

LTERR



Structure and Function of a Chihuahuan Desert Ecosystem

The Jornada Basin Long-Term
Ecological Research Site

EDITED BY

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middle sections, were tips were embedded in the text. I found the glossary so general and short that it was almost superfluous. Addition of statistical and modeling terms to the glossary would have aided the student reader, especially when reading the case studies and the statistical analysis and modeling chapters.

I really liked this book because it goes beyond the classic vegetation sampling texts and presents the current state of plant diversity sampling design and vegetation science. I believe it should be required reading for students studying vegetation science because it provides a solid foundation on which future advances in field will be based.

Reference cited:

Peet, R. K., T. R. Wentworth, and P. S. White. 1998. A flexible, multipurpose method for recording vegetation composition and structure. *Castanea* **63**:262-274.

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Structure and Function of a Chihuahuan Desert Ecosystem: The Jornada Basin Long-Term Ecological Research Site edited by Kris M. Havstad, Laura F. Huenneke, and William H. Schlesinger (2007) Oxford University Press in conjunction with the LTER Network. xv + 465 pp.

This edited volume of 18 chapters provides a wealth of information about the Jornada LTER and Experimental Range, located in south-central New Mexico, in the northern Chihuahuan Desert. Jornada is the short form of the place name Jornada del Muerto, which translates into "journey of the dead," a name reflecting that this desolate region, part of the famed Camino Real, was an extraordinarily difficult place for 16th and 17th century Spanish colonizers to traverse – due to lack of water – on their way from current-day Chihuahua, Mexico to northern New Mexico.

Virtually all chapters are superb. Many of them are encyclopaedic, sometimes with mind-numbing detail, such as precise map locations of data collection sites within the Jornada. There are also a few broad review chapters, such as on desert NPP (net primary productivity) by Huenneke and Schlesinger and temporal transitions between ecological communities by Peters and Gibbens, both of which are extraordinarily eloquent. With its richness of detail, interleaved with broad overviews, this volume would be perfect for any new researcher at the Jornada, including incoming graduate students. It would also be great, albeit possibly too detailed, for congressional staffers who need to

understand the importance of this long-term research.

My two primary criticisms of this volume are political. First, the preference for grasslands over shrublands seems driven by cattle grazing, and not ecology. Second, the favouring of abiotic (vice biotic) factors in ecology seems driven by a single influential researcher.

The notion of the Jornada only being useful as rangeland for cattle is pervasive throughout this volume. Historically this view was sensible insofar as the original purpose of this land was to study beef production and was why this study area was first set aside for rigorous scientific study in 1912. Several contributors to this volume discuss restoration and remediation of creosote-mesquite shrublands to black grama grasslands and discuss that shrublands are one step beyond degraded grasslands, implying that something is wrong with shrublands. This makes sense to a rancher, but should sound peculiar to a contemporary ecologist, especially since shrublands are repeatedly referred to in this volume as being more spatially heterogeneous than grasslands. The desire for spatially homogenous grasslands, with much finer-scale patchiness, is a normative goal, one that is here undoubtedly driven by politics. In a similar vein, two of the editors, who also happen to be former Jornada LTER PIs, repeatedly in one chapter talk about "desertification as degradation." My naïve impression is that deserts have greater biodiversity than any other ecosystem type in North America, including grasslands, an impression that is somewhat supported by Whitford and Bestelmeyer's chapter on animals of the Jornada ecosystem. In fact, the chapter by Bestelmeyer, Brown, Havstad and Fredrickson acknowledges that, on average, during the transition from grasslands to shrublands in the Jornada Basin, alpha-diversity remains unchanged, while beta-diversity seems to increase. This refreshing chapter also acknowledges the political bias that the Jornada's mission is largely to support ranchers, primarily of beef cattle. Desertification is a problem if you graze cattle, but should not necessarily be viewed negatively for maximizing biodiversity.

This volume contains a huge amount of geology, geography, and geochemistry. The preface states, "Much of that research effort, evident in the chapters of this book, has been creating an abiotic-based understanding of this ecosystem given the overwhelming importance of these bottom-up processes in the Jornada Basin." I appreciate the editors' candour insofar as the abiotic, bottom-up approach truly comprises most of this volume. However, it is debatable whether an abiotic view is somehow more important in the Chihuahuan Desert

than in other ecosystems or whether an abiotic view should dominate the study of structure and function of any ecosystem. Although justification for such an abiotic bias may exist, none is presented. The abiotic perspective seems striking given that many of the contributors acknowledge that humans and their cattle are of overwhelming importance in shaping the modern Jornada Basin. An abiotic view may not appeal to most botanists, who usually take a more organismal view of ecosystems. In fact, this volume contains surprisingly little about plants. My guess is that this volume's abiotic emphasis reflects that a biogeochemist, Bill Schlesinger, was PI of the Jornada LTER for most of its history and that he co-authored over one-quarter of the chapters. Tellingly, the one organismal botany chapter in this volume was co-authored by the current and relatively new PI of the Jornada LTER, Debra Peters.

Despite the detailed nature of most chapters, not quite enough attention was paid to details. Several of the chapters contain figures that are unreadable or barely readable. This was probably due to lifting figures that were originally in colour and printing them here in black-and-white. Several equations are gibberish for lack of a decent equation editor. Automatic spelling correction was relied on to its detriment, e.g. creosote being labelled *Larrea tridentate*. The abbreviation ANPP is used in two different ways, aboveground versus annual NPP. None of the chapters contain abstracts. The chapters are seemingly not arranged by themes. These are minor issues, but distracting nonetheless.

This volume not only introduces lots of interesting data and ideas, but also broaches many interesting questions for future research. For example, several authors in this volume state that plant growth is limited by availability of water and nitrogen. We also learn that heavy rains wash away available nitrogen. Hence, it seems to be impossible to simultaneously increase availability of these two limiting factors. I anxiously await someone figuring out the elaborate dynamics between water and nitrogen. As another example, is the Jornada really a unique ecosystem in terms of its creosote-mesquite islands of fertility and idiosyncratic nitrogen cycling? Do similar phenomena occur in other semi-arid regions, such as Argentina? How do we estimate NPP in shrublands dominated by mesquite (*Prosopis* spp.), when most of this nitrogen-fixing plant's biomass is below-ground, but traditionally all of our sampling is above-ground? I anxiously await more papers from this great and interdisciplinary assemblage of researchers who call the Jornada home. Despite some foibles, this is a valuable collection of chapters.

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Edible Medicines: An Ethnopharmacology of Food.

Etkin, Nina L. 2006. ISBN 0-8165-2093-3 (hardcover: alk. paper, US\$50.00). 304pp. University of Arizona Press. Tucson, Arizona, USA.

In her book *Edible Medicines: An Ethnopharmacology of Food*, Nina Etkin provides us with a rich resource for addressing "non-nutritive" qualities of food, specifically, the medicinal qualities. She states that we use about 3% of the world's plants (~7000 species) as food plants, but half of those food plants derive from only three genera. Many of the other species have limited nutritive roles, but may have pharmacological uses. In her own research with the Hausa of Nigeria, of the 264 local plants that are used medicinally, only 11% are cultivated.

Etkin starts out with an excellent primer of phytochemistry and a brief history of the "food-getting systems" used throughout history. She reminds us that food plants serve many roles besides cuisine components – they may have ritual uses, medicinal value, power as metaphors – and these roles sum to our "sense" of foods.

The author presents a well-written history of the attitudes and philosophies toward food-medicines and their roles in health and healing. Prior to the nineteenth century, healing was a holistic, systemic process that involved generalist approaches to therapy related to balancing our "bodily humors". Most of the burden of health and healing rested on the shoulders of women and the food-medicines they prepared for the family. The advent of the germ theory and advances in technology resulted in a realignment of the responsibility for family health to "professionals", physicians that had a more in-depth knowledge of human anatomy and physiology. By the mid-to-late 1800s, attitudes had shifted from a generalist philosophy to "an articulated doctrine of specific etiology and its corollary, specific therapy" and medicinal foods did not fit well into this new framework.

In subsequent chapters, Etkin discusses specific food groups: spices, fermented foods and beverages, "social plants", and zoologically derived medicines. Spices, with volatile essential oils, are used for flavoring, coloring, and preserving food. Etkin provides a case study of the use of chile pepper (*Capsicum* spp.). Though a New World plant, chile has been incorporated as a signature flavor in the national cuisines of India, China, and Pakistan. Its arrival is more recent in West Africa, but the Hausa people also favor it in their cooking and use it as medicine for treating intestinal parasites, fevers, wounds and other ailments. Modern studies into its pharmacology and phytochemistry have supported its antimicrobial properties.