**Online Supplement 1: Preceramic Bifaces and Constricted Unifaces from Belize**

*Paleoindian Fluted Points*

 The Paleoindian period in Belize has traditionally been defined by the presence of fluted lanceolate (or Clovis-style) and fishtail (or Fell’s Cave-style) bifaces, of which four are fishtail points and three are lanceolate points (Hester et al. 1981; Lohse et al. 2006; MacNeish et al. 1980; MacNeish and Nelken-Terner 1983; Pearson and Bostrom 1998; Valdez and Aylesworth 2005; Weintraub 1994). No radiocarbon dates are associated with these fluted points from Belize.

Fishtail Points

Based on the examples recovered along the New River Lagoon (Pearson and Bostrom 1998), from around Orange Walk Town (MacNeish and Nelken-Terner 1983), and at Lowe Ranch (MacNeish et al. 1980), fishtail points possess generally rounded tips, descending into unbarbed broad shoulders. The fourth example found along the Rio Grande near Big Falls in southern Belize has been heavily reworked/resharpened, resulting in the removal of the original tip and shoulders (Weintraub 1994). All four points possess narrow stems with concave bases and slightly outcurving ‘ears’. The bases are thinned by one flute or channel on each face of the stem (Lohse 2006: 215). The dimensions for the four fishtail points are provided in Table 1.

Lanceolate Points

Of the three known lanceolate points, the one from Ladyville (Hester et al. 1981) provides a model for the basic size and morphology of fluted, lanceolate points from Belize. The basal fragment found near Ladyville (MacNeish and Nelken-Terner 1983) and the substantially reduced/resharpened example recovered around August Pine Ridge in Central Belize (Valdez and Aylesworth 2005) provide additional information about the proximal ends of this biface type. The lanceolate points from Belize possess slightly convex edges beginning about a third of the way from the base. The points have a mildly narrowing waist and weak outward flaring at the base (Hester et al. 1981: 2; Kelly 1993: 210; Lohse et al. 2006: 216). As noted by Hester et al. (1981: 2), this narrowing is associated with quite heavy lateral edge grinding on the nearly complete Ladyville point. The bases of all three points are concave and they are thinned by flutes or channel flakes. The biface from Ladyville recovered by Hester et al. (1981: 2) and the one from August Pine Ridge are both fluted, once on one face and twice on the other (Lohse et al. 2006: 216). The small outflaring ‘ears’ at the base and the slight narrowing of the waist on the August Pine Ridge point are similar to the traits on the fishtail points, which suggests that it may be an example of a point that combines morphological traits of both the lanceolate and fishtail types (see Lohse et al. 2006: 216). The dimensions for the three lanceolate points are provided in Table 1.

Table 1. Length, Maximum Width, Width at the Shoulder, Width at the Base, Thickness, and the Maximum Width to Thickness Ratio for the Seven Fluted Paleoindian Points from Belize based on Data from Lohse et al. (2006: 215, Table 1).

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Length [mm] | Max. width [mm] | Width at shoulder [mm] | Width at waista [mm] | Width at base [mm] | Thickness [mm] | Max. width: thickness ratio |
| New River Lagoon fishtail | 69.6 | 52.6 | 44.5 | 26.9 | 21.6 | 7.9 | 6.6:1 |
| Big Falls fishtail | 43.0 | 28.8 | 28.8 | 25.6 | 21.4 | 6.2 | 4.6:1 |
| Orange Walk fishtail | 70.4 | 46.7 | 37.1 | 23.0 | 20.5 | - | - |
| Lowe Ranch fishtail | 69.6 | 46.5 | 40.4 | 25.7 | 19.3 | - | - |
| BAAR 191/Ladyville lanceolate | - | - | - | - | 29.6 | - | - |
| Ladyville lanceolate | 91.6 (incomplete) | 35.9 | 35.9 | 33.5 | 27.7 | 8.3 | 4.3:1 |
| August Pine ridge lanceolate | 51.6 | 26.1 | 26.1 | 19.6 | 20.4 | 6.0 | 4.4:1 |

aimmediately below shoulder.

*Stemmed Points*

In Belize, there are currently 63 known Lowe points and 23 known Sawmill points, as well as two provisional stemmed and barbed point types, specifically Allspice (N = 4) and Ya’axche’ (N = 2) (Kelly 1993; Prufer et al. 2019; 2021; Solmo 2017; Stemp et al. 2016, 2018; Valdez et al. 2021). Relying on point types that, in almost all cases, do not have reliable stratigraphic contexts of recovery and lack associated radiocarbon dates is potentially problematic (see Flenniken and Raymond 1986: 611-612). However, Lowe and Sawmill points are considered true types for Belize (see Kelly 1993: 210 for Krieger’s (1944) “sufficient character” criteria) and both the Allspice and Ya’axche’ points are classified as provisional until more examples are recovered.

Lowe Points

This point type is a large biface that possesses broad shoulders with large, sharply defined barbs. Lowe points usually have wide square or slightly expanding stems with flat to concave bases. Stem bases are typically basally thinned using a variety of techniques, some of which resemble fluting (Kelly 1993: 211, Table 1). Stems are usually ground on the edges from one barb tip around the perimeter of the stem and then to the other barb tip. The blade portions of Lowe points typically possess sub-parallel oblique pressure flaking and their edges are often heavily retouched with alternate-opposite beveling. This beveling is most common on the left side, but it has been observed on the right side in some cases (Kelly 1993: 210; Lohse et al. 2006:217; Stemp et al. 2016: 281). Metrics for the Lowe points are presented in Table 2. The barb angles on most Lowe points are between 45o–65o (Kelly 1993:210; Stemp and Awe 2013:20, table 1; Stemp et al. 2016: 281). Metric and use-wear data, as well as design features, have been used to suggest that Lowe points were used as thrusting spears or harpoons and, in some cases, cutting tools (Kelly; 1993; Stemp et al. 2016).

The Esperanza phase points from Honduras share some similarities with Lowe and Ya’axche’ points from Belize; however, the examples from El Gigante are not resharpened using alternate beveling like the Lowe and Ya’axche’ points, and there is some variation in basal thinning of the stems, specifically the presence of fluting (Iceland and Hirth 2021; Kelly 1993; Scheffler 2008; Scheffler et al. 2012; Stemp and Awe 2013; Stemp et al. 2016).

Sawmill Points

On average, Sawmill points are comparatively shorter and narrower than Lowe points. They possess well-defined barbs with deep corner notching. The stems of these points are narrow and typically expand from the neck to the base. Some stems demonstrate ‘false fluting’ of the base, typically on one side. The blades of Sawmill points possess fine parallel-oblique pressure flaking. Like Lowe points, Sawmill point alternate edges are resharpened using a steep beveling technique primarily on the left-hand side (Lohse et al. 2006: 217; Stemp et al. 2016: 284). Metrics for the Sawmill points are presented in Table 2. The barb angles for Sawmill points are narrower than those on Lowe points, ranging between 30o–45o (Kelly 1993:216; Stemp and Awe 2013:20–21, table 1). Based on the metrics, design features, and limited use-wear evidence on these bifaces, they were most likely hafted onto spear-thrower darts and may have also served as cutting tools (Kelly 1993; Stemp et al. 2016).

Provisional Allspice Points

 Allspice points are considered a provisional type because only four examples are known from Belize (Kelly 1993; Stemp et al. 2016). Allspice points are long and generally narrow bifaces with short barbs and long expanding stems with variable degrees of basal thinning (Kelly 1993: 216; Stemp et al. 2016: 286). The stem bases are either flat or concave and the stem edges are ground. Like Lowe and Sawmill points, Allspice points possess alternate-opposite edge beveling on the left side of the blade portion. Metrics for the provisional Allspice points are presented in Table 2. Because the small barbs are damaged on most examples, barb angles cannot be reliably determined. The function of Allspice points is not known; however, based on metrics, they were neither arrow nor dart points. They likely served as thrusting spears. It has been suggested that Allspice points are just reworked Lowe points and should not be considered a separate type (Kelly 1993: 216; see Flenniken and Raymond 1986).

Provisional Ya’axche’ Points

Provisional Ya’axche’ points are relatively wide points with short, wide, and expanding ‘eared’ stems. The stems possess a basal concavity and are thinned on both faces, but not fluted with a single flake scar or channel. The shapes of the blades on the two examples form southern Belize differ due to the alternate-opposite edge beveling on one of them and minor edge resharpening on one edge of the other. Metrics for the Sawmill points are presented in Table 2. The barb angles of the points measure 45 o–55o. This stem style is somewhat similar to those on points from El Gigante, Honduras (see above). At present, the functions of Ya’axche’ points are not known.

Table 2. Length (L), Width (W), Thickness (T), and Neck (or Haft) Width (NW) for Lowe, Sawmill, Allspice, and Ya’axche’ Points from Belize based on Data from Stemp et al. (2016, 2018).

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Mean L [mm] – (N) | Range L [mm]  | SDa  | Mean W [mm] – (N) | Range W [mm]  | SDa  | Mean T [mm] – (N) | Range T [mm] | SDa | Mean NW [mm] – (N) | Range NW [mm]  | SDa  |
| Lowe Points | 83.5 (35) | 59.3-139 | 18.1 | 55.6 (36) | 43.6-78.0 | 6.9 | 9.8 (23) | 6.0-12.1 | 1.3 | 29.0 (45) | 21.2-39.4 | 3.8 |
| Sawmill Points | 67.9 (15) | 49.4-91 | 13.1 | 39.4 (16) | 33-59.7 | 7.1 | 7.8 (7) | 5.3-10.4 | 1.8 | 14.9 (18) | 9-25 | 4.9 |
| Allspice Points | 85.7 (4) | 63-107 | 24.5 | 37.8 (4) | 33-44 | 6.8 | 10.7 (1) | 10.7 | \_ | 33.2 (4) | 32-36.8 | 4.1 |
| Ya’axche’ Points | 65.7 (2) | 62.9-68.5 | 4.0 | 52.8 (2) | 47.8-57.8 | 7.1 | 10.9 (1) | 10.9 | \_ | 29.9 (2) | 26.1-33.6 | 5.3 |

aStandard Deviations (SD) were calculated for the dimensions. Some metric data from significantly damaged bifaces are not included in the numbers (N) used for calculations in some categories.

*Constricted Unifaces*

There are over 130 examples of constricted unifaces/adzes currently known in Belize (Gibson 1991; Iceland 1997; Murata 2011; Pohl et al. 1996; Rosenswig 2015; Rosenswig and Masson 2001; Rosenswig et al. 2014; Stemp and Awe 2013). Constricted unifaces come in a variety of sizes and shapes, which show a wide range of variation. The majority have been recovered from Northern Belize and were associated with the Late Preceramic phase of the Late Archaic period using the traditional chronological typology (Gibson 1991; Hester et al. 1996; Iceland 1997; Pohl et al. 1996; Rosenswig et al. 2014). The constricted uniface is described as a unifacially flaked tool produced on a primary, secondary, or tertiary macroflake or macroblade blank using hard-hammer percussion. Constricted unifaces from Belize possess broad, convex bit ends (mean of 6.4 cm) with a steeply flaked constriction on either side of the opposite end. However, differences in form include some that are “pear-shaped” with no mid-section constriction or a wider medial section than proximal end, some that are bilaterally asymmetrical, and some that have upturned or downturned, rather than flat, ventral surfaces on the bit ends (see Hudler and Lohse 1994: 4; Iceland 1997: 219; also see Rosenswig 2015; Rosenswig et al. 2014). The bulb of percussion on the tool blanks can be on the proximal or distal end or on one of the lateral edges.

The constricted unifaces from Belize range in length from 6.9 – 20.2 cm with a mean length of 11.7 cm. The convex bit end has a spine plane angle that ranges from 30o – 79o, with a mean of 54o (Iceland 1997: 300, Appendix B). Variation in size and bit end angle may be due to degree of resharpening of finished versions or the fact that they are discarded preforms. Based on use-wear data and experimentation, constricted unifaces were likely hafted like an adze or hoe and contacted hard materials, in most cases wood, as well as sediment or soil (Gibson 1991; Hudler and Lohse 1994; Stemp and Harrison-Buck 2019). Two possible constricted uniface production locations have bene identified in northern Belize at Colha and the Kelly site in the Northern Belize Chert-bearing Zone [NBCZ] (Hester et al. 1996; Iceland 1997). Lohse (2007, 2010, 2020; Lohse et al. 2006) also recovered a constricted biface from Archaic deposits in the Actun Halal rockshelter in western Belize.

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