

SUPPLEMENTARY MATERIALS

Supplementary table (ST) 1.

Physico-chemical soil characteristics at the onset of the Nigerian and Indonesian trials.

Sites	Horizon (cm)	Granulometry				Acidity		Organic Matter				P content		(Cations) Exchange Complex contents								
		Clay (%)	Slit (%)		Fine sand (%)	Coarse sand (%)	pH water	pHco	Organic matter (%)	Organic Carbon (%)	Total N (%)	C/N	Total P (mg/kg)	Available P (mg/kg)	Ca ²⁺ (me/100g)	Mg ²⁺ (me/100g)	K ⁺ (me/100g)	Na ⁺ (me/100g)	Al ³⁺ (me/100g)	S (Ca, Mg, K, Na) (me/100g)	CEC (me/100g)	TS (%)
			Fine	Coarse																		
NIGERIA	0 - 20	12.33	1.69	1.11	13.79	71.1	5.47	4.31	1.57	0.91	0.65	13.93	125	2.9	1.54	0.37	0.09	0.03	0.04	2.04	2.34	86.88
	20 - 70	14.3	1.89	1.17	13.46	69.19	4.95	4.12	0.74	0.43	0.29	14.84	122.5	1.7	0.5	0.16	0.05	0.04	0.41	0.74	1.53	49.11
INDONESIA	0 - 15	12	10	9	69	4.59	4.38	6.7	3.88	0.36	10.7	153	3.7	1.39	0.36	0.27	0.07	-	2.09	6.97	29.99	
	15- 30	13.9	10	9	69	4.95	4.12	4.74	2.75	0.27	10.39	81	1.4	0.96	0.25	0.23	0.04	-	1.48	5.31	27.87	

N: Nitrogen, C: Carbon, P: Phosphorus, Al: Aluminium, Na: Sodium, Ca: Calcium, Mg: Magnesium, S: Base ion (cation) sum, CEC: Cation exchange capacity, TS: Saturation rate, pHco: pH cobalt (Soil acidity assessed using the cobaltihexamine method)

Supplementary table (ST) 2.

Fertilizer application scheme (g of fertilizer per palm) in Nigeria (A) and Indonesia (B)

A- Fertilizer application scheme in Nigeria (in g of fertilizer per palm)

Years after planting	Months	Quantities of applied fertilizers											Equivalent in g per palm of nutrients											
		Basal dressing fertilizer					Treatment fertilization						Basal dressing fertilization					Experimental treatment fertilization						
		NPK (3 x 15)	borax	Kieserite	Urea	TSP	K (KCl)			Mg (kieserite)			NaCl	N (34%)	P ₂ O ₅ (50%)	K ₂ O (60%)	MgO (27%)	B ₂ O ₃ (11%)	K ₂ O (60%)			MgO (27%)		
							K 0	K 1	K 2	Mg 0	Mg 1	Mg 2	K0						K0	K1	K2	Mg0	Mg1	Mg2
1	June	500	0	0	0	0	0	0	0	0	0	0	0	75	75	75	0	0	0	0	0	0	0	
	July	0	10	150	0	0	0	0	0	0	0	0	0	0	0	0	40.5	1.1	0	0	0	0	0	
	October	750	0	0	0	0	0	0	0	0	0	0	0	112.5	112.5	112.5	0	0	0	0	0	0	0	
2	April	0	20	0	500	0	0	0	0	0	0	0	0	170	0	0	0	2.2	0	0	0	0	0	
	May	0	0	0	0	500	0	200	400	0	150	300	0	0	250	0	0	0	0	120	240	0	40.5	81
	October	0	0	0	500	0	0	300	600	0	0	0	0	170	0	0	0	0	0	180	360	0	0	0
3	May	0	20	0	0	0	0	400	800	0	300	600	0	0	0	0	0	2.2	0	240	480	0	81	162
	October	0	0	0	0	0	0	600	1200	0	0	0	0	0	0	0	0	0	0	360	720	0	0	0
4	May	0	50	0	0	0	0	1500	3000	0	500	1000	500	0	0	0	0	5.5	0	900	1800	0	135	270
	March	0	0	0	0	0	0	1500	3000	0	0	0	0	0	0	0	0	0	0	900	1800	0	0	0
5	April	0	0	0	0	0	0	0	0	0	500	1000	0	0	0	0	0	0	0	0	0	0	135	270
	October	0	0	0	0	0	0	0	0	0	0	0	1000	0	0	0	0	0	0	0	0	0	0	0
6	March	0	0	0	0	0	0	1500	3000	0	0	0	0	0	0	0	0	0	0	900	1800	0	0	0
	May	0	0	0	0	0	0	0	0	0	500	1000	500	0	0	0	0	0	0	0	0	0	135	270
	October	0	0	0	0	0	0	0	0	0	250	500	500	0	0	0	0	0	0	0	0	0	67.5	135
7	May	0	0	0	0	0	0	1500	3000	0	0	0	0	0	0	0	0	0	0	900	1800	0	0	0
	October	0	0	0	0	0	0	0	0	0	750	1500	0	0	0	0	0	0	0	0	0	0	202.5	405
8	March	0	0	0	0	0	0	1500	3000	0	0	0	0	0	0	0	0	0	0	900	1800	0	0	0
	October	0	0	0	0	0	0	0	0	0	750	1500	0	0	0	0	0	0	0	0	0	0	202.5	405
TOTAL		1250	100	150	1000	500	0	9000	18000	0	3700	7400	2500	527.5	437.5	187.5	40.5	11	0	5400	10800	0	999	1998

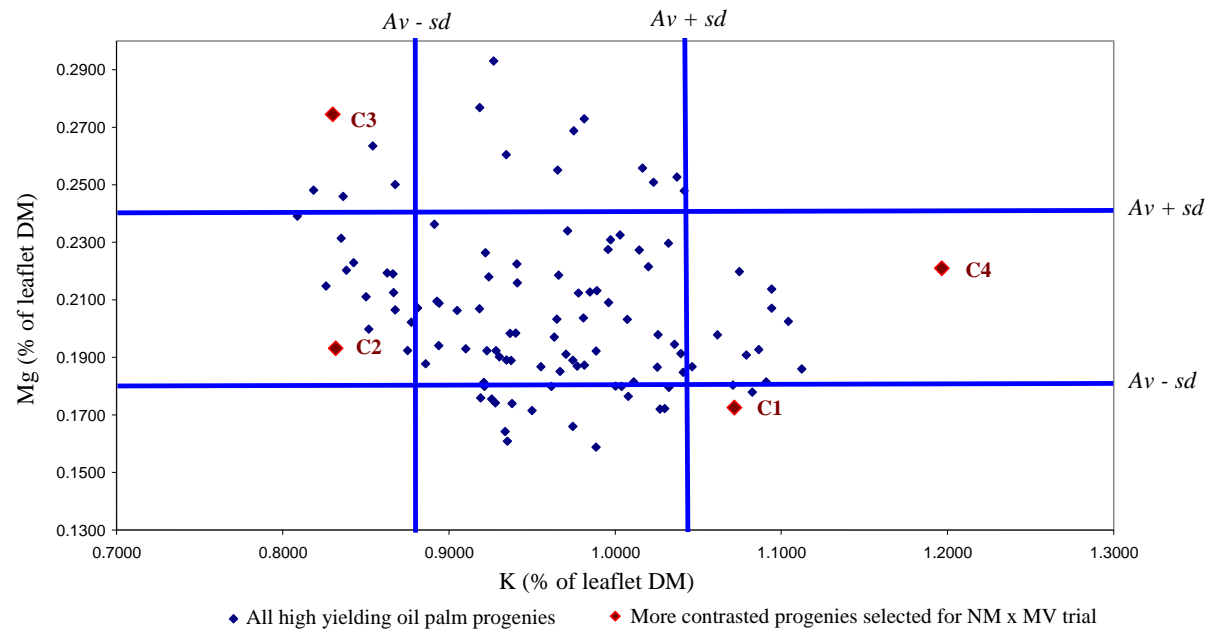
B- Fertilizer application scheme in Indonesia (in g of fertilizer per palm)

Years after planting	Mineral fertilizer in g per palm						Equivalent in g per palm of nutrients				
	Urea	RP	TSP	KCl	Dolomie	Kieserite	NPK (3 x 15)	N (34%)	P ₂ O ₅ (50%)	K ₂ O (60%)	MgO (27%)
1	0	500	0	0	0	0	0	165	305	165	0
2	700	0	0	0	0	0	0	472	150	150	0
3	1550	0	900	1800	0	700	1100	713	405	1080	189
4	2500	0	1250	3000	0	1000	1000	1150	563	1800	270
5	2500	1000	0	2500	0	2000	0	1150	280	1500	540
6	2750	1250	0	2750	1250	0	0	1265	350	1650	250
7	2750	500	0	2000	1000	0	0	1265	140	1200	200
8	2750	1500	0	3000	1250	0	0	1265	420	1800	250
TOTAL	15500	4750	2150	15050	3500	3700	2100	7445	2613	11145	1699

Source: Ollivier *et al.*, 2017

Supplementary fig. (SF) 1.

Leaflet K and Mg contents of 116 high yielding oil palm progenies tested in a genetic block experiment in Aek Loba Timur (Indonesia) showing the four most contrasting progenies based on their mineral contents and that were subsequently used to set up the mineral nutrition (MN) x genetic material (GM) trial in Nigeria.



" Av " is the average of leaflet mineral (K or Mg) concentration of an oil palm population and " sd " is its standard deviation