (12.0)	54.6 (15.3)	102.7 (17.7)	80.0 (28.7)	148.0 (50.1)	156.0 (22.4)	160.0 (45.2)	153.3 (42.0)
<b>Total endogeic earthworms</b>			184.0 (84.1)	81.3 (22.7)	73.4 (31.6)	137.3 (33.2)	49.3 (14.0)	57.3 (16.8)	108.0 (18.4)	82.7 (28.9)	148.0 (50.1)	156.0 (22.4)	160.0 (45.2)	153.3 (42.0)
<b>Total earthworms count</b>			222.7 (85.7)	93.3 (22.5)	98.7 (29.6)	161.3 (30.0)	66.7 (15.9)	92.0 (21.3)	122.7 (18.1)	94.7 (28.1)	150.7 (49.8)	161.3 (20.8)	166.7 (45.1)	164.0 (41.6)

<sup>†</sup> G II = Group two, W = wood, L = leaf litter, F = fungus grower, G = dead/dry grass.



**Figure S1:** A summary of the tree attributes; **(a)** diameter of the tree canopy and **(b)** height of the trees