Reports

Honduran Folk Entomology[1]

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Do people discover their world or create it? If people discover the categories of nature, then folk taxonomy of living things should have formal similarities cross-culturally because of the biological integrity of our planet. If people create the categories of nature, each culture should order living things uniquely (see Berlin 1992, Brown 1984, Hunn 1990, Ellen 1993). The universalist or intellectualist school claims that some living things are so perceptually salient, so biologically real, that they are "crying out to be named" (Berlin 1992:53). American college students faced with a pile of bird skins from the Peruvian Amazon classify them the same way as Jivaro and ornithologists on the basis of the birds' morphology (Boster 1987, Boster, Berlin, and O'Neill 1986). The cultural relativist or utilitarian school observes that plants and animals are named because people use them; "survival placed a premium on knowledge of utilitarian value" (Hunn 1990:117; see also Conklin 1962:129). The Sahaptin of the Columbia River have an extensive folk taxonomy of edible plants, while hundreds of species of culturally insignificant flowering plants are peremptorily dismissed as "just a flower" (Hunn 1990:198–99). We try to reconcile the utilitarian and universalist perspectives by showing how cultural importance and the ease of observation of animal morphology interact in influencing which species are named, which are lumped into residual categories (Hays 1983), which are confused, and which are ignored in ethnobiological systems. Many researchers have noticed that cultural importance and morphological attributes are key to folk classifications (Hays 1982; Brown 1984; Posey 1984; Arioti 1985; Atran 1985; Ellen 1986, 1993; Berlin 1992) without distinguishing their roles.

Paul Sillitoe's (1996) ethnography of the folk ecology of the Wola people of Highland New Guinea is scientifically sophisticated and reveals a comprehensive, sympathetic knowledge of the Wola's view of their land. Both universalist and utilitarian explanations apply here. Wola knowledge of some topics is highly detailed; for example, there are 64 named varieties of sweet potato. At the same time, Wola are completely unaware of, for example, microorganisms, including the ones that cause disease, and have only a "hazy" idea of the relationship of some grubs to their adult forms and only partial knowledge of insect metamorphosis. They label butterflies, spiders, and some other major morphotypes of arthropods but do not name various beetles and larvae at all. They do not give separate names to the many kinds of grubs, even the ones that they realize are different species, because these grubs are not important to them. Yet for topics that are important to them, such as rat damage to their gardens, local knowledge is not so much incomplete as highly contradictory to modern science. For example, Wola believe that if someone who has recently eaten meat sees a garden, that crop may be devastated by a rat attack. Farmers build screens of cane grass to shield their sweet potato plants from the sight of possible meat eaters who may be passing by.

In the modest hypothetical scheme we propose in this paper, folk knowledge has an uneven texture which can be explained by comparing the cultural importance (utility) of the domain with its ease of observation (conspicuousness, perceptual salience). We say that a species is easy to observe if it is large, social, colorful, abundant, noisy, and diurnal (Berlin 1990:23–24; 1992:81; Atran 1987:150; Bentley 1992*a*, *b*, 1993, 1994). Many species go unobserved because they are very small, solitary, cryptic, rare, silent, or nocturnal. Hunn (1977) emphasizes perceptual salience: the more distinctive a species is, the more likely it is to be named. The boundaries of biological categories are formed along the lines of discontinuities in nature. While this notion is thoughtful and logical, we propose that perceptual salience is less relevant than ease of observation; species that look very much alike are commonly named if there is a cultural reason to do so. Of the common grain crops, maize is by far the most salient, followed by rice, while rye, oats, barley, and wheat are nearly identical to a city person, but farmers who grow these crops distinguish them all. Their ease of observation and the motivation of cultural importance allow farmers to name them in spite of their lack of perceptual salience.

By "cultural importance" we mean perceived importance within a specific culture, whether useful or harmful. The utilitarian school has emphasized economic use.

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The universalist school has countered that many animals are named that are not strictly useful (Hays 1982: 93; Berlin 1992:89; see also Brown 1992). Defining "culturally important" to include harmful species and not just useful ones gives the utilitarian argument wider range.

Cultural importance and ease of observation influence each other. People take the time to observe useful insects such as bees and harmful ones such as crop pests. Honduran peasants ignore harmless and useless species such as mud dauber wasps (Hymenoptera: Sphecidae), which do not sting and make nothing people use, despite the fact that some of these wasps make mud nests shaped like pan pipes and others nests shaped like footballs, all common along with nests of other shapes around farmhouses.

Arguing against the role of cultural relativism in folk classification, Berlin (1992:80) writes, "To the extent that one is able to predict which plants and animals in some society will be named without prior knowledge of the cultural significance of those organisms, the Utilitarian argument loses much of its force." Several cross-cultural domains of plants and animals are, however, important enough to be classified in detail in most languages. These include domesticated and game animals; edible plants, seasonings, and medicines; firewood; cordage and textiles; weeds and other crop pests; pests of the human body and of our animal intimates; dangerous or painful organisms; and anything used for games, toys, ornament, ritual, or art.

Many large animals and vascular plants are either useful, harmful, or impossible to ignore and therefore named. However, folk classification of entomofauna often lumps thousands of species into a single category because the creatures are small and hard to see (Atran 1987; see also Berlin 1992:81). Insects are a challenge to classify, even for entomological taxonomists, because of their sheer number—30 to 50 million species (Erwin 1988; Wilson 1988; 1992:143). Because insects evolved before Pangea assembled and broke up again, individual insect families tend to range farther than vertebrate families (DiMichele et al. 1992). Insects persist in interacting with people, and therefore ethnoentomology can be used to test cross-cultural hypotheses with any human group. A traditional community is able to name most of the birds, mammals, and trees in the local environment but must cram several million insect species into (at most) a few hundred categories. Insects are perfect for illustrating the biological and cultural criteria a community uses to name, lump, confuse, or ignore living things. We present a case study of Honduran ethnoentomology.

To reject the universalist hypothesis, we would need to find folk taxonomies ordered along the lines of the utility of the organisms; folk names for taxa would be based on cultural criteria (e.g., use, harm), and folk knowledge would be deeper for the culturally important creatures than for the perceptually salient ones. To reject the utilitarian hypothesis, we would need to find folk taxonomies ordered along the lines of the creatures' morphology; plants and animals would be named for their physical characteristics, and folk knowledge would be deeper for the easy-to-observe than for the culturally important. According to the utilitarian school, folk taxonomies should be based on taxa that the people in a specific culture use (e.g., Hunn 1982, 1990). Supporters of the universalist hypothesis argue that all languages have words for the major morphotypes of insects and have other similarities (Berlin 1992). We show that these two perspectives are complementary, since (1) folk taxonomies show both tendencies, (2) some folk categories are named for their roles in local culture and others for their biological properties, and (3) folk knowledge is deepest for creatures that are both culturally important and easily observed.

TABLE 1
Categories of Honduran Folk Entomology and Examples

	Culturally Unimportant	Culturally Important
Easy to observe	Mud dauber wasps Earwigs Spiders	Social bees Social wasps
Difficult to observe	Parasitic wasps Nematodes	Pest caterpillars (especially early instars and Lepidoptera reproduction)

We divide rural Honduran folk entomology into four categories according to cultural importance and ease of observation: (1) the culturally important and easily observed (e.g., bees, social wasps), (2) the easily observed but culturally unimportant (e.g., mud dauber wasps, earwigs, spiders), (3) the culturally important but difficult to observe (e.g., pest caterpillars), and (4) the culturally unimportant and difficult to observe (e.g., parasitic wasps, nematodes). We discuss (nonstandard, rural) Honduran (Spanish) folk knowledge, taxonomy, and semantics of insects and other terrestrial invertebrates for each category (table 1).

Each category has its own epistemology, taxonomic structure, and semantics. Easily observed and culturally important taxa have deep folk knowledge[2] and hierarchical taxonomies. They tend to be named for their physical characteristics more than for their cultural importance, and some have semantically opaque names. For easily observed but culturally unimportant taxa folk knowledge is thinner and taxonomies are broad and shallow. Their names tend to reflect their appearance (nature). For the culturally important but difficult-to-observe taxa folk knowledge is complex, and much of it

2. We originally used the term "thick knowledge." We are grateful to Peter Baker for pointing out that in British English one of the meanings of "thick" is "stupid."

clashes with modern science.[3] Taxonomies include binomial folk names that reflect the insects' interaction with humans. Difficult-to-observe and culturally unimportant organisms are not known, named, or classified.

We identified each creature as culturally important or not and as easy or difficult to observe. We ranked a creature as culturally important if we knew that Honduran farmers considered it a pest, a danger or a nuisance, a plaything, or of any utility at all. It was harder to identify organisms as easy or difficult to observe. We classed social insects, larger ones, and brightly colored flying ones as easily observed. We considered cryptic and nocturnal animals (unless they were social) as difficult to observe. Although some caterpillars are quite conspicuous, we classified most of them as difficult to observe; many are cryptically colored, and most are too small to be very noticeable until their later instars. Few of the creatures were difficult to classify by cultural importance. We did, however, end up classifying all bees as "important" because campesinos distinguish the otherwise unimportant ones from the troublesome or useful ones. A few taxa were hard to classify as easy versus difficult to observe (notably the pest Lepidoptera larvae), but our findings would have been little altered by reclassifying them. In future work we may want to make "ease of observation" a longer scale, with a category for insects that are themselves conspicuous but for which key aspects of their lives are difficult to observe.

Folk Knowledge

The folk knowledge of culturally important and easily observed groups is deep. Almost all descriptions of folk knowledge have dealt with culturally important and easily observed domains, and this has produced the impression that all folk knowledge is deep. Scholars of traditional people tend to discuss topics of importance to the people themselves, topics on which they are experts. Traditional agriculture in general is dependent on elaborate systems of folk knowledge (Netting 1993:321; see also Wilken 1987 and Wilk 1991).

We agree that folk knowledge can be quite sophisticated. For example, Honduran campesinos can describe the brood chambers, worker and queen morphology, and honey quality of the bees whose hives they harvest (see Posey and Carmago 1985). They understand that bees and wasps lay eggs and that the workers tend the brood. They distinguish species of bees for their utility: some give honey and others do not. Some of the honeys are medicinal; the honey of the *jimerito* (*Trigona angustala*, Hymenoptera: Apidae) is used as an ointment for injured eyes (see Chittampalli and Mulcahy 1990). Some honeys are merely edible, and others are considered poisonous. The bees must also be distinguished because one stings, some bite, one secretes a blister-causing liquid, and others are passive.

Folk knowledge about these insects is sometimes ahead of current entomological thought. For example, campesinos told Bentley that leaf-cutter ants (Hymenoptera: Formicidae: Attini) have a *nahual* (an animal soul companion), a snake or a lizard. They said that digging into a nest until one found the lizard would cause the nest to die (see also Hunn 1977:262). While digging up leaf-cutter ant nests with campesinos we have seen a coral snake emerge from one of the ant tunnels and unearthed a nest of reptile eggs on a bed of spent leaf tissue in a chamber. It is apparent that leaf-cutter ants do have reptilian commensals (see Hölldobler and Wilson 1990: 471). Again, dozens of campesinos told us that social wasps eat flower nectar, but entomologist colleagues insisted that social wasps preyed on insects. Formal research in vespid diet confirms both ideas. Adult social wasps drink nectar but forage for caterpillars and other insects to feed to their brood (Reeve 1991, Gadagkar 1991, Jeanne 1991, Hunt 1991).

Most of the folk knowledge of the easily observed but not culturally important taxa tends to agree with modern science: dragonflies live around water; spiders weave webs; mud dauber wasps have spiders in their nests; June beetles emerge with the first rains; dung beetles roll balls of manure; and earwigs live in maize plants. These examples may seem trivial; they are facts that entomologists and Honduran farmers know but few find remarkable. Campesinos know of some predatory insects, such as army ants, but few know that social wasps hunt for insects or that many other insects are beneficial predators of insect pests (González 1993). Honduran farmers know that spiders and fire ants prey on insects but not that there are many other serious predators of other insects. Once we had shown farmers wasps and ants preying on pests, they continued to notice it on their own. This new information did not clash with local knowledge; folk knowledge is thinner than modern science for topics that are not culturally important.

For the culturally important but difficult-to-observe taxa, local knowledge and modern science part company. Beliefs in caterpillars that rain from the sky, pests created by spontaneous generation, and wasps that lay papaya-eating worms are some examples. Farmers watching their maize fields being eaten by caterpillars that seem to have come from nowhere may be forced to adopt explanations that are consistent with local observations but not with modern science. Without the benefit of devices such as microscopes and without conceptual tools such as germ theory and metamorphosis, people may conclude that disease is caused by spirits (Last 1981) and caterpillars are produced by spontaneous generation (Bentley, Rodríguez, and González 1994).

Anthropologists have been reluctant to discuss gaps and misunderstandings in folk knowledge. Chambers (1983:84) has criticized ethnoscience for focusing on competent informants and large, well-known domains. Vayda and Setyawati (1995) write that cognitive anthro-

3. We avoid the phrase "Western science." Many of the Eastern countries, such as Japan, now have more than a passing familiarity with "Western" science, while much of the culture of Latin American countries such as Honduras is of Western European (Spanish) origin. One could write of "Northern" science, but it makes more sense to omit the geographic stereotyping.

pological accounts of traditional knowledge discuss linguistic distinctions of little practical relevance and are deficient in describing knowledge and ignorance about insects which could be useful for informing pest-management practices.

Of all the insects, Honduran campesinos generally recognize only bees and wasps as reproducing sexually. They say that caterpillars reproduce by spontaneous generation. The reproduction of pest Lepidoptera is economically important but difficult to observe. The *cogollero* (fall armyworm, *Spodoptera frugiperda* [Lepidoptera: Noctuidae]), a maize pest, for example, is a dull gray moth as an adult. Few farmers name the moth; even fewer notice its egg masses, cream-colored blobs on fence posts and maize leaves. The tiny larvae hatch and glide through the air on silk threads that they spin. They land and search for a maize whorl to live in and feed on. Honduran farmers notice them when the caterpillars have molted two or three times and grown big enough to be easily seen and to cause enough damage to worry about. *Cogolleros* pupate in the soil or in the maize ear. The brown pupae escape rural people's attention. Other traditional peoples have misunderstood insect reproduction by generally failing to grasp the notion of metamorphosis (see Winarto 1996).

There is little or no folk knowledge about the taxa that are culturally unimportant and difficult to observe. Honduran farmers do not recognize the causal agents of disease (Bentley 1990, 1991), and most of them (along with anthropologists and most other nonentomologists) are unaware of the existence of insect parasitoids (of other insects), especially of the abundant but almost microscopic parasitic wasps.

In summary (see table 2), for insects that are culturally important and easily observed, folk knowledge is deep: local people often know more about them than scientists do. This local knowledge can be empirically verified by the scientific method. For insects that are not culturally important but are easily observed, folk knowledge is thin: local people know them in a way that scientists can understand, although local knowledge may be less complete than that of specialized natural scientists. Local knowledge of the culturally important but difficult to observe is gritty: local people may have beliefs and perceptions which are at odds with scientific notions and cannot always be tested with the scientific method. About insects that are difficult to observe and of no cultural importance, local people know very little.

TABLE 2
Characteristics of Folk Knowledge in Each Category

	Culturally Unimportant	Culturally Important
Easy to observe	Thin but consistent with formal (so-called Western) science	Deep, much of it unknown to formal science
Difficult to observe	Absent	Complex but often inconsistent with formal science

TAXONOMY

Berlin (1992) divides folk taxonomies into hierarchical levels: kingdom, life-form, intermediate, generic, specific, and varietal. There is an obvious similarity with formal biology: kingdom, phylum, class, order, family, genus, and species. The key Berlinian level is the generic, which includes the most basic primary meaningful categories; their labels are simple (Berlin 1992:27; Conklin 1969:106). Folk species usually have binomial labels (Berlin 1992). Intermediate categories are rare (Brown 1984: 4; Berlin 1992:27).

Our study deals with a single life-form, *insecto*. (The Standard Spanish word *bicho* is rarely used in Honduras.) Like Brown's (1984:16) WUG, *insecto* includes not just insects but other terrestrial invertebrates. Spiders and centipedes are *insectos* and so are slugs, which are mollusks. Each of the four categories of taxa has its own taxonomic properties. Culturally important and easily observed taxa are ordered in hierarchies: they are the only taxa with intermediate categories. Some folk genera are polytypic (divided into folk species). Culturally unimportant but easily observed taxa are lists of generic names, without categories of intermediate or specific rank. Culturally important but difficult-to-observe taxa may be taxonomically quite different from those of modern science. There are some polytypic folk genera, with species labeled with productive binomials. Culturally unimportant and difficult-to-observe species escape classification.

Outlining a test of the universalist hypothesis, Berlin (1992:267) predicts that the following morphotypes (if found locally) are likely to be named in any ethnobiological system of classification: ants, wasps, bees, flies, butterflies and moths, grasshoppers, dragonflies, cicadas, ticks, roaches, beetles/bugs, weevils, spiders, scorpions, fleas/lice/chiggers, caterpillars, and millipedes. Our work fails to disprove his hypothesis. Honduran Spanish labels bees, wasps, flies, caterpillars, and most of the others on Berlin's list (table 3). Unlike Standard Spanish, Rural Honduran Spanish has no single term for ant or beetle (*escarabajo* refers only to some of the larger species). Weevils, fleas, lice, and chiggers are probably familiar to people more for their cultural importance as pests than for their morphology. To Berlin's list of major morphotypes we would add earwigs (order Dermaptera) and grubs (larval Coleoptera).

Hymenoptera (bees, wasps, and ants) are some of the larger, more colorful insects. Many are diurnal. Some of the nests of the social ones are larger than a person's

TABLE 3

Honduran Folk Categories for Terrestrial Invertebrates (Unique Beginner Animales*, Life Form* Insectos*) Classified by Cultural Importance and Ease of Observation*

Intermediate	Generic	Specific	English Common Name	Translation of Spanish	Category
	Babosa (Gastropoda: Veronicellidae) (*Sarasinula plebeia* and others)		Slug	Slobberer	Important, difficult
	Lipí **Moclija** (Gastropoda: Limacidae)		Slug	Unanalyzable	Important, difficult
	Realillo **Real** (Diplopoda)		Millipede	Little coin[a] Coin[a]	Unimportant, easy
	Ciempiés (Chilopoda)		Centipede	Hundred legs	Unimportant, easy
	Lombriz (Annellida)		Earthworm	Earthworm	Unimportant, easy
	Araña (Araneae)		Spider	Spider	Unimportant, easy
		Araña meacaballos **Picacaballos** (Theraphosidae)	Tarantula	Horse pisser[b] Horse stinger	Important, easy
	Pendejo (Opilionnes)		Daddy longlegs	Pubic hair[c]	Unimportant, easy
	Cazampulga (unidentified small spiders)			Flea hunter	Unimportant, easy
	Alacrán (Scorpiones)		Scorpion	Scorpion	Important, easy
	Coloradilla (Acari: Trombiculidae)		Chigger	Little red one	Important, difficult
	Garrapata (Acari: Ixodidae)		Tick	Leg grabber	Important, easy
		Garrapata chata *Dermacentor imitans*		Thick (blood-filled) tick	Important, easy
		Garrapata menudita **Coloradita** *Dermacentor imitans*		Small tick Small red tick	Important, easy
	Mosca (Diptera, especially Muscidae)	**Mosca**	Fly	Fly	Unimportant, easy
		Queresa (eggs and larvae) (Calliphoridae)	Screwworm	Unanalyzable	Important, easy
		Mosca de la queresa (adult) (Calliphoridae)	Screwworm	*Queresa* fly	Important, easy
		Mosca tábano (Tabanidae)	Horse fly	Horse fly	Important, easy
		Mosca lambesudor **Chupasudor** (Syrphidae)	Syrphid fly	Sweat licker Sweat sucker	Unimportant, easy
		Mosca de la fruta especially *Ceratitis* spp. and *Anastrepha* spp. (Tephritidae)	Fruit fly	Fruit fly	Important, difficult
	Zancudo (Culicidae)		Mosquito	Long legs	Important, easy
	Mosquito (various small Diptera)		Gnat	Little fly	Important, difficult
	Mosquito (various small Diptera)		Gnat	Little fly	Important, difficult
Avispa (Vespidae)			Wasp	Wasp	Important, easy
	Turma **Campanillas** **Caucsiril** **Caushogo** *Polybia* spp., usually *P. occidentalis*			Scrotum[c] Little bell[c] Unanalyzable Unanalyzable	Important, easy
		Turma de las largas *Polybia diguetana*		Scrotum, the long kind[c]	Important, easy

TABLE 3
(*Continued*)

Intermediate	Generic	Specific	English Common Name	Translation of Spanish	Category
		Turma de las redondas		Scrotum, the round kind[c]	Important, easy
		Polybia occidentalis			
		Turma de toro		Bull's scrotum[c]	Important, easy
		Polybia rejecta			
	Catala			Unanalyzable	Important, easy
	Chilera			Chile-like[d]	
	Chilizata				
	usually *Polistes* spp.				
		Catala de las rojas		Red catala	Important, easy
		Polistes major, *P. instabilis*, and *P. erythrocephalus*			
		Catala de las negras		Black catala	Important, easy
		Mischocyttarus spp.			
		Ahorcadora		Strangler[e]	Important, easy
		Polistes sp.			
	Jarrito			Little jar[c]	Important, easy
	Polybia emaciata				
	Pico de chanco			Pig snout[c]	Important, easy
	Alas blancas			White wings	
	Parachartergus apicalis				
	Chirechancho			Pig snout[c]	Important, easy
	Epipona sp.				
	Carnicero			Butcher[f]	Important, easy
	Comecarne			Meat eater[f]	
	Agelaia cajennensis				
	Quitacalzón			Underwear remover	Important, easy
	Papelillo			Little paper[c]	
	Protopolybia acutiscutis				
	Media luna			Half-moon[c]	Important, easy
	Apoica thoracica				
	Pupusa			Stuffed tortilla	Important, easy
	Metapolybia azteca				
	Panal			Honeycomb[g]	Important, easy
	Brachygastra mellifica				
	Guitarrón			Bass guitar[h]	Important, easy
	Corroncha de cuzuco			Armadillo's shell[c]	
	Panza de burro			Donkey's belly[c]	
	Synoeca septentrionalis				
	Caserita		Mud dauber	Little house[c]	Unimportant, easy
	Casitas de tierra				
	(Sphecidae)				
	Avispón			Big wasp	Unimportant, easy
	Rey de arañas			King of spiders	
	Cazarañas			Spider hunter	
	(Pompilidae)				
	Avispa de la papaya		Papaya fly	Papaya wasp[i]	Important, difficult
	Toxotripana curvicauda				
	(Diptera: Tephritidae)				
Abeja			Bee	Bee	Important, easy
(especially Apidae)					
	Blanco		Bee	Hive	Important, easy
	Colmena grande			Big hive	
		Abeja blanco de castilla	European honeybee	Castilian bee[j]	Important, easy
		Apis mellifera			
		Abeja aluva	Stingless bee	*Aluva* (unanalyzable) bee	Important, easy
		Blanco aluva		*Aluva* hive	
		Melipona beecheii			
		Abeja mora		*Moro* bee[k]	Important, easy
		Blanco moro		*Moro* hive[k]	
		Melipona fasciata			
	Morroco		Stingless bee	Unanalyzable	Important, easy
		Morroco		Unanalyzable	Important, easy
		Trigona amalthea			
		Trigona nigerrima			

TABLE 3
(*Continued*)

Intermediate	Generic	Specific	English Common Name	Translation of Spanish	Category
		Morroco pequeño		Little *morroco*	Important, easy
		Morroco tapiero		*Morroco* that makes earth walls	
		Talnete			
		Partamona bilineata		Unanalyzable	
		Culo de buey		Ox's anus[c]	Important, easy
		Culo de vieja		Old woman's anus[c]	
		Trigona fulviventris			
	Chumela			Unanalyzable	Important, easy
	Zope				
	Cumún				
	Nannotrigona sp.				
	Jimerito			Unanalyzable	Important,easy
	Trigona angustala				
	Quemaquema			Burns burns[l]	Important, easy
	Trigona pallens				
	Lambesudor			Sweat sucker	Important, easy
	Plebeia latitarsis				
	Zunteco			Unanalyzable	Important,easy
	Trigona nigerrima				
	Panta			Unanalyzable	Important, easy
	Zuncuán				
	Magua				
	Scaptotrigona pectoralis				
	Melero			Honey-maker	Important, easy
	Trigona sp.				
	Abejón		Bumblebee	Big bee	Unimportant, easy
	Abejorro			Hummingbird	
	Moscarrón			Big fly	
	Bombus ephippiatus				
	Galga		Ant	Greyhound	Important, easy
		Galga bala		Bullet greyhound[d]	Important, easy
		Pachycondyla sp.			
		Galga chela		Red greyhound	Important, easy
		Camponotus abdominalis			
		Galga loca		Crazy greyhound[m]	Important, easy
		Monacis bispinosa			
		Galga mora		Blackberry greyhound	Important, easy
		Camponotus sericeiventris			
	Guerreadora		Army ant	Warrior or guerrilla	Important, easy
	Guerrillera				
	mostly *Eciton* spp.				
		Guerreadora negra		Black warrior	Important, easy
		Eciton burchelli			
		Guerreadora roja		Red warrior	Important, easy
		Eciton hamatum			
	Hormiga		Ant	Ant (small)	Important, easy
		Hormiga brava	Fire ant	Mean ant[d]	Important, easy
		Solenopsis geminata			
		Hormiga de carnisuelo		Acacia ant[n]	Important, easy
		Pseudomyrmex flavicornis			
		Hormiga loca		Crazy ant[m]	Important, easy
		especially *Azteca* spp. and *Pheidole* spp.			
		Hormiga roja		Red ant	Important, easy
		Ectatomma tuberculatum			
		Hormiga tigre	Velvet ant	Jaguar ant[d]	Important, easy
		Hormigón		Big ant	
		Hormiga peluda		Hairy ant	
		(Mutillidae)			
	Zompopo		Leaf-cutter ant	Unanalyzable	Important, easy
	(Formicidae: Attini)				
	Mariposa		Butterfly	Butterfly/moth	Unimportant, easy
	(Lepidoptera)				
	Palomilla		Butterfly moth (small)	Little dove	Unimportant, easy
	(Lepidoptera)				
		Palomilla del maicillo	Sorghum moth	Sorghum moth	Important, difficult
		Polilla del maicillo			
		Sitotroga cerealella			

TABLE 3
(*Continued*)

Intermediate	Generic	Specific	English Common Name	Translation of Spanish	Category
	Gusano (larvae of several insects, especially Lepidoptera)		Worm	Worm[o]	Unimportant, easy
		Gusano peludo (several hairy larvae) (Arctiidae)		Hairy worm	Important, easy
		Gusano dorado *Estigmene acrea* (Arctiidae)		Golden worm	Important, easy
		Gusano quemador (Arctiidae)		Burning worm[d]	Important, easy
		Gusano cogollero larvae of *Spodoptera frugiperda* (Noctuidae)	Fall armyworm	Whorl worm[p]	Important, difficult
		Gusano medidor larvae of *Mocis latipes* (Noctuidae)	Grasslooper	Measurer	Important, difficult
		Falso medidor larvae of *Trichoplusia ni* and *Pseudoplusia includens* (Noctuidae)	False grasslooper	False measurer	Important, difficult
		Gusano elotero larvae that eat corn, e.g., *Helicoverpa zea* (Noctuidae)	Corn seed worm	Corn ear worm	Important, difficult
		Gusano cortador larvae that cut the cornstalk, e.g., *Agrotis* spp.	Cutworm	Cutter	Important, difficult
		Gusano cuerudo cutworms, e.g., *Spodoptera sunia*	Armyworm	Leathery worm	Important, difficult
		Gusano cachudo	Horned worm	Horned worm	Important, difficult
		Gusano corronchudo especially larvae of *Manduca sexta* (Sphingidae)		Thick, leathery worm	
		Gusano barrenador larvae of *Diatraea lineolata* (Pyralidae)		Driller[q]	Important, difficult
		Gusano barrenador de caña larvae of *Diatraea saccharalis* (Pyralidae)		Cane driller	Important, difficult
	Gusano de . . . (larvae of various Lepidoptera)			Worm of . . .	
		Gusano del pepino larvae of *Diaphania nitidalis* (Pyralidae)		Cucumber worm	Important, difficult
		Gusano del melón larvae of *Diaphania hyalinata* (Pyralidae)		Cantaloupe worm	Important, difficult
		Gusano del repollo larvae of *Ascia monuste* and *Leptophobia aripa* (Pieridae)		Cabbage worm	Important, difficult
		Rasquiña		Scratcher[r]	Important, difficult
		Gusano del repollo *Plutella xylostella*		Cabbage worm	
	Langosta (larvae of Noctuidae, e.g., *Mocis latipes*)			Locust	Important, difficult
	Coralillo (larvae of *Elasmopalpus lignosellus*) (Pyralidae)			Little coral snake[s]	Important, easy
	Coyota			Female coyote	Important, easy

TABLE 3
(*Continued*)

Intermediate	Generic	Specific	English Common Name	Translation of Spanish	Category
	Társalo (larvae of *Dermatobia hominis*) (Cuterebridae)		Botfly	Unanalyzable	Important, difficult
	Clavito (larvae of Culicidae)		Mosquito larvae	Little nail[s]	Unimportant, easy
	Gallina ciega (larvae of Scarabaeidae, especially *Phyllophaga* spp.)		White grub	Blind chicken	Important, difficult
	Gusano alambre (larvae of Coleoptera, Elateridae)			Wire worm[t]	Important, difficult
	Cucaracha de agua (Hydrophilidae)			Water cockroach[s]	Unimportant, easy
	Ronrón Especially *Phyllophaga* spp. (Scarabaeidae Subf: Melolonthinae)			(Onomatopoeic)[h]	Unimportant, easy
	Rueda mojón **Mierdero** (Scarabaeidae Subf: Scarabaeinae)		Dung beetle	Turd roller Shitter	Unimportant, easy
	Escarabajo (larger beetles of several families)			Beetle	Unimportant, easy
	Tronador **Trastrás** (Elateridae)		Click beetle	Cracker[h] (Onomatopoeic)[h]	Unimportant, easy
	Carapacho **Carapachito** *Megascelis* spp. (Chrysomelidae) and *Eutheola* spp. (Scarabaeidae)			Carapace[s] Little carapace[s]	Unimportant, easy
	Burro **Cachetón** (Meloidae, Cantharidae, Cerambycidae)			Donkey Big cheeks	Unimportant, easy
	Trozapalo (Passalidae)			Log breaker[u]	Unimportant, easy
	Candelilla **Luciérnaga** (Lampyridae)		Firefly	Little candle Light maker	Unimportant, easy
	Camaleón **Taladro** (Buprestidae)			Chameleon Drill[v]	Unimportant, easy
	Gorgojo (especially Curculionidae and Bostrichidae)		Weevil	Weevil	Important, difficult
	Picudo (especially Curculionidae)		Weevil	Big snout[s]	Important, difficult
	Tortuguilla **Malla** **Pulgón** (Chrysomelidae, especially *Diabrotica* spp.)		Leaf beetle	Little turtle[s] Mesh[w] Big flea[s]	Important, easy
	Pulga (Siphonaptera)		Flea	Flea	Important, difficult
	Nigua *Tunga penetrans* (Siphonaptera: Tungidae)		Chigoe flea	Chigoe flea	Important, difficult
	Ladilla (*Pthirus pubis*) (Phthiraptera: Pthiridae)		Crab louse	Unanalyzable	Important, difficult
	Piojo (*Pediculus humanus*) (Phthiraptera: Pediculidae)		Louse	Louse	Important, difficult
	Cusuquito (larvae of Myrmeleontidae) (Neuroptera)		Ant lion	Little armadillo[s]	Important, easy

TABLE 3
(Continued)

Intermediate	Generic	Specific	English Common Name	Translation of Spanish	Category
	Perro de agua			Water dog[s]	Unimportant, easy
	(larvae of Corydalidae)				
	(Neuroptera)				
	Chinche	**Chinche de agua**		Water bug	Unimportant, easy
	(Hemiptera)	**Tortuga de agua**		Water turtle[s]	
		(Belostomatidae)			
		Chinche estrella	Water strider	Star bug[s]	Unimportant, easy
		Patillo		Little duck	
		(Gerridae)			
		Chinche talaje	Bed bug	Unanalyzable	Important, easy
		(Cimicidae)			
		Chinche picuda	Cone-nosed bug	Big snout bug[s]	Important, easy
		Chinche casera		House bug	
		Triatoma dimidiata			
		(Reduviidae)			
		Chinche pata de alacrán		Scorpion foot[s]	Unimportant, easy
		Pata de hoja		Leaf foot[s]	
		Especially *Leptoglossus* spp.			
		(Coreidae)			
		Chinche hedionda	Stink bug	Stink bug[x]	Unimportant, easy
		Chinche pedorrilla		Fart bug	
		Chinche miona		Piss bug	
		(Pentatomidae)			
	Caballitos del diablo		Dragonfly	The devil's little horses	Unimportant, easy
	Libélula			Dragonfly	
	San Juán			Saint John	
	Guaro			A distilled cane liquor	
	Zuncún			Unanalyzable	
	Mojaculo			Ass wetter	
	Helicóptero			Helicopter	
	(Odonata)				
	Tijerilla		Earwig	Little scissors	Unimportant, easy
	Tijereta				
	Doru spp.				
	(Dermaptera: Forficulidae)				
	Chuchito de agua			Little water dogs	Unimportant, easy
	(Orthoptera: Gryllotalpidae)				
	Chapulín		Grasshopper	(Nahuati loanword)	Important, easy
	Langosta			Locust	
	Saltamontes			Grasshopper	
	Chachalaca			Chachalaca	
	Grillo			Cricket	
	(Orthoptera: Acrididae)				
	Grillo de noche		Cricket	Night cricket	Important, easy
	(Orthoptera: Gryllidae)				
	Esperanza		Katydid	Hope[y]	Unimportant, easy
	(Orthoptera: Tettigoniidae)				
	Cucaracha		Cockroach (large)	Cockroach	Important, easy
	(Blattaria: Blattidae)				
	Jate		Cockroach (small)	Unanalyzable	Important, easy
	(Blattaria: Blatellidae)				
	Ponemesas		Praying mantis	Table-setter[s]	Important, difficult
	Religiosa			Nun[s]	
	Rezadora			One who prays[s]	
	Madre de culebra			Mother of snake[z]	
	(Mantodea)				
	Quiebrapalitos			Break little sticks[s]	Unimportant, easy
	Secamano			Hand dryer[z]	
	Palo			Stick[s]	
	Chilincoco			Unanalyzable	
	(Phasmatidae: Phasmatidae)				
	Palomillas		Termite kings and queens with wings	Little moth	Unimportant, easy
	Polillas			Moth	
	(Isoptera: Termitidae)				
	Comején		Termite	Unanalyzable	Important, easy
	(Isoptera: Termitidae)				
		Comején de madera		Wood termite	Important, easy

TABLE 3
(*Continued*)

Intermediate	Generic	Specific	English Common Name	Translation of Spanish	Category
		Comején de tierra		Earth termite	Important, easy
		Comején de pelota		Ball termite	Important, easy
		(*Nasutitermes* spp.)			
	Piojillo		Thrip	Little louse[s]	Important, difficult
	(Thysanoptera)				
	Chicharra		Cicada	Cicada	Unimportant, easy
	Chiquirín			(Onomatopoetic)[h]	
	(Homoptera: Cicadidae)				
	Lomo de camello			Camel's hump	Unimportant, easy
	Torito			Little bull	
	(Homoptera: Membracidae)				
	Espuma de sapo		Spittlebug	Toad foam	Unimportant, easy
	Sapillo			Little toad	
	Salivazo			Glob of saliva	
	Espumón			Big foam	
	Ponchito			Little punch	
	(Homoptera: Cercopidae immature)				
	Lorito verde		Empoasca	Little green parrot[s]	Important, difficult
	Especially *Empoasca kraemeri*				
	(Homoptera: Cicadellidae)				
	Pulgon		Aphid	Big flea[s]	Important, easy
	Piojillo			Little louse[s]	
	(Homoptera: Aphidiidae)				
	Mosca blanca		Whitefly	White fly	Important, difficult
	(*Bemisia tabaci*)				
	(Homoptera: Aleyrodidae)				

[a]Rolled up, looks like coin.
[b]Believed to urinate while plucking hair for nest from horse's leg, causing horse to lose its hoof.
[c]Allusion to shape of nest.
[d]Stings.
[e]Sting produces choking sensation.
[f]Eats carrion.
[g]Makes honey.
[h]Allusion to sound it makes.
[i]Mimics a wasp.
[j]Originally brought to Latin America from Spain.
[k]*Moro* means "Moor" and *mora* means "blackberry," but in this case *moro* is probably unanalyzable.
[l]Secretes a burning liquid on attacker's skin.
[m]Runs around.
[n]Lives in symbiosis inside the thorns of the bullhorn acacia.
[o]In Spain *oruga* is the word for "caterpillar," but in Latin America *gusano* is generally used for both "worm" and "caterpillar."
[p]Lives in and eats maize whorls.
[q]Drills into cornstalk.
[r]Scratches into flesh of cabbage.
[s]Allusion to appearance.
[t]Calqued from English by agronomists?
[u]Lives in fallen timber.
[v]Bores into trees.
[w]Makes the leaves it eats look like mesh.
[x]Defends itself with foul-smelling urine.
[y]Brings good luck.
[z]Is believed to deform hand of person who picks it up.

head and have unique shapes and colors. Hymenoptera are culturally important for their honey, their edible brood, and their defense strategy (stinging, biting, and blistering). Fifty-one (38%) of the folk names we recorded for *insectos* are for Hymenoptera. The only two intermediate taxa in Honduran folk entomology are for Hymenoptera: bee (*abeja*) and wasp (*avispa*).

We would expect a detailed folk taxonomy for insects that people eat (see Conconi 1982, Dufour 1987, Posey 1987, Moran 1991, Setz 1991). Honduran peasants eat some social wasp brood and honey, and they have a complex classification for wasps, with many folk genera and a few specifics. Some of the social wasp folk genera are polytypic, among them, *catala* (*Polistes* spp. and some *Mischocyttarus* spp.) and *turma* (some *Polybia* spp.). The Jicaque of Honduras, formerly hunter-gatherers, eat wasp brood and classify wasps in nearly the same way as Hispanic Hondurans (Oltrogge 1975). In contrast, the Bribri, forest horticulturists of Costa Rica, classify a fairly similar wasp fauna with binomial labels (Starr and Bozzoli 1990). Most Honduran bee names are generics, but there are three folk species in the genus *abejas de blanco*, "hive bees" (*Apis mellifera* and two *Melipona* spp.). All three species live in the forest and are also tended in the villages. In the woods, the bees nest in hollow tree branches, which campesinos cut off and bring home to hang from their front porches, harvesting the honey regularly, somewhat as described by Posey (1983) for the Kayapó. The three "hive" (*blanco*) species are much larger than other bees. This folk genus is classified by size, not by use, since at least two species of smaller bees are also brought home and protected but are not classified as *abejas de blanco*. The folk genus *morroco* (several smaller Meliponinae bees) is also polytypic.

Campesinos say, "Wasps sting and don't make honey. Bees don't sting and do give honey." However, the (*avispa*) *panal*, "honeycomb (wasp)" (*Brachygastra mellifica*), is a honey-making vespid wasp, and the European honeybee, *abeja de castilla* (*Apis mellifera*) stings, unlike other local bees. In spite of this ambiguity, Honduran farmers classify the *panal* as a wasp and the honeybee as a bee, as do entomologists.

Hondurans classify ants (Hymenoptera: Formicidae) in four folk genera—*zompopos*, *guerreadoras*, *hormigas*, and *galgas*—but have no word for "ant." *Zompopos* (leafcutter ants—Formicidae: Attini, especially *Atta* spp. and *Acromyrmex* spp.) are not classified as ants. Few insects are more conspicuous or perceptually salient. Large and red or black, they travel in long columns carrying crescent-shaped pieces of leaves like sails. Some of their trails through the tropical vegetation are as bare and wide as human paths. They are common, and some species are diurnal. The mounded entrances to mature colonies cover several square meters. They occasionally attack maize or other crops and can strip an orange tree bare overnight.

Army ants (*guerreadoras*), "warriors" (especially *Eciton burchelli* and other *Eciton* spp.), are the next-most-salient ants; the colonies move constantly and can field several million workers each, fanning out in long columns and eating every small animal they catch (see Hölldobler and Wilson 1990: chap. 16). The Honduran folk name is grammatically feminine, suggesting that it may have evolved from **hormiga guerreadora*. All other ants fall into two residual categories. Large ones are *galgas* (literally "greyhounds"). Small ones are *hormigas* ("ants" in Standard Spanish). There are several folk species of *galga* and *hormiga*. Stinging and nonstinging folk species are distinguished, for example, *hormiga brava* (*Solenopsis geminata*) and *galga bala* (*Pachycondyla* sp.) are known mainly for their bite and sting.

Several species of orange hairy caterpillars, *gusano peludo* (family Arctiidae—especially *Estigmene acrea*—and Megalopygidae), are distinguished. The megalopygid species have urticating hairs that burn to the touch, while arctiid caterpillars are harmless, fuzzy Batesian mimics. Many campesinos fail to distinguish the imitators from the burning caterpillars. This contrasts with local knowledge of bees, but in contrast to bees, none of the hairy caterpillars are useful and therefore they can all receive the same behavioral response (Hays 1982:92): avoidance.

Campesinos consider few other insects as important as bees or wasps and classify them at the biological order or family level. However, they may single out a few families because of their harmfulness. Tabanidae (horse flies) are distinguished from other flies because of their bite (see Posey 1984:133).

Important, easily observed species may be named in orders which are otherwise not highly classified. There are few Honduran terms for the various true bugs (order Hemiptera). One of these is *chinche picuda* (especially *Triatoma dimidiata* [Hemiptera: Reduviidae]), a large red-and-black bug that lives in people's houses and sucks blood from humans and other warm-blooded animals. Campesinos are becoming aware through public health programs that it transmits Chagas' disease. The Spanish term used in these programs, *chinche* (true bug), unfortunately leads to some confusion.

Honduran campesinos know some insects because of their role in children's play. Dry sand patches are often dimpled with the conical traps of ant lions (Neuroptera: Myrmeleontidae). The late Arnulfo Flores, a Honduran farmer, showed us how to blow the sand out of the traps and collect the fat, squirming insects and said, "We used to play with them when we were kids."

Culturally important, easily observed taxa are finely categorized. Many of the terminal taxa are folk species that coincide with Linnaean species. The only two intermediate categories (bee, wasp) in Honduran folk entomology are culturally important and easily observed. This category could be used as an illustration for a paradigmatic description of biological folk categories, with hierarchical taxonomic levels and some polytypic folk genera divided into binomial folk species. The other three categories could not.

Hondurans label the following invertebrates even though they have little if any local cultural significance: millipede, centipede, earthworm, spider, harvestman, hover fly, mosquito larvae (not recognized as the young of mosquitoes), butterfly, small butterfly (*palomilla*), water scavenger beetle (Hydrophilidae), June beetle, large beetle, click beetle, timber beetle, lightning bug, metallic woodboring beetle (Buprestidae), larval dobsonfly, true bug, dragonfly, earwig, mole cricket, katydid, termite reproductives, cicada, treehopper, spittle bug, mud dauber wasp, tarantula wasp, and bumblebee. These categories are folk genera, but their organization is not very hierarchical. They are not subordinate to intermediate ranks, and they rarely have subordinate specific ranks. This long, flat taxonomy of generic categories lumps invertebrates at the biological order or family level, with the result that each folk genus includes hundreds or thousands of biological species. The taxonomy of the easily observed but culturally unimportant has little structure. It could be represented as an index or a finding list (Conklin 1969:107).

Campesinos classify some insects at the order level or lump several families together while singling out other insect families for names of their own. They notice *candelillas* (lightning bugs—Coleoptera: Lampyridae) because of their light and find the insects difficult to recognize in the daytime. Click beetles (*tronadores*) (Coleoptera: Elateridae) have little cultural importance as adults, but they are noticeable; they can snap a joint between two thoracic segments with enough force to hurl themselves into the air.

Small, cryptic arthropods that would otherwise escape attention demand a name if they are pests of the human body such as ticks, chiggers, and lice.

Culturally important mimics are named but may be misclassified from a modern scientific perspective. Campesinos label the papaya "wasp" at the biological species level; they know that the *avispa de papaya* causes worms to appear in papaya fruit. Entomologists, in contrast, know it as a fly (*Toxotrypana curvicauda* [Diptera: Tephritidae]) that, except for its long ovipositor (egg-laying organ) and two wings (wasps have four), is an uncanny mimic of a tiger-colored social wasp, *Agelaia cajennensis* (Hymenoptera: Vespidae).

Because they are difficult to observe, all grain-dwelling Honduran beetles (at least 25 species) are classified as *gorgojos*, "weevils" (Hoppe 1986), including true weevils (Curculionidae) and members of at least three other families (Bostrichidae, Tenebrionidae, Cucujidae). They spend their first three life stages buried in stored food. Many farmers confuse the parasitic wasps of the weevils with the weevils themselves. However, they classify weevils as *picudos* if they feed on beans, chiles, and other crops in the field (rather than in storage). *Gorgojos* and *picudos* are contrasted ecologically (field versus storage), not by morphotype, because of their cultural importance as pests.

Most Lepidoptera (butterflies and moths) are specialized plant eaters in their larval (caterpillar) stage. Some are pests, and these are important and labeled at the biological species level. Caterpillars that feed on wild plants are labeled by the residual term *gusano*. The insects themselves are often difficult to observe—small, colored to blend with the host plant, and buried in plant tissue—but are noticed because of the attention that farmers pay to their crops. As Hunn (1982) observed in Chiapas, Honduran campesinos label pest caterpillars but classify the adults as separate species. There are many names for pest caterpillars, while the adults are lumped into larger, almost residual categories such as *mariposa*, "moth/butterfly." Crop varieties are often binomial folk species (Hunn and French 1984; Berlin 1992: 24), and so are many crop pests.

Few anthropologists have discussed what local people do not label. It is easier to notice what is present than to notice what is missing (Hearst 1991). However, cross-culturally, there are consistent gaps in local classifications. Many organisms are too difficult to observe and too unimportant to be included at all in Honduran folk entomology. Most parasitic wasps are solitary and too small to be seen easily, in spite of being among the most numerous insects on Earth (LaSalle and Gauld 1991). Terrestrial nematodes tend to be microscopic and soil-dwelling. Insects of the order Collembola are small, flightless, and soil-dwelling; even some relatively large insects like green lacewings (Neuroptera: Chrysopidae) are not named even though they are occasionally seen. Green lacewings are difficult to see because they are solitary, pale green, and nocturnal. Millions of species of mites go unobserved and unlabeled. The exception that proves the rule is the *coloradilla* (chigger—Acari: Trombiculidae), a larval mite that digs into human skin and causes an agonizing itch.

Some highly salient species are unnamed because they are so scarce that they are rarely observed. We noticed a colony of wasps (*Brachygastra smithi* [Hymenoptera: Vespidae]) with an asymmetrical, lumpy nest envelope. The wasps stung us when we touched their tree. We asked several campesinos about the species. They had never seen it before and recognized it as a new species but had no name for it. The colony moved on within a few days, and in four years we never saw another.

In summary (see table 4), intermediate categories are found only in the culturally important and easily observed group. Folk genera may be divided into species if they are culturally important, whether easy or difficult to observe. The easily observed but culturally unimportant taxa have little hierarchical organization and correspond roughly to scientific orders and families. Folk

TABLE 4
Taxonomic Properties of Each Category

	Culturally Unimportant	Culturally Important
Easy to observe	Shallow, often a long string of generic terms. Organisms named to the level of Linnaean orders or families.	Deeper, hierarchical (often including intermediate and specific levels). Organisms frequently named to the level of Linnaean species.
Difficult to observe	None	Deep (e.g., with folk species), but adult and juvenile forms are not necessarily classified together and adults may even be lumped in large, residual categories. Some stages of some organisms are labeled to the level of the Linnaean species.

classification of culturally important but difficult-to-observe organisms may be inconsistent with modern scientific taxonomy, especially where a species mimics a distantly related one, where creatures are small, or where people fail to associate larvae with their adults. The culturally unimportant and difficult to observe are unclassified.

TABLE 5
Semantics of Each Category

	Culturally Unimportant	Culturally Important
Easy to observe	Most named for a natural characteristic	Named for a natural characteristic; fewer named for the role they play when interacting with humans
Difficult to observe	Not named	Many named for their role in human culture; some named for a natural characteristic

SEMANTICS

Some plant and animal names are semantically opaque. Most other names are coined from either appearance or utility (or damage). As Berlin (1992:27) has observed, encoding salient morphological and behavioral features in ethnobiological names makes a large vocabulary easy to learn and remember. In Honduras, most of the culturally unimportant and easily observed invertebrates are named for their appearance and behavior, and a plurality of the culturally important and difficult-to-observe creatures are named for their importance (e.g., the crops they attack). Some culturally important and easily observed invertebrates are named for their natural attributes and others for their cultural roles, but some names in all three of these categories are unanalyzable.

The culturally important and easily observed insects tend to be named for natural rather than cultural traits. Of 66 categories which we judged to belong to this group, 34 (52%) were named for natural attributes. For example, the leaf beetle is *tortuguilla* ("little turtle") because it has a hard round shell. Most wasp and bee species are named after an object that the nest resembles: a pig's snout, an ox's anus, or a bass guitar.

Seventeen (26%) of the culturally important and easily observed insects are named for their cultural roles. For example, the "underwear remover" (the social wasp *Protopolybia acutiscutis*) is named for the way it attacks humans, and so is a bee called *quema quema* ("burny burny") (*Trigona pallens*), which burns its victims with a toxic secretion. As we have seen, a wasp that makes edible honey is called *panal*, "honeycomb." The tarantula (Theraphosidae) is called (*araña*) *meacaballo* ("horse-pissing spider") because campesinos insist that tarantulas urinate on a horse's foot and make it lose its hoof. (Most agronomists deny the validity of this belief.) The *comecarne* ("meat eater") wasp (also called *carnicero*, "butcher") (*Agelaia cajennensis*) feeds on carrion and sometimes annoys farmers butchering an animal.

Fifteen (23%) of the culturally important and easily observed insects have semantically opaque names, some of which are old Spanish words and a few of which are loans from Native American languages. The 29 categories with semantically opaque names in Honduran folk entomology are spread fairly evenly and do not correlate with either cultural importance or ease of observation. This result was unexpected. Balée (1989) notes that cultivated plants (which are culturally important and easily observed) are labeled by single-word, unanalyzable lexemes.

We expected that the easily observed but culturally unimportant creatures would be named for natural attributes. Of 41 insects in this category, 31 (76%) are so named. For example, daddy longlegs (harvestmen) (order Opiliones) are called *pendejos* ("pubic hairs") because when they are huddled in a gregarious mass they look like a clump of body hair. Dung beetles (Coleoptera: Scarabaeidae: Scarabaeinae) are *ruedamojón* ("turd roller"); the lightning bug is *candelilla* ("little candle"). Eight (20%) have unanalyzable, semantically opaque names. Only two categories (5%) are named for the way in which the insects interact with humans. Hover flies are named *chupasudor*, "sweat-sucker," for their habit of lapping sweat from the arms of people at work.

We expected that culturally important but difficult-to-observe insects would be named for their interaction with humans. Only 13 (38%) of the 34 categories in this group are named for their cultural importance. Most of the caterpillar pest species are named for the fruit they attack (e.g., *gusano del melón* [*Diaphania hyalinata* (Lepidoptera: Pyralidae)]) or the kind of damage they do (e.g., *gusano cogollero*, "whorl worm"). Another 13 of these insects are named for natural characteristics, again reflecting the overall Honduran bias toward natural rather than cultural insect names. The *babosa* (slug) (several gastropod families, especially Veronicellidae) is named for the trail of slime it leaves. *Picudos* (field weevils) are named for their snouts. *Gusano cachudo* (several horned caterpillars of the family Sphingidae, especially *Manduca sexta*) is named for its horn. It seems paradoxical that any difficult-to-observe insects could be named for their physical characteristics, but while difficult to observe they are not invisible. Six (18%) of the culturally important and difficult-to-observe insects have semantically opaque names.

In summary (see table 5), 80 (57%) of all categories are named for natural attributes. This lends modest support to the universalist hypothesis, and, as would be expected, the tendency is especially strong for the easily observed but culturally unimportant. Some names, especially for the culturally important insects, reflect the creatures' interaction with humans. Thirty-two (23%) of all categories are named for their interaction with humans, which lends a little support to the utilitarian hypothesis. Almost all of those names (30, 94%) are for culturally important taxa. The 29 (21%) categories labeled with unanalyzable names are evenly spread through the whole lexical set. Binomial folk species generally label culturally important insects, whether easy or difficult to observe. The names for pests are highly productive (tomato worm, melon worm, etc.).

DISCUSSION

We began by asking whether people discover their world or create it—that is, whether they know and name living things for their natural (universal) qualities or for their culturally specific roles in human life. On semantic evidence, the rural people of Central Honduras pay more attention to natural attributes but name a substantial minority of creatures for their roles in human culture—suggesting that the people both discover and create their world. Honduran campesinos discover (and label) nature's major morphotypes, the biologists' orders and families—the ants and the butterflies "crying out for names." This supports the universalist argument. They discriminate finer categories according to local cultural priorities of avoiding pain, playing, getting food and shelter, and managing pests. This supports the cultural relativist argument, misnamed "utilitarian" in that culture deals with creatures as much for their nuisance value as for their utility. When a culture classifies the creatures that nature camouflages, some species are confused with unrelated ones; some relationships between adults and offspring are misunderstood. Culture ignores the microscopic species and others that nature hides.

We propose that people first discover their world. As the universalist argument suggests, they notice and name the great categories of natural things that cry out for labels. At least with insects, they name major morphotypes (dragonflies, for example) just because those organisms are so perceptually salient, even when they are perceived to have no utility or harm value for humans. However, as people make a living, they create or at least modify their world. They notice more subtle details of coloring, habitat, locomotion, etc., to distinguish pests from nonpests, food from the inedible, the safe from the dangerous (consistent with the utilitarian argument). Traditional rural people label the insect world along universalist lines about to the level of the Linnaean order or family but generally label entomofauna at the (formal, biological) genus or species level only when necessary for utilitarian reasons. In other words, as the universalist perspective suggests, nature provides people with the basic framework for biological taxonomies, the names for living things and the folk knowledge of them. However, people elaborate on that basic system in culturally specific ways to make a living, to play, to avoid pain, and occasionally to meet spiritual and other culturally mediated needs.

Given the limits of unaided human observation, the millions of Earth's species, and other demands on people's attention, traditional peoples cannot label all invertebrates. However, ethnoentomology has ample categories for discussing work and play and for wondering about living things. Folk classification of terrestrial invertebrates is reasonably comprehensive and usually consistent with formal, scientific entomology. Traditional rural people know insects more intimately than anyone except entomologists, but few entomologists know how to harvest wasp honey or are aware that leafcutter ants host lizard lodgers.

We hypothesize that cross-culturally, fish, mammals, birds, trees, weeds, and crops will also be associated with deep knowledge and deep taxonomies and will be named for a mix of natural and cultural properties (because these taxa are culturally important, usually, and easily observed). Disease organisms and most pests of crops, livestock, and the human body will be associated with gritty knowledge and taxonomies that are somewhat stratified and will often be named for their utility (harm) value (because they are culturally important but difficult to observe). Larger insects, large but inedible fungi, and useless but harmless herbaceous plants will be associated with thin knowledge and flat taxonomies in categories formed at high Linnaean levels, and their names will describe their appearance (because they are culturally unimportant but easy to observe). The very small, rare, cryptic beings, such as most nematodes, bacteria, and microscopic fungi, will be associated with no local knowledge, no taxonomies, and no names (because they are difficult to observe and culturally unimportant).

References Cited

ARIOTI, MARIA. 1985. Edible animals of the Ituri Forest, Africa, in the ethnozoology of the Efe Bambuti. *Journal of Ethnobiology* 5:21–28.

ATRAN, SCOTT. 1985. The nature of folk-botanical life forms. *American Anthropologist* 87:298–315.

———. 1987. The essence of folkbiology: A reply to Randall and Hunn. *American Anthropologist* 89:149–51.

BALÉE, W. 1989. Nomenclatural patterns in Ka'apor ethnobotany. *Journal of Ethnobiology* 9:1–24.

BENTLEY, JEFFERY W. 1990. Conocimiento y experimentos espontáneos de campesinos hondureños sobre el maíz muerto. *Manejo Integrado de Plagas* 17(September):16–26.

———. 1991. ¿Qué es hielo? Percepciones de los campesinos hondureños sobre enfermedades del frijol y otros cultivos. *Interciencia* 16:131–37.

———. 1992*a*. Learning about biological pest control. *ILEIA Newsletter* 8:16–17.

———. 1992*b*. "The epistemology of plant protection: Honduran campesino knowledge of pests and natural enemies," in *Proceedings of a seminar on crop protection for resource-poor farmers*. Edited by R. W. Gibson and A. Sweetmore. Chatham, U.K.: Technical Centre for Agricultural and Rural Co-operation and Natural Resources Institute.

———. 1993. What farmers don't know. *Ceres* 26(141):42–45.

———. 1994. "Stimulating farmer experiments in non-chemical pest control in Central America," in *Beyond Farmer First: Rural people's knowledge, agricultural research, and extension practice*. Edited by I. Scoones and J. Thompson, pp. 147–50. London: Intermediate Technology Publications.

BENTLEY, JEFFERY W., GONZALO RODRÍGUEZ, AND ANA

GONZÁLEZ. 1994. Science and people: Honduran campesinos and natural pest control in Honduras. *Agriculture and Human Values* 11:178–82.

BERLIN, BRENT. 1990. "The chicken and the egg-head revisited: Further evidence for the intellectualist bases of ethnobiological classification," in *Ethnobiology: Implications and applications* (*Proceedings of the First International Congress of Ethnobiology* [*Belém, 1988*]), vol. 1. Edited by D. A. Posey, pp. 19–33. Belém: Museu Paraense Emílio Goeldi.

———. 1992. *Ethnobiological classification: Principles of categorization of plants and animals in traditional societies*. Princeton: Princeton University Press.

BOSTER, JAMES. 1987. Agreement between biological classification systems is not dependent on cultural transmission. *American Anthropologist* 89:914–20.

BOSTER, JAMES, BRENT BERLIN, AND JOHN O'NEILL. 1986. The correspondence of Jivaroan to scientific ornithology. *American Anthropologist* 88:569–83.

BROWN, CECIL H. 1984. *Language and living things: Uniformities in folk classification and naming*. New Brunswick: Rutgers University Press.

———. 1992. British names for American birds. *Journal of Linguistic Anthropology* 2:30–50.

CHAMBERS, ROBERT. 1983. *Rural development: Putting the last first*. New York: Wiley.

CHITTAMPALLI, PUDMA, AND F. DAVID MULCAHY. 1990. "Honey and sugar in the treatment of wounds and ulcers in biomedicine and in the Ayurveda," in *Ethnobiology: Implications and applications* (*Proceedings of the First International Congress of Ethnobiology* [*Belém, 1988*]), vol. 2. Edited by D. A. Posey, pp. 155–64. Belém: Museu Paraense Emílio Goeldi.

CONCONI, JULIETA RAMOS ELORDUR DE. 1982. *Los insectos como fuente de proteínas en el futuro*. México, D.F.: Editorial Limusa.

CONKLIN, HAROLD C. 1962. Lexicographical treatment of folk taxonomies. *International Journal of American Linguistics* 28, pt. 2(4):119–41.

———. 1969. "Ethnogenealogical method," in *Cognitive anthropology*. Edited by Stephen A. Tyler, pp. 93–122. New York: Holt, Rinehart and Winston.

DI MICHELE, WILLIAM A., AND ROBERT W. HOOK, WITH RICHARD BEERBOWER, JÜRGEN A. BOY, ROBERT A. GASTALDO, NICHOLAS HOTTON III, TOM L. PHILLIPS, STEPHEN E. SCHECKLER, WILLIAM A. SHEAR, AND HANS-DIETER SUES. 1992. "Paleozoic terrestrial ecosystems," in *Terrestrial ecosystems through time*. Edited by A. K. Behrensmeyer, J. D. Damuth, W. A. Di Michele, R. Potts, H. D. Sues, and S. L. Wing, pp. 204–325. Chicago: University of Chicago Press.

DUFOUR, DARNA L. 1987. Insects as food: A case study from the Northwest Amazon. *American Anthropologist* 89:383–97.

ELLEN, ROY F. 1986. Ethnobiology, cognition, and the structure of prehension: Some general theoretical notes. *Journal of Ethnobiology* 6:83–98.

———. 1993. *The cultural relations of classification: An analysis of Nuaulu animal categories from Central Seram*. Cambridge: Cambridge University Press.

ERWIN, TERRY L. 1988. "The tropical forest canopy: The heart of biotic diversity," in *Biodiversity*. Edited by E. O. Wilson, pp. 123–29. Washington, D.C.: National Academy Press.

GADAGKAR, RAGHAVENDRA. 1991. "*Belongaster, Mischocyttarus, Parapolybia*, and independent-founding *Ropalidia*," in *The social biology of wasps*. Edited by K. G. Ross and R. W. Matthews, pp. 149–91. Ithaca: Cornell University Press.

GONZÁLEZ, ANA. 1993. Elaboración y evaluación de cursos de control biológico para agricultores y extensionistas. Thesis, Escuela Agrícola Panamericana, Zamorano, Honduras.

HAYS, TERENCE E. 1982. Utilitarian/adaptationist explanations of folk biological classification: Some cautionary notes. *Journal of Ethnobiology* 2:89–94.

———. 1983. Ndumba folk biology and general principles of ethnobiological classification and nomenclature. *American Anthropologist* 85:592–611.

HEARST, ELIOT. 1991. Psychology and nothing. *American Scientist* 79:432–43.

HÖLLDOBLER, BERT, AND EDWARD O. WILSON. 1990. *The ants*. Cambridge: Belknap Press.

HOPPE, T. 1986. Storage insects of basic food grains in Honduras. *Tropical Science* 26:25–38.

HUNN, EUGENE S. 1977. *Tzeltal folk zoology: The classification of discontinuities in nature*. New York: Academic Press.

———. 1982. The utilitarian factor in folk biological classification. *American Anthropologist* 84:830–47.

———. 1990. *Nch'i-Wána, "The Big River": Mid-Columbia Indians and their land*. Seattle: University of Washington Press.

HUNN, EUGENE, AND DAVID H. FRENCH. 1984. Alternatives to taxonomic hierarchy: The Sahaptin case. *Journal of Ethnobiology* 4:73–92.

HUNT, JAMES H. 1991. "Nourishment and the evolution of the social Vespidae," in *The social biology of wasps*. Edited by K. G. Ross and R. W. Matthews, pp. 426–50. Ithaca: Cornell University Press.

JEANNE, ROBERT L. 1991. "The swarm-founding Polistinae," in *The social biology of wasps*. Edited by K. G. Ross and R. W. Matthews, pp. 191–231. Ithaca: Cornell University Press.

LA SALLE, J., AND I. D. GAULD. 1991. "Parasitic Hymenoptera and the biodiversity crisis," in *Insect parasitoids: 4th European workshop—Perugia 3–5 April, 1991*, Appendice, pp. 315–34. REDIA 74.

LAST, MURRAY. 1981. The importance of knowing about not knowing. *Social Science and Medicine* 15B:387–92.

MORAN, EMILIO F. 1991. Human adaptive strategies in Amazonian blackwater ecosystems. *American Anthropologist* 93: 361–82.

NETTING, ROBERT MC C. 1993. *Smallholders, householders: Farm families and the ecology of intensive, sustainable agriculture*. Stanford: Stanford University Press.

OLTROGGE, D. F. 1975. "La etnoentomología de algunas categorías de la orden Himenóptera entre los jicaques." *Ponencias de los miembros del Instituto Lingüístico de Verano, A.C. en la XIV Reunión de Mesa Redonda de la Sociedad Mexicana de Antropología y la I Reunión de Antropólogos e Historiadores de Centroamérica y México, 22 al 28 de junio*. Tegucigalpa: Summer Institute of Linguistics.

POSEY, DARRELL A. 1983. Keeping of stingless bees by the Kayapó Indians of Brazil. *Journal of Ethnobiology* 3:63–73.

———. 1984. Hierarchy and utility in a folk biological taxonomic system: Patterns in classification of arthropods by the Kayapó Indians of Brazil. *Journal of Ethnobiology* 4:123–39.

———. 1987. Ethnoentomological survey of Brazilian Indians. *Entomologia Generalis* 12:191–202.

POSEY, DARRELL A., AND JOÃO MARIA FRANCO DE CAMAGO. 1985. Additional notes on the classification and knowledge of stingless bees (Meliponinae, Apidae, Hymenoptera) by the Kayapó Indians of Gorotire, Pará, Brazil. *Annals of Carnegie Museum* 54:247–74.

REEVE, HUDSON K. 1991. "Polistes," in *The social biology of wasps*. Edited by K. G. Ross and R. W. Matthews, pp. 99–148. Ithaca: Cornell University Press.

SETZ, ELEONORE ZULNARA FREIRE. 1991. Animals in the Nambiquara diet: Methods of collection and processing. *Journal of Ethnobiology* 11:1–22.

SILLITOE, PAUL. 1996. *A place against time: Land and environment in the Papua New Guinea Highlands*. London: Harwood Academic Publishers.

STARR, CHRISTOPHER K., AND MARIA EUGENIA BOZZOLI DE WILLE. 1990. "Social wasps among the Bribri of Costa Rica," in *Ethnobiology: Implications and applications* (*Proceedings of the First International Congress of Ethnobiology* [*Belém, 1988*]), vol. 1. Edited by D. A. Posey, pp. 187–94. Belém: Museu Paraense Emílio Goeldi.

VAYDA, ANDREW P., AND INDAH SETYAWATI. 1995. "Questions about culture-related considerations in research on cognition and agro-ecological change: Illustrations from studies of agricultural pest management in Java," in *Cultural dynam-*

ics in development processes. Edited by A. de Ruijter and L. van Vucht Tijssen, pp. 259–78. Amsterdam: UNESCO.

WILK, RICHARD R. 1991. *Household ecology: Economic change and domestic life among the Kekchi Maya in Belize*. Tucson: University of Arizona Press.

WILKEN, GENE C. 1987. *Good farmers: Traditional agricultural resource management in Mexico and Central America*. Berkeley: University of California Press.

WILSON, EDWARD O. 1988. "The current state of biological diversity," in *Biodiversity*. Edited by E. O. Wilson, pp. 3–18. Washington, D.C.: National Academy Press.

———. 1992. *The diversity of life*. Cambridge: Belknap Press.

WINARTO, YUNITA TRIWARDANI. 1996. Seeds of knowledge: The consequences of integrated pest management schooling on a rice farming community in West Java. Ph.D. diss., Australian National University, Canberra, Australia.

Assessing the Biological Status of Human Populations[1]

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The biological status of human populations is an important object of research on human evolution and adaptation to contemporary living conditions and on practical applications related to its role as a mirror of socioeconomic transformations. Every human biological trait reflects living conditions, but the phenotype is the product of all the traits taken together. Moreover, cultural adaptation modifies and replaces biological adaptations and must therefore also be taken into consideration. The biological status of a population describes its potential for health in terms of both negative and positive indices. Body height and weight are usually taken as positive indices of health, especially in childhood. The biological status of an adult is the result of growth and development. From this the health of the environment is also assessed. Biological status, health status, nutritional status, and reproductive fitness are interrelated but have independent meanings and values. The last three of these are also related to certain psychological and social problems. In our discussion the term "biological status" is in general broader than the other three terms.

"Adaptation" is here understood as the structural and functional characteristics of individuals that enhance their survival and reproduction and enable them to cope with their environment. Adaptation may be genetic or cultural. "Adaptive changes" are understood as a pattern of adaptation and/or adjustment to the environment, biological and/or cultural. Any change in environmental conditions causes adaptive changes in human populations. In contemporary populations these changes are usually assessed in terms of a synthetic biological marker, stature. Although such comparisons are based on several traits, each trait is considered separately (Wolański 1966, 1990). Indices relating one trait to another are sometimes used to eliminate differences resulting from variation in stature or weight, but there is a lack of such relations between traits involved in the same physiological process. Some progress in this direction has been provided by factor analysis, which creates a smaller number of noncorrelated factors or components. Unfortunately, these nonmeasurable factors or components are difficult to identify and interpret.

Studies of populations living under different social and economic conditions and at various cultural levels have revealed that it is impossible to distinguish them in terms of any single trait. For example, if individuals representing a certain population are tall, their nutritional and health conditions can be expected to be good; however, the same population may show low endurance fitness, considered a negative trait. People from one population may display high muscular strength but low persistence fitness (stamina), whereas others have high persistence fitness but low muscular strength. Many biological traits—for example, the various respiratory, cardiovascular, and blood traits involved in transporting oxygen to the tissues—interact. If vital capacity alone were examined, the process of respiration would not be fully understood. In the case of some environmental influences, vital capacity, blood pressure, or hematocrit index may not show any changes while changes are apparent in ventilation and/or hemoglobin concentration and/or heart output. The question is which population is biologically better off.

The main aim of this work is to show that the kind of evaluation just described is insufficient. Thus, the problem becomes how to assess the biological status of human populations as an indicator of health and how to interpret variations in individual biological traits. We shall present an attempt to elucidate this problem using investigations conducted in different geographical regions and including populations living under different socioeconomic conditions. We want to show how contemporary human populations in a country that is ethnically rather homogeneous adapt to their living conditions by presenting their phenotypic differences. We suggest that the criteria used for the assessment of biological traits need to be revised; instead of attempting to assign positive or negative values to traits we should

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