

Supplementary material

C₃ and C₄ plant leaf breakdown and assimilation by aquatic macroinvertebrates in streams of the Brazilian Atlantic Forest

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Table S1. Physical and chemical characteristics measured in streams during the experiment (both periods of installation and collection)

*, $P < 0.05$

	Forest	Pasture
pH	6.4 ± 0.4	6.5 ± 0.5
CE ($\mu\text{S cm}^{-1}$)*	20.2 ± 0.9	15.7 ± 1.0
O ₂ (mg L ⁻¹)	8.3 ± 0.9	8.1 ± 0.7
O ₂ (%)	88.7 ± 1.7	88.4 ± 1.1
T (°C)	15.2 ± 1.8	15.9 ± 1.5
Depth*	22.8 ± 8.0	33.1 ± 5.6

Table S2. Initial characteristics of plant material used in the experiment

Data source: Figueiredo *et al.* (2018)

	<i>Mollinedia schottiana</i>	<i>Brachiaria brizantha</i>
C ^A	460.7	423.1
N ^A	33.4	16.6
C/N ^A	13.8	25.2
$\delta^{13}\text{C}$ (‰) ^A	-33.8	-13.6
$\delta^{15}\text{N}$ (‰) ^A	2.2	1.0
Cellulose (%)	27.0	30.6
Lignin (%) ^A	30.0	8.7
Lignin:N ^A	9	27
Fibres (%) ^A	57.7	42.3
Polyphenols (%)	1.23	1.97
Condensed tannins ^A	31.2	2.3
Toughness (Kpa)	905	1386

^AStatistically different characteristics between plants.

Table S3. $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ average values followed by standard deviation (s.d.) of and number of samples (*n*) putative sources to macroinvertebrates used in the MixSIAR model

	$\delta^{13}\text{C}$		$\delta^{15}\text{N}$		<i>n</i>
	average	s.d.	average	s.d.	
<i>Brachiaria brizantha</i>	-18.2	1.45	1.45	0.63	8
<i>Mollinedia schottiana</i>	-33.9	0.25	2.3	0.35	8
Periphyton	-30.4	2.7	5.8	0.8	9
Seston	-25.1	1.7	5.4	0.6	8

Table S4. Absolute density (individuals g⁻¹) and relative density (%) of the taxa found throughout the experiment and richness, density and total diversity

Forest *M. schottiana* (FMoll), forest *B. brizantha* (FGram), forest mixture (PMix), pasture *M. schottiana* (PMoll), pasture *B. brizantha* (PGram) and pasture mixture (PMix). Gatherers (Gath.), Predator (Pred.), Scraper (Scr.) shredders (Shr.) and unidentified organisms (NI)

Taxa	FFG	Forest				Pasture							
		<i>M.schottiana</i>		<i>B.brizantha</i>		Mix		<i>M.schottiana</i>		<i>B.brizantha</i>		Mix	
		individuals g ⁻¹	%	individuals g ⁻¹	%	individuals g ⁻¹	%	individuals g ⁻¹	%	individuals g ⁻¹	%	individuals g ⁻¹	%
Acari	Pred.	0.4	0.7	0.6	0.6	0.5	0.8	2.2	2.0	4.2	3.7	1.9	1.9
Amphipoda	Shr.	1.3	2.5	5.5	5.5	2.0	2.9	0.0	0.0	0.0	0.0	0.0	0.0
Cl. Bivalvia	Gath.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Cl. Gastropoda	Scr.	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.04	0.04	0.0	0.0
Coleoptera													
Dytiscidae	Pred.	0.05	0.1	0.1	0.1	0.0	0.0	10.1	9.1	0.0	0.0	0.0	0.0
Elmidae	Gath. or Scr.	6.3	11.6	9.8	9.8	8.2	11.6	0.0	0.0	12.5	11.0	10.6	10.5
Gyrinidae	Pred.	0.05	0.1	0.0	0.0	0.0	0.0	0.05	0.04	0.04	0.04	0.04	0.04
Lutrochidae	Shr.	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Psephenidae	Scr.	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Staphilinidae	Shr.											0.04	0.04
Collembola	Gath.	0.0	0.0	0.0	0.0	0.0	0.0	0.05	0.04	0.1	0.1	0.0	0.0
Diptera													
Ceratopogonidae	Pred.	0.8	1.5	2.3	2.3	1.8	2.6	1.2	1.1	3.3	2.9	2.7	2.7
Chironomidae	Gath., Pred. or Shr.	24.5	45.5	51.2	51.4	34.9	49.5	73.5	66.8	78.3	69.0	70.1	69.7
Empididae	Pred.	0.5	0.9	0.6	0.6	0.4	0.5	0.2	0.2	0.2	0.2	0.1	0.1
Simuliidae	Gath.	0.6	1.1	0.8	0.8	0.5	0.7	1.0	0.9	1.2	1.0	0.4	0.4
Tabanidae	Pred.	0.1	0.3	0.0	0.0	0.2	0.3	0.0	0.0	0.0	0.0	0.0	0.0
Tipulidae	Gath. or Shr.	0.05	0.1	0.3	0.3	0.04	0.1	0.2	0.2	0.5	0.4	0.3	0.3
NI	NI	0.6	1.1	2.2	2.2	1.0	1.4	1.5	1.4	2.1	1.9	1.5	1.5
Ephemeroptera													
Baetidae	Gath. or Scr.	0.2	0.3	0.3	0.3	0.3	0.4	1.4	1.3	0.2	0.2	0.7	0.7
Caenidae	Gath.	0.0	0.0	0.1	0.1	0.04	0.1	0.05	0.04	0.0	0.0	0.0	0.0
Leptohyphidae	Gath.	0.2	0.3	0.3	0.3	0.2	0.3	0.6	0.5	0.7	0.6	0.6	0.6
Leptophlebiidae	Gath. or Scr.	5.1	9.4	10.5	10.5	5.1	7.2	2.1	1.9	1.5	1.3	1.3	1.3
NI	NI	0.1	0.2	0.1	0.1	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0
Hemiptera													
Gerromorpha	Pred.	0.0	0.0	0.0	0.0	0.04	0.1	0.0	0.0	0.04	0.04	0.04	0.04
Nepomorpha	Pred.	0.1	0.2	0.1	0.1	0.04	0.1	0.2	0.2	0.1	0.1	0.3	0.3
Veliidae	Pred.	0.0	0.0	0.0	0.0	0.04	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Hirudinea	Pred.	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.4	0.4
Hymenoptera	Pred.	0.05	0.1	0.0	0.0	0.04	0.1	0.0	0.0	0.0	0.0	0.0	0.0

Taxa	FFG	Forest				Pasture							
		<i>M.schottiana</i>		<i>B.brizantha</i>		Mix		<i>M.schottiana</i>		<i>B.brizantha</i>		Mix	
		individuals g ⁻¹	%	individuals g ⁻¹	%	individuals g ⁻¹	%	individuals g ⁻¹	%	individuals g ⁻¹	%	individuals g ⁻¹	%
Megaloptera	Pred.	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.1	0.1	0.2	0.2
Odonata	Pred.	0.3	0.6	1.0	1.0	0.5	0.8	0.5	0.4	0.7	0.6	0.5	0.5
Oligochaeta	Gath.	0.0	0.0	0.0	0.0	0.0	0.0	0.05	0.04	0.2	0.2	0.2	0.2
Plecoptera													
Gripopterygidae	Shr.	1.8	3.4	2.2	2.2	1.7	2.4	0.9	0.8	1.6	1.4	1.0	1.0
Perlidae	Pred.	3.1	5.8	3.5	3.5	2.8	4.0	2.8	2.5	0.6	0.5	1.4	1.4
Trichoptera													
Calamoceratidae													
<i>Phylloicus</i>	Shr.	2.8	5.1	1.4	1.4	2.1	3.0	3.6	3.2	0.3	0.3	1.8	1.8
Glossosomatidae	Scr.	0.0	0.0	0.1	0.1	0.04	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Helicopsychidae													
<i>Helichopsyche</i>	Scr.	0.1	0.2	0.1	0.1	0.0	0.0	0.05	0.04	0.0	0.0	0.04	0.04
Hydrobiosidae													
<i>Atopsyche</i>	Pred.	0.0	0.0	0.1	0.1	0.04	0.1	0.4	0.3	0.1	0.1	0.2	0.2
Hydropsychidae													
<i>Leptinema</i>	Gath.	0.05	0.1	0.2	0.2	0.6	0.8	1.1	1.0	0.8	0.7	0.5	0.5
<i>Macrostemum</i>	Gath.	0.0	0.0	0.0	0.0	0.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0
Hydroptilidae													
<i>Hydroptila</i>	Gath. or Scr.	0.0	0.0	0.0	0.0	0.0	0.0	0.05	0.04	0.0	0.0	0.0	0.0
<i>Neotrichia</i>	Scr.	1.9	3.6	3.6	3.6	3.1	4.4	2.7	2.4	2.2	1.9	2.2	2.2
<i>Oxyethira</i>	Gath. or Scr.	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.3	0.04	0.04	0.0	0.0
Leptoceridae													
<i>Nectopsyche</i>	Gath. or Shr.	1.6	2.9	0.7	0.7	1.1	1.6	1.0	0.9	0.7	0.6	0.6	0.6
<i>Notalina</i>	Gath., Shr. or Pred.	0.05	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0
<i>Oecetis</i>	Pred.	0.05	0.1	0.6	0.6	1.0	1.4	0.4	0.3	0.5	0.5	0.3	0.3
<i>Triplectides</i>	Shr.	0.3	0.6	0.7	0.7	0.7	1.0	1.4	1.3	0.04	0.04	0.5	0.5
Odontoceridae													
<i>Marilia</i>	Shr.	0.1	0.2	0.0	0.0	0.04	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Phylopotamidae	Gath.	0.0	0.0	0.1	0.1	0.0	0.0	0.05	0.04	0.04	0.04	0.04	0.04
Polycentropotidae	Gath. or Pred.	0.5	0.9	0.4	0.4	0.4	0.6	0.2	0.2	0.1	0.1	0.0	0.0
<i>Cyrnellus</i>	Gath.	0.05	0.1	0.2	0.2	0.4	0.5	0.0	0.0	0.0	0.0	0.0	0.0
Sericostomatidae													
<i>Grumicha</i>	Shr.	0.0	0.0	0.1	0.1	0.04	0.1	0.1	0.1	0.04	0.04	0.0	0.0
NI	NI	0.05	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0
	Abundance	1168		1879		1815		2355		2576		2430	
	Richness	34		36		39		35		35		31	
	Density	53.8		99.7		70.6		110.1		113.4		100.6	
	Simpson <i>D</i>	0.775		0.722		0.744		0.639		0.520		0.549	
	Shannon <i>D</i>	2.551		2.364		2.504		2.101		1.781		1.829	

Reference

- Figueiredo, A. F., Augusto, F. G., Coletta, L. D., Duarte-Neto, B. P. J., Mazzi, E. A., and Martinelli, L. A. (2018). Comparison of microbial processing of *Brachiaria brizantha*, a C₄ invasive species and a rainforest species in tropical streams of the Atlantic Forest of south-eastern Brazil. *Marine and Freshwater Research* **69**(9), 1397–1407. [doi:10.1071/MF17080](https://doi.org/10.1071/MF17080)