WATER QUALITY
and
ABATEMENT of POLLUTION
in
NATAL RIVERS

PART V

THE RIVERS OF SOUTHERN NATAL

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INTRODUCTION

This study of the southern part of Natal is a continuation of the river surveys conducted by the National Institute for Water Research on behalf of the Natal Town and Regional Planning Commission. As in previous surveys, the work was undertaken in terms of the Natal Rivers Research Fellowships. The results presented here were obtained during studies undertaken between 1968 and 1973.

Reports of previous surveys (Parts II to IV) were presented river by river. The present report deals with a greater number of smaller rivers than the previous publications did, and for this reason the previous format would have been repetitive and uninteresting; it has therefore been abandoned. The complete survey results are presented in tables in the Appendix. The text indicates results of particular interest and presents conclusions. It has been divided into sections according to the scientific disciplines concerned.

The experimental techniques used were mainly as described in Part I[1]. Where modifications were introduced they are described in the appropriate sections of this report.

GENERAL DESCRIPTION OF THE REGION

The area drained by the Umkomaas River and rivers further south as far as and including the Mtamvuna (Figure 1), an area of some 15 000 km^2, is covered in this report. The area is essentially agricultural and almost one-third lies in the Cape Province. A large proportion consists of Bantu reserves. Forest reserves are found in the vicinity of the Drakensberg and in the region between Harding and Kokstad; sugar is grown in the coastal areas. Stock raising, dairy farming and the cultivation of various crops are practised in the remainder of the area.

Geologically the high country near the Drakensberg is built from rocks of the Stormberg Series. These give way in succession to Beaufort, Ecca, Dwyka and granite formations as the coast is approached. Table Mountain rocks also crop out in the coastal region, although these are not as extensive as those found further north in the Three Rivers Region (Part II).

The annual rainfall varies from more than 1 900 mm on the Drakensberg at the head of the Umkomaas River to about 1 000 mm at the coast, although it is only 750 mm or less at places at the centres of the Umkomaas and Umzimkulu catchments, 60 to 80 km inland. About 80 per cent of the total rainfall occurs in summer.

The agro-ecology of the inland half of the region comprises Highland Sourveld. This is followed towards the coast by *Podocarpus* Forest, then by Open Sandy Bush and finally by Coast Forest near the sea. Short Acacia Savanna occupies the valleys of the major rivers for the last 60 to 80 km of their courses.

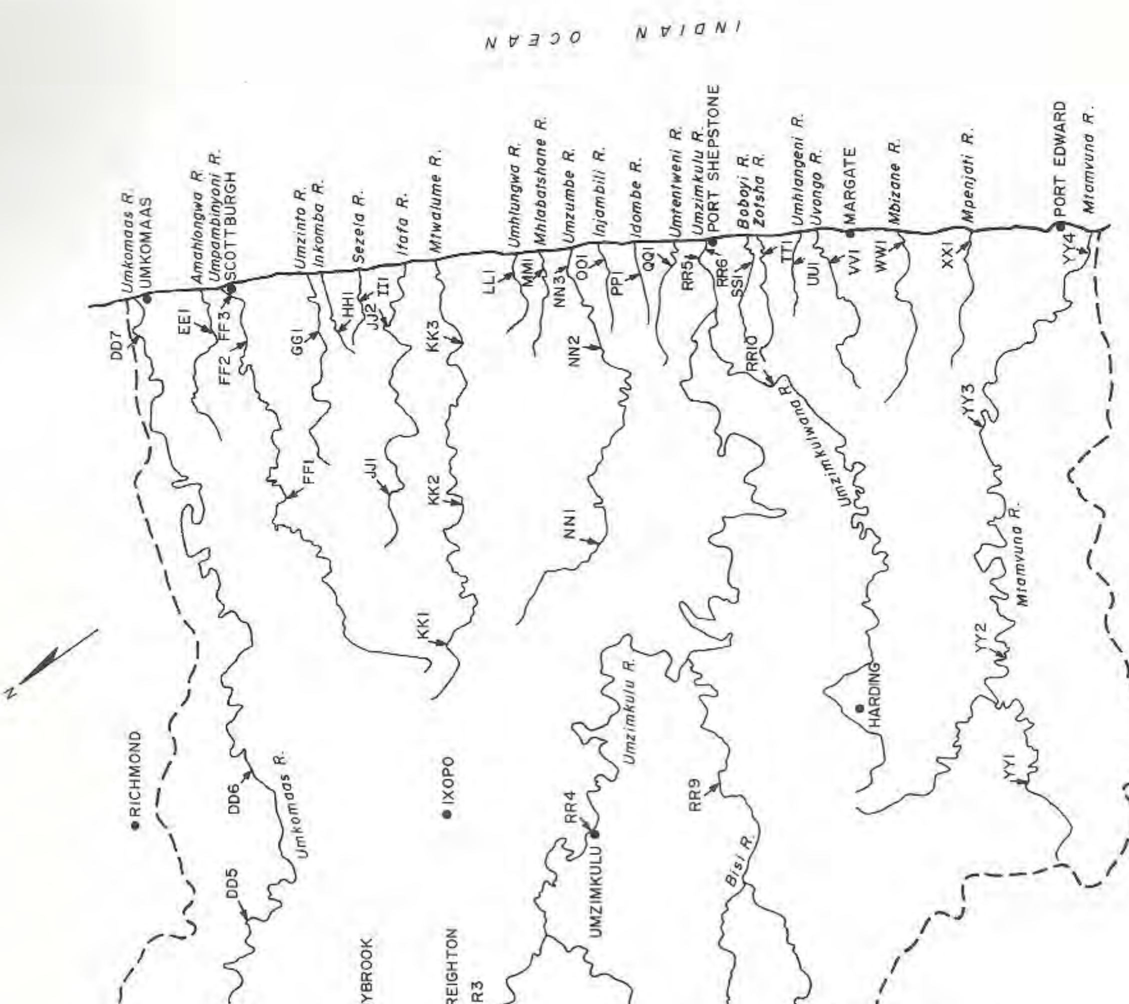

FIGURE 1

The survey area showing rivers, sampling points and towns

The coastal strip has undergone extensive urbanization. Here (with populations according to the 1970 census shown in brackets) are Port Shepstone (5 510), Margate (4 758), Park Rynie (2 785), Scottburgh (3 472) and Umkomaas (1 729), each of which is a popular holiday centre; there is a sugar mill on the Umzimkulu River at Port Shepstone, while at nearby Marburg (4 689) there is a light industrial centre. Two other sugar mills are also established in this region, one at Sezela (2 072) at the mouth of the small Sezela River and the other at Renishaw on the Umpambinyoni River. Umkomaas is also the site of the SAICOR rayon factory. Apart from these, there are only four other towns in the whole region with a population of more than 1 000 each. These are Umzinto (5 193) and Esperanza (1 089), which are sugar-growing centres; and Ixopo (1 761) and Harding (3 305), which are agricultural centres.

Much additional environmental information has been made available by Ninham Shand & Partners[2] and their publication should be consulted for information concerning the hydrology of the river catchments and existing water use as well as many other topics.

Certain parts of three of the rivers and their tributaries are listed under the Schedule of the 1956 Water Act as rivers to which the Special Standard for Effluents should apply. These are:

(i) The Umkomaas River down to the entry of the Nzinga tributary, as well as the Nzinga itself.

(ii) The Umzimkulu River down to the entry of the Polela, and the Polela, Bisi, Ngwangwane and Cabane tributaries.

(iii) The Mtamvuna River down to the entry of the Weza tributary, as well as the Weza itself.

In the reach of the Umzimkulu River below Centocow there is a series of springs on the left bank, some of them delivering warm water (of about 25° C) which is saturated with hydrogen sulphide. The combined flow is quite low, however, amounting to no more than 30 ℓ/s.

Along the lower reaches of the Ngwangwane some of the worst soil erosion encountered during the course of the Natal river surveys was observed.

SAMPLING PROGRAMME AND STATIONS

Water samples for chemical analysis were collected between 1968 and 1971. Attention was initially confined to the eleven major rivers of the region which rise further than 15 km from the coast. Eleven smaller rivers, each of which rises between 7 and 15 km from the coast, were subsequently included as well, since it was considered that some of them might become of importance as future sources of water supply.

Water samples for bacteriological examination were collected from some of the stations in 1971, while more extensive sampling was undertaken during 1972/73. Samples were taken from the stations used in the chemical survey.

In June, 1973, samples of the benthic fauna were collected from these stations, with the exception of one which had been shown to be estuarine. Biological samples were also collected from four upland tributaries of the Umkomaas and Umzimkulu Rivers since these represented stream types of biological interest.

TABLE 1

The rivers studied

Name	Code	Length in km	Catchment area in km²	Average flow in ℓ/s	Altitude of source in m
Umkomaas	DD	298	4 350	34 000	2 650
Amahlongwa	EE	23	98	140	460
Umpambinyoni	FF	100	567	710	1 010
Umzinto	GG	37	142	370	460
Inkomba	HH	13	34	85	300
Sezela	II	10	21	140	180
Ifafa	JJ	68	259	620	910
Mtwalume	KK	85	580	1 700	1 010
Umhlungwa	LL	11	39	140	150
Mhlabatshane	MM	16	49	110	240
Umzumbe	NN	84	541	1 980	950
Injambili	OO	13	34	85	210
Idombe	PP	11	26	110	300
Umtentweni	QQ	14	41	85	340
Umzimkulu	RR	319	6 643	51 000	1 980
Boboyi	SS	14	31	85	370
Zotsha	TT	16	65	280	490
Umhlangeni	UU	11	52	85	340
Uvongo	VV	16	111	570	340
Mbizane	WW	26	150	370	460
Mpenjati	XX	18	83	510	490
Mtamvuna	YY	161	159	8 500	1 920

The twenty-two rivers studied are listed in Table 1 in order of occurrence from north to south. The average flows recorded were mostly estimates based on few observations, but were included for purposes of comparison. The Umkomaas and Umzimkulu are the largest rivers in this part of Natal; they actually rise in the Drakensberg, whilst the other rivers do not have sources as far inland.

The sampling points used during the survey are shown in Figure 1. Their precise locality is described in Table 2.

WATER CHEMISTRY

Full details of the chemical analyses of all the samples are given in Table 1 of the Appendix.

One feature of the results was the sporadic occurrence of surprisingly high BOD values at some of the stations. Subsequent visits to these stations confirmed the reality of these values even though there were no obvious sources of organic enrichment of the water. It was concluded that cattle might be responsible for the high values in some instances; otherwise the phenomenon could only be attributed to agricultural sources in general.

When the chemical analyses were converted to standardized percentage form (see Part I)[1] it was found that the samples fell broadly into three main groups:

(a) Those with a chloride percentage of less than about 20, which included stations DD1-7, RR1-9 and YY1-3.

TABLE 2

Sampling points, Southern Natal rivers

Station number	River	Latitude E °	Latitude E ′	Longtitude S °	Longtitude S ′	Description
DD1	Umkomaas	29	26	29	32	Large tributary in Vergelegen Nature Reserve
DD2		29	34	29	36	Where crossed by Nottingham Road/Himeville road
DD3		29	44	29	37	Where crossed by Himeville/Impendle road
DD4		29	55	29	45	Deepdale on Bulwer/Pietermaritzburg road
DD5		30	6	29	54	At Hela Hela
DD6		30	14	30	1	At Josephine Bridge - Richmond/Ixopo road
DD7		30	46	30	11	Where crossed by inland South Coast road
DD8	Umkomanzana	29	20	29	36	At Sani Pass Police Camp and Border Post
DD9	?	29	43	29	32	Tributary of Nzinga stream on Carter's Hill
DD10	?	29	56	29	44	Umkomaas small tributary on Lundy's Hill near DD4
EE1	Amahlongwa	30	43	30	15	Where crossed by inland South Coast road
FF1	Umpambinyoni	30	31	30	12	North of Sawoti Railway Station
FF2		30	41	30	16	Where crossed by inland South Coast road
FF3		30	44	30	17	Below sugar mill at Scottburgh
GG1	Umzinto	30	39	30	21	At Esperanza
HH1	Inkomba	30	38	30	22	2 km west of inland South Coast road
II1	Sezela	30	39	30	24	Where crossed by main South Coast road
JJ1	Ifafa	30	26	30	18	South of Dumisa Railway Station
JJ2		30	36	30	20	At Nil Desperandum
KK1	Mtwalume	30	14	30	16	Where crossed by Highflats/Umzinto road
KK2		30	22	30	22	South of Jolivet Railway Station
KK3		30	32	30	27	Between Mtwalume and Wilder Mission Stations
LL1	Umhlungwa	30	34	30	32	Where crossed by inland South Coast road
MM1	Mhlabatshane	30	33	30	35	Where crossed by inland South Coast road
NN1	Umzumbe	30	14	30	27	At Braeside store, off Highflats/Port Shepstone road
NN2		30	26	30	35	Near Umzumbe Mission Station
NN3		30	32	30	36	Where crossed by inland South Coast road
OO1	Injambili	30	31	30	37	Where crossed by inland South Coast road
PP1	Idombe	30	28	30	39	Where crossed by inland South Coast road
QQ1	Umtentweni	30	27	30	41	Where crossed by inland South Coast road
RR1	Umzimkulu	29	31	29	49	At 'The Rocks', on Underberg/Coleford road
RR2		29	46	30	3	Where crossed by Creighton/Riverside Railway Station road
RR3		29	49	30	4	Below Ngwangwane/Umzimkulu confluence
RR4		29	57	30	16	At Umzimkulu Village
RR5		30	27	30	43	Above sugar mill, Port Shepstone
RR6		30	27	30	44	At Archibald Bridge, Port Shepstone
RR7	Polela	29	31	29	43	Where crossed by Nottingham road/Himeville road
RR8	Ngwangwane	29	44	30	5	At Riverside Railway Station
RR9	Bisi	29	54	30	25	Where crossed by Umzimkulu/Kokstad road
RR10	Umzimkulwana	30	20	30	40	Below Oribi Gorge Nature Reserve
RR11	Ngwangwane	29	19	29	53	On farm Ideal View (F.P.169, 9143, Underberg Magistracy)
SS1	Boboyi	30	24	30	46	Where crossed by inland South Coast road
TT1	Zotsha	30	24	30	47	Where crossed by inland South Coast road
UU1	Umhlangeni	30	22	30	48	Where crossed by inland South Coast road
VV1	Uvongo	30	21	30	50	Where crossed by inland South Coast road
WW1	Mbizane	30	19	30	54	Where crossed by Port Shepstone/Port Edward road
XX1	Mpenjati	30	16	30	58	Where crossed by Port Shepstone/Port Edward road
YY1	Mtamvuna	29	40	30	40	On edge of Bangeni Forest Reserve
YY2		29	50	30	44	Where crossed by Harding/Bizana road
YY3		30	4	30	51	At Mpunzi Drift
YY4		30	11	31	4	At Port Edward

Place names, with the exception of Braeside store (Stn. N1) and Ideal View (Stn. RR11) may be found on South Africa 1:500 000 Sheet Durban SE31/28. Topographical Edition, Government Printer, Pretoria, 1956

(b) Those with a chloride percentage approximately in the range 20 to 40, which included most of the other stations.

(c) Those with a chloride percentage exceeding about 40, which included stations TT1, UU1, VV1 and YY4.

The average compositions of the waters from these three groups are shown in Figure 2.

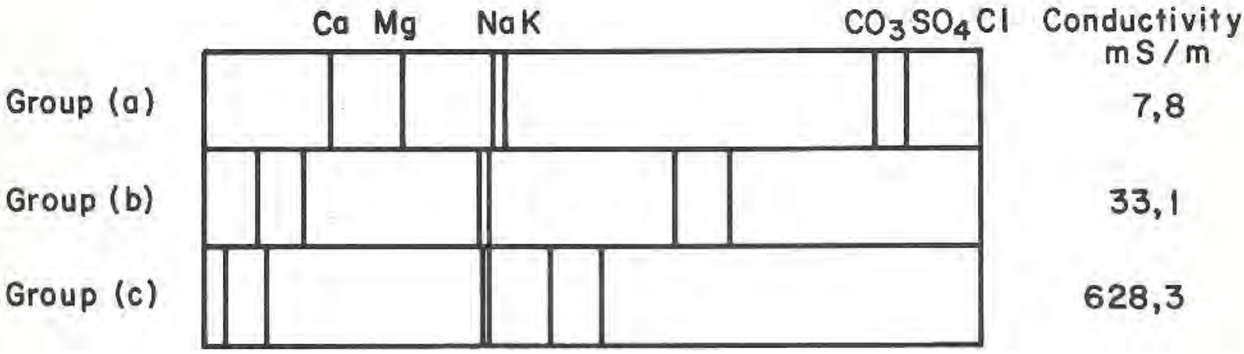

FIGURE 2

Average water compositions for rivers of different groups

The outcrop percentages used to calculate the expected water compositions are given in Table II of the Appendix. The analyses for station DD1 were taken as representative of waters from Stormberg formations in the absence of other data. Most of the water compositions agreed fairly well with the calculated expectations, and it was found that group —

(a) contained waters derived from catchments formed upon outcrops of higher geological formations, with less than 35 per cent of Table Mountain, Dwyka and granite outcrops;

(b) contained waters derived from catchments formed upon lower formations, with more than 35 per cent of these particular outcrops; and

(c) contained waters which, if not actually estuarine, were perhaps influenced by proximity to the sea.

Most of the rivers contained water with corrosive tendencies, as judged by the values of the stability index. Only the Umtentweni and Umpambinyoni Rivers did not show this feature.

The water of the Zotsha River, where sampled, was saline. The sampling point might have been too close to the river mouth, which was about 3 km downstream. Analyses from the Uvongo and Umhlangeni Rivers suggested that the water had been contaminated by sea water, even though the sampling points were almost 7 km from the river mouth. At the lower station on the Mtamvuna River the water was certainly estuarine.

HYDROBIOLOGICAL STUDIES

Introduction

Samples of the benthic invertebrate fauna were collected in June, 1972 after completion of the chemically-oriented studies. Station YY4 on the Mtamvuna estuary was excluded from the biological study since the chemical study had shown this station to be estuarine. However, some biological stream types had not been included in the chemical study and four extra sampling points were chosen to include them. These were true mountain streams for which stations DD8 and DD9 (Table 2) were included, streams draining *Podocarpus* Forest (station DD10) and a high-lying river with extensive submerged weed beds (station RR11).

An objective of the biological study was to place the invertebrate fauna of the area on record for future reference. In satisfying this aim by sampling during only one month of the year, an obvious restriction was placed on future comparative biological studies. It would only be possible to compare samples taken in June in future years with the results of the 1972 study. The reasoning behind the decision to restrict the present study to June was that, given the large study area with its numerous streams and rivers, a programme of monthly sampling covering a full year's cycle would be an unreasonably large task. In summer, streams and rivers are at their peak of physical instability and their biota is variable because of varying flow conditions. In this season, the effects of polluting substances are masked by the diluting effects of the increased flows. In late winter and spring, filamentous algae are often abundant and hampered the sorting of samples. June, in the winter, was therefore chosen as the sampling month.

Further objectives of the study were to attempt to classify the sampling points from their biota and to identify places where man's activities had resulted in disturbance of the biota. Biological classification of the sampling points was considered essential as it would result in the recognition of river reaches with similar biotas. Only when this had been done would it be possible to make reasonably accurate predictions of the biota to be expected at places where no samples were collected.

This section of the report was compiled with these three objectives (the permanent record, the stream classification and disturbance due to human activities) in mind.

Methods

FIELD COLLECTION AND LABORATORY SORTING OF SAMPLES

In contrast to methods used in Parts I to IV of this report, where only marginal (or strictly speaking, fringing) vegetation and sediment biotopes were sampled, all available biotopes at each sampling point were sampled in Southern Natal. Sediment samples were taken with the corer used in previous studies, but instead of 3 cores being taken for each sample, 5 were taken. Marginal vegetation was sampled, not in a single sweep of about 3 m (the method used in Parts I to IV), but by moving the net back and forth through the vegetation in short sweeps of about 0,5 m, until inspection showed that an adequate sample had been collected. The largest samples covered 5 m, but more usually between 2 and 3 m was sampled. Sweeping back and forth results in considerably larger numbers of animals being collected per unit length of marginal vegetation than unidirectional sweeping does[3]. submerged fully aquatic vegetation was sampled in the same way as marginal vegetation. Where possible, a Surber sampler[4] was used for the stones-in-current biotope, otherwise a hand net was used with stones lifted one at a time in front of the net and the fauna being thoroughly washed from them. The hand net was also used for the stones-out-of-current or stony-bottomed backwater biotope. The netting used on all sampling apparatus was bolting silk with a pore size of 300 μm.

Samples were sorted and the animals counted according to the usual techniques of the National Institute for Water Research[5]. Rare, unusual and new species were retained separately in a permanent, catalogued collection. The remaining animals were also kept in the catalogued collection, but were not separated from one another. This point has been mentioned here because the tabulated faunal analyses (Appendix, Tables III to XVI) contain many provisional names such as *Baetis (Acentrella) sp. 1, Cheumatopsyche sp. 1* and Tanytarsini type A. In future years it will be possible to determine from the catalogued material which type, for example, of *Cheumatopsyche* was tabulated here as species 1.

MATHEMATICAL ANALYSIS

The initial stage in any attempt to compare faunal samples from different sampling points in a survey area would be to consider what might be validly compared in the light of the sampling programme and the reliability of the field data. Since the different biotopes each had a distinctive fauna, they had to be treated separately. Since varying areas were sampled in each biotope and estimates of density from single samples had been found to be notoriously unreliable[6, 7], comparisons may not be based on quantitative data in its raw state.

The composition of a sample is affected in two ways by its size. The first way is obvious — the larger the sample the more animals are collected. For purposes of comparing samples of different sizes, this effect may be eliminated by expressing the number of individuals of each taxon as a percentage of the total number of animals found in the sample. The second way in which sample size is related to the composition of the sample is that the larger the sample the greater the probability of collecting rare kinds of animals[8, 9, 10]. Mountford[9] described a measure of the similarity between pairs of samples, which was intended to eliminate the effect of sample size. Mountford's similarlity was based solely on the presence of taxa, and their abundance was ignored.

In using Mountford's measure, the assumption is made that there is a logrithmic relationship between the number of individuals and the number of taxa in collections. While this assumption is, broadly speaking, valid[10], the relationship at the individual sample level is very variable as may be seen, for instance, in data from replicate sampling of a single biotope[6]. The calculation of Mountford's measure of similarity is unusually intricate.

Working with soil samples, which probably contained much smaller numbers of taxa than occur in benthic macroinvertebrate samples, Mountford derived a simple approximation for the calculation of his similarity measure. This approximation was not reliable for the larger numbers of taxa encountered in the Southern Natal samples. Furthermore the scale of Mountford's measure of similarity was not linear, which complicated interpretations considerably. It was therefore not used here.

Comparison of samples with each other was based on two indices of similarity between each sample and every other sample taken from the same type of biotope. According to Stephenson,[11] the correct name for the first index of similarity is the Czekanowski Index, though in many publications, including Southwood's well-known textbook[8] it is called the Sørenson Index. The Czekanowski Index measures the similarity between two samples as follows:

$$C.I. = \frac{2c}{a + b}$$

where: *a* is the number of taxa in sample A
b is the number of taxa in sample B
c is the number of taxa common to samples A and B.

In this report it was found more convenient to multiply C.I. values by 100 than to present them as absolute values.

The Czekanowski Index takes only the presence of taxa into account and their abundance relative to one another is ignored. Rare animals carry as much weight in the calculation of the index value as do common animals.

A second measure of a similarity between all pairs of samples, in the calculation of which the abundant animals are of overriding importance, was therefore used. This is calculated by the formula:

$$I = \frac{2w}{u + v}$$

where: *u* is the sum of the numbers of animals of all taxa found in sample A
v is the sum of the numbers of animals of all taxa found in sample B
w is the sum of the lesser values of those taxa common to both samples A and B

This measure of similarity is now commonly known as the Bray-Curtis measure of similarity, though Bray and Curtis[12] themselves described earlier usage of the measure.

For the Southern Natal samples, which were reduced to uniform size by the percentage transformation (see above), *u* and *v* each become 100 . I then equals $\frac{2w}{200}$, and

$$100\ I = w$$

or, $$100\ I = \Sigma \min (x_1, x_2, \ldots x_j)$$

where $x_1, x_2, \ldots x_j$ are the percentages of the taxa.

100 I is what Southwood[8] called the Percentage of Similarity and this name was used here.

In the literature there are indices of similarity which simultaneously take both the taxa present and their abundance relative to one another into account. This type of index was not considered here because it is not possible to distinguish the role of either the variety of taxa common to a pair of samples, or the dominant taxa, in the index value.

Czekanowski Index values and Percentages of Similarity were computed between all pairs of samples from each habitat. The results could have been presented as triangular matrices of similarity values, but the information contained in such matrices is not readily read directly from them. A number of clustering strategies are available[13] for sorting the information in such matrices into order and allowing it to be presented in the form of dendrograms. The clustering strategy used here is known either as the unweighted pair-group method using arithmetic averages (UPGMA) method[13] or group average sorting[14].

Computer programs have been compiled which accept the raw data sampling point by sampling point, transform the numbers of individuals of each taxa in each sample into percentages, compute the indices of similarity used here, cluster the resulting similarity matrices by group average sorting and plot the resulting dendrograms. The raw data from the stones-in-current and marginal-vegetation biotopes was, on account of the large numbers of samples and taxa, so great that it exceeded the computer's capacity to handle it. The maximum number of taxa per biotope which could be used was 180. In the marginal-vegetation and stones-in-current biotopes rare taxa were discarded in descending order of rarity until 180 or fewer taxa remained. The occurrence and number of the discarded taxa are tabulated in Tables VI and XI in the Appendix.

In all samples there were several groups of animals in which small individuals could not be identified to species level, but in which large individuals could be. Good examples of this were the mayfly family Baetidae and the fly family Simuliidae. In such cases the small unidentified juveniles were apportioned among the identified large individuals in proportion to the abundance of the large individuals before the data were fed into the computer.

BIOTIC INDICES OF WATER QUALITY

Chutter's[15] Empirical Biotic Index of Water Quality was applied here to data from the stones-in-current biotope. The biotic index described in Part I[1] was used for data from the marginal-vegetation and sediment biotopes. This index is dependent on the sampling method and, as mentioned in the INTRODUCTION, methods used here were not identical to those used in Part I. In the sediments, where 5 cores were taken instead of 3, sample counts were reduced by three-fifths before calculating biotic index values. In the marginal vegetation the standard sample size for biotic index purposes was a single sweep of approximately 3 m (10 feet) in length. Where the sample size was calculated in metres (each sampled metre being swept back and forth) and where sample size varied, a conversion factor had to be calculated for each sample. An earlier study[3] showed that the forward sweep collected about 40 per cent of the back and forth sweep collection. The conversion factor was therefore based on a 1 m back and forth sweep being the equivalent of a 2,44 m unidirectional sweep.

Some Environmental Characteristics of the Sampling Points

Certain environmental characteristics, thought to be important in the distribution of the aquatic fauna, have not been described elsewhere. These are the size of the stream or river, the nature of the river bed and the altitude at each sampling point. Stream beds of moving sand are not stable environments for their biota, while beds supporting extensive growths of submerged macrophytes are probably more stable than those which do not. In Table 3 the sampling points have been classified according to the size of the river, altitude and nature of the stream bed. Features of Table 3 are that sand-chocked streams occurred mainly in the coastal belt and that all large watercourses

TABLE 3

A classification of sampling points according to nature of stream bed, altitude and estimated flow

Altitude in m	Average flow in ℓ/s	Nature of the stream bed		
		Sand-choked	With weed beds	Normal (i.e. not sand-choked and without weed beds)
<100	>1 000	DD7, FF3, KK3, NN3, RR5, RR6		
	150 - 999	FF2, NN2, WW1 XX1		GG1, JJ2, RR10, TT1, VV1
	<150	MM1, PP1		EE1, HH1, II1, LL1, OO1, QQ1, SS1, UU1
100 - 500	>1 000			DD6, YY3
	<150	FF1, NN1		
500 - 1 000	>1 000			DD4, DD5, RR2, RR3, RR4, YY2
	150 - 999		KK1	KK2, RR8, RR9
	<150			JJ1, YY1
1 000 - 1 500	>1 000			DD2, DD3, RR1
	150 - 999			RR7
	<150			DD10
>1 500	150 - 999		RR11	DD1, DD8, DD9

were sand-choked in their lowest reaches. The smaller the stream near the coast, the less likelihood there was of its being sandy. There were few sampling points in the altitude range of between 100 and 500 m and none of them were on intermediately-sized rivers. At the highest altitudes only intermediately-sized streams were sampled.

Biotopes sampled at the sampling points are shown in Table 4. Those most frequently sampled were stones in current, marginal vegetation and sediments. There was an obvious relationship between biotopes available for sampling and watercourse type. Thus no stones-in-current biotopes were available in large sand-choked rivers, but they were available on three smaller sand-choked rivers at stations FF2, MM1 and PP1 (cf. Tables 3 and 4). At each of these three stations, the streams were cutting through rocky outcrops with loose stones here and there in the current. Marginal-vegetation biotopes were not often found in moderate to small streams higher than 1 000m. Sediments were usually not available in these streams and were infrequent in streams lying between 100 and 1 00 m above sea level.

Results

THE PERMANENT RECORD OF THE FAUNA (Tables III to XVI)

The complete species lists, with the taxa included in the computer analysis shown as percentages of the total numbers in each sample are tabulated in the Appendix. Rare taxa from the stones in current and marginal vegetation which could not be included in the computer analysis are tabulated separately (Tables VI and XI).

TABLE 4

Biotopes sampled at the sampling points

Sampling point	Biotopes				
	Stones in current	Stones out of current	Marginal vegetation	Aquatic vegetation	Sediments
DD1	*	*			
DD2	*	*			
DD3	*	*	*		*
DD4	*	*			*
DD5	*	*	*		
DD6	*		*		
DD7			*		*
DD8	*	*			
DD9†	*	*			
DD10	*	*			
EE1	*	*	*		
FF1			*		*
FF2	*		*		*
FF3			*		*
GG1	*		*		*
HH1	*		*		*
II1	*		*		*
JJ1	*		*		*
JJ2	*		*		*
KK1	*		*	*	
KK2	*		*		*
KK3			*		*
LL1	*		2*		*
MM1	*		*		*
NN1	*		*		*
NN2			*		*
NN3			*		*
OO1	*		*		*
PP1	*		*		*
QQ1	*		*		*
RR1	*	*	*		
RR2	*		*		
RR3			*		
RR4	*		*		
RR5			*		*
RR6			*		*
RR7	*	*	*		
RR8	*	*	*		*
RR9	*		*		*
RR10	*		*		*
RR11	*	*	*	*	
SS1	*				*
TT1	*		*		*
UU1	*				*
VV1	*				*
WW1			*		*
XX1			*		*
YY1	*	*			
YY2	*		*		
YY3	*		*		*
YY4					

* - biotope sampled; 2* - two samples from one sampling point
† A sample was also collected from a cascade-waterfall at station DD9

BIOLOGICAL CLASSIFICATION OF THE SAMPLING POINTS

The stones-in-current biota (Tables 5 to 7, III to VI, Figures 3 and 4)

The Czekanowski similarity between sampling points from their stones-in current fauna is shown in Figure 3, where major clusters have been labelled using capital letters from A to F. The distribution of the members of each cluster in terms of altitude, size of river and nature of stream bed is shown in Table 5. There was a good correlation between the distribution of the members of most clusters and stream type. Thus sampling points of cluster A were all in intermediately-sized to large streams at intermediate altitudes, and members of cluster C were all at low altitudes. Cluster D was made up of small streams at high altitudes. Cluster E grouped station DD 10 on a stream draining a *Podocarpus* Forest with the sampling points draining stable streams with weed beds. This would seem to be logical were stability the overriding ecological factor, for a forest stream might be expected to be a stable environment. Station HH 1 stood alone in cluster F. It was a very much smaller stream than any of the others sampled. Cluster B sampling points were the most diverse in distribution. Figure 3 shows, however, that with the exception of station FF2, which stood considerably apart, similarity between the fauna of the sampling points was close. In the three major rivers (the Umkomaas, the Umzimkulu and the Mtamvuna) all the sampling points in the middle reaches of the Umkomaas and the Umzimkulu were in cluster A, while both sampling points in the middle reaches of the Mtamvuna were in cluster B. There was no evidence that the sandy-bedded streams had a distinctive fauna. The three sampling points with high chloride percentages, stations TT1, UU1 and VV1 were not dissimilar to other coastal belt sampling points on the basis of the Czekanowski Index.

TABLE 5

Distribution of the major groups of sampling points from Figure 3, according to the stream classification given in Table 3

Altitude in m	Average flow in ℓ/s	Nature of the stream bed		
		Sand-choked	With weed beds	Normal (i.e. not sand-choked and without weed beds)
<100	>1 000			
	150 - 999	B		B, B, C, C, C
	<150	C,C		C, C, C, C, C, C, C, F
100 - 500	>1 000			A, B
	<150	B		
500 - 1 000	>1 000			A, A, A, A, B
	150 - 999		E	A, A, B
	<150			B, D
1 000 - 1 500	>1 000			A, A, A
	150 - 999			A
	<150			E
>1 500	150 - 999		E	D, D, D

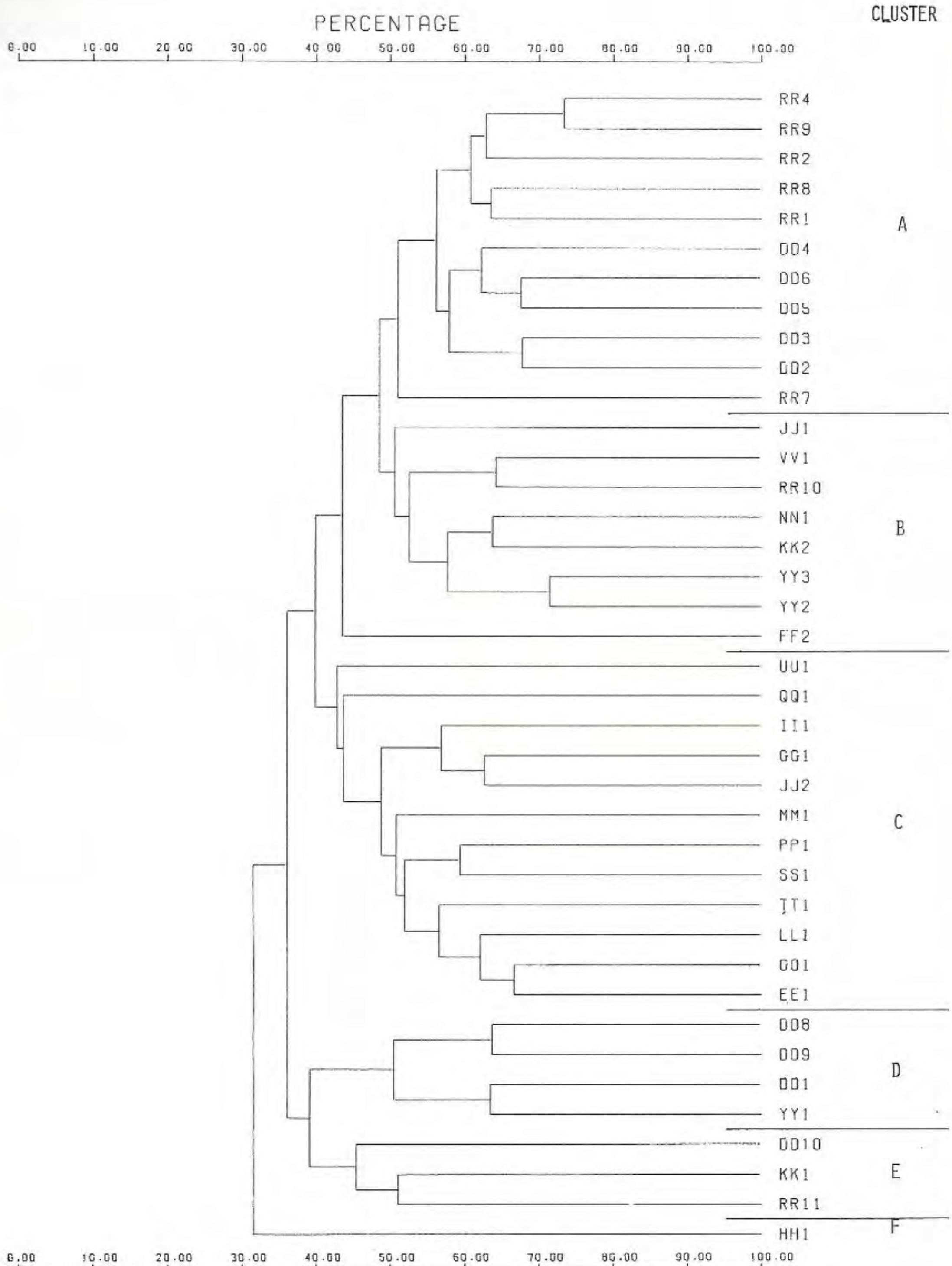

FIGURE 3

Stones in current. Dendrogram of Czekanowski similarity between samples

There were extremely few instances of the taxa responsible for the clustering (Tables III to V), occurring in all samples from a particular cluster and nowhere else, with the result that they could not be referred to as 'indicator' taxa. Comment on taxa typical of clusters will therefore be limited.

Cluster A sampling points were characterized by *Afronurus* (which also occurred in most samples in cluster D) *Hydropsyche, Simulium bovis, S. unicornutum* and Chironomini type A (all of which were found infrequently elsewhere). Mermithidae, which are mainly *Simulium* parasites, were found more frequently in this group of sampling points than in others. *Baetis* type A, *Cheumatopsyche* sp. 1 and sp. 2, *Simulium vorax,* Blepharoceridae A, B and C, Tanytarsini type E and Orthocladiinae type A were found at fewer sampling points in cluster A but were, for the most part, rarely encountered at sampling points in other clusters.

Zygonyx and *Simulium cervicornutum* were typically cluster B taxa, with *Baetis glaucus, Cheumatopsyche* sp. 2 and sp. 8, *Pachyelmis, S. damnosum* and *Rheotanytarsus* often recorded at rather more sampling points than in other clusters. Cluster C was characterized by *Pseudocloeon maculosum* and *Cheumatopsyche* sp. 6 with *Nais, Potamon, Cheumatopsyche* sp. 8, *Chimarra, Orthotrichia,* Helminii C1, *Lobelmis, Aulonogyrus, Simulium adersi* and Tanytarsini type J occurring in a greater proportion of samples in this cluster than in other clusters. *Centroptilum sudafricanum* was present at most sampling points in clusters C, D, E and F and at few sampling points in clusters A and B. Referring back to Table 5, this distribution encompasses presence in high-lying streams and coastal streams with absence from larger rivers at intermediate altitudes. It is suspected that the distribution of this animal is more obviously governed by stream temperature than is the case with many other taxa. Shaded coastal streams remain cool enough for it.

TABLE 6

Distribution of the major groups of sampling points from Figure 4, according to the stream classification in Table 3

Altitude in m	Average flow in ℓ/s	Nature of the stream bed: Sand-choked	With weed beds	Normal (i.e. not sand-choked and without weed beds)
<100	>1 000			
	150 - 999	B		B, C, C, D, H
	<150	G, I		C, G, G, H, J, J, J, J
100 - 500	>1 000			A, B
	<150	B		
500 - 1 000	>1 000			A, A, A, A, C
	150 - 999		J	A, A, I
	<150			A, F
1 000 - 1 500	>1 000			A, C, C
	150 - 999			C
	<150			I
>1 500	150 - 999		E	F, F, F

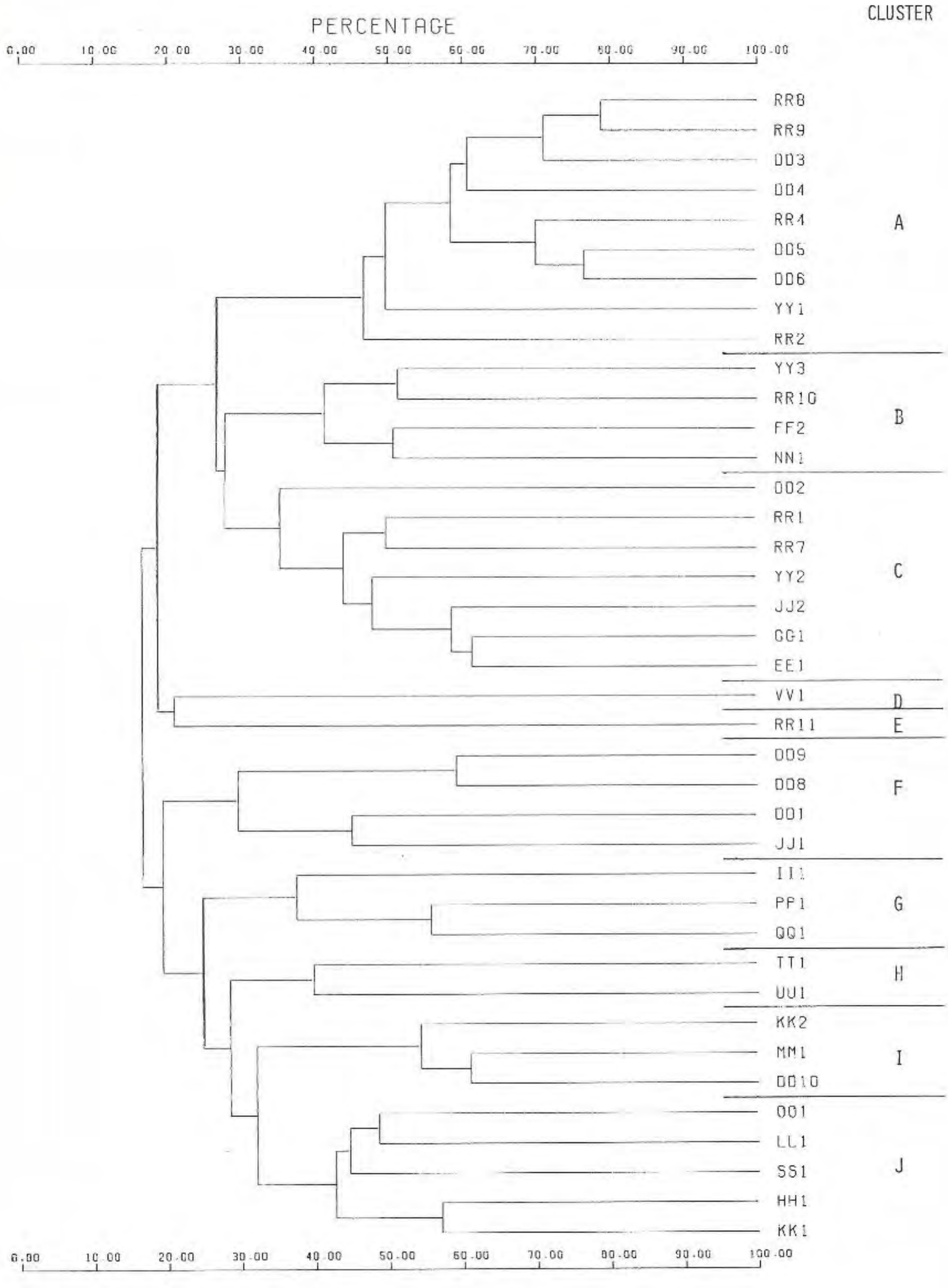

FIGURE 4

Stones in current. Dendrogram of Percentage of Similarity between samples

Cluster D had a greater number of taxa almost exclusive to it than did other clusters. These were *Baetis (Acentrella) monticola, B. (A.)* sp. 1 and sp. 3, *Castanophlebia, Peloriolus* and helodid larvae. Since there was only one sample forming cluster F, the only way to distinguish taxa likely to characterize that type of sampling point was to consider the abundance of the taxa within the sample. On this basis, cluster F was characterized by *Leptonema* (which was found nowhere else), *Chimarra, Simulium hirsutum,* Orthocladiinae type D and Orthocladiinae type 2.

A classification of the sampling points according to the Percentage of Similarity (Figure 4) followed the classification of the sampling points according to their physical characteristics (Table 6) rather less closely than did the classification following the Czekanowski Index (see p. 13). The composition of group A was almost identical in both classifications, while the Percentage of Similarity group B was made up of four of the Czekanowski Index group B sampling points, all at lower altitudes. Group C (Figure 4, Table 6) was a miscellany of sampling points and groups D and E were both single sampling points. Group F comprised the high-lying streams and was very similar to group D of the Czekanowski Index. Groups G, H and J were almost exclusively low-lying while group I, like group C, was rather a geographically meaningless miscellany of sampling points. As was the case with the Czekanowski Index, the sandy stream fauna did not appear to differ from the normal stream fauna. Whereas, according to the Czekanowski Index, the stable, weedy streams formed a distinct group, they did not do so in the Percentage of Similarity classification. The Percentage of Similarity classification did not, as did the Czekanowski Index, separate the middle reaches of the Mtamvuna River from the middle reaches of the Umzimkulu and the Umkomaas. Station HH1, which alone formed cluster F in the Czekanowski Index, was not unique in the Percentage of Similarity classification.

Taxa whose mean percentages exceeded 10 percent in any single cluster of sampling points from Figure 4 are shown in Table 7. Cluster A sampling points were characterized by high mean

TABLE 7

The mean percentages of taxa from the stones in current arranged according to the clusters shown in Figure 4

Only taxa whose mean percentage was >10% in any one cluster have been included. The number of sampling points at which each taxon was found is shown in brackets after the mean.

Cluster	A	B	C	D	E	F	G	H	I	J
Number of sampling points in cluster	9	4	7	1	1	4	3	2	3	5
TAXON:										
Hydrachnellae	1 (9)	P (3)	3 (6)	2	19	P (3)	5 (3)	2 (1)	P (1)	2 (5)
Baetis (Acentrella) monticola	1 (1)	-	P (2)	-	-	19 (3)	-	-	-	-
Baetis harrisoni	8 (9)	7 (4)	11 (6)	12	13	20 (3)	6 (3)	3 (2)	6 (3)	3 (5)
Centroptilum sudafricanum	P (2)	-	3 (3)	P	12	4 (2)	4 (2)	2 (2)	3 (2)	20 (5)
Choroterpes elegans	1 (7)	P (1)	1 (6)	1	-	1 (2)	1 (2)	12 (2)	P (2)	1 (2)
Caenidae	1 (9)	4 (4)	1 (7)	1	14	2 (4)	4 (3)	13 (2)	2 (2)	5 (5)
Cheumatopsyche sp. 2	4 (6)	10 (4)	1 (1)	-	-	P (1)	-	-	P (1)	-
Cheumatopsyche sp. 6	P (1)	1 (2)	4 (6)	-	-	-	33 (3)	2 (2)	2 (1)	10 (4)
Chimarra	P (1)	P (3)	P (2)	21	-	P (1)	P (1)	1 (2)	1 (2)	5 (4)
Simulium ? bovis	11 (8)	P (1)	1 (4)	-	-	-	-	-	-	-
Simulium cervicornutum	P (1)	1 (3)	2 (3)	24	-	P (1)	-	P (1)	3 (1)	-
Simulium medusaeforme (s.l.)	8 (5)	6 (2)	34 (7)	1	-	2 (4)	2 (2)	-	3 (2)	1 (3)
Simulium nigritarse	1 (5)	6 (2)	4 (4)	P	2	4 (4)	3 (2)	14 (2)	55 (3)	19 (5)
Simulium vorax	37 (9)	4 (3)	3 (5)	P	-	P (4)	P (1)	-	3 (2)	P (1)
Tanytarsini type C	1 (8)	23 (4)	4 (6)	2	-	P (1)	10 (3)	1 (1)	2 (3)	3 (4)

P means present, mean percentage less than 1
\- means not recorded

percentages of *Simulium vorax* and *Simulium ? bovis*, both of which had a limited occurrence and low mean percentages at sampling points in other clusters. Tanytarsini type C and *Cheumatopsyche* sp. 2 were dominants in cluster B. Of these two taxa only *Cheumatopsyche* sp. 2, whose mean percentage was the lower, was the taxon whose occurrence in large numbers was restricted to cluster B sampling points.

In terms of the physical environment, cluster C was one of the least homogeneous clusters (Table 6). The reason for this was probably a lack of satisfactory taxonomic information on the dominant taxon forming the cluster, *Simulium medusaeforme*. Several subspecies have been recognised from the pupal stage of *S. medusaeforme* and the consensus of opinion among modern students of the Simuliidae is that these subspecies represent separate species. The problem in identification lies in the larval stage, which cannot be separated into subspecies and which is usually far more abundant than the pupal stage in benthic samples. As larvae of *'S. medusaeforme'* were recorded without pupae from many samples in the present study, all *'S. medusaeforme'* had to be taken as a single taxon. This was done in the knowledge that it might lead to an artificial cluster, but it was considered to be less undesirable than the alternative, the probable creation of artificial clusters. The second dominant at cluster C sampling points was *Baetis harrisoni*, which was ubiquitous in Southern Natal, being recorded in very nearly every stones-in-current sample. It was therefore a singularly poor guide to the further subdivision of cluster C.

Cluster D was unique for its very high percentages of *Chimarra* and *Simulium cervicornutum*. Both these taxa were rare at most other sampling points. *Baetis harrisoni* was the third dominant. Sampling point VV1, which alone formed cluster D, was one of the three sampling points where the chloride percentage of the water was high. Hydrachnellae, *Baetis harrisoni* and Caenidae, all of which were widely distributed throughout the survey area, were the dominants in cluster E. Cluster F was distinguished by *B. harrisoni* being particularly abundant, by *Centroptilum sudafricanum* and by *Baetis (Acentrella) monticola*, which was rare at sampling points in other clusters. The dominants in cluster G, *Cheumatopsyche* sp. 6 and Tanytarsini type C were also dominants in cluster J *(Cheumatopsyche)* or in cluster B (Tanytarsini), and cluster G could be considered to be intermediate between these two clusters. All three clusters were principally from the low altitude sampling points (Table 6).

Cluster H represented a rather different coastal belt type of community, dominated by *Simulium nigritarse*, Caenidae and *Choroterpes elegans*. It was the only cluster in which *C. elegans* was a dominant. As this taxon is most abundant under stones in slow currents, it may be concluded that current speed played a role in the separation of cluster H from the other low-lying sampling points. If this is true, it may be that samples collected from points with higher current speeds on these streams would have resulted in their being part of cluster D. There is, however, a complicating factor, which is that both sampling points in cluster H were in streams in which chloride percentages were high (see page 6). Present knowledge of the ecological requirements of the stones-in-current fauna does not permit a decision as to whether current speed or the chloride content of the water was the major environmental factor leading to the formation of cluster H. More than half of the individuals in samples of cluster I were *Simulium nigritarse* and very few of the other taxa shown in Table 7 were present at all three sampling points in the cluster. Thus the cluster was formed by only one taxon, but insufficient is known about the optimum larval habitat of *S. nigritase* to clarify the environmental factor linking the sampling points in cluster I. Dominants in cluster J were *Centroptilum sudafricanum*, *Cheumatopsyche* sp. 6 and *S. nigritarse*.

Centroptilum sudafricanum is a cool water species, while *Cheumatopsyche* sp. 6 is mainly a low altitude species. It may be concluded that cluster J primarily represented a grouping of the cool streams of the coastal belt.

Comparing the classification according to Czekanowski Index and the Percentage of Similarity, the advantage of the Czekanowski Index was that it was robust with regard to taxonomic accuracy. In spite of taxonomic problems such as those experienced with *Simulium medusaeforme*, it resulted in a classification of sampling points into broad categories which were consistent with zoogeographical expectations. Its shortcomings were due to the complexity of the occurrence of the individual taxa which seldom allowed one to pinpoint particular taxa as being exclusively typical of a particular stream type. On the other hand, the Percentage of Similarity was, as has been implied in the description of the role of '*S. medusaeforme*' in cluster C of Figure 4 and Table 6, particularly sensitive to the accuracy with which the dominants might be identified. Where dominants could be satisfactorily identified and where something was known of their ecological requirements, the Percentage of Similarity not only showed the zoogeographical aspect of distribution, but showed further distinctions between sampling points such as the identification of the cooler streams in the coastal belt (cluster J, Figure 4) or those with slower current speeds (cluster H, Figure 4). One might conclude that, because of the absence of *Centroptilum sudafricanum* from all sampling points, Percentage of Similarity cluster B represented the warmer coastal belt sampling points. Finally the Percentage of Similarity resulted in the separation of the three sampling points on streams with high chloride percentages into two separate clusters.

TABLE 8

Distribution of the major groups of sampling points from Figure 5 according to the stream classification in Table 3

Altitude in m	Average flow in ℓ/s	Nature of the stream bed		
		Sand-choked	With weed beds	Normal (i.e. not sand-choked and without weed beds)
<100	>1 000			
	150 - 999			
	<150			D
100 - 500	>1 000			
	<150			
500 - 1 000	>1 000			B, D
	150 - 999			B
	<150			B
1 000 - 1 500	>1 000			A, B, C
	150 - 999			C
	<150			E
>1 500	150 - 999		C	A, A, A

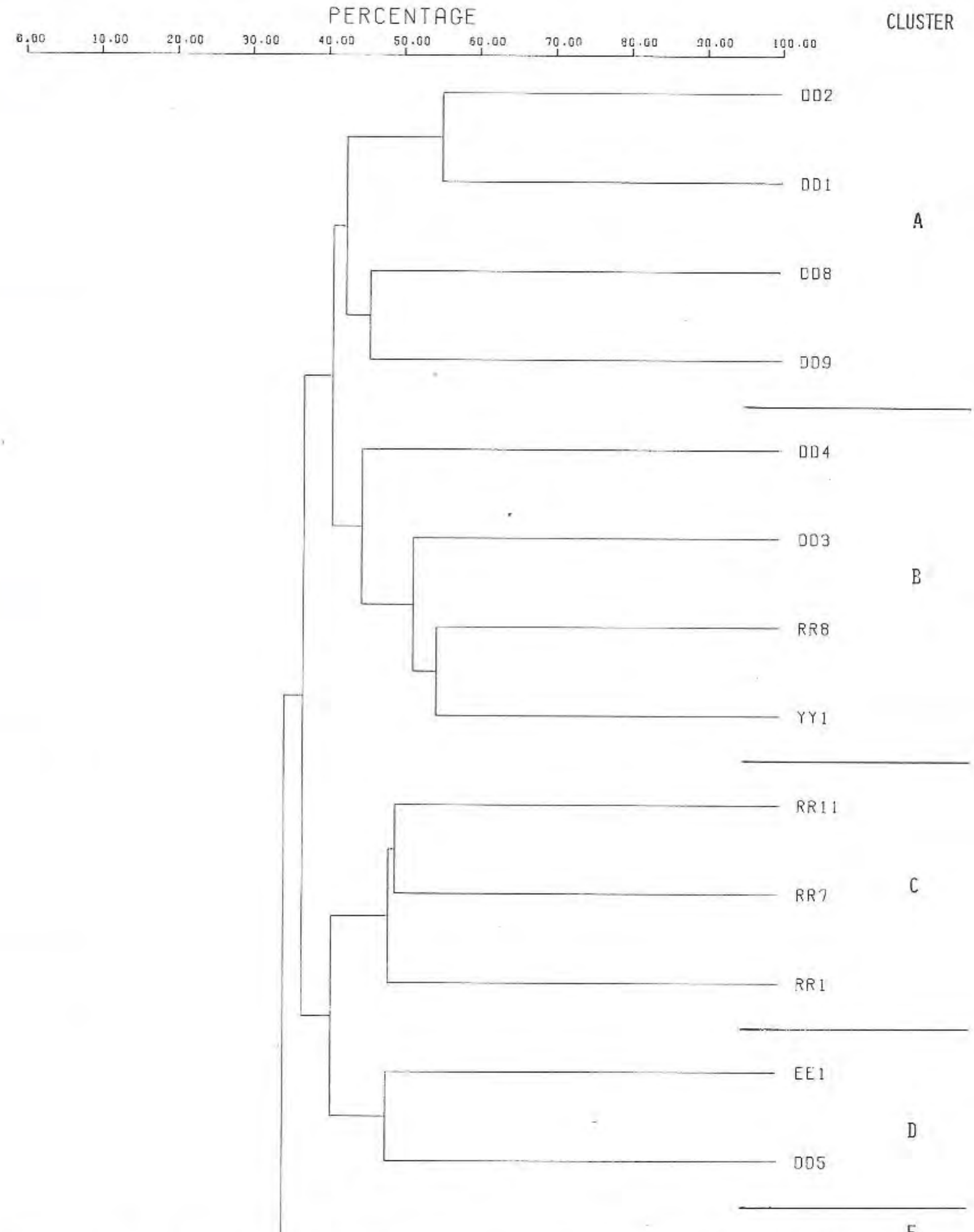

FIGURE 5

Stones out of current. Dendrogram of Czekanowski similarity between samples

The stones-out-of-current biota (Tables 8 to 10, VII, Figures 5 and 6)

The grouping of sampling points according to the Czekanowski Index is shown in Figure 5 and the distribution of the members of each cluster in Table 8. As was the case with the stones-in-current fauna, the Czekanowski clustering of the stones-out-of-current fauna followed a general zoogeographical pattern, but taxa exclusive to single clusters were few. Cluster A was the mountain streams plus station DD2, and taxa defining this assemblage of sampling points were *Baetis (Acentrella) monticola, Peloriolus* and *Pentaneura* type 4 (Table VII). It was interesting that all these sampling points in cluster A were from the Umkomaas catchment, but the sampling points in cluster C, which, in altitude, overlapped those in cluster A (Table 8) considerably, were all from the Umzimkulu catchment. The reason for this was most probably due to the profiles of the rivers at the sampling points concerned: those in the Umzimkulu catchment were less steep and the stones-out-of-current biotopes in them therefore tended to be more stable, warmer and to harbour more eetritus and silt. *Hydroptila* sand grain case was the only taxon nearly restricted to cluster C. However, several more widely distributed taxa (Hydrachnellae, Tanytarsini type J, Orthocladiinae types 3 and 4 and *Burnupia)* which might be expected in more stable, detritus-rich biotopes were present at cluster C sampling points. The absence of *Centroptilum sudafricanum* and *Admenophlebia* from sampling points in cluster C was also noteworthy in this respect.

Cluster B was made up of sampling points at lower altitudes from the Umkomaas, the Umzimkulu and the Mtamvuna catchments. Characteristic taxa were *Baetis harrisoni, Pseudocloeon inzingae, Choroterpes elegans* (also at all cluster D sampling points) and *Burnupia* (also at all cluster C sampling points). Cluster D consisted of the two lowest-lying sampling points where *Baetis glaucus, Centroptilum indusii* and Tanytarsini type K were more often found than in other parts of the survey area. Station DD10, which alone made up cluster E, had no taxa restricted to it. The reason it stood alone was that many taxa found in all other clusters were not recorded from it (for example, *Centroptilum excisum, Pseudocloeon inzingae, Afronurus* and Orthocladiinae type B). At the same time the fauna of this high-lying stream draining a *Podocarpus* Forest showed an expected similarity to that of other high-lying streams through the presence of taxa such as Nemouridae, *Centroptilum sudafricanum* and *Castanophlebia.*

Turning to the classification of the stones-out-of-current samples according to the Percentage of Similarity (Figure 6, Tables 9 and 10), cluster A was restricted to the three really high-lying sampling points whose fauna was dominated by *Centroptilum sudafricanum* and *Afronurus.* Cluster E was the exact equivalent of cluster C of the Czekanowski Index and its dominants were Hydrachnellae and Caenidae, which supported the earlier hypothesis that conditions at the three sampling points concerned were stable and silty. Station DD10 (dominants *Stenocypris* and Tanytarsini type J) was again alone.The remaining sampling points which constituted clusters B and D in the Czekanowski Index, were considerably rearranged in the Percentage of Similarity dendrogram where they formed clusters B, C and F. It seemed probable, on account of the high *Baetis harrisoni* percentage, that the sampled biotopes at cluster B sampling points were exposed to more current than elsewhere, and that this cluster should therefore really be regarded as an artefact. Had true backwaters been sampled at the two stations (DD2 and DD4) in cluster B, they might be expected to be in cluster F, representing backwaters of large to medium-sized rivers lying between 500 and 1 500 m above sea level. Dominants in cluster F were *Centroptilum excisum,* Caenidae, *Choroterpes elegans,* Tanytarsini type J and *Pentaneura* type 2. The two sampling points on small streams at intermediate to low altitudes formed cluster C. While both faunas were

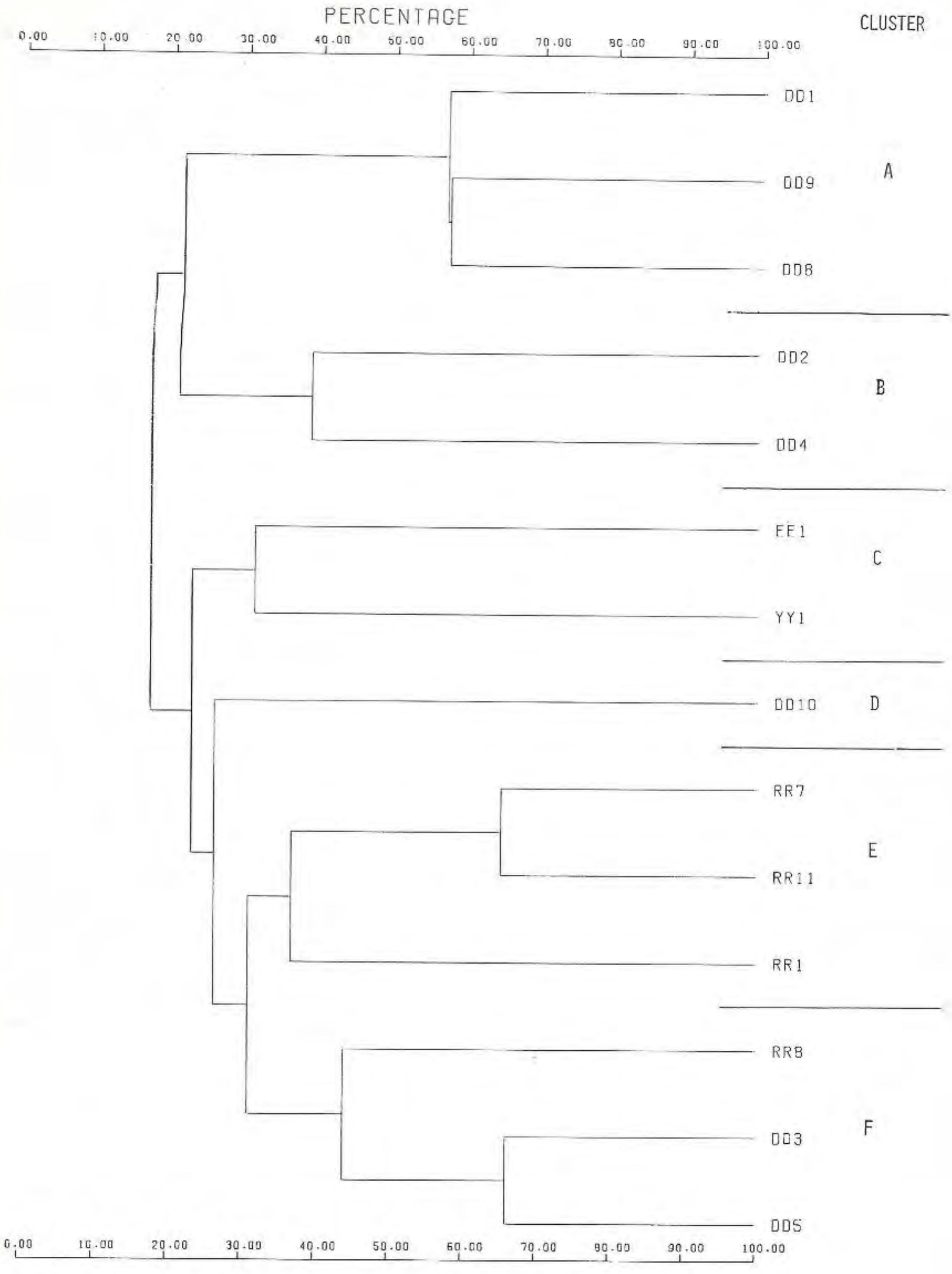

FIGURE 6

Stones out of current. Dendrogram of Percentage of Similarity between samples

TABLE 9

Distribution of the major groups of sampling points from Figure 6, according to the stream classification in Table 3

Altitude in m	Average flow in ℓ/s	Nature of the stream bed		
		Sand-choked	With weed beds	Normal (i.e. not sand-choked and without weed beds)
<100	>1 000			
	150 - 999			
	<150			C
100 - 500	>1 000			
	<150			
500 - 1 000	>1 000			B,F
	150 - 999			F
	<150			C
1 000 - 1 500	>1 000			B, E, F
	150 - 999			E
	<150			D
>1 500	150 - 999		E	A, A, A

TABLE 10

The mean percentage of taxa from the stones out of current arranged according to the clusters shown in Figure 6

Only taxa whose mean percentage was >10% in any one cluster have been included.
The number of sampling points at which each taxon was found is shown in brackets after the mean.

Cluster	A	B	C	D	E	F
Number of sampling points in cluster	3	2	2	1	3	3
TAXON:						
Stenocypris	P (1)	-	1 (1)	10	-	-
Hydrachnellae	1 (2)	1 (2)	13 (2)	P	26 (3)	1 (2)
Baetis harrisoni	-	31 (2)	P (1)	-	P (1)	1 (2)
Centroptilum excisum	4 (2)	3 (2)	3 (2)	-	6 (3)	10 (3)
Centroptilum sudafricanum	39 (3)	7 (2)	5 (1)	6	-	2 (2)
Cloeon africanum	-	-	25 (2)	-	-	-
Afronurus	13 (3)	7 (2)	1 (1)	-	P (2)	4 (3)
Caenidae	1 (3)	8 (2)	P (1)	3	10 (3)	11 (3)
Choroterpes elegans	P (1)	13 (2)	4 (2)	P	P (1)	10 (3)
Tanytarsini type J	4 (2)	-	4 (2)	30	8 (3)	14 (3)
Pentaneura type 2	1 (3)	1 (1)	1 (2)	7	6 (3)	16 (3)

P means present, mean percentage less than 1
- means not recorded

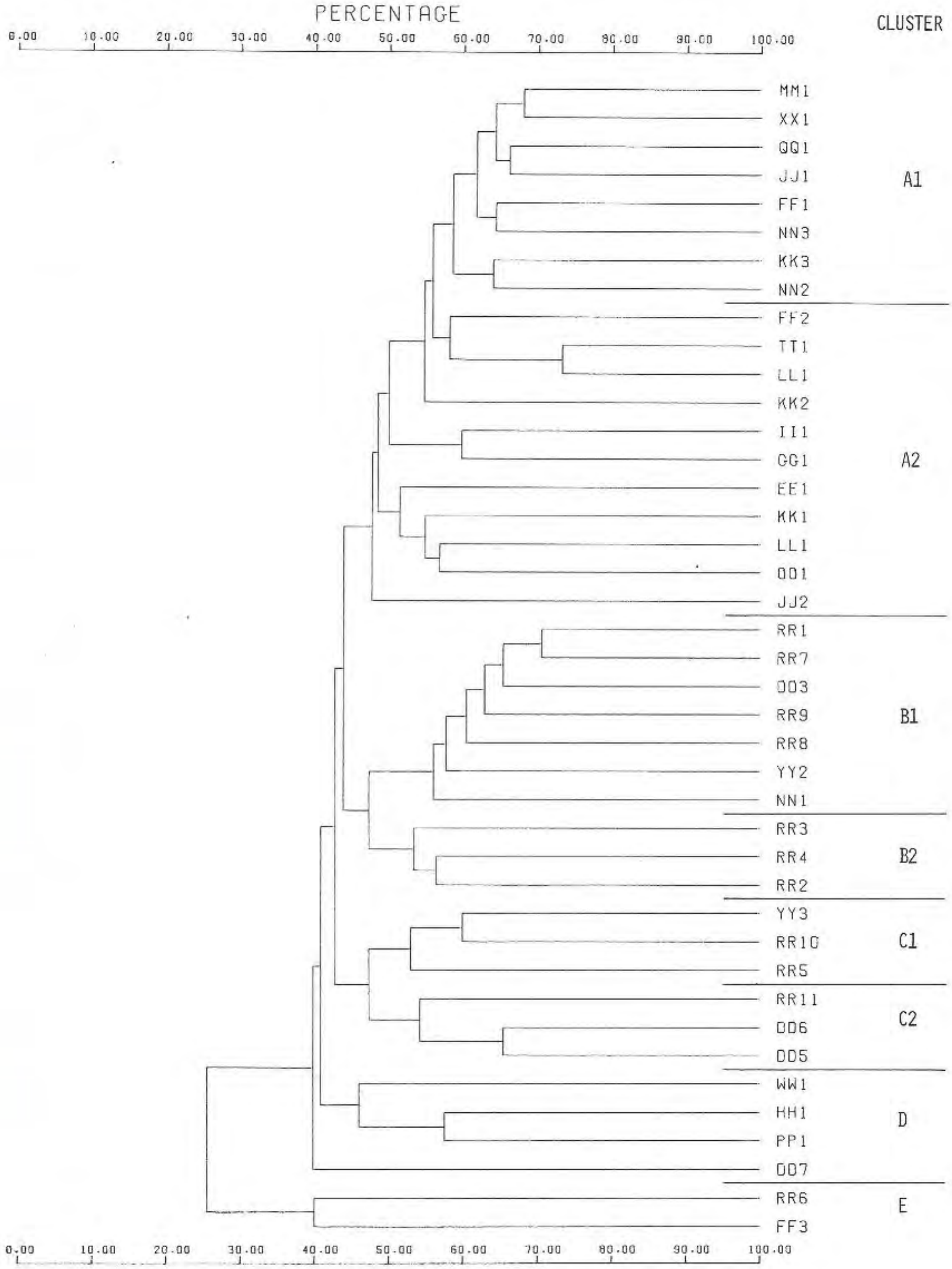

FIGURE 7

Marginal vegetation. Dendrogram of Czekanowski similarity between samples

dominated by *Cloeon africanum* and Hydrachnellae (Table 10), their Percentage of Similarity (Figure 6) was low and the two sampling points were nearly as dissimilar from one another as were the whole of clusters E and F.

As was the case with the stones-in-current fauna, the two analyses of the stones-out-of-current fauna had their strengths and weaknesses. The Czekanowski Index revealed the broad zoogeographical pattern, whereas the Percentage of Similarity disclosed more detailed ecological aspects.

The marginal-vegetation biota (Tables 11 to 14, VIII to XI, Figures 7 and 8)

Marginal vegetation is a biotope which is more variable as to several important ecological characteristics than are the stony biotopes thus far described. It may be made up of a wide variety of vegetation types giving tremendously variable amounts of cover and substratum. It is exposed to water movements to a very varying degree, in some places being in nearly 'dead' water, in others exposed to obvious currents. Moreover, it is seldom that an absolutely homogeneous fringe of vegetation can be sampled at a single sampling point.

The clustering of the sampling points from the Czekanowski Index (Figure 7) showed five major clusters whose zoogeographical distribution is given in Table 11. In the field, the sampled vegetation was classified as mainly in current or mainly out of current and these observations showed that the Czekanowski similarity dendrogram separated sampling points according to the presence or absence of current. Thus cluster A1 sampling points were in current and cluster A2

TABLE 11

Distribution of the major groups of sampling points from Figure 7, according to the stream classification in Table 3

Altitude in m	Average flow in ℓ/s	Nature of the stream bed		
		Sand-choked	With weed beds	Normal (i.e. not sand-choked and without weed beds)
<100	>1 000	A, A, C, D, E, E		
	150 - 999	A, A, A, D		A, A, A, C
	<150	A, D		A, A, A, A, A, A, D
100 - 500	>1 000			C,C
	<150	A, B		
500 - 1 000	>1 000			B, B, B, B, C
	150 - 999		A	A, B, B
	<150			A
1 000 - 1 500	>1 000			B,B
	150 - 999			B
	<150			
>1 500	150 - 999		C	

points were out of the current. The majority of cluster A sampling points were in the coastal belt and none of them were on the Umkomaas, the Umzimkulu and the Mtamvuna Rivers or their tributaries. Cluster B also fell into two subclusters, B1 (in current) and B2 (out of current) and included ten sampling points of which all except station NN1 were on the Umkomaas, the Umzimkulu and the Mtamvuna Rivers and their tributaries. All cluster B sampling points were at intermediate altitudes. The zoogeographical distribution of cluster C was diverse, including sampling points from high altitudes to the coastal belt. Although the vegetation at all cluster C sampling points was sheltered from the current, there were two distinct subclusters: C1, including stations in the coastal belt; and C2, mainly at higher altitudes. Cluster D sampling points were all in the coastal belt and there was current through the vegetation of all of them.

Finally, there was no current through the vegetation at the cluster E sampling points, both of which were in the coastal belt and both of which were downstream from sugar mills. Of the three sampling points where chloride percentages were high, the marginal-vegetation biotope was found only at station TT1, whose fauna was not exceptional and which formed part of cluster A2, where it would be expected were the high chloride percentage to have no marked effect on the number and variety of taxa recorded.

TABLE 12

The mean numbers of taxa and of individuals in samples from the clusters shown in Figure 7

Cluster	Mean number of:	
	Taxa	Individuals
A1	57	3 303
A2	54	4 091
B1	59	3 704
B2	38	800
C1	36	1 372
C2	27	559
D	32	844
E	12	1 650

It would appear that sample size was an important factor in the separation of clusters B1 from B2, and of clusters C and D from A and B (Table 12). Samples in clusters A1, A2 and B1 were large, with high numbers of individuals and of taxa. Samples from the other clusters were much smaller than cluster A1, A2 or B1 samples in terms of both numbers of individuals and taxa. It was, however, impossible on account of the variable nature of the biotope, to place any ecological interpretation on the differences in sample size except in the case of cluster E, the two sampling points sited below sugar mills. Here the mean number of taxa was two to three times less than would have been expected from the mean number of individuals (Table 12), which may be interpreted as a disturbance due to a change in the environment.

Turning to the taxa responsible for the clustering shown in Figure 7 (Tables VIII to X), there were many taxa found only in clusters A1, A2 and B1, as would be expected from Table 12, but few of them were found exclusively at every sampling point in a single cluster. The further one proceeds down the dendrogram towards cluster E, the fewer the taxa that can be named as being more or less limited to a particular cluster. Taxa found mainly in cluster A were *Nais*, *Cyclops*, *Trithemis*, Lepidoptera type B, Helodidae, *Anopheles*, Dixidae, Tanytarsini type J, *Pentaneura* type 3, *Corynoneura, Procladius, Forcipomyia, Lymnaea* and *Burnupia*. The occurrence of these taxa was apparently not influenced by current. However, *Hydroptila* algal case, *Triaenodes, Aulonogyrus* larvae, *Simulium nigritarse, Thienemanniella* and *Culicoides* occured mainly in cluster A1 samples, while *Tubifex, Simocephalus, Chydorus, Gomphocythere, Centroptilum crassi, Cloeon africanum, Pseudagrion hageni, Anax, Sphaerodema, Ranatra, Athripsodes prionii* type 2 and Hydraenidae type E were recorded mainly in cluster A2, where the vegetation was not in the current. Taxa found mainly in clusters B1 and B2 were *Baetis latus, Oecetis* vegetation case and Hydraenidae type A. Only two taxa (*Stenelmis* and Hydrophilidae type H) were recorded mainly in cluster B2 (no current) but many more taxa (*Planaria, Centroptilum sudafricanum, Pseudocloeon vinosum, Pseudagrion natalensis, Oxyethira, Athripsodes prionii* type 2, *Goerodes, Simulium medusaeforme, Rheotanytarsus* and *Atherix*) were found mainly in cluster B1. Non-ubiquitous taxa found in all three samples in cluster C1 were *Caridina nilotica, Cloeon africanum* and *Trithemis*. All these taxa were usually found in cluster A samples, thus suggesting that clusters A and C1 were more similar than would appear from Figure 7. The occurrence of *C. nilotica*, in particular, illustrated the underlying similarity between clusters A, C1 and D where it occurred in nearly every sample and the difference between these clusters and clusters B and C2, where it was not recorded. All the taxa with high frequencies of occurrence in clusters C2, D and E, with the exception of *C. nilotica*, were frequently found at sampling points in other clusters.

The Percentage of Similarity dendrogram for the marginal vegetation (Figure 8) shows several large clusters (A, B and C) which are better treated in the subdivisions shown. Cluster A was made up of sampling points higher than 500 m (Table 13) with A1 occurring at higher altitudes

TABLE 13

Distribution of the major groups of sampling points from Figure 8, according to the stream classification in Table 3

Altitude in m	Average flow in ℓ/s	Nature of the stream bed		
		Sand-choked	With weed beds	Normal (i.e. not sand-choked and without weed beds)
<100	>1 000	C1, C2, D, D, E, F		
	150 - 999	C2, C3, C3, C4		C1, C1, C1, C2
	<150	C1, C1		B1, B2, C1, C4, C4, C4, D
100 - 500	>1 000			B2, B2
	<150	C1, C2		
500 - 1 000	>1 000			A1, A2, A2, B2, B2
	150 - 999		C1	A1, A2, C1
	<150			C1
1 000 - 1 500	>1 000			A1, A1
	150 - 999			A1
	<150			
>1 500	150 - 999		A1	

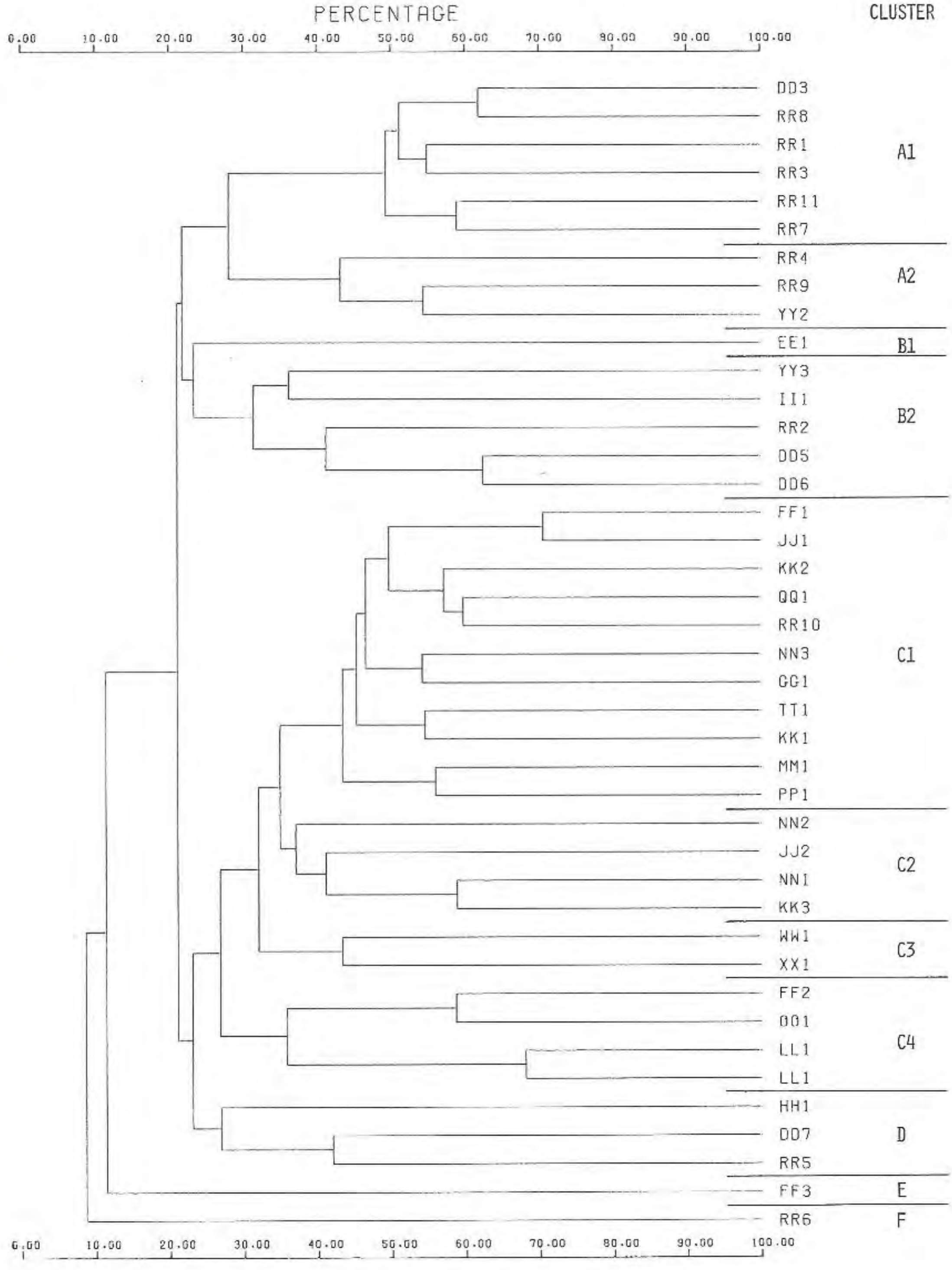

FIGURE 8

Marginal vegetation. Dendrogram of Percentage of Similarity between samples

TABLE 14

The mean percentages of taxa from the marginal vegetation arranged according to the clusters shown in Figure 8

Only taxa whose mean percentage was > 10% in any one cluster have been included.
The number of sampling points at which each taxon was found is shown in brackets after the mean.

Cluster	A1	A2	B1	B2	C1	C2	C3	C4	D	E	F
Number of sampling points in cluster	6	3	1	5	11	4	2	4	3	1	1
TAXON:											
Chaetogaster	P (2)	3 (1)	P	-	1 (3)	-	-	P (1)	1 (1)	-	73
Pristina	-	-	23	P (1)	-	-	-	-	-	-	-
Nais	P (3)	-	2	1(1)	2 (8)	P (2)	17 (2)	P (1)	-	-	1
Simocephalus	-	-	12	-	P (2)	-	-	P (1)	-	-	-
Cyclops	2 (5)	P (2)	3	3 (4)	3 (10)	1 (4)	P (1)	28 (4)	-	5	P
Caridina nilotica	-	-	P	P (2)	1 (10)	P (2)	8 (2)	1 (4)	14 (3)	-	9
Baetis bellus	1 (5)	5 (3)	3	3 (4)	30 (11)	10 (4)	11 (2)	8 (4)	3 (3)	-	-
Cloeon africanum	P (1)	-	9	1 (2)	2 (9)	1 (2)	P (1)	22 (4)	3 (1)	-	1
Pseudocloeon vinosum	35 (6)	5 (3)	-	P (1)	P (3)	8 (3)	P (1)	-	4 (2)	-	-
Caenidae	6 (6)	7 (3)	4	7 (5)	12 (10)	15 (4)	5 (2)	4 (4)	4 (3)	-	-
Pseudagrion kersteni	1 (1)	P (1)	-	2 (2)	5 (8)	6 (4)	5 (2)	4 (4)	17 (3)	P	2
Simulium nigritarse	P (2)	P (1)	-	-	2 (8)	1 (3)	16 (2)	P (1)	1 (2)	-	-
Chironomini type B	5 (5)	13 (3)	9	4 (5)	3 (11)	6 (4)	1 (2)	5 (4)	3 (3)	55	1
Tanytarsini type H	P (1)	-	P	-	-	P (3)	-	-	1 (2)	24	-
Pentaneura type 2	6 (6)	3 (3)	1	20 (5)	4 (11)	3 (4)	1 (1)	3 (4)	1 (3)	10	1
Pentaneura type 3	P (3)	P (2)	P	P (1)	1 (8)	2 (4)	10 (2)	1 (4)	P (1)	-	-
Orthocladiinae type 3	3 (5)	16 (3)	P	5 (5)	2 (11)	1 (3)	3 (2)	1 (4)	3 (3)	-	2

P means present, mean percentage less than 1
\- means not recorded

than A2. Cluster A of Figure 8 corresponded to a considerable extent with cluster B of the Czekanowski Index (Figure 7), but there was no separation of samples taken in the current from those taken out of the current. Both A1 and A2 included both types of sample. The dominant animals in clusters A1 and A2 differed (Table 14). Cluster A1 was characterized by *Pseudocloeon vinosum* and cluster A2 by Chironomini type B and by Orthocladiinae type 3. Cluster B1, made up of sample EE1 alone, was from the coastal belt and was dominated by *Pristina* and *Simocephalus,* which were otherwise rarely encountered. All samples in cluster B2 were from marginal-vegetation-without-current biotopes, but it was otherwise not a closely-knit cluster (Figure 8). The sampling points belonging to it were all lower than 1 000 m, but included large and small streams. The dominant taxon was *Pentaneura* type 2. Sampling points with high percentages of *Baetis bellus* formed cluster C. Caenidae were the second dominant in cluster C1 which had a wide geographical distribution in all streams lower than 1 000 m (Table 13). The same taxon was dominant in cluster C2 but, contrary to cluster C1, in cluster C2 Caenidae were more abundant than *B. bellus.* Cluster C2 sampling points were at lower altitudes than cluster C1 sampling points. Both clusters included sampling points with and without current through the vegetation. *Nais, Simulium nigritarse* and *Pentaneura* type 3, together with *B. bellus,* were the dominants in cluster C3. This cluster consisted of two sandy coastal belt sampling points with current through the vegetation. Cluster C4 was also restricted to the coastal belt and consisted of sampling points without current. The dominants were *Cyclops* and *Cloeon africanum.* Cluster D was made up of three coastal belt sampling points, two with current through the vegetation and one (station RR5) without. In these the dominants were *Caridina nilotica* and *Pseudagrion kersteni.* Here it appears likely that the community may be associated with a particular plant type, for at all three stations the only vegetation found was *Phragmites.* Perhaps the most satisfactory feature of Figure 8 is the manner in which it shows

FIGURE 9

Sediments. Dendrogram of Czekanowski similarity between samples

the very great difference between the communities at stations FF3 and RR6 (clusters E and F) and all other marginal-vegetation communities. Cluster E was dominated by Chironomini type B, Tanytarsini Type H and *Pentaneura* type 2, and cluster F by *Chaetogaster*. Stations FF3 and RR6 were both on sandy rivers below sugar mills.

This classification of the marginal-vegetation fauna by means of the two indices of similarity was less satisfactory than were the classifications of the fauna of stony biotopes. Not only does the biotope 'marginal vegetation' cover an unusually variable range of environmental conditions, but also rather less is known of the autecology of the dominant taxa of marginal vegetation than is the case with the stony biotope dominants. This made interpretation of the classifications difficult. However, the clustering analyses did show how unusual the marginal vegetation fauna of the two sampling points sited below sugar mills was.

The sediment biota (Tables 15 to 18, XII to XIV, Figures 9 and 10)

The streams and rivers of the study area being usually fast-flowing and steeply-falling, finely divided stable sediments rich in organic matter were not frequently encountered. Nearly all the sampled sediments appeared sandy to the eye. Exceptional sediments were recorded at station UU1 (a mixture of sand and clay and the only sediment smelling of hydrogen sulphide), station DD3 (silty) and station RR9 (silty with a lot of detritus).

In several important ways the nature of river sediments and of their fauna makes it unlikely that they will provide a meaningful classification of streams. Sediments, like the marginal vegetation, are variable with respect to water movements over them. They are not necessarily of uniform particle size even in small areas and are often layered. The distribution of the biota of sediments is notoriously patchy. The most abundant animals living within sediments (the Nematoda, the Oligochaeta and the Chironomidae) are difficult to identify accurately and in only a few cases is it possible to identify them to genus on a routine basis. Finally, samples of the sediment biota always include taxa which happened to be on top of the sampled area, and, in the Southern Natal samples, these were often sufficiently abundant to influence the classification of sampling points.

The dendrogram derived from the Czekanowski Index (Figure 9), shows seven major clusters of sampling points, but little can be said about their geographical distribution (Table 15). The sampling points in cluster D were all on sandy streams and both sampling points in cluster E were on large 'normal' rivers away from the coastal belt. Clusters A and B included sampling points in both sandy and normal rivers of all sizes and at a wide range of altitudes. The remaining three clusters, (C, F and G), each consisted of single sampling points in the coastal belt. The fauna of the two sampling points below sugar mills was not exceptional, station FF3 falling under cluster D and station RR6 under cluster B.

Proceeding down the dendrogram from cluster A to cluster G there was a decrease in the mean number of taxa per sampling point (Table 16), but contrary to the situation in the marginal vegetation (Table 12), the mean number of animals per sample did not follow the mean number of taxa. Two taxa, Caenidae and Tanytarsini type H, were found in nearly every sediment sample (Tables XII to XIV). Taxa assoicated mainly with samples in cluster A were Hydrachnellae, Helmini C1, hydrophilid larvae, simuliid larvae, *Pentaneura* type 2 and *Corynoneura*. This list consists mainly of taxa frequently found in other biotopes and therefore likely to be living on top of the sediment rather than within it. A single taxon, *Branchiura sowerbyi*, which is a burrowing

TABLE 15

Distribution of the major groups of sampling points from Figure 9, according to the stream classification in Table 3

Altitude in m	Average flow in ℓ/s	Nature of the stream bed		
		Sand-choked	With weed beds	Normal (i.e. not sand-choked and without weed beds)
<100	>1 000	A, B, D, D, D, D		
	150 - 999	A, A, A		A, A, B, B, B
	<150	A, A, F		A, A, A, B, B, C, G
100 - 500	>1 000			E
	<150	A, D		
500 - 1 000	>1 000			A
	150 - 999			A, B,B
	<150			A
1 000 - 1 500	>1 000			E
	150 - 999			
	<150			
>1 500	150 - 999			

TABLE 16

Numbers of taxa and of individuals of the sediment fauna of sampling points clustered according to Figure 9

Cluster	Mean number of:	
	Taxa	Individuals per 5 cores
A	21	192
B	15	363
C	15	515
D	10	139
E	10	249
F	8	65
G	7	123

oligochaete, was recorded mainly from cluster B, but other taxa *(Paragomphus*, Chironomini type B) were recorded mainly in clusters A and B. Rhabditidae were present in a high proportion of samples of clusters B and E only, while *Bezzia* provided a link between clusters A, B and E, as it was nearly always present in samples from these three clusters but rarely encountered in samples belonging to other clusters. Of the taxa not previously mentioned in this paragraph, *Micronecta dimidiata* and Orthocladiinae type 3 were found in both samples in cluster E. Cluster D was characterized by *Cryptochironomus*, an unusual chironomid larva with an elongate body form found in many groups of animals highly adapted to life in sand. Significantly, other burrowing forms such as the Oligochaeta, Nematoda and *Paragomphus* were infrequently found in cluster D samples, and the faunal density was low (Table 16).

Taking account of the fauna and its density, the distribution of the sampling points within the clusters and field observations of the sediment types, the following conclusions may be drawn about clusters A, B, D and E. Cluster D represented a group of sampling points where the sediments were almost exclusively sand particles with little organic matter; these sediments were highly unstable. At station DD7 (in this cluster) there was an obvious current across the sediments, but currents over the sediments were not noticed at the other sampling points in the cluster. Clusters A and B were also from sandy sediments but their fauna showed, either from the presence of surface-dwellers (cluster A) or from true burrowing forms (cluster B), that they were stable at the time of sampling. The relative lack of burrowing forms at cluster A and the low density of the fauna (Table 16) suggested that the sediments here became unstable at certain times such as during the rainy season, while those in cluster B, with their burrowing forms (Rhabditidae and *Branchiura sowerbyi*) and high population density (Table 16) were the most stable sandy sediments. The fact that only one cluster B sampling point was on a sandy river (Table 15) supported this suggestion. Station DD3 in cluster E had a silty sediment which implied quieter current conditions allowing the finer particles to settle. The clustering of station YY3 with station DD3 in cluster E suggested that its sediment might have been similar, though if this were so, it was overlooked in the field. Furthermore the animals common to these two samples included taxa typical of quiet, silty sediments *(Micronecta dimidiata* and Rhabditidae), while a prominent burrowing form known to avoid silty sediments *(Paragomphus)*[16] was absent.

From the very large number of individuals and taxa found at station II1 (cluster C, Table 16), the sediment must have been stable, while from the sparse fauna, station WW1 (cluster E) must have been highly unstable. A peculiarity of station UU1 (cluster G) may be associated with the fact that the sediment was anaerobic near the surface. The animals found here included only a single specimen of a single burrowing form (*Tubifex*, Table XIV).

The dendrogram derived from the Percentage of Similarity of the sediment samples (Figure 10) shows four major clusters (A to D) and five sampling points (labelled E to I) differing greatly from one another and also from clusters A to D. Table 17 shows that sampling points in clusters A, B and C were mainly in the coastal belt with three of the four members of cluster C on 'normal' rivers. Cluster D sampling points were mainly in rivers away from the coastal belt.

Cluster A was made up of samples in which Tanytarsini type H was dominant (Table 18) while in cluster B samples, Tanytarsini type H and Chironomini type B were dominants, the former being only about half as abundant as it had been in cluster A samples. *Pentaneura* type 2 and *Corynoneura* were the dominants in cluster C, which therefore differed markedly from clusters A and B. However, the dominants of cluster D (Caenidae, Chironomini type B and Tanytarsini type H) showed that this cluster was more similar to clusters A and B than to cluster C.

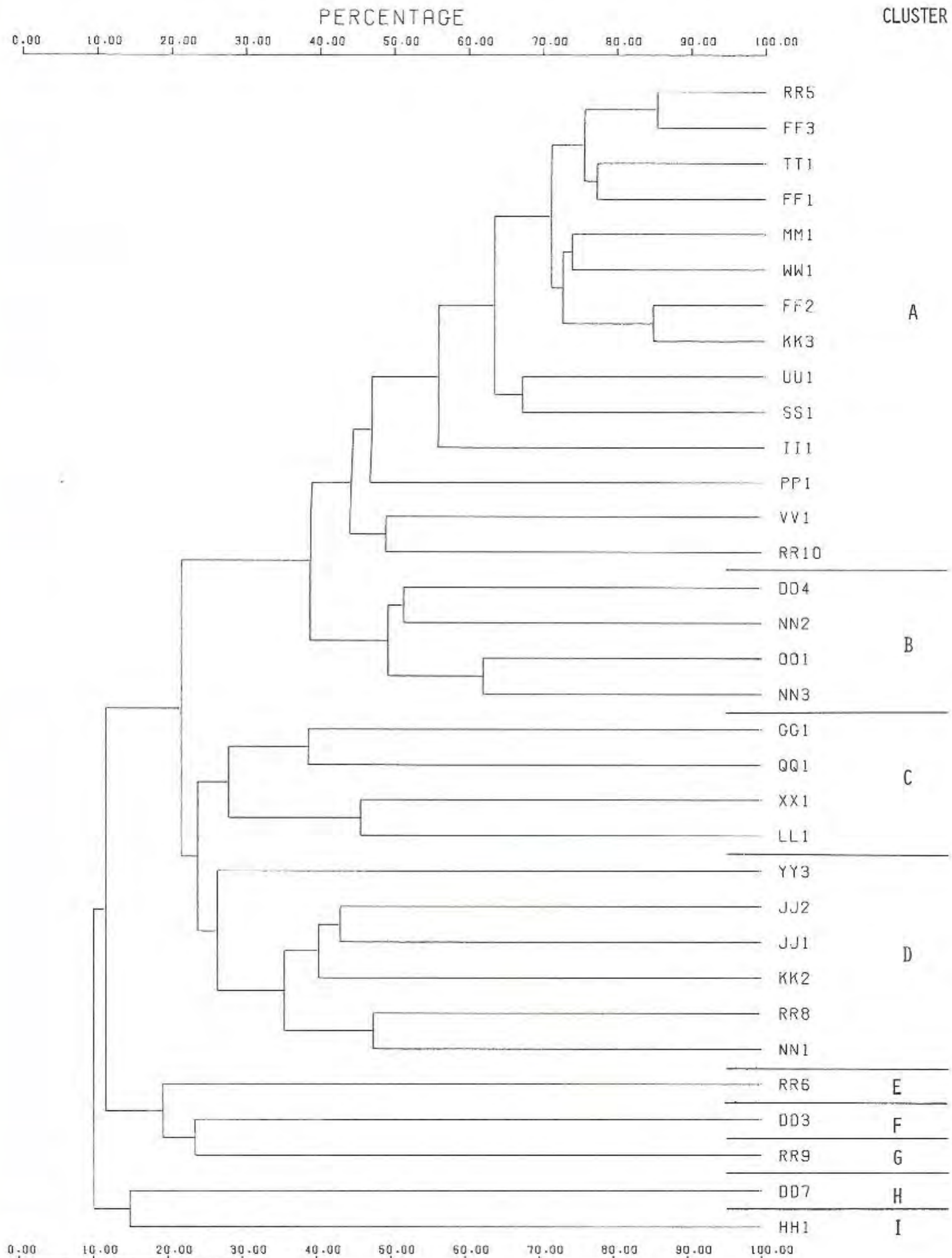

FIGURE 10

Sediments. Dendrogram of Percentage of Similarity between samples

TABLE 17

Distribution of the major groups of sampling points from Figure 10, according to the stream classification in Table 3

Altitude in m	Average flow in ℓ/s	Nature of the stream bed		
		Sand-choked	With weed beds	Normal (i.e. not sand-choked and without weed beds)
<100	>1 000	A, A, A, B, E, H		
	150 - 999	A, A, B, C		A, A, A, C, D
	<150	A, A		A, A, A, B, C, C, I
100 - 500	>1 000			D
	<150	A, D		
500 - 1 000	>1 000			B
	150 - 999			D,D, G
	<150			D
1 000 - 1 500	>1 000			F
	150 - 999			
	<150			
>1 500	150 - 999			

TABLE 18

The mean percentages of taxa from the sediments arranged according to the clusters shown in Figure 10

Only taxa whose mean percentage was >10% in any one cluster have been included.

The number of sampling points at which each taxon was found is shown in brackets after the mean.

Cluster	A	B	C	D	E	F	G	H	I
Number of sampling points in cluster	14	4	4	6	1	1	1	1	1
TAXON:									
Limnodrilus	P (3)	-	3 (2)	P (2)	66	13	9	-	4
Cyclops	1 (6)	9 (4)	1 (2)	P (2)	-	25	-	-	3
Cypridopsis	-	P (1)	P (1)	2 (2)	-	-	-	-	14
Stenocypris	P (3)	2 (2)	P (2)	2 (4)	-	6	18	-	-
Caenidae	4 (9)	3 (3)	4 (4)	15 (6)	-	1	1	3	4
Chironomini type B	1 (8)	17 (4)	1 (2)	12 (6)	16	-	8	-	-
Tanytarsini type D	-	P (1)	-	-	-	-	11	-	-
Tanytarsini type E	-	-	-	-	-	-	12	-	-
Tanytarsini type H	63 (14)	30 (4)	7 (4)	10 (6)	6	-	-	-	-
Tanytarsini type L	-	-	-	-	-	-	-	-	37
Pentaneura type 2	2 (8)	1 (2)	31 (4)	4 (4)	-	-	8	-	-
Corynoneura	1 (6)	1 (1)	15 (4)	3 (3)	-	-	-	3	-
Cryptochironomus	P (4)	5 (2)	P (1)	2 (2)	-	-	-	19	-
Orthocladiinae type 5	1 (3)	P (1)	-	-	1	36	-	-	-
Orthocladiinae type 6	-	-	-	-	-	-	-	42	-
Burnupia	P (2)	P (1)	P (1)	-	-	-	-	13	-

P means present, mean percentage less than 1

\- means not recorded

All samples from clusters A to D came from sandy sediments. Stations II1, WW1 and UU1, which formed clusters of single samples in the Czekanowski dendrogram, were clustered with the sandy sediments by the Percentage of Similarity. Two features of the sandy sediment fauna from these clusters were important. The first was that the burrowing oligochaetes typical of stable, finer-grained sediments were usually absent and were not recorded as large percentages of the fauna at any sampling points in clusters A to D. The second was that cluster C represented a different kind of community to clusters A, B and D (see dominants, Table 18). The reason for this was not clear.

The remaining clusters (E to I) each represented a different community and there appeared to be satisfactory reasons why they should differ from clusters A to D. Cluster E (station RR6) was dominated by *Limnodrilus*, a burrowing animal and by Chironomini type B, a non-burrower (Table 18). The large percentage of *Limnodrilus* in this sandy sediment was, as can be concluded from the previous paragraph, very unusual. In this respect it was highly significant that station RR6 was located downstream from a sugar mill. Station DD3 (cluster F) was a silty sediment dominated by *Limnodrilus, Cyclops* and Orthocladiinae type 5 and its peculiarity might be due to the fact that it was the only sediment of that type sampled in the study area. Station RR8 (cluster G) was also a single example of a sediment type, in this case, silty, with a great deal of organic detritus. Dominants were *Stenocypris,* Tanytarsini type D and Tanytarsini type E. Cluster H represented the only sampling point (station DD7) where the sample was collected from sand with a current of water over it. Dominants were *Cryptochironomus,* Orthocladiinae type 6 and *Burnupia* and the density of the fauna was very low (Table XIV). Finally, the sediment fauna from the smallest coastal stream sampled (cluster I, station HH1) stood alone on account of the dominance of Tanytarsini type L (found in no other sediments) and *Cypridopsis*.

The classification of the sediment fauna showed that sandy sediments had a fauna different from other sediment types. However, the sediment fauna in streams with high chloride percentages did not appear to have faunas any different from those with low chloride percentages. Only in respect of the Percentage of Similarity analysis did one of the two sampling points below sugar mills appear unusual. This was in stark contrast to the results from the analysis of the marginal-vegetation fauna where both analyses showed both sampling points to have very unusual communities of animals.

The aquatic-weed and cascade-waterfall biotas (Tables XV and XVI)

The animals collected in the two aquatic weed samples (Table XV) were of some interest, mainly because the dominants confirmed differences found in the marginal vegetation out of the current at high and intermediate altitudes. At the high-lying station RR11, *Pseudocloeon vinosum* was the dominant animal. It also dominated, but by no means to the same extent, the marginal vegetation communities from high-lying sampling points. *Cloeon africanum*, which dominated the community at station KK1, was a dominant in marginal vegetation at low and intermediate altitudes where the vegetation was sheltered from the current.

The cascade-waterfall sample from station DD9 showed mainly that *Baetis (Acentrella)* sp. 1 was capable of living in extreme current conditions, where it was far more abundant than *B. (A.) monticola*. In the stones-in-current sample (Table III) from the same sampling point, *B. (A.)*

monticola was more abundant than *B. (A.)* sp. 1, which suggested that the optimum habitat of the two species might differ with respect to current speed.

The three samples described here illustrate the value of collecting samples from unusual biotopes, for their fauna often provides useful pointers to the ecological requirements of taxa frequently found in the more regularly sampled biotopes.

WATER QUALITY AND THE BIOTA (Table 19)

Table 19 shows all the sampling points together with biotic index values for the fauna of the stones in current, the marginal vegetation and the sediments and also 5-day BOD values. In the biotic index applied to the stones-in-current fauna, values from 0 to 2 indicate clean, unpolluted waters, from 2 to 4 indicate slightly enriched waters in which chemical changes may be hardly detectable and from 4 to 7 indicate enriched waters with obvious increases in chemical parameters associated with organic pollution[15]. The biotic index applied to the marginal vegetation and the sediment fauna was described in Part I[1], where an index value of 6 indicates clean water, 5 indicates slight disturbance and 3 indicates moderate disturbance.

As noted in the section on water chemistry, 5-day BOD values were often somewhat higher than might be expected in clean, natural waters. While there is no correlation between the various biotic index values and 5-day BOD values (Table 19), it is obvious that many individual values for the stones-in-current and the marginal-vegetation samples lay in ranges indicating slight enrichment, so that the indices were in broad agreement with the chemical analysis. The same could not be said of the index values for the sediment fauna, the vast majority of which indicated clean water.

Aspects of the biological indices which call for further comment include the relatively high value for the stones-in-current fauna at station RR2 (Table 19). This was the sampling point where there were warm springs yielding water saturated with hydrogen sulphide on the river bank (see GENERAL DESCRIPTION OF THE REGION), resulting in a disturbance of the stones-in-current fauna and an abnormally high biotic index value. Stones-in-current biotopes were not available at stations FF3 and RR6, which were sited below sugar mills. The biotic index value for the marginal-vegetation fauna at station FF3 indicated moderate disturbance, while that at station RR6 showed only slight disturbance. Such is the derivation of the biotic index applied to the marginal vegetation that the presence of a few specimens of a baetid mayfly could cause an index value which would otherwise be 3 (moderate disturbance) to become 5 (slight disturbance). This was why the value of station RR6 was 5 and not 3 (see Table X, *Cloeon africanum*). Both the Czekanowski Index and the Percentage of Similarity analyses showed that the marginal vegetation fauna of these two sampling points was unusual, but they hardly showed that that of one sampling point was more unusual than that of the other. Biotic index values for the sediments at stations FF3 and RR6 were not unusual (Table 19). However, the fauna at station RR6 was shown, by the Percentage of Similarity to be aberrant and unusually rich in *Limnodrilus*, a taxon known to increase in abundance when there is organic enrichment. At both sampling points there were obvious growths of sewage fungus, an assemblage of organisms associated with sewage pollution, but which is also found where dissolved organic substances of other origins reach water-courses in appreciable quantities.

TABLE 19

Measures of water quality from Southern Natal streams

Sampling point	Measure of water quality				
	Biotic Index (Chutter)[1]	Biotic index (Brand *et al*)[1]		5-day B.O.D.[2]	
	Stones in current	Fringing vegetation	Sediments	Rainy Season	Dry Season
DD1	0,1	-	-	3,5	0,9
DD2	2,4	-	-	1,8	0,8
DD3	2,4	5	6	3,3	0,7
DD4	2,5	-	6	nil	0,5
DD5	2,1	5	-	3,4	1,3
DD6	0,5	6	-	0,5	0,7
DD7	-	6	6	2,8	2,9
DD8	0,1	-	-	-	-
DD9	0,3	-	-	-	-
DD10	0,1	-	-	-	-
EE1	0,5	5	-	4,9	4,3
FF1	-	5	6	1,7	1,0
FF2	0,7	5	6	5,4	3,4
FF3	-	3	5	-	3,7
GG1	1,7	5	6	4,6	4,2
HH1	0,5	5	6	6,3	4,0
II1	2,0	5	5	2,0	3,7
JJ1	0,4	5	6	1,2	2,3
JJ2	0,3	6	6	0,8	nil
KK1	0,5	5	-	1,8	4,2
KK2	3,4	5	6	1,6	1,3
KK3	-	5	6	1,4	2,7
LL1	0,6	5;5[3]	6	2,3	0,9
MM1	2,4	5	6	3,6	0,7
NN1	2,6	5	6	1,3	3,9
NN2	-	6	6	1,2	0,1
NN3	-	5	6	1,4	2,4
OO1	0,4	5	6	1,2	0,8
PP1	0,8	6	6	1,5	0,5
QQ1	1,5	5	6	5,9	-
RR1	0,3	5	-	1,1	2,5
RR2	4,2	5	-	2,9	3,0
RR3	-	5	-	1,2	2,4
RR4	2,3	5	-	1,0	0,7
RR5	-	6	6	1,5	0,7
RR6	-	5	6	-	3,6
RR7	0,1	5	-	1,7	2,4
RR8	0,3	5	6	0,8	-
RR9	0,2	5	6	1,3	0,5
RR10	1,8	5	6	1,4	0,7
RR11	0,4	6	-	-	-
SS1	0,8	-	5	4,3	1,3
TT1	0,6	5	3	3,9	1,6
UU1	0,8	-	6	2,3	2,5
VV1	0,2	-	6	1,0	1,9
WW1	-	6	6	1,3	0,1
XX1	-	5	6	1,6	0,5
YY1	0,3	-	-	-	1,8
YY2	2,7	5	-	1,7	1,7
YY3	0,8	5	6	1,7	2,2

1 See BIOTIC INDICES OF WATER QUALITY, p. 10

2 Taken directly from Appendix Table 1

3 There were two fringing vegetation samples at station LL1

The only other biotic index value outside the range for clean to very slightly enriched waters was from the sediment at station TT1. Here again it might be argued that the biotic index was at fault, firstly through too much emphasis being placed on the baetid Ephemeroptera, and secondly through the Chironomidae being treated as a single taxonomic unit. The fauna at station TT1 was moderately dense, contained no Baetidae and was dominated by a chironomid taxon (Tanytarsini type H) (Table XIII). The lack of Baetidae resulted in its biotic index value being 3 instead of 5. However, the similarity analyses (Figures 9 and 10) showed that a sediment fauna of this type was by no means exceptional. The stones-in-current biotic index value was well within the clean water range and it must be concluded that the low biotic index value for the sediment fauna indicated nothing but a weakness in the method by which the index value was arrived at.

Station TT1 was one of the three sampling points, the others being stations UU1 and VV1, where the chemical analyses suggested the presence of sea water. Biotic index values from the biotopes sampled at these three stations were normal, apart from those for the sediment at station TT1.

Discussion of the Hydrobiology

The distribution of the invertebrate fauna in the streams and rivers of Southern Natal was such that a number of zoogeographical zones could be recognised. There was a mountain-stream fauna distinct from an intermediate-altitude fauna and a separate coastal-belt fauna. Very small streams, such as the stream draining a *Podocarpus* Forest (station DD10) and the Inkomba stream (station HH1), supported invertebrate communities which differed from those of larger streams and rivers mainly through having fewer taxa, but also through including taxa not found elsewhere (e.g. *Leptonema* in the stones in current at station HH1). However, the communities of very small streams in the coastal belt were distinct from those of very small streams further inland at higher altitudes. The Czekanowski Index of Similarity with group average sorting of the matrix of similarity provided dendrograms showing this broad zoogeographical classification of the streams particularly clearly for the two stony habitats.

Within these main zoogeographical areas, differences in communities as a result of special environmental factors were apparent from the Percentage of Similarity analysis. Important among these were biotope type, stream stability and temperature. Except to a limited extent in the sediment fauna, the communities of sandy-bedded rivers were not appreciably different to those of normal rivers. It should be stressed here that the area was sampled during a time of the year when, because of the seasonal nature of the rainfall, sandy-bedded watercourses were probably as stable as normal watercourses. Faunal differences between sandy watercourses and other types are far more likely to be apparent during the rainy season.

Nevertheless sand, and particularly moving sand, is a very inhospitable biotope and consequently few animals are found in it. The biomass of sandy watercourses is very much lower than that of normal watercourses. This would have important consequences in circumstances where the ability of the river biota to assimilate nutrients was of importance.

Hydrobiological studies showed that in only two places, both in the coastal belt, did the fauna reflect changes in water quality as a result of organic enrichment. While it was pleasing to find that the quality of flowing waters in this large area, so well-endowed with water, was good, the ecologist could not but be distressed by the large tracts of Southern Natal being devastated through soil erosion. This was again a varying environmental factor which was unlikely to be apparent from a dry season study made when sediment transport was uniformly low.

WATER BACTERIOLOGY

Introduction

Some limited bacteriological sampling was undertaken in 1971. Results obtained, using the methods described in Part I[1], are shown in Tables XVII and XVIII of the Appendix.

More extensive sampling was undertaken during 1972/73 when two rainy season and four dry season runs were made. The last dry season run was started towards the end of September but was interrupted by excessive rain; it was completed at the beginning of January, during a drought, when the water temperatures and flows were of the same order as the other dry season runs. The results of this broader sampling programme are recorded in Tables XIX to XLIV of the Appendix. The following paragraphs are applicable to the 1972/1973 sampling.

Methods

SAMPLING AND PLATING

Samples were taken in sterile 250mℓ wide mouth bottles. The bottle was pushed, mouth down under the water and allowed to fill gradually. This prevented any surface dust or particles from entering the bottle and taking the sample over a longer period presumably gave a more representative sample.

The plating of these samples was done immediately on returning to the local base (usually an hotel providing accommodation for an overnight stop). For the presumptive *E. coli* I count the membranes were incubated at 44,5°C in a small water bath.

TOTAL PLATE COUNT

The medium used was the casein-peptone starch of Jones[17], which gave consistently higher counts in trials than Difco nutrient agar. Incubation was at ambient temperature while in the field and at 20°C in the laboratory. Brand *et al*[1] incubated these plates at 32°C for five days. This would give a higher count than incubation at 20 °C because bacteria with an optimal growth temperature of 37 °C and 20°C would all still grow at 32 °C. The bacteria with an optimal growth temperature of 37 °C, however, would play a very insignificant role in the self-purification of the river and their value in assessing water quality is debatable. Their presence would be reflected in the presumptive *E. coli* I count.

The plates were incubated for 6 days to obtain the total plate count I. The samples were kept for 24 hours at ambient temperatures and then plated again to provide total plate count II. Any increase in the count after the additional 24 hours would indicate recent organic enrichment while a decrease in the count would suggest that the river was in the process of purifying itself.

PROTEOLYTIC BACTERIAL COUNTS

Using the same medium but with 1mℓ of skim milk added, incubation for 2 days at 20°C gave a proteolytic bacterial colony with a clear zone that could be counted.

ANAEROBIC BACTERIAL COUNTS

Oxoid reinforced clostridial agar was used. One m*l* of the diluted sample was mixed with the melted agar and allowed to set. Then another 10m*l* of the melted agar was used to cover the first layer and prevent oxygen from coming into contact with its surface. Incubation was at 20° C for 6 days.

These anaerobic bacteria were of importance because-

(i) they play a role in the breakdown of organic material in the bottom sediments; and

(ii) a large proportion of them form spores which, being more resistant than bacteria under adverse conditions, could cause contamination, especially in the food industry.

A higher than normal anaerobic plate count could mean that there had been organic pollution of the water to the extent that the oxygen content was depleted. Abnormal flow in the river could also mix the bottom sediments with the overlying water.

FUNGI

The medium used was Difco potato dextrose agar with the addition of 1 m*l* of a 1 to 10 dilution of tartaric acid, thus obtaining a final pH of 3,5. The role of the fungi was not very clear. In a mountain stream there appeared to be a great number of species, while in the polluted reaches of a river the number of species was greatly reduced. Incubation was at 20° C for 6 days.

PRESUMPTIVE *E. coli* I

The method employed was the same as that of Livingstone *et al*[18]. The presumptive *E. coli* I count was made in the field and typing was carried out by the Marine Bacteriological Section after return to the Regional Laboratory. Only one quantity of water was used,due to the limited space available for laboratory equipment while travelling. In many cases this was not enough, resulting in a zero count; in other cases it was too much. It was found that the 4-5 days storage of the membranes with colonies before typing very often resulted in the impossibility of resuscitating many colonies. This naturally meant no typing being done - thus a zero *E. coli* I result did not mean there was no faecal contamination of the water.

Results

The detailed bacteriological results are given in Tables XVII to XLIV of the Appendix. They indicated that the smaller rivers, in general, showed occasional organic enrichment and faecal pollution, but always of a relatively low order and never consistently maintained. Agriculture, especially cattle, and local human activities could easily account for such findings. The earlier (1971) results were in agreement with this.

WATER QUALITY

In terms of the water quality classification used previously in this work (Part I)[1], it would be expected that, unless marked organic or bacterial pollution occurred, waters of group (a), according to their chemistry, would, on the whole, be of Class III quality or better, while those of group (b) would mainly be of Class III quality or worse, solely on the basis of their TDS values.

This was close to what was actually found when the water quality classification was applied fully to the chemical and bacteriological data. Very few of the waters were of a quality poorer than Class III. Despite a few inconsistencies (due mainly to the use of a small number of samples), the two major rivers (Umzimkulu and Umkomaas) contained water of Class III quality, apparently due to mild organic enrichment presumably from agricultural sources, while the Mtamvuna, the third largest stream, carried water of Class II. Of the main tributaries of the Umzimkulu, the Polela, Ngwangwane and Umzimkulwana Rivers appeared to carry water of Class II, while the Bisi contained Class III water.

The quality of the smaller rivers varied from case to case, thus:

Class II

Ifafa
Mtwalume (except at the upper station KK1, which was Class III)
Umhlungwa
Umzumbe (except at the upper station NN1, which was Class III)
Injambili
Idombe
Umhlangeni
Uvongo
Mbizane
Mpenjati

Class III

Amahlongwa
Sezela
Mhlabatshane
Boboyi

Class IV

Umzinto

Class V

Inkomba
Umtentweni

The Umpambinyoni River was noteworthy as showing a much higher TDS value at each station than expected; it was certainly not better than Class III quality and might even be put in Class V on occasion, owing to sporadic organic enrichment.

The survey results accorded with those for small coastal streams elsewhere in Natal in that the water quality differed widely from one stream to another, even when no specific source of pollution could be identified.

No instances of marked pollution were detected. The sugar mill on the Umzimkulu River did appear to cause some organic enrichment of the water, although this appeared to be in the process of disappearing. The sugar mill on the Umpambinyoni River appeared to have little or no effect on the chemistry and bacteriology of the water. Below both sugar mills there were, however, considerable changes in the composition of the fauna.

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TABLE I

Chemical results

Station number	Rainy season							Dry season						
	Umkomaas							Umkomaas						
	DD1	DD2	DD3	DD4	DD5	DD6	DD7	DD1	DD2	DD3	DD4	DD5	DD6	DD7
pH value	7,50	7,75	7,73	7,70	7,80	7,68	7,78	7,80	8,00	7,96	7,92	7,95	8,00	8,15
Temperature, °C	21,0	22,0	22,1	21,6	23,8	22,0	25,0	13,5	14,5	14,5	14,0	13,5	14,0	23,0
Conductivity, mS/m	4,6	4,0	4,1	3,3	3,6	3,7	6,0	6,2	7,0	7,2	7,7	12,1	16,9	23,0
TDS, mg/ℓ (calc.)	45	41	45	45	47	43	63	55	57	59	63	88	114	142
DO, mg/ℓ	7,9	7,8	7,9	8,2	8,6	8,7	8,2	9,6	9,8	10,3	9,8	10,3	10,6	8,3
DO, % saturation	109	102	103	102	108	102	99	113	111	114	106	105	103	95
BOD, mg/ℓ	3,5	1,8	3,3	nil	3,4	0,5	2,8	0,9	0,8	0,7	0,5	1,3	0,7	2,9
Kjeldahl nitrogen, mg/ℓ	0,2	0,3	0,4	1,0	0,6	0,6	0,2	nil	nil	tr	tr	tr	tr	0,2
Nitrates, as mg/ℓ N	0,07	0,10	0,17	0,18	0,23	0,25	0,26	0,08	0,11	0,13	0,02	0,02	0,04	0,03
Phosphates, as mg/ℓ PO_4	0,70	0,53	0,66	0,56	0,58	0,59	0,61	0,06	0,06	0,10	0,14	0,06	0,07	0,08
Total alkalinity, as mg/ℓ $CaCO_3$	28,1	23,9	20,8	21,8	22,7	20,8	21,8	34,4	37,2	38,4	40,5	46,8	51,1	60,3
Total hardness, as mg/ℓ $CaCO_3$	25,9	21,9	27,5	25,9	26,5	23,9	42,4	31,9	32,9	33,5	35,5	43,8	49,8	60,8
Calcium, as mg/ℓ Ca	6,7	5,6	6,8	6,0	6,0	5,1	6,8	8,0	8,5	8,5	8,5	10,7	11,3	13,8
Magnesium, as mg/ℓ Mg	2,2	1,9	2,5	2,6	2,8	2,7	6,2	2,9	2,8	3,0	3,5	4,1	5,2	6,4
Sodium, as mg/ℓ Na	1,8	2,0	2,0	2,2	2,6	2,6	5,7	3,1	3,7	4,3	5,1	11,1	17,6	24,8
Potassium, as mg/ℓ K	0,3	0,3	0,4	0,8	0,6	0,7	0,7	0,4	0,5	0,6	0,6	0,7	0,8	1,0
Sulphates, as mg/ℓ SO_4	nil	nil	nil	nil	nil	nil	nil	1,5	1,5	1,5	2,7	6,0	11,5	14,4
Chlorides, as mg/ℓ Cl	tr	tr	1,5	1,5	1,5	1,5	5,9	1,5	0,9	1,5	1,5	10,6	20,1	29,1
Fluorides, as mg/ℓ F	0,2	0,1	0,2	0,2	0,2	0,2	0,7	0,1	0,1	0,1	0,1	0,1	0,1	0,2
Free carbonic acid, as mg/ℓ CO_2	1,7	0,8	0,8	0,9	0,7	0,9	0,7	1,1	0,7	0,8	0,9	1,0	1,0	0,8
Saturation pH value, pH_s	9,5	9,6	9,6	9,6	9,6	9,7	9,6	8,9	8,8	8,8	8,8	8,7	8,6	8,5
Stability index	11,4	11,5	11,4	11,5	11,4	11,7	11,4	10,0	9,7	9,7	9,7	9,4	9,2	8,8
Flow, m^3/s	8,5	12	28	51	57	85	110	0,3	1,4	1,7	2,3	2,8	2,8	5,7
Appearance	Good	Good	Turbid	Turbid	Turbid	Turbid	Turbid	Good	Good	Fair	Fair	Turbid	Fair	Fair

Table I continued

Station number	Rainy season					Dry season					
	Amahlongwa	Umpambinyoni		Umzinto	Inkomba	Amalongwa	Umpambinyoni			Umzinto	Inkomba
	EE1	FF1	FF2	GG1	HH1	EE1	FF1	FF2	FF3	GG1	HH1
pH value	7,80	7,65	7,90	7,60	8,30	8,12	8,10	8,12	8,15	7,80	7,65
Temperature, ° C	25,0	29,4	25,0	25,0	23,0	18,0	25,6	17,8	22,2	17,8	15,0
Conductivity, mS/m	38,9	53,0	56,3	29,1	32,5	55,0	78,0	106,5	89,0	37,3	43,1
TDS, mg/ℓ (calc.)	217	285	317	167	193	344	422	625	524	223	262
DO, mg/ℓ	8,6	7,5	8,2	8,4	8,7	10,8	9,1	9,5	9,5	10,2	10,3
DO, % saturation	104	99	99	102	100	114	114	100	109	108	101
BOD,mg/ℓ	4,9	1,7	5,4	4,6	6,3	4,3	1,0	3,4	3,7	4,2	4,0
Kjeldahl nitrogen, mg/ℓ	0,6	0,2	0,6	0,8	0,5	0,5	1,1	0,2	0,7	0,2	0,5
Nitrates, as mg/ℓ N	0,14	0,59	0,14	0,15	0,90	0,20	2,08	0,24	0,52	0,20	1,01
Phosphates, as mg/ℓ PO_4	0,46	0,45	0,28	0,36	0,35	0,08	0,10	0,06	0,11	0,08	0,16
Total alkalinity, as mg/ℓ $CaCO_3$	89,4	124,7	112,2	66,3	63,5	120,5	167,3	157,9	147,5	74,9	72,5
Total hardness, as mg/ℓ $CaCO_3$	83,7	121,5	129,5	72,9	81,3	109,6	161,4	217,5	181,3	79,7	94,0
Calcium, as mg/ℓ Ca	11,1	22,2	24,1	11,1	11,3	16,2	28,9	39,7	31,6	13,5	12,1
Magnesium, as mg/ℓ Mg	13,6	16,0	16,8	11,0	12,9	16,8	21,6	28,7	24,8	11,2	15,5
Sodium, as mg/ℓ Na	41,0	50,5	60,0	26,3	40,0	87,5	94,0	150,8	124,7	45,5	55,0
Potassium, as mg/ℓ K	2,1	2,9	2,7	2,2	1,4	1,8	3,8	3,8	4,4	1,5	2,0
Sulphates, as mg/ℓ SO_4	11,9	12,7	18,1	16,9	28,2	21,1	25,3	42,8	43,6	29,5	33,0
Chlorides, as mg/ℓ Cl	65,7	86,1	111,0	42,3	56,9	111,1	122,5	246,6	188,1	59,8	80,3
Fluorides, as mg/ℓ F	0,4	0,7	0,5	0,4	0,1	0,4	0,7	0,5	0,4	0,3	0,2
Free carbonic acid, as mg/ℓ CO_2	2,8	5,5	2,7	3,2	0,6	1,8	2,7	2,4	2,1	2,3	2,5
Saturation pH value, pH_S	8,4	8,0	8,0	8,5	8,5	8,1	7,7	7,7	7,8	8,4	8,5
Stability index	9,0	8,3	8,1	9,5	8,8	8,1	7,4	7,2	7,4	9,0	9,2
Flow, m^3/s	0,2	0,2	0,3	0,3	0,06	0,03	0,03	0,04	0,06	0,03	0,08
Appearance	Turbid	Good	Turbid	Turbid	Fair	Good	Good	Good	Fair	Fair	Good

Table 1 continued

Station number	Rainy season						Dry season					
	Sezela	Ifafa		Mtwalume			Sezela	Ifafa		Mtwalume		
	II1	JJ1	JJ2	KK1	KK2	KK3	II1	JJ1	JJ2	KK1	KK2	KK3
pH value	8,10	7,65	8,62	7,75	7,82	7,67	7,82	8,00	7,41	7,43	7,48	7,69
Temperature, °C	24,5	22,2	29,0	17,4	23,0	30,2	12,5	17,8	17,0	13,0	21,0	17,0
Conductivity, mS/m	27,5	18,6	23,4	22,1	11,3	14,6	32,8	20,5	31,1	22,8	10,7	19,3
TDS, mg/ℓ (calc.)	182	106	130	111	75	88	201	126	154	139	78	124
DO, mg/ℓ	8,6	8,1	9,7	8,3	8,1	7,8	10,9	9,6	9,5	8,9	8,7	9,6
DO, % saturation	102	102	126	95	103	104	100	111	98	93	106	100
BOD, mg/ℓ	2,0	1,2	0,8	1,8	1,6	1,4	3,7	2,3	nil	4,2	1,3	2,7
Kjeldahl nitrogen, mg/ℓ	0,7	0,4	0,8	0,2	0,2	0,1	0,2	0,6	0,4	0,2	0,2	0,2
Nitrates, as mg/ℓ N	1,40	0,56	0,21	0,09	0,18	0,21	0,70	0,31	0,32	0,18	0,44	0,40
Phosphates, as mg/ℓ PO_4	0,35	0,36	0,29	0,15	0,28	0,36	0,19	0,07	0,07	0,06	0,06	0,10
Total alkalinity, as mg/ℓ $CaCO_3$	76,4	26,4	39,0	33,3	28,3	30,1	87,3	41,0	62,0	50,9	27,8	45,7
Total hardness, as mg/ℓ $CaCO_3$	69,7	50,4	51,8	72,1	44,8	37,1	74,1	37,8	62,2	55,8	23,5	39,8
Calcium, as mg/ℓ Ca	9,5	5,3	7,7	10,3	4,4	5,6	11,1	6,8	10,3	8,5	3,8	7,3
Magnesium, as mg/ℓ Mg	13,6	9,0	7,9	11,2	8,2	5,6	11,3	5,1	8,9	8,4	3,4	5,2
Sodium, as mg/ℓ Na	38,3	17,8	22,8	16,2	9,8	13,7	39,0	25,2	38,0	23,0	13,1	24,0
Potassium, as mg/ℓ K	0,9	1,1	1,4	0,4	0,8	1,3	1,1	1,2	1,7	0,8	1,1	1,7
Sulphates, as mg/ℓ SO_4	20,5	4,3	8,0	12,3	1,5	3,8	16,9	7,0	18,1	6,0	6,0	10,0
Chlorides, as mg/ℓ Cl	46,5	33,5	40,9	23,7	16,1	21,9	49,7	38,7	55,5	45,2	17,4	30,6
Fluorides, as mg/ℓ F	0,3	0,2	0,3	0,2	0,1	0,3	0,4	0,1	0,2	tr	0,1	0,2
Free carbonic acid, as mg/ℓ CO_2	1,2	1,2	0,2	1,2	0,8	1,3	2,6	0,8	4,7	3,7	1,8	1,8
Saturation pH value, pH_S	8,5	9,2	8,9	8,8	9,3	9,1	8,4	9,0	8,6	8,8	9,3	8,9
Stability index	9,0	10,8	9,2	9,9	10,7	10,6	9,0	9,9	9,8	10,1	11,2	10,0
Flow, m^3/s	0,1	0,1	0,6	0,3	0,8	1,4	0,1	0,03	0,1	0,01	0,3	0,4
Appearance	Poor	Fair	Good	Fair	Fair	Good	Poor	Good	Good	Fair	Good	Good

Table 1 continued

	Rainy season							Dry season						
	Umhl ungwa	Mhlabat shane	Umzumbe			Injam bili	Idombe	Umhl ungwa	Mhlabat shane	Umzumbe			Injam bili	Idombe
Station number	LL1	MM1	NN1	NN2	NN3	OO1	PP1	LL1	MM1	NN1	NN2	NN3	OO1	PP1
pH value	8,02	8,01	7,75	8,00	7,95	8,00	8,02	7,93	7,60	7,80	8,03	8,23	7,50	7,42
Temperature, °C	25,0	24,0	17,4	24,2	25,0	27,0	26,2	16,0	15,0	19,8	21,0	24,0	15,0	17,0
Conductivity, mS/m	37,0	30,5	8,6	20,1	22,9	35,5	33,5	46,2	37,0	11,1	23,8	27,3	40,3	39,0
TDS, mg/ℓ (calc.)	228	196	60	122	134	217	203	285	226	81	146	166	263	236
DO, mg/ℓ	8,7	7,9	9,3	8,4	9,1	7,7	7,7	10,2	9,6	9,0	9,2	9,6	9,5	9,2
DO, % saturation	105	93	101	100	109	95	94	103	94	102	103	114	93	95
BOD, mg/ℓ	2,3	3,6	1,3	1,2	1,4	1,2	1,5	0,9	0,7	3,9	0,1	2,4	0,8	0,5
Kjeldahl nitrogen, mg/ℓ	0,7	0,7	0,4	0,2	0,3	0,2	0,4	0,4	0,3	0,2	nil	0,2	0,1	0,4
Nitrates, as mg/ℓ N	0,65	0,28	0,19	0,49	0,33	0,14	0,18	0,35	0,34	0,57	0,62	0,62	0,28	0,25
Phosphates, as mg/ℓ PO_4	0,44	0,31	0,50	0,23	0,14	0,40	0,38	0,21	0,23	0,08	0,15	0,15	0,16	0,16
Total alkalinity, as mg/ℓ $CaCO_3$	86,0	81,0	22,9	56,6	61,5	77,1	93,9	124,2	91,4	34,3	62,5	72,7	71,8	83,3
Total hardness, as mg/ℓ $CaCO_3$	90,6	73,7	24,1	48,2	53,8	76,1	82,7	98,6	79,7	23,9	52,2	62,2	75,7	83,7
Calcium, as mg/ℓ Ca	13,7	11,1	3,5	8,6	9,4	11,1	12,0	15,6	12,1	4,4	9,6	12,0	10,9	12,0
Magnesium, as mg/ℓ Mg	13,7	11,2	3,7	6,5	7,4	11,7	12,8	14,5	12,0	3,1	6,8	7,8	11,8	13,1
Sodium, as mg/ℓ Na	50,5	50,0	8,0	25,1	28,1	53,5	46,0	60,0	47,5	14,3	30,0	32,5	70,8	50,0
Potassium, as mg/ℓ K	1,9	1,5	1,0	2,1	1,5	2,0	1,3	1,9	1,7	1,2	2,4	2,2	2,0	1,8
Sulphates, as mg/ℓ SO_4	21,5	15,4	1,5	2,7	2,7	10,2	10,0	17,0	15,3	5,0	6,0	8,9	20,0	16,9
Chlorides, as mg/ℓ Cl	71,5	55,5	11,0	24,9	29,9	80,3	62,7	83,4	64,5	13,4	34,3	40,9	86,1	74,4
Fluorides, as mg/ℓ F	0,3	0,3	0,2	0,3	0,3	0,3	0,3	0,4	0,3	0,2	0,3	0,3	0,3	0,3
Free carbonic acid, as mg/ℓ CO_2	1,6	1,6	0,8	1,1	1,4	1,5	1,8	2,6	4,5	1,1	1,2	0,8	4,4	6,2
Saturation pH value, pH_S	8,3	8,4	9,4	8,7	8,6	8,5	8,4	8,1	8,4	9,2	8,6	8,5	8,5	8,4
Stability index	8,7	8,9	11,1	9,4	9,3	8,9	8,7	8,3	9,2	10,6	9,2	8,7	9,5	9,4
Flow, m^3/s	0,1	0,08	0,2	2,3	2,3	0,06	0,06	0,1	0,1	0,1	0,6	0,7	0,08	0,1
Appearance	Poor	Good	Fair	Turbid	Turbid	Good	Good	Fair	Good	Good	Good	Good	Good	Good

Table I continued

	Rainy season						Dry season					
	Umtentweni	Umzimkulu					Umzimkulu					
Station number	QQ1	RR1	RR2	RR3	RR4	RR5	RR1	RR2	RR3	RR4	RR5	RR6
pH value	7,70	8,00	8,10	8,10	8,05	8,12	7,63	7,90	7,98	8,06	8,12	8,10
Temperature, °C	31,0	16,0	15,2	16,2	17,8	20,0	3,9	7,9	8,8	7,2	11,2	11,4
Conductivity, mS/m	27,9	4,3	4,6	5,9	6,4	9,4	4,6	5,4	8,1	9,5	13,8	15,1
TDS, mg/ℓ (calc.)	171	47	46	52	60	72	49	51	63	75	99	102
DO, mg/ℓ	9,7	9,3	9,1	9,1	9,1	9,3	11,4	10,9	10,8	11,1	10,4	10,0
DO, % saturation	129	111	101	101	103	101	104	103	102	100	95	91
BOD, mg/ℓ	5,9	1,1	2,9	1,2	1,0	1,5	2,5	3,0	2,4	0,7	0,7	3,6
Kjeldahl nitrogen, mg/ℓ	0,3	0,5	0,5	1,3	0,1	0,3	-	0,2	nil	nil	nil	nil
Nitrates, as mg/ℓ N	0,11	0,08	0,10	0,13	0,09	0,08	0,08	0,12	0,18	0,20	0,28	0,24
Phosphates, as mg/ℓ PO_4	0,40	0,08	0,11	0,11	0,05	0,09	0,03	0,02	0,12	0,05	0,03	0,05
Total alkalinity, as mg/ℓ $CaCO_3$	83,3	22,9	24,4	28,1	35,8	39,5	29,2	30,7	37,7	45,1	57,7	59,4
Total hardness, as mg/ℓ $CaCO_3$	75,3	29,9	19,9	20,9	29,9	31,9	30,5	34,1	34,5	44,7	56,9	54,9
Calcium, as mg/ℓ Ca	11,2	4,3	4,5	5,1	6,0	7,7	5,2	5,8	6,6	7,4	9,5	9,1
Magnesium, as mg/ℓ Mg	11,5	4,7	2,1	2,0	3,6	3,1	4,2	4,8	4,4	6,4	8,0	7,8
Sodium, as mg/ℓ Na	37,5	2,1	2,8	4,1	4,8	7,9	2,7	3,2	7,4	8,7	14,0	14,0
Potassium, as mg/ℓ K	1,5	0,4	0,5	0,5	0,5	0,6	0,4	0,5	0,5	0,6	0,9	0,8
Sulphates, as mg/ℓ SO_4	14,0	2,7	1,5	2,1	2,7	3,3	1,5	nil	1,3	1,5	2,7	2,7
Chlorides, as mg/ℓ Cl	44,5	2,8	3,1	4,6	4,6	9,2	1,1	1,1	2,9	5,6	11,8	14,5
Fluorides, as mg/ℓ F	0,4	0,1	tr	0,1	0,1	0,1	0,1	tr	0,1	0,1	0,1	0,2
Free carbonic acid, as mg/ℓ CO_2	3,2	0,5	0,4	0,4	0,6	0,6	1,3	0,7	1,5	0,8	0,9	1,0
Saturation pH value, pH_S	8,4	9,3	9,3	9,2	9,0	8,9	9,1	9,1	9,0	8,9	8,6	8,7
Stability index	7,0	10,7	10,5	10,2	10,0	9,6	10,7	10,2	9,9	9,6	9,2	9,2
Flow, m^3/s	0,08	14	20	28	57	57	0,8	1,4	1,7	8,5	28	28
Appearance	Fair	Good	Good	Good	Turbid	Turbid	Good	Good	Good	Good	Good	Poor

Table 1 continued

	Rainy season							Dry season					
	Polela	Ngwan gwane	Bisi	Umzim kulwana	Boboyi	Zotsha	Umhl angeni	Polela	Bisi	Umzim kulwana	Boboyi	Zotsha	Umhl angeni
Station number	RR7	RR8	RR9	RR10	SS1	TT1	UU1	RR7	RR9	RR10	SS1	TT1	UU1
pH value	7,82	7,91	8,00	7,95	7,90	7,45	7,52	7,42	7,90	8,11	7,58	7,15	7,10
Temperature, °C	15,6	15,0	12,5	19,0	25,0	26,5	22,0	5,3	6,8	11,1	14,0	18,5	14,0
Conductivity, mS/m	3,7	5,7	7,7	24,6	22,0	120,0	31,0	4,4	9,4	22,1	29,2	930,0	34,8
TDS, mg/ℓ (calc.)	42	51	69	155	135	773	181	45	73	145	184	6250	217
DO, mg/ℓ	9,0	9,2	9,9	8,8	9,3	8,6	8,0	11,0	11,6	10,2	9,9	8,1	9,8
DO, % saturation	106	101	100	95	111	105	90	103	103	93	95	86	94
BOD, mg/ℓ	1,7	0,8	1,3	1,4	4,3	3,9	2,3	2,4	0,5	0,7	1,3	1,6	2,5
Kjeldahl nitrogen, mg/ℓ	nil	0,1	0,3	0,3	0,4	0,4	0,7	0,2	nil	nil	0,4	0,1	0,2
Nitrates, as mg/ℓ N	0,04	0,12	0,11	0,27	0,24	0,47	0,33	0,06	0,21	0,48	0,52	0,31	0,26
Phosphates, as mg/ℓ PO_4	0,08	0,11	0,11	0,15	0,21	0,18	0,32	0,03	0,05	0,06	0,14	0,11	0,12
Total alkalinity, as mg/ℓ $CaCO_3$	21,9	29,6	47,2	44,7	54,0	26,8	45,9	24,6	45,2	78,8	60,8	71,2	37,2
Total hardness, as mg/ℓ $CaCO_3$	18,5	21,9	27,9	55,8	52,4	143,8	61,4	28,5	42,3	69,1	59,8	2099,6	60,3
Calcium, as mg/ℓ Ca	5,1	5,1	6,0	8,4	6,7	11,3	6,2	4,1	7,4	10,5	8,5	79,9	6,7
Magnesium, as mg/ℓ Mg	1,4	2,2	3,1	8,5	8,7	28,0	11,2	4,4	5,8	10,4	9,3	461,3	10,6
Sodium, as mg/ℓ Na	1,7	3,8	5,5	30,0	30,0	235,3	44,0	1,7	7,3	20,0	39,0	1625,0	57,5
Potassium, as mg/ℓ K	0,2	0,4	0,7	1,2	1,2	6,9	2,0	0,2	0,6	1,6	1,8	75,0	2,1
Sulphates, as mg/ℓ SO_4	0,8	1,5	2,1	8,2	7,4	50,2	6,6	0,4	1,5	3,9	10,8	750,0	12,5
Chlorides, as mg/ℓ Cl	3,1	3,1	6,2	54,6	46,7	422,9	81,0	1,1	5,6	33,1	59,8	3197,2	87,6
Fluorides, as mg/ℓ F	tr	0,1	0,1	0,1	0,2	0,2	0,1	0,1	0,1	0,2	0,2	0,6	0,1
Free carbonic acid, as mg/ℓ CO_2	0,7	0,7	0,9	1,0	1,3	1,8	2,7	1,8	1,1	1,3	3,1	-	5,7
Saturation pH value, pH_S	9,3	9,2	8,9	8,8	8,8	9,0	8,9	9,3	8,8	8,5	8,7	7,7	9,0
Stability index	10,7	10,4	9,8	9,7	9,7	10,5	10,4	11,2	9,8	8,9	9,8	8,3	10,9
Flow, m^3/s	1,3	1,4	0,4	0,08	0,08	nil	0,08	0,06	0,08	0,2	0,08	nil	0,06
Appearance	Good	Good	Turbid	Turbid	Fair	Fair	Fair	Good	Turbid	Turbid	Good	Fair	Good

Table I continued

Station number	Rainy season						Dry season						
	Uvongo	Mbizane	Mpenjati	Mtamvuna			Uvongo	Mbizane	Mpenjati	Mtamvuna			
	VV1	WW1	XX1	YY2	YY3	YY4	VV1	WW1	XX1	YY1	YY2	YY3	YY4
pH value	7,52	7,98	7,72	7,80	7,33	7,33	7,78	7,95	7,19	7,55	7,92	7,75	7,93
Temperature, °C	23,0	24,0	23,8	17,8	22,5	23,0	18,0	18,8	17,0	12,0	15,0	19,5	19,0
Conductivity, mS/m	17,7	22,0	15,0	4,8	7,2	152,2	20,3	28,8	20,0	3,6	13,4	17,3	3 720,0
TDS, mg/ℓ (calc.)	107	134	89	38	53	1043	123	166	137	39	80	105	25 920
DO, mg/ℓ	8,7	9,2	9,3	9,2	8,3	8,8	9,6	9,8	9,4	10,3	9,9	10,0	7,8
DO, % saturation	101	108	100	106	99	101	102	103	97	105	103	106	83
BOD, mg/ℓ	1,0	1,3	1,6	1,7	1,7	1,0	1,9	0,1	0,5	1,8	1,7	2,2	0,2
Kjeldahl nitrogen, mg/ℓ	0,3	0,2	0,2	nil	0,2	0,2	nil	nil	0,4	tr	nil	nil	0,2
Nitrates, as mg/ℓ N	0,50	0,27	0,31	0,20	0,19	0,19	0,19	0,17	0,36	0,34	0,32	0,24	0,11
Phosphates, as mg/ℓ PO_4	0,10	0,12	0,20	0,07	0,11	0,11	0,09	0,08	0,10	0,06	0,10	0,09	0,06
Total alkalinity, as mg/ℓ $CaCO_3$	24,9	45,7	30,7	16,4	27,0	43,6	25,0	40,0	37,4	12,5	46,5	66,5	106,0
Total hardness, as mg/ℓ $CaCO_3$	33,9	37,8	29,5	19,9	27,9	207,2	32,1	40,0	46,0	13,7	44,0	63,7	4 780,8
Calcium, as mg/ℓ Ca	3,2	4,3	3,4	2,6	4,3	16,2	3,4	5,1	5,1	2,6	6,8	10,3	316,2
Magnesium, as mg/ℓ Mg	6,3	6,6	5,1	3,3	4,2	40,5	5,7	6,6	8,1	1,7	6,6	9,2	968,8
Sodium, as mg/ℓ Na	22,2	31,4	21,3	2,7	4,5	325,0	26,7	40,0	27,0	3,0	7,7	7,3	7 600,0
Potassium, as mg/ℓ K	0,9	1,1	0,7	0,4	0,6	12,0	1,0	1,4	1,2	0,4	0,6	1,0	300,0
Sulphates, as mg/ℓ SO_4	1,5	5,0	4,4	nil	1,5	87,2	8,6	10,8	10,0	2,1	3,6	5,8	1 350,0
Chlorides, as mg/ℓ Cl	39,4	40,9	33,5	1,8	4,2	518,6	45,2	61,3	44,8	4,4	9,2	14,6	15 306,4
Fluorides, as mg/ℓ F	0,2	0,3	0,1	0,1	0,2	0,2	0,1	0,2	0,1	tr	0,1	0,2	-
Free carbonic acid, as mg/ℓ CO_2	1,5	1,0	1,1	0,5	2,5	-	0,8	0,9	7,1	0,7	1,1	2,3	-
Saturation pH value, pH_S	9,5	9,1	9,3	9,7	9,3	8,6	9,4	9,1	9,1	9,8	8,9	8,5	-
Stability index	11,4	10,2	10,9	11,6	11,2	9,5	11,1	10,2	11,0	12,0	9,8	9,3	-
Flow, m^3/s	1,3	0,3	0,8	5,7	8,5	-	0,1	0,06	0,2	0,3	1,1	2,8	-
Appearance	Fair	Good	Good	Turbid	Turbid	Turbid	Good	Good	Good	Good	Turbid	Turbid	Fair

TABLE II

Outcrop percentages

Stn. no.	Stormberg	Beaufort	Ecca	Dwyka	TMS	Granite	River
DD 1	100	-	-	-	-	-	Umkomaas
2	66	34	-	-	-	-	
3	51	49	-	-	-	-	
4	31	67	2	-	-	-	
5	19	57	24	-	-	-	
6	17	50	32	1	-	-	
7	13	38	32	8	3	6	
EE 1	-	-	-	58	-	42	Amahlongwa
FF 1	-	-	-	12	25	63	Umpambinyoni
2	-	-	-	11	21	68	
3	-	-	-	14	20	66	
GG 1	-	-	-	3	-	97	Umzinto
HH 1	-	-	-	-	10	90	Inkomba
II 1	-	-	-	30	20	50	Sezela
JJ 1	-	-	-	-	19	81	Ifafa
2	-	-	-	9	25	66	
KK 1	-	-	50	33	17	-	Mtwalume
2	-	-	16	13	35	36	
3	-	-	6	5	20	69	
LL 1	-	-	-	-	-	100	Umhlungwa
MM 1	-	-	-	-	-	100	Mhlabatšhane
NN 1	-	-	-	17	26	57	Umzumbe
2	-	-	1	22	6	71	
3	-	-	1	18	6	75	
OO 1	-	-	-	-	-	100	Injambili
PP 1	-	-	-	-	-	100	Idombe
QQ 1	-	-	-	-	-	100	Umtentweni
RR 1	30	70	-	-	-	-	Umzimkulu
2	13	79	8	-	-	-	
3	9	80	11	-	-	-	
4	7	64	29	-	-	-	
5	4	34	38	16	3	5	
6	4	34	38	16	3	5	
7	30	70	-	-	-	-	Polela
8	5	90	5	-	-	-	Ngwangwane
9	-	8	91	1	-	-	Bisi
10	-	-	27	45	24	4	Umzimkulwana
SS 1	-	-	-	20	30	50	Boboyi
TT 1	-	-	-	30	30	20	Zotsha
UU 1	-	-	-	40	30	30	Umhlangeni
VV 1	-	-	67	-	-	33	Uvongo
WW 1	-	-	-	12	27	61	Mbizane
XX 1	-	-	-	-	30	70	Mpenjati
YY 1	-	15	85	-	-	-	Mtamvuna
2	-	4	96	-	-	-	
3	-	2	67	31	-	-	
4	-	2	51	37	9	1	

TABLE III. THE STONES IN CURRENT FAUNA FROM CLUSTERS A AND D OF FIGURE 3.

	A											D			
STATION NUMBER	RR4	RR9	RR2	RR8	RR1	DD4	DD6	DD5	DD3	DD2	RR7	DD8	DD9	DD1	YY1
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
TAXON:															
PLANARIA	0.3	0.2	0.1	0.1	0.5	****	****	****	****	0.0	0.6	0.1	0.2	0.7	0.3
PROSTOMA	****	****	****	****	****	****	****	****	****	****	****	****	****	****	0.1
MERMITHID	0.0	0.4	1.4	****	0.1	0.1	0.0	****	0.2	0.0	0.2	****	****	0.1	0.8
RHABDITID	****	****	****	****	0.3	****	0.1	0.1	****	****	****	****	****	0.1	****
LIMNODRILUS	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
TUBIFEX	****	****	****	0.1	****	0.3	0.1	****	****	****	0.0	****	****	****	****
NAIS	****	****	****	0.0	****	****	****	****	****	****	0.5	0.1	****	0.3	****
SLAVINA	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
CHAETOGASTER	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
NAIDIDAE	****	****	****	****	****	****	****	****	****	****	****	0.5	0.1	****	****
DAPHNIA	****	****	****	****	****	****	****	****	****	****	0.3	****	****	****	****
BOSMINA	****	****	****	****	****	****	****	****	****	****	0.2	****	****	****	****
DIAPTOMUS	****	****	****	****	****	****	****	****	****	****	0.2	****	****	****	****
CYCLOPS	****	****	0.1	****	****	****	****	****	****	****	0.2	****	****	****	****
CYPRIDOPSIS	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
GOMPHOCYTHERE	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
PIONOCYPRIS	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
STENOCYPRIS	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
POTAMON	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
AMPHIPOD (QUERY)MELITA	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
HYDRACHNELLAE	1.6	1.3	0.3	0.5	0.4	1.6	0.4	0.3	0.1	****	1.8	0.2	****	0.9	0.8
ORIBATOIDES	****	****	****	****	****	****	****	****	****	0.0	0.5	****	****	****	****
NEMOURIDAE	****	****	****	****	****	0.4	****	****	****	****	****	5.0	0.4	****	****
NEOPERLA SPIO	0.3	0.1	1.1	0.1	0.8	****	1.4	0.3	0.1	0.0	0.0	0.2	****	1.4	0.1
BAETIS (ACENTRELLA) MONTICOLA	****	0.0	****	****	****	****	****	****	****	0.4	0.0	25.0	37.2	15.4	9.6
BAETIS (ACENTRELLA) NATALENSIS	****	****	****	0.2	****	****	****	****	0.2	****	****	****	****	****	****
BAETIS (ACENTRELLA) SP. 1	****	****	****	****	2.1	****	****	****	****	****	0.3	25.8	11.8	4.5	2.6
BAETIS (ACENTRELLA) SP. 2	****	****	****	****	****	****	****	****	****	****	****	6.5	****	****	****
BAETIS (ACENTRELLA) SP. 3	****	****	****	****	****	****	****	****	****	****	****	2.6	0.1	****	****
BAETIS BELLUS	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
BAETIS GLAUCUS	****	****	****	****	****	0.2	1.9	5.5	****	****	****	****	****	****	****
BAETIS HARRISONI	5.2	9.3	5.3	5.9	5.2	10.3	4.7	8.9	12.1	****	5.1	****	1.0	47.7	7.7
BAETIS LATUS	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
BAETIS TYPE A	****	0.0	****	0.6	0.3	****	1.1	****	****	****	4.9	****	****	****	****
CENTROPTILUM EXCISUM	****	****	****	****	****	****	****	****	****	0.0	0.0	****	****	****	****
CENTROPTILUM SUDAFRICANUM	****	****	****	0.2	3.3	****	****	****	****	16.4	****	12.5	10.5	6.2	2.2
CENTROPTILUM VARIUM	****	0.0	****	****	****	****	****	****	****	****	****	****	0.2	****	****
PSEUDOCLOEON MACULOSUM	0.1	****	****	0.2	****	****	0.1	****	****	****	****	****	****	****	****
PSEUDOCLOEON VINOSUM	****	****	****	****	0.0	****	****	****	****	****	****	****	****	****	****
CLOEON AFRICANUM	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
CENTROPTILOIDES BIFASCIATUM	1.1	0.0	****	****	****	0.1	1.1	0.5	****	****	****	****	****	****	****
ADENOPHLEBIA AURICULATA	****	****	****	****	****	****	****	****	****	****	****	0.4	****	****	****
CASTANOPHLEBIA	****	****	****	****	****	0.1	****	****	****	****	****	4.9	2.4	3.0	0.2
CHOROTERPES ELEGANS	0.3	0.2	1.5	0.7	2.0	****	1.5	2.0	0.2	0.1	1.4	****	****	2.3	****
TRICORYTHUS	1.4	0.5	0.6	0.6	11.2	0.6	0.2	0.7	2.7	0.3	7.6	2.2	1.5	0.9	2.0
CAENIDAE	2.0	0.2	1.7	0.6	1.6	0.1	3.0	0.1	0.1	0.0	0.3	0.3	****	1.1	2.9
PROSOPISTOMA	0.1	****	0.2	****	0.0	****	0.4	****	****	****	0.0	****	****	****	****
AFRONURUS	0.6	0.3	0.4	0.1	0.4	****	0.4	0.3	0.2	0.1	0.0	0.5	0.1	0.6	****
PSEUDAGRION	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
CHLOROCYPHA	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
PARAGOMPHUS	****	****	****	****	****	****	0.0	****	****	****	****	****	****	****	****
AESHNA	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
ZYGONYX	****	0.0	****	****	****	****	****	0.1	****	****	****	****	****	****	****
APHELOCHEIRUS SCHOUTEDENI	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
MICRONECTA DIMIDIATA	****	****	0.0	****	****	****	****	****	****	****	0.1	****	****	****	****
CHEUMATOPSYCHE SP. 1	****	****	2.9	0.6	3.8	****	****	****	1.0	0.1	****	****	****	****	****
CHEUMATOPSYCHE SP. 2	10.9	0.3	****	0.1	****	1.3	10.2	13.6	****	****	****	****	****	0.3	****
CHEUMATOPSYCHE SP. 3	****	****	****	****	****	****	****	****	****	****	****	****	0.9	****	****
CHEUMATOPSYCHE SP. 4	****	****	****	****	****	****	****	****	****	****	****	2.0	****	****	****
CHEUMATOPSYCHE SP. 5	****	****	****	****	0.1	****	****	****	****	0.2	****	****	****	0.8	1.0
CHEUMATOPSYCHE SP. 6	****	0.9	****	****	1.6	****	****	****	****	****	0.2	****	****	****	****
CHEUMATOPSYCHE SP. 7	****	****	****	0.1	0.1	****	****	****	****	****	****	0.8	8.2	0.6	5.0
CHEUMATOPSYCHE SP. 8	****	****	****	****	****	****	1.5	****	****	****	****	****	****	****	****
HYDROPSYCHE	3.7	2.2	0.8	0.8	1.9	1.7	0.9	5.2	2.8	0.8	****	****	****	****	****
LEPTONEMA	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
MACRONEMA	****	****	****	****	****	****	****	****	****	****	0.0	****	****	****	****
CHIMARRA	****	****	****	****	2.6	****	****	****	****	****	****	****	****	0.1	0.1
PSEUDONEURECLIPSIS	0.7	****	0.0	****	0.0	****	****	****	****	****	****	****	****	0.1	****
CATOXYETHIRA	0.1	0.5	****	****	****	****	****	****	****	****	****	****	****	****	****
HYDROPTILA ALGAL CASE	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
HYDROPTILA SAND CASE	****	****	****	****	****	****	****	****	****	****	****	****	****	****	0.6
ORTHOTRICHIA	****	0.0	****	****	0.3	****	****	****	****	0.0	****	****	0.1	0.0	1.4
OXYETHIRA	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
HYDROPTILID JUVENILES	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
ATHRIPSODES "PSEUDOLEPTOCERUS"	0.0	****	****	****	****	****	****	****	****	****	****	****	****	****	****
TRICHOSETODES	0.1	****	0.0	****	****	****	****	****	****	****	****	****	****	****	****
OECETIS SAND CASE	0.1	****	****	****	****	****	****	****	****	****	****	****	****	****	****
OECETIS VEGETATION CASE	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
LEPIDOPTERA TYPE A	****	****	0.0	0.1	****	0.0	****	0.2	****	0.1	****	****	****	****	****
GUIGNOTUS	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
DRYOPS LARVAE	****	****	0.0	****	****	****	****	****	****	****	****	****	****	****	****
HAPLELMIS	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
HELMINII TYPE C1	0.2	****	0.0	****	****	****	****	****	****	****	****	****	****	****	0.6
HELMINTHOCHARIS	****	****	0.0	****	****	****	****	****	****	****	0.0	****	****	****	****

CONTINUED

TABLE III. CONTINUED

STATION NUMBER	A: RR4	RR9	RR2	RR8	RR1	DD4	DD6	DD5	DD3	DD2	RR7	D: DD8	DD9	DD1	YY1
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
TAXON:															
HELMINTHOPSIS	0.0	0.2	****	0.0	****	****	****	****	****	****	****	****	****	****	****
LOBELMIS	****	****	****	****	****	****	****	****	****	****	0.1	****	****	0.0	****
PACHYELMIS LARVAE	****	****	0.1	0.0	0.1	****	****	****	****	****	0.9	****	****	0.1	****
PACHYELMIS ADULTS	****	****	****	0.0	0.7	****	****	****	****	****	0.8	****	****	0.1	0.1
PELORIOLUS LARVAE	****	****	****	****	****	****	****	****	****	****	****	****	****	0.4	****
PELORIOLUS ADULTS	****	****	****	****	****	****	****	****	****	****	****	0.2	****	0.1	0.1
POTAMODYTES	****	****	****	****	****	****	0.0	****	****	****	****	****	****	****	****
PROTELMIS	****	****	****	****	0.3	****	****	****	****	****	0.1	****	****	****	****
PSEUDACYRONYX	0.0	0.1	****	****	1.2	****	****	****	****	****	0.0	****	****	****	****
PSEUDELMIDOLIA	****	****	****	****	0.0	****	****	****	****	****	****	****	****	****	****
STENELMIS LARVAE	****	****	****	****	0.0	****	0.3	****	****	****	****	0.1	****	****	****
STENELMIS ADULTS	****	****	****	****	0.0	****	0.0	****	****	****	****	****	****	****	****
AULONOGYRUS LARVAE	0.0	****	****	****	****	****	****	****	****	****	****	****	****	****	****
ORECTOGYRUS LARVAE	0.2	0.1	****	****	0.0	****	****	0.1	****	****	****	****	****	0.0	****
HELODID LARVAE	****	****	****	****	****	****	****	****	****	****	****	0.2	0.2	1.4	0.1
HYDRAENID LARVAE	****	****	****	****	****	****	****	****	****	****	0.2	****	0.4	****	****
HYDRAENID TYPE A	****	****	0.0	****	****	****	0.0	****	****	****	****	****	****	****	****
HYDRAENID TYPE D	****	****	****	0.0	0.1	****	****	****	****	****	0.0	****	0.1	****	****
HYDROPHILID LARVAE	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
HYDROPHILID TYPE T	****	****	0.0	****	****	****	****	****	****	****	****	****	****	****	****
AFROEUBRIA	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
EUBRIANAX	0.1	0.0	****	****	0.0	****	****	****	****	****	****	****	****	****	****
PTILODACTYLID	****	****	****	****	0.1	****	****	****	****	****	0.3	****	****	****	****
BLEPHAROCERID TYPE A	****	****	****	****	****	****	****	****	0.0	0.6	****	****	****	0.0	****
BLEPHAROCERID TYPE B	****	****	****	0.0	0.0	****	****	****	0.0	0.3	****	****	****	****	****
BLEPHAROCERID TYPE C	****	****	****	****	0.1	****	****	****	****	****	****	****	****	****	****
ANTOCHA	0.1	****	****	0.0	0.0	****	****	****	****	0.0	****	0.1	****	****	****
LIMNOPHILA	****	****	****	0.0	****	****	0.1	****	****	****	****	****	****	****	****
MARUINA	****	****	****	****	****	****	****	****	****	****	****	0.1	****	****	****
ANOPHELES	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
SIMULIUM ADERSI	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
SIMULIUM ALCOCKI	****	****	****	****	****	0.0	****	****	****	****	0.1	****	****	****	0.8
SIMULIUM (QUERY)BOVIS	16.3	11.1	42.7	21.7	5.1	0.1	3.2	2.0	3.9	0.1	1.4	****	****	****	****
SIMULIUM CERVICORNUTUM	****	****	****	****	****	0.0	****	****	****	****	****	****	****	****	****
SIMULIUM DAMNOSUM	0.1	0.1	****	****	****	****	****	****	****	****	****	****	****	****	****
SIMULIUM HIRSUTUM	****	0.1	0.1	****	****	0.0	****	****	****	****	0.0	****	****	****	****
SIMULIUM MEDUSAEFORME	****	15.9	7.1	10.4	38.9	9.8	****	****	29.4	67.8	21.7	2.1	1.7	5.2	****
SIMULIUM NIGRITARSE	0.1	0.2	0.5	****	0.0	****	****	0.1	****	****	26.3	1.1	12.6	0.6	8.9
SIMULIUM RUFICORNE	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
SIMULIUM UNICORNUTUM	2.1	2.6	6.0	0.4	0.0	0.0	0.1	1.6	0.1	0.0	0.2	****	****	****	****
SIMULIUM VORAX	34.9	32.0	21.3	31.5	1.3	62.4	41.7	41.7	30.0	7.2	1.7	****	****	0.5	35.6
CHIRONOMINI TYPE A	1.6	1.0	0.1	0.6	****	0.2	1.7	2.0	0.0	0.0	****	****	0.2	0.2	****
CHIRONOMINI TYPE B	****	****	****	****	2.5	1.4	1.8	0.1	0.2	0.1	2.1	0.2	1.8	****	0.6
TANYTARSINI TYPE A	****	****	0.0	****	****	****	0.1	****	****	****	0.0	****	****	****	****
TANYTARSINI TYPE B	0.4	1.1	0.5	0.7	3.5	****	****	0.7	0.2	****	1.3	0.2	0.1	0.3	****
TANYTARSINI TYPE C	0.6	0.6	0.7	0.3	2.5	****	3.0	0.5	0.7	****	7.3	0.4	****	0.2	0.6
TANYTARSINI TYPE D	0.4	****	****	****	****	****	****	****	****	****	0.6	0.1	1.7	****	****
TANYTARSINI TYPE E	0.0	****	****	0.1	****	****	0.0	****	****	****	0.3	****	****	****	****
TANYTARSINI TYPE G	****	****	****	****	****	****	****	****	****	****	0.4	****	****	****	****
TANYTARSINI TYPE H	****	****	****	****	****	****	****	****	****	****	1.0	****	****	****	****
TANYTARSINI TYPE J	****	****	****	****	****	****	****	****	****	****	****	0.1	****	0.7	****
TANYTARSINI TYPE L	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
RHEOTANYTARSUS	****	****	0.1	0.1	0.1	0.5	0.0	0.1	0.5	0.4	2.1	****	****	****	0.1
CORYNONEURA	****	****	0.0	****	0.0	****	****	****	****	****	0.3	0.7	1.0	****	0.1
THIENEMANNIELLA	****	****	****	****	****	****	****	****	****	****	****	****	0.2	****	****
PENTANEURA TYPE 1	0.1	****	0.0	0.3	0.1	****	0.7	0.1	0.2	****	0.1	****	****	0.3	****
PENTANEURA TYPE 2	****	****	****	****	****	****	****	****	****	****	0.1	****	****	****	****
PENTANEURA TYPE 3	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
ORTHOCLAD TYPE A	1.0	0.6	0.0	0.4	****	****	****	****	****	****	0.0	****	****	****	****
ORTHOCLAD TYPE B	2.4	7.3	1.1	8.0	0.2	0.6	4.0	3.2	5.2	2.2	1.6	****	****	0.6	1.4
ORTHOCLAD TYPE C	5.2	3.2	1.1	7.2	1.4	4.2	2.0	4.3	2.8	0.8	0.7	0.6	1.5	1.0	9.1
ORTHOCLAD TYPE D	0.8	2.7	1.4	3.9	0.2	2.7	9.0	3.7	4.6	0.9	0.5	****	****	****	0.1
ORTHOCLAD TYPE E	****	0.0	****	0.0	****	****	****	****	****	****	****	****	****	****	****
ORTHOCLAD TYPE G	****	****	****	****	****	****	****	****	****	****	****	0.7	****	0.0	****
ORTHOCLAD TYPE H	****	****	****	****	****	****	****	****	****	****	****	****	****	0.1	0.1
ORTHOCLAD TYPE J	****	****	****	****	0.2	****	****	****	****	****	1.4	****	****	0.1	****
ORTHOCLAD TYPE 1	1.1	0.8	0.0	1.4	1.1	1.1	0.2	1.8	2.0	0.9	0.3	0.9	****	0.1	****
ORTHOCLAD TYPE 2	0.4	0.2	0.4	0.7	0.5	0.1	1.4	****	0.0	****	0.8	1.1	2.9	****	2.4
ORTHOCLAD TYPE 3	2.5	3.0	0.1	0.7	0.1	****	****	0.1	****	****	****	****	****	****	****
ORTHOCLAD TYPE 4	****	****	****	****	****	****	0.7	0.1	****	****	1.0	****	****	****	****
ORTHOCLAD TYPE 5	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
ATRICHOGOPON	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
BEZZIA	0.0	****	****	0.0	0.0	****	0.1	****	****	****	****	****	****	0.0	****
FORCIPOMYIA	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
PALPOMYIA	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
CHRYSOPS	****	****	****	****	****	****	0.0	****	****	****	****	****	****	****	****
ATHERIX	****	0.2	****	****	0.1	****	****	****	****	0.1	****	0.1	****	0.1	0.1
HEMERODROMIA	0.4	****	0.0	****	****	0.0	0.3	****	0.1	****	0.2	****	****	0.4	2.2
WIEDMANNIA	****	****	****	0.1	****	****	****	****	0.3	****	****	1.7	0.6	0.0	****
LIMNOPHORA	****	****	****	****	****	****	****	****	****	****	0.0	****	****	****	****
BURNUPIA	0.1	0.1	****	****	0.9	****	****	****	0.0	****	****	****	****	****	****
TOTAL NUMBER OF INDIVIDUALS IN SAMPLE	2279	4635	4455	3412	6759	2630	2067	1524	2520	4870	4909	1025	819	2730	1566

**** = MEANS NOT RECORDED; 0.0 MEANS PRESENT < 0.05%

TABLE IV. THE STONES IN CURRENT FAUNA FROM CLUSTERS B, F AND F OF FIGURF 3.

STATION NUMBER	B								E			F
	JJ1	VV1	RR10	NN1	KK2	YY3	YY2	FF2	DD10	KK1	RR11	HH1
TAXON:	%	%	%	%	%	%	%	%	%	%	%	%
PLANARIA	****	0.2	0.1	****	0.2	****	0.3	0.1	0.1	5.3	2.5	****
PROSTOMA	****	****	****	****	0.0	****	****	****	****	****	****	****
MERMITHID	****	****	****	****	****	****	3.4	****	****	****	****	****
RHABDITID	****	****	****	0.1	0.6	0.1	****	****	****	0.4	****	****
LIMNODRILUS	****	****	****	****	****	****	****	****	0.1	****	****	****
TUBIFEX	****	****	****	****	0.3	****	****	****	****	****	0.2	****
NAIS	****	****	****	****	****	****	****	****	****	****	1.1	****
SLAVINA	****	****	****	****	****	****	****	****	****	****	****	****
CHAETOGASTER	****	****	0.7	****	****	****	****	****	****	****	****	****
NAIDIDAE	****	****	****	****	****	****	****	****	****	****	****	****
DAPHNIA	****	****	****	****	****	****	****	****	****	****	****	****
BOSMINA	****	****	****	****	****	****	****	****	****	****	****	****
DIAPTOMUS	****	****	****	****	****	****	****	****	****	****	****	****
CYCLOPS	****	0.2	****	****	****	****	****	****	****	****	****	****
CYPRIDOPSIS	****	****	****	****	****	****	****	****	****	****	4.5	****
GOMPHOCYTHERE	****	****	****	****	****	****	****	****	****	****	****	****
PIONOCYPRIS	****	****	****	0.4	****	****	****	****	****	****	****	****
STENOCYPRIS	****	****	****	1.2	1.1	****	****	****	****	****	****	****
POTAMON	0.6	****	****	0.0	****	****	****	****	****	****	****	0.2
AMPHIPOD (QUERY)MELITA	****	****	****	****	****	****	****	****	****	****	****	****
HYDRACHNELLAE	0.1	1.5	0.7	0.5	****	0.5	7.5	****	0.6	2.5	19.1	1.6
ORIBATOIDES	****	****	****	****	1.9	****	****	****	****	****	****	****
NEMOURIDAE	****	****	****	****	****	****	****	****	1.6	****	****	****
NEOPERLA SPIO	****	1.0	3.0	6.4	****	1.5	0.3	0.1	****	****	****	****
BAETIS (ACENTRELLA) MONTICOLA	****	****	****	****	****	****	****	****	****	****	****	****
BAETIS (ACENTRELLA) NATALENSI	****	****	****	****	0.5	****	****	****	****	****	****	****
BAETIS (ACENTRELLA) SP. 1	****	****	****	****	****	****	****	****	****	7.2	****	****
BAETIS (ACENTRELLA) SP. 2	****	****	****	****	****	****	****	****	16.3	****	****	****
BAETIS (ACENTRELLA) SP. 3	****	****	****	****	****	****	****	****	****	****	****	****
BAETIS BELLUS	****	****	****	****	****	****	****	****	****	1.2	0.2	****
BAETIS GLAUCUS	****	1.7	3.0	****	****	3.4	0.2	7.0	****	****	****	****
BAETIS HARRISONI	32.5	12.3	6.0	12.4	10.6	8.2	5.8	1.1	0.1	3.7	12.7	2.6
BAETIS LATUS	****	****	****	****	****	****	****	0.5	****	****	****	****
BAETIS TYPE A	****	****	****	****	****	****	****	****	****	****	****	****
CENTROPTILUM EXCISUM	0.1	****	****	****	****	****	****	****	****	****	5.5	****
CENTROPTILUM SUDAFRICANUM	20.0	****	****	****	****	****	****	****	4.3	22.6	0.2	32.9
CENTROPTILUM VARIUM	****	0.2	****	****	****	****	****	0.2	****	****	****	****
PSEUDOCLOEON MACULOSUM	2.8	1.7	0.3	****	****	0.6	****	0.1	****	****	****	****
PSEUDOCLOEON VINOSUM	****	****	****	****	****	****	****	****	****	****	****	****
CLOEON AFRICANUM	****	****	****	****	****	****	****	****	****	****	****	****
CENTROPTILOIDES BIFASCIATU	****	0.3	0.2	****	****	0.6	****	****	****	****	****	****
ADENOPHLEBIA AURICULATA	1.2	****	****	****	****	****	****	****	****	****	****	2.6
CASTANOPHLEBIA	****	****	0.4	****	****	****	****	****	3.6	****	****	****
CHOROTERPES ELEGANS	0.3	0.7	****	****	0.1	1.2	1.3	****	****	****	****	****
TRICORYTHUS	0.4	4.4	1.3	****	0.1	0.2	1.9	****	0.3	****	1.7	****
CAENIDAE	8.1	0.7	2.8	7.9	4.9	4.1	1.0	0.8	****	3.5	13.8	3.0
PROSOPISTOMA	****	****	0.3	****	****	0.5	0.1	****	****	****	****	****
AFRONURUS	****	2.0	0.1	****	****	1.5	0.1	****	****	****	2.1	****
PSEUDAGRION	****	0.2	****	0.0	****	0.5	****	****	****	****	****	0.3
CHLOROCYPHA	****	****	****	****	****	0.2	****	****	****	****	****	****
PARAGOMPHUS	****	****	****	0.1	****	0.3	0.1	0.7	****	****	****	****
AESHNA	****	****	****	0.0	0.0	****	****	****	****	0.2	****	****
ZYGONYX	****	0.9	2.3	0.2	0.5	0.5	0.1	0.3	****	0.2	****	****
APHELOCHEIRUS SCHOUTEDENI	0.3	****	****	****	****	****	****	****	****	****	****	****
MICRONECTA DIMIDIATA	****	****	****	****	****	****	****	****	****	****	****	****
CHEUMATOPSYCHE SP. 1	****	****	****	****	****	****	****	****	****	****	****	****
CHEUMATOPSYCHE SP. 2	0.7	****	2.9	10.2	0.5	5.2	6.7	23.1	****	****	****	****
CHEUMATOPSYCHE SP. 3	****	****	****	****	****	****	****	****	0.9	****	****	****
CHEUMATOPSYCHE SP. 4	****	****	****	****	****	****	****	****	****	****	****	****
CHEUMATOPSYCHE SP. 5	****	****	****	****	****	****	****	****	****	****	****	****
CHEUMATOPSYCHE SP. 6	****	****	2.8	1.4	****	****	5.1	****	****	5.1	****	****
CHEUMATOPSYCHE SP. 7	6.8	2.9	0.4	****	****	****	****	****	****	6.6	****	5.3
CHEUMATOPSYCHE SP. 8	1.7	0.5	2.3	2.0	2.0	****	****	3.4	****	****	****	****
HYDROPSYCHE	0.4	****	****	2.5	2.6	0.1	2.4	****	****	****	****	****
LEPTONEMA	****	****	****	****	****	****	****	****	****	****	****	4.0
MACRONEMA	****	****	0.5	****	****	****	****	****	****	****	****	****
CHIMARRA	****	21.2	0.2	0.1	3.4	0.5	****	****	****	****	****	2.6
PSEUDONEURECLIPSIS	****	****	****	****	****	****	****	****	****	****	****	****
CATOXYETHIRA	****	****	****	****	****	0.6	0.1	****	****	****	****	****
HYDROPTILA ALGAL CASE	****	****	1.2	****	****	0.1	****	****	****	****	****	****
HYDROPTILA SAND CASE	****	****	0.3	****	****	1.2	****	****	****	****	0.6	****
ORTHOTRICHIA	****	****	****	****	****	2.3	0.1	****	****	****	****	****
OXYETHIRA	****	****	****	****	****	****	****	****	****	****	5.5	****
HYDROPTILID JUVENILES	****	0.2	****	****	****	****	****	****	****	****	****	****
ATHRIPSODES "PSEUDOLEPTOCERUS"	****	****	****	****	****	****	****	0.3	0.1	****	****	****
TRICHOSETODES	****	0.2	****	****	****	****	****	****	****	****	****	****
OECETIS SAND CASE	****	****	****	****	0.0	0.5	0.1	****	****	****	****	****
OECETIS VEGETATION CASE	****	****	0.1	****	****	0.5	****	0.1	****	****	****	****
LEPIDOPTERA TYPE A	****	****	****	****	0.0	****	****	****	****	****	****	****
GUIGNOTUS	****	****	****	****	****	****	****	****	****	****	****	****
DRYOPS LARVAE	****	****	****	0.0	0.2	****	0.1	****	****	****	****	****
HAPLELMIS	****	****	****	****	****	****	0.1	****	****	****	****	****
HELMINII TYPE C1	0.1	****	****	0.1	****	****	****	****	****	****	****	****
HELMINTHOCHARIS	****	****	****	****	****	****	****	****	****	****	****	****

CONTINUED

TABLE IV. CONTINUED

STATION NUMBER	B								E			F
	JJ1	VV1	RR10	NN1	KK2	YY3	YY2	FF2	DD10	KK1	RR11	HH1
	%	%	%	%	%	%	%	%	%	%	%	%
TAXON:												
HELMINTHOPSIS	****	****	****	****	****	****	****	****	****	****	****	****
LOBELMIS	****	****	****	****	****	****	****	****	****	****	****	****
PACHYELMIS LARVAE	****	0.2	0.3	0.0	0.4	0.1	0.5	****	****	****	****	****
PACHYELMIS ADULTS	0.1	****	0.3	0.0	0.1	****	0.1	****	****	****	****	****
PELORIOLUS LARVAE	****	****	****	****	****	****	****	****	****	****	****	****
PELORIOLUS ADULTS	****	****	****	****	****	****	****	****	****	****	****	****
POTAMODYTES	****	****	****	****	****	****	****	****	****	****	****	****
PROTELMIS	****	****	****	0.0	****	****	****	****	****	****	****	****
PSEUDACYRONYX	****	0.2	****	****	****	0.1	0.7	****	****	****	****	****
PSEUDELMIDOLIA	****	****	****	****	****	****	****	****	****	****	****	****
STENELMIS LARVAE	****	0.5	0.9	****	1.4	0.3	****	****	****	****	****	****
STENELMIS ADULTS	****	****	0.6	****	0.3	0.1	0.1	****	****	****	****	****
AULONOGYRUS LARVAE	0.1	****	****	****	****	0.5	0.1	****	****	****	****	****
ORECTOGYRUS LARVAE	****	1.2	0.8	0.2	****	0.8	0.2	0.1	****	****	****	****
HELODID LARVAE	****	****	****	0.0	****	****	****	****	****	****	****	****
HYDRAENID LARVAE	****	****	****	****	****	****	****	****	****	****	****	****
HYDRAENID TYPE A	****	****	****	****	****	****	****	****	****	****	****	****
HYDRAENID TYPE D	****	****	****	0.0	****	****	0.1	****	1.2	****	****	****
HYDROPHILID LARVAE	****	****	****	****	0.0	****	****	****	****	****	****	****
HYDROPHILID TYPE T	****	****	****	****	****	****	****	****	****	****	****	****
AFROEUBRIA	****	****	****	****	****	****	****	****	****	****	****	****
EUBRIANAX	****	0.2	****	****	0.0	0.1	****	****	****	****	****	****
PTILODACTYLID	****	****	****	****	****	****	****	****	****	****	****	****
BLEPHAROCERID TYPE A	****	****	****	****	****	****	****	****	****	****	****	****
BLEPHAROCERID TYPE B	****	****	****	****	****	****	****	****	****	****	****	****
BLEPHAROCERID TYPE C	****	****	****	****	****	****	****	****	****	****	****	****
ANTOCHA	****	****	****	****	****	1.2	****	0.8	****	****	1.9	****
LIMNOPHILA	****	****	****	****	0.1	****	****	****	****	****	****	****
MARUINA	****	****	****	****	****	****	****	****	2.3	****	****	0.2
ANOPHELES	****	****	****	****	****	****	****	****	****	****	****	****
SIMULIUM ADERSI	0.6	****	0.4	****	****	****	****	0.4	****	****	****	****
SIMULIUM ALCOCKI	****	****	****	****	****	****	****	****	****	****	****	****
SIMULIUM (QUERY)BOVIS	****	****	****	0.1	****	****	0.3	****	****	****	****	****
SIMULIUM CERVICORNUTUM	0.6	24.1	1.3	0.3	9.1	1.3	6.5	****	****	****	****	****
SIMULIUM DAMNOSUM	****	0.3	0.4	****	0.1	****	0.2	0.1	****	****	****	****
SIMULIUM HIRSUTUM	1.0	3.9	0.8	****	****	****	****	****	****	****	****	9.9
SIMULIUM MEDUSAEFORME	0.6	0.7	****	14.3	1.2	****	26.5	11.3	****	****	****	1.6
SIMULIUM NIGRITARSE	3.2	0.5	17.6	4.8	46.2	****	****	****	62.1	35.2	1.5	18.9
SIMULIUM RUFICORNE	****	****	****	****	****	****	****	****	****	****	****	****
SIMULIUM UNICORNUTUM	****	****	****	****	****	1.9	0.3	****	****	****	****	****
SIMULIUM VORAX	0.4	0.5	****	3.4	1.2	****	****	11.3	****	****	****	****
CHIRONOMINI TYPE A	****	****	****	****	****	****	0.1	****	****	****	****	****
CHIRONOMINI TYPE B	2.0	1.4	1.9	2.7	0.1	1.6	1.3	0.9	0.1	0.2	****	1.2
TANYTARSINI TYPE A	****	****	****	****	****	****	****	****	****	****	****	0.2
TANYTARSINI TYPE B	****	****	****	****	****	****	****	****	****	0.8	****	****
TANYTARSINI TYPE C	****	2.4	17.1	16.2	3.1	39.9	1.1	19.1	0.1	0.8	****	1.6
TANYTARSINI TYPE D	****	****	****	****	****	****	****	****	****	****	****	****
TANYTARSINI TYPE E	****	****	****	****	****	****	****	****	****	****	****	****
TANYTARSINI TYPE G	****	****	****	****	****	****	****	****	****	****	****	****
TANYTARSINI TYPE H	****	****	****	****	****	****	****	****	****	****	****	****
TANYTARSINI TYPE J	****	****	****	0.0	****	1.6	****	****	****	****	8.1	0.7
TANYTARSINI TYPE L	****	****	****	****	****	****	****	****	****	****	****	0.8
RHEOTANYTARSUS	2.8	1.9	2.3	0.2	0.0	1.8	9.4	****	****	****	4.7	****
CORYNONEURA	****	0.2	****	****	0.9	****	****	****	****	0.2	****	****
THIENEMANNIELLA	****	****	****	****	****	****	****	****	****	0.2	****	****
PENTANEURA TYPE 1	0.1	****	****	0.1	0.0	1.7	0.1	0.8	****	0.2	****	****
PENTANEURA TYPE 2	****	****	****	0.1	****	1.6	0.2	****	0.1	0.2	3.8	****
PENTANEURA TYPE 3	****	****	****	****	****	****	****	0.1	****	****	****	0.3
ORTHOCLAD TYPE A	****	****	****	****	****	****	****	****	****	****	****	****
ORTHOCLAD TYPE B	0.3	****	****	2.4	1.6	****	4.0	13.3	****	0.2	0.8	****
ORTHOCLAD TYPE C	0.7	****	8.0	1.3	0.4	4.1	4.0	2.9	3.3	0.4	5.5	****
ORTHOCLAD TYPE D	1.4	0.7	2.8	2.0	0.9	****	1.7	****	1.8	****	****	4.6
ORTHOCLAD TYPE E	****	****	****	****	****	****	****	****	****	****	****	****
ORTHOCLAD TYPE G	****	****	****	****	****	****	****	****	****	****	****	****
ORTHOCLAD TYPE H	****	****	****	****	****	****	****	****	****	****	****	****
ORTHOCLAD TYPE J	****	****	****	****	****	****	****	****	****	****	****	****
ORTHOCLAD TYPE 1	0.3	****	****	0.4	0.6	0.5	0.5	0.1	****	****	****	****
ORTHOCLAD TYPE 2	7.5	8.0	4.9	2.2	1.0	3.1	2.5	0.1	****	1.9	0.2	3.3
ORTHOCLAD TYPE 3	0.1	****	7.5	2.7	0.8	1.7	0.8	0.4	0.5	0.2	0.8	****
ORTHOCLAD TYPE 4	0.1	****	****	****	****	****	****	****	****	****	1.1	****
ORTHOCLAD TYPE 5	****	****	****	0.1	****	****	****	****	****	****	****	****
ATRICHOGOPON	****	****	****	****	****	****	****	****	****	****	****	****
BEZZIA	****	****	****	0.0	0.1	0.4	0.1	0.7	0.1	****	0.4	****
FORCIPOMYIA	****	0.3	****	****	****	****	****	****	****	****	****	1.5
PALPOMYIA	****	****	****	****	****	****	****	****	****	****	****	****
CHRYSOPS	****	****	****	0.1	****	****	****	****	****	****	****	****
ATHERIX	0.1	****	0.1	****	****	0.3	****	****	****	****	****	****
HEMERODROMIA	1.4	****	0.1	0.1	0.7	0.2	0.2	****	0.5	****	****	****
WIEDMANNIA	****	****	****	****	****	0.1	****	0.1	****	****	****	****
LIMNOPHORA	****	****	0.1	****	****	****	****	****	****	****	****	****
BURNUPIA	****	****	****	****	****	0.1	2.2	****	0.1	0.8	1.3	****
TOTAL NUMBER OF INDIVIDUALS IN SAMPLE	690	586	1194	2065	2770	1715	1929	1110	1738	486	471	607

**** = MEANS NOT RECORDED! 0.0 MEANS PRESENT < 0.05%

TABLE V. THE STONES IN CURRENT FAUNA FROM CLUSTER C OF FIGURE 3.

STATION NUMBER	UU1	OO1	II1	GG1	JJ2	MM1	PP1	SS1	TT1	LL1	DD1	EE1
	%	%	%	%	%	%	%	%	%	%	%	%
TAXON:												
PLANARIA	****	****	****	0.4	****	****	****	****	0.1	1.3	2.1	****
PROSTOMA	****	****	0.1	0.0	****	****	****	****	0.3	****	1.4	****
MERMITHID	****	****	0.2	0.1	0.0	****	****	0.2	****	****	****	0.0
RHABDITID	****	****	****	****	****	****	****	****	****	****	0.1	****
LIMNODRILUS	0.1	****	****	****	****	****	0.3	0.8	1.6	****	****	****
TUBIFEX	****	****	6.0	****	****	****	0.7	0.3	****	****	0.3	****
NAIS	14.5	****	3.2	4.2	0.4	0.2	0.3	****	****	****	****	0.0
SLAVINA	****	****	6.4	****	0.0	****	****	****	****	****	****	****
CHAETOGASTER	****	****	****	****	****	****	****	****	****	****	****	****
NAIDIDAE	3.2	****	****	****	****	****	****	****	****	****	****	****
DAPHNIA	****	****	****	****	****	0.2	****	****	****	****	****	****
BOSMINA	****	****	****	****	****	****	****	****	****	****	****	****
DIAPTOMUS	****	****	****	****	****	****	****	****	****	****	****	****
CYCLOPS	1.0	****	****	****	0.3	****	0.3	****	0.3	****	****	****
CYPRIDOPSIS	****	0.5	****	****	****	****	****	****	****	****	****	****
GOMPHOCYTHERE	****	****	****	****	****	0.2	****	****	1.6	****	****	****
PIONOCYPRIS	****	****	****	****	****	****	****	****	****	****	****	****
STENOCYPRIS	****	****	****	****	****	****	****	****	****	****	****	****
POTAMON	****	****	****	0.0	****	0.2	****	0.2	0.1	0.0	0.0	****
AMPHIPOD (QUERY)MELITA	****	****	****	****	0.0	0.4	****	****	****	****	****	****
HYDRACHNELLAE	****	1.1	5.3	9.8	0.8	****	7.3	0.4	3.1	0.4	7.3	1.2
ORIBATOIDES	****	****	****	****	0.3	****	****	0.4	0.4	****	****	****
NEMOURIDAE	****	****	****	****	****	****	****	****	****	****	****	****
NEOPERLA SPIO	****	1.2	****	0.1	2.0	****	****	0.1	0.1	****	****	****
BAETIS (ACENTRELLA) MONTICOLA	****	****	****	****	****	****	****	****	****	****	****	****
BAETIS (ACENTRELLA) NATALENSIS	****	****	****	****	****	****	****	****	****	****	****	****
BAETIS (ACENTRELLA) SP. 1	****	****	****	****	****	****	****	****	****	****	****	****
BAETIS (ACENTRELLA) SP. 2	****	****	****	****	****	****	****	****	****	****	****	****
BAETIS (ACENTRELLA) SP. 3	****	****	****	****	****	****	****	****	****	****	****	****
BAETIS BELLUS	0.5	****	****	****	****	****	****	****	5.9	****	****	****
BAETIS GLAUCUS	10.4	****	****	****	****	2.1	6.6	****	0.7	0.7	0.1	3.7
BAETIS HARRISONI	3.5	4.9	2.6	14.9	29.5	5.7	9.9	0.8	1.7	5.7	1.2	16.3
BAETIS LATUS	****	****	1.0	****	****	****	1.3	****	0.5	****	0.1	****
BAETIS TYPE A	****	****	****	0.6	****	****	****	****	****	****	****	****
CENTROPTILUM EXCISUM	5.9	1.6	0.1	****	****	****	0.3	7.4	1.0	****	****	****
CENTROPTILUM SUDAFRICANUM	1.5	0.8	****	****	****	3.6	12.5	10.7	1.7	16.1	19.4	0.2
CENTROPTILUM VARIUM	****	****	****	0.0	****	****	****	****	****	****	****	0.1
PSEUDOCLOEON MACULOSUM	1.0	****	0.2	2.4	0.9	****	1.3	11.0	7.6	0.7	0.1	6.3
PSEUDOCLOEON VINOSUM	****	****	****	****	****	****	****	****	1.2	****	****	****
CLOEON AFRICANUM	0.5	****	****	****	****	****	****	****	****	****	****	****
CENTROPTILOIDES BIFASCIATUM	****	****	****	****	0.9	****	****	****	****	0.6	****	****
ADENOPHLEBIA AURICULATA	****	****	****	****	****	0.2	****	****	****	0.2	****	****
CASTANOPHLEBIA	0.6	****	****	****	****	****	****	****	****	****	****	****
CHOROTERPES ELEGANS	3.6	2.3	****	****	0.0	0.6	1.3	3.5	20.0	****	0.9	0.2
TRICORYTHUS	****	****	****	3.9	0.1	****	****	0.3	0.8	4.0	****	****
CAENIDAE	14.7	6.3	3.4	2.4	3.0	1.1	2.6	3.8	11.1	2.6	10.7	0.4
PROSOPISTOMA	****	****	****	****	****	****	****	****	****	****	****	****
AFRONURUS	****	****	****	****	****	****	****	****	2.1	****	****	****
PSEUDAGRION	0.1	0.1	****	****	****	****	****	****	0.2	****	0.0	****
CHLOROCYPHA	****	****	****	****	****	****	****	0.1	0.2	****	****	****
PARAGOMPHUS	3.0	0.3	****	0.1	****	****	****	****	0.2	****	****	****
AESHNA	0.4	****	****	****	****	****	****	****	0.0	****	****	****
ZYGONYX	****	0.3	****	****	0.1	****	****	****	****	0.4	****	****
APHELOCHEIRUS SCHOUTEDENI	****	0.7	****	****	****	****	****	****	****	****	****	****
MICRONECTA DIMIDIATA	****	****	****	****	****	****	****	****	****	****	****	****
CHEUMATOPSYCHE SP. 1	****	****	****	****	****	****	****	****	****	****	****	****
CHEUMATOPSYCHE SP. 2	****	****	****	****	****	****	****	****	****	****	****	****
CHEUMATOPSYCHE SP. 3	****	****	****	****	****	****	****	****	****	****	****	****
CHEUMATOPSYCHE SP. 4	****	****	****	****	****	****	****	****	****	****	****	****
CHEUMATOPSYCHE SP. 5	****	****	****	****	****	****	****	****	****	****	****	****
CHEUMATOPSYCHE SP. 6	1.4	40.6	18.7	3.3	0.5	5.5	38.3	17.3	2.8	19.6	7.0	14.8
CHEUMATOPSYCHE SP. 7	****	****	****	****	****	****	****	****	1.8	****	****	****
CHEUMATOPSYCHE SP. 8	****	11.0	1.7	7.7	11.0	0.2	0.7	6.5	0.8	****	0.0	8.2
HYDROPSYCHE	****	****	0.1	0.1	0.9	****	****	****	****	****	****	****
LEPTONEMA	****	****	****	****	****	****	****	****	****	****	****	****
MACRONEMA	****	****	****	****	****	****	****	****	****	0.1	****	****
CHIMARRA	0.1	****	****	****	****	0.4	0.3	1.7	2.1	11.4	9.3	0.1
PSEUDONEURECLIPSIS	****	****	****	****	****	****	****	****	****	****	****	****
CATOXYETHIRA	****	****	****	****	****	****	****	****	0.0	0.0	****	****
HYDROPTILA ALGAL CASE	****	****	0.1	****	****	****	****	****	****	****	****	****
HYDROPTILA SAND CASE	****	****	****	****	****	****	****	****	****	****	****	****
ORTHOTRICHIA	****	0.1	****	0.5	0.2	****	****	****	0.7	0.0	0.1	0.2
OXYETHIRA	****	****	****	****	****	****	****	****	****	****	****	****
HYDROPTILID JUVENILES	****	****	****	****	****	****	0.3	0.8	****	****	****	****
ATHRIPSODES "PSEUDOLEPTOCERUS"	****	****	****	****	****	****	****	****	****	****	****	****
TRICHOSETODES	****	****	****	****	****	****	****	****	****	****	****	****
OECETIS SAND CASE	****	****	****	****	****	****	****	****	****	****	****	****
OECETIS VEGETATION CASE	****	0.1	****	****	0.0	****	****	****	0.0	****	****	****
LEPIDOPTERA TYPE A	****	****	****	0.9	0.1	****	****	****	****	****	****	****
GUIGNOTUS	0.2	0.3	****	****	****	****	****	****	****	****	****	****
DRYOPS LARVAE	****	0.5	****	0.2	0.0	****	****	****	****	****	****	****
HAPLELMIS	****	****	****	****	****	****	****	****	****	0.0	0.0	****
HELMINII TYPE C1	****	1.8	1.1	0.1	0.2	****	1.0	****	4.2	****	19.1	0.4
HELMINTHOCHARIS	****	****	****	****	****	****	****	****	****	****	0.0	****

CONTINUED

TABLE V. CONTINUED

STATION NUMBER	UU1	QQ1	II1	GG1	JJ2	MM1	PP1	SS1	TT1	LL1	OO1	EE1
	%	%	%	%	%	%	%	%	%	%	%	%
TAXON:												
HELMINTHOPSIS	****	****	****	****	0.0	****	****	****	****	****	****	****
LOBELMIS	0.1	****	****	****	0.1	0.6	0.3	****	0.6	0.0	0.6	****
PACHYELMIS LARVAE	****	****	****	****	0.1	****	****	****	0.1	0.2	0.0	****
PACHYELMIS ADULTS	****	****	****	0.1	****	****	****	****	0.0	****	0.0	****
PELORIOLUS LARVAE	****	****	****	****	****	****	****	****	****	****	****	****
PELORIOLUS ADULTS	****	****	****	****	****	****	****	****	****	****	****	****
POTAMODYTES	****	****	0.1	****	0.0	****	****	0.1	****	****	****	****
PROTELMIS	****	****	0.0	0.0	0.1	****	****	****	****	****	****	****
PSEUDACYRONYX	****	****	****	0.8	****	****	****	****	0.3	****	****	****
PSEUDELMIDOLIA	****	1.2	****	****	0.0	****	****	****	****	****	****	****
STENELMIS LARVAE	****	****	****	****	0.1	****	****	****	****	0.4	****	0.1
STENELMIS ADULTS	****	1.2	****	0.1	****	****	****	****	****	0.3	****	****
AULONOGYRUS LARVAE	0.2	****	0.1	0.1	0.0	0.4	****	0.2	0.0	0.0	0.0	0.1
ORECTOGYRUS LARVAE	****	****	0.2	0.1	0.1	0.2	****	****	0.2	0.1	****	0.1
HELODID LARVAE	****	****	****	****	****	****	****	****	****	****	****	****
HYDRAENID LARVAE	****	****	****	****	****	****	****	****	****	****	****	****
HYDRAENID TYPE A	****	0.1	****	****	****	****	****	****	****	****	****	****
HYDRAENID TYPE D	****	****	****	****	****	****	****	****	****	0.0	0.1	****
HYDROPHILID LARVAE	3.5	1.2	****	****	****	****	0.7	0.1	****	****	0.0	****
HYDROPHILID TYPE T	****	8.0	****	****	****	****	****	****	****	****	****	****
AFROEUBRIA	****	****	****	****	****	****	****	0.1	0.0	0.4	0.0	****
EUBRIANAX	0.1	****	****	****	0.0	****	****	****	0.1	0.6	0.1	0.0
PTILODACTYLID	****	****	****	****	****	****	****	****	****	****	****	****
BLEPHAROCERID TYPE A	****	****	****	****	****	****	****	****	****	****	****	****
BLEPHAROCERID TYPE B	****	****	****	****	****	****	****	****	****	****	****	****
BLEPHAROCERID TYPE C	****	****	****	****	****	****	****	****	****	****	****	****
ANTOCHA	****	****	****	****	****	****	****	****	****	****	****	****
LIMNOPHILA	****	****	0.1	****	****	****	****	****	****	****	****	****
MARUINA	****	****	****	****	****	****	****	****	****	****	****	****
ANOPHELES	1.0	****	****	****	****	****	****	****	****	****	****	****
SIMULIUM ADERSI	****	****	0.4	0.3	****	1.9	****	0.9	****	1.2	2.7	0.0
SIMULIUM ALCOCKI	****	****	****	****	****	****	****	1.0	2.7	****	****	****
SIMULIUM (QUERY)BOVIS	****	****	****	****	****	****	****	****	****	****	****	****
SIMULIUM CERVICORNUTUM	****	****	****	3.8	2.2	****	****	****	0.9	****	****	****
SIMULIUM DAMNOSUM	****	****	****	0.5	0.2	****	****	****	****	****	****	****
SIMULIUM HIRSUTUM	****	****	****	****	****	****	****	****	****	****	****	****
SIMULIUM MEDUSAEFORME	****	****	4.0	27.4	21.4	6.2	2.0	****	****	3.9	0.5	36.2
SIMULIUM NIGRITARSE	13.2	6.9	1.2	3.4	0.2	57.0	****	20.7	15.2	7.1	14.3	0.3
SIMULIUM RUFICORNE	1.9	****	****	****	****	****	****	****	****	****	****	****
SIMULIUM UNICORNUTUM	****	****	****	****	****	****	****	0.3	****	****	****	****
SIMULIUM VORAX	****	****	****	****	7.0	6.2	1.7	2.0	****	****	****	1.9
CHIRONOMINI TYPE A	****	****	****	****	0.7	****	****	****	****	****	****	0.0
CHIRONOMINI TYPE B	1.6	2.9	0.3	0.0	0.3	1.7	2.0	1.5	0.5	2.3	0.5	0.4
TANYTARSINI TYPE A	****	****	****	****	****	****	****	****	****	****	****	****
TANYTARSINI TYPE B	****	****	12.1	****	1.0	****	0.7	****	****	****	0.3	0.0
TANYTARSINI TYPE C	1.5	0.3	24.8	2.0	7.5	4.0	4.6	1.0	****	10.2	****	5.3
TANYTARSINI TYPE D	****	****	****	****	****	****	****	****	****	****	****	****
TANYTARSINI TYPE E	****	****	****	****	****	****	****	****	****	****	****	****
TANYTARSINI TYPE G	****	****	****	****	****	****	****	****	****	****	****	****
TANYTARSINI TYPE H	****	****	2.0	3.1	0.4	0.2	****	****	****	****	****	****
TANYTARSINI TYPE J	2.6	****	****	****	0.6	0.4	****	****	0.7	****	0.0	0.0
TANYTARSINI TYPE L	****	****	****	****	****	****	****	****	****	****	****	****
RHEOTANYTARSUS	****	****	****	****	****	0.2	****	****	****	3.9	****	****
CORYNONEURA	****	****	****	****	****	****	****	****	0.2	****	****	****
THIENEMANNIELLA	****	****	****	****	****	0.2	****	****	****	****	****	****
PENTANEURA TYPE 1	3.8	****	****	0.0	****	****	****	****	0.5	****	0.3	0.0
PENTANEURA TYPE 2	****	0.7	****	0.0	0.1	****	0.3	0.1	0.1	****	0.0	****
PENTANEURA TYPE 3	0.2	****	****	0.0	****	0.2	****	****	****	0.0	****	****
ORTHOCLAD TYPE A	****	****	****	****	0.4	****	****	****	****	****	****	****
ORTHOCLAD TYPE B	****	****	****	0.3	1.9	****	0.3	****	0.8	0.4	0.0	1.8
ORTHOCLAD TYPE C	****	1.6	2.1	3.1	1.0	0.2	1.3	****	0.6	2.5	0.1	0.6
ORTHOCLAD TYPE D	1.0	****	****	2.3	0.7	****	****	****	****	****	****	****
ORTHOCLAD TYPE E	****	****	****	****	****	****	****	****	****	****	****	****
ORTHOCLAD TYPE G	****	****	****	****	****	****	****	****	****	****	****	****
ORTHOCLAD TYPE H	****	****	****	****	0.0	****	****	****	****	****	****	****
ORTHOCLAD TYPE J	****	****	****	****	****	****	****	****	****	****	****	****
ORTHOCLAD TYPE 1	****	****	****	0.3	****	****	****	****	****	0.1	****	****
ORTHOCLAD TYPE 2	0.6	0.5	1.2	0.4	1.7	****	****	2.0	****	1.1	0.4	0.1
ORTHOCLAD TYPE 3	1.2	****	****	****	0.2	****	0.3	0.1	1.3	****	****	0.1
ORTHOCLAD TYPE 4	****	****	****	****	****	****	****	****	0.0	****	0.0	****
ORTHOCLAD TYPE 5	****	****	****	****	****	****	****	****	****	****	****	****
ATRICHOGOPON	****	****	0.2	****	****	****	****	****	****	****	****	****
BEZZIA	****	0.5	0.1	0.2	0.1	****	****	****	0.1	0.0	0.1	0.1
FORCIPOMYIA	****	****	****	****	****	****	****	****	****	****	0.0	****
PALPOMYIA	1.1	****	****	****	****	****	****	****	****	****	****	****
CHRYSOPS	****	0.1	****	0.0	****	****	0.3	****	****	****	0.1	0.0
ATHERIX	****	****	****	****	****	****	****	****	0.0	****	****	****
HEMERODROMIA	****	****	0.0	****	0.0	****	****	****	****	****	****	****
WIEDMANNIA	****	****	****	****	****	****	****	****	****	****	****	****
LIMNOPHORA	****	****	0.1	****	****	****	****	****	****	****	****	****
BURNUPIA	****	****	0.7	****	****	0.2	****	3.5	0.1	0.7	0.0	0.2
TOTAL NUMBER OF INDIVIDUALS IN SAMPLE	808	736	3489	3409	2450	530	303	983	2575	2047	2931	2844

**** = MEANS NOT RECORDED; 0.0 MEANS PRESENT < 0.05%

TABLE VI. FAUNA OF STONES IN CURRENT. TAXA NOT INCLUDED IN TABLES III TO V. NUMBERS OF INDIVIDUALS IN SAMPLES ARRANGED IN ORDER OF CLUSTERS IN FIGURE 3.

CLUSTER			A				B					C					D		E
STATION NUMBER	RR4	RR9	RR2	RR1	DD4	RR7	VV1	RR10	NN1	QQ1	II1	JJ2	SS1	TT1	LL1	DD8	DD1	YY1	RR11
TAXON:																			
ISOCYPRIS	+++	+++	2	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
CARIDINA ŅILOTICA	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++
EPHORON	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
CENTROPTILUM INDUSII	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++
CERATOGOMPHUS	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
MICRONECTA UVAROVI	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++
METALYPE	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++
GOERODES	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	2	+++
ECNOMUS	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++
YOLA NATALENSIS	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
AULONOGYRUS ABDOMINALIS	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++
HELMINTHOPSIS	+++	+++	+++	2	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
MICRODINODES	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
HYDRAENID TYPE C	+++	+++	+++	1	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
TIPULID-PRIONOCERA TYPE	+++	+++	+++	+++	+++	+++	+++	+++	+++	2	+++	+++	+++	+++	+++	+++	+++	+++	+++
DIXID	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	1	+++	+++	+++
PENTANEURA TYPE 4	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++
ORTHOCLAD TYPE L	2	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
CULICOIDES	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++
DASYHELEA	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++
STRATIOMYIID	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
EMPIDID-CLINOCERA TYPE	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	1	+++
EPHYDRID	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++
GYRAULUS	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1
PISIDIUM	+++	+++	+++	+++	+++	+++	+++	2	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++

ALL TAXA FROM STATIONS NOT SHOWN HERE APPEAR IN TABLES III TO V.

TABLE VII. THE STONES OUT OF CURRENT FAUNA IN CLUSTER ORDER FROM FIGURE 5.

	A				B				C			D		E
STATION NUMBER	D02	D01	D08	D09	D04	D03	RR8	YY1	RR11	RR7	RR1	EE1	D05	D010
	%	%	%	%	%	%	%	%	%	%	%	%	%	%
TAXON:														
HYDRA	****	****	****	****	****	****	****	1.4	****	****	****	****	****	****
PLANARIANS	1.1	****	0.9	0.1	0.3	1.8	1.0	3.6	7.5	3.6	8.7	0.3	0.4	****
PROSTOMA	****	****	****	****	****	****	****	****	****	****	0.1	****	****	****
MERMITHID	****	****	****	****	****	0.2	****	****	****	****	****	****	****	****
RHABDITID	****	****	****	****	****	****	3.4	****	1.1	1.2	****	****	****	1.5
LUMBRICID	0.1	****	****	****	****	****	****	****	****	****	****	****	****	0.1
LIMNODRILUS	****	****	****	****	****	****	****	****	****	0.5	****	****	****	0.4
TUBIFEX	****	****	****	****	****	****	0.1	0.7	1.0	1.0	****	****	****	****
NAIS	0.1	****	0.9	****	0.3	****	****	****	****	****	****	8.7	0.2	****
CHAETOGASTER	****	****	0.5	****	****	****	****	****	4.0	****	0.8	****	****	****
NAIDIDAE	****	1.0	****	****	****	****	****	****	****	****	****	****	****	5.5
ACROPERUS HARPAE	****	****	****	****	****	****	****	****	1.0	****	****	****	****	****
ALONA	****	****	****	****	****	****	****	****	****	1.0	1.0	****	****	1.1
CYCLOPS	0.9	****	****	****	0.3	****	****	2.2	4.9	10.5	0.4	4.4	****	5.8
CYPRIDOPSIS	0.7	****	****	1.9	****	****	****	****	2.9	****	1.1	****	****	****
GOMPHOCYTHERE	****	****	****	****	****	****	****	****	****	****	16.0	2.5	****	****
ISOCYPRIS	****	****	****	****	****	****	1.1	****	****	****	****	****	****	****
PIONOCYPRIS	****	****	****	****	****	****	****	****	****	****	****	****	****	1.1
STENOCYPRIS	****	****	****	1.0	****	****	****	1.4	****	****	****	****	****	10.2
POTAMON	****	****	****	****	****	****	****	****	****	****	****	****	****	0.3
HYDRACHNELLAE	0.5	1.0	****	1.2	2.1	0.7	1.5	16.7	30.0	38.6	8.0	9.6	****	0.3
ORIBATOIDES	****	****	****	****	****	****	****	****	1.0	****	****	****	****	1.1
NEMOURIDAE	****	****	4.1	0.1	****	****	****	****	****	****	0.3	****	****	1.7
NEOPERLA SPIO	****	****	****	****	0.3	****	****	****	****	****	****	****	****	****
BAETIS (ACENTRELLA) MONTICOLA	0.3	0.2	1.7	10.3	****	****	****	****	****	****	****	****	****	****
BAETIS (ACENTRELLA) SP. 1	****	****	0.5	****	****	****	****	****	****	****	2.5	****	****	****
BAETIS (ACENTRELLA) SP. 2	****	****	4.4	****	****	****	****	****	****	****	****	****	****	2.4
BAETIS GLAUCUS	****	****	****	****	3.3	****	****	****	****	****	****	0.6	2.8	****
BAETIS HARRISONI	41.6	****	****	****	21.1	0.5	1.6	0.7	****	****	0.1	****	****	****
BAETIS LATUS	****	****	****	****	****	****	0.3	****	****	****	****	****	****	****
BAETIS TYPE A	0.1	****	****	****	****	****	0.8	****	****	****	****	****	****	****
CENTROPTILUM EXCISUM	5.6	0.5	****	12.5	1.3	6.8	9.5	0.7	12.2	4.0	2.2	5.7	12.9	****
CENTROPTILUM INDUSII	****	****	****	****	****	****	1.8	****	4.9	****	****	1.1	6.5	****
CENTROPTILUM SUDAFRICANUM	4.9	36.4	44.0	36.7	9.8	4.3	2.6	10.1	****	****	****	****	****	5.5
PSEUDOCLOEON INZINGAE	0.5	****	****	2.3	****	2.3	0.7	13.0	****	0.2	****	****	3.5	****
PSEUDOCLOEON VINOSUM	2.1	****	****	****	****	0.4	****	****	1.2	****	****	****	****	****
CLOEON AFRICANUM	****	****	****	****	****	****	****	13.0	****	****	****	37.8	****	****
ADENOPHLEBIA	1.2	9.3	6.2	8.1	1.0	1.4	0.1	2.9	****	****	****	****	0.6	1.1
APRIONYX	****	****	****	0.2	****	****	****	****	****	****	****	****	****	****
CASTANOPHLEBIA	0.1	****	5.0	0.7	****	****	****	****	****	****	****	****	****	0.7
CHOROTERPES ELEGANS	1.3	1.2	****	****	23.9	9.2	6.4	0.7	****	****	2.3	7.4	13.5	0.3
TRICORYTHUS	****	0.2	****	****	****	****	****	****	****	****	****	****	****	****
CAENIDAE	10.9	1.0	1.4	0.1	4.6	13.3	6.7	****	8.7	15.2	4.6	0.5	14.2	3.1
PROSOPISTOMA	****	****	****	****	0.3	****	****	****	****	****	1.0	****	****	****
AFRONURUS	1.2	24.4	8.7	5.5	12.6	2.9	1.9	2.9	0.1	****	1.0	****	6.1	****
PSEUDAGRION	0.1	****	****	****	****	****	****	****	0.1	****	0.1	0.6	****	0.1
CHLOROCYPHA	****	****	****	****	****	0.4	****	****	****	****	****	****	****	****
GOMPHID	0.1	****	****	****	****	****	****	****	****	****	****	****	****	****
AESHNA RILEYI	****	0.2	****	****	****	****	****	****	****	****	****	****	****	****
LIBELLULID	****	****	****	****	****	****	****	****	****	****	****	****	0.4	****
LACCOCORIS LIMIGENUS	****	****	****	****	****	****	****	****	****	****	1.3	****	****	****
MICRONECTA DIMIDIATA	0.1	****	****	****	****	****	****	****	****	0.2	****	****	****	****
CHEUMATOPSYCHE TYPE 1	****	****	****	****	0.8	****	****	****	****	****	****	****	****	****
CHEUMATOPSYCHE TYPE 2	****	****	****	****	4.6	****	****	****	****	****	****	****	****	****
CHEUMATOPSYCHE TYPE 3	****	****	****	****	****	****	****	****	****	****	****	****	****	0.3
CHEUMATOPSYCHE TYPE 7	****	****	0.1	****	****	****	****	0.7	****	****	****	****	****	****
CHEUMATOPSYCHE TYPE 8	****	****	****	****	****	****	****	****	****	****	****	0.3	****	****
HYDROPSYCHE	****	****	****	****	****	****	0.1	****	****	****	****	****	0.4	****
ECNOMUS	****	****	****	****	****	****	****	****	****	****	****	0.6	****	****
PSEUDONEURECLIPSIS	0.1	1.7	****	****	****	****	****	****	****	****	****	****	****	****
POLYCENTROPUS	****	0.5	****	****	****	****	****	****	****	****	****	****	****	****
GOERODES	****	****	****	0.2	****	****	****	****	****	****	****	****	****	0.8
SINION	****	****	****	****	****	****	****	1.4	****	****	****	****	****	****
ATHRIPSODES "PRIONII" SP.1	****	****	****	****	****	****	****	****	0.1	****	****	****	****	****
ATHRIPSODES "PRIONII" SP.2	****	****	****	****	****	****	****	1.4	****	****	****	****	****	****
OECETIS SAND CASE	0.1	****	****	****	****	****	****	****	****	****	****	****	****	0.1
TRIAENODES	****	****	****	****	****	****	****	****	****	0.2	****	****	****	****
TRICHOSETODES	0.1	****	****	****	****	****	****	****	****	****	****	****	****	****
HYDROPTILA ALGAL CASE	****	****	****	0.1	****	****	****	****	0.4	****	1.1	****	****	****
HYDROPTILA SAND CASE	****	****	****	****	****	****	****	2.9	1.1	1.9	1.3	****	****	****
ORTHOTRICHIA	0.1	****	****	****	****	0.4	****	****	****	****	****	0.2	****	0.1
OXYETHIRA	****	****	****	****	****	****	****	****	1.7	****	****	****	****	****
LEPIDOPTERA TYPE A	****	****	****	****	****	0.2	****	****	****	****	****	****	****	****
LEPIDOPTERA TYPE C	****	****	****	****	****	****	****	****	0.1	****	****	****	****	****
DYTISCID LARVAE	0.1	****	****	****	****	0.9	****	****	****	0.2	1.1	****	****	****
UVARUS PERINGUEYI	****	****	****	****	****	****	****	****	****	0.2	****	****	****	****
HELMINTHOPSIS	0.1	****	****	****	****	****	0.1	****	****	0.5	1.0	****	0.2	****
HELMINII TYPE C1	****	0.2	****	****	****	0.2	0.1	****	****	****	0.1	****	****	****
MICRODINODES	****	****	****	****	****	****	0.1	****	****	****	****	****	****	****
PACHYELMIS	****	****	****	****	0.3	****	****	****	****	****	0.1	****	****	****
PELORIOLUS	0.1	1.2	0.6	****	****	****	****	****	****	****	****	****	****	****
POTAMODYTES	****	****	****	****	****	****	****	****	****	****	0.5	****	****	****
POTAMOGETHES	0.1	****	****	****	****	****	****	****	****	****	****	****	****	****
PSEUDANCYRONYX	****	****	****	****	****	****	****	****	****	****	7.0	****	****	****

CONTINUED

TABLE VII. CONTINUED

	A				B				C			D		E
STATION NUMBER	DD2	DD1	DD8	DD9	DD4	DD3	RR8	YY1	RR11	RR7	RR1	EE1	DD5	DD10
	%	%	%	%	%	%	%	%	%	%	%	%	%	%
TAXON:														
STENELMIS	****	****	****	****	****	****	****	****	****	****	****	****	0.2	****
HELODID	****	****	****	0.1	****	****	****	****	****	****	****	****	****	****
HYDRAENID LARVAE	****	****	****	****	****	****	2.2	****	****	****	****	****	****	****
HYDRAENID TYPE C	****	****	****	0.1	****	****	****	****	****	****	****	****	****	****
HYDRAENID TYPE N	****	****	0.1	****	****	****	****	****	****	****	****	****	****	****
HYDROPHILID TYPE H	****	****	****	****	****	****	****	****	****	****	1.3	****	****	****
EUBRIANAX	0.1	0.2	****	****	****	****	****	****	****	****	1.1	****	****	****
PTILODACTYLID	0.1	****	****	****	****	****	****	****	****	****	****	****	****	****
ANTOCHA	****	****	****	****	****	****	****	****	1.2	****	****	****	****	0.3
LIMNOPHILA	****	****	****	****	****	0.2	0.1	****	****	****	****	****	****	****
DIXID	****	****	0.4	****	****	****	****	****	****	****	****	****	****	****
ANOPHELES	****	****	****	****	****	****	****	****	****	****	****	****	****	1.1
SIMULIUM MEDUSAEFORME	0.1	0.5	3.5	****	1.3	3.4	****	****	****	****	1.3	****	****	****
SIMULIUM NIGRITARSE	****	****	****	****	****	****	****	****	****	****	****	****	0.2	2.1
SIMULIUM VORAX	****	****	****	****	****	3.6	0.5	****	****	0.5	****	****	****	****
CHIRONOMINI TYPE A	0.5	****	****	****	1.0	****	1.6	0.7	****	1.0	0.1	0.3	****	****
CHIRONOMINI TYPE B	1.2	2.6	0.4	3.0	1.3	2.2	1.0	2.9	1.0	2.1	0.4	0.8	0.7	1.3
TANYTARSINI TYPE B	0.1	1.0	****	****	****	****	****	****	****	****	****	****	****	****
TANYTARSINI TYPE C	****	****	****	1.9	4.1	****	****	****	****	****	****	****	****	****
TANYTARSINI TYPE D	2.7	****	****	****	****	****	****	****	****	****	****	****	****	****
TANYTARSINI TYPE F	5.6	0.2	****	0.3	****	****	18.4	0.7	****	****	****	****	****	****
TANYTARSINI TYPE G	0.2	****	****	****	****	****	2.6	****	****	0.2	0.1	****	****	****
TANYTARSINI TYPE H	****	****	****	****	****	****	6.4	0.7	****	****	****	****	****	****
TANYTARSINI TYPE J	****	****	4.6	8.6	****	19.9	****	2.9	4.5	9.8	9.3	6.0	21.1	29.5
TANYTARSINI TYPE K	****	****	****	****	****	****	****	****	****	****	****	3.8	4.6	****
RHEOTANYTARSUS	****	****	****	****	1.5	0.2	****	****	****	****	****	****	****	****
CORYNONEURA	0.8	2.4	9.1	0.9	0.8	****	0.1	****	****	****	****	****	****	1.2
THIENEMANNIELLA	0.1	0.2	****	****	****	****	****	****	****	****	****	****	****	1.2
PENTANEURA TYPE 1	0.1	0.2	****	0.2	1.0	****	0.3	****	0.1	****	****	****	0.4	0.1
PENTANEURA TYPE 2	2.2	1.0	0.4	1.5	****	20.1	18.4	0.7	3.3	3.3	12.1	0.5	9.8	6.8
PENTANEURA TYPE 3	****	****	****	****	****	3.4	****	****	****	1.2	****	0.6	****	****
PENTANEURA TYPE 4	0.2	1.0	0.1	****	****	****	****	****	****	****	****	****	****	****
ORTHOCLAD TYPE A	0.1	****	****	****	****	****	****	****	****	****	****	0.6	****	****
ORTHOCLAD TYPE B	6.8	****	0.6	0.1	0.3	****	5.5	****	****	****	0.1	0.2	0.9	****
ORTHOCLAD TYPE C	4.3	11.0	****	****	****	0.2	****	****	****	0.2	0.1	****	0.2	3.4
ORTHOCLAD TYPE D	0.5	****	****	****	****	****	****	****	****	****	3.7	****	****	****
ORTHOCLAD TYPE E	****	****	****	****	****	****	****	****	****	0.2	****	****	****	****
ORTHOCLAD TYPE H	****	****	0.3	****	****	****	****	1.4	0.6	0.2	****	****	0.4	****
ORTHOCLAD TYPE K	****	****	****	****	****	****	****	****	****	****	****	0.5	****	****
ORTHOCLAD TYPE 1	****	****	****	0.1	****	****	0.1	****	****	****	****	****	****	****
ORTHOCLAD TYPE 2	0.1	****	0.1	****	0.8	0.4	0.3	0.7	****	****	0.4	****	****	4.4
ORTHOCLAD TYPE 3	****	****	****	1.7	****	****	1.4	0.7	2.2	1.2	0.5	5.0	****	0.8
ORTHOCLAD TYPE 4	****	****	****	0.1	****	****	****	****	0.5	0.7	0.4	0.5	0.2	****
ORTHOCLAD TYPE 5	****	****	****	****	****	****	****	****	****	****	0.3	0.5	****	****
BEZZIA	0.1	0.2	****	****	****	0.5	0.4	****	0.1	****	0.1	0.2	****	****
CULICOIDES	****	****	****	****	0.3	****	****	****	****	****	****	****	0.2	2.8
PALPOMYIA	****	****	****	****	****	****	0.3	****	****	****	****	****	****	****
ATHERIX	****	0.5	0.6	****	****	****	****	****	0.2	****	0.1	****	****	****
HEMERODROMIA	****	****	****	****	1.0	****	****	****	0.2	****	****	****	****	****
WIEDMANNIA	0.1	****	0.6	****	****	****	****	****	****	****	****	****	****	****
LIMNOPHORA	****	****	****	0.1	****	****	****	****	****	****	****	****	****	****
BULINUS	0.1	****	****	****	****	****	****	****	****	****	****	****	****	****
GYRAULUS	****	****	****	****	****	****	****	****	****	****	0.3	****	****	****
BURNUPIA	****	****	****	****	****	0.2	0.3	11.6	2.1	0.2	4.2	****	****	****
PISIDIUM	****	****	****	****	****	****	****	****	****	****	****	****	****	1.5
TADPOLES	0.2	****	****	****	****	****	****	****	****	****	0.3	0.2	****	****
TOTAL NUMBER OF INDIVIDUALS IN SAMPLE	1706	418	778	862	389	557	733	138	823	420	786	635	541	745

**** - MEANS NOT RECORDED; 0.0 MEANS PRESENT < 0.05%

TABLE VIII. THE MARGINAL VEGETATION FAUNA FROM PART OF CLUSTER A OF FIGURE 7.

STATION NUMBER	MM1	XX1	QQ1	JJ1	FF1	NN3	KK3	NN2	FF2	TT1	LL1	KK2	II1	GG1	EE1
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
TAXON:															
HYDRA	****	****	****	****	****	0.4	****	****	****	****	****	****	****	****	0.0
PLANARIA	****	****	****	****	****	****	****	****	0.1	0.0	****	3.2	****	****	****
RHABDOCOEL	****	****	****	****	****	****	****	****	****	****	****	****	****	****	3.4
PROSTOMA	****	****	0.1	0.2	0.1	1.9	****	0.1	0.6	0.4	0.0	0.2	0.7	0.2	0.1
RHABDITID	****	0.5	1.0	0.0	0.1	1.9	0.0	0.7	0.5	0.1	0.0	****	1.5	****	3.9
BRANCHIURA SOWERBYI	****	****	****	****	****	****	****	****	****	0.0	****	0.1	0.1	****	****
LIMNODRILUS	0.0	0.4	****	0.5	****	2.6	1.3	0.2	0.2	0.0	0.2	0.0	3.1	****	****
TUBIFEX	0.0	1.2	0.1	0.0	****	7.3	****	1.3	1.1	3.2	0.3	0.5	25.3	7.9	1.7
AULOPHORUS	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
NAIS	0.3	27.6	3.4	0.0	0.1	7.6	0.0	0.1	1.2	0.2	****	****	3.9	7.6	1.7
PRISTINA	****	****	****	****	****	****	****	****	****	****	****	****	0.6	****	23.2
SLAVINA	****	****	****	****	****	****	****	****	0.1	****	****	****	****	****	****
CHAETOGASTER	****	****	****	0.0	****	****	****	****	****	****	****	****	****	1.4	0.2
NAIDIDAE	****	****	0.4	****	0.5	****	****	****	****	****	****	****	****	****	****
SIMOCEPHALUS	****	****	****	****	****	****	****	****	****	0.4	0.1	****	****	****	12.1
ILYOCRYPTUS	****	****	****	****	****	****	****	****	****	****	****	****	****	****	0.7
ALONELLA	****	****	****	****	0.5	****	****	****	****	0.6	****	****	****	****	****
CHYDORUS	****	****	0.9	****	****	****	****	****	****	0.9	0.4	****	1.4	****	1.3
CYCLOPS	0.1	0.4	4.8	4.1	0.5	1.5	0.2	0.1	35.8	1.4	14.8	1.4	7.9	8.5	3.3
PARACYCLOPS	****	****	****	****	****	****	****	****	****	****	****	****	****	****	0.8
HARPACTICIDS	****	****	0.5	0.8	****	****	****	****	****	****	****	****	****	****	****
CYPRIDOPSIS	0.0	0.4	1.5	0.0	0.9	0.8	0.2	****	1.7	18.8	0.5	2.7	****	0.3	0.0
CYPRILLA	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
GOMPHOCYTHERE	****	****	****	0.0	****	****	0.4	****	4.6	0.2	0.6	0.8	0.1	0.6	****
ILYOCYTHERE	****	****	****	****	****	****	****	****	****	****	****	****	****	****	1.0
ISOCYPRIS	****	****	****	****	****	****	****	****	****	****	****	****	****	****	1.9
PIONOCYPRIS	****	0.4	5.3	2.1	****	****	0.0	0.6	****	****	****	****	****	0.0	0.3
STENOCYPRIS	****	****	0.5	0.1	****	****	****	3.5	****	****	****	****	****	****	****
CARIDINA NILOTICA	0.6	1.6	0.1	0.1	****	0.2	1.2	****	0.3	0.2	1.3	2.2	0.6	0.1	0.2
CARIDINA TYPUS	****	****	****	****	****	0.4	****	****	****	****	****	****	****	****	****
MACROBRACHIUM EQUIDENS	****	****	****	****	****	****	0.0	****	****	****	****	****	****	****	****
POTAMON	****	****	****	****	****	0.1	****	****	****	0.0	****	****	****	****	0.0
HYDRACHNELLAE	0.5	0.4	0.2	0.7	****	0.4	1.2	****	****	1.2	1.0	0.4	0.2	2.9	0.3
ORIBATOIDES	****	1.5	0.3	0.9	0.5	****	****	0.7	0.5	0.0	****	****	0.1	****	0.0
BAETIS BELLUS	35.3	10.9	31.0	20.3	26.4	18.9	11.4	5.1	0.9	33.7	4.2	39.6	2.9	25.4	2.5
BAETIS GLAUCUS	****	****	****	****	****	0.0	****	****	****	****	****	****	****	****	****
BAETIS HARRISONI	****	0.1	****	0.0	0.2	****	0.0	0.1	0.1	0.0	0.0	0.2	****	****	****
BAETIS LATUS	28.0	0.1	0.1	0.1	2.0	0.3	0.0	****	****	****	****	2.5	0.2	2.1	****
CENTROPTILUM CRASSI	****	****	0.2	****	****	****	****	****	****	0.7	0.3	****	****	****	0.9
CENTROPTILUM EXCISUM	0.7	0.1	2.2	0.2	0.2	0.0	****	****	0.1	0.5	0.1	0.1	****	1.2	0.2
CENTROPTILUM INDUSII	****	****	****	****	****	****	****	****	****	0.0	****	****	****	****	****
CENTROPTILUM SUDAFRICANUM	2.1	****	****	****	****	****	0.0	****	****	0.0	****	****	****	****	****
PSEUDOCLOEON MACULOSUM	****	****	****	****	****	0.0	0.2	****	****	****	****	****	****	****	****
PSEUDOCLOEON VINOSUM	1.1	0.0	****	****	0.5	****	10.8	2.4	****	****	****	****	****	2.2	****
CLOEON AFRICANUM	0.4	0.2	3.7	0.6	****	1.9	****	1.3	3.0	4.6	49.1	0.1	4.9	5.7	8.5
CLOEON VIRGILIAE	****	****	0.1	****	****	****	****	****	0.6	****	****	****	****	****	1.1
ADENOPHLEBIA	0.2	****	0.0	****	****	****	0.1	****	****	****	****	****	****	****	****
CHOROTERPES ELEGANS	****	****	****	****	****	****	****	0.1	****	0.4	0.0	0.2	****	****	****
TRICORYTHUS	****	****	****	****	****	****	0.0	****	****	****	****	****	****	****	****
CAENIDAE	17.4	6.0	6.6	38.4	31.6	6.4	16.5	24.1	5.4	1.0	2.0	4.1	9.5	4.7	3.5
NOTONURUS	****	****	0.0	0.0	****	****	****	****	****	0.7	****	0.5	****	0.2	****
PSEUDAGRION GIGAS	****	****	****	****	****	****	****	****	****	0.6	****	8.1	****	****	****
PSEUDAGRION HAGENI	****	****	****	****	****	****	****	****	0.7	4.1	****	****	****	****	0.4
PSEUDAGRION KERSTENI	0.6	8.0	14.0	3.1	8.1	5.2	3.0	3.7	4.0	****	10.8	10.1	****	****	****
PSEUDAGRION MASSAICUM	****	****	****	****	****	****	****	****	0.7	****	****	****	****	****	****
PSEUDAGRION NATALENSE	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
PSEUDAGRION SALISBURYENSE	****	****	****	0.6	1.0	****	****	****	****	****	****	****	1.2	0.5	2.2
ENALLAGMA/ISCHNURA	****	****	****	****	****	****	****	****	****	****	****	****	0.4	****	****
ELATTONEURA	****	****	****	0.1	****	****	****	****	****	****	****	****	****	****	0.1
CHLOROCYPHA	****	****	****	****	****	****	0.0	****	****	0.0	****	0.1	****	****	0.0
PARAGOMPHUS	0.1	****	****	0.1	0.2	0.5	****	11.4	0.3	0.0	0.1	0.2	****	****	****
ANAX	****	0.1	****	0.2	****	****	****	****	0.8	0.1	0.1	****	0.6	****	0.2
CROCOTHEMIS	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
TRITHEMIS	0.1	0.4	1.3	0.5	0.4	0.0	0.2	9.6	0.5	1.5	2.4	0.2	****	****	1.3
APHELOCHEIRUS SCHOUTEDENI	****	****	0.6	****	****	****	0.0	1.2	0.1	****	****	****	****	****	****
LACCOCORIS LIMIGENUS	0.1	****	****	****	0.2	0.5	****	****	0.3	****	****	****	****	****	****
NAUCORIS OBSCURATUS	****	****	****	****	0.5	****	****	****	****	****	****	****	****	****	****
SPHAERODEMA	****	****	****	****	****	0.0	****	****	****	0.0	****	0.0	****	****	0.0
RANATRA	****	****	****	****	****	****	****	****	****	0.0	0.0	****	****	****	0.0
ANISOPS	****	****	****	****	****	****	****	****	0.2	****	0.1	****	****	****	****
ENITHARES SOBRIA	****	****	****	****	****	****	****	****	****	****	****	****	****	****	0.1
MICRONECTA DIMIDIATA	0.0	0.7	0.1	0.1	0.7	0.0	****	0.1	****	0.1	0.0	0.1	****	****	****
CHEUMATOPSYCHE SP. 2	****	****	****	****	****	0.3	0.9	0.9	****	****	****	****	****	****	****
CHEUMATOPSYCHE SP. 5	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
CHEUMATOPSYCHE SP. 6	0.5	0.1	0.1	****	****	****	****	****	****	0.1	****	****	****	0.1	****
CHEUMATOPSYCHE SP. 7	****	****	****	0.2	0.2	****	****	****	****	0.1	****	****	****	****	****
CHEUMATOPSYCHE SP. 8	****	****	****	****	****	****	5.4	0.1	****	0.0	****	****	****	****	****
HYDROPSYCHE	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
ANISOCENTROPUS	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
GOERODES	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
ATHRIPSODES PRIONII TYPE 1	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
ATHRIPSODES PRIONII TYPE 2	0.0	****	0.4	1.4	****	****	0.0	****	0.2	4.4	0.9	0.1	****	****	0.1
ATHRIPSODES	****	0.1	****	****	0.8	****	****	0.1	0.1	****	0.0	****	****	****	****
LEPTOCERUS	****	****	****	****	****	****	1.2	****	****	1.1	****	0.9	****	0.1	****

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TABLE VIII, CONTINUED

STATION NUMBER	MM1	XX1	QQ1	JJ1	FF1	NN3	KK3	NN2	FF2	TT1	LL1	KK2	II1	GG1	EE1
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
TAXON:															
OECETIS SAND CASE	****	****	****	****	****	****	0.0	****	****	0.3	****	****	****	****	****
OECETIS VEGETATION CASE	0.3	****	****	****	0.4	****	0.8	1.2	0.4	0.4	0.0	****	****	0.1	****
PARASETODES	****	****	****	****	****	****	****	****	1.7	****	****	****	****	****	****
TRIAENODES	****	****	0.0	****	0.1	0.0	0.0	0.4	****	****	****	****	****	0.0	****
TRICHOSETODES	****	****	****	****	****	****	****	****	5.2	****	****	****	****	****	****
HYDROPTILA ALGAL CASE	****	0.6	0.1	****	1.4	****	0.0	4.6	****	0.0	****	****	****	****	****
HYDROPTILA SAND CASE	****	0.0	0.2	****	****	****	****	****	****	0.2	****	****	****	****	****
ORTHOTRICHIA	****	****	0.4	0.1	****	****	****	****	****	0.5	0.0	****	0.1	0.2	0.0
OXYETHIRA	****	****	****	****	****	****	****	****	****	****	****	****	****	0.0	****
LEPIDOPTERA TYPE B	****	****	****	0.1	1.0	0.4	0.5	2.1	0.2	0.0	0.0	0.1	****	****	0.1
HELMINII TYPE C1	0.0	****	****	****	****	****	****	****	****	0.6	****	0.0	****	0.1	****
HELMINII TYPE M3	****	****	****	****	****	****	****	****	****	****	****	0.0	****	****	****
HELMINTHOPSIS	****	****	0.0	0.1	****	0.0	0.0	****	****	0.0	0.0	0.0	****	0.0	****
POTAMODYTES	****	****	****	****	****	****	0.0	0.1	0.2	****	****	****	****	****	****
POTAMOGETHES	****	****	****	****	****	****	****	****	****	****	0.0	****	****	****	****
STENELMIS	****	****	****	****	****	0.0	****	****	****	****	****	****	****	****	****
DYTISCID LARVAE	****	****	****	****	****	****	****	****	0.4	0.1	0.0	****	****	****	****
LACCOPHILUS LINEATUS	****	****	****	0.2	0.1	****	****	****	0.2	0.1	****	****	****	****	****
LACCOPHILUS PELLUCIDUS	****	****	****	****	****	****	****	****	****	0.1	0.1	****	****	****	0.1
UVARUS PERINGUEYI	****	****	0.0	****	****	****	****	****	****	****	****	****	****	****	****
YOLA NATALENSIS	0.0	****	0.1	****	****	****	****	****	****	0.3	****	****	****	****	****
AULONOGYRUS LARVAE	0.0	0.0	****	****	0.1	0.5	0.0	****	****	****	****	0.1	****	****	****
ORECTOGYRUS LARVAE	0.1	****	****	****	****	****	0.0	0.1	****	0.0	****	****	0.1	****	****
HELODID LARVAE	****	0.0	****	****	****	****	****	0.1	****	0.1	0.0	****	0.1	****	****
HYDRAENID LARVAE	****	****	0.2	****	****	****	****	****	****	0.0	****	****	****	0.3	****
HYDRAENID TYPE A	0.0	****	0.0	0.1	0.1	0.1	0.0	****	0.1	0.1	0.0	****	0.6	****	****
HYDRAENID TYPE D	****	****	****	****	****	0.0	****	****	****	****	****	****	****	****	****
HYDRAENID TYPE E	****	****	****	****	****	****	****	****	****	0.0	0.1	****	****	****	****
HYDROPHILID LARVAE	****	0.1	0.3	****	0.1	0.0	0.1	0.4	****	0.0	0.0	****	****	****	****
HYDROPHILID TYPE C	****	****	0.0	****	****	****	****	****	****	****	0.1	****	****	****	****
HYDROPHILID TYPE H	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
HYDROPHILID TYPE T	****	****	****	****	****	****	0.0	0.1	****	****	0.1	****	****	****	****
LIMONIA	****	****	****	****	0.1	0.1	0.0	0.1	****	0.0	0.0	****	0.6	****	****
DIXID	0.0	****	****	0.0	****	****	****	****	****	****	****	****	****	0.0	****
ANOPHELES	0.0	****	0.6	1.7	0.1	0.1	****	****	0.3	0.2	0.2	****	3.9	****	0.0
CULEX	****	****	****	****	****	****	****	****	2.3	****	****	****	****	****	0.0
SIMULIUM ADERSI	0.4	0.2	****	****	****	5.0	0.3	****	****	****	****	0.1	****	0.5	****
SIMULIUM ALCOCKI	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
SIMULIUM (QUERY) BOVIS	****	****	****	****	****	****	****	0.7	****	****	****	****	****	****	****
SIMULIUM CERVICORNUTUM	****	****	****	****	****	****	0.4	****	****	****	****	****	****	0.1	****
SIMULIUM DAMNOSUM	****	****	****	****	****	0.3	****	****	****	****	****	0.0	****	****	****
SIMULIUM HIRSUTUM	****	****	****	****	0.2	****	****	****	****	****	****	****	****	****	****
SIMULIUM MCMAHONI	****	****	****	****	****	0.1	****	****	****	****	****	****	****	****	****
SIMULIUM MEDUSAEFORME	****	****	****	****	****	****	****	****	0.1	****	****	****	****	****	****
SIMULIUM NIGRITARSE	4.7	0.2	0.6	****	0.5	3.8	0.5	2.9	****	0.1	****	****	****	****	****
SIMULIUM UNICORNUTUM	****	****	****	****	****	****	****	****	****	****	****	****	****	0.1	****
SIMULIUM VORAX	****	****	****	****	****	****	****	****	0.1	****	****	****	****	****	****
CHIRONOMINI TYPE B	2.2	0.7	0.9	5.5	1.6	2.7	5.7	2.2	7.1	2.9	1.7	4.8	4.8	2.1	9.1
CHIRONOMINI TYPE C	****	****	****	****	****	****	0.0	****	0.1	0.1	****	****	0.3	****	****
TANYTARSINI TYPE A	****	****	****	****	****	****	0.0	****	****	****	****	****	****	****	****
TANYTARSINI TYPE B	****	****	****	****	****	****	****	****	****	****	****	0.0	****	****	****
TANYTARSINI TYPE C	1.8	0.5	1.0	****	0.3	10.1	10.8	0.4	0.1	****	****	4.5	****	****	****
TANYTARSINI TYPE D	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
TANYTARSINI TYPE E	****	****	****	****	****	****	0.0	****	****	****	****	****	****	****	****
TANYTARSINI TYPE F	****	****	****	****	0.1	****	****	****	****	****	****	0.4	****	****	****
TANYTARSINI TYPE G	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
TANYTARSINI TYPE H	****	****	****	****	****	****	0.1	0.4	****	****	****	****	****	****	0.4
TANYTARSINI TYPE J	****	2.2	****	1.0	4.9	0.4	0.6	1.4	5.2	0.8	0.3	0.4	1.3	8.0	****
TANYTARSINI TYPE K	0.0	0.0	0.1	****	****	****	****	****	0.1	****	****	****	0.1	0.2	****
RHEOTANYTARSUS	****	0.0	****	****	****	****	****	****	****	****	****	****	0.1	0.0	****
CORYNONEURA	0.1	8.8	0.5	0.2	0.3	4.6	12.4	1.4	1.5	0.2	0.7	1.7	4.4	2.5	****
THIENEMANNIELLA	0.2	1.5	0.2	0.0	0.4	0.4	1.3	1.2	0.9	0.8	0.1	0.0	****	****	****
PENTANEURA TYPE 1	0.1	0.4	0.1	0.0	0.3	1.3	1.3	1.8	0.1	0.0	****	0.3	****	****	0.0
PENTANEURA TYPE 2	0.1	1.6	4.6	9.5	6.4	3.9	1.1	2.5	3.5	6.6	4.2	2.6	7.4	4.9	0.5
PENTANEURA TYPE 3	0.8	17.1	5.0	1.2	****	0.1	2.8	0.1	1.5	0.5	0.3	****	0.5	0.1	0.3
PENTANEURA TYPE 4	0.1	****	0.4	****	****	****	****	****	****	0.3	0.0	****	1.0	0.9	****
CLINOTANYPUS	****	****	****	****	****	0.0	****	****	****	****	****	****	****	****	0.1
PROCLADIUS	****	****	****	0.2	****	3.5	0.0	****	0.2	0.6	0.1	****	****	****	****
ORTHOCLAD TYPE A	****	****	****	****	****	****	****	****	0.2	****	****	****	****	****	****
ORTHOCLAD TYPE B	****	****	****	****	****	****	0.0	****	0.1	****	****	****	****	****	****
ORTHOCLAD TYPE C	****	****	0.2	0.0	****	0.0	****	0.2	****	0.0	0.0	****	****	****	****
ORTHOCLAD TYPE D	****	0.2	****	0.2	****	0.1	0.0	****	****	****	****	1.1	****	****	****
ORTHOCLAD TYPE H	****	****	****	0.1	****	****	****	****	****	****	****	****	****	****	****
ORTHOCLAD TYPE J	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
ORTHOCLAD TYPE 1	****	****	****	****	****	****	****	****	****	****	****	0.0	0.3	****	****
ORTHOCLAD TYPE 2	0.3	0.0	0.0	0.1	0.5	0.7	2.3	0.4	****	0.2	0.4	0.2	****	****	****
ORTHOCLAD TYPE 3	0.2	3.8	2.5	2.7	3.2	0.5	0.4	2.1	0.8	0.8	0.0	3.6	1.3	7.1	0.1
ORTHOCLAD TYPE 4	0.1	****	****	0.3	****	****	****	****	****	0.0	****	****	0.2	****	0.3
ORTHOCLAD TYPE 5	0.0	****	****	0.0	****	****	****	****	****	0.0	0.0	****	****	****	0.1
BEZZIA	0.0	0.1	0.1	0.1	****	0.4	0.5	0.2	0.1	0.6	0.1	0.5	0.3	0.3	0.7
CULICOIDES	0.0	0.4	0.8	0.0	0.1	0.0	0.0	1.9	****	****	****	****	****	****	2.1
FORCIPOMYIA	0.0	0.0	0.1	0.1	0.1	0.1	****	0.1	1.0	****	****	0.0	1.6	0.1	0.0
PALPOMYIA	****	****	****	****	****	****	****	****	****	0.1	0.1	****	****	****	****
STRATIOMYID	****	****	****	****	****	****	****	0.1	0.1	****	****	0.0	****	****	****

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TABLE VIII. CONTINUED

STATION NUMBER	MM1	XX1	QQ1	JJ1	FF1	NN3	KK3	NN2	FF2	TT1	LL1	KK2	II1	GG1	EE1
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
TAXON:															
CHRYSOPS	****	****	****	0.2	0.1	****	0.0	****	****	****	****	****	****	****	0.0
ATHERIX	****	0.0	****	****	****	****	****	****	****	0.0	****	****	****	****	****
HEMERODROMIA	****	0.0	****	0.1	****	****	0.0	****	****	****	****	****	****	****	****
HYDRELLIA	****	0.0	****	****	****	0.5	0.2	0.1	****	****	****	****	****	****	****
SCATELLA	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
LIMNOPHORA	****	****	****	****	****	****	0.0	****	0.3	****	****	****	****	****	****
BIOMPHYLARIA PFEIFFERI	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
LYMNAEA	****	****	0.1	****	0.1	0.0	****	****	1.7	0.2	****	0.1	0.6	****	0.4
GYRAULUS	0.0	****	0.0	****	****	****	****	0.7	****	0.2	****	0.0	****	****	2.4
BURNUPIA	****	****	0.9	0.6	0.1	0.4	2.7	1.5	0.6	0.1	1.5	****	5.3	0.4	6.0
PISIDIUM	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
TADPOLES	0.1	0.0	0.4	0.2	1.7	0.1	****	1.0	0.2	0.0	0.3	****	0.1	0.1	****
TOTAL NUMBER OF INDIVIDUALS IN SAMPLE	8215	2093	3388	3245	1770	2119	4212	1382	1981	7770	7542	2220	1763	2837	11330

**** = MEANS NOT RECORDED; 0.0 MEANS PRESENT < 0.05%

TABLE IX. THE MARGINAL VEGETATION FAUNA FROM THE REMAINDER OF CLUSTER A AND FROM CLUSTER B OF FIGURE 7.

	A				B									
STATION NUMBER	KK1	LL1	DD1	JJ2	RR1	RR7	DD3	RR9	RR8	YY2	NN1	RR3	RR4	RR2
	%	%	%	%	%	%	%	%	%	%	%	%	%	%
TAXON:														
HYDRA	****	****	****	1.3	****	****	0.0	****	****	****	****	3.2	****	****
PLANARIA	1.5	****	****	0.7	3.0	0.2	0.5	0.2	0.5	0.7	0.1	****	****	1.2
RHABDOCOEL	****	****	****	****	****	****	****	****	0.3	****	****	****	****	8.7
PROSTOMA	****	****	****	0.2	0.2	****	****	0.1	0.8	****	****	4.4	****	0.5
RHABDITID	****	****	0.5	5.9	0.8	0.0	1.0	****	2.1	1.5	0.0	0.2	0.2	2.5
BRANCHIURA SOWERBYI	****	****	****	****	0.0	****	****	****	****	****	****	****	****	****
LIMNODRILUS	0.2	0.9	****	****	0.1	****	****	****	****	1.7	0.4	****	****	****
TUBIFEX	****	2.4	0.5	0.5	0.3	****	0.4	****	0.2	0.4	****	****	0.2	****
AULOPHORUS	****	****	****	****	****	****	****	****	****	****	****	****	****	****
NAIS	****	****	****	****	****	****	****	****	0.1	****	****	0.4	****	****
PRISTINA	****	****	****	****	****	****	****	****	****	****	****	****	****	****
SLAVINA	****	****	****	****	****	5.4	0.5	****	****	****	****	****	****	****
CHAETOGASTER	****	0.3	****	****	0.8	****	****	****	0.7	****	****	****	9.6	****
NAIDIDAE	****	****	****	6.5	****	****	****	****	****	****	****	****	****	2.1
SIMOCEPHALUS	0.2	****	****	****	****	****	****	****	****	****	****	****	****	****
ILYOCRYPTUS	****	0.3	****	****	****	****	****	****	****	****	****	****	****	****
ALONELLA	****	****	****	****	****	****	****	****	****	****	****	****	****	****
CHYDORUS	****	0.3	8.4	****	****	****	****	****	****	****	****	****	****	****
CYCLOPS	6.7	15.7	43.9	2.7	0.5	2.2	1.0	0.3	0.3	1.2	0.5	****	****	0.3
PARACYCLOPS	****	****	****	1.3	****	****	****	****	****	****	****	****	****	****
HARPACTICIDS	0.0	****	****	4.6	****	****	****	****	0.1	****	****	****	****	1.1
CYPRIDOPSIS	0.1	****	0.5	****	0.9	0.3	****	****	****	****	0.3	1.2	****	0.1
CYPRILLA	****	****	****	****	****	****	****	****	****	****	0.6	****	****	****
GOMPHOCYTHERE	0.0	****	****	****	3.1	0.0	****	****	****	****	****	****	****	****
ILYOCYTHERE	****	****	****	****	****	****	0.2	****	****	****	****	****	****	****
ISOCYPRIS	****	****	****	0.7	****	****	2.7	****	0.7	****	****	****	0.2	0.3
PIONOCYPRIS	****	****	1.3	****	****	****	****	****	****	****	****	****	****	****
STENOCYPRIS	1.8	****	****	****	****	****	****	****	****	0.4	****	****	****	****
CARIDINA NILOTICA	0.5	1.4	1.5	0.1	****	****	****	****	****	****	****	****	****	****
CARIDINA TYPUS	****	****	****	****	****	****	****	****	****	****	****	****	****	****
MACROBRACHIUM EQUIDENS	****	****	****	****	****	****	****	****	****	****	****	****	****	****
POTAMON	****	****	****	****	****	****	****	****	****	****	0.0	****	****	****
HYDRACHNELLAE	2.3	0.1	****	0.7	0.3	7.8	0.9	1.4	0.1	7.5	0.5	****	****	4.4
ORIBATOIDES	0.2	****	0.9	1.3	****	****	0.2	****	0.6	0.5	0.0	****	****	****
BAETIS BELLUS	36.3	21.9	4.9	11.2	0.3	0.6	0.2	5.2	2.2	7.4	12.8	0.8	2.1	****
BAETIS GLAUCUS	****	****	****	****	****	****	****	****	****	****	****	****	1.0	****
BAETIS HARRISONI	****	****	****	0.3	0.8	0.8	3.5	0.7	0.7	****	3.5	0.3	1.4	****
BAETIS LATUS	****	0.0	****	****	0.4	2.7	0.6	13.1	8.7	2.8	2.7	0.4	4.3	1.6
CENTROPTILUM CRASSI	****	****	****	****	****	****	****	****	****	****	****	****	****	****
CENTROPTILUM EXCISUM	****	0.0	****	****	0.2	0.3	0.2	0.4	****	1.6	0.0	0.2	0.2	****
CENTROPTILUM INDUSII	****	0.2	****	****	****	****	****	****	****	****	****	****	****	****
CENTROPTILUM SUDAFRICANUM	****	****	0.1	****	0.7	0.0	8.9	****	0.7	0.1	****	****	****	****
PSEUDOCLOEON MACULOSUM	****	****	****	****	****	****	0.1	****	****	****	0.8	****	****	****
PSEUDOCLOEON VINOSUM	****	****	****	****	25.8	38.2	36.2	1.6	35.9	2.1	18.8	35.5	10.3	****
CLOEON AFRICANUM	7.9	35.5	0.8	2.0	****	****	****	****	0.4	****	****	****	****	****
CLOEON VIRGILIAE	****	****	1.8	****	****	****	****	****	****	****	****	****	****	****
ADENOPHLEBIA	****	****	0.2	0.1	****	****	0.2	****	0.0	****	5.9	****	****	****
CHOROTERPES ELEGANS	****	****	****	****	0.1	****	****	****	****	****	****	****	****	****
TRICORYTHUS	****	****	****	****	0.0	0.3	0.0	****	****	****	****	****	****	****
CAENIDAE	8.7	5.1	2.4	6.4	5.8	2.3	12.2	1.7	10.7	11.4	14.4	2.8	7.5	5.6
NOTONURUS	****	****	****	****	****	****	****	1.6	0.0	1.7	****	****	****	****
PSEUDAGRION GIGAS	****	****	****	****	****	****	****	****	****	5.0	****	****	****	****
PSEUDAGRION HAGENI	1.6	0.8	0.8	****	****	****	****	****	****	****	****	****	****	****
PSEUDAGRION KERSTENI	****	1.8	0.3	10.5	****	****	****	****	****	****	7.6	4.2	0.2	6.4
PSEUDAGRION MASSAICUM	****	****	****	****	****	****	****	****	****	****	****	****	****	****
PSEUDAGRION NATALENSE	****	****	****	****	1.2	0.0	0.1	1.2	0.2	****	****	****	****	****
PSEUDAGRION SALISBURYENSE	0.5	****	****	0.2	****	****	****	****	0.1	****	1.7	4.2	****	****
ENALLAGMA/ISCHNURA	****	****	****	****	****	****	****	****	****	****	****	****	****	****
ELATTONEURA	****	****	****	****	****	****	****	****	****	****	****	****	****	****
CHLOROCYPHA	****	****	****	****	****	****	****	****	****	****	0.1	****	****	0.1
PARAGOMPHUS	****	****	****	****	0.2	****	0.0	****	0.0	0.2	0.2	****	****	****
ANAX	0.2	****	0.3	0.1	****	****	****	****	****	****	0.0	****	****	****
CROCOTHEMIS	****	****	****	1.1	****	****	****	****	****	****	****	****	****	****
TRITHEMIS	0.0	0.5	****	****	****	****	****	****	0.1	1.3	****	****	****	0.1
APHELOCHEIRUS SCHOUTEDENI	****	0.1	****	****	****	****	****	****	****	****	****	****	****	****
LACCOCORIS LIMIGENUS	****	0.0	****	****	****	****	****	****	****	****	****	0.1	****	0.4
NAUCORIS OBSCURATUS	****	****	0.1	****	****	****	****	****	****	****	****	****	****	****
SPHAERODEMA	0.1	****	0.1	0.1	****	****	****	****	****	****	****	****	****	****
RANATRA	0.1	****	****	****	****	****	****	****	****	****	****	0.1	****	****
ANISOPS	****	****	0.1	****	****	****	****	****	****	****	****	****	****	****
ENITHARES SOBRIA	****	****	0.1	****	****	****	****	****	****	****	****	****	****	****
MICRONECTA DIMIDIATA	****	****	****	0.1	0.1	0.4	****	0.0	****	****	0.0	0.8	****	0.4
CHEUMATOPSYCHE SP. 2	****	****	****	****	****	****	****	****	****	****	0.2	****	****	0.1
CHEUMATOPSYCHE SP. 5	****	****	****	****	****	****	****	****	****	****	****	****	****	****
CHEUMATOPSYCHE SP. 6	0.4	0.0	****	****	****	****	0.1	****	****	****	0.0	****	****	****
CHEUMATOPSYCHE SP. 7	****	****	****	****	****	****	****	****	****	****	****	****	****	****
CHEUMATOPSYCHE SP. 8	****	****	****	****	****	****	****	****	****	****	****	****	****	****
HYDROPSYCHE	****	****	****	****	****	****	1.1	****	****	****	****	****	****	****
ANISOCENTROPUS	0.2	****	****	****	****	****	****	****	****	****	****	****	****	****
GOERODES	****	****	****	****	0.1	0.0	0.1	****	0.1	****	****	0.1	****	****
ATHRIPSODES PRIONII TYPE 1	0.1	****	****	****	1.1	0.1	0.0	****	0.0	****	****	****	****	****
ATHRIPSODES PRIONII TYPE 2	8.5	1.0	0.5	0.3	****	****	****	0.0	0.0	0.4	1.2	****	****	****
ATHRIPSODES	****	****	****	****	****	****	****	****	****	****	0.0	****	****	****
LEPTOCERUS	****	****	****	0.1	****	****	****	****	****	0.5	****	****	****	****

CONTINUED

TABLE IX. CONTINUED

STATION NUMBER	A				B									
	KK1	LL1	001	JJ2	RR1	RR7	DD3	RR9	RR8	YY2	NN1	RR3	RR4	RR2
TAXON:	%	%	%	%	%	%	%	%	%	%	%	%	%	%
OECETIS SAND CASE	****	****	****	****	****	****	****	****	0.0	****	0.0	****	****	0.1
OECETIS VEGETATION CASE	****	****	****	0.8	1.4	0.1	0.1	0.7	0.4	0.1	3.4	0.1	0.2	0.1
PARASETODES	****	****	****	****	****	****	****	****	****	****	****	****	****	****
TRIAENODES	****	****	****	0.2	****	****	0.7	****	0.1	0.1	0.0	****	****	0.3
TRICHOSETODES	****	****	****	****	****	****	****	****	0.1	****	****	****	0.2	0.1
HYDROPTILA ALGAL CASE	****	****	****	****	0.2	****	****	0.1	0.0	****	0.1	****	****	****
HYDROPTILA SAND CASE	****	****	****	****	0.9	0.3	****	****	****	****	****	****	****	****
ORTHOTRICHIA	****	0.1	****	****	0.2	****	0.0	0.1	0.0	0.1	****	****	****	****
OXYETHIRA	****	****	****	****	0.3	2.9	****	0.1	0.1	****	0.0	****	****	****
LEPIDOPTERA TYPE B	0.1	****	****	****	****	****	****	0.5	0.1	****	****	****	****	****
HELMINII TYPE C1	****	0.1	****	****	0.4	****	0.1	****	0.0	****	****	****	****	****
HELMINII TYPE M3	****	****	****	****	****	****	****	****	****	1.0	****	****	****	****
HELMINTHOPSIS	****	****	****	****	1.8	0.0	0.4	0.2	0.4	2.8	****	****	****	0.3
POTAMODYTES	****	****	****	0.1	0.2	****	0.0	****	0.0	0.4	0.0	0.3	0.2	0.3
POTAMOGETHES	****	****	****	0.1	0.0	****	0.1	0.1	0.2	0.3	****	****	0.2	0.1
STENELMIS	****	****	****	****	****	****	****	****	****	****	****	0.1	0.3	0.1
DYTISCID LARVAE	0.0	0.0	0.1	****	****	****	****	****	****	****	0.0	****	****	****
LACCOPHILUS LINEATUS	****	****	0.1	****	****	****	****	****	****	****	****	****	****	****
LACCOPHILUS PELLUCIDUS	****	****	1.1	****	****	****	****	****	****	****	****	****	****	****
UVARUS PERINGUEYI	****	****	****	0.5	****	0.0	****	0.0	****	****	****	0.2	****	0.1
YOLA NATALENSIS	****	****	****	****	****	****	****	****	****	****	****	****	****	****
AULONOGYRUS LARVAE	****	****	****	****	****	****	0.2	0.2	****	****	0.1	****	****	****
ORECTOGYRUS LARVAE	****	****	****	0.2	****	****	****	****	****	****	0.0	****	****	****
HELODID LARVAE	0.1	****	0.1	0.2	****	****	****	****	****	****	****	****	****	****
HYDRAENID LARVAE	****	****	****	0.1	0.1	****	0.7	0.3	0.4	****	0.0	0.2	****	0.1
HYDRAENID TYPE A	0.4	0.1	0.3	0.3	0.8	0.1	0.2	0.4	0.6	0.9	****	3.4	0.2	0.4
HYDRAENID TYPE D	****	****	****	****	0.0	0.1	0.1	****	0.1	****	****	****	****	****
HYDRAENID TYPE E	0.0	0.0	0.2	****	****	****	****	****	****	****	****	****	****	****
HYDROPHILID LARVAE	****	****	****	****	0.1	****	0.0	0.0	0.0	0.1	****	****	****	****
HYDROPHILID TYPE C	0.0	****	0.1	****	****	****	****	****	****	****	0.0	****	****	0.1
HYDROPHILID TYPE H	****	****	****	****	0.2	****	****	****	0.1	0.2	****	1.2	1.9	6.5
HYDROPHILID TYPE T	****	****	****	0.2	****	****	****	****	0.2	****	****	0.2	****	****
LIMONIA	****	****	****	0.2	****	****	****	0.1	0.3	0.1	****	****	****	****
DIXID	1.2	0.0	0.2	3.3	****	****	****	****	****	****	0.4	****	****	****
ANOPHELES	10.3	0.0	4.7	1.2	****	****	****	****	0.0	****	****	****	****	****
CULEX	0.8	****	0.3	****	****	****	****	****	****	****	****	****	****	****
SIMULIUM ADERSI	****	****	****	****	****	****	****	****	****	****	****	****	****	****
SIMULIUM ALCOCKI	****	****	****	****	****	****	****	****	****	****	****	****	****	****
SIMULIUM (QUERY) BOVIS	****	****	****	****	****	****	1.1	****	0.1	****	****	****	****	****
SIMULIUM CERVICORNUTUM	****	****	****	****	****	****	****	****	****	****	0.6	****	****	****
SIMULIUM DAMNOSUM	****	****	****	****	****	0.0	****	****	****	****	0.8	****	****	****
SIMULIUM HIRSUTUM	****	****	****	****	****	0.0	****	****	****	****	****	****	****	****
SIMULIUM MCMAHONI	****	****	****	****	****	****	****	****	****	****	****	****	****	****
SIMULIUM MEDUSAEFORME	****	****	****	****	0.1	0.7	2.9	0.7	0.0	****	0.1	0.1	****	****
SIMULIUM NIGRITARSE	0.1	0.1	****	****	****	1.1	0.3	****	****	0.5	0.2	****	****	****
SIMULIUM UNICORNUTUM	****	****	****	****	****	****	0.5	0.5	****	****	****	****	2.9	****
SIMULIUM VORAX	****	****	****	****	****	****	****	****	0.1	****	0.1	****	****	****
CHIRONOMINI TYPE B	5.5	3.2	6.3	10.9	10.4	6.2	2.3	19.0	1.5	14.6	3.4	7.5	6.5	11.1
CHIRONOMINI TYPE C	0.3	****	****	****	****	0.3	****	****	****	0.2	****	2.3	****	****
TANYTARSINI TYPE A	****	****	****	0.2	****	****	****	****	0.0	****	****	****	****	****
TANYTARSINI TYPE B	****	****	****	****	5.7	2.3	****	****	****	0.1	0.1	****	****	****
TANYTARSINI TYPE C	****	0.6	****	****	1.8	3.9	1.9	0.2	0.3	0.1	2.8	****	6.8	1.2
TANYTARSINI TYPE D	****	****	****	****	****	****	2.0	3.0	****	****	****	****	1.7	****
TANYTARSINI TYPE E	****	****	****	****	****	****	0.1	1.7	0.0	****	****	****	****	****
TANYTARSINI TYPE F	****	****	****	0.7	****	****	****	2.4	13.4	****	****	****	0.2	7.6
TANYTARSINI TYPE G	****	****	****	****	****	****	****	****	1.0	****	****	****	****	2.5
TANYTARSINI TYPE H	****	****	****	1.1	0.0	****	****	****	****	****	****	****	****	****
TANYTARSINI TYPE J	0.1	0.2	****	****	1.9	****	****	****	****	1.9	****	4.3	****	****
TANYTARSINI TYPE K	****	****	****	****	****	****	****	****	****	****	****	****	****	****
RHEOTANYTARSUS	****	****	****	****	1.0	13.4	2.3	0.1	0.1	0.1	0.3	****	0.2	****
CORYNONEURA	****	1.3	1.9	4.6	2.4	0.2	2.2	6.3	0.7	****	4.4	****	3.8	1.5
THIENEMANNIELLA	****	0.7	4.3	****	4.4	****	****	1.7	****	****	0.4	****	3.3	****
PENTANEURA TYPE 1	****	****	****	0.1	0.8	0.2	0.5	3.2	1.1	0.1	1.0	0.4	5.1	0.5
PENTANEURA TYPE 2	0.1	1.9	1.7	5.3	5.2	1.8	4.4	2.3	9.6	1.1	1.9	12.3	3.8	23.1
PENTANEURA TYPE 3	****	0.6	1.1	2.7	0.1	0.6	****	****	****	0.9	0.5	0.1	0.2	****
PENTANEURA TYPE 4	****	0.5	4.2	****	****	****	****	****	****	****	****	****	****	****
CLINOTANYPUS	****	****	****	****	****	****	****	****	****	****	****	****	****	****
PROCLADIUS	0.4	0.2	****	****	****	****	****	****	****	****	****	****	****	****
ORTHOCLAD TYPE A	****	****	****	****	****	0.1	****	****	0.5	****	****	****	****	****
ORTHOCLAD TYPE B	****	****	****	****	0.0	****	0.0	0.0	****	****	0.4	****	****	****
ORTHOCLAD TYPE C	****	0.1	****	****	0.5	0.1	0.5	0.0	****	****	0.1	0.7	9.8	0.1
ORTHOCLAD TYPE D	0.1	****	****	****	****	0.5	0.5	0.0	****	1.2	1.8	****	****	****
ORTHOCLAD TYPE H	****	****	****	****	2.2	****	****	****	****	****	0.0	****	****	****
ORTHOCLAD TYPE J	****	****	****	****	****	0.2	****	****	****	****	****	****	****	****
ORTHOCLAD TYPE 1	****	****	****	****	0.1	0.0	1.5	****	****	****	0.5	****	****	****
ORTHOCLAD TYPE 2	0.2	****	****	1.2	0.1	0.0	1.3	3.5	0.2	1.1	1.1	****	0.7	0.3
ORTHOCLAD TYPE 3	0.4	0.5	0.7	****	7.1	2.4	****	24.0	1.5	20.6	1.4	6.2	14.6	4.9
ORTHOCLAD TYPE 4	0.0	0.3	0.9	****	0.3	0.1	0.8	0.0	0.1	****	0.0	0.8	****	0.8
ORTHOCLAD TYPE 5	****	****	****	****	0.0	****	****	****	****	****	****	****	****	****
BEZZIA	0.8	0.2	0.1	1.8	0.5	0.0	0.7	0.1	0.4	1.2	0.1	****	0.5	1.5
CULICOIDES	0.1	0.1	****	2.3	****	****	0.0	****	****	****	****	****	****	****
FORCIPOMYIA	****	****	1.1	****	****	****	****	****	****	****	0.0	****	****	****
PALPOMYIA	****	****	****	****	****	****	****	****	****	0.1	0.0	****	****	****
STRATIOMYID	****	****	****	****	****	****	****	****	****	****	****	****	****	****

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TABLE IX. CONTINUED

	A				B									
STATION NUMBER	KK1	LL1	OO1	JJ2	RR1	RR7	DD3	RR9	RR8	YY2	NN1	RR3	RR4	RR2
	%	%	%	%	%	%	%	%	%	%	%	%	%	%
TAXON:														
CHRYSOPS	****	****	****	****	****	****	****	****	****	****	****	****	****	****
ATHERIX	****	****	****	****	0.0	0.0	0.1	0.2	0.0	0.2	0.0	****	****	****
HEMERODROMIA	****	****	****	****	****	0.2	0.0	****	****	****	0.0	****	****	****
HYDRELLIA	****	****	****	****	****	****	****	0.2	****	****	****	0.9	****	****
SCATELLA	****	****	****	****	****	0.0	****	****	0.2	****	****	****	****	****
LIMNOPHORA	****	****	****	****	****	****	0.1	****	****	****	****	****	****	****
BIOMPHYLARIA PFEIFFERI	****	****	****	****	****	****	****	****	****	****	****	****	****	****
LYMNAEA	0.2	****	****	0.2	0.0	0.0	****	0.0	****	****	****	****	****	****
GYRAULUS	0.0	****	****	****	0.8	****	0.0	****	****	0.2	****	****	****	****
BURNUPIA	0.1	0.4	0.7	2.8	0.7	****	0.1	0.2	****	0.1	0.5	****	****	****
PISIDIUM	0.7	****	****	****	0.5	****	****	****	****	1.5	****	****	****	****
TADPOLES	****	0.2	****	****	0.2	0.1	0.0	****	****	0.1	0.7	****	****	0.1
TOTAL NUMBER OF INDIVIDUALS IN SAMPLE	3692	2831	1807	1224	3314	2909	4143	2479	5981	1939	5160	1065	584	750

**** = MEANS NOT RECORDED; 0.0 MEANS PRESENT < 0.05%

TABLE X. THE MARGINAL VEGETATION FAUNA FROM CLUSTERS C, D AND E OF FIGURE 7.

	C						D				E	
STATION NUMBER	YY3	RR10	RR5	RR11	DD6	DD5	WW1	HH1	PP1	DD7	RR6	FF3
	%	%	%	%	%	%	%	%	%	%	%	%
TAXON:												
HYDRA	****	****	****	****	****	****	****	****	****	****	****	****
PLANARIA	0.0	****	****	7.6	****	****	****	****	0.1	****	****	****
RHABDOCOEL	****	****	****	****	****	****	****	****	****	****	****	****
PROSTOMA	0.1	0.1	1.2	0.3	6.5	8.3	****	****	****	****	0.3	****
RHABDITID	0.4	0.7	1.2	5.3	****	1.3	****	****	****	1.1	6.2	****
BRANCHIURA SOWERBYI	****	****	****	****	****	****	****	****	****	0.1	****	****
LIMNODRILUS	****	****	2.0	****	****	****	1.3	0.9	****	0.3	0.3	4.8
TUBIFEX	****	****	****	****	0.2	****	1.3	****	1.2	1.1	2.8	****
AULOPHORUS	****	****	****	****	****	****	****	****	****	2.7	****	****
NAIS	****	****	****	2.1	****	****	6.6	****	4.3	****	0.7	****
PRISTINA	****	****	****	****	****	****	****	****	****	****	****	****
SLAVINA	****	****	****	****	****	****	****	****	****	****	****	****
CHAETOGASTER	****	4.7	****	****	****	****	****	****	****	2.3	72.5	****
NAIDIDAE	****	6.7	0.3	****	2.9	****	****	****	****	****	****	****
SIMOCEPHALUS	****	****	****	****	****	****	****	****	****	****	****	****
ILYOCRYPTUS	****	****	****	****	****	****	****	****	****	****	****	****
ALONELLA	****	****	****	****	****	****	****	****	****	****	****	****
CHYDORUS	2.1	****	****	****	****	****	****	****	****	****	****	****
CYCLOPS	4.3	0.7	****	7.4	****	4.2	****	****	****	****	0.3	4.6
PARACYCLOPS	****	****	****	****	****	****	****	****	****	****	****	****
HARPACTICIDS	****	****	****	****	****	****	****	****	****	****	****	****
CYPRIDOPSIS	****	0.1	****	2.4	****	****	****	5.6	****	****	****	****
CYPRILLA	****	****	****	****	****	****	****	****	****	****	****	****
GOMPHOCYTHERE	****	****	****	1.1	****	****	****	****	****	****	****	****
ILYOCYTHERE	****	****	****	****	****	****	****	****	****	****	****	****
ISOCYPRIS	****	****	****	****	****	****	****	****	****	****	****	****
PIONOCYPRIS	0.0	****	****	****	****	****	****	****	****	****	****	****
STENOCYPRIS	****	****	****	****	****	0.2	****	****	****	****	****	****
CARIDINA NILOTICA	0.8	2.2	15.9	****	****	****	14.6	9.3	1.3	17.5	9.1	****
CARIDINA TYPUS	****	****	****	****	****	****	****	****	****	****	****	****
MACROBRACHIUM EQUIDENS	****	****	****	****	****	****	****	****	****	3.1	****	****
POTAMON	****	****	****	****	****	****	****	0.1	0.4	****	0.1	****
HYDRACHNELLAE	****	****	****	****	****	0.3	****	0.9	2.0	****	****	****
ORIBATOIDES	****	****	****	****	****	****	2.0	****	3.9	****	****	****
BAETIS BELLUS	2.3	28.6	4.5	****	6.5	0.8	11.9	1.0	33.3	2.6	****	****
BAETIS GLAUCUS	****	****	****	****	****	****	****	****	****	1.1	****	****
BAETIS HARRISONI	****	****	****	****	****	****	2.0	****	****	****	****	****
BAETIS LATUS	****	****	****	****	****	****	****	10.1	9.9	0.4	****	****
CENTROPTILUM CRASSI	****	****	****	****	****	****	****	****	****	****	****	****
CENTROPTILUM EXCISUM	1.3	0.8	****	3.4	2.4	1.3	****	****	0.2	****	****	****
CENTROPTILUM INDUSII	****	****	****	****	****	****	****	****	****	****	****	****
CENTROPTILUM SUDAFRICANUM	****	****	****	****	****	****	****	16.6	0.5	****	****	****
PSEUDOCLOEON MACULOSUM	****	****	****	****	****	****	****	****	****	0.4	****	****
PSEUDOCLOEON VINOSUM	****	****	5.9	37.1	0.9	****	****	****	****	7.3	****	****
CLOEON AFRICANUM	2.2	0.6	9.0	****	****	****	****	****	****	****	1.4	****
CLOEON VIRGILIAE	****	****	****	****	****	****	****	****	****	0.7	****	****
ADENOPHLEBIA	****	****	****	****	****	****	****	7.0	1.5	****	****	****
CHOROTERPES ELEGANS	****	****	****	****	****	****	****	****	****	0.1	****	****
TRICORYTHUS	****	****	****	****	****	****	****	****	****	****	****	****
CAENIDAE	6.3	7.4	1.7	3.7	8.8	6.3	4.6	3.7	****	6.7	****	****
NOTONURUS	3.7	11.3	0.2	****	****	****	****	****	****	****	****	****
PSEUDAGRION GIGAS	****	****	****	****	****	****	****	****	****	****	****	****
PSEUDAGRION HAGENI	****	****	****	****	****	****	****	****	****	****	****	****
PSEUDAGRION KERSTENI	****	11.3	34.3	****	3.0	****	2.6	9.9	5.6	5.4	2.1	0.4
PSEUDAGRION MASSAICUM	10.1	****	****	****	1.5	****	****	****	****	****	****	****
PSEUDAGRION NATALENSE	****	****	****	2.1	****	****	****	****	****	****	****	****
PSEUDAGRION SALISBURYENSE	30.5	****	****	****	2.3	0.5	****	****	****	****	****	****
ENALLAGMA/ISCHNURA	****	****	****	****	****	****	****	****	****	****	****	****
ELATTONEURA	****	****	****	****	****	0.2	****	****	****	****	****	****
CHLOROCYPHA	0.1	****	****	****	1.5	****	****	****	****	****	****	****
PARAGOMPHUS	****	0.4	****	****	****	****	****	****	0.1	****	****	****
ANAX	****	****	****	****	****	****	****	****	****	0.1	****	****
CROCOTHEMIS	****	****	****	****	****	****	****	****	0.2	****	****	****
TRITHEMIS	0.1	0.1	0.3	****	0.2	0.3	****	****	****	0.4	****	****
APHELOCHEIRUS SCHOUTEDENI	****	****	****	****	****	****	****	****	****	****	****	****
LACCOCORIS LIMIGENUS	****	****	****	****	****	****	****	****	0.5	****	****	****
NAUCORIS OBSCURATUS	****	****	****	****	****	****	****	****	****	****	****	****
SPHAERODEMA	0.0	0.1	****	****	****	****	****	****	****	****	****	****
RANATRA	****	****	****	****	****	****	****	****	0.1	****	****	****
ANISOPS	****	****	****	****	****	****	****	****	****	****	****	****
ENITHARES SOBRIA	****	****	****	****	****	****	****	****	****	****	****	****
MICRONECTA DIMIDIATA	****	****	****	0.3	0.2	5.0	****	****	****	****	****	****
CHEUMATOPSYCHE SP. 2	****	****	****	****	****	****	****	****	****	****	****	****
CHEUMATOPSYCHE SP. 5	****	****	****	****	****	****	****	****	1.7	****	****	****
CHEUMATOPSYCHE SP. 6	****	****	****	****	****	****	****	****	****	0.1	****	****
CHEUMATOPSYCHE SP. 7	****	****	****	****	****	****	****	0.9	****	****	****	****
CHEUMATOPSYCHE SP. 8	****	****	****	****	****	****	****	****	****	****	****	****
HYDROPSYCHE	****	****	****	****	****	****	****	****	****	****	****	****
ANISOCENTROPUS	****	****	****	****	****	****	****	****	****	****	****	****
GOERODES	****	****	****	****	****	****	****	****	****	****	****	****
ATHRIPSODES PRIONII TYPE 1	****	****	****	****	****	****	****	****	****	****	****	****
ATHRIPSODES PRIONII TYPE 2	0.1	2.4	0.2	****	****	0.2	0.7	****	****	****	****	****
ATHRIPSODES	****	****	****	****	****	****	****	****	****	****	****	****
LEPTOCERUS	1.9	****	****	****	****	****	****	****	****	****	****	****

CONTINUED

TABLE X. CONTINUED

	C						D				E	
STATION NUMBER	YY3	RR10	RR5	RR11	DD6	DD5	WW1	HH1	PP1	DD7	RR6	FF3
	%	%	%	%	%	%	%	%	%	%	%	%
TAXON:												
OECETIS SAND CASE	****	****	****	****	****	****	****	****	****	****	****	****
OECETIS VEGETATION CASE	0.3	0.4	****	****	****	****	****	****	0.1	****	****	****
PARASETODES	****	****	****	****	****	****	****	****	****	****	****	****
TRIAENODES	0.8	0.1	****	****	****	****	****	****	****	****	****	****
TRICHOSETODES	****	****	****	****	****	****	****	****	****	****	****	****
HYDROPTILA ALGAL CASE	****	****	2.5	****	****	****	****	****	****	****	****	****
HYDROPTILA SAND CASE	****	****	****	****	****	****	****	****	****	****	****	****
ORTHOTRICHIA	****	****	****	****	****	****	****	****	0.5	****	****	****
OXYETHIRA	****	****	****	3.2	****	****	****	****	****	****	****	****
LEPIDOPTERA TYPE B	****	****	****	****	****	****	****	****	****	****	****	0.1
HELMINII TYPE C1	****	****	****	****	****	****	****	****	0.2	****	****	****
HELMINII TYPE M3	****	****	****	****	****	****	****	****	****	****	****	****
HELMINTHOPSIS	****	****	****	****	****	****	****	****	****	****	****	****
POTAMODYTES	****	0.1	****	****	****	0.2	****	****	****	****	****	****
POTAMOGETHES	0.0	****	****	****	****	****	****	****	****	****	****	****
STENELMIS	****	****	0.2	****	****	****	****	****	****	****	****	****
DYTISCID LARVAE	****	****	****	****	****	****	****	****	****	****	****	****
LACCOPHILUS LINEATUS	****	****	****	****	****	****	****	****	****	****	****	****
LACCOPHILUS PELLUCIDUS	****	****	****	****	****	****	****	****	****	****	****	****
UVARUS PERINGUEYI	****	****	****	****	****	****	****	****	0.1	****	****	****
YOLA NATALENSIS	****	****	****	****	****	****	****	****	****	****	****	****
AULONOGYRUS LARVAE	****	****	****	****	****	****	****	****	0.4	****	****	****
ORECTOGYRUS LARVAE	****	****	****	****	****	****	****	****	0.1	****	****	****
HELODID LARVAE	****	****	****	****	****	****	****	****	****	****	****	****
HYDRAENID LARVAE	****	****	****	****	****	****	****	****	****	****	****	****
HYDRAENID TYPE A	****	0.1	****	****	****	****	****	0.1	0.1	****	****	****
HYDRAENID TYPE D	****	****	****	****	****	****	****	****	****	****	****	****
HYDRAENID TYPE E	****	****	****	****	****	****	****	****	****	****	****	****
HYDROPHILID LARVAE	****	****	****	****	****	****	****	****	0.1	****	****	0.1
HYDROPHILID TYPE C	****	****	****	****	****	****	****	****	****	****	****	****
HYDROPHILID TYPE H	****	****	****	****	****	0.3	****	****	****	****	****	****
HYDROPHILID TYPE T	****	****	****	****	****	****	****	****	****	****	****	****
LIMONIA	****	0.1	****	****	****	****	****	0.1	****	****	****	0.1
DIXID	****	****	****	****	****	****	****	11.5	****	****	****	****
ANOPHELES	****	****	****	****	****	****	****	2.2	****	****	****	****
CULEX	****	****	****	****	****	****	****	****	****	****	****	****
SIMULIUM ADERSI	****	****	****	****	****	****	****	****	****	****	****	****
SIMULIUM ALCOCKI	****	****	****	****	****	****	****	1.6	****	****	****	****
SIMULIUM (QUERY) BOVIS	****	****	****	****	****	****	****	****	****	****	****	****
SIMULIUM CERVICORNUTUM	****	****	****	****	****	****	****	****	****	****	****	****
SIMULIUM DAMNOSUM	****	****	****	****	****	****	****	****	****	****	****	****
SIMULIUM HIRSUTUM	****	****	****	****	****	****	****	****	4.0	****	****	****
SIMULIUM MCMAHONI	****	****	****	****	****	****	****	****	****	7.0	****	****
SIMULIUM MEDUSAEFORME	****	****	****	****	****	****	****	****	****	7.0	****	****
SIMULIUM NIGRITARSE	****	1.4	0.2	****	****	****	31.8	2.1	7.4	****	****	****
SIMULIUM UNICORNUTUM	****	****	****	****	****	****	****	****	****	****	****	****
SIMULIUM VORAX	****	****	****	****	****	****	****	****	****	****	****	****
CHIRONOMINI TYPE B	1.9	3.1	5.1	0.8	1.1	0.5	1.3	0.1	0.9	3.3	0.7	55.2
CHIRONOMINI TYPE C	****	0.2	****	1.1	0.2	2.2	****	****	****	****	****	****
TANYTARSINI TYPE A	****	****	****	****	****	****	****	****	****	3.4	****	****
TANYTARSINI TYPE B	****	****	****	****	****	****	****	****	****	****	****	****
TANYTARSINI TYPE C	0.1	****	1.4	****	****	****	0.7	3.0	6.2	4.1	****	****
TANYTARSINI TYPE D	0.2	****	****	****	1.5	6.6	****	****	****	****	****	****
TANYTARSINI TYPE E	****	****	****	****	****	****	****	****	****	0.1	****	****
TANYTARSINI TYPE F	****	****	****	****	1.5	****	****	****	****	****	****	****
TANYTARSINI TYPE G	****	****	****	****	****	****	****	****	****	****	****	****
TANYTARSINI TYPE H	****	****	2.6	****	****	****	****	****	****	0.3	****	24.4
TANYTARSINI TYPE J	1.5	0.1	****	2.1	****	****	6.0	****	****	****	****	****
TANYTARSINI TYPE K	****	0.4	****	****	****	****	****	****	****	****	****	****
RHEOTANYTARSUS	****	****	****	9.2	****	****	****	****	****	1.7	****	****
CORYNONEURA	0.1	2.1	****	1.1	0.2	****	4.0	2.8	5.1	1.1	****	****
THIENEMANNIELLA	****	****	****	****	1.7	0.2	1.3	0.1	2.3	1.4	****	****
PENTANEURA TYPE 1	0.3	1.0	0.8	0.3	0.2	0.2	****	2.3	0.4	1.0	0.7	****
PENTANEURA TYPE 2	16.5	5.0	1.7	0.5	24.0	31.0	****	1.2	0.1	0.1	0.7	10.2
PENTANEURA TYPE 3	****	1.3	****	****	****	****	2.0	****	1.5	1.0	****	****
PENTANEURA TYPE 4	****	0.2	****	****	****	****	****	****	****	****	****	****
CLINOTANYPUS	****	****	****	****	****	****	****	****	****	****	****	****
PROCLADIUS	****	****	****	****	****	****	****	****	****	****	****	****
ORTHOCLAD TYPE A	****	****	****	****	****	****	1.3	****	****	****	****	****
ORTHOCLAD TYPE B	****	****	****	****	****	****	****	****	****	****	****	****
ORTHOCLAD TYPE C	0.1	****	0.3	1.6	****	****	****	****	0.5	****	****	****
ORTHOCLAD TYPE D	****	****	1.2	****	****	****	****	****	****	****	****	****
ORTHOCLAD TYPE H	****	****	****	****	****	****	****	****	****	****	****	****
ORTHOCLAD TYPE J	****	****	****	****	****	****	****	****	****	****	****	****
ORTHOCLAD TYPE 1	****	****	****	****	****	****	****	****	****	****	****	****
ORTHOCLAD TYPE 2	0.1	0.7	0.2	****	****	****	****	3.0	0.2	0.9	****	****
ORTHOCLAD TYPE 3	1.3	0.8	5.3	1.8	13.5	4.1	2.6	0.1	0.2	2.7	2.1	****
ORTHOCLAD TYPE 4	****	0.7	****	****	****	****	****	****	****	8.6	****	****
ORTHOCLAD TYPE 5	****	****	****	****	****	****	****	****	****	****	****	****
BEZZIA	0.0	1.2	0.2	0.3	1.8	3.0	****	0.2	1.2	****	****	****
CULICOIDES	****	****	****	****	0.2	****	****	****	****	****	****	****
FORCIPOMYIA	****	0.1	****	****	****	****	1.3	2.9	1.1	****	****	****
PALPOMYIA	****	****	****	****	****	****	****	****	****	****	****	****
STRATIOMYID	****	0.1	****	****	****	****	****	0.1	****	****	****	****

CONTINUED

TABLE X. CONTINUED

	C						D				E	
STATION NUMBER	YY3	RR10	RR5	RR11	DD6	DD5	WW1	HH1	PP1	DD7	RR6	FF3
	%	%	%	%	%	%	%	%	%	%	%	%
TAXON:												
CHRYSOPS	****	****	****	****	****	****	****	****	****	****	****	****
ATHERIX	0.0	0.1	****	****	****	0.2	****	0.1	****	****	****	****
HEMERODROMIA	0.0	****	****	****	****	****	****	****	****	****	****	****
HYDRELLIA	****	****	0.3	****	****	****	****	****	****	****	****	****
SCATELLA	****	****	****	****	****	****	****	****	****	****	****	****
LIMNOPHORA	****	****	****	****	****	****	****	****	****	****	****	****
BIOMPHYLARIA PFEIFFERI	****	****	****	****	0.2	8.6	****	****	****	****	****	****
LYMNAEA	****	0.7	****	****	****	****	****	****	****	****	****	****
GYRAULUS	0.1	0.8	****	0.5	0.3	0.3	****	0.1	****	****	****	****
BURNUPIA	6.0	****	****	3.2	16.7	13.9	****	****	****	2.3	****	****
PISIDIUM	****	1.3	****	****	****	****	****	****	****	****	****	****
TADPOLES	4.1	****	1.5	1.8	****	0.3	****	0.2	0.1	****	****	0.1
TOTAL NUMBER OF INDIVIDUALS IN SAMPLE	2261	1208	647	380	657	639	151	862	819	701	2317	1383

**** = MEANS NOT RECORDED; 0.0 MEANS PRESENT < 0.05%

TABLE XI FAUNA OF MARGINAL VEGETATION. TAXA NOT INCLUDED IN TABLES VIII TO X. NUMBERS OF INDIVIDUALS IN SAMPLES ARRANGED IN ORDER OF CLUSTERS IN FIGURE 5.

CLUSTER									A										
STATION NUMBER	MM1	XX1	QQ1	JJ1	FF1	NN3	KK3	NN2	FF2	TT1	LL1	KK2	II1	GG1	EE1	KK1	LL1	OO1	JJ2
TAXON:																			
MERMITHIDAE	+++	+++	2	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
HIRUDINEA	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	3	+++	+++	+++
ACROPERUS HARPAE	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++
PLEUROXUS	+++	+++	2	1	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
CERIODAPHNIA	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++
NEOPERLA SPIO	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
EPHORON	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++
BAETIS (ACENTRELLA) JUVENILES	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++
MACHADORYTHUS	+++	+++	+++	+++	+++	+++	+++	+++	+++	4	+++	1	+++	+++	+++	+++	+++	+++	+++
LESTES	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	4	+++	+++	+++
PHAON	+++	+++	+++	+++	+++	+++	2	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
CERATOGOMPHUS	+++	+++	+++	+++	+++	+++	+++	+++	+++	2	+++	+++	+++	+++	+++	+++	+++	+++	+++
MACROMIA	+++	+++	+++	2	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++
ENITHARES V-FLAVUM	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++
NYCHIA	+++	+++	+++	+++	2	+++	+++	+++	+++	+++	+++	1	+++	+++	4	+++	+++	+++	+++
PLEA PULLULA	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	5	+++	+++	+++
ECNOMUS THOMASSETI	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	4	1	+++	+++	+++
GUIGNOTUS	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	3	+++	+++
HYDATICUS DORSIGER	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++
HYPHYDRUS AETHIOPICUS	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++
LACCOPHILUS FLAVEOLUS	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++
LACCOPHILUS MODESTUS	+++	+++	+++	1	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++
YOLA FRONTALIS	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++
YOLA INOPINATA	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	1	+++	+++	+++	+++
YOLA ?SP.	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
CANTHYDRUS NOTULA	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	2	+++	+++
RHANTATICUS CONGESTUS	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++
PACHYELMIS	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1
PSEUDANCYRONYX	+++	+++	+++	+++	+++	+++	+++	+++	+++	2	+++	+++	+++	+++	+++	+++	+++	+++	+++
AULONOGYRUS ABDOMINALIS	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++
DINEUTUS GROSSUS	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	2	+++	+++	+++
ORECTOGYRUS SPP.	2	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++
HALIPLID	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	3	+++	+++	+++
HYDRAENID TYPE F	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++
HYDRAENID TYPE M	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++
HYDROPHILID TYPE D	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++
HYDROPHILID TYPE F	+++	1	1	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
HYDROPHILID TYPE G	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
HYDROPHILID TYPE L	1	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1
HYDROPHILID TYPE Q	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
HYDROPHILID TYPE R	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++
HYDROPHILID TYPE U	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	1	+++
HYDROPHILID TYPE W	+++	+++	+++	3	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	3
LAMPYRID	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++
AFROEUBRIA	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
EUBRIANAX	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++
TIPULID-LIMNOPHILA TYPE	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
TIPULID-LONGURIA TYPE	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1
TIPULID-PRIONOCERA TYPE	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	2	+++	3
LIROPEIDAE	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1
PSYCHODID-MARUINA TYPE	+++	+++	+++	+++	+++	+++	+++	2	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
PSYCHODID-PSYCHODA TYPE	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++
PSYCHODID-?SP.	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1
CHAOBORUS	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
AEDES	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++
MANSONIA	+++	+++	+++	+++	+++	+++	+++	+++	2	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
SIMULIUM RUFICORNE	+++	4	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
CHIRONOMINI TYPE A	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	3	+++	+++	+++	+++	+++	+++
ORTHOCLAD TYPE K	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++
ALLUAUDOMYIA	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++
DASYHELEA	+++	+++	+++	+++	+++	+++	2	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
EMPIDID-CHELIFERA TYPE	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++
EPHYDRID-PARYDRA TYPE	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++
EPHYDRID-?SP.	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
MUSCID-LIPSOCEPHALA TYPE	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
MUSCID-LIPSE TYPE	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++
CICHLID	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++

continued

TABLE XI CONTINUED

CLUSTER					B								C				D		E
STATION NUMBER	RR1	RR7	DD3	RR9	RR8	YY2	NN1	RR3	RR4	RR2	YY3	RR10	RR5	RR11	DD6	HH1	PP1	DD7	FF3
TAXON:																			
MERMITHIDAE	+++	+++	+++	1	+++	+++	+++	+++	9	+++	+++	13	+++	+++	+++	+++	+++	+++	+++
TARDIGRADA	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++
ISOPODA	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++
BAETIS (ACENTRELLA) JUVENILES	+++	3	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
BAETIS TYPE A	+++	+++	+++	+++	+++	+++	4	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
PSEUDOCLOEON TYPE C	+++	+++	+++	1	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
PSEUDOCLOEON TYPE D	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
CASTANOPHLEBIA	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	3	+++	+++	+++	+++	+++	+++	+++	+++
PROSOPISTOMA	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	1	+++
AFRONURUS	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
CERATOGOMPHUS	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1
AESHNA	+++	+++	2	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
ORTHETRUM	+++	+++	2	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
TROPOCORIXA	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++
PLEA PULLULA	+++	+++	+++	2	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
METALYPE	+++	+++	2	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
POLYPLECTROPUS	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
CATOXYETHIRA	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++
GUIGNOTUS	3	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
LACCOPHILUS CYCLOPIS	+++	2	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
DRYOPS	+++	1	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
LEPTELMIS	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++
LOBELMIS	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++
PSEUDANCYRONYX	2	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
PSEUDELMIDOLIA	1	+++	1	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
AULONOGYRUS ABDOMINALIS	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
AULONOGYRUS BACHMANNI	+++	+++	2	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
AULONOGYRUS SP.	+++	+++	+++	2	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
ORECTOGYRUS SPP.	2	+++	+++	2	+++	+++	+++	3	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++
HALIPLID	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++
HYDRAENID TYPE C	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
HYDRAENID TYPE K	+++	+++	3	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
HYDROPHILID TYPE F	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
HYDROPHILID TYPE L	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++
HYDROPHILID TYPE R	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++
EUBRIANAX	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
PTILODACTYLID	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
PSYCHODID-PERICOMA TYPE	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1
PSYCHODID-?SP.	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
CHIRONOMUS	+++	+++	+++	+++	+++	+++	+++	+++	+++	2	+++	+++	+++	+++	+++	+++	+++	+++	+++
CHIRONOMINI TYPE A	+++	+++	3	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
TANYTARSINI TYPE L	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++
TANYTARSINI TYPE M	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
ORTHOCLAD TYPE G	2	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
ATRICHOPOGON	+++	+++	+++	+++	+++	3	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
DASYHELEA	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	2	+++	+++
STILOBEZZIA	+++	+++	+++	+++	2	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
EMPIDID-CHELIFERA TYPE	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++
EMPIDID-CLINOCERA TYPE	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
EMPIDID-WIEDMANNIA TYPE	1	+++	+++	+++	+++	2	+++	1	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
EMPIDID-?SP.	+++	+++	+++	+++	3	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
EPHYDRID-PARYDRA	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1	+++	+++	+++	+++	+++	+++
BULINUS	1	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
CICHLID	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	1
BARBUS	+++	5	+++	+++	+++	+++	+++	+++	+++	+++	3	+++	+++	5	+++	+++	+++	+++	+++
ANGUILLA	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	2	+++

ALL TAXA FROM STATIONS DD5, FF2, RR6 AND WW1 ARE INCLUDED IN TABLES VIII TO X

TABLE XII. THE SEDIMENT FAUNA FROM CLUSTER A OF FIGURE 9.

STATION NUMBER	XX1	PP1	FF2	KK3	LL1	MM1	QQ1	JJ1	NN1	KK2	NN2	GG1	DD4	VV1	HH1
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
TAXON:															
HYDRA	****	****	****	****	****	****	****	****	****	0.8	****	****	****	****	****
PROSTOMA	****	****	****	****	****	****	****	0.4	****	****	1.4	****	****	****	4.3
MERMITHID	****	****	****	****	****	****	****	****	****	0.8	****	****	****	1.7	****
RHABDITID	****	****	****	****	4.0	0.6	0.4	****	****	****	****	0.7	4.0	****	****
TARDIGRADA	****	****	****	****	****	****	****	****	****	****	****	0.7	1.7	****	****
BRANCHIURA SOWERBYI	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
LIMNODRILUS	****	****	****	****	12.4	0.6	****	****	0.7	****	****	1.1	****	****	4.3
TUBIFEX	1.3	1.7	****	****	4.0	****	0.4	4.9	****	****	****	1.5	****	5.1	0.9
HAEMONAIS	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
NAIS	****	****	****	****	****	****	0.7	****	****	****	****	****	****	****	****
CHAETOGASTER	****	****	****	****	****	****	****	1.1	****	****	1.4	****	****	****	****
NAIDIDAE	****	****	****	****	****	****	****	0.4	0.7	****	****	****	****	****	****
DAPHNIA	****	****	****	****	****	****	****	****	****	****	****	****	****	0.4	****
ILYOCRYPTUS	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
ALONA	****	****	****	****	****	****	****	****	****	****	****	****	0.5	****	****
CYCLOPS	****	****	0.6	4.5	4.0	****	1.1	0.7	****	****	5.5	****	13.4	****	2.6
HARPACTICIDAE	****	****	****	****	****	****	****	****	****	****	****	****	3.0	****	****
CYPRIDOPSIS	****	****	****	****	****	****	1.8	0.4	****	****	****	****	2.0	****	13.9
GOMPHOCYTHERE	****	****	****	****	****	****	0.4	****	****	0.8	****	****	0.7	1.7	****
ILYOCYPRIS	****	****	****	****	****	****	****	****	****	****	****	****	0.2	****	****
PIONOCYPRIS	0.7	1.7	****	****	0.5	****	****	0.4	****	0.8	1.4	****	****	****	****
STENOCYPRIS	****	****	****	****	****	****	0.4	0.7	0.7	5.5	****	0.4	6.9	****	0.9
CARIDINA NILOTICA	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
HYDRACHNELLAE	1.3	****	0.6	****	****	****	0.4	0.4	0.7	1.6	****	3.7	0.5	1.7	4.3
ORIBATOIDES	****	****	****	****	0.5	****	****	****	****	****	****	0.7	0.2	0.8	****
NEOPERLA SPIO	****	****	****	****	****	****	****	****	****	1.6	****	****	****	****	****
BAETIDAE	0.7	1.7	11.5	11.9	6.0	1.2	0.4	1.4	18.8	7.1	4.1	0.4	4.0	****	4.3
CHOROTERPES ELEGANS	****	****	****	****	****	****	0.4	****	0.7	0.8	****	****	****	****	****
CAENIDAE	2.6	1.7	1.1	1.5	2.0	****	7.0	25.1	16.7	4.7	8.2	4.4	2.5	0.8	4.3
PSEUDAGRION	****	****	****	****	****	****	****	****	****	3.1	****	****	****	****	****
PARAGOMPHUS	****	****	3.4	****	10.4	1.2	0.4	1.4	3.6	2.4	2.7	0.7	****	6.8	2.6
LIBELLULID JUVENILES	****	****	****	****	2.0	****	****	0.7	0.7	0.8	****	****	****	****	****
APHELOCHEIRUS SCHOUTEDENI	****	****	****	****	****	****	0.7	****	****	****	****	****	****	****	****
LACCOCORIS LIMIGENUS	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
MICRONECTA DIMIDIATA	****	****	****	****	****	****	****	****	****	****	****	****	****	7.2	****
CHEUMATOPSYCHE	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
HYDROPSYCHID	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
DIPSEUDOPSIS	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
CHIMARRA	****	****	****	****	****	****	****	****	****	****	****	****	****	0.8	****
ECNOMUS THOMASSETI	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
LEPTOCERIDAE	****	****	1.7	0.7	****	****	****	0.7	1.4	0.8	****	0.4	0.2	****	****
HYDROPTILID JUVENILES	****	****	****	****	****	****	****	****	****	****	****	****	****	0.4	****
YOLA NATALENSIS	****	****	****	****	****	****	0.4	****	****	****	****	****	****	****	****
HELMINII TYPE C1	0.7	3.3	****	0.7	1.5	2.5	0.4	9.9	0.7	15.0	****	5.9	****	1.7	****
LOBELMIS	****	****	****	****	****	0.6	****	****	****	0.8	****	****	****	****	****
AULONOGYRUS LARVAE	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
HYDROPHILID LARVAE	6.6	1.7	1.7	0.7	10.0	1.2	1.8	****	0.7	1.6	2.7	2.2	****	0.4	0.9
HYDROPHILID TYPE C	****	****	****	****	****	****	0.7	****	****	****	****	****	****	****	****
HYDROPHILID TYPE L	****	****	****	****	****	****	****	****	****	****	1.4	****	****	****	****
ANTOCHA	****	****	****	****	****	****	****	****	1.4	****	****	****	0.2	****	****
LIMNOPHILA	0.7	****	****	****	****	****	1.1	****	****	****	****	****	****	2.1	5.2
LIMONIA	****	****	****	****	****	****	****	****	****	0.8	****	0.4	****	0.4	****
DIXID	****	****	****	****	****	****	****	****	****	****	****	0.4	****	****	0.9
ANOPHELES	****	****	****	****	****	****	****	****	****	****	****	****	****	****	0.9
SIMULIIDAE	1.3	1.7	1.7	1.5	0.5	****	0.7	****	0.7	0.8	****	****	****	0.4	0.9
CHIRONOMINI TYPE B	****	1.7	****	0.7	3.0	0.6	1.5	36.7	1.4	11.0	5.5	****	10.4	0.4	****
CHIRONOMINI TYPE C	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
CHIRONOMINI TYPE D	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
CRYPTOCHIRONOMUS	****	****	0.6	2.2	1.0	****	****	****	10.9	1.6	6.8	****	****	****	****
TANYTARSINI TYPE A	****	****	1.7	****	****	****	****	****	11.6	3.9	8.2	****	****	2.5	8.7
TANYTARSINI TYPE C	****	****	****	****	****	4.3	****	****	****	****	****	****	****	****	****
TANYTARSINI TYPE D	****	****	****	****	****	****	****	****	****	****	****	****	1.2	****	****
TANYTARSINI TYPE E	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
TANYTARSINI TYPE F	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
TANYTARSINI TYPE H	5.9	40.0	70.1	65.7	7.5	67.5	11.8	5.7	0.7	11.0	32.9	3.7	39.2	39.8	****
TANYTARSINI TYPE K	****	****	****	****	0.5	****	****	****	****	****	****	****	****	****	****
TANYTARSINI TYPE L	****	****	****	****	****	****	****	3.5	****	1.6	****	****	****	****	37.4
RHEOTANYTARSUS	****	****	****	****	****	****	****	****	****	****	****	****	****	0.4	****
CORYNONEURA	0.7	1.7	1.1	5.2	0.5	0.6	13.6	0.7	8.7	10.2	4.1	45.2	****	****	****
THIENEMANNIELLA	****	****	****	2.2	****	1.2	10.7	****	0.7	1.6	****	****	****	****	****
PENTANEURA TYPE 1	****	****	****	****	****	****	****	****	****	****	4.1	1.1	0.2	****	****
PENTANEURA TYPE 2	73.7	****	3.4	0.7	26.9	0.6	7.7	3.9	13.0	3.1	****	14.7	4.0	9.3	****
PENTANEURA TYPE 3	****	35.0	****	0.7	1.0	4.3	14.7	****	2.2	0.8	1.4	****	****	****	****
PENTANEURA TYPE 4	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
PROCLADIUS	****	****	****	****	0.5	****	****	0.4	****	****	****	****	****	2.1	0.9
ORTHOCLAD TYPE A	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
ORTHOCLAD TYPE B	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
ORTHOCLAD TYPE C	****	****	****	****	****	****	****	****	****	0.8	****	****	****	****	****
ORTHOCLAD TYPE D	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
ORTHOCLAD TYPE 1	****	****	****	****	****	****	****	****	****	****	****	****	****	****	0.9
ORTHOCLAD TYPE 2	****	****	****	****	****	****	****	****	1.4	0.8	****	****	****	****	****
ORTHOCLAD TYPE 3	****	****	****	****	****	****	****	0.7	****	0.8	1.4	****	1.2	****	****
ORTHOCLAD TYPE 5	****	****	****	****	****	****	****	****	****	****	****	****	1.0	3.4	****
ORTHOCLAD TYPE 6	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****

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TABLE XII. CONTINUED

STATION NUMBER	XX1	PP1	FF2	KK3	LL1	MM1	QQ1	JJ1	NN1	KK2	NN2	GG1	DD4	VV1	HH1
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
TAXON:															
ALLUAUDOMYIA	****	5.0	****	****	****	8.0	13.6	****	****	****	2.7	****	****	****	****
BEZZIA	3.9	3.3	0.6	0.7	0.5	4.9	5.1	****	****	1.6	****	11.8	2.5	6.8	0.9
CULICOIDES	****	****	****	****	0.5	****	****	****	****	****	2.7	****	****	2.1	****
STRATIOMYID	****	****	****	****	0.5	****	****	****	****	****	****	****	****	****	****
CHRYSOPS	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
HEMERODROMIA	****	****	****	****	****	****	****	****	****	0.8	****	****	****	****	****
SCATELLA	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
DOLICHOPODID	****	****	****	****	****	****	****	****	****	****	****	****	****	****	****
PHORID	****	****	****	****	****	****	****	****	****	****	****	****	****	0.4	****
GYRAULUS	****	****	****	****	****	****	0.7	****	****	****	****	****	****	****	****
BURNUPIA	****	****	****	****	****	****	1.1	****	****	****	1.4	****	****	****	****
TADPOLES	****	****	****	****	****	****	****	****	0.7	****	****	****	****	****	****
TOTAL NUMBER OF INDIVIDUALS IN SAMPLE	152	60	174	134	201	163	272	283	138	127	73	272	403	236	115

**** - MEANS NOT RECORDED; 0.0 MEANS PRESENT < 0.05%

TABLE XIII. THE SEDIMENT FAUNA FROM CLUSTER B OF FIGURE 9.

STATION NUMBER	RR10	JJ2	RR9	RR6	TT1	RR8	DD1	SS1
	%	%	%	%	%	%	%	%
TAXON:								
HYDRA	****	****	****	****	****	****	****	****
PROSTOMA	****	****	****	****	****	****	****	****
MERMITHID	****	****	****	****	****	0.8	****	****
RHABDITID	17.0	****	9.2	2.8	0.4	12.7	2.3	6.7
TARDIGRADA	****	****	4.5	****	****	****	****	****
BRANCHIURA SOWERBYI	4.3	17.2	1.3	1.8	0.2	0.8	0.3	3.6
LIMNODRILUS	****	****	9.2	66.4	****	1.6	****	0.3
TUBIFEX	****	****	0.1	6.4	1.7	1.6	2.3	2.2
HAEMONAIS	****	****	****	****	****	****	****	****
NAIS	****	****	****	****	****	0.8	****	****
CHAETOGASTER	****	****	****	****	****	****	****	****
NAIDIDAE	****	****	****	****	****	****	****	****
DAPHNIA	****	****	****	****	****	****	****	****
ILYOCRYPTUS	****	****	****	****	****	****	****	7.1
ALONA	****	****	****	****	****	****	****	****
CYCLOPS	****	****	****	****	****	0.8	11.0	1.6
HARPACTICIDAE	****	****	****	****	****	****	****	****
CYPRIDOPSIS	****	****	****	****	****	****	****	****
GOMPHOCYTHERE	****	****	****	****	****	****	0.3	****
ILYOCYPRIS	****	****	****	****	****	****	****	****
PIONOCYPRIS	****	****	****	****	****	****	****	****
STENOCYPRIS	****	****	18.0	****	3.4	2.4	0.3	0.1
CARIDINA NILOTICA	****	****	****	****	****	****	****	0.3
HYDRACHNELLAE	****	****	****	****	****	0.8	0.6	****
ORIBATOIDES	****	4.7	****	****	****	****	****	****
NEOPERLA SPIO	****	****	****	****	****	****	****	****
BAETIDAE	2.1	****	5.1	****	****	13.5	15.3	0.1
CHOROTERPES ELEGANS	****	****	****	****	****	****	****	****
CAENIDAE	****	14.2	0.6	****	3.4	15.9	1.1	0.1
PSEUDAGRION	****	****	****	****	****	****	****	****
PARAGOMPHUS	17.0	0.6	0.1	0.4	2.1	2.4	3.4	1.3
LIBELLULID JUVENILES	****	****	****	****	****	****	0.6	****
APHELOCHEIRUS SCHOUTEDENI	****	****	****	****	****	****	****	****
LACCOCORIS LIMIGENUS	****	****	****	****	****	****	****	****
MICRONECTA DIMIDIATA	****	****	0.4	****	****	****	****	1.5
CHEUMATOPSYCHE	****	****	****	****	****	0.8	****	****
HYDROPSYCHID	17.0	****	****	****	****	****	****	****
DIPSEUDOPSIS	****	****	****	****	****	****	****	0.1
CHIMARRA	****	****	****	****	****	****	****	****
ECNOMUS THOMASSETI	****	****	****	****	****	****	****	****
LEPTOCERIDAE	****	****	****	****	****	****	****	****
HYDROPTILID JUVENILES	****	****	****	****	****	****	****	****
YOLA NATALENSIS	****	****	****	****	****	****	****	****
HELMINII TYPE C1	****	****	****	****	****	****	0.6	****
LOBELMIS	****	****	****	****	****	****	****	****
AULONOGYRUS LARVAE	****	****	****	****	****	****	****	****
HYDROPHILID LARVAE	****	****	****	****	****	****	****	****
HYDROPHILID TYPE C	****	****	****	****	****	****	****	****
HYDROPHILID TYPE L	****	****	****	****	****	****	****	****
ANTOCHA	****	****	****	****	****	****	****	****
LIMNOPHILA	****	1.2	0.1	****	****	****	****	****
LIMONIA	****	****	****	****	****	****	****	****
DIXID	****	****	****	****	****	****	****	****
ANOPHELES	****	****	****	****	****	****	****	****
SIMULIIDAE	****	****	0.1	****	****	****	****	****
CHIRONOMINI TYPE B	****	18.9	8.3	15.5	5.1	4.0	27.4	2.1
CHIRONOMINI TYPE C	****	****	****	****	****	****	****	****
CHIRONOMINI TYPE D	****	****	****	****	****	****	****	****
CRYPTOCHIRONOMUS	****	****	****	****	****	****	****	****
TANYTARSINI TYPE A	****	9.5	****	****	****	24.6	0.3	****
TANYTARSINI TYPE C	****	****	****	****	****	****	****	****
TANYTARSINI TYPE D	****	****	10.6	****	****	****	****	****
TANYTARSINI TYPE E	****	****	11.5	****	****	****	****	****
TANYTARSINI TYPE F	****	****	0.8	****	****	****	****	****
TANYTARSINI TYPE H	34.0	18.9	****	6.0	74.1	10.3	29.7	57.8
TANYTARSINI TYPE K	****	****	****	****	1.7	****	****	****
TANYTARSINI TYPE L	****	****	****	****	****	****	****	****
RHEOTANYTARSUS	****	****	0.4	****	****	****	****	****
CORYNONEURA	****	****	****	****	****	****	****	****
THIENEMANNIELLA	****	4.7	****	****	****	****	****	****
PENTANEURA TYPE 1	****	****	****	****	****	3.2	****	****
PENTANEURA TYPE 2	4.3	4.7	8.4	****	****	****	0.8	****
PENTANEURA TYPE 3	****	****	****	****	****	****	0.8	****
PENTANEURA TYPE 4	****	****	****	****	****	****	****	****
PROCLADIUS	****	****	****	****	1.9	****	0.6	0.4
ORTHOCLAD TYPE A	****	****	****	****	****	0.8	****	****
ORTHOCLAD TYPE B	****	****	****	****	****	****	****	****
ORTHOCLAD TYPE C	****	****	****	****	****	****	****	****
ORTHOCLAD TYPE D	****	****	****	****	****	0.8	****	****
ORTHOCLAD TYPE 1	****	****	****	****	****	****	****	****
ORTHOCLAD TYPE 2	****	****	****	****	****	****	****	****
ORTHOCLAD TYPE 3	****	****	8.4	****	****	****	****	****
ORTHOCLAD TYPE 5	****	****	****	0.7	1.7	****	****	****
ORTHOCLAD TYPE 6	****	****	****	****	****	****	****	****

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TABLE XIII. CONTINUED

STATION NUMBER	RR10	JJ2	RR9	RR6	TT1	RR8	001	SS1
	%	%	%	%	%	%	%	%
TAXON:								
ALLUAUDOMYIA	****	****	****	****	****	****	****	****
BEZZIA	4.3	4.7	0.8	****	3.9	1.6	1.7	13.1
CULICOIDES	****	****	****	****	****	****	0.8	1.3
STRATIOMYID	****	****	****	****	****	****	****	****
CHRYSOPS	****	0.6	1.9	****	****	****	****	****
HEMERODROMIA	****	****	****	****	****	****	****	****
SCATELLA	****	****	****	****	****	****	****	****
DOLICHOPODID	****	****	****	****	0.2	****	****	****
PHORID	****	****	****	****	****	****	****	****
GYRAULUS	****	****	****	****	****	****	****	****
BURNUPIA	****	****	****	****	****	****	****	****
TADPOLES	****	****	****	****	****	****	****	****
TOTAL NUMBER OF INDIVIDUALS IN SAMPLE	47	169	782	283	467	126	354	673

**** = MEANS NOT RECORDED; 0.0 MEANS PRESENT < 0.05%

TABLE XIV. THE SEDIMENT FAUNA FROM CLUSTERS C TO G OF FIGURE 9.

	C	D					E		F	G
STATION NUMBER	II1	DD7	FF1	NN3	RR5	FF3	DD3	YY3	WW1	UU1
	%	%	%	%	%	%	%	%	%	%
TAXON:										
HYDRA	****	****	****	****	****	****	****	****	****	****
PROSTOMA	****	****	****	****	****	****	****	****	****	****
MERMITHID	0.6	****	****	****	****	****	****	****	****	****
RHABDITID	****	****	****	****	****	****	6.2	33.1	****	6.5
TARDIGRADA	****	****	****	****	****	****	****	****	****	****
BRANCHIURA SOWERBYI	2.1	6.5	****	****	****	****	****	****	****	****
LIMNODRILUS	****	****	****	****	****	0.6	13.3	****	****	****
TUBIFEX	0.2	****	****	****	****	****	****	****	****	1.6
HAEMONAIS	****	****	****	5.9	****	****	****	****	****	****
NAIS	****	****	****	****	****	****	****	****	****	****
CHAETOGASTER	****	****	****	****	****	****	****	****	****	****
NAIDIDAE	****	****	****	****	****	****	****	****	****	****
DAPHNIA	****	****	****	****	****	****	****	****	****	****
ILYOCRYPTUS	****	****	****	****	****	****	****	****	****	****
ALONA	****	****	****	****	****	****	****	****	****	****
CYCLOPS	4.7	****	****	5.9	1.4	0.2	25.1	****	****	****
HARPACTICIDAE	****	****	****	****	****	****	****	****	****	****
CYPRIDOPSIS	****	****	****	****	****	****	****	10.8	****	****
GOMPHOCYTHERE	****	****	****	****	****	****	****	****	****	****
ILYOCYPRIS	****	****	****	****	****	****	****	****	****	****
PIONOCYPRIS	****	****	****	****	****	****	****	****	****	****
STENOCYPRIS	****	****	1.2	****	****	****	6.2	****	****	****
CARIDINA NILOTICA	0.2	****	****	****	****	****	****	****	****	****
HYDRACHNELLAE	4.7	****	****	****	****	****	****	****	****	****
ORIBATOIDES	****	****	****	****	****	****	****	****	****	****
NEOPERLA SPIO	****	****	****	****	****	****	****	****	****	****
BAETIDAE	3.1	3.2	2.4	11.8	1.4	0.2	****	5.4	****	****
CHOROTERPES ELEGANS	****	****	****	****	****	****	****	****	****	****
CAENIDAE	26.8	3.2	9.4	****	4.2	****	0.5	10.8	****	****
PSEUDAGRION	****	****	2.4	****	****	****	****	****	****	****
PARAGOMPHUS	****	****	4.7	5.9	****	****	****	****	****	7.3
LIBELLULID JUVENILES	****	****	1.2	****	****	****	****	****	****	****
APHELOCHEIRUS SCHOUTEDENI	****	****	****	****	****	****	****	****	****	****
LACCOCORIS LIMIGENUS	0.2	****	****	****	****	****	****	****	****	****
MICRONECTA DIMIDIATA	****	****	****	5.9	****	****	6.2	5.4	****	****
CHEUMATOPSYCHE	****	****	****	****	****	****	****	****	****	****
HYDROPSYCHID	****	****	****	****	****	****	****	****	****	****
DIPSEUDOPSIS	****	****	****	****	****	****	****	****	****	****
CHIMARRA	****	****	****	****	****	****	****	****	****	****
ECNOMUS THOMASSETI	1.6	****	****	****	****	****	****	****	****	****
LEPTOCERIDAE	****	****	****	****	****	****	****	5.4	****	****
HYDROPTILID JUVENILES	****	****	****	****	1.4	****	****	****	****	****
YOLA NATALENSIS	****	****	****	****	****	****	****	****	****	****
HELMINII TYPE CI	****	****	****	****	****	****	****	****	****	****
LOBELMIS	****	****	****	****	****	****	****	****	****	****
AULONOGYRUS LARVAE	****	****	****	****	****	****	****	****	****	****
HYDROPHILID LARVAE	****	****	****	****	****	0.2	****	****	6.2	13.0
HYDROPHILID TYPE C	****	****	****	****	****	****	****	****	****	****
HYDROPHILID TYPE L	****	****	****	****	****	****	****	****	****	****
ANTOCHA	****	****	****	****	****	****	****	****	****	****
LIMNOPHILA	****	6.5	****	****	****	0.4	****	****	****	****
LIMONIA	****	****	****	****	****	****	****	****	****	****
DIXID	****	****	****	****	****	****	****	****	****	****
ANOPHELES	****	****	****	5.9	****	****	****	****	****	****
SIMULIIDAE	****	****	****	****	****	****	****	****	3.1	****
CHIRONOMINI TYPE B	****	****	****	23.5	1.4	0.2	****	0.7	****	****
CHIRONOMINI TYPE C	****	****	****	****	1.4	****	****	****	****	****
CHIRONOMINI TYPE D	****	****	****	****	****	****	****	****	****	2.4
CRYPTOCHIRONOMUS	****	19.4	2.4	11.8	****	0.2	****	****	****	****
TANYTARSINI TYPE A	****	3.2	****	5.9	****	****	****	****	13.8	****
TANYTARSINI TYPE C	****	****	****	****	****	****	****	****	****	****
TANYTARSINI TYPE D	****	****	****	****	****	****	****	****	****	****
TANYTARSINI TYPE E	****	****	****	****	****	****	****	****	****	****
TANYTARSINI TYPE F	****	****	****	****	****	****	****	****	****	****
TANYTARSINI TYPE H	50.5	****	70.6	17.6	84.5	96.9	****	11.5	67.7	61.8
TANYTARSINI TYPE K	****	****	****	****	****	****	****	****	****	****
TANYTARSINI TYPE L	****	****	****	****	****	****	****	****	****	****
RHEOTANYTARSUS	****	****	****	****	****	****	****	****	****	****
CORYNONEURA	1.6	3.2	****	****	****	****	****	****	1.5	****
THIENEMANNIELLA	****	****	****	****	****	****	****	****	****	****
PENTANEURA TYPE 1	****	****	****	****	****	****	****	****	****	****
PENTANEURA TYPE 2	1.6	****	3.5	****	****	0.4	****	****	****	****
PENTANEURA TYPE 3	****	****	****	****	****	****	****	****	****	****
PENTANEURA TYPE 4	****	****	****	****	****	****	****	5.4	****	7.3
PROCLADIUS	****	****	****	****	****	****	****	****	****	****
ORTHOCLAD TYPE A	****	****	****	****	****	****	****	****	****	****
ORTHOCLAD TYPE B	****	****	****	****	****	0.2	****	****	****	****
ORTHOCLAD TYPE C	****	****	****	****	****	****	****	****	****	****
ORTHOCLAD TYPE D	****	****	****	****	****	****	****	****	****	****
ORTHOCLAD TYPE 1	****	****	****	****	****	****	****	****	****	****
ORTHOCLAD TYPE 2	1.6	****	****	****	1.4	0.2	****	****	****	****
ORTHOCLAD TYPE 3	****	****	1.2	****	****	****	0.5	5.4	****	****
ORTHOCLAD TYPE 5	****	****	****	****	****	****	35.5	****	1.5	****
ORTHOCLAD TYPE 6	****	41.9	****	****	****	****	****	****	****	****

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TABLE XIV. CONTINUED

	C	D					E		F	G
STATION NUMBER	II1	DD7	FF1	NN3	RR5	FF3	DD3	YY3	WW1	UU1
	%	%	%	%	%	%	%	%	%	%
TAXON:										
ALLUAUDOMYIA	****	****	****	****	****	****	****	****	****	****
BEZZIA	****	****	****	****	****	0.2	6.2	6.1	4.6	****
CULICOIDES	****	****	****	****	****	****	****	****	****	****
STRATIOMYID	****	****	****	****	****	****	****	****	****	****
CHRYSOPS	****	****	****	****	****	****	****	****	1.5	****
HEMERODROMIA	****	****	****	****	****	****	****	****	****	****
SCATELLA	****	****	****	****	****	****	0.5	****	****	****
DOLICHOPODID	****	****	****	****	****	****	****	****	****	****
PHORID	****	****	****	****	****	****	****	****	****	****
GYRAULUS	****	****	****	****	****	****	****	****	****	****
BURNUPIA	****	12.9	1.2	****	2.8	****	****	****	****	****
TADPOLES	0.8	****	****	****	****	****	****	****	****	****
TOTAL NUMBER OF INDIVIDUALS IN SAMPLE	515	31	85	17	71	489	211	148	65	123

**** = MEANS NOT RECORDED; 0.0 MEANS PRESENT < 0.05%

TABLE XV : The fauna of aquatic vegetation

STATION NUMBER	KR11	KK1
	%	%
TAXON:		
PLANARIA	0.3	0.0
RHABDITID	0.1	++++
CHAETOGASTER	0.1	++++
SIMOCEPHALUS	++++	0.0
ACROPERUS HARPAE	++++	3.5
CHYDORUS	++++	7.9
CYCLOPS	1.0	8.9
CYPRIDOPSIS	0.3	1.3
STENOCYPRIS	++++	0.0
CARIDINA NILOTICA	++++	1.1
HYDRACHNELLAE	0.2	0.1
NEOPERLA SPIO	0.2	++++
BAETIS BELLUS	++++	2.3
BAETIS LATUS	++++	0.1
CENTROPTILUM EXCISUM	0.1	++++
CENTROPTILUM SUDAFRICANUM	0.2	++++
PSEUDOCLOEON VINOSUM	93.1	++++
CLOEON AFRICANUM	++++	52.2
CAENIDAE	0.5	4.1
LESTES	++++	0.3
PSEUDAGRION JUVENILES	0.2	1.1
ANAX	++++	0.0
PLEA PULLULA	++++	0.0
MICRONECTA JUVENILES	++++	0.0
ATHRIPSODES 'PRIONII' TYPE 1	0.0	0.9
ATHRIPSODES 'PRIONII' TYPE 4	++++	2.2
OECETIS	0.0	++++
HYDROPTILA SAND CASE	0.1	++++
OXYETHIRA	0.2	++++
LEPIDOPTERA TYPE C	0.1	0.0
DYTISCID LARVAE	0.1	0.7
HALIPLID	++++	0.0
HYDRAENID TYPE D	0.0	++++
SIMULIUM LARVAE	0.0	0.1
CHIRONOMINI TYPE B	++++	3.0
TANYTARSINI TYPE C	0.2	++++
RHEOTANYTARSUS	1.2	++++
CORYNONEURA	0.4	++++
THIENEMANNIELLA	++++	0.0
PENTANEURA TYPE 2	0.2	1.6
ORTHOCLAD TYPE D	0.0	++++
ORTHOCLAD TYPE H	0.0	++++
ORTHOCLAD TYPE 1	0.0	++++
ORTHOCLAD TYPE 3	0.4	8.2
ORTHOCLAD TYPE 4	0.1	0.3
BEZZIA	++++	0.3
LYMNAEA	++++	0.0
GYRAULUS	0.0	++++
BARBUS	0.4	++++
TADPOLES	0.3	0.0
TOTAL NUMBER OF INDIVIDUALS IN SAMPLE	5627	3222

++++ - MEANS NOT RECORDED

0.0 - MEANS PRESENT < 0.05%

TABLE XVI : The fauna of a cascade-waterfall

STATION NUMBER	DD9
	%
TAXON:	
PLANARIA	1.3
RHABDITID	0.1
NAIS	7.8
BAETIS (ACENTRELLA) MONTICOLA	4.8
BAETIS (ACENTRELLA) SP. 1	67.1
BAETIS HARRISONI	0.3
CENTROPTILUM SUDAFRICANUM	2.8
CAENIDAE	1.6
CHEUMATOPSYCHE SP. 3	0.3
CHEUMATOPSYCHE SP. 7	0.1
HYDRAENID TYPE D	0.1
BLEPHAROCERID PUPA	0.1
LIMONIA	0.6
SIMULIUM MEDUSAEFORME	0.9
PENTANEURA TYPE 1	0.1
PENTANEURA TYPE 2	0.1
ORTHOCLAD TYPE A	0.1
ORTHOCLAD TYPE B	1.0
ORTHOCLAD TYPE C	4.4
ORTHOCLAD TYPE G	4.5
ORTHOCLAD TYPE 2	0.1
ORTHOCLAD TYPE 4	1.3
WIEDMANNIA	0.1
TOTAL NUMBER OF INDIVIDUALS IN SAMPLE	703

TABLE XVII
Bacteriological results : rainy season

River	Station No.	Total Coliforms / 100 mℓ	Total Presumptive *E.coli* I / 100 mℓ	Confirmed *E. coli* I / 100 mℓ	Irregular II / 100 mℓ	Irregular VI / 100 mℓ	Parasite units / 250 mℓ	C⁺M⁺ *staph.* / 250 mℓ	*S. typhi* / 250 mℓ	*Salmonellae* / 250 mℓ	*Shigellae* / 250 mℓ	*Prot. - Pseud.* / 250 mℓ	*Salmonellae* isolated
Umkomaas	DD7	13 500	1 003	602	401	0	0	0	0	+	0	+	*S. lovelace*
Amahlongwa	EE1	7 800	7 400	7 400	0	0	0	+	0	0	0	+	
Umpambinyoni	FF3	7 900	2 600	2 080	520	0	0	0	0	0	0	+	
Umzinto	GG1	4 100	274	164	110	0	0	0	0	0	0	+	
Inkomba	HH1	5 100	638	638	0	0	0	0	0	0	0	+	
Sezela	II1	26 500	7 300	4 380	2 920	0	0	+	0	0	0	+	
Ifafa	JJ2	6 200	2 400	2 400	0	0	0	0	0	+	0	+	*S lovelace*
Mtwalume	KK3	3 300	90	54	36	0	0	0	0	0	0	+	
Umhlungwa	LL1	3 900	809	162	647	0	0	0	0	0	0	+	
Mhlabatshane	MM1	5 000	278	167	111	0	0	0	0	0	0	+	
Umzumbe	NN3	4 700	343	69	274	0	0	0	0	0	0	+	
Injambili	OO1	1 794	736	294	442	0	0	0	0	0	0	+	
Idombe	PP1	2 200	206	206	0	0	0	0	0	0	0	+	
Umtentweni	QQ1	400	116	93	23	0	0	0	0	0	0	+	
Boboyi	SS1	6 400	467	187	280	0	1	0	0	0	0	+	
Zotsha	TT1	11 200	824	824	0	0	0	0	0	0	0	+	
Umhlangeni	UU1	16 600	15 700	9 420	6 280	0	0	+	0	0	0	+	
Uvongo	VV1	1 100	162	32	130	0	0	0	0	0	0	+	
Mbizane	WW1	2 900	490	294	196	0	0	0	0	0	0	+	
Mpenjati	XX1	900	186	112	74	0	0	0	0	0	0	+	
Mtamvuna	YY4	2 600	216	130	86	0	0	0	0	0	0	+	

TABLE XVIII
Bacteriological results: dry season

River	Station No.	Total Coliforms / 100 mℓ	Total Presumptive *E.coli* I / 100 mℓ	Confirmed *E. coli* I / 100 mℓ	Irregular II / 100 mℓ	Irregular VI / 100 mℓ	Parasite units / 250 mℓ	C⁺M⁺ *staph.* / 250 mℓ	*S. typhi* / 250 mℓ	*Salmonellae* / 250 mℓ	*Shigellae* / 250 mℓ	*Prot. - Pseud.* / 250 mℓ
Umkomaas	DD7	1 084	442	88	354	0	0	0	0	+	0	+
Amahlongwa	EE1	3 900	356	214	142	0	0	+	0	0	0	+
Umpambinyoni	FF3	186	152	61	91	0	0	0	0	0	0	+
Umzinto	GG1	705	422	169	253	0	0	0	0	0	0	+
Inkomba	HH1	616	292	58	234	0	0	0	0	0	0	+
Sezela	II 1	1 600	652	391	261	0	0	0	0	0	0	+
Ifafa	JJ2	226	118	47	71	0	0	0	0	0	0	+
Mtwalume	KK3	352	122	98	24	0	0	0	0	+	0	+
Umhlungwa	LL1	733	246	123	82	41	0	0	0	0	0	+
Mhlabatshane	MM1	1 500	588	353	235	0	0	+	0	+	0	+
Umzumbe	NN3	789	340	136	204	0	0	0	0	+	0	+
Injambili	OO1	839	222	222	0	0	0	0	0	+	0	+
Idombe	PP1	1 600	280	168	112	0	0	0	0	0	0	+
Umtentweni	QQ1	800	282	226	82	0	0	0	0	0	0	0
Boboyi	SS1	12 800	5 100	3 060	2 040	0	0	+	0	0	0	+
Zotsha	TT1	3 100	216	86	216	0	0	+	0	0	0	+
Umhlangeni	UU1	1 400	713	285	428	0	0	0	0	0	0	+
Uvongo	VV1	1 700	162	97	65	0	0	0	0	0	0	+
Mbizane	WW1	1 000	222	178	44	0	0	0	0	0	0	+
Mpenjati	XX1	6 900	817	327	490	0	0	0	0	0	0	+
Mtamvuna	YY4	42	24	14	10	0	0	0	0	0	0	0

KEY TO TABLES XIX - XLIV

TPC I:	Total plate count
TPC II:	Total plate count after 24 hours on the same sample
Prot:	Proteolytic plate count
AN:	Anaerobic plate count
Pres. *E. coli* I:	Presumptive *E. coli* I count per 100 mℓ
Irr. II:	Irregular Type II *E. coli*
Irr. VI:	Irregular Type VI *E. coli*
Fungi:	The number in brackets denotes the number of different species of fungi judged by colony form, surface and colour
TM:	Too many to count

TABLE XIX

Bacteriological results : Umkomaas River

Stn. No:	Date	Flow m³/s	TPC I/mℓ x 10³	TPC II/mℓ x 10³	Prot/mℓ x 10²	AN/mℓ x 10²	Fungi per mℓ	Pres. *E.coli* I per 100 mℓ	*E. coli* I per 100 mℓ	Irr. II per 100 mℓ	Irr. VI per 100 mℓ
Dry Season											
DD1	7.7.72	-	-	-	-	-	-	-	-	-	-
	3.8.72	0,3	6 000	500	11	1	8				
	1.9.72	0,1	45	3	43	7	8	40			
	28.9.72	0,2	80	60	31	3	5(5)	60			
DD2	7.7.72	0,8	360	290	4	18	2				
	3.8.72	0,3	90	230	13	4	2				
	1.9.72	0,3	50	8	10	2	11	20			
	28.9.72	0,7	1 040	830	22	6	10(5)	260			
DD3	7.7.72	3,4	90	480	10	11	2				
	3.8.72	0,4	2 960	180	37	2	10				
	1.9.72	0,3	80	7	19	4	5	20	0	20	0
	28.9.72	1,1	2 000	710	9	14	4(4)	140			
DD4	7.7.72	-	240	380	12	50	8				
	3.8.72	4,2	260	8 000	45	24	9				
	1.9.72	2,5	90	200	3	3	6	20	0	20	0
	28.9.72	2,8	3 700	920	12	18	4(4)	80			
DD5	7.7.72	9,9	840	320							
	3.8.72	18	7 000	2 500	7	6	11	200			
	1.9.72	4,2	120	140	9	2	1	20	0	20	0
	27.9.72	4,8	1 800	1 100	14	12	6(4)				
DD6	16.8.72	8,5	110	150	13	3	6	140	56	84	0
	27.9.72	3,4	570	890	21	7	69(2)	100	50	50	0
DD7	5.7.72	11	7 200	61	10	9	5	550	275	275	0
	31.7.72	34	2 000	210	42	5	12	2 560			
	16.8.72	16	120	6 000	13	2	3				
	15.1.73	6,8	70	1 600	39	5	47(2)	1 900			

Stn. No:	Date	Flow m^3/s	TPC I/mℓ $x\ 10^3$	TPC II/mℓ $x\ 10^3$	Prot/mℓ $x\ 10^2$	AN/mℓ $x\ 10^2$	Fungi per mℓ	Pres. *E.coli* I per 100 mℓ	*E. coli* I per 100 mℓ	Irr. II per 100 mℓ	Irr. VI per 100 mℓ
Wet Season											
DD1	9.2.72	2,3	112	96	44	23	4	20			
	25.2.72		70	83	6	11	4				
DD2	9.2.72	6,8	48	96	3	9	1	20			
	25.2.72		90	130	2	39	3				
DD3	9.2.72	11	84	130	5	8	4	100			
	25.2.72		220	340	20	22	7				
DD4	9.2.72	14	36	720	4	6	7	50			
	25.2.72		240	120	29	31	120				
DD5	10.2.72	17	54	36	16	28	13				
	25.2.72		290	84	32	59	60				
DD6	10.2.72	34	38	1 200	21	19	36				
	25.2.72		450	210	45	20	2				
DD7	3.2.72		336	240	4		63				
	21.2.72		650	420	69	22	84	100	100		

TABLE XX

Bacteriological results : Amahlongwa River

Stn. No:	Date	Flow m^3/s	TPC I/mℓ $x\ 10^3$	TPC II/mℓ $x\ 10^3$	Prot/mℓ $x\ 10^2$	AN/mℓ $x\ 10^2$	Fungi per mℓ	Pres. *E.coli* I per 100 mℓ	*E. coli* I per 100 mℓ	Irr. II per 100 mℓ	Irr. VI per 100 mℓ
Dry Season											
EE1	5.7.72	0,08	77	5 900	5	89	7	310	310		
	2.8.72	0,4	160	75	54	42	60	2 160	2 160		
	16.8.72	0,4	40	830	6	24	8				
	15.1.73	0,1	500	920	48	17	75(5)	3 400			
Wet Season											
EE1	5.2.72	0,2	140	384	19	19	13	150	150		
	23.2.72	1,8	320	1 200	27	17	16	1 700	1 700		

TABLE XXI

Bacteriological results : Umpambinyoni River

Stn. No:	Date	Flow m^3/s	TPC I/mℓ x 10^3	TPC II/mℓ x 10^3	Prot/mℓ x 10^2	AN/mℓ x 10^2	Fungi per mℓ	Pres. *E.coli* I per 100 mℓ	*E. coli* I per 100 mℓ	Irr. II per 100 mℓ	Irr. VI per 100 mℓ
						Dry Season					
FF1	5.7.72	0,1	110	190	108	18	8	850	850	0	0
	2.8.72	0,4	160	75	54	42	60	2 160	2 160	0	0
	16.8.72	0,4	40	830	6	24	8				
	15.1.73	0,1	300	130	29	8	41(6)	20 400			
FF2	5.7.72	0,1	110	190	110	18	850				
	2.8.72	2,5	6 400	2 000	10	27	116	180	180	0	0
	16.8.72	0.6	70	2 000	14	2	30				
	15.1.73	0,2	5 600	640	7	2	54(5)	900	450	450	0
FF3	5.7.72	1,0	110	3 900	10	10	17	320	214	106	0
	2.8.72	2,8	200	110	71	24	290	120			
	16.8.72	0,7	1 850	2 200	83	3	17				
	15.1.73	0,2	480	350	13	13	95(5)	1 600	0	1 600	0
						Wet Season					
FF1	10.2.72	0,5	74	128	128	7	21	50			
	23.2.72	0,8	350	220	53	39	91	1 700	1 700	0	0
FF2	5.2.72	0,6	56	180	62	13	38	400			
	23.2.72	2,5	360	344	17	49	44	3 100	1 033	2067	0
FF3	10.2.72	0,8	27	720	92	37	26	100			
	23.2.72	9,3	380	263	19	18	90	2 000	1 333	667	0

TABLE XXII

Bacteriological results: Umzinto River

Stn. No:	Date	Flow m^3/s	TPC I/mℓ x 10^3	TPC II/mℓ x 10^3	Prot/mℓ x 10^2	AN/mℓ x 10^2	Fungi per mℓ	Pres. *E.coli* I per 100 mℓ	*E. coli* I per 100 mℓ	Irr. II per 100 mℓ	Irr. VI per 100 mℓ
Dry Season											
GG1	5.7.72	0,1	106	96	9	21	6	120	120	0	0
	2.8.72	0,8	310	180	7	13	116	600			
	16.8.72	0,2	80	3 900	9	5	14				
	15.1.73	0,2	440	1 200	120	18	25(2)	8 400	2 100	6 300	0
Wet Season											
GG1	9.2.72	0,1	192	430	62	19	18	100	50	50	0
	23.2.72	0,9	150	416	35	41	39	700	700	0	0

TABLE XXIII

Bateriological results : Inkomba River

Stn. No:	Date	Flow m^3/s	TPC I/mℓ x 10^3	TPC II/mℓ x 10^3	Prot/mℓ x 10^2	AN/mℓ x 10^2	Fungi per mℓ	Pres. *E.coli* I per 100 mℓ	*E. coli* I per 100 mℓ	Irr. II per 100 mℓ	Irr. VI per 100 mℓ
Dry Season											
HH1	5.7.72	0,01	49	290	16	13	5	20	20	0	0
	2.8.72	0,1	210	310	78	61	100	980	327	653	0
	16.8.72	0,08	140	8 120	98	18	13				
	15.1.73	0,03	120	4 000	144	26	18(4)	9 900			
Wet Season											
HH1	8.2.72		52	115	50	5	11	12			
	23.2.72	0,1	590	180	27	24	63				

TABLE XXIV

Bacteriological results: Sezela River

Stn. No:	Date	Flow m^3/s	TPC I/mℓ x 10^3	TPC II/mℓ x 10^3	Prot/mℓ x 10^2	AN/mℓ x 10^2	Fungi per mℓ	Pres. *E.coli* I per 100 mℓ	*E. coli* I per 100 mℓ	Irr. II per 100 mℓ	Irr. VI per 100 mℓ
						Dry Season					
II1	3.7.72		10	40	15	16	13	11 700	5 850	5 850	0
	1.8.72	0,2	160	82	16	24		2 420			
	16.8.72	0,06	80	3 400	22	3	29				
	15.1.73	0,1	2 500	1 280	160	48	87(5)	34 200			
						Wet Season					
II1	8.2.72	0,3	224	990	110	116	25	2 300	2 300	0	0
	23.2.72	0,4	600	240	12	39	74	1 100	1 100	0	0

TABLE XXV

Bacteriological results : Ifafa River

Stn. No:	Date	Flow m^3/s	TPC I/mℓ x 10^3	TPC II/mℓ x 10^3	Prot/mℓ x 10^2	AN/mℓ x 10^2	Fungi per mℓ	Pres. *E.coli* I per 100 mℓ	*E. coli* I per 100 mℓ	Irr. II per 100 mℓ	Irr. VI per 100 mℓ
						Dry Season					
JJ1	5.7.72	0,04	10	2 200	14	8	10	40	30	10	0
	2.8.72	1,0	9 600	2 200	42	7	3	150			
	16.8.72	0,4	15	870	8	3	12				
	16.1.73	0,07	380	630	12	14	10(9)				
JJ2	5.7.72	0,2	960	112	14	77	95	210	126	84	
	2.8.72	1,3	650	260	92	25	290				
	16.8.72	0,6	30	1 160	110	2	26				
	15.1.73	0,1	2 500	1 280	160	48	87(5)	34 200			
						Wet Season					
JJ1	9.2.72	0,3	17	4	42	9	22				
	23.2.72	1,1	190	83	9	30	15				
JJ2	5.2.72	0,7	7	144	35	48	20	350	282	68	0
	23.2.72	5,7	240	184	27	42	84	600	600	0	0

TABLE XXVI

Bacteriological results : Mtwalume River

Stn. No:	Date	Flow m^3/s	TPC I/mℓ x 10^3	TPC II/mℓ x 10^3	Prot/mℓ x 10^2	AN/mℓ x 10^2	Fungi per mℓ	Pres. *E.coli* I per 100 mℓ	*E. coli* I per 100 mℓ	Irr. II per 100 mℓ	Irr. VI per 100 mℓ
						Dry Season					
KK1	5.7.72	0,3	130	4 100	350	37	3	40	40	0	0
	2.8.72	0,3	140	101	9	11	70	30			
	16.8.72	0,06	190	120	19	2	6	60	40	20	0
	27.9.72	0,01	40	5 000	8	2	96(8)	20	0	20	0
KK2	3.7.72	0,8	148	4 100	6	2	6	80	64	16	0
	1.8.72	0,8	340	134	93	10	76	90			
	16.8.72	0,3	270	126	21	4	2				
	16.1.73	0,2	70	170	17	8	13(5)	10			
KK3	4.7.72		40	640		5	3				
	1.8.72	8,5	320	160	54	9	62	280	87	193	0
	16.8.72	0,6	60	920	2	3	14	TM			
	15.1.73	0,8	1 200	960	33	31	46(7)	1 000			
						Wet Season					
KK1	9.2.72	1,7	24	53	55	5	4				
	23.2.72	1,1	61	8	11	54	69	1 700	1 134	566	0
KK2	5.2.72	6,8	101	67	62	23	20	100	34	33	33
	23.2.72	7,9	300	184	40	14	78	1 700	1 134	566	0
KK3	5.2.72	10	130	74	4	15	19	150	100	50	0
	23.2.72	20	480	228	27	35	84	1 900	1 900	0	0

TABLE XXVII

Bacteriological results : Umhlungwa River

Stn. No:	Date	Flow m^3/s	TPC I/mℓ x 10^3	TPC II/mℓ x 10^3	Prot/mℓ x 10^2	AN/mℓ x 10^2	Fungi per mℓ	Pres. *E.coli* I per 100 mℓ	*E. coli* I per 100 mℓ	Irr. II per 100 mℓ	Irr. VI per 100 mℓ
Dry Season											
LL1	4.7.72	0,04	80	2 500		16	2	2 800	560	2 240	0
	1.8.72	0,2	310	176	57	34	160	170			
	23.8.72	0,03	70	100	37	14	47	420			
	9.1.73	0,06	850	1 600	26	16	66(4)				
Wet Season											
LL1	5.2.72	0,4	8	7	12	24	4				
	23.2.72	0,2	280	240	9	97	68	6 400	1 600	4 800	0

TABLE XXVIII

Bacteriological results : Mhlabatshane River

Stn. No:	Date	Flow m^3/s	TPC I/mℓ x 10^3	TPC II/mℓ x 10^3	Prot/mℓ x 10^2	AN/mℓ x 10^2	Fungi per mℓ	Pres. *E.coli* I per 100 mℓ	*E. coli* I per 100 mℓ	Irr. II per 100 mℓ	Irr. VI per 100 mℓ
Dry Season											
MM1	4.7.72	0,03	2 240	700	49	19	12	150	60	90	0
	1.8.72	0,3	210	320	81	27	14	160			
	16.8.72		220	1 800	7	1	7				
	9.1.73	0,06	230	670	8	13	20(6)	1 200	960	240	0
Wet Season											
MM1	5.2.72	0,2	107	3	5	12	10				
	23.2.72	1,1	800	520	21	44	43	10 800	3 600	7 200	0

TABLE XXIX

Bacteriological results : Umzumbe River

Stn. No:	Date	Flow m^3/s	TPC I/mℓ x 10^3	TPC II/mℓ x 10^3	Prot/mℓ x 10^2	AN/mℓ x 10^2	Fungi per mℓ	Pres. *E.coli* I per 100 mℓ	*E. coli* I per 100 mℓ	Irr. II per 100 mℓ	Irr. VI per 100 mℓ
						Dry Season					
NN1	6.7.72	0,3	5 100	156	3	4	4				
	1.8.72	4,0	5 600	1 900	77	5	40	66			
	23.8.72		50	690	4	3	20				
	27.9.72	0,2	3 200	1 000	9	70	27(8)	100	50	50	
NN2	4.7.72		210	240	9	6	26	920	0	920	0
	2.8.72	25	470	230	73	5	93	50			
	23.8.72		290	130	6	4	6				
	9.1.73	2,5	360	920	20	3	45(5)	2 600			
						Wet Season					
NN1	9.2.72	2,3	69	13	48	7	21	300			
	23.2.72	1,4	230	198	13	32	78				
NN2	9.2.72	2,5	59	83	19	8	7	300			
	23.2.72	1,7	480	296	22	38	94	2 300	2 300	0	0
NN3	4.2.72	2,8	256	112	124	31	17				
	23.2.72	2,1	800	264	56	31	110	3 900	1 300	2 600	0

TABLE XXX

Bacteriological results : Injambili River

Stn. No:	Date	Flow m^3/s	TPC I/mℓ x 10^3	TPC II/mℓ x 10^3	Prot/mℓ x 10^2	AN/mℓ x 10^2	Fungi per mℓ	Pres. *E.coli* I per 100 mℓ	*E. coli* I per 100 mℓ	Irr. II per 100 mℓ	Irr. VI per 100 mℓ
						Dry Season					
OO1	4.2.72	0,01	120	320	32	63	2	80	20	40	20
	1.8.72	0,1	1 130	620	53	9	310	55			
	23.8.72		690	50	3	2	18	20	20	0	0
	9.1.73	0,06	410	390	22	21	120(3)	6 400	2 133	4 267	0
						Wet Season					
OO1	4.2.72	0,2	200	144	120	7	5				
	23.2.72	0,4	280	488	40	34	42	4 100	1 250	2 850	0

TABLE XXXI

Bacteriological results : Idombe River

Stn. No:	Date	Flow m^3/s	TPC I/mℓ x 10^3	TPC II/mℓ x 10^3	Prot/mℓ x 10^2	AN/mℓ x 10^2	Fungi per mℓ	Pres. *E.coli* I per 100 mℓ	*E. coli* I per 100 mℓ	Irr. II per 100 mℓ	Irr. VI per 100 mℓ
						Dry Season					
PPI	4.7.72	0,03	26	60	11	7	7	TM			
	1.8.72	0,1	240	140	38	19	14	60			
	23.8.72		60	10	9	8	15	98	49	0	49
	9.1.73	0,06	740	240	15	9	15(3)	200			
						Wet Season					
PPI	4.2.72	0,2	224	112	48	35	6				
	23.2.72	0,4	600	440	67	31	26	4 400	3 267	1 133	0

TABLE XXXII

Bacteriological results : Umtentweni River

Stn. No:	Date	Flow m^3/s	TPC I/mℓ x 10^3	TPC II/mℓ x 10^3	Prot/mℓ x 10^2	AN/mℓ x 10^2	Fungi per mℓ	Pres. *E.coli* I per 100 mℓ	*E. coli* I per 100 mℓ	Irr. II per 100 mℓ	Irr. VI per 100 mℓ
						Dry Season					
QQI	4.7.72	0,06	84	340	52	110	5	TM			
	1.8.72	0,3	150	101	55	17	92	75			
	23.8.72		940	350	102	12	19				
	9.1.73	0,1	340	200	45	17	41(5)	400	200	200	0
						Wet Season					
QQI	4.2.72	0,2	54	50	15	22	15				
	23.2.72	1,1	460	240	26	38	33	1 700	1 700	0	0

TABLE XXXIII

Bacteriological results : Umzimkulu River

Stn. No:	Date	Flow m³/s	TPC I/mℓ x 10³	TPC II/mℓ x 10³	Prot/mℓ x 10²	AN/mℓ x 10²	Fungi per mℓ	Pres. *E.coli* I per 100 mℓ	*E. coli* I per 100 mℓ	Irr. II per 100 mℓ	Irr. VI per 100 mℓ
					Dry Season						
RR1	6.7.72	2,3	730	80	300	5	10	20	20	0	0
	2.8.72	0,4	180	430	15	2	1	40			
	1.9.72	0,3	140	7	18	5	16	100	50	50	0
	28.9.72	2,3	2 400		12	3	11(6)	160			
RR2	6.7.72	2,8	450	60	18	45	13	TM			
	2.8.72	2,3	160	60	128	13	6				
	23.8.72	2,1	360	40	7	6	1	20	20	0	0
	16.1.73	5,7	80	190	8	4	4(2)				
RR3	6.7.72	2,8	544	200		18	32	TM			
	2.8.72	5,7	150	350	43		2				
	23.8.72	5,7	120	17	7		5				
	16.1.73	7,1	350		14	4	58(3)	20			
RR4	4.7.72	11	4 500	22	18	14	4	280	37	140	103
	3.8.72	10	60	20	1	3	14	25			
	23.8.72	8,5	170	90	7	7	1	320			
	9.1.73	25	160	300	24	15	47(6)	800	640	160	0
RR5	4.7.72	13	160	270	6	1 050	3	200	0	120	80
	2.8.72	37	44	16	8	7	17	30			
	23.8.72	31	70	130	210	85	2	40	0	40	0
	9.1.73	28	160	300	24	15	47(6)	800	640	160	0
					Wet Season						
RR1	8.2.72	8,5	98	152	3	1	4	240			
	24.2.72	8,5	198	84	36	19	5				
RR2	8.2.72	16	11	38	6	2	3	200			
	25.2.72	13	210	140	12	45	75				
RR3	8.2.72	23	58	350	18	7	7	600			
	25.2.72	24	410	600	5	18	64				
RR4	9.2.72	33	62	38	9	9	12	400			
	25.2.72	57	137	220	25	74	350				
RR5	4.2.72	51	36	384	42	80	2	400			
	25.2.72	85	230	122	18	29	30	60	60	0	0

TABLE XXXIV

Bacteriological results : Polela River

Stn. No:	Date	Flow m³/s	TPC I/mℓ x 10^3	TPC II/mℓ x 10^3	Prot/mℓ x 10^2	AN/mℓ x 10^2	Fungi per mℓ	Pres. *E.coli* I per 100 mℓ	*E. coli* I per 100 mℓ	Irr. II per 100 mℓ	Irr. VI per 100 mℓ
						Dry Season					
RR7	3.7.72	0,2	40	390	32	7	2	100	100	0	0
	3.8.72	0,08	60	690	82	9	12	200	200	0	0
	1.9.72	0,06	93	8	26	10	16	750	500	250	0
	28.9.72	0,2	220	180		500	5(4)	180	180	0	0
						Wet Season					
RR7	8.2.72	2,0	19	2	13	3	1	300	300	0	0
	24.2.72	4,2	480	265	42	30	74				

TABLE XXXV

Bacteriological results : Ngwangwane River

Stn. No:	Date	Flow m³/s	TPC I/mℓ x 10^3	TPC II/mℓ x 10^3	Prot/mℓ x 10^2	AN/mℓ x 10^2	Fungi per mℓ	Pres. *E.coli* I per 100 mℓ	*E. coli* I per 100 mℓ	Irr. II per 100 mℓ	Irr. VI per 100 mℓ
						Dry Season					
RR8	3.7.72	0,7	490	210	24	3	14	20	20	0	0
	3.8.72	1,0	190	200	34	8	22	40	20	20	0
	23.8.72		550	12	13	5	1				
	16.1.73	4,5	140	490	75	8	7(3)	10			
						Wet Season					
RR8	9.2.72	5,7	71	240	9	18	14	20			
	25.2.72	4,2	140	240	11	38	46				

TABLE XXXVI

Bacteriological results : Bisi River

Stn. No:	Date	Flow m^3/s	TPC I/mℓ x 10^3	TPC II/mℓ x 10^3	Prot/mℓ x 10^2	AN/mℓ x 10^2	Fungi per mℓ	Pres. *E.coli* I per 100 mℓ	*E. coli* I per 100 mℓ	Irr. II per 100 mℓ	Irr. VI per 100 mℓ
Dry Season											
RR9	6.7.72	1,1	280	200		70	28	20	20	0	0
	3.8.72	0,7	140	92	41	5	48				
	1.9.72	0,3	160	64	7	4	22				
	27.9.72	0,2	1 100	230	11	35	92(2)	840			
Wet Season											
RR9	9.2.72										
	24.2.72	1,0	79	170	28	44	36				

TABLE XXXVII

Bacteriological results : Umzimkulwana River

Stn. No:	Date	Flow m^3/s	TPC I/mℓ x 10^3	TPC II/mℓ x 10^3	Prot/mℓ x 10^2	AN/mℓ x 10^2	Fungi per mℓ	Pres. *E.coli* I per 100 mℓ	*E. coli* I per 100 mℓ	Irr. II per 100 mℓ	Irr. VI per 100 mℓ
Dry Season											
RR10	4.7.72	0,1	4 500	2 400	18	89	3	TM			
	2.8.72	0,1	13	9	10	7	7	20			
	23.8.72	0,08	40	10	12	6	9				
	9.1.73	0,7	380	670	38	7	30(6)				
Wet Season											
RR10	4.2.72	0,8	320	120	34	44	3				
	25.2.72	2,3	140	408	11	20	14	100	100	0	0

TABLE XXXVIII

Bacteriological results : Boboyi River

Stn. No:	Date	Flow m^3/s	TPC I/mℓ x 10^3	TPC II/mℓ x 10^3	Prot/mℓ x 10^2	AN/mℓ x 10^2	Fungi per mℓ	Pres. *E.coli* I per 100 mℓ	*E. coli* I per 100 mℓ	Irr. II per 100 mℓ	Irr. VI per 100 mℓ
Dry Season											
SS1	3.7.72		43	344	26	40	10	TM			
	31.7.72		150	490	28	36	200	20	0	20	0
	17.8.72		240	170	180	176	100				
	8.1.73	0,04	2 400	250	50	10	34(4)	500	333	167	0
Wet Season											
SS1	3.2.72	0,2	37	28	14	12	3	1300	650	325	325
	21.2.72	0,3	550	350	52	20	110	1900	1900	0	0

TABLE XXXIX

Bacteriological results : Zotsha River

Stn. No:	Date	Flow m^3/s	TPC I/mℓ x 10^3	TPC II/mℓ x 10^3	Prot/mℓ x 10^2	AN/mℓ x 10^2	Fungi per mℓ	Pres. *E.coli* I per 100 mℓ	*E. coli* I per 100 mℓ	Irr. II per 100 mℓ	Irr. VI per 100 mℓ
Dry Season											
TT1	3.7.72		105	336	16	9	29				
	31.7.72	0,06	120	81	15	31	320	40	20	20	0
	17.8.72	0,01	320	84	20	10	15				
	8.1.73	0,1	970	190	55	8	14	300			
Wet Season											
TT1	3.2.72	0,3	210	240	220	310	14				
	21.2.72	0,3	400	160	39	26	76	1100	366	734	0

TABLE XL

Bacteriological results : Umhlangeni River

Stn. No:	Date	Flow m^3/s	TPC I/mℓ $\times 10^3$	TPC II/mℓ $\times 10^3$	Prot/mℓ $\times 10^2$	AN/mℓ $\times 10^2$	Fungi per mℓ	Pres. *E.coli* I per 100 mℓ	*E. coli* I per 100 mℓ	Irr. II per 100 mℓ	Irr. VI per 100 mℓ
Dry Season											
UU1	3.7.72	0,03	108	390	35	39	20	780	156	624	0
	31.7.72	0,03	360	180	51	10	71	100			
	17.8.72	0,03	130	7	47	9	15				
	8.1.73	0,06	110	580	30	9	20(4)				
Wet Season											
UU1	3.2.72	0,08	112	104	140	70	5				
	21.2.72	0,3	220	300	22	38	36	3 950	3 950	0	0

TABLE XLI

Bacteriological results : Uvongo River

Stn. No:	Date	Flow m^3/s	TPC I/mℓ $\times 10^3$	TPC II/mℓ $\times 10^3$	Prot/mℓ $\times 10^2$	AN/mℓ $\times 10^2$	Fungi per mℓ	Pres. *E.coli* I per 100 mℓ	*E. coli* I per 100 mℓ	Irr. II per 100 mℓ	Irr. VI per 100 mℓ
Dry Season											
VV1	3.7.72	0,2	142	480	5	34	6	20	10	10	0
	31.7.72		350	120	16	33	400	20			
	17.8.72	0,06	130	39	10	14	16				
	8.1.73	0,2	5 360	1 800	32	5	24(3)	300			
Wet Season											
VV1	3.2.72	0,6	112	104	140	70	5				
	21.2.72	1,0	96	150	9	16	40	350	233	117	0

TABLE XLII

Bacteriological results: Mbizane River

Stn. No:	Date	Flow m³/s	TPC I/mℓ x 10³	TPC II/mℓ x 10³	Prot/mℓ x 10²	AN/mℓ x 10²	Fungi per mℓ	Pres. *E.coli* I per 100 mℓ	*E. coli* I per 100 mℓ	Irr. II per 100 mℓ	Irr. VI per 100 mℓ
Dry Season											
WW1	3.7.72	0,06	70	17	10	20	8	280	140	140	0
	31.7.72	0,1	70	52	14	2	16	100			
	17.8.72	0,06	30	45	11	3	14				
	8.1.73	0,1	290	220	61	5	17(2)	100			
Wet Season											
WW1	3.2.72	0,8	126	101	320	210	3	5 200	1 300	3 900	0
	21.2.72	1,7	128	320	18	18	8	1 900	1 425	0	475

TABLE XLIII

Bacteriological results : Mpenjati River

Stn. No:	Date	Flow m³/s	TPC I/mℓ x 10³	TPC II/mℓ x 10³	Prot/mℓ x 10²	AN/mℓ x 10²	Fungi per mℓ	Pres. *E.coli* I per 100 mℓ	*E. coli* I per 100 mℓ	Irr. II per 100 mℓ	Irr. VI per 100 mℓ
Dry Season											
XX1	3.7.72	0,06	240	23	4	14	4	40	10	30	0
	31.7.72	0,03	80	16	7	4	9	20	20	0	0
	17.8.72	0,06	20	5	9	3	4				
	8.1.73	0,04	1 160	130	90	3	10(4)	100			
Wet Season											
XX1	3.2.72	0,2	132	150	180	120	8	100	100	0	0
	21.2.72	0,2	250	400	36	25	60	1 850	617	1 233	0

TABLE XLIV

Bacteriological results : Mtamvuna River

Stn. No:	Date	Flow m^3/s	TPC I/mℓ x 10^3	TPC II/mℓ x 10^3	Prot/mℓ x 10^2	AN/mℓ x 10^2	Fungi per mℓ	Pres. *E.coli* I per 100 mℓ	*E. coli* I per 100 mℓ	Irr. II per 100 mℓ	Irr. VI per 100 mℓ
Dry Season											
YY2	3.7.72	8,5	1	192	1	16	5	1 200	600	600	0
	31.7.72		100	200	19	5	4	20	0	20	0
	17.8.72	1,4	30	60	62	7	6				
	8.1.73	2,7	410	160	99	8	13(2)	200	200		
YY3	3.7.72	11	3	216	2	25	7	50	12	38	0
	31.7.72		90	26	9	7	7	60	0	60	0
	17.8.72	2,0	70	120	19	3	1				
	8.1.73	3,4	650	510	79	19	15(2)	200			
YY4	3.7.72		3	288	2	3	1	TM			
	31.7.72		780	10	3	7	4				
	17.8.72		30	3	38	2	4				
	8.1.73		300	3 200	9	4	9(4)				
Wet Season											
YY2	3.2.72		7	6	34	11	22	100	100	0	0
	21.2.72	5,1	220	300	26	20	68	200	200	0	0
YY3	3.2.72	9,9	97	118	58	13	18				
	21.2.72	9,6	352	220	26	12	95	750	375	187	188
YY4	3.2.72		23	13	60	10	12	300	300	0	0
	21.2.72		140	300	36	11	110	150	150	0	0