

Distribution and habitats of *Corbicula fluminalis africana* (Mollusca: Bivalvia) in South Africa

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Abstract

An account is given of the geographical distribution and habitats of the South African representative of the genus *Corbicula* Mühlfeld 1811, formerly known as *C. africana* (Krauss, 1848) but currently regarded as conspecific with the Asian clam, *C. fluminalis* (Müller, 1774). Data pertaining to 390 samples of *C. fluminalis africana* (Krauss, 1848) were extracted from the database of the National Freshwater Snail Collection (NFSC) and statistically analysed. Details of each habitat, as well as mean altitude and mean annual temperature and rainfall for each locality, were processed to determine chi-square and effect size values. An integrated decision tree constructed from the data indicated that temperature, altitude, current speed and type of water-body seemed the more important factors that significantly influenced the distribution of this species in South Africa. In spite of the fact that *C. fluminalis africana* is relatively widespread in South Africa and was recovered from a wide range of habitat types and water-bodies, it has, to our knowledge, not yet been reported to cause problems in cooling circuits as experienced elsewhere in the world. It is proposed that the feasibility to exploit this species for monitoring heavy metal pollution in freshwater biotopes should be investigated in view of reports from elsewhere in the world that it has the ability to accumulate metals such as copper, lead, zinc and manganese.

Keywords: *Corbicula fluminalis africana*, *C. fluminea*, geographical distribution, habitat analysis, freshwater Bivalvia, South Africa

Introduction

The distribution of the bivalve genus *Corbicula* was reported by Pilsbury and Bequart in 1927 as widespread over the Afro-Tropical Region, Madagascar, south-eastern Europe, southern and eastern Asia, the indo-Malayan Region, eastern Australia and Tasmania. They also mentioned that the distribution of this genus extended over much of central and southern Europe during the late Pliocene and Pleistocene. African representatives of the genus *Corbicula* were separated by Haas (1936) into two groups, one with a smooth ligament plate (4 species), the other with a crenulated ligament plate (1 species). According to Mandahl-Barth (1988) this is incorrect since the ligament plate in all species is more or less uneven. This author is therefore of the opinion that the many species of *Corbicula* previously described as being from Africa should be included in only 2 species groups, namely the *C. fluminalis*-group and the *C. astartina*-group, the latter group restricted to Africa. Identification of the Bivalvia in the National Freshwater Snail Collection (NFSC) of South Africa was largely based on the monograph of Connolly (1939) who acknowledged only 2 species of this genus in South Africa, namely *C. africana* and *C. astartina* (Martens 1860). After studies on the freshwater bivalves of Africa, Mandahl-Barth (1988) also came to the conclusion that these were the only 2 species of this genus represented in South Africa, but regarded the previously known *C. africana* as conspecific with the widespread Asian clam, *C. fluminalis* and considered it as a defensible subspecies, *C. fluminalis africana* (Krauss 1848). According to Mandahl-Barth (1988) two other

defensible subspecies occur in east and central African lakes, namely *C. fluminalis cunningtoni* (Smith 1906) in Lake Victoria and *C. fluminalis tanganyicensis* (Crosse 1881) in Lake Tanganyika. These are also the subspecies of *Corbicula* acknowledged by Appleton and Curtis (2007) in their account of the freshwater bivalves of Namibia and Botswana.

This report focuses on the geographical distribution and habitats of *C. fluminalis africana* as reflected by 390 collection sites currently on record in the database of the NFSC of South Africa. Details of each habitat, as well as mean altitude and mean annual air temperature and rainfall for each locality, were processed to determine chi-square and effect size values.

Methods

Details of the habitats of all samples of *C. fluminalis africana* that could be located on the on the 1:250 000 topo-cadastral map series of South Africa, dating from 1956 until 2006, were extracted from the database of the NFSC. The number of loci ($1/_{16}$ square degrees) in which the collection sites were located, were distributed in intervals of mean annual air temperature and rainfall, as well as intervals of mean altitude to illustrate the frequency of occurrence of this species within specific intervals. Rainfall, temperature and altitude data were made available by the Computing Centre for Water Research in 2001 (disbanded since), University of KwaZulu-Natal. A temperature index was calculated for all mollusc species in the database from their frequencies of occurrence within the selected temperature intervals and the results used to rank them in order of association with low to high climatic temperatures. The method of calculation is discussed in detail in our earlier publications (De Kock and Wolmarans, 2005a; 2005b). Chi-square values were calculated to determine the significance in difference between the frequency of occurrence in, on, or at the different options for each variable,

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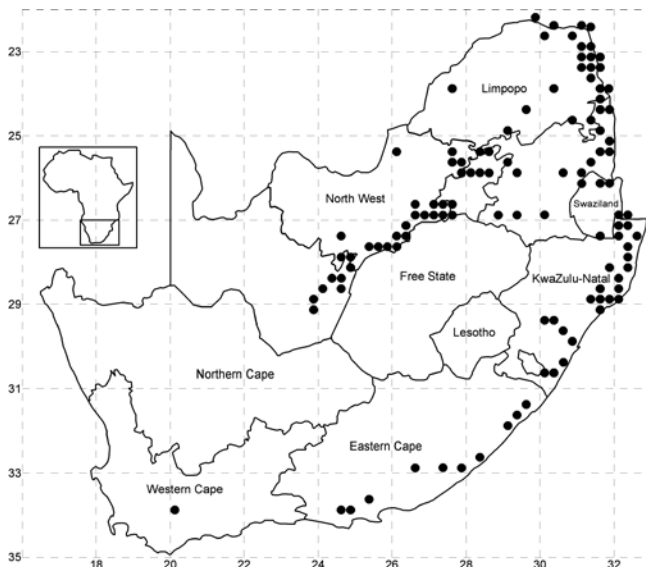


Figure 1

The geographical distribution of *Corbicula fluminalis africana* s. l. in 1/16 square degree loci in South Africa

such as water-body type, substratum type or temperature interval. In addition an effect size (Cohen, 1977) was calculated for all the different variables discussed in this paper. The effect size is an index which measures the degree of discrepancy between the frequency distribution of a given species in the set of alternatives of a given variable such as water-bodies, as compared to the frequency distribution of all other mollusc species in the database in the set of alternatives of the same variable (Cohen, 1977). According to this author values for this index in the order of 0.1 and 0.3 indicate small and moderate effects respectively, while values in the order of 0.5 and higher indicate practical significant large effects. More details of the significance and interpretation of specific values calculated for this statistic in a given situation, are discussed in our earlier publications (De Kock and Wolmarans, 2005a; 2005b).

TABLE 1
Water-body types in which *Corbicula fluminalis africana* s. l. was found in 390 collection sites recorded during surveys

Water-bodies	A	B	C	D
Channel	8	2.1%	169	4.7%
Concrete dam	2	0.5%	221	0.9%
Dam	40	10.3%	8 400	0.5%
Ditch	5	1.3%	636	0.8%
Irrigation furrow	2	0.5%	113	1.8%
Pan	4	1.0%	306	1.3%
Pond	10	2.3%	1 566	0.6%
Quarry	1	0.3%	122	0.8%
River	248	63.6%	7 507	3.3%
Spring	1	0.3%	301	0.3%
Stream	16	4.1%	7 211	0.2%
Swamp	6	1.5%	2 076	0.3%

Effect size: $w = 1.09$ (large effect)

A number of times collected in a specific water-body

B % of the total number of collections (390)

C Number of times any mollusc was collected in a specific water-body

D % occurrence of this species in a specific water-body

An integrated decision tree (Breiman et al., 1984) was also constructed from the data. This statistical model enables the selection and ranking of those variables that can maximally discriminate between the frequency of occurrence of a given species under specific conditions as compared to all other species in the database. This was accomplished by making use of the SAS Enterprise Miner for Windows NT Release 4.0, April 19, 2000 programme and Decision Tree Modelling Course Notes (Potts, 1999).

Results

The 113 loci from which the 390 samples of *C. fluminalis africana* were recovered, are depicted in Fig. 1. This species was represented in 12 of the 14 different water-body types on record in the database. Although the largest percentage of samples (63.3%) came from rivers, the eight samples from channels represented a higher percentage (4.7%) of the total number of times any mollusc in the database was collected from a specific type of water-body (Table 1). The frequency of occurrence in rivers differed significantly ($p < 0.05$) from all the other types of water-body except from channels ($\chi = 1.05$, $df = 1$; $p > 0.05$), irrigation furrows ($\chi = 3.7$, $df = 1$; $p > 0.05$) and pans ($\chi = 3.75$, $df = 1$; $p > 0.05$). The majority of samples were collected in perennial habitats with clear freshwater but there were relatively small differences with regard to its percentage occurrence in habitats with either fast-flowing, slow-flowing or standing water (Table 2). It should be pointed out, however, that its occurrence in fast-flowing water represented a higher percentage (4.8%) of the total number of times any mollusc was recovered from habitats with fast-flowing water (Table 2). Its occurrence under these circumstances therefore differed significantly ($p < 0.05$) from the other two possibilities. The majority of samples were collected in habitats with a predominantly sandy substratum (Table 3) and its frequency of occurrence on this type of substratum differed significantly ($p < 0.05$) from the other three substrata types on record in the database.

Although the majority of samples (74.6%) came from sites which fell within the temperature interval ranging from 16 to 20°C the 4 samples from sites falling within the 26 to 30°C interval represented a much higher percentage (10.8%) of the total number of times any mollusc was collected in a locality falling within a specific interval (Table 4). The frequency of occurrence within the 16 to 20°C interval therefore differed significantly from the other three intervals (Chi-square values ranging from $\chi = 29.4$, $df = 1$; $p < 0.05$ to $\chi = 49.8$, $df = 1$; $p < 0.05$). More than 60% of the samples were collected from sites that fell within the rainfall interval ranging from 601 to 900 mm/a (Table 4) but no significant differences could be demonstrated between the frequency of occurrence within the 4 rainfall intervals. Although the majority of samples were collected from sites falling within the altitude interval ranging from 1 001 to 1 500 m (Table 4), this did not differ significantly from the frequency of occurrence within the interval ranging from 0 to 500 m ($\chi = 2.3$, $df = 1$; $p > 0.05$).

Effect size values calculated for the various parameters investigated are given in Tables 1 to 4. The temperature indexes calculated for all mollusc species in the database, as well as their frequencies of occurrence within the selected temperature intervals are displayed in Table 5 and the species are ranked according to their association with cold to high climatic temperatures. From the effect size values listed in Table 5, it can be deduced that *C. fluminalis africana* did not differ significantly in this respect ($w < 0.5$) from 15 of the 53 species on record in the data-

TABLE 2
Water conditions in the habitats of *Corbicula fluminalis africana* s. l. as described during surveys

	Type		Current velocity			Turbidity		Salinity	
	Perennial	Seasonal	Fast	Slow	Standing	Clear	Muddy	Fresh	Brackish
A	322	13	106	130	100	261	41	281	2
B	82.6%	3.3%	27.2%	33.3%	25.6%	66.9%	10.5%	72.1%	0.5%
C	22 432	5 350	2 229	9 501	16 147	20 408	6 438	24 089	657
D	1.4%	0.2%	4.8%	1.4%	0.6%	1.3%	0.6%	1.16%	0.3%
E	$w = 0.39$ (moderate effect)		$w = 0.91$ (large effect)			$w = 0.24$ (small effect)		$w = 0.13$ (small effect)	

A Number of times collected in a specific water condition
 B % of the total number of collections (390) on record for this species
 C Number of times any mollusc was collected in a specific water condition
 E Effect size values calculated for each factor

base. The decision tree analysis depicted in Fig. 2 shows that the sites of 250 of the 291 samples of this species falling within the 16 to 20°C interval also fell within the altitude interval ranging from 1 001 to 1 500 m and that 169 of these samples were recovered from habitats where the current speed was described as either slow or fast running. From Fig. 2 it can also be deduced that 97 of these 169 samples were collected in rivers and channels and that the frequency of occurrence in these two types of water-body differed significantly from the 72 times that it was recovered from the other 10 water-body types.

Discussion

The genus *Corbicula* was already represented in the Ethiopian Realm during the Pliocene (Pilsbury and Bequaert, 1927) as mentioned earlier and the first representative of this genus from South Africa, namely *C. africana*, was described by Krauss (1848) as *Cyrena africana* from specimens collected in the Gauritz River, Cape Province in 1848. However, as mentioned

TABLE 3
Substratum types in the habitats of *Corbicula fluminalis africana* s. l. as described during surveys

	Substratum types			
	Muddy	Stony	Sandy	Decomposing material
A	78	49	176	7
B	20.0%	12.6%	45.1%	1.8%
C	12 835	7 934	6 523	632
D	0.6%	0.6%	2.7%	1.1%
E	$w = 0.64$			

A Number of times collected on a specific substratum
 B % of the total number of collections (390) on record for this species
 C Number of times any mollusc was collected in a water-body with a specific substratum
 D % occurrence of this species in the total number of collections in a water-body with a specific substratum
 E Effect size values calculated for substrata

TABLE 4
Frequency distribution of the 390 collection sites of *Corbicula fluminalis africana* s. l. in selected intervals of mean annual air temperature and rainfall and mean altitude in South Africa

	Temperature intervals (°C)				Rainfall intervals (mm)				Altitude intervals (m)			
	11 - 15	16 - 20	21 - 25	26 - 30	0 - 300	301 - 600	601 - 900	901 - 1 200	0 - 500	501 - 1 000	1 001 - 1 500	1 501 - 2 000
A	1	291	94	4	8	128	238	16	100	19	264	7
B	0.3%	74.6%	24.1%	1.0%	2.1%	32.8%	61.0%	4.1%	25.6%	4.9%	67.7%	1.8%
C	4 758	24 928	4 276	37	975	11 994	19 799	1 203	6 747	4 491	14 918	6 998
D	0.02%	1.2%	2.2%	10.8%	0.8%	1.1%	1.2%	1.3%	1.5%	0.4%	1.8%	0.1%
E	$w = 0.50$ (large effect)				$w = 0.08$ (small effect)				$w = 0.61$ (large effect)			

A Number of times collected in a locality falling in a specific interval
 B % of the total number of collections (390) on record for this species
 C Number of times any mollusc was collected in a locality falling in a specific interval
 D % occurrence of this species in the total number of collections in a specific interval
 E Effect size values calculated for each factor

earlier, after an in-depth study of the African freshwater bivalves, Mandahl-Barth (1988) came to the conclusion that *C. africana* is conspecific with the Asian clam, *C. fluminalis*, which is well known as an aggressive invader once introduced, as experienced in countries such as Hungary (Csányi, 1998-99), the New World (Taehwan et al., 2004) and Switzerland (Wittenberg, 2005), amongst others. Another Asian species, *C. fluminea* (Müller, 1774) which was introduced into North America in 1924 and has since spread throughout the continent, has also been reported from Europe during the past 2 decades (Renard et al., 2000). According to Appleton and Curtis (2007), this species has, to

their knowledge, not yet been reported from Africa. However, the possibility that this very successful invader species could already have spread to South Africa cannot be excluded. The identity of the 390 samples discussed in this paper were determined on the strength of shell characteristics exclusively (Connolly, 1939). Due to a high variation of shell shape, colour and sculpture, identification of different species inside the *Corbicula* genus could, however, be problematic as pointed out by Sousa et al. (2007a). In an evaluation of the genetic and shell morphological variability of *C. fluminea* populations from 2 estuaries in Portugal these authors recorded significant differences in shell

TABLE 5

Frequency distribution in temperature intervals and temperature index of *Corbicula fluminalis africana* s.l. as compared to all mollusc species in the database of the National Freshwater Snail Collection

Mollusc species	Number of samples	5 - 10°C	11 - 15°C	16 - 20°C	21 - 25°C	26 - 30°C	¹ Index	² SD	³ CV	Effect size
<i>Pisidium viridarium</i>	636	201	270	163	2		1.947	0.764	39.22	-3.022
<i>Lymnaea truncatula</i>	723	95	281	343	4		2.354	0.709	30.14	-2.089
<i>Pisidium casertanum</i>	5		2	3			2.600	0.548	21.07	-1.526
<i>Pisidium langleyanum</i>	627	18	173	430	6		2.676	0.544	20.33	-1.352
<i>Pisidium costulosum</i>	425	1	138	282	4		2.680	0.492	18.34	-1.343
<i>Bulinus tropicus</i>	8 448	32	2 326	5 860	230		2.744	0.502	18.31	-1.196
<i>Gyraulus connollyi</i>	969		185	777	7		2.816	0.406	14.40	-1.031
<i>Ceratophallus natalensis</i>	1 797		299	1 430	68		2.871	0.433	15.09	-0.905
<i>Burnupia</i> (all species)	2 778	7	287	2 384	100		2.928	0.380	12.97	-0.777
<i>Ferrissia</i> (all species)	540		72	420	47	1	2.957	0.476	16.09	-0.708
<i>Bulinus reticulatus</i>	296		6	287	3		2.990	0.174	5.83	-0.634
<i>Assiminea umlaasiana</i>	2			2			3.000	0.000	0.00	-0.611
<i>Tomichia cawstoni</i>	4			4			3.000	0.000	0.00	-0.611
<i>Tomichia diferens</i>	10			10			3.000	0.000	0.00	-0.611
<i>Tomichia lirata</i>	2			2			3.000	0.000	0.00	-0.611
<i>Tomichia ventricosa</i>	89			89			3.000	0.000	0.00	-0.611
<i>Tomichia tristis</i>	81			79	2		3.025	0.156	5.16	-0.554
<i>Unio caffer</i>	76		6	63	6	1	3.026	0.461	15.24	-0.551
<i>Physa acuta</i>	755			719	36		3.048	0.213	7.00	-0.502
<i>Bulinus depressus</i>	552			519	33		3.060	0.237	7.76	-0.474
<i>Arcuatula capensis</i>	15			14	1		3.067	0.258	8.42	-0.458
<i>Lymnaea columella</i>	2 302		81	1 977	243	1	3.071	0.371	12.07	-0.448
<i>Lymnaea natalensis</i>	4 721		205	3 802	713	1	3.108	0.429	13.79	-0.364
<i>Assiminea bifasciata</i>	17			15	2		3.118	0.332	10.65	-0.342
<i>Gyraulus costulatus</i>	736		20	580	135	1	3.159	0.437	13.84	-0.247
<i>Bulinus forskalii</i>	1 209		17	985	204	3	3.160	0.409	12.95	-0.246
<i>Pisidium ovampicum</i>	6			5	1		3.167	0.408	12.89	-0.230
<i>Sphaerium capense</i>	25		1	17	7		3.240	0.523	16.14	-0.062
<i>Bulinus africanus</i> group	2 930		9	2 155	760	6	3.260	0.450	13.82	-0.015
<i>Corbicula fluminalis africana</i>	390		1	291	94	4	3.267	0.437	13.38	0.000
<i>Tomichia natalensis</i>	23			16	7		3.304	0.470	14.24	0.085
<i>Thiara amarula</i>	10			6	4		3.400	0.516	15.19	0.304
<i>Assiminea ovata</i>	5			3	2		3.400	0.548	16.11	0.304
<i>Melanoides victoricae</i>	49			29	19	1	3.429	0.540	15.75	0.370
<i>Biomphalaria pfeifferi</i>	1 639		5	880	751	3	3.459	0.508	14.69	0.439
<i>Septaria tessellaria</i>	2			1	1		3.500	0.707	20.20	0.533
<i>Coelatura framesi</i>	6			3	3		3.500	0.548	15.65	0.533
<i>Neritina natalensis</i>	16			8	8		3.500	0.516	14.75	0.533
<i>Bulinus natalensis</i>	244		2	97	145		3.588	0.510	14.20	0.734
<i>Segmentorbis planodiscus</i>	27			9	18		3.667	0.480	13.10	0.915
<i>Segmentorbis angustus</i>	32			7	25		3.781	0.420	11.11	1.177
<i>Melanoides tuberculata</i>	305			64	237	4	3.803	0.430	11.30	1.227
<i>Pisidium pirothi</i>	23			4	19		3.826	0.388	10.13	1.279
<i>Chambardia wahlbergi</i>	36			7	28	1	3.932	0.398	10.11	1.521
<i>Aplexa marmorata</i>	9				9		4.000	0.000	0.00	1.677
<i>Bellamyia capillata</i>	31				31		4.000	0.000	0.00	1.677
<i>Eupera ferruginea</i>	169			6	157	6	4.000	0.267	6.68	1.677
<i>Lentorbis carringtoni</i>	8				8		4.000	0.000	0.00	1.677
<i>Lentorbis junodi</i>	12				12		4.000	0.000	0.00	1.677
<i>Segmentorbis kanisaensis</i>	9				9		4.000	0.000	0.00	1.677
<i>Chambardia petersi</i>	39			1	36	2	4.000	0.272	6.80	1.677
<i>Cleopatra ferruginea</i>	73				71	2	4.027	0.164	4.08	1.740
<i>Lanistes ovum</i>	41				38	3	4.073	0.264	6.47	1.845

¹Index: Temperature index; ²SD: Standard deviation; ³CV: Coefficient of variance

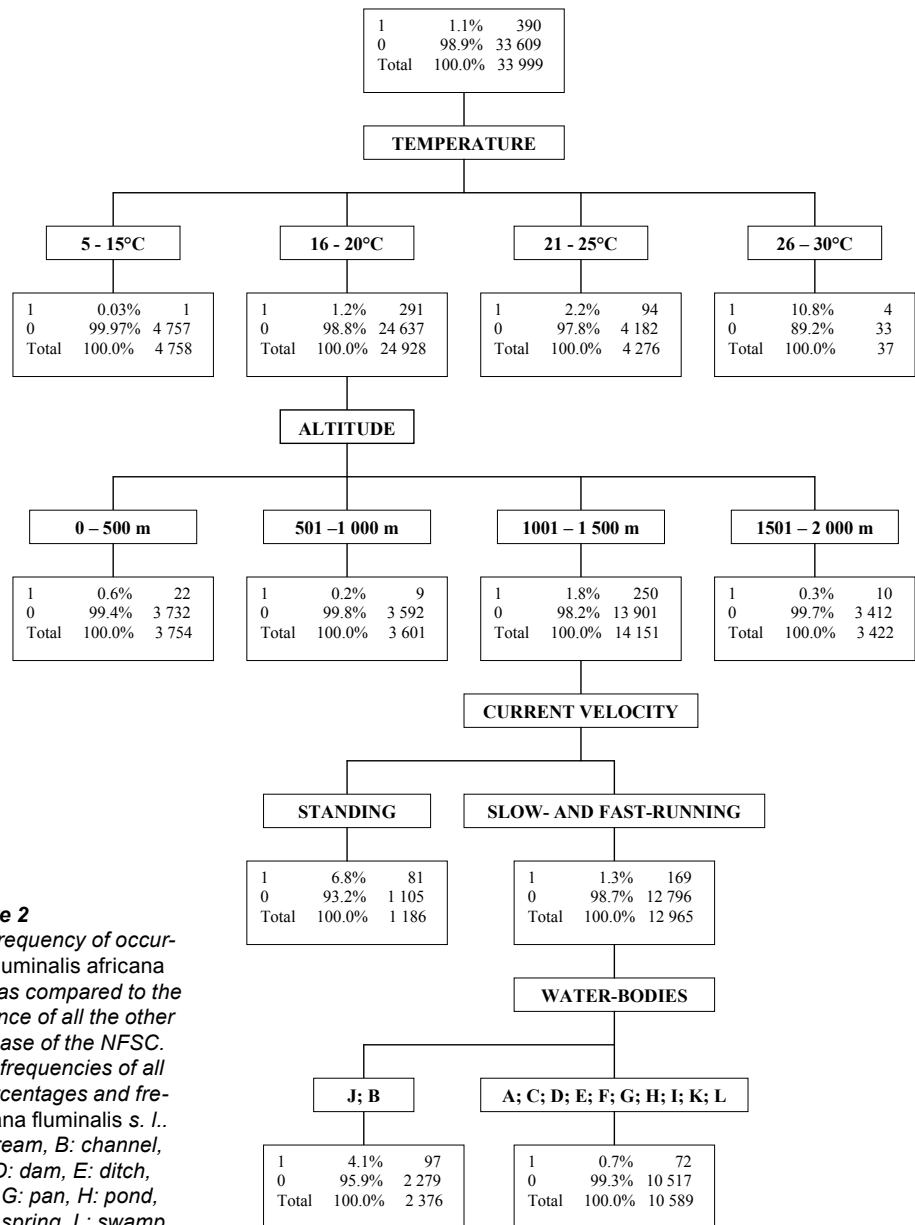


Figure 2
Decision tree of the frequency of occurrence of *Corbicula fluminalis africana* s. l. for each variable as compared to the frequency of occurrence of all the other species in the database of the NFSC. 0: percentages and frequencies of all other species, 1: percentages and frequencies of *C. fluminalis africana* s. l. Water-bodies: A: stream, B: channel, C: concrete dam, D: dam, E: ditch, F: irrigation furrow, G: pan, H: pond, I: quarry, J: river, K: spring, L: swamp

shape between the 2 populations, but identical genetic characteristics. In view of the fact that no genetic criteria were taken into account in the identification of the 390 samples discussed in this paper, these specimens should rather be referred to as *C. fluminalis africana* sensu lato.

The oldest record of *C. fluminalis africana* s. l. in the database of the NFSC dates back to 1956 and was collected in a stream near Groblersdal, Mpumalanga Province. The geographical distribution depicted in Fig. 1 and the habitat preferences presented in Table 1 are largely in accordance with the report by Appleton (2002) that *C. fluminalis africana* is widespread in rivers, lakes and dams across Southern Africa except for the arid western parts. Although a considerable number of samples of various other freshwater molluscs species are on record in the NFSC for the western parts of South Africa (De Kock et al., 1989; De Kock et al., 2001; De Kock et al., 2002; De Kock and Wolmarans, 2004; De Kock and Wolmarans, 2005c; De Kock and Wolmarans, 2007) the species diversity is significantly lower when compared to the situation in the eastern parts of this country. According to Brown (1978) the obvious explanation

for this phenomenon is that water in itself is the primary need for an aquatic mollusc and, according to him, there can be no doubt that the more or less arid zone extending from the Western Cape Province through Namibia, Northern Cape Province and Botswana is of overriding importance in that region. It could further be added (Brown, 1978) that there appear to be no endemic molluscs in the specialised fauna living in acid streams in the Western Cape Province (Harrison and Agnew, 1962) or in mountain streams where palaeogenic invertebrates are found (Harrison, 1965). The absence of *C. fluminalis africana* s. l. in these parts could therefore most probably be ascribed to the absence of suitable habitats. However, this species could be more widespread than reflected by the distribution in Fig. 1 because specimens can easily be overlooked due to the fact that the species is a bottom dweller. Mandahl-Barth (1988) also mentions that, in his experience, live specimens of *Corbicula* are not easily obtained since they are sometimes buried in clay at the bottom of a habitat. It should, however, be mentioned that the majority of samples on record in the database of the NFSC has been collected by specially trained staff of the State Ecologist, local

health authorities and staff of the former Snail Research Unit of the Medical Research Council at Potchefstroom. In the majority of these surveys only sites with lower depth and near the margins of a water-body were surveyed, which might not have been the most appropriate methodology for obtaining specimens of bivalves. However, during seasonal surveys of all available habitat types at 15 sites in the Mooi River (North-West Province) by means of Birge-Ekman grabs, standardised scoops and sediment scrapers designed for quantitative collections of benthic fauna, it was established that the largest populations of the 2 bivalve genera *Corbicula* and *Pisidium* were located either on or in sediments in shallow runs near the margins (De Kock and Van Eeden, 1969). From the large number of samples recovered of the gastropod genus *Burnupia* and of the small bivalve genus *Pisidium*, as reflected by the data in the database of the NFSC (Table 5), it could be assumed that water-bodies were adequately screened during most of the surveys because these species are not easily found if not specifically searched for.

Corbicula fluminalis africana s. l. seems not only well adapted to colonise different water-body types as reflected by the results in Table 1, but also has the ability to exploit different habitat types within a specific water-body. In the in-depth study of the habitat selection of the molluscs in the Mooi River by De Kock and Van Eeden (1969), mentioned above, specimens were recovered in all habitat types where sediment samples were taken, such as backwaters, pools, flats, runs and stickles and in some of these habitat types densities of up to 100/m² were recorded.

In a recent study of abiotic impacts on spatial and temporal distribution of *C. fluminea* in the River Minho estuary in Portugal, it was found that redox potential, nutrient concentrations, hardness, organic matter and sediment characteristics could explain 60% of the variation in biomass of this species in the freshwater subtidal area (Sousa et al., 2007b). The only abiotic factors reported for the majority of samples on record in the NFSC are those listed in Tables 1 to 4 and to our knowledge no specific data pertaining to the effect of abiotic factors on the biology of the South African species of *Corbicula* are available in print.

Corbicula fluminalis is well-known for causing severe problems in cooling circuits elsewhere in the world (Rajagopal et al., 1991; Verelst et al., 2005). However, in spite of its relatively wide geographical distribution in the RSA and the fact that it can exploit a variety of habitat types in a wide spectrum of water-bodies, to our knowledge the South African species has not yet been incriminated for causing similar problems in this country.

In studies conducted in a wetland in Iran, it was established that *C. fluminalis* could accumulate heavy metals such as lead, copper, zinc and manganese from superficial sediments (Pourang, 1996). In view of these results, a lifespan ranging between 2 and 7 years reported in literature for *C. fluminea* (Hall, 1984; Marsh, 1985) might be an attribute that could make it a useful candidate for relatively long-term monitoring of heavy metal pollution in selected water-bodies. Although, to our knowledge, no data on the longevity of indigenous South African *Corbicula* species have yet been reported in literature, Leveque and Saint-Jean (1973) established that *C. africana* had a lifespan of 2 to 3 years and bred seasonally in a lake in Chad. In view of these findings we are of the opinion that the feasibility of exploiting *C. fluminalis africana* s. l. as indicator species for monitoring heavy metal pollution in South Africa should be investigated. The facts that this mollusc is fairly widespread in the RSA, and can establish itself in various types of freshwater habitats, especially because of its limited means of locomotion

and relatively long lifespan, are attributes which could make it an ideal candidate for such investigations.

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