

Verslagen en Technische Gegevens

Instituut voor Taxonomische Zoölogie (Zoölogisch Museum)
Universiteit van Amsterdam

No 34

Amphibians in Western Asturia

by

Geert Veenstra

mei 1982

Verslagen en Technische Gegevens. No 34 mei 1982
Instituut voor Taxonomische Zoölogie - Plantage Middenlaan 53 - Amsterdam

Amphibians in Western Asturia

by

Geert Veenstra

CONTENTS

Introduction	2
Description of study area	3
Methods	4
Results	6
Discussion	12
Conclusions and remarks	19
Map	22
Literature	23

INTRODUCTION

In the spring of 1980, from the end of March till in July, I visited the eastern part of the Spanish province of Oviedo and the adjacent part of the province of Leon.

The main subject of investigation during this period was the species Rana temporaria (Veenstra 1981). I tried to find out where this species could be found and while doing so I determined the occurrence of more species of amphibians. Totally twelve species of amphibians could be observed. Characteristics of their reproduction sites are listed and worked out below.

The special attention for R. temporaria has influenced the results. The breeding sites, for example those where R. temporaria was not found, received gradually less attention. Furthermore not all altitudes were visited with the same frequency, so these results must be seen as an indication, not as an exact representation.

STUDY AREA

The investigated region is roughly situated between the places Villaviciosa, Infiesto, Cangas de Onis and additionally the surroundings of two roads leading to the higher parts of the Cantabrian mountains. These are situated along the road from Covadonga to Lago Ercina and along the road from Cangas de Onis to Riaño.

The climate of the whole region is influenced by the close presence of the ocean. Near the coast the rainfall amounts approximately to 1100 mm, but decreases in the southern parts of the mountains. Although their often limy soils only partially retain this amount of water, the hills and mountains have a humid and green character. The landscape between the coast and the higher parts of the Cantabrian mountains consists of steep and rocky mountain ridges, undulating hills and some wide valleys. The scenery offers the charm of variety, not only in the range from the coast up to the Picos de Europa, but also along shorter distances. One can find rocks, pastures, several kinds of woods, small moors, fields, farms, orchards, villages, rivers, brooks, quarries and roads. The amount of stagnant water is limited, not only because of the steep slopes, but especially because of the arrangement of the rural area. The lands of the farmers are scattered and bringing cattle to pastures seems to be full of risks and requires much labour. Cattle remain therefore in the cowsheds, where they are fed and milked. That's why watering places for cattle are rare. When they do exist, they are usually situated near the farms and villages or up in the mountains where extensive cattle-breeding occurs. Ponds and reservoirs for hunting (ducks) don't exist, whereas they can be found in other parts of Europe. Draining of the rainfall usually occurs in a natural way by brooks, rarely by means of scarcely sloping artificial channels.

METHODS

Breeding sites were found by watching attentively the environment, when traversing the area by moped. Moreover the maps of the geographical and cadastral institute in Madrid were used for selecting appropriate areas, where some water for breeding sites could be expected.

If species could not be found in an other way, potential breeding sites were netted. The presence of a species could be determined by means of all stages of development, namely eggs, larvae, juveniles and adults. The eggs of Triturus helveticus and T. alpestris however can't be distinguished with the naked eye and so their occurrence had to be affirmed by the presence of other stages.

During the last part of the breeding season, all breeding sites were visited again.

It is possible to distinguish six types of breeding sites.

1. Brook. This type involves all beds of brooks and rivers or parts of them. These beds are usually covered with gravel and stones and lack vegetation.
2. Trench. This type of breeding site is usually found along roads and paths. They are shallow and narrow and have a length of several meters. The bottom is covered with vegetation and there is usually a weak current.
3. Fen. This type is shallow and has a large surface, which sometimes is composed of several smaller parts. The vegetation is dense. Apart from flat areas they are often found near springs.
4. Pool. Breeding sites with a restricted surface. Usually they are shallow and may possess all kinds of vegetation. They may often be connected with small springs or occur along roads. This type is less homogenous than the other types and can be regarded as a restgroup. Their small size is one feature they have in common.
5. Reservoir. This type of breeding site is deep, usually artificially formed and in most cases there is little vegetation.
6. Watering trough. Small artificially formed breeding sites with stone edges rising above the surroundings. They are made for watering cattle and are found near springs.

The altitudes are divided into 4 classes.

1. 0-20. These altitudes are found near the coast and in the valleys near the estuaries of the rivers. These areas are flat and humid and are some of the few places cattle can nearly always be seen.

2. 21-150. These altitudes are found in the higher parts of the valleys along rivers and in the hilly land near the coast with its varied landscape.

3. 151-500. These altitudes are mainly found in the hills between the coast and the high mountains. There are many woods, fields and pastures. Houses and villages are already less common than in lower areas.

4. 500 and higher. These altitudes are found at three places. In two cases we find rough mountains with only few trees, but in the province of Leon there are woods on the slopes and usually pastures along the brooks and rivers in the valleys.

The distribution of the types of breeding sites over the described areas is given in table 1.

	0-20	21-150	151-500	500 ⁺
brook	2	4	5	4
trench	8	14	4	4
fen	11	14	5	4
pool	4	24	28	8
reservoir	6	12	1	6
watering trough	0	6	7	7

TABLE 1

RESULTS

The (sub)species that were found are:

Rana temporaria parvipalmata Seoane, 1885

Rana iberica Boulanger, 1879

Rana ridibunda perezii Seoane, 1885

Hyla arborea arborea (Linnaeus, 1758)

Bufo bufo spinosus Daudin, 1803

Discoglossus pictus pictus Otth, 1837

Alytes obstetricans boscai Lataste, 1879

Chioglossa lusitanica Bocage, 1864

Salamandra salamandra fastuosa Schreiber, 1912

Triturus helveticus helveticus (Razoumowski, 1789)

Triturus alpestris cyreni Wolterstorff 1932

Triturus marmoratus marmoratus (Latreille, 1928).

The breeding sites are listed in table 2. The first column mentions the type of breeding site. The second column mentions the altitude of the breeding site. The third column gives the species found, followed by the geographical coordinates, as marked on the maps of the geographical institute of Madrid (maps nrs. 15,30,31,54,55,79,80) and at last in column 5 a name of a nearby location (village, road, mountain, brook etc.) found on the same map. On these maps the 0 meridian of Greenwich can be found at about 3^o43' east.

NR.	TYPE	COLUMN 1	COLUMN 2	COLUMN 3											COLUMN 4	COLUMN 5
		ALTITUDE	Rt	Ri	Rr	Ha	Bb	Dp	Ao	C1	Ss	Th	Ta	Tm	COORDINATES	NAME OF NEARBY PLACE
1	RESERVOIR	1110	X				X		X			X	X		43°15'50" 1°17'35"	LAGO ERCINA
2	BROOK	1170							X		X	X			43°15'50" 1°17'10"	BROOK TO LAGO ERCINA
3	RESERVOIR	1110	X						X			X	X		43°16'20" 1°17'35"	NEAR PARKING OF L.E.
4	TRENCH	1100	X									X			43°16'25" 1°17'40"	ROAD TO L.E. KM. 12
5	W. TROUGH	1080	X						X			X			43°16'10" 1°18'30"	BEHIND LAGO ENOL
6	W. TROUGH	1080	X						X			X			43°15'25" 1°19'10"	VEGA DE HUERTO
7	BROOK	1120					X		X		X	X			43°15'20" 1°19'15"	M. as DE LA PIEDRA
8	W. TROUGH	1100									X				43°15'25" 1°19'20"	M. as DE LA PIEDRA
9	RESERVOIR	1870	X										X		43°13'15" 1°18'25"	LAGUNA
10	W. TROUGH	960							X			X			43°17'0" 1°18'55"	ROAD TO L.E. KM. 9
11	POOL	1010	X												43°17'5" 1°19'15"	ROAD TO L.E. KM. 8,4
12	POOL	990	X												43°17'10" 1°19'10"	ROAD TO L.E. KM. 8
13	W. TROUGH	1000	X						X			X	X		43°17'10" 1°19'5"	ROAD TO L.E. KM. 8
14	POOL	880	X									X			43°17'25" 1°19'30"	ROAD TO L.E. KM. 6,7
15	W. TROUGH	850	X						X						43°17'25" 1°19'40"	ROAD TO L.E. KM. 6,5
16	BROOK	650									X				43°17'30" 1°19'25"	ROAD TO L.E. KM. 5,7
17	POOL	650	X												43°17'55" 1°19'55"	FURNTE LAFELECHO
18	POOL	540							X						43°18'0" 1°20'45"	ROAD TO L.E. KM. 3,2
19	TRENCH	80	X												43°20'55" 1°24'5"	LA VENTA
20	FEN	80										X			43°21'0" 1°24'25"	SUBSIERRA
21	POOL	80									X		X		43°21'0" 1°24'25"	ROAD NR. C 6312 KM. 2,2
22	RESERVOIR	80	X						X		X	X	X		43°21'0" 1°25'30"	ROAD NR. C 6312 KM. 1,5
23	RESERVOIR	80	X								X				43°21'0" 1°25'30"	ROAD NR. C 6312 KM. 1,5
24	BROOK	70					X								43°21'0" 1°24'50"	RIO GUEÑA
25	POOL	200							X						43°21'25" 1°24'40"	CARDES NEAR EL "BUXU"
26	BROOK	180		X											43°21'30" 1°24'50"	CARDES NEAR EL "BUXU"
27	W. TROUGH	110							X	X		X			43°21'30" 1°26'15"	HALF-WAY LLUEVES
28	W. TROUGH	210							X			X			43°21'40" 1°26'30"	LLUEVES
29	POOL	210							X			X			43°21'40" 1°26'30"	LLUEVES
30	TRENCH	200									X				43°21'40" 1°26'25"	LLUEVES
31	POOL	200							X						43°21'40" 1°26'25"	LLUEVES
32	RESERVOIR	40					X								43°22'35" 1°28'40"	LAS ROZAS
33	POOL	40							X						43°22'40" 1°28'40"	LAS ROZAS
34	POOL	40		X								X			43°22'55" 1°29'0"	LAS ROZAS
35	FEN	30						X	X						43°23'20" 1°29'40"	ARRIONDAS
36	TRENCH	30			X		X					X			43°23'45" 1°27'40"	TRIONGO
37	POOL	30			X		X					X			43°23'45" 1°27'40"	TRIONGO
38	TRENCH	30	X									X			43°23'45" 1°27'40"	TRIONGO
39	RESERVOIR	30		X											43°24'25" 1°26'40"	TRIONGO
40	FEN	40	X	X					X						43°24'30" 1°26'0"	LA SEROBIA

NR.	TYPE	COLUMN 1	COLUMN 2	COLUMN 3											COLUMN 4	COLUMN 5
		ALTITUDE	Rt	Ri	Rr	Ha	Bb	Dp	Ao	C1	Ss	Th	Ta	Tm	COORDINATES	NAME OF NEARBY PLACE
41	RESERVOIR	40			X				X					X	43°24'30" 1°26'0"	LA SEROBIA
42	TRENCH	20													43°24'35" 1°24'30"	VIÑA
43	BROOK	30													43°24'25" 1°24'20"	VIÑA
44	FEN	30				X			X					X	43°27'10" 1°20'55"	ARRIONDA
45	FEN	70	X						X					X	43°26'25" 1°28'30"	LA LLANVIRIA
46	TRENCH	60												X	43°26'30" 1°17'50"	BELMONTE
47	POOL	60							X	X					43°26'30" 1°17'30"	BELMONTE
48	FEN	100							X					X	43°25'50" 1°15'20"	NUEVA
49	TRENCH	110									X				43°25'45" 1°15'30"	NUEVA
50	POOL	120							X					X	43°25'30" 1°15'30"	NUEVA
51	RESERVOIR	20			X			X	X					X	43°27'40" 1°22'50"	MORIA
52	TRENCH	20									X				43°27'10" 1°23'15"	LA HUERTONA
53	FEN	10	X		X	X							X	X	43°27'0" 1°22'55"	LA JUNCALERA
54	RESERVOIR	0			X								X	X	43°27'10" 1°22'35"	LA JUNCALERA
55	TRENCH	10						X							43°27'0" 1°22'30"	LA JUNCALERA
56	TRENCH	10			X		X		X						43°26'50" 1°22'30"	LA JUNCALERA
57	RESERVOIR	10			X		X						X	X	43°26'45" 1°22'25"	LA JUNCALERA
58	W. TROUGH	60							X				X	X	43°27'0" 1°23'40"	FUENFRIA
59	TRENCH	20			X				X						43°24'45" 1°26'0"	TORAÑO
60	POOL	20							X						43°24'0" 1°27'40"	FUENTES
61	BROOK	150		X						X					43°24'10" 1°28'35"	B° DE POZOVAL
62	POOL	190							X						43°24'45" 1°29'45"	CAMINO DE CABREROS
63	FEN	280	X									X	X	X	43°25'10" 1°28'50"	LAS CORONAS
64	POOL	140							X					X	43°26'0" 1°27'30"	CALABREZ
65	POOL	160							X				X	X	43°26'40" 1°25'45"	SARDEDO
66	W. TROUGH	100							X				X	X	43°27'50" 1°25'10"	SAN ESTABAN
67	FEN	120										X	X	X	43°28'20" 1°25'50"	ABEO
68	TRENCH	60	X											X	43°27'30" 1°26'20"	LA SARTAL
69	POOL	80	X										X	X	43°27'30" 1°26'25"	LA SARTAL
70	POOL	60	X						X				X	X	43°27'25" 1°26'20"	LA SARTAL
71	POOL	150	X						X					X	43°27'10" 1°27'0"	LINARES
72	W. TROUGH	150							X				X	X	43°27'10" 1°27'5"	LINARES
73	TRENCH	80	X				X		X				X	X	43°27'20" 1°27'15"	ARROYO DEL CASTAÑAR
74	RESERVOIR	10					X								43°28'35" 1°26'55"	LA VEGA
75	TRENCH	20			X										43°28'30" 1°26'40"	LA VEGA
76	POOL	80						X	X				X		43°28'30" 1°27'30"	BERBES
77	POOL	80							X						43°28'30" 1°27'30"	BERBES
78	POOL	90							X				X	X	43°28'55" 1°27'40"	BERBES
79	POOL	100	X						X						43°28'20" 1°27'40"	BERBES
80	TRENCH	40	X										X	X	43°27'50" 1°32'10"	LOROÑE

NR.	TYPE	COLUMN 1	COLUMN 2	COLUMN 3											COLUMN 4		COLUMN 5
		ALTITUDE	Rt	Ri	Rr	Ha	Bb	Dp	Ao	Cl	Ss	Th	Ta	Tm	COORDINATES	NAME OF NEARBY PLACE	
81	RESERVOIR	50					X	X				X			43°27'10" 1°31'25"	CAMINO DEL MONTE (QUARRY)	
82	POOL	50	X					X							43°27'20" 1°31'25"	CAMINO DEL MONTE (QUARRY)	
83	RESERVOIR	50	X				X	X			X	X			43°27'20" 1°31'25"	CAMINO DEL MONTE (QUARRY)	
84	POOL	50						X							43°27'20" 1°31'25"	CAMINO DEL MONTE (QUARRY)	
85	RESERVOIR	50					X	X			X	X			43°27'20" 1°31'25"	CAMINO DEL MONTE (QUARRY)	
86	RESERVOIR	50						X							43°27'20" 1°31'25"	CAMINO DEL MONTE (QUARRY)	
87	POOL	70	X					X			X	X			43°27'20" 1°31'15"	CAMINO DEL MONTE	
88	POOL	380	X					X			X				43°26'50" 1°30'25"	C 637 KM. 12,4	
89	POOL	400	X					X	X		X				43°26'40" 1°30'30"	PIEDRA REDONDA	
90	W. TROUGH	550	X					X							43°26'25" 1°30'25"	MIRADOR DEL FITO	
91	POOL	560	X					X			X				43°26'25" 1°30'20"	MIRADOR DEL FITO	
92	POOL	380	X					X			X				43°25'25" 1°31'25"	C 637 KM. 7,2	
93	BROOK	290		X					X						43°25'5" 1°31'45"	BUSTIELLO	
94	POOL	260	X					X							43°24'55" 1°31'45"	BUSTIELLO	
95	POOL	260						X			X				43°24'55" 1°31'45"	BUSTIELLO	
96	POOL	160	X					X			X				43°24'45" 1°31'5"	BODES	
97	W. TROUGH	270									X	X			43°25'10" 1°30'10"	LA SALGAR	
98	POOL	270						X							43°25'10" 1°30'10"	LA SALGAR	
99	W. TROUGH	230							X		X				43°24'55" 1°30'30"	COLLIA	
100	POOL	220	X					X			X				43°20'45" 1°35'55"	CANTO DE SAN PEDRO	
101	W. TROUGH	390									X				43°20'40" 1°36'10"	CANTO DE SAN PEDRO	
102	POOL	130	X								X				43°20'35" 1°33'55"	RIO TENDI	
103	POOL	220	X						X		X				43°19'10" 1°34'5"	RIO TENDI	
104	POOL	210						X	X						43°21'45" 1°38'0"	SAN MIGUEL	
105	RESERVOIR	200							X		X	X			43°21'40" 1°38'0"	SAN MIGUEL	
106	FEN	200	X					X	X		X				43°21'40" 1°38'0"	SAN MIGUEL	
107	TRENCH	200					X	X			X				43°21'35" 1°38'15"	SAN MIGUEL	
108	RESERVOIR	120					X								43°21'5" 1°38'25"	VILLAMAYOR	
109	TRENCH	130					X								43°20'55" 1°38'55"	VILLAMAYOR	
110	FEN	130	X	X			X								43°20'50" 1°39'0"	VILLAMAYOR	
111	TRENCH	130	X					X			X				43°20'55" 1°39'0"	VILLAMAYOR	
112	RESERVOIR	140					X				X				43°20'50" 1°38'50"	VILLAMAYOR	
113	POOL	140	X				X				X				43°20'50" 1°38'55"	VILLAMAYOR	
114	POOL	160					X								43°20'40" 1°41'10"	RIO DE MAREA	
115	FEN	170									X	X			43°20'20" 1°41'20"	RIO DE MAREA	
116	TRENCH	180	X												43°19'45" 1°41'40"	RIO DE MAREA	
117	FEN	200	X				X	X			X				43°19'20" 1°42'0"	RIO DE MAREA	
118	POOL	170					X	X			X				43°21'30" 1°41'50"	ESTACION DE PINTUELES	
119	POOL	170		X				X			X				43°21'30" 1°41'50"	ESTACION DE PINTUELES	
120	BROOK	170					X								43°21'30" 1°41'50"	ESTACION DE PINTUELES	

NR.	TYPE	COLUMN 1 ALTITUDE	COLUMN 2 Rt	COLUMN 3 Ri Rr	Ha	Bb	Dp	Ao	C1	Ss	Th	Ta	Tm	COLUMN 4 COORDINATES	COLUMN 5 NAME OF NEARBY PLACE
121	POOL	180	X											43°22'0" 1°41'30"	LODEÑA
122	TRENCH	300				X					X			43°22'50" 1°43'35"	ROAD TO CABRANES KM. 5
123	POOL	230	X								X			43°24'25" 1°43'50"	ROAD TO CABRANES KM. 10,1
124	POOL	230	X											43°24'20" 1°43'45"	ROAD TO CABRANES KM. 10,3
125	BROOK	200				X								43°24'30" 1°43'40"	ARROYO VIACABA
126	POOL	200	X				X	X			X	X	X	43°24'50" 1°43'30"	NEAR ARROYO SALES
127	POOL	300	X					X			X		X	43°25'10" 1°43'10"	SANTA EULALIA
128	W. TROUGH	280						X			X		X	43°25'0" 1°43'30"	BOSPOLIN
129	FEN	260				X		X			X	X		43°24'55" 1°43'50"	MADIEDO
130	W. TROUGH	260						X			X	X		43°24'55" 1°43'50"	MADIEDO
131	POOL	400						X			X	X	X	43°25'10" 1°41'25"	GIRANES
132	TRENCH	210									X		X	43°24'50" 1°43'45"	CARABAÑO
133	BROOK	180				X								43°25'0" 1°43'40"	ARROYO VIACABA
134	POOL	200					X							43°25'10" 1°43'50"	ROAD TO CABRANES KM. 12,2
135	POOL	180	X								X			43°25'30" 1°44'10"	VIÑON
136	POOL	140	X											43°26'15" 1°45'0"	VENTA DEL CARBON
137	POOL	10						X						43°29'30" 1°44'50"	BEDRIÑANA
138	BROOK	10				X								43°29'40" 1°44'40"	BEDRIÑANA
139	FEN	0	X		X		X				X	X		43°29'30" 1°44'15"	FABRICA DEL GAITERO
140	FEN	0			X						X	X		43°29'30" 1°44'10"	FABRICA DEL GAITERO
141	FEN	0	X											43°29'35" 1°44'5"	FABRICA DEL GAITERO
142	FEN	0			X						X	X		43°29'35" 1°44'0"	FABRICA DEL GAITERO
143	TRENCH	10	X								X			43°29'45" 1°43'50"	FABRICA DEL GAITERO
144	FEN	10									X	X		43°30'5" 1°43'50"	MASLERA
145	RESERVOIR	10		X							X			43°30'25" 1°42'5"	ESPINA
146	POOL	10									X	X		43°30'25" 1°42'15"	ESPINA
147	FEN	0									X	X		43°31'20" 1°41'40"	VILLA MINEGO
148	FEN	0				X					X			43°31'25" 1°41'20"	PLAYA DE RODILES
149	FEN	0		X							X	X		43°31'30" 1°41'20"	PLAYA DE RODILES
150	TRENCH	0					X				X			43°31'35" 1°41'25"	PLAYA DE RODILES
151	RESERVOIR	0		X							X	X		43°31'40" 1°41'25"	PLAYA DE RODILES
152	FEN	0		X		X								43°31'45" 1°41'20"	PLAYA DE RODILES
153	FEN	130	X				X	X			X			43°30'25" 1°37'55"	VENTA DEL POBRE
154	TRENCH	130	X											43°30'25" 1°38'0"	VENTA DEL POBRE
155	FEN	130	X		X		X				X	X	X	43°30'25" 1°38'0"	VENTA DEL POBRE
156	TRENCH	140					X							43°30'45" 1°36'50"	LA GRANJA
157	POOL	140	X								X			43°30'45" 1°36'50"	LA GRANJA
158	RESERVOIR	140						X			X			43°30'50" 1°36'55"	LA GRANJA
159	POOL	110					X							43°31'10" 1°36'55"	ARROYO DE LA LLASTRE
160	POOL	110	X					X			X			43°31'10" 1°36'55"	ARROYO DE LA LLASTRE

NR.	COLUMN 1 TYPE	COLUMN 2 ALTITUDE	COLUMN 3													COLUMN 4 COORDINATES	COLUMN 5 NAME OF NEARBY PLACE
			Rt	Rl	Rr	Ha	Bb	Dp	Ao	Cl	Ss	Th	Ta	Tm			
161	W. TROUGH	140							X			X			43°31'25"	1°36'40"	LUCES
162	POOL	150						X							43°31'5"	1°35'50"	LASTRES KM. 5
163	POOL	150	X					X	X			X			43°30'55"	1°35'50"	LASTRES KM. 5
164	W. TROUGH	80					X		X						43°28'15"	1°33'45"	COCEÑA DE ARRIBA
165	FEN	10	X												43°28'45"	1°35'50"	COLUNGA
166	BROOK	10					X								43°29'0"	1°35'50"	PRADO COLUNGA
167	FEN	10	X		X							X	X		43°29'0"	1°35'50"	PRADO COLUNGA
168	POOL	100	X						X			X	X	X	43°28'30"	1°38'20"	PERNUS
169	W. TROUGH	200							X			X	X		43°28'10"	1°38'20"	FUENTE DE LOS ACEBOS
170	FEN	60					X					X			43°27'50"	1°37'50"	PUENTE AGUERA
171	FEN	60	X									X			43°27'35"	1°38'10"	PUENTE AGUERA
172	POOL	280						X							43°27'40"	1°39'50"	ROAD TO PUENTE AGUERA KM. 12
173	FEN	70					X		X			X			43°27'50"	1°40'30"	BUSTO
174	BROOK	70					X								43°27'50"	1°40'30"	BUSTO
175	TRENCH	70	X				X		X			X			43°27'55"	1°40'35"	BUSTO
176	POOL	1280	X									X			43°5'55"	1°19'50"	EL PONTON
177	FEN	1280	X									X			43°6'5"	1°19'5"	VALLE DE LA IGLESIA
178	BROOK	1320					X								43°6'10"	1°18'50"	VALLE DE LA IGLESIA
179	FEN	1400	X									X			43°6'40"	1°18'30"	VALLE DE LA IGLESIA
180	TRENCH	1460	X						X						43°7'20"	1°17'35"	PANDERRUEDAS
181	TRENCH	1220	X												43°5'20"	1°19'40"	NEAR BRIDGE KM. "101"
182	TRENCH	1190	X									X			43°4'45"	1°19'55"	CASSILLA DE PEONES
183	POOL	1170	X												43°4'10"	1°19'30"	RETUERTO
184	RESERVOIR	1140	X												43°3'5"	1°19'25"	ROAD TO RIAÑO KM. "96"
185	RESERVOIR	1080			X										43°0'35"	1°19'45"	PUENTE DE LOS TORTEROS
186	FEN	1480	X									X	X		43°4'55"	1°31'45"	PUERTO DE TARNA
187	RESERVOIR	1620	X						X			X	X		43°4'25"	1°33'20"	PUERTO DE LAS SEÑALES
188	FEN	1700	X												43°4'35"	1°35'45"	LAS LAGUNILLAS

DISCUSSION

The results of table 2 are graphically worked out. For all types of breeding sites and all areas, the percentage populated by a species is shown (figs. 1-12). The total in which one type of breeding site is present and the total number of breeding sites in the distinguished areas are mentioned below the columns concerned.

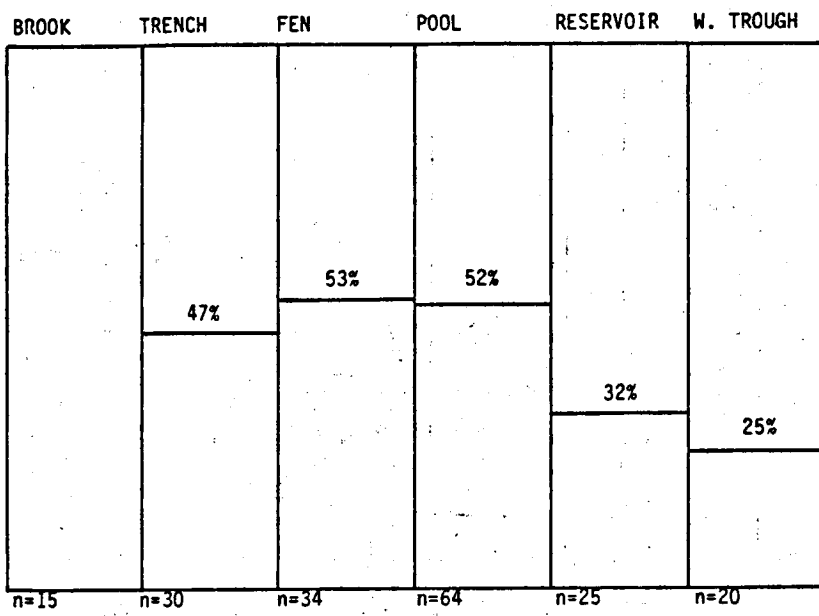


FIGURE 1 RANA TEMPORARIA

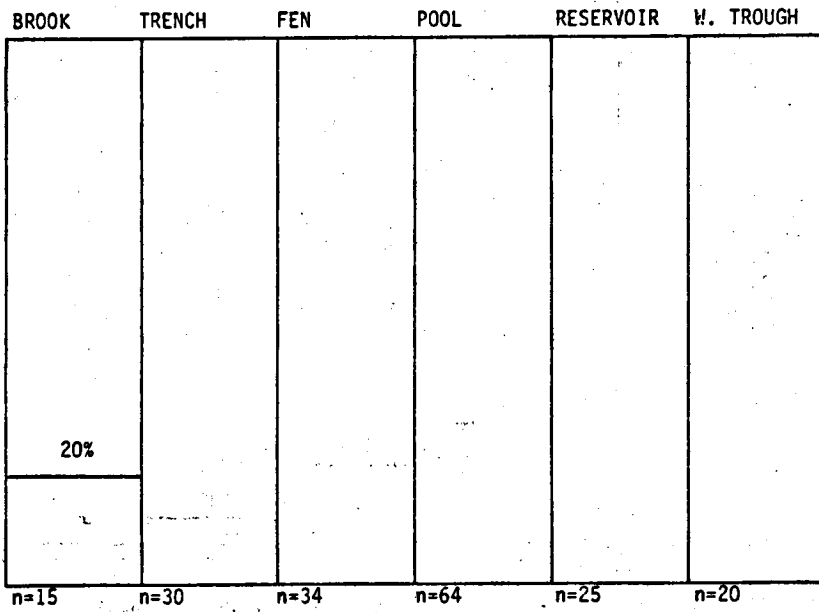
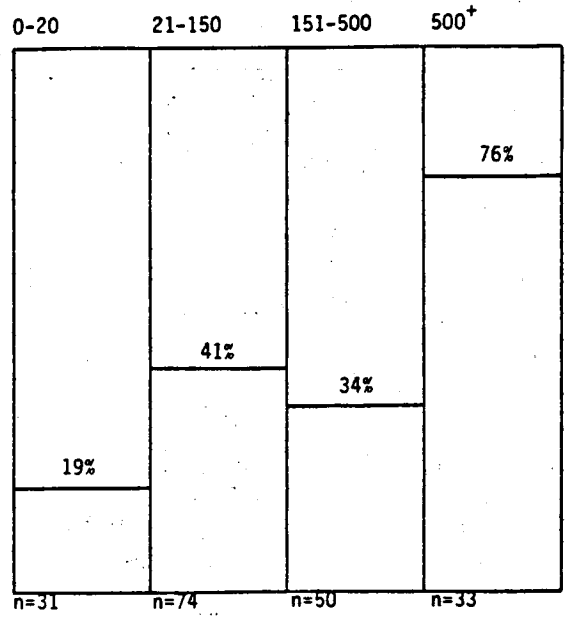


FIGURE 2 RANA IBERICA

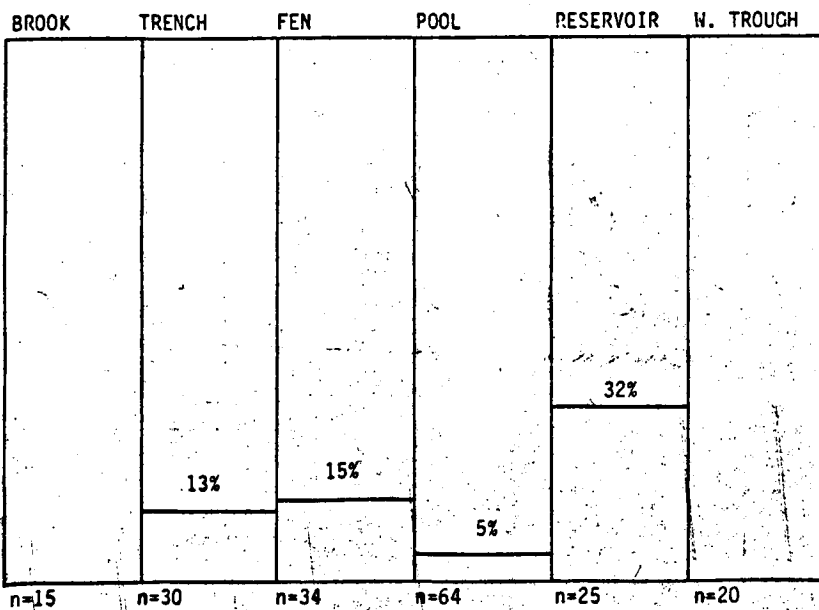
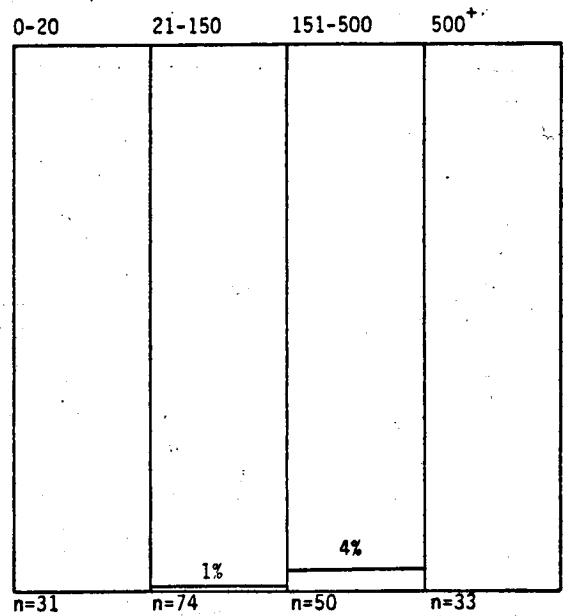
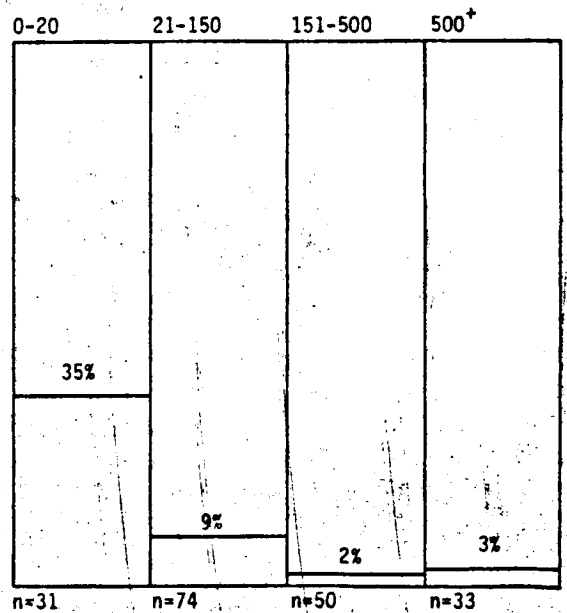


FIGURE 3 RANA RIDIBUNDA



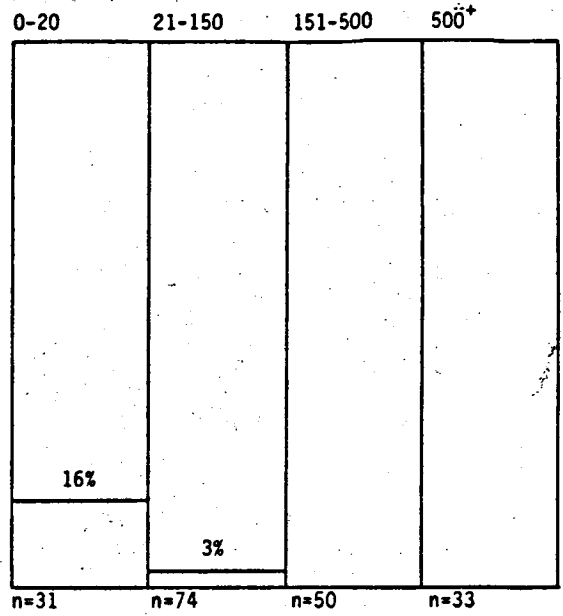
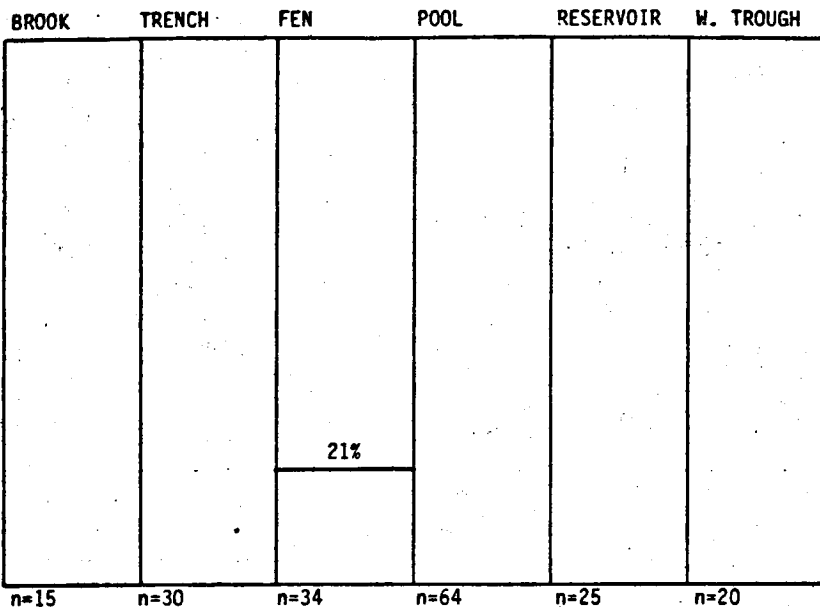


FIGURE 4 HYL A ARBOREA

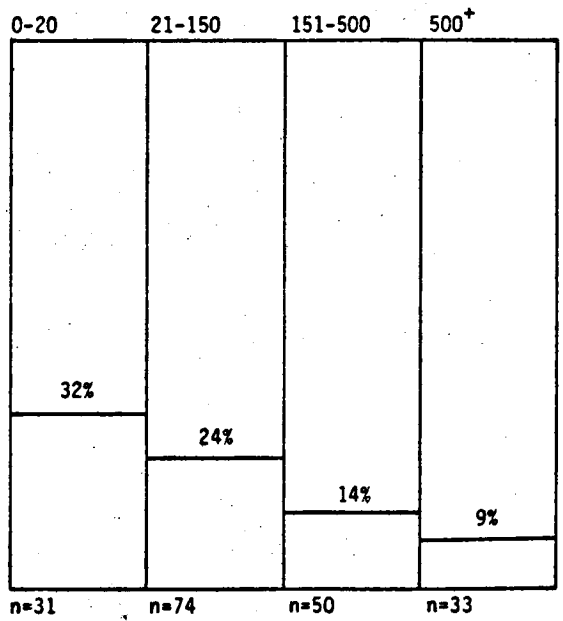
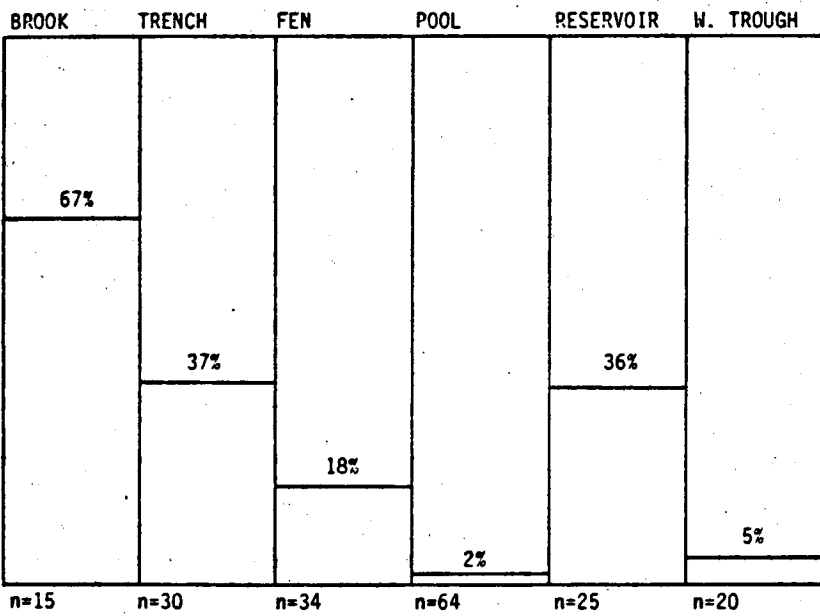


FIGURE 5 BUFO BUFO

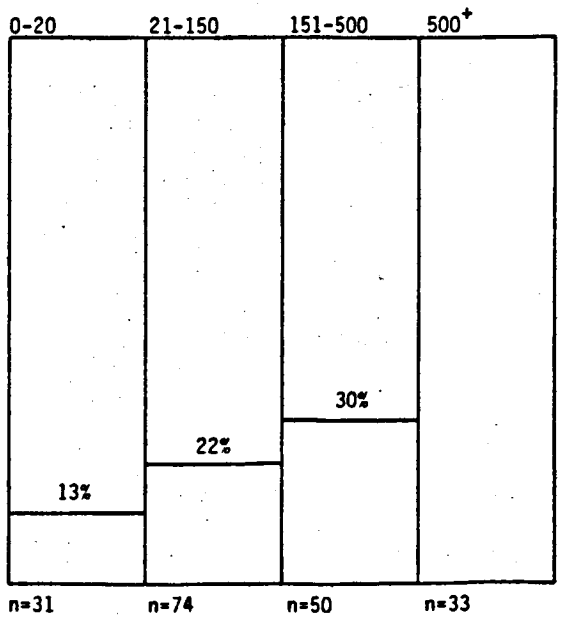
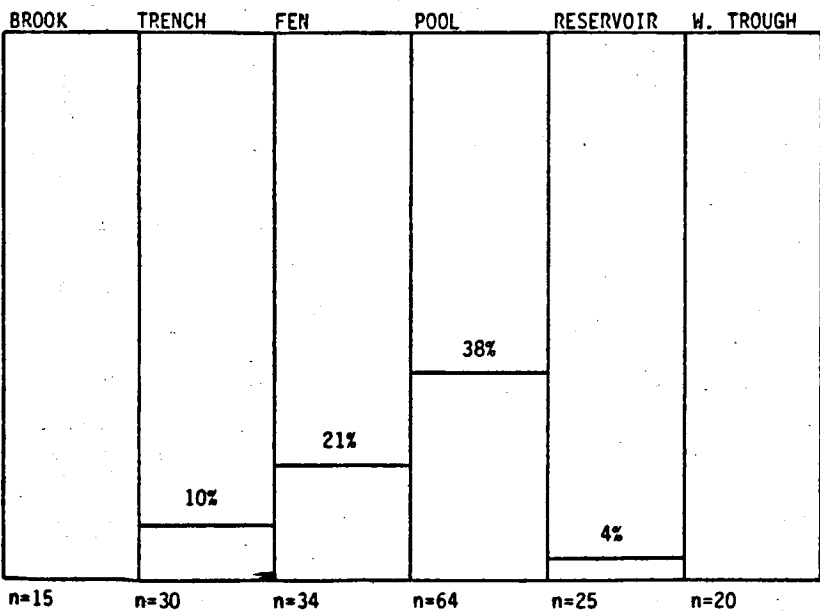


FIGURE 6 DISCOGLOSSUS PICTUS

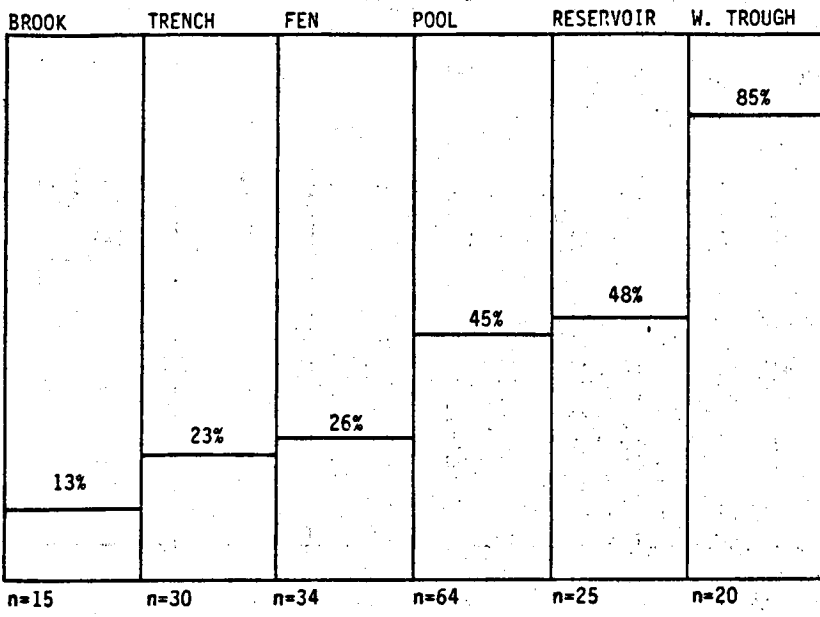


FIGURE 7 ALYTES OBSTETRICANS

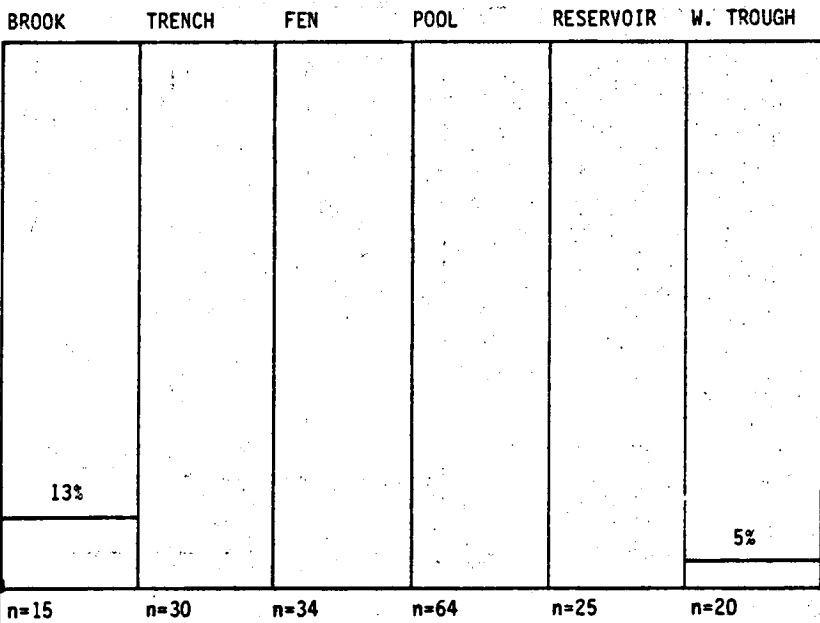
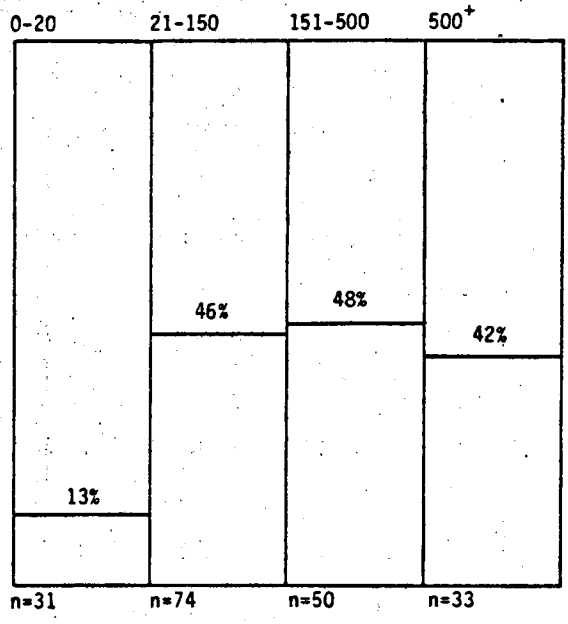


FIGURE 8 CHIOGLOSSA LUSITANICA

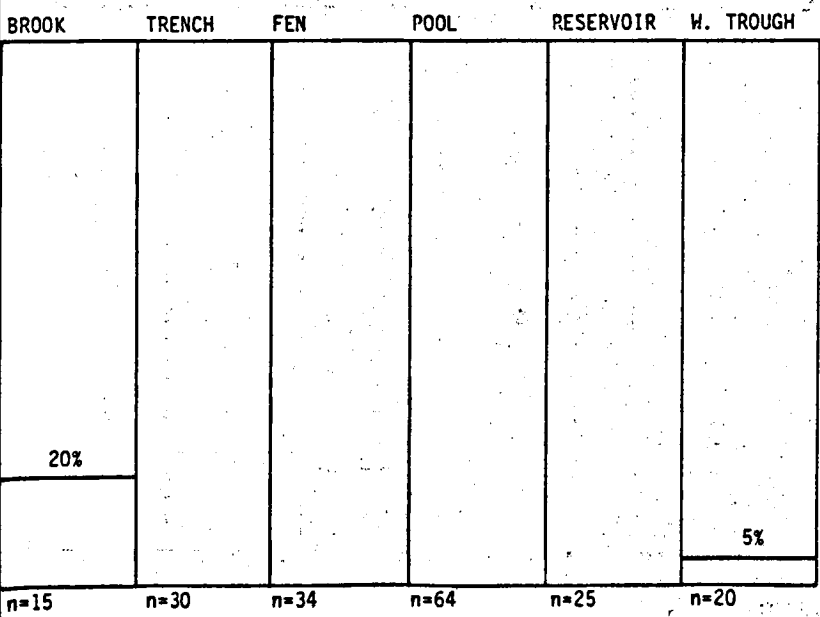
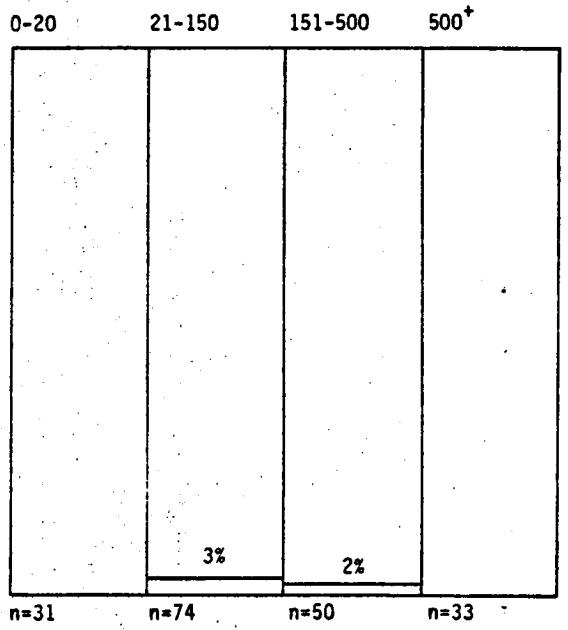
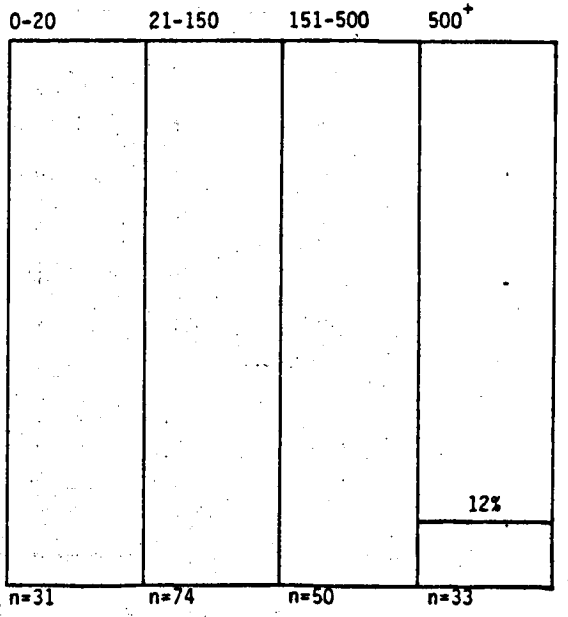


FIGURE 9 SALAMANDRA SALAMANDRA



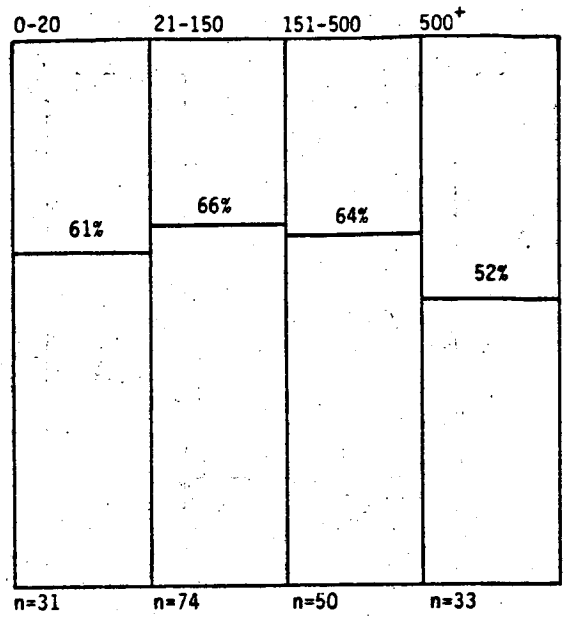
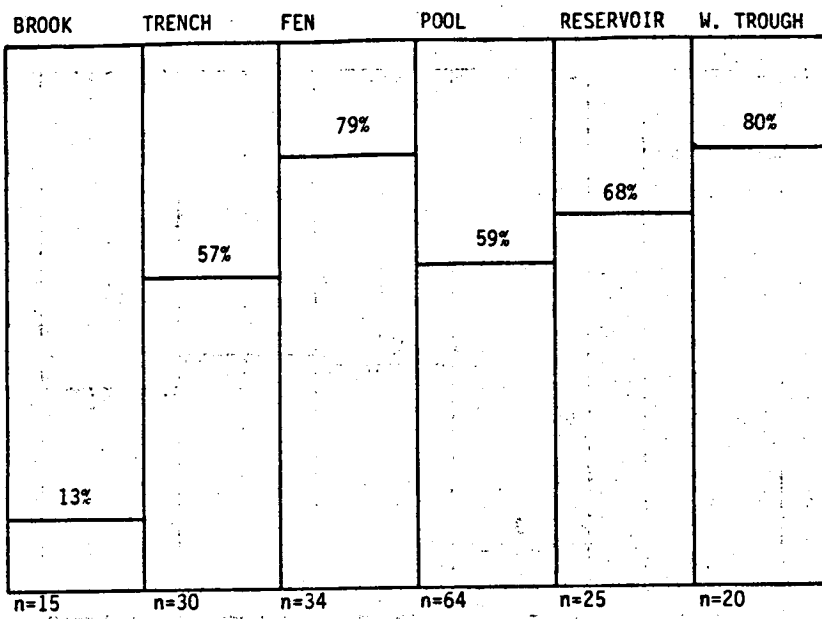


FIGURE 10 TRITUTUS HELVETICUS

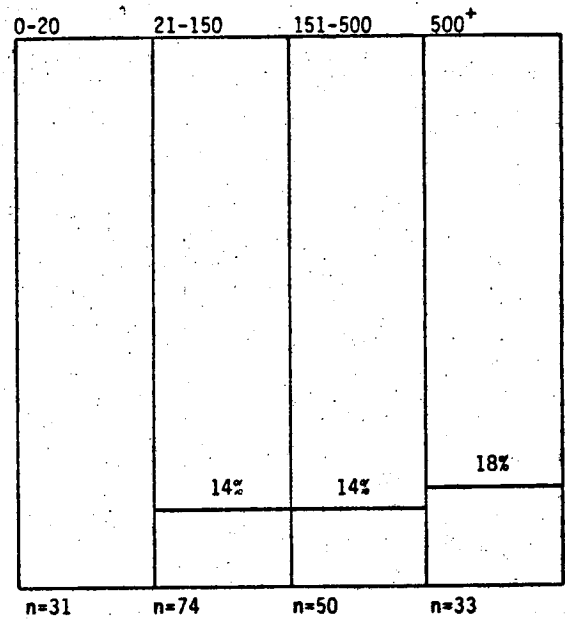
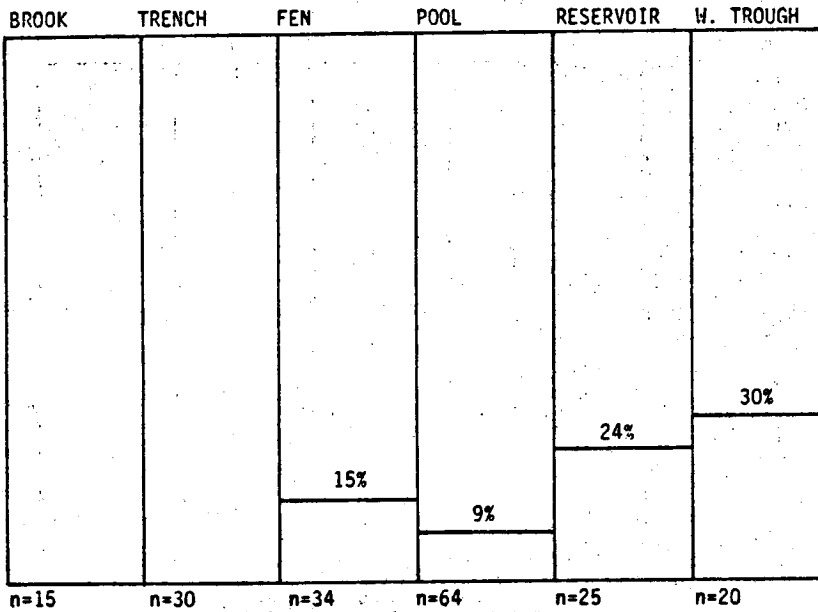


FIGURE 11 TRITURUS ALPESTRIS

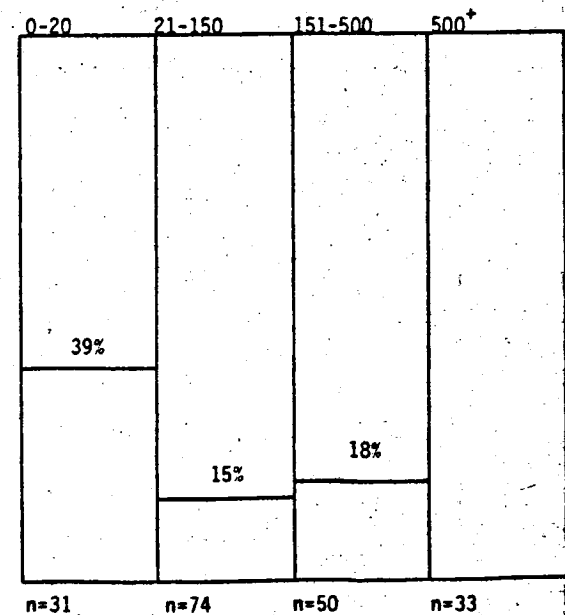
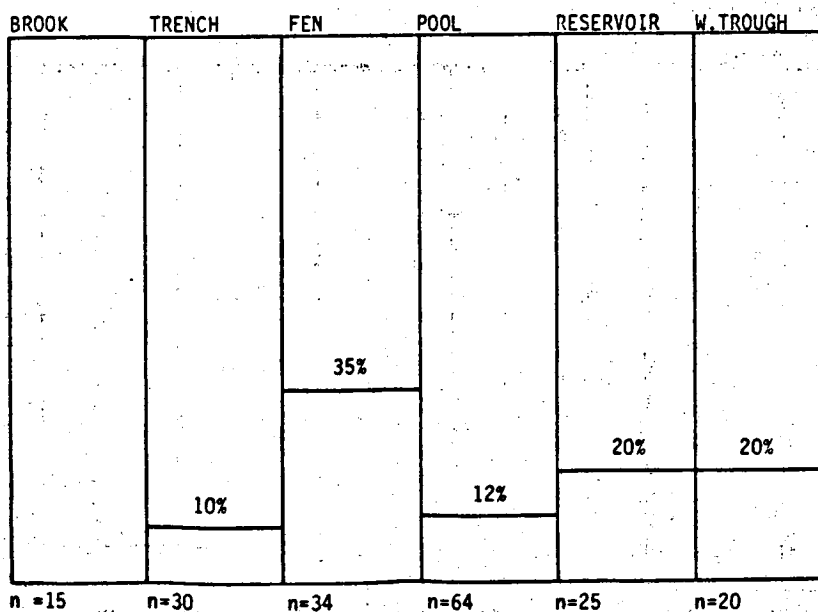


FIGURE 12 TRITURUS MARMORATUS

Table 3 shows the number of breeding sites in which a species occurs as the only one, followed by a figure, that shows the number of other species, that on the average can be found in the breeding sites of the species concerned. The last number is the total number of breeding sites of a species.

<u>R. temporaria</u>	14	1,79	78
<u>R. iberica</u>	1	0,67	3
<u>R. ridibunda</u>	3	1,75	20
<u>H. arborea</u>	0	3,14	7
<u>B. bufo</u>	16	1,29	38
<u>D. pictus</u>	13	1,51	35
<u>A. obstetricans</u>	6	2,01	76
<u>C. lusitanica</u>	0	1,33	3
<u>S. salamandra</u>	2	1,25	4
<u>T. helveticus</u>	3	1,97	117
<u>T. alpestris</u>	0	2,87	23
<u>T. marmoratus</u>	0	2,5	32

TABLE 3

Table 4 gives information about the coexistence of species in the breeding sites. Because of the very few data, R. iberica, C. lusitanica and S. salamandra are not considered here. For every pair of species two figures are given. The first figure is the number of breeding sites in which their coexistence can be expected if their occurrence would be totally independent of each other and the second figure shows the real situation. Independence was tested by means of Fisher's exact test for independence in 2x2-tables with level of significance =0,05 or the X^2 test with the same level of significance. If independence had to be rejected, there is a mark under this pair of species.

	Rt	Rr	Ha	Bb	Dp	Ao	Th	Ta	Tm
<u>R. temporaria</u>		8,3	2,8	15,8	14,5	31,5	48,5	9,6	13,3
		<u>3</u>	4	<u>5</u>	14	32	55	14	11
<u>R. ridibunda</u>			0,8	4,1	3,8	8,1	12,4	2,4	3,4
			1	5	2	6	10	-	5
<u>H. arborea</u>				1,5	1,3	2,8	4,3	0,9	1,1
				-	2	1	7	1	<u>6</u>
<u>B. bufo</u>					6,8	15,4	23,7	4,7	6,4
					<u>1</u>	12	19	4	<u>2</u>
<u>D. pictus</u>						14,1	21,8	4,3	6,0
						11	18	2	3
<u>A. obstetricans</u>							47,8	9,2	13,0
							60	15	13
<u>T. helveticus</u>								14,3	19,9
								22	32
<u>T. alpestris</u>									3,9
									<u>7</u>
<u>T. marmoratus</u>									

TABLE 4

CONCLUSIONS AND REMARKS

R. temporaria is found at all altitudes. The species is rare in the lowest area. In the mountains its abundance is such that it can even be found in watering troughs, however, larvae thrive especially in those types where the species can be found in the lowlands as well: pools, fens and trenches.

R. iberica is close to the eastern boundary of its range in this region. The brooks in which R. iberica was found have a strong current and are set off by woods. This is a biotope, that, apart from C. lusitanica and to a certain extent B. bufo, doesn't seem suitable for other amphibians. Adults were always found near the brook itself and larvae could be caught where the current was slower.

R. ridibunda is, as can be seen in fig. 3, an inhabitant of the lowlands. It is striking, that it was found at 1080 m. The landscape of that place on the other hand resembles that of the lowest areas: a wide valley of which the surface is covered by grass and a river in the middle of it. This indicates that the preference of this species for an altitude is in fact a preference for a type of landscape. R. ridibunda has often large and deep breeding sites, places that seem to be avoided by the related R. temporaria. This difference in preference for types of breeding sites and the fact that these species generally occur at different altitudes, make that these frogs are rarely found together.

H. arborea is a rare species, restricted to the lower parts of the region. It always prefers fens as breeding sites. There are usually a lot of other amphibians also using these breeding sites, which indicates that this biotope is a good one for amphibians in general.

B. bufo larvae were usually found in running water and deeper bodies of water. Those places contain water for a longer period. The brooks in which B. bufo occurs are distinguished from those in which R. iberica and C. lusitanica occur by the rate of the current. Especially the old branches and enlargements are chosen. B. bufo is always the only amphibian in such brooks.

D. pictus is another species with its own typical choice of breeding sites. For this species small and shallow puddles are concerned. Even a footprint in humid soil can contain eggs or larvae of D. pictus. It was not seen at altitudes above 500 meter, but it was also scarce in the lowest areas. The scarcity of these very small pools seem to be a reason for that. The presence of brackish water doesn't hurt D. pictus, for in two cases larvae were found in the direct vicinity of the sea. Plants that are restricted to places with brackish water were growing in these breeding sites.

A. obstetricans is even more abundant than can be concluded from these results. This is because a lot of watering troughs in which the larvae of A. obstetricans often occur, were passed over (see introduction). Especially in the rural area of the hills we find a lot of such places in which A. obstetricans is abundant. Apart from watering troughs larvae were found in bodies of water in a rocky environment. This species is in consequence rare in extended pastures and wide valleys, where stones and rocks can hardly be found.

C. lusitanica can be seen after watching intensively the banks of brooks by night, unless one destroys its biotope (Arntzen 1981). Only once larvae could be noticed. This was in a trough near a brook. They could never be found in the brooks themselves. Because R. temporaria avoids fast streaming brooks as breeding sites, a lot of these locations were sed over (see introduction). This and the fact that it was hard to find C. lusitanica where it did occur, give raise to the presumption that the species is less scarce as one can conclude from the results of this rough inventory.

S. salamandra is viviparous, which means that larvae are deposited instead of eggs. In the subspecies fastuosa it has even been noticed, that already metamorphosed juveniles were deposited (Hillenius 1966). They might do so in this region as well, for at some places adult animals have been seen, but larvae were lacking. However, in four cases larvae did occur and these places are mentioned in the listed breeding sites. All breeding sites with larvae were found in the environment of Lago Ercina. Apart from this region the occurrence of S. salamandra had to be determined by means of adults. These adults were also seen near the Mirador del Fito along the road from Colunga to Arriendas. The lowest altitude where S. salamandra was found was 180 meter. At 1900 meter, near breeding site nr. 9 in a rocky environment very blackish animals were found. The yellow lines at the back were narrow and one animal had a totally black backside, having reduced the yellow colour to the feet near the shoulder.

T. helveticus is the most abundant amphibian in this region. It occurs in all kinds of places, except fast streaming currents.

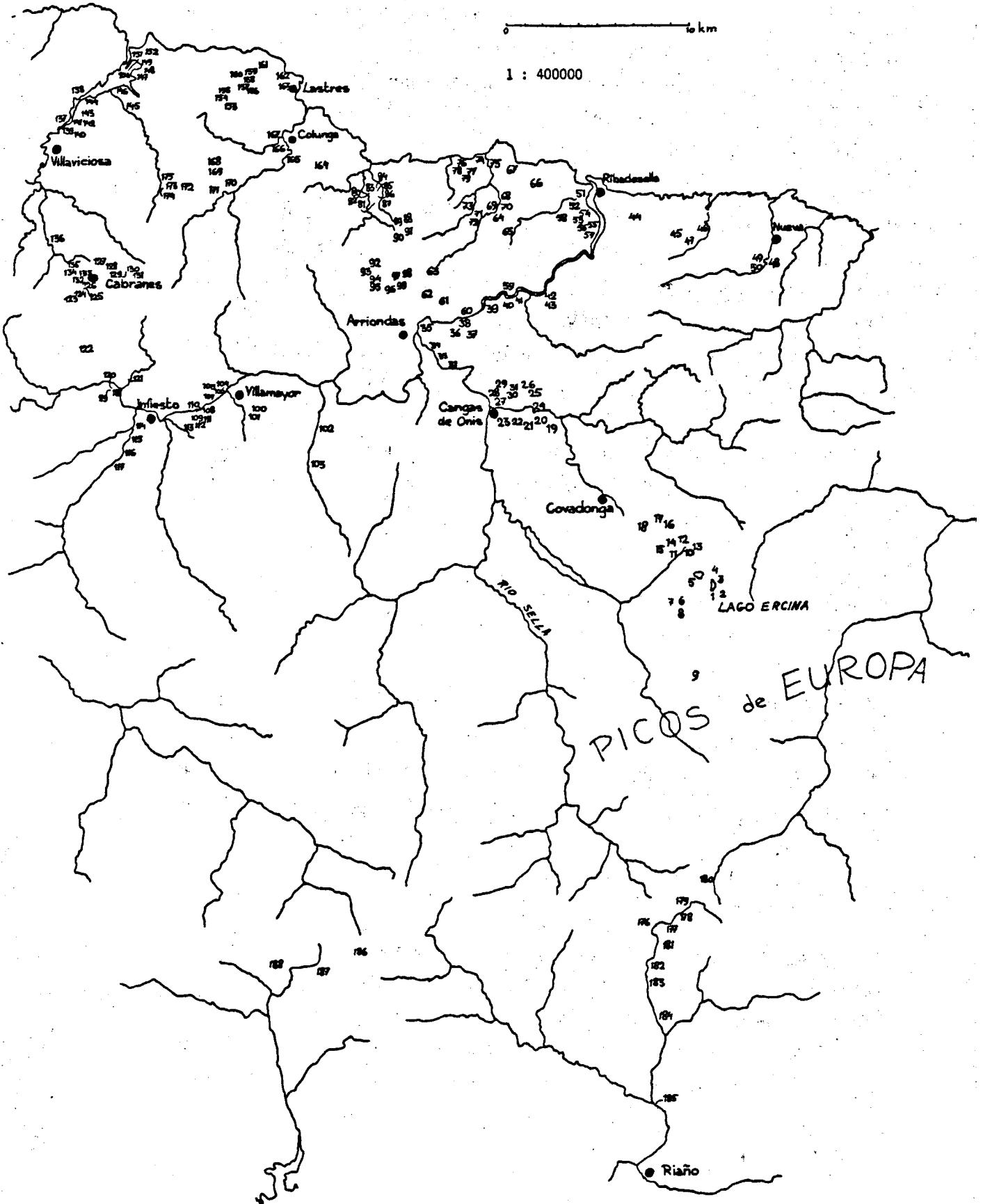
T. alpestris is the rarest species of the genus Triturus in this region. It prefers those places where other species occur as well. If T. alpestris is found in watering troughs, these other species usually are A. obstetricans, T. helveticus and T. marmoratus. In the other breeding sites of this species R. temporaria was nearly always present.

T. marmoratus is an inhabitant of the lowlands. It can be seen in almost all larger bodies of water in the flat area near the coast. Further away of the coast T. marmoratus is fairly rare and seems even to avoid the flat areas in the valleys and can especially be seen in watering troughs in the hills. The breeding sites of T. marmoratus are usually somewhat deeper than those of the other species of the genus Triturus.

PICOS DE EUROPA AND
WESTERN ASTURIAS

0 ————— 10 km

1 : 40000



LITERATURE

- Arntzen, J W 1981 Ecological observations on *Chioglossa lusitanica*
Amphibia-Reptilia 3/4, 187-203
- Hillenius, D 1968 Notes on *Salamandra salamandra* ssp.
Bijdragen tot de dierkunde afl. 38:31-38
- Mertens, R & Wermuth, H 1960 Die Amphibien und Reptilien Europas
Verlag Waldemar Kramer, Frankfurt am Main.
- Veenstra, G T 1981 De bruine kikker in West Europa.
(doctoraal verslag)

