

TECHNIQUES

A SIMPLE CODE FOR TOE CLIPPING ANURANS

A limited number of unique toe clipping codes have been proposed (see Ferner 1979 for a review). The most widely cited code is that of Martof (1953). Martof's system is appropriate if the study involves thousands of individuals. However, it has the disadvantage of requiring the clipping of many digits for even numbers of two or three digits (e.g., #16 requires clipping three toes, #66 four toes and #199 six toes). Clarke (1972) has shown that toe clipping loads reduces the probability of recapture, suggesting that the procedure may be detrimental to them. Underhill (pers. comm. in Daugherty 1976) also reported weight loss in toe-clipped *Rana pipiens*. Toe clipping may also reduce the mobility of arboreal frogs.

A system that minimizes toe clips is preferred. I have used the system shown in Figure 1. This system allows the first 99 individuals to be marked with only one or two toes clipped (Table 1) and involves the clipping of no more than three digits for up to 736 individuals, a number large enough to be adequate for many studies. After 99, not all consecutive numbers are available. When two amputations occur on one side of the body (left or right), the lower digit takes the higher value. For example clipping the first and third digits on the right hand side would represent

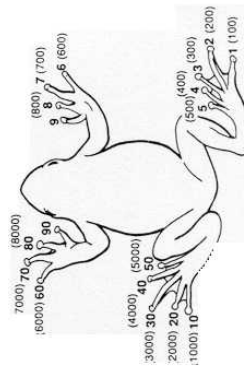


Figure 1. A simple code for toe clipping anurans. Note, when two clips are made on one side of the body, the number in brackets is adopted by the lowest digit (e.g. marking the first and third digits on the right foot would represent number 103 not 301).

the number 103, not 301. Hence it is then necessary to delete those numbers which become obsolete (e.g., number 301 cannot be used). Repeating marks can be avoided by using a table of clip codes (Table 1) and checking the codes as they are used. In addition to minimizing the number of clips, this simplified system is easily remembered, thus allowing more rapid marking and recognition of frogs in the field.

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	NUMBERS AVAILABLE	Total number of unique marks
1 Toe Clip	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 20, 30, 40, 50, 60, 70, 80, 90	18
2 Toe Clips	11-19, 21-29, 31-39, 41-49,91-99. 102-109, 203-209, 304-309, 405-409, 506-509, 607-609, 708, 709, 809 1020, 1030, 1040, 1050, 1060, 1070, 1080, 1090	124
3 Toe Clips	112-119, 122-129, 132-139, 142-149, 192-199 213-219, 223-229, 233-239, 243-249, 293-299 314-319, 324-329, 334-339, 344-349, 392-399 415-419, 425-429, 495-499 516-519, 526-529, 596-599 617-619, 627-629, 697-699 718-719, 728-729, 798-799 819, 829, 839, 849, 889, 899 1021-1029, 1031-1039, 1041-1049, 1091-1099 2031-2039, 2041-2049, 2091-2099 3041-3049, 3051-3059, 3091-3099 4051-4059, 4061-4069, 4091-4099 5061-5069, 5071-5079, 5091-5099 6071-6079, 6081-6089, 6091-6099 7081-7089, 7091-7099 8091-8099	736

Table 1. Numbers available using 1,2 and 3 clips, and the accumulated total number of unique marks available. Note that after 99 not all numbers are available (see explanation in text).

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Toe Clips

LOCALITY: _____ SPECIES: _____ SEX: _____

1 TOE	58	1060	186	325	468	1021	2032	3053	4084
1	61	1070	187	326	475	1022	2033	3054	4085
2	62	1080	188	327	476	1023	2034	3055	4086
3	63	TOES	213	328	477	1024	2035	3056	4087
4	64	112	214	334	478	1025	2036	3057	4088
5	65	113	215	335	485	1026	2037	3058	5061
6	66	114	216	336	486	1027	2038	3061	5062
7	67	115	217	337	487	1028	2041	3062	5063
8	68	116	218	338	488	1031	2042	3063	5064
10	71	117	223	344	516	1032	2043	3064	5065
20	72	118	224	345	517	1033	2044	3065	5066
30	73	122	225	346	518	1034	2045	3066	5067
40	74	123	226	347	526	1035	2046	3067	5068
50	75	124	227	348	527	1036	2047	3068	5071
60	76	125	228	354	528	1037	2048	3071	5072
70	77	126	233	355	536	1038	2051	3072	5073
80	78	127	234	356	537	1041	2052	3073	5074
2 TOES	81	128	235	357	538	1042	2053	3074	5075
11	82	132	236	358	546	1043	2054	3075	5076
12	83	133	237	364	547	1044	2055	3076	5077
13	84	134	238	365	548	1045	2056	3077	5078
14	85	135	243	366	556	1046	2057	3078	5081
15	86	136	244	367	557	1047	2058	3081	5082
16	87	137	245	368	558	1048	2061	3082	5083
17	88	138	246	374	566	1051	2062	3083	5084
18	102	142	247	375	567	1052	2063	3084	5085
21	103	143	248	376	568	1053	2064	3085	5086
22	104	144	253	377	576	1054	2065	3086	5087
23	105	145	254	378	577	1055	2066	3087	5088
24	106	146	255	384	578	1056	2067	3088	6071
25	107	147	256	385	586	1057	2068	4051	6072
26	108	148	257	386	587	1058	2071	4052	6073
27	203	152	258	387	588	1061	2072	4053	6074
28	204	153	263	388	617	1062	2073	4054	6075
31	205	154	264	415	618	1063	2074	4055	6076
32	206	155	265	416	627	1064	2075	4056	6077
33	207	156	266	417	628	1065	2076	4057	6078
34	208	157	267	418	637	1066	2077	4058	6081
35	304	158	268	425	638	1067	2078	4061	6082
36	305	162	273	426	647	1068	2081	4062	6083
37	306	163	274	427	648	1071	2082	4063	6084
38	307	164	275	428	657	1072	2083	4064	6085
41	308	165	276	435	658	1073	2084	4065	6086
42	405	166	277	436	667	1074	2085	4066	6087
43	406	167	278	437	668	1075	2086	4067	6088
44	407	168	283	438	677	1076	2087	4068	7081
45	408	172	284	445	678	1077	2088	4071	7082
46	506	173	285	446	687	1078	3041	4072	7083
47	507	174	286	447	688	1081	3042	4073	7084
48	508	175	287	448	718	1082	3043	4074	7085
51	607	176	288	455	728	1083	3044	4075	7087
52	608	177	314	456	738	1084	3045	4076	7087
53	708	178	315	457	748	1085	3046	4077	7088
54	1020	182	316	458	758	1086	3047	4078	
55	1030	183	317	465	768	1087	3048	4081	
56	1040	184	318	466	778	1088	3051	4082	
57	1050	185	324	467	788	2031	3052	4083	