An Investigation Into the Design Qualities, Ecological Requirements, and Potential Use of Some Native Trees and Shrubs of the Mountains of Northeastern Utah

Richard K. Sutton
AN INVESTIGATION INTO THE DESIGN QUALITIES, ECOLOGICAL REQUIREMENTS, AND POTENTIAL USE OF SOME NATIVE TREES AND SHRUBS OF THE MOUNTAINS OF NORTHEASTERN UTAH

by

Richard K. Sutton

A thesis submitted in partial fulfillment of the requirements for the degree of

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Approved:

Major Professor

Committee Member

Committee Member

Dean of Graduate Studies

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Richard K. Sutton
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ABSTRACT

An Investigation into the Design Qualities, Ecological Requirements and Potential Use of Some Native Trees and Shrubs of the Mountains of Northeastern Utah

by

Richard K. Sutton, Master of Landscape Architecture
Utah State University, 1974

Major Professor: Craig W. Johnson
Department: Landscape Architecture and Environmental Planning

The purposes of this paper are threefold: 1) To provide a justification for the increased use of native plants in mountain land development, not only in northeastern Utah, but in the entire western United States. 2) To investigate and delineate what the physical needs of a plant materials list are. 3) To provide a nearly comprehensive list of basically unused plants native to northeastern Utah and to highlight their landscaping potentials based on the earlier investigation.

Also touched upon, to help landscape architectural students and professionals alike, are two cursory case studies and a chapter which deals briefly with the problems of nursery supply of native plants and the potential and future research.

(197 pages)
CHAPTER I

Problem Statement

The rich and diverse flora found in the mountains of northeastern Utah contains trees and shrubs which have seen little use by landscape designers in the Intermountain area. The bulk of native plants, which are adapted to varied mountain sites, have, however, been ignored for many varied and interdependent reasons. Some natives, such as blue spruce (*Picea pungens*) and the creeping Oregon grape (*Berberis repens*), have gained popular use, but there remains a vast, unnoticed body of plants which have not been tapped for landscaping purposes (Box, 1972; Blaisdell, 1972; Stark, 1972; Van Dersal, 1972).

The first apparent obstacle is that many landscape architects are relatively uninformed regarding the benefits derived from using native plants. Secondly, even if the designer wants to use the native plant, he often does not know or cannot obtain facts about native plants which would allow him to make a design choice; or he may find the needed information incomplete, unavailable or undecipherable. Thirdly, in order to produce coherent designs with native plants, he needs planting plans which utilize native plants which he can study for comparison and criticism of his own work. Lastly, the fourth and greatest barrier to the use of native plant materials is simply the fact that local nurseries have not found it necessary or profitable to carry native plant materials.
Objectives

The objectives of this thesis are, therefore, to mitigate the obstacles in the way of widespread use of the native mountain plants of northeastern Utah. The following steps will be taken to eliminate these obstacles:

1) Describe potential uses and benefits of native plants in solving landscape architectural design problems.

2) Develop the historical/philosophical context, practicality, and justification for the use of native plants.

3) Determine what facts should be known about a native plant if it is to be used intelligently.

4) Ascertain what format should be used to display usefulness.

5) Develop a list of selected trees and shrubs of the mountains of northeastern Utah with a body of factual information in a retrievable format for each individual plant.

6) Present a planting design case study, using the plant list.

It is beyond the scope of this thesis to ameliorate the problem of supplying native plants. However, a cursory overview of this obstacle as it now exists will be given with suggestions for further research.

Problem Resolution

Presented in the balance of this chapter is a wide scope of problems which native planting design and native plant information can be a major asset in resolving.
Mountain land development problems

The development of Utah's northeastern mountains is being felt as an offshoot of the expansion of the Wasatch Front. While all the inherent problems connected with large scale land use/planning/zoning/allocation are being wrestled with on many fronts, i.e., environment impact statements, county-wide master planning and regional councils of government, there are increased demands being placed on undeveloped plots for summer and winter recreation complexes, both large and small, governmental and private (Barker, 1972). In the period 1962-1972 seven counties in northern Utah (Cache, Duchesne, Morgan, Rich, Summit, Tooele, and Wasatch) recorded 223 rural subdivisions consisting of 18,293 lots and covering over 37 square miles (Johnson, 1973). With this activity comes the companion pressures for roads and commercial development. However, even ecologically sound and well-functioning facilities, from recreation communities to new roads or campgrounds, cannot be construed as fitting or harmonious if the site detail scale, including planting design, lacks intelligent forethought when applied to a local landscape (Odenwald, 1960; Barker, 1972).

While much of Utah's mountain landscape is in the public trust, large tracts remain in private hands. It is this private portion that is ripe for development and which, if not properly planned from concept to detail, can lead to disastrous results. Five land development characteristics typify the impacts of unplanned mountain development on the existing plant community:

1) Complete removal of vegetation from the site.

2) Partial vegetation removal and no replanting.
3) Planting with exotic species.

4) Possible planting failure due to incorrect selection.

5) Native vegetation destruction caused by the impact of overuse.

Park City West, a Wasatch Front skiing resort, illustrates what happens when the natural topography and vegetation are ignored. Plant materials were clearcut, hills were stripped to substrata or completely obliterated. Such treatment severely threatened the remaining plants and limited their re-establishment on the slopes as well as generating a host of other problems, such as accelerated runoff, serious soil erosion, and subsequent water pollution.

Bridgerland Village, a vacation home subdivision on the west side of Bear Lake, Utah, has a conglomeration of A-frame and log cabins linked by sinews of barren road cuts. No attempt appears to have been made to replant these cuts with any plant material, let alone native plants. Due to the harsh exposure, natural revegetation will be retarded for years. Meanwhile, the vacation homes rise incongruously from sagebrush slopes which offer little to soften the visual lines of the buildings, provide protection from the winter winds or the summer sun, or abate soil erosion.

However, Bridgerland Village has not been established long enough to become the horticultural collage that one finds in Ogden Canyon, where the myriad of exotic and domestic plants inevitably clash with the surrounding natural landscape.

The specter of incorrect plant selection can be a costly experience. Stansbury Park, near Tooele, Utah, though not located in the mountains, is having severe plant selection problems because of the highly saline/
alkaline soil. The developers are forced to use salt-tolerant plants, thus limiting their selection and eliminating most large trees so essential in assuring some type of quality living environment for the buyers.

The government is not immune to questionable site planning as related to the existing plant community and new planting; the following quote is found in Barker (1972) and deals with public campsites: "On site after site, use has become so heavy that it exceeds the area's capacity to regenerate itself ... the visitor is faced with a sooty, dusty pad reminescent of a hobo jungle." (Tocher, Wagar and Hunt, 1965) Barker (1972) also goes on to question the criteria used to choose plant material for use in campgrounds—ease of propagation and availability, not the adaptability, local harmony or the sense of place native plants can supply.

**Additional Problems**

The destruction of native plant communities and the introduction of exotics perpetuate three problems which are worth investigating in further detail. They are: ecological destruction and degradation, visual harmony, and adaptation and maintenance.

**Ecological destruction and degradation**

Each plant carries a gene pool of information, much of which is related to the ecological adaptability of that species to a general environment. A species may have within it an ecotype with genetic differences relating to an even more limited or narrower environmental range (Stark, 1966; Ackermann, 1972; Anderson and Holmgren, 1969;
Shubert, 1973). These various ecotypes are much of what makes up the diversity and stability of a natural landscape. By inclusion of domestic plants of genetic uniformity and the exotic plants which have no niche, man leaves the door open to disasters in the form of fire, insects and disease (Odum, 1966; Billings, 1971; Lynch, 1971).

Destruction of the native gene pool or disruption of the native habitat reduces the genetic material plant breeders use to produce better domestic stock (Ackermann, 1972; Marine, 1969; Darling and Milton, 1966) as well as use for standards of comparison (Brown and Schomaker, 1973). Dr. Darnell of Marquette University put it quite simply when he told the United States Senate, "Our most valuable resource, [is] the native species of plants, animals and microbes which are of enormous potential use to our civilization." (Marine, 1969, p. 34)

There are many subtle and often unforeseen ways in which degradation of the environment and the introduction of exotics are made manifest. The effects of common nursery stock planted in Utah's mountains may be as dramatic as those experienced in Tucson, Arizona, where the tide of easterners bringing their favorite trees and shrubs have so "polluted" the once pollen-free air so as to raise the levels 1500 percent in thirty years (Maggio, 1973). The neighboring state of Wyoming, by planting an exotic grass along its highways, has created a potential death trap for deer and motorists. Since native grass was not used along the right-of-way, an earlier-greening exotic lures deer to the roadside in the spring with a resulting increased incidence of accidents (Olofson, 1973).
Visual harmony

A more esoteric, but no less important, aspect concerns the visual harmony native plants contribute to a landscape's character. This is not a radically new concept. Theophrastus, a Greek naturalist, 2,300 years ago said of the importance of position and climate, "Now all [trees] grow fairer and are more vigorous in their proper positions; for wild no less than cultivated trees, have each their own positions ..." (Kormandy, 1965, p. 2). Linneaus, the father of modern taxonomy, likewise said, "The native places or stations of plants respect the country, climate, situation, and nature of the ground, earth and mould." (Kormandy, 1965, p. 4)

Man now seems to have a penchant for laying his hand heaviest on those landscapes he wishes to escape into for a look at a naturally functioning community (Odum, 1966). If one looks at the natural landscape, he will see nature working well to integrate forms, color and texture, creating harmony with native plants (Jensen, 1936; Halprin, 1972; Bye, 1969; Hanson, 1967). John Simonds in his book, Landscape Architecture, gives what he feels is a solution to the preceding problem.

With only the visual aspects of site character in mind, it would seem that in developing a natural landscape area we should do all that we could to preserve and intensify its native landscape character. We would therefore eliminate objects that were out of character and might even introduce objects to increase or accentuate this character. (Simonds, 1961, p. 18)

What, then, is harmony? Simonds (1961, p. 6) offers this contrast as a definition: "Man instinctively seeks harmony; he is repelled by disorder, friction, ugliness and the illogical." Site planning expert
Kevin Lynch (1971, p. 5) sums up the use of harmony when he says, "Every site, natural or man-made, is to some degree a web of things and activities. That web must be understood, it imposes limitations, it contains new possibilities. Any plan, however radical maintains continuity to the pre-existing locale. Understanding a locale demands time and effort." Many of the preceding examples illustrate the results of violating a landscape's character through insensitive planting.

Adaptation and maintenance

The growth rates and reproduction ability of many domestics are not up to par when used in the harsh and varied climates of a mountain landscape (Barker, 1972; Shubert, 1973; Squilance and Silen, 1962; Van Dersal, 1972). Time and money are thus lost by destroying native vegetation and then planting to inferiorly adapted domestics (Hanson, 1966).

Also, maintenance costs are increased with the use of exotic plants. Frequent fertilizing, watering or pruning can be expected with non-natives. Noting that, landscape architect Neil Porterfield (1969) stated this about a newly designed college campus in Wisconsin: "It is our premise that a landscape planned in accordance with and maintained by practices simulating nature's own processes will reduce maintenance." One can not simulate nature's processes with plants from a wide range of exotic places. While this improper selection of plant materials would mean not only a loss of growth and establishment time, as well as the cost of planting and material, it can mean a loss of enthusiasm for the home owner (Fisher, 1959).
There are examples where the use of native plants has integrated, ecologically and aesthetically, a development with the natural landscape. Sea Ranches, a recreation community north of San Francisco, is an excellent example of the harmony created and reflected within the natural landscape through proper planting. Planting restrictions specify only native plant material, and, when combined with the architecture of natural wood and roof pitches reflecting the surrounding hillslopes, the results are a true wedding of site and development. The designer, Lawrence Halprin (1972, p. 126) describes it this way: "The architecture and the land enhance each other. What has been planned is an environment in which man and nature, with mutual respect, look after one another in a biologically ordered way." But, because of ignorance, few developments follow Sea Ranches' example.

This type of development is now scarce but would be the logical step to be following when designing sites for mountain living in Utah also.
CHAPTER II

Introduction

The purpose of this section is to review ideas promulgated by persons who have been interested in using native plants or designs suggesting natural landscapes. The list of those people chosen is by no means exhaustive, nor are they all landscape architects, but they represent the related fields of horticulture or ecology. They also represent a good cross section of theory and practice of the use of native plants at a natural level of design. Some of those selected have written material that approaches philosophical discussion, but these are often accompanied by a body of factual experience and design theory gained from the use of native plant material. The review is therefore 1) supportive by illustrating aesthetic, functional and philosophical justification for the study. It is also 2) instructive by showing how the individuals selected define, interpret or use terms such as: style, appropriateness, naturalistic, and character.

A survey of written material, as an alternative to site visits which time and money will not allow, was chosen for a means of review. In order to attain a historical and developmental view, the persons are discussed in chronological order. Those chosen include:

1) F.A. Waugh
2) Jens Jensen
3) Wilhelm Miller
4) Brian Hackett
5) Lawrence Halprin
6) Warren G. Kenfield

Review

F.A. Waugh

F.A. Waugh (1901), a professor of horticulture at the University of Vermont, proffered at the turn of the century a very explicit treatise on the styles and methods of what he refers to as the art of "landscape gardening." To Waugh there appeared to be two predominant styles of landscape design which a designer or artist worked within to promote an overall unity in his composition. He traced the natural style from the Romantics of England and offered principles for its attainment. This style strongly influenced American design at that time, especially through the work of English landscape gardeners Capability Brown and Humphrey Repton. The architectural style of landscape design is briefly discussed as to its history and difficulties of its appropriate use.

There is proffered a third style which he considers as being different from the first two. Here Waugh encompasses landscape painter William Gilpin's definition of picturesque as the essence of this different style. Its qualities are those of vastness, broken and rough forms in plant materials, the skylines and the ground planes. Other qualities found in picturesqueness are dark monotones and deformed specimens used judiciously and in a small number. Waugh (1901, p. 41) says, "... it is not improper ... to designate the peculiar beauties of
mountain scenery as picturesqueness." In short, it is neither English garden (natural) or architectural.

Waugh's discussion of propriety and appropriateness derives from the subtle compositional aspects of style and character. He feels that a good design may be executed and totally fail because of the lack of either style or character as influenced by the intended use, or the surrounding area. Simply, appropriateness can be thought of as design within the context of its use and surroundings, and here Waugh was possibly alluding or implying the use of native plants.

However, not until 1944 did Professor Waugh enter any comment of the use of native plants; in his book, *Everybody's Garden*, he says, "There is a most deep, perverted and curious prejudice existing widely against the wild plant and in favor of its cultivated sister. The wild plant is a weed. The fact that the weed has more genuine grace and beauty than the half sick exotic in the garden seems to be overlooked." (Waugh, 1944, p. 106) He defends this point of view on the basis of natural profusion and the ecological adaptability of native plant materials.

**Jens Jensen**

Jens Jensen, a Danish emmigrant, was possibly the greatest master of native planting design to ever work this art in the United States. His actual period of private practice stretched from approximately 1900 to 1940. While, with only one exception, his work centered in the midwest prairie region of Illinois, his philosophy about native plants is easily extrapolated to most regions of distinctive landform, soils,
climate and vegetation. Jensen was able to clearly perceive this regional character. Even though he operated most effectively in a narrow geographic area, the midwest, in his book, *Siftings*, Jensen (1936, p. 119) clearly states this theme, "Whether home is out on the prairies, in the hills or the mountains or along the river valleys, its character must be in complete harmony with the expression from which it grew." In a broad geographical sense, Jensen was referring, no doubt, to Waugh's term appropriateness.

Jensen's style was naturalistic to the minutest degree, but overall, he had a greater influence in defining and strengthening that style rather than being held directly under its sway. Though he did execute some of the most important urban parks in Chicago in the early 1900's, such as Columbus Park, Jensen was not an urban designer. His realm of work, with large estates such as the Ford Place, lent itself to an earthy and richly subtle approach which centered on the use of native plants and other native materials. Jensen may be accused at times of copying nature; however, this writer sees him as does his biographer, Leonard Eaton, not as a copyist, but an individual with a "strong concept of nature [which] was a continuing source of inspiration." (Eaton, 1964)

Jensen felt his bias for native plants had good scientific and aesthetic roots. The use of non-natives and exotics did not allow the plant and site to come to the best possible compliment at maturity or in youth. Exotics were labeled as at the very best sickly and at the worst as potential threats to the natural flora and its delicately balanced niches.
When Odenwald (1960) quotes the introduction to *Siftings*, written by the editors, he sums up succinctly Jensen's philosophy,

Jensen's greatest contribution to American life may consist largely in his conviction that the conditions and forces natural to any environment are logical normal ones for living in that place, having an integrity beyond imported materials and ideas, which usually turn out to be either obtrusive or impractical. *Love of and understanding of the forces and material expressions of the life about him* (emphasis mine) *afford the basis for his happiness.* (Jensen, 1936)

**Wilhelm Miller**

Horticulturist Wilhelm Miller, a contemporary of both Waugh and Jens Jensen, worked with the University of Illinois trying to promote more planting, especially of natives. He wrote a contribution to Bailey's epic, *Handbook of Cultivated Plants*, dealing with native gardens, which, upon investigation, reduces in scope to wild flower gardens. Nonetheless, he points out three general principles which could be extrapolated to the use of other native plants. They are:
1) use of only primitive or slightly improved varieties of flowers,
2) required permanence, and 3) inexpensive varieties (Bailey, 1916).

**Brian Hackett**

British born Brian Hackett, as a teacher and practicing landscape architect, has emphasized an ecological approach to planting design for the last twenty years. In an article in *Landscape Architectural Quarterly*, he brings out an interesting technique for using the native plant communities as structural guides for planting design. He says, "One can ... see in the work of Nature herself much that is fundamental to planting design, serving as a lesson and a guide to the landscape
designer today." (Hackett, 1954, p. 12) Hackett calls this idea a logical progression from past planting design goals and goes on to define the philosophy as the "ecological balance in a landscape."

In summary to that introduction of his technique he says, "There is little difficulty in discerning its sympathy with the present revival of the use of wild plants in planting landscapes." (Hackett, 1954, p. 13)

But the plant community only serves as the structure from which native plants are added or extracted. The real value of native plants, Hackett says, is to provide more interesting planting, enable landscapes to be more self-maintaining and produce landscapes of greater harmony and orderliness.

Lawrence Halprin

Contemporary landscape architect Lawrence Halprin has in some instances followed a logical progression of Jensen's philosophy of learning and understanding nature's processes and using them as guidelines, if not principles, for design. Probably his best example of native planting design was in Sea Ranches, but it also involved the study of the processes unique to the coastal redwood forest. The actual interaction of the native plants and animals were studied in depth as were the implications of the most desirable successional position. The site was previously heavily overgrazed by sheep, so Halprin manipulated the existing conditions to bring the native plant and animal community into harmony.
He planted native grass on the barren eroded areas, native forbs among the remaining grass, and shore pine and redwoods among the forbs.

The buildings were closely related to the existing trees for wind protection and their design was harmonious with the site character. Summing up this design concept, Halprin (1972, p. 31) says, "Natural phenomena give us the base on which we hang our sense of art organization."

Warren Kenfield

Kenfield (1966) in his book, The Wild Gardener in the Wild Landscape articulately unfolds his own bias and philosophy about the use and manipulation of the plants which are the major components of the landscape. He is a very sensitive ecologist/horticulturalist/layman with no formal design training. But, in order to stress his point, he goes into an analysis of five landscape modes. (Kenfield's term, "mode" is basically that of a "style" and it represents a more finely divided spectrum than that of Waugh.) He includes wilderness as a mode. However, it is quickly pointed out that vast areas are needed to encompass wilderness as well as no interference from man. A second mode is the rural landscape, agricultural, pastoral, and less intensive uses, where the minimal effects of man are seen, but nonetheless present, producing openings in forests or fence rows and woodlots on the plains. Kenfield's own bias is present in the third mode--the herbicide-sculptured landscape. This provides a rural landscape for the "large-scale" gardener with minimal labor expenditure. The fourth, or occidental landscape garden, is that of the natural English country garden which he asserts, though beautiful, is completely unnatural, saying,
"The wilderness man accepts nature. The gardener improves on nature—until it is beautiful, but unnatural ... The [English] landscape garden is first a garden a landscape second ..." (Kenfield, 1966, p. 7).

Finally, he recognizes the existence of the oriental landscape garden as a symbolic retreat for meditation, which emphasizes a highly altered microcosm of nature or wilderness.

In writing further, on the use of native plants Kenfield (1966, p. 103) says, "It is my opinion that the soundest criterion in this problem is not whether the plant is an alien or a native, but whether it is in good landscaping taste." He does not go on to define "taste."

Figure 1 gives a diagramatic summary of the cited authors' spectrum of landscape design styles as interpreted by this writer.
Figure 1. Comparison of landscape architectural styles.
CHAPTER III

Introduction

The focus of this section will be to first delimit and describe what facts a landscape designer uses in order to produce a planting plan. Secondly, a format for the presentation of the facts will be developed. It is assumed that the preceding chapter has shown through the thoughts of Jens Jensen that the region is a valid concept for selecting plant materials; therefore, thirdly, it will be more closely delineated in this chapter.

Description of Plant Characteristics

The planting plan is the technical method a landscape architect uses to study, delimit and direct the placement of a system of living things in harmony with the site, not only functionally and ecologically, but also aesthetically. In order for the designer to use the plants effectively, he must know certain characteristics of the plant.

A survey of literature dealing with plant lists was undertaken to record and compare the various plant traits designers feel are relevant to a plant list. These are summarized in Table 1. The literature survey showed a discrepancy in the quality of plant materials lists and investigations of what a designer needs for a clear consistent, concise and documented list. Also, the differences in terminology notwithstanding, this researcher found it hard to understand why such a long list of information was really necessary to design with plant materials.
Table 1. Plant characteristics from literature and mail surveys

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*A combination of the helpful and essential categories.*
With this as a hypothesis, additional research was undertaken to resolve the question. The additional research was in the form of a survey mailed to several professional landscape architectural offices nationwide, both private and governmental, asking about the pertinence of a list of design, ecological and cultural traits for developing a planting plan. A copy of the cover letter and questionnaire are found in Appendix A.


Those landscape architectural offices surveyed were asked to check the appropriate columns as to whether the trait was 1) essential, 2) helpful, or 3) nonessential when designing with plant material. An additional question was asked. It was, "Would more information about native plants increase their use?" Of the total sample of 19, 16 returned the questionnaire. This was 84.5 percent. The results are summarized in Table 1.

To make this native plant list into a useful reference tool, it is necessary to provide additional helpful information about a plant even though that information may not always be essential. However, if a characteristic is of no use at all to a designer, then it should be eliminated in the interest of time. Therefore, the total numbers in the survey column are a combination of the helpful/essential responses.
The following characteristics described are those indicated as most appropriate as per Table 1. Each one is described as to its content and possible use implications.

**Botanical and common plant names**

In discussing plants for almost any purpose, the most important element is the use of the proper plant name so that persons can be sure they are accurate and consistent. The botanical or Latin name serves this purpose, as it has in the past and will continue to in the future. All names used in the plant list are those from *Checklist of the Vascular Plants of the Intermountain Region* (Holmgren and Reveal, 1966).

Robinson (1960) was the only one of the several writers investigated that used a reference to any common or widely used synonym. It is especially important to update and put before the landscape architect or nurseryman the latest acceptable usage as proposed by taxonomists. However, until a new specific epiphet or genus is widely known it is advisable to make a transition by placing the discarded and more well-known synonym in juxtaposition with the newer one, which is harder to identify. The common name used is taken from *Checklist of the Vascular Plants of the Intermountain Region* (Holmgren and Reveal, 1966) as well as *Native Woody Plants of the U.S.* (Van Dersal, 1938), and *Native Trees of Utah* (Johnson, 1970).

**Height and spread**

These characteristics are important design elements which must be taken into account in all aspects of landscape architectural design. Later, the ecological aspects will be given in such a way as they
pertain to each plant so that a plant is described for a particular habitat and any spread or height dimension will be the maximum for the most suitable habitat. If a plant is used outside its natural habitat and does not succumb, then it cannot necessarily be expected to be true to the suggested ultimate height (Perkins, 1942).

**Leaf description/texture/color**

A description of foliage (primarily summer foliage) can serve as a guide to identification, color, and texture. Color is probably the most noticeable characteristic in design, but through leaf size, shape and texture, it can be modified to innumerable permutations of tone and value. Texture, of course, will vary with observer position and distance as well as leaf gloss and size (USDA National Forest Landscape Management, Vol. 1, 1973). Whereas foliage is the main component of spring, summer and fall texture, branching habit is one of the main features of winter texture on deciduous material. Appearance and disappearance of the foliage canopy or screen is an important functional characteristic when designing microclimates or visual barriers and should be covered in discussing each plant.

Texture as a function of leaf size on broadleaf plants and needle and cluster size on evergreens (when used here) is roughly as follows:

- 0.0" (0cm)-1.5"(4cm): Fine texture
- 1.5" (4cm)-3.0" (7.5cm): Medium texture
- 3.0" (7.5cm) +: Coarse texture.

**Autumn color**

This is the change in the leaf pigment composition in the fall. Since color is so great a force in design, then its wise, harmonious use is required in the grouping of plants in the autumn as well as summer.
Flower description/period

Many plants are used and noted for their conspicuous flowers. Color and fragrance are in every sense design elements which need to be considered. However, many plants do not have conspicuous blooms or are in bloom for a short period. This, of course, reduces their appeal for use as color or fragrance. Periodicity is important when arranging plants to orchestrate pulsating, harmonious color masses in changing patterns of weekly or monthly interest.

Fruit description/season

Fruits on many plants are concurrent with fall foliage displays. Others are significant during the rather bland winter months. Descriptions of the fruit aid in identification and evaluate colors and amounts of the fruit, and point to cleanliness problems or wildlife needs. Again, as with the flower display, the total period and approximate dates of the effective fruit season must be known.

Form

Again, to effectively group and space plants, descriptions of their natural shape or outline is a must. Word descriptions, however inadequate, are accepted as proper when used consistently (Robinson, 1960; Perkins, 1942; Wyman, 1965; Kirscht, 1967). See Figure 2 for illustration of form.

Bark description

On deciduous plant material the color and texture of the bark becomes important, especially in the winter. On evergreen plant
Figure 2. Plant form illustrations.
material where the foliage goes to the ground it is less obvious, though on many open branching conifers the bark is of importance. Bark is also of secondary merit in identification of plants.

Winter description

Deciduous trees and shrubs have a tremendous range of change between summer and winter in terms of color and texture. With the extended winter season in mountainous areas the winter look of the material becomes more important. Here conifers come to the fore with good foliage to screen views or block winds. The sculptural patterns and line quality of deciduous plants offer a change of visual experience from what the same plants offer in the summer.

Ecological Factors

Extension of range

In this study all plants are indigenous to the described study area; thus extension of range will describe what other ranges or habitats they can conceivably occupy. These will be listed as states outside the study area. The extension is given as a broad area within a line from one state to another. While many of the plants range further north and east, only the 11 western states of Washington, Oregon, California, Idaho, Nevada, Arizona, Montana, Wyoming, Utah, Colorado and New Mexico are used to denote extension of range.

Elevation

The two terms, elevation and temperature hardiness, as explained earlier, are nearly inseparable when applied to a mountainous region.
The described elevation bounds are fairly rigid and upward movement of plants will prove usually more disasterous than downward movement. However, moving from a higher to a lower elevation means leaving a humid for a subarid climate; in that case moisture becomes limiting.

Latitudinal changes are important. When moving plant material from the south to the north at the same altitude, phenological phenomena, such as flowering, will begin sooner and therefore be subjected to frost. The same is true for movement from a lower to a higher elevation. Hopkins' Bioclimatic Law states, "Phenological events in the spring are four days later for every 400 foot increase in elevation [or] one degree increase in latitude ..." (Asleson, 1966, p. 28).

Vegetative type

By noting the vegetation types (associations) that a particular plant grows within, it can be beneficial for a designer to use the other associated plants to maintain continuity and integrity of the design and the surrounding landscape. The broad vegetation types used will be those of Cronquist et al. (1972) for the Wasatch and Uinta mountains. They are: Chaparral, Douglas fir/white fir/blue spruce, Engelmann spruce/subalpine fir, Alpine tundra for the Wasatch, and Upper Uinta sagebrush, pinyon/juniper, ponderosa pine, aspen/lodgepole pine, Engelmann spruce/subalpine fir, Alpine tundra for the Uintas. While the riparian type is not recognized by Cronquist et al. (1972) as a type per se, it needs mentioning because of the plants unique to it.
Root type

Root description is basically tied to the form roots take underground, whether it is fibrous or a taproot. This is a prime determinant of transplantability, drought resistance, soil depth, and wind firmness. Fibrous roots are more easily transplanted and are less drought and wind resistant.

Growth rate

Plants grow at various rates. A designer must have an appreciation of what the rates will be for the various plants in his composition. Of course, aside from giving yearly increments for the species on the list, a comparative placement into categories will help separate plants on that particular trait.

It can be thought of as a rough percent ratio of the maximum height or spread attained in one year by the plant.

All growth rates on this list are relative to one another as shown by the terms rapid, moderate, slow or very slow.

Lifespan

This trait is tied closely with growth rate, since a relationship in some cases shows that rapidly growing species are not particularly long-lived. Again plants may vary and therefore be placed on a relative nonquantitative scale, so they can be used in context with each other. Vegetative reproduction on some plants is so vigorous that they will occupy a site indefinitely, barring environmental change. The lifespan is divided thusly: 1-80 years = short; 80-200 years = moderate; 200-400 years = long; 400+ years = very long.
Sun exposure

The silvicultural term "tolerance" is a synonym for sun exposure here. If a plant can grow and reproduce in its own shade or the shade of another species, it possesses particular design implications. Placement of plants must respect this basic need for shade or sunshine; however, there is again a range of tolerances. Where some plants need shade at every phase of their life, others need it only as seedlings, while others are completely indifferent. These time, life period aspects will be noted.

Drought tolerance/wind firmness

These are two special characteristics that plants may have, though the degree to which it appears may vary. It allows a designer to use a species in a difficult, dry place or to avoid using a weak rooted or limbed tree on the windward side of a home or drive.

Aspect

The orientation of the slope to the sun on which a plant grows has effects on the soil moisture and survival of a plant. North aspects are more mesic, that is, less variation between winter and summer and day and night. Also, a stream bank, though not strictly an aspect, can provide moist growing conditions needed by many plants.

Soil

As a broad heading, soil is a composite of several properties which may or may not be important for any one plant. They are texture (relative amounts of rocks, gravel, sand, silt/loam or clay), given as
rocky, coarse, medium, fine; moisture (relative amounts of available water for plant use, which is often tied closely with the texture of the soil, elevation, or slope orientation), given as dry, 4" (10cm)-18" (46cm) annual precipitation, moist, 18" (46cm)+ annual precipitation; presences or absence of H+ ion in the chemical makeup of the soil (with this concentration being directly related to the availability of various soil nutrients and being dependent mainly on the parent material from which a soil has been derived), here it is only an approximation; organic matter (this affects soil moisture availability, pH, and soil texture); depth (potential root requirements must be commensurate with the soil depth), given as shallow, 0" (0cm)-12" (30cm), moderate, 12" (30cm)-30" (76cm), deep, 30" (76cm)+; drainage (this gives the relative amount of time water will stand in the air pores of a soil; a few plants are tolerant of poor drainage, while most will not grow in wet soil, or at least be unable to compete well there).

Maintenance/cleanliness

Native plants by the very fact of being in their natural environment are not subject to continual maintenance. However, if these plants are used in more urbanized areas, some of their characteristics may prove bothersome. In settings such as patios, fruit drop may become a maintenance problem or excessive needle fall may kill grass, for example.

Pruning tolerance is tied to the problem of maintenance and many of these native plants have never been used in situations that warranted or required pruning. It is therefore hard to predict what the outcome
of heavy pruning may be. The only exception would be those plants browsed extensively by deer or elk.

**Insects/diseases**

Again with native plants, as with exotics, disease prone or insect prone plants are eyesores and maintenance problems. Many plants are alternate hosts for virulent diseases or insects without showing particular harm themselves. By listing the known number of diseases and insects affecting a plant, some idea may be gained of its relative susceptibility to attack.

**Transplantability/propagation/availability**

These three factors are very closely interconnected. However, transplanting of many of the plants on the list has been successfully attempted for individuals under three inches in diameter (Jacob, 1973). See Appendix B. Propagation is proceeding slowly and, as pointed out earlier, is tied to demand. However, a limited survey of many nursery catalogs for the intermountain area has yielded sources of native plants. Where this information exists, then it will be noted.

**Animal food**

Planting design is not only responsible to the native flora of an area, but also the fauna. Animals add that unexpected bit of movement and interest to any design. Van Dersal (1938) has listed the plants with the animals which use them.

**Best use**

This is a note by the author after working with and observing the plants.
Format Formulation

Researchers from ecologists to recreation resource managers are calling for an illumination of native plant material for landscaping use (Barker, 1972; Blaisdell, 1972; Box, 1972; Hanson, 1966). However, a native plant's intrinsic aesthetic qualities are not as fully understood as are their ecological requirements. Range managers, plant taxonomists, and foresters have been studying and storing a wealth of information on native plant habits and habitats. This data is scattered throughout various botanical keys, ecological publications, technical bulletins, theses and dissertations. In its present form, the information is extremely time-consuming for the individual designer to extract and, once found, is often in an unusable format (Perkins, 1942).

The most important criteria in selection of a format is an understanding of the user or audience. This work is directed primarily toward landscape architects, and so review of references often used by landscape architects is a starting point. Florence Bell Robinson (1960) has developed a card system which hangs terse and pertinent facts in a regular order under boldface headings. The total list is subdivided into categories of deciduous trees, deciduous shrubs, evergreen trees, and broadleaf evergreens. This helps to fit plant material into their most functionally adequate groups.

Donald Wyman (1965; 1968) keeps a running alphabetical description of the plants using short word definitions under regular headings. He, however, omits irrelevant headings on specific plants where necessary. As a potpourri under the abbreviated list, he adds a paragraph of
written information not covered above it. The length of the comments is dependent on the relative importance of the plant under discussion. He also quickly covers the important varieties.

Kirscht (1967), in an unpublished Master's thesis dealing with some trees of Iowa and southern Minnesota, has a heading and description type format. It is barely adequate because of the paucity of headings.

Though not writing directly for landscape architects, Stark (1966) deals with the tangential field of highway design and planting. His background is that of an ecological researcher and this bias is transported into his format. All of his factual statements which appear under headings are referenced. This allows the reader to delve deeper into the information which is more important to his needs.

The above review helped evolve a format which uses:

1) Major headings with word descriptions and no deletions.
2) Alphabetical listing by genus.
3) Cross-referenced index of common and botanical names.
4) Referenced sources.
5) Conflicting information.
6) Standardized order and word descriptions.
7) Matrices for quick location of special plant types.
8) Synonyms which may be in common use.
9) Dimensions in the English and metric systems.

Study Area

The regional context of planting design has not been exploited to its fullest potential. In terms of architecture, Santa Fe, New Mexico,
and its environs has preserved the Spanish style. Small areas such as Williamsburg, Virginia, maintain historical gardens in juxtaposition to restored buildings. However, one is hard pressed to see planting used in the regional context as envisioned by Jensen (1939) where he felt the natural existing local forces should be used as the design context. Though not quite as applicable to high cost, highly maintained urbanized areas, native plantings do maintain continuity with local vegetative types in wildland or rural situations.

The mountains of northeastern Utah provide a regional context, an opportunity and a challenge for the landscape designer. It provides a base for aesthetic and ecological plant selection within various vegetative types. As well, a quickly perceived challenge is an opportunity to preserve much of the existing landscape from the throes of inharmonious development. That can be aided greatly by planting native plants because of the significant contribution plants make to overall landscape character.

The regional context for plant selection has strong points in delimiting the scope of this work so as to meet time constraints. It also coincides with increased Wasatch Front development.

**Delineation**

Precise description of a study area is necessary to be sensitive to the problems discussed above. Generally, the area is the mountainous region of northeastern Utah (Figure 3).
Figure 3. Study area (after Cronquist et al., 1972).
For precise delineation the taxonimist and plant geographers' concept of vegetative type was used. Since the identification of individual native plant species was to be the final end product, it, along with vegetative type, was used. Native vegetation types and the component individuals are actually the end product or final integration of "... latitude and altitude which have a direct bearing on temperature, frosts and length of growing season as well as extremes of temperature; rainfall totals and distribution through the year; humidity as influenced by rainfall and winds; soil type and character; and amount and intensity of sunshine." (Van Dersal, 1938, p. 16) These are the natural existing local forces that Jensen felt formed a design context.

Cronquist et al. (1972) in their book dealing with the intermountain flora have an excellent section on its vegetative types phytogeography. Within, it is broken into various divisions, two of which are the Wasatch Mountains and Uintas. This is further subdivided into the component ranges; here the Wasatch and Uintas will be dealt with. This breakdown enables one to horizontally define the area but with the system it also allows further delimitation into vegetative types. The simplicity of this system is that it can describe geographical areas which are of similar environmental conditions which contain similar plant dominants. (See Figure 3.)

**Wasatch Mountain Range**

- **Geomorphology:** North-south 200 miles (334 km) long, 40 miles (67 km) wide, block faulted, sedimentary and metamorphic
(limestone, calcareous sandstone, and dolomite); 5000-
11,000 ft. (1666-3666m).

**Annual precipitation:** 60 inches (155cm) on western peaks, 20
inches (51cm) on eastern lower slopes.

**Frost-free days:** 20 days on peaks to 100 days at lower elevations.

**Vegetation zones:**

- Chaparral—5000-8500 ft. (1666-2833m)
- Douglas fir/white fir/blue spruce—8,000-10,000 ft. (2666-
  3333m)
- Engelmann spruce/subalpine fir—9,500-11,000 ft. (3166-3666m)
- Alpine tundra—10,500 ft.+ (3500m+).

**Uinta Mountain Range**

**Geomorphology:** East-west 150 miles (250 km) long, 30 miles
(50 km) wide, glaciated, granitic and quartzite rock; 6,000-
13,000 ft. (2,000-4333m)

**Annual precipitation:** 40 inches (157cm) on peaks decreasing to
20 inches (79cm) below.

**Frost-free days:** 20 days or less on peaks to 80 below.

**Vegetation zones:**

- Pinyon/juniper—5,000-8,000 ft. (1333-2666m)
- Ponderosa pine—7,000-8,000 ft. (2333-2666m)
- Upper sagebrush—7,000-8,000 ft. (2333-2666m)
- Aspen/lodgepole pine—8,000-10,000 ft. (2666-3333m)
- Engelmann spruce/subalpine fir—10,000-11,000 ft. (3333-
  3666m)
- Alpine tundra—11,000 ft.+ (3666m+).
Zonal heterogeneity

Evolving the preceding study area which is supposed to contain areas of broad agreement of vegetative types does not seem to correlate with the heterogeneity of plant types apparent to the most casual observer gazing on the Wasatch front.

Jeseph Caprio, an agricultural climatologist, when speaking of the West very nearly describes the diversity of plant growth areas within the specific study area when he talks about climate. "[The West] is characterized by steep topographic gradients, elevational differences are predominant in climate control." He continues, "Due to topographic influences, atmospheric conditions, and middle latitude location, most of the Western Region is characterized by sharp micro-climatic contrasts within short distances. ... Variations in aspect, vegetative cover and soil properties add further to the complexity of the micro-climate variation." (Asleson, 1966, p. 9) And when speaking of the vegetation in the Wasatch-Uinta area, Anderson and Holmgren likewise found "... variations in wind currents, elevation, drainage, soil, etc., [produce] an infinite variety of growing conditions within a relatively short distance." (Anderson and Holmgren, 1969, p. 6)

The designer must take into consideration the various soil, micro-climate and elevation nuances on any site. A south aspect with gravel soil will be more likely to support a plant from a lower elevation vegetation type. The vegetative types are therefore not strictly binding and will be best used in conjunction with a good site analysis.
Summary

Probably the most glaring omission from literature dealing with plant materials is a distinct, logical, and rational method for producing a list of plants. The procedure used here is as follows: From observations over a two-year period, by a search of the literature for the study area, including botanical keys, ecological studies and highway or big game range planting research, and through conversations with various interested and knowledgeable people, the author gathered a "worklist." This worklist of native plants consisted of approximately 150 plants.

The worklist was then culled of plants not growing in the study area. Then it was further researched as to the available knowledge which would coincide with that found to be necessary from surveys of professional landscape architects and a survey of the literature (see Table 1). The research was done from reviewing literature such as floras, and research publications and in the USU herbarium with pressed specimens and direct observation. Finally the list was placed in a format which extracted the better points of the existing formats reviewed. The actual plant list is listed as Appendix C. General matrices for plant extraction and use are listed in Appendix C.
CHAPTER IV

Introduction

Plant lists in themselves are very limited tools to help planting design students. Aside from actual field trips, the next best thing is a graphical representation with the environmental factors serving as the design context. Therefore, to make the native plant list (Appendix C) more meaningful and functional, a case study was developed. It provides an environmental and functional context for the graphic portrayal of planting design problems.

The criteria for selection of a problem and a site for the case study were:

1) Realism (an actual project in progress which could benefit from the native plant list or a complete project in which the planting could be restudied.

2) Location within the previously defined study area.

3) Use of a wide range of plants, which here means the divergence into two case study sites with widely dissimilar climate, soils, and vegetative communities.

Permission was obtained from the firm, The Environmental Associates, which consists of landscape architects, architects, and land planners, headquartered in Salt Lake City, Utah, to use two of the office's sites. The Daggett County case study site was located just south of Manila, Utah, and the Solitude site was near Brighton, Utah. (See Figure 4 for locations.)
Figure 4. Case study site locations.
**Daggett County site**

The Daggett County Development is a large recreational PUD south of Manila, Utah, and just west of the Flaming Gorge National Recreation Area. The site, which is currently in the design phase, lies on the northeastern edge of the study area in the foothills of the north slope of the Uinta Mountains. The vegetation is of the pinyon/juniper type. The climate is quite severe in its lack of rainfall and the seasonal and diurnal temperature fluctuation.

**Solitude site**

A project at the base of Solitude Ski Area in Big Cottonwood Canyon was chosen for the second case study. Currently the project is inactive, that is, it has not proceeded beyond the initial design phase and will not, in all probability, be constructed. The site encompasses approximately four acres abutting Big Cottonwood Creek in heavy stands of spruce and aspen. The climate is cool and moist with a variety of existing plants. The design program called for placement of eight clusters of units on the site. The sloping topography was handled by placing the modular units on pilings.

**Case Studies**

The time phase scheduled for completion of this thesis has dictated a cursory study be undertaken. It would consist of a telescoped design, including a large scale planting design with emphasis on massing. Also, enlargements of areas were done to more fully show the range of usable plants. Attendant sections and guidelines were added
to more fully explain the site concept. It has been assumed for the focus of this case study that interested readers will be well-versed or at least familiar with design principles, enough so as to eliminate time-consuming design studies. Here the focus will be on the microclimatic and ecological positioning of the plant material.

**Daggett County case study**

This individual case study focuses in on a 45 acre picnic area with two parking and pavillion areas as well as six picnic pads. See Figure 4 for site location. See Figure 5 for topographic contours, site character, microclimate, and existing vegetation. See Figure 6 for proposed layout with planting issues. See Figure 7 for proposed planting plan.

Given the preceding analysis and in order to more fully explore the preceding situation, an enlargement of one picnic pad was done to more clearly describe the planting which could be instigated. This is shown as Figure 8.

In reviewing the planting at the larger site scale, this is what essentially was carried out:

1) Introduction of *Juniperus scopulorum* and *Pinus edulis*.
2) Tree spacing is wide to allow root moisture composition.

On the smaller scale picnic pad a variety of plants were used for:

1) Screening—*Juniperus osteosperma*, *Cercocarpus ledifolius*, *Juniperus scopulorum*, *Pinus edulis*.
2) Shade—*Celtis reticulata*. 
Figure 5. Daggett site analysis.
Figure 6. Daggett planting issues and layout.
Figure 7. Daggett planting plan.
Figure 8. Daggett picnic pad enlargement.
3) Additional screening, fillers, edge softening, textural and color interest—*Purshia tridentata*, *Cercocarpus montanus*, *Atriplex nutallii*.

4) Ground tie with low stature with seasonal interest in the viewing foreground—*Artemisia* sps. and *Eriogonum* sps.

Any proposed planting plan is far from a reality unless a program for its implementation is given. This is extremely important when handling native plant material, since its manipulation is not well known. Following are some important considerations and guidelines to use when planting on the Daggett site:

1) Planting stock should be of local origin or, failing that, be of parent stock which was grown under similar conditions—

   A. Equal latitudinal range.

   B. Equivalent extremes of temperature.

   C. Equal periods free from frost.

   D. Similar soil conditions.

2) Staking time should be kept to a minimum to eliminate its own inherent obtrusiveness and expense. This allows the plants to conform to natural wind conditions.

3) The vegetal cover on the site is sparse. Therefore, minimal disturbance of the cover and the coarse soil is necessary to preclude erosion—

   A. Only small equipment should be allowed on the site.

   B. Work on picnic pads and trails should be in the summer and fall months.

   C. No disturbance of the ground should be allowed within a 7' radius from any tree over 3" basal diameter.
4) Actual planting should be:

A. In the spring, which will allow the existing maximum moisture present at that time for rapid plant establishment.

B. If the precipitation is below normal, supplemented with water.

C. Disallowed in the fall due to soil moisture conditions and the severity of the winter climate.

These guidelines are in addition to normal planting specifications, which cover viability of stock, planting, depth, fertilizing, etc.

**Solitude case study**

The Solitude project was inactive and incomplete, so the site plan presented here was designed by the author in order to have a framework for the planting as well as to fit the structures into the existing vegetation. The units are of a modular design and will be placed on pilings as the slopes presented on most of the site demand this type of treatment.

See Figure 4 for location of the site.

See Figure 9 for the topographic contours, existing vegetation, microclimate and views.

Also presented with Figure 9 is a section through the site explaining the soil and existing plant relationships.

The actual design for the site layout and the attending planting issues are found in Figure 10.

These are resolved with the proposed planting plan shown in Figure 11.

Finally, to give a more precise view of the plant material and its
Figure 9. Solitude site analysis.
SOLITUDE
THESIS CASE STUDY
R.K.SUTTON

PROPOSED LAYOUT WITH ATTENDING PLANTING ISSUES

Figure 10. Solitude proposed layout with attending planting issues.
Figure 11. Solitude final site planting plan.
possible use, an enlargement of two individual clusters are shown in Figures 12 and 13.

On the site as a whole the major plant manipulations consisted of removing or planting spruce, fir or aspen. The major planting was along the south side of the site and is to serve as a year-round visual screen and a drifting snow entrapment. Spruce were intermixed with aspen along the drifting area to add variety, whereas aspen only was used next to parking to permit rapid melting of ice. Many spruce on the south sides of sun decks were removed to improve the winter microclimate. They were also removed to provide "view pockets" around the decks. Spruces and firs were used as year-round masses to screen noise and autos from the front of the units.

The small scale unit blowups were provided to illuminate many of the smaller plants available for landscaping on the Solitude site. Both A and B are trying to (1) provide an opportunity to cut down energy loss at the sides and underneath the buildings by using evergreen plants to trap snow for insulation, (2) provide interest in the spring and fall with broadleaf evergreens put together in patterns of textural interest since they will be viewed from above, and (3) place shade tolerant plants under the units and evergreens.

1) Planting stock should be of local origin or, failing that, be of parent stock grown under similar conditions--

A. Equal latitudinal range.
B. Equivalent extremes of temperature.
C. Equal frost-free periods.
D. Similar soil conditions.
Figure 12. Solitude planting blowup (A).
Figure 13. Solitude planting blowup (B).
2) Staking time should be kept to a minimum to eliminate its own inherent obstrusiveness and expense. This allows the plants to readily conform to natural conditions.

3) Development and site construction should proceed as follows to minimize site disturbance:

A. Heavy construction of sewers, roads and parking should all be done from mid-July to snow. This eliminates work during the fragile, wet spring.

B. No equipment or worker should be allowed to disturb the existing cover within 50' of Big Cottonwood Creek.

C. Use the parking areas as work platforms to complete module construction.

D. All trees over 2" caliper are to be left undisturbed, unless marked by the project landscape architect for removal. Penalties should be leveled for any tree damage by the contractor.

4) Many small trees and shrubs which would be destroyed by the park or road could be transplanted and held for replanting in a small on-site nursery or holding be.

5) The transplanting should be in the spring months prior to construction.
CHAPTER V

Introduction

The greatest obstacle to the use of our native plants is their supply or, more appropriately, their lack of supply. This supply is dependent on the wholesale or retail nursery trade or field collection. The nursery trade does not carry native plants because of a purported lack of demand, lack of supply to the retailer, low uniformity in the stock, ignorance about growing and storage conditions as well as propagation. Field collection is not really practical on a large scale because of the difficulty of insuring viable plants, confirming origin of the plants (altitude and latitude), lack of uniformity, and possible damage to fragile environment where collections often take place.

The lack of supply can be attacked from two logical and strategic positions:

1) Increase the demand to such a level so as the basically cautious and conservative nursery trade begins to supply the native plants.

2) Increase the knowledge base dealing with mass-production and propagation of native plant materials and disseminate this information to nurserymen.
Demand for Native Plants

There now exists a "knowledge gap" between horticulturists, landscape architects, garden writers and nurserymen concerning the use of our native plants for landscaping purposes. The horticulturist possesses the techniques for providing native plants on a large scale, but lacks the knowledge of which plants would be appropriate in a design sense. The landscape architect understands the design uses and techniques but often times has difficulty in finding a desirable native in a nursery's stock or is unable to show or explain to his client what a specific native plant may look like. A garden writer with his broad exposure to the public mind may talk about natives and not know if they are available, while the nurseryman may say there is no demand or uniformity in the native plants (see Figure 14).

Thus, through ignorance, most landscape architects are destined to use staid, traditional, domestic plant materials, and, even if they wish to use natives, the uninformed nurserymen cannot ordinarily supply them. Forty-seven percent of the landscape architects surveyed felt that an increase in the native plant information available to them would increase the use of native plants. This use would be a strong point in increasing the demand for native plants. Another 47 percent of those surveyed felt that simple availability was an important factor. We could assume that greater knowledge would lead to greater demand and thus increase supply.

The average home owner, another big element in the marketplace, is even more a captive of the seller. He can only pick from or ask about the traditional domestic or exotic plants shown in trade publications
Figure 14. Information/knowledge cycle.
for use in home grounds landscaping. Or with a small but interested group of home owners, the trend toward natural living surroundings which integrate man and nature, not separating them, finds him demanding native plants (New York Times, 1972), but not knowing what may be obtained or where.

The current lag in supply of native plant materials is somewhat due to quick and unheralded rush for mountain living environments. The development of the eastern United States was not as rapid as that which our western mountain lands are undergoing. Therefore, the integration of the local midwestern and eastern floras into the nursery trade did not need to be accomplished over a short period. However, the sense of urgency in using native plants which pervades the West is being ignored while the nursery trade largely offers for sale those plants adapted for growth in the East.

As it now exists, the supply/demand/open market system is simply not administering the current need for native plants, though it may be meeting the demand. The need is actually a latent demand suppressed by confusion and ignorance in the supply and demand cycle. This confusion and ignorance will be very short lived and the demand will increase.

Figure 14 represents the cycle as it is currently stalled. The landscape architect is in an advantageous position to start it in motion through thoughtful research. By informing the public and other landscape architects, a researcher can stimulate the latent demand, thus allowing nurserymen to economically propagate native plants.
Native Plant Propagation

The survey of landscape architects illuminated several comments on the propagation problems nurserymen find when trying to produce native plant materials. Actually many governmental agencies from the ARS to various state universities, highway departments and big game management bureaus have been propagating and selecting native plants (Plummer and Christensen, 1970; Stark, 1966).

The native plants available for raw material are actually not much different in terms of propagation since many are only ecotypes of genera which have been used in the nursery trade for many years. The basic methods of reproduction will not change with native plants, whether it be seeds, cuttings, or clonings.

Selection can often be made now from the naturally profuse ecotypic variation that exists in our wild landscapes. Much money that is now spent on plant exploration throughout the world could thus be more profitably used at home.

Future Research

This chapter also intends to encourage additional work on the use of native plants, not only in Utah, but in the entire United States. Recommended researchable areas uncovered in developing this thesis include focus on the following problems:

1) Evaluation of native woody plants in the rest of the Rocky Mountain region.

2) Evaluation of flowering herbaceous perennials, grasses and ferns.
3) Gathering and dissemination of current propagation and availability information to landscape architects, nurserymen and homeowners. The Extension Service would seem to be a logical place for this endeavor to be focused.

4) Further research and field work on propagation, retesting of released native plants, with emphasis on provenance, outstanding color, form and foliage.

5) An all-out search for superior varieties, ecotypes, and species now found as native plants, with breeding programs for their perfection and increased supply.

6) A further investigation into native planting design as it relates to other styles would strengthen a designer's ability to integrate his work in mountain areas. This should include a vegetative type by vegetative type analysis of the innate visual character found in each.

7) A study of how the nursery trade actually works economically in response to needs for native plants. Focus should be on the wholesale distribution, the relationship of public knowledge to demand for native plants, the actual propagation experience and problems experienced by nurseries, and the persuasive ability of nursery salesmen to sell certain types of plants to customers, whether or not the plant is actually what the buyer needs.
POST SCRIPT

A special disclaimer is offered here. The potential threat to our native flora is manifest in the collection of native plants. Any attempt to dig wildling plants has several ramifications—legal and ecological. First, it is illegal to trespass on private property without the owner's permission. As well, it is also illegal to dig plants on either public or private land without the owner's or manager's permission. Fair remuneration should also be expected by the landowner for any plants removed. Secondly, since wildling collection usually takes place in the spring, which is an especially fragile period in the mountain landscape, special care must be made not to destroy the groundcover, remaining plants, or leave unfilled holes. Replanting may even be considered as a viable procedure on some sites. Also, due to the varied climate and soil conditions within short distances in a mountain environment, wildlings will be easily susceptible to death.

A second disclaimer concerns the accuracies or lack thereof within this thesis. The author accepts sole responsibility for any errors, real or imagined.

Richard K. Sutton
LITERATURE CITED


Appendix A

As a part of the plant characteristic investigation, a cover letter and survey questionnaire were sent to 20 landscape architectural offices or individuals working as professional landscape architects for governmental agencies. Of a sample of 19 questionnaires sent out, 16 were returned; this was 84.5 percent. This writer wishes to thank the following persons for the time they took to answer the questionnaire: Mr. Robert Scott, The Rouse Company; Mr. Peter Lassig; Mr. Dale Torgerson, Manti-Sal National Forest; Mr. Mick Johnson, The Environmental Associates; Mr. Garrett Eckbo, Eckbo, Dean, Austin, and Williams; Mr. Robert Goetz, Robert Goetz Associates; Mr. Clinton Hewitt, University of Minnesota; Mr. Leonard Grassli, Maas & Grassli; Mr. Garr Campbell, Sasaki, Dawson and Demay Associates; Mr. Paul Fjäre, Brauer and Associates; Mr. Craig Hanchett; Mr. Kenji Shiozawa, USFS; Mr. Rick Hoopes, Lombard North Group; Mr. Phil Flores, Phil Flores Associates; Mr. John Gattuso, Elkier, Gattuso Associates; Mr. George Omi; Sasaki Walker Associates.

Following are copies of the cover letter and questionnaire.
As a graduate student in landscape architecture at Utah State University, I would like to elicit your help as a professional in delineating more clearly what characteristics need to be known about plant materials in order to use them more intelligently in planting design. A search of published information relating to plant materials characteristics by Florence Robinson, Brian Hackett, Donald Wyman, Sunset, and others, leaves me wondering which portions of information are most useful and which are of little value.

Currently I am researching biological and design related information for some of northern Utah's unused mountain trees and shrubs. The final result will be not only a list of those plants suitable for inclusion into planting designs, but an adequate description of the plant in a usable format. Your comments will be used to construct a "usable format" into which native plant information can be stored.

Please complete and return as soon as possible the attached checklist (list any additional needs under the appropriate section). Feel free to make any other comments you think are pertinent. Thanks.

Sincerely yours,

Richard Sutton
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Appendix B

In a personal interview with Mr. Ralph Jacob, a National Park Service employee who transplants wildling native plants, this writer asked him whether or not he had transplanted any plants from the list in Appendix C. The plants he noted as being transplanted successfully are listed below:

- Abies concolor
- Abies lasiocarpa
- Acer negundo
- Alnus tenuifolia
- Amelanchier sps.
- Arctostaphylos uva-ursi
- Artemisia sps.
- Betula occidentalis
- Cercocarpus sps.
- Chrysothamnus sps.
- Crataegus sps.
- Juniperus scopulorum
- Kalmia polifolia
- Picea engelmannii
- Picea pungens
- Pinus contorta
- Pinus edulis
- Pinus flexilis
- Pinus ponderosa
- Populus angustifolia
- Populus tremuloides
- Prunus virginiana
- Pseudotsuga menziesii
- Purshia tridentata
- Ribes sps.
- Rosa sps.
- Salix exigua
- Salix wolfii
- Sambucus sps.
- Sheperdia sps.
- Sorbus scopulina
- Symphoriocarpos sps.
Appendix C

Following is a list of some 101 plants indigenous to the Wasatch and Uinta mountain sections according to Cronquist et al. (1972)(see Figure 3). The qualities and characteristics were derived from many sources.

Unreferenced facts are the observations of the author from herbarium specimens, field observations or personal interviews. Following, in Appendix D, is an index of common and scientific names (synonyms are also listed). Explanation of the scope of each subheading under a plant is contained in Chapter III. Since this is not a taxonomic or botanical work and is pointed toward practical use, the plants are arranged alphabetically by genus and not phylogenetically. No attempt was made to list all the synonyms--only recently changed ones.

Following immediately are matrices which cover the list in summary on several characteristics. There are six matrices: Coniferous Evergreens; Broadleaf Evergreen/Ground Covers; Deciduous Trees; Deciduous Shrubs Over 6 Feet; Deciduous Shrubs Under 6 Feet; and Deciduous Ground Covers and Vines.
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Scientific Name  Abies concolor var. concolor Lindl.

Synonym
Common Name  White fir (Johnson, 1970); Concolor fir (Van Dersal, 1938)

Ultimate Height  80-100'(17-33m) (Preston, 1968); 60-105'(20-35m) (Harrington, 1954); 100-120'(33-40m) (Anderson & Holmgren, 1969)
Ultimate Spread  25-30' (6-10m)
Leaf Description/Texture  Acuminate needles, gray green to blue green (Harrington, 1954); 2 1/2" (6cm), silver green (Johnson, 1970); 2-ranked needles (Preston, 1968); medium texture
Leaf Color, Summer  Evergreen, gray-green (Stark, 1966)
Leaf Color, Autumn  Evergreen
Cone Description/Color  Staminate cones, inconspicuous, red (Harrington, 1954)
Fruit Description/Color/Effective Period  4"(10cm) upright cone, summer, deciduous after frost, ovulate cones yellow to purple (Harrington, 1954)
Flowering Time/Effective Period  Summer, May-June (Stark, 1966)
Form  Pyramidal, dense, rounded with age (Harrington, 1954); conical, dense (Johnson, 1970)
Bark Description  Gray in youth, furrowed in age, resin blisters (Harrington, 1954) (Johnson, 1970); hard & horny in maturity (Preston, 1968)
Winter Appearance  Evergreen
Extension of Range  Washington to Montana, south to New Mexico and California (Johnson, 1970)
Elevation  Colorado 7500-11,000' (2500-3666m) (Harrington, 1954); Nevada 3000-10,000' (1000-3333m) (Stark, 1966); Utah 5000-9500' (1666-3166m) (Johnson, 1970)
Vegetation Type  Douglas fir/white fir, Aspen/lodgepole pine
Root Type  Shallow, spreading, fibrous (Preston, 1968)
Growth Rate  Rapid in youth, moderate to slow in maturity (Van Dersal, 1938) (Preston, 1968); slow until 30 yrs., then rapid & slowing again (USDA, 1965)
Lifespan  Long-lived (Van Dersal, 1938); 300 years (Preston, 1968)
Sun Exposure  Tolerant of shade in youth, but will take sun (USDA, 1965)
Drought Tolerance  Moderate to good, if well-established
Wind Firm  Subject to wind throw if mature stand is thinned (Preston, 1968)
Aspect  Bottoms, north (Johnson, 1970); benches (Preston, 1968); North-west (Stark, 1966)
Soil: Texture  Loams (Stark, 1966); Moisture  Dry to moist (Johnson, 1970); annual precipitation
pH  5.5-7.0 (Stark, 1966); 18" (45cm) (Stark, 1966)
Depth  Deep (Stark, 1966); Organic Matter  Moderate to high
Drainage  Well-drained (Van Dersal, 1938)
Maintenance/Cleanliness  Little maintenance; clean
Insects  19+ on species (Stark, 1966)
Diseases  Mistletoe, heart rot (Preston, 1968); 24+ on species (Stark, 1966)
Transplantability  Good when young (to 15'(5m)), larger older trees subject to desiccation
Propagation  Seeds; hormonal, vegetative (Stark, 1966)
Availability  Widely available (check provenance)
Animal Food  Grouse, rodents and deer (Van Dersal, 1938)
Best Use  Screen, specimen
Comments  Climax species, softer effect than P. pungens (Kelly, 1970)
Scientific Name  Abies lasiocarpa (Hook.) Nutt.

Synonym

Common Name  Alpine fir (Van Dersal, 1938); Subalpine fir (Johnson, 1970)

Ultimate Height  60-120' (20-40m) (Harrington, 1954); 90' (30m) (Johnson, 1970); 80' (26m) (Anderson & Holmgren, 1969)

Ultimate Spread  21-27' (7-9m)

Leaf Description/Texture  Flattened needles, blunt on ends or notched, blue green (Harrington, 1954); ascending needles (Johnson, 1970); medium texture

Leaf Color, Summer  Evergreen, green

Leaf Color, Autumn  Evergreen

Cone Description/Color  Staminate cones, inconspicuous

Fruit Description/Color/Effective Period  Ovulate cones purplish, deciduous cones, 3 1/2" (9cm) (Johnson, 1970); deciduous after frost (Kelly, 1970); resinous (Anderson & Holmgren, 1969)

Flowering Time/Effective Period  Summer

Form  Narrowly pyramidal, spirelike (Harrington, 1954) (Johnson, 1970)

Bark Description  Gray, smooth when young, fissured when older, resin blisters (Johnson, 1970) (Harrington, 1954)

Winter Appearance  Evergreen

Extension of Range  Washington to Montana south to New Mexico and Oregon

Elevation  Colorado 8500-11,000' (2740-3666m) (Harrington, 1954); S. range: 11,000' (3666m), N. range: 3500' (1166m) (Preston, 1968); Utah 4600' + (1530m) (Johnson, 1970)

Vegetation Type  Spruce/fir, Aspen/lodgepole pine

Root Type  Shallow, spreading laterals

Growth Rate  Moderate (Van Dersal, 1938); slow (Preston, 1968); diameter in 15 years: 15" (6.9cm)

Lifespan  Moderate (Van Dersal, 1938); Long

Sun Exposure  Shade tolerant in youth, sun in age

Drought Tolerance  Poor

Wind Firm  Good in groups, poor in thinned mature stands

Aspect  North at lower elevation, south at timberline

Soil:  Texture  Rocky to med. tex.  Moisture  Moist

pH  5.5-7.0

Depth  Shallow, or deep  Drainage  Must be well-drained

Maintenance/Cleanliness  Little maintenance, clean

Insects  6 on species (Essig, 1926)

Diseases  Many on genus (USDA, 1960)

Transplantability  Good when young: to 15' (5m); larger, older trees subject to shock, desiccation

Propagation  Seeds; layers readily (Harrington, 1954)

Availability  Many western nurseries have collected trees (check provenance)

Animal Food  Grouse, mountain sheep, deer, squirrels (Van Dersal, 1938)

Best Uses  Screen, windbreak, may be trained to hedge

Comments  Climax species
Scientific Name Acer glabrum Torr. var. glabrum

Synonym

Common Name Rocky Mountain maple (Johnson, 1970); Dwarf maple (Van Dersal, 1938)

Ultimate Height 6-18' (2-6m)(Harrington, 1954); 20-30' (7-10m)(Preston, 1968); 25' (6.3m)(Johnson, 1970)
Ultimate Spread 15' (5m)

Leaf Description/Texture 3-5 lobed or parted, margins doubly serrated (Harrington, 1954); 3 1/2" (9cm) in diameter (Johnson, 1970); medium texture

Leaf Color, Summer Green, pale below (Preston, 1968); pale green (Johnson, 1970)
Leaf Color, Autumn Pale yellow (Kelly, 1970); reddish orange (Johnson, 1970)

Flower Description/Color Monoecious, deciduous (Harrington, 1954); inconspicuous (Kelly, 1970)(Stark, 1966); appear before leaves; greenish yellow (Johnson, 1970)

Fruit/Color/Description/Effective Period Double samara (Johnson, 1970); Green through yellow and red (Kelly, 1970); tan, summer, fall, winter, conspicuous

Flowering Time/Effective Period Early spring (Johnson, 1970)

Form Rounded shrub (Harrington, 1954) to small tree (Johnson, 1970) (Van Dersal, 1938)

Bark Description Smooth in youth, brown-gray, fissured in age (Johnson, 1970); red stems (Kelly, 1970)

Winter Appearance Finely branched with red buds (Kelly, 1970)

Extension of Range Washington to Montana south to New Mexico and California (Preston, 1968)
Elevation Colorado 5000-10,500' (1666-3500m)(Harrington, 1954); Utah 6000-9000' (2000-3000m) (Johnson, 1970)

Vegetation Type Aspen/lodgepole pine, Douglas fir/white fir, Upper Uinta sage, Chaparral

Root Type Fibrous, spreading

Growth Rate Rapid on good sites

Lifespan Moderate

Sun Exposure Sun or shade; sun (Preston, 1968)

Drought Tolerance Poor to fair

Wind Firm Yes

Aspect North, streamsides

Soil: Texture Medium
pH 6.0-7.0 (Stark, 1966)
Depth Deep (Johnson, 1970)
Drainage Well-drained

Moisture Moist (Johnson, 1970); dry (Van Dersal, 1938)

Organic matter If possible; poorer soils (Van Dersal, 1938)

Maintenance/Cleanliness Little maintenance, prune if desired; clean

Insects 49 on genus (Stark, 1966)

Diseases 7 on species (Stark, 1966)

Transplantability Poor with wildlings

Propagation Seeds; easy to grow (Kelly, 1970)

Availability Doubtful commercial source

Animal Food Mountain sheep, deer (Van Dersal, 1938)

Best Use Tall ornamental shrub (Kelly, 1970)

Comments Usually not in extremes of wetness or dryness (Kelly, 1970); tree-like on good sites only
Scientific Name Acer grandidentatum Nutt.

Synonym

Common Name Big tooth maple (Johnson, 1970)

Ultimate Height 30'(10m) (Harrington, 1954); 40' (13.6m) (Preston, 1968)
Ultimate Spread Tree to 25' (8.3m); shrub to 20' (6.6m)
Leaf Description/Texture 3-5 lobed, rounded lobes (Harrington, 1954); 4" (10cm) in diameter; broad as high (Kelly, 1970); medium to coarse texture
Leaf Color, Summer Dark green (Preston, 1968)
Leaf Color, Autumn Red, yellow, orange (Johnson, 1970)
Flower Description/Color Light green, inconspicuous (Anderson & Holmgren, 1969)
Fruit Description/Color/Effective Period 1" (2.5cm) samara, reddish tan, summer
Flowering Time/Effective Period Early spring
Form Tree or shrub (Harrington, 1954); several branched shrub (Kelly, 1970); rounded, spreading (Johnson, 1970); ascending branches
Bark Description Grayish flat-topped ridge on mature bark (Johnson, 1970); plate-like scales (Preston, 1968)
Winter Appearance Reddish gray twigs, dense
Extension of Range Idaho to Wyoming, south to New Mexico
Elevation Utah 4500-7500' (1500-2500m) (Johnson, 1970)
Vegetation Type Chaparral, Upper Uinta sage
Root Type Spreading, shallow
Growth Rate Slow
Lifespan Moderate
Sun Exposure Sun
Drought Tolerance Fair to good
Wind Firm Yes
Aspect South at higher elevations, all aspects at lower elevations
Soil: Texture Rocky to medium Moisture Moist to dry
pH 6.0 to 8.0 Organic matter If possible
Depth Deep to shallow Drainage Must be well-drained
Maintenance/Cleanliness Poorly branched trunks may split; clean
Insects 49 on genus (Stark, 1966)
Diseases 8 on species (USDA, 1960)
Transplantability Poor on established wildlings
Propagation Seeds
Availability Western Evergreens, Inc., Golden, Colorado
Animal Food Deer
Best Use Hedge, specimen, shrub mass/screen
Comments Bright fall foliage.
Scientific Name Acer negundo L. var. interior (Britt.) Sarg.

Synonym

Common Name Boxelder

Ultimate Height 45' (15m) (Johnson, 1970); 65' (21m) (Anderson & Holmgren, 1969); 75' (25m) (Preston, 1968)

Ultimate Spread 25-30' (6-10m)

Leaf Description/Texture Compound or tripinately compound, 3 lobed (Harrington, 1954); leaflets oblong, acuminate, 3" (7.6cm) long (Johnson, 1970); medium texture

Leaf Color, Summer Dull green (Johnson, 1970)

Leaf Color, Autumn Yellow (Johnson, 1970)

Flower Description/Color Nearly inconspicuous; yellow-green (Johnson, 1970)

Fruit Description/Color/Effective Period 1" (2.5cm) red samara, autumn, winter turns brown in autumn

Flowering Time/Effective Period Spring

Form Irregular tree; broadly, densely rounded (Johnson, 1970) (Anderson & Holmgren, 1969); shrub (Kelly, 1970)

Bark Description Light gray, narrowly furrowed (Johnson, 1970); light brown (Preston, 1968); gnarled trunks

Winter Appearance No particular merit

Extension of Range Washington to Montana south to New Mexico and Calif.

Elevation 4000-8000' (1333-2666m)

Vegetation Type Chaparral, Upper Uinta sage, Pinyon/juniper, Ponderosa Pine

Root Type Shallow to deep, spreading

Growth Rate Rapid

Lifespan Short

Sun Exposure Sun (Van Dersal, 1938); partial shade (Preston, 1968)

Drought Tolerance Good, if well established (Stark, 1966)

Wind Firm Yes

Aspect Stream bottoms

Soil: Wide variety of soils

Texture Medium to rocky

pH 6.5-7.5

Depth Deep

Moisture Moist (Johnson, 1970); dry (Van Dersal, 1938)

Organic matter If possible

Drainage Well-drained, standing water for short periods

Maintenance/Cleanliness Weak wood, suckers, clean

Insects 49 on genus (Stark, 1966)

Diseases Heartrot (Van Dersal, 1938); 32 on species (Stark, 1966)

Transplantability Readily transplanted when young (Van Dersal, 1938)

Propagation Seeds; others (Stark, 1966)

Availability Readily available

Animal Food Birds, squirrels, deer (Van Dersal, 1938)

Best Use Rapid shade

Comments Questionable as ornamental unless nothing else is suited to site
Scientific Name  *Alnus tenuifolia* Nutt.

Synonym  

Common Name  Thinleaf alder (Johnson, 1970)

Ultimate Height  30' (10m)(Harrington, 1954)(Johnson, 1970)

Ultimate Spread  Shrub 20' (6.6m); tree 15' (5m)

Leaf Description/Texture  Ovate, doubly serrate (Harrington, 1954); 3" (7.5cm) long (Johnson, 1970); medium texture

Leaf Color, Summer  Yellow-green (Harrington, 1954); dark green (Stark, 1966); dull-green (Johnson, 1970)

Leaf Color, Autumn  Yellowish-green (Johnson, 1970)

Flower Description/Color  Pistillate: small, inconspicuous "strobiles"; Staminate: pinkish, catkins 2" (5cm); conspicuous

Fruit Description/Color/Effective Period  Small "conelike" dark, brown; winter, fall

Flowering Time/Effective Period  March-April

Form  Small tree or shrub (Harrington, 1954); ascending limbs (Anderson & Holmgren, 1969); shrubby, rounded, in clumps (Johnson, 1970)

Bark Description  Thin, reddish (Harrington, 1954); horizontal lenticels (Johnson, 1970); scaly

Winter Appearance  Reddish, much-branched

Extension of Range  Washington to Montana, south to New Mexico, west to California (Preston, 1968)

Elevation  Colorado 5000-10,000' (1666-3333m)(Harrington, 1954); Utah 5000-8500' (1666-2833m)(Johnson, 1970)

Vegetation Type  Chaparral, Upper Uinta sage, Aspen/lodgepole pine, Douglas fir/white fir

Root Type  Nitrogen-fixing (Van Dersal, 1938); fibrous, shallow

Growth Rate  Rapid (Van Dersal, 1938)

Lifespan  Short

Sun Exposure  Sun (Van Dersal, 1938); shade when young, sun when mature (Preston, 1968)

Drought Tolerance  Poor

Wind Firm  Yes

Aspect  Northwest (Stark, 1966); stream bottoms

Soil:  Texture Medium; black loam (Stark, 1966)  Moisture  Moist to wet

pH  6.0-7.0  Organic matter  High (Stark, 1966)

Depth  Deep to moderately deep Drainage  Well-drained with peris of standing water

Maintenance/Cleanliness  Weak wood, clean, train to small tree

Insects  3 on species (Stark, 1966)

Diseases  27 on species (Stark, 1966)

Transplantability  Good when young

Propagation  Seeds, cuttings, layering

Availability  Doubtful commercial source

Animal Food  Deer, sheep, beaver (Stark, 1966)

Best Use  Barrier, screen

Comments  Erosion control on streams (Stark, 1966)
Scientific Name  *Amelanchier alnifolia* Nutt. var. *alnifolia*

Synonym

Common Name  Saskatoon serviceberry; Western serviceberry (Van Dersal, 1938)

Ultimate Height  3-12' (1-4m) (Harrington, 1954); 18-21' (6-7m) (Johnson, 1970) (Anderson & Holmgren, 1969); 24-40' (8-13.3m) (Preston, 1968)

Ultimate Spread Shrub 20' (6.3m); tree 10-15' (3.3-5m)

Leaf Description/Texture  Oval to suborbicular, pubescent veins, round base, serrate (Harrington, 1954); alternate, 1 1/2-2 1/2" (3.8-6.8cm) long, 1-1 1/2" (2.5-3.8cm) wide (Preston, 1968); medium to fine texture

Leaf Color, Summer  Green; young leaves bronze (Sunset Western Garden Book, 1971)

Leaf Color, Autumn  Brown (Johnson, 1970); yellow to dusty red (Sunset Western Garden Book, 1971); orange

Flower Description/Color  Fragrant, 1" (2.54cm) white (Johnson, 1970); on racemes, showy

Fruit Description/Color/Effective Period  Small, black or purple berry; late summer, fall

Flowering Time/Effective Period  Spring; April-May (Van Dersal, 1938)

Form  Small tree or shrub (Harrington, 1954) (Johnson, 1970); open oblong crown (Preston, 1968); ascending branches

Bark Description  Bronze, smooth (Kelly, 1970); light brown, smooth to furrowed (Preston, 1968)

Winter Appearance  Bronze, stemy, attractive

Extension of Range  Washington to Montana, south to Colorado and Oregon

Elevation  Colorado: 5000-10,000' (1666-3333m) (Harrington, 1954)

Vegetation Type  Chaparral, Aspen/lodgepole pine, Upper Uinta sage, Ponderosa pine, Douglas fir/white fir

Root Type  Deep, spreading fibrous; stoloniferous, suckering (Van Dersal, 1938)

Growth Rate  Slow (Kelly, 1970)

Lifespan  Moderate

Sun Exposure  Sun (Van Dersal, 1938); sun or shade when young (Preston, 1968)

Drought Tolerance  Moderate, if well-established

Wind Firm  Yes

Aspect  South, west, east

Soil: Texture Medium

pH  6.0-7.0 (Van Dersal, 1938)

Moisture  Moist (Van Dersal, 1938)

Organic matter  If possible

Depth  Deep

Drainage  Well-drained (Van Dersal, 1938)

Maintenance/Cleanliness  Suckers, clean

Insects  2 on genus (Stark, 1966)

Diseases  Alternate host for cedar apple rust (Van Dersal, 1938); 48 on genus (Stark, 1966)

Transplantability  Difficult (Kelly, 1970)

Propagation  Seeds

Availability  Possibly locally available

Animal Food  Most birds, deer (Van Dersal, 1938)

Best Use  Flowering shrub

Comments  Very ornamental, attracts birds, highly variable, hybridizes readily, delicate values of flowers, foliage & winter form. Intergrades with *A. utahensis* and *A. pumila.*
Scientific Name: Amelanchier utahensis Koehne ssp. utahensis

Synonym

Common Name: Utah serviceberry

Ultimate Height: 9-12' (3-4m) (Harrington, 1954); 15' (5m) (Johnson, 1970)
Ultimate Spread: Shrub 10-15' (3.3-5m); tree 10' (3.3m)
Leaf Description/Texture: 2" (5cm) ovate leaves, rounded or acute tip, upper and lower surfaces hairy, coarsely dentate or serrate margins (Harrington, 1954); medium texture
Leaf Color, Summer: Light green
Leaf Color, Autumn: Brown (Johnson, 1970); reddish
Flower Description/Color: 1" (2.5cm) white flowers in racemes, showy
Fruit/Description/Color/Effective Period: 1/2" (1.2cm) berrylike pome, purple black (Stark, 1966)
Flowering Time/Effective Period: May-June (Van Dersal, 1938); April-May (Stark, 1966)
Form: Shrub (Harrington, 1954) (Van Dersal, 1938); round top
Bark Description: Grayish, smooth (Johnson, 1970)
Winter Appearance: Coarse twig pattern
Extension of Range: Oregon east to Montana and south to Colorado
Elevation: Colorado 5000-5500' (1666-3166m) (Harrington, 1954); Utah 4000-8000' (1333-2666m) (Johnson, 1970)
Vegetation Type: Chaparral, Pinyon/juniper, Upper Uinta sage, Douglas fir/white fir, Ponderosa pine
Root Type: Deep, spreading, stoloniferous, suckering (Van Dersal, 1938)
Growth Rate: Slow (Kelly, 1970)
Lifespan: Moderate
Sun Exposure: Sun (Van Dersal, 1938)
Drought Tolerance: Good, if well established
Wind Firm: Yes
Aspect: South, west, east; hillsides (Harrington, 1954); survived northwest (Stark, 1966)
Soil: Texture: Coarse to medium (Stark, 1966)
Moisture: Dry (Van Dersal, 1938); annual precipitation 8-14"+(20-35cm+) (Stark, 1966)
pH: 6.5-7.5
Depth: Moderate
Organic Matter: Moderate
Drainage: Well-drained (Van Dersal, 1938)
Maintenance/Cleanliness: Suckers, clean
Insects: 2 on genus (Stark, 1966)
Diseases: Alternate host for apple cedar rust (Van Dersal, 1938); 48 on genus (Stark, 1966)
Transplantability: Difficult (Kelly, 1970)
Propagation: Seeds
Availability: No known source
Animal Food: Most birds, deer
Best Use: Ornamental shrub, background mass
Comments: This species is found on drier, poorer sites, and grows larger than A. alnifolia. Intergrades with A. pumila and A. alnifolia.
Scientific Name  Arctostaphylos patula Greene  

Synonym

Common Name  Greenleaf manzanita

Ultimate Height  6' (2m) (Rehder, 1940)  
Ultimate Spread  10' (3.3m)  
Leaf Description/Texture  Green, 1'2" (2.5-5cm) leaves orbicular, leathery (Rehder, 1940); medium-fine texture  
Leaf Color, Summer  Green  
Leaf Color, Autumn  Evergreen (Harrington, 1954)  
Flower Description/Color  Small, pink, in dense 1 1/2" (3cm) panicles (Rehder, 1940); showy  
Fruit Description/Color/Effective Period  Globose drupe, dark brown or black, glossy (Rehder, 1940); May-September (Stark, 1966)  
Flowering Time/Effective Period  April-June (Stark, 1966)  
Form  Rounded crown, usually symmetrical, many ascended branches  
Bark Description  Dark red purple (Rehder, 1940)  
Winter Appearance  Evergreen (Harrington, 1954)  
Extension of Range  Oregon to Colorado south to California  
Elevation  Colorado 7000-9000' (2666-3000m); Nevada 2000-9000' (666-3000m) (Stark, 1966)  
Vegetation Type  Chaparral, Ponderosa pine  
Root Type  Deep (Kelly, 1970)  
Growth Rate  Rapid to moderate  
Lifespan  Moderate  
Sun Exposure  Sun (Stark, 1966)  
Drought Tolerance  Good  
Wind Firm  Good  
Aspect  Flat south  
Soil:  Texture  Coarse (Stark, 1966)  
           Moisture  Less than 20" (50cm)  
           pH  5.0-6.0  
           Depth  Moderate; 12-37"+ (33-100cm) (Stark, 1966)  
           Organic Matter  No  
           Drainage  Well-drained (Stark, 1966)  
Maintenance/Cleanliness  Clean carefree  
Insects  25 on genus (Stark, 1966)  
Diseases  5 on species (Stark, 1966)  
Transplantability  Poor (Kelly, 1970)  
Propagation  Seed (Stark, 1966)  
Availability  Valley View Nursery, Ogden, Utah  
Animal Food  Deer (Van Dersal, 1938); blue grouse (Stark, 1966)  
Best Use  Broadleaf evergreen for low hedge, showy blossom  
Comments  Pioneer after fire in southern Wasatch Range; less hardy in extreme northern Utah.
Scientific Name: Arctostaphylos uva-ursi (L.) Spreng.

Synonym

Common Name: Kinnikinick (Kelly, 1970); Bearberry

Ultimate Height: 6" (15cm) (Harrington, 1954)
Ultimate Spread: Ground cover 2' (.6m)

Leaf Description/Texture: Small, 1/2" (1.5cm) diameter, leaves, dark green above, whitish below, leathery, evergreen. Fine texture

Leaf Color, Summer: Dark green
Leaf Color, Autumn: Dark green (dead leaves will turn red)

Flower Description/Color: Inconspicuous, pink flower

Fruit Description/Color/Effective Period: 1/4" (.6cm) berrylike nutlet, green summer; bright red fall, winter

Flowering Time/Effective Period: April–June depending on elevation, inconspicuous

Form: Trailing, prostate mat; vinelike (Van Dersal, 1938)

Bark Description: Reddish tan

Winter Appearance: Evergreen, attractive

Extension of Range: Washington east to Montana south to New Mexico, and California

Elevation: Colorado 6000–10,000' (2000–3333m) (Harrington, 1954)

Vegetation Type: Ponderosa pine, Douglas fir/white fir, Aspen/lodgepole pine, Spruce/fir

Root Type: Shallow, fibrous; layers easily

Growth Rate: Moderate to rapidly spreading

Lifespan: Continuous

Sun Exposure: Shade or sun (Van Dersal, 1938)

Drought Tolerance: Good (Kelly, 1970)

Wind Firm: Yes

Aspect: All

Soil: Texture: Coarse to rocky (Kelly, 1970)

Moisture: Dry (Kelly, 1970)

Organic matter: No

pH: 5.0–6.5

Drainage: Well-drained (Kelly, 1970)

Depth: Shallow

Maintenance/Cleanliness: May need some pruning to direct growth; clean

Insects: 25 on genus (Stark, 1966)

Diseases: 9 on genus (USDA, 1960)

Transplantability: Difficult with old established plants but not with young plants

Propagation: Seeds, cuttings (Van Dersal, 1938)

Availability: Varieties available (check provenance)

Animal Food: Birds, deer, sheep, bears

Best Use: Ground cover for gravely dry soil

Comments: One of the few broadleaf evergreens in Utah
Scientific Name  *Artemisia arbuscula* (Nutt.) var. *nova* (A. Nels.) Cronquist

Synonyms  *Artemisia tridentata* var. *nova* (A. Nels.) H. and C.

Common Name  Dwarf sagebrush

**Ultimate Height**  4-16" (10-40cm) (Anderson & Holmgren, 1969)

**Ultimate Spread**  1-2' (.3-1m)

**Leaf Description/Texture**  Small 3/4" (1.9cm) gray green, or green; 3-lobed ends, revolute margins, glabrous (Anderson & Holmgren, 1969); fine texture

**Leaf Color, Summer**  Gray-green to green (Anderson & Holmgren, 1969)

**Leaf Color, Autumn**  Evergreen

**Flower Description/Color**  Yellow, inconspicuous

**Fruit Description/Color**  Small, inconspicuous achene, fall

**Flowering Time/Effective Period**  Late summer

**Form**  Low, spreading shrub (Anderson & Holmgren, 1969)

**Bark Description**  Brown, shreddy (Anderson & Holmgren, 1969)

**Winter Appearance**  Evergreen, attractive

**Extension of Range**  Idaho south to Utah and Colorado

**Elevation**  Colorado 7000-8000' (2333-2666m) (Harrington, 1954)

**Vegetation Type**  Douglas fir/white fir, chaparral, Upper Uinta sage

**Root Type**  Deep spreading

**Growth Rate**  Moderate to rapid

**Lifespan**  Short

**Sun Exposure**  Sun

**Drought Tolerance**  Good

**Wind Firm**  Yes

**Aspect**  South at higher elevations

**Soil**:  Texture Coarse to rocky (Anderson & Holmgren, 1969)

**pH**  6.5-7.5

**Depth**  Deep

**Moisture**  Dry (Anderson & Holmgren, 1969)

**Organic matter**  No

**Drainage**  Well-drained

**Maintenance/Cleanliness**  Carefree, clean

**Insects**  9 on species

**Diseases**  30 on genus (Stark, 1966)

**Transplantability**  Readily transplants

**Propagation**  Seeds, cuttings

**Availability**  No known source

**Animal Food**  Deer browse

**Best Use**  Border, color accent

**Comments**  Similar to *A. tridentata* but smaller, greener, growing at higher elevations
Scientific Name  *Artemisia cana* Pursh ssp. *cana*

**Synonym**

**Common Name**  Hoary sagebrush; Silver sagebrush

**Ultimate Height**  1-6' (.3-2m) (Harrington, 1954) (Kelly, 1970); 1-3 1/2' (.3-1.1m) (Anderson & Holmgren, 1969)

**Ultimate Spread**  2-3' (.6-1m)

**Leaf Description/Texture**  1/2-1" (1.2-2.5cm) long narrow leaves, aromatic; fine texture

**Leaf Color, Summer**  Silvery white (Anderson & Holmgren, 1969)

**Leaf Color, Autumn**  Evergreen

**Flower Description/Color**  Small, yellowish (Anderson & Holmgren, 1969)

**Fruit Description/Color/Effective Period**  1/4" (.6cm), round, whitish capsule; late summer, fall

**Flowering Time/Effective Period**  August-September (Anderson & Holmgren, 1969)

**Form**  Shrub (Harrington, 1954); erect, round, low (Anderson & Holmgren, 1969)

**Bark Description**  Silvery white to gray

**Winter Appearance**  Evergreen, attractive

**Extension of Range**  Washington to Montana, south to New Mexico and California (Harrington, 1954)

**Elevation**  Colorado 5000-10,000' (1666-3333m) (Harrington, 1954)

**Vegetation Type**  Upper Uinta sage, Pinyon/juniper, Douglas fir/white fir, Chaparral

**Root Type**  Spreading, deep

**Growth Rate**  Rapid

**Lifespan**  Short

**Sun Exposure**  Sun

**Drought Tolerance**  Good

**Wind Firm**  Yes

**Aspect**  North at higher elevations (Kelly, 1970)

**Soil:**
- **Texture**  Coarse (Kelly, 1970)
- **pH**  6.5-8.5 (Anderson & Holmgren, 1969)
- **Moisture**  Dry (Kelly, 1970)
- **Organic matter**  No
- **Drainage**  Well-drained

**Depth**  Deep

**Maintenance/Cleanliness**  Carefree, clean

**Insects**  9 on genus

**Diseases**  30 on genus (Stark, 1966)

**Transplantability**  Yes

**Propagation**  Seeds

**Availability**  Wild Garden, Bothell, Washington

**Animal Food**  Deer browse

**Best Use**  Border, accents, higher ground cover

**Comments**
Scientific Name  Artemisia frigida Willd.

Synonym

Common Name  Fringed sagebrush

Ultimate Height  4-14" (10-35cm) (Kelly, 1970)
Ultimate Spread  1' (.3m), usually less
Leaf Description/Texture  3/4" (1.9cm) white, tomentose, pinnatifid to linear (Harrington, 1954); fine texture
Leaf Color, Summer  White; silver-gray (Kelly, 1970)
Leaf Color, Autumn  Evergreen
Flower Description/Color  Inconspicuous, summer
Fruit Description/Color/Effective Period  Inconspicuous achenes; late summer
Flowering Time/Effective Period  Inconspicuous; summer
Form  Undershrub, woody and branching at base; mat-like (Van Dersal, 1938)
Bark Description  White tomentose stems
Winter Appearance  Attractive, white
Extension of Range  Oregon to Montana south to New Mexico and Arizona
Elevation  Colorado 4500-10,000' (1500-3333m)
Vegetation Type  Chaparral, Pinyon/juniper, Douglas fir/white fir, Spruce/fir, Upper Uinta sage, Ponderosa pine
Root Type  Fibrous
Growth Rate  Rapid
Lifespan  Short
Sun Exposure  Sun
Drought Tolerance  Moderate to good
Wind Firm  Yes
Aspect  All, south at higher elevations
Soil: Texture  Fine to coarse
pH  7.0
Depth  Shallow to deep
Maintenance/Cleanliness  Carefree, clean
Insects  9 on genus
Diseases  30 on genus (Stark, 1966)
Transplantability  Good
Propagation  Seeds, wildlings
Availability  Wild Garden, Bothell, Washington
Animal Food  Sage grouse
Best Use  Borders, gravel cover, color accent
Comments  Excellent color
Scientific Name  *Artemisia spinescens* D.C.

**Synonym**

**Common Name**  Bud sage; Spiny sagebrush

**Ultimate Height**  8-12" (20-30cm) (Harrington, 1954)

**Ultimate Spread**  12" (30cm)

**Leaf Description/Texture**  3/4" (2cm) spiny stems, white tomentose, 3-5 parted (Harrington, 1954); fine texture

**Leaf Color, Summer**  Whitish-green

**Leaf Color, Autumn**  Whitish-green

**Flower Description/Color**  Small, yellow, in masses (Kelly, 1970)

**Flower Description/Color/Effective Period**  Inconspicuous, in heads; summer

**Flowering Time/Effective Period**  Early spring (Johnson, 1970)

**Form**  Small, round-top, shrub, woody at base (Kelly, 1970)

**Bark Description**  Tomentose, whitish, stemy

**Winter Appearance**  Deciduous, attractive, stemy

**Extension of Range**  Washington to Montana, south to New Mexico and California

**Elevation**  Colorado 4500-8000' (1500-2666m) (Kelly, 1970)

**Vegetation Type**  Chaparral, Pinyon/juniper, Douglas fir/white fir, Aspen/lodgepole pine, Ponderosa pine, Upper Uinta sage

**Root Type**  Fibrous

**Growth Rate**  Rapid

**Lifespan**  Short

**Sun Exposure**  Sun

**Drought Tolerance**  Good

**Wind Firm**  Yes

**Aspect**  All, south at higher elevations

**Soil:**  Texture  Fine to coarse

**pH**  7.0-8.5 (Kelly, 1970)

**Depth**  Moderate

**Moisture**  Dry (Kelly, 1970)

**Organic matter**  No

**Drainage**  Well-drained

**Maintenance/Cleanliness**  Carefree, clean

**Insects**  9 on genus (Stark, 1966)

**Diseases**  30 on genus (Stark, 1966)

**Transplantability**  Good

**Propagation**  Seeds

**Availability**  Western Evergreen, Golden, Colorado

**Animal Food**  Deer browse

**Best Use**  Border accent

**Comments**
Scientific Name: *Artemisia tridentata* ssp. *rockrothii* (A. Gray) H. and C.

Synonym: *Artemisia rockrothii* A. Gray

Common Name: Intermediate sage

**Ultimate Height**: 4-25" (10-62.5cm)

**Ultimate Spread**: 1-2' (.3-.66m)

**Leaf Description/Texture**: 1/2" (1.25cm) long leaves, 3-lobed at head (Harrington, 1954); fine texture

**Leaf Color, Summer**: Gray-green; whitish

**Leaf Color, Autumn**: Evergreen

**Flower Description/Color**: Yellowish green flowers in spikes, inconspicuous

**Fruit Description/Color/Effective Period**: Achene, inconspicuous, fall

**Flowering Time/Effective Period**: Late summer

**Form**: Small, rounded, compact shrub

**Bark Description**: Shreddy, brown

**Winter Appearance**: Evergreen, gray-green

**Extension of Range**: Washington to Montana, south to New Mexico and California

**Elevation**: Colorado 8500-9000' (2833-3000m) (Harrington, 1954)

**Vegetation Type**: Aspen/lodgepole pine, Douglas fir/white fir, Chaparral, Upper Uinta sage

**Root Type**: Deep spreading

**Growth Rate**: Rapid

**Lifespan**: Short

**Sun Exposure**: Sun

**Drought Tolerance**: Good

**Wind Firm**: Yes

**Aspect**: All, south at higher elevations

**Soil**: Texture Fine to coarse

**pH**: 6.5-7.5

**Depth**: Deep

**Moisture**: Dry

**Organic matter**: No

**Drainage**: Well-drained

**Maintenance/Cleanliness**: Carefree, clean

**Insects**: 9 on genus (Stark, 1966)

**Diseases**: 30 on genus (Stark, 1966)

**Transplantability**: Readily transplants

**Propagation**: Seeds

**Availability**: No known source

**Animal Food**: Deer browse

**Best Use**: Border, accent

**Comments**: Similar to *A. tridentata* but found at higher elevations. More like *A. tridentata* than *A. arbuscula* var. *nova*, but smaller
Scientific Name  *Artemisia tridentata* ssp. *tridentata* (Nutt.) H. and C.

Synonym

Common Name  Big sage

Ultimate Height  3-12' (1-4m) (Harrington, 1954); 1-10' (3-3.3m) (Anderson & Holmgren, 1969)

Ultimate Spread  5-8' (1.6-2.6m)

Leaf Description/Texture  3/4" (2cm) elongated leaf, with 3 lobes at tip, silvery pubescence on upper and lower sides, aromatic (Harrington, 1954); fine texture

Leaf Color, Summer  Whitish green, silver green (Stark, 1966); yellowish white (Anderson & Holmgren, 1969)

Leaf Color, Autumn  Whitish green

Flower Description/Color  Yellow, inconspicuous (Stark, 1966)

Fruit Description/Color/Effective Period  Achene; inconspicuous; fall

Flowering Time/Effective Period  July-November (Stark, 1966)

Form  Shrub, much-branched (Harrington, 1954); round, compact shrub

Bark Description  Twisted, gray brown, scaly

Winter Appearance  Evergreen, attractive

Extension of Range  Washington to Montana, south to New Mexico and California

Elevation  Colorado 5000-9500' (2666-3166m) (Kelly, 1970); Nevada 1500-10,600' (500-3533m) (Stark, 1966)

Vegetation Type  Chaparral, Pinion/juniper, Aspen/lodgepole pine, Upper Uinta sage, Ponderosa pine

Root Type  Deep, spreading

Growth Rate  Rapid in youth, slow in maturity

Lifespan  Short to moderate

Sun Exposure  Sun (Stark, 1966) (Van Dersal, 1938)

Drought Tolerance  Good

Wind Firm  In youth

Aspect  All, south at higher elevations

Soil: Texture  Coarse to fine

pH  6.5-7.5

Depth  Moderate; deep (Stark, 1966)

Moisture  Dry (do not overwater)

8"+ (20cm+) annual precipitation (Stark, 1966)

Organic matter  No

Drainage  Well-drained

Maintenance/Cleanliness  Becomes symmetrical under cultivation; clean

Insects  9 on genus (Stark, 1966)

Diseases  33 for genus (Stark, 1966)

Transplantability  Young plants transplant easily (Stark, 1966)

Propagation  Seeds

Availability  Western Evergreen, Golden, Colorado

Animal Food  Deer browse

Best Use  Dry, year around ornamental

Comments  Invader on overgrazed areas. May be climax in some areas (Stark, 1966)
Scientific Name  *Atriplex confertifolia* (Torr. & Frem.) S. Wats.

Synonym

Common Name  Shadscale

**Ultimate Height**  3' (1m) (Harrington, 1954)

**Ultimate Spread**  4' (1.3m)

**Leaf Description/Texture**  1/2" (1.2cm) rounded leaves clumped together, spiny (Harrington, 1954); fine texture

**Leaf Color, Summer**  Light green; gray (Stark, 1966)

**Leaf Color, Autumn**  Gray

**Flower Description/Color**  Dioecious; staminate: inconspicuous; pistillate: 1/2" (6-12mm) fruiting bracts

**Fruit Description/Color/Effective Period**  Achene, semishowy, tan; July-November

**Flowering Time/Effective Period**  April-July (Stark, 1966)

**Form**  Rounded top, erect ascending branches

**Bark Description**  Stout, twiggy, spiny branches (Harrington, 1954)

**Winter Appearance**  Stemy, light brown-gray

**Extension of Range**  Washington to Montana south to New Mexico and California

**Elevation**  Nevada below 7000' (2333m) (Stark, 1966)

**Vegetation Type**  Chaparral, Pinyon/juniper

**Root Type**  Deep, wide-spreading

**Growth Rate**  Rapid

**Lifespan**  Short

**Sun Exposure**  Sun (Van Dersal, 1938)

**Drought Tolerance**  Good

**Wind Firm**  Yes

**Aspect**  All, especially flat or south

**Soil:**  Salt tolerant

**Texture**  Medium to fine

**pH**  7.5-9.0

**Depth**  Deep to moderate

**Drainage**  25-60% saturation (Stark, 1966); well drained, some periods of standing water

**Maintenance/Cleanliness**  Carefree, clean

**Insects**  11 on genus (Stark, 1966)

**Diseases**  14 on genus (Stark, 1966)

**Transplantability**  Good when young

**Propagation**  Seed (Stark, 1966)

**Availability**  No known commercial source

**Animal Food**  Birds, browse

**Best Use**  Shrub for alkaline conditions, good barrier

**Comments**
Scientific Name: *Atriplex nuttallii* S. Wats.

**Synonym**

**Common Name:** Salt sage; Four-wing saltbrush

**Ultimate Height:** 3' (1m)
**Ultimate Spread:** 3' (1m)

**Leaf Description/Texture:** 2" (5cm) rounded, oblong (Harrington, 1954); medium texture

**Leaf Color, Summer:** Whitish
**Leaf Color, Autumn:** Silvery gray

**Flower Description/Color:** Dioecious, inconspicuous

**Fruit Description/Color/Effective Period:** Interesting winged achene, tan; late summer, fall

**Flowering Time/Effective Period:** June-August (Stark, 1966)

**Form:** Rounded shrub or procumbent shrub

**Bark Description:** Stout twigs

**Winter Appearance:** Twiggy

**Extension of Range:** Idaho south to Utah and Colorado

**Elevation:** Nevada 4000-5000' (1333-1666m) (Stark, 1966)

**Vegetation Type:** Chaparral, Pinyon/juniper

**Root Type:** Deep, spreading

**Growth Rate:** Rapid

**Lifespan:** Short

**Sun Exposure:** Sun

**Drought Tolerance:** Yes

**Wind Firm:** Yes

**Aspect:** All, especially South and flat

**Soil:** Slight salt tolerance

<table>
<thead>
<tr>
<th>Texture</th>
<th>Medium to coarse</th>
<th>pH 7.5-8.5</th>
<th>Depth 36-60&quot;+ (1-1.6m)</th>
</tr>
</thead>
</table>

**Maintenance/Cleanliness:** Clean, carefree

**Insects:** 11 on genus (Stark, 1966)

**Diseases:** 14 on genus (Stark, 1966)

**Transplantability:** Good when young

**Propagation:** Seed (Stark, 1966)

**Availability:** No known commercial source

**Animal Food:** Birds, browse

**Best Uses:** Shrub with interesting fruit, barrier

**Comments:** Differs from *A. confertifolia* by coarser textured, unarmed, less salt tolerance and whiter leaf.
**Scientific Name** Berberis repens Lindl.

**Synonym** Mahonia repens G. Don

**Common Name** Creeping Oregon grape

<table>
<thead>
<tr>
<th><strong>Ultimate Height</strong></th>
<th>1' (.3m) (Harrington, 1954)(Kelly, 1970); 3' (1m)</th>
<th>Sunset Western Garden Book, 1971</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ultimate Spread</strong></td>
<td>Ground cover, 4-6' (10-15cm)</td>
<td></td>
</tr>
<tr>
<td><strong>Leaf Description/Texture</strong></td>
<td>1-3 1/2&quot; (3-9cm) pinnately compound with 3-7 leaflets, glossy green, evergreen, wavy leaf margins with bristle-tips (Harrington, 1954); hollylike leaves (Anderson &amp; Holmgren, 1969); medium to medium-coarse</td>
<td></td>
</tr>
<tr>
<td><strong>Leaf Color, Summer</strong></td>
<td>Dark, glossy green</td>
<td></td>
</tr>
<tr>
<td><strong>Leaf Color, Autumn</strong></td>
<td>Red (depending on amount of sun) (Kelly, 1970)</td>
<td></td>
</tr>
<tr>
<td><strong>Flower Description/Color</strong></td>
<td>Yellow, racemes of small, fragrant flowers</td>
<td></td>
</tr>
<tr>
<td><strong>Fruit Description/Color/Effective Period</strong></td>
<td>1/4&quot; (.7cm) berry, black or bluish with a glaucous bloom (Harrington, 1954); September (Van Dersal, 1938)</td>
<td></td>
</tr>
<tr>
<td><strong>Flowering Time/Effective Period</strong></td>
<td>Spring</td>
<td></td>
</tr>
<tr>
<td><strong>Form</strong></td>
<td>Prostrate, creeping</td>
<td></td>
</tr>
<tr>
<td><strong>Bark Description</strong></td>
<td>Reddish brown</td>
<td></td>
</tr>
<tr>
<td><strong>Winter Appearance</strong></td>
<td>Evergreen, attractive</td>
<td></td>
</tr>
<tr>
<td><strong>Extension of Range</strong></td>
<td>Washington to Montana south to New Mexico and Calif.</td>
<td></td>
</tr>
<tr>
<td><strong>Elevation</strong></td>
<td>Colorado 5500-10,000' (2833-3333m) (Harrington, 1954)</td>
<td></td>
</tr>
<tr>
<td><strong>Vegetation Type</strong></td>
<td>Douglas fir/white fir, Aspen/lodgepole pine, Chaparral, ponderosa pine, Spruce/fir, Upper Uinta sage</td>
<td></td>
</tr>
<tr>
<td><strong>Root Type</strong></td>
<td>Creeping, and stoloniferous (Harrington, 1954); deep (Stark, 1966)</td>
<td></td>
</tr>
<tr>
<td><strong>Growth Rate</strong></td>
<td>Moderate</td>
<td></td>
</tr>
<tr>
<td><strong>Lifespan</strong></td>
<td>Continuous</td>
<td></td>
</tr>
<tr>
<td><strong>Sun Exposure</strong></td>
<td>Sun, shade, partial shade</td>
<td></td>
</tr>
<tr>
<td><strong>Drought Tolerance</strong></td>
<td>Good to moderate</td>
<td></td>
</tr>
<tr>
<td><strong>Wind Firm</strong></td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td><strong>Aspect</strong></td>
<td>All</td>
<td></td>
</tr>
<tr>
<td><strong>Soil: Texture</strong></td>
<td>Coarse to medium; loam (Stark, 1966)</td>
<td></td>
</tr>
<tr>
<td><strong>Moisture</strong></td>
<td>Dry to moist</td>
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<tr>
<td><strong>Organic matter</strong></td>
<td>No</td>
<td></td>
</tr>
<tr>
<td><strong>pH</strong></td>
<td>5.5-7.0</td>
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<td><strong>Drainage</strong></td>
<td>Well-drained</td>
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<tr>
<td><strong>Depth</strong></td>
<td>Shallow to moderate</td>
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</tr>
<tr>
<td><strong>Maintenance/Cleanliness</strong></td>
<td>Pruning to direct growth; clean</td>
<td></td>
</tr>
<tr>
<td><strong>Insects</strong></td>
<td>None known (Stark, 1966)</td>
<td></td>
</tr>
<tr>
<td><strong>Diseases</strong></td>
<td>4 on species (1966)</td>
<td></td>
</tr>
<tr>
<td><strong>Transplantability</strong></td>
<td>Difficult on older plants because of stolons (Kelly, 1970); easy on young plants</td>
<td></td>
</tr>
<tr>
<td><strong>Propagation</strong></td>
<td>Seeds</td>
<td></td>
</tr>
<tr>
<td><strong>Availability</strong></td>
<td>Widely available (check provenance)</td>
<td></td>
</tr>
<tr>
<td><strong>Animal Food</strong></td>
<td>Birds; deer (Van Dersal, 1938)</td>
<td></td>
</tr>
<tr>
<td><strong>Best Use</strong></td>
<td>Ground cover; good on steep slopes (Kelly, 1970)</td>
<td></td>
</tr>
<tr>
<td><strong>Comments</strong></td>
<td>One of Utah's few broad-leaf evergreens</td>
<td></td>
</tr>
</tbody>
</table>
Scientific Name  Betula glandulosa Michx.

Synonym

Common Name  Bog Birch

Ultimate Height  3-6' (1-2m) (Harrington, 1954)
Ultimate Spread  8-10' (2.6-3.3m), in thickets
Leaf Description/Texture  3/4-1" (.8-2.5cm), small roundish thickened leaves; fine texture
Leaf Color, Summer  Glossy green
Leaf Color, Autumn  Brown
Flower Description/Color  Catkins
Fruit Description/Color/Effective Period  Small conelike brown; fall, winter
Flowering Time/Effective Period  Inconspicuous; spring
Form  Low spreading shrubs with ascending branches
Bark Description  Brown, cherrylike, glandular (Kelly, 1970)
Winter Appearance  Red-brown stems
Extension of Range  Washington south to Oregon, California and Colorado
Elevation  Colorado 7500-11,000' (2500-3666m) (Harrington, 1954)
Vegetation Type  Alpine, riparian
Root Type  Deep, fibrous
Growth Rate  Slow
Lifespan  Moderate
Sun Exposure  Sun (Van Dersal, 1938)
Drought Tolerance  Very poor
Wind Firm  Yes
Aspect  All
Soil:  Sphagnum bogs (Van Dersal, 1938)
       Texture  Medium to fine
       pH  5.5-6.5
       Depth  Deep
       Moisture  Wet (Van Dersal, 1938)
       Organic matter  If possible
       Drainage  Standing water; wet
Maintenance/Cleanliness  Carefree; clean
Insects  20 on genus (Stark, 1966)
Diseases  Many on genus only (Stark, 1966)
Transplantability  Poor (Kelly, 1970)
Propagation  Seeds
Availability  No known commercial source
Animal Food
Best Use  Bog or water edge
Comments  Hydrophilous; associates with Salix spp.; molds to landscape
Scientific Name  *Betula occidentalis* Hook.

**Synonym**  *Betula fontinalis* Sarg. (Van Dersal, 1938)

**Common Name**  Water birch (Kelly, 1970)

**Ultimate Height**  36' (12m)(Harrington, 1954); 6-15' (2-5m)(Kelly, 1970); 20'(6.6m)(Johnson, 1970); 30' (10m)(Anderson & Holmgren, 1969)

**Ultimate Spread**  Tree 10-15' (3.3-5m); shrub 15-20' (5-6.6m)

**Leaf Description/Texture**  1-2" (2.5-5cm) ovate, sharply pointed, sharply lobed, prominent veins (Harrington, 1954); medium texture

**Leaf Color, Summer**  Green

**Leaf Color, Autumn**  Brown (Johnson, 1970); golden (Anderson & Holmgren, 1969)

**Flower Description/Color**  Staminate: inconspicuous, catkins; Pistillate: catkins 3/4" (2cm), green

**Fruit Description/Color/Effective Period**  Brown cone-like catkins with nutlet; late summer, fall

**Flowering Time/Effective Period**  Inconspicuous; spring

**Form**  Shrub or tree (Harrington, 1954); ascending branches (Preston, 1968); clump-like; spreading, open crown

**Bark Description**  Smooth, brownish red, thin, with horizontal lenticels

**Winter Appearance**  Pendulous twigs thin, reddish, fine texture, attractive

**Extension of Range**  Washington to Montana south to New Mexico and California

**Elevation**  Colorado 5000-9000' (1666-3000m)(Harrington, 1954)(Kelly, 1970); Utah 5000-8000' (1666-2666m) (Johnson, 1970)

**Vegetation Type**  Riparian

**Root Type**  Fibrous, spreading, shallow

**Growth Rate**  Rapid

**Lifespan**  Short (Van Dersal, 1938)

**Sun Exposure**  Sun (Van Dersal, 1938)(Preston, 1968)

**Drought Tolerance**  Good

**Wind Firm**  Yes

**Aspect**  Stream side

**Soil: Texture**  Medium; loam (Stark, 1966)

**Moisture**  Moist to wet

**Organic matter**  No (Van Dersal, 1938)

**pH**  6.5-7.0

**Depth**  Shallow (Preston, 1968)

**Drainage**  Well-drained

**Maintenance/Cleanliness**  Weak branches; clean

**Insects**  20 on genus (Stark, 1966)

**Diseases**  Many on genus only (Stark, 1966)

**Transplantability**  Only in May when young and buds are green (Kelly, 1970)

**Propagation**  Seeds (Van Dersal, 1938); cuttings

**Availability**  Collected trees available at some western nurseries

**Animal Food**  Sheep, goats, birds, deer (Van Dersal, 1938); beaver (Stark, 1966)

**Best Use**  Specimen, shrub mass

**Comments**  Fine winter line and color values
Scientific Name  Ceanothus fendleri  Gray

Synonym

Common Name  Fendler snowbrush

Ultimate Height  1-2 1/2' (.3-1m) (Harrington)
Ultimate Spread  2' (.6m)
Leaf Description/Texture  1/3" (lcm) narrow leaves, tomentose below; fine texture
Leaf Color, Summer  Green above, whitish below
Leaf Color, Autumn  Evergreen
Flower Description/Color  Small, white, in terminal clusters; showy
Fruit Description/Color/Effective Period  Small, round in terminal racemes, inconspicuous; summer
Flowering Time/Effective Period  Spring
Form  Low spreading shrub, spiny (Van Dersal, 1938); in thickets
Bark Description  Young: green; old: brown
Winter Appearance  Evergreen
Extension of Range  Wyoming and Colorado, south to New Mexico and Arizona (Harrington, 1954)
Elevation  Colorado 5500-9000' (1833-3000m) (Kelly, 1970)
Vegetation Type  Chaparral, Upper Uinta sage, Douglas fir/white fir, Aspen/lodgepole pine, Ponderosa pine
Root Type  Spreading fibrous, extensive; shallow, taproot
Growth Rate  Moderate
Lifespan  Short
Sun Exposure  Sun or shade (Van Dersal, 1938)
Drought Tolerance  Moderate
Wind Firm  Yes
Aspect  All; north at lower elevations
Soil:  Texture  Medium to coarse  Moisture  Dry (Van Dersal, 1938)
      pH  6.0-7.0  Organic matter  No
      Depth  Shallow to moderate  Drainage  Well-drained (Van Dersal, 1938)
Maintenance/Cleanliness  Carefree (may winterburn if exposed above snow); clean
Insects  33 on genus (Stark, 1966)
Diseases  30 on genus (Stark, 1966)
Transplantability  Poor (Kelly, 1970)
Propagation  Seeds, cuttings
Availability  Doubtful commercial availability
Animal Food  Deer browse
Best Use  Mass shrub background, year-round screen/barrier
Comments  One of Utah's few broadleaf evergreens.
Scientific Name  Ceanothus martinii  M.E. Jones

Synonym

Common Name  Martin snowbrush

Ultimate Height  1-2' (.3-.6m)(McMinn, 1942)
Ultimate Spread  2-3' (.6-1m)
Leaf Description/Texture  1/2-1" (1.2-2.5cm) roundish, thin, semi-deciduous (McMinn, 1942); fine texture
Leaf Color, Summer  Light green
Leaf Color, Autumn  Green
Flower Description/Color  White in 1-3" clusters (2.5-7.5cm)(McMinn, 1942)
Fruit Description/Color/Effective Period  Small capsule, inconspicuous; fall
Flowering Time/Effective Period  May-July (McMinn, 1942)
Form  Low, open and ascending branches
Bark Description  Green young stems
Winter Appearance  Evergreen
Extension of Range  Nevada, Utah and Colorado (McMinn, 1942)
Elevation  6500-7500'
Vegetation Type  Chaparral, Douglas fir/white fir, Aspen/lodgepole pine, Upper Uinta sage, Ponderosa pine
Root Type  Spreading with taproot
Growth Rate  Rapid
Lifespan  Short
Sun Exposure  Sun (Van Dersal, 1938)
Drought Tolerance  Good
Wind Firm  Yes
Aspect  All
Soil: Texture  Medium
pH  6.5
Moisture  Dry
Organic matter  No
Depth  Deep
Drainage  Well-drained
Maintenance/Cleanliness  May "winterburn"; clean
Insects  33+ on genus (Essig, 1926)
Diseases  13 on western genus (USDA, 1960)
Transplantability  Poor
Propagation  Seeds, cuttings
Availability  Doubtful availability
Animal Food  Birds
Best Use  Ornamental shrub
Comments  One of Utah's few broadleafed evergreens.
Scientific Name  Ceanothus velutinus Doug.

Synonym

Common Name  Tobacco snowbrush (Van Dersal, 1938)

Ultimate Height  3-9' (1-3m) (Harrington, 1954); 1-3' (.3-1m) (Kelly, 1970)
Ultimate Spread  10' (3.3m)

Leaf Description/Texture  Ovate, with distinct venation, fragrant, dark green above to white pubescent below, serrulate margins (Harrington, 1954); sticky exudate on leaves (Kelly, 1970); medium texture

Leaf Color, Summer  Green
Leaf Color, Autumn  Green

Flower Description/Color  White, in heads 2-4" (5-10cm), attractive (Sunset Western Garden Book, 1971)

Fruit Description/Color/Effective Period  Not showy; July-winter

Flowering Time/Effective Period  May-June (Van Dersal, 1938); June-July (Kelly, 1970)

Form  Shrubs, dense patches (Harrington, 1954); round topped (Anderson & Holmgren, 1969)

Bark Description  Young: olive-green; old: gray (Harrington, 1954)

Winter Appearance  Evergreen

Extension of Range  Washington to Montana, south to New Mexico and Calif.
Elevation  Colorado 6500-9000' (2166-3000m) (Harrington, 1954); 6000-10,000' (2000-3300m) (Kelly, 1970)

Vegetation Type  Chaparral, Douglas fir/white fir, Aspen/lodgepole pine, Spruce/fir, Ponderosa pine, Upper Uinta sage

Root Type  Nitrogen-fixing (Van Dersal, 1938); tap root spreading, deep (Van Dersal, 1938)

Growth Rate  Slow
Lifespan  Moderate

Sun Exposure  Sun (Van Dersal, 1938)
Drought Tolerance  Moderate if well established

Wind Firm  Yes
Aspect  All, hillsides

Soil: Texture  Medium to coarse
pH  5.5-7.0
Depth  Deep

Moisture  Dry
Organic matter  No
Drainage  Well-drained

Maintenance/Cleanliness  Tops subject to desiccation when exposed above snow; clean

Insects  33 on genus (Stark, 1966)
Diseases  30 on genus (Stark, 1966)

Transplantability  Taproot makes it nearly impossible (Van Dersal, 1938)

Propagation  Seeds
Availability  Possibly locally available in west

Animal Food  Deer, birds

Best Use  Screen, mass planting, ornamental flowers; protected places
Comments  One of Utah's few broad-leaf evergreens; a pioneer after fire or logging; excellent form, foliage and flower display.
Scientific Name  
Celtis reticulata Torr.

Synonym  
Celtis douglasii Planch.

Common Name  
Netleaf hackberry

Ultimate Height  
30' (10m)(Stark, 1966)

Ultimate Spread  
15-20' (5-6.6m)

Leaf Description/Texture  
2" (5cm) leathery, rough, asymmetrical leaves, prominent veins; medium texture

Leaf Color, Summer  
Yellow green (Stark, 1966)

Leaf Color, Autumn  
Yellow

Flower Description/Color  
Inconspicuous, green (Stark, 1966)

Fruit Description/Color/Effective Period  
Orange, berry-like drupe; late summer, fall

Flowering Time/Effective Period  
Spring

Form  
Large shrub to small tree (Van Dersal, 1938); rounded (Johnson, 1970)

Bark Description  
Red-brown to gray, rough, prominent ridges and furrows (Johnson, 1970)

Winter Appearance  
Grayish

Extension of Range  
Washington to Idaho south to New Mexico and California

Elevation  
Utah: to 6000' (2000m)(Johnson, 1970)

Vegetation Type  
Chaparral, Riparian

Root Type  
Fibrous, wide-spreading

Growth Rate  
Slow

Lifespan  
Moderate

Sun Exposure  
Sun (Van Dersal, 1938)

Drought Tolerance  
Good

Wind Firm  
Yes

Aspect  
All

Soil:  
Texture Gravelly, rocky (Van Dersal, 1938)

pH  
7.0-7.5

Depth  
Moderate to deep

Moisture  
Dry-Moist (Van Dersal, 1938)

Organic matter  
Yes

Drainage  
Well-drained (Van Dersal, 1938)

Maintenance/Cleanliness  
Carefree; clean

Insects  
6 on genus (Stark, 1966)

Diseases  
62 on genus; none specific (Stark, 1966)

Transplantability  
Good when young

Propagation  
Seeds (Van Dersal, 1938)

Availability  
Doubtful commercial availability

Animal Food  
Birds

Best Use  
Small shade tree for dry sites, patios

Comments
Scientific Name  *Cercocarpus intricatus* S. Wats.

**Synonym** *Cercocarpus ledifolius* Nutt. var. *intricatus* (S. Wats) M. E. Jones

**Common Name** Little-leaf mountain mahogany

**Ultimate Height** 4.5' (1.5m) (Harrington, 1954)

**Ultimate Spread** 2-3' (.6-1m)

**Leaf Description/Texture** 1/2" (1.2cm) linear, evergreen-like, thick, resinous, aromatic revolute (Harrington, 1954); fine texture

**Leaf Color, Summer** Green

**Leaf Color, Autumn** Evergreen

**Flower Description/Color** Tubular, small, pinkish

**Fruit Description/Color/Effective Period** 1-1 1/2" (2.5-3.5cm) plumose achene, conspicuous; fall

**Flowering Time/Effective Period** May (Stark, 1966)

**Form** Shrub, irregular crown; spiny stems

**Bark Description** Gray (Harrington, 1954)

**Winter Appearance** Intricate branching; densely twiggy

**Extension of Range** California to Colorado and New Mexico

**Elevation** Colorado 4500-8500' (1500-2833m) (Harrington, 1954)

**Vegetation Type** Chaparral, Upper Uinta sagebrush, Pinyon/juniper, Douglas fir/white fir, Aspen/lodgepole pine

**Root Type** Fibrous with large laterals

**Growth Rate** Moderate to slow

**Lifespan** Moderate

**Sun Exposure** Sun (Van Dersal, 1938)

**Drought Tolerance** Good

**Wind Firm** Yes

**Aspect** All

**Soil:**

- **Texture** Medium to coarse; loamy (Stark, 1966)
- **Moisture** Dry (Stark, 1966)
- **Organic matter** No
- **pH** 7.0-7.5
- **Drainage** Well-drained

**Depth** Moderate

**Maintenance/Cleanliness** Carefree (tolerant of pruning); clean

**Insects** None (Stark, 1966); 4 on genus (Essig, 1926)

**Diseases** 9 for genus (Stark, 1966)

**Transplantability** Unknown

**Propagation** Seed

**Availability** Doubtful commercial availability

**Animal Food** Birds, rodents, good deer browse

**Best Use** Compact ornamental shrub; barrier

**Comments** Spring/fall interest
Scientific Name  Cercocarpus ledifolius Nutt. var. ledifolius

Synonym

Common Name  Curly-leaf mountain mahogany

Ultimate Height  24' (8m)(Harrington, 1954); 40' (13m)(Preston, 1968); 15-35' (5-11.6m)(Johnson, 1970); 12' (4m)(Anderson & Holmgren, 1969)

Ultimate Spread  Tree 15' (5m); shrub 20' (6.6m)

Leaf Description/Texture  Linear, evergreen, coriaceous, fragrant, resinous, revolute margins, underside hairy-white (Harrington, 1954); fine texture

Leaf Color, Summer  Green

Leaf Color, Autumn  Green

Flower Description/Color  Small, reddish (Kelly, 1970); pink (Anderson & Holmgren, 1969); yellowish (Johnson, 1970)

Fruit Description/Color/Effective Period  2" (5cm) plumose achene; attractive; August-winter

Flowering Time/Effective Period  July-August (Van Dersal, 1938); June (Anderson-Holmgren, 1969)

Form  Shrub; small tree, sparse, open, irregular

Bark Description  Reddish-brown furrowed (Harrington, 1954); scaly (Preston, 1968)

Winter Appearance  Sparsely evergreen, attractive; interesting twig pattern

Extension of Range  Washington to Montana south to New Mexico and Calif.

Elevation  Colorado 6500-9000' (2166-3000m)

Vegetation Type  Chaparral, Pinyon/juniper, Upper Uinta sage, Douglas fir/white fir, Aspen/lodgepole pine, Spruce/fir

Root Type  Shallow, wide spreading

Growth Rate  Slow (Preston, 1968)

Lifespan  Long-lived (Preston, 1968)

Sun Exposure  Sun (Van Dersal, 1938)(Preston, 1968)

Drought Tolerance  Good

Wind Firm  Yes, very

Aspect  South at higher elevations, all at lower elevations

Soil: Texture  Coarse to rocky (Van Dersal, 1938); sandy loam (Stark, 1966)

Moisture  Dry (Van Dersal, 1938); annual precipitation 12"+ (Stark, 1966)

pH  6.0-7.0 (Stark, 1966)

Organic matter  No

Depth  Deep to shallow

Drainage  Well-drained

Maintenance/Cleanliness  Pruning tolerant; clean

Insects  None known (Stark, 1966); 4 on genus (Essig, 1926)

Diseases  9 on genus (Stark, 1966)

Transplantability  Difficult to transplant mature plants

Propagation  Seed

Availability  Available (check provenance)

Animal Food  Good deer browse

Best Use  Ornament shrub for dry spots

Comments  Informal, large, picturesque evergreen shrub for difficult spots
Scientific Name  Cercocarpus montanus Raf. var. montanus

Synonym

Common Name  True mountain mahogany (Anderson & Holmgren, 1969)(Kelly, 1970)

Ultimate Height  9' (3m)(Harrington, 1954); 4-6' (1.3-2m)(Kelly, 1970); 3-10' (1-3.3m)(Anderson & Holmgren, 1969)

Ultimate Spread  6' (2m)

Leaf Description/Texture  oval to obovate, serrate, round at apex, green above, whitish below (Harrington, 1954); fine texture

Leaf Color, Summer  Green

Leaf Color, Autumn  Brown

Flower Description/Color  Small, pink

Fruit Description/Color/Effective Period  White fuzzy 2" (5cm) corkscrews, fall, winter (Kelly, 1970)

Flowering Time/Effective Period  May-June

Form  Sparse, irregular but dense, symmetrical under cultivation (Kelly, 1970)

Bark Description  Gray-brown (Anderson & Holmgren, 1969)

Winter Appearance  Attractive, interesting plumose

Extension of Range  Washington to Montana south to New Mexico and Calif.

Elevation  Colorado 4000-8000' (1666-2666m)(Harrington, 1954)

Vegetation Type  Chaparral, Pinyon/juniper, Upper Uinta sage, Aspen/ lodgepole pine, Ponderosa pine

Root Type  Deep, spreading (Van Dersal, 1938)

Growth Rate  Slow (Van Dersal, 1938)

Lifespan  Moderate

Sun Exposure  Sun

Drought Tolerance  Moderate to good, if well-established

Wind Firm  Yes

Aspect  All

Soil: Texture  Coarse to rocky  Moisture  Dry  pH  6.5-7.5  Organic matter  No  Depth  Deep  Drainage  Well-drained

Maintenance/Cleanliness  Pruning tolerant; clean

Insects  4 on genus (Essig, 1926)

Diseases  9 on genus (Stark, 1966)

Transplantability  Difficult on established plants

Propagation  Seeds

Availability  Available Western Evergreens, Golden, Colorado

Animal Food  Important deer winter-browse

Best Use  Hedge, small shrub, barrier, spring, fall interest

Comments  Good values of form, flowers and adaptibility
Scientific Name  Chrysothamnus nauseosus H. & C. var. nauseosus

Synonym

Common Name  Rubber rabbitbrush (Van Dersal, 1938)

Ultimate Height  2-3' (.6-1m); 3-5' (1-1.6m) (Kelly, 1970)
Ultimate Spread  2-3' (.6-1m)
Leaf Description/Texture  1" (2.5cm) long narrow pubescent leaves (Harrington, 1954); aromatic; fine texture
Leaf Color, Summer  Gray or white (Stark, 1966)
Leaf Color, Autumn  Gray or white
Flower Description/Color  Yellow to golden in narrow heads; attractive
Fruit Description/Color/Effective Period  Plumose white achenes; winter-fall
Flowering Time/Effective Period  Late summer
Form  Shrub with rounded head; dense erect (Stark, 1966)
Bark Description  White, felty (Stark, 1966)
Winter Appearance  Semi-deciduous, gray-green; interesting fruit
Extension of Range  Washington southeast to Nevada and Colorado
Elevation  Colorado 5000-9000' (1666-3000m) (Harrington, 1954); Nevada 3000-8000' (1000-2666m) (Stark, 1966)
Vegetation Type  Chaparral, Pinyon/juniper, Aspen/lodgepole pine, Upper Uinta sage, Ponderosa pine
Root Type  Deep (Kelly, 1970)
Growth Rate  Rapid
Lifespan  Very short; 8-9 years (Stark, 1966)
Sun Exposure  Sun (Van Dersal, 1938)
Drought Tolerance  Good
Wind Firm  Yes
Aspect  All
Soil: Texture  Clay loam (Stark, 1966); Moisture  Annual precipitation sand loam (Stark, 1966) 6-10"+ (15-25cm) (Stark, 1966);
 pH  7.0-8.5; saline tolerant dry (Stark, 1966)
Depth  Moderate, 40-60"+ (Stark, 1966)
Organic matter  No
Drainage  Well-drained (Stark, 1966)
Maintenance/Cleanliness  Carefree; clean
Insects  None known (Stark, 1966)
Diseases  20 for species (Stark, 1966)
Transplantability  Poor
Propagation  Seeds; divide crowns
Availability  Western Evergreens, Golden, Colorado
Animal Food  Deer
Best Use  Dry ornamental, late summer-fall flower, accent
Comments  Grows on disturbed areas (Stark, 1966); plant contains rubber
Scientific Name  Chrysothamnus viscidiflorus (Hook.) Nutt. var. viscidiflorus

Synonym

Common Name  Douglas rabbitbrush (Van Dersal, 1938)

Ultimate Height  1-3' (.3-1m)(Harrington, 1954)
Ultimate Spread  2-3' (.6-1m)
Leaf Description/Texture  Viscid leaves, elongate; fine texture
Leaf Color, Summer  Green (Stark, 1966)
Leaf Color, Autumn  Green
Flower Description/Color  Yellow, tight head
Fruit Description/Color/Effective Period  White head; fall, winter
Flowering Time/Effective Period  July-September
Form  Small shrub rounded-head, erect branching
Bark Description  White (Stark, 1966)
Winter Appearance  Semi-deciduous; interesting fruit
Extension of Range  Nevada and Wyoming south to Arizona and New Mexico
Elevation  Nevada 5000-10,000' (1666-3333m) (Stark, 1966)
Vegetation Type  Chaparral, Pinyon/juniper, Aspen/lodgepole pine, Ponderosa pine, Upper Uinta sage
Root Type  Deep (Kelly, 1970)
Growth Rate  Rapid
Lifespan  Very short
Sun Exposure  Sun
Drought Tolerance  Good
Wind Firm  Yes
Aspect  All; south at higher elevations
Soil:  Salt tolerant (Stark, 1966)
   Texture  Medium to fine
   pH  7.0-8.5
   Moisture  Dry (Van Dersal, 1938)
   Organic matter  No
   Depth  Deep
   Drainage  Well-drained
Maintenance/Cleanliness  Carefree; clean
Insects  None known (Stark, 1966)
Diseases  20 for species (Stark, 1966)
Transplantability  Poor
Propagation  Seeds
Availability  Doubtful commercial availability
Animal Food  Deer browse
Best Use  Accent, ornamental shrub
Comments  Similar to C. nauseosus but smaller and greener
Scientific Name Clematis columbiana (Nutt.) Ex T. & G.

Synonym

Common Name Blue clematis (Anderson & Holmgren, 1969); Columbian clematis

Ultimate Height 30' + (10m+); 5' (2.6m)(Kelly, 1970)
Ultimate Spread 30' + (10m+); vine
Leaf Description/Texture 3-foliate, leaflets ovate with acute tip; medium texture
Leaf Color, Summer Green
Leaf Color, Autumn Light Green
Flower Description/Color 2" pale blue-lavender; attractive (Anderson & Holmgren, 1969)
Fruit Description/Color/Effective Period Head of densely pubescent achenes, white (Harrington, 1954); fall
Flowering Time/Effective Period May-August (Anderson & Holmgren, 1969)
Form Climbing vine
Bark Description Thin stems
Winter Appearance Vine, mass of stems
Extension of Range Washington southeast to Colorado northwest to Oregon
Elevation Colorado 6000-10,000' (2000-3333m)(Harrington, 1954)
Vegetation Type Riparian
Root Type Spreading deep
Growth Rate Rapid
Lifespan Short
Sun Exposure Shade (Kelly, 1970); sun (Van Dersal, 1938)(Sunset Western Garden Book, 1971)
Drought Tolerance Poor
Wind Firm No
Aspect Stream banks
Soil: Texture Medium Moist (Kelly, 1970)
  pH 7.0 Organic matter Yes (Sunset Western Garden Book, 1971)
  Depth Deep Drainage Well-drained (Van Dersal, 1938)
Maintenance/Cleanliness Will overtake shrub tops; clean
Insects 4 on wild genus (Essig, 1926)
Diseases 39 on genus (Stark, 1966)
Transplantability Good when young
Propagation Seed (Van Dersal, 1938)
Availability Possibly locally available
Animal Food Birds, deer browse
Best Use Vine situations
Comments
Scientific Name  *Clematis ligusticifolia* Nutt. var. *ligusticifolia*

**Synonym**

**Common Name** Western virgin's bower (Anderson & Holmgren, 1969)

**Ultimate Height** 12-18' (4-6m) (Harrington, 1954); 45' (15m) (Stark, 1966)

**Ultimate Spread** 12-18' (4-6m); vine

**Leaf Description/Texture** 5-7 pinnate leaflets, ovate, toothed, clasping (Harrington, 1954); medium texture

**Leaf Color, Summer** Green

**Leaf Color, Autumn** Light green

**Flower Description/Color** 2-3" (5-7.5cm) white

**Fruit Description/Color/Effective Period** White, pubescent, achenes (Harrington, 1954); fall (Van Dersal, 1938); winter (Kelly, 1970); attractive

**Flowering Time/Effective Period** May-August

**Form** Climbing vine (Stark, 1966)

**Bark Description** Thin stems; exfoliating bark (Anderson & Holmgren, 1969)

**Winter Appearance** Stems massed

**Extension of Range** Washington east to Montana south to New Mexico and California

**Elevation** Colorado 5000-8500' (1666-2833m) (Harrington, 1954); Nevada 7000 and below (2333m and below) (Stark, 1966)

**Vegetation Type** Riparian

**Root Type** Shallow, vigorous

**Growth Rate** Rapid; 15-20' (5-6.6m) in a season (Kelly, 1970)

**Lifespan** Short

**Sun Exposure** Sun (Van Dersal, 1938)

**Drought Tolerance** Poor

**Wind Firm** No

**Aspect** Stream banks

**Soil** Texture Rocky loam (Stark, 1966) Moist (Sunset Western Garden Book, 1971)

**pH** 7.0

**Depth** Shallow to deep

**Organic matter** Yes (Sunset Western Garden Book, 1971)

**Drainage** Well-drained (Van Dersal, 1938)

**Maintenance/Cleanliness** Will overtop shrubs; clean

**Insects** 3 on species (Stark, 1966); 4 on species (Essig, 1926)

**Diseases** 39 on genus (Stark, 1966)

**Transplantability** Yes

**Propagation** Seeds (Van Dersal, 1938); cuttings (Stark, 1966)

**Availability** Possibly locally available

**Animal Food** Birds, deer (Van Dersal, 1938)

**Best Use** Vine situations

**Comments**
Scientific Name  Cornus stolonifera Michx. var. stolonifera

Synonym

Common Name  Red osier dogwood

Ultimate Height  12' (4m) (Harrington, 1954); 15' (5m) (Stark, 1966); 4-6' (1.3-2m) (Kelly, 1970); 7-8' (2.3-2.6m) (Anderson & Holmgren, 1969)

Ultimate Spread  20' (6.6m)

Leaf Description/Texture  3" (7.5cm) leaves, distinct venation, pubescent and gray below (Harrington, 1954); medium texture

Leaf Color, Summer  Green

Leaf Color, Autumn  Reddish (Stark, 1966)

Flower Description/Color  Small white in flat-top cyme 2-3" (5-7.5cm) across, attractive

Fruit Description/Color/Effective Period  Small berrylike drupe in clusters, white, attractive; fall, winter-spring

Flowering Time/Effective Period  Spring-summer

Form  Shrub in clumps, spreading

Bark Description  Bright reddish purple (Kelly, 1970)

Winter Appearance  Very attractive bark

Extension of Range  Washington to Montana south to New Mexico and California

Elevation  Colorado 4500-10,000' (1500-3333m) (Harrington, 1954); Nevada below 9000' (3000m) (Stark, 1966)

Vegetation Type  Riparian

Root Type  Stoloniferous, spreading, layers (Stark, 1966)

Growth Rate  Rapid

Lifespan  Moderate to short

Sun Exposure  Sun and shade (Stark, 1966) (Van Dersal, 1938)

Drought Tolerance  Poor

Wind Firm  Yes

Aspect  Streamside

Soil: Texture  Medium to coarse  Moisture  Moist to wet
pH  7.0-8.0 (Van Dersal, 1938)  Organic matter  No
Depth  Moderate  Drainage  Good, water for short periods

Maintenance/Cleanliness  May need control on stolons; clean

Insects  11 on genus (Stark, 1966)

Diseases  10 on species (Stark, 1966)

Transplantability  Readily transplants (Kelly, 1970)

Propagation  Cuttings (Kelly, 1970); seeds

Availability  Widely introduced into gardens (Anderson & Holmgren, 1969)

Animal Food  Birds (Van Dersal, 1938)

Best Use  Specimen, mass shrub, something going at all seasons

Comments  Bark when smoked has a slightly narcotic effect! (Kelly, 1970)
Scientific Name  Cowania mexicana (Torr.) Jeps. var. stansburiana

Synonym

Common Name  Stansbury's cliffrose (Anderson & Holmgren, 1969)

Ultimate Height  3-10' (1-3.3m)(Anderson & Holmgren, 1969); 6' (2m) (Sunset Western Garden Book, 1971); maximum 25' (8.3m)(Johnson, 1970)
Ultimate Spread  3-8' (1-2.6m)
Leaf Description/Texture  Small, deeply incised, close to branch, glandular (Anderson & Holmgren, 1969); fine to medium texture
Leaf Color, Summer  Gray green
Leaf Color, Autumn  Gray green
Flower Description/Color  5/8-1" (1.5-2.5cm) roselike, yellow and white (Anderson & Holmgren, 1969)
Fruit Description/Color/Effective Period  Loose head of achenes with plumose styles; summer-fall
Flowering Time/Effective Period  April-September (Anderson & Holmgren, 1969)
Form  Stiff irregular branching (Johnson, 1970); narrow crown (Preston, 1968); shrub to small tree (Johnson, 1970)
Bark Description  Gray-shreddy (Anderson & Holmgren, 1969); Reddish-gray (Johnson, 1970)
Winter Appearance  Striking branching pattern; evergreen
Extension of Range  Nevada to Colorado south to Nevada and California
Elevation  Utah 3500-8000' (1166-2666m)(Johnson, 1970)
Vegetation Type  Chaparral, Pinyon/juniper
Root Type  Deep, spreading
Growth Rate  Slow
Lifespan  Moderate
Sun Exposure  Sun (Van Dersal, 1938)
Drought Tolerance  Good
Wind Firm  Yes
Aspect  All, south at higher elevations
Soil: Texture  Rocky to coarse
pH  7.0-8.0 (Stark, 1966)
Depth  Deep
Moisture  Dry (Stark, 1966)
Organic matter  No
Drainage  Well-drained (Van Dersal, 1938)
Maintenance/Cleanliness  Carefree; tolerant of pruning (Sunset Western Garden Book, 1971); clean
Insects  None (Stark, 1966)
Diseases  Rust (Stark, 1966)
Transplantability  Poor
Propagation  Seed
Availability  Doubtful commercial availability
Animal Food  Deer browse, birds
Best Use  Ornamental shrub with spring bloom, hedge
Comments  Prune to tame; do not over-water; good flowers; for difficult places.
Scientific Name  *Crataegus douglasii* Lindl.

**Synonym**

**Common Name** Douglas hawthorn (Anderson & Holmgren, 1969)

**Ultimate Height** 10-12' (3.3-4m) (Anderson & Holmgren, 1969); 35' (11.6m) (Preston, 1968); 6-30' (2-10m) (Stark, 1966)

**Ultimate Spread** 10' (3.3m)

**Leaf Description/Texture** 2'' (5cm) oblong to ovate, doubly serrate, pubescent, thick, thorns on branches (Stark, 1966); medium texture

**Leaf Color, Summer** Shiny green (Anderson & Holmgren, 1969)

**Leaf Color, Autumn** Brown (Johnson, 1970)

**Flower Description/Color** 1/2-1'' (1.2-2.5cm) white blossoms, fragrant, attractive (Anderson & Holmgren, 1969)

**Fruit Description/Color/Effective Period** Purple-black pome; fall (Stark, 1966)

**Flowering Time/Effective Period** April-May (Anderson & Holmgren, 1969)

**Form** Shrub, forms thickets (Anderson & Holmgren, 1969); small tree (Stark, 1966); compact round top (Preston, 1968)

**Bark Description** Smooth reddish brown (Anderson & Holmgren, 1969)

**Winter Appearance** Reddish bronze

**Extension of Range** Washington to Montana south New Mexico and California

**Elevation** Nevada 2500-5500' (833-1833m) (Stark, 1966)

**Vegetation Type** Riparian

**Root Type** Deep taproot (Van Dersal, 1938)

**Growth Rate** Moderate to slow

**Lifespan** Moderate

**Sun Exposure** Sun (Van Dersal, 1938)

**Drought Tolerance** Good if well-established

**Wind Firm** Yes

**Aspect** Streamsides

**Soil**: 
- **Texture** Rocky, silty clay loam
- **Moisture** Moist (Preston, 1968) (Stark, 1966)
- **Organic matter** Yes
- **pH** 7.0 (Van Dersal, 1938)
- **Drainage** Well-drained (can stand periods of wet soil)

**Maintenance/Cleanliness** Carefree; clean (birds eat fruit)

**Insects** 30 on genus (Stark, 1966)

**Diseases** 73 on genus (Stark, 1966)

**Transplantability** Poor due to taproot (Van Dersal, 1938)

**Propagation** Seeds (Van Dersal, 1938)

**Availability** Doubtful commercial availability

**Animal Food** Birds

**Best Use** Barrier

**Comments** Difficult confusing genus. Similar to *C. rivularis*, but leaves are thicker, wider and has more thorns and is shrubby.
Scientific Name  Crataegus rivularis  Nutt.

Synonym  Crataegus douglasii  Lindl. var. rivularis  (Nutt.) Sarg.

Common Name  River hawthorn

Ultimate Height  20' (6.6m)(Johnson, 1970); 9-18' (3-6m)(Harrington, 1954)
Ultimate Spread  15-20' (5-6.6m)
Leaf Description/Texture  2" (5cm) lanceolate, thin, blue-green, serrate, thorns on branches (Johnson, 1970); medium texture
Leaf Color, Summer  Blue-green
Leaf Color, Autumn  Brown (Johnson, 1970)
Flower Description/Color  1/2" (1.2cm) white, attractive
Fruit Description/Color/Effective Period  Small, purple-black pome, attractive; fall-winter; crimson to black (Harrington, 1954)
Flowering Time/Effective Period  April-May
Form  Small tree (Johnson, 1970); ascending branches (Harrington, 1954)
Bark Description  Scaly, furrowed, gray (Johnson, 1970); orangish
Winter Appearance  Interesting branches, fruit and bark
Extension of Range  Wyoming, Idaho, Colorado, Nevada, Arizona, New Mexico
Elevation  Utah 5000-6000' (1666-2000m)(Johnson, 1970); Colorado 5500-8500' (1833-2833m)(Harrington, 1954)
Vegetation Type  Riparian
Root Type  Taproot
Growth Rate  Moderate to slow
Lifespan  Moderate
Sun Exposure  Sun
Drought Tolerance  Good
Wind Firm  Yes
Aspect  Streamsides
Soil:  Texture  Medium
pH  7.0 (Van Dersal, 1938)
Depth  Deep
Moisture  Moist (Preston, 1968)
Organic matter  Yes
Drainage  Well-drained (can stand periods of wet soil)

Maintenance/Cleanliness  Carefree; clean (birds eat fruit)
Insects  30 on genus (Stark, 1966)
Diseases  7 on genus (Stark, 1966)
Transplantability  Poor due to taproot (Van Dersal, 1938)
Propagation  Seeds (Van Dersal, 1938)
Availability  Doubtful commercial availability
Animal Food  Birds
Best Use  Specimen; spring and fall accent
Comments  Difficult, confusing genus. Similar to C. douglasii but thinner, longer, serrate leaves; more tree-like with less thorns.
Scientific Name  Eriogonum caespitosum Nutt.

Synonym

Common Name  Mat buckwheat (Stark, 1966)

Ultimate Height  3-6" (7.5-15cm) (Anderson & Holmgren, 1969)
Ultimate Spread  2' (.6m)
Leaf Description/Texture  1/3" (1cm) ovate, densely tomentose, in whorls (Harrington, 1954); fine texture
Leaf Color, Summer  White (Stark, 1966)
Leaf Color, Autumn  White
Flower Description/Color  Yellow to reddish (Stark, 1966)
Fruit Description/Color/Effective Period  Brown, achene in heads on stalk
Flowering Time/Effective Period  May-July (Stark, 1966)
Form  Dense mat (Harrington, 1954)
Bark Description  Whitish
Winter Appearance  Rug-like; attractive
Extension of Range  Montana and Idaho, south to Colorado and Nevada
Elevation  Nevada 5000-8600' (1666-2883m) (Stark, 1966)
Vegetation Type  Chaparral, Pinyon/juniper, Douglas fir/white fir, Aspen/lodgepole pine, Upper Uinta sage, Ponderosa pine
Root Type  Thick, woody taproot
Growth Rate  Slow to moderate
Lifespan  Short
Drought Tolerance  Sun (Van Dersal, 1938)
Wind Tolerance  Yes
Aspect  All, south at higher elevations
Soil: Texture  Fine to coarse (Stark, 1966)
Moisture  8-12"+ (20-30cm) annual precipitation (Stark, 1966)
ph  7.0+
Organic matter  No
Depth  Moderate to shallow
Drainage  Well-drained
Maintenance/Cleanliness  Carefree; clean
Insects  1 on genus (Stark, 1966)
Diseases  14 on genus (Stark, 1966)
Transplantability  Doubtful due to taproot
Propagation  Seed (Stark, 1966)
Availability  Wild Garden, Bothell, Washington
Animal Food  Deer, birds, rodents
Best Use  Ground cover
Comments  Finer, denser mat than E. umbellatum or E. heracleoides
Scientific Name  Eriogonum heracleoides Nutt.

Synonym

Common Name  Wyeth buckwheat

Ultimate Height  12-14" (30-35cm)
Ultimate Spread 2-3' (.6-1m)
Leaf Description/Texture  1" (2.5cm) oblanceolate, gray green, in
whorls, at base of flower stalks (Anderson & Holmgren, 1969); fine texture
Leaf Color, Summer  Gray green
Leaf Color, Autumn Semi-deciduous; brown to red
Flower Description/Color  Cream color in heads on stalks
Fruit Description/Color/Effective Period  Brown, achenes on stalks, attractive; late summer
Flowering Time/Effective Period Early summer
Form Mat-like, prostrate
Bark Description Reddish-brown, inconspicuous
Winter Appearance Semi-deciduous; red, attractive
Extension of Range Utah, Wyoming and Colorado (Harrington, 1954)
Elevation Colorado 5500-8000' (1833-2666m)(Harrington, 1954)
Vegetation Type Chaparral, Pinyon/juniper, Douglas fir/white fir,
Upper Uinta sage, Ponderosa pine
Root Type Fibrous, roots form spreading, deep, woody caudices
Growth Rate Rapid
Lifespan Short
Sun Exposure Sun (Van Dersal, 1938)
Drought Tolerance Good
Wind Firm Yes
Aspect All, south at higher elevation
Soil: Texture Fine to coarse Moisture Dry
pH 7.0 Organic matter No
Depth Moderate Drainage Well-drained
Maintenance/Cleanliness Spread is not too vigorous; clean
Insects 1 on genus (Stark, 1966)
Diseases 14 on genus (Stark, 1966)
Transplantability Poor
Propagation Seed
Availability Doubtful commercial availability
Animal Food Deer
Best Use Ground cover
Comments Similar to E. umbellatum but has gray-green leaves and cream-colored flowers
Scientific Name  Eriogonum umbellatum Torr. ssp. umbellatum

Synonym

Common Name  Sulphur-flowered buckwheat (Anderson & Holmgren, 1969)

Ultimate Height  4-10" (10-25cm) (Harrington, 1954)
Ultimate Spread  2-3' (.6-1m)
Leaf Description/Texture  1" (2.5cm) oblanceolate, white, tomentose
below, in whorls (Harrington, 1954); medium-fine texture
Leaf Color, Summer  Green (Anderson & Holmgren, 1969)
Leaf Color, Autumn  Reddish-brown
Flower Description/Color  Bright yellow on upright, 8-12" (20-30cm)
Fruit Description/Color/Effective Period  Brown, winged achene; attractive; late summer
Flowering Time/Effective Period  June-August (Stark, 1966)
Form  Prostrate, mat-forming, with upright flower stalks
Bark Description  Shreddy brown
Winter Appearance  Semi-deciduous leaves, with some red
Extension of Range  Washington to Montana south to New Mexico and California
Elevation  Colorado 5000-10,500' (1666-3500m) (Harrington, 1954)
Vegetation Type  Chaparral, Pinyon/juniper, Douglas fir/white fir,
Upper Uinta sage, Ponderosa pine, Aspen/lodgepole pine
Root Type  Fibrous, layers, and spreads with branches, deep woody caudices
Growth Rate  Rapid
Lifespan  Short
Sun Exposure  Sun (Van Dersal, 1938)
Drought Tolerance  Good
Wind Firm  Yes
Aspect  All, south at higher elevations
Soil: Texture  Fine to coarse
pH  7.0
Depth  Moderate
Drainage  Well-drained
Moisture  Dry, annual precipitation 6-10" (15-25cm)
(Stark, 1966)
Organic matter  No
Maintenance/Cleanliness  Spread is not too vigorous; clean
Insects  1 on genus (Stark, 1966)
Diseases  14 on genus
Transplantability  Poor
Propagation  Seeds
Availability  Wild Garden, Bothell, Washington
Animal Food  Deer, birds
Best Use  Ground cover
Comments  Similar to E. heracleoides, but greener leaves; blossoms are yellow instead of cream.
Scientific Name Gaultheria humifusa (Graham) Rydb.

Synonym

Common Name Creeping wintergreen

Ultimate Height 6" (15cm) (Harrington, 1954)
Ultimate Spread 8-12" (20-30cm)
Leaf Description/Texture 1/2" (1.2cm) oval to round leaves, thicken; fine texture
Leaf Color, Summer Green
Leaf Color, Autumn Evergreen
Flower Description/Color Small white; pinkish white
Fruit Description/Color/Effective Period 1/2" (1.2cm) scarlet, berry-like; late summer, fall
Flowering Time/Effective Period August
Form Procumbent and spreading (Harrington, 1954)
Bark Description Inconspicuous
Winter Appearance Evergreen
Extension of Range Washington to California and Montana south to Utah and Colorado
Elevation Colorado 9000-11,500' (3000-3833m)
Vegetation Type Alpine tundra, Spruce/fir
Root Type Fibrous, shallow
Growth Rate Moderate
Lifespan Short
Sun Exposure Sun (Van Dersal, 1938); shade
Drought Tolerance Poor
Wind Firm Yes
Aspect North, east
Soil: Texture Coarse to medium
pH 5.0-6.5
Depth Shallow to moderate
Moisture Moist (Kelly, 1970)
Organic matter Yes
Drainage Well-drained (Van Dersal, 1938)

Maintenance/Cleanliness Carefree; clean
Insects Unknown
Diseases 20 on genus, some specific (USDA, 1960)
Transplantability Good
Propagation Seeds, cuttings
Availability Siskyou Rare Plant Nursery, Medford, Oregon
Animal Food Birds, small animals
Best Use Ground cover, semi shade
Comments
Scientific Name  Haplopappus macronema A. Gray

Synonym

Common Name  Whitestem goldenweed

Ultimate Height  5-10" (12.5-25cm) (Harrington, 1954)
Ultimate Spread  12" (30cm)
Leaf Description/Texture  1" (2.5cm) oblong or oblanceolate leaves, glandular scabrous; medium texture
Leaf Color, Summer  Light green
Leaf Color, Autumn  Brown
Flower Description/Color  Whitish head
Fruit Description/Color/Effective Period  Achene, plumose, fall
Flowering Time/Effective Period  Summer
Form  Subshrubs rounded, branches from base (Harrington, 1954); irregular
Bark Description  Twigs white tomentose (Harrington, 1954); brown below
Winter Appearance  Inconspicuous
Extension of Range  Nevada and California east to Colorado and Idaho
Elevation  Colorado 9000-12000' (3000-4000m) (Harrington, 1954)
Vegetation Type  Spruce/fir, Alpine tundra
Root Type  Shallow taproot
Growth Rate  Rapid
Lifespan  Short
Sun Exposure  Sun
Drought Tolerance  Moderate to short
Wind Firm  Yes
Aspect  All
Soil:  Texture  Medium to coarse
pH  6.5-7.0
Depth  Shallow
Moisture  Moist
Organic matter  If possible
Drainage  Well-drained
Maintenance/Cleanliness  Carefree; clean
Insects  None found
Diseases  None found
Transplantability  Unknown
Propagation  Seeds
Availability  Doubtful commercial availability
Animal Food  Birds, rodents
Best Use  Rock plant, accent form
Comments
Scientific Name  Holodiscus dumosus (Nutt.) Heller var. dumosus

Synonym

Common Name  Rock spray spirea; Bush oceanspray

Ultimate Height  3-12' (1-4m) (Anderson & Holmgren, 1969); 9' (3m) (Harrington, 1954)
Ultimate Spread  5-10' (2.6-3.3m)

Leaf Description/Texture  1" (2.5cm) elliptic leaf, with some pubescence, 3-6 lobed on end (Harrington, 1954); medium-fine texture

Leaf Color, Summer  Green

Leaf Color, Autumn  Green-brown

Flower Description/Color  Small white in branch-tip masses, effective; pinkish (Kelly, 1970)

Fruit Description/Color/Effective Period  Inconspicuous as individuals, in mass conspicuous, showy; summer, fall, winter

Flowering Time/Effective Period  June-August (Anderson & Holmgren, 1969)

Form  Compact, branching from base (Anderson & Holmgren, 1969); spreading

Bark Description  Older twigs dark red (Harrington, 1954); later gray, exfoliating

Winter Appearance  Conspicuous fruit

Extension of Range  Wyoming and Utah south to New Mexico and Arizona

Elevation  Colorado 5500-10,000' (1833-3333m) (Harrington, 1954)

Vegetation Type  Pinyon/juniper, Chaparral, Douglas fir/white fir, Ponderosa pine, Spruce/fir, Upper Uinta sage, Aspen/lodgepole pine

Root Type  Fibrous, spreading

Growth Rate  Slow

Lifespan  Moderate

Sun Exposure  Sun (Van Dersal, 1938)

Drought Tolerance  Good

Wind Firm  Yes

Aspect  All, south at higher elevations

Soil:  Texture  Medium
       pH  7.0-8.0
       Depth  Deep

Moisture  Dry (Van Dersal, 1938)

Organic matter  Unknown

Drainage  Well-drained (Van Dersal, 1938)

Maintenance/Cleanliness  Carefree; clean

Insects  None listed (Stark, 1966)

Diseases  11 on genus (USDA, 1960)

Transplantability  Unknown, probably good on young plants

Propagation  Seeds (Van Dersal, 1938)

Availability  Doubtful commercial availability

Animal Food  Birds

Best Use  Ornamental shrub in masses, quite showy in bloom

Comments  Often found in large clumps (Van Dersal, 1938). Could be used as a showy ornamental shrub.
Scientific Name  Jamesia americana Torr. & Gray var. americana

Synonym

Common Name  Waxflower; Cliff jamesia

Ultimate Height  6' (2m) (Harrington, 1954)
Ultimate Spread  4' (1.3m)
Leaf Description/Texture  1/2-2" (1.2-5cm) leaves oval, serrate, thick deeply veined (Kelly, 1970); medium texture
Leaf Color, Summer  Green above, paler below
Leaf Color, Autumn  Orange and scarlet (Rehder, 1940)
Flower Description/Color  1/2" (1.25cm) white, showy in heads
Fruit Description/Color/Effective Period  Dry brown in heads; fall, winter
Flowering Time/Effective Period  May-July
Form  Much branched shrub, irregular
Bark Description  Reddish, exfoliating (Harrington, 1954)
Winter Appearance  Red-brown; intricate patterns
Extension of Range  Wyoming and Utah south to New Mexico and Arizona (Harrington, 1954)
Elevation  Colorado 5500-10,000' (2833-3333m) (Harrington, 1954)
Vegetation Type  Chaparral, Upper Uinta sage, Douglas fir/white fir, Aspen/lodgepole pine, Ponderosa pine, Riparian
Root Type  Deep
Growth Rate  Slow
Lifespan  Moderate
Sun Exposure  Sun (Van Dersal, 1938)
Drought Tolerance  Good
Wind Firm  Yes
Aspect  All
Soil: Texture  Coarse to rocky
Moisture  Dry or moist (Van Dersal, 1938)
Depth  Deep
Organic matter  If possible
Drainage  Well-drained (Van Dersal, 1938)
Maintenance/Cleanliness  Carefree; clean
Insects  Unknown
Diseases  1 on species (USDA, 1960)
Transplantability  Poor (Kelly, 1970)
Propagation  Seeds
Availability  Doubtful availability
Animal Food  Birds
Best Use  Ornamental shrub, showy bloom
Comments
Scientific Name  Juniperus communis L. var. saxatilis Pall.

Synonym  Juniperis sibirica Burgsd.

Common Name  Mountain common juniper

Ultimate Height  3' (1m) (Harrington, 1954)
Ultimate Spread  8-10' (2.6-3.3m) (Kelly, 1970)
Leaf Description/Texture  Small, awl-shaped leaves, sharp-pointed, green below, a white band above (Harrington, 1954); fine texture
Leaf Color, Summer  Green to whitish green
Leaf Color, Autumn  Evergreen
Flower Description/Color  Staminate cone: inconspicuous
Fruit Description/Color/Effective Period  Ovulate cone: glaucous blue berry (Harrington, 1954); all seasons (Kelly, 1970)
Flowering Time/Effective Period  Inconspicuous
Form  Lateral ascending branches, in dense patches
Bark Description  Brown-gray (Stark, 1966)
Winter Appearance  Evergreen attractive
Extension of Range  Circumpolar; in cool places
Elevation  Colorado 5000-7000' (1666-2333m) (Harrington, 1954)
Vegetation Type  Douglas fir/white fir, Aspen/lodgepole pine, Spruce/fir, Ponderosa pine
Root Type  Fibrous spreading
Growth Rate  Slow (Van Dersal, 1938); moderate
Lifespan  Long-lived (Van Dersal, 1938)
Sun Exposure  Sun or shade (Kelly, 1970)
Drought Tolerance  Good if well-established
Wind Firm  Yes
Aspect  Northeast (Stark, 1966)
Soil: Texture  Fine to coarse (Stark, 1966)
  pH  7.0
  Drainage  Well-drained (Van Dersal, 1938)
  Moisture  Dry to moist
  Organic matter  If possible
Maintenance/Cleanliness  Can "winterburn" if exposed; clean
Insects  10 on genus (Stark, 1966)
Diseases  10 on genus (Stark, 1966)
Transplantability  Poor on wildlings
Propagation  Seeds, cuttings
Availability  Collected plants available from some western nurseries, check provenance
Animal Food  Birds
Best Use  Low evergreen shrub for shady place
Comments  Utah's only native low juniper. Fine foliage colors and textures.
Scientific Name  Juniperus osteosperma (Torr.)Little

Synonym  Juniperus utahensis (Engelm.) Lemmon

Common Name  Utah juniper

Ultimate Height  18' (6m)(Harrington, 1954); 8-15' (2.6-5.0m)(Anderson & Holmgren, 1969); 20' (6.6m)(Kelly, 1970)
Ultimate Spread  15-18' (5-6m)

Leaf Description/Texture  Small, green, scale-like leaves, glandular dotted, smooth margins (Harrington, 1954); medium texture
Leaf Color, Summer  Green; yellowish green (Anderson & Holmgren, 1969)
Leaf Color, Autumn  Evergreen

Flower Description/Color  Dioecious; staminate cone; inconspicuous
Flowering Time/Effective Period  Spring

Form  Tree, may be multi-branched (Harrington, 1954); dense-rounded (Anderson & Holmgren, 1969); slightly higher than broad (Kelly, 1970)

Bark Description  Thin ash-gray, scaly (Harrington, 1954)
Winter Appearance  Evergreen

Extension of Range  Oregon to Wyoming south to New Mexico and California
Elevation  Colorado 4000-8000' (1333-2666m)(Harrington, 1954)
Vegetation Type  Pinyon/juniper (Climax), Chaparral, Douglas fir/white fir, Upper Uinta sage

Root Type  Fibrous, wide spreading; taproot when young
Growth Rate  Slow (Preston, 1958)
Lifespan  Long-moderate

Sun Exposure  Sun
Drought Tolerance  Good
Wind Firm  Yes
Aspect  All, south at higher elevations

Soil:  Texture  fine to coarse and
pH  7.0-8.0
Depth  Deep

Maintenance/Cleanliness  Dead branches; clean

Insects  10 on genus (Stark, 1966)
Diseases  10 on genus (Stark, 1966)

Transplantability  Wildlings when young
Propagation  Seed, cuttings
Availability  Possibly locally available
Animal Food  Rodents, birds
Best Use  Screen, windbreak, evergreen, Bonsai

Comments
Scientific Name: Juniperus scopulorum Sarg.

Synonym

Common Name: Rocky Mountain juniper

Ultimate Height: 36' (12m) (Harrington, 1954); 20-50' (6.6-16.6m) (Anderson & Holmgren, 1969)
Ultimate Spread: 25' (8.3m)

Leaf Description/Texture: Small leaves, scale-like, glandular dotted, smooth margins (Harrington, 1954); fine texture
Leaf Color, Summer: Silver-green or glaucus (Harrington, 1954); dark green (Johnson, 1970)
Leaf Color, Autumn: Evergreen

Flower Description/Color: Dioecious, or monoeccious; inconspicuous, staminate flower

Fruit Description/Color/Effective Period: Ovulate cone; small, glaucous blue berries; fall, summer, winter

Flowering Time/Effective Period: Spring

Form: Irregular crown (Harrington, 1954); symmetrical, pointed (Johnson, 1970); pyramidal (Kelly, 1970); single-stems to multi-branching when shrubby

Bark Description: Red-brown to gray-brown (Harrington, 1954); twisted, scaly, interesting

Winter Appearance: Evergreen

Extension of Range: Washington to Montana south to New Mexico west to Arizona

Elevation: Colorado 4000-8000' (1333-2333m) (Harrington, 1954); Utah 5000-9000' (1666-3000m) (Johnson, 1970); Nevada 6000-8500' (2000-2833m) (Stark, 1966)

Vegetation Type: Pinyon/juniper (Climax), Chaparral, Douglas fir/white fir, Upper Uinta sage, Ponderosa pine

Root Type: Fibrous, spreading; deep, compact (Preston, 1968)

Growth Rate: Slow (Kelly, 1970); 13-14' (4.3-4.6m) at age 40, 18' (6m) at age 80 (USDA, 1965)

Lifespan: Long (Van Dersal, 1938)

Sun Exposure: Sun; shade tolerant in youth (Preston, 1968)

Drought Tolerance: Good (Preston, 1968)

Wind Firm: Yes

Aspect: All, south at higher elevations

Soil: Calcareous soils (USDA, 1965)

Texture: Fine to coarse
pH: 7.0-8.0
Depth: Shallow to moderate
Moisture: Annual precipitation 8-14" (20-35cm) (Stark, 1966)

Organic matter: No

Drainage: Well-drained

Maintenance/Cleanliness: Pruning tolerant (Kelly, 1970); clean

Insects: 1 on species (Stark, 1966)

Diseases: 10 on species (Stark, 1966)

Transplantability: When young

Propagation: Seeds, cuttings

Availability: Cultivars widely available

Animal Food: Birds, rodents

Best Use: Screen, windbreak, Bonsai

Comments
Scientific Name  Kalmia polifolia var. microphylla (Hook.) Redh.

Synonym 

Common Name  Bog laurel; Alpine bog kalmia

Ultimate Height  6-20" (15-50cm) (Anderson & Holmgren, 1969)
Ultimate Spread  1' (.3m)
Leaf Description/Texture  Small, thick leathery, revolute, evergreen; fine texture
Leaf Color, Summer  Dark green
Leaf Color, Autumn  Evergreen
Flower Description/Color  3/4" (2cm), pink and white, cup-shaped
Fruit Description/Color/Effective Period  Inconspicuous; summer and fall
Flowering Time/Effective Period  June-August (Anderson & Holmgren, 1969)
Form  Straggling (Van Dersal, 1938); sparsely ascending
Bark Description  Inconspicuous
Winter Appearance  Evergreen, inconspicuous
Extension of Range  Washington to Montana south to Colorado and California, except Nevada
Elevation  Colorado 9000-11,500' (3000-3500m) (Harrington, 1954)
Vegetation Type  Spruce/fir, Alpine tundra
Root Type  Fibrous, spreading
Growth Rate  Rapid
Lifespan  Short
Sun Exposure  Shade; partial shade (Sunset Western Garden Book, 1971)
Drought Tolerance  Poor
Wind Firm  Yes
Aspect  North, east
Soil: Texture  Fine to medium  Moisture  Wet
pH  5.5-7.0  Organic matter  Yes
Depth  Moderate  Drainage  Wet or boggy
Maintenance/Cleanliness  Carefree; clean
Insects  1 on genus (Essig, 1926)
Diseases  24 on species (USDA, 1960)
Transplantability  Good
Propagation  Cuttings
Availability  The Wild Garden, Bothell, Washington
Animal Food  Unknown
Best Use  Bog perennial; groundcover
Comments  Will not tolerate a basic soil
Scientific Name  Ledum glandulosum Nutt.

Synonym

Common Name  Smooth labrador tea; Western labrador tea

Ultimate Height  4-12" (10-30cm)(Davis, 1952); 1-5' (.3-2.6m)(Anderson & Holmgren, 1969)
Ultimate Spread  1' (.3m)
Leaf Description/Texture  Leaves clustered at branch ends, elliptic or oval 1 1/2" (4cm) fragrant, coriaceous; medium texture
Leaf Color, Summer  Green above, gray below (Anderson & Holmgren, 1969)
Leaf Color, Autumn  Evergreen
Flower Description/Color  White in clusters; showy
Fruit Description/Color/Effective Period  Small capsule brown; July-August
Flowering Time/Effective Period  May-June
Form  Shrub, irregular
Bark Description  Greenish to brown
Winter Appearance  Evergreen
Extension of Range  Washington to Montana south to Colorado and California
Elevation  8000-12,000' (2666-4000m)(Anderson & Holmgren, 1969)
Vegetation Type  Bog or Riparian
Root Type  Fibrous spreading
Growth Rate  Moderate
Lifespan  Short
Sun Exposure  Sun
Drought Tolerance  Good
Wind Firm  Yes
Aspect  All, mainly north at lower elevations (bogs, and streamside)
Soil: Texture Medium to fine
pH  5.0-6.5
Depth  Shallow to deep
Moisture  Wet
Organic matter  Yes
Drainage  Bog or wet soil
Maintenance/Cleanliness  Carefree; clean
Insects  1 on species (Essig, 1926)
Diseases  6 on species (USDA, 1960)
Transplantability  Good
Propagation  Cuttings, seeds
Availability  Doubtful commercial availability
Animal Food  Unknown
Best Use  Boggy or wet ground cover
Comments  Acid and water-loving
Scientific Name  *Lonicera involucrata* (Richards.) Banks

Synonym

Common Name  Twinberry; Bearberry honeysuckle

**Ultimate Height**  9' (3m) (Stark, 1966)
**Ultimate Spread**  8-10' (2.6-3.3m)
**Leaf Description/Texture**  Opposite, 4" (10cm) leaves, acuminate, ovate, prominent venation; medium texture
**Leaf Color, Summer**  Green (Stark, 1966)
**Leaf Color, Autumn**  Brown
**Flower Description/Color**  Yellow, greenish, some are pink
**Flower Description/Color/Effective Period**  Black ovoid berry late summer, fall, surrounded by purplish, attractive involucre bracts (Kelly, 1970)
**Flowering Time/Effective Period**  March–April (Stark, 1966)
**Form**  Upright shrub (Stark, 1966)
**Bark Description**  Gray (Kelly, 1970)
**Winter Appearance**  Not particularly interesting
**Extension of Range**  Washington to Montana south to Colorado and California
**Elevation**  Nevada 6000-10,000' (2000-3333m) (Stark, 1966); Colorado 6000-10,000' (2000-3333m) (Kelly, 1970)
**Vegetation Type**  Douglas fir/white fir, Riparian, Aspen/lodgepole pine
**Root Type**  Fibrous; shallow (Van Dersal, 1938)
**Growth Rate**  Rapid under cultivation
**Lifespan**  Short
**Sun Exposure**  Shade (Van Dersal, 1938)
**Drought Tolerance**  Good
**Wind**  Firm Yes
**Aspect**  Riparian; north slopes
**Soil: Texture**  Medium
**pH**  7.0
**Moisture**  Moist (Stark, 1966)
**Organic matter**  If possible
**Depth**  Moderate to shallow
**Drainage**  Well-drained
**Maintenance/Cleanliness**  Suckers, can become coarse and unkempt under cultivation (Kelly, 1970); clean
**Insects**  None listed (Stark, 1966)
**Diseases**  10 on species (Stark, 1966)
**Transplantability**  When young
**Propagation**  Cuttings, seeds (Stark, 1966)
**Availability**  Doubtful commercial availability
**Animal Food**  Birds (Van Dersal, 1938)
**Best Use**  Ornamental shrub in masses, interesting flower and fruit
**Comments**  Similar to *L. utahensis* but smaller flower and bracts, larger shrub, black berry, and more pointed leaf.
Scientific Name  *Lonicera utahensis* S. Wats.

Synonym

Common Name  Utah honeysuckle

Ultimate Height  5' (1.6m) (Anderson & Holmgren, 1969)
Ultimate Spread  5-8' (1.6-3.6m)
Leaf Description/Texture  1" (2.5cm) oval leaves, blunt ends; medium texture
Leaf Color, Summer  Green
Leaf Color, Autumn  Brown
Flower Description/Color  White or yellow, trumpet-shaped, attractive
Fruit Description/Color/Effective Period  Red berry in involucre, June-August (Van Dersal, 1938)
Flowering Time/Effective Period  Late spring, early summer (Anderson & Holmgren, 1969)
Form  Shrub (Anderson & Holmgren, 1969)
Bark Description  Gray
Winter Appearance  Uninteresting
Extension of Range  Washington to Montana south to New Mexico and California
Elevation  7000-10,000' (2333-3333m)
Vegetation Type  Aspen/lodgepole pine, Douglas fir/white fire (Anderson & Holmgren, 1969)
Root Type  Fibrous, shallow, suckering
Growth Rate  Rapid under cultivation
Lifespan  Short
Sun Exposure  Shade
Drought Tolerance  Good
Wind Firm  Yes
Aspect  Riparian, north
Soil: Texture  Medium 
  pH  6.5-7.0
  Depth  Moderate
  Moisture  Dry, moist
  Organic matter  If possible
  Drainage  Well-drained (Van Dersal, 1938)

Maintenance/Cleanliness  Carefree; clean
Insects  2 on wild genus (Essig, 1926)
Diseases  15 on wild genus (USDA, 1960)
Transplantability  When young
Propagation  Seeds, cuttings
Availability  Doubtful commercial availability
Animal Food  Birds
Best Use  Ornamental shrub, mass as low screen or barrier
Comments  Similar to *L. involucrata* but larger flower, smaller-sized shrub, reddish berry, and blunter leaf.
Scientific Name: Pachystima myrsinites (Pursh) Raf.

Synonym

Common Name: Mountain lover; Myrtle pachystima

Ultimate Height: 4" (10cm); 10" (25cm) (Harrington, 1954)
Ultimate Spread: 3-4'(1-1.3m) creeping
Leaf Description/Texture: 1/2-3/4" (1.2-2cm) oval leaf, thick leathery, revolute margins, serrate; fine texture
Leaf Color, Summer: Dark green
Leaf Color, Autumn: Evergreen
Flower Description/Color: Small, purple disks (Kelly, 1970)
Fruit Description/Color/Effective Period: Inconspicuous; summer
Flowering Time/Effective Period: May; inconspicuous
Form: Densely branched, spreading, decumbent, very leafy
Bark Description: Inconspicuous
Winter Appearance: Evergreen

Extension of Range: Washington to Montana south to New Mexico and California

Elevation: Colorado 6000-11,000' (2000-3666m) (Harrington, 1954)
Vegetation Type: Douglas fir/white fir, Spruce/fir, Aspen/lodgepole pine
Root Type: Fibrous, layers, shallow
Growth Rate: Moderate
Lifespan: Regenerates by layering
Sun Exposure: Sun (Van Dersal, 1938); shade
Drought Tolerance: Good-moderate
Wind Firm: Yes
Aspect: North

Soil: Texture: Medium to coarse
   pH: 5.5-6.5
   Moisture: Moist (Kelly, 1970)
   Organic matter: Yes
   Depth: Shallow to moderate
   Drainage: Well-drained (Kelly, 1970)

Maintenance/Cleanliness: May "winterburn" if exposed; clean

Insects: Unknown
Diseases: Unknown
Transplantability: Good
Propagation: Seeds; cuttings; layering
Availability: The Wild Garden, Bothell, Washington; Siskiyou Rare Plant Nursery, Medford, Oregon
Animal Food: Unknown
Best Use: Ground cover, edging
Comments: Very similar to boxwood. One of Utah's few broadleaf evergreens.
Scientific Name  *Petrophytum caespitosum* (Nutt.) Rydb. var. *caespitosum*

Synonym  *Spirea caespitosum* Nutt.

Common Name  Tufted rockmat

**Ultimate Height**  3-6' (1-2m) (Stark, 1966)
**Ultimate Spread**  2-3' (.6-1m)
**Leaf Description/Texture**  Small, in compact rosettes (Anderson & Holmgren, 1969); fine texture
**Leaf Color, Summer**  Green (Stark, 1966)
**Leaf Color, Autumn**  Light Green
**Flower Description/Color**  6" (15cm) high, like bottle-brush, racemes, creamy-white (Anderson & Holmgren, 1969)
**Fruit Description/Color/Effective Period**  Inconspicuous, stalks interesting; summer, fall, winter
**Flowering Time/Effective Period**  Spring; May (Van Dersal, 1938)
**Form**  Mat-like
**Bark Description**  Brown, shreddy
**Winter Appearance**  Attractive fruit stalks
**Extension of Range**  Washington to Montana south to New Mexico and California
**Elevation**  Colorado 6500-8000' (2166-2666m) (Harrington, 1954); Nevada 4000-7000' (1333-2333m) (Stark, 1966)
**Vegetation Type**  Pinyon/juniper, Douglas fir/white fir, Chaparral
**Root Type**  Woody, caudices, long taproot
**Growth Rate**  Slow
**Lifespan**  Moderate
**Sun Exposure**  Sun-shade
**Drought Tolerance**  Good to excellent if well-established
**Wind Firm**  Yes
**Aspect**  All
**Soil: Texture**  In rock crevices
**pH**  7.0-8.0
**Depth**  Shallow
**Moisture**  Dry
**Organic matter**  No
**Drainage**  Well-drained
**Maintenance/Cleanliness**  Carefree; clean
**Insects**  6 on genus (Stark, 1966)
**Diseases**  16 on genus none specific (Stark, 1966)
**Transplantability**  Poor
**Propagation**  Seeds, cuttings
**Availability**  The Wild Garden, Bothell, Washington; Siskiyou Rare Plant Nursery, Medford, Oregon
**Animal Food**  Rodents, birds, browse
**Best Use**  Rock garden, ground cover
**Comments**  Interesting fruit-flower.
Scientific Name  Philadelphus microphyllus A. Gray ssp. occidentalis (Nels.) Hitchc.

Synonym

Common Name  Little-leaf mockorange

Ultimate Height  6' (2m)(Harrington, 1954)
Ultimate Spread  4' (.6m)
Leaf Description/Texture  Small, narrow; fine texture
Leaf Color, Summer  Green
Leaf Color, Autumn  Yellow-green
Flower Description/Color  1 1/2" (4cm) white, solitary to 3's (Kelly, 1970); fragrant (Anderson & Holmgren, 1969)
Fruit Description/Color/Effective Period  Interesting, 1/2" (1.2cm) seed capsules in heads, tan; fall, winter
Flowering Time/Effective Period  Late spring, early summer (Sunset Western Garden Book, 1971)
Form  Ascending shrub; rounded crown (Stark, 1966)
Bark Description  Reddish-brown tan, exfoliating (Harrington, 1954)
Winter Appearance  Reddish-brown, medium texture branching
Elevation  Colorado 5000-8000' (1666-2666m)(Harrington, 1954)
Vegetation Type  Pinyon/juniper, Aspen/lodgepole pine, Douglas fir/white fir
Root Type  Fibrous spreading
Growth Rate  Moderate to rapid
Lifespan  Short
Sun Exposure  Sun (Stark, 1966)
Drought Tolerance  Good
Wind Firm  Yes
Aspect  All
Soil:  Texture  Rocky, gravelly (Stark, 1966)
       pH  7.0-7.5
       Depth  Moderate
       Maintenance/Cleanliness  Carefree; clean
Insects  None listed (Stark, 1966)
Diseases  16 on genus (Stark, 1966)
Transplantability  Good
Propagation  Seeds, cuttings (Stark, 1966)
Availability  Possibly locally available
Animal Food  Unknown
Best Use  Informal ornamental shrub, color accent
Comments  Outstanding floral display with showy spring flowers.
Scientific Name  Physocarpus alternans (M.E. Jones) J.T. Howell

Synonym

Common Name  Dwarf ninebark

Ultimate Height  4.5' (1.5m) (Davis, 1952)
Ultimate Spread  2-3' (.6-1m)
Leaf Description/Texture  3" (7.5cm) 3-lobed leaf, doubly crenate; coarse texture
Leaf Color, Summer  Green
Leaf Color, Autumn  Brown
Flower Description/Color  Small, white in corymbs
Fruit Description/Color/Effective Period  Inconspicuous in corymbs, brown; late summer, fall
Flowering Time/Effective Period  Spring
Form  Much-branched shrub (Davis, 1952)
Bark Description  Exfoliating, brown
Winter Appearance  Brownish, not outstanding
Extension of Range  Idaho, Nevada, Utah
Elevation  5000-7000' (1666-2333m)
Vegetation Type  Chaparral, Upper Uinta sage, Douglas fir/white fir
Root Type  Fibrous spreading
Growth Rate  Rapid
Lifespan  Short
Sun Exposure  Sun
Drought Tolerance  Good
Wind Firm  Yes
Aspect  South, east, west
Soil: Texture  Medium to rocky
pH  7.0
Depth  Shallow to moderate
Moisture  Dry (Van Dersal, 1938)
Organic matter  No
Drainage  Well-drained (Van Dersal, 1938)

Maintenance/Cleanliness  Carefree; clean
Insects  2 on genus (Stark, 1966)
Diseases  20 on genus (Stark, 1966)
Transplantability  Good
Propagation  Seeds
Availability  Possibly locally available
Animal Food  Birds, deer browse
Best Use  Erosion control, spring flower color
Comments  Steep slopes
Scientific Name  Physocarpus malvaceus (Green) Kuntze

Synonym

Common Name  Mallow ninebark

Ultimate Height  3-7' (1-2.3m)(Anderson & Holmgren, 1969)
Ultimate Spread  3-5' (1-1.6m)
Leaf Description/Texture  Large, maple-shaped leaves; medium texture
Leaf Color, Summer  Green
Leaf Color, Autumn  Greenish yellow to brown
Flower Description/Color  Yellow stamens and white petals in masses; attractive (Anderson & Holmgren, 1969)
Fruit Description/Color/Effective Period  2" (5cm) dry corymb; fall, winter
Flowering Time/Effective Period  Spring; May-July (Van Dersal, 1938)
Form  Leggy stemmy shrub, arching to ascending
Bark Description  Exfoliating, brownish tan
Winter Appearance  Interesting bark
Extension of Range  Washington to Montana south to Wyoming and Oregon
Elevation  6000-9000' (2000-3000m)
Vegetation Type  Douglas fir/white fir, Riparian, Aspen/lodgepole pine
Root Type  Shallow fibrous, rhizomatous (Van Dersal, 1938)
Growth Rate  Rapid
Lifespan  Short
Sun Exposure  Shade; sun (Van Dersal, 1938)
Drought Tolerance  Poor
Wind Firm  Yes
Aspect  North, streamside
Soil:  Texture  Medium
pH  7.0-7.5
Depth  Deep
Moisture  Moist
Organic matter  Yes
Drainage  Well-drained
Maintenance/Cleanliness  Carefree (may need pruning); clean
Insects  2 on genus (Stark, 1966)
Diseases  20 on genus (Stark, 1966)
Transplantability  Good
Propagation  Cuttings; seeds (Stark, 1966)
Availability  Possibly locally available
Animal Food  Birds, browse
Best Use  Ornamental shrub, erosion control
Comments  A good reliable flowering shrub
Scientific Name  Physocarpus monogynous  (Torr.) Coult.

Synonym

Common Name  Mountain ninebark

Ultimate Height  3' (1m) (Anderson & Holmgren, 1969)
Ultimate Spread  5' (1.6m)
Leaf Description/Texture  1 1/2" (4cm) maple-like leaf; medium texture
Leaf Color, Summer  Green
Leaf Color, Autumn  Brown; greenish yellow
Flower Description/Color  White in heads, showy (5 days) (Kelly, 1970)
Fruit Description/Color/Effective Period  Attractive, red-brown seed heads (Kelly, 1970)
Flowering Time/Effective Period  May
Form  Small, diffuse, shrub (Van Dersal, 1938); spreading, loose (Kelly, 1970)
Bark Description  Brown shreddy (Kelly, 1970)
Winter Appearance  Interesting fruit head
Extension of Range  Nevada to Idaho and Wyoming south to New Mexico and Arizona
Elevation  Colorado 5500-10,000' (2833-3333m) (Harrington, 1954)
Vegetation Type  Douglas fir/white fir, Pinyon/juniper, Aspen/lodgepole pine
Root Type  Shallow, suckers
Growth Rate  Rapid
Lifespan  Short, regenerates
Sun Exposure  Shade (Kelly, 1970)
Drought Tolerance  Good
Wind Firm  Yes
Aspect  All
Soil: Texture  Rocky to coarse
Ph  7.0 (Van Dersal, 1938)
Depth  Moderate to shallow
Drainage  Well-drained
Moisture  Dry (Anderson & Holmgren, 1969)
Organic matter  No
Maintenance/Cleanliness  Carefree (suckers); clean
Insects  2 on genus (Stark, 1966)
Diseases  20 on genus (Stark, 1966)
Transplantability  When young
Propagation  Seeds, cuttings (Stark, 1966)
Availability  Western Evergreen, Golden, Colorado
Animal Food  Birds, deer browse
Best Use  Ornamental, informal shrub, erosion control
Comments  Similar to P. malvaceus but smaller and on drier sites.
<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>Picea engelmannii Parry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synonym</td>
<td></td>
</tr>
<tr>
<td>Common Name</td>
<td>Engelmann spruce</td>
</tr>
<tr>
<td>Ultimate Height</td>
<td>60-120' (20-40m) (Harrington, 1954); 100' (33m) (Anderson &amp; Holmgren, 1969)</td>
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<tr>
<td>Ultimate Spread</td>
<td>30-35' (10-11.6m)</td>
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<tr>
<td>Leaf Description/Texture</td>
<td>Small hairs on twig, squarish needle; fine to medium texture</td>
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<tr>
<td>Leaf Color, Summer</td>
<td>Green; dark-bluegreen (Stark, 1966)</td>
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<tr>
<td>Leaf Color, Autumn</td>
<td>Evergreen</td>
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<tr>
<td>Flower Description/Color</td>
<td>Staminate: dark purple (Harrington, 1954)</td>
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<tr>
<td>Fruit Description/Color/Effective Period</td>
<td>Ovulate cone: scarlet (Preston, 1968); 3-4&quot; (7.5-10cm) brown cone, summer, fall, winter</td>
</tr>
<tr>
<td>Flowering Time/Effective Period</td>
<td>Spring, summer</td>
</tr>
<tr>
<td>Form</td>
<td>Large tree with narrow pyramidal crown (Harrington, 1954)</td>
</tr>
<tr>
<td>Bark Description</td>
<td>Thin, cinnamon-red, scaly (Harrington, 1954)</td>
</tr>
<tr>
<td>Winter Appearance</td>
<td>Evergreen, effective</td>
</tr>
<tr>
<td>Extension of Range</td>
<td>Washington to Montana south New Mexico and Arizona</td>
</tr>
<tr>
<td>Elevation</td>
<td>Colorado 8500-12,000' (2833-4000m) (Harrington, 1954); Utah 7000' (2333m) to timberline (Johnson, 1970)</td>
</tr>
<tr>
<td>Vegetation Type</td>
<td>Spruce/fir (climax type)</td>
</tr>
<tr>
<td>Root Type</td>
<td>Vigorous shallow, spreading (Van Dersal, 1938) (Preston, 1968); 8' (2.6m) deep on deep soils (USDA, 1960)</td>
</tr>
<tr>
<td>Growth Rate</td>
<td>Moderate to rapid when young; slow (Preston, 1968)</td>
</tr>
<tr>
<td>Lifespan</td>
<td>Long</td>
</tr>
<tr>
<td>Sun Exposure</td>
<td>Shade tolerant when young, sun when older</td>
</tr>
<tr>
<td>Drought Tolerance</td>
<td>Poor</td>
</tr>
<tr>
<td>Wind Firm</td>
<td>Not if purestands are thinned</td>
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<tr>
<td>Aspect</td>
<td>North, flats</td>
</tr>
<tr>
<td>Soil: Texture</td>
<td>Medium (Stark, 1966)</td>
</tr>
<tr>
<td>Moisture</td>
<td>Dry, moist (Van Dersal, 1938); annual precipitation 6.0-7.0</td>
</tr>
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</tr>
</tbody>
</table>

| Depth | Moderate to deep |
| Drainage | Well-drained (Van Dersal, 1938) |
| Organic matter | Yes |

| Maintenance/Cleanliness | Carefree; heavy needle fall |
| Insects | 13 on species (Stark, 1966) |
| Diseases | 74 on genus (Stark, 1966) |
| Transplantability | Good when young (older trees subject to desiccation) |
| Propagation | Seeds; layering (USDA, 1960) |
| Availability | Available in many western nurseries (check provenance) |
| Animal Food | Birds, deer |
| Best Use | Screen, specimen, wind break |
| Comments | Slimmer outline than P. pungens, greener, blunter needles. |
Scientific Name  Picea pungens Engelm.

Synonym

Common Name  Blue spruce

Ultimate Height  90' (30m) (Johnson, 1970)
Ultimate Spread  25-30' (6.3-10m)
Leaf Description/Texture  1 1/4" (3cm) needles, squarish, on smooth twigs; fine to medium texture
Leaf Color, Summer  Glaucous bluegreen
Leaf Color, Autumn  Evergreen
Flower Description/Color  Staminate: Yellow, small
Fruit Description/Color/Effective Period  Ovulate: 3 1/4" (8cm);
tawny cone, pendulous; summer, fall, winter
Flowering Time/Effective Period  Early summer
Form  Large tree, pyramidal crown; loses lower branches after 70-80 years
Bark Description  Thick, gray, furrowed (Johnson, 1970)
Winter Appearance  Evergreen, effective
Extension of Range  Montana, Idaho, south to Arizona and New Mexico (Preston, 1968)
Elevation  Utah 6500-8000' (2133-2666m) (Johnson, 1970)
Vegetation Type  Spruce/fir (climax)
Root Type  Wide-spreading, moderately deep (Preston, 1968)
Growth Rate  Slow (Preston, 1968)
Lifespan  Long to very long
Sun Exposure  Takes shade when young, sun when older
Drought Tolerance  Poor
Wind Firm  Not if stands are thinned
Aspect  North, streamside
Soil: Texture  Medium  Moisture  Moist (Preston, 1968)
ph  7.0  Organic matter  Yes
Depth  Moderate  Drainage  Well-drained
Maintenance/Cleanliness  Carefree; heavy needle fall
Insects  13 on genus
Diseases  74 on genus (Stark, 1966)
Transplantability  When young, older trees subject to desiccation
Propagation  Seeds
Availability  Several ornamental cultivars; widely available
Animal Food  Birds, deer
Best Use  Screen, specimen for large area, windbreak
Comments  Utah State tree; similar to P. engelmannii but bluer grayer bark, sharper needle. Intergrades with P. engelmannii, grows at a lower elevation and moister site.
Scientific Name  Pinus contorta var. latifolia Engelm.

**Synonym**  Pinus contorta Douglas

**Common Name**  Rocky Mountain lodgepole pine

**Ultimate Height**  60-90' (20-30m) (Harrington, 1954); 80-100' (26-33m) (Anderson & Holmgren, 1969)

**Ultimate Spread**  25-30' (6.3-10m)

**Leaf Description/Texture**  2-3" (5-7.5cm) needle, 2 to a bundle, twisted, persist 4-6 years; medium texture

**Leaf Color, Summer**  Green; yellowish green (Kelly, 1970)

**Leaf Color, Autumn**  Evergreen

**Flower Description/Color**  Staminate: red-orange

**Fruit Description/Color/Effective Period**  Ovulate: green ripening to 2" (5cm) brown to tan cone; summer, fall, winter, spring

**Flowering Time/Effective Period**  Spring, early summer

**Form**  Roundly pyramidal, open to dense

**Bark Description**  Orange-brown to gray-scaly (Harrington, 1954)

**Winter Appearance**  Evergreen

**Extension of Range**  Washington to Montana south to New Mexico and Arizona

**Elevation**  Colorado 6000-11,000' (2000-3666m) (Harrington, 1954)

**Vegetation Type**  Aspen/lodgepole pine (disclimax), Spruce/fir

**Root Type**  Shallow (Preston, 1968)

**Growth Rate**  Moderate in youth, slowing with age

**Lifespan**  Long

**Sun Exposure**  Sun

**Drought Tolerance**  Good if well established

**Wind Firm**  No (Preston, 1968); may be windfirm if grown under windy conditions

**Aspect**  All; south at higher elevations

**Soil:**

- **Texture**  Coarse
- **pH**  6.0-7.0
- **Depth**  Shallow to deep
- **Drainage**  Well-drained (Van Dersal, 1938)

**Moisture**  Dry to moist (Van Dersal, 1938); annual precipitation 18"+ (46cm+) (USDA, 1960)

**Organic matter**  No

**Maintenance/Cleanliness**  Carefree; heavy needle fall; sunscald (Preston, 1968)

**Insects**  19 on species (Stark, 1966)

**Diseases**  44 on species (Stark, 1966); very susceptible to mistletoe

**Transplantability**  Yes, when young, older tree subject to desiccation

**Propagation**  Seeds

**Availability**  Available in many western nurseries (check provenance)

**Animal Food**  Squirrels

**Best Use**  Screen, windbreak

**Comments**  Invades burned over areas.
Scientific Name  Pinus edulis Engelm.

Synonym

Common Name  Pinyon pine

Ultimate Height  20' (3.6m) (Johnson, 1970); 15-35' (5-11.6m) (Anderson & Holmgren, 1969)
Ultimate Spread  15' (5m)
Leaf Description/Texture  1" (2.5cm) needles in 2's or 3's, persist for 9 years; medium texture
Leaf Color, Summer  Yellow green (Johnson, 1970)
Leaf Color, Autumn  Evergreen
Flower Description/Color  Staminate: Yellow clusters
Fruit Description/Color/Effective Period  Ovulate cone: roundish, brown, with large seeds; fall, summer, winter
Flowering Time/Effective Period  Early summer
Form  Round bushy, small tree (Johnson, 1970)
Bark Description  Gray-reddish, narrow scales (Johnson, 1970)
Winter Appearance  Evergreen
Extension of Range  Utah and Wyoming, south to New Mexico, Arizona
Elevation  Utah 5000-7000 (1666-2333m) (Johnson, 1970)
Vegetation Type  Pinyon/juniper, Chaparral, Upper Uinta sage, Ponderosa pine
Root Type  Extensive, moderate to shallow (Preston, 1968)
Growth Rate  Slow (Preston, 1968)
Lifespan  Long (Preston, 1968)
Sun Exposure  Sun (Preston, 1968)
Drought Tolerance  Good (Preston, 1968)
Wind Firm  Yes (Preston, 1968)
Aspect  All
Soil: Texture  Coarse to rocky  Moisture  Dry; annual precipitation 12-20" (30-50cm) (USDA, 1965)
  pH  7.0-7.5  Depth  Deep to shallow
  Drainage  Well-drained  Organic matter  No
Maintenance/Cleanliness  Carefree; clean
Insects  2 on species (Essig, 1926)
Diseases  9 on species (USDA, 1960)
Transplantability  Only when young in medium texture to gravelly soil; easy (Kelly, 1970)
Propagation  Seeds
Availability  Collected plants available in many nurseries (check provenance)
Animal Food  Birds, rodents
Best Use  Screen, windbreak, Bonsai
Comments  Picturesque and rounded shrub/tree for dry situations
Scientific Name  Pinus flexilis James

Synonym

Common Name  Limber pine

Ultimate Height  30-45' (10-15m) (Harrington, 1954); 25-50' (8.3-16m) (Preston, 1968)
Ultimate Spread  25-30' (8.3-10m)
Leaf Description/Texture  1-3" (1.2-7.5cm), 5 bundled needles, persist 5-6 years; medium to coarse
Leaf Color, Summer  Green; whitish-green; bluish-green (Kelly, 1970)
Leaf Color, Autumn  Evergreen
Flower Description/Color  Staminate: small reddish, inconspicuous
Fruit Description/Color/Effective Period  Ovulate: green cone ripening to 6" (15cm) brown cone; summer, fall, winter
Flowering Time/Effective Period  Early summer, inconspicuous
Form  Medium-sized tree with round top, informal plume-like or dropping branches, picturesque
Bark Description  Young bark: gray; platy, brown with age; good contrast on young trees
Winter Appearance  Evergreen
Extension of Range  Washington to Montana south to New Mexico and California
Elevation  Colorado 5000-11,000' (1666-3666m) (Harrington, 1954); Utah 8000'+ (Anderson & Holmgren, 1960); 4000-11,000' (1333-3666m) (Johnson, 1970)
Vegetation Type  All except Riparian
Root Type  Taproot, with several large laterals (Preston, 1968)
Growth Rate  Slow
Lifespan  Long
Sun Exposure  Sun (Van Dersal, 1938)
Drought Tolerance  Moderate to good
Wind Firm  Yes (Preston, 1968)
Aspect  All, exposed slopes, ridges
Soil: Widely adapted to different soils
   Texture  Coarse  Moisture  Dry (Van Dersal, 1938); annual precipitation 20"+
   pH  6.5-7.0
   Depth  Shallow to moderate (50cm) (Stark, 1966)
   Drainage  Well-drained  Organic matter  No
Maintenance/Cleanliness  Carefree (withstands snow well) (Stark, 1966); clean
Insects  2 on species (Stark, 1966)
Diseases  15 on species (Stark, 1966)
Transplantability  Good on young stock
Propagation  Seed (Stark, 1966)
Availability  Available in many western nurseries (check provenance)
Animal Food  Birds, rodents (Van Dersal, 1938)
Best Use  Screen, windbreak, Bonsai
Comments  Wide range of adaptation; picturesque in age.
Scientific Name  Pinus longaeva D.K. Bailey

Synonym

Common Name  Intermountain bristlecone pine

Ultimate Height  45' (15m)(Cronquist et al., 1972)
Ultimate Spread  21-30' (7-10m)
Leaf Description/Texture  3/4-2" (2-4cm) needles in fascicles of five, not covered with resinous dots (Cronquist et al., 1972); medium texture (coarser with age)
Leaf Color, Summer  Dark green
Leaf Color, Autumn  Dark green
Flower Description/Color  Staminate cones: 3/8" (12mm) orange-red (Cronquist et al., 1972)
Fruite Description/Color/Effective Period  Ovulate cones: 2 3/4-3 1/2" (7-9cm) red brown; year around (Cronquist et al., 1972)
Flowering Time/Effective Period  Year around
Form  Pyramidal to irregular in youth, definitely irregular in age
Bark Description  Gray in youth to reddish brown in age (Cronquist et al., 1972)
Winter Appearance  Evergreen

Extension of Range  California to Nevada and Utah
Elevation  8000' (2666m) to timberline
Vegetation Type  Spruce/fir
Root Type  Deep and wide-spreading laterals
Growth Rate  Very slow
Lifespan  Very long (5000 years)
Sun Exposure  Sun
Drought Tolerance  Good if well-established

Wind Firm  Yes
Aspect  All

Soil:  Limestone or dolomite parent material (Cronquist et al., 1972)
       Texture  Rocky  Moisture  Dry
       pH  6.5-7.5  Organic matter  No
       Depth  Shallow to moderate  Drainage  Well-drained

Maintenance/Cleanliness  Carefree; clean

Insects  Many on genus (Essig, 1926)
Diseases  3 on species (USDA, 1960)
Transplantability  Good only if not in rocks and with young plants
Propagation  Seeds
Availability  Limited availability in western nurseries
Animal Food  Rodents, birds
Best Use  Specimen, Bonsai
Comments  Very slow growing; tree for a small space. Very similar to P. aristata but without resinous dots on needles.
Scientific Name  Pinus monophylla Torr. & Frem.

Synonym

Common Name  Single-leaf pinyon

Ultimate Height  20' (16.6m) (Johnson, 1970)
Ultimate Spread  20' (6.6m)
Leaf Description/Texture  1-2" (2.5-5cm) single needle without a sheath; medium in youth to coarse with age
Leaf Color, Summer  Gray-green
Leaf Color, Autumn  Evergreen
Flower Description/Color  Staminate: small, orange in clusters
Fruit Description/Color/Effective Period  Ovulate: green cones ripening to 1-1 1/2" (4-7 1/2cm) cone, tawny; fall, winter, attractive
Flowering Time/Effective Period  Spring, summer; inconspicuous
Form  Small bushy tree, with large laterals, may be multi-stemmed; symmetrical when young (Sunset Western Garden Book, 1971)
Bark Description  Dark-brown, scaly ridges (Johnson, 1970)
Winter Appearance  Evergreen

Extension of Range  Utah and Nevada south to Arizona and California (Preston, 1968)
Elevation  Utah 4500-6500' (1500-2166m) (Johnson, 1970)
Vegetation Type  Pinyon/juniper (climax), chaparral
Root Type  Deep fibrous, spreading
Growth Rate  Slow (Sunset Western Garden Book, 1971)
Lifespan  Long-lived
Sun Exposure  Sun
Drought Tolerance  Good
Wind Firm  Yes
Aspect  All, south at higher elevations
Soil: Not salt tolerant
Texture  Coarse to medium
pH  6.0-7.0
Depth  Deep to shallow
Drainage  Well-drained (Van Dersal, 1938)
Moisture  Dry; annual precipitation 8-14"+ (20-35cm)

Maintenance/Cleanliness  Carefree; clean
Insects  Many on species (Stark, 1966)
Diseases  5 on species (Stark, 1966)
Transplantability  When young
Propagation  Seeds (Stark, 1966)
Availability  Possibly locally available
Animal Food  Birds, rodents
Best Use  Screen, windbreak, Bonsai
Comments  Picturesque, small evergreen tree for dry situations.
Scientific Name  Pinus ponderosa  Laws.

Synonym

Common Name  Ponderosa pine

Ultimate Height  45-135' (15-45m) (Harrington, 1954); 150' (50m) (Anderson & Holmgren, 1969); 150-180' (50-60m) (Preston, 1968)

Ultimate Spread  20-30' (6.6-10m)

Leaf Description/Texture  4-11" (10-20cm) needles in fascicles of 2's or 3's (Preston, 1968); medium texture

Leaf Color, Summer  Yellowish-green

Leaf Color, Autumn  Evergreen

Flower Description/Color  Staminate: yellowish small

Fruit Description/Color/Effective Period  Ovulate: green cones ripening to 6" (15cm) brown cone; summer, winter, fall

Flowering Time/Effective Period  Summer, fall, winter; inconspicuous cone

Form  Large tree, broad and round-topped (Harrington, 1954); symmetrical in youth; conical (Preston, 1968); picturesque (Kelly, 1970)

Bark Description  Thick brown-cinnamon scales, platy (Harrington, 1954); brown to black (Preston, 1968)

Winter Appearance  Evergreen

Extension of Range  Washington to Montana south to New Mexico and California

Elevation  Colorado 5000-9000' (1666-3000m) (Harrington, 1954); Utah 5000-8000' (1666-2666m) (Johnson, 1970)

Vegetation Type  Ponderosa pine (climax), Pinyon/juniper, Aspen/lodgepole pine

Root Type  Taproot (Preston, 1968)

Growth Rate  Slow (Preston, 1968); moderate to rapid (Sunset Western Garden Book, 1971)

Lifespan  Long-lived (Johnson, 1970)

Sun Exposure  Shade in youth, sun in age

Drought Tolerance  Good (Preston, 1968)

Wind Firm  Yes

Aspect  South, west (Stark, 1966)

Soil:  Can tolerate 8000 ppm NaCl (Stark, 1966)

Texture  Medium to coarse

Moisture  Annual precipitation

pH  6.5-7.0

10-12"+ (25-31cm) (Stark, 1966)

Depth  Deep

Organic matter  No

Drainage  Well-drained (Stark, 1966)

Maintenance/Cleanliness  Carefree; (Porcupine and mistletoe problems)

(Stark, 1966); clean

Insects  45+ cone insects (Stark, 1966)

Diseases  55+ on species (Stark, 1966)

Transplantability  Good only when young due to taproot

Propagation  Seeds, easy to grow (Stark, 1966)

Availability  Widely available in nursery trade, check provenance

Animal Food  Birds, rodents (Stark, 1966)

Best Use  Screen, windbreak, interesting bark

Comments
Scientific Name  Populus angustifolia James

Synonym

Common Name  Narrowleaf cottonwood

Ultimate Height  45-60' (15-20m) (Stark, 1966); 50-70' (16.6-23.3m) Preston, 1968); 40' (13.3m) (Johnson, 1970)
Ultimate Spread  30-40' (10-13.3m)
Leaf Description/Texture  3" (7.3cm) lanceolate, coarsely serrate, glabrous (Stark, 1966); medium texture
Leaf Color, Summer  Yellow-green (Stark, 1966); dark green (Anderson & Holmgren, 1969)
Leaf Color, Autumn  Bright yellow
Flower Description/Color  Catkins, green
Fruit Description/Color/Effective Period  Whitish hair tufts; spring
Flowering Time/Effective Period  Early spring; varies with altitude
Form  Young: pyramidal; old: irregular, mounding; ascending (Johnson, 1970)
Bark Description  Young: smooth, yellow green; old: gray vertical furrows
Winter Appearance  Interesting young bark
Extension of Range  Washington to Montana south to Arizona and New Mexico (Preston, 1968)
Elevation  Utah 4000-8000' (1333-2666m) (Johnson, 1970)
Vegetation Type  Riparian (Johnson, 1970)
Root Type  Fibrous spreading, shallow, large laterals
Growth Rate  Rapid (Van Dersal, 1938)
Lifespan  Short (Preston, 1968)
Sun Exposure  Sun (Van Dersal, 1938)
Drought Tolerance  Poor
Wind Firm  No
Aspect  Streamsides
Soil: Texture  Medium to coarse  Moisture  Moist
pH  7.0  Organic matter  No
Depth  Deep (Stark, 1966)  Drainage  Well-drained
Maintenance/Cleanliness  Dieback in older branches; clean
Insects  12 on genus (Stark, 1966)
Diseases  27 for general group (Stark, 1966)
Transplantability  Good when young
Propagation  Seeds, cuttings
Availability  Western Evergreen, Golden, Colorado
Animal Food  Beaver
Best Use  High altitude shade tree; high altitude street tree (Preston, 1968)
Comments  Contrast between youth and age.
Scientific Name  *Populus tremuloides* Michx.

Synonym

Common Name  Quaking aspen

Ultimate Height  90' (30m)(Harrington, 1970); 9-60' (3-20m)(Stark, 1966); 20-60' (6.6-20m)(Sunset Western Garden Book, 1971); 40' (13.3m) (Johnson, 1970)

Ultimate Spread  25-30' (8.3-10m)

Leaf Description/Texture  1 1/2-3" (4-7.5cm), broadly ovate, acute tip, broad base, interesting sound and movement; medium texture

Leaf Color, Summer  Green

Leaf Color, Autumn  Yellow to bronze

Flower Description/Color  Catkins; greenish white

Fruit Description/Color/Effective Period  White hair tufts; spring

Flowering Time/Effective Period  Early spring; varies with altitude

Form  Slender tree; globose head to pyramidal

Bark Description  Young: green-white, cream; old: rough, furrowed, black

Winter Appearance  White to cream green bark, vertical branches

Extension of Range  Washington to Montana south to New Mexico and California

Elevation  Colorado 6000-10,000' (2000-5333m)(Harrington, 1954); Utah 6000+ (2000m+)(Anderson & Holmgren, 1969)

Vegetation Type  Chaparral, Douglas fir/white fir, Ponderosa pine, Spruce/fir (disclimax), Upper Uinta sage, Aspen/lodgepole pine

Root Type  Large underground laterals, spreading; majority of roots are in top 1' (.3m) of soil

Growth Rate  Rapid (Sunset Western Garden Book, 1971)

Lifespan  Short (regenerating rootstocks)

Sun Exposure  Sun (Van Dersal, 1938)

Drought Tolerance  Poor

Wind Firm  Good if open grown, poor if older stand overthinned

Aspect  All; north at lower elevations

Soil: Texture  Medium to coarse  Moisture  Dry to moist; annual precipitation 20-60"+

pH  6.5-7.0

Depth  Shallow (50-150cm)(Stark, 1966)

Drainage  Well-drained (Van Dersal, 1938)

Maintenance/Cleanliness  Dead branches provide entry for disease; suckers; clean

Insects  12 on genus (Stark, 1966)

Diseases  25 on species (Stark, 1966)

Transplantability  When young, not in leaf

Propagation  Cuttings

Availability  Collected trees available in many western nurseries

Animal Food  Beaver, elk and deer

Best Use  High altitude, specimen, shade; background (Sunset Western Garden Book, 1971)

Comments  Can be planted in clumps or close on center.
Scientific Name Potentilla fruticosa L.

Synonym

Common Name Shrubby cinquefoil; Bush cinquefoil

Ultimate Height 3.5' (1.2m) (Stark, 1966); 1-3' (.3-1m) (Kelly, 1970)
Ultimate Spread 2' (.6m)
Leaf Description/Texture 1" (2.5cm) hairy, palmately 3-7 parted; fine texture
Leaf Color, Summer Pale green; gray-green
Leaf Color, Autumn Yellowish
Flower Description/Color 3/4-1" (2-2.5cm) bright yellow disks
Fruit Description/Color/Effective Period Inconspicuous, silky achene; summer, fall
Flowering Time/Effective Period Summer (continuous)
Form Much-branched shrub (Stark, 1966); round-topped
Bark Description Shreddy
Winter Appearance Twigs hold round-top form
Extension of Range Washington to Montana south to New Mexico and California
Elevation Nevada 6500-12,000' (2133-4000m) (Stark, 1966)
Vegetation Type Chaparral, Douglas fir/white fir, Ponderosa pine, Spruce/fir, Upper Uinta sage, Aspen/lodgepole pine
Root Type Fibrous, spreading
Growth Rate Rapid
Lifespan Short
Sun Exposure Sun; semi-shade (Stark, 1966)
Drought Tolerance Poor
Wind Firm Yes
Aspect All
Soil: Texture Medium to fine Moist (Van Dersal, 1938)

pH 6.5-7.0
Depth Shallow Organic matter Yes, if possible
Drainage Well-drained (Van Dersal, 1938)
Maintenance/Cleanliness Carefree; clean
Insects 1 on genus (Stark, 1966)
Diseases 3 on species (Stark, 1966)
Transplantability Yes
Propagation Seeds, vegetative (Stark, 1966)
Availability Many cultivars available
Animal Food Browse
Best Use Ornamental shrub, color accent
Comments A choice, reliable flowering shrub, blooming all summer.
Scientific Name  Prunus americana Marsh.

Synonym

Common Name  American plum

Ultimate Height  15' (5m)(Harrington, 1954); 25-30' (6.3-10m)(Preston, 1968)

Ultimate Spread  5' (1.6m)

Leaf Description/Texture  2-3" (5-7.5cm) leaves, serrate, oblong to oval, spiny stems (Preston, 1968); medium to coarse

Leaf Color, Summer  Green

Leaf Color, Autumn  Brown

Flower Description/Color  1/2-2/3" (1.2-2cm) red and white; effective

Fruit Description/Color/Effective Period  1" (2.5cm) juicy plum, reddish; fall (Preston, 1968)

Flowering Time/Effective Period  Early spring; May (Kelly, 1970)

Form  Thicket-forming shrubs or small trees (Harrington, 1954)

Bark Description  Dark brown, tinged with red (Preston, 1968)

Winter Appearance  Thickets have sculptural form

Extension of Range  Montana to Utah south to New Mexico

Elevation  Colorado 3500-6000' (1166-2000m)(Harrington, 1954)

Vegetation Type  Riparian, Chaparral

Root Type  Spreading, fibrous

Growth Rate  Rapid

Lifespan  Short

Sun Exposure  Sun

Drought Tolerance  Good, if well-established

Wind Firm  Yes

Aspect  All, mostly flat

Soil: Texture  Medium

pH  7.0

Moisture  Dry or moist

Organic matter  Yes

Depth  Moderate

Drainage  Well-drained

Maintenance/Cleanliness  Carefree (vigorous suckers); messy fruits

Insects  67 on genus (Stark, 1966)

Diseases  Many on genus (Stark, 1966)

Transplantability  Good

Propagation  Root cuttings

Availability  Widely available in nurseries

Animal Food  Birds, rodents

Best Use  Barriers, backgrounds, spring flowers

Comments  Mostly a plains species, train to tree.
Scientific Name  *Prunus virginiana* L. var. *melanocarpa* (A. Nels.) Sarg.

**Synonym**

Common Name  Black chokecherry

**Ultimate Height**  30' (10m) (Harrington, 1954) (Anderson & Holmgren, 1969)

**Ultimate Spread**  15-20' (5-6.6m)

**Leaf Description/Texture**  1-3" (2.5-7.5cm) leaves, obovate, abruptly acute, round base, finely serrate margins (Harrington, 1954); medium texture

**Leaf Color, Summer**  Dark green; glossy

**Leaf Color, Autumn**  Red-brown (Johnson, 1970)

**Flower Description/Color**  Small white in 4" (10cm) racemes, attractive

**Fruit Description/Color/Effective Period**  Dark purple to black berry; late summer; attractive

**Flowering Time/Effective Period**  Spring (April to June)

**Form**  Shrub to small tree; in thickets (Kelly, 1970)

**Bark Description**  Smooth, reddish brown, horizontal lenticels

**Winter Appearance**  Erect branches

**Extension of Range**  Washington to Montana south to New Mexico and California (Preston, 1968)

**Elevation**  Colorado 4500-9000' (1500-3000m) (Harrington, 1954); Utah 4500-8000' (1500-2666m) (Johnson, 1970)

**Vegetation Type**  Riparian, Upper Uinta sage, Douglas fir/white fir, Ponderosa pine, Aspen/lodgepole pine

**Root Type**  Long laterals, suckers

**Growth Rate**  Rapid

**Lifespan**  Short (Preston, 1968)

**Sun Exposure**  Sun or shade (Van Dersal, 1938)

**Drought Tolerance**  Poor

**Wind Firm**  Yes

**Aspect**  North, stream sides

**Soil:**
- Texture  Medium to coarse
- *pH* 7.0
- Depth  Moderate
- Moisture  Moist
- Organic matter  No
- Drainage  Well-drained (Stark, 1966)

**Maintenance/Cleanliness**  Carefree (watch suckers); clean (may have some fruit drop)

**Insects**  67 on genus (Stark, 1966)

**Diseases**  33 on species (Stark, 1966)

**Transplantability**  Good for young individual plant

**Propagation**  Seeds

**Availability**  Cultivars available

**Animal Food**  Birds

**Best Use**  Ornamental shrub; in masses, fine spring flower accent

**Comments**  Can become a troublesome weed.
Scientific Name  Pseudotsuga menziesii (Mirb.) Franco var. glauca (Beissn.) Franco

Synonym  Pseudotsuga taxifolia var. glauca (Mayr.) Sudw.

Common Name  Rocky Mountain Douglas fir

Ultimate Height  130' (43.3m) (Johnson, 1970)
Ultimate Spread  25-30' (8.3-10m)
Leaf Description/Texture  1" (2.5cm) flat needles, constricted at twig; medium to fine texture
Leaf Color, Summer  Blue-green (Johnson, 1970)
Leaf Color, Autumn  Evergreen
Flower Description/Color  Staminate: small orange
Fruit Description/Color/Effective Period  Ovulate: red green cone ripening to 2 1/2" (6cm) cone with distinctive protruding bracts, red-brown; summer, fall, winter
Flowering Time/Effective Period  Spring; inconspicuous
Form  Pyramidal, symmetrical; graceful drooping branches (Stark, 1966)
Bark Description  Young: smooth, gray, thin; old: gray-brown ridges
Winter Appearance  Evergreen
Extension of Range  Idaho and Montana south to New Mexico and Arizona
Elevation  Utah 5000-8000' (1666-2666m) (Johnson, 1970)
Vegetation Type  Douglas fir/white fir (climax), Aspen/lodgepole pine, Ponderosa pine, Chaparral, Upper Uinta sage
Root Type  Well-developed, lateral, spreading (Preston, 1968)
Growth Rate  Moderate
Lifespan  Moderate to long
Sun Exposure  Shade when young; sun in age
Drought Tolerance  Good (Preston, 1968)
Wind Firm  Yes, if not over-thinned
Aspect  North, steep slopes
Soil: Texture  Medium to coarse
pH  6.0-7.0
Depth  Deep (Stark, 1966)
Moisture  Moist (Preston, 1968)
Organic matter  Yes
Drainage  Well-drained
Maintenance/Cleanliness  Carefree; clean
Insects  5 on species (Stark, 1966)
Diseases  61 on species (Stark, 1966)
Transplantability  Good when young (older trees suffer from desiccation)
Propagation  Seed (Stark, 1966)
Availability  Wide availability in western U.S. (check provenance)
Animal Food  Squirrels
Best Use  Screen, windbreak
Comments
Scientific Name  *Purshia tridentata* (Pursh) D.C.

Synonym

Common Name  Antelope bitterbrush

**Ultimate Height**  9' (3m) (Harrington, 1954); 2-4' (.6-1.3m) (Kelly, 1970)

**Ultimate Spread**  3-4' (1-1.3m)

**Leaf Description/Texture**  1/4-1" (7-25mm) leaves, aromatic, three-lobed, thickened, wedge-shaped, tomentose; fine texture

**Leaf Color, Summer**  Gray green

**Leaf Color, Autumn**  Brown

**Flower Description/Color**  Small 1/2" (.2cm) yellow

**Fruit Description/Color/Effective Period**  Inconspicuous berrylike drupe; late summer

**Flowering Time/Effective Period**  Spring

**Form**  Shrub, stemmy, irregular due to browsing

**Bark Description**  Shreddy, twisted, brownish gray

**Winter Appearance**  Desert shrub (Kelly, 1970)

**Extension of Range**  Washington to Montana south to New Mexico and California

**Elevation**  Colorado 5000-8000' (1666-2666m) (Harrington, 1954)

**Vegetation Type**  Chaparral, Pinyon/juniper, Ponderosa pine, Upper Uinta sage

**Root Type**  Fibrous, spreading

**Growth Rate**  Moderate to slow

**Sun Exposure**  Sun (Van Dersal, 1938)

**Drought Tolerance**  Good

**Wind Firm**  Yes

**Aspect**  South

**Soil: Texture**  Rocky (Kelly, 1970)

- **pH**  6.0-7.5 (Stark, 1966)
- **Depth**  Moderate to deep; 20-60" (.6-1.6m), 3' (1m) (Stark, 1966)
- **Moisture**  Dry (Kelly, 1970); annual precipitation 2-25" (5-62.5cm) (Stark, 1966)
- **Organic matter**  No
- **Drainage**  Well-drained

**Maintenance/Cleanliness**  Carefree (pruning tolerant); clean

**Insects**  None (Stark, 1966)

**Diseases**  None (Stark, 1966)

**Transplantability**  Poor (Kelly, 1970)

**Propagation**  Seeds (Stark, 1966)

**Availability**  Governmental seed source for wildlife habitat; doubtful commercial source

**Animal Food**  Excellent deer browse, rodents, birds

**Best Use**  Ornamental shrub, hedge

**Comments**  Fine small ornamental for dry places.
Scientific Name  
Quercus gambelii Nutt.

Synonym

Common Name  
Gambel's oak

Ultimate Height  
9-15' (3-5m)(Harrington, 1954); 33-36' (11-12m)(Stark, 1966)

Ultimate Spread  
12-15' (4-5m)

Leaf Description/Texture  
5" (13cm) leaves, ovate, repand sinuses; coarse

Leaf Color, Summer  
Bright green, lighter under

Leaf Color, Autumn  
Golden brown; reddish brown

Flower Description/Color  
Light green, inconspicuous

Fruit Description/Color/Effective Period  
Annual acorn, sweet, 1/2" (1.2cm) in diameter

Flowering Time/Effective Period  
May-June (Stark, 1966)

Form  
Shrubs or small trees (Harrington, 1954); sometimes in dense thickets; irregular crown (Johnson, 1970)

Bark Description  
Rough, furrowed, gray

Winter Appearance  
Interesting branch pattern, stout twigs

Extension of Range  
Nevada to Wyoming south to New Mexico and Arizona

Elevation  
Colorado 4500-8000' (1500-2666m)(Harrington, 1954)

Vegetation Type  
Chaparral

Root Type  
Deep, wide-spreading

Growth Rate  
Slow

Lifespan  
Long to very long

Sun Exposure  
Sun

Drought Tolerance  
Moderate

Wind Firm  
Yes

Aspect  
All; south at higher elevations, west

Soil:  
Granitic parent materials (Anderson & Holmgren, 1969)

- Texture  
Coarse (Stark, 1966)

- pH  
7.0-7.5

- Moisture  
Dry (Van Dersal, 1938); Moist, annual precipitation

- Depth  
Deep

- Drainage  
Well-drained (Van Dersal, 1938)

- Organic matter  
If possible

Maintenance/Cleanliness  
May have dead branches; clean

Insects  
1 on genus (Stark, 1966)

Diseases  
14 on species (Stark, 1966)

Transplantability  
Poor to impossible (Kelly, 1970)

Propagation  
Seeds

Availability  
Western Evergreens, Golden, Colorado

Animal Food  
Rodents, browse for deer

Best Use  
Small tree, background

Comments  
Very picturesque, coarse, informal.
Scientific Name Rhamnus alnifolia L'Her.

Synonym

Common Name Dwarf buckthorn (Davis, 1952); Alder-leafed buckthorn
(Van Dersal, 1938)

Ultimate Height 3-6' (1-2m) (Davis, 1952)
Ultimate Spread 4' (1.3m)
Leaf Description/Texture 2" (5cm) elliptic or ovate leaves, serrate; medium texture
Leaf Color, Summer Dark green
Leaf Color, Autumn Brown
Flower Description/Color Dioecious, inconspicuous, greenish
Fruit Description/Color/Effective Period Black, berrylike; late summer; poisonous
Flowering Time/Effective Period Early summer
Form Shrub with many drooping branches; thicket forming
Bark Description Green branchlets (Davis, 1952)
Winter Appearance Not outstanding
Extension of Range Washington to Montana south to Wyoming, Utah, and Oregon
Elevation 7000-9000' (2333-3000m)
Vegetation Type Douglas fir/white fir, Aspen/lodgepole pine, Upper Uinta sage
Root Type Fibrous spreading
Growth Rate Moderate
Lifespan Short
Sun Exposure Sun
Drought Tolerance Poor
Wind Firm Yes
Aspect North, east, west
Soil: Texture Medium Moisture Moist (Davis, 1952)
  pH 7.0 (Van Dersal, 1938) Organic matter If possible
  Depth Moderate Drainage Well-drained
Maintenance/Cleanliness Carefree; clean
Insects 2 on genus (Essig, 1926)
Diseases 5 on species (Stark, 1966)
Transplantability Unknown
Propagation Seeds (Stark, 1966)
Availability Doubtful commercial availability
Animal Food Unknown
Best Use Mass in background, solid summer foliage, interesting fall fruit
Comments Poisonous fruit.
Scientific Name  Rhus glabra L.

Synonym  Rhus cismontana Greene

Common Name  Smooth sumac

Ultimate Height  6-7' (2-2.3m) (Anderson & Holmgren, 1969); 3-9' (1-3m) (Stark, 1966)
Ultimate Spread  5-9' (1.6-3m)

Leaf Description/Texture  2" (5cm), 9-17 leaflets lanceolate, serrulate; coarse to medium texture
Leaf Color, Summer  Green above, whitish below
Leaf Color, Autumn  Rose, scarlet (Anderson & Holmgren, 1969)
Flower Description/Color  Green small, in panicles
Fruit Description/Color/Effective Period  Red, hairy, berry-like, in head; year around

Flowering Time/Effective Period

Form  Erect, few-branched shrub (Anderson & Holmgren, 1969)

Bark Description  Gray, rough at leaf scars
Winter Appearance  Coarse, scraggly trunks

Extension of Range  Washington to Montana south to New Mexico and California
Elevation  Colorado 5500-7500' (1633-2500m) (Harrington, 1954)
Vegetation Type  Chaparral, Upper Uinta sage

Root Type  Shallow (Kelly, 1970)
Growth Rate  Rapid
Lifespan  Short

Sun Exposure  Sun
Drought Tolerance  Good
Wind Firm  Yes
Aspect  South

Soil:  Varies (Stark, 1966)
Texture  Coarse
pH  6.5-7.0 (Van Dersal, 1938)

Depth  Shallow to moderate

Drainage  Well-drained (Van Dersal, 1938)

Moisture  Dry to moist (Van Dersal, 1938)

Organic matter  No

Maintenance/Cleanliness  Carefree; clean

Insects  14 on genus (Stark, 1966)
Diseases  14 on species (Stark, 1966)

Transplantability  Easily transplanted (Kelly, 1970)
Propagation  Seed (Stark, 1966)

Availability  Widely available

Animal Food  Birds

Best Use  Ornamental shrub, fine fall color accent
Comments  Picturesque.
Scientific Name  
Rhus radicans L.

Synonym  
Rhus toxidendron of American authors, in part, not L.

Common Name  
Posion ivy

Ultimate Height  
6-18" (15-45cm) ave.; 3-4' (1-1.3m)(Kelly, 1970)

Ultimate Spread  
1' (.3m)

Leaf Description/Texture  
1-7" (2.5-18cm) 3-parted oblanceolate, acuminate tip; medium texture

Leaf Color, Summer  
Dark glossy green

Leaf Color, Autumn  
Red orange

Flower Description/Color  
Small, white, inconspicuous

Fruit Description/Color/Effective Period  
White, waxy, berrylike; summer, fall, winter

Flowering Time/Effective Period  
May; inconspicuous

Form  
Low shrub or vine

Bark Description  
Inconspicuous

Winter Appearance  
Interesting fruit

Extension of Range  
Washington to Montana south to New Mexico and California

Elevation  
Colorado 4500-8500' (1500-2633m)(Harrington, 1954)

Vegetation Type  
Chaparral, Douglas fir/white fir, Ponderosa pine, Aspen/lodgepole pine

Root Type  
Shallow fibrous

Growth Rate  
Rapid

Sun Exposure  
Shade

Drought Tolerance  
Poor

Wind Firm  
Yes

Aspect  
North

Soil:  
Texture Medium  
Moisture Moist (Van Dersal, 1938)

pH  
6.0-7.0

Depth  
Moderate, deep

Organic matter  
Yes, if possible

Drainage  
Well-drained (Van Dersal, 1938)

Maintenance/Cleanliness  
Carefree; is extremely toxic to many people, when touched

Insects  
14 on genus (Stark, 1966)

Diseases  
22 on species (USDA, 1960)

Transplantability  
Good

Propagation  
Seed

Availability  
Doubtful commercial availability

Animal Food  
Birds

Best Use  
Barrier, ground cover

Comments  
Toxic to skin
Scientific Name  Rhus trilobata Nutt. var. trilobata

Synonym

Common Name  Skunkbush sumac

Ultimate Height  1 1/2-6' (.4-2m)(Harrington, 1954); 2-8' (.6-2.6m) (Kelly, 1970)
Ultimate Spread  10' (3.3m)
Leaf Description/Texture  Small 1-1 1/2" (2.5-3.2cm) 3-lobed, odoriferous; medium to fine texture
Leaf Color, Summer  Green
Leaf Color, Autumn  Yellow green; golden orange
Flower Description/Color  Inconspicuous, yellow
Fruit Description/Color/Effective Period  Plumose, crimson drupe, year around (Stark, 1966)
Flowering Time/Effective Period  Spiny, inconspicuous
Form  Round top, multi-branched, diffuse
Bark Description  Heavily pubescent; inconspicuous
Winter Appearance  Greenish, round-topped
Extension of Range  Washington to Montana south to New Mexico and California
Elevation  Colorado 3500-9000' (1166-3000m)
Vegetation Type  Upper Uinta sage, Pinyon/juniper, Ponderosa pine, Douglas fir/white fir, Aspen /lodgepole pine
Root Type  Spreading fibrous
Growth Rate  Moderate
Lifespan  Moderate
Sun Exposure  Shade, sun (Van Dersal, 1938)
Drought Tolerance  Good
Wind  Firm  Yes
Aspect  South
Soil: Texture  Medium to coarse
pH  6.5-7.5
Depth  Deep
Drainage  Well-drained (Van Dersal, 1938)
Moisture  Moist or dry; annual precipitation 3-5"+ (7.5-13cm)
Organic matter  No
Maintenance/Cleanliness  Carefree; clean
Insects  14 on genus (Stark, 1966)
Diseases  7 on species (Stark, 1966); alternate host for pinyon blister rust
Transplantability  Yes
Propagation  Seeds, cuttings (Stark, 1966)
Availability  Possibly locally available
Animal Food  Birds
Best Use  Ornamental shrub, mass background
Comments  A choice shrub; with good summer and autumn color; pleasant form
Scientific Name  Ribes aureum Pursh

Synonym

Common Name  Golden currant

Ultimate Height  4' (1.3m) (Anderson & Holmgren, 1969); 3-6' (1-2m) (Sunset Western Garden Book, 1971)
Ultimate Spread  4' (1.3m)
Leaf Description/Texture  Spineless; 3-5 lobed, 1 1/2" (3.7cm), obovate to uniform; fine to medium texture
Leaf Color, Summer  Green
Leaf Color, Autumn  Light Green
Flower Description/Color  1" (2.5cm), yellow in axillary racemes, turn rose (Anderson & Holmgren, 1969)
Fruit Description/Color/Effective Period  1/2" (1.2cm) yellow, red, black, berry; late summer
Flowering Time/Effective Period  Spring; April-May (Stark, 1966)
Form  Clump (Kelly, 1970); round shrub (Stark, 1966); arching branches
Bark Description  Grayish (Stark, 1966)
Winter Appearance  Gray branch masses
Extension of Range  Washington to Montana south to New Mexico and California
Elevation  Nevada 2500-7800' (833-2633m) (Stark, 1966)
Vegetation Type  Upper Uinta sage, Douglas fir/white fir, Ponderosa pine, Riparian, Chaparral
Root Type  Underground suckering
Growth Rate  Rapid
Lifespan  Regenerates by suckering; continuous
Sun Exposure  Sun or shade (Van Dersal, 1938)
Drought Tolerance  Moderate
Wind Firm  Yes
Aspect  All
Soil: Texture  Coarse to medium
pH  6.5-7.0
Depth  Shallow to deep
Moisture  Moist or dry (Kelly, 1970)
Organic matter  If possible
Drainage  Well-drained
Maintenance/Cleanliness  Carefree; clean
Insects  7 on species (Stark, 1966)
Diseases  23 on species (Stark, 1966)
Transplantability  Yes
Propagation  Seeds (Stark, 1966)
Availability  Many ornamental cultivars available
Animal Food  Birds
Best Use  Coarse screen (Stark, 1966); spring color accent
Comments  A reliable, hardy ornamental shrub.
Scientific Name  Ribes cereum Dougl. var. inebrians (Lindl.) C.L. Hitchc.

Synonym  Ribes inebrians Lindl.

Common Name  Squaw currant

Ultimate Height  3-4' (1-1.3m)
Ultimate Spread  3' (1m)
Leaf Description/Texture  Spineless; roundish 1 1/2" (3.7cm) broad, tomentose, sticky (Kelly, 1970); fine to medium texture
Leaf Color, Summer  Green
Leaf Color, Autumn  Brown
Flower Description/Color  1/3" (8mm) hanging, pink, tubular (Kelly, 1970)
Fruit Description/Color/Effective Period  Red, smooth berry; August (Kelly, 1970)
Flowering Time/Effective Period  June (Kelly, 1970)
Form  Compact (Kelly, 1970); multi-stemmed shrub
Bark Description  Cherry-like (Kelly, 1970)
Winter Appearance  Compact branching
Extension of Range  Washington to Montana south to New Mexico and California
Elevation  Colorado 4000-11,000' (1333-3666m) (Harrington, 1954)
Vegetation Type  Upper Uinta sage, Douglas fir/white fir, Ponderosa pine, Spruce/fir, Aspen/lodgepole pine, Chaparral
Root Type  Fibrous, spreading
Growth Rate  Rapid
Lifespan  Short
Sun Exposure  Sun (Van Dersal, 1938)
Drought Tolerance  Moderate
Wind Firm  Yes
Aspect  All, south at higher elevations
Soil: Texture  Medium to coarse
pH  7.0
Depth  Moderate to shallow
Moisture  Dry (Van Dersal, 1938)
Organic matter  No
Drainage  Well-drained
Maintenance/Cleanliness  Subject to chlorosis (Kelly, 1970); clean
Insects  Many on wild genus
Diseases  Many on native species; alternate host for white pine blister rust (USDA, 1960)
Transplantability  Good
Propagation  Seeds
Availability  Possibly locally available
Animal Food  Birds, rodents
Best Uses  Ornamental shrub, early summer color
Comments  Similar to R. alpinum but less desirable under cultivation (Kelly, 1970).
Scientific Name  Ribes montigenum McClatchie

Synonym

Common Name  Gooseberry currant

Ultimate Height  10-20" (25-51cm) (Harrington, 1954)
Ultimate Spread  12-24" (32-66cm)
Leaf Description/Texture  1" (2.5cm) orbicular, 5-lobed leaves; medium to fine texture
Leaf Color, Summer  Green
Leaf Color, Autumn  Light green, yellow green
Flower Description/Color  3/8: (1cm) yellow and pink, broad; in short racemes (Anderson & Holmgren, 1969)
Fruit Description/Color/Effective Period  Red glandular, bristly (Anderson & Holmgren, 1969)
Flowering Time/Effective Period  Spring
Form  Low, procumbent, with ascending branches (Harrington, 1954)
Bark Description  Spiny
Winter Appearance  Sparse, not outstanding
Extension of Range  Washington to Montana south to New Mexico and California
Elevation  Colorado 7500-11,500' (2500-3833m) (Harrington, 1954)
Vegetation Type  Spruce/fir, Alpine tundra
Root type  Fibrous, spreading
Growth Rate  Slow to moderate
Lifespan  Short to moderate
Sun Exposure  Sun or shade
Drought Tolerance  Poor
Wind Firm  Yes
Aspect  North, south at higher elevations
Soil: Texture  Moderate to coarse
pH  6.0-7.0
Moisture  Moist
Organic matter  Yes
Depth  Moderate
Drainage  Well-drained
Maintenance/Cleanliness  Carefree; clean
Insects  Many on wild genus (Essig, 1926)
Diseases  Many on native species; alternate host for white pine blister rust (USDA, 1960)
Transplantability  Good
Propagation  Seeds
Availability  Doubtful commercial availability
Animal Food  Birds, rodents
Best Use  Low shrub, border, barrier
Comments  Small shrub for spring color.
Scientific Name: Ribes petiolare Dougl.

Synonym

Common Name: Western black currant

Ultimate Height: 3-6' (1-2m) (Davis, 1952)
Ultimate Spread: 5' (1.6m)
Leaf Description/Texture: 3-4" (7.5-10cm) orbicular, 3-5 lobed; medium to coarse texture
Leaf Color, Summer: Green
Leaf Color, Autumn: Greenish yellow
Flower Description/Color: White in 3" (7.5cm) racemes
Fruit Description/Color/Effective Period: Black, berry; late summer
Flowering Time/Effective Period: Spring
Form: Small to large shrub, unarmed (Van Dersal, 1938); erect to spreading (Davis, 1952)
Bark Description: Tan to brown
Winter Appearance: Sparse, not outstanding
Extension of Range: Washington to Montana south to Wyoming and Oregon
Elevation: 7000-9000' (2333-3000m)
Vegetation Type: Douglas fir/white fir, Aspen/lodgepole pine
Root Type: Fibrous, spreading
Growth Rate: Rapid
Lifespan: Short
Sun Exposure: Sun (Van Dersal, 1938)
Drought Tolerance: Poor
Wind Firm: Yes
Aspect: North, east, west
Soil: Texture: Medium to coarse
pH: 6.0-7.0
Depth: Shallow to moderate
Moisture: Moist (Davis, 1952)
Organic matter: If possible
Drainage: Well-drained (Van Dersal, 1938)

Maintenance/Cleanliness: Carefree; clean
Insects: Many on wild genus (Essig, 1926)
Diseases: Many on native currants (USDA, 1960); alternate host for white pine blister rust
Transplantability: Good when young
Propagation: Seed (Stark, 1966)
Availability: Doubtful commercial availability
Animal Food: Birds, small mammals
Best Use: Ornamental shrub, spring color accent
Comments


Scientific Name Ribes viscosissimum Pursh var. viscosissimum

Synonym

Common Name Sticky currant

Ultimate Height 2 1/2-4 1/2' (1-1.5m) (Harrington, 1954)
Ultimate Spread 3' (1m)
Leaf Description/Texture Spineless, 1/2-3/4" (1-2cm) wick, 3 or 5-lobed, glandular; cordate, 2-3" (5-8cm) (Rehder, 1940); medium texture
Leaf Color, Summer Green
Leaf Color, Autumn Brown
Flower Description/Color 1 1/2" (3.7cm) narrow tubes, pinkish green
Fruit Description/Color/Effective Period 1/4" (.7cm) in diameter, black, pubescent, dry; summer, fall
Flowering Time/Effective Period June-July (Van Dersal, 1938)
Form Multi-stemmed shrub
Bark Description Shreddy
Winter Appearance Inconspicuous, not outstanding
Extension of Range Washington to Montana south to Colorado, Arizona and California
Elevation Colorado 6700' (2233m) (Harrington, 1954)
Vegetation Type Douglas fir/white fir, Ponderosa pine, Spruce/fir
Root Type Not fibrous, 4' (1.3m) deep (Van Dersal, 1938)
Growth Rate Rapid
Lifespan Short
Sun Exposure Sun, shade (Van Dersal, 1938)
Drought Tolerance Poor
Wind Firm Yes
Aspect All
Soil: Texture Medium Moisture Moist
pH 6.5-7.0 Organic matter Yes
Depth Deep Drainage Well-drained (Van Dersal, 1938)

Maintenance/Cleanliness Carefree; clean
Insects Many on wild genus
Diseases Many on native species, alternate host for white pine blister rust (USDA, 1960)
Transplantability Poor (long roots)
Propagation Seeds
Availability Doubtful commercial availability
Animal Food Birds, rodents
Best Use Early summer, color, ornamental shrub
Comments Ranker growth and larger leaves than R. cereum
Scientific Name  *Rosa nutkana* Presl. var. *hispida* Fern.

Synonym  *Rosa spaldingii* Crepin (Anderson & Holmgren, 1969)

Common Name  Bristly nootka rose

**Ultimate Height**  4' (1.3m) (Anderson & Holmgren, 1969)

**Ultimate Spread**  5-6' (1.6-2m)

**Leaf Description/Texture**  Compound, 1" (2.5cm), 5 leaflets, serrate, sessile; medium texture

**Leaf Color, Summer**  Green

**Leaf Color, Autumn**  Reddish

**Flower Description/Color**  Large 3" (7.5cm), pale pink

**Fruit Description/Color/Effective Period**  1/2" (1.2cm) red achene; fall, winter

**Flowering Time/Effective Period**  Summer

**Form**  Much branched from ground, shrubby

**Bark Description**  Interesting bark

**Winter Appearance**  Reddish stems, arching line

**Extension of Range**  Washington to Montana south to New Mexico and California

**Elevation**  5000-9000' (1666-3000m)

**Vegetation Type**  Chaparral, Upper Uinta sage, Douglas fir/white fir, Aspen/lodgepole pine, Ponderosa pine

**Root Type**  Suckering, spreading

**Growth Rate**  Rapid

**Lifespan**  Moderate; regenerating rootstocks

**Sun Exposure**  Sun

**Drought Tolerance**  Poor

**Wind Firm**  Yes

**Aspect**  All

**Soil:**  Texture Coarse  Moisture Moist (Anderson & Holmgren, 1969)

**pH**  6.0-7.0

**Depth**  Shallow to moderate

**Drainage**  Well-drained

**Organic matter**  If possible

**Maintenance/Cleanliness**  Carefree; clean

**Insects**  15 on native roses (Stark, 1966)

**Diseases**  37 on native roses (Stark, 1966)

**Transplantability**  Good

**Propagation**  Cuttings; seeds

**Availability**  Possibly locally available

**Animal Food**  Birds, rodents

**Best Use**  Barrier, ornamental, erosion control

**Comments**  Similar to *R. woodsii*, shorter, with larger solitary flowers. Hybridizes and intergrades with other native roses.
**Scientific Name**  Rosa woodsii Lindl. var. ultramontana (Wats.) Jeps.  

**Synonym**  Rosa woodsii of intermountain authors not Lindl.  

**Common Name**  Wood’s rose  

<table>
<thead>
<tr>
<th>Ultimate Height</th>
<th>1 1/2-9' (.4-3m) (Harrington, 1954)</th>
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<tbody>
<tr>
<td>Ultimate Spread</td>
<td>6-9' (2-3m)</td>
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</tbody>
</table>

**Leaf Description/Texture**  Compound, ovate, acuminate, serrate; prickles only at base; medium texture  

**Leaf Color, Summer**  Dark green  

**Leaf Color, Autumn**  Yellow  

**Flower Description/Color**  1-2" (2.5-5.0cm) delicate; pink to reddish  

**Fruit Description/Color/Effective Period**  Dry, red; nice color; fall, winter  

**Flowering Time/Effective Period**  June  

**Form**  Arching shrub, in clump or thickets  

**Bark Description**  Dark reddish, armed; interesting  

**Winter Appearance**  Nice form and color  

**Extension of Range**  Washington to Montana south to New Mexico and California  

**Elevation**  Colorado 3500-9000' (1166-3000m) (Harrington, 1954)  

**Vegetation Type**  Upper Uinta sage, Douglas fir/white fir, Ponderosa pine, Spruce/fir, Riparian, Aspen/lodgepole pine, Chaparral  

**Root Type**  Stoloniferous, shallow, spreading  

**Growth Rate**  Rapid  

**Lifespan**  Moderate, regenerating rootstocks  

**Sun Exposure**  Sun  

**Drought Tolerance**  Moderate  

**Wind Firm**  No  

**Aspect**  All  

**Soil: Texture**  Medium to coarse  

**Moisture**  Moist or dry  

**pH**  6.0-7.0  

**Organic matter**  If possible  

**Depth**  Shallow to deep  

**Drainage**  Well-drained  

**Maintenance/Cleanliness**  May become large clump--10-15' (3.3-5m) across; clean  

**Insects**  15 on wild roses (Stark, 1966)  

**Diseases**  37 on native roses (Stark, 1966)  

**Transplantability**  Good  

**Propagation**  Cuttings; seeds  

**Availability**  Readily available  

**Animal Food**  Birds, rodents  

**Best Use**  Barrier, ornamental shrub, erosion control  

**Comments**  Similar to R. nutkana but taller, with masses of smaller flowers. Hybridizes and intergrades with other native roses.
Scientific Name  Rubus ideaus var. melanolasius (Focke) Davis

Synonym R. strigosus Michx.

Common Name Red raspberry

Ultimate Height  3-4.5' (1-1.5m)
Ultimate Spread  3-5' (1-1.6m)
Leaf Description/Texture  1 1/2" (3.7cm), 3-5 foliate, ovate, doubly serrate; medium to fine texture
Leaf Color, Summer  Light green (Davis, 1952)
Leaf Color, Autumn  Yellow
Flower Description/Color  Small, white, inconspicuous (Kelly, 1970)
Fruit Description/Color/Effective Period  Red, sweet berry; late summer
Flowering Time/Effective Period  Spring, early summer
Form  Arching, spiny stems
Bark Description  Glaucescent
Winter Appearance  Arching, not outstanding
Extension of Range  Washington to Montana south to Oregon and Colorado (Davis, 1952)
Elevation  Colorado 5000-11,000' (1666-3666m) (Harrington, 1954)
Vegetation Type  Alpine tundra, Spruce/fir, Aspen/lodgepole pine, Douglas fir/white fir, Ponderosa pine, Upper Uinta sage, Chaparral
Root Type  Fibrous, underground stolons
Growth Rate  Rapid
Lifespan  Short (regenerates)
Sun Exposure  Sun (Van Dersal, 1938)
Drought Tolerance  Poor
Wind Firm  No
Aspect  All
Soil: Texture  Medium to coarse
pH  5.5-7.0
Depth  Shallow to moderate
Drainage  Well-drained
Moisture  Moist
Organic matter  If possible, not necessary

Maintenance/Cleanliness  Carefree (will spread rapidly); clean
Insects  Many on wild genus (Essig, 1926)
Diseases  Many on species (USDA, 1960)
Transplantability  Good (Kelly, 1970)
Propagation  Seeds, root cuttings
Availability  Doubtful commercial availability (variety only)
Animal Food  Birds, mammals
Best Use  Barrier, erosion control, useful fruit
Comments  Delicious fruit.
Scientific Name Rubus parviflorus Nutt.

Synonym

Common Name Western thimbleberry

Ultimate Height 4-6' (1.3-2m)(Anderson & Holmgren, 1969)
Ultimate Spread 1-2' (.3-.6m)
Leaf Description/Texture 6" (15cm), 5-lobed, leaves; coarse
Leaf Color, Summer Light green
Leaf Color, Autumn Yellow-green, brown
Flower Description/Color Cymes of 2-9, 1 1/2" (3.7cm), white flowers
Fruit Description/Color/Effective Period A multiple berry on a head, reddish; late summer, fall
Flowering Time/Effective Period Early summer
Form Upright leggy shrub
Bark Description Shreddy
Winter Appearance Upright stems
Extension of Range Washington to Montana south to New Mexico and California
Elevation Colorado 7000-10,000' (2333-3333m) (Harrington, 1954); Utah 8000+ (2666m+) (Anderson & Holmgren, 1969)
Vegetation Type Douglas fir/white fir, Spruce/fir, Riparian, Aspen/ lodgepole pine
Root Type Stoloniferous, spreading, extensive
Growth Rate Rapid
Lifespan Moderate (regenerating rootstocks)
Sun Exposure Shade
Drought Tolerance Poor
Wind Firm No
Aspect All, north at lower elevations
Soil: Texture Medium to coarse
       Moisture Moist
       pH 6.0-7.0
       Organic matter No
       Depth Shallow
       Drainage Well-drained
Maintenance/Cleanliness New growth may die back; suckers; clean
Insects 8 on species (Essig, 1926)
Diseases Several on native thimbleberries, some specific (USDA, 1960)
Transplantability Good
Propagation Cuttings
Availability Available at several western nurseries
Animal Food Birds, rodents, bear
Best Use Ground cover, in mass
Comments An exceptional plant with useful fruit and interesting flower.
Scientific Name  Salix bebbiana Sarg. var. perrostrata (Rydb.) Schn.

Synonym  Salix perrostrata Rydb.

Common Name  Bebb willow

Ultimate Height  8-9' (2-3m)(Harrington, 1954)
Ultimate Spread  4-5' (.6-1.6m)
Leaf Description/Texture  Obovate, entire 1-3" (2.5-7.5cm) leaves; medium texture
Leaf Color, Summer  Dull green (Kelly, 1970)
Leaf Color, Autumn  Yellow
Flower Description/Color  Staminate catkins: 1/2" (1.2cm) inconspicuous
Fruit Description/Color/Effective Period  Pistillate catkins: 1-2" (2.5-5cm) whitish-yellow fruit a capsule
Flowering Time/Effective Period  Spring
Form  Shrub or small tree; in either case usually 1-stemmed (Harrington, 1954); bushy topped, thicket forming
Bark Description  Gray; purple-brown (Kelly, 1970)
Winter Appearance  Not outstanding
Extension of Range  Washington to Montana south to New Mexico and California
Elevation  Colorado 5000-9500' (1666-3166m)(Harrington, 1954)
Vegetation Type  Riparian
Root Type  Fibrous, spreading
Growth Rate  Rapid
Lifespan  Short
Sun Exposure  Sun
Drought Tolerance  Poor
Wind Firm  Yes
Aspect  All, streamside
Soil: Texture  Medium to coarse
pH  7.0
Depth  Moderate
Moisture  Wet
Organic matter  No
Drainage  Boggy or wet
Maintenance/Cleanliness  Carefree; clean
Insects  91 on genus (Stark, 1966)
Diseases  Many on genus (Stark, 1966)
Transplantability  Good
Propagation  Cuttings
Availability  Possibly locally available
Animal Food  Beaver, deer browse
Best Use  Streamside, mass background
Comments  Nice winter color, compose winter color effects with other willows.
Scientific Name Salix drummondiana Barratt

Synonym Salix subcoerulea Piper

Common Name Drummond willow

Ultimate Height 3'12" (1-4m) (Kelly, 1970)
Ultimate Spread 10-15' (3.3-5m)

Leaf Description/Texture Oblong, hairy below 1-2 1/2" (2-5cm) (Harrington, 1954); medium-fine texture

Leaf Color, Summer Whitish green under, green above (Harrington, 1954)

Leaf Color, Autumn Yellow-green

Flower Description/Color Staminate catkins: 1/2-1 1/2" (2-3cm) reddish (Harrington, 1954)

Fruit Description/Color/Effective Period Pistillate catkins 1-1 1/2" (2-3cm), silvery pubescent (Harrington, 1954); spring

Flowering Time/Effective Period Spring

Form Multi-branched shrub with ascending branches

Bark Description Purple-brown to yellow with bluish glaucous bloom (Kelly, 1970)

Winter Appearance Excellent bluish color

Extension of Range Washington to Wyoming south to New Mexico and California (Harrington, 1954)

Elevation Colorado 7500-11,000' (2500-3666m)

Vegetation Type Riparian, Spruce/fir, Alpine tundra, Aspen/lodgepole pine

Root Type Growth Rate Rapid

Lifespan Short

Sun Exposure Sun

Drought Tolerance Poor

Wind Firm Good

Aspect All; most at lower elevations

Soil: Texture Medium

ph 6.0-7.0

Depth Moderate to shallow

Maintenance/Cleanliness Clean/carefree

Insects 91 on genus (Stark, 1966)

Diseases 25 on species (Stark, 1966)

Transplantability Good on young plants

Propagation Cuttings

Availability Doubtful availability

Animal Food Beaver, deer browse

Best Use Water sides, mass in background

Comments Excellent winter color, compose with other willows for winter color effects.
Scientific Name  Salix exigua Nutt. ssp. exigua

Synonym

Common Name  Coyote willow

Ultimate Height  6-12' (2-4m)(Harrington, 1954)
Ultimate Spread  3-5' (1-1.6m)
Leaf Description/Texture  Linear 4" (10cm) leaves graceful; fine texture
Leaf Color, Summer  Green-gray; silvery tomentose (Stark, 1966)
Leaf Color, Autumn  Yellow
Flower Description/Color  Staminate catkins: 1" (2.5cm) yellowish
Fruit Description/Color/Effective Period  Pistillate catkins: 2" (5cm) fuzzy; fall
Flowering Time/Effective Period  Spring
Form  Shrub or small tree rounded in youth, irregular in age, can form thickets
Bark Description  Twigs: Reddish (Harrington, 1954); older: Gray (Harrington, 1954)
Winter Appearance  Effective branch color; reddish
Extension of Range  Washington to Wyoming south to Colorado and Oregon
Elevation  Colorado 5000-7500' (1666-2500m)(Harrington, 1954); Utah below 6000' (2000m)(Anderson & Holmgren, 1969)
Vegetation Type  Riparian
Root Type  Fibrous, spreading
Growth Rate  Rapid
Sun Exposure  Sun
Drought Tolerance  Poor
Wind Firm  Yes
Aspect  All, streamside
Soil:  Variable, moist
Texture  Medium to coarse
pH  7.0-8.0 (Stark, 1966)
Depth  Moderate
Moisture  Wet
Organic matter  No
Drainage  Wet or boggy
Maintenance/Cleanliness  Limb breakage; clean
Insects  91 on genus (Stark, 1966)
Diseases  Many on genus (Stark, 1966)
Transplantability  Good
Propagation  Cuttings
Availability  Possibly locally available
Animal Food  Beaver, deer browse
Best Use  Streamside, mass background
Comments  Good winter color; compose winter color effects with other willows.
Scientific Name  Salix geyeriana Anderss.

Synonym

Common Name  Geyer willow

Ultimate Height  9' (3m) (Rehder, 1940); 7.5-12' (2.5-4m) (Harrington, 1954)
Ultimate Spread  10-15' (3.3-5m)
Leaf Description/Texture  Linear-lanceolate 1-2 1/2" (2-6cm) (Rehder, 1940); medium texture
Leaf Color, Summer  Green
Leaf Color, Autumn  Yellow-green
Flower Description/Color  Staminate catkins 1/2" (1.3cm) yellowish to reddish (Harrington, 1954)
Fruit Description/Color/Effective Period  Pistillate catkins: 1/2" (1.3cm) globose, reddish (Harrington, 1954); spring
Flowering Time/Effective Period  Spring
Form  Multi-branched with ascending branches
Bark Description  Brown-purple, with glaucous bloom (Kelly, 1970)
Winter Appearance  Very effective color
Extension of Range  Washington to Oregon, Montana to Colorado (Rehder, 1940)
Elevation  Colorado 6500'+ (2166m+) (Kelly, 1970)
Vegetation Type  Riparian, Spruce/fir, Lodgepole/aspen, Alpine tundra, Douglas fir/white fir
Root Type  Deep, spreading, fibrous
Growth Rate  Rapid
Lifespan  Short
Sun Exposure  Sun
Drought Tolerance  Poor
Wind Firm  Good
Aspect  All
Soil: Texture  Medium
pH  5.0-6.5
Depth  Moderate
Moisture  Moist to wet
Organic Matter  Yes
Drainage  Wet, boggy (Harrington, 1954)

Maintenance/Cleanliness  Clean
Insects  91 on genus (Stark, 1966)
Diseases  Many on genus (Stark, 1966)
Transplantability  Good when young
Propagation  Cuttings
Availability  Doubtful availability
Animal Food  Deer browse, beaver
Best Use  Watersides, mass in composition
Comments  Excellent winter color; compose with other willows for winter color effects.
Scientific Name  Salix lasiandra Benth. var. lasiandra

Synonym

Common Name  Pacific willow

Ultimate Height  15-45' (5-15m) (Davis, 1952)
Ultimate Spread  15' (5m)
Leaf Description/Texture  2-4" (5-10cm) oblanceolate, acuminate, glandular serrulate (Harrington, 1954); medium texture
Leaf Color, Summer  Dark green (Harrington, 1954)
Leaf Color, Autumn  Yellow
Flower Description/Color  Staminate: catkins, 2-3" (5-7.5cm) terminal white
Fruit Description/Color/Effective Period  Pistillate: catkins, 4" (10cm) yellowish to white, inconspicuous; summer
Flowering Time/Effective Period  Spring
Form  Small round tree or large shrub
Bark Description  Shiny (Harrington, 1954)
Winter Appearance  Orangish fine branches; yellow-red-brown (Davis, 1952)
Extension of Range  Washington to Montana south to New Mexico and California
Elevation  Utah 6000-8000' (2000-2666m)
Vegetation Type  Riparian
Root Type  Fibrous, spreading
Growth Rate  Rapid
Lifespan  Short
Sun Exposure  Sun (Van Dersal, 1938)
Drought Tolerance  Poor
Wind Firm  Moderate
Aspect  All, streamside
Soil: Texture  Medium to coarse (Van Dersal, 1938)
  pH 6.0-7.0
  Depth  Deep
Moisture  Moist (Van Dersal, 1938)
Organic matter  If possible
Drainage  Well-drained (Van Dersal, 1938)
Maintenance/Cleanliness  Carefree (may have weak wood); clean
Insects  91 on genus (Stark, 1966)
Diseases  12 on species (USDA, 1960)
Transplantability  Good
Propagations  Cuttings
Availability  Possibly locally available
Animal Food  Beaver
Best Use  Small shade tree at high elevations, background
Comments  Nice winter color.
Scientific Name: *Salix scouleriana* Barratt

**Synonym**

**Common Name:** Scouler willow

**Ultimate Height:** 9-12' (3-4m) (Harrington, 1954); 35' (11.6m) (Johnson, 1970)

**Ultimate Spread:** 10' (3.3m)

**Leaf Description/Texture:** Oblanceolate 2-3" (5-7.5cm) long entire to serrulate (Harrington, 1954); medium texture

**Leaf Color, Summer:** Dark green (Harrington, 1954)

**Leaf Color, Autumn:** Yellow

**Flower Description/Color:** Staminate catkins: 1" (2.5cm) yellowish white (Harrington, 1954)

**Fruit Description/Color/Effective Period:** Pistillate catkins 2" (5cm), reddish, effective (Harrington, 1954); fruit a capsule

**Flowering Time/Effective Period:** Spring

**Form:** Shrub, rounded crown; tree (Johnson, 1970)

**Bark Description:** Reddish brown to blackish (Harrington, 1954); gray (Kelly, 1970)

**Winter Appearance:** Contrasts to snow

**Extension of Range:** Washington to Montana south to New Mexico and California

**Elevation:** Colorado 8000-10,000' (2666-3333m) (Harrington, 1954)

**Vegetation Type:** Riparian; Spruce/fir, Douglas fir/white fir (Johnson, 1970)

**Root Type:** Fibrous, spreading

**Growth Rate:** Rapid (Van Dersal, 1938)

**Lifespan:** Short

**Sun Exposure:** Sun

**Drought Tolerance:** Poor

**Wind Firm:** Yes

**Aspect:** All, streamside

**Soil:**
- **Texture:** Medium
- **pH:** 6.5-7.0
- **Depth:** Deep
- **Drainage:** Wet; well-drained (Van Dersal, 1938)

**Moisture:** Moist or dry (Van Dersal, 1938)

**Organic matter:** No

**Maintenance/Cleanliness:** Carefree; clean

**Insects:** 91 on genus (Stark, 1966)

**Diseases:** Many on genus (Stark, 1966)

**Transplantability:** Good

**Propagation:** Cuttings

**Availability:** Possibly locally available

**Animal Food:** Beaver, deer browse

**Best Use:** In mass as a background or screen

**Comments:** Can pioneer burns (Van Dersal, 1938); streambank, wet areas, compose with other willows for winter color effects.
Scientific Name  **Salix wolfii** Bebb. var. *wolfii*

**Synonym**

Common Name  Wild pussywillow; Wolf's willow

**Ultimate Height**  3' (1m) (Harrington, 1954)

**Ultimate Spread**  3-4' (1-1.3m)

**Leaf Description/Texture**  1" (2.5cm) leaves, oblanceolate acute tip, entire (Harrington, 1954); fine to medium texture

**Leaf Color, Summer**  Dull green (Harrington, 1954)

**Leaf Color, Autumn**  Yellow-green

**Flower Description/Color**  Staminate catkins: 1/2" (1.2cm) small yellowish

**Fruit Description/Color/Effective Period**  Pistillate catkins: 1" (2.5cm) globose whitish, fuzzy white; June

**Flowering Time/Effective Period**  Spring

**Form**  Low round shrub in thickets

**Bark Description**  Young: Yellow to orange; old: brown

**Winter Appearance**  Effective winter twig color

**Extension of Range**  Idaho, Wyoming, Colorado, Utah

**Elevation**  Colorado 7500-10,000' (2500-3333m)

**Vegetation Type**  Riparian

**Root Type**  Spreading fibrous

**Growth Rate**  Rapid

**Lifespan**  Short

**Sun Exposure**  Sun

**Drought Tolerance**  Poor

**Wind Firm**  Yes

**Aspect**  All; streamside; north at lower elevations

**Soil:**

- Texture  Medium
- pH  6.5-7.0
- Depth  Moderate

**Moisture**  Moist to wet

**Organic matter**  No

**Drainage**  Wet to boggy

**Maintenance/Cleanliness**  Clean; carefree

**Insects**  91 on genus (Stark, 1966)

**Diseases**  Many on genus (Stark, 1966)

**Transplantability**  Good

**Propagation**  Cuttings

**Availability**  Possibly available locally

**Animal Food**  Deer browse, beaver

**Best Use**  Water sides, mass in background

**Comments**  Good winter color; compose with other willows for winter color effects.
Scientific Name  Sambucus caerulea var. glauca (Raf.) Nutt.

Synonym

Common Name  Blueberry elder

Ultimate Height  6-18' (2-6m) (Harrington, 1954); 10-12' (3.3-4m) (Anderson & Holmgren, 1969)
Ultimate Spread  5-8' (1.6-2.6m)
Leaf Description/Texture  5-9 leaflets 2-4" (5-10cm), lanceolate, compound; medium to coarse texture
Leaf Color, Summer  Green yellow
Leaf Color, Autumn  Brown to purple
Flower Description/Color  Small, white, in cymes, effective
Fruit Description/Color/Effective Period  Small blue-black drupe in cymes, effective; September
Flowering Time/Effective Period  April-July
Form  Shrub or small tree (Harrington, 1954)
Bark Description  Vertical, gray furrows
Winter Appearance  Not outstanding
Extension of Range  Washington to Montana south to New Mexico and California
Elevation  Colorado 5500-8000' (1833-2666m) (Harrington, 1954)
Vegetation Type  Riparian, Chaparral, Upper Uinta sage, Douglas fir/white fir
Root Type  Fibrous, spreading
Growth Rate  Rapid
Lifespan  Short (Preston, 1968)
Sun Exposure  Sun (Preston, 1968)
Drought Tolerance  Poor
Wind Firm  Yes
Aspect  All, except south at lower elevations
Soil:  Texture  Medium to coarse
      pH  7.0
      Moisture  Moist, dry
      Organic matter  Yes
      Depth  Deep
      Drainage  Well-drained
Maintenance/Cleanliness  Subject to breakage; clean
Insects  2 on species (Stark, 1966)
Diseases  10 on species (Stark, 1966)
Transplantability  Good
Propagation  Seed, cuttings (Stark, 1966)
Availability  Possibly locally available
Animal Food  Birds, deer
Best Use  Ornamental shrub, accent or in mass
Comments  Interesting fruit.
Scientific Name Sambucus melanocarpa A. Gray

Synonym S. racemosa L. ssp. pubens. (Michx.) House var. melanocarpa

Common Name Elderberry

Ultimate Height 9' (3m)(Harrington, 1954); 12' (4m)(Rehder, 1940)
Ultimate Spread 5-8' (1.6-2.6m)

Leaf Description/Texture 5-7 leaflets 2-4" (5-10cm) ovate, serrate; medium to coarse texture

Leaf Color, Summer Green
Leaf Color, Autumn Brown to purple

Flower Description/Color Small, white, in 2-3" (5-7.5cm) cymes

Fruit Description/Color/Effective Period Black drupe in cyme; fall

Flowering Time/Effective Period Spring, early summer
Form Shrub, rounded

Bark Description Gray; red-brown (Rehder, 1940)

Winter Appearance Not outstanding

Extension of Range Washington to Montana south to New Mexico and California (Harrington, 1954)

Elevation Colorado 7500–10,000' (2500–3333m)(Harrington, 1954)

Vegetation Type Spruce/fir, Douglas fir/white fir, Aspen/lodgepole pine, Ponderosa pine, Upper Uinta sage, Chaparral

Root Type Fibrous, spreading

Growth Rate Rapid

Lifespan Short

Sun Exposure Sun, shade (Van Dersal, 1938)

Drought Tolerance Poor

Wind Firm Yes

Aspect All

Soil: Texture Medium to coarse, rocky
pH 6.0–7.0
Depth Moderate

Moisture Moist (Van Dersal, 1938)

Organic matter If possible

Drainage Well-drained (Van Dersal, 1938)

Maintenance/Cleanliness Carefree; clean

Insects 8 on genus (Essig, 1926)

Diseases 6 on species (USDA, 1960)

Transplantability Good

Propagation Seeds, cuttings (Stark, 1966)

Availability Doubtful commercial availability

Animal Food Birds (Van Dersal, 1938)

Best Use Accent, background in summer

Comments Colorful fruit and foliage.
Scientific Name  Sambucus racemosa of authors not L. var. microbotrys Rydb.

Synonym  S. microbotrys Rydb.

Common Name  Elderberry

Ultimate Height  12' (4m)(Harrington, 1954); 4' (1.3m)(Kelly, 1970)
Ultimate Spread  5-6' (1.6-2m)
Leaf Description/Texture  5-7 leaflets, 2-4" (5-10cm), ovate, lanceolate, serrate (Harrington, 1954); medium to coarse texture
Leaf Color, Summer  Green
Leaf Color, Autumn  Purple to brown
Flower Description/Color  Small, white-yellowish, in cymes 2" (5cm) (Harrington, 1954)
Fruit Description/Color/Effective Period  Orange-red drupes in cymes; fall (Harrington, 1954); panicles (Rehder, 1940)
Flowering Time/Effective Period  Summer
Form  Shrub; rounded to irregular; clump of stems
Bark Description  Rank odor (Stark, 1966)
Winter Appearance  Not outstanding, grayish
Extension of Range  Washington to Montana south to New Mexico and California
Elevation  Colorado 8000-12,000' (2666-4000m)(Harrington, 1954); Nevada 6000-11,000' (2000-3666m) (Stark, 1966)
Vegetation Type  Spruce/fir, Douglas fir/white fir, Aspen/lodgepole pine, Ponderosa pine, Upper Uinta sage, Chaparral
Root Type  Fibrous spreading
Growth Rate  Rapid
Lifespan  Short
Sun Exposure  Shade, sun (Van Dersal, 1938)
Drought Tolerance  Poor
Wind Firm  Yes
Aspect  All
Soil: Texture  Medium to coarse
pH  7.0
Depth  Moderate
Moisture  Moist (Stark, 1966)
Organic matter  If possible
Drainage  Well-drained (Van Dersal, 1938)

Maintenance/Cleanliness  Carefree, thrives on neglect; clean
Insects  3 on genus (Stark, 1966)
Diseases  7 on species (Stark, 1966)
Transplantability  Good
Propagation  Seeds, cuttings (Stark, 1966)
Availability  Western Evergreen, Golden, Colorado
Animal Food  Birds (Van Dersal, 1938)
Best Use  Background foliage in summer
Comments  Attractive (Kelly, 1970); colorful fruit and flower.
Scientific Name  Shepherdia argentea (Pursh.) Nutt.

Synonym

Common Name  Silver buffaloberry

Ultimate Height  6–21' (3–7m)(Harrington, 1954)
Ultimate Spread  10' (3.3m)
Leaf Description/Texture  2" (5cm) leaves oblong entire, thorny twigs; medium texture
Leaf Color, Summer  Silver
Leaf Color, Autumn  Brown
Flower Description/Color  Inconspicuous (Stark, 1966)
Fruit Description/Color/Effective Period  Small, round, golden or red berry (Harrington, 1954); attractive; July–August
Flowering Time/Effective Period  Spring
Form  Tall shrub, thicket forming (Kelly, 1970)
Bark Description  Silver when young (Harrington, 1954)
Winter Appearance  Much branched
Extension of Range  Washington to Montana south to New Mexico and California
Elevation  Colorado 4500–7500' (1500–2500m)(Harrington, 1954)
Vegetation Type  Riparian (Kelly, 1970)
Root Type  Suckering
Growth Rate  Rapid
Lifespan  Short
Sun Exposure  Sun
Drought Tolerance  Poor
Wind Firm  Yes
Aspect  All, streamside
Soil: Texture  Medium to coarse or fine
pH  7.0–8.0 (Stark, 1966)
Depth  Deep (Stark, 1966)
Moisture  Moist (Stark, 1966)
Organic matter  No
Drainage  Well-drained (Van Dersal, 1938)

Maintenance/Cleanliness  Carefree; clean
Insects  1 on genus
Diseases  13 for genus
Transplantability  Good
Propagation  Seed (Stark, 1966)
Availability  Widely available
Animal Food  Birds
Best Use  Barrier, color contrast
Comments  A native plant with silver foliage.
Scientific Name  Sorbus scopulina  Greene

Synonym

Common Name  Greene’s mountain ash

Ultimate Height  12-15' (4-5m) (Anderson & Holmgren, 1969)
Ultimate Spread  5-10' (1.6-3.3m)
Leaf Description/Texture  1" (2.5cm) leaflets, pinnately compound, serrate; medium texture
Leaf Color, Summer  Green
Leaf Color, Autumn  Red-orange (Johnson, 1970); showy
Flower Description/Color  1/4" (.7cm) white flower in large racemes; showy, fragrant (Anderson & Holmgren, 1969)
Fruit Description/Color/Effective Period  3-4" (7.5-10cm) heads of red orange berrylike; very showy; September-November
Flowering Time/Effective Period  Spring; June
Form  Semi-erect shrub, branching from base (Anderson & Holmgren, 1969); small tree, or thicket-forming
Bark Description  Young: yellow brown; older: dark brown-gray (Kelly, 1970); smooth, thin (Johnson, 1970)
Winter Appearance  Some showy fruit left on in winter
Extension of Range  Washington to Montana south to New Mexico and California
Elevation  Utah 8000'+ (2666m) (Anderson & Holmgren, 1969)
Vegetation Type  Douglas fir/white fir, Aspen/lodgepole pine, Spruce/fir
Root Type  Underground suckers, heavy, layering
Growth Rate  Moderate
Lifespan  Short to moderate
Sun Exposure  Shade or sun
Drought Tolerance  Poor
Wind Firm  Yes
Aspect  All, north at lower elevations
Soil: Texture  Medium; coarse (Van Dersal, 1938)
PH  6.0-7.0
Depth  Deep
Moisture  Moist (Van Dersal, 1938)
Organic matter  Yes
Drainage  Well-drained (Van Dersal, 1938)

Maintenance/Cleanliness  Carefree; clean
Insects  16 for genus (Stark, 1966)
Diseases  48 on genus (Stark, 1966)
Transplantability  Only if young
Propagation  Seeds, cuttings
Availability  Doubtful commercial availability
Animal Food  Birds
Best Use  Ornamental shrub with colorful fall fruit; accent; mass in background
Comments  Showy shrub for shade or semi-shade.
Scientific Name  
Symphoricarpos longiflorus A. Gray

Synonym

Common Name  
Longflower snowberry

Ultimate Height  
1 1/2-3' (.4-1m) (Harrington, 1954)

Ultimate Spread  
3' (1m)

Leaf Description/Texture  
Small lanceolate or oval leaves, entire glabrate (Harrington, 1954); fine texture

Leaf Color, Summer  
Pale green (Harrington, 1954)

Leaf Color, Autumn  
Brown

Flower Description/Color/Effective Period  
Small white ellipsoidal fruit; interesting; summer

Flowering Time/Effective Period  
May-June

Form  
Low shrub, spreading shrub

Bark Description  
Exfoliating; young glaucous

Winter Appearance  
Fine twig pattern

Extension of Range  
Washington to Montana south to New Mexico and California

Elevation  
Colorado 5000' (1666m) (Harrington, 1954); Nevada 4500-7000' (1500-2333m) (Stark, 1966)

Vegetation Type  
Chaparral, Aspen/lodgepole pine, Upper Uinta sage, Douglas fir/white fir

Root Type  
Fibrous spreading

Growth Rate  
Rapid

Lifespan  
Short

Sun Exposure  
Sun (Stark, 1966)

Drought Tolerance  
Moderate

Wind Firm  
Yes

Aspect  
All, north at lower elevations

Soil:  
Limestone soil

Texture  
Medium to rocky

pH  
7.0-8.0

Depth  
Moderate to deep; 20-60"+ (50-150cm) (Stark, 1966)

Moisture  
Dry; annual precipitation 8-14" (20-35cm) (Stark, 1966)

Organic matter  
No

Drainage  
Well-drained

Maintenance/Cleanliness  
Carefree; clean

Insects  
11 for genus (Stark, 1966)

Diseases  
None listed on species (USDA, 1960)

Transplantability  
Good when young

Propagation  
Seed; root cuttings (Stark, 1966)

Availability  
Doubtful commercial availability

Animal Food  
Birds

Best Use  
Low shrub with interesting fruit in fall

Comments  
Attractive fruit.
Scientific Name  
**Symphoricarpos oreophilus var. utahensis** (Rydb.)

A. Nels.

**Synonym**  
*Symphoricarpos utahensis* Rydb.

**Common Name**  
Mountain snowberry

**Ultimate Height**  
3' (1m) (Stark, 1966); 2-5' (.6-1.6m) (Kelly, 1970)

**Ultimate Spread**  
3' (1m)

**Leaf Description/Texture**  
Small, smooth, thin oval, opposite sessile; fine texture

**Leaf Color, Summer**  
Green or gray green (Stark, 1966)

**Leaf Color, Autumn**  
Brown

**Flower Description/Color**  
1/2" (1.2cm) white-pink, small

**Fruit Description/Color/Effective Period**  
White berrylike drupe (Van Dersal, 1938); fall, attractive

**Flowering Time/Effective Period**  
June-July

**Form**  
Small stoloniferous shrub; nicely shaped (Kelly, 1970)

**Bark Description**  
Pubescent

**Winter Appearance**  
Finely branched twigs

**Extension of Range**  
Oregon to Wyoming south to New Mexico and California

**Elevation**  
Nevada 6300-9000' (2100-3000m) (Stark, 1966)

**Vegetation Type**  
Douglas fir/white fir, Aspen/lodgepole pine, Spruce/fir

**Root Type**  
Stoloniferous, fibrous

**Growth Rate**  
Rapid

**Lifespan**  
Short (regenerates)

**Sun Exposure**  
Sun (Stark, 1966); shade (Kelly, 1970)

**Drought Tolerance**  
Moderate if well-established

**Wind Firm**  
Yes

**Aspect**  
All, north at lower elevations

**Soil: Texture**  
Medium

**Moisture**  
Moist or dry (Van Dersal, 1938)

**pH**  
7.0

**Depth**  
Moderate

**Organic matter**  
No

**Drainage**  
Well-drained (Van Dersal, 1938)

**Maintenance/Cleanliness**  
Carefree (may sucker); clean

**Insects**  
11 for genus (Stark, 1966)

**Diseases**  
7 on species (Stark, 1966)

**Transplantability**  
Good when young

**Propagation**  
Root cuttings; seeds (Stark, 1966)

**Availability**  
Many western nurseries

**Animal Food**  
Birds, rodents, deer browse

**Best Use**  
Specimen or in mass

**Comments**  
Give room since it will spread.
Scientific Name  Symphoricarpos vaccinioides Rydb.

Synonym

Common Name  Huckleberry snowberry

Ultimate Height  4 1/2' (1.5m)(Harrington, 1954); 2' (.6m)(Kelly, 1970)
Ultimate Spread  5' (1.6m)
Leaf Description/Texture  1" (2.5cm) oval to ovate, entire or dentate, thick pubescent; medium to fine texture
Leaf Color, Summer  Green above, paler beneath (Harrington, 1954)
Leaf Color, Autumn  Brown
Flower Description/Color  Small white to pink
Fruit Description/Color/Effective Period  Ellipsoid white; fall
Flowering Time/Effective Period  Spring
Form  Much-branched, rounded shrub
Bark Description  Pubescent
Winter Appearance  Fruit interesting
Extension of Range  Washington to Idaho south to Colorado and California
Elevation  Nevada 5000-10,000' (1666-3333m)(Stark, 1966); Colorado 6000-10,500' (2000-3500m)(Harrington, 1954)
Vegetation Type  Douglas fir/white fir, Aspen/lodgepole pine, Ponderosa pine, Spruce/fir (Stark, 1966)
Root Type  Fibrous; underground runners
Growth Rate  Rapid
Lifespan  Short
Sun Exposure  Sun (Van Dersal, 1938)
Drought Tolerance  Good if well-established
Wind Firm  Yes
Aspect  All, north at lower elevations
Soil:  Granite soils (Stark, 1966)
  Texture  Medium
  pH  6.5-7.0
  Depth  Moderate
  Moisture  Dry (Stark, 1966)
  Organic matter  Yes (Stark, 1966)
  Drainage  Well-drained (Van Dersal, 1938)
Maintenance/Cleanliness  Carefree; clean
Insects  11 on genus (Stark, 1966)
Diseases  3 on species (Stark, 1966)
Transplantability  Good when young
Propagation  Seeds, root cuttings (Stark, 1966)
Availability  Doubtful commercial availability
Animal Food  Birds, small mammals, deer browse (Stark, 1966)
Best Use  Mass planting, low informal shrub
Comments  Not as well formed as S. oreophilus var. utahensis (Kelly, 1970); interesting fruit.
Scientific Name  Vaccinium caespitosum Michx.

Synonym

Common Name  Dwarf huckleberry

Ultimate Height  2'6" (5-15cm)
Ultimate Spread  6" (15cm)
Leaf Description/Texture  Small oblong to oblanceolate, thick, entire (Harrington, 1954); fine to very fine texture
Leaf Color, Summer  Green
Leaf Color, Autumn  Yellow-green
Flower Description/Color  Small pink to white inconspicuous
Fruit Description/Color/Effective Period  1/4" (.7cm) blue berry with glaucous bloom; fall, late summer
Flowering Time/Effective Period  Summer
Form  Spreading with short upright stems
Bark Description  Green
Winter Appearance  Green stems
Extension of Range  Washington to Montana south to Colorado and Oregon
Elevation  Colorado 8500-12,000' (2833-4000m)(Harrington, 1954)
Vegetation Type  Aspen/lodgepole pine, Spruce/fir
Root Type  Fibrous spreading
Growth Rate  Rapid
Lifespan  Short
Sun Exposure  Shade; sun (Van Dersal, 1938)
Drought Tolerance  Poor
Wind Firm  Yes
Aspect  North, east
Soil: Granite soils
   Texture  Medium to coarse
   pH 5.5-7.0
   Depth  Moderate to shallow
Moisture  Moist
Organic matter  Yes
Drainage  Well-drained
Maintenance/Cleanliness  Carefree; clean
Insects  5 on genus (Essig, 1926)
Diseases  2 for species (USDA, 1960)
Transplantability  Good
Propagation  Seeds
Availability  The Wild Garden, Bothell, Washington
Animal Food  Birds, small rodents
Best Use  Ground cover
Comments  Very shade and acid loving.
Scientific Name  Vaccinium membranaceum Doug1.

Synonym

Common Name  Blue huckleberry; Big whortleberry

Ultimate Height  4' (1.3m) (Anderson & Holmgren, 1969)
Ultimate Spread  2' (.6m)
Leaf Description/Texture  2" (5cm) deciduous, oval to ovate, glandular, serrulate; medium texture
Leaf Color, Summer  Green, paler beneath (Anderson & Holmgren, 1969)
Leaf Color, Autumn  Yellow-green
Flower Description/Color  Small, inconspicuous, yellow (Anderson & Holmgren, 1969)
Fruit Description/Color/Effective Period  1/4" (.7cm) berry, blue, purple, attractive, aromatic; August-September
Flowering Time/Effective Period  June-July (Anderson & Holmgren, 1969)
Form  A coarsely branched shrub
Bark Description  Green, small
Winter Appearance  Not outstanding
Extension of Range  Washington to Montana south to Wyoming and California
Elevation  8000-11,000' (2666-3666m)
Vegetation Type  Aspen/lodgepole pine, Spruce/fir
Root Type  Spreading shallow, fibrous
Growth Rate  Rapid
Lifespan  Short
Sun Exposure  Shade
Drought Tolerance  Poor
Wind Firm  Yes
Aspect  North, east
Soil:  Granitic soil
  Texture  Medium to coarse
  pH  5.5-6.5
  Depth  Deep to shallow
  Moisture  Moist
  Organic matter  If possible
  Drainage  Well-drained
Maintenance/Cleanliness  Carefree; clean
Insects  5 on genus (Essig, 1926)
Diseases  3 on species (USDA, 1960)
Transplantability  Good
Propagation  Seeds
Availability  Doubtful commercial availability
Animal Food  Birds, rodents
Best Use  Ground cover
Comments  Very shade and acid loving.
Scientific Name Vaccinium scoparium Leiberg

Synonym

Common Name Grouse whortleberry

Ultimate Height 6" (15cm) (Harrington, 1954); 15" (37.7cm) (Anderson & Holmgren, 1969)
Ultimate Spread 1' (30cm)

Leaf Description/Texture 1/2" (1.2cm) leaves, evergreen, ovate, entire (Harrington, 1954); fine texture
Leaf Color, Summer Light green
Leaf Color, Autumn Light yellow

Flower Description/Color Small pinkish, inconspicuous

Fruit Description/Color/Effective Period A red berry, 1/4" (.7cm), attractive; late summer
Flowering Time/Effective Period July

Form Low, finely branched shrub (Anderson & Holmgren, 1969)

Bark Description Green, brown at base
Winter Appearance Evergreen stems, buried under snow

Extension of Range Washington to Montana south to Colorado and California

Elevation Colorado 8500-11,500' (2833-3833m) (Harrington, 1954)

Vegetation Type Aspen/lodgepole pine, Spruce/fir

Root Type Fibrous, spreading
Growth Rate Rapid
Lifespan Short

Sun Exposure Shade
Drought Tolerance Poor
Wind Firm Yes
Aspect North, east

Soil: Granitic soil
Texture Medium to coarse
pH 5.5-6.5
Depth Shallow to moderate

Moisture Moist
Organic matter Yes
Drainage Well-drained

Maintenance/Cleanliness Carefree; clean

Insects 5 on genus (Essig, 1926)
Diseases None listed for species (USDA, 1960)

Transplantability Good

Propagation Seeds

Availability The Wild Garden, Bothell, Washington

Animal Food Birds, small rodents

Best Use Ground cover

Comments Very shade and acid loving.
Scientific Name  Viburnum pauciflorum Pylaie

Synonym  Viburnum edule (Michx.) Raf.

Common Name  Squashberry

Ultimate Height  3-6' (1-2m) (Harrington, 1954)
Ultimate Spread  4' (1.3m)

Leaf Description/Texture  Variable leaf shape 2-5" (5-12.5cm) elliptic to orbicular serrate to coarsely dentate, 3-lobed at apex (Harrington, 1954); coarse texture

Leaf Color, Summer  Green
Leaf Color, Autumn  Brown

Flower Description/Color  Small in small cyme

Fruit Description/Color/Effective Period  Red drupe in heads; July-September

Flowering Time/Effective Period  Spring

Form  Small to large straggling shrub

Bark Description  Inconspicuous, brown

Winter Appearance  Not outstanding

Extension of Range  Washington to Montana south to Oregon and Colorado

Elevation  Colorado 7000-9000' (2333-3000m) (Harrington, 1954)

Vegetation Type  Riparian (Kelly, 1970)

Root Type  Fibrous spreading

Growth Rate  Rapid

Lifespan  Short

Sun Exposure  Shade (Van Dersal, 1938)

Drought Tolerance  Poor

Wind Firm  Yes

Aspect  North, east

Soil: Texture  Medium  Moisture  Moist (Van Dersal, 1938)

pH  6.0-7.0  Soil: Depth  Deep to moderate

Organic matter  Yes  Drainage  Well-drained

Maintenance/Cleanliness  Carefree; clean

Insects  Several on genus (Essig, 1926)

Diseases  None listed (USDA, 1960)

Transplantability  Good when young

Propagation  Cuttings, layering, seeds (Stark, 1966)

Availability  Doubtful commercial availability

Animal Food  Birds, small mammals

Best Use  Shady, barrier and background shrub

Comments
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VITA

Richard Kenneth Sutton

Candidate for the Degree of

Master of Landscape Architecture

Thesis: An Investigation into the Design Qualities, Ecological Requirements, and Potential Use of Some Native Trees and Shrubs of the Mountains of Northeastern Utah

Major Field: Landscape Architecture and Environmental Planning

Biographical Information:

Personal Data: Born February 26, 1948, in Beatrice, Nebraska, as the third child of Philip Stanley and Elizabeth Mae Stewart Sutton.

Education: Lincoln Public Schools (Nebraska); graduated from Lincoln Northeast High School (Nebraska), 1966. Received Bachelor of Science in Forest Biology from Colorado State University, Ft. Collins, Colorado, in 1970. Received a Master of Landscape Architecture and Environmental Planning from Utah State University, Logan, Utah, in 1974.

Professional Experience: 1973-1974, Graduate Teaching Assistant in the Department of Landscape Architecture and Environmental Planning, Utah State University; 1973 (Summer), Draftsman with Robert Goetz Associates, Webster Groves, Missouri; 1972-1973, Graduate Research Assistant in the Department of Landscape Architecture and Environmental Planning, Utah State University, doing a planting study for a ten-mile segment of new highway. Six summers of various jobs with governmental agencies in the western United States in conservation, forestry, insect and fire control.