

## Age groups and habitat of unionid mussels in a South Swedish stream

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### 1. Introduction

The distribution of the unionid species *Anodonta cygnea* (L.), *A. piscinalis* Nilsson and *Unio pictorum* (L.) was studied in the outflow Ålabäcken of Lake Krankesjön, Scania, in autumn 1964 and spring 1966. The investigation was intended to analyse the composition of the unionid fauna along the stream with reference to the contemporaneous unionid fauna at the lake mouth.

### 2. Methods

At each sampling station 100 living specimens were taken, regardless of bottom area, by a toothed scraper, 30 cm across the mouth and with a net bag, with a mesh size of 10 mm.

Juvenile specimens were secured by being caught in the bottom mud that collected on the scraper. Before preservation in 80% alcohol the mussels were weighed, measured and placed in age groups. Collecting was carried out on two occasions, viz. 20 November 1964 (locs. 1-3) and 17 March 1966 (locs. 1-5).

### 3. The habitat

Five sampling areas were chosen along the stream within a distance of 1400 m from the lake mouth (Fig. 1). As described below they are rather similar as regards depth and current velocity, substrate and vegetation. Beyond locality 5 the bottom silt gave way to gravel, which was covered with stones of various sizes. There were very few mussels beyond this point.

Since the stream is fed by the lake, seasonal variations in water flow are not pronounced, and it has not been known to dry up.

### 4. Current velocity

Current velocity was measured in the middle of the stream, about 10 cm above the bottom, by means of an Ott current meter. The values for each occasion (Tab. 2) are the average of five measurements just above the site of the unionids.

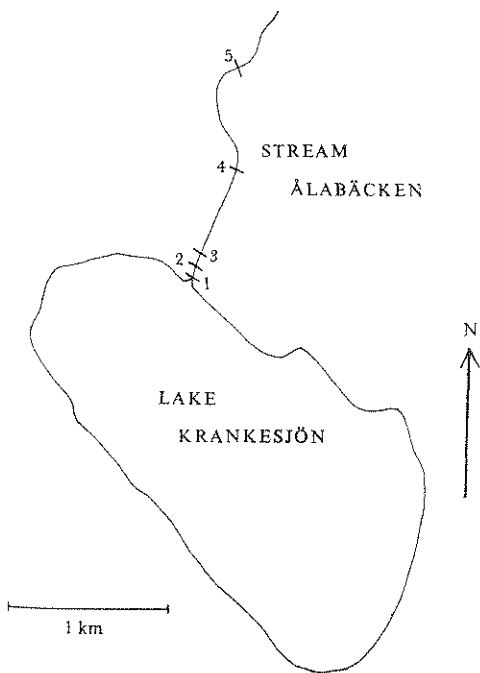


Fig. 1. Map showing the sampling stations.

Manuscript accepted June 1967.

Running water influences the distribution of the mussels in three ways, viz. directly by carrying away the glochidia when they leave the mother and require a host and indirectly by determining the situation of the fish which act as hosts of the glochidia and again when the glochidia leave the fish and reach the bottom.

**5. Water depth**

The mobility of unionids is negligible and

extraordinary environmental changes such as strong fluctuations of water depth and current may be fatal to the mussels, since such changes greatly influence oxygen content and water temperature.

The stream has been surveyed and topographical profiles of two of the sampling areas are shown in Figs. 2 and 3 (cf. Tab. 2). These are seen to be rather alike, and are presumably similarly affected by environmental factors.

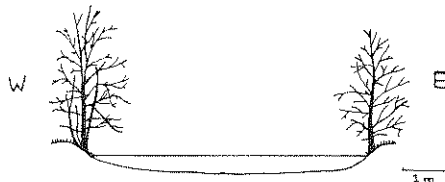


Fig. 2. Locality No. 1 on the stream Ålabäcken in the immediate vicinity of its outflow from lake Krankesjön. The habitat of *Anodonta cygnea* (10%), *A. piscinalis* (74%) and *Unio pictorum* (16%), 20 November 1964. Below, transect of the stream at the same place. 3 August 1966. Photo I. Norelius.

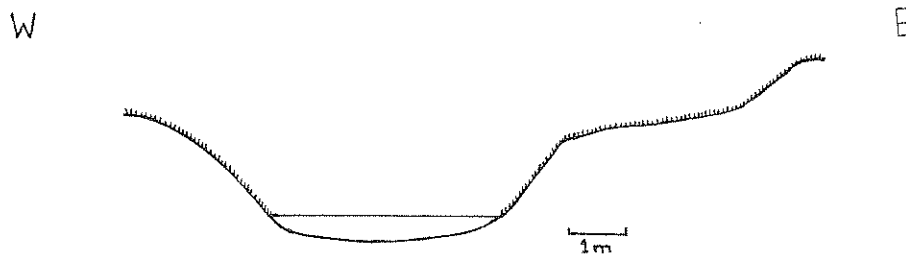


Fig. 3. Locality No. 5 on the stream Ålabäcken 1400 m from the mouth. The habitat of *Anodonta piscinalis* (36%) and *Unio pictorum* (64%). Below, transect of the stream at the same place. 3 August 1966. Photo I. Norelius.

Tab. 1. C in tern

Grain size in mm
>20 . . . . .
20-6 . . . . .
6-2 . . . . .
2-0.6 . . . . .
0.6-0.2 . . . . .
0.2-0.06 . . . . .
0.06-0.02 . . . . .
<0.02 . . . . .

Tab. 2. /

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Tab. 1. Composition of substratum of the stream in terms of grain-size (%). 3 August 1966.

Grain size in mm	Loc. No.				
	1	2	3	4	5
>20.....	0	0	0	0	11.6
20-6.....	0.1	0.7	2.1	0.6	0.2
6-2.....	2.7	0	3.6	3.9	2.8
2-0.6.....	21.3	32.6	17.3	14.5	8.9
0.6-0.2.....	70.9	64.1	73.3	55.4	68.1
0.2-0.06.....	5.3	2.3	3.5	24.1	8.6
0.06-0.02.....	0.2	0.1	0.1	1.2	0.3
<0.02.....	0	0	0	0	0

Tab. 2. Abiotic characteristics of sampling areas in the stream. 3 August 1966.

	Loc. No.				
	1	2	3	4	5
Velocity m/sec....	0.29	0.24	0.31	0.30	0.36
Maximum depth m	0.40	0.45	0.40	0.38	0.37
Flow m <sup>3</sup> /sec.....	0.57	0.35	0.31	0.34	0.34
Breadth m.....	6.70	2.95	3.70	3.70	3.55
Contents organic material of bottom sediments %.....	2.31	1.36	1.97	1.10	0.59

## 6. Substrate

The bottom material is similar at the various sampling areas. The organic content is rather low and tends to decrease downstream. The grain size of the mineral material falls mainly within the range at 0.6-0.2 mm.

The bottom consists of gravel overlaid with silt. The adult mussels are most abundant at places with a moderately thick layer of mud which can be penetrated by the hinder parts to gain anchorage in the underlying gravel. The samples of the bottom material were all collected at such places (cf. Tabs. 1, 2).

## 7. Vegetation

In the bank vegetation the grasses *Deschampsia* sp. and *Aira* sp. predominate and a few dicotyledons are also common, viz. *Achillea ptarmica* L., *Lysimachia vulgaris* L., *Epilobium hirsutum* L. and *E. angustifolium* L. In stations 1 and 3 scattered *Alnus glutinosa* (L.) Gaertn. grow at the water's edge. The other stations

are well exposed. Thus, vegetation does not differ much between the localities.

The adjacent part of the lake has grassy slopes down to a narrow sandy beach. In the lake there are stands of *Phragmites communis* Trin. and some *Scirpus lacustris* L.

## 8. The distribution of the unionid species in the stream

The numerical relations of the three species present in the stream differ from one locality to the other (Tab. 3). *Anodonta cygnea* prefers

Tab. 3. Number of specimens of unionid species collected in five sample areas in the stream.

Loc. No.	Date	<i>A. cygnea</i>	<i>A. piscinalis</i>	<i>U. pictorum</i>
1	20.11.64	10	74	16
	17.3.66	4	63	33
2	20.11.64	5	67	28
	17.3.66	9	56	35
3	20.11.64	3	17	80
	17.3.66	3	24	73
4	17.3.66	1	31	68
	17.3.66	0	36	64

still water and is more abundant in the lake (24% *A. cygnea*, 60% *A. piscinalis* and 16% *U. pictorum*). The decrease in numbers of *A. cygnea* downstream is obvious despite the limited number of specimens. A similar condition is found with *A. piscinalis* whereas the distribution of *Unio pictorum* shows the opposite tendency.

Thus the localities may be divided into two groups, viz. lake mouth localities (nos. 1, 2) and stream localities (nos. 4, 5).

The lake mouth localities are characterized by high numbers of *A. cygnea* and a predominance of *A. piscinalis*. In the typical stream localities there is a strong increase of *U. pictorum* while *A. cygnea* appears only exceptionally. Loc. no. 3 (250 m from the mouth) represents a transition with a somewhat larger proportion of *A. cygnea*, few *A. piscinalis* and numerous *U. pictorum*.

The difference in the species composition between the localities cannot be connected

with any environmental factor studied. It is probably the result of the situation of the host fishes at the time of the deposit of the glochidia.

Tab. 4. The distribution of the age groups of *Anodonta piscinalis* in the various localities. 17 March 1966.

Loc. No.	Age groups					Σ
	1-3	4	5	6	7-11	
1	1	4	17	18	17	63
2	13	5	19	17	2	56
3	4	5	5	8	2	24
4	3	3	7	11	7	31
5	2	2	7	9	16	36
Σ	29	19	55	63	44	210

$$\chi^2 = 34.51^{**}$$

Tab. 5. The distribution of the age groups of *Unio pictorum* in the various localities. 17 March 1966.

Loc. No.	Age groups					Σ
	1-3	4	5	6	7-11	
1	8	5	1	9	10	33
2	18	2	3	5	7	35
3	49	6	8	9	1	73
4	7	3	6	19	33	68
5	8	8	12	18	18	64
Σ	90	24	30	60	69	273

$$\chi^2 = 97.81^{***}$$

#### Reference

- NEGUS, C. L. 1966. A quantitative study of growth and production of Unionid mussels in the Thames at Reading. - *J. Anim. Ecol.* 35: 513-532. Oxford.

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#### 9. Age group distribution within the localities

The distribution of the age groups of *A. piscinalis* and *U. pictorum* differs in different localities (Tabs. 4, 5). Most age groups are well represented and the comparatively high proportion of the youngest age group indicates a relative stability of the habitat. Specimens of the youngest age group were collected in a lower proportion than might be expected. This agrees with findings of Negus (1966) and with results of unpublished field work in the Scania region, Sövedsjön and its affluent Klingvalkan.

#### Abstract

Unionid mussels were collected in five sampling stations in the River Ålabäcken, Scania, Sweden. The age group distributions in the five localities were very similar with respect to abiotic factors. *Anodonta cygnea* and *A. piscinalis* were most abundant at the sites near the lake mouth but decreased in number in the stream, whilst the opposite was true for *U. pictorum* which occurred predominantly in stream localities.

Since there are no obvious physical differences between the sampling stations, the reason for the non-random distribution of the age groups of the species may be connected with the situation of the fishes that act as hosts to the glochidia at the time the glochidia leave and settle on the bottom.