

Anjos, D. V., Leal, L. C., Jordano, P. and Del-Claro, K. 2020. Ants as diaspore removers of non-myrmecochorous plants: a meta-analysis. – Oikos doi: 10.1111/oik.06940

## Appendix 1

Table A1. Description of data collated from each paper included in the meta-analysis. All papers evaluated the ant contribution on diaspore removal of non-myrmecochorous plants.

References	Study site	Plant specie	Plant growth form	Diaspore size	Ecosystem type	Main ant disperser (size)
Andrieu and Debussche (2016)	France	<i>Paeonia officinalis</i> <sup>out/p</sup>	Shrub	Medium	Mediterranean	-
		<i>P. officinalis</i> <sup>out/w</sup>	Shrub	Medium	Mediterranean	-
Barroso et al. (2013)	Spain	<i>Arum italicum</i>	Shrub	Large	Mediterranean	<i>Aphaenogaster senili</i> (large)
		<i>Ornithogalum</i>	Shrub	Small	Mediterranean	<i>Aphaenogaster senili</i> (large)

		<i>orthophyllum</i>				
		<i>Phillyrea angustifolia</i>	Shrub	Medium	Mediterranean	<i>Aphaenogaster senili</i> (large)
		<i>Pistacia lentiscus</i>	Shrub	Small	Mediterranean	<i>Aphaenogaster senili</i> (large)
Broncano et al. (2008)	Spain	<i>Pinus halepensis</i> <sup>out</sup>	Tree	Medium	Mediterranean	-
Camargo et al. (2016)	Brazil	<i>Erythroxylum</i>	Shrub	Large	Rainforest	<i>Pachycondyla striata</i> (large)
		<i>ambiguum</i>	Shrub	Large	Rainforest	<i>Pachycondyla striata</i> (large)
		<i>Erythroxylum</i>				
		<i>ambiguum</i> *				
Chandler et al. (2016)	USA	<i>Rubus cuneifolius</i> <sup>sol</sup>	Shrub	Small	-	<i>Solenopsis invicta</i>
		<i>Rubus cuneifolius</i> <sup>Fsol</sup>	Shrub	Small	-	-
Christianini and Oliveira (2012)	Brazil	<i>Erythroxylum</i>	Shrub	Large	Savanna	<i>Pachycondyla striata</i> (large)
		<i>pelleterianum</i> <sup>1,3</sup>				
		<i>E. pelleterianum</i> <sup>1,4</sup>	Shrub	Medium	Savanna	-
		<i>E. pelleterianum</i> <sup>2,3</sup>	Shrub	Large	Savanna	<i>Pachycondyla striata</i> (large)
		<i>E. pelleterianum</i> <sup>2,4</sup>	Shrub	Medium	Savanna	-
Christianini and Oliveira (2010)	Brazil	<i>Xylopia aromatica</i>	Tree	Medium	Savanna	<i>Pheidole</i> sp (small)

Christianini et al. (2007)	Brazil	<i>E. pelleterianum</i>	Shrub	Medium	Savanna	<i>Pachycondyla striata</i> (large)
		<i>Miconia albicans</i>	Shrub	Small	Savanna	<i>Atta sexdens rubropilosa</i> (large)
		<i>Miconia fallax</i>	Shrub	Medium	Savanna	<i>A. sexdens rubropilosa</i> (large)
		<i>Miconia rubiginosa</i>	Tree	Small	Savanna	<i>A. sexdens rubropilosa</i> (large)
		<i>Myrcia lingua</i>	Tree	Large	Savanna	<i>A. sexdens rubropilosa</i> (large)
		<i>Ocotea pulchella</i>	Tree	Medium	Savanna	<i>Pheidole</i> sp (small)
		<i>Ouratea spectabilis</i>	Tree	Large	Savanna	<i>Pheidole</i> sp (small)
		<i>Stryphnodendron adstringens</i>	Tree	Large	Savanna	<i>A. sexdens rubropilosa</i> (large)
Deus et al. (2018)	Portugal	<i>Eucalyptus globulus</i>	Tree	Small	Mediterranean	<i>Temnothorax</i> sp (small)
		<i>Cistus salviifolius</i>	Shrub	Small	Mediterranean	<i>Tetramorium</i> sp (small)
Ferreira et al. (2012)	Brazil	<i>Coussarea</i>	Tree	Small	Savanna	**
		<i>hydrangeaefolia</i> <sup>5</sup>				
		<i>Coussarea</i>	Tree	Small	Savanna	**
		<i>hydrangeaefolia</i> <sup>6</sup>				
		<i>Siparuna guianensis</i> <sup>5</sup>	Shrub	Small	Savanna	-

		<i>Siparuna guianensis</i> <sup>6</sup>	Shrub	Small	Savanna	-
		<i>Virola sebifera</i> <sup>5</sup>	Tree	Large	Savanna	**
		<i>Virola sebifera</i> <sup>6</sup>	Tree	Large	Savanna	**
Fornara et al. (2005)	Panama	<i>Luehea seemannii</i> <sup>m</sup>	Tree	Medium	Rainforest	<i>Cyphomyrmex</i> sp (small)
		<i>L. seemannii</i> <sup>b</sup>	Tree	Medium	Rainforest	<i>Cyphomyrmex</i> sp (small)
		<i>L. seemannii</i> <sup>s</sup>	Tree	Medium	Rainforest	<i>Cyphomyrmex</i> sp (small)
		<i>L. seemannii</i> <sup>out/c</sup>	Tree	Medium	Rainforest	<i>Cyphomyrmex</i> sp (small)
		<i>L. seemannii</i> <sup>f</sup>	Tree	Medium	Rainforest	<i>Cyphomyrmex</i> sp (small)
		<i>Apeiba aspera</i> <sup>m</sup>	Tree	Small	Rainforest	<i>Pheidole</i> sp (small)
		<i>A. aspera</i> <sup>b</sup>	Tree	Small	Rainforest	<i>Pheidole</i> sp (small)
		<i>A. aspera</i> <sup>s</sup>	Tree	Small	Rainforest	<i>Pheidole</i> sp (small)
		<i>A. aspera</i> <sup>c</sup>	Tree	Small	Rainforest	<i>Pheidole</i> sp (small)
		<i>A. aspera</i> <sup>f</sup>	Tree	Small	Rainforest	<i>Pheidole</i> sp (small)
		<i>Cecropia peltata</i> <sup>m</sup>	Tree	Small	Rainforest	<i>Pheidole</i> sp (small)
		<i>Cecropia peltata</i> <sup>b</sup>	Tree	Small	Rainforest	<i>Pheidole</i> sp (small)
		<i>Cecropia peltata</i> <sup>s</sup>	Tree	Small	Rainforest	<i>Pheidole</i> sp (small)
		<i>Cecropia peltata</i> <sup>c</sup>	Tree	Small	Rainforest	<i>Pheidole</i> sp (small)

		<i>Cecropia peltata</i> <sup>f</sup>	Tree	Small	Rainforest	<i>Pheidole</i> sp (small)
Gallegos et al. (2014)	Bolivia	<i>Clusia trochiformis</i>	Tree	Medium	Rainforest	**
Griffiths et al. (2016)	Malaysia	<i>Helianthus annuus</i>	Shrub	Large	Rainforest	-
Guerra et al. (2018)	Brazil	<i>Miconia irwinii</i> <sup>3</sup>	Shrub	Medium	Savanna	<i>Cyphomyrmex</i> sp (small)
		<i>M. irwinii</i> <sup>4</sup>	Shrub	Small	Savanna	<i>Cyphomyrmex</i> sp (small)
		<i>M. irwinii</i> <sup>*3</sup>	Shrub	Medium	Savanna	<i>Cyphomyrmex</i> sp (small)
		<i>M. irwinii</i> <sup>*4</sup>	Shrub	Small	Savanna	<i>Atta</i> sp (large)
Hulme (1997)	Spain	<i>Crataegus monogyna</i>	Tree	Large	Mediterranean	-
		<i>Prunus mahaleb</i> <sup>1f</sup>	Tree	Medium	Mediterranean	<i>Cataglyphis velox/Aphaenogaster iberica</i> (large)
		<i>P. mahaleb</i> <sup>out/10f</sup>	Tree	Medium	Mediterranean	<i>C. velox/A. iberica</i> (large)
		<i>P. mahaleb</i> <sup>1s</sup>	Tree	Medium	Mediterranean	<i>C. velox/A. iberica</i> (large)
		<i>P. mahaleb</i> <sup>out/10s</sup>	Tree	Medium	Mediterranean	-
		<i>P. mahaleb</i> <sup>out/p</sup>	Tree	Medium	Mediterranean	-
		<i>P. mahaleb</i> <sup>o</sup>	Tree	Medium	Mediterranean	-
		<i>P. mahaleb</i> <sup>out/r</sup>	Tree	Medium	Mediterranean	-
		<i>P. mahaleb</i> <sup>s</sup>	Tree	Medium	Mediterranean	-
		<i>P. mahaleb</i> <sup>out/t</sup>	Tree	Medium	Mediterranean	-

			<i>Taxus baccata</i> <sup>out</sup>	Tree	Large	Mediterranean	-
Leite et al. (2013)	Brazil		<i>Miconia albicans</i> <sup>2</sup>	Shrub	Small	Savanna	-
			<i>M. albicans</i> <sup>1</sup>	Shrub	Small	Savanna	-
Lima et al. (2013)	Brazil		<i>Miconia albicans</i> <sup>6</sup>	Shrub	Small	Savanna	**
			<i>M. albicans</i> <sup>7</sup>	Shrub	Small	Savanna	**
			<i>M. albicans</i> <sup>8</sup>	Shrub	Small	Savanna	**
			<i>M. albicans</i> <sup>5</sup>	Shrub	Small	Savanna	**
			<i>Miconia alborufescens</i>	Shrub	Medium	Savanna	-
			<i>Miconia coralina</i> <sup>out</sup>	Shrub	Small	Savanna	-
			<i>Miconia ferruginata</i>	Tree	Medium	Savanna	-
			<i>Miconia ibaguensis</i>	Shrub	Medium	Savanna	-
			<i>Miconia irwinii</i>	Shrub	Medium	Savanna	-
Lima et al. (2015)	Brazil		<i>Hovenia dulcis</i>	Tree	Medium	Rainforest	-
Magalhães et al. (2018)	Brazil		<i>Siparuna guianensis</i>	Shrub	Small	Rainforest	-
Munoz and Arroyo (2002)	Chile		<i>Sisyrrinchium arenarium</i> <small>low</small>	Shrub	Small	Mediterranean	<i>Solenopsis gayi</i> (small)
			<i>S. arenarium</i> <sup>high</sup>	Shrub	Small	Mediterranean	<i>Solenopsis gayi</i> (small)
Pan et al. (2016)	China		<i>Taxus chinensis</i> <sup>out</sup>	Shrub	Large	Rainforest	-

Passos and Oliveira (2002)	Brazil	<i>Clusia criuva</i>	Tree	Large	Rainforest	<i>Pachycondyla striata</i> / <i>Odontomachus chelifer</i> (large)
Pizo and Oliveira (1998)	Brazil	<i>Cabrlea canjerana</i>	Tree	Large	Rainforest	<i>Pachycondyla striata</i> / <i>Odontomachus chelifer</i> (large)
Robert and Heithaus (1987)	Costa Rica	<i>Ficus hondurensi</i>	Tree	Small	Rainforest	<i>Pheidole randoszkowskii</i> (small)
		<i>F. hondurensi</i> *	Tree	Small	Rainforest	<i>Pheidole randoszkowskii</i> (small)
Rocha-Ortega et al. (2017)	Brazil	<i>Siparuna guianensis</i>	Shrub	Small	Savanna	-
		<i>Xylopia aromatica</i>	Tree	Medium	Savanna	-
		<i>Solanum lycocarpum</i>	Shrub	-	Savanna	-
		<i>Matayba guianensis</i>	Tree	Large	Savanna	-
		<i>Tapirira guianensis</i>	Tree	Large	Savanna	-
Setterfield and Andersen (2018)	Australia	<i>Eucalyptus miniate</i> <sup>t1</sup>	Tree	Medium	Savanna	<i>Monomorium rothteini</i> (small)
		<i>E. miniate</i> <sup>t2</sup>	Tree	Medium	Savanna	<i>Monomorium rothteini</i> (small)
		<i>E. miniate</i> <sup>t3</sup>	Tree	Medium	Savanna	<i>Monomorium rothteini</i> (small)
		<i>E. miniate</i> <sup>t4</sup>	Tree	Medium	Savanna	<i>Monomorium rothteini</i> (small)

		<i>E. miniate</i> <sup>15</sup>	Tree	Medium	Savanna	<i>Monomorium rothteini</i> (small)
		<i>E. miniate</i> <sup>16</sup>	Tree	Medium	Savanna	<i>Monomorium rothteini</i> (small)
		<i>E. miniate</i> <sup>17</sup>	Tree	Medium	Savanna	<i>Monomorium rothteini</i> (small)
Weiblen and Thomson (1995)	USA	<i>Erythronium</i> <i>grandiflorum</i> <sup>day</sup>	Shrub	Small	-	-
		<i>E. grandiflorum</i> <sup>night</sup>	Shrub	Small	-	-
Weltzin et al.	USA	<i>Prosopis glandulosa</i> <i>ss/on</i>	Tree	Medium	Savanna	<i>Pogonomyrmex</i> sp (large)
		<i>P. glandulosa</i> <sup>89/on</sup>	Tree	Medium	Savanna	<i>Pogonomyrmex</i> sp (large)
		<i>P. glandulosa</i> <sup>NF/on</sup>	Tree	Medium	Savanna	<i>Pogonomyrmex</i> sp (large)
		<i>P. glandulosa</i> <sup>88/off</sup>	Tree	Medium	Savanna	<i>Pogonomyrmex</i> sp (large)
		<i>P. glandulosa</i> <sup>89/off</sup>	Tree	Medium	Savanna	<i>Pogonomyrmex</i> sp (large)
		<i>P. glandulosa</i> <sup>NF/off</sup>	Tree	Medium	Savanna	<i>Pogonomyrmex</i> sp (large)

<sup>out</sup> Potential outliers removed according to the Egger's regression model.

\*Far from parental plant; \*\* Many ant species; - Information unavailable.

<sup>1</sup> Border areas; <sup>2</sup> Interior forest; <sup>3</sup> Fruit; <sup>4</sup> Seed.

<sup>sol</sup> Near *Solenopsis invicta* nests; <sup>Fsol</sup> Far from *Solenopsis invicta* nests

<sup>5</sup> Brazilian Savanna *strictu sensu*; <sup>6</sup> Brazilian Savanna “*cerradão*”; <sup>7</sup> Brazilian Savanna “*campo rupestre*”; <sup>8</sup> Brazilian Savanna “*campo sujo*”.

<sup>m</sup> Metropolitan forest; <sup>b</sup> Barro Colorado Island; <sup>s</sup> Sherman forest; <sup>c</sup> Campana forest; <sup>f</sup> Fortuna Forest.

<sup>1f</sup> 01 fruit per experiment; <sup>10f</sup> 10 fruits per experiment; <sup>1s</sup> 01 seed per experiment; <sup>10s</sup> 10 seeds per experiment. <sup>p</sup> *Prunus* forest; <sup>o</sup> Open forest; <sup>r</sup> Rock forest; <sup>s</sup> Shrub forest; <sup>t</sup> *Taxus* forest, <sup>w</sup> woodlands.

<sup>low</sup> 2000 meters above sea level; <sup>high</sup> 2700 meters above sea level.

t1 Trial 1; t2 Trial 2; t3 Trial 3; t4 Trial 4; t5 Trial 5; t6 Trial 6; t7 Trial 7.

day Experiments carried during day time; night Experiments carried during night time.

<sup>88</sup> Experiments carried in 1988; <sup>89</sup> Experiments carried in 1989; <sup>on</sup> Experiments carried on prairie dog colonies; <sup>off</sup> Experiments carried on prairie dog colonies;

<sup>NF</sup> Experiments carried in North Fork.

Table A2. Description of data collated from each paper included in the meta-analysis after removal of the outliers. The response variable (proportion, percentage or mean total number of diaspores removed) used to describe the ant contribution on diaspore removal of non-myrmecochorous plants is represented. In addition to the plant species that had their diaspore removed by ants, important qualitative variables such as plant growth form (PGF), diaspore size and ecosystem type (Med. = mediterranean; Sav. = savanna; Rain = rainforest) are also indicated in the table. The original and transformed (percentages) values of removal rates were reported in each manuscript considering control group (experiments that allow access to diaspore by vertebrates and ants) and treatment group (experiments in which the vertebrates were excluded and only ants had access to the diaspore).

References	Response variable	Plant specie	PGF/Diaspore size/Ecosystem type	Diaspore removal (control)	Diaspore removal (treatment)	Diaspore removal percentage (control)	Diaspore removal percentage (treatment)
Barroso et al. (2013)	Percentage	<i>Arum italicum</i>	Shrub/Large/Med.	0.9 ± 0.0	0.9 ± 0.0	97%	99%
		<i>Ornithogalum orthophyllum</i>	Shrub/Small/Med.	0.4 ± 0.4	0.4 ± 0.4	41%	46%
		<i>Phillyrea angustifolia</i>	Shrub/Medium/Med.	0.8 ± 0.3	0.8 ± 0.2	85%	83%
		<i>Pistacia lentiscus</i>	Shrub/Small/Med.	0.4 ± 0.4	0.5 ± 0.4	49%	58%
Camargo et al. (2016)	Mean	<i>Erythroxylum ambiguum</i>	Shrub/Large/Rain	1.4 ± 1.3	0.9 ± 0.6	14%	9%

		<i>E. ambiguum</i> *	Shrub/Large/Rain	1.5 ± 1.0	0.6 ± 0.9	15%	6%
Chandler et al. (2016)	Proportion	<i>Rubus</i>	Shrub/Small/-	49.6 ± 56.0	47.2 ± 56.5	49%	47%
		<i>cuneifolius</i> <sup>sol</sup>					
		<i>R. cuneifolius</i> <sup>Fsol</sup>	Shrub/Small/-	54.8 ± 52.0	91.2 ± 19.7	54%	91%
Christianini and Oliveira (2012)	Mean	<i>Erythroxylum</i>	Shrub/Large/Sav.	3.5 ± 1.3	3.1 ± 1.5	35%	31%
		<i>pelleterianum</i> <sup>1,3</sup>					
		<i>E.</i>	Shrub/Medium/Sav.	1.9 ± 0.7	1.5 ± 1.3	19%	15%
		<i>pelleterianum</i> <sup>1,4</sup>					
		<i>E.</i>	Shrub/Large/Sav.	2.9 ± 1.4	2.0 ± 1.6	29%	20%
		<i>pelleterianum</i> <sup>2,3</sup>					
		<i>E.</i>	Shrub/Medium/Sav.	1.6 ± 0.7	1.0 ± 0.9	16%	10%
		<i>pelleterianum</i> <sup>2,4</sup>					
Christianini and Oliveira (2010)	Mean	<i>Xylopia</i>	Tree/Medium/Sav.	4.3 ± 1.2	4.0 ± 1.6	43%	40%
		<i>aromatica</i>					
Christianini et al. (2007)	Mean	<i>E. pelleterianum</i>	Shrub/Medium/Sav.	6.8 ± 4	5.6 ± 3.9	68%	56%
		<i>Miconia albicans</i>	Shrub/Small/Sav.	4.3 ± 4	3.1 ± 3.4	43%	31%
		<i>M. fallax</i>	Shrub/Medium/Sav.	5.6 ± 4.2	5.6 ± 4.1	56%	56%

		<i>M. rubiginosa</i>	Tree/Small/Sav.	4.0 ± 4.5	3.2 ± 4.4	40%	32%
		<i>Myrcia lingua</i>	Tree/Large/Sav.	4.2 ± 5.3	3.8 ± 4.8	42%	38%
		<i>Ocotea pulchella</i>	Tree/Medium/Sav.	4.8 ± 4.8	6.2 ± 3.0	48%	62%
		<i>Ouratea spectabilis</i>	Tree/Large/Sav.	2.3 ± 0.6	1 ± 1.7	23%	10%
		<i>Stryphnodendron adstringens</i>	Tree/Large/Sav.	5.7 ± 4.2	1.6 ± 1.9	57%	16%
Deus et al. (2018)	Proportion	<i>Eucalyptus globulus</i>	Tree/Small/Med.	0.3 ± 0.1	0.13 ± 0.1	30%	13%
		<i>Cistus salviifolius</i>	Shrub/Small/Med.	0.1 ± 0.1	0.09 ± 0.1	18%	9%
Ferreira et al. (2012)	Proportion	<i>Coussarea hydrangeaefolia</i> <sup>5</sup>	Tree/Small/Sav.	0.2 ± 0.0	0.2 ± 0.0	28%	20%
		<i>C. hydrangeaefolia</i> <sup>6</sup>	Tree/Small/Sav.	0.2 ± 0.1	0.28 ± 0.0	23%	28%
		<i>Siparuna guianensis</i> <sup>5</sup>	Shrub/Small/Sav.	0.7 ± 0.3	0.8 ± 0.3	79%	82%
		<i>S. guianensis</i> <sup>6</sup>	Shrub/Small/Sav.	0.8 ± 0.3	0.8 ± 0.3	82%	88%
		<i>Virola sebifera</i> <sup>5</sup>	Tree/Large/Sav.	0.3 ± 0.2	0.1 ± 0.2	31%	15%

Fornara et al. (2005)	Percentage	<i>V. sebifera</i> <sup>6</sup>	Tree/Large/Sav.	0.3 ± 0.3	0.30 ± 0.3	32%	30%	
		<i>Luehea</i>	Tree/Medium/Rain	17.0 ± 6.3	11.0 ± 9.4	17%	11%	
		<i>seemannii</i> <sup>m</sup>						
		<i>L. seemannii</i> <sup>b</sup>	Tree/Medium/Rain	5.0 ± 25.2	8.0 ± 6.3	5%	8%	
		<i>L. seemannii</i> <sup>s</sup>	Tree/Medium/Rain	8.0 ± 2.5	3.0 ± 12.6	8%	3%	
		<i>L. seemannii</i> <sup>f</sup>	Tree/Medium/Rain	3.0 ± 2.2	4.0 ± 3.1	3%	4%	
		<i>Apeiba aspera</i> <sup>m</sup>	Tree/Small/Rain	27.0 ± 12.6	29.0 ± 12.6	27%	29%	
		<i>A. aspera</i> <sup>b</sup>	Tree/Small/Rain	35.0 ± 9.4	36.0 ± 12.6	35%	36%	
		<i>A. aspera</i> <sup>s</sup>	Tree/Small/Rain	68.0 ± 12.6	60.0 ± 37.9	68%	60%	
		<i>A. aspera</i> <sup>c</sup>	Tree/Small/Rain	100.0 ± 0.0	98.0 ± 18.9	100%	98%	
		<i>A. aspera</i> <sup>f</sup>	Tree/Small/Rain	72.0 ± 9.4	80.0 ± 9.4	72%	80%	
		<i>Cecropia peltata</i> <sup>m</sup>	Tree/Small/Rain	74.0 ± 12.6	58.0 ± 12.6	74%	58%	
		<i>C. peltata</i> <sup>b</sup>	Tree/Small/Rain	17.0 ± 9.4	18.0 ± 9.4	17%	18%	
		<i>C. peltata</i> <sup>s</sup>	Tree/Small/Rain	29.0 ± 9.4	18.0 ± 9.4	29%	18%	
		<i>C. peltata</i> <sup>c</sup>	Tree/Small/Rain	34.0 ± 15.8	27.0 ± 12.6	34%	27%	
		<i>C. peltata</i> <sup>f</sup>	Tree/Small/Rain	49.0 ± 12.6	44.0 ± 15.8	49%	44%	

Gallegos et al. (2014)	Proportion	<i>Clusia trochiformis</i>	Tree/Medium/Rain	41.2 ± 22.8	33.6 ± 22.8	41%	33%
Griffiths et al. (2016)	Proportion	<i>Helianthus annuus</i>	Shrub/Large/Rain	0.5 ± 0.4	0.4 ± 0.4	52%	45%
Guerra et al. (2018)	Mean	<i>Miconia irwinii</i> <sup>3</sup>	Shrub/Medium/Sav.	3.5 ± 4.6	1.5 ± 3.3	35%	15%
		<i>M. irwinii</i> <sup>4</sup>	Shrub/Small/Sav.	2.88 ± 2.99	1.81 ± 2.82	28%	18%
		<i>M. irwinii</i> <sup>*3</sup>	Shrub/Medium/Sav.	0.9 ± 2.8	0.8 ± 2.3	9%	8%
		<i>M. irwinii</i> <sup>*4</sup>	Shrub/Medium/Sav.	2.4 ± 4.3	1.8 ± 4.4	24%	18%
Hulme (1997)	Percentage	<i>Crataegus monogyna</i>	Tree/Large/Med.	3.8 ± 4.6	1.5 ± 1.0	3%	1%
		<i>Prunus mahaleb</i> <sup>lf</sup>	Tree/Medium/Med.	84.4 ± 18.0	40.0 ± 22.9	84%	40%
		<i>P. mahaleb</i> <sup>ls</sup>	Tree/Medium/Med.	36.5 ± 22.8	3.2 ± 2.4	36%	3%
		<i>P. mahaleb</i> <sup>o</sup>	Tree/Medium/Med.	52.3 ± 26.0	27.8 ± 22.1	52%	27%
		<i>P. mahaleb</i> <sup>s</sup>	Tree/Medium/Med.	59.3 ± 24.7	11.7 ± 19.9	59%	11%
Leite et al. (2013)	Mean	<i>Miconia albicans</i> <sup>2</sup>	Shrub/Small/Sav.	8.6 ± 0.6	8.3 ± 0.9	86%	83%
		<i>M. albicans</i> <sup>1</sup>	Shrub/Small/Sav.	6.8 ± 0.9	5.7 ± 1.5	68%	57%
Lima et al. (2013)	Mean	<i>Miconia albicans</i>	Shrub/Small/Sav.	3.0 ± 3.8	3.7 ± 3.7	30%	37%

		<i>M. albicans</i> <sup>7</sup>	Shrub/Small/Sav.	7.2 ± 0.0	7.5 ± 3.4	72%	75%
		<i>M. albicans</i> <sup>8</sup>	Shrub/Small/Sav.	2.3 ± 3.1	3.6 ± 3.3	23%	36%
		<i>M. albicans</i> <sup>5</sup>	Shrub/Small/Sav.	3.6 ± 4.2	2.3 ± 3.9	36%	23%
		<i>M. alborufescens</i>	Shrub/Medium/Sav.	5.1 ± 4.6	3.4 ± 4.4	51%	34%
		<i>M. coralina</i> <sup>out</sup>	Shrub/Small/Sav.	4.2 ± 4.1	5.6 ± 2.8	42%	56%
		<i>M. ferruginata</i>	Tree/Medium/Sav.	2.1 ± 4.1	2.5 ± 4.1	21%	25%
		<i>M. ibaguensis</i>	Shrub/Medium/Sav.	2.8 ± 2.6	2.4 ± 3.5	28%	24%
		<i>M. irwinii</i>	Shrub/Medium/Sav.	8.3 ± 3.0	9.3 ± 2.6	83%	93%
Lima et al. (2015)	Mean	<i>Hovenia dulcis</i>	Tree/Medium/Rain	2.5 ± 4.2	1.7 ± 2.7	25%	17%
Magalhães et al. (2018)	Mean	<i>Siparuna guianensis</i>	Shrub/Small/Rain	11.0 ± 0.9	11.1 ± 1.1	92%	93%
Munoz and Arroyo (2002)	Percentage	<i>Sisyrinchium arenarium</i> <sup>low</sup>	Shrub/Small/Med.	1.1 ± 0.1	4.4 ± 8.0	1%	4%
		<i>S. arenarium</i> <sup>high</sup>	Shrub/Small/Med.	7.0 ± 14.8	12.3 ± 9.1	7%	12%
Passos and Oliveira (2002)	Mean	<i>Clusia criuva</i>	Tree/Large/Rain	91.5 ± 15.6	89.0 ± 18.1	91%	89%
Pizo and Oliveira	Brazil	<i>Cabralea</i>	Tree/Large/Rain	2.3 ± 1.6	1.2 ± 1.8	47%	24%

(1998)		<i>canjerana</i>					
Robert and Heithaus	Costa Rica	<i>Ficus hondurensi</i>	Tree/Small/Rain	44.1 ± 12.4	41.8 ± 11.9	88%	83%
(1987)		<i>F. hondurensi</i> *	Tree/Small/Rain	48.0 ± 4.9	47.3 ± 7.2	96%	94%
Rocha-Ortega et al.	Mean	<i>Siparuna guianensis</i>	Shrub/Small/Sav.	4.6 ± 3.8	4.5 ± 3.2	46%	45%
(2017)		<i>Xylopia aromatica</i>	Tree/Medium/Sav.	5.7 ± 3.8	5.0 ± 3.6	57%	50%
		<i>Solanum lycocarpum</i>	Shrub/-/Sav.	3.0 ± 3.8	2.7 ± 3.8	30%	27%
		<i>Matayba guianensis</i>	Tree/Large/Sav.	1.9 ± 2.2	0.7 ± 1.5	19%	7%
		<i>Tapirira guianensis</i>	Tree/Large/Sav.	4.0 ± 4.6	2.5 ± 3.6	40%	25%
Setterfield and Andersen (2018)	Percentage	<i>Eucalyptus miniate</i> <sup>t1</sup>	Tree/Medium/Sav.	10.3 ± 27.2	5.1 ± 4.3	10%	5%
		<i>E. miniate</i> <sup>t2</sup>	Tree/Medium/Sav.	19.5 ± 26.6	6.6 ± 6.1	19%	6%
		<i>E. miniate</i> <sup>t3</sup>	Tree/Medium/Sav.	27.1 ± 35.1	21.9 ± 29.9	27%	21%
		<i>E. miniate</i> <sup>t4</sup>	Tree/Medium/Sav.	30.7 ± 31.6	28.4 ± 21.9	30%	28%
		<i>E. miniate</i> <sup>t5</sup>	Tree/Medium/Sav.	29.7 ± 20.5	12.5 ± 18.0	29%	12%

Weiblen and Thomson (1995)	Mean	<i>E. miniate</i> <sup>16</sup>	Tree/Medium/Sav.	45.1 ± 20.5	19.8 ± 22.3	45%	19%
		<i>E. miniate</i> <sup>17</sup>	Tree/Medium/Sav.	58.7 ± 22.1	46.9 ± 29.3	58%	46%
		<i>Erythronium grandiflorum</i> <sup>day</sup>	Shrub/Small/-	7.0 ± 5.6	6.0 ± 7.0	7%	6%
		<i>E. grandiflorum</i> <sup>night</sup>	Shrub/Small/-	2.7 ± 2.3	2.0 ± 2.7	2%	2%
		<i>Prosopis glandulosa</i> <sup>88/on</sup>	Tree/Medium/Sav.	86.0 ± 16.9	88.0 ± 16.9	86%	88%
Weltzin et al.	Percentage	<i>P. glandulosa</i> <sup>88/on</sup>	Tree/Medium/Sav.	85.0 ± 20.0	67.0 ± 20.0	85%	67%
		<i>P. glandulosa</i> <sup>89/on</sup>	Tree/Medium/Sav.	63.0 ± 19.8	54.0 ± 19.8	63%	54%
		<i>P. glandulosa</i> <sup>NF/on</sup>	Tree/Medium/Sav.	36.0 ± 16.9	31.0 ± 16.9	36%	31%
		<i>P. glandulosa</i> <sup>88/off</sup>	Tree/Medium/Sav.	32.0 ± 20.0	27.0 ± 20.0	32%	27%
		<i>P. glandulosa</i> <sup>89/off</sup>	Tree/Medium/Sav.	34.0 ± 19.8	33.0 ± 19.8	34%	33%
		<i>P. glandulosa</i> <sup>NF/off</sup>	Tree/Medium/Sav.				

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\*Far from parental plant; - Information unavailable.

<sup>1</sup> Border areas; <sup>2</sup> Interior forest; <sup>3</sup> Fruit; <sup>4</sup> Seed.

<sup>sol</sup> Near *Solenopsis invicta* nests; <sup>Fsol</sup> Far from *Solenopsis invicta* nests

<sup>5</sup> Brazilian Savanna *strictu sensu*; <sup>6</sup> Brazilian Savanna “*cerradão*”; <sup>7</sup> Brazilian Savanna “*campo rupestre*”; <sup>8</sup> Brazilian Savanna “*campo sujo*”.

<sup>m</sup> Metropolitan forest; <sup>b</sup> Barro Colorado Island; <sup>s</sup> Sherman forest; <sup>c</sup> Campana forest; <sup>f</sup> Fortuna Forest.

<sup>lf</sup> 01 fruit per experiment; <sup>ls</sup> 01 seed per experiment; <sup>o</sup> Open forest; <sup>s</sup> Shrub forest.

<sup>low</sup> 2000 meters above sea level; <sup>high</sup> 2700 meters a.s.l.

<sup>t1</sup> Trial 1; <sup>t2</sup> Trial 2; <sup>t3</sup> Trial 3; <sup>t4</sup> Trial 4; <sup>t5</sup> Trial 5; <sup>t6</sup> Trial 6; <sup>t7</sup> Trial 7.

<sup>day</sup> Experiments carried during day time; <sup>night</sup> Experiments carried during night time.

<sup>88</sup> Experiments carried in 1988; <sup>89</sup> Experiments carried in 1989; <sup>on</sup> Experiments carried on prairie dog colonies; <sup>off</sup> Experiments carried on prairie dog colonies;

<sup>NF</sup> Experiments carried in North Fork.

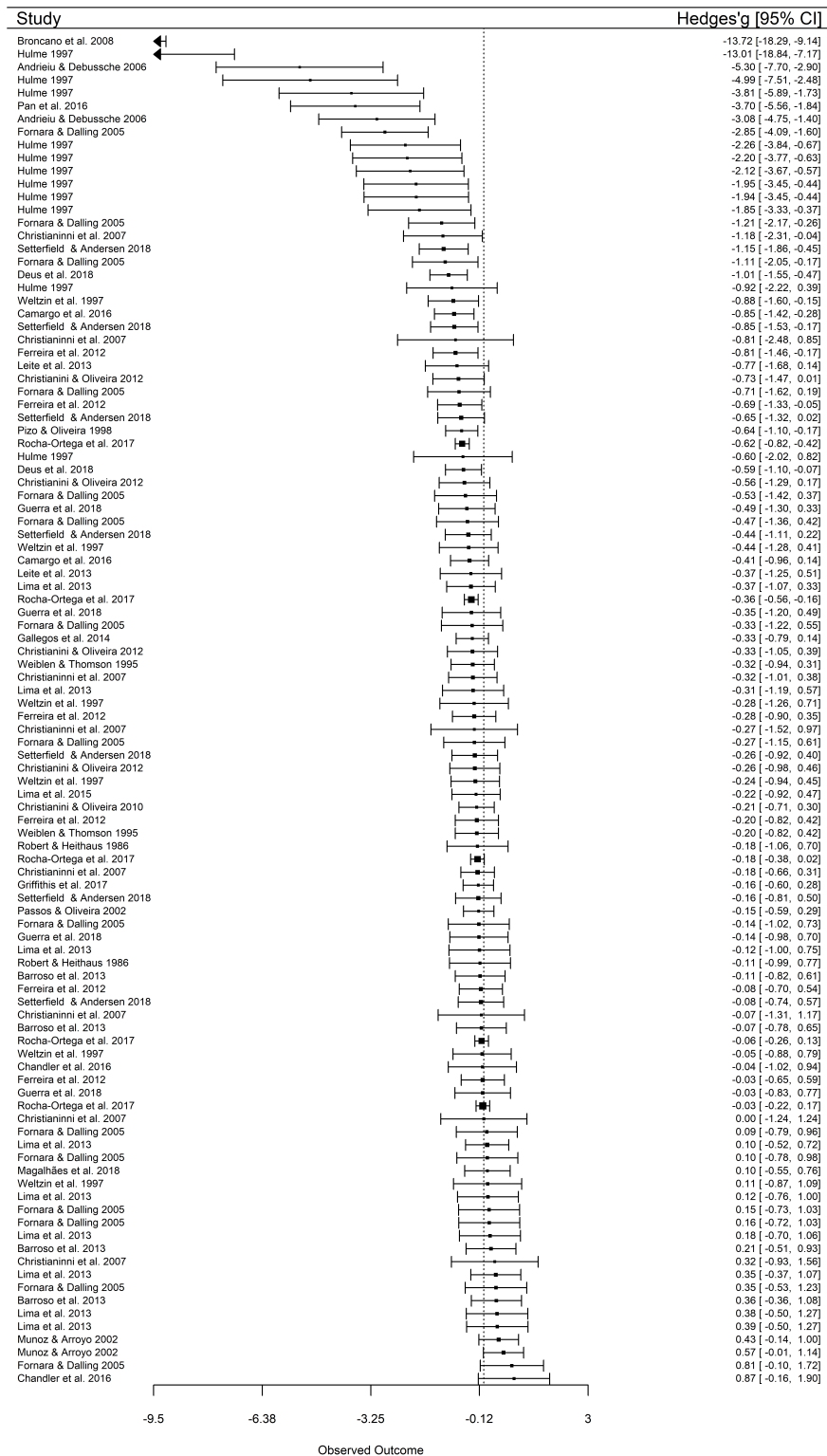
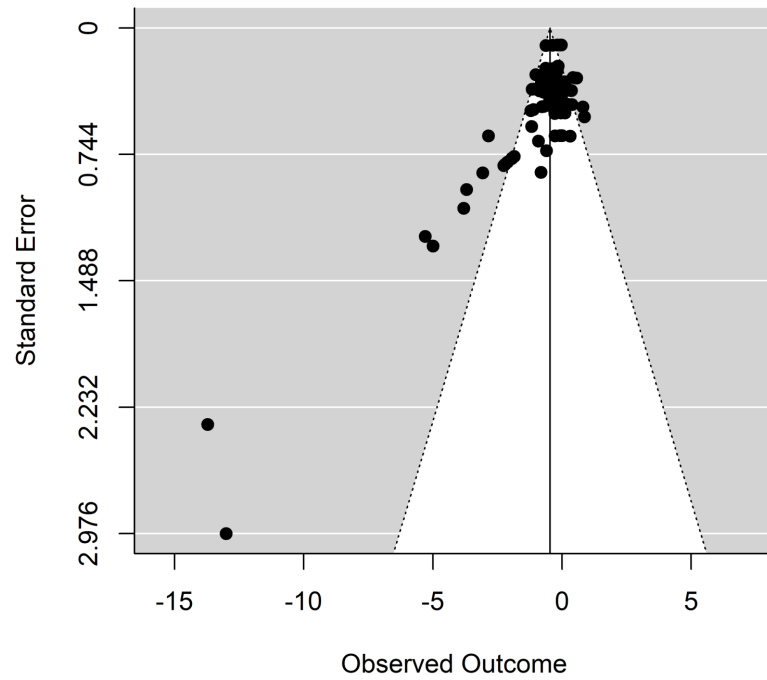


Figure A1 Effect of diaspore removal by ants through vertebrate exclusion experiments in biased dataset, before removal of 11 potential outliers. Weighted-mean effect size (observed outcome) and 95% CI for diaspore removal by ants.

A



B

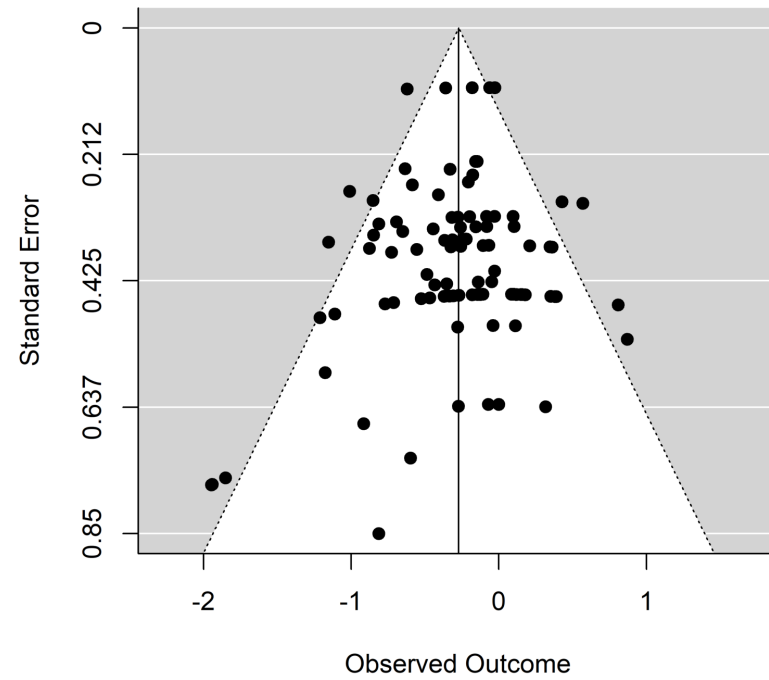
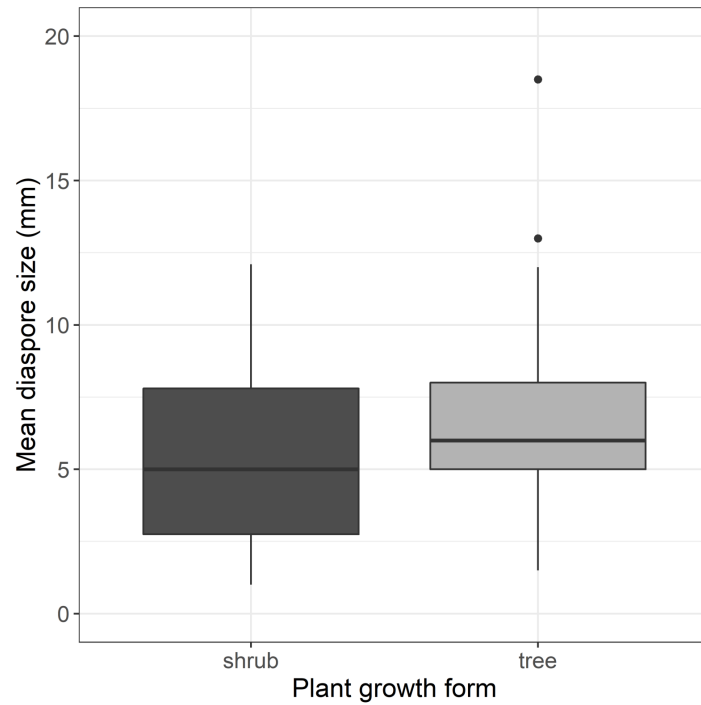


Figure A2. Funnel plots of standard residuals of original effect sizes (relative interaction intensity index; *Hedges' g*) plotted against the corresponding precision (standard error of the variances). (A) Funnel plot of original data set. (B) Funnel plot after removal of outliers.

A



B

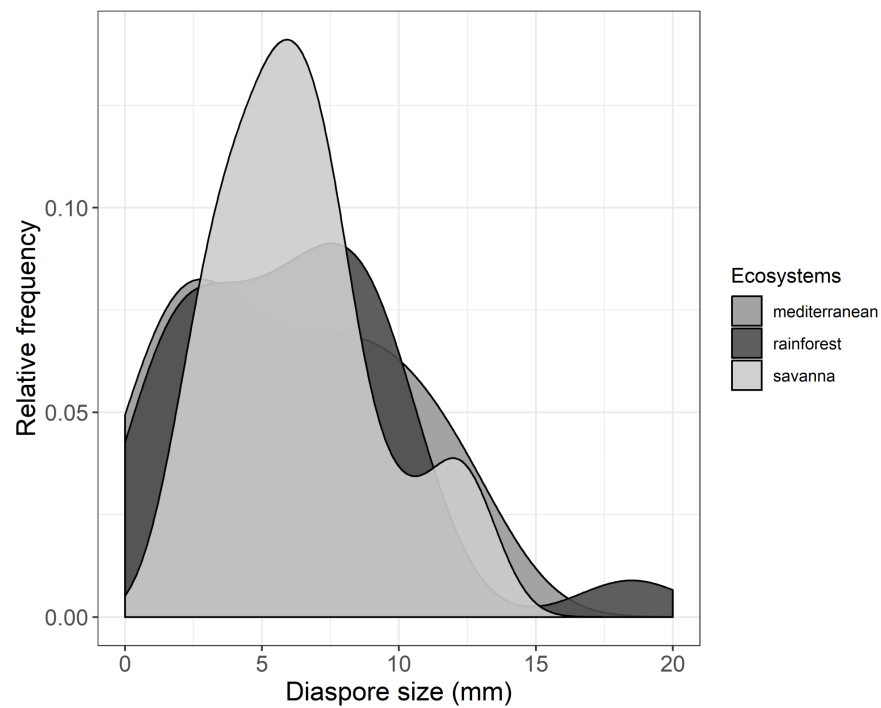


Figure A3. Mean diaspore size removed by ants, classified in shrub and tree diaspore ( $F = 0.10$ ;  $df = 87$ ;  $p = 0.89$ ) (A) the relative frequency of diaspore size of shrubs and trees (B).

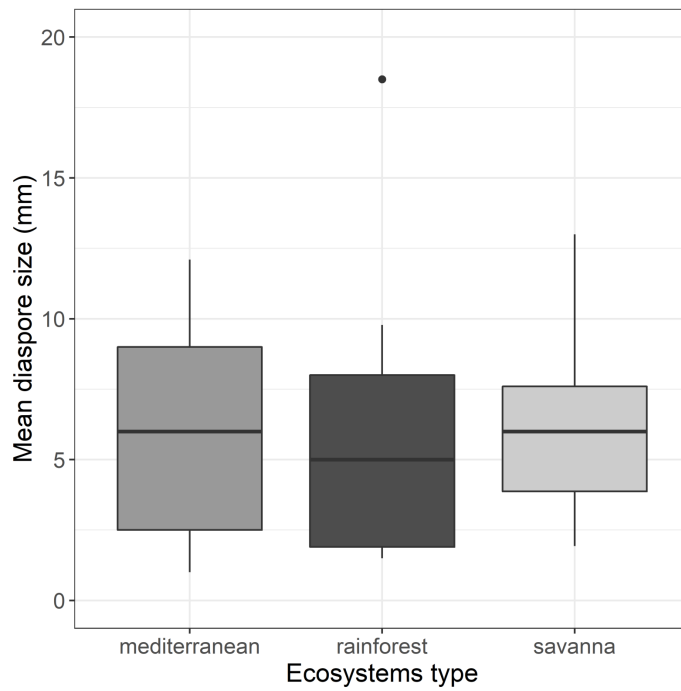
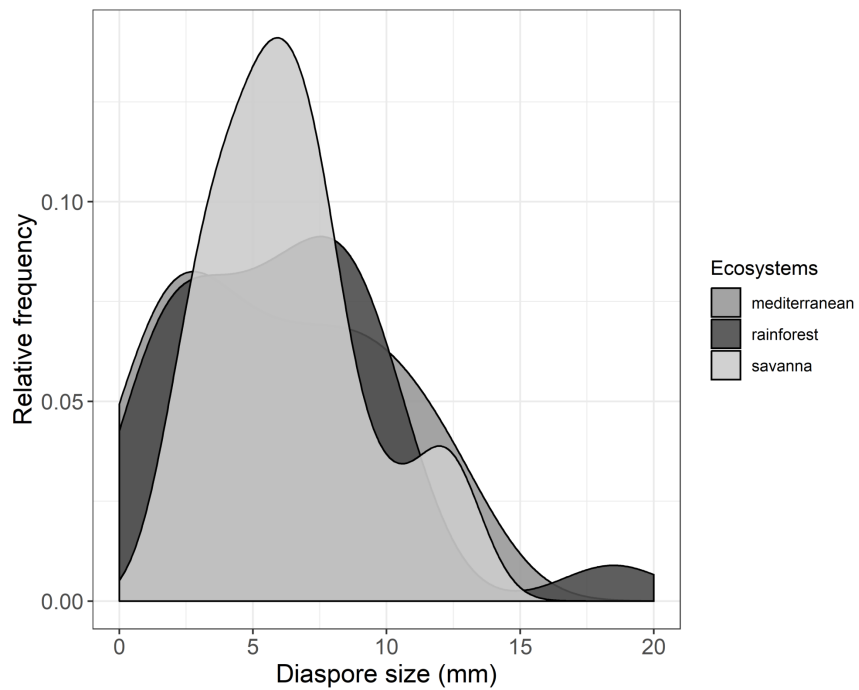
**A****B**

Figure A4. Mean diaspore size removed by ants from three ecosystems type studies (savanna, Mediterranean and rainforest) ( $F = 2.67$ ;  $df = 90$ ;  $p = 0.10$ ) (A) and the relative frequency of diaspore size in ecosystems types (B).