

Vegetables and Fruits

A Guide to Heirloom Varieties and Community-Based Stewardship.

Volume 1, Annotated Bibliography

Special Reference Briefs Series no. SRB 98-05

Volume 2, Resource Organizations

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Volume 3, Historical Supplement

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A Note About the Electronic Files for Each Volume

The publication *Vegetables and Fruits: A Guide to Heirloom Varieties and Community-Based Stewardship* was published in **three** printed volumes. The following sections were repeated in each volume: 1) Table of Contents for 3 volumes, 2) Introduction (including Notes and References) to 3

volumes, 3) Acknowledgements, 4) Alternative Farming Systems Information Center overview, and 5) document access instructions. To reduce duplication in the electronic versions, these sections have been extracted and placed in this document

[http://www.nal.usda.gov/afsic/AFSIC_pubs/heirloom/heirloom.htm].

The **remainder** of each volume is contained in a separate file which includes its respective citations, indices, and table of contents. These files, accessible through the table of contents below, are:

Volume 1. Annotated Bibliography, http://www.nal.usda.gov/afsic/AFSIC_pubs/heirloom/srb9805.htm

Volume 2. Resource Organizations, http://www.nal.usda.gov/afsic/AFSIC_pubs/heirloom/srb9806.htm

Volume 3. Historical Supplement, http://www.nal.usda.gov/afsic/AFSIC_pubs/heirloom/srb9807.htm.

There are many cross-reference links to related entries, either within the same document, or to another document in this heirloom series. When you activate a link to *another* document, use your browser's "back" button to return to the document from which the link was selected.

Additional related entries can be located through use of the indices that accompany each document. Separate indices to publication titles, organization names, and persons (as authors or contacts) are found at the end of Volume 1, Volume 2, and Volume 3. (Note that there is no comprehensive index that covers all three documents. Therefore, to find all substantive references to particular publications or organizations, you will need to follow the links from each document's indices.)

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Introduction [Volumes 1, 2, and 3]

1. Background

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Like any heirlooms passed from generation to generation, the vintage varieties of garden plants that we still grow today have lasting value. Some old types of vegetables have been kept alive within families or communities by succeeding generations of seed savers. Others with a long history in the seed trade can be traced back to the 19th C., when commerce in seeds expanded, or even to the Colonial period. Some consider true heirlooms to be those belonging to the first group above, the "folk varieties" that have existed for long periods outside of commercial and professional plant breeding circles. Most, however, favor more inclusive usage, viewing all traditional varieties, regardless of their lineage or means of distribution, as *bona fide* heirlooms.

(In practical terms, making such distinctions can be difficult, since many old varieties are poorly documented, and the same or similar varieties may exist under different popular names. These uncertainties, along with changes in physical traits that occur naturally as plants are continually propagated over time, can make it difficult to know the origin and identity of a particular cultivated variety. From a stewardship perspective, the more inclusive view may be more useful, since both types are threatened with commercial extinction, their continued survival depending largely on popular interest and initiative. According to the 1994 *Garden Seed Inventory*, for instance, two-thirds of the 5000 non-hybrid varieties available in 1984 seed catalogs from North America were dropped during the next decade.¹)

With respect to heirlooms, how old is "old"? Most people agree that heirloom vegetables and fruits are those types known through historical documentation or folk history for at least 50 years. Dating to the early 20th C. and before, many originated during a very different agricultural age--when localized and subsistence-based food economies flourished, when waves of immigrant farmers and gardeners brought cherished seeds and plants to this country, and before seed saving had dwindled to a "lost art" among most North American farmers and gardeners. For apples, for instance, antique apple grower and historian Lee Calhoun uses 1928 as the cut-off date to delineate the heirloom varieties that were once grown in the U.S. South. By this time, subsistence farming in the region had nearly disappeared and commercial apple breeding was severely diminished. (According to his research, only 300 of the 1600 apple varieties that originated or were once grown in the South still exist.²)

In addition to their long history of use, the heirloom vegetables that are routinely grown from seed are open-pollinated, meaning that they set seed "naturally," often aided by wind, rain, or pollinating insects, and can thus be renewed by sowing the seeds harvested from each generation of plants. Known also as

standard or non-hybrid, open-pollinated varieties tend to be stable and true-breeding. They differ from F1 hybrids, which in usual practice result from deliberate crossing of two distinct, highly inbred parent lines. (The term "F1" to describe the hybrid offspring indicates the "first filial" generation, with respect to the parent lines.)

Since their genetic makeup has been manipulated--and simplified--in this way, F1 hybrids tend to be highly uniform, and may display "hybrid vigor," as shown by improved yields or more robust garden or field performance. Irrespective of hybrid vigor (which tends to occur in particular kinds of plants, including corn and brassicas), hybrids are used increasingly in large-scale, intensive agriculture because they provide production advantages for farmers and commercial incentives for seed sellers. The benefits of hybrids tend to be less cut-and-dried for home gardeners, however, and saving seeds from hybrids is problematic. Although seed collected from F1 hybrids may be viable, the resulting plants tend to be highly variable, hence undesirable for many growers and especially un-economical for commercial producers. Thus, gardeners and farmers who grow hybrids must return to the seed company each year to obtain the same varietal "package."

Many of the perennial fruits grown in gardens and orchards (including slow-growing trees and shrubs), and also a few of the more popular garden vegetables (such as potatoes and onions), are propagated routinely by plant pieces or cuttings, rather than by seeds. In addition to faster maturity, a distinct advantage offered by grafting apple trees or planting potato "eyes" (the portion of the tuber containing the growing point) is that these procedures preserve varietal identity. With apples and a number of other tree fruits, for instance, desired traits are not passed reliably through seeds, and many potato varieties fail to flower or to produce functional seeds. For these kinds of plants, like the vegetables typically grown from seed, heirloom varieties are also the distinct named types known for at least a half-century or so.

Growing interest in heirlooms. Although they belong to the past, heirloom varieties of vegetables and fruits are by no means obsolete. Since the 1970s, an expanding popular movement dedicated to perpetuating and distributing these garden classics has emerged among home gardeners and small-scale growers, with interest and endorsement from scientists, historians, environmentalists, and consumers. Although active seed savers tend to be a minority among the millions of Americans who plant a garden, broad-based support has expanded for grassroots plant conservation networks such as Seed Savers Exchange in Iowa, and Seeds of Diversity Canada, two organizations in North America with national scope. A variety of other groups with local or regional membership, or with ethnic or crop-oriented focus, are also active.

With support from these networks, the seeds of vintage varieties are being introduced--or reintroduced--to the garden seed trade, and old varieties of vegetables and fruits are appearing at local farmers' and specialty markets. New, independent seed companies offering unique collections of regionally adapted varieties have emerged (a trend that serves, in some degree, to fill the void created from the decline in recent decades in long-established, regional seed companies, which have been displaced or absorbed by corporate seed and agrichemical firms serving national and global markets). Fruit hobbyist groups--whose members include antique and rare fruit enthusiasts--are thriving, and old fruit varieties are increasingly available from specialized and mainstream nurseries. Traditional crop varieties are being restored to

native farmers and gardeners, and associated farming traditions revived. In addition, growing and disseminating authentic old varieties have become important program elements at a number of living historical farms and open-air museums. Besides bolstering the heirloom movement, these activities (which are often supported by historical research to discover the past uses and values of particular plants, and historical growing methods) lend vital support to the museums' work in recreating the foodways and lifeways of earlier generations.

Heirloom appeal and related issues. Interest in traditional varieties has been gaining momentum for a variety of reasons that are as diverse and difficult to characterize as the old varieties themselves. They reflect practical motives (which are based, for instance, on garden performance or epicurean interests), as well as curiosity and nostalgia, and also broader philosophical interests and social concerns. The opportunity to take an active role in preserving the genetic repository still existing in our garden vegetables and fruits--although impoverished in comparison to earlier periods--has been a strong motivator for many heirloom preservationists. And for some, interest in heirlooms relates strongly to the perceived limitations of modern hybrids and other exclusive varieties, which can be said to lack "pride of ancestry or hope of posterity."³

Novelty, nostalgia, and general merit. Many heirloom enthusiasts have discovered the endless variety and novelty still existing among the old types of vegetables and fruits. To some, their sensory qualities (unusual shapes, distinctive colors, and uncommon flavors), as well as departure from standard fare, are especially appealing. Even the old names exercise the imagination, suggesting the unconventional, and in some cases, recalling the "sounds and tastes and tales of gardeners past."⁴ (To name only a few within the existing pool of old varieties...consider the Cherokee Trail of Tears bean...or Moon and Stars watermelon...or Bloody Butcher and Howling Moon corns...or Sops of Wine, Esopus Spitzenburg, and Rambo apples...) According to ethnobotanist Gary Nabhan, expressions of curiosity and kindness on the part of crop stewards have, in themselves, helped to foster varietal diversity, and continue to support the perpetuation of traditional varieties.⁵ To explain the enormous variation in the shapes and colors of beans found among different cultures around the world, one scientist has suggested that, in addition to yield, hardiness, and flavor, beans have been selected for their beauty, "to feed not only the body but the spirit."⁶

Beyond their novelty, sentimental, or aesthetic appeal, heirlooms are considered by many who grow them to be top performers in home gardens, or under conditions that likewise differ from intensively managed, commercial norms, and where toughness and dependability are desirable. Or, they stand out in situations that display their out-of-the-ordinary qualities--superior flavor or cooking properties, for instance, or unique harvest or storage characteristics. Many traditional varieties display combinations of traits that make them especially responsive to local or regional conditions, or well-suited to particular growing methods (such as those used in organic, low-external-input, or permaculture systems), or tolerant of local pests and diseases, or other stresses and constraints. The corn and bean varieties developed by native Southwestern farmers, for instance, are highly adapted to the local soils, climate, and growing methods that shaped them, allowing survival of the plants, along with their caretakers, under harsh, dryland conditions.

Some of these sought-after heirlooms--a drought-tolerant bean; an insect-resistant or high-protein corn; a cold-hardy tomato; or an apple variety that bears early, or stores well, or is exceptional for baking, cider-making, or fresh-eating--have fallen from favor because they are not widely adapted, or they fail to satisfy commercial production standards or mainstream tastes. These factors limit the ability of the old varieties to compete against newer introductions whose general or specific attributes (or in some cases, their novelty) have broader appeal, making them less profitable to seed and plant merchants.

Sustaining connections. Those who grow and disseminate old varieties are offered a tangible means to engage the past, and also to cultivate community relationships and associated values of participation, equity, and sustainability.⁷ Some seed savers perpetuate a family legacy, or share favorite plants with neighbors or friends. Others express community or tribal kinships by growing varieties that are central to traditional, local foods and cuisines, or to religious practices, or that embody other cultural meanings. Some who delve into the histories of particular local or ethnic varieties discover connections to fading agricultural traditions and rhythms, and to the social customs of past generations. Some heirloom advocates have taken to heart Wendell Berry's urgings to "learn the life histories of the food species," to assist in reducing the growing gap between food producers and consumers.⁸

Patronizing old varieties and exploring their histories may offer gardeners (and other eaters) the means to honor the ancient crop stewards who domesticated and further refined our food plants, or to salute the efforts of more modern plant breeders and the years of effort often invested in a single improved variety. One writer, in referring to the plant selection efforts of North American farmers in the previous century alone, has noted that the genetic base that underpins our highly productive crops, which was adapted largely from imported plant materials, resulted from "thousands of experiments by thousands of farmers committing millions of hours of labor in thousands of diverse ecological niches over a period of many decades."⁹

Preserving alternatives. Particularly within the agricultural sector, there is growing awareness that crop surpluses, supermarket abundance, and product and brand name proliferation (albeit conditions more common to the developed nations) mask a general decline in agricultural diversity, which spans farming and food systems, from farmers' fields to food processing and distribution. Of particular concern to garden stewards is the serious decline in our food plants' genetic base, as evidenced by significant reduction, especially within this century, in the range of vegetable and fruit varieties grown on farms and in gardens. According to the United Nations Food and Agriculture Organization, crop genetic resources are being lost, on a global scale, at the rate of 1-2% per year.¹⁰ Many who support the preservation of heirlooms and other "public domain" varieties are working to safeguard a portion of this diminishing legacy, and also to address the factors that have contributed to its decline, and threaten to further undermine broad public participation in food production.

In North America and similar agricultural settings, a variety of forces play out to reduce genetic richness in the crop and livestock base, and in consequence, to lessen the ecologic and economic resilience of farming systems. Despite impressive yield gains in modern production agriculture, widespread adoption of simplified farming systems with low genetic diversity carries a variety of risks. In the short term, such

systems risk potential crop failure, and in the longer term, they encourage the demise of the broad genetic base that contributes to high yields, and thus compromise the future genetic health of crop populations. The devastating ruin of the Irish potato crop during the last century, and more recent crop losses from the Southern corn leaf blight in the U.S. in 1970, signaled clearly the dangers of genetic uniformity in our staple food crops.

Especially prominent among the "enemies" of genetic diversity are the economic and social pressures that have influenced breeding practices that promote uniformity, and have encouraged extensive cultivation (within crop monocultures) of preferred varieties with low variability. In addition, these forces have stimulated decline in seed companies serving local and regional markets, and heightened losses in seed-saving traditions among farmers (themselves a disappearing breed) and gardeners.

Beyond our borders, similar influences shape events in the developing world, including the sites where many of our important food crops have originated and evolved. In some of these "centers of diversity," a variety of homogenizing forces imperil survival of vast numbers of existing "landraces," the heterogeneous, locally adapted, farmer-bred crop varieties that have traditionally supported local food producers and rural communities. Along with their wild relatives, these "gene treasures" ¹¹ deliver the genetic infusions that are needed to improve crops the world over. Here also, the results are farming systems with diminished ecological, biological, and genetic complexity, fewer farmers with reduced seed-saving skills, and impoverished natural habitats.

It is widely agreed that wise management of our biological resources is central to ensuring food abundance. While broad public interest barely exists, issues relating to plant and animal genetic resources have taken center stage within the agricultural arena. How best to safeguard diminishing plant and animal biodiversity, while enhancing crop productivity to serve expanding food and fiber needs, and also preserving social and economic equity, have become issues of serious international debate.

Concerns over "genetic erosion" (the continuing, absolute losses in crop species and varieties) are intensified by questions surrounding ownership and equitable access to plant genetic materials. Various stakeholders--from North American seed savers to Third World farmers--are apprehensive over potentially widespread use of bioengineered varieties, including the specter of "terminator" seeds that fail to reproduce.¹² Of concern also are expanded uses of legal mechanisms (such as patents and plant breeders rights, or restrictive commercial seed lists) that remove plant germplasm from public use. Alongside the many opportunities and challenges offered to the agricultural sector and society-at-large, at the farm and garden gates, these developments may work to further limit growers' access to seeds--the fundamental materials of plant breeding and propagation--and potentially to risk further declines in plant genetic diversity.

Fostering participation and choice. Preserving a measure of personal or community independence is an important motivation for many who perpetuate heirlooms and other public domain varieties, whether a grower plants a garden for the many pleasures it brings, or chooses particular foods for the table. Seed saving is inherently self-reliant, allowing people to bypass the seed trade and to maintain choice varieties

found commercially wanting, or to breed desired types themselves. (Organic growers, for instance, who seek to grow "full-cycle," are working to ensure the continued availability of organically grown seeds, which may lose quality as they become economically marginalized.) Alongside farmers' markets, community-supported agriculture, urban and community gardens, and similar initiatives, grassroots efforts to preserve heirlooms and other commonly-held varieties may contribute to efforts to return food production and consumption from "the global everywhere"¹³ to serve more locally responsive and regionally reliant food economies.¹⁴

Community-based stewardship. There are considerable ongoing efforts by national governments and international organizations to preserve plant germplasm (i.e., seeds and other plant materials) in "genebanks" (known also as *ex situ* or "offsite" storage). These measures fall short as fail-safe approaches, however, since they "protect the products of evolution, but not the process,"¹⁵ and they rely heavily on continued political stability and support, including sustained governmental funding. Although their stored plant materials are held for public use, the U.S. collections, in particular, fail to serve the direct needs of many gardeners and other small-scale growers, since the stored materials are largely those favored by professional plant breeders to improve commercial crops. Thus, the national collections consist overwhelmingly of breeding lines and other specialized types of germplasm, as well as farmers' landraces and wild relatives of crop species. The old commercial varieties and family heirlooms of various garden crops (many of them lacking the "deep diversity" typically sought by breeders), and crops with low commercial appeal, have received less priority. (Limited institutional resources, alongside the recent growth of alternative suppliers in the form of grassroots seed banks and exchanges, work also to restrict seeds and other materials to professional users who, in exchange for plant germplasm, agree to return agronomic information on the seeds and other materials received.)

Within the "PGR community" (i.e., those with diverse roles and interests in managing plant genetic resources), there is expanding support for conservation strategies that rely on more natural settings, including farmers' fields and garden plots. Managing crop resources under these conditions, which are a form of *in situ* conservation (or conservation "in place"), may serve to enhance and complement the "Noah's Ark"¹⁶ strategy that has been emphasized traditionally in the formal conservation sector. Within their original and natural environments, crop plants are subjected to particular changing conditions and stresses, and thus are continually shaped by natural selection. A further advantage, from the point of view of community stewards, is that such measures put vital plant germplasm into as many "hands" as possible. People are thus allowed continued access to plant materials valued for their horticultural, cultural, and historical relevance, and with their qualities--for better and worse--clearly visible.¹⁷

Variety's merits. As their commercial demise suggests, the old vegetable and fruit varieties are not uniformly appreciated. To some, they are retrograde,¹⁸ championed by people seeking a return to simpler times. Others doubt that quality seeds can be produced by gardeners or farmers, and farmers' breeding efforts are generally dismissed as nonprogressive. Some have disparaged the "confused condition" that accompanies varietal and name proliferation,¹⁹ and decentralized production and conservation, and question whether nonspecialists can, or should, play an important role in conserving plant genetic resources.

Among gardeners, many choose freely among the growing array of old and new varieties currently available, acknowledging the gains (such as improved disease and pest resistance) conferred by plant breeders, and advances in seed purity and quality provided by professional seed producers. Heirloom promoter Carolyn Jabs has acknowledged, for instance, that in light of modern breeding work, as well as changing tastes and environments over time, "some heirlooms do resemble museum pieces."²⁰ Likewise, Seed Savers Exchange co-founder, Kent Whealy, has asserted that the network is not "anti-hybrid," but he points out that the ascendancy of modern hybrids has loomed large in the "wholesale destruction of traditional standard varieties."²¹

Narrowing discussion of the values of old and new varieties to their respective horticultural merits ignores the broader appeal of traditional varieties--as cultural, historical, and genetic resources--and deflects the complex issues that surround their use. Focusing attention on "need for improvement" in old varieties discounts the potential tradeoffs in terms of diversity, quality, and broad public participation that have accompanied specialization, standardization, and consolidation in agricultural production.²² Or, to paraphrase another observer, "[E]very seed of change, whether accidental or incidental, [has] both positive and negative consequences."²³

In the end, the question of whether old or new varieties are "better" remains elusive, since the answer implies values and priorities: Better for whom, and for what purposes? As seed activists Cary Fowler and Pat Mooney have written, "Someone else's seeds imply someone else's needs."²⁴ Growing old varieties allows people to express their individual tastes and preferences, and their personal or commonly-held beliefs about what is worth sustaining. As Carolyn Jabs has put it: "In a world...changing so rapidly, one of the most meaningful things we can preserve...is a full range of possibilities."²⁵

More than seventy-five years ago, Liberty Hyde Bailey asked readers of *The Apple Tree*, "Why do we need so many kinds of apples?" His answer--"Because there are so many folks."²⁶ In the same book, the eminent American horticulturalist lauded the part played by the "amateur" in creating, appreciating, and preserving variety in our domestic fruits, declaring that "when we lose the amateur, we lose the ideals."²⁷ Professor Bailey anticipated the views of modern heirloom stewards when he stated that "...there is merit in variety itself. It provides more contact with life, and leads away from uniformity and monotony."²⁸

A note on terminology: The terms used to describe old varieties are varied and often used loosely. Some writers lump together such terms as landraces, and folk, traditional, indigenous, or heirloom varieties. Others make distinctions among these different terms, reflecting differences in the geographic and cultural histories of old varieties (and thus their genetic diversity aspects). The term "landraces," for instance, is favored by scientists and seed professionals to indicate the particular kinds of old varieties that are farmer-selected in areas where local subsistence agriculture has long prevailed. (According to this usage, among the New World crops, "landraces" is most accurately applied to the varieties of corn, squash, and beans, for instance, that were domesticated by native farmers, and further modified by native and also immigrant farmers.)

For the purposes of this publication, the term "heirloom" is used broadly and synonymously with such terms as traditional, vintage, antique, heritage, or classic, since each of these terms conveys the age and perceived value of heirlooms, but says little about who grows them, or where, or how. This usage follows that of plant breeder, Carolyn Deppe, who describes the seed-propagated vegetable heirlooms as "any old open-pollinated variet[ies] that [have] been around for a while."²⁹ Also for this publication, the term "historical varieties" denotes the distinct plant types known from historical documentation; when they still exist today, they are called "heirlooms" or the equivalent. Otherwise, the terms used to describe old varieties are adopted, or inferred, from the respective authors' more specific or contrary usage.

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2. Scope of Publication

This guide is contained in a series of three separate volumes. It focuses on the published literature, organizations, and other informational resources pertaining to heirloom vegetable and fruit varieties, and community-based stewardship of these and other public-domain varieties. The materials and contacts selected for inclusion document and illuminate current interest in traditional varieties in their many guises--as garden plants, breeding materials, or cash crops for small farmers; as living history and living culture; for local flavor, local memory, and local economy; as museum pieces; and as expressions of personal conviction and social action intended to reshape food landscapes. Included are citations and resources that provide information on how garden plant genetic diversity originated, why it is threatened, and how it is utilized, and the range of conservation approaches being used by citizens groups and individuals.

Featured also in this series are references to selected publications and other resources that deal with the varietal and historical aspects of six garden vegetables, including tomatoes, corn, *Capsicum* peppers, *Phaseolus* beans, squash and pumpkins (*Cucurbita* species), and potatoes (*Solanum tuberosum*). In addition to their importance as economic crops, and their popularity among gardeners and seed savers, each of these crops originated in the Americas, having been domesticated and further refined by Native American farmers prior to worldwide dispersal. A selection of books, articles, bibliographies, periodicals, and Internet sites provide information on the horticultural traits of old varieties of these New World crops, and also their social histories and genetic diversity. Accompanying these citations are selected references on more general features of New World crop varieties and traditional farming and gardening systems in North America.

Heirloom apple varieties are, for a variety of reasons, especially popular among the temperate zone fruits grown by home orchardists and collectors. Accordingly, this fruit is featured in the books, agricultural reports, and articles cited in this resource guide.

To further restrict the scope of this publication, certain subject areas that provide context to modern interest in heirlooms, and illuminate plant genetic resources issues, are covered in a more limited way. These topics include the current and historical roles of the seed industry and modern plant breeding, and issues and developments pertaining to plant biotechnology, intellectual property rights, and formal plant germplasm conservation goals and efforts. For these topics, selected citations were chosen to represent current issues and the larger literature.

This guide focuses on so-called "domesticated" biodiversity. Thus, the biodiversity aspects of wild plants and ecosystems (the central focus of the field of conservation biology, and immensely important to the continuing evolution of cultivated plants) are beyond the scope of this publication. A handful of citations are included to suggest the broader literature on these topics, and along with several bibliographies and Internet sites, may guide readers to additional sources of information on "wild" biodiversity--said to serve as "grist for the agricultural mill."³⁰

Also little emphasized are the traditional varieties of important agronomic crops (such as wheat and rice), which are vital from a genetic resources and food security perspective but seldom grown by North American gardeners. The crop varieties grown in farms and gardens in tropical areas and less well-developed agricultural settings, and their management, also receive minimal focus. Selected citations serving only to "scratch the surface" of the extensive and expanding literature on these subjects are included, and are supplemented by bibliographies, current periodicals, and Internet sites that may aid researchers and others interested in these subject areas.

Volume 1, Annotated Bibliography describes relevant books; articles from magazines, journals, and newsletters; current and recent periodicals; and videos. Included also are a number of bibliographies and resource guides that point readers to additional information and expand upon subjects treated less thoroughly in this publication, or, in the case of the resource guides, identify additional sources for seeds, plants, and other materials. Most of these materials date from the 1970s to late 1990s. For the most part organized into format categories, these documents emphasize heirloom interest in the U.S. and other places (especially Canada, the U.K., and Australia) where the English language literature predominates, and where there is parallel interest in traditional crop varieties, within similar societal contexts. This volume cites also publications that explore the genetic diversity and conservation of food crops grown in North America (centering on the vegetables and fruits grown in gardens), and including farmer- and community-based stewardship initiatives.

Volume 2, Resource Organizations contains contact information for a variety of organizations involved in the conservation and use of varietal diversity in garden vegetables and fruits, with brief summaries of their respective missions, scope of activities, and types of resources available. Included are membership-based seed trusts and exchanges, and fruit hobbyist groups, along with a variety of other governmental and nonprofit organizations or programs that are working in various areas relating to the management of crop genetic resources. Also described is a selection of public gardens and living history museums with heritage garden displays and programs, and commercial firms that specialize in selling older varieties of vegetables and fruits, or offer notable selections of regional, open-pollinated, or heirloom varieties.

For the public gardens and museums, fruit hobbyist groups, commercial seed and plant sellers, and governmental conservation programs, organizations and programs within the U.S. are emphasized. A selection of commercial firms and the governmental genebank program in Canada is included also. Seed banks and exchanges emphasize U.S. organizations also, but include a number from several other English-speaking countries.

Information on seeds, plants, publications, and other materials available from commercial companies or nonprofit organizations was obtained directly from 1998 or 1999 sales catalogs (and for many, Internet home pages also). In some cases, information from secondary sources was included. Source data are provided for information only and their inclusion does not indicate or imply any endorsement or guarantee.

Volume 3, Historical Supplement is an annotated bibliography on the vegetable and fruit varieties once grown in North American temperate-zone gardens, and thus serving as ancestors to today's existing "heirlooms." In addition, it focuses on historical aspects of garden vegetables and fruits, including their origins, travels, development, and commerce.

Part I cites historical books, agricultural bulletins and reports, and periodical articles published in the U.S. or Canada, and dating to the period 1863 to 1954. Most of these publications compare and evaluate contemporary vegetable and fruit varieties. Thus, they indicate the "changing variet[al] picture,"³¹ and to large degree, what has come and gone within the garden. Although selected for their value in providing information on crop varieties *per se*, some of these publications convey also additional historical dimensions of garden plants and gardening, plant breeding, and commercial horticulture. (A few of these publications have been reprinted and are currently available from publishers or distributors--see below concerning access information.)

Within this volume, cited bulletins and reports from U.S. and Canadian agricultural stations or agencies, or horticultural institutions stem from the period 1886 to 1941. Some of these are classics and frequently cited; others were chosen to represent the format and scope of the existing literature, and by so doing, to indicate the varietal diversity that formerly existed on a regional and local level in farms and gardens, and also the scope and nature of the work done to characterize and utilize it, and further its development. With subject scope that is parallel to *Volume 1, Annotated Bibliography*, this volume features, among the fruits, historical apple varieties, and among the garden vegetables, six crops native to the Americas, including corn, tomatoes, peppers, beans, squash and pumpkins, and potatoes.

Part II of *Volume 3* cites contemporary books, articles, and bibliographies that address primarily the historical aspects of garden vegetables and fruits, early histories of crop plants, and development of the commercial seed and nursery trade in North America. Most of these publications were selected from current literature (1970s to 1990s), while several notable works date to earlier periods.

Audience and Availability. This resource guide is intended primarily for gardeners, collectors,

community-based curators, and small-scale farmers who are actively growing or interested in growing heirlooms, or for anyone interested in the garden heirloom movement and current issues and events relating to the management of crop genetic resources. Publications were chosen for their potential relevance to, and suitability for, these particular readers. The majority of cited publications (including popular books as well as agricultural and scientific reports, and reference works) are contained within the collections of the National Agricultural Library (NAL) and its affiliate, the U.S. National Arboretum Library. (These materials are identified with NAL or ARB call numbers, respectively).

Specific tools found useful in locating relevant publications included ISIS (Integrated System for Information Services, NAL's computerized card catalog) and NAL's Dictionary Card Catalog. The latter, which contains citations to the Library's catalogued publications dating from 1862 to 1965, was especially valuable in identifying a portion of the historical works cited in *Volume 3*, although many of the older USDA publications from this period are referenced also in the computerized catalog.

Many of the article citations were selected from gardening magazines and farmers' publications. Others are contained in popular magazines written for more general audiences, or in scientific and trade publications. Articles from the latter group of more specialized publications provide overviews of subject areas, in many cases, or may interest researchers seeking more in-depth information. For the most part, they are written in nontechnical language for a broad readership (many of them contained in scientific periodicals intended for nonspecialist readers, such as *BioScience* or *Scientific American*). A few journal articles that are more technical, but are included for their special subject coverage or value as reference works, are noted as such. A portion of the periodical citations were identified with the aid of several indexes and databases, including [AGRICOLA](#) (1979-1997), Biological & Agricultural Index (1983-1997), Magazine Index (1980-1997), *Garden Literature* (1992-1994), and *Gardener's Index* (1986-1994). Others were selected from back-of-the-book reference lists or similar source materials.

For the books, videos, resource guides, and bibliographies cited in Parts I and II of *Volume 1, Annotated Bibliography* (most of them recently published), information on the availability of these materials, when known, is provided at the end of each content summary. For some books that are widely available from seed exchanges and plant sellers, two-letter codes indicate selected retailers, the codes corresponding to a list found within the Appendices of *Volume 1* and *Volume 3*. Additional description of these organizations or firms is provided in *Volume 2, Resource Organizations*. When known, information on current commercial availability (i.e., books are designated "in print" or "out of print") is provided also. Subscription and contact information is provided also for the magazines and newsletters whose content summaries are found in Part IV of *Volume 1, Annotated Bibliography*.

Several 19th-C. books that document garden vegetables of the period, and also contemporary home or market gardening, have been reprinted and are available from new-book sellers. These publications are cited along with other historical works in Part I of *Volume 3, Historical Supplement*.³²

Together, *Volume 1, Annotated Bibliography*, and *Volume 2, Resource Organizations*, identify a variety of resources available on the Internet, including original documents, articles or bibliographies first

published in print form, and home pages of various individuals and organizations. Except for the miscellaneous Web pages cited in *Volume 1* (Part 1, Section 7), Web addresses and related information are otherwise found throughout the two volumes, in conjunction with respective organizations or documents. Web sites were reviewed during August to September 1998, thus the descriptive summaries reflect their informational content during this time period, which may change as the sites evolve over time.

Since there is considerable topical overlap among the subjects, organizations, and individuals dealt with in *Volume 1* and *Volume 2*, and these volumes are both largely concerned with the present-day aspects of heirloom varieties, these two portions of the guide were conceived to complement each other. Some cross-references, especially those not revealed through the separate indexes, are provided within the annotations accompanying each citation. More complete cross-referencing is provided by the indexes that supplement each volume. For each volume, titles to publications (excluding Web documents), and the names of relevant organizations and persons (as authors, publishers, or major subjects) are indexed.

Volume 3, Historical Supplement, was intended, in part, to aid researchers in documenting the histories of modern heirlooms, and especially in embarking on historical research at the National Agricultural Library, since each publication cited in this volume is contained in the Library's General Collection (although many can be located elsewhere as well). Because the subject area may have less interest for many readers, and since many of the publications are out of print and thus less readily available, this volume was prepared as a "supplement," with minimal cross-referencing to other volumes.

An excellent general resource for conducting historical research at NAL on crops, crop varieties, and related historical subjects is Susan Chapman's publication, *Guide to Historical Research at the National Agricultural Library: The General Collection*.³³ Configured as "an entree to historical research" at the Library, this publication, which emphasizes American and English-language documents, identifies a variety of print and nonprint materials, including documents that serve as guides to the historical agricultural and horticultural literature contained in NAL's General Collection.

NAL's Special Collections, consisting of rare books and manuscripts, photographs, archival materials, artwork, and audiovisual materials, serve as the focal point for specialized historical research at the Library. As the contents of *Volume 3* suggest, a wealth of 19th-C. and early 20th-C. documents on old plant varieties and related subjects are part of the General Collection. (An important exception that may be useful to researchers is the Library's Nursery and Seed Catalogs Collection, which provides extensive coverage of post-1890s catalogs from North American firms.) In general, due in part to the wealth of general background materials in the main part of the Library, NAL recommends that researchers start their work in the General Collection. (For more information on reference materials, research assistance, and visiting hours, or to obtain an illustrated 18-page pamphlet, *Our Agricultural Heritage* (rev. edition Oct. 1987, NAL aZ765.A8N37) contact Special Collections, National Agricultural Library, 14th Floor, 10301 Baltimore Blvd., Beltsville, MD 20705, tel. 301-344-3875, e-mail speccol@nal.usda.gov.)

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(Brief citations that identify only author, title, and publication year indicate that a work is cited fully elsewhere in this resource guide.)

1. K. Whealy and J. Thuente, *Garden Seed Inventory*, 1995, Intro., p. 4. (Countering this varietal loss, nearly 1800 new varieties were introduced, or reintroduced, into commercial trade during this period. This section of the book provides abundant statistics on crop varieties and North American seed companies.)
2. C.L. Calhoun, 1995, *Old Southern Apples*, p. 37.
3. P. C. Manglesdorf, 1951, "Hybrid corn," *Scientific American*. The author referred specifically to the hybrid mule, which although having greater endurance than either of its parents, the horse and ass, is "without pride of ancestry or hope of posterity." Likewise, crop hybrids can be said to lack a popular and distinct history (since their parentage is kept a trade secret), and although some will regenerate from seed, in practice they no longer serve as the germline of future generations.
4. T.M. Barrett, 1992, "A heritage of seeds and stories," *Small Farm Today*.
5. G.P. Nabhan, *Enduring Seeds*, 1989, p. xxii.
6. A. Walter, "Beauty: A reason behind the genetic diversity in beans," *CIAT International* 11(2) :10 (Oct. 1992), NAL S540.8.C4C53.
7. N.C. Alexander, "Healing community: restoring creation," *Earth Ethics* [Public Resource Foundation, Washington, DC] 2(3): 1,3-5 (Spring 1991). The author proposes that community as the central value is essential towards realizing more sustainable use of the world's resources.
8. W. Berry, 1990, "The pleasures of eating," *Our Sustainable Table*, p. 125-151. This essay appears in similar form in the author's collection of essays, *What Are People For?* (San Francisco: North Point Press, 1990, p. 145-152, NAL AC8.B4). Berry cites additional ways to participate in and learn about food production, in order to "eat responsibly." Similarly, food historian Sophie Coe has asserted that knowing the history of foods consumed will lend them respect, and honor those who have helped make them edible; she writes that "The origin of the bean, or of the potato, should be part of the landscape of everybody's mind, so that eating is not just an automatic process." (p. 250 in *America's First Cuisines*, 1994).
9. J. Kloppenburg, 1988, *First the Seed: The Political Economy of Plant Biotechnology, 1492-2000*, p. 56.
10. *Plant Genetic Resources* (Rome: U.N. Food and Agriculture Organization, 1993, Development Education Exchange Papers); cited in H. Shand, *Human Nature: Agricultural Biodiversity and Farm-based Food Security*, 1997, p. 1.
11. O.H. Frankel et al., "Landraces in transit--The threat perceived," *Diversity*, 1995.
12. See, e.g., Anon., "New patent aims to prevent farmers from saving seed," *In Good Tilth* [Oregon

- Tilth]: 13 (Mar./April 1998); or H. Shand and P. Mooney, 1998, "'Terminator Technology' prevents farmers from saving seed," *Global Pesticide Campaigner*.
13. J. Kloppenburg et al., "Coming into the foodshed," *Agriculture and Human Values* 13(3): 33-42 (Sum. 1996), NAL HT401.A36.
 14. See, e.g., G.W. Feenstra, "Local food systems and sustainable communities," *American Journal of Alternative Agriculture* 12(1): 28-36 (1997), NAL S605.5.A43, for a review of current thinking and various initiatives relating to local food economies, which the author supports as "logical and appropriate way[s] to revitalize a community." For an exploration of the value of local production for local needs, see M.H. Shuman, *Going Local: Creating Self-reliant Communities in a Global Age* (New York: Free Press, 1998, 306 p., NAL HC110.E5S49 1998), especially p. 58-63 on food production.
 15. S. Lustgarten, "Draining the gene pool," *Vegetarian Times*, 1993.
 16. K. Dahl and G.P. Nabhan, *Conservation of Plant Genetic Resources: Grassroots Efforts in North America*, 1992, p.1,23.
 17. Many participants and observers support conservation of crop genetic diversity through use. C. Fowler and P. Mooney, e.g., contend that "agricultural diversity will not be saved unless it is used...[and] only in use can diversity be appreciated enough to be saved." (See "Five laws of genetic conservation," *Shattering: Food, Politics, and the Loss of Genetic Diversity*, 1990, p. 218-219.)
 18. See, e.g., C. Jabs, *Heirloom Gardener*, 1984, p. 14. (A seedsman equates heirlooms with medieval medicine.)
 19. W.W. Tracy, Jr., *American Varieties of Garden Beans*, 1907, p. 3. Referring to crop varieties attuned to local conditions, C. Jabs notes that "nature thrives on messy diversity." (*Heirloom Gardener*, p. 17.)
 20. C. Jabs, *Heirloom Gardener*, p. 97.
 21. Anon., "Seed savers see their activity as essential," *Biotechnology/Diversity Week* 3(7): 7 (Mar. 25, 1994), NAL S494.5.B563B5684.
 22. In addition to many of the publications cited in this resource guide, for an introduction to the literature of agricultural sustainability, see G. Hegyes and C.A. Francis, eds., *Future Horizons: Recent Literature in Sustainable Agriculture*, University of Nebraska-Lincoln, 1997, Extension and Education Materials for Sustainable Agriculture, Vol. 6, 221 p. See also C.E. Beus et al., *Competing Paradigms: The Debate Between Alternative and Conventional Agriculture*, Research Bulletin no. XB1020, Washington State University, 1991, 80 p., NAL S541.5.W2R47. This report examines underlying themes and values in the current debate on competing perspectives in agriculture, whose key elements include centralization vs. decentralization; dependence vs. independence; competition vs. community; domination of vs. harmony with nature; and specialization vs. diversity.
 23. H.J. Viola and C. Margolis, eds., *Seeds of Change: A Quincentennial Commemoration*, 1991, p. 15. (Here the authors refer to the biological transformations accompanying the first encounters of the New World and the Old.)
 24. C. Fowler and P. Mooney, *Shattering: Food, Politics, and the Loss of Genetic Diversity*, 1990, p. 218. Others have similarly examined how human cultural values shape the genotypes of our crops. Wes Jackson has written that our major food crops contain "Chicago Board of Trade genes"

(*Becoming Native to This Place*, University Press of Kentucky, 1994, p. 21, NAL GE195.7.J33 1994). For other analyses, see V. Shiva's *Monocultures of the Mind: Perspectives on Biodiversity and Biotechnology*, 1993 (Ch. 1, p. 9-64); B. Kneen's *Rape of Canola*, 1992, and J. Kloppenburg's *First the Seed: The Political Economy of Plant Biotechnology, 1492-2000*, 1988. Many of G. Nabhan's works (see, e.g., *Enduring Seeds*, 1989) explore the shared destinies of Native American crops and cultures.

25. C. Jabs, *Heirloom Gardener*, 1984, p. 4.
26. L.H. Bailey, *The Apple Tree*. New York: Macmillan, 1922, Open Country Books no. 1, p. 68, NAL 93.31 B15A
27. Bailey, op cit., p. 77.
28. Bailey, op cit., p. 68.
29. C. Deppe, *Breed Your Own Vegetable Varieties*, 1993, p. 115.
30. D.R. Miller and A.Y. Rossman, "Systematics, biodiversity, and agriculture," *BioScience* 45(10): 680-686 (1995), NAL 500 Am322A.
31. H.M. Darling, "North American potato varieties," *1959 Potato Handbook*.
32. These 19th-C. works existing as modern reprints include: F. Burr's, *Field and Garden Vegetables of America*, P. Henderson's *Gardening for Profit*, A.W. Livingston's *Livingston and the Tomato*, and G.L. Wilson's *Buffalo Bird Woman's Garden*, and Vilmorin's *Vegetable Garden*.
33. S. Chapman, *Guide to Historical Research at the National Agricultural Library: The General Collection*, Beltsville, MD: National Agricultural Library, 1994, Special References Briefs 94-02, 92 p., NAL aS21.D27S64.

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