

SUPPLEMENTARY MATERIAL

Data S1. Descriptions of the species studied.***Azadirachta indica* - Exotic**

Azadirachta indica A. Juss (Meliaceae), popularly known for “Indian-neem”, is a tree species evergreen that presents tolerance to drought, usually with 5 to 15 m height. Its leaves are compound and alternate and the flowers are small panicles of a white or cream color. This fruits are drupe, oblong, 1.2-2 cm wide, yellowish green in color, becoming purple, with only one seed (Fabricante 2014). *A. indica* is a tree species originating in India and has been introduced in Brazil since 1984 (Neves & Carpanezzi 2009). The species is of economic interest with its active ingredients used to agriculture in the combat agricultural pests, medicinal use and cosmetic industries (Neves 2004, Neves & Carpanezzi 2009, Soares et al. 2009). In addition, *A. indica* has been widely used in urban forestry due to its rapid growth, low leaf deciduousness in dry periods and high ecological adaptability in different climate and soil types (Neves 2004, Lacerda et al. 2011, Sousa et al. 2013). There is currently no official estimate of the occupation of *A. indica* distributed throughout the Brazilian territory, but there is uncontrolled spread of the species in all regions of Brazil, but in some cities *A. indica* represents up to 90% of urban trees (Rufino et al. 2019). For the semiarid region of Brazil, *A. indica* is classified as naturalized (Moro et al. 2013), and during the reproductive period, from november to january, the species produces a large amount of fruit with viable seeds (Moro & Westerkamp 2011). Despite benefits of using *A. indica* in urban afforestation, the intensive use of the specie combined with their ecophysiological characteristics and allelopathic, make of *A. indica* a potential invader of natural environments

(França et al. 2008, Rickli et al. 2011). Several authors have highlighted the potential of this species to spread rapidly, becoming invasive to the point of competing with native species (Richardson et al. 2000, Espínola & Júlio 2007, Moro & Westerkamp 2011, Moro et al. 2013), however, little is known about how the functional responses of *A. indica* can influence the invasive potential of the species.

***Ouratea fieldingiana* - Native**

Ouratea fieldingiana (Gardner) Engl. (Ochnaceae) popularly known as batiputã, it is a shrub-tree plant from 2 to 4 m high, occurring in coastal boards in Ceará (Castro et al. 2012) endemic of northern coast of the northeast Brazilian (Chacon & Yamamoto 2015). The species presents simple alternate lanceolate leaves, oblong with partly serrated edge. The flowers are yellow, with a pedicel the length of the floral bud; oblong to ovate sepals; obovated petals. The fruits are polidrupas, with 3 to 5 shiny black seeds when ripe (Forzza et al. 2010). *O. fieldingiana* has great cultural and economic importance for traditional communities the Northern Coast of the Northeast, with various purposes, such as: in human and animal nutrition, in the making of artifacts, in medicines, in healing practices and rituals (Pinto et al. 2019). In addition, oil extracted from the seeds of *O. fieldingiana* presents pharmacological potential as a pharmaceutical input (Pinto 2017).

***Myrcia multiflora* - Native**

Myrcia multiflora (Lam.) DC (Myrtaceae) is a tree-shrub species with great variation in size; reproductive adults vary from 2 to 20 m in height, depending on the habitat where they occur (Forzza et al. 2010). Shrub form when occurring in more open vegetation with sandy soil, such

as in coastal vegetation of the collection area. Among the species of neotropical Myrtaceae, it is certainly one of the most widely distributed species, occurring in four biomes: the Caatinga, Cerrado, Atlantic Forest and Amazon (Forzza et al. 2010). It presents opposite and simple

leaves, acuminate apex and glabrous (Donato & Morretes 2011). The flowers are white with glabrous hyanthus and visible glands. Globous fleshy fruits atro-purple when ripe, with pulp rich in water and sugar being widely consumed by birds (Forzza et al. 2010).

Table S1. Data of leaf metamer traits for exotic (*Azadirachta indica*) and native (*Ouratea fieldingiana* and *Myrcia multiflora*) species of northern coast of the northeast Brazilian. For trait abbreviations see the materials and methods of this article.

Species	Individual	Metamer	LA	PL	IL	LARs	SLA	SPL	SIL
<i>A.indica</i>	A1	1	127.34	6.83	6.33	95.89	131.14	47.87	6.28
<i>A.indica</i>	A1	2	97.55	5.49	4.75	83.30	107.43	32.75	14.63
<i>A.indica</i>	A1	3	120.09	4.19	4.77	127.08	171.81	39.16	11.43
<i>A.indica</i>	A1	4	190.04	7.61	6.99	169.68	230.07	36.63	13.82
<i>A.indica</i>	A1	5	266.90	5.37	7.05	164.35	221.49	29.39	7.00
<i>A.indica</i>	A2	1	224.81	5.51	5.15	119.39	168.77	30.64	7.16
<i>A.indica</i>	A2	2	191.41	6.46	7.18	97.71	137.02	25.77	5.67
<i>A.indica</i>	A2	3	117.92	5.91	5.86	85.76	114.27	38.84	9.95
<i>A.indica</i>	A2	4	84.47	5.24	5.79	71.95	134.72	49.55	3.32
<i>A.indica</i>	A2	5	124.02	6.93	6.36	100.59	136.29	26.04	14.57
<i>A.indica</i>	A3	1	142.00	7.06	6.33	95.81	133.58	47.90	5.97
<i>A.indica</i>	A3	2	152.23	8.03	7.14	89.86	132.60	33.13	6.34
<i>A.indica</i>	A3	3	89.47	6.21	6.13	108.31	175.77	50.38	14.14
<i>A.indica</i>	A3	4	130.23	5.88	6.21	101.58	144.38	41.92	7.52
<i>A.indica</i>	A3	5	205.14	3.14	6.42	113.46	166.78	34.08	5.42
<i>A.indica</i>	A4	1	294.80	5.97	5.82	192.55	279.70	34.36	5.34
<i>A.indica</i>	A4	2	145.49	6.48	6.94	71.60	111.66	32.55	4.35
<i>A.indica</i>	A4	3	99.74	4.45	6.02	84.46	141.68	48.86	8.35
<i>A.indica</i>	A4	4	74.17	3.61	4.35	72.01	100.91	42.06	7.63
<i>A.indica</i>	A4	5	97.50	4.50	5.70	68.86	104.50	33.51	6.87
<i>A.indica</i>	A5	1	163.23	6.66	6.74	71.13	101.07	37.89	6.31
<i>A.indica</i>	A5	2	89.24	4.39	5.88	69.40	96.27	45.13	6.97
<i>A.indica</i>	A5	3	80.56	5.21	4.53	81.12	111.42	72.90	9.56

Table S1. Continuation.

<i>A.indica</i>	A5	4	57.69	4.39	5.03	72.93	105.26	64.77	7.89
<i>A.indica</i>	A5	5	85.19	5.22	5.23	46.30	53.21	61.47	8.77
<i>A.indica</i>	A6	1	110.13	6.10	6.00	100.03	149.22	48.07	14.54
<i>A.indica</i>	A6	2	163.92	7.36	7.25	104.94	140.58	33.92	10.29
<i>A.indica</i>	A6	3	109.63	6.35	5.56	128.82	200.05	49.53	9.89
<i>A.indica</i>	A6	4	154.03	7.30	6.99	83.62	120.15	32.57	5.69
<i>A.indica</i>	A6	5	198.30	8.39	9.08	75.20	98.56	21.32	8.16
<i>A.indica</i>	A7	1	205.97	7.87	7.93	93.03	136.23	19.35	6.26
<i>A.indica</i>	A7	2	264.66	7.58	6.83	95.65	123.44	20.11	6.56
<i>A.indica</i>	A7	3	131.23	7.45	6.88	107.39	166.32	34.62	11.48
<i>A.indica</i>	A7	4	169.25	6.51	6.97	90.56	126.40	31.71	5.52
<i>A.indica</i>	A7	5	276.72	7.66	7.35	76.36	114.63	17.78	3.43
<i>A.indica</i>	A8	1	112.66	5.83	7.90	126.73	177.98	55.12	17.52
<i>A.indica</i>	A8	2	140.90	7.19	7.53	90.96	144.07	31.64	7.07
<i>A.indica</i>	A8	3	117.39	7.53	7.58	85.93	133.39	42.90	7.24
<i>A.indica</i>	A8	4	71.98	7.36	7.81	39.10	53.96	34.19	9.67
<i>A.indica</i>	A8	5	132.82	6.97	7.64	115.69	158.30	39.51	12.10
<i>A.indica</i>	A9	1	105.88	6.66	6.64	71.30	153.45	56.96	1.13
<i>A.indica</i>	A9	2	86.82	5.92	5.59	81.67	112.60	61.15	13.41
<i>A.indica</i>	A9	3	99.60	6.69	6.47	117.31	149.54	54.36	10.92
<i>A.indica</i>	A9	4	156.81	7.25	7.24	93.73	126.87	36.66	5.68
<i>A.indica</i>	A9	5	141.57	7.71	6.71	91.10	116.71	35.25	11.25
<i>A.indica</i>	A10	1	119.23	7.37	5.77	92.07	118.99	36.47	18.15
<i>A.indica</i>	A10	2	174.00	7.21	7.12	75.07	98.81	26.15	7.86
<i>A.indica</i>	A10	3	68.07	5.69	5.40	75.64	102.06	56.36	10.53
<i>A.indica</i>	A10	4	106.61	6.33	6.13	71.17	92.86	36.28	6.33
<i>A.indica</i>	A10	5	143.55	6.25	7.69	62.12	82.59	23.88	5.45
<i>M.multiflora</i>	M1	1	12.81	0.40	1.58	69.11	77.14	93.37	105.53
<i>M.multiflora</i>	M1	2	15.48	0.39	2.31	73.34	83.69	77.06	109.76
<i>M.multiflora</i>	M1	3	9.36	0.35	2.39	62.75	77.97	112.90	92.00
<i>M.multiflora</i>	M1	4	13.25	0.37	1.77	79.84	89.55	93.25	126.29

Table S1. Continuation.

<i>M.multiflora</i>	M1	5	16.07	0.33	2.59	83.80	98.61	68.75	108.04
<i>M.multiflora</i>	M2	1	8.62	0.26	1.50	56.96	65.29	79.39	93.50
<i>M.multiflora</i>	M2	2	9.11	0.28	1.94	54.99	66.47	59.89	80.75
<i>M.multiflora</i>	M2	3	9.41	0.30	2.68	46.23	63.59	84.31	51.60
<i>M.multiflora</i>	M2	4	12.28	0.25	2.72	47.29	59.61	53.72	55.53
<i>M.multiflora</i>	M2	5	7.17	0.33	1.44	59.61	70.94	104.53	89.75
<i>M.multiflora</i>	M3	1	9.25	0.12	2.61	43.77	61.68	36.62	45.05
<i>M.multiflora</i>	M3	2	13.95	0.17	2.52	64.72	73.83	67.12	104.79
<i>M.multiflora</i>	M3	3	11.51	0.20	1.60	53.86	58.40	76.35	114.29
<i>M.multiflora</i>	M3	4	9.78	0.19	1.74	55.59	62.71	64.67	102.06
<i>M.multiflora</i>	M3	5	11.08	0.20	2.88	51.65	62.24	81.20	84.79
<i>M.multiflora</i>	M4	1	13.21	0.28	1.92	58.32	68.80	50.91	66.21
<i>M.multiflora</i>	M4	2	15.85	0.38	1.86	66.52	77.29	72.69	66.46
<i>M.multiflora</i>	M4	3	11.31	0.35	1.90	69.11	81.93	62.32	94.80
<i>M.multiflora</i>	M4	4	12.23	0.28	2.02	63.91	72.81	52.04	112.11
<i>M.multiflora</i>	M4	5	11.29	0.40	2.63	68.66	83.04	87.78	109.75
<i>M.multiflora</i>	M5	1	10.02	0.19	1.91	61.12	69.60	46.50	119.56
<i>M.multiflora</i>	M5	2	9.63	0.22	1.68	64.19	74.06	37.00	119.86
<i>M.multiflora</i>	M5	3	8.67	0.23	1.81	62.59	75.38	31.20	113.00
<i>M.multiflora</i>	M5	4	10.38	0.21	2.09	74.81	85.75	56.35	149.21
<i>M.multiflora</i>	M5	5	6.83	0.22	1.64	80.57	91.21	77.07	234.29
<i>M.multiflora</i>	M6	1	7.33	0.29	2.29	59.69	70.48	102.86	143.38
<i>M.multiflora</i>	M6	2	8.48	0.33	2.37	62.33	74.36	108.33	124.53
<i>M.multiflora</i>	M6	3	7.24	0.27	2.66	59.93	75.57	89.67	120.77
<i>M.multiflora</i>	M6	4	7.21	0.33	2.39	66.18	80.62	218.00	132.56
<i>M.multiflora</i>	M6	5	9.74	0.32	2.32	68.68	82.53	84.74	116.05
<i>M.multiflora</i>	M7	1	12.17	0.21	1.90	50.76	61.79	36.47	51.32
<i>M.multiflora</i>	M7	2	9.94	0.17	2.24	52.17	65.82	47.29	62.14
<i>M.multiflora</i>	M7	3	9.69	0.27	2.46	43.10	54.41	72.03	57.26
<i>M.multiflora</i>	M7	4	11.96	0.32	1.94	56.12	63.96	77.44	88.05
<i>M.multiflora</i>	M7	5	12.17	0.35	1.56	57.60	65.40	83.57	74.43

Table S1. Continuation.

<i>M.multiflora</i>	M8	1	8.51	0.49	2.12	37.46	45.27	78.31	64.36
<i>M.multiflora</i>	M8	2	7.41	0.27	2.60	38.20	55.71	66.88	45.65
<i>M.multiflora</i>	M8	3	10.80	0.30	2.14	49.56	59.69	49.25	69.06
<i>M.multiflora</i>	M8	4	7.49	0.19	1.61	51.88	58.49	58.64	124.00
<i>M.multiflora</i>	M8	5	4.65	0.20	1.73	44.11	59.02	75.00	71.92
<i>M.multiflora</i>	M9	1	12.60	0.20	1.86	46.72	52.50	42.66	74.40
<i>M.multiflora</i>	M9	2	11.50	0.22	2.26	45.86	60.51	46.49	40.30
<i>M.multiflora</i>	M9	3	14.82	0.26	2.24	57.24	65.26	68.29	79.89
<i>M.multiflora</i>	M9	4	11.42	0.20	1.70	52.50	57.96	58.14	99.82
<i>M.multiflora</i>	M9	5	18.48	0.27	2.04	65.20	78.30	78.09	46.39
<i>M.multiflora</i>	M10	1	8.80	0.25	2.12	55.65	63.29	48.92	151.43
<i>M.multiflora</i>	M10	2	8.27	0.28	2.77	49.44	63.10	53.65	89.39
<i>M.multiflora</i>	M10	3	9.08	0.23	1.56	56.33	66.82	35.87	81.95
<i>M.multiflora</i>	M10	4	10.41	0.21	2.46	46.97	59.47	28.16	63.08
<i>M.multiflora</i>	M10	5	7.85	0.27	2.99	47.41	69.48	73.61	61.00
<i>O.fieldingiana</i>	O1	1	11.02	0.33	1.09	39.77	44.78	41.25	47.35
<i>O.fieldingiana</i>	O1	2	9.97	0.36	0.89	42.62	46.82	51.86	63.64
<i>O.fieldingiana</i>	O1	3	6.18	0.26	0.69	38.37	42.31	63.75	62.64
<i>O.fieldingiana</i>	O1	4	11.41	0.36	1.42	41.03	46.37	72.20	52.56
<i>O.fieldingiana</i>	O1	5	13.23	0.36	1.11	41.46	45.60	40.33	55.25
<i>O.fieldingiana</i>	O2	1	13.33	0.29	0.92	64.71	69.43	144.00	76.92
<i>O.fieldingiana</i>	O2	2	17.51	0.51	1.20	43.99	49.74	73.14	30.82
<i>O.fieldingiana</i>	O2	3	8.30	0.43	0.65	55.73	61.06	108.00	71.78
<i>O.fieldingiana</i>	O2	4	10.90	0.40	0.71	54.48	59.54	99.00	54.77
<i>O.fieldingiana</i>	O2	5	14.54	0.43	0.88	46.91	51.94	60.71	38.13
<i>O.fieldingiana</i>	O3	1	22.77	0.48	1.08	52.83	57.07	68.71	43.04
<i>O.fieldingiana</i>	O3	2	21.51	0.65	0.81	55.72	59.74	81.38	44.94
<i>O.fieldingiana</i>	O3	3	10.63	0.52	0.44	48.08	51.33	130.25	44.10
<i>O.fieldingiana</i>	O3	4	13.61	0.58	0.76	53.58	58.66	144.00	42.11
<i>O.fieldingiana</i>	O3	5	13.35	0.52	1.24	43.20	51.15	74.43	30.24
<i>O.fieldingiana</i>	O4	1	11.75	0.23	1.65	35.18	41.37	25.67	40.12

Table S1. Continuation.

<i>O.fieldingiana</i>	O4	2	12.48	0.57	1.68	35.97	44.74	81.71	27.51
<i>O.fieldingiana</i>	O4	3	7.37	0.29	0.74	39.62	46.35	71.75	32.30
<i>O.fieldingiana</i>	O4	4	12.12	0.38	1.41	36.41	39.75	95.25	58.67
<i>O.fieldingiana</i>	O4	5	12.99	0.32	1.16	38.42	42.43	64.60	42.78
<i>O.fieldingiana</i>	O5	1	12.60	0.34	0.49	39.74	41.71	48.29	61.63
<i>O.fieldingiana</i>	O5	2	11.36	0.37	0.62	43.04	46.76	53.43	44.29
<i>O.fieldingiana</i>	O5	3	7.96	0.36	0.56	41.25	44.23	71.40	69.75
<i>O.fieldingiana</i>	O5	4	13.58	0.44	0.68	45.56	49.92	55.13	37.78
<i>O.fieldingiana</i>	O5	5	16.70	0.61	0.80	51.21	56.02	87.29	37.95
<i>O.fieldingiana</i>	O6	1	9.70	0.51	0.68	60.97	65.95	127.25	84.75
<i>O.fieldingiana</i>	O6	2	12.34	0.64	1.72	53.18	62.63	127.20	57.27
<i>O.fieldingiana</i>	O6	3	8.01	0.48	0.66	59.30	67.85	118.75	50.69
<i>O.fieldingiana</i>	O6	4	20.04	0.59	1.60	56.46	63.43	73.63	51.71
<i>O.fieldingiana</i>	O6	5	16.84	0.60	1.97	57.88	68.75	119.40	47.93
<i>O.fieldingiana</i>	O7	1	8.92	0.48	0.85	49.55	58.68	96.40	36.78
<i>O.fieldingiana</i>	O7	2	17.49	0.57	2.03	44.63	53.82	71.38	34.42
<i>O.fieldingiana</i>	O7	3	11.28	0.46	1.40	44.59	54.76	77.17	34.22
<i>O.fieldingiana</i>	O7	4	12.23	0.45	1.69	40.76	52.04	74.67	28.69
<i>O.fieldingiana</i>	O7	5	14.23	0.47	1.12	44.60	49.74	66.86	42.88
<i>O.fieldingiana</i>	O8	1	14.71	0.25	0.90	48.22	54.27	30.88	34.62
<i>O.fieldingiana</i>	O8	2	20.68	0.42	2.14	43.90	53.02	34.75	31.01
<i>O.fieldingiana</i>	O8	3	13.58	0.47	1.89	40.05	49.37	66.57	33.16
<i>O.fieldingiana</i>	O8	4	9.61	0.19	1.02	37.82	45.10	38.60	28.31
<i>O.fieldingiana</i>	O8	5	14.13	0.35	0.93	52.51	61.68	58.17	27.29
<i>O.fieldingiana</i>	O9	1	17.65	0.83	1.51	37.46	44.56	55.00	25.08
<i>O.fieldingiana</i>	O9	2	16.97	0.56	1.37	42.42	48.34	51.09	36.00
<i>O.fieldingiana</i>	O9	3	18.71	0.56	1.36	50.83	60.74	55.60	27.10
<i>O.fieldingiana</i>	O9	4	22.90	0.62	1.55	46.36	49.36	38.63	110.93
<i>O.fieldingiana</i>	O9	5	20.81	0.54	2.38	42.72	51.76	33.56	34.45
<i>O.fieldingiana</i>	O10	1	21.15	0.56	2.09	53.81	64.87	69.63	35.46
<i>O.fieldingiana</i>	O10	2	9.60	0.34	0.77	59.61	71.09	67.80	36.62

Table S1. Continuation.

<i>O.fieldingiana</i>	O10	3	10.77	0.36	1.10	63.70	74.76	89.25	52.52
<i>O.fieldingiana</i>	O10	4	11.98	0.42	0.58	62.71	68.84	83.40	48.00
<i>O.fieldingiana</i>	O10	5	10.53	0.42	0.90	63.79	73.60	104.25	49.89