Schembri, P.J.; Falzon, A.; Fenech, K. & Sant, M.J. (2000) The molluscan remains. pp.102-109. In: Bonanno, A.; Frendo, A.J. & Vella, N.C. [eds] Excavations at Tas-Silg, Malta. A preliminary report on the 1996-1998 campaigns conducted by the Department of Classics and Archaeology of the University of Malta. *Mediterranean Archaeology* 13: 67-114.

THE MOLLUSCAN REMAINS

The following account is a preliminary report on the molluscan material examined to date, which includes that recovered between 1996 and 1997.

MATERIAL AND METHODS

The material examined came from three Areas A, B, and C. Three types of samples were examined for molluscs.

Bulk samples of approximately 30 litres volume were treated in a water separation machine ('flotation tank') constructed according to blueprints supplied by the Museum of London. The float was passed through graded sieves (1 mm and 250 micrometre mesh, in that order) and then air-dried and sorted. The sediment remaining in the machine, after all the flot was separated off, was air-dried and sieved through graded sieves of mesh size 8 mm, 4 mm, 2 mm, and 1mm in that order, following which each fraction was sorted by hand to separate out organic remains.

[118] See section on Stratigraphy, above.

[119] See section on Pottery, above.

Samples collected for pollen analysis ranging in volume between 50 cm^3 and 1,000 cm^3, depending on provenance, were dry-sieved through graded sieves (8 mm, 4 mm, 2 mm, and 1 mm) and any molluscs present were picked out by hand.

The third type of sample consisted of mollusc shells picked by hand by the excavators during the dig.

Mollusca were identified using published manuals and keys and by comparison with the reference collections of the Department of Biology of the University of Malta.

RESULTS AND INTERPRETATION

NON-MARINE MOLLUSCS

The non-marine Mollusca identified from the samples studied and their general habitat preferences are given in **table 2**. In this table, all specimens from the same stratigraphic unit are listed together, irrespective of the type of sample they originated from, and therefore relative abundances are indicative only, as sampling effort was not uniform. A quantitative analysis will be presented in a future report. Apart from the species listed in **table 2**, most samples also contained varying amounts of unidentifiable shell fragments, which are not reported. Also not reported are those samples from which only unidentifiable fragments were recovered.

Twenty species of non-marine molluscs were recorded from the Tas-Silg excavations, one of which is freshwater, and the rest strictly terrestrial. In terms of habitat preferences, these species may be classified into the following groups:

Ubiquitous	Eurytopic; found in most types of habitat present in the Maltese Islands, including both natural and anthropogenic ones.
Xeric	Occur in habitats that do not receive any substantial water during the dry season.
Mesic	Occur in habitats that are not wet but that do not remain dry for very long periods, even during the dry season.
Subterranean	Burrow in soil or live in microcavities in soil, or under deeply embedded stones, or in caves.
On vegetation	Open habitats with vegetation, including gardens and fields.
Freshwater	Freshwater habitats.

The distribution of the species recorded, in terms of this broad classification, is shown in **fig. 15**. Predictably, ubiquitous species, that is, those with catholic habitat requirements, are the most represented (9 species). These are the least interesting from the point of view of environmental interpretation. Also not very interesting from this point of view are the subterranean species since these may have burrowed into the deposit at any time after its formation and only serve to show that the strata were buried! The other species are more indicative, however. The xeric forms present (4 species) are those found in open rocky habitats, such as steppic or *garigue* communities. One of these, *Marmorana melitensis*, is characteristic of shady rocky habitats,

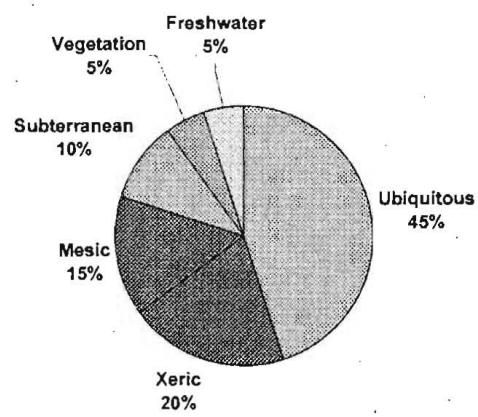

Figure 15. The percent distribution of 20 species of non-marine molluscs recorded from Tas-Silg, in terms of broad habitat categories.

SPECIES	SU 25	SU 34	SU 50	SU 55	SU 71	SU 205	SU 1008	SU 1009	SU 2061	SU 2069	TOTAL	HABITAT
Pomatias sulcatus	7		1	4	2	2			1		17	Ubiquitous
Planorbis moquini	1										1	Freshwater; springs
Truncatellina callicratis	1										1	Leaf litter
Granopupa granum						3	3				6	Xeric environments, esp.karstland
Chondrula pupa					1						1	Ubiquitous
Oxychilus draparnaudi	1					1					2	Damp environments
Oxychilus hydatinus									2		2	Semi-subterranean; soil or stones
Cecilioides acicula	1877	2552	111			67	333				4940	Subterranean; soil
Ferussacia folliculus	84	18	8	1	43	10	4	1	3		172	Damp environments; leaf litter
Rumina decollata	16		3	3	4	3	2	1	6		38	Xeric environments
Papillifera papillaris	20	4	2		6	6	19				57	Ubiquitous
Trochoidea spratti	26	17	6	2	8	13	15		1		88	Xeric environments, esp. karstland
Cernuella caruanae	6			15	6	4			13		44	Ubiquitous
Cernuella cf. *cisalpina*					4						4	Ubiquitous
Cochlicella acuta	1438	358	934	2	179	1589	650	1	58		5209	Ubiquitous
Caracollina lenticula	243	185	144	2	237	27	161	3	7		1009	Ubiquitous; habitats with soil
Theba pisana									4		4	Ubiquitous; esp. coastal habitats
Marmorana melitensis									1		1	Xeric rocky habitats receiving some shade
Eobania vermiculata	21	2	1	28	25	16	2		61	2	158	Ubiquitous
Cantareus apertus	1								10		11	Steppic habitats and cultivated areas
TOTALS	3742	3136	1210	57	515	1741	1189	6	167	2	11765	

Table 2. Tas-Silg Excavations 1996–1997: total identifiable non-marine Mollusca recovered by all methods and the general habitat preferences of the species.

suggesting the presence of shade such as provided by rock faces, boulders, or high walls. Three species are mesic (*Truncatellina callicratis*, *Oxychilus draparnaudi*, and *Ferussacia folliculus*). All three are associated with leaf litter and indicate the presence of relatively thick vegetation that may be natural or may represent cultivated habitats such as gardens. *Cantareus apertus* also suggests vegetated habitats. The single specimen of *Planorbis moquini* found is very interesting since it not only shows the presence of fresh water, but also of running water, as this is a species of springs rather than ponds. This may suggest the presence of either a spring or of more or less continuously flowing irrigation water.

What is absent is almost as interesting as what is present. No *Muticaria* are present, suggesting the absence of karstland, which is hardly surprising since this forms mainly on Coralline limestone, which is absent from the locality. Neither are any woodland species present (notably *Lauria cylindracea*) suggesting the absence of a dense tree cover. Given the presence of fresh water, it is surprising that no species characteristic of ponds or other standing bodies of water have been found. This may be an artefact of sampling or may actually indicate that such standing water was not present. It is also interesting to note that no specimens of *Cantareus aspersus*, the common edible snail that is now ubiquitous in the Maltese Islands, were found.

Of the species found, none are presently used as items of food in the Maltese Islands, although *Eobania vermiculata* is consumed elsewhere in the Mediterranean. Actually, all large land snails are edible even if they are not equally palatable. Since when cooked the soft parts of the animals are easily extracted from the shells without damaging them, it is not possible to distinguish shells that represent 'kitchen waste' from those that have died naturally.

A number of the specimens examined showed signs of breakage of the shells that is usually associated with animal predation (**table 3**). It would appear that a substantial portion of the *Cernuella caruanae* and the majority of the *Theba pisana* and the *Eobania vermiculata* recovered from the deposits, may have been transported to the site due to animal activity. In the case of *Eobania vermiculata* it also suggests that the Tas-Silg inhabitants did not use this snail as an item of food.

SPECIES	SU 25	SU 34	SU 50	SU 55	SU 71	SU 205	SU 1008	SU 2061	SU 2069	TOTALS
Cernuella caruanae	3(50%)	–	–	7(47%)	0(0%)	1(25%)	–	2(15%)	–	13(30%)
Theba pisana	–	–	–	–	–	–	–	3(75%)	–	3(75%)
Eobania vermiculata	13(62%)	0(0%)	0(0%)	18(64%)	7(28%)	10(63%)	2(100%)	46(75%)	2(100%)	98(62%)

Table 3.

Non-marine molluscs from the 1996–1997 Tas-Silg excavations that showed signs of animal predation. The actual number of specimens is given as well as the proportion of the total number of individuals of that species collected that showed signs of predation (as percentage).

Marine molluscs

The marine Mollusca identified from the samples studied and their general habitat preferences are given in **table 4**. As for the non-marine species, all specimens from the same stratigraphic unit are lumped together, irrespective of the type of sample they originated from, and therefore relative abundances are indicative only, as sampling effort was not uniform.

Given that many of the specimens were eroded and/or fragmented, the number of individuals in the samples was established according to the following criteria:

- a limpet shell was considered to constitute an individual shell if the apex was present;
- a spiral gastropod shell was considered to constitute an individual shell if the apex was intact or if the bulk of the body whorls were intact;
- a bivalve valve was considered to be a single individual if the major portion of the umbo was present.

SPECIES	SU 25	SU 34	SU 50	SU 55	SU 71	SU 204	SU 205	SU 1002	SU 1005	SU 1006	SU 1008	SU 1009	SU 2061	SU 2069	TOTAL	HABITAT
Arca noae							1								1	Shallow infralittoral rock with algae
Bittium sp.[1]		1													1	Ubiquitous in infralittoral
Bolinus brandaris[2]			1	2f			1						1		3	Infralittoral sandy bottoms
Cerastoderma glaucum	80 + 36f	8 + 1f	1	5 + 25f		8	15 + 5f	148 + 8f	15 + 21f	28	114 + 10f	122 + 7f	15 + 14f	1	560	Brackish water muddy bottoms; lagoons
Cerithium rupestre[3]	9												1		10	Shallow infralittoral rock with algae
Cerithium sp.									1						1	?
Cerithium vulgatum[3]	18 + 7f	3	1	7		1	7				1		1		39	Shallow infralittoral sand-mud bottoms
Columbella rustica	1f	1	1	1			6								9	Shallow infralittoral rock with algae
Conus ventricosus[4]	2			1			1		1						5	Shallow infralittoral rock with algae
Gibbula adansonii	1			2			2						1		6	Shallow infralittoral rock with algae
Gibbula ardens	1														1	Shallow infralittoral rock with algae
Gibbula divaricata	1	1					2						6		10	Shallow infralittoral rock with algae
Hexaplex trunculus[5]	16 + 13f	1				1	1 +1f	3 + 1f	2f		3 + 1f		5 + 2f		30	Infralittoral muddy bottoms
Luria lurida													1f		1	Infralittoral rock with algae
Melarhaphe neritoides				1							1				2	Supralittoral rock
Monodonta articolata[0]	10		1	4			2						5		22	Mediolittoral rock
Monodonta turbinata[0]	41 + 8f	5 + 1f	5	25		1	61		1		1		81 + 11f	1	222	Mediolittoral rock
Muricopsis cristata	1														1	Infralittoral rock with algae
Nassarius costulata cuvierii													1		1	Fairly ubiquitous in shallow infralittoral
Ostrea edulis													1		1	Rocky and coarse substrata
Patella coerulea	12 + 1f			2f		4	6	1	1 + 2f	2	7 + 2f	3	18 + 1f	1	55	Mediolittoral rock
Patella rustica	114 + 8f		9	15 + 13f	1		42	2		1	1		99 + 7f		284	Mediolittoral rock
Patella ulyssiponensis	13			4							1	1	13		32	Mediolittoral rock
Pirenella conica	2														2	Shallow infralittoral; reduced salinity
Pisania striatus							1								1	Shallow infralittoral rock with algae
Tapes decussatus	23 + 124f	2f	1f	2 + 30f			1f	1	35f		21	3 + 1f	15 + 38f		65	Shallow infralittoral sand-mud bottoms
Others	1[10]			9f[9]			3f[7] + 1[8]		1f[9]						2	
TOTALS	345	20	19	67	1	15	149	155	19	31	150	129	264	3	1367	

Table 4.

Tas-Silg Excavations 1996–1997: total identifiable marine Mollusca recovered by all methods and the general habitat preferences of the species. Superscript numbers correspond to the notes below the table; f = shell fragments.

Notes:

1. Single individual, lacking aperture.
2. The individual from SU 50 was broken open; those from SU 55 were reduced to their apices; that from SU 205 had some damage in the region of the aperture.
3. Numerous *Cerithium* were broken open, especially the larger individuals.
4. The specimen from SU 55 had a hole drilled through the apex, where the protoconch would have been. The other specimens were small in size.
5. Many individuals had broken apertures or were missing the apex.
6. Many individuals had their apex removed.
7. Fragments of test of sea urchin (*Paracentrotus lividus*).
8. Oxidized and eroded trochid shell.
9. Probably fragments of *Monodonta* sp.
10. Eroded vermetid shell.

Twenty-two species of gastropods and four species of bivalves were identified from the Tas-Silg excavations. All are common Mediterranean shore and shallow water species. The species present indicate that a range of habitats was accessible to the inhabitants of Tas-Silg, as follows:

- Gently sloping rocky shores;
- Rocky bottoms with photophilic algae at depths of 0 to 10 m;
- Sandy or sandy-mud bottoms in shallow water;
- Lagoons or semi-enclosed water with reduced salinity and a muddy bottom.

With the exception of the last environment, all these habitats presently occur round the Delimara Peninsula and in Marsaxlokk Bay. Although brackish water lagoons do not now occur in the vicinity of Tas-Silg, they occurred in the historic past (the so-called Marsaxlokk 'fishponds' at Il-Ballut) and still occur at Marsascala ('Il-Maghluq').

It is interesting to note that one very common and widespread habitat, that of sea-grass meadows, seems not to be represented. With the exception of *Bittium*, of which only a single specimen was found, none of the molluscs characteristic of this habitat occurred in the samples. As will be discussed below, the bulk of the marine remains represent kitchen waste. Therefore, species characteristic of sea-grass meadows may not be represented because this habitat was not harvested for edible species, rather than because sea-grass meadows were not present.

EDIBLE SPECIES	NON-EDIBLE SPECIES	UNKNOWN
Bolinus brandaris	*Bittium* sp.	*Cerithium* sp.
Cerithium vulgatum	*Columbella rustica*	*Muricopsis cristata*
Hexaplex trunculus	*Conus ventricosus*	*Gibbula adansonii*
Monodonta articolata	*Luria lurida*	*Gibbula ardens*
Monodonta turbinata	*Melarhaphe neritoides*	*Gibbula divaricata*
Patella caerulea	*Nassarius costulata cuvierii*	
Patella rustica	*Pirenella conica*	
Patella ulyssiponensis	*Pisania striatus*	
Arca noae		
Cerastoderma glaucum		
Ostrea edulis		
Tapes decussatus		

Table 5.
Edible and non-edible species of marine molluscs recovered from Tas-Silg.

About 50% of the species identified are edible (**table 5**). In terms of abundance, 96% of all individuals recovered (fragments excluded) belonged to the edible species (**table 4**). It is therefore clear that the deposits represent dumped kitchen waste. The larger edible species (for example, *Hexaplex trunculus* and the larger individuals of *Cerithium*) tended to have broken apertures and/or apices. Trochids (for example, *Monodonta* and some *Gibbula*) had their apices removed. These treatments facilitate extraction of the edible soft parts from the shell.

Although the non-edible species may represent incidental by-catch, some may have been deliberately collected for their ornamental value (for example, the cowrie *Luria lurida*, the dove shell *Columbella rustica*, and the cone shell *Conus ventricosus*). By-catch species tend to be found in low numbers. However, six *Columbella rustica* were recovered from sample SU 205, suggesting that collection of these shells was deliberate. It is also interesting to note that the *Conus ventricosus* from sample SU 55 had a hole drilled through the apex where the protoconch would have been, indicating that it might have been prepared to form part of an ornament.

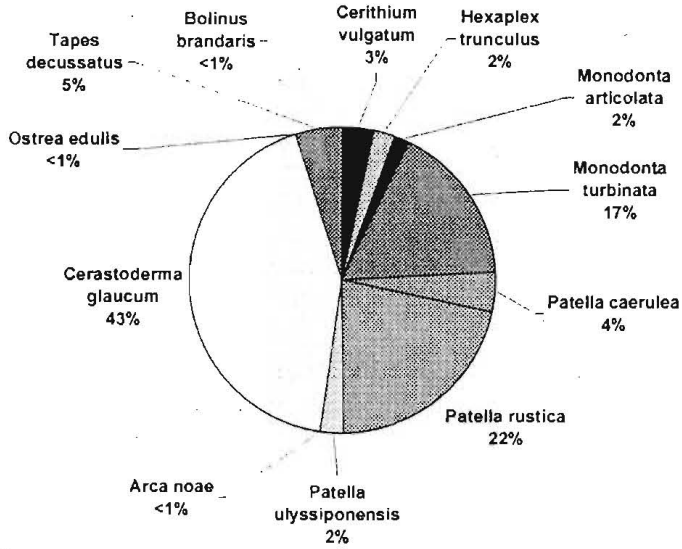

Figure 16. Percentage distribution of the different species of edible molluscans recovered from Tas-Silg.

From **fig. 16** it is evident that just three species, *Cerastoderma glaucum*, *Patella rustica*, and *Monodonta turbinata*, between them contribute about 82% of the remains of edible molluscs recovered. This is interesting since *Patella rustica* and *Monodonta turbinata* are shore animals, occurring just above and just below mean sea level respectively, while *Cerastoderma glaucum* is a lagoonal species inhabiting very shallow enclosed muddy bottoms. This suggests that in the main it was shore and near-shore environments that were exploited for food by the inhabitants of Tas-Silg.

DISCUSSION

The deposits from SU 25, 34, 50, 55, 71, and 205 in Area A and SU 1008 in Area B have been described by the excavators as a series of grey ash deposits. The deposit from SU 1009 in Area B and SU 2061 in Area C is described as a loose brown sandy deposit, while SU 2069 in Area C is described as a loose ashy brown deposit. It would appear therefore that the deposits investigated consist of dumped material. The animal remains in these deposits have two possible origins. They either represent individuals that found their way into the deposits naturally—they died *in situ*, burrowed into the deposit, were carried there by wind or water, were transported by other animals, or simply 'fell in' from the surrounding environment—or

else they represent material that was deliberately dumped by people. It is obvious from the results presented above that the animal remains recovered owe their origin to both processes: some remains are autochthonous and are indicative of the environment of the site and its surroundings, while others are allochthonous and represent 'kitchen waste' and other anthropogenic material. Such material is not necessarily indicative of the environment at the site and its surroundings, but it does provide useful information about the environments accessible to the inhabitants of Tas-Silg at the time the deposits were laid down, as well as to their cultural and economic activities. Here we discuss environmental aspects only.

Non-marine molluscs

While some of the species recovered are edible, the bulk of the remains do not appear to be kitchen waste but to represent species that lived in the general area and found their way into the deposit autochthonously. A few species showing signs of animal predation were probably transported by their predators. Subterranean species probably actively burrowed into the deposit and are not necessarily coeval with the stratum in which they were found.

If this interpretation of the origin of the material is correct, it suggests that the site consisted of a mosaic of open ground, low grassy vegetation, more luxuriant vegetation under which leaf litter collected, and a source of freshwater, probably running. Rocky outcrops or walls or buildings were also present. Taken together, this suggests agriculture or gardens.

Marine molluscs

The bulk of the marine molluscan remains recovered were of edible species, suggesting that the deposits excavated represent rubbish tips. The few specimens of non-edible species recovered were either those 'collected' more or less accidentally with the edible species, or else those collected live or picked up as empty shells for their ornamental value. The bulk of the remains of edible species belonged to forms that live on rocky shores or else burrow in shallow muddy bottoms. This suggests that the Tas-Silg people were foraging for shellfish in very shallow water only, possibly by wading. The range of marine habitats indicated by the edible and non-edible molluscan remains recovered suggests that these foraging activities were limited to the environs of the Tas-Silg site, namely within Marsaxlokk Bay and round the Delimara peninsula.

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