

Collection to Commerce: Western North Carolina Non-Timber Forest Products and Their Markets

2003 Report

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Introduction

During the past 20 years there have been significant changes in the collection and marketing of forest botanicals. Traditionally, forest botanicals, with the exception of ginseng, were collected primarily for personal use. Small volumes of herbs and roots were collected by local people to sell to root, herb, and fur buyers in the region. The level of harvest was limited by local population density and access to suitable harvest sites. Today the trend is towards large-scale collection for commerce in rapidly expanding commercial markets far away from the areas of harvest (Kauffman, 2001). For example, at least 175 species of plants native to North America are currently sold in the non-prescription medicinal market in the United States; and more than 140 medicinal herbs native to North America have been documented in herbal products and phytomedicines in foreign countries (Robbins, 1999). Approximately half of the above mentioned 175 species occur within the Southern Appalachians.

According to F-D-C Reports/The Hartman Group, the medicinal herbal market alone grew from $1.3 billion in 1994 to almost $4 billion in 1998. It is estimated that over 40% of prescription drugs in the U.S. contain at least one ingredient derived from nature (Foster & Duke, 1990). According to a market report done for Yellow Creek Botanical Institute (2001), estimates of the current size of the overall botanicals industry vary widely, due to changeable definitions of what is encompassed by the botanicals industry. Table 1 shows estimates from this report.

Table 1. Estimates of retail sales in the botanical industry.

Segment	Estimate
Herbal dietary supplements	$4 billion
Culinary herbs and spices	$10 billion
Botanicals for functional foods	Category $14 billion, botanical sales unknown
Botanicals for other natural products (herbal teas, bulk sales, over the counter drugs)	$4 billion

Yellow Creek Botanical Institute, 2001.

From another report (NC Consortium, 2002), the global market consumption at the retail level for medicinal herbs is estimated at around $35 billion. Figure 1 shows the consumption breakdown, globally (in percentages).

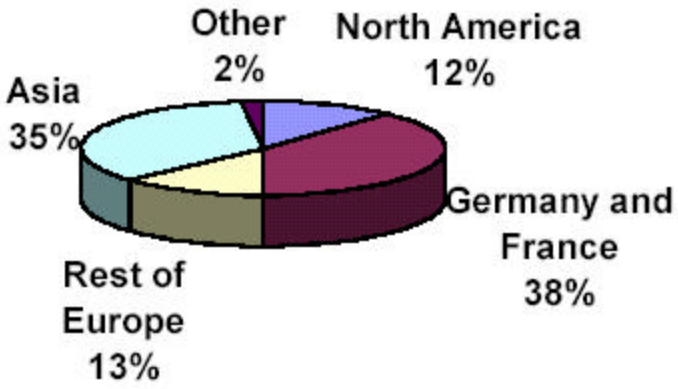


Figure 1. Global market consumption of medicinal herbs at retail level in 2001. NC Consortium, 2002.

Demand is expected to rise as more clinical research is done on the benefits of medicinal herbs, many of them native species. The aging baby boomer generation has brought increased awareness of women's health problems related to menopause, prostate enlargement in men, and cancer. This generation's practical approach to health care and interest in natural products will create even more of a demand for these botanicals.

The figures mentioned above refer to just one of four segments of non-timber forest products (NTFP) that are wild-harvested, bought, and resold. The four segments are medicinals, edibles,

floral-decoratives, and nursery ornamentals. This project, **Collection to Commerce: Western North Carolina Non-Timber Forest Products (NTFP) and their Markets,** is **Phase I** of a 2001 study of forty-six NTFPs (Table 2) that are found growing in twenty-five counties of Western North Carolina (see Figure 2). The Western North Carolina Counties included in this study are: Alleghany, Ashe, Avery, Buncombe, Burke, Caldwell, Cherokee, Clay, Graham, Haywood, Henderson, Jackson, Macon, Madison, McDowell, Mitchell, Polk, Rutherford, Surry, Swain, Transylvania, Watauga, Wilkes, Yadkin, and Yancey.

This project is a cooperative study between the United States Forest Service SRS 4702 (Integrated Life Cycles, Blacksburg, VA) and the Department of Horticultural Science at North Carolina State University.

Table 2. Forty-six forest botanical products collected and sold from the Southern Appalachians, including western NC. List provided by Gary Kauffman, US Forest Service, 2002.

Product Group	Common Name	Scientific Name
Medicinals	Yarrow	*Achillea millefolium*
	Black Cohosh	***Actaea racemosa, Cimicifuga racemosa***
	Maidenhair Fern	*Adiantum peltatum*
	Star Grass	*Aletris farinosa*
	Mountain Angelica	*Angelica triquinata*
	Wild Sarsparilla	*Aralia nudicaulis*
	Spikenard	*Aralia racemosa*
	Wild Ginger	*Asarum canadensis*
	Butterfly Weed	*Asclepias tuberosa*
	Wild Indigo	*Baptisia tinctoria*
	Star Grub	*Chamelirium luteum*
	Blue Cohosh	*Caulophyllum thalictroides*
	Pipsissewa	*Chimaphila umbellata*
	Stone Root	*Collinsonia canadensis*
	Hawthorn	*Crategus spp.*
	Wild Yam	*Dioscorea villosa*
	Striped Gentian	*Gentiana villosa*
	Witch Hazel	*Hamamelis virginiana*
	Wood Nettle	*Laportea canadensis*
	Indian Tobacco	*Lobelia inflata*
	Partridge Berry	*Mitchella repens*
	Ginseng	***Panax quinquefolius***
	Broad-leaved Plantain	*Plantago rugelii*
	Mayapple	*Podophyllum peltatum*
	Bowman's Root	*Porteranthus trifoliatus*
	Red Raspberry	*Rubus idaeus*
	Elderberry	*Sambucus canadensis*
	Bloodroot	***Sanguinaria canadensis***
	Sassafras	*Sassafras albidium*
	Maddog Skullcap	*Scutellaria integrifolia*
	Goldenrod	*Solidago spp.*
	Red Clover	*Trifolium pratense*
	Bethroot	***Trillium erectum***
	Slippery Elm	*Ulmus rubra*
	Yellowroot	*Xanthoriza simplicissima*
Edible plants	**Ramps**	***Allium tricoccum, Allium burdickii***
Floral plants	Smokevine	*Aristolochia macrophylla*
	Bittersweet	*Celastrus scandens*
	Galax	***Galax urceolata***
	Log mosses	***Hypnum curvifolium, H. imponens, Thuidium delicatum***
	Laurel Leaves	*Kalmia latifolia*
	Ground-Pine, Running Cedar	*Lycopdium obscurum, Diphasiastrum digitatum*
	Christmas Ferns	*Polystichum acrostichoides*
	Grapevine	*Vitis spp.*
Ornamentals	**Fraser Fir**	***Abies fraseri***
	Mountain Laurel & Azalea	***Kalmia latifolia & Rhododendron calendulaceum***
	Doghobble	*Leucothoe fontansiana*
	Rhododendron	*Rhododendron maximum, R. minus*
	Hemlock	*Tsuga canadensis*

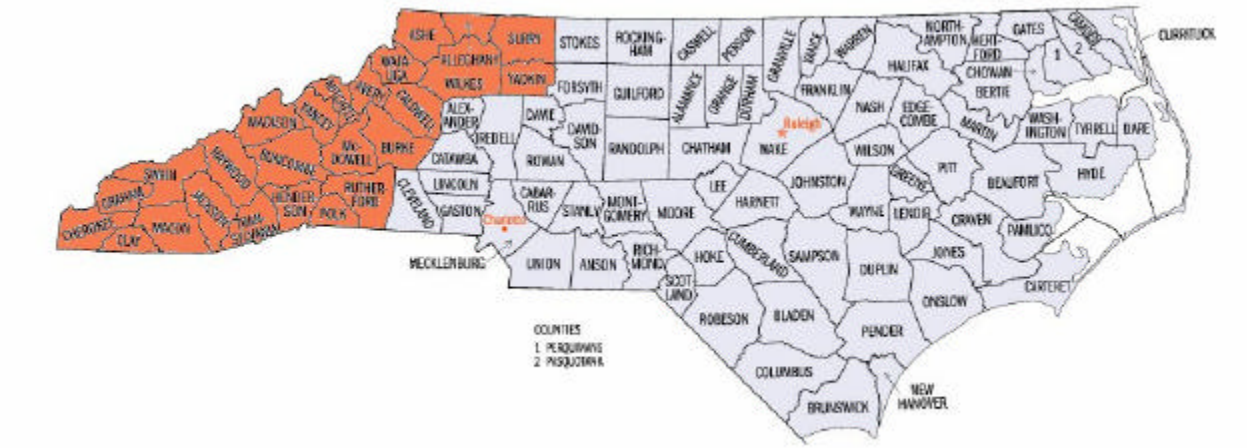


Figure 2. Western NC counties studied in Phase I of the Western NC Non-timber Forest Product Markets Project (highlighted in orange).

Purpose

The purpose of this study is to identify how much product is collected, distributed, and marketed throughout Western North Carolina, for each of the 46 plant species; to develop practical methods for collecting such data; and to create a model program so that other states may be able to build similar programs based on this model.

Acknowledgements

No research project in North Carolina on NTFP would be complete without mentioning Wilcox Natural Products whose roots lie in the hills, valleys, and woodlands of southern Appalachia. In 1900, General Grant Wilcox established the Wilcox Drug Company in Boone, NC. His focus was to supply pharmaceutical companies with quality wildcrafted American botanicals. Various roots, herbs, and barks were purchased from collectors throughout the southern Appalachian Mountains, and eventually were distributed to pharmaceutical companies by New York brokers. The company expanded into other states and European markets and created new operations dealing not only in botanicals, but also, greenery and wild fur pelts. In 1982, Wilcox Drug Co. was purchased by Zuellig Group North America, who changed the name to Wilcox Natural

Products. The company merged with Hauser, Inc. in 1999. To the surprise of the natural products industry, after 100 years in the industry, Wilcox shut its doors in the year 2000. As the leading buyer of raw botanical materials, diggers and harvesters in North Carolina came to rely on the Wilcox Co. to purchase most of their harvested products. Each year, the company would put out a product price list and anticipated units of botanicals needed for the upcoming year. This allowed harvesters to plan what products would be worth their efforts to harvest and to scout out population areas in advance. When Wilcox closed its doors, many local harvesters were stunned and saddened by the news and left without a market for their wild-harvested products.

What is also significant about the closing of Wilcox is that almost all of the top employees continued on in the botanicals business, with some of them starting their own botanical companies. Many of these individuals were instrumental in guiding the direction of segments of this study. We are most grateful to them.

Gary Kauffman, botanist for the US Forest Service, along with Jim Corbin and Marge Boyer of the North Carolina Department of Agriculture and Consumer Services, were invaluable with their plant-based knowledge and their familiarity of the regions that were covered in this study. Special thanks goes to Dr. Jim Chamberlain, Research Scientist for USFS, who provided funding and guidance. We would also like to acknowledge all of the individuals who took the time to answer our questions and who were so supportive in helping us through the process of understanding the North Carolina NTFP industry.

Objectives

This project had three primary objectives:

- Develop a means to identify and contact the market players (e.g., firms, dealers, processors) that constitute the various segments of the NTFP industry.
- Develop, test, and put into operation an instrument to collect and summarize desired output data concerning the various NTFP.
- Summarize and analyze the data and present the results in a user-friendly format.

Background

This project is the first step in a process designed to help us understand NTFP in the South. The amount of information available on forest products other than timber is quite limited. There is almost no information available on the amount of NTFP collected from our forests. Market channels through which these products travel are also not well understood. Unlike the timber-based industry, the demographics of the NTFP market players have not been examined nor described. There is also a growing interest in the economic and socio-economic importance surrounding these products and those individuals who are dependent upon them for their livelihoods. Hopefully, the information presented in this report will be useful in determining the regional economic impact of NTFP and what issues need to be addressed pertaining to the sustainability of these products.

This project focuses on the mountains of western North Carolina, which have a high diversity of species and products that are wild-harvested and sold (Table 2). Many of the products that are found in Western North Carolina are also collected in other states. The NTFP that were studied fall into four segments of the industry: **medicinal, edible, floral-decorative,** and **nursery-ornamental**. Ten species "of concern" were targeted initially. These ten priority species (listed below) were selected because of their market value, product demand, and special concern about their conservation status:

Medicinals:

- Black Cohosh, *Actaea racemosa, Cimicifuga racemosa*
- Bloodroot, *Sanguinaria canadensis*
- Ginseng, *Panax quinquefolius*

Edibles:

- Ramps, *Allium tricoccum*

Floral:

- Galax, *Galax urceolata*
- Log mosses, *Hypnum curvifolium, H. imponens, Thuidium delicatum*

Nursery:

- Azalea, *Rhododendron calendulaceum*

- Fraser fir, *Abies fraseri*
- Mountain Laurel, *Kalmia latifolia*
- Trillium, *Trillium erectum*

Methods and Materials

Due to the uniqueness and diversity of the products, markets, and people involved with this project, a number of methods were employed to collect and record data. This study used an exploratory, inductive qualitative approach. This approach was used to avoid predetermining or limiting the direction the research might take. A snowball (or referral) sampling technique was used to determine and identify the buyers, harvesters, etc. A snowball sample is defined as a "subject" with a desired characteristic that is identified. In this case, dealers, harvesters, and researchers were identified. These "subjects" then identified other "subjects", etc. Through this process, the size of the sample "snowballs" or grows larger. This technique is useful when little is known about a population being studied or the subjects are difficult to find. The problem with the snowball sample is that not all subjects in the study population have a chance of being included in the sample. (Kansas State University, 2003).

This type of "exploratory" nonprobability sampling proved beneficial in helping to gain initial insights into behavior and patterns of the overall picture of the NTFP industry and the individuals involved in it. Criteria significant to this project went through a sort of "metamorphosis", i.e., more refinement, as new subjects where interviewed. While findings obtained from this type of sampling cannot be empirically generalized to a larger population, they could be viewed as "suggestive" (Kansas State University, 2003).

Listed below is an outline of the methods and materials that were used from the period of Fall 2001 through Fall 2002. At the end of this report is a section titled, **Recommendations**. Please refer to that section for guidelines to designing a model for your state or region.

<u>Outline of Methods and Materials</u>

1. Specialists, Researchers, Extension Agents, State and Federal Employees
    - Specialists identified

- List of specialists developed
- Telephone and personal interviews conducted
- Information summarized

2. Miscellaneous Public Records and Private Reports Used to Collect Additional Data
    - Reports and records identified
    - List of reports and records developed
    - Information gathered
    - Information summarized and map with demographics included
3. Dealers/Buyers
    - Dealers and buyers identified
    - List of dealers and buyers developed
    - Questionnaire and cover letter prepared and mailed
    - Completed/returned questionnaires collected and tabulated
    - Telephone interviews and personal interviews with dealers conducted and summarized
    - Flow charts developed for five wild harvested products (based on information collected)
4. Harvesters
    - Harvesters identified
    - List of harvesters developed
    - Personal interviews conducted
    - Information summarized

1. Making Contacts and Identifying Dealers, Harvesters, and Specialists

Contacts were made with individuals at the United States Forest Service (USFS); Blue Ridge Parkway (National Park Service); Great Smoky Mountains National Park; North Carolina State University Cooperative Extension Service (county agents and District Directors); North Carolina Dept. of Agriculture and Consumer Services (NCDA&CS), Plant Protection Division; North Carolina Forest Service; university researchers at various institutions; plant harvesters; product buyers; and industry personnel. These people were interviewed to gather information on the industry, conservation, social concerns, and the economy. Many provided names for other

contacts, including dealers and harvesters. To date, 185 people have been interviewed in person, by telephone, or through a questionnaire.

Names for new contacts were collected from a number of sources. For example, the NCDA&CS provided the names and addresses of all of the registered ginseng dealers in the state of North Carolina (see Appendix 1 for NC Ginseng Dealers List). Some of these dealers also buy other botanicals in addition to ginseng. Galax dealer names were obtained from the Cooperative Extension offices and the District Ranger offices of the USFS (see Appendix 2 for NC Galax Dealers List). Two names were also found on the Internet. No list of log moss dealers was available so names were collected from other dealers and specialists, and from the Internet. Newspaper ads, advertising certain products to buy, and flyers hanging in store windows advertising the buying of ginseng, were also methods of determining who the buyers were. Talking to individuals in the local community led to another list of names. For instance, sitting in a doctor's office talking with a nurse about this project, generated the name of an individual who she thought would be willing to be interviewed. In a short period of time, going to ramp festivals around the state provided access to a large number of people, who were involved in gathering and selling ramps.

Other information was collected from USFS Product Plan sheets, NC ginseng reports, USFS permit information, individual questionnaires and interviews, and other written reports:

- US Forest Service Permit Records for Fiscal Years beginning Oct 2000 and Oct 2001
- North Carolina Department of Agriculture & Consumer Services, Plant Protection Division; Ginseng Data for 2000 and 2001
- Literature Reviews and Private Reports (see references)

2. Collection of Dealer/Buyer Information

A dealer survey/questionnaire was developed for selected products to determine how much product is being wild harvested and marketed from 25 counties in Western North Carolina (see Appendix 3). The survey, a cover letter, and self-addressed stamped envelope were distributed via mail, in March 2002, to 65 dealers who trade in North Carolina ginseng, galax, log moss, and other botanicals. Some of the dealers/buyers also purchase products from harvesters and buyers out of state. Questions asked of these dealers pertained to products harvested from North

Carolina only. Information was gathered for the 2001 harvest season on: product information, employee information, and harvester profiles.

Follow up telephone interviews or personal visits to buyers and dealers were conducted to add to the total of completed questionnaires. Results were combined so that no individual data would be presented separately. A number of personal semi-structured interviews were conducted where a questionnaire was used as a guideline, but due to the nature of the situation, an informal atmosphere was created to help those individuals who were being interviewed feel more comfortable about the process. All names are kept confidential. It is with great hope that these relationships can continue to be built upon based on trust, honesty, and respect for privacy.

3. Collection of Harvester Information

Another list of questions was developed for personal, informal, unstructured and semi-structured interviews with harvesters (see Appendix 4). This one-on-one method proved to be a much better approach for collecting information due to the personal and comfortable nature of the interview. Most harvesters, when asked, were not interested in filling out a written survey. The questions that were developed were used as guidelines, with much sensitivity placed on creating a trusting, informal atmosphere for those being interviewed. (Not all questions were asked of each of the harvesters, and, often the interview occurred spontaneously, not necessarily as a planned, organized, scheduled meeting. Interview length of time varied from twenty minutes to six hours.)

Data were summarized and analyzed as the beginning steps to design workable methods on gathering information from the various segments of the NTFP industry. Some of the individuals have yet to be contacted due to the time restraints of this project.

Problems and Challenges

<u>The NTFP industry is closed</u>

All results and figures, presented here, are based on how truthfully and completely people responded to the questionnaires and interviews. This is a big issue in an industry, which is by nature, secretive and suspicious of anyone asking “too many questions”.

Success in this industry is often based on who has which contacts, so people are reluctant to share that information. We believe most of botanical dealers in the region were contacted, but we know we did not contact all of them. Some dealers did not respond to the questionnaire; some did not answer all of the questions; and some refused to participate. Not all harvesters in North Carolina, which number in the thousands, were interviewed. Of those who were interviewed, some did not answer all of the questions asked of them. Therefore, the information in this report should be considered a foundation of information to build on. We offer this caution because we have found throughout this process that the data from just one dealer, for example, can change the average percentage results for a question significantly.

Finding contacts can be difficult

Finding the North Carolina dealer contacts in the NTFP industry could have taken months in itself and may prove to be a challenge in other states or regions researching the same subject. We were successful in locating many of the North Carolina dealers in a relatively short period of time because of the extensive contacts several people associated with this project had. There are others, however, who may not have been contacted. Because this is a complex industry, with many different factions, and fewer industry associations, finding all the players is difficult.

Designing a program that would include representation of the wild harvester segment of the NTFP industry was challenging to say the least. So, the dealers and long-time harvesters are often in close communication with each other. One of our strategies included developing and building relationships with the NTFP dealers in hopes of also building a workable relationship with the harvesters.

Assumptions and concerns about dealers

Some of the dealers in North Carolina buy product from out of state and some of the out of state dealers buy product from North Carolina. For the purposes of this study the dealer questionnaires were focused on North Carolina product only, and to the best of our knowledge, the results reflect that. Not all of the dealers contacted agreed to answer the questionnaire or provide an interview, so we have to assume that those that did represent the industry. Another

stumbling block included the diversity of dealers. Having four components to this study, medicinal, edible, floral-decorative, and nursery-ornamental markets, created more of a challenge in that the players involved were unique to each component with limited overlap. In most cases we were dealing with four different marketing channels. Within those channels, for example, medicinal herbs, some dealers purchased only ginseng. Many of the ginseng dealers are small dealers who sell to larger dealers. Some of the small dealers sell the ginseng they dig themselves and do not purchase ginseng from other harvesters. There are a few larger medicinal herb dealers in North Carolina, who trade a diversity of products, and who buy and/or ship out of state, nationally, and internationally.

Building trust

What quickly became clear for the whole interview process to be successful was to build trust with those being interviewed. Much of the time, the beginning of an interview dealt with generating that trust and helping individuals feel comfortable with what was being asked of them. When possible, a person was visited twice. This allowed for a continuation of relationship building as well as for developing the necessary trust needed for future communication. There is much skepticism within the NTFP industry, from digger/harvester to buyer to manufacturer. Representatives from a law enforcement division, revenue agency, non-local researcher, etc, may have difficulty gaining the trust of participants in the NTFP industry because of suspicion of how the information will be used. For example, when an interview was scheduled to visit a log moss dealer, before the interview ever took place, the dealer called another dealer to find out "who this interviewer was". As the interview took place, yet another dealer (from Tennessee) called during the interview to find out how the interview was going. It was quite clear the dealers are well connected with each other.

We feel our success in this process was due to the fact that the interviewer was a university employee and not an employee of any kind of regulatory agency. Also, the interviewer has a very casual, personable nature, is not threatening, and gains people's trust quickly.

Before any interviews were scheduled, a letter was sent (along with the questionnaire) to dealers and buyers explaining the purpose for gathering this information and what would be done with it.

We also assured that all information would be combined and tabulated without singling out any business. It was optional to include a name and contact information. We also offered to send a summary report to those dealers and buyers who were interested in receiving one. It was important for us to show the participants how this report may be a valuable tool benefiting their business as well as the industry.

Use of USFS permit information

In researching the USFS Product Plan sheets, a limited number of species were categorized individually under medicinals, florals, and ornamentals. The product reports show how many permits were issued in a given time for a given commodity and how much income was realized from those permits. The reports are divided by ranger district. While galax, ginseng, log moss, ramps, and Fraser fir all had their own codes/categories for permits issued, the rest of the targeted species outlined in this project were classified under: "other medicinal herbs; florist products; annuals, perennials, and misc. plants; or trees (all species)". Species that fall in these permit categories are grouped together, and income reported from these species cannot be identified individually. For this report, we used the permit information as a guideline.

Accuracy of estimates

We cannot stress enough that we are reporting information as it was reported to us. Discrepancies can be huge as was apparent when we started comparing estimates from different reports and interviews. For example, one report indicated a total of 135,000 lbs of dried bloodroot was sold in 2001 throughout the industry, while one of the dealers estimated 40,000-60,000 lbs was the total volume sold in the industry for that year; and, yet another dealer estimated 19,000-20,000 lb for the 2001 harvest. This, however, is the nature of this industry at the present time and people using this report should be aware of the limitations.

Results

The results from this study are based on information obtained by the following:

Interviews and returned questionnaires (including telephone interviews, returned questionnaires, and personal interviews)

A total of 185 interviews and returned questionnaires took place between Fall 2001 and Fall 2002:

- Harvesters – 76
- Buyers/Dealers – 37
- Specialists, Researchers, State and Federal Employees - 72

General information about the dealers who were sent questionnaires

- 65 Dealers were mailed a cover letter and questionnaire (see Appendices 1, 2, and 3 for ginseng dealer list, galax dealer list, questionnaire and cover letter).
- 54 dealers trade in ginseng; many of these dealers are small, and ginseng is the only commodity they buy.
- Of the smaller ginseng dealers many typically do not purchase from other harvesters but resell what they personally harvest to a larger dealer.
- Nine of the 65 dealers buy galax; some of those buy log moss.
- 60 of the 65 dealers who were sent questionnaires, reside in North Carolina (all others were from: Tenn-2, Ga-2, Vt-1). All dealers, who were sent questionnaires, buy North Carolina products.

Summary of the dealer questionnaire results

- A total of 17 questionnaire forms were returned out of the 65 sent. Seven of those required follow up phone calls or personal interviews to complete. This represented a 26% return rate, but it included two different markets: the medicinal herb markets and the floral markets.
- Of the 17 responses, two indicated they only sell what they personally harvest (their information was not tallied with the rest of the dealer questionnaires but was included in the Ginseng Section of this report); two would not give complete quantitative answers for volume or sales.
- Questionnaire tally is based on 15 completed questionnaires with some missing quantitative information. This represents a return rate of 23%.

Harvester and Employee Profiles (based on dealer information)

This information came from the questionnaires that were filled out by cooperating dealers. Information is based on the 2001-harvest season.

Dealer Employee Profiles

Dealers/buyers were asked to describe their employees: fulltime, part-time, seasonal; men, women, and youth. The number of employees working for the businesses that responded to the questionnaire, ranged from one employee up to fifty employees. **Note:** One dealer's response was not included as it was unclear how many employees in the company worked with wild harvested products.

As illustrated in Figures 3 and 4, the majority of employees working for NC dealers/buyers are men working fulltime or seasonally.

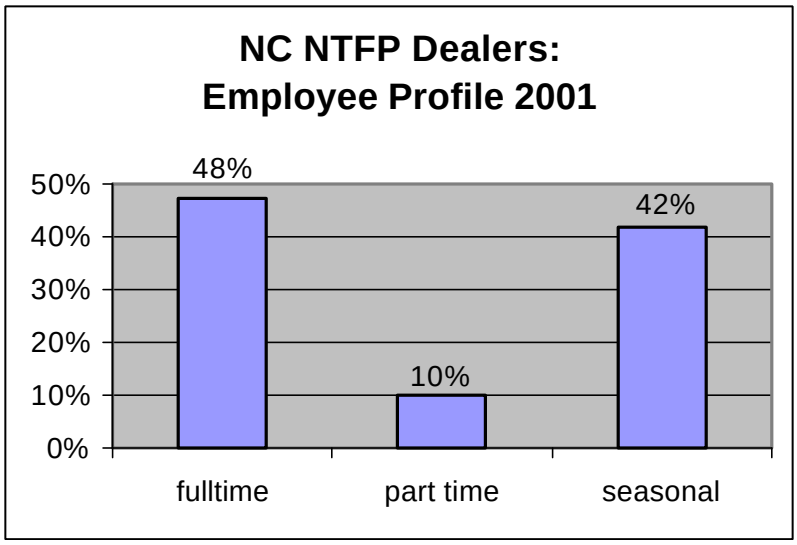


Figure 3. Employment status of employees working for NC dealers, 2001.

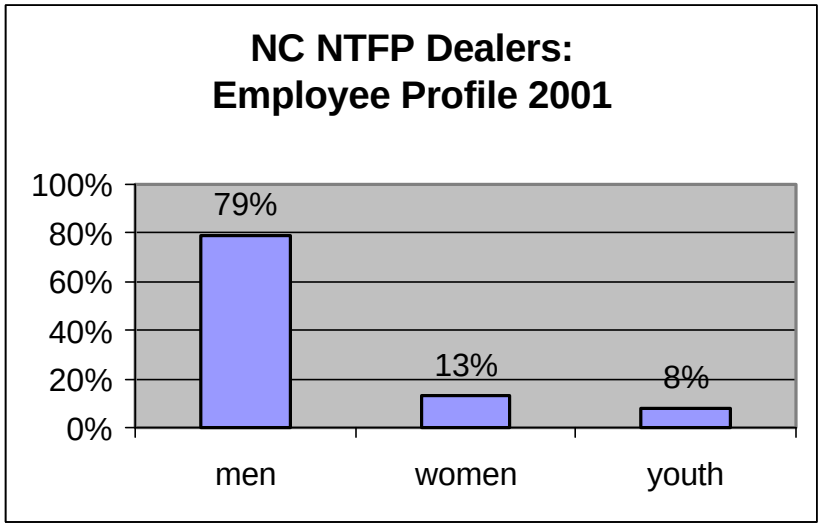


Figure 4. Gender and age of employees working for NC dealers, 2001

Harvester Profiles

Dealers were also asked questions about the harvesters they buy from. Those questions included ethnic background, number of harvesters each buyer purchases product from, and if they were men, women, or youth (see Figures 5 and 6.). Three dealers answered these questions without quantities and therefore, their answers could not be included in the quantitative evaluation. Their three responses were: 1.) mostly men 2.) mostly Latino and 3.) Caucasian and American Indian. Of the dealers who responded as requested, the number of harvesters they buy from ranged from 50 up to 600 harvesters. The majority of North Carolina harvesters are Caucasian men, although Latino men are a rapidly growing segment.

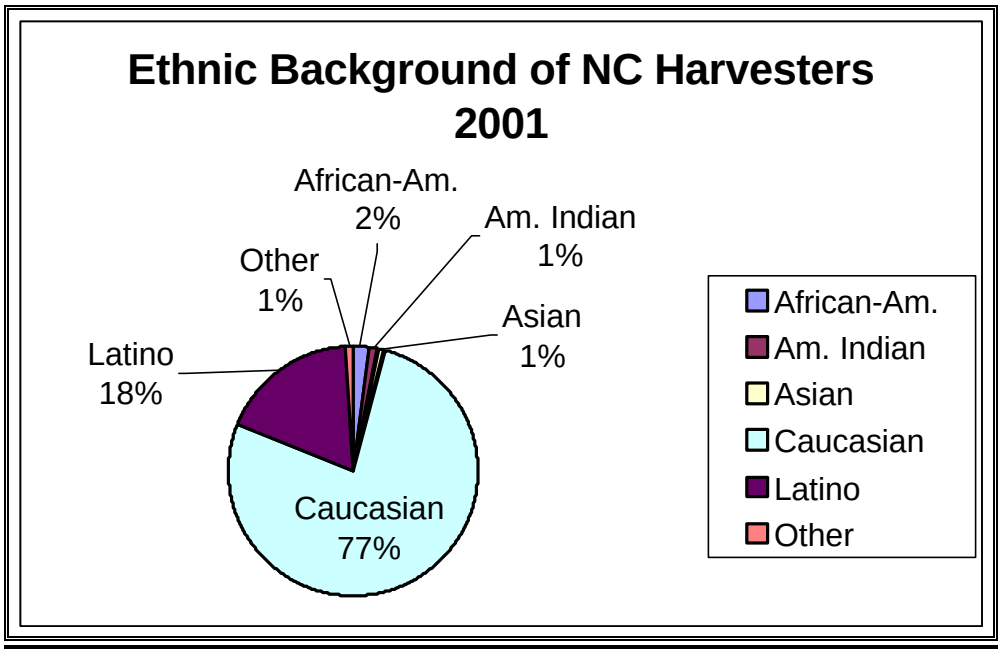


Figure 5. Ethnic background of harvesters as reported by NC dealers, 2001.

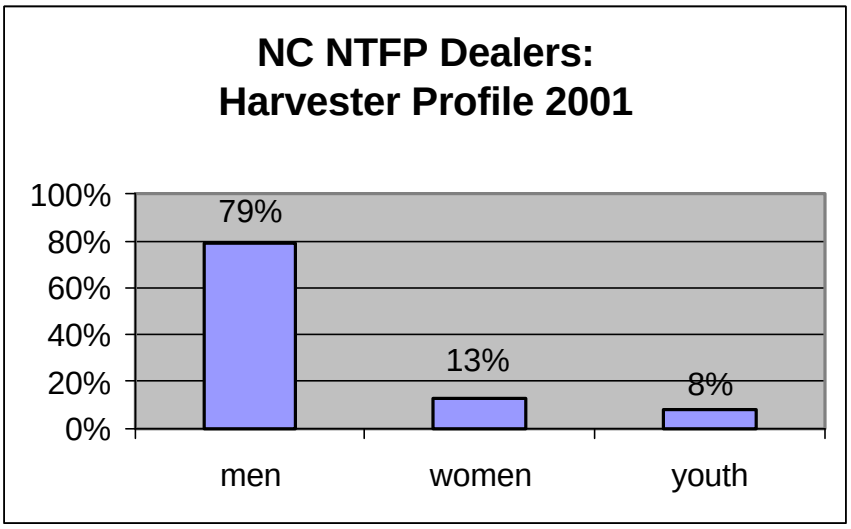


Figure 6. Gender and age of harvesters as reported by NC dealers, 2001.

Pricing Structure

Trying to keep up with prices paid to harvesters was no small feat. Supply and demand is the controlling factor for prices for most all of the forest products. Ginseng prices are quoted daily by dealers. Galax had seasonal prices: higher in the colder months, lower in the summer. While there is a strong demand for bloodroot, the major buyers will not pay over a certain amount.

With some commodities, the better quality product often brought in a higher price. Table 2 illustrates the various prices paid to harvesters for ten NTFP during 2001-2002. Occasionally, some of the dealers will supply a pricelist to harvesters for products they want to purchase; what quantities they need of each; and what prices they are willing to pay. We did not ask buyers what prices they resell their purchased products for.

Table 3. 2001-2002 prices paid to harvesters for wild-harvested botanicals.

2001-2002 Prices Paid to NC Harvesters of Wild-Harvested Botanicals

Each line represents the price paid by a NC dealer.

Black Cohosh		Bloodroot		Galax	Ginseng 2001	Ginseng 2002	Yam, Wild
Dried/lb	Fresh/lb	Dried/lb	Fresh/lb	Box (5000 ct)	Dried/lb	Dried/lb	Root
$1.15	$0.40	$6.00	$1.00 (spring)	$35.00	$185.00	$270.00	$1.50
$1.25	$0.50	$7.00	$2.00 (fall)	$40.00	$190.00	$275.00	$2.00
$1.40	$0.75	$8.00	$1.75	$50.00	$200.00	$300.00	
$1.50	$1.00	$8.10	$3.25	$55.00	$210.00	$340.00	
$2.00	$1.75	$9.00		$60.00	$220.00	$350.00	
$2.20		$10.00		$70.00	$240.00	$400.00	
$2.25		$10.50		$80.00	$250.00		
$2.35		$12.00		$100.00	$265.00		
$2.46				$110.00	$290.00		
$4.00					$300.00		

Goldenseal		Log Moss		Chamaelirium	Star Grass	Witch Hazel	
Dried/lb,wild	Dried/lb,cult	Per lb	Other	Dried/lb	Dried/lb	Bark/lb	Leaves lb
$15.00	$32.00	$0.60	$6.00/box	$24.00	$8.00	$1.40-1.60	$2.15-2.35
$18.00	$36.00	$1.00	$10.00 per roll	$25.00	$10.00	$0.60	$1.20
$28.00		$1.80		$28.00	$12.00		
$33.00		$2.00		$30.00			

***Information was compiled from the questionnaires, personal interviews, and dealer price sheets.**

Results for Bloodroot

Bloodroot (*Sanguinaria canadensis)* is an early spring wildflower found in rich woodlands of North America from Nova Scotia to Florida and west to Alabama, Arkansas, Nebraska, and Manitoba. Bloodroot is one of the first flowers to bloom in early spring and is native to North Carolina. It is harvested for the medicinal properties of its rhizome.

The current demand for bloodroot is primarily as an anti-parasitic animal feed additive and appetite enhancer for poultry and swine in Europe. Current research includes studies with poultry and swine, as well as with cattle and horses. A German company, Phytobiotics, is marketing the product, Sangrovit©, that contains benzophenanthridine (BA) alkaloids, which are the major bioactive components in bloodroot. Sanguinarine is the major alkaloid in bloodroot. (Roth, 2002a). Phytobiotics also holds the patent for Sangrovit©. Bloodroot is also used as a homeopathic expectorant and cough remedy as well as in homeopathic preparations for the treatment of menopause symptoms and headache. It is used as an antibacterial agent in toothpastes and mouthwashes to reduce the build-up of dental plaque, which was its primary market in the 1980s. Topically, it is used in escharotic salves for removing skin cancers and moles (Yellow Creek Botanical Institute, 2001). Of the major nutraceutical/botanical companies in North America and Europe, 15% offer bloodroot as a stand-alone product, while 19% supply this material in a product that contains more than one active ingredient (NC Consortium, 2002).

Marketing, Volume, and Sales

Demand is strong for bloodroot in Europe. The Commission of European Communities has stipulated that all synthetic antibiotic compounds incorporated into livestock feed, as a way to fatten cattle, must be removed by the end of 2005 (NC Consortium, 2002). This action was taken in response to scientific evidence that these synthetic antibiotics are transmitted to humans via meat consumption and make humans more resistant to certain drugs (NC Consortium, 2002). Bloodroot is currently being considered as an alternative ingredient to synthetic antibiotics in cattle feeds. Phytobiotics' current markets for bloodroot include Germany, Austria, Scandinavia, France, and Spain. The United States market is very appealing to them, but they face significant regulatory hurdles there. Some of the research being done to address these regulatory issues is work on efficacy and safety issues via programs in Europe. Interest in distributing this product

in the United States is growing. The incorporation of bloodroot into animal feed in the US would require FDA approval as a veterinary drug and feed additive (Roth, 2002b).

While much of the dried raw bloodroot harvested in the US is sold to Phytobiotics in Germany for the animal feed business, the remainder is sold to homeopathic and supplement manufacturers worldwide. It is shipped to Korea (equivalent to 2.2 to 4.4 tons) and distributed to processors throughout the United States. The supply of bloodroot is not keeping up with the demand. An estimate of at least 38 to 55 tons per year are needed. One dealer estimated that in 2002, approximately 12,000-13,000 lbs/year (dried) were wild--harvested in the United States. The same dealer estimated 19,000-20,000 lbs were sold, overall, in 2001. Another North Carolina dealer estimated 60,000-70,000 lbs of bloodroot was sold in 2001, while 12,000-14,000 lbs came from North Carolina. A report completed for the North Carolina Consortium on Natural Medicinal Products (NC Consortium, 2002) indicated that 135,000 lbs of bloodroot were sold to the industry in 2001. The market value of this amount was estimated at $1.89 million dollars. With growing sales, the demand could go up quickly. Seventy-five percent of the bloodroot dealers responding to the questionnaire indicated they could have sold more bloodroot in 2001.

Figure 7 is a flow chart showing how North Carolina bloodroot moves through the distribution channels from harvester to delivered product. The chart was developed based on conversations with North Carolina buyers, dealers, and harvesters.

According to one buyer, North Carolina harvesters supply around 5% of the bloodroot sold annually from the United States. Dealers in North Carolina buy bloodroot from other states as well as from NC. The bulk of the product is harvested (in order of production by state) from: Kentucky, Virginia, Tennessee, West Virginia, Indiana, Missouri, Ohio, North Carolina, and others. To date, very little bloodroot comes from cultivated operations, and to the best of our knowledge, most roots are dug from native woodlands within the United States. Questionnaire results show North Carolina counties where bloodroot was harvested from, in 2001. They include: Ashe, Avery, Haywood, Madison, McDowell, Watauga, Wilkes, and Yancey.

Bloodroot Distribution Chart

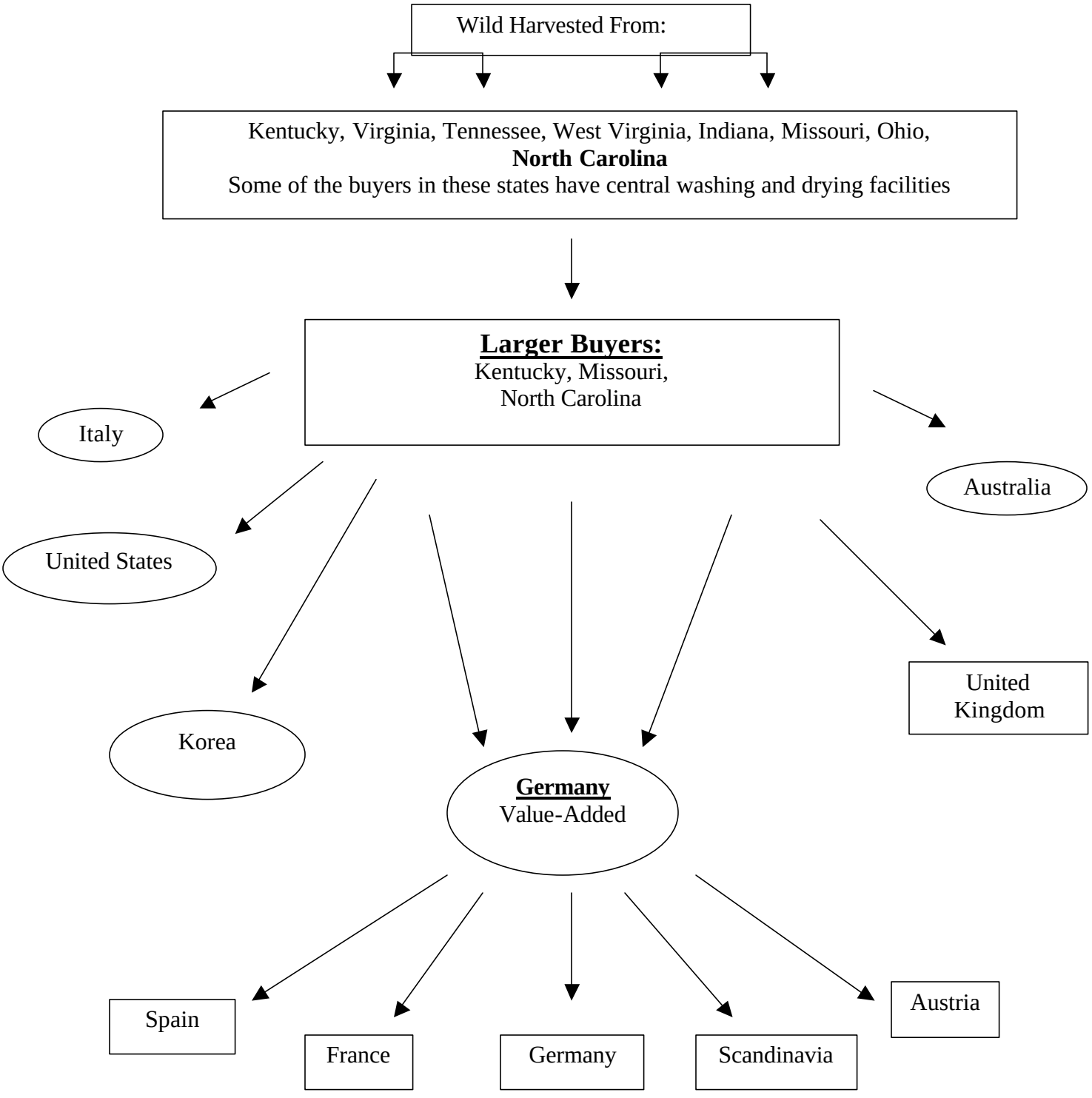


Figure 7. Bloodroot distribution chart

Prepared by Jackie Greenfield and Jeanine M. Davis. 2003.

Summary 1 shows bloodroot results from 2001, as reported by North Carolina dealers who responded to the questionnaire.

Summary 1. Bloodroot information as reported by NC dealers, 2001.

- 17% came from public lands; 83% from private lands
- 94% was wild harvested; 6% cultivated
- A total of 2005 lbs of North Carolina bloodroot was sold to these North Carolina dealers in 2001 (This represents fresh and dried roots that were reported purchased).
- Bloodroot was bought fresh and dried.
- All dealers bought in the fall; 40% also purchased in spring; 40% also purchased in summer.

Another growing market for bloodroot is in the nursery industry. Bloodroot is available now in limited quantities as an ornamental sold in quart and gallon containers. It is a very attractive woodland plant and has showy leaves throughout most of the summer. The plant sells in garden centers and specialty shops for anywhere from $3.50 to $10.00 per plant. Lowe's Home Improvement Store also carries a line of native wildflowers, sold by the root or rhizome, packaged in peat moss in small plastic bags. Each package contains one plant root, and packages sold in 2002, for $.98 each. Bloodroot is one of the natives sold this way.

Economics and Socio-Economics

Bloodroot is collected in both spring and fall. Fall is the preferred time by the product manufacturers, but the diggers prefer to dig it in the spring when the plant is easier to find in the wild (flowers and/or leaves easily spotted). Typically, particularly in E. Kentucky and West Virginia, diggers sell fresh root to small buyers who have equipment to wash and dry the roots. It is not uncommon to find these central washing and drying stations in areas where large concentrations of bloodroot are harvested. Product usually is dried down to around 12% moisture. Further drying occurs at the next level of trading taking the bloodroot to around 10% moisture. Summary 2 shows results from the returned dealer questionnaires for dried bloodroot prices paid to harvesters.

Summary 2. Prices paid for dried bloodroot as reported by NC dealers, 2001.

- Highest price paid in 2001: $12.00/lb
- Lowest price paid in 2001: $ 8.00/lb
- Highest price paid in last 5 years: $12.00/lb
- Lowest price paid in last 5 years: $ 5.25/lb

Fresh root prices reported (paid to harvesters in NC) ranged from $1.00/lb to $3.25/lb during the 2001 season.

Additional information:

- All dealers exported bloodroot; 25% also sold to NC manufacturers; 50% also sold to US manufacturers.
- All dealers exported to Europe. Some locations included Germany, United Kingdom, and Italy. Bloodroot was also exported to Australia.
- The price paid for bloodroot varies depending on whom the harvester sells to, e.g., if a harvester sells to a small dealer who resells to a larger dealer, or if the harvester sells directly to the larger dealer.
- Based on another report, two of the top three suppliers of bloodroot to the industry live in North Carolina (NC Consortium, 2002).

In August 2002, after attending an informative meeting with both the owner and CEO of Phytobiotics, it was stated that the highest price that they would pay for dried bloodroot (raw) was $11.36/lb US. The limiting factor is the amount that the European livestock owners are willing to pay for this feed additive and still have an affordable product. The $11.36/lb is what is paid to the larger dealer who exports the raw material to Germany. The Phytobiotics executives were not picky about whether bloodroot was wild harvested or cultivated, but they did show some concern about it being wild harvested illegally on National Forest and National Park property.

Through interviews with harvesters in North Carolina, it became quite clear that harvesting bloodroot at the current prices offered (average $8.83 per lb) was not as profitable as harvesting

log moss or ginseng. As long as log moss and ginseng were accessible and the markets viable, the fulltime and part-time North Carolina harvesters, who were interviewed, would continue to harvest those products before bloodroot. A few harvesters would harvest bloodroot if they came upon a patch that was quite abundant and easy to dig.

Because of high unemployment in the coal mining regions of Kentucky and West Virginia, more harvesting of bloodroot (and black cohosh) is taking place there because more people are financially dependent on the income from this product. One dealer indicated that the volume of bloodroot (and black cohosh) coming out of those states is starting to impact populations of those species.

Education and Sustainability

Growers in many western counties of North Carolina are interested in putting some of their woodlands into bloodroot production. An active group in Graham County, the Smoky Mountain Native Plant Association, has purchased bloodroot for members to plant. Thanks to contributions from the North Carolina Specialty Crops Program, members of this association have also been given ginseng, goldenseal, and ramps to plant on their properties. In Madison and Yancey Counties, growers are also experimenting with these woodland botanicals as potential market crops. Encouraging farmers to cultivate woodland botanical crops, such as bloodroot, could help ease the pressures on the wild populations.

Currently, large quantities of bloodroot seed are not commercially available, and rootstock is quite expensive. Large-scale production, as is currently taking place in Canada, is dependent on wild-harvested material to use as planting stock. Cultivation research is in process at North Carolina State University and the University of Georgia, which will help growers produce bloodroot economically.

Greater celandine (*Chelidonium majus*) and plume poppy (*Macleaya cordata* and *M. microcarpa*), other members of the same family as bloodroot, contain sanguinarine and are being studied as commercial substitutes for bloodroot. Phytobiotics has done research on *Macleaya* and are testing it in some of their products (Roth, 2003). This particular species is fast growing

and is harvested for its aerial parts, which means the same perennial plants can be harvested year after year. In contrast, bloodroot must be destructively harvested since the root is the plant part of economic interest. If either of these other species can be cultivated and processed at a lower cost than bloodroot, and are as effective as bloodroot, they will be used. This would dramatically decrease the demand for wild and cultivated bloodroot.

Bloodroot Research in North Carolina

In North Carolina, bloodroot cultivation studies are being conducted at NC State University, overseen by Dr. Jeanine Davis in the Department of Horticultural Science and Dr. David Danehower in the Department of Crop Science. They are examining propagation methods, production in the forest and under artificial shade, companion planting with other native medicinals of economic importance, and different production systems including no-till and strip-till methods.

Dr. David Danehower, in cooperation with Robin Suggs of Yellow Creek Botanical Institute, is developing germplasm collections from native populations.

Dr. Jeanine Davis, in cooperation with Dr. Nick Oberlies and Dr. Keith Levine at the Research Triangle Institute, is studying the effects of time of harvest on bloodroot alkaloid levels in cultivated and wild plants.

Population and harvest studies are underway by Chris Ulrey, botanist for the Blue Ridge Parkway, National Park Service.

Gary Kauffman, botanist for the US Forest Service, has ongoing population studies throughout the National Forests in the region.

Yellow Creek Botanical Institute in Graham County, North Carolina, is researching how to get FDA approval for livestock products containing bloodroot for use in the United States. Yellow Creek has also secured grants from the GoldenLEAF Foundation to promote bloodroot as a viable alternative crop for the tobacco dependent region in and around Graham County.

Discussion

The market for bloodroot is quite vulnerable with much of the product being sold to just one company. Expansion into this new market, for the animal feed additive, appears to be what is driving the market. Supply has remained fairly unchanged over the past few years, but demand has increased. According to one report, Phytobiotics is projecting that it will need between 250,000 lbs and 330,000 lbs of dried bloodroot per year to meet its production schedule (NC Consortium, 2002). With one company buying for one particular use, problems could arise. If the company stops using bloodroot, or if the feed additive product fails for any reason, market demand could decrease suddenly.

With wild populations declining in the heavily harvested states like Kentucky, West Virginia, and parts of Virginia, more pressure will be put on North Carolina populations. Unemployment pressures in certain areas will also play an important role affecting the harvesting of bloodroot. Also, if the current market price per pound increases, supply will more than likely increase. Cultivation is to be encouraged and supported. Summary 3 shows 2001 estimates based on interviews, questionnaires, and research.

Summary 3. Demand, volume, and price information for bloodroot, 2001.

- Estimated 19,000 - 135,000 lbs of dried root sold per year in 2001 and 2002 for the entire US.
- Prices paid to NC harvesters ranged from $6.00 – $12.00 per dried lb.
- Estimated market value for dried root in 2001 was 1.89 million.
- Estimated demand is 38 – 55 tons per year.
- Demand is increasing.

Results for Black Cohosh

Black cohosh *(Actea racemosa*, formerly *Cimicifuga racemosa)* is a native medicinal plant found in woodlands from Maine to Georgia, west to Missouri, Indiana, and Ontario. In North Carolina it can be found at elevations up to 4,000 feet (Palmer & Fowler, 1975). It is an herbaceous perennial reaching a mature height of well above four feet. When the leaves start to die back in the fall, the root is harvested and dried.

The main bioactive components of black cohosh are triterpene glycosides, acetein and 27-deoxyactein, and the isoflavone formonenetin. Black cohosh root is used in the US herbal dietary supplement market and the European phytomedicine market for women's health purposes. The primary modern market for black cohosh is in formulations for menopause and PMS. Secondary markets include functional foods, like nutrition bars and functional beverages, as well as homeopathic remedies (Yellow Creek Botanical Institute, 2001). Clinical trials supporting black cohosh in treatment of menopausal conditions indicate demand will continue to rise for this product. A new trial, sponsored by the National Institute of Health, is assessing the efficacy of black cohosh for menopausal symptoms. One of the leading menopausal commercial products is called Remifemin©, distributed by GlaxoSmithKline.

Marketing, Volume, and Sales

Sales are likely to continue to increase for this popular medicinal herb. The current demographics of American and European consumers (i.e., the large number of women approaching menopause) will surely bring more potential buyers into the market. Research on the species is strong, and there seems little chance that further research will fail to support the use of black cohosh in treating menopausal conditions (Yellow Creek Botanical Institute, 2001). Any increase in public awareness among menopausal women or health care practitioners will further drive market demand.

According to one report (NC Consortium, 2002), in 1998, around 700,000 lbs of black cohosh were sold worldwide. Supplies came mostly from wild-harvested sources. In 1999, world consumption dropped to about 183,000 lbs (due to a saturated market from the previous year), and rebounded to approximately 420,000 lbs in 2001. This 2001 figure reflects $2.25 million

dollars in product sold to the industry. This report also stated that interest in black cohosh has accelerated over the past 18 months, and projections for consumption have exceeded 500,000 lbs for 2002. Two of the top suppliers of black cohosh live in North Carolina.

In North Carolina, dealers responding to the questionnaire reported buying a total of 3,700 lbs of North Carolina black cohosh root in 2001. (This figure includes fresh and dried root.) Counties where black cohosh was harvested include: Ashe, Avery, Haywood, Madison, McDowell, Mitchell, Watauga, Wilkes, and Yancey. Dealers who reported buying black cohosh indicated that the bulk of their purchases were from out of state. We asked that figures for only North Carolina product be reported. In 2002, one NC dealer showed us 1,400 lbs of dried black cohosh root ready to be shipped out. Another buyer reported that he has a standing order of 66 tons from one of his customers to fill each year. One North Carolina dealer estimated 12,000-14,000 lbs of black cohosh were harvested and sold from North Carolina in 2001. The same dealer estimated volume sold to the industry to be 60,000-70,000 lbs. 2001 dealer questionnaire results for black cohosh in North Carolina are included in Summary 4.

Summary 4. Black cohosh information as reported by NC dealers, 2001.

- 17% was harvested from public lands; 83% from private lands
- 96% was wild harvested; 4% was cultivated
- All dealers interviewed buy cohosh in the fall; 40% also buy in winter; 40% also purchase in spring; 40% also purchase in summer.
- All dealers bought cohosh root dried; 60% also bought roots fresh.
- Dealers were split on demand: 40% said it increased; 40% said decreased; 20% said stayed the same.
- All dealers (who responded to the question) export black cohosh; 25% also sell to a retailer; 25% also sell to a US manufacturer; 50% also sell to a US wholesaler.

Export destinations were primarily to Europe. Included were Germany, Italy, Poland, and United Kingdom. Some product was also exported to Australia. Product is sold primarily in bulk. One dealer, who was interviewed in person, shipped bulk dried cohosh root in approximately 700-lb bins. Many of the dealers interviewed who trade in bloodroot also trade in

black cohosh. In addition, most buy ginseng. A product flow chart illustrates transport of black cohosh from North Carolina (see Figure 8). Information was provided by North Carolina dealers, buyers, and researchers and could change at any time.

Economics and Socio-Economics

Black cohosh is purchased year round. Similar to bloodroot, it is not uncommon for diggers/harvesters to sell fresh root to small buyers who have equipment to wash and dry the roots; one dealer said this is the case particularly in E. Kentucky and West Virginia. These central washing and drying stations are in areas where large concentrations of black cohosh are harvested.

North Carolina harvesters suffered a big set back in 1998 when many harvesters and diggers collected large volumes of black cohosh root. The market became saturated and drove the selling price down, discouraging new harvests. Many harvesters and small dealers, who anticipated brisk sales for their product, found themselves sitting on inventory and not being able to get a good market price for their black cohosh. Buyers have indicated that inventories have been reduced to the point that now new roots are being collected and sold.

One dealer reiterated that thousands of people used to dig black cohosh, now only hundreds do. As with bloodroot, the coal mining states, Kentucky and West Virginia, for example, seem to have an increase of displaced coal miners harvesting wild products. Currently, North Carolina is not a huge supplier of black cohosh, but more demand may be placed on native populations in North Carolina as cohosh populations decline in these other states. Summary 5 shows dealer responses on prices paid to harvesters for black cohosh in 2001.

Summary 5. Prices paid for dried black cohosh as reported by NC dealers, 2001.

- Highest price a dealer paid (2001): $4.00/lb
- Lowest price paid (2001): $1.15/lb
- Highest price in last 5 years: $4.25/lb
- Lowest price in last 5 years: $1.12/lb

Black Cohosh Distribution

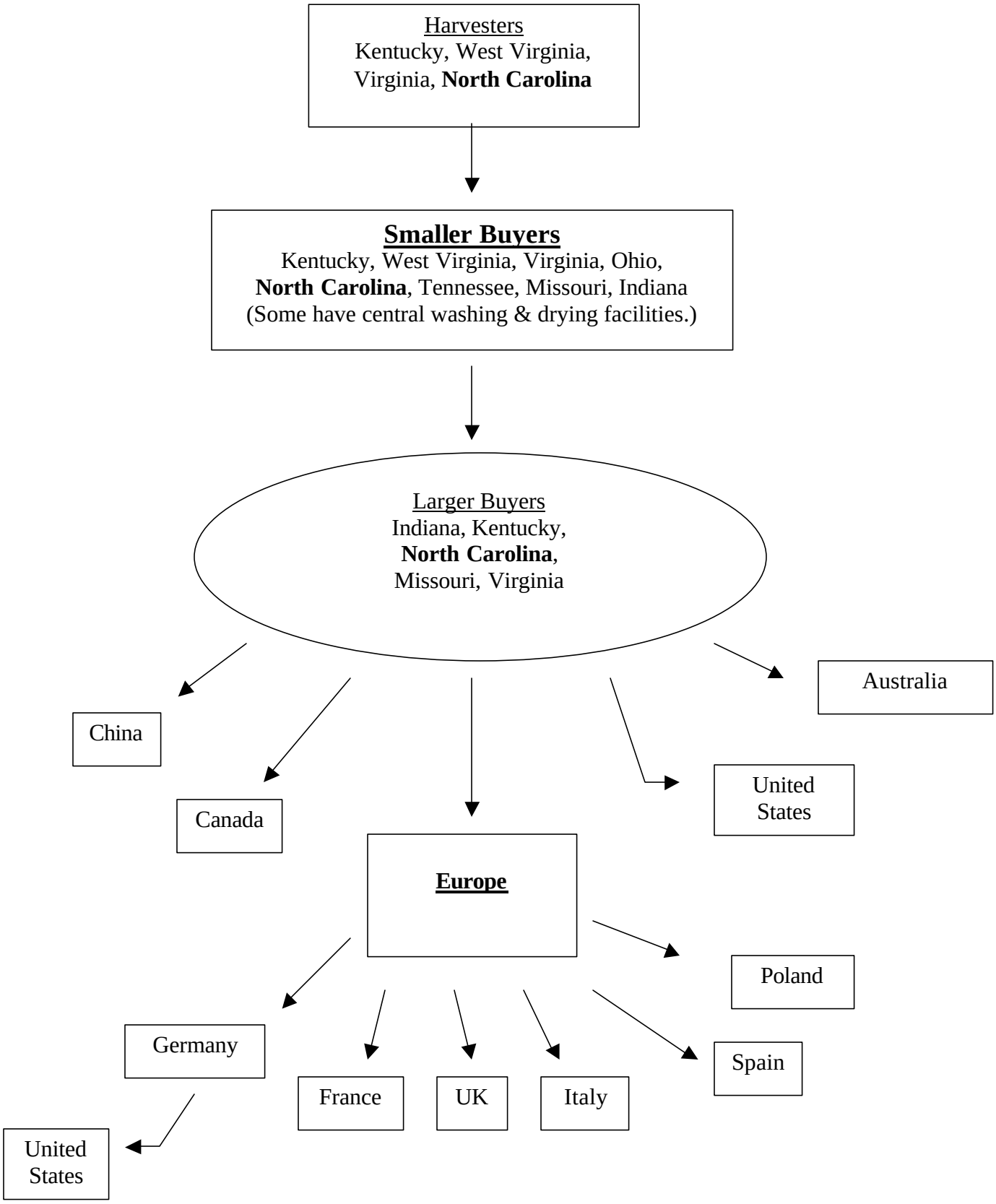


Figure 8. Black cohosh distribution chart

Prepared by Jackie Greenfield and Jeanine M. Davis. 2003.

Fresh root prices reported ranged from $.40/lb up to $1.35/lb during the 2001 season. One dealer reported the following prices paid to diggers: fresh, not washed - $.40 -.50/lb; fresh, washed - $.45 -.50/lb; dried - $2.00/lb; then, indicated that a larger buyer will purchase the dried cohosh at $2.75/lb. Often the product comes in needing screening of what he calls, "trash", which accounts for approximately 2-3% of the volume.

Education and Sustainability

A strong body of clinical research supports the use of black cohosh for easing both physical and psychological symptoms of menopause. Yellow Creek Botanical Institute's *Appalachian Botanicals Market Analysis Report* states the following information on this research: "More than twenty clinical trials involving more than 3,000 women have been conducted since the 1950s, most of them in Germany. Results indicate that black cohosh is significantly more effective than a placebo and as effective as conventional hormone replacement therapy (HRT) in relieving symptoms of menopause, including hot flashes, night sweats, headaches, heart palpitations, dizziness, and vaginal atrophy (Stolze, 1982; Stoll, 1987; Pethö, 1987; Warnecke, 1985). One study showed that black cohosh is as effective as diazepam (Valium) in relieving psychological symptoms of menopause, including nervousness and depression (Warnecke, 1985). Preliminary research offers some support for black cohosh's traditional use as an anti-inflammatory agent in arthritic conditions (Hirabayashi, et al, 1995). Recent research on black cohosh's mechanism of action suggests that the plant works by normalizing levels of luteinizing hormone (LH), not through "estrogenic" activity, as was originally believed (Düker, et al, 1991; Einer-Jensen, et al, 1996)".

Some of the highly concentrated, easily accessible, large natural populations have already been over-harvested, and, according to the NC Consortium report (2002), quantities harvested still have not been able to satisfy the recent spike in demand that has occurred during the latter half of 2002.

Renewed interest in this material by pharmaceutical companies has led to larger companies contracting directly with wild-harvest suppliers. Interest in cultivation, particularly organically certified crops, has also increased. Still, the majority of this material continues to flow through

general brokers. The largest players are actively pursuing integrated cultivation options, but players of every size exist in the business. Higher root prices will continue to keep small collectors foraging for natural populations (NC Consortium, 2002).

Black Cohosh Research in North Carolina

Dr. Jeanine Davis, NC State University and Coordinator of the NC Specialty Crops Program, is heading up field cultivation studies as well as aeroponics greenhouse production studies.

Harvest impact studies have been underway for three years now in North Carolina led by Gary Kauffman, botanist, US Forest Service. Sites throughout the North Carolina mountains are being monitored, from controlled harvests, comparing and contrasting different levels and methods of harvesting.

Joe-Ann McCoy, Ph. D. student, Clemson University, in cooperation with N.C. State University, has spent the last four years researching black cohosh, through population studies, cultivation studies, harvest impact studies, and laboratory analyses.

Discussion

With the growing health concerns over Hormone Replacement Therapy (HRT) treatments, many health professionals are looking to black cohosh and other natural substances as potential treatment options for hormone depletion. Positive clinical results, using black cohosh for HRT, continue to drive demand for this material (NC Consortium, 2001).

Wild harvesting will likely continue, especially with the current availability of the product in the wild. With populations declining in some of the more heavily harvested states, North Carolina's native sites will no doubt feel the impact. Similar to bloodroot, many of the fulltime harvesters in the western most counties of North Carolina are earning such a good income pulling log mosses that they currently are not harvesting as much black cohosh as they did previously. It is suspected that as the price for black cohosh increases, it may prove to be worthwhile again for North Carolina harvesters.

There is concern within the industry about adulterated cohosh, as well as other unidentified roots contaminating the product. GlaxoSmithKline has been experimenting with commercial cultivation of black cohosh rhizomes for a few years now. Support for cultivation is not only encouraged but also desired from the manufacturers. Growers are always exploring new markets and new products, but the investment and time have to be cost effective. History has proven that fluctuations in volume of wild harvested cohosh greatly influence the price. Nevertheless, growing of black cohosh should strongly be encouraged. Summary 6 shows black cohosh estimates based on interviews, questionnaires, and research.

Summary 6. Demand, volume, and price information for black cohosh, 2001.

- Estimated 60,000 – 420,000 lbs of dried root sold in 2001.
- Prices paid to harvesters in NC ranged from $1.15 - $2.35 per dried lb.
- Estimated market value for dried root in 2001 was $2.25 million.
- Estimated demand is over 500,000 lbs per year.
- Demand should increase 20-30% over the next 3-5 years.

Results for Galax

Galax (*Galax urceolata*) is native to the Southern Appalachian Mountains. It is a low growing evergreen perennial with round shaped leaves that can span up to five inches in diameter. Because of the leaf's heart-shaped resemblance, florists have valued this plant as a decorative for over a century. The Eastern Band of the Cherokee Indians has used galax, medicinally, as a root tea for kidney trouble and a tea for nerves (Hamel and Chiltoskey, 1975). Other historical herbal uses include remedies for skin problems and for healing wounds and cuts (Creelin and Philpott, 1990).

Galax is highly desirable in the florist trade because of its sturdy, attractive, shiny leaves that can be stored for weeks, even months at a time. In the wild, the color of the leaves often turn red in the fall as the weather changes. The red leaves are very desirable and often bring a higher price when harvested, except for the fact that when they are stored in the dark, in the walk-in cooler, their color changes back to green.

In addition to its traditional use as a floral green, galax leaves have found their way in New York City restaurants as a festive plate garnish and as a table adornment for weddings. At some funerals, galax leaves are stitched together and draped over caskets to create a decorative covering.

Galax interviews were conducted with individuals from the US Forest Service; Blue Ridge Parkway; North Carolina State University Cooperative Extension Service (county agents and District Directors); North Carolina Department of Agriculture & Consumer Services, Plant Protection Division; North Carolina Forest Service; researchers from Appalachian State University and North Carolina State University; plant harvesters; product buyers; and industry personnel.

Marketing, Volume, and Sales

The galax industry is well organized, has established markets, and has a "supply and demand" pricing structure. Distribution of this product is worldwide. The industry has worked out a uniform system of bundling and packaging the leaves. In the field, twenty-five galax leaves are bundled together with a twist tie, rubber band, or piece of twine. The bundles are packed in boxes holding 2,500 or 5,000 leaves. (Boxes are provided by the dealers.) Galax is sold wholesale by a 5,000-leaf count (200 bundles) or by a 2,500-leaf count (100 bundles). The boxes are shipped out or picked up, usually by tractor-trailers, and are distributed throughout the United States, Europe, and Asia for the florist trade.

There are nine known galax dealers in North Carolina who buy from local harvesters; seven dealers are in Yancey County and two are in Avery County (see Appendix 2). Dealers indicated that the counties where galax is primarily harvested from are Ashe, Avery, Buncombe, Madison, McDowell, Mitchell, Transylvania, Watauga, and Yancey. Summary 7 shows North Carolina galax dealer questionnaire results for 2001.

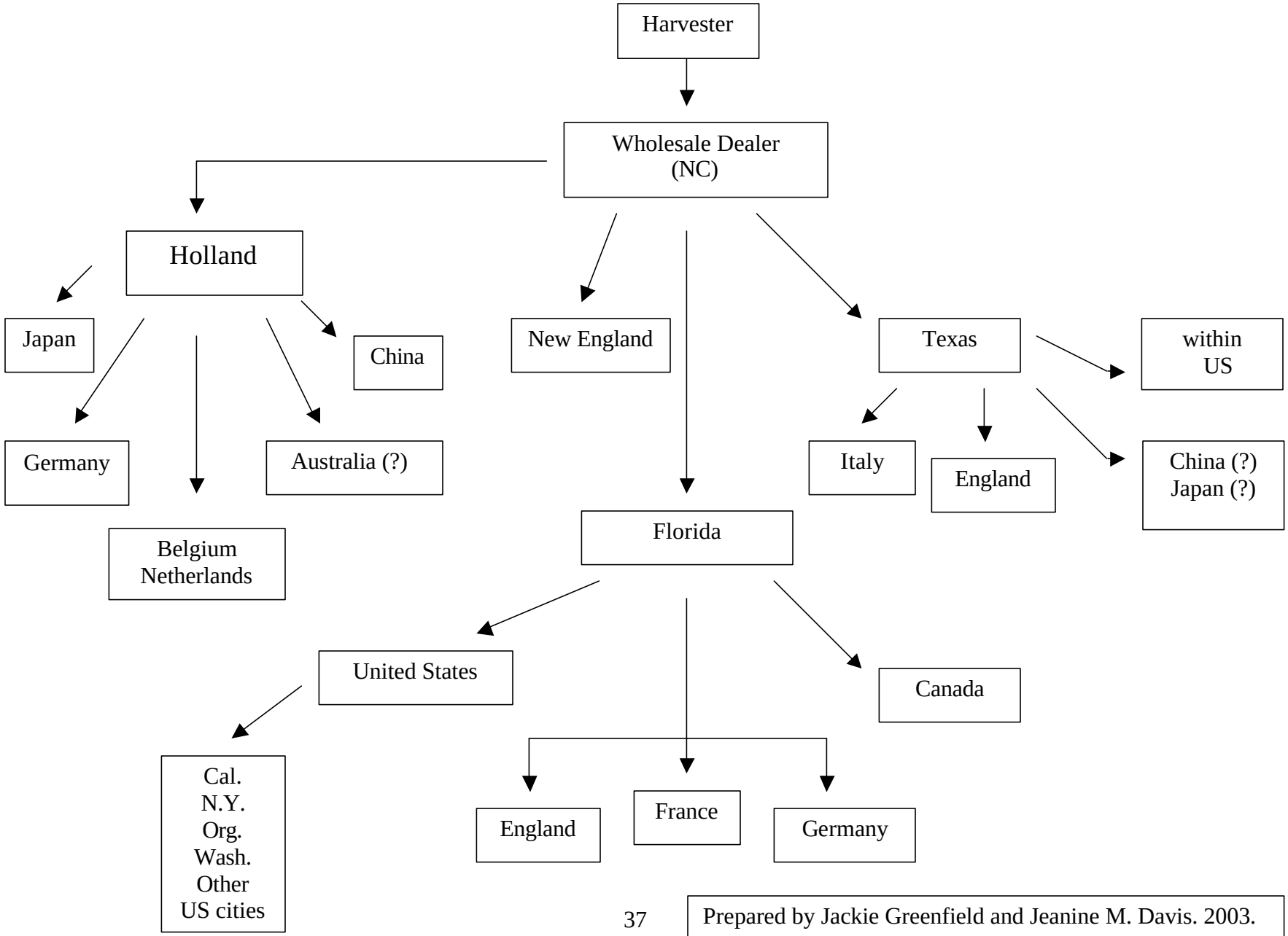
Summary 7. Galax harvest information as reported by NC dealers, 2001.

- 82.5% is harvested from public lands; 17.5% private lands
- 99.75% of the galax harvested is from the wild; 0.25% is cultivated
- All buyers responding purchase galax in the fall, winter, and spring; 50% also purchase in the summer.

Galax is either picked up by distributors or shipped from a dealer. The product is exported to Belgium, China, England, France, Germany, Holland, Japan, and the Netherlands (possibly Australia). Within the United States galax is shipped nationwide; some of the areas are Florida, Texas, Washington (Seattle), as well as the east coast (See Figure 9.) One individual is exploring the possibility of exporting galax to Israel. Questionnaire results indicate 50% of the dealers sell their product to US wholesalers and 50% export. One direct export location reported was Holland.

Preliminary figures indicate that the annual harvest of galax leaves in the escarpment region (see Figure 10) could be more than one billion leaves per year. One buyer indicated that a good harvester could collect an average of 7,500 leaves per day. The same buyer indicated that there are an average of 3,000 harvesters. Recently, another buyer confirmed that figure by estimating there are 2,500-3,500 harvesters who pull galax. (It is not clear how many galax harvesters actually harvest every year.) That particular business deals with around 300 harvesters a year, but has a database of over 1,200 harvester names. For some time, sales of galax have been quite brisk. With the increase of harvesters, some buyers are limited by how much volume they can physically handle.

Galax Distribution Routes



Prepared by Jackie Greenfield and Jeanine M. Davis. 2003.

Figure 9. Galax distribution chart

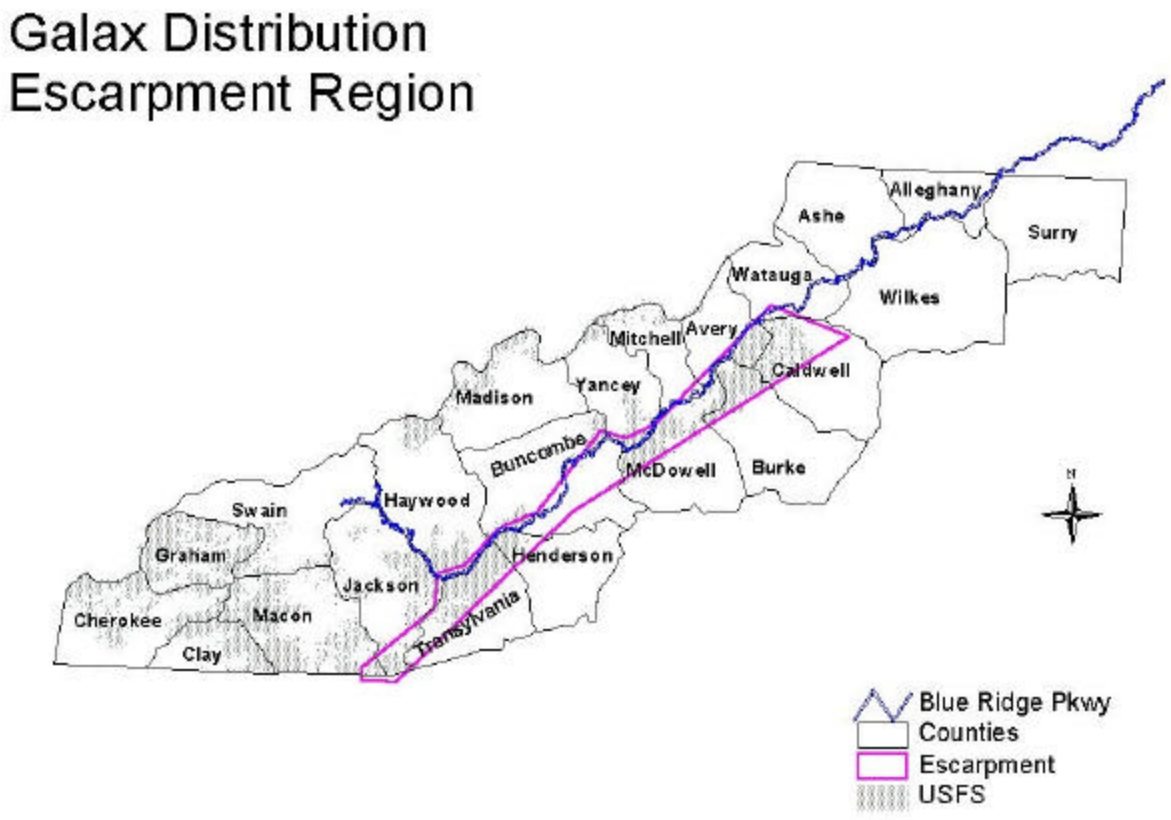


Figure 10. Galax distribution in the escarpment region of western NC. Prepared by Gary Kauffman. 2003.

Economics and Socio-Economics

Galax is a commodity that is easy to harvest, easy to handle, and gives immediate financial payback. For many years, collection of galax provided supplemental income to long-term mountain families. Often the galax harvester needed extra money for the winter months or for special occasions, or just to help make ends meet.

The price paid per box to harvesters fluctuates. Prices paid tend to be higher in fall and winter, when sales are highest and product is at peak production. Some dealers buy much less in the summer months. Harvesters are paid per box of 5,000 leaves. In Winter 2002, $60.00 per box was the average price paid per box. In June 2002, prices were being advertised at $40.00/box

paid to the harvester. In Fall 2001, prices varied between $60.00-$80.00/box. One dealer paid $100.00/box in early Winter 2002. Prices in Fall 2002 were quoted from $50 to $65 per box (5,000 count). Summary 8 lists galax prices as summarized from dealer questionnaire results.

Summary 8. Prices paid for fresh galax as reported by NC dealers, 2001.

- Highest price paid in 2001: $80.00/box
- Lowest price paid in 2001: $20.00/box
- Highest price paid last 5 years: $100.00/box
- Lowest price paid last 5 years: $20.00/box

The price paid to harvesters in 2001 varied from less than $.01 per leaf to $.02 per leaf (5,000 leaf count). In the winter, when harvesting is more difficult due to weather (cold, snow, ice), the price paid for galax usually increases. There is at least one dealer who grades by leaf size, color, and quality. This type of sorting generally brings in a higher price for the product.

In Fall 2001, sales estimates were calculated based on interviews with buyers, dealers, and experts in the industry, as well as by estimating the number of galax boxes that can fit in a tractor-trailer at one time. One buyer estimated that they ship out 1-2 tractor-trailer loads per week of galax. Another dealer shared that their company ships out 500-600 boxes of galax per week. From questionnaires that were filled out and returned, yearly totals from two dealers equaled 14,942 boxes shipped in 2001. Based on this information, information given by dealers estimating which dealer was the largest, smallest, etc, in the area, and conservatively estimating the number of trucks loaded and shipped out each week, income realized could range from $10-$18 million annually. This product is resold nationally and internationally throughout the florist trade. Galax has been observed in wholesale florist operations selling at the price of $.85-$1.45 per bundle of 25 leaves (sold to retail florists); through one Florida wholesale mail-order company, priced at $2.25/bundle; through retail mail order priced at $6.50/100 leaves; and in high-end specialty shops from $2.50/bundle up to $7.50/bundle (One wholesale florist buys galax year round and purchases two boxes every week and a half.).

The demographics of the galax harvesters are changing. Galax harvesters comprised of mostly local residents, but now it is estimated that 94%-99% of the galax permits issued by the US Forest Service are issued to people of Latino origin. These numbers have climbed steadily each year for the last five years. Historically, some of the Christmas tree growers in this area, who hired Latino laborers for their farm operations, encouraged these laborers to harvest galax in the off-season. Many found galax harvesting as a means not only to help make ends meet, but also to help provide a new financial enterprise for themselves, as well as their families, allowing an avenue to earn a respectable living in the United States.

Latino individuals and families continue to move to the Avery, Henderson, McDowell, and Yancey County areas; picking galax is a way to generate income quickly. From 1990 to 2000 the Latino community grew 875.5% in Yancey County alone (Tomas Rivera Policy Institute, 2003). Most are from the same area in Mexico and come to this area because they have family here. One person who works with the Latino community in this area offered this information:

- In the second half of 1995, the first wave of Latinos came.
- Most come to the United States with a debt, their "rite to passage".
- Galax is a means of income when the Latinos first come to the area: some stick with it; some get better jobs.
- Some are fulltime galax harvesters; some are factory workers who harvest galax on the weekends. Some also work on Christmas tree farms or with the nursery/landscaping trade.

Recently, with the closing of factories and the possibility of other businesses shutting down, Yancey County has experienced some increase in unemployment. According to dealers, galax harvesting by local long-term residents is starting to increase. These residents are looking to this old tradition as a possible way to help offset their increasing financial pressures.

Local Issues

With the Latino community growing in many of these counties, local, community based issues start to emerge. One, for example, is the issue of private property rights. Many harvesters are harvesting not only on public lands but also on private property. Secondly, some members of the

local community are unhappy with trash and waste that have been left at galax harvest sites. Some of the dealers have informed harvesters of this problem. Comments published in local newspapers, as well as through verbal communication, indicate tension between some local residents and some Latino community members (Willett, 2002). "There were reports of Latino's tires being slashed, windshields broken, and license plates stolen. In a four to six month period over 70 windshields were broken", says one spokesperson for the Latino community. Some local residents seem comfortable with Latino community members working in the nursery or agriculture trade, but when factory jobs are given to a Latino worker and not to a "local", tensions build. There are many more local issues that could be explored, supporting both communities.

North Carolina State Forests are seeing illegal harvesting of galax and other products within the state forests. For example, DuPont State Forest (Transylvania County) has confiscated poached lycopodium and log moss. There are indications that galax and possibly ginseng also have been harvested illegally on that property. No harvesting is allowed in the state forests unless a special permit is issued, which is usually for research purposes only. (Note: The two individuals interviewed from DuPont State Forest added that there would be two factory closings in 2002, in Transylvania County, which would put approximately 700 people out of work from that area.)

In 2001, Blue Ridge Parkway confiscated more than 100,000 galax plants. Parkway officials estimated one batch alone of 17,800 galax leaves had an estimated retail value of $4,000 [Asheville Citizens Times, Feb 16, 2001 (Ostendorff, 2001)]. The Parkway continues to be a "hot spot" for harvesters. One, it is easily accessible, and two, galax leaves are abundant along the Parkway. More education is needed to inform harvesters as to what areas are legal and illegal for harvest.

Education and Sustainability

The most common method of harvesting used by the Latino harvester is to pull the plants up by the roots and rhizomes. This, of course, is more destructive than the more time-consuming, but plant-friendly method of cutting the leaves. Some of the dealers have spent time working with harvesters showing them how to harvest and bundle as well as how to determine what size leaf to

pick. Dealers prefer leaves at least three and one half inches wide, although three-inch wide leaves are acceptable in the industry. Efforts are underway to develop a galax information brochure written in Spanish. This brochure will be designed to help non-English speaking individuals understand the permit application procedure, legal and illegal harvesting areas, sustainable harvesting practices, quality control issues, and the permissible scheduled harvest dates.

Concerns with over-harvesting of this native species led the US Forest Service to halt the harvest and collection of galax in 2001 and 2002 during the period of May 1 through June 15. During this period, new growth on the plant is developing. The plants are very vulnerable at this stage and can be damaged easily just by being walked on. Removing new growth this time of year jeopardizes the plant's vigor, growth, and long-term sustainability. The leaves are much more tender at this time and, thus, do not hold up well post harvest.

The main US Forest Service Ranger Districts that sell galax permits are Appalachian, Grandfather, Highlands, and Pisgah. Permits, issued by the US Forest Service, define maximum allowable harvest amounts. (See Appendix 5 for a sample permit from the Appalachian Ranger District, which is available in English or Spanish.) For galax, a permit costs $25.00 for 30 days and no more than 100 pounds of galax can be collected with each permit. The industry calculates sales on a per-leaf, per box basis though. One researcher estimated that there are between 173.81 to 328.99 leaves per pound, depending on the grade (Bir, 2001, see Table 4). Not all buyers grade galax. The dealer mentioned below determines grades on quality of leaf and leaf size. Different grades are then sorted into appropriate boxes - special box (largest leaves), purple box (top quality), and brown boxes (good quality).

Table 4. Number of galax leaves in a pound.

How many galax leaves are in a pound?

November 27, 2001 – 10 bundles of 25 leaves were weighed from each of the three grades of galax leaves at United Galax in Yancey Co., NC. For the three grades (Special, Purple and Brown based on the boxes in which the leaves are shipped . . . no leaves were brown or purple) the following numbers were recorded:

Grade	**Special**	**Purple**	**Brown**
Grams per bundle	65.3	53.5	34.5
Grams per leaf	2.61	2.14	1.38
Leaves per pound	173.81	212.15	328.99
Leaves per 100 pounds	17,381	21,215	32,899

(Bir, 2001)

Galax Research in North Carolina

Galax research studies are now underway at the Mountain Horticultural Crops Research and Extension Center (MHCREC), Fletcher, NC. Richard Bir, North Carolina State University, is working on methods to domesticate galax. Asexual and sexual propagation techniques are being evaluated and preliminary research is being conducted on cultural techniques.

Claude Deyton, NC A&T State University, Yancey County Horticulture Technician, has established test/demonstration beds with cooperators in Yancey County. These test plots were established with plants obtained from the US Forest Service lands via a special use permit.

Another researcher, Dr. Howard Neufeld, Appalachian State University, is a plant physiologist working with the role of anthocyanins in winter (Neufeld, 2002). Galax is one of the plants he is working with. He has also done some preliminary investigations with the "odor" of galax (Amoroso, 2002).

Energy Xchange, a private, non-profit, community-based organization in Yancey County, has a program, Project Branch Out, which was designed to preserve the forests and wildlife, while providing economic opportunities for its citizens. Native species are being grown, including galax, to "reduce the pressure on these species from harvests in the wild". This project fuels its greenhouses from the recycled methane produced from the Yancey County Landfill.

Sustainable harvest studies are being conducted both by Chris Ulrey, botanist for the Blue Ridge Parkway, and Gary Kauffman, botanist for the US Forest Service. The studies underway at the Parkway involve monitoring 32 plots in which galax leaves, three inches and larger, were removed (Ulrey, 2001). The US Forest Service also has studies underway with harvested plots, repeating the methods outlined in Chris Ulrey's paper.

US Forest Service now has a tagging/marking program for galax, a system where designated plants are sprayed with an adhesive, then dusted with a six-layer polymer that bears a "signature" coding. With this method, areas that are illegal for galax harvesting can have plants tagged and tracked if they are harvested.

Discussion

In Winter 2002, a shipment of galax leaves to China revealed problems with mold contamination that resulted in a Clorox/sterilization process necessary to export product overseas. Perhaps plant pathogen studies should be encouraged. One dealer indicated observing two different *Lepidoptera* species (caterpillars) on galax leaves in two different field locations. Also, hail damage this past spring halted harvesting from a particular area due to discoloration and physical damage to the leaves.

Following the chain of travel for a galax leaf could be a research project in itself. Harvesters sell to local buyers in the area and those buyers ship the boxes out to larger buyers, jobbers, or distributors. Some boxes go overseas, some get shipped nationally, and some get delivered locally. Buyers are very protective of information leading to where their product is shipped and are sensitive to sharing prices realized by their transactions. Typically, trucks come in to pick up galax boxes, in Yancey County, five days a week. There is at least one dealer shipping product

out with the dealer's own trucks. The North Carolina galax flow chart included with this report is the start of understanding where galax travels once it leaves North Carolina (Figure 9).

Galax clearly is an important commodity for many of the communities in Western Carolina counties. There appears to be a large number of harvesters picking daily. At what point, does this level of harvesting impact the growth and vigor of the whole population of galax? With the daily increase and accelerated rate of harvest, can this plant population survive and will it be able to maintain a sustainable existence?

Stopping the harvest of galax on public lands, during the May 1 through June 15 period, slowed the harvest and sales of galax but did not halt it. Most dealers did abide by the rules; but, without enforcement, some dealers continued to trade. At least one dealer would like to see the moratorium on galax harvesting extended for all of May and June and would like to see active visible enforcement. It appears that some of the dealers are concerned about over-harvesting of galax.

Within this NTFP project, interviews with Latino galax harvesters have been limited due to the language barrier. Bringing in an individual who can speak fluent Spanish and who lives in this area would be very beneficial to help develop a better understanding for the socio-economic issues as well as for the sociological differences within the local community and with those individuals who are newly established residents.

Most of the information gathered for this report came from Fall 2001 - Spring 2002 and is based on personal interviews, interviews over the telephone, returned surveys, available public records, and observations from harvested public lands. The questionnaire responses are based on 2001 figures. Most galax dealers did not want to fill out the questionnaire and most were not interested in revealing how much product they move each year.

Perhaps the biggest accomplishment this past year has been the rise in awareness of the issue. Populations of galax are being harvested extensively. Harvesters are hiking in further in the mountain areas to get to areas that have sizeable leaves and populations. Galax distribution is

worldwide now with other markets and applications broadening. Summary 9 shows galax estimates based on interviews, questionnaires, and research.

Summary 9. Demand, prices, and volumes of galax based on NC buyers, 2001.

- Estimated 1 – 2 billion leaves of galax harvested in 2001.
- Prices paid to harvesters ranged from $35.00 - $100.00 per box (5,000 count) in 2001.
- Estimated value for fresh leaves in 2001 was $10 – $26 million.
- Estimated demand was increasing.

Results for Ginseng

American ginseng (*Panax quinquefolius*) is native to North America and can be found in rich woodlands from Quebec to Alabama, west to Minnesota, Missouri, and Nebraska. It is an herbaceous perennial that grows as an understory plant in densely shaded deciduous hardwood forests.

Ginseng emerges in late April. A first-year seedling has three leaflets joined at the top of a 2 to 4 inch erect stalk. A small, generally carrot shaped root with a bud at its upper end is formed during the seedling year. The foliage dies in the fall, but the root and bud lie dormant through the winter. A new top grows from the bud the following year. With age, the plant increases in size and complexity. Second-year plants generally have two compound leaves terminating in a 4 to 7 inch erect stalk. The compound leaves normally consist of five ovate leaflets; the three middle leaflets are much larger than the basal ones. In subsequent years, the plant may have three, four, or rarely five prongs of compound leaves and may reach a height of 12 to 24 inches. Flowering occurs in late spring during the third and later years of development. Green fruit, or berries, nearly the size of dogwood seeds, develop from the flowers. These ripen to a bright red in late summer, each containing two to four hard seeds. Leaves turn bright yellow in the fall and the plant dies back to the ground (Davis, 2001)

Ginseng has deep roots connected with traditional uses in medicines of Asia. For over 4000 years (and perhaps 5000 years) ginseng has been used as medicine in China as well as in other

eastern cultures. It is now used worldwide as a medicinal. The main bioactive components of ginseng are a diverse group of steroidal saponins called ginsenosides. As many as 25 different ginsenosides have been separated and cataloged as existing in the root of the ginseng plant. Ginsenosides demonstrate an ability to act on different tissues in the body in different ways. Research into the function and relevance of the various ginsenosides in medicine has been complicated by these sometimes contradictory and confusing reactions (NC Consortium, 2002). In North America, ginseng is used to relieve stress, increase energy, and improve mental acuteness.

Ginseng is a valued plant to many people in the Southern Appalachian region and has earned the reputation as “green gold”. For several generations, "digging sang" has been an enjoyable and profitable activity for many mountain people.

Marketing, Volume, and Sales

It is estimated that more than 90% of the wild harvested American ginseng in the United States is exported to Asia. North Carolina ginseng is no exception. The traditional Chinese medicine market purchases high-end ginseng roots that get divided into different grades. This is the market that prefers the wild harvested American ginseng and bases much of the quality factors on age and appearance of the roots. North Carolina has long been known for its high-quality wild ginseng roots. Higher prices are paid for better quality “sang”. The dietary supplement industry also purchases ginseng but primarily uses cultivated ginseng, which is historically sold at a lesser price.

The North Carolina Department of Agriculture and Consumer Services (NCDA&CS) has developed a Ginseng Program that has gained recognition throughout the United States. This program is recommended as a model program for other states to emulate. In the state of North Carolina, ginseng is a plant species of special concern (see Appendix 6), and ginseng dealers must be registered. They are issued a permit to buy American ginseng for the purpose of resale or trade (see Appendix 7). The permit applies to ginseng collected in North Carolina. Product moving out of North Carolina must have a certificate from the NCDA&CS (certificate of origin). Product coming into the state of North Carolina must have a certificate of origin from the state in

which it came from. Yearly figures, by county, have been compiled for over 10 years. Please see the summaries listed below of ginseng harvest figures from the NCDA&CS report (Table 5 through Table 10).

As indicated for the year 2001, 6,788 lbs of dried ginseng were reported collected with 5,994 lbs certified for export. It is estimated that there were approximately 2,200 collectors in the state, who harvested from 31 counties and sold to 30 actively trading dealers (out of 54 dealers registered) for the 2001 harvest season. In North Carolina, harvest dates for green (fresh) ginseng are September 1st through March 30th; harvest dates for dried root range from September 15th through March 30th. The NCDA&CS report breaks down the harvest amounts collected from each county (Table 9 and Table 10). In 2001, the top five counties where ginseng was reported harvested, came from: Buncombe (916 lb), Madison (865 lb), Haywood (615 lb), Yancey (568 lb), and Jackson (562 lb).

For 2001 in North Carolina there was a decrease in the harvest amount compared to the previous year (2000), as well as the number of harvesters (Table 5). With the events of September 11th, 2001, the overseas China market slowed to a halt at one point. According to Jim Corbin, ginseng inspector for NCDA&CS, New York markets were affected significantly.

Table 5. Summary of wild ginseng harvests in North Carolina, 2001 harvest season.

	2001	**2000**	**1999**
Collected, pounds dry weight	**6,788**	**8,415**	7,710
Certified for export, pounds dry weight	**5,994**	**8,212**	7,614
Number of sales transactions by collectors	3,690	5,844	5,669
Average pounds per transaction	1.84	1.44	1.36
# collectors	~ 2,200	~ 3,250	~ 3,300
# dealers actively trading/ # holding permits	30/54	31/49	30/53
# counties harvested (out of the 100 counties in NC)	31	33	32

NC Dept. of Agriculture and Consumer Services, 2002

Table 6. Annual NC wild ginseng harvests, in pounds dry weight, 1978-2001.

Year	Pounds	Year	Pounds	Year	Pounds
2001	6788	*1993*	9746	*1985*	5778
2000	8415	*1992*	9841	*1984*	4926
1999	7710	*1991*	9172	*1983*	4360
1998	6496	*1990*	6447	*1982*	4482
1997	9182	*1989*	4306	*1981*	5647
1996	10970	*1988*	7742	*1980*	3847
1995	8664	*1987*	6037	*1979*	4243
1994	10201	*1986*	5843	*1978*	3136

NC Dept. of Agriculture and Consumer Services, 2002

Table 7. Roots per pound, dry weight. Average of samples taken from the stocks of five major dealers representing the range of ginseng in the state.

Year	# roots	Year	# roots	Year	# roots
2001	365	*1995*	285	*1989*	294
2000	327	*1994*	288	*1987*	296
1999	293	*1993*	299	*1983-85*	320-330
1998	315	*1992*	295	*1981*	330
1997	291	*1991*	295	*1979*	368
1996	314	*1990*	310		

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Table 8. Annual cultivated ginseng harvests in North Carolina (dry weight)

Year	Pounds	Year	Pounds	Year	Pounds
2001	0	*1996*	31	*1991*	406
2000	23	*1995*	20	*1990*	793
1999	0	*1994*	97	*1989*	175
1998	30	*1993*	80	*1988*	797
1997	31	*1992*	546		

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Table 9. Alphabetical listing of NC county wild ginseng harvests, in lbs dry weight

County	2001	2000	1999	1998	1997	1996	1995	1994	1993	1992	1991	1990	1980
Alamance	0	0	0	0	1	0	0	0	0	0	0	0	0
Alexander	4	7	17	9	9	12	12	17	6	6	23	6	13
Alleghany	70	27	43	141	106	155	79	55	107	87	103	86	32
Ashe	251	332	334	262	374	539	603	438	489	425	497	296	179
Avery	208	202	150	119	152	226	185	212	177	238	118	73	66
Buncombe	916	895	787	625	869	1089	707	861	848	784	786	497	417
Burke	50	26	16	18	12	33	31	14	40	12	43	19	12
Caldwell	78	47	114	105	149	210	139	162	140	114	93	86	62
Caswell	0	0	0	0	0	0	0	0	0	0	0	0	0
Catawba	4	0	4	8	30	3	11	12	14	5	13	10	6
Cherokee	268	415	336	220	359	427	530	528	395	514	484	220	186
Clay	237	419	406	134	276	262	116	391	289	352	318	180	64
Cleveland	0	19	8	11	4	7	3	3	4	5	3	2	0
Davidson	0	0	5	10	1	5	0	0	1	0	6	3	1
Davie	0	0	6	0	1	0	0	0	0	2	0	4	1
Forsyth	1	0	0	0	13	20	2	0	0	2	2	0	1
Gaston	0	0	0	0	7	0	1	2	1	3	0	0	0
Graham	372	517	453	223	514	498	503	589	348	528	396	210	150
Guilford	0	0	0	2	2	0	0	0	1	1	2	3	0
Haywood	615	707	602	580	656	1030	779	1026	771	841	727	720	477
Henderson	92	171	129	86	161	179	179	175	110	127	99	97	37
Iredell	2	4	4	3	29	12	11	19	2	9	2	1	2
Jackson	562	826	747	872	1017	1212	865	940	1143	1207	890	770	104
Lincoln	0	2	5	6	0	0	0	0	1	0	0	0	0
Macon	341	691	663	604	1002	901	574	931	996	943	644	429	225
Madison	865	896	721	717	768	1019	779	971	843	921	830	524	370
McDowell	230	331	342	246	244	447	334	348	176	324	197	187	156
Mecklenburg	0	0	0	0	0	2	0	0	0	0	0	0	0
Mitchell	420	387	276	278	418	496	426	427	440	521	554	318	231
Polk	15	88	28	27	41	34	53	95	37	39	75	55	12
Randolph	0	0	0	0	0	0	0	26	0	0	0	0	1
Rockingham	3	1	0	0	1	5	0	0	0	0	0	2	0
Rutherford	3	70	10	31	67	50	17	26	23	14	12	32	6
Stanly	0	0	0	0	0	0	0	0	0	0	0	0	0
Stokes	11	4	41	17	14	33	2	18	10	8	5	3	5
Surry	22	62	88	47	49	64	69	13	5	158	74	24	16
Swain	273	451	355	271	408	388	409	439	505	466	299	301	145
Transylvania	68	73	88	92	103	111	86	104	140	130	100	91	9
Watauga	167	156	249	217	364	423	387	397	445	441	500	320	354
Wilkes	70	52	192	137	317	226	213	253	161	96	173	128	91
Yadkin	2	2	0	2	1	2	2	2	2	1	15	10	1
Yancey	568	536	493	376	685	848	556	733	451	553	600	464	415

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Table 10. Rankings of NC counties by 2001-season wild ginseng harvest (lbs dry weight)

Region	County	2001	2000	1999	1998	1997	1996	1995	1994	1993	1992	1991	1990	1980
MN	Buncombe	916	895	787	625	869	1089	707	861	848	784	786	497	417
MN	Madison	865	896	721	717	768	1019	779	971	843	921	830	524	370
MS	Haywood	615	707	602	580	656	1030	779	1026	771	841	727	720	477
MN	Yancey	568	536	493	376	685	848	556	733	451	553	600	464	415
MS	Jackson	562	826	747	872	1017	1212	865	940	1143	1207	890	770	104
MN	Mitchell	420	387	276	278	418	496	426	427	440	521	554	318	231
MS	Graham	372	517	453	223	514	498	503	589	348	528	396	210	150
MS	Macon	341	691	663	604	1002	901	574	931	996	943	644	429	225
MS	Swain	273	451	355	271	408	388	409	439	505	466	299	301	145
MS	Cherokee	268	415	336	220	359	427	530	528	395	514	484	220	186
MN	Ashe	251	332	334	262	374	539	603	438	489	425	497	296	179
MS	Clay	237	419	406	134	276	262	116	391	289	352	318	180	64
PF	McDowell	230	331	342	246	244	447	334	348	176	324	197	187	156
MN	Avery	208	202	150	119	152	226	185	212	177	238	118	73	66
MN	Watauga	167	156	249	217	364	423	387	397	445	441	500	320	354
MS	Henderson	92	171	129	86	161	179	179	175	110	127	99	97	37
PF	Caldwell	78	47	114	105	149	210	139	162	140	114	93	86	62
PF	Wilkes	70	52	192	137	317	226	213	253	161	96	173	128	91
MN	Alleghany	70	27	43	141	106	155	79	55	107	87	103	86	32
MS	Transylvania	68	73	88	92	103	111	86	104	140	130	100	91	9
PF	Burke	50	26	16	18	12	33	31	14	40	12	43	19	12
PF	Surry	22	62	88	47	49	64	69	13	5	158	74	24	16
PF	Polk	15	88	28	27	41	34	53	95	37	39	75	55	12
PF	Stokes	11	4	41	17	14	33	2	18	10	8	5	3	5
PF	Alexander	4	7	17	9	9	12	12	17	6	6	23	6	13
PP	Catawba	4	0	4	8	30	3	11	12	14	5	13	10	6
PP	Rockingham	3	1	0	0	1	5	0	0	0	0	0	2	0
PF	Rutherford	3	70	10	31	67	50	17	26	23	14	12	32	6
PP	Yadkin	2	2	0	2	1	2	2	2	2	1	15	10	1
PP	Iredell	2	4	4	3	29	12	11	19	2	9	2	1	2
PP	Forsyth	1	0	0	0	13	20	2	0	0	2	2	0	1
PP	Caswell	0	0	0	0	0	0	0	0	0	0	0	0	0
PP	Davidson	0	0	5	10	1	5	0	0	1	0	6	3	1
PP	Mecklenburg	0	0	0	0	0	2	0	0	0	0	0	0	0
PP	Davie	0	0	6	0	1	0	0	0	0	2	0	4	1
PP	Gaston	0	0	0	0	7	0	1	2	1	3	0	0	0
PP	Stanly	0	0	0	0	0	0	0	0	0	0	0	0	0
PP	Guilford	0	0	0	2	2	0	0	0	1	1	2	3	0
PP	Alamance	0	0	0	0	1	0	0	0	0	0	0	0	0
PP	Randolph	0	0	0	0	0	0	0	26	0	0	0	0	1
PP	Lincoln	0	2	5	6	0	0	0	0	1	0	0	0	0
PP	Cleveland	0	19	8	11	4	7	3	3	4	5	3	2	0

REGION:
- MS Mountains south: Haywood and Henderson through Cherokee Counties
- MN Mountains north & central: Alleghany through Buncombe Counties
- PF Foothills: Piedmont counties bordering mountains
- PP Piedmont counties east of the foothills tier

NC Dept. of Agriculture and Consumer Services, 2002

Summary 10. Ginseng trends, prices, and collection information, 2001.

Marjorie Boyer, Ginseng Coordinator for NCDA&CS Plant Industry Division, reported the following in the "Trends in wild ginseng populations" from the 2001 Report:

Trends in wild ginseng populations: The 2001 wild ginseng harvest in North Carolina is comparable to the low of 1998 and has a likely similar explanation: a substantial drop in the price offered by Oriental buyers for wild American ginseng. Prices had risen in 1999; the 2000 season saw erratic prices. Drought conditions may have contributed to the low 2001 ginseng harvest after more favorable weather in parts of the ginseng range in the 2000 season than in the previous two years.

The roots-per-pound average reflects the lack of data from the more northern counties of the state where roots-per-pound averages in previous years were consistently lower than in the more southern counties. The average has risen despite the application of the 5-year minimum root size over the last three seasons.

With a ten-fold price differential between wild and cultivated ginseng, the tendency among North Carolinians is to grow "woods grown" and "wild simulated" ginseng in their own forest patches. Often such ginseng is mixed with genuinely wild roots in lots that the dealer sells as wild. There is no clear line between indigenous wild ginseng and what has been established and/or encouraged by some degree of human intervention.

Collection on state lands: Collection of ginseng is not permitted in state parks and state forests. National forests occupy about a quarter of the North Carolina mountain region and are an important source of ginseng; permits are issued on a district-by-district basis (see Appendix 8).

NC Dept. of Agriculture and Consumer Services, 2002

It is not known how much ginseng "escapes" this system. One researcher estimated possibly as much as 25% of the wild harvested ginseng in North Carolina may not get registered with the NCDA&CS (Personal communication, 2002).

Figure 11 shows a ginseng distribution chart with information supplied by North Carolina buyers, harvesters, and researchers. The information provided is to the best of our knowledge. The main purpose for these distribution maps is to see how the product moves once it is harvested from North Carolina. Updates will be made regularly on these charts as new information is produced. Of the 54 ginseng dealers registered in North Carolina, 10 reported the following results in Summary 11 by responding to the questionnaire for the 2001 season.

Summary 11. Ginseng harvest and sale information from NC dealers, 2001.

- Dealers' reports reflected sales from all ginseng counties (see NCDA list of counties)
- 34% was harvested from public lands; 66% harvested from private lands
- 97.50% was wild harvested; 2.50% cultivated
- All dealers responding bought ginseng in the fall; 20% also purchased in the winter
- Of the dealers answering the questionnaire, a total of 3509 lbs of NC ginseng was purchased; dealer amounts varied from 2 lbs to 1000 lbs.
- All dealers bought dried ginseng; 50% also purchased fresh ginseng.
- 70% said they could have sold more, ranging from 20% more to 100% more.
- Market demand: 20% said it increased; 30% said it stayed the same; 50% said it decreased.
- Two dealers reported selling fresh seed.
- 50% of the dealers export ginseng; 10% sell to retailers only; 40% sell to wholesalers in the US.
- Export destination: Hong Kong and other points in Asia

Wild Harvested Ginseng Distribution North Carolina

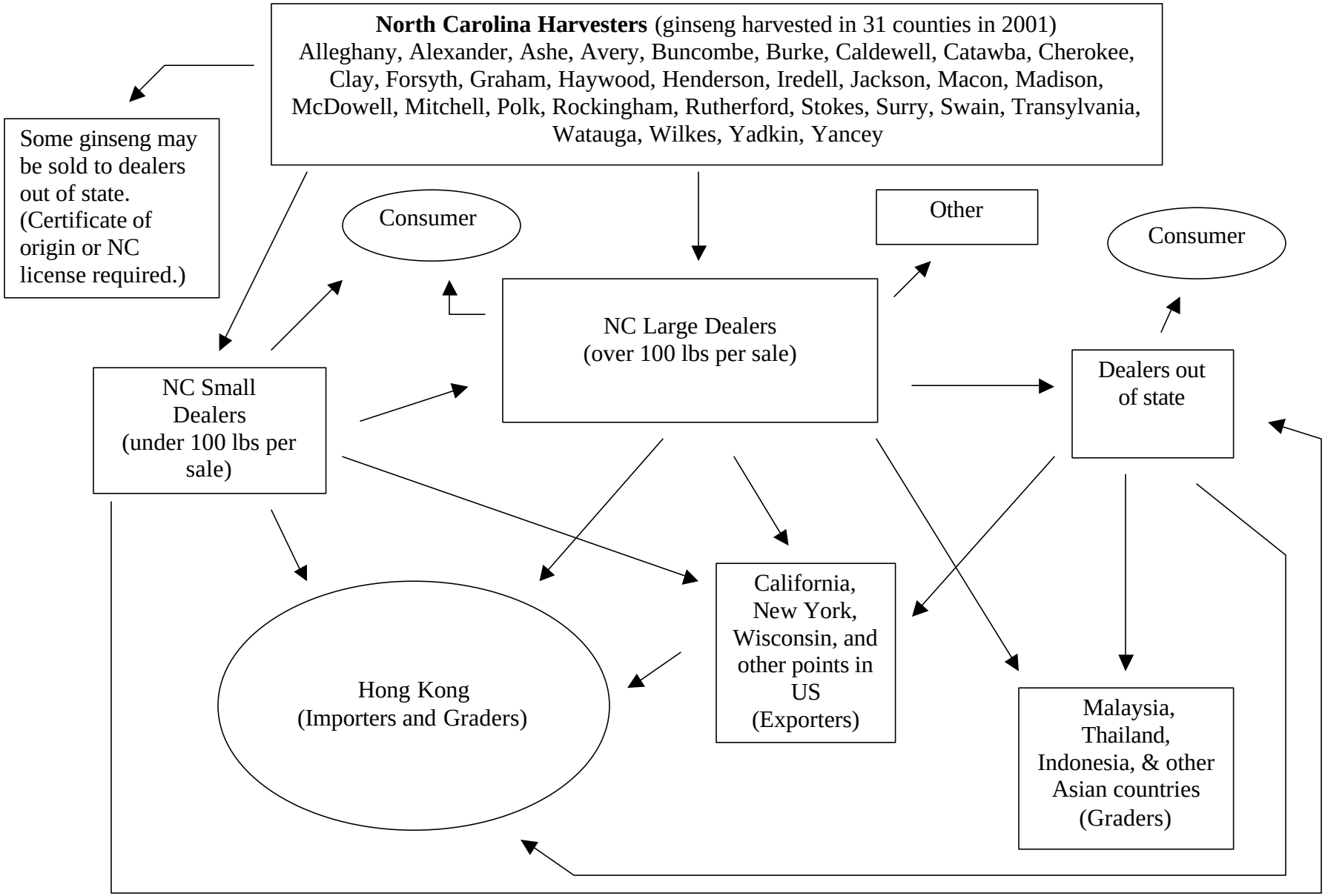


Figure 11. Ginseng distribution chart

Prepared by Jackie Greenfield and Jeanine M. Davis. 2003.

Economics and Socio-Economics

In North Carolina, ginseng digging is considered "the poor man's sport" according to one digger who was interviewed. Many Appalachian families and individuals participate in the yearly ritual of "sang" hunting. One dealer commented that historically, next to furs, ginseng was the next largest source of money for settlers coming from Europe. A harvester commented that his family's property has around 50 acres of ginseng. Much of the seed that was sown on those 50 acres, came from a one hundred year-old parent plant that is still growing.

Interviews with North Carolina harvesters showed that individuals, who dig ginseng, have been taught (by family members or friends) where to find ginseng and how to harvest it. This tradition continues to be passed down from generation to generation. Many of the harvesters rely on the extra income they earn from harvesting ginseng. Harvesters also stated how much they enjoyed being in the woods and "the hunt".

When harvesters were asked about the ease of finding ginseng these days, many cited two limits: access to habitats (mainly due to land ownership changing hands) and the need to travel further into the woods for larger ginseng roots. One full time harvester who was interviewed uses a GPS device to locate and mark ginseng populations for future harvests.

From permit information, it is estimated between 2,000 and 4,000 people apply for ginseng permits each year in North Carolina. From talking with harvesters and researchers, it appears that the number of people digging ginseng in a given year is often influenced by price, as with the case in the 1996 harvest season when dried ginseng root reached a price of over $500/lb paid to the harvester. That year, NCDA&CS recorded 10,970 dried pounds of harvested ginseng.

In 2001, the price paid to harvesters for dried ginseng root averaged between $215-$235/lb; green (fresh) ginseng averaged between $50-$90/lb. In January 2003, one dealer reported the price paid to harvesters for 2002 ranged between $365-$400/lb for dried root. Summary 12 shows the results from the dealer questionnaire of prices paid to harvesters in 2001.

Summary 12. Prices paid for dried ginseng as reported by NC dealers, 2001.

- Highest price a dealer paid in 2001: $300.00
- Lowest price a dealer paid in 2001: $185.00
- Highest price in last 5 years: $520.00
- Lowest price in last 5 years: $180.00

According to NCDA&CS reported figures, in 2001, five North Carolina ginseng dealers accounted for approximately 75% of the documented ginseng exported from North Carolina.

Based on information reported to NCDA&CS, Figure 12 shows what counties ginseng was harvested from in 2001, Figure 13 indicates where registered North Carolina ginseng dealers are located, and Figure 14 shows 2001 county-by-county demographics of ginseng harvesters.

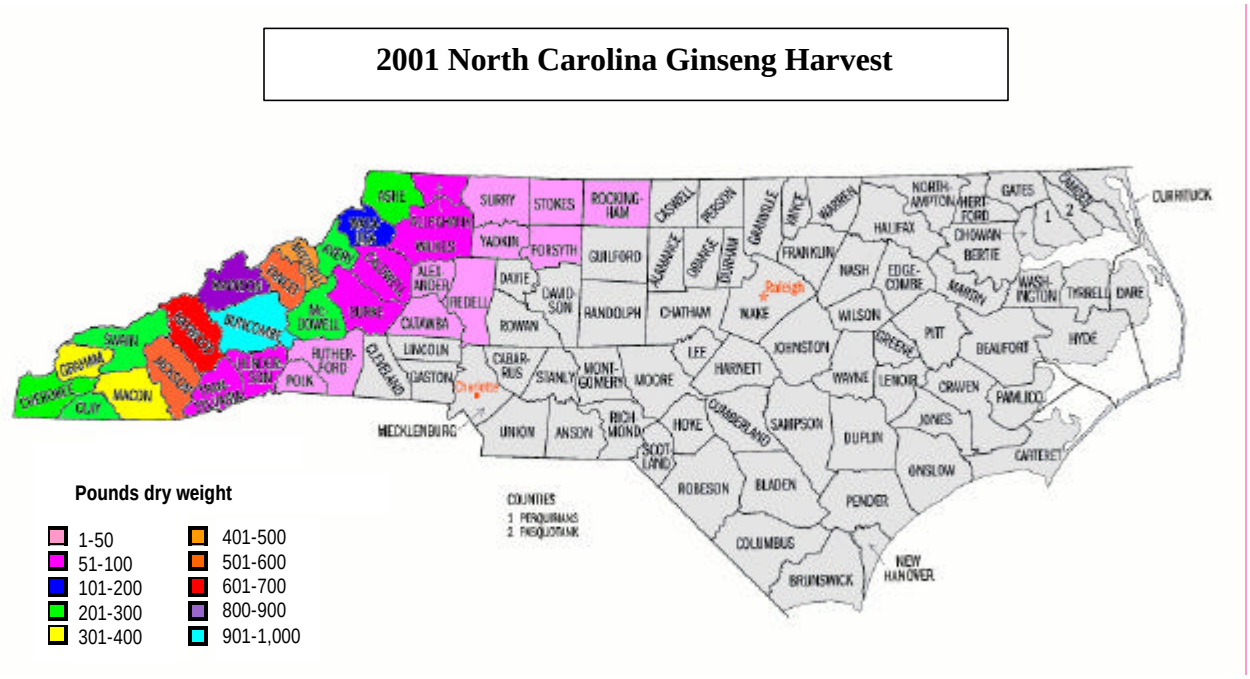


Figure 12. 2001 NC county ginseng harvest volumes; based on information provided by NCDA&CS.

Prepared by Karen Hardy and Jackie Greenfield. 2003.

North Carolina

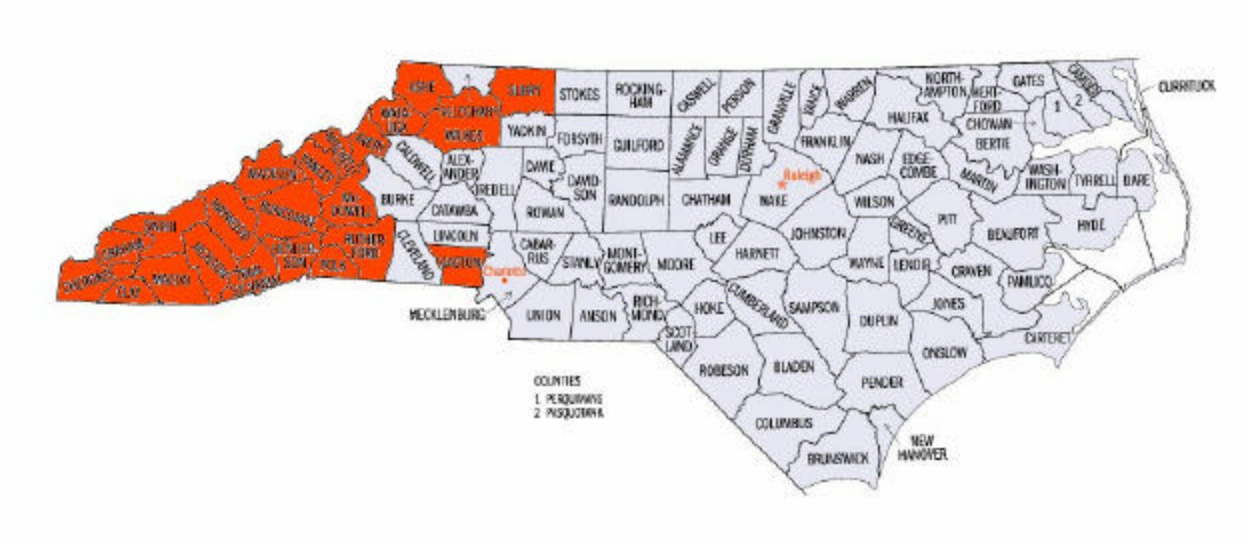


Figure 13. North Carolina ginseng dealer locations, by county; based on information provided by NCDA&CS.

Prepared by Karen Hardy and Jackie Greenfield. 2003.

North Carolina

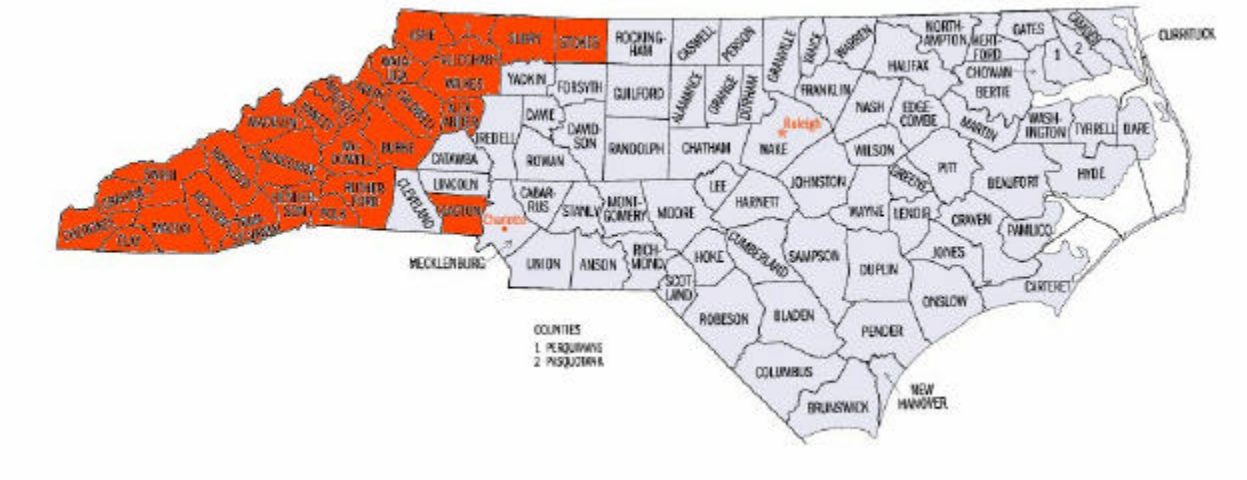


Figure 14. 2001 Demographics of ginseng harvesters, by county; based on information provided by NCDA&CS.

Prepared by Karen Hardy and Jackie Greenfield. 2003.

Education and Sustainability

"The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) was formed to provide a mechanism to regulate and monitor international trade in wild plants and animals, and their parts and products. Specimens of species outlined in CITES Appendix II may be traded internationally through the use of export permits. This includes the sale and trade of ginseng. CITES regulates international trade through a system of permits. The U.S. responsibility for CITES implementation lies with the U.S. Fish and Wildlife Service. The U.S. Fish and Wildlife Service, Division of Law Enforcement, inspects paperwork and shipments of CITES-listed animals and their parts and products entering and exiting the United States. They also undertake CITES-related investigations. The U.S. Department of Agriculture, Animal and Plant Health Inspection Service (USDA/APHIS) is responsible for inspecting shipments of CITES-listed plants and their parts and products."
(http://international.fws.gov/animals/ginindx.html)

Ginseng is managed at the state level, and in North Carolina, is a legally protected plant, ranked as Special Concern, and is subject to certain regulations. Listed below are regulations cited from NCDA&CS's website:

-Wild ginseng collection in the state is prohibited during the growing season of April 1 to September 1st. This allows the plants to set seed. During the harvest season September 1-April 1, collectors should replant any ginseng seeds from collected plants in the place where the roots are dug.

-To collect ginseng from another's land the collector must have written permission from the landowner, dated and valid for no more than 180 days. The document must be on the collector's person when digging ginseng on that land. **This requirement applies to both public and private lands.** In National Forests, district offices are responsible for such permits. State and national parks, including the Blue Ridge Parkway and the Great Smoky Mountains National Park, do not allow ginseng collection.

-No state permit is needed to dig ginseng, only the landowner's permission.

-Taking ginseng from another's land with intent to steal is a felony.

-Diggers should collect only 3-prong plants or larger. Only roots 5 years old or older can be sold at this time (1999 -2001). Plants with 3 prongs are usually at least 5 years old; 1- or 2-prong plants are too young and should not be dug. This applies to wild and "wild-simulated" ginseng. Diggers need to check about current restrictions each season before digging wild roots, as rules may change.

-A ginseng dealer's permit is required for anyone who buys North Carolina ginseng roots, wild or cultivated, for resale, or who intends to sell roots out of state. The Plant Conservation Program issues

the permits annually. The dealer must follow state regulations on buying, record keeping and export certification. Any ginseng leaving the state must have an export certificate, issued by the local NCDA&CS Plant Protection Specialist. There is no fee for the dealer's permit or for export certification.

-A ginseng grower or digger needs a North Carolina ginseng dealer's permit if the grower/digger intends to sell roots directly to an out-of-state buyer rather than to a North Carolina-registered dealer. The permit is needed only when the ginseng is to be sold.

-No permit is needed to grow ginseng to be harvested only for the roots. If intending to sell live plants, the grower needs a nursery certificate, issued by the local NCDA&CS Plant Protection Specialist. Growers should keep records to show that their ginseng is not wild, since there is always the possibility that future regulations may restrict the sale of wild ginseng.
-Anyone collecting or dealing in live ginseng plants intended for replanting must obtain a Collected Plant Certificate and/or Nursery Dealer Certificate from NCDA&CS. Live ginseng plants are subject to plant pest regulations.

For further information on North Carolina ginseng trade, contact Marjorie Boyer at Marj.Boyer@ncmail.net.
Ginseng regulations can be found on the internet at:
http://www.ncagr.com/plantind/plant/conserv/48f03c.htm#.0305

In North Carolina, it should be noted that the three-prong rule is in effect: that is, a ginseng root cannot be taken unless it is five years old, defined by "possessing four bud scars, one bud on neck, and having at least three prongs". Harvesters will also be required to replant the seed from a plant that has been removed from that immediate area. For establishing new populations, seed can be removed and replanted elsewhere as long as the ginseng plant is not harvested the same year as the seed that came from it (Boyer, 2002).

Poaching of ginseng continues to be a problem on private and public lands. Jim Corbin, inspector for NCDA&CS, describes a variety of marking systems including steel ribbons, dyes, and silicon chips being used to deter illegal harvesting of ginseng (Corbin, 2002). With the addition of a K-9 unit in 2001 to detect marked ginseng these combined efforts have helped to recapture illegally harvested ginseng and hopefully deter poachers from harvesting these lands.

It was reported at a 2003 ginseng conference in Kentucky that one dealer had $125,000 worth of ginseng confiscated at the docks, ready for export. The product had the National Park signature mark, and thus, was able to be traced as illegally harvested ginseng (Personal communication, 2003).

One couple, interviewed in 2002, spoke of poaching problems they were experiencing on their 70-acre property where they reside. Poachers took their wild ginseng plants but never touched the "wild simulated" plants that had been planted. That year, they had to put a gate up to keep out vehicles, driven by log moss harvesters, as well as having to post their land for no trespassing.

There is no match in price to what wild harvested ginseng brings compared to the price paid for woods grown ginseng. According to the Asian buyers, wild harvested is preferred for their markets. Encouraging harvesters to grow ginseng, instead of wild harvesting it, has been a slow process in North Carolina. What does seem to be evident from the interviews, is that most of the "old-timers" who harvest ginseng, practice replanting the seeds as part of their harvesting regime. In 2002, one dealer donated 25 lb of ginseng seed to a native plant association in the state. It is not clear how dedicated younger and newer harvesters are to this old time tradition of "sowing the seeds from the plants you reap".

Ginseng Research in North Carolina

US Forest Service researchers, as well as researchers from the Great Smoky Mountains National Park, continue population studies throughout North Carolina, monitoring wild populations of ginseng. The US Forest Service is also working on a distribution study of ginseng in North Carolina, to determine ginseng's range and how much of it is actually out in the forests.

As mentioned earlier, NCDA&CS Plant Conservation Program has an on-going tagging/marking program for ginseng, similar to what was described for galax; one system, that is used, designates certain plants that are sprayed with an adhesive, then dusted with a six-layer polymer that bears a "signature" coding. With this method, areas where ginseng harvesting is not allowed can have plants tagged and tracked.

Dr. Jeanine Davis, Mountain Horticultural Research and Extension Center and Coordinator of the NCSU Specialty Crops Program, oversees on-going field cultivation studies at the research station as well as on-farm studies with growers throughout the region.

Discussion

To help us better understand the interaction of buying and selling ginseng, in 2002, one North Carolina ginseng dealer allowed us to observe a day of ginseng buying and selling. This hands on experience was a valuable lesson in: how ginseng is sold; who the players typically are; how much root it takes to make a pound of ginseng; what better quality ginseng looks like; how ginseng is graded and rated; what to look for in determining the age of the roots; how to tell the difference between wild harvested and wild simulated; and how the product is weighed and sold. It was obvious relationships have been built over the years between this dealer and some of the harvesters. Trust appears to be very important in developing these relationships; although it was quite evident that price was the driving force behind selling the ginseng. Most harvesters sell to a dealer in close proximity to where they live. One dealer said that typically, if a harvester needs to sell his ginseng during the week, often he will go to a dealer in close proximity to where he lives. If it is a weekend, many times the harvester will travel a little farther to get a better price.

Each harvester, who came to sell his 'sang, knew ahead of time, exactly to the fraction of a gram, how much his ginseng weighed. Some tried to negotiate the price. One man, who had excellent quality and was offered the highest price of the day for his ginseng ($410/lb for four pounds), decided not to sell that day in hopes that the price would rise in a week or two. (The price of ginseng is quoted daily; it fluctuates that much during a season.)

Ginseng markets are much different than other medicinals. That is, it is prized, in the Asian market, for its appearance and age of roots, as opposed to content of ginsenocides. Physical appearance is the driving force for this botanical for the Asian markets. Listed in Summary 13 are ginseng results summarized from the returned dealer questionnaires.

Summary 13. Ginseng yields and prices as reported by NC dealers, 2001.

- Estimated 46,000 lbs of dried root of wild simulated/wild harvested sold from the US in 2001.
- Estimated 6,788 lbs of dried root of wild harvested ginseng sold from North Carolina in 2001.
- Prices paid to NC harvesters ranged from $185.00 - $300.00 for dried root in 2001; prices paid to harvesters in 2002 ranged from $270.00 - $400.00 per dried lb.
- Estimated market value for dried root in 2001 was $12.1 million.
- Estimated demand 10-20% increase for the next 3-5 years.

Results for Log Moss

Log mosses (*Hypnum curvifolium, H. imponens, Thuidium delicatum*), native to the Southern Appalachian Mountains, are found throughout the forest floor in rich moist woods. Mosses are often found covering downed logs of chestnut, oaks, and other hardwoods. This class of bryophytic plants has a small leafy often-tufted stem and can spread by creeping stems. While its growth rate is not nearly as fast as many rhizomatous vascular plants, it can come back if fragments of the moss are left along the harvested log (Kauffman, 2001).

Most of the mosses harvested for sale are classified as "sheet moss". Years ago, the predominant tree species, where mosses were harvested from, were old American chestnut logs. Now, with the pressures from increased harvesting, mosses found on oaks and other hardwoods are also being pulled. Specialty mosses like rock moss, reindeer moss, sphagnum moss, and a moss called "mood moss" (found on the ground in drier red spruce forests) are also being harvested in North Carolina for niche markets.

Marketing, Volume, and Sales

Mosses are primarily used in the florist trade and for packaging of horticultural products. Machine parts have even been packed with log mosses. The majority of the packing material seems to be used mainly with the horticulture industry, especially with products such as African violets and other houseplants. Rhododendrons are packed from the west coast with log moss as well (Corbin, 2002).

Early indicators show that these commodities are shipped and sold, not only in the U.S. but also abroad. Direct shipments go to Florida, Georgia, Texas, and New Jersey, to name a few. Log moss is used in the floral industry and is shipped fresh or dried. The product is packaged in a variety of ways: by the pound, by the roll, by the bag or by the box.

Based on interviews with dealers and harvesters, the 2001 price paid to harvesters for fresh moss varied from $.60 cents to $1.50 per pound or $10.00 per roll. Further drying or curing of moss is usually done by the buyer; although, one harvester allowed us to tour his greenhouse area where he does his own drying. One harvester indicated that he receives between $1.50-$2.00 per pound for his top quality moss, which he dries himself. Some harvesters deliver bulk dump truck loads of moss while others package their log moss in case boxes that are provided by the buyers. Sometimes 24 inch feed sack-type bags are used and supplied by the buyers. These bags hold approximately eight pounds of moss. One dealer's log moss is boxed with approximately ten pounds in each box. Common case prices being paid to harvesters for these boxes average around $6.00 per case. Another dealer packages specialty mosses in five or ten pound boxes and brings in a higher price for these specialty items. Prices in the regional wholesale florist houses (who sell to floral shops) vary from $18.00 to $28.00 per ten-pound box. Another market for mosses is in the landscaping trade. In 2002, 24-inch bags of fresh moss were being sold at a landscaping nursery in Macon County for $30.00 per bag.

There are at least eight known (perhaps more) log moss buyers in western North Carolina who purchase directly from harvesters. Buyers can be found in Avery, Clay, Graham, and Yancey Counties, to name a few. One dealer from Graham County has the website, http://www.snowbirdmoss.com/. This particular dealer/harvester delivers to Georgia, Tennessee, and North Carolina. There is at least one known buyer in Tennessee and Georgia who buy moss from NC dealers and harvesters. There are several Florida buyers. Another dealer interviewed, indicated that he regularly travels to Georgia to make deliveries as well as shipping product out via trucker. More information is needed on buyers and dealers in and out of state. A product flow chart was not developed for moss because information gathered is inconclusive on volume, sales, dealers, etc. One harvester, who was interviewed, indicated that in the past, he traveled to a West Virginia dealer to sell moss. Price is the driving force.

Some of the buyers sell directly to retail accounts across the United States; others sell to wholesalers, distributors, etc. Some distributors bring tractor-trailers five days a week to Yancey County to pick up moss (and galax); others have orders shipped out. From the dealer questionnaires, it was reported that moss is harvested from: Clay, Graham, Jackson, Macon, Madison, Mitchell, and Yancey Counties. Log moss is also harvested and shipped from other states, for example, Kentucky, Tennessee, and West Virginia. Much interest is in the overseas market, particularly the Netherlands. It is not unusual for mosses to be shipped by tractor-trailer loads or repackaged into five-to-ten pound boxes for resale.

Depending on whom you speak with, estimates vary on how much volume is harvested and sold from North Carolina. One small dealer sold 4,000 cases of log moss in 2001. Another dealer revealed that in the far western counties of North Carolina, moss harvesting yields gross proceeds of over one million dollars paid to harvesters each year. Through observation, a dealer reported that another dealer receives 1-2 tons a week of log moss from harvesters or dealers who travel from other counties. Still, another dealer stated that he delivered, in one load, 3,000 pounds of bulk moss to another dealer for repackaging. All dealers who were interviewed or casually communicated with indicated sales were increasing. The market demand was driving it.

Interviews with moss dealers and harvesters occurred primarily in Spring/Summer 2002. Most dealers contacted would not give volume information or sales information. Only two filled out questionnaires and one of the two only gave partial volume sales figures to record on the questionnaire. It is not yet clear what volume of log moss in exported from the counties of western North Carolina. Information gathered is inconclusive, and it is our opinion that harvest and sales have steadily increased as well as the number of harvesters pulling mosses. Therefore, what gets harvested gets sold, with no known indication of saturation of the market as of yet.

Economics and Socio-Economics

Based on interviews with dealers and harvesters, in North Carolina, log moss is a commodity that is harvested primarily by individuals who have lived in the area their whole lives. The number of harvesters is quite small compared to the total number of galax harvesters. Earlier estimates indicated that there were 50-75 moss harvesters in the western counties of North Carolina. Just in 2002, the number of harvesters has climbed to possibly 100-150 individuals

(maybe more) who rely on moss harvesting for income. Very rough estimates indicate there are at least 25-50 people harvesting moss full time; therefore, they rely on log moss for their livelihoods. More harvesters and buyers must be interviewed before an accurate summary of the situation can be provided.

US Forest Service District offices issue harvesting permits for National Forest Service land. Not all districts issue moss permits. Those that do, charge $.15 per pound for a 10-day permit. Harvest limit, per permit, is 100 pounds. Harvesters and dealers who were interviewed, estimated, on an average, that one out of ten harvesters applies for a permit for moss. Poaching of mosses is a problem not only on US Forest Service property, but also on State Forest Lands. DuPont State Park reported confiscating moss from harvesters and indicated they have had problems with galax and princess pine being poached, as well. There is no wild harvesting allowed on State Forest lands unless you have a permit for research.

Harvesting of log moss is more difficult than galax because log mosses are found deeper in the forests, often where terrain is rugged. Since mosses are bulky and can be heavy, more space is needed in a vehicle for transport. Sometimes all terrain vehicles or mules are used to remove moss from the forests. It is not unusual for two or more individuals (usually men) to go out together to harvest. Harvesters have indicated that a team of pullers can harvest 800-1,000 pounds a day, on a good day, if the moss is readily available and more or less concentrated in a few locations. One logger said he knew of a harvester who would collect 1,000 lbs a week of moss. The same person interviewed also revealed that it is possible to collect 2,000 lbs in one day. Mosses are cut, stripped, and rolled from the downed logs. Some harvesters sell fresh moss directly to the dealers, while a few will take it home and dry it further. One harvester is experimenting with dyeing the moss. There is a limited market for color mosses.

It appears that many of those who harvest log moss are people who harvest forest products fulltime and rely on these forest products for their annual family income. Three classifications of harvesters were given by one of the moss harvesters: full time harvester, part time harvester, and the occasional “when I need money” harvester. One observation: the ethnic background of log moss harvesters continues to be Caucasian with no dramatic

increase of any other ethnic group represented. General consensus among harvesters and dealers is that most of the moss harvested is currently from public lands.

Because of the relatively limited location of where galax is harvested, dealers of that product appear to be somewhat organized and concentrated in the same area. Most interact with each other, often trading boxes or helping each other fill orders on a per week basis. Log moss dealers, on the other hand, are scattered in different areas of western North Carolina. Some of the dealers are harvesters themselves. Some deal directly with clients; others sell to larger moss dealers or to wholesale distributors. There is log moss that travels from different areas of the state. For example, in some cases, moss is shipped from Graham County to Yancey County where it is sold to a larger dealer then shipped to Florida or elsewhere. There are at least four galax dealers who also buy log moss.

General consensus among dealers and harvesters is that the season for harvesting mosses slows down during drought periods and in the typical drier months like July and August. Although some of the dealers buy year round, others buy spring, fall, and winter. Winter months are variable for harvesting, depending on inclement weather and access. Two dealers indicated that spots appear on some of the log mosses; perhaps a type of fungus. Both dealers said is could be cause for rejection with some of their clients in the floral industry. One harvester, who commented on the spotting, indicated that he cuts the spots out. It is not known what causes this spotting and would be worth further study.

Education and Sustainability

With the diversity of mosses in demand in the florist trade now, populations are being harvested from many different forest-type ecosystems, and harvesters do not appear to be engaging in any type of sustainable harvesting techniques or methods. Some harvesters have indicated that it is more difficult to find log mosses in the woods; they have to travel deeper into the forests to locate the larger populations. Jim Corbin has stated that moss is getting hit perhaps as hard as galax (Corbin, 2002).

Communication with Dr. James Costa, Western Carolina University (WCU) biology professor, revealed that there are several species dependent on moss environments. One species,

Microhexura montivaga, the Mygalomorph spider, is known as the spruce-moss spider. According to Dr. Costa, this tiny species is a Southern Appalachian endemic and is on the Federal endangered species list. It is found above 5000 feet in moist moss mats (largely sphagnum) on the forest floor. It is restricted to a few peaks in our area. Another WCU biology professor, Dr. Fred Coyle, did a detailed survey of its populations on Mt. Leconte, in the Great Smoky Mountains National Park, and Dr. Costa is presently involved in a population genetic study (funded by US Fish and Wildlife Service) to estimate levels of genetic variation and gene flow between populations. *M. montivaga* is now further imperiled because the balsam woolly adelgid has destroyed much of the Fraser fir canopy, subjecting the moss mat to desiccation. More information can be found on this species at the website: http://ecos.fws.gov/servlet/SpeciesProfile?spcode=J014.

Dr. Costa added that other specialists, including several Lepidopteran larvae, are moss feeders; some Psocoptera are associated with mosses; and there is at least one cryptic acridid grasshopper that frequents moss and lichen. "Harvesting log and rock mosses will impact a diversity of other species - nurse logs are 'incubators' for many seedlings; and there is a rich assemblage of springtails, proturans, pseudoscorpions, and other microarthropods associated with that environment", adds Dr. Costa.

Discussion

The impact of moss harvesting and marketing in North Carolina is slowly unveiling. It is clear that more information is needed to further assess this product. Hopefully moss dealers and harvesters will cooperate in supplying more information. Based on the data collected from interviews, what has been apparent over the last few years is the steady increase in moss use and sales, as well as the increase in demand for the specialty, niche-type mosses.

More moss research needs to be done on populations/species affected by removal of the various types of mosses. Perhaps whole populations are becoming extinct before ever being discovered. Research and cultivation information on growing mosses could perhaps, eventually, ease the pressure on wild populations.

Throughout the course of this project, data that was gained on log moss seemed contradictory to say the least. Some individuals stated that log moss reproduces within three years; others indicated it takes at least nine years. It was not clear what volume of moss mass is needed to remain intact in order for reproduction to occur on its native log or native site. Most harvesters did agree, though, moss is getting scarcer in the forests.

Results for Ramps

Ramps (*Allium tricoccum* or *Allium tricoccum*, var. *burdickii),* known as wild leeks, are native to the eastern North American mountains. They can be found growing in patches in rich, moist, deciduous forests from as far north as Canada, west to Missouri and Minnesota, and south to North Carolina and Tennessee. In early spring, ramps send up smooth, broad, lily-of-the-valley-like leaves that disappear by summer before the white flowers appear. The bulbs have the pleasant taste of sweet spring onions with a strong garlic-like aroma.

Marketing, Volume, and Sales

As one of the first plants to emerge in the spring, ramps were traditionally consumed as the season's first "greens". Throughout the mountains of the eastern United States, including many western North Carolina counties, annual spring ramps festivals are held.

These festivals have become major tourist attractions and are actively promoted by the communities in which they are held. For the year 2001, over 2,000 pounds of ramps were harvested from the North Carolina forests to fill the need for five ramp festivals (Chamberlain, 2002). Chamberlain estimates approximately 3,050 pounds were harvested for the 2002 ramp festival season (This figure includes eight ramp festivals.). Ramp bunches were sold at some of these festivals as well as being used for the fundraising dinners. Bunched ramps brought in a premium price of $3.00 - $5.00 per bunch at the festivals. There are 11 known ramp festivals and fundraising dinners in Western North Carolina. (Note: More than likely, there are many more that may only be advertised locally.) Other states that host ramp festivals or dinners include Tennessee, Virginia, and West Virginia. To the best of our knowledge, most ramps harvested for the ramp festivals come from public lands.

Interviews were conducted at roadside market stands in various counties, at market stands in the North Carolina Asheville Farmers Market, with restaurants, wholesalers, commercial harvesters, pleasure harvesters, ramp festival organizers, county agents, state and federal employees, and researchers. Supply and demand seems to guide prices.

In 2002, at the Asheville Farmers Market, market stands were selling ramp bunches for $1.50 - $1.75 per bunch. The vendors indicated the season for sales generally is around three weeks in April. Two vendors indicated it was not uncommon for a customer to purchase 10-15 bunches at a time. The vendors buy their ramps from commercial harvesters who deliver to the market. Typical locations where ramps are sold, roadside stands, market stands, farmer's markets, all had ramps for sale by the bunch. Other market stand prices around the counties averaged around $1.50 per bunch, ranging from $1.25 - $1.75. Two market stand owners said they pay harvesters $1.00 per bunch for the delivered ramp bunches. Bunch sizes varied at all locations. The average weight of bunches ranged between a quarter pound and half pound. Occasionally bunches weighed over a half pound. At one market stand in Madison County, an average bunch weighed three-quarters of a pound both times the stand was visited.

Commercial harvesters interviewed all sold directly to market stand vendors; one harvested for his own stand. Ramps were harvested from Buncombe, Haywood, Jackson, Macon, Madison, and Yancey Counties. One harvester indicated that he sells a 50 lb. nylon sack for $75.00 and can make $150.00 in one day. At the time of the interview, he had harvested 20 sacks for the 2002 season and said he could harvest another 30 sacks in one season. One of his customers sells ramp bunches at a flea market for $2.00/bunch. The harvester that digs and sells his ramps at his own stand estimated that he sold 1,700 bunches for the 2001 season. He uses his four-wheeler to get into remote areas. His ramps were priced at $1.50/bunch. Most harvesters indicated that ramps were harvested both from public and private lands.

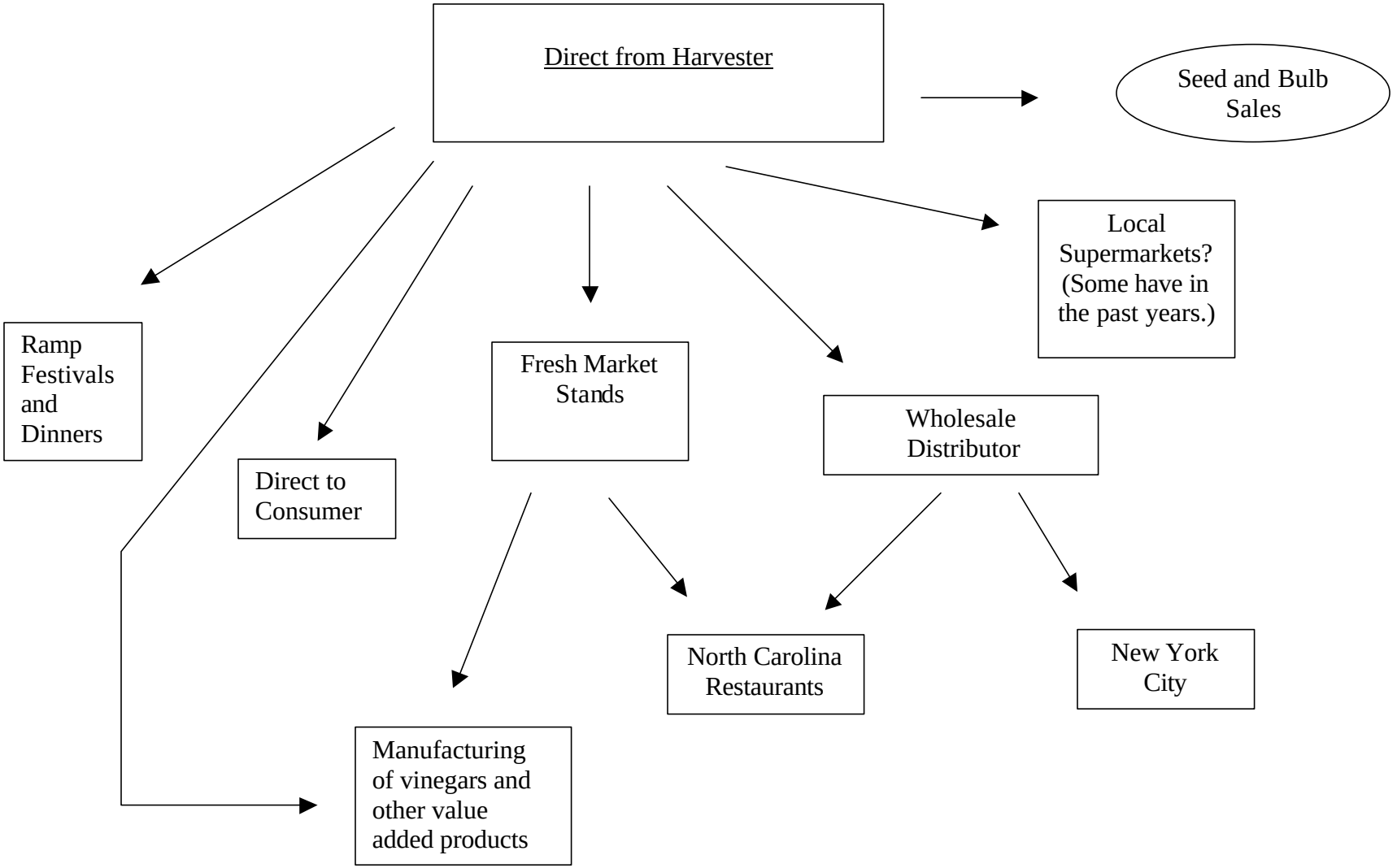
Johnny Hensley, recently retired County Extension Director for Yancey County, estimated there were at least 12 vendors in Yancey County (possibly up to 20) selling ramps in the 2002 season. The enterprises varied from gas stations to road side market stands, greenhouses, general stores, and even car trunks and the back of pick-up trucks. He reported two Fire Department ramp

dinners as well as numerous church and family get-togethers for the 2002 season. To the best of his knowledge (as well as the opinion of most of the people interviewed), all ramps collected and sold were dug from the wild.

In recent years, white-table cloth restaurants have also begun serving ramps, increasing the demand for large, consistent supplies of the native forest plant. North Carolina restaurants as far as Raleigh, and restaurants nationwide, are discovering the delights of this onion family delicacy. One grower from West Virginia ships his ramps to chefs in various cities throughout the United States. He also sells seed and bulbs to growers. His value added products are a huge success with his mail-order business, offering items like dehydrated ramps, jellies, biscuit mixes, pickled ramps, and mustards. There is one known processor in Transylvania County, NC, who produces vinegars, salad dressings, steak sauce, and barbeque sauces. He used to harvest his own ramps, but now purchases them. The Smoky Mountain Native Plant Association, in Graham County, has started developing value-added products from ramps to sell at the local ramp festival.

A local produce wholesaler, Mountain Foods, distributes a limited amount of ramps, mainly as a preordered item by local restaurants or specialty shops. Carolina Organic Growers, a statewide organic produce distributor, sold ramps to its restaurants throughout North Carolina. Figure 15 shows how ramps are distributed once harvested from North Carolina. As this chart gets updated, it is expected that distribution and receiving points will change as the market for ramps continues to grow. Average bulk prices for ramps, including websites, ranged from $5.00 - $10.00 per lb.

Ramps Distribution in North Carolina



Prepared by Jackie Greenfield and Jeanine M. Davis. 2003.

Figure 15. Ramps distribution in North Carolina

Economics and Socio-Economics

Socio-economic factors associated with ramps and ramp harvesting are playing an increasingly important role. As one of the first plants to emerge in the spring, ramps were traditionally consumed as the season's first "greens". They were considered a tonic because they provided necessary vitamins and minerals following the long winter months without any fresh vegetables. Traditions evolved around the annual gathering and preparation of this pungent and flavorful plant.

Pleasure harvesters, when interviewed, stated the following reasons for harvesting ramps:

- Family tradition
- Enjoyed being outside
- Wanted to pass the tradition on to their children
- Love eating ramps

Commercial harvesters shared the same responses, adding:

- For added income

The ramp festivals in North Carolina long have been known as fundraising events for the communities in which they are held. Local rescue squad and volunteer fire companies rely heavily from the proceeds of these ramp festivals to meet the increasing demands of their annual budgets. One fire company indicated that 30% of their annual budget comes from proceeds of their annual ramp dinner.

Spring 2002, the Great Smoky Mountains National Park (GSMNP) halted all harvesting of ramps in the park. Many people, frustrated and upset by the decision, sought other areas to harvest. Sales of ramps at local market stands increased tremendously, causing an increase of commercial harvesters gathering from the native populations. Many days, some of the market stand vendors sold 50-100 bunches of ramps per day. Mentioned earlier, Hensley reported Yancey County ramp vendor estimates. He also estimates that in a three-week period, ramp sales may have reached around $36,000 for that county, with bunches priced at $1.50 each.

Local Issues

Harvest studies within the GSMNP indicate a decline in populations where harvesting has been monitored (Rock, 1996). This has led the GSMNP to ban all ramp harvesting as of Spring 2002. Many individuals were outraged and felt their rights were violated; this was their "rite of spring". Yearly treks to the mountains for ramps and trout are part of a lifelong tradition, for some families.

While the GSMNP gave at least two years notice of this policy change, many locals did not pay attention to the announcements in that many individuals felt it happened "all of a sudden". Needless to say, people interpreted this rule as one that applies to all government owned lands, including the US Forest Service lands. There is still much confusion in North Carolina as to what is National Park Service property and what is US Forest Service property. The media did not seem to explain the distinctions well enough for the general public to truly comprehend.

Because of the closing of ramp harvesting at the GSMNP and the confusion as to what lands this referred to, there was a huge increase of commercial harvesters digging ramps from private and public lands. At this time we do not have quantitative numbers of collective volumes sold to market stands, just estimates of how much was sold at some of the stands.

In spring of 2003, the Enterprise Mountaineer Newspaper in Waynesville, NC, reported an incident of a ramp population stolen from private property. From a personal telephone call, another ramp patch had been removed from private property during the same season. In both cases, whole populations were taken, and both incidences occurred in Haywood County, NC.

Education and Sustainability

The tremendous volume of ramps consumed at North Carolina's ramp festivals are gathered from the forests. In many areas, the annual intensive harvesting is seriously damaging the wild populations of ramps. Studies in Canada and Ohio demonstrated that ramps are very sensitive to how they are harvested. Years ago, gatherers would only take a small number of bulbs from a population. Now the demand for ramps is so great, the entire population is often harvested.

Most specialists and researchers agree that ramp populations are declining. Many "pleasure" harvesters also commented that some population sites they normally visit each year are getting smaller. Some of the commercial harvesters disagree. They feel there are populations still untouched, and that the ramp is not declining. With the estimated harvests from the ramp festivals alone, the harvest numbers are steadily climbing.

One wholesale distributor, from New York City, who was interviewed, indicated that most of the ramps he knew of being sold throughout the City, came from New England harvesters. He also indicated there was much interest in ramps with area chefs. (Ramps have been featured on the two most popular Food Channel shows, Cooking with Martha Stewart and Emeril. Martha Stewart also has published ramp articles in her magazine.)

Through the North Carolina Specialty Crops Program, coordinated by Jeanine Davis, and through grants from the GoldenLEAF Foundation, 26 cooperators/growers in five counties of Western North Carolina, as well as one cooperator in Persons County in the Piedmont of North Carolina, are involved in on-farm studies. There is tremendous interest in growing ramps as an alternative to tobacco and potentially as a new commodity for vegetable farmers.

Smithson Mills, marketing specialist for NCDA&CS, is coordinating a kitchen incubator project in western North Carolina to assist farmers, growers, and food manufacturers, in processing their value added products. He sees ramps as one of the targeted commodities that would be ideal for this project. Growers and harvesters could bring their bulk ramps to the kitchen and be able to process vinegars, dehydrated ramps, pickled ramps, etc, on a large scale. All equipment would be available for use, ie., food dehydrators, canners, etc.

Research in North Carolina

Ramp cultivation studies have been underway since 1999 at the NC State University Mountain Horticultural Research and Extension Center in cooperation with North Carolina Department of Agriculture & Consumer Services and the GoldenLEAF Foundation (2000-2002). Research includes pH/calcium studies, seed germination studies, fall versus spring plantings, on-farm research, and observation studies at naturalized and native sites. North Carolina counties

currently included in these studies are: Avery, Buncombe, Graham, Haywood, Henderson, Jackson, Macon, Madison, Persons, and Yancey.

Jackie Greenfield, plant biologist and graduate student at Western Carolina University, is conducting additional seed germination studies looking at breaking physiological and epicotyl dormancy of *Allium tricoccum* seed.

Gary Kauffman and David White, both from US Forest Service, have been conducting population studies and harvest studies in North Carolina on ramps for the last few years.

As mentioned earlier, Janet Rock, vascular plant specialist for the Great Smoky Mountains National Park, has completed a three-year study on the impact of ramp harvesting (J. Rock, 1996) in the Great Smoky Mountains National Park.

With the increased popularity of ramp festivals, Jim Chamberlain's research brings him to North Carolina every year to monitor ramp harvests and to measure, weigh, and calculate the huge volume of ramps harvested and sold each year at these festivals.

A publication, on line and in print, has been published as a North Carolina State University Horticulture Information Leaflet, *The Cultivation of Ramps*, written by Jackie Greenfield and Jeanine Davis. This publication is updated periodically as new results are produced.

Discussion

Interest in ramps is continuing to grow as farmers seek new alternatives to traditional crops; landowners want to supplement their income with a niche product; chefs across the United States are discovering the flavor of ramps; and interest is booming in spring ramp festivals held all throughout Western North Carolina. With populations of ramps dwindling in our national forests, more pressure is on to find viable ways to reproduce this species in a timely manner.

One ramp grower from West Virginia suggests the US Forest Service conduct seed harvesting programs to collect and replant the seeds on the National Forest Service property. (Note: Researcher, Daniel Gagnon, reported that it can take a ramp seedling up to seven years to reach

reproduction stage.) Those involved with research on cultivation are also encouraging growers to start and continue a seedbed each year to ensure constant reproduction and supply.

As with Johnny Hensley's report on the number of market stands selling ramps in Yancey County, he also questioned how much is being sold and how much spoils, since ramps are quite perishable, and most market stands do not have refrigeration for them. Thus, in an effort to conserve native populations and meet rising demand, cultivation of ramps is strongly encouraged. Harvesting ramps from easily accessible, concentrated plantings would not only benefit festival participants, chefs, and consumers, but also create a new marketable product for the commercial grower. Native populations would be allowed to regenerate and multiply as ramps gain recognition and popularity among consumers.

General Discussion

In the Appalachian region, the roots of wild-harvesting have been a way of life for many generations. With three different interviews, stories were shared of how the additional income from these forest products made a difference in survival: shoes were bought for the children, for example. Two elderly women shared their story about when they were children: walking to school in the creek bed during the winter, because it was warmer to their sack-wrapped feet than walking in the snow on the ground. In a remote area of Buncombe County, one local mother was observed harvesting galax while her three young children waited patiently for her in the car. She had been gone for several hours and had to travel long distances on foot to find the sites for harvesting. We cannot forget that many families depend on this method of income for day-to-day survivorship.

But, how have the dynamics of the industry changed that have altered the methods of harvesting, the volume harvested, and who the harvesters and buyers are in this day? For one, long-term local residents used to be the primary harvesters of galax. Now, the majority of galax harvesters are Latinos, who have moved to the area to find work. Typically, what we have found, is that most wild harvesters take other, better paying jobs, when these jobs become available; for example, factory jobs. On the other hand, when factories are laying off workers, some local residents rely on wild-harvesting to help pay the bills.

Poaching on private and public lands continues to be a problem. Listed in Table 11 are the current species Jim Corbin, NCDA&CS, indicated that were a concern in North Carolina.

Table 11. List of Poached Species and Species Used in Trade

Black Cohosh	Partridgeberry
Blood Root	Rhododendron Spp.- Wild Azaleas
Blue Cohosh	Solomons seal
Boneset	Squaw Root
Butterfly Weed	Star Grass
Dicentra spp.	Star Grub
Flowering Dogwood	Sumac (Roots and Bark)
Fraser Fir	Trillium Species
Galax	Trout lilies- Lilies
Ginseng	Virginia Snake Root
Golden Seal	Wild Cherry Bark
Hepatica	Wild Geranium
Indian Pink	Wild Ginger Root
Joe-Pye	Wild Hydrangea bark
Ladies Slippers	Wild Indigo
Log Moss	Wild Iris
Mayapple root	Wild Yam Root
Mullein leaf	WitchHazel

It is not clear how much the dealers actually know where these forest products are harvested. Information is based on what the harvesters report, and for some dealers, where they, themselves, harvest. Estimating the percent harvest from public land versus private land for many has been a guess at best. How many harvesters know exactly when they have crossed a county line in the forest if there is no sign? Many opportunist harvesters appear to not be practicing sustainable harvest methods like their forefathers did. “Old Timers”, who have harvested wild products for years, shared their concerns about the changing attitudes of some of the young harvesters. They also stated that fewer and fewer offspring choose to continue the long time tradition of wild harvesting.

Coming on to the scene appears to be new wild plant “entrepreneurs” who are trying their hand at the brokering scene. Harvesters and small dealers are taking advantage of the World Wide Web by advertising their products and eliminating the middleman or one of the levels of trading.

One interesting note: Of the established dealers who answered the questionnaire, most of them stated they do not advertise their businesses, either for harvesters or for companies to resell product to. Almost all of these dealers indicated business success was due to word of mouth.

As interest in these species accelerate, researchers are feeling a sense of urgency to develop cultivation methods. Other researchers are racing to measure levels of constituents within these species to find the most desirable "mother" plants.

Can we confidently educate harvesters, buyers, and processors as to the importance of sustainable practices? Many of the harvesters interviewed complained about government regulations. Many of these harvesters regularly harvest product on public lands. As indicated earlier, general consensus among harvesters is that perhaps one out of ten harvesters applies for a permit. Income from these permits could help sponsor reseeding programs, education programs, population studies, and enforcement measures. At what point does a harvester or buyer or manufacturer say, "Yes, I am responsible, too. What can I do to help?"

The message is quite clear throughout this report: **More information is needed to better assess non-timber forest products in North Carolina.** This is only a beginning. Whether we will ever feel confident with the information gained remains to be seen. Many factors come into play when trying to assess these markets. Supply and demand clearly rules.

It is our hope dealers and businesses that chose not to participate in an interview or in filling out a questionnaire will reconsider and contribute to this project in the coming years. There are also several thousand harvesters who are part-time, fulltime, seasonal, or hobbyist-type gatherers. Only a small percentage of these harvesters were interviewed for this project.

Recommendations

Listed below is an outline for the framework to set up a model for data collection of non-timber forest products. This is a work in progress and should be used as a guideline. Other regions and states may have specific needs and concerns that would be unique to those areas.

Information available from Public Records

- US Forest Service Permit Information, District Rangers Office: product volumes, number of permits applied for, revenue amounts taken in from the permits, county information, permit rules (can vary from district to district).
- State Ginseng Program: dealer records, dealer names and addresses, ginseng harvest records by weight and county, rules and regulations governing ginseng.
- County demographic studies: example, ethnic population percentages, unemployment figures, etc.
- State/county list of nurserymen and plant collectors: publication put out (in NC) every two years with names and addresses of nurseries and plant collectors in the state.
- State and Federal endangered species and plants of special concern from National Fish and Wildlife Services and (for NC) North Carolina Department of Agriculture and Consumer Services, Plant Protection Division: rules and regulations governing these plants, export information, etc.
- County Extension Offices: records of filings, for example, in NC, Fraser fir cone permits; known dealers, buyers or businesses of forest products in the area.

Media and Literature Outlets to Gather Information

- Internet searches: use a number of different search engines and list your search title in a variety of different ways; for example, log moss- search for sheet moss, log moss, moss wholesale, etc.
- Flyers posted in store windows advertising buyers of products.
- Local newspaper classifieds: forest products are often advertised in the weekly “items for sale” newspapers (usually newspaper is no cost) or the local community newspaper in the classified section.

- Local newspapers often run feature stories about community events or news: ie., ramp festivals coming up, poaching of ginseng, work by native plant enthusiasts, confiscation of illegal harvests, crafts made from the wild, etc. Contacts are often listed in these articles.
- Literature searches to find research on plant species: Use databases, like Agricola, Biological Abstracts, Biological and Agricultural Index, etc.

Organizations/Individuals to Interview

- United States Forest Service (USFS); botanists, law enforcement officials; district offices; Rangers.
- National Parks in the state (including for example Blue Ridge Parkway which is part of the National Park Service): botanists; law enforcement officials; Rangers.
- State University Cooperative Extension Service: Horticulture and forestry county agents and District directors.
- State Dept. of Agriculture: plant protection division; nursery division; marketing specialists; inspectors.
- State Forest Service: botanists; Rangers; district managers.
- University researchers at various institutions.
- Wild harvesters.
- Raw product buyers: dealers of ginseng, medicinals, floral, nursery, etc.
- Industry personnel: companies in the area that manufacture, process, or sell forest products; for example, sawmills, herb extract companies, floral businesses (wholesale and retail), produce distributors, restaurants, specialty shops, nurseries (wholesale and retail), roadside market stands, festival attendees.
- Trade associations (like the American Herbal Products Association) or non-profits: nurseryman's association; state floral association; Christmas tree association; conservation groups like National Heritage Program; Sierra Club; advocates for minorities.

Other Useful Tools

Questionnaires

- Develop one questionnaire for dealers/buyers and one for wild harvesters. Determine which segment of non-timber forest products you wanted to research and design your questions just for that segment: for example, medicinals, edibles, floral-decorative, or nursery-ornamental. If you identify a dealer who buys products from more than one segment, send two separate questionnaires.
- Determine what you want to do with the information once it is collected. Is it for plant protection, sustainable harvesting awareness, limitations on harvesting, preserving the rights of the harvesters, cultivation methods, further research studies on diseases, insects, etc?
- Plan the questions accordingly to target those goals.
- If questionnaire is to be mailed, include a cover letter explaining who is conducting the survey and what will be done with the information. What are you offering these people in return? Why should they answer your questions? How will **they** benefit?
- In the letter, list a contact person and your telephone number as well as a date you would like the forms returned. Determine if you want **their** contact information on the questionnaire (note: We chose to keep it anonymous.). It is very important to insure confidentiality of information. By combining information (volume, prices, etc) no one company or dealer would be identified or singled out.
- Include a self-addressed stamped envelope.
- If at all possible, call or visit the dealers/buyers in advance to introduce yourself and to let them know what you want to accomplish.
- Remember, this industry is built on trust.
- Follow up with a telephone call to buyers/dealers who did not respond to the questionnaire. Try to schedule a personal interview or a telephone interview to complete the questionnaire. Personal interviews are ideal.

In compiling and reporting the information, whenever possible, use graphics like histograms, scatter charts, or county/state maps to report specific information. For example, show a pie chart representing ethnic backgrounds of harvesters; show a histogram of the number of employees

who are fulltime, part-time, and seasonal; fill in counties on a state map indicating where a particular product is harvested from.

Interviews: in person and on the telephone

The most successful interviews were the in-person one-on-one interviews, based on the snowball method (see above report). There will be times when family members, employees, extension agents, etc, will also be present for the interview. Those being interviewed, tend to be more open and much more comfortable if they can speak with you directly. What you are doing is formulating a relationship built on trust. This takes time and may take half the interview before both parties begin to feel comfortable.

Often, writing information down while someone is answering questions makes some individuals uncomfortable. Be sensitive to that as you are recording information, and reassure them the information is confidential. Explain exactly how this information will be dealt with and in what format it will be presented. Offer a copy of the report when it is completed. It is not recommended to use a tape recorder for interviews with dealers or harvesters.

Introducing yourself to dealers initially, before an interview, would be ideal. Usually, their network of communication, among each other, is very tight. Having good relationships with buyers and dealers could open the door to harvesters and other buyers.

Interviews can last anywhere from twenty minutes to six hours. Be sensitive to the responses of those being interviewed. Get your cues from them as to if it is time to wrap up the questions and interview. It is always good to give them your contact information and to ask if it is okay to call if you have any follow up questions. Be sure to show your gratitude for their time.

Sample questions are attached to use as guidelines. Remember to ask yourself, what information is important to your research. Telephone interviews are quite impersonal, but sometimes it is the only way to gain information or to have information clarified. If at all possible, call to set a time for your telephone appointment to avoid any potential disruptions during the time of the interview. Use the same guidelines as the personal interview. Don't feel uncomfortable with pauses in the conversation. This allows each of you to think about what it is you want to say.

Finding the harvesters:

- Ask the dealers
- County extension agents
- Other harvesters
- State ginseng dealer records
- US Forest Service permit records
- Law enforcement officials (National Park Service, US Forest Service, etc)
- State plant collectors list
- Researchers

Finding the dealers:

- From harvesters or other dealers
- Researchers
- State ginseng harvest records
- Export records
- Newspapers – classified sections advertising to buy
- Posters in windows of local community stores
- County extension agents
- State plant collectors list
- Internet
- Law enforcement officials (Park Service, Forest Service, etc)

Collecting plant data information:

- Dealers
- Harvesters
- Industry manufacturers of those products
- Trade organizations and publications representing those products
- Public Records, state, federal, county
- University researchers and extension centers
- Private marketing reports (with permission)
- Database searches for literature reviews

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Appendix 1

Plant Conservation Program
Plant Industry Division
North Carolina Department of Agriculture and Consumer Services
P.O. Box 27647
Raleigh, NC 27611
(919) 733-3610

NORTH CAROLINA GINSENG DEALERS 2001-2002

AS OF NOVEMBER 27, 2001

The North Carolina Department of Agriculture and Consumer Services has issued permits to the following Ginseng Dealers to buy American ginseng (*Panax quinquefolius*) during the 2001-2002 ginseng season for the purpose of resale or trade. The permits apply only to ginseng grown or collected in North Carolina.

This list supersedes all previous lists. The list is subject to change at any time, especially between July and October. The Plant Conservation Program sends out current lists on request.

Permit #, Co. locale	Dealer	Address	Phone
0120 Surry	Abshers' Appalachian Wild Larry Ralph Absher, Sr.	240 Dutchman Creek Rd. Elkin, NC 28621	(336) 835-6513
0108 Buncombe	Allen's Fur & Ginseng Thurman D. Allen	302 Wilson Cove Road Swannanoa, NC 28778	(828) 298-4456
0130 Polk	James Anthony Bell	P.O. Box 8 Lynn, NC 28750	(828) 863-4930
0115 Rutherford	Big Mountains Ginseng Joel Ammons	136 E Main St. Forest City, NC 28043	(828) 245-0596
0102 Watauga 0256	Blue Ridge Botanicals Raymond E. Bowkley	978 Laurel Branch Road Vilas, NC 28692-9156	(828) 297-5230 Fax (603) 619-
0114 Jackson	Buchanan's Ginseng Huey L. Buchanan	110 Plum Street Sylva, NC 28779	(828) 586-8542
0117 Avery	C & K Huffman Nursery Keith Huffman	468 Little Squirrel Creek Rd. Newland, NC 28657	(828) 733-0875 Fax same #
0110 Avery	Calloway's Ginseng & Herb Stacy D. Calloway	Box 494 Crossnore, NC 28616	(828) 733-5696
0148 Haywood	Carolina Wholesale Bait Wayne King	9 Mingus Hill Road Canton, NC 28716	(828) 648-6107
0109 Buncombe	Carson Grocery Opal Carson	456 Dillingham Road Barnardsville, NC 28709	(828) 626-2240
0132 Polk	Ron Chontos	668 Bishop Lane Mill Spring, NC 28796	(828) 894-3373
0137	Coopers Creek Store	20 Coopers Creek Rd.	(828) 488-3167

Swain	Susan H. Call	Bryson City, NC 28713	
0103 Jackson	Michael E. Dillard	1278 W. Main Street Sylva, NC 28779	(828) 586-8610
0116 Mitchell	Donald Phillips Ginseng Co. Donald Phillips	1321 Wing Rd. Bakersville, NC 28705	(828) 688-2869
0123 Haywood 0580	Ferguson Supply James M. Ferguson	11571 Betsy Gap Rd. Clyde, NC 28721	(828) 627-6404 Fax (704) 627-
0144 Avery	Five Fingers Nursery Robyn Fletcher	P.O. Box 21 Crossnore, NC 28616	(828) 733-3935 Fax same #
0113 Buncombe	Flat Creek General Store Garold Metcalf	82 Old Mars Hill Hwy. Weaverville, NC 28787	(828) 645-0982 (828) 645-8143
0104 Transylvania	Gaia Herbs, Inc. Daniel S. Vickers	108 Island Ford Road Brevard, NC 28712	(828) 883-5944
0135 Avery 8894	Gardens of the Blue Ridge Robyn Fletcher	PO Box 10 Pineola, NC 28662	(828) 733-2417 Fax (828) 733-
0133 (TN)	Ginseng International Mark Chaffin	PO Box 14395 Knoxville, TN 37914	(865) 932-3889
0152 Caldwell	Lisa R. Hoke	6170 Buffalo Cove Road Lenoir, NC 28645	(828) 757-9228
0107 Clay 4263	William H. Ledford	94 West Vineyard Lane Hayesville, NC 28904	(828) 389-8235 Fax (828) 389-
0134 Wilkes	Lowe Fur & Herb, Inc. Arthur C. Lowe	P.O. Box 1332 North Wilkesboro, NC 28659	(336) 838-3881
0112 Cherokee	Raymond E. Luther	PO Box 936 Murphy, NC 28906	(828) 837-1257 or 269-9762
0147 Macon 8739	Mason's Ginseng Todd Mason	85 Stewart Street Franklin, NC 28734	(828) 524-2166 Fax (828) 369-
0129 Cherokee	Mason's Sporting Goods Ronnie J. Mason	P.O. Box 39 Topton, NC 28781	(828) 321-4107
0153 Yancey	McMahan' Ginseng Carrol McMahan	Rt. 6 Box 765 Burnsville, NC 28714	(828) 682-9237
0141 [Madison] 9029	Gary L. Metcalf	412 Scott Farm Rd. Afton, TN 37616	(423)783-0044 or (828)689-
0143 Jackson	Joseph S. Myers	450 Sutton Branch Road Sylva, NC 28779	(828) 631-3930
0119 Madison	NC Ginseng & Goldenseal Co. Robert A. Eidus	300 Indigo Bunting Lane Marshall, NC 28753	(828) 649-3536
0142 Wilkes 7502	Northwest Steel & Recycling Tony H. Byrd	117 Maple Street N. Wilkesboro, NC 28659	(336) 838-5117 Fax (336) 838-
0101 Cherokee	Pendergrass Ginseng Paula Pendergrass	360 Allmon Creek Rd. Marble, NC 28905	(828) 837-8227 or 837-6176
0111 Jackson	W. Scott Persons	P.O. Box 236 Tuckasegee, NC 28783	(828) 293-5189

0131 (VT) 2046	Quality Northern Ginseng Steven Korshak	554 Cummings Road Barre, VT 05641-9615	(802) 479-2395 Fax (802) 479-
0150 Jackson	Eddie Queen	246 Dodgen Ridge Road Tuckasegee, NC 28783	(828) 293-5709

0105 Ashe 2267	Rainbow Recycling & Botanicals Mark Blevins	P.O. Box 1475 West Jefferson, NC 28694	(336) 246-2267 Fax (336) 246-
0118 Wilkes 2451	Redding's Country Cabin Shawn Redding	13150 East US Hwy 421 Ronda, NC 28670 Fax (336) 984-4075	(336) 984-4070 or 1-800-462-
0140 Watauga	Ridge Runner Trading Co. Tony Hayes	PO Box 391 Boone, NC 28607	(828) 264-3615 (828) 262-3605
0149 Graham 8201	Robinson's Grocery Gina Crisp	60 Cornsilk Branch Road Robbinsville, NC 28771	(828) 479-8433 Fax (828) 479-
0127 Graham	Ron's Bait & Tackle Ronald A. Lofty	P.O. Box 187 Robbinsville, NC 28771	(828) 479-4467
0138 Gaston	Bennie L. Rowland	1704 County Line Rd. Kings Mountain, NC 28086	(704) 734-5179
0126 Haywood	Sentelle Fur Company W.S. Sentelle	P.O. Box 915 Clyde, NC 28721	(828) 627-2177
0121 McDowell	Richard D. Smith	Route 3 Box 290 Marion, NC 28752	(828) 756-4446
0136 [Cherokee]	Smokey Mountain Ginseng Earl Raburn	2750 Mobile Rd. McCaysville, GA 30555	(706) 492-4569
0151 Graham	Robin Suggs	P.O. Box 1757 Robbinsville, NC 28771	(828) 479-2788
0106 Buncombe	Lester Stanley	640 Clark Branch Road Leicester, NC 28748	(828) 683-3822
0124 Yancey	Robert A. Taylor	Rt. 9 Box 848 Burnsville, NC 28714	(828) 682-0939
0122 Macon	Ricky H. Teem	142 Panther Ridge Lane Franklin, NC 28734	(828) 524-7748
0125 Henderson	Thompson's Hide, Furs & Ginseng Todd Thompson	102 Duncan Hill Road Hendersonville, NC 28792	(828) 692-1995
0139 Madison	Upland Sports Jacqueline Ray	635 Carl Eller Rd. Mars Hill, NC 28754	(828) 689-5271 Fax same #
0146 Macon	Clyde Sparky Watts	83 Morrison Ch. Rd. Franklin, NC 28734	(828) 524-6940
0128 (GA)	Charles W. White Jr.	194 Maple Grove Road NW Dalton, GA 30721	(706) 259-8798 Fax same #
0154 Madison	Wild Herb Robert S. Smith	2683 Crooked Creek Road Mars Hill, NC 28754	(828) 689-3951
0145 Watauga	Wildwood Farm Roger D. Hodges	P.O. Box 747 Blowing Rock, NC 28605	(828) 295-9196

Appendix 2

2001 North Carolina Galax Dealer List

Jim Ballew
International Floral Company
PO Box 441
Burnsville, NC 28714

Elaine Canipe
Decorative Evergreen
PO Box 507
Micaville, NC 28755

Angie Murphy
903 Still Fork Rd
Burnsville, NC 28714

Keith Seivers
United Galax
227 Starlite Rd
Mount Airy, NC 27050

Barry and Loretta Shuford
Mt Mitchell Floral Greens
PO Box 347
Micaville, NC 28755

Larry Shuford
Rock Creek Evergreens
Burnsville, NC 28714

Sluder's Floral Company
6900 Linville Falls Highway
Newland, NC 28657

Chuck Stamey
Chuck's Floral Greens
1169 Elk River Rd
Elk Park, NC 28622

Cliff Vinson
388 Lower Brown's Creek Rd
Burnsville, NC 28714

Appendix 3

March 1, 2002

Dear Forest Products Buyer,

Many local people depend on the collection and trade of medicinal plants and other forest products. We are doing a study to improve our knowledge of the economic importance of these plants and products to rural communities in western North Carolina. We believe that decision makers in our local and state governments need to know just how important this industry is to western North Carolina. Through this study, we will be able to provide accurate and reliable information to these people and influence how they allocate resources to support this industry. We are counting on your help. Our goal is to give every native plant buyer in western North Carolina an opportunity to participate in this survey.

We are trying to calculate the combined value of the entire industry in this part of the state. To do this we need to know how much material is being harvested and how much enters the market. We need information on the products, the people, the prices, the places, and the promotion. This will help show how important these products are to the local economy. We need this information from you, the buyer.

We fully appreciate your desire for privacy and understand that competitive advantages rely on keeping certain business information private. No specific information will be given away on any business as a result of this survey. All information that is received will be combined and tabulated and will remain confidential; businesses cannot be identified. If interested, the summary report will be shared with anyone who participates in the questionnaire.

The reliability of this study depends on you. The more accurate and correct the answers, the better our results will reflect the importance of this industry to western North Carolina and to the communities whose livelihoods depend on it. Please help by filling out this questionnaire and returning it as soon as possible. Feel free to call if you have any questions: Jackie Greenfield, 828-684-3562, ext. 227. **Please return** the questionnaire by **April 5, 2002**.

On a similar project, we are gathering information to publish the ***first*** **North Carolina Buyers/Sellers Manual** for medicinals. This will include North Carolina growers, harvesters, and buyers, as well as buyers nationally and internationally. If you would like to have your business listed (no charge), please indicate on the questionnaire by giving us your company name. We will contact you for the exact information you would like listed about your business. A free copy will be sent to you when published.

Thank you in advance for your participation in this project and for your commitment to native plant products.

Sincerely,

Jeanine M. Davis
Associate Professor

Jackie Greenfield
Research Associate

Forest Products Questionnaire

		Black Cohosh	Bloodroot	Galax	Ginseng	Log Moss	Ramps	Trillium
1	Check off the products you typically purchase in a year.							
2	Please indicate total amount of each product you purchased in 2001 and indicate unit of measure.							
3	Could you have sold more? How much more?							
4	What time of year do you purchase these?							
5	Has the demand for this product increased, decreased, or stayed the same in the last 5 years?							
6	What part of the plant do you purchase? (root, flower, leaf, etc)							
7	Are the products bought fresh, dried, etc?							
8	Unit of measure you purchase them in (lb, ton, bundle, etc)							
9	What standards do you look for (ex. size of galax leaves, forks on ginseng roots)?							
10	What % of these products were wild harvested and what % cultivated?							
11	Please specify what counties these products usually come from.							

		Black Cohosh	Bloodroot	Galax	Ginseng	Log Moss	Ramps	Trillium
12	Please provide an estimate of what % of product is harvested on public land and what % is harvested on private land.							
13	What was the highest price you paid for the products in 2001?							
14	What was the lowest price you paid in 2001?							
15	In the last 5 years, what was the highest price you paid? In what year?							
16	In the last 5 years, what was the lowest price you paid? What year?							
17	Where do you sell your product? _____exporter _____retailer _____wholesaler in NC _____wholesaler in US _____manufacturer in NC _____manufacturer in US							
18	If you export, what are the three major destinations for you products?							
19	In general, over the last 5 years, what trends have you noticed with prices, demand, etc?							

20 Do you advertise or promote your products? ____yes ____no What method of advertising do you do?

21 Including yourself, how many people do you employ in this forest products business?
_____full-time _____part-time _____seasonal

22 Please describe your labor force (number of each).
_____men _____women _____youth

23 Approximately how many people do you buy forest products from each year?

24 Did they contact you through word of mouth, advertising, other?

25 Please describe the harvesters you buy from (number of each).
_____men _____women _____youth

26 What is the ethnic background of the harvesters you buy from (number of each)?
_____Caucasian _____Latino _____Afro-American _____Asian _____Other

27 How has this changed over the past 5 years?

28 Please add any additional comments or questions in the space below or on the back side of this page. Thank you!

Please Return by April 5, 2002

Jackie Greenfield, Mtn. Hort. Crops Research & Ext. Center, 455 Research Dr, Rm 101, Fletcher, NC 28732

Any questions? Call Jackie at 828-684-3562, ext. 227.

Appendix 4

Suggested Questions for Interviewing Wild Harvesters

Use these questions as guidelines. Making the harvester feel at ease during the interview process is the most important factor in achieving a successful interview. Try to ask questions in a way that the harvester can tell his/her story.

- When did you first start wild harvesting? How old were you?
- Who taught you how to wild harvest?
- How long have you been wild harvesting?
- Have you taught others (your children, for example) how and what to wild harvest?
- What products do you harvest from the forest? Please list the plant names, what part you harvest, and what season you harvest for each.
- What are the reasons you harvest (extra income; make gifts; for food or medicine; ceremonial reasons; enjoy being in the woods)?
- How much does your family rely on the income from wild harvested products? (Examples: special items like Christmas, every month to pay bills, etc)
- Do you own land?
- What county do you live in?
- How long have you lived in the county or in the area?
- Do you work fulltime, work part-time, are unemployed, or are retired?
- If the unemployment rate goes up in your area, do more people go out and wild harvest to make ends meet?
- In your opinion, how many fulltime, part-time, and occasional wild harvesters are in your area or county (Estimate for each product – for example, log moss harvesters may be different people other than ramp harvesters.)
- Do you harvest on private property, public lands, or both?
- What do you think about the permit system for harvesting from Forest Service property?

About the plants and process

- To find the best area for a particular product (ginseng, for example), what do you look for in the area (trees, slope, etc)? Do you return to the same area to collect each year?
- Have you seen a decline in the size of populations of the types of plants you harvest? Which ones?
- Do you find yourself looking for new areas to harvest? For what particular plants?
- Do you feel some of the wild plants are being over-harvested? Which ones?
- In your opinion, are there more people wild-harvesting in your area than 5 years ago? 10 years ago? (Is it increasing, decreasing, or staying the same?)
- If you harvest ginseng, do you think it takes more roots to equal a pound than it did 5 years ago?
- Were you taught to always replant the seeds of the plants you harvest and to plant back some of the roots you dig?

- Do you practice this method now? Do you think most other harvesters replant seeds or roots?
- What are your thoughts on people's harvest methods and habits today? Do you think they have changed over the years?
- Of the products you harvest from the wild, what is the most you have ever collected at one time or in one day? (for each product)
- In your opinion, what volume, of each of the products, is harvested from your area (or county)? (For example, how much log moss is harvested in a week in your area and how many weeks per year is it usually harvested?)
- Which products do you sell fresh; which products do you sell dried?
- Talk about your drying methods for ginseng or other plants.
- Talk about how you package these products. Does the dealer supply boxes, bags, etc?
- Do you sell to the same dealer/dealers year after year? Or do you "shop around" for the best price? How do you find new dealers? (Do they advertise or through word of mouth?) Typically, how many different dealers do you sell to in a year?
- How many total trips do you have to make each year (to a dealer) to sell your products?
- Are you able to sell all that you harvest? Are you interested in finding more dealers or buyers for your products?
- How far do you have to travel to sell your goods?
- Do you feel you are offered a fair price for the work you put into wild harvesting?
- What was the highest price you have been offered for each product you sell? (this year; within the last five years) What was the lowest price you have been offered for each product you sell (this year; within the last five years)?
- Do you wild harvest by choice?
- Do you have any questions for me?
- Can I call you if I have any questions about what I may have written in my notes?
- Thank you so much for taking the time to share this information with me.

Appendix 5

ATTACHMENT TO 2400-4a PERMITS FOR GALAX

PERMIT #_____

1. No Galax may be pulled within 50' of traveled roads or within 200' of the Appalachian Trail. No plants may be pulled in developed recreation areas or on developed trails. No pulling is allowed in Walker Creek or Middle Creek Natural Areas. Plants may no be pulled on Roan Mountain or the Blue Ridge Parkway.

2. Permit must be in possession of permittee when pulling.

3. Every person over 16 years of age must have a valid permit in their name when gathering any forest product. Each person must have proper identification when gathering forest products on a permit.

4. Children 16 years of age and under may help permittee with the removal of forest products as a partner on the same permit.

5. Motorized vehicles are not permitted on gated, signed, waterbarred, or otherwise closed roads.

6. Permittee must complete in ink the Product Record of Removal located at the bottom of of permit each time product is removed.

7. Possession of any Forest Product on the Blue Ridge Parkway is illegal.

8. THIS SALE IS FINAL AND IS NOT SUBJECT TO REFUND!

I UNDERSTAND AND AGREE TO THE CONDITIONS OF THIS PERMIT.

_____

Permittee

THIS PERMIT NOT VALID ON GRANDFATHER DISTRICT

Atado a 2400-4a Permisos para Galax #del permiso:

1. No es permitido coger hojas (galax) dentro de 50 pies (15 metros) de caminos o brechas que se usan o dentro de 200 pies (61 metros) del Sendero de Appalachia (Appalachian Trail). No se puede coger plantas en las areas para recreacion o de los senderos de desarollo. No es permitido coger hojas (galax) en las areas concervadas de Walker Creek y Middle Creek. No se puede coger hojas (galax) en Roan Mountain o del Blue Ridge Parkway.

2. Hay que tener su permiso cuando esta cogiendo hojas (galax).

3. Cada persona mayor de 16 anos de edad tiene que tener un permiso valido en su nombre cuando uno coja cualquier producto forestal. Cada persona tiene que llevar identificacion valida cuando esta cogiendo productos forestales con un permiso.

4. Los ninos de 16 anos o menor pueden ayudar a otra persona con un permiso a coger productos forestales como estan compartiendo el mismo permiso.

5. Vehiculos con motores no son permitidos en los caminos con puertas, con letreros avisando que estan cerrados (por ejemplo: ROAD CLOSED), con postes, con zanjas o de otra manera cerrados.

6. Hay que completar con lapicero el record del producto que lleva (product record of removal) ubicado en la parte de abajo del permiso cada vez que lleva productos forestales.

7. La posesion de cualquier producto forestal menos que las hojas (galax) en las carretera Blue Ridge Parkway es ilegal.

8. La venta del permiso es final, y no hay posibilidad de un reembolso.

Yo entiendo y estoy de acuerdo con las condiciones de este permiso.

_____

Firma del Hojero

NO INCLUYE EL DISTRITO GRANDFATHER

Appendix 6

Plant Industry Division - Plant Protection Section
Regulations:
North Carolina Plant Species of Special Concern

Rules, Regulations,Definitions and Standards of the
NORTH CAROLINA DEPARTMENT OF AGRICULTURE
W. Britt Cobb, Jr., Interim Commissioner
RALEIGH, N.C.

CHAPTER 48
PLANT INDUSTRY

SUBCHAPTER 48F - PLANT CONSERVATION
SECTION .0300 - ENDANGERED PLANT SPECIES LIST: THREATENED PLANT SPECIES LIST: LIST OF SPECIES OF SPECIAL CONCERN

.0303 LIST OF SPECIES OF SPECIAL CONCERN

History Note: Statutory Authority G.S. 106-202.12 through 106-202.19; Eff. July 1, 1980; Repealed Eff. June 30, 1981.

.0304 PLANT SPECIES OF SPECIAL CONCERN
(a) Special Concern Endangered Plant Species are those species that appear on both the Endangered Species List and on the Special Concern Species List and which can be offered for propagation to qualified propagators under permit.

(1) *Cystopteris tennesseensis* -- Shaver
Tennessee Bladderfern;
(2) *Delphinium exaltatum* -- Aiton
Tall Larkspur;
(3) *Echinacea laevigata* -- (Boynton & Beadle) Blake
Smooth Coneflower;
(4) *Gentianopsis crinita* -- (Froehlich) Ma
Fringed Gentian;
(5) *Geum radiatum* -- Michaux
Spreading Avens;
(6) *Hydrastis canadensis* -- L.
Goldenseal, Orangeroot;
(7) *Kalmia cuneata* -- Michaux
White Wicky;
(8) *Pellaea wrightiana* -- Hooker

Wright's Cliff-brake Fern;
(9) *Rhus michauxii* -- Sargent
Michaux's Sumac;
(10) *Sarracenia jonesii* -- Wherry
Mountain Sweet Pitcher Plant;
(11) *Sarracenia oreophila* -- (Kearney) Wherry
Green Pitcher Plant;
(12) *Shortia galacifolia* -- T. & G.
Oconee Bells.

(b) Special Concern Threatened Plant Species are those species that appear on both the Threatened Species List and on the Special Concern Species List and which can be offered for propagation to qualified propagators under permit.

(1) *Eupatorium resinosum* -- Torr. ex DC.
Resinous Boneset;
(2) *Helonias bullata* -- L.
Swamp Pink;
(3) *Liatris helleri* -- (Porter) Porter
Heller's Blazing Star;
(4) *Lilium grayi* -- Watson
Gray's Lily;
(5) *Sabatia kennedyana* -- Fern.
Plymouth Gentian;
(6) *Schisandra glabra* -- (Brickel) Rehder
Magnolia Vine.

(c) Special Concern Not Endangered or Threatened Plant Species are those species that appear on the Special Concern Species List but do not appear on the Endangered Species List or the Threatened Species List and which it shall be unlawful to distribute, sell or offer for sale except as otherwise provided in the rules.

(1) *Dionaea muscipula* -- Ellis
Venus Flytrap;
(2) *Panax quinquefolius* -- L.
Ginseng.

History Note: Statutory Authority G.S. 106-202.15; Eff. June 30, 1981; Amended Eff. July 1, 1998; June 1, 1991; August 1, 1990; May 1, 1984.

.0305 COLLECTION AND SALE OF GINSENG

(a) Definitions:

(1) **Department.** The North Carolina Department of Agriculture and Consumer Services.
(2) **Ginseng.** Any plant of the species *Panax quinquefolius* including cuttings, roots, fruits, seeds, propagules or any other plant part.
(3) **Ginseng Dealer.** Any person who purchases or otherwise obtains ginseng roots which have been collected or cultivated in North Carolina in any quantity for commercial use. This definition does not include those persons who directly collect or cultivate ginseng roots, or who obtain ginseng roots for their own personal use.

(4) **Export Certificate.** A document issued to allow the export or shipment of ginseng out of the State by certifying that the ginseng covered by the document was legally collected or grown in North Carolina.
(5) **Five Year Old Wild Ginseng Plant.** Any wild ginseng plant having at least three prongs (five leaflet leaves) or, in the absence of leaves, having at least four discernable bud scars plus a bud on the neck (rhizome).
(6) **Inspector.** An employee of the Department or any other person authorized by the Commissioner to enforce the Plant Protection and Conservation Act and the rules adopted thereunder.
(7) **Person.** Individual, corporation, partnership, firm, or association.
(8) **Record of Ginseng Purchase.** A document completed by a ginseng dealer on a form provided by the Department to record ginseng purchases.
(9) **Record of Harvest Season Collection.** A document completed and signed by a collector of wild ginseng and by an Inspector, certifying that the ginseng covered by the document was legally collected during the harvest season.
(10) **Statement Indicating Legal Collection of Ginseng from One's Own Land.** A document completed and signed by a person verifying that the wild collected ginseng being sold was collected from that person's own land.

(b) Purpose. The purpose of this Rule is to regulate trade in ginseng in North Carolina to obtain federal approval for the export of ginseng from the state, to support the ginseng trade within the state and to protect the species from over collection and extinction.

(c) Collection of Ginseng:

(1) Harvest Season for the Collection of Ginseng. The ginseng harvest season will be from September 1 through April 1. Harvesting ginseng outside of this period is prohibited except when the plants are dug from one's own land.
(2) Collectors Harvesting or Selling Outside of the Harvest Season. Any person collecting wild ginseng outside of the harvest season must complete a Statement Indicating Legal Collection of Ginseng from One's Own Land before selling the ginseng. This form is available from ginseng dealers. Any person collecting ginseng within the harvest season but wishing to sell the ginseng outside of the season must complete a Record of Harvest Season Collection and have it signed by an Inspector before the end of the harvest season; the form is available from Inspectors.
(3) Size of Collected Plants. Collection of any wild ginseng plant not meeting the definition of a five year old wild ginseng plant is prohibited except for the purpose of replanting. (4) The Replanting of Ginseng. All persons collecting ginseng from the wild shall plant the seeds of collected plants within 100 feet of where the plants are located. Ginseng seeds may be collected from the wild for replanting to a different location

only if the plant bearing the seeds is not also collected in the same harvest season.
to plant the seeds of collected plants in the immediate vicinity of where they are found.
(5) Any person collecting wild ginseng on the lands of another, shall, at time of collection, have on their person written permission from the landowner, as required under G.S. 106-202.19(1).
(6) Possession of freshly dug ginseng on the lands of another shall constitute prima facie evidence that the ginseng was taken from the same land on which the collector was found.

(d) Purchase and Sale of Ginseng:

(1) Ginseng Dealer Permits. All ginseng dealers shall obtain a permit from the Plant Industry Division of the Department prior to purchasing ginseng. Permits shall be valid from July 1 or the date of issue, whichever is later, to the following June 30. No ginseng may be purchased by a ginseng dealer without a current permit.
(2) Buying Season for Ginseng. The buying season for wild collected ginseng will be from September 1 through the following April 1 for green ginseng and from September 15 through the following April 1 for dried ginseng. To buy wild collected ginseng outside of this buying season a ginseng dealer must obtain from the collector either:
(A) a completed Statement Indicating Legal Collection of Ginseng from One's Own Land; or
(B) a Record of Harvest Season Collection completed by the collector and signed by an Inspector.
(3) Purchase Records. Every ginseng dealer shall keep a record of each purchase of ginseng collected or grown in North Carolina on the applicable Record of Ginseng Purchases provided by the Department. Forms from previous years, copies, or any forms other than those provided by the Department for the current permit period shall not be used. Records of Ginseng Purchases shall be made available for inspection by an Inspector and shall be surrendered to an Inspector upon issuance of an Export Certificate or on a periodic basis. The applicable Statement Indicating Legal Collection of Ginseng from One's Own Land or Record of Harvest Season Collection shall be attached to any Record of Ginseng Purchases recording a purchase of wild collected ginseng collected outside of the harvest season or bought outside of the buying season.
(4) Purchase of Ginseng from Other Ginseng Dealers. All ginseng dealers who purchase ginseng from other ginseng dealers located in North Carolina shall purchase only from those ginseng dealers that have valid dealer permits. Such purchases shall be recorded in a Record of Dealer-Dealer Transactions. Ginseng purchased from ginseng dealers who lack valid permits will not be certified for export or shipment out of the State.
(5) Exportation and Shipment of Ginseng. All persons who have ginseng in any quantity and wish to export or ship any amount out of the state shall obtain an export certificate from an Inspector. To obtain an export certificate a person must have accurate records of his purchases,

present and surrender the original Record of Ginseng Purchases upon issuance of an export certificate and possess a valid ginseng dealer's permit.

History Note: Statutory Authority G.S. 106-202.15; Eff. June 30, 1981; Amended Eff. April 1, 2003; July 1, 1998; August 1, 1990; May 1, 1984.

.0306 COLLECTION AND SALE OF VENUS FLYTRAP

(a) Definitions:

(1) **Department.** The North Carolina Department of Agriculture.
(2) **Flytrap, Venus Flytrap.** Any plant of the species *Dionaea muscipula* including cuttings, roots, fruits, seeds, propagules or any other plant part.
(3) **Person.** Individual, corporation, partnership, firm, or association.

(b) Collection of flytraps:

(1) Venus Flytraps shall not be uprooted, dug, taken or otherwise disturbed or removed for any purpose from the lands of another without a written permit from the owner which is dated and valid for no more than 180 days except that the incidental disturbance of flytraps during agricultural, forestry or development operations is not illegal so long as the plants are not collected for sale or barter.
(2) Venus Flytraps may not be uprooted, dug, taken or otherwise disturbed or removed for any purpose from public lands in North Carolina without a written permit from the agency which is responsible for administration for such public lands.
(3) The Replanting of Flytraps. All persons collecting flytraps from the wild may plant the seeds of collected plants, if any, in the immediate vicinity of where they are found.
(4) Any person collecting Venus Flytraps on the lands of another shall, at time collection, have on their person written permission from the landowner, as required under G.S. 106-202.19(1).
(5) Possession of freshly dug Venus Flytraps on the lands of another shall constitute prima facie evidence that the plants were taken from the same land on which the collector was found.

(c) Sale of flytraps: No person may sell or offer for sale Venus Flytraps unless they have been lawfully collected, propagated from lawfully obtained stock plants or seed, or collected from one's own land.

History Note:Statutory Authority G.S. 106-202.15; Eff. June 1, 1991; Amended Eff. July 1, 1998.

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Endangered Plant Species List
Threatened Plant Species List
Endangered Plants of N.C.; Images and Information

For Additional Information Contact:

Dr. Cecil Frost - ***Plant Ecologist***
Email Address: ***Cecil.Frost@ncmail.net***
Phone: **(919) 733-3610 ext. 249**
Fax: **(919) 733-1041**

Marj Boyer - ***Botanist and Ginseng Coordinator***
Email Address: ***Marj.Boyer@ncmail.net***
Phone: **(919) 733-3610 ext. 250**
Fax: **(919) 733-1041**

Address: **NCDA&CS**
Plant Protection Section
PO Box 27647
Raleigh, NC 27611

Seed Section	Fertilizer Section	Plant Protection Section	Laws & Regulations
Apps.-Forms-Permits	Plant Industry Site Map	Plant Industry Home Page	NCDA&CS Welcome Page

Last Updated: May 9, 2003

Appendix 7

APPLICATION FOR
NORTH CAROLINA GINSENG DEALER PERMIT

Applicant (name of business or individual):

Mailing address:

Telephone:

FAX / e-mail address (optional):

If mailing address is a postal route or box number, give street address or other directions to location where records will be available for inspection:

If ginseng roots will be kept elsewhere, give street address or directions to where roots are kept:

Names of agents: See and complete back of sheet. Any person buying ginseng must be a registered dealer or be listed on the dealer permit application as an agent of the dealer.

I agree to maintain purchase records of all wild and cultivated ginseng roots that are purchased, use only the forms provided by the NC Department of Agriculture & Consumer Services, and complete forms accurately. I agree to make these records and the ginseng roots in my possession available for inspection by an authorized inspector of the NC Department of Agriculture & Consumer Services. I understand that I am responsible for the actions of my agents. I agree to abide by state and federal laws and regulations regarding the collection and sale of ginseng.

Signature _____

Name of signer (please print) _____

Date _____

Return completed application to: **Plant Conservation Program**
Plant Industry Division
NC Department of Agriculture & Consumer Services
1060 Mail Service
Raleigh NC 27699-1060

Agents Representing Dealer

An agent is defined as any individual buying ginseng as a representative of a registered ginseng dealer. The actions of an agent are the responsibility of the dealer. Any individual buying ginseng at or outside of the site of business must be listed as an agent.

Name _____

Address _____

_____

Name _____

Address _____

_____

Name _____

Address _____

_____

Name _____

Address _____

_____

Name _____

Address _____

_____

Appendix 8

2460

ATTACHMENT TO 2400-4a PERMITS FOR GINSENG

PERMIT #:_____

1. Only 3 prong or larger plants will be dug.
2. All plants should have red berries before digging.
3. Berries must be replanted in vicinity where plants are dug.
4. No plants to be dug within 50' of traveled roads or within 200' of Appalachian Trail. No plants may be dug in developed recreation areas or on developed trails. No digging is allowed in Walker Creek or Middle Creek Natural Areas. Plants may NOT be dug on Roan Mountain or the Blue Ridge Parkway.
5. Permit must be in possession of permittee when digging.
6. Every person over 12 years of age must have a valid permit in their name when gathering any forest product. Each person must have proper identification when gathering forest products on a permit.
7. Children 12 years of age and under may help permittee with the removal of forest products as a partner on the same permit.
8. Motorized vehicles are not permitted on gated, signed, waterbarred, or otherwise closed roads.
9. Permittee must complete in ink the Product Record of Removal located at the bottom of permit each time product is removed.
10. Possession of any Forest Products on the Blue Ridge Parkway boundary is illegal.
11. DIGGING PERIOD BEGINS SEPTEMBER 1 AND ENDS
12. PERMIT IS ISSUED ON BASIS OF GREEN WEIGHT.
13. THIS SALE IS FINAL AND IS NOT SUBJECT TO REFUND.

I UNDERSTAND AND AGREE TO THE CONDITIONS OF THIS PERMIT.

_____

Permittee