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Revisiting the oldest known lithic assemblages of Colombia: A review of data from El Abra and Tibitó (Cundiboyacense Plateau, Eastern Cordillera, Colombia)

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ABSTRACT

The aim of this paper is to present a review of the data referred to some of the earliest Colombian archaeological sites, i.e. Tibitó 1, El Abra 2 and El Abra 3 (Cundiboyacense Plateau, Eastern Cordillera).

The re-analysis of the lithic assemblages, according to a techno-typological approach referred to the lowest levels of these sites, traditionally considered the oldest and most significant sites of Colombia, has highlighted several discrepancies and critical elements in reference to the analysis of the lithic industry and the effective association between cultural elements and stratigraphy.

Our review reveals that the evidence of human occupation of the oldest levels of these sites is reduced to a few artefacts, from which it is not possible to infer any kind of interpretation.

1. Introduction

The northern part of South America, which roughly corresponds to current Colombia, constitutes a key area to understand the dispersal of early human populations throughout South America (e.g., Ardila and Politis, 1989; Dillehay, 1989, 2008; Cooke, 1998; López, 2008; Politis et al., 2009; Aceituno et al., 2013; Cooke et al., 2013).

In fact, although the place of initial entry into South America is not known, it is plausible to hypothesise a dispersion along the Pacific and Caribbean coastlines and through interior routes of Panama spreading across South America (Dillehay, 1999; Dillehay et al., 2008), with multiple dispersal trajectories, preferentially along the valleys of large rivers (Bueno et al., 2013).

Consequently, the oldest occupation of Colombia should necessarily correspond to its north/north-western part, which links Panama with the rest of the continent. Unfortunately, this region still remains mostly unexplored. Additionally, other vast areas, i.e. the Eastern Plains (*Llanos*) and the Amazon Basin have not been sufficiently investigated, when compared to the highlands of the Eastern Cordillera and the lowlands of the Magdalena valley (Fig. 1) (Ardila, 1986; López and Cano, 2011; Aceituno and Mora, 2012; Aceituno et al., 2013; Delgado et al., 2015).

Therefore, at present there are some gaps in the comprehension of the behavioural, adaptive and subsistence strategy of the oldest hunter-gatherers of the Colombian territory, as well as in the reconstruction of their chronology and routes of dispersion. The fragmentation of archaeological data, with enormous areas still unexplored and unanswered questions in the surveyed ones (Ardila and Politis, 1989; López and Cano, 2011; Aceituno et al., 2013), as well as the paucity of systematic research projects (Aceituno et al., 2013; Delgado et al., 2015), poses a great difficulty to correlate the archaeological sites and prevents proper interpretation. Moreover, we have to consider the lack of reliability of the available chronological database (see Delgado et al., 2015).

From a technological point of view, the early human settlement is characterised by a widespread interregional technological and typological diversity in lithic assemblages, distinctive contemporaneous regional features and patterns, whose origins and interactions are still unclear.

In this framework the re-visitation and re-interpretation of the lithic series from the oldest archaeological sites constitutes an important challenge in the attempt to reconstruct the cultural identity of the earliest hunters-gatherers and in defining their phylogenetic cultural relationship.

Currently, the oldest archaeological evidences have been recorded at: Pubenza 3, dated to 16,400 ± 420 BP (Correal, 1993; Correal et al., 2005) and Tibitó 1, dated to 11,740 ± 110 years BP (Correal, 1981), both characterised by the presence of megafauna associated to lithic

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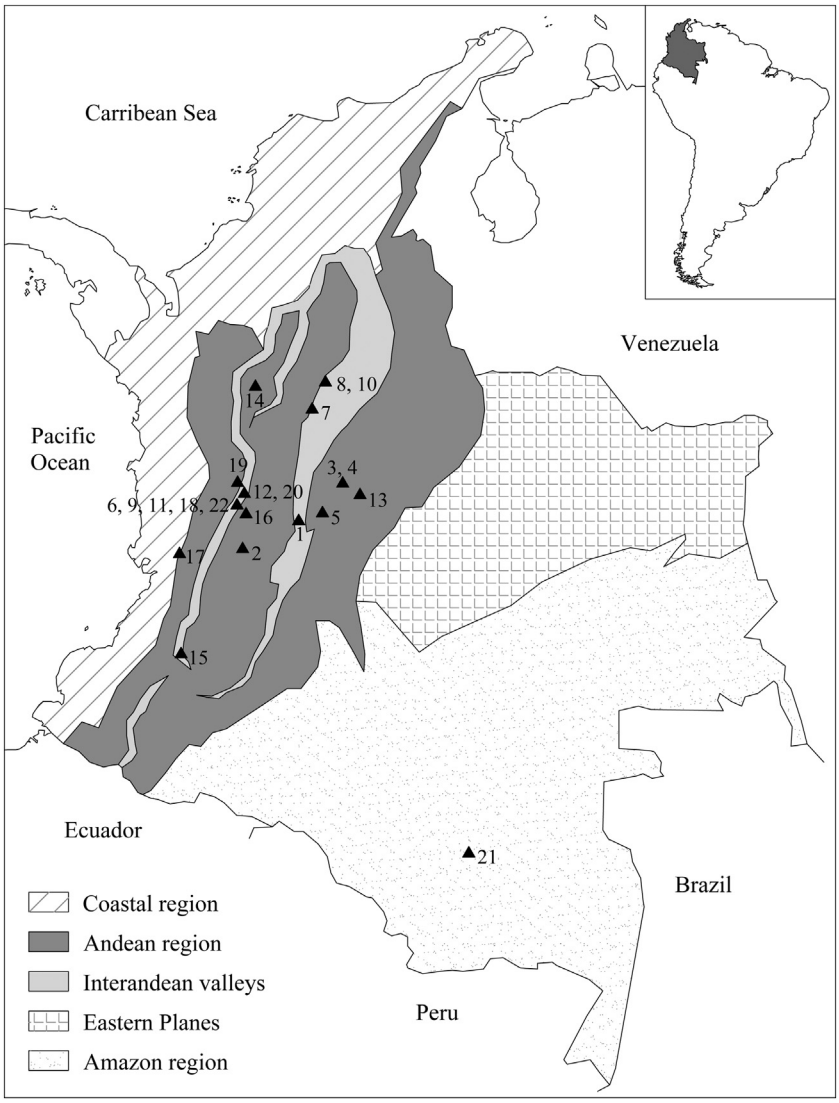

Fig. 1. Geographic location of the main early archaeological sites cited in the text: 1. Pubenza; 2. El Jordán; 3. El Abra 2; 4. Tibitó 1; 5. Tequendama I; 6. Cuba; 7. Nare; 8. La Palestina 2; 9. La Mikela; 10. San Juan de Bedout; 11. El Guatín; 12. El Jazmín; 13. Sueva 1; 14. La Morena; 15. San Isidro; 16. Salento 24; 17. Sauzalito; 18. La Trinidad I; 19. La Selva; 20. La Pochola; 21. Peña Roja; 22. La Montañita.

industry, and El Abra (Correal et al., 1969; Hurt et al., 1972, 1977; van der Hammen, 1991) and Tequendama I (Correal and van der Hammen, 1977; van der Hammen, 1991), dated to 12,400 ± 160 and 10,920 ± 250 BP, respectively.

This work will contribute to the understanding of this crucial period, through a detailed and critical re-analysis of the lithic assemblages of some of the most ancient archaeological Colombian sites where an almost exclusively typological characterisation has prevailed over a techno-economic analysis. Until now no technological and techno-economic reconstructions have been achieved on these lithic industries, except for some use-wear analysis conducted by Nieuwenhuis (2002) on a random sampling without controlled stratigraphic provenance.

We shall, therefore, present a review of the data referred to the earliest Colombian archaeological sites, i.e. Tibitó 1, El Abra 2 and El Abra 3 (Cundiboyacense Plateau, Eastern Cordillera).

2. The early human peopling of Colombia: state of the art

Currently, the oldest known archaeological evidences (Table 1) are located in the Cundiboyacense Plateau (Eastern Cordillera) and in the valley of the Rio Magdalena. The Cundiboyacense Plateau is, de facto, one of the most studied areas of the country, thanks to the pioneering work of Gonzalo Correal, Colombian archaeologist, and Thomas van der Hammen, Dutch geologist, from the mid-60s onwards. Under the programme 'Medio Ambiente Pleistocénico-Holocénico y Hombre Prehistórico en Colombia' guided by the Instituto de Ciencias Naturales (Universidad Nacional de Colombia), which represented a positive convergence of palaeo-ecological and anthropological studies, the oldest archaeological sites of Colombia were discovered: El Abra and Tequendama rock shelters (Fig. 1), both located in the Sabana de Bogotá (about 2600 m.a.s.l), that, due to their antiquity, wealth of information and continuity of the archaeological record, soon became reference sites for the prehistory of the country (Ardila, 1986; López and Cano, 2011; Aceituno and Mora, 2012; Aceituno et al., 2013; Delgado et al., 2015).

El Abra (Tocancipá, Cundinamarca Department) was the first stratified site to be excavated in Colombia, between 1967 and 1969. Four rock shelters were partially excavated, along a corridor located between two parallel walls of Upper Cretaceous rocks, part of the extinct Pleistocene lake that corresponds to the Sabana de Bogotá. In the arbitrary level 7 of El Abra 2 (within the unit C), dated to 12,400 ± 160 years BP, few flakes of chert were found (Correal et al., 1969; Hurt et al., 1972, 1977; van der Hammen, 1991). However,

Table 1
Radiocarbon dates from the main early Colombian sites. Site samples in bold correspond to new unpublished dates from the Middle Cauca Archaeology Project.

				Aceituno et al., 2013	Aceituno and Loaiza, 2015	Dickau et al., 2015
n.	Site	^{14}C date	References	Calib BC (2σ)	Calib BC (2σ)	Calib BC (2σ)
1	Pubenza	16,400 ± 420	Correal et al., 2005	16,731–18,576	16,869–18,830	–
2	El Jordán	12,910 ± 60	Salgado, 1998	13,087–14,137	13,255–13,724	–
3	El Abra 2	12,400 ± 160	Hurt et al., 1972	12,021–13,152	12,121–13,236	–
4	Tibitó 1	11,740 ± 110	Correal, 1981	11,408–11,872	11,312–11,826	–
5	Tequendama I	10,920 ± 250	Correal and van der Hammen, 1977	10,424–11,369	10,193–11,358	–
6	Cuba	10,619 ± 66	Cano, 2004	–	–	**12,424–12,708**
7	Nare	10,400 ± 60	López, 2008	10,111–10,579	10,095–10,488	–
8	La Palestina 2	10,400 ± 90	López, 2008	10,048–10,612	10,025–10,613	–
9	La Mikela	10,376 ± 70	Cano, 2004	–	–	**11,990–12,525**
10	San Juan de Bedout	10,350 ± 90	López, 2008	9878–10,593	9980–10,581	–
11	El Guatín	10,130 ± 50	Restrepo, 2013	–	–	11,408–12,023
12	El Jazmín	10,120 ± 70	Aceituno and Loaiza, 2007	9449–10,075	9447–10,078	11,396–12,027
13	Sueva I	10,060 ± 90	Correal, 1979	9374–10,009	9322–10,020	–
14	La Morena	10,090 ± 60	Santos, 2010	9364–10,074	9366–9881	–
15	San Isidro	10,050 ± 100	Gnecco, 2003	9312–10,027	9310–10,027	–
16	Salento 24	9680 ± 100	Tabares and Rojas, 2000	8784–9298	8784–9296	10,733–11,245
17	Sauzalito	9670 ± 100	Salgado, 1998	8782–9292	8782–9291	–
18	La Trinidad I	9542 ± 50	Restrepo, 2013	–	8750–9147	10,699-11,096
19	La Selva	9490 ± 110	Rodríguez, 2002	8560–9221	8556–9221	10,505–11,170
20	La Pochola	9312 ± 55	Dickau et al., 2015	8348–8724	8420–8719	10,297–10,668
21	Peña Roja	9250 ± 140	Cavelier et al., 1995	8221–9119	8211–8849	–
22	La Montañita	9230 ± 50	Restrepo, 2013	–	8302–8572	10,251-10,544

the authors themselves did not reject the hypothesis that the few artefacts found in the dated layer were the result of intrusions from the upper levels (Hurt et al., 1977).

In the lower levels of Tequendama I (Soacha, Cundinamarca Department), which dates to 10,920 ± 260 BP, few lithic artefacts were found. This site, which has a very rich and significant cultural sequence, includes various occupations whose chronology goes from the end of the Pleistocene until the time of the Spanish conquest (Correal and van der Hammen, 1977; van der Hammen, 1991). In both sites no projectile points or remains of megafauna were found, but only bones of small and middle-sized animals such as cervids (genera *Odocoileus* and *Mazama*), rodents (*Sigmodon*, *Cavia*), lagomorphs (genus *Sylvilagus*) and armadillos (*Dasypus*).

The first Colombian typological lithic inventory was created on the basis of the study of these two sites; it borrowed types developed by García Cook (1967) for Mexico and it preferred formal attributes (with functional implications) to technological ones (Hernández, 2006). Accordingly, lithic industries were divided into two categories, called *Abriense* and *Tequendamiense*. The first term refers to a set composed of cores, flakes and few tools retouched on one side («tradición de artefactos con borde arreglado» or «edge-trimmed tool tradition»), obtained by a direct percussion technique on local raw materials. The second term refers to a lithic assemblage composed of more elaborate tools obtained through pressure technique or controlled percussion on exogenous raw material; there were only few artefacts of this category, found in the oldest levels of the Tequendama site (Correal et al., 1969; Correal and van der Hammen, 1977; Hurt et al., 1977; Correal, 1982, 1990).

In the archaeological site of Tibitó 1 (Tocancipá, Cundinamarca Department), two anthropic levels were identified, units 3 and 3A (the last one dated to 11,740 ± 110 BP), characterised by remains of extinct megafauna (*Haplomastodon* sp. and *Cuvieronius hyodon*), American horse (*Equus* sp.) and deer (*Odocoileus virginianus*) associated with lithic objects, mainly of *Abriense* type (except for a keeled scraper that shows affinity with the *Tequendamiense* class) (Correal, 1981).

Other sites, such as Sueva 1, Gachalá, Galindo 1, Checua, characterised by the presence of *Abriense* industry, testify a continuous occupation of the Sabana de Bogotá in the late Upper Pleistocene/early Holocene (Correal, 1979; Groot, 2003; Pinto, 2003).

In the Magdalena valley (Fig. 1) the earliest evidence is represented by the open-air site of Pubenza (16,400 ± 420 BP, Girardot, Cundinamarca Department) which also constitutes the oldest site of the entire Colombian territory. In the site, faunal remains were found, including megafauna (*Haplomastodon waringi*, *Gliptodon clavipes*, *Propaopus magnus*), associated with a few lithic artefacts (flakes, cores and tools) (Correal, 1993; Correal et al., 2005). However, the association between the scarce lithics and megafauna remains is doubtful. The authors (Correal et al., 2005) mention the existence of reworked material due to erosional phenomena (Aceituno and Mora, 2012). Moreover, the lack of a complete and detailed publication about the site, the association of dates with the stratigraphic sequence and of these elements with lithic and faunal remains is not clear (Politis et al., 2009). Apart from the dates, we should admit that there is a big gap in the sequence of the Magdalena valley, from ~16,400 years of Pubenza up to ~10,400 years, when a technological tradition consisting of a considerable quantity of bifacial elements appears, as documented by the Middle Magdalena sequence (López, 2008; Aceituno and Mora, 2012).

In the 90s, Carlos López carried out intensive research on the alluvial plain of the Middle Magdalena River. He investigated a certain number of open-air sites that attested the presence of a pre-ceramic cultural sequence ranging from 10,400 to 5000 years BP. The oldest sites, La Palestina 2 (10,400 BP), San Juan de Bedout (10,350 BP) and Nare (10,400 BP), suggest that the first occupation of the region coincided with the improvement of climatic conditions that characterise the period of transition between the late Upper Pleistocene and the early Holocene (López, 2008).

The characteristics of the lithic industry are totally different from the lithic assemblages from the Sabana de Bogotá: although unretouched artefacts dominate, there are many unifacial tools obtained with pressure retouch (planoconvex and knives) and bifacially retouched projectile points, without fluting or basal thinning, obtained from high quality raw material (López, 1989, 1990, 1999, 2008; López and Cano, 2011).

In the Central Cordillera (Fig. 1), the oldest evidence is documented at the El Jordán site (Roncesvalles, Tolima Department), dated to 12,910 ± 60 BP, where only few artefacts associated with charcoal remains were recovered (Salgado, 1998). Unfortunately, the site lacks more detailed archaeological and stratigraphic information (Aceituno et al., 2013). Further south, on the western slope of the Central Cordillera, at the Popayán Plateau, the site of San Isidro, dated between 10,050 and 9530 ± 100 BP, has yielded thousands of chert artefacts, among which we can mention lanceolate bifaces, though not associated

with faunal remains (Gnecco and Bravo, 1994; Gnecco and Mora, 1997; Gnecco, 1999, 2003).

In the Middle Porce River basin (Central Cordillera), the site of La Morena (10,090 ± 60 BP) yielded a lithic assemblage mainly composed of flakes, axes, hoes, hand stones and milling bases (Santos, 2010). The Middle Cauca region (western Central Cordillera) reported numerous preceramic sites ascribed to the late Upper Pleistocene/early Holocene, such as El Jazmín, La Mikela, El Guatín, dated approximately between 10,100 and 10,400 BP, and La Selva, La Pochola, La Montañita, La Trinidad, Salento 24, dated between 10,000 and 9000 BP (Tabares and Rojas, 2000; Rodríguez, 2002; Cano, 2004; Aceituno and Loaiza, 2007; Restrepo, 2013; Dickau et al., 2015). The lithic assemblages recovered are mainly composed of hoes and grinding stones, devoted to plant resource exploitation, according to archaeobotanical evidences (Aceituno et al., 2013; Dickau et al., 2015). Recently, new radiocarbon dates indicate that the site of Cuba (Cano, 2004), dated to 10,619 ± 66 BP, represents the earliest evidence of human occupation in the region (Dickau et al., 2015).

In the Western Cordillera (Fig. 1), in the Calima Valley, the oldest evidences are two open-air sites, Sauzalito and El Recreo, ascribed to the early Holocene. Lithic artefacts (flakes, anvils, hammers, hand stones, hoes) were produced for plant resource exploitation and some incipient form of horticulture (Gnecco and Salgado, 1989; Salgado, 1998; Aceituno and Mora, 2012).

Finally, in the Colombian Amazonia (Fig. 1), the site of Peña Roja, 50 km from Araracuara, on the middle Caquetá River Basin, is dated between 9250 ± 140 and 8090 ± 60 BP. The lithic industry (flakes, unifacial artefacts, choppers, sidescrapers, endscrapers, hammers, anvils, drills, hand stones, milling stones) is associated with a broad-spectrum economy in which plant gathering, especially palm fruits, rather than hunting, plays an important role (Cavelier et al., 1995; Morcote et al., 1998; Gnecco, 2003; Mora, 2006).

3. El Abra rock shelters and Tibitó 1 open-air site: a critical overview of the archaeological contexts

3.1. El Abra Site

The rock shelters, located to the south-west of the city of Zipaquirá (Fig. 2), were excavated in two phases, in 1967 and 1969 (Correal et al., 1969; Hurt et al., 1977).

The sites, at 2570 m.a.s.l, lie in the base of two parallel sandstone escarpments of the Upper Cretaceous that form a corridor projected into the basin of the extinct Pleistocene lake (Hurt et al., 1972, 1977).

In 1967, during the first fieldwork, the excavation was carried out through nine artificial levels of 25 cm, (top, level 1 - bottom, level 9) (Correal et al., 1969). During the 1969 excavation, the artificial levels were replaced by depositional units. Five major stratigraphic units were identified, from the bottom to the top, unit A to unit E (divided into subunits) (Fig. 3), which cover a time span from 34 to 32,000 BP to historic times. Units C, D, and E contain anthropic evidences. In particular in the subunit C3 of El Abra 2 the first evidence of human occupation was discovered (Hurt et al., 1972, 1977; van der Hammen, 1991). This subunit was dated to 12,400 ± 16 BP thanks to the carbon-dating of charcoal mixed with soil from the 1967 excavation trench, collected at a depth of 1.50–1.75 m (corresponding to arbitrary level 7 of the 1967 excavation, containing 9 artefacts) (Hurt et al., 1977). Another dating for the depositional unit C3, 9420 ± 110 BP, was discarded by Correal et al. (1969) on the basis of chronological and stratigraphical considerations and it is not mentioned in Hurt et al. (1977).

The whole El Abra lithic assemblage, mostly composed of unretouched flakes, cores and only to a lesser extent of retouched tools (simple scrapers, knives and spoke shaves), was assigned to the *Abriense* or «edge-trimmed tool tradition» (with the exception of a single scraper of black chert recovered in the sub-unit C3 of El Abra 2 which shows affinities with *Tequendamiense* class) (Hurt et al., 1977). « […] through time were additions to the tool kit but no replacements» (Hurt et al., 1977: 14) and the preceramic tradition persisted through the later ceramic complexes.

Chert was the preferred raw material, as pebbles, cobbles or chunks recovered in a secondary deposition; only to a lesser extent, human groups used indurated siltstone and sandstone, that are unsuitable and unsatisfactory for knapping. Sandstone, particularly abundant in the oldest levels, occurs naturally in the fill of the site as rockfall from the rear walls (Hurt et al., 1977).

Unfortunately, the analysis of El Abra lithic industries as a single and homogeneous assemblage, that includes different stratigraphic levels and covers a large span of time, does not take into account typological and technological diversity and its evolution and it is not useful for our comparisons.

Consequently, it is very arduous to reconstruct the nature, consistence and interpretation of the lithic industry of the Unit C of El Abra 2 and El Abra 3. In the 1967 fieldwork in El Abra 2, 42 lithics were recovered (level 6 = 24; level 7 = 9; level 8 = 5; level 9 = 4), mostly flakes, also in sandstone, and at least 6 sidescrapers and 2 endscrapers; but it is not possible to ascertain the exact classification of the entire set (Correal et al., 1969). No report has been published on the lithic industry recovered in El Abra 3 in the 1967 fieldwork, therefore we do not know how many pieces were found.

More data on the lithic composition is available from the 1969

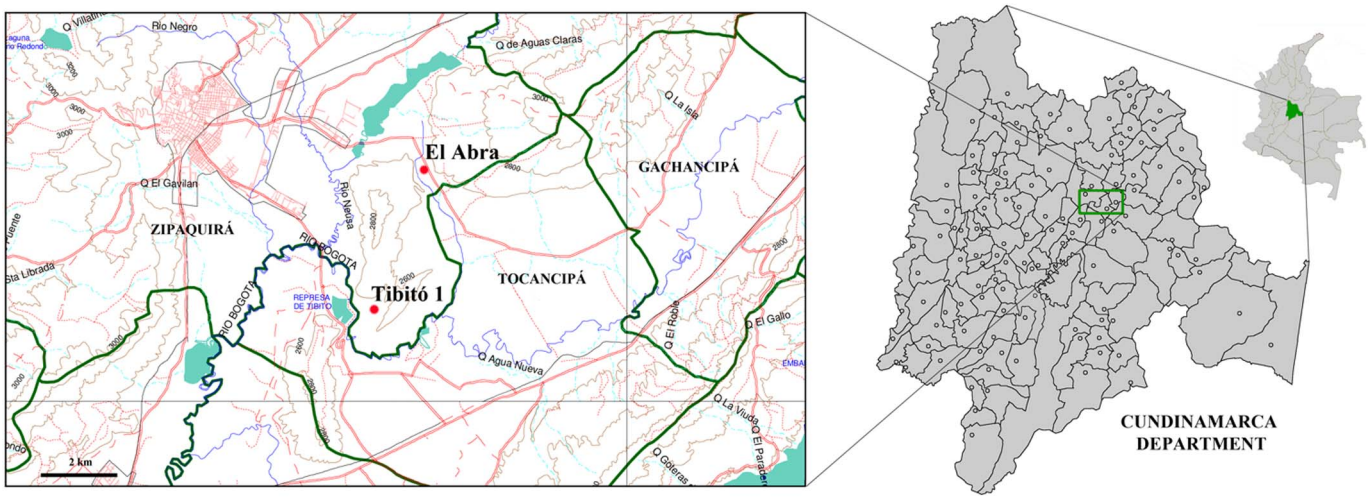

Fig. 2. Geographic location of El Abra and Tibitó 1 sites in the Cundinamarca Department.

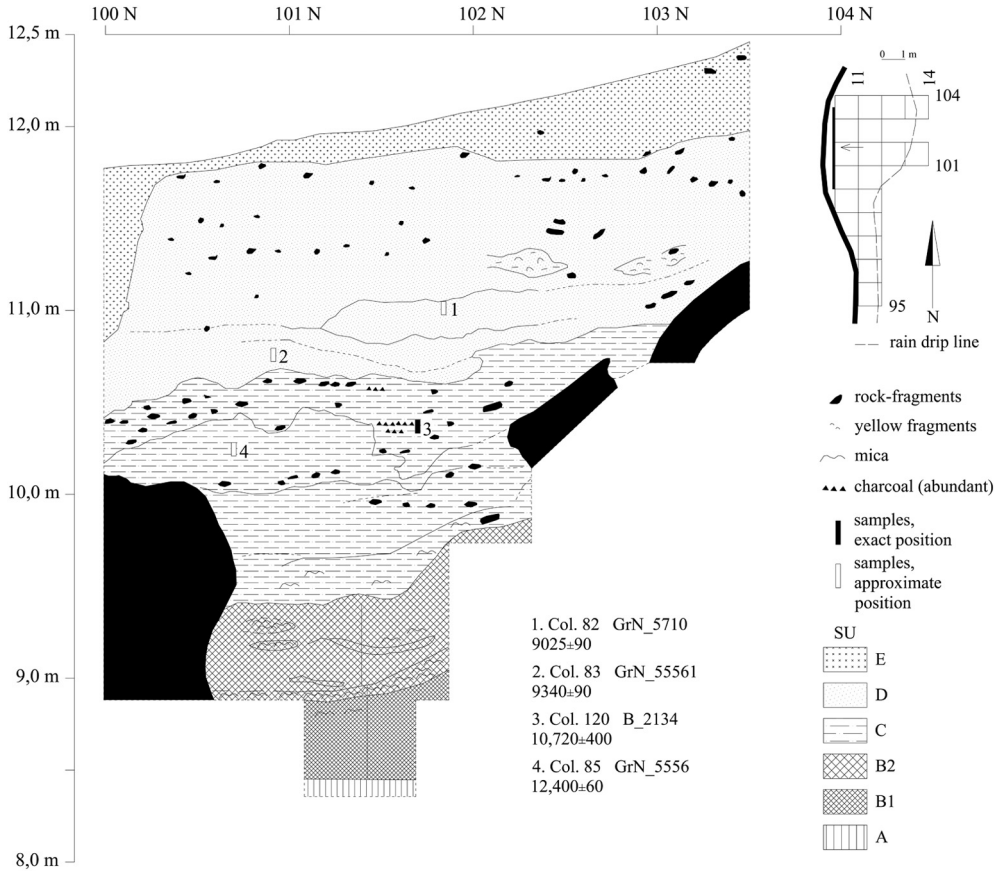

Fig. 3. Stratigraphic sequence of El Abra 2 site from Hurt et al., 1977.

excavation. In El Abra 2, unit C, a total of 79 lithics were recovered, subdivided as follow: 29 flakes were found in the sub-unit C2; 18 flakes and 1 scraper in the sub-unit C3; 31 flakes in the sub-unit C4. In the unit C of El Abra 3, 18 flakes were recovered. Finally, in El Abra 4 the combined C4–D1 sub-units yielded 51 flakes and 19 flaked tools (Hurt et al., 1977).

The same authors (Hurt et al., 1977) complain about some critical points in the reconstruction of the oldest levels of El Abra rock shelters and recognise that only from the unit D (in particular subunit D1, about 10,000 to 9000 BP) onwards human occupation becomes more consistent, certain and significant.

Concerning the discovery of 29 flakes in the subunit C2 (El Abra 2), which could backdate human presence in the site before 12,500 BP, the authors discourage a definite association, considering the absence of chert flakes in the adjacent trenches at the same depth (Hurt et al., 1977: 5). On the set of 18 flakes and 1 scraper of chert, recovered in the sub-unit C3 (El Abra 2) the authors speculate the possibility that this extremely low number of pieces could be the result of an intrusion from overlying levels, falling down through rodent holes or natural fissures (Hurt et al., 1977: 6). Concerning the unit C of El Abra 3, the same authors express some doubts about the correlation with the previous fieldwork and the stratigraphy of El Abra 2 (Hurt et al., 1977: 8).

3.2. Tibitó 1

This open-air site is located to the west of the city of Tocancipá, at about 4 km south-west from El Abra (Fig. 2). The site, at 2590 m.a.s.l, was excavated in 1979/80 by Gonzalo Correal. In a stratigraphic sequence composed of 9 levels, 2 anthropic levels were identified (unit 3 and unit 3A) characterised by lithic artefacts and faunal remains (Fig. 4). In the unit 3A, the richest and oldest level, 3 deposits of elliptical shape were recovered; the depressions were characterised by a particular association of lithic artefacts, charcoal and faunal remains, mainly mastodon (*Haplomastodon* sp. and *Cuvieronius hyodon*), American horse (*Equus amerhippus*) and deer (*Odocoileus virginianus*). Moreover, the presence of intentionally fractured bones, together with incisions on a bone produced by a lithic tool and a fragment of scapula with a rupture caused by a blunt object, suggest the anthropic nature of these deposits, which should constitute the result of a selective accumulation linked to butchering activities or ritual practices (Correal, 1981). A single ^{14}C dating of a bone reported an age of 11,740 ± 110 BP (Correal, 1981)

Lithic industry (156 artefacts; $n = 35$ in unit 3, $n = 121$ in unit 3A), made from chert, is mostly composed of core fragments, flakes and, only to a lesser extent, of retouched tools; it was, therefore, assigned to the *Abriense* class, following the typo-morphological criteria and nomenclature established in the previous works on the Sabana de Bogotá (Correal et al., 1969; Correal and van der Hammen, 1977; Hurt et al., 1977), except for a single sidescraper which showed affinities with the *Tequendamiense* class, due to its pressure retouch.

4. Materials and methods

The lithic industry reviewed is composed of 257 pieces ($n = 154$ at Tibitó 1; $n = 36$ at El Abra 2; $n = 67$ at El Abra 3), stored at the Instituto Colombiano de Antropológía e Historia and Universidad Nacional de Colombia. This selection pertains to a critical revision of the contextual information from: Correal et al., 1969; Correal, 1981; Hurt et al., 1972, 1977. Thus, the description of the archaeological contexts has been introduced before the lithic analysis.

We exclusively refer to the first phase of El Abra fieldwork (1967 excavation; Correal et al., 1969), with the analysis of 103 pieces found in the oldest levels (Levels 9, 8, 7, 6 corresponding to the unit C of the 1969 excavation) of El Abra 2 and 3. We selected these collections

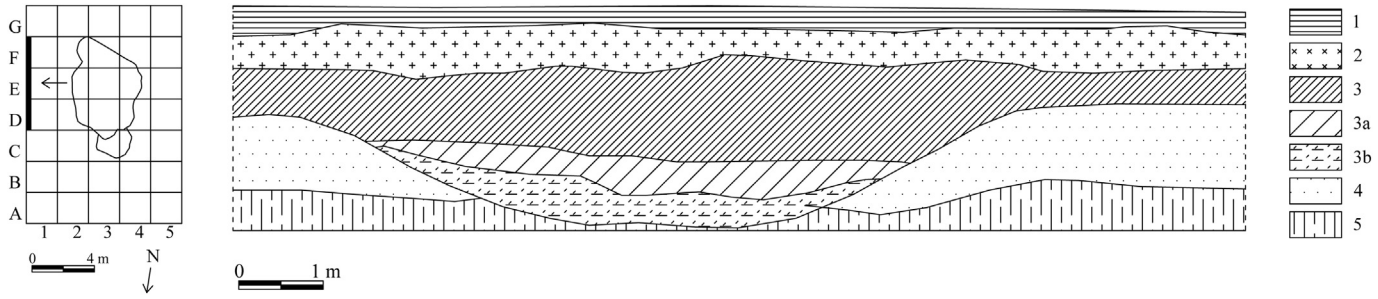

Fig. 4. Stratigraphic sequence of Tibitó 1 from Correal, 1981.

Table 2
El Abra 2: composition of the Unit C lithic assemblage.

Lithic components	Level 6	Level 7	Level 8	Level 9	Tot.
Flakes	5	–	–	–	5
Retouched tools	1	–	–	–	1
Cores	–	–	–	–	–
Indeterminable fragments	2	–	–	–	2
Geofacts	11	8	5	4	28
Natural blocks	–	–	–	–	–
Tot. of analysed material	19	8	5	4	36

because they come from well investigated and well documented stratigraphic and archaeological contexts.

Pubenza 3 and Tequendama I were excluded from our review due to problems related to the incomplete documentation, making it impossible to reconstruct the stratigraphic provenance of the material. In particular, for the Pubenza 3 site, the lack of a complete and detailed publication, the unclear association of dates with stratigraphic sequence, the doubtful association between the scarce lithics and megafauna remains (Politis et al., 2009) have discouraged our attempts.

A techno-typological approach has been followed in the study of lithic industries: the typological approach, purely functional to the classification and systematisation of lithic products, goes hand in hand with the positioning of any element inside the *chaîne opératoire* (Leroi-Gourhan, 1964), in order to interpret the techno-economic system (e.g., Pelegrin, 1985; Boëda et al., 1990; Boëda, 1991; Perlés, 1991; Inizan et al., 1999). The adopted terminology refers to that conceptualised from the 80s by French technologists (e.g., Boëda et al., 1990; Boëda, 1991; Inizan et al., 1999).

A first distinction has been made between unworked and worked material. The first assemblage includes natural material (blocks, cobbles, pebbles, angular fragments), and geofacts, objects not displaying any type of human action. The unmodified material has been analysed taking into account shape, size and raw material type, in order to evaluate the raw material availability and procurement and to appraise selection material criteria. Geofacts have been recognised following the criteria for the knapping and shaping of hard rocks due to natural phenomena as established by Chung (1936), Barnes (1939), Haynes (1973), Gillespie et al. (2004), Lubinski et al. (2014). According to the surveyed literature we considered a series of elements to evaluate the non-artefactual nature of an element, i.e. the absence of a visible impact point, flaking angle less than 90°, absence of incipient cones, absence of bulb (or negative bulb), atypical morphology, negative nature and its organisation (incompatible with a debitage project).

The knapped material has been technologically determined (flakes, retouched tools, cores, *debris*) and positioned inside the *chaîne opératoire*. For each piece we took into account: raw material type; debitage method; knapping technique; state of preservation; state of integrity; presence/absence of the cortex and metrical data.

The classification of cores, intended as technological waste, has been made on the basis of the identification of the knapping method, taking into account the number of flaking surfaces and their relationship, presence/absence of prepared striking platforms, debitage conduct. The recognition of the knapping technique was conducted according to the criteria established by Pelegrin (2000).

The analysis of the flakes was particularly focused on the observation of the dorsal scar patterns, in order to infer the debitage method and on the presence/absence of cortex, in order to determine the stages of reduction process. The retouching, i.e. the intentional modification of the blank edge(s) to manufacture a tool, was studied taking into account the delineation, extension, angle, localisation, morphology, position and distribution (Inizan et al., 1999). Moreover, the distinction between retouching and pseudo-retouching – that is a retouching produced by natural causes resembling human intentional retouching – was conducted taking into account these parameters (e.g., Cyrek and Sudoł, 2012; Patterson, 1983).

5. Results and discussion

5.1. Technological Analysis of El Abra 2

The lithic assemblages of levels 8 and 9 of El Abra 2 (Table 2) are composed of unworked material (Fig. 7), numbers 4 and 5 are geofacts of sandstone that, despite their similarity to man-worked flakes, do not come from knapping. They have irregular angular shapes and heterogeneous dimensions (from 53 to 105 mm in length; average dimensions 83 × 49 × 21 mm).

The lithic assemblage attributable to the level 7 is composed of geofacts (n = 8) of sandstone of different size (from 65 to 164 mm in length; average dimensions 91 × 48 × 20 mm), in which we do not identify any characteristics attributable to human work.

This assemblage does not show any traces of human alteration: no conchoidal fracture, no incipient cones, no bulbs or visible impact points. Moreover, the presumed flaking angle of the flake is less than 90°, incompatible with a debitage reduction. Even though the morphology resembles anthropic flakes, it constitutes the result of natural causes.

The analysed material referred to level 6 (or subunit C4) amounts to 19 elements, composed of unworked material (n = 11), mainly of sandstone and, only to a lesser extent of siltstone, and worked material (Fig. 5), such as flakes (n = 5), a retouched blank and indeterminable fragments (n = 2). The flakes, made of chert, indurated siltstone and sandstone, have been obtained through percussion according to the criteria established by Pelegrin (2000); they are characterised by orthogonal and crossed scars on the dorsal face, small-medium sized (only 1 is large-sized,165 × 81 × 38 mm), have a sub-quadrangular and sub-oval shape, orthogonal directions of the scars on the dorsal surface and simple butts. The edges are mainly affected by deep pseudo-retouches.

The only retouched blank, a small-sized denticulate sidescraper (39 × 30 × 23 mm) (Fig. 6), has been obtained from a small-sized pebble of reddish chert, covered by an extensive dark patina and a partial cortex. Retouching is direct, partial, denticulate, invasive, scaled, abrupt and modifies only a single and limited part of the blank.

Fig. 5. El Abra worked material. Flakes and fractured flakes: El Abra 2, level 6 [1–2]; El Abra 3, level 6 [3–7]; El Abra 3, level 7 [8] (photo: G. Lembo).

5.2. Technological Analysis of El Abra 3

The lithic assemblage belonging to level 8 of El Abra 3 (Table 3) is exclusively composed of unworked sandstone objects (Fig. 7), 18 geofacts of different shapes and dimensions (from 50 to 115 mm in length; average dimensions 83 × 58 × 21 mm).

The lithic assemblage of level 7 amounts to 27 pieces and includes worked material (n = 10) (Fig. 6), such as flakes (n = 5), retouched blanks (n = 3) of chert, indeterminable fragments of chert and siltstone (n = 2), and unworked material (n = 17), such as geofacts of sandstone and, only to a lesser extent, of chert. The flakes, two of which are fractured, are small-sized (largest dimension 34 × 46 × 8 mm), without cortex, sub-rectangular shaped (only one presents a length/width ratio greater than 2:1), have simple butts (linear in one case) and orthogonal scars on the dorsal face. They have been obtained by percussion. Retouched blanks (2 sidescrapers and 1 endscraper) (Fig. 6) have been obtained from a natural blank of chert by a long, denticulate, scaled, semi-abrupt and flat retouching.

Table 3
El Abra 3: composition of the Unit C lithic assemblage.

Lithic components	Level 6	Level 7	Level 8	Tot.
Flakes	7	5	–	12
Retouched tools	–	3	–	3
Cores	1	–	–	1
Indeterminable fragments	4	2	–	7
Geofacts	10	17	18	44
Natural blocks	–	–	–	–
Tot. of analysed material	22	27	18	67

Level 6, amounting to 22 lithic elements, is composed of worked

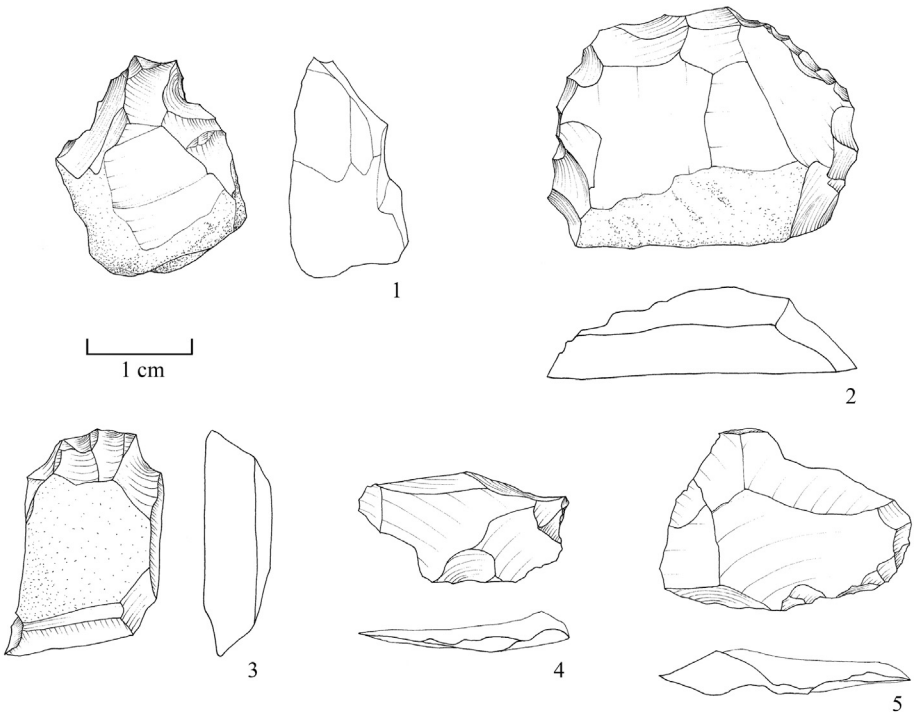

Fig. 6. El Abra worked material. Retouched blanks: El Abra 2, level 6 [1]; El Abra 3, level 7 [2–3]. Flakes: El Abra 3, level 6 [4]; El Abra 3, level 6 [5] (Drawings: B. Muttillo).

Fig. 7. El Abra unworked material. El Abra 2, level 6 [1–3]; El Abra 2, level 7 [4]; El Abra 2, level 9 [5–6]; El Abra 3, level 8 [7]; El Abra 3, level 7 [8]; El Abra 3, level 6 [9] (photo: G. Lembo).

material, such as flakes ($n = 7$), a core, indeterminable fragments ($n = 4$), and unworked material ($n = 10$), such as geofacts of sandstone and a heat detachment of chert. Flakes, of chert and indurated siltstone, only two of which are complete, are small-sized (average size 27 × 29 × 6 mm). They were obtained by percussion without any particular preparation of the core, they show orthogonal and unipolar scars on the dorsal face, flat butts (if present), and could be related to *plèin débitage*, except for a single cortical first flake deriving from the exploitation of the pebble.

Only one small-sized core (49 × 39 × 30 mm) was recovered; it could be ascribed to an opportunistic debitage method (cfr. S.S.D.A., Forestier, 1993) conducted through the exploitation of 6 unprepared orthogonal striking platforms. The abandonment corresponds to the depletion of the core and the last products are small-sized flakes.

5.3. Technological Analysis of Tibitó 1

The lithic assemblage of unit 3A (Table 4) is mostly composed of unworked material, such as small-medium sized geofacts of chert ($n = 128$), affected by deep pseudo-retouches and fluting (Fig. 9). We have identified only 6 unretouched small-sized flakes (average size 21 × 21 × 7 mm), 4 of which are complete (Fig. 8). These flakes, sub-quadrangular shaped and showing unidirectional and orthogonal scars on the surface, have been probably obtained by direct percussion with a hard hammer, without any preparation of the cores; they are covered by a diffuse patina.

Unit 3 is composed of unworked material (Fig. 9), mainly geofacts and natural fragments, and worked material (Fig. 8), such as 3 flakes and only one retouched blank. Flakes of chert (incomplete) are small-medium-sized (average size 57 × 44 × 19 mm), sub-rectangular or sub-triangular-shaped, have bipolar, crossed or centripetal scars on the surface and no marks of preparation of the platform; they have a patina on the surface and deep pseudo-retouches along the edges.

Table 4
Tibitó 1: composition of the lithic assemblage.

Lithic components	Unit 3	Unit 3A	Tot.
Flakes	3	6	9
Retouched tools	–	–	–
Cores	–	–	–
Indeterminable fragments	1	1	2
Geofacts	11	128	139
Natural blocks	2	2	4
Tot. of analysed material	17	137	154

5.4. Lithic industry of the oldest levels of El Abra and Tibitó 1: new interpretation

Our re-analysis of lithic industries shows discrepancies with previous studies, mostly concerning the anthropic nature of the artefacts.

Within 36 analysed lithics belonging to the oldest levels of the El Abra 2, only 6 pieces (5 flakes and 1 retouched tool) clearly represent the result of human activities and they refer to the upper part of the unit C (level 6). Several elements of sandstone, interpreted as worked material in the previous works (Correal et al., 1969), are natural products.

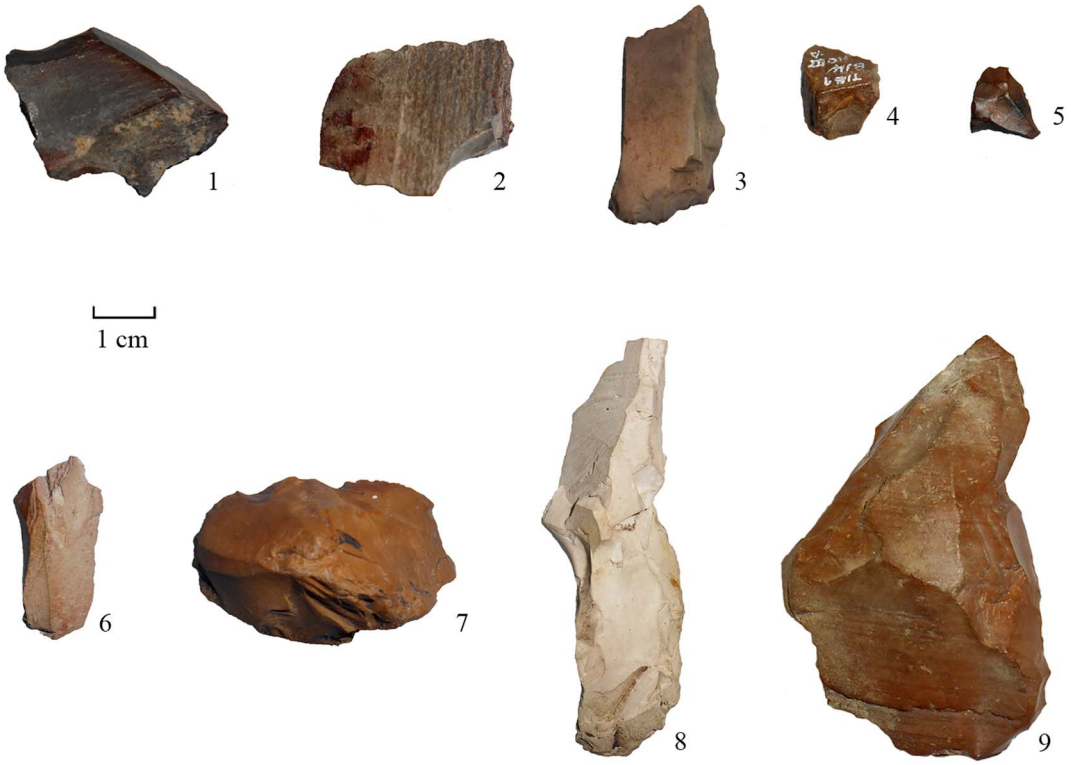

Fig. 8. Tibitó 1 worked material. Flakes: level 3A [1–6]; level 3 [7–8]. Retouched blank: level 3 [9] (photo: G. Lembo).

The lithic assemblage of the oldest levels of El Abra 3 here analysed ($n = 67$) is mostly composed of unworked material; only 12 flakes, 3 retouched tools and one core could be mentioned and they belong to the upper part of unit C.

In conclusion, the lithic assemblage of the oldest levels of El Abra 2 and El Abra 3 is not coherent and consistent. The extreme paucity of lithics coming from anthropic actions does not allow reconstructing, in a statistically significant way, the technical behaviours and it is not possible to propose any kind of interpretation.

In the assemblage unworked material prevails, the majority of which was interpreted in the previous studies as worked material, resulting from knapping activities (Correal et al., 1969). The unworked material is primarily composed of sandstone and plausibly results from the detachment from the wall of the rock shelter due to natural phenomena (mainly thermic variations). Sandstone is a very poor quality raw material and is unsuitable for knapping.

Moreover, the low extension of the investigated area must be taken into account, as well as the stratigraphic sequence and the uncertain attribution of the oldest lithic industry about which some authors complain (see above).

Our review of the lithic industry of Tibitó 1 reveals that this assemblage is mostly composed of geofacts and natural fragments and that the worked material is extremely scarce (6 flakes in unit 3A and 3 flakes in unit 3). Presumed anthropic nature of the lithic objects is due to the massive presence of deep pseudo-retouches that are really natural breakages along the edges. In fact, when we analysed the main characteristics of the presumed retouched tools (delineation, extension, angle, localisation, morphology, position and distribution) we noticed that the recovered scars are incompatible with an intentional human modification: the scars along the edges are randomly dispersed, irregular, uneven and steep; in some cases, the state of preservation of the pseudo-retouches differ from the state of preservation of the surfaces.

Moreover, these pieces, made of chert, are characterised by a strong and diffuse patina on their surfaces and an intense fluting due to post-depositional phenomena.

Even though we do not exclude the attestation of human presence in the Tibitó 1 site, our review clearly shows the necessity of reconsidering the nature of this occupation and the relative techno-economic and cultural implications, which cannot be formulated on the basis of only 9 artefacts. Considering the importance devoted to this site in the attestation of the coexistence of extinct megafauna and lithic artefacts in the Late Pleistocene, it is necessary to reconsider its significance, its stratigraphic sequence and the post-depositional processes.

Moreover, as mentioned above, we have also to consider that the presence of a single dating is not sufficient and reliable (Aceituno et al., 2013; Delgado et al., 2015).

6. Conclusions

The re-analysis of the lithic assemblages, according to the techno-typological approach referred to the lowest levels of El Abra 2, El Abra 3 and Tibitó 1, traditionally considered the oldest and most significant sites of Colombia, has highlighted several discrepancies and critical elements in reference to the analysis of the lithic industry and the effective association between cultural elements and stratigraphy. Our review reveals that the evidence of human occupation of the oldest levels of these sites is reduced to a few artefacts, from which it is not possible to infer any kind of interpretation.

The scarcity and fragmentation of data referred to the early human settlement of Colombia, together with the presence of critical elements related to several older sites, does not allow us to achieve a full and detailed comprehension of chronology, routes of dispersion and human economic strategies of the earliest human inhabitants of the Colombian territory.

Considering the crucial position of its territory, Colombia plays a key role in the comprehension of the first peopling of north-western South America; therefore it would be necessary to promote systematic and broad research projects on the pre-ceramic period in different areas, in order to analyse original information coming from reliable stratigraphic contexts and extensive excavations and to re-date the earliest archaeological sites (Delgado et al., 2015). However we have to

Fig. 9. Tibitó 1 unworked material. Tibitó 1, level 3A [1 – 10]; Tibitó 1, level 3 [11–15] (photo: G. Lembo).

mention several efforts in this sense, as evidenced by the most recent ongoing research projects (see for example Aceituno and Loaiza, 2015; Delgado et al., 2015; Dickau et al., 2015).

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