

size' without developing mature ovaries - immature ovaries are most frequent among small females.

Sexual distribution varies with the age of the animals and with the distance from breeding place. The 120 examined newly metamorphosed were 50 males and 70 females. Among toads of 'sexual mature size' about 30% are females. I have not yet found out at what size (age?) the unequal distribution appears - and cannot explain it.

FLUCTUATIONS BETWEEN YEARS IN DENSITY OF *RANA ARVALIS* AND *R. TEMPORARIA*

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The following refers to a study plot, 50 × 50 m, in a luxuriant meadow that (subjectively) supports a density of frogs that is high but characteristic of this vegetation in the study

area. The study area is situated in S Sweden (55°40'N, 13°30'E). Frogs were captured by hand, and measured and individually tagged by toe-clipping. Their exact locations were noted. Only adult frogs (defined as: *Rana arvalis* 37 mm or more, *R. temporaria* 45 mm or more) were considered. Catching was carried out 8-17 times per month. The size of the catchable population was, independently for each month, calculated according to the method of Schumacher and Eschmeyer (Seber, G. 1973. *The Estimation of Animal Abundance*, pp. 141-142, Griffin, London).

The recaptures made it likely that most frogs have a restricted home-range, though some might be transients, causing the figures below to be too high. To obtain density values from the population estimates, a strip with a width equal to the mean distance between successive captures of one frog was added to the study plot. This value was 5.2 m for *R. arvalis* and 9.2 m for *R. temporaria*, giving a total area of 0.37 and 0.47 hectare respectively. The following results were obtained:

	<i>Rana arvalis</i>			<i>Rana temporaria</i>			
	N		n	N	n	C	
July 1972	1120	(540-)	5.1	25	(15-)	1.3	12
Sept. 1972	330	(160-)	2.4	75	(40-2300)	1.6	12
July 1973	160	(110-300)	1.7	60	(15-)	0.6	16
Aug. 1973	150	(85-480)	2.1	115	(75- 210)	2.6	14
Sept. 1973	85	(45-920)	0.9	200	(150- 350)	3.5	17
Aug. 1974	440	(300-800)	3.4	170	(130- 250)	4.2	17
Aug. 1975	260	(180-480)	3.4	530	(430- 690)	6.8	17
Sept. 1975	210	(60-)	2.6	750	(300-)	8.1	8

(N: estimated density in frogs per hectare followed by the 90% confidence interval. n: mean number of frogs captured per catching bout. C: number of catching bouts in the month.)

The decrease in density of *R. arvalis* in September each year is probably due to the beginning of hibernation. This means that some frogs are completely unavailable for catching. The increase in density of *R. temporaria* late in the season is probably due to recruitment through growth into the adult category.

In summary, the two species show considerable between-year variations in density. The total number of adult brown frogs fluctuated between 790 and 265 per hectare in August.

EUROPEAN CO-OPERATION IN AUTOMATIC DATA PROCESSING METHODS IN FAUNISTIC RESEARCH

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In European herpetology there has not yet been any pronounced interest in applying methods of automatic data processing. This is certainly due to the fact that the number of species is small and relatively complete

information about distribution is easily available for other groups, such as molluscs, the situation is quite different. The number of species is large, considerable and confusion exists (records is quite numerous of millions). Only a few technical methods of broad, international cooperation are possible to manage a complex mass of information about progress in herpetology.

Having started a project for recording pean programmes and plants are based on a geographical reference by using a standard. The card contains taxonomical units, sex, etc., geographical lecting, ecological this basic scheme taxonomical groups of research.

The system of information language, can be with records for species found in specified ecological conditions of data computers. Of actual programmes produced automatic of different symbols (triangles etc.) all categories, such as particular year, altitude, etc.

A thoroughly procedure for data bank is essential the innumerable bank are reliable.

No doubt herpetologists benefit from the processing methods. This is on the state now in progress.

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