

Traditional Medicinal Plant Use Among Virginia's Powhatan Indians

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ABSTRACT

The goal of this study was to identify native Virginian plants used by the indigenous Powhatan Indians for medicine prior to English colonization. We compiled a database of traditional Powhatan medicinal plants by conducting literature surveys, assessing species nativity, and interviewing two members of the Pamunkey tribe. Plants were placed into broad treatment categories based on the area of body or symptoms treated by specific remedies. We identified 89 plants, representing 49 families, used for medicinal purposes by the Powhatan. Woody and herbaceous species were employed almost equally and most (89%) were perennial. Nearly half (49.3%) of all remedies involving woody species utilized the roots or bark alone. More than half of remedies involving herbaceous species used either the whole plant (22.0%), its leaves (18.6%) or the roots (33.9%). Only 15 remedies employed multiple parts of one plant while six called for multiple species.

Key words: Ethnobotany, Powhatan Indian medicine, Pamunkey Indians, native plants, plant remedies.

INTRODUCTION

English explorers of the 16th and 17th centuries were certainly interested in the medicinal plant resources of North America. During the Voyages of Discovery, European explorers were exhorted by their governments and investors to seek out and record the uses of medicinal plants in the New World, including those remedies used by native peoples (Wear, 2000). Several native "cures" were imported and popularized in Europe, and the English recognized the profitability of this international medicinal trade. For example, Quinn (1970) states that the main practical reason for Samuel Mace's voyage to North Carolina in 1602 was "...to bring back roots, bark, and leaves of vegetable products

of the area which had some value for medicine or for their odor." Thomas Hariot also appealed to the profitability of natural medicinal resources when seeking to convince English individuals and investors to colonize North America (Hariot, 1969). An interpreter and intermediary for Sir Walter Raleigh's first colonization attempt, Hariot lists several medicinal plants under the "marchantable commodities" found in "Virginia" (now Roanoke Island, NC).

Englishmen such as John Smith met native Algonquian groups, known collectively as the Powhatan, when they began exploring and colonizing Virginia's Coastal Plain. The name "Powhatan" refers to several tribes, including the Pamunkey, Mattaponi, Chickahominy, and Rappahannock, which lived in this region and were associated with the paramount

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chiefdom created by the man Powhatan between the late 16th and early 17th century (Rountree, 1989).

Unfortunately, recorded knowledge of medicinal plant use among the Powhatan prior to colonization is sparse. Most available works from the Colonial period were authored by Englishmen who did not always distinguish between the cultural practices of the Powhatan and other Native American groups with which they interacted, and the Powhatan themselves did not author cultural records until long after English settlement in Virginia (Rountree, 1989). In addition, many English authors claimed that knowledge of herbal remedies was not widespread among tribal members. Medically-trained minister John Clayton recorded in the late 1600s that herbal knowledge was held closely by the male Powhatan priests who dispensed the remedies (Hoffman & Clayton, 1964). Rountree (1989) confirms that a century after English colonization, "...[Powhatan] priests kept laymen almost totally ignorant..." of herbal remedies. Furthermore, although they were interested in North America's natural medicinal resources, the English were certainly not always open to being instructed by a group they considered "inferior." Indeed, the longer the Powhatan associated with the English, the less willing they were to provide the colonists with information about their medicinal and religious practices (Rountree, 1989). Finally, as a result of English colonization, the Powhatan were displaced and tribes were decimated by disputes and disease; correspondingly, knowledge of traditional medicinal plant use was largely lost.

Despite these obstacles, it is still possible to construct a list of medicinal plants used by the Powhatan. The purpose of our study was to identify native Powhatan medicinal plants and to determine their traditional uses prior to European colonization. This research necessarily relies heavily on early English sources, slim first-hand accounts by remaining Virginia tribal members, and ethnobotanical work conducted among the Powhatan in the twentieth century. While several researchers have authored lists of Powhatan medicinal plants (e.g., Speck et al., 1942; Rountree & Davidson, 1997; Moerman, 1998; Shufer, unpub. ms), these works often include plants that were introduced to North America by the colonists. In contrast, our study incorporates only those plants native to Virginia's Coastal Plain and Piedmont.

We recognize that Colonial English authors interpreted Powhatan medicine within their own cultural framework and that several of these authors wrote decades to centuries after colonization. In addition, enslaved Africans and other Native American groups may have influenced recorded remedies, and other unknown cultural and social lenses may have

been applied to the transmission of this knowledge (sensu Gleach, 1997; Williamson, 2003). By including only regionally native plants, we sought to control for these types of historical impacts to the data; however, due to the influences listed above, this compilation is largely theoretical.

We classify and present the native plants by treatment category to facilitate drawing connections between different plants and their uses. This research was intended to add to the record of historical Powhatan medicinal practices and to potentially act as a source of information for modern drug development. As our goal is to make this information accessible to contemporary researchers, we have reported the data in categories familiar to a 21st century audience. However, note that colonial English authors as well as original Powhatan practitioners categorized remedies according to their own cultural context and understanding of medicinal practices. Hence, our categories are only tangentially related to original Powhatan healing perspectives. Further anthropological research on the Powhatan's view of medicinal practices and their translation by colonial English authors would be a worthwhile future endeavour.

METHODS

Study Area

The Powhatan occupied the Coastal Plain region of Virginia, which is the easternmost physiographic province in the state and abuts the Piedmont Plateau region. Four major tidal rivers drain the Northern Coastal Plain, dividing it into three peninsulas and emptying to the east in the Chesapeake Bay; these rivers include the Potomac, Rappahannock, York, and James. Numerous tribes were incorporated into Powhatan's paramount chiefdom; in 1607 they inhabited the region between the Potomac River on Virginia's Northern Neck and the James River on the southeastern peninsula (Rountree, 1989). The Coastal Plain is broad, low, and terraced, with sandy soils intermixed locally with gravels, clays, and shells, and its highest elevation is only approximately 250 feet (76 m) at its western edge (Virginia Department of Conservation and Recreation, 2008). The Coastal Plain includes a variety of habitats, from the marshes and bays of the Eastern Shore to freshwater and saltwater tidal wetlands as well as upland systems.

Virginia's relatively warm temperatures and proximity to warm ocean currents allow many southern plant species to reach the northern limit of their range in the state, giving Virginia a diverse flora (Harvill et al., 1993). Historically, the Coastal Plain was dominated by

oak/chestnut hardwood forests; however, modern development and forestry practices have produced a shift toward forests increasingly dominated by pines such as loblolly pine (*Pinus taeda* L.) (Virginia Department of Conservation and Recreation, 2008). See Rountree (1989) and Rountree & Davidson (1997) for further information about Powhatan cultural practices and the role of medicine and healers in their society.

Database Development

To develop a list of Powhatan medicinal plants, we used (1) primary and secondary literature surveys, and (2) ethnobotanical interviews. Plant nomenclature follows the USDA Plants Database (US Dept. Agriculture, 2008).

Literature Surveys

We consulted primary sources from the 1600s and 1700s written by English explorers, gentlemen, and entrepreneurs about the cultural practices of the Virginia Indians (e.g., Beverley, 1947; Hoffman, 1964; Hariot, 1969; Strachey, 1998). For each source, we noted references to particular medicinal plants and attempted to identify those plants to the species level using given scientific or common names. We accepted species-level identifications proposed by the modern editors of these works as well as authors such as Merrill & Feest (1975) and Rountree (1989).

In situations where only a generic or common name was available, we applied a specific name based on nativity and regionalism. For example, various primary authors listed “sassafras” as a medicinal plant (e.g., Hoffman, 1964; Hariot, 1969); we listed this as the tree *Sassafras albidum* (Nutt.) Nees., a species native to Virginia and found throughout the state. In some cases, identification to the subspecies or variety level was possible based upon nativity and regionalism (i.e., only one subspecies or variety occurs in Virginia). These detailed identifications can be found in Appendix 1. For the purposes of this paper, we maintained identifications at the species level except in cases where plants originally reported as full species (e.g., *Sambucus canadensis*) have been reclassified (now *Sambucus nigra* ssp. *canadensis*).

We also consulted medicinal herb use compilations by modern authors (Speck et al., 1942; Rountree & Davidson, 1997). We accepted the taxonomic identifications provided by the authors of these secondary sources, and included all regionally native plants and their uses attributed to a particular Powhatan tribe, including the Pamunkey, Mattaponi, and Rappahannock. We also included plants attributed to

“Virginia Indians”, the “Algonquian”, or to “Indians” generally, if the source listed such plants as used by Indians among the early colonists; however, we recognize that such inclusions are certainly hypothetical. If a plant was recorded as a Powhatan medicinal but the use was non-specific (i.e., simply listed as “medicine”), we followed Rountree & Davidson’s (1997) information on how the plant was used by geographically close tribes such as the Mohegan, Iroquois, and Cherokee. In the few cases where such information was unavailable for nearby tribes, we included general information on the plant’s use among unspecified North American Indians (e.g., see Jamestown-Yorktown Foundation, Outreach Education and Special Services, 2003). Again, these uses are simply educated guesses as to the real use of a plant by the Powhatan. See Appendix 1 for a detailed account of each plant with notes on where we obtained information about its use as a Powhatan medicinal. We did not include any plants that were ambiguously described, non-native, or unavailable on the Virginia Coastal Plain or Piedmont.

Ethnobotanical Interviews

Initially, we intended for this study to rely on interviews with extant members of Virginia Indian tribes, specifically the Pamunkey and Mattaponi. However, we encountered two major obstacles. First, tribal members stated that much herbal knowledge had passed away with their grandparents’ generation. Second, although the tribal members with whom we spoke were exceedingly courteous and cooperative, they stated that other members would be reluctant to participate in this research given past interactions with non-tribal individuals. Consequently, only two Pamunkey tribal members, both knowledgeable of tribal use of plants, were willing to sit for an interview. These individuals were provided with a brief survey, created by the authors in conjunction with Dr. W. Ryan (2007 pers. comm.), which followed anthropological guidelines for informed consent and confidentiality.

Interviews were conducted in February 2007, on the Pamunkey Reservation in southeastern Virginia. Participants received a paper copy of the survey questions, with a written disclaimer at the beginning of the survey. The disclaimer stated that participation in the survey was voluntary and anonymous, and that participants would not be held in any way responsible for their comments. Participants were assured that responses would only be used for the purposes of the research project and for education. These terms were also stated verbally and verbal consent was obtained before continuing with the survey. The survey itself

was conducted verbally, with the interviewer taking notes on participant responses to each question. The survey consisted of 11 questions, assessing the extent of the participant's general knowledge of medicinal plants, as well as their specific knowledge of individual plants and remedies. Questions addressed plant identification, remedy preparation, whether or not the participant had used or observed the use of a given remedy, their opinion of its effectiveness, how long the plant had been used by tribal members, how the individual learned of its use, any non-medicinal uses of a given plant, and questions related to whether the authors could observe its preparation or use. We also asked whether a participant could suggest other sources of information (written or oral) regarding medicinals. Since participants were only familiar with the common names of plants, we assigned a scientific name based on the given name and description of the plant; for example, one participant identified the "black cherry" as a medicinal, and we listed this as *Prunus serotina*. While only two members of the tribe were willing to meet with us, we decided to include their input in this study as it provided useful information that verified small portions of the literature.

Database Construction

For each plant, we determined nativity and distribution in Virginia using the Digital Atlas of the Virginia Flora database (2009). While we acknowledge that plant abundance and distribution can and likely has changed in the last four centuries, current state-wide abundance and distribution patterns can still provide some idea of the likelihood that a particular plant was used among the Powhatan dwelling on Virginia's Coastal Plain. We did not include plants in our list that are not found in Coastal Plain or nearby Piedmont habitats.

In addition, we compiled information on local common names and the medicinal uses attributed to each plant, including any available information on their collection, preparation, and prescription. We classified medicinal uses into broad categories in order to better understand the number and types of plants used for particular ailments and to evaluate possible connections between remedies and their means of efficacy. We categorized plants into the following groups: Analgesic, Animals (Treatment for and Treatment from), Bowels, Eyes, Fever, Gynecology, Joints/Bones/Muscles, Lungs, Mouth/Throat, Nervous System/Blood, Other, Sedative, Skin, Stimulant, Stomach, Wounds (external), and Venereal. Plants were categorized based on their effect or the area of the body that they were diagnosed to treat. If plants were used for multiple remedies, they

were placed into each appropriate category.

"Analgesics" include any plant designated as a pain reliever. "Animals (treatment for)" includes veterinary aids and plants purported to improve hunting success. "Animals (treatment from)" includes plants indicated for bites or pest removal. "Bowel" remedies include plants used to treat kidney problems, hemorrhoids, and diarrhea, or those used as a laxative or purge; in cases where an author listed a plant as a "purge" but did not specify whether that plant acted as an emetic or laxative, we have listed the plant in both the "Bowel" and "Stomach" categories. The term "purge" was used in the 17th, 18th, and 19th centuries to refer to emptying either the bowels or stomach (Oxford English Dictionary, 2008). The "Eyes" category includes plants used to treat various eye afflictions, and "Fever" applies to plants used to reduce either fever from illness or inflammation from injury. "Gynecology" includes plants used during menstruation, childbirth, and for treatment of infants. "Joints/Bones/Muscles" includes plants indicated for joint and limb pain or rheumatism, "Mouth/Throat" includes those for sore throat or thrush, and "Lungs" includes those for coughs, congestion, and other breathing difficulties. Plants used in blood tonics or "nerve medicines" are listed under "Nervous System/Blood", and those acting as tonics or hallucinogens are recorded under "Stimulant." Skin afflictions such as poison ivy rash, boils, bruises, sores, and other infections are listed under "Skin." "Stomach" includes those plants used as purges, emetics, and appetizers, as well as those used to treat problems such as dyspepsia and stomach pain. Finally, all plants used to treat superficial wounds are listed under "Wounds (external)" and one used to treat syphilis under "Venereal." Any plant whose use did not fit into these categories was listed under "Other"; examples include plants used for hair washes, chills, poisons, or panaceas.

RESULTS

We identified 89 plants, representing 49 families that were used for medicinal purposes by the Powhatan tribes. Of these, 38 genera (42.7%) were woody, 48 herbaceous (53.9%), and three were graminoids (3.4%). 82 of these plants were identified to species, and 73 of these were perennials (89.0%), six were annuals (7.3%), and three were facultative annuals (3.7%). Of the 89 plants identified, 25 species were categorized by Shufer (unpub. ms) only as "medicine" of the Mattaponi and Pamunkey tribes (see Appendix 1). We found no additional information concerning their use in this source or others consulted in our literature survey. Information on both the indication and the plant part(s) used for the corresponding remedy was available for 57

species. There were 16 species that were ascribed for 25 indications, but no information was available as to which plant part (e.g., roots, leaves, berries, etc.) was used in the remedy for those indications. Of these 16 species, seven plants occur *only* in this category; as such, the remaining nine species are also included in the total of 57 described above.

Some plants were used for multiple indications within a single medicinal category. Some species were also used for different indications in multiple medicinal categories. For example, *Sassafras albidum* appears in seven categories and was used to treat nine different indications. Overall, there were 129 different medicinal uses described for plant parts taken from the 57 plants in our list. Remedies generally called for one specific part of a plant (e.g., leaves, flowers, stems, or roots), although some remedies utilized multiple parts of one plant or of several different plants.

Of the 57 plants, 25 were woody species, 31 were herbaceous, and 1 was a graminoid. Parts from woody plants were used alone in 65 different remedies, parts from herbaceous species were used alone in 53 different remedies, and the roots from the graminoid *Andropogon glomeratus* were used alone in three remedies: for hemorrhoids, itch, and poison ivy. Five remedies combined woody and herbaceous species, one remedy combined parts from two woody species, and one remedy combined parts from two herbaceous

species. Finally, there was one remedy where a plant part was specified (i.e., sap from *Liquidambar styraciflua*), but the use of the resultant “medicine” was not. Note that for treatments in which two different plants were combined, the remedy may be listed under both plant constituents in the following results and in Appendix 1.

Woody Species

Sixteen treatments called for only the root or root bark of a single plant, and nineteen only bark (Table 1). There were four remedies each that called for only the sap or only the twigs/branches of the plant. Three remedies each called for only leaves or the whole plant. Two remedies each involved only berries, only buds, or only the wood. Only one remedy, a tonic, was made using two parts of the same plant: the bark and leaves of *Quercus rubra*. There were nine remedies that called for either of two parts from the same plant. For example, a remedy for dyspepsia called for either the runners or berries of *Rubus* spp. Six remedies involved combinations of parts from two plants. Of the latter six, five were combinations of plant parts from both woody and herbaceous species that were mixed to create the remedy. There were six additional treatments that called for woody species, but no information was available on which part of the plant was used.

Table 1. Powhatan use of woody species in medicinal remedies. Column 2: the number of different species from which a plant part was harvested. Column 3: the number of remedies that called for a given plant part. Column 4: the proportion of all remedies that called for that particular plant part. There was one additional remedy (not shown) that called for the sap of a woody species, but did not specify the use of the resultant medicine. The dashed line separates remedies that only called for a single plant part from those that designated multiple parts.

Plant part used in remedy	Number of species	Number of remedies	Proportion of total (%)
Bark	11	19	26.8
Roots	7	16	22.5
Sap	4	4	5.6
Twigs or branches	3	4	5.6
Whole plant	1	3	4.2
Leaf	3	3	4.2
Berry	2	2	2.8
Bud	2	2	2.8
Wood	1	2	2.8
One OR another part of the same plant (e.g., berries OR runners)	7	9	12.7
Combinations of two different species Two parts of the same plant (e.g., bark AND leaves)	5	6	8.5
	1	1	1.4
Total	47 total (25 unique spp.)	71	100.0

Table 2. Powhatan use of herbaceous species in medicinal remedies. Column 2: the number of different species from which a plant part was harvested. Column 3: the number of remedies that called for a given plant part. Column 4: the proportion of all remedies that called for that particular plant part. The dashed line separates remedies that only called for a single plant part from those that designated multiple parts.

Plant part used in remedy	Number of species	Number of remedies	Proportion of total (%)
Roots	11	20	33.9
Whole plant	12	13	22.0
Leaf	8	11	18.6
Sap	1	2	3.4
Berry	1	1	1.7
Stems	1	1	1.7

Combinations of two different species	5	6	10.2
One OR another part of the same plant (e.g., berries OR runners)	3	5	8.5
Total	42 total (31 unique spp.)	59	100.0

Herbaceous Species

Twenty treatments called just for the plant roots, while thirteen called for the entire plant (Table 2). Eleven remedies used only the leaves of an herbaceous species. Two remedies involved sap, and one remedy each specified only berries or stems. There were five remedies that called for either one or another plant part. For example, either the seeds or leaves of *Phytolacca americana* could be used to treat symptoms of rheumatism. Six remedies involved combinations of parts from two plants. Five were mixtures of herbaceous and woody species, while the last remedy (a skin ointment) combined two herbaceous species. There were nine species ascribed for 14 additional indications (other than just “medicine”), but no information was available as to which part of the plant was used in the treatments.

Graminoids

Andropogon glomeratus roots were used in hemorrhoid, poison ivy, and itch remedies. No specific information on medicinal use was available for the other two graminoids identified: *Leersia oryzoides* and *Phragmites australis* (see Appendix 1).

Detailed Results By Treatment Category

Following are detailed results from each broad treatment category. No specific results are discussed for the following categories: “Analgesic,” “Venereal,” and “Other.” There was only one plant in each of the former two categories, with specific preparation information

available for only one (*Liriodendron tulipifera*, leaves used to relieve neuralgic pain). The latter category contained 20 plants, but their uses and preparations were so varied that meaningful patterns could not be discerned. Information on the plants in these categories is available in Appendix 1.

Animals (Treatment for)

We placed one herbaceous and two woody species in this category. Two trees were utilized to cure distemper in dogs: *Liquidambar styraciflua* and *Pinus echinata*. Sap of *L. styraciflua* was placed in the dog’s nose and the dried and grated bark of *P. echinata* was combined with the animal’s food (Speck et al., 1942). The third plant, *Angelica venenosa*, was reportedly used by the Powhatan to gain success in hunting; a hunter released the odor of this herbaceous plant by rubbing it between his hands, supposedly attracting deer (Hoffman & Clayton, 1964; Rountree, 1989).

Animals (Treatment from)

All three plants in this category are herbaceous; two are perennials (*Aristolochia serpentaria* and *Asclepias tuberosa*) and one is an annual (*Hedeoma pulegiodes*). Both perennials were used to treat snake bite (Speck et al., 1942; Rountree & Davidson, 1997), and *A. serpentaria* was also used for spider bites (Speck et al., 1942). In both cases, plant parts were applied externally to the injury. The roots of *A. serpentaria* were mashed in a mixture and applied as a salve, while *A. tuberosa* leaves were applied as a poultice to bites (Speck et al., 1942). The dried leaves of *H. pulegiodes* were supposed to deter fleas if kept in a room (Speck et al., 1942).

Bowels

The following perennial herbs were all used as purges: *Angelica venenosa* (Hoffman & Clayton, 1964), *Apocynum cannabinum* (Hoffman, 1964; Merrill, 1975), *Euphorbia corollata*, *E. ipecacuanhae*, *Iris verna*, *Triosteum perfoliatum* (Hoffman & Clayton, 1964; Rountree, 1989), and *Phytolacca americana* (Speck et al., 1942). Of these seven plants, specific preparation information was available for only three (*Euphorbia* spp. and *T. perfoliatum*); in each case, the root was used.

The perennial herbs *A. venenosa* and *Podophyllum peltatum* were used as laxatives (Hoffman, 1964; Rountree & Davidson, 1997). Information on preparation is only available for mayapple (*P. peltatum*) and from nearby tribes (Cherokee, Iroquois, and Delaware), who made a root tea for this purpose (Rountree & Davidson, 1997).

Of the seven species listed specifically as diarrhea remedies, five were woody: *Cornus florida*, *Juglans nigra*, *Ulmus rubra*, *Rubus hispidus*, and *Rubus* spp. Four of these woody species were used in remedies involving the roots or root bark. The Powhatan steeped the root bark of *C. florida* and *J. nigra* and drank the resulting liquid (Speck et al., 1942). The boiled or steeped roots of the two *Rubus* species were also used, and berries may have been steeped for a tea (Speck et al., 1942; Rountree & Davidson, 1997). The bark from *U. rubra* was employed in an unspecified way by Native Americans (Jamestown-Yorktown Foundation, 2003; interview participant, pers. comm.). Two perennial herbaceous species, *Hieracium scabrum* and *H. venosum* were incorporated in diarrheal remedies (Speck et al., 1942; Rountree & Davidson, 1997). Preparation information is only available for the first species, in which the treatment involved either chewing the leaves or steeping them and drinking the “broth” (Speck et al., 1942).

Three of the plants used to treat diarrhea were also used for dysentery: *J. nigra*, *R. hispidus*, and *Rubus* spp. For the first species, a tea made from the steeped root bark was used as a treatment (Speck et al., 1942). The berries or roots of *R. hispidus* were turned into a wine used to combat this ailment, and the same plant parts from available *Rubus* spp., steeped to make a tea, were also used (Speck et al., 1942; Rountree & Davidson, 1997). *Angelica venenosa*, *Liquidambar styraciflua*, *Phytolacca americana*, and *Quercus rubra* were also utilized in dysentery remedies. Preparation information is unavailable for *A. venenosa* (Hoffman & Clayton, 1964). The dried bark of sweetgum (*L. styraciflua*) was steeped to make an infusion, and was usually mixed with an equal amount of *Q. rubra* (red

oak) bark (Speck et al., 1942). Steeped pokeberries (*P. americana*) were also taken for dysentery (Speck et al., 1942). Therefore, of the seven plants discussed, one remedy called for root bark, two for berries or roots, one just for berries, and one for a mixture of dried bark from two species. All remedies were taken internally; most were steeped as a tea.

Two external hemorrhoid applications were recorded; the first involves the graminoid *Andropogon glomeratus*, the roots of which were combined with lard to make a salve (Speck et al., 1942). In the second remedy, *P. americana* roots were placed in a bucket and covered with boiling water; the patient sat over the bucket in order to get relief from the steam (Moerman, 1998). The Rappahannock also took small pills of hardened sap from *Pinus virginiana* to treat kidney problems (Moerman, 1998).

Eyes

Four perennials were used to treat eye ailments: *Monotropa uniflora*, *Acer rubrum*, *Sassafras albidum*, and *Ulmus rubra* (Speck et al., 1942; Rountree & Davidson, 1997; Moerman, 1998; Medical Economics Company, 2000; Jamestown-Yorktown Foundation, 2003; interview participant, pers. comm.; Shufer, unpub. manuscript). The latter three plants are woody species while the first is herbaceous. All remedies involving the woody species utilized their bark, and all applications were external. In the case of *A. rubrum*, preparation information is only available from the nearby Cherokee and Iroquois, who used bark decoctions (Rountree & Davidson, 1997). For both *S. albidum* and *U. rubra*, the inner bark was made into eyewash (using boiling water); branch pith or pulverized bark may have also been used (Rountree & Davidson, 1997). For the herbaceous species, juice from the pulverized plant was mixed with water to act as an eye lotion (Jamestown-Yorktown Foundation, 2003).

Fever

Four woody species were used to treat fever: *Aralia spinosa*, *Magnolia virginiana*, *Sassafras albidum*, and *Ulmus rubra* (Speck et al., 1942; Hoffman, 1964; Rountree & Davidson, 1997). The roots from both *A. spinosa* and *S. albidum* were used in remedies; however, the former plant's roots were mixed with other ingredients as a decoction and applied as a salve (Speck et al., 1942), while the latter plant's roots were scraped and steeped in boiling water and drunk as a tea (Speck et al., 1942). *Aralia spinosa* was also used for treating inflammation (Speck et al., 1942). Preparation

information was unavailable for *M. virginiana*. For *U. rubra*, we found general information that Native Americans used the pulverized bark, but there was no specific information regarding Powhatan preparation or administration (sensu Jamestown-Yorktown Foundation, 2003; interview participant, pers. comm.; Shufer, unpub. ms).

Three herbaceous species were also used to treat fever: *Hexastylis virginica*, *Monarda punctata*, and *Nuphar lutea*. Remedies involving *H. virginica* and *N. lutea* both required leaves, but were administered differently. The green or dried leaves of *H. virginica* were steeped and made into a tea, whereas the leaves of *N. lutea* were parched and bound over sores to relieve associated fever and inflammation (Speck et al., 1942). The Powhatan also used *M. punctata* for fever; nearby tribes such as the Cherokee, Iroquois, and Delaware made a tea from the whole plant (Rountree & Davidson, 1997).

Gynecology

Aletris farinosa, *Hedeoma pulegioides*, and *Lindera benzoin* were all used to make teas that were drunk to relieve menstrual symptoms. Remedies involving the two herbaceous plants called for the whole plant, steeped to relieve “female troubles” or menstrual pains (Speck et al., 1942). The Powhatan also made a tea from handfuls of *L. benzoin* twigs to relieve menstrual pain or correct delayed menses (Speck et al., 1942).

Impatiens capensis, an herbaceous species, and *Ulmus rubra*, a woody species, were both used to assist childbirth (Rountree & Davidson, 1997; sensu Jamestown-Yorktown Foundation, 2003). Specific information on preparation and use comes from nearby tribes (Cherokee, Iroquois) or Native American use generally. The stems of *I. capensis* were used (Rountree & Davidson, 1997), whereas the boiled roots of *U. rubra* were made into a tea (sensu Jamestown-Yorktown Foundation, 2003).

Joints/Bones/Muscles

For joint aches or rheumatism, the Powhatan made remedies from *Phytolacca americana* and *Sambucus nigra* ssp. *canadensis*. They steeped and fermented the seeds of the former and the berries of the latter to make a wine to treat symptoms. They may have also used a fermented leaf infusion or boiled leaves from *P. americana* as a remedy (Speck et al., 1942; Westbrooks & Preacher, 1986; Rountree & Davidson, 1997; Moerman, 1998).

Cicuta maculata and *Quercus alba* (or other species of oak and soft woods) were used to remedy limb and

joint pain. Information on the use of water hemlock (*C. maculata*) comes from the nearby Iroquois, who used the root or the whole plant in a poultice that was also a remedy for lameness and sprains (Rountree & Davidson, 1997). With oak, the Powhatan purportedly cut soft wood from the knots, placed it on the injured part and made a running sore to ease joint and limb pain (Beverley, 1947). Additionally, *Polygonum biflorum* was used as an orthopedic aid, with its roots made into a decoction and salve to relieve cuts, bruises, and sores (Moerman, 1998).

Lungs

One woody and two herbaceous species were used in cough remedies: *Prunus serotina*, *Asarum canadense*, and *Hexastylis virginica*. For the woody species, the Powhatan steeped the bark or berries of *P. serotina* (Speck et al., 1942; Rountree & Davidson, 1997). For the herbaceous species, they used the root from *A. canadense* (Rountree & Davidson, 1997) and a leaf tea from *H. virginica* specifically to treat whooping cough symptoms (Speck et al., 1942).

Hexastylis virginica, *Juniperus virginiana*, and *Pseudognaphalium obtusifolium* were treatments for asthma or shortness of breath (Speck et al., 1942; Rountree & Davidson, 1997). The Powhatan steeped the berries of *J. virginiana* with *H. virginica* leaves to treat symptoms, while they also boiled *H. virginica* leaves alone (Speck et al., 1942). The dried leaves of *P. obtusifolium* were smoked in a pipe and the dried stems, steeped to make a tea, were also curatives (Speck et al., 1942; Rountree & Davidson, 1997).

Finally, two plants were used for specific pulmonary complaints. Nearby Cherokee and Iroquois used *Hamamelis virginiana* bark in a tuberculosis remedy (Rountree & Davidson, 1997), and Native Americans also used the pulverized bark of *Ulmus rubra* to treat respiratory infections (sensu Jamestown-Yorktown Foundation, 2003; interview participant, pers. comm.).

Mouth/Throat

The Powhatan reportedly steeped the bark of *Diospyros virginiana* to make a tea to treat sore throat. The inner bark was also steeped to make a wash to cure thrush (Speck et al., 1942).

Nervous System/Blood

Three plants were used as blood medicines or purifiers: *Eupatorium purpureum*, *Cornus florida*, and *Sassafras albidum* (Speck et al., 1942; interview

participant, pers. comm.). Preparation information is available for the two woody species, and both remedies required that the roots be steeped and the resulting liquid drunk. In the case of *C. florida*, the remedy specified that the root bark (as opposed to generalized “roots”) be used to make the tea. (Speck et al., 1942). *Angelica venenosa* was purportedly prescribed to treat “vapours”, a vague ailment described by English physicians of the Colonial period (Hoffman & Clayton, 1964).

Skin

To treat poison ivy rashes, the Powhatan remedies involved *Andropogon glomeratus*, *Fagus grandifolia*, *Impatiens capensis*, and *Phytolacca americana*. The roots of the graminoid *A. glomeratus* and the herbaceous *P. americana* were steeped and applied to the affected area; individuals may have also taken an infusion of *A. glomeratus* (Speck et al., 1942). The bark of *F. grandifolia* was made into a wash (Speck et al., 1942), and nearby Cherokee and Iroquois used the juice from whole plants of *I. capensis* for the same purpose (Rountree & Davidson, 1997).

Cures for boils utilized *Aralia spinosa*, *Rubus hispidus*, *Arisaema triphyllum*, and *Nuphar lutea*. Roots of *A. spinosa*, boiled and mixed with other ingredients, were applied as a salve (Speck et al., 1942). The pulverized dried root of *A. triphyllum* was also applied externally as a poultice (Speck et al., 1942). Alternatively, patients drank a steeped leaf tea or infusion of *R. hispidus* (Speck et al., 1942), while the leaves of *N. lutea* were warmed and then applied to boils (Speck et al., 1942).

Three woody and one herbaceous species were used to treat sores: *A. spinosa*, *Hamamelis virginiana*, *Sambucus nigra* ssp. *canadensis*, and *Polygonatum biflorum*. Many different plant parts were used in remedies. For the woody species, the Powhatan applied a tea made from *A. spinosa* (Speck et al., 1942). Nearby Cherokee and Mohegan also treated this ailment with a leaf or twig tea made from *H. virginiana*, although no information is available on their method of administration (Rountree & Davidson, 1997). The bark of *S. nigra* was mixed with grease and stewed *P. biflorum* berries to make a salve (Speck et al., 1942).

Arisaema triphyllum, *H. virginiana*, *P. americana*, and *P. biflorum* were also used on bruises. The nearby Cherokee and Mohegan made a leaf or twig tea from *H. virginiana*, the only woody species (Rountree & Davidson, 1997). The crushed whole plant of *A. triphyllum* was used in a poultice for bruises (Rountree & Davidson, 1997), and the boiled roots of *P. biflorum*

were boiled to syrup and applied as a salve (Speck et al., 1942).

Two cures were available for warts. The milky sap of fresh *Asclepias syriaca* was rubbed on warts (Speck et al., 1942), as were the mashed, buried, and dug roots of *Phytolacca americana*. Milkweed (*A. syriaca*) and red mulberry (*Morus rubra*) were also described as a cure for ringworm, and in both cases, the sap from the plant was rubbed on the skin (Speck et al., 1942). *Angelica venenosa* and *Sanguinaria canadensis* were combined with bear grease to make lotion applied to the skin after bathing, which was supposed to close the pores, make the skin supple, and promote nimbleness (Beverley, 1947).

Several plants are described as treatments for “swellings.” A poultice of the crushed whole plant of *A. triphyllum* (Rountree & Davidson, 1997), a strong wash made from the top branches of *Pinus echinata* (mixed with other ingredients), and the stewed berries of *P. biflorum* (mixed with *S. nigra* bark and other ingredients) applied as a salve were all recorded as remedies (Speck et al., 1942).

Finally, there were several plants used for individual complaints from burns to chilblains, and ointments to cauterization. All of the remedies include various plant parts, were applied externally, and are summarized in Appendix 1.

Stimulant

Most of the plants in this category were prescribed as tonics. Seven species were used for tonics, two of which were herbaceous. For the herbaceous species, Powhatan adults steeped the dried leaves of *Eupatorium perfoliatum* to make a tea (Speck et al., 1942). Nearby Iroquois and Delaware made a tea from the roots of *Podophyllum peltatum* (Rountree & Davidson, 1997). For the woody species, the Powhatan steeped the roots of *Sassafras albidum* (Speck et al., 1942; Rountree & Davidson, 1997, interview participant, pers. comm.). The root bark of *Cornus florida* was made into a tea (Speck et al., 1942) as was the bark of *Prunus serotina* (Speck et al., 1942; interview participant, pers. comm.) and *Quercus rubra* (mixed with its leaves) (Speck et al., 1942). Finally, a wine from the berries of *Rubus hispidus* was also used (Speck et al., 1942).

Two plants acted specifically as stimulants or hallucinogens: *Liriodendron tulipifera* and *Magnolia virginiana*. Both indications involved bark; for the first species, the green bark was chewed, while for the second, the individual breathed in the scent of leaves or bark placed in their cupped hands (Speck et al., 1942).

Stomach

Over half of the plants in this category are indicated as purges or emetics, and six are herbaceous while only two are woody. The herbaceous species include *Apocynum cannabinum*, *Euphorbia corollata*, *E. ipecacuanhae*, *Iris verna*, *Phytolacca americana*, and *Triosteum perfoliatum* (Hoffman & Clayton, 1964; Merrill & Feest, 1975; Rountree, 1989; Rountree & Davidson, 1997). Of these, preparation information was only available for three. For both species of *Euphorbia*, the root was used, while the root bark of *T. perfoliatum* is a known emetic (Hoffman & Clayton, 1964). For the woody species, the Powhatan added warm water to the sap of *Lindera benzoin* (Hoffman & Clayton, 1964), and made a concoction using the grated, dry bark of *Pinus echinata* (Speck et al., 1942).

Two plants were used as gastrointestinal aids for stomach cramps or pains: *Gaylussacia* spp. and *Juglans nigra*. The dried or fresh roots of *Gaylussacia* spp. were steeped for a tea (Speck et al., 1942). No information was available on the preparation of *J. nigra* (Moerman, 1998).

Two plants were prescribed to restore appetite: *Prunus serotina* and *Quercus rubra* (Speck et al., 1942). For both species, the bark was steeped and made into a tea. Finally, a broth made from steeping the runners or the juice from berries of *Rubus* spp. was used to treat dyspepsia (Speck et al., 1942).

Wounds (external)

Four of the five plants recorded as wound-curing were herbaceous. Available preparation information indicates that the whole plant was used in several cases; for example, *Sphagnum* spp. as an absorbent (Speck et al., 1942), and *Asclepias* spp. bruised and applied to the wound (Strachey, 1998). The juice from chewed *Polygonum hydropiper* was also squirted into wounds (Hoffman & Clayton, 1964; Merrill, 1975; Rountree, 1989). Information is not available for the preparation and administration of *Pseudognaphalium obtusifolium* (Hoffman & Clayton, 1964; Merrill, 1975; Rountree, 1989; Rountree & Davidson, 1997). Information on the only woody species, *Ulmus rubra*, indicates that the bark, beaten to a pulp, was administered on wounds – following European colonization, it was used on gunshot wounds (sensu Jamestown-Yorktown Foundation, 2003; interview participant, pers. comm.).

DISCUSSION

Currently, approximately 78% of the Virginia flora is perennial (A.S. Weakley, University of North

Carolina Herbarium, pers. comm.). We found that 89% of the medicinal plants identified to species were perennials. This appears to reflect the high overall proportion of perennial species available. In other words, it appears the medicinal use of perennial species may have been more or less random – perennial species were chosen simply because they were available, rather than because of their particular growth habit.

Perennial species would also provide healers with a relatively predictable medicinal source, allowing them to return to given locations year after year to harvest the necessary plants. However, we did note that a number of remedies utilized the roots of these plants. Needless to say, removing the root may prevent a plant from growing the following season. It is also true that the roots of perennials would be one of few viable plant resources available in the winter months when herbaceous portions senesce.

We also know that nearly 85% of the current Virginia flora is herbaceous (A.S. Weakley, pers. comm.). However, our results indicated approximately equal use of woody and herbaceous species for medicinal purposes: 43.2% and 53.4%, respectively. This may indicate non-random patterns of use, i.e., that the Powhatan favored woody species. Alternatively, it may simply reflect seasonal gathering practices; the bark of woody species would have been available in winter when aboveground portions of herbaceous species were not. In fact, bark was the most common plant part incorporated into remedies that used woody species. Forty-one of the 55 remedies that used only one specific part of a woody plant (over 74%) called for roots, bark, twigs, or wood – all products that could be harvested year-round.

The roots and root bark of both woody and herbaceous species were prevalent ingredients in many of the Powhatan remedies documented. While year-round availability may be one explanation for this, roots are also the location of water and inorganic nutrient uptake in a plant, as well as the site of energy storage. Therefore, roots may also contain concentrations of physiologically active compounds. Heinrich et al. (2004) note that the secondary roots of mature plants, with special storage functions, are often used in pharmacy.

The use of leaves from herbaceous species was much more common than those of woody species; more than three times as many herbaceous remedies called for leaves alone. It is also interesting that all of the remedies calling for the leaves of a particular woody species in combination with another plant part directed the practitioner to combine or substitute a perennial or woody part of that plant, such as roots, bark, or twigs. Again, this may simply reflect that the Powhatan

adapted their pharmacopeia to make use of whatever plant parts were available in a given season. Obviously, the morphological characteristics of the plants also made certain usages specific to woody or herbaceous species; for example, only woody remedies could employ twigs or inner bark, while only herbaceous remedies ever called for the use of the whole plant.

Available information on the administration of remedies suggests that for most treatments, external symptoms were treated externally, and internal symptoms were treated internally; for example, coughs were generally treated with a tea, while poultices were applied to sores. Categories in which internal ailments were treated with medicines taken into the body include treatments for animals, diarrhea and dysentery remedies for bowels, gynecological treatments, cough and asthma remedies, blood medicines, stimulating tonics and hallucinogens, and most stomach ailments. Categories in which external symptoms were treated with a poultice, salve, or wash include treatment for animal bites, hemorrhoids, eyes, inflammation, most skin problems, and external wounds.

There were several categories in which an "external" treatment was prescribed for an "internal" symptom, and vice versa. For example, some febrifuges were administered as teas, while others were applied as salves. Relief from joint or muscle pain could involve poultices, wines, or teas. Chest congestion as well as sore throat might have been treated with a salve, while an individual might have also drunk a tea for sore throat.

CONCLUSIONS

The Powhatan medicinal plants and their uses presented in this paper are necessarily part of a hypothetical list. Limited literary sources and the length of time since English colonization restrict knowledge of all plants used by the Powhatan. However, to the extent that this partial knowledge represents Powhatan medicinal plant use, the results of this study suggest that the Powhatan used mostly perennial species, and that woody and herbaceous species were used nearly equally. There is no evidence to suggest that the Powhatan consciously favoured perennial over annual species, or woody over herbaceous species. Rather, the types of plants used can be explained by the overall prevalence or seasonal availability of certain species or plant parts. Cures often made use of plant parts that would be available throughout the year. Most remedies were administered in a way that matched the symptoms they were intended to treat; in other words, remedies were generally applied externally if symptoms were

external, and vice versa for internal medications.

This research addresses the lack of specific knowledge regarding Powhatan medicinal plant use. It synthesizes contemporary knowledge of plant growth characteristics and nativity with literary and tribal sources. In addition, it may provide avenues for further research into the biochemistry of these plants.

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Appendix 1. Powhatan medicinal plants and their uses.

Powhatan medicinal plants organized alphabetically by species. "Growth Habit" distinguishes woody and herbaceous plants, and whether the plant is a perennial [P], annual [A], or facultative annual [F]. General treatment categories are listed, with the specific indications within a category shown in italics. The numbered references are: 1 = Beverley, 1947; 2 = Hariot, 1969; 3 = Hoffman & Clayton, 1964; 4 = Jamestown-Yorktown Foundation, 2003; 5 = MEC, 2000; 6 = Merrill & Feest, 1975; 7 = Moerman, 1998; 8 = Rountree, 1989; 9 = Rountree & Davidson, 1997; 10 = Shufer, unpublished manuscript; 11 = Speck et al., 1942; 12 = Strachey, 1998; 13 = Westbrook & Preacher, 1986; 14 = information obtained from interview with Pamunkey tribal member (also noted with an asterisk [*] and **bold** text).

PLANT (<i>Scientific, Common names</i>)	BOTANICAL FAMILY	GROWTH HABIT	GENERAL USE, - <i>SPECIFIC USE</i>	PREPARATION INFORMATION	REFS.
<i>Acer rubrum</i> L. Red maple	Aceraceae	Tree (Woody) [P]	Eyes - <i>Eye ailments</i>	Used bark decoctions (Cherokee, Iroquois)	4, 5, 9, 10
<i>Aletris farinosa</i> L. White colicroot, unicornroot, "Ague grass", "star root"	Liliaceae	Herb [P]	Gynecology - <i>Gynecological aid</i>	Whole plant steeped to make a tea (or infusion), given for "female troubles"	7, 9, 11
<i>Andropogon glomeratus</i> (Walter) Britton, Sterns, & Poggenb. Bushy bluestem, "broom straw roots"	Poaceae	Graminoid [P]	Bowels - <i>Hemorrhoids</i> Skin - <i>Ich, poison ivy</i>	Poultice of roots + lard applied as salve Steep roots and apply broth for both indications, may have also taken infusion	7, 11 7, 11
<i>Angelica venenosa</i> (Greenway) Fernald Hairy angelica "hunting/ fishing root"	Apiaceae	Herb [P]	Animals (treatment for) - <i>Hunting aid</i> Bowels - <i>Dysentery, laxative, purge</i> Nervous system/Blood - <i>Vapors</i> Skin - <i>Ointment</i>	Rubbed plant between hands to release odor and draw deer Useful for curing "flux", loosens and purges those afflicted by "gripes", good distemper remedy Useful for treating "vapours", acts as a sudorific Combined with bear grease and <i>Sanguinaria canadensis</i> to make skin supple, close pores, and promote nimbleness. Used after bathing.	3, 8 3 3 1
<i>Apocynum cannabinum</i> L. Indian hemp	Apocynaceae	Herb [P]	Bowels - <i>Purge</i> Stomach - <i>Purge, emetic</i>		3, 6 3, 6, 9
<i>Aralia spinosa</i> L. Hercules club "Angelica tree" "Sun brier"	Araliaceae	Tree/Shrub (Woody) [P]	Fever - <i>Inflammation, fever</i> Skin - <i>Boils, sores</i>	Decoction of root, sugar, and flour or bran used as a salve for fever (7), draws out fever from "risings" (11) Tea applied to sores. Scrape off dark root coating, boil root until tender (~30 min.), add sugar, flour, or bran to make a salve for boils.	7, 10, 11 7, 9, 10, 11
<i>Arisaema triphyllum</i> (L.) Schott Jack-in-the-pulpit	Araceae	Herb [P]	Skin - <i>Boils, bruises, "risings", swelling</i>	Crushed plant used in poultice for bruises, swelling (9). Dried and hardened roots are beaten like meal and wetted to make a poultice (mixed with dough or hog's lard to make it stick to skin) (11).	9, 11

Appendix 1 (continued).

PLANT (<i>Scientific, Common names</i>)	BOTANICAL FAMILY	GROWTH HABIT	GENERAL USE, - <i>SPECIFIC USE</i>	PREPARATION INFORMATION	REFS.
<i>Aristolochia serpentaria</i> L. Virginia snakeroot	Aristolochiaceae	Herb [P]	Animals (treatment from) - <i>Snake bite, spider bite</i> Other - <i>Chills</i>	Mashed roots as part of a mixture, applied as salve to bites Leaves steeped to make a tea	9, 11 9, 11
<i>Asarum canadense</i> L. Canadian wildginger	Aristolochiaceae	Herb [P]	Lungs - <i>Cough medicine</i>	Root used in cough remedy	9
<i>Asclepias incarnata</i> L. Swamp milkweed	Asclepiadaceae	Herb [P]	Medicine		10
<i>Asclepias</i> spp. Milkweeds	Asclepiadaceae	Herb	Wounds (external) - <i>Wound herb</i>	Bruised and applied to wounds	12
<i>Asclepias syriaca</i> L. Common milkweed	Asclepiadaceae	Herb [P]	Skin - <i>Warts, ringworm</i>	Rub the milk of fresh plant on warts or ringworm.	7, 9, 10, 11
<i>Asclepias tuberosa</i> L. ssp. <i>tuberosa</i> Butterfly milkweed, "pleurisy root", orange milkweed	Asclepiadaceae	Herb [P]	Animals (treatment from) - <i>Snake bite</i>	Bruised leaves applied for 3 hours as poultice to body part bitten by poisonous snake (rattlesnake or copperhead). Poultice renewed often, but 2 nd application considered "final cure".	7, 11
<i>Asimina triloba</i> (L.) Dunal Pawpaw	Annonaceae	Tree/Shrub (Woody) [P]	Medicine		10
<i>Betula nigra</i> L. River birch	Betulaceae	Tree (Woody) [P]	Medicine		10
<i>Cephalanthus occidentalis</i> L. Common buttonbush	Rubiaceae	Tree/Shrub [P]	Medicine		10
<i>Cicuta maculata</i> L. var <i>maculata</i> Spotted water hemlock, "snakeweed"	Apiaceae	Herb [P]	Joints/Bones/Muscles - <i>Joint pain, lameness,</i> <i>sprains</i> Other - <i>Poison</i>	Used root or whole plant in poultice (Iroquois) Widely known by Eastern Woodland peoples to be extremely poisonous	9, 10 9, 10
<i>Cornus florida</i> L. Red dogwood	Cornaceae	Tree/Shrub (Woody) [P]	Bowels - <i>Diarrhea</i> Nervous system/Blood - <i>Blood medicine</i> Stimulant - <i>Tonic</i>	Root bark steeped and drunk Handful of dried root-bark boiled for tea Handful of dried root-bark boiled for tea	7, 10, 11 7, 9, 10, 11 7, 9, 10, 11
<i>Cypripedium acaule</i> Aiton Moccasin flower, pink lady slipper	Orchidaceae	Herb [P]	Other - <i>Panacea</i>	Dried roots used in a mixture, taken as a panacea for general ailments	7, 11
<i>Diospyros virginiana</i> L. Persimmon	Ebenaceae	Tree (Woody) [P]	Mouth/Throat - <i>Sore throat, thrush</i>	Bark from north side of tree steeped for tea to treat sore throat. ~1 oz. inner bark is steeped in 1 pint of water and strained to make a wash, applied with soft linen to cure "thrash" (thrush)	7, 9, 10, 11

Appendix 1 (continued).

PLANT (<i>Scientific, Common names</i>)	BOTANICAL FAMILY	GROWTH HABIT	GENERAL USE, - <i>SPECIFIC USE</i>	PREPARATION INFORMATION	REFS.
<i>Eupatorium perfoliatum</i> L. var. <i>perfoliatum</i> Common boneset	Asteraceae	Herb [P]	Stimulant - <i>Tonic</i>	Dried leaves (picked from plant prior to flower maturation) steeped for tea drunk to improve health	7, 9, 11
<i>Eupatorium purpureum</i> L. Sweetscented joepeyweed, "Queen of the meadow"	Asteraceae	Herb [P]	Nervous system/Blood - <i>Blood medicine</i>	Ingredient	7, 11
<i>Euphorbia corollata</i> L. Flowering spurge	Euphorbiaceae	Herb [P]	Bowels - <i>Purge</i> Stomach - <i>Purge, emetic</i>	Used roots Used roots	3, 6, 8 3, 8, 9
<i>Euphorbia ipecacuanhae</i> L. American ipecac	Euphorbiaceae	Herb [P]	Bowels - <i>Purge</i> Stomach - <i>Purge, emetic</i>	Used roots Used roots	3, 6, 8 3, 6, 8, 9
<i>Fagus grandifolia</i> Ehrh. American beech	Fagaceae	Tree [P]	Skin - <i>Poison ivy</i>	Wash made from handful of bark from north side of tree, 1 pint water, 1 teaspoon salt. Applied 3 times daily.	7, 10, 11
<i>Fragaria virginiana</i> Duchesne Virginia strawberry	Rosaceae	Herb [P]	Medicine		10
<i>Gaylussacia</i> spp. Huckleberries	Ericaceae	Woody	Stomach - <i>Gastrointestinal aid,</i> <i>sick stomach</i>	Small parcel of dried or fresh roots steeped for tea	11
<i>Hamamelis virginiana</i> L. American witchhazel	Hamamelidaceae	Tree/Shrub (Woody) [P]	Lungs - <i>Tuberculosis</i> Other - <i>Cold remedy</i> Skin - <i>Bruises, sores</i>	Bark ingredient in tuberculosis remedy (Cherokee, Iroquois) Leaf tea (Cherokee, Iroquois) Leaf or twig tea (Cherokee, Mohegan)	9, 10 9, 10 9, 10
<i>Hedeoma pulegiodes</i> (L.) Pers. American false pennyroyal	Lamiaceae	Herb [A]	Animals (treatment from) - <i>Flea deterrent</i> Gynecology - <i>Menstrual pain,</i> <i>difficulties</i>	Dried leaves kept in a room will deter fleas Handful of fresh or dried plants, steeped to make a tea to relieve menstrual pain	11 7, 9, 11
<i>Hexastylis virginica</i> (L.) Small "heart leaf", "wild ginger"	Aristolochiaceae	Herb [P]	Fever - <i>Febrifuge</i> Lungs - <i>Asthma, respiratory aid,</i> <i>whooping cough</i>	Green or dried leaves steeped for tea used to reduce high fever (typhoid) ~6 leaves steeped in 1, quart water, boiled down to a pint and mixed with alcohol. Taken 3x daily for asthma or "shortness of breath". Also steeped with <i>Juniperus</i> <i>virginiana</i> berries. Leaves steeped to make tea to treat whooping cough; also boiled down and mixed with sugar or honey to drink.	10, 11 10, 11
<i>Hibiscus moscheutos</i> L. Rose mallow	Malvaceae	Subshrub/ Herb [F]	Medicine		10
<i>Hieracium scabrum</i> Michx. var. <i>scabrum</i> Rough hawkweed	Asteraceae	Herb [P]	Bowels - <i>Diarrhea</i>	Chew leaves or steep and drink "broth"	11
<i>Hieracium venosum</i> L. Rattlesnakeweed	Asteraceae	Herb [P]	Bowels - <i>Diarrhea</i>	Various parts of this plant and other species of this genus	9

Appendix 1 (continued).

PLANT (<i>Scientific, Common names</i>)	BOTANICAL FAMILY	GROWTH HABIT	GENERAL USE, - <i>SPECIFIC USE</i>	PREPARATION INFORMATION	REFS.
<i>Ilex opaca</i> Aiton var. <i>opaca</i> American holly	Aquifoliaceae	Tree/Shrub (Woody) [P]	Medicine		10
<i>Impatiens capensis</i> Meerb. Jewelweed	Balsaminaceae	Herb [A]	Gynecology - <i>Ease difficult childbirth</i> Skin - <i>Poison ivy</i>	Used stems (Cherokee, Iroquois) Used a wash made from this plant. Applied juice (Cherokee, Iroquois).	9, 10 4, 9, 10
<i>Iris verna</i> L. Dwarf violet iris "dwarf iris", "fleur-de-lis"	Iridaceae	Herb [P]	Bowels - <i>Purge</i> Stomach - <i>Purge</i>		3, 6, 8 3, 6, 8
<i>Juglans nigra</i> L. Black walnut	Juglandaceae	Tree [P]	Bowels - <i>Diarrhea, dysentery</i> Other - <i>Chills</i> Stomach - <i>Gastrointestinal aid</i>	Root bark steeped for tea; about ½ cupful used to "roughen the intestines" (prevent dysentery) Soaked bark from north side of tree in vinegar, bound while hot around arm to cure chills. Kept on for "one sun, one moon".	7, 10, 11 7, 10, 11
<i>Juniperus virginiana</i> L. var. <i>virginiana</i> Eastern red cedar	Cupressaceae	Tree (Woody) [P]	Lungs - <i>Respiratory aid, asthma</i> Other - <i>Summer cholera</i>	Berries steeped with <i>Hexastylis virginica</i> for "shortness of breath" and asthma. Bark steeped for tea to treat "summer complaint"	7, 9, 11 7, 11
<i>Kalmia latifolia</i> L. Mountain laurel	Ericaceae	Tree/Shrub (Woody) [P]	Medicine		10
<i>Leersia oryzoides</i> (L.) Sw. Rice cutgrass	Poaceae	Graminoid [P]	Medicine		10
<i>Lilium superbum</i> L. Turk's cap lily	Liliaceae	Herb [P]	Medicine		10
<i>Lindera benzoin</i> (L.) Blume Northern spicebush, "Wild allspice", "Lesser sassafras"	Lauraceae	Tree/Shrub (Woody) [P]	Gynecology - <i>Menstrual pain, delayed menses</i> Stomach - <i>Emetic</i>	Bundle of twigs split and steeped for tea for menstrual pains or to correct delayed menses Warm water added to sap	7, 11 3, 6, 8, 9
<i>Liquidambar styraciflua</i> L. Sweetgum	Hamamelidaceae	Tree (Woody) [P]	Animals (treatment for) - <i>Veterinary Aid (dogs)</i> Bowels - <i>Dysentery</i> Other - <i>Unspecified</i>	Roll "pills" of hardened sap, heat, and put in dog's nose to cure distemper Handful of dried bark steeped to make an infusion; generally mixed with an equal amount of <i>Quercus rubra</i> bark Medicine made from gum collected by scraping tree's interior	7, 11 7, 11 3
<i>Liriodendron tulipifera</i> L. Tulip poplar, tulipree	Magnoliaceae	Tree (Woody) [P]	Analgesic Other - <i>Love medicine, sex invigorant, "opener of obstructions"</i> Stimulant	Bruised leaves bound to head to relieve neuralgic pain Chewed green bark. Young buds used medicinally, excellent "opener of obstructions"	7, 10, 11 3, 7, 10, 11
				Chewed green bark	7, 10, 11

Appendix 1 (continued).

PLANT (Scientific, Common names)	BOTANICAL FAMILY	GROWTH HABIT	GENERAL USE, - SPECIFIC USE	PREPARATION INFORMATION	REFS.
<i>Ludwigia alternifolia</i> L. Seedbox	Onagraceae	Herb [P]	Medicine		10
<i>Magnolia virginiana</i> L. Sweetbay magnolia, "Sorrell tree"	Magnoliaceae	Tree/Shrub (Woody) [P]	Fever - - <i>Febrifuge</i> Stimulant - <i>Stimulant, hallucinogen</i>	"Sorrell tree" used to treat fevers Place leaves or bruised bark in cupped hands, place over nose and breathe deeply to get stimulating effect as a "mild dope"	3 7, 11
<i>Mikania scandens</i> (L.) Willd. Climbing hempvine	Asteraceae	Vine/Herb [P]	Medicine		10
<i>Monarda punctata</i> L. ssp. Eastern Horse-mint, spotted beebalm	Lamiaceae	Subshrub/ Herb [F]	Fever - <i>Febrifuge</i>	Plant tea (Cherokee, Iroquois, Delaware)	9, 10
<i>Monotropa uniflora</i> L. Indian pipe	Ericaceae	Herb [P]	Eyes - <i>Eye lotion</i> Medicine	Juice of pulverized plant mixed with water	4, 10
<i>Morella cerifera</i> (L.) Small Wax myrtle	Myricaceae	Tree (Woody) [P]	Medicine		10
<i>Morus rubra</i> L. var. <i>rubra</i> Red mulberry	Moraceae	Tree (Woody) [P]	Skin - <i>Ringworm</i>	Rubbed sap of tree on skin	7, 10, 11
<i>Nuphar lutea</i> (L.) Sm. ssp. <i>advena</i> (Aiton) Kartesz & Gandhi Yellow pond-lily "Cow or swamp collard"	Nymphaeaceae	Herb [P]	Fever - <i>Febrifuge, inflammation</i> Skin - <i>Boils</i> Medicine	Leaves parched ("killed?") on stove, bruised, and bound over sores to remove fever and inflammation Leaves warmed on stove applied to boils	7, 10, 11 7, 10, 11
<i>Peltandra virginica</i> (L.) Schott Green arrow arum	Araceae	Herb [P]	Medicine		10
<i>Phoradendron leucarpum</i> (Raf.) Reveal & M.C. Johnst. Oak mistletoe	Viscaceae	Subshrub/ Shrub (Woody) [P]	Other - <i>Hair wash</i>	Plant steeped with <i>Yucca filamentosa</i>	11
<i>Phragmites australis</i> (Cav.) Trin. ex Steud. ssp. <i>americanus</i> Saltonstall, P.M. Peterson & Soreng Reedgrass	Poaceae	Subshrub/ Shrub/ Graminoid [P]	Medicine		10
<i>Phytolacca americana</i> L. Pokeweed, "poke", "pocan", "American nightshade"	Phytolaccaceae	Herb [P]	Bowels - <i>Dysentery,</i> <i>hemorrhoids, purge</i>	Berries steeped and taken for dysentery. Boiling water poured over roots in a bucket, patient sits over bucket to get the steam to relieve hemorrhoids.	7, 11

Appendix 1 (continued).

PLANT (Scientific, Common names)	BOTANICAL FAMILY	GROWTH HABIT	GENERAL USE, - SPECIFIC USE	PREPARATION INFORMATION	REFS.
<i>Phytolacca americana</i> L. (continued)			Joints/Bones/Muscles - <i>Rheumatism</i> Skin - <i>Poison ivy, warts, bruises, unidentified lumps, & other skin ailments</i> Stomach - <i>Emetic, purge</i>	Steeped and fermented seeds for wine to relieve joint aches, or used a fermented leaf infusion. Boiled leaves may have also been used. Steeped water, brine from salt fish, and plant roots and applied to relieve poison ivy. Mashed roots, buried them, and dug them up after a short time, then rubbed wart with this until it bled. Used various parts on many types of skin ailments.	7, 9, 11, 13 7, 9, 11 8, 9
<i>Pinus echinata</i> Mill. Shortleaf pine	Pinaceae	Tree (Woody) [P]	Animals (treatment for) - <i>Veterinary aid (emetic, dogs)</i> Skin - <i>Swellings</i>	Used grated dry bark in a mixture, fed to dog with distemper to induce vomiting Top branches used in a mixture, steeped or boiled to make a strong wash Dry, grated bark used in a mixture	7, 11 7, 11 7, 11
<i>Pinus virginiana</i> Mill. Virginia pine	Pinaceae	Tree (Woody) [P]	Bowels - <i>Kidneys</i>	Rolled small "pills" of hardened sap with fingers and took internally to cure kidney trouble	11
<i>Podophyllum peltatum</i> L. Mayapple, "mandrake"	Berberidaceae	Herb [P]	Bowels - <i>Laxative</i> Other - <i>Poison</i>	Root tea (Cherokee, Iroquois, Delaware) Small amounts of leaves and roots are poisonous	4, 9 4
<i>Polygonatum biflorum</i> (Walter) Elliot var. <i>commutatum</i> (Schult. & Schult.f.) Morong Smooth Solomon's seal	Liliaceae	Herb [P]	Stimulant - <i>Tonic</i> Joints/Bones/Muscles - <i>Orthopedic aid</i> Skin - <i>Bruises, sores, swellings</i>	Root tea (Iroquois, Delaware) Decoction of roots applied as salve to cuts, bruises, and sores Boiled roots down to a syrup, applied as a salve for bruises; mixed stewed berries with grease from a hog's jawbone and <i>Sambucus nigra</i> ssp. <i>canadensis</i> bark to make a salve for swellings and sores	9 7 11
<i>Polygonum arifolium</i> L. Hastate tearthumb	Polygonaceae	Vine/Herb [A]	Medicine		10
<i>Polygonum hydropiper</i> L. Knotweed, smartweed, "Biting Persicary"	Polygonaceae	Herb [A]	Wounds (external) - <i>Wound herb</i>	Chewed plant and squirted juice into wound	3, 6, 8
<i>Polygonum pennsylvanicum</i> L. Knotweed, Pennsylvania persicaria	Polygonaceae	Herb [A]	Medicine		10
<i>Polygonum sagittatum</i> L. Arrowleaf tearthumb	Polygonaceae	Vine/Herb [F]	Medicine		10

Appendix 1 (continued).

PLANT (<i>Scientific, Common names</i>)	BOTANICAL FAMILY	GROWTH HABIT	GENERAL USE, - <i>SPECIFIC USE</i>	PREPARATION INFORMATION	REFS.
<i>Prunus americana</i> Marsh. American plum	Rosaceae	Tree/Shrub (Woody) [P]	Other - <i>Unspecified</i>	Ingredient of a medicine made after diagnosis	11
* <i>Prunus serotina</i> Ehrh. Black cherry	Rosaceae	Tree/Shrub (Woody) [P]	Lungs - <i>Cough medicine</i> Other - <i>Cold remedy</i> Stimulant - <i>Tonic</i> Stomach - <i>Dietary aid, appetizer</i>	Bark or berry tea taken with honey for coughs; must be used fresh as it may "poison if allowed to stand" Infusion of buds, leaves, or bark taken with sugar Fresh or dried bark steeped, spring tonic Fresh or dried bark steeped	7, 9, 11 7 9, 11, 14* 11
<i>Pseudognaphalium obtusifolium</i> (L.) Hilliard & B.L. Burtt Rabbit tobacco, "white plantain"	Asteraceae	Herb [A]	Lungs - <i>Respiratory aid, asthma</i> Other - <i>Chills, colds</i> Wounds (external) - <i>Wound herb</i>	Dried stems steeped to make a tea for asthma; dried leaves also smoked in a pipe for asthma relief Steeped handful of roots in hot water, drank 1 teaspoon 3x daily Wound-curing medicine	7, 9, 11 7, 9, 11 3, 6, 8, 9
<i>Quercus alba</i> L. White oak	Fagaceae	Tree (Woody) [P]	Joints/Bones/Muscles - <i>Limb/joint pain</i> Skin - <i>Cauterization</i>	Placed burning "punk" (soft wood cut from knots of oak) on injured part to make a running sore and remedy joint and limb pain Used "punk" (inner part of oak), burning on skin to cauterize it	1, 10 3, 10
<i>Quercus rubra</i> L. Northern red oak	Fagaceae	Tree (Woody) [P]	Bowels - <i>Dysentery</i> Stimulant - <i>Tonic</i> Stomach - <i>Appetizer</i>	Generally mixed in equal amounts with a handful of <i>Liquidambar styraciflua</i> bark, steeped to make an infusion Boiled bark and leaves to make "bitters", a beneficial drink Tea made from bark taken from the tree's north side	7, 11 7, 11 7, 11
<i>Rhus copallinum</i> L. Winged sumac	Anacardiaceae	Tree/Shrub (Woody) [P]	Other - <i>Unspecified</i>	Used for "various complaints"	9
<i>Rhus typhina</i> L. Staghorn sumac	Anacardiaceae	Tree/Shrub (Woody) [P]	Other - <i>Panacea, unspecified</i>	Used for "various complaints"	7, 9
<i>Rosa palustris</i> Marsh. Swamp rose	Rosaceae	Subshrub (Woody) [P]	Medicine		10
<i>Rubus argutus</i> Link Sawtooth blackberry	Rosaceae	Subshrub (Woody) [P]	Medicine		10
<i>Rubus hispida</i> L. Bristly dewberry	Rosaceae	Subshrub (Woody) [P]	Bowels - <i>Diarrhea, dysentery</i> Skin - <i>Boils</i> Stimulant - <i>Tonic</i>	Wine made from berries (or roots) for dysentery. Boiled half a handful of roots to make medicine to treat diarrhea; drunk as desired until patient cured. Steeped leaf tea, or leaf infusion Wine made from berries	7, 11 7, 11 7, 11

Appendix 1 (continued).

PLANT (<i>Scientific, Common names</i>)	BOTANICAL FAMILY	GROWTH HABIT	GENERAL USE, - <i>SPECIFIC USE</i>	PREPARATION INFORMATION	REFS.
<i>Rubus</i> spp. Blackberries	Rosaceae	Woody	Bowels - <i>Diarrhea, dysentery</i>	(Blackberry) Moderate quantity of roots or berries steeped to make a tea to stop diarrhea. Overdose causes numbness and "dopey feeling". Used available species to combat dysentery.	9, 11
<i>Rumex verticillatus</i> L. Swamp dock	Polygonaceae	Herb [P]	Stomach - <i>Dyspepsia</i>	Steeped quantity of dried and brown runners and drank "broth"; also mashed berries and drank juice, which was not considered as effective	11
<i>Sagittaria latifolia</i> Willd. Broadleaf arrowhead,	Alismataceae	Herb [P]	Medicine		10
Duck potato			Medicine		10
<i>Salix</i> spp. Willows	Salicaceae	Woody	Medicine		10
<i>Salvia</i> spp. Sages	Lamiaceae	Herbs	Other - <i>Misc. infectious disease remedy</i>	2 tablespoons of a leaf tea (or leaf infusion) given to children with measles	7, 11
<i>Sambucus nigra</i> L. ssp. <i>canadensis</i> (L.) R. Bolli American black elderberry	Caprifoliaceae	Tree/Shrub (Woody) [P]	Joints/Bones/Muscles - <i>Rheumatism (neuritis)</i> Skin - <i>Sores, swellings, cuts, burns, skin eruptions</i>	Berry wine taken for "rheumatism" (neuritis) Bark used in salve with stewed <i>Polygonatum biflorum</i> berries and grease from a hog's jawbone. Various parts were ingredients in remedies for cuts, burns, and skin eruptions.	7, 10, 11 7, 9, 10, 11
<i>Sanguinaria canadensis</i> L. Bloodroot, "puccoon", "tumeric"	Papaveraceae	Herb [P]	Other - <i>Love medicine</i> Skin - <i>Ointment</i>	Used by the Algonquin in a love charm Combined with bear grease and <i>Angelica venenosa</i> to make skin supple, close pores, and promote nimbleness. Used after bathing.	7 1
* <i>Sassafras albidum</i> (Nutt.) Nees Sassafras	Lauraceae	Tree/Shrub (Woody) [P]	Eyes - <i>Sore eyes</i> Fever - <i>Febrifuge</i> Nervous system/Blood - " <i>Thin the blood</i> ", <i>blood purifier</i> , <i>"nerve medicine"</i>	Boiling water poured over pith of branches or inner bark applied as a wash for sore eyes Steeped scraped roots in boiling water, drank infusion hot	7, 9, 10, 11 7, 10, 11
				Root tea as blood purifier. Steeped roots to make "nerve medicine" (sedative?)	7, 9, 11, 14*, 20

Appendix 1 (continued).

PLANT (<i>Scientific, Common names</i>)	BOTANICAL FAMILY	GROWTH HABIT	GENERAL USE, - <i>SPECIFIC USE</i>	PREPARATION INFORMATION	REFS.
<i>*Sassafras albidum</i> (Nutt.) Nees (continued)			Other - <i>Misc. infectious disease remedy, "increase male vigor", unspecified</i> Skin - <i>Burns</i> Stimulant - <i>Stimulant, tonic</i> Venereal - <i>Anti-syphilitic</i> Medicine	Steeped scraped roots in boiling water, drank hot infusion to bring out rash in measles cases. Males chewed raw buds to increase vigor. Boiled water poured over pith of branches applied as a wash for burns Steeped root for spring tonic Used to cure "the pox"	2, 7, 10, 11 10, 11 7, 9, 10, 11, 14* 10, 12
<i>Saururus cernuus</i> L. Lizard's tail	Saururaceae	Herb [P]	Medicine		10
<i>Scutellaria lateriflora</i> L. Mad-dog skullcap Helmet flower	Lamiaceae	Herb [P]	Medicine		10
<i>Smilax</i> spp. Greenbrier, sarsaparilla	Smilacaceae	Woody	Other - <i>Unspecified</i>	Ingredient in a medicine made after diagnosis	7, 11
<i>Sphagnum</i> spp. Sphagnum	Sphagnaceae	Herb	Wounds (external) - <i>Absorbent</i>	Used as an absorbent in wounds	11
<i>Triosteum perfoliatum</i> L. Feverwort, "Indian purge"	Caprifoliaceae	Herb [P]	Bowels - <i>Purge</i> Stomach - <i>Emetic</i>	Used root Root bark known to have this effect	3, 6, 8 3, 6, 8, 9
<i>*Ulmus rubra</i> Muhl. Slippery elm	Ulmaceae	Tree [P]	Bowels - <i>Diarrhea</i> Eyes - <i>Eyewash</i> Fever - <i>Febrifuge</i> Gynecology - <i>Assist childbirth</i> Lungs - <i>Respiratory infection</i> Wounds (external) - <i>e.g., gunshot wounds</i> Other - <i>Hair wash</i>	Used bark, beaten to a pulp Inner bark used for eyewash. Used bark, beaten to a pulp Used bark, beaten to a pulp Tea from boiled roots Used bark, beaten to a pulp Used bark, beaten to a pulp	4, 10, 14* 9, 10, 14* 4, 10, 14* 4, 10 4, 10, 14* 4, 10, 14*
<i>Yucca filamentosa</i> L. Adam's needle, "bar grass"	Agavaceae	Subshrub, forb/herb [P]	Other - <i>Hair wash</i>	Combined with <i>Phoradendron leucarpum</i>	11