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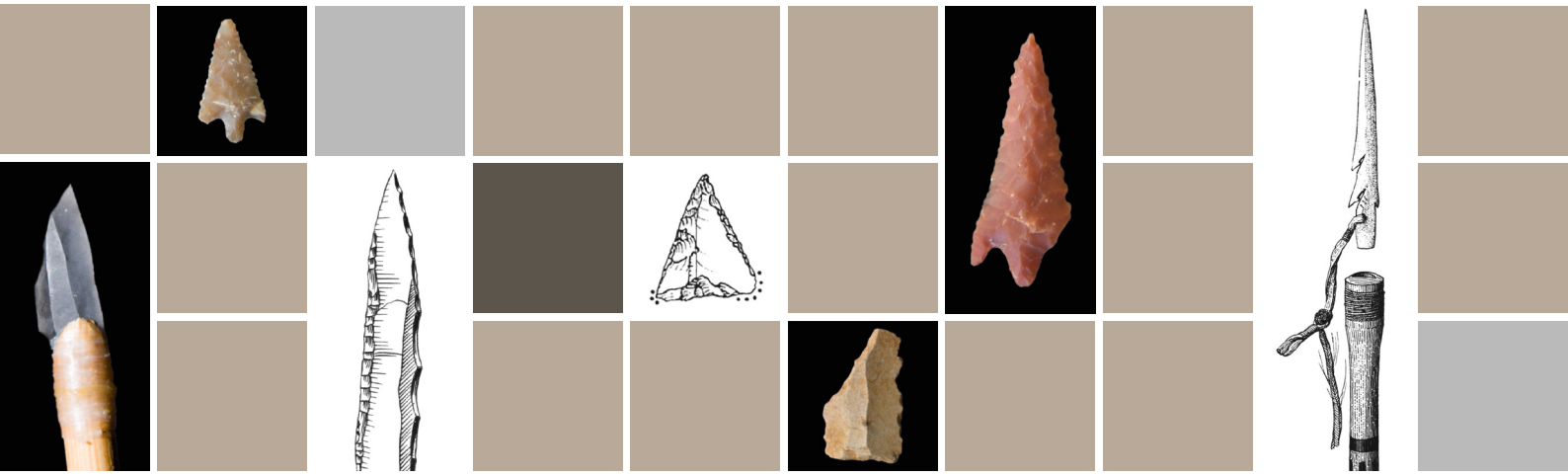
PROJECTILE WEAPON ELEMENTS
FROM THE UPPER PALAEOLITHIC TO THE NEOLITHIC

Proceedings of session C83



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GEOMETRIC WEAPON ELEMENTS DURING THE NEOLITHIC IN THE EASTERN IBERIAN PENINSULA : TYPOLOGICAL, TECHNOLOGICAL AND FUNCTIONAL ASPECTS

Javier FERNÁNDEZ LÓPEZ DE PABLO, Juan Francisco GIBAJA BAO & Antoni PALOMO

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Abstract

In this paper, we present a global view of the principal traits of the evolution of Neolithic geometric microliths in Eastern Spain (principally in Catalonia and the Valencia region). Our discussion addresses two aspects. The first concerns the morpho-technological and functional relations of these pieces, as well as their diachronic transformation. Following this orientation, we present a summary of recent typological, technological and traceological studies. The second aspect concerns the relationship between microliths and their archaeological context with particular focus on economic data, as well as funerary conditions, which permit us to develop new lines of research and hypotheses.

Key-words : Iberian Peninsula, Neolithic, lithic tools, geometric, projectile

Introduction

Javier Fortea (Fortea, 1973) conducted an early study of microliths in eastern Spain. Based on comparative stratigraphy, he established an evolution of Late and Final Mesolithic industries of the geometric complex of the Cocina facies. He also revealed differences in the lithic industries of the Cardial Neolithic.

During the 1980's, archaeological data were greatly enriched and microliths were studied as a first indicator of the filiations of industries during the process of Neolithization (Barandiarán and Cava, 1989; Juan Cabanilles, 1984 and 1985). At this time, microliths from phases before the Neolithic were poorly known: the only well defined archaeological culture was in Catalonia—Sepulcrod de Fosa—where the microliths were considered only as characteristic elements of tombs. Outside of Catalonia, the presence of geometric elements alone was sufficient for the identification of an archaeological context, in this case, the Neolithic or Epipalaeolithic tradition (e.g. in the Bas Aragon region).

Later research, during the 1990's and early 2000's, modified our perception of microliths. New excavations in each region yielded a great diversity of archaeological contexts (village, cave, rock shelter) where microliths were present from the Early Neolithic to the Eneolithic periods (fig. 1 and 2). At the same time, methods in lithic studies were renewed with the introduction of concepts such as "*chaîne opératoire*" (operational sequence) and "lithic production", both of which were employed as a structuring framework integrating raw material studies, a technological approach and microwear analyses.

Neolithic microliths : a global perspective

A first observation that can be made concerning Early Neolithic microliths is that they show a morphological and technological rupture from Final Mesolithic industries, which are characterized by a dominance of triangles with abrupt retouch and the use of the micro-burin technique. In addition, significant technological differences in the bladelet debitage of Early Neolithic sites such as Cova de l'Or, Chaves and La Draga,

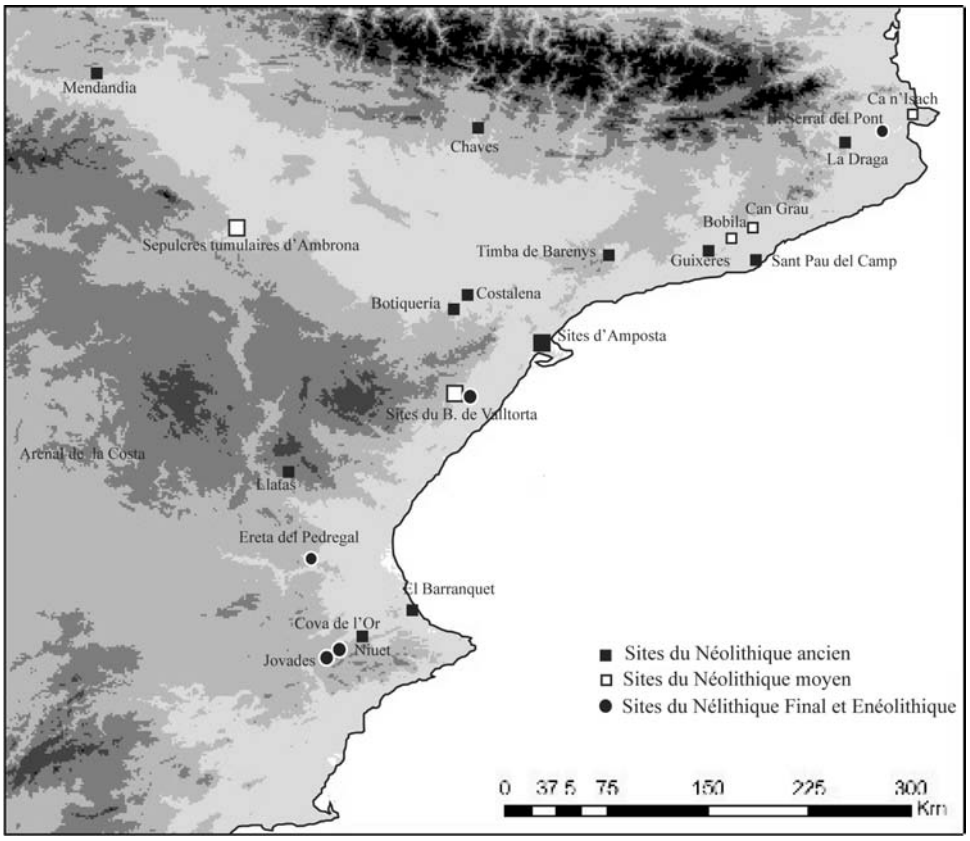


fig. 1 : Locations of sites cited in the text.

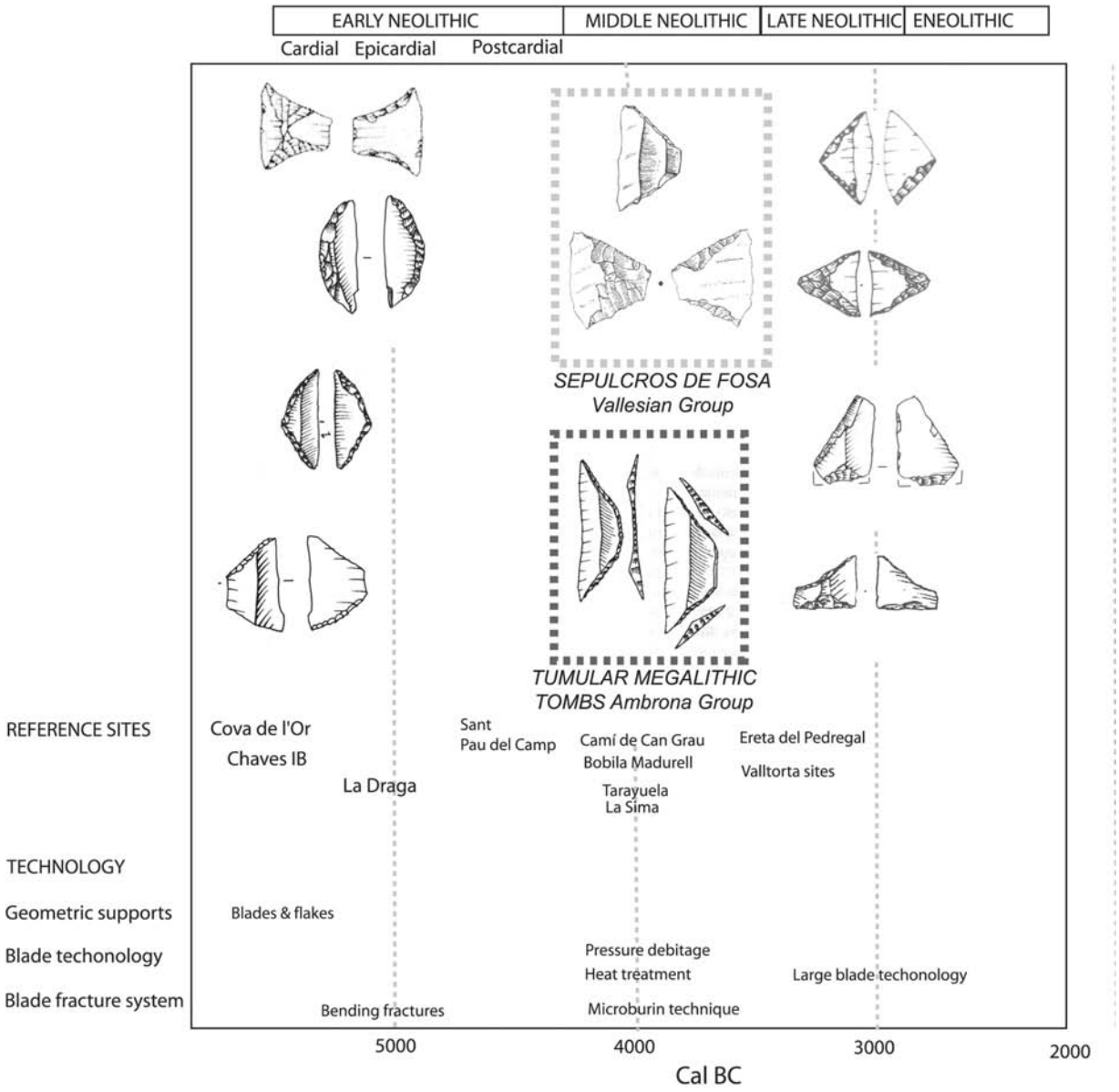


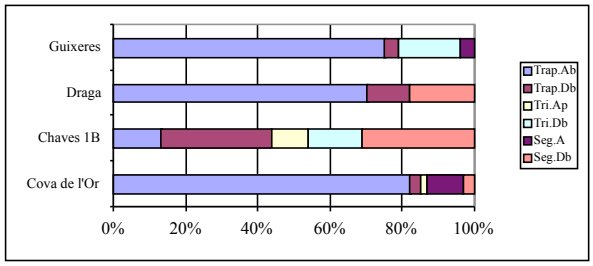
fig. 2 : General evolution of geometric weapon elements during the Neolithic in the eastern Iberian Peninsula.

prevent the establishment of a phylogenetic relationship between these two cultural complexes (García, 2005).

In contrast to Mesolithic industries, the micro-burin technique is non existent, or only very rarely encountered in Early Neolithic assemblages. Analyses of microliths show a general dominance of trapeze forms with mostly abrupt retouch, but also with semi-abrupt, inverse retouch or flat, direct, invasive retouch.

The available data on microliths of the Cardial period show differences that are related to the diversity of Cardial groups and their evolutionary processes (graph. 1). The site of Cova de l'Or contains the largest assemblage of the southern central Cardial group in Valencia (Juan Cabanilles, 1984). These microliths are characterized by a dominance of trapezes with abrupt retouch and a concave side. The other basic geometric forms, such as segments and triangles (in this order of importance) are much less numerous. The segments were formed by abrupt retouch. The site of Guixeres de Vilobí has yielded the most complete lithic assemblage of the Cardial complex in Catalonia. The microliths are composed of trapezes with abrupt retouch. In contrast to Cova de l'Or, however, the symmetric and asymmetric forms are well represented. Triangles with bifacial retouch constitute the second morphological category, while segments with abrupt retouch and bifacial trapezes are poorly represented (Mestres, 1987). The site of La Draga belongs to the following phase, the Late Cardial, in Catalonia. This site clearly illustrates the traits the existing continuity through the presence of symmetric trapezes with alternate truncations already observed, as well as by the significant increase in microliths with bifacial retouch, such as trapezes and segments (Palomo, 2000).

The Cardial group of Haut Aragon, represented by the site of Chaves (levels Ib and Ia), shows different behaviours characterized by a high proportion of segments and triangles with bifacial retouch (Cava, 2002). These traits signal the characteristics of the following Epicardinal phase (5100-4700 cal. BC), in which we observe a predominance of segments with bifacial retouch in geometric assemblages, to the detriment of other morphological categories such as triangles and trapezes (Juan Cabanilles and Martí, 2002).



graph. 1 : Early Cardial Neolithic. Relative frequencies of the principal microlith types. Trap. Ab: trapeze with abrupt retouch; Trap. Db: trapeze with bifacial retouch; Tri. Ap: triangle with abrupt retouch; Tri. Db: triangle with bifacial retouch; Seg. A: segment with abrupt retouch; Seg. Db: segment with bifacial retouch.

Usewear studies were conducted on the microliths of eight Early Neolithic sites (Cardial and Epicardial phases). The site of La Draga is the most representative due the abundance of its remains. We thus used it to complement the information provided by the other sites. In table 1, we summarize interpretations based on different functional analyses of the arrangement of microliths on arrow shafts. The most common hypothesis, particularly for the segments, is that they were used as a point. The other hypotheses proposed are that of a "tranchant" position, a transversal edge position, and finally, as a barb or in laterally inserted. We must note that the majority of evidence supporting the hypothesis of a "tranchant" position comes from the site of Mendandia (Domingo, 2005). We think that this case could be exceptional since their penetrating capacity is very weak. It is possible that at this site, this particular type of arrowhead was employed to hunt species without penetrating them (birds or small mammals). On the other hand, the interpretation that the segments were used as points is contrasted for the other sites retained since these pieces favour the formation of recognizable edge damage, such as long burin-type fractures initiated on the distal extremities. The triangles with bifacial retouch are more numerous and the results of functional analyses show they were used point or

A. Segments

Site	n	Point	Tranchet	Barbelure	Reference
C. de Llatas	9	6	2	1	García et Jardón, 1999
Mendandia II	7	0	7	0	Domingo, 2005b
Valltorta	4	4	0	0	Fernández, 2006
C. del Vidre	2	2	0	0	Gibaja & Palomo, 2004
La Draga	2	2	0	0	Gibaja & Palomo, 2004
Kobaederra	1	1	0	0	González e Ibáñez, 1999
Total	**25**	**15**	**9**	**1**	

B. Triangles

Site	n	Point	Tranchet	Barbelure	Reference
Botiqiería 6-8	3	2	0	1	Domingo, 2004
Costalena c2	2	1	0	1	Domingo, 2004
C. de Llatas	2	2	0	0	García et Jardón 1999
Kobaederra	1	1	0	0	González & Ibáñez, 1999
Total	**8**	**6**	**0**	**2**	

C. Trapezes

Site	n	Point	Tranchet	Barbelure	Reference
La Draga	5	1	3	1	Gibaja, 1999
C. del Vidre	1	1	0	0	Gibaja & Palomo, 2004
C. del Frare	1	0	1	0	Gibaja & Palomo, 2004
Valltorta	2	0	2	0	Fernández, 2006
Botiqueria 6-8	2	1	0	1	Domingo, 2004
Total	**11**	**3**	**6**	**2**	

tab. 1 : Compilation of the functional interpretation of usewear analyses conducted on Early Neolithic sites: A. Segments, B. Triangles, C. Trapzes.

on a lateral edge. The narrow form of the segments could be explained by the same mode of use. We must meanwhile remember that our current sample is insufficient to reach reliable conclusions. In the near future, we hope to present the next phase of our studies of this weapon element type, in which we will develop more complete conclusions, especially concerning the interpretation of a lateral position.

For the Post-Cardial Early Neolithic phase (4700-4100 cal. BC), we do not have a representative assemblage of microliths. Only the open-air site of La Timba de Barenys yielded an assemblage of microliths dominated by segments with bifacial retouch. Meanwhile, its only radiocarbon date (Miró, 1996) is problematic because the decorative techniques of the pottery (incised and appliqué) are older, suggesting the presence of an Epicardial phase. On the other hand, the information furnished for the late phase of Guixeres de Vilobí confirms the presence of trapezes with abrupt retouch (Mestres, 1987). In the Valencian Country, excavations conducted in new open-air sites, such as Barranquet de Oliva (Esquembre *et al.*, in press), will probably complete the lack of information for this period in this sector.

For this chronological phase, we can, for the first time, document the use of microliths as grave offerings since they have been found in the tombs of the Sant Pau del Camp necropolis and the inhumations of the Amposta group Gibaja, 2003; Bosch and Faura, 2003).

For the Middle Neolithic (4100-3500 cal. av. BC), we observe the appearance of geographically separated cultural groups that develop different inhumation practices: Sepulcros de Fosa and tumulaire megalithic tombs.

The microliths of the Sepulcros de Fosa group are characterized by a clear dominance of trapezoidal forms that are particularly symmetric and asymmetric with a few examples of concave truncations and a small, very short base. They are strongly associated with a blade production system on a beige flint of exogenous origin, with heat treatment and pressure debitage (Terradas et Gibaja, 2002).

A typo-metric analysis conducted on a sample of 20 trapezes from La Bóbila Madurell shows an average length of 20.47 mm (standard deviation 3.13) and width of 12.87 mm (standard deviation 1.65 mm). These results attribute a length index of 1.6 with a standard deviation of 0.27.

The principal tumular tombs of the middle Elbe basin are located in the Abrona Valley and were excavated by the research team of Professor Manuel Rojo. The lithic assemblages of these tombs were studied by I. Alegre (Alegre, 2005). The principal characteristics of the microliths are a dominant representation of symmetric trapezes with a small retouched base, similar to the general form of the segments. The typo-metric projection of these trapezes indicates an average length of 25.3 mm and width of 9.17 mm. The combination of these values yields a higher length index (around 2.75) and a very standardized width. A significant number of these pieces have trihedral points on the apical parts of truncations, indicating the use of the micro-burin technique.

The interest of these two cultural groups resides in the fact that they developed different models of arrowheads—both with trapezes—with different typo-metric, technological and morphological characteristics, as is shown by a comparative analysis of the relations between their length and width, and the length of the small base (graph. 2).

The functional study of the microliths of the Sepulcros de Fosa was principally conducted by one of the authors of this paper (Gibaja, 2003). The principal function of trapezes was as a "tranchant" or as a transverse arrowhead with characteristic traits: symmetric and dissymmetric forms, very long transverse edge and different wide models for the small base. These traits reflect the low penetrating capacity of these microliths, as is confirmed by experimentation (Gibaja & Palomo, 2004). Furthermore, usewear analysis showed that a high number of these trapezes were not used, while others that were did not show the significant stigmata of edge damage. Generally, the trapezes used as points have a globally symmetric form with rectilinear, or sometimes concave, truncations (fig. 4). In some cases, their use created striations, as was documented at the sites of n'Isach and Gava de Catalogne.

There are no exploitable data to document the production contexts of the tumular megalithic tombs of the Ambrona group. However, through a program conducted in the northern Valencian Country, we have been able to study several open-air sites containing the same type of trapezes (fig. 5) (Fernández, 2006a and b). The trapezes were produced *in situ* at these sites, generally with Tertiary flint from Miocene formations in the Elbe basin. One of their most characteristic technological traits is the frequent use of the micro-burin technique. A typo-metric analysis of the micro-burins shows a broad type different from those present in the Final Mesolithic sites. This type can be strictly correlated with the widths of the full debitage blades found in these same assemblages. In terms of usewear, these trapezes have well developed burin-type fractures, suggesting their use as points (Fernández, 2006b).

For the Final Neolithic and Eneolithic periods, we observe a general decrease in microliths in the lithic assemblages. The generalization of bifacial points can partly explain this profound change. This tendency confirms our observations of the regional variability represented by the morphology and technology of microliths (fig. 1).

In north-east Catalonia, we observe the presence of isosceles triangles with bifacial retouch in the sites of Pont de Bauma del Serrat and La Prunera (Borrell, in press). At the same time, in the Valencia and neighbouring regions, such as Muricia, the presence of rectangular trapezes is very characteristic. The principal corpus of these rectangular trapezes from habitat contexts has been documented at the open-air sites of the Valltorta ravine in the Castellón (Fernández, 2006a). In these open-air sites, as well as in some levels in caves such as La Cova de la Pipa, these trapezes were found in association with micro-burins. The rectangular trapezes are characterized by a rectilinear truncation that forms a convergent point on the large base (fig. 6). The side is generally modified by different types of bifacial retouch created by different procedures: semi-abrupt, marginal bifacial retouch; semi-abrupt inverse retouch, and; flat invasive retouch whose flat scars direct and facilitate the insertion of trapezes into the extremity

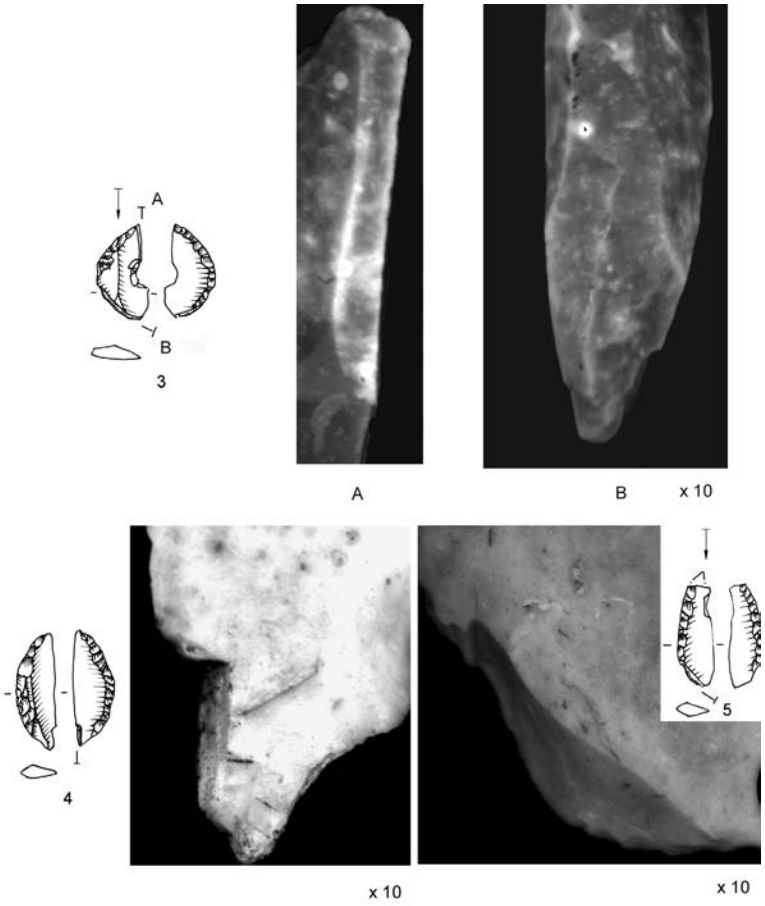
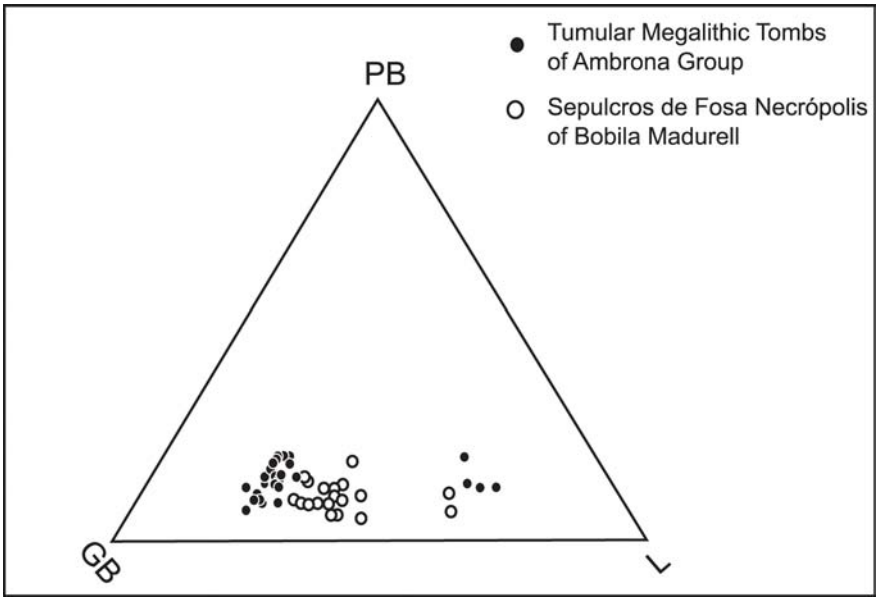


fig. 3 : Burin-like fractures on segments used as points. (Rueda, Valltorta complex of archaeological sites).



graph. 2 : Comparative triangular diagram of the dimensional relationships of Middle Neolithic trapezes.

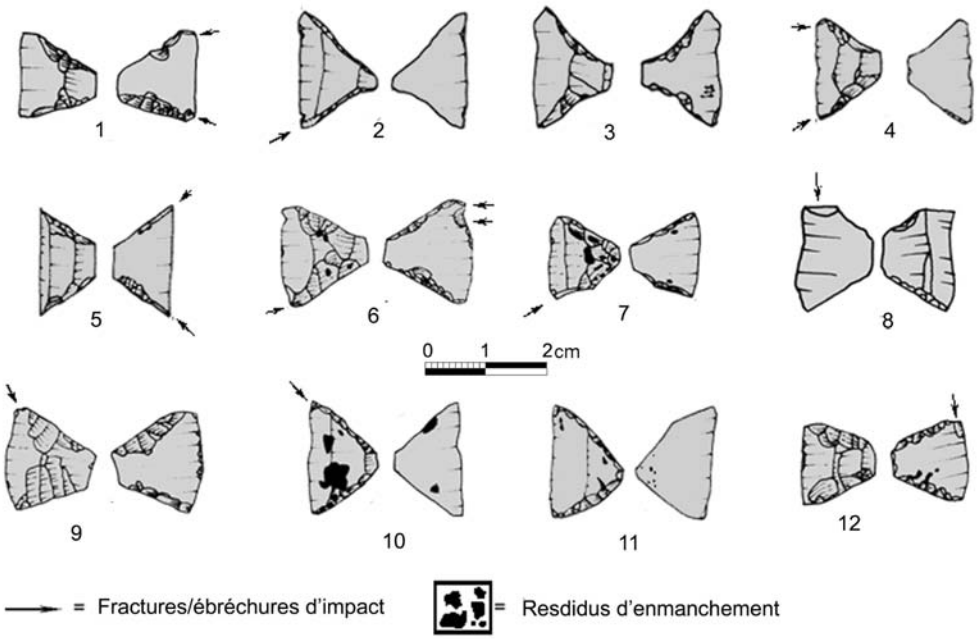


fig. 4 : Middle Neolithic trapezes in Catalonia : 1-5 used as « tranchant » arrowheads; 8-12 used as points; Provenience: 1-5 burial pits of Bóbila Madurell; 6-7 and 9-12 burial pits of Camí de Can Grau; 8 habitation pit of Bóbila Madurell.

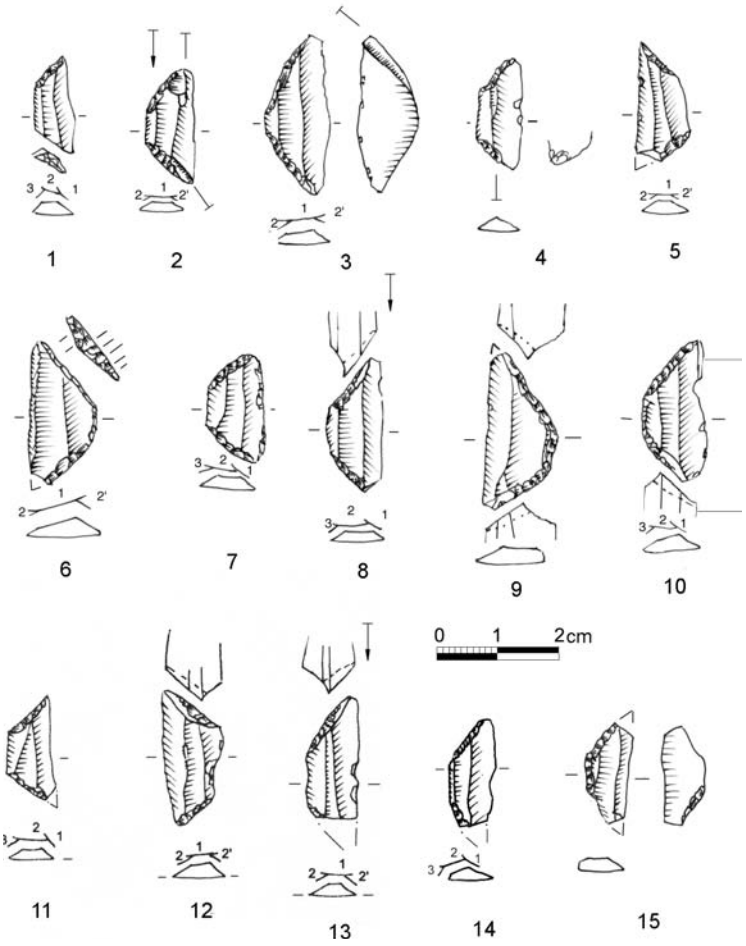


fig. 5 : Long trapezes from different assemblages in the Valltorta ravine (Castellón).

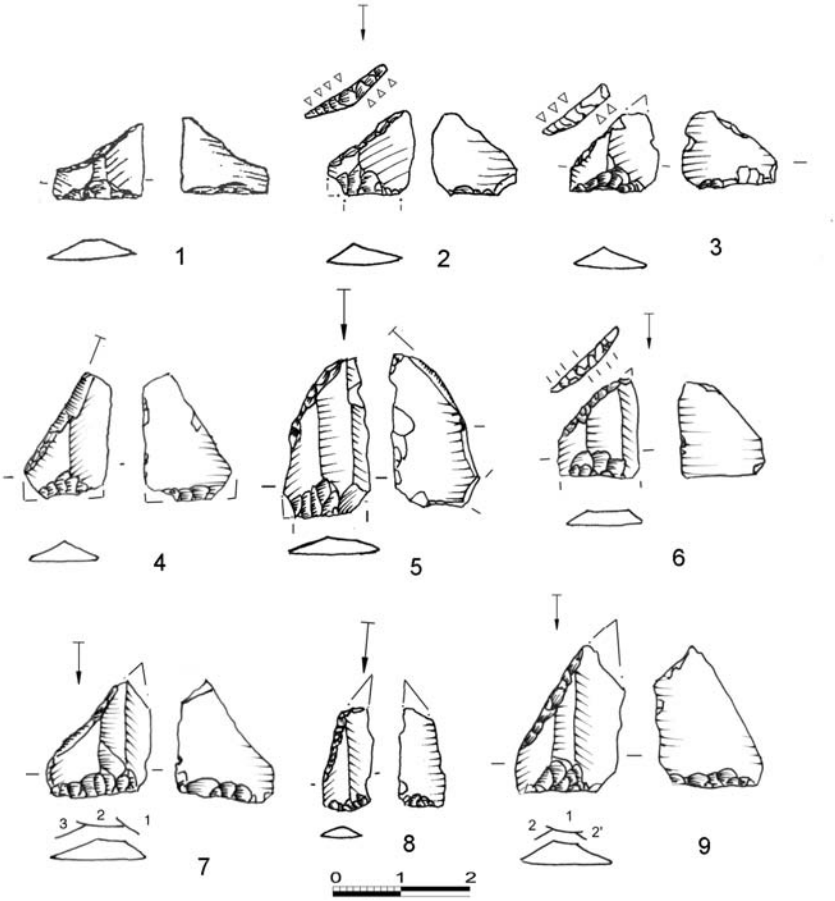


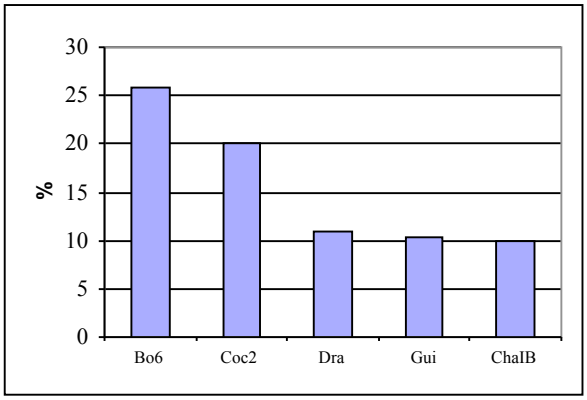
fig. 6 : Long trapezes from different assemblages in the Valltorta ravine (Castellón).

of the shaft. Usewear analysis confirms their use as points (Fernández, 2006b).

The economic context of Neolithic microliths

In this section, we will focus on the general evolutionary tendencies of microliths through a consideration of their relationships with other components of the material culture and economy. We should again remark the general quantitative decrease of microliths in assemblages during the Neolithic. This phenomenon occurs in parallel with a general decrease in hunting activities, but in the Middle Neolithic it is also combined with a significant increase in the symbolic value of arrows in association with funerary activities.

In the Early Neolithic, we can establish a clear correlation between the number of geometrics in lithic assemblages and the relative frequency of wild fauna. However, this global view is obviously conditioned by the status or function of the sites considered (graph. 3): a higher number in caves and rock shelters, considered to be directly associated with hunting activities (e.g. Botiqueria 6: 25.88% and Costalena level 2: 19.99%) (Barandiarán, 1978; Barandiarán and Cava, 1989), and a lower number in villages (La Draga: 11%, Guixeres de Vilobí 10.27 %) (Palomo, 2000; Mestres, 1987) and habitat caves (Chaves IB:10,02%) (Cava, 2002). The faunal assemblages of these sites also show a few differences. For example, at Cova de l'Or wild ungulates represent around 9.7% of the assemblage, while the common red deer is the main hunted species (8.4%) (Pérez 1980). On the other hand, at the lakeside site of La Draga, hunting is implicated in 6.8% of the faunal assemblage, though a larger range of species is hunted (*Cervus elaphus, Capra pyrenaica, Bos Taurus, Sus scropha*) (Saña, 2000).



graph. 3 : Relative frequency of microliths in lithic assemblages during the Early Neolithic. Bo6: Botiquería level 6; Coc2: Costalena level 2; Dra: La Draga; Gui: Guixeres de Vilobí; ChaIB: Chaves IB.

For the Middle Neolithic, we have already noted that the microliths are primarily associated with funerary contexts. This situation prevents us from evaluating the economic significance of hunting since representative faunal assemblages are absent.

On the other hand, for the Final Neolithic and Eneolithic periods, we have access to a significant number of contexts (particularly villages) for which faunal analyses could be conducted (Pérez Ripoll, 1999). As we observed in the villages of Jovades, Niuet and Arenal de la Costa, the representation of wild mammals in the faunal assemblages is very low and thus shows a strong correlation with the low frequency of microliths. Arrowheads with flat, bifacial retouch are usually much more numerous than geometric microliths, but they do not reflect the specific role of hunting in the economic system. Meanwhile, and in contrast to the preceding observation, there are sites that present a much clearer association of wild mammals and arrowheads. For example, the site of Ereta del Predregal (Navarrés Canal) has yielded a large number of arrowheads made from local limestone flint (Juan Cabanilles, 1997) and wild ungulates representing 31.5% of the faunal assemblage (*Cervus elaphus* 28.1% et *Capra pyrenaica* 3.4%) (Pérez Ripoll, 1990). This situation strongly suggests that economic and ecological factors influenced hunting practices during the later Neolithic and Eneolithic periods. The site of Ereta del Pedregal could thus be correlated with the economic changes that occur in the agricultural system during the final Neolithic and with a demographic increase that generated the colonization of new, marginal sectors. The function of hunting would have been to eliminate herbivores that were potential competitors of sheep and to protect and maintain cultivated land. Other hypotheses are feasible, such as the search for additional proteins or the exploitation of wild ungulate resources, such as skin, horns and bones, in the context of exchanges between regions and craft specialization. Meanwhile, these possibilities do not appear to explain the additional production of bifacial points observed in numerous villages during this period. In our opinion, symbolic factors, such as the construction of an archer identity, as well as the development of conflicts between groups, played an important role in the Mediterranean zone of Spain.

The social and symbolic context of microliths

In contrast to the Early Neolithic, for which the available data do not allow us to formulate hypotheses concerning the role and symbolic value of projectiles in societies, Middle Neolithic contexts are more favourable context for this endeavour. The differences observed in the concept of trapezes during this period can be correlated with phenomena related to the construction of group identities in the ways that we observed in different funerary practices associated with tumular megalithic tombs and the Sepulcros de Fosa of neighbouring regions. Moreover, in the Sepulcros de Fosa group, the systematic presence of microliths, as the principal components of tomb offerings, is strictly associated with the male gender. This phenomenon could be related to the conception of an archer identity by the different cultural traditions that thus constructed their own identity relative to other groups. A similar interpretation could be made for Levantine rock art in which we observe specific manners of representing arrowheads according to a discrete distribution model (Fernández, 2006b).

Despite their low representation in the lithic assemblages of the later periods of the Neolithic and the Eneolithic, microliths cannot be dissociated from

bifacial arrowheads. The range of formal and stylistic variability could therefore be explained by a different quiver composition, reflecting differences in the rank or status of individuals (Pétrequin and Pétrequin, 1990).

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