Anthro 3BB3: Paleoethnobotany

Instructor: Shanti Morell-Hart <smorell@mcmaster.ca>

Meeting Schedule: Tuesdays 2:30 pm- 5:20 pm
Meeting Location: Kenneth Taylor Hall, Room B122
Office Hours: 11:00 am-1:00 pm on Wednesdays, or by appointment
Office Location: Chester New Hall, Room 534

Course Description:
What was the role of plants in ancient communities? What aspects of daily life are framed by flora and negotiated through ethnobotanical practice? What happens to plant remains after they become incorporated into the archaeological record, and what are the methods used to study these "ecofacts"? How can we use plant remains to answer archaeological and anthropological questions? How do paleoethnobotanical interpretations contribute to our understanding of history and structure our public policy?

In this course, we will engage with archaeobotanical laboratory methods and ethnobotanical interpretation through scholarship and hands-on practice. The course is arranged around 1) exploring the major classes of plant remains likely to be encountered in archaeological sites; 2) identifying these remains and organizing the data to make interpretable results; and 3) addressing major issues within the sub-discipline including preservation, analytical methods, sampling, collection, and interpretation. The broad goals are to:

- Learn about macro- and micro-botanical analysis of archaeological plant material;
- Understand the problems and range of archaeological research using paleoethnobotanical data;
- Gain knowledge of paleoethnobotanical analysis from sampling to interpretation; and
- Consider the broader applications of paleoethnobotanical interpretation, including economics, identity, foodways, politics, symbolism, and historical ecology.

The class will proceed partly as a seminar, with discussions on assigned readings, and partly as a laboratory section, with practicums and field trips. You will be evaluated on consistent participation in class discussion (in the classroom and/or the online forum) (20%), a set of reading responses (20%), a set of laboratory practicums and field activities (25%), a final paper (25%), and a final research presentation (10%).

Required Texts:

Most of the readings will be posted online. However, there are two required books available for purchase online and in the campus bookstore:

D'Alpoim Guedes, Jade , John Marston and Christina Warinner
2015 *Method and Theory in Paleoethnobotany*. University Press of Colorado, Boulder, CO.
ISBN-13: 978-1607323150

Pearsall, Deborah M.
2015 *Paleoethnobotany: A Handbook of Procedures.* 3rd ed. Left Coast Press, Walnut Creek, CA.
ISBN-10: 1611322987
ISBN-13: 978-1611322989

Required Supplies:

In the laboratory, we will supply modern botanical materials to be dissected (such as fruits and flowers), jewel boxes, sorting forms, Bioquip blunt featherweight forceps, weight boats, labels, sorting trays, and index cards. To prepare you for laboratory work, there are several supplies you'll need to bring to the laboratory as a part of your paleoethnobotanical sorting kit:
Recording*:* pencils and erasers, pen, one three-ringed notebook with both plain and graph paper (metric only)
Sorting: a small clear ruler (metric); very fine paintbrush (00, 000), dissection needle, exacto knives or scalpel, tweezers (Biology dissecting kits contain several of these items, and are sometimes sold at the campus bookstore)

On occasion, when noted in the syllabus, you will also need to bring a notebook/laptop computer with working versions of Excel and PowerPoint.

Course Requirements:

This course meets once per week. Classes will be divided between informal lectures, discussions, and activities. Your grade in the course will be based on your performance in completing the following assignments:

Reading responses: 20% of total grade
You will be responsible for a 300 word (roughly ¾ page, double-spaced) response to **one** of the assigned readings-- ***NOT including the Pearsall or For Lab readings***-- the evening before the first class meeting of the week. These are to be posted to the Discussions area of Avenue to Learn, before 8 pm (usually Monday evening). Everyone is responsible for completing all of the assigned readings for each week's discussion.

Each reading response should include the following:

-Full citation of the assigned reading at the very beginning of the response (author, year, publication, publisher, etc., following the SAA Style Guide:
http://www.saa.org/Portals/0/SAA/Publications/StyleGuide/StyleGuide_Final_813.pdf
-A set of 5 keywords (list), just below the citation
-Identify the subject, the time period(s), and the location(s) of the study. (1 sentence)

-What do you think is the theoretical position of the author(s)? That is, what *kinds* of questions are the authors asking (e.g., ecological questions, ritual questions, questions of gender, etc.)? (1 sentence)
-What are the primary research objectives/thesis statements/questions asked of the data by the author(s)? That is, what *specific* questions are the authors asking? (3 sentences)
-What types of plant materials/data/evidence are used to address these objectives? (1 sentence)
-What is one key thing you drew from this reading? (1 sentence)
-What else would you like to see the author address? (A short critique, or a request for more or different types of data.) (2 sentences)
-What does this make you reflect on-- in the news, your own daily practice, or your own experiences? or, What other class readings does it remind you of, and why? (1-2 sentences)
-What questions do you have about the reading? (1-2 sentences)
-*OPTIONAL*: What are your suggestions for re-interpretation, using the same data set or material? How would you have done the study differently?

The goal of these reading responses is prepare you for class discussion, with your personal and critical reflections on assigned material at the ready. A secondary goal is to leave you with a set of your own annotations on class readings.

Class Participation: 20% of total grade
Class participation is based partially on attendance, and partially on contributions to discussion. It is necessary for you to join class dialogue, through substantive questions and comments in the classroom, and/or through posting to the online discussion forums. Online dialogue can be a response to previous postings, or the posting of a new discussion topic.

The goal of class discussion is to draw out your own interests in the course materials, and to regularly and critically engage you, along with your peers, with the central themes of the course.

ALSO REQUIRED: Feedback on the final presentations of two of your colleagues in class.

Laboratory Notebook: 25% of total grade. ***Due Nov.28th at end of class.***
The proper recording of laboratory work is a critical aspect of laboratory analysis and interpretation. Your work from each laboratory practicum and field trip activity will be recorded into your lab notebook. Each entry will entail answering a series of questions and/or crafting detailed drawings and descriptions. Your laboratory notebook will be graded on completeness, clarity of information, and accuracy of answers to exercise questions. The bulk of your laboratory notebook will be due **Nov. 28th**, at the end of class time.

Final Paper: 25% of total grade
This assignment will be broken up into two components: an outline (5%), and the final paper itself (20%). Your final paper will include the formulation of an original research question, second-stage analysis using Excel, SPSS, Access, ArcMap and/or Conoco software, and interpretation that contextualizes your research within the broader literature. Your research will draw on an actual paleoethnobotanical data set from Northwestern Honduras.

Final paper outline: 5% of total grade. Due Friday Nov. 17th, by 10 pm.
This is a 2-page assignment that includes a 1-page (single-spaced) outline (roughly 250 words), and a 1-page (single-spaced) list of sources and brief annotations. You will need to include a minimum of 8

readings you are going to cite in your paper. At least 5 of these readings must come from sources outside of assigned class readings.

In your outline, the author and date of a reading you wish to cite will go in parentheses next to every applicable outline subheading. In the list of sources, you will need to provide complete citation information, and a brief (1-sentence) description of how each source will contribute to your paper. I will post an example of a final paper outline online, and talk over the template in class. I will give you feedback on your paper outlines in preparation for your final paper.

Final paper: 20% of total grade. Due Friday Dec. 8th, by 10 pm.
This is a 2400 word assignment (roughly 8-pages of narrative, double-spaced, 12-pt font, 1-inch margins). Be sure to include a title page and bibliography on separate pages (and outside the word count). Again, you will need to use at least 8 sources, 5 of which must be outside of class readings.

I will post an example of the evaluation sheet I will use for your final paper online, and talk over the format in class, so that you have an idea of how to structure your paper.

Laboratory Research Presentations: 10% of total grade
Final research presentations will take place during the last week of the term. You will need to prepare a short (5-6 min) PowerPoint (or similar) presentation. This will cover your research questions, analysis, and preliminary interpretations as you have prepared them for your final paper. Basically, imagine condensing the text of your paper into 2 pages, and then craft roughly 5 slides to graphically illustrate your research. The goal of the presentations is to make you conversant in your own hard work!

Expectations and General Guidelines:

Letter[1]	%	GPA[1]	Verbal[2]	Definition[2]
A+	90-100	12	Distinction	Strong evidence of original thinking; good organization; superior grasp of subject matter with sound critical evaluations; evidence of extensive knowledge base
A	85-89	11		
A-	80-84	10		
B+	77-79	9	Superior	Evidence of grasp of subject matter, some evidence of critical capacity and analytic ability; reasonable understanding of relevant issues; evidence of familiarity with literature
B	73-76	8		
B-	70-72	7		
C+	67-69	6	Average	Student who is profiting from his/her university experience; understanding of the subject matter, ability to develop solutions to simple problems in the material
C	63-66	5		
C-	60-62	4		
D+	57-59	3	Marginal	Some evidence of familiarity with subject matter and some evidence that critical analytic skills have been developed
D	53-56	2		
D-	50-52	1		
F	0-49	0	Failure	Little evidence of even superficial understanding of subject matter, weakness in critical and analytic skills; with limited or irrelevant use of literature

[1] See section on General Academic Regulations in McMaster University Undergraduate Calendar 2013/2014;
[2] Definitions by University of Toronto Faculty of Arts and Science

The instructor and university reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check his/her McMaster email and course websites weekly during the term and to note any changes.

Academic Dishonesty:

Academic dishonesty consists of misrepresentation by deception or by other fraudulent means and can result in serious consequences, e.g., the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university.

It is your responsibility to understand what constitutes academic dishonesty. For information on the various kinds of academic dishonesty please refer to the Academic Integrity Policy, Appendix 3, http://www.mcmaster.ca/policy/Students-AcademicStudies/AcademicIntegrity.pdf

The following illustrates only three forms of academic dishonesty:

1. Plagiarism, e.g., the submission of work that is not one's own for which other credit has been obtained.
2. Improper collaboration in group work.
3. Copying or using unauthorized aids in tests and examinations.

In this course we will be using a software package designed to reveal plagiarism. Students will be required to submit their work electronically so that it can be checked for academic dishonesty.

Faculty of Social Sciences E-mail Communication Policy:

Effective September 1, 2010, it is the policy of the Faculty of Social Sciences that all e-mail communication sent from students to instructors (including TAs), and from students to staff, must originate from the student's own McMaster University e-mail account. This policy protects confidentiality and confirms the identity of the student. It is the student's responsibility to ensure that communication is sent to the university from a McMaster account. If an instructor becomes aware that a communication has come from an alternate address, the instructor may not reply at his or her discretion.

Email Forwarding in MUGSI:
http://www.mcmaster.ca/uts/support/email/emailforward.html
*Forwarding will take effect 24-hours after students complete the process at the above link

Special accommodations:

If you have any special accommodations, such as additional resource requirements and/or adjustments to your schedule due to athletic events or religious holidays, send me an email detailing your needs within the first two weeks of the course. It is not necessary to explain the context or background—just describe your necessary accommodations clearly. Student Accessibility Services (linked below) can help to guide you in this process.

Student Accessibility Services:

Student Accessibility Services (SAS) supports students who have been diagnosed with a disability or disorder, such as a learning disability, ADHD, mental health diagnosis, chronic medical condition, sensory, neurological or mobility limitation. Students who require accommodation should contact SAS as early in the term as possible. http://sas.mcmaster.ca

Office of Human Rights and Equity Services:

McMaster recently launched MACcessibility, part of the Office of Human Rights and Equity Services, to help advance the University's goal of building an inclusive community with a shared purpose. HRES works with campus and community partners to ensure that McMaster University is a place where all students, staff and faculty are treated equitably and respectfully in all areas of campus life.
http://www.mcmaster.ca/hres/index.html

Personal Counselling and Mental Health at the Student Wellness Center:

If you believe that you are in imminent danger or that harm to yourself or someone else exists, immediately call the police for assistance. For other situations of emotional distress, please contact a health or wellness specialist. The SWC offers individual counselling at the SWC, group programming at the SWC, community referrals, crisis referrals, and connections to community/campus resources.
http://wellness.mcmaster.ca/counselling.html

Requests for Relief for Missed Academic Term Work:

The University recognizes that students periodically require relief from academic work for medical or personal situations. In the event of an absence for medical or other reasons, students should review and follow the Academic Regulation in the Undergraduate Calendar "Requests for Relief for Missed Academic Term Work". **Please note these regulations have changed beginning Spring/Summer 2015.**

http://academiccalendars.romcmaster.ca/content.php?catoid=11&navoid=1698#Requests_for_Relief_for_Missed_Academic_Term_Work

For missed academic work worth less than 25% of the final grade, use the MSAF mechanism to report absences due to medical or personal situations that last up to three calendar days. You may submit requests for relief using the MSAF only once per term. It is your responsibility to immediately follow up with each of your instructors (normally within two working days) regarding the nature of the accommodation. https://www.mcmaster.ca/msaf/index.html

If you are absent for reasons other than medical reasons, are missing for more than 3 days, have missed academic work worth more than 25% of the final grade, or exceed one request per term you MUST visit your Associate Dean's Office (KTH 129). You may be required to provide supporting documentation. It is the prerogative of the instructor in each of your courses to determine the appropriate relief for missed term work.

Writing Support Services:

If you need help researching, structuring, writing, or proofreading your paper, contact Writing Support Services early in the term and consult with them often. Trained upper-year and graduate Writing Assistants are available to provide help with particular assignments or specific questions related to academic writing.
http://studentsuccess.mcmaster.ca/students/academic-skills/writing-support-services.html

Research Help

A Service Desk is located near the entrance of each library on campus. Students may drop-by in person, call or email to get help finding library resources. Students may also get online research help by using the "Ask a Librarian" virtual reference service https://library.mcmaster.ca/justask

Research Consultations

Faculty, students and staff who require in-depth information on resources may request a one-on-one consultation with a librarian. Before making a request, ask for help at one of the Service Desks https://library.mcmaster.ca/forms/research-consultation-request

Images from the top of syllabus:
Plaster cast of Zea mays *from the site of Joya de Cerén (photo by SMH)*
Collection of Acrocomia mexicana *palm fruits (Illustration by Sarah Davidson)*
Calathea *sp. starch grains recovered from an artifact (photo by SMH)*

Course Schedule

(Reminder: You are responsible for a 300 word response to **one** of the assigned readings the evening before the first class meeting of the week. NOTE: This does not include the Pearsall readings or the For Lab readings.)

Week 1: Course introduction. Introductions and overview of the course.
Sep.5
Laboratory Practicum: Introduction to the Archaeology Teaching Laboratory; paleoethnobotanical equipment and tools; lab safety; basic microscopy
Read: Pearsall Chapter 1: The Paleoethnobotanical Approach

Week 2: Overview of Ethnobotany, Paleoethnobotany, Archaeobotany, and Paleobotany.
Sep.12
Discuss: Marston et al. 2015 (Marston) pp. 1-18; Bohrer 1986; Butzer 1990; Carlson 2001
Laboratory Practicum: Basic plant anatomy; Flower anatomy
For Lab: Young section 1: Importance of Plants to Humans; sections 8, 13, 22, 68 and 69 on general botany and identification; sections 82, 83, 89 and 91 on characteristics of flowers

Week 3: History of paleoethnobotany and early studies. Ecology, gardens, and phytosociology.
Sep.19
Discuss: Marston et al. 2015 (Messner) pp.257-274 and (Casana) pp.315-338; Hillman 1991; Pollan 1991
Laboratory Practicum: Succulent fruit anatomy
For Lab: Young sections 84, 94, 95 and 96 on fruits

Week 4: Underground storage tissues: use, preservation, and recovery. Formation Processes, taphonomy, and preservation. Experimental archaeology.
Sep.26
Discuss: Marston et al. 2015 (Gallagher) pp.19-34; Hather 1991; Kubiak-Martens 2002; van der Veen 2007
Presentation: Formation processes (short)
Laboratory Practicum: Wood anatomy; Underground Storage Organ (USO) anatomy
For Lab: Young sections 55, 57, 58, 65, and 66 on woods and wood tissues; sections 61, 63, 64, and 72 on roots and storage tissues; section 97 on seed and fruit dispersal

****Bring cameras or camera phones to class on Oct.3****

Week 5: Ethnobotany and regional flora. Palynology. Comparative collections. Identifying plants in the field and collecting specimens.
Oct.3
Discuss: Pearsall Chapter 4: Pollen Analysis; Martin 1995: Chapters 1, 2 and 4
Laboratory Practicum: A) Field trip to Greenhouse: Modern specimen identification, collection, and curation. B) Dry fruit anatomy; Seed anatomy
For Lab: Harrington 1957; Young sections 81 and 98 on seeds; sections 78 and 88 on seed-bearing plants; sections 94 and 95 on dry fruit anatomy

** **FALL TERM RECESS: Oct.7- Oct.15** **

Week 6: Reference collections and herbaria ("plant libraries"). Assembling and curating reference collections. Experimental charring. Comparing specimens.
Oct.17
Discuss: Marston et al. 2015 (Fritz) pp.115-146; Flaster 2004; Lentz et al. 1996; Tolar et al. 2010
Guest presentation: Rudy Fecteau: "Ontario Paleoethnobotany"
Laboratory Practicum: Developing an ethnobotanical list of major regional species. Ethnobotanical surveys. Preparation of comparative samples (charred and uncharred).
For Lab: Harrington 1957 (redux)

Week 7: Microbotanical and chemical residues. Phytoliths, starches, lipids, proteins, DNA, and isotopes.
Oct.24
Discuss: Pearsall Chapter 5: Phytolith Analysis and Chapter 6: Starch Analysis; Haslam 2006; Marston et al. 2015 (Warinner) pp. 275-292; Perry 2004
Laboratory Practicum: Microbotanical residues of plants: starches, phytoliths, pollen
For Lab: Young sections 92 and 93 on pollination, sections 3 and 56 on cell types

Week 8: Research design, in-field sampling, and field biases. Collection of paleoethnobotanical samples. Recovery techniques. SPOOKY PLANTS: Plants in forensic cases
Oct.31
Discuss: Pearsall Chapter 2: Deposition, Preservation, and Recovery of Macroremains; Marston et al. 2015 (Guedes) pp.77-94; Lane et al. 1990; Lennstrom and Hastorf 1995
Presentation: Introduction to the Honduran archaeological sites
Laboratory Practicum: Preparation of macrobotanical samples for analysis
For Lab: Morell-Hart 2011

****Download Honduras data set and explore the database before Nov.7 class****
****Bring computers to Nov.7 class****

Week 9: Processing of macrobotanical bulk samples. Introduction to the Honduras data set.
Nov.7
Discuss: Pearsall Chapter 3: Identification and Interpretation of Macroremains; Hageman and Goldstein 2009; VanDerwarker et al. 2015
Presentation: Macrobotanical sample flotation and processing in Northwestern Honduras
Workshop: Getting to know the Honduras data set
Laboratory Practicum: Macrobotanical sample sorting and identification
For Lab: Joyce and Henderson 2001

****Bring computers to Nov.14 class****

Week 10: Macrobotanical sorting and identification. Integrated paleoethnobotanical approaches. Sampling and implications. Basic quantification. Organization and analysis of paleoethnobotanical data.
Nov.14
Discuss: Pearsall Chapter 7, Part I: Indicators of Diet and Health; Marston et al. 2015 (Marston) pp. 163-180; Petchey and Gaston 2002; Welch and Scarry 1995
Laboratory Practicum: Using Excel for paleoethnobotanical data-- organizing data sets; pivot charts; pie charts, bar graphs, line graphs

For Lab: Morell-Hart et al. 2014

****Final paper outline due Friday, Nov.17th, by 10 pm ****

Week 11: Interpretation of data. Economic plant use; lifeways; diet and health; cuisine and foodways; economy; status.
Nov.21
Discuss: Pearsall Chapter 7, Part II: The Interplay of Dietary Indicators; Fuller 2005; Gumerman 1994; Jacomet 2009
Laboratory Practicum: Macrobotanical sorting and identification
For Lab: Marston et al. 2015 (Morell-Hart) pp.371-390

Week 12: Paleoethnobotany in the modern world.
Nov.28
Presentation: Implications and applications in the modern world: environmental concerns, Slow Food movements, government policies, paleodiets, historical ecology and restoration, island environments, ethnopharmacology, extirpations and extinctions, and genetic studies
Discuss: Berman and Pearsall 2008; Diekmann et al. 2007; Dunn 2012; van der Veen 2014
****Turn in lab notebooks at the end of class****

Week 13: Final presentations and feast.
Dec.5
Laboratory Practicum: ID your food.
****Final Research Presentations****

****Final papers due Friday, Dec. 8th by 10 pm****

Course Readings:

Berman, Mary Jane and Deborah M Pearsall
2008 At the crossroads: starch grain and phytolith analyses in Lucayan prehistory. *Latin American Antiquity*:181-203.

Bohrer, Vorsila L.
1986 Guideposts in ethnobotany. *Journal of Ethnobiology* 6(1):27-43.

Bouchard-Perron, Julie-Anne
2017 Savage Lands, Civilizing Appetites: Power and Wilderness in Quebec City (1535–1900). American Antiquity:1-18.

Butzer, Karl W.
1990 Ethno-agriculture and Cultural Ecology in Mexico: Historical Vistas and Modern Implications. Paper presented at the Conference of Latin Americanist Geographers, Benchmark 1990.

Carlson, Thomas
2001 Language, ethnobotanical knowledge and tropical public health. In *On Biocultural Diversity*, edited by L. Maffi, pp. 489-502. Smithsonian Institution Press, Washington, D.C.

D'Alpoim Guedes, Jade , John Marston and Christina Warinner
2015 *Method and Theory in Paleoethnobotany*. University Press of Colorado, Boulder, CO.

Diekmann, L., L. Panich and C. Striplen
2007 Native American Management and the Legacy of Working Landscapes in California. *Rangelands* 29(3):46-50.

Dunn, R. K.
2012 Human Ancestors Were Nearly All Vegetarians. *Scientific American* (2012).

Flaster, Trish
2004 Survey of medicinal plants in the Main U.S. Herbaria. *Ethnobotany Research and Applications* 2:101-110.

Fuller, Dorian Q.
2005 Ceramics, seeds and culinary change in prehistoric India. *Antiquity* 79(306):761-777.

Gumerman, George
1994 Feeding Specialists: The Effect of Specialization on Subsistence Variation. In *Paleonutrition: The Diet and Health of Prehistoric Americans*, edited by K. D. Sobollik, pp. 80. vol. 22. Center for Archaeological Investigations, Southern Illinois University, IL.

Hageman, John B. and David J. Goldstein
2009 An integrated assessment of archaeobotanical recovery methods in the Neotropical rainforest of northern Belize: flotation and dry screening. *Journal of Archaeological Science* 36(12):2841-2852.

Harrington, H.D.
1957 *How to Identify Plants*. Swallow Press.

Haslam, Michael A.
2006 An Archaeology of the Instant? Action and Narrative in Microscopic Archaeological Residue Analyses. *Journal of Social Archaeology* 6(3):402-424.

Hather, Jon G.
1991 The identification of charred archaeological remains of vegetative parenchymous tissue. *Journal of Archaeological Science* 18:661-675.

Hillman, Gordon C.
1991 Phytosociology and Ancient Weed Floras: Taking Account of Taphonomy and Cultivation Methods. In *Modeling Ecological Change*, edited by D. R. Harris and K. D. Thomas. Institute of Archaeology Publications, London, UK.

Jacomet, Stephanie
2009 Plant economy and village life in Neolithic lake dwellings at the time of the Alpine Iceman. *Vegetation History and Archaeobotany* 18(1):47-59.

Joyce, Rosemary A. and John S. Henderson
2001 Beginnings of Village Life in Eastern Mesoamerica. *Latin American Antiquity* 12(1):5-24.

Kubiak-Martens, L.
2002 New evidence for the use of root foods in pre-agrarian subsistence recovered from the late Mesolithic site at Halsskov, Denmark. *Vegetation History and Archaeobotany* 11:23-31.

Lane, Meredith A, Loran C Anderson, Theodore M Barkley, Jane H Bock, Ernest M Gifford, David W Hall, David O Norris, Thomas L Rost and William Louis Stern
1990 Forensic botany. *Bioscience* 40(1):34-39.

Lennstrom, Heidi A. and Christine A. Hastorf
1995 Interpretation in context: sampling and analysis in paleoethnobotany. *American Antiquity* 60(4):701-721.

Lentz, David L., Marilyn P. Beaudry-Corbett, M.L.R. de Aguilar and L. Kaplan
1996 Foodstuffs, Forests, Fields, and Shelter: A Paleoethnobotanical Analysis of Vessel Contents from the Ceren site, El Salvador. *Latin American Antiquity*:247-262.

Martin, Gary J.
1995 *Ethnobotany: A Methods Manual*. WWF International; UNESCO. Royal Botanic Gardins, Kew, London, UK.

Miksicek, Charles H.
1987 Formation processes of the archaeobotanical record. *Advances in archaeological method and theory*:211-247.

Morell-Hart, Shanti
2011 Ancient communities and ecological contexts. In *Paradigms and Syntagms of Ethnobotanical Practice in Pre-Hispanic Northwestern Honduras*. Ph.D. Dissertation. University of California, Berkeley.

Morell-Hart, Shanti, Rosemary A. Joyce and John S. Henderson
2014 Multi-Proxy Analysis of Plant Use at Formative Period Los Naranjos, Honduras. *Latin American Antiquity* 25(1):65-81.

Pearsall, Deborah M.
2015 *Paleoethnobotany: A Handbook of Procedures*. 3rd ed. Left Coast Press, Walnut Creek, CA.

Perry, Linda
2004 Starch Analyses Reveal the Relationship between Tool Type and Function: An Example from the Orinoco Valley of Venezuela. *Journal of Archaeological Science* 31(8):1069-1081.

Petchey, Owen L. and Kevin J. Gaston
2002 Functional Diversity (FD), Species Richness and community Composition. *Ecology Letters* 2002(5):402-411.

Pollan, Michael
1991 Second Nature. *The Atlantic Monthly Press*:108-112.

Tolar, Tjasa, Stefanie Jacomet, Anton Vaeluscek and Katarina Cufar
2010 Recovery techniques for waterlogged archaeological sediments: A comparison of different treatment methods for samples from Neolithic lake shore settlements. *Vegetation History and Archaeobotany* 19:53-67.

van der Veen, Marijke
2007 Formation processes of desiccated and carbonized plant remains-the identification of routine practice. *Journal of Archaeological Science* 34(6):968-990.

2014 The Materiality of Plants: Plant-People Entanglements. *World Archaeology* 46(5):799-812.

VanDerwarker, Amber M., Dana N. Bardolph, Kristin M. Hoppa, Heather B. Thakar, Lana S. Martin, Allison L. Jaqua, Matthew E. Biwer and Kristina M. Gill
2015 New World Paleoethnobotany in the New Millennium (2000-2013). *Journal of Archaeological Research*.

Welch, Paul D. and C. Margaret Scarry
1995 Status-related variation in foodways in the Moundville chiefdom. *American Antiquity* 60(3):397-419.

Young, Paul G. and Jacquelyn Giuffre
1982 *The Botany Coloring Book*. Harper Collins Coloring Books.