Psychotropic or ritual use of Acacia flowers prior to abandonment of a prehistoric Mimbres-Mogollon archeological site

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Citation

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Abstract

One hundred twenty-eight samples of pollen were collected from 11 rooms at the NAN Ranch Ruin, a Mimbres-Mogollon archeological site in south-central New Mexico occupied from 750 to 1130 A.D. Of these 128 pollen samples, a large percentage of Acacia pollen grains was recovered only from soil sample 12. This sample was taken from soil located within a broken bowl recovered in Room 60. Room 60 is considered to be one of the last rooms occupied at this site after the continuous habitation by people for nearly 400 years. It is likely that a collection of Acacia flowers left in a bowl could account for the unusually large percentage of Acacia pollen and the unusually large pollen concentration level recovered from sample 12 (within the bowl) in Room 60. This study presents evidence for the possible ritual or psychotropic use of Acacia flowers.

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INTRODUCTION

Based in the Mimbres Valley of southwestern New Mexico, the Mimbres regional system developed into one of the most influential regional systems in the Southwest, becoming in many ways equivalent to the Chaco and Hohokam regional systems [1]. Kidder [2] and Haury [3] elaborated on early descriptions of the Mimbres culture by Fewkes [4] and others. The NAN Ranch Ruin (LA 2465) is a Classic Mimbres pueblo ruin having at least 100 rooms built within at least three room blocks overlaying a Mogollon pithouse village [5]. Early archeological investigations of the NAN Ranch Ruin were initiated by Cosgrove and Cosgrove [6] in 1932 after the partial destruction of the site by looters and vandals. Later, limited excavations at the site were by Richard Ellison and Virginia Wunder, but no publications were produced from this work [7]. From 1978 until 1996, Dr. Harry Shafer of Texas A&M University studied the archeology and botany at the NAN Ranch Ruin to intensively examine the ecology of Mogollon adaptations in the Mimbres Valley [7, 8].

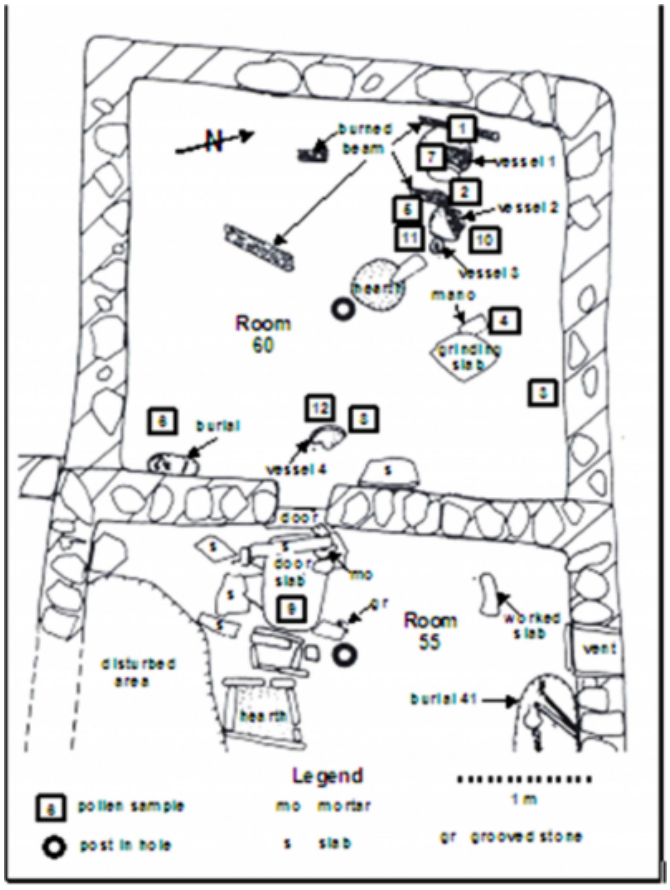
Several publications [5, 9] have described in detail the excavation of Room 60 at the NAN Ranch Ruin. While descriptions of the sampling, extraction and analysis of the entire taxa range of pollen grains recovered in Room 60 have been described in previous publications [10, 11, 12, 13, 14], only brief comments concerning the possible relevance of the Acacia pollen recovered was mentioned in these earlier works. Therefore, this work presents a much more comprehensive interpretation of the use of Acacia flowers (and/or Acacia pollen) at the NAN Ranch Ruin.

One hundred twenty-eight samples of pollen were collected from 11 rooms at the NAN Ranch Ruin, along with an additional 12 samples of modern pollen from along a transect near the site. One of the rooms which was sampled for pollen was Room 60, part of the Late Classic Mimbres Room 55/60 room cluster (Figure 1). Room 60 is of special interest because it is considered to be one of the last rooms occupied at the site [15] after a continuous habitation of the site from 750 A.D. to 1130 A.D. The types of pollen present from Room 60 are a result of the activities (including possible psychotropic substance use) of the inhabitants. At

the time of the abandonment of the NAN Ranch Ruin, the large Mimbres pueblo complexes in the area were also abandoned and the entire Mimbres cultural system collapsed [1] .

Figure 1

Figure 1: Map of Room 60 and portions of Room 55 at the NAN Ranch Ruin with locations of pollen samples and other features . For this study, pollen sample 9 is considered part of the Room 60 pollen assemblage.



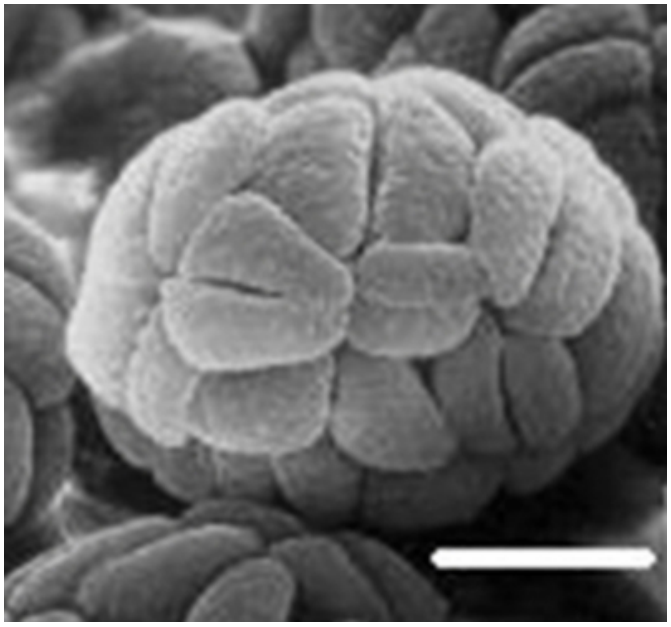
METHODS AND MATERIALS

One hundred twenty-eight samples of pollen were collected from 11 rooms at the NAN Ranch Ruin, along with an additional 12 samples of modern pollen from along a transect near the site. Each sample of soil (containing at least a volume of 20 ml) was taken for pollen analysis using a trowel rinsed in distilled water and the sample was placed in a clean plastic bag along with its provenience label [10] . The procedure used to extract the pollen from archeological and modern transect contexts was identical [10] . Lycopodium tablets were added to each 20 ml sample of soil prior to processing to allow the pollen concentration to be calculated [16] . Soil samples were placed in hydrochloric acid to remove free calcium carbonate in the sediment, rinsed, and filtered through 200 m mesh to remove debris and rocks. Following treatment in hydrofluoric acid and additional rinsing and sonication, the residues containing pollen were placed in a 2.0 absolute density solution of zinc bromide, and the heavy fraction containing fine-grained silicates and colloids was discarded. The light fraction containing pollen was acetolyzed [17] to remove cellulose, and after rinsing in alcohol, the pollen residues were mounted in glycerin on slides. If available, 200 grains of pollen were counted from each sample [18] .

The great number of Tillitia fungal spores observed in sample 12 from Room 60 was tallied but was not included in the 200-grain total of pollen counted for this sample. These spores are known to occur locally and are fungal pathogens of grasses present in the area [11] . For this study, pollen sample 9 from Room 55 will be considered part of the Room 60 pollen assemblage because it was recovered from the doorway area between Rooms 55 and 60. The extracted pollen grains from all samples were observed for identification with the aid of a Swift compound light microscope. Although such species of Acacia as A. greggii, A. roemeriana, A. neovernicosa, A. constricta, and A. angustissima are currently found in New Mexico [19] , Acacia pollen (naturally produced in groups of pollen grains called polyads) could be identified only to genera. Each Acacia polyad was counted as a single grain in the total count of pollen from each sample. The family Chenopodiaceae and the genera Amaranthus cannot be easily separated using routine light microscopy [20] so these taxa are combined into the category of Cheno-Am pollen. Pollen grains were identified by comparison with the reference pollen collection at the Texas A&M University Palynology Laboratory.

Figure 2

Figure 2: pollen polyad which is comprised of many pollen grains. Image from Martin and Drew used by permission. Bar = 10 m.

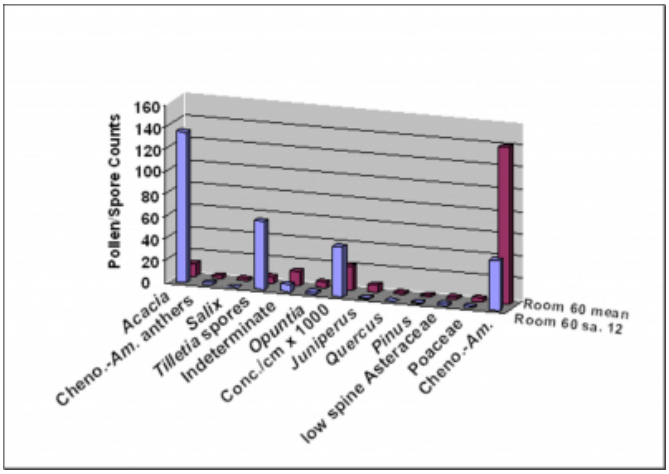


RESULTS

Of the 128 samples of pollen from 11 rooms at the NAN Ranch Ruin (including 12 samples from Room 60) and the additional 12 samples of modern pollen from along the transect near the NAN Ranch Ruin, only sample 12 from Room 60 (Figure 1) had an unusually large percentage (68.5%) of Acacia pollen grains and an unusually large concentration of pollen grains [11] . Except for sample 12 from Room 60, only trace amounts (less than one percent) of Acacia pollen were found in three (samples 1, 4, and 7) of the 12 samples from Room 60 (Figure 3). Only trace percentages (less than one percent) of Acacia pollen were recovered from five other rooms (7, 12, 46, 49, and 52) at the NAN Ranch Ruin [10] and from three samples (5, 7, and 10) from samples of surface soil taken along a transect near the NAN Ranch Ruin [10] . A large count of Tillitia fungal spores was also was obtained from sample 12 in Room 60 [11] . These spores are known to occur locally and are pathogens of grasses present in the area. The implications of the recovery of these fungal spores are discussed at length in a previous publication [11] and do not appear to be directly related to the pollen recovered at the NAN Ranch Ruin. The recovery of both a large percentage of Acacia pollen grains and a large concentration of pollen grains from only sample 12 in Room 60 is evidence of the presence of Acacia flowers associated with this sample. Because Room 60 was one of the last rooms inhabited at a site continuously occupied for nearly 400 years, the use of Acacia flowers in this room was probably related to the activities performed prior to the final abandonment after continuous habitation by many generations. These Acacia flowers may have been part of a ritual or, if ingested, the psychotropic effects of Acacia flowers may have mediated the negative emotions generated by leaving an ancestral home.

Figure 3

Figure 3: Graph of pollen or spore counts as 1) the means for taxa greater than 1 percent or the means for concentration levels for all samples in Room 60 and 2) the raw counts for taxa greater than 1 percent or for concentration levels for sample 12 in Room 60. The family Chenopodiaceae and the genera are combined into the Cheno- category .



DISCUSSION

I: THE POLLEN NEAR THE BOWL IN SAMPLE 12 WAS NOT PRESENT DUE TO CONTAMINATION.

Soil sample 12, which contained an unusually large percentage (68.5%) of Acacia pollen, was taken from soil near the broken half of the portable (or easily moved from room to room) flare-rim bowl in the floor of Room 60 west of the doorway to Room 55. Non-portable vessels (or embedded vessels) such as subfloor storage pits containing large jars or pit containers were found in NAN Ranch Ruin Classic Phase Rooms 40, 41, and 46, [22] but not in Room 60. Because portable vessels or bowls are readily moved from room to room, pollen samples taken from portable vessels usually are associated with a different spectrum of pollen than samples collected from a floor area near the portable vessel [23] . The presence of the large percentage of Acacia pollen recovered from soil sample 12 indicates that this soil was probably contained within the nearby broken half of the

portable flare-rim bowl because the other soil samples taken from the floor of Room 60 did not have high percentages of Acacia pollen.

The Acacia pollen in sample 12 was likely contained within the portable half flare-rim bowl and probably not transferred into the soil near the bowl due to the activity of wind after the roof of the ruin collapsed. Research completed by Hall [24] in California indicated that contamination by Acacia pollen blown by wind is unlikely because Acacia pollen generally is produced very sparingly (as combined pollen groups called polyads). Also, Acacia pollen is pollinated by insects moving from flower to flower and not by wind. Wind pollinated plants must usually produce large quantities of pollen to be spread widely in order to reach other flowers to complete fertilization. Insect pollinated plants (such as Acacia) need to produce far less pollen than wind pollinated plants because insect vectors transfer Acacia pollen grains [25] from anthers to pistils to complete fertilization. Because of the large percentage of Acacia pollen grains and the great concentration of pollen grains recovered from sample 12 in Room 60, it is argued that many Acacia pollen grains and/or flowers were utilized within the flare-rim bowl and not the result of random contamination by wind.

II: FEATURES ASSOCIATED WITH POLLEN SAMPLES IN ROOM 60.

Most of the pollen samples discussed in this study were located within Room 60, but soil sample 9, recovered from just inside an adjacent room (Room 55), is considered part of the Room 60 pollen assemblage because it was recovered from the doorway area between Rooms 55 and 60. Soil sample 12 (having the highest percentage of Acacia pollen) was located west of the doorway to Room 55 but clearly inside of Room 60 (Figure 1).

Room 55 (accessed through a doorway from Room 60) was designated a corporate kiva [22] . Room 55 was a large room (3.9 x 3.0 m) with two slab-lined floor features. Roof supports were near the east wall and in the west portion of Room 55. A door slab was on the floor of Room 55 just inside the doorway to Room 60. Within Room 55, a concentration of rhyolite, andesite and tuff slabs was present between the slab-lined floor features and doorway to Room 60. A previous excavation disturbed much of the floor of Room 55. The bodies of two children and one adult were interred beneath the floor of Room 55 [9] .

Late Classic Mimbres Room 60 (which measured 2.6 x 2.4 m) was identified as a storeroom [22] and contained numerous interesting features, including several bowls (Figure 1). A roof post was located near the center of Room 60. A shallow oval ash basin was in the floor northeast of the center roof post. In the northwest section of Room 60, a rhyolite slab, mano, and three pottery vessels were on the floor. One of these vessels was a large corrugated olla containing lumps of kaolin clay. Another of these vessels was a large Mimbres Classic Black-on-white olla. The third vessel was a small, narrow-necked plain jar. On the floor of Room 60 west of the doorway to Room 55 was half of a flare-rim bowl. Because these Classic Mimbres Black-on-white vessels were recovered on the floor surface in a relatively undisturbed state and the arrangement of the Room 60 walls indicated that it was constructed on top of many other previously occupied rooms, Shafer considered Room 60 to be one of the last rooms to be occupied at the site prior to site abandonment [15] .

III: BOWL WEAR, FAMINE, AND ABANDONMENT

Although the flare-rim bowl fragment associated with soil sample 12 (containing an unusually large percentage of Acacia pollen) in Room 60 did not exhibit unusual wear marks, many of the Classic Mimbres Black-on-white vessels recovered from Room 60 were exceptionally worn compared to other Classic Mimbres Black-on-white vessels recovered in other rooms [7] . A much-used Mimbres Classic Black-on-white bowl was associated with the burial of a child beneath the floor near the southeastern corner of Room 60 [9] . Bray [26] proposed that the amount of use-wear in Mimbres bowls was greater for those bowls having a utilitarian purpose than the use-wear observed in bowls functioning as heirlooms. If Bray is correct, the Classic Mimbres Black-on-white vessels in Room 60 which usually functioned as heirlooms (having little use-wear) were instead used extensively for utilitarian purposes. Shafer and Taylor [7] determined that the great amount of pottery use-wear noted in Room 60 was caused either by unusual activities or because pottery production was disrupted during the occupation of the room. A similar decrease in the production of pottery was noted in two late 13th and 14th century Saladoean pueblo populations in southeastern Arizona. This decrease in production of pottery occurred during a time period in which drought and famine in the area were severe [27] . A famine caused by drought during the occupation of Room 60 (and before abandonment of the site) at the NAN Ranch Ruin might have disrupted pottery production in a similar pattern as the Saladoean

example cited. Minnis [28] suggested that during the early part of the Classic Mimbres Period precipitation was unusually favorable for non-flood plain agriculture. However, during the end of the Classic Mimbres Period (at the time of occupation of Room 60 prior to abandonment), precipitation was a more normal pattern detrimental to non-flood plain farming, a strategy that had become more common at the end of the Classic Period [28] . Within a single generation, the large Mimbres area pueblo towns (including the NAN Ranch Ruin) were abandoned and the cultural system ended. Shafer [1] has suggested that the major cause of this abandonment was a failure of the prime agricultural land surrounding the towns. If this agricultural failure occurred, the resulting famine may have disrupted pottery production and produced the high use-wear on pottery recovered in Room 60, one of the last rooms occupied before abandonment of the NAN Ranch ruin.

IV: ETHNOARCHAEOLOGICAL/ETHNOGRAPHIC OBSERVATIONS.

Ethnographic sources cite the use of pollen grains, rather than flowers, for medicinal purposes in the Southwest. Ethnographic descriptions of Navajo medicinal rituals include the use of many types of pollen grains such as: 1) corn pollen grains sprinkled by shamen on sand paintings during curing ceremonies [29] ; 2) along with ground plant materials, juniper, pinyon, pine and other tree pollen grains are mixed with water and given to the patient during the Wind Chant ceremony [30] and during the Mountain Top Chant [30] ; 3) pollen grains from five different trees and ground plant material are given to a sick person to cause vomiting [30] ; and 4) pollen grains from four types of pine trees and two types of juniper are used to make the medicine used in the Night Chant [31] . The Navajo commonly used pollen from Typha latifolia L. (cattail) in their ceremonies “in the old days” but Zea mays L. (corn) pollen became more popular later [31] . Ceremonial uses of corn pollen by the Navajo included the scattering on dancing grounds, trails of ceremonial processions, prayer sticks, masks during rites, and sand paintings [31] . Corn pollen was mixed with water and combined with other ingredients as an ointment by the Navajo when an insect or snake bite caused a skin inflammation [32] .

At the NAN Ranch Ruin, pollen was recovered in association with human remains indicating that the pollen and/or flowers of certain plants was ingested by the deceased (prior to death) for medicinal purposes and not deposited at the gravesite as part of a ritual. For example, a large percentage of Salix and Brassicaceae pollen was recovered from the colon area of Burial 109 in San Francisco Phase Room 86, which dates to 1000 to 1100 A.D. at the NAN Ranch Ruin [33] . This pollen probably reflects the medicinal use (the ingestion) of either the pollen or the flowers of these plants [33] . Samples from the stomach area of Burial 12 in Classic Room 40 at the NAN Ranch Ruin contained large amounts of grass and phacelia pollen, indicating that a gruel containing grass and phacelia flowers and/or pollen was ingested for medicinal purposes by the deceased shortly before death [22] .

Examples cited above of widespread medicinal use of pollen combined with the large pollen grain concentration and percentage of Acacia pollen recovered from Room 60 are factors might imply that Acacia pollen was used for medicinal purposes at the NAN Ranch Ruin. However, this is unlikely because inhalation of a concentration of Acacia pollen grains can cause hay fever and asthma [25] and skin contact with concentrated Acacia pollen can cause dermatitis and pollen toxemia [34] .

V: WERE THE POLLEN GRAINS IN SAMPLE 12 PART OF A RITUAL INVOLVING THE GRAVESIDE PLACEMENT OF FLOWERS (NOT POLLEN GRAINS) USUALLY UTILIZED FOR MEDICINAL PURPOSES?

Moerman [35] asserted that the fossil pollen grains associated with the Middle Paleolithic burial at Shanidar IV [36] , [37] represented the oldest archeological materials that might have been used for medicinal purposes. At Shanidar IV, the pollen grains are thought to be present as a result of the use of flowers during the “flower burial” ritual. It is assumed that in such contexts, pollen grains of plants used for medicinal purposes are recovered not due to ingestion (prior to death) by the deceased but as a result of the ritual use of the flowers of medicinal plants during a burial. An example of such ritual use would include distributing or rubbing the flowers on the torso of the deceased during or prior to burial. These flowers, which are not nearly as resistant to decay as pollen grains, are not preserved but the pollen grains are preserved and recovered in the soil near the burial. Because only the pollen grains are preserved, in some situations it cannot be conclusively determined 1) whether the pollen grains were used alone or if the flowers (containing pollen) were used or 2) whether the pollen grains (or flowers) were

ingested by the deceased for a medicinal use or 3) whether the pollen grains or flowers were used in a graveside ritual ceremony. For example, the great frequency of juniper pollen in the soil in the chest and stomach area of Burial 73, Classic Room 41 at the NAN Ranch Ruin indicates either a medicinal use (ingestion by the deceased) or a ritual use at the gravesite of juniper pollen grains or portions of the juniper plant containing pollen [22] . The pollen grains of plants that are sources of modern medicines (Ephedra, Larrea, Chenopodium, and Salix) have been found in large percentages from samples from southwestern archeological sites (in mortuary and non-mortuary contexts) dating from A.D. 200 to 1000 [38] . But the source of these pollen grains, the flowers, have not been cited in southwestern ethnographic sources as being used for medicinal purposes [39] , and also Kay [38] noted that the flowers and pollen of Ephedra, Chenopodium, or Larrea are not the plant parts containing medicinal properties. Because of the toxicity of Acacia pollen previously cited, a medicinal use is unlikely but a ritual use at the graveside is still a possibility.

VI: WERE POLLEN GRAINS USED IN GRAVESIDE RITUALS?

At other archeological sites in the Southwest, Bryant and Morris [23] suggested that corn pollen grains might have been used in some graveside ceremonies at Antelope House. Although the flare-rim bowl associated with soil sample 12 (from Room 60) was not associated with burial remains, two other flare-rim bowls recovered at the NAN Ranch Ruin were associated with burials: one such bowl in a Phase 2 room located in another section of the Ruin [7] and another from Room 41 [7] . Except for sample 12, soil samples associated with other flare-rim bowls recovered at the NAN Ranch Ruin were not processed to recover pollen grains. Although soil sample 12 (containing the large Acacia pollen percentage) was not associated with burial remains, concentrations of pollen grains were recovered from soil samples taken from burials at the NAN Ranch Ruin and suggest that pollen grains were a primary component (perhaps associated with the use of pollen bearing plant parts) of burial rituals. Shafer [22] has suggested that the mixture of corn pollen, other kinds of grass pollen, and cattail pollen recovered from soil samples taken near the head of Burial 86 in the Three Circle Phase pithouse Room 14 was the result of the ritual sprinkling of pollen grains or plant parts containing pollen grains over the head of the deceased at burial. The exceptionally large proportion of corn pollen in the soil surrounding Burial 109 in San Francisco Phase Room 86, which dates to 1000 to 1100 A.D., indicated the ritual use of corn pollen or corn meal during grave preparation [33] . The only burial in Room 60 was of a child beneath the floor near the southeastern corner of the room. Despite the evidence for pollen grain use at graveside ceremonies in the southwest and the relationship of flare rim bowls (similar to the bowl associated with soil sample 12 in Room 60) to other burials at the NAN Ranch Ruin, the use of Acacia pollen at a graveside ritual is not likely because the flare rim bowl associated with sample 12 in Room 60 is not located near a burial but near the doorway to Room 55.

VII: WERE FLOWERS EATEN FOR FOOD OR MEDICINAL REASONS IN THE SOUTHWEST?

When eaten, flowers generally contain much moisture and scarce protein and fat, with only some containing carotene or ascorbic acid [40] . Indigenous people of Canada ate rose petals, fireweed flowers, and mariposa lily buds [41] . In the Southwest, Latino American women of New Mexico chew star thistle flowers during childbirth [42] . The flowers, fruits, and stems of several species of Opuntia cacti, especially buds in the early spring when few other vegetable foods were available, were dietary staples in the Southwest [40] . The Navajo used Indian paintbrush flowers (Castilleja affinis) as a sweet delicacy and as a remedy for stomach troubles [43] . Either alone or mixed with animal fat, the catkins (pollen-producing structures) of the Populus wislizeni (S. Wats.) Sarg. (valley cottonwood) were chewed as gum by the Navajo [30] . It is unlikely that remains of greens, buds, flowers or the diagnostic features or tools for cooking these materials would be recovered in archeological contexts if they were to be consumed in their raw state or were processed by boiling [44] .

Figure 4

Figure 4: flowers. Photo By G.A. Cooper, courtesy of the Smithsonian Institution and used by permission.

IIX: FLOWERS WERE PROBABLY EATEN FOR RITUAL OR PSYCHOTROPIC PURPOSES.

Acacia flowers (Fig. 4) might be eaten or ingested for medicinal purposes despite the toxic nature of Acacia pollen grains cited earlier. This is due to the fact that Acacia flowers do not produce high concentrations of pollen per flower because the pollen is spread by insects and not wind. Therefore, eating a few Acacia flowers would not be nearly as toxic as ingesting a great number of the pollen grains. For example, Latino American children in New Mexico suck the flowers of Acacia greggii for the sweet taste [46]. Altschul [47] noted from herbarium specimen records that Acacia acatlensis flower buds were sold for food in Mexican markets. The Pima Bajo Indians boiled the flowers and spines of Acacia cymbispina for several hours to produce a tonic to cure stomach ache [48]. The Mountain Pima Indians made a tonic from the bark and flowers of A. farnesiana to reduce fever [38]. Mixed with grease, the flowers of A. farnesiana were rubbed on bruises to reduce pain [38] or the forehead to cure headache by the Warijio Indians [38, 47]. Moore [49] reported that Indians of the Southwest used the flowers and leaves of Acacia in a tea to cure nausea, vomiting, and hangovers. Recent experiments have shown that extracts from the leaves, stems, and flowers of A. angustissima inhibited the growth of malignant tumors in experimental animals, perhaps due to the flavonoids in leaves and stems of the plant [50]. These examples imply that Acacia flowers can be utilized for medicinal purposes, either topically or ingested.

Moore [49] noted that Indians of the Southwest used Acacia flowers and leaves as a sedative, implying that these flowers had a mood altering effect different from a medicinal effect to cure a medical problem. A sedative effect also was noted for animals ingesting the extracts of the leaves, stems, and flowers of A. angustissima [50]. Instead of a sedative effect, the ingestion of the bark and roots of A. nilotica caused a frenzied mental state considered important for readiness in battle for the Masai and Batemi of Africa [51]. Because psychoactive plant materials such as harvested Datura seeds have been recovered at the Janss site, a Mimbres adobe pueblo [52], the large concentration of Acacia pollen at the NAN Ranch Ruin also might indicate a similar use of Acacia flowers for their psychoactive effects by the Mimbres people. While the species of Acacia pollen recovered from sample 12 in Room 60 cannot be determined, three psychoactive alkaloids have been extracted from an Acacia species currently found in northeastern Mexico [53].

Mind altering substances such as Acacia flowers may have been highly desired by the NAN Ranch Ruin inhabitants, especially during a famine. For example, during a long-lasting famine, the Tikopians of the Solomon Islands [54] did not sell or barter food, but tobacco and tobacco seed were sold at exorbitant prices, probably because of their narcotic qualities. Therefore it can be inferred that mood-altering substances were highly valued during famines, which may have been the reason Acacia flowers were collected in one of the last rooms (Room 60) occupied at the NAN Ranch Ruin site.

During the end of the Classic Mimbres Period (at the time of occupation of Room 60 prior to abandonment), a detrimental pattern of precipitation existed for non-flood plain farming, the type of agriculture common at that time [28]. Within a single generation, the large Mimbres area pueblo towns (including the NAN Ranch Ruin) were abandoned and the cultural system ended. Shafer [1] has suggested that the major cause of this abandonment was a failure of the prime agricultural land surrounding the towns. If this agricultural failure occurred, the resulting famine may have disrupted pottery production and produced the high use-wear on pottery recovered in Room 60, one of the last rooms occupied before abandonment of the NAN Ranch ruin.

If a famine was present before the abandonment of Room 60 at the NAN Ranch Ruin, this might have led to the preferential collection and use of psychoactive Acacia flowers to alter mood (in a similar fashion to the Tikopian example cited), resulting in the pollen spectra recovered in sample 12, Room 60. If further archeological evidence can

be discovered which implies that Acacia was used as a mind-altering substance, perhaps Acacia should be added to the list of eighty to one hundred psychotropic drugs [55] known to the American Indians.

Many possible uses of Acacia pollen and flowers have been presented to account for the large concentration and percentage of Acacia pollen in sample 12 from Room 60 at the NAN Ranch Ruin. Flowers of the Acacia plant have been utilized for food, ceremonial uses, medicinal purposes, and altering mood. Future investigations might clarify further the extent of the geographical area and time during which Acacia was used in the Mimbres area and perhaps in the greater Southwest. The relevance of this study is to promote interest in the prehistoric uses of Acacia flowers and pollen and specifically, to incite future medical research of Acacia flowers as possible sources of beneficial psychotropic substances.

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