Chapter 14
Mediterranean Zootherapy: A Historical to Modern Perspective

Cassandra L. Quave and Andrea Pieroni

Abstract Animals have been used as a source of human medicine for millennia. In the Mediterranean, these ancient practices were documented in historic texts such as Dioscoride's *De Materia Medica* (40–90 A.D.) and continue to be documented even in current day ethnobiological surveys. Here, we summarize a few recent ethnobiological literature on Southern European zootherapy and compare these "modern" traditional medical applications of animals and their byproducts with those ancient practices documented >2,000 years ago. In doing so, we reflect on the continuity between ancient and modern medicine and examine the implications that such practices hold for both animal conservation and drug discovery.

14.1 Introduction

Animals and animal products have constituted an important portion of the Mediterranean pharmacopeia for millennia. Collectively recognized as zootherapeutic remedies today, many of these ancient therapies have persisted in current day traditional medical practices and even become integrated into modern pharmaceuticals. Their use has been documented in both ancient medical texts and recent ethnobiological field studies. In this chapter, we review the results of our field studies on the zootherapeutic practices of the Mediterranean. In doing this,

C. L. Quave (✉)
Center for the Study of Human Health, Emory University, Candler Library 107E,
550 Asbury Circle, Atlanta, GA 30322, USA
e-mail: cquave@emory.edu

A. Pieroni
University of Gastronomic Sciences, Piazza Vittorio Emanuele 9,
I-12060, Pollenzo/Bra, Italy

R. R. N. Alves and I. L. Rosa (eds.), *Animals in Traditional Folk Medicine*,
DOI: 10.1007/978-3-642-29026-8_14,

we employ the use of animals as medicine to better understand the ethnomedical practices of this geographic region. We use the seminal work (*De Materia Medica*) of the Greek physician Pedanius Dioscorides as our main resource for comparison of the state of zootherapy during the time of the Emperor Nero in the Roman Empire (circa first century A.D.) to present day. Here, we discuss the following questions:

- How have ancient zootherapeutic practices become integrated into current day health practices, encompassing both ethnomedical and allopathic care?
- Have the types of animals used in Mediterranean zootherapy changed over the past two millennia? Or, rather, are the same animals used but for different applications?

14.2 Historic Zootherapeutic Practices

Records of zootherapeutic practices have been identified in the surviving texts of ancient cultures, beginning with the earliest written records. For example, historical documents of ancient Egypt such as the *Ebers Paypyrus* (1550 B.C.) include medicinal descriptions of animal substances such as honey, lizard blood, sperm whale ambergis, and musk deer glands, among others (Lev 2006; Nunn 1996; Bryan 1930). Animals have clearly played a central role in the medical pharmacopeias of mankind for at least the past 3,000–4,000 years.

Today, animal-based medicines continue to play an important role in diverse systems of traditional medicine worldwide, as well as in modern pharmaceuticals. Two good examples of this include ACE (angiotensin converting enzyme) inhibitors from pit viper snake [*Bothrops jararaca* (Wied 1824)] venom (Bisset 1991) and dietary supplements of Omega-3 PUFAs (polyunsaturated fatty acids) from certain fish oils (Costa-Neto 2005). The continued use of zootherapeutics from ancient times to present day suggests that their use may be associated with some medical efficacy.

There are several excellent studies that describe the state of medical pharmacopeias in different eras ranging from the tenth to nineteenth centuries in the Mediterranean basin. This includes studies on Medieval zootherapy in the Levant (Lev 2003), Egypt (Lev 2007; Lev and Amar 2006), and Serbia (Jarić et al. 2011), among others. We are interested in gaining a better understanding of how these zootherapeutic practices have evolved over a longer temporal period. Thus, specific to our focus on Mediterranean ethnomedicine, here we assess the state of current-day zootherapy with that documented in this region 2,000 years ago.

14.2.1 Pedanius Dioscorides

Pedanius Dioscorides (40–90 A.D.) was a Greek physician who traveled throughout the Roman Empire (including Asia Minor, Greece, Italy, and France) as an army doctor during the time of the Emperor Nero. It was during this period of travel and practicing medicine that he amassed a wealth of knowledge therapeutic remedies of that era. In particular, he collected medicinal plants, studied disease processes, and collected information on other healing materials. Dioscorides recorded the knowledge that he accumulated over this period in his *De Materia Medica*—a text that has arguably been known as the ultimate authority on plants and medicine for the past 2,000 years. Later medical texts and herbals, including the *Canon of Medicine* (1025 A.D.) by the great Persian polymath Ibn Sīnā (or Avicenna), drew heavily from Dioscorides' work.

Although *De Materia Medica* is best known as an extensively descriptive herbal, details regarding the use of animals or their byproducts in medicine are also abundant. Specifically, Chap. 2 on "Living Creatures" provides a detailed account of more than 100 zootherapeutic remedies. For the purposes of this chapter, we have chosen to use both Goodyer's old English translation (1655), reprinted and edited (Gunther 1959), as well as a more recent modern English translation (Osbaldeston 2000) as key references in comparing the state of zootherapy in the Mediterranean as documented in our various contemporary field studies to that of two millennia ago.

14.3 Results and Discussion

Over the past decade, we have been actively involved in the collection and documentation of traditional knowledge of medical practices in the Mediterranean. Specifically, our research efforts to date have been focused in the areas of modern day Italy (Pieroni and Quave 2005; Pieroni et al. 2002, 2004a, b; Quave and Pieroni 2005, 2007; Quave et al. 2008), Albania (Quave et al. 2010; Pieroni et al. 2005), Serbia (Pieroni et al. 2011), Croatia (Pieroni et al. 2003; Pieroni and Giusti 2008), and Romania (unpublished data). The results of these studies are reported in Tables 14.1–14.5. In these studies, we have endeavored to collect and record data on not only the use of botanical remedies in traditional medicine, but also the use of animals and their byproducts for medical purposes.

14.3.1 Livestock as Medicine

In our field studies, we have noted the prominent incorporation of domestic animals and livestock into the local folk pharmacopeia. In particular, the use of animals like swine, cattle, poultry, goats, and dogs, are most common.

Table 14.1 Animal remedies recorded (2004–2005) in the folk medicine of the Northern Albanian Alps (Pieroni et al. 2005)

Remedy	Preparation and administration	Quoted medical use
Bees wax	Liquefied and arranged on the top of a small piece of cloth which is inserted (still warm) in the ear	To treat earache
Blood	The blood gathered after having cut the ear of the animal is put in the mouth of the same animal	To treat fever in animals
Cheese (fresh)	Applied externally	To heal wounds
	Eaten raw or cooked with flour and eaten hot	"To strengthen the stomach"; anti-diarrheic
Cobweb	Applied externally	Hemostatic
Cow feces	Used fresh and applied externally	To heal burns
Cow milk	Drunk	To treat intestinal pains and poisonings (especially in children, and also in animals)
	Drunk very hot	To treat mumps
Dog hair	Applied externally	To treat wounds from dog bites
Donkey milk	Drunk fresh	To heal coughs in the elderly
Egg	Eaten raw	Antidote against poisoning. Also used for cattle and sheep
	The raw egg is put on a piece of raw wool which is adhered to the body with the help of oil (ritual)	To treat pains (the egg moves on the wool and where the yolk stops, the yolk "takes the pain away" and comes out of the membrane; the whole treatment last at least 1 h!)
	Cooked	Anti-diarrheic
	Eaten	To treat stomach ache
Fish	Left alive in a small amount of water	Diagnostic means to establish the length of hepatitis. While the fish is still alive, the affected person will remain ill (ritual)
Goat fat	Heated and drunk (one spoonful)	To treat asthma
Hen muscular stomach	The membrane of the muscular stomach is extracted and dried, then ground and made into a decoction	To treat kidney stones
Honey	Applied externally under the ears	Mumps
	Applied on the mucosa	To treat mouth inflammations

(continued)

Table 14.1 (continued)

Remedy	Preparation and administration	Quoted medical use
	Dissolved in hot water and milk and drunk	Given as a reconstituent after women have given birth
	Eaten	Given as a reconstituent after women have given birth
Human feces	Used fresh, applied externally	To treat snake bites
Jardun (dense yogurt-like dairy product obtained boiling fresh sheep milk with salt)	Drunk	Reconstituent; used to prevent many illnesses
Medicinal leech[a]	Applied externally	To relieve muscular pains ("they suck the bad blood")
Milk cream	Applied externally	To treat chapped lips
Petroleum[a]	Applied externally on the legs for 24 h	To treat rheumatism[b]
Pork fat	Heated and applied externally	Used as veterinary preparation to heal wolf bites (cattle, sheep, goats), and as a symptomatic for treating skin inflammations due to erysipelas (*Erysipelothrix rhusiopathiae*) in pigs
Rennet (from the calf abomasus)	Dried, added in food	To treat severe digestive troubles in animals[b]
Snail	Fresh meat ground up and mixed with sugar, in compress	To treat eye inflammations
Turtle meat	Eaten cooked	To heal coughs in the elderly[b]
Urine	Applied topically	Toothache, earache, symptomatic in relieving the pains of measles
Yogurt	Eaten	To treat food poisoning (also used for animals)
	Eaten	To treat stomach ache
Wool	Special singlet (*krahol*) and socks made with raw wool, and to worn only when affected by high fever	Diaphoretic
Whey	Drunk	To treat kidney stones; nutraceutical
	Applied externally in washes	To treat sunburn

[a] Product bought in local market
[b] Disappeared use in the last decades

This propensity to use these animals for common ailments is likely related to the ease of access to these products as compared to the rarer, wild terrestrial, or marine organisms.

Table 14.2 Animal remedies recorded (2011) in the folk medicine of a North-Eastern Italian diaspora in Dobruja, Eastern Romania

Remedy	Preparation and administration	Quoted medical use
Cat's tie	Rubbed externally on the affected part	Herpes
Dog's lick	Direct external application	Wounds
Donkey's milk	Drunk	Cough (especially in children)
Egg albumen	Externally applied on the eye	Eye inflammations
	Mixed with hemp fibres, topically wrapped	Sprains
Eggs, mixed with sugar (sbatudin)	Eaten	Gracility (strengthening food, especially for children)
Hare fat (also aged)	Applied externally	Ingrown nails; suppurative
Hedgehog spines	Burned, and the resulting ashes inserted into the vagina	Vaginal complaints
Hen	Soup (*sopa da galina*)	Post-partum reconstituent
Hen's muscular stomach membrane	Dried and powdered, ingested in spoons	Diarrhea
Honey	Externally applied	Burns
Pork lard	Old pork fat is externally applied	Hemorrhoids; sores
Turtle meat	Boiled, then eaten	Tumors
Woman's milk	Inserted in the eye	Eye inflammations

Dioscorides reported some remedies that we have never documented in our studies on contemporary zootherapy. This includes the use of the lungs of swine, lamb or bear for the treatment of foot blisters, and sores; ground horse or ass hooves for epilepsy; goat hooves for baldness; goat liver for blindness; boar liver for snake bite; poultry parts for snake bite; pig knucklebone for colic; whey for epilepsy and skin diseases; and blood as a poison antidote.

Some domestic zootherapeutic remedies, however, have survived the passage of time relatively intact. This may be also due to the fact that a remarkable part of these home-medicines are in fact "food-medicines" (Etkin 2006; Pieroni and Price 2006), i.e. food items, which are consumed to obtain specific therapeutic effects. They are still popular in Southern Europe, especially in rural, and agro-pastoral contexts.

Current zootherapeutical practices involving domestic animal-based food products include for example the use of eggs to treat diarrhea and inflammation; milk (cow, goat, ass, and mare) for treating cough or as a laxative; whey and yogurt for digestive troubles; cheese as an intestinal astringent and topical anti-inflammatory; butter for topical applications (skin infections, inflammations, and burns); and the fats of numerous domestic (and, sometimes, wild) animals are still quoted for various topical applications.

Regarding the treatment of dog bites, there are some similarities in past and current remedies. Today, this is treated using a part of the dog that bit the patient (such as the dog hair), and other wounds may be treated with dog saliva or feces.

Dioscorides, on the other hand, reported treatment of dog bite by eating the roasted liver of the infected dog and also wearing the tooth of this dog as an amulet. Similarly, in modern-day Serbia, wolf teeth are worn as Evil-eye amulets. In both cases, a key component of the treatment is to use some part of the rabid dog that bit the patient in the formulation of the curative therapy. This tradition of treating an animal bite with the culpable animal (or another of same species) is also evident in the case of scorpion stings, which are treated by applying ground up scorpion topically to the affected area.

14.3.2 Wild Terrestrial Animals

Based on the number of remedies reported in *De Materia Medica*, the medical use of wild animals in the Mediterranean appears to has been more prominent in the past. Today, some wild terrestrial animals are employed in the pharmacopeia, and this includes various snakes, insects (bees, scorpions), turtles, rabbits, hedgehog, badger, fox, wolf, birds (storks, pigeons. common cuckoo), leeches, snails, and slugs. Relatively few of these, however, were reported in more than one of our field sites. For example, reports of the use of snails for eye inflammations was only recorded in the north Albanian Alps, despite the availability of this and other similar species in other study sites. Likewise, the use of hedgehog spines for treating vaginal complaints was reported only in eastern Romania, despite the presence of wild populations in other areas of the Mediterranean. Interestingly, this use of the hedgehog is quite different from that reported by Dioscorides. In the past, the hedgehog was used to treat baldness, dropsy, elephantitis, and diarrhea—but nothing related to gynecological issues.

Some of the remedies of the past that were notably absent from reports in our study sites included the use of snake skins for otitis; hares for sterility and as a poison antidote; hippopotamus or beaver testicles for snakebite; burnt weasels for snakebite, gout, scrofulous tumors, and epilepsy; frogs for snakebite, toothache, and baldness; bed bugs for quartian fever (malaria); cockroaches for otitis pain; woodlouse for tonsillitis, otitis pain, painful urination and jaundice; seagull liver for placental expulsion following birth; grasshoppers for bladder problems; locusts for difficult urination; osprey for kidney stones; skylark for colic, swallows for epilepsy and tonsillitis; elephant tooth for abscesses (whitlows) of the finger or toenails; skink as an aphrodisiac; and earthworms for toothache, among some others. Bees wax, honey and propolis, however, are used medicinally in much the same way as 2,000 years ago in both topical and oral (medicinal food) applications.

Although certain exotic animals, such as the hippopotamus, elephant and skink were included in the ancient pharamacopeia, they are notably absent today. In the past, these animal products would have likely been included in the trade network responsible for moving plant materials throughout the Mediterranean. Today, however, such trade is highly restricted due to international laws that govern the movement of biological materials. Trade restrictions undoubtedly influence the use

Table 14.3 Animal remedies recorded (2010) in the folk medicine of Serbians and (bosniakicized) Albanians in the Pešter plateau, South-Western Serbia (Pieroni et al. 2011)

Remedy	Preparation and administration	Quoted medical use
Badger (*jazavac*)'s internal organs	Topical applications of the fresh internal organs, immediately after the animal has been killed	Hemorrhoids
Bee's wax	Externally applied	Earache
		Bruises
Butter and clarified butter	Consumed	Panacea
	External applications	Warts, chilblains, and wounds
Cheese	Consumed	Galactagogue
Clotted cream (*kajmak*) and cream	Consumed	Reconstituent
	External applications	Emollient and chilblains
Cow/buffalo/sheep fat	Mixed with bee's wax and honey, in a cream and externally applied	Wounds
Dairy products (all)	Consumed	Prevention of bone fractures, panacea
Donkey's milk	Drunk	Pertussis
Donkey's urine	Instilled in the nose (urine has to come from young animals only)	Sinusitis
Dog's saliva (lick)	External lick given by young dogs	Warts
Ewe's milk	A piece of cloth imbibed with ewe's milk and put on top of a child's abdomen	Anthelmintic
Ewe's cheese (fresh)	Consumed	"Good for the heart," diabetes, reconstituent
Fat-based foods	Consumed	Galactagogue
Fox's veins	Dried veins of a killed fox, put inside the ear	Earache
Goat cheese	Topically applied	Wounds
Goat milk	Drunk	Cough
Goat or sheep skin	Topically applied (warm) on the chest, (with a piece of paper to divide the human and goat skins)	Bronchitis
Honey	Consumed	Cough, sore throat, galactagogue, heart tonic, "good for the circulation," panacea
	Topically applied	Burns
Horse's hair	Tied to the wart for 2 days	Warts
Human urine	Topically applied	Skin burns, furuncles

(continued)

Table 14.3 (continued)

Remedy	Preparation and administration	Quoted medical use
Jardum (dairy product obtained by gently heating fresh ewe's milk—milked in July and August only—with salt)	Consumed	Panacea
Milk (generally cow's milk)	Boiled, and then drunk	Sore throats, fever, headache, hypertension, constipation, "healthy food"
		Galactagogue
Mare milk (milked after the mare has given the first birth)	Drunk	Sore throats, cough, pertussis
Mother's lick	Mother licking in the central part of the front of the child, then simulating spitting three times on the right and three times on the left	Evil Eye
Pork lard	External massages with lard, at the end with *rakija*	Wounds, chilblains, fever (children)
Snake	Snake dried in the shadow of a juniper shrub, then the fat extracted and stored; snake fat, mixed with lemon balm tea and flour, to make a poultice (*mehlem*)	Every skin disease
Stork (*Ciconia ciconia*, *leileku/roda*)'s beak or bone	A dried piece of stork—generally the beak or a bone—in a necklace, or sewn in the internal part of a cloth and dressed, as an amulet; alternatively, a stork's feather is boiled and the resulting water used in external washes	Evil Eye amulet
Yogurt (*kos, kiselo mlijeko*)	Drunk	Stomachache, hypertension, "good for the circulation," "healthy food," panacea
Whey (*hirra, surutka*)	Drunk	Digestive troubles, diabetes, obesity; Cold, bronchitis
Wolf' tooth	Used in a necklace, as an amulet	Evil Eye amulet
Woman's milk	External application	Earache, eye inflammations
Wool	External application	Chilblains
	Dress in warm wool clothes	Rheumatisms, fever

of various animal products as people tend to use those resources which are most readily available to them—either by way of their environment, agricultural practices, or local markets.

Table 14.4 Animal remedies recorded (2001–2006) in Arbëreshë (ethnic Albanian) villages, southern Italy (Quave et al. 2008; Pieroni et al. 2002)

Remedy	Preparation and administration	Quoted medical use
Dog saliva	External application	Anti-furuncles, antiseptic[a]
Donkey hair (braided rope)	Ritual object (tool used for the topical application of red wine)	Ritual healing of *mal vjint*
Egg albumen	Scrambled, local application with salt and cotton or wheat bran	Anti-bruises[a]
Hair	External amulet	Amulet against *malocchio* (evil-eye)[a]
Hen meat	Cooked in a soup as food	Reconstituent after giving birth
Honey	Consumed	Against sore throat
Horse blood	Consumed raw	Anti-anemia[a]
Pig gall bladder	Left outside for one night and then applied topically	Anti-chilblain[a]
Ricotta cheese	Consumed	Light anti-diarrheal
Scorpion	Oleolite (cold decoction with olive oil to be instilled in the ears)	Anti-otitis[a]
Whey (liquid precipitate from the cheese making process)	Drunk	Mild laxative
Wood affected by woodworms (*Anobium punctatum*)	External application	Hemostatic; anti-mastitis[a]

[a] No longer used

14.3.3 Marine Life

Roughly 24% of the animal-based remedies reported by Dioscorides relate to marine animals. The difference in knowledge of marine animals for medicine between then and now is quite remarkable as only one example of a marine animal used for human medicine (fish used as a diagnostic tool for hepatitis) was reported in our studies. This could be due to the fact that our study sites were not located in close proximity to the sea—but were rather in land-locked or even in mountainous zones. Dioscorides, on the other hand, would have spent much time in coastal communities during his maritime travels throughout the Mediterranean with the army.

The diversity of sea life used in ancient medicine reported by Dioscorides is astonishing—and ranged from various types of fish (scorpion fish, spiny-finned fish, cuttlefish, red mullet, sheath fish, maena, smelt, and tunny), to sea urchins, shellfish (purpura), mussels, seahorse, whelks, bivalves, crabs, sea centipedes, electric rays, sea hares, sting rays, sea gudgeons, and jellyfish. Examples of their medicinal uses included the sea urchin being good for the stomach and intestines, and a diuretic; the sea horse for treating baldness; mussels for eye remedies and to treat dog bite; crabs for snakebite and other insect bites and to treat consumption; sea centipedes and sea hares for depilation (hair removal); sea scorpion fish gall for

Table 14.5 Animal derived remedies recorded in the folk medicine of the Dolomiti Lucane (Castelmezzano and Pietrapertosa), inland Southern Italy (Pieroni et al. 2004a; Quave et al. 2008, 2010)

Remedy	Preparation and administration	Quoted medical use
Two-headed salamander	Head cut and stored in alcohol	Good omen
Cerumen	Topical application	Heal purulent skin abscesses (caused by thorns)
Common coockoo	To hear the bird singing	Good omen for long life
Cow feces	Topical application	To heal skin burns
	Smelling it early in the morning	Against pertussis
Dog feaces	Topical application	To heal skin burns
Donkey milk	Drunk	Reconstituent for children
Dried ricotta	Mixed with hot water, which remains after having boiled noodles, and then the mixture used as sauce for the same noodles; mixed with boiled bread	Anti-diarrhea; galactagogue
Egg albumen	Scrambled and topically applied with a cloth	Anti-bruises
Egg	Boiled eggs	Anti-diarrhea
Fermented cream (from cow milk)	Topical application	Emollient for healing skin inflammations of babies
Four-lined snake	Fat (*a sunzē*) extracted when the snake is still alive, used as an ointment	Anti-rheumatism
Goat milk	Drunk hot with honey	Anti-tussive; reconstituent (children)
Human hair	Cut on 1st Friday of March	Good omen for preventing headache
Hen meat	Soup	Post-partum depurative (even given as gift to a woman who has just given birth); reconstituent during various illnesses
Human milk	Topical application	To heal eye inflammations
Human sweat	Topical application of the sweat soaked inner brim of a hat	Anti-wounds
Insect (non identified)	The crystal of the insect placed on necklaces to be dressed	Amulet against the evil-eye (*affascēnē*)
Leather (extracted from a black dog)	To be worn as an amulet	Against the evil-eye
Leech	Topical application	To heal a not clearly identified disease related with skin troubles, as an apotropoaic: if the animals survive after the application, it is seen as good omen
Mouse	Eaten boiled or cooked	Anti-enuresis

(continued)

Table 14.5 (continued)

Remedy	Preparation and administration	Quoted medical use
Pig lard	Soup	Laxative
Pigeon meat	Soup	Postpartum depurative (even given as gift to the women who have had a birth); reconstituent during an illness
	Soup	Galactagogue
Sheep milk	Drunk	Laxative
Silk ribbon	Bound around the wart	Anti-warts
Slug	Topical application	To heal warts: after the treatment, which has to be carried out when full moon is decreasing, the slug is hung on a *Rubus ulmifolius* thorn; when the animal has dried up, the wart will have disappeared
Urine	Topical application	Hemostatic
Whey	Drunk	Laxative; digestive troubles
Wood affected by woodworms		Topical application
Antiseptic (babies)		

treating white spots on the cornea; sting rays for tooth extraction; red mullet to treat pains of spider bites and sea dragon and scorpion stings; sheath fish for sciatica and dysentery; sea gudgeon as a laxative; and smelt to treat warts, corns, and gangrenous ulcerations. Further ethnobiological studies conducted in coastal communities in this region would be of great utility in gaining a better understanding of the continuity of traditional knowledge of marine zootherapeutics in comparison with this and other ancient texts of the region.

14.4 Conclusions

Zootherapy is still a thriving practice in the Mediterranean, though based on our field studies in interior and mountainous regions; it is relatively restricted to domestic and some wild terrestrial animals. This differs greatly from Dioscorides reports which included a great diversity of marine life and also several valuable exotic species that would have likely been traded throughout the region by land and sea during his lifetime. Most of the animals included in the ancient and contemporary pharmacopeias of this region shared the characteristic of being readily available to the people using them. Today, domestic animals and some wild species that are common in agricultural communities and the surrounding areas are used most often.

It is interesting to note that many of the same types of livestock used 2,000 years ago for these medicinal purposes are still used today, though the preparation and application of the products may vary by region. Thus, while many of these medicinal products continue to play an important role in local ethnomedical practices; very few have made the transition to modern pharmaceutical applications. Further pharmacological investigation of those remedies that have withstood the test of time is necessary and could lead to both the validation of these traditional medical practices and the development of new pharmaceuticals for the global market.

References

Bisset NG (1991) One man's poison, another man's medicine? J Ethnopharmacol 32:71–81

Bryan CP (1930) Ancient egyptian medicine. The Papyrus Ebers Ares, Chicago

Costa-Neto EM (2005) Animal-based medicines: biological prospection and the susatinable use of zootherapeutic resources. Anais da Academia Brasileira de Ciências 77(1):33–43

Etkin N (2006) Edible medicines, An ethnopharmacology of food. University of Arizina Press, Tucson

Gunther RT (1959) The greek herbal of dioscorides. Hafner Publishing Co, New York

Jarić S, Mitrović M, Djurdjević L, Kostić O, Gajić G, Pavlović D, Pavlović P (2011) Phytotherapy in medieval Serbian medicine according to the pharmacological manuscripts of the Chilandar Medical Codez (15–16th centuries). J Ethnopharmacol 137:601–619. doi:10.1016/j.jep.2011.06.016

Lev E (2003) Traditional healing with animals (zootherapy): medieval to present-day Levantine practice. J Ethnopharmacol 85:107–118. doi:10.1016/S0378-8741(02)003377-X

Lev E (2006) Healing with animals in the Levant from the 10th to the 18th century. J Ethnobiol Ethnomed 2:11

Lev E (2007) Drugs held and sold by pharmacists of the Jewish community of medieval (11th-14th centuries) Cairo according to lists of *materia medica* found at the Taylo-Schechter Genizah collection, Cambridge. J Ethnopharmacol 110:275–293. doi:10.1016/j.jep.2006.09.044

Lev E, Amar Z (2006) Reconstruction of the inventory of *materia medica* used by members of the Jewish community of medieval Cairo according to prescriptions found in the Taylor-Schechter Genizah collection, Cambridge. J Ethnopharmacol 108:428–444. doi:10.1016/j.jep.2006.06.005

Nunn JF (1996) Ancient egyptian medicine. University of Oklahoma Press, Norman

Osbaldeston TA (2000) Dioscorides De Materia Medica: Being an Herbal with Many other Medicinal Materials Written in Greek in the First Century of the Common Era; A New Indexed Version in Modern English. IBIDIS Press, Johannesburg

Pieroni A, Dibra B, Grishaj G, Grishaj I, Gjon Maçai S (2005) Traditional phytotherapy of the Albanians of Lepushe Northern Albanian Alps. Fitoterapia 76(3–4):379–399. doi:10.1016/j.fitote.2005.03.015

Pieroni A, Giusti ME, Münz H, Lenzarini C, Turković G, Turković A (2003) Ethnobotanical knowledge of the Istro-Romanians of Žejane in Croatia. Fitoterapia 74(7–8):710–719. doi:10.1016/j.fitote.2003.06.002

Pieroni A, Giusti ME (2008) The remedies of the folk medicine of the croatians living in Cidarija Northern Istria. Coll Antropol 32(2):623–627

Pieroni A, Giusti ME, Quave CL (2011) Cross-cultural ethnobiology in the Western Balkans: medical ethnobotany and ethnozoology among Albanians and Serbs in the Pešter Plateau, Sandžak South-Western Serbia. Anglais 39(3):17. doi:10.1007/s10745-011-9401-3

Pieroni A, Price LL (2006) Eating and healing. Traditional food as medicine. Haworth Press, Binghamton

Pieroni A, Quave CL (2005) Traditional pharmacopoeias and medicines among Albanians and Italians in southern Italy: a comparison. J Ethnopharmacol 101(1–3):258–270

Pieroni A, Quave CL, Nebel S, Heinrich M (2002) Ethnopharmacy of the ethnic Albanians (Arbëreshë) of northern Basilicata Italy. Fitoterapia 73(3):217–241. doi:10.1016/S0367-326X(02)00063-1

Pieroni A, Quave CL, Santoro RF (2004a) Folk pharmaceutical knowledge in the territory of the Dolomiti Lucane, inland southern Italy. J Ethnopharmacol 95(2–3):373–384. doi:10.1016/j.jep.2004.08.012

Pieroni A, Quave CL, Villanelli ML, Mangino P, Sabbatini G, Santini L, Boccetti T, Profili M, Ciccioli T, Rampa LG, Antonimi G, Girolamini C, Cecchi M, Tomasi M (2004b) Ethnopharmacognistic survey on the natural ingredients used in folk cosmetics, cosmeceuticals and remedies for healing skin diseases in the inland Marches, Central-Eastern Italy. J Ethnopharmacol 91:331–344. doi:10.1016/j.jep.2004.01.015

Quave CL, Lohani U, Verde A, Fajardo J, Rivera D, Obón C, Valdes A, Pieroni A (2010) A comparative assessment of zootherapeutic remedies from selected areas in Albania, Italy Spain and Nepal. J Ethnobiol 30(1):92–125

Quave CL, Pieroni A (2005) Ritual healing in Arbëreshë Albanian and Italian communities of Lucania, southern Italy. J Folklore Res 42(1):57–97

Quave CL, Pieroni A (2007) Traditional health care and food and medicinal plant use among historic Albanian migrants and Italians in Northern Lucania, southern Italy. In: Pieroni A, Vandebroek I (eds) Travelling cultures, plants and medicines. The ethnobiology and ethnopharmacy of migrations. Berghahn Press, Oxford pp 204–226

Quave CL, Pieroni A, Bennett BC (2008) Dermatological remedies in the traditional pharmacopoeia of Vulture-Alto Bradano, inland southern Italy. J Ethnobiol Ethnomed 4:5. doi:10.1186/1746-4269-4-5

Rômulo Romeu Nóbrega Alves
Ierecê Lucena Rosa
Editors

Animals in Traditional Folk Medicine

Implications for Conservation

Springer

Editors
Rômulo Romeu Nóbrega Alves
CCBS—Departamento de Biologia
Universidade Estadual da Paraiba
Campina Grande-PB
Brazil

Ierecê Lucena Rosa
CCEN/Depto. de Sistemático
Universidade Federal da Paraíba
João Pessoa-PB
Brazil

ISBN 978-3-642-29025-1 ISBN 978-3-642-29026-8 (eBook)
DOI 10.1007/978-3-642-29026-8
Springer Heidelberg New York Dordrecht London

Library of Congress Control Number: 2012940466

Printed on acid-free paper

Springer is part of Springer Science+Business Media (www.springer.com)