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Supplement of

Responses of nitrous oxide emissions to nitrogen and phosphorus additions in two tropical plantations with N-fixing vs. non-N-fixing tree species

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1 **Supplementary material:**

2 **Table S1.** Indices of tree structure in *Acacia auriculiformis* and *Eucalyptus urophylla* plantations.

	<i>AA</i> plantation			<i>EU</i> plantation		
	<i>Acacia auriculiformis</i>	Other plants	Total	<i>Eucalyptus urophylla</i>	Other plants	Total
Stem density (tree ha ⁻²)	357	1719	2076	1186	776	1961
Mean height (m)	12.2	5.6		11.5	4	
DBH (cm)	15	4.8		11.1	3.9	
Tree age (years)	27			27		
Basal area (m ² ha ⁻²)	7.3	5.2	12.5	14.7	2	16.7
Percentage of basal area (%)	59	41	100	88	12	100

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4 **Notes:** The survey was conducted in July 2010 (27 years after tree planting) before the first N, P, and NP applications. DBH, Diameter at breast

5 height. *AA*, *Acacia auriculiformis* plantation; *EU*, *Eucalyptus urophylla* plantation.

6 **Table S2.** Soil properties (0-10 cm depth) of the *Acacia auriculiformis* and *Eucalyptus urophylla* plantations.

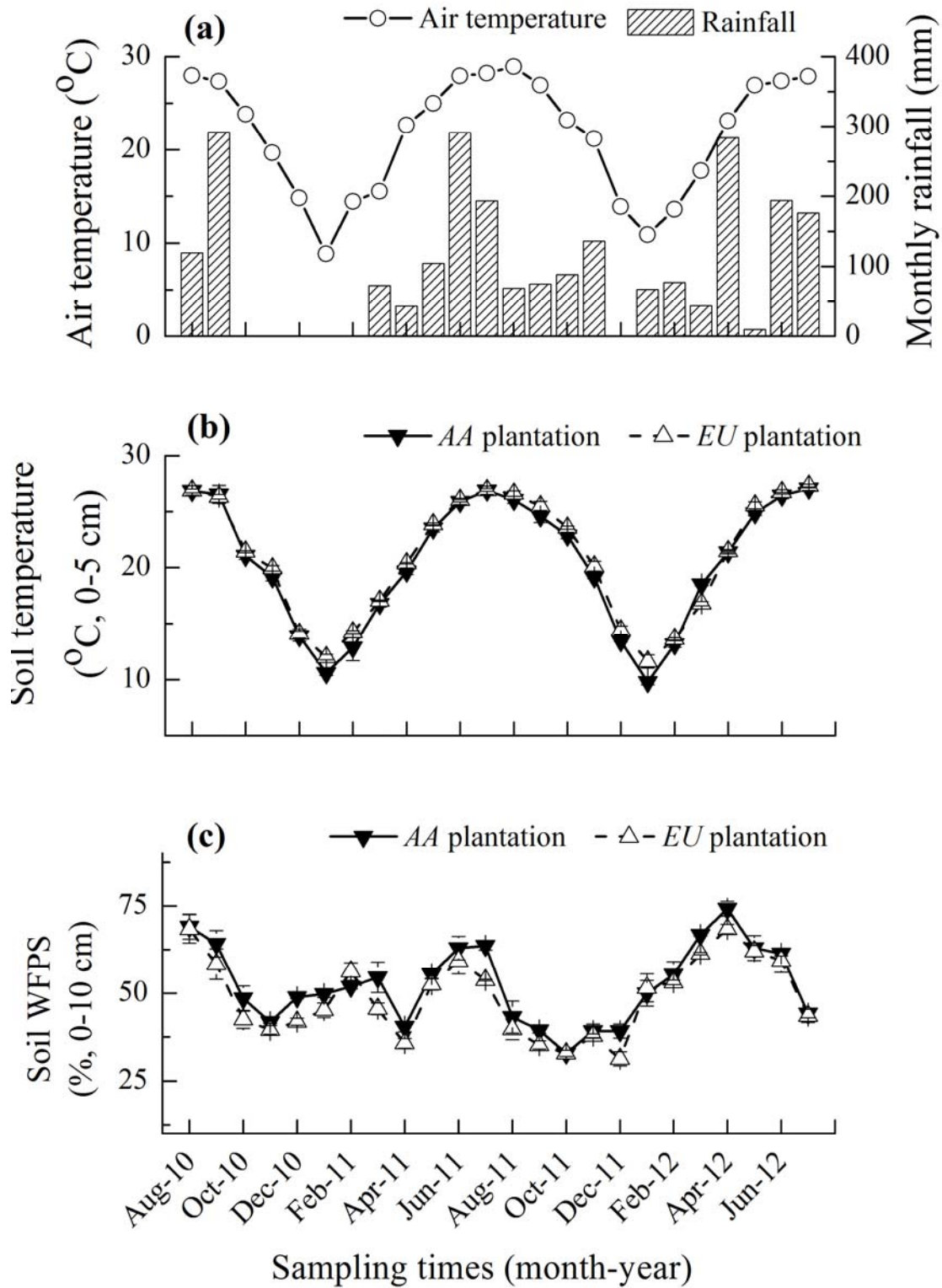
Site	Treatment	July 2011						July 2012					
		NO ₃ ⁻ -N (mg kg ⁻¹)	NH ₄ ⁺ -N (mg kg ⁻¹)	TN (g kg ⁻¹)	SOC (g kg ⁻¹)	C:N ratio	Av. P (mg kg ⁻¹)	NO ₃ ⁻ -N (mg kg ⁻¹)	NH ₄ ⁺ -N (mg kg ⁻¹)	TN (g kg ⁻¹)	SOC (g kg ⁻¹)	C:N ratio	Av. P (mg kg ⁻¹)
AA	C	8.1(0.2)a	10.5(0.3)a	1.6(0.1)a	22.1(2)	13.8(2)b	1.8(0.2)a	7.7(0.9)a	9.4(0.5)a	2.2(0.1)a	40.7(3)	18.5(1)b	2.9(0.3)a
	MN	12.3(0.5)b	13.2(0.4)ab	1.8(0.3)ab	19.0(2)	11.7(2)ab	1.9(0.2)a	11.9(1.4)ab	11.7(0.3)ab	2.5(0.1)ab	38.0(2)	15.2(1)ab	2.8(0.1)a
	HN	14.9(0.6)b	16.3(0.7)b	2.2(0.1)b	21.5(1)	9.8(1)a	1.9(0.6)a	13.5(1.2)b	15.3(1.4)b	2.7(0.2)b	32.7(3)	12.5(2)a	3.0(0.2)a
	MP	9.6(0.8)a	12.2(1.2)a	1.3(0.3)a	18.4(1)	14.2(3)b	3.3(1.2)ab	6.7(1.1)a	9.8(1.8)a	2.2(0.2)ab	38.5(3)	17.5(2)b	3.3(0.5)ab
	HP	10.2(0.6)ab	12.8(1.6)a	1.5(0.2)a	19.7(3)	13.1(2)ab	8.9(0.4)c	6.6(0.4)a	11.9(0.7)ab	2.2(0.2)ab	45.3(4)	18.9(3)bc	4.1(0.5)b
	MNP	11.7(1.0)b	14.8(1.2)ab	1.6(0.2)a	21.5(1)	13.4(3)b	3.3(0.8)ab	10.9(1.3)ab	10.5(1.2)a	2.1(0.4)a	49.1(5)	23.4(4)c	3.6(0.3)ab
	HNP	9.6(0.5)a	14.4(1.0)ab	1.5(0.1)a	22.6(2)	15.1(1)b	5.8(1.4)b	11.3(1.0)ab	12.2(0.8)ab	2.0(0.2)a	55.8(4)	27.9(3)c	4.0(0.1)b
EU	C	6.1(0.6)a	8.7(1.3)	1.4(0.0)	15.5(2)	11.1(1)	1.6(0.3)a	5.6(0.5)b	6.7(0.2)a	1.6(0.1)	20.9(3)	13.1(2)	2.6(0.1)a
	MN	9.5(0.7)ab	9.0(1.8)	1.5(0.3)	15.8(2)	10.5(1)	1.1(0.3)a	7.4(0.4)b	8.7(0.7)ab	1.4(0.2)	25.8(3)	18.4(3)	2.8(0.2)a
	HN	10.6(0.5)b	9.3(1.2)	1.8(0.2)	16.1(1)	9.0(1)	2.0(0.3)a	12.3(0.6)c	13.9(0.2)b	1.7(0.2)	28.9(2)	17.9(3)	3.4(0.1)ab
	MP	8.1(0.5)ab	9.1(0.9)	1.5(0.1)	17.2(1)	11.5(0)	2.1(0.7)a	3.6(0.4)a	6.6(0.4)a	1.5(0.1)	26.3(3)	17.5(3)	3.8(0.1)b
	HP	7.8(0.9)ab	8.6(1.2)	1.6(0.1)	18.8(2)	11.8(1)	5.3(1.1)b	4.2(0.7)a	5.2(0.8)a	1.6(0.3)	33.9(2)	21.2(2)	4.1(0.4)b
	MNP	8.6(0.4)ab	10.7(0.7)	1.8(0.1)	18.9(2)	10.6(2)	2.8(0.6)ab	5.7(1.4)b	6.0(1.4)a	1.8(0.2)	31.8(3)	17.7(1)	3.4(0.3)ab
	HNP	8.0(0.7)ab	9.9(0.8)	1.7(0.3)	17.3(3)	10.2(2)	6.3(1.3)b	6.0(0.6)b	6.9(0.7)a	1.7(0.1)	33.6(3)	19.8(1)	4.0(0.5)b

7 **notes:** Soil samples were collected in July 2011 and July 2012. Values are presented as means with SE in parentheses (n = 3). Different letters in
8 the same column indicate significantly different mean values among treatments of each plantation (Tukey's HSD test, $p \leq 0.05$). AA: *Acacia*
9 *auriculiformis* plantation; EU: *Eucalyptus urophylla* plantation. TN, total nitrogen; SOC, soil organic C; C:N ratio, SOC:TN ratio; Av. P, soil
10 available P.

11 **Table S3.** Soil pH, MBC, MBN, LM and N, P concentrations of leaf litter at *Acacia auriculiformis* and *Eucalyptus urophylla* plantations.

Site	Treatment	July 2011				July 2012						
		pH value	MBC (mg kg ⁻¹)	MBN (mg kg ⁻¹)	LM (gm ⁻² yr ⁻¹)	pH value	MBC (mg kg ⁻¹)	MBN (mg kg ⁻¹)	LM (gm ⁻² yr ⁻¹)	Litter N (mg g ⁻¹)	Litter P (mg g ⁻¹)	N:P ratio
AA	C	3.8(0.02)ab	254(14)a	41(4)ab	749(85)	3.8(0.01)ab	330(31)a	67(12)	841(58)	12(0.5)	0.2(0.0)a	77(2)c
	MN	3.8(0.03)ab	215(10)a	52(6)ab	712(57)	3.8(0.03)ab	350(33)a	74(15)	704(59)	14(1.1)	0.2(0.0)a	72(9)c
	HN	3.7(0.02)a	204(15)a	60(7)b	800(23)	3.7(0.01)a	292(31)a	79(10)	846(72)	14(0.3)	0.2(0.0)a	85(3)c
	MP	3.9(0.04)b	237(45)a	40(18)ab	964(96)	3.9(0.03)b	298(35)a	61(18)	864(64)	13(0.5)	0.3(0.0)ab	45(7)b
	HP	3.9(0.05)b	234(27)a	28(4)a	715(54)	3.9(0.04)b	634(38)b	86(17)	780(77)	12(0.5)	1.4(0.3)c	10(2)a
	MNP	3.8(0.02)ab	316(36)b	32(6)ab	751(66)	3.9(0.02)b	414(32)ab	94(12)	744(59)	13(0.9)	0.4(0.1)ab	35(7)ab
	HNP	3.8(0.05)ab	426(32)b	51(8)ab	738(50)	3.9(0.02)b	446(34)ab	52(14)	783(56)	14(1.6)	0.7(0.1)b	23(5)ab
EU	C	3.9(0.05)	288(21)	44(6)	644(28)	3.9(0.02)	378(33)	78(8)	870(67)	11(0.4)a	0.4(0.1)ab	33(7)b
	MN	3.9(0.04)	279(24)	31(1)	517(10)	3.9(0.03)	333(34)	60(13)	697(55)	13(0.4)b	0.3(0.0)a	43(2)c
	HN	3.8(0.02)	246(23)	39(7)	520(61)	4.0(0.05)	326(26)	69(10)	674(58)	13(0.4)b	0.3(0.0)a	44(5)c
	MP	3.9(0.04)	258(27)	40(7)	690(46)	3.9(0.01)	286(24)	73(9)	714(29)	12(0.8)ab	0.5(0.2)ab	23(6)ab
	HP	3.8(0.01)	328(36)	49(11)	574(59)	4.0(0.03)	359(26)	47(12)	826(57)	13(0.3)b	1.4(0.2)c	9(1)a
	MNP	3.9(0.05)	293(18)	51(12)	486(54)	4.0(0.05)	361(16)	74(11)	817(45)	12(0.4)ab	0.9(0.1)ab	15(1)ab
	HNP	3.9(0.04)	285(16)	35(4)	634(13)	3.9(0.04)	350(20)	80(10)	914(39)	14(0.3)b	1.1(0.3)b	15(5)ab

12 **Notes:** Soil samples were collected in July 2011 and July 2012. Values are presented as means with SE in parentheses ($n = 3$). Different letters in
13 the same column indicate significantly different mean values among treatments of each stand (Tukey's HSD test, $p \leq 0.05$). AA, *Acacia*
14 *auriculiformis* plantation; EU, *Eucalyptus urophylla* plantation. MBC, microbial biomass C; MBN, microbial biomass N; LM, litterfall mass; N:P
15 ratio, litter N:litter P.

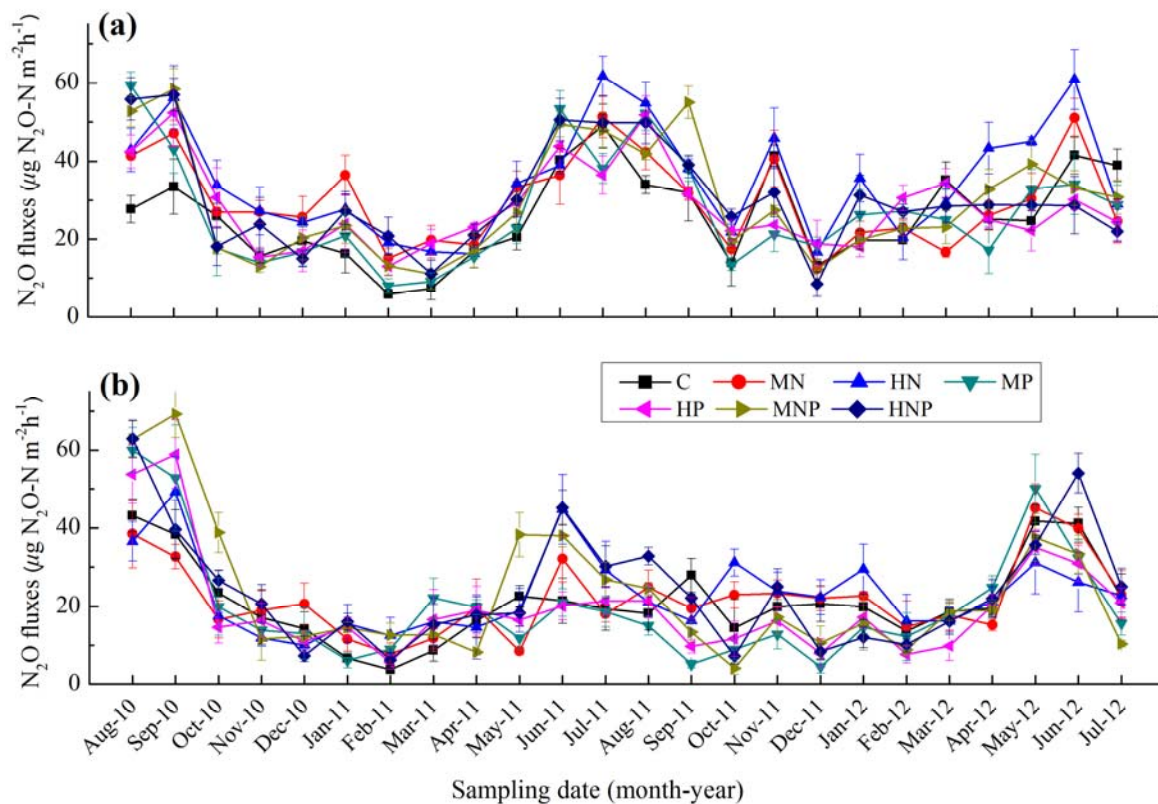


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17 **Figure S1.** Temporal variation of climate factors, soil temperature and WFPS from August

18 2010 to July 2012. (a) Monthly rainfall and air temperature, (b) soil temperature at 5 cm depth,

19 and (c) soil WFPS at 0-10 cm depth. The error bars denote 1 SE. AA, *Acacia auriculiformis*
20 plantation; EU, *Eucalyptus urophylla* plantation.



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22 **Figure S2.** Seasonal patterns of soil N_2O emissions from (a) *Acacia auriculiformis* and (b)
23 *Eucalyptus urophylla* plantations. The error bars denote 1 SE.
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