Bantham Ham Surf Club 2001 (BHSC'01) – Land Mollusca

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Introduction

A total of 22 samples were provided comprising the Mollusca recovered via flotation from 15-20 litre samples. Twenty samples comprised a discontinuous sequence through a *c.* 3m deep sand deposit containing 2 distinct palaeosols; Context 501 (lower) and Context 521 (upper). A bulk sample from each of the palaeosols was also provided.

Initial Assessment methodology

The Mollusca from each sample were assessed using a low-power zoom binocular microscope (x6-x40). Identifications were made to at least Family level (most to species), using Evans (1972), Kerney and Cameron (1979) and Kerney (1999) as aids to identification when required. Abundance was estimated using the following ACFOR scale:

A (abundant) – 100+ individuals
C (common) – 50-100 individuals
F (frequent) – 20-50 individuals
O (occasional) – 10-20 individuals
R (rare) – less than 10 individuals

Assessement results and broad interpretation

Preservation was excellent throughout. Numbers of Mollusca per sample were also generally high, as one might expect from the large sediment sample size, with the exception of the bulk sample from Context 521, where molluscan numbers were generally low. Recovered Mollusca and abundance are given as Table 1. In total some 20+ species were represented (though not necessarily all are determined to species level on Table 1). 'Other Helicidae' most probably consists in the main of *Helicella itala, Candidula intersecta* and *Cernuella virgata*, though this must remain provisional for most samples (except for those analysed fully, below and Table 2). Samples from 2.00-2.05cm, 2.15-2.20cm and 2.3-2.35cm contained charcoal but the shells were not burnt.The bulk samples from Contexts 501 and 521 both contained fragments of marine Mollusca, some of which had been burnt. None of the terrestrial Mollusca showed signs of burning in either sample.

In terms of the Mollusca, from base upwards the sequence can broadly be divided into four zones:

Depth (cm)

2.95.2.90 BHM1: A low diversity assemblage comprising dry-ground, open-country species (*Vallonia, Pupilla, Cochlicella, Trichia Cochlicopa*) typical of short-sward sand dunes.

2.90.2.30 BHM2: Higher diversity assemblages comprising open-country species (as above) and some species generally considered as requiring more shaded conditions (*Aegopinella/Oxychilus, Discus, Carychium*), though none of these are ever abundant. The lower part of this zone is also represented by the bulk sample from Context 501 which also shows the same characteristics, a mainly open-country assemblage with a slightly wider range of shade-requiring species (*Carychium, Lauria cylindracea, Punctum pygmaeum, Discus, Aegopinella/Oxychilus, Clausilia*).

2.30-0.65 BHM3: A return to lower diversity open-country assemblage (as 2.95-2.90)

0.65-0.05 BHM4: Extremely low diversity open-country assemblage.

Full analysis

Eight samples were analysed fully, concentrating mainly on those samples near the base of the sequence (2.3 to 2.95m, molluscan zones BHM1 and 2) where environmental change appeared most pronounced. In addition, however, full analysis was also undertaken to more fully characterise the other molluscan zones (BHM3 and BHM4). Methodology was as outlined above, and results are given as Table 2.

Interpretation and discussion

The assemblages throughout are generally in accord with those recovered from Holocene age sand dune sequences elsewhere from the UK coastline (Spencer 1975, Evans 1979) and previously from Bantham Hams (Davies in Griffiths and Reed 1998). Of particular note is that the basal samples generally (with the exception of the lowermost sample) indicate development of a more heavily shaded environment than that later represented, with *Clausilia bidentata, Oxychilus cellarius, Aegopinella nitidula, Aegopinella pura, Discus rotundatus, Lauria cylindracea* (though sparse as always in Cornwall as discussed recently by Evans 2004) and *Carychium tridentatum* all present. The detailed analysis shows the main shade element between 2.30-2.65m. This pattern is common to UK Holocene dune sequences (Evans 1972, 1979) and is often taken as indicative of the development of woody-scrubby conditions with more open sand-accumulation (dune) conditions developing later as, for example, at Towan Head, Newquay in Cornwall and Skara Brae, Orkney (Spencer 1975), the Knap of Howar (Evans and Vaughn in Ritchie 1983)also on Orkney, and in western Ireland (Stelfox and Welch 1980). Above 2.30m the fauna is essentially open country, being dominated by *Cochlicella acuta* and *Vallonia costata/excentrica*, and later *Cochlicella-Cernuella virgata*. *Cochlicella acuta* has been characterised as a species of semi-fixed or mobile dunes (Tattersfield 1981), and Haslett *et al* (2000) found that it was often the sole species on bare sand on dunes in Brittany. Chatfield (1975) found

that on Jersey *Cochlicella* and *Cernuella* were often abundant on the bare sand of dune 'blow-outs', and this may be of relevance to the two uppermost samples taken to full analysis (Table 2). The faunas through the main body of the sequence can, therefore, be taken as indicative of relatively short sward or patchy dune vegetation. Interestingly, the buried soil (Context 521) within the main sand units, shown no sign of further vegetation development.

The development of woody-scrubby conditions in BHM2 deserves some further attention. As outlined above, the basal parts of dune sequences from the British Isles often have high-diversity assemblages and are assumed to indicate woody or scrubby conditions. It is worthy of note, however, that this interpretation has largely been derived *internally* and by reference to individual species modern ecologies and palaeoecological interpretations from different environmental contexts, rather than on detailed analogy with present dune faunas. That said, Evans and Vaughn (in Ritchie 1983) did undertake some limited modern studies on Orkney and found that relatively long grassland on dunes still did not support the shade-loving species, clearly supporting their interpretation that the presence of shade-requiring species in fossil sequences indicated rather more than long or rank vegetation. However, following a modern study in Brittany, Haslett *et al* (2000) have recently questioned the degree of shade necessary on dunes to support the shade-requiring species commonly found at the base of Holocene dune sequences, and recent observations at Braunton Burrows, Devon have found *Clausilia bidentata* living at the base of grass tussocks in otherwise 'open' areas, and *Lauria cylindracea* living on moss and in grass-herb rich areas (Paul Davies, pers. observation). Clearly, some comprehensive modern surveys of calcareous dune areas would be beneficial in interpreting fossil assemblages.

References

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Table 1 – Bantham Ham Surf Club, 2001 (BHSC'01) - assessment

Context	526	526	526	527	527	524	524	524	519	519	519
Depth below surface (m)	**0.05-**	**0.2-**	**0.35-**	**0.5-**	**0.65-**	**0.8-**	**0.95-**	**1.10-**	**1.25-**	**1.40-**	**1.55-**
Species	**0.10**	**0.25**	**0.4**	**0.55**	**0.7**	**0.85**	**1.00**	**1.15**	**1.30**	**1.45**	**1.60**
Carychium tridentatum											
Cochlicopa lubrica			O	F	C	C	O	O	O	O	
Vertigo pygmaea								O		O	
Pupilla muscorum	R		O	F	F		O				O
Lauria cylindracea											
Vallonia costata/excentrica	R	F	F	C	C	F	F	F	C	C	A
Punctum pygmaeum	R										
Discus rotundatus											
***Vitrea* sp.**											
Nesovitrea hammonis										R	R
Aegopinella/Oxychilus											
Cecilioides acicula	R		R	O							
Clausilia bidentata											
Ashfordia granulata					R		R	R	O	F	F
Trichia hispida					R	O	O	O	F	C	C
Cochlicella acuta	C	A	A	A	A	A	A	C	A	A	A
Other *Helicidae*	F	A	A	A	A	C	R			O	

Table 1 – Bantham Ham Surf Club, 2001 (BHSC'01) – assessment (continued)

Context	521	528	500	500	500	500	500	501	512	521	501
Depth below surface (m)	1.70-1.75	1.85-1.90	2.00-2.05	2.15-2.20	2.30-2.35	2.45-2.50	2.6-2.65	2.75-2.80	2.90-2.95	(bulk)	(bulk)
Species											
Carychium tridentatum					R	C					C
Cochlicopa lubrica	O		R		O	O	O		R		F
Vertigo pygmaea		R		R	O	R	R				R
Pupilla muscorum						O			R		O
Lauria cylindracea											R
Vallonia costata/excentrica	C	A	O	R	A	C	A	C	O	R	A
Punctum pygmaeum											R
Discus rotundatus					R		R	R			O
***Vitrea* sp.**											O
Nesovitrea hammonis							R				
Aegopinella/Oxychilus						R	R				R
Cecilioides acicula											
Ashfordia granulata	F	R			R	R	R		R		
Clausilia bidentata											R
Trichia hispida	F	O			O	O	O		R	R	C
Cochlicella acuta	A	A	R	R	A	A	A	A	A	R	A
Other *Helicidae*				R				R			R

Table 2 – Bantham Ham Surf Club, 2001 (BHSC'01) – selected detailed analysis

Context	527	524	519	500	500	500	501	512
depth below surface (m)	0.50-	0.95-	1.55-	2.30-	2.45-	2.60-	2.75-	2.90-
species	0.55	1.00	1.60	2.35	2.50	2.65	2.80	2.95
Carychium tridentatum	-	-	-	30	43	15	6	-
Cochlicopa lubrica	10	10	13	7	12	12	2	3
Cochlicopa lubricella				1		-	-	-
Vertigo pygmaea	-	-	-	2	2	4	1	-
Pupilla muscorum	4	10	-	7	7	17	-	2
Lauria cylindracea	-	-	-	-	2	-	-	1
Vallonia costata	-	68	200+	17	28	42	38	5
Vallonia excentrica		8	15	5	10	20	5	10
***Vallonia* sp.**		46	86	40	75	70	-	-
Punctum pygmaeum	-	1	4	-	1	-	1	-
Discus rotundatus	-	-	-	3	1	1	1	-
***Vitrea* sp.**	-	-	1	-	-	2	-	-
Vitrina pellucida		2	-	-	-	3	1	-
Nesovitrea hammonis	-	-	1	-	2	1	-	-
Aegopinella nitidula	-	-	-	1	2	-	-	-
Aegopinella pura				1	2	2	-	-
Oxychilus cellarius				-	1	3	-	-
Cecilioides acicula	-	2	-	-	-	-	-	-
Clausilia bidentata	-	-	-	3	-	1	-	-
Ashfordia granulata	-	6	44	22	37	16	-	2
Trichia hispida	-	4	28	14	1	10	8	1
Cochlicella acuta	27	200+	200+	200+	129	200+	200+	200+
Cernuella virgata	143	174	-	-	-	-	-	-
Helicella itala	-	-	-	1	-	-	10	-
Candidula intersecta	20	-	-	-	-	-	-	-
Monacha cantiana	-	2	-	-	-	-	-	-
Helix aspersa	1	-	-	-	-	-	-	-