

The Neolithisation of the Trieste Karst in North-Eastern Italy and its neighbouring countries

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The environmental background

The Trieste Karst is a limestone ellipsoid whose Italian territory, following World War Two, has been reduced to some 850 square kilometres. It is bordered to the north-west by the alluvial deposits of the river Isonzo, to the north-east by the synclinal of the Vipacco, to the south-east by the Val Rosandra and to the south-west by the Adriatic Sea (POLDINI 1971.). The Karstic upland, which rises gradually from the north-west to the south-east, is a hilly landscape whose highest peak is Mt. Concusso (m 672 asl). The coast which borders it to the south-west is generally high. It drops vertically into the Trieste Gulf and is interrupted by two alluvial plains, namely those of Grignano and of Trieste.

The Trieste Karst is characterized by its climate, which distinguishes it from the surrounding regions. In fact this is a transitional zone between the Venetian and the Danubian Plains, characterized by the Bora, a cold, dry, strong katabatic wind that blows from east-north-east. The annual mean temperature of Trieste is 14.6° centigrades and that of Basovizza, an inland village, is 10.8°. According to the classical sources, the Karst was covered with a mixed-oak woodland mainly composed of *Quercus robur* (oak), *Carpinus* (hornbeam) and *Fraxinus* (ash). The forest clearance which started during the 14th century AD and continued for some four centuries, almost completely destroyed the original tree cover (CHERSI 1984.).

The Mesolithic assemblages

The distribution of the Mesolithic and Neolithic sites in the Trieste Karst (Fig. 1) is strongly affected by the geomorphology of the region. All the sites so far known are caves or rock shelters which open at the bottom of the dolinas. Some of them were inhabited for many thousands of years, including the Mesolithic period, as indicated by the archaeological sequences brought to light by the excavations (BOSCHIAN-MONTAGNARI KOKELJ 1984.). No open air Mesolithic site is known to-date. This is probably also due to the coastal retreat consequent

to the sea-level rise between the end of the last Glacial and the beginning of the Holocene. Only three sites have been 14C dated, namely the Grotta Benussi, the Grotta dei Ciclami and the Caverna degli Zingari (Table 1). The typological sequence of the Mesolithic flint assemblages is very similar to that already known for other parts of Italy. It is characterized by Sauveterrian assemblages. These are followed by Castelnovian industries, which made their appearance at the start of the Atlantic (BROGLIO 1971.). The date of the earliest Mesolithic occupation of the Karst is still unclear. Most of the sites have produced typical Boreal Sauveterrian assemblages with hypermicrolithic scalene triangles and circular end scrapers, but the presence of Pre-Boreal industries is rather uncertain. The actual distribution of the Mesolithic sites is obscured by many factors. According to the more recent data, from 9000 BP the sea-level rise should have submerged at least 20-25 kilometres of flat coastal land ideal for settling (SHACKLETON-VAN ANDEL 1985.). The analysis of the faunal remains from the Mesolithic sequences of the Grotta Azzurra di Samatorza (CANNARELLA-CREMONESI 1967., CICCONE 1993.) gives a reasonable picture of the coastal environment exploited by the Trieste Karst Mesolithic bands. Revolution in economic strategy is evident from the beginning of the Atlantic, when the presence of abundant remains of marine molluscs, typical of rocky environments, indicates a sea-oriented subsistence connected with the retreat of the sea-shore.

The situation is even less clear in the Slovene Karst and the nearby territory where some ten sites are known to-date. Most information comes from the sites of Breg (FRELJH 1986.) and Pod Črmukljo (BRODAR 1992.). The assemblage from Breg which includes trapezes and denticulated blades, has been dated to 6830±150 BP (Z-1421). This should indicate that the station, the subsistence of which was mainly based on the hunting of red deer (POHAR 1984.), was settled during an advanced period in the development of the Castelnovian Culture. An open-air site with a similar assemblage has been reported by BRODAR and OSOLE (1979.) at Dedkov, near Prestranac in the Slovenian Karst; while a date of

6460±95 BP (Z-198) has been reported from the cave of Podosojna, near Mošćenice in Istria, which is associated with a Mesolithic Castelnovian industry (MALEZ 1979.).

The first Mesolithic tools were collected in Friuli ten years ago. The only stratigraphic sequence is that of the Riparo di Biarzo (BRESSAN et al. 1982.), whose archaeological deposits cover a long period between the Late Glacial Epigravettian Culture and the Early Holocene.

The distribution map of open air sites from this age is extremely interesting. The morainic amphitheatre of the river Tagliamento is rich in Mesolithic finds of both Sauveterrian and Castelnovian tradition (Fig. 2). These are systematically located along the slope of morainic cordons, facing former lake basins or, more rarely, at the confluence of small rivers (CANDUSSIO et al. 1989.). This distribution pattern is similar to that already observed for the morainic amphitheatres of the Lombard pre-alpine lakes (BIAGI 1981.). High altitude Mesolithic sites have also been discovered as well as some flint assemblages scattered along fluvial terraces a few kilometres from the actual sea-shore.

The Grotta dell'Edera sequence

The excavations actually in progress at the Grotta dell'Edera near Aurisina in the Trieste Karst have produced a thick sequence from the beginning of the Holocene up to the 6th century AD (Fig. 3). The cave, whose opening faces north-east, lies at the bottom of a dolina at an altitude of some 125 metres, 3 kilometres from the actual coastline. From a cultural and typological point of view the Mesolithic assemblages from the 1974-1975 excavations were accurately described by BOSCHIAN and PITTI (1984.). The research resumed in 1990 under the direction of the writers, in investigating the Early Atlantic levels. Even though the materials have not been analysed in detail yet, the lower-most layer (3B) so far excavated at a depth of 360-370 centimetres, yielded a poor early Castelnovian assemblage with trapezes, scalene triangles, microburins and cores from local Komen flint. A fireplace above this layer has been excavated in layer 3A. It produced a few fragments of undecorated, coarse, thick-walled pottery, as well as a Komen flint assemblage with trapezes, microburins and narrow bladelets. Around the fireplaces many faunal remains and marine shells of the genus *Trochus* and *Patella* were collected. An almost sterile clayey-sandy layer 3 separates it from a Neolithic series of the superimposed fireplaces that characterize the sandy-loamy layer 2A, the lowermost of which produced sherds of a typical Danilo *rhyton* or salt-pot (CHAPMAN 1988.) and fragments of Vlaška type pedestalled, deep pots with restricted-mouth (BARFIELD 1972.).

The Early Neolithic in the neighbouring regions

Many sources demonstrate (BUDJA 1994.) that the earliest Neolithic of the Trieste Karst is far from being clear. From a chronological/typological point of view many arguments are still open to question, namely

1. the relationship between the coastal Impressed Ware Culture, fairly well documented in Istria and Dalmatia (MÜLLER 1988., CHAPMAN-MÜLLER 1990.) and the Vlaška pottery;

2. the duration and the chronological sequence of the Vlaška assemblage, which appears to be a regional variant of the Danilo Culture (BARFIELD 1972.) needs to be better defined.

The 14C dating of the Neolithic sequence of the Grotta dell'Edera will, to a certain extent, help clarify these two points.

Detailed re-examination of the materials from the 1959-1961 excavations at Grotta dei Ciclami is also of extreme importance (GILLI-MONTAGNARI KOKELJ 1993.). The cave, whose mouth faces north, opens along the southern slope of Mt. Orsario at an altitude of 323 metres, some 5.5 kilometres from the sea, and close to the Slovenian border. Even though the excavations were inaccurately conducted by local amateurs, the analysis of the pottery assemblage revealed that the lower-most Neolithic eighth layer contained Vlaška type material (Fig. 4). The presence of typical potsherds from two square mouthed bowls indicates that at least part of the assemblage from the seventh layer is attributed to the middle of the 6th millennium BP. As far as we know, the Vlaška horizon is documented from twelve cave sites in the Trieste Karst, one of which, the eighth layer from the Grotta dei Ciclami, was dated to 6300±60 BP (R-1040A) and 6290±130 BP (R-1038) (MÜLLER 1991.). The Vlaška type Neolithic also occurs in the nearby Slovene Karst as revealed from the finds from a few cave stations (LEBEN 1976., TURK et al. 1993.).

The situation is quite different in the Friuli Plain which extends to the west of the Karst. Here the excavations and surveys of the last twenty years have produced new evidence for the Neolithisation of the region. Most of the sites are open-air settlements distributed in various geographical locations (FERRARI-PESSINA 1992.). Recent research conducted at Sammardenchia indicates that the Neolithic village extended for at least five square kilometres (Fig. 5). A dense concentration of structures, mainly rubbish pits, were excavated in the northern area of the settlement. They produced an impressive amount of flint and greenstone artefacts and vessels decorated with incised, impressed, scratched and painted decorations. A similar but not identical assemblage was found at Valer, near Pordenone (FASANI pers. comm. 1992.), and from nearby site of Fagnigola (BAGOLINI et al. 1993.). Both are on very low hills surrounded

by spring zones. These sites are characterized by cylindrical rubbish and, more rarely, storage pits, which have been somewhat damaged by recent agricultural activity. Even though the excavation of these settlements has been carried out on a rather limited scale, some observations can be made on their archaeological assemblages. Broadly speaking the pottery shapes show some similarities with those from the Early Neolithic cultures of the Po Valley by the presence of carinated handled cups, beakers, conical pots and pedestalled vases. Vague parallels with the Karst can only be extended to the presence of deep restricted-mouthed vessels and incised linear ornamentation, sometimes in the form of isosceles triangles. The flint tools, mainly obtained from good-quality Alpine material, are very similar to those from the Early Neolithic Po Plain villages of the Fiorano and Vhò Cultures. The industry consists almost exclusively of narrow bladelets. It includes burins on a side notch, long end scrapers with backed fronts, long straight perforators and rhomboids obtained with the microburin technique as well as a high percentage of end scrapers on blades and short end scrapers. These recall in terms of frequency Neolithic types from the Balkan sites (VOYTEK 1990.) including early Vinča assemblages. The greenstone tools from Sammardenchia are mainly polished from Piedmontese Western Alpine material (D'AMICO et al. 1992.). Their presence as well as that of one piece of obsidian of Carpathian provenance (RANDLE et al. 1993.) indicates that a long-distance trade network was already established between Friuli and the Western Alps as well as Central-Eastern Europe in the late 7th millennium BP.

The observations are valid for the middle-low Friuli Plain, while new discoveries have recently been made along the actual shore-line of the Marano Lagoon. Little is known of the Neolithisation of this part of the north Adriatic coast even though one must consider that according to recent studies (BORTOLAMI et al. 1977.), the coastline was some 8-20 metres below the present sea-level, during the Early Atlantic at around 7000 BP.

Considerations

The Trieste Karst lies in a key area for understanding the relationship between the Neolithic cultures of the Dalmatian coast and the Friuli Plain in North-Eastern Italy. The ^{14}C dates available from the Impressed Ware sites of Istria and Dalmatia (CHAPMAN et al. 1990., MÜLLER 1991.) generally predate the spread of the Danilo Culture, even though dates earlier than previously suspected have recently been published for this latter aspect (BATOVIĆ-CHAPMAN 1984.). The presence of the Impressed Ware Culture along the Italian North Adriatic is limited to a few

potsherds recovered from unclear stratigraphic positions some of the Trieste cave sites. Better known is the so-called Vlaška tradition (BARFIELD 1972.) which recurs at a number of cave sites and has produced two dates very similar to the new ones from the Dalmatian coast Danilo Culture. The stratigraphy under study from the Grotta dell'Edera seems to support this view, even though the ^{14}C dates from this site are not ready yet. Here the Vlaška horizon clearly lies above an Earlier Neolithic layer with a few atypical potsherds, a very specialized flint assemblage obtained from Komen raw material characterized by locally manufactured trapezoidal arrowheads and narrow bladelets. A change in the sedimentation of the cave also occurs after this earlier stage when the dark brown-brown clayey soil is substituted by the sandy-loamy deposit of yellowish brown colour that characterizes the Vlaška levels. The identification of *Cotinus* shrubs from this deposit should indicate that human activity on the landscape surrounding the cave had already affected the original woodland cover.

In the Friuli Plain the appearance of the Neolithic seems to be a phenomenon clearly distinguished from that of the Karst. Here the Neolithic is known from several large open-air settlements from which has been documented an almost complete "Neolithic package", with the exception of the bone remains totally destroyed by the acidity of the soil. Seeds of domesticated barley and three types of wheat are known from Sammardenchia, where the evidence for prehistoric agriculture is further supported by upper and lower querns, sickle blades and greenstone tools.

According to some authors (BAGOLINI et al. 1993.) the pottery decorations from the Early Neolithic sites of Friuli resemble some motifs seen in the Male Korenovo aspect of the Linear Pottery Culture of Croatia, whose distribution is bordered by the rivers Drava and Sava, east of Zagreb (TEŽAK-GREGL 1993.). Examples of this pottery have been found amongst the Danilo assemblage, along the Adriatic coast at Smilčić (DIMITRIJEVIĆ 1979.). According to the same author this group is roughly contemporary with Vinča B (Early Vinča).

Even though our knowledge of the Neolithisation of North-Eastern Italy has significantly increased during the last decade, many questions are still waiting to be answered. In fact, at least two areas lack reasonable archaeological data: the coastline with the problem of the sea-level rise and the shore retreat during the Early Holocene; and the basin of the river Sava up to the Tarvisio Pass, a natural wide saddle leading into Italy at an altitude of some 1000 metres, whose importance as a natural trade route between the Balkan Peninsula and North-Eastern Italy should be taken into greater consideration.¹

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A Trieszti karsztvidék (Észak-Olaszország) neolitizálódása és kapcsolatai a szomszédos vidékekkel

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A Trieszti karsztvidék az Adria partvidékének döntő fontosságú területe a Balkán és a közép-európai neolitikus kultúrák közötti viszony megítélés szempontjából. Különleges klimatikus és földrajzi tényezők alakították e terület régészeti hagyatékát: a rendkívül gazdag barlangi lelőhelyek rétegsorát, amelyek közül több szinte megszakítás nélkül folytatódik a holocén kezdetétől a késő középkorig.

A korábbi, gyűjteményekben őrzött kerámia- és

kőeszköz leletek vizsgálata után a jelenleg a Grotta dell'Edera lelőhelyen folyó ásatás során feltárt rétegsor új megvilágításba helyezte eddigi tudásunkat a vidék neolitikumáról. A tanulmány az erről a barlangi lelőhelyről nyert új eredményeket ismerteti, szélesebb összefüggésben pedig az észak-adriai neolitikum és a szomszédos területek újkőkorra közötti kapcsolatokat vizsgálja.

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Site	Lab n ^o	Uncal BP	Cal BC*	Material	Culture
Zingari	R-981	9570±80	8960 (8850,8804,8627) 8525	Charcoal	M Sauveterrian
Benussi 5/6	R-1045A	8650±70	7852 (7586) 7545	Charcoal	M Sauveterrian
Benussi 5	R-1045	8380±60	7492 (7474,7465,7436) 7320	Charcoal	M Sauveterrian
Ciclami 9	R-1041	8260±60	7420 (7293) 7098	Charcoal	M Sauveterrian
Benussi 4	R-1044	7620±150	6549 (6425) 6244	Charcoal	M Castelnovian
Benussi 3/4	R-1042	7230±140	6180 (6026) 5898	Charcoal	M Castelnovian
Benussi 3	R-1043	7050±60	5960 (5940,5911,5880) 5816	Bones	M Castelnovian
Breg 3A	Z-10421	6630±150	5621 (5566,5549,5524) 5389	Charcoal	M Castelnovian
Podosojna	Z-198	9460±90	5443 (5425,5383,5349) 5283	Charcoal	M Castelnovian
Gudnja I	GrN-10315	7170±70	6044 (5986) 5955	Charcoal	N Impressed Ware
Gospodska Pečina C	Z-579	7010±90	5956 (5847) 5732	Charcoal	N Impressed Ware
Tinj	GrN-15236	6980±160	5972 (5806) 5667	Charcoal	N Impressed Ware
Gudnja I	GrN-10314	6935±50	5813 (5748) 5706	Charcoal	N Impressed Ware
Medulin	HD-12093	6850±180	5929 (5685) 5528	Bones	N Impressed Ware
Samograd	HD-11885	6780±180	5772 (5621) 5483	Bones	N Impressed Ware
Tinj	GrN-15237	6670±260	5742 (5575,5543,5528) 5326	Charcoal	N Impressed Ware
Samograd II	HD-12269	6600±100	5583 (5520,5519,5483) 5435	Bones	N Impressed Ware
Gudnja II/III	GrN-10311	6660±40	5521 (5445) 5438	Charcoal	N Impressed Ware
Tinj	GrN-10238	6280±210	5433 (5246) 4946	Charcoal	N Impressed Ware
Medulin	HD-11733	6140±65	5209 (5059) 4948	Bones	N Impressed Ware
Gudnja	GrN-10313	6520±40	5445 (5439) 5389	Charcoal	N Danilo
Gudnja	GrN-10312	6415±40	5424 (5330) 5285	Charcoal	N Danilo
Pokrovnik	Z-895	6300±150	5421 (5256) 5063	Seeds	N Danilo
Pokrovnik	HD-12842	6290±65	5277 (5253) 5145	Seeds	N Danilo
Ciclami 8	R-1040A	6300±60	5280 (5256) 5149	Charcoal	N Vlaška
Ciclami 8	R-1038	6290±130	5332 (5253) 5068	Charcoal	N Vlaška
Sammardenchia	Bln-3373	6120±60	5189 (5051) 4941	Charcoal	N Friuli
Fagnigola Pit I	R-1544A	6050±90	5060 (4938) 4836	Charcoal	N Friuli
Fagnigola Pit IV	R-1545A	5760±160	4794 (4595) 4408	Charcoal	N Friuli

* Calibrations according to STUIVER-REIMER 1993.

Table 1 List of the 14C dates to - date available for the region between the Dalmatian coast and Friuli
1. táblázat A dalmát tengerpart és Friuli közötti területről ismert C14 datálások

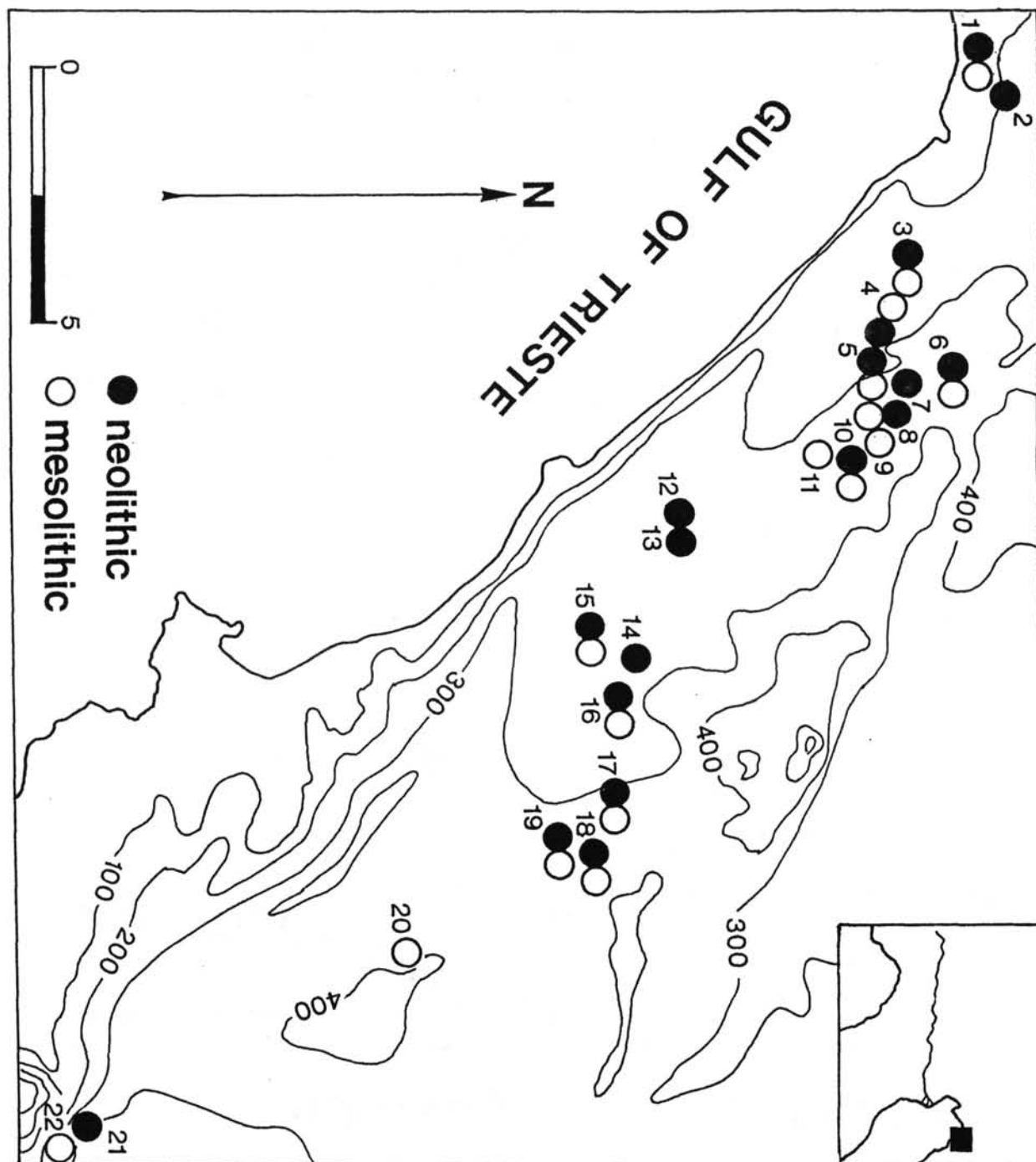


Fig. 1 Distribution map of the Mesolithic and Early Neolithic sites of the Trieste Karst (draw by P. Biagi)
1. kép A Trieszti karsztvidék mezolitikus és kora neolitikus lelőhelyeinek elterjedési térképe (Rajzolta P. Biagi) 1: Grotta Teresiana 2: Grotta del Mitreo 3: Caverna del Pettiroso 4: Riparo Zaccaria 5: Grotta Caterina 6: Grotta Benussi 7: Grotta dell'Ansa 8: Caverna dell'Edera 9: Grotta Gialla 10: Grotta Azzurra 11: Grotta Moser 12: Grotta dell'Orso 13: Grotta Cotariova 14: Grotta Gigante 15: Grotta della Tartaruga 16: Grotta degli Zingari 17: Grotta Lonza 18: Caverna dei Ciclami 19: Riparo di Monrupino 20: Grotta di Trebiciano 21: Grotta delle Gallerie 22: Cavernetta della Trincea

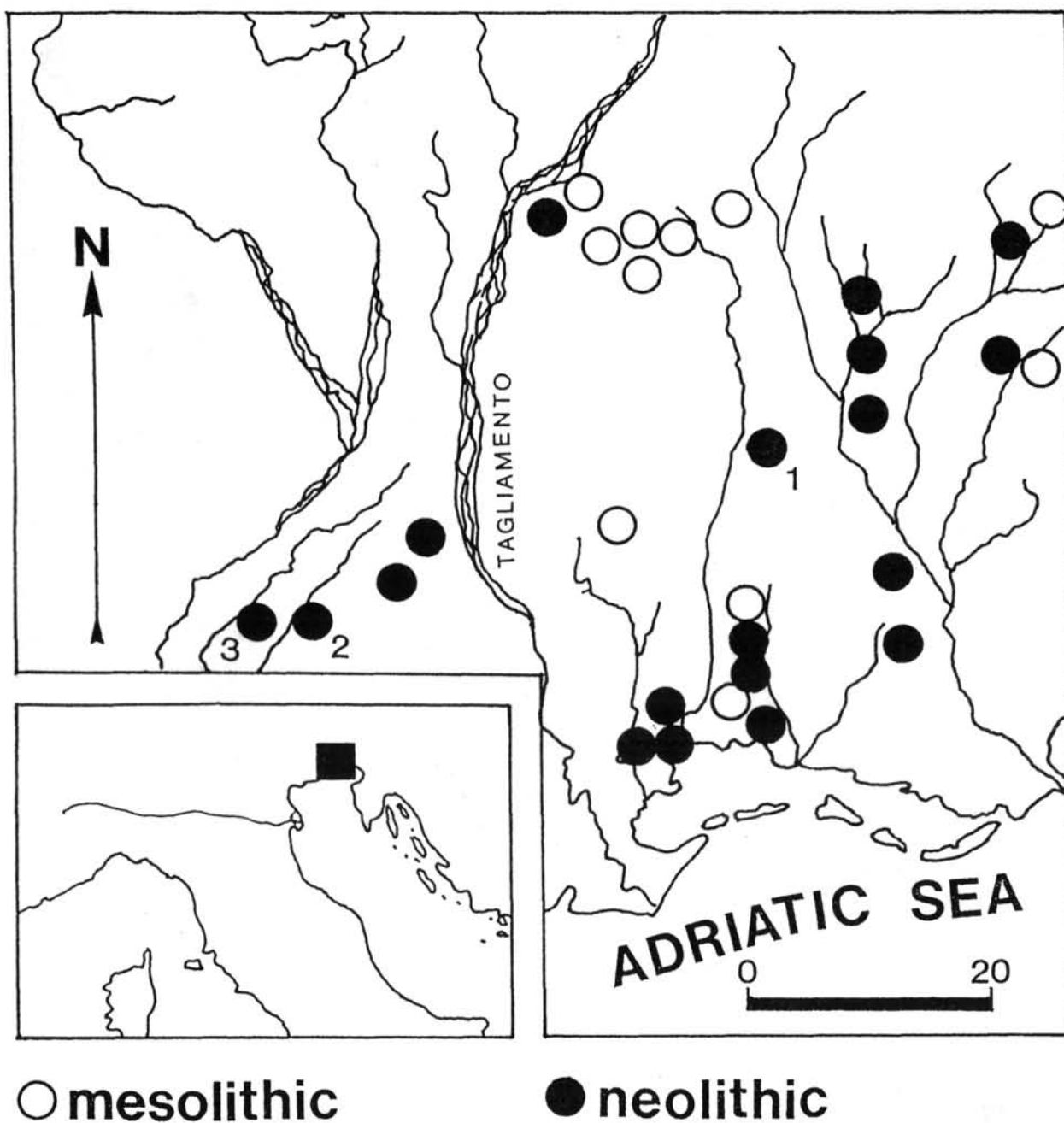


Fig 2 Distribution map of the Mesolithic and Early Neolithic sites in eastern Friuli (data after FERRARI-PESSINA 1992.)

2. kép Kelet-Friuli tartomány mezolitikus és kora neolitikus lelőhelyeinek elterjedési térképe (FERRARI-PESSINA 1992. alapján) 1: Sammardenchia 2: Valer 3: Fagnigola

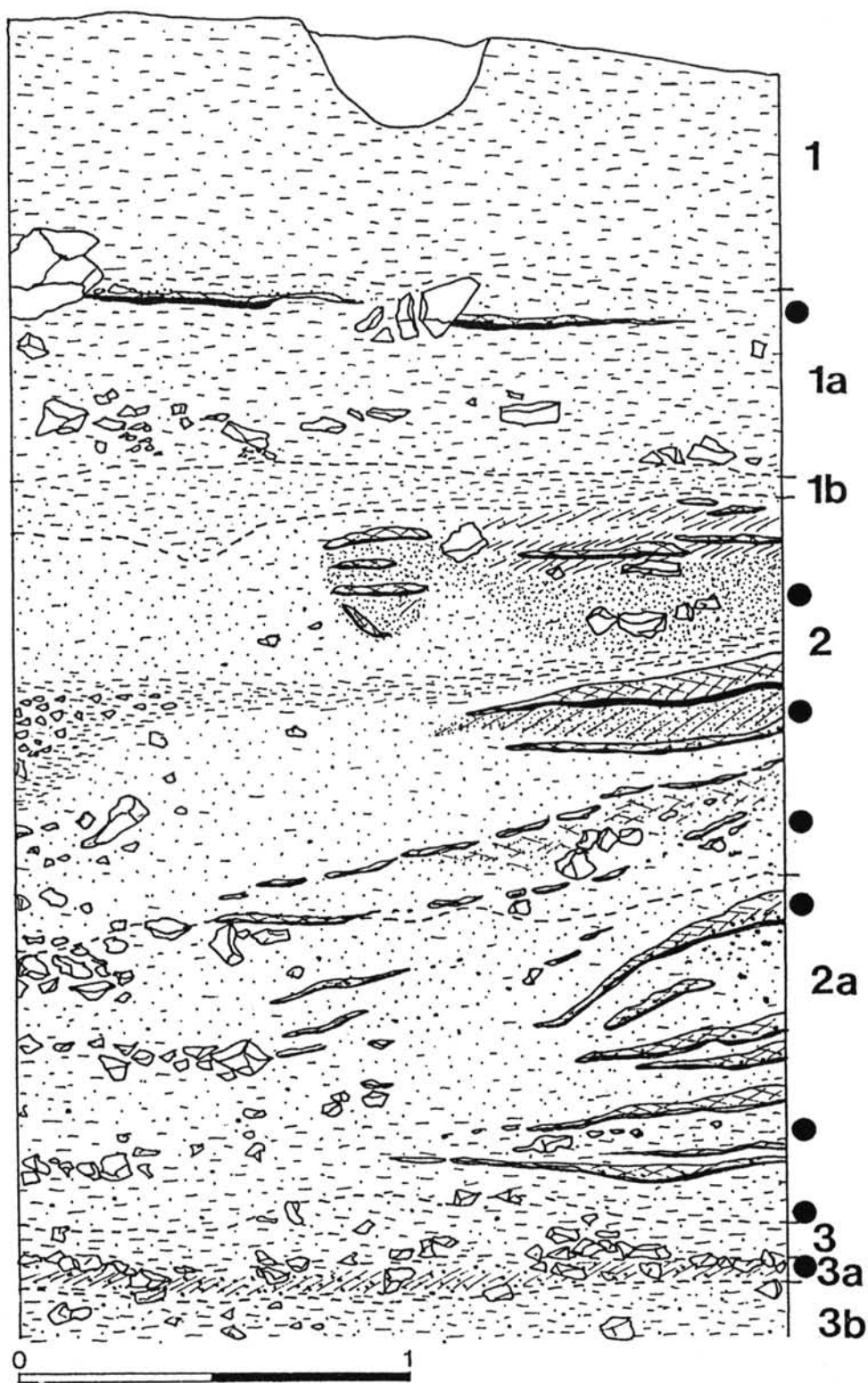


Fig. 3 Grotta dell'Edera. Stratigraphical sequence of the 1990-1992 excavations with the indication of the 14C samples (dots) (draw by N. Ilić and V. Munčan)

3. kép Grotta dell'Edera. Az 1990-1992-es ásatás rétegsora a C14 adatok feltüntetésével (pontozva) (Rajzolta N. Ilić és V. Munčan)

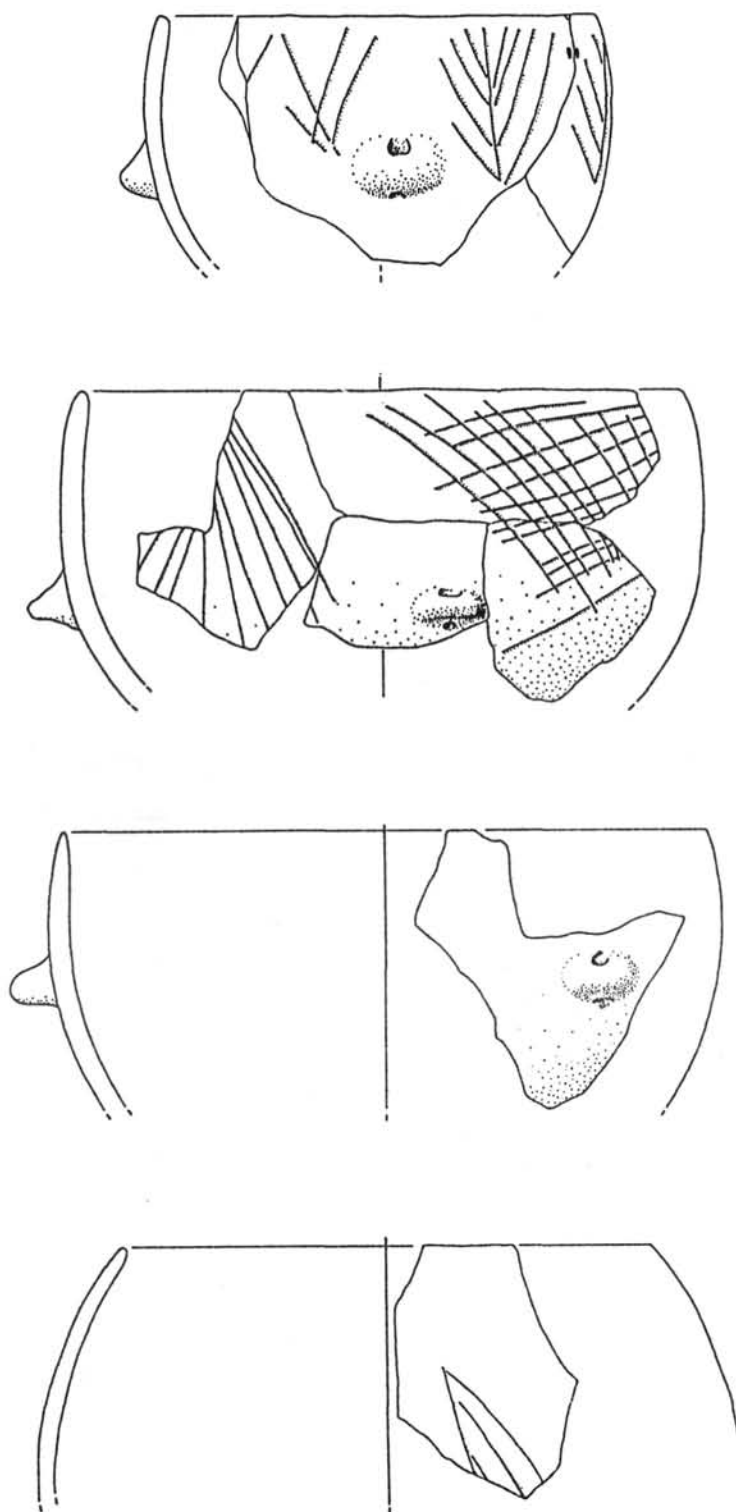


Fig. 4 Vlaška type pottery from Grotta dei Ciclami, the eighth layer (after GILLI-MONTAGNARI KOKELJ 1993.)
4. kép A Vlaška típusú kerámia Grotta dei Ciclami lelőhelyről, nyolcadik szint (GILLI-MONTAGNARI KOKELJ 1993. alapján)



Fig. 5 Sammardenchia. Distribution map of the Neolithic structures as revealed by the surveys (after FERRARI-PESSINA 1992.)

5. kép Sammardenchia. A feltárt neolitikus objektumok szóródása (FERRARI-PESSINA 1992. alapján)

