Algal-Dependency in Sub-Tropical, Arid Streams: Tables

Sean Kinard

2023-05-24

E.Variable	Units	Semi-Arid	Transition	Sub-Humid
Site Name	NA	San Fernando Creek	Aransas River	Garcitas Creek
Latitude	DD	27.773	28.283	28.891
Longitude	DD	-98.034	-97.621	-96.819
Rainfall	cm/yr	56.67	68.53	84.25
Temperature	°C	22.22	21.55	21.21
Elevation	m	62	47	20
Discharge	cfs	144. ± 83.1	89.2 ± 50.2	30.9 ± 17.8
Measurements	NA	9	9	9
Canopy	%	0.87 ± 0.03	0.89 ± 0.01	0.94 ± 0.01
Algae	µg/cm^2	0.60 ± 0.10	2.23 ± 0.39	1.44 ± 0.49
Channel Width	m	2.83 ± 0.13	3.28 ± 0.22	6.33 ± 0.60
Depth Max	m	0.32 ± 0.05	0.17 ± 0.01	0.27 ± 0.03
Conductivity	µcm/S	1165 ± 91.7	1546 ± 40.0	517. ± 41.3
Nitrate	mg/L	11.9 ± 0.63	4.51 ± 0.34	0.20 ± 0.06
Phosphate	mg/L	2.20 ± 0.05	2.12 ± 0.14	0.18 ± 0.04

Table 1. Site Characteristics Sampling location environmental characteristics (E.variables). Annual rainfall, annual average temperature and elevation were obtained from the USGS Gages-ii database. In-situ measurements represent the seasonal mean ± the standard error; three measurements were taken every 25 meters within each stream, May-July of 2018, for a total of nine samples.

Group	Semi-Arid	Transition	Sub-Humid
Fish	76 (64:87)**	36 (32:40)**	5 (1:10)**
F-Herbivore	80 (61:97)*	39 (8:77)	18 (3:51)*
P.latipinna	80 (61:96)*	39 (8:77)	19 (3:52)*
F-Invertivore	60 (44:77)**	36 (30:42)**	5 (1:11)**
L.macrochirus	61 (23:91)*	36 (16:52)	8 (1:19)*
F-Piscivore	70 (40:93)*	34 (22:42)*	10 (2:21)**
L.cyanellus	62 (20:92)	34 (9:53)	18 (3:48)
L.gulosus	63 (27:92)	35 (9:66)	12 (2:34)
Invertebrate	57 (38:74)*	28 (20:34)*	32 (10:57)
I-Filterer	41 (12:72)	31 (10:50)	20 (4:50)
Corbiculidae	42 (13:74)	31 (6:58)	19 (4:48)
I-Gatherer	45 (6:90)	27 (11:41)	46 (11:84)
I-Predator	62 (31:86)	22 (9:31)	41 (7:83)
Coenagrionidae	46 (7:92)	25 (7:48)	30 (5:71)
I-Herbivore	54 (15:91)	60 (33:93)	NA

Table 2. Autochthonous Assimilation Autochthonous Source assimilation (%) in fish and invertebrate communities, functional feeding groups, and common taxa at Semi-Arid, Transition, and Sub-Humid sites. Values reflect the high density mode and associated 95% credible interval with stars indicating the number of non-overlapping intervals between sites. Autochthonous source assimilation is estimated using δ^{13}C and δ^{2}H in Bayesian mixing models for each level of comparison (community, feeding group, species/family), calibrated to local aquatic and terrestrial source signatures.

Table 3. Isotopic Trophic Level Isotopic trophic levels for fish and invertebrate communities as well as functional feeding groups. Each row contains the group of comparison, the mean ± the standard deviation, the sample size (in parentheses) as well as the statistical significance (whether 95% credible intervals overlap between sites). Sample δ^{15}N values were calibrated to the local resources, so isotopic trophic levels represent the distance from local resources in steps of 3.4‰ δ^{15}N.

Group	Semi-Arid	Sub-Humid	Transition
Fish	0.7 (0.5, 0.9)∗∗	2.1 (2.0, 2.3)∗∗	1.8 (1.6, 2.0)∗
F-Herbivore	0.4 (0.2, 0.6)∗∗	2.2 (1.8, 2.7)∗	1.6 (1.1, 2.0)∗
P.latipinna	0.4 (0.2, 0.6)∗∗	2.2 (1.8, 2.7)∗	1.6 (1.1, 2.1)∗
F-Invertivore	0.7 (0.5, 1.0)∗∗	2.1 (1.9, 2.3)∗∗	1.7 (1.5, 1.9)∗
L.macrochirus	0.7 (0.3, 1.1)∗∗	2.6 (2.0, 3.2)∗∗	1.3 (1.1, 1.6)∗
F-Piscivore	1.1 (0.5, 1.6)∗	2.1 (1.9, 2.3)∗	1.9 (1.5, 2.3)
L.cyanellus	0.7 (0.2, 1.2)∗	2.2 (2.0, 2.4)∗∗	1.1 (0.9, 1.2)∗
L.gulosus	0.7 (0.1, 1.3)∗∗	1.9 (1.9, 2.0)∗	1.8 (1.7, 1.9)∗
Invertebrate	0.2 (0.1, 0.4)∗∗	0.9 (0.6, 1.1)∗	1.2 (0.9, 1.5)∗
I-Filterer	0.0 (0.0, 0.0)∗	0.8 (0.7, 0.9)∗	0.4 (0.0, 0.9)
Corbiculidae	0.0 (0.0, 0.0)∗	0.8 (0.7, 0.9)∗∗	0.2 (-0.2, 0.6)∗
I-Predator	0.3 (0.1, 0.6)∗	0.9 (0.5, 1.3)	1.4 (1.0, 1.8)∗

Table 4. Niche Estimates Bayesian estimates for the δ^2H x δ^{15}N standard ellipse area and nearest-neighbor distance, as well as boostrapped estimates of δ^2H range and δ^{15}N range for fish and invertebrate communities. Summary statistics represent the mean and the associated 95% credible interval. Statistical significance stars represent whether one or more pairs of sites have non-overlapping credible intervals.

Guild	Estimate	Unit	Semi-Arid	Transition	Sub-Humid
Fish	C-Range	‰	4 (4, 5)	4 (4, 5)	6 (5, 7)
Fish	Ellipse Area	‰^{2}	89 (60, 131)$*$	57 (42, 77)	42 (31, 55)$*$
Fish	H-Range	‰	58 (51, 74)	43 (38, 57)	41 (33, 61)
Fish	N-Range	‰	7 (6, 9)	8 (8, 10)	11 (8, 16)
Fish	Neighbor Distance	‰	5 (4, 6)$**$	1 (0, 2)$**$	4 (3, 4)$*$
Invertebrate	C-Range	‰	6 (5, 7)$*$	6 (5, 8)$*$	13 (10, 20)$**$
Invertebrate	Ellipse Area	‰^{2}	99 (59, 170)	98 (60, 150)	91 (45, 172)
Invertebrate	H-Range	‰	54 (41, 88)	61 (51, 89)	70 (58, 109)
Invertebrate	N-Range	‰	12 (10, 17)$*$	10 (9, 12)$*$	5 (4, 7)$**$
Invertebrate	Neighbor Distance	‰	4 (3, 5)$*$	1 (0, 2)$**$	19 (17, 20)$**$