

Appendix 1. Species abundances by study site.

Species/sites	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	s12	s13	s14	s15	s16	s17	s18	s19	s20	s21	s22	s23	s24
Agrilinelus azteca	0	102	0	0	0	1	0	1	31	36	0	34	0	11	0	2	0	0	5	0	0	0	0	0
Agrilinelus ornatus	2	0	0	4	7	0	15	0	15	0	4	29	0	37	5	1	0	0	0	0	0	0	0	0
Blackburneus charmionus	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blackburneus guatemalensis	0	0	0	0	1	0	0	0	34	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Blackburneus saylorea	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cephalocyclus fuliginosus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	122	0	0	0	0	0
Cephalocyclus hoguei	83	3	0	191	0	0	0	0	21	16	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Ceratotrupes bolivari	1	3	4	1	6	0	21	3	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
Copris armatus	0	0	0	0	61	0	37	0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0
Geomyphilus barrerae	0	29	0	0	0	0	0	0	0	0	38	0	0	52	0	0	0	0	0	0	0	0	0	0
Gonaphodiellus bimaculosus	0	0	0	0	0	0	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gonaphodiellus opisthius	2	0	0	0	13	0	0	0	102	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0
Geomyphilus pierai	0	89	0	2	3	0	0	0	0	0	0	0	0	24	0	1	0	0	0	0	0	0	0	0
Halffterius rufoclavatus	4	20	0	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Labarrus pseudolividus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Neotrichonotulus inurbanus	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Neotrichonotulus perotensis	0	102	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0
Onthophagus aureofuscus	0	0	105	9	0	0	0	0	0	0	13	0	0	0	0	0	0	0	0	0	1	26	1	12
Onthophagus bolivari	0	0	0	0	18	4	144	6	0	0	0	0	0	0	0	0	123	0	87	0	0	0	0	0
Onthophagus chevrolati	362	51	53	114	112	10	187	11	227	13	66	116	93	38	38	4	79	0	50	9	0	0	0	0
Onthophagus clavijeroi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	7	0	0	0	0	0
Onthophagus hippopotamus	0	116	0	16	3	0	0	16	0	5	0	5	0	61	0	0	0	0	0	0	0	0	0	0
Onthophagus lecontei	0	0	7	0	126	0	0	1	0	0	0	0	0	0	0	0	46	0	2	0	0	0	0	0
Onthophagus martinpierai	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	0	29	0	0	0	0	0
Onthophagus mexicanus	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	37	0	0	0	0	0	0	0
Onthotrupes herbeus	5	4	0	2	3	1	8	7	14	3	4	273	0	2	0	0	0	1	0	11	0	0	0	0
Onthotrupes nebularum	0	2	0	0	0	1	2	2	102	1	3	0	0	0	0	0	0	0	0	0	0	0	0	0
Onthotrupes sallei	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oscarinus indutilis	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxyomus setosopunctatus	0	0	0	0	0	0	0	0	15	1	0	0	0	0	0	0	0	0	2	0	0	0	0	0
Phanaeus amethystinus	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Phanaeus quadridens	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Planolinellus vittatus	0	1	0	0	0	0	0	0	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichonotuloides alfonsinae	0	0	0	0	0	0	0	0	0	0	1	5	0	0	0	2	0	0	0	0	0	0	0	0
Trichonotuloides glyptus	7	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trichonotuloides hansferyi	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix 2. Estimated distance and dissimilarity between study sites.

Observation	Dissimilarity between sites	Distance between sites
1	0.7222222	9.7
2	0.8	12.9
3	0.5	6.1
4	0.6875	88.2
5	0.8181818	91.2
6	0.6363636	102.5
7	0.7692308	94.6
8	0.6470588	42
9	0.7142857	41.2
10	0.6666667	47.1
11	0.7272727	42.3
12	0.75	58.6
13	0.6923077	52.8
14	0.8	54.7
15	0.8181818	49.8
16	0.9230769	84.8
17	0.875	86.1
18	0.8666667	87.1
19	0.75	86
20	1	34.5
21	1	36.8
22	1	37.4
23	1	38.3
24	0.8823529	11.4
25	0.6842105	7.5
26	0.7826087	92.7
27	0.75	95.9
28	0.7777778	107.3
29	0.6470588	99.1
30	0.6956522	51.5
31	0.4375	51.2
32	0.7222222	56.4
33	0.7647059	51.8
34	0.8666667	68.2
35	0.5	62.4
36	0.9444444	64
37	0.8235294	59.2
38	0.95	90.7
39	0.9333333	92
40	0.9090909	92.9
41	0.8666667	91.8
42	1	41.2
43	1	43.5
44	1	44.1
45	1	45.2
46	0.7272727	6.9
47	0.7857143	81.8
48	0.875	85
49	0.7777778	96

50	0.6666667	88.2
51	0.9444444	51.5
52	0.9230769	50.6
53	0.6666667	51.6
54	0.8888889	48.3
55	0.5	65.8
56	0.9166667	60.1
57	0.8571429	59.5
58	0.875	55.7
59	0.75	80.5
60	1	81.8
61	0.8181818	82.7
62	0.8	81.5
63	0.75	32.4
64	0.75	34.6
65	0.75	35.2
66	0.75	36.4
67	0.6470588	85.7
68	0.8461538	88.8
69	0.6923077	100
70	0.7142857	92.2
71	0.8095238	46.8
72	0.75	46.1
73	0.6153846	49.6
74	0.6666667	45.5
75	0.8	62.4
76	0.5384615	56.8
77	0.8333333	57.3
78	0.75	52.9
79	0.9333333	83.3
80	0.9	84.6
81	0.9444444	85.6
82	0.8	84.4
83	0.9	33.7
84	0.9	36
85	0.9	36.6
86	0.9	37.7
87	0.8	3.5
88	0.5714286	14.3
89	0.6	6.5
90	0.7826087	87.4
91	0.85	84.4
92	0.7647059	64.9
93	0.7333333	71.8
94	0.8461538	79.5
95	0.7058824	78.7
96	0.7857143	66.4
97	0.8	71.5
98	0.7333333	14.7
99	0.9230769	14.5

100	0.7777778	13.7
101	0.8461538	13.7
102	1	55.1
103	1	53
104	1	52.6
105	1	52.2
106	0.5	11.5
107	0.375	4.1
108	0.75	89.2
109	0.6363636	86.2
110	0.7	66.6
111	0.625	73.6
112	0.8333333	80.6
113	0.7272727	80.1
114	0.875	67.6
115	0.75	73
116	0.7777778	14.3
117	0.8	13.7
118	0.7272727	12.7
119	0.6	13
120	1	57.8
121	1	55.6
122	1	55.2
123	1	54.8
124	0.5	7.9
125	0.7777778	100.4
126	0.7857143	97.4
127	0.5	77.7
128	0.7	84.8
129	0.7142857	90.9
130	0.7692308	90.7
131	0.625	78.2
132	0.8	83.69
133	0.8181818	23.7
134	0.8571429	22.7
135	0.8571429	21.5
136	0.7142857	22.2
137	1	69.4
138	1	67.1
139	1	66.8
140	1	66.3
141	0.7894737	93.4
142	0.6153846	90.2
143	0.6666667	70.7
144	0.6	77.7
145	0.75	84.6
146	0.6923077	84.2
147	0.9090909	71.8
148	0.8181818	77.2
149	0.7272727	18.1

150	0.875	17.5
151	0.6923077	16.4
152	0.75	16.8
153	1	61.5
154	1	59.4
155	1	59
156	1	58.6
157	0.5294118	3.1
158	0.7894737	23
159	0.7647059	15.6
160	0.9375	20.1
161	0.7368421	15.2
162	0.8823529	25.3
163	0.8235294	18.3
164	0.95	77.6
165	0.9333333	78.7
166	0.8	80
167	0.8666667	79
168	1	40.2
169	1	41.1
170	1	40.9
171	1	40.4
172	0.8	20
173	0.6666667	12.6
174	0.9090909	18.8
175	0.6428571	13.3
176	0.9230769	22.6
177	0.8461538	15.5
178	0.9333333	74.5
179	0.9	75.8
180	0.8125	76.9
181	0.8	75.9
182	1	37.6
183	1	38.4
184	1	38.2
185	1	37.6
186	0.6	7.8
187	0.75	18.4
188	0.6923077	15
189	0.8	7.9
190	0.7	7.4
191	0.9230769	54.6
192	0.875	55.8
193	0.9375	57
194	0.75	56
195	0.875	26.3
196	0.875	25.9
197	0.875	25.4
198	0.875	24.4
199	0.8571429	17.7

200	0.5	12.5
201	0.75	13.1
202	0.4285714	7.4
203	0.9090909	62
204	0.8333333	63.2
205	0.8461538	64.4
206	0.6666667	63.4
207	1	27.9
208	1	28.2
209	1	27.8
210	1	27
211	0.9	5.9
212	0.8	13.4
213	0.8333333	11.4
214	0.8571429	67.3
215	1	68.3
216	0.9	69.6
217	0.6666667	68.8
218	1	44.5
219	1	44.3
220	1	43.7
221	1	42.7
222	0.8181818	12.6
223	0.6	7.6
224	0.9285714	67.3
225	0.8888889	68.4
226	0.875	69.6
227	0.7777778	68.7
228	1	40.1
229	1	40.1
230	1	39.6
231	1	38.7
232	0.7142857	7.1
233	0.8888889	54.7
234	1	55.8
235	0.9166667	57
236	0.8	56.1
237	1	33.6
238	1	33
239	1	32.3
240	1	31.2
241	0.9	60.6
242	1	61.7
243	0.8333333	63
244	0.8333333	62.1
245	1	33.1
246	1	32.9
247	1	32.4
248	1	31.4
249	1	1.3

250	0.5	2.5
251	0.8571429	1.4
252	1	50.4
253	1	48.1
254	1	47.6
255	1	46.8
256	1	1.3
257	0.5	0.8
258	1	51.8
259	1	49.4
260	1	48.9
261	1	48.1
262	0.9	1.2
263	1	52.7
264	1	50.4
265	1	49.9
266	1	49.2
267	1	51.6
268	1	49.3
269	1	48.7
270	1	48
271	0	2.3
272	0	3
273	0	4.1
274	0	0.8
275	0	2.1
276	0	1.3
