

Land Snails

Michael J Allen
(March 2004)

A series of Middle Neolithic pits were recovered in small clusters on two 'sites' along the pipe trench; Sites 3 and 6. Eighteen spot samples were analysed from 11 Neolithic pits and six samples from five Bronze Age (or later) features as a comparison (Tables M1 and M2). Samples were processed by standard methods (Evans 1972), and the identification undertaken with Sarah F. Wyles and the writer. The data are presented in tables M1 and M2 and nomenclature follows Kerney (1999). The results are presented as histograms of relative abundance (Figures M1 and M2) in which the species groupings follow Evans (1984) and Entwistle and Bowden (1991). A number of the shade-loving species (*sensu* Evans 1972), are considered to have more catholic preferences occurring in longer grass swards and open shrubs where damp mesic habitats exist at the base of the vegetation (Cameron and Morgan-Huws 1975; Evans 1984). In the accompanying histograms the species are grouped as follows:

Shade-loving species

Zonitidae: *Vitrea crystallina*, *V. contracta*, *Aegopinella pura*, *A. nitidula*, *Oxychilus cellarius*, *Vertigo* cf. *pusilla*

Discus rotundatus: plotted separately in the histograms, but included with shade-loving species

Carychium tridentatum: plotted separately in the histograms, but included with shade-loving species

Other Shade-loving species: *Cochlodina laminata*, *Ena obscura*, *Helicigona lapicida*, *Acanthinula aculeata*

Catholic species

Catholic species: *Cochlicopa* spp., *Punctum pygmaeum*, *Euconulus fulvus*, *Cepaea* spp, *Vitrina pellucida*, *Nesovitrea hammonis*, Limacidae

Trichia hispida: plotted separately in the histograms, but included with catholic species

Pomatias elegans: plotted separately in the histograms, but included with catholic species

Open country species

Open country species: *Vertigo pygmaea*, *Vallonia costata*, *Vallonia excentrica*, *Pupilla muscorum*, *Helicella itala*, Introduced Helicellids,

Species diversity calculations have been employed to aid in interpretation of the sequences of molluscan assemblages (Tables M1 and M2). The analysis of Δ (delta) species diversity indices (Hurbert 1971) allows us to attempt to examine how 'uniform' the wider landscape is (cf. Entwistle, in Allen *et al.* 1990; Entwistle and Bowden 1991), and the application of species diversity indices clearly allow us to examine generally the nature of the environment (cf. Allen in French *et al.* 2003, 226-8, 233-4; Bell *et al.* 2008):

- i) closeness of sampled assemblage to a likely real population; Shannon index (H') - Brillouin index (HB), see Evans in Ashbee *et al.* 1979; Evans in Evans and Smith 1983
- ii) the diversity of the ecological mosaic sampled ($\Delta 2$ and $\Delta 4$)
- iii) the complexity or maturity of the assemblages and thus the environment they inhabited

One of the nationally and regionally important (Allen 1998) themes in the Neolithic period is the presence and nature of woodland development (Smith 1981) and that of Neolithic regeneration which has been taken to indicate social movement from the chalklands (Bradley 1978). The preservation of land snails in the Middle Neolithic pits provide an opportunity to examine this and compare with the sparse molluscan data Wessex. Although

similar pits have been found at Winterbourne Dauntsey (Stone 1934) and the Beehive (Cleal in Heaton 2003) comparable environmental data have only be obtained from Easton Lane (pit 1017), Hants (Allen 1989).

The potential to examine changes in woodland and of woodland regeneration here is limited by the failure to take columns of contiguous samples through any of the Neolithic pits, and by the probable short-lived infill sequences they represent. Short sequences of subsamples from stratified sequences of bulk samples do, however, provide an opportunity to examine this here.

The lack of other suitable contexts hinders further analysis of the landscape and landscape change. Nevertheless, a few selected samples from suitable Middle to Late Bronze Age contexts allow some comparison with the Neolithic environment to be made.

Neolithic Pits

Pits are not considered ideal contexts for land snails as the precise origin of the deposits, and thus the included snail faunas, is not always known (Thomas 1977; Shackley 1976). However, where pits infilled naturally, rather than by human dumping, they can provide useful long sequences (e.g. Easton Lane, Hampshire - Allen 1989). The deposits from the pits at along the Old Sarum Pipeline, however, represent largely cultural activity, rather than a natural sequence of infills. This invokes serious challenges as to the origin of the molluscan assemblages. At the very least we can establish the general nature local environment, rather than the detailed sequence of land-use development. However, *if* we can assume that the deposits, and the soil encapsulating the shells are both local, even if the artefacts are not, and are surface derived, then we are examining assemblages that are both contemporary with the feature, and representative of the local environment.

The lack of chalk rock rubble in the sampled contexts excludes the difficulties of a large proportion of the potentially troglophile species (*Discus rotundatus*, *Oxychilus cellarius* and *Vitrea contracta*) being attributed to this pit-specific habitat (Evans and Jones 1973). Although some of these species, and other more catholic members of the shade-loving group, may have inhabited the pit microenvironment, the short-lived nature of the pit fill sequences reduces the likely significance of this component. As such we are largely, though not wholly, dealing with assemblages representing the environment surrounding the sampled features.

Mollusc assemblages

The dated Neolithic pits from both sites are contemporary (c. 3340-2910 cal BC), nevertheless there is a radiocarbon plateau covering this period of Peterborough Ware pottery style from c. 3350 to 3050 cal BC. All of these molluscan assemblages can be considered to be broadly contemporary, however, in four pits where a series of samples were taken, some limited time-depth is provided with which to examine local changes, rather than spatial variation. What is clear however, is that where sequences of more than two samples were taken (pits 6056, 6061 (Site 5) and 3007 (Site 3)), no real successive changes could be seen. This tends to confirm the relatively rapid infill history of the features as suggested by the deposits (Figure XX of pit section).

In this report mollusc assemblages are considered on the basis of five distinct ecological assemblage groups which are defined on the basis of their ecology and assemblage composition, and regardless of location or age (see Figures M1 and M2). Not surprisingly, however, a strong chronological trend can be seen with assemblage groups 1 – 3a relating to Middle Neolithic pits, assemblage group 3b and 4 to Neolithic and Bronze Age pits, assemblage group 5 to a Middle Bronze Age or later pits.

Group 1: pits 6093, 6056, 6100 (site 5) and pits 3000, 3007, 3198 (site 3)

Pits in this group come from both sites and from two separate clusters within both sites. Three of the assemblages have radiocarbon determinations, all falling into the Middle Neolithic period *c.* 3340-2910 cal BC.

The assemblages are dominated by shade-loving elements, and in particular *Zonitoides* and *Discus rotundatus* with *Carychium tridentatus* (Figure M1 and M2). A shady environment with leaf litter is indicated by these assemblages. The main open country species in all of these assemblages is *Vallonia costata* which is known to occur in open woodland (Evans 1984). The range of taxa (generally 18-21) is modest for ancient woodland, and although *Vertigo cf. pusilla* is present as single specimens, the assemblage lacks a whole raft of taxa typical of ancient and largely undisturbed woodland such as *Ena montana* and a number of other species. The species diversity is moderate (Shannon index generally between 2.64 and 2.18) suggesting that this is neither an ancient nor very mature woodland. The relatively low Δ (delta) indices suggest a wide habitat variation rather than a mature ecology.

We can suggest the existence of an open broad-leaved deciduous woodland, with local mosaic of habitats. The activity, possibly including clearing or thinning the trees locally, may have encouraged this diversity and created the multitude of coeval habitats (see below). What is clear, however, is that very long established mature wildwood was not present, and that in all probability, although largely wooded on both sites, these were modified and utilised woods.

Group 2: pit 6061 (site 5)

Three assemblages from one pit (pit 6061) fall into this group, from which a radiocarbon date of 3340-2930 cal BC was obtained. These assemblages show slight decreases in the shade-loving species present in assemblage group 1. The Zonitids and *Discus rotundatus* are less important while *Carychium tridentatum* is the dominant shade-loving species. The presence of *Helicella itala* at 15 to 26% and the presence of *Pupilla muscorum* indicate the presence of dry open grassland. Lower taxonomic range (13 taxa) and species diversity indices (Shannon *c.* 2.09) suggest decreasing ecological maturity while higher Δ_4 indices (to 7.39) might suggest habitat diversity.

Here, therefore we can suggest open grassland and woods, probably with shrubs. There is unlikely to be a closed woodland canopy, and the lack of predatory Zonitids might lead us to suggest that *Carychium tridentatum* is exploiting long grassland habitats (Cameron and Morgan-Huws 1975) rather than leaf litter. Although this is a subtly different local habitat to that defined by assemblage group 1, it is not difficult to see these two habitats being coeval and in close proximity.

Group 3: pits 3119, 3005, 3020, 3102, and 3013 (site 3)

Pits from this group came from both sites and again from several separate clusters of pits on site 3. I have divided this assemblage into two subgroups. In general, however, these assemblages are dominated by open country species, predominantly *Helicella itala* and *Vallonia excentrica* with *Pupilla muscorum*, and are typical of short dry grassland habitats. The presence of shade-loving species is much reduced, especially in assemblage group 3b. *Pomatias elegans* which enjoys loose and broken soil, and is sometimes taken as an indicator of arable, is well represented in Bronze Age pit 3013. The main differences between the subgroups are the dramatic reduction of *Vallonia costata* in group 3b, and the presence of shade-loving taxa. The lower ecological diversity is represented by reduced Shannon indices (1.42-1.78) and much lower Δ_4 indices (2.3-3.6) indicating fewer habitat types in the vicinity.

Both assemblage groups indicate open grassy downland with few trees, though shrubs are likely to be present. Subgroup 3b, suggests an even drier, and grassed grassland, from

which a radiocarbon date of 3290-2910 cal BC indicates that this environment is contemporary with both those represented by assemblage groups 1 and 2. However, this open grassland environment existed in both the Middle Neolithic period (pit 3020, 3290-2910 cal BC), and the later Bronze Age (pit s3013, 3102 and 3106) see figure M1. Although Δ_4 indices tend to suggest lower habitat variation locally, this seems to belie the presence of woodier habitats represented by assemblage groups 1 and 2. Although this may be a factor of species competition (Thomas 1985), it may also indicate chronological variation over the decadal to centennial scale not detectable by the radiocarbon determinations during this period (see radiocarbon discussion)

Group 4: pits 6065 (site 5) and pit 3106 (site 3)

This assemblage group also contains pits provisionally ascribed to both Neolithic (pit 6065) and Bronze Age (pit 3106) phases, on each site. These assemblages characterised by the dominance of open country taxa and Limicidae and have low levels of *D. rotundatus* and Zonitids with *Carychium tridentatum*. Although the xerophile *Helicella itala* is present, it occurs in lower proportions (8-13%, rather than 20-30%), than in group 3, but with slightly raised taxonomic ranges. The presence of Introduced Helicellids (medieval or later date) in pit 6065 reflects the shallow and poorly sealed nature of this context. It also questions the coeval nature of the entire assemblage.

Although this represents an undoubtedly predominantly open countryside environment, the slightly higher mesic components may suggest longer grasses with less grazing pressure. This environment is one that exists today as rough downland, and can be seen to be non-period specific being common in cleared, and maintained open downland in the Middle Neolithic and later periods. In Bronze Age pit 3106 the high presence of *Pomatias elegans* might suggest loose tilled soil.

Bronze Age Pits

Group 5: pit 6153 (site 5) and pit 3328 (site 3)

Both pits were confidently ascribed to the Bronze Age or later periods. The assemblages are dominated by open country species, mainly *Helicella itala*, *Pupilla muscorum* and *V. excentica*. The almost total absence of shade-loving taxa confirms the presence of long - established open downland conditions. These probably represent dry short grassed, grazed downland, or possibly even limited arable. The presence of *Pomatias elegans* in pit 6153 tends to suggest the presence of broken ground and arable here.

Neolithic 'Wildwood'

Despite the relatively early date of the assemblages and presence of an open canopy woodland, no evidence of primeval woodland, wild wood, or mature, ancient undisturbed woodland can be detected in the assemblages. More mature ancient woodland is evidenced within the general area at Coneybury Henge (Bell and Jones 1990). The lack of a mature 'wildwood' here allows two possibilities. The first is that the postglacial wildwood developed and had been thinned and modified by both human action and browsing animals resulting in the development of a more open woodland canopy. The second is that a fully developed mature post-glacial Atlantic woodland had not, in fact, blanketed the entire downland, and there was no wildwood to thin or modify. Such interpretations have already been presented for the Dorchester area (Allen 1997, 278) and Cranborne Chase (Allen 2002; French *et al.* 2003).

Open Woodland and Diverse Downland

Open woodland (assemblage group 1) is more dominant in the pits in Site 5 than Site 3 (compare Figures M1 and M2), but in view of the diversity of seemingly contemporaneous assemblages, we cannot be sure if this is spatial or temporal pattern.

We tend to view much of the chalk downlands as a series of very large and extensive habitats. Previous interpretations have often also viewed prehistoric downland with a similar monotony and low diversity, albeit with different and more appropriate habitats to early prehistory. Assuming that we can consider all the Middle Neolithic pits from both sites as contemporaneous, and that the chronological range is not great enough to enable large landscape changes and establishment of their respective molluscan fauna, then this data provide clear evidence of huge local habitat diversity.

Clearing Ground

The data do not allow us to examine detailed sequences, of landscape and land-use change such as can be seen, for instance, at Easton Lane, Hants. (Allen 1989), and even if some chronological dimension can be given to the supposedly contemporaneous pit assemblages, no evidence of clearance episodes can be detected. Some open dry grass downland existed in the Middle Neolithic as evidenced from the assemblages in the radiocarbon dated pit 3020, but woodland was also present. Evidence of clearance in terms of assemblages typical of broken ground are not present. These may not be represented in the fills, or clearance may not have occurred as a major short-lived event, but rather as a gradual expansion of grassland by the demise of trees and retreat of the woodland fringes. Such development could be relatively rapid over the centennial scale and be encouraged by both human action and animal browsing, and thus not lead to broken soils and clear felled forest. The non-quantitative analysis by Kennard (in Stone 1934, 447-8) from Peterborough Ware pits at Winterbourne Dauntsey, seems to show an open country assemblage probably most akin to assemblage group 3. By the mature Bronze Age (assemblages in pits 6153 and 3328) open downland prevailed.

Open Downland

Although overall the trend shows open downland more prevalent in the Bronze Age, its origins are certainly in at least the Middle Neolithic on this site. With the open downland came cultivation of crops as Stevens (charred plants) indicates, but local tillage cannot be detected until the mature Bronze Age here, if at all.

Bibliography

- Allen, M.J., 1989. Land snails, in P.J. Fasham, D.E. Farwell and R.J.B. Whinney, *The Archaeological Site at Easton Lane, Winchester*, 134–40. Winchester: Hampshire Field Club and Archaeological Society Monograph 6
- Allen, M.J., 1997. Land-use history: land molluscan evidence, in R.J.C. Smith, F. Healy, M.J. Allen, E.L. Morris, I. Barnes and P.J. Woodward, 1997. *Excavations Along the Route of the Dorchester By-pass, Dorset, 1986–8*, 166–184. Salisbury, Wessex Archaeology Report 11
- Allen, M.J., 1998. Landscape and landuse reconstruction: looking forward or looking back, in A. Woodward and J. Gardiner (eds), *Wessex before Words: some new research direction for prehistoric Wessex*, 15–17. CBA Wessex, Salisbury, Wessex Archaeology
- Allen, M.J., 2002. The chalkland landscape of Cranborne Chase: a prehistoric human ecology, *Landscapes* 3, 55–69
- Allen, M.J., Entwistle, R. and Richards, J.C., 1990. Molluscan studies, in J.C. Richards, *The Stonehenge Environs Project*, 253–256. London: English Heritage Archaeol. Rep. 16
- Bell, M., Allen, M.J., Smith, R.W. and Johnson, S., 2008. Mollusc and sedimentary evidence for the environment of Hambledon Hill and its surroundings, in R. Mercer and F. Healy, *Hambledon Hill, Dorset, England: excavation and survey of a Neolithic monument complex and its surrounding landscape*. London: English Heritage Archaeological Report
- Bell, M.G. and Jones, J., 1990. Land mollusca (Coneybury Henge), in J.C. Richards, *The Stonehenge Environs Project*, 154–8. English Heritage Archaeological Report 16
- Bradley, R., 1978. *The Prehistoric Settlement of Britain*. London: Routledge & Kegan Paul
- Ashbee, P., Smith, I.F. and Evans, J.G., 1979. Excavation of three long barrows near Avebury, Wiltshire. *Proc. Prehist. Soc.* 45, 207–300
- Cameron, R.A.D. and Morgan-Huws, D.I., 1975. Snail faunas in the early stages of a chalk grassland succession. *Biological Journal of the Linnean Society* 7, 215–29
- Entwistle, R. and Bowden, M., 1991. Cranborne Chase: the molluscan evidence, in J. Barrett, R. Bradley and M. Hall, *Papers on the Prehistoric Archaeology of Cranborne Chase*, 20–48. Oxford: Oxbow Monograph 11
- Evans, J.G., 1972. *Land Snails in Archaeology*. London: Seminar Press
- Evans, J.G., 1984. Stonehenge – the environment in the Late Neolithic and Early Bronze Age and a Beaker burial, *Wiltshire Archaeological and Natural History Magazine* 78, 7–30
- Evans, J.G. and Jones, H., 1973. Subfossil and modern land-snail faunas from rock rubble habitats, *Journal of Conchology* 28, 103–29
- Evans, J.G. and Smith, I.F., 1983. Excavations at Cherhill, North Wiltshire 1967, *Proc. Prehist. Soc.* 49, 101–9
- French, C., Lewis, H., Allen, M.J., Scaife, R.G. and Green, M., 2003. Archaeological and palaeoenvironmental investigations of the Upper Allen valley, Cranborne Chase, Dorset (1998–2000): a new model of earlier Holocene landscape development, *Proc. Prehist. Soc.* 69, 201–34
- Heaton, M., 2003. Neolithic pits at The Beehive, *Wiltshire Archaeological and Natural History Magazine* 96, 54–62
- Hurlbert, S.H., 1971. The nonconcept of species diversity: a critique and alternative parameters, *Ecology* 52, 577–86
- Kerney, M.P., 1999. *Atlas of the Land and Freshwater Molluscs of Britain and Ireland*. Colchester: The Conchological Society of Great Britain and Ireland
- Shackley, M.L., 1976. The Danebury project: an experiment in site sediment recording, in D.A. Davidson and M.L. Shackley (eds), *Geoarchaeology*, 9–21. London: Duckworth

- Smith, A.G., 1981. The Neolithic, in I. Simmons and M. Tooley M (eds), *The Environment in British Prehistory*. London: Duckworth
- Stone, J.F.S. 1934, Three 'Peterborough' dwelling pits and a doubly-stockaded Early Iron Age ditch at Winterbourne Dauntsey, *Wiltshire Archaeological and Natural History Magazine* 46, 44–53
- Thomas, K.D., 1977. The mollusca from an Iron Age pit at Winklebury, in K. Smith, The excavation of Winklebury Camp, Basingstoke, Hampshire. *Proceedings of the Prehistoric Society* 43, 70–4
- Thomas, K.D., 1985. Land snail analysis in archaeology: theory and practice, in N.R.J. Fieller, D.D. Gilbertson and N.G.A. Ralph (eds), *Palaeobiological Investigations: research design, methods and data analysis*. Oxford, British Archaeological Reports (International Series) 266

Table M1 Molluscs Site 3

Phase	Neolithic pits								M-LBA			BA + ? later	
Ecological group	1	1	1	1	1	3a	3a	3b	3b	3b	4	5	5
Neolithic pit group	3	3	3	3	1	1	2	2			-	-	-
Pit	3000			3007	3198	3119	3005	3020	3013	3102	3106		3328
Context	3002	3331	3012	3008	3201	3120	3006	3022	3014	3133	3108	3329	3330
Sample	10	77	76	75	43	58	7	14	12	42	39	79	80
Weight (g)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
Mollusca		*						*					
<i>Pomatias elegans</i> (Müller)	+	2	+	+	2	6	-	+	7	1	15	1	2
<i>Carychium tridentatum</i> (Risso)	6	2	2	-	1	1	-	-	-	-	-	-	-
<i>Carychium</i> spp.	6	-	-	1	1	-	-	-	-	-	-	-	-
<i>Succinea putris</i> (Linnaeus)	-	-	-	-	-	-	-	-	-	-	-	-	1
<i>Cochlicopa lubrica</i> (Müller)	-	1	4	-	-	-	1	-	-	-	-	2	2
<i>Cochlicopa lubricella</i> (Porro)	-	-	-	-	-	-	-	-	-	-	-	-	-
<i>Cochlicopa</i> spp.	5	1	1	3	-	1	-	1	1	2	2	2	-
<i>Vertigo</i> cf. <i>pusilla</i> Müller	-	-	-	-	-	-	-	-	-	-	+	-	-
<i>Vertigo pygmaea</i> (Draparnaud)	-	-	2	2	1	-	-	-	-	1	-	-	-
<i>Vertigo</i> spp.	-	-	1	-	-	-	-	-	-	-	1	-	-
<i>Pupilla muscorum</i> (Linnaeus)	1	-	2	-	3	9	2	4	3	11	1	15	8
<i>Vallonia costata</i> (Müller)	9	7	8	11	8	7	18	2	3	3	3	7	9
<i>Vallonia excentrica</i> Sterki	4	3	8	12	5	16	14	10	6	17	5	18	19
<i>Vallonia</i> spp.	-	-	-	-	-	3	3	-	1	-	-	2	2
<i>Acanthinula aculeata</i> (Müller)	1	2	5	1	2	-	-	-	-	-	-	-	-
<i>Ena obscura</i> (Müller)	3	1	3	-	1	-	-	-	-	-	-	-	-
<i>Punctum pygmaeum</i> (Draparnaud)	-	1	-	-	-	-	1	-	-	-	-	1	-
<i>Discus rotundatus</i> (Müller)	13	13	44	38	3	3	6	1	+	-	9	+	+
<i>Vitrina pellucida</i> (Müller)	2	2	3	2	-	-	-	-	-	-	-	-	-
<i>Vitrea crystallina</i> (Müller)	3	3	4	-	1	-	-	-	-	-	-	-	-
<i>Vitrea contracta</i> (Westerlund)	4	2	6	3	-	1	-	-	-	-	-	-	-
<i>Nesovitrea hammonis</i> (Ström)	1	1	-	-	-	-	-	-	-	-	-	-	-
<i>Aegopinella pura</i> (Alder)	-	3	2	1	-	-	-	-	-	-	-	-	-
<i>Aegopinella nitidula</i> (Draparnaud)	6	7	7	4	2	-	-	-	-	-	4	-	-
<i>Oxychilus cellarius</i> (Müller)	5	13	10	3	1	1	-	-	2	-	3	-	-
Limacidae	5	23	13	25	10	29	4	33	36	33	57	37	26
<i>Euconulus fulvus</i> (Müller)	-	-	-	-	2	-	-	-	-	-	-	-	-
<i>Cecilioides acicula</i> (Müller)	221	78	97	208	97	180	171	194	158	195	147	320	223

Phase	Neolithic pits								M-LBA			BA + ? later	
Ecological group	1	1	1	1	1	3a	3a	3b	3b	3b	4	5	5
Neolithic pit group	3	3	3	3	1	1	2	2			-	-	-
Pit	3000			3007	3198	3119	3005	3020	3013	3102	3106		3328
Context	3002	3331	3012	3008	3201	3120	3006	3022	3014	3133	3108	3329	3330
Sample	10	77	76	75	43	58	7	14	12	42	39	79	80
Weight (g)	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500
<i>Cochlodina laminata</i> (Montagu)	-	-	1	1	-	-	-	-	-	-	-	-	-
<i>Clausilia bidentata</i> (Ström)	+	+	2	1	1	-	+	-	+	1	+	1	1
<i>Candidula intersecta</i> (Poiret)	-	-	-	-	-	-	-	-	-	4	-	6	5
<i>Candidula gigaxii</i> (L. Pfeiffer)	-	-	-	-	-	-	-	-	-	-	-	4	1
<i>Cerneuella virgata</i> (Da Costa)	-	-	-	-	-	-	-	-	-	-	-	1	-
<i>Helicella itala</i> (Linnaeus)	4	31	5	9	23	37	13	35	17	33	16	64	23
<i>Trichia hispida</i> (Linnaeus)	8	10	14	7	2	7	4	3	4	2	2	9	2
<i>Arianta arbustorum</i> (Linnaeus)	+	-	-	+	-	+	-	-	-	-	-	-	-
<i>Helicigona lapicida</i> (Linnaeus)	1	-	-	-	-	-	-	-	-	-	-	+	-
<i>Cepaea/Arianta</i> spp.	-	+	3	4	+	1	+	+	2	1	5	1	4
Taxa	18	19	21	18	17	13	9	8	10	12	13	14	13
Shannon Index	2.64	2.40	2.57	1.19	2.28	1.93	1.81	1.42	1.73	1.78	1.80	1.99	2.04
Brillouin Index	2.35	2.19	2.35	1.99	1.98	1.78	1.62	1.30	1.56	1.63	1.66	1.78	1.87
Shannon Index - Brillouin Index	0.29	0.21	0.22	0.19	0.31	0.15	0.19	0.12	0.17	0.15	0.15	0.12	0.18
$\Delta 2$	0.92	0.87	0.88	0.84	0.84	0.81	0.80	0.69	0.74	0.78	0.74	0.79	0.83
$\Delta 4$	12.46	7.33	7.57	5.37	5.74	4.47	4.35	2.32	3.04	3.68	2.90	3.77	5.35
Total	87	128	150	128	69	122	66	89	82	109	123	171	105

Key: * = radiocarbon date from this context

Table M2 Molluscs Site 5

	Neolithic pits										BA +
Ecological group	1	1	1	1	1	1	2	2	2	4	5
Neolithic pit group	5	5	5	4	4	4	4	4	4	4	5
Pit	6093	6093	6100	6056	6056	6056	6061	6061	6061	6065	6153
Context	6097	6094	6101	6058	6057	6060	612	6064	6063	6067	6154
Sample	104	102	103	92	84	83	101	100	88	91	142
Weight (g)	1500	1500	1500	1500	1500	1500	150	1500	1500	1500	1500
Mollusca				*	*				*		
<i>Pomatias elegans</i> (Müller)	13	13	7	2	4	9	+	3	5	1	5
<i>Carychium tridentatum</i> (Risso)	34	19	135	13	71	60	2	3	45	5	-
<i>Carychium</i> spp.	3	7	19	8	14	7	-	-	10	2	-
<i>Succinea putris</i> (Linnaeus)	-	-	-	-	-	-	-	-	-	-	-
<i>Cochlicopa lubrica</i> (Müller)	6	1	26	1	2	3	-	2	1	-	1
<i>Cochlicopa lubricella</i> (Porro)	-	-	2	-	-	-	-	-	-	-	-
<i>Cochlicopa</i> spp.	3	3	17	-	10	-	-	2	3	-	1
<i>Vertigo</i> cf. <i>pusilla</i> Müller	-	-	-	-	-	1	-	-	-	-	-
<i>Vertigo pygmaea</i> (Draparnaud)	-	1	2	-	3	3	-	1	1	-	-
<i>Vertigo</i> spp.	-	-	-	-	2	2	-	-	3	-	-
<i>Pupilla muscorum</i> (Linnaeus)	-	-	-	5	5	6	1	2	5	[1]	8
<i>Vallonia costata</i> (Müller)	17	11	97	13	110	82	1	5	68	4	5
<i>Vallonia excentrica</i> Sterki	12	12	56	5	43	24	2	8	17	6	16
<i>Vallonia</i> spp.	-	-	2	-	-	-	-	-	5	-	-
<i>Acanthinula aculeata</i> (Müller)	2	3	2	3	3	5	1	-	3	-	1
<i>Ena obscura</i> (Müller)	3	-	+	3	5	8	-	-	3	-	-
<i>Punctum pygmaeum</i> (Draparnaud)	1	1	4	-	3	3	-	-	1	-	1
<i>Discus rotundatus</i> (Müller)	92	87	114	58	99	72	7	13	71	4	1
<i>Vitrina pellucida</i> (Müller)	2	-	2	3	9	4	-	-	4	1	-
<i>Vitrea crystallina</i> (Müller)	-	-	-	1	13	6	-	-	8	1	-
<i>Vitrea contracta</i> (Westerlund)	12	10	82	4	29	15	1	-	18	1	-
<i>Nesovitrea hammonis</i> (Ström)	2	1	6	-	-	-	-	-	-	-	-
<i>Aegopinella pura</i> (Alder)	2	4	4	-	14	12	-	-	1	-	-
<i>Aegopinella nitidula</i> (Draparnaud)	2	4	28	14	20	17	1	2	9	1	-
<i>Oxychilus cellarius</i> (Müller)	1	4	28	17	20	12	-	2	14	-	-
Limacidae	25	26	11	12	31	26	14	26	40	32	23
<i>Euconulus fulvus</i> (Müller)	-	-	-	2	-	3	-	-	-	-	-
<i>Cecilioides acicula</i> (Müller)	25	28	24	38	81	150	13	42	75	100	158
<i>Cochlodina laminata</i> (Montagu)	-	-	-	-	-	2	-	-	1	-	1
<i>Clausilia bidentata</i> (Ström)	1	1	+	2	1	3	1	-	1	1	-
<i>Candidula intersecta</i> (Poiret)	-	-	-	-	-	-	-	-	-	1	-
<i>Candidula gigaxii</i> (L. Pfeiffer)	-	-	-	-	-	-	-	-	-	3	-
<i>Cerneuella virgata</i> (Da Costa)	-	-	-	-	-	-	-	-	-	-	-
<i>Helicella itala</i> (Linnaeus)	7	5	13	16	16	18	6	27	11	10	14
<i>Trichia hispida</i> (Linnaeus)	4	7	14	8	21	35	1	6	17	2	1
<i>Arianta arbustorum</i> (Linnaeus)	-	-	-	-	-	-	-	-	-	-	-
<i>Helicigona lapicida</i> (Linnaeus)	-	+	-	-	+	1	-	-	-	-	-
<i>Cepaea/Arianta</i> spp.	3	3	7	1	+	2	1	+	2	1	[1]
Taxa	20	19	20	20	21	26	13	13	23	17	13
Shannon Index	2.18	2.17	2.31	2.40	2.48	2.62	2.02	2.09	2.44	2.08	2.00
Brillouin Index	2.05	2.04	2.25	2.24	2.40	2.51	1.67	1.90	2.33	1.82	1.78
Shannon Index - Brillouin Index	0.13	0.14	0.06	0.17	0.08	0.11	0.36	0.19	0.11	0.27	0.21
Δ2	0.81	0.81	0.87	0.86	0.88	0.90	0.80	0.83	0.88	0.79	0.82
Δ4	4.45	4.27	6.70	6.50	7.71	8.76	4.74	5.27	7.39	3.93	5.01
Total	247	223	678	191	548	441	39	102	367	76	78

Key: * = radiocarbon date from this context; numbers in [] = shells with periostricum and considered modern so excluded from analysis