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Dating the Peopling of Northwestern South America: An AMS Date from El Inga Site, Highland Ecuador

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The El Inga site in Ecuador produced an important number of fishtail (or Fell) points. Early 1960s conventional radiocarbon assays yielded dates ranging between 9000 and 4900 ^{14}C yr BP. Even the oldest one seems too young given dates for these artifacts in South America. We recently AMS dated a curated sample from Bell's original excavation. The new results are in agreement with dates obtained from fishtail point sites in the rest of the continent.

Keywords peopling of South America, AMS dating, fishtail points, Ecuador

During the 1920s, the revolutionary discoveries at the Blackwater Draw, Folsom, and Lindenmeier sites demonstrated human exploitation of Ice Age fauna in the North American Great Plains. A few years later, during the 1930s, at the southern tip of South America, the Fell and Pali Aike caves yielded similar evidence. In these sites, the early South Americans used "fishtail" (or "Fell") points, and since then this artifact form has become an important lithic marker of human populations living during the late Pleistocene (Bird 1938, 1946). Interestingly, like North American Clovis and Folsom points, some South American fishtail points were fluted. Since the 1950s, when the method of radiocarbon dating was developed, it has been repeatedly demonstrated that the fishtail Paleoindian occupations ranged in age from about 11,000 to 10,000 ^{14}C yr BP (e.g., Flegenheimer et al. 2013; Nami 2007; Prates et al. 2013), an age similar to the early North American human populations.

After more than a decade without significant comparable finds from South America, in 1947 Dr Kaplan, a resident of Quito City (Republic of Ecuador), found obsidian artifacts and a few remains of extinct fauna at the El Inga site (00° 3′ S, 78°33′ W) in the province of Pichincha, highland Ecuador (Figure 1). Later, in the mid-1950s, Kaplan led the American geologist A. A. Graffham to the site, where they found and collected fluted lithic materials. Upon returning to the USA, Graffham showed the Ecuadorean artifacts to American archaeologist R. Bell (University of Oklahoma). Bell quickly recognized the importance of the findings (Bell 1960; Mayer-Oakes and Bell 1960a, 1960b), and for that reason, he organized an expedition to the site in 1960–1961. Bell unearthed a large number of artifacts, among them fishtail points reminiscent of those found by Bird in southern Patagonia; some of them were remarkably similar (Bell 1965; Mayer-Oakes 1963, 1966). Comparative research showed that fishtails from northwestern and southern South America shared many technical and morphological similarities (Bird 1969), an observation supported by additional investigations recently performed (e.g., Nami 2000, 2014a). Due to its large number of artifacts permitting a greater understanding of fishtail-point variation and technology, El Inga became a landmark in the history of Paleoamerican studies in both hemispheres of the New World.

At El Inga, the cross-section observed during Bell's excavations revealed a simple profile composed of two distinct deposits consisting of a dark-colored soil ~40–45 cm thick containing the archaeological remains, and an underlying bedrock formation of consolidated volcanic ash, or *cangagua*, which was archaeologically sterile (Bell 1965, 239). The archaeological assemblage showed great variation in the sample of unfinished and finished projectile points recovered

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Figure 1 Maps showing the location of the El Inga site in highland Ecuador (A–C) (the rectangle in the map of South America (A) indicates the location of Ecuador (B); the star indicates the location of El Inga near the city of Tumbaco in the Pichincha province (C)) (after Googlemaps.com).

from the dark-colored deposit, suggesting a palimpsest of lithic artifacts of different ages. The projectile points' morphological variants included Ayampitín lanceolate, triangular with narrow contracting stem, fishtail, and El Inga broad-stemmed points. The last form may be considered as part of the variability existing among fishtail assemblages (Bell 1965; Mayer-Oakes 1986; Nami 2014a).

During the early days of radiocarbon dating, from El Inga five soil samples were taken from different depths and provided ages ranging from ~9000 to 4000 ^{14}C yr BP (Bell 1965), a range consistent with the variability of exhumed lithic point forms. The oldest date, 9030 ± 144 ^{14}C yr BP (R-1070/2) (Bell 1965, 311–312), was obtained from a level with fishtail points, in excavation square S12 L2 and a depth of 20–22 inches (~50–55 cm). In retrospect, given our understanding of fishtail-point chronology elsewhere in South America, this date seems too late for a human occupation that used fishtail points.

To perform new radiocarbon analysis using up-to-date methods, in 1999 Antonio Fresco, a staff archaeologist at the Museo Nacional del Banco Central in Quito City, provided one of us (Nami) with a sample from Bell's excavations, while Nami was studying Paleo-South American artifacts from Ecuador. The sample was collected from El Inga on 31 July 1961, and came from square S13 L2, level 6, at a depth of 20–24 inches (~50–60 cm). According to Bell (1965) and Mayer Oakes (1986), this level apparently shows some consistency. It is the only one with little variety in point morphology, including fishtails (Figure 2)

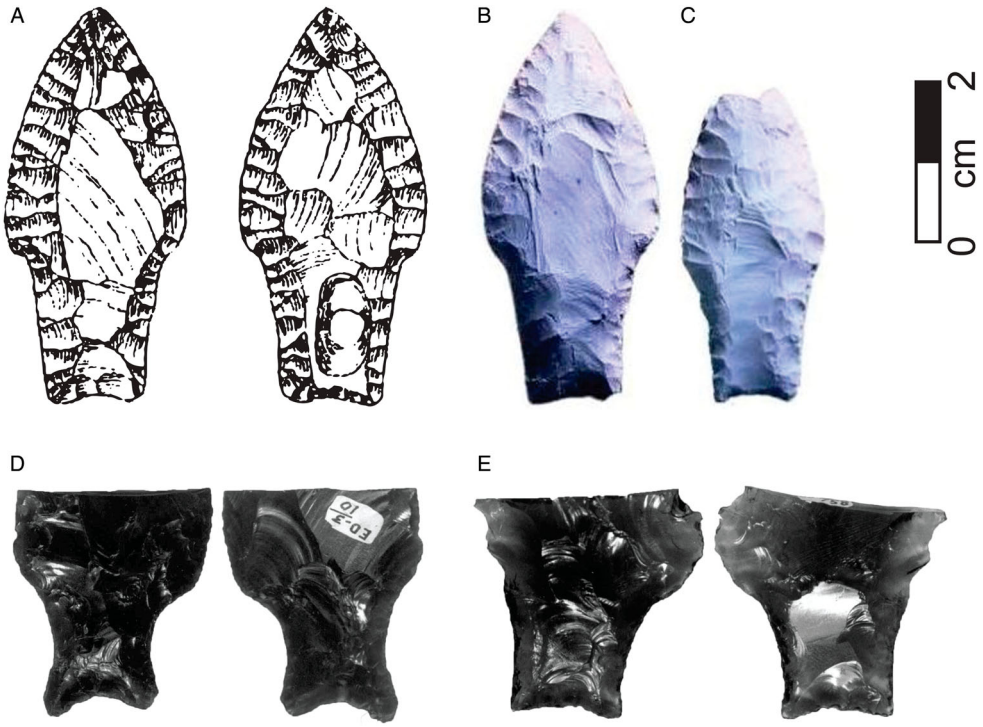

Figure 2 Fishtail points recovered at the El Inga site (slightly modified from Bell 1965; Nami 2014a, 2014b).

(Bell 1965; Mayer-Oakes 1986; Nami 2014a). Two fishtail points were, respectively, found in squares S12 L1 and S12 L2, at depths of 20–22 and $23\frac{1}{2}$ inches (~50–60 cm) (Bell 1965, figures 10a, 11c). One of these is illustrated in Figure 2A and 2B.

The analyzed sample consisted of many pieces of hardwood charcoal flecks embedded in small chunks of sediments, originating from some undetermined combustion phenomenon. We submitted the sample to L. Scott Cummings at the PaleoResearch Institute in Golden, Colorado, and it was processed there by T. Stafford. Using AMS ^{14}C methods he obtained an age of $10{,}410 \pm 35$ ^{14}C yr BP (PRI-13-029). The AMS date was calibrated using the OxCal3.10 program (Bronk Ramsey 2005; Telford et al. 2004), producing the histogram in Figure 3. The one-sigma calibrated age range is 12,390–12,220 and 12,210–12,160 cal yr BP, while the two-sigma range is 12,590–12,470

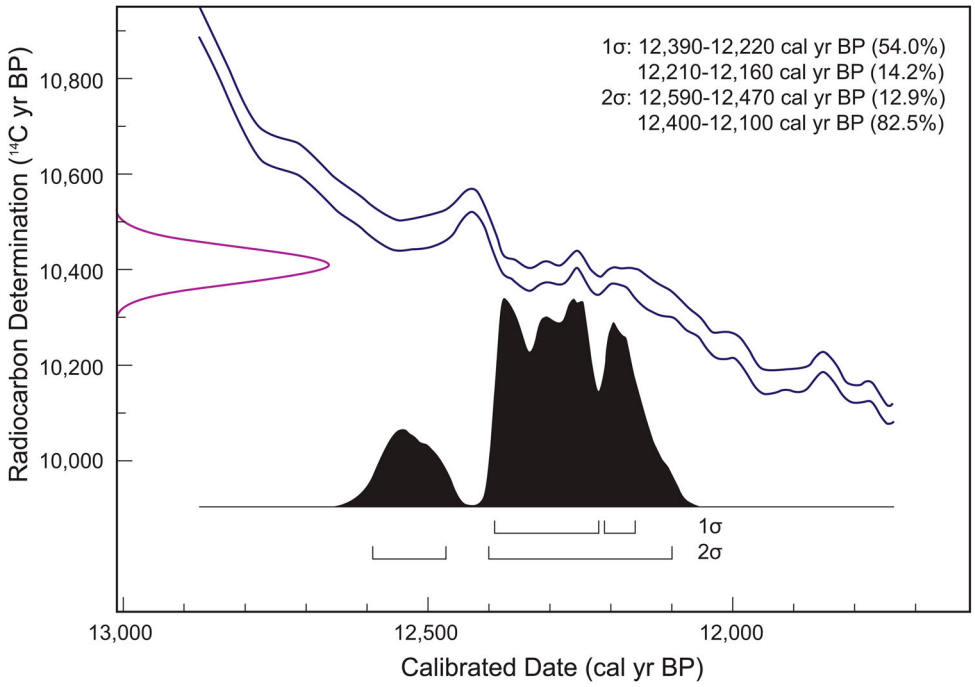

Figure 3 Plot showing the AMS date of $10{,}410 \pm 35$ ^{14}C yr BP (PRI-13-029-1) for the charcoal sample from the El Inga site, as well as the one-sigma and two-sigma calibrated age ranges (calibration performed using OxCal 3.1 (Bronk Ramsey 2005)).

and 12,400–12,100 cal yr BP. It is worth mentioning that at El Tingo, a town located 12 km from El Inga, an AMS date of 10,550 ± 55 ^{14}C yr BP (CURL-5504) was obtained on organic matter from a similar stratigraphic deposit and depth. This sample came from a dark level overlying the *cangagua* bedrock (Nami 2002), and because the apparent mean residence time of organic components is a significant factor in soil dating, it should be considered as a minimum age (see Scharpenseel 1976; Scharpenseel and Schiffmann 1977; Stein 1992). However, the date from El Tingo confirms that the stratigraphic levels containing fishtail points in the region correspond to the Pleistocene–Holocene transition (Nami 2015).

The new AMS date from a level with fishtail points at El Inga agrees with other ages obtained in nearby sites in northwestern Peru. In the Jequetepeque valley, Maggard and Dillehay (2011, appendix 1) reported four sites attributed to the "El Palto Phase," characterized by fishtail and other early points (Maggard 2015). These Paleo-South American sites yielded seven radiocarbon dates ranging between ~11,600 and 10,300 ^{14}C yr BP, although most of them ($n = 4$) were obtained from the JE-996 site and ranged between only 10,600 and 10,100 ^{14}C yr BP. Clearly, the new AMS date reported here for El Inga is compatible with other ages coming from nearby sites with fishtail points, as well as fishtail-point sites in the rest of South America. Hence, the results provide significant new data for dating an important late Pleistocene colonization event in northwestern South America, a region with very scarce archaeological evidence.

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