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ARTICLE

Small-Scale Migrations among Early Farmers in the Sonoran Desert

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Abstract
Migration played a significant role in shaping the Native populations of the southwest United States and northwest Mexico. Large-scale migrations into and across the region were underlain by small-scale (intraregional) population shifts affected by environmental fluctuations (declines and improvements) and social phenomena such as aggregation and the spread of sociopolitical spheres of influence within the region. We compare projectile point types, mortuary patterns, and biodistance information from Early Agricultural period (2100 BC–AD 50) sites to identify subtle differences in population composition associated with the arrival and spread of maize across the region. Small-scale migrations occurring around the foundation of farming communities in the Sonoran Desert may have established the basis of broad regional connectivity, shared historical ties, and subsequent migration patterns and practices. Rooted in early farming traditions and a shared language family, we argue that farmers expanded north and east from the borderlands, then eventually returned to ancestral homelands when environmental and incursive pressures pushed them back south.

Resumen
La migración jugo un papel significativo en la formación de poblaciones nativos de la región del suroeste de Estados Unidos y noroeste de México. Las migraciones a gran escala hacia y a través de la región se debieron a desplazamientos demográficos en pequeña escala (intrarregionales) afectados por las fluctuaciones ambientales (disminuciones y mejoras) y fenómenos sociales como la agregación y la expansión de esferas de influencia sociopolítica dentro de la región. Comparamos los tipos de puntas de proyectil, los patrones mortuorios y los datos de biodistancia de los sitios del período de Agricultora Temprana (2100 aC-50 dC) para identificar diferencias sutiles en la composición poblacional asociadas con la llegada y propagación del maíz en toda la región. Las migraciones a pequeña escala que ocurrieron alrededor de la fundación de las comunidades agrícolas en el desierto de Sonora pueden haber formado la base de una amplia conectividad regional, lazos históricos compartidos y patrones y prácticas migratorias posteriores. Basados en las primeras tradiciones agrícolas y en una familia lingüística compartida, argumentamos que los agricultores se expandieron hacia el norte y el este desde las tierras fronterizas, y luego regresaron a sus tierras ancestrales cuando las presiones ambientales e externas los empujaron hacia el sur.

Keywords: migration; Early Agricultural period; Basketmaker

Palabras clave: migración; período de Agricultora Temprana; Cestero

Migration played a significant role in shaping the Native populations of the southwest United States and northwest Mexico (SW/NW). Large-scale migrations into and across the region were underlain by small-scale (intraregional) population shifts affected by environmental fluctuations and social

phenomena such as aggregation and the spread of sociopolitical spheres of influence within the region (Hill et al. 2004; Ingram and Patrick 2021; Mills et al. 2013). These multiscalar demographic shifts resulted in a palimpsest of cultural and biological community composition across the region and over time, eventually contributing to the historic and modern makeup of indigenous communities.

Some evidence suggests that small groups of early farmers (groups partially reliant on Mesoamerican cultigens) migrated into the SW/NW. Haury (1962) proposed that the Mesoamerican crop complex (corn, beans, squash) likely entered the region about 4,500 years ago, which some researchers interpreted as evidence for colonization of the region by migrant farmers (e.g., Berry and Berry 1986; Huckell 1995). Others argued that cultigens spread across a broad cultural continuum from Mesoamerica into the SW/NW and were adopted into seasonal foraging cycles (e.g., Hard 1986; Wills 1988). The arrival of these cultigens varies significantly over time, however, with direct radiocarbon dates on maize (*Zea mays*) in the Tucson Basin by at least 2100 BC (Whittlesey 2015)—although dates on maize pollen may indicate its arrival as early as 3700 BC (Vint 2015). In contrast, evidence for the cultivation of beans (*Phaseolus vulgaris*) is not present in the Tucson Basin until after 400 BC (Huckell 1998).

Molecular evidence suggests a more complicated picture regarding population movements. Smith and colleagues (2000) identify the presence of a rare albumin gene variant (AL*Mexico) in modern Native populations of Mesoamerica and the SW/NW, and they propose that its distribution was the result of northward movement from Mesoamerica before 1000 BC. Malhi and colleagues (2002) identify the widespread founding lineage of mtDNA haplogroup B in modern Native groups in the SW/NW, which they suggest is tied to the spread of agriculture throughout the region instead of an influx of Mesoamerican farmers. In contrast, Kemp and colleagues (2010) identify differences in Y-chromosome and mtDNA diversity that were consistent with differing male and female population histories. Their results demonstrate that Y-chromosome variation between the SW/NW and Mesoamerica correlates significantly with linguistic distances, whereas mtDNA diversity correlates significantly with geographic distance. Although they cannot conclude that migration directly contributed to the introduction of cultigens and farming from Mesoamerica into the SW/NW, they acknowledge that if migration occurred during this period, "it was predominantly comprised of males and likely not as a result of a demographic expansion" (Kemp et al. 2010:6763).

Irrespective of specific early migration scenarios, maize was introduced into the SW/NW perhaps as early as 3000 BC (Vint 2018:76) and integrated into local seasonal foraging adaptations, and it took advantage of appropriate niches along the rivers and streams of the Sonoran Desert (Vint and Mills 2017). This was followed by a prolonged period of cultivating maize along river corridors but with apparently minimal investment until the adoption of canal irrigation by 1500 BC (Doolittle and Mabry 2006; Mabry 2002; Vint 2018). A shift to increased investment in irrigation after 1200 BC signaled a move toward more cultivation and decreased community mobility. This period of transition to—and investment in—the cultivation of maize, specifically, in the Sonoran Desert is referred to as the Early Agricultural period (EAP), and it dates between 2100 BC and AD 50 (Figure 1).

Data from the archaeological record has been used by various researchers to support models of both the migration of maize farmers from Mesoamerica and the diffusion of maize across a cultural continuum from central Mexico to the SW/NW. Arguments for the diffusion of maize into the region are supported by continuity in site locations and areas of resource exploitation from before its arrival through the EAP. In addition, researchers are continually pushing back the arrival of cultigens with earlier direct AMS dates on maize from sites in various locations in southern Arizona and northern Sonora (e.g., Vint 2018). Models of the migration of farmers from Mesoamerica propose that the archaeological record demonstrates a rapid change from previous foraging practices to one largely reliant on maize (Carpenter et al. 2002, 2005; Huckell 1990, 1995; Mabry 1998). The appearance of (ca. 1500 BC) and eventual investment (ca. 1200 BC) in extensive irrigation systems could be argued to reflect this transition—although maize apparently arrived in the region more than a millennium prior. Minimally, the archaeological record demonstrates that sometime before 2000 BC, people began exploiting maize on the floodplains of the Sonoran Desert. These early populations represent groups that provided the foundation of biological variation for subsequent

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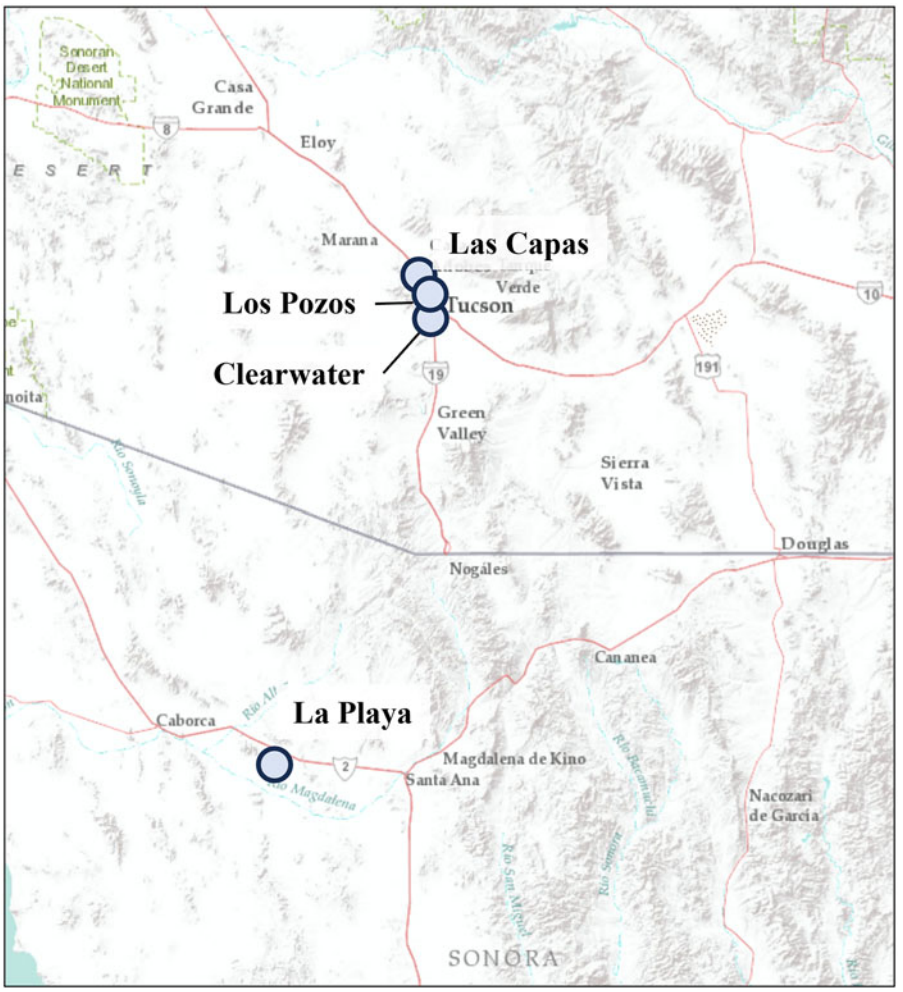

Figure 1. Map displaying the location of Early Agricultural period sites considered in this study.

Formative cultures in the area. Ultimately, evidence from the archaeological record both supports and refutes migration hypotheses.

In this article, we compare data drawn from distinct spheres of EAP technological and cultural practice—projectile point design, mortuary practices, and bioarchaeology—to identify subtle differences in population composition related to small-scale migration within the Sonoran Desert that are associated with the arrival and spread of maize across the region. These comparisons are subsequently applied to the question of Western Basketmaker II origins on the Colorado Plateau to provide insights into subsequent migrations and the establishment of long-term social and biological connections across the SW/NW.

Early Agricultural Period

The Early Agricultural period is divided into four archaeological phases based on changes in the material culture that reflect trends in site composition, artifact assemblages, and increasing population sizes: Silverbell interval (2100–1200 BC), San Pedro phase (1200–800 BC), and Early (800–400 BC) and Late Cienega (400 BC–AD 50) phases. The Silverbell interval (Whittlesey 2015) represents an extension of Middle Archaic (3700–2100 BC) adaptations to foraging and the exploitation of seasonal resources, but it is largely defined by the arrival and incorporation of maize into existing foraging strategies (Mabry 2008; Roth and Freeman 2008). Small, impermanent, jacal habitation structures and storage

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pits dating to this phase have been identified at a few sites along the Santa Cruz River in the Tucson Basin (Diehl 2005; Whittlesey 2015). Botanical remains recovered from several of these EAP sites indicate that maize had become one of seven important types of plants consumed; the others included saguaro cactus fruit, wild grass seeds, mesquite pods, false purslane, goosefoot, and amaranth (Diehl 2005).

San Pedro phase sites are found in river floodplains, along benches, on piedmonts, and in the uplands (Diehl 2005; Huckell et al. 1995; Roth 1996). They are generally characterized by the presence of small, shallow depressions that are the remnants of pit structure habitations, large extramural storage pits, ubiquitous ground stone, expedient lithic technology, San Pedro dart points, and the presence of maize (Gregory et al. 2007; Huckell 1995; Huckell et al. 1995; Roth and Wellman 2001). In addition, low-fired clay figurines and sherds from small ceramic vessels have been recovered from San Pedro contexts (Heidke 2015; Heidke and Ferg 1997). The earliest irrigation canals dug into the floodplain of the Santa Cruz River date to approximately 1500 BC (Mabry 2006). The widespread use of irrigation systems at the largest and most intensively inhabited sites during this period demonstrates that San Pedro groups were using technologies designed to intensify plant productivity.

The Cienega phase represents a greater variety and increased complexity of cultural characteristics from those defined for the San Pedro phase. Due to significant diversity across Cienega phase sites, the phase was split into Early (800–400 BC) and Late (400 BC–AD 50) components (Gregory 2001). These phases are characterized by villages with more formal structure/layouts, increased technological complexity, the establishment of both local and long-distance commerce networks, deeper and larger pit structures, and the Cienega point type (Gruner 2023; Mabry et al. 1997; Shackley 2024). The small, light Cienega point likely represents experimentation with projectile point technology, which may include the introduction of the bow and arrow (Ochoa D'Aynés 2004; Sliva 2006). The Cienega phase also saw an elaboration of ground stone manufacture, the development of a shell ornament production industry, and an "Incipient Plainware" ceramic tradition (Heidke 1999). In addition to the dozens of sites with Cienega phase components identified in southern Arizona, Cienega phase sites were also documented in the Tonto Basin and Safford area (Clark, ed. 2004; Huckell and Vint 2000).

Huckell (1995) asserts that sometime between 1500 and 1000 BC, a mixed subsistence system based equally on maize agriculture and wild plant collection appeared in southern Arizona. Huckell argues that by the Cienega phase, subsistence was primarily based on maize agriculture, with surplus stored during different times of the year; evidence for this lies in the vast quantities of storage pits. Other researchers (Doelle and Fish 1988; Mabry 1998) cite the characteristics related to sedentism—the ubiquity of maize and the presence of large middens, cemeteries, and irrigation canals—to suggest that the Cienega phase represents groups fully reliant on agriculture. Archaeobotanical remains additionally indicate multiseasonal residence as early as the San Pedro phase (Huckell et al. 1995). Diehl and Waters (2006) suggest that subsistence strategies remained stable and focused on a mixed economy throughout the EAP because pit storage technology was inadequate and made primary reliance on maize cultivation extremely risky. Schurr and Gregory (2002) identified a dramatic rise in all plant resources in storage features during 200 years of the Late Cienega phase at the site of Los Pozos, including maize, seeds, grasses, cacti, and mesquite. Gruner (2023) recently argued that these settlements were still seasonally occupied as late as the Early Cienega phase but that they demonstrate internal structures, such as house groups with associated cemeteries, that reflect the rise of land tenure associated with descent groups.

Lesure and colleagues (2021) identify the SW/NW as undergoing an "agricultural demographic transition" (ADT) associated with increased investment in maize farming that spurred sweeping social, economic, and political changes. They also divide the ADT into periods of low and high "productivity": the period from 1200 BC to AD 400 had limited demographic consequences due to the cultivation of small and somewhat unproductive maize. This period of low productivitiy was followed by significant population growth and expansion across the region circa AD 500–1300 and is associated with more productive maize varieties and improving agricultural technologies. The EAP is firmly placed in the initial low productivity period of the ADT but maintains a protracted evolution of increasing cultural and technological complexity.

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EAP Projectile Point Design

Early Agricultural period projectile points are categorized based on point type, which refers to points that exhibit a specific set of morphological attributes within a defined temporal and geographic range. Consequently, projectile points belonging to the same type are said to be the result of a shared mental template that illustrates a commonality in thought, a standard set of techniques, and a commonly held understanding of technology and technological expression (Sliva 2015). Each template reflects a combination of the unconscious motor habits of manufacture and conscious design decisions in the service of both social signaling and the intended performance of the finished point. The templates were therefore developed within specific sociocultural contexts and were passed among people both within and across generations, creating distinctive design and use attributes that can be identified even if people produced or used the points away from their natal areas (Adams 2014:11; Bernardini 2011; Burmeister 2000; Clark 2004; Dobres and Hoffman 1999:1–19; Schiffer 2011; Schiffer and Skibo 1987:595).

Types used in the SW/NW to categorize EAP projectile points include Cortaro, Empire, San Pedro, and Cienega. Cortaro points are unnotched and unserrated triangular points with excurvate edges and concave bases, and they are primarily associated with the Silverbell Interval and the early San Pedro phase (Sliva 2015). The other three types encompass significant variation and multiple subtypes, which creates the challenge of determining when morphological differences result from individual knapper idiosyncrasies, reflect deviations from an original design due to repair or resharpening, or represent intentional, culturally held variants. San Pedro points and Empire points (Figure 2) contain variants defined by mutually exclusive attribute suites with specific geographic and temporal associations and are of specific interest to this article.

San Pedro points appeared in the SW/NW during the earlier part of the San Pedro phase (ca. 1200–1000 BC), becoming the dominant style by the later part of the San Pedro phase (ca. 1000–800 BC). People continued to use San Pedro points through the Early Ceramic period (AD 50–500), although their abundance decreased relative to Cienega points beginning in the Early Cienega phase (800–400 BC). The San Pedro projectile point type is characterized as having a broad blade with generally excurvate edges, well-defined shoulders or downward barbs, horizontally oriented notches in a C-shape or a half-heart shape, a wide neck, and an expanding stem with a generally flat base. Two variants (Norte and Centro) distinguished by notch shape are recognized for the San Pedro phase in the Tucson Basin (see Supplemental Text 1), although it should be noted that these are small subsets of the overall known San Pedro template and co-occur with generic San Pedro points that do not possess the variants' distinctive attribute suites (Sliva 2015).

Empire points were first recognized on multiple sites surveyed on the Empire Ranch in the Cienega Valley southeast of Tucson, and the general Empire template describes a relatively narrow point with a

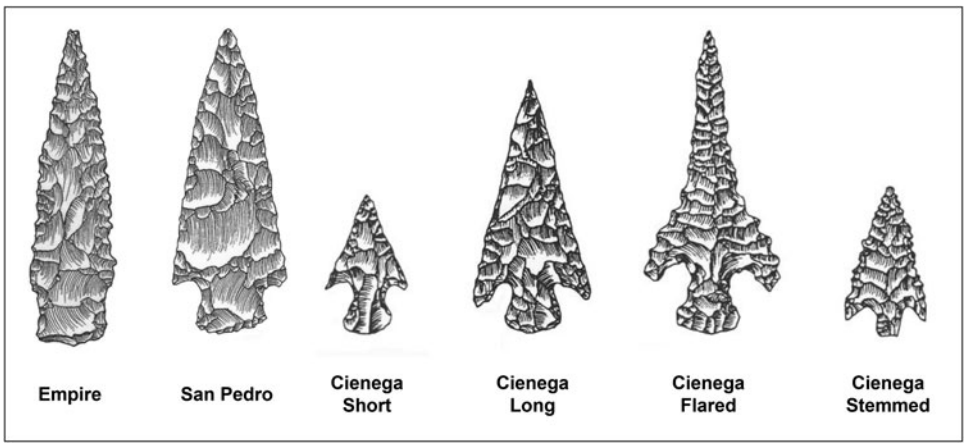

Figure 2. Early Agricultural period projectile point types (from Sliva 2009).

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long, thick, finely serrated blade (Stevens and Sliva 2002). Empire encompasses a stylistic continuum with one end having leaf-shaped points with tapered tips and little to no separation of the blade and haft elements, and the other end having points with straight to excurvate triangular blades and well-defined stems. Within this continuum, numerous variants have been defined that may have geographic associations (see Supplemental Text 1). The dating of Empire points indicates they are early San Pedro phase designs, although they occasionally are found in later EAP assemblages, likely representing scavenging and reuse (Sliva 2015).

Prior to extensive work at the site of Las Capas in the Tucson Basin, Empire points were rarely observed on EAP sites in southern Arizona and were usually considered San Pedro variants (e.g., Huckell 1984). However, comparing morphological and metric attributes of both Empire and San Pedro point types reveals that the Empire point type is distinct. Empire points are relatively narrow and have straight or tapering stems, whereas San Pedro points have wide blades with side or corner notches forming expanding stems (Stevens and Sliva 2002). The uniformity in the basal-width to blade-width ratios and the basal-width to neck-width ratios within Empire subtypes makes type identification straightforward in most cases. Conversely, broad variation among San Pedro points often defies subtype identifications for individual specimens (Sliva 2015). The distinct style differences between San Pedro and Empire points likely represent expressions of cultural identity (Stevens and Sliva 2002).

Another key difference between the point types is the locations and times in which they are most abundant and ubiquitous. Of the 113 Empire points recorded in Tucson Basin excavations and surveys, 77 were recovered from early San Pedro phase contexts at the Las Capas site (see Supplemental Text 1: Tables 1 and 2a). Although the late 1990s surveys in the Cienega Valley encountered 15 Empires, this sample was scattered across several sites that have not been excavated, with only small numbers of points present on any given site. Other than Las Capas, the only currently known site in the SW/NW where Empire points are as abundant is La Playa, although full coverage survey is minimal in Sonora, and excavations of earlier San Pedro phase components at a scale similar to Las Capas has not occurred. The highest concentration in the Tucson Basin outside of Las Capas is the Roland Site ($n = 11$), a multicomponent EAP settlement across the Santa Cruz River from Las Capas that has not been excavated (Sliva 2015). Despite this, it is notable that the other San Pedro phase components that have been excavated in southern Arizona reliably have contained San Pedro points but not Empire points (Supplemental Text 1:Table 2b). Evidence from Las Capas indicates that the early San Pedro phase inhabitants used a projectile point template different from that of the people living in other settlements in the Tucson Basin. Although the early San Pedro phase Las Capas assemblage was dominated by Empire points, with only 15 San Pedro points (including one Norte subtype) scattered through the assemblage, the contemporaneous nearby sites only produced San Pedro points ($n = 8$, one of which is the Norte subtype), with no Empire points. Following a major scouring event at Las Capas around 1000 BC, the pattern reversed. The late San Pedro phase assemblage at the site contained 86 San Pedro points, with only 11 Empire points (see Supplemental Text 1:Table 1).

Empire and San Pedro points in the Tucson Basin were manufactured from the same range of locally available raw materials, and neither delivered substantial advantages over the other for hunting. This raises the question of what caused the sharp division in spatial distributions of the two types during the early San Pedro phase in the Tucson Basin, and what led to the change from one to the other during the late San Pedro phase at Las Capas. Two possible conclusions may be derived from the data. First, the San Pedro point type is endemic to the Tucson Basin (i.e., local), whereas the Empire type—endemic to northern Sonora—was brought in by migrant populations (i.e., nonlocal). Second, the Empire-using early San Pedro phase occupants at Las Capas maintained a distinct and separate social identity; however, following the hiatus, the late San Pedro phase occupants of the site became integrated into the social and technological system seen elsewhere in the Tucson Basin (Sliva 2015).

The lines of evidence used to support these conclusions focus on the distribution of projectile point types at the surrounding sites. During the early San Pedro phase, sites near Las Capas were producing San Pedro Norte but not Empire points, whereas the assemblage at Las Capas contained numerous Empire points and few San Pedro points. More than 40% of the Empires at early San Pedro phase

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Las Capas are the La Playa and Magdalena subtypes, which are nearly absent elsewhere in the Tucson Basin and the Cienega Valley but are ubiquitous at La Playa (Sliva 2015). Note, however, that the surveyed Cienega Valley sites have not been excavated.

The presence and absence of certain point types are not the result of settlements being isolated from one another. Evidence of Las Capas knappers experimenting with San Pedro design elements (adding San Pedro–style notches onto Empire points but with the Empire unifacial notching technique) suggests that contact between the two groups occurred. However, the early San Pedro phase occupants of Las Capas neither abandoned Empire points nor produced canon San Pedro points, suggesting that they did not assimilate into the larger Tucson Basin social system that utilized only San Pedro point types. The inverse of this relationship—San Pedro points with Empire attributes—is absent (Sliva 2015). This absence illustrates that San Pedro–producing knappers living on nearby sites did not adopt Empire designs, perhaps considering them functionally inferior or stylistically undesirable within the context of their own social identity.

Vint (2015, 2018) and Nials (2015) identify that flood events likely scoured the deposits comprising a 70-year interval between the early and late San Pedro phase components at Las Capas. Projectile-point data following this unconformity indicate that the late San Pedro phase residents of Las Capas produced point assemblages that were primarily composed of San Pedro points ($n = 83$, from all occupational components) and contained few or no Empire points ($n = 11$, from all), mirroring patterns from contemporaneous Tucson Basin sites. This new settlement is inferred to be established by either the direct descendants of earlier migrants who eventually integrated into the Tucson Basin social and technological system or descendants of local populations who were unrelated to initial occupants at Las Capas and who took advantage of the site's abandonment (Sliva 2015).

The limited temporal (early San Pedro phase) and spatial (Las Capas) distribution of Empire points in the Tucson Basin suggests that people from northern Sonora migrated into the Tucson Basin and retained a distinct technological tradition that reflected their own social and cultural identity. The retention of the tradition, reflected in the continued manufacture of Empire points, also suggests that this population maintained social relationships with groups in northern Sonora. The disappearance of Empire points and the dominance of San Pedro points during the late San Pedro phase at Las Capas and across the Tucson Basin appears to express a shared social and cultural identity with the local population. Therefore, the initial population at Las Capas was composed of migrant individuals practicing the Empire technological tradition. Several generations later, their descendants either adopted the local San Pedro technological tradition or were replaced by a local population. Because projectile technology is traditionally associated with males in the SW/NW (Crown and Fish 1996), the arrival of Empire points in the Tucson Basin may signal early San Pedro phase male-focused migration, possibly for exogamy (Sliva 2015).

EAP Mortuary Customs

Mortuary customs reflect the rites and manipulations of material culture, social relations, cultural ideals, and the human body surrounding the death of an individual (Rakita and Buikstra 2005). The traditional Saxe-Binford approach to interpreting mortuary customs from the archaeological record proposes a direct relationship between the social status of the dead and the relative number of treatments, funerary objects, or amount of energy expended on postmortem activities (Brown 1995). As a direct response to this narrow processual perspective, archaeologists began to view mortuary customs as a way the living negotiate, display, mask, or transform power or social relations within communities. This perspective recognizes the agency of the living in manipulating the deceased (Rakita and Buikstra 2005). More recently, researchers have proposed a postmortem agency for the deceased themselves, actively playing a role as passive participants in how mortuary behaviors are expressed during the act of burial (Crandall and Martin 2014). This perspective reconnects the postprocessual approaches to the Saxe-Binford approach in the sense that a person's social identity is displayed in death, via the amount and type of accompanying funerary objects, reflecting the postmortem agency embodied within the corpse.

There is no consensus among bioarchaeologists as to which approach is best suited for mortuary analysis. For this article, the interpretation of how individuals are buried—and the behaviors expressed

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Table 1. Distribution of EAP Mortuary Features Used in This Study.

Site	*n*	%
Clearwater	40	38.5
La Playa	38	36.5
Las Capas	23	22.1
Los Pozos	3	2.9

in those burials—draw from all approaches. Researchers also largely assume that the objects with which the deceased are placed carry meaning both in life and in the afterlife for the individual and the society to which they belong. The variation in what accompanies an individual, then, should reflect aspects of their social and cultural identities (Rakita and Buikstra 2005; Rakita et al. 2020). Similarities among mortuary features are estimated to reflect individuals adhering to a shared group identity. We consider these assumptions while acknowledging that both the deceased and the living have a say in the activities that accompany the act of dying.

The EAP mortuary features considered here are derived from four sites located in the Sonoran Desert (Table 1; Supplemental Table 1). The Las Capas, Los Pozos, and Clearwater sites are located along the Santa Cruz River in southern Arizona, and the La Playa site is located along the Boquillas River in northern Sonora, Mexico. Based on Sliva's (2015) proposed group distinctions, we further assigned the sites as representing Tucson Basin–linked (local) or La Playa–linked (nonlocal) groups (Table 2). The sample representing "local" groups (Tucson Basin) includes individuals associated with the Cienega phase from Los Pozos and Clearwater and the late San Pedro phase at Las Capas ($n = 54$). The sample representing "nonlocal" groups (La Playa linked) includes individuals from La Playa and the early San Pedro phase at Las Capas ($n = 50$).

Watson and Phelps's (2016) characterization of EAP mortuary behavior defined 10 biocultural variables, including (1) site, (2) sex, (3) age, (4) burial context (primary vs. secondary interment), (5) feature construction (single, double, or multiple individuals), (6) interment type (inhumation or cremation), (7) body position (flexed, semiflexed, extended, other), (8) body placement (side), (9) body orientation (hip-to-head cardinal direction), and (10) body treatment (presence or absence of funerary objects or mineral pigment). Body treatment involving pigment application is of particular interest in the SW/NW. Pigmentation on skeletal remains is often the result of applying ochre, hematite-rich soil that was ground and used to create a reddish discoloration. The use of pigmentation is said to play an important role in human behavior and has been hypothesized to convey social identity and symbolize the continuity of life and death in the SW/NW (Mabry 2005; Wreschner et al. 1980).

Table 2 displays the demographic information, mortuary variables that represent the physical act of burial, and the results of comparisons within categories from the EAP mortuary sample. EAP mortuary practices are generally characterized by single, primary inhumations (Watson 2020). Other common patterns seen in this sample are (1) the tendency for individuals to be placed along a north–south axis (64% for Tucson and 54% for La Playa) and (2) the rarity of associated funerary belongings. Funerary belongings include shell jewelry in the form of beads and pendants, objects associated with food processing—such as manos, metates, bowls, and pestles—and projectile points. Out of the 24 total individuals with funerary belongings, nine are associated with projectile points, all of whom are male. This gendered distribution is seen in other studies on mortuary behaviors during the EAP (Watson and Phelps 2016).

The first major difference in mortuary behavior between local (Tucson Basin linked) and nonlocal (La Playa linked) groups is the preference for placing individuals in a flexed position in the local group. Individuals in the nonlocal group displayed a greater diversity in body position, although more than half were interred in a flexed position. There also seems to be a relationship between certain body positions and placements. This can be seen in the absence of the extended position in the local group and

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Table 2. Comparisons of EAP Mortuary Variables and Results of Statistical Analysis.

		Local (Tucson Basin)		Nonlocal (La Playa–linked)				
		n	%	*n*	%	*t*	*df*	*p**
Sex	Male	19	52.8	29	67.4	1.327	77	0.094
	Female	17	47.2	14	32.6			
Age Group	Infant/Child	9	16.7	8	16.0	0.038	102	0.485
	Adolescent	1	1.9	3	6.0			
	Young Adult	17	31.5	13	26.0			
	Old Adult	27	50.0	26	52.0			
Burial Context	Inhumation	54	100.0	50	100.0	NA		
	Cremation	0	—	0	—			
Composition	Individual	54	100.0	50	100.0	NA		
	Multiple	0	—	0	—			
Position	Flexed	48	96.0	26	59.1	−4.832	92	**<0.001**
	Semiflexed	2	4.0	9	20.5			
	Extended	0	—	9	20.5			
Body Orientation	Supine	13	29.5	15	4.9	0.003	85	0.499
	Side	20	45.5	20	46.5			
	Seated	10	22.7	2	4.7			
	Prone	1	2.3	6	14.0			
Cranial Orientation	North	9	18.8	16	36.4	−0.586	90	0.280
	South	26	54.2	11	25.0			
	East	8	16.7	4	9.1			
	West	5	10.4	13	29.5			
Objects / Ochre	Present	24	44.4	38	76.0	3.427	102	**<0.001**
	None	30	55.6	12	24.0			

Note: Bold indicates significance at the 0.05 level.

near absence of prone placement. However, both variables appear among the nonlocal group. The relationship between the two variables is expected, because if an individual is interred in an extended position, with their arms and legs fully extended, they would most commonly be placed lying on their back (supine) or on their stomach (prone). Given that extended interments are absent among the local group, it is reasonable that the prone position would be too. The fact that the flexed position is more common than other positions for local individuals also relates to how the body is placed. Side (right or left) placement (37%) is the preference for body placement.

Another difference in the mortuary behavior for both groups can be seen in the relatively frequent display of pigmentation for nonlocal individuals (70%), whereas only 35% of local individuals display pigmentation. Pigmentation was applied around the face and to the pelvic area. A greater percentage of nonlocal individuals displaying pigmentation may be related to La Playa's location directly adjacent to a large source of hematite (McLaurin and Rehrer 2008; Watson and Phelps 2016), although there are numerous sources of hematite around the Tucson Basin (Popelka-Filcoff et al. 2008).

Comparisons across mortuary attributes in the EAP samples suggest that the nonlocal group employed more diverse mortuary practices, although they were still dominated by flexed body

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positioning with a north–south orientation. In contrast, local groups display a more uniform pattern with a great majority of individuals interred in a flexed position on their side. More diverse mortuary practices among nonlocal individuals is interesting given that there are more subtypes (greater diversity in design) of Empire points than San Pedro points. The nonlocal group therefore displays a greater diversity in mortuary patterns and projectile points than the local group, which may not directly support evidence for migration but reinforces the idea that there were tangible differences between these two groups that became more similar with time during the EAP.

EAP Bioarchaeology

Watson and Stoll (2013) measured cross-sectional geometry from EAP individuals and identified significantly larger anterior-posterior femoral dimensions in men than in women. They suggest that this pattern reflects greater male mobility during the EAP, which is tied to logistic foraging behaviors and the continued investment in wild resources (particularly hunting).

Byrd (2014) examined facial dimensions in EAP individuals to assess the biological relationships within and across several communities and determined that there was a widespread phenotypic heterogeneity during this period, perhaps reflecting some of the migration proposed by Sliva (2015). She identified greater male variation across the samples, which she attributed to higher frequencies of gene flow, possibly reflecting exogenous marriage patterns among EAP males. Byrd (2014) argues that EAP farming communities practiced male exogamy to expand mate selection and increase population viability within the Sonoran Desert. If so, it would provide support for Sliva's (2015) proposal, given that projectile-point manufacture and utilization are tied to male-biased activities.

Mallard (2021) examined tooth dimensions to track gene flow across broad geographic and temporal ranges in the SW/NW and identified close biological affiliation between the La Playa and Las Capas samples, which she argues reflects evidence for gene flow between the sites. In addition, Mallard identified greater-than-expected variation during the San Pedro phase at La Playa that transitioned to lower-than-expected variation in the later Cienega phase. Typically, greater-than-expected phenotypic variation within a population results from gene flow with another population, a possible result of migration. She argues that this pattern of variation in the SW/NW indicates an early pulse of gene flow on a subregional scale that began to homogenize over time.

Several lines of evidence from the bioarchaeological record indicate (1) measurable—albeit subtle—differences between populations in the early part of the EAP and (2) evidence for small-scale and potentially persistent migration within the Sonoran Desert, possibly from northern Sonora into southern Arizona, and likely primarily facilitated by more mobile males. These results also support suppositions by Kemp et alia (2010) about the movement of males from Mesoamerica into the SW/NW based on Y-chromosome diversity and a distinct male-based population history.

Small-Scale Migration among EAP Communities

As outlined above, Sliva (2015) suggests that differences in the distribution of Empire and San Pedro projectile-point types over space and time during the early part of the EAP may be indicative of the migration of individuals from northern Sonora to southern Arizona. Similar, albeit more subtle, differences in mortuary practices between proposed local and nonlocal populations are also suggestive of the influx of different cultural behaviors into the Tucson Basin during the early part of the EAP. Mortuary practices appear to homogenize over the course of the EAP in the Tucson Basin specifically (Watson 2020). Finally, information from bone biomechanics and biodistance studies indicate that EAP males were likely more mobile than females and that there was greater genetic diversity among males early in the sequence that became more similar over the course of the EAP. The diversity of information presented above reinforces the idea that local population dynamics may have been modified and shaped by male-centered migration, particularly during the San Pedro phase of the EAP. Although Y-chromosome data hints that we would possibly extend these behaviors back to origins in Mesoamerica, the information presented here is indicative of small-scale (intraregional) migration associated with the foundation and establishment of nascent farming villages in the Sonoran Desert.

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Origins of Western Basketmaker II

Researchers have argued that the Western Basketmaker II complex originated in a migration of San Pedro phase farmers from the Sonoran Desert to the Colorado Plateau (Matson 1991). Basketmaker II (BM II) identifies the period between 500 BC and AD 400 across the Colorado Plateau, when ancestral Puebloan peoples began cultivating crops and lived in pithouse villages, and it is often divided into Eastern and Western segments based on differences in material culture (Matson 2006). BM II is effectively the upland correlate to the EAP in the Sonoran Desert. Coltrain and Janetski (2019:15) "argue that the appearance of Four Corners Basketmaker settlements was unlikely to have been an in situ development or the consequence of a single migration event" based on a broad suite of evidence.

Similarities between San Pedro phase and Western BM II material culture—including basketry, sandals, cordage, and projectile points—have been cited by numerous researchers as evidence that migrant groups brought maize cultivation and technologies to the Colorado Plateau from the south (Berry and Berry 1986; Huckell 1990; Mabry 2005; Matson 1991). Evidence from BM II textiles points to a subtler association in which Washburn and Webster (2006:259) contend that sites in the Kayenta region share closer affinities with EAP populations to the south, whereas BM II populations outside the Kayenta area share closer affinities with Great Basin Archaic traditions (Charles and Cole 2006; Matson 1991). We evaluate the projectile-point and bioarchaeological evidence for a Sonoran Desert to Colorado Plateau migration during the EAP. The two classes of information do not hew as closely together here as in the desert borderlands, given that the bioarchaeological data provide more robust support for migration.

BM II Projectile Point Design

Generically broad-bladed, side- to corner-notched dart points are common in the Arizona–Sonora borderlands, on the Colorado Plateau, and in the areas between them during the EAP. However, the oft-cited suggestion that San Pedro and Basketmaker point designs are indistinguishable (Berry and Berry 1986:281) or even significantly overlapping at more than a general level is not supported. Although both have triangular blades and side notches, Basketmaker points have narrow necks and parallel-sided stems that drop to wide, short bases with squared to pointed ears. The points are smaller than the San Pedro phase San Pedro points in every dimension, and they average less than half their mass (Table 3).

Because of this, stylistic disconformities—that is, points exhibiting designs that are endemic to one region but located in another—can be used to investigate long-distance population movement. Tracking the geographic and temporal distributions of San Pedro points and points that are generally similar to San Pedro points but do not exhibit the complete suite of defined attributes for the type, and then evaluating the degree of deviation from the San Pedro template with geographic distance, is one way to evaluate whether projectile point design supports the desert-to-plateau migration hypothesis.

Uncertainty surrounding the start date for Western BM II (Geib 2011; Smiley 1994, 2002) complicates assessments of both the timing of migrations from the south and the identification of the cultural source area. Matson (1991) hypothesizes a borderlands-to-plateau migration event occurring within the 850–300 BC interval, which encompasses the very end of the San Pedro phase, the entire Early Cienega phase, and the beginning of the Late Cienega phase. Each of these phases in the desert borderlands is associated with at least one distinctive San Pedro or Cienega point subtype and could elucidate the timing of movement to the Colorado Plateau by their presence. Direct migration of Sonoran Desert populations to the Colorado Plateau should be reflected by the presence of projectile points in the north that largely conform to specific lowland designs. An incremental migration should be reflected by designs that are derived but distinct from Sonoran Desert templates, with intermediate variations present in likely areas of transit, such as the Arizona Transition Zone and Mogollon Highlands (Sliva 2015). Areas of overlapping contemporaneous designs may signal a physical or social frontier separating different groups.

Post–800 BC San Pedro points exhibit a wide range of variation in all regions. This presumably reflects design drift resulting from the wide dispersal of both the San Pedro template and its producers across the Southwest but makes regional metrical comparisons of little value. More importantly, readily

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Table 3. Metrical Attributes for Early Agricultural Projectile Points from the US Southwest in the Desert Archaeology Inc. Database.

			Mass (g)[b]			Neck Width (mm)			Blade Width (mm)			Blade Thickness (mm)			Stem Length (mm)			Base Width (mm)				
Type	Variant	Total[a]	Mean	Std	CV	Mean	Std	CV	Mean	Std	CV	Mean	Std	CV	Mean	Std	CV	Mean	Std	CV	PCSA[c] (mm^2)	Sectional Density[d] (g/mm^2)
San Pedro	Centro[e]	36	6.0	1.2	0.20	11.5	2.1	0.18	19.9	2.1	0.11	7.1	1.7	0.24	11.2	1.2	0.11	19.5	2.1	0.11	70.6	0.085
	Norte[e]	25	6.2	2.0	0.32	12.7	1.6	0.13	22.8	2.4	0.11	6.4	1.9	0.30	11.1	1.0	0.09	21.2	2.1	0.10	73.0	0.085
	Finado[f]	55	8.4	4.1	0.49	15.3	2.6	0.17	25.1	3.5	0.14	5.9	2.4	0.41	10.6	2.0	0.19	18.1	3.5	0.19	74.0	0.113
BMII	White Dog	8	2.3	0.4	0.15	6.8	0.8	0.12	15.2	3.1	0.20	5.5	0.7	0.13	9.2	1.8	0.20	15.5	2.1	0.14	41.8	0.055
	Triangle	16	2.7	1.0	0.36	8.6	1.2	0.14	18.8	2.9	0.15	4.7	1.0	0.21	8.9	1.2	0.13	13.3	1.9	0.14	44.2	0.061
	Crescent	29	2.8	0.7	0.25	7.4	0.9	0.12	18.8	1.4	0.07	5.1	0.8	0.16	8.7	1.3	0.15	15.6	1.6	0.10	47.9	0.058

Source: After Sliva 2015:Table 2.1.
[a] Total of all points in the Desert Archaeology Inc. Database for which blade width and blade thickness are measurable.
[b] Measured only for complete points.
[c] PCSA = Point Cross-Sectional Area, ½ (blade width*blade thickness).
[d] Sectional density = mass/PCSA.
[e] San Pedro phase.
[f] Cienega phase.

identifiable Cienega points (800 BC–AD 150) are absent north of the Salt River except at the Cienega Creek site (Haury 1957), which pushes the arrival of any significant population from the borderlands on the Colorado Plateau back to a time before the Cienega phase. If the original migration event of farmers from southern Arizona to the north began at the early end of Matson's (1991:270) suggested 850–300 BC time frame, it should have been accompanied by points reflecting specific San Pedro phase designs, but only a small number of San Pedro–like points have been documented on the Colorado Plateau (e.g., Burton and Farrell 1993:Figure 8.8a, e, h; Dosh 1996:Figure 16f–g), and none from directly dated contexts within the Western BM II core area. Coefficients of variation (Brown 1998) for key metrical attributes on these individuals, compared to each attribute in the available Tucson Basin sample, indicate that few of the illustrated plateau points fall within the range of variation for San Pedro phase borderlands designs. In short, the lack of robust numbers of identifiable San Pedro points from dated sites prevents inferring direct borderlands-to-plateau migration based on projectile technology data alone.

Shifting the focus to the south, Haury (1962) interpreted the Mogollon Highlands at the eastern end of the Mogollon Rim as a staging area that San Pedro groups moved into and from which they eventually diffused technology to the Colorado Plateau. Indeed, the San Pedro phase San Pedro point designs that have been identified north and northeast of the Basin and Range Province are limited to the Mogollon Highlands and the far southern portion of the Colorado Plateau along the Mogollon Rim. For example, most of the dart points illustrated from Bat Cave are stylistically consistent with borderlands San Pedro designs (Dick 1965:Figure 20r–s, u). Wills (1985:237–239, 270–271) suggests that Bat Cave is an early maize site, with dates roughly coinciding with the beginning of the Cienega phase in the borderlands, although a small number of earlier dates push the potential start back to the middle of the San Pedro phase (Matson 1991:249). Matson (1991:251) posits that Bat Cave could represent experimentation by a local population or an incursion by southern desert migrants.

The points illustrated by Martin, Rinaldo, and their collaborators (Martin 1943:Figure 72, 74; Martin and Rinaldo 1940:Figure 29, 1960:Figure 48; Martin et al. 1957:Figure 61, 62, 1961:Figure 57, 1964:Figure 38) from numerous sites stretching from the eastern extent of the Mogollon Rim into the Mogollon Highlands of west-central New Mexico reflect a combination of Colorado Plateau types and San Pedro–like points that, although not conforming to either of the defined San Pedro phase subtypes, would not be out of place in the Sonoran Desert (Sliva 2015). Interpretations, again, are hampered by the lack of direct dates from many contexts that might otherwise demonstrate the timing of a San Pedro phase presence (Sliva 2015). During the Cienega phase, apart from the Cienega Creek site, identifiable Cienega points are absent in the highlands. However, Western BM II and other designs with southern Colorado Plateau / Arizona Transition Zone origins appeared in multiple Tucson Basin assemblages at this time (Sliva 2015).

The spatial distributions of point designs indicate different directions of movement between the borderlands and regions to the north and east during different times, with possible northward movement of borderlands populations to the Mogollon Highlands during the San Pedro phase and demonstrated southward movement of Colorado Plateau and/or Arizona Transition Zone populations to the borderlands during the Late Cienega phase. As in the Early San Pedro phase in southern Arizona and northern Sonora, the association of projectile points with men suggests male-centered migration. The Mogollon Rim appears to have been something of a frontier during the Cienega phase, with Western BM II points frequently coming south to that boundary but only rarely crossing it (Sliva 2015). The observed pattern of borderlands and Colorado Plateau designs co-occurring on sites where the southeastern Colorado Plateau borders the Mogollon Highlands (Dick 1965; Haury 1957; Matson 1991; Sliva 2015; Wills 1995) meets the expectations outlined earlier for different populations occupying a shared space, but a developmental relationship between San Pedro and Western BM II has yet to be demonstrated.

BM II Mortuary Customs

Mowrer (2006) conducted an extensive survey of Basketmaker II mortuary practices to directly test the proposed distinction between Eastern and Western cultural traditions across the Colorado Plateau.

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Mowrer (2006) identifies that Eastern BM II groups generally placed their deceased in single interments (67%) compared to Western BM II groups, which more commonly (79%) placed their deceased in multi-individual interments. In addition, more than 50% of Eastern BM II interments were oriented to the north, whereas Western BM II groups maintained more variable orientation patterns. She also argues for social differentiation associated with funerary belongings: adults were almost exclusively accompanied by hunting tools, but textiles accompanied juveniles. This pattern was also found to differ between Eastern and Western groups; infants among Western BM II groups contained a higher frequency of belongings than children and adolescents did. This pattern was reversed among Eastern BM II groups; children and adolescents contained a higher frequency of belongings than infants did (Mowrer 2006).

Although comparisons of mortuary behaviors across the vast spatial and temporal distance of the EAP and BM II traditions are problematic, some superficial similarities can be observed. For example, EAP interments are incredibly variable and do not have a strong direction orientation, which is similar to patterns described among the Western BM II groups. Although multiple interments are completely absent from the mortuary features considered in this study (a subset of the mortuary features at each of the four sites examined), they are present in numerous EAP sites across the Sonoran Desert, and there is a clear increase in their frequency in the Late Cienega phase (Gruner 2023; Thiel 2021; Watson 2020; Watson and Phelps 2016). Differences in preservation, especially of perishable belongings, between EAP and BM II sites are a significant factor in the number and types of objects observed. Individuals of all ages are just as likely to be placed with belongings within EAP sites, but juveniles are more likely to have shell ornaments placed with them, potentially hinting at some social differentiation among these groups.

BM II Bioarchaeology

Turner (1993) identified significant differences in dental morphological trait data between Eastern and Western Basketmaker II populations, characterizing Western BM II dentitions as distinct from Eastern BM II groups and more closely related (closer biodistance) to Mesoamerican populations. More recently, O'Donnell and colleagues (2020) similarly used dental nonmetric data to examine proposed connections and relationships to the inhabitants at Pottery Mound in New Mexico and demonstrated closer phenetic relationships between Western Puebloan communities (i.e., descended from Western BM II groups) and populations in northern and central Mexico.

LeBlanc and colleagues (2007) expressly tested the migration theory for the origin of the Western BM II tradition by extracting ancient DNA from quids and aprons recovered from BM II sites in southeast Utah and northeast Arizona. The study focused on sequencing mitochondrial DNA (mtDNA) to compare haplogroups to previously published results from the US Southwest and Mexico. Their results identify high frequencies of haplogroup B, followed by haplogroup A. They argue that the presence of 13%–14% haplogroup A from Western BM II individuals is consistent with a migration origins model. Furthermore, their pan-regional comparison of haplogroup frequencies identifies a clinal distribution of haplogroup A specifically, from central Mexico (50%+) to the Southwest (5%) among Uto-Aztecan speakers (LeBlanc et al. 2007). Modern O'odham groups exhibit the lowest frequency of haplogroup A (5%–7%) compared to the intermediate values observed among Western BM II and northern Puebloan groups (10%–14%), which could reflect founder effect among the BM II groups and subsequent admixture among O'odham groups. They also identify a complete lack of haplogroup A among pre-colonial Mimbres groups and modern Jemez Pueblo. In addition to limited samples sizes, the use of mtDNA in this study limits interpretations to the biological connections along the matriline, given that mtDNA does not recombine and is passed down from mother to daughter. Although potentially problematic, mtDNA haplotype frequencies are suggestive of a migration scenario from early farming Uto-Aztecan speaking groups into the Western BM II area and may additionally imply that migration occurred as family groups rather than the male-centric migration proposed across the Sonoran Desert.

Byrd (2019) conducted multivariate comparisons of craniometric variables across the Southwest/Northwest to provide evidence for biological connectivity between the EAP and Western BM II areas. She suggests that genetic differentiation values (F_{ST}) indicate that these populations experienced higher-than-average gene flow ($F_{ST} = 0.2644$; $p = <0.0001$), likely due to high rates of in-migration or

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diverse origins of founding groups. The results of Byrd's (2019) principal component analysis and Mantel tests identify close phenotypic affinity between Western BM II and the EAP site groups, with little variation on either axis and no significant relationship between geographic and biological distance. She argues that EAP and Western BM II groups are more closely related biologically than Western BM II and Eastern BM II groups are. Byrd (2019) further argues that the relatively low biological variation observed in Western BM samples is more consistent with direct EAP immigration and colonization pre–AD 500, establishing an early foundational lineage rather than admixing with existing Western BM II groups.

The bioarchaeological evidence indicates that San Pedro phase groups may have migrated north out of the Sonoran Desert, eventually settling in the western Four Corners area, giving rise to the suite of traits traditionally attributed to the Western BM II complex. Projectile-point data are far more equivocal but suggest that any such migration would have occurred before the end of the San Pedro phase (800 BC). Coltrain and Janetski (2019) argue that the same pattern of male-centered migration observed in the Sonoran Desert may have facilitated the arrival of farming technology once better cold-adapted races of maize was developed (through artificial selection) and enabled southern male farmers to integrate into local foraging communities (through in-marriage) on the Plateau.

Migration and BM II Origins

Similarities in point types between San Pedro points and Western Basketmaker points could reflect the movement of people or design templates from the Sonoran Desert to the Colorado Plateau. Evidence for similarities between EAP and Western BM II mortuary practices is less compelling, but the distinction in mortuary practices between Eastern and Western BM II groups is a tantalizing clue to distinctions in cultural practices between these groups. The best evidence for northward migrations during the EAP comes from biodistance studies. There are clear phenetic distinctions between Eastern and Western BM II groups and potentially close phenetic distances between EAP groups and Western BM II groups. Given these biological relationships, a parsimonious explanation for similarities between projectile point types and mortuary practices is the continued small-scale migration of EAP groups north and onto the Colorado Plateau.

Conclusions

Migrations during the Early Agricultural period may be rooted in preceding small-scale emigration from Mesoamerica or highly mobile seasonal foraging across the diverse Sonoran Desert ecosystems throughout the preceding Archaic period. Material signals of migration during the EAP are incredibly subtle and may reflect socially dynamic, small-scale movements. Small-scale migrations occurring around the foundation of farming communities in the Sonoran Desert likely formed the foundation of broad regional connectivity, shared historical ties, and subsequent migration patterns and practices. There is clear evidence of movement or trade across the region, including evidence for obsidian from distant sources as early as the Silverbell Interval (Shackley 2024) and shell from the Sea of Cortez (Virden-Lange 2015; Vokes 2006).

Here, we compared information drawn from projectile point design, mortuary practices, and bioarchaeology to identify subtle differences in population composition associated with small-scale migration from northern Sonora to southern Arizona during the San Pedro phase. Sliva (2015) argues for the migration of people from northern Sonora into the Tucson Basin based on projectile point design: San Pedro points reflect the manufacturing style of a local group (Tucson Basin), in contrast to Empire points, which reflect the manufacturing style of a nonlocal group (northern Sonora). Differences in mortuary practices between these groups reinforce Sliva's (2015) suppositions and those of others (Byrd 2014; Mabry 2005) that if males were motivated to migrate into the Tucson Basin from the south, they would have brought their tool manufacture technology and mortuary rituals. The significance of measurable differences in body treatment during a time when mortuary practices are incredibly variable underpins the arguments that they reflect small-scale population movements.

Although projectile points are used as evidence of San Pedro phase male movement across the landscape, it should be noted that ground stone artifacts cannot be used in the same manner to track the

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movement of women during this time. People in the SW/NW did not adopt culturally and geographically specific ground-stone designs until roughly AD 500 (Adams 2014:127). Because EAP stone artifacts can only track male-identified individuals, conclusions drawn from them about single-gender migrations must be evaluated with bioarchaeological data as well. Bioarchaeological information (and some molecular data) does additionally support the theory that male-centered migration may have facilitated the connections between—and eventual integration of—EAP communities in the Sonoran Desert.

It is also important to recognize that there are some limitations to our study. These include marked spatial and temporal gaps in the archaeological record of the region, which are largely an artifact of an imbalance in CRM and research projects. This information gap is exemplified by the separation of La Playa in northern Sonora and the concentration of EAP sites in the Tucson Basin region. In addition, connecting population dynamics and movements within the Sonoran Desert to those of the Colorado Plateau is complicated by a shortage of sites in the spaces between that date and this interval. Significant contributions can be made by examining the variables considered here with additional samples to address gaps in the data. Other material approaches could be added to our consideration of projectile point styles, mortuary patterns, and bioarchaeology to address these questions, including research on textiles, ground stone, or animal bone tools, et cetera.

Although additional research needs to be conducted, it might be possible to extend the observations of early small-scale migrations within the Sonoran Desert proposed here to the migration of farmers onto the Colorado Plateau and the creation of the Western BM II complex. Regardless of the individual characteristics, it is clear that population movements played critical roles in the composition of populations during this time of transition and technological development (i.e., adoption of cultigens and farming).

Clark and colleagues (2019) argue that a deep historical perspective is imperative to resolve the "migrant paradox" and successful multigenerational process of integrating migrants into coalescent communities. Sequential migrations of Puebloan peoples from the Four Corners area beginning in the thirteenth century completely reshaped the demography in the region and left some areas nearly completely vacant (Clark et al. 2013; Ortman 2012). By AD 1500, some of these voids were being filled by a small but influential influx of Athapaskan groups from a subarctic origin in northwest North America (Malhi et al. 2008). Therefore, long-distance and temporally deep ties—perhaps curated through oral histories such as those seen among the Pueblo peoples today—may have preserved historical connections between desert, intermontane, and plateau populations, leading to recursive migrations later in the prehistoric cultural sequence. Recent research by Ingram and Patrick (2021) identifies a spatially patterned, multigenerational decline in human security in the regional SW/NW system that resulted in the depopulation of some areas and forced migration to others. We argue that, rooted in early farming traditions and a shared language family, farmers expanded north and east, then eventually returned to ancestral homelands when environmental and incursive pressures pushed them back south.

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Supplemental Text 1. Projectile Points.
Supplemental Table 1. Data.

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