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AUNG SI. *The Traditional Ecological Knowledge of the Solega: A Linguistic Perspective*. Springer. xii + 252 pp. ISBN 987-3-319-24679-6. \$180 cloth, \$139 eBook.

Reviewed by ANDREA L. BEREZ-KROEKER, *University of Hawai'i at Mānoa*  
& LUCIA MILLER, *University of Hawai'i at Mānoa*

The documentation of traditional ecological knowledge (TEK) has only been a consideration in modern academic fieldwork-based disciplines for the last few decades, mostly through research concerned with developing sustainable agricultural practices and combatting worsening environmental concerns. Linguistically well-informed documentation of TEK is an especially recent development, as linguists and (ethno)biologists are becoming more frequent partners on language documentation project teams. Aung Si (henceforth AS), author of *The Traditional Ecological Knowledge of the Solega: A Linguistic Perspective*, is, in a sense, a one-person TEK documentation team. Drawing on his dual doctoral degrees in linguistics and neuroscience (for the latter he researched learning and memory of honeybees, a creature that figures prominently in Solega TEK), AS has produced a volume that is well-timed for our field.

Language-based research into TEK has played a key role in the work of conservation biologists, e.g., the Maori-based tuatara conservation project described by Ramstad and colleagues (2007). However, as AS discusses at length, there has been a “classification bias” among ethnobiologists, probably brought about by Berlin’s (1992) exceedingly popular monograph *Ethnobiological Classification*, such that inquiries into how languages name and taxonomize entities in the natural world have come to dominate ethnobiological research. The problem with this development is that not only do many of Berlin’s universals not hold up to careful scrutiny, linguistically-untrained ethnobiologists are poorly equipped to understand the linguistic implications of certain elicitation situations, or to make use of naturally-occurring discourse data in their studies. Similarly, biologically-untrained linguists are unlikely to understand the origins and limitations of the western scientific classification systems, which are often seen as etic “truths” about the natural world and are used as a basis for comparison to the traditional system. Thus increased knowledge exchange between linguistics and ethnobiology is welcome, since bringing expertise in both fields together enriches the quality of documentation on all fronts.

In this volume, AS describes various aspects of TEK of the Solega people who live in the Biligiri Rangaswamy (BR) Hills between Mysore and Bangalore in Karnataka state, India. Solega (ISO 639-3: sle; Glottocode: shol1230) is a Dravidian language that is spoken in numerous settlements that span the BR Hills and surrounding countryside. It is closely related to the dominant language of the state, Kannada. Previous studies on the Solega or their language are scarce, despite growing awareness

of the group's advocacy work in conservation debates. These include a brief 1970s-era ethnography by the Archaeological Society of India (Morab 1997), and a sketch grammar (Zvelebil 1990) collected from a single speaker that arguably contains more Kannada and Tamil than Solega (p. 22).

Below we describe the contents of the present volume by chapters, followed by a review. The publication represents a synthesis of AS's fieldwork, totaling a full annual cycle over multiple years, with the Solega people. The book is engaging for academic purposes, but also provides an accessible introduction to ethnobiology for the interested nonspecialist. Starting with an overview and critique of the notable literature in ethnotaxonomy, AS then examines several areas of Solega ethnobiological knowledge through a linguistic lens: plants and trees of the forest; birds; landscape; semiotics; and, drawing on his neuroscience background in apian behavior, honeybees.

Chapter 1 opens by introducing the Solega people and the main research questions this publication aims to answer. AS elegantly describes this project as a record that conceptualizes the Solega's environment and documents the taxonomic treasures encoded in the language. A significant part of this chapter is devoted to defining ethnobiology and exploring how this expanding field interacts with TEK and linguistic research. AS references researchers from various fields that have contributed to the movement to make linguistic investigation a fundamental part of any anthropological or ethnobiological study. Citing Bulmer's (1967) *Why is the cassowary not a bird?*, AS explains that language gives insight into culture that can carry just as much weight in classification decisions as western taxonomy methods (p. 3). Once this is recognized, TEK becomes the bridge between language and biology that unites diachronic and synchronic knowledge. AS compares engaging in TEK research without considering the natural contexts in which biological items are referenced to "a biological species that is perceived exclusively through the four-letter alphabet of its genome" (p. 18).

Chapter 1 continues by unpacking some of the bigger questions that challenge linguistic and ethnobiological research. Some notable ones are (i) *what is named?* and *how can categorization differ from person to person?* (p. 10), (ii) *how do Solega speakers' mental maps interact with their encyclopedic knowledge?*, and (iii) "[h]ow does one account for variation among speech communities?" (p. 14). Of particular interest is AS's reference to studies by Ross & Murphy (1999) that reveal the multiple ways a person may categorize a group of items, and how this should be considered by researchers as they try to determine categories in folk classification (p. 10). A consequence of this is to include studies on a speech community's context that reveal unconscious connections, for example, between plants and animals and topography in Solega. That is, AS makes an effort to present his findings as a body of knowledge and not as "taxonomy-centric paradigm[s] of linguistic ethnobiology" (p. 12). AS also indicates that a large motivation behind his work with the Solega is to demonstrate how a speech community can have intricate knowledge of their surrounding biological phenomena even if their folk classifications appear "simplistic" to outsiders (p. 15). The chapter closes with an insightful section on the Solega's relationship with the forest they call home. While recent issues arising from the presence of an invasive

plant species (*Lantana camara*) threaten Solega traditions, “*the forest is our home*” (p. 28, emphasis original) remains a core Solega value.

Chapter 2 is an overview of the state of scholarship in the field of ethnotaxonomy. As the chapter title suggests, AS here reviews the key assumptions found in the literature, primarily those found in and arising from Berlin 1992. This chapter describes the key features of Berlin’s model for how people categorize living organisms, and how those categories are named in the world’s languages. Briefly, Berlin’s model argues for six universal features of ethnoclassification: (i) organisms are categorized based on their appearance and behavior; (ii) these categories, or taxa, are arranged into a hierarchical structure; (iii) folk taxa are generally organized into six levels roughly corresponding to western biological classification (kingdom, life form, intermediate, generic, specific, and varietal); (iv) taxa at each level will be similar across languages in terms of numbers and content; (v) generic and subgeneric folk taxa will contain some members that are considered by speakers to be “prototypical”; and (vi) folk taxa overwhelmingly correspond to western scientific taxa, especially at the generic level.

With regard to naming, Berlin’s model claims that (i) intermediate, life-form, and kingdom-level taxa might not be named; (ii) *primary names* can be simple or complex (e.g., *dog* vs. *forget-me-not*), while *secondary names* can only be complex and always contain the name of the superordinate taxon (e.g. *blue gum*); (iii) generic, life form and intermediate level taxa are always labelled with primary names, and subgeneric levels are always labelled with secondary names; (iv) a subgeneric taxon may be given a primary name if it is prototypical or of cultural importance; and (v) names usually refer to traits of their referents (p. 33–34).

In this chapter, AS also takes up a position on positing and defending ‘universals’ such as Berlin’s.<sup>1</sup> Among the challenges in dealing in ‘universals’ is the mere paucity of documentation of the world’s languages, especially in the realm of ethnobiology. In addition, questioning a ‘universal’ is not a complicated matter, since one counterexample can be enough to discredit such a claim. On the other hand, defending a ‘universal’ is exceedingly difficult, since the defender is required to either explain why the counterexample is not valid, or revise the ‘universal.’ In terms of Berlin’s principles, AS is able to provide counterexamples – or at least refute his argumentation – for the main points of the model presented above.

Berlin’s model is based on a couple of faulty assumptions, which AS illustrates via Berlin’s own classroom experiment. In the experiment, Berlin asks an untrained student to categorize a prepared set of bird specimens “in whatever way he deems appropriate” (p. 36). The student’s categories invariably mirror those of western scientific taxonomy, which Berlin cites as proof of his classification universals at work. AS points out that the faulty assumptions here are first that “[...] there is a single ‘natural order’ of plants and animals that is possible to discover through objective, scientific means. The second is that the work of (mainly European) taxonomists over the last two centuries has indeed been objective, and has resulted in truly natural groupings [...]” (p. 36). Modern taxonomies of flowering plants, for example, are still

<sup>1</sup>Scare quotes are AS’s.

plagued by being based on plants that were common in Europe in the 18th century (p. 39), and early “scientific” taxonomists borrowed heavily from folk taxonomies in Europe and North America (p. 41). This alone may be a revelation to the linguist reader, who may not have previously examined the assumptions inherent in scientific taxonomies.

Chapter 2 concludes with a discussion of how Berlin 1992 bears on Solega, and vice versa. First, Solega provides evidence that cultural importance and especially utility determine which organisms in the human environment will be named: nearly all plants, mushrooms, and bees with Solega names either have obvious utility to humans or are found in Solega folklore. Conversely, organisms with little utility tend to not have Solega names. For example, orchid species, which are among the most visually stunning organisms in the forest but have no utility to Solega people, are grouped together under one label; similarly, Solega speakers, when asked to name inedible mushrooms, often just say “we don’t eat those” (p. 49). Color photographs of visually diverse orchids, mushrooms, ferns, and butterflies, each of which are grouped under single Solega names, illustrate this point. AS points out that Solega speakers will often mention whether a plant has human utility or not. Second, with regard to nomenclature, while secondary names are indeed common to Solega plant names, including the presence of the label of the superordinate taxon in the name, contrary to Berlin’s predictions there are fewer secondary names found for birds, and none whatsoever attested among mammals. Tabular data in this chapter includes Solega nomenclature patterns for various organism types.

Chapter 3 considers plants, especially trees, in Solega language and culture. The Solega consider the forest to be their natural home, full of remedies and food, and AS describes Solega attitudes toward the forest that include, among other things, admiration for trees in bloom and disgust with the invasive species *Lantana camara*. The Solega also have relationships with individual trees: especially large trees, or those that are home to a considerable number of honeybees may receive proper names and be well-known to Solega people living in different settlements. As for naming conventions, AS is able to identify only a few. A prefix *he-* individuates organisms from a group (e.g., *hebbidiru* ‘thorny bamboo’ vs. *bidiru* ‘bamboo’, p. 60). An epithet *uccu* ‘crazy’ can denote plants of no utility (e.g., *uccaabe* for inedible mushrooms). Furthermore, plant names tend to be two- or three-part secondary lexemes. In two-part names, the first element is usually unanalyzable, and the second element is usually an obligatory superordinate category label for *tree*, *vine*, *herb* or *grass*. In three-part names the first element is usually a descriptive modifier, like *small*.

In Chapter 3, AS also compares Solega plant ethnosespecies and ethnogenera to scientific classification. At the species level, there is a strong correspondence between the two systems, although there are cases where one ethnosespecies corresponds to multiple scientific species – for example, with groups of plants that are of no utility like orchids, ferns, and some succulents. At the generic level, Solega does not behave according to the expectations of Berlin, who posits primary lexemes at this level. Solega ethnogenera require secondary lexemes.

Chapter 3 additionally touches on other aspects of plants in Solega language and culture, and AS advocates that analyses of ethnobotany need to include information about how terms are used in ordinary communication. For example, certain narrative structures allow plant names to be shortened to indicate a change of topic, and when speaking about large culturally important trees, the ‘tree’ label is not always required.

Chapter 3 contains considerable tabular data and images. Tables include Solega plant names and their corresponding scientific names; Solega toponyms that refer to plants; proper names of individual trees; and an extensive list of plant uses by Solega people. Interesting examples from this last table include *uise mara* (*Tamarindus indica*) that is used to give food a sour flavor (p. 84), *arau mara* (*Ricinus communis*) that is used as a hair-oil and to soothe arthritis, and *arai mara* (*Ficus religiosa*) which is used to cook bread to feed to “children who can’t speak properly” (p. 86). Color photographs include trees illustrating aspects of nomenclature.

In Chapter 4, AS tackles Solega ethno-ornithology; the BR Hills are home to over 250 species of birds, most of which have Solega names. The research presented in this chapter was conducted in a two-stage process. First, bird names were collected from Solega speakers at a nearby biology field station. During this study the focus was on whether bird names were *obligate binomials* (i.e., those with *-hakki* ‘bird’ as the second element), *optional binomials* (i.e., those in which the *-hakki* may be omitted), or *obligate monomials* (i.e., those to which *-hakki* cannot be appended). The second study was conducted in five villages throughout the Solega-speaking region, in which digital slide presentations containing images of birds and recordings of their calls were used to elicit names from groups of speakers. In this study, names were then analyzed for *reliability* – that is, a name that either matched a name from the earlier field station study or was novel but accompanied an accurate description of the bird’s behavior or appearance – and *consistency* – that is, speakers from three or more villages provided the same name.

One of the findings in Chapter 4 concerns the role of perceptual salience versus cultural salience in determining which birds receive Solega names. AS notes that many large, colorful birds do indeed have Solega names, but that visual salience alone does not fully account for which birds receive names. For example, three (scientific) species of drongo share a single Solega name despite their obvious differences in appearance, while a fourth species with more significant cultural value warrants its own name. Thus, as was the case for plant naming in Chapter 2, Solega culture plays an important role in the naming of birds – those birds that are featured in Solega folklore are far more consistently named than those that do not.

Birds hold two important positions in Solega folklore. First, they are “sources of information” (p. 123): bird calls can inform people about deaths, danger, time of day or approaching rain. Second, birds are “moral arbiters” (p. 127). Stories about birds can be used to instruct humans how to behave properly – AS provides an example in which a human mother, whose selfishness caused the death of her own baby, was turned into a bird. Tabular data in this chapter includes Solega bird names with English and scientific equivalents; data collected in the naming tasks; visually salient

birds in the BR Hills that do not have Solega names; lexicalized bird calls in Solega; and the occurrence of birds in Solega folklore.

Chapter 5 is dedicated to landscape terms. AS begins this chapter with a brief discussion of ethnophysiography, the study of a people's knowledge of the landscape including terminology, TEK, beliefs, and usage (e.g., Burenhult & Levinson 2008). AS also discusses some of the literature on cognitive maps (e.g., Kitchin 1994), and corpus-based studies of discourse about mapping (e.g., Linde & Labov 1975). The bulk of this chapter is a presentation of AS's discourse-based investigation of terminology for various types of landscape habitats in Solega. According to AS, "the forest that the Solega live in is a highly dynamic spatial network. Ecosystems are constantly changing entities, and the drivers of this change include the life cycles of plants and animals (i.e. the phenology of these species), the migration of animals, the swelling and subsiding of water bodies, and the cycling of seasons" (p. 137).<sup>2</sup> Importantly, Solega speakers are keenly aware of how the seasonality of weather, plants, and animals affects the landscape around them.

The 27 interview excerpts in Chapter 5 demonstrate how Solega speakers identify and distinguish between some fourteen named habitats, most of which contain the highly polysemous morpheme *ka:du*, roughly glossed as 'forest.' These habitats are distinguished on the basis of plant and animal life found there, geological and topographic features, and human use cycles. For example, *guddega:du* is a habitat found on elevated slopes that is home to potentially-dangerous mammals like elephants and buffalo during the wet season, but when these animals leave with the rain, *guddega:du* becomes as an excellent place for harvesting yams (p. 163). Tabular data in this chapter includes Solega landscape and hydrological terms and a list of terms containing the morpheme *ka:du*. Landscape types are illustrated with color photographs and schematic drawings.

In Chapter 6, AS moves away from the physical world and discusses semiotics, the "meaningful signs and relationships which enable Solega people to navigate a world that is at once familiar, complex, and sometimes dangerous" (p. 173). These signs and relationships include, for example, knowledge of plant phenology, knowledge of feeding and interactional habits of animals, and knowledge of weather patterns, as well as the significance of all of these to Solega people.

As for signs, AS discusses long-term cycles, including the annual rain cycle and the relationship of each rain stage to flowers, food, weather, agriculture, and festivals. The Solega rain cycle is compared with the Kannada rain calendar, the latter being derived from the Sanskrit-based Hindu astrological sequence *nakṣatra*. AS also presents short-term cycles like bird calls and honeybee activity, both of which can indicate the time of day. Other signs include spatial collocations; for example, only particular pairings of mushrooms and rotting tree substrates are taken as indicators that the mushroom is appropriate to eat, even though that mushroom may also grow well on other substrates (p. 185). Also discussed are the many signs that indicate the

<sup>2</sup>AS defines *phenology* as "the study of recurring plant and animal life cycle stages, or phenophases, such as leafing and flowering of plants, maturation of agricultural crops, emergence of insects, and migration of birds" (p. 137, fn. 2).

behavior and proximity of elephants in the forest, which Solega people need to recognize lest they be surprised by a potentially dangerous encounter. As for relationships between entities in the Solega ecological world, AS discusses relationships between plants and animals including observations of elephant self-medication; relationships between plants, like the crowding-out effect of invasive *Lantana* on local species; and animal-to-animal relationships, mostly including local predators like tigers and leopards. Tabular data in this chapter includes Kannada and Solega rain cycles, and animals and their plant food sources.

Chapter 7 is concerned with Solega honeybee lore, and again AS takes the opportunity to challenge Berlin's universals. Here he challenges the idea that societies develop or evolve in some kind of "natural" order with regard to the manipulation of resources – that is, that societies "progress" from hunter-gatherer to agrarian, and that concomitant with that evolution, taxonomies progress from simpler to more complex. Berlin implies that people develop more complex taxonomies for domesticated plants in particular because of a cognitive difference between observing plants as hunter-gatherers on the one hand, versus observing them as agrarians for the purposes of domestication on the other. AS claims that Berlin implies that subtle distinctions in the natural world go unnoticed by hunter-gatherers. The Solega have both agrarian practices with regards to some foods, and hunter-gatherer practices with regards to others, including honey. Solega are not beekeepers, rather they gather honey from unmanaged hives. In this chapter AS shows that despite not managing bee colonies, Solega have a deep understanding of bee species and behaviors, including details about bee reproduction, that closely mirrors that of western science. In order to avoid the pitfall of measuring the Solega against the yardstick of modern western scientific knowledge about bee behavior, AS also includes observations about bees from the writings of Aristotle as a point of comparison, on the grounds that Aristotle, like the Solega, also did not use tools of modern science to observe bee behavior.

AS describes Solega procedures for harvesting wild honey, songs and stories about bees, and Solega bee knowledge in three areas. These are (i) honeybee species (the most significant of which is *hejje:nu*, the giant honeybee or *Apis dorsata*), (ii) phases of the honeybee lifecycle including gender and reproduction, and (iii) swarming behavior. This chapter contains considerable excerpts from narrative and conversations taken from interviews.

Chapter 8 contains concluding discussion on the nature of TEK research. Readers are cautioned against overgeneralizing from a published "ethn classification of taxon X in language L" (p. 227) to a mental representation that is shared to some extent by all members of the speech community. AS also discusses the diachronic and evolving nature of TEK, noting that TEK is not homogenous from person to person or from generation to generation. In this chapter he also discusses TEK from the position of the analyst, noting that documenters must take care in many aspects of their research to ensure that results are as naturalistic and reliable as possible. The book ends with an exhortation that "language-oriented, context-sensitive approach[es]" (p. 237) be incorporated into the study of TEK.

Overall, we have a very favorable opinion of the volume. The writing style is accessible to a broad audience, and it fills a gap in the linguistics literature on Solega language. More importantly, the book contains significant considerations for documentary linguistics as our field increasingly embraces the documentation of TEK as part of our regular practice. AS carefully discusses a few key concepts in the biology and ethnobiology literature that could be misunderstood or misinterpreted by outsiders to the biological sciences, since it would be easy for linguists to have a somewhat distorted view of the assumptions of those fields.

The first of these is the considerable caution with which we should approach scientific taxonomy, the *kingdom-phylum-class-order-family-genus-species* schema that is commonly memorized by secondary school students. While popular understanding casts this schema as a system that is able to capture relational truths about organisms in the natural world, in reality the system is fraught. We are reminded of similar misconceptions in popular understanding about the “truths” captured in language family classifications presented in venues like *The Ethnologue*:<sup>3</sup> they are historically biased toward the familiar, limited by available documentation, and can potentially overstate the discreteness of taxa. How biologists define the boundaries of a species can be as tenuous and fuzzy as how linguists define the boundaries of a language.

The second important discussion is the critical stance AS takes toward Berlin’s claims about the ‘universals’ of ethnoclassification. Among the strongest of Berlin’s claims is that ethnoclassifications often share properties with scientific classifications, which “cannot be coincidental, and must therefore be the result of shared, *innate properties of human cognition*” (p. 36, emphasis ours). Yet in every chapter of this volume, AS presents counterexamples from a single language that refute most of Berlin’s model. Linguistics also has a long history of positing universals about human cognition that are subsequently refuted through field research. AS explicitly mentions Evans & Levinson’s (2009) review of counterexamples to Chomsky’s Universal Grammar, as well as “[u]niversal patterns [that] have [...] been proposed for the semantic domains of colour, landscape and body-part terminology, but only a few have escaped careful scrutiny in any way” (p. 32).

Finally, this book will serve as a model for other similar projects to undertake TEK documentation. AS is transparent about his research methods, and reflective about which aspects of his methods could be improved. He is keenly aware of the need to use naturally-occurring language as a primary source and discusses at length the kinds of metalinguistic interference that can arise in elicitation, especially between consultants and outside researchers, who do not necessarily share a background or insider knowledge.

AS is also careful to foreground the Solega people’s extensive knowledge of the natural world in this book. Quotes and excerpts directly from Solega speakers are given prominence as data sources, and he is careful about not using western taxonomy as the basis against which Solega TEK is presented. As he writes in Chapter 1, “[a] key reason for undertaking this study was to demonstrate that a speech community can indeed possess highly detailed and sophisticated knowledge of biological


<sup>3</sup><https://www.ethnologue.com/>.




entities and processes, even if their folk classification might seem simple or shallow in comparison to those of others” (p. 15). As a linguist who is also an expert in biology, AS understands that TEK is a “highly integrated knowledge system” (p. 237), and that any documentation can only capture a small corner of the sum total TEK of a community. Nonetheless, this volume, one of the first book-length documentations of language-based TEK written for a linguistically savvy audience, is an excellent example of what we hope will be a growing trend to record, preserve, and share TEK in languages worldwide.

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Andrea L. Berez-Kroeker  
andrea.berez@hawaii.edu

 [orcid.org/0000-0001-8782-515X](https://orcid.org/0000-0001-8782-515X)

Lucia Miller  
luciakm@hawaii.edu

 [orcid.org/0000-0003-0741-6116](https://orcid.org/0000-0003-0741-6116)