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# *Cultural Conservation of Medicinal Plant Use in the Ozarks*

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While a number of recent health care studies have focused on the availability of modern health care services among rural U.S. populations, the commensurate study of access to folk medical systems has been relatively neglected. In this paper we explore the cultural conservation of folk medicinal plant use in 14 communities across the Ozark Mountain region of Arkansas and Missouri. Six relevant socioeconomic and demographic factors are examined in relation to the number of medicinal plant applications reported by expert informants in each locale. Using a multiple correlation and regression analysis, we find that the preservation of traditional medicine and praxis in the Ozarks is inversely related to community "delocalization." It is suggested that the survival of esoteric, albeit dynamic, medical knowledge and praxis among rural populations ultimately depends upon sustaining biological and cultural diversity.

**Key words**: Ozarks, medicinal plants, delocalization, cultural conservation, ethnobotany

A number of recent health care studies in the United States have been concerned with the accessibility of rural populations to modern health care services (e.g., Comer and Mueller 1995; DeFriese and Ricketts 1989; Escovitz and Birdwell 1996; Jecker and Berg 1992; Krein 1997; Ramsbottom-Lucier et al. 1996; Strickland and Strickland 1995). Relatively neglected, however, is the commensurate study of access to folk medical systems. Folk medicine, which includes the use of home remedies and local medicinal plants, as well as a primary reliance on family and friends for information and social support, remains a viable health care alternative in many rural communities. For this reason alone, there is a corresponding need to examine the factors associated with its preservation. In a provocative article on the use of traditional medicine in American families, Doris Wilkinson (1987:72) suggests that:

> the duration of folk medicine is the result of…the regional location of its users; repeated success with particular plants and herbs; limited economic resources; the escalating cost of physician services, prescription medicines, and hospitalization; lack of comprehensive health insurance; the distrust of modern medical technology and of doctors; lack of immediate access to treatment facilities in rural and isolated communities; and intrinsic intrafamily sentiments and traditional help patterns.

In this paper, our goal is to investigate the contribution several of these factors make to the conservation of folk medicine in the Ozark Mountains of Arkansas and Missouri. As a region of relative isolation, the Ozarks provide a rare ethnographic opportunity to examine in particular how local knowledge and practices are conserved and, in general, how folk culture is expressed and rendered meaningful.

## The Study Area and Its People

The Ozark Mountains, including the Ouachita region to the south, encompass roughly 70,000 square miles and consist of rugged ridges, broad valleys, and dense forests across the states of Arkansas, Missouri, Oklahoma, and Kansas (Rafferty 1980; Rafferty and Catau 1991). Most of the region was settled by Scotch-Irish and German immigrants during the mid to late 1800s (Gerlach 1986; Rafferty and Catau 1991; Rossiter 1992). The mixed economy is based on timber, mining, and farming in the highlands and large-scale agriculture in the river valleys.

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Most Ozark natives are white Protestants of Scotch-Irish descent (Gerlach 1986; Rossiter 1992). The frontier migrants who settled the Ozark Highlands were European-American farmers from Southern Appalachia, specifically Eastern Tennessee and Kentucky. Not long after settling the region, these hill dwellers were branded with "hillbilly" stereotypes by virtue of their relative socioeconomic isolation (Sabo et al. 1990), a popular image still romanticized in American literature and film. In a descriptive account of changing lifeways in the Ozark and Ouachita Mountains, Milton Rafferty (1987:7) identifies a number of regional cultural characteristics, which include:

> clinging to traditional technologies, a disdain for city life and education, a suspicion of outsiders, conservative politics, a reverence for outdoor activities, fundamental religious beliefs, with the persistence of traditional religious practices such as brush-arbor revivals and river baptisms…[and] a preference for traditional forms of entertainment and music.

The tradition of self-reliance on both the individual and community level is an additional salient feature of Ozark Mountain culture. Ozarkers are generally industrious people who pride themselves on their independence. Like their Appalachian neighbors, Ozarkers maintain a strong sense of community, cooperation, and mutual aid. Help from outsiders, however, is only grudgingly accepted or avoided altogether.

In Ozark communities, women play pivotal roles in the delivery of health care. For example, it is mostly women who gather wild plants from forests and herbs from garden patches to prepare medicinal concoctions, provide treatment to the sick, and assist in natal events (Gibbens 1992; also see Sachs 1996). Known among some hill folk as *granny women,* these practitioners are especially experienced in childbirth management (Scott 1982), yet are knowledgeable in using plant-based medicines for treating illnesses, from childhood conditions such as dropsy and thrush to geriatric ailments including arthritis and rheumatism.

As are commonly found in Southern Appalachia, Ozark *root diggers*, who are typically young and male, also extract medicinal plants from local forests, but for commercial sale on the crude drug market rather than for personal or medical use (Price 1960). Root diggers are not generally consulted for their medical expertise, but are renowned in their communities for their practical knowledge of native botanicals and their identification. A third category of experts, the male folk practitioners, specialize in a more arcane and secretive form of herbal medicine. Known locally as *yarb doctors*, these individuals have a more superstitious orientation toward the concept of illness and rely upon supernatural beliefs and practices when treating the sick (e.g., Randolph 1964). Yarb doctors offer their medical services to any ailing member of the community; they are skilled in concocting medicines using wild botanicals combined with household items such as whiskey, vinegar, and turpentine.

In general, it can be said that granny women, root diggers, and yarb doctors each acquire their botanical expertise rather informally within their communities. Interestingly, the transmission of folk knowledge in the rural Ozarks is very much a social process of information sharing that tends to alternate between generations of individuals. For example, granddaughters learn about botanical medicines by working closely with their grandmothers, while grandsons learn to emulate the plant selection techniques of their grandfathers (see Nolan n.d.).

## Research Methods and Results

To assess the factors associated with the preservation of folk medicinal plant use, two kinds of data were collected. First, 14 medicinal plant experts (nine females and five males), each from a different Ozark county, were selected by local reputation during the summers of 1995 and 1996 and interviewed. From each informant, a free-listing of native medicinal plants was obtained (Bernard 1994:239-242; Robbins and Nolan 1997) along with the corresponding medical applications for each plant (Martin 1995). Informants were asked to describe the attributes of each listed plant (leaf shape, flowering time, etc.) to aid in the formal identification of reported species. Each reported plant was later identified to species level by consulting regional floral keys (Denison 1991; Hunter 1989, 1984; Moore 1988) and by cross-checking the published species descriptions against those supplied by the informants.

The number of different medical applications specified constituted the measure of medicinal plant use for each informant (Phillips and Gentry 1993)[1]. A total of 39 names of medicinal plants were reported in the free-listing task. The average was 9.2 medicinal plant names (S.D. = 3.2). Among the most frequently mentioned are jewelweed (*Impatiens capensis*), may apple (*Podophyllym peltatum*), sassafras (*Sassafras albidum*), heal-all (*Prunella vulgaris*), wild black cherry (*Prunus serotina*), and pokeweed (*Phytolacca americana*). See Figure 1 for a composite list of reported plants and corresponding applications.

For the 39 listed plants, 224 applications were mentioned in total. The average per informant was 16 (S.D. = 6.7). The majority of medicinal plants are targeted for the treatment of common chronic illnesses, including colds, coughs, blood impurities, diarrheas, and arthritis. Lesser mentions include dysentery, infant thrush, gout, ringworm, toothache, and urinary pain.

Following Wilkinson (1987), the second type of information gathered concerns six relevant demographic and socioeconomic variables on the informants' communities and counties thought to effect the degree of medicinal plant use. As listed in Table 1, the predictor variables are: 1) miles from nearest urban center of 50,000; 2) number of county physicians; 3) yearly county retail sales; 4) county population density; 5) the percentage of county population over age 18; and 6) acres of county farmland. To examine the effect these vari-

**Figure 1. Reported Plant Names and Corresponding Applications**

| Family | Species | Vernacular Name | Medicinal Use(s) | Part(s) Used |
|---|---|---|---|---|
| Anacardiaceae | *Rhus aromatica L.* | Sumac | colds, fevers, diarrhea | berries, leaves |
| Apiaceae | *Eryngium yuccafolium L.* | Snakeroot | snakebite | roots |
| Araceae | *Arisaema atrorubens Mart.* | Indian turnip | asthma, rheumatism | roots |
| Araliaceae | *Panax quinquefolius L.* | Ginseng | stimulant, cure-all | roots |
| Asclepiadaceae | *Asclepias sp.* | Milkweed | kidney pain, warts | plant |
| Asteraceae | *Solidago sp.* | Goldenrod | indigestion, fatigue | flowers, leaves |
| Balsaminaceae | *Impatiens capensis L.* | Jewelweed | poison ivy | leaves |
| Berberidaceae | *Podophyllum peltatum L.* | May Apple | colds, fevers | fruit |
| Betulaceae | *Betula nigra L.* | River Birch | wounds, urinary pain | bark |
| Betulaceae | *Alnus serrulata Mill.* | Alder | sore throat | inner bark |
| Boraginaceae | *Lithospermum incisum L.* | Yellow Puccoon | stomach pain, vomiting | roots |
| Campanulaceae | *Lobelia sp.* | Lobelia | pneumonia | leaves, flowers |
| Cornaceae | *Cornus sp.* | Dogwood | fever, diarrhea, malaise | bark, berries |
| Cupressaceae | *Juniperus virginiana L.* | Juniper | dropsy, bronchitis, heartburn | berries |
| Fagaceae | *Castanea pumila Mill.* | Chinquapin | constipation | nuts |
| Geraniaceae | *Geranium sp.* | Crane’s Bill | sore throat | stems, leaves |
| Hamamelidaceae | *Hamamelis virginiana L.* | Witch Hazel | wounds, infections, diarrhea | bark |
| Hamamelidaceae | *Liquidambar styracifula L.* | Sweet Gum | expectorant, skin rashes | balsam |
| Juglandaceae | *Juglans nigra L.* | Black Walnut | ringworn, diarrhea | bark, fruit rind |
| Juglandaceae | *Carya texana Nutt.* | Hickory | asthma | bark |
| Lamiaceae | *Prunella vulgaris L.* | Heal-All | ulcers, blood purifier, thrush | leaves |
| Lamiaceae | *Monarda spp.* | Mint, Horsemint | insomnia, nausea, coughing | leaves |
| Lauraceae | *Sassafras albidum Nees* | Sassafras | fever, pain, blood purifier | roots, bark |
| Liliaceae | *Allium stellatum L.* | Wild Onion | high blood pressure, heartburn | bulb |
| Magnoliaceae | *Magnolia tripetala L.* | Magnolia | colds | bark |
| Moraceae | *Morus rubra L.* | Mulberry | laxative | bark |
| Myricaceae | *Myrica cerifera L.* | Wax Myrtle | wounds, dysentery | bark, leaves |
| Oleaceae | *Fraxinus quadrangulata L.* | Blue Ash | laxative | fruit |
| Passifloraceae | *Passiflora incarnata L.* | Passion Flower | tension | fruit, seeds |
| Phytolaccaceae | *Phytolacca americana L.* | Pokeweed | pain, arthritis | leaves, roots |
| Ranunculaceae | *Hydrastis canadensis L.* | Golden Seal | infections, stomach pain, purifier | roots |
| Rhamnaceae | *Rhamnus caroliniana L.* | Buckthorn | laxative | bark |
| Rosaceae | *Prunus serotina L.* | Black Cherry | colds, coughing, kidney pain | bark |
| Rosaceae | *Rubus spp.* | Blackberry | colds, coughing, diarrhea | roots |
| Rutaceae | *Zanthoxylum americanum L.* | Toothache Tree | tooth pain, rheumatism | bark |
| Salicaceae | *Populus alba L.* | Poplar | wounds | buds |
| Salicaceae | *Salix sp.* | Willow | fever, arthritis | bark |
| Tiliaceae | *Tilia americana L.* | Basswood | colds | flowers |
| Ulmaceae | *Ulmus rubra L.* | Slippery Elm | sore throat, dysentery | bark |

ables have on medicinal plant use, both separately and together, a multiple correlation and regression analysis was performed[2].

Table 1 displays the intercorrelations among the variables. As seen in column 1 of Table 1 in descending order of importance, a number of rather high to moderate significant zero-order correlations exist between the number of reported plant applications and each of the six predictor variables. The strongest correlation with medicinal plant use is the distance in miles of each community to the nearest urban center ($r = .76$, $p < .01$), followed by the scarcity of practicing physicians residing in the informant’s home county ($r = -.66$, $p < .05$)[3]. This pattern suggests that the geographic remoteness of each informant’s community from cosmopolitan centers and services has contributed to the continuity of medicinal plant use. Thus, the same physical barriers that prevent access to modern medical services appear to have, in turn, facilitated the survival of folk medicine (see Ramsbottom-Lucier et al. 1996).

Low yearly county retail sales ranks third in importance ($r = -.66$, $p < .05$). This suggests that the proprietorship of traditional medical knowledge in the Ozarks is inversely linked to exposure to commercial activity and the concomitant pattern of access and acquisition of cosmopolitan goods

**Table 1: Correlations Between Number of Plant Applications and Socioeconomic Variables**

| Partial Correlation | Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|
| | 1. Number of reported plant applications | 1 | | | | | | |
| .62 | 2. Miles from urban center | .76** | 1 | | | | | |
| .25 | 3. Number of physicians in county | -.66* | -.49 | 1 | | | | |
| .18 | 4. Yearly retail sales for county | -.66* | -.52 | .98*** | 1 | | | |
| .05 | 5. Population density for county | -.62* | -.43 | .97*** | .97*** | 1 | | |
| .10 | 6. Percent of county population over 18 | .57* | .62* | -.48 | -.51 | -.47 | 1 | |
| .08 | 7. Amount of farmland in county | -.47 | -.44 | .68** | .70** | .67** | -.44 | 1 |

***significant at the .001 level; **significant at the .01 level; *significant at the .05 level

and services. Fourth is low population density ($r = -.62$, $p < .05$). The more sparsely populated counties are largely without health clinics, and it is here that folk medicine is an especially feasible option.

The penultimate variable is an older county age structure, as indicated by the percentage of the population over age 18 ($r = .57$, $p < .05$). Communities located in areas inhabited by older populations appear to conserve medicinal plant knowledge more than those with younger age structures. This finding (in addition to those above) is consistent not only with Wilkinson but also Palmore (1983), whose research on health care behavior among the rural elderly has identified similar models of self-treatment, resistance to modern care, and adherence to traditional medical practices.

The last variable, acres of county farm land, is not only insignificantly correlated with medicinal plant use, it is in the opposite direction from that expected ($r = -.47$, $p > .05$). This variable was included as an ecological component to determine whether land disturbance (and the subsequent growth of opportunistic species) is positively related to local knowledge of ambient plants (e.g., Brown 1985). The weak correlation between the lack of farm land and plant knowledge, coupled with the stronger correlations with demographic and socioeconomic variables, suggests that the retention of plant-based medicine in the Ozarks is due more to sociocultural forces than plant ecology and biodiversity (Etkin 1988; Moerman 1979, 1989).

Further examination of Table 1 also reveals that many of the independent predictor variables are themselves highly intercorrelated (e.g., population density and the number of physicians per county shown in row 5, column 3 [$r = .97$]). These reflect the interrelationship between the geographic, demographic, and socioeconomic factors that, in concert, contribute to the region's relative detachment from modern cosmopolitan culture.

To examine the relative predictive efficacy of each of these variables, together and separately, a multiple regression analysis was performed. The multiple correlation coefficient of .84 is encouraging and indicates that 71% of the variance in the number of medicinal plant applications can be explained by the entire set of predictor variables. The partial correlation coefficients, which examine the effects of each variable when others are statistically controlled, are listed in the left-hand column of Table 1. Their relative order of magnitude differs slightly from the zero-order correlations for variables five, six, and seven. The ranking of the first three variables remains essentially the same, with variable 2, distance from urban centers, of overwhelming importance[4].

## Summary and Conclusion

In general, the number of reported medicinal plant applications is inversely related to what has been called *delocalization*, a form of modernization in which the members of a socioeconomic system become dependent upon exogenous, commercially distributed technologies (Pelto 1973:165; also see Bernard and Pelto 1987). As communities undergo the process of delocalization, traditional technology, and the local knowledge and praxis that sustains it, are relinquished in favor of cosmopolitan beliefs and practices. This process probably explains the decline in medicinal plant use within Ozark communities situated in close proximity to urban centers.

In this sense, rural areas can be conceptualized as repositories of traditional culture. Accordingly, the conservation of medicinal plant knowledge can be considered a form of stand by technology, or a set of strategies held in "ready reserve" should contemporary technology fail (Roberts 1971:212). In those locales where traditional medical praxis continues to thrive, botanical knowledge, and its uses, can be seen as dynamic and adaptive, *not* static or ahistorical. That is, while a number of age-old uses for medicinal plants have endured, folk experts often discover new uses for plants over time and freely exchange this information with one another as did their European forebearers who settled this region (Nolan n.d.). The efficacy of traditional medicine has been demonstrated by its persistence through many generations of Ozarkers. It is also shown by the strong, recent demand for alternative therapies among cosmopolites, especially when contemporary medicine has fallen short of their needs and expectations (Tyler 1996).

In sum, access to folk medicine in the Ozarks is greatest for communities relatively removed from urban centers, with few physicians, low population density, light commerce, and a high proportion of elderly in residence. It is here, in these more bucolic places, that a diversity of cultural alternatives can endure if not flourish. The survival of local medicinal plant knowledge ultimately depends on the interdependent processes of cultural and biological diversification (Balick 1996; Brush 1996). Local culture, biota, and their habitat must be protected. By identifying some of the cultural and ecological components requisite to the sustainability of local medicinal plant use, as we have tried to do here, it may eventually be possible to develop models which can inform intervention policies designed to preserve this information for the benefit of all.

## Notes

[1]In a recent ethnobotanical survey, Phillips and Gentry (1993) develop a statistic for calculating the overall cultural value of useful species that incorporates the number of different applications for each plant as reported by native informants. Following this approach, we also use number of applications, but as a general measure of medicinal plant use that takes into account all possible modes of use known to the informant.

[2]Additional socioeconomic data for each consultant's home community and county are available from the authors upon request.

[3]In an historical account of midwifery practices in Southern Appalachia, Scott (1982) attributed the continued popularity of midwives to the regional shortage of rural doctors, which mirrors our correlation between the survival of folk medical knowledge and the scarcity of county physicians.

[4]To avoid the problem of multicollinear predictor variables, an orthogonal varimax factor analysis was also performed. Only one factor yielded an eigenvalue > 1. This we labeled "delocalization." The predictor variable factor loadings are: V2 = .93, V3 = -.67, V4 = .95, V5 = .96, V6 = .79, and V7 = -.67. The correlation of the factor scores on this factor with V1 (number of reported plant applications) = -.74.

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