

ANALYSIS OF THE COPROLITES
RECOVERED FROM THE
DOLORES ARCHAEOLOGICAL PROGRAM

by
John G. Jones

September 1983

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INTRODUCTION

A total of thirteen coprolites recovered from eight sites excavated by the Dolores Archaeological Program (DAP) were analyzed in an attempt to determine feces origin and utilized resources not recovered through other means, for example, macrobotanical analysis. Thirty-eight coprolites were collected during excavations and of these, thirteen were selected for analysis. Seven were determined to be of human origin and the remaining six of a carnivore or herbivore origin. Coprolites were selected for analysis on the basis of their origin and provenience within the sites although all coprolites of human origin were examined regardless of provenience. Those feces judged as nonhuman were analyzed only if they were found in a secure cultural provenience, for example, a living floor. The sites and proveniences of the analyzed coprolites are listed in Table 1.

METHODOLOGY

The coprolites were analyzed using a technique outlined by Fry (1976:7-8) whereby the samples were rehydrated in a 0.5% w/v solution of trisodium phosphate (Na_3PO_4). The coprolites were first cleaned of all dirt and extraneous material. They were then weighed and measured in terms of length, width, and thickness. A simple sketch was made of the specimen and Munsell color readings were taken.

When all preliminary measurements had been made, each sample was broken in half and a minimum of 1-2 cc's of fecal material was carefully taken for the purpose of future pollen analysis. Approximately one half of the remaining coprolite was then weighed and placed in the trisodium phosphate solution,

TABLE 1
SITES AND PROVENIENCES OF ANALYZED COPROLITES

Site	Specimen #	Provenience	Subphase & Range*
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	11	Room 6; Surf. 1, F2 (hearth)	Periman (AD 850-900)
	12	E Unit 2, Seq. 3, Strat. 6	ND
5MT2161	13	2x2 (072/068) level 6, midden	DosCasas (AD 760-850)
5MT2198	14	Pitstruct. 2, fill	Sagehill (AD 700-780)
5MT2235	15	Pitstruct. 1, F27 (wall feature)	Marshview (AD 1050-1125)
5MT4475	16	Room 61, Surf. 1	ND
5MT4477	17	Nonstruct. 4, F1 (cist)	Periman
5MT4654	18	Occupation Area 1, Strat. 1	Protohistoric
5MT4683	2	4x4 (204/196) level 1	Escalante (AD 1125-1200)
	4	4x4 (204/196) level 1	Escalante
	8	Looter backdirt	ND
	9	Nonstruct. 1, F9 (fireplace)	Escalante

F = Feature

ND = No Date

* = Subphase designation and temporal range according to the temporal systematic of the DAP (Kane 1981).

roughly ten parts solution to one part coprolite. The sample was kept in solution for a minimum of seventy-two hours. For the first forty-eight hours the samples was shaken periodically to expedite the disaggregation process. During the last twenty-four hours in solution, the sample remained undisturbed to allow for standardized color readings. When the sample was deemed to be sufficiently broken up, Munsell color readings were again taken of the fluid (Table 2) and the entire sample was wet-screened through a series of graded sieves. Two standard screens were employed, with mesh openings of 1.0 and 0.5 mm. All fluid and material smaller than 0.5 mm was retained in a catch pan. In the cases where the coprolite had not completely broken down, it was gently disaggregated with a stirring rod. The coprolite components were then dried and placed into individual petri dishes for analysis.

The coarse component, material retained in the 1.0 mm screen, was analyzed completely. The fine component, recovered in the 0.5 mm screen, was subsampled, with approximately one-third of the total screen analyzed. The remaining two-thirds of the screen was carefully scanned for unique seeds or plant material and parasites. The material retained in the catch pan, designated as sediment, was also scanned for small seeds and identifiable plant material.

DETERMINATION OF ORIGIN

Fry (1976:7) points out that there are no tests for the positive determination of feces origin. Nonetheless, experimentation and research, such as that conducted by Fry (1976:7), Stiger (1977:6), and Bryant (1974:4-5) suggests that classification and differentiation between human and nonhuman coprolites is possible using a variety of descriptive tests. A series of four tests were employed in this study in an attempt to determine the origin of the (DAP) coprolites.

TABLE 2
MUNSELL COLOR READINGS

Sample #	Site #	Transparency*	Munsell Color in Solution	Fecal Odor**	Origin***
2	5MT4683	0	10YR4/6 Dark Yellow Brown	P	Human
4	5MT4683	0	5YR4/4 Reddish Brown	S	Human
8	5MT4683	0	2.5YR3/4 Dark Reddish Brown	S	Human
9	5MT4683	0	2.5YR2.5/0 Black	S	Human
10	5MT2151	0	2.5YR2.5/2 Very Dusky Red	S	Human
11	5MT2151	0	5YR2.5/1 Black	P	Human
12	5MT2151	0	2.5YR2.5/0 Black	S	Human

13	5MT2161	T	2.5YR8/4 Pale Yellow	S	Carnivore
14	5MT2161	T	10YR6/6 Brownish Yellow	A	Carnivore
15	5MT2235	T	2.5YR6/6 Olive Yellow	A	Carnivore
16	5MT4475	T	10YR6/8 Brownish Yellow	A	Carnivore
17	5MT4477	T	5YR5/3 Reddish Brown	A	Carnivore
18	5MT4654	T	2.5YR2.5/2 Very Dusky Red	A	Herbivore

* - T = Transparent
- 0 = Opaque

** - P = Present
- S = Slight
- A = Absent

*** - Tests for determining origin are discussed in text.

The first, and most effective method, was simple observation of the actual dry coprolite. Human feces can usually be distinguished from herbivore and canine scats on the basis of shape or form, as well as visible contents. In the cases where any degree of uncertainty existed, the coprolite was treated as human and placed in solution for further analysis. A second test for coprolite origin is that of fluid color while in solution. Fry (1976:7) notes that human feces turn the trisodium phosphate solution a characteristic opaque dark-brown/black color. This was true of all human feces recovered.

A third test employed was odor. Bryant (1974:410) points out that human feces generally possess a characteristic odor upon reconstitution which is not found in nonhuman coprolites. Several of the human feces did have an intense fecal odor rather than the musty smell characteristic of nonhuman feces (Table 2). The fourth test was used in conjunction with the other three tests and consisted of the actual component analysis of the feces. Coprolites that were of questionable human origin, but containing materials found exclusively in a human diet and possessing the other characteristic traits of human feces, were judged to be of human origin. Though no positive test for fecal origin exists, actual appraisals seem to be gained by the employment of these four tests.

RESULTS

Because of the small sample size, it was determined that a detailed study of the microscopic components would be cost-prohibitive. Similarly, weights and measurements were taken though generally disregarded in favor of a simple presence/absence listing of utilized (ingested) materials. Dietary reconstructions would be risky, if not totally erroneous, with a sample size of only thirteen specimens.

All recognizable plant material was identified to the finest level possible utilizing the DAP's extensive comparative collection. All bone material was sent to the DAP's Faunal Section for further analysis and is not included in this report beyond noting its presence.

The following tables (Tables 3 and 4) represent a breakdown of the components identified in the coprolites. It is interesting to note that a parasitic infection is indicated by a human head louse (Pediculus humanus) recovered in coprolite Specimen 4.

SUMMARY

Due to the small sample size, meaningful dietary interpretations are impossible. A simple presence/absence listing was felt to be the most adequate means of data presentation. Further work on the coprolites will undoubtedly provide additional information on Anasazi diet in the Dolores River Valley.

TABLE 3
 BREAKDOWN BY COMPONENTS OF HUMAN COPROLITES

Genus species plant part/ dietary component	Site 5MT4683				Site 5MT2151		
	Spec. 2	Spec. 4	Spec. 8	Spec. 9	Spec. 10	Spec. 11	Spec. 12
Anacardiaceae							
<u>Rhus aromatica</u> seeds							X
<u>Chenopodium</u> sp. fruit		X	X				X
Compositae							
fruit			X*	X			
<u>Artemisia</u> sp. leaf <u>tridentata</u> wood	X		X				
<u>Juniperus osteosperma</u> seed scale	X				X		
Cyperaceae							
fruit			X				
Gramineae							
<u>Gramineae</u> fiber caryopsis	X	X	X X*		X	X	
<u>Zea mays</u> fruit				X	X	X	
Pinaceae							
<u>Pinus</u> sp. needle							X
<u>Pinus edulis</u> seed needle seed membrane	X X X		X				X
Dicotyledoneae							
seed wood leaves			X X				

TABLE 3 continued

Genus species plant part/ dietary component	Site 5MT4683				Site 5MT2151		
	Spec. 2	Spec. 4	Spec. 8	Spec. 9	Spec. 10	Spec. 11	Spec. 12
Indeterminate wood charred	X	X	X				X
noncharred			X				
Indeterminate seeds				X		X	
Indeterminate fruit	X						
Indeterminate root material				X			
Indeterminate plant fibers							X
Indeterminate plant material charred		X	X*	X	X	X	X*
Stone and grit	X	X			X	X	X
Bone fragments	X	X		X	X		
Hair	X*	X	X	X	X	X	X
Insect chiton	X	X	X				X
Feather					X		
Fungal spores							X
Head louse		X					
Undifferentiated fecal debris	X	X		X		X	X

* More than one type represented.

TABLE 4
BREAKDOWN BY COMPONENTS OF NONHUMAN COPROLITE

Dietary Component	Site 5MT2161 Spec. 13	Site 5MT2198 Spec. 14	Site 5MT2235 Spec. 15	Site 5MT4475 Spec. 16	Site 5MT4477 Spec. 17	Site 5MT4654 Spec. 18
Bone fragments	X	X	X	X	X	
Stone and grit	X	X			X	X
Charcoal		X	X			
Obsidian flake			X			
Indeterminate root material				X*		
Fungal spores				X		
Hair					X	X
Plant material NFS**						X
Plant stem NFS						X
Undifferentiated fecal debris	X	X	X	X	X	X

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REFERENCES

- Bryant, V. M.
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seed			X				
wood			X				
leaves	X						

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noncharred			X				
Indeterminate seeds				X		X	
Indeterminate fruit	X						
Indeterminate root material				X			
Indeterminate plant fibers							X
Indeterminate plant material charred		X	X*	X	X	X	X*
Stone and grit	X	X			X	X	X
Bone fragments	X	X		X	X		
Hair	X*	X	X	X	X	X	X
Insect chiton	X	X	X				X
Feather					X		
Fungal spores							X
Head louse		X					
Undifferentiated fecal debris	X	X		X		X	X

* More than one type represented.

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