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A meta-analysis of the human uses of pteridophytic species in Tennessee

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A Meta-analysis of the Human Uses of Pteridophytic Species in Tennessee

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1. Introduction

The title of this thesis is "A Meta-analysis of the Human Uses of Pteridophytic Species in Tennessee." To understand the objectives of completing this project, each aspect of the title needs to be examined and explained.

1.1 Meta-analysis

A meta-analysis examines data from a number of independent studies of the same subject, in order to determine overall trends. This thesis is a meta-analysis because data were collected from hundreds of sources about the same subject, the human uses of Tennessee pteridophyte species. The goal of the work was to determine trends in the conglomeration of data. This work examined trends of human use within and across taxonomic rankings of pteridophytes.

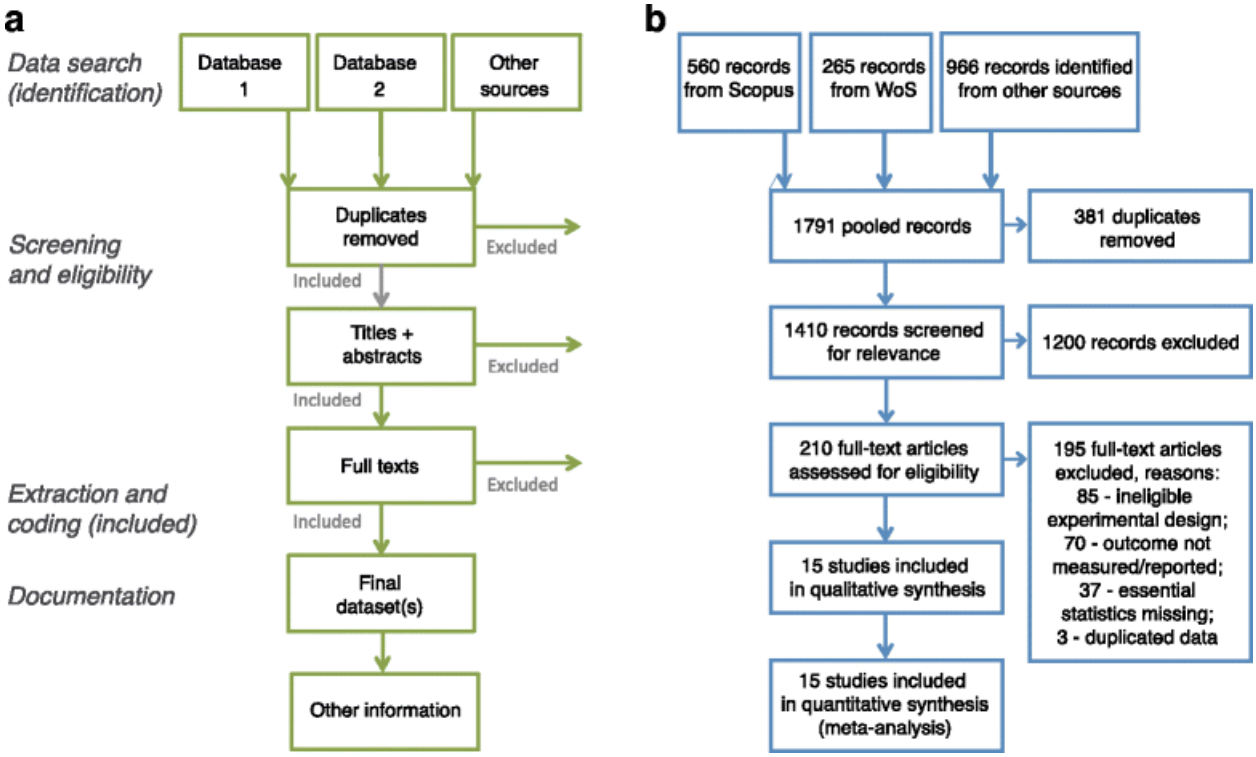


Figure 1*:** Flow charts representing the meta-analysis process (Nakagawa, 2017). ***a. Theoretical display of gathering sources from various databases, removing duplicates, assessing for relevance, and including relevant sources in research. ***b.*** Example scenario of the meta-analysis process. Further information on the process presented in the methods section.

1.2 Human Uses

Humans have been utilizing plants since the beginning of our existence. They not only provided and provide us with the oxygen necessary to breathe but also allowed and allow us to

develop as a species and society. From our need for oxygen to the food we eat to the rooves over our heads, plants provide us with the very essentials for survival.

It is only in recent history that academia created fields of study addressing the relationships between humans and plants. Examples of these disciplines are ethnobotany and economic botany. Both disciplines study plant-human relationships but with different foci. Ethnobotany examines how each culture uses its unique set of botanical resources to build lifeways, where economic botany focuses on the financial value of plants to humans in the era of globalization and global economies. Both disciplines recognize the large variety of plant-human relationships, and to make those more digestible, researchers often set up human use categories. While plants have been used to fulfill a large variety of human needs, most uses can fall under a few broad categories. Since this project focuses on pteridophytes, the following paragraphs will detail the most common human use categories for pteridophytes which are also the categories used in this project.

1.2.1 Medicine

Although North American studies of pteridophytes are still quite limited, much research is being done in Asia to understand their medicinal uses to humans. For example, a study from China identified the pteridophytic families of Pteridaceae, Polypodiaceae, and Adiantaceae as having "significant medicinal activity" (Baskaran, 2018). In addition, an ethnobotanical paper from Bangladesh describes 16 pteridophytic species linked to human consumption as food, medicine, or both (Sarker, 2009). A paper from Cambridge details both the medicinal uses, such as "antioxidant, antimicrobial, antiviral, anti-inflammatory, antitumor and anti-HIV, etc" of certain pteridophytes and the specific biochemical chemical compounds within them (Goswami, 2016). Goswami's paper emphasizes the potential ability pteridophytes have as antioxidants; "polyphenols are useful phytochemicals, which provide health benefits such as antioxidants" (2016). Furthermore, high antimicrobial activity has been observed in *Adiantum* species; specifically "data showed that the activity of the methanolic extracts of *Adiantum* species was better [than] standard antibiotics Gentamicin and Ketoconzole" (Singh, 2008).

1.2.2 Food

Uprety identified five species of pteridophytes that are used as food sources in Nepal (2012). These species are from four different families (Dryopteridaceae, Woodsiaceae, Davalliaceae, Ophioglossaceae) showing the diversity of taxonomic classes that have food source species within them. Most commonly young leafy parts or young shoots are eaten as vegetables, although there is one example of the tuberous roots being consumed (Uprety, 2012). In addition, Nwosu identified four pteridophytic species in four different families in southern Nigeria used as food sources (2002). Most commonly, young leaves and fronds are eaten as vegetables (Nwosu, 2002). Both Uprety and Nwosu identified *Diplazium esculentum* and *Nephrolepis cordifolia* as food items (2012; 2002). Furthermore, a study from the Western Himalayan region recorded two species of pteridophytes consumed as food and medicine (Arayal, 2018). The two species are *Dryopteris cochleata* and *Nephrolepis cordifolia*. Therefore, three studies from different parts of Asia and Africa all confirm *Nephrolepis cordifolia* as an important food source.

1.2.3 Agriculture

Pteridophytes have important human use because they may be used as sustainable biofertilizers. The genus *Azolla* is especially important because of its symbiotic relationship with a cyanobacterium that has nitrogen-fixing properties (Wagner, 1997). Often the most limiting factor in agriculture is the availability of nitrogen, so using this pteridophyte instead of a chemical fertilizer could greatly improve sustainability. *Azolla* is found in Tennessee and may be utilized by citizens to improve the quality of their gardens.

1.2.4 Ornamental

Of the approximately 12,000 pteridophyte species worldwide, 500 are known to be grown in gardens throughout the U.S. (Chadwick, 2017). The Christmas fern *(Polystichum acrostichoides*), Ghost fern (hybrid of *Athyrium niponicum* var. *'pictum'* and *Athyrium filix-femina*), Ostrich fern *(Matteuccia struthiopteris*), Leatherwood fern (*Dryopteris carthusiana*), and Lady in Red (*Athyrium filix-femina* var. *angustum)* are all commonly recommended ferns to use in gardening (Longfield Gardens, 2019). Piedmont Master Gardeners report some native ferns that are commonly used in gardening: *Asplenium platyneuron, Polystichum acrostichoides,*

Osmunda cinnamomea, Dennstaedtia punctilobula, Osmunda claytoniana, Athyrium filix-femina, Adiantum pedatum, Dryopteris marginalis, Matteuccia struthiopteris, Osmunda spectabilis (Chadwick, 2017).

1.2.5 Phytoremediation

Due to the increasing worldwide environmental pollution, phytoremediation is an essential field which is tasked with finding plants that can remove those environmental pollutants (Kramer, 2005). Plants are often a cheap and accessible alternative compared to other remediation strategies. Pteridophytes have been used in a variety of ways in phytoremediation, from bioaccumulators/hyperaccumulators to indicators of both soil and water quality. As accumulators, pteridophytes are typically used to uptake heavy metals, like arsenic and lead, from the environment. Some pteridophytes are classified as hyperaccumulators since they can not only tolerate environments with heavy metals but also accumulate exceptionally high concentrations of heavy metals (Rathinasabapathi, 2006). As indicators, researchers can analyze the heavy metal content in fronds or rhizomes of pteridophytes and determine the level of pollution of that area (Chang, 2009). Pteridophytes are extremely useful in many different facets of phytoremediation.

The genus *Salvinia* has been shown to have the ability to biodegrade certain polar micro-contaminants, such as caffeine, in water (Matamoros, 2012). Therefore, it may have applications as a fertilizer as well as a phytoremediator that can improve soil quality by removing similar harmful compounds; “since this plant [*Salvinia*] is a potential remover of heavy metals such as lead (Pb), cadmium (Cd), nickel (Ni), copper (Cu), chromium (Cr) and mercury (Hg) from wastewater, this has been used as a decontaminating agent” (Goswami, 2016).

1.3 Pteridophytic Species

Pteridophytes are a group of primitive vascular plants containing approximately 12,000 extant species (Iwatsuki, 1997). Pteridophytes are traditionally split into two groups, ferns and fern allies (Tennessee Flora Committee, 2015). Of the 12,000 species of pteridophytes, 11,000 are “true ferns” and 1,000 are “fern allies” (Haufler, 2016). Ferns and fern allies share a similar

life cycle but differ in that ferns have larger leaves, megaphylls, than fern allies, which have microphylls.

Pteridophytes are an ancient lineage dating back nearly 400 million years (Haufler, 2016). Their distribution is worldwide; they are found on every continent except Antarctica (although fern ancestor fossils have been found there) (Kramer, 1993). In the U.S., there are 853 species, 116 genera, and 30 families of pteridophytes (Qian, 1999), with Tennessee having 94 species, 42 genera, and 19 families (Tennessee Flora Committee, 2015). In this project, the species and genera of Tennessee pteridophytes were researched.

Due to pteridophytes' ancient lineage, they have a very complex evolutionary history. Researchers have been working for years to create a phylogeny that depicts the true evolutionary relationships, which has led to many overhauls of previously accepted relationships. Through the process of coming closer to a true pteridophyte phylogeny many synonyms for species were created, because each time a new evolutionary link was found, species and genera would have to be moved and renamed, since taxonomy and phylogeny should reflect evolutionary relationships. Due to the evolutionary history of the pteridophyte lineage being complex and ancient, confusion regarding taxonomic relationships has resulted in there being a rather large number of synonyms.

Numerous synonyms create a unique research challenge. To gain all the information about a certain species, one would have to search the current species name along with all the synonyms from previous taxonomical placements. For pteridophytes this would be a huge additional labor, therefore, given the already large scale of this thesis, synonyms were not used, only the current species name. Further research should be completed that addresses synonyms to create a more complete view of all the species human uses, no matter what name that species had at the time of research.

While the research focus of this work is the 94 species of pteridophytes present in Tennessee, it must be noted that some pteridophytes have a greater distribution than others. Some of Tennessee's 94 pteridophytes have cosmopolitan distributions, while others are endemic to the Southeast. Since there is some overlap between the pteridophyte species present in Tennessee and around the world, a species present in Tennessee could also be found in India, so there may be research about that pteridophyte from both regions, therefore sources from around the world were utilized in this research. Furthermore, the U.S. has a general lack of sources about the human uses of pteridophytes in comparison to other nations, therefore many sources in this

research are derived from other countries that happen to research a species present in Tennessee. The challenge of using sources about Tennessee pteridophytes that were not produced in the Southeast is that plants have phenotypic plasticity, so some characteristics may be based on locale and not characteristics of the species overall.

1.4 Goals

This thesis aims to pull data together from many resources on Tennessee's pteridophyte species to create a repository of human use information, as well as examine, analyze, and comment on the trends present within and between taxonomic groups of pteridophytes.

2. Methods

Databases were first tested to determine which would contain the most sources about human use and pteridophytes. The eight databases chosen had the most relevance to the thesis topic or highly approved for breadth and depth of information.

Then search strings were designed to return pertinent sources. The primary search string utilized was species name. Sometimes there were hundreds of sources returned from this primary search. This introduced the necessity of a differentiation process between sources to be utilized versus ones to discard. That process involved examining each source's title and abstract to determine the relevance of the source to the thesis topic. Sources were discarded if they did not mention any of the human uses in the title or abstract of the source. For example, sources that only discussed the genetics or ecological significances of pteridophytes without relating any relevance to human use would be discarded. After each search performed, a record was kept of the total sources yielded from the search, the number of relevant sources, and duplicate relevant sources. Duplicate relevant sources arose when the current database search results in the same source which had already been identified as relevant from a previous database search.

The final step involved handling an overwhelming number of sources returned from a single search. A parameter was set that if any search results in greater than 250 sources, the search was modified to be more specific, rather than only using the species name. The modified and refined search string is [species name] AND [medicine OR food OR agriculture OR ornamental OR phytoremediation]. This process was necessary because search results greater than 250 often contain hundreds of non-relevant sources.

2. 1. Databases

Many different databases were used to find sources about the human use properties of pteridophytic species. It is necessary to use many databases because ethnobotany and economic botany are disciplines that involve the intersection of numerous academic studies, and each of those academic study areas has at least one database or journal associated with it. Moreover, certain databases will be best suited for collecting information about certain human use categories. Listed below are the eight databases used in this research and why each was chosen.

Economic Botany Journal on Springer, Economic Botany Collection on KEW, Native American Ethnobotany DB, and Dr. Duke's Phytochemical and Ethnobotanical Databases are the

most relevant to the topic of this thesis since they have sources that only address human-plant relationships. These databases have some limitations due to the smaller number of sources contained in each and the specificity of the database (e.g. Native American Ethnobotany). Web of Science and PubMed are the most useful for looking at the human use category of medicine. Garden and Landscape Journals on JSTOR are useful for looking at the human use category of ornamentation. Proquest: Agricultural & Environmental Science Collection is useful for looking at the human use category of agriculture.

2. 2. Search Terms and Search Strings

The primary search string contained solely the species scientific name. There were 94 primary search strings since there are 94 species of pteridophytes present in Tennessee. Each species name was searched in each database. The secondary search strings were genus names only. Secondary search strings were only used in specific situations, e.g., when a search on the full species name returned zero human uses.

A third search string was used to refine primary or secondary search string results. If greater than 250 sources were returned from a primary or secondary search string, the modified search string was used. The modified string is [species name] AND [medicine OR food OR agriculture OR ornamental OR phytoremediation].

For some searches, a fourth string was used. The fourth search string was [species name] AND [medicine OR food OR agriculture OR ornamental OR phytoremediation] NOT [ecology OR genetics]. The fourth search string was used when the third search string still resulted in greater than 250 sources.

There were two times when the fourth search string still resulted in greater than 250 sources which were when searching *Equisetum arvense* and *Pteridium aquilinum* in the Proquest: Agriculture and Environmental Science Collection. To reduce the number of sources that needed to be evaluated to assign human uses to these species, the average number of sources returned per species per database, twelve, was used to randomly select twelve sources from the total sources returned. Then the differentiation process was used to determine which of those twelve sources were relevant.

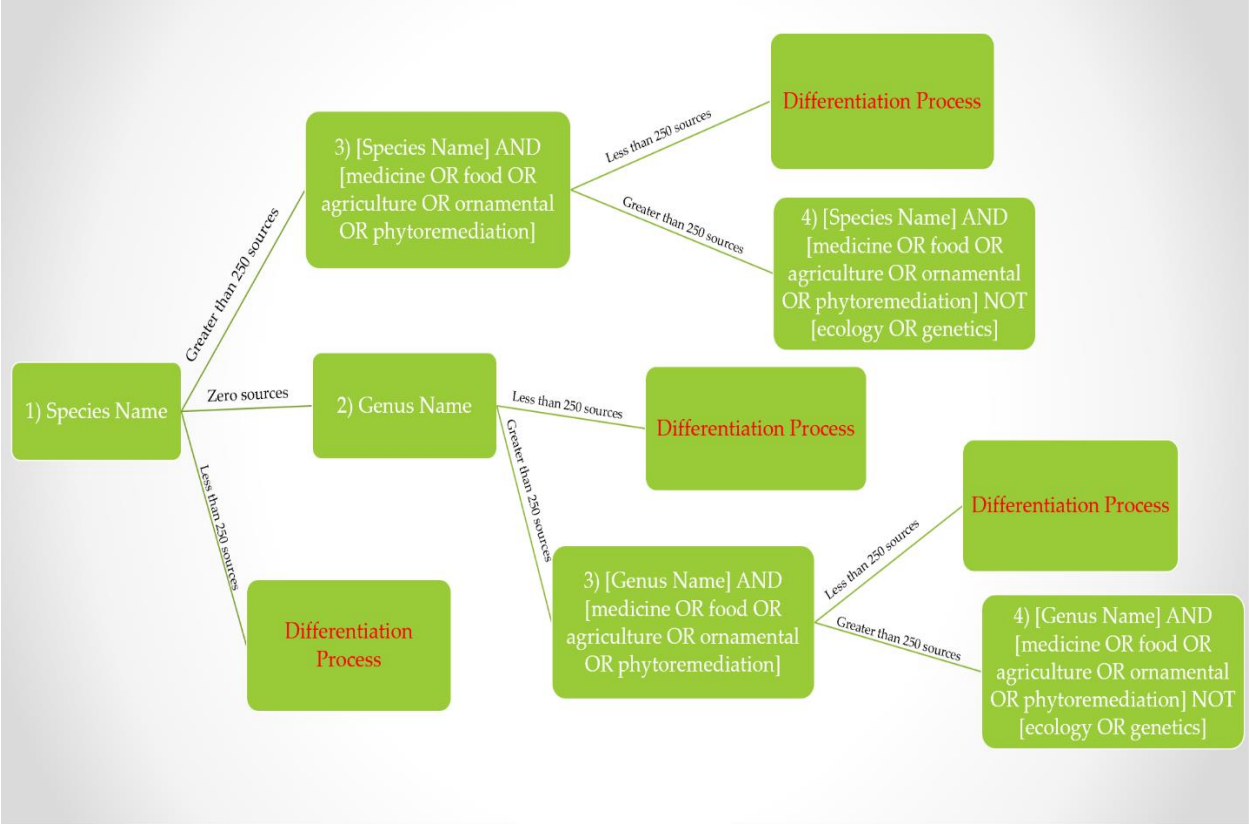


Figure 2: Flow chart depicting the described search string process in section 2.2 Search Terms and Search Strings. The flow chart shows the cascade of search strings used based on the number of sources returned from a given search. It displays at which point the primary, secondary, tertiary, and quaternary search strings were used, represented by the numbers. It also shows at what point the differentiation process of determining relevance was used.

2.3. Numbers of Searches Performed

1) The primary search strings were entered into each database. There are 94 species and eight databases, therefore a total of 752 searches were performed during this initial step. In reality, greater than 752 searches were performed because of the necessity to use the tertiary or quaternary search strings when greater than 250 sources were returned from any of the 752 searches.

2) The secondary search string was implemented 13 times because there were 13 genera with no Tennessee species having reported human uses, therefore 104 searches were performed concerning genera names.

2.4 Organizing and Storing Raw Data

Once relevant sources were determined from the use of search strings and differentiation methods, the pertinent information from the source was stored in an Excel document. Each Excel sheet was set up to record the database where the source was found, the author name, date, summary of source information about the pteridophyte species, and human use category under which that information fell. These record details were listed for each pertinent source about each Tennessee pteridophyte. This information was then turned into tables that appear at the end of this thesis in Appendix I.

2.5 Analyzing Data

Raw data were analyzed in a format that highlighted similarities within genera. Compound bar graphs per genus were the primary way raw data was analyzed. Using a compound bar graph per genus, where species are stacked per use, highlights the similarity of human use between species in the same genus. The bar graphs contain an x-axis which are the human use categories and a y-axis which is the number of uses. The x-axis is labeled with each human use category mentioned in the introduction of this paper. The method to calculate the number of uses was to count each piece of information from a source that related to the human use of a Tennessee pteridophyte as one use.

In addition to the use of graphs as a quantifiable measure of human use per genus, a qualitative written summary proceeds the graph to highlight sub-categories of use within each broad human use category. These summaries identify the broad trends within the genera as well as some of the unique uses of certain pteridophytes.

3. Results

The over 752 searches performed resulted in 11,095 sources, of which 835 were relevant. Therefore, 7.53% of sources returned from searches were relevant to the focus of this work. The average number of sources returned per genus was 264 and the average number per species was 118. The average number of relevant sources per genus was 20 and the average number per species was nine. The range of sources returned per genus was from zero to 1,066 (*Equisetum*). The range of sources returned per species was zero to 859 (*Pteridium aquilinum*).

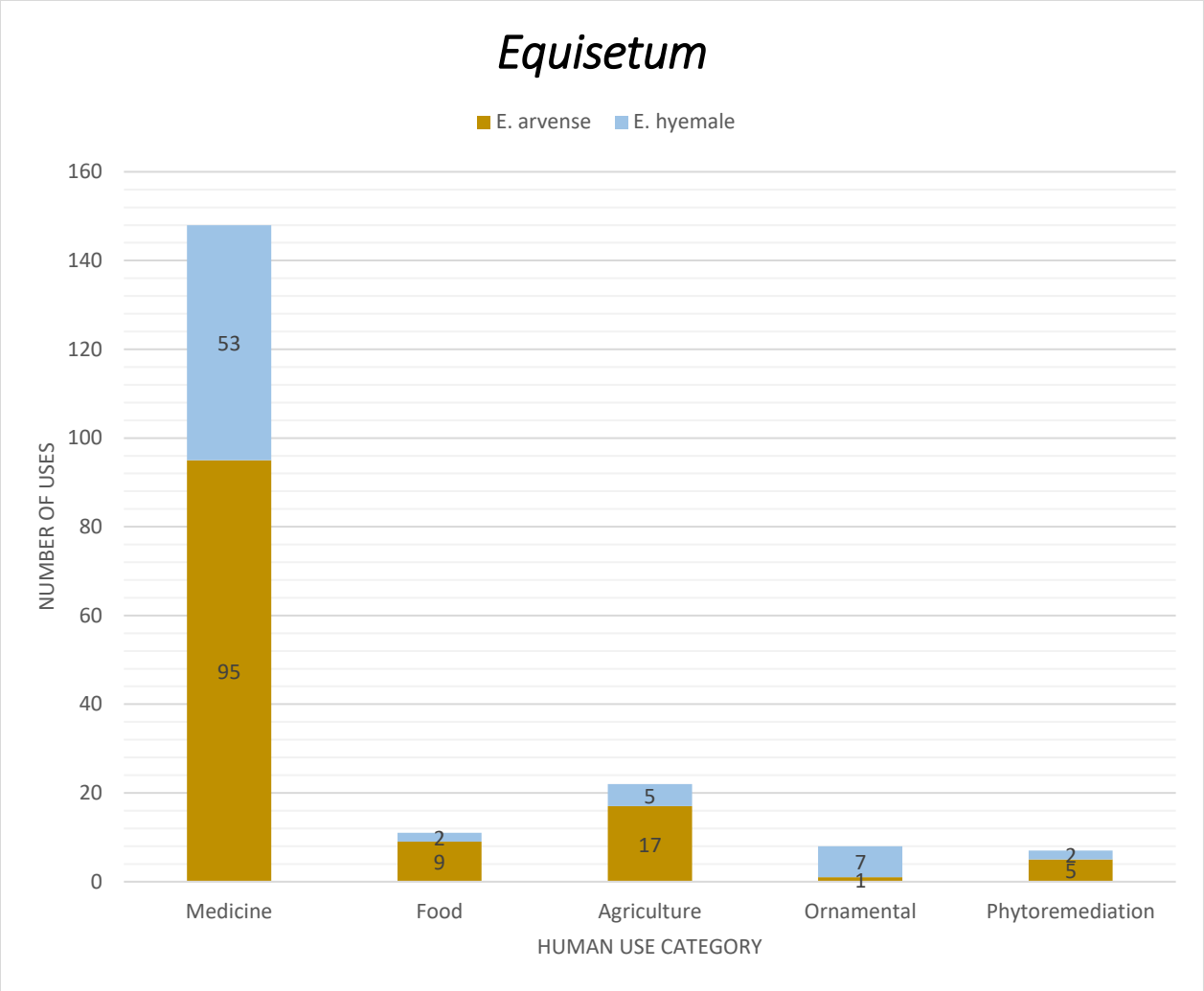
Of the 42 genera of pteridophytes present in Tennessee, 29 genera had human uses and 13 had no reported uses. Of all genera with human use, the most reported human use category was medicinal with 593 uses. The second largest use category across all Tennessee pteridophytes was ornamental with 125 uses. From largest to smallest the next three categories were food (83 uses), phytoremediation (72 uses), and agriculture (63 uses).

The sections below give summaries and graphs for Tennessee pteridophytes. The result section is dived into fern allies (3.1) and true ferns (3.2). Results under those sections are organized by family and genus. Appendix I contains further information and citations.

3.1. Fern Allies

a. Equisetaceae

The family Equisetaceae is monogeneric (*Equisetum*) within Tennessee. There are two species of *Equisetum* present in Tennessee, which are *E. arvense* and *E. hyemale*. This genus had the highest human use of any genus in this study. In medicine, both species have been used to cure a variety of ailments. These species have been used as antibacterial, anticancer, antioxidant, diuretic, dermatological, gynecological, wound, and orthopedic agents and aids, among many others. As a food, both species' young shoots, strobili, and rhizomes have been cooked and consumed. Agriculturally, *E. hyemale* has been used as a veterinary medicine for horses and used as fodder to fatten livestock; *E. arvense* was used as both of those as well as a fungicide to control maize microbiota and anti-pest to control weevils. *E. hyemale* was used often in the ornamentation of residential and public landscaping due to its color, rigid mass plantings, and perennial nature. Both species have been proven to remove lead from soil as well as remediate some types of wastewater, which were the reasons for its use in phytoremediation.



Human Uses of Tennessee *Equisetum* Species: This graph shows that both species of *Equisetum* present in Tennessee have many human uses in every category; in total, *Equisetum* has 196 human uses. The medicinal category contains most of the human uses, with 148. The second-largest category is agriculture, with 22 uses. *E. arvense* has more reported human uses than *E. hyemale*. *E. arvense* has more human uses than *E. hyemale* in every category, except for ornamental.

b. Isoetaceae

The family Isoetaceae is monogeneric (*Isoetes*) within Tennessee. There were no reported uses for any of the Tennessee species of *Isoetes.* A database search was conducted for the genus name, *Isoetes*, which yielded a couple of results. *I. martii* had medicinal use as an antivenom and *I. debii* had food use as the whole plant is consumed in a culinary dish (Uphof, 1968; Yumkham, 2017). This research shows that some species in *Isoetes* had medicinal and food uses, therefore *Isoetes* species of Tennessee should be researched to reveal if they have similar uses.

c. Lycopodiaceae

1. *Dendrolycopodium*

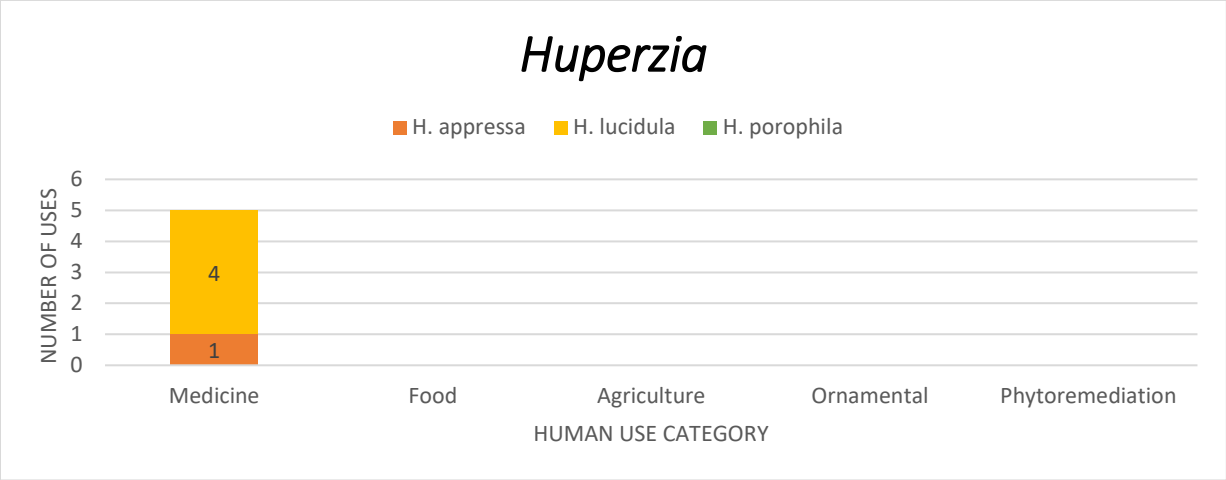
The Tennessee species in this genus had only one reported use, which is that *D. hickeyi* can be cultivated for use in gardens (Benca, 2014). Other Tennessee *Dendrolycopodium* species should be investigated for ornamental use.

2. *Diphasiastrum*

The Tennessee species in this genus had no reported uses. A database search was conducted for the genus name, *Diphasiastrum*, which yielded many results. The most prevalent use was medicinal, specifically for its antioxidant, anticancer, and antibacterial properties (Czapski, 2014; Boonya-udtayan, 2019; Yan, 2010; Kim, 2020). Furthermore, many of the species can be cultivated and could then have ornamental use (Benca, 2014).

3. *Huperzia*

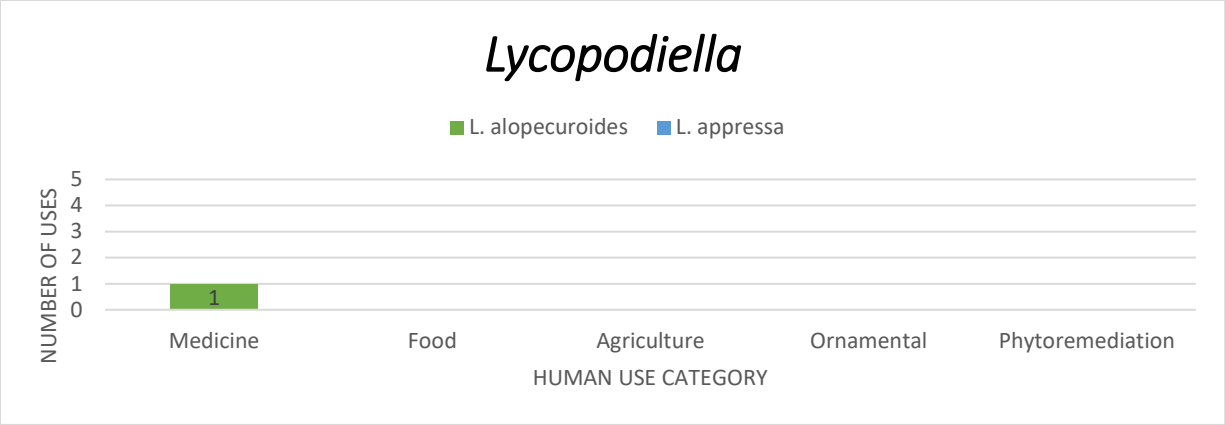
As the graph shows, medicinal use was prevalent in this genus. More specifically, the Tennessee species have been utilized as cold remedies, dermatological aids, and produce Huperzine A which is thought to improve memory and mental function in people with Alzheimer's disease or other types of dementia.



Human Uses of Tennessee *Huperzia* Species: This graph shows that *H. appressa* and *H. lucidula* have medicinal uses, while *H. porophila* had no reported uses. Tennessee *Huperzia* species have a total of 5 uses, which are all medicinal.

4. *Lycopodiella*

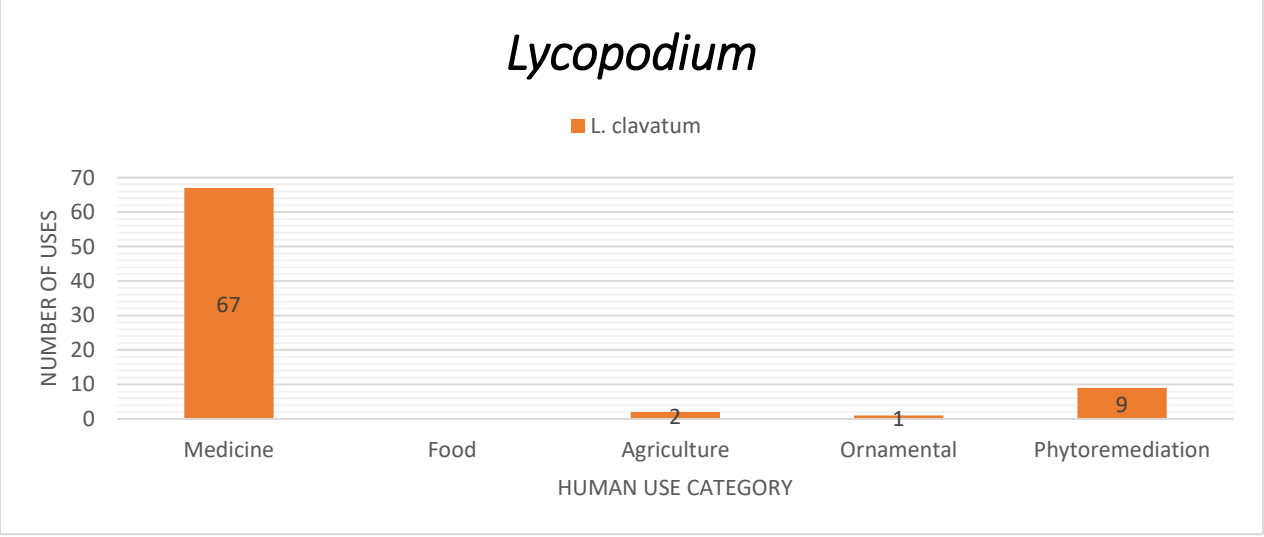
There was only one use reported for the Tennessee species of *Lycopodiella*, which is medicinal. Specifically, its phytochemical components, like phenols and anthocyanins, were said to be medicinal due to antioxidant properties.



Human Uses of Tennessee *Lycopodiella* Species: This graph shows that *L. alopecuroides* has one medicinal use, while *L. appressa* has no reported uses. Tennessee *Lycopodiella* species have a total of one use, which is medicinal.

5. Lycopodium

L. clavatum was one of the most used species out of the whole of Tennessee pteridophytes. Most commonly it was used medicinally, but it also has significance in phytoremediation as well as a few uses in agricultural and ornamental industries. The most prominent medicinal uses of *L. clavatum* was for its anticancer, antioxidant, antimicrobial, and anti-inflammatory agents. Moreover, the spore capsules were often used for drug delivery. It was useful as a phytoremediator because its sporopollenin could absorb heavy metals like lead and arsenic from aqueous media. In agriculture, it was used as an anti-pest and feed for poultry to promote growth.



Human Uses of Tennessee *Lycopodium* Species: This graph shows that *L. clavatum* has 67 medicinal uses, two agricultural uses, one ornamental use, nine phytoremediation, and no use as food. *L. clavatum* has a total of 79 reported uses, making it one of the most useful Tennessee pteridophytes.

6. *Spinulum*

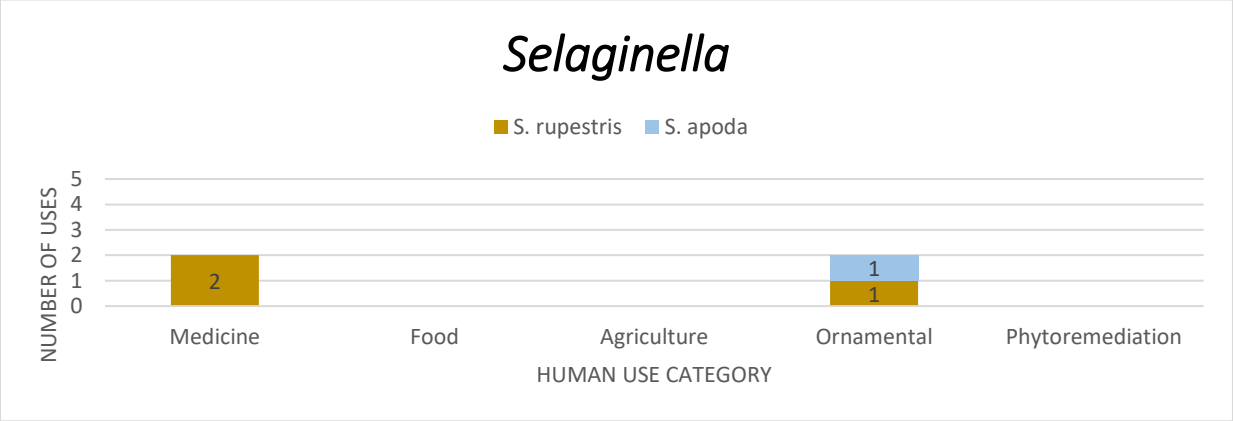
The Tennessee species in this genus had no reported uses. A database search was conducted for the genus name, *Spinulum*, which yielded only one source, which is that a species in this genus can be cultivated and could, therefore, be utilized ornamentally (Benca, 2014).

d. Selaginellaceae

The family Selaginellaceae is monogeneric within Tennessee.

1. *Selaginella*

The Tennessee species in this genus had medicinal and ornamental uses reported. The medicinal uses derived from *S. rupestris's* phytochemicals, like bioflavonoids and amentoflavone, which aid in the action of vitamin C. Both Tennessee species have been used ornamentally, one to promote the growth of flowering plants through positive interactions, the other as a species planted in gardens.



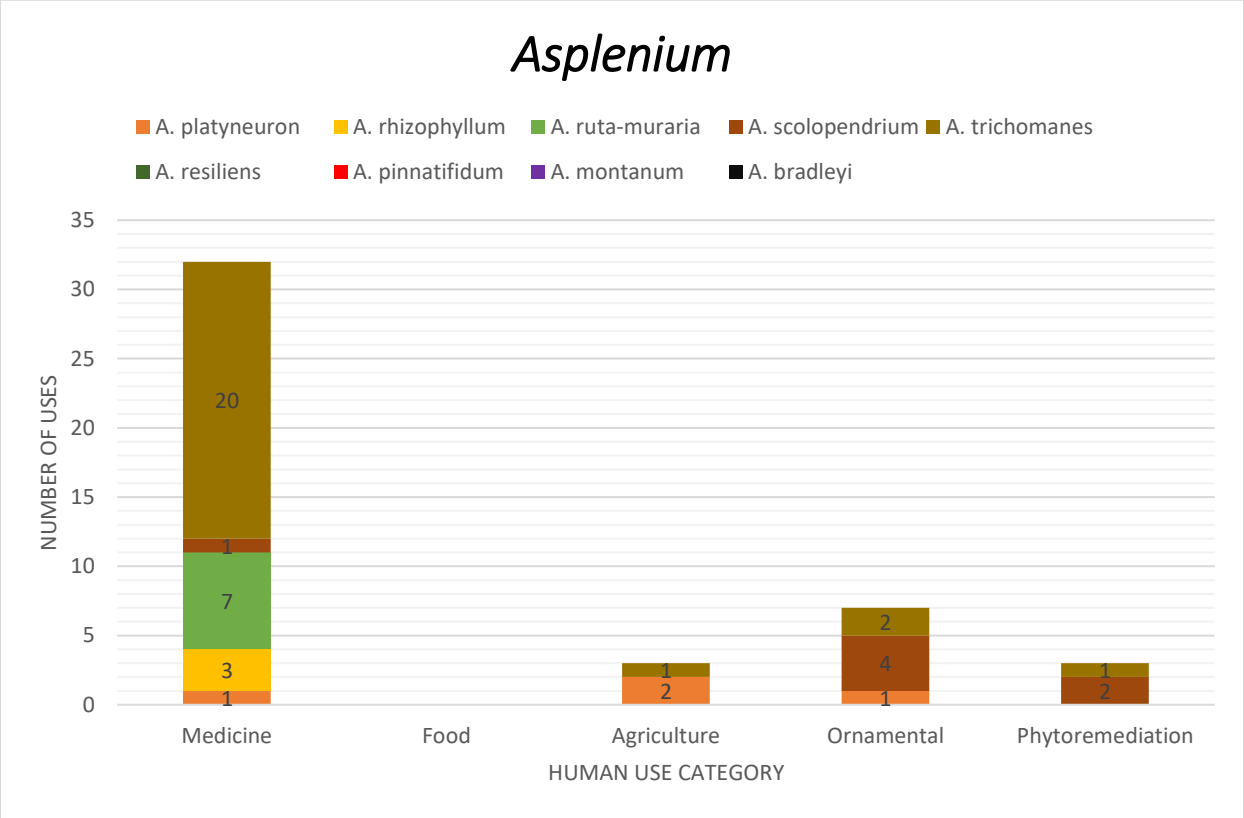
Human Uses of Tennessee *Selanginella* Species: This graph shows that *S. rupestris* has two medicinal uses, while S. apoda has no reported use as medicine. The genus has a total of two ornamental uses. Tennessee *Selaginella* species have a total of four uses, which are medicinal and ornamental.

3.2. True Ferns

a. Aspleniaceae

The family Aspleniaceae is monogeneric within Tennessee; the only genus present is *Asplenium*. There are nine species of Asplenium present in Tennessee. Searches performed for the species *A. bradleyi, A. montanum, A. pinnatifidum*, and *A. resiliens* returned no relevant sources. The other five species returned sources related to a variety of use categories, which were medicine, agriculture, landscaping, and phytoremediation. The largest category of use for this genus is medicine due to its uses as a gynecological aid, cough medicine, kidney aid, liver aid, breast

treatment, anticancer properties, antibacterial activity. Agriculturally, it was most commonly used for pest control. Ornamentally, it was used in gardening often due to the feathery texture and color of the fern, as well as a ground cover for landscaping. In phytoremediation, it was used as a biomarker and bioaccumulator of various heavy metals.



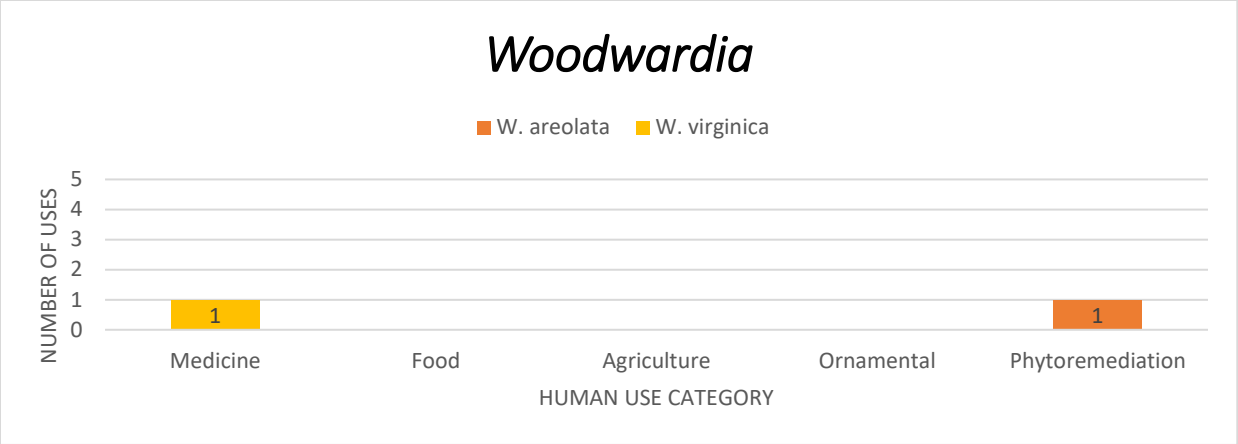
Human Uses of Tennessee *Asplenium* Species: This graph shows that 5 Tennessee species of *Asplenium* have human uses. Tennessee *Asplenium* species have a total of 45 uses, which span all the human use categories except food. There is a total of 32 medicinal uses, three agricultural, seven ornamental, and three phytoremedial. *A. trichomanes* has the most human uses of all the Tennessee species in *Asplenium* as well as the greatest variety, having medicinal, agricultural, ornamental, and phytoremediation uses.

b. Blechnaceae

The family Blechnaceae is monogeneric within Tennessee.

1. *Woodwardia*

The searches performed for this genus resulted in only two uses, one medicinal use of *W. virginica* as an astringent and one phytoremedial use of *W. areolata* as an accumulator of thorium and uranium.

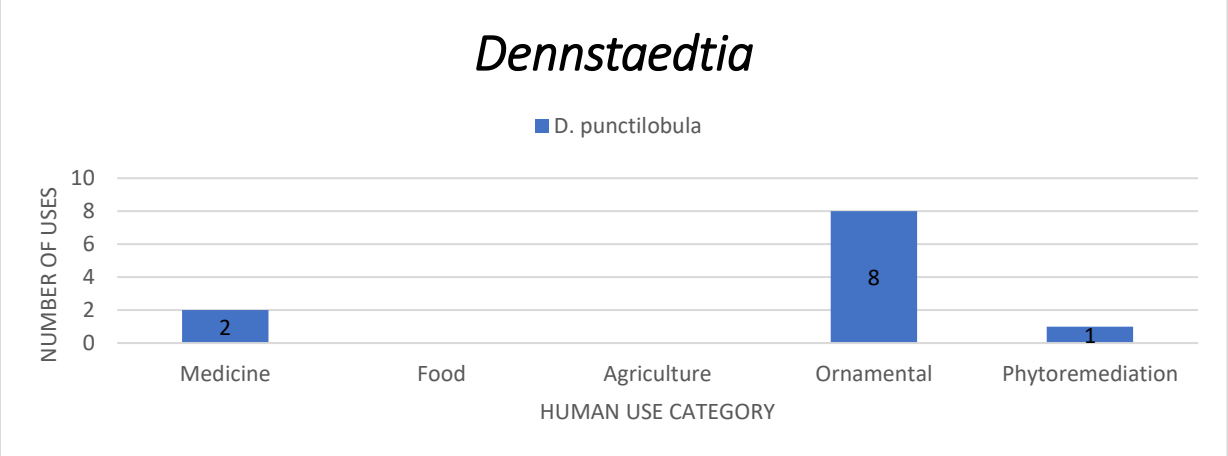


Human Uses of Tennessee *Woodwardia* Species: There is a total of two human uses of Tennessee species of *Woodwardia*, one medicinal and the other phytoremedial.

c. Dennstaedtiaceae

1. *Dennstaedtia*

This genus was primarily used for its ornamental assets, such as perennial ground cover in landscaping. Medicinally, it had been used as a febrifuge and antihemorrhagic. There was evidence that *D. punctilobula* could bioaccumulate metals, which shows its use in phytoremediation.

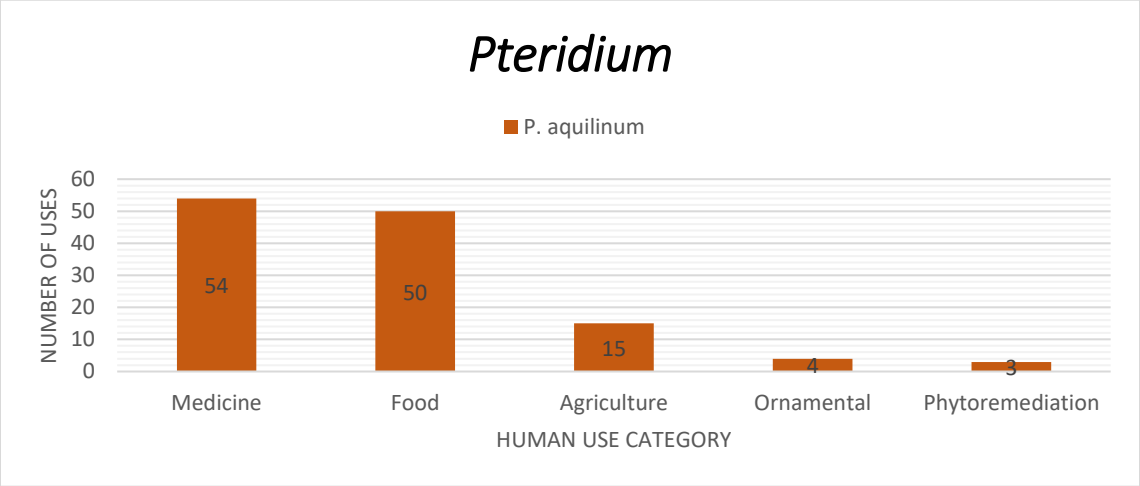


Human Uses of Tennessee *Denstaedtia* Species: This graph shows a total of 11 human uses of the one species of *Denstaedtia*, *D. punctilobula*, present in Tennessee. It is most often used ornamentally, with only a few medicinal and phytoremedial uses.

2. Pteridium

Pteridium is monotypic in Tennessee, with *P. aquilinum* being the sole representative of the genus. This species had the second-highest human use of all Tennessee pteridophytes. In medicine, this pteridophyte had primarily been used as an antioxidant, antirheumatic,

analgesic, gynecological aid, and antidiarrheal. As a food, almost every part of the plant, young shoots and fronds, fiddleheads, and rhizomes, had been prepared and consumed by humans. Uniquely, the rhizome had been made into a flour used to prepare bread. Agriculturally, this species had been used as fodder for a variety of livestock, but much research revealed that it causes bovine enzootic haematuria (BEH) if chronically consumed, so it is typically considered poisonous to livestock. It had also been used to improve agricultural soils and as a pesticide that works as an antifeedant. Many studies cited that this pteridophyte is highly toxic and carcinogenic, so there should be cautionary use of this plant. It is one of the most widely distributed species around the globe. It was widely consumed as food. Its ornamental uses were attributed to its groundcover use in residential landscaping and a dried floristry species, although it was reported to be a weed since it caused inference with other landscaping and agricultural efforts. *P. aquilinum* had also been used in the field of phytoremediation to remediate copper pollutants and other heavy metals.



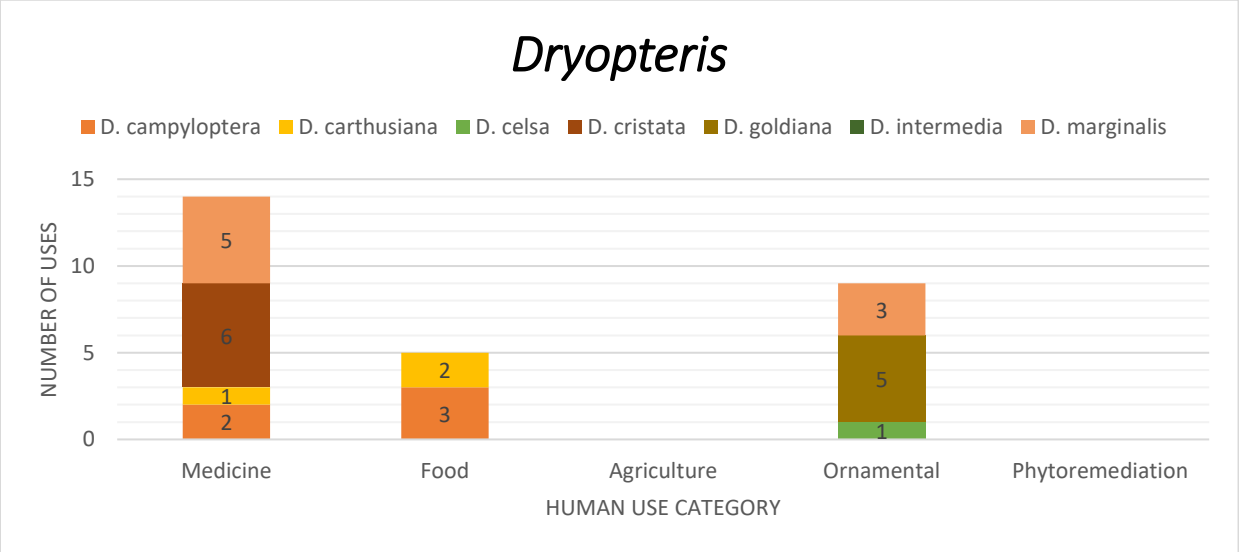
Human Uses of Tennessee *Pteridium* Species: This genus has 126 human uses. Those uses are spread across each human use category. It has been used as medicine almost as often as food. There are 54 medicinal uses and 50 food uses.

d. Dryopteridaceae

1. *Dryopteris*

This genus contains seven species in Tennessee, all having human uses except *D. intermedia*. The food uses came from the consumption of the rhizome or young fronds of some of the species. Medicinally, it was mostly used as a gastrointestinal aid, with some use of it as a cancer treatment, analgesic, antidote, antirheumatic, emetic, and a toothache

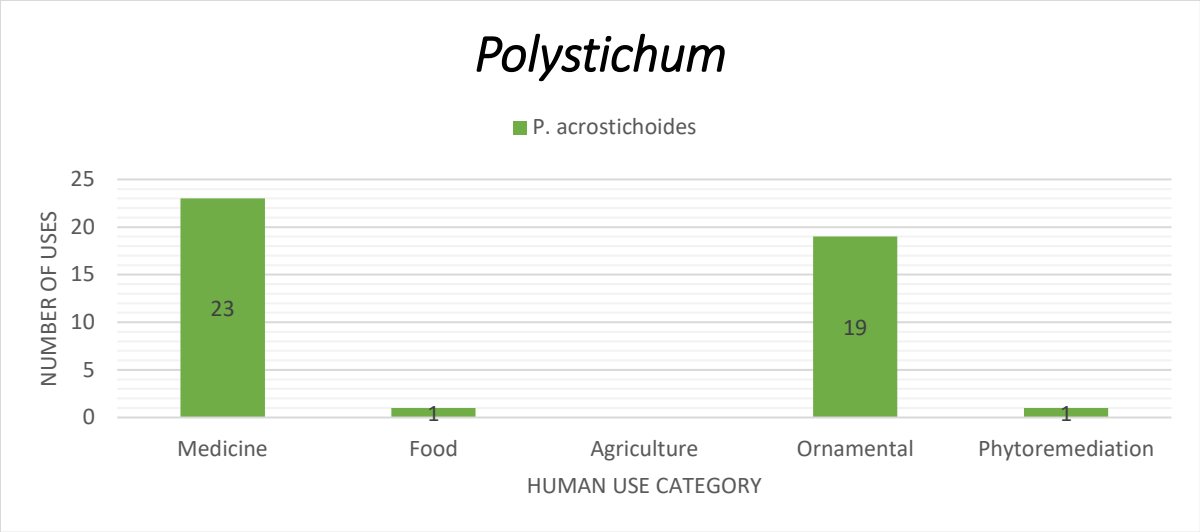
remedy. Tennessee species in this genus were also often used for ornamental purposes due to unique color, lacy fronds, perennial life growth habit, and durable nature. It has been used for both home gardens and landscaping purposes. The searches performed indicated that there are no uses of this genus in agriculture or phytoremediation.



Human Uses of Tennessee *Dryopteris* Species: This graph shows a total of 28 human uses of Tennessee *Dryopteris* species. The majority are medicinal, with some in ornamental and food. *D. goldiana* and *D. celsa* only used ornamentally and *D. cristata* is only used medicinally, while the other species' human uses span multiple categories. *D. marginalis* has the most human uses of the *Dryopteris* species in Tennessee, with a total of eight uses.

2. *Polystichum*

Polystichum contains only one species within Tennessee, which is *P. acrostichoides*. This species was mostly used medicinally and ornamentally. Medicinally, it was used as a throat, tooth, dermatological, gynecological, orthopedic, pulmonary, and venereal aid, as well as analgesic, antidiarrheal, antirheumatic, and emetic just to name a few. This shows the diversity of conditions that have been treated using this species. In the ornamental sector, it was used in home gardens, residential, and public landscaping as a perennial, dry shade ground cover. In the food and phytoremediation categories, the fiddleheads were used for food and as a potential arsenic accumulator, respectively.



Human Uses of Tennessee *Polystichum* Species: In total, the Tennessee species of *Polystichum* has 44 uses, which are predominantly medicinal and ornamental.

e. Hymenophyllaceae

1. *Hymenophyllum*

The Tennessee species in this genus had no reported uses. A database search was conducted for the genus name, *Hymenophyllum*, which yielded four results. Three of the four described the medicinal use of a species in the genus for cancer treatment, diuretic, chest, cold, and sudorific (Hartwell, 1967; Pittier, 1926; Uphof, 1968).

2. *Trichomanes*

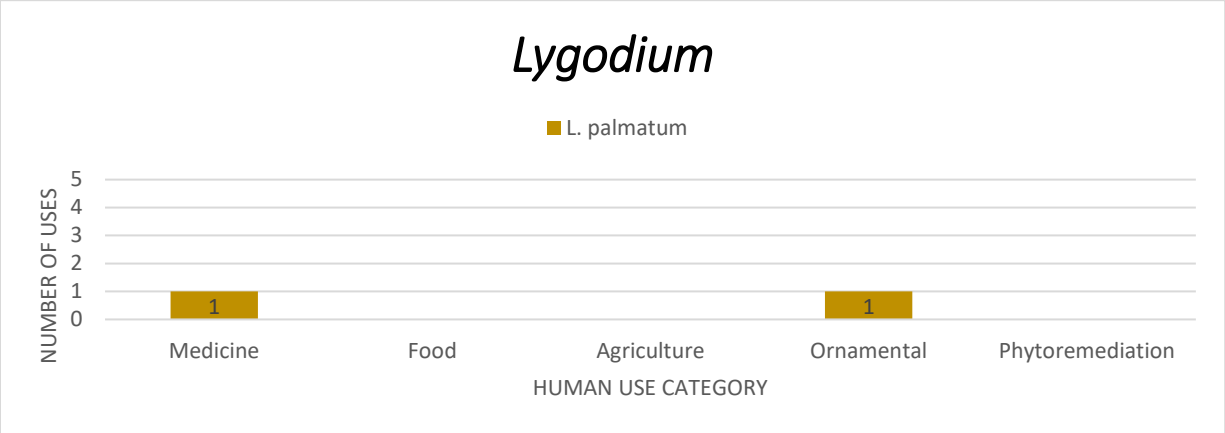
The Tennessee species in this genus had no reported uses. A database search was conducted for the genus name, *Trichomanes*, which resulted in many sources, mostly reporting the medicinal properties of some species in the genus. Most of the sources on the genus's medicinal properties related to its use as an antivenom, but it had also been used to treat headache, bladder conditions, fever, and wounds (Duke, 1970; Shih-chen, 1973; Otero, 2000; Núñez, 2004; Gupta, 2012; Aruwa, 2020; Soares, 2005). There was also a report of the fern being used as food where young fronds are consumed (Sarker, 2009). Furthermore, some species in the genus had been used ornamentally in botanical gardens (Appleby, 2005).

f. Lygodiaceae

The family Lygodiaceae is monogeneric within Tennessee.

1. *Lygodium*

This genus contains one species in Tennessee, which is *L. palmatum*. This species had been used medicinally as a dermatological aid to heal boils, abscesses, and swelling. Ornamentally, it had been used in gardens for its unique frond characteristics.

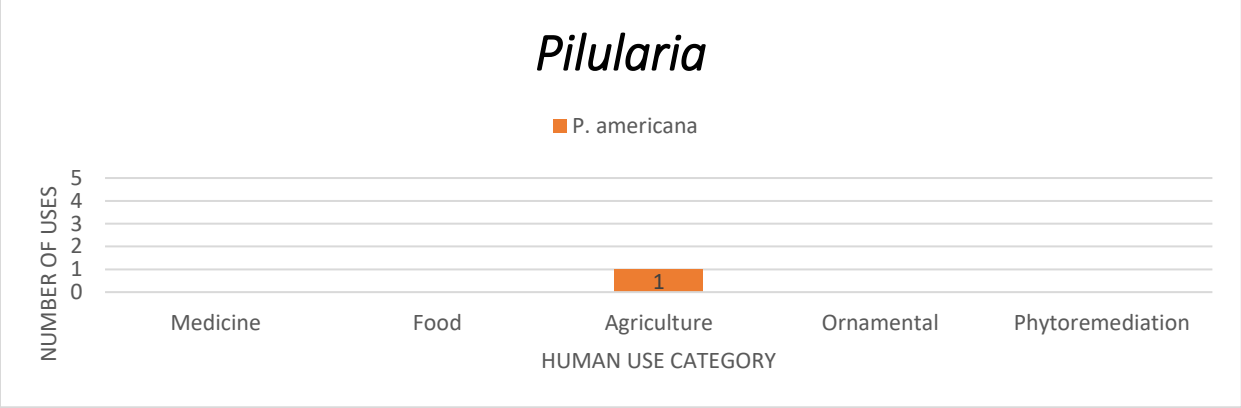


Human Uses of Tennessee *Lygodium* Species: There is a total of two uses reported for the Tennessee species of *Lygodium*, one medicinal and one ornamental.

g. Marsileaceae

1. *Pilularia*

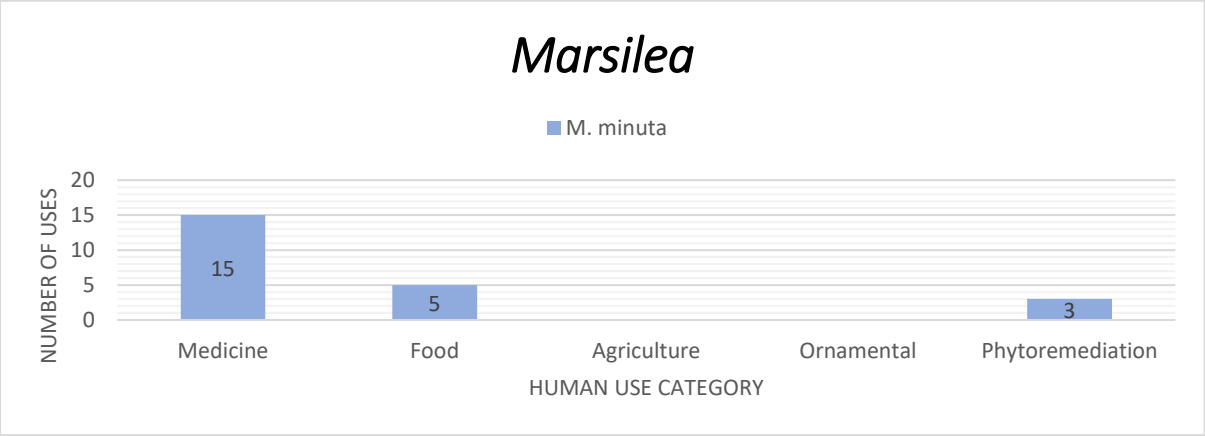
There is only one species of *Pilularia* present in Tennessee, *P. americana*, and it had one reported use which is in the agricultural sector. It was used for its anti-pest activity.



Human Uses of Tennessee *Pilularia* Species: The Tennessee species of *Pilularia* has a total of one reported use, which is in the agriculture category.

2. *Marsilea*

There is only one species of the *Marsilea* genus in Tennessee, which is *M. minuta*. The majority of human use reported is medicinal. To list a few, it had been used as an analgesic, antidiabetic, antiamnesic, antimicrobial, and antioxidant. This species had one of the highest uses in the food category of all Tennessee pteridophytes, with five reported uses. Fronds, frond juice, and shoots have all been prepared for consumption. One reference suggested that it was a good source of carbohydrates, fat, protein, sodium, phosphorous, potassium, and nitrogen. Furthermore, this species was used in phytoremediation processes as a remediator of arsenic and chromium, as well as its ability to absorb and bioaccumulate cadmium.



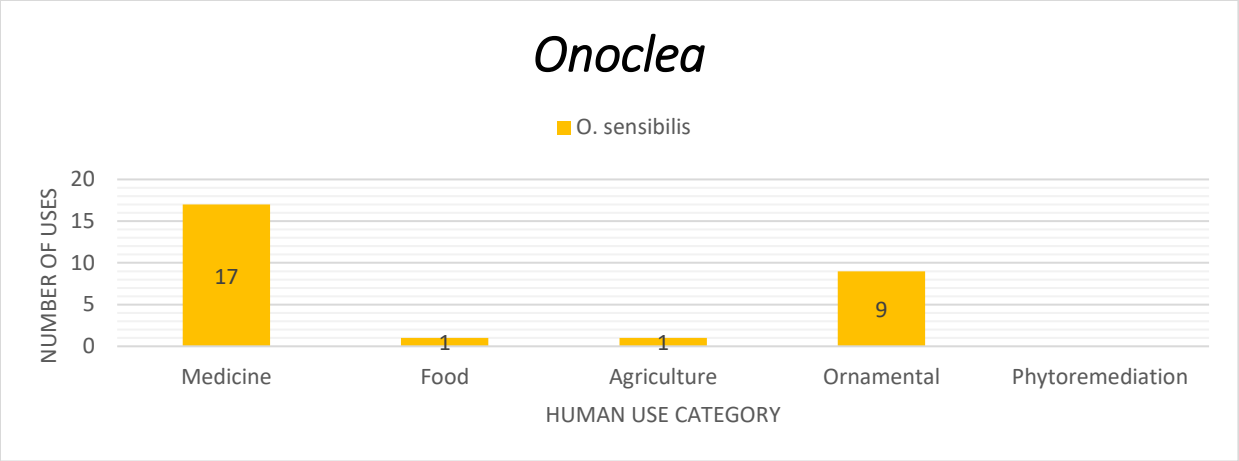
Human Uses of Tennessee *Marsilea* Species: This graph shows that there is a total of 23 uses of species of *Marsilea* present in Tennessee. There is no use of the Tennessee species for agricultural or ornamental purposes.

h. Onocleaceae

The family Onocleaceae is monogeneric within Tennessee.

1. *Onoclea*

This genus is monotypic in Tennessee, with *O. sensibilis* being the sole representative. It was most used for medicinal purposes, where it may be used as a dermatological, gastrointestinal, gynecological, and venereal aid. This species also had many ornamental uses in landscaping for its attractive fronds and waterside planting. There was one food use of this plant being consumed in a meal and one agricultural use of it as feed for livestock.



Human Uses of Tennessee *Onoclea* Species: The Tennessee representative of this genus has mostly medicinal and ornamental human uses. This species has a total of 28 uses across the human categories. There is no reported use of this species for phytoremediation.

i. Ophioglossaceae

1. *Botrychium*

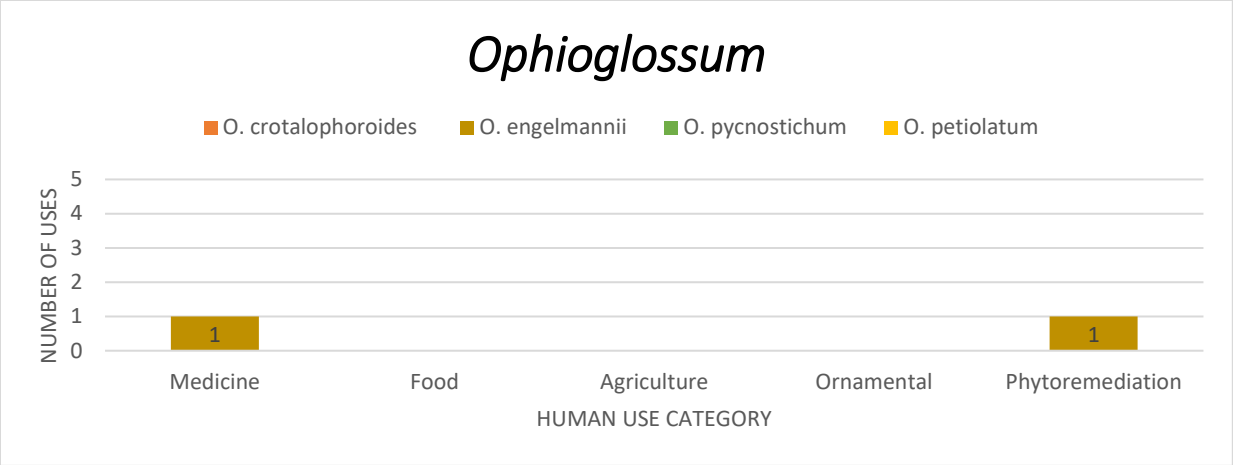
The Tennessee species in this genus had no reported uses. While there were no reported uses of the Tennessee species of this genus, there were many other species in this genus that do have human uses. The genus research presented a wealth of medicinal uses in this genus and one food use, but none for any of the other human use categories. There was a great variety of medicinal use from anti-inflammatory and antibiotic to dysentery and wound (Rousseau, 1945; Banerjee, 1980; Gaur, 1994; Goswami, 2016). The one food use was the young fronds being eaten as a vegetable (Gaur, 1994). The Tennessee species in this genus should be researched further to determine if they have similar medicinal uses.

2. *Botrypus*

The Tennessee species in this genus had no reported uses. A genus database search was performed but also resulted in zero uses. Therefore, this whole genus is completely lacking any research relating to its human uses, meaning there could be many untapped resources in this group of plants.

3. *Ophioglossum*

There are four species of *Ophioglossum* present in Tennessee, but only *O.engelmannii* had reported human uses. One was medicinal where it is boiled and used in healing. *O. engelmannii* can also be used as an indicator in phytoremediation.



Human Uses of Tennessee *Ophioglossum* Species: The majority of the Tennessee species of *Ophioglossum* do not have any reported human uses. Only one of the four species, *O. engelmannii*, had reported uses. There is a total of 2 uses for that species, one medicinal and one phytoremedial.

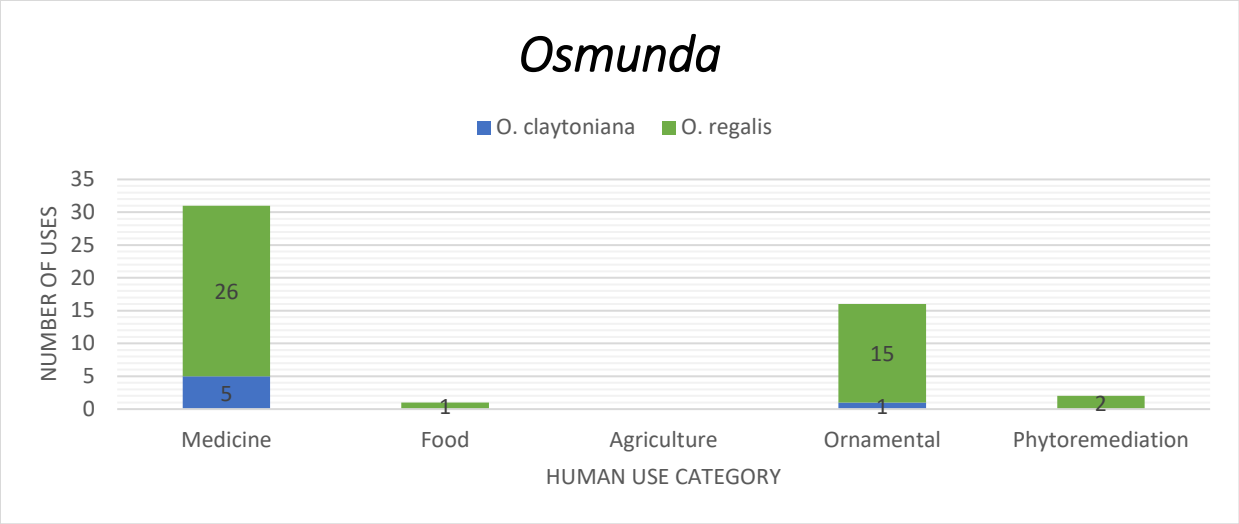
4. *Sceptridium*

The Tennessee species in this genus had no reported uses, although the genus search resulted in a few sources, all related to medicinal uses. A species in this genus had been used as an anti-inflammatory, asthma treatment, dermatological aid, and some common ailments like headaches, cough, and fever (Huang, 2017; Yuan, 2013; Lim, 2015; Cao, 2017).

j. Osmundaceae

1. *Osmunda*

There are two species of *Osmunda* present in Tennessee and both had human uses. Most uses were medicinal. *O. claytonia* had been used for wounds, antibiotics, and venereal infections. Similarly, *O. regalis* had also been used for wounds and antibiotics. Additionally, *O. regalis* had been used as an antiviral, anticancer, psychological, gynecological, and kidney aid. *O. regalis* was the only Tennessee species of *Osmunda* that had food and phytoremediation uses. In phytoremediation, it was used as an indicator of pollutants. Both *O. regalis* and *O. claytoniana* had been used ornamentally, although *O. regalis* had been far more often. *O. claytonia* had been used in home gardening, while *O. regalis* had been used for the same purpose as well as landscaping in the public sector and botanical gardens.



Human Uses of Tennessee *Osmunda* Species: Most of the human uses in this genus are attributed to *O. regalis*, with a total of 44 uses spread across the medicine, food, ornamental, and phytoremediation categories. *O. claytoniana* has a total of six uses, with five being medicinal and one ornamental. Overall, the Tennessee species of *Osmunda* have 50 human uses in medicine, food, ornamental, and phytoremediation. There are no reported uses of the Tennessee species of *Osmunda* in agriculture.

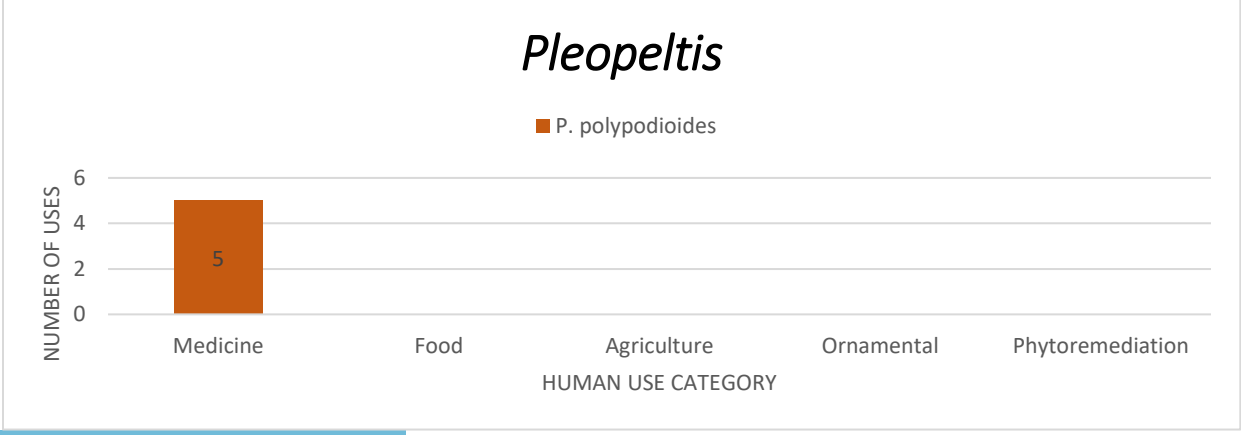
2. *Osmundastrum*

The Tennessee species in this genus had no reported uses. A genus search resulted in one source. That source reported that a species of *Osmundastrum* had been used in phytoremediation as a hyperaccumulator of lead (Goswami, 2016). Therefore, the Tennessee species, *O. cinnamomea*, could be researched to reveal if it has a similar property.

k. Polypodiaceae

1. *Pleopeltis*

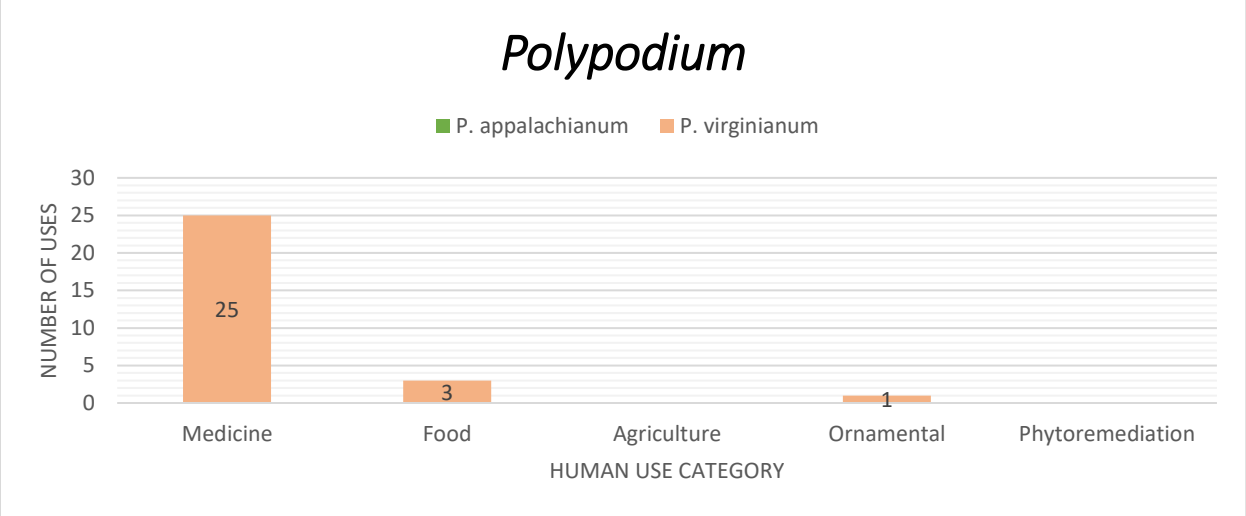
There is only one species of *Pleopeltis* present in Tennessee and it had exclusively medicinal uses. It had been used to treat liver problems, headaches, thrush, and dizziness.



Human Uses of Tennessee *Pleopeltis* Species: There is a total of five uses for the Tennessee species of *Pleopeltis*. All five uses are medicinal.

2. *Polypodium*

Of the two species on *Polypodium* present in Tennessee, only one, *P. virginianum*, had reported human uses. *P. virginianum* had been used for medicinal, food, and ornamental purposes. Medicinally, *P. virginianum* had been used to treat a variety of ailments, but the most prevalent are cough, gastrointestinal, and pulmonary issues. In the food category, the rhizome of the fern was consumed fresh or dried. It was reported to be used ornamentally for planting under trees due to its ability to tolerate dry shade.



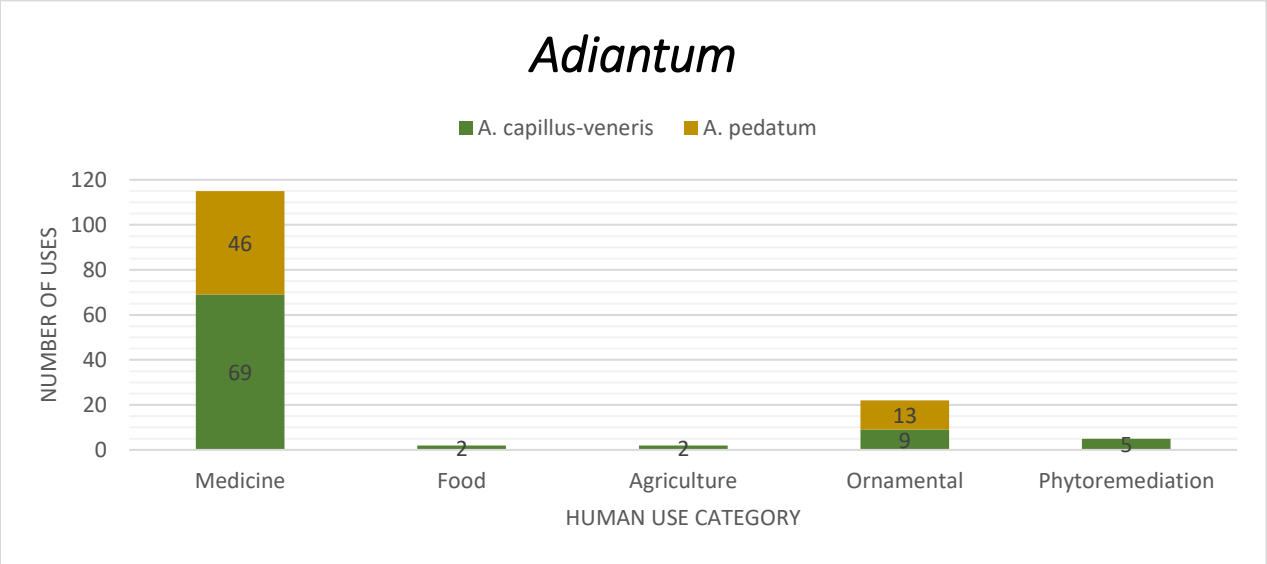
Human Uses of Tennessee *Polypodium* Species: There is a total of 29 uses of the Tennessee species of *Polypodium*, with all those uses being attributed to *P. virginianum. P. appalachianum* had no reported human uses. *P. virginianum* has 25 medicinal uses, three food uses, and one ornamental use.

l. Pteridaceae

1. *Adiantum*

The uses of Tennessee *Adiantum* species span all human use categories. *A. capillus-veneris* had uses in all categories, while *A. pedatum* only had medicinal and ornamental uses. The major medicinal uses of Tennessee *Adiantum* species included anticancer, antimicrobial, antibacterial, antioxidant, anti-inflammatory, respiratory, and gynecological aid. Ornamentally, these species had been used in public and private landscaping due to their hardiness and wiry black stalks with delicate pinnae. Additionally, both species had been utilized for hanging gardening. *A. capillus-veneris* was used as a health food. In agriculture, *A. capillus-veneris* had been used as a fodder for chicken and piglets. *A. capillus-veneris* was used in phytoremediation as an arsenic

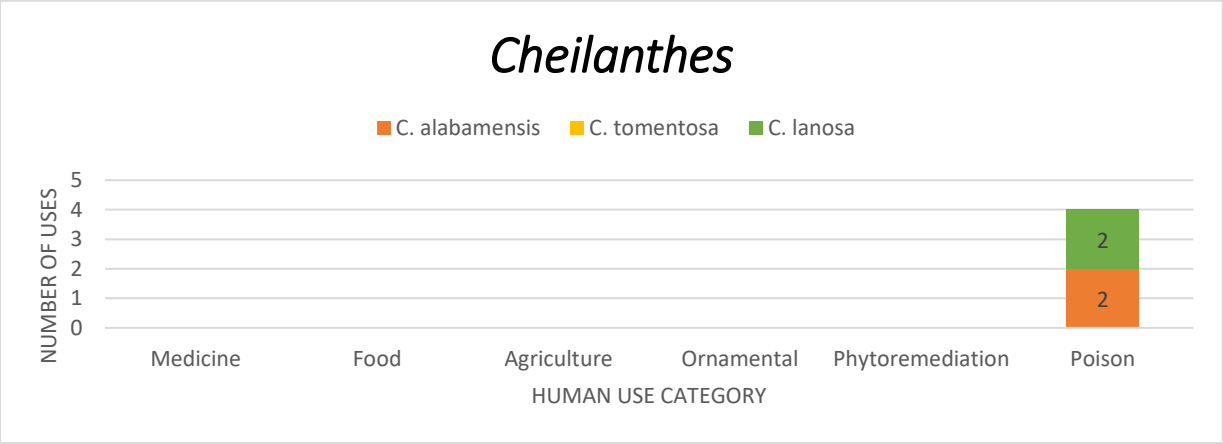
and chromium accumulator. It had also been reported to remove formaldehyde from indoor air.



Human Uses of Tennessee *Adiantum* Species: The Tennessee species of Adiantum range all human use categories. There is a total of 146 human uses of Tennessee *Adiantum* species. Most of those uses are attributed to *A. capillus-veneris*, with a total of 87 human uses, while *A. pedatum* has a total of 59 uses. *A. capillus* has a greater variety of uses in comparison to *A. pedatum*.

2. *Cheilanthes*

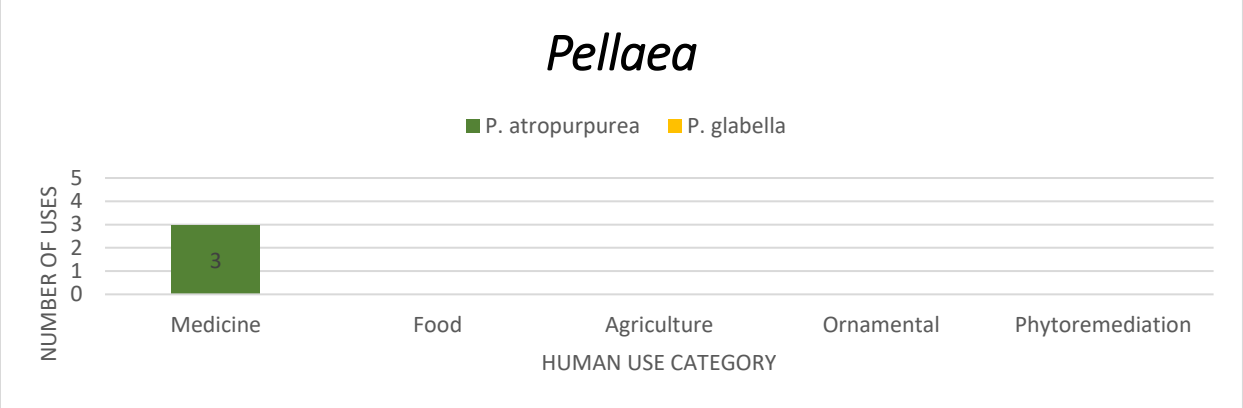
There were no reported uses of Tennessee *Cheilanthes* species in the typical human use categories, but a few sources highlighted the poisonous attributes. Both *C. alabamensis* and *C. lanosa* had been shown to produce cyanogenic compounds, which can damage the central nervous system, therefore these species were classified as poisonous.



Human Uses of Tennessee *Cheilanthes* Species: Tennessee *Cheilanthes* species have a total of four uses, which are all due to their poisonous nature. Both *C. lanosa* and *C. alabamensis* are reported to be poisonous, while no sources reported any human uses of *C. tomentosa*.

3. *Pellaea*

There are two species of *Pellaea* present in Tennessee, but only one had reported human uses. *P. atropurpurea* had three medicinal uses, which concerned its use as a kidney aid, anti-sunstroke, astringent, and anthelmintic.



Human Uses of Tennessee *Pellaea* Species: There are two species of *Pellaea* present in Tennessee. Only one of the two species of *Pellea* present in Tennessee has reported human use. That species is *P. atropurpurea* with three medicinal uses, making a total of three human uses among the Tennessee species of *Pellaea*.

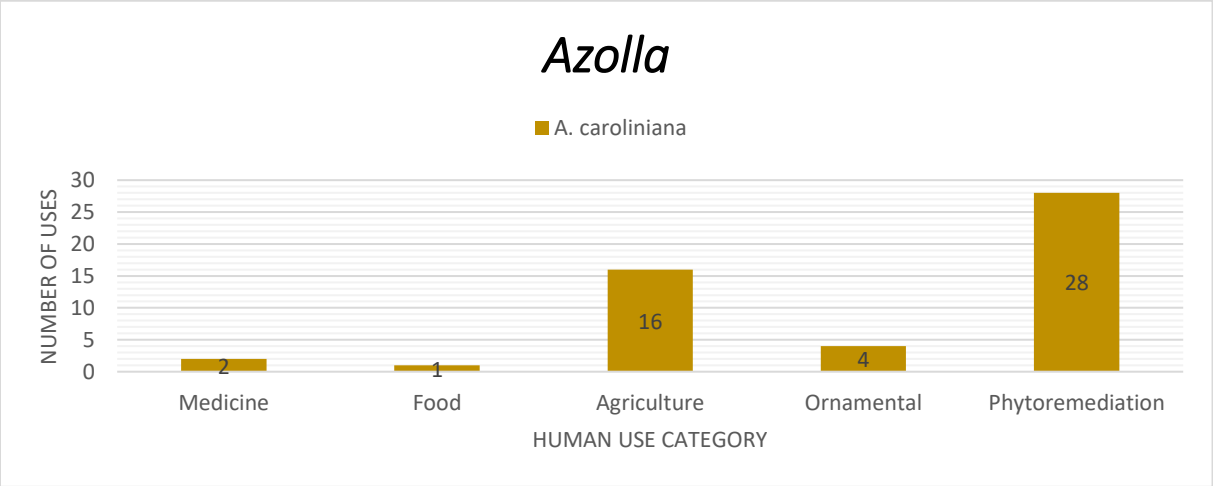
4. *Vittaria*

The Tennessee species in this genus had no reported uses. From a genus search, other species in *Vittaria* had human use as medicine. In medicine, those species had been used as pediatric and psychological aids as well as having antioxidant and anticancer properties (Hazlett, 1986; Sturtevant, 1954; Takahashi, 2012; Wu, 2005). The Tennessee species of *Vittaria* should be researched for these important medicinal uses.

m. Salviniaceae

The family Salviniaceae is monogeneric within Tennessee, with *Azolla* being the sole representative genus. Within *Azolla*, there is only one Tennessee species, *A. caroliana*. This species' human uses span all categories, although the highest use is in phytoremediation. In that category, it was used as an indicator, accumulator, and phytofilter of arsenic and much more. It could bioremediate ammonia, pesticides, herbicides, lead, copper, silicon, zinc, chromium, and cadmium. The diversity of compounds and heavy metals it removed makes it a great candidate for a variety of phytoremediation needs. The second-highest category of use was in agriculture, where it had been used as a nitrogen fertilizer, livestock feed, methane emission suppressor, and biological pesticide. The few ornamental uses were attributed to its presence in water gardens and pond areas. Medicinally, it had some antibiotic properties and had been chewed to cure sore

throat. There was only one food use of *A. caroliana* where it had been reported to have potential as a good food source if suitably processed.

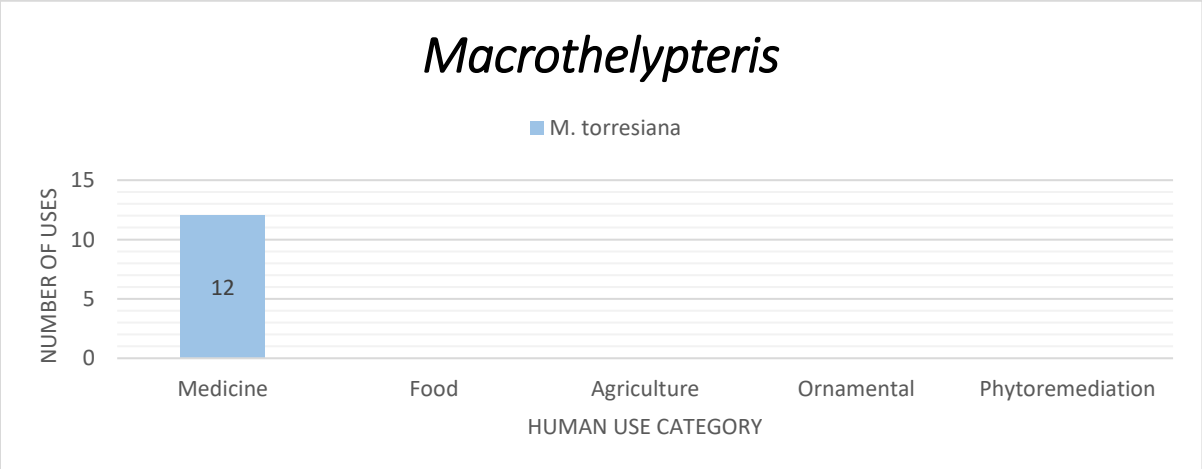


Human Uses of Tennessee *Azolla* Species: There is a total of 51 human uses of *A. caroliniana*, with the majority being phytoremediation. The graph shows the diversity of human use of *A. caroliniana* since its uses are spread across all categories.

n. Thelypteridaceae

1. *Macrothelypteris*

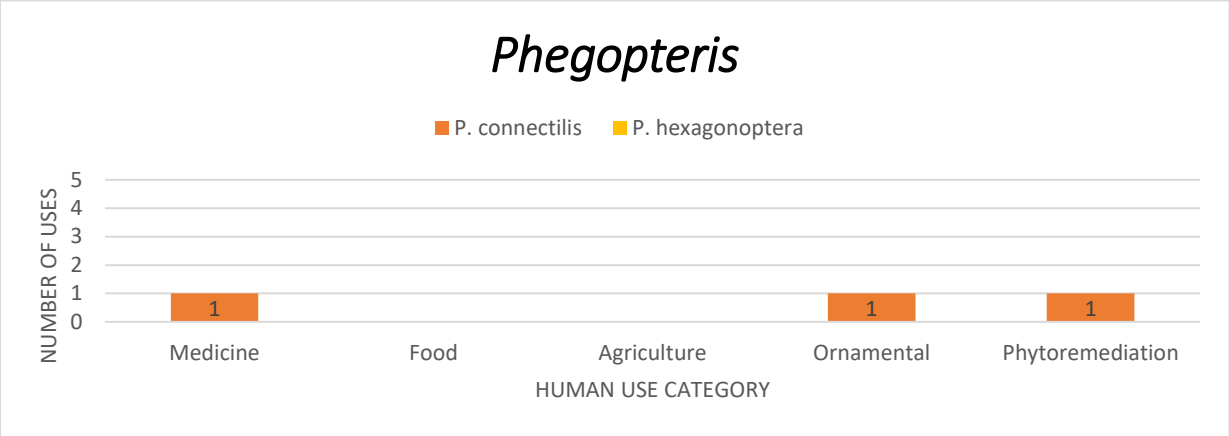
Macrothelypteris is monotypic in Tennessee, with *M. torresiana* being the only representative of the genus. This species only had reported medicinal uses, no uses in any other human use category. In medicine, this species had been heavily researched due to its anticancer properties. It had also been used in medicine as a diuretic, laxative, and kidney/bladder aid.



Human Uses of Tennessee *Macrothelypteris* Species: This graph shows that *M. torresiana* only has medicinal uses. There is a total of twelve human uses for the Tennessee species of *Macrothelypteris*, which are all medicinal.

2. Phegopteris

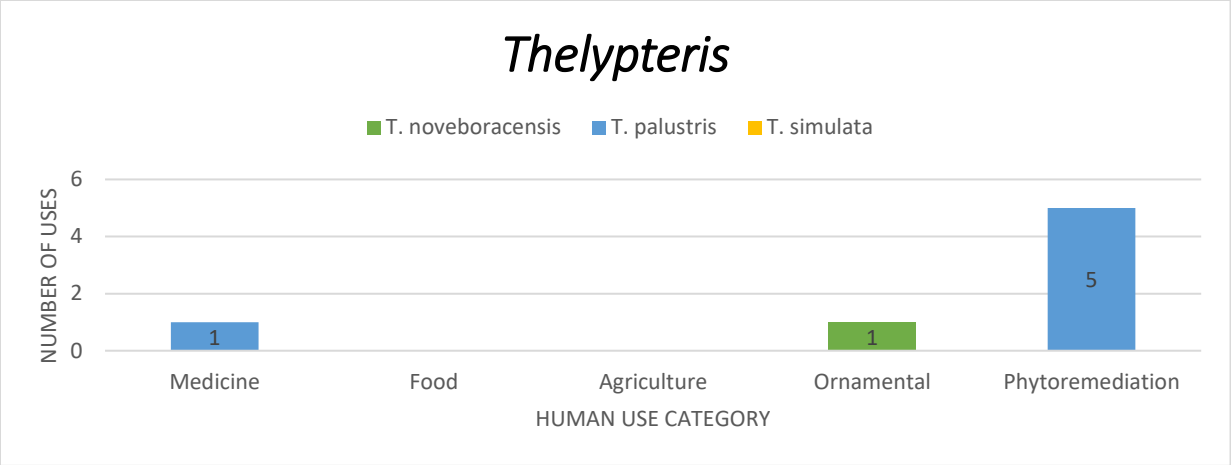
There are two species of *Phegopteris* in Tennessee, which are *P. connectilis* and *P. hexagonoptera*. Only *P. connectilis* had reported human uses, which were spread across medicine, ornament, and phytoremediation. Medicinally, this species had protoflavones, which are novel anticancer agents. In ornamental horticulture, it had been used in residential gardening. It had also been used in phytoremediation to uptake contaminants from a fire training facility. This species had only a few uses, but those uses are quite diverse.



Human Uses of Tennessee *Phegopteris* Species: The Tennessee representative species in this genus have a total of three reported human uses. *P. hexagonoptera* has no reported human uses, while *P. connectilis* has three. There is one use per medicine, ornamental, and phytoremediation.

3. *Thelypteris*

There are three species of *Thelypteris* that represent this genus in Tennessee. Two of the three had human uses that were spread across the categories of medicine, ornament, and phytoremediation. The category with the most reported uses was phytoremediation, where all those uses were attributed to *T. palustris*. *T. palustris* was used in phytoremediation to bioaccumulate heavy metals like copper, zinc, and arsenic. The one medicinal use of this genus was derived from *T. palustris's* rhizome being used for gynecological issues. The singular ornamental use in this genus was due to *T. noveboracensis* being included in the wet woodland collection of a botanical garden.

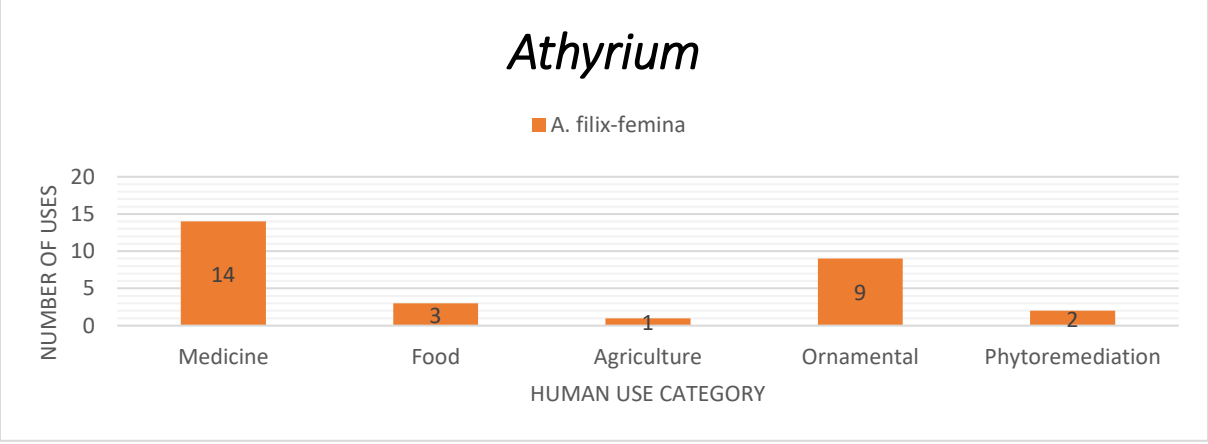


Human Uses of Tennessee *Thelypteris* Species: There is a total of seven uses of the Tennessee species of *Thelypteris*. *T. simulata* has no reported human uses, while *T. noveboracensis* has one and *T. palustris* has six. Most of the human use in this genus is attributed to phytoremediation with a total of five uses.

o. Woodsiaceae

1. *Arthyrium*

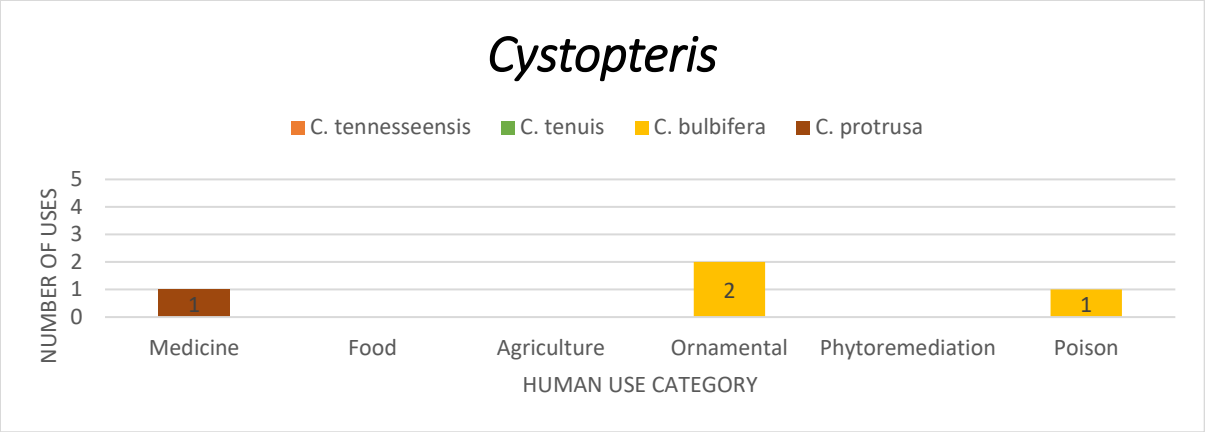
This genus is monotypic in Tennessee, where *A. filix-femina* is the sole representative of the genus. The highest use of this species was for medicinal purposes. It had been used for its anticancer, antihemorrhagic, and analgesic properties. It had also been used as a gynecological, reproductive, and dermatological aid. Ornamentally, it had been most used in residential and public landscaping projects. This fern was consumed as food by eating the cooked fiddleheads and roasted, peeled rhizomes. There was one report of *A. filix-femina* in agriculture, which was that it can harm livestock if it was eaten. In phytoremediation, it could accumulate certain heavy metals. This fern had a large diversity of use.



Human Uses of Tennessee *Athyrium* Species: There is a total of 29 reported uses of *A. filix-femina* spread across all human use categories.

2. *Cystopteris*

There are four species of *Cystopteris* present in Tennessee. *C. bulbifera* had been used ornamentally in naturalist gardens with water features; this species had also been recorded as poisonous due to its cyanogenic compounds. The one reported medicinal use was attributed to *C. protrusa* because it has been used as a febrifuge.



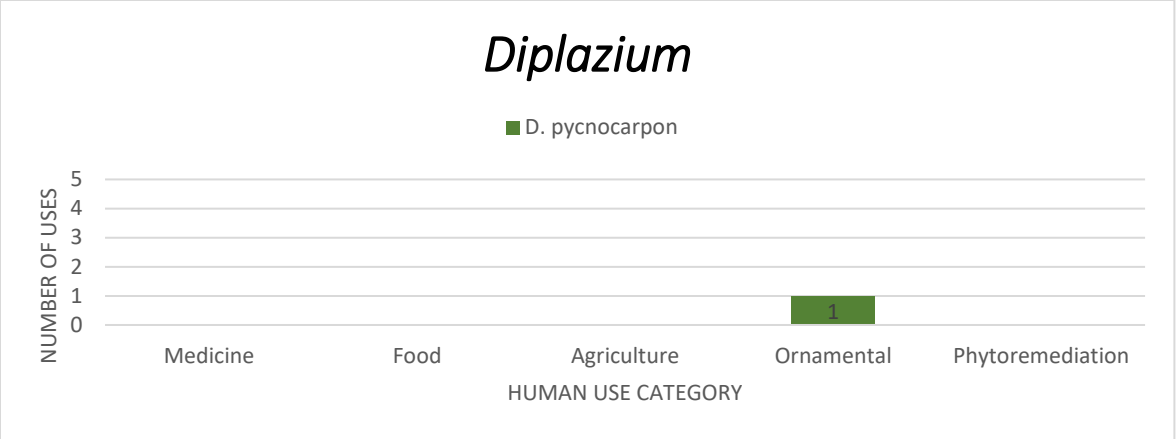
Human Uses of Tennessee *Cystopteris* Species: The Tennesse species of *Cystopteris* have four human uses spread across medicine, ornamental, and poison categories. Most of the human uses are in the ornamental category. *C. tennesseensis* and *C. tenuis* do not have any reported human uses, while *C. bulbifera* has three and *C. protrusa* has one

3. *Deparia*

The Tennessee species in this genus had no reported uses. A genus search revealed that a different species in this genus had use in phytoremediation as an accumulator of arsenic (Chang, 2010). Another *Deparia* species had been used in Japanese gardening as an ornamental plant (Kawano, 2015).

4. *Diplazium*

Diplazium is monotypic in Tennessee, where *D. pycnocarpon* is the sole representative. *D. pycnocarpon* only had one reported use which was ornamental. It had been part of a wet woodland collection in landscaping.



Human Uses of Tennessee *Diplazium* Species: There is only one reported human use of the Tennessee species of *Diplazium. D. pycnocarpon* has one ornamental use.

5. *Woodsia*

The Tennessee species in this genus had no reported uses. The genus search revealed a variety of medicinal uses within *Woodsia*. The entire family and genus were reported to have antioxidant activity (Soare, 2012; Goswami, 2016). One species in *Woodsia* was attributed as a gynecological and dermatological aid (Swank, 1932; Vestal, 1952). The Tennessee species in this genus should be researched to identify if they have similar medicinal properties.

4. Conclusion

As observed from the results section, almost every genus of Tennessee pteridophyte had some form of human use, and if not the Tennessee species specifically, then other species in the genus. The sections that follow go through each human use category and describe the most prominent sub-categories and which Tennessee pteridophyte species are featured often in those. Citations and further information can be found in Appendix I.

4.1 Medicine

There were a total of 593 medicinal uses of Tennessee pteridophytes. The genera with the highest medicinal use were *Equisetum* and *Adiantum*, which had 148 and 115 medicinal uses, respectively. The three species with the greatest number of reported medicinal uses were *Equisetum arvense*, *Lycopodium clavatum*, and *Adiantum capillus-veneris*. These three had been proven by numerous studies to be extremely useful to the field of medicine.

The medicinal uses of Tennessee pteridophytes spanned almost any use imaginable to heal or aid a huge variety of ailments. Listed below are some of the most prominent categories of medicinal use of Tennessee pteridophytes and which species were commonly used as those aids.

Anticancer

Tennessee pteridophytes were used as anticancer agents against many kinds of cancer. Each had a method to stop proliferation or destroy cancer cells which usually involved apoptosis. *Lycopodium clavatum* and *Macrothelypteris torresiana* were the most researched pteridophytes regarding anticancer activity. *Lycopodium clavatum* had activity against colon cancer cells (Paramita, 2018); lycopodine triggered apoptosis, which reduced the proliferation of cancer cells (Bishayee, 2013). There was also increased hepatocyte and slenocyte apoptosis (Falkowski-Temporini, 2016) and anticancerous potential against hepatocarcinogenesis (Pathak, 2007). *Macrothelypteris torresiana* contained kaempferol and protoapigenone, which were antitumor agents. Protoapigenone was a potential chemotherapeutic agent for lung cancers and had significant anti-ovarian cancer activity with low toxicity. It also had DICO which had antitumor activity and DEDC which induced apoptosis in neuroblastoma cells. Moreover, there were protoflavones which acted as novel anticancer agents.

Other pteridophytes have been used to address certain types of cancer. The whole plant extract of *Athyrium filix-femina* induced cell death in diverse human solid tumor malignancies in vitro, among these, cell lines derived from cancers of the brain (glioblastoma), colon, lung, breast and several types of leukemia. *Adiantum capillus-veneris* modulated alveolar apoptosis under hypoxia; it modulated proteins involved in cell cycle and apoptosis. *Equisetum arvense* induced cell death in pancreatic cancer cell lines and may serve as an alternative anticancer agent for the treatment of pancreatic carcinoma (PC) with no or least side effects to the patient.

Some pteridophytes have been shown to have anticancer properties, but not against a specific kind of cancer. *Asplenium ruta-muraria* had phenolic compounds as anticancer agents (Fan, 2012). *Pteridium aquilinum's* extract was a potent source of anticancer compounds. *Equisetum hyemale* induced G2/M arrest and cell apoptosis.

Antioxidant

Most pteridophytes with antioxidant activity do not have in-depth described modes of action, so the following are pteridophytes shown to have antioxidant activity: *Equisetum arvense, Equisetum hyemale, Asplenium trichomanes, Pteridium aquilinum,* and *Marsilea minuta.*

Antimicrobial

Tennessee pteridophytes were used as various antimicrobial agents, which included antibacterial, antifungal, and antiviral. The pteridophytes with antibacterial activity follow. *Asplenium scolopendrium* had generalized antibacterial activity (Bahadori, 2015). *Lycopodium clavatum* contained marinomycin A which could be an effective inhibitor of periodontal pathogens bacteria such as *P. gingivalis*. *Equisetum arvense* had antibacterial effects on gram-positive cocci, antibacterial activity against *S. aureus*, and mycobacteria. *Marsilea minuta* can be a natural additive to prevent food spoilage bacteria.

The pteridophytes that showed both antibacterial and antifungal activity are *Adiantum capillus-veneris*, *Equisetum hyemale* (strong antibacterial power against major oral pathogenic bacteria), and *Pteridium aquilinum* (antibacterial activity against gram-positive bacteria and strong antifungal activity).

The only pteridophyte that was specifically mentioned to be antiviral is *Osmunda regalis*.

Anti-inflammatory

Most pteridophytes with antioxidant activity did not have in-depth described modes of action, so the following were pteridophytes shown to have antioxidant activity: *Equisetum hyemale*, *Lycopodium clavatum*, and *Adiantum capillus-veneris*. *Equisetum arvense* had anti-inflammatory properties specifically concerning COPD.

Gynecological Aid

Pteridophytes have been used for a wide variety of gynecological issues. Common issues included irregular menses, post-partum pain, and abortifacient. Ones used for correcting irregular menses were *A. trichomanes*, *Equisetum hyemale*, and *Adiantum pedatum* (compound decoction or infusion of roots). Ones used for post-partum pain were *Lycopodium clavatum, Onoclea sensibilis,* and *Adiantum pedatum*. Ones used as abortifacient were *Osmunda regalis* (rhizome extract), *Adiantum capillus-veneris* (infusion of leaves), and *Adiantum pedatum*.

Some species were used for other gynecological issues. A decoction of *Onoclea sensibilis* can be taken to start menses and for swelling, cramps, and sore abdomen. A decoction of pounded stems of *Athyrium filix-femina* was taken to ease labor. Also, an infusion of the rhizome induced milk flow in patients with caked breasts. An infusion of fronds of *Adiantum capillus-veneris* was drunk against infertility and other women's diseases such as vaginal discharge caused by fungal growth.

Respiratory Aid

The most common uses of Tennessee pteridophytes as respiratory aids were as expectorants, antirheumatics, and cough remedies. *Asplenium ruta-muraria, A. trichomanes,* and *Polypodium virginianum* were used as expectorants. *Polystichum acrostichoides, Adiantum capillus-veneris*, and *Adiantum pedatum* were used as antirheumatics. *Polystichum acrostichoides* was also used to treat pneumonia and hoarseness. The leaves and stems of *Adiantum capillus-veneris* were used to treat bronchitis, nasal congestion, and runny nose. *Adiantum pedatum* was used for chronic catarrhs and other pectoral affections, shortness of breath. The pteridophytes used as cough remedies were *Marsilea minuta* (juice of fresh shoots), *Polypodium virginianum* (baked or raw roots; peeled stems chewed), and *Adiantum capillus-veneris* (juice of the whole plant).

Alzheimer's Aid

The Tennessee species of Lycopodiaceae were particularly helpful in creating treatments for Alzheimer's disease. The species of *Huperzia* contained Huperzine A, which acts against AD. *Lycopodium clavatum* had AChE inhibitory activity and antioxidant effects. *Pteridium aquilinum* contained phytochemicals that might be beneficial in the treatment of AD.

Kidney Aid/Urinary Aid/Diuretic

There were many species used in the treatment of urinary and kidney problems, many as diuretics, but the two species below give examples of what some of those actions were. *Asplenium trichomanes* and *Equisetum arvense* have been used to cure kidney stones. *Equisetum arvense* had also been used as a part of a formula that reduces symptoms of overactive bladder (OAB) and urinary frequency and/or urgency and incontinence. *Equisetum arvense* was highly used as a diuretic.

Antidiabetic

A few pteridophytes have been used to mediate the effects of diabetes. The powdered dry rhizome of *Pteridium aquilinum* was mixed with milk used to relieve diabetic disorders. The leaf juice of *Marsilea minuta* and *Adiantum capillus-veneris* was used to cure diabetes. *Adiantum capillus-veneris* also had a role in the wound healing of diabetics.

Gastrointestinal Aid

As a gastrointestinal aid, most Tennessee pteridophytes have been used to treat stomach pains. A compound decoction of fronds from *Dryopteris campyloptera* and *Dryopteris cristata* had been taken for stomachache and intestinal discomfort. *Polypodium virginianum* and *Adiantum pedatum* were said to relieve stomach aches, pains, and troubles. A cold infusion of the rhizome of *Polystichum acrostichoides* was used for stomachache or bowel complaints.

Orthopedic Aid

The common uses of Tennessee pteridophytes as orthopedic aids involved their use in joint pain and bone healing or regeneration. Some of the species that relieve joint pain were

Equisetum arvense, which was part of a formula that reduced perceived pain and improved in functional mobility related to chronic joint, back, and muscle pain. *Pteridium aquilinum's* leaves have been used in a steam bath for arthritis. *Onoclea sensibilis* and *Osmunda regalis* were also species used in the treatment of arthritis.

Species used to induce bone regeneration or healing were *Equisetum arvense*, which was effective in reversing osteoporotic changes, causing a negative effect on human osteoclastogenesis, and had potential use for treatment in bone regeneration strategies. *Pteridium aquilinum* was used for bone healing, and the rhizome of *Osmunda regalis* was used to treat bone fractures and joint disorders.

Wound Care

Equisetum arvense (external use of extracts), *Adiantum capillus-veneris* (healing of external wounds, such as bedsores and burns), *Equisetum hyemale*, and *Osmunda claytoniana* are all agents that accelerate external wound healing.

Venereal Disease

Pteridophytes have been used to treat or cure a couple of venereal diseases like hepatitis, syphilis, and gonorrhea. The species used to treat hepatitis was *Equisetum arvense*, because of its hepatoprotective and free radical scavenging activities. This species had also been used in the treatment of syphilis and gonorrhea. The rhizome was taken internally to treat gonorrheal disease. A decoction of *Equisetum arvense* and false box had been taken or used as a bath for syphilis and gonorrhea.

Other pteridophytes have also been used to treat gonorrhea. These species included *Equisetum hyemale* (infusion of the whole plant), *Onoclea sensibilis* (cold, compound infusion of the plant as a wash), *Osmunda claytoniana* (compound decoction), and *Adiantum pedatum* (decoction of the plant used as a wash).

A large variety of medicinal uses could not be covered by the sub-categories above. Some of the more interesting and unique uses were that spores of *Lycopodium clavatum* were used for oral vaccinations due to their controlled release mechanism and taste masking. Some were used as antidotes for snake, spider, and even wolf bites. For further information on medicinal uses, refer to Appendix I.

4.2 Ornamental

The species with the highest ornamental use was *Polystichum acrostichoides* (19 uses). The genera with the highest were *Adiantum* (22 uses) and *Osmunda* (16 uses). Overall, there were two or three main sub-categories of ornamental use which were home garden, residential landscaping, and public landscaping. Ferns were most used by home gardeners. Often pteridophytes were included in gardening and landscaping to have native plants represented. Therefore, these hundreds of uses of native Tennessee pteridophytes in ornamentation should inspire the landscaper or home-gardener to choose these both beautiful and native plants to add or exclusively incorporate into their cultivation.

Home Garden

Home gardeners most often value pteridophytes because of their perennial nature, the unique forms certain species' fronds take, and their adaption to moist or dry shade environments. Some of the key species that represented home gardeners' pteridophyte plantings follow. *Asplenium scolopendrium* was prized for its leathery, featherlike, wavy to ruffled edged, bright-green fronds. *Dryopteris marginalis* was a dry shade plant used for its dark bluish-green evergreen lacy fronds. *Osmunda regalis* was highly used in home gardens. It thrived in shade and damp; it can be a central feature in garden rockwork and offered a tropical look in certain plantings. As *Adiantum capillus-veneris* unfurled, it went from a delicate purplish-pink to mid-green. *Adiantum pedatum* was palmately compound which gives the appearance of finger, hands, or spokes of an umbrella and had wiry black stems, which were attractive traits to gardeners. Despite its fragile and beautiful look, it can be very hardy. *Athyrium filix-femina* was grown for its lacy, light green fronds on attractive dark red-violet stipes. It was considered easy to grow in a woodland setting, as well as being vigorous and tough; it provided color and texture to shaded spots.

Some species have gained approval from gardeners as companion plants to water features, like ponds and waterfalls. *Dryopteris celsa* and *Cystopteris bulbifera* were some of those species. *Azolla caroliniana* was most cited in water gardening. It was used in pond planting because it was pretty and dainty, grows vigorously, and turns red in autumn.

Residential Landscaping

Residential landscapers have used a variety of Tennessee pteridophytes in their projects. *Equisetum hyemale* and *Polystichum acrostichoides* have been part of the aquatic plant section of landscape projects. *Onoclea sensibilis* was also cited as suited for landscaped waterside planting in wet woodland collections due to its attractive fronds that turn foxy-brown after the first frost, biofiltration actions, and ability to mask drying foliage. Other pteridophytes like *Dennstaedtia punctilobula* and *Dryopteris goldiana* were used in residential landscaping as perennial, woodland ground covers for dry shade areas or courtyard settings, rather than waterside plantings.

Public Landscaping

Tennessee pteridophytes have been utilized in various public landscaping efforts. *Equisetum hyemale* was part of public landscaping for a Toyota Motor Sales's headquarters and a Neurosciences Institute. *Equistem hyemale* was chosen because it is a native species and for its color and vertical lines. *Polystichum acrostichoides* had been used in city park, aquarium, and university landscaping. *Adiantum pedatum* and *Athyrium filix-femina* were used as woodland groundcovers on academic campuses like university and elementary courtyards.

There were a few other uses that were not covered by the above sub-categories. These include the use of some species in the floristry industry as cut stems or flowers in herb and flower arrangements, the promotion of flowering in other ornamental plants, and the plantings in botanical gardens and hanging gardens.

4.3 Food

Almost every part of pteridophytes, including fronds, rhizomes, fiddleheads, and strobili, have been prepared and consumed by humans, although some pteridophytes are safer to eat than others. Pteridophytes have been prepared in numerous ways to be edible and enjoyable. Some of those methods included boiled, cooked, peeled and raw, roasted, floured, and dried. Whichever part or preparation method, pteridophytes remained as some of the key forages in the human diet in many places around the world. There were 83 food uses of Tennessee pteridophytes, with *Pteridium aquilinum* making up the majority (50 uses).

Pteridium aquilinum had been prepared in every way described above and almost every part of the fern consumed. Unlike any other pteridophyte examined in this study of food use, the

rhizome was roasted, pounded, turned into flour, and made into bread. It was renowned for its high starch and fiber content. The second most used Tennessee pteridophytes were the species of *Equisetum*. Most commonly the young shoots of *Equisetum arvense* were eaten either peeled and raw or boiled. The stalk tops or rootstocks of *Equisetum hyemale* had also been consumed. The rhizome was the sole part eaten of the species *Dryopteris campyloptera* and *Polypodium virginianum*. *Marsilea minuta* was popular in dishes because it was said to be a good source of many essential nutrients, like carbohydrates, fat, protein, sodium, phosphorous, potassium, and nitrogen. It was supposed to be especially useful as a dietary supplement during times of famine. The continued consumption of pteridophytes by humans is key to meet some dietary needs and maintain many cultural culinary traditions.

4.4 Phytoremediation

There are two main ways Tennessee pteridophytes were used in phytoremediation, as indicators of environmental pollutants and accumulators of heavy metals. Pteridophytes have been used in those ways in both water, soil, and air media. *Azolla caroliniana* was the most useful species in phytoremediation, with 28 uses spread across all types of phytoremediation.

Accumulators/Hyperaccumulators

There were a variety of Tennessee pteridophytes used in phytoremediation as accumulators of heavy metals. There were three main metals that Tennessee pteridophyte species were shown to accumulate: chromium, arsenic, and lead. *Asplenium trichomanes, Marsilea minuta, Adiantum capillus-veneris,* and *Azolla carolinana* were all reported to be chromium accumulators. *Marsilea minuta, Adiantum capillus-veneris,* and *Azolla carolinana* had also been shown to accumulate or indicate arsenic. *Polystichum acrostichoides* and *Thelypteris palustris* were arsenic accumulators as well. Lead accumulators were *Equisetum arvense*, which removes lead from soil; *Equisetum hyemale*, which removes it from wastewater; *A. scolopendrium*, which bioaccumulates it; *Lycopodium clavatum* and *Azolla carolinana*. Many other species took up various heavy metals (cadmium, copper, thorium, uranium, zinc, nickel).

Biomarker/Indicator

Other ways pteridophyte species were used in phytoremediation were as biomarkers or indicators of environmental pollution levels. *Asplenium scolopendrium*, *Ophioglossum engelmannii*, *Osmunda regalis*, and *Azolla caroliniana* were all species used in this process. *Osumda regalis* was an inexpensive means of detecting pollutants, like mutagens, in aquatic ecosystems. *Osmunda regalis* had also been used for monitoring ambient air quality around several major industrial cities, nuclear power plants, and industrial waste sites. *Adiantum capillus-veneris* was another species shown to affect air pollutants, specifically to remove formaldehyde from indoor air. *Azolla carolinana* had been used to monitor pesticides in aquatic environments. Moreover, it removed herbicides, pharmaceuticals, and other industrial effluents.

Phytoremediation is a unique, relatively cheap, and environmentally friendly strategy to mediate some of the repercussions of environmental pollution caused by industrialization.

4.5 Agriculture

While agriculture had the least use of all human use categories across Tennessee pteridophytes, there were still some prominent species and genera that aided in this sector. The genus with the most use in agriculture was *Equisetum* with 22 uses. The species with the most agricultural uses were *Equisetum arvense* (17 uses) and *Azolla caroliniana* (16 uses). While *Azolla caroliana* had slightly fewer uses, it was a key species since it was used in almost every sector of agriculture. There were many ways Tennessee pteridophytes had been utilized in agriculture, from fertilizers to fungicides. The sections below detail sub-categories of use and which species have been used to aid in that specific agricultural sector.

Fertilizer

The species with the most use as fertilizer was *Azolla caroliniana*. It had been used to enhance soil carbon storage and plant carbon fixation, which in turn increased grain yield. In addition, due to the fern's symbiotic relationship with *Anabaena*, a cyanobacterium, it was a good source of organic manure and nitrogen, since it increased the nitrogen content of soil. *Pteridium aquilinum* had also been used as fertilizer because it was a good soil binder to use in the preparation of manures.

Fodder

There is a variety of Tennessee pteridophyte species that have been used as fodder for livestock. *Equisetum arvense* was used in winter for fodder during hay shortage and to improve the fatness and glossy coats of livestock. *Onoclea sensibilis* was also used in winter, but as food for turkeys. *Adiantum capillus-veneris* was used as feed for broiler chickens and fodder additive that promoted piglet growth. *Azolla caroliniana* was also used to feed pigs. Additionally, it was considered very useful as a fodder due to its high nitrogen and protein content. Most uses of pteridophytes as fodder were as a winter food or to promote growth and fatness of livestock.

Anti-pest/Pesticide and Fungicide

Pteridophytes obstructed many different types of pests that affect agricultural crops. *Equisetum arvense* was shown to be an effective and sustainable control method against the bean weevil *Acanthoscelides obtectus*, an insect pest that affects stored common beans and other legumes. Offspring of aphid decreased after the application of *Lycopodium clavatum*. *Asplenium platyneuron* was rich in saponins which decreased larval growth of corn earworm and fall armyworm. *Pteridium aquilinum* showed a 50% reduction in the population of red spider mite. *Azolla caroliniana* was a biological pesticide that controlled the growth of mosquitoes and weeds. There were a few species that can act as a fungicide. The most prominent is *Equiestum arvense* which was an alternative to synthetic fungicides to control maize mycobiota level in moist grain. These pteridophyte species were great biological options to control agricultural pests instead of synthetic, costly chemicals.

4.6 Further Discussions

These conclusions show that Tennessee pteridophytes have a wide and deep variety of human use. It is important to note some of the bias possible in this research and how this foundation of research should be used by the public and future researchers.

Bias in Research

It is important to note that there could be some bias in the conclusions and results of this thesis. First, these results could be skewed since some pteridophyte species have a global distribution, where they would be more readily researched, compared to a small range species or endemic species, that would likely only be researched in the small area it is present. Furthermore, the trends created by sources included in this thesis may provide a biased outcome. Often,

scientific researchers focus on discovering new cures to the disease that ail our current society, so the conclusion that humans use pteridophytes the most as medicine may not be the reality. In reality, it may simply reflect the particular interest of scientific researchers in that human use category. Some bias might also be a result of the methods of this thesis. Two databases that focus solely on medicine were used, where only one database was used to address other categories of human use.

Recommendations for Researchers

After looking through the results and conclusions of this work, it is apparent that Tennessee pteridophytes have many human uses. Although that is true, there is still much work to be done. First, the public, private, and academic sectors need to recognize the value of these plants to human society, so that the ones that have already been heavily researched can be used more often for human society's benefit. Some of the Tennessee genera with large human use are *Equisetum, Azolla, Lycopodium, Pteridium,* and *Adiantum* and they should become household names because of the great benefits they can provide to the immediate population.

Second, the Tennessee species with little to no reported uses need to be further researched, since genus searches often showed that there are a plethora of possible uses that just have not been explored yet. Twelve genus names were researched since the Tennessee species within had no reported uses. Which genera should be focused on and for what purpose follows. *Isoestes, Spinulum, Botrypus, Osmundastrum,* and *Deparia* are Tennessee genera that had no or very few sources returned after a genus search. This means that there is a great opportunity to discover the trends and possible new human uses of species in these genera, including the Tennessee species. The Tennessee species of *Diphasiastrum, Hymenophyllum, Trichomanes, Botrychium, Sceptridium, Vittaria,* and *Woodsia* are highly recommended for research because genus searches revealed a plethora of sources about the human uses of other species in this genus, so it likely that the Tennessee species have similar properties.

These conclusions should provide both the scientific researcher and the public the opportunity to see the great wealth of resources we have present in this state that directly benefit us, and the many possibilities that await on the horizon of research. This is also a call to action to protect those biological resources because once these pteridophyte species are gone, we will not be able to receive any further wisdom or use from them.

Appendix I: Tables of Tennessee Pteridophyte Human Uses

Aspleniaceae: *Asplenium*

Species	Category	Note	Author	Date
A. platyneuron	Agriculture	use of plant because it is rich in saponins which decrease larval growth of corn earworm and fall armyworm	Radhakrishnan	2014
	Agriculture	protein extracts cause decrease in leaf-disk assays and larval growth	Markham	2006
	Ornamental	fern used in gardening in northern latitudes of the United States	Bailey	2004
	Medicine	used medicinally	Duke's	
A. rhizophyllum	Medicine	compound used for swollen breasts	Hamel	1975
	Medicine	decoction of whole plant rubbed on swollen breast	Taylor	1940
	Medicine	decoction of whole plant taken to induce vomiting for swollen breasts	Taylor	1940
	Other	commercially harvested in the Appalachian Mountains of West Virginia	Studlar	2007
A. ruta-muraria	Medicine	Cold, rickets and swelling; roots anthelmintic, astringent, leaves pectoral, diuretic	Goswami	2016
	Medicine	aromatase inhibitory activity of the extracts and phenolic compounds	Fan	2012
	Medicine	pectoral	Font Query	1979
	Medicine	swelling	Hartwell	1967
	Medicine	expectorant	Steinmetz	1957
	Medicine	expectorant	Al-Rawi	
	Medicine	medicinal	Duke's	
A. scolopendrium	Medicine	antibacterial activity	Bahadori	2015
	Ornamental	irregular crested, or forked, tips; prefers slightly alkaline soil	Anonymous	2007
	Ornamental	evergreen, undivided fronds; wavy to ruffled edges; needs neutral to alkaline soil that's moist but well drained; do not overwater; tolerates part sun	Hall	2006
	Ornamental	leathery, featherlike, bright-green fronds; prefers moist, dappled shade, but will tolerate drier conditions; lime tolerant, but can be found in neutral and acid soils	Fowler	2003
	Ornamental	use in gardens	Gatacre	2002
	Phytoremediation	use as a biomarker in environmental assessment	Draghiceanu	2018
	Phytoremediation	bioaccumulation of lead	Soare	2015

A. trichomanes	Agriculture	link between fern consumption and Enzootic bovine hematuria	Rai	2017
	Medicine	antioxidant and antityrosinase agent	Farras	2019
	Medicine	cure for kidney stones and alopecia	Fiorin	2019
	Medicine	expectorant, diuretic, and emmenagogue	Fiorin	2019
	Medicine	plant laxative, expectorant, leaves smoked for cold	Goswami	2016
	Medicine	aerial parts drunk as a tea as a diuretic	Pieroni	2015
	Medicine	used during pregnancy, for parturition, nursing, and abortion	Idolo	2010
	Medicine	in vitro estrogenic activity	Dall'Acqua	2009
	Medicine	to regularize menstruation	Guarrera	2008
	Medicine	used as a hypotensive	Agelet	2000
	Medicine	deobstruent	Font Query	1979
	Medicine	taken for irregular menses	Hamel	1975
	Medicine	infusion taken for breast diseases and acrid humors	Hamel	1975
	Medicine	infusion taken for coughs	Hamel	1975
	Medicine	taken for liver complaints	Hamel	1975
	Medicine	sclerosis (spleen)	Hartwell	1967
	Medicine	pectoral	Al-Rawi	1964
	Medicine	vermifuge	Al-Rawi	1964
	Medicine	pectoral	Steinmetz	1957
	Medicine	vermifuge	Steinmetz	1957
	Medicine	medicinal	Duke's	
	Ornamental	used in garden	Gatacre	2002
	Ornamental	use as ground cover in landscaping that is ecologically conscious	Hackett	1954
	Phytoremediation	highly accumulates Sc, Cr, and Co	Ozaki	2000

**A. bradleyi*, *A. montanum*, *A. pinnatifidum*, and *A. resiliens* had no reported uses.

Blechnaceae: *Woodwardia*

Species	Category	Note	Author	Date
W. areolata	Phytoremediation	high uptake of Th and U	Knox	2008
W. virginica	Medicine	leaves astringent	Goswami	2016

Dennstaedtiaceae: *Dennstaedtia*

Species	Category	Note	Author	Date
D. punctilobula	Ornamental	used as ground cover in landscaping	Berger	2014
	Ornamental	perennial used in landscaping	Lerner	2014
	Ornamental	fern used in landscaping in farm landscape	Berger	2012

	Ornamental	woodland ground cover used in courtyard landscaping	Jost	2012
	Ornamental	perennial used in landscaping	Berger	2010
	Ornamental	plant used in landscaping	Brown	2010
	Ornamental	plant used in landscaping for dry shade areas	Oettinger	2005
	Ornamental	used as ground cover in landscaping, to solve design problems	Stack	1999
	Medicine	compound infusion taken for chills	Hamel	1975
	Medicine	plant used for lung hemorrhages	Romero	1954
	Phytoremediation	metal bioaccumulation	Koelmel	2012

Dennstaedtiaceae: *Pteridium*

Species	Category	Note	Author	Date
P. aquilinum	Agriculture	fodder for buffaloes	Rana	2019
	Agriculture	increases nitrification and reduces denitrification in acidic soils	Bardon	2018
	Agriculture	chronic ingestion by cattle leads to bovine enzootic haematuria (BEH)	Hidano	2017
	Agriculture	50% reduction in the population of red spider mite and caused no phytotoxic effect to tea leaves	Prabhakaran	2017
	Agriculture	causes degradation of agricultural land in the tropics	Berget	2015
	Agriculture	posinous to horses	Caloni	2015
	Agriculture	contains carcinogenic compounds that can be in the milk of livestock that consume the plant	Virgilio	2015
	Agriculture	injurous to grazing cattle	Brussell	2004
	Agriculture	causes BEH	Peixoto	2003
	Agriculture	retted fronds used as manure in homestead gardens	Nwosu	2002
	Agriculture	green fronds as fodder	Gaur	1994
	Agriculture	good soil binder; used in prepartion of manures	Gaur	1994
	Agriculture	injurous to grazing cattle	Krochmal	1955
	Agriculture	full grown fronds poisonous to cattle	Heller	1953
	Agriculture	used for feeding pigs	KEW	
	Other	used as green dye	DoOan	2003
	Other	roots used in basketry	Bocek	1984
	Other	split roots used for the black design in coiled basketry	Merriam	1966

Other	root fiber made into coils and used in basketry	Barrett	1908
Other	root wood split into flat bands and used for the black strands of cheap baskets	Chestnut	1902
Food	collected and consumed	Chatterjee	2019
Food	young shoots used in soups	Savo	2019
Food	eaten as a vegetable	Kang	2014
Food	leaves are consumed; immature fronds cooked as condiment or vegetable; fiddleheads consumed; rhizome consumed;	Maroyi	2014
Food	eaten as a vegetable	Kang	2013
Food	young shoots or leaves consumed	Kang	2012
Food	shoots are consumed	Menendez-Baceta	2012
Food	used as a vegetable, but contains carcinogenic compunds	Leonti	2006
Food	young shoots consumed in springtime; must first be detoxified	Weckerle	2006
Food	fiddleheads are boiled and eaten	Brussell	2004
Food	young fronds eaten as vegetables	Nwosu	2002
Food	source of carbohydrates from preparing flour from roots	Bermejo	1998
Food	tender fronds used as vegetables	Gaur	1994
Food	cooked , inner rhizome pounded into a flour and used for food	Turner	1990
Food	dried, toasted rhizomes beaten with a stick to remove the bark and the white insides used for food	Turner	1990
Food	fiddleheads broken off and the stem portion of the shoot used for food	Turner	1990
Food	roots roasted in ashes, peeled, and eaten	Theodoratus	1989
Food	young fronds eaten, raw or cooked	Bocek	1984
Food	rhizomes roasted, pounded and inner portions used for food	Turner	1983
Food	long, thick rhizomes formerly steamed, dried and used as a vegetable food in winter	Turner	1983
Food	long, mashed rhizomes eaten boiled or steamed	Turner	1982
Food	fronds, cooked and consumed	Turner	1982
Food	rhizomes roasted, pounded into flour and eaten	Fleisher	1980
Food	major item in the diet of people of western Washington; contributes starch and fiber;	Norton	1979

	used as a form of "flour" and baked or dried into cakes and bread		
Food	rhizomes toasted and eaten in summer	Turner	1973
Food	rhizomes roasted, beaten until soft, broken into pieces and used for food	Turner	1973
Food	rhizomes consumed for starch content; roasted, beaten, and broken into pieces	Turner	1973
Food	used as food	Turner	1972
Food	rhizomes pounded into flour and baked to make bread	Turner	1971
Food	rhizomes eaten fresh in late fall or winter	Turner	1971
Food	young shoots used for food	Turner	1971
Food	roasted and beaten, then consumed; rhizomes turned into flour and made into bread	Turner	1971
Food	consumption of fiddleheads	Turner	1971
Food	roots cooked in ground ovens	Merriam	1966
Food	consumed as food	Gaertner	1962
Food	edible root	Stone	1962
Food	roots and young fronds used for food	Krochmal	1954
Food	yound shoots cut, cooked, and eaten	Romero	1954
Food	raw leaves and tender stems used for food	Garth	1953
Food	young fiddlenecks canned for winter use	Heller	1953
Food	young fiddlenecks peeled, boiled or steamed and eaten as a substitute for asparagus	Heller	1953
Food	rootstocks boiled or roasted and used for food	Perry	1952
Food	young fern sprouts used as soup material. The tips were thrown into hot water for an hour to rid them of ants, then put into soup stock and thickened with flour. The flavor resembles wild rice	Smith	1932
Food	rootstocks cooked and eaten as a nutritious food	Steedman	1928
Food	peeled root roasted for food	Speck	1917
Food	roots used as a staple food	Chestnut	1902
Food	rhizome used as food	KEW	
Food	used as food	KEW	
Food	meal prepared from roots	KEW	
Food	used as food for starch content	KEW	
Ornamental	dried floristry species	Cook	2015

Ornamental	native weedy plant that infers with landscaping or agriculture	Marble	2018
Medicine	contains phytochemicals that might be beneficial in the treatment of AD	Choi	2018
Medicine	antioxidant activity	Xu	2018
Medicine	injuries, poisining, and other consequences of external causes	Perez-Nicolas	2017
Medicine	contains molecule with immunomodulatory activity	Song	2017
Medicine	contains compounds that exhibit anti-inflammatory and/or antioxidant activity	Dion	2015
Medicine	source of nutrients and natural antioxidants	Qi	2015
Medicine	antioxidant activity	Wang	2013
Medicine	extract is a potent source of anticancer compounds	Roudsari	2012
Medicine	strong antifungal activity	Hamza	2006
Medicine	used for wolf bites	Guarrera	2005
Medicine	decoction of rhizome drunk as herbal tea; purge	Nwosu	2002
Medicine	rhizome used in several remedies, most of them for female complaints	Kindscher	1998
Medicine	powder of dried rhizome mixed with milk used to relieve diabetic disorders	Gaur	1994
Medicine	infusion of rhizomes taken for vomiting blood, possibly from internal injuries	Turner	1990
Medicine	leaves used in a steambath for arthritis. The leaves were placed over red hot rocks in a steaming pit, a little water was added and the person laid on top of the fronds	Turner	1990
Medicine	decoction of rhizomes taken for colds	Turner	1990
Medicine	poultice of pounded fronds and leaves applied to sores of any type. Fronds, pounded with a rock, mixed with leaves and melted pine pitch, strained and applied to sores from one to several days	Turner	1990
Medicine	decoction of rhizomes taken for lack of appetite	Turner	1990
Medicine	decoction of leaves used as a bath for broken bones or poultice of leaves used to bind broken bones	Turner	1990
Medicine	rhizome pounded up to treat snake bite (along with Selanginella)	Anderon	1986
Medicine	crushed fronds used as antiseptic and astringent	Anderson	1986

	Medicine	young shoots eaten as medicine for 'troubles with one's insides,' such as cancer of the womb	Turner	1982
	Medicine	fronds of plant used for weak babies and old people	Chandler	1979
	Medicine	hypertension	Font Query	1979
	Medicine	decotion taken for diarrhea	Herrick	1977
	Medicine	compound used for rheumatism	Herrick	1977
	Medicine	cold, compound decoction of roots taken for weak blood	Herrick	1977
	Medicine	compound decoction taken for prolapsus of uterus	Herrick	1977
	Medicine	decoction taken when suffering after birth	Herrick	1977
	Medicine	decoction used to make 'good blood' after menses, taken after baby's birth	Herrick	1977
	Medicine	used as a liver and rheumatism medicine	Herrick	1977
	Medicine	compound decoction taken during the early stages of consumption	Herrick	1977
	Medicine	compound decoction taken by men to retain urine	Herrick	1977
	Medicine	compound used for infection, probably venereal disease	Herrick	1977
	Medicine	root used as a tonic and antiemetic and given for 'cholera-morbus	Hamel	1975
	Medicine	root used as an antiseptic	Hamel	1975
	Medicine	breast	Krochmal	1973
	Medicine	diarrhea	Krochmal	1973
	Medicine	diuretic	Krochmal	1973
	Medicine	vermifuge	Krochmal	1973
	Medicine	fever	Shih-chen	1973
	Medicine	vermifuge	Uphof	1968
	Medicine	sclerosis (spleen)	Hartwell	1967
	Medicine	antimicrobial activity against gram postive bacteria	Nickell	1959
	Medicine	hernia remedy	Levi-Strauss	1952
	Medicine	poultice of pounded, heated roots applied to burns	Sapir	1943
	Medicine	decoction of ground roots taken for chest pain	Taylor	1940
	Medicine	infusion of root taken by women to allay stomach cramps	Smith	1932
	Medicine	smoke from dried leaves on coals used for headaches	Smith	1932

Medicine	decoction of root taken for 'caked breast' and a dog whisker used to pierce teat	Smith	1923
Medicine	fronds used as a bed to strengthen babies' backs and old people	Speck	1917
Medicine	used as medicine	KEW	
Medicine	used as medicine	KEW	
Medicine	roots used as medicine	KEW	
Ornamental	used as a ground cover in residential landscaping	Berger	2014
Ornamental	planted in egytian garden	Hamdy	2010
Other	used as a raw material for kraft pulp production	Agriculture Week	2019
Other	consuming wild and raw fiddleheads can lead to poisoning	Dhir	2019
Other	Used as fixer between soil and timber beam for roof thatching in the construction of houses	Rana	2019
Other	corrosion inhibition	Wang	2019
Other	cesium hyperaccumulation	Zheleznova	2019
Other	used to produce a sustainable oil	Corton	2016
Other	immunosuppressive effect that enhances susceptibility to lung carcinogenesis	Caniceiro	2014
Other	used as animal feed, technology and craft, firewood; sometimes toxic	Tardio	2008
Other	used for storage purposes	Yoon	2007
Other	carcinogenic compounds	Rasmussen	2003
Other	rhizome chewed, used as punk in a clam shell and placed in a fire	Compton	1993
Other	fronds used for house thatching	Timbrook	1990
Other	fronds used to cover food being roasted in earht ovens	Timbrook	1990
Other	decoction of root used as hair rinse or root paste rubbed in scalp to encourage hair growth	Bocek	1984
Other	large fronds used as umbrellas and for roofing	Bocek	1984
Other	line acorn-leaching pits and earth ovens	Bocek	1984
Other	carcinogenesis	von Aderkas	1984
Other	fronds used to cover berry baskets and to wipe fish before hanging up to smoke	Fleisher	1980
Other	fronds considered poisonous when mature and known to contain carcinogenic substances	Turner	1980
Other	fronds dipped in water and used in pit cooking to place over and under the food	Turner	1980

	Other	ferns considered to be a sign of water when travelling through the mountains	Turner	1980
	Other	carcinogenic	Lewis	1977
	Other	mutagenic	Lewis	1977
	Other	poison	Lewis	1977
	Other	produces a cyanogenic compound	Seigler	1976
	Other	spasm	Krochmal	1973
	Other	stomach	Krochmal	1973
	Other	sedative	Shih-chen	1973
	Other	tonic	Shih-chen	1973
	Other	fronds used for bedding while camping	Speck	1917
	Other	plant used as a diuretic for horses	Chestnut	1902
	Other	ash balls used for washing	KEW	
	Other	rope made from stems	KEW	
	Other	fibrous bundles from stems	KEW	
	Other	braken rope	KEW	
	Phytoremediation	hyperaccumulator of Ra-226	Hu	2014
	Phytoremediation	used to remediate copper	Olaifa	2014
	Phytoremediation	bioaccumulation of heavy metals	Yang	2012

Dryopteridaceae: *Dryopteris*

Species	Category	Note	Author	Date
D. campyloptera	Food	boiled roots added to 'Eskimo ice cream'	Wilson	1978
	Food	Rhizomes cooked in steaming pits and used for food	Turner	1973
	Food	rhizomes used for food	Turner	1971
	Medicine	young shoots used for cancer of the womb	Turner	1982
	Medicine	Compound decoction of leaves taken for stomachache and intestinal discomfort	Lantis	1959
	Other	Fronds placed in layers below and above food in steaming pits	Turner	1983
	Other	Thin, wiry roots used as the burning material in a slow match	Turner	1973
D. carthusiana	Food	Old leaf stalks on the underground stem roasted, peeled and the inner portion eaten	Heller	1953
	Food	Young, curled fronds boiled or steamed & eaten like asparagus with butter, margarine or cream sauce	Heller	1953
	Medicine	Root eaten as an antidote for poison from eating shellfish in early summer	Smith	1929
D. celsa	Ornamental	planted along the edge of a pond; unique texture	Askey	2014

D. cristata	Medicine	intestinal worms	Goswami	2016
	Medicine	expectorant	Krochmal	1973
	Medicine	fever	Krochmal	1973
	Medicine	sudorific	Krochmal	1973
	Medicine	vermifuge	Krochmal	1973
	Medicine	infusion of root used for stomach trouble	Smith	1932
D. goldiana	Ornamental	fern used in residential landscaping	Berger	2013
	Ornamental	used as woodland ground cover in courtyard setting	Jost	2012
	Ornamental	use in urban setting; durable fern that is drought tolerant, but suffers in nights that are hot and humid	Burrell	1999
	Ornamental	perennial to plant in dry shade	Stack	1999
	Ornamental	used in naturalistic garden	Koehler	1924
D. marginalis	Medicine	Infusion of root used alone or in a compound for rheumatism	Hamel	1975
	Medicine	Infusion of root taken as an emetic	Hamel	1975
	Medicine	Warm infusion held in mouth for toothache	Hamel	1975
	Medicine	vermifuge	Steinmetz	1957
	Medicine	vermifuge	Duke's	
	Ornamental	dry shade plant used for its lacy fronds	Christopher	2005
	Ornamental	dark bluish green evergreen fern planted in shaded side of property	Kielly	2003
	Ornamental	perennial in naturalistic garden	Koehler	1924
	Other	poison	Steinmetz	1957

**D. intermedia* had no reported uses.

Dryopteridaceae: *Polystichum*

Species	Category	Note	Author	Date
P. acrostichoides	Food	Fiddle heads used for food	Hamel	1975
	Medicine	Roots used for hoarseness	Chandler	1979
	Medicine	Decoction of plant used by children for cramps	Herrick	1977
	Medicine	Poultice of wet, smashed roots used on children's back and head for convulsions	Herrick	1977
	Medicine	Compound decoction taken for diarrhea	Herrick	1977
	Medicine	Infusion of smashed roots used as a foot soak for 'rheumatism' in back and legs	Herrick	1977
	Medicine	Poultice of wet, smashed roots used on children's back and head for red spots	Herrick	1977
	Medicine	Infusion of roots taken as an emetic for dyspepsia and consumption	Herrick	1977
	Medicine	Decoction of vine with small leaves used for children with fevers	Herrick	1977

Medicine	Plant taken before and after baby to clean womb	Herrick	1977
Medicine	Roots used as a 'Lady's medicine' for the insides	Herrick	1977
Medicine	Poultice applied to back and feet for spinal trouble and sore back of babies	Herrick	1977
Medicine	Decoction of plant given to children (sometimes mother too) for listlessness	Herrick	1977
Medicine	Powder inhaled and coughed up by a man who can't talk	Herrick	1977
Medicine	Infusion of roots taken as an emetic for consumption	Herrick	1977
Medicine	Compound decoction used as a blood purifier and for venereal disease	Herrick	1977
Medicine	Compound decoction of root applied with warm hands for rheumatism	Hamel	1975
Medicine	Roots used as an ingredient in an emetic	Hamel	1975
Medicine	Compound decoction taken for chills and infusion taken for fever	Hamel	1975
Medicine	Cold infusion of root used for 'stomachache or bowel complaint	Hamel	1975
Medicine	infusion taken for pneumonia	Hamel	1975
Medicine	Compound decoction used for toothache and chills	Hamel	1975
Medicine	Roots chewed and used for hoarseness	Mechling	1959
Medicine	Decoction of roots rubbed on area affected by rheumatism	Taylor	1940
Ornamental	recommended for use in rain garden; drought intolerant	Morash	2019
Ornamental	used in home garden; "Christmas fern"	Waters	2018
Ornamental	ground cover used in residential landscaping	Berger	2014
Ornamental	used in forest transition area of botanical garden	Griswold	2014
Ornamental	herbaceous plant used in city park landscaping	Rehak	2014
Ornamental	fern used in residential landscaping	Berger	2013
Ornamental	perennial used in residential landscaping	Berger	2010
Ornamental	perennial used in residential landscaping	Berger	2010
Ornamental	plant used in residential landscaping	Brown	2010
Ornamental	fern used in entry plaza to aquarium	Jost	2009
Ornamental	plant used for small spaces leftover in garden	Fox	2008
Ornamental	fern used in university eco-friendly design	Cramer	2006
Ornamental	plant to grow under trees in dry shade	Oettinger	2005
Ornamental	perennial used in residential landscaping	Rauh	2005
Ornamental	plant used in dry shade	Summerfeldt	2005
Ornamental	fern planted on edge of pond	Mulligan	2004

	Ornamental	plant used for small spaces leftover in garden	Fox	2003
	Ornamental	evergreen used in landscaping	Poncavage	2000
	Ornamental	plant used in naturalistic garden	Koehler	1924
	Phytoremediation	potential arsenic accumulator	Srivastava	2010

Equisetaceae: *Equisetum*

Species	Category	Note	Author	Date
E. arvense	Agriculture	effective and sustainable control method against the bean weevil Acanthoscelides obtectus (Say), an important insect pest affecting stored common beans and other legume	Bohinc	2013
	Agriculture	alternative to synthetic fungicides to control maize mycobiota level in moist grain.	Garcia	2013
	Agriculture	alternative to synthetic fungicides to control maize microbiota	Garcia	2013
	Agriculture	antifungal and antimycotoxigenics	Garcia	2011
	Agriculture	Animal food, medicine, and weeds	Tardio	2008
	Agriculture	Animal food and medicine	Kindscher	1998
	Agriculture	Used in winter for fodder during hay shortage	Turner	1980
	Agriculture	Given to thin, old horses with diarrhea after eating fresh grass in spring	Turner	1980
	Agriculture	excellent fall and winter forage for horses	Johnston	1979
	Agriculture	Infusion of fertile stem roots given to horses as a diuretic	Hellson	1974
	Agriculture	Infusion of leaves and stems given to horses with a hard cough	Grinnell	1972
	Agriculture	Poisonous or injurious to livestock	Krochmal	1955
	Agriculture	Plant gathered to feed domesticated ducks and fed to ponies to make their coats glossy.	Smith	1932
	Agriculture	Plant fed to captive wild geese to make them fat in a week	Smith	1928
	Agriculture	plant eaten by horses	Robbins	1916
	Agriculture	horses can eat it without suffering from sickness.	KEW	
	Agriculture	hay poisonous to cattle	KEW	
	Food	consumed boiled during winter and early spring	Kosaka	2013
	Food	young shoots are eaten boiled and salted or chopped and scrambled with eggs.	Brussell	2004
	Food	Young strobili are cooked or preserved for consumption	Kays	1995
	Food	Young shoots used as food	Kays	1995

Food	tubers eaten	Kari	1985
Food	Tender, young, vegetative shoots peeled and eaten raw.	Turner	1982
Food	Black, edible nodules attached to roots used for food	Ager	1980
Food	Young shoots used as food	Gunther	1973
Food	Tender, young shoots eaten raw or boiled	Turner	1971
Medicine	induced cell death in pancreatic cancer cell lines and may serve as an alternative anticancer agent for the treatment of pancreatic carcinoma (PC) with no or least side effects to the patient	Bhat	2020
Medicine	antioxidant activity; pectins as components of wound healing	Patova	2019
Medicine	contains essiental elements vital for health (Fe, Mn, Zn, Cu, and Se)	Brima	2018
Medicine	antibacterial effects on gram-positive cocci; used for diseases associated with hypertonic conditions or oxidative stress and ap	Pallag	2018
Medicine	protective effect due to anti-inflammatory properties in relation to COPD	Possebon	2018
Medicine	cures diseases of the genitourinary system	Rossi-Santos	2018
Medicine	part of formula that reduces symptoms of overactive bladder (OAB) and urinary frequency and/or urgency and incontinence	Schoendorfer	2018
Medicine	source of natural antibacterial compounds against foodborne pathogenic bacteria.	Das	2017
Medicine	used to treat chronic joint inflammatory disorder	Dragos	2017
Medicine	part of formula that reduces perceived pain and improvement in functional mobility related to chronic joint, back, and muscle pain	Hedaya	2017
Medicine	cancer as a chemopreventive agent	Kour	2017
Medicine	medicinal	Melian	2017
Medicine	high activity against influenze and high antioxidant activity	Moradi	2017
Medicine	effective in reversing osteoporotic changes	Kotwal	2016
Medicine	ointment promoted wound healing and relieved pain after episiotomy	Asgharikhatooni	2015
Medicine	the oral application for inflammation of the urinary system	Bussmann	2015
Medicine	external use of extracts in supportive wound care	Bussmann	2015
Medicine	no secondary effects are known	Bussmann	2015
Medicine	diuretic effect	Carneiro	2014

	Medicine	anti-inflammatory properties	Grundemann	2014
	Medicine	anxiolytic activity	Sarris	2013
	Medicine	antibacterial activity	Ceyhan	2012
	Medicine	negative effect on human osteoclastogenesis; potential use for treatment in bone regeneration strategies	Costa-Rodrigues	2012
	Medicine	antibacterial activity against S. aureus	Pereira	2012
	Medicine	promote bone healing: inductive effect on human osteoblasts	Pereira	2012
	Medicine	anti-anxiety activity	Singh	2011
	Medicine	easily accessible source of natural antioxidants	Cetojevic-Simin	2010
	Medicine	significant wound healing activity	Ozay	2010
	Medicine	some antioxidant properties	Stajner	2009
	Medicine	phenolic compounds as natural antioxidants	Mimica-Dukic	2008
	Medicine	antioxidants, antimicrobials and/or genotoxic substances	Milovanovic	2007
	Medicine	significant antidiabetic effect	Safiyeh	2007
	Medicine	very strong antimicrobial activity against all tested strains.	Radulovic	2006
	Medicine	anticonvulsant and sedative effects	Dos Santos Jr	2005
	Medicine	antioxidant activity; rich in vitamin C and E; high levels of Cu and Zn; health food and useful in preventing various degenerative diseases	Nagai	2005
	Medicine	cognitive enhancement effects may be attributed, at least in part, to it antioxidant action	Santos Jr	2005
	Medicine	Tea made from the stems is drunk to treat an upset stomach	Brussell	2004
	Medicine	decoction from the above ground parts of the plant is drunk to treat kidney stones, as a diuretic, and for diseases of the urinary system in general	Brussell	2004
	Medicine	antinociceptive and anti-inflammatory effects	Monte	2004
	Medicine	treatment of hepatitis; hepatoprotective and free radical scavenging acitivites	Oh	2004
	Medicine	hepatoprotective activity; support use for treatment of hepatitis	Oh	2004
	Medicine	used as a diuretic	Ozgokce	2004
	Medicine	Antihemorrhagic	Agelet	2000
	Medicine	psychomedicine	Gaur	1994
	Medicine	rhizome also internally used in gonorrheal disease	Gaur	1994
	Medicine	diuretic	Gaur	1994

Medicine	Decoction or infusion of stems used after childbirth to expel the afterbirth more quickly	Turner	1990
Medicine	Decoction of new plant tops taken for 'stoppage of urine'	Turner	1990
Medicine	Decoction of plant used as a wash for itching or open sores	Goodrich	1980
Medicine	Infusion of stems taken for lumbago	Turner	1980
Medicine	Plant pounded, mixed with water and used to wash areas of the body affected by poison ivy	Turner	1980
Medicine	Infusion of stems taken as a diuretic to stimulate the kidneys	Turner	1980
Medicine	infusion of stems taken for backaches	Turner	1980
Medicine	infusion of stems taken for sluggishness due to a cold	Turner	1980
Medicine	Decoction of plant and false box taken or used as a bath for syphilis and gonorrhea	Turner	1980
Medicine	used for diuretic	Font Query	1979
Medicine	used for antiseptic	Gupta	1979
Medicine	used for diuretic	Hart	1979
Medicine	Used for headaches and pains	Herrick	1977
Medicine	Used for rheumatism	Herrick	1977
Medicine	Used for joint aches	Herrick	1977
Medicine	Raw stems chewed by teething babies	Herrick	1977
Medicine	Infusion taken for kidneys	Hamel	1975
Medicine	Strong infusion taken for constipation	Hamel	1975
Medicine	Poultice of stem pieces applied to rash under the arm and in the groin	Hellson	1974
Medicine	Infusion of fertile stem roots used as a powerful diuretic	Hellson	1974
Medicine	Powdered stems put in moccasins to avoid foot cramps when traveling long distances	Hellson	1974
Medicine	used for albuminuria	Liogier	1974
Medicine	used for calculus	Liogier	1974
Medicine	used for diarrhea	Liogier	1974
Medicine	used for anodyne	Shih-chen	1973
Medicine	used for carminative	Shih-chen	1973
Medicine	Poultice of rough leaves and stems applied to cuts and sores	Turner	1973
Medicine	Tender, young shoots eaten raw or boiled and thought to be 'good for the blood	Turner	1971
Medicine	used for bladder problems	Uphof	1968
Medicine	used for diuretic	Uphof	1968
Medicine	used for dropsy	Uphof	1968
Medicine	used for cancer	Hartwell	1967

	Medicine	used for bone cancer	Hartwell	1967
	Medicine	used for diabetes	Al-Rawi	1964
	Medicine	Antimicrobial for gram positive bacteria and mycobacteria	Nickell	1959
	Medicine	used for antiseptic	Steinmetz	1957
	Medicine	used for astringent	Steinmetz	1957
	Medicine	used for carminative	Steinmetz	1957
	Medicine	used for diuretic	Steinmetz	1957
	Medicine	apoptotic cell death	Mohammed	1947
	Medicine	infusion of rhizomes and hazel stems given to children for teething	Rousseau	1945
	Medicine	Decoction of stems taken for dysuria	Gilmore	1933
	Medicine	Infusion of whole plant used for lumbago	Smith	1933
	Medicine	Infusion of plant used for kidney trouble	Smith	1933
	Medicine	Infusion of plant used for bladder trouble	Smith	1933
	Medicine	Infusion of whole plant used for dropsy.	Smith	1932
	Medicine	used for diuretic	Duke's	
	Medicine	used for diuretic	Duke's	
	Medicine	Medicine for pain	KEW	
	Ornamental	cut stems make an interesting addition to herb and flower arrangements	KEW	
	Other	environmental weed	Rawling	1994
	Other	Potential for silica extraction; remineralizing and diuretic medicinal products as well as non-therapeutic uses	Vilarem	1992
	Other	roots used in basketry	Bocek	1984
	Other	Hollow stems used to administer medicines to babies	Turner	1980
	Other	Stems used as sandpaper to polish bone tools and soapstone pipes	Turner	1980
	Other	Used to polish fingernails	Turner	1980
	Other	Crushed stems used as a light pink dye for porcupine quills	Hellson	1974
	Other	Plant used by children to shine their bouncing arrows	Hellson	1974
	Other	Rough leaves and stems used to polish wooden articles	Turner	1973
	Other	Making whistles	Turner	1973
	Other	Horsetail yields a deep green color when used for dying fabric	KEW	
	Other	used to sand wood or scour and shine metal. This is due to its high silica content	KEW	
	Phytoremediation	proposed to remediate degraded soils	Buta	2019
	Phytoremediation	accumulates high concentrations of silicon	Garcia-Gaytan	2019

	Phytoremediation	important role in mitigating water contamination by accumulating neonicotinoids	Main	2017
	Phytoremediation	uptake of lead from soil	Robinson	2008
	Phytoremediation	some removal of lead from soil	Robinson	2008
E. hyemale	Agriculture	Infusion used as a drench for horse medicine	Hart	1992
	Agriculture	Plant given to horses to fatten them	Rogers	1980
	Agriculture	The foliage was boiled in water and the liquid used in horse medicine as a drench	Johnston	1970
	Agriculture	Plant fed to ponies to make them fat in a week	Smith	1923
	Agriculture	Decoction of plant used as a horse medicine	McClintock	1909
	Food	Stalk tops dried, mashed, mixed with salmon eggs and eaten	Gunther	1973
	Food	Rootstocks dried and used for food	Reagan	1936
	Medicine	flavonoid-rich ethyl acetate extract of E. hyemale exhibits in situ hair-regenerative properties	David	2019
	Medicine	antimicrobial, antitrypanosomal and antibioflim activity	dos Santos	2016
	Medicine	root juice eye wash	Goswami	2016
	Medicine	antifungal and antioxidant activity	de Queiroz	2015
	Medicine	strong antibacterial power against major oral pathogenic bacteria	Ferrazzano	2013
	Medicine	natural antioxidant and source of anti-inflammatory agent	Jiang	2012
	Medicine	inducing G2/M arrest and cell apoptosis	Li	2012
	Medicine	high antioxidant content	Dogan	2010
	Medicine	diuretic activity	Wright	2007
	Medicine	Poultice used for bladder and prostate pains	Hart	1992
	Medicine	Infusion of stems used as a diuretic	Hart	1992
	Medicine	used for irregular menstruation	Hart	1992
	Medicine	Infusion of stems taken for lumbago	Turner	1980
	Medicine	Decoction of stems used as a wash on children for skin sores	Turner	1980
	Medicine	Plant pounded, mixed with water and used to wash areas of the body affected by poison ivy	Turner	1980
	Medicine	Infusion of stems taken as a diuretic to stimulate the kidneys	Turner	1980
	Medicine	Stem fluid used as an eyewash	Turner	1980
	Medicine	Infusion of stems taken for backaches	Turner	1980
	Medicine	astringent	Duke's	1978
	Medicine	infusion taken for kidneys	Hamel	1975
	Medicine	Strong infusion taken for constipation	Hamel	1975

Medicine	Decoction of plant taken for kidney problems	Carrier Linguistic Committee	1973
Medicine	decoction of plant taken for the inability to pass water	Carrier Linguistic Committee	1973
Medicine	Raw shoots chewed for diarrhea.	Gunther	1973
Medicine	Decoction of stalks used as a wash for hair infested with vermin	Gunther	1973
Medicine	antidote for copper	Shih-chen	1973
Medicine	epiphora	Shih-chen	1973
Medicine	flux	Shih-chen	1973
Medicine	hemorrhage	Shih-chen	1973
Medicine	leucorrhea	Shih-chen	1973
Medicine	menorrhagia	Shih-chen	1973
Medicine	ophthalmia	Shih-chen	1973
Medicine	prolapse	Shih-chen	1973
Medicine	rectum	Shih-chen	1973
Medicine	uterus	Shih-chen	1973
Medicine	used to correct menstrual irregularities was made by boiling together scouring rush and two unknown roots	Johnston	1970
Medicine	cancer	Hartwell	1967
Medicine	cancer	Hartwell	1967
Medicine	astringent	Steinmetz	1957
Medicine	diuretic	Steinmetz	1957
Medicine	hemostat	Steinmetz	1957
Medicine	lung	Steinmetz	1957
Medicine	tuberculosis	Steinmetz	1957
Medicine	Infusion of dried plants taken for prostate gland troubles	Romero	1954
Medicine	Decoction of plant used as a wash or poultice of stalks applied for sore eyes	Schenck	1952
Medicine	infusion of rhizomes taken by old people 'when the urine is too red.'	Rousseau	1945
Medicine	Leaves burned as a disinfectant	Densmore	1928
Medicine	Decoction of rushes taken after childbirth 'to clear up the system.'	Smith	1923
Medicine	Decoction of rushes taken for kidney troubles	Smith	1923
Medicine	Infusion of whole plant taken by both men and women for gonorrhea	Smith	1923
Medicine	wound	Duke's	
Medicine	sore	Duke's	
Medicine	medicinal	KEW	

Ornamental	planted in Japanese gardens surronding ponds and waterfalls	Kawano	2015
Ornamental	used as contrast; rigid massed plantings	Tanner	2014
Ornamental	part of residential landscaping; perennial	Martin	2013
Ornamental	part of residential landscaping; perennial	Berger	2012
Ornamental	part of aquatic plant section of residential lanscaping	Martignoni	2012
Ornamental	part of public landscaping for Toyota Motor Sales's headquarters	Newman	2006
Ornamental	part of public landscaping for Neurosciences Institute; native; color and vertical lines	Aragone	1996
Other	traditional craft works; grinding and honing of wooden wares	Kawano	2015
Other	one of the strongest accumulators of silicon	Sapei	2007
Other	roots used in basketry	Bocek	1984
Other	fatal poisining in grazing animals	Lowy	1975
Other	used for scouring	Gunther	1973
Other	used in kitchens for cleaning wooden spoons and platters	KEW	
Phytoremediation	removal of pollutants in laundry waste water	Wahyudianto	2019
Phytoremediation	removal of lead and chromium from wastewater	Kurniati	2014

Hymenophyllaceae: *Hymenophyllum*

* *H. tayloriae* had no reported uses

Hymenophyllaceae: *Trichomanes*

* *T. boshchianum, T. intricatum,* and *T. petersii* had no reported uses

Isoetaceae: Isoetes

* *I. appalachiana, I. butleri, I. engelmannii, I. melanopoda, I. tennesseenis,* and *I. valida* had no reported uses.

Lycopodiaceae: *Dendrolycopodium*

* *D. dendroideum, D. hickeyi,* and *D. obscurum* had no reported uses.

Lycopodiaceae: Diphasiastrum

* *D. digitatum* and *D. tristachyum* had no reported uses

Lycopodiaceae: Huperzia

Species	Category	Note	Author	Date
H. appressa	Medicine	association of fungi with huperzia species produce Hupzine A	Ju	2009
H. lucidula	Medicine	Lycopodium alkalkaloids; sterols; 14-serratene derives; lycoxanthol	Ma	2006
	Medicine	Compound used when 'blood is bad.'	Herrick	1977
	Medicine	Decoction used when woman catches cold due to suppressed menses	Herrick	1977
	Medicine	Compound used for neck sores.	Herrick	1977

* *H. porophila* had no reported uses.

Lycopodiaceae: Lycopodiella

Species	Category	Note	Author	Date
L. alopecuroides	Medicine	low phenols and anthocyanin contents	Henao-Zuluaga	2016

* *L. appressa* had no reported uses.

Lycopodiaceae: Lycopodium

Species	Category	Note	Author	Date
L. clavatum	Agriculture	veterinary medicine that promotes the growth of poultry	Global IP News	2015
	Agriculture	effective in plant-pest systems (offspring of aphid decreased after application of clavatum)	Wyss	2010
	Medicine	contains compounds that have anti-inflammatory effect, so may be useful in treating IBD	Jo	2020
	Medicine	contains marinomycin A with has antimicrobial and anticancer activities, but easily deteriorates when exposed to light	Bailey	2019
	Medicine	neuroprotective potential, specifically Parkinson's disease	Jayaraj	2019
	Medicine	antioxidant	Kar	2019
	Medicine	anti-inflammatory, antioxidant, and antimicrobial actions and inhibits acetylcholinesterase activity	Li	2019
	Medicine	could be an effective inhibitor of periodontal pathogens bacteria such as P. gingivalis	Almaguer-Flores	2018
	Medicine	enhanced antimicrobial activity	Dyab	2018
	Medicine	enhanced antimicrobial activity	Dyab	2018

Medicine	no significant inhibitory effect on E. coli	Pannek	2018
Medicine	significantly inhibited growth and increased the apoptosis of colon cancer cells indicating its potential anti-cancer activity against colon cancer cells	Paramita	2018
Medicine	anti-cancer activity	Pongpamorn	2018
Medicine	spores used for oral vaccination	Uddin	2018
Medicine	beneficial immunomodulatory action reducing the pathogenic progression of digestive Chagas disease	Alexio	2017
Medicine	anti-cancer activity	Bag	2017
Medicine	increased hepatocyte and solenocyte apoptosis	Falkowski-Temporini	2017
Medicine	reduce parasitemia, however intensified histopathological lesions in encephalon and heart of mice	Pereira	2017
Medicine	branches are used for genitourinary system illnesses	Perez-Nicolas	2017
Medicine	use of spore capsules to orally administer peptides and proteins	Sudareva	2017
Medicine	increase of megakaryocytes and Kupffer cells	Falkowski-Temporini	2016
Medicine	Spasmodic retention of urine in infants, gastritis, emollient, urinary or kidney disorders, catarrhal cystitis; dyspepsia, hepatic congestion and pustular skin eruptions, rheumatism, cramps and varices; Ulcer, diarrhea, dysentery; homeopathic medicine	Goswami	2016
Medicine	use of spores for drug delivery	Harris	2016
Medicine	treatment for tissue parasitism and inflammation from infection of Trypanosoma cruzi	Lopes	2016
Medicine	spore provide a controlled release formulation; use for gastrointestinal cancer	Mundargi	2016
Medicine	use of spores for drug delivery	Mundargi	2016
Medicine	treatment for Toxoplasma gondii, but some adverse side effects	Pereira	2016
Medicine	fawcettimine and lycopodine-type alkaloid	Pongpamorn	2016
Medicine	hepatoprotective effect	da Silva	2015
Medicine	increased cerebral blood flow and improvement in learning and memory	Hanif	2015
Medicine	spores for oral vaccination	Atwe	2014
Medicine	lycopodine triggers apoptosis, reduces proliferation of cancer cells	Bishayee	2013

Medicine	contains huperzine A, which may be used to treat Alzheimer's	Calderon	2013
Medicine	homeopathic treatment of migraines in children	Danno	2013
Medicine	spores for drug delivery	Diego-Taboada	2013
Medicine	may be used in treating diabetic distal symmetric polyneuropathy	Nayak	2013
Medicine	possibly contain antiprotozoal compounds with no cytotoxicity	Orhan	2013
Medicine	contains compounds that induce apoptosis in cancer cells	Samadder	2013
Medicine	apigenin-induced apoptosis	Das	2012
Medicine	AChE inhibitory activity and antioxidant effects,	Konrath	2012
Medicine	spore exine capsules for microencapsulation	Barrier	2011
Medicine	fawcettimine-related alkaloids	Katakawa	2011
Medicine	lower phenolics, higher ligans and terpenoids (hepatoprotective potential)	Zavoi	2011
Medicine	sporopollenin exines for natural taste masking material	Barrier	2010
Medicine	lycopodine inhibits proliferation of HeLa cells through apoptosis	Mandal	2010
Medicine	anti-inflammatory effects	Namsa	2009
Medicine	significant reduction of tumor incidence; complementary and alternative medicine against hepato-toxicity	Pathak	2009
Medicine	contains ferulic acid, a potential antioxidant	Srivastava	2008
Medicine	anti-inflammatory activity, possibly from alkalodial-type compound	Orhan	2007
Medicine	anticancerous potential against hepatocarcinogenesis	Pathak	2007
Medicine	spores for encapsulation and targeted delivery of active components	Paunov	2007
Medicine	Lycopodium-30 from spores gives protective potential to hepatocarcinogenesis	Pathak	2006
Medicine	AChE inhibitory activity	Rollinger	2005
Medicine	spores are used for baby powder	Brussell	2004
Medicine	alpha-onocerin, an AChE inhibitor	Orhan	2003
Medicine	decoction of young fronds applied externally to deteriorating wounds or ulcer; used for diarrhea and dysentery in infants	Nwosu	2002
Medicine	spores and whole plant internally taken in treatment of spasmodic retention of urine in infants, gastritis, emollient, urinary or kidney	Gaur	1994

	disorders and externally applied for catarrhal cystitis		
Medicine	no antibiotic activity	Banerjee	1980
Medicine	infusion of plant taken for postpartum pain	Bank	1953
Medicine	spores of fruiting spikes used as a styptic and coagulant	Smith	1933
Medicine	moss inserted into the nose to cause bleeding for headaches	Smith	1929
Medicine	brew' from plant used for weakness and fever	Speck	1917
Medicine	spores used for medicine	Kew	
Medicine	medicine, not defined	Kew	
Medicine	powered lycopodium as medicine	Kew	
Medicine	spores used for medicine	Kew	
Medicine	medicinal homeopathic tablets	Kew	
Medicine	refer to database for specific chemical activities	Duke's	
Medicine	headache, aperitif, aphrodisiac, skin cancer, carminative, catarrh, chest, diarrhea, diuretic, dyspepsia, emmenagogue, fever, fumitory, fever, homeopathy, laxative, nerves, pill-coating, pressor	Duke's	
Ornamental	used ornamentally and for handicrafts	Rendon-Aguilar	2017
Other	use of spores to sequester edible oil	Diego-Taboada	2012
Other	plant used as a belt for blankets that are worn	Compton	1993
Other	Christmas decoration	Turner	1990
Other	spores used in condom manufacture; can result in allergic reactions from hay-fever to giant cell granulomas	Balick	1989
Other	used by children to make Christmas decorations	Turner	1982
Other	used to make wreath	Turner	1973
Other	plant used to make decorative necklace worn during festive occasions	Speck	1917
Other	doormats of clubmoss		
Phytoremediation	removal of lead and arsenic from aqueous solution	Ahmad	2017
Phytoremediation	adsorptive removal of Co, Ni, and Cu ions from aqueous media using sporopollenin	Cimen	2014
Phytoremediation	sporopollenin for sorption of heavy metal ions	Gubbuk	2011
Phytoremediation	hyperaccumulator of aluminum	Olivares	2009
Phytoremediation	removal of heavy metal ions through sporopollenin	Unlu	2007

Phytoremediation	adsorption of heavy metal ions via sporopollenin	Unlu	2006
Phytoremediation	removal of cadmium from aqueous solumns via sporopollenin	Arslan	2004
Phytoremediation	adsorption of heavy metal ions via sporopollenin	Ersoz	1995
Phytoremediation	adsorption of heavy metal ions via sporopollenin	Pehlivan	1994

Lycopodiaceae: *Spinulum*

* *S. annotinum* had no reported uses.

Lygodiaceae: *Lygodium*

Species	Category	Note	Author	Date
L. palmatum	Medicine	aqueous extract of young fronds applied externally to boils, abscess, swellings	Nwosu	2002
	Ornamental	unusual native evergreen-twining fronds that climb used in gardening	Bailey	2004
	Other	used as astringent, emollient, and cosmetics by women	Nwosu	2002

Marsileaceae: *Pilularia*

Species	Category	Note	Author	Date
P. americana	Agriculture	γ-glutamyl transferase activities; hurts pests	Ding	1986

Marsileaceae: *Marsilea*

Species	Category	Note	Author	Date
M. minuta	Agriculture	negative effect on other plants growth	Sana	2015
	Agriculture	produces biochemicals that have negative allelopathic effect	Tanveer	2015
	Agriculture	weed in rice fields	Tauseef	2012
	Agriculture	weed that competes with rice plants	Rabbani	2011
	Agriculture	high nutrient removal from soil	Srinivasan	1994
	Food	used as a vegetable	Sajini	2019
	Food	used as a vegetable; phenols, flavonoids, xanthoproteins, coumarins	Yumkham	2017
	Food	shoot is a good source of carbohydrates, fat, protein, sodium, phosphorous, potassium, and nitrogen	Mishra	2016

Food	edible plant; leaves juiced and added to soup to be consumed; famine food plants	Fardous	2014
Food	fronds cooked as vegetable	Chowdhury	2012
Medicine	antipyretic and analgesic, antidiabetic, antitussive, expectorant, antiamnesic, anti-aggressive, antimicrobial, hepatoprotective, antifertility, anti-tumor, antioxidant activity.	Sajini	2019
Medicine	leaf juice is used for diabetes	Shahida	2019
Medicine	antioxidant and antibacterial properties; natural additive to prevent food spoilage bacteria	Arokiyaraj	2018
Medicine	Epilepsy, used in cough, spastic conditions of leg muscles, sedation and insomnia	Goswami	2016
Medicine	antitussive, expectorant	Chakraborty	2013
Medicine	used in skin diseases and beneficial as memory enhancer	Sharma	2013
Medicine	antimnesic activity, mediating through central cholinergic system	Bhattamisra	2012
Medicine	antibacterial activity in relation to cadmium and chromium	Hussain	2011
Medicine	anti-aggressive activity	Tiwari	2010
Medicine	eat the fronds as vegetable: relief from hypertension, sleeping disorders and headache by regular eating	Sarker	2009
Medicine	juice of fresh shoots as a remedy for cough, respiratory troubles, especially for their babies	Sarker	2009
Medicine	antidepressant effect	Bhattamisra	2008
Medicine	anti-stress, anti-convulsant and rehabilitation drug	Chatterjee	2007
Medicine	hypocholesterolemic activity	Gupta	2000
Medicine	sedative and anticonvulsant properties	Chatterjee	1963
Other	used as vegetation in aquarium	Sajini	2019
Phytoremediation	phytoremediator of arsenic	Hassi	2017
Phytoremediation	biosorption and bioaccumulation of Cadmium	MK	2015
Phytoremediation	phytoremediator of Chromium	Kumar	2012

Onocleaceae: *Onoclea*

Species	Category	Note	Author	Date
O. sensibilis	Agriculture	winter food for turkeys	Decker	1991
	Food	Cooked and seasoned with salt, pepper or butter	Waugh	1916
	Medicine	Used for arthritis and infection	Herrick	1977
	Medicine	Compound decoction of roots taken for 'cold in blood.	Herrick	1977

Medicine	Decoction used as a hair wash and taken for the blood which caused the hair to fall out	Herrick	1977
Medicine	Fermented compound decoction taken before meals and bed to 'make blood.	Herrick	1977
Medicine	Poultice of plant top used for deep cuts	Herrick	1977
Medicine	Used 'for trouble with the intestines, when you catch cold and get inflated and sore	Herrick	1977
Medicine	Decoction of roots taken for fertility in women and the blood	Herrick	1977
Medicine	Decoction of roots taken to give strength after childbirth	Herrick	1977
Medicine	Decoction taken to start menses and for swellings, cramps and sore abdomen	Herrick	1977
Medicine	Infusion of root taken for pain after childbirth	Herrick	1977
Medicine	Infusion of whole plant or roots applied to full, non-flowing breasts	Herrick	1977
Medicine	Compound decoction of roots taken during the early stages of consumption	Herrick	1977
Medicine	Cold, compound infusion of plant washed on sores and taken for gonorrhea	Herrick	1977
Medicine	Compound decoction used for venereal disease	Herrick	1977
Medicine	Infusion of rhizomes given to children when 'the blood doesn't have a determined path	Rousseau	1945
Medicine	Infusion of plant and female fern rhizomes used by men for venereal diseases	Rousseau	1945
Medicine	Decoction of powdered, dried root used by patients with caked breast for milk flow	Smith	1932
Ornamental	part of wet woodland fern collection in landscaping	Griswold	2014
Ornamental	used for biofiltration in landscaping	Lerner	2014
Ornamental	perennial used in landscaping	Lerner	2014
Ornamental	fern used in landscaping	Berger	2013
Ornamental	fern used in landscaping	Jost	2009
Ornamental	fern used in landscaping	Cramer	2006
Ornamental	attractive fronds that turn foxy-brown after first frost. Suited for waterside planting	Fowler	2003
Ornamental	native fern used in gardening to mask other plants dying foliage	Johnson	2003
Ornamental	upland plant used in buffer zones	Burrell	2000
Other	used as a poison	Lewis	1977

Ophioglossaceae: *Botrychium*

* *B. matricariifolium*, *B. simplex*, and *B. lanceolatum* had no reported uses.

Ophioglossaceae: *Botrypus*

* *B. virginianus* had no reported uses

Ophioglossaceae: *Ophioglossum*

Species	Category	Note	Author	Date
O. engelmannii	Medicine	boil	Guillarmod	1971
	Phytoremediation	indicator	Guillarmod	1971

* *O. crotalophoroides*, *O. pycnostichum*, and *O. petiolatum* had no reported uses.

Ophioglossaceae: *Sceptridium*

**S. biternatum*, *S. dissectum*, *S. jenmanii*, and *S. oneidense* had no reported uses.

Osmundaceae: *Osmunda*

Species	Category	Note	Author	Date
O. claytoniana	Medicine	root is used as medicine	Kindscher	1998
	Medicine	paste of plant applied externally to wounds	Gaur	1994
	Medicine	some antibiotic activity	Banerjee	1980
	Medicine	cold, compound decoction taken for weak blood	Herrick	1977
	Medicine	compound decoction taken for gonorrhea	Herrick	1977
	Ornamental	fern used in gardening	Selby	2002
O. regalis	Food	use as food	Kew	
	Medicine	antiviral agent	Bouazzi	2018
	Medicine	Rickets, rheumatism, intestinal gripping and styptic	Goswami	2018
	Medicine	malaria and jaundice	Goswami	2018
	Medicine	anticancer remedy	Schmidt	2017
	Medicine	rhizome extract used as an abortifacient	Yumkham	2017
	Medicine	rhizome used for treatment of bone fractures, joint disorders, rheumatic, and arthritic pain	Molina	2009
	Medicine	whole plant extract taken internally for psychosis	Nwosu	2002
	Medicine	infusion of roots used against malaria and jaundice	Nwosu	2002
	Medicine	antibiotic activity	Banerjee	1980
	Medicine	Decoction taken by women for watery blood	Herrick	1977
	Medicine	Decoction taken by women for strong menses	Herrick	1977
	Medicine	Decoction used when 'girls leak rotten; affected women can't raise children	Herrick	1977

Medicine	Decoction taken by women for cold in kidneys	Herrick	1977
Medicine	good wound herb	Hussey	1974
Medicine	Complex infusion of roots taken for chronic conditions.	Sturtevant	1954
Medicine	Plant used for chronically ill babies.	Sturtevant	1954
Medicine	Infusion of plant used to steam and bathe the body for insanity	Sturtevant	1954
Medicine	used medicinally	Sturtevant	1954
Medicine	infusion of fronds and wild ginger rhizomes used by children with convulsions from intestinal worms.	Rousseau	1945
Medicine	used medicinally	Smith	1923
Medicine	debility	Duke's	
Medicine	rickets	Duke's	
Medicine	swelling	Duke's	
Medicine	tonic	Duke's	
Medicine	tumor	Duke's	
Medicine	wound	Duke's	
Ornamental	floating islands as a strategy for the establishment of aquatic plants in botanical garden	Martinez-Pena	2018
Ornamental	perennials used in landscaping	Berger	2012
Ornamental	planted in terrace wall and on the bank	Campbell	2012
Ornamental	planted as vegetation under highways, since they do well in shade	Jost	2009
Ornamental	tolerates seasonal inundation, plant near the water, use in parks	Harwell	2008
Ornamental	used in gardening	Cunnington	2007
Ornamental	used in gardening for a tropical look	Bailey	2004
Ornamental	used in gardening	Fowler	2003
Ornamental	perennials used in gardening	Hodgson	2003
Ornamental	used in gardening, shady and damp	Jackson	2003
Ornamental	used in gardening	Selby	2002
Ornamental	used in botanic gardens	Campbell	2001
Ornamental	ferns planted as a complement to other flowering plants	Roth	1999
Ornamental	used as the central feature in a mass of rockwork	Heriz-Smith	1989
Ornamental	use in landscaping	Loines	1917
Other	Psychosis, moon-madness	Goswami	2018
Other	tonic can chase away evil spirits; treatment for moon-madness	Nwosu	2002
Other	possible deadly poison	Tabor	1970

	Phytoremediation	used for monitoring ambient air quality around several major industrial cities, nuclear power plants, and industrial waste sites and for the assessment of potential health effects of municipal sewage sludges	Sandhu	1989
	Phytoremediation	detection of mutagens as an inexpensive means of detecting pollutants in aquatic ecosystem	Klekowski	1978

Osmundaceae: *Osmundastrum*

* *O. cinnamomea* had no reported uses.

Polypodiaceae: *Pleopeltis*

Species	Category	Note	Author	Date
P. polypodioides	Medicine	used medicinally	Rendon-Aguilar	2017
	Medicine	used for liver problems	Liogier	1974
	Medicine	decoction of fronds taken for headaches	Speck	1941
	Medicine	Cold decoction of fronds used as a wash for babies' sore mouth or thrush	Speck	1941
	Medicine	Decoction of fronds taken for dizziness	Speck	1941

Polypodiaceae: *Polypodium*

Species	Category	Note	Author	Date
P. virginianum	Food	rhizomes sun dried and used as a winter food	Turner	1971
	Food	rhizomes formerly used as a substitute for sugar	Turner	1971
	Food	rhizomes eaten fresh	Turner	1971
	Medicine	used as a purgative	Flannery	1998
	Medicine	used for upper respiratory complaints	Flannery	1998
	Medicine	Plant used to make a demulcent	Theodoratus	1989
	Medicine	Plant used to make an expectorant	Theodoratus	1989
	Medicine	Plant used to make a laxative	Theodoratus	1989
	Medicine	Decoction of leaf taken for tuberculosis	Leighton	1985
	Medicine	used to make a medicinal tea for heart disease	Black	1980
	Medicine	roots used for pleurisy	Chandler	1979

	Medicine	Compound decoction taken for cholera	Herrick	1977
	Medicine	Poultice used for inflamed swellings and wounds and infusion taken for hives	Hamel	1975
	Medicine	useful as a purge	Strickland	1974
	Medicine	Infusion of crushed stems taken for the measles	Gunther	1973
	Medicine	Baked or raw roots used as a cough medicine	Gunther	1973
	Medicine	Peeled stems chewed for coughs	Gunther	1973
	Medicine	Baked or raw roots used as a cough medicine	Gunther	1973
	Medicine	rhizomes used for colds	Turner	1971
	Medicine	rhizomes used for stomach ailments	Turner	1971
	Medicine	rhizomes used for sore throat	Turner	1971
	Medicine	Infusion of pounded roots used for pleurisy	Mechling	1959
	Medicine	Infusion of plant used for urine retention	Rousseau	1948
	Medicine	Decoction of whole plant used for stomachaches	Rousseau	1947
	Medicine	Simple or compound decoction taken for stomach pains	Smith	1929
	Medicine	Compound decoction of root taken for stomach pain, not vomiting or diarrhea	Smith	1929
	Medicine	Roots chewed for swollen, sore throat and compound decoction used for stomach pain	Smith	1929
	Medicine	used as a purgative	Duke's	
	Ornamental	planted under trees that can tolerant dry shade	Oettinger	2005

* *P. appalachianum* had no reported uses

Pteridaceae: *Adiantum*

Species	Category	Note	Author	Date
A. capillus-veneris	Agriculture	used as feed for broiler chickens	Tayeb	2019
	Agriculture	fodder additive that promotes piglet growth; reduces the medicine residue; small in toxic and side effects; plays a good role in health care	Global IP News	2015
	Food	source of nutraceuticals or as food ingredient	Zeb	2017
	Food	incorporated into food via edible film for its antimicrobial and antioxidant agents	Hashemi	2016
	Medicine	ingredient in herbal mixture which decreases severity of coughs and nighttime awakenings	Javid	2019

Medicine	used for dysmenorrhea disorders; oral decoction of leaves taken for emmenagogue	Motti	2019
Medicine	ingredient in medicinal syrup	Rezghi	2019
Medicine	role in wound healing of diabetics	Soliman	2019
Medicine	modulates alveolar apoptosis under hypoxia	Yadegari	2019
Medicine	antimicrobial activity	Zhang	2019
Medicine	natural source of antioxidants and enzyme inhibitors	Abdulqadir	2018
Medicine	possess anti-diabetic, anticonvulsant, analgesic, hypocholesterolemic, goitrogenic, anti-thyroidal, antibacterial, antifungal, wound healing, antiobesity, anti-hair loss, anti-asthmatic, anti-inflammatory, antidiarrheal and antispasmodic, antioxidant as well as diuretic, anti-urolithiatic and detoxifying effects	Dehdari	2018
Medicine	antioxidant; ameliorative potential; reduce BPA-induced hepatic toxicity	Kanwal	2018
Medicine	positive effect on blood system and plasma proteins	Pashaei	2018
Medicine	can increase the immune system without the presence of antigenic factors	Pashaei	2018
Medicine	exhibit antidysenteric, antiulcer, antimicrobial, antitumor, and antiviral activities	Rastogi	2018
Medicine	used in treating microbial infections, diabetes, liver disorders, and inflammatory disorder	Rastogi	2018
Medicine	modulates proteins involved in cell cycle and apoptosis	Rautray	2018
Medicine	used to cure diabetes, anti-viral, boils, menstrual problems, fever, eczema, cold, cough, respitory problems, snake bite, and asthma	Sanatombi	2018
Medicine	used in herbal tea	Yumkham	2018
Medicine	modulates pancreatic digestive enzymes; diabesity prevention	Kasabri	2017
Medicine	decoction internally taken for cough, boils, asthma, jaundice, fever, diabetes, eczema, measles, and chest pain	Shaheen	2017
Medicine	treat wounds in diabetic patients	Galehdari	2016
Medicine	difficult confinements	Moteetee	2016
Medicine	antibacterial activity	Nath	2016

Medicine	fronds used to cure emetic, vomiting, and indigestion	Rahman	2016
Medicine	healing effect on BPA-induced reproductive toxicity	Yousaf	2016
Medicine	potential for management of hypercholesterolemia and atherosclerotic complications	Al-Hallaq	2015
Medicine	antioxidant activity of essiental oil	Khodaie	2015
Medicine	antibacterial and antifungal activity	Ishaq	2014
Medicine	angiogenic effects and protective effects against oxygen free radical	Nilforoushzadeh	2014
Medicine	prevention of late-radiation-induced injuries	Nilforoushzadeh	2014
Medicine	healing of external wounds (bedsores and burns)	Nilforoushzadeh	2014
Medicine	good activity against testosterone-induced alopecia	Noubarani	2014
Medicine	antiurolthic activity	Ahmed	2013
Medicine	anti-inflammatory and anti-nociceptive activity	Haider	2013
Medicine	used for regulation of hypothyroidism	Vijayalakshmi	2013
Medicine	anti-inflmmatory medicine	Yuan	2013
Medicine	anti-inflmmatory activity and hypoglycemic	Ibraheim	2011
Medicine	antioxidant properties	Jiang	2011
Medicine	juice of whole plant used for curing cough and diabetes	Sarker	2009
Medicine	Juice of fresh fronds is also taken by their children for good health and against microbial diseases	Sarker	2009
Medicine	antimicrobial agents	Singh	2008
Medicine	decoction from leaves and stems is imbibed to treat bronchitis, nasal congestion, and runny nose	Brussel	2004
Medicine	infusion of leaves drunk against infertility and other women's diseases such as vaginal discharge caused by fungal growth	Nwosu	2002
Medicine	powered rhizome mixed with other ingredients and applied externally to hair infested by lice	Nwosu	2002
Medicine	used for abortive properties	Agelet	2000
Medicine	decoction of leaves drunk afresh for relief of cough, cold, and bronchial diseases	Gaur	1994
Medicine	infusion of leaves is said to be an abortifacient	Nicholson	1993
Medicine	paste of leaves applied to wounds	Siddiqui	1989

Medicine	moderately active against Staphylococcus aureus	Banerjee	1980
Medicine	used for catarrh	Font Query	1979
Medicine	used for asthma	Tackholm	1973
Medicine	used for snake bites	Tackholm	1973
Medicine	used for spider bites	Tackholm	1973
Medicine	used for catarrh	Tackholm	1973
Medicine	used for chest	Tackholm	1973
Medicine	used for cough	Tackholm	1973
Medicine	used for chest	Guillarmod	1971
Medicine	used for cold	Guillarmod	1971
Medicine	used as alopecia	Martinez	1969
Medicine	used for bladder problems	Martinez	1969
Medicine	medicinal plant from Appalachia	Krochmal	1968
Medicine	used as astringent	Al-Rawi	1964
Medicine	used for catarrh	Al-Rawi	1964
Medicine	used for cold	Al-Rawi	1964
Medicine	used for cough	Al-Rawi	1964
Medicine	used as astringent	Steinmetz	1957
Medicine	used for catarrh	Steinmetz	1957
Medicine	plant used for rheumatism	Romero	1954
Medicine	infusion of plant used as lotion for bumblebee or centipede stings	Wyman	1951
Medicine	plant smoked or infusion of plant used for insanity	Wyman	1951
Medicine	used medicinally	Kew	
Ornamental	used in hanging gardening	Qian	2018
Ornamental	fern considered as a gardening plant	Kawano	2015
Ornamental	cultivated in garden next to pond	Hamdy	2010
Ornamental	deciduous fronds unfurl a delicate purplish-pink but end up mid-green. Likes dry conditions, minimum temperature 0° C	Kimberley	2010
Ornamental	grown ornamentally; evergreen; thrives best in alkaline soils	Morgan	2006
Ornamental	valuable decorative plants, especially by their fronds	Georgeta	2004
Ornamental	cultivated in gardens	Robertson	2001
Ornamental	planted in gazebo and pond area		1987
Ornamental	Turkish garden plant	Harvey	1976
Other	decoction of roots used for washing hair to remove dandruff	Nwosu	2002
Phytoremediation	arsenic accumulator	Raj	2015
Phytoremediation	remove formaldehyde from indoor air	Zhang	2013
Phytoremediation	hyperaccumulator of Cr	Sinam	2012
Phytoremediation	arsenic accumulator	Singh	2010

	Phytoremediation	arsenic hypotolerant plant	Li	2009
A. pedatum	Medicine	Fronds used to stop bleeding	Goswami	2016
	Medicine	fronds are chewed for chests, stomach trouble, female disorders, respiratory ailments	Goswami	2016
	Medicine	used for chronic catarrhs and other pectoral affections	Flannery	1998
	Medicine	decoction of plant used for stomach troubles	Bocek	1984
	Medicine	Fronds chewed or eaten for 'weak stomach	Gill	1983
	Medicine	green fronds chewed for shortness of breath	Turner	1982
	Medicine	Infusion of dried fronds burned to ashes, mixed with unknown and taken for shortness of breath	Turner	1982
	Medicine	Decoction of plant used by children for cramps	Herrick	1977
	Medicine	Compound decoction of green roots used as foot soak for rheumatism	Herrick	1977
	Medicine	Decoction of roots taken for the cessation of urine due to gall	Herrick	1977
	Medicine	Compound decoction or infusion of roots taken for excessive menstruation	Herrick	1977
	Medicine	Decoction of roots used by 'ladies to get period, cleans out' or for abortions	Herrick	1977
	Medicine	Plant used for abortal pains and pain when about to deliver	Herrick	1977
	Medicine	Poultice of smashed plant applied to sore back of babies	Herrick	1977
	Medicine	Poultice of wet, smashed fronds bound to snakebites	Herrick	1977
	Medicine	Decoction of plant used as a wash for gonorrhea	Herrick	1977
	Medicine	fronds used to stop bleeding	Mitsuhashi	1976
	Medicine	Compound decoction of root applied with warm hands for rheumatism	Hamel	1975
	Medicine	infusion taken for rheumatism	Hamel	1975
	Medicine	Infusion of whole plant given as an emetic 'in case of ague and fever	Hamel	1975
	Medicine	Infusion of whole plant blown over head and chest of patient for fever	Hamel	1975
	Medicine	powered leaves smoked for heart trouble	Hamel	1975
	Medicine	Given for 'sudden paralytic attacks as in bad pneumonia of children	Hamel	1975
	Medicine	Powdered plant 'snuffed' and smoked for asthma	Hamel	1975

Medicine	used for cold	Krochmal	1973
Medicine	used for cough	Krochmal	1973
Medicine	used as emollient	Krochmal	1973
Medicine	used as expectorant	Krochmal	1973
Medicine	used for hoarseness	Krochmal	1973
Medicine	used for respiratory problems	Krochmal	1973
Medicine	used as a stimulant	Krochmal	1973
Medicine	used medicinally	Turner	1971
Medicine	medicinal plant in Appalachia	Krochmal	1968
Medicine	used for catarrh	Uphof	1968
Medicine	used for demulcent	Uphof	1968
Medicine	used as expectorant	Uphof	1968
Medicine	used as pectoral	Uphof	1968
Medicine	used as stimulant	Uphof	1968
Medicine	used for cold	Brutus	1960
Medicine	Decoction of whole plant used as an emetic in cases of ague and fever	Witthoft	1947
Medicine	Decoction of roots rubbed on area affected by rheumatism	Taylor	1940
Medicine	compound decoction of root used for dysentery	Densmore	1932
Medicine	Blades, stem and root used for 'female maladies	Smith	1923
Medicine	Infusion of root taken by nursing mothers for caked breast	Smith	1923
Medicine	fronds used medicinally	Kew	
Medicine	fronds used medicinally	Kew	
Ornamental	planted as woodland groundcover in school courtyard	Jost	2012
Ornamental	cold-hardy plants for shady gardens in the midwest	Ottesen	2007
Ornamental	fern planted in university landscaping	Cramer	2006
Ornamental	Deciduous; airy, rounded leaflets arranged in finger-like pattern on wiry black stems. Forms dense colonies. Despite fragile look, tough as nails in moist, acidic soil in part shade.	Hall	2006
Ornamental	pinnae that spread out like the spokes of an umbrella, and it has striking black stalks; grows well in the face of a rockery in free-draining light soil, but could also be grown in a border if it's shady	Morgan	2006
Ornamental	shade-loving; planted along water	Brigham	2005
Ornamental	fronds that resemble a palm and fingers. The fiddleheads and young fronds are an interesting shade of pink	Bailey	2004

Ornamental	deciduous, maidenhair fern with delicate large lobbed pinnules and pale color; soft, cascading foliage	Fowler	2003
Ornamental	perennial can be planted in garden of beach sand	Williams	2003
Ornamental	grown for hardiness combined with beauty	Armitage	2002
Ornamental	fern grown in garden	Selby	2002
Ornamental	grown indoors as part of hanging baskets	Haapoja	1995
Ornamental	grown in part shade, moist soil	Loines	1917
Other	Dark petioles split in two, worked until soft and used for black in basketry	Gill	1983
Other	Green fronds chewed by dancers in winter for strength and endurance	Turner	1982
Other	used for lining baskets and covering berry drying racks	Turner	1973
Other	used shiny black stems for basket imbrication	Turner	1971
Other	Stalks used as decorative overlay twine in the manufacture of baskets	Swartz	1958

Pteridaceae: Cheilanthes

Species	Category	Note	Author	Date
C. alabamensis	Other	capable of producing cyanogenic compound	Seigler	1976
	Other	cyanogenetic	Duke's	
C. lanosa	Other	capable of producing cyanogenic compound	Seigler	1976
	Other	cyanogenetic	Duke's	

* *C. tomentosa* had no reported uses.

Pteridaceae: Pellaea

Species	Category	Note	Author	Date
P. atropurpurea	Medicine	entire plant astringent, anthelmintic	Goswami	2016
	Medicine	infusion of plants taken to flush the kidneys	Romero	1954
	Medicine	infusion of plants taken as a preventative against sunstroke	Romero	1954

* *P. glabella* had no reported uses.

Pteridaceae: Vittaria

* *V. appalachiana* had no reported uses.

Salviniaceae: *Azolla*

Species	Category	Note	Author	Date
A. caroliniana	Agriculture	enhanced soil carbon storage and plant carbon fixation; increased grain yield	Bhararli	2017
	Agriculture	suppresses methane emissions from rice paddies	Liu	2017
	Agriculture	source of organic manure and nitrogen	Manhanty	2017
	Agriculture	important nitrogen source for agriculture and animal industry	Kollah	2016
	Agriculture	mitigates greenhouse gas emission from agriculture	Kollah	2016
	Agriculture	used to feed pigs	Morand	2011
	Agriculture	biological pesticide, controls the growth of mosquitoes and weeds	Srivastava	2008
	Agriculture	positive increase in aeration of solution containing cadmium and mercury	Bennicelli	2007
	Agriculture	nitrogen fixation in wetlands	Hotaling	2004
	Agriculture	moderating effect on methane efflux from flooded soil through an increase in dissolved oxygen concentration	Bhararti	2000
	Agriculture	use of biomass as animal feed due to high nitrogen and protein content	Reddy	1985
	Agriculture	used as a green manure	Lumpkin	1980
	Agriculture	increasing nitrogen content of soil	Lumpkin	1980
	Agriculture	weed suppression	Lumpkin	1980
	Agriculture	fish food	Lumpkin	1980
	Agriculture	a fodder crop	Lumpkin	1980
	Food	with suitable processing, could become a good source of food	Lumpkin	1980
	Medicine	potential for use against infections caused by Gram-positive bacteria and C. albicans	Pereira	2015
	Medicine	chewed to cure sore throat	Lumpkin	1980
	Ornamental	ornamental species used in water gardens	Kun	2009
	Ornamental	use in water gardening	Calkins	2004
	Ornamental	garden plant in pond areas	Selby	2004
	Ornamental	pretty and dainty, turns red in autumn, and has nitrogen fixing nodules, grows vigorously; garden pond plant	Pondcavage	1996
	Other	phenanthrene dissipation	Castro-Carrilli	2008
	Other	possible use in mosquito control	Lumpkin	1980

Other	ingredient in soap production	Lumpkin	1980
Phytoremediation	removal of coliforms and E. coli from wastewater	Leon	2018
Phytoremediation	arsenic indicator	Moogouei	2018
Phytoremediation	very high potential for arsenic phytofiltration	Bibi	2017
Phytoremediation	antioxidants content allows high removal of arsenic from water	Leao	2017
Phytoremediation	removal of ammonia from wastewater	Carlozzi	2016
Phytoremediation	used to monitor pesticides in aquatic environments (fungicides)	Della Vechia	2016
Phytoremediation	high bioremediation potential for Cd, Cr, Cu, and Zn	Kollah	2016
Phytoremediation	removal of arsenic from wastewater	Mohammed	2015
Phytoremediation	bioremediation for removing TDS, BOD, and COD from paper mill effluent	Sivakumar	2015
Phytoremediation	removal of pharmaceuticals from water	Maharjan	2014
Phytoremediation	removes lead from aqueous solution	Roberts	2014
Phytoremediation	uptake of arsenic, copper, and silicon	Rofkar	2014
Phytoremediation	used to treat Zinc from polluted water; high accumulator of Zinc	Deval	2012
Phytoremediation	phytofiltration of arsenic	Favas	2012
Phytoremediation	some accumulation of Manganese	Lizieri	2012
Phytoremediation	accumulator of heavy metals	Pandey	2012
Phytoremediation	phytoaccumulation of heavy metals	Sood	2012
Phytoremediation	removal of herbicide (atrazine) at low herbicide concentrations	Guimaraes	2011
Phytoremediation	phytoremediation of arsenic	Rahman	2011
Phytoremediation	phytoaccumulation of Cadmium in aqueous solution	Tan	2011
Phytoremediation	biofilteration of effluent	Ena	2009
Phytoremediation	biofilter as it binds heavy metals and is helpful in the purification of waters polluted by Hg and Cr	Srivastava	2008
Phytoremediation	high arsenic accumulation	Zhang	2008
Phytoremediation	heavy metal phytoremediation	Rai	2007
Phytoremediation	removal of heavy metals from wastewater (Hg, Cr)	Bennicelli	2004
Phytoremediation	ion removal from low radioactive wastewaters	Popa	2004
Phytoremediation	bioaccumulation of selenium in aqueous solution	Ornes	1991
Phytoremediation	help purify water	Lumpkin	1980

Selaginellaceae: *Selaginella*

Species	Category	Note	Author	Date
S. rupestris	Medicine	biflavonoid	Reddy	2007
	Medicine	amentoflavone	Chakravarthy	1981
	Ornamental	Association of lichen and *S. rupestris* with Opuntia fragilis help promote flowering	Bennett	2003

Thelypteridaceae: *Macrothelypteris*

Species	Category	Note	Author	Date
M. torresiana	Medicine	ethanol extract (EEMTAP) shows diuretic and laxative activities	Mondal	2018
	Medicine	flavonoids present in species	Cao	2017
	Medicine	hepatoprotective activity against induced hepatotoxivity	Mondal	2017
	Medicine	analgesic, anti-inflammatory, and antipyretic activity	Mondal	2016
	Medicine	kaempferol and protoapigenone are antitumor agents in fern	Cai	2014
	Medicine	protoflavones as novel anticancer agents	Hunyadi	2014
	Medicine	contains DICO which has antitumor and antineoplastic activity	Zhou	2013
	Medicine	used for treatment of nephrotic syndrome; renoprotective potential	Chen	2012
	Medicine	contains DEDC which induces apoptosis in neuroblastoma cells	Liu	2012
	Medicine	significant antitumor activity	Huang	2010
	Medicine	protoapigenone is a potential chemotherapeutic agent for lung cancers	Chiu	2009
	Medicine	protoapigenone as significant anti-ovarian cancer activity with low toxicity	Chang	2008

Thelypteridaceae: *Phegopteris*

Species	Category	Note	Author	Date
P. connectilis	Medicine	contains protoflavones, promising as novel anticancer agents	Hunyadi	2014
	Ornamental	fern used in residential naturalistic garden	Selby	2002
	Other	part of "fougere" scent in perfumery	Froissard	2011
	Phytoremediation	possible uptake of per- and polyfluoroalkyl substances from contaminated fire training facility	Gobelius	2017

* P. hexagonoptera had no reported uses.

Thelypteridaceae: *Thelypteris*

Species	Category	Note	Author	Date
T. noveboracensis	Ornamental	part of wet woodland collection in botanical garden landscaping	Griswold	2014
T. palustris	Medicine	roots used for woman's troubles	Herrick	1977
	Phytoremediation	bioaccumulate and translocate zinc and copper from wastewater, which are heavy metals that result from animal production	Hejna	2020
	Phytoremediation	remove copper and zinc from contaminated soil and ground water	Stroppa	2020
	Phytoremediation	phytoextraction of zinc	Wang	2018
	Phytoremediation	hyperaccumulator in remediation of arsenic contaminated soil	Anderson	2011
	Phytoremediation	use in phytoremediation of arsenic contaminated water or soil with low levels of contamination	Anderson	2007

* *T. simulata* had no reported uses.

Woodsiaceae: *Athyrium*

Species	Category	Note	Author	Date
A. filix-femina	Agriculture	harmful and poisonous species, causing livestock to go blind	Alm	2016
	Food	fiddleheads are consumed after cooking	Thayer	2004
	Food	Rhizomes roasted, peeled and the centers eaten	Gunther	1973
	Food	new shoots and rhizomes consumed	Turner	1971
	Medicine	rhizome collected to be used medicinally	Kostadinovic	2013
	Medicine	whole plant extracts prepared from this species induce cell death in diverse human solid tumor malignancies in vitro, among these, cell lines derived from cancers of the brain (glioblastoma), colon, lung, breast and several types of leukemia	Crawford	2008
	Medicine	Infusion of plant used for vomiting blood	Turner	1990
	Medicine	Young, unfurling fronds eaten for internal ailments, such as cancer of the womb	Turner	1982
	Medicine	infusion of stems taken for body pains	Gunther	1973
	Medicine	Decoction of pounded stems taken by women to ease labor	Gunther	1973
	Medicine	Infusion of rhizomes and whole New England aster plant taken by mothers with intestinal fevers	Rousseau	1945

Medicine	Infusion of plant, vinegar bark and flower stalks taken to prevent women's water from breaking	Rousseau	1945
Medicine	Infusion of rhizomes and sensitive fern used by men with venereal diseases	Rousseau	1945
Medicine	Grated dried root used as healing powder for sores	Smith	1932
Medicine	Infusion of root induced milk flow in patients with caked breast	Smith	1932
Medicine	Simple or compound decoction of root used as a wash for sore eyes	Smith	1929
Medicine	compound decoction of root taken for 'stoppage of urine'	Densmore	1928
Medicine	Decoction of root taken by women for bosom pains caused by childbirth	Smith	1928
Ornamental	fern used in landscaping for business campus	Anderson	2014
Ornamental	used as a woodland groundcover in courtyard of elementary school	Jost	2012
Ornamental	fern used in residential beech landscaping	Berger	2010
Ornamental	tall, upright, deciduous species; suited to woodland planting; very attractive	Kimberley	2010
Ornamental	used in gardening for attractive fronds	Bailey	2004
Ornamental	grown for lacy fronds; moist soil in deep shade to partial sun	Fowler	2003
Ornamental	lacy, light green foliage on attractive dark red-violet stipes; easy to grow in woodland setting	Van Nest	2003
Ornamental	vigorous and tough; provide color and texture to shaded spots	Armitage	2002
Ornamental	grown in residential garden	Selby	2002
Other	efficient at concentrating high levels of light rare Earth elements	Bluemel	2013
Other	fronds used to manufacture red paint	Turner	1973
Phytoremediation	accumulation of N, P, K, Mg, and Ca	Parzych	2018
Phytoremediation	bioaccumulator of Nickle	Parzych	2018

Woodsiaceae: Cystopteris

Species	Category	Note	Author	Date
C. bulbifera	Ornamental	fern used in garden with water features	Davis	2008
	Ornamental	perennial used in naturalistic garden theater	Koehler	1924
	Other	produces cyanogenic compounds	Seigler	1976
C. protrusa	Medicine	compound infusion given for chills	Hamel	1975

* *C. tennesseensis* and *C. tenuis* had no reported uses.

Woodsiaceae: Deparia

* *D. acrostichoides* had no reported uses.

Woodsiaceae: Diplazium

Species	Category 1	Note	Author	Date
D. pycnocarpon	Ornamental	part of wet woodland and fern collection using native vegetation	Griswold	2014

Woodsiaceae: Woodsia

* *W. appalachiana* and *W. obtusa* had no reported uses.

Bibliography

Abdulqadir, A., Cakmak, Y. S., & Zengin, G. (2018). Phenolic compounds, antioxidant properties and enzyme inhibition ability of *Adiantum capillus veneris* L. linked to Alzheimer's Disease, Diabetes Mellitus and skin disorders. *Current Organic Chemistry*, *22*(17), 1697–1703. https://doi.org/10.2174/1385272822666180711145256

Agelet, A., Bonet, M.À. & Vallés, J. (2000). Homegardens and their role as a main source of medicinal plants in mountain regions of Catalonia (Iberian peninsula). *Economic Botany* 54, 295–309 https://doi-org.proxy.lib.utc.edu/10.1007/BF02864783

Ager, T. A. & Ager, L. P. (1980) Ethnobotany of the Eskimos of Nelson Island, Alaska. *Arctic Anthropology* 27:26-48.

Agriculture Week. Forestry; Bartin University reports findings in forestry [chemical composition, fiber morphology, and kraft pulping of bracken stalks (*Pteridium aquilinum* (L.) Kuhn)]. (2019, February). *Agriculture Week* Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/2186193742?accountid=14767

Ahmad, N. F., Kamboh, M. A., Nodeh, H. R., Halim, S. N. B. A., & Mohamad, S. (2017). Synthesis of piperazine functionalized magnetic sporopollenin: A new organic-inorganic hybrid material for the removal of lead(II) and arsenic(III) from aqueous solution. *Environmental Science and Pollution Research*, *24*(27), 21846–21858. https://doi.org/10.1007/s11356-017-9820-9

Ahmed, A., Wadud, A., Jahan, N., Bilal, A., & Hajera, S. (2013). Efficacy of *Adiantum capillus veneris* Linn in chemically induced urolithiasis in rats. *Journal of Ethnopharmacology*, *146*(1), 411–416. https://doi.org/10.1016/j.jep.2013.01.011

Al Mohammed, H. I., Paray, B. A., & Rather, I. A. (2017). Anticancer activity of EA1 extracted from *Equisetum arvense*. *Pakistan journal of pharmaceutical sciences*, *30*(5(Supplementary)), 1947–1950.

Al-Hallaq, Litescu, S., Kasabri, V., Abdul-Razzak, K., & Abaza, I. (2015). Hypocholesterolemic effects of *Adiantum capillus veneris* l. aqueous extract in high cholesterol diet-fed rats and HPLC-MS determination of its polyphenolics. *Revue Roumaine de Chimie*, *60*(4), 357–365.

Alm, T. (2016). Fern rhizomes as fodder in Norway. *Journal of Ethnobiology and Ethnomedicine*, *12*(1), 37. https://doi.org/10.1186/s13002-016-0112-0

Almaguer-Flores, Gonzalez-Alva, P. (2018). Antibacterial activity of homeopathic medications *Lycopodium clavatum* and *Arsenicum album* against periodontal bacteria. *Odovtos*, *20*(2), 71–79. https://doi.org/10.15517/ijds.v0i0.32807

Al-Rawi, A. (1964). *Medicinal Plants of Iraq Tech. Bull. No. 15.* Ministry of Agriculture, Directorate General of Agricultural Research Projects.

Anderson, B. (2014). Share the wealth. *Landscape Architecture*, *104*(11), 116-129. Retrieved July 2, 2020, from www.jstor.org/stable/44796112

Anderson, E. F. (1986). Ethnobotany of hill tribes of northern Thailand. I. Medicinal plants of Akha. *Economic Botany*, *40*(1), 38–53. https://doi.org/10.1007/BF02858945

Anderson, L. L., Walsh, M., Roy, A., Bianchetti, C. M., & Merchan, G. (2010). The potential of *Thelypteris palustris* and *Asparagus sprengeri* in phytoremediation of arsenic contamination. *International Journal of Phytoremediation*, *13*(2), 177–184. https://doi.org/10.1080/15226511003671346

Anderson, L., & Walsh, M. M. (2007). Arsenic uptake by common marsh fern *Thelypteris palustris* and its potential for phytoremediation. *Science of The Total Environment*, *379*(2–3), 263–265. https://doi.org/10.1016/j.scitotenv.2006.09.032

Appleby, M. (2005). Rooted in history. *Horticulture Week*, 17. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/225442064?accountid=14767

Aragone, J. (1996). Cerebeal scheme. *Landscape Architecture, 86*(6), 62-87. Retrieved June 24, 2020, from www.jstor.org/stable/44672244

Armitage, A. (2002). Garden ferns: Bring them out of the closet. *Greenhouse Grower, 20*(3), 96. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/217037645?accountid=14767

Arokiyaraj, S., Bharanidharan, R., Agastian, P., & Shin, H. (2018). Chemical composition, antioxidant activity and antibacterial mechanism of action from *Marsilea minuta* leaf hexane: Methanol extract. *Chemistry Central Journal*, *12*(1), 105. https://doi.org/10.1186/s13065-018-0476-4

Arslan, Temocin, Z., & Yigitoglu, M. (2004). Removal of cadmium (II) from aqueous solumns using sporopollenin. *Fresenius Environmental Bulletin*, *13*(7), 616–619.

Aruwa, C. E., Mukaila, Y. O., Ajao, A. A., & Sabiu, S. (2020). An appraisal of antidotes' effectiveness: Evidence of the use of phyto-antidotes and biotechnological advancements. *Molecules*, *25*(7), 1516. https://doi.org/10.3390/molecules25071516

Aryal, K. P., Poudel, S., Chaudhary, R. P., Chettri, N., Chaudhary, P., Ning, W., & Kotru, R. (2018). Diversity and use of wild and non-cultivated edible plants in the western Himalaya. *Journal of Ethnobiology and Ethnomedicine, 14*(1), 10. doi:http://dx.doi.org.proxy.lib.utc.edu/10.1186/s13002-018-0211-1

Asgharikhatooni, A., Bani, S., Hasanpoor, S., Mohammad Alizade, S., & Javadzadeh, Y. (2015). The effect of *Equisetum arvense* (Horse Tail) ointment on wound healing and pain intensity after episiotomy: A randomized placebo-controlled trial. *Iranian Red Crescent Medical Journal*, *17*(3). https://doi.org/10.5812/ircmj.25637

Askey, L. (2014, Aug). A splash of contentment. *Organic Gardening, 61*, 49-53. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/1679940950?accountid=14767

Atkin, S. L., Barrier, S., Cui, Z., Fletcher, P. D. I., Mackenzie, G., Panel, V., Sol, V., & Zhang, X. (2011). UV and visible light screening by individual sporopollenin exines derived from *Lycopodium clavatum* (club moss) and *Ambrosia trifida* (giant ragweed). *Journal of Photochemistry and Photobiology B: Biology*, *102*(3), 209–217. https://doi.org/10.1016/j.jphotobiol.2010.12.005

Atwe, S. U., Ma, Y., & Gill, H. S. (2014). Pollen grains for oral vaccination. *Journal of Controlled Release*, *194*, 45–52. https://doi.org/10.1016/j.jconrel.2014.08.010

Bag, B. G., Hasan, S. N., Pongpamorn, P., & Thasana, N. (2017). First hierarchical self-assembly of a seco-triterpenoid α-onocerin yielding supramolecular architectures. *ChemistrySelect*, *2*(23), 6650–6657. https://doi.org/10.1002/slct.201701285

Bahadori, S., Kordi, F., Ahmadi, A., & Valizadeh, H. (2015). Antibacterial evaluation and preliminary phytochemical screening of selected ferns from Iran. *Research Journal of Pharmacognosy*, *2*(2), 53–59.

Bailey, C. S., Zarins-Tutt, J. S., Agbo, M., Gao, H., Diego-Taboada, A., Gan, M., Hamed, R. B., Abraham, E. R., Mackenzie, G., Evans, P. A., & Goss, R. J. M. (2019). A natural solution

to photoprotection and isolation of the potent polyene antibiotic, marinomycin A. *Chemical Science*, *10*(32), 7549–7553. https://doi.org/10.1039/C9SC01375J

Bailey, R. (2004, Aug). Best fronds. *Organic Gardening*, *51*, 30-33. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/203733586?accountid=14767

Balick, M. J., & Beitel, J. M. (1989). Lycopodium spores used in condom manufacture: Associated health hazards. *Economic Botany*, *43*(3), 373–377. https://doi.org/10.1007/BF02858733

Banerjee, R. D., & Sen, S. P. (1980). Antibiotic activity of pteridophytes. *Economic Botany*, *34*(3), 284–298. https://doi.org/10.1007/BF02858649

Bank, T. P. (1953). *Botanical and ethnobotanical studies in the Aleutian Islands II. Health and medical lore of the Aleuts.* Michigan Academy of Science

Bardon, C., Misery, B., Piola, F., Poly, F., & Le Roux, X. (2018). Control of soil N cycle processes by *Pteridium aquilinum* and *Erica cinerea* in heathlands along a pH gradient. *Ecosphere*, *9*(9), e02426. https://doi.org/10.1002/ecs2.2426

Barrett, S. A. (1908). Pomo Indian Basketry, *University of California Publications in American Archaeology and Ethnology, 7*(134-308), 139.

Barrier, S., Rigby, A. S., Diego-Taboada, A., Thomasson, M. J., Mackenzie, G., & Atkin, S. L. (2010). Sporopollenin exines: A novel natural taste masking material. *LWT - Food Science and Technology*, *43*(1), 73–76. https://doi.org/10.1016/j.lwt.2009.07.001

Baskaran, X., Antony-varuvel, G., Shou-zhou, Z., Shi-xiu, F., & Wen-bo Liao. (2018). A review of the use of pteridophytes for treating human ailments. *Journal of Zhejiang University, 19*(2), 85-119. doi:http://dx.doi.org.proxy.lib.utc.edu/10.1631/jzus.B1600344

Benca, J. P. (2014). Cultivation techniques for terrestrial clubmosses (Lycopodiaceae): Conservation, research, and horticultural opportunities for an early-diverging plant lineage. *American Fern Journal*, *104*(2), 25-48. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/1535966132?accountid=14767

Bennett, J. P., Bomar, C. R., & Harrington, C. A. (2003). Lichens promote flowering of *Opuntia fragilis* in west-central Wisconsin. *The American Midland Naturalist*, *150*(2), 221–230. https://doi.org/10.1674/0003-0031(2003)150[0221:LPFOOF]2.0.CO;2

Bennicelli, R. P., Stępniewska, Z., Banach, K., Banach, A. M., & Szafranek, A. (2007). Comparison of aeration status measurements by Clark Sensor (DO) and ODR-Meter during *Azolla caroliniana* Willd. growth in the presence of Cd(II) and Hg(II). *Water, Air, and Soil Pollution*, *180*(1–4), 29–37. https://doi.org/10.1007/s11270-006-9247-2

Berger, J. (2010). Terra virginiana. *Landscape Architecture, 100*(7), 26-33. Retrieved July 2, 2020, from www.jstor.org/stable/44792126

Berger, J. (2012). Choice cuts. *Landscape Architecture, 102*(12), 36-46. Retrieved June 24, 2020, from www.jstor.org/stable/44795141

Berger, J. (2012). Return trip. *Landscape Architecture, 102*(5), 110-119. Retrieved July 2, 2020, from www.jstor.org/stable/44795233

Berger, J. (2013). Still utopia. *Landscape Architecture, 103*(4), 70-78. Retrieved July 2, 2020, from www.jstor.org/stable/44795899

Berger, J. (2014). Acadia Remade. *Landscape Architecture, 104*(11), 90-98. Retrieved July 2, 2020, from www.jstor.org/stable/44796109

Berget, C., Duran, E., & Bray, D. B. (2015). Participatory restoration of degraded agricultural areas invaded by bracken fern (*Pteridium aquilinum*) and conservation in the Chinantla region, Oaxaca, Mexico. *Human Ecology*, *43*(4), 547–558. https://doi.org/10.1007/s10745-015-9762-0

Bermejo, J. E. H., & Sánchez, E. G. (1998). Economic botany and ethnobotany in al-Andalus (Iberian Peninsula: Tenth-fifteenth centuries), an unknown heritage of mankind. *Economic Botany*, *52*(1), 15–26. https://doi.org/10.1007/BF02861292

Bharali, A., Baruah, K. K., Bhattacharyya, P., & Gorh, D. (2017). Integrated nutrient management in wheat grown in a northeast India soil: Impacts on soil organic carbon fractions in relation to grain yield. *Soil and Tillage Research*, *168*, 81–91. https://doi.org/10.1016/j.still.2016.12.001

Bharati, K., Mohanty, S. R., Singh, D. P., Rao, V. R., & Adhya, T. K. (2000). Influence of incorporation or dual cropping of *Azolla* on methane emission from a flooded alluvial soil planted to rice in eastern India. *Agriculture, Ecosystems & Environment*, *79*(1), 73–83. https://doi.org/10.1016/S0167-8809(99)00148-6

Bhat, A. A., Ahamad, B., Rehman, M. U., & Ahmad, P. (2020). Impact of ethanolic extract of *Equisetum arvense* (EA1) on pancreatic carcinoma AsPC-1 cells. *Saudi Journal of Biological Sciences*, *27*(5), 1260–1264. https://doi.org/10.1016/j.sjbs.2020.01.029

Bhattamisra, S. K., Khanna, V. K., Agrawal, A. K., Singh, P. N., & Singh, S. K. (2008). Antidepressant activity of standardised extract of *Marsilea minuta* Linn. *Journal of Ethnopharmacology*, *117*(1), 51–57. https://doi.org/10.1016/j.jep.2008.01.012

Bhattamisra, S. K., Singh, P. N., & Singh, S. K. (2012). Effect of standardized extract of *Marsilea minuta* on learning and memory performance in rat amnesic models. *Pharmaceutical Biology*, *50*(6), 766–772. https://doi.org/10.3109/13880209.2011.632421

Bibi, S., Kamran, M. A., Sultana, J., & Farooqi, A. (2017). Occurrence and methods to remove arsenic and fluoride contamination in water. *Environmental Chemistry Letters*, *15*(1), 125–149. https://doi.org/10.1007/s10311-016-0590-2

Bishayee, K., Chakraborty, D., Ghosh, S., Boujedaini, N., & Khuda-Bukhsh, A. R. (2013). Lycopodine triggers apoptosis by modulating 5-lipoxygenase, and depolarizing mitochondrial membrane potential in androgen sensitive and refractory prostate cancer cells without modulating p53 activity: Signaling cascade and drug–DNA interaction. *European Journal of Pharmacology*, *698*(1–3), 110–121. https://doi.org/10.1016/j.ejphar.2012.10.041

Black, M. J. (1980). *Algonquin ethnobotany: An interpretation of aboriginal adaptation in South Western Quebec, Ottawa*. National Museums of Canada.

Bluemel, B., Leijd, M., Dunn, C., Hart, C. J. R., Saxon, M., & Sadeghi, M. (2013). Biogeochemical expression of rare earth element and zirconium mineralization at Norra Kärr, Southern Sweden. *Journal of Geochemical Exploration*, *133*, 15–24. https://doi.org/10.1016/j.gexplo.2012.12.005

Bocek, B. R. (1984). Ethnobotany of Costanoan Indians, California, based on collections by John P. Harrington. *Economic Botany*, *38*(2), 240–255. https://doi.org/10.1007/BF02858839

Bohinc, T., Vayias, B., Bartol, T., & Trdan, S. (2013). Assessment of insecticidal efficacy of diatomaceous earth and powders of common lavender and field horsetail against bean weevil adults. *Neotropical Entomology*, *42*(6), 642–648. https://doi.org/10.1007/s13744-013-0168-7

Boonya-udtayan, S., Thasana, N., Jarussophon, N., & Ruchirawat, S. (2019). Serratene triterpenoids and their biological activities from Lycopodiaceae plants. *Fitoterapia*, *136*, 104181. https://doi.org/10.1016/j.fitote.2019.104181

Bouazzi, S., Jmii, H., El Mokni, R., Faidi, K., Falconieri, D., Piras, A., Jaïdane, H., Porcedda, S., & Hammami, S. (2018). Cytotoxic and antiviral activities of the essential oils from Tunisian Fern, *Osmunda regalis*. *South African Journal of Botany*, *118*, 52–57. https://doi.org/10.1016/j.sajb.2018.06.015

Brigham, D. (2005). The couple who planted trees. *Landscape Architecture*, *95*(1), 48-53. Retrieved July 2, 2020, from www.jstor.org/stable/44674021

Brima, E. I. (2018). Levels of essential elements in different medicinal plants determined by using inductively coupled plasma mass spectrometry. *Journal of Analytical Methods in Chemistry*, *2018*, 1–6. https://doi.org/10.1155/2018/7264892

Brown, J. (2010). Through the woods. *Landscape Architecture*, *100*(2), 36-43. Retrieved July 2, 2020, from www.jstor.org/stable/44794339

Brussell, D. (2004a). Medicinal plants of Mt. Pelion, Greece. *Economic Botany*, *58*(sp1), S174–S202. https://doi.org/10.1663/0013-0001(2004)58[S174:MPOMPG]2.0.CO;2

Brussell, D. (2004b). A medicinal plant collection from Montserrat, West Indies. *Economic Botany*, *58*(sp1), S203–S220. https://doi.org/10.1663/0013-0001(2004)58[S203:AMPCFM]2.0.CO;2

Brustolin Aleixo, C. F., Ferraz, F. N., Massini, P. F., Lopes, C. R., Falkowski Temporini, G. J., Aleixo, D. L., & de Araújo, S. M. (2017). Beneficial immunomodulatory and neuro digestive effect in *Trypanosoma cruzi* infection after *Lycopodium clavatum* 13c treatment. *Microbial Pathogenesis*, *112*, 1–4. https://doi.org/10.1016/j.micpath.2017.09.026

Brutus, T.C., & Pierce-Noel, A.V. (1960). *Les plantes et les legumes d'Hati qui guerissent. imprimerie de l'etat, Port-Au-Prince, Haiti*.

Burrell, C. (1999). Urban ferns. *Landscape Architecture*, *89*(10), 20-20. Retrieved July 2, 2020, from www.jstor.org/stable/44672954

Burrell, C. (2000). Bufferin'. *Landscape Architecture*, *90*(4), 24-24. Retrieved July 2, 2020, from www.jstor.org/stable/44670813

Bussmann, R. W., Paniagua-Zambrana, N. Y., & Moya Huanca, A. L. (2015). Dangerous confusion—"Cola de Caballo"—Horsetail, in the markets of La Paz, Bolivia. *Economic Botany*, *69*(1), 89–93. https://doi.org/10.1007/s12231-015-9297-8

Buta, M., Blaga, G., Paulette, L., Păcurar, I., Roșca, S., Borsai, O., Grecu, F., Sînziana, P. E., & Negrușier, C. (2019). Soil reclamation of abandoned mine lands by revegetation in Northwestern part of Transylvania: A 40-year retrospective study. *Sustainability*, *11*(12), 3393. https://doi.org/10.3390/su11123393

Cai, P., Zhao, Y., Yang, T., Chen, J., Xiong, C., & Ruan, J. (2014). Preparation of magnetic molecularly imprinted polymers for selective isolation and determination of kaempferol and protoapigenone in *Macrothelypteris torresiana*. *Journal of Huazhong University of Science and Technology [Medical Sciences]*, *34*(6), 845–855. https://doi.org/10.1007/s11596-014-1363-4

Calderón, A. I., Simithy-Williams, J., Sanchez, R., Espinosa, A., Valdespino, I., & Gupta, M. P. (2013). Lycopodiaceae from Panama: A new source of acetylcholinesterase inhibitors. *Natural Product Research*, *27*(4–5), 500–505. https://doi.org/10.1080/14786419.2012.701217

Calkins, B. (2004, Jan). Home improvements. *Today's Garden Center*, *1*, 20-20,22. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/229393247?accountid=14767

Caloni, F., & Cortinovis, C. (2015). Plants poisonous to horses in Europe: Poisoning in horses by plants. *Equine Veterinary Education*, *27*(5), 269–274. https://doi.org/10.1111/eve.12274

Campbell, K. (2001). Challenges on the Silk Route. *Historic Gardens Review*, (7), 28-32. Retrieved July 3, 2020, from www.jstor.org/stable/44790404

Campbell, S. (2012). 'Its situation…was exquisite in the extreme': ornamental flowers, shrubs and trees in the Darwin's family garden at the mount, Shrewsbury, 1838-1865. *Garden History*, *40*(2), 167-198. Retrieved July 3, 2020, from www.jstor.org/stable/41719902

Caniceiro, B. D., Latorre, A. O., Fukumasu, H., Sanches, D. S., Haraguchi, M., & Górniak, S. L. (2015). Immunosuppressive effects of *Pteridium aquilinum* enhance susceptibility to urethane-induced lung carcinogenesis. *Journal of Immunotoxicology*, *12*(1), 74–80. https://doi.org/10.3109/1547691X.2014.885619

Cao, H., Chai, T.-T., Wang, X., Morais-Braga, M. F. B., Yang, J.-H., Wong, F.-C., Wang, R., Yao, H., Cao, J., Cornara, L., Burlando, B., Wang, Y., Xiao, J., & Coutinho, H. D. M. (2017). Phytochemicals from fern species: Potential for medicine applications. *Phytochemistry Reviews*, *16*(3), 379–440. https://doi.org/10.1007/s11101-016-9488-7

Carlozzi, P., & Padovani, G. (2016). The aquatic fern *Azolla* as a natural plant-factory for ammonia removal from fish-breeding fresh wastewater. *Environmental Science and Pollution Research*, *23*(9), 8749–8755. https://doi.org/10.1007/s11356-016-6120-8

Carneiro, D. M., Freire, R. C., Honório, T. C. de D., Zoghaib, I., Cardoso, F. F. de S. e S., Tresvenzol, L. M. F., de Paula, J. R., Sousa, A. L. L., Jardim, P. C. B. V., & Cunha, L. C. (2014). Randomized, double-blind clinical trial to assess the acute diuretic effect of *Equisetum arvense* (Field Horsetail) in healthy volunteers. *Evidence-Based Complementary and Alternative Medicine*, *2014*, 1–8. https://doi.org/10.1155/2014/760683

Carrier Linguistic Committee. (1973). *Plants of Carrier Country, Fort St. James, BC.* Carrier Linguistic Committee.

Castro-Carrillo, Delgadillo-Martinez, J., Ferrera-Cerrato, R., & Alarcon, A. (2008). Phenanthrene dissipation by *Azolla caroliniana* utilizing bioaugmentation with hydrocarbonoclastic microorganisms. *Interciencia*, *33*(8), 591–597.

Četojević-Simin, D. D., Čanadanović-Brunet, J. M., Bogdanović, G. M., Djilas, S. M., Ćetković, G. S., Tumbas, V. T., & Stojiljković, B. T. (2010). Antioxidative and antiproliferative activities of different Horsetail (*Equisetum arvense* L.) extracts. *Journal of Medicinal Food*, *13*(2), 452–459. https://doi.org/10.1089/jmf.2008.0159

Ceyhan, N., Uğur, A., & Keskin, D. (2012). Antimicrobial activities of different extracts of eight plant species from four different family against some pathogenic microoorganisms. *Journal of Food, Agriculture and Environment*, *10*(1), 193-197. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/1038054936?accountid=14767

Chadwick, P. (2017). Landscaping with ferns (Vol. 3 No. 10). Retrieved from https://piedmontmastergardeners.org/article/landscaping-with-ferns/

Chakraborty, R., De, B., Devanna, N., & Sen, S. (2013). Antitussive, expectorant activity of *Marsilea minuta* L., an Indian vegetable. *Journal of Advanced Pharmaceutical Technology & Research*, *4*(1), 61. https://doi.org/10.4103/2231-4040.107502

Chakravarthy, B., Rao, Y., Gambhir, S., & Gode, K. (1981). Isolation of amentoflavone from *Selaginella rupestris* and its pharmacological activity on central nervous system, smooth muscles and isolated frog heart preparations. *Planta Medica*, *43*(09), 64–70. https://doi.org/10.1055/s-2007-971475

Chandler, R., Frank, L. F. & Hooper, S.N. (1979). Herbal Remedies of the Maritime Indians. *Journal of Ethnopharmacology, 1*(49-68), 59.

Chang, H. L., Su, J. H., Yeh, Y. T., Lee, Y. C., Chen, H. M., Wu, Y. C., & Yuan, S. (2008). Protoapigenone, a novel flavonoid, inhibits ovarian cancer cell growth in vitro and in vivo. *Cancer Letters*, *267*(1), 85-95. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/925480099?accountid=14767

Chang, J. S., Yoon, I. H., & Kim, K. W. (2009). Heavy metal and arsenic accumulating fern species as potential ecological indicators in As-contaminated abandoned mines. *Ecological Indicators*, *9*(6), 1275-1279.

Chang, J.-S., Lee, S.-Y., & Kim, K.-W. (2010). Arsenic in an As-contaminated abandoned mine was mobilized from fern-rhizobium to frond-bacteria via the ars gene. *Biotechnology and Bioprocess Engineering*, *15*(5), 862–873. https://doi.org/10.1007/s12257-009-3154-5

Chatterjee, A., Dutta, C. P., Choudhury, B., Dey, P. K., Dey, C. D., Chaterjee, C., & Mukherjee, S. R. (1963). The chemistry and pharmacology of Marsiline: a sedative and anticonvulsant principle isolated from *Marsilea minuta* Linn. and *Marsilea rajasthanensis* Gupta. *Journal of Experimental Medical Sciences*, *7*, 53–67.

Chatterjee, Dutta, U., Bandyopadhyay, D., Nayak, A., & Basak, B. (2007). An overview of the genus *Nardostachys*. *Natural Product Communications*, *2*(11), 1163–1173.

Chatterjee, S., & van Andel, T. (2019). Lost Grains and Forgotten Vegetables from Japan: The Seikei Zusetsu Agricultural Catalog (1793–1804). *Economic Botany*, *73*(3), 375–389. https://doi.org/10.1007/s12231-019-09466-z

Chemical Society of Pakistan. (2011). The effect of cadmium and chromium concentration, on biological activity of *Marsilea minuta*. *Journal of the Chemical Society of Pakistan*, *33*(6), 874–876.

Chen, J., Lei, Y., Wu, G., Zhang, Y., Fu, W., Xiong, C., & Ruan, J. (2012). Renoprotective potential of *Macrothelypteris torresiana* via ameliorating oxidative stress and proinflammatory cytokines. *Journal of Ethnopharmacology*, *139*(1), 207–213. https://doi.org/10.1016/j.jep.2011.11.002

Chestnut, V. K. (1902). *Plants Used by the Indians of Mendocino County, California.* U.S. National Herbarium.

Chiu, C.-C., Chang, H.-W., Chuang, D.-W., Chang, F.-R., Chang, Y.-C., Cheng, Y.-S., Tsai, M.-T., Chen, W.-Y., Lee, S.-S., Wang, C.-K., Chen, J. Y.-F., Wang, H.-M., Chen, C.-C., Liu, Y.-C., & Wu, Y.-C. (2009). Fern plant–derived protoapigenone leads to DNA damage, apoptosis, and G_2/M arrest in lung cancer cell line H1299. *DNA and Cell Biology*, *28*(10), 501–506. https://doi.org/10.1089/dna.2009.0852

Choi, Y.-H., Choi, C. W., Kim, J. K., Jeong, W., Park, G. H., & Hong, S. S. (2018). (–)-Pteroside N and pterosinone, new BACE1 and cholinesterase inhibitors from *Pteridium aquilinum*. *Phytochemistry Letters*, *27*, 63–68. https://doi.org/10.1016/j.phytol.2018.06.021

Chowdhury, M., & Mukherjee, R. (2012). Wild edible plants consumed by local communities of Maldah district of West Bengal, India. *Indian Journal of Scientific Research, 3*(2), 163-

170. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/1502746969?accountid=14767

Christopher, T. (2005, Summer). Foliage: Backbone of the summer garden. *Country Living Gardener, 13*, 101-104. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/222734297?accountid=14767

Çimen, A., Bilgiç, A., Kursunlu, A. N., Gübbük, İ. H., & Uçan, H. İ. (2014). Adsorptive removal of Co(II), Ni(II), and Cu(II) ions from aqueous media using chemically modified sporopollenin of *Lycopodium clavatum* as novel biosorbent. *Desalination and Water Treatment*, *52*(25–27), 4837–4847. https://doi.org/10.1080/19443994.2013.806228

Compton, B. D. (1993) *Upper north Wakashan and southern Tsimshian ethnobotany: The knowledge and usage of plants* [Doctoral dissertation, University of British Columbia]. Native American Ethnobotany Database.

Cook, F. E. M., Leon, C. J., & Nesbitt, M. (2015). Potpourri as a sustainable plant product: Identity, origin, and conservation status. *Economic Botany*, *69*(4), 330–344. https://doi.org/10.1007/s12231-015-9325-8

Corton, J., Donnison, I. S., Patel, M., Bühle, L., Hodgson, E., Wachendorf, M., Bridgwater, A., Allison, G., & Fraser, M. D. (2016). Expanding the biomass resource: Sustainable oil production via fast pyrolysis of low input high diversity biomass and the potential integration of thermochemical and biological conversion routes. *Applied Energy*, *177*, 852–862. https://doi.org/10.1016/j.apenergy.2016.05.088

Costa-Rodrigues, J., Carmo, S. C., Silva, J. C., & Fernandes, M. H. R. (2012). Inhibition of human *in vitro* osteoclastogenesis by *Equisetum arvense*. *Cell Proliferation*, *45*(6), 566–576. https://doi.org/10.1111/j.1365-2184.2012.00848.x

Cramer, G. (2006). Naturally secluded. *Landscape Architecture*, *96*(1), 46-54. Retrieved July 2, 2020, from www.jstor.org/stable/44674167

Crawford, S., Boisvert, E., Herbert, T., Potter, H., Diamond, D., Sprague, W., Pennareta, R., Fong, D., Liddie, S., & Okhiria, F. (2008). Extracts prepared from primitive plant: Common Ladyfern (species *Athyrium filix-femina*) displays potent anti-cancer effects in preclinical assessments of diverse human malignant cell lines. *European Journal of Cancer Supplements*, *6*(9), 199–200. https://doi.org/10.1016/S1359-6349(08)71885-8

Cunnington, Y. (2007, April). Treading water. *Canadian Gardening, 18*, 34-34,37. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/217791877?accountid=14767

Czapski, G. A., Szypuła, W., Kudlik, M., Wileńska, B., Kania, M., Danikiewicz, W., & Adamczyk, A. (2014). Assessment of antioxidative activity of alkaloids from *Huperzia selago* and *Diphasiastrum complanatum* using in vitro systems. *Folia Neuropathologica*, *4*, 394–406. https://doi.org/10.5114/fn.2014.47840

Dall'Acqua, S., Tomè, F., Vitalini, S., Agradi, E., & Innocenti, G. (2009). In vitro estrogenic activity of *Asplenium trichomanes* L. extracts and isolated compounds. *Journal of Ethnopharmacology*, *122*(3), 424–429. https://doi.org/10.1016/j.jep.2009.02.012

Danno, K., Colas, A., Masson, J.-L., & Bordet, M.-F. (2013). Homeopathic treatment of migraine in children: results of a prospective, multicenter, observational study. *The Journal of Alternative and Complementary Medicine*, *19*(2), 119–123. https://doi.org/10.1089/acm.2011.0821

Das, G., Patra, J. K., & Baek, K.-H. (2017). Antibacterial properties of endophytic bacteria isolated from a fern species *Equisetum arvense* L. against foodborne pathogenic bacteria

Staphylococcus aureus and *Escherichia coli* O157:H7. *Foodborne Pathogens and Disease*, *14*(1), 50–58. https://doi.org/10.1089/fpd.2016.2192

Das, S., Das, J., Samadder, A., Boujedaini, N., & Khuda-Bukhsh, A. R. (2012). Apigenin-induced apoptosis in A375 and A549 cells through selective action and dysfunction of mitochondria. *Experimental Biology and Medicine*, *237*(12), 1433–1448. https://doi.org/10.1258/ebm.2012.012148

David, Santiagom, C., Castillo, A., & De Guzman, G. (2019). Hair regenerative activities of flavonoid-rich extract of *Equisetum hyemale* L. (Equisetaceae) in chemically-induced alopecia in Sprague Dawley rats. *Journal of Pharmacy & Pharmacognosy Research*, *7*(5), 323–330.

Davis, J. (2008) Add some charm. *Canadian Gardening, 19*, 66-69. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/217798344?accountid=14767

de Queiroz, G. M., Politi, F. A. S., Rodrigues, E. R., Souza-Moreira, T. M., Moreira, R. R. D., Cardoso, C. R. P., Santos, L. C., & Pietro, R. C. L. R. (2015). Phytochemical characterization, antimicrobial activity, and antioxidant potential of *Equisetum hyemale* L. (Equisetaceae) extracts. *Journal of Medicinal Food*, *18*(7), 830–834. https://doi.org/10.1089/jmf.2014.0089

Decker, S. R., Pekins, P. J., & Mautz, W. W. (1991). Nutritional evaluation of winter foods of wild turkeys. *Canadian Journal of Zoology*, *69*(8), 2128–2132. https://doi.org/10.1139/z91-297

Dehdari, S., & Hajimehdipoor, H. (2018). Medicinal properties of *Adiantum capillus-veneris* Linn. in traditional medicine and modern phytotherapy: A review article. *Iranian Journal of Public Health*, *47*(2), 188–197.

Densmore, F. (1928) *Uses of Plants by the Chippewa Indians.* SI-BAE Annual Report.

Densmore, F. (1932) *Menominee Music*. SI-BAE Bulletin.

Deval, C. G., Mane, A. V., Joshi, N. P., & Saratale, G. D. (2012). Phytoremediation potential of aquatic macrophyte *Azolla caroliniana* with references to zinc plating effluent. *Emirates Journal of Food and Agriculture, 24*(3), 208-223. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/1018155679?accountid=14767

Dhir, S. B. (2020). Fiddlehead fern poisoning: a case report. *Wilderness & Environmental Medicine*, *31*(2), 226–229. https://doi.org/10.1016/j.wem.2019.12.011

Diego-Taboada, A., Cousson, P., Raynaud, E., Huang, Y., Lorch, M., Binks, B. P., Queneau, Y., Boa, A. N., Atkin, S. L., Beckett, S. T., & Mackenzie, G. (2012). Sequestration of edible oil from emulsions using new single and double layered microcapsules from plant spores. *Journal of Materials Chemistry*, *22*(19), 9767. https://doi.org/10.1039/c2jm00103a

Diego-Taboada, A., Maillet, L., Banoub, J. H., Lorch, M., Rigby, A. S., Boa, A. N., Atkin, S. L., & Mackenzie, G. (2013). Protein free microcapsules obtained from plant spores as a model for drug delivery: Ibuprofen encapsulation, release and taste masking. *J. Mater. Chem. B*, *1*(5), 707–713. https://doi.org/10.1039/C2TB00228K

Diken, M., & Dogan, M. (2010). Antioxidant, phenolic and protein contents of some medicinal plants. *Journal of Medicinal Plant Research, 4*(23), 2566–2573.

Ding, J. L., & Yeo, L. C. (1986). Conjugation of diazinon with glutathione, and γ-glutamyl transferase activities in P. Americana (L). *Comparative Biochemistry and Physiology*

Part C: Comparative Pharmacology, *85*(2), 413–417. https://doi.org/10.1016/0742-8413(86)90218-5

Do Monte, F. H. M., dos Santos, J. G., Russi, M., Bispo Lanziotti, V. M. N., Leal, L. K. A. M., & de Andrade Cunha, G. M. (2004). Antinociceptive and anti-inflammatory properties of the hydroalcoholic extract of stems from *Equisetum arvense* L. in mice. *Pharmacological Research*, *49*(3), 239–243. https://doi.org/10.1016/j.phrs.2003.10.002

Doğan, Y., Başlar, S., Mert, H. H., & Ay, G. (2003). Plants used as natural dye sources in turkey. *Economic Botany*, *57*(4), 442–453. https://doi.org/10.1663/0013-0001(2003)057[0442:PUANDS]2.0.CO;2

dos Santos Alves, C. F., Bonez, P. C., de Souza, M. de E., da Cruz, R. C., Boligon, A. A., Piana, M., Brum, T. F., Rossi, G. G., Jesus, R. da S., Grando, T. H., Monteiro, S. G., Anraku de Campos, M. M., Giongo, J. L., & Vianna Santos, R. C. (2016). Antimicrobial, antitrypanosomal and antibiofilm activity of *Equisetum hyemale*. *Microbial Pathogenesis*, *101*, 119–125. https://doi.org/10.1016/j.micpath.2016.11.008

dos Santos, J. G., Blanco, M. M., Do Monte, F. H. M., Russi, M., Lanziotti, V. M. N. B., Leal, L. K. A. M., & Cunha, G. M. (2005). Sedative and anticonvulsant effects of hydroalcoholic extract of *Equisetum arvense*. *Fitoterapia*, *76*(6), 508–513. https://doi.org/10.1016/j.fitote.2005.04.017

Drăghiceanu, O. A., Soare, L. C., Fierăscu, I., Fierăscu, R.-C., & Popescu, M. (2018). Lead-induced physiological, biochemical and enzymatic changes in *Asplenium scolopendrium* L. *Bulletin of Environmental Contamination and Toxicology*, *100*(3), 438–443. https://doi.org/10.1007/s00128-018-2274-z

Dragos, D., Gilca, M., Gaman, L., Vlad, A., Iosif, L., Stoian, I., & Lupescu, O. (2017). Phytomedicine in joint disorders. *Nutrients*, *9*(1), 70. https://doi.org/10.3390/nu9010070

Duke, J. A. (1970). Ethnobotanical observations on the Chocó Indians. *Economic Botany*, *24*(3), 344–366. https://doi.org/10.1007/BF02860669

Dyab, A. K. F., Mohamed, M. A., Meligi, N. M., & Mohamed, S. K. (2018). Encapsulation of erythromycin and bacitracin antibiotics into natural sporopollenin microcapsules: Antibacterial, cytotoxicity, *in vitro* and *in vivo* release studies for enhanced bioavailability. *RSC Advances*, *8*(58), 33432–33444. https://doi.org/10.1039/C8RA05499A

Ena, A., Pintucci, C., Faraloni, C., & Torzillo, G. (2009). An eco-compatible process for the depuration of wastewater from olive mill industry. *Water Science and Technology*, *60*(4), 1055–1063. https://doi.org/10.2166/wst.2009.461

Erdogan Orhan, I., Sener, B., Kaiser, M., Brun, R., Tasdemir, D., & Erdogan Orhan, I. (2013). *Lycopodium clavatum* and *Lycopodium complanatum* subsp. Chamaecyparissus ekstrelerinin antiprotozoal aktivitesi ve sitotoksisitesi. *Turkish Journal of Biochemistry*, *38*(4), 403–408. https://doi.org/10.5505/tjb.2013.07379

Ersoz, M., Pehlivan, E., Duncan, H. J., Yildiz, S., & Pehlivan, M. (1995). Ion exchange equilibria of heavy metals in aqueous solution on new chelating resins of sporopollenin. *Reactive Polymers*, *24*(3), 195–202. https://doi.org/10.1016/0923-1137(94)00084-I

Falkowski-Temporini, G. J., Lopes, C. R., Massini, P. F., Brustolin, C. F., Ferraz, F. N., Sandri, P. F., Hernandes, L., Aleixo, D. L., Barion, T. F., Esper, L. G., & de Araújo, S. M. (2017). Increased of the hepatocytes and splenocytes apoptosis accompanies clinical improvement and higher survival in mice infected with *Trypanosoma cruzi* and treated

with highly diluted *Lycopodium clavatum*. *Microbial Pathogenesis*, *110*, 107–116. https://doi.org/10.1016/j.micpath.2017.06.027

Falkowski-Temporini, G. J., Lopes, C. R., Massini, P. F., Brustolin, C. F., Sandri, P. F., Ferreira, É. C., Aleixo, D. L., Pala, N. R., & de Araújo, S. M. (2016). Predominance of Th1 response, increase of megakaryocytes and Kupffer cells are related to survival in *Trypanosoma cruzi* infected mice treated with *Lycopodium clavatum*. *Cytokine*, *88*, 57–61. https://doi.org/10.1016/j.cyto.2016.08.015

Fan, P., Zhao, L., Hostettmann, K., & Lou, H. (2012). Chemical constituents of *Asplenium ruta-muraria* L. *Natural Product Research*, *26*(15), 1413–1418. https://doi.org/10.1080/14786419.2011.599805

Farràs, A., Cásedas, G., Les, F., Terrado, E., Mitjans, M., & López, V. (2019). Evaluation of anti-tyrosinase and antioxidant properties of four fern species for potential cosmetic applications. *Forests*, *10*(2), 179. https://doi.org/10.3390/f10020179

Favas, P. J. C., Pratas, J., & Prasad, M. N. V. (2012). Accumulation of arsenic by aquatic plants in large-scale field conditions: Opportunities for phytoremediation and bioindication. *Science of The Total Environment*, *433*, 390–397. https://doi.org/10.1016/j.scitotenv.2012.06.091

Ferrazzano, G. F., Roberto, L., Catania, M. R., Chiaviello, A., De Natale, A., Roscetto, E., Pinto, G., Pollio, A., Ingenito, A., & Palumbo, G. (2013). Screening and scoring of antimicrobial and biological activities of italian vulnerary plants against major oral pathogenic bacteria. *Evidence-Based Complementary and Alternative Medicine*, *2013*, 1–10. https://doi.org/10.1155/2013/316280

Fiorin, E., Sáez, L., & Malgosa, A. (2019). Ferns as healing plants in medieval Mallorca, Spain? Evidence from human dental calculus. *International Journal of Osteoarchaeology*, *29*(1), 82–90. https://doi.org/10.1002/oa.2718

Flannery, M. A. (1998). The Medicine and medicinal plants of C. S. Rafinesque. *Economic Botany*, *52*(1), 27–43. https://doi.org/10.1007/BF02861293

Fleisher, M. S. (1980). The ethnobotany of the Clallam Indians of Western Washington, *Northwest Anthropological Research Notes*, *14*(2), 192-210.

Font Query, P. (1979). *Plantas Medicinales el Dioscorides Renovado.* Editorial Labor.

Fowler, A. (2003). Ferns. *Horticulture Week*, 18. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/225464472?accountid=14767

Fox, B. (2003, February). Space savers: Turn a small horticultural wasteland into a delightful part of the garden. *Canadian Gardening*, *14*, 24-28. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/217789866?accountid=14767

Fox, B. (2008). A tight squeeze. *Canadian Gardening*, *19*, 74-76. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/217802843?accountid=14767

Froissard, D., Fons, F., Bessière, J., Buatois, B., & Rapior, S. (2011). Volatiles of French ferns and "fougère" scent in perfumery. *Natural Product Communications*, *6*(11), 1723–1726.

Gaertner, E. E. (1962). Freezing, preservation and preparation of some edible wild plants of Ontario. *Economic Botany*, *16*(4), 264–265. https://doi.org/10.1007/BF02860183

Garcia, D., Garcia-Cela, E., Ramos, A. J., Sanchis, V., & Marín, S. (2011). Mould growth and mycotoxin production as affected by *Equisetum arvense* and *Stevia rebaudiana* extracts. *Food Control*, *22*(8), 1378–1384. https://doi.org/10.1016/j.foodcont.2011.02.016

Garcia, D., Ramos, A. J., Sanchis, V., & Marín, S. (2013). *Equisetum arvense* hydro-alcoholic extract: Phenolic composition and antifungal and antimycotoxigenic effect against *Aspergillus flavus* and *Fusarium verticillioides* in stored maize: *Equisetum arvense* hydro-alcoholic extract. *Journal of the Science of Food and Agriculture*, *93*(9), 2248–2253. https://doi.org/10.1002/jsfa.6033

García-Gaytán, V., Bojórquez-Quintal, E., Hernández-Mendoza, F., Tiwari, D. K., Corona-Morales, N., & Moradi-Shakoorian, Z. (2019). Polymerized silicon (SIO2·NH2O) in *Equisetum arvense*: potential nanoparticle in crops. *Journal of the Chilean Chemical Society*, *64*(1), 4298–4302. https://doi.org/10.4067/s0717-97072019000104298

Garth, T. R. (1953). Atsugewi Ethnography. *Anthropological Records*, *14*(2), 140-141.

Gatacre, L. (2002). An English gardener in a Dutch historic garden. *Garden History*, *30*(2), 252. https://doi.org/10.2307/1587256

Gaur, R. D., & Bhatt, B. P. (1994). Folk utilization of some pteridophytes of Deoprayag area in Garhwal Himalaya: India. *Economic Botany*, *48*(2), 146–151. https://doi.org/10.1007/BF02908203

Georgeta, T. (2004). "A. fatu" botanical garden iassy - the greenhouse. Buletinul Grâdinii Botanicae, 12 Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/916733321?accountid=14767

Gill, S. J. (1983). *Ethnobotany of the Makah and Ozette People, Olympic Peninsula, Washington (USA)*. [Doctoral dissertation, Washington State University]. Native American Ethnobotany Database.

Gilmore, M. R. (1933) *Some Chippewa uses of plants, Ann Arbor.* University of Michigan Press.

Global IP News. (2015, Aug 25). Huzhou tianjian veterinary drug files chinese patent application for chinese veterinary medicine for promoting growth of poultry. Global IP News. Husbandry Patent News. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/1706554589?accountid=14767

Global IP News. (2015, Jul 11). State intellectual property office of china receives Shandong new hope Liuhe group's patent application for Chinese medicine additive for promoting piglet growth and preparation method thereof. Global IP News. Husbandry Patent News Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/1695385697?accountid=14767

Gobelius, L., Lewis, J., & Ahrens, L. (2017). Plant uptake of per- and polyfluoroalkyl substances at a contaminated fire training facility to evaluate the phytoremediation potential of various plant species. *Environmental Science & Technology*, *51*(21), 12602–12610. https://doi.org/10.1021/acs.est.7b02926

Goodrich, J. & Lawson, C. (1980). *Kashaya Pomo Plants, Los Angeles.* University of California.

Goswami, H. K., Sen, K., & Mukhopadhyay, R. (2016). Pteridophytes: Evolutionary boon as medicinal plants. *Plant Genetic Resources*, *14*(4), 328–355. https://doi.org/10.1017/S1479262116000290

Green, P. S., Kramer, K. U., & Kubitzki, K. (1990). *The families and genera of vascular plants, I: pteridophytes and gymnosperms*. Berlin: Springer-Verlag.

Gregory M. Wagner. (1997). Azolla: A Review of Its Biology and Utilization. *Botanical Review, 63*(1), 1-26. Retrieved from http://www.jstor.org.proxy.lib.utc.edu/stable/4354285

Grinnell, G. B. (1972). *The Cheyenne Indians - Their history and ways of life*. University of Nebraska Press.

Griswold, M. (2014). The larger vision. *Landscape Architecture, 104*(6), 126-139. Retrieved July 2, 2020, from www.jstor.org/stable/44794699

Gründemann, C., Lengen, K., Sauer, B., Garcia-Käufer, M., Zehl, M., & Huber, R. (2014). *Equisetum arvense* (common Horsetail) modulates the function of inflammatory immunocompetent cells. *BMC Complementary and Alternative Medicine*, *14*(1), 283. https://doi.org/10.1186/1472-6882-14-283

Guarrera, P. M., Salerno, G., & Caneva, G. (2005). Folk phytotherapeutical plants from Maratea area (Basilicata, Italy). *Journal of Ethnopharmacology*, *99*(3), 367–378. https://doi.org/10.1016/j.jep.2005.01.039

Guarrera, P., Lucchese, F., & Medori, S. (2008). Ethnophytotherapeutical research in the high Molise region (Central-Southern Italy). *Journal of Ethnobiology and Ethnomedicine*, *4*(1), 7. https://doi.org/10.1186/1746-4269-4-7

Gubbuk, I. H. (2011). Isotherms and thermodynamics for the sorption of heavy metal ions onto functionalized sporopollenin. *Journal of Hazardous Materials*, *186*(1), 416–422. https://doi.org/10.1016/j.jhazmat.2010.11.010

Guillarmod, A.J. (1971). *Flora of Lesotho (Basutoland).* Verlag von J. Cramer.

Guimarães, F. P., Aguiar, R., Karam, D., Oliveira, J. A., Silva, J. A. A., Santos, C. L., Sant'anna-Santos, B. F., & Lizieri-Santos, C. (2011). Potential of macrophytes for removing atrazine from aqueous solution. *Planta Daninha*, *29*(spe), 1137–1147. https://doi.org/10.1590/S0100-83582011000500022

Gunther, E. (1973). *Ethnobotany of Western Washington, Seattle.* University of Washington Press.

Gupta, M.P. (1979) Ethnopharmacognostic observations on Panamanian medicinal plants, Part I. *Quarterly Journal of Crude Drug Research, 17*(3-4), 115-130.

Gupta, R. S., Kumar, P., Sharma, A., Bharadwaj, T. N., & Dixit, V. P. (2000). Hypocholesterolemic activity of *Marsilea minuta* in gerbils. *Fitoterapia*, *71*(2), 113–117. https://doi.org/10.1016/S0367-326X(99)00140-9

Gupta, Y., & Peshin, S. (2012). Do herbal medicines have potential for managing snake bite envenomation? *Toxicology International*, *19*(2), 89. https://doi.org/10.4103/0971-6580.97194

Haapoja, M. A. (1995, September). Tropical ferns to grow indoors. *Flower and Garden* (39) 62. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/232317949?accountid=14767

Hackett, B. (1954). The influence of ecology on choice of plant material: a method for rationalizing plant use in landscape design. *Landscape Architecture*, 45(1), 12-17. Retrieved June 27, 2020, from www.jstor.org/stable/44659160

Haider, S., Kharbanda, C., Alam, M. S., Hamid, H., Ali, M., Alam, M., Nazreen, S., & Ali, Y. (2013). Anti-inflammatory and anti-nociceptive activities of two new triterpenoids from *Adiantum capillus-veneris* Linn. *Natural Product Research*, *27*(24), 2304–2310. https://doi.org/10.1080/14786419.2013.828292

Hall, C. (2006, 04). Ferns. *Canadian Gardening, (17)*30, 32. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/217790976?accountid=14767

Hamdy, R. (2010). A study of plant distribution in nine historic gardens in Egypt. *Garden History, 38*(2), 267-314. Retrieved July 3, 2020, from www.jstor.org/stable/41411758

Hamel, P. B. & Chiltoskey, M. U. (1975). *Cherokee plants and their uses -- A 400 year history*. Herald Publishing Co.

Hamza, O. J. M., van den Bout-van den Beukel, C. J. P., Matee, M. I. N., Moshi, M. J., Mikx, F. H. M., Selemani, H. O., Mbwambo, Z. H., Van der Ven, A. J. A. M., & Verweij, P. E. (2006). Antifungal activity of some Tanzanian plants used traditionally for the treatment of fungal infections. *Journal of Ethnopharmacology*, *108*(1), 124–132. https://doi.org/10.1016/j.jep.2006.04.026

Hanif, K., Kumar, M., Singh, N., & Shukla, R. (2015). Effect of homeopathic *Lycopodium clavatum* on memory functions and cerebral blood flow in memory-impaired rats. *Homeopathy*, *104*(1), 24–28. https://doi.org/10.1016/j.homp.2014.08.003

Harris, T. L., Wenthur, C. J., Diego-Taboada, A., Mackenzie, G., Corbitt, T. S., & Janda, K. D. (2016). *Lycopodium clavatum* exine microcapsules enable safe oral delivery of 3,4-diaminopyridine for treatment of botulinum neurotoxin A intoxication. *Chemical Communications*, *52*(22), 4187–4190. https://doi.org/10.1039/C6CC00615A

Hart, J. (1992) *Montana Native Plants and Early Peoples*. Montana Historical Society Press.

Hart, J. A. (1979). *The ethnobotany of the Flathead Indians of Western Montana*. Harvard University.

Hartwell, J. L. (1967-71). *Plants used against cancer.* Lloydia.

Harvey, J. H. (1976). Turkey as a source of garden plants. *Garden History*, *4*(3), 21. https://doi.org/10.2307/1586521

Harwell, F., & Garner, B. (2008). Bringing back Olmsted's plantings. *Landscape Architecture, 98*(8), 78-89. Retrieved July 3, 2020, from www.jstor.org/stable/44794009

Hashemi, S. M. B., Zahabi, N., Rezaee, Z., Maherani, Z., Boghori, P., & Keshavarz, Z. (2016). Evaluation of a starch-based edible film as carrier of *Adiantum capillus-veneris* extract to improve the shelf life of fresh-cut pears: Antimicrobial and antioxidant properties of starch film. *Journal of Food Safety*, *36*(3), 291–298. https://doi.org/10.1111/jfs.12241

Hassi, U., Hossain, Md. T., & Huq, S. M. I. (2017). Mitigating arsenic contamination in rice plants with an aquatic fern, *Marsilea minuta*. *Environmental Monitoring and Assessment*, *189*(11), 550. https://doi.org/10.1007/s10661-017-6270-2

Haufler, C. (2016). Pteridophytes. In M. S. Hill (Ed.), *Biology* (2nd ed., Vol. 3, pp. 306-308). Farmington Hills, MI: Macmillan Reference USA. Retrieved from https://link-gale-com.proxy.lib.utc.edu/apps/doc/CX3629800357/GVRL?u=tel_a_utc&sid=GVRL&xid=091ed424

Hazlett, D. L. (1986). Ethnobotanical observations from Cabecar and Guaymí settlements in Central America. *Economic Botany*, *40*(3), 339–352. https://doi.org/10.1007/BF02858990

Hedaya, R. (2017). Five herbs plus thiamine reduce pain and improve functional mobility in patients with pain: A pilot study. *Alternative Therapies in Health and Medicine, 23*(1), 14–19.

Hejna, M., Moscatelli, A., Stroppa, N., Onelli, E., Pilu, S., Baldi, A., & Rossi, L. (2020). Bioaccumulation of heavy metals from wastewater through a *Typha latifolia* and

Thelypteris palustris phytoremediation system. *Chemosphere*, *241*, 125018. https://doi.org/10.1016/j.chemosphere.2019.125018

Heller, C. A. (1953). *Edible and Poisonous Plants of Alaska*. University of Alaska.

Hellson, J. C. (1974). *Ethnobotany of the Blackfoot Indians, Ottawa.* National Museums of Canada.

Henrique da Silva, G., Barros, P. P., Silva Gonçalves, G. M., & Landi, M. A. (2015). Hepatoprotective effect of *Lycopodium clavatum* 30CH on experimental model of paracetamol-induced liver damage in rats. *Homeopathy*, *104*(1), 29–35. https://doi.org/10.1016/j.homp.2014.05.005

Heriz-Smith, S. (1989). James Veitch & Sons of Exeter and Chelsea, 1853-1870. *Garden History*, *17*(2), 135. https://doi.org/10.2307/1586879

Herrick, J. W. (1977). *Iroquois Medical Botany*. [Doctoral dissertation, State University of New York]. Native American Ethnobotany Database.

Hidano, A., Sharma, B., Rinzin, K., Dahal, N., Dukpa, K., & Stevenson, M. A. (2017). Revisiting an old disease? Risk factors for bovine enzootic haematuria in the Kingdom of Bhutan. *Preventive Veterinary Medicine*, *140*, 10–18. https://doi.org/10.1016/j.prevetmed.2017.02.011

Hodgson, L. (2003, Summer). Shrub subs: Once considered old-fashioned, flowering hedge perennials look new again. *Canadian Gardening*, *14*, 44-52. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/217788095?accountid=14767

Hotaling, N., & Leopold, D. J. (2004). *Coastal wetlands as dynamic ecological filters: Linking wetland area and nitrogen fixation to water quality in eastern lake ontario watersheds* Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/19941652?accountid=14767

Hu, N., Ding, D., Li, G., Zheng, J., Li, L., Zhao, W., & Wang, Y. (2014). Vegetation composition and 226Ra uptake by native plant species at a uranium mill tailings impoundment in South China. *Journal of Environmental Radioactivity*, *129*, 100–106. https://doi.org/10.1016/j.jenvrad.2013.12.012

Huang, P., Xin, W., Zheng, X., Luo, F., Li, Q., & Lv, G. (2017). Screening of *Sceptridium ternatum* for antitussive and antiasthmatic activity and associated mechanisms. *Journal of International Medical Research*, *45*(6), 1985–2000. https://doi.org/10.1177/0300060517722876

Huang, X. H., Xiong, P. C., Xiong, C. M., Cai, Y. L., Wei, A. H., Wang, J. P., Liang, X. F., & Ruan, J. L. (2010). In vitro and in vivo antitumor activity of *Macrothelypteris torresiana* and its acute/subacute oral toxicity. *Phytomedicine*, *17*(12), 930–934. https://doi.org/10.1016/j.phymed.2010.03.006

Hunyadi, A., Martins, A., Danko, B., Chang, F. R., & Wu, Y. C. (2014). Protoflavones: A class of unusual flavonoids as promising novel anticancer agents. *Phytochemistry Reviews*, *13*(1), 69–77. https://doi.org/10.1007/s11101-013-9288-2

Hussey, J. S. (1974). Some useful plants of early New England. *Economic Botany*, *28*(3), 311–337. https://doi.org/10.1007/BF02861428

Ibraheim, Z. Z., Ahmed, A. S., & Gouda, Y. G. (2011). Phytochemical and biological studies of *Adiantum capillus-veneris* L. *Saudi Pharmaceutical Journal*, *19*(2), 65–74. https://doi.org/10.1016/j.jsps.2011.01.007

Idolo, M., Motti, R., & Mazzoleni, S. (2010). Ethnobotanical and phytomedicinal knowledge in a long-history protected area, the Abruzzo, Lazio and Molise National Park (Italian Apennines). *Journal of Ethnopharmacology*, *127*(2), 379–395. https://doi.org/10.1016/j.jep.2009.10.027

Ishaq, M. S., Hussain, M. M., Siddique Afridi, M., Ali, G., Khattak, M., Ahmad, S., & Shakirullah. (2014). *In vitro* phytochemical, antibacterial, and antifungal activities of leaf, stem, and root extracts of *Adiantum capillus veneris*. *The Scientific World Journal*, *2014*, 1–7. https://doi.org/10.1155/2014/269793

Iwatsuki, K. (1997). *Evolution and diversification of land plants*. Tokyo: Springer.

Jackson, B. S. (2003, April). Bright ideas for shade: Lost in the dark? here's what you need to know and grow to shed a little light--and add a lot of colour--in any shady situation. *Canadian Gardening*, *14*, 72-79. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/217784190?accountid=14767

Javid, A., Motevalli Haghi, N., Emami, S., Ansari, A., Zojaji, S., Khoshkhui, M., & Ahanchian, H. (n.d.). Short-course administration of a traditional herbal mixture ameliorates asthma symptoms of the common cold in children. *Avicenna Journal of Phytomedicine*, *9*(2), 126–133.

Jayaraj, R. L., Beiram, R., Azimullah, S., Meeran, M. F. N., Ojha, S. K., Adem, A., & Jalal, F. Y. (2019). *Lycopodium* attenuates loss of dopaminergic neurons by suppressing oxidative stress and neuroinflammation in a rat model of Parkinson's Disease. *Molecules*, *24*(11), 2182. https://doi.org/10.3390/molecules24112182

Jiang, Y., Hu, W., Han, W., Yeo, J.-H., & Wang, M.-H. (2012). Antioxidant and nitric oxide production inhibitory activities of scouring rush (*Equisetum hyemale* L.). *Food Science and Biotechnology*, *21*(4), 1037–1044. https://doi.org/10.1007/s10068-012-0135-9

Jo, A., Een Kim, C., & Lee, M. (2020). Serratane triterpenoids isolated from *Lycopodium clavatum* by bioactivity-guided fractionation attenuate the production of inflammatory mediators. *Bioorganic Chemistry*, *96*, 103632. https://doi.org/10.1016/j.bioorg.2020.103632

Johnson, L. (2003, October). An insider's guide to natives: Find a niche for native plants among their cultivated cronies in your garden beds. *Canadian Gardening*, *14*, 98-104. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/217804888?accountid=14767

Johnston, A. (1970). Blackfoot Indian utilization of the flora of the northwestern great plains. *Economic Botany*, *24*(3), 301–324. https://doi.org/10.1007/BF02860666

Jost, D. (2009). Catch the wave. *Landscape Architecture*, *99*(8), 26-35. Retrieved July 2, 2020, from www.jstor.org/stable/44794254

Jost, D. (2012). Hey kids: Outside is in. *Landscape Architecture*, *102*(1), 82-91. Retrieved July 2, 2020, from www.jstor.org/stable/44795070

Ju, Z., Wang, J., & Pan, S. (2009). Isolation and preliminary identification of the endophytic fungi which produce hupzine A from four species in hupziaceae and determination of huperzine A by HPLC. *Fundan University Journal of Medical Sciences*, *36*(4), 445-449. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/744699228?accountid=14767

Kang, Y., Łuczaj, Ł., Kang, J., & Zhang, S. (2013). Wild food plants and wild edible fungi in two valleys of the Qinling Mountains (Shaanxi, central China). *Journal of Ethnobiology and Ethnomedicine*, *9*(1), 26. https://doi.org/10.1186/1746-4269-9-26

Kang, Y., Łuczaj, Ł., Kang, J., Wang, F., Hou, J., & Guo, Q. (2014). Wild food plants used by the Tibetans of Gongba Valley (Zhouqu county, Gansu, China). *Journal of Ethnobiology and Ethnomedicine*, *10*(1), 20. https://doi.org/10.1186/1746-4269-10-20

Kang, YX et al. (2012). Wild food plants and wild edible fungi of Heihe valley (Qinling Mountains, Shaanxi, central China): herbophilia and indifference to fruits and mushrooms. *Acta Societatis Botanicorum Poloniae.*, *81*(4), 405–413. https://doi.org/10.5586/asbp.2012.044

Kanwal, Q., Qadir, A., Amina, Asmatullah, Iqbal, H. H., & Munir, B. (2018). Healing potential of *Adiantum capillus-veneris* L. plant extract on bisphenol A-induced hepatic toxicity in male albino rats. *Environmental Science and Pollution Research*, *25*(12), 11884–11892. https://doi.org/10.1007/s11356-018-1211-3

Kar, Ozyurt, D., & Ozturk, B. (2019). The effects of optimization methods on the determination of total antioxidant capacity in some plants. *Fresenius Environmental Bulletin*, *28*(9), 6589–6595.

Kari, P. R. (1985). *Upper Tanana ethnobotany*, *Anchorage*. Alaska Historical Commission.

Karimi, A., Lorigooini, Z., Pourgheysari, B., Alidadi, S., & Moradi, M.-T. (2017). In vitro anti influenza virus activity, antioxidant potential and total phenolic content of twelve Iranian medicinal plants. *Marmara Pharmaceutical Journal*, *21*(4), 843–851. https://doi.org/10.12991/mpj.2017.10

Kasabri, V., Al-Hallaq, E. K., Bustanji, Y. K., Abdul-Razzak, K. K., Abaza, I. F., & Afifi, F. U. (2017). Antiobesity and antihyperglycaemic effects of *Adiantum capillus-veneris* extracts: *In vitro* and *in vivo* evaluations. *Pharmaceutical Biology*, *55*(1), 164–172. https://doi.org/10.1080/13880209.2016.1233567

Katakawa, K., Mito, H., Kogure, N., Kitajima, M., Wongseripipatana, S., Arisawa, M., & Takayama, H. (2011). Ten new fawcettimine-related alkaloids from three species of *Lycopodium*. *Tetrahedron*, *67*(35), 6561–6567. https://doi.org/10.1016/j.tet.2011.05.107

Kawano, T. (2015). Pteridophytes as active components in gardening, agricultural and horticultural ecosystems in japan. *Advances in Horticultural Science*, *29*(1), 41-47. doi:http://dx.doi.org.proxy.lib.utc.edu/10.13128/ahs-21305

Kays, S. J., & Dias, J. C. S. (1995). Common names of commercially cultivated vegetables of the world in 15 languages. *Economic Botany*, *49*(2), 115–152. https://doi.org/10.1007/BF02862917

Khodaie, L., Esnaashari, S., & Bamdad Moghaddam, S. (2015). Essential oil of arial parts of *Adiantum capillus-veneris*: Chemical composition and antioxidant activity. *Jundishapur Journal of Natural Pharmaceutical Products*, *10*(4). https://doi.org/10.17795/jjnpp-21968

Kielly, H. (2003, April). Law & order: Hostas in all sizes, colours, textures and shapes hold court in a charlottetown corner lot. *Canadian Gardening*, *14*, 52-59. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/217788194?accountid=14767

Kim, G., Gan, R.-Y., Zhang, D., Farha, A. K., Habimana, O., Mavumengwana, V., Li, H.-B., Wang, X.-H., & Corke, H. (2020). Large-scale screening of 239 traditional Chinese medicinal plant extracts for their antibacterial activities against multidrug-resistant

Staphylococcus aureus and cytotoxic activities. *Pathogens*, *9*(3), 185. https://doi.org/10.3390/pathogens9030185

Kimberley, M. (2010). Ferns. *Horticulture Week*, 16-17. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/347863496?accountid=14767

Kindscher, K., & Hurlburt, D. P. (1998). Huron Smith's ethnobotany of the Hocąk (Winnebago). *Economic Botany*, *52*(4), 352–372. https://doi.org/10.1007/BF02862065

Klekowski, E., & Levin, D. E. (1979). Mutagens in a river heavily polluted with paper recycling wastes: Results of field and laboratory mutagen assays. *Environmental Mutagenesis*, *1*(3), 209–219. https://doi.org/10.1002/em.2860010303

Knox, A. S., Kaplan, D. I., & Hinton, T. G. (2008). Elevated uptake of Th and U by netted chain fern (*Woodwardia areolata*). *Journal of Radioanalytical and Nuclear Chemistry*, *277*(1), 169–173. https://doi.org/10.1007/s10967-008-0726-3

Koehler, H. (1924). Planting a naturalistic garden theater in a limestone region. *Landscape Architecture*, *14*(3), 153-170. Retrieved July 2, 2020, from www.jstor.org/stable/44661891

Koelmel, J., & Amarasiriwardena, D. (2012). Imaging of metal bioaccumulation in Hay-scented fern (*Dennstaedtia punctilobula*) rhizomes growing on contaminated soils by laser ablation ICP-MS. *Environmental Pollution*, *168*, 62–70. https://doi.org/10.1016/j.envpol.2012.03.035

Kollah, B., Patra, A. K., & Mohanty, S. R. (2016). Aquatic microphylla *Azolla*: A perspective paradigm for sustainable agriculture, environment and global climate change. *Environmental Science and Pollution Research*, *23*(5), 4358–4369. https://doi.org/10.1007/s11356-015-5857-9

Konrath, E. L., Neves, B. M., Lunardi, P. S., Passos, C. dos S., Simões-Pires, A., Ortega, M. G., Gonçalves, C. A., Cabrera, J. L., Moreira, J. C. F., & Henriques, A. T. (2012). Investigation of the in vitro and ex vivo acetylcholinesterase and antioxidant activities of traditionally used *Lycopodium* species from South America on alkaloid extracts. *Journal of Ethnopharmacology*, *139*(1), 58–67. https://doi.org/10.1016/j.jep.2011.10.042

Kordi, F., Ahmadi, A., Bahadori, S., & Valizadeh, H. (2015). Antibacterial evaluation and preliminary phytochemical screening of selected ferns from Iran. *Research Journal of Pharmacognosy*, *2*(2), 53–59.

Kosaka, Y., Xayvongsa, L., Vilayphone, A., Chanthavong, H., Takeda, S., & Kato, M. (2013). Wild edible herbs in paddy fields and their sale in a mixture in Houaphan province, the Lao People's Democratic Republic. *Economic Botany*, *67*(4), 335–349. https://doi.org/10.1007/s12231-013-9251-6

Kostadinovic, L., Ruzicic, L., Dozet, G., & Cvijanovic, G. (2013). Sustainable agricultural production of medicinal herbs. *Poljoprivreda i Sumarstvo*, *59*(3), 193-205. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/1468452850?accountid=14767

Kotwal, S., & Badole, S. (2016). Anabolic therapy with *Equisetum arvense* along with bone mineralising nutrients in ovariectomized rat model of osteoporosis. *Indian Journal of Pharmacology*, *48*(3), 312. https://doi.org/10.4103/0253-7613.182880

Kour, J., Ali, M. N., Ganaie, H. A., & Tabassum, N. (2017). Amelioration of the cyclophosphamide induced genotoxic damage in mice by the ethanolic extract of

Equisetum arvense. *Toxicology Reports*, *4*, 226–233. https://doi.org/10.1016/j.toxrep.2017.05.001

Kramer, K. (1993). Distribution Patterns in Major Pteridophyte Taxa Relative to Those of Angiosperms. *Journal of Biogeography*, *20*(3), 287-291. doi:10.2307/2845637

Krämer, U. (2005). Phytoremediation: Novel approaches to cleaning up polluted soils. *Current Opinion in Biotechnology*, *16*(2), 133–141. https://doi.org/10.1016/j.copbio.2005.02.006

Krochmal, A. & Krochmal, C. (1973). *A guide to the medicinal plants of the United States.* Quadrangle/The N.Y. Times Book Co.

Krochmal, A., & Lavrentiades, G. (1955). Poisonous plants of Greece. *Economic Botany*, *9*(2), 175–189. https://doi.org/10.1007/BF02898799

Krochmal, A., Paur, S., & Duisberg, P. (1954). Useful native plants in the American southwestern deserts. *Economic Botany*, *8*(1), 3–20. https://doi.org/10.1007/BF02898875

Krochmal, Arnold. (1968). Medicinal plants and Appalachia. *Economic Botany*, *22*(4), 332–337. https://doi.org/10.1007/BF02908128

Kumar, N., Bauddh, K., Dwivedi, N., Barman, S., & Singh, D. (2012). Accumulation of metals in selected macrophytes grown in mixture of drain water and tannery effluent and their phytoremediation potential. *Journal of Environmental Biology*, *33*(5), 923–927.

Kun, P. S., Ryong, C. H., Erzsebet, B., Maria, C., & Adrian, Z. (2009). Ornamental species used in water gardens from South Korea. *Journal of Plant Development, 16* Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/916727455?accountid=14767

Kurniati, E., Imai, T., Higuchi, T., & Sekine, M. (2014). Lead and chromium removal from leachate using Horsetail (*Equisetum hyemale*). *Journal of Degraded and Mining Lands Management, 1*(2), 93-96. doi:http://dx.doi.org.proxy.lib.utc.edu/10.15243/jdmlm.2014.012.093

Lantis, M. (1959). Folk medicine and hygiene. *Anthropological Papers of the University of Alaska*, *8*, 1-75.

Leão, G. A., Oliveira, J. A. de, Felipe, R. T. A., & Farnese, F. S. (2017). Phytoremediation of arsenic-contaminated water: The role of antioxidant metabolism of *Azolla caroliniana* Willd. (Salviniales). *Acta Botanica Brasilica*, *31*(2), 161–168. https://doi.org/10.1590/0102-33062016abb0407

Leighton, A. L. (1985). *Wild plant use by the Woods Cree (Nihithawak) of east-central Saskatchewan, Ottawa*. National Museums of Canada.

León, R., Pernía Santos, B. M., Siguencia, R., Franco, S., Noboa, A., & Cornejo, X. (2018). Potencial de plantas acuáticas para la remoción de coliformes totales y *Escherichia coli* en aguas negras. *Enfoque UTE*, *9*(4), 131–144. https://doi.org/10.29019/enfoqueute.v9n4.286

Leonti, M., Nebel, S., Rivera, D., & Heinrich, M. (2006). Wild gathered food plants in the European Mediterranean: A comparative analysis. *Economic Botany*, *60*(2), 130–142. https://doi.org/10.1663/0013-0001(2006)60[130:WGFPIT]2.0.CO;2

Lerner, J. (2014). Dissolved at the edges. *Landscape Architecture*, *104*(12), 54-64. Retrieved July 2, 2020, from www.jstor.org/stable/44794822

Lévi-Strauss, C. (1952). The use of wild plants in tropical South America. *Economic Botany*, *6*(3), 252–270. https://doi.org/10.1007/BF02985068

Lewis & Lewis. (1977). *Medical Botany*.

Li, H., Wang, P., Liu, Q., Cheng, X., Zhou, Y., & Xiao, Y. (2012). Cell cycle arrest and cell apoptosis induced by *Equisetum hyemale* extract in murine leukemia L1210 cells. *Journal of Ethnopharmacology*, *144*(2), 322–327. https://doi.org/10.1016/j.jep.2012.09.015

Li, X., Kang, M., Ma, N., Pang, T., Zhang, Y., Jin, H., Yang, Z., & Song, L. (2019). Identification and analysis of chemical constituents and rat serum metabolites in *Lycopodium clavatum* using UPLC-Q-TOF/MS combined with multiple data-processing approaches. *Evidence-Based Complementary and Alternative Medicine*, *2019*, 1–8. https://doi.org/10.1155/2019/5165029

Li, X.-W. (2009). Roles of sulfur in the arsenic tolerant plant *Adiantum capillus-veneris* and the hyperaccumulator *Pteris vittata*. *Journal of the Korean Society for Applied Biological Chemistry*, *52*(5), 498–502. https://doi.org/10.3839/jksabc.2009.085

Lim, D., Kim, M. K., Jang, Y.-P., & Kim, J. (2015). *Sceptridium ternatum* attenuates allergic contact dermatitis-like skin lesions by inhibiting T helper 2-type immune responses and inflammatory responses in a mouse model. *Journal of Dermatological Science*, *79*(3), 288–297. https://doi.org/10.1016/j.jdermsci.2015.06.012

Liogier, A. H. (1974). *Diccionario botanico de nombres vulgares de la Espanola*. Universidad Nacional Pedro Henriquez Urena, Santo Domingo.

Liu, H., Jiang, C., Xiong, C., & Ruan, J. (2012). DEDC, a new flavonoid induces apoptosis via a ROS-dependent mechanism in human neuroblastoma SH-SY5Y cells. *Toxicology in Vitro*, *26*(1), 16–23. https://doi.org/10.1016/j.tiv.2011.10.002

Liu, J., Xu, H., Jiang, Y., Zhang, K., Hu, Y., & Zeng, Z. (2017). Methane emissions and microbial communities as influenced by dual cropping of Azolla along with early rice. *Scientific Reports*, *7*(1), 40635. https://doi.org/10.1038/srep40635

Lizieri, C., Kuki, K. N., & Aguiar, R. (2012). The morphophysiological responses of free-floating aquatic macrophytes to a supra-optimal supply of manganese. *Water, Air, & Soil Pollution*, *223*(5), 2807–2820. https://doi.org/10.1007/s11270-011-1068-2

Loines, E. (1917). Naturalizing flowers. *Landscape Architecture*, *7*(3), 138-143. Retrieved July 3, 2020, from www.jstor.org/stable/44659509

Lois, B. S. (1999). Solve design problems with perennials. *Grounds Maintenance, 34*(9), 28-32. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/220785525?accountid=14767 (Stack, 1999)

Longfield Gardens. (2019). *Best ferns for gardens and landscapes.* Retrieved from https://www.longfield-gardens.com/article/Best-Ferns-For-Gardens-And-Landscapes

Lowy, B., J.W.T., Hess, W. J., Tucker, S. C., Eshbaugh, W. H., Cutler, H., Bates, D. M., Pecora, R. A., R.F.R., J.F.M., Ritschel, G., Evers, R. A., & Chambers, J. E. (1975). Book reviews. *Economic Botany*, *29*(2), 97–98. https://doi.org/10.1007/BF02863308

Lumpkin, T. A., & Plucknett, D. L. (1980). *Azolla*: Botany, physiology, and use as a green manure. *Economic Botany*, *34*(2), 111–153. https://doi.org/10.1007/BF02858627

Ma, X., Tan, C., Zhu, D., & Gang. (2006). A survey of potential huperzine A natural resources in china: The huperziaceae. *Journal of Ethnopharmacology, 104 (1-2) Pp.54-67, 2006,* Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/925408019?accountid=14767

Mahanty, T., Bhattacharjee, S., Goswami, M., Bhattacharyya, P., Das, B., Ghosh, A., & Tribedi, P. (2017). Biofertilizers: A potential approach for sustainable agriculture development.

Environmental Science and Pollution Research, *24*(4), 3315–3335. https://doi.org/10.1007/s11356-016-8104-0

Maharjan, R. (2014). Phytoremediation of selected pharmaceuticals by and their phytotoxicity to aquatic plants (aquatic plants, constructed wetland, pharmaceuticals, phytoremediation, phytotoxicity, *Azolla caroliniana*, *Lemna minor*, *Pistia stratiotes*, aquatic plants, constructed wetland, pharmaceuticals, phytoremediation, phytotoxicity, *Azolla caroliniana*, *Lemna minor*, *Pistia stratiotes*, selected, aquatic, plants). Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/1859471498?accountid=14767

Main, A. R., Fehr, J., Liber, K., Headley, J. V., Peru, K. M., & Morrissey, C. A. (2017). Reduction of neonicotinoid insecticide residues in Prairie wetlands by common wetland plants. *Science of The Total Environment*, *579*, 1193–1202. https://doi.org/10.1016/j.scitotenv.2016.11.102

Mandal, S. K., Biswas, R., Bhattacharyya, S. S., Paul, S., Dutta, S., Pathak, S., & Khuda-Bukhsh, A. R. (2010). Lycopodine from *Lycopodium clavatum* extract inhibits proliferation of HeLa cells through induction of apoptosis via caspase-3 activation. *European Journal of Pharmacology*, *626*(2–3), 115–122. https://doi.org/10.1016/j.ejphar.2009.09.033

Marble, S. C. (2018). Native weedy pests of the deep South. *HortScience*, *53*(9), 1244–1249. https://doi.org/10.21273/HORTSCI13112-18

Markham, K., Chalk, T., & Stewart Jr., C. N. (2006). Evaluation of fern and moss protein-based defenses against phytophagous insects. *International Journal of Plant Sciences*, *167*(1), 111–117. https://doi.org/10.1086/497651

Maroyi, A. (2014). Not just minor wild edible forest products: Consumption of pteridophytes in sub-Saharan Africa. *Journal of Ethnobiology and Ethnomedicine*, *10*(1), 78. https://doi.org/10.1186/1746-4269-10-78

Martignoni, J. (2012). History channeled. *Landscape Architecture*, *102*(10), 90-98. Retrieved June 24, 2020, from www.jstor.org/stable/44795092

Martin, F. (2013). Later, and better. *Landscape Architecture*, *103*(1), 90-103. Retrieved June 24, 2020, from www.jstor.org/stable/44794566

Martin, Gary J.. *Ethnobotany: A Methods Manual*, Routledge, 2004. ProQuest Ebook Central, http://ebookcentral.proquest.com/lib/utc-ebooks/detail.action?docID=585499.

Martinez, M. (1969). *Las Plantas Medinales de Mexico.*

Martínez-Peña, L., & López-Candela, C. (2018). Floating islands as a strategy for the establishment of aquatic plants in the botanical garden of Bogotá. *Gestión y Ambiente*, *21*(1), 110-120. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/2091218505?accountid=14767

Matamoros V, Loc Xuan N, Arias CA, Salvado V and Brix H (2012) Evaluation of aquatic plants for removing polar microcontaminants: a microcosm experiment. Chemosphere 88: 1257–1264.

McClintock, W. (1909). Medizinal- Und Nutzpflanzen Der Schwarzfuss Indianer. *Zeitschriff fur Ethnologie*, *41*, 273-9.

Mechling, W.H. (1959). The Malecite Indians with notes on the Micmacs. *Anthropologica, 8*, 239-263.

Mejía-Giraldo, J. C., Henao-Zuluaga, K., Gallardo, C., Atehortúa, L., & Puertas-Mejía, M. A. (2016). Novel in vitro antioxidant and photoprotection capacity of plants from high

altitude ecosystems of Colombia. *Photochemistry and Photobiology*, *92*(1), 150–157. https://doi.org/10.1111/php.12543

Melián, A., Rucabado, T., Sarabia, J. F., Botella, M. Á., Asencio, A. D., & Pretel, M. T. (2017). Cultural importance of wild or traditionally collected plants in the Sierra de Grazalema (southern Spain). *Economic Botany*, *71*(2), 160–174. https://doi.org/10.1007/s12231-017-9381-3

Menendez-Baceta, G., Aceituno-Mata, L., Tardío, J., Reyes-García, V., & Pardo-de-Santayana, M. (2012). Wild edible plants traditionally gathered in Gorbeialdea (Biscay, Basque country). *Genetic Resources and Crop Evolution*, *59*(7), 1329–1347. https://doi.org/10.1007/s10722-011-9760-z

Merriam, C. H. (1966). *Ethnographic Notes on California Indian Tribes.* University of California Archaeological Research Facility, Berkeley.

Milovanović, V., Radulović, N., Todorović, Z., Stanković, M., & Stojanović, G. (2007). Antioxidant, antimicrobial and genotoxicity screening of hydro-alcoholic extracts of five serbian *Equisetum* Species. *Plant Foods for Human Nutrition*, *62*(3), 113–119. https://doi.org/10.1007/s11130-007-0050-z

Mimica-Dukic, N., Simin, N., Cvejic, J., Jovin, E., Orcic, D., & Bozin, B. (2008). Phenolic compounds in Field Horsetail (*Equisetum arvense* L.) as natural antioxidants. *Molecules*, *13*(7), 1455–1464. https://doi.org/10.3390/molecules13071455

Ming-Zhu Jiang. (2011). In vitro and in vivo studies of antioxidant activities of flavonoids from *Adiantum capillus-veneris* L. *African Journal of Pharmacy and Pharmacology*, *5*(18). https://doi.org/10.5897/AJPP11.500

Mishra, Panda, T., Pradhan, B., Rout, S., & Mohanty, R. (2016). Indigenous knowledge in utilization of wetland plants of Bhadrak district, Odisha, India. *Indian Journal of Natural Products and Resources*, *7*(1), 82–89.

Mitsuhashi, H. (1976). Medicinal plants of the Ainu. *Economic Botany*, *30*(3), 209–217. https://doi.org/10.1007/BF02909729

MK, A. (2015). Biosorption property of cadmium (II) in *Marsilea minuta* L. with polyamine interaction. *Molecular Plant Breeding*, *6*(14) Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/1827895307?accountid=14767

Mohammed Barznji, D. A. (2015). Potential of some aquatic plants for removal of arsenic from wastewater by green technology. *Limnological Review*, *15*(1), 15–20. https://doi.org/10.2478/limre-2015-0002

Molina, M., Reyes-GarcÍa, V., & Pardo-de-Santayana, M. (2009). Local knowledge and management of the Royal Fern (*Osmunda regalis* l.) in northern Spain: Implications for biodiversity conservation. *American Fern Journal*, *99*(1), 45–55. https://doi.org/10.1640/0002-8444-99.1.45

Mondal, S., Ghosh, D., Ganapaty, S., Chekuboyina, S. V. G., & Samal, M. (2017). Hepatoprotective activity of *Macrothelypteris torresiana* (Gaudich.) aerial parts against CCl 4 -induced hepatotoxicity in rodents and analysis of polyphenolic compounds by HPTLC. *Journal of Pharmaceutical Analysis*, *7*(3), 181–189. https://doi.org/10.1016/j.jpha.2016.12.001

Mondal, S., Ghosh, D., Seru, G., Manna, O., Venkata Reddy, M., & Revanth, V. (2016). Evaluation of analgesic, antipyretic and anti-inflammatory effects of ethanol extract from

a fern species *Macrothelypteris torresiana* (Gaudich) aerial parts. *Pharmacognosy Communications*, *6*(2), 57–63. https://doi.org/10.5530/pc.2016.2.2

Mondal, S., Panigrahi, N., Sancheti, P., Tirkey, R., Mondal, P., Almas, S., & Kola, V. (2018). Evaluation of toxicological, diuretic, and laxative properties of ethanol extract from *Macrothelypteris torresiana* (Gaudich) aerial parts with in silico docking studies of polyphenolic compounds on carbonic anhydrase II: An enzyme target for diuretic activity. *Pharmacognosy Research*, *10*(4), 408. https://doi.org/10.4103/pr.pr_16_18

Moogouei, R. (2018). Use of terrestrial plants for phytoremediation of pollutants from solutions. *Iranian Journal of Science and Technology, Transactions A: Science*, *42*(4), 1753–1759. https://doi.org/10.1007/s40995-017-0356-0

Morand, P., Robin, P., Pourcher, A.-M., Oudart, D., Fievet, S., Luth, D., Cluzeau, D., Picot, B., & Landrain, B. (2011). Design of an integrated piggery system with recycled water, biomass production and water purification by vermiculture, macrophyte ponds and constructed wetlands. *Water Science and Technology*, *63*(6), 1314–1320. https://doi.org/10.2166/wst.2011.109

Morash, J., Wright, A., LeBleu, C., Meder, A., Kessler, R., Brantley, E., & Howe, J. (2019). Increasing sustainability of residential areas using rain gardens to improve pollutant capture, biodiversity and ecosystem resilience. *Sustainability*, *11*(12), 3269. https://doi.org/10.3390/su11123269

Morgan, S. (2006). *Adiantums*. *Horticulture Week*, 18-19. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/225440510?accountid=14767

Moteetee, A., & Seleteng Kose, L. (2016). Medicinal plants used in Lesotho for treatment of reproductive and post reproductive problems. *Journal of Ethnopharmacology*, *194*, 827–849. https://doi.org/10.1016/j.jep.2016.10.062

Motti, R., Bonanomi, G., Emrick, S., & Lanzotti, V. (2019). Traditional herbal remedies used in women's health care in Italy: A review. *Human Ecology*, *47*(6), 941–972. https://doi.org/10.1007/s10745-019-00125-4

Mulligan, C. (2004). A balancing act: A Sudbury, Ontario gardener finds time for both of her passions: Her growing family and her garden [garden of Sharon Lennox & jack Caswell]. *Canadian Gardening*, *15*, 72-77. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/217816277?accountid=14767

Mundargi, R. C., Tan, E.-L., Seo, J., & Cho, N.-J. (2016). Encapsulation and controlled release formulations of 5-fluorouracil from natural *Lycopodium clavatum* spores. *Journal of Industrial and Engineering Chemistry*, *36*, 102–108. https://doi.org/10.1016/j.jiec.2016.01.022

Museum of Economic Botany. (1847). *Kew Economic Botany Collection.* [database]. Retrieved from https://ecbot.science.kew.org/?_ga=1.79100956.949438320.1455314438

Nagai, T., Myoda, T., & Nagashima, T. (2005). Antioxidative activities of water extract and ethanol extract from Field Horsetail (Tsukushi) *Equisetum arvense* L. *Food Chemistry*, *91*(3), 389–394. https://doi.org/10.1016/j.foodchem.2004.04.016

Nakagawa, S., Noble, D. W. A., Senior, A. M., & Lagisz, M. (2017). Meta-evaluation of meta-analysis: ten appraisal questions for biologists [flow chart]. Retrieved from https://bmcbiol.biomedcentral.com/articles/10.1186/s12915-017-0357-7/figures/2

Namsa, N. D., Tag, H., Mandal, M., Kalita, P., & Das, A. K. (2009). An ethnobotanical study of traditional anti-inflammatory plants used by the Lohit community of Arunachal Pradesh, India. *Journal of Ethnopharmacology*, *125*(2), 234–245. https://doi.org/10.1016/j.jep.2009.07.004

Nath, K. Bhattacharya, M. K., & Kar, S. (2016). Antibacterial activity of some ethno-botanically important ferns of Southern Assam, India. *Taiwania, 61*(3), 260–268. https://doi.org/10.6165/tai.2016.61.260

Naveed, S., Salma, Khattak, I., & Khan, B. M. (2019). Ethnomedicinal study of weeds in maize, rice, and tobacco fields of Tehsil Razzar District Swabi Pakistan. *Pakistan Journal of Weed Science Research, 25*(2), 91. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/2259302377?accountid=14767 (Shahida, 2019)

Nayak, C., Oberai, P., Varanasi, R., Baig, H., Ch, R., Reddy, G. R. C., Devi, P., S, B., Singh, V., Singh, V. P., Singh, H., & Shitanshu, S. S. (2013). A prospective multi-centric open clinical trial of homeopathy in diabetic distal symmetric polyneuropathy. *Homeopathy*, *102*(2), 130–138. https://doi.org/10.1016/j.homp.2013.02.004

Nazem, M. P., Mehrdad Modare, Habibolah. (2018). *The effects of Adiantum capillus-veneris hydro alcoholic extract on plasma proteins and blood electrophoretic pattern in mice.* https://doi.org/10.5281/ZENODO.1411932

Negahdari, S., Galehdari, H., Kesmati, M., Rezaie, A., & Shariati, G. (2017). Wound healing activity of extracts and formulations of Aloe Vera, Henna, *Adiantum capillus-veneris*, and Myrrh on mouse dermal fibroblast cells. *International Journal of Preventive Medicine*, *8*(1), 18. https://doi.org/10.4103/ijpvm.IJPVM_338_16

Newman, M. (2006). Anything but zen. *Landscape Architecture*, *96*(5), 118-125. Retrieved June 24, 2020, from www.jstor.org/stable/44676110

Nicholson, M. S., & Arzeni, C. B. (1993). The market medicinal plants of Monterrey, Nuevo León, México. *Economic Botany*, *47*(2), 184–192. https://doi.org/10.1007/BF02862021

Nickell, L. G. (1959). Antimicrobial activity of vascular plants. *Economic Botany*, *13*(4), 281–318. https://doi.org/10.1007/BF02885664

Nilforoushzadeh, M. A., Javanmard, S. H., Ghanadian, M., Asghari, G., Jaffary, F., Yakhdani, A. F., Dana, N., & Fatemi, S. A. (2014). The effects of *Adiantum capillus-veneris* on wound healing: An experimental in vitro evaluation. *International Journal of Preventive Medicine*, *5*(10), 1261–1268.

Norton, H. H. (1979). Evidence for bracken fern as a food for aboriginal peoples of western Washington. *Economic Botany*, *33*(4), 384–396. https://doi.org/10.1007/BF02858334

Noubarani, M., Rostamkhani, H., Erfan, M., Kamalinejad, M., Eskandari, M. R., Babaeian, M., & Salamzadeh, J. (2014). Effect of *Adiantum capillus veneris* Linn on an animal model of testosterone-induced hair loss. *Iranian Journal of Pharmaceutical Research: IJPR*, *13*(Suppl), 113–118.

Núñez, V., Otero, R., Barona, J., Fonnegra, R., Jiménez, S., Osorio, R. G., Quintana, J. C., & Díaz, A. (2004). Inhibition of the toxic effects of *Lachesis muta*, *Crotalus durissus cumanensis*, and *Micrurus mipartitus* snake venoms by plant extracts. *Pharmaceutical Biology*, *42*(1), 49–54. https://doi.org/10.1080/13880200490505483

Nwosu, M. O. (2002). Ethnobotanical studies on some pteridophytes of southern Nigeria. *Economic Botany*, *56*(3), 255–259. https://doi.org/10.1663/0013-0001(2002)056[0255:ESOSPO]2.0.CO;2

Oettinger, D. (2005). Planting under trees. *Landscape Architecture*, *95*(4), 56-68. Retrieved July 2, 2020, from www.jstor.org/stable/44675221

Oh, H., Kim, D.-H., Cho, J.-H., & Kim, Y.-C. (2004). Hepatoprotective and free radical scavenging activities of phenolic petrosins and flavonoids isolated from *Equisetum arvense*. *Journal of Ethnopharmacology*, *95*(2–3), 421–424. https://doi.org/10.1016/j.jep.2004.08.015

Olaifa, F. E., & Omekam, A. J. (2014). Studies on phytoremediation of copper using *Pteridium Aquilinum* (Bracken Fern) in the presence of biostimulants and bioassay using *Clarias Gariepinus* juveniles. *International Journal of Phytoremediation*, *16*(3), 219–234. https://doi.org/10.1080/15226514.2013.773272

Olivares, E., Pena, E., Marcano, E., Mostacero, J., Aguiar, G., Benitez, M., & Rengifo, E. (2009). Aluminum accumulation and its relationship with mineral plant nutrients in 12 pteridophytes from Venezuela. *Environmental and Experimental Botany*, *65*(1), 132–141. https://doi.org/10.1016/j.envexpbot.2008.04.002

Orhan, I., Küpeli, E., Şener, B., & Yesilada, E. (2007). Appraisal of anti-inflammatory potential of the clubmoss, *Lycopodium clavatum* L. *Journal of Ethnopharmacology*, *109*(1), 146–150. https://doi.org/10.1016/j.jep.2006.07.018

Orhan, I., Terzioglu, S., & Şener, B. (2003). α-Onocerin: An acetylcholinesterase inhibitor from *Lycopodium clavatum*. *Planta Medica*, *69*(3), 265–267. https://doi.org/10.1055/s-2003-38489

Ornes, W. H., Sajwan, K. S., Dosskey, M. G., & Adriano, D. C. (1991). Bioaccumulation of selenium by floating aquatic plants. *Water, Air, and Soil Pollution*, *57–58*(1), 53–57. https://doi.org/10.1007/BF00282868

Otero, R., Núñez, V., Barona, J., Fonnegra, R., Jiménez, S. L., Osorio, R. G., Saldarriaga, M., & Díaz, A. (2000). Snakebites and ethnobotany in the northwest region of Colombia. *Journal of Ethnopharmacology*, *73*(1–2), 233–241. https://doi.org/10.1016/S0378-8741(00)00321-4

Ottesen, C. (2007). Hardy plants for cool-climate gardens. *Landscape Architecture*, *97*(12), 32-37. Retrieved July 2, 2020, from www.jstor.org/stable/44677141

Ozaki, T., Enomoto, S., Minai, Y., Ambe, S., & Makide, Y. (2000). A survey of trace elements in pteridophytes. *Biological Trace Element Research*, *74*(3), 259–274. https://doi.org/10.1385/BTER:74:3:259

Ozay, Y., Ozyurt, S., Guzel, S., Cimbiz, A., Olgun, E. G., & Cayci, M. K. (2010). Effects of *Equisetum arvense* ointment on dermal wound healing in rats. *Wounds: a compendium of clinical research and practice*, *22*(10), 261–267.

Özgökçe, F., & Özçelik, H. (2004). Ethnobotanical aspects of some taxa in East Anatolia, Turkey. *Economic Botany*, *58*(4), 697–704. https://doi.org/10.1663/0013-0001(2004)058[0697:EAOSTI]2.0.CO;2

Pallag, A., Filip, G. A., Olteanu, D., Clichici, S., Baldea, I., Jurca, T., Micle, O., Vicaş, L., Marian, E., Soriţău, O., Cenariu, M., & Mureşan, M. (2018). *Equisetum arvense* L. extract induces antibacterial activity and modulates oxidative stress, inflammation, and apoptosis in endothelial vascular cells exposed to hyperosmotic stress. *Oxidative Medicine and Cellular Longevity*, *2018*, 1–14. https://doi.org/10.1155/2018/3060525

Pandey, V. C. (2012). Phytoremediation of heavy metals from fly ash pond by *Azolla caroliniana*. *Ecotoxicology and Environmental Safety*, *82*, 8–12. https://doi.org/10.1016/j.ecoenv.2012.05.002

Pannek, J., Kurmann, C., Imbach, E., Amsler, F., & Pannek-Rademacher, S. (2018). In vitro effects of homeopathic drugs on cultured *Escherichia coli*. *Homeopathy*, *107*(02), 150–154. https://doi.org/10.1055/s-0038-1637729

Paramita, P., Subramaniam, V. D., Murugesan, R., Gopinath, M., Ramachandran, I., Ramalingam, S., Sun, X. F., Banerjee, A., Marotta, F., & Pathak, S. (2018). Evaluation of potential anti-cancer activity of cationic liposomal nanoformulated *Lycopodium clavatum* in colon cancer cells. *IET Nanobiotechnology*, *12*(6), 727–732. https://doi.org/10.1049/iet-nbt.2017.0106

Parzych, A., & Astel, A. (2018). Accumulation of N, P, K, Mg and Ca in 20 species of herbaceous plants in headwater riparian forest. *Desalination and Water Treatment*, *117*, 156–167. https://doi.org/10.5004/dwt.2018.22202

Parzych, A., & Jonczak, J. (2018). Bioaccumulation of macro- and microelements in herbaceous plants in the river valley. *Journal of Ecological Engineering*, *19*(3), 170–177. https://doi.org/10.12911/22998993/86157

Pathak, S., Banerjee, A., Paul, S., & Khuda-Bukhsh, A. (2009). Protective potentials of a plant extract (*Lycopodium clavatum*) on mice chronically fed hepato-carcinogens. *Indian Journal of Experimental Biology*, *47*(7), 602–607.

Pathak, S., Bhattacharjee, N., Das, J. K., Choudhury, S. C., Karmakar, S. R., Banerjee, P., Paul, S., Banerjee, A., & Khuda-Bukhsh, A. R. (2007). Supportive evidence for the anticancerous potential of alternative medicine against hepatocarcinogenesis in mice. *Complementary Medicine Research*, *14*(3), 148–156. https://doi.org/10.1159/000103280

Pathak, S., Kumar Das, J., Jyoti Biswas, S., & Khuda-Bukhsh, A. R. (2006). Protective potentials of a potentized homeopathic drug, Lycopodium-30, in ameliorating azo dye induced hepatocarcinogenesis in mice. *Molecular and Cellular Biochemistry*, *285*(1–2), 121–131. https://doi.org/10.1007/s11010-005-9065-7

Patova, O. A., Smirnov, V. V., Golovchenko, V. V., Vityazev, F. V., Shashkov, A. S., & Popov, S. V. (2019). Structural, rheological and antioxidant properties of pectins from *Equisetum arvense* L. and *Equisetum sylvaticum* L. *Carbohydrate Polymers*, *209*, 239–249. https://doi.org/10.1016/j.carbpol.2018.12.098

Paunov, V. N., Mackenzie, G., & Stoyanov, S. D. (2007). Sporopollenin micro-reactors for in-situ preparation, encapsulation and targeted delivery of active components. *Journal of Materials Chemistry*, *17*(7), 609. https://doi.org/10.1039/b615865j

Pehlivan, E., Ersoz, M., Yildiz, S., & Duncan, H. J. (1994). Sorption of heavy metal ions on new metal-ligand complexes chemically derived from *Lycopodium clavatum*. *Separation Science and Technology*, *29*(13), 1757–1768. https://doi.org/10.1080/01496399408002170

Peixoto, P. V., França, T. do N., Barros, C. S. L., & Tokarnia, C. H. (2003). Histopathological aspects of Bovine Enzootic Hematuria in Brazil. *Pesquisa Veterinária Brasileira*, *23*(2), 65–81. https://doi.org/10.1590/S0100-736X2003000200004

Pereira, A. L., Bessa, L. J., Leão, P. N., Vasconcelos, V., & Martins da Costa, P. (2015). Bioactivity of *Azolla* aqueous and organic extracts against bacteria and fungi. *Symbiosis*, *65*(1), 17–21. https://doi.org/10.1007/s13199-015-0316-4

Pereira, A. V., Góis, M. B., Lera, K. R. J. L., Falkowski-Temporini, G. J., Massini, P. F., Drozino, R. N., Aleixo, D. L., Miranda, M. M., da Silva Watanabe, P., Conchon-Costa, I., da Costa, I. N., dos Anjos Neto Filho, M., de Araújo, S. M., & Pavanelli, W. R. (2017). Histopathological lesions in encephalon and heart of mice infected with *Toxoplasma*

gondii increase after *Lycopodium clavatum* 200dH treatment. *Pathology - Research and Practice*, *213*(1), 50–57. https://doi.org/10.1016/j.prp.2016.11.003

Pereira, A. V., Lera, K. R. J. L., Miranda, M. M., Drozino, R. N., Falkowski-Temporini, G. J., Góis, M. B., Conchon-Costa, I., da Costa, I. N., Aleixo, D. L., de Araújo, S. M., & Pavanelli, W. R. (2016). Safety and efficacy of *Lycopodium clavatum* 200dH in *Toxoplasma gondii* infected mice. *European Journal of Integrative Medicine*, *8*(4), 540–545. https://doi.org/10.1016/j.eujim.2016.03.004

Pérez-Nicolás, M., Vibrans, H., Romero-Manzanares, A., Saynes-Vásquez, A., Luna-Cavazos, M., Flores-Cruz, M., & Lira-Saade, R. (2017). Patterns of knowledge and use of medicinal plants in Santiago Camotlán, Oaxaca, Mexico. *Economic Botany*, *71*(3), 209–223. https://doi.org/10.1007/s12231-017-9384-0

Perry, F. (1952). Ethnobotany of the Indians in the interior of British Columbia. *Museum and Art Notes*, *2*(2), 36-43.

Pieroni, A., Ibraliu, A., Abbasi, A. M., & Papajani-Toska, V. (2015). An ethnobotanical study among Albanians and Aromanians living in the Rraicë and Mokra areas of Eastern Albania. *Genetic Resources and Crop Evolution*, *62*(4), 477–500. https://doi.org/10.1007/s10722-014-0174-6

Pittier, H. (1926). *Manual de las Plantas Usuales de Venezuela.* Litografia del Comercio, Caracas, Venezuela.

Poncavage, J. (2000). A full year of blooms. *Organic Gardening*, *47*, 24-31. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/203734234?accountid=14767

Pondcavage, J. (1996). Build a beautiful--and beneficial--pond. *Organic Gardening*, *43*, 28. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/203752941?accountid=14767

Pongpamorn, P., Wan-erlor, S., Ruchirawat, S., & Thasana, N. (2016). Lycoclavatumide and 8β,11α-dihydroxylycopodine, a new fawcettimine and lycopodine-type alkaloid from Lycopodium clavatum. *Tetrahedron*, *72*(44), 7065–7069. https://doi.org/10.1016/j.tet.2016.09.046

Pongpamorn, P., Wan-erlor, S., Ruchirawat, S., & Thasana, N. (2018). Semi-synthetic studies of α-onocerin derivatives for cytotoxicity. *Phytochemistry Letters*, *23*, 106–115. https://doi.org/10.1016/j.phytol.2017.11.017

Popa, K., Cecal, A., Humelnicu, D., Caraus, I., & Draghici, C. (2004). Removal of 60Co2+ and 137Cs+ ions from low radioactive solutions using *Azolla caroliniana* Willd. Water Fern. *Open Chemistry*, *2*(3), 434–445. https://doi.org/10.2478/BF02476199

Possebon, L., de Souza Lima Lebron, I., Furlan da Silva, L., Tagliaferri Paletta, J., Glad, B. G., Sant'Ana, M., Iyomasa-Pilon, M. M., Ribeiro Souza, H., de Souza Costa, S., Pereira da Silva Rodriguesa, G., Pereira, M. de L., de Haro Moreno, A., & Girol, A. P. (2018). Anti-inflammatory actions of herbal medicines in a model of chronic obstructive pulmonary disease induced by cigarette smoke. *Biomedicine & Pharmacotherapy*, *99*, 591–597. https://doi.org/10.1016/j.biopha.2018.01.106

Prabhakaran, P., Balakrishnan, R., Kodakkadal Kotian, S., & Bastian Suresh, K. (2017). Efficacy of certain common ferns against red spider mite *Oligonychus coffeae* and tea mosquito bug *Helopeltis theivora* infesting tea. *Plant Protection Science*, *53*(4), 232–242. https://doi.org/10.17221/23/2015-PPS

Qi, G., Yang, L., Xiao, C., Shi, J., Mi, Y., & Liu, X. (2015). Nutrient values and bioactivities of the extracts from three fern species in China: A comparative assessment. *Food & Function*, *6*(9), 2918–2929. https://doi.org/10.1039/C5FO00510H

Qian, H., Ricklefs, R., & Associate Editor: Daniel Simberloff. (1999). A Comparison of the Taxonomic Richness of Vascular Plants in China and the United States. *The American Naturalist*, *154*(2), 160-181. doi:10.1086/303230

Qian, S. (2018). Hanging gardens in modern high-rise apartment buildings. *Journal of Landscape Research, 10*(4), 1-4. doi:http://dx.doi.org.proxy.lib.utc.edu/10.16785/j.issn1943-989x.2018.4.001

Rabbani, Bajwa, R., & Javaid, A. (2011). Interference of five problematic weed species with rice growth and yield. *African Journal of Biotechnology*., 10(10), 1854–1862.

Radhakrishnan, B., & Prabhakaran, P. (2014). Biocidal activity of certain indigenous plant extracts against red spider mite, *Oligonychus coffeae* (Nietner) infesting tea. *Journal of Biopesticides*, *7*(1), 29-34. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/1586124254?accountid=14767

Radulović, N., Stojanović, G., & Palić, R. (2006). Composition and antimicrobial activity of *Equisetum arvense* L. essential oil. *Phytotherapy Research*, *20*(1), 85–88. https://doi.org/10.1002/ptr.1815

Rahman, I. U., Ijaz, F., Afzal, A., Iqbal, Z., Ali, N., & Khan, S. M. (2016). Contributions to the phytotherapies of digestive disorders: Traditional knowledge and cultural drivers of Manoor Valley, Northern Pakistan. *Journal of Ethnopharmacology*, *192*, 30–52. https://doi.org/10.1016/j.jep.2016.06.049

Rahman, M. A., & Hasegawa, H. (2011). Aquatic arsenic: Phytoremediation using floating macrophytes. *Chemosphere*, *83*(5), 633–646. https://doi.org/10.1016/j.chemosphere.2011.02.045

Rai, P. K. (2007). Wastewater management through biomass of *Azolla pinnata*: An eco-sustainable approach. *Ambio*, *36*(5), 426-8. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/207671408?accountid=14767

Rai, S. K., Sharma, R., Kumari, A., Rasmussen, L. H., Patil, R. D., & Bhar, R. (2017). Survey of ferns and clinico-pathological studies on the field cases of Enzootic Bovine Haematuria in Himachal Pradesh, a north-western Himalayan state of India. *Toxicon*, *138*, 31–36. https://doi.org/10.1016/j.toxicon.2017.08.010

Raj, A., & Singh, N. (2015). Phytoremediation of arsenic contaminated soil by arsenic accumulators: A three year study. *Bulletin of Environmental Contamination and Toxicology*, *94*(3), 308–313. https://doi.org/10.1007/s00128-015-1486-8

Rana, D., Bhatt, A., & Lal, B. (2019). Ethnobotanical knowledge among the semi-pastoral Gujjar tribe in the high altitude (Adhwari's) of Churah subdivision, district Chamba, Western Himalaya. *Journal of Ethnobiology and Ethnomedicine*, *15*(1), 10. https://doi.org/10.1186/s13002-019-0286-3

Rasmussen, L. H., Kroghsbo, S., Frisvad, J. C., & Hansen, H. C. B. (2003). Occurrence of the carcinogenic Bracken constituent ptaquiloside in fronds, topsoils and organic soil layers in Denmark. *Chemosphere*, *51*(2), 117–127. https://doi.org/10.1016/S0045-6535(02)00694-X

Rastogi, S., Pandey, M. M., & Rawat, A. K. S. (2018). Ethnopharmacological uses, phytochemistry and pharmacology of genus *Adiantum*: A comprehensive review. *Journal of Ethnopharmacology*, *215*, 101–119. https://doi.org/10.1016/j.jep.2017.12.034

Rathinasabapathi, B., Ma, L. Q., & Srivastava, M. (2006). Arsenic hyperaccumulating ferns and their application to phytoremediation of arsenic contaminated sites. *Floriculture, ornamental and plant biotechnology*, *3*(32), 304-311.

Rauh, D. (2005). Ferns. *The Botanical Artist,* (37), 7-7. Retrieved July 2, 2020, from www.jstor.org/stable/45037024

Rautray, S., Panikar, S., Amutha, T., & Rajananthini, A. U. (2018). Anticancer activity of *Adiantum capillus veneris* and *Pteris quadriureta* L. in human breast cancer cell lines. *Molecular Biology Reports*, *45*(6), 1897–1911. https://doi.org/10.1007/s11033-018-4337-y

Rawling, J. (1994). Australia's environmental weeds — whose responsibility? *Landscape Australia*, *16*(1), 36-58. Retrieved June 23, 2020, from www.jstor.org/stable/45145812

Reagan, A. B. (1936). Plants used by the Hoh and Quileute Indians. *Kansas Academy of Science 37*, 55-70.

Reddy, B., Gunasekar, D., Blond, A., & Bodo, B. (2007). New biflavonoid from *Selaginella rupestris. Natural Product Communications*, *2*(6), 659–662.

Reddy, K. R., & DeBusk, W. F. (1985). Growth characteristics of aquatic macrophytes cultured in nutrient-enriched water: II. *Azolla*, Duckweed, and *Salvinia*. *Economic Botany*, *39*(2), 200–208. https://doi.org/10.1007/BF02907846

Rehak, M. (2014). Heaven's skate. *Landscape Architecture, 104*(3), 104-115. Retrieved July 2, 2020, from www.jstor.org/stable/44794638

Rendón-Aguilar, B., Bernal-Ramírez, L. A., Bravo-Avilez, D., & Mendoza-Ruiz, A. (2017). Ethnobotany of Lycophyta and Polypodiophyta in priority terrestrial regions of Oaxaca, Mexico. *American Fern Journal*, *107*(4), 200-218. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/1981695328?accountid=14767

Rezghi, Mortazavi, S., Choopani, R., Fahimi, S., & Sheihkoleslami, M. (2019). Formulation of a traditional polyherbal product to a standard pharmaceutical syrup and development of its quality control methods. *Research Journal of Pharmacognosy*, *6*(4), 53–59. https://doi.org/10.22127/RJP.2019.93523.

Robbins, W.W., Harrington, J.P., & Freire-Marreco, B. (1916) *Ethnobotany of the Tewa Indians*. SI-BAE Bulletin.

Roberts, A. E., Boylen, C. W., & Nierzwicki-Bauer, S. A. (2014). Effects of lead accumulation on the *Azolla caroliniana–Anabaena* association. *Ecotoxicology and Environmental Safety*, *102*, 100–104. https://doi.org/10.1016/j.ecoenv.2014.01.019

Robertson, F. W. (2001). James Sutherland's "Hortus Medicus Edinburgensis" (1683). *Garden History*, *29*(2), 121. https://doi.org/10.2307/1587367

Robinson, B. H., Bischofberger, S., Stoll, A., Schroer, D., Furrer, G., Roulier, S., Gruenwald, A., Attinger, W., & Schulin, R. (2008). Plant uptake of trace elements on a Swiss military shooting range: Uptake pathways and land management implications. *Environmental Pollution*, *153*(3), 668–676. https://doi.org/10.1016/j.envpol.2007.08.034

Rofkar, J. R., Dwyer, D. F., & Bobak, D. M. (2014). Uptake and toxicity of arsenic, copper, and silicon in *Azolla caroliniana* and *Lemna minor*. *International Journal of Phytoremediation*, *16*(2), 155–166. https://doi.org/10.1080/15226514.2012.759534

Rogers, D. J. (1980). *Lakota names and traditional uses of native plants by Sicangu (Brule) People in the Rosebud Area, South Dakota, St. Francis, SD*. Rosebud Educational Society.

Rollinger, J. M., Ewelt, J., Seger, C., Sturm, S., Ellmerer, E. P., & Stuppner, H. (2005). New insights into the acetylcholinesterase inhibitory activity of *Lycopodium clavatum*. *Planta Medica*, *71*(11), 1040–1043. https://doi.org/10.1055/s-2005-873130

Romero, J. B. (1954). *The botanical lore of the California Indians, New York*. Vantage Press, Inc.

Rossi-Santos, B., de Oliveira Jacintho, J., Milliken, W., & Messias, M. C. T. B. (2018). The role of exotic species in traditional pharmacopeias of the Cerrado: A case study in southeast Brazil. *Economic Botany*, *72*(1), 38–55. https://doi.org/10.1007/s12231-018-9406-6

Roth, S. (1999). Gardener to the rescue. *Organic Gardening*, *46*, 54-58. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/203741946?accountid=14767

Roudsari, M. T., Bahrami, A. R., Dehghani, H., Iranshahi, M., Matin, M. M., & Mahmoudi, M. (2012). Bracken-fern extracts induce cell cycle arrest and apoptosis in certain cancer cell lines. *Asian Pacific Journal of Cancer Prevention*, *13*(12), 6047–6053. https://doi.org/10.7314/APJCP.2012.13.12.6047

Rousseau, J. (1945). Le folklore botanique de Caughnawaga. *Contributions de l'Institut botanique l'Universite de Montreal*, *55*, 7-72.

S. S., F. B. F., N. V., N. H., & S. S. H. (2007). Antidiabetic effect of *Equisetum arvense* L. (Equisetaceae) in Streptozotocin-induced diabetes in male rats. *Pakistan Journal of Biological Sciences*, *10*(10), 1661–1666. https://doi.org/10.3923/pjbs.2007.1661.1666

Sajini, R., Prema, S., & Chitra, K. (2019). Phytoconstituents, pharmacological activities of *Marsilea minuta* l. (Marsileaceae)—an overview. *International Journal of Pharmaceutical Sciences and Research*, *10*(4), 1582–1587. https://doi.org/10.13040/IJPSR.0975-8232.10(4).1582-87

Samadder, A., Das, S., Das, J., Paul, A., Boujedaini, N., & Khuda-Bukhsh, A. R. (2013). The potentized homeopathic drug, *Lycopodium clavatum* (5C and 15C) has anti-cancer effect on HeLa Cells in vitro. *Journal of Acupuncture and Meridian Studies*, *6*(4), 180–187. https://doi.org/10.1016/j.jams.2013.04.004

Sana, Javaid, A., Shoaib, A., & Bajwa, R. (2015). Effect of weeds and soil amendments on N, P and K contents of rice. *Pakistan Journal of Botany*, *47*, 251–254.

Sandhu, S. S., & Lower, W. R. (1989). In situ assessment of genotoxic hazards of environmental pollution. *Toxicology and Industrial Health*, *5*(1), 73–83. https://doi.org/10.1177/074823378900500107

Sapei, L., Gierlinger, N., Hartmann, J., Nöske, R., Strauch, P., & Paris, O. (2007). Structural and analytical studies of silica accumulations in *Equisetum hyemale*. *Analytical and Bioanalytical Chemistry*, *389*(4), 1249–1257. https://doi.org/10.1007/s00216-007-1522-6

Sapir, E. & Spier, L. (1943). Notes on the Culture of the Yana. *Anthropological Records, 3*(3), 252-253.

Sarker, S. K., & Hossain, A. B. M. E. (2009). Pteridophytes of greater Mymensingh district of Bangladesh used as vegetables and medicines. *Bangladesh Journal of Plant Taxonomy*, *16*(1), 47–56. https://doi.org/10.3329/bjpt.v16i1.2746

Sarris, J., McIntyre, E., & Camfield, D. A. (2013). Plant-based medicines for anxiety disorders, part 1: A review of preclinical studies. *CNS Drugs*, *27*(3), 207–219. https://doi.org/10.1007/s40263-013-0044-3

Savo, V., Salomone, F., Bartoli, F., & Caneva, G. (2019). When the local cuisine still incorporates wild food plants: The unknown traditions of the Monti Picentini Regional Park (Southern Italy). *Economic Botany*, *73*(1), 28–46. https://doi.org/10.1007/s12231-018-9432-4

Schenck, S. M. & Gifford, E. W. (1952). Karok Ethnobotany. *Anthropological Records*, *13*(6), 377-392.

Schmidt, M., Skaf, J., Gavril, G., Polednik, C., Roller, J., Kessler, M., & Holzgrabe, U. (2017). The influence of *Osmunda regalis* root extract on head and neck cancer cell proliferation, invasion and gene expression. *BMC Complementary and Alternative Medicine*, *17*(1), 518. https://doi.org/10.1186/s12906-017-2009-4

Schoendorfer, N., Sharp, N., Seipel, T., Schauss, A. G., & Ahuja, K. D. K. (2018). Urox containing concentrated extracts of *Crataeva nurvala* stem bark, *Equisetum arvense* stem and *Lindera aggregata* root, in the treatment of symptoms of overactive bladder and urinary incontinence: A phase 2, randomised, double-blind placebo controlled trial. *BMC Complementary and Alternative Medicine*, *18*(1), 42. https://doi.org/10.1186/s12906-018-2101-4

Seigler, D. S. (1976). Plants of the northeastern United States that produce cyanogenic compounds. *Economic Botany*, *30*(4), 395–407. https://doi.org/10.1007/BF02904662

Selby, C. (2002, August). Nature lessons: A newfoundland gardener learns that preserving a natural landscape means making room for change [Madeline Norris]. *Canadian Gardening*, *13*, 32-39. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/217803995?accountid=14767

Selby, C. (2004, Summer). Potted ponds: Water, water everywhere - even in the smallest garden. *Canadian Gardening*, *15*, 50-50,52. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/217791565?accountid=14767

Shaheen, H., Qaseem, M. F., Amjad, M. S., & Bruschi, P. (2017). Exploration of ethno-medicinal knowledge among rural communities of Pearl Valley; Rawalakot, District Poonch Azad Jammu and Kashmir. *PLOS ONE*, *12*(9), e0183956. https://doi.org/10.1371/journal.pone.0183956

Sharma, H. P., & Kumar, R. A. (2013). Health security in ethnic communities through nutraceutical leafy vegetables. *Journal of Environmental Research and Development*, *7*(4), 1423-1429. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/1511818680?accountid=14767

Shih-chen, Li. (1973). *Chinese medicinal herbs*. Georgetown Press.

Siddiqui, M. B., Alam, M. M., & Husain, W. (1989). Traditional treatment of skin diseases in Uttar Pradesh, India. *Economic Botany*, *43*(4), 480–486. https://doi.org/10.1007/BF02935922

Sinam, G., Behera, S. Kr., Mishra, R. Kr., Sinha, S., Mallick, S., & Khare, P. B. (2012). Comparison of two ferns (*Adiantum Capillus-veneris* Linn. and *Microsorium punctatum* (Linn.) Copel) for their Cr accumulation potential and antioxidant responses. *International Journal of Phytoremediation*, *14*(7), 629–642. https://doi.org/10.1080/15226514.2011.619229

Singh, M., Singh, N., Khare, P. B., & Rawat, A. K. S. (2008). Antimicrobial activity of some important *Adiantum* species used traditionally in indigenous systems of medicine. *Journal of Ethnopharmacology*, *115*(2), 327–329. https://doi.org/10.1016/j.jep.2007.09.018

Singh, N., Kaur, S., Bedi, P.M., & Kaur, D. (2011). Anxiolytic effects of *Equisetum arvense* Linn. extracts in mice. *Indian J Exp Biol*, *49*(5), 352-356.

Singh, Nandita, Raj, A., Khare, P. B., Tripathi, R. D., & Jamil, S. (2010). Arsenic accumulation pattern in 12 Indian ferns and assessing the potential of *Adiantum capillus-veneris*, in comparison to *Pteris vittata*, as arsenic hyperaccumulator. *Bioresource Technology*, *101*(23), 8960–8968. https://doi.org/10.1016/j.biortech.2010.06.116

Singh, Navdeep, Kaur, S., Bedi, P. M. S., & Kaur, D. (2011). Anxiolytic effects of *Equisetum arvense* Linn. extracts in mice. *Indian Journal of Experimental Biology*, *49*(5), 352–356.

Sivakumar, Nouri, J. (2015). Removal of contaminants in a paper mill effluent by *Azolla caroliniana*. *Global Journal of Environmental Science and Management*, *1*(4), 297–304. https://doi.org/10.7508/gjesm.2015.04.004.

Smith, D., & Harborne, J. (1971). Xanthones in the Appalachian Asplenium complex. *Phytochemistry*, *10*(9), 2117–2119. https://doi.org/10.1016/S0031-9422(00)97205-4

Smith, H. H. (1923) Ethnobotany of the Menomini Indians. *Bulletin of the Public Museum of the City of Milwaukee*, *4*, 1-174.

Smith, H. H. (1928). Ethnobotany of the Meskwaki Indians. *Bulletin of the Public Museum of the City of Milwaukee*, *4*, 175-326.

Smith, H. H. (1932). Ethnobotany of the Ojibwe Indians. *Bulletin of the Public Museum of Milwaukee*, *4*, 327-525.

Smith, H. H. (1933). Ethnobotany of the Forest Potawatomi Indians. *Bulletin of the Public Museum of the City of Milwaukee*, *7*, 1-230.

Smith, H. I. (1929). Materia Medica of the Bella Coola and Neighboring Tribes of British Columbia. *National Museum of Canada Bulletin*, *56*, 47-68.

Soare, L., Ferdes, M., Stefanov, S., Denkova, Z., Nicolova, R., Denev, P., & Paunescu, A. (2012). Antioxidant activity, polyphenols content and antimicrobial activity of several native pteridophytes of Romania. *Notulae Botanicae Horti Agrobotanici Cluj-Napoca*, *40*(1), 53. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/1170751244?accountid=14767

Soare, Visoiu, E., Bejan, C., Dobrescu, C., & Fierascu, I. (2015). Research on the in vitro bioaccumulation capacity of lead in some pteridophyte species of the Romanian flora. *Revista de Chimie*, *66*(12), 2017–2020.

Soares, A., Ticli, F., Marcussi, S., Lourenco, M., Januario, A., Sampaio, S., Giglio, J., Lomonte, B., & Pereira, P. (2005). Medicinal plants with inhibitory properties against snake venoms. *Current Medicinal Chemistry*, *12*(22), 2625–2641. https://doi.org/10.2174/092986705774370655

Soliman, A. M., Teoh, S. L., Ghafar, N. A., & Das, S. (2019). Molecular concept of diabetic wound healing: Effective role of herbal remedies. *Mini-Reviews in Medicinal Chemistry*, *19*(5), 381–394. https://doi.org/10.2174/1389557518666181025155204

Song, G., Wang, K., Zhang, H., Sun, H., Wu, B., & Ju, X. (2017). Structural characterization and immunomodulatory activity of a novel polysaccharide from *Pteridium aquilinum*. *International Journal of Biological Macromolecules*, *102*, 599–604. https://doi.org/10.1016/j.ijbiomac.2017.04.037

Sood, A., Uniyal, P. L., Prasanna, R., & Ahluwalia, A. S. (2012). Phytoremediation potential of aquatic macrophyte, *Azolla*. *AMBIO*, *41*(2), 122–137. https://doi.org/10.1007/s13280-011-0159-z

Speck, F. G. (1917). *Medicine Practices of the Northeastern Algonquians*. [Proceedings of the 19th International Congress of Americanists]. 19th International Congress of Americanists.

Speck, F. G. (1941). A list of plant curatives obtained from the Houma Indians of Louisiana. *Primitive Man, 14,* 49-75.

Srinivasan, Palaniappan, S. (1994). Effect of major weed species on growth and yield of rice (Oryza-sativa). *Indian Journal of Agronomy*, *39*(1), 13–15.

Srivastava, J., Gupta, A., & Chandra, H. (2008). Managing water quality with aquatic macrophytes. *Reviews in Environmental Science and Bio/Technology*, *7*(3), 255–266. https://doi.org/10.1007/s11157-008-9135-x

Srivastava, M., Santos, J., Srivastava, P., & Ma, L. Q. (2010). Comparison of arsenic accumulation in 18 fern species and four *Pteris vittata* accessions. *Bioresource Technology*, *101*(8), 2691–2699. https://doi.org/10.1016/j.biortech.2009.11.070

Srivastava, Singh, A., & Rawat, A. (2008). Pharmacognostical and phytochemical evaluation of *Lycopodium clavatum* stem. *Journal of Scientific & Industrial Research, 67*(3), 228–232.

Štajner, D., Popović, B. M., Čanadanović-Brunet, J., & Anačkov, G. (2009). Exploring *Equisetum arvense* L., *Equisetum ramosissimum* L. and *Equisetum telmateia* L. as sources of natural antioxidants. *Phytotherapy Research*, *23*(4), 546–550. https://doi.org/10.1002/ptr.2682

Steedman, E.V. (1928) *The ethnobotany of the Thompson Indians of British Columbia*. SI-BAE Annual Report #45.

Steinmetz, E.F. (1957). *Codex vegetabilis*. Published by the author.

Stone, J. H. (1962). Economic plants encountered on the voyage of the beagle. *Economic Botany*, *16*(2), 116–126. https://doi.org/10.1007/BF02985299

Stroppa, N., Onelli, E., Hejna, M., Rossi, L., Gagliardi, A., Bini, L., Baldi, A., & Moscatelli, A. (2020). *Typha latifolia* and *Thelypteris palustris* behavior in a pilot system for the refinement of livestock wastewaters: A case of study. *Chemosphere*, *240*, 124915. https://doi.org/10.1016/j.chemosphere.2019.124915

Studlar, S. M., & Peck, J. E. (2007). Commercial moss harvest in the Appalachian Mountains of West Virginia: Targeted species and incidental take. *The Bryologist*, *110*(4), 752–765. https://doi.org/10.1639/0007-2745(2007)110[752:CMHITA]2.0.CO;2

Sturtevant, W. (1954). *The Mikasuki Seminole: Medical Beliefs and Practices*. [Doctoral dissertation, Yale University]. Native American Ethnobotany Database.

Sudareva, N., Suvorova, O., Saprykina, N., Vilesov, A., Bel'tiukov, P., Petunov, S., & Radilov, A. (2017). Two-level delivery systems for oral administration of peptides and proteins based on spore capsules of *Lycopodium clavatum*. *Journal of Materials Chemistry B*, *5*(37), 7711–7720. https://doi.org/10.1039/C7TB01681F

Sumesh N. Dudani, Mahesh M.K., Vishnu Mukri, M.D. Subash Chandran and T.V. Ramachandra. (2013). An appraisal and conservation strategies for the pteridophytes of Uttara Kannada. *CES Technical Report : 129, Energy & Wetlands Research Group, Centre for Ecological Sciences, Indian Institute of Science, Bangalore 560 012.* doi:http://wgbis.ces.iisc.ernet.in/biodiversity/pubs/ces_tr/TR129/index.htm

Summerfeldt, B. (2005, May). Side effects: Tips for turning your narrow side yard into a little garden of Eden. *Canadian Gardening, 16*, 40-42. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/217817509?accountid=14767

Swank, G. R. (1932). *The ethnobotany of the Acoma and Laguna Indians.* [Master's Thesis, University of New Mexico]. Native American Ethnobotany Database.

Swartz, B. K. (1958). A study of material aspects of northeastern Maidu basketry. *Kroeber Anthropological Society Publications, 19*, 67-84.

Tabor, E. (1970). Plant poisons in Shakespeare. *Economic Botany*, *24*(1), 81–94. https://doi.org/10.1007/BF02860641

Tackholm, V. & Tackholm, Gunnar. (1973). Flora of Egypt. Foriad I University Bulletin of the Faculty of Science.

Takahashi, M., Murata, Y., Hakamata, Y., Suzuki, K., Sengoku, T., & Yoda, H. (2012). First total synthesis and absolute stereochemical assignment of vittarilide-A, an antioxidant extractive component isolated from *Vittaria anguste-elongata* Hayata. *Tetrahedron*, *68*(38), 7997–8002. https://doi.org/10.1016/j.tet.2012.06.105

Takeda Chem. Industries. (1978). *List of Plants.* Kyoto Herbal Garden, Parmacognostic Research Lab., Central Research Division, Takeda Chem. Industries, Ltd., Ichijoji, Sakyoku, Kyoto, Japan.

Tan, C., Shan, X., Xu, G., Lin, Y.-M., & Chen, Z. (2011). Phytoaccumulation of cadmium through *Azolla* from aqueous solution. *Ecological Engineering*, *37*(11), 1942–1946. https://doi.org/10.1016/j.ecoleng.2011.01.010

Tanner, H. (2014). New California landscapes. *Landscape Architecture Australia,* (141), 72-73. Retrieved June 24, 2020, from www.jstor.org/stable/48513255

Tanveer, A., Safdar, M. E., Suleman, M., Tahir, M., Zamir, S. I., & Nadeem, M. A. (2015). Assessing the potential of the water soluble allelopaths of *Marsilea minuta* in rice and wheat. *Planta Daninha*, *33*(2), 231–239. https://doi.org/10.1590/0100-83582015000200008

Tardío, J., & Pardo-de-Santayana, M. (2008). Cultural importance indices: A comparative analysis based on the useful wild plants of Southern Cantabria (Northern Spain). *Economic Botany*, *62*(1), 24–39. https://doi.org/10.1007/s12231-007-9004-5

Tauseef, M., Ihsan, F., Nazir, W., & Farooq, J. (2012). Weed flora and importance value index (ivi) of the weeds in cotton crop fields in the region of Khanewal, Pakistan. *Pakistan Journal of Weed Science Research*, *18*(3) Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/1095849203?accountid=14767

Tayeb, I. T., Artoshi, N. H. R., & Sögüt, B. (2019). performance of broiler chicken fed different levels thyme, adiantum, rosemary and their combination. *The Iraqi Journal of Agricultural Science, 50*(5), 1522-1532. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/2352142252?accountid=14767

Taylor, L. A. (1940). *Plants used as curatives by certain southeastern tribes*. Botanical Museum of Harvard University.

Tennessee Flora Committee. (2015). *Guide to the vascular plants of Tennessee* (editors: E.W. Chester, B.E. Wofford, J. Shaw, D. Estes, and D.H. Webb). Knoxville, TN: The University of Tennessee Press.

Thayer, S. (2004, May). Fern fiddleheads: The succulent stalks of spring. *Countryside and Small Stock Journal, 88*, 55-57. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/197242114?accountid=14767

Theodoratus, R. J. (1989). Loss, transfer, and reintroduction in the use of wild plant foods in the Upper Skagit Valley. *Northwest Anthropological Research Notes, 23*(1), 35-52.

Timbrook, J. (1990). Ethnobotany of Chumash Indians, California, based on collections by John P. Harrington. *Economic Botany*, *44*(2), 236–253. https://doi.org/10.1007/BF02860489

Tiwari, O. P., Bhattamisra, S. K., Tripathi, P. K., & Singh, P. N. (2010). Anti-aggressive activity of a standardized extract of *Marsilea minuta* Linn. in rodent models of aggression. *Bioscience Trends*, *4*(4), 190–194.

Trans canada. (2007, June). *Canadian Gardening, 18*, 108-116,119. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/217801936?accountid=14767

Turner, N. C., & Bell, M. A. M. (1971). The ethnobotany of the Coast Salish Indians of Vancouver Island. *Economic Botany*, *25*(1), 63–99. https://doi.org/10.1007/BF02894564

Turner, N. C., & Bell, M. A. M. (1973). The ethnobotany of the Southern Kwakiutl Indians of British Columbia. *Economic Botany*, *27*(3), 257–310. https://doi.org/10.1007/BF02907532

Turner, N. J. & Efrat, B.S. (1982). *Ethnobotany of the Hesquiat Indians of Vancouver Island, Victoria.* British Columbia Provincial Museum.

Turner, N. J., Bouchard, R., & Kennedy, D. (1980). *Ethnobotany of the Okanagan-Colville Indians of British Columbia and Washington.* British Columbia Provincial Museum.

Turner, N. J., Thomas, J., Carlson, B. F., & Ogilvie, R. T. (1983). *Ethnobotany of the Nitinaht Indians of Vancouver Island, Victoria.* British Columbia Provincial Museum.

Turner, N. J., Thompson, L. C., & Thompson, M. T. (1990) *Thompson ethnobotany: Knowledge and usage of plants by the Thompson Indians of British Columbia, Victoria.* Royal British Columbia Museum.

U.S. Department of Agriculture. (1992). *Duke's Phytochemical and Ethnobotanical Databases.* [database]. Retrieved from http://phytochem.nal.usda.gov/ http://dx.doi.org/10.15482/USDA.ADC/1239279

Uddin, M. J., & Gill, H. S. (2018). From allergen to oral vaccine carrier: A new face of ragweed pollen. *International Journal of Pharmaceutics*, *545*(1–2), 286–294. https://doi.org/10.1016/j.ijpharm.2018.05.003

University of Michigan. (1977). *Native American Ethnobotany Database: A Database of Foods, Drugs, Dyes and Fibers of Native American Peoples, Derived from Plants.* [database]. Retrieved from http://naeb.brit.org/

Uphof, J.C. (1968). *Dictionary of economic plants.* Verlag von J. Cramer.

Uprety, Y., Poudel, R. C., Shrestha, K. K., Rajbhandary, S., Tiwari, N. N., Shrestha, U. B., & Asselin, H. (2012). Diversity of use and local knowledge of wild edible plant resources in nepal. *Journal of Ethnobiology and Ethnomedicine, 8*, 16. doi:http://dx.doi.org.proxy.lib.utc.edu/10.1186/1746-4269-8-16

Van Nest, A. M. (2003, April). Hot new perennials for 2003: Purple and gold lead a colourful parade of new introductions. *Canadian Gardening, 14*, 100-109. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/217795178?accountid=14767

Vechia, J. F. D., Cruz, C., Silva, A. F., Cerveirajr., W. R., & Garlich, N. (2016). Macrophyte bioassay applications for monitoring pesticides in the aquatic environment. *Planta Daninha*, *34*(3), 597–603. https://doi.org/10.1590/s0100-83582016340300021

Vestal, P. A. (1952). The ethnobotany of the Ramah Navaho. *Papers of the Peabody Museum of American Archaeology and Ethnology*, *40*(4), 1-94.

Vijayalakshmi, A., & Kiran Kumar, Y. (2013). Evaluation of goitrogenic and antithyroidal effect of the fern *Adiantum capillus-veneris*. *Revista Brasileira de Farmacognosia*, *23*(5), 802–810. https://doi.org/10.1590/S0102-695X2013000500013

Vilarem, G., Périneau, F., & Gaset, A. (1992). Exploitation of the molecular potential of plants: *Equisetum arvense* (Equisetaceae). *Economic Botany*, *46*(4), 401–407. https://doi.org/10.1007/BF02866512

Virgilio, A., Sinisi, A., Russo, V., Gerardo, S., Santoro, A., Galeone, A., Taglialatela-Scafati, O., & Roperto, F. (2015). Ptaquiloside, the major carcinogen of Bracken Fern, in the pooled raw milk of healthy sheep and goats: An underestimated, global concern of food safety. *Journal of Agricultural and Food Chemistry*, *63*(19), 4886–4892. https://doi.org/10.1021/acs.jafc.5b01937

von Aderkas, P. (1984). Economic history of ostrich fern, *Matteuccia struthiopteris*, the edible fiddlehead. *Economic Botany*, *38*(1), 14–23. https://doi.org/10.1007/BF02904412

Wahyudianto, F., Oktavitri, N., Hariyanto, S., & Maulidia, D. (2019). Application of *Equisetum hyemale* in constructed wetland: influence of wastewater dilution and contact time. *Journal of Ecological Engineering*, *20*(1), 174–179. https://doi.org/10.12911/22998993/93941

Wang, Hong, Nie, L., Xu, Y., Li, M., & Lv, Y. (2018). Traffic-emitted metal status and uptake by *Carex meyeriana* Kunth and *Thelypteris palustris* var. *pubescens* Fernald growing in roadside turfy swamp in the Changbai Mountain area, China. *Environmental Science and Pollution Research*, *25*(19), 18498–18509. https://doi.org/10.1007/s11356-018-1990-6

Wang, Hongbing, & Wu, S. (2013). Preparation and antioxidant activity of *Pteridium aquilinum*-derived oligosaccharide. *International Journal of Biological Macromolecules*, *61*, 33–35. https://doi.org/10.1016/j.ijbiomac.2013.06.053

Wang, Q., Wang, Q., Ni, Z., Bao, H., & Li, X. (2019). Evaluation of corrosion inhibition to *Pteridium aquilinum* extract via the methods of electrochemistry experiment. *Materials Research Express*, *6*(12), 125504. https://doi.org/10.1088/2053-1591/ab5479

Waters, A. (2018). The Lure of Possibility. *The Botanical Artist, 24*(3), 26-27. doi:10.2307/48502964

Waugh, F. W. (1916) *Iroquis foods and food preparation*. Canada Department of Mines.

Weckerle, C. S., Huber, F. K., Yongping, Y., & Weibang, S. (2006). Plant knowledge of the Shuhi in the Hengduan Mountains, Southwest China. *Economic Botany*, *60*(1), 3–23. https://doi.org/10.1663/0013-0001(2006)60[3:PKOTSI]2.0.CO;2

Williams, S. (2003, September). Prairie oasis: The challenge of creating a garden on beach sand, with limited water and zone 2 conditions, is met by a consummate plantswoman. *Canadian Gardening, 14*, 46-53. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/217805182?accountid=14767

Wilson, M. R. (1978). Notes on ethnobotany in Inuktitut. *The Western Canadian Journal of Anthropology, 8*, 180-196.

Witthoft, J. (1947). An early Cherokee ethnobotanical note. *Journal of the Washington Academy of Sciences*, *37*(3), 73-75.

Wright, C. I., Van-Buren, L., Kroner, C. I., & Koning, M. (2007). Herbal medicines as diuretics: A review of the scientific evidence. *Journal of Ethnopharmacology*, *114(1)*, 1-31. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/925451364?accountid=14767

Wu, P. L., Hsu, Y. L., Zao, C. W., Damu, A. G., & Wu, T. S. (2005). Constituents of *Vittaria anguste-elongata* and their biological activities. *Journal of Natural Products*, *68*(8), 1180–1184. https://doi.org/10.1021/np050060o

Wyman, L. C. & Harris, S.K. (1951). *The ethnobotany of the Kayenta Navaho.* The University of New Mexico Press.

Wyss, E., Tamm, L., Siebenwirth, J., & Baumgartner, S. (2010). Homeopathic preparations to control the Rosy Apple Aphid (*Dysaphis plantaginea* Pass.). *The Scientific World Journal*, *10*, 38–48. https://doi.org/10.1100/tsw.2010.12

Xu, W., Zhang, F., Luo, Y., Ma, L., Kou, X., & Huang, K. (2009). Antioxidant activity of a water-soluble polysaccharide purified from *Pteridium aquilinum*. *Carbohydrate Research*, *344*(2), 217–222. https://doi.org/10.1016/j.carres.2008.10.021

Yadegari, Sellami, Riahy, Mirdar, Hamidian, Saeidi, Abderrahman, Hackney, & Zouhal. (2019). Supplementation of *Adiantum capillus-veneris* modulates alveolar apoptosis under hypoxia condition in wistar rats exposed to exercise. *Medicina*, *55*(7), 401. https://doi.org/10.3390/medicina55070401

Yan, J., Sun, L., Li, W., Zhou, L., Li, Z., Zhang, X., Yang, L., & Qiu, M. (2010). Cytotoxic serratane triterpenes from *Diphasiastrum complanatum* with a hydroxy group at C-27. *Planta Medica*, *76*(04), 353–357. https://doi.org/10.1055/s-0029-1186168

Yang, S. X., Tian, Q. J., Liang, S. C., Zhou, Y. Y., & Zou, H. C. (2012). [Bioaccumulation of heavy metals by the dominant plants growing in Huayuan manganese and lead/zinc mineland, Xiangxi]. *Huan Jing Ke Xu*, *33*(6), 2038–2045.

Yoon, S., & Woudstra, J. (2007). Advanced horticultural techniques in Korea: The earliest documented greenhouses. *Garden History*, *35*(1), 68-84. doi:10.2307/25472355

Yousaf, B., Amina, Liu, G., Wang, R., Qadir, A., Ali, M. U., Kanwal, Q., Munir, B., Asmatullah, & Abbas, Z. (2016). Bisphenol A exposure and healing effects of *Adiantum capillus-veneris* L. plant extract (APE) in bisphenol A-induced reproductive toxicity in albino rats. *Environmental Science and Pollution Research*, *23*(12), 11645–11657. https://doi.org/10.1007/s11356-016-6330-0

Yuan, Q., Zhang, X., Liu, Z., Song, S., Xue, P., Wang, J., & Ruan, J. (2013). Ethanol extract of *Adiantum capillus-veneris* L. suppresses the production of inflammatory mediators by inhibiting NF-κB activation. *Journal of Ethnopharmacology*, *147*(3), 603–611. https://doi.org/10.1016/j.jep.2013.03.046

Yuan, Y., Yang, B., Ye, Z., Zhang, M., Yang, X., Xin, C., Lin, M., & Huang, P. (2013). *Sceptridium ternatum* extract exerts antiasthmatic effects by regulating Th1/Th2 balance and the expression levels of leukotriene receptors in a mouse asthma model. *Journal of Ethnopharmacology*, *149*(3), 701–706. https://doi.org/10.1016/j.jep.2013.07.032

Yumkham, S. D., Chakpram, L., Salam, S., Bhattacharya, M. K., & Singh, P. K. (2017). Edible ferns and fern–allies of North East India: A study on potential wild vegetables. *Genetic Resources and Crop Evolution*, *64*(3), 467–477. https://doi.org/10.1007/s10722-016-0372-5

Yumkham, S. D., Elangbam, M., Nongmaithem, R., Naorem, P. D., & Singh, P. K. (2018). Maiden hair ferns (*Adiantum* L., Pteridaceae–Vittarioideae) of North East India: Diversity, phytochemistry and utilization. *Genetic Resources and Crop Evolution*, *65*(4), 1269–1280. https://doi.org/10.1007/s10722-018-0612-y

Zavoi, S., Fetea, F., Ranga, F., Pop, R. M., Baciu, A., & Socaciu, C. (2011). Comparative fingerprint and extraction yield of medicinal herb phenolics with hepatoprotective potential, as determined by UV-Vis and FT-MIR Spectroscopy. *Notulae Botanicae Horti Agrobotanici Cluj-Napoca*, *39*(2), 82. https://doi.org/10.15835/nbha3926278

Zeb, A., & Ullah, F. (2017). Reversed phase HPLC-DAD profiling of carotenoids, chlorophylls and phenolic compounds in *Adiantum capillus-veneris* Leaves. *Frontiers in Chemistry*, *5*, 29. https://doi.org/10.3389/fchem.2017.00029

Zhang, S., Huang, Y., Xie, Z., & Zhang, X. (2013). Screening of the indoor plants for removing formaldehyde. *Meteorological and Environmental Research*, *4*(2-3), 40. Retrieved from https://proxy.lib.utc.edu/login?url=https://search-proquest-com.proxy.lib.utc.edu/docview/1352289566?accountid=14767

Zhang, X., Chen, H.-L., Hong, L., Xu, L.-L., Gong, X.-W., Zhu, D.-L., Xu, X.-H., Zhao, W., Wang, F., & Yang, X.-L. (2019). Three new hopane-type triterpenoids from the aerial part of *Adiantum capillus-veneris* and their antimicrobial activities. *Fitoterapia*, *133*, 146–149. https://doi.org/10.1016/j.fitote.2019.01.006

Zhang, X., Lin, A.-J., Zhao, F.-J., Xu, G.-Z., Duan, G.-L., & Zhu, Y.-G. (2008). Arsenic accumulation by the aquatic fern *Azolla*: Comparison of arsenate uptake, speciation and efflux by *A. caroliniana* and *A. filiculoides*. *Environmental Pollution*, *156*(3), 1149–1155. https://doi.org/10.1016/j.envpol.2008.04.002

Zheleznova, O. S., & Tobratov, S. A. (2019). Механизм гипераккумуляции цезия: Как растения противостоят питательным дисбалансам в условиях загрязнения. *Журнал общей биологии*, *80*(5), 386–400. https://doi.org/10.1134/S0044459619050099

Zhou, D., Wei, A., Cao, C., & Ruan, J. (2013). DICO, a novel nonaromatic B-ring flavonoid, induces G2/M cell cycle arrest and apoptosis in human hepatoma cells. *Food and Chemical Toxicology*, *57*, 322–329. https://doi.org/10.1016/j.fct.2013.03.032