



Plants and People in the African Past: Themes and Objectives of Archaeobotany

Anna Maria Mercuri¹(✉), A. Catherine D'Andrea², Rita Fornaciari³,
and Alexa Höhn⁴

¹ Università di Modena e Reggio Emilia, Laboratorio di Palinologia e
Paleobotanica, Dip. Scienze della Vita, Modena, Italy
annamaria.mercuri@unimore.it

² Department of Archaeology, Simon Fraser University, Burnaby, BC, Canada
adandrea@sfu.ca

³ Università di Modena e Reggio Emilia, Laboratorio di Palinologia e
Paleobotanica, Modena, Italy
rita.fornaciari@unimore.it

⁴ Institut für Archäologische Wissenschaften, Goethe-Universität, Frankfurt,
Germany
a.hoehn@em.uni-frankfurt.de

Africa with its impressive, deep history and ecosystem diversity continues to offer an ideal setting to expand our frontiers of understanding plants and people in the past. Early and unique interrelationships between humans and plants make Africa a critical reference point for interdisciplinary studies of cultural developments and environmental transformations. On-going research in many fields is evaluating the independent patterns of phytogeography and ethnography of Africa's plants and peoples. On the continent, climatic oscillations together with population growth and migration have sparked continual innovations and adaptation to changes over the entire duration of human existence. Palaeoethnobotanical and palaeoecological studies, focusing on vegetation development and natural resources exploitation, are investigating these fascinating issues through interdisciplinary and careful analyses of archaeological and botanical records.

The study of plant micro- and macroremains from archaeological sites, and other human-influenced contexts, is of key importance to investigate the ethnobotany and ecology of the past. The most common themes within this field of research are the knowledge of plants for food and medicine and their processing, the selection and manipulation of wild plants leading to cultivation and in some cases to domestication, foodways, and subsistence strategies of humans living in complex ecosystems, environmental change, the role of human agency in vegetation change, and plant migrations mediated by climate and human activity. Archaeobotany aims at understanding food, fuel and other plant uses as well as environment/habitat transformations, and situated at the nexus of human and the natural spheres, is one of the few reliable approaches to understanding the historical development of plant use and landscapes. The long-term reciprocal relationships between humans and the environment have become the motor of adaptation of living organisms and of the transformation of ecosystems and habitats, in Africa and beyond (Harlan and Stemler 1976; Fuller 2007, 2012; Fuller and Colledge 2008; Mercuri 2008a; Pearsall and Hastorf 2011; Zohary et al. 2012; Pelling 2013; Stevens et al. 2014).

In Africa, ancient relationships between plants and people may differ from other regions of the world (Garcea 2004; Fuller and Hildebrand 2013; Larson et al. 2014), especially from those where plant domestication has been early (Zohary and Hopf 2000; Aiello 2011). In Africa, plant foods were gathered and foraged for millennia and perhaps they were cultivated in some areas (Wasylikowa and Dahlberg 1999; Mercuri et al. 2018), but unambiguous signs of domestication appear rather recently in the African Middle-Late Holocene archaeobotanical record (D'Andrea et al. 2001; Fuller 2007). On the pathway to food production, other choices were made, other turns taken: wild cereals supplied basic carbohydrate-protein resources, while cattle and small livestock were the main sources of domesticated food for much of the Holocene (Marshall and Hildebrand 2002). Moreover, pottery preceded food production: wild plants, including grasses and aquatic plants, were cooked in vessels as early as 10,000 years ago in the central Sahara (Dunne et al. 2016). In West Africa, tree fruits such as oil palm (*Elaeis guineensis* Jacq.) and incense tree (*Canarium schweinfurthii* Engl.) were significant resources which were likely managed in arboricultural systems as far back as the Early Holocene (D'Andrea et al. 2006; Oas et al. 2015).

Despite the later beginning of plant domestication, the conviction of some early researchers that Africa was a continent without history, implying that its environment had not been shaped to a great extent by ancient peoples, was prejudiced. In recent years, it has become increasingly evident that humans have had an important role in shaping African environments: tropical forests were by no means pristine, and savannas, while not entirely man-made had to a large extent been shaped by human activities. Archaeobotany and palaeoethnobotany are making impressive contributions to this body of research (e.g. van Gemerden et al. 2003; Mercuri 2008b; Höhn and Neumann 2012; Morin-Rivat et al. 2014).

Africa covers about one-fifth of the earth's land surface and encompasses several phytogeographical communities which developed under equatorial, tropical and Mediterranean climates (White 1983). Environmental and ecological conditions are extremely diverse not only passing from rainforest to desert and sea coast but also within similar ecosystems and latitudes. In addition, the continent hosts an immense diversity of peoples, traditions and histories. Together this necessitates more investigations of cultural-environmental changes to provide an extended chronological perspective.

The research presented in this volume includes studies comprising many of these diverse environments and cultures, presenting a clear demonstration of the variability and richness of data relating to African studies in the field of archaeobotany. The subject is crucial for sustainable development by increasing our knowledge of the links between natural resources and exploitation, opportunities and flexibility, changes and adaptation, as evident in long-term interactions of humans and the environment. If the study of one archaeological site can demonstrate local space-time events and the behaviour of a few people, the integration of data from many sites investigated with an interdisciplinary approach will enable regional and cross-cultural landscape reconstructions (Mercuri 2008a, 2014). In the pages of this book, archaeobotanists as

botanists, archaeologists, anthropologists, ethnoarchaeologists and palaeoecologists compare and discuss the evidence from the African past with varied scientific languages, approaches, and research objectives. The targets, however, are the same and involve an interest in deepening the complex and fascinating history of this continent, and in the desire to learn from the ‘nature and culture’ of Africa the lessons on how *to exploit our lands without destroying them* (Plotkin 1994).

IWAA Workshops

The Workgroup for African Archaeobotany was founded by Professor Krystyna Wasylikowa (Kraków) in 1994 with the 1st IWAA meeting held in Mogilany, Poland in May 1994. Following this, International Workgroup for African Archaeobotany meetings have been held regularly every three years as key events where data and knowledge on African archaeobotany are exchanged on a wide range of topics. In following years, IWAA workshops were held in Leicester, England (1997); Frankfurt, Germany (2000); Groningen, Netherlands (2003); London, England (2006); Cairo, Egypt (2009); Vienna, Austria (2012) and most recently in Modena, Italy (2015) (Fig. 1).

Initially the focus of the workshop was on northern African countries and palaeoethnobotany, and included mainly macro-botanical remains. In later meetings the geographical and methodological boundaries enlarged. Today, presented research typically covers the entire African continent from South Africa to Morocco and from Mediterranean environments to the tropical forest zone. Topics have broadened considerably to include the relationships between humans and plants and ancient environments. In addition to macroremains, phytoliths, pollen, and non-pollen palynomorphs, analysed in multidisciplinary archaeo-environmental perspective, are now considered substantial components of archaeobotanical research. Ethnological and linguistic studies are also interdisciplinary elements of ancient plant use studies, as well as molecular and biochemical (for example, nucleic and fatty acids) analyses. The abstracts of conference papers presented in Modena provide a concise overview of the diversity and range of subjects and themes that are currently under investigation in African archaeobotany. They have been published as peer-reviewed long abstracts in *Atti della Società dei Naturalisti e Matematici di Modena*, Volume 146.

The workshop in Modena was dedicated to the memory of our colleague Prof. Ahmed Gamal-El-Din Fahmy, who organized and hosted the IWAA6 meeting at Helwan University in 2009. His untimely death in December 2013 has left us deeply saddened. In his honour the “Fahmy Memorial Speaker” award was created and awarded to the top student presentation in Modena. The winner was Ahmed’s former student Dr. Mennat-Allah El-Dorry for her presentation on *Grapes, raisins and wine: archaeobotanical finds from the Monastery of St John the Little in Wadi El Natrun (Egypt)*. The second prize was given to Dr. Elshafaey A. E. Attia, and the third prize was given to Dr. Emuobosa A. Orijemie. We also commemorated the memory of Lydia



Fig. 1. The logo of the IWAA 8 congress (created and drawn by Serena Ferretti, in Reggio Emilia 2015)

Zapata Peña, another enthusiastic and extraordinary researcher and teacher, working on plant use within and beyond Africa. Indeed she also left us far too soon in January 2015.

Published Volumes from Previous IWAA Workshops

This volume is a compilation of peer-reviewed papers presented to the 8th International Workgroup for African Archaeobotany, held in Modena, Italy in June 2015. Such reference books have been published after each meeting of the International Workgroup for African Archaeobotany. With titles reflecting the main thematic lines of the presented studies, they provide an important outcome of each workshop and guidance for further studies and research in African archaeobotany.

Papers from the 1st meeting in Mogilani, Poland were published in volume 35(1) of *Acta Palaeobotanica* by Stuchlik and Wasylikowa (1995) without a synoptic title. The titles of the following two volumes, by Van der Veen (1999) and Neumann et al. (2003), pointed to plant exploitation, plant use for food and fuel, and trends toward agriculture as the ‘green world’ has been, and still is, at the base of resource procurement and economy in ancient and modern Africa (e.g., Cunningham 1997). The important subheading “Progress in African Archaeobotany” appeared for the first time with the book by Neumann et al. (2003). It mirrors the vivid and incessant advancement that this science has been able to achieve and contributes to the study of Africa’s past.

“Fields of Change” by Cappers (2005) recalls that our cultural—agrarian—landscapes are subjected to adaptations and transformations under environmental—climate—as well as socio-economic changes, a remarkably contemporary theme. With the same awareness, the titles of the books by Fahmy et al. (2011) and Thanheiser (2016) underline the interest of archaeobotanists to open windows to new perspectives and employ diverse methods of deciphering human-plant relationships. The volume by Stevens et al. (2014) points to flora as an archaeological record and identifies it as a fundamental partner in the dyadic cultural-botanical relationship: the African flora, which has peculiar properties and a unique role in human and cultural history of the continent.

The lessons from previous books and IWAA conferences have been incorporated into the themes of this volume which illuminates human-plant interactions in the African past.

The Organization and Themes of This Book

The papers included in this volume represent the most current archaeobotanical research completed by international scholars from Africa, Europe and North America. The book presents a pan-African perspective, including study locales from Mediterranean Africa, the Horn, West, East, Central and Saharan Africa, as well as synthesis papers covering more than one region (Fig. 2). Contributions are data-rich and employ some of the most advanced methods available in archaeobotanical research. General themes touched on by papers in this volume include agricultural systems of sub-Saharan Africa, agricultural history, status of archaeobotanical studies, culinary practices, food and drink production/processing, plant domestication history, landscape reconstruction, anthropogenesis and Holocene vegetation history. Chapters focussing on studies of important species are presented including wild grasses, cotton, barley, sorghum, millet and rice. Much of the presented research focuses on macro-botanical remains, mainly seeds/fruits, but in addition, contributions on anthracology as well as micro-remains, including pollen, starch grains and phytoliths are also presented. Many chapters report on studies completed on key archaeological sites in Africa: Luxor, Helwan, Dakhleh Oasis and Hierakonpolis in Egypt; Takarkori in Libya; Tin Hana-katen Cave in Algeria; Kassala and Sai Island in Sudan; Mezber in Ethiopia; the Niger River basin in Benin; Pangwari and Motako in Nigeria; the Middle Senegal River

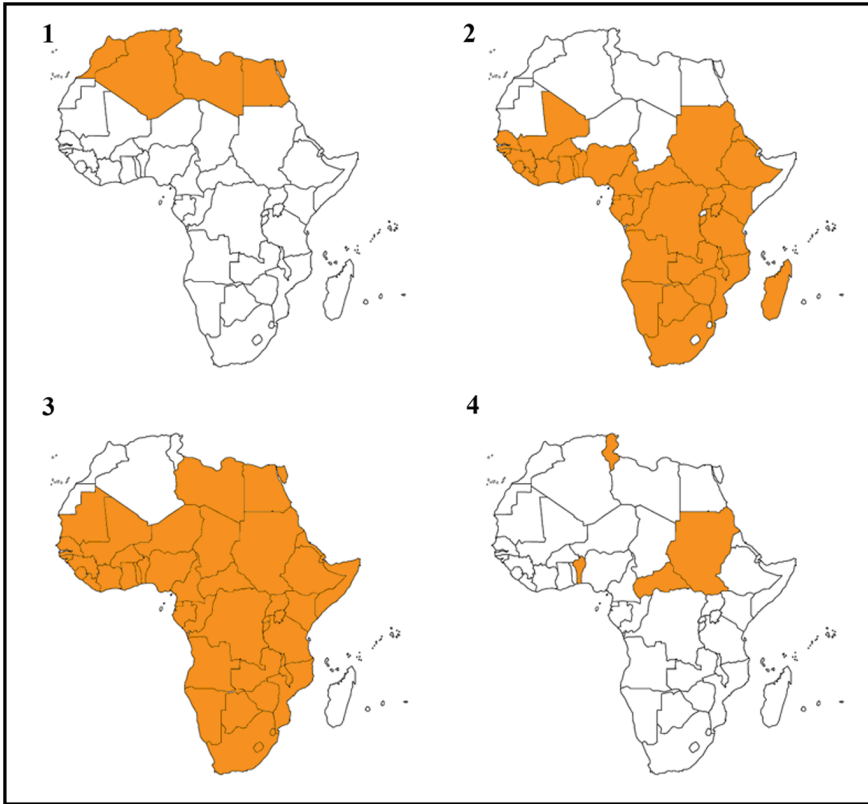


Fig. 2. Map of the country studied in the research papers included in this book, divided into the four themes represented at the Modena conference: (1) Mediterranean Africa; (2) Archaeology and Palaeoecology: Integrated Methods; (3) Plant Use, Agricultural History and Ethnoarchaeology: Foods and Fields; and (4) Climate and Agrarian-Cultural Landscapes.

Valley, and Mtwara Creek in Kenya. All papers present maps and geographical descriptions to make clear the phytogeographical context of the archaeobotanical study.

The volume is divided into four themes represented at the Modena conference: (1) Mediterranean Africa; (2) Archaeology and Palaeoecology: Integrated Methods; (3) Plant Use, Agricultural History and Ethnoarchaeology: Foods and Fields; and (4) Climate and Agrarian-Cultural Landscapes.

The first section, *Mediterranean Africa*, includes eight contributions on current research in Egypt, Libya, Tunisia, Algeria and Morocco, covering a temporal period ranging from the Palaeolithic to Late Antiquity (c. 2nd–8th centuries AD). Themes touched upon by these papers include ancient Egyptian Predynastic, New Kingdom and Medieval archaeobotany, and plant use by Holocene forager inhabitants of Mediterranean Africa.

The second section, *Archaeology and Palaeoecology: Integrated Methods*, presents five papers that emphasise the use of integrated methods in archaeology and palaeoecology. Contributions from West and East Africa and the Nile region deal with



Fig. 3. Photo of some participants to the IWAA8 in Modena (1. Rossella Rinaldi; 2. Alice Fietta; 3. Chris J. Stevens; 4. Senna Thornton-Barnett; 5. Sahbi Jaouadi; 6. Amanda Logan; 7. Welmoed A. Out; 8. Shannon Hardwick; 9. Sarah Walshaw; 10. Daphne Gallagher; 11. Elshafaey Abdelatif Elshafaey Attia; 12. Federica Riso; 13. Christopher A. Kiahtipes; 14. Roger Blench; 15. Kingsley Daraojimba; 16. Alexa Höhn; 17. Justin Bradfield; 18. Steven Brandt; 19. Ursula Thanheiser; 20. Phylippa Ryan; 21. Ryan M. Szymanski; 22. Claire Malleson; 23. Mats Widgren; 24. Lucia Veronica Collura; 25. Barbara Eichhorn; 26. Charlène Bouchaud; 27. Amy Styring; 28. Samira Amrani; 29. Laurent Bremond; 30. Alemseged Beldados; 31. René T. J. Cappers; 32. Louis Champion; 33. May Lesley Murungi; 34. Elisabeth Hildebrand; 35. Catherine A. D’Andrea; 36. Fabrizio Buldrini; 37. Rim Hamdy; 38. Adel M. Ahmed Ali; 39. Mennat-Allah El Dorry; 40. Christine Sievers; 41. Elisa Nervo; 42. Yolanda Carrión Marco; 43. Katharina Neumann; 44. Sonja Filatova; 45. Anna Maria Mercuri; 46. Marie-Pierre Ruas; 47. Rita Fornaciari; 48. Assunta Florenzano; 49. Paola Torri; 50. Maria Chiara Montecchi).

issues of taphonomy and the difficulties in differentiating anthropogenic and natural environmental changes in the prehistoric archaeological and palaeoecological records.

Section three, *Plant Use, Agricultural History and Ethnoarchaeology: Foods and Fields*, presents six papers dealing with plant use, foodways and agricultural history, and ethnoarchaeological approaches to African archaeobotany with contributions from West, East Africa and the Horn. Examples are presented of plant use in agrarian and foraging societies, plant domestication and the evolution of ancient agricultural systems in Africa.

The final section, *Climate and Agrarian-Cultural Landscapes*, presents four contributions on climate change and agricultural-mediated landscapes as documented in various study sites across northern and central Africa. Themes include human-environmental interactions, anthropogenic impacts and new evidence on the spread of early agricultural communities.

In more than twenty years of research activity (1994–2018), archaeobotanists have played a significant role in interdisciplinary cooperation that is needed to understand the detailed and complex history of Africa. This book reflects a portion of these cooperative efforts, and we hope it will encourage further studies of the relationships between plants and people by considering processes from a long-term perspective, and from local to regional scales in Africa.

Acknowledgements. The 8th IWAA was the meeting of about 70 scholars in Modena (Fig. 3—Photo of the participants—group under the big holm oak in Modena). We would like to express our gratitude to the referees whose efforts have contributed to the quality of papers

presented in this volume: Aziz Ballouche, Marion K. Bamford, Ortrud Monika Barth, Koen Bostoen, Terry M. Brncic, Alan J. Clapham, Charles R. Clements, Savino di Lernia, Barbara Eichhorn, Mennat-Allah El Dorry, Rodolfo Fattovich, Assunta Florenzano, Daphne Gallagher, Renate Germer, Lara Carretero Gonzalez, Elisabeth Hildebrand, Christopher Hunt, Sarah Ivorra, Andrea Kay, Christopher A. Kiathipes, Chap Kusimba, Amanda Logan, Marco Madella, Evi Margaritis, Elena Marinova, Naomi Miller, Katharina Neumann, Ruth Pelling, Peter Rowley-Conwy, Rita Scheel-Ybert, Christine Sievers, Chris Stevens, Ursula Thanheiser, Mariano Uccesu, Tania Valamoti, Sarah Walshaw, John-Peter Wild, Martin Williams, Michèle Wollstonecroft, Elsa Yvanez, Andrea Zerboni.

References

- Aiello LC (ed) (2011) Origin of agriculture: New Data, New Ideas. *Curr Anthropol* 52 (S4): S161–S162
- Cappers RTJ (ed) (2005) *Fields of change: progress in African archaeobotany*. Barkhuis & Groningen University Library, Groningen
- Cunningham AB (1997) An Africa-wide overview of medicinal plant harvesting, conservation and health care. In: *Global Initiative for Traditional Systems of Health & FAO (eds) Medicinal plants for forest conservation and health care. Non-Wood Forest Products 11*, FAO, Rome
- D’Andrea AC, Klee M, Casey J (2001) Archaeobotanical evidence for pearl millet (*Pennisetum glaucum*) in sub-Saharan West Africa. *Antiquity* 75(288):341–348
- D’Andrea AC, Logan AL, Watson DJ (2006) Oil palm and prehistoric subsistence in tropical West Africa. *J Afr Archaeol* 4(2):63–71
- Dunne J, Mercuri AM, Evershed RP et al (2016) Earliest direct evidence of plant processing in prehistoric Saharan pottery. *Nat Plants* 3(16194)
- Fahmy AG, Kahlheber S, D’Andrea AC (eds) (2011) *Windows on the African past. Current approaches to African archaeobotany*. Africa Magna Verlag, Frankfurt
- Fuller DQ (2007) Contrasting patterns in crop domestication and domestication rates: recent archaeobotanical insights from the Old World. *Ann Bot* 100(5):903–924
- Fuller DQ (2012) New archaeobotanical information on plant domestication from macroremains: tracking the evolution of domestication syndrome traits. In: *Biodiversity in agriculture: domestication, evolution, and sustainability*. Cambridge University Press, Cambridge, pp 110–135
- Fuller DQ, Colledge S (2008) Recent lessons from Near Eastern archaeobotany: wild cereal use, pre-domestication cultivation and tracing multiple origins and dispersals. *Pragmara* 18:105–134
- Fuller DQ, Hildebrand E (2013) Domesticating Plants in Africa. In: Mitchell P, Lane P (eds) *The Oxford handbook of African archaeology*. Oxford University Press, Oxford, pp 507–525
- Garcea EA (2004) An alternative way towards food production: the perspective from the Libyan Sahara. *J World Prehist* 18(2):107–154
- Harlan JR, Stemler AB (1976) The races of Sorghum in Africa. In: Harlan JR, De Wet MJM, Stemler ABL (eds) *Origins of African plant domestication*. Mouton Press, The Hague, Netherlands, pp 465–478
- Höhn A, Neumann K (2012) Shifting cultivation and the development of a cultural landscape during the Iron Age (0–1500 AD) in the northern Sahel of Burkina Faso, West Africa: insights from archaeological charcoal. *Quatern Int* 249:72–83
- Larson G, Piperno DR, Allaby RG et al (2014) Current perspectives and the future of domestication studies. *P Natl Acad Sci* 111(17):6139–6146

- Marshall F, Hildebrand E (2002) Cattle before crops: the beginnings of food production in Africa. *J World Prehist* 16(2):99–143
- Mercuri AM (2008a) Human influence, plant landscape evolution and climate inferences from the archaeobotanical records of the Wadi Teshuinat area (Libyan Sahara). *J Arid Environ* 72:1950–1967
- Mercuri AM (2008b) Plant exploitation and ethnopalynological evidence from the Wadi Teshuinat area (Tadrart Acacus, Libyan Sahara). *J Archaeol Sci* 35(6):1619–1642
- Mercuri AM (2014) Genesis and evolution of the cultural landscape in central Mediterranean: the ‘where, when and how’ through the palynological approach. *Landsc Ecol* 29(10):1799–1810
- Mercuri AM, Fornaciari R, Gallinaro M et al (2018) Plant behaviour through human imprints and the cultivation of wild cereals in Holocene Sahara. *Nat Plants* 4:71–81
- Morin-Rivat J, Fayolle A, Gillet J et al (2014) New evidence of human activities during the Holocene in the lowland forests of the Northern Congo Basin. *Radiocarbon* 56(1):209–220
- Neumann K, Butler A, Kahlheber S (eds) (2003) Food, fuel and fields: progress in African archaeobotany. Heinrich Barth Institut, Köln
- Oas S, D’Andrea AC, Watson DJ (2015) 10,000 year history of plant use at Bosumpra Cave, Ghana. *Veg Hist Archaeobot* 24(5):635–653
- Pearsall DM, Hastorf CA (2011) Reconstructing past life-ways with plants II: human-environment and human interactions. In: *Ethnobiology*. Wiley-Blackwell, Hoboken, NJ, pp 173–187
- Pelling R (2013) Patterns in the archaeobotany of Africa. In: *Archaeology of African plant use*, vol 61, p 205
- Plotkin MJ (1994) Tales of a Shaman’s apprentice: an ethnobotanist searches for new medicines in the rain forest. Penguin, New York, p 328
- Stevens CJ, Nixon S, Murray MA et al (eds) (2014) *Archaeology of African plant use*, vol 61. Left Coast Press, Walnut Creek
- Stuchlik L, Wasylkova K (eds) (1995) *Acta Palaeobotanica* 35(1)
- Thanheiser U (ed) (2016) *News from the past: progress in African archaeobotany*. Barkhuis, Groningen
- Van der Veen M (ed) (1999) *The exploitation of plant resources in ancient Africa*. Kluwer/Plenum, New York
- van Gernerden BS, Olf H, Parren MPE et al (2003) The pristine rain forest? Remnants of historical human impacts on current tree species composition and diversity. *J Biogeogr* 30:1381–1390
- Wasylkova K, Dahlberg J (1999) Sorghum in the economy of the Early Neolithic nomadic tribes at Nabta Playa, Southern Egypt. The exploitation of plant resources in ancient Africa. Springer, US, pp 11–31
- White F (1983) *The vegetation of Africa, a descriptive memoir to accompany the UNESCO/AETFAT/UNSO vegetation map of Africa (3 Plates, Northwestern Africa, Northeastern Africa, and Southern Africa, 1: 5,000,000)*
- Zohary D, Hopf M (2000) *Domestication of plants in the Old World*, 3rd edn. Oxford University Press, Oxford
- Zohary D, Hopf M, Weiss E (2012) *Domestication of plants in the Old World: The origin and spread of domesticated plants in Southwest Asia, Europe, and the Mediterranean Basin*. Oxford University Press on Demand, Oxford