CHAPTER 16

ANALYSES AND INTERPRETATIONS OF CANAL OSTRACODES

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INTRODUCTION

Until recently, it was generally accepted that canals and irrigated agriculture were introduced to the Greater Southwest from Mexico during the early development of the Hohokam culture (e.g., Cheek 1994). However, recent discoveries of buried canals in the Santa Cruz River floodplain in the Tucson Basin of southern Arizona have revealed a long sequence of prehistoric canals and canal systems that argue against this hypothesis. In the Santa Cruz floodplain near downtown Tucson, the Rio Nuevo Archaeology project investigations documented several canals dating between 1500 and 100 B.C., as well as later Prehistoric, Protohistoric, and Historic canals (see descriptions in Chapter 4, this volume). At locations downstream, in the same floodplain, canals built at various times between 1200 B.C. and A.D. 50, have been identified at the sites of Santa Cruz Bend, AZ AA:12:746 (ASM) (Mabry and Archer 1997); Costello-King, AZ AA:12:503 (ASM) (Ezzo and Deaver 1998); and Las Capas, AZ AA:12:111 (ASM) (Mabry 1999, 2002, 2006).

The earliest known canals in the Santa Cruz Valley are up to 1,500 years older than the famous canals of the Hohokam culture of southern Arizona, and they are more complex, and often larger, than the earliest canals found in central Mexico (cf. Doolittle 1990, 2004). Mabry (2005a, 2005b) proposes that these canals document the earliest attempts at water control in the Southwest, in which both surface flows and groundwater tables were successfully exploited for agriculture.

How did irrigation technology and techniques evolve in this region over the last 3,500 years? A study of canal ostracode records at Las Capas shows a shift between about 1200 and 1000 B.C., from diverting episodic flood flows, to diverting the perennial base flow of the river and operating canal headgates (Palacios-Fest and Davis 2006; Palacios-Fest et al. 2001). Since the investigations of the Las Capas canals, ostracode analysis has become a useful tool in reconstructing the history of irrigation operations in the Tucson Basin. The purpose of this study is to compare and contrast the ostracode records from the long sequence of prehistoric, protohistoric, and historic canals discovered at AZ BB:13:481 (ASM), the site number assigned to the canal segments documented during the Rio Nuevo Archaeology project.

AREAS OF INVESTIGATION

A total of 36 canals was documented under the site number BB:13:481 in four different loci during the Rio Nuevo investigations (Figure 16.1a-b; Table 16.1). Eighteen canals were exposed in the area known as the Congress Street/Brickyard loci, Clearwater site, AZ BB:13:6 (ASM), located on the western side of the Santa Cruz River, between the San Agustín Mission site to the south, and Congress Street to the north. The locus known as the San Agustín Mission, also the Clearwater site, is in downtown Tucson on the western side of the Santa Cruz River, west of Interstate 10 (I-10), east of Grande Avenue, south of Congress Street, and north of Mission Lane. Five canals were exposed in this location at the base of A-Mountain. Thirteen canals were exposed in the Mission Gardens locus, also part of the Clearwater site, west of I-10, at the southeastern corner of the intersection of Mission Road and Mission Lane. Canal feature numbers are grouped by locations and periods in Table 16.1; the canals that yielded ostracode records are shown in bold.

MATERIALS AND METHODS

Out of a total of 194 sediment samples analyzed, 91 samples (47 percent) from 25 different canals contained ostracodes. The sample sizes ranged from 43 gm to 138 gm of sediment collected from a rectanguloid excavation (roughly 1 cm thick, 2 cm long, and 2 cm deep), at microstratigraphic intervals of 2 cm to 10 cm, depending on strata thickness and availability. Sediments were stored in plastic zip-lock bags, labeled, dated, and sealed. Stratigraphic contexts

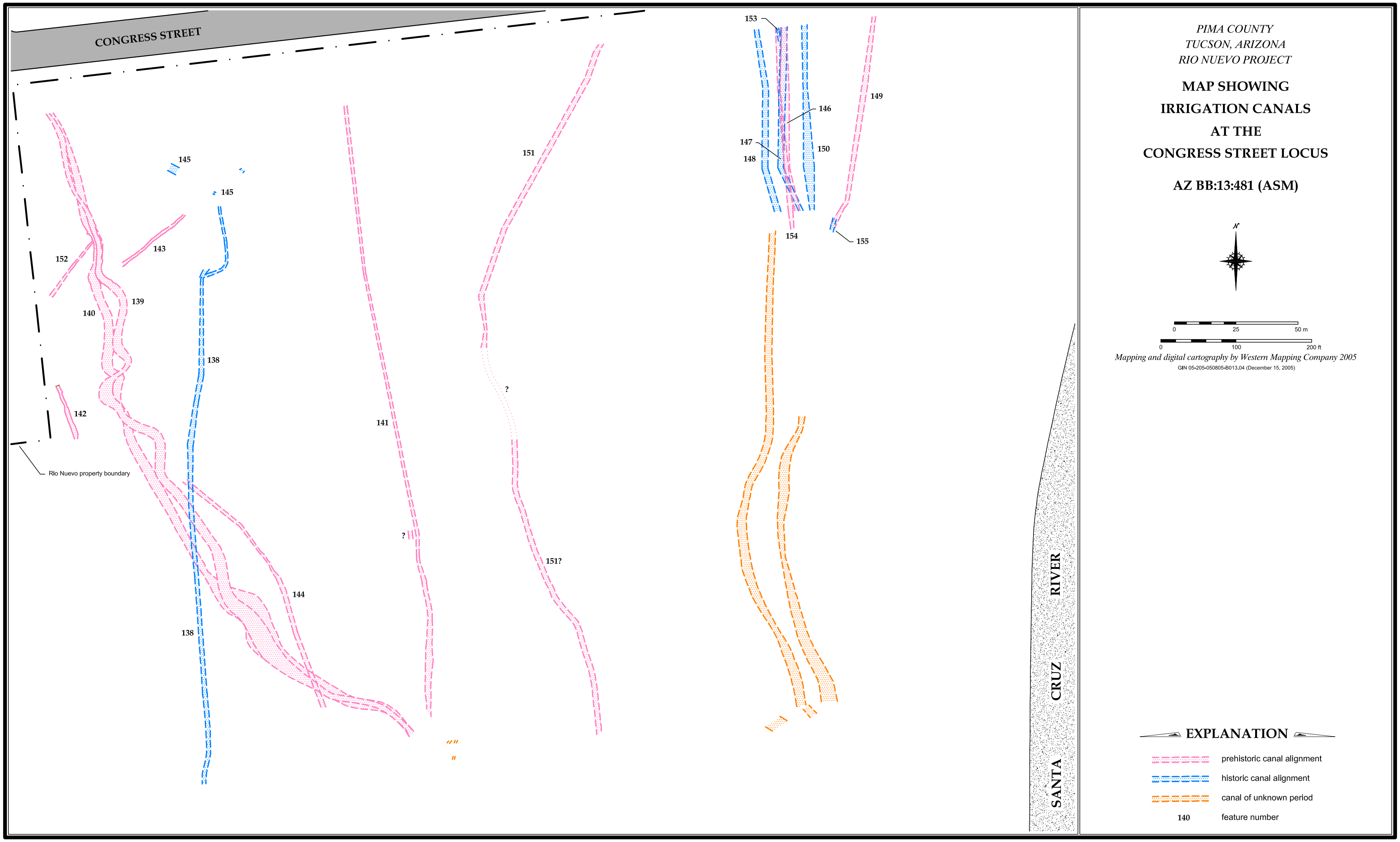

Figure 16.1a. Alignments of canals, AZ BB:13:481 (ASM), in the Congress Street/Brickyard loci, the Clearwater site, AZ BB:13:6 (ASM), identified during the Rio Nuevo Archaeology project.

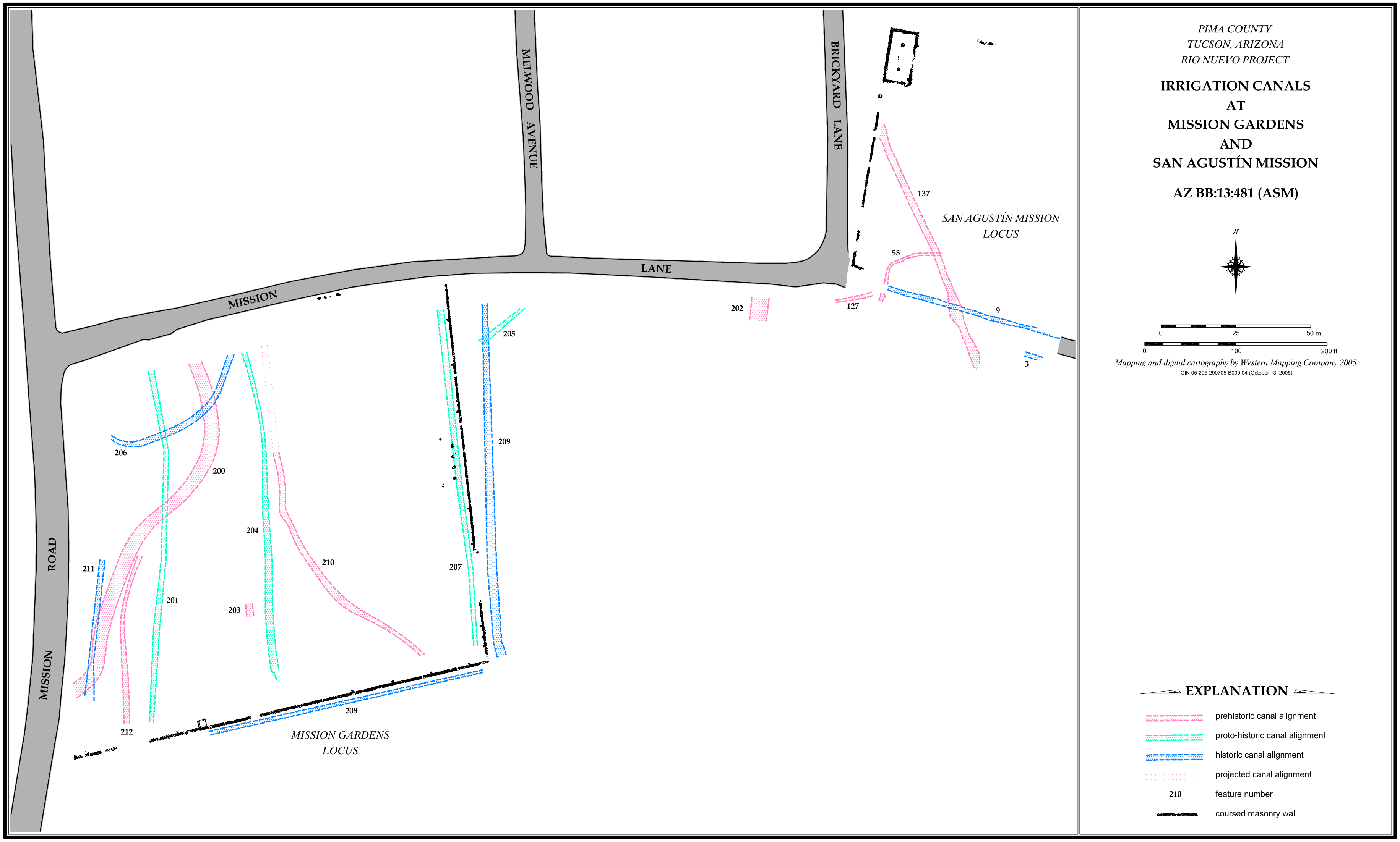

Figure 16.1b. Alignments of canals, AZ BB:13:481 (ASM), in the San Agustín Mission and Mission Gardens loci, the Clearwater site, AZ BB:13:6 (ASM), identified during the Rio Nuevo Archaeology project.

Table 16.1. Canal feature numbers at AZ BB:13:481 (ASM), by locus and period/era.

Locus	Early Agricultural	Hohokam	Protohistoric	Historic
Congress Street/Brickyard	**139, 140, 141,** 152	**142,** 143, **144, 146, 149, 151, 154**	–	**138,** 145, **147, 148, 150, 153,** 155
San Agustín Mission	**53, 127**	137	–	3, **9**
Mission Gardens	–	**200,** 202, 203, 210, 212	**201, 204, 205, 207**	**206,** 208, 209, 211

Note: Features analyzed for ostracode records in **bold**.

were marked in canal feature cross sections. Samples were prepared using routine procedures (Forester 1988), as modified by Palacios-Fest (1994). Sediment residuals were analyzed under a low-power microscope.

All fossiliferous samples were examined to identify fossil contents and faunal assemblages. Total and relative abundance was recorded. Additionally, standard taphonomic parameters, such as fragmentation, disarticulation (carapace/valve, C/V ratios), abrasion, and adult/juvenile (A/J) ratios (Delorme 1969, 1989), were recorded to establish the synecology (ecology of the communities), as opposed to the autoecology (ecology of single species) of the canals. However, autoecology was implemented to integrate the environmental framework. The specimens were placed in micropaleontological slides.

The taphonomic parameters were used to recognize degrees of transport and/or burial characteristics such as desiccation and sediment compaction. The rates of fragmentation, abrasion, and disarticulation are realistic indicators of transport; these parameters commonly show increasing damage with increasing transport. One must be cautious in using this criterion, but the nature of the deposits suggests ostracodes may reflect canal hydraulic properties.

Other features such as encrustation and coating were used to determine authigenic mineralization or stream action, respectively. The redox index and color of valves reflected burial conditions. The A/J and C/V ratios were used as indicators of biocenosis (Palacios-Fest et al. 2001).

Based on the faunal composition, a paleosalinity index was developed. The paleosalinity index considers the salinity tolerance of the species present in the canals based on current knowledge of their ecological requirements (Palacios-Fest 1994; Palacios-Fest et al. 2001). The equation used for the present study is:

SI = [4(% *Limnocythere* sp. cf. *L. paraornata*) + 3(% *Cypridopsis vidua*) + 2(% *Candona caudata*) + % *Herpetocypris brevicaudata*]-[% *Potamocypris unicaudata* + 2(% *Ilyocypris bradyi*) + 3(% *Darwinula stevensoni*) + 4(% *Physocypria pustulosa*)]

As in Palacios-Fest et al. (2001), *Limnocythere* sp. cf. *L. paraornata* is assumed here to be a salinity-tolerant species, because it is associated with cienega-like sediments but is absent during the freshwater input stages. However, Forester (personal communication 2001) indicates *L. paraornata* lives in cold, flowing waters, fresh to slightly saline (<5,000 mg l^{-1} total dissolved solids, hereafter TDS), either Ca- or HCO_3-rich waters. Its possible presence in the Southwest warm waters may expand its geographic and hydrochemical spectrum, although it could be associated with winter precipitation or snowmelt discharge. The maximum salinity tolerance for *L. paraornata* is used here as indication of the highest salinity range reached in canals in the Santa Cruz River basin.

RESULTS FROM CANALS IN THE CONGRESS STREET/BRICKYARD LOCI, THE CLEARWATER SITE, AZ BB:13:6 (ASM)

The sample identification number, stratigraphic level (measured from base of canal), bulk and residual weights, lithology, color, and color code of sediment residuals are shown in Table 16.2 (see Tables 16.2-16.5 at the end of this chapter). The samples consist primarily of pale yellowish-brown (10YR 6/2) and grayish-orange (10YR 7/4), occasionally moderate brown (5YR 3/4), gravelly sands to clay. The dominant minerals recognized in these canals are quartz, tufa (or travertine), biotite, and feldspars; fragments of charcoal, shell, and rock are also present. Pegmatite and manganese nodules are present, but rare, at the bases of canals. Other minerals occur occasionally (Table 16.3).

The biological contents of the canals and the overall taphonomic characteristics recorded are summarized in Table 16.4. Ostracodes and molluscs are the microinvertebrate groups present. The ostracode total population is provided in Table 16.5, by sample, and the total and relative abundance by species per sample. C/V and A/J ratios, by species, are also listed to establish biocenosis.

Ten species of ostracodes were identified. *Ilyocypris bradyi* was the most common and abundant, followed by *Cypridopsis vidua* and *Darwinula stevensoni*. The remaining seven species occurred only occasionally in the canals: *Herpetocypris brevicaudata*, *Limnocythere* sp. cf. *L. paraornata*, *Candona caudata*, *Candona patzcuaro*, *Physocypria pustulosa*, *Cypridopsis* sp., and *Potamocypris unicaudata*. Based on occurrence and relative abundance, three assemblages were recognized: (1) Assemblage I is dominated by *I. bradyi*, a streamflow indicator; (2) Assemblage II is dominated by *I. bradyi* and *C. vidua*, both associated with streamflow conditions; and (3) Assemblage III is dominated by *I. bradyi*, *C. vidua*, and *D. stevensoni*, reflecting long-term water permanence conditions. Assemblage I marks the beginning of water input and operation in all canals studied. Assemblage II represents a transition to more saline conditions. It occurs in canal Features 140, 146, 147, and 154. Assemblage III occurs in Features 144 and 150. The hydrochemical evolution suggested by the transition from Assemblage I to Assemblage III indicates increasing salinity; however, the water was still relatively dilute, as the *I. bradyi* and *D. stevensoni* occurrences were significant.

The presence of *D. stevensoni* at the ends of the records suggests canals held water for long periods. The faunal association is consistent with the water chemistry type I (dilute) and type II (Ca-rich, dominated by Na^+, Mg^{2+}, and SO_4^{2-}) of Eugster and Hardie (1978). Tadayon and Smith's (1994) and Tadayon's (1995) surface and groundwater analyses of the modern Rillito Creek in the Tucson Basin (sampled from August 1987 to August 1993) showed near-equivalent proportions of Ca and HCO_3, with Ca slightly dominant. This association is consistent with that suggested for canals, AZ AA:12:753 (ASM), at Las Capas (Palacios-Fest and Davis 2006; Palacios-Fest et al. 2001), and in canals at the San Agustín Mission locus (see below). Similarly, the occurrence of *Limnocythere* sp. cf. *L. paraornata* indicates a period of marshy (cienega-like) conditions.

For each canal, the sequence of species distribution and inferred paleoecology is used to interpret environmental conditions through time in the canals. The paleosalinity index developed for each canal is shown in the right-hand side of each figure. A small-to-large population (1-398 individuals per sample) and low diversity (one to eight species) characterize fossiliferous samples. Based on Delorme (1969, 1989), taphonomic parameters are used to distinguish allochthonous from autochthonous populations.

Early Agricultural Period Canals

Four canal features (Features 139, 140, 141, and 152) represent Early Agricultural period canals. Canal Feature 139, containing a charcoal fragment radiocarbon dated to 2140±40 b.p. (uncalibrated radiocarbon years before present; circa 150 B.C. calibrated) (Chapter 19, this volume), was exposed on the southern wall of Trench 201. The set of samples consisted of a reference sample (2 cm below canal base; bcb) and 12 canal fill samples, most of which contained no fossils. The top four intervals (DA-RNA8-201-139-10/13) contained ostracodes (see Table 16.5). Sediments consisted of gravelly to silty sand, gradually grading to silty clay and clay (see Table 16.2).

Fine sediments suitable for ostracodes appear sparsely some 52 cm above the canal base (acb) but settle to establish a large population at the next interval (59 cm acb). The dominant species is *I. bradyi* (Assemblage I), representing more than 90 percent of the population (Figure 16.2). The taphonomic parameters show high fragmentation and abrasion (30-100 percent) in the lower fossiliferous samples, decreasing substantially upward (5-15 percent). No signs of encrustation or coating were recorded, but the redox index ranged from strong oxidizing stains at initial stages, to no stains upward (see Table 16.4). Similarly, the A/J ratios grade from purely adult to a mixed population, upward. The C/V ratios show strong valve disarticulation. Assemblage I dominates the history of the canal (see Figure 16.2).

The set of samples collected from canal Feature 140, where it was exposed on the southern wall of

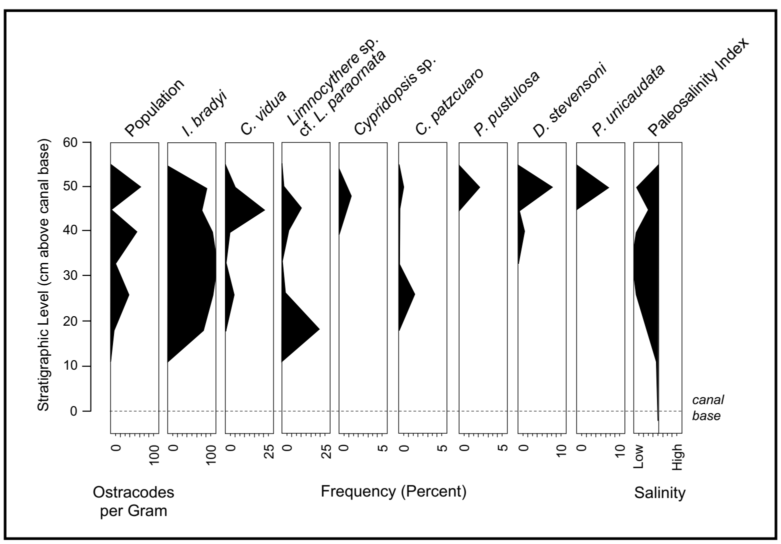

Figure 16.2. Ostracode valves per gram, relative frequencies of ostracode species, and paleosalinity index, by stratigraphic level, canal Feature 139, AZ BB:13:481 (ASM).

Trench 203, consisted of a reference sample (2 cm bcb) and seven canal fill samples, some containing a few ostracodes (1-27 specimens). Sediment textures range from gravelly sand to sandy silty clay, occasionally clay; the finer sediments were suitable to host ostracodes (see Table 16.2). Sample DA-RNA8-203-140-3 contained a stable population; other fossiliferous samples consisted of reworked specimens (see Table 16.5). The taphonomic characteristics show low-to-moderate fragmentation and abrasion (5-20 percent); no other parameters are relevant. Again, most fauna were washed into the canal, as indicated by the A/J and C/V ratios (see Table 16.4). At 10 cm acb, the biocenosis formed an Assemblage I with strong influence of *C. vidua* and *C. patzcuaro* and the occurrence of *L.* sp. cf. *L. paraornata* (Figure 16.3).

Charcoal from canal Feature 141 provided a radiocarbon date of 2470±40 b.p. (uncalibrated; circa 600 B.C. calibrated) (see Chapter 19). The set of samples collected from where it was exposed on the southern wall of Trench 219 consisted of a reference sample (2 cm bcb) and two canal in-fill samples containing no ostracodes or their fragments (see Table 16.5). Fine grain-sized sediments suitable for microinvertebrates do not explain their absence (see Table 16.2).

Canal Feature 152 is the oldest canal documented during the Rio Nuevo project; radiocarbon dates on annual plant remains from nearby pit features originating within the same stratum place the age of this canal near 1500 B.C. (see Chapter 19). The samples collected from where it was exposed on the west-southwest wall of Trench 267 consisted of a reference sample (2 cm bcb) and five canal fill samples containing no fossils or their fragments (see Table 16.5). Sediments consist of coarse-to-medium sand, rarely suitable for microinvertebrates to settle, especially ostracodes. However, toward the top of the stratigraphic sequence, particle size decreases to a sandy silt that is appropriate habitat for microinvertebrates. However, ostracodes were still absent in all samples.

Hohokam Canals

Six canal features (Features 142, 143, 144, 146, 149, and 154) can be dated to Hohokam periods based on their stratigraphic contexts. Late Rincon or Tanque Verde phase decorated sherds were collected from canal Feature 146, placing its construction between A.D. 1100-1300. Canal Feature 149 contained a variety of Classic period sherds, including Tanque Verde Red-on-brown, Sells Red, and corrugated wares, bracketing its age between A.D. 1150-1300.

Samples collected from canal Feature 142, where it was exposed on the southern wall of Trench 206, consisted of a reference sample (2 cm bcb) and five canal fill samples containing ostracodes (Figure 16.4; see Table 16.5). Seven species occur throughout the history of the canal: *I. bradyi* the most common and abundant, followed by *C. vidua* and occasionally *L.* sp. cf. *L. paraornata*, *C. patzcuaro*, *C. caudata*, *P. pustulosa,* and *P. unicaudata* (see Figure 16.4). The taphonomic parameters show low fragmentation and abrasion (5-10 percent). Evidence of authigenic mineralization and coating of the valves was recorded in some strata. The redox index ranged from no stains to light oxidizing stains. The A/J and C/V ratios indicate a stable community throughout the record. Despite some minor fluctuations, Assemblage I dominates the canal history (see Figure 16.4).

Samples from canal Feature 143 on the west-southwest wall in the Block 5 stripping area consisted of a reference sample (2 cm bcb) and three canal fill samples that held no fossils. Sediments ranged from gravelly sand to silty clay, the latter providing optimal conditions for microinvertebrates to settle. Nonetheless, no organisms or their fragments were recovered.

Samples were collected from canal Feature 144 where it was exposed on the west-northwest wall of Trench 212. The sample set consisted of a reference

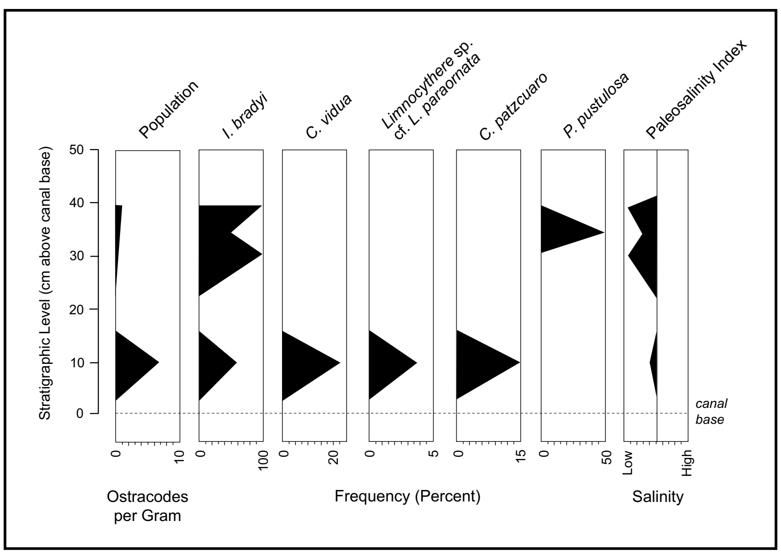

Figure 16.3. Ostracode valves per gram, relative frequencies of ostracode species, and paleosalinity index, by stratigraphic level, canal Feature 140, AZ BB:13:481 (ASM).

sample (2 cm bcb) and seven canal fill samples. Sediments consist primarily of sandy silty clay to clay suitable for microinvertebrates. Three samples—DA-RNA8-212-144-5/7—contained ostracodes. The dominant species is *I. bradyi*, representing more than 70 percent of the population, but *C. vidua*, *Cypridopsis* sp., and *D. stevensoni* became established later in the sequence (Figure 16.5). The taphonomic characteristics indicate low-to-moderate fragmentation and abrasion (5-15 percent), but no authigenic mineralization or coating. Valves are well preserved (no stains), as shown by the redox index. Adult specimens are the most abundant, but all samples include juveniles of most species (see Tables 16.3-16.4). Faunal assemblages evolved from Assemblage I to Assemblage III, and back to Assemblage I.

Canal Feature 146, exposed on the southern wall of Trench 253, provided a sample set consisting of a reference sample (2 cm bcb) and five canal fill samples. Sediments are primarily sandy silts that would have been optimal for microinvertebrates. Three samples—DA-RNA8-253-146-2/4—contained ostracodes. The dominant species, *I. bradyi,* alternates frequently with *C. vidua*, and less frequently with *H. brevicaudata* and *L*. sp. cf. *L. paraornata* (Figure 16.6). The taphonomic parameters show low-to-moderate fragmentation and abrasion (5-15 percent). No coating or authigenic mineralization is evident. The redox index shows well-preserved valves with no stains. Adults are dominant, but some species incorporated juveniles (see Tables 16.4-16.5). Throughout the record, faunal assemblages shifted from Assemblage I to Assemblage II, and returned to Assemblage I.

Samples collected from canal Feature 149 on the south-southwest wall of Trench 260 consisted of a reference sample (2 cm bcb) and six canal fill samples. Sediments range from gravelly sand to silty clay suitable for microinvertebrates. The canal was dug in cienega-like deposits. One sample, DA-RNA8-260-149-6, contained an almost monospecific ostracode record, *I. bradyi* (>96 percent), *C. vidua,* and *L*. sp. cf. *L. paraornata* (Figure 16.7). There was a low rate of fragmentation and abrasion (5-10 percent) and no evidence of coating or authigenic mineralization. Some stains are shown by the redox index. An almost-adult population was recorded (see Tables 16.4-16.5). Assemblage I entered the canal.

Samples were collected from canal Feature 154 on the southern wall of Trench 258. They consisted of two samples, one of them a reference (2 cm bcb). The canal was dug on top of a natural channel. Sediments consist of silty sand that is

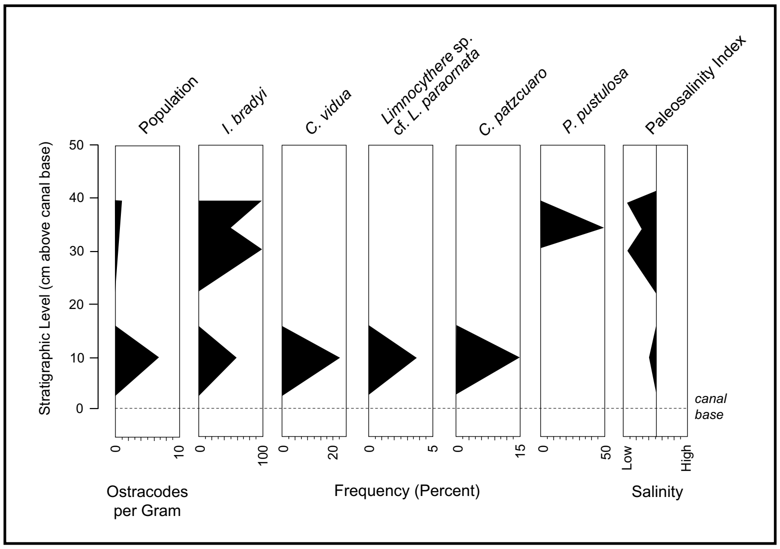

Figure 16.4. Ostracode valves per gram, relative frequencies of ostracode species, and paleosalinity index, by stratigraphic level, canal Feature 142, AZ BB:13:481 (ASM).

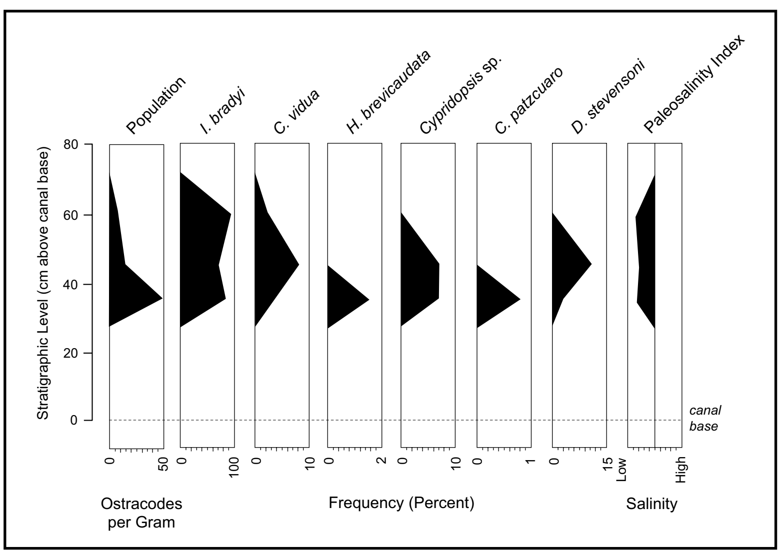

Figure 16.5. Ostracode valves per gram, relative frequencies of ostracode species, and paleosalinity index, by stratigraphic level, canal Feature 144, AZ BB:13:481 (ASM).

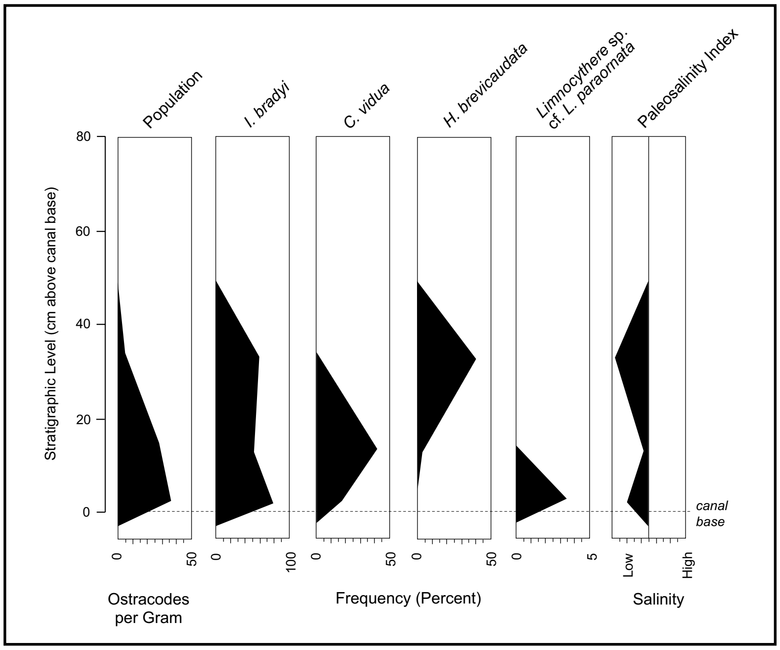

Figure 16.6. Ostracode valves per gram, relative frequencies of ostracode species, and paleosalinity index, by stratigraphic level, canal Feature 146, AZ BB:13:481 (ASM).

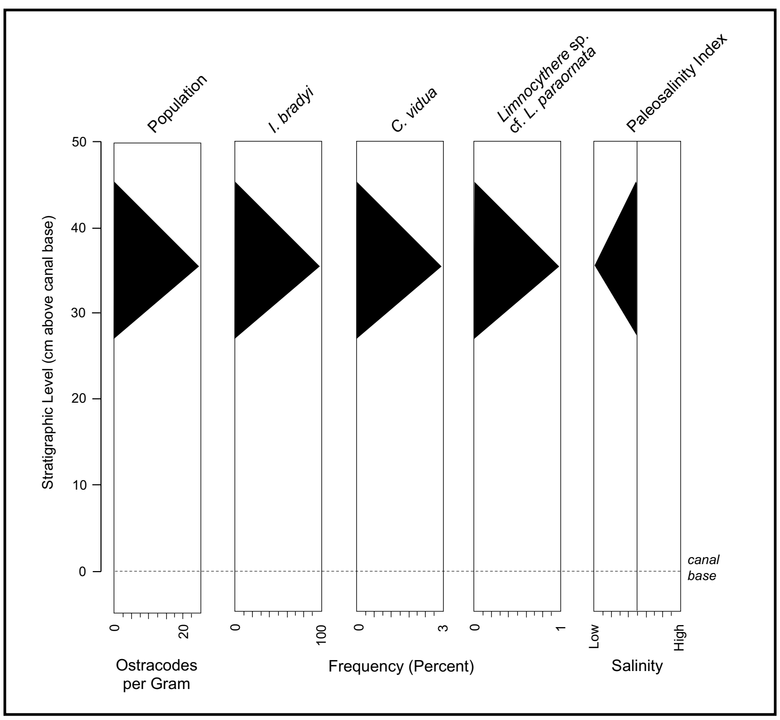

Figure 16.7. Ostracode valves per gram, relative frequencies of ostracode species, and paleosalinity index, by stratigraphic level, canal Feature 149, AZ BB:13:481 (ASM).

appropriate for microinvertebrates to settle. The two samples contained ostracodes. Surprisingly, sample DA-RNA8-258-154-1 contained some ostracodes, *I. bradyi* and *C. vidua*. This is explained by the origin of the substrate. The most diverse population is represented in sample DA-RNA8-258-154-2 (Figure 16.8), containing *I. bradyi*, *C. vidua*, *L.* sp. cf. *L. paraornata*, *Cypridopsis* sp., and *D. stevensoni*. Taphonomic parameters show low fragmentation and abrasion (5-10 percent), no authigenic mineralization or coating, and no stains (redox index). Adults dominate the assemblage, but *D. stevensoni* consisted of juveniles only (see Tables 16.4-16.5). Assemblage I entered the canal.

Historic-era Canals

Based on their stratigraphic contexts and artifact inclusions, five canal features (Features 138, 147, 148, 150, and 153) represent historic irrigation. Canal Feature 138 appears on an 1862 map as the "Acequia Madre Primera" (see Figure 1.2), and contained late nineteenth century European and Native American ceramics and other historic-era artifacts. Canal Feature 148 probably correlates with another canal shown on the 1862 map.

Samples collected from canal Feature 153 from the southern wall of Trench 258 where it overlies canal Feature 154 (see Figure 16.8) consists of two canal fill samples with a very poor ostracode record (see Table 16.5). Medium- to fine-grained sediments suitable for ostracodes are almost deprived of their fossils. A monospecific Assemblage I (*I. bradyi*) occurs in this canal. Low-to-moderate fragmentation and abrasion (5-25 percent) characterize the strata, and no other taphonomic features are relevant.

Samples from canal Feature 138 on the southern wall of Trench 202 consisted of a reference sample (2 cm bcb) and four canal fill samples containing a diverse and rich ostracode fauna (see Table 16.5). Fine-grained sediments are optimal for microinvertebrates (see Table 16.2). Seven species occurred throughout the record: *I bradyi*, followed by *C. vidua* and, more randomly, *L.* sp. cf. *L. paraornata*, *P. pustulosa*, *H. brevicaudata*, and *D. stevensoni*. *C. patzcuaro* occurs only in the cienega deposits underlying the canal (Figure 16.9). Taphonomic parameters show low-to-moderate fragmentation and abrasion (5-15 percent), no authigenic mineralization or coating, but light oxidizing stains (see Table 16.4). Balanced A/J and C/V ratios characterize the sequence (see Table 16.5). Assemblage I dominates the canal history.

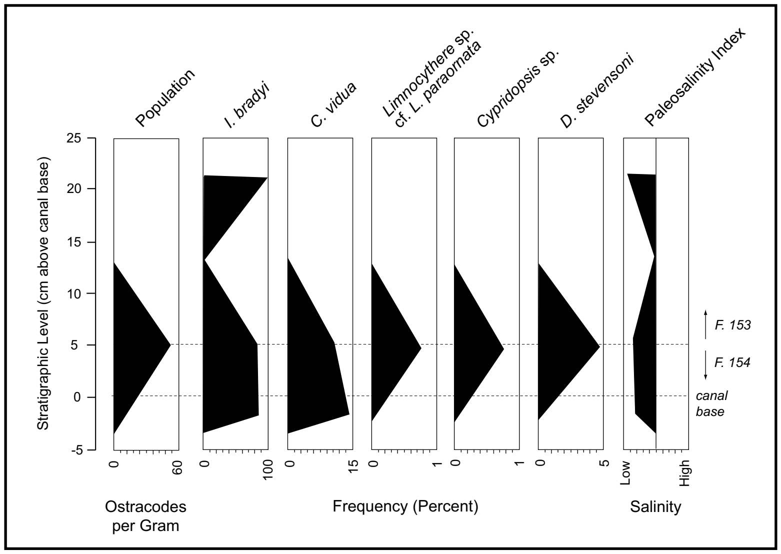

Figure 16.8. Ostracode valves per gram, relative frequencies of ostracode species, and paleosalinity index, by stratigraphic level, canal Features 153 and 154, AZ BB:13:481 (ASM).

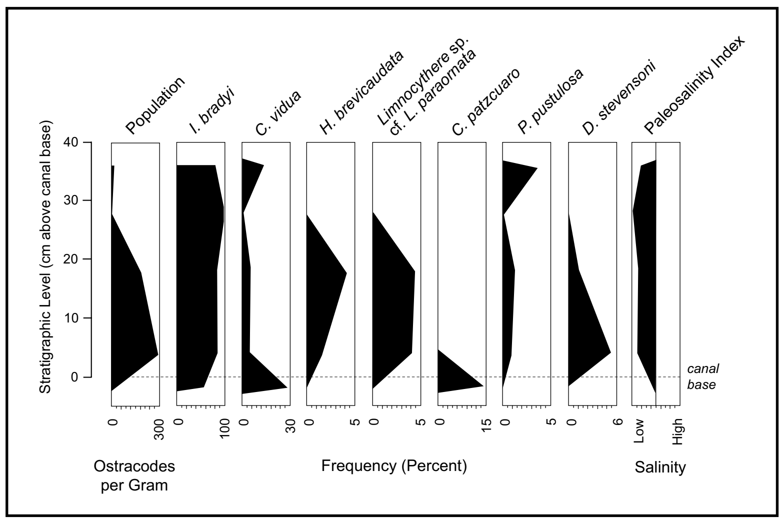

Figure 16.9. Ostracode valves per gram, relative frequencies of ostracode species, and paleosalinity index, by stratigraphic level, canal Feature 138, AZ BB:13:481 (ASM).

Canal Feature 147, on the southern wall of Trench 253, provided two canal fill samples. The feature was dug on top of the Hohokam canal Feature 146. Sediments consist of sandy silts optimal for microinvertebrates. Both samples held ostracodes, with *I. bradyi* and *C. vidua* the most abundant species. *L.* sp. cf. *L. paraornata* and *D. stevensoni* occurred occasionally (Figure 16.10). Taphonomic parameters show an increase from low-to-moderately high fragmentation and abrasion (5-30 percent). Other parameters show no or little effects on shells. For example, the redox index varies from no alteration to slightly oxidizing conditions. An adult population characterizes the sequence (see Tables 16.4-16.5). Assemblage II entered the canal, and Assemblage I replaced it until the end of the record.

Samples were collected from canal Feature 148 where it was exposed on the southern wall of Trench 253. These consisted of a reference sample (2 cm bcb) and two canal fill samples. Sediments consist primarily of silty sands suitable for microinvertebrates, but only the top sample (sandy silts) contains ostracodes—*I. bradyi*, *Cypridopsis* sp., and *D. stevensoni* (Figure 16.11). Taphonomic parameters show moderate fragmentation (15 percent) and low abrasion (5 percent), but no other effects. Adults dominate the population, but some juveniles occur (see Tables 16.4-16.5). Assemblage I settled in this canal.

Samples were collected from canal Feature 150 where it was exposed on the southern wall of Trench 253. These consisted of a reference sample (2 cm bcb) and two canal fill samples. The canal was dug into a cienega-like deposit. Upward through the sample sequence, the canal sediments grade from gravelly silty sand to silty sand. The occurrence of ostracodes in the reference sample results from the substrate origin. Five species occur: *I. bradyi*, *C. vidua*, *L.* sp. cf. *L. paraornata*, *D. stevensoni*, and *P. unicaudata* (Figure 16.12). Taphonomic features show low fragmentation

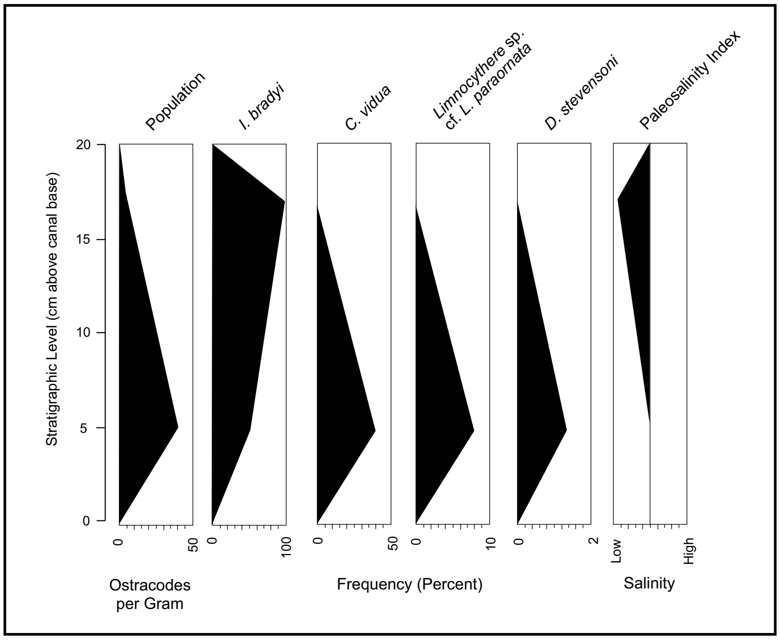

Figure 16.10. Ostracode valves per gram, relative frequencies of ostracode species, and paleosalinity index, by stratigraphic level, canal Feature 147, AZ BB:13:481 (ASM).

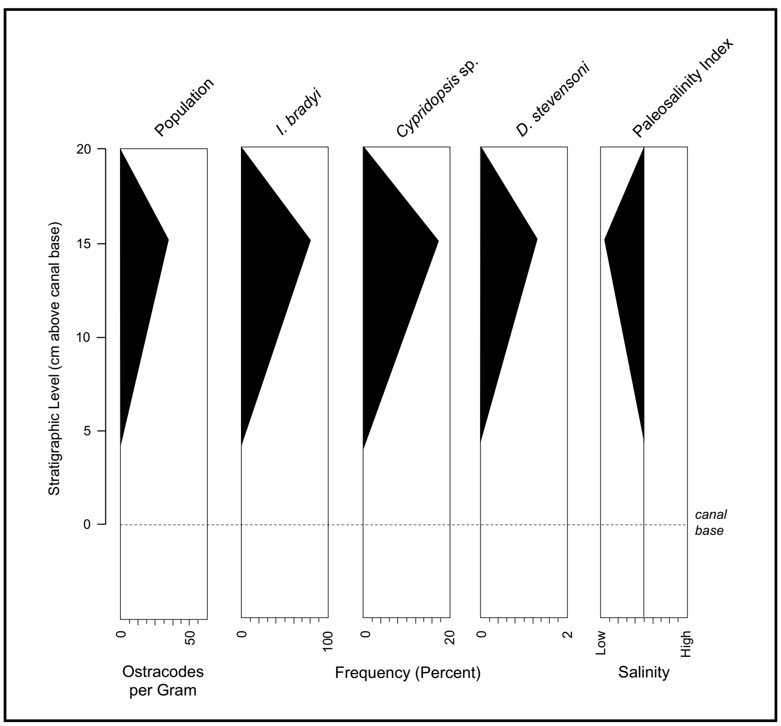

Figure 16.11. Ostracode valves per gram, relative frequencies of ostracode species, and paleosalinity index, by stratigraphic level, canal Feature 148, AZ BB:13:481 (ASM).

and abrasion (5 percent) and no other effects. Only adults occur in this canal (see Tables 16.4-16.5). Assemblage II entered the canal.

Interpretations of Canal Ostracode Records from the Congress Street/ Brickyard Loci, the Clearwater Site, AZ BB:13:6 (ASM)

Four Early Agricultural period canals were documented at the Congress Street/Brickyard loci. Canal Feature 139 is a large canal about 3.6 m wide and 71 cm deep, filled with seven lithostratigraphic units. The thicknesses of the units suggest a long-term, fast-flowing discharge that decreased gradually over time. Lack of ostracodes or their fragments in the lower 45 cm is consistent with fast flow. Occurrence of these microinvertebrates afterward implies decreasing flow that ended abruptly. A detailed sampling above the last interval would provide information about the final stages of this canal. However, current data suggest a prolonged canal operation with at least two pulses of water input before the arrival of ostracodes, and two more during late stages containing ostracodes.

The faunal Assemblage I strongly dominated by *I. bradyi* is consistent with the interpretation of dilute water input; however, it is unwarranted to place a minimum and maximum salinity range because other species occurred very randomly. *I. bradyi*'s tolerance ranges from 100-4,000 mg l^{-1} TDS (Delorme 1989; Palacios-Fest 1994); therefore, the salinity range of Feature 139 could not exceed either limit. Considering the rare occurrences of *P. pustulosa* (salinity tolerance = 100-600 mg l^{-1} TDS) and *D. stevensoni* (50-2,000 mg l^{-1} TDS), canal salinity did not exceed 600 mg l^{-1} TDS at the time of canal operation. The paleosalinity index is in good agreement with dilute water input (see Figure 16.2).

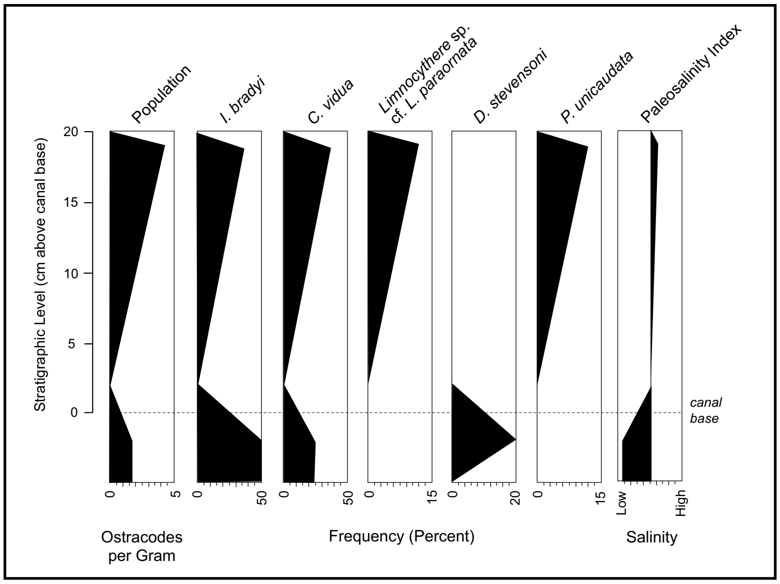

Figure 16.12. Ostracode valves per gram, relative frequencies of ostracode species, and paleosalinity index, by stratigraphic level, canal Feature 150, AZ BB:13:481 (ASM).

Canal Feature 140 is a large canal approximately 3.4 m wide and 45 cm deep, consisting of six lithostratigraphic units. The thicknesses of the sediment units suggest a continuous streamflow marked by two input pulses. Streamflow was moderate to low after initial discharge, as suggested by sediment grain sizes. The ostracode record is consistent with the canal sedimentological composition. A relatively diverse (four species) Assemblage II entered the canal. *I. bradyi* and *C. vidua,* associated with *C. patzcuaro* and *L.* sp. cf. *L. paraornata,* occur as streamflow declines. Only the first two species settled and developed communities. The other two were more likely introduced; no adults of *C. patzcuaro* and a single valve of *L.* sp. cf. *L. paraornata* occurred. The salinity tolerances of *I. bradyi* and *C. vidua* both range from 100-4,000 mg l^{-1} TDS (Delorme 1989; Palacios-Fest 1994). Occurrence of *C. patzcuaro* juveniles suggests stressful conditions for the species, preventing maturation. Presence of *L.* sp. cf. *L. paraornata* implies moderate-to-high salinity (<5,000 mg l^{-1} TDS; R. Forester, personal communication 2001) and may also indicate winter or snowmelt discharge. *C. vidua* may live in cold waters but its preferred temperature for hatching is about 13°C (Taylor 1991). Therefore, for the species to settle a biocenosis, water temperature had to be greater than 13°C; thus, the interpretation of cold-water input may be discarded. As water flow continued, more dilute conditions prevailed as *I. bradyi* and *P. pustulosa* (100-600 mg l^{-1} TDS; Delorme 1989; Palacios-Fest 1994) entered the canal. The paleosalinity index is consistent with salinity fluctuations shown in canal Feature 140 (see Figure 16.3).

Canal Feature 141 is a small (roughly 1.22 m wide) and shallow (about 40 cm deep) canal consisting of a truncated lithostratigraphic unit. The unit's thickness and sedimentological composition indicate short-term canal operation. However, loss of the upper part and lack of ostracodes prevents any further interpretation. The fact that sediment grain size declined rapidly after initial water input is consistent with a short-term canal operation (see Table 16.2).

Feature 152 is a large canal about 2.65 m wide and 56 cm deep, consisting of two lithostratigraphic units. The thickness of the units suggests a continuous water input. The slightly sandier deposit, sample DA-RNA8-267-152-3, implies an increase in streamflow that rapidly declined. It is deprived of ostracodes or their fragments. As mentioned earlier, sediment composition suggests a fast-flowing discharge followed by a rapid desiccation that left very little clay. This canal may have been used for a short time and then failed.

Six features (Features 142, 143, 144, 146, 149, and 154) provided the history of Hohokam irrigation in the area. Feature 142 is a small (circa 1.25 m wide), deep (circa 60 cm) canal consisting of two lithostratigraphic units. The thicknesses and grain-size compositions of the units suggest a sustained, slow streamflow. The ostracode record is consistent with this interpretation. Faunal Assemblage I dominates the canal history. *I. bradyi* entered the canal that was initially dug into a cienega soil (containing ostracodes as well). Other species occurred in low proportions and were introduced as juveniles unable to settle, except *C. vidua*, due to stressing conditions (see Figure 16.4). Canal operation probably lasted over a month, as the life cycle of *C. vidua* takes that long (Anderson et al. 1998; Kesling 1951). However, the duration of flow was less than three months, as other species such as *C. patzcuaro*, *C. caudata,* and *P. unicaudata* (represented by juveniles) require at least that long to reach maturity (R. Forester, personal communication 1988). Fine grain size and the thickness of the unit do not seem to support a short-term canal operation as suggested by the ostracode record; therefore, other stressing conditions may have prevented these species from completing their life cycles. All species present tolerate a similar salinity range as *I. bradyi* and *C. vidua* (100-4000 mg l^{-1} TDS), except *P. pustulosa* (100-600 mg l^{-1} TDS). Thus, other parameters in the water chemistry may be responsible for a stressful environment. The paleosalinity index is consistent with long-term freshwater input (see Figure 16.4).

Feature 143 is a small, shallow (about 1.2 m wide and 33 cm deep) Hohokam canal. In contrast with other canals of this time, it is relatively shallow and deprived of microinvertebrates. Sediment grain size (silty clay) suggests an optimal substrate for establishing a biocenosis. The relatively thin sedimentologic sequence consisting of a lithostratigraphic unit suggests a short-term canal operation. Lack of organisms may only be explained if the canal did not operate for a long time and water flow was fast enough to wash them out. The geomorphologic and sedimentologic studies will provide a better perspective to understand this canal.

Feature 144 is a medium-to-large canal roughly 1.65 m wide and 74 cm deep, with a fill consisting of three lithologic units. The thick sedimentologic sequence suggests a long-term canal operation similar to that of canal Feature 137 at the San Agustín Mission locus (see below). The canal was cut into cienega-like deposits. Fast-flow input characterized this canal. The faunal assemblage is diverse but limited to the latter stages of canal operation. The extreme abundance of *I. bradyi* throughout the record strongly suggests freshwater input (Assemblage I). Transition to Assemblage III is indicated by the occurrence of *D. stevensoni* and *H. brevicaudata*, suggesting salinity was not higher than 2,000 mg l^{-1} TDS, and more likely, much lower, because *C. patzcuaro* establishes at a minimum salinity of 200 mg l^{-1} TDS (Delorme 1989; Forester 1991; Palacios-Fest 1994). *Limnocythere staplini*, absent in this region, is not observed at any of the Tucson Basin canal sites studied to date (León Farmstead, Thiel et al. 2005; Las Capas, Palacios-Fest et al. 2001). This suggests that water chemistry remained in the pathway of type I (dilute) of Eugster and Hardie (1978), despite the presence of tufa.

The presence of an adult and a juvenile population supports a well-established biocenosis in the canal. Low-to-moderate effects of taphonomic features also suggest an autochthonous assemblage. The canal was fed during the early spring, as shown by the paleosalinity index (see Figure 16.5). The pattern is similar to that of canal Feature 137 at the San Agustín Mission locus (see below). In contrast to the latter, canal Feature 144 held an Assemblage I population the entire time. The paleosalinity index is consistent with a low salinity range throughout the record (see Figure 16.5).

Feature 146 is a medium-to-large canal about 1.5 m wide and 70 cm deep, with a fill consisting of a travertine-rich lithologic unit. The thick sedimentologic sequence suggests a long and continuous canal operation. The canal was dug into an abandoned natural channel of the Santa Cruz River. Fast-flowing input characterized this canal. The faunal assemblage is not diverse, being limited to four species—*I. bradyi*, *C. vidua*, *H. brevicaudata,* and *L.* sp. cf. *L. paraornata*—and restricted to the initial water-input stages. *I. bradyi* dominates the sequence (Assemblage I). *C. vidua* (Assemblage II) became established for a short episode and was replaced by *H. brevicaudata* (Assemblage I). The presence of *L.* sp. cf. *L. paraornata* is fortuitous (two adult valves recovered). *I. bradyi* and *C. vidua* tolerate a maximum salinity of 4,000 mg l^{-1} TDS; however, *H. brevicaudata* is limited to less than 3,000 mg l^{-1} TDS (Delorme 1989; Forester 1991; Palacios-Fest 1994). Regarding canal Feature 144 (and canals elsewhere in the Tucson Basin), the absence of *L. staplini* highlights the difference in water sources from the Phoenix Basin. The paleosalinity index is consistent with the ostracode salinity tolerance ranges (see Figure 16.6).

For a brief interval (Assemblage II), the water chemistry evolved to pathway type II (Ca-rich) of Eugster and Hardie (1978) but rapidly returned to Assemblage I, this time with the strong presence of *H. brevicaudata*, another streamflow indicator. The Assemblage I prevalent conditions are consistent with Tadayon and Smith's (1994) and Tadayon's (1995) water chemistry records for the Rillito Creek basin, which may be extended to the Santa Cruz River basin. The adult-dominated population is consistent with a permanent, fast-flowing input to the canal. Taphonomic characteristics do not indicate a reworked fauna. An explanation for the short transition to Assemblage II is that it represents a summer canal operation. The unit thickness and uniformity suggest that the canal was used for a long time and that flow was continuous. Transition to Assemblage II may have resulted from summer temperatures rather than human activity. Absence of ostracodes to the end of the record may be the result of low water temperatures from late fall to late winter, assuming this canal was used year-round (during the last year of operation).

Feature 149 is a medium-to-large canal about 1.50 m wide and 1.15 m deep, with a fill consisting of five lithologic units. The thick sedimentologic sequence suggests episodes of prolonged canal operation. Water control is evident from stratigraphy and grain-size data. The canal was cut into paleochannel sediments and across the cienega-like deposit. Episodes of fast flow characterized the canal. Ostracodes are absent throughout all units but one (see Figure 16.7). The occurrence of fossils in a sandy silty clay unit indicates streamflow decreased. *I. bradyi* dominates the assemblage (Assemblage I). A few specimens of *C. vidua* and *L.* sp. cf. *L. paraornata* entered the system.

The taphonomic parameters are not indicative of a transported fauna; however, the A/J and C/V ratios suggest an allochthonous population. Assemblage I briefly entered the canal. The paleosalinity may not be a realistic indicator of water salinity, because it is strongly biased by a single event. It does not, however, diverge from trends observed in other canals of this age (see Figure 16.7).

Feature 154 is a small- to medium-sized (approximately 1.7 m wide), shallow (circa 25 cm deep) canal with a fill consisting of two lithostratigraphic units. The thicknesses and grain-size composition of the units suggest short-term, slow-to-moderate streamflow. The ostracode record supports this hypothesis. The faunal Assemblage I dominated the history of the canal. The occurrence of *D. stevensoni* juveniles suggests the canal did not operate long enough for this species to reach maturity (six months; Andrew Cohen, personal communication 1992). *I. bradyi* and *C. vidua* settled a biocenosis; therefore, a month-long, or slightly longer, canal operation is plausible. However, at Trench 258, Feature 154 is truncated by historic canal Feature 153, limiting any further interpretation. Dilute water entered and remained in the canal, as suggested by the paleosalinity index (see Figure 16.8) and by the occurrence of *D. stevensoni* (50-2000 mg l^{-1} TDS) (Delorme 1989; Palacios-Fest 1994).

Five canal features (Features 138, 147, 148, 150, and 153) contributed to understanding irrigation during historic times. Feature 153 is a small canal (circa 90 cm wide and 25 cm deep) dug into the Hohokam canal Feature 154, and its fill consists of a single lithostratigraphic unit. Slow streamflow is suggested by the thickness and grain-size composition of the unit. However, the ostracode record is meager and monospecific toward the end of the canal history, suggesting a short-term canal operation that only introduced a few adults of *I. bradyi*. The paleosalinity index indicates freshwater input, although the signal may be biased due to the absence of other species (see Figure 16.8).

Feature 138 is a small- to medium-sized canal (about 1.15 m wide and 40 cm deep), cut by the plowzone, consisting of a single lithostratigraphic unit. The thickness and grain-size composition of the unit indicate a moderately fast discharge. The occurrence of an Assemblage I-dominated fauna is consistent with this interpretation. *I. bradyi* dominates the history of the canal, with minor occurrences of *C. vidua*, *H. brevicaudata*, *L.* sp. cf. *L. paraornata*, *P. pustulosa*, and *D. stevensoni* – all of which established communities (see Table 16.5). For *D. stevensoni* to settle implies the canal was active for a prolonged period, perhaps longer than six months; for *P. pustulosa* to be present, salinity did not exceed 600 mg l^{-1} TDS (Delorme 1989; Palacios-Fest 1994). The paleosalinity index is consistent with a permanent freshwater input during canal operation (see Figure 16.9).

Feature 147 is a medium-sized canal, wide (approximately 1.4 m) but shallow (26 cm deep), with a fill consisting of a single lithostratigraphic unit. The sedimentologic composition of this unit suggests a single, continuous use of the canal. The canal was dug into parts of two Hohokam canals, Features 146 and 154. The lithology shows no significant changes in streamflow velocity (see Table 16.2). The faunal composition is not diverse. Four species occur in this canal, with *I. bradyi* and *C. vidua* dominating, and *L.* sp. cf. *L. paraornata* and *D. stevensoni* poorly represented. Initially, all four species entered the canal and became established (Assemblage II). Later, *I. bradyi* was the only poorly represented species present (Assemblage I). The taphonomic features range from low fragmentation and abrasion (5-10 percent) and no other effects, to low-to-high fragmentation and abrasion (10-30 percent) and increasing stains in valves (indicative of oxidizing conditions). Adults dominated the sequence, although juveniles were present and well preserved, suggesting a permanent biocenosis at the time. The transition from Assemblage II to Assemblage I suggests a change in streamflow input; increasing velocity may have resulted in the monospecific assemblage.

This is not consistent, however, with the sedimentologic data. Fine particle concentration increases toward the end of the canal history, suggesting canal operation stopped, with subsequent desiccation of soils. This explanation is consistent with the monospecific and poor fossil record. The canal was used for only a brief period. The paleosalinity may not be an accurate indicator of water salinity. Regardless of the absence of *L. staplini*, salinity may have increased to the upper limits of *I. bradyi* (4,000 mg l^{-1} TDS) (Delorme 1989; Palacios-Fest 1994) as the assemblage became monospecific toward the end of the record. The paleosalinity index shows a permanent freshwater input consistent with this interpretation (see Figure 16.10).

Feature 148 is a medium-sized canal, wide (circa 1.8 m) but shallow (circa 22 cm), consisting of a single lithologic unit. Sediments suggest a single-event, moderately fast flow (see Table 16.2). The canal was cut into the paleochannel deposits across the cienega-like soil. The faunal record is strongly dominated by *I. bradyi* in the upper part of the sequence. *Cypridopsis* sp. and *D. stevensoni* also occur. The former, as well as *I. bradyi*, formed a biocenosis; the latter was more likely washed in. The moderate taphonomic parameters indicate at least part of the population was transported. In contrast, the relatively significant occurrence of juvenile valves shows a stable population. After a quick introduction to the system, ostracodes settled and formed a biocenosis. Again, Assemblage I characterizes the canal, and the paleosalinity index suggests freshwater input sustained the introduction of *D. stevensoni* (see Figure 16.11). A detailed analysis of *Cypridopsis* sp. is necessary to recognize the species and its ecological needs.

Feature 150 is a medium-sized canal, wide (about 1.5 m) but shallow (about 29 cm deep), with a fill consisting of a single lithologic unit. Like the other historic-era canals, a single event of moderately fast flow is indicated. The canal was dug into the cienega-like soil. Ostracodes occur at the contact with the cienega-like sediments and the top of the sequence. The former is evidently not significant to this study, other than to verify the source of organisms to the environment. In contrast, the latter reflects the introduction of an allochthonous fauna strongly dominated by adult *I. bradyi*, *C. vidua*, *L.* sp. cf. *L. paraornata,* and *P. unicaudata*. The occurrences of *P. unicaudata* and *L* sp. cf. *L. paraornata* are fortuitous, as they were reworked; however, they indicate increasing salinity of input water, as *P. unicaudata* tolerates ranges greater than 4,000 mg l^{-1} TDS (Delorme 1989). The exclusively adult population indicates an allochthonous Assemblage II. The paleosalinity index is consistent with this interpretation (see Figure 16.12).

Summary

Ostracode records of canals in the Congress Street/Brickyard loci allow a better understanding of the history of irrigation in the Santa Cruz River floodplain. The records are consistent with previous findings at Las Capas (Palacios-Fest and Davis 2006; Palacios-Fest et al. 2001) and at the San Agustín Mission locus (see below). The faunal composition is similar, suggesting a similar source of water (the Santa Cruz River). Also, *I. bradyi* is the most abundant species across the site, followed by *C. vidua*. Other species appeared and disappeared at several intervals.

Absence of *L. staplini* in canals in the Tucson Basin contrasts with its abundance and frequent dominance in canals in the Phoenix Basin (Palacios-Fest 1994). A preliminary interpretation is that the Tucson and Phoenix basins are fed by two substantially different fluvial systems with contrasting water chemistries (Hem 1985; Tadayon 1995; Tadayon and Smith 1994). The occurrence of *L.* sp. cf. *L. paraornata* suggests water salinity was not as high as that of the Salt River (Hem 1985). A more detailed ecological analysis of species present in the Phoenix and Tucson basins is needed.

This study of canals in the Congress Street/Brickyard loci confirms previous interpretations about the evolution of canal operation from the Early Agricultural to the Hohokam periods (Palacios-Fest et al. 2001). Further, the historic use of canals shows a different pattern. For example, ostracode faunal assemblages are significantly more diverse during Hohokam periods than they were at the earlier stages or during historic times. While the transition from Early Agricultural to Hohokam irrigation has been explained as the technological evolution of water management (Palacios-Fest et al. 2001), ostracode records of canal operation during historic times indicates a different strategy. Hohokam farmers mastered canal operation and succeeded in sustaining long-term flows in the canals. During historic times, farmers introduced fast-flowing water for short intervals, probably before the summer monsoon season. Evidence to support this interpretation is that historic-era canals hosted a primarily adult population associated with upward grading sediments in relatively thin lithologic units.

RESULTS FROM CANALS IN THE SAN AGUSTÍN MISSION LOCUS, THE CLEARWATER SITE, AZ BB:13:6 (ASM)

Sediment samples from four of the five canal features identified in the San Agustín Mission locus were analyzed for ostracode records. Canal Features 53 and 127 date to the Cienega phase (800 B.C.-A.D. 50) of the Early Agricultural period. Based on the radiocarbon dates obtained from pit structures originating in the same alluvial stratum (see Chapter 19), these canals were probably built between 500 and 400 B.C. The Hohokam canal Feature 137 cut through a Cienega phase pit structure and its fill contained plain ware pottery sherds; however, the latter were not diagnostic of a specific phase or period. Because it cuts into a pit that contained European ceramics dating to the 1850s and 1860s, the historic-era canal Feature 9 was probably dug in the 1860s, near the beginning of the American Territorial period.

Table 16.2 shows the sample identification number, stratigraphic level (from base of canal), bulk and residual weight, lithology, and color (and color code) of sediment residuals. The samples consist primarily of pale yellowish-brown (10YR 6/2) to dusky brown (5YR 2/2), occasionally moderate brown (5YR 3/4), gravelly sandy silts to silty clay. The dominant minerals recognized in these canals are quartz, tufa (or travertine) biotite, muscovite, charcoal, feldspars, and shell and rock fragments. Other common minerals present are glass, pegmatite, and manganese nodules (at the base of the Hohokam canal Feature 137). Other minerals or man-made materials occur occasionally (see Table 16.3).

The biological contents of the canals and the taphonomic characteristics recorded are summarized in Table 16.4. Ostracodes, molluscs, and gyrogonites of Characeae are shown quantitatively; the plant debris is only marked when present. Table 16.5 shows the ostracode total population by sample, as well as the total and relative abundance by species per sample. The C/V and A/J ratios, by species, are also listed to establish biocenosis.

Eight species of ostracodes were identified in samples from canals in the San Agustín Mission locus. *Ilyocypris bradyi* was the most common and abundant species present, followed by *Cypridopsis vidua* and *Darwinula stevensoni*. The remaining five species occurred occasionally in the canals: *Herpetocypris brevicaudata*, *Limnocythere* sp. cf. *L. paraornata*, *Candona caudata*, *Physocypria pustulosa*, and *Potamocypris unicaudata*. Based on the occurrence and relative abundance, three assemblages were recognized. Assemblage I is dominated by *I. bradyi*, a streamflow indicator; Assemblage II is dominated by *I. bradyi* and *C. vidua*, a transitional assemblage; and Assemblage III is dominated by *C. vidua*, reflecting increasing salinity conditions. Assemblages II and III occur in the Hohokam period Feature 137 canal and in the American Territorial period Feature 9 canal. The hydrochemical evolution suggested from Assemblage I to Assemblage III shows increasing salinity, although water remained fairly dilute as *I. bradyi* and *D. stevensoni* occurrence was significant. The faunal association is consistent with the water chemistry type I (dilute) and type II (Ca-rich, dominated by Na^{+}, Mg^{2+}, and SO_4^{2-}) of Eugster and Hardie (1978). This association is very similar to that found at Las Capas (Palacios-Fest and Davis 2006; Palacios Fest et al. 2001). Similarly, the occurrence of *Limnocythere* sp. cf. *L. paraornata* is related to the period of cienega-like conditions.

For each canal, the sequence of species distribution and inferred paleoecology is used to interpret environmental conditions, through time, in the canals. The paleosalinity index developed for each canal is shown in the left-hand side of each figure. All fossiliferous samples are characterized by a small population (1-99 individuals per sample) and low diversity (one to eight species). Based on Delorme (1969, 1989), taphonomic parameters are used to distinguish allochthonous from autochthonous populations.

Cienega Phase Canals

The set of samples from Feature 53 consists of 14 samples collected from several different trench exposures. From west to east, the samples are grouped as follows: DA-RNA2-53-12 to -14, the westernmost exposure (Figure 16.13a); DA-RNA2-53-1 to -3, the next exposure to the east (Figure 16.13b); DA-RNA2-53-4 and -5, east from the former (Figure 16.13c); DA-RNA2-53-6 to -9, the following exposure to the east (Figure 16.13d); DA-RNA2-53-10 and -11, the easternmost exposure (Figure 16.13e). Five ostracode species were identified along this canal: *I. bradyi*, *C. vidua*, *H. brevicaudata*, *P. unicaudata*, and *D. stevensoni*. Most samples are either monospecific (*I. bradyi*) or have two species (*I. bradyi* and *C. vidua*). The two distal segments of this canal host the remaining three species (see Figure 16.13d-e). The taphonomic properties of the specimens recovered range from no fragmentation to 50 percent, low-to-moderate abrasion (5-20 percent), low authigenic mineralization (5 percent), and occasional moderate coating (30 percent). The redox index of the specimens shows good preservation, with occasional light orange stains. Adult specimens are the most abundant, and an articulated carapace was recovered in only one sample (see Tables 16.4-16.5).

The column of samples collected from Feature 127 in the east-northeast wall of Trench 19 consisted of a reference sample 6 cm below the canal base (unfossiliferous) and four canal fill samples containing a monospecific and poor ostracode record (Figure 16.14). The main taphonomic characteristics ranged from no fragmentation to 30 percent, moderately low abrasion (10-15 percent), and no authigenic mineralization or coating. The redox index shows no stains of any kind (clear to white valves). Only disarticulated and adult valves were recovered (see Tables 16.4-16.5).

Hohokam Canal

Feature 137, with a width of 1.88 m and a depth of 1.30 m, is one of the largest prehistoric canals documented during the Rio Nuevo project. A total of 31 samples was collected from this feature, including a reference sample from the alluvial unit 1 underlying the canal. The complex canal stratigraphy allowed separate groupings and presentation of summary diagrams in Figure 16.15. Units 6 and 7 (samples 1-8 and 13-15, respectively) document a sediment unit representing the longest continuous canal operation; it is approximately 62 cm thick and contains four species (see Figure 16.15a). Unit 7b (samples 9-12) is a small segment cut by Unit 8 on the western side of the feature. The assemblage is dominated by *I. bradyi* throughout the stratigraphic column and is the only species present in the lower 30 cm of the sequence. Thereafter, it shares abundance with *C. vidua*, *H. brevicaudata,* and *D. stevensoni*.

The taphonomic parameters show a moderate-to-high fragmentation (15-40 percent), low-to-moderate abrasion (5-20 percent), no authigenic mineralization and coating in Units 6 and 7, but moderately high

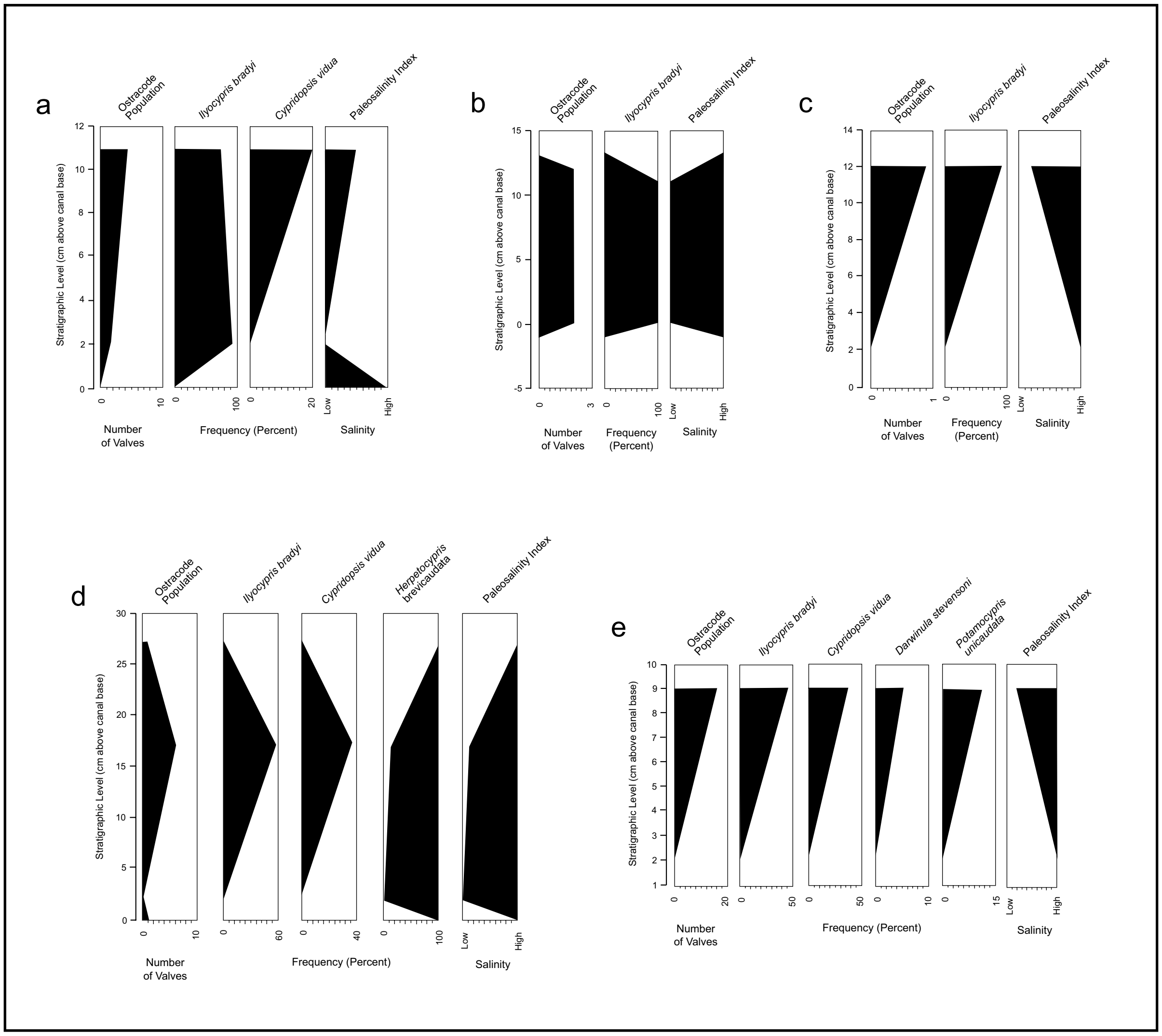

Figure 16.13. Ostracode valves per gram, relative frequencies of ostracode species, and paleosalinity index, by stratigraphic level, canal Feature 53, AZ BB:13:481 (ASM).

mineralization (30 percent) and relatively low coating (10-15 percent) in Unit 7b. The redox index shows a similar pattern—no stains in samples 1-8 but orange stains in samples 13-15. The ostracode population consists primarily of disarticulated adult valves (see Tables 16.4-16.5).

Unit 8 samples (9-12) overlap with those from Unit 7b, which filled a cut that reshaped the canal. Therefore, the Unit 8 ostracode record is shown separately (see Figure 16.15b). Six species occur in this unit, dominated by *I. bradyi* and *C. vidua*, with minor occurrences of *H. brevicaudata*, *Limnocythere* sp. cf. *L. paraornata*, *P. pustulosa,* and *D. stevensoni*. The taphonomic record indicates relatively low-to-moderate fragmentation (10-20 percent) and abrasion (10-15 percent). Authigenic mineralization and coating are low (5-10 percent), and the redox index ranges from unstained to orange valves. The ostracode record shows abundance of juveniles throughout the stratigraphic sequence but only one articulated carapace (see Tables 16.4-16.5). It is not clear if Units 8, 9, and 10 represent a continuous event or three independent flow episodes. Therefore, Units 9 and 10 are grouped separately.

Unit 9 and part of Unit 10 are grouped in Figure 16.15c, which represents another interval of long-term canal operation, followed by abandonment (samples 16-19 and 25-26). It contains seven species, with *C. vidua* as the most abundant throughout the record, associated with *I. bradyi* and the minor occurrence of *H. brevicaudata*, *Limnocythere* sp. cf. *L. paraornata*, *C. caudata*, *P. pustulosa*, and *D. stevensoni*. The taphonomic features indicate low fragmentation and abrasion (5-15 percent), but the valves show some evidence

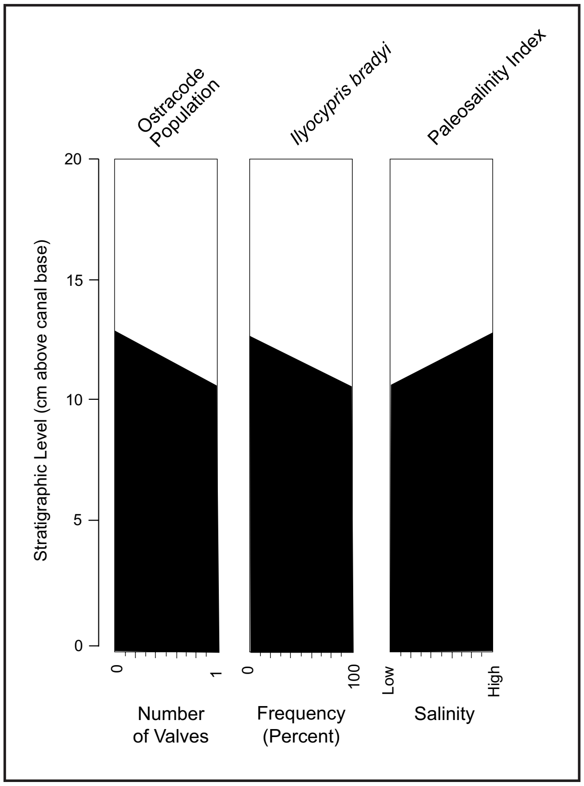

Figure 16.14. Ostracode valves per gram, relative frequencies of ostracode species, and paleosalinity index, by stratigraphic level, canal Feature 127, AZ BB:13:481 (ASM).

of authigenic mineralization and coating (5-10 percent). The redox index may be as high as brownish-orange, but usually shows no stains (see Tables 16.4-16.5).

On the western extreme of the canal exposure, a reshaped canal was sampled in part of Unit 10 (b). Five samples (20-24) document this sequence, with *I. bradyi* and *C. vidua* the dominant species (see Figure 16.15d). Other species, *Limnocythere* sp. cf. *L. paraornata* and *D. stevensoni*, occur occasionally. Fragmentation and abrasion are low (5-15 percent); authigenic mineralization and coating are also low (5-10 percent). The redox index of these valves is very low, indicating no stains (clear to white) (see Tables 16.4-16.5).

On the wall (southeast) opposite the exposure of Feature 137, overbank deposits were sampled in the attempt to correlate them with the history of the canal. Five samples (27-31) document two possible overbank deposits. The lower one, stratigraphically associated with canal-use sediments, is deprived of ostracodes. The upper overbank deposit contains ostracode valves in only the top sample (31). *I. bradyi*, *C. vidua*, and *Limnocythere* sp. cf. *L. paraornata* were the only three species present (see Figure 16.15e). Fragmentation and abrasion are low (10 percent); no evidence of authigenic mineralization or coating was recorded. The redox index shows clear valves. Articulated carapaces of adult *I. bradyi* are abundant. The other two species consist of juvenile and adult disarticulated valves (see Tables 16.4-16.5).

American Territorial Period Canals

Two canals (Features 3 and 9) were built during the American Territorial period. They were exposed at the San Agustín Mission locus in Trenches 101, 102, and 103. Feature 3 (sampled in Trench 103) contained no ostracodes, and is not discussed further. Four samples were collected from Feature 9 in Trench 101 (see Tables 16.4-16.5). At the base of the canal, Assemblage I is monospecific, consisting of *I. bradyi.* However, it suddenly reaches the highest abundance (99 individuals) and diversity (six species) among the analyzed ostracode records. It is dominated by *I. bradyi* and *C. vidua* (Assemblage II), with minor occurrence of *D. stevensoni*, *H. brevicaudata*, *P. pustulosa*, and *Limnocythere* sp. cf. *L. paraornata*. Then, *C. vidua* becomes the dominant species (Assemblage III) at the end of the record, followed by *D. stevensoni*, *I. bradyi*, *P. pustulosa*, *H. brevicaudata,* and *Limnocythere* sp. cf. *L. paraornata* (Figure 16.16). Fragmentation and abrasion are low (5-10 percent), authigenic mineralization and coating were absent or low (10 percent), and the redox index showed little staining of the valves (light orange). A diverse suite of adult and juvenile valves and carapaces was recovered (see Tables 16.4-16.5).

Interpretations of Canal Ostracode Records from the San Agustín Mission Locus, the Clearwater Site, AZ BB:13:6 (ASM)

Features 127 and 53, the Cienega phase canals, are characterized by a very similar ostracode assemblage, dominated by *I. bradyi*. The sedimentological composition in both features is also quite similar, grading to finer grain size from west to east. This characteristic is significant, because the ostracode assemblage—that is almost monospecific at Feature 127 and the first three segments of Feature 53—holds a more diverse association in the same direction. The canal appears to have been fed by a spring or high water table in a cienega in the floodplain at the base of A-Mountain. The occurrence of *C. vidua* in one of these segments, and later toward the east, supports this interpretation. The dominant adult composition and the taphonomic characteristics of the assemblage

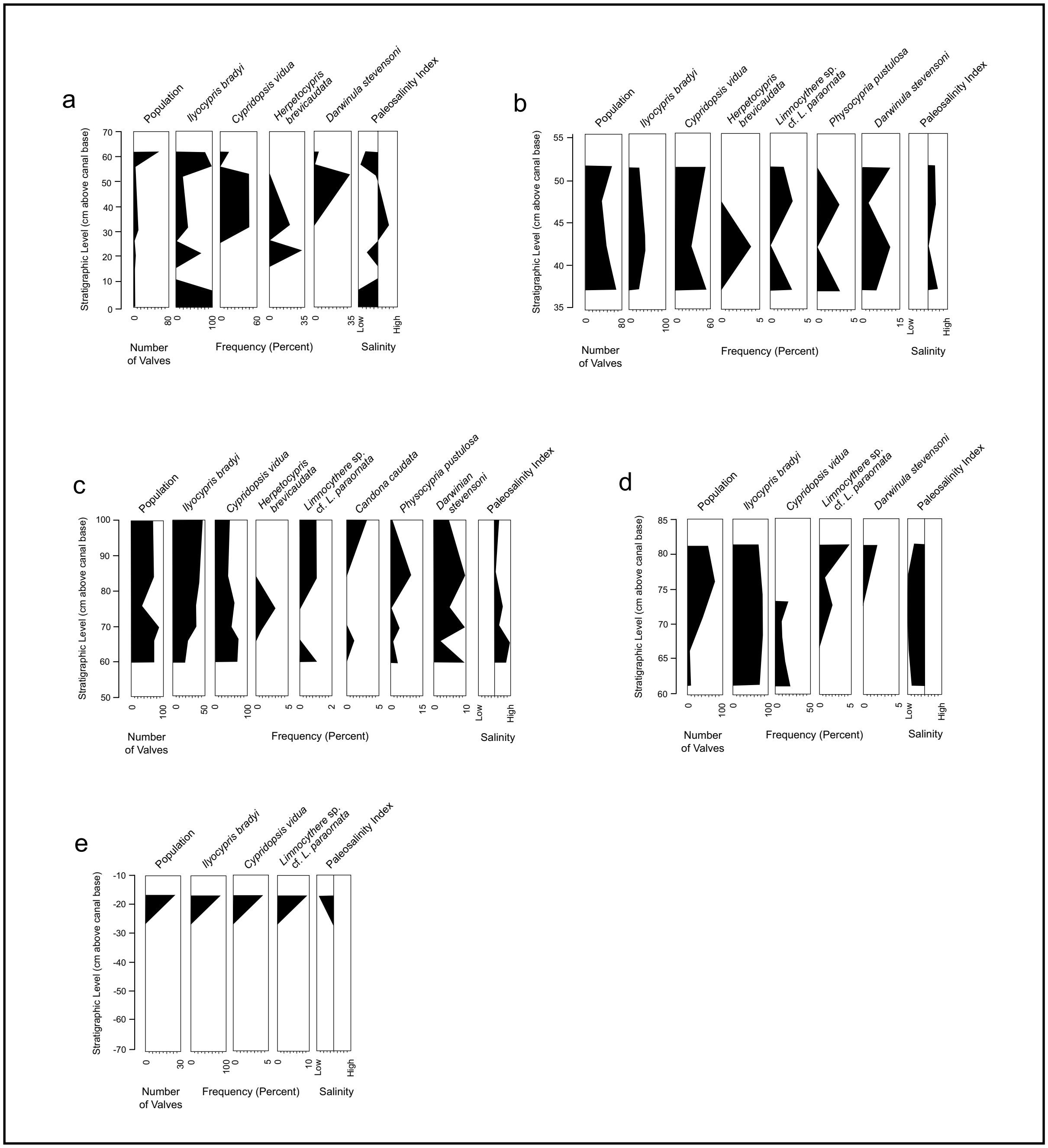

Figure 16.15. Ostracode valves per gram, relative frequencies of ostracode species, and paleosalinity index, by stratigraphic level, canal Feature 137, AZ BB:13:481 (ASM).

suggest specimens were transported to the site. The water entering this canal was dilute, as indicated by the paleosalinity index (see Figure 16.13a-e and Figure 16.14). Dilute water entered the canal and gradually increased in salinity and flow velocity, supporting the settlement of species that prefer relatively calm water flows. The operation of this canal was opportunistic (relying on natural pulses of water flow), as there are no indications of headgate operation.

The thick sediment sequence filling the Hohokam canal, Feature 137, suggests a long-term canal operation not previously recorded in the Tucson Basin. The ostracode faunal composition is the most diverse recorded at this locus. Starting with a monospecific Assemblage I (*I. bradyi*), it became gradually enriched in species composition, evolving to a transitional Assemblage II (*I. bradyi/C. vidua*) that suggests increasing salinity (see Figure 16.15a).

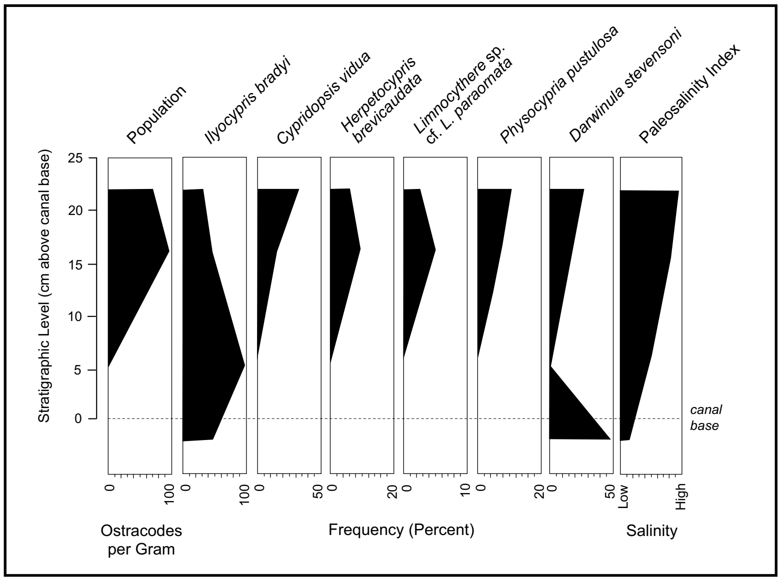

Figure 16.16. Ostracode valves per gram, relative frequencies of ostracode species, and paleosalinity index, by stratigraphic level, canal Feature 9, AZ BB:13:481 (ASM).

Salinity was not too high during the accumulations of Units 6 and 7. The canal received dilute water from the Santa Cruz River for a while and was characterized by moderately fast flow, as suggested by the adult-dominated faunal composition and taphonomic characteristics. The paleosalinity index for these units suggests the canal was operated during the early spring, when dilute water flowed in the Santa Cruz River.

Some time after the accumulation of Unit 7b, the canal was cleaned and reshaped. A new episode of canal operation is marked by a drastic change in lithology (gravelly silty sand) in Unit 8 that is associated with a diverse ostracode fauna dominated by *C. vidua*. Assemblage III characterized the waters entering the canal during this episode and indicates the highest salinity of water recorded in the site (see Figure 16.15b). During this interval, the canal probably conveyed water from the Santa Cruz River during the late spring/early summer, when increasing temperatures accelerate water salinization by evaporation. The lithology and the stable ostracode community suggest a moderate flow. The ostracode assemblage includes a suite of adult and juvenile forms, supporting the interpretation that this unit represents a long interval of canal use.

Later, canal operation continued into Units 9 and 10. Lithological and faunal continuity with respect to Unit 8 suggest another prolonged use of this canal. However, field observations indicate some discontinuity between Units 8 and 9. Therefore, the last two units are treated separately from Unit 8.

At the time of accumulation of Unit 9, coarse sediments (gravelly silty sand) are still dominant. Ostracode Assemblage III is similar to the record of the previous unit, indicating relatively saline waters entered the canal. The occurrence of *I. bradyi* and the paleosalinity index increase toward the end of the Unit 10 deposition (see Figure 16.15c), indicating a slow-flowing pulse of water during late spring/early summer. The change in lithology and faunal composition at the transition from Unit 9 to Unit 10 indicates human manipulation of the flow through headgate operations; this is a functional canal.

At the western edge of Feature 137, a smaller channel was cut into Unit 9 and accumulated the same kind of sediments reported at Unit 10. This channel is recognized as Unit 10, although it is documented separately due to its physical position in relation to the remainder of the sequence. Assemblage I (*I. bradyi*-dominated) is consistent with the assemblage reported at the end of the large canal sequence. This suggests that Unit 10, that caps the large canal, is an overflow deposit from the smaller canal situated to the west. No evidence was recorded in the field about the northwestern trench wall where the samples were collected, although overbank deposits were sampled on the opposite wall of the exposure. The paleosalinity index and the canal lithology indicate slow-flowing water inputs (see Figure 16.15d). Assuming a connection between the large canal deposits and small canal deposits, they are probably a result of human operation.

On the opposite, southeastern trench wall, a few samples were collected from overbank alluvial deposits. The assemblage is similar to that of the small canal discussed earlier. The high abundance of *I. bradyi* carapaces indicates rapid burial rather than a biocenosis (see Figure 16.15e).

The historic ditch, Feature 9, ran along the northern edge of Mission Lane. It was an almost straight ditch fed by the Santa Cruz River. The ostracode assemblages evolved from Assemblage I to Assemblage III, generating a paleosalinity index that shows gradual salinization of the water through time. The flow was controlled, as indicated by the ostracode diversity and preservation and lithology, suggesting a slow flow. The occurrence of a stable ostracode community is consistent with long-term, steady flows in the canal (see Figure 16.16).

Summary

The occurrence of canals ranging in age from the Early Agricultural period to the American Territorial period in the San Agustín Mission locus provided a unique opportunity to reconstruct the history of canal operations in the Tucson Basin reach of the Santa Cruz River valley. As reported for San Pedro phase canals a few miles downstream at Las Capas (Palacios-Fest and Davis 2006; Palacios-Fest et al. 2001), it has been possible to recognize opportunistically used canals (diverting only flood flows of the river) during the Cienega phase occupation of the San Agustín Mission locus, followed by functionally used canals (diverting the perennial baseflow of the river through the operation of headgates) during Hohokam times. The ostracode record of the American Territorial period canal shares a significant similarity with the record of the Hohokam canal: both evolve from Assemblage I to Assemblage III and consist of the same species. This similarity is noteworthy because it demonstrates that ostracode assemblages are good indicators of water chemistry evolution in canals.

Questions also emerged during this study. It is suggested here that Features 53 and 127 are segments of the same canal, but no solid evidence is available. It is also suggested that these canal segments were fed from a spring or cienega, based on the lithology of infilling sediments and ostracode assemblages; however, with the short lengths of canal segments exposed, it is not possible to determine the gradient and direction of flow of Feature 53 to test this. The stratigraphy of the Hohokam canal Feature 137 is very complex, and further data would help refine the relationships among strata and ostracode assemblages. Finally, the exposed portion of the late nineteenth century ditch Feature 9 is too short to expand any interpretation.

RESULTS FROM CANALS IN THE MISSION GARDENS LOCUS, THE CLEARWATER SITE, AZ BB:13:6 (ASM)

Table 16.2 shows the sample identification number, stratigraphic level (from base of canal), bulk and residual weight, lithology, and color (and color code) of sediment residuals. The samples consist primarily of moderate yellowish-brown (10YR 5/4) and pale yellowish-brown (10YR 6/2), occasionally dark yellowish-brown (10YR 4/2), gravelly silty sands to clay. The dominant minerals recognized in these canals are quartz, tufa (or travertine), biotite, and feldspars. Other common minerals include basalt, muscovite, and caliche. Other minerals occur occasionally, and glass, shell, and rock fragments are present (see Table 16.3).

The biological contents of the canals and the overall taphonomic characteristics recorded are summarized in Table 16.4. Ostracodes and molluscs are the groups present. Table 16.5 shows the ostracode total population, by sample, and the total and relative abundance, by species per sample. The C/V and A/J ratios, by species, are also listed to establish biocenosis.

Ten species of ostracodes were identified. *Ilyocypris bradyi* was the most common and abundant, followed by *Cypridopsis vidua* and *Darwinula stevensoni*. The remaining seven species occurred occasionally in the canals: *Herpetocypris brevicaudata*, *Limnocythere* sp. cf. *L. paraornata*, *Candona patzcuaro*, *Physocypria pustulosa*, *Cypridopsis* sp., *Chlamydotheca arcuata* (not reported in other loci), and *Potamocypris unicaudata*.

Based on the occurrence and relative abundance, three assemblages were recognized. Assemblage I is dominated by *I. bradyi*, a streamflow indicator; Assemblage II is dominated by *I. bradyi* and *C. vidua*, both associated with streamflow conditions; and Assemblage III composed by *I. bradyi*, *C. vidua*, and a minor but significant occurrence of *D. stevensoni*. Other species are less significant. Assemblage I marks the beginning of water input and operation in all canals studied. Assemblage II shows a transition to more saline conditions. It occurs in canal Features 200, 205, and 206. The hydrochemical evolution suggested from Assemblage I to Assemblage II indicates increasing salinity. Assemblage III results from prolonged water input that allowed *D. stevensoni* to settle and salinity to decrease.

The presence of *D. stevensoni* at the end of the records suggests canals held water for long periods. The faunal association is consistent with the water chemistry type I (dilute) and type II (Ca-rich, dominated by Na^+, Mg^{2+}, and SO_4^{2-}) of Eugster and Hardie (1978). Tadayon's (1995) and Tadayon and Smith's (1994) surface and groundwater analyses of the modern Rillito Creek in the Tucson Basin (sampled from August 1987 to August 1993) showed near-equivalent proportions of Ca and HCO_3, with the former slightly dominant. This association is very similar to that found at the Congress Street/Brickyard and San Agustín Mission loci (see above), as well as at Las Capas (Palacios-Fest and Davis 2006; Palacios-Fest et al. 2001). Similarly, the occurrence of *Limnocythere* sp. cf. *L. paraornata* is related to a period of cienega-like conditions.

Relative abundances of species for each canal are shown in Figures 16.17-16.19. The sequence of species distribution and inferred paleoecology is used to interpret environmental conditions in the canals, through time. The paleosalinity index developed for each canal is shown in the right-hand side of each figure. A small to large population (2-526 individuals per sample) and low diversity (two to seven species) characterize fossiliferous samples. Based on Delorme (1969, 1989), taphonomic parameters are used to distinguish allochthonous from autochthonous populations.

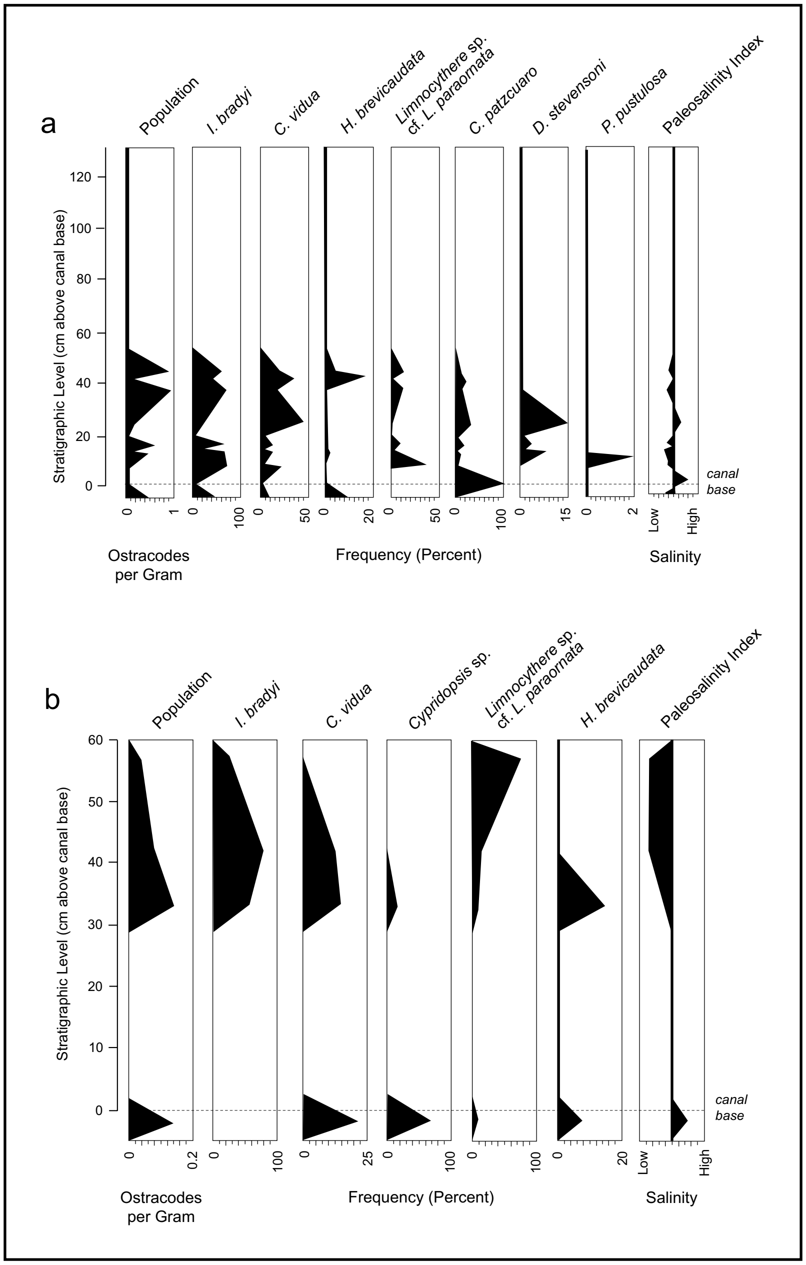

Figure 16.17. Ostracode valves per gram, relative frequencies of ostracode species, and paleosalinity index, by stratigraphic level, canal Feature 200, AZ BB:13:481 (ASM).

Hohokam Canal

Feature 200 is a Sedentary period Hohokam canal (see Figure 16.17). The samples were collected from exposures on the southern walls of Trenches 310 and 302. They consisted of reference samples (2 cm bcb) and 18 and nine samples from canal fill sediments, respectively. Trench 310 is upstream of Trench 302. Ostracodes ranged from rare to abundant, particularly in Trench 310 (see Figures 16.17a-b; see also Table 16.5). In Trench 310, ostracodes occurred from the cienega-like deposits to roughly 43 cm from the canal base (see Figure 16.17a). In Trench 302, ostracodes occurred in the cienega-like deposits and from about 30 cm above the canal base to the end of the record. Sediments consist of gravelly to silty sand, gradually grading to silty clay and clay (see Table 16.2). In Trench 310, frequent grain-size coarsening above 43 cm reflects pulses of one or more flood events. Ostracodes and sediments indicate at least two cycles of water input into this canal.

The dominant species is *I. bradyi* (Assemblage I), representing more than 50 percent of the population in most of the samples (see Figures 16.17a-b). Through time, Assemblage III (*I. bradyi*/*C. vidua*/*D. stevensoni*) characterized the canal. The taphonomic parameters show low-to-moderate fragmentation and abrasion (5-20 percent). Rare signs of encrustation or coating were recorded in Trench 302 (5 percent), but not in Trench 310. The redox index ranged from slightly oxidizing stains to no stains, upward (see Table 16.4). Similarly, the A/J ratios graded from purely adult to a mixed population upward. The C/V ratios show strong valve disarticulation. Assemblage I evolved into Assemblage III (see Figures 16.17a-b).

Protohistoric Period Canals

Four features (Features 207, 205, 204, and 201) represent Protohistoric irrigation (see Figure 16.18). Feature 207, exposed on the southern wall of Trench 300, consisted of a reference sample (2 cm bcb) and three canal in-fill samples containing ostracodes (see Figure 16.18a; see also Table 16.5). Six species occurred throughout the history of the canal—*I. bradyi* the most common and abundant, followed by *C. vidua*, *H. brevicaudata*, *L.* sp. cf. *L. paraornata*, *D. stevensoni*, and *P. pustulosa*. The taphonomic parameters show moderate-to-high fragmentation and abrasion (10-50 percent); no signs of encrustation or coating of the valves were recorded. The redox index ranged from no stains to

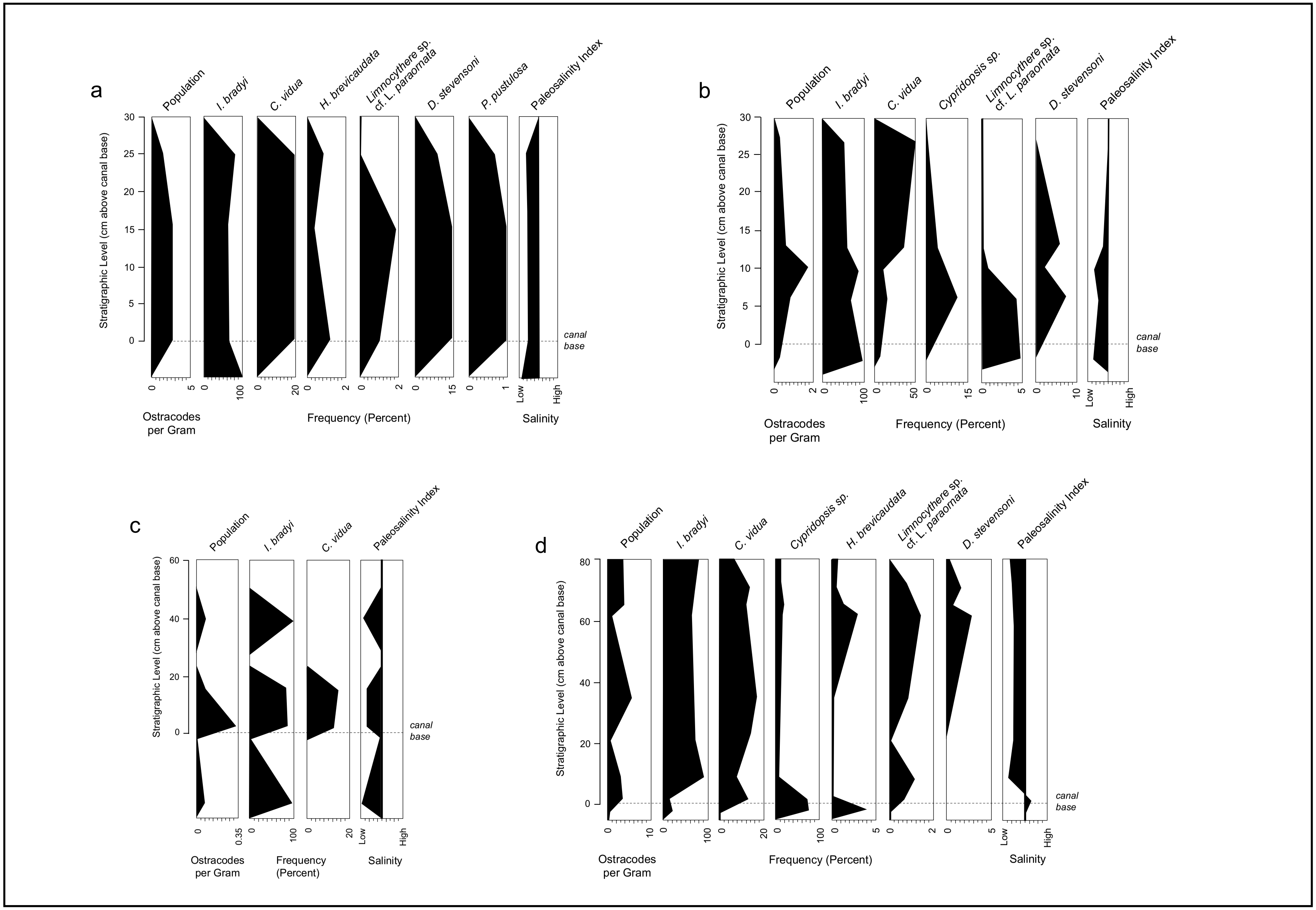

Figure 16.18. Ostracode valves per gram, relative frequencies of ostracode species, and paleosalinity index, by stratigraphic level, AZ BB:13:481 (ASM): (a) canal Feature 207; (b) canal Feature 205; (c) canal Feature 204; (d) canal Feature 201.

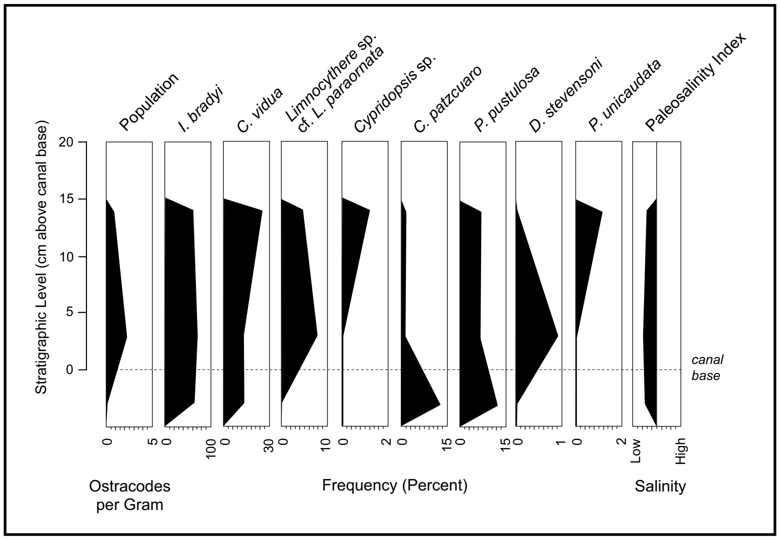

Figure 16.19. Ostracode valves per gram, relative frequencies of ostracode species, and paleosalinity index, by stratigraphic level, canal Feature 206, AZ BB:13:481 (ASM).

light oxidizing stains. The A/J and C/V ratios indicate a stable community throughout the record. Despite some minor fluctuations, Assemblage III dominates the canal history (see Figure 16.18a). A single, continuous water input is suggested by the sediments and ostracodes.

Canal Feature 205, exposed on the east-northeast wall of Trench 307, provided a reference sample (2 cm bcb) and four canal fill samples (see Figure 16.18b). Sediments consist primarily of sandy silty clay to clay suitable for microinvertebrates. All samples contained ostracodes. The dominant species is *I. bradyi*, representing more than 50 percent of the population; however, *C. vidua* became established later in the sequence. *Cypridopsis* sp., *Limnocythere* sp. cf. *L. paraornata*, and *D. stevensoni* appeared occasionally (see Figure 16.18b). The taphonomic characteristics indicate low-to-moderate fragmentation and abrasion (10-15 percent); low authigenic mineralization or coating (circa 10 percent) characterized the later stages. No stains to light oxidizing conditions also occur, as shown by the redox index. Adult specimens are the most abundant, although all samples include juveniles of most species (see Tables 16.4-16.5). Faunal assemblages fluctuated from Assemblage I to Assemblage III. Assemblage II characterizes the end of the record. A continuous, single water cycle is inferred from the sedimentology and the faunal composition.

Canal Feature 204, exposed on the southern wall of Trench 305, provided a reference sample (2 cm bcb) and seven canal fill samples (see Figure 16.18c). Sediments are mostly sandy silt to clay, optimal for microinvertebrates. Four samples contained ostracodes. The thick cienega-like deposits were monospecific (*I. bradyi*). *C. vidua* occurred occasionally at the early stages of the canal (see Figure 16.18c). The taphonomic parameters show a low-to-high rate of fragmentation and abrasion (5-70 percent). Low-to-moderate coating and authigenic mineralization (5-30 percent) is evident. The redox index fluctuated from well-preserved valves with no stains to strong oxidizing conditions. Adults are dominant (see Tables 16.4-16.5). Assemblage I characterized the canal. A continuous, single water cycle, with an input pulse at about 20 cm above the canal base, is inferred from the sedimentology and faunal record.

Canal Feature 201, exposed on the southern wall of Trench 302, provided a reference sample (2 cm bcb) and eight canal fill samples with a very rich and diverse ostracode record (see Table 16.5). Gravelly sandy clay to clay characterize the canal. *I. bradyi*, *C. vidua*, *Cypridopsis* sp., *H. brevicaudata*, *Limnocythere* sp. cf. *L. paraornata*, and *D. stevensoni* occurred in this canal (see Figure 16.18d). Low-to-moderate fragmentation and abrasion (5-25 percent) characterize the strata, authigenic mineralization and coating are low (5-10 percent), and the redox index shows no stains to light oxidizing conditions. At least two water cycles were identified, based on the sedimentology and faunal composition.

Historic-era Canals

Canal Feature 206 represents historic irrigation (see Figure 16.19). Feature 206, exposed on the southern wall of Trench 309, provided a reference sample (2 cm bcb) and two canal fill samples containing a diverse and rich ostracode fauna (see Figure 16.19; see also Table 16.5). Fine-grained sediments are optimal for microinvertebrates (see Table 16.1). Eight species occurred throughout the record: *I. bradyi*, followed in abundance by *C. vidua*, *Cypridopsis* sp., and more randomly *L.* sp. cf. *L. paraornata*, *H. brevicaudata*, *D. stevensoni*, *P. unicaudata*, and *Ch. arcuata*. Taphonomic parameters show low-to-moderate fragmentation and abrasion (5-15 percent), low authigenic mineralization (5 percent), and no coating. Light oxidizing stains are shown by the redox index (see Table 16.4). The A/J ratios indicate adult-dominated fauna, while the C/V ratios indicate mostly disarticulated specimens (see Table 16.5). Assemblage I evolved to Assemblage III during the canal history, showing a single continuous water cycle.

Interpretations of Canal Ostracode Records from the Mission Gardens Locus

Feature 200 is a large Sedentary period Hohokam canal consisting of two channels ranging in size from 6 m to 2 m wide and 150 cm to 85 cm deep; at least 18 lithostratigraphic units were recorded. The thickness of the units suggests a permanent flow discharge for the time the canal was active (0-60 cm). A sudden change in lithology is associated with a flood event that capped the canal (approximately 60-130 cm). In Trench 310, this sequence is evident; in Trench 302, the thick flood deposit is not recorded.

Ostracodes entered the canal early, as shown in Figure 16.17a; *C. patzcuaro* and *I. bradyi* established a community Assemblage I that evolved into Assemblage III, as *C. vidua* and *D. stevensoni* developed in the area between Trench 310 and Trench 302. Absence of ostracodes in the lower part of Trench 302 is not easy to explain. The upper part is consistent with the upper portion recorded in Trench 310. Canal hydraulics may be responsible for the trend observed between the two sites.

Faunal Assemblage I suggests dilute water input. Tolerance of *I. bradyi* ranges from 100 to 4,000 mg l^{-1} TDS (Delorme 1989; Palacios-Fest 1994). Therefore, the salinity range of Feature 200 does not exceed either limit. The occurrences of *P. pustulosa* (salinity tolerance 100-600 mg l^{-1} TDS) and *D. stevensoni* (50-2,000 mg l^{-1} TDS) indicate canal salinity did not exceed 600 mg l^{-1} TDS at the beginning of canal operation. *P. pustulosa* consisted of juveniles, implying the species did not reach maturity in a harsh environment. Salinity increased, but did not exceed 2,000 mg l^{-1}, as *D. stevensoni* established a community in Trench 310. Its absence in Trench 302 might be a result of canal hydraulics. The paleosalinity index is in good agreement with two pulses of dilute water input (see Figures 16.17a-b).

Four features (Features 207, 205, 204, and 201) provided the view of Protohistoric period activity in the area. Feature 207 is a small (about 1.45 m wide) and shallow (about 29 cm) canal consisting of a single lithostratigraphic unit. Its thickness and grain-size composition suggest a sustained, moderately slow water flow (see Table 16.2). The ostracode record is consistent with this interpretation.

Faunal Assemblage III dominates the canal history. *I. bradyi* entered the canal that was dug into cienega soils (containing ostracodes as well). Other species occurred in low proportions, except *C. vidua* and *D. stevensoni* (see Figure 16.18a). Canal operation probably lasted for a prolonged period, as the life cycle of *D. stevensoni* takes over six months, and this species established a biocenosis (Andrew Cohen, personal communication 1988). *I. bradyi*, *C. vidua*, and *H. brevicaudata* tolerate a similar salinity range (100-4,000 mg l^{-1} TDS), in contrast with *P. pustulosa* (100-600 mg l^{-1} TDS) and *D. stevensoni* (50-2,000 mg l^{-1}). Therefore, it is suggested that salinity did not exceed the upper limit of *D. stevensoni*. Absence of adults of *P. pustulosa* suggests the species was introduced, but did not last due to stressful conditions. The paleosalinity index is consistent with a permanent freshwater input (see Figure 16.18a).

Feature 205 is a small, shallow canal, approximately 60 cm wide and 34 cm deep. Grain size (silty and sandy clay) suggests an optimal substrate for establishing a biocenosis (see Table 16.2). The relatively thin sedimentologic sequence consisting of a lithostratigraphic unit suggests a short-term canal operation. However, the ostracode assemblage does not appear to support the interpretation of a short-term canal operation.

Faunal Assemblage I throughout the record suggests low salinity water input. Transition to Assemblage III and then to Assemblage II is indicated by the occurrences of *D. stevensoni*, and later of *C. vidua*, suggesting salinity increased over 2,000 mg l^{-1} TDS as *D. stevensoni* disappeared from the record (Delorme 1989; Forester 1991; Palacios-Fest 1994). Only *I. bradyi* and *C. vidua* occurred toward the end of the canal history (see Figure 16.18b). The paleosalinity index and grain-size diagrams are consistent with increasing salinization and decreasing water flow.

Feature 204 is a large canal approximately 2.25 m wide and 60 cm deep, consisting of a single lithostratigraphic unit with manganese stains at the base and at 36-37 cm from the base. The thick sedimentologic sequence suggests a long and continuous canal operation. The canal was dug into the cienega deposit. Moderately fast-flow input characterized this canal. The faunal assemblage is limited to *I. bradyi* and *C. vidua*. *I. bradyi* dominates the sequence (Assemblage I), and *C. vidua* became established for a short interval. Two pulses of moderately saline water and fresh water are indicated by the paleosalinity index (see Figure 16.18c). The occurrence of two saline-tolerant species (100-4,000 mg l^{-1}) at the initial stages of water discharge suggests water flow was moderately slow (*C. vidua* prefers slow-moving water) (Delorme 1989; Palacios-Fest 1994). Increasing flow velocity is indicated by the occurrence of a monospecific Assemblage I in the upper part of the record (see Figure 16.18c).

Feature 201 is a medium-to-large canal (some 1.4 m wide and 80 cm deep) dug into the cienega deposit, consisting of eight lithostratigraphic units. Moderately fast water flow, which gradually decreased, is suggested by the thickness and grain-size composition of the unit (see Table 16.2). A continuous ostracode record also suggests long-term canal operation (see Figure 16.18d). Faunal Assemblage I (*I. bradyi*) dominates the sequence. *C. vidua* is also significant and indicates a transition from Assemblage I to Assemblage II during operation of the canal. A stable community settled in the canal, allowing *D. stevensoni* to establish as the flow velocity decreased. Moderately saline water entered the canal. Salinity did not exceed 3,000 mg l^{-1} TDS (maximum tolerance of *H. brevicaudata)* (Forester 1991). Through time, salinity decreased due to a constant freshwater input favoring the settlement of *D. stevensoni*, suggesting a salinity range no greater than 2,000 mg l^{-1} TDS. Both the paleosalinity index and the grain-size diagrams are consistent in suggesting two water cycles—the first short, the second prolonged (see Figure 16.18d).

Canal Feature 206 was used during historic times. It is a small- to medium-sized canal (roughly 1.3 m wide and 16 cm deep)—dug into the cienega deposit and truncated by the plowzone—consisting of two lithostratigraphic units. The thicknesses and grain-size compositions of the units indicate a moderately slow discharge (see Table 16.2). The ostracode record suggests continuous canal operation. Assemblage I evolved into Assemblage III. *I. bradyi* dominates the history of the canal, but *C. vidua*, *Cypridopsis* sp., and *D. stevensoni* are also significant, and they increase in abundance toward the end of the record. *H. brevicaudata*, *L*. sp. cf. *L. paraornata*, *P. unicaudata*, and *Ch. arcuata* were introduced, but did not settle (see Table 16.5). For *D. stevensoni* to settle implies that the canal was active for a prolonged period, perhaps longer than six months, and that salinity did not exceed 2,000 mg l^{-1} (Delorme 1989; Palacios-Fest 1994). The paleosalinity index is consistent with a permanent, moderately freshwater input during canal operation (see Figure 16.19).

Summary

The ostracode records of canals in the Mission Gardens locus contribute new information about prehistoric Hohokam, Protohistoric, and Historic irrigation. Protohistoric canals are documented for the first time in the Tucson Basin. Further, ostracodes demonstrate that canal Feature 200, thought to be fed by groundwater due to its deep profile, received discharge from the Santa Cruz River. Two trenches were sampled, showing similar ostracode assemblages; however, they differ in terms of a faunal gap recorded at the base of the canal in Trench 302. As suggested earlier, the gap may have resulted from canal hydraulics controlled by changes in canal gradient and shape.

Despite the apparent fluvial origin of ostracodes, this interpretation could be tested by conducting stable isotope shell chemistry analysis of the shells of *I. bradyi*. Stable isotopes from the carbonate shells record the water source signal. David Dettman (personal communication 2004) proposes the possibility of identifying and quantifying the origin of hydrologic variations in response to seasonal or climatic changes, or of distinguishing between surface and groundwater origin, based on the $\delta^{18}O$ and $\delta^{13}C$ values of ostracode valves.

The canal faunal association is consistent with previous findings at Las Capas (Palacios-Fest 2001; Palacios-Fest and Davis 2006) and at the San Agustín Mission (see above). The faunal composition is similar, suggesting a not surprising similar source of water to the canals. Additionally, *I. bradyi* is the most abundant species across the site, followed by *C. vidua* and *D. stevensoni*, representing three assemblages (*I. bradyi*-dominated, *I. bradyi*/*C. vidua*-dominated, and *I. bradyi*/*C. vidua*/*D. stevensoni*-dominated). Other species appeared and disappeared at several intervals. The interpretation is that canals at the Mission Gardens were characterized by a prolonged operation and constant input, keeping salinity relatively low, below 2,000 mg l^{-1}.

The study of ostracode records of canals in the Mission Gardens locus provided new insights on canal operations through time. The strong presence of *I. bradyi* suggests all canals were river-fed; however, this species may also occur in wetlands. Therefore, it is suggested that future research include carbon and oxygen isotope analysis of ostracode shells to definitively determine water sources.

CONCLUSIONS

The results of this study may be summarized in terms of seven major conclusions that highlight the relevance of ostracode research in archaeology.

(1) The history of canal irrigation in the Tucson Basin goes back to 3500 years B.P.

(2) Early Agricultural period canal irrigationwas simple, similar to that recorded for the same time interval at Las Capas (Palacios-Fest et al. 2001).

(3) Canal irrigation during the Hohokam periods was complex; the ostracode record demonstrates the Hohokam mastered water management. Multiple cycles of canal flow, implying operation of headgates, were common during Hohokam time.

(4) Post-Hohokam canal irrigation was again apparently less sophisticated. Protohistoric and Historic canals were generally smaller and consisted of a single stratigraphic unit; canal operation was prolonged.

(5) Canal histories may not have been exactly as the cycles inferred in this study. For example, the changes recorded within the canals may represent independent events following canal clean-outs. However, the interpretation conducted here is our best approximation for understanding canal operation and the evolution of water management technology by ancient societies.

(6) Ostracodes are a powerful tool with which to reconstruct anthropogenic activities in the Santa Cruz Valley and the Tucson Basin.

(7) Future research on ostracode paleoecology should include geochemical techniques to measure trace elements and stable isotopes for paleoclimatic and water source reconstructions.

Table 16.2. Ostracode samples from AZ BB:13:481 (ASM), by identification number, stratigraphic level, bulk and residual weights, lithology, color, and color code of sediment residuals.

Locus/ Sample ID Number	Stratigraphic Level (cm from base of canal)	Bulk Weight (gm)	Residual Weight (gm)	>1 mm	>106 mm	>63 mm	<63 mm	>1 mm	>106 mm	>63 mm	<63 mm	Lithology	Color	Color Code
Congress Street/Brickyard														
DA-RNA8-212-144-1	-2	106.69	5.89	1.35	2.27	2.27	100.80	1.27	2.13	2.13	94.48	Clay	Pale yellowish-brown	10YR 6/2
DA-RNA8-212-144-2	4	108.96	28.79	1.55	15.89	11.35	80.17	1.42	14.58	10.42	73.58	Sandy silty clay	Pale yellowish-brown	10YR 6/2
DA-RNA8-212-144-3	17	99.88	24.15	1.45	13.62	9.08	75.73	1.45	13.64	9.09	75.82	Sandy silty clay	Moderate yellowish-brown	10YR 5/4
DA-RNA8-212-144-4	27	106.69	28.24	1.00	15.89	11.35	78.45	0.94	14.89	10.64	73.53	Sandy silty clay	Moderate yellowish-brown	10YR 5/4
DA-RNA8-212-144-5	35	118.04	45.40	2.27	31.78	11.35	72.64	1.92	26.92	9.62	61.54	Silty sand	Grayish-orange	10YR 7/4
DA-RNA8-212-144-6	45	111.23	16.39	0.50	6.81	9.08	94.84	0.45	6.12	8.16	85.26	Silty clay	Moderate yellowish-brown	10YR 5/4
DA-RNA8-212-144-7	60	113.50	21.43	1.00	11.35	9.08	92.07	0.88	10.00	8.00	81.12	Sandy silty clay	Moderate yellowish-brown	10YR 5/4
DA-RNA8-212-144-8	72	120.31	29.89	2.65	18.16	9.08	90.42	2.20	15.09	7.55	75.16	Sandy silty clay	Moderate yellowish-brown	10YR 5/4
DA-RNA8-267-152-1	-2	108.96	98.61	18.16	79.45	1.00	10.35	16.67	72.92	0.92	9.50	Gravelly sand	Grayish-orange	10YR 7/4
DA-RNA8-267-152-2	2	133.93	79.45	6.81	70.37	2.27	54.48	5.08	52.54	1.69	40.68	Gravelly sand	Grayish-orange	10YR 7/4
DA-RNA8-267-152-3	16	138.47	82.21	4.54	75.40	2.27	56.26	3.28	54.45	1.64	40.63	Gravelly sand	Grayish-orange	10YR 7/4
DA-RNA8-267-152-4	30	124.85	26.47	4.54	20.43	1.50	98.38	3.64	16.36	1.20	78.80	Sandy silt	Grayish-orange	10YR 7/4
DA-RNA8-267-152-5	50	120.31	22.70	2.27	18.16	2.27	97.61	1.89	15.09	1.89	81.13	Sandy silt	Grayish-orange	10YR 7/4
DA-RNA8-Block 5-143-1	-2	86.26	73.64	11.35	61.29	1.00	12.62	13.16	71.05	1.16	14.63	Gravelly sand	Grayish-orange	10YR 7/4
DA-RNA8-Block 5-143-2	2	102.15	22.16	2.50	18.16	1.50	79.99	2.45	17.78	1.47	78.31	Sandy silt	Pale yellowish-brown	10YR 6/2
DA-RNA8-Block 5-143-3	11	115.77	15.62	2.27	11.35	2.00	100.15	1.96	9.80	1.73	86.51	Sandy silty clay	Pale yellowish-brown	10YR 6/2

Table 16.2. Continued.

Locus/ Sample ID Number	Stratigraphic Level (cm from base of canal)	Bulk Weight (gm)	Residual Weight (gm)	>1 mm	>106 mm	>63 mm	<63 mm	>1 mm	>106 mm	>63 mm	<63 mm	Lithology	Color	Color Code
DA-RNA8-Block 5-143-4	22	113.50	13.35	1.00	11.35	1.00	100.15	0.88	10.00	0.88	88.24	Sandy silty clay	Pale yellowish-brown	10YR 6/2
DA-RNA8-260-149-1	-2	59.02	12.31	2.00	3.50	6.81	46.71	3.39	5.93	11.54	79.14	Silty clay	Dark yellowish-brown	10YR 4/2
DA-RNA8-260-149-2	4	111.23	88.53	24.97	61.29	2.27	22.70	22.45	55.10	2.04	20.41	Gravelly sand	Grayish-orange	10YR 7/4
DA-RNA8-260-149-3	15	88.53	20.16	2.00	9.08	9.08	68.37	2.26	10.26	10.26	77.23	Silty clay	Pale yellowish-brown	10YR 6/2
DA-RNA8-260-149-4	21	106.69	18.51	0.35	6.81	11.35	88.18	0.33	6.38	10.64	82.65	Silty clay	Grayish-orange	10YR 7/4
DA-RNA8-260-149-5	27	106.69	44.68	1.55	34.05	9.08	62.01	1.45	31.91	8.51	58.12	Silty sand	Grayish-orange	10YR 7/4
DA-RNA8-260-149-6	35	129.39	26.97	2.00	18.16	6.81	102.42	1.55	14.04	5.26	79.16	Sandy silty clay	Pale yellowish-brown	10YR 6/2
DA-RNA8-260-149-7	45	133.93	127.85	2.00	124.85	1.00	6.08	1.49	93.22	0.75	4.54	Sand	Pale yellowish-brown	10YR 6/2
DA-RNA8-253-146-1	-2	108.96	88.53	11.35	74.91	2.27	20.43	10.42	68.75	2.08	18.75	Gravelly sand	Grayish-orange	10YR 7/4
DA-RNA8-253-146-2	3	111.23	72.64	9.08	54.48	9.08	38.59	8.16	48.98	8.16	34.69	Gravelly silty sand	Pale yellowish-brown	10YR 6/2
DA-RNA8-253-146-3	14	124.85	56.75	2.27	40.86	13.62	68.10	1.82	32.73	10.91	54.55	Silty sand	Pale yellowish-brown	10YR 6/2
DA-RNA8-253-146-4	34	115.77	59.02	2.27	43.13	13.62	56.75	1.96	37.25	11.76	49.02	Sandy silt	Pale yellowish-brown	10YR 6/2
DA-RNA8-253-146-5	50	106.69	56.75	2.27	36.32	18.16	49.94	2.13	34.04	17.02	46.81	Sandy silt	Pale yellowish-brown	10YR 6/2
DA-RNA8-253-146-6	68	106.69	54.48	2.27	43.13	9.08	52.21	2.13	40.43	8.51	48.94	Sandy silt	Pale yellowish-brown	10YR 6/2
DA-RNA8-253-147-1	5	106.69	56.75	2.27	45.40	9.08	49.94	2.13	42.55	8.51	46.81	Sandy silt	Pale yellowish-brown	10YR 6/2
DA-RNA8-253-147-2	17	108.96	49.94	2.27	38.59	9.08	59.02	2.08	35.42	8.33	54.17	Sandy silt	Pale yellowish-brown	10YR 6/2
DA-RNA8-253-148-1	-2	83.99	59.02	2.27	49.94	6.81	24.97	2.70	59.46	8.11	29.73	Silty sand	Pale yellowish-brown	10YR 6/2

Table 16.2. Continued.

Locus/ Sample ID Number	Stratigraphic Level (cm from base of canal)	Bulk Weight (gm)	Residual Weight (gm)	>1 mm	>106 mm	>63 mm	<63 mm	>1 mm	>106 mm	>63 mm	<63 mm	Lithology	Color	Color Code
DA-RNA8-253-148-2	4	118.04	72.64	2.27	52.21	18.16	45.40	1.92	44.23	15.38	38.46	Silty sand	Grayish-orange	10YR 7/4
DA-RNA8-253-148-3	15	124.85	41.86	1.00	27.24	13.62	82.99	0.80	21.82	10.91	66.47	Sandy silt	Grayish-orange	10YR 7/4
DA-RNA8-253-150-1	-2	99.88	42.41	1.55	31.78	9.08	57.47	1.55	31.82	9.09	57.54	Sandy silt	Pale yellowish-brown	10YR 6/2
DA-RNA8-253-150-2	2	120.31	90.80	13.62	70.37	6.81	29.51	11.32	58.49	5.66	24.53	Gravelly silty sand	Pale yellowish-brown	10YR 6/2
DA-RNA8-253-150-3	19	102.15	54.48	4.54	40.86	9.08	47.67	4.44	40.00	8.89	46.67	Silty sand	Pale yellowish-brown	10YR 6/2
DA-RNA8-258-153/ 154-1	-2	106.69	63.56	2.27	54.48	6.81	43.13	2.13	51.06	6.38	40.43	Silty sand	Pale yellowish-brown	10YR 6/2
DA-RNA8-258-153/ 154-2	5	106.69	43.13	4.54	31.78	6.81	63.56	4.26	29.79	6.38	59.57	Sandy silt	Pale yellowish-brown	10YR 6/2
DA-RNA8-258-153/ 154-3	13	120.31	10.58	1.50	6.81	2.27	109.73	1.25	5.66	1.89	91.21	Silty clay	Dusky yellowish-brown	10YR 2/2
DA-RNA8-258-153/ 154-4	21	124.85	33.78	2.00	22.70	9.08	91.07	1.60	18.18	7.27	72.94	Sandy silt	Dark yellowish-brown	10YR 4/2
DA-RNA8-203-140-1	-2	59.02	50.44	6.81	43.13	0.50	8.58	11.54	73.08	0.85	14.54	Gravelly sand	Moderate brown	5YR 4/4
DA-RNA8-203-140-2	3	74.91	40.86	2.27	36.32	2.27	34.05	3.03	48.48	3.03	45.45	Gravelly sand	Moderate yellowish-brown	10YR 5/4
DA-RNA8-203-140-3	10	77.18	19.16	1.00	9.08	9.08	58.02	1.30	11.76	11.76	75.17	Sandy silt	Pale yellowish-brown	10YR 6/2
DA-RNA8-203-140-4	16	86.26	5.54	1.00	2.27	2.27	80.72	1.16	2.63	2.63	93.58	Clay	Dark yellowish-brown	10YR 4/2
DA-RNA8-203-140-5	22	74.91	36.32	2.27	29.51	4.54	38.59	3.03	39.39	6.06	51.52	Sandy silty clay	Pale yellowish-brown	10YR 6/2
DA-RNA8-203-140-6	30	68.10	26.47	1.50	18.16	6.81	41.63	2.20	26.67	10.00	61.13	Sandy silt	Pale yellowish-brown	10YR 6/2
DA-RNA8-203-140-7	34	61.29	14.12	0.50	6.81	6.81	47.17	0.82	11.11	11.11	76.96	Sandy silty clay	Pale yellowish-brown	10YR 6/2
DA-RNA8-203-140-8	39	70.37	16.89	1.00	11.35	4.54	53.48	1.42	16.13	6.45	76.00	Sandy silty clay	Pale brown	5YR 5/2

Table 16.2. Continued.

Locus/ Sample ID Number	Stratigraphic Level (cm from base of canal)	Bulk Weight (gm)	Residual Weight (gm)	>1 mm	>106 mm	>63 mm	<63 mm	>1 mm	>106 mm	>63 mm	<63 mm	Lithology	Color	Color Code
DA-RNA8-201-139-1	-2	68.10	61.79	13.62	47.67	0.50	6.31	20.00	70.00	0.73	9.27	Gravelly sand	Light brown	5YR 6/4
DA-RNA8-201-139-2	2	86.26	44.63	1.50	29.51	13.62	41.63	1.74	34.21	15.79	48.26	Silty sand	Pale yellowish-brown	10YR 6/2
DA-RNA8-201-139-3	9	81.72	50.19	0.25	36.32	13.62	31.53	0.31	44.44	16.67	38.58	Silty sand	Pale yellowish-brown	10YR 6/2
DA-RNA8-201-139-4	14	74.91	37.32	1.00	27.24	9.08	37.59	1.33	36.36	12.12	50.18	Silty sand	Pale yellowish-brown	10YR 6/2
DA-RNA8-201-139-5	23	86.26	34.05	11.35	20.43	2.27	52.21	13.16	23.68	2.63	60.53	Gravelly sandy silt	Moderate yellowish-brown	10YR 5/4
DA-RNA8-201-139-6	27	79.45	35.05	1.00	22.70	11.35	44.40	1.26	28.57	14.29	55.88	Sandy silt	Pale yellowish-brown	10YR 6/2
DA-RNA8-201-139-7	36	77.18	18.89	3.00	13.62	2.27	58.29	3.89	17.65	2.94	75.52	Sandy clayey silt	Pale yellowish-brown	10YR 6/2
DA-RNA8-201-139-8	40	88.53	45.13	2.00	36.32	6.81	43.40	2.26	41.03	7.69	49.02	Sandy silt	Pale yellowish-brown	10YR 6/2
DA-RNA8-201-139-9	45	81.72	42.86	2.00	34.05	6.81	38.86	2.45	41.67	8.33	47.55	Silty sand	Pale yellowish-brown	10YR 6/2
DA-RNA8-201-139-10	52	79.45	11.60	0.25	6.81	4.54	67.85	0.31	8.57	5.71	85.40	Silty clay	Dark yellowish-brown	10YR 4/2
DA-RNA8-201-139-11	59	63.56	9.58	0.50	4.54	4.54	53.98	0.79	7.14	7.14	84.93	Clay	Pale yellowish-brown	10YR 6/2
DA-RNA8-201-139-12	63	65.83	6.04	1.50	2.27	2.27	59.79	2.28	3.45	3.45	90.82	Clay	Grayish-orange	10YR 7/4
DA-RNA8-201-139-13	71	61.29	12.35	1.00	9.08	2.27	48.94	1.63	14.81	3.70	79.85	Silty clay	Pale yellowish-brown	10YR 6/2
DA-RNA8-202-138-1	-2	97.61	10.08	1.00	4.54	4.54	87.53	1.02	4.65	4.65	89.67	Silty clay	Dark yellowish-brown	10YR 4/2
DA-RNA8-202-138-2	4	81.72	58.25	1.50	47.67	9.08	23.47	1.84	58.33	11.11	28.72	Silty sand	Pale yellowish-brown	10YR 6/2
DA-RNA8-202-138-3	18	86.26	45.13	2.00	34.05	9.08	41.13	2.32	39.47	10.53	47.68	Sandy silt	Pale yellowish-brown	10YR 6/2
DA-RNA8-202-138-4	28	90.80	43.13	2.27	31.78	9.08	47.67	2.50	35.00	10.00	52.50	Sandy silt	Pale yellowish-brown	10YR 6/2

Table 16.2. Continued.

Locus/ Sample ID Number	Stratigraphic Level (cm from base of canal)	Bulk Weight (gm)	Residual Weight (gm)	>1 mm	>106 mm	>63 mm	<63 mm	>1 mm	>106 mm	>63 mm	<63 mm	Lithology	Color	Color Code
DA-RNA8-202-138-5	36	81.72	30.51	1.00	20.43	9.08	51.21	1.22	25.00	11.11	62.67	Sandy silt	Pale yellowish-brown	10YR 6/2
DA-RNA8-219-141-1	-2	74.91	46.90	2.27	43.13	1.50	28.01	3.03	57.58	2.00	37.39	Silty sand	Pale yellowish-brown	10YR 6/2
DA-RNA8-219-141-2	10	90.80	8.31	1.50	4.54	2.27	82.49	1.65	5.00	2.50	90.85	Silty clay	Dark yellowish-brown	10YR 4/2
DA-RNA8-219-141-3	26	77.18	8.31	1.50	4.54	2.27	68.87	1.94	5.88	2.94	89.23	Silty clay	Dark yellowish-brown	10YR 4/2
DA-RNA8-206-142-1	-2	61.29	4.79	0.25	2.27	2.27	56.50	0.41	3.70	3.70	92.18	Clay	Dark yellowish-brown	10YR 4/2
DA-RNA8-206-142-2	6	81.72	9.38	0.30	4.54	4.54	72.34	0.37	5.56	5.56	88.52	Clay	Pale yellowish-brown	10YR 6/2
DA-RNA8-206-142-3	12	99.88	13.72	0.10	6.81	6.81	86.16	0.10	6.82	6.82	86.26	Clay	Moderate yellowish-brown	10YR 5/4
DA-RNA8-206-142-4	21	93.07	15.99	0.10	9.08	6.81	77.08	0.11	9.76	7.32	82.82	Silty clay	Moderate yellowish-brown	10YR 5/4
DA-RNA8-206-142-5	50	88.53	16.04	0.15	9.08	6.81	72.49	0.17	10.26	7.69	81.88	Silty clay	Moderate yellowish-brown	10YR 5/4
DA-RNA8-206-142-6	64	52.21	9.18	0.10	4.54	4.54	43.03	0.19	8.70	8.70	82.42	Silty clay	Moderate yellowish-brown	10YR 5/4
DA-RNA8-215-139-1	-2	38.59	36.32	0.00	24.97	11.35	2.27	0.00	64.71	29.41	5.88	Sand	Pale yellowish-brown	10YR 6/2
DA-RNA8-215-139-2	2	74.91	17.19	1.30	9.08	6.81	57.72	1.74	12.12	9.09	77.05	Sandy clay	Pale yellowish-brown	10YR 6/2
DA-RNA8-215-139-3	11	77.18	10.48	1.40	4.54	4.54	66.70	1.81	5.88	5.88	86.42	Sandy silty clay	Moderate yellowish-brown	10YR 5/4
DA-RNA8-215-139-4	18	79.45	19.01	0.85	15.89	2.27	60.44	1.07	20.00	2.86	76.07	Sandy clay	Pale yellowish-brown	10YR 6/2
DA-RNA8-215-139-5	26	95.34	27.24	2.27	20.43	4.54	68.10	2.38	21.43	4.76	71.43	Sandy clay	Pale yellowish-brown	10YR 6/2
DA-RNA8-215-139-6	33	79.45	31.78	2.27	27.24	2.27	47.67	2.86	34.29	2.86	60.00	Sandy clay	Pale yellowish-brown	10YR 6/2

Table 16.2. Continued.

Locus/ Sample ID Number	Stratigraphic Level (cm from base of canal)	Bulk Weight (gm)	Residual Weight (gm)	>1 mm	>106 mm	>63 mm	<63 mm	>1 mm	>106 mm	>63 mm	<63 mm	Lithology	Color	Color Code
DA-RNA8-215-139-7	40	74.91	21.98	1.55	13.62	6.81	52.93	2.07	18.18	9.09	70.66	Sandy clay	Pale yellowish-brown	10YR 6/2
DA-RNA8-215-139-8	45	40.86	2.65	0.05	1.60	1.00	38.21	0.12	3.92	2.45	93.51	Clay	Moderate yellowish-brown	10YR 5/4
DA-RNA8-215-139-9	50	100.00	12.35	1.00	9.08	2.27	87.65	1.00	9.08	2.27	87.65	Clay	Moderate yellowish-brown	10YR 5/4
DA-RNA8-220-141-1	-2	68.10	26.47	2.27	22.70	1.50	41.63	3.33	33.33	2.20	61.13	Clayey sand	Pale yellowish-brown	10YR 6/2
DA-RNA8-220-141-2	10	83.99	8.11	1.30	4.54	2.27	75.88	1.55	5.41	2.70	90.34	Clay	Pale yellowish-brown	10YR 6/2
DA-RNA8-220-141-3	26	88.53	9.01	1.20	6.81	1.00	79.52	1.36	7.69	1.13	89.82	Clay	Pale yellowish-brown	10YR 6/2
DA-RNA8-265-151-1	-2	79.45	29.56	0.05	22.70	6.81	49.89	0.06	28.57	8.57	62.79	Sandy clay	Pale yellowish-brown	10YR 6/2
DA-RNA8-265-151-2	4	100.00	16.89	1.00	11.35	4.54	83.11	1.00	11.35	4.54	83.11	Sandy clay	Pale yellowish-brown	10YR 6/2
DA-RNA8-265-151-3	25	100.00	16.89	1.00	9.08	6.81	83.11	1.00	9.08	6.81	83.11	Sandy clay	Pale yellowish-brown	10YR 6/2
DA-RNA8-265-151-4	35	100.00	73.94	1.30	70.37	2.27	26.06	1.30	70.37	2.27	26.06	Sand	Pale yellowish-brown	10YR 6/2
DA-RNA8-265-151-5	48	100.00	14.62	1.00	9.08	4.54	85.38	1.00	9.08	4.54	85.38	Clay	Dark yellowish-brown	10YR 4/2
DA-RNA8-265-151-6	54	100.00	28.34	1.10	22.70	4.54	71.66	1.10	22.70	4.54	71.66	Sandy clay	Pale yellowish-brown	10YR 6/2
DA-RNA8-265-151-7	63	100.00	26.12	1.15	22.70	2.27	73.88	1.15	22.70	2.27	73.88	Sandy clay	Pale yellowish-brown	10YR 6/2
DA-RNA8-265-151-8	71	100.00	70.37	18.16	49.94	2.27	29.63	18.16	49.94	2.27	29.63	Gravelly sand	Grayish-orange	10YR 7/4
DA-RNA8-265-151-9	82	100.00	20.52	2.27	15.98	2.27	79.48	2.27	15.98	2.27	79.48	Sandy clay	Moderate yellowish-brown	10YR 5/4
DA-RNA8-265-151-10	86	83.99	6.54	1.00	4.54	1.00	77.45	1.19	5.41	1.19	92.21	Clay	Dark yellowish-brown	10YR 4/2
DA-RNA8-255-154-1	-2	100.00	68.90	4.54	63.56	0.80	31.10	4.54	63.56	0.80	31.10	Sand	Grayish-orange	10YR 7/4

Table 16.2. Continued.

Locus/ Sample ID Number	Stratigraphic Level (cm from base of canal)	Bulk Weight (gm)	Residual Weight (gm)	>1 mm	>106 mm	>63 mm	<63 mm	>1 mm	>106 mm	>63 mm	<63 mm	Lithology	Color	Color Code
DA-RNA8-255-154-2	5	100.00	57.45	43.13	13.62	0.70	42.55	43.13	13.62	0.70	42.55	Clayey sandy gravel	Grayish-orange	10YR 7/4
DA-RNA8-255-154-3	13	100.00	29.51	6.81	20.43	2.27	70.49	6.81	20.43	2.27	70.49	Sandy clay	Grayish-orange	10YR 7/4
San Agustín Mission														
DA-RNA2-3-1	1	72.64	24.97	–	–	–	–	–	–	–	–	Sandy silt	Moderate brown	5YR 3/4
DA-RNA2-3-2	8	83.99	31.78	–	–	–	–	–	–	–	–	Gravelly sandy silt	Moderate brown	5YR 3/4
DA-RNA2-3-3	-5	56.75	6.81	–	–	–	–	–	–	–	–	Sandy silty clay	Dusky brown	5YR 2/2
DA-RNA2-3-4	2	79.45	11.35	–	–	–	–	–	–	–	–	Sandy silty clay	Moderate brown	5YR 3/4
DA-RNA2-3-5	9	72.64	15.89	–	–	–	–	–	–	–	–	Gravelly sandy silt	Dusky brown	5YR 2/2
DA-RNA2-9-1	-2	59.02	2.27	–	–	–	–	–	–	–	–	Clay	Dusky brown	5YR 2/2
DA-RNA2-9-2	5	68.10	15.89	–	–	–	–	–	–	–	–	Sandy silty clay	Pale yellowish-brown	10YR 6/2
DA-RNA2-9-3	16	61.29	11.35	–	–	–	–	–	–	–	–	Sandy silty clay	Pale yellowish-brown	10YR 6/2
DA-RNA2-9-4	22	43.13	6.81	–	–	–	–	–	–	–	–	Sandy silty clay	Pale yellowish-brown	10YR 6/2
DA-RNA2-53-1	0	95.34	4.54	–	–	–	–	–	–	–	–	Silty clay	Dusky brown	5YR 2/2
DA-RNA2-53-2	2	72.64	9.08	–	–	–	–	–	–	–	–	Clayey silt	Pale yellowish-brown	10YR 6/2
DA-RNA2-53-3	12	72.64	6.81	–	–	–	–	–	–	–	–	Silty clay	Pale yellowish-brown	10YR 6/2
DA-RNA2-53-4	2	70.37	18.16	–	–	–	–	–	–	–	–	Gravelly sandy silt	Pale yellowish-brown	10YR 6/2
DA-RNA2-53-5	12	63.56	4.54	–	–	–	–	–	–	–	–	Clayey silt	Pale yellowish-brown	10YR 6/2

Table 16.2. Continued.

Locus/ Sample ID Number	Stratigraphic Level (cm from base of canal)	Bulk Weight (gm)	Residual Weight (gm)	>1 mm	>106 mm	>63 mm	<63 mm	>1 mm	>106 mm	>63 mm	<63 mm	Lithology	Color	Color Code
DA-RNA2-53-6	0	93.07	9.08	–	–	–	–	–	–	–	–	Silty clay	Dusky brown	5YR 2/2
DA-RNA2-53-7	2	68.10	22.1	–	–	–	–	–	–	–	–	Sandy silt	Pale yellowish-brown	10YR 6/2
DA-RNA2-53-8	17	72.64	9.08	–	–	–	–	–	–	–	–	Sandy silt	Pale yellowish-brown	10YR 6/2
DA-RNA2-53-9	27	70.37	6.81	–	–	–	–	–	–	–	–	Sandy silty clay	Pale yellowish-brown	10YR 6/2
DA-RNA2-53-10	2	70.37	27.24	–	–	–	–	–	–	–	–	Gravelly silty sand	Dusky brown	5YR 2/2
DA-RNA2-53-11	9	59.02	18.16	–	–	–	–	–	–	–	–	Gravelly silty sand	Pale yellowish-brown	10YR 6/2
DA-RNA2-53-12	0	68.10	6.81	–	–	–	–	–	–	–	–	Gravelly silty clay	Dusky brown	5YR 2/2
DA-RNA2-53-13	2	52.21	11.35	–	–	–	–	–	–	–	–	Gravelly clayey silt	Pale yellowish-brown	10YR 6/2
DA-RNA2-53-14	11	65.83	11.35	–	–	–	–	–	–	–	–	Sandy clayey silt	Pale yellowish-brown	10YR 6/2
DA-RNA2-127-1	-6	65.83	18.16	–	–	–	–	–	–	–	–	Gravelly sandy silt	Dusky brown	5YR 2/2
DA-RNA2-127-2	1	61.29	2.27	–	–	–	–	–	–	–	–	Sandy silty clay	Yellowish-brown	
DA-RNA2-127-3	11	59.02	2.27	–	–	–	–	–	–	–	–	Sandy silty clay	Yellowish-brown	
DA-RNA2-127-4	13	63.56	2.27	–	–	–	–	–	–	–	–	Sandy silty clay	Dusky brown	5YR 2/2
DA-RNA2-127-5	18	68.10	6.81	–	–	–	–	–	–	–	–	Sandy silty clay	Dusky brown	5YR 2/2
DA-RNA2-137-1	-30	49.94	31.78	–	–	–	–	–	–	–	–	Sand	Pale yellowish-brown	10YR 6/2
DA-RNA2-137-2	1	63.56	9.08	–	–	–	–	–	–	–	–	Sandy silty clay	Pale yellowish-brown to brown	10YR 6/2: 10YR 5/3
DA-RNA2-137-3	7	68.10	9.08	–	–	–	–	–	–	–	–	Sandy silty clay	Pale yellowish-brown to brown	10YR 6/2: 10YR 5/3

Table 16.2. Continued.

Locus/ Sample ID Number	Stratigraphic Level (cm from base of canal)	Bulk Weight (gm)	Residual Weight (gm)	>1 mm	>106 mm	>63 mm	<63 mm	>1 mm	>106 mm	>63 mm	<63 mm	Lithology	Color	Color Code
DA-RNA2-137-4	11	56.75	6.81	–	–	–	–	–	–	–	–	Sandy silty clay	Pale yellowish-brown to brown	10YR 6/2: 10YR 5/3
DA-RNA2-137-5	16	70.37	15.89	–	–	–	–	–	–	–	–	Sandy silty clay	Pale yellowish-brown to brown	10YR 6/2: 10YR 5/3
DA-RNA2-137-6	22	70.37	22.70	–	–	–	–	–	–	–	–	Sandy silty clay	Pale yellowish-brown to brown	10YR 6/2: 10YR 5/3
DA-RNA2-137-7	26	70.37	22.70	–	–	–	–	–	–	–	–	Sandy silty clay	Pale yellowish-brown to brown	10YR 6/2: 10YR 5/3
DA-RNA2-137-8	32	70.37	24.97	–	–	–	–	–	–	–	–	Sandy silty clay	Pale yellowish-brown to brown	10YR 6/2: 10YR 5/3
DA-RNA2-137-9	37	68.10	34.05	–	–	–	–	–	–	–	–	Gravelly silty sand	Pale yellowish-brown	10YR 6/2
DA-RNA2-137-10	42	70.37	29.51	–	–	–	–	–	–	–	–	Gravelly silty sand	Pale yellowish-brown	10YR 6/2
DA-RNA2-137-11	47	68.10	31.78	–	–	–	–	–	–	–	–	Gravelly silty sand	Pale yellowish-brown	10YR 6/2
DA-RNA2-137-12	51	74.91	36.32	–	–	–	–	–	–	–	–	Gravelly silty sand	Pale yellowish-brown	10YR 6/2
DA-RNA2-137-13	53	61.29	13.62	–	–	–	–	–	–	–	–	Sandy silty clay	Pale yellowish-brown to brown	10YR 6/2: 10YR 5/3
DA-RNA2-137-14	56	65.83	13.62	–	–	–	–	–	–	–	–	Sandy silty clay	Pale yellowish-brown to brown	10YR 6/2: 10YR 5/3
DA-RNA2-137-15	62	72.64	20.43	–	–	–	–	–	–	–	–	Sandy silty clay	Pale yellowish-brown to brown	10YR 6/2: 10YR 5/3
DA-RNA2-137-16	59	65.83	27.24	–	–	–	–	–	–	–	–	Gravelly silty sand	Pale yellowish-brown	10YR 6/2
DA-RNA2-137-17	65	70.37	34.05	–	–	–	–	–	–	–	–	Gravelly silty sand	Pale yellowish-brown	10YR 6/2
DA-RNA2-137-18	69	70.37	31.78	–	–	–	–	–	–	–	–	Gravelly silty sand	Pale yellowish-brown	10YR 6/2
DA-RNA2-137-19	75	81.72	40.86	–	–	–	–	–	–	–	–	Gravelly silty sand	Pale yellowish-brown	10YR 6/2

Table 16.2. Continued.

Locus/ Sample ID Number	Stratigraphic Level (cm from base of canal)	Bulk Weight (gm)	Residual Weight (gm)	>1 mm	>106 mm	>63 mm	<63 mm	>1 mm	>106 mm	>63 mm	<63 mm	Lithology	Color	Color Code
DA-RNA2-137-20	61	79.45	22.70	–	–	–	–	–	–	–	–	Sandy silty clay	Dusky brown	5YR 2/2
DA-RNA2-137-21	66	74.91	20.43	–	–	–	–	–	–	–	–	Sandy silty clay	Dusky brown	5YR 2/2
DA-RNA2-137-22	72	65.83	13.62	–	–	–	–	–	–	–	–	Sandy silty clay	Dusky brown	5YR 2/2
DA-RNA2-137-23	76	70.37	11.35	–	–	–	–	–	–	–	–	Sandy silty clay	Dusky brown	5YR 2/2
DA-RNA2-137-24	81	83.99	13.62	–	–	–	–	–	–	–	–	Sandy silty clay	Dusky brown	5YR 2/2
DA-RNA2-137-25	84	65.83	24.97	–	–	–	–	–	–	–	–	Sandy silty clay	Dusky brown	5YR 2/2
DA-RNA2-137-26	100	83.99	34.09	–	–	–	–	–	–	–	–	Sandy silty clay	Dusky brown	5YR 2/2
DA-RNA2-137-27	-59	74.91	22.70	–	–	–	–	–	–	–	–	Gravelly sandy clay	Dusky brown	5YR 2/2
DA-RNA2-137-28	-48	70.37	11.35	–	–	–	–	–	–	–	–	Sandy silty clay	Dusky brown	5YR 2/2
DA-RNA2-137-29	-38	70.37	6.81	–	–	–	–	–	–	–	–	Sandy silty clay	Dusky brown	5YR 2/2
DA-RNA2-137-30	-28	65.83	9.08	–	–	–	–	–	–	–	–	Sandy silty clay	Pale yellowish-brown	10YR 6/2
DA-RNA2-137-31	-18	79.45	13.62	–	–	–	–	–	–	–	–	Sandy silty clay	Pale yellowish-brown	10YR 6/2
DA-RNA2-Cienega		56.75	6.81	–	–	–	–	–	–	–	–	Sandy silty clay	Dusky brown	5YR 2/2
Mission Gardens														
DA-RNA11-310-200-1	-5	100.00	9.08	2.27	4.54	2.27	90.92	2.27	4.54	2.27	90.92	Clay	Dark yellowish-brown	10YR 4/2
DA-RNA11-310-200-2	0	100.00	7.81	1.00	2.27	4.54	92.19	1.00	2.27	4.54	92.19	Clay	Pale brown	5YR 5/2
DA-RNA11-310-200-3	6	100.00	7.31	0.50	2.27	4.54	92.69	0.50	2.27	4.54	92.69	Clay	Dark yellowish-brown	10YR 4/2

Table 16.2. Continued.

Locus/ Sample ID Number	Stratigraphic Level (cm from base of canal)	Bulk Weight (gm)	Residual Weight (gm)	>1 mm	>106 mm	>63 mm	<63 mm	>1 mm	>106 mm	>63 mm	<63 mm	Lithology	Color	Color Code
DA-RNA11-310-200-4	15	100.00	23.25	0.55	13.62	9.08	76.75	0.55	13.62	9.08	76.75	Sandy clay	Moderate yellowish-brown	10YR 5/4
DA-RNA11-310-200-5	36	100.00	60.02	1.00	52.21	6.81	39.98	1.00	52.21	6.81	39.98	Clayey silty sand	Moderate yellowish-brown	10YR 5/4
DA-RNA11-310-200-6	43	100.00	43.48	0.35	36.32	6.81	56.52	0.35	36.32	6.81	56.52	Sandy silty clay	Moderate yellowish-brown	10YR 5/4
DA-RNA11-310-200-7	7	100.00	21.73	1.30	15.89	4.54	78.27	1.30	15.89	4.54	78.27	Silty sandy clay	Moderate yellowish-brown	10YR 5/4
DA-RNA11-310-200-8	23	100.00	19.16	1.00	11.35	6.81	80.84	1.00	11.35	6.81	80.84	Silty sandy clay	Moderate yellowish-brown	10YR 5/4
DA-RNA11-310-200-9	13	100.00	30.66	1.15	24.97	4.54	69.34	1.15	24.97	4.54	69.34	Silty sandy clay	Pale yellowish-brown	10YR 6/2
DA-RNA11-310-200-10	52	100.00	61.29	4.54	49.94	6.81	38.71	4.54	49.94	6.81	38.71	Clayey silty sand	Pale yellowish-brown	10YR 6/2
DA-RNA11-310-200-11	12	100.00	18.81	0.65	6.81	11.35	81.19	0.65	6.81	11.35	81.19	Silty clay	Moderate yellowish-brown	10YR 5/4
DA-RNA11-310-200-12	40	100.00	20.93	0.50	15.89	4.54	79.07	0.50	15.89	4.54	79.07	Silty sandy clay	Moderate yellowish-brown	10YR 5/4
DA-RNA11-310-200-13	18	100.00	86.50	0.70	83.53	2.27	13.50	0.70	83.53	2.27	13.50	Sand	Pale yellowish-brown	10YR 6/2
DA-RNA11-310-200-14	70	100.00	90.80	4.54	83.99	2.27	9.20	4.54	83.99	2.27	9.20	Sand	Moderate yellowish-brown	10YR 5/4
DA-RNA11-310-200-15	90	97.60	89.53	6.81	81.72	1.00	8.07	6.98	83.73	1.02	8.27	Sand	Moderate yellowish-brown	10YR 5/4
DA-RNA11-310-200-16	109	100.00	83.99	4.54	77.18	2.27	16.01	4.54	77.18	2.27	16.01	Sand	Moderate yellowish-brown	10YR 5/4
DA-RNA11-310-200-17	129	100.00	70.37	2.27	63.56	4.54	29.63	2.27	63.56	4.54	29.63	Silty sand	Moderate yellowish-brown	10YR 5/4
DA-RNA11-310-200-18	75	100.00	48.40	3.00	38.59	6.81	51.60	3.00	38.59	6.81	51.60	Sandy silt	Moderate yellowish-brown	10YR 5/4
DA-RNA11-300-207-1	-5	100.00	6.69	0.15	2.00	4.54	93.31	0.15	2.00	4.54	93.31	Clay	Moderate yellowish-brown	10YR 5/4

Table 16.2. Continued.

Locus/ Sample ID Number	Stratigraphic Level (cm from base of canal)	Bulk Weight (gm)	Residual Weight (gm)	>1 mm	>106 mm	>63 mm	<63 mm	>1 mm	>106 mm	>63 mm	<63 mm	Lithology	Color	Color Code
DA-RNA11-300-207-2	0	100.00	47.67	2.27	34.05	11.35	52.33	2.27	34.05	11.35	52.33	Sandy clayey silt	Pale yellowish-brown	10YR 6/2
DA-RNA11-300-207-3	15	100.00	42.36	1.50	27.24	13.62	57.64	1.50	27.24	13.62	57.64	Sandy clayey silt	Pale yellowish-brown	10YR 6/2
DA-RNA11-300-207-4	25	100.00	37.32	1.00	22.70	13.62	62.68	1.00	22.70	13.62	62.68	Sandy clayey silt	Pale yellowish-brown	10YR 6/2
DA-RNA11-307-205-1	-2	100.00	12.35	1.00	6.81	4.54	87.65	1.00	6.81	4.54	87.65	Clay	Pale yellowish-brown	10YR 6/2
DA-RNA11-307-205-2	6	100.00	18.16	2.27	11.35	4.54	81.84	2.27	11.35	4.54	81.84	Clay	Pale yellowish-brown	10YR 6/2
DA-RNA11-307-205-3	10	100.00	28.49	1.25	18.16	9.08	71.51	1.25	18.16	9.08	71.51	Silty clay	Pale yellowish-brown	10YR 6/2
DA-RNA11-307-205-4	13	100.00	27.24	2.27	15.89	9.08	72.76	2.27	15.89	9.08	72.76	Sandy silty clay	Pale yellowish-brown	10YR 6/2
DA-RNA11-307-205-5	27	100.00	24.97	2.27	13.62	9.08	75.03	2.27	13.62	9.08	75.03	Sandy silty clay	Moderate yellowish-brown	10YR 5/4
DA-RNA11-302-200-1	-2	100.00	12.65	1.30	9.08	2.27	87.35	1.30	9.08	2.27	87.35	Silty clay	Moderate yellowish-brown	10YR 5/4
DA-RNA11-302-200-2	2	100.00	61.29	2.27	54.48	4.54	38.71	2.27	54.48	4.54	38.71	Silty sand	Moderate yellowish-brown	10YR 5/4
DA-RNA11-302-200-3	25	100.00	70.37	13.62	47.67	9.08	29.63	13.62	47.67	9.08	29.63	Gravelly silty sand	Moderate yellowish-brown	10YR 5/4
DA-RNA11-302-200-4	29	100.00	56.75	4.54	40.86	11.35	43.25	4.54	40.86	11.35	43.25	Silty gravelly sand	Moderate yellowish-brown	10YR 5/4
DA-RNA11-302-200-5	15	100.00	14.12	0.50	9.08	4.54	85.88	0.50	9.08	4.54	85.88	Silty clay	Moderate yellowish-brown	10YR 5/4
DA-RNA11-302-200-6	8	100.00	7.15	0.30	2.10	4.75	92.85	0.30	2.10	4.75	92.85	Clay	Moderate yellowish-brown	10YR 5/4
DA-RNA11-302-200-7	21	100.00	3.37	0.10	2.27	1.00	96.63	0.10	2.27	1.00	96.63	Clay	Moderate yellowish-brown	10YR 5/4
DA-RNA11-302-200-8	33	100.00	39.94	1.35	29.51	9.08	60.06	1.35	29.51	9.08	60.06	Clayey silty sand	Pale yellowish-brown	10YR 6/2

Table 16.2. Continued.

Locus/ Sample ID Number	Stratigraphic Level (cm from base of canal)	Bulk Weight (gm)	Residual Weight (gm)	>1 mm	>106 mm	>63 mm	<63 mm	>1 mm	>106 mm	>63 mm	<63 mm	Lithology	Color	Color Code
DA-RNA11-302-200-9	42	100.00	17.14	1.25	11.35	4.54	82.86	1.25	11.35	4.54	82.86	Silty sandy clay	Moderate yellowish-brown	10YR 5/4
DA-RNA11-302-200-10	57	100.00	43.48	0.35	29.51	13.62	56.52	0.35	29.51	13.62	56.52	Sandy silt	Moderate yellowish-brown	10YR 5/4
DA-RNA11-302-201-1	-2	100.00	5.64	1.10	2.27	2.27	94.36	1.10	2.27	2.27	94.36	Clay	Dark yellowish-brown	10YR 4/2
DA-RNA11-302-201-2	2	100.00	36.32	2.27	29.51	4.54	63.68	2.27	29.51	4.54	63.68	Sandy silt	Pale yellowish-brown	10YR 6/2
DA-RNA11-302-201-3	9	100.00	18.96	0.80	11.35	6.81	81.04	0.80	11.35	6.81	81.04	Sandy silt	Moderate yellowish-brown	10YR 5/4
DA-RNA11-302-201-4	21	100.00	44.13	1.00	36.32	6.81	55.87	1.00	36.32	6.81	55.87	Sandy silt	Moderate yellowish-brown	10YR 5/4
DA-RNA11-302-201-5	35	100.00	34.05	11.35	18.16	4.54	65.95	11.35	18.16	4.54	65.95	Gravelly sandy clay	Pale yellowish-brown	10YR 6/2
DA-RNA11-302-201-6	62	100.00	29.51	11.35	13.62	4.54	70.49	11.35	13.62	4.54	70.49	Silty clay	Moderate yellowish-brown	10YR 5/4
DA-RNA11-302-201-7	65	100.00	27.24	2.27	15.89	9.08	72.76	2.27	15.89	9.08	72.76	Silty clay	Moderate yellowish-brown	10YR 5/4
DA-RNA11-302-201-8	71	100.00	17.39	1.50	9.08	6.81	82.61	1.50	9.08	6.81	82.61	Silty clay	Moderate yellowish-brown	10YR 5/4
DA-RNA11-302-201-9	80	97.61	15.89	2.27	9.08	4.54	81.72	2.33	9.30	4.65	83.72	Silty clay	Moderate yellowish-brown	10YR 5/4
DA-RNA11-309-206-1	-3	100.00	28.24	1.00	18.16	9.08	71.76	1.00	18.16	9.08	71.76	Sandy silty clay	Moderate yellowish-brown	10YR 5/4
DA-RNA11-309-206-2	3	100.00	43.13	2.27	34.05	6.81	56.87	2.27	34.05	6.81	56.87	Sandy silt	Pale yellowish-brown	10YR 6/2
DA-RNA11-309-206-3	14	100.00	52.21	4.54	38.59	9.08	47.79	4.54	38.59	9.08	47.79	Silty sand	Pale yellowish-brown	10YR 6/2
DA-RNA11-305-204-1	-25	100.00	7.31	0.50	4.54	2.27	92.69	0.50	4.54	2.27	92.69	Clay	Dark yellowish-brown	10YR 4/2
DA-RNA11-305-204-2	-2	93.07	20.43	2.27	2.27	15.89	72.64	2.44	2.44	17.07	78.05	Silty clay	Moderate yellowish-brown	10YR 5/4

Table 16.2. Continued.

Locus/ Sample ID Number	Stratigraphic Level (cm from base of canal)	Bulk Weight (gm)	Residual Weight (gm)	>1 mm	>106 mm	>63 mm	<63 mm	>1 mm	>106 mm	>63 mm	<63 mm	Lithology	Color	Color Code
DA-RNA11-305-204-3	2	100.00	30.11	0.60	20.43	9.08	69.89	0.60	20.43	9.08	69.89	Sandy silty clay	Pale yellowish-brown	10YR 6/2
DA-RNA11-305-204-4	15	100.00	36.72	0.40	27.24	9.08	63.28	0.40	27.24	9.08	63.28	Sandy silt	Pale yellowish-brown	10YR 6/2
DA-RNA11-305-204-5	23	100.00	56.75	2.27	45.40	9.08	43.25	2.27	45.40	9.08	43.25	Silty sand	Moderate yellowish-brown	10YR 5/4
DA-RNA11-305-204-6	28	100.00	47.97	0.30	38.59	9.08	52.03	0.30	38.59	9.08	52.03	Sandy silt	Moderate yellowish-brown	10YR 5/4
DA-RNA11-305-204-7	40	100.00	40.86	2.27	31.78	6.81	59.14	2.27	31.78	6.81	59.14	Sandy silt	Pale yellowish-brown	10YR 6/2
DA-RNA11-305-204-8	51	100.00	18.46	0.30	6.81	11.35	81.54	0.30	6.81	11.35	81.54	Silty clay	Moderate yellowish-brown	10YR 5/4

Table 16.3. Minerals and other materials present in ostracode samples, AZ BB:13:481 (ASM).

Locus/ Sample ID Number	Stratigraphic Level (cm from base of canal)	Minerology																							
		Quartz	Feldspars	Pegmatite	Magnetite	Biotite	Muscovite	Gneiss	Schist	Glass	Basalt	Manganese Nodules	Tufa	Calcareous Concretions	Caliche	Clay Clumps	Charcoal	Shell Fragments	Rock Fragments	Ostracode Fragments	Calcified Wood	Bone Fragments	Metal Fragments	Pottery Sherds	Flakes
Congress Street/Brickyard																									
DA-RNA8-212-144-1	-2	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	–	–	–	–	–	–	–
DA-RNA8-212-144-2	4	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	X	–
DA-RNA8-212-144-3	17	X	–	–	–	X	–	–	–	–	–	–	X	–	X	–	X	X	X	–	–	–	–	–	–
DA-RNA8-212-144-4	27	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA8-212-144-5	35	X	–	–	–	X	X	–	–	–	–	–	X	–	–	–	X	X	X	X	–	–	–	X	–
DA-RNA8-212-144-6	45	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	–	X	X	–	–	–	–	–	–
DA-RNA8-212-144-7	60	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	–	X	X	–	–	–	–	–	–
DA-RNA8-212-144-8	72	X	–	–	–	X	X	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA8-267-152-1	-2	X	X	X	–	X	–	–	–	X	–	–	X	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-267-152-2	2	X	X	X	–	X	–	–	–	–	–	–	X	–	–	–	X	–	X	–	–	–	–	–	–
DA-RNA8-267-152-3	16	X	X	X	–	X	–	–	–	–	–	–	X	–	–	–	–	–	X	–	–	–	–	–	–
DA-RNA8-267-152-4	30	X	X	X	–	X	–	–	–	–	–	–	X	–	–	–	–	–	X	–	–	–	–	–	–
DA-RNA8-267-152-5	50	X	X	X	–	X	–	–	–	–	–	–	X	–	–	–	–	–	X	–	–	–	–	–	–
DA-RNA8-Block 5-143-1	-2	X	X	X	–	X	–	–	–	X	–	–	X	–	–	–	–	–	X	–	–	–	–	–	–
DA-RNA8-Block 5-143-2	2	X	X	–	–	X	–	–	–	–	–	–	X	–	–	–	–	–	X	–	–	–	–	–	–
DA-RNA8-Block 5-143-3	11	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	–	–	X	–	–	–	–	–	–
DA-RNA8-Block 5-143-4	22	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	–	–	X	–	–	–	–	–	–

Table 16.3. Continued.

Locus/ Sample ID Number	Stratigraphic Level (cm from base of canal)	Minerology																							
		Quartz	Feldspars	Pegmatite	Magnetite	Biotite	Muscovite	Gneiss	Schist	Glass	Basalt	Manganese Nodules	Tufa	Calcareous Concretions	Caliche	Clay Clumps	Charcoal	Shell Fragments	Rock Fragments	Ostracode Fragments	Calcified Wood	Bone Fragments	Metal Fragments	Pottery Sherds	Flakes
DA-RNA8-260-149-1	-2	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	–	X	–	–	–	–	–	–
DA-RNA8-260-149-2	4	X	–	X	–	X	–	X	X	–	–	–	–	–	–	–	–	–	X	–	–	–	–	–	–
DA-RNA8-260-149-3	15	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	–	X	–	–	–	–	–	–
DA-RNA8-260-149-4	21	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	–	X	–	–	–	–	–	–
DA-RNA8-260-149-5	27	X	X	X	–	X	–	–	–	–	–	–	X	–	–	–	X	–	X	–	–	–	–	–	–
DA-RNA8-260-149-6	35	X	X	X	–	X	–	–	–	–	–	–	X	–	–	–	X	–	X	–	–	–	–	–	–
DA-RNA8-260-149-7	45	X	X	–	–	X	–	–	–	X	–	–	X	–	–	–	–	–	X	–	–	–	–	–	–
DA-RNA8-253-146-1	-2	X	X	–	–	X	–	–	–	–	–	–	–	–	–	–	–	–	X	–	–	–	–	–	–
DA-RNA8-253-146-2	3	X	X	X	–	X	–	X	X	X	–	–	–	–	–	–	X	X	X	X	–	–	–	–	–
DA-RNA8-253-146-3	14	X	–	–	–	X	–	X	–	X	–	–	X	–	–	–	–	X	X	–	–	–	–	–	–
DA-RNA8-253-146-4	34	X	X	X	–	X	–	–	X	X	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA8-253-146-5	50	X	X	–	–	X	–	–	–	X	–	–	–	–	–	–	–	X	X	–	–	–	–	–	–
DA-RNA8-253-146-6	68	X	X	–	–	X	X	–	–	X	–	–	–	–	–	–	–	X	X	–	–	–	–	–	–
DA-RNA8-253-147-1	5	X	X	–	–	X	X	–	–	X	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA8-253-147-2	17	X	X	–	–	X	–	–	–	X	–	–	X	–	–	–	X	–	X	–	–	–	–	–	–
DA-RNA8-253-148-1	-2	X	–	–	–	X	–	X	–	X	–	–	X	–	–	–	–	–	X	–	–	–	–	–	–
DA-RNA8-253-148-2	4	X	X	–	–	X	–	X	–	X	–	–	X	–	–	–	X	–	X	–	–	–	–	–	–
DA-RNA8-253-148-3	15	X	X	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	X	–	–	–	–	–
DA-RNA8-253-150-1	-2	X	X	–	–	X	–	–	–	X	–	–	X	–	–	–	X	X	X	X	–	–	–	–	–
DA-RNA8-253-150-2	2	X	X	X	–	X	–	–	–	–	–	–	X	–	–	–	–	–	X	–	–	–	–	–	–
DA-RNA8-253-150-3	19	X	X	–	–	X	–	–	–	X	–	–	X	–	–	–	X	X	X	X	–	–	–	–	–

Table 16.3. Continued.

Locus/ Sample ID Number	Stratigraphic Level (cm from base of canal)	Minerology																							
		Quartz	Feldspars	Pegmatite	Magnetite	Biotite	Muscovite	Gneiss	Schist	Glass	Basalt	Manganese Nodules	Tufa	Calcareous Concretions	Caliche	Clay Clumps	Charcoal	Shell Fragments	Rock Fragments	Ostracode Fragments	Calcified Wood	Bone Fragments	Metal Fragments	Pottery Sherds	Flakes
DA-RNA8-258-153/154-1	-2	X	X	–	–	X	–	–	–	X	–	X	X	–	–	–	–	X	X	X	–	–	–	–	–
DA-RNA8-258-153/154-2	5	X	X	X	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	X	–	–	–	–	–
DA-RNA8-258-153/154-3	13	X	X	–	–	X	–	–	–	X	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA8-258-153/154-4	21	X	X	–	–	X	–	–	–	X	–	–	X	–	–	–	X	X	X	X	–	–	–	–	–
DA-RNA8-203-140-1	-2	X	X	–	–	X	–	–	–	X	–	–	–	–	–	–	–	–	X	–	–	–	–	–	–
DA-RNA8-203-140-2	3	X	–	–	–	X	–	–	–	X	–	–	X	–	–	–	X	–	X	–	–	–	–	–	–
DA-RNA8-203-140-3	10	X	–	–	–	X	–	–	–	X	–	–	X	–	–	–	X	–	X	–	–	–	–	–	–
DA-RNA8-203-140-4	16	X	X	–	–	X	–	–	–	X	–	–	X	–	–	–	–	–	X	–	–	–	–	–	–
DA-RNA8-203-140-5	22	X	X	–	–	X	–	–	–	X	–	–	X	–	–	–	X	–	X	–	–	–	X	–	–
DA-RNA8-203-140-6	30	X	X	–	–	X	–	–	X	X	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA8-203-140-7	34	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	–	–	–	–	–	–	–	–
DA-RNA8-203-140-8	39	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA8-201-139-1	-2	X	X	–	–	X	–	–	X	–	–	–	–	–	–	–	–	–	X	–	–	–	–	–	–
DA-RNA8-201-139-2	2	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	–	X	–	–	–	–	–	–
DA-RNA8-201-139-3	9	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	–	–	–	–	–	–	–	–
DA-RNA8-201-139-4	14	X	X	–	–	X	–	–	–	X	–	–	X	–	–	–	X	–	–	–	–	–	X	–	–
DA-RNA8-201-139-5	23	X	X	–	–	X	–	–	–	–	–	–	X	–	–	–	–	–	X	–	–	–	–	–	–
DA-RNA8-201-139-6	27	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	–	X	–	–	–	–	–	–
DA-RNA8-201-139-7	36	X	X	–	–	X	X	–	–	–	–	–	X	–	–	–	X	–	–	–	–	–	–	–	–
DA-RNA8-201-139-8	40	X	X	–	–	X	–	–	–	–	–	–	X	–	–	–	–	–	X	–	–	–	X	–	–

Table 16.3. Continued.

Locus/ Sample ID Number	Stratigraphic Level (cm from base of canal)	Minerology																							
		Quartz	Feldspars	Pegmatite	Magnetite	Biotite	Muscovite	Gneiss	Schist	Glass	Basalt	Manganese Nodules	Tufa	Calcareous Concretions	Caliche	Clay Clumps	Charcoal	Shell Fragments	Rock Fragments	Ostracode Fragments	Calcified Wood	Bone Fragments	Metal Fragments	Pottery Sherds	Flakes
DA-RNA8-201-139-9	45	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	X	X	–
DA-RNA8-201-139-10	52	X	–	–	–	X	–	–	–	X	–	–	X	–	–	–	X	X	X	–	–	–	X	–	–
DA-RNA8-201-139-11	59	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	X	–	–	–	–	–
DA-RNA8-201-139-12	63	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	–	X	–	–	–	–	–
DA-RNA8-201-139-13	71	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	–	X	–	–	–	–	–	–
DA-RNA8-202-138-1	-2	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	–	–	–	–	–	X	–	–
DA-RNA8-202-138-2	4	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	–	–	–	–	–	–	–
DA-RNA8-202-138-3	18	X	–	–	–	X	–	–	–	X	–	–	X	–	–	–	X	X	X	X	–	–	–	–	–
DA-RNA8-202-138-4	28	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA8-202-138-5	36	X	–	–	–	X	–	–	–	X	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA8-219-141-1	-2	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	–	–	X	–	–	–	–	–	–
DA-RNA8-219-141-2	10	X	–	–	–	X	–	–	–	X	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA8-219-141-3	26	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	–	–	–	–	–	–	–
DA-RNA8-206-142-1	-2	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	–	X	–	–	–	–	–	–	–
DA-RNA8-206-142-2	6	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	–	X	–	–	–	–	–	–	–
DA-RNA8-206-142-3	12	X	–	–	–	X	–	–	–	X	–	–	X	–	–	–	X	X	–	–	–	–	–	–	–
DA-RNA8-206-142-4	21	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	–	–	–	–	–	–	–
DA-RNA8-206-142-5	50	X	–	–	–	X	–	–	–	X	–	–	X	–	–	–	X	X	–	–	–	–	–	–	–
DA-RNA8-206-142-6	64	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	–	–	–	–	–	–	–
DA-RNA8-215-139-1	-2	X	X	–	–	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-215-139-2	2	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	–	–	–	–	–	–	–

Table 16.3. Continued.

Locus/ Sample ID Number	Stratigraphic Level (cm from base of canal)	Minerology: Quartz	Feldspars	Pegmatite	Magnetite	Biotite	Muscovite	Gneiss	Schist	Glass	Basalt	Manganese Nodules	Tufa	Calcareous Concretions	Caliche	Clay Clumps	Charcoal	Shell Fragments	Rock Fragments	Ostracode Fragments	Calcified Wood	Bone Fragments	Metal Fragments	Pottery Sherds	Flakes
DA-RNA8-215-139-3	11	X	X	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	–	–	–	–	–	–	–
DA-RNA8-215-139-4	18	X	X	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	–	–	–	–	–	–	–
DA-RNA8-215-139-5	26	X	–	–	–	X	–	–	–	–	–	–	X	–	–	X	X	X	–	–	–	–	–	–	–
DA-RNA8-215-139-6	33	X	X	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA8-215-139-7	40	X	–	–	–	X	–	–	–	–	–	–	X	–	–	X	X	X	X	–	–	–	–	–	–
DA-RNA8-215-139-8	45	X	X	–	–	X	–	–	–	–	–	–	–	–	–	–	–	X	X	–	–	–	–	–	–
DA-RNA8-215-139-9	50	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA8-220-141-1	-2	X	X	–	–	X	–	–	–	X	–	–	X	–	–	–	X	–	X	–	–	–	–	–	–
DA-RNA8-220-141-2	10	X	–	–	–	–	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA8-220-141-3	26	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA8-265-151-1	-2	X	X	–	–	X	–	–	–	–	–	–	X	–	–	–	X	–	X	–	–	–	–	–	–
DA-RNA8-265-151-2	4	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA8-265-151-3	25	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA8-265-151-4	35	X	–	–	–	X	–	–	–	–	–	–	–	–	–	–	X	X	X	–	–	–	–	X	–
DA-RNA8-265-151-5	48	X	X	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	–	–	–	–	–	–	–
DA-RNA8-265-151-6	54	X	–	–	–	X	X	–	–	X	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA8-265-151-7	63	X	–	–	–	X	–	–	–	X	–	–	X	–	–	–	X	X	–	–	–	–	–	–	–
DA-RNA8-265-151-8	71	X	X	–	–	X	–	–	–	X	–	–	–	–	–	–	–	X	X	–	–	–	–	–	–
DA-RNA8-265-151-9	82	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	–	–	–	–	–	–	–
DA-RNA8-265-151-10	86	X	–	–	–	–	–	–	–	–	–	–	X	–	–	X	X	X	X	–	–	–	–	–	–

Table 16.3. Continued.

Locus/ Sample ID Number	Stratigraphic Level (cm from base of canal)	Minerology																							
		Quartz	Feldspars	Pegmatite	Magnetite	Biotite	Muscovite	Gneiss	Schist	Glass	Basalt	Manganese Nodules	Tufa	Calcareous Concretions	Caliche	Clay Clumps	Charcoal	Shell Fragments	Rock Fragments	Ostracode Fragments	Calcified Wood	Bone Fragments	Metal Fragments	Pottery Sherds	Flakes
DA-RNA8-255-154-1	-2	X	X	–	–	X	–	–	–	–	–	–	–	–	–	–	–	–	X	–	–	–	–	–	–
DA-RNA8-255-154-2	5	X	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	X	–	–	–	–	–	–
DA-RNA8-255-154-3	13	X	–	–	–	X	–	–	–	X	–	–	X	–	–	–	–	X	X	–	–	–	–	X	–
San Agustín Mission																									
DA-RNA2-3-1	1	X	X	X	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	X	–	–
DA-RNA2-3-2	8	X	X	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA2-3-3	-5	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	–	X	X	–	–	–	–	–	–
DA-RNA2-3-4	2	X	X	X	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA2-3-5	9	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA2-9-1	-2	X	X	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA2-9-2	5	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	X	–	–	–	–	–
DA-RNA2-9-3	16	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	X	–
DA-RNA2-9-4	22	X	X	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA2-53-1	0	X	–	–	–	–	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA2-53-2	2	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	X	–	–	–	–	–
DA-RNA2-53-3	12	X	X	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	X	–	–	–	–	–
DA-RNA2-53-4	2	X	X	–	–	X	–	–	–	–	–	–	X	–	–	–	–	–	X	–	–	–	–	–	–
DA-RNA2-53-5	12	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA2-53-6	0	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	–	X	–	–	–	–	–	–	–
DA-RNA2-53-7	2	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	–	X	–	–	–	–	–	–

Table 16.3. Continued.

Locus/ Sample ID Number	Stratigraphic Level (cm from base of canal)	Minerology																							
		Quartz	Feldspars	Pegmatite	Magnetite	Biotite	Muscovite	Gneiss	Schist	Glass	Basalt	Manganese Nodules	Tufa	Calcareous Concretions	Caliche	Clay Clumps	Charcoal	Shell Fragments	Rock Fragments	Ostracode Fragments	Calcified Wood	Bone Fragments	Metal Fragments	Pottery Sherds	Flakes
DA-RNA2-53-8	17	X	X	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA2-53-9	27	X	X	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA2-53-10	2	X	X	X	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA2-53-11	9	X	X	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA2-53-12	0	X	X	–	–	X	–	–	–	–	–	–	X	–	–	–	–	–	X	–	–	–	–	–	–
DA-RNA2-53-13	2	X	X	X	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	X	–	–	–	–	–
DA-RNA2-53-14	11	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA2-127-1	-6	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	–	X	–	–	–	–	–	–
DA-RNA2-127-2	1	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	–	–	–	–	X	–	–	–
DA-RNA2-127-3	11	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	–	–	–	–	–	–	–
DA-RNA2-127-4	13	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	–	–	–	–	–	–	–	–
DA-RNA2-127-5	18	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	–	–	–	–	–	–	–
DA-RNA2-137-1	-30	X	X	–	–	X	–	–	–	–	–	X	X	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-2	1	X	–	–	–	X	–	–	–	–	–	X	X	–	–	–	X	X	–	–	–	–	–	–	–
DA-RNA2-137-3	7	X	–	–	–	X	–	–	–	–	–	X	X	–	–	–	X	X	X	X	–	–	–	–	–
DA-RNA2-137-4	11	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	–	X	X	X	–	–	–	–	–
DA-RNA2-137-5	16	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA2-137-6	22	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	–	X	X	X	–	–	–	–	–
DA-RNA2-137-7	26	X	X	X	–	X	–	–	–	–	–	–	X	–	–	–	–	X	–	–	–	–	–	–	–
DA-RNA2-137-8	32	X	–	–	X	X	–	–	–	–	–	–	X	–	–	–	–	X	X	X	–	–	–	–	–
DA-RNA2-137-9	37	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–

Table 16.3. Continued.

Locus/ Sample ID Number	Stratigraphic Level (cm from base of canal)	Minerology																							
		Quartz	Feldspars	Pegmatite	Magnetite	Biotite	Muscovite	Gneiss	Schist	Glass	Basalt	Manganese Nodules	Tufa	Calcareous Concretions	Caliche	Clay Clumps	Charcoal	Shell Fragments	Rock Fragments	Ostracode Fragments	Calcified Wood	Bone Fragments	Metal Fragments	Pottery Sherds	Flakes
DA-RNA2-137-10	42	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	–	–	–	–	–	–	–
DA-RNA2-137-11	47	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	–	X	X	–	–	–	–	–	–
DA-RNA2-137-12	51	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA2-137-13	53	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	–	X	–	–	–	–	–	–	–
DA-RNA2-137-14	56	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA2-137-15	62	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA2-137-16	59	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA2-137-17	65	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA2-137-18	69	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA2-137-19	75	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	–	X	X	–	–	X	–	–	–
DA-RNA2-137-20	61	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA2-137-21	66	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	–	–	–	X	–	–	–
DA-RNA2-137-22	72	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA2-137-23	76	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA2-137-24	81	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA2-137-25	84	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA2-137-26	100	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	X	–	–	–	–	–
DA-RNA2-137-27	-59	X	–	–	–	X	–	–	–	–	–	–	X	–	–	X	X	–	X	–	–	–	–	–	–
DA-RNA2-137-28	-48	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	–	X	–	–	–	–	–	–
DA-RNA2-137-29	-38	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	–	X	X	–	–	–	–	–	–

Table 16.3. Continued.

Locus/ Sample ID Number	Stratigraphic Level (cm from base of canal)	Minerology																							
		Quartz	Feldspars	Pegmatite	Magnetite	Biotite	Muscovite	Gneiss	Schist	Glass	Basalt	Manganese Nodules	Tufa	Calcareous Concretions	Caliche	Clay Clumps	Charcoal	Shell Fragments	Rock Fragments	Ostracode Fragments	Calcified Wood	Bone Fragments	Metal Fragments	Pottery Sherds	Flakes
DA-RNA2-137-30	-28	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	–	X	–	–	–	–	–	–
DA-RNA2-137-31	-18	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA2-Cienega		X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
Mission Gardens																									
DA-RNA11-310-200-1	-5	X	–	–	–	–	–	–	–	–	–	–	X	–	–	–	–	X	–	–	–	–	–	–	–
DA-RNA11-310-200-2	0	X	–	–	–	–	–	–	–	–	–	–	X	–	–	–	–	X	–	–	–	–	–	–	–
DA-RNA11-310-200-3	6	X	–	–	–	X	–	–	–	X	–	–	X	–	–	–	X	–	–	X	–	–	–	–	–
DA-RNA11-310-200-4	15	X	–	–	–	X	–	–	–	X	–	–	X	–	–	–	X	X	X	X	–	–	–	–	–
DA-RNA11-310-200-5	36	X	X	–	–	X	–	–	–	X	–	–	X	–	–	–	–	X	X	X	–	–	–	–	–
DA-RNA11-310-200-6	43	X	–	–	–	X	–	–	–	X	–	–	X	–	–	–	X	X	X	X	–	–	–	–	–
DA-RNA11-310-200-7	7	X	X	–	–	X	–	–	–	X	–	–	X	–	–	–	X	X	X	X	–	–	–	–	–
DA-RNA11-310-200-8	23	X	X	–	–	X	–	–	–	X	–	–	X	–	–	–	X	X	X	X	–	–	–	–	–
DA-RNA11-310-200-9	13	X	X	–	–	X	–	–	–	X	–	–	X	–	–	–	–	X	X	–	–	–	–	–	–
DA-RNA11-310-200-10	52	X	X	–	–	X	–	–	–	–	–	–	X	–	–	–	–	–	X	–	–	X	–	X	X
DA-RNA11-310-200-11	12	X	–	–	–	X	–	–	–	X	–	–	X	–	–	–	X	X	X	X	–	–	–	–	–
DA-RNA11-310-200-12	40	X	–	–	–	X	–	–	–	X	–	–	X	–	–	–	X	X	X	X	–	–	–	–	–
DA-RNA11-310-200-13	18	X	X	–	–	X	–	–	–	X	–	–	–	–	–	–	–	–	X	–	–	–	–	–	–
DA-RNA11-310-200-14	70	X	X	–	–	X	–	–	–	–	–	–	–	–	–	–	–	–	X	–	–	–	–	–	–
DA-RNA11-310-200-15	90	X	X	–	–	X	–	–	–	–	–	–	X	–	–	–	–	–	X	–	–	–	–	–	–
DA-RNA11-310-200-16	109	X	X	–	–	X	–	–	–	X	–	–	–	–	–	–	–	–	X	–	–	–	–	–	–

Table 16.3. Continued.

Locus/ Sample ID Number	Stratigraphic Level (cm from base of canal)	Minerology																							
		Quartz	Feldspars	Pegmatite	Magnetite	Biotite	Muscovite	Gneiss	Schist	Glass	Basalt	Manganese Nodules	Tufa	Calcareous Concretions	Caliche	Clay Clumps	Charcoal	Shell Fragments	Rock Fragments	Ostracode Fragments	Calcified Wood	Bone Fragments	Metal Fragments	Pottery Sherds	Flakes
DA-RNA11-310-200-17	129	X	X	–	–	X	–	–	–	X	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA11-310-200-18	75	X	X	–	–	X	–	–	–	–	–	–	–	–	–	–	X	–	X	–	–	–	–	–	–
DA-RNA11-300-207-1	-5	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	X	–	–	–	–	–
DA-RNA11-300-207-2	0	X	X	–	–	X	–	–	–	X	–	–	X	–	–	–	X	X	X	X	–	–	–	–	–
DA-RNA11-300-207-3	15	X	X	–	–	X	–	–	–	X	–	–	X	–	–	–	X	X	X	X	–	X	–	X	–
DA-RNA11-300-207-4	25	X	X	–	–	X	–	–	–	X	–	–	X	X	–	–	X	X	X	X	–	–	–	–	–
DA-RNA11-307-205-1	-2	X	X	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	–	–	–	–	–	–	–
DA-RNA11-307-205-2	6	X	X	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	–	–	–	–	–	X	–
DA-RNA11-307-205-3	10	X	X	–	–	X	–	–	–	–	–	–	X	X	–	–	X	X	–	–	–	–	–	–	–
DA-RNA11-307-205-4	13	X	–	–	–	X	–	–	–	X	–	–	–	X	–	–	X	X	X	–	–	–	–	–	–
DA-RNA11-307-205-5	27	X	–	–	–	X	–	–	–	X	–	–	–	X	–	–	X	–	X	–	–	–	–	X	–
DA-RNA11-302-200-1	-2	X	X	–	–	X	–	–	–	X	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA11-302-200-2	2	X	X	–	–	X	–	–	–	X	–	–	–	–	–	–	–	X	–	–	–	–	–	–	–
DA-RNA11-302-200-3	25	X	X	–	–	X	–	–	–	X	–	–	–	–	–	X	–	–	X	–	–	–	–	–	–
DA-RNA11-302-200-4	29	X	X	–	–	X	–	–	–	–	–	–	–	–	–	X	X	–	–	–	–	–	–	–	–
DA-RNA11-302-200-5	15	X	–	–	–	X	–	–	–	X	–	–	X	–	–	–	X	–	–	–	–	–	–	–	–
DA-RNA11-302-200-6	8	X	–	–	–	X	X	–	–	X	–	–	X	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-302-200-7	21	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-302-200-8	33	X	X	–	–	X	–	–	–	X	–	–	X	X	–	–	X	X	–	–	–	–	–	–	–
DA-RNA11-302-200-9	42	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	–	–	–	–	–	–	–
DA-RNA11-302-200-10	57	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	X	–	X	–	–

Table 16.3. Continued.

Locus/ Sample ID Number	Stratigraphic Level (cm from base of canal)	Minerology																							
		Quartz	Feldspars	Pegmatite	Magnetite	Biotite	Muscovite	Gneiss	Schist	Glass	Basalt	Manganese Nodules	Tufa	Calcareous Concretions	Caliche	Clay Clumps	Charcoal	Shell Fragments	Rock Fragments	Ostracode Fragments	Calcified Wood	Bone Fragments	Metal Fragments	Pottery Sherds	Flakes
DA-RNA11-302-201-1	-2	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	–	–	–	–	–	–	–
DA-RNA11-302-201-2	2	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA11-302-201-3	9	X	–	–	–	X	–	–	–	–	X	–	X	–	–	–	X	X	–	–	–	–	–	–	–
DA-RNA11-302-201-4	21	X	X	–	–	X	–	–	–	–	X	–	X	–	–	–	X	X	–	–	X	–	–	–	–
DA-RNA11-302-201-5	35	X	X	–	–	X	–	–	X	–	–	–	X	–	–	–	X	X	X	–	–	–	–	X	–
DA-RNA11-302-201-6	62	X	X	–	–	X	–	–	–	X	–	–	X	–	X	–	X	X	–	–	–	X	–	X	–
DA-RNA11-302-201-7	65	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	X	–	–	–	–
DA-RNA11-302-201-8	71	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	–	X
DA-RNA11-302-201-9	80	X	–	–	–	X	–	–	–	–	X	–	X	–	–	X	X	X	–	–	–	–	–	–	–
DA-RNA11-309-206-1	-3	X	X	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	–	–	–	–
DA-RNA11-309-206-2	3	X	–	–	–	X	–	–	–	–	–	–	X	–	X	–	X	X	X	–	–	–	–	–	–
DA-RNA11-309-206-3	14	X	–	–	–	X	–	–	–	–	–	–	X	–	X	–	–	X	X	–	–	–	–	X	–
DA-RNA11-305-204-1	-25	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	X	–	–	–	–
DA-RNA11-305-204-2	-2	X	–	–	–	X	X	–	–	–	X	–	X	–	–	X	X	–	–	–	–	–	–	–	–
DA-RNA11-305-204-3	2	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	X	–	–	X	–	–	–
DA-RNA11-305-204-4	15	X	X	–	–	X	X	–	–	–	–	–	X	–	–	–	X	X	–	–	–	–	–	–	–
DA-RNA11-305-204-5	23	X	–	–	–	X	X	–	–	–	X	–	X	–	–	X	X	X	–	–	–	–	–	–	–
DA-RNA11-305-204-6	28	X	X	–	–	X	–	–	–	–	–	–	X	–	–	–	–	X	X	–	–	–	–	–	–
DA-RNA11-305-204-7	40	X	X	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	–	–	X	–	–	–	–
DA-RNA11-305-204-8	51	X	–	–	–	X	–	–	–	–	–	–	X	–	–	–	X	X	–	–	X	–	–	–	–

Table 16.4. Biological contents and taphonomic characteristics of ostracode samples, AZ BB:13:481 (ASM).

		Fossils						Taphonomy					
Locus/ Sample ID Number	Stratigraphic Level (cm from base of canal)	Ostracodes	Molluscs	Fish Bones	Gyrogonites	Plant Debris	Calcareous Spherules	Fragmentation	Abrasion	Encrustation	Coating	Redox Index	Color
Congress Street/Brickyard													
DA-RNA8-212-144-1	-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-212-144-2	4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-212-144-3	17	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-212-144-4	27	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-212-144-5	35	129	8	–	–	–	–	15	10	0	0	0	Clear
DA-RNA8-212-144-6	45	99	3	–	–	–	–	10	5	0	0	0	Clear
DA-RNA8-212-144-7	60	44	7	–	–	–	–	15	5	0	0	0	Clear
DA-RNA8-212-144-8	72	–	1	–	–	–	–	15	5	0	0	0	White
DA-RNA8-267-152-1	-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-267-152-2	2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-267-152-3	16	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-267-152-4	30	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-267-152-5	50	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-Block 5-143-1	-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-Block 5-143-2	2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-Block 5-143-3	11	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-Block 5-143-4	22	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-260-149-1	-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-260-149-2	4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-260-149-3	15	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-260-149-4	21	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-260-149-5	27	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-260-149-6	35	114	1	–	–	–	–	10	5	0	0	1	Light orange
DA-RNA8-260-149-7	45	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-253-146-1	-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-253-146-2	3	56	22	–	–	–	–	10	5	0	0	0	Clear
DA-RNA8-253-146-3	14	66	14	–	–	–	–	5	5	0	0	0	Clear
DA-RNA8-253-146-4	34	10	6	–	–	–	–	15	5	0	0	1	Light orange
DA-RNA8-253-146-5	50	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-253-146-6	68	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-253-147-1	5	74	86	–	–	–	–	10	5	0	0	0	Clear
DA-RNA8-253-147-2	17	8	16	–	–	–	–	30	10	0	0	1	Light orange

Table 16.4. Continued.

		Fossils						Taphonomy					
Locus/ Sample ID Number	Stratigraphic Level (cm from base of canal)	Ostracodes	Molluscs	Fish Bones	Gyrogonites	Plant Debris	Calcareous Spherules	Fragmentation	Abrasion	Encrustation	Coating	Redox Index	Color
DA-RNA8-253-148-1	-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-253-148-2	4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-253-148-3	15	78	5	–	–	–	–	15	5	0	0	0	Clear
DA-RNA8-253-150-1	-2	4	3	–	–	–	–	0	0	0	0	0	Clear
DA-RNA8-253-150-2	2	–	14	–	–	–	–	15	10	0	0	0	White
DA-RNA8-253-150-3	19	8	16	–	–	–	–	5	5	0	0	0	Clear
DA-RNA8-258-153/154-1	-2	14	7	–	–	–	–	10	5	0	0	0	Clear
DA-RNA8-258-153/154-2	5	127	14	–	–	–	–	10	5	0	0	0	Clear
DA-RNA8-258-153/154-3	13	–	1	–	–	X	–	25	5	0	0	0	White
DA-RNA8-258-153/154-4	21	4	11	–	–	X	–	25	5	0	0	0	Clear
DA-RNA8-203-140-1	-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-203-140-2	3	–	–	–	–	X	–	–	–	–	–	–	–
DA-RNA8-203-140-3	10	27	–	–	–	X	–	10	5	0	0	0	Clear
DA-RNA8-203-140-4	16	–	–	–	–	X	–	–	–	–	–	–	–
DA-RNA8-203-140-5	22	–	–	–	–	X	–	–	–	–	–	–	–
DA-RNA8-203-140-6	30	1	2	–	–	X	–	20	10	0	0	0	Clear
DA-RNA8-203-140-7	34	2	–	–	–	X	–	5	5	0	0	0	Clear
DA-RNA8-203-140-8	39	4	2	–	–	X	–	10	5	0	0	0	Clear
DA-RNA8-201-139-1	-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-2	2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-3	9	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-4	14	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-5	23	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-6	27	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-7	36	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-8	40	–	–	–	–	X	–	–	–	–	–	–	–
DA-RNA8-201-139-9	45	–	2	1	–	X	–	100	40	0	0	0	White
DA-RNA8-201-139-10	52	4	–	–	–	X	–	70	30	0	0	2	Orange
DA-RNA8-201-139-11	59	227	13	–	–	X	–	15	10	0	0	1	Light orange
DA-RNA8-201-139-12	63	54	–	–	–	X	–	5	5	0	0	0	Clear
DA-RNA8-201-139-13	71	15	3	–	–	–	–	5	5	0	0	0	Clear
DA-RNA8-202-138-1	-2	7	–	–	–	X	–	0	0	0	0	0	Clear
DA-RNA8-202-138-2	4	398	14	–	8	–	–	15	5	0	0	1	Light orange

Table 16.4. Continued.

Locus/ Sample ID Number	Stratigraphic Level (cm from base of canal)	Fossils						Taphonomy					
		Ostracodes	Molluscs	Fish Bones	Gyrogonites	Plant Debris	Calcareous Spherules	Fragmentation	Abrasion	Encrustation	Coating	Redox Index	Color
DA-RNA8-202-138-3	18	344	23	–	8	–	–	10	5	0	0	1	Light orange
DA-RNA8-202-138-4	28	5	8	–	–	X	–	0	0	0	0	0	Clear
DA-RNA8-202-138-5	36	29	8	–	3	X	–	15	10	0	0	1	Light orange
DA-RNA8-219-141-1	-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-219-141-2	10	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-219-141-3	26	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-206-142-1	-2	13	1	–	1	–	–	10	5	0	0	0	Clear
DA-RNA8-206-142-2	6	28	–	–	–	–	–	10	5	0	0	0	Clear
DA-RNA8-206-142-3	12	70	5	–	–	X	–	10	5	5	5	1	Light orange
DA-RNA8-206-142-4	21	92	1	–	1	X	–	5	5	5	5	1	Light orange
DA-RNA8-206-142-5	50	39	1	–	–	–	–	5	5	5	0	1	Light orange
DA-RNA8-206-142-6	64	9	2	–	–	X	–	5	5	0	0	0	Clear
DA-RNA8-215-139-1	-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-215-139-2	2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-215-139-3	11	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-215-139-4	18	25	–	–	–	X	–	15	15	15	10	1	Light orange
DA-RNA8-215-139-5	26	131	–	–	–	X	–	10	20	15	10	1	Light orange
DA-RNA8-215-139-6	33	23	12	–	–	X	–	10	10	5	5	1	Light orange
DA-RNA8-215-139-7	40	187	26	–	–	X	–	10	10	5	5	1	Light orange
DA-RNA8-215-139-8	45	10	–	–	–	X	–	5	0	0	0	0	Clear
DA-RNA8-215-139-9	50	505	29	–	2	X	–	5	5	0	0	0	Clear
DA-RNA8-220-141-1	-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-220-141-2	10	130	2	–	–	X	–	15	15	10	10	2	Orange
DA-RNA8-220-141-3	26	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-265-151-1	-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-265-151-2	4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-265-151-3	25	14	–	–	–	X	–	10	10	0	0	0	Clear
DA-RNA8-265-151-4	35	–	2	–	–	–	–	50	50	0	0	0	White
DA-RNA8-265-151-5	48	253	3	–	4	X	–	10	10	0	5	0	Clear
DA-RNA8-265-151-6	54	82	3	–	3	X	–	10	10	0	0	1	Light orange
DA-RNA8-265-151-7	63	15	–	–	–	X	–	5	5	0	0	0	Clear
DA-RNA8-265-151-8	71	2	1	–	–	–	–	10	5	0	0	0	Clear
DA-RNA8-265-151-9	82	–	–	–	–	–	–	–	–	–	–	–	–

Table 16.4. Continued.

		Fossils						Taphonomy					
Locus/ Sample ID Number	Stratigraphic Level (cm from base of canal)	Ostracodes	Molluscs	Fish Bones	Gyrogonites	Plant Debris	Calcareous Spherules	Fragmentation	Abrasion	Encrustation	Coating	Redox Index	Color
DA-RNA8-265-151-10	86	4	2	–	–	X	–	30	10	0	0	0	Clear
DA-RNA8-255-154-1	-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-255-154-2	5	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-255-154-3	13	159	–	–	–	–	–	10	10	0	0	0	Clear
San Agustín Mission													
DA-RNA2-3-1	1	–	–	–	–	X	–	–	–	–	–	–	–
DA-RNA2-3-2	8	–	–	–	–	X	–	–	–	–	–	–	–
DA-RNA2-3-3	-5	–	–	–	–	X	–	–	–	–	–	–	–
DA-RNA2-3-4	2	–	–	–	–	X	–	–	–	–	–	–	–
DA-RNA2-3-5	9	–	–	–	–	X	–	–	–	–	–	–	–
DA-RNA2-9-1	-2	2	1	–	–	–	–	0	0	0	0	0	Clear
DA-RNA2-9-2	5	1	–	–	–	–	–	10	10	10	0	1	Light orange
DA-RNA2-9-3	16	99	16	–	6	–	–	10	0	0	0	1	Light orange
DA-RNA2-9-4	22	74	6	–	5	–	–	10	5	0	0	1	Light orange
DA-RNA2-53-1	0	2	1	–	–	X	–	10	5	0	0	1	Light orange
DA-RNA2-53-2	2	2	2	–	–	–	–	10	5	0	0	1	Light orange
DA-RNA2-53-3	12	2	1	–	–	X	–	0	5	0	0	0	Clear
DA-RNA2-53-4	2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-53-5	12	1	6	–	–	–	–	0	5	5	0	1	Light orange
DA-RNA2-53-6	0	1	1	–	–	–	–	50	20	0	30	1	Light orange
DA-RNA2-53-7	2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-53-8	17	6	1	–	–	–	–	30	10	0	5	1	Light orange
DA-RNA2-53-9	27	1	–	–	–	–	–	0	5	0	5	1	Light orange
DA-RNA2-53-10	2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-53-11	9	19	7	–	–	–	–	25	10	0	5	0	Clear
DA-RNA2-53-12	0	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-53-13	2	2	1	–	–	–	–	0	5	0	0	0	Clear
DA-RNA2-53-14	11	5	1	–	–	–	–	15	5	0	5	0	Clear
DA-RNA2-127-1	-6	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-127-2	1	1	–	–	–	–	–	0	10	0	0	1	Light orange
DA-RNA2-127-3	11	1	–	–	–	–	–	30	15	10	0	0	Clear
DA-RNA2-127-4	13	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-127-5	18	–	–	–	–	–	–	–	–	–	–	–	–

Table 16.4. Continued.

Locus/ Sample ID Number	Stratigraphic Level (cm from base of canal)	Fossils						Taphonomy					
		Ostracodes	Molluscs	Fish Bones	Gyrogonites	Plant Debris	Calcareous Spherules	Fragmentation	Abrasion	Encrustation	Coating	Redox Index	Color
DA-RNA2-137-1	-30	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-2	1	2	1	–	–	–	–	0	5	0	0	0	Clear
DA-RNA2-137-3	7	3	2	–	–	–	–	30	5	0	0	0	Clear
DA-RNA2-137-4	11	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-5	16	–	1	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-6	22	3	1	–	–	–	–	15	10	0	0	0	Clear
DA-RNA2-137-7	26	–	1	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-8	32	10	3	–	–	–	–	15	10	0	0	1	Light orange
DA-RNA2-137-9	37	67	17	–	–	–	–	20	15	10	10	2	Orange
DA-RNA2-137-10	42	46	6	–	1	–	–	20	10	5	10	1	Light orange
DA-RNA2-137-11	47	36	10	–	–	–	–	10	10	0	5	0	Clear
DA-RNA2-137-12	51	56	15	–	–	–	–	10	10	0	0	0	Clear
DA-RNA2-137-13	53	6	3	–	–	–	–	40	20	30	15	2	Orange
DA-RNA2-137-14	56	6	–	–	–	–	–	30	10	30	10	2	Orange
DA-RNA2-137-15	62	54	5	–	–	–	–	15	10	30	15	2	Orange
DA-RNA2-137-16	59	79	6	–	–	–	–	15	15	10	10	2	Orange
DA-RNA2-137-17	65	81	14	–	–	–	–	10	10	10	10	0	Clear
DA-RNA2-137-18	69	92	10	–	–	–	–	10	10	10	10	3	Brownish-orange
DA-RNA2-137-19	75	38	10	–	–	–	–	10	10	0	0	0	Clear
DA-RNA2-137-20	61	10	4	–	–	–	–	15	15	10	5	0	Clear
DA-RNA2-137-21	66	7	3	–	–	–	–	15	15	10	10	1	Light orange
DA-RNA2-137-22	72	57	4	–	–	–	–	10	10	5	5	1	Light orange
DA-RNA2-137-23	76	80	2	–	–	–	–	10	10	10	10	0	Clear
DA-RNA2-137-24	81	62	13	–	–	–	–	5	5	0	0	0	Clear
DA-RNA2-137-25	84	79	7	–	–	–	–	5	5	0	0	0	Clear
DA-RNA2-137-26	100	74	13	–	–	–	–	15	10	5	5	0	Clear
DA-RNA2-137-27	-59	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-28	-48	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-29	-38	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-30	-28	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-31	-18	27	2	–	–	–	–	10	10	0	0	0	Clear
DA-RNA2-Cienega		–	–	–	–	–	–	–	–	–	–	–	–

Table 16.4. Continued.

Locus/ Sample ID Number	Stratigraphic Level (cm from base of canal)	Fossils						Taphonomy					
		Ostracodes	Molluscs	Fish Bones	Gyrogonites	Plant Debris	Calcareous Spherules	Fragmentation	Abrasion	Encrustation	Coating	Redox Index	Color
Mission Gardens													
DA-RNA11-310-200-1	-5	53	6	–	–	–	–	5	0	0	0	0	Clear
DA-RNA11-310-200-2	0	3	–	–	–	–	–	15	0	0	0	0	Clear
DA-RNA11-310-200-3	6	5	–	–	–	–	–	20	0	0	0	0	Clear
DA-RNA11-310-200-4	15	68	3	–	–	–	–	15	5	0	0	0	Clear
DA-RNA11-310-200-5	36	110	6	2	–	–	–	20	10	0	0	0	Clear
DA-RNA11-310-200-6	43	104	10	–	–	–	–	15	15	0	0	0	Clear
DA-RNA11-310-200-7	7	3	1	–	–	–	–	20	5	0	0	0	Clear
DA-RNA11-310-200-8	23	14	2	–	–	–	–	20	10	0	0	0	Clear
DA-RNA11-310-200-9	13	–	2	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-10	52	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-11	12	54	6	–	–	–	–	20	10	0	0	0	Clear
DA-RNA11-310-200-12	40	6	3	–	–	–	–	0	0	0	0	0	Clear
DA-RNA11-310-200-13	18	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-14	70	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-15	90	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-16	109	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-17	129	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-18	75	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-300-207-1	-5	2	–	–	–	–	–	50	30	0	0	0	Clear
DA-RNA11-300-207-2	0	272	79	–	–	–	–	15	10	0	0	1	Light orange
DA-RNA11-300-207-3	15	272	60	–	1	–	–	15	10	0	0	1	Light orange
DA-RNA11-300-207-4	25	135	48	–	–	–	2	15	10	0	0	1	Light orange
DA-RNA11-307-205-1	-2	22	9	–	–	X	–	10	0	0	0	0	Clear
DA-RNA11-307-205-2	6	73	27	–	–	X	–	10	10	0	0	0	Clear
DA-RNA11-307-205-3	10	166	45	–	1	X	–	15	15	10	10	1	Light orange
DA-RNA11-307-205-4	13	55	32	–	–	–	–	15	15	10	10	1	Light orange
DA-RNA11-307-205-5	27	26	6	–	–	X	6	10	10	5	0	1	Light orange
DA-RNA11-302-200-1	-2	14	3	–	–	X	–	20	5	0	0	1	Light orange
DA-RNA11-302-200-2	2	–	1	–	–	X	–	0	0	0	0	0	White
DA-RNA11-302-200-3	25	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-302-200-4	29	–	–	–	–	X	–	–	–	–	–	–	–
DA-RNA11-302-200-5	15	–	1	–	–	X	–	0	0	0	0	0	White
DA-RNA11-302-200-6	8	–	–	–	–	–	–	–	–	–	–	–	–

Table 16.4. Continued.

Locus/ Sample ID Number	Stratigraphic Level (cm from base of canal)	Fossils						Taphonomy					
		Ostracodes	Molluscs	Fish Bones	Gyrogonites	Plant Debris	Calcareous Spherules	Fragmentation	Abrasion	Encrustation	Coating	Redox Index	Color
DA-RNA11-302-200-7	21	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-302-200-8	33	14	4	–	–	X	–	5	5	0	5	1	Light orange
DA-RNA11-302-200-9	42	8	2	–	–	X	–	0	0	0	0	0	Clear
DA-RNA11-302-200-10	57	4	–	–	–	X	–	10	10	0	0	0	Clear
DA-RNA11-302-201-1	-2	26	–	–	–	X	–	5	5	0	0	0	Clear
DA-RNA11-302-201-2	2	325	20	–	–	X	–	25	15	0	0	0	Clear
DA-RNA11-302-201-3	9	277	4	–	–	X	–	15	10	10	5	1	Light orange
DA-RNA11-302-201-4	21	44	–	–	–	X	–	15	10	0	0	1	Light orange
DA-RNA11-302-201-5	35	526	68	–	–	X	–	15	10	0	0	0	Clear
DA-RNA11-302-201-6	62	73	14	–	–	X	–	10	10	10	10	1	Light orange
DA-RNA11-302-201-7	65	337	31	–	–	X	–	10	10	10	10	1	Light orange
DA-RNA11-302-201-8	71	371	12	–	–	X	–	10	10	10	10	1	Light orange
DA-RNA11-302-201-9	80	342	49	–	–	X	–	10	10	10	10	1	Light orange
DA-RNA11-309-206-1	-3	8	4	–	–	X	–	5	5	5	0	1	Light orange
DA-RNA11-309-206-2	3	222	281	–	–	X	–	15	10	0	0	1	Light orange
DA-RNA11-309-206-3	14	87	264	–	–	X	–	15	10	5	0	1	Light orange
DA-RNA11-305-204-1	-25	6	–	–	–	–	–	5	5	5	5	0	Clear
DA-RNA11-305-204-2	-2	–	1	–	–	X	–	0	0	0	0	0	White
DA-RNA11-305-204-3	2	33	6	–	–	–	–	10	5	5	5	2	Orange
DA-RNA11-305-204-4	15	7	4	–	–	–	–	5	5	0	0	1	Light orange
DA-RNA11-305-204-5	23	–	4	–	–	–	–	70	30	0	0	0	White
DA-RNA11-305-204-6	28	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-305-204-7	40	7	4	–	–	X	–	15	10	0	0	1	Light orange
DA-RNA11-305-204-8	51	–	–	–	–	–	–	–	–	–	–	–	–

Table 16.5. Ostracode populations by sample number, stratigraphic level, weight, and adult/juvenile and carapace/valve ratios, AZ BB:13:481 (ASM).

						L. cf. *L. paraornata*				*C. vidua*			
Locus/ Sample ID Number	Stratigraphic Level (cm from base of canal)	Bulk Weight (gm)	Residual Weight (gm)	Ostra- codes	Ostra- codes/ gm	No.	%	A/J	C/V	No.	%	A/J	C/V
Congress Street/Brickyard													
DA-RNA8-212-144-1	-2	106.69	5.89	–	–	–	–	–	–	–	–	–	–
DA-RNA8-212-144-2	4	108.96	28.79	–	–	–	–	–	–	–	–	–	–
DA-RNA8-212-144-3	17	99.88	24.15	–	–	–	–	–	–	–	–	–	–
DA-RNA8-212-144-4	27	106.69	28.24	–	–	–	–	–	–	–	–	–	–
DA-RNA8-212-144-5	35	118.04	45.40	129	49.62	–	–	–	–	2	1.55	0.50	0.00
DA-RNA8-212-144-6	45	111.23	16.39	99	14.59	2	2.02	1.00	0.00	8	8.08	0.38	0.00
DA-RNA8-212-144-7	60	113.50	21.43	44	8.31	–	–	–	–	1	2.27	1.00	0.00
DA-RNA8-212-144-8	72	120.31	29.89	–	–	–	–	–	–	–	–	–	–
DA-RNA8-267-152-1	-2	108.96	98.61	–	–	–	–	–	–	–	–	–	–
DA-RNA8-267-152-2	2	133.93	79.45	–	–	–	–	–	–	–	–	–	–
DA-RNA8-267-152-3	16	138.47	82.21	–	–	–	–	–	–	–	–	–	–
DA-RNA8-267-152-4	30	124.85	26.47	–	–	–	–	–	–	–	–	–	–
DA-RNA8-267-152-5	50	120.31	22.70	–	–	–	–	–	–	–	–	–	–
DA-RNA8-Block 5-143-1	-2	86.26	73.64	–	–	–	–	–	–	–	–	–	–
DA-RNA8-Block 5-143-2	2	102.15	22.16	–	–	–	–	–	–	–	–	–	–
DA-RNA8-Block 5-143-3	11	115.77	15.62	–	–	–	–	–	–	–	–	–	–
DA-RNA8-Block 5-143-4	22	113.5	13.35	–	–	–	–	–	–	–	–	–	–
DA-RNA8-260-149-1	-2	59.02	12.31	–	–	–	–	–	–	–	–	–	–
DA-RNA8-260-149-2	4	111.23	88.53	–	–	–	–	–	–	–	–	–	–
DA-RNA8-260-149-3	15	88.53	20.16	–	–	–	–	–	–	–	–	–	–
DA-RNA8-260-149-4	21	106.69	18.51	–	–	–	–	–	–	–	–	–	–
DA-RNA8-260-149-5	27	106.69	44.68	–	–	–	–	–	–	–	–	–	–
DA-RNA8-260-149-6	35	129.39	26.97	114	23.76	1	0.88	1.00	0.00	3	2.63	0.67	0.00
DA-RNA8-260-149-7	45	133.93	127.85	–	–	–	–	–	–	–	–	–	–
DA-RNA8-253-146-1	-2	108.96	88.53	–	–	–	–	–	–	–	–	–	–
DA-RNA8-253-146-2	3	111.23	72.64	56	36.57	2	3.57	1.00	0.00	10	17.86	1.00	0.00

Table 16.5. Continued.

Locus/ Sample ID Number	*C. patzcuaro*				*C. caudata*				*I. bradyi*			
	No.	%	A/J	C/V	No.	%	A/J	C/V	No.	%	A/J	C/V
Congress Street/Brickyard (contd.)												
DA-RNA8-212-144-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-212-144-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-212-144-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-212-144-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-212-144-5	1	0.78	1.00	0.00	–	–	–	–	111	86.05	0.82	0.00
DA-RNA8-212-144-6	–	–	–	–	–	–	–	–	71	71.72	0.51	0.00
DA-RNA8-212-144-7	–	–	–	–	–	–	–	–	43	97.73	0.70	0.00
DA-RNA8-212-144-8	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-267-152-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-267-152-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-267-152-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-267-152-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-267-152-5	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-Block 5-143-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-Block 5-143-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-Block 5-143-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-Block 5-143-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-260-149-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-260-149-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-260-149-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-260-149-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-260-149-5	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-260-149-6	–	–	–	–	–	–	–	–	110	96.49	0.95	0.00
DA-RNA8-260-149-7	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-253-146-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-253-146-2	–	–	–	–	–	–	–	–	44	78.57	0.91	0.00

Table 16.5. Continued.

Locus/ Sample ID Number	*H. brevicaudata*				*Ch. Arcuata*				*D. stevensoni*			
	No.	%	A/J	C/V	No.	%	A/J	C/V	No.	%	A/J	C/V
Congress Street/Brickyard (contd.)												
DA-RNA8-212-144-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-212-144-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-212-144-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-212-144-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-212-144-5	2	1.55	0.50	0.00	–	–	–	–	4	3.10	1.00	0.00
DA-RNA8-212-144-6	–	–	–	–	–	–	–	–	11	11.11	0.64	0.00
DA-RNA8-212-144-7	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-212-144-8	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-267-152-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-267-152-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-267-152-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-267-152-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-267-152-5	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-Block 5-143-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-Block 5-143-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-Block 5-143-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-Block 5-143-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-260-149-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-260-149-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-260-149-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-260-149-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-260-149-5	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-260-149-6	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-260-149-7	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-253-146-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-253-146-2	–	–	–	–	–	–	–	–	–	–	–	–

Table 16.5. Continued.

Locus/ Sample ID Number	*P. unicaudata*				*P. pustulosa*				*Cypridopsis* sp.			
	No.	%	A/J	C/V	No.	%	A/J	C/V	No.	%	A/J	C/V
Congress Street/Brickyard (contd.)												
DA-RNA8-212-144-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-212-144-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-212-144-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-212-144-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-212-144-5	–	–	–	–	–	–	–	–	9	6.98	0.56	0.00
DA-RNA8-212-144-6	–	–	–	–	–	–	–	–	7	7.07	0.29	–
DA-RNA8-212-144-7	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-212-144-8	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-267-152-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-267-152-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-267-152-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-267-152-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-267-152-5	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-Block 5-143-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-Block 5-143-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-Block 5-143-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-Block 5-143-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-260-149-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-260-149-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-260-149-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-260-149-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-260-149-5	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-260-149-6	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-260-149-7	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-253-146-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-253-146-2	–	–	–	–	–	–	–	–	–	–	–	–

Table 16.5. Continued.

Locus/ Sample ID Number	Stratigraphic Level (cm from base of canal)	Bulk Weight (gm)	Residual Weight (gm)	Ostra-codes	Ostra-codes/ gm	*L.* cf. *L. paraornata*				*C. vidua*			
						No.	%	A/J	C/V	No.	%	A/J	C/V
Congress Street/Brickyard													
DA-RNA8-253-146-3	14	124.85	56.75	66	30.00	–	–	–	–	28	42.42	0.71	0.00
DA-RNA8-253-146-4	34	115.77	59.02	10	5.10	–	–	–	–	–	–	–	–
DA-RNA8-253-146-5	50	106.69	56.75	–	–	–	–	–	–	–	–	–	–
DA-RNA8-253-146-6	68	106.69	54.48	–	–	–	–	–	–	–	–	–	–
DA-RNA8-253-147-1	5	106.69	56.75	73	38.83	6	8.22	1.00	0.00	30	41.10	1.00	0.00
DA-RNA8-253-147-2	17	108.96	49.94	8	3.67	–	–	–	–	–	–	–	–
DA-RNA8-253-148-1	-2	83.99	59.02	–	–	–	–	–	–	–	–	–	–
DA-RNA8-253-148-2	4	118.04	72.64	–	–	–	–	–	–	–	–	–	–
DA-RNA8-253-148-3	15	124.85	41.86	78	26.15	–	–	–	–	–	–	–	–
DA-RNA8-253-150-1	-2	99.88	42.41	4	1.70	–	–	–	–	1	25.00	1.00	0.00
DA-RNA8-253-150-2	2	120.31	90.80	–	–	–	–	–	–	–	–	–	–
DA-RNA8-253-150-3	19	102.15	54.48	8	4.27	1	12.50	1.00	0.00	3	37.50	1.00	0.00
DA-RNA8-258-153/154-1	-2	106.69	63.56	14	8.34	–	–	–	–	2	14.29	1.00	0.00
DA-RNA8-258-153/154-2	5	106.69	43.13	127	51.34	1	0.79	1.00	0.00	14	11.02	0.86	0.29
DA-RNA8-258-153/154-3	13	120.31	10.58	–	–	–	–	–	–	–	–	–	–
DA-RNA8-258-153/154-4	21	124.85	33.78	4	1.08	–	–	–	–	–	–	–	–
DA-RNA8-203-140-1	-2	59.02	50.44	–	–	–	–	–	–	–	–	–	–
DA-RNA8-203-140-2	3	74.91	40.86	–	–	–	–	–	–	–	–	–	–
DA-RNA8-203-140-3	10	77.18	19.16	27	6.70	1	3.70	1.00	0.00	6	22.22	0.83	0.00
DA-RNA8-203-140-4	16	86.26	5.54	–	–	–	–	–	–	–	–	–	–
DA-RNA8-203-140-5	22	74.91	36.32	–	–	–	–	–	–	–	–	–	–
DA-RNA8-203-140-6	30	68.10	26.47	1	0.39	–	–	–	–	–	–	–	–
DA-RNA8-203-140-7	34	61.29	14.12	2	0.46	–	–	–	–	–	–	–	–
DA-RNA8-203-140-8	39	70.37	16.89	4	0.96	–	–	–	–	–	–	–	–
DA-RNA8-201-139-1	-2	68.10	61.79	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-2	2	86.26	44.63	–	–	–	–	–	–	–	–	–	–

Table 16.5. Continued.

Locus/ Sample ID Number	*C. patzcuaro*				*C. caudata*				*I. bradyi*			
	No.	%	A/J	C/V	No.	%	A/J	C/V	No.	%	A/J	C/V
Congress Street/Brickyard (contd.)												
DA-RNA8-253-146-3	–	–	–	–	–	–	–	–	36	54.55	0.71	0.00
DA-RNA8-253-146-4	–	–	–	–	–	–	–	–	6	60.00	1.00	0.00
DA-RNA8-253-146-5	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-253-146-6	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-253-147-1	–	–	–	–	–	–	–	–	36	49.32	0.94	0.00
DA-RNA8-253-147-2	–	–	–	–	–	–	–	–	8	100.00	0.75	0.00
DA-RNA8-253-148-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-253-148-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-253-148-3	–	–	–	–	–	–	–	–	61	78.21	0.90	0.00
DA-RNA8-253-150-1	–	–	–	–	–	–	–	–	2	50.00	0.50	0.00
DA-RNA8-253-150-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-253-150-3	–	–	–	–	–	–	–	–	3	37.50	1.00	0.00
DA-RNA8-258-153/154-1	–	–	–	–	–	–	–	–	12	85.71	1.00	0.00
DA-RNA8-258-153/154-2	–	–	–	–	–	–	–	–	105	82.68	0.68	0.04
DA-RNA8-258-153/154-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-258-153/154-4	–	–	–	–	–	–	–	–	4	100.00	0.75	0.00
DA-RNA8-203-140-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-203-140-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-203-140-3	4	14.81	0.00	0.00	–	–	–	–	16	59.26	0.75	0.00
DA-RNA8-203-140-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-203-140-5	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-203-140-6	–	–	–	–	–	–	–	–	1	100.00	1.00	0.00
DA-RNA8-203-140-7	–	–	–	–	–	–	–	–	1	50.00	1.00	0.00
DA-RNA8-203-140-8	–	–	–	–	–	–	–	–	4	100.00	0.75	0.00
DA-RNA8-201-139-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-2	–	–	–	–	–	–	–	–	–	–	–	–

Table 16.5. Continued.

Locus/	*H. brevicaudata*				*Ch. Arcuata*				*D. stevensoni*			
Sample ID Number	No.	%	A/J	C/V	No.	%	A/J	C/V	No.	%	A/J	C/V
Congress Street/Brickyard (contd.)												
DA-RNA8-253-146-3	2	3.03	0.00	0.00	–	–	–	–	–	–	–	–
DA-RNA8-253-146-4	4	40.00	0.00	0.00	–	–	–	–	–	–	–	–
DA-RNA8-253-146-5	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-253-146-6	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-253-147-1	–	–	–	–	–	–	–	–	1	1.37	1.00	0.00
DA-RNA8-253-147-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-253-148-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-253-148-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-253-148-3	–	–	–	–	–	–	–	–	1	1.28	1.00	0.00
DA-RNA8-253-150-1	–	–	–	–	–	–	–	–	1	25.00	1.00	0.00
DA-RNA8-253-150-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-253-150-3	–	–	–	–	1	12.50	1.00	0.00	–	–	–	–
DA-RNA8-258-153/154-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-258-153/154-2	–	–	–	–	–	–	–	–	6	4.72	0.00	0.33
DA-RNA8-258-153/154-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-258-153/154-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-203-140-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-203-140-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-203-140-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-203-140-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-203-140-5	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-203-140-6	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-203-140-7	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-203-140-8	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-2	–	–	–	–	–	–	–	–	–	–	–	–

Table 16.5. Continued.

Locus/ Sample ID Number	*P. unicaudata*				*P. pustulosa*				*Cypridopsis* sp.			
	No.	%	A/J	C/V	No.	%	A/J	C/V	No.	%	A/J	C/V
Congress Street/Brickyard (contd.)												
DA-RNA8-253-146-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-253-146-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-253-146-5	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-253-146-6	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-253-147-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-253-147-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-253-148-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-253-148-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-253-148-3	–	–	–	–	–	–	–	–	16	20.51	0.69	0.00
DA-RNA8-253-150-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-253-150-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-253-150-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-258-153/154-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-258-153/154-2	–	–	–	–	–	–	–	–	1	0.79	0.00	0.00
DA-RNA8-258-153/154-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-258-153/154-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-203-140-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-203-140-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-203-140-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-203-140-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-203-140-5	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-203-140-6	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-203-140-7	–	–	–	–	1	50.00	1.00	0.00	–	–	–	–
DA-RNA8-203-140-8	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-2	–	–	–	–	–	–	–	–	–	–	–	–

Table 16.5. Continued.

Locus/ Sample ID Number	Stratigraphic Level (cm from base of canal)	Bulk Weight (gm)	Residual Weight (gm)	Ostra-codes	Ostra-codes/ gm	*L.* cf. *L. paraornata*				*C. vidua*			
						No.	%	A/J	C/V	No.	%	A/J	C/V
Congress Street/Brickyard													
DA-RNA8-201-139-3	9	81.72	50.19	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-4	14	74.91	37.32	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-5	23	86.26	34.05	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-6	27	79.45	35.05	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-7	36	77.18	18.89	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-8	40	88.53	45.13	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-9	45	81.72	42.86	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-10	52	79.45	11.60	4	0.58	–	–	–	–	–	–	–	–
DA-RNA8-201-139-11	59	63.56	9.58	227	34.21	6	2.64	1.00	0.00	5	2.20	0.80	0.00
DA-RNA8-201-139-12	63	65.83	6.04	54	4.95	2	3.70	1.00	0.00	2	3.70	1.00	0.00
DA-RNA8-201-139-13	71	61.29	12.35	15	3.02	–	–	–	–	–	–	–	–
DA-RNA8-202-138-1	-2	97.61	10.08	7	0.72	–	–	–	–	2	28.57	0.50	0.00
DA-RNA8-202-138-2	4	81.72	58.25	398	283.69	16	4.02	0.94	0.00	19	4.77	0.79	0.11
DA-RNA8-202-138-3	18	86.26	45.13	344	179.98	15	4.36	0.87	0.00	18	5.23	0.22	0.00
DA-RNA8-202-138-4	28	90.80	43.13	5	2.38	–	–	–	–	–	–	–	–
DA-RNA8-202-138-5	36	81.72	30.51	29	10.83	–	–	–	–	4	13.79	1.00	0.00
DA-RNA8-219-141-1	-2	74.91	46.90	–	–	–	–	–	–	–	–	–	–
DA-RNA8-219-141-2	10	90.80	8.31	–	–	–	–	–	–	–	–	–	–
DA-RNA8-219-141-3	26	77.18	8.31	–	–	–	–	–	–	–	–	–	–
DA-RNA8-206-142-1	-2	61.29	4.79	13	1.02	–	–	–	–	1	7.69	1.00	0.00
DA-RNA8-206-142-2	6	81.72	9.38	28	3.21	–	–	–	–	1	3.57	1.00	0.00
DA-RNA8-206-142-3	12	99.88	13.72	70	9.62	1	1.43	1.00	0.00	2	2.86	1.00	0.00
DA-RNA8-206-142-4	21	93.07	15.99	92	15.81	–	–	–	–	3	3.26	0.33	0.00
DA-RNA8-206-142-5	50	88.53	16.04	39	7.07	–	–	–	–	–	–	–	–
DA-RNA8-206-142-6	64	52.21	9.18	9	1.58	–	–	–	–	1	11.11	1.00	0.00
DA-RNA8-215-139-1	-2	38.59	36.32	–	–	–	–	–	–	–	–	–	–
DA-RNA8-215-139-2	2	74.91	17.19	–	–	–	–	–	–	–	–	–	–

Table 16.5. Continued.

Locus/ Sample ID Number	*C. patzcuaro*				*C. caudata*				*I. bradyi*			
	No.	%	A/J	C/V	No.	%	A/J	C/V	No.	%	A/J	C/V
Congress Street/Brickyard (contd.)												
DA-RNA8-201-139-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-5	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-6	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-7	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-8	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-9	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-10	–	–	–	–	–	–	–	–	4	100.00	1.00	0.00
DA-RNA8-201-139-11	–	–	–	–	–	–	–	–	206	90.75	0.74	0.08
DA-RNA8-201-139-12	–	–	–	–	–	–	–	–	50	92.59	0.44	0.00
DA-RNA8-201-139-13	–	–	–	–	–	–	–	–	15	100.00	0.87	0.00
DA-RNA8-202-138-1	1	14.29	0.00	0.00	–	–	–	–	4	57.14	0.75	0.00
DA-RNA8-202-138-2	–	–	–	–	–	–	–	–	334	83.92	0.61	0.00
DA-RNA8-202-138-3	–	–	–	–	–	–	–	–	289	84.01	0.56	0.00
DA-RNA8-202-138-4	–	–	–	–	–	–	–	–	5	100.00	1.00	0.00
DA-RNA8-202-138-5	–	–	–	–	–	–	–	–	24	82.76	0.71	0.00
DA-RNA8-219-141-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-219-141-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-219-141-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-206-142-1	–	–	–	–	–	–	–	–	12	92.31	0.92	0.00
DA-RNA8-206-142-2	2	7.14	0.00	1.00	–	–	–	–	25	89.29	0.84	0.00
DA-RNA8-206-142-3	–	–	–	–	5	7.14	0.00	0.40	60	85.71	0.75	0.00
DA-RNA8-206-142-4	–	–	–	–	–	–	–	–	89	96.74	0.78	0.00
DA-RNA8-206-142-5	–	–	–	–	–	–	–	–	39	100.00	0.79	0.00
DA-RNA8-206-142-6	–	–	–	–	–	–	–	–	8	88.89	0.88	0.00
DA-RNA8-215-139-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-215-139-2	–	–	–	–	–	–	–	–	–	–	–	–

Table 16.5. Continued.

Locus/ Sample ID Number	*H. brevicaudata* No.	%	A/J	C/V	*Ch. Arcuata* No.	%	A/J	C/V	*D. stevensoni* No.	%	A/J	C/V
Congress Street/Brickyard (contd.)												
DA-RNA8-201-139-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-5	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-6	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-7	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-8	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-9	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-10	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-11	–	–	–	–	5	2.20	0.00	0.00	5	2.20	1.00	0.00
DA-RNA8-201-139-12	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-13	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-202-138-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-202-138-2	6	1.51	0.83	0.00	–	–	–	–	20	5.03	0.65	0.10
DA-RNA8-202-138-3	14	4.07	0.64	0.00	–	–	–	–	4	1.16	0.50	0.00
DA-RNA8-202-138-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-202-138-5	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-219-141-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-219-141-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-219-141-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-206-142-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-206-142-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-206-142-3	–	–	–	–	1	1.43	0.00	0.00	–	–	–	–
DA-RNA8-206-142-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-206-142-5	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-206-142-6	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-215-139-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-215-139-2	–	–	–	–	–	–	–	–	–	–	–	–

Table 16.5. Continued.

Locus/ Sample ID Number	*P. unicaudata*				*P. pustulosa*				*Cypridopsis* sp.			
	No.	%	A/J	C/V	No.	%	A/J	C/V	No.	%	A/J	C/V
Congress Street/Brickyard (contd.)												
DA-RNA8-201-139-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-5	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-6	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-7	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-8	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-9	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-10	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-11	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-12	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-201-139-13	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-202-138-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-202-138-2	–	–	–	–	3	0.75	0.33	0.00	–	–	–	–
DA-RNA8-202-138-3	–	–	–	–	4	1.16	0.00	0.00	–	–	–	–
DA-RNA8-202-138-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-202-138-5	–	–	–	–	1	3.45	0.00	0.00	–	–	–	–
DA-RNA8-219-141-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-219-141-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-219-141-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-206-142-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-206-142-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-206-142-3	–	–	–	–	1	1.43	0.00	0.00	–	–	–	–
DA-RNA8-206-142-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-206-142-5	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-206-142-6	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-215-139-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-215-139-2	–	–	–	–	–	–	–	–	–	–	–	–

Table 16.5. Continued.

Locus/ Sample ID Number	Stratigraphic Level (cm from base of canal)	Bulk Weight (gm)	Residual Weight (gm)	Ostra-codes	Ostra-codes/ gm	*L.* cf. *L. paraornata*				*C. vidua*			
						No.	%	A/J	C/V	No.	%	A/J	C/V
Congress Street/Brickyard													
DA-RNA8-215-139-3	11	77.18	10.48	–	–	–	–	–	–	–	–	–	–
DA-RNA8-215-139-4	18	79.45	19.01	25	5.98	5	20.00	1.00	0.00	–	–	–	–
DA-RNA8-215-139-5	26	95.34	27.24	131	37.43	2	1.53	1.00	0.00	5	3.82	0.40	–
DA-RNA8-215-139-6	33	79.45	31.78	23	9.20	–	–	–	–	–	–	–	–
DA-RNA8-215-139-7	40	74.91	21.98	187	54.87	6	3.21	0.83	0.00	4	2.14	0.50	0.00
DA-RNA8-215-139-8	45	40.86	2.65	10	0.65	1	10.00	1.00	0.00	2	20.00	0.50	0.00
DA-RNA8-215-139-9	50	100.00	12.35	505	62.37	4	0.79	0.75	0.00	24	4.75	0.63	0.00
DA-RNA8-220-141-1	-2	68.10	26.47	–	–	–	–	–	–	–	–	–	–
DA-RNA8-220-141-2	10	83.99	8.11	130	12.55	–	–	–	–	2	1.54	1.00	1.00
DA-RNA8-220-141-3	26	88.53	9.01	–	–	–	–	–	–	–	–	–	–
DA-RNA8-265-151-1	-2	79.45	29.56	–	–	–	–	–	–	–	–	–	–
DA-RNA8-265-151-2	4	100.00	16.89	–	–	–	–	–	–	–	–	–	–
DA-RNA8-265-151-3	25	100.00	16.89	14	2.36	–	–	–	–	–	–	–	–
DA-RNA8-265-151-4	35	100.00	73.94	–	–	–	–	–	–	–	–	–	–
DA-RNA8-265-151-5	48	100.00	14.62	253	36.99	4	1.58	1.00	0.00	14	5.53	0.57	0.00
DA-RNA8-265-151-6	54	100.00	28.34	82	23.24	5	6.10	1.00	0.00	2	2.44	1.00	0.00
DA-RNA8-265-151-7	63	100.00	26.12	15	3.92	1	6.67	1.00	0.00	–	–	–	–
DA-RNA8-265-151-8	71	100.00	70.37	2	1.41	–	–	–	–	–	–	–	–
DA-RNA8-265-151-9	82	100.00	20.52	–	–	–	–	–	–	–	–	–	–
DA-RNA8-265-151-10	86	83.99	6.54	4	0.31	–	–	–	–	1	25.00	1.00	0.00
DA-RNA8-255-154-1	-2	100.00	68.90	–	–	–	–	–	–	–	–	–	–
DA-RNA8-255-154-2	5	100.00	57.45	–	–	–	–	–	–	–	–	–	–
DA-RNA8-255-154-3	13	100.00	29.51	159	46.92	7	4.40	1.00	0.00	21	13.21	0.48	0.00

Table 16.5. Continued.

Locus/ Sample ID Number	*C. patzcuaro*				*C. caudata*				*I. bradyi*			
	No.	%	A/J	C/V	No.	%	A/J	C/V	No.	%	A/J	C/V
Congress Street/Brickyard (contd.)												
DA-RNA8-215-139-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-215-139-4	–	–	–	–	–	–	–	–	18	72.00	0.72	0.11
DA-RNA8-215-139-5	2	1.53	0.00	0.00	–	–	–	–	122	93.13	0.70	0.00
DA-RNA8-215-139-6	–	–	–	–	–	–	–	–	23	100.00	0.61	0.09
DA-RNA8-215-139-7	–	–	–	–	–	–	–	–	173	92.51	0.73	0.00
DA-RNA8-215-139-8	–	–	–	–	–	–	–	–	7	70.00	0.57	0.00
DA-RNA8-215-139-9	2	0.40	0.00	0.00	–	–	–	–	401	79.41	0.82	0.00
DA-RNA8-220-141-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-220-141-2	–	–	–	–	–	–	–	–	128	98.46	0.72	0.02
DA-RNA8-220-141-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-265-151-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-265-151-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-265-151-3	–	–	–	–	–	–	–	–	14	100.00	0.93	0.00
DA-RNA8-265-151-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-265-151-5	–	–	–	–	–	–	–	–	223	88.14	0.65	0.01
DA-RNA8-265-151-6	1	1.22	0.00	0.00	–	–	–	–	64	78.05	0.73	0.00
DA-RNA8-265-151-7	–	–	–	–	–	–	–	–	12	80.00	0.67	0.00
DA-RNA8-265-151-8	–	–	–	–	–	–	–	–	1	50.00	1.00	0.00
DA-RNA8-265-151-9	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-265-151-10	–	–	–	–	–	–	–	–	3	75.00	0.67	0.00
DA-RNA8-255-154-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-255-154-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-255-154-3	–	–	–	–	–	–	–	–	120	75.47	0.63	0.00

Table 16.5. Continued.

Locus/	*H. brevicaudata*				*Ch. Arcuata*				*D. stevensoni*			
Sample ID Number	No.	%	A/J	C/V	No.	%	A/J	C/V	No.	%	A/J	C/V
Congress Street/Brickyard (contd.)												
DA-RNA8-215-139-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-215-139-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-215-139-5	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-215-139-6	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-215-139-7	–	–	–	–	–	–	–	–	2	1.07	1.00	0.00
DA-RNA8-215-139-8	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-215-139-9	–	–	–	–	33	6.53	0.00	0.00	35	6.93	0.74	0.06
DA-RNA8-220-141-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-220-141-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-220-141-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-265-151-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-265-151-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-265-151-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-265-151-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-265-151-5	–	–	–	–	–	–	–	–	2	0.79	1.00	0.00
DA-RNA8-265-151-6	–	–	–	–	–	–	–	–	1	1.22	0.00	0.00
DA-RNA8-265-151-7	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-265-151-8	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-265-151-9	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-265-151-10	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-255-154-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-255-154-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-255-154-3	–	–	–	–	–	–	–	–	–	–	–	–

Table 16.5. Continued.

Locus/ Sample ID Number	*P. unicaudata*				*P. pustulosa*				*Cypridopsis* sp.			
	No.	%	A/J	C/V	No.	%	A/J	C/V	No.	%	A/J	C/V
Congress Street/Brickyard (contd.)												
DA-RNA8-215-139-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-215-139-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-215-139-5	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-215-139-6	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-215-139-7	–	–	–	–	–	–	–	–	2	1.07	0.00	0.00
DA-RNA8-215-139-8	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-215-139-9	–	–	–	–	10	1.98	0.00	0.00	–	–	–	–
DA-RNA8-220-141-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-220-141-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-220-141-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-265-151-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-265-151-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-265-151-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-265-151-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-265-151-5	–	–	–	–	–	–	–	–	10	3.95	0.40	0.00
DA-RNA8-265-151-6	–	–	–	–	–	–	–	–	9	10.98	0.33	0.00
DA-RNA8-265-151-7	–	–	–	–	–	–	–	–	2	13.33	0.00	0.00
DA-RNA8-265-151-8	–	–	–	–	–	–	–	–	1	50.00	0.00	0.00
DA-RNA8-265-151-9	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-265-151-10	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-255-154-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-255-154-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA8-255-154-3	–	–	–	–	–	–	–	–	7	4.40	0.00	0.00

Table 16.5. Continued.

Locus/ Sample ID Number	Stratigraphic Level (cm from base of canal)	Bulk Weight (gm)	Residual Weight (gm)	Ostra-codes	Ostra-codes/ gm	*L.* cf. *L. paraornata*				*C. vidua*			
						No.	%	A/J	C/V	No.	%	A/J	C/V
San Agustín Mission													
DA-RNA2-3-1	1	72.64	24.97	0	–	–	–	–	–	–	–	–	–
DA-RNA2-3-2	8	83.99	31.78	0	–	–	–	–	–	–	–	–	–
DA-RNA2-3-3	-5	56.75	6.81	0	–	–	–	–	–	–	–	–	–
DA-RNA2-3-4	2	79.45	11.35	0	–	–	–	–	–	–	–	–	–
DA-RNA2-3-5	9	72.64	15.89	0	–	–	–	–	–	–	–	–	–
DA-RNA2-9-1	-2	59.02	2.27	2	0.08	–	–	–	–	–	–	–	–
DA-RNA2-9-2	5	68.10	15.89	1	0.23	–	–	–	–	–	–	–	–
DA-RNA2-9-3	16	61.29	11.35	99	18.33	5	5.05	–	–	17	17.17	–	–
DA-RNA2-9-4	22	43.13	6.81	74	11.68	2	2.70	–	–	25	33.78	–	–
DA-RNA2-53-1	0	95.34	4.54	2	0.10	–	–	–	–	–	–	–	–
DA-RNA2-53-2	2	72.64	9.08	2	0.25	–	–	–	–	–	–	–	–
DA-RNA2-53-3	12	72.64	6.81	2	0.19	–	–	–	–	–	–	–	–
DA-RNA2-53-4	2	70.37	18.16	0	–	–	–	–	–	–	–	–	–
DA-RNA2-53-5	12	63.56	4.54	1	0.07	–	–	–	–	–	–	–	–
DA-RNA2-53-6	0	93.07	9.08	1	0.10	–	–	–	–	–	–	–	–
DA-RNA2-53-7	2	68.10	22.10	0	–	–	–	–	–	–	–	–	–
DA-RNA2-53-8	17	72.64	9.08	6	0.75	–	–	–	–	2	33.33	–	–
DA-RNA2-53-9	27	70.37	6.81	1	0.10	–	–	–	–	–	–	–	–
DA-RNA2-53-10	2	70.37	27.24	0	–	–	–	–	–	–	–	–	–
DA-RNA2-53-11	9	59.02	18.16	19	5.85	–	–	–	–	7	36.84	–	–
DA-RNA2-53-12	0	68.10	6.81	0	–	–	–	–	–	–	–	–	–
DA-RNA2-53-13	2	52.21	11.35	2	0.43	–	–	–	–	–	–	–	–
DA-RNA2-53-14	11	65.83	11.35	5	0.86	–	–	–	–	1	20.00	–	–
DA-RNA2-127-1	-6	65.83	18.16	0	–	–	–	–	–	–	–	–	–
DA-RNA2-127-2	1	61.29	2.27	1	0.04	–	–	–	–	–	–	–	–
DA-RNA2-127-3	11	59.02	2.27	1	0.04	–	–	–	–	–	–	–	–
DA-RNA2-127-4	13	63.56	2.27	0	–	–	–	–	–	–	–	–	–

Table 16.5. Continued.

Locus/ Sample ID Number	*C. patzcuaro*				*C. caudata*				*I. bradyi*			
	No.	%	A/J	C/V	No.	%	A/J	C/V	No.	%	A/J	C/V
San Agustín Mission (contd.)												
DA-RNA2-3-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-3-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-3-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-3-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-3-5	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-9-1	–	–	–	–	–	–	–	–	1	50.00	–	–
DA-RNA2-9-2	–	–	–	–	–	–	–	–	1	100.00	–	–
DA-RNA2-9-3	–	–	–	–	–	–	–	–	46	46.46	–	–
DA-RNA2-9-4	–	–	–	–	–	–	–	–	24	32.43	–	–
DA-RNA2-53-1	–	–	–	–	–	–	–	–	2	100.00	–	–
DA-RNA2-53-2	–	–	–	–	–	–	–	–	2	100.00	–	–
DA-RNA2-53-3	–	–	–	–	–	–	–	–	2	100.00	–	–
DA-RNA2-53-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-53-5	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-53-6	–	–	–		–	–	–	–	–	–	–	–
DA-RNA2-53-7	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-53-8	–	–	–	–	–	–	–	–	3	50.00	–	–
DA-RNA2-53-9	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-53-10	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-53-11	–	–	–	–	–	–	–	–	9	47.37	–	–
DA-RNA2-53-12	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-53-13	–	–	–	–	–	–	–	–	2	100.00	–	–
DA-RNA2-53-14	–	–	–	–	–	–	–	–	4	80.00	–	–
DA-RNA2-127-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-127-2	–	–	–	–	–	–	–	–	1	100.00	–	–
DA-RNA2-127-3	–	–	–	–	–	–	–	–	1	100.00	–	–
DA-RNA2-127-4	–	–	–	–	–	–	–	–	–	–	–	–

Table 16.5. Continued.

Locus/ Sample ID Number	*H. brevicaudata*				*Ch. Arcuata*				*D. stevensoni*			
	No.	%	A/J	C/V	No.	%	A/J	C/V	No.	%	A/J	C/V
San Agustín Mission (contd.)												
DA-RNA2-3-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-3-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-3-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-3-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-3-5	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-9-1	–	–	–	–	–	–	–	–	1	50.00	–	–
DA-RNA2-9-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-9-3	10	10.10	–	–	–	–	–	–	18	18.18	–	–
DA-RNA2-9-4	5	6.76	–	–	–	–	–	–	20	27.03	–	–
DA-RNA2-53-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-53-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-53-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-53-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-53-5	–	–	–	–	–	–	–	–	1	100.00	–	–
DA-RNA2-53-6	1	100.00	–	–	–	–	–	–	–	–	–	–
DA-RNA2-53-7	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-53-8	1	16.67	–	–	–	–	–	–	–	–	–	–
DA-RNA2-53-9	1	100.00	–	–	–	–	–	–	–	–	–	–
DA-RNA2-53-10	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-53-11	–	–	–	–	2	10.53	–	–	1	5.26	–	–
DA-RNA2-53-12	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-53-13	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-53-14	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-127-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-127-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-127-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-127-4	–	–	–	–	–	–	–	–	–	–	–	–

Table 16.5. Continued.

Locus/ Sample ID Number	*P. unicaudata*				*P. pustulosa*				*Cypridopsis* sp.			
	No.	%	A/J	C/V	No.	%	A/J	C/V	No.	%	A/J	C/V
San Agustín Mission (contd.)												
DA-RNA2-3-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-3-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-3-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-3-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-3-5	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-9-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-9-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-9-3	–	–	–	–	8	8.08	–	–	–	–	–	–
DA-RNA2-9-4	–	–	–	–	8	10.81	–	–	–	–	–	–
DA-RNA2-53-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-53-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-53-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-53-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-53-5	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-53-6	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-53-7	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-53-8	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-53-9	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-53-10	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-53-11	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-53-12	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-53-13	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-53-14	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-127-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-127-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-127-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-127-4	–	–	–	–	–	–	–	–	–	–	–	–

Table 16.5. Continued.

Locus/ Sample ID Number	Stratigraphic Level (cm from base of canal)	Bulk Weight (gm)	Residual Weight (gm)	Ostra- codes	Ostra- codes/ gm	*L.* cf. *L. paraornata*				*C. vidua*			
						No.	%	A/J	C/V	No.	%	A/J	C/V
San Agustín Mission													
DA-RNA2-127-5	18	68.10	6.81	0	–	–	–	–	–	–	–	–	–
DA-RNA2-137-1	-30	49.94	31.78	0	–	–	–	–	–	–	–	–	–
DA-RNA2-137-2	1	63.56	9.08	2	0.29	–	–	–	–	–	–	–	–
DA-RNA2-137-3	7	68.10	9.08	3	0.40	–	–	–	–	–	–	–	–
DA-RNA2-137-4	11	56.75	6.81	0	–	–	–	–	–	–	–	–	–
DA-RNA2-137-5	16	70.37	15.89	0	–	–	–	–	–	–	–	–	–
DA-RNA2-137-6	22	70.37	22.70	3	0.97	–	–	–	–	–	–	–	–
DA-RNA2-137-7	26	70.37	22.70	0	–	–	–	–	–	–	–	–	–
DA-RNA2-137-8	32	70.37	24.97	10	3.55	–	–	–	–	5	50.00	–	–
DA-RNA2-137-9	37	68.10	34.05	67	33.50	2	2.99	–	–	39	58.21	–	–
DA-RNA2-137-10	42	70.37	29.51	46	19.29	–	–	–	–	21	45.65	–	–
DA-RNA2-137-11	47	68.10	31.78	36	16.80	1	2.78	–	–	19	52.78	–	–
DA-RNA2-137-12	51	74.91	36.32	56	27.15	1	1.79	–	–	32	57.14	–	–
DA-RNA2-137-13	53	61.29	13.62	6	1.33	–	–	–	–	3	50.00	–	–
DA-RNA2-137-14	56	65.83	13.62	6	1.24	–	–	–	–	–	–	–	–
DA-RNA2-137-15	62	72.64	20.43	54	15.19	–	–	–	–	8	14.81	–	–
DA-RNA2-137-16	59	65.83	27.24	79	32.69	1	1.27	–	–	53	67.09	–	–
DA-RNA2-137-17	65	70.37	34.05	81	39.19	–	–	–	–	58	71.60	–	–
DA-RNA2-137-18	69	70.37	31.78	92	41.55	–	–	–	–	48	52.17	–	–
DA-RNA2-137-19	75	81.72	40.86	38	19.00	–	–	–	–	22	57.89	–	–
DA-RNA2-137-20	61	79.45	22.70	10	2.86	–	–	–	–	2	20.00	–	–
DA-RNA2-137-21	66	74.91	20.43	7	1.91	–	–	–	–	1	14.29	–	–
DA-RNA2-137-22	72	65.83	13.62	57	11.79	1	1.75	–	–	6	10.53	–	–
DA-RNA2-137-23	76	70.37	11.35	80	12.90	1	1.25	–	–	9	11.25	–	–
DA-RNA2-137-24	81	83.99	13.62	62	10.05	3	4.84	–	–	11	17.74	–	–
DA-RNA2-137-25	84	65.83	24.97	79	29.97	1	1.27	–	–	31	39.24	–	–
DA-RNA2-137-26	100	83.99	34.09	74	30.04	1	1.35	–	–	34	45.95	–	–

Table 16.5. Continued.

Locus/ Sample ID Number	*C. patzcuaro*				*C. caudata*				*I. bradyi*			
	No.	%	A/J	C/V	No.	%	A/J	C/V	No.	%	A/J	C/V
San Agustín Mission (contd.)												
DA-RNA2-127-5	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-2	–	–	–	–	–	–	–	–	2	100.00	–	–
DA-RNA2-137-3	–	–	–	–	–	–	–	–	3	100.00	–	–
DA-RNA2-137-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-5	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-6	–	–	–	–	–	–	–	–	2	66.67	–	–
DA-RNA2-137-7	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-8	–	–	–	–	–	–	–	–	3	30.00	–	–
DA-RNA2-137-9	–	–	–	–	–	–	–	–	20	29.85	–	–
DA-RNA2-137-10	–	–	–	–	–	–	–	–	22	47.83	–	–
DA-RNA2-137-11	–	–	–	–	–	–	–	–	14	38.89	–	–
DA-RNA2-137-12	–	–	–	–	–	–	–	–	17	30.36	–	–
DA-RNA2-137-13	–	–	–	–	–	–	–	–	1	16.67	–	–
DA-RNA2-137-14	–	–	–	–	–	–	–	–	6	100.00	–	–
DA-RNA2-137-15	–	–	–	–	–	–	–	–	44	81.48	–	–
DA-RNA2-137-16	–	–	–	–	–	–	–	–	15	18.99	–	–
DA-RNA2-137-17	–	–	–	–	1	1.23	–	–	19	23.46	–	–
DA-RNA2-137-18	–	–	–	–	–	–	–	–	30	32.61	–	–
DA-RNA2-137-19	–	–	–	–	–	–	–	–	13	34.21	–	–
DA-RNA2-137-20	–	–	–	–	–	–	–	–	8	80.00	–	–
DA-RNA2-137-21	–	–	–	–	–	–	–	–	6	85.71	–	–
DA-RNA2-137-22	–	–	–	–	–	–	–	–	51	89.47	–	–
DA-RNA2-137-23	–	–	–	–	–	–	–	–	69	86.25	–	–
DA-RNA2-137-24	–	–	–	–	–	–	–	–	47	75.81	–	–
DA-RNA2-137-25	–	–	–	–	–	–	–	–	31	39.24	–	–
DA-RNA2-137-26	–	–	–	–	2	2.70	–	–	32	43.24	–	–

Table 16.5. Continued.

Locus/ Sample ID Number	*H. brevicaudata*				*Ch. Arcuata*				*D. stevensoni*			
	No.	%	A/J	C/V	No.	%	A/J	C/V	No.	%	A/J	C/V
San Agustín Mission (contd.)												
DA-RNA2-127-5	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-5	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-6	1	33.33	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-7	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-8	2	20.00	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-9	–	–	–	–	–	–	–	–	4	5.97	–	–
DA-RNA2-137-10	2	4.35	–	–	–	–	–	–	5	10.87	–	–
DA-RNA2-137-11	–	–	–	–	–	–	–	–	1	2.78	–	–
DA-RNA2-137-12	–	–	–	–	–	–	–	–	6	10.71	–	–
DA-RNA2-137-13	–	–	–	–	–	–	–	–	2	33.33	–	–
DA-RNA2-137-14	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-15	–	–	–	–	–	–	–	–	2	3.70	–	–
DA-RNA2-137-16	–	–	–	–	–	–	–	–	8	10.13	–	–
DA-RNA2-137-17	–	–	–	–	–	–	–	–	2	2.47	–	–
DA-RNA2-137-18	1	1.09	–	–	–	–	–	–	9	9.78	–	–
DA-RNA2-137-19	1	2.63	–	–	–	–	–	–	2	5.26	–	–
DA-RNA2-137-20	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-21	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-22	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-23	–	–	–	–	–	–	–	–	1	1.25	–	–
DA-RNA2-137-24	–	–	–	–	–	–	–	–	1	1.61	–	–
DA-RNA2-137-25	–	–	–	–	–	–	–	–	8	10.13	–	–
DA-RNA2-137-26	–	–	–	–	–	–	–	–	4	5.41	–	–

Table 16.5. Continued.

Locus/ Sample ID Number	*P. unicaudata*				*P. pustulosa*				*Cypridopsis* sp.			
	No.	%	A/J	C/V	No.	%	A/J	C/V	No.	%	A/J	C/V
San Agustín Mission (contd.)												
DA-RNA2-127-5	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-5	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-6	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-7	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-8	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-9	–	–	–	–	2	2.99	–	–	–	–	–	–
DA-RNA2-137-10	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-11	–	–	–	–	1	2.78	–	–	–	–	–	–
DA-RNA2-137-12	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-13	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-14	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-15	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-16	–	–	–	–	2	2.53	–	–	–	–	–	–
DA-RNA2-137-17	–	–	–	–	1	1.23	–	–	–	–	–	–
DA-RNA2-137-18	–	–	–	–	4	4.35	–	–	–	–	–	–
DA-RNA2-137-19	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-20	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-21	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-22	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-23	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-24	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-25	–	–	–	–	8	10.13	–	–	–	–	–	–
DA-RNA2-137-26	–	–	–	–	1	1.35	–	–	–	–	–	–

Table 16.5. Continued.

Locus/ Sample ID Number	Stratigraphic Level (cm from base of canal)	Bulk Weight (gm)	Residual Weight (gm)	Ostra- codes	Ostra- codes/ gm	*L.* cf. *L. paraornata* No.	%	A/J	C/V	*C. vidua* No.	%	A/J	C/V
San Agustín Mission													
DA-RNA2-137-27	-59	74.91	22.70	0	–	–	–	–	–	–	–	–	–
DA-RNA2-137-28	-48	70.37	11.35	0	–	–	–	–	–	–	–	–	–
DA-RNA2-137-29	-38	70.37	6.81	0	–	–	–	–	–	–	–	–	–
DA-RNA2-137-30	-28	65.83	9.08	0	–	–	–	–	–	–	–	–	–
DA-RNA2-137-31	-18	79.45	13.62	27	4.63	2	7.41	–	–	1	3.70	–	–
DA-RNA2-Cienega		56.75	6.81	0	–	–	–	–	–	–	–	–	–
Mission Gardens													
DA-RNA11-310-200-1	-5	100.00	9.08	53	0.53	–	–	–	–	4	7.55	1.00	0.00
DA-RNA11-310-200-2	0	100.00	7.81	3	0.03	–	–	–	–	–	–	–	–
DA-RNA11-310-200-3	6	100.00	7.31	5	0.05	–	–	–	–	1	20.00	1.00	0.00
DA-RNA11-310-200-4	15	100.00	23.25	68	0.68	6	8.82	1.00	0.00	8	11.76	0.50	0.00
DA-RNA11-310-200-5	36	100.00	60.02	110	1.10	12	10.91	1.00	0.00	16	14.55	0.63	0.00
DA-RNA11-310-200-6	43	100.00	43.48	104	1.04	14	13.46	1.00	0.00	20	19.23	0.20	0.00
DA-RNA11-310-200-7	7	100.00	21.73	3	0.03	1	33.33	1.00	0.00	–	–	–	–
DA-RNA11-310-200-8	23	100.00	19.16	14	0.14	–	–	–	–	6	42.86	0.00	0.00
DA-RNA11-310-200-9	13	100.00	30.66	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-10	52	100.00	61.29	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-11	12	100.00	18.81	54	0.54	6	11.11	0.83	0.00	6	11.11	0.33	0.00
DA-RNA11-310-200-12	40	100.00	20.93	6	0.06	–	–	–	–	2	33.33	0.00	0.00
DA-RNA11-310-200-13	18	100.00	86.50	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-14	70	100.00	90.80	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-15	90	97.60	89.53	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-16	109	100.00	83.99	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-17	129	100.00	70.37	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-18	75	100.00	48.40	–	–	–	–	–	–	–	–	–	–

Table 16.5. Continued.

Locus/ Sample ID Number	*C. patzcuaro*				*C. caudata*				*I. bradyi*			
	No.	%	A/J	C/V	No.	%	A/J	C/V	No.	%	A/J	C/V
San Agustín Mission (contd.)												
DA-RNA2-137-27	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-28	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-29	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-30	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-31	–	–	–	–	–	–	–	–	24	88.89	–	–
DA-RNA2-Cienega	–	–	–	–	–	–	–	–	–	–	–	–
Mission Gardens (contd.)												
DA-RNA11-310-200-1	–	–	–	–	–	–	–	–	22	41.51	0.91	0.00
DA-RNA11-310-200-2	3	100.00	0.00	0.67	–	–	–	–	–	–	–	–
DA-RNA11-310-200-3	1	20.00	0.00	0.00	–	–	–	–	3	60.00	1.00	0.00
DA-RNA11-310-200-4	10	14.71	0.20	0.00	–	–	–	–	42	61.76	0.90	–
DA-RNA11-310-200-5	12	10.91	0.17	0.00	–	–	–	–	70	63.64	0.94	0.00
DA-RNA11-310-200-6	8	7.69	0.00	0.00	–	–	–	–	58	55.77	0.72	0.00
DA-RNA11-310-200-7	–	–	–	–	–	–	–	–	2	66.67	1.00	0.00
DA-RNA11-310-200-8	4	28.57	0.50	0.00	–	–	–	–	2	14.29	1.00	0.00
DA-RNA11-310-200-9	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-10	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-11	3	5.56	0.00	0.00	–	–	–	–	33	61.11	0.82	0.00
DA-RNA11-310-200-12	1	16.67	0.00	0.00	–	–	–	–	2	33.33	0.50	0.00
DA-RNA11-310-200-13	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-14	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-15	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-16	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-17	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-18	–	–	–	–	–	–	–	–	–	–	–	–

Table 16.5. Continued.

Locus/ Sample ID Number	*H. brevicaudata*				*Ch. Arcuata*				*D. stevensoni*			
	No.	%	A/J	C/V	No.	%	A/J	C/V	No.	%	A/J	C/V
San Agustín Mission (contd.)												
DA-RNA2-137-27	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-28	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-29	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-30	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-31	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-Cienega	–	–	–	–	–	–	–	–	–	–	–	–
Mission Gardens (contd.)												
DA-RNA11-310-200-1	5	9.43	0.00	0.00	–	–	–	–	–	–	–	–
DA-RNA11-310-200-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-4	–	–	–	–	–	–	–	–	2	2.94	1.00	0.00
DA-RNA11-310-200-5	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-6	4	3.85	0.00	0.00	–	–	–	–	–	–	–	–
DA-RNA11-310-200-7	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-8	–	–	–	–	–	–	–	–	2	14.29	1.00	0.00
DA-RNA11-310-200-9	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-10	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-11	1	1.85	0.00	0.00	–	–	–	–	4	7.41	1.00	0.00
DA-RNA11-310-200-12	1	16.67	0.00	0.00	–	–	–	–	–	–	–	–
DA-RNA11-310-200-13	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-14	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-15	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-16	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-17	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-18	–	–	–	–	–	–	–	–	–	–	–	–

Table 16.5. Continued.

Locus/ Sample ID Number	*P. unicaudata*				*P. pustulosa*				*Cypridopsis* sp.			
	No.	%	A/J	C/V	No.	%	A/J	C/V	No.	%	A/J	C/V
San Agustín Mission (contd.)												
DA-RNA2-137-27	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-28	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-29	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-30	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-137-31	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA2-Cienega	–	–	–	–	–	–	–	–	–	–	–	–
Mission Gardens (contd.)												
DA-RNA11-310-200-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-5	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-6	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-7	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-8	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-9	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-10	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-11	–	–	–	–	1	1.85	0.00	0.00	–	–	–	–
DA-RNA11-310-200-12	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-13	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-14	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-15	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-16	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-17	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-310-200-18	–	–	–	–	–	–	–	–	–	–	–	–

Table 16.5. Continued.

Locus/ Sample ID Number	Stratigraphic Level (cm from base of canal)	Bulk Weight (gm)	Residual Weight (gm)	Ostra- codes	Ostra- codes/ gm	*L.* cf. *L. paraornata*				*C. vidua*			
						No.	%	A/J	C/V	No.	%	A/J	C/V
Mission Gardens													
DA-RNA11-300-207-1	-5	100.00	6.69	2	0.02	–	–	–	–	–	–	–	–
DA-RNA11-300-207-2	0	100.00	47.67	272	2.72	3	1.10	1.00	0.00	51	18.75	0.25	0.00
DA-RNA11-300-207-3	15	100.00	42.36	272	2.72	6	2.21	1.00	0.00	51	18.75	0.43	0.00
DA-RNA11-300-207-4	25	100.00	37.32	135	1.35	–	–	–	–	25	18.52	0.20	0.00
DA-RNA11-307-205-1	-2	100.00	12.35	22	0.22	1	4.55	1.00	0.00	1	4.55	1.00	0.00
DA-RNA11-307-205-2	6	100.00	18.16	73	0.73	3	–	0.67	0.00	10	13.70	0.40	0.00
DA-RNA11-307-205-3	10	100.00	28.49	166	1.66	1	–	1.00	0.00	16	9.64	0.56	0.00
DA-RNA11-307-205-4	13	100.00	27.24	55	0.55	–	–	–	–	19	34.55	0.53	0.11
DA-RNA11-307-205-5	27	100.00	24.97	26	0.26	–	–	–	–	13	50.00	0.23	0.00
DA-RNA11-302-200-1	-2	100.00	12.65	14	0.14	1	7.14	0.00	0.00	3.00	21.43	0.67	0.00
DA-RNA11-302-200-2	2	100.00	61.29	–	–	–	–	–	–	–	–	–	–
DA-RNA11-302-200-3	25	100.00	70.37	–	–	–	–	–	–	–	–	–	–
DA-RNA11-302-200-4	29	100.00	56.75	–	–	–	–	–	–	–	–	–	–
DA-RNA11-302-200-5	15	100.00	14.12	–	–	–	–	–	–	–	–	–	–
DA-RNA11-302-200-6	8	100.00	7.15	–	–	–	–	–	–	–	–	–	–
DA-RNA11-302-200-7	21	100.00	3.37	–	–	–	–	–	–	–	–	–	–
DA-RNA11-302-200-8	33	100.00	39.94	14	0.14	1	7.14	0.00	0.00	2	14.29	0.50	0.00
DA-RNA11-302-200-9	42	100.00	17.14	8	0.08	1	12.50	0.00	0.00	1	12.50	0.00	0.00
DA-RNA11-302-200-10	57	100.00	43.48	4	0.04	3	75.00	0.00	0.00	–	–	–	–
DA-RNA11-302-201-1	-2	100.00	5.64	26	0.26	–	–	–	–	–	–	–	–
DA-RNA11-302-201-2	2	100.00	36.32	325	3.25	2	0.62	1.00	0.00	42	12.92	0.76	0.00
DA-RNA11-302-201-3	9	100.00	18.96	277	2.77	3	1.08	1.00	0.00	21	7.58	0.86	0.38
DA-RNA11-302-201-4	21	100.00	44.13	44	0.44	–	–	–	–	6	13.64	1.00	0.00
DA-RNA11-302-201-5	35	100.00	34.05	526	5.26	4	0.76	1.00	0.00	86	16.35	0.62	0.00

Table 16.5. Continued.

Locus/	*C. patzcuaro*				*C. caudata*				*I. bradyi*			
Sample ID Number	No.	%	A/J	C/V	No.	%	A/J	C/V	No.	%	A/J	C/V
Mission Gardens												
DA-RNA11-300-207-1	-	-	-	-	-	-	-	-	2	100.00	1.00	0.00
DA-RNA11-300-207-2	-	-	-	-	-	-	-	-	173	63.60	0.58	0.00
DA-RNA11-300-207-3	-	-	-	-	-	-	-	-	173	63.60	0.58	0.00
DA-RNA11-300-207-4	-	-	-	-	-	-	-	-	107	79.26	0.75	0.00
DA-RNA11-307-205-1	-	-	-	-	-	-	-	-	20	90.91	0.85	0.00
DA-RNA11-307-205-2	-	-	-	-	-	-	-	-	47	64.38	0.85	0.00
DA-RNA11-307-205-3	-	-	-	-	-	-	-	-	136	81.93	0.85	0.00
DA-RNA11-307-205-4	-	-	-	-	-	-	-	-	31	56.36	0.94	0.00
DA-RNA11-307-205-5	-	-	-	-	-	-	-	-	13	50.00	1.00	0.00
DA-RNA11-302-200-1	-	-	-	-	-	-	-	-	-	-	-	-
DA-RNA11-302-200-2	-	-	-	-	-	-	-	-	-	-	-	-
DA-RNA11-302-200-3	-	-	-	-	-	-	-	-	-	-	-	-
DA-RNA11-302-200-4	-	-	-	-	-	-	-	-	-	-	-	-
DA-RNA11-302-200-5	-	-	-	-	-	-	-	-	-	-	-	-
DA-RNA11-302-200-6	-	-	-	-	-	-	-	-	-	-	-	-
DA-RNA11-302-200-7	-	-	-	-	-	-	-	-	-	-	-	-
DA-RNA11-302-200-8	-	-	-	-	-	-	-	-	7	50.00	1.00	0.00
DA-RNA11-302-200-9	-	-	-	-	-	-	-	-	6	75.00	1.00	0.00
DA-RNA11-302-200-10	-	-	-	-	-	-	-	-	1	25.00	1.00	0.00
DA-RNA11-302-201-1	-	-	-	-	-	-	-	-	5	19.23	1.00	0.00
DA-RNA11-302-201-2	-	-	-	-	-	-	-	-	43	13.23	0.63	0.00
DA-RNA11-302-201-3	-	-	-	-	-	-	-	-	250	90.25	0.87	0.05
DA-RNA11-302-201-4	-	-	-	-	-	-	-	-	32	72.73	0.81	0.00
DA-RNA11-302-201-5	-	-	-	-	-	-	-	-	370	70.34	0.78	0.00

Table 16.5. Continued.

Locus/ Sample ID Number	*H. brevicaudata*				*Ch. Arcuata*				*D. stevensoni*			
	No.	%	A/J	C/V	No.	%	A/J	C/V	No.	%	A/J	C/V
Mission Gardens												
DA-RNA11-300-207-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-300-207-2	3	1.10	0.00	0.00	3	1.10	0	0	37	13.60	0.59	0.00
DA-RNA11-300-207-3	1	0.37	0.00	0.00	3	1.10	0.00	0.00	38	13.97	0.58	0.11
DA-RNA11-300-207-4	1	0.74	0.00	0.00	1	0.74	0.00	0.00	11	8.15	0.82	0.00
DA-RNA11-307-205-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-307-205-2	–	–	–	–	–	–	–	–	5	6.85	1.00	0.00
DA-RNA11-307-205-3	–	–	–	–	–	–	–	–	3	1.81	0.33	0.00
DA-RNA11-307-205-4	–	–	–	–	–	–	–	–	3	5.45	0.33	0.00
DA-RNA11-307-205-5	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-302-200-1	1	7.14	0.00	0.00	–	–	–	–	–	–	–	–
DA-RNA11-302-200-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-302-200-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-302-200-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-302-200-5	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-302-200-6	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-302-200-7	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-302-200-8	1	7.14	0.00	0.00	–	–	–	–	–	–	–	–
DA-RNA11-302-200-9	1	12.50	0.00	0.00	–	–	–	–	–	–	–	–
DA-RNA11-302-200-10	3	75.00	0.00	0.00	–	–	–	–	–	–	–	–
DA-RNA11-302-201-1	1	3.85	0.00	0.00	–	–	–	–	–	–	–	–
DA-RNA11-302-201-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-302-201-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-302-201-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-302-201-5	–	–	–	–	–	–	–	–	3	0.57	1.00	0.00

Table 16.5. Continued.

Locus/	*P. unicaudata*				*P. pustulosa*				*Cypridopsis* sp.			
Sample ID Number	No.	%	A/J	C/V	No.	%	A/J	C/V	No.	%	A/J	C/V
Mission Gardens												
DA-RNA11-300-207-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-300-207-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-300-207-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-300-207-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-307-205-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-307-205-2	–	–	–	–	–	–	–	–	8	10.96	0.00	0.00
DA-RNA11-307-205-3	–	–	–	–	–	–	–	–	10	6.02	0.60	0.00
DA-RNA11-307-205-4	–	–	–	–	–	–	–	–	2	3.64	0.00	0.00
DA-RNA11-307-205-5	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-302-200-1	–	–	–	–	–	–	–	–	9	64.29	0.56	0.00
DA-RNA11-302-200-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-302-200-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-302-200-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-302-200-5	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-302-200-6	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-302-200-7	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-302-200-8	–	–	–	–	–	–	–	–	2	14.29	1.00	0.00
DA-RNA11-302-200-9	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-302-200-10	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-302-201-1	–	–	–	–	–	–	–	–	20	76.92	0.35	0.00
DA-RNA11-302-201-2	–	–	–	–	–	–	–	–	238	73.23	0.10	0.00
DA-RNA11-302-201-3	–	–	–	–	–	–	–	–	13	4.69	0.31	0.00
DA-RNA11-302-201-4	–	–	–	–	–	–	–	–	6	13.64	0.00	0.00
DA-RNA11-302-201-5	–	–	–	–	–	–	–	–	63	11.98	0.24	0.00

Table 16.5. Continued.

Locus/ Sample ID Number	Stratigraphic Level (cm from base of canal)	Bulk Weight (gm)	Residual Weight (gm)	Ostra-codes	Ostra-codes/ gm	*L.* cf. *L. paraornata* No.	%	A/J	C/V	*C. vidua* No.	%	A/J	C/V
Mission Gardens													
DA-RNA11-302-201-6	62	100.00	29.51	73	0.73	1	1.37	1.00	0.00	9	12.33	0.33	0.00
DA-RNA11-302-201-7	65	100.00	27.24	337	3.37	4	1.19	1.00	0.00	40	11.87	0.30	0.05
DA-RNA11-302-201-8	71	100.00	17.39	371	3.71	3	0.81	1.00	0.00	50	13.48	0.84	0.04
DA-RNA11-302-201-9	80	97.61	15.89	342	3.50	–	–	–	–	21	6.14	0.62	0.00
DA-RNA11-309-206-1	-3	100.00	28.24	8	0.08	1	12.50	1.00	0.00	1	12.50	0.00	0.00
DA-RNA11-309-206-2	3	100.00	43.13	222	2.22	3	1.35	1.00	0.00	29	13.06	0.59	0.00
DA-RNA11-309-206-3	14	100.00	52.21	87	0.87	1	1.15	1.00	0.00	22	25.29	0.36	0.18
DA-RNA11-305-204-1	-25	100.00	7.31	6	0.06	–	–	–	–	–	–	–	–
DA-RNA11-305-204-2	-2	93.07	20.43	–	–	–	–	–	–	–	–	–	–
DA-RNA11-305-204-3	2	100.00	30.11	33	0.33	–	–	–	–	4	12.12	0.00	0.00
DA-RNA11-305-204-4	15	100.00	36.72	7	0.07	–	–	–	–	1	14.29	0.00	0.00
DA-RNA11-305-204-5	23	100.00	56.75	–	–	–	–	–	–	–	–	–	–
DA-RNA11-305-204-6	28	100.00	47.97	–	–	–	–	–	–	–	–	–	–
DA-RNA11-305-204-7	40	100.00	40.86	7	0.07	–	–	–	–	–	–	–	–
DA-RNA11-305-204-8	51	100.00	18.46	–	–	–	–	–	–	–	–	–	–

Table 16.5. Continued.

Locus/ Sample ID Number	*C. patzcuaro*				*C. caudata*				*I. bradyi*			
	No.	%	A/J	C/V	No.	%	A/J	C/V	No.	%	A/J	C/V
Mission Gardens (contd.)												
DA-RNA11-302-201-6	–	–	–	–	–	–	–	–	47	64.38	0.77	0.00
DA-RNA11-302-201-7	–	–	–	–	–	–	–	–	231	68.55	0.78	0.00
DA-RNA11-302-201-8	–	–	–	–	–	–	–	–	269	72.51	0.45	0.00
DA-RNA11-302-201-9	–	–	–	–	–	–	–	–	276	80.70	0.55	0.04
DA-RNA11-309-206-1	–	–	–	–	–	–	–	–	5	62.50	1.00	0.00
DA-RNA11-309-206-2	–	–	–	–	–	–	–	–	156	70.27	0.74	0.00
DA-RNA11-309-206-3	–	–	–	–	–	–	–	–	52	59.77	0.85	0.00
DA-RNA11-305-204-1	–	–	–	–	–	–	–	–	6	100.00	0.83	0.00
DA-RNA11-305-204-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-305-204-3	–	–	–	–	–	–	–	–	29	87.88	0.93	0.00
DA-RNA11-305-204-4	–	–	–	–	–	–	–	–	6	85.71	1.00	0.00
DA-RNA11-305-204-5	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-305-204-6	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-305-204-7	–	–	–	–	–	–	–	–	7	100.00	1.00	0.00
DA-RNA11-305-204-8	–	–	–	–	–	–	–	–	–	–	–	–

Table 16.5. Continued.

Locus/ Sample ID Number	*H. brevicaudata*				*Ch. Arcuata*				*D. stevensoni*			
	No.	%	A/J	C/V	No.	%	A/J	C/V	No.	%	A/J	C/V
Mission Gardens (contd.)												
DA-RNA11-302-201-6	2	2.74	1.00	0.00	–	–	–	–	2	2.74	1.00	0.00
DA-RNA11-302-201-7	4	1.19	0.00	0.00	–	–	–	–	2	0.59	1.00	0.00
DA-RNA11-302-201-8	1	0.27	0.00	0.00	–	–	–	–	6	1.62	1.00	0.00
DA-RNA11-302-201-9	2	0.58	0.00	0.00	–	–	–	–	1	0.29	1.00	0.00
DA-RNA11-309-206-1	–	–	–	–	–	–	–	–	1	12.50	1.00	0.00
DA-RNA11-309-206-2	–	–	–	–	–	–	–	–	15	6.76	0.87	0.00
DA-RNA11-309-206-3	1	1.15	0.00	0.00	1	1.15	1.00	0.00	6	6.90	1.00	0.00
DA-RNA11-305-204-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-305-204-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-305-204-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-305-204-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-305-204-5	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-305-204-6	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-305-204-7	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-305-204-8	–	–	–	–	–	–	–	–	–	–	–	–

Table 16.5. Continued.

Locus/ Sample ID Number	*P. unicaudata*				*P. pustulosa*				*Cypridopsis* sp.			
	No.	%	A/J	C/V	No.	%	A/J	C/V	No.	%	A/J	C/V
Mission Gardens (contd.)												
DA-RNA11-302-201-6	–	–	–	–	–	–	–	–	10	13.70	0.20	0.00
DA-RNA11-302-201-7	–	–	–	–	–	–	–	–	57	16.91	0.12	0.00
DA-RNA11-302-201-8	–	–	–	–	–	–	–	–	44	11.86	0.05	0.00
DA-RNA11-302-201-9	–	–	–	–	–	–	–	–	34	9.94	0.35	0.00
DA-RNA11-309-206-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-309-206-2	2	0.90	0.00	0.00	–	–	–	–	17	7.66	0.06	0.00
DA-RNA11-309-206-3	–	–	–	–	–	–	–	–	4	4.60	0.00	0.00
DA-RNA11-305-204-1	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-305-204-2	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-305-204-3	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-305-204-4	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-305-204-5	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-305-204-6	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-305-204-7	–	–	–	–	–	–	–	–	–	–	–	–
DA-RNA11-305-204-8	–	–	–	–	–	–	–	–	–	–	–	–

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