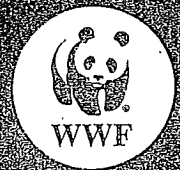


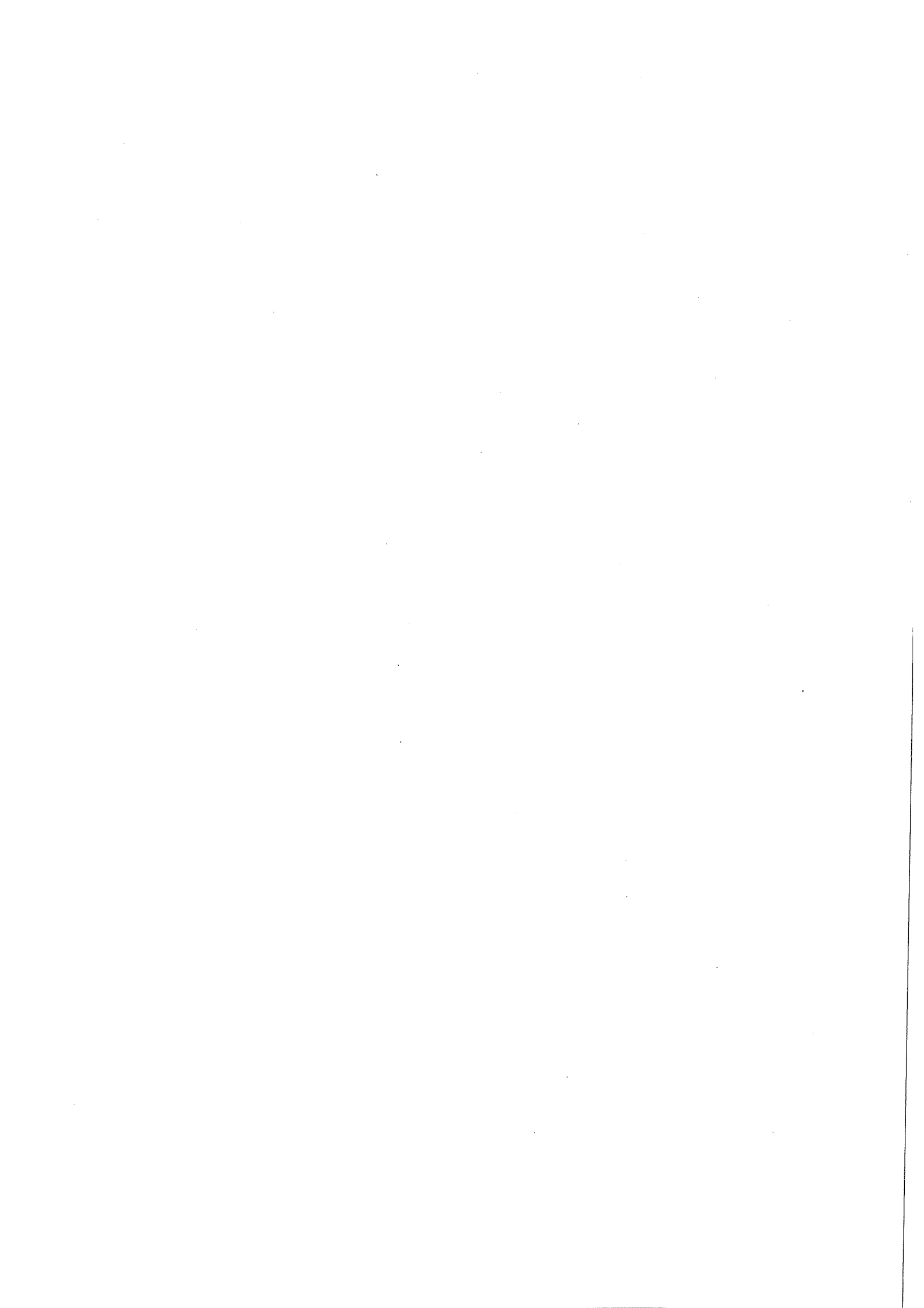
**AMERICAN  
GINSENG**

**The Root of  
North America's  
Medicinal Herb  
Trade**

**Christopher S. Robbins**

**TRAFFIC**  
—NORTH AMERICA—





Published by TRAFFIC North America,  
Washington, D.C., USA

© 1998 TRAFFIC North America  
All rights reserved.

All material appearing in this publication is copyrighted and may be reproduced with permission. Any reproduction in full or in part of this publication must credit TRAFFIC North America as the copyright owner.

The views of the authors expressed in this publication do not necessarily reflect those of the TRAFFIC Network, World Wildlife Fund (WWF), or IUCN-The World Conservation Union.

The designations of geographical entities in this publication and the presentation of the material do not imply the expression of any opinion whatsoever on the part of TRAFFIC or its supporting organizations concerning the legal status of any country, territory, or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries.

The TRAFFIC symbol copyright and Registered Trademark ownership is held by WWF. TRAFFIC is a joint program of WWF and IUCN.

Front cover photograph: Ginseng Plant (*Panax quinquefolius*)  
Photo credit: Ron Singer  
Cover design: Nanci Davis/WWF

♻️ Printed on recycled paper.

**American Ginseng:**  
**The Root of North America's Medicinal Herb Trade**

Christopher S. Robbins

TRAFFIC North America

May 1998

*When you find a ginseng plant gather the seed and bury them in the berry about an inch or inch and a half deep in some good, rich, shady place, one berry in each spot. Thus you will have plants to dig in later years, you and those who come after you.*

Arthur Richard Harding (1972)

Vertical line of text or markings on the left side.



TABLE OF CONTENTS

Acknowledgments .....	ix
Executive Summary .....	1
I INTRODUCTION .....	5
II BACKGROUND .....	7
<i>Distribution, Morphology, Biology, and Demography</i> .....	7
III METHODS AND SOURCES OF INFORMATION.....	11
IV. CONSERVATION AND PROTECTION STATUS.....	13
<i>Overview</i> .....	13
<i>United States</i> .....	13
<i>Canada</i> .....	15
V. MARKETS, TRADE, AND HARVEST.....	19
<i>Uses of Ginseng</i> .....	19
<i>The Role of Hong Kong in the Ginseng Trade</i> .....	21
<i>Contemporary Use of Ginseng in the United States</i> .....	22
<i>Ginseng in North America - A History of Trade</i> .....	23
<i>Recent Trends in U.S. Imports and Exports of Ginseng</i> .....	25
<i>Wild Ginseng Exports</i> .....	26
<i>Wild Ginseng Imports</i> .....	28
<i>Cultivated Ginseng</i> .....	31
<i>U.S. Harvest</i> .....	31
<i>Wild Ginseng Harvest</i> .....	32
<i>Ginseng Collection in U.S. National Forests</i> .....	39
<i>Cultivated Ginseng Production</i> .....	41
<i>Recent Trends in Canadian Harvest and Commerce</i> .....	42
<i>Wild Ginseng</i> .....	42
<i>Cultivated Ginseng</i> .....	43
VI. REGULATION AND MANAGEMENT.....	45
<i>Overview: United States</i> .....	45
<i>U.S. State and Federal Procedural and Permitting Requirements for Exporting Ginseng</i> .....	46
<i>Overview: Canada</i> .....	47
<i>Review of the U.S. Federal-State Ginseng Program</i> .....	48
<i>OSA Criteria for Export Approval and State Supporting Information</i> .....	48
<i>OMA Criteria for Export Approval and State Supporting Information</i> .....	49

Vertical line of text or markings on the left side of the page.





VII. DISCUSSION.....	53
<i>Program Accomplishments</i> .....	53
<i>Program Shortcomings</i> .....	53
<i>Overview</i> .....	53
<i>Incomplete Reporting</i> .....	54
<i>Population Estimates</i> .....	60
<i>Confusing Standards</i> .....	61
<i>"Woodsgrown" Ginseng</i> .....	62
<i>Harvest Seasons</i> .....	62
<i>Certification and Inspection</i> .....	63
<i>Law Enforcement</i> .....	66
VIII. CONCLUSIONS.....	69
IX. RECOMMENDATIONS.....	71
<i>Recommendations for USFWS</i> .....	71
<i>Recommendations for USDA/APHIS/PPQ</i> .....	74
<i>Recommendations for USFS</i> .....	75
<i>Recommendations for States</i> .....	75
<i>Other Recommendations</i> .....	78
Appendix 1. Additional Information on the Protection and Regulatory Status of <i>P. quinquefolius</i> .....	81
Appendix 2. Additional Information on <i>P. quinquefolius</i> Collection in U.S. National Forests.....	85
Glossary.....	87
References.....	89

TABLES

Table 1.	Conservation, State Protection, and Export Status of <i>Panax quinquefolius</i> in U.S. States and Canadian Provinces .....	16
Table 2.	Types and Wholesale Prices of Ginseng Offered on the U.S. Market, 1995.....	24
Table 3.	Comparison of U.S. Bureau of Census and U.S. Fish and Wildlife Service Wild Ginseng Exports Data (1992-1996).....	28
Table 4.	Total Reported U.S. Harvest and Export of Wild Ginseng (1991-1996).....	29
Table 5.	Comparison of U.S. Exports of Wild Ginseng to Canada and U.S. Imports of Wild Ginseng from Canada.....	30
Table 6.	U.S. Exports of Ginseng Root and Products Thereof (1990-1996).....	32
Table 7.	U.S. Imports of Ginseng Root and Products Thereof (1990-1996).....	33
Table 8.	Permits Issued for <i>Panax quinquefolius</i> Collection in National Forests .....	40
Table 9.	Estimated Production of Cultivated Ginseng in Ontario and British Columbia, Canada (1988-1995) .....	44
Table 10.	Summary of State Responses to USFWS/OSA Request for Information as Reported in 1996 for the 1995 Harvest Season .....	56

FIGURES

Figure 1. American Ginseng (*Panax quinquefolius*).....8

Figure 2. Top Destinations of Wild Ginseng Exported from the United States (1990-1996).....27

Figure 3. Total Wild American Ginseng Harvest (1989).....35

Figure 4. Total Wild American Ginseng Harvest (1990).....35

Figure 5. Total Wild American Ginseng Harvest (1991).....36

Figure 6. Total Wild American Ginseng Harvest (1992).....36

Figure 7. Total Wild American Ginseng Harvest (1993).....37

Figure 8. Total Wild American Ginseng Harvest (1994).....37

Figure 9. Total Wild American Ginseng Harvest (1995).....38

Figure 10. Total Wild American Ginseng Harvest (1996).....38

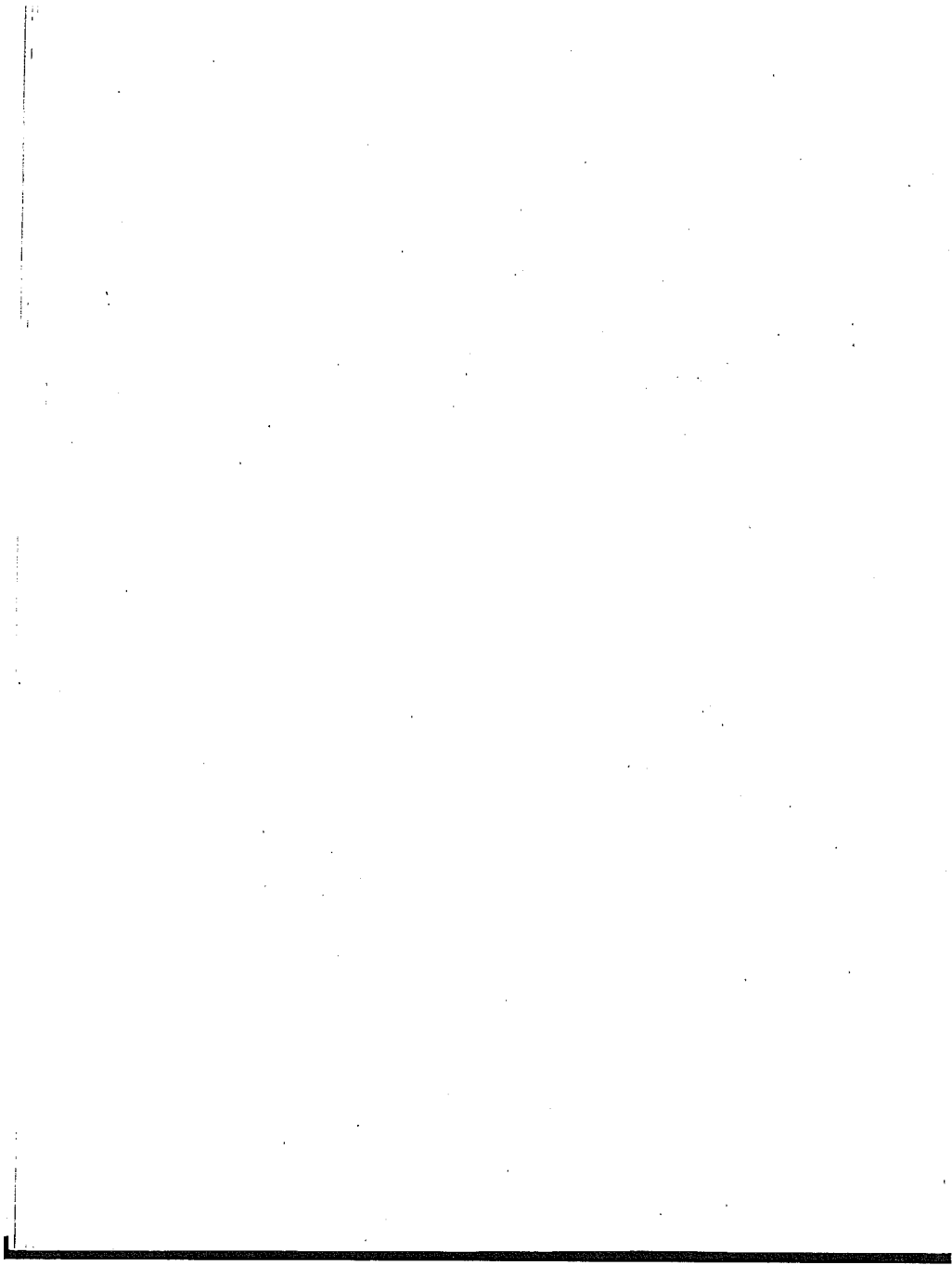
Figure 11. U.S. Wild *P. quinquefolius* Harvest, Annual Averages 1990-1996.....65

## ACKNOWLEDGMENTS

The author appreciates enormously the input and time that the following individuals contributed to the preparation of this report: Gina De Ferrari (TRAFFIC North America), Andrea Gaski (TRAFFIC North America), Patty Kufchock (TRAFFIC North America), Holly Reed (TRAFFIC North America), Teresa Mulliken (TRAFFIC International), Rob Parry-Jones (TRAFFIC East Asia-Hong Kong), Nina Marshall (TRAFFIC East/Southern Africa-Kenya), Uwe Schippmann (Bundesamt für Naturschutz), Charlie Dane (U.S. Fish and Wildlife Service), Bruce MacBryde (Office of Scientific Authority), Mike A. Lidsky (U.S. Department of Agriculture), Javier Alvarez (U.S. Fish and Wildlife Service), Carol Carson (U.S. Fish and Wildlife Service), Martha Van der Voort (West Virginia University), Brent Bailey (West Virginia University), Kim Derek Pritts (Pennsylvania State Conservation Officer), Roger C. Anderson (Illinois State University), S. Kelly Kearns (Wisconsin Department of Natural Resources), John R. Tate (Virginia Department of Agriculture & Consumer Services), Anette Phibbs (Wisconsin Department of Agriculture, Trade and Consumer Protection), Tim E. Smith (Missouri Department of Conservation), Douglas Schmid (New York State Department of Environmental Conservation), Edward Dix (Department of Conservation and Natural Resources), and Steve Olson (Hoosier National Forest, Indiana).

The author would like to thank The Nature Conservancy and the Network of State Natural Heritage Programs for providing information on the conservation status of American ginseng. The eye for detail of Alice Taylor, World Wildlife Fund's copy editor, helped to prepare and polish this document for publication.

There are undoubtedly others not mentioned here who assisted with the direction and development of this report — my gratitude to all.



## EXECUTIVE SUMMARY

Ginseng (*Panax* spp.) is arguably the most revered medicinal plant in traditional Chinese medicine and is quickly becoming one of the most popular herbs in Western markets. In the United States, where the market for medicinal botanicals is US\$3 billion (CA\$4.3 billion) and growing, ginseng is the top selling herb among first-time herbal users and ranks third, surpassed only by *Echinacea* and garlic, in sales of herbs in U.S. health food stores (Johnston 1997). No other plant better represents the cultural and economic value of medicine harvested from the wild in North America than *Panax quinquefolius*, American ginseng. This herbaceous plant grows in the understory of eastern U.S. and Canadian deciduous forests and is sought for its high-value and gnarled root, most of which is exported to East Asia — the dominant ginseng market.

Although most *P. quinquefolius* roots on the market come from cultivated beds in the United States and Canada, a considerable amount is legally harvested from the wild in the United States. Concerns about the sustainability of wild harvest have been raised by conservationists, state and federal officials, herbalists, and ginseng dealers. There is much discussion about whether current levels of *P. quinquefolius* harvest threaten the viability of wild populations and whether management of the species in the United States is adequately safeguarding wild populations from intensive collection and increasingly pervasive habitat loss.

Four factors prompted TRAFFIC North America to examine the harvest, trade, conservation status, and management of *P. quinquefolius* in North America as part one of a two-part study. First, there is a continuing strong demand for ginseng in Asia. Second, there appears to be a growing number of herbal products containing ginseng available in the United States, Canada, and Europe. Third, there is substantial collection of ginseng from the wild in the United States. And fourth, habitat alteration through logging and suburbanization, particularly in the U.S. eastern hardwood forests of Appalachia where much of the wild harvest occurs, is a lurking threat to the species, and, if left unchecked, could whittle away wild populations and deny consumers a venerable source of herbal medicine (McMahan 1981).

The study aims to review harvest and trade levels and determine whether management of *P. quinquefolius* in the United States and Canada is adequately protecting wild populations from intensive collection and increasingly pervasive habitat loss. The second phase of the study, which will begin in early 1998, will take a closer look at *P. quinquefolius* production in a key ginseng-producing U.S. state and make recommendations for improving monitoring and management.

The early 18th-century commercial discovery of *P. quinquefolius* in North America propelled Canada and later the United States into a lucrative trade with the Far East that has lasted for nearly three centuries. Canada was once the leading North American exporter of wild American ginseng and is currently a major exporter of cultivated ginseng. However, Canada now prohibits the collection of wild roots for export because of the vulnerability of its wild ginseng populations. These occur predominately in Ontario where, according to The Nature Conservancy, the species'

status is considered uncommon, and in Québec, where its status is classified as imperiled to uncommon. Forest clearing and historical exploitation have both taken their toll in Canada.

Today, the United States is the chief supplier of wild American ginseng to overseas markets, exporting annually an average 60 metric tons of wild root, more than 90 percent of which goes to East Asia. Wild American ginseng occurs naturally in 34 of the 50 states and is officially listed as endangered in one state, threatened in four, rare in one, and vulnerable in another. Nine states consider American ginseng a "species of special concern" or include it in a "watch list" and seven peripheral range states do not afford the species any protection. Twenty-four states, in cooperation with the federal government, regulate the harvest and/or sale of *P. quinquefolius*.

Commercial trade in American ginseng has been regulated since 1975 when its CITES Appendix II listing went into effect (CITES is the Convention on International Trade in Endangered Species of Wild Fauna and Flora.). In the United States, the U.S. Fish and Wildlife Service (USFWS) is the designated U.S. CITES scientific and management authority. Before issuing a CITES export permit, the USFWS must determine whether ginseng roots being exported were legally acquired and whether exports will be detrimental to the species' survival. In order to make these determinations, USFWS has established a joint ginseng management program with states to monitor wild ginseng populations and regulate ginseng harvest and commerce. Per program requirements, ginseng dealers must register with each state in which they intend to purchase and sell wild and cultivated American ginseng roots and must report their transactions to the states. States submit annual information on ginseng harvest, biology, laws, and regulations to USFWS, which the federal agency uses to approve or disapprove ginseng export on a state-by-state basis.

Since the export of wild American ginseng root is banned under provincial law in Québec and Ontario, the Canadian government has not been obligated by CITES to make a "no-detriment" finding for exports. However, cultivated ginseng is exported from Ontario and British Columbia, which together are the top North American producers and exporters of cultivated roots.

Of the 24 U.S. states approved by the USFWS for *P. quinquefolius* export, 19 are authorized to export wild and cultivated roots and five are authorized to export cultivated roots only. In 1996, according to the USFWS, approximately 64 metric tons of wild ginseng root were harvested in the United States: 46 metric tons (85%) were exported to Hong Kong, and smaller amounts were exported to Taiwan (3.6 mt), Singapore (2.7 mt), Malaysia (769 kg), and Canada (459 kg).

The United States is also a sizable importer of wild ginseng, which may in fact be a variety of *Panax* species seeded and grown under wild conditions. According to U.S. Bureau of the Census (Customs) data, which refer to all species of ginseng, the United States imported 208 metric tons of wild ginseng from China, 1990-96; 59 metric tons from South Korea; 34 metric tons from Mexico; and 19 metric tons from a handful of other countries, including Canada. Presumably, the large volume of U.S. imports of wild ginseng from China consists of roots harvested from naturalized populations of *Panax* in China, or roots of wild-collected American ginseng that

originated in the United States and were reexported from China. The high numbers may also be the result of misreporting, as wild ginseng is rare in China and unlikely to be exported in any great quantity. U.S. imports of wild ginseng from Canada, which prohibits the export of wild ginseng, could be *P. quinquefolius* or another ginseng species exported from the United States or elsewhere to Canada for processing, and subsequently reexported to the United States.

Kentucky is located in the center of *P. quinquefolius*' range and has consistently been the top wild ginseng-producing state; in 1996, it reported a harvest of 14.8 metric tons. Other states producing significant amounts of wild ginseng in 1996 included West Virginia (8.4 mt), Tennessee (8.3 mt), Virginia (5.5 mt), and Indiana (5.4 mt) (OSA 1997). Wisconsin, which produces about 1.8 metric tons of wild ginseng annually, is the leading producer of cultivated American ginseng in the United States, producing nearly 1,000 metric tons of cultivated roots annually. Wisconsin also serves as a major center for the foreign and domestic redistribution of wild roots harvested in other states.

The amount of wild American ginseng harvested and exported has remained relatively constant in recent years, although a growing number of ginseng harvesters in U.S. National Forests suggests that the collection of wild roots may be escalating. One measure of the increase in demand for wild ginseng might be extrapolated from the number of collecting permits issued for the species in U.S. national forests; national forests in seven states reported increases in permits issued for *P. quinquefolius* in 1996 or 1997. At Indiana's Hoosier National Forest, where the number of permits issued increased from 176 to 519 (nearly 300 percent) from 1993 to 1996, authorities may raise permit fees and impose additional restrictions on collection later this year.

Given the steady rise in the demand for and commercial value of wild American ginseng, it is critical that harvest and trade continue to be monitored, reported, and regulated to identify and avert potential conservation problems.

There is little doubt that the joint federal-state program has bolstered state ginseng monitoring, regulation, and management, and is the only mechanism for systematically gathering important information on ginseng biology and harvest. However, based on this report's analysis, and on discussion with states, aspects of the program are deficient or onerous and specific changes should be considered at both the federal and state level to ensure that the program maximizes its conservation benefits. USFWS administrators should look at the extent to which states are capable of meeting federal criteria and at whether the program can be streamlined without jeopardizing the quality of information needed to satisfy CITES requirements. Similarly, states should seek creative partnerships and alternative approaches to managing a high-value resource that is increasingly under pressure from commercial collection and habitat loss.

This report makes specific recommendations on steps that can be taken at the federal and state levels to streamline and improve the effectiveness of ginseng management, harvest and ecological monitoring, and trade controls. TRAFFIC hopes that lessons from the successes and shortcomings of the ginseng program can be applied to the management of other commercially exploited wild medicinal plants in the United States.



Vertical text on the left side of the page, possibly a page number or header.

Vertical text on the left side of the page, possibly a page number or header.

Horizontal text at the bottom of the page, possibly a footer or page number.

## I. INTRODUCTION

Thousands of species of plants are collected from wild sources or cultivated commercially for use in natural medicines, cosmetics, and foods. Growing interest in natural medicine may be contributing to what appears to be escalating commercial demand for many medicinal plants (Lange & Schippmann 1997; Lewington 1993; Johnston 1997). North America, where the nutritional supplement industry is worth billions of dollars, is a significant consumer and producer of plants used in herbal products. In 1995, the United States alone imported over 12,000 metric tons and exported 8,000 metric tons of plants or plant parts for use in medicinals, aromatics, fungicides, and insecticides. More than 50 countries were involved in this trade with the United States (Robbins 1997).

One of the most heavily traded North American medicinal plants is American ginseng (*Panax quinquefolius*, family Araliaceae). *P. quinquefolius*, one of several species of the *Panax* genus, is native only to the United States and Canada. Its root is highly valued in traditional Chinese medicine (TCM) and increasingly used in Western herbal products and foods. In the United States, ginseng is the most popular herbal supplement among new users of herbal remedies (Wood 1997). *P. quinquefolius* has been commercially exported from Canada and the United States for nearly three centuries and ranks among North America's most lucrative medicinal plant crops. Despite the regulation of its trade by CITES and an abundant supply of cultivated roots, heavy and persistent collection of wild plants raises concerns about how current levels of exploitation are affecting wild populations and the conservation status of the species.

TRAFFIC North America has undertaken a review of American ginseng harvest, trade, conservation status, and management in the United States and Canada to determine whether current protection and management are adequately conserving wild populations. This assessment is being carried out in two phases. Phase I, the results of which are presented here, includes an overview of *P. quinquefolius* conservation, protection, harvest, trade, and markets, an assessment of the cooperative federal-state ginseng management program in the United States, a summary of U.S. and Canadian regulations, and preliminary recommendations for improving management and conservation of the species. Phase II will involve an extensive review and analysis of American ginseng management and regulation in key ginseng-producing states, the results of which may be presented at a workshop for state and federal officials.

Vertical text or markings on the left side of the page, possibly a page number or header.

## II. BACKGROUND

*Panax* spp. (ginseng) is considered a general health tonic in traditional Chinese medicine (TCM) and is an increasingly popular herbal medicine in Western markets. The United States and Canada are the world's third and fourth largest ginseng producers (surpassed only by South Korea and China), and the largest producers for the North American species *Panax quinquefolius* (Carlson 1986).

There are several species of ginseng, the most sought after of which are *Panax ginseng*, which is often described interchangeably as Asiatic, Chinese, Oriental, or Korean ginseng, and its North American relative, *Panax quinquefolius* (American ginseng). Chinese ginseng is native to parts of northeastern China, Russia, and northern Korea and has been an important herb in TCM for approximately 4,000 years. Today, virtually all *P. ginseng* commercially harvested in East Asia is cultivated in China, Japan, Taiwan, North and South Korea, and the Pacific coastal regions of Russia (Prescott-Allen 1986). Wild populations of Chinese ginseng have been severely reduced due to intensive collection, clearing of forests for agriculture, and forest fires (Prescott-Allen 1986; Fulder 1993). Wild populations are still extant, albeit increasingly rare, in the high mountains of northeast China, specifically in Heilongjiang, Jilin, and Liaoning provinces, as well as the adjacent Korean peninsula and Russia (Fulder 1993; Foster pers. comm. 1997).

American ginseng, an herbaceous perennial endemic to North America, is similar in appearance to Chinese ginseng and has been naturalized in portions of northern China (Jiansheng pers. comm. 1997). It has been used medicinally among Native Americans for preventative and curative purposes. It has been commercially exported to East Asia for nearly three centuries and is available in an increasing number of natural foods and herbal products in the United States, Canada, and Europe.

The commercial export of American ginseng has been regulated since 1975 when the species was listed in CITES Appendix II. Primary factors contributing to the documented dwindling of wild populations of American ginseng in the United States include the intensive and widespread collection of its valuable root and clearance of eastern deciduous forests (McMahan 1981). Likewise, in Canada, the decline of wild populations is attributed to the collection of young and immature plants and loss of habitat through the removal of hardwood forests for sand mining, roads, and commercial and residential construction (Prescott-Allen 1986).

### Distribution, Morphology, Biology, and Demography

American ginseng grows in eastern U.S. and Canadian deciduous forests and favors damp but well drained soil on northern or northeastern cool rocky slopes. The plant occurs from southern Ontario and southwestern Québec south to Oklahoma, Louisiana, and northern Florida (Catling et al. 1994). Ginseng has been introduced to British Columbia, Oregon, North and South Dakota, and Washington, among other provinces and states, where it is commercially grown.

Individual plants, which may live as long as 60 years, can have several taproots, often forked, distributed along a narrow rhizome, with the largest taproot situated at its end. The protruding aerial stem falls off at the end of each growing season and forms a scar at the end of the rhizome (Charron and Gagnon 1991). A scar represents one growing season and counting the total number of scars is one way of determining a plant's age, although this method tends to underestimate actual age (Carpenter and Cottam 1982). Another indicator of population age and size class is the number of leaf stems (prongs) on each plant. Generally among wild plants, one-prong plants are up to 5 years old, two-prong plants 5 to 6 years, and three-prong plants 8 to 14 years, while four-prong plants and rare five-prong plants represent the oldest individuals of a population (Lewis and Zenger 1983). Most states do not allow the harvest of plants bearing fewer than three prongs. Typically, leaves are palmately divided into 4-5 (occasionally 3-7) serrated, oblong-lance-shaped leaflets (Foster and Duke 1990). Population studies indicate that older plants are the most reproductively viable and critical to the growth, maintenance, and survival of a population (Charron and Gagnon 1991).

Figure 1. American ginseng (*Panax quinquefolius*)



Illustration from United States Department of Agriculture

Ginseng plants normally do not flower until they are large enough to produce two leaves (Gagnon et al. 1996; Charron and Gagnon 1991). Flowers are whitish, small, and have the ability to cross-fertilize by wind or other physical disturbances, though a few species of insects assist with pollination (Catling et al. 1994). A flower typically produces one to three fruits, which turn bright red when ripe in the autumn (mid-September to mid-December) (Charron and Gagnon 1991). Each plant can yield up to 150 seeds which, upon dispersal, generally do not germinate for about 18 months.

Morphologically, there are a few North American plants that mimic or resemble *P. quinquefolius*, including dwarf ginseng (*P. trifolius*) and species of a closely related genus, *Aralia*, particularly wild sasparilla (*A. nudicaulis*). Neither of these appears to have the medicinal properties found in *P. quinquefolius*. However, whole plants and roots of *P. trifolius* were reportedly used by Native Americans for medicine and *A. nudicaulis* is a botanical sold domestically and internationally.

11-11-11

11-11-11

11-11-11

### III. METHODS AND SOURCES OF INFORMATION

American ginseng is listed on CITES Appendix II and is subject to further regulation at the state, provincial, and national levels. As a result, harvest and trade records have been maintained and are available for analysis. States are required to submit annual reports on the biological status and harvest of ginseng to the Office of Scientific Authority (OSA) and the Office of Management Authority (OMA) at the U.S. Fish and Wildlife Service (USFWS). These reports provide USFWS with information to determine whether states should be approved or reapproved for ginseng export. Copies of these state ginseng program reports for 1989-1995 were obtained from USFWS through a Freedom of Information Act (FOIA) request submitted by TRAFFIC. State ginseng harvest data for 1996 were obtained separately from OSA.

Through a FOIA, TRAFFIC obtained a copy of the 1994 USFWS report "American Ginseng Trade: An Overview," which was based on an investigation carried out by Region Three of the USFWS Division of Law Enforcement, Intelligence Section and Branch of Special Operations. Sections of this report were not released to TRAFFIC because they contained sensitive information affecting ongoing USFWS investigations.

Data on the production of American ginseng in British Columbia and Ontario, Canada, were provided by Agriculture and Agri-Food Canada. Canadian and U.S. American ginseng export data were obtained from CITES annual reports compiled by the Canadian Wildlife Service and USFWS. The World Conservation Monitoring Centre provided data derived from CITES annual reports on global trade in American ginseng from 1977 to 1994.

Much of the information on American ginseng biology, use, markets, and products was gleaned through a review of literature, including scientific papers, herbal magazines, and catalogs, and through discussions with ginseng growers, dealers, manufacturers, and retailers. Information on conservation and legal status was provided by The Nature Conservancy (TNC), which maintains computerized data on the biological and conservation status of plants from state and provincial Natural Heritage Inventory Programs. These programs, also known internationally as conservation data centers, are a part of the Natural Heritage network, which is a partnership between public agencies and TNC. Information derived from existing scientific literature, natural history collections, field surveys, and expert references including satellite images, aerial photography, and firsthand observations, is gathered and computerized by Natural Heritage programs for practical retrieval and use.

TRAFFIC reviewed the U.S. federal process that sets minimum guidelines on biological and harvest information that states should submit for review by USFWS. This information is used to determine whether states should be granted approval to export American ginseng. Pursuant to the FOIA, TRAFFIC acquired copies of correspondence and documentation from USFWS and conducted interviews with officials who administer the ginseng program at the state and federal levels.



11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45  
46  
47  
48  
49  
50  
51  
52  
53  
54  
55  
56  
57  
58  
59  
60  
61  
62  
63  
64  
65  
66  
67  
68  
69  
70  
71  
72  
73  
74  
75  
76  
77  
78  
79  
80  
81  
82  
83  
84  
85  
86  
87  
88  
89  
90  
91  
92  
93  
94  
95  
96  
97  
98  
99  
100

#### IV. CONSERVATION AND PROTECTION STATUS

##### Overview

American ginseng has been under some degree of threat from exploitation since the early 18th century, particularly in Canada, where the species was first discovered for commercial export by colonists. By 1900, heavy collection and the loss of virgin forest had severely altered native populations of ginseng, which had historically been a common species (McMahan 1981). Ontario and some U.S. states passed legislation restricting the harvest of plants as early as the late 19th century (Emboden 1974; Haber 1990). However, the international trade in American ginseng would not be regulated for nearly another century.

In 1973 at the original meeting of the countries that formed CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora), American ginseng, whole plants as well as roots, was placed in Appendix II owing to the documented heavy collection of roots for international commercial trade. In 1975, the listing went into effect regulating all readily recognizable parts of the plant. Since 1985, as agreed at the Fifth Meeting of the Conference of the Parties to CITES (COP5), roots and readily recognizable parts of them (e.g., root chunks and slices) have been subject to CITES controls (USFWS 1994a), but the COP5 proposal made clear that small root pieces and the products containing ginseng were not proposed for inclusion. However, at the Tenth Meeting (COP10) in June 1997, it was found necessary to amend the ginseng listing annotation to explicitly exclude manufactured processed products, such as powders, extracts, pills, tonics, teas, and confectionery. Because the vast majority of wild-dug *Panax quinquefolius* roots in international trade are in the form of whole roots and pieces of root, it is believed that the conservation importance of controlling trade in processed, packaged products is negligible.

##### United States

American ginseng has a wide range and occurs in a reported 34 states and two, possibly three, Canadian provinces (table 1). Indiana, Kentucky, Ohio, Tennessee, and West Virginia are located in the heart of American ginseng's range. Compared to most states, Georgia, Indiana, and Kentucky have conducted fairly detailed surveys on ginseng distribution, density, and demography in recent years. Clearly, there have been few *recent* extensive ginseng surveys carried out in the United States. While some states try to track the location and number of ginseng populations within their borders by carrying out field surveys and entering the results into a computerized mapping system, such as a Geographic Information System (GIS), many do not have the capability to conduct such surveys. Using GIS, along with The Nature Conservancy's (TNC) methodology for gauging the rarity of plants, states are able to assess the conservation status of ginseng. TNC, in collaboration with states and provinces, ranks the rarity of plant species in the United States and Canada based on the estimated number of occurrences of populations or individuals reported in each state and province. The rarity of a plant is also determined by other factors, such as overexploitation and the absence or loss of suitable habitat.

Based upon TNC's rankings and information from State Natural Heritage Programs, the state-by-state conservation status of American ginseng has been determined, as listed in table 1. The species is classified by TNC as critically imperiled in five states located primarily at the edge of the species' range, imperiled in another five, and imperiled/vulnerable or vulnerable in 11 states, two of which, Tennessee and Indiana, are the second and fifth largest producers, respectively, of wild ginseng in the United States. TNC considers the species "apparently secure" in 12 states. One state, Missouri, reports occurrences of ginseng but no ranking has been assigned by TNC. In Iowa, TNC ranks ginseng as secure (TNC 1996).

It has been brought to the attention of TRAFFIC that the conservation rankings assigned to *P. quinquefolius* using the TNC system may underestimate the size of the populations because harvest figures for most states suggest populations greatly exceeding the rankings provided (Kearns in litt. 1997). This suggests that the rankings for *P. quinquefolius* in states whose harvest of plants from the wild is higher than the number of estimated individuals may be outdated and could distort the representation of the status of wild populations in those states. TRAFFIC uses the TNC's rarity rankings as one measure of ginseng's conservation status and recommends that these rankings be considered along with available quantitative data and other anecdotal reports of the species' status.

Several states legally protect wild populations of ginseng or designate the species a certain status, e.g. "threatened," or note that it is of "special concern." The latter designation may not necessarily impart legal protection, depending on state laws or regulations, but it recognizes the species' vulnerability and is used primarily for educational and monitoring purposes. The legal and regulatory weight of a state endangered, threatened, vulnerable, or rare designation for ginseng varies among states. Maine designates ginseng as a threatened species, but does not impose restrictions on the collection of wild plants on state lands (Gibbs pers. comm. 1997). Delaware, Michigan, New Hampshire, New York, Pennsylvania, Rhode Island, and Virginia designate ginseng as rare, threatened, threatened, exploitably vulnerable, endangered, and threatened, respectively, and regulate collection by issuing permits or requiring written permission from the appropriate state agency or private landowner. Seven states officially recognize ginseng as a species of "special concern" or include the species on a state watch list. The definition of "special concern" and the level of protection afforded by states to ginseng under this designation varies considerably by state, with New Jersey and Tennessee granting little or no protection and Connecticut and Massachusetts strictly regulating collection. An additional nine states do not grant any protection for or special status to ginseng, but regulate its harvest and/or sale. Four states and the District of Columbia, where ginseng has been historically reported, do not protect ginseng or regulate its harvest. Refer to table 1 for more complete information on the regulatory and state protection status of ginseng in the United States.

## Canada

Naturally occurring wild populations of American ginseng in Canada are limited to deciduous forest regions in southern Ontario, southwestern Québec, and Manitoba (Rowe 1972). Although the exact number of extant populations in Canada is not known, the species is reportedly more abundant in Ontario than Québec, where there are only 30 known populations (Charron and Gagnon 1991; Haber 1990). Because ginseng's historic range is now the most developed and populated areas of Québec and Ontario, many of its populations have disappeared due to loss of habitat (Gagnon et al. 1996). According to TNC's rarity ranking system, ginseng is classified as imperiled to vulnerable in Québec; vulnerable in Ontario; and reported, but not ranked, in Manitoba (TNC 1996) (table 1). The Province of Ontario has not designated any legal status or protection to ginseng. A 1988 study on the status of ginseng in Canada concluded that the species was rare in Québec (White 1988; Gagnon and Charron 1987; Bouchard et al. 1983), and the species is listed as endangered in the Québec Endangered Species Act.

Shortly after American ginseng was listed on CITES Appendix II in 1975, Québec prohibited the wild collection of ginseng for export because extant wild populations were very few. In 1988, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) designated American ginseng as threatened. COSEWIC is comprised of federal, provincial, and nongovernmental officials and designates Canadian species as endangered, threatened, vulnerable, extirpated, or extinct. Although Canadian federal law provides no special legal protection for species designated by COSEWIC, provinces may use COSEWIC's designations to accord protection to species within their jurisdiction. COSEWIC's designation prompted Ontario to prohibit exports of wild American ginseng in 1989 (Haber 1996).

Table 1. Conservation, State Protection, and Export Status of *Panax quinquefolius* in U.S. States and Canadian Provinces

STATE OR PROVINCE	PERCENT OF 1996 U.S. WILD GINSENG PRODUCTION	INC CONSERVATION STATUS*	STATE/PROVINCIAL LEGAL PROTECTION STATUS <sup>1</sup>	STATE/PROVINCE APPROVED TO EXPORT WILD GINSENG
Alabama	≈ 1%	Apparently Secure	None	✓
Arkansas	≈ 2%	Apparently Secure	None	✓
Connecticut	NK	Vulnerable	Special Concern	No
Delaware	NK	Imperiled	Rare	No
District of Columbia	NK	Historically Reported: No Status	None	No
Georgia	< 1%	Vulnerable	None	✓
Illinois	4%	Vulnerable	None	✓
Indiana	8%	Apparently Secure	Watch List	✓
Iowa	≈ 1%	Apparently Secure	None	✓
Kansas	NK	Reported; No Status	None	No
Kentucky	23%	Apparently Secure	None	✓
Louisiana	NK	Critically Imperiled	None	No
Maine	NK	Imperiled	Threatened	No
Manitoba	NK	Reported; No Rank	None	No
Maryland	< 1%	Vulnerable	Watch List	✓
Massachusetts	NK	Vulnerable	Special Concern	No
Michigan	NK	Imperiled	Threatened	No
Minnesota	2%	Apparently Secure	Special Concern	✓
Mississippi	NK	Vulnerable	None	No
Missouri	3%	Reported; No Rank	None	✓
Nebraska	NK	Critically Imperiled	None	No
New Hampshire	NK	Imperiled	Threatened	No
New Jersey	NK	Imperiled	Special Concern	No
New York	1%	Apparently Secure	Exploitably Vulnerable	✓

<sup>1</sup> For additional information on the Protection and Regulatory Status of *P. quinquefolius*, see Appendix 1.

Table 1 (cont.) Conservation, State Protection, and Export Status of *Panax quinquefolius* in U.S. States and Canadian Provinces

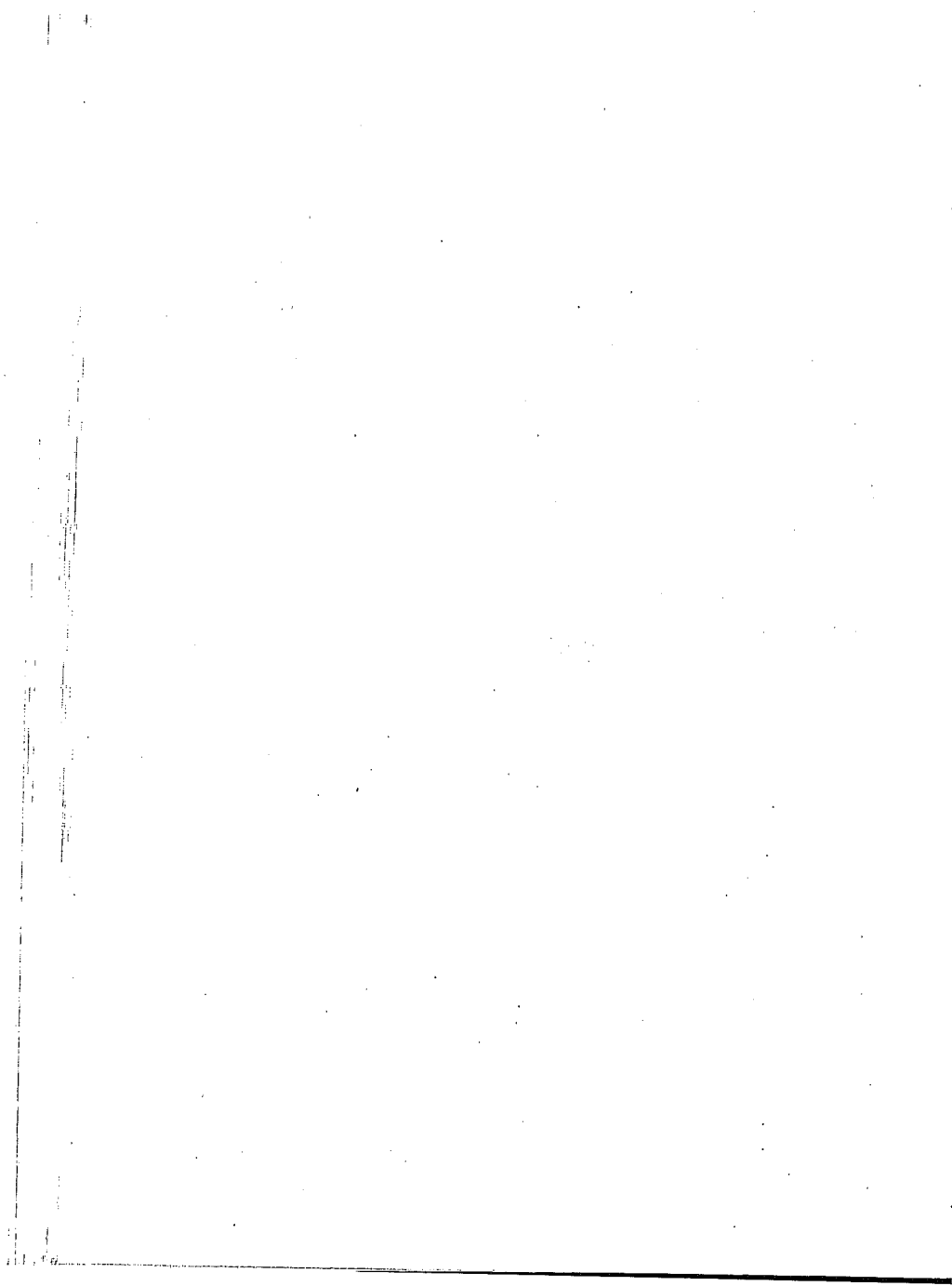
STATE OR PROVINCE	PERCENT OF 1996 U.S. WILD GINSENG PRODUCTION	INC CONSERVATION STATUS*	STATE/PROVINCIAL LEGAL PROTECTION STATUS	STATE/PROVINCE APPROVED TO EXPORT WILD GINSENG
North Carolina	8%	Apparently Secure	Watch List-Special Concern	✓
Ohio	8%	Apparently Secure	None	✓
Oklahoma	NK	Critically Imperiled	None	No
Ontario	NK	Vulnerable	None	No
Pennsylvania	2%	Apparently Secure	Vulnerable	✓
Québec	NK	Imperiled - Vulnerable	Endangered	No
Rhode Island	NK	Critically Imperiled	Endangered	No
South Carolina	NK	Imperiled - Vulnerable	None	No
South Dakota	NK	Critically Imperiled	None	No
Tennessee	13%	Vulnerable	Special Concern	✓
Vermont	< 1%	Vulnerable	None	✓
Virginia	8%	Apparently Secure	Threatened	✓
West Virginia	13%	Apparently Secure	Special Concern	✓
Wisconsin	2%	Apparently Secure	Special Concern	✓

NK These states/provinces are not approved to export ginseng. As a result, ginseng harvest is not formally reported and cannot be computed as a portion of total harvest. It is expected that ginseng collection in states/provinces for which ginseng export has not been approved is minimal.

Source: Information on production of *P. quinquefolius* provided by the Office of Scientific Authority at the U.S. Fish and Wildlife Service; information on conservation status of *P. quinquefolius* provided by The Nature Conservancy and updated by TRAFFIC USA in March 1997. For additional information on the protection status of *P. quinquefolius* refer to Appendix 1.

Explanation of General Guidelines Typically Used to Rank Conservation Status by The Nature Conservancy:

- Critically Imperiled: 5 or fewer occurrences; or fewer than 1,000 individuals.
- Imperiled: 6-20 occurrences; or fewer than 3,000 individuals.
- Vulnerable: 21-100 occurrences; or fewer than 10,000 individuals.
- Apparently Secure: 100 occurrences or more; or more than 10,000 individuals, but concern about long-term survival.
- Secure: 100 occurrences or more; or more than 10,000 individuals demonstrably widespread, abundant, and secure.



## V. MARKETS, TRADE, AND HARVEST

### Uses of Ginseng

American ginseng (*Panax quinquefolius*) entered international trade in the early 1700s when Asiatic ginseng (*P. ginseng*) was becoming increasingly scarce due to long-term overexploitation of its highly valued root for medicinal consumption in East Asia (Carlson 1986; Fuller 1991).

Before the introduction of *P. quinquefolius* to Asia, *P. ginseng*, also known in trade as Chinese or Korean ginseng, had been used for millennia in traditional Chinese medicine (TCM), primarily as a tonic or stimulant to increase fertility and sexual appetite and to strengthen the body and prolong longevity (Carlson 1986). The name "ginseng" is derived from the Chinese term "ren shen," meaning "shaped like a man," because the root resembles the human body. According to Chinese belief, ginseng root is considered a universal remedy, or cure-all (Hu 1976; Hu 1977). American ginseng has uses similar to those of Asiatic ginseng, but is considered to have properties that are less stimulating and more relaxing (Bremness 1994). Both herbs are reputed to improve vital energy and slow aging. On the Hong Kong market, American ginseng is 5 to 10 times more expensive than Asiatic ginseng, which has been frequently and inaccurately labeled and sold as American ginseng there (Cheung et al. 1994).

East Asia is the oldest and largest commercial market for *P. quinquefolius* and East Asian countries import several hundred tonnes of wild and cultivated roots annually from Canada and the United States for use in Chinese medicines. Ginseng is chewed in the raw, prepared as teas and extracts, used as a condiment in cooking, burned as incense, and worn around the neck for good luck. Much of the ginseng on the Asian market is imported into Hong Kong where it undergoes processing for reexport to other parts of Asia, particularly China, but often back to North America and Europe (Carlson 1986). Other important Asian markets are Singapore, Indochina, Macao, Malaysia, Taiwan, and Japan. There is also a market for ginseng in many Western countries. For instance, West Germany and the United Kingdom market facial creams, aspirin, and vitamin and mineral products prepared with ginseng (Massey 1976; Speestra 1971).

China and South Korea are large producers of cultivated Asiatic ginseng (Fulder 1993; Liu and Xiao 1992). The *China Plant Red Data Book* lists *P. ginseng* as endangered in China and the species may be extinct in the Korean Peninsula. The Association of Korean Oriental Medicine (AKOM) disputes the claim that *P. ginseng* is extinct in South Korea, but reports wild ginseng to be extremely rare (Kennett and Parry-Jones, in prep). The production, marketing, and trade of ginseng in South Korea is strictly regulated by the government, which prohibits the importation of all foreign ginseng in order to protect its domestic market. This ban on ginseng imports may be the reason that there are very few reported U.S. exports of ginseng destined for South Korea.

Chinese domestic sales of *P. ginseng* totaled approximately 14 metric tons in 1994 (Blumenthal 1996). Much of the ginseng grown in China is used in tonic wines, extracts, and traditional medicines, some of which are exported, particularly to Chinese communities abroad



(Hu 1976, in Fulder 1993). South Korea's ginseng production is subsidized by the government and competes directly with production in North America (Carlson 1986). Chinese ginseng harvested from cultivated sources in South Korea is reportedly more efficacious than cultivated American ginseng (Carlson 1986). However, wild American ginseng is considered quite valuable in East Asia and has a substantially higher wholesale value than Korean-grown Chinese ginseng. *P. ginseng* roots of Korean origin are also cultivated in Japan, but are apparently inferior to those grown in South Korea (Fulder 1993). Relative value is also judged according to the degree and method of processing, which are often denoted by color. For example, Chinese red ginseng is considered better than Chinese white ginseng. Wholesale and retail herbal catalogs indicate that Chinese red ginseng, Korean red ginseng, and Chinese white ginseng are sold in the United States.

The species, source (wild or cultivated), growing conditions, curing methods, and degree of processing affect the grade and price of ginseng. In general, wild root is purportedly more efficacious than cultivated root and whole root is more potent than powdered root. However, ginseng root in powdered form is considered medicinally superior to extracts, which are superior to instant teas, which are superior to cosmetics (Fulder 1993). Wild roots are preferred over cultivated roots in TCM owing to their older age, form, taste, color, and efficacy. While this preference is based more on traditional belief than clinical fact, a higher number and concentration of the active ingredients, dammarane saponins (plant-based sugars)—commonly referred to as ginsenosides—have been identified in wild roots (Cottrell et al. 1996).

Ginsenosides, the main active ingredients found in *Panax* spp., are complex carbohydrate molecules representing about 3 to 6 percent of the dried root weight and may be associated with a number of therapeutic benefits. According to lab analyses, *P. ginseng* contains higher concentrations of ginsenosides that produce stimulating effects, whereas *P. quinquefolius* contains higher concentrations of ginsenosides that produce calming effects (Pritts 1995). According to clinical testing, the ginsenoside content of American ginseng, which ranges between 8 and 14 percent, is generally 5 to 8 percent higher in wild than in cultivated plants (Romang 1996). There is also a correlation between the weight and ginsenoside concentration in ginseng roots. For instance, a recent study compared 20 four-year-old cultivated *P. quinquefolius* roots and found that the larger, heavier plants contained higher ginsenoside levels (Carriere et al. 1996).

*Eleutherococcus senticosus*, a genus closely related to *Panax* that also belongs to the Araliaceae family, is marketed under the name Siberian ginseng. This species is a shrub that occurs in northeast Asia and much of the far southeastern corner of the former Soviet Union. *E. senticosus* contains medicinal properties—called eleutherosides—similar to those of *Panax* (Carlson 1986; Anon. 1997). The plant is widely used in TCM to treat chronic pneumonia and tuberculosis, to inhibit malignant tumors, and to reduce the side-effects of radiotherapy and chemotherapy in cancer patients (Fulder 1993). Western herbal medicine labels the plant an adaptogen, which helps the body combat stress, reduces chronic fatigue syndrome, and generally returns the body to a healthy balance (Anon. 1997).

### The Role of Hong Kong in the Ginseng Trade

Hong Kong is a major international trading center for herbs used in TCM. Due to its favorable location, proximity to East Asia, and no import duties, Hong Kong is an attractive center for herbal processors, manufacturers, and brokers. A high volume and variety of unprocessed TCM herbs are imported into Hong Kong for processing, packaging, and eventual reexport to East Asia and Asian communities overseas. Hong Kong's 1995 herbal imports, most of which were imported from mainland China, were a reported 80,000 metric tons, with a declared value of US\$343 million (CA\$496 million), based on Hong Kong Customs statistics. Hong Kong's 1995 reexports of herbal medicines totaled 70,000 metric tons, with a declared value of US\$239 million (CA\$345 million), based on Hong Kong Customs statistics (Kennett and Parry-Jones, in prep). Ginseng root, also known in TCM by its pharmaceutical latinized name "Radix ginseng," is among the unprocessed herbal commodities imported into Hong Kong for processing and reexport.

The Hong Kong Census and Statistics Department employs the Harmonized Commodity Description and Coding System (HS) — a universally accepted system of product nomenclature that classifies goods in international trade — to record imports and reexports of wild and cultivated ginseng. Under the general HS commodity code for medicinal plants, which is described as "Plants and parts of plants (including seeds and fruits), of a kind used primarily in perfumery, in pharmacy or for insecticidal, fungicidal or similar purposes, fresh or dried, whether or not cut, crushed or powdered," a subheading code exists for ginseng: "Ginseng roots." This code is further divided into two categories: cultivated and wild. The HS commodity code for ginseng does not discriminate among *Panax* species or other species referred to as "ginseng in trade."<sup>2</sup> Moreover, the HS ginseng commodity code includes both raw material and processed products. The lack of additional codes to report specific species of ginseng and forms in which they are imported or exported makes it difficult to examine levels of trade in *Panax*. However, given Hong Kong's role as a major trading country in raw medicinal materials, it is most likely that ginseng trade data compiled from HS codes refer to *Panax* raw material.

From 1984 to 1995, Hong Kong imported between 900 and 2,500 metric tons annually of cultivated ginseng root. According to Hong Kong trade statistics, more than 73 percent (47 mt) of total wild ginseng imports in 1995 were from the United States, followed by imports from China (16 mt) and Singapore (4 mt). Imports of wild ginseng root from the United States are almost certainly those of *P. quinquefolius*. The large volume of reported imports of wild ginseng from China is unrealistic and assumed to be erroneous owing to the extreme rarity and scarcity of wild *Panax* in China. Hong Kong's reported imports of wild ginseng from China probably reflects

---

<sup>2</sup> Customs commodity codes for wild and cultivated ginseng are 1211200040 and 1211200020, respectively.

transplanted or naturalized *Panax* (Kennett and Parry-Jones, in prep). Imports of wild ginseng from Singapore were probably reexports as no natural populations are known to occur there. China supplied between 38 and 64 percent of the cultivated *Panax* imports to Hong Kong from 1984 to 1995 (Kennett and Parry-Jones, in prep).

According to Hong Kong's Census and Statistics Department, Hong Kong generally reexports about 10 percent by weight of the wild ginseng that it imports. In 1995, Hong Kong reexported wild ginseng to Singapore (2,600 kg), West Malaysia (1,160 kg), Taiwan (56 kg), Macao (54 kg), the United States (42 kg), Canada (19 kg), China (78 kg), and the United Kingdom (28 kg). From 1984 to 1995, Hong Kong's reexports of cultivated ginseng ranged from a minimum of 412 metric tons (1984) to a maximum of 3,800 metric tons (1992) (Kennett and Parry-Jones, in prep). China was the reported source of between 13 and 38 percent of Hong Kong's reexports of cultivated ginseng during the period 1984-1995.

Hong Kong is by far the most significant importer of wild and cultivated *P. quinquefolius* root from North America. According to CITES Annual Report data, the United States exported nearly 9,000 metric tons of wild and cultivated *P. quinquefolius* root to Hong Kong from 1980 to 1996, while more than 2,200 metric tons of cultivated ginseng root were exported from Canada to that destination from 1980 to 1995. Other countries reporting U.S. imports of *P. quinquefolius* root from 1980 to 1995 include Taiwan (924 mt), Singapore (257 mt), China (232 mt), Malaysia (120 mt), Japan (4.2 mt), the United Kingdom (2 mt), and at least a dozen other countries in Oceania, Asia, and Europe.

Hong Kong was the top importer of U.S.-origin wild *P. quinquefolius* from 1991 to 1996, importing more than 250 metric tons from the United States during the six-year period, according to customs statistics. *P. quinquefolius* imported into Hong Kong from the United States is classed into 40 grades depending on shape, size, texture, etc., and redistributed to local and foreign markets. In 1994, 1995, and 1996, Hong Kong was the primary recipient of wild *P. quinquefolius* root harvested in the United States, accounting for 57 mt (89%), 46 mt (85%), and 46 mt (86%) of total U.S. exports (Robbins 1997; USFWS 1996, 1997). Other reported destinations for wild *P. quinquefolius* root include Singapore, Taiwan, Canada, and Malaysia. Nearly 600 metric tons of cultivated *P. quinquefolius* root were exported from the United States to Hong Kong in 1996, while smaller amounts were exported to China, Canada, Malaysia, Taiwan, and Singapore (USFWS 1997).

#### Contemporary Use of Ginseng in the United States

American ginseng was listed in the *United States Pharmacopoeia* (USP) until 1882 when most herbs were dropped from the *Pharmacopoeia* due to shifting ideology regarding herbal use and classification (Foster pers. comm. 1997). The USP was instituted in 1820 and has since been an official compendium of drugs produced by legal authority and recognized by the medical community for information on purity, dosage, etc. American ginseng was prescribed as a stimulant and digestive tonic by pharmacists (Foster 1995). The *Dispensary of the United States of*

*America*, in which ginseng was listed as a secondary plant used in medicines worldwide, provided commentary on official and unofficial drugs until it was discontinued in the 1950s (Foster in litt. 1997; Carlson 1986). Today, ginseng is available in the United States and Canada as an over-the-counter nutritional supplement. In the United States, herbs, including ginseng, are legally treated as dietary supplements and cannot be advertised as products that make medical claims.

Asiatic and American ginseng are widely marketed herbs in the United States and Canada. An increasing immigrant Asian population and the "mainstreaming" of herbal consumption have contributed to a growing market for ginseng products. Ginseng root is sold by Chinese pharmacies, health food and convenience stores, supermarkets, and mail-order companies in the form of raw roots, capsules, teas, liquid extracts, chewing gum, candy, cigarettes, and soft drinks (Carlson 1986). It has also been added to cosmetics, soaps, aftershave cologne, and perfumes (Carter 1975). Based on 1995 prices offered in U.S. wholesale catalogs, wild American ginseng roots sold for US\$31.13/oz (CA\$44/oz), or US\$498/lb (CA\$719/lb) (US\$1,390/kg; CA\$2,009/kg), while cultivated American ginseng roots sold for US\$10.35/oz (CA\$14.96/oz), or \$166/lb (CA\$240/lb) (US\$365/kg; CA\$527/kg). See table 2 for prices of American, Asiatic, and Siberian ginseng offered on the U.S. market.

In 1994, ginseng was an herb of preference among U.S. consumers, surpassed only by garlic and goldenseal, with 33 percent of consumers surveyed by the natural foods industry choosing ginseng products (Oliver 1995). Similarly, U.S. health food stores responding to a 1995 herbal industry survey reported that ginseng was their fourth most popular herb sold, surpassed only by coneflower (*Echinacea* spp.), garlic (*Allium sativum*), and goldenseal (*Hydrastis canadensis*) (Brevoort 1996).

#### **Ginseng in North America - A History of Trade**

The early 18th-century commercial discovery of *P. quinquefolius* in North America launched Canada and the United States into a lucrative trade with the Far East that has lasted for nearly three centuries. Native Americans and settlers were the principal collectors of wild ginseng, and frequently dug roots along with trapping fur-bearing wildlife. Native Americans did not appear to rely heavily on ginseng for medicinal or intertribal trading purposes prior to European colonization (Carlson 1986). Claims from Asia of ginseng's efficacy may have influenced a rise in its popularity and application. During the Colonial era, Native Americans reportedly used ginseng for medicinal purposes similar to those of the Chinese (Hariman 1973). By the mid-1700s, the plant had become an important herb in Native American medicine and commerce (Carlson 1986). Anthropological records indicate that at least a dozen North American tribes used ginseng to relieve pain, prevent and treat convulsions, aid gastrointestinal and gynecological conditions, inhibit vomiting, and increase energy levels, among other uses (Moerman 1986).

Table 2. Types and Wholesale Prices of Ginseng Offered on the U.S. Market, 1995

TAXON/VARIETY	SOURCE	FORM AVAILABLE	PRICE/UNIT (kg)	PRICE/UNIT (lb)
American ginseng <i>P. quinquefolius</i>	Wild	Dried Root	US\$1,099/kg CA\$1,588/kg (320 roots)	US\$498/lb CA\$720/lb
American ginseng <i>P. quinquefolius</i>	Wild	Powder	US\$550/kg CA\$795/kg	US\$249/lb CA\$360/lb
American ginseng <i>P. quinquefolius</i>	Cultivated	Dried Root	US\$354/kg CA\$512/kg	US\$161/lb CA\$233/lb
American ginseng <i>P. quinquefolius</i>	Cultivated	Powder	US\$255/kg CA\$369/kg	US\$116/lb CA\$168/lb
Chinese Red <i>Panax ginseng</i>	Cultivated	Dried Root	US\$243-\$970/kg CA\$351/kg- \$1,402/kg	US\$110-\$440/lb CA\$159-\$636/lb
Korean White <i>P. ginseng</i>	Cultivated	Dried Root	US\$340-\$357/kg CA\$491-\$516/kg	US\$154-\$162/lb CA\$223-\$234/lb
Siberian ginseng <i>Eleutherococcus senticosus</i>	Cultivated	Dried Root	US\$15/kg CA\$22/kg	US\$7/lb CA\$10/lb

Note: Prices extracted from a 1995 catalog of a major U.S. distributor of ginseng.

Today, ginseng collection is often carried out by entrepreneurial rural hunters and wildcrafters who harvest a variety of wild animals and plants valued in traditional medicine markets in the United States and abroad. Most ginseng diggers in the United States have a background of rural living and live or have lived in areas where ginseng harvest was an accepted means of family support (USFWS 1994b). Interestingly, according to a 1994 USFWS investigation, the primary forms of income for ginseng diggers studied were welfare, aid to dependent children, sale of aluminum and other scrap, and trapping furbearers. Diggers may be reluctant to disclose information about digging locations, methods of harvest, income derived from root harvest, etc., because they fear their income will be taxed, their welfare benefits threatened or their resource depleted through competition from other diggers (USFWS 1994b). The collection of wild ginseng roots in some regions of the eastern United States, particularly Appalachia and the Ozark Mountains, is a longstanding tradition that provides supplemental income for rural people. A recent survey conducted in West Virginia—the state third largest in wild ginseng production—

reveals that an estimated 20,662 households (3 percent) in that state harvested ginseng from the wild (Bailey et al. 1996).

Canada was the first to take commercial advantage of its wild ginseng and export roots to East Asia. However, owing to indiscriminate overcollection and habitat loss, Canada's wild populations were severely diminished by the mid-1700s. As the quality of ginseng roots deteriorated, Chinese merchants refused to purchase small and poor quality roots from Canadian sources (Haber 1990). By 1973, the heavy collection and pervasive habitat loss prompted the Canadian province of Québec to take legislative action to curtail the trade. Shortly after the species was listed on CITES in 1975, Québec banned the collection of wild ginseng for export. As of 1989, Ontario prohibited the export of wild ginseng. No wild roots have been exported legally from Canada since 1990.

The depletion of Canada's wild ginseng prompted traders to turn to the United States where an abundance of ginseng was tapped for export. By the mid-1800s, the United States had become the largest producer and exporter of wild-dug American ginseng roots, the vast majority of which were destined for East Asia. From 1821 to 1899, 30 million pounds (over 13,000 metric tons) of wild ginseng roots valued at US\$24 million (CA\$35 million) were exported from the United States. Of these, more than 29 million pounds (13,000 metric tons) were sent to East Asia. Of the remainder, 251 metric tons went to northern Europe; 66 metric tons to southern Europe; and smaller amounts to Southeast Asia, South America, the West Indies, Africa, and Canada, among other destinations (Carlson 1986).

#### **Recent Trends in U.S. Imports and Exports of Wild Ginseng**

The volumes and declared values of wild and cultivated ginseng (fresh or dried, whether or not cut, crushed, or powdered) exported from and imported into the United States from 1990 to 1996 were obtained from U.S. Imports and Exports of Merchandise compiled by the Bureau of Census under the U.S. Department of Commerce. U.S. Customs submits data recorded from import and export shipments to the Bureau of the Census, which further categorizes imports and exports according to the *Harmonized Tariff Schedule of the United States*, which is based upon the Harmonized Commodity Description and Coding System (HS) (explained in earlier discussion on Hong Kong ginseng trade). U.S. Bureau of Census data are noted as "Customs" data in this section.

U.S. Customs reports imports and exports of fresh, dried, cut, crushed, or powdered ginseng by using the HS commodity code category "Ginseng roots," which is further divided into two categories: cultivated and wild. As noted earlier, the HS ginseng commodity code does not discriminate among *Panax* or other species referred to as "ginseng" in trade.<sup>3</sup> Although the code

---

<sup>3</sup>Customs commodity codes for wild and cultivated ginseng are 1211200040 and 1211200020, respectively.

used by Customs includes both raw material and processed products, it is not known what portion of incoming or outgoing U.S. shipments consist of raw material or finished products.

It is presumed that most U.S. exports of wild ginseng consist of *Panax quinquefolius*, which grows naturally in the United States. Reported U.S. exports of cultivated ginseng are also likely to be *P. quinquefolius*, but may consist of different varieties of *Panax* that have been grown from seed in the United States. Reported U.S. imports of wild ginseng may be 1) roots of *Panax* harvested from naturalized populations; 2) semiprocessed U.S.-origin *P. quinquefolius* roots; 3) cultivated *Panax* reported erroneously as wild; or 4) *Eleutherococcus senticosus*, Siberian ginseng, or any other plant traded under the name "ginseng." Reported U.S. imports of cultivated ginseng probably consist of *P. ginseng* or *P. quinquefolius*, both of which are grown commercially from seed in East Asia.

#### *Wild Ginseng Exports*

According to Customs data, U.S. exports of wild ginseng roots increased steadily from around 67 metric tons (declared value of US\$12 million; CA\$17 million) in 1990, to more than 190 metric tons (declared value of US\$32 million; CA\$46 million) in 1996 (table 6). Approximately 89 percent (672 metric tons) of these exports were destined for Hong Kong, while 86 metric tons were exported to Singapore (5 percent), Taiwan (4 percent), and a handful of other countries (figure 2). The number and variety of countries to which the United States has exported wild ginseng since 1990 has also increased. For instance, from 1994 to 1996, the United States exported nearly 6 metric tons of wild ginseng to Australia, Colombia, Germany, Italy, Malaysia, and the United Kingdom, none of which were destinations for U.S.-produced wild ginseng from 1990 to 1993. In 1996, approximately 40 percent of U.S. wild ginseng exports were shipped from Chicago; 31 percent from New York City; 10 percent from Philadelphia; and 19 percent from 10 other U.S. cities.

Data on exports of wild ginseng compiled by U.S. Customs contrast with those compiled by the U.S. Fish and Wildlife Service (USFWS). There are at least three possible explanations of the discrepancies between these two sources of data: 1) the different tasks of each agency; 2) the method of data compilation; 3) the type of data compiled (table 3).

First, the primary responsibility of Customs is the collection of tariffs on goods imported into the United States. This involves the physical inspection of imports to verify their identity, which may result in less time to devote to the inspection of exported goods. As a result, Customs officials may not independently or physically verify the source of ginseng intended for export, and, for reporting purposes, may rely on the exporter's description of the ginseng shipment. The exporter's description of the ginseng shipment may be inaccurate. Census may report higher export numbers than does USFWS because Census documents exports of processed materials, and USFWS does not. (Processed materials do not require an export permit from USFWS, and are excluded from CITES controls.) Also, the disparity may be related to instances of unprocessed

wild ginseng being approved for export by U.S. Customs, which may not be aware of the CITES export permit requirement (Dames pers. comm. 1997).

Subtle fluctuations in exports of wild *P. quinquefolius* from one year to the next also might be attributed to fluctuations in weather, phenology (leaf drop), density of deer (who eat the plant), intensity of collection, changes in the number of diggers, fluctuating prices, and the classification as "wild" of increasingly common "woods-grown" roots (e.g., ginseng seeded and cultivated in a wild environment). A comparison of U.S. wild ginseng harvest and CITES export data from 1991 to 1996 reveals that exports generally represent between 82 and 92 percent of harvest—with the exception of 1993 and 1994, when the amount exported was reportedly higher than the amount harvested (table 4). This seeming impossibility may have occurred because 1) harvests were underreported, or 2) ginseng not exported during previous years was carried over for export in 1993 and 1994.

Figure 2

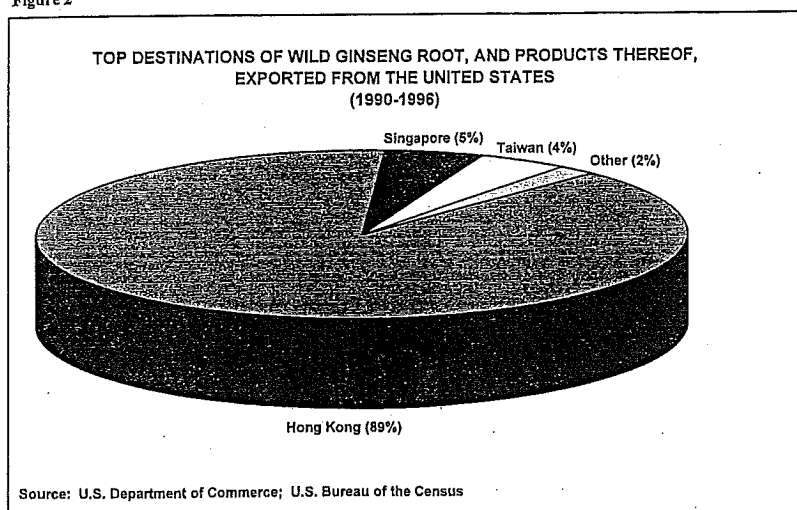




Table 3. Comparison of U.S. Bureau of Census and U.S. Fish and Wildlife Service  
Wild Ginseng Exports Data (1992-1996)

Year	U.S. Bureau of the Census (mt)	U.S. Fish and Wildlife Service (mt)
1992	100	54
1993	70	59
1994	104	64
1995	162	54
1996	191	54

#### *Wild Ginseng Imports*

A review of the same Customs data appear to indicate that the United States is a sizable importer of wild ginseng when taken on face value. From 1990 to 1996, the United States imported a reported 208 mt of wild ginseng (63 percent) from China, 59 mt (18 percent) from South Korea, 34 mt (10 percent) from Mexico, and smaller amounts (19 mt) from Hong Kong, Canada, Germany, India, Israel, and Peru (table 7).

#### From South Korea, Mainland China, and Hong Kong

The high volume of U.S. imports of ginseng classified as "wild" from China and South Korea is incongruous with the extreme rarity of *Panax ginseng* in those countries. It is likely that imports of "wild" ginseng from China reflect one or a combination of the following: transplanted or seeded wild *Panax* under cultivation (plants cultivated in a wild, natural habitat can resemble wild roots and could be reported as such); another species traded under the name "ginseng" and reported as such by U.S. Customs; or erroneous reporting of cultivated ginseng as wild. U.S. imports of wild ginseng from China or South Korea might be wild or woodsgrown *P. quinquefolius* that was exported from the United States to those countries for processing and subsequently reexported to the United States. As semiprocessed and processed wild *P. quinquefolius* are value-added products reported by Customs for tariff purposes, but exempt from CITES controls for practical reasons, Customs is in a much better position than CITES to report U.S. imports of value-added products of wild *P. quinquefolius* root. Furthermore, the additional weight of value-added products owing to other ingredients and packaging might account for heavier shipments reflected in U.S. Customs figures.

This may also be the situation for U.S. imports of wild ginseng from Hong Kong. While Customs data indicate the United States imported 8.5 metric tons of wild ginseng from Hong Kong from 1990 to 1996, CITES Annual Report data indicate 274 kilograms of U.S.-origin wild *P. quinquefolius* were imported into the United States from Hong Kong during 1991 to 1994.

#### From Canada

Recent reports of wild ginseng received by the United States from Canada are intriguing because Canada has prohibited the export of wild-collected *P. quinquefolius* since 1990. A review of U.S. Customs data shows that the United States imported 162 kilograms of wild ginseng roots from Canada in 1991; 1,100 kg in 1992; 575 kg in 1993; 187 kg in 1994; 624 kg in 1995; and 6,000 kg in 1996 (table 5). These imports of wild ginseng roots are reported by U.S. Customs only and do not appear in U.S. or Canadian CITES annual reports. As noted earlier, U.S. Customs classifies imports of fresh, dried, cut, crushed, or powdered ginseng, including processed ginseng products, under the HS subheading code "Ginseng roots; cultivated or wild." However, processed products of wild *P. quinquefolius* are exempt from CITES controls, which is a likely explanation why wild ginseng imported from Canada was reflected in U.S. Customs data and not in CITES annual report data.

An unknown quantity of wild ginseng of U.S. origin is exported to East Asia, notably Hong Kong, and subsequently reexported to Canada and the United States as semiprocessed or processed material. It is entirely possible that U.S. imports of wild ginseng roots from Canada were originally exported from the United States in the form of whole roots to Hong Kong for processing. The processed material could have been reexported from Hong Kong to Canada, and later reexported from Canada to the United States. What's more, U.S. Customs treats Canada as the country of origin for exports and reexports of wild ginseng roots, which might create the perception that ginseng imported into the United States is exported directly from Canada when in actuality it is being reexported from there.

Table 4. Total Reported U.S. Harvest and Export of Wild Ginseng (1991-1996)

Year	Total Wild Harvest (kg)	Total Wild Export (kg)	Percent of Harvest Exported
1991	58,300	53,500	92%
1992	72,300	63,900	88%
1993	46,100	58,500	121%
1994	56,800	63,800	111%
1995	59,000	54,300	92%
1996	65,400	53,700	82%

Source: 1991-1996 harvest data from the Office of Scientific Authority at the U.S. Fish and Wildlife Service; 1991-1993 CITES Annual Report data as maintained by the World Conservation Monitoring Centre; 1994-1996 U.S. CITES Annual Report data from U.S. Fish and Wildlife Service.

Table 5. Comparison of U.S. Exports of Wild Ginseng to Canada and U.S. Imports of Wild Ginseng from Canada (1991-1996)

Year	U.S. Exports (kg) of Wild <i>P. quinquefolius</i> to Canada (CITES data)	U.S. Imports (kg) of Wild Ginseng from Canada (U.S. Customs data)
1991	10	162
1992	161	1,100
1993	265	575
1994	414	187
1995	223	624
1996	459	6,000

Source: 1991-1993 U.S. exports of wild *P. quinquefolius* to Canada were obtained from CITES Annual Reports compiled by the World Conservation Monitoring Centre, Cambridge, UK; 1994-1996 U.S. exports obtained from CITES Annual Report data compiled by the U.S. Fish and Wildlife Service; and 1991-1996 U.S. imports of wild ginseng from Canada were obtained from the U.S. Bureau of the Census using HS commodity codes 1211200040 for wild ginseng and 121100020 for cultivated ginseng; these codes refer to unprocessed and processed material.

Other possible explanations for reported U.S. imports of wild ginseng from Canada are 1) misreporting cultivated ginseng as wild ginseng, and 2) Canadian exporters using the term "woodsgrown" on shipping manifests which in turn U.S. Customs might interpret and report as wild ginseng. Canadian CITES officials corroborated these possibilities and informed TRAFFIC that U.S. imports of wild ginseng from Canada are likely Canadian reexports of processed wild ginseng or cultivated ginseng that had been misreported as wild or not reported by source at all by Canadian agricultural authorities (Robillard in litt. 1998).

Although there are fundamental differences in how data are reported by Customs versus CITES, it seems logical to compare the two sets of data for a possible correlation or explanation regarding anomalous U.S. imports of *P. quinquefolius* from Canada. In particular, CITES data show that a Canadian shipment of 575 kilograms of *P. quinquefolius* of unknown origin was received by the United States in 1993. This figure matches exactly the amount of imported wild ginseng reported by U.S. Customs for that year. Although a meaningful correlation between CITES and Customs data is difficult to ascertain in this case, the U.S. shipment of *P. quinquefolius* of unknown origin from Canada might account for the unusually high amount of "wild" ginseng exported from Canada to the United States and reported by U.S. Customs in 1993.

### *Cultivated Ginseng*

Cultivated *Panax* roots have accounted for over two-thirds of total ginseng root exports from the United States since the late 1970s. Today, the ratio of cultivated to wild *P. quinquefolius* roots exported from the United States is about 13 to 1.

According to an analysis of U.S. Customs data, which refer to unprocessed ginseng roots and products made therefrom, exports of cultivated ginseng from the United States averaged annually 758 metric tons from 1990 to 1996 and totaled 5,300 metric tons (with a total declared value of US\$372 million) during that period (table 6). By comparison, CITES annual report data, which refer only to whole ginseng roots and readily recognizable parts of roots such as root chunks and slices, show that the United States exported between 550 and 800 metric tons of cultivated *P. quinquefolius* annually from 1991 to 1996 totaling 3,370 metric tons (WCMC 1995; USFWS 1997).

The primary destinations for exports of cultivated *P. quinquefolius* traded as whole or sliced roots from 1991 to 1996 were Hong Kong (2,894 mt), Taiwan (198 mt), China (108 mt), Malaysia (43 mt), Canada (42 mt) and Singapore (14 mt) (WCMC 1995; USFWS 1997). The United States exported substantially smaller volumes to Australia, Austria, Belgium, Czech Republic, Denmark, Japan, The Netherlands, and Spain. More than 95 percent of cultivated ginseng roots exported from the United States are from Wisconsin. Although not as voluminous as its exports of cultivated ginseng, the United States imports significant amounts of cultivated ginseng. U.S. imports of cultivated ginseng, mostly from Asia, during 1990-1996 totaled 2,825 metric tons (with a total declared value of US\$64 million; CA\$92 million) (table 7). Customs data show that the top exporters of ginseng to the United States during this period were China at 71 percent (1,996 mt), Hong Kong at 15 percent (436 mt), and South Korea at 6 percent (183 mt). The United States also imported 97 mt of cultivated ginseng from Canada, 48.5 metric tons from India, 15.6 metric tons from Japan, and approximately 49 metric tons from a handful of European countries.

### *U.S. Harvest*

The USFWS began approving state programs for ginseng export in 1978 as a means of implementing the CITES Appendix II designation. From 1978 to 1982, state ginseng programs were evaluated and approved for export annually by USFWS, which published its findings of state programs in the *Federal Register*. Beginning in 1982, state programs were approved to export ginseng for three-year periods. Michigan alone was approved for the export of wild ginseng for 1977-78 harvest seasons; 17 states were approved for 1978-79; 14 states for 1979-80; 15 states for 1982-83; 15 states for 1984; 16 states for 1985-87; 19 states for 1988-90; 19 states for 1991-93; and 19 states for 1994-96. During the 1994-96 harvest seasons, 4 states were approved to export cultivated ginseng only. Maine was approved to export cultivated ginseng in 1995 and 1996 only; North Dakota and Michigan in 1994-96 only; and Washington in 1996 only. North Dakota and Washington are outside the natural range of ginseng.

Table 6. U.S. Exports of Ginseng Root and Products Thereof (1990-1996)

Year	Ginseng Type	Volume (mt)	Declared Value (US\$ million)
1990	Wild	67	\$ 12.1
	Cultivated	1,003	70
1991	Wild	62	14.2
	Cultivated	593	62.4
1992	Wild	100	24.5
	Cultivated	764	81.2
1993	Wild	69	21.8
	Cultivated	737	59.2
1994	Wild	104	25.7
	Cultivated	977	50.2
1995	Wild	162	31.4
	Cultivated	552	16.7
1996	Wild	191	32
	Cultivated	673	33

Source: U.S. Department of Commerce; Bureau of the Census *U.S. Harvest*

At the time of preparation of this report, the Office of Scientific Authority (OSA) had prepared and submitted an internal written memorandum to the Office of Management Authority (OMA) approving the export of American ginseng for ginseng roots collected during the 1997 harvest season from the following 24 states: Alabama, Arkansas, Georgia, Illinois, Indiana, Iowa, Kentucky, Maine, Maryland, Michigan, Minnesota, Missouri, New York, North Carolina, North Dakota, Ohio, Oregon, Pennsylvania, Tennessee, Vermont, Virginia, Washington, West Virginia and Wisconsin. Maine, Michigan, North Dakota, Oregon, and Washington were approved to export cultivated ginseng only (USFWS/OSA in litt 1997).

#### *Wild Ginseng Harvest*

Indiana, Kentucky, North Carolina, Ohio, Tennessee, Virginia, and West Virginia have been approved for the export of wild ginseng since 1982-83, with the partial exception of Tennessee, which was approved to export only cultivated ginseng in 1984. These states are the top producers of wild ginseng (Figures 3-10), with Kentucky reporting over a 16-year period (1981-1996) an average harvest of 22,600 lb (10,200 kg), followed by West Virginia at 20,980 lb (9,500 kg), Tennessee at 17,000 lb (7,700 kg), Virginia at 12,230 lb (5,500 kg), Indiana at 11,060 lb (5,000 kg), Ohio at 9,230 lb (4,200 kg), and North Carolina at 7,140 lb (3,200 kg). Other important producers of wild ginseng include Illinois, Arkansas, Wisconsin, Missouri, Pennsylvania, New

York, Minnesota, Iowa, and Alabama. States producing wild ginseng in relatively small volumes—less than 1,000 pounds (454 kg) annually—are Maryland, Georgia, and Vermont.

The amount of ginseng "harvested" is a reflection of ginseng sold to registered dealers who report sales to states, and does not take into account roots harvested and sold to unregistered dealers who do not report transactions to states. Ginseng purchased by unregistered dealers cannot be exported from the United States. Furthermore, states have various limits on sale of ginseng outside of the state.

Table 7. U.S. Imports of Ginseng Root and Products Thereof (1990-1996)

Year	Ginseng Type	Volume (mt)	Declared Value (US\$ million)
1990	Wild	6	5.83
	Cultivated	223	8.6
1991	Wild	13	.45
	Cultivated	315	9.3
1992	Wild	14	.42
	Cultivated	428	10.4
1993	Wild	28	.36
	Cultivated	497	8.6
1994	Wild	28	.32
	Cultivated	497	6.7
1995	Wild	100	.60
	Cultivated	405	10
1996	Wild	130	.81
	Cultivated	456	10.7

Source: U.S. Department of Commerce; Bureau of the Census *U.S. Harvest*

There is an active interstate trade among ginseng dealers. The number of wild ginseng diggers who are residents of states authorized to export ginseng ranges from an estimated low of 100 in Vermont to a high of 12,000 in West Virginia, and the number of registered ginseng dealers ranges from a low of 4 in Arkansas to a high of 120 in Kentucky. There are diggers who try to maximize their return from sales of ginseng by waiting for the price of ginseng to peak before selling, while others will sell ginseng regardless of market fluctuations. Diggers not interested in predicting market trends typically sell freshly dug wild roots promptly, in order to sell them at their heaviest weight (the roots lose water over time and become lighter). Recently, there has been

reported a growing demand by a few of the larger U.S. dealers for freshly dug wild roots (Pritts pers. comm. 1997).

The price a digger receives for a pound of wild ginseng root depends on the market, the buyer, and the appearance of the roots (size, shape, color, texture, etc.). In general, a pound of wild ginseng is worth around US\$300 (CA\$434) at the dealer level, with diggers making US\$50-250/lb (US\$110-551/kg; CA\$159-796/kg) (Olson 1997). Prices of ginseng have been reported as high as US\$500/lb (US\$1,102/kg; CA\$1,593/kg) and as low as US\$250/lb (US\$551/kg; CA\$796/kg) in recent years. It is a common practice for large U.S. exporters to provide dealers with cash advances ranging from US\$50,000 to US\$100,000 (CA\$72,260 to CA\$144,520) to help float dealer purchases of wild ginseng from diggers during the harvest season. Wild ginseng purchased by dealers from diggers (or other dealers) is shipped to the exporter who pays the dealer upon receipt of roots. The balance of the cash advance is either returned to the exporter at the end of the harvest season or depleted by purchasing roots (USFWS 1994b). Most dealers who buy ginseng directly from diggers will try to make a 15 to 20 percent profit from the resale, whether it be to another dealer, a domestic wholesaler, or an exporter (Pritts pers. comm. 1997). Ginseng may be bought and sold several times among dealers before it is exported from the country.

At least 10 states reported importing ginseng from other states sometime between harvest years 1989 and 1995. Indiana imported ginseng from other states every year from 1989 to 1995: from Alabama and Illinois from 1989 to 1995; from Kentucky in 1989, 1991, and 1993-95; and sporadically from Iowa, Minnesota, Tennessee, Missouri, West Virginia, and Virginia from 1989 to 1995. Ohio has also been a frequent importer, and reportedly imported ginseng from Illinois, Indiana, Kentucky, and Tennessee every year from 1989 to 1995, with the exception of 1993. Other states importing ginseng sometime between 1989 and 1995 include Tennessee (1989, 1993, 1994), Wisconsin (1989, 1993, 1991), Pennsylvania (1989, 1995), Illinois (1990, 1991), New York (1990, 1991), Missouri (1992), Virginia (1989), and West Virginia (1990).

Wisconsin, a major U.S. redistribution and processing center for ginseng, imported approximately 40,000 lb (18 mt) of wild ginseng from out of state in 1996, making it one of the largest ginseng-importing states that year. Much of the wild ginseng imported into Wisconsin is "reexported" to East Asia or processed and redistributed to domestic Asian markets.

Figure 3

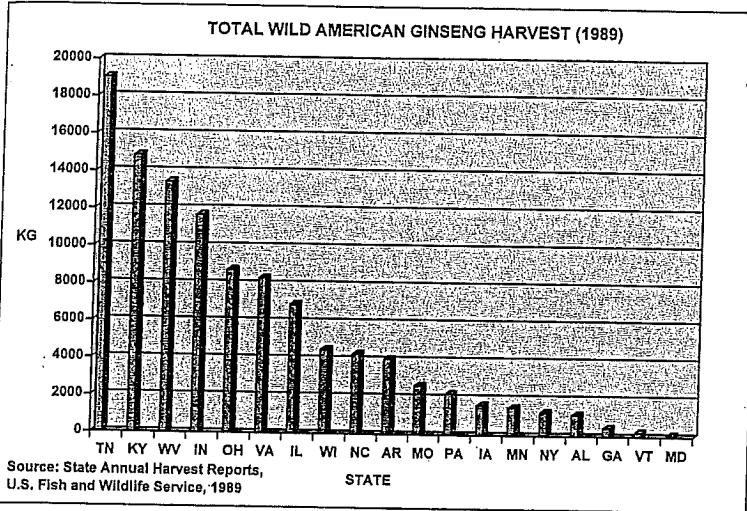


Figure 4

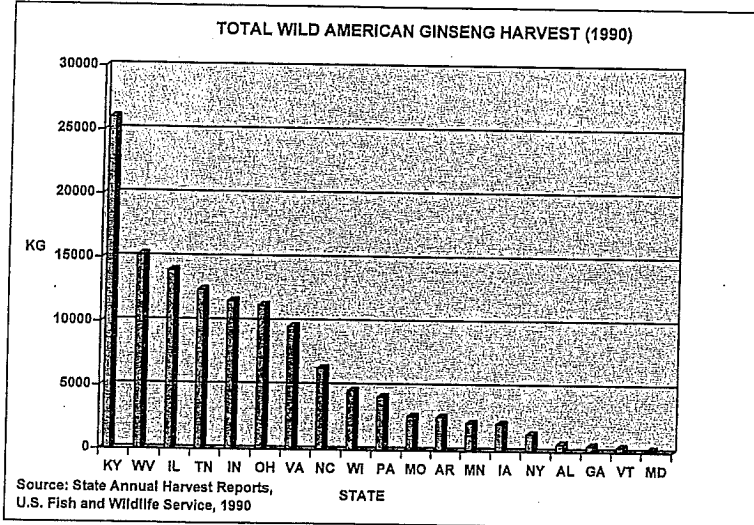




Figure 5

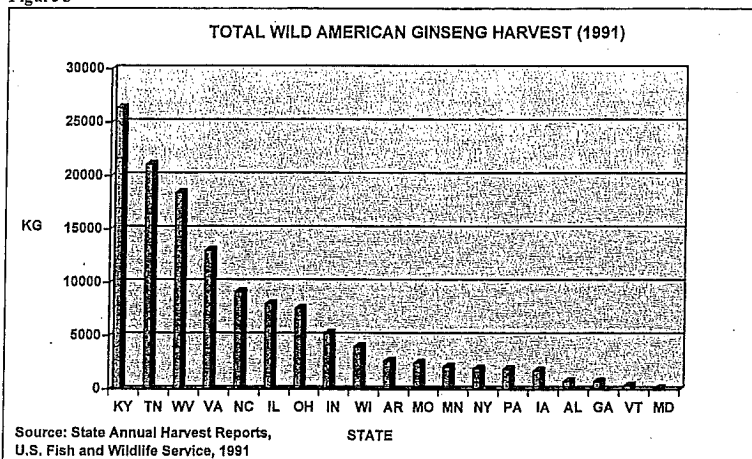


Figure 6

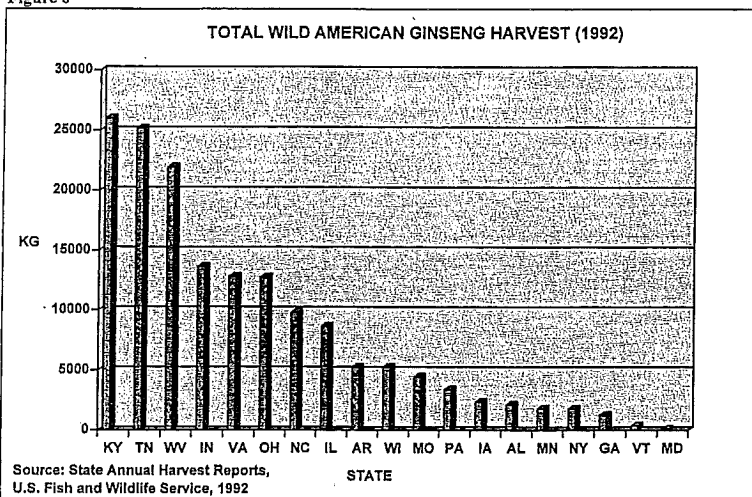


Figure 7

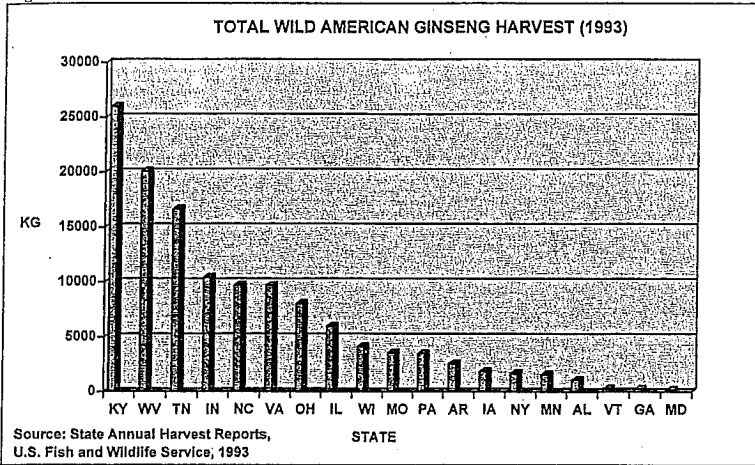


Figure 8

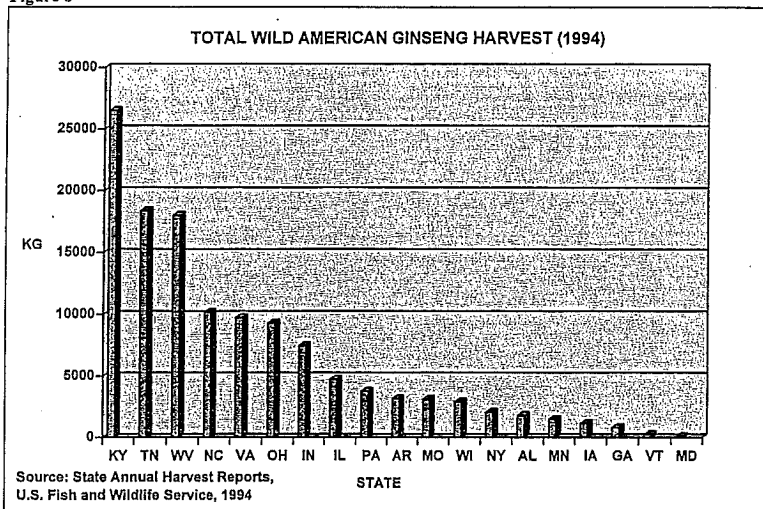


Figure 9

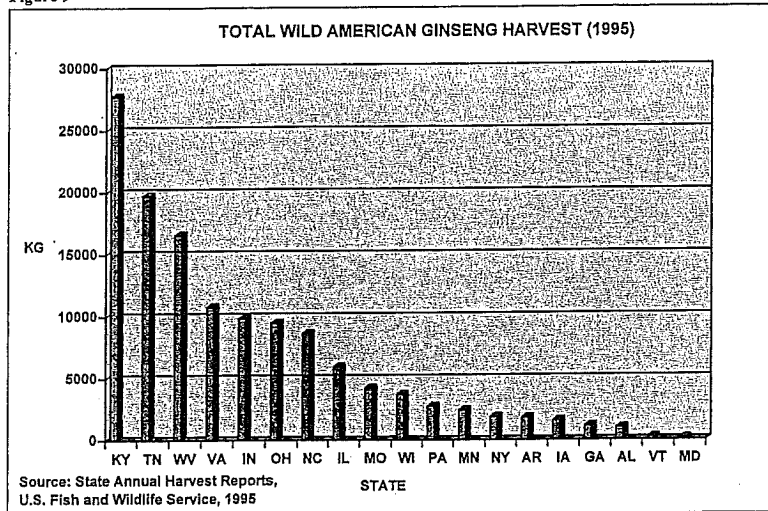
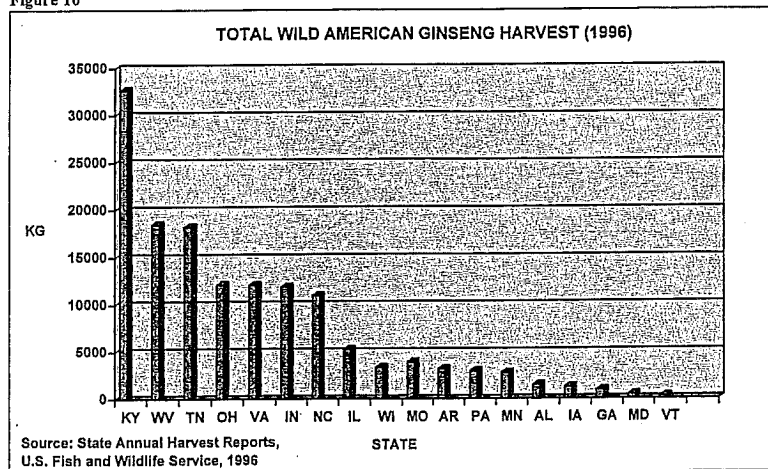


Figure 10



#### *Ginseng Collection in U.S. National Forests*

The U.S. Forest Service (USFS) issues "special use" permits for the collection of non-timber forest products (NTFP) such as aromatics, berries and wild fruits, charcoal, cones and seeds, mosses, lichens, mushrooms, and a wide array of marketable forest botanicals (used for flavorings, medicinals, and pharmaceuticals) growing wild in national forests (Schumann and Thomas 1993). As timber concessions are scaled back in the United States, communities traditionally dependent on logging are turning to other forest industries, including NTFPs, to offset the loss in revenue from timber sales. In rural areas, the number of NTFP collectors tends to increase during periods of economic stagnation. *Panax quinquefolius* is a high-value NTFP that is collected seasonally by root diggers in eastern national forests to supplement annual income, particularly when unemployment is high (Tate pers. comm. 1997).

A permit issued by the appropriate USFS extension or field office is required prior to the collection of ginseng in national forests. The USFS designates harvest seasons and issues permits, but generally does not monitor or regulate the harvest. Permits usually do not restrict the amount of ginseng gathered, nor require collectors to report the amount collected. Therefore, it is difficult to quantify the impacts of harvest on wild populations in national forests. Only the number of permits issued by USFS is recorded and available for analysis.

An examination of USFS permit data indicates that the level of harvest may be increasing. The number of permits issued for the harvest of *P. quinquefolius* on national forest land in Indiana, North Carolina, and Tennessee increased steadily from 1993 to 1996 (table 8). In Virginia and West Virginia, the number of permits issued from 1993 to 1995 remained fairly constant, but increased in 1996. As *P. quinquefolius* collection appears to be rising considerably in some forests, USFS officials are considering measures that would result in greater protection for the species. For instance, authorities at Indiana's Hoosier National Forest, where permits issued for unlimited collection of *P. quinquefolius* increased from 176 in 1993 to 519 in 1996, are considering not issuing permits for *P. quinquefolius* in 1998 or raising the permit fee from US\$10 to US\$50 (CA\$14 to CA\$72) for diggers (Olson pers. comm. 1997).

The removal without a permit of animals, plants, and minerals from national parks is strictly prohibited. Nevertheless, in some parks, particularly the Shenandoah and Great Smoky Mountains national parks, the illicit harvest of ginseng is believed to be one of the biggest threats to the species. Despite stepped-up efforts to deter poachers by marking roots in the ground with a bright orange dye, the number of seizures of illegally removed ginseng remains high. Great Smoky Mountains National Park officials seized 734 ginseng roots from poachers in 1991; 358 in 1992; 2,668 in 1993; 1,263 in 1994; 1,524 in 1995; and 1,259 in 1996 (Rock 1997).

Table 8. Permits Issued for *Panax quinquefolius* Collection in U.S. National Forests<sup>4</sup>

STATE <sup>5</sup>	NATIONAL FOREST ACREAGE IN STATE	TIME PERIOD/ YEAR	NUMBER OF PERMITS ISSUED
Arkansas	2,961,951	1992	380
		1994	577
Georgia	864,991	1992	7
		1994	10
		1996	6
Indiana	194,265	1993	176
		1994	212
		1995	249
		1996	519
Kentucky	690,987	1995	151
		1996	200
Missouri	1,000,000	-	Limited
North Carolina	1,243,115	1993	401
		1994	440
		1995	538
		1996	518
		1997	950
Ohio	219,000	1995	276
Tennessee	633,000	1993	85
		1994	86
		1995	128
		1996	139

<sup>4</sup> For additional information on ginseng in specific national forests, refer to Appendix 2.

<sup>5</sup> In recent years, no permits have been issued by the U.S. Forest Service for *P. quinquefolius* collection in national forests in Alabama (959,848 acres), Illinois (260,000 acres), Michigan (2,838,012 acres), Minnesota (2,827,150 acres), Mississippi (1,100,000 acres), New Hampshire (773,903 acres), Pennsylvania (513,161 acres), South Carolina (600,663 acres), Vermont (370,000 acres), or Wisconsin (1,519,793 acres).

Table 8. (cont.) Permits Issued for *Panax quinquefolius* Collection in U.S. National Forests

STATE	NATIONAL FOREST ACREAGE IN STATE	TIME PERIOD/ YEAR	NUMBER OF PERMITS ISSUED
Virginia	1,900,000	1993	224
		1994	99
		1995	95
		1996	196
West Virginia	964,970	1993	67
		1994	45
		1995	62
		1996	72

#### *Cultivated Ginseng Production*

From 1700 to 1900, prior to the establishment of commercial *P. quinquefolius* cultivation, virtually all ginseng roots exported from the United States and Canada were of wild origin. In the United States, *P. quinquefolius* has been successfully cultivated since the early 1900s. A century ago, the United States Department of Agriculture recommended that farmers cultivate ginseng for supplemental income (Koehler 1912). Cultivated *P. quinquefolius* has become one of the most valuable medicinal plant cash crops in the United States. Initially, cultivated *P. quinquefolius* roots, owing to their clean, uniform appearance, fetched a higher price than wild roots (Carlson 1986). With time, however, the market-depressed price of wild *P. quinquefolius* root increased and is now easily ten times higher than that of cultivated root.

By the early 1900s, Indiana, Kentucky, Michigan, Minnesota, Ohio, Pennsylvania, and Wisconsin had successfully established ginseng cultivation. Owing to the persistence of early farmers, favorable growing conditions, and a cooperative growers association, Wisconsin has been able to maintain the most viable and competitive ginseng crop (Carlson 1986).

Wisconsin, home to at least 1,330 growers, is the largest commercial producer of cultivated ginseng in the United States (Phibbs in litt. 1997). Marathon County alone accounts for upwards of 95 percent of all cultivated ginseng produced in the United States today. The production of cultivated ginseng in Wisconsin has provided seasonal work for many women and teenagers who are hired as laborers in summer months to pull weeds and operate mechanical harvesters (Carlson 1986). From 1989 to 1995, Wisconsin's harvest yielded between 1.3-1.9 million pounds (590-862 metric tons) of roots annually for a total harvest of more than 11 million pounds (5,000 metric tons). Under USFWS regulations, Wisconsin was approved to export wild and cultivated ginseng on a yearly basis between 1978 and 1981 and on a triennial basis beginning in 1982.

According to state harvest reports, ginseng is also grown commercially in an additional fifteen states which together produce more than 13,000 pounds (6 mt) of cultivated root annually, equaling less than one percent of Wisconsin's annual harvest. According to harvest reports, states that produced over 1,000 pounds (454 kg) of cultivated ginseng roots for commercial trade in 1995 include Tennessee (4,411 lb; 2 mt), Maryland (2,164 lb; 981 kg), Kentucky (1,234 lb; 560 kg), and New York (1,226 lb; 556 kg). Vermont was also a notable producer of cultivated ginseng and reportedly harvested 3,000-4,000 pounds (1.3-1.8 mt) of cultivated roots per year from 1989 to 1991. Ginseng has been planted in at least a dozen states outside of its natural range and has been successfully cultivated in California, Kansas, Oregon, and Washington; the latter two are producing ginseng commercially for export (USFWS 1994a).

An analysis of state annual harvest reports indicates that the production of cultivated roots has varied considerably from year to year in a few states. For instance, Illinois, which produced only a reported 39 lb (18 kg) in 1995 and 102 lb (46 kg) in 1994, increased production to 1,279 lb (580 kg) in 1993, 2,089 lb (947 kg) in 1992, 387 lb (176 kg) in 1991, and 6,526 lb (2.9 mt) in 1990. Another state whose production of cultivated roots has fluctuated is Georgia, where production went from a high of 1,060 lb (5.1 mt) in 1989, to 818 lb (371 kg) in 1990, to 307 lb (139 kg) in 1991, to 773 lb (351 kg) in 1992, to 286 lb (130 kg) in 1993, and to 199 lb (90 kg) in 1994.

#### **Recent Trends in Canadian Harvest and Commerce**

##### *Wild Ginseng*

Canada has not legally exported wild American ginseng since 1990. The export ban does not apply to the collection and use of wild ginseng within Canadian provinces (Haber 1990).

Data on the number of wild roots collected for domestic use in Canada are not available because neither federal nor provincial agencies compile such information. It is not known what portion of wild roots collected in Canada were exported versus consumed within the country before the 1990 ban. CITES export permits indicate that 302 pounds of dry wild root were exported from Ontario in 1979-80. According to a 1981 survey distributed to 58 diggers residing in Ontario, 29 diggers responded that the average yearly harvest was 5.1 pounds, which extrapolates to an annual harvest average of 296 pounds for all 58 diggers (Argus and White 1984). Wild ginseng roots have been documented for sale in Ontario, but it is not known whether domestic sale is contributing to the decline of wild populations.

The same 1981 survey indicated that the average weight of wild ginseng collected ranged from 0.5 lb (0.2 kg) to 25 lb (11.3 kg) (White 1988). About 75 percent of diggers surveyed indicated that they found the same or more ginseng in locales during their average 23 years of digging experience. Despite the purported constancy of harvest noted by the majority of diggers surveyed, the average number of roots per pound harvested in Ontario apparently increased from a historical high of nine roots per pound to an estimated 134 roots per pound by the mid-1980s (White 1988). The increase in the number of plants per pound suggests that there may have been a reduction in

larger, older plants and a preponderance of small, younger plants on which collectors were increasingly relying.

#### *Cultivated Ginseng*

Suitable habitat and climate for growing ginseng has led to a booming agricultural industry in Ontario, British Columbia, and to a lesser extent Québec (Charest pers. comm. 1996). Ginseng cultivation was first established in Canada in 1893 near Waterford of Haldimand/Norfolk County in southern Ontario. Today, this comprises one of the largest commercial ginseng growing areas in Canada. Seed stock for cultivated ginseng in Ontario has come from wild sources within the province, and from artificially propagated stock in Wisconsin (White 1988).

The amount of land in Ontario on which ginseng is cultivated has been divided into three categories: acres under cultivation (the total amount of land on which ginseng is currently being grown); acres seeded (the amount of land on which ginseng seeds have been exclusively planted); and acres harvested (the amount of land from which ginseng roots were harvested). Ontario had 5,585 acres of ginseng under cultivation in 1995 and its production of cultivated ginseng roots has increased steadily from 193 metric tons in 1991 to 743 metric tons in 1996 (table 9). From 1991 to 1994, between 40 and 60 percent of Ontario's production was reportedly exported (Clark 1996).

British Columbia, which is outside the natural range of ginseng, has been cultivating the species for commercial trade since the mid-1980s and now accounts for a significant portion of Canada's total production and exports (Charest pers. comm. 1996; Clark 1996). According to the British Columbia Ministry of Agriculture, currently British Columbia has a total of 3,067 acres under cultivation (table 9). British Columbia increased its commercial production of ginseng from 6 metric tons in 1986 to over 440 metric tons by 1995. Since 1993, between 30 and 50 percent of British Columbia's cultivated roots were exported (Clark 1996).

Canada's exports of cultivated roots increased dramatically after 1990 as a result of increased production in British Columbia and Ontario — from 278 metric tons in 1991, to 396 metric tons in 1992, to 445 metric tons in 1993, and to 625 metric tons in 1994. Between 75 and 90 percent of Canada's exports of cultivated roots were sent to Hong Kong during that period. China, Taiwan, Malaysia, Singapore, the United States, and Japan were the next most popular destinations for cultivated roots from Canada.



Table 9. Estimated Production of Cultivated Ginseng in Ontario and British Columbia, Canada (1988-1995)

PROVINCE	YEAR	ACRES UNDER CULTIVATION	SEEDED ACRES	HARVEST ACRES	PRODUCTION	
					Pounds	Metric Tons
ONTARIO	1988	-	522	-	-	-
	1989	-	622	-	-	-
	1990	-	900	-	-	-
	1991	965	1,100	283	425	193
	1992	2,122	1,500	343	750	340
	1993	3,365	1,700	457	913	414
	1994	4,565	1,800	600	1,200	544
	1995	5,585	1,800	780	1,638	743
BRITISH COLUMBIA	1988	195	84	11	29	13
	1989	350	178	23	62	28
	1990	549	235	36	101	46
	1991	822	325	52	151	69
	1992	1,238	500	84	252	114
	1993	1,827	767	178	534	242
	1994	2,492	900	235	705	320
	1995	3,067	900	325	975	442

Source:

Ontario data: Charest, N. 1996. Estimates compiled by Harvey Clark, Saskatchewan Irrigation Development Centre, January 1996. In litt. to C. Robbins, TRAFFIC North America. December 9, 1996.

British Columbia data: Charest, N. 1996. Data provided by British Columbia Ministry of Agriculture, Fisheries and Food; Statistics Canada, International Trade Division; Agricultural Canada, Marketing and Industry Services Branch. In litt. to C. Robbins, TRAFFIC North America. December 9, 1997.

## VI. REGULATION AND MANAGEMENT

### Overview: United States

According to CITES, a permit for the export of American ginseng from the United States may be issued only after the CITES scientific authority has determined that the export of ginseng will not be detrimental to the survival of the species (Art. IV 2(a)). The Office of Scientific Authority (OSA) within the U.S. Fish and Wildlife Service (USFWS) determines whether export of ginseng is detrimental to the survival of the species in the United States. Together with OSA's "non-detriment" finding and confirmation from the Office of Management Authority (OMA) that state certification has provided OMA with reasonable assurance that the ginseng was legally acquired, USFWS approves the export of ginseng on a state-by-state basis.

USFWS has regulated the exportation of American ginseng since 1975, but has been approving U.S. exports in three-year increments since 1982. Before states are approved (or re-approved) to export ginseng for the next three-year period, USFWS publishes a notice (proposed rule) in the *Federal Register*<sup>6</sup> announcing the variety and types of data and information the states can provide so USFWS can determine detriment. The notice also contains a list of states that USFWS has tentatively approved to export ginseng for the next three years.

The USFWS published a proposed rule reapproving qualifying states for the export of wild and/or cultivated American ginseng harvested from 1994 to 1996 (in the *Federal Register*, September 26, 1994). Tentative export approval was based on the opinion of USFWS that states from which ginseng export had previously been approved were likely to continue satisfying CITES requirements (USFWS 1994a). In actuality, however, USFWS did not approve the export of ginseng for the entire 1994-96 period, but approved exports annually, giving federal officials an opportunity to review state ginseng programs more closely each year (DOI 1996, Dane pers. comm. 1997).

Although USFWS must determine whether ginseng exports are in compliance with CITES requirements, the conservation and management of wild ginseng falls constitutionally under the authority of the states. In order to comply with CITES, USFWS has established a ginseng management program under which states agree to submit to USFWS annual reports on ginseng biology, harvest, regulation, and commercial transactions. Under the USFWS rule, states are expected to submit these reports by May 31. These reports are used by OSA and OMA to evaluate individual state ginseng programs, monitor harvest levels, assess impacts of harvest on wild populations, and ultimately determine whether states should be approved or reapproved for ginseng export.

---

<sup>6</sup> The *Federal Register* is a U.S. government publication that announces public regulations and legal notices issued by federal agencies.

### **U.S. State and Federal Procedural and Permitting Requirements for Exporting Ginseng**

In order for a state to be allowed to export ginseng under USFWS regulations, state government personnel must inspect and certify wild-harvested ginseng. Under the certification process, dealers typically take wild (dry or green) ginseng roots to the appropriate state agency office for inspection, weighing, and validation. Some states allow state officials to conduct inspections and certify ginseng on a dealer's premises. At the time of certification, inspectors may check the dealer's transaction records to verify that the amount of ginseng being certified corresponds with the amount of ginseng originally purchased by the dealer from harvesters or other dealers. Inspectors certify ginseng roots by issuing a state certificate of origin or, if the dealer has not sold the ginseng roots by March 31 of the year after harvest, the inspector may issue a state weight receipt that may be used to obtain a certificate in the future. Certificates of origin validate the ginseng intended for export by providing a "paper trail" that verifies the state in which the ginseng was harvested and the legality of harvest. Original certificates of origin must be presented to federal officials at the U.S. Department of Agriculture prior to ginseng export.

The USFWS has informed ginseng-exporting states that cultivated ginseng is exempt from state-conducted inspection and certification during sales. State-issued certificates may be filled out by registered growers and dealers directly, with copies submitted to state officials. This exemption is based on the vast difference in morphology and value between wild and cultivated ginseng, a difference that makes the substitution of wild for cultivated material reasonably unlikely (USFWS 1994a). The federal exemption does not preclude states from requiring the inspection of cultivated ginseng. Despite the exemption for on-site inspection of cultivated ginseng, states can and often do provide OSA annually with a list of counties in which ginseng is commercially cultivated and/or the total amount of cultivated roots produced in pounds and dry weight (USFWS 1994a).

In order for OMA to issue a CITES export permit for wild American ginseng, OSA must inform OMA that export will not be detrimental to the species' survival in the state being considered for export approval. Individuals exporting American ginseng from the United States are required to submit a completed Federal Fish and Wildlife License/Permit Application (Form 3-200-Ginseng) to OMA at least 45 days prior to the anticipated date of exportation. In addition, the exporter must have the original state certificates of origin verifying that the wild ginseng was acquired lawfully from a USFWS-approved state and that it was collected during that state's legal harvest season. The permits are valid for six months and, generally, for multiple exports (USFWS 1995).

CITES does not require a non-detriment finding for artificially propagated ginseng, but stipulates that the cultivated parental stock must be established in a manner not detrimental to the survival of the species in the wild. As with the exports of wild ginseng roots, for the export of cultivated ginseng there are administrative steps that must be followed to obtain a CITES export certificate of artificial propagation, which is valid for two years. American ginseng imported legally into the United States for reexport requires a CITES reexport permit, which exporters can obtain from OMA by submitting an application. The CITES export documents issued by a foreign

country (e.g., Canada) that are used to import ginseng into the United States must be presented upon reexport in lieu of the U.S. individual state certificates of origin.

Five U.S. ports are specifically designated for the import, export, or reexport of American ginseng: Atlanta, Georgia; Baltimore, Maryland; Chicago, Illinois; Milwaukee, Wisconsin; and St. Louis, Missouri. Sixteen additional U.S. ports are designated for CITES-listed plant material and may be used for the import, export, or reexport of ginseng. Prior to export, each shipment of ginseng is to be inspected and approved by a port inspector of the United States Department of Agriculture's (USDA) Division of Plant Protection and Quarantine (PPQ), which is a division of the Animal and Plant Health Inspection Service (APHIS). USDA implements and enforces CITES border controls for plants, with this responsibility delegated to APHIS.

PPQ inspectors carry out a physical inspection of all commercial and noncommercial exports and reexports of wild and cultivated American ginseng. An inspector checks the weights, numbers, and type of each ginseng shipment being exported against copies of the documentation that must accompany each commercial export of American ginseng: 1) original State Certificates of Origin (or foreign export documents for reexport); 2) three completed CITES export documents issued by OMA; 3) one completed export report; 4) one shipper's invoice; and 5) a general permit from USDA. Shipper's invoices and a USDA general permit or PPQ form 621 are generally not necessary for noncommercial U.S. exports and reexports of ginseng. If satisfied that all requirements have been fulfilled, the port inspector will stamp, sign, and date the CITES documents to validate them for export (USFWS 1994a).

#### **Overview: Canada**

Even though wild ginseng may not be collected for export in Canada, Ontario and British Columbia are leading Canadian suppliers and exporters of artificially propagated ginseng in North America.

Artificially propagated ginseng harvested in and exported from Canada, with the exception of Québec, requires a CITES export permit from the Canadian Wildlife Service, Environment Canada, which is Canada's CITES Management Authority, located in Ottawa, Ontario. If ginseng is being exported from Québec, a permit must be obtained from the Ministère de l'Environnement et de la Faune in Québec. An export permit is issued only after an application for a CITES Multiple-Use permit has been completed and submitted to the appropriate agency.

Individuals applying for a CITES Multiple-Use permit are required to provide contact information on the growers or exporters with whom they are dealing, a brief description of the techniques or facilities used in the artificial propagation of ginseng intended for export, estimated number of shipments per year, estimated volume of ginseng to be exported per year, description of specimens to be exported (e.g., live plants, roots), and countries of destination. Before leaving the country, ginseng consignments must be accompanied by a photocopy of the CITES Multiple-Use permit that has been stamped and validated by Customs Canada.

### Review of the U.S. Federal-State Ginseng Program

TRAFFIC undertook a preliminary analysis of the criteria used by OSA in making its "non-detriment" findings and sought to assess whether states are supplying information sufficient to make those findings. The following analysis is based upon various discussions with federal officials who administer the ginseng program for OSA and OMA at USFWS, state program coordinators, a review of state annual harvest reports, and copies of correspondence between the states and USFWS. A review and analysis of these sources was useful in identifying benefits, deficiencies, or problems in the implementation, administration, and enforcement of state ginseng management programs.

### OSA Criteria for Export Approval and State Supporting Information

As announced in the September 1994 *Federal Register* notice, OSA evaluates a state's ginseng program to determine whether export of *P. quinquefolius* from a state will or will not be detrimental to the survival of the species by using the following criteria:

- *Whether numbers or distribution of ginseng in the state had been appreciably reduced due to past export;*
- *Whether export has, or is expected to increase, decrease, or remain constant in the state; and*
- *Whether present or proposed levels of export would be detrimental to ginseng and/or other species within the ecosystem in the state.*

In order to reaffirm their individual ginseng programs and be approved for exporting as also indicated in *Federal Register*, states were asked to provide OSA with information to help the agency make its determination about export approval. As outlined below, states were asked to submit the following information and data for 1994, 1995, and 1996 harvest seasons by May 31 of 1995, 1996, and 1997, respectively.

- Historic distribution of ginseng;
- Location of statute-protected lands in state where ginseng occurs and collection is prohibited;
- Approximate acreage of statute-protected lands in state where ginseng occurs and collection is prohibited;
- Abundance of ginseng using USFWS scale (0=absent, 1=rare, 2=occasional, 3=frequent);
- Ginseng population density information using USFWS scale (1=sparse, 2=moderate, 3=dense);
- Harvest collecting intensity using USFWS scale (0=none, 1=light, 2=moderate, 3=heavy);
- Average number of roots per pound (dry weight) as purchased by dealers in areas where ginseng occurs naturally;

- Trends in wild ginseng populations (increasing, decreasing, stable, or being extirpated);
- Number of ginseng collectors in the state and whether they appear to be increasing, decreasing, or stabilizing;
- Regulations for annual ginseng harvest, including 1) harvest season, 2) minimum size of plants being collected, 3) whether seeds from collected plants must be replanted at site;
- Number of pounds (dry weight) of wild ginseng roots certified by the state;
- Growth trends in roots per pound (dry weight), indicating whether numbers are increasing, decreasing, or stabilizing;
- State-initiated research projects relating to ginseng's status;
- State's opinion as to whether the removal of wild ginseng in the state might have been adverse for the state's entire ginseng population;
- Counties cultivating ginseng commercially; and
- Dry weight of cultivated roots certified by the state for export.

#### **OMA Criteria for Export Approval and State Supporting Information**

In order to export ginseng, states are expected to meet the requirements of the Office of Management Authority (OMA) at USFWS in addition to those of OSA just discussed. OMA confirms that a state has implemented certain regulatory steps and mechanisms to control ginseng harvest and monitor intra- and interstate ginseng sales. Specifically, as outlined in the USFWS *Federal Register* notice dated September 26, 1994, OMA would like those states seeking approval or reapproval to export ginseng to implement the following regulatory and administrative measures:

- Ginseng laws and regulations mandating state licensing or registration of individuals involved in commercial transactions of ginseng grown or collected in that state;
- Assurance that ginseng dealers in the state are maintaining accurate and complete records of their commercial transactions and that these records, along with a dated statement, are reported to the state at least every 90 days (within 15 days of the end of each quarter) and a year-end accounting of all commercial ginseng transactions for the year;
- Assurance that ginseng dealer records disclose date of transaction, source of roots (wild or cultivated), form of roots at time of transaction (dried or fresh/green), total root weight or number of plants, state of origin of roots or plants, and identification numbers of state certificates used to ship ginseng from the state of origin (dealers are also required to supply on copies of commerce records forms the names and addresses of sellers or buyers of ginseng with whom they did business);

- An inspection and certification system to verify the legality of wild ginseng collected in the state (exemptions exist for the inspection of cultivated ginseng; refer to earlier discussion);
- Assurance that ginseng unsold by March 31 of the year after harvest is weighed by the state and the dealer, digger, or root owner is issued a weight receipt;
- Assurance that certificate of origin forms remain in state control until certification and that the forms disclose the following information:
  1. State of origin
  2. Serial number of certificate
  3. Dealer's state registration number
  4. Dealer's shipment number for that harvest season
  5. Year of harvest of ginseng being certified
  6. Source of roots or plants being certified (wild or cultivated)
  7. Form being certified (dried or fresh/green roots or live plants)
  8. Weight of roots or plants (or number of plants) separately expressed numerically and in writing
  9. Verification statement by state that ginseng was obtained legally
  10. Name and title of state certifying official
  11. Date of certification
  12. Signatures of both the dealer and the state official carrying out certification;
- Regulations that prohibit the export of uncertified ginseng from the state and require uncertified ginseng obtained by state-registered dealers to be returned to the state of origin within 30 calendar days for certification.

In addition to assurance that these regulatory and administrative measures are being implemented, OMA requests that states reaffirm by written notification the following information already on file at OMA:

- State ginseng laws and regulations;
- Season of ginseng harvest and commerce;
- State dealer, digger, and/or grower license or registration rules;
- Sample of licenses issued to ginseng dealers, diggers, growers, etc.;
- License or registration fees;
- Record maintenance and reporting requirements for dealers, diggers, or growers;

- Record maintenance and reporting requirements for dealers, diggers, or growers;
- Sample of current-year dealer certificates and reporting forms;
- Description of state certification system and controls to deter uncertified ginseng from leaving or entering the state;
- Names, addresses, and telephone and fax numbers of state officials overseeing the state's ginseng program.

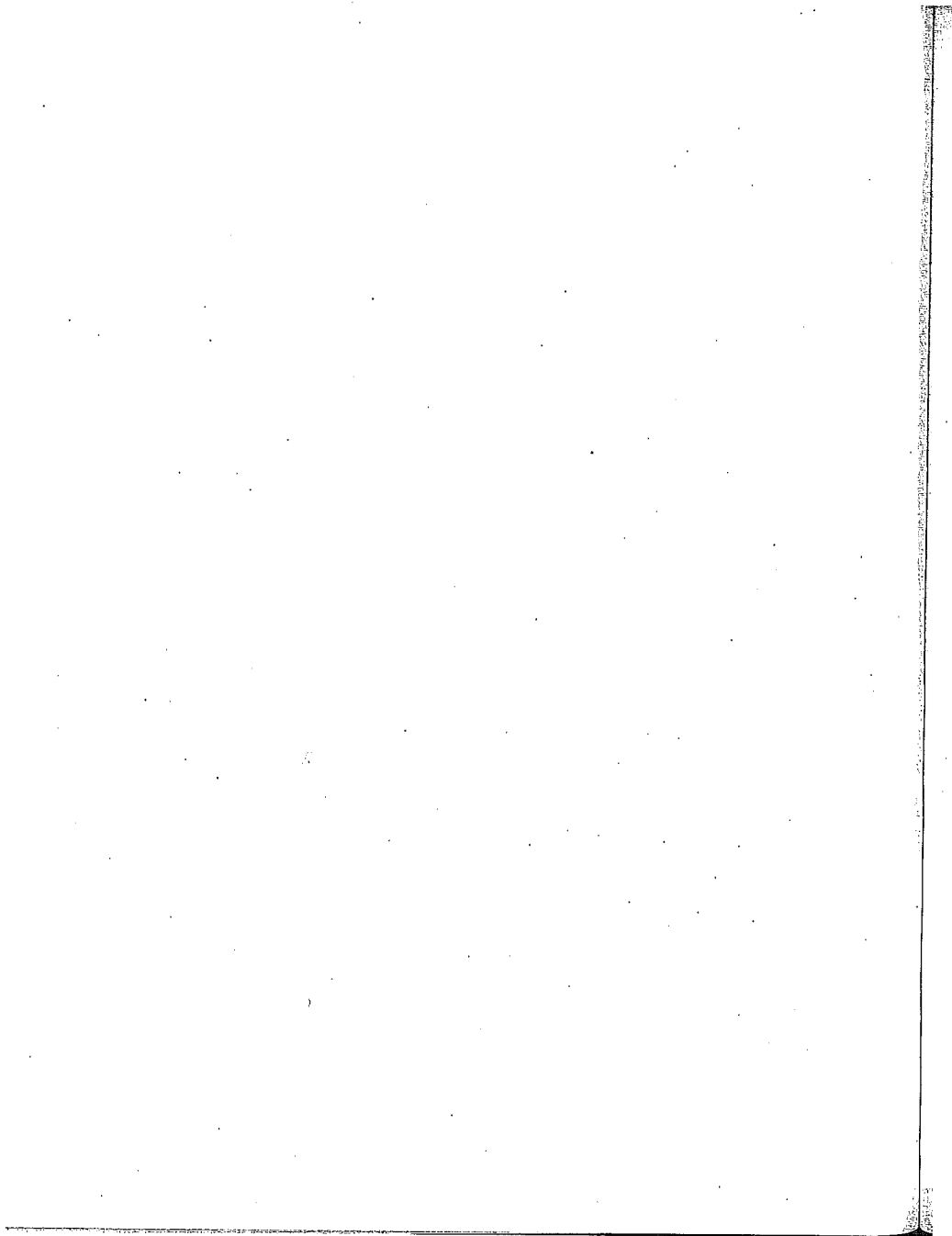
OMA requests that states submit the following information on an annual basis:

- Pounds of wild and cultivated ginseng roots and weight or number of live plants harvested and certified by the state as well as pounds of ginseng bought and sold from in-state and from out-of-state sources;
- Explanation of ginseng certification process for dealers not registered in the state and controls in place to regulate this type of commerce;
- Ginseng law enforcement procedures, violations reported, and solutions; and
- A sample of the current-year state certificate of legal take and origin.

OMA reviews the information summarized above on a state-by-state, year-by-year basis by distributing a standardized data sheet to states for completion and submission to OMA. Data sheets are intended to help states report information in a standardized form and are a practical way for OMA to obtain the information it needs to evaluate the regulatory and administrative status of state ginseng programs. Most states appear to be using the data sheets to report the number of ginseng violations and prosecutions to OMA annually. From 1989 to 1995, over 350 violations involving illicit ginseng harvest or commercialization were reported to USFWS by 13 states (Robbins 1997). Nearly half of these violations were reported by Indiana (Robbins 1997) and may be indicative of that state's, and/or USFWS', strong enforcement of regulations there or of other states' lack of enforcement.

In recent years, it appears several states have submitted OMA-issued data sheets in lieu of separate reports to OSA. While a few of OSA's requirements can be summarized and reported on OMA data sheets, these sheets are intended for OMA's informational requirements and do not adequately address OSA's needs.





## VII. DISCUSSION

### Program Accomplishments

In theory, annual state ginseng management program reports — as a prerequisite for exporting ginseng — should provide USFWS with the type of qualitative and quantitative information on ginseng biology, conservation, and harvest levels that is essential for assessing the status of ginseng and determining whether export restrictions are necessary. State annual program reports can contain useful information that enables USFWS to identify potential conservation problems resulting from unsustainable harvest. Consequently, the preparation of annual reports is not only beneficial from the perspective of federal administrators, but also provides states a reason to collect biological and harvest data for ginseng management. If not for the federal (and CITES) requirements, most states would not be obligated legislatively or administratively to establish a management plan for ginseng. Moreover, the requirement that states inspect and certify ginseng and implement harvest and trade regulations gives states an incentive to monitor intrastate ginseng trade. Formally, the establishment of a federal-state ginseng program has also prompted some states to adopt or strengthen legislation that enables them to prosecute harvest, trade, or transaction violations.

USFWS has made attempts to streamline the annual reporting process. For instance, OMA distributes standardized forms, known as data sheets, to states for convenient reporting of ginseng harvest data and general administrative information about their programs. Data sheets are used primarily by OMA for updating its files on states' annual harvests, changes in program administration or legislation, and the number of ginseng violations reported or prosecuted by the state. USFWS has also dropped the requirement that state officials inspect cultivated ginseng. The certification of cultivated ginseng is still mandatory, but may be done by registered dealers approved by the state. This modification is based on the fact that cultivated ginseng and wild ginseng vary greatly in appearance and value and the substitution of wild for cultivated ginseng or vice-versa is reasonably unlikely.

### Program Shortcomings

#### *Overview*

The inadequacies of the federal-state ginseng program range from misunderstandings over and disagreement with the interpretation of USFWS requirements to a lack of financial resources available to states to compile harvest and biological information required by USFWS. States have complained that although USFWS mandates state laws and legislation, the agency provides little assistance in enforcement of ginseng laws (USFWS 1994b). Some states believe that there is a lack of USFWS staff understanding of the difficulties states have in implementing rules designed to protect ginseng (Kearns in litt. 1997). TRAFFIC interviews found that states may not respond to OSA's requests for information or implement OMA's criteria because states believe the system is inefficient and does not adequately take into account some practical issues. By and large,

however, the greatest impediment to implementing USFWS requirements is the lack of funding available to states,

TRAFFIC reviewed 1995 state annual harvest reports to check the information submitted by states against the informational requirements of OSA, as summarized above. These reports should have been submitted to USFWS' central office in May 1996 for use in considering administrative modifications to the ginseng program and state export approval for the 1996 fall harvest season. TRAFFIC's review of 1995 state harvest reports was based on copies of reports obtained from USFWS through the Freedom of Information Act (FOIA). It is possible that TRAFFIC did not have all state reports, or sections of reports, for its analysis because USFWS may not have had them on file at the time of TRAFFIC's FOIA request or because, under the FOIA and Privacy Act regulations, USFWS may have withheld reports, or sections of reports, from TRAFFIC.

#### *Incomplete Reporting*

TRAFFIC's review of 1995 state harvest reports submitted to OSA reveals that many states' reports contained little of the information that OSA had asked states to submit for its evaluation of state ginseng programs. Some of the information submitted by states was also inconsistent and in places did not follow or conform to the parameters that OSA had developed to facilitate state reporting. The gap in information submitted to OSA raises questions about the ability of OSA to make a scientifically valid "non-detriment" finding (table 10). However, there may be little OSA can do to obtain much-needed state information on ginseng due to restrictions imposed by the U.S. Office of Management and Budget that limit the detail and types of information U.S. federal agencies can request from states.

According to USFWS, states need not submit biological and harvest information to USFWS if these data are unchanged from previous harvest seasons and already on file at USFWS. However, USFWS requests that states refer to and reaffirm the validity of this information in each annual report. Many state reports reviewed did not contain references to biological information that might previously have been submitted to USFWS. But nearly all states either indicated that relevant legislation was unchanged and already on file, or provided brief summaries of revised state statutes.

Most states submitted complete data on the amount of wild and cultivated ginseng harvested in 1995 and subsequently certified, but many states submitted incomplete data or no data at all on harvest specifics such as number of roots per pound by county and harvest intensity by county. Moreover, relatively few states submitted information on ginseng distribution, abundance and density. In instances where states did provide OSA with biological or demographic data, the information was dated.

Other reporting gaps for the year included the lack of information on trends in wild ginseng populations, roots per pound, and the number of ginseng collectors in the state. The latter informational requirement may be difficult for some states to fulfill because the states may not require ginseng collectors to obtain licenses or permits and so would not have collectors' records

on file. For instance, Pennsylvania does not require the licensing of diggers unless they are involved in the resale of ginseng, which places them in the category of "dealer." And while Wisconsin requires each in-state and out-of-state ginseng digger to obtain a license and could provide this information to OSA, it has done so infrequently (Anon. 1996).

States submitting incomplete information from the 1995 harvest season were contacted individually by OSA and asked to provide federal administrators with specific data upon which to assess states. Even though several states did not appear to provide the missing information, OSA reapproved the export of ginseng from these states if available harvest information did not suggest adverse effect or if state assessment efforts had been expanded.

When states do not or cannot gather the harvest and biological information needed by OSA, TRAFFIC believes that federal administrators cannot make a well-documented "non-detriment" finding. The causes of incomplete reporting need to be recognized so that gaps in information can be identified and addressed. TRAFFIC believes that incomplete or inadequate reporting is likely the result of a wide variety of interrelated factors but primarily can be attributed to a single, fundamental problem: lack of funding, which precludes states from collecting the necessary information for submission to USFWS. The funding issue aside, another legitimate explanation for deficient reporting may be states not understanding what to submit. As a federal agency, USFWS may publish notices about proposed changes to the ginseng program in the *Federal Register*. According to some state coordinators, *Federal Register* notices outlining changes in information requested by OSA can be verbose or esoteric. TRAFFIC, based upon its review of these notices, concurs. In addition, state coordinators note that they do not always receive copies of the relevant *Federal Register* notices and as a result proposed modifications to the program may inadvertently escape their attention. Federal and state officials note that the high turnover of state program coordinators is a recurring problem and contributes to a breakdown in communication between federal and state agencies.

Inadequate, incomplete, or delinquent reports may result when a state agency's fundamental mission is different from that of the ginseng program. For instance, some state management programs are administered by state agriculture departments; some by natural resource departments. The type of information on harvesters or dealers required by an agriculture department may be different from the type required by a natural resource department. The agriculture department may pay closer attention to the production of cultivated ginseng than to the harvest of wild ginseng, while the natural resource department is more concerned with the harvest, status, and conservation of wild plants. So the prioritization of specific ginseng program requirements may differ from one state agency to the next and could have a direct bearing on the usefulness of information compiled for and submitted to USFWS. Because state ginseng management agencies might interpret or implement USFWS's criteria differently, the information submitted to USFWS may be inconsistent and provide a distorted basis for the comparison of ginseng management from state to state.

**Table 10. Summary of State Responses to USFWS/OSA Request for Information as Reported in 1996 for the 1995 Harvest Season (Alabama - Minnesota)**

Indicators: A check indicates that the state provided the Office of Scientific Authority (OSA) at the U.S. Fish and Wildlife Service (USFWS) with the information requested in the proposed rule published in the *Federal Register* Vol. 39(183) dated September 26, 1994, or that the state reported the information had been previously submitted and remained valid. OSA uses the harvest and biological information submitted by states to determine whether export will be detrimental to the survival of ginseng. A star indicates that the state used a different index than USFWS scale.

SPECIFIC REQUEST FOR INFORMATION	STATE												
	AL	AR	GA	IL	IN	IA	KY	ME	MD	MI	MN		
on historic distribution		✓	✓										
on location of statute-protected lands in state where ginseng occurs and collection is prohibited		✓	✓		✓				✓				
on approximate acreage of statute-protected lands in state where ginseng occurs and collection is prohibited		✓	✓		✓								
on abundance of ginseng using USFWS scale (0=absent, 1=rare, 2=occasional, 3=frequent)		*			*		✓						
on ginseng population density using USFWS scale (1=sparse, 2=moderate, 3=dense)		*			*								
on ginseng harvest collecting intensity using USFWS scale (0=none, 1=light, 2=moderate, 3=heavy)					*			NA		NA			
on the average number of roots per pound (dry weight) as purchased by dealers in areas where ginseng occurs naturally		✓	✓					NA		NA			
on trends in wild ginseng populations: increasing, decreasing, stable, or being extirpated		✓	✓		✓								
on the number of ginseng collectors in the state and whether they appear to be increasing, decreasing, or stabilizing		✓	✓		✓			NA	✓	NA			

Table 10 (cont.) Summary of State Responses to USFWS/OSSA Request for Information as Reported in 1996 for the 1995 Harvest Season (Alabama - Minnesota)

SPECIFIC REQUEST FOR INFORMATION	AL	AR	GA	IL	IN	IA	KY	ME	MD	MI	MN
on state regulations for annual ginseng harvest, including:											
harvest season	✓	✓	✓	✓	✓	✓	✓	NA		✓	✓
minimum size of collected plant (e.g., 3-leaf minimum)		✓	✓		✓			NA		NA	
whether seeds from collected plants must be replanted at harvest sites	✓		✓	✓	✓	✓	✓	✓		NA	✓
on the number of pounds (dry weight) of ginseng roots certified by the state for export		✓	✓	✓	✓	✓		NA	✓	NA	✓
on growth trends in roots per pound (dry weight), indicating whether numbers are increasing, decreasing, or stabilizing		✓	✓					NA		NA	
on state-initiated research projects relating to ginseng's status		✓	✓		✓		✓				
on the state's opinion as to whether the removal of wild ginseng in the state might have been adverse for the state's entire ginseng population		✓	✓					NA		NA	
on which counties cultivate ginseng commercially		✓	✓		✓		✓	NA			
on how many pounds (dry weight) of cultivated ginseng root are certified by the state for export	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓

Table 10 (cont.) Summary of State Responses to USFWS/OSA Request for Information as Reported in 1996 for the 1995 Harvest Season (Missouri - Wisconsin)

SPECIFIC REQUEST FOR INFORMATION	MO	NY	NC	ND	OH	PA	IN	VT	VA	WV	WI
on historic distribution			✓								
on location of statute-protected lands in state where ginseng occurs and collection is prohibited			✓		✓						
on approximate acreage of statute-protected lands in state where ginseng occurs and collection is prohibited					✓						
on abundance of ginseng using USFWS scale (0=absent, 1=rare, 2=occasional, 3=frequent)			✓								
on ginseng population density using USFWS scale (1=sparse, 2=moderate, 3=dense)			✓		✓						
on ginseng harvest collecting intensity using USFWS scale (0=none, 1=light, 2=moderate, 3=heavy)			✓		✓						
on the average number of roots per pound (dry weight) as purchased by dealers in areas where ginseng occurs naturally			✓								
on trends in wild ginseng populations: increasing, decreasing, stable, or being extirpated			✓		✓						
on the number of ginseng collectors in the state and whether they appear to be increasing, decreasing, or stabilizing			✓		✓						

Table 10 (cont.) Summary of State Responses to USFWS/OESA Request for Information as Reported in 1996 for the 1995 Harvest Season (Missouri - Wisconsin)

SPECIFIC REQUEST FOR INFORMATION	MO	NY	NC	ND	OH	PA	TN	VJ	VA	WV	WI
on state regulations for annual ginseng harvest, including:											
harvest season	✓		✓		✓	✓	✓	✓	✓	✓	✓
minimum size of collected plant (e.g., 3-leaf minimum)					✓			✓			
whether seeds from collected plants must be replanted at harvest sites			✓		✓	✓	✓	✓		✓	✓
on the number of pounds (dry weight) of ginseng roots certified by the state for export	✓		✓		✓	✓	✓	✓	✓	✓	✓
on growth trends in roots per pound (dry weight), indicating whether numbers are increasing, decreasing, or stabilizing			✓		✓			✓			
on state-initiated research projects relating to ginseng's status			✓		✓						✓
on the state's opinion as to whether the removal of wild ginseng in the state might have been adverse for the state's entire ginseng population			✓		✓						✓
on which counties cultivate ginseng commercially			✓		✓						
on how many pounds (dry weight) of cultivated ginseng root are certified by the state for export	✓		✓		✓	✓	✓	✓	✓	✓	✓

NA - Not Applicable; Maine and Michigan were approved for export of cultivated ginseng roots only.



### *Population Estimates*

The number of roots per pound by county that are recorded by dealers at the time of purchase can be used as a measure of a local population's age structure and status. While states are requested to submit this data to USFWS annually, very few 1996 state reports provided county-by-county information on the number of roots per pound. This data is typically gathered when roots are inspected and certified by state officials. However, obtaining an accurate measurement is difficult because dealers, who are required to maintain records of their transactions with diggers, almost always combine roots bought from different counties and states. Moreover, it is unknown whether the ginseng sold to dealers is reported by the county in which the ginseng was actually collected or by the county in which the digger is a resident. If it is the latter, reporting may not be a reflection of where harvest occurred.

Many states submitted statewide harvest totals or a statewide average number of roots per pound as an indicator of population status. A few states used harvest weight data to determine the population status of wild ginseng. For example, Pennsylvania used "pounds harvested," which are really "pounds bought and sold," to estimate population status. This is not an adequate indicator. Using statewide harvest totals to measure the status of a state's ginseng population may not truly reflect the size of that population. Ginseng bought from out of state is often included in the total harvest reported by the importing state. As a result, harvest figures could skew state population estimates.

Indiana estimates the density of its wild populations based on the amount of ginseng that was certified in each county. Although a better representation of population status than the statewide harvest totals used by Pennsylvania, county harvest totals may also include ginseng purchases from other counties or even states. In addition to the lumping of roots, the time and location of collection and the randomness of the sample taken may influence the number of roots per pound.

Ohio notes the problem of "root lumping" in its 1996 report to USFWS:

"Diggers do not keep roots dug from different counties in different piles. Although most [diggers] only dig in one or two counties, when they sell that root to a dealer it is lumped together with roots purchased from other counties and previously even from roots purchased from out-of-state. Consequently, root counts taken during certification are notoriously meaningless on a county-by-county basis."

Out-of-state roots purchased by dealers have theoretically been certified in the originating state and are already accounted for when resold. However, roots bought and sold multiple times within a state could be reported (certified) in a different county from where they were harvested.

### *Confusing Standards*

A factor contributing to insufficient reporting may be state misinterpretation of or confusion over specific USFWS informational requests. In particular, OSA solicits information on ginseng abundance and distribution based on loosely defined indices. OSA ranks ginseng abundance as 0 = absent, 1 = rare, 2 = occasional, 3 = frequent. OSA ranks population density as 1 = sparse, 2 = moderate, 3 = dense. OSA ranks harvest intensity as 0 = none, 1 = light, 2 = moderate, 3 = heavy. However, the ranks are not based on specific numbers and states may interpret the classification system subjectively. Without specific parameters and definitions, states may have difficulty using the ranking system for its intended purpose or may use a self-prescribed system that takes into account the quality of data available to them. Furthermore, states simply do not have enough quantitative information on ginseng populations at their disposal to accurately rank ginseng abundance, population density, or harvest intensity. Pennsylvania's ginseng program coordinator indicated that diggers and foresters might be reliable sources of anecdotal information on ginseng populations, but the coordinator has lacked the resources and time needed to seek their assistance (Pritts pers. comm. 1997).

According to 1996 reports only three states—Kentucky, North Carolina, and Ohio—provided information on all parameters identified by OSA. Arkansas and Indiana used their own indices, which are slightly more detailed than the federal ones. In particular, they rank the abundance of ginseng on a county-by-county basis using a numeric scale. For instance, Indiana defines "very abundant" as 1,000's of plants per patch; "abundant" as 100's per patch; "common" as 50-100 per patch; "few" as 10-50 per patch; and "scarce" as 10 per patch. Arkansas measures abundance on a county-by-county level using the following scale: "very abundant," 1,000 plants/patch; "abundant," 100 plants/patch; "common," 50-100 plants/patch; "few," 10-50 plants/patch; and "scarce," 10 plants/patch. Neither state defines the size of a "patch." Indiana's information on ginseng abundance, which has not been updated since 1986, is based largely on field surveys carried out by the Department of Natural Resources and accounts from diggers and dealers. Indiana's harvest intensity is also based on specific numeric parameters: "very hard" >500 lb; "heavy" 100-500 lb; "moderate" 50-99 lb; "light" <50 lb, and "unknown," none reported. While Arkansas has created a scale to describe the relative frequency and population trends of ginseng, and plots the amount of wild ginseng harvested by county on a map, the state has not established a scale for gauging harvest intensity.

Although the OSA indices are designed to facilitate and simplify state reporting and OSA review, they do not encourage states to collect precise or absolute data. Lack of funding for field studies notwithstanding, legal restrictions limiting the detail of information that the U.S. government can require from states may ultimately determine the quantity and quality of information USFWS receives from states for evaluation.

#### *"Woodsgrown" Ginseng*

Yet another reason the amount of harvested wild ginseng reported to USFWS may be artificially high is that dealers in some states report cultivated "woodsgrown" ginseng as wild ginseng. "Woodsgrown" ginseng is generally defined as any plant raised using limited to intensive cultivation methods under a natural tree canopy in a forest setting (Pritts 1995). Owing to the similarity in appearance between woodsgrown and wild roots, dealers (naturally seeking the highest possible financial return from root sales) may report woodsgrown roots as wild in states where this is permitted. Even though USFWS regards woodsgrown ginseng roots as cultivated, and expects states to report it as such, dealers are allowed to report woodsgrown ginseng as wild in two states (Maryland and North Carolina) and possibly others. USFWS previously has expressed concerns about the use of the term "woodsgrown" in Georgia. A distinction between wild and woodsgrown roots should be made so that harvest figures reflect the amount of ginseng roots taken from wild versus cultivated sources.

#### *Harvest Seasons*

The ginseng harvest seasons designated by a few northern states may have negative impacts on wild populations. This statement is based largely on the results of a study conducted in Illinois, which demonstrated two occurrences: 1) that the maturation of *P. quinquefolius* fruit occurred sooner in southern Illinois (July 21) than in northern Illinois (August 12); and 2) that it took less time (37 days) for berries on plants at the southern site to reach maturity than for berries on plants at central sites (62 days) and northern sites (60 days) (Anderson in litt. 1998; Anderson et al. 1993). Earlier fruit maturation in southern Illinois could be influenced by phenological (e.g., weather-related) changes that occur earlier in the south than in the north (Anderson et al. 1993).

The conclusions drawn from the above study suggest that latitude might determine when *P. quinquefolius* fruit matures and the rate at which it matures (there is also anecdotal information indicating that elevation influences the growth of the berries). The earlier the harvest season—particularly in northern states, northern parts of states, or in states with ginseng populations at higher elevations—the less likely ginseng berries have matured and produced viable seeds for replanting.

So it would appear that in setting ginseng harvest seasons states should take into account not only length of time for fruit maturation or the date at which mature fruits are present, but also the date at which the maximum number of fruits have matured (Anderson in litt. 1998). The greater the number of mature fruits on plants at time of collection, the greater the potential for viable seeds for replanting. The seeds of mature, red berries are more prone to successful germination and adaptation to natural forest conditions.

Ohio and Pennsylvania, both of whose harvest seasons begin on August 1, and Indiana, whose harvest season begins August 15, are at the same latitude as Illinois. Kentucky and Maryland are slightly further south and have harvest seasons beginning on August 1 and 20, respectively (for the

location of U.S. states in which ginseng occurs naturally, refer to figure 11). These states have set harvest seasons allowing the collection of plants whose berries may not have ripened or may not have produced the maximum number of mature fruits, potentially compromising the viability of the seeds and long-term health of wild populations. States should also consider that there will be some year to year variation in the time at which phenological events occur, possibly resulting in early or late fruit maturation and seed development (Anderson in litt. 1998).

States should reevaluate their harvest seasons from a law enforcement standpoint as well as a biological one. Neighboring states might consider harmonizing harvest seasons to reduce the out-of-season take and sale of roots. For example, New York's program coordinator has expressed concern about pre-season harvest of wild roots—as Pennsylvania's season begins on August 1 and New York's on September 1, diggers may be digging roots in New York and offering them for sale to dealers in Pennsylvania (Schmid pers. comm. 1997).

There are also differences in harvest seasons set by states and the U.S. Forest Service (USFS). States establish ginseng harvest seasons for state and private lands, whereas the harvest season in federally managed national forests is set by USFS. For instance, USFS has established a digging season from September 15 to November 30 in Virginia's national forests while the state of Virginia permits collection on state lands from August 15 to December 31. The disparity between these designated harvest seasons may invite illegal collection in national forests before September 15 or after November 30. It is important that the harvest seasons set by USFS and those set by states be as consistent as possible so that out-of-season harvest and other regulatory problems are minimized. USFS is not a participating government agency in the federal-state ginseng program and is not obliged to follow USFWS rules established under the program.

#### *Certification and Inspection*

Certification is one of the most complex and contentious issues facing the ginseng program. Pursuant to CITES requirements, USFWS must be assured that ginseng has been legally acquired before granting export approval. Certification, administered by the states, is the system USFWS uses to provide reasonable assurance that the ginseng roots were legally acquired. The ability of a state to supply OMA the information it needs to verify legal acquisition is in turn dependent on a state's ability to ensure that all wild ginseng roots are inspected and certified by the state, dealers are registered with the state, dealers' records are accurate and submitted on time to the state, and state ginseng regulations are being implemented and enforced.

States raise valid concerns about the effectiveness of ginseng root certification. Opinions on the current system range from the view that it should be abolished or deregulated to the view that it should be retained. Skeptics wonder whether the certification "stamp of approval" is more a mere counting of roots than a proof that roots were legally acquired. With the possible exception of root size, there is no way a state inspector can tell whether a wild root was collected in accordance with the law (smaller roots are generally younger and the collection of roots under a certain age is

prohibited in most states). Dealers are in a better position to reject roots that have been collected and offered to them out of season, although industry self-certification is not always effective.

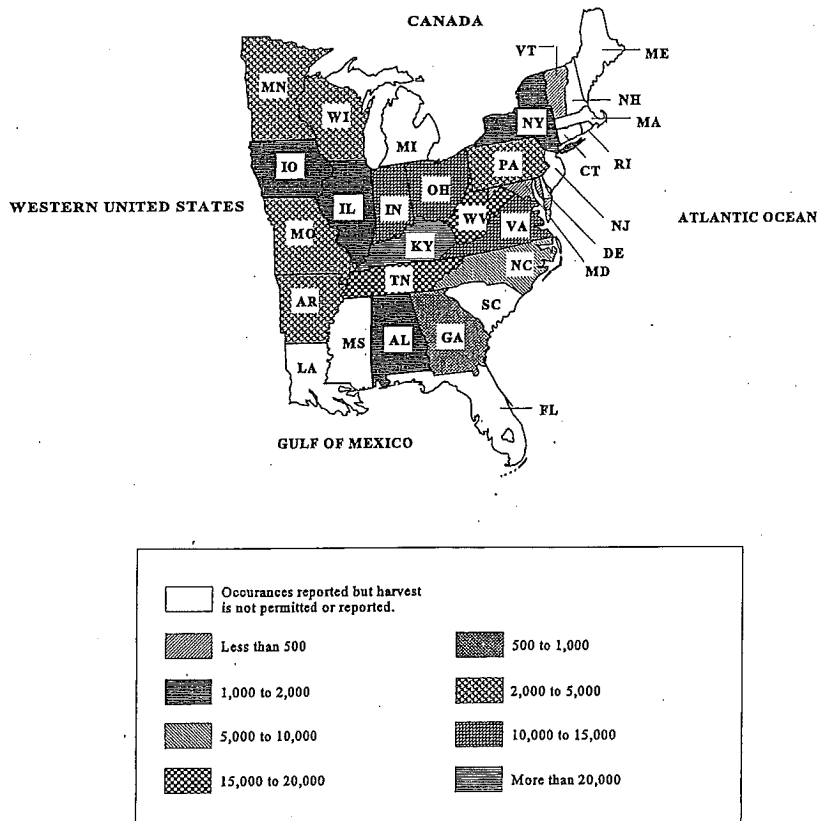
Wisconsin initiated a self-certification program designed to simplify certification by giving dealers the authority to certify wild roots. The program reduced the amount of time state officials and dealers allocated for wild ginseng certification and may have been more conducive to gathering reliable data. As they are one level less removed from state inspectors, registered dealers obtain more precise data on the number of roots per pound by county, which can be a useful proxy measure in assessing ginseng population status. However, self-certification was terminated by the state because the scheme did not conform with the USFWS rule requiring that certification be carried out by a state agency. New York's program coordinator indicates that dealer self-certification of wild roots could be successfully implemented in that state. About 90 percent of wild ginseng dug in New York is handled by four to six dealers, all of whom could be relied upon to certify wild roots (Schmid pers. comm. 1997).

While there is some merit in dealer self-certification, there is no guarantee that dealer self-certification would work in states where a great volume of roots is harvested and a higher potential for noncompliance exists. Virginia's program coordinator thought that certification was more or less performing its intended function and argued that dealer self-certification could result in greater complacency about adhering to state laws. Missouri's program coordinator was reticent about making *any* changes to certification because it would require an extensive reeducation campaign aimed at dealers who do not fully understand the present system. Missouri's coordinator also commented that less emphasis should be placed on streamlining or deregulating certification than on ensuring reliable data on the number of roots per pound collected. In other words, emphasis and energy should be on the collection of relevant, accurate data rather than the legal documentation (certification) of roots. If certification were modified or discontinued, coordinators in New York, Missouri, and Wisconsin agree that random spot checks carried out by state conservation officers would sufficiently deter dealers from fraudulent activity.

USFWS rules explicitly state that *all* wild ginseng must be inspected and certified by state officials, regardless of whether it is destined for export or for in-state consumption; nevertheless, state reports reveal that there is confusion regarding which roots should be certified. For instance, New York's program coordinator indicated that not all ginseng harvested and consumed in New York is certified (Schmid pers. comm. 1997).

Figure 11

U.S. Wild *P. quinquefolius* Harvest, Annual Averages 1990-1996 (pounds)



There appears to be an administrative inconsistency with respect to the certification of ginseng destined for states that are not participating in the ginseng program. States with ginseng programs are required to certify all ginseng harvested within their borders and must verify that ginseng imported from another state has been certified by the exporting state. However, states with programs cannot enforce the certification of ginseng destined for a state without a program because the latter does not require any documentation (e.g., certificate of origin) for ginseng from out of state. For instance, California, owing to its high concentration of health food companies, is a major domestic importer and processor of wild ginseng, but does not participate in the national ginseng program. Consequently, states that maintain programs cannot guarantee that ginseng exported to California is ever certified because California does not have a mechanism that requires uncertified ginseng to be returned to the originating state.

The present system for certifying wild ginseng can be very time-consuming for roving state inspectors and for dealers who sometimes must travel to distant inspection stations. While state inspectors weigh wild ginseng and check the weight against the transaction records of dealers, the extent to which inspectors actually weigh ginseng at the time of certification has been questioned (as dealers maintain precise weights of ginseng sales and purchases, inspectors may consider re-weighing unnecessary). Furthermore, some states may require only a sample of wild ginseng roots be brought to a station for inspection, and that sample may not be representative of a dealer's inventory (dealers often purchase wild ginseng from multiple counties and states and aggregate roots before inspection).

Many states hold that the inspection process for wild ginseng is overly administrative and time consuming for state inspectors and dealers (Dix 1996). The inspection of wild ginseng at the time of state certification is considered redundant because USDA/APHIS or state agricultural officials visually inspect all shipments prior to export from the United States or a state (Kearns in litt. 1997). Pennsylvania's ginseng program coordinator indicates that state inspection of roots is also redundant since ginseng is already weighed by the dealer at the time of purchase and inspections generally do not provide any additional useful information (Dix 1996). Virginia's ginseng program administrator reports that dealers consider the paperwork associated with the state's regulations unnecessary, but recognize the state's responsibility to assist USFWS in meeting CITES export requirements (Tate pers. comm. 1996). Wisconsin's coordinator also indicates that the USFWS rule is unreasonably burdensome to both the certifying agency and dealer (Pils in litt. 1996).

#### *Law Enforcement*

Comprehensive regulations and effective law enforcement are arguably the two most important elements in achieving compliance to a state's ginseng program. However, the enforcement of state ginseng laws can be complicated by at least six factors: 1) state ginseng management programs may be administered by divisions that have no law enforcement authority and no experts to investigate ginseng violations; 2) state laws lack uniformity, particularly in definitions of pertinent

phrases or words in regulations; 3) states may lack adequate financial resources and staff to effectively enforce laws and regulations; 4) rural communities may have collected ginseng for traditional medicine and subsistence for generations and may not view out-of-season take as unlawful nor report complaints of violations to the authorities; 5) prosecution of ginseng cases may be assigned low priority due to the light fines handed down in court; and 6) ginseng may be perceived as just another plant with little economic significance (USFWS 1994a).

This last factor—the misconception that ginseng is just another protected plant with inconsequential commercial value—may be why ginseng violations are not vigorously prosecuted. The financial benefits that individuals and states derive from ginseng sales are generally underappreciated in the judicial system.

Most ginseng violations are attributed to the unlawful collection, purchase, or sale of ginseng. The illegal collection of ginseng is likely to occur in the spring when plants flower and are easily identifiable, or in late summer just before the opening of harvest season. The sparse vegetative cover in spring makes the forest more accessible to collectors. The unlawful purchase of ginseng may involve any one of the following: 1) the purchase of ginseng harvested outside of lawful season; 2) the purchase of ginseng sold in violation of state law; 3) the purchase of ginseng by an unlicensed state dealer; or 4) the purchase of uncertified ginseng in interstate commerce (USFWS 1994a). The unlawful sale of ginseng may include any one of the following: 1) the sale of ginseng harvested outside of lawful season; 2) the sale of ginseng purchased or sold in violation of state law; or 3) the sale of uncertified ginseng in interstate commerce (USFWS 1994a).

State ginseng laws tend to be broken initially when a licensed dealer purchases ginseng from a harvester out-of-season. The dealer will subsequently unload the illegally purchased ginseng by 1) selling it to another dealer who relies on fictitious documents to obtain state export certificates; 2) using fraudulent state documents to obtain state export certificates and sell the ginseng in interstate commerce; or 3) selling the ginseng directly to Asian customers within the United States. Licensed dealers who have business relationships with exporters may commission unlicensed dealers to purchase ginseng roots illegally from harvesters. It is difficult to prove that unlicensed dealers have illegally purchased ginseng because they seldom maintain records of transactions and bank deposits and claim that cash advances from licensed dealers are used for the purchase of goldenseal, bloodroot, and other unregulated botanicals (USFWS 1994a). The illegal purchase of ginseng can sometimes be detected through dealers' transaction records showing large amounts of roots—20+ lbs (9+ kg) per season—sold by a single harvester (Kearns in litt. 1997).

There is an unknown quantity of uncertified ginseng being sold to owners of Asian herbal shops in New York, San Francisco, Los Angeles, and possibly other U.S. cities. A ginseng dealer may personally contact prospective Asian buyers in these cities and sell between 1 and 5 pounds (.45 to 2.2 kilograms) of ginseng to each buyer. These buyers purchase high quality wild roots and pay the dealer market price, usually in the form of a check which is cashed at the issuing bank before the seller leaves town (USFWS 1994a). Most of the Asian buyers are likely unaware of the



federal/state ginseng program and state requirements concerning export certificates. However, collectively they may purchase a large amount of uncertified wild ginseng in the United States.

Wisconsin's program coordinator has expressed concern about individuals who purportedly mail wild ginseng roots to their families and friends in Asia. There may also be a problem with ginseng leaving the United States in personal or household effects, which, depending on the quantity of roots in a traveler's possession, may be in violation of federal and state law. According to a 1994 USFWS investigation, small amounts of ginseng are routinely exported in personal baggage or small shipping containers to Korea (USFWS 1994a). Apparently, the purpose of this method of exportation is to gain a substantial profit from the sale of American ginseng in Korea or to aid family members in obtaining American ginseng at lower prices in Korea (USFWS 1994a). A small amount of wild ginseng root exported from the country via mail or in an individual's baggage cannot be easily documented or controlled and is not likely to be a commercial threat to the species. In fact, some states exempt from certification limited amounts of wild ginseng for noncommercial or personal use. Moreover, depending on the amount of ginseng exported, an individual may meet CITES personal effects exemption.

The collective and continuous impact of exporting small amounts of wild ginseng, however, poses a potential management concern and a regulatory problem over which regulators presently have little control.

## VIII. CONCLUSIONS

Probably the greatest underlying threat to *P. quinquefolius* is the loss of the species' habitat, which is increasingly affected by human activities. *P. quinquefolius* is vulnerable to over-collection for a variety of reasons. Although illegal in most states, collection of the plant in spring time, prior to seed production, removes potentially reproductive individuals from populations. Ginseng is a long-lived herbaceous perennial that is slow to reach reproductive maturity, a biological factor that undoubtedly curbs proliferation of the species. The ecological requirements of *P. quinquefolius* are not well understood and contribute to a lack of knowledge regarding species regeneration.

Given the commercial value of *P. quinquefolius* and signs of increasing interest in wild roots among collectors, it is critical that harvest and trade continue to be monitored, reported, and regulated to identify and avert potential conservation problems. A ginseng program that recognizes the biological and ecological limitations of the species and encourages sustainable harvest through a system of verifiable checks and balances with minimum burden to the responsible state agencies is the most constructive course of management for *P. quinquefolius*.

Although opinions vary, there is a general consensus among the states that the joint federal-state ginseng regulatory program is overly burdensome and is not yielding the quality of information USFWS needs to make a "non-detriment" finding. There are practical, legal, and budgetary constraints with which states are continuously faced that keep them from fulfilling their responsibilities under the program. Further, states believe that they are being asked to fulfill the federal government's commitment to CITES, but given no federal funding to carry out the task.

The federal-state ginseng program was indeed established to enable the U.S. government to satisfy CITES requirements. The program was designed to enlist states' cooperation in providing USFWS with information it needs to determine whether ginseng export should be approved. A number of gaps in the program raise questions as to whether ginseng export approval has been based on sound and complete information on the biological status of the species. Furthermore, the certification mechanism upon which USFWS relies to validate the legality of wild-collected ginseng is not foolproof and could be subject to misuse. The fundamental reasons for these gaps are discussed next, and recommendations are made on ways to clarify federal regulations, facilitate state reporting, and improve ginseng regulation, protection, and management.



## IX. RECOMMENDATIONS

### Recommendations for USFWS

#### *Certification*

Under the provisions of CITES, the USFWS must be assured that ginseng exported from the United States was legally acquired. Certification is the only existing mechanism that strives to ensure that wild roots were legally acquired and accurately documented. There is little doubt that some level of mechanism to document root harvest and sales is necessary for regulatory and management purposes, but the present certification system can be burdensome to states and therefore is of questionable use. There is also some degree of uncertainty regarding the usefulness of certification in collecting the data necessary to make a scientifically sound "non-detriment" finding.

Pursuant to the Clinton administration's "regulatory reinvention initiative" (Executive Order No. 12866 of September 30, 1993), USFWS might consider alternative mechanisms that perform the same function as certification but are more efficient and recognize the constraints states face. In reevaluating certification, USFWS should seek input from states on the strengths, benefits, shortcomings, and goals of certification and negotiate with states on a system that fulfills USFWS requirements to CITES yet is also acceptable to states. USFWS should take into account the following factors in its evaluation:

- In general, states and ginseng dealers maintain a cooperative relationship. Ginseng dealers rely on states to certify their roots. Similarly, states rely largely upon dealers for dependable information on ginseng harvest and commerce. Dealers function at a level of trade where certain types of data, such as number of roots per pound, could be collected more reliably.
- USFWS requires that all wild ginseng roots harvested be certified, regardless of whether they are consumed in the state of origin or exported. In actuality, however, some states may be certifying wild and cultivated roots destined for export out of the state or the country only; wild roots harvested for in-state consumption may be escaping certification, but may constitute a significant amount of the roots traded.
- Many states do not have the resources to establish enough inspection stations to accommodate all dealers and this may deter dealers from taking their roots to be certified.
- Any level of modification to the present certification system would involve reeducating dealers to conform to new rules or procedures.
- Many states, particularly Western states outside the natural range of *P. quinquefolius*, do not have a ginseng program but import large amounts of ginseng root for processing. States with a program cannot enforce the certification of roots destined for states without a program because states with no program do not have the legal or administrative mechanisms to verify that roots have been certified in the state of origin. While over two-thirds of the wild roots harvested in

the United States continue to be exported to Asia, ginseng's popularity has grown in the United States, which suggests domestic consumption of wild roots could become increasingly problematic for certification.

- It appears that the physical inspection of wild ginseng roots may be duplicative. Wild roots are inspected by state officials at the time of certification and reinspected by Plant Protection and Quarantine (PPQ) officials at the U.S. Department of Agriculture (USDA) or state plant health authorities just prior to export from the United States or a particular state.

*Specificity of Criteria; "Other" Category of Ginseng Root*

- States are asked to rank ginseng abundance, population density, and harvest intensity based on indices prepared by OSA. The qualitative nature of those indices has led to confusion and inconsistent reporting among states. In the absence of long-term field studies, a standardized ranking system is the best way USFWS can consistently and over a long period of time obtain a measure of ginseng population status and harvest intensities. Such a system should be based on specific definitions so that states are all estimating ginseng abundance, density, and harvest intensity quantitatively. The methodology for ranking species rarity developed by The Nature Conservancy and state heritage programs might be of use to states in estimating ginseng populations.
- States are requested to provide OSA with information on the number of ginseng collectors in the state so that trends in intensity of collection can be ascertained. However, for legal or administrative reasons, many states do not license diggers or keep diggers' records on file, so data on the number of collectors are difficult to quantify. In lieu of information on the number of collectors, OSA might consider requesting and using information on total revenue derived from all sales of licenses issued to diggers, from which the number of individual licenses sold can be extrapolated. The number of licenses sold annually could be used as another surrogate measurement of approximate demand for wild roots.
- Seeds of *P. quinquefolius* planted under natural shade (forest canopy) and subsequently cultivated to yield "woodsgrown" roots can have a wild appearance and, in some states, are being reported by dealers as wild roots. Reporting of woodsgrown roots as wild *P. quinquefolius* up to the 1996 harvest season might have inflated true wild harvest figures and presented an inaccurate picture of the status of wild populations. USFWS should reevaluate its definition of "wild" and "cultivated" ginseng and create a third category for "other" that would include woodsgrown ginseng.

Dealers will try to sell woodsgrown ginseng as wild to maximize returns. States might encourage compliance with reporting woodsgrown ginseng if they developed a system that would allow dealers to treat woodsgrown ginseng as wild for commercial purposes, but would require dealers to disclose all transactions of woodsgrown *as such* to states for reporting purposes.

#### *OSA Data Sheets*

- The Office of Scientific Authority (OSA) has not provided a standardized data sheet to states for reporting purposes and should prepare one that is modeled after the data sheet distributed by the Office of Management Authority (OMA). OMA-issued data sheets enable states to provide updates on ginseng harvest, transactions, legislation, regulations, etc., in an organized and convenient fashion. An OSA data sheet could be a useful tool for consistent reporting of biological and harvest information and should improve overall reporting to OSA administrators. OMA and OSA should coordinate the distribution of data sheets to state authorities.

#### *Standardized Biological Monitoring Guidelines*

- OSA should prepare standard guidelines for state ginseng population demography surveys. OSA, in close collaboration with states, should determine the number of sites or populations to monitor based on state size and total ginseng harvest, and should solicit the input of states in preparing the guidelines. OSA should consider developing a monitoring protocol in collaboration with West Virginia University, which has received funding to create biological and ecological monitoring guidelines for ginseng.

#### *Annual Synthesis and Distribution of Information on Trade, Violations, and Legislation*

- States participating in the ginseng program submit information annually to USFWS. As a service and resource to states, USFWS should synthesize this information and provide states with timely summaries of *P. quinquefolius* harvest, trade, and population status, a list of program coordinators and their contact information, harvest season dates, number of violations reported, and updates on new legislation and law enforcement activities prior to the beginning of the next harvest season. USFWS might also distribute to states an annual summary of global ginseng trade based on CITES annual reports.

#### *Communication Enhancement*

- States have expressed concern about the lack of communication between USFWS and the state agencies administering the ginseng program. This lack has apparently resulted in delayed or missed announcements, notices, and information from USFWS. Communication among states has also been very limited. In order to facilitate the dissemination of information to states, USFWS should set up an electronic mailing system between OMA/OSA and state ginseng program coordinators via a listserv. State program coordinators could also use a listserv to share information among themselves and with USFWS.

#### *Law Enforcement Training*

- The USFWS Division of Law Enforcement should conduct training seminars for state ginseng management program staff, particularly for programs administered by a department that does not have the authority or expertise to investigate ginseng violations. Training conservation

officers to detect ginseng harvest violations and falsification of dealer records, engage in covert contacts with ginseng dealers, and undertake covert investigations would likely increase the level of intelligence and result in more prosecutions.

#### *Closer Collaboration with the U.S. Forest Service*

- The U.S. Forest Service (USFS) is not formally a part of the ginseng program between USFWS and states. However, ginseng is heavily sought from U.S. national forests, which are managed by USFS. Aside from issuing collecting permits, USFS generally does not monitor or regulate the take of ginseng from national forests. USFWS should develop a memorandum of understanding with USFS to increase communication, cooperation, and information exchange between the two federal agencies and states regarding ginseng harvest. For instance, the number of permits issued by USFS for ginseng collection in national forests is not reported to USFWS, but could be another source of information used to assess species demand, exploitation, and management.

#### *Communication Between U.S. Customs and the U.S. Fish and Wildlife Service*

- Customs has consistently reported higher exports of wild ginseng than the U.S. Fish and Wildlife Service. There are multiple possible explanations for the disparities in data. Customs' first responsibility is to verify the identity and value of goods imported into the United States for assessment of duties. Verifying exports is a secondary duty. To help Customs track ginseng exports, USFWS might circulate information on the CITES rules pertaining to ginseng and on how to identify *P. quinquefolius*.

#### **Recommendations for USDA/APHIS/PPQ**

##### *Detection of Illegal Ginseng Exports*

- Port inspectors with Plant Protection and Quarantine (PPQ), Animal and Plant Health Inspection Service (APHIS), at the U.S. Department of Agriculture (USDA) are responsible for inspecting and clearing ginseng for export and, as such, they are the last U.S. checkpoint at which illegal ginseng exports can be detected. It is known that, through falsified dealer records, fraudulent or invalid state certification documents have been routinely obtained and submitted to PPQ to clear illegal ginseng for export (USFWS 1994a). Furthermore, evidence obtained from covert USFWS investigations indicates that large quantities of uncertified wild ginseng could be smuggled from the United States by adjusting the tare weights on shipping containers. The tare weight could be intentionally lowered to compensate for extra ginseng that is uncertified and not documented on shipping invoices (USFWS 1994a).

It is critical that PPQ officers thoroughly scrutinize the required documents and check the tare weights of containers against the weight of ginseng being exported. Particular attention might be given to the main ginseng export sites of Chicago, New York, and Milwaukee. Federal and state wildlife inspectors should coordinate more closely with PPQ to carry out random inspections of ginseng shipments at these and other U.S. ports known to export wild ginseng.

## **Recommendations for USFS**

### *USFS Participation*

- The U.S. Forest Service, pursuant to a memorandum of understanding with USFWS, should monitor offtake and population status of ginseng and provide to USFWS annual information on the number of ginseng permits issued.

### *Dealer Education on Harvest (Bag) Limits for Ginseng in National Forests*

- There is a potential loophole in the national forest permitting system. USFS generally allows permit holders to dig a limited amount of ginseng per permit in national forests. For example, in Virginia diggers are allowed to collect up to two pounds of ginseng from the Jefferson and Washington national forests on a single permit. Additional permits must be purchased for the collection of more than two pounds of roots. But whether the two-pound per permit rule is enforced is questionable. USFS, in coordination with state agencies administering the ginseng program, should inform dealers of the bag limits for ginseng in national forests and ask for their cooperation in educating diggers about these rules.

## **Recommendations for States**

### *Population Monitoring*

- Incomplete or dated information on the biological status of ginseng has been submitted to USFWS in recent years owing to a lack of surveys undertaken at the state level. Improved and continuous monitoring of wild ginseng populations is needed to identify and understand the impacts of harvest, phenology, predation, and habitat loss on populations. Understandably, most states lack the resources to monitor and survey ginseng populations on a regular basis. With this in mind, states might consider instituting a program that enlists the voluntary assistance of licensed diggers to carry out site-specific surveys while harvesting. Diggers may have unique knowledge about remote ginseng sites, thus giving states a reason for their participation in the ginseng program. Incentives for diggers who volunteer to carry out surveys might include providing them with 1) locally available ginseng seeds; 2) discounts on licenses; and 3) gift certificates at home improvement centers or garden centers. States might publish notices for volunteers in state conservation journals, fur trapping and trading publications, and state herbal society and association newsletters. States should design short and user-friendly questionnaires to gather information on number of stands observed, average number of plants per stand, unripe/ripe berries present, number of roots harvested, etc. A workshop, arranged by state officials, university staff, and/or private individuals, could be arranged for volunteers prior to harvest season.



#### *Genetic Studies and Distribution of Seeds*

- Studies should be undertaken to determine if planting of cultivated seed is detrimental to the genetic integrity of wild populations through out-breeding depression (e.g., dilution of genetic variability). If it is determined that such planting would be beneficial for the conservation of ginseng, states, possibly through dealers, should give seeds from local populations to harvesters who have collection licenses.

#### *Regulatory Modifications/Enhancement*

- In order to allow ginseng berries to mature adequately before harvest and to minimize out-of-season take, greater uniformity regarding harvest seasons should be sought. Ginseng berries may not mature and produce viable seeds as early in northern states as they do in southern states. In order to minimize out-of-season take and sale of ginseng across state borders, neighboring states having different harvest opening and closing dates should harmonize their seasons. States and national forests should also seek greater uniformity in harvest seasons.
- Many states prohibit the take of ginseng plants having fewer than three leaves (prongs), which generally indicate a 3-to-6 year-old plant. Implementing compliance with and enforcement of this rule is difficult. States could strengthen the rule by requiring diggers to keep the vegetative part of the plant until the root is displayed to a dealer for purchase. It would be largely the responsibility of dealers to reinforce this rule by refusing to purchase underage plants or plants with fewer than three prongs. While roots below a certain size (or with fewer than a specific number of bud scale scars on the rhizome) reflect plant age, it is difficult to estimate plant age based on the morphological features of a root alone. Side-by-side and scaled photos of underage and legal-size ginseng plants distributed to diggers via dealers may help diggers be more discriminating.
- It is known that many ginseng diggers who sell ginseng also hunt game, or vice-versa. In many states, ginseng and game hunting seasons overlap. Moreover, many diggers have little knowledge of the legal season dates for ginseng harvest and are surprised that buyers do not advise them of these dates (USFWS 1994a). State agencies should consider publishing ginseng harvest regulations on the reverse side of game hunting regulations so both sets of rules are equally accessible to diggers and hunters. An alternative could be the distribution of ginseng regulations on pocket-size cards to diggers through registered dealers.

#### *Alternative Sources of Funding*

- Funding has been the single largest factor precluding states from gathering biological and harvest information for submission to USFWS. Currently, states run their ginseng programs with funds appropriated from state treasuries (endangered and nongame species income tax checkoffs) or revenue derived from forest products and/or dealer license fees. But, in almost all states, these funds are insufficient. Alternative, reliable, and continuing sources of funding should be secured so that states can undertake long-term and in-depth ginseng population

studies, collect and maintain data, hold educational seminars, and carry out law enforcement operations. Some suggestions for funding include the following:

Ideally, states should obtain funding for the ginseng program through user fees (e.g., digging permits, dealer licenses, etc.), which are the most logical and appropriate source of funding to cover the cost of the species' management. However, in order to help offset insufficient funds raised through user fees, states might consider adding a checkoff to state income tax reforms so that taxpayers can donate a portion their income tax return to the state agency administering the ginseng program.

If license fees can be put into management programs in a state, states should consider charging a fee for dealer licenses or raising fees to a level that reflects the value of the resource and/or the amount of ginseng actually traded. Using historical records, states could calculate the average weight of roots traded by dealers and base fees on a sliding scale. Even though such a system might encourage underreporting of ginseng harvests, the benefits of increased funding would likely outweigh the costs. Another mechanism for generating revenue to cover the costs of certification is charging dealers a flat fee for the inspection and certification of each shipment of roots (or alternatively \$1 per pound of wild ginseng certified).

#### *Deterring Collection of Protected Plants*

- States should consider marking ginseng plants and/or roots that are geographically protected and prohibited from collection by using a nontoxic dye that is applied to the top of a root. Officials at the Great Smoky Mountains National Park have initiated a marking program by sprinkling a bright orange dye onto the roots of plants in the park. Park officials have warned local dealers not to purchase dyed roots and believe the system is deterring the removal of protected plants from the park.

#### *Determining and Deterring Falsification of Export Documents*

- Upon certification of wild ginseng roots, state personnel issue an export certificate which must accompany the certified roots through interstate commerce up until they are exported from the United States (ginseng certified in its state of origin may travel through several states before leaving the country). Upon inspection and endorsement of roots for export, inspectors from APHIS/PPQ forward the original export certificate to USFWS, which formerly sent a copy of the original certificate to states for verification. This practice of forwarding copies of certificates to states has been discontinued, but should be reinstated so that states can check the copy of the export certificate sent to them by USFWS against the copy of the certificate on file to determine whether the document was modified between the point of issuance and the point of export.

#### *Educate Domestic Asian Buyers About Ginseng Program Requirements*

- Ginseng dealers sell small amounts (1-5 lbs) of high quality wild ginseng roots to Asian herbal shop owners in various large U.S. cities including Los Angeles, New York, and San Francisco. Asian herbal buyers who purchase wild ginseng from roving dealers may not be familiar with the ginseng program requirements and may be undermining the program by purchasing ginseng that has not been certified in the state of origin. State ginseng program coordinators, in cooperation with state and USFWS law enforcement, should inform owners of Asian herbal shops in these cities about the ginseng program and the programmatic requirements to which they must adhere. A pamphlet translated into Chinese and Korean for distribution to shop owners could increase their awareness of program responsibilities.

#### *Educate State Lawmakers, Prosecutors, and Judges*

- Violations of ginseng regulations are misdemeanors, and penalties and sentences are often very light. An educational campaign highlighting the value of ginseng and its positive impact on local and state economies should be aimed at state legislators, district attorneys, and judges so violations are treated more seriously and fines raised.

#### *Dealer Cooperation*

- The majority of dealers are all too aware of the economic importance of ginseng and do not condone unsustainable or unlawful collection. Dealers can potentially have a significant impact on the resource by helping states enforce regulations, educating diggers, and reporting problems or illegal activity. In a few states, dealers have expressed concern about the need for biological monitoring of ginseng populations but are aware of funding limitations. Dealers should be encouraged to form associations that could help states to monitor ginseng commerce, lobby state legislators for funding to support state ginseng programs, and police the trade themselves.

#### **Other Recommendations**

##### *Medicinal Plant Conservation Fund*

- A common complaint from states is that there is insufficient funding to undertake the level of field research needed to provide USFWS with required information on ginseng biology and ecology. Other aspects of state ginseng programs may suffer because there are not enough resources to hire conservation officers, pay for certification, or conduct law enforcement training or public outreach programs. A conservation fund for ginseng and other high-value medicinal plants should be established to help cover the costs associated with their management. Herbal companies selling value-added products containing wild ginseng and other commercially significant botanicals should be encouraged to donate a small portion of proceeds (1-2 percent) derived from sales of these products to a special fund for the

management and conservation of commercially exploited species. The fund could be managed by a nonprofit organization and a board of experts who determine allocation of the fund.

#### *Habitat Loss*

- Habitat alteration, particularly in southeastern Appalachian states where timber operations are on the rise, could adversely affect ginseng populations by changing the growing conditions which the species requires to survive. State and federal agencies should closely monitor ginseng sites targeted for timber extraction and work with public and private landowners to protect plants through appropriate land management or rescue and translocation operations.

#### *Wild Ginseng Harvest in Canada*

- Studies should be undertaken to determine the level of domestic wild ginseng collection and domestic trade in Canada, particularly in Québec and Ontario, to identify potential conservation implications for wild populations. An examination of the U.S. and Canadian cross-border trade in *P. quinquefolius* should be carried out to document whether wild roots harvested in Canada are illegally exported to the United States.

---

---

**APPENDIX 1. Additional Information on the Protection and Regulatory  
Status of *P. quinquefolius***

**Connecticut:** In Connecticut, ginseng is considered a plant of "special concern," meaning any native plant species documented by scientific research and inventory to have a naturally restricted range or habitat in the state, to be at a low population level, to be in such high demand by man that its unregulated taking would be detrimental to the conservation of its population, or to have been extirpated from the state (Fisheries and Game Regulations; Endangered Species, Chapter 495).

**Delaware:** Ginseng is listed on Delaware's Rare Native Plant List. This designation is used to assist the state in environmental impact statements and does not impart any legal protection (Bill McAvoy, Delaware Natural Heritage Program).

**Georgia:** Ginseng is protected by the Georgia Ginseng Protection Act of 1979, as amended in 1996. Collection in national forests is prohibited or regulated through permits; permits are not issued for the collection of ginseng on state lands (Ginseng Fact Sheet, Georgia Natural Heritage Program).

**Indiana:** Ginseng is on Indiana's "watch list," which includes species for which some problems of limited abundance or distribution in the state are known or suspected, implying that the species should be closely monitored (Indiana's Rare Plants and Animals; A Checklist of Endangered and Threatened Species, May 1990).

**Maine:** Maine lists ginseng as "threatened," meaning that there have been two to four documented, recent occurrences of ginseng in the wild; exceptions to the numerical criteria are small populations, confined to a small geographic area in Maine and the taxon is clearly and imminently jeopardized (Official List of Maine's Endangered or Threatened Plants, 1989). Ginseng may be collected in the wild on state lands without a permit (E. Ann Gibbs, Maine Department of Agriculture).

**Maryland:** Ginseng is on Maryland's "watch list," a list of any uncommon species that is typically thought to be secure in the state but worthy of attention or monitoring due to limited distribution, declining population, or ecological vulnerabilities, and/or any uncommon species that may become rare in the foreseeable future (Rare, Threatened, and Endangered Plants of Maryland, 1991). Collection of ginseng on state lands is generally prohibited.

**Massachusetts:** In Massachusetts, ginseng is a species of "special concern," meaning any species that has been documented by biological research and inventory to have suffered a decline that could threaten the species if allowed to continue unchecked, or one that occurs in such small numbers or with such a restricted distribution or specialized habitat that it could easily become threatened in the state of Massachusetts. Collection of ginseng from the wild is prohibited without permission from the appropriate state agency (Massachusetts List of Endangered, Threatened, and Special Concern Species, January 1992; Paul Somers, Massachusetts Natural Heritage & Endangered Species Program).

*Michigan:* Ginseng is protected and listed as "threatened" in Michigan. A threatened species is one in danger of becoming endangered without protection. Ginseng is legally protected on private and public land; a collecting permit is required from the state. The state has not issued permits for the commercial take of ginseng in several years (Mike Penskar, Michigan Natural Features Inventory; 1994 Michigan Ginseng Program Report to the Department of Interior).

*Minnesota:* Ginseng is listed as a species of "special concern" in Minnesota. "Special concern" means any species that is extremely uncommon in the state or that has unique or highly specific habitat requirements and deserves careful monitoring of its status. Species on the periphery of their range that are not listed as threatened may be included in this category, along with those species that were once threatened or endangered but now have increasing or protected stable populations (Welby Smith, Minnesota Department of Natural Resources). Ginseng harvest is prohibited on state parks and recreation lands; a permit is required for collection of the species in state wildlife management areas (Smith in litt. 1996).

*Missouri:* Collection of ginseng is generally prohibited on state lands in Missouri (Tim Smith, Missouri Department of Conservation).

*Nebraska:* Ginseng is known to occur in only four counties in Nebraska.

*New Hampshire:* In New Hampshire, permission from the landowner is required to collect ginseng on private lands and from the appropriate state agency on state lands (New Hampshire RSA 217-A, as amended 1993).

*New Jersey:* Ginseng is on New Jersey's "waiting list," which includes species that may be reviewed for inclusion on the state endangered species list. Ginseng harvest is generally unregulated in New Jersey.

*New York:* Ginseng is an "exploitably vulnerable plant" in New York and is protected under Section 9-1503 of the Environmental Conservation Law. An exploitably vulnerable plant is a plant likely to become threatened in the near future throughout all or a significant portion of its range within the state if causal factors continue unchecked (6 NYCRR Part 193.3). Collection of ginseng is prohibited on private and public land without the consent of the owner or appropriate state agency (6 NYCRR Part 193.3). Harvest and sale of ginseng is also regulated (6 NYCRR Part 193.4).

*North Carolina:* In North Carolina, collection and sale of ginseng is permissible but subject to provisions of North Carolina's Plant Protection and Conservation Act and Rules on Ginseng Collection and Trade.

*Ontario:* Ginseng is not included in the province's endangered species list.

*Pennsylvania:* Pennsylvania lists ginseng as a "vulnerable" species, one in danger of population decline due to beauty, economic value, use as a cultivar, or other factors which indicate that persons may remove the species from its natural habitat. No person may buy, trade, or barter

Pennsylvania vulnerable plants or parts thereof with the intent to sell them within the state without first applying for and obtaining a commercial license in writing from the Department of Conservation and Natural Resources. Ginseng collection on state lands is allowed by permit only (Steve Grund, Western Pennsylvania Conservancy/Pennsylvania Natural Diversity Inventory-Western Office).

**Québec:** Ginseng is on the waiting list for future designation under provincial legislation as threatened or vulnerable, but has no legal designation yet in Québec.

**Rhode Island:** A permit is required for the collection of ginseng on state lands in Rhode Island. Requests for permits would likely be denied due to ginseng's limited distribution and population size in the state (Rick Enser, Rhode Island Natural Heritage Program).

**South Carolina:** A permit from the state is required in order to collect ginseng on public lands in South Carolina (Albert Pittman, South Carolina Heritage Trust).

**Tennessee:** Ginseng designation as a species of "special concern" in Tennessee allows the state to track wild populations of ginseng but does not afford any legal protection to the species.

**Virginia:** Ginseng has "threatened" status in Virginia. A species listed as "threatened" by Virginia is any species determined by the state Board of Agriculture and Consumer Services likely to become an endangered species within the foreseeable future throughout all or significant portions of its native range (Virginia Endangered Plant and Insect Species Act, Chapter 31).

**West Virginia:** Ginseng is listed as a species of "special concern" by West Virginia. The main purpose of this category is to focus attention on certain species before they become endangered. Written permission to collect ginseng on private and public lands is required.

**Wisconsin:** Ginseng is listed as a species of "special concern" by Wisconsin. This nonlegal category is for species that are believed to be uncommon, or possibly declining, and for species for which there is significant harvest and commercial use (Kelly Kearns, Wisconsin Bureau of Endangered Resources).



\_\_\_\_\_

\_\_\_\_\_

**APPENDIX 2. Additional Information on *P. quinquefolius* Collection in U.S. National Forests**

**Alabama:** The U.S. Forest Service does not issue permits for the collection of ginseng in national forests within the state of Alabama. These forests are Bankhead (348,917 acres), Conecuh (171,177 acres), Talladeya (424,126 acres), and Tuskegee (15,628 acres). Only a handful of special study permits have been issued for research purposes over the last ten years (Jim Huntly, U.S. Forest Service).

**Arkansas:** Permits are issued to researchers only for ginseng collection in the Ozark National Forest (1.2 million acres). An annual average of 233 permits, sold on an annual basis for a maximum 10 lbs. of ginseng, were issued from 1981 to 1991. The St. Francis National Forest is closed to ginseng collection. Ginseng does not occur in the Ouachita National Forest (1.7 million acres), which is in the southern part of the state (Carl Minehart, U.S. Forest Service).

**Georgia:** There are two national forests in Georgia: Chattahoochee (750,000 acres) and Oconee (115,000 acres). The number of permits issued is not necessarily reflective of actual ginseng take. The majority of ginseng is thought to be collected in forest districts along the lower Mississippi River Valley. Collecting permits can be purchased from ranger districts for an unlimited amount of ginseng for \$25/lb. (Cindy Wentworth, U.S. Forest Service).

**Illinois:** No collection permits have been issued for ginseng since national forests were designated in Illinois (Louise Odegaard, U.S. Forest Service).

**Indiana:** Based on a U.S. Forest Service survey of ginseng collectors, 2,045 lbs. of ginseng were collected in the Hoosier National Forest (194,033 acres) during 1994-95, compared to 2,901 lbs. during 1995-96. The state reportedly certified ginseng that had been collected from all nine counties in the Hoosier National Forest.

**Kentucky:** In 1996, 136 permits were issued for ginseng collection in the Daniel Boone National Forest (691,000 acres); another 62 permits were issued for ginseng and/or goldenseal (*Hydrastis canadensis*); 2 permits were issued for ginseng, goldenseal, bloodroot (*Sanguinaria canadensis*), and lady-slipper's orchid (*Cypripedium spp.*) (David Taylor, U.S. Forest Service).

**Mississippi:** Ginseng is known to occur in national forests in Mississippi, but collection is not very popular (Jerry Windham, U.S. Forest Service).

**Missouri:** No permits are issued for commercial collection of ginseng in Missouri's national forests, although illegal commerce is known to occur. Some permits are issued for personal use (small quantities) collection in the Mark Twain National Forest (one million acres), but even these are rarely issued (Linda Richards, U.S. Forest Service).

**New Hampshire:** The White Mountain National Forest is comprised of approximately 724,000 acres in New Hampshire and 49,000 acres in Maine. No permits have been issued for ginseng collection in the last 30 years (Dona Hepp, U.S. Forest Service).

*North Carolina:* Four districts (Cheoah, Highland, Tusquite, Wayah) in the Nantahala National Forest and three districts (Appalachian, Grandfather, Pisgah) in the Pisgah National Forest issue ginseng collecting permits (Steve Samone, U.S. Forest Service).

*Ohio:* The Wayne National Forest (219,000 acres) has been issuing permits for the collection of ginseng since 1993.

*Tennessee:* There are five ranger districts in the Cherokee National Forest (633,000 acres). Permits have been issued for ginseng collection in four of the five districts since 1993. Each permit allows the collection of one pound of ginseng root at a cost of \$15.00 (John F. Ramey, U.S. Forest Service).

*Wisconsin:* Collection is not allowed in either the Chequamegon or Nicolet national forests.

## GLOSSARY

**Ginseng Certification**—The system under which state officials verify the legal acquisition of all ginseng roots harvested by checking dealers' roots against dealers' records and by issuing certification documentation. States must certify whether roots were harvested in that state, whether they were legally obtained in a particular season, and whether they are wild or cultivated (artificially propagated) specimens (50 CFR, Part 23 (e)(2)). Proof of certification must be presented upon export from the United States.

**CITES**—The Convention on International Trade in Endangered Species of Wild Fauna and Flora regulates international trade in wildlife through a system of permits and certificates. More than 140 countries are party to CITES. The Convention accords varying degrees of protection to wild animals and plants exploited for international trade by placing species in one of three appendices. The implementation of CITES is overseen by the CITES Secretariat, which is administered by the United Nations Environment Programme (UNEP) and is based in Geneva, Switzerland.

**CITES Annual Reports**—These reports are summaries of all reported exports, reexports, and imports of CITES-listed species, including regulated specimens thereof, which are submitted annually by CITES parties to a database managed by the World Conservation Monitoring Centre in Cambridge, United Kingdom.

**Federal/State Ginseng Program**—A program designed to foster cooperation and information exchange between the U.S. Fish and Wildlife Service and states regarding the commercialization and management of *P. quinquefolius*.

**Federal Register**—A U.S. government publication that announces public regulations and legal notices issued by federal agencies.

**Ginsenosides**—The main active ingredients of *Panax*, which are composed of complex carbohydrate molecules representing about three to six percent of the dried root weight.

**HS**—The Harmonized Commodity Description and Coding System (HS), developed in 1989 by the Customs Cooperation Council in Brussels, Belgium, is a universally accepted system of product nomenclature that customs uses to classify various information on imported and exported commercial goods.

**OMA**—The Office of Management Authority is housed within the U.S. Fish and Wildlife Service. OMA must have reasonable assurance from states that *P. quinquefolius* roots were legally acquired before it can approve export from individual states.

**OSA**—The Office of Scientific Authority is housed within the U.S. Fish and Wildlife Service. OSA must determine, based upon biological, ecological, and harvest information voluntarily submitted by states annually, that collection of wild ginseng for export will not be detrimental to the survival of the species in the wild. Export approval is contingent on OSA's finding that export will not be detrimental to wild *P. quinquefolius*.

**TCM**—Traditional Chinese medicine.

**TNC**—The Nature Conservancy, a U.S.-based international conservation organization, maintains a repository of computerized information on the conservation status of plants in the Americas and ranks the rarity of plants based on a system developed in cooperation with the Network of Natural Heritage Programs located in the United States, Canada, and Latin America.

**USDA/APHIS/PPQ**—The U.S. Department of Agriculture's (USDA) Division of Plant Protection and Quarantine (PPQ) is a division of the Animal and Plant Health Inspection Service (APHIS) that implements and enforces CITES border controls for plants. PPQ is the final checkpoint at which ginseng is physically inspected before being exported from the United States.

**USFS**—The U.S. Forest Service is the agency under the Department of Interior that manages all national forests and regulates the collection of non-timber forest products, including ginseng, in USFS-managed forests. USFS is not associated with the Federal/State Ginseng Program.

**USFWS**—The U.S. Fish and Wildlife Service is the agency under the Department of Interior that implements and enforces CITES animal and plant listings, including the CITES Appendix II listing for American ginseng (*P. quinquefolius*). USFWS, of which OMA and OSA are specific divisions, administers the Federal/State Ginseng Program.

**WCMC**—The World Conservation Monitoring Centre, based in Cambridge, United Kingdom, is a conservation organization specializing in information services on the conservation and sustainable use of species and ecosystems. WCMC is under contract to the CITES Secretariat to computerize and manage data submitted by parties on the export, reexport, and import of species listed in the CITES appendices. WCMC produces the CITES annual reports.

**Woodsgrown ginseng**—The definition of "woodsgrown" ginseng varies, but generally refers to any ginseng plant that has been seeded and subsequently raised under a natural tree canopy in a forest setting and has undergone some degree of cultivation.

## REFERENCES

- Anderson, R. C. 1998. In litt. to C. Robbins, TRAFFIC USA. January 21, 1998.
- Anderson, R. C., J. E. Armstrong, P. K. Benjamin, and J. S. Fralish. 1993. The ecology and biology of *Panax quinquefolium* L. (Araliaceae) in Illinois. *The American Midland Naturalist* 129(2): 357-372.
- Anon., 1989. Letter to Marshall P. Jones, Office of Management Authority, U.S. Fish and Wildlife Service, Washington, D.C.
- Anon., 1996. *Management of Panax quinquefolius: Analysis of federal and state programs*. College Park, Maryland: Sustainable Development and Conservation Biology (CONS) Program, University of Maryland.
- Anon., 1997. Siberian ginseng: Adaptogen aids in array of modern stresses. *Healthy Cell News* June 1997: 15-16.
- Argus, G. W. and D. J. White. 1977. The rare vascular plants of Ontario. *Syllogeus* 14.
- Bailey, B., D. Samuel, M. Van Voort, and L. Williams. 1996. *Ginseng and other wild harvested products in West Virginia*. Unpublished Report.
- Blumenthal, M. 1996. Traditional Chinese medicines: The Chinese market and international opportunities. *Herbalgram* 38: 58-59.
- Bouchard, A., D. Barabe, M. Dumais, and S. Hay. 1983. The rare vascular plants of Québec. National Museum of Natural Sciences. *Syllogeus* No. 48.
- Bremness, L. 1994. *Herbs*. New York: Dorling Kindersley Publishing, Inc.
- Brevoort, P. 1996. The U.S. botanical market - An overview. *Herbalgram* 36: 49-57.
- Carlson, A. W. 1986. Ginseng - America's botanical drug connection to the Orient. *Economic Botany* 40(2): 233-249.
- Carpenter, S. G. and G. Cottam. 1982. Growth and reproduction of American ginseng (*Panax quinquefolius*) in Wisconsin, USA. *Canadian Journal of Botany* 60: 2692-2696. In: D. J. White, *Status report on the American ginseng, Panax quinquefolium L., in Canada*.
- Carriere, A., D. Caswell, R. G. Smith, and B. Zielke. 1996. Variation in the ginsenoside content of American ginseng, *Panax quinquefolius* L., roots. *Canadian Journal of Botany* 74: 1616-1620.
- Carter, M. R. 1975. Ginseng, a brand new scent from an age-old herb. *Mademoiselle* 81: 156, 158.
- Catling, P. M., E. Haber, and E. Small. 1994. Poorly known economic plants of Canada: Ginseng - *Panax quinquefolius* L. *CBA/ABC Bulletin* 27(4): 70-72.

- Charest, N. 1996. Pers. comm. to C. Robbins, TRAFFIC USA.
- Charron, D. and D. Gagnon. 1991. The demography of northern populations of *Panax quinquefolium* (American ginseng). *J. of Ecology* 79: 431-445.
- Cheung, K. S., H. S. Kwan, P. PH. But, and P. C. Shaw. 1994. Pharmacological identification of American and Oriental ginseng roots by genomic fingerprinting using arbitrarily primed polymerase chain reaction (AP-PCR). *J. of Ethnopharmacology* 42: 67-69.
- Clark, H. 1996. Saskatchewan irrigation development centre. In: N. Charest. 1996. Pers. comm. to C. Robbins, TRAFFIC USA. December 9, 1996.
- Cottrell, A. C., L. Gao, T. S. C. Li, and G. Mazza. 1996. Ginsenosides in roots and leaves of American ginseng. *J. of Agriculture and Food Chemistry* 44: 717-720.
- Dames, C. 1997. Pers. comm. to C. Robbins. August 21, 1997.
- Dane, C. 1997. Pers. comm. to C. Robbins, TRAFFIC USA. April 22, 1997.
- Department of the Interior. 1996. Semiannual agenda of rules schedules for review or development. (50 CFR Chs. I and II). *U.S. Federal Register* 61(93): 23078-23171.
- Dix, E. 1996. Management of *Panax quinquefolius*: Analysis of federal and state programs. College Park, Maryland: Sustainable Development and Conservation Biology Program, University of Maryland.
- Emboden, W. A. 1974. *Bizarre plants, magical, monstrous, mythical*. New York: Macmillan Publishing Co. In: L. McMahan. 1981. *The trade, biology, and management of American ginseng (Panax quinquefolius)*. Prepared for the International Convention Advisory Commission.
- Foster, S. 1995. *Forest pharmacy: Medicinal plants in American forests*. Durham, North Carolina: Forest History Society.
- Foster, S. 1997. In litt. to C. Robbins, TRAFFIC USA.
- Foster, S. 1997. Pers. comm. to C. Robbins, TRAFFIC USA.
- Foster, S. and J. A. Duke. 1990. *Peterson field guide: Eastern/central medicinal plants*. New York: Houghton Mifflin Company.
- Fulder, S. 1993. *The book of ginseng*. Rochester, Vermont: Healing Arts Press.
- Fuller, D. 1991. *Medicine from the wild: An overview of the U.S. native medicinal plant trade and its conservation implications*. Washington, D.C.: TRAFFIC USA.
- Gagnon, D. and D. Charron. 1987. Report on the status of *Panax Quinquefolium* in Québec. Unpublished report prepared for World Wildlife Fund, Canada.

- Gagnon, D., P. Mantel, and A. Fault. 1996. Population viability analysis of American ginseng and wild leek harvested in stochastic environments. *Conservation Biology* 10(2): 608-621.
- Gaski, A. and K. Johnson. 1994. *Prescription for extinction: Endangered species and patented oriental medicines in trade*. Washington, D.C.: TRAFFIC USA.
- Gibbs, A. E. 1997. Pers. comm. to C. Robbins. December 10, 1997.
- Haber, E. 1990. Ginseng, the root of good health: Threatened in Canada. *BIOME* 10(1): 3.
- Haber, E. 1996. Pers. comm. to C. Robbins, TRAFFIC USA. December 20, 1996.
- Hariman, G. F. 1973. *The book of ginseng*. New York: Pyramid. In: A. W. Carlson. 1986. Ginseng - America's botanical drug connection to the Orient. *Economic Botany* 40(2): 233-249.
- Hu, S. Y. 1976. The genus *Panax* (ginseng) in Chinese medicine. *Economic Botany* 30: 11-28.
- Hu, S. Y. 1977. A contribution to our knowledge of ginseng. *American Journal of Chinese Medicine* 5(1): 1-23.
- Jiansheng, J. 1997. Pers. comm. to C. Robbins, TRAFFIC USA. November 11, 1997.
- Johnston, B. A. 1997. One-third of nation's adults use herbal remedies. *Herbalgram*. No. 40, Summer.
- Kearns, K. 1997. In litt. to C. Robbins, TRAFFIC USA. November 19, 1997.
- Kennett, G. A. and R. Parry-Jones (in prep). *Review of the trade in plants for traditional Chinese medicine: A Hong Kong perspective*. Hong Kong: TRAFFIC East Asia.
- Koehler, J. H. 1912. Ginseng and goldenseal growers' handbook. Drug connection to the Orient. *Economic Botany* 40(2): 233. In: A. W. Carlson. 1986. *Ginseng - America's botanical*, p. 249.
- Lange, D. and U. Schippmann. 1997. *Trade survey of medicinal plants in Germany*. Bonn, Germany: Bundesamt für Naturschutz.
- Lewington, A. 1993. *Medicinal plants and plant extracts*. Cambridge, United Kingdom: TRAFFIC International.
- Lewis, W. H. and V. E. Zenger. 1983. Breeding systems and fecundity in the American ginseng, *Panax quinquefolius* (ARALIACEAE). *American Journal of Botany* 70: 466-468. In: D. J. White. *Status report on the American ginseng, Panax quinquefolium L., in Canada*.
- Liu, C. and P. Xiao. 1992. Recent advances on ginseng research in China. *Journal of Ethnopharmacology* 36: 27-38.



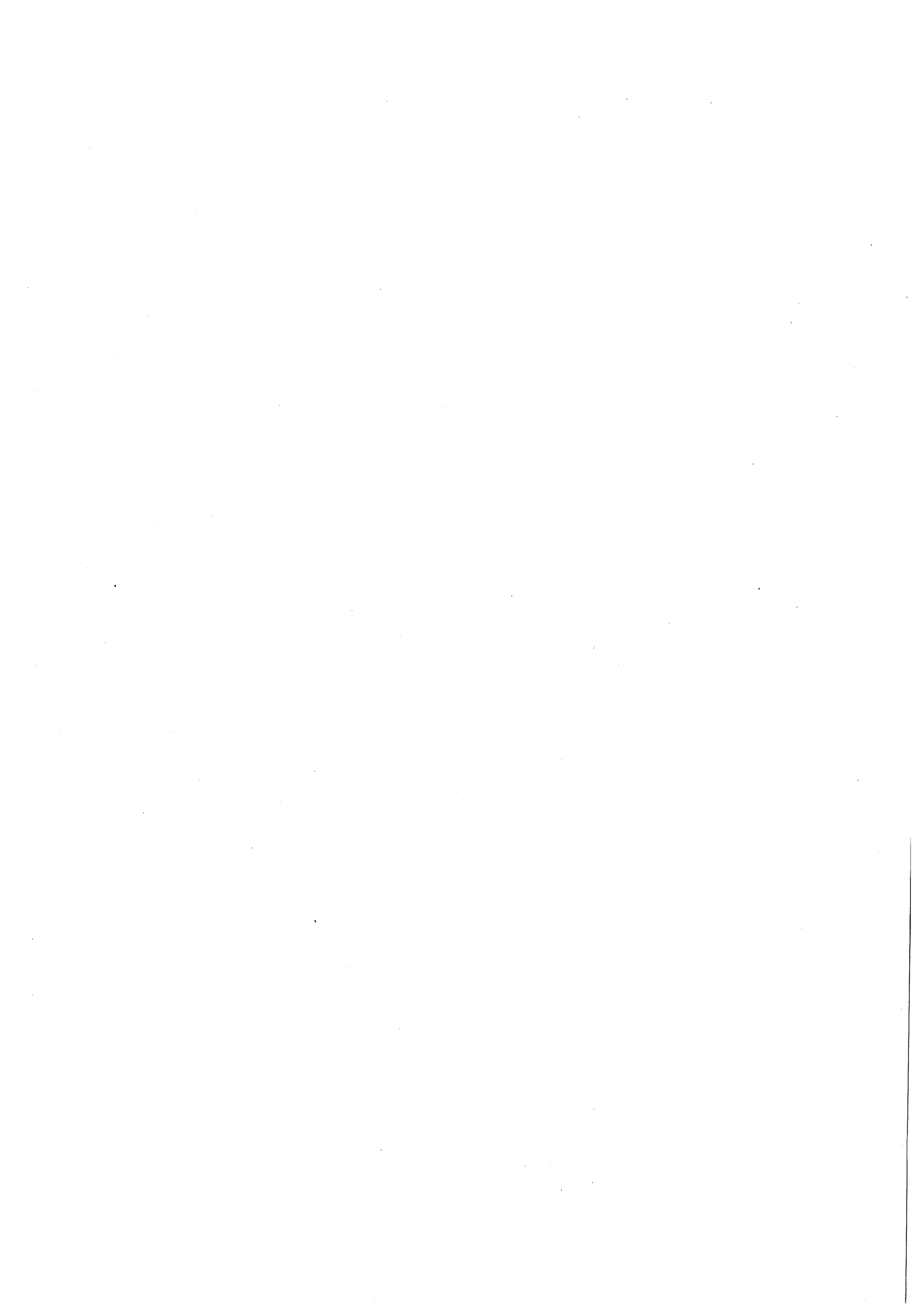
- Massey, J. S. 1976. Ginseng, folklore cure-all, is being regarded seriously. *Smithsonian* 6: 104-111. In: A. W. Carlson. 1986. Ginseng - America's botanical drug connection to the Orient. *Economic Botany* 40(2): 233-249.
- McMahan, L. 1981. *The trade, biology, and management of American ginseng Panax quinquefolius*. Washington, D.C.: TRAFFIC USA.
- McMahan, L. 1981. *The trade, biology, and management of American ginseng Panax quinquefolius*. Prepared for the International Convention Advisory Commission.
- Moerman, D. E. 1986. *Medicinal plants of Native America*. Technical reports Vols. I & II (19). Ann Arbor, Michigan: University of Michigan, Museum of Anthropology.
- Office of Scientific Authority (OSA), U.S. Fish and Wildlife Service. 1997. Printout of annual state ginseng harvests for 1985-1996.
- Oliver, P. C. 1995. Demographic and economic trends affecting the herb industry in the 1990s and beyond. In *Proceedings of Herbs '95*, Tenth Annual National Conference of the International Herb Association, Chicago, Illinois, July 27-30, 1995.
- Olson, S. 1997. Pers. comm. to C. Robbins, TRAFFIC USA. March 15, 1997.
- Olson, S. 1997. *Plant collecting permits for Hoosier National Forest: Policy change recommendations*. April 16, 1997.
- Phibbs, A. 1997. In litt. to C. Robbins, TRAFFIC USA. November 4, 1997.
- Pils, C. 1996. In litt. to Marshall P. Jones, Office of Management Authority, U.S. Fish and Wildlife Service, Washington, D.C.
- Prescott-Allen, C. P. and R. P. Prescott-Allen. 1986. *The first resource: Wild species in the North American economy*. New Haven, Connecticut: Yale University Press.
- Pritts, K. D. 1995. *Ginseng: How to find, grow, and use America's forest gold*. Mechanicsburg, Pennsylvania: Stackpole Books.
- Pritts, K. D. 1997. Pers. comm. to C. Robbins, TRAFFIC USA. June 16, 1997.
- Robbins, C. 1997. U.S. medicinal plant trade studies. *TRAFFIC Bulletin* 16(3): 121-125.
- Robillard, J. 1998. In litt. to Chuck Dauphine, Canadian CITES Scientific Authority. January 23, 1998.
- Rock, J. 1997. Ginseng workshop held at West Virginia University, May 15-17, 1997, Morgantown, West Virginia.
- Romang, R. 1996. Pers. comm. to C. Robbins, TRAFFIC USA. December 12, 1996.
- Rowe, J. S. 1972. *Forest regions of Canada*. Canadian Forestry Service. Publication No. 1300.

- Schmid, D. 1997. Pers. comm. to C. Robbins, TRAFFIC USA. August 8, 1997.
- Schumann, D. R. and M. G. Thomas. 1993. Income opportunities in special forest products: Self help suggestion for rural entrepreneurs. *Agricultural Information Bulletin* (666). U.S. Department of Agriculture, Washington, D.C.
- Smith, W. 1996. In litt. to U.S. Fish and Wildlife Service, Arlington, Virginia. June 6, 1996.
- Speestra, K. 1971. Ginseng: Wisconsin's gift to the Orient. *Wisconsin Trails* 12: 10-11. In: A. W. Carlson. 1986. Ginseng - America's botanical drug connection to the Orient. *Economic Botany* 40(2): 233-249.
- Tate, J. 1996. Pers. comm. to Conservation Biology Program, University of Maryland.
- The Nature Conservancy (TNC). 1996. Data on the conservation status of American ginseng (*Panax quinquefolius*) in North America. Arlington, Virginia, USA.
- U.S. Department of Agriculture. 1995. Export certification manual: Procedures validating and endorsing documents for the export of American ginseng (*Panax quinquefolius*). Washington, D.C.
- U.S. Fish and Wildlife Service. 1994a. Proposed rule for the export of American ginseng harvested in 1994-1996 seasons (50 CFR Part 23). *U.S. Federal Register* 59(185): 49046-49052.
- U.S. Fish and Wildlife Service. 1994b. American ginseng trade (*Panax quinquefolius* L.) - An overview. USFWS Division of Law Enforcement Region Three and Intelligence Section, Branch of Operations.
- U.S. Fish and Wildlife Service. 1995. Fact sheet on export of American ginseng (*Panax quinquefolius*). Office of Management Authority, USFWS, Arlington, Virginia.
- U.S. Fish and Wildlife Service. 1996. Printout of U.S. exports of wild and cultivated American ginseng during 1995.
- U.S. Fish and Wildlife Service. 1997. Printout of U.S. exports of wild and cultivated American ginseng during 1996.
- U.S. Fish and Wildlife Service. 1997. Chief, Office of Scientific Authority, in litt. to Chief, Office of Management Authority, regarding Convention Permit Applications. December 1, 1997.
- Whipkey, R. 1991. In litt. to Marshall P. Jones, Office of Management Authority, U.S. Fish and Wildlife Service, Washington, D.C.
- White, D. J. 1988. *Status report on the American ginseng, Panax quinquefolium L., in Canada*. Committee on the Status of Endangered Wildlife in Canada.
- Wood, L. 1997. Today's proactive consumer and herbal supplements. *Herbalgram* 40: 50-51.

World Conservation Monitoring Centre. 1995. Compilation of CITES Annual Report data for artificially propagated *Panax quinquefolius* 1991-1994. Cambridge, United Kingdom.

World Conservation Monitoring Centre. 1996. Compilation of CITES Annual Report data for all trade in *Panax quinquefolius*. Cambridge, United Kingdom.







The TRAFFIC Network is the world's largest wildlife trade monitoring program with offices covering most parts of the world. TRAFFIC is a program of WWF-World Wildlife Fund and IUCN-The World Conservation Union, established to monitor trade in wild plants and animals. It works in close cooperation with the Secretariat of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

The TRAFFIC Network shares its international headquarters in the United Kingdom with the World Conservation Monitoring Centre.

For further information contact:

The Director  
TRAFFIC North America  
c/o World Wildlife Fund-US  
1250 24th Street, N.W.  
Washington, D.C. 20037  
Telephone: (202) 293-4800  
Fax: (202) 775-8287  
E-mail: [ina@wwfus.org](mailto:ina@wwfus.org)  
Web Site: [www.traffic.org](http://www.traffic.org)