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Deciduous Trees for South Dakota Landscapes

D. E. Herman

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Agricultural Experiment Station
South Dakota State University
Brookings, South Dakota 57006

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COVER—A distinctive landscape asset of deciduous trees is annual development of yellow, orange, and scarlet shades of autumn coloration. This 3-fold panorama of color may be observed annually in Sieche Hollow State Park near Sisseton, South Dakota. This area is the extreme northwestern limit of the native range of sugar maple in the United States. Leaf reproductions on the cover are authentic impressions of silver maple leaves.

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Acknowledgment

The author expresses his appreciation to Horticulturists Paul E. Collins and Dean M. Martin and Botanist Charles A. Taylor for their assistance in reading the manuscript. Thanks are also extended to other members of the Horticulture-Forestry Department for their helpful suggestions. The tree forms, as represented in figures 2-7, are modifications from "Trees for New Jersey Streets," a publication of the New Jersey Federation of Shade Tree Commissions, 1965.

Introduction

The Great Plains, including South Dakota, has been characterized as a vast "treeless" plain. Granted, this statement carries a measure of truth, but we need not be apologetic, for if we didn't appreciate the assets of this vast, unrestricted, non-congested and, as yet, relatively non-polluted environment, we wouldn't choose to live here. Nevertheless, the important role which trees play in tempering man's environment and in providing a more beautiful, enjoyable environment in which to work and recreate needs no amplification. Actually the abundance of open space provides an unparalleled opportunity to beautify the landscape scene in South Dakota.

This publication was prepared to meet the need for an informative reference on deciduous trees in South Dakota. Also, this publication will be of regional value due to its rather extensive treatment of cultivars, including hybrid and clonal varieties.

The term *cultivar* was introduced in 1961 by the International Commission for the Nomenclature of Cultivated Plants to designate a "*cultivated variety.*" A cultivar is a plant which is developed, propagated, and maintained under cultivation by man. New plants (cultivars) are produced by various means, including hybridization (hybrids), naturally occurring genetic changes which give rise to sports and mutants, and man-made selections.

A clone is actually a type of cultivar. Clones are plants which are propagated vegetatively (asexually) by such means as cutting, grafting, or budding from a single selected parent. Therefore, each plant is identical. Asexual propagation is essential because clones fail to reproduce true to type from seed. Since most new ornamental tree cultivars are propagated asexually, the terms cultivar and clone are used interchangeably throughout the publication.

A hybrid tree is commonly produced by crossing two or more species or cultivars. A majority of hybrid trees are vegetatively propagated because they fail to come true from seed. In fact, certain hybrids fail to produce viable seed.

Your attention is directed to a common misconception that only a small group of plants are available which possess adequate hardiness to perform satisfactorily in the Northern Plains. However, if one really familiarizes himself with the many readily obtainable deciduous trees and the various new cultivars that are becoming available, our selection really becomes surprisingly extensive. Furthermore, as we continue to evaluate new trees and the public begins to request more of the newer and less-commonly offered material, nurserymen will further expand their tree inventories.

The primary purpose of this reference is to provide a useful tool for landscape nurserymen, landscape architects, arborists, park department personnel, greenhouse and garden center operators, Cooperative Extension Service personnel, Forestry and Soil Conservation Service personnel, garden club members, homeowners, and conservationists and horticulturists in general. It will serve as an excellent supplementary teaching aid for university-level arboriculture and woody plant identification courses. High school students will also find it useful.

Alphabetical Index of Deciduous Trees

Family and Genus Relationships

AILANTHUS—family Simaroubaceae
Ailanthus—Tree of Heaven

BEECH—family Fagaceae
Quercus—Oak

BIGNONIA—family Bignoniaceae
Catalpa—Catalpa

BIRCH—family Betulaceae
Alnus—Alder
Betula—Birch
Ostrya—Hop-hornbeam

BUCKEYE—family Hippocastanaceae
Aesculus—Buckeye, Horse-chestnut

BUCKTHORN—family Rhamnaceae
Rhamnus—Buckthorn

CASHEW—family Anacardiaceae
Rhus—Sumac

ELM—family Ulmaceae
Celtis—Hackberry
Ulmus—Elm
Zelkova—Zelkova

GINKGO—family Ginkgoaceae
Ginkgo—Maidenhair Tree

LINDEN—family Tiliaceae
Tilia—Linden

MAPLE—family Aceraceae
Acer—Maple

MULBERRY—family Moraceae
Morus—Mulberry

OLEASTER—family Elaeagnaceae
Elaeagnus—Russian-olive

OLIVE—family Oleaceae
Fraxinus—Ash
Syringa—Lilac

PEA—family Leguminosae
Cercis—Redbud
Cladrastis—Yellowwood
Gleditsia—Honey-locust
Gymnocladus—Coffee-Tree
Maackia—Maackia
Robinia—Locust

PINE—family Pinaceae
Larix—Larch

PLANETREE—family Platanaceae
Platanus—Planetree, Sycamore

ROSE—family Rosaceae
Amelanchier—Serviceberry
Crataegus—Hawthorn
Malus—Crabapple
Prunus—Apricot, Cherry, Plum
Pyrus—Pear
Sorbus—Mountain-ash

RUE—family Rutaceae
Phellodendron—Cork-Tree
Ptelea—Hop-Tree

SOAPBERRY—family Sapindaceae
Koelreuteria—Golderain-Tree

WALNUT—family Juglandaceae
Carya—Hickory
Juglans—Walnut

WILLOW—family Salicaceae
Populus—Aspen, Cottonwood, Poplar
Salix—Willow

Publication Format

Botanical Name

A species name is always a binomial, composed of a genus epithet (capitalized) and a species epithet (not capitalized). In this bulletin, both words are italicized.

e.g, *Acer platanoides* 'Crimson King'
(genus) (species) (cultivar or clone)

Deciduous trees are listed in alphabetical order by genera. The several species in a genus are then alphabetized as are cultivars of a given species.

A cultivar name is written in the language of the country where it was named; e.g., 'Crimson King' is an English name as are almost all of the cultivars herein listed. The 1961 International Code for Cultivated Plants, however, permits retention of latinized cultivar names which were published before January 1, 1959. Therefore, certain cultivars will be noted as having Latin-sounding names; e.g., *Betula pendula* 'Gracilis.' Cultivar names, including latinized cultivars, are always enclosed in single quotation marks and capitalized.

Certain plants are listed under more than one botanical name *(1)*, or in rare instances the botanical name has recently been changed *(2)*. In such cases a second name is listed as a synonym (syn.) in parentheses after the most recently accepted botanical name.

e.g., *(1) Acer platanoides* 'Crimson King'
(syn. *A. platanoides* 'Faassen's Red')
or
(2) Betula platyphylla
(syn. *B. mandshurica)*

In nature, not all plants of a botanical species are necessarily alike. Plants in nature that differ from the typical element of the species (and form a geographically significant population) are given a scientific (botanical) varietal name. A botanical variety is designated by var.; it is latinized, and in this publication, italicized. Like the species name, it is not capitalized.

e.g., *Morus alba* var. *tatarica*

Hybrid cultivars require long, cumbersome names if the complete parentage is recited in the botanical name. Therefore, in most cases, hybrids are named by listing the genus and the cultivar name only. The genus is preceded by the capital letter X which designates that it is a hybrid.

e.g., X *Malus* 'Radiant'

The actual parentage of the cultivar is usually listed, if known, in the "Descriptive Features" section.

Due to the large numbers of named crabapples, they are divided into several groups to make a more orderly discussion. Flower color is used as a basis of separation, and in the case of the "Purpurea" hybrids, foliage color.

Common Name

Definitive rules for writing the common names of plants do not exist. The importance of knowing the botanical name of a tree is therefore obvious when one realizes that a given tree may be listed under numerous common or trade names. This is further accentuated if you obtain nursery catalogs from different parts of the country. In this publication the *first letter* of each part of the common name is CAPITALIZED. An exception is when the common name is misleading and suggests that a tree is falsely related to a distinct group of woody plants. In such cases, this part of the name is *separated by a hyphen* and the latter part is *not* capitalized.

e.g., Russian-olive
Russian-olive is not related to the olive family
or
European Mountain-ash
European Mountain-ash is not a true ash.

Note that cultivar names are generally used as, or are at least a component of, the common name. Cultivar names which were latinized are seldom used as a component of the common name.

In certain instances, two common names are essentially equal in accepted usage. In such cases, a second name is listed as a synonym (syn.).

e.g., Variegated Norway Maple
(syn. Harlequin Maple)

Keeping up-to-date on plant names is an interesting and continuous job. The botanical and common names listed herein are, to the author's knowledge, current as of July 1, 1970.

ZONE RECOMMENDATIONS

The genetic makeup of a plant determines to some extent its hardiness and adaptability to a given site. For example, one plant may be killed if temperatures fall below -10° F. whereas another may survive at -35° F. The "environmental complex" to which a given tree is subjected plays a very important role. In preparing a so-called "hardiness" zone map for South Dakota, an effort was made to broaden its scope by recognizing other factors in addition to mere temperature extremes. Therefore, consideration was also given to differences in annual precipitation, humidity, wind and/or exposure, and soil conditions throughout the state. Admittedly, these factors can only be depicted on a macro-environment level in a zone map, because there are innumerable localized micro-climatic variations within a given woody plant zone.

A sizable number of the trees listed are of fairly recent origin, and time has not permitted thorough evaluation or performance studies. Therefore, certain zone recommendations may be on the liberal side, others somewhat conservative. For example, it is likely that certain trees could be grown in local micro-climatic situations within the Black Hills (Zone I-B), that would not survive in southeastern South Dakota (Zone I-A). Similarly, trees recommended only for Zone I may perform satisfactorily in protected sites of Zone II. Unless, however, one is very familiar with the performance of a specific tree or will be planting a tree in a highly favored and/or protected site, the suggested zone recommendation should be followed.

Many factors may contribute to the make-up of a more favorable tree planting site within a given zone. Some of these are as follows:

- Site protection (less exposure to desiccating winds).
- Higher humidity.
- Sufficient moisture supply, whether natural or artificially supplemented.
- Adequate drainage (ensures good aeration).
- Deep, fertile, non-droughty soils.
- Neutral to slightly acid soils and low salt concentration.
- Dependable winter snow cover as a tempering mulch.

With the above as background, four woody plant zones were established in South Dakota with the aid of annual precipitation and temperature charts, plus a soil association map, all prepared at South Dakota State University.

Zone I is the most favored zone for growing the greatest variety of trees. Due to the marked geographical separation between southeast South Dakota and the Black Hills region* and the fact that the Black Hills area is characterized by an abundance of micro-climatic variations, Zone I was subdivided into Zones I-A and I-B, respectively. Both areas

*An in-depth study of the Black Hills might possibly reveal that this region warrants division into several distinct woody plant zones. For example, the northern hills have a more stable temperature and precipitation pattern (including a more dependable snow cover) than the southern hills. The latter region tends to have greater fluctuations in temperature and is also considerably dryer. Portions of the central and eastern hills are intermediate in character. However, the many favorable micro-climatic areas and the marked reduction in exposure afforded throughout the Black Hills, make this area, as a whole, quite favorable for trees. Due to the complexity of this area and the lack of detailed information, the author believes that establishing additional woody plant zones could well be more confusing than enlightening at this time.

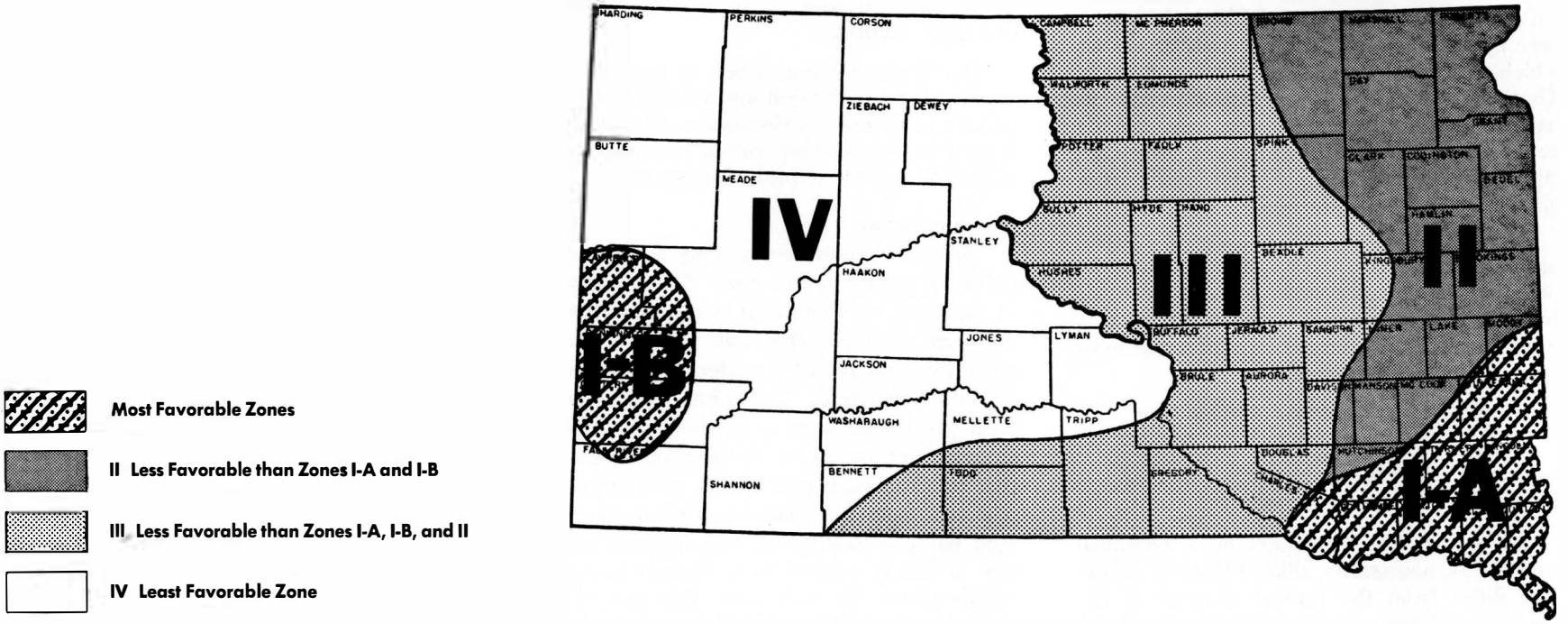


Figure 1. Woody plant zones in South Dakota.

have higher humidity and rainfall, more temporate winter temperatures as a whole, and a lesser degree of exposure than the other zones. Zone I-A has some of the better soil types (silty-clay-loams) for trees in the state. Annual precipitation ranges from 25 inches in the northern hills (Lead-Deadwood area) to only 16 inches along the extremities of the Black Hills. In southeast South Dakota annual precipitation ranges from 22 to 26 inches.

Zone II includes much of extreme eastern and northeastern South Dakota. This region does not vary markedly from Zone I-A. Winter temperatures are slightly more severe and the region is somewhat more exposed. A majority of the silty-clay-loam soils are deep and relatively fertile. Annual precipitation ranges from 19 to 23 inches.

Zone III includes central South Dakota east of the Missouri River and the extreme south-central portion of the state. Except for the southern portion of this zone, precipitation and undoubtedly humidity are considerably lower than in Zones I and II. This zone is also more exposed and is quite devoid of trees. Most of the soils are of a loamy texture and are able to support good tree growth if sufficient moisture is available. Soils are alkaline, however, in some areas. Annual precipitation ranges from 16 to 22 inches north to south.

Zone IV is the least favored zone for growing trees. The list of species performing satisfactorily is quite limited. The entire area is deficient in moisture and very exposed to desiccating winds. Summer temperatures also tend to be higher than in eastern South Dakota or in the Black Hills region. The soils are usually thin and vary from sandy-loams to silt to clay-loams. Many of the soils are formed from calcareous – and in certain instances, saline–sediments and consequently soils tend to be alkaline, or in places salty. Such conditions are not conducive to the growth of trees. Annual precipitation ranges from 13 to 18 inches.

Note: An asterisk ("*") placed after a zone number in the "Discussion of Deciduous Trees" below indicates that the respective tree is suggested only for favorable, protected sites or trial.

HEIGHT AND SPREAD IN FEET

Establishing an "absolute" height and spread for any given tree in South Dakota is obviously impossible because of tremendous variation in environmental conditions. Consequently, most authors of tree publications shy from including this information. However, an interested public seeking information is entitled to have at least some basic knowledge of the eventual shape and size of the product being purchased. Therefore, an approximate height and width is suggested for each tree discussed. Ultimate tree size in the different state zones will vary considerably, and in some cases markedly. Therefore, the height and spread listed in this publication is the expected size that a given tree will reach in Zone I—the most favored zone in the state. If one resides in Zones II, III or IV, the ultimate size —especially height—would usually be progressively less. From this, it can be generalized that if a specific clone of a tree species is vegetatively propagated and identical trees planted in all four zones, the trees planted in Zone IV would probably mature at the smallest stature. It should be recognized that a given tree may perform quite differently, even in the same zone, due to marked variations in microenvironments. Obviously, such variation, although clearly recognized, cannot always be accurately depicted.

In certain instances a second number is placed in parentheses, e.g., 5(10), under the "spread in feet" category. This number indiates the "eventual" spread of that tree. Some columnar or fastigiate trees, although very upright while young, tend to spread or become more vase-like with age. An increase in spread is encouraged by heavy fruit production.

As previously indicated, a considerable number of recently introduced cultivars are discussed. Although the exact height and spread of such trees remains to be seen, the liberty has been taken to suggest an approximate size, which may be revised as more information becomes available.

DESCRIPTIVE FEATURES

The primary objective of the "Descriptive Features" section is to list the main attributes, landscape characteristics, identifying features, and weaknesses of each tree.

To elaborate further, the following types of information are discussed although not necessarily in this order:

- Identification (morphological and color characteristics of bark, twigs, leaves, flowers, and fruits, including autumn coloration).
- Landscape uses (including use for shelter purposes).
- Disease and insect susceptibility.
- Water requirements.
- Soil requirements (including pH and iron chlorosis problems).
- Hardiness and adaptability.
- Form or growth habit.
- Rate of growth.
- Native habitat.
- Limited propagation, transplanting and maintenance information.
- Parentage of hybrid cultivars.
- Other miscellaneous information, e.g., Plant Patent (PP) number.

Several footnotes were added in the text to provide additional pertinent information or clarification. Footnotes, for example, are used to enumerate information which pertains to an entire group of trees, thus avoiding need for repetition.

Discussion of Deciduous Trees (pages 8-63)

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
Acer campestre	Hedge Maple	I-A*	15	10	Small, rounded Eurasian tree generally not sufficiently hardy in South Dakota due to winter die back. It has persisted only as a shrub at Brookings. The leathery leaves are typically 3-lobed, dark green and upon removal display a white milky sap like the Norway maple. Some leaves may have 5 rounded primary lobes. Fall color is yellowish at best. Not recommended except for trial in well protected sites.
Acer ginnala	Amur Maple	All	20	15	Very hardy, small rounded maple from northern Asia, well adapted in Northern Plains except for one problem: chlorosis in heavy, alkaline soils. Chlorosis symptoms often vary markedly within a seedling population. (See footnote No. 13). Leaves are 3-lobed, with center lobe longer and more prominent. Foliage is fairly fine textured, and brilliant scarlet autumn color is common. Mass plantings (in parks) would provide a real splash of autumn color. Fruits (samaras) on some trees become bright red in summer and contrast well with the green foliage. Variation in seed and autumn color, form, and susceptibility to chlorosis provide opportunity for selection. It is worthy of increased popularity for screening, shelter, and specimen purposes. Due to marked variation among seedlings to chlorosis susceptibility, it cannot be recommended for hedges. This maple has considerable drought tolerance, but is very susceptible to 2,4-D injury.
Acer glabrum	Rocky Mountain Maple	I-A*, I-B, II*	16	9	Small, upright western maple reportedly native to the Black Hills. It has glabrous, dark green, glossy leaves with 3-5 lobes. Fall color is yellow. Worthy of additional trial, but does not appear to be well adapted in the state.
Acer negundo	Box-elder	All	46	36	Native. Not suggested for landscape purposes and decreasingly so for shelter plantings. Weakwooded, irregular in growth habit, very susceptible to pests and 2,4-D injury and short lived. Due to its extreme hardiness and adaptability, however, it is given a "qualified" recommendation.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
Acer platanoides	Norway Maple	I-A, I-B* II*, III*	50	40	Excellent street, shade and specimen tree which adapts to varied soil conditions. Trees are well structured and oval to rounded in outline. Removal of leaves reveals a milky sap at base of petiole which aids in identifying this species and its cultivars. Leaves have 5 primary lobes.[1] Dense, dark green foliage plus shallow rooting nature of the trees makes turf growing difficult under the crown. Golden-yellow autumn color is an asset. Unfortunately, this tree is not fully hardy in much of the state.
Acer platanoides 'Cleveland'	Cleveland Norway Maple	I-A, I-B* II*, III*	45	25	Vigorous, oval, upright branched cultivar with dense and more sun tolerant foliage. Questionable in hardiness, but has performed well at the University of Minnesota landscape arboretum.
Acer platanoides 'Columnare'	Columnar Norway Maple	I*, II*, III*	35	18	A narrow form for boulevards, accent or formal effect. A clone named 'Olmsted' is even more columnar in habit. Questionable hardiness.
Acer platanoides 'Crimson King' (syn. *A. platanoides* 'Faassen's Red')	Crimson King Maple (syn. Faassen's Red Maple)	I*, II*, III*	45	30	Showy street, shade or specimen tree with rich purplish-red foliage all summer. Slow in growth and compact in form. Such almost indistinguishable selections as 'Faassen's Black' and 'Goldsworth Purple' are reported to be of lesser quality or at least not superior to 'Crimson King.' An improved selection, 'Royal Red,' is favored by some authorities. Continued evaluation is warranted. Not fully hardy; survival percentage is rather low.
Acer platanoides 'Drummondii' (syn. *A. platanoides* '*Harlequin*')	Variegated Norway Maple (syn. Harlequin Maple)	I*, II*, III*	35	25	Variegated clone with white-margined leaves. Foliage may scorch or brown in full sun. Lacks vigor and is a slow grower. Not reliably hardy.
Acer platanoides 'Emerald Queen'	Emerald Queen Norway Maple	I*, II*, III*	40	30	Straight-trunked cultivar with dark, glossy green, leathery foliage and a vigorous growth rate. Questionable hardiness.
Acer platanoides 'Globosum'	Globehead Norway Maple	I*, II*	20	18	Low growing globe-shaped clone grafted on 6- to 7-foot Norway maple understocks for use on streets with low utility lines. Questionable hardiness.

[1]The lowest pair of leaf lobes on such maple species as *A. platanoides, A. saccharum,* and *A. saccharinum* are usually underdeveloped or may even be lacking on some leaves. Thus for identification purposes, they are not counted as primary lobes.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
Acer platanoides 'Greenlace'	Greenlace Maple	I*, II*, III*	40	28	A 1969 introduction described as a distinctive cut-leaved clone with glossy green foliage followed by yellowish autumn color. Branching habit is rather upright. It merits early trial. This clone appears similar to the older botanical var. *palmatifidum.* (PP No. 2759.)
Acer platanoides 'Schwedleri'	Schwedler Maple	I-A, I-B* II*, III*	48	34	Well known attractive cultivar with purplish-red foliage which gradually changes to bronze-green and finally very dark green as summer progresses. Uses are similar to the species. Not fully hardy.
Acer platanoides 'Summershade'	Summershade Maple	I-A, I-B* II*, III*	50	30	Reputedly rapid in growth, heat resistant, and upright oval in form with a central leader. It has large, leathery dark green leaves. Questionable hardiness. (PP No. 1748.)
Acer rubrum	Red Maple	I*, II*	45	24	Symmetrical, rounded or sometimes pyramidal tree. Showy red blossoms in spring contrast with attractive gray bark. Leaves are indistinctly 3-lobed and noted for outstanding scarlet autumn color. Newer named pyramidal clones like 'Armstrong,' 'Gerling,' and 'Scanlon' and such rounded clones as 'Tilford' and 'Globosum' have not been evaluated in the state. Red maple and its cultivars cannot be recommended for planting in South Dakota because of apparent lack of moisture, soils which lack sufficient acidity, and other unknown factors. They seldom produce acceptable trees. Only northern selections should be planted. The cultivar 'Schlesingeri' was highly advertised in the Northern Plains as a rounded tree producing early red fall color. It has not been successful in most areas, however.
Acer saccharinum	Silver Maple	All, IV*	65	50	Native. Leaves have 3 primary lobes and are rather deeply cut. (See footnote No.1). Capable of developing into a stately vase-shaped shade or boulevard tree, but may become too large for small properties. Although criticized for structural weakness, proper pruning when young could partially alleviate this problem. Growth rate is rapid. Brilliant yellow autumn color is common. Also referred to as soft maple. Chlorosis in alkaline soils is a problem. (See footnote No. 13.)
Acer saccharinum 'Beebe'	Beebe Cutleaf Maple	All, IV*	45	30	Deeply cut-leaved clone with somewhat pendulous branches. Wider branch angle gives this tree more resistance to splitting V-crotches. A beautiful foliaged tree which needs to be better known.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
Acer saccharinum 'Blair'	Blair's Silver Maple	All, IV*	65	45	Relatively new, budded cultivar originating at Blair, Nebraska. Reputedly rapid in growth and stronger-limbed than the species.
Acer saccharinum 'Pyramidale'	Pyramidal Silver Maple	All, IV*	55	35	This new cultivar is described as a symmetrical tree with an upright branch habit, but not truly pyramidal in outline. It is propagated by budding and is worthy of evaluation.
Acer saccharinum 'Wieri' (syn. *A. saccharinum* 'Laciniatum')	Wier's Cutleaf Maple	All, IV*	60	45	Deeply cut leaves and somewhat pendulous branches characterize this attractive tree; otherwise similar to the species.
Acer saccharum	Sugar Maple	I, II, III*	60	30	Native. Dense, upright shade tree which should be grown more often in the Northern Plains. Young trees have thin bark and should be wrapped for several years after transplanting. Leaves have 3 primary lobes, but are broader and not as deeply cut as those of silver maple. (See footnote No. 1). Outstanding fall color ranges from yellow to red. Trees have good structural strength and excellent oval form, but not rapid growth. Sugar maples prefer heavier soils and cool, moist sites such as north-facing slopes. Mulching to conserve moisture and maintain a cooler soil is beneficial. Although native, avoid planting in open, windswept sites and areas of excess alkalinity. Also referred to as hard maple.
Acer saccharum 'Green Mountain'[2]	Green Mountain Maple	I*, II*, III*	40	20	Reportedly a cross between sugar maple and the closely related black maple[2] exhibiting hybrid vigor and orange to scarlet fall color. Leaves have a thicker waxy coating which makes this tree more resistant to scorch in dry, windy summer weather. It produces a uniform, oval crown. Performance in South Dakota unknown. For trial. (PP No. 2339.)
Acer saccharum 'Newton Sentry' (syn. *A. saccharum* 'Columnare')	Newton Sentry Maple	I*, II*	30	7	Very narrow, upright columnar form with central leader. Questionable adaptability but this clone has performed surprisingly well in early tests at SDSU.
Acer saccharum 'Temple's Upright' (syn. *A. saccharum* 'Monumentale')	Temple's Upright Maple	I*, II*	30	8	Narrow, upright columnar form, but lacking a central leader. Questionable performance.

[2]In this publication, *Acer nigrum* (Black Maple) is considered as essentially synonymous with *Acer saccharum*. Some authors consider the black maple as a variety of the sugar maple (*A. saccharum* var. *nigrum*). Certain authorities list the native maple to the outpost in Sieche Hollow State Park, near Sisseton, South Dakota, as the black maple. The differences between these two maples, however, are actually insignificant, and this is further accentuated by the fact that these maples hybridize freely. The socalled "black maple" is available in the nursery trade, as well as a densely upright selection named 'Slavin's Upright' which merits trial. Minor botanical differences which are supposed to characterize the black maple include: the lack of defined secondary basal leaf lobes, a more leathery leaf, drooping leaf habit, stipule-like appendages at base of petiole and more hairy buds.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
Acer spicatum	Mountain Maple	I*, II*	15	10	Small, shrubby, eastern tree apparently hardy, but not adapted to open, sunny or dry sites. Leaves are 3-lobed and light green turning to orange in autumn. Seeds (samaras) are reddish. For trial in partial shade or wooded sites. Prefers acid soils.
Acer tataricum	Tatarian Maple	All, IV*	20	15	Small hardy tree not as useful as the amur maple. Leaves are indistinctly 3-lobed, if at all. Fall color is yellow. Based on leaf form and other characteristics, some nursery stock resembles amur maple and appears to be of hybrid origin. The winged fruit (samaras) are usually less colorful than those of amur maple.
Acer truncatum	Purpleblow Maple	I*, II*	15	10	Graceful, small, rounded tree with deeply cut, 5-lobed bright green leaves. Newly unfolding leaves tend to be purplish. Excellent specimens grow at the Morden Experiment Station in Manitoba, Canada. Worthy of trial.
X Aesculus carnea	Red Horse-chestnut	I-A*	36	24	Hybrid derived from the Horse-chestnut x Red buckeye *(A. pavia).* Very ornamental with pink to red flower spikes. No autumn color of value and it lacks sufficient hardiness. For trial only.
X Aesculus carnea 'Briotii'	Ruby Horse-chestnut	I-A*	36	24	Cultivar with scarlet flowers larger than those of above. Since it is sterile there are no messy fruits. Palmate compound leaves are dark lustrous green. Trees are broadly oval in form. For trial only.
Aesculus glabra[3]	Ohio Buckeye	All, IV*	40	28	Hardy tree deserving of much greater popularity. Creamy, lime tinted flower spikes are ornamental and the palmate compound leaves which turn orange to red in the fall are outstanding. This is the hardiest and best adapted *Aesculus* for northern regions. Tree form is characterized by a handsome, rounded head. Due to its taproot system, nurserymen and homeowners unfortunately shy from handling and planting it. Homeowners often grow it from seed.
Aesculus hippocastanum[3]	Common Horse-chestnut	I*, II*, III*	40	26	Stately, massive street or specimen tree when grown successfully. Flowers are larger and whiter than those of Ohio buckeye. Buds are larger and usually sticky. Produces no fall color of value. This species is rare in the Northern Plains, and apparently somewhat less hardy than the Ohio Buckeye. It is not easily transplanted. Recommended for trial planting.

[3]Due to hybridization among such *Aesculus* species as *A. glabra, A. hippocastanum, A. octandra* (Sweet buckeye) and *A. pavia* (Red buckeye) considerable variation may occur in leaflet shape and number and also flower color of buckeye species planted in the northern plains. Many homeowners have been surprised to learn that their "horse-chestnut" is actually an Ohio buckeye or an *Aesculus* hybrid. A true horse-chestnut commonly has leaves with 7 doubly-serrated leaflets which are broadest at a point ⅓ to ¼ the distance from the tips. The Ohio buckeye, in comparison, generally has 5 finely-serrated leaflets which are narrower, more nearly elliptical, and broadest near the mid-point. Trees with intermediate leaf shapes, variable leaflet number, and a pink or red tint to the flowers suggest hybridization. Such specimens are commonly found and verifying their identity is difficult.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
Aesculus hippocastanum 'Baumannii'	Baumann Horse-chestnut	I*, II*, III*	40	25	A clone superior to the species primarily because of longer lasting double white, sterile flowers. No messy fruits (nuts) are produced. Reputedly has good leaf scorch resistance. Due to questionable hardiness, it can only be recommended for trial.
Ailanthus altissima	Tree of Heaven	I-A*	30	15	Extremely rampant growing, coarse textured tree that has become a weed-tree in eastern United States. Large pinnate compound leaves may have as many as two dozen leaflets. One advantage is that it tolerates city conditions very well. Where it is hardy, it produces an open spreading-to-rounded tree; but in most areas of South Dakota it will winterkill-back severely. A planting in Brookings actually produces 10 feet of new growth from ground level each year. Unreliable.
Alnus rugosa	Speckled Alder	I, II, III*	14	6	Small, shrubby tree native to the eastern Dakotas along water courses and other moist sites. Staminate and pistillate catkins are borne, and the latter—in which the seed is produced—resemble miniature pine cones as they persist on the branches over winter. Alders do not possess striking ornamental qualities and are seldom offered by nurseries. Recommended only for moist, shady sites. A lesser known species which merits trial is *A. glutinosa* (European alder). It is capable of growing in a more tree-like form.
Amelanchier alnifolia	Saskatoon Serviceberry (syn. Juneberry)	All	12	8	Native. Although usually a low growing shrubby plant, it can grow considerably taller than 12 feet under favorable conditions. For this reason it is included as a very small tree. Shrubs commonly sucker, but generally not in obnoxious manner. Although extremely variable in growth habit, it could be used considerably more for ornamental purposes. Under cultivation it commonly forms a dense, upright, rounded shrub with clean, attractive foliage. The short racemes of white flowers are showy in the spring. It also has value as a dual purpose tree since the blue-black berries make an excellent substitute for the blueberry fruit which can seldom be grown successfully in the Northern Plains. The fruit is higher in vitamin C content than blueberries and freezing quality is excellent. This shrub is hardy and well adapted in the Dakotas.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
Amelanchier canadensis (syn. *A. arborea*)	Shadblow Serviceberry (syn. Downy Serviceberry)	I*, II*, III*	20	10	Small tree widespread in the eastern United States and the earliest of the species to bloom. Only species with young leaves, grayish tomentose on both sides. Fruits are purplish and fall color is yellow to red. Confusion exists in identity and naming of the species. Not outstanding and suggested only for trial due to insufficient hardiness.
X Amelanchier grandiflora	Apple Serviceberry	I*, II*, III*	16	10	Natural hybrid between *A. laevis* and *A. canadensis*. Has larger white flowers than any other serviceberry and its buds and petals are initially tinged pink. The parent *A. laevis* (Allegheny serviceberry) is growing at Brookings and has proven hardy, but based on growth rate it does not appear to be completely adapted locally. The hybrid is suggested for trial purposes only.
Betula davurica	Dahurian Birch	I*, II*	35	20	Asian species with purplish-brown exfoliating bark. Reputedly grows in less favorable sites than river birch. Yellow autumn color. Merits trial.
Betula nigra	River Birch	I*, II*	40	16	Loosely pyramidal tree preferring moist sites protected from high winds. Often has multiple trunks in its native habitat. Reddish-brown, exfoliating bark marked by lenticels plus a graceful, semi-pendulous growth habit add up to a very distinctive specimen tree for naturalistic settings. Grows quite rapidly and generally free of disease. It is the preferable birch species in the eastern United States due to apparent resistance to damage by the bronze birch borer. Fall color is yellow. Although performance in most of South Dakota is very questionable, it is receiving renewed attention and is under evaluation. Iron chlorosis may be a problem.
Betula occidentalis (syn. *B. fontinalis*)	Water Birch	I, II, III*	30	16	Native species in the Black Hills. Shrubby birch characteristically growing in dense, clump-like fashion. This hardy western tree deserves more attention. Several test plants at Brookings are performing exceptionally well. Leaves are bright green, broad-ovate in shape, and color well in autumn. Fall color ranges to purplish-bronze; not only yellow as in most birches. Bark is purplish-brown and competes well with dogwoods for interest in the winter scene. Could be very effective for specimen or mass plantings in parks and other naturalistic settings with ample moisture. Low branching habit may render it useful as a screen. Merits wider use.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
Betula papyrifera	Paper Birch	I, II, III*	45	20	Native. Ornamental single or multi-trunked specimen tree with white, exfoliating bark. Excellent yellow fall color. Requires adequate moisture and wind protection. It is not infested by bronze birch borers as readily as the European species. Bark peeling instincts of the public discourage general planting of birches in parks.
Betula pendula	European White Birch	I, II, III*	40	20	Qualities and limitations of this tree are practically synonymous with those of paper birch. European white birch, however, tends to grow faster and its bark whitens earlier. This birch and its cultivars are very susceptible to damage by the bronze birch borer. Vivid yellow fall color is again a distinct landscape asset.
Betula pendula 'Fastigiata'	Columnar European Birch	I, II, III*	35	6(16)	Narrow, fastigiate form effective as accent in both the summer and winter scene. After 15-20 years it tends to lose narrow upright form and become more spreading.
Betula pendula 'Gracilis'	Cutleaf Weeping Birch	I, II, III*	40	20	Hardy, graceful pendulous tree difficult to surpass in ornamental beauty, if adequate space is allotted for display. Very popular specimen tree with attractive white bark and deeply cut, dark green ornamental leaves. Growth habit generally considered more formal than that of weeping willows. Due to borer attack, its use has declined somewhat.
Betula pendula 'Purpurea'	Purpleleaf Birch	I*, II*, III*	24	14	Cultivar with purplish-green foliage tending to mellow as summer progresses. Purplish foliage provides rich contrast against the chalky bark. Performance in South Dakota awaits evaluation. New clones are being named, including 'Scarlet Glory' and 'Purple Splendor.' These cultivars merit trial.
Betula pendula 'Tristis'	Slender European Birch	I, II, III*	40	20	Very attractive, round-headed, pendulous tree. Secondary limbs are the predominant weeping branches in the case of this clone as well as the clone 'Gracilis.' Leaves not as deeply cut as 'Gracilis' but instead closely resemble those of the species. Only occasionally encountered in landscape plantings, but truly ornamental and hardy.
Betula pendula 'Youngii'	Young's Weeping Birch	I, II, III*	18	15	Very graceful, extreme weeping form. Even primary branches are pendulous. Fully hardy, as evidenced by a beautiful specimen growing in Assiniboine Park in Winnipeg, Canada. Quite exotic, but could be used very effectively in naturalistic park settings as well as in more formal sites. As a backyard specimen it would be an excellent conversation piece, since it is rarely seen.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
Betula platyphylla (syn. *B. mandshurica)*	Manchurian Birch	I, II, III*	40	20	Oriental birch apparently hardy and reasonably well adapted to the Northern Plains. Very similar in appearance to *B. papyrifera* and *B. pendula*, but leaves tend to be more triangular. Several varieties are known. Attractive yellow fall color.
Betula populifolia	Gray Birch	I, II, III*	25	15	Smallest of northeastern United States tree birches. Tends to grow somewhat irregular in form, often at its best when multi-trunked. Bark is chalky or grayish white with blackish triangular markings primarily below points where lateral branches arise. Trunks are very elastic and resist breakage after severe bending from ice storms. Fall color is bright yellow. In native habitat it grows under variable soil and moisture conditions. Merits additional trial.
Carya ovata	Shagbark Hickory	I*, II*, III*	50	25	Upright, oval, slow growing tree. Shaggy bark flakes off in long strips which makes a picturesque specimen. Large buds covered by several loose scales are distinctive. Leaves are pinnately compound with usually five leaflets, the terminal leaflet being largest. Scattered trees are known to be performing satisfactorily in eastern South Dakota. For trial.
Catalpa speciosa	Northern Catalpa	I, II, III*	60	25	General growth habit is coarse as characterized by large, simple, heart-shaped leaves, long bean-like fruits, and thickened twigs. Whitish flowers are conspicuous and ornamental. Trees grow in rather upright or loosely pyramidal form. No fall color of value is produced. Sufficiently hardy in most of the state and will withstand rather dry soil conditions. When excessively dry, however, the foliage tends to wilt severely.
Celtis occidentalis	Common Hackberry	All	55	35	Native. Medium-large tree with characteristics closely parallel to those of American elm. Gray, corky ridged bark is distinctive. Autumn color is pale yellow. Unfortunately, plagued by several problems, including witches' broom (a rosette-like proliferation of twigs) and nipple gall (round unsightly galls which form on the lower leaf surface). Witches broom is believed to be caused by a bud mite, and nipple gall by a louse or psyllid. Also significant is that slow growth and lack of winter hardiness characterizes certain seed sources. New growth is very subject to spring frost injury. Rated, however, as acceptable vase-shaped tree and a substitute for American elm.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
Cercis canadensis	Eastern Redbud	I-A*, II*	16	12	Small tree native to eastern United States where popularly grown much as ornamental flowering crabs are in Plains States. Pink flowers are borne in pea-like clusters followed by production of pods typical of legume family. Leaves distinctly heart-shaped. Trees often irregular in shape. Lacks sufficient hardiness in most of South Dakota; however, several excellent specimens grow in Vermillion. Selection for seedling hardiness from such trees may be worthwhile. Fall color is yellowish. It cannot be recommended other than for trial.
Crataegus chlorosarca[1]	Blackfruit Hawthorn	All	12	8	Small tree somewhat pyramidal in habit. Leaves are dark green, triangular-ovate, 3- to 5-lobed. Fruits are black. Very hardy.
Crataegus chrysocarpa	Roundleaf Hawthorn	All	10	6	Native. Very small tree with ovoid to rhombic-shaped dark green leaves with 3 or 4 pairs of acute, doubly serrate lobes. Fruits vary from light orange to red. Hardy.
Crataegus crus-galli	Cockspur Hawthorn	All, III*, IV*	15	14	Very attractive, densely branched, small to medium tree. Branches tend to be layered and wide spreading, thorns are numerous. Leaves generally obovate, rounded at apex and dark glossy green. Attractive white flowers are followed by green fruits which turn red and persist into winter. Orange and scarlet fall color is common. Merits increased landscape use in border plantings or as a specimen tree. It has performed well at SDSU, being attractive in all seasons.
Crataegus crus-galli 'Inermis'	Thornless Cockspur Hawthorn	All, III*, IV*	15	14	Thornless cultivar worthy of early trial. Recommended as potential replacement for the species and reputedly rust-free.
Crataegus erythropoda	Cerro Hawthorn	All	10	6	Small, glossy-leaved upright hawthorn bearing chocolate-colored fruits. Under test presently at SDSU. Native to Wyoming and Colorado.
Crataegus mollis	Downy Hawthorn	All	20	16	Native, small tree with spreading, broad-topped crown. Attractive bright green leaves are broad-ovate and doubly serrate with 4 to 5 pairs of acute lobes. Thorns are sparse and stout. Flowers are white with red disk. Scarlet fruits, less than ½-inch in diameter, are showy. Reasonably attractive, usable small tree.

[1]The hawthorns have received little attention in the Northern Plains, although several species are native. They are susceptible to cedar apple rust and somewhat difficult to propagate and transplant. This, plus the fact that there is confusion in nomenclature, may account for the lack of interest in this genus. Hawthorns need thorough study and evaluation in South Dakota before adequate information is available and reliable recommendations can be made. Therefore, only a limited number of *Crataegus* are discussed in this publication. Other hawthorns which perhaps should be evaluated are: *C. arnoldiana,* X *C. lavallei, C. pedicellata, C. phaenopyrum, C. punctata, C. rivularis, C. viridis,* and *C. pinnatifida*. It is possible that one or more of these hawthorns may someday be recommended as superior to several of the species discussed.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
X *Crataegus mordenensis* 'Snowbird'	Snowbird Hawthorn	All	14	9	A 1968 introduction from the Morden Research Station in Manitoba, Canada. Second generation open pollinated seedling of X *C. mordenensis* 'Toba' characterized by double white flowers without a trace of pink. Growth habit is upright and it bears bright crimson fruits about ⅓-inch in diameter. Hardy. Merits early trial.
X *Crataegus mordenensis* 'Toba'	Toba Hawthorn	All	15	12	Earlier introduction from same source as above. It is a hybrid of *C. succulenta* x *C. oxyacantha* 'Paul's Scarlet.' Flowers and foliage resemble the latter, but it is hardier. Glossy lobed leaves, variable pink flowers and bright red fruits ½-inch in diameter. This attractive small tree merits increased planting in the state. 'Toba' and 'Paul's Scarlet' hawthorn, however, are damaged by fireblight in the Midwest.
Crataegus succulenta	Fleshy Hawthorn	All	10	7	Very small tree with reasonably glossy leaves, stout ascending branches and 2-inch thorns. Fruit is bright red. Under test at SDSU.
Elaeagnus angustifolia	Russian-olive	All	28	20	Very hardy small tree (or very large shrub) which adapts to varied soil and moisture conditions. Becoming naturalized in various locations throughout the Northern Plains. Growth rate quite rapid. Often used in shelter belts and some as an ornamental, but commonly requires shaping to produce an attractive specimen tree. In combination with purple-leaved plums, it makes an attractive accent due to narrow silvery-green leaves. Inconspicuous yellow flowers are very fragrant. Yellowish fruits are covered by silvery scales. Some fanciers appreciate the dark shredding bark and tendency to produce crooked trunks. Very usable species.
Fraxinus americana	White Ash	I-A*, II*	45	30	Common round-topped landscape tree in eastern United States, but not well adapted to dryer conditions of Northern Plains. For trial.
Fraxinus americana 'Autumn Purple'	Autumn Purple Ash	I-A*, II*	45	30	New white ash selection from a specimen growing on the University of Wisconsin campus at Madison. Seedless. Attractive green foliage takes on distinctive mahogany color in the fall. This attractive clone is now being evaluated in regional trials, including South Dakota. Has performed well in first year of trial.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
Fraxinus americana 'Rosehill'	Rosehill Ash	I-A*, II*	45	30	New seedless white ash for street, park or home planting. Reputedly displays dark green foliage, bronze-red fall color, rapid growth, disease resistance, and tolerance to rather alkaline soils. It also transplants readily. Unfortunately, trees established at SDSU have shown considerable twig dieback in the spring. Merits trial. (PP No. 2678.)
Fraxinus excelsior	European Ash	I-A*, II*, III*	48	28	Street or shade tree native to Europe. Lacks exceptional qualities, especially brilliant yellow fall color of our native green ash. A tree of considerable size is growing on the SDSU campus. Questionable value.
Fraxinus excelsior 'Rancho'	Roundhead Ash	I-A*, II*, III*	24	16	Small tree with rounded growth form. Reputedly adaptable to varying soil and climatic conditions. Early evaluations at SDSU suggest it will be sufficiently hardy. Size may permit eventual recommendation for use in rather narrow boulevards. For trial only.
Fraxinus mandshurica	Manchurian Ash	I*, II*, III*	45	25	Native to northeast Asia, this tree is similar to black ash, but reportedly has lower moisture requirements. Specimens are growing in the Dakotas and at Morden, Manitoba, Canada so it is sufficiently hardy for the area. Merits wider evaluation.
Fraxinus nigra	Black Ash	I-A*, II*	40	25	Species native into eastern edge of Northern Plains. Lacks drought tolerance and performance under cultivation is questionable. For trial only.
Fraxinus pennsylvanica[5]	Green Ash	All	50	25	Native. Very hardy, proven lawn, street and shelter tree easily transplanted. Increased interest in this tree evidenced by naming of new clones. Such new clones deserve thorough evaluation because 15%-20% of a green ash seedling population may be unsaleable due to growth irregularities. Brilliant yellow fall color is common. Adaptability to varying soil and climatic conditions needs no elaboration.

[5]The 1953 Checklist of Native and Naturalized Trees in the United States did not recognize the varietal designation (var. *lanceolata*)and transferred the name green ash to the species (previously designated red ash). This form is adhered to above. Certain authorities now list the green ash native to the Northern Plains as *F. pennsylvanica* var. *subintegerrima*. A green ash seedling originating at Kindred, North Dakota which is under evaluation in regional trials may be of future interest. It is described as being seedless and having lustrous, dark green leaves which take on a superior yellow fall color. The original 20-year-old tree is 30 feet tall and 20 feet wide.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
Fraxinus pennsylvanica 'Marshall's Seedless'	Marshall's Seedless Ash	All	48	25	Staminate (seedless) green ash. This relatively new clone has gained considerable popularity in the nursery trade. Foliage is an attractive, glossy green. Evaluations to date, however, must be qualified for several reasons. Rate of growth is only average. It grows rather late in fall and leaves tend to freeze-off, suggesting tree originated some distance south of our northern latitude. Good yellow autumn color typical of the species has not been produced in evaluations at SDSU. It tends to lack a central leader and consequently requires considerable pruning and maintenance to produce a quality, oval-shaped tree. Recent observations indicate terminal branch buds often fail to develop in spring. This phenomenon also occurs in certain other green ash, especially southern seed sources, and appears to be directly related to winter or frost hardiness considerations.
Fraxinus pennsylvanica 'Summit'	Summit Ash	All	50	25	Green ash, believed to be seedless, selected by a Stillwater, Minnesota nursery. Symmetrical and upright in form with central leader. Foliage is glossy green and yellow fall color is evident in early evaluations. This clone shows definite promise as a superior selection. It appears to be slightly finer textured than most green ash.
Fraxinus quadrangulata	Blue Ash	I-A*, II*	35	25	An ash, native to the northeastern United States, with 4-angled twigs, often slightly winged. Not well adapted to South Dakota and is not recommended.
Ginkgo biloba	Ginkgo (syn. Maidenhair Tree)	I-A*, II*	45	30	Large, stately street or specimen tree under favorable conditions. Seemingly pest free and resistant to city smog or pollution. Another asset is its clear yellow autumn color. Fruitless male cultivars including fastigiate and columnar forms are available. Recommended only for the trial hobbyist due to insufficient hardiness. Several trees are well established at the University of Minnesota landscape arboretum.
Gleditsia triacanthos	Common Honey-locust	All, IV*	50	30	Native. Medium sized, finely textured tree often producing coarse-branched thorns up to 4 inches in length along trunk or main limbs. Large brown fruit pods—nearly a foot in length—are messy. Leaves are bi-pinnately compound. Depending on seed source and environmental conditions, honey-locusts are not always adapted in South Dakota. Winter damage is common. Foliage appears late in spring and drops early in fall. One advantage of honey-locusts: fine-textured leaves create little mess in fall and need not be raked. Species type is seldom planted.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
Gleditsia triacanthos var. *inermis*[6]	Thornless Honey-locust	All, IV*	50	30	This botanical variety is naturally thornless and its numerous clones are popular street and yard trees. Revival of interest in this form occurred as Dutch elm disease devastated American elms throughout the eastern United States. Numerous cultivars were selected and patented, most of which are also podless. Golden yellow autumn color may develop. Fairly drought and alkaline tolerant. Due to fine textured leaves, honey-locusts are mediocre if desired specifically for shade.
Gleditsia triacanthos var. *inermis* 'Beatrice'	Beatrice Honey-locust	I-A, I-B* II*, III*	50	35	Fast growing, relatively wide-spreading tree often compared with American elm in shape. Originally selected at Beatrice, Neb. Thornless and podless. Not fully hardy except in southeast South Dakota. Availability in the nursery trade is scarce.
Gleditsia triacanthos var. *inermis* 'Imperial'	Imperial Honey-locust	I, II, III*	40	28	This clone has a more regular spreading, full-headed growth habit than some of the cultivars. Straight trunk with wide-angle branches helps to assure stronger crotches. Feathery foliage is dark green and dense. Performance has been good. A recommended cultivar. (PP No. 1605.)
Gleditsia triacanthos var. *inermis* 'Majestic'	Majestic Honey-locust	I-A, I-B* II*, III*	45	26	This clone is reportedly a compact and regularly branched tree. Mature foliage is dark green. Thornless and podless. Further hardiness evaluation needed. (PP No. 1534.)
Gleditsia triacanthos var. *inermis* (Mandan)	(Mandan) Honey-locust	All, IV*	45	28	Selected at the Mandan, N. D. experiment station and probably the hardiest honey-locust. No winter dieback in test plantings. Merits continued evaluation. Probably unavailable in nursery trade. This selection has not been officially named.
Gleditsia triacanthos var. *inermis* 'Maxwell'	Maxwell Honey-locust	I-A, I-B* II*, III*	40	28	Only limited information available concerning this clone. Thornless, podless, reportedly has good form for street and park use. Available commercially.
Gleditsia triacanthos var. *inermis* 'Moraine'	Moraine Honey-locust	I-A, I-B* II*, III*	50	35	Originating at Dayton, Ohio, this was one of the first cultivars to be selected; and still retains popularity. Although reputed to resemble American elm in form (vase-shaped), it is questionable whether the shape of any honey-locust is truly comparable to that of American elm. Thornless, podless, wide-spreading and fast growing. This tree, however, has disappointed many buyers due to winter dieback. Primarily recommended for the southeastern part of South Dakota. Several other clones are more highly recommended. (PP No. 836.)

[6]To date several thornless honey-locusts have not been adequately evaluated at SDSU. More time is needed before recommendations can be highly definitive due to considerable differences in hardiness or twig dieback. One favorable point is that honey-locusts transplant rather easily. Contrarily, leaf pod gall—caused by a midge—tends to hinder growth potential and mar attractiveness of the foliage.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
Gleditsia triacanthos var. *inermis* 'Rubylace'	Rubylace Honey-locust	I-A, I-B* II*, III*	30	20	Smaller, slower growing, ornamental cultivar characterized by purplish-red foliage which gradually turns to bronze-green as it matures. Performance in much of Zones II and III is very questionable. Merits further evaluation. (PP No. 2038.)
Gleditsia triacanthos var. *inermis* 'Shademaster'	Shademaster Honey-locust	I-A, I-B* II, III*	50	30	Highly advertised and already popular thornless clone with strong trunk and symmetrical, ascending branches. Reputedly rapid in growth with dark green, disease-resistant foliage retained somewhat later in fall. Transplants readily and shows complete hardiness in SDSU plantings. Apparently one of the better clones. (PP No. 1515.)
Gleditsia triacanthos var. *inermis* 'Skyline'	Skyline Honey-locust	I, II, III*	45	28	Stately, upright pyramidal-shaped tree, thornless and essentially podless. Foliage is dark green and slightly coarser textured than average honey-locust. Strong crotches and sturdy trunk characterize its structure. Rated high in SDSU evaluations. One of better and hardier clones selected. (PP No. 1619.)
Gleditsia triacanthos var. *inermis* 'Sunburst'	Sunburst Honey-locust	I-A, I-B* II*, III*	35	25	Ornamental cultivar with bright golden-yellow leaves which gradually turn green as they mature. Broadly pyramidal in shape. Definitely questionable in hardiness for northern portions of Zones II and III. (PP No. 1313.)
Gymnocladus dioicus	Kentucky Coffee-tree	I, II, III*	48	25	This dense, upright picturesque tree has been largely overlooked. It is reproducing itself naturally in Newton Hills State Park in southeastern South Dakota. Characterized by very large bi-pinnately-compound leaves and thick stubby twigs, dark scaly bark and coarse brown fruit pods which give it a sturdy, rustic winter appearance. Fall color is yellowish. A slow grower, but proven hardy in the eastern half of South Dakota. Reportedly tolerant to drought and relatively pest free. Merits wider acceptance.
Juglans cinerea	Butternut	I, II, III*	38	30	Medium-small tree, wide spreading in form. Somewhat coarse foliage appears late in spring and drops early in fall with autumn color of little value. Greenish fruits are oval or egg-shaped. A tree on the SDSU campus is fully hardy, but performance in the northern portion of Zones II and III is questionable.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
Juglans nigra	Black Walnut	I, II, III*	50	30	Native. Black walnut is typically upright in native growth habit, often producing a high, rounded crown. In full sun, however, it becomes more spreading in shape. Round greenish fruits are messy in lawn areas and the roots give off a substance (juglone) toxic to many plants. Probably best used in parks and wooded areas. Leaves often color to bright yellow in fall. Sometimes shows injury after especially trying winters, at least in northern South Dakota. Taprooted, therefore not easily transplanted.
Juglans nigra 'Laciniata'	Cutleaf Walnut	I, II*, III*	45	28	A clone superior to the species as an ornamental. Leaflets are deeply cut giving foliage a fine texture. Merits evaluation, but is seldom available from nurseries.
Koelreuteria paniculata	Goldenrain-tree	I-A*	15	12	One of the few trees which produces truly yellow flowers in early summer. Showy upright, pyramidal flower clusters followed by conspicuous yellowish-brown bladder-like seed pods. Leaves pinnately compound with 7 to 15 coarsely-toothed leaflets. Insufficient hardiness, not recommended. An 8-foot tree apparently is established in Union County State Park in southeastern South Dakota.
Larix decidua[7]	European Larch	All, III*, IV*	68	22	Very hardy, tall European tree. Most popularly grown larch in Europe and America. With age its excellent pyramidal shape may become more irregular. Bark on young branchlets is gray to yellowish and spurs are brownish-black. Older bark is brown and sheds in small plates. Brown cones about 1¼ inches long with round scales are very persistent. Golden yellow fall color is common. Excellent specimens throughout eastern South Dakota.
X Larix eurolepis	Dunkeld Larch	I*, II*	50	16	Natural hybrid of *L. decidua* x *L. kaempferi.* Broadly pyramidal in growth habit with shorter needles but denser foliage than the Japanese larch. Reportedly vigorous in growth, resistant to pests, and able to adapt to well drained soils. Yellow autumn color. For trial only; performance in South Dakota is unknown.

[7]Larch trees are deciduous conifers; that is, they bear cones but drop their leaves in the fall. Attractive yellow fall color is common to the group. Larch are characterized by an upright, pyramidal growth habit. Although they transplant readily if handled properly, larch tend to break dormancy early in spring and therefore nurseries shy from growing or handling them. Due to their soft, delicate green foliage, larches are exceptionally ornamental in the spring. A majority of the species is very hardy, but at the same time, a majority will not withstand or adapt to dry, wind swept sites which characterize central and western South Dakota. Larch grow quite rapidly and often display pendulous branchlets. Axillary buds on spurs give rise to tufts of needles which is a distinct identification aid.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
Larix gmelinii	Dahurian Larch	I*, II*, III*	48	16	Hardy species native to eastern Asia, including Siberia. Essentially unknown in South Dakota, but specimens are established at the Morden Experiment Station in Manitoba, Canada. With age horizontal branches can become rather wide spreading. Cones ½ to ¾ inch long. Needles drop rather late in the fall. For trial only.
Larix laricina	Eastern Larch (syn. Tamarack)	I*, II*, III*	45	16	Extremely hardy tree native in northern Minnesota and much of Canada. Usually smaller in stature than *L. decidua.* A moisture-loving tree seldom planted or offered by nurserymen. This tree will adapt, however, to well-drained soils. Leaves are light bluish-green. Gray to reddish-brown bark, thin and scaly. Cones are ½ to ¾ inch long. Merits trial.
Larix kaempferi (syn. *L. leptolepis)*	Japanese Larch	I*, II*	55	18	Most ornamental of larches and one of the fastest growing. Characterized by short horizontal branches and brown bark which scales off leaving reddish scars. Bark on young branchlets also reddish-brown. Dark brown spurs and cones average about 1 inch long. Young trees under evaluation at SDSU show darker, more distinctive fall color than several other species. Needles are held later in fall than either the eastern or European larch. Experimental shelterbelt plantings in eastern Nebraska have performed exceptionally well. Under test at SDSU and performance awaits further evaluation. For trial only.
Larix occidentalis	Western Larch	I*, II*	60	20	Species native to the northwestern states, including Montana, where it grows to heights of up to 200 feet. Young trees grow rapidly. Older bark becomes cinnamon-red in color and the clustered, pale green leaves tend to be slightly longer than most species. Cones average a little over an inch in length. It is presently under test at SDSU and performance awaits further evaluation. For trial only.
Larix siberica	Siberian Larch	I*, II*, III*	60	18	Hardy, slender, pyramidal tree with rather erect branches when young. Native to northern Russia and Siberia. Branchlets light yellowish-gray. Cones average about 1¼ inches in length. Under evaluation at SDSU and recommended for trial. Rare in the United States.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
Maackia amurensis	Amur Maackia	I, II, III*	25	17	Small tree primarily valued for branched, upright panicles of creamy-white flowers produced in mid-summer when few woody plants are in bloom. Bronzy, smooth bark on young trees is rather glossy and resembles mountain-ash bark. Has opposite, pinnate-compound leaves. This species is sufficiently hardy based on evaluations at SDSU. *Cladrastis lutea* (American yellowwood), another member of the legume family, somewhat resembles Amur maackia. Its white flowers, however, are produced in pendulous racemes and it is not sufficiently hardy. It might be given trial in Zone I-A.
MALUS–CRABAPPLE[8]					
LIGHT-PINK TO NEAR-WHITE FLOWERED CRABAPPLES					
X *Malus arnoldiana*	Arnold Crabapple	I*, II*, III*	14	9	Hybrid crab believed to be of *M. floribunda* (Japanese flowering crab) x *M. baccata* parentage. Originated as a chance seedling in the Arnold Arboretum, Jamaica Plain, Mass. Characterized by deep-red buds which open to large pinkish-white flowers, providing a rich contrast. Densely branched. Fruits are yellow with a red blush and slightly over ½-inch in diameter. Susceptible to apple scab and fireblight. Merits trial.
X *Malus* 'Ellen Gerhart'	Ellen Gerhart Crabapple	I*, II*, III*	14	10	Hybrid seedling resulting from a cross between X *M.* 'Van Eseltine' and *M. zumi* 'Calocarpa.' This relatively new crab of rounded form originated in Vincennes, Indiana. Single and semi-double blossoms are pale-pink. Bright-red ½-inch fruits are persistent, remaining attractive later than many crabs. The foliage is reported to be resistant to apple scab. Merits trail.
X *Malus* 'Katherine'	Katherine Crabapple	I-A*, II*	12	10	Hybrid derived from *M. halliana* (Hall crabapple) x *M. baccata* which originated in Rochester, N. Y. It was introduced in 1943 by the Arnold Arboretum, Jamaica Plain, Mass. Double, 2-inch diameter pinkish-white flowers are exceptionally large. Branches are slender and growth habit ultimately becomes open and spreading. Small ¼-inch fruits are dull-reddish or yellow and not showy. This crab has gained considerable popularity in the eastern states, but due to insufficient information concerning hardiness and performance in the Northern Plains it can only be suggested for trial.

[8]It is significant to note that the crabapple has been the most popular flowering tree in America since 1955. Justifiable reasons for such wide acceptance include: numerous varieties and growth forms available; a broad range of ornamental flower, fruit, and foliage colors; wide adaptability; ease of transplanting; relatively rapid growth rate; ability to flower at an early age; minimum care required; attractiveness of fruits to wildlife; and a rather long life expectancy. Due to the large number of named crabapples, they have been divided into several groups for a more orderly discussion. Flower color is used as the basis of separation. The "Purpurea" hybrids, however, are separated on the basis of their purplish foliage.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
X *Malus robusta*	Cherry Crabapple	I*, II*, III*	24	20	Diverse representation of hybrid crabs derived from *M. baccata* x *M. prunifolia* (Plumleaf crabapple). Early single flowers white or tinged with pink; fruits mostly cherry-red. Alternate year blooming is common. The cultivar 'Erecta' (Column cherry crabapple) has an upright habit while young. The cultivar 'Persicifolia' (Peachleaf crabapple) may be considered a dual purpose crab with very ornamental red fruits ¾-inch in diameter which persist on the tree into winter unless gathered for jelly. Peachleaf crabapple is reputedly very hardy and grows more like a large shrub than a tree. For those who prefer pinkish-white flowers, this crab might be tried. Relatively disease free.
X *Malus* 'White Candle'	White Candle Crabapple	I*, II*, III*	14	6	A 1970 introduction reported to be a cross between X *M.* 'Van Eseltine' and X *M.* 'Almey.' Leaves are glossy green and it produces semi-double pale pink flowers changing to white. Small red fruits are sparingly produced. It is reputed to grow very upright with few lateral branches. Due to its columnar form, early evaluation is merited.
X *Malus zumi* 'Calocarpa' (syn. *M. sieboldii* var. *zumi* 'Calocarpa')	Calocarpa Crabapple (syn. Redbud Crabapple)	I*, II*, III*	15	12	Parentage believed to be *M. baccata* var. *mandshurica* (Manchurian crab) x *M. sieboldii* (Toringo crab). Characterized by pink buds which open to near-white flowers followed by a profusion of ¼-inch bright red fruits. Scattered leaves may have lobes. Foliar disease problems seem to be minimal. Ornamental, extremely persistent winter fruit is an important asset, although it may bear alternately. It has a dense, somewhat pyramidal growth habit. Early evaluations at SDSU appear promising. Recommended for trial planting.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
PINK-FLOWERED CRABAPPLES					
X *Malus* 'Dorothea'	Dorothea Crabapple	I, II, III*	15	16	Hybrid derived from cross between *M. halliana 'Parkmanii'* (Parkman crabapple) and X *M. arnoldiana.* Introduced by the Arnold Arboretum, Jamaica Plain, Mass., in 1948. Highly rated in various locations. Based on early South Dakota evaluations, its spreading branch habit requires considerable pruning due to crossing, rubbing branches. Rose-opal buds open to large, semi-double pink flowers which tend not to fade. The ½-inch persistent fruits are yellow. It flowers annually beginning early in life and the foliage is scab resistant. A new open-pollinated seedling of this crab named 'Barbara Ann' was introduced by the Arnold Arboretum in 1966. It is taller, with semi-double purplish-pink flowers and dark reddish-purple ½-inch fruits. Both merit evaluation and trial planting.
Malus ioensis 'Plena'	Bechtel Crabapple	I, II*, III*	16	12	Fully double (over 30 petals) pink flowering crab discovered in a fence row in Illinois more than 100 years ago. It gained considerable popularity in the Midwest as well as farther east. Flowers measure over 2 inches across and resemble miniature roses. Tree form is distinctly round-headed. An outstanding specimen is growing in Brookings. It is densely branched and takes on attractive reddish shades each fall. Although very distinctive, it is not faultless. Disease susceptibility (including fireblight, apple scab and especially cedar-apple rust) is a problem. Also, green fruits slightly over 1 inch in diameter, have little ornamental value. Iowa crab *(M. ioensis)* is a native Midwest species, but has single, very light pink flowers and is definitely second rate in quality compared to its cultivars. All of these crabs have variably-lobed, rather coarse leaves markedly tomentose below. An asset is that flowers are produced in late May—almost 2 weeks later than the "Rosy-blooms."
Malus ioensis 'Nova' (syn. *M. ioensis* 'Plena Nova')	Nova Crabapple	I, II*, III*	15	10	Almost identical to and believed to be a sport of Bechtel crabapple except the flower color is deeper rose-pink. Introduced by the Morton Arboretum, Lisle, Illinois.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
X *Malus* 'Prince Georges'	Prince Georges Crabapple	I*, II*, III*	15	12	The parentage of this crab is questionable, but does involve *M. ioensis* or one of its cultivars. Introduced in 1943 by the Arnold Arboretum, Jamaica Plain, Mass. It resembles the Bechtel crab, but is more densely upright in growth habit. It also appears to have better resistance to diseases, including apple scab. With 50 petals per flower, it is the most double of all crabs. Flowers are rose-pink and 2 inches in diameter. It is apparently sterile (fruitless). Foliage is dark green, drops late in fall, and may display attractive fall color. A similar cultivar, named 'Prairie Rose' is reported to have a superior growth habit. For trial.
X *Malus* 'Van Eseltine'	Van Eseltine Crabapple	I*, II*	15	5(10)	Highly advertised and popularized east of the northern plains. Originated in New York and introduced in 1941. Parentage involves X *M. arnoldiana* and *M. spectabilis* 'Plena' (Chinese double-flowering crab). Reportedly superior to either parent. Produces double rose-pink flowers and yellow to red-blushed ¾-inch fruits. Alternate bearer. It has a narrow, upright growth habit, but tends to spread to a narrow vase-shape as it matures. Fire-blight susceptibility is reported to be a problem. It is not as hardy as the "Rosyblooms." A new seedling selection of X *M.* 'Van Eseltine' has been named 'Coralburst.' It produces small double-pink flowers, but due to a small, compact growth habit it might be best classified as a shrub.
"PURPUREA" HYBRIDS AND RELATED PURPLE-LEAVED CRABAPPLES[9]					
X *Malus* 'Crimson Brilliant'	Crimson Brilliant Crabapple	I, II, III*	15	12	Originated in Des Moines, Ia. and introduced in 1952 as an improved seedling of Jay Darling crab. Foliage is dark purple and the flowers bright crimson with small white star in center. This is a divergence from the "Purpurea" hybrids. (See footnote No. 10.) Some flowers are semi-double. Since the fruits are dark purplish-red and ¾ inch in diameter, they are not as ornamental as some crabs. It develops into a small, shrubby crab. Reputedly hardy, but susceptible to apple scab. Merits evaluation. (PP No. 939.)

[9]Purple crabapple (X *Malus purpurea)* was derived by crossing the Redvein crab with the Carmine crab (X *M. atrosanguinea).* Crabs with Purple crabapple parentage are becoming known as the "Purpurea" hybrids. These crabs are characterized by purplish foliage, which is their primary ornamental asset. The purplish-rose flowers are very ornamental but generally fade and are somewhat masked by the new reddish-purple foliage. The purplish fruits can hardly compete with the brighter red, persistent fruits which characterize a majority of the "Rosyblooms." The "Purpurea" hybrids do not possess the extreme hardiness of the "Rosyblooms" since the Siberian crab is not involved in the parentage of a majority of the group. However, the purple foliaged crabs merit wider evaluation and trial. Several of these crabs are or will undoubtedly become worthy additions to the recommended list of small landscape trees for all but the more difficult growing areas in South Dakota. The Purple crabapple (X *M. purpurea)* is inferior to most of the hybrid "Purpurea" cultivars becoming available. Although parentage varies considerably, all crabs listed in this group are characterized by purplish foliage of varying intensity.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
X *Malus* 'Evelyn'	Evelyn Crabapple	I, II, III*	15	10	Hybrid crabapple which originated at Des Moines, Ia., and named in 1953. Believed to be a cross between *M. ioensis* (Iowa Crab) and X *M. purpurea*. Compared to the Iowa crab, this hybrid has purple leaves, 1¼-inch red fruits, and single, deeper pink blossoms produced a week earlier. Upright-oval in growth habit. Foliage turns bronze-green in summer followed by variable shades of purple through orange in fall. Reputedly resistant to apple scab, but moderately susceptible to fireblight. The oversized fruits are not persistent. Worthy of wider trial.
X Malus 'Irene'	Irene Crabapple	I, II, III*	12	14	Another improved seedling of Jay Darling crab originating at Des Moines, Ia., and introduced in 1951. (See footnote No. 10.) It has purplish foliage and large single red to purple-red flowers are produced in abundance. Distinguishable from the Crimson Brilliant crab since the latter is larger and produces some semi-double flowers. Irene crab produces purple-red fruits about ¾ inch in diameter. Susceptible to apple scab. Merits trial.
X *Malus* 'Liset'	Liset Crabapple	I, II, III*	15	10	Originated in Holland as cross between Lemoine crab and *M. sieboldii* (Toringo crab). Resembles Lemoine crab in many respects, but flowers at earlier age and bears brighter red ½-inch fruits. Purplish-red flowers change to a bright pink and glossy purplish leaves change to dark bronze-green as the season progresses. South Dakota test plantings show some susceptibility to fireblight.
X Malus 'Oekonomierat Echtermeyer'	Echtermeyer Crabapple (syn. Pink Weeper Crabapple)	I*, II*, III*	10	6	Originated in Germany and involves the Redvein crab in its parentage. Produces purple foliage which gradually changes to bronze-green. Leaves are coarsely and irregularly toothed. Best grown as a specimen where its open, graceful, pendulous branch habit can be displayed. Red flower buds open to pink blossoms and fruits are deep purple. This weeper has not been evaluated at SDSU, but has performed satisfactorily at the University of Minnesota landscape arboretum. Reportedly susceptible to apple scab.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
X *Malus* 'Purple Wave'	Purple Wave Crabapple	I, II, III*	12	14	This attractive crab originated in Des Moines, Ia., as a seedling of Jay Darling crab and was introduced in 1953. (See footnote No. 10.) Distinguished from other purple foliaged crabs by the large, exceedingly dark purple to purple-bronze leaves. New foliage has a distinct reddish tint at first. Bright red flowers and ½-inch purple-red fruits tend to be masked by the foliage color. Growth form is quite spreading. As an accent plant, this ornamental deserves wider acceptance. Bronze foliage tones tend to accentuate in the fall. Susceptible to apple scab.
X *Malus purpurea* 'Eleyi'[10]	Eley Crabapple	I, II, III*	16	14	Parentage of this crab is questionable, but generally listed as one of the "Purpurea" hybrids. Considerable confusion has existed in naming.[10] Characterized by attractive purplish to bronze foliage, it produces a round-crowned tree and flowers when very young. Flowers fade from purplish-red to pink. The 1-inch diameter purplish-red fruits are larger than desirable for an ornamental crab. Susceptible to apple scab and tends to bear alternately.
X *Malus purpurea* 'Lemoinei'	Lemoine Crabapple	I, II, III*	18	16	Hybrid originating in France. Authorities usually rate this upright crab as superior to several other "Purpurea" hybrids, e.g., X *M. purpurea* '*Aldenhamensis*' (Aldenham crab). Semi-double flowers are very deep rose or bright purplish-red and highly ornamental. Flowers fade slower than several related crabs. It is resistant to apple scab and bears annually. The ⅝-inch purplish-red fruits lack showiness of the "Rosyblooms." Leaves tend to be lobed and purplish, turning deep green or bronze-green later in the season. Merits trial.
X *Malus* 'Redglobe'	Redglobe Crabapple	All, IV*	16	14	Relatively new seedling of Red Splendor crab selected by a Fertile, Minn., nurseryman for its attractive purplish-red foliage, dark red flowers, and most importantly, a natural globe shape. Fully hardy and recommended for trial planting in South Dakota.

[10]Eley crabapple has often been listed as being synonymous with the Jay Darling crab. More recently, certain authorities list these crabapples as two distinct hybrids with a different parentage. Eley crab is believed to be of "Purpurea" hybrid parentage, whereas Jay Darling Crab is reputed to be of "Rosybloom" hybrid parentage. With this in mind, Jay Darling crab is not listed as a synonym for Eley crab in this publication. Such crabapple cultivars as Crimson Brilliant, Irene and Purple Wave are believed to be open pollinated seedling selections of Jay Darling crab, rather than Eley crab.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
X *Malus* 'Red Silver'	Red Silver Crabapple	All, IV*	22	18	Excellent ornamental crab introduced at SDSU in 1928, believed to be of same parentage as "Rosybloom" group. Purple foliage is coated by a silver-like sheen due to tiny whitish hairs. Unfortunately, this tends to impart a dull appearance to trees viewed from a distance. In bloom, the crimson flowers are hard to surpass in ornamental beauty. Half- to ¾-inch dark purple-red fruits are produced. Merits wider acceptance. Group plantings of 3 or 5 in such sites as parks would be effective. Susceptible to apple scab.
X *Malus* 'Royalty'	Royalty Crabapple	All	14	10	Hardy 1958 introduction from Sutherland, Saskatchewan, Canada, characterized by thick textured, lustrous purplish-red leaves. Its rich, glossy foliage is second to none as a purple-leaved accent plant. Rather high susceptibility to fireblight in plantings at SDSU results in recommendation with reservations. Flowers and fruits are purplish-red but tend to be masked by darker foliage. Growth habit is fairly compact and moderately upright. An earlier introduction from whose seedlings Royalty was selected is named Sutherland crab. It has similar foliage, flowers and fruits. Royalty and Sutherland crabs originated from open pollinated "Rosybloom" seedlings.
"ROSYBLOOM" CRABAPPLES[11]					
X *Malus* 'Almey'	Almey Crabapple	All	20	18	A 1945 introduction of Morden Experiment Station in Manitoba, Canada. Branching habit is somewhat open. Trees begin flowering at an early age. Deep purplish-red buds open, in clusters of 5 to 7, to a deep rose color accentuated by white petal bases. Small, ornamental crimson fruits persist on branches into winter. Although a striking specimen tree, it shows susceptibility to apple scab.
X *Malus* 'Arctic Dawn'	Arctic Dawn Crabapple	All	20	17	Introduced by the Canadian Research Station, Beaverlodge, Alberta in 1952. It has failed to gain popularity. Pink flowers fade badly but are borne profusely each year followed by small, red crabapples. Extremely hardy. Under evaluation in South Dakota.

[11]"Rosybloom" appropriately designates all hybrid crabapples derived from Redvein crabapple *(Malus pumila* var. *niedzwetzkyana)* x Siberian crabapple *(M. baccata)*. Some authorities designate this hybrid as X *M. adstringens*. The term "Rosybloom" is not a cultivar name, but rather designates a distinct race of crabapples. The Redvein crab is significant for its contribution of the reddish-purple pigment so important to the pink to deep rose-red flowering "Rosyblooms." The Siberian crab is important for its contribution of hardiness so essential in the Northern Plains. "Rosybloom" crabs make one of the most outstanding groups of flowering woody ornamentals in the Northern Plains. Rosyblooms are known and respected nationally and internationally. Many "Rosyblooms" have been named and experiment stations are thoroughly evaluating them so that cultivars with lesser quality and disease resistance might be removed from recommended varietal lists. This publication, however, lists a considerable number of the "Rosyblooms." With the introduction of the Hopa crabapple, the late N. E. Hansen of SDSU was primarily responsible for initial breeding efforts which resulted in production of the noted "Rosyblooms." In addition to ornamental landscape use, seedling "Rosyblooms" have been tried on a limited scale for shelterbelt plantings. This use might be more thoroughly investigated, for they certainly do not lack hardiness. They are recommended for planting in all zones, recognizing, however, that in droughty, wind swept exposures, e.g., zone IV, the performance of some may be poor at best.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
X *Malus* 'Garry'	Garry Crabapple	All	20	14	A 1963 introduction of the Morden Experiment Station in Manitoba, Canada. Upright in growth habit and somewhat more densely and finely branched than Almey crab. Leaves tend to be bronzy-red in spring and fall, medium green with a bronzy cast during summer. Deep maroon buds open to rose, fading to clear pink. Glossy red fruits ½-inch in diameter remain firm and colorful until spring, unless eaten by birds. Presently under evaluation at SDSU.
X *Malus* 'Hopa'	Hopa Crabapple	All	25	20	First "Rosybloom" to become truly popular. Although Hopa crab is still a popular seller, it is declining in use because of definite inferiority ornamentally to some newer introductions. Flower color is lavender-pink which fades rather rapidly to a dingy pinkish-gray. Dull reddish ¾- to 1-inch fruits are not persistent and therefore messy in the fall. Trees become fairly large and spreading with age and are a common sight in Northern Plains plantings. It is susceptible to apple scab. The Hopa crab has proven successful for planting in restrictive curb excavations. It apparently withstands conditions such as minimum amount of soil area, heat and glare reflected from cement or pavement and city air pollution. This crab has certainly played a role as a forerunner in popularizing flowering woody ornamentals, especially crabapples, in North-Central States. It was introduced at SDSU in 1920 by N. E. Hansen.
X *Malus* 'Indian Magic'	Indian Magic Crabapple	I, II, III*	14	10	Included with "Rosybloom" group due to rosy flower color and "related parentage." A hybrid seedling resulting from crossing X *M.* 'Almey' with X *M. zumi* 'Calocarpa.' Introduced in 1969, originating at Vincennes, Ind. Medium sized, rounded crab with scab resistant foliage. Flowers are rosy-red and small, elongated fruits are bright red changing to golden orange and finally to glossy brown as they persist in winter. Fall fruit display is a definite asset. Should prove hardy and is recommended for trial planting.
X *Malus* 'Kelsey'	Kelsey Crabapple	All	18	12	Hardy, 1970, semi-double "Rosybloom" introduction developed at the Morden Experiment Station in Manitoba, Canada. The original tree is upright in habit with slender branches. Rather small leaves are bright red when young, but mature to green. Blooming annually, flowers are purplish-red with 10-16 broad petals and a white marking at each petal base. Dark red fruits are ¾- to 1-inch in diameter, larger than desirable. This first double-flowered "Rosybloom" merits early trial.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
X *Malus* 'Kibele'	Kibele Crabapple	I, II, III*	10	14	A new "Rosybloom" crabapple originating at Springfield, Ill. Reportedly spreading and semi-dwarf in growth habit. Spring foliage is quite purplish, changing to bronzy-green. An important feature is showy, bright red flowers. Fruits are small and dark purple. Currently under evaluation regionally, including SDSU. It will undoubtedly prove hardy and merits early trial planting. Reportedly disease free.
X *Malus* 'Patricia'	Patricia Crabapple	All	18	15	Dual purpose crabapple selected from a group of Hopa crab seedlings at Des Moines, Ia., and named in 1953. Has larger, more deeply tinted blossoms, better quality foliage and more compact or sturdy growth habit than Hopa. Dark red fruits approach 2 inches in diameter, reputedly of excellent quality. Scarcely known but merits planting by those who desire a tree with both fruit and ornamental value. Susceptible to apple scab.
X *Malus* 'Pink Cascade'	Pink Cascade Crabapple	All	15	7	Hardy 1969 introduction from Sutherland, Saskatchewan, Canada, selected from seedlings at the Morden Experiment Station. Main attribute is narrow growth habit and pendulous branches. Blooms freely in spring and flowers are pink. Half-inch bright red fruits are persistent into fall. This narrow, weeping ornamental merits early trial.
X *Malus* 'Pink Spires'	Pink Spires Crabapple	All	14	7	This hardy tree, named in 1964, is fastigiate in growth habit and originated in Saskatoon, Saskatchewan, Canada. Very floriferous with pink to rosy-pink flowers followed by purplish-red fruits. Purplish-red spring foliage turns to bronze-green and in fall a coppery orange cast often develops. This attractive upright branched crabapple merits a high recommendation. Definitely superior to the upright cultivar 'Strathmore' in evaluations at several locations. Essentially disease free.
X *Malus* 'Pink Splendor'	Pink Splendor Crabapple	All	16	14	Hardy 1970 seedling selection of Red Splendor crab made by a Fertile, Minnesota, nurseryman. It flowers slightly later, and the season of bloom is longer than that of its parent. Reddish buds open pink, changing to light pink giving the tree an attractive three-fold color effect. Worthy of trial.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
X *Malus* 'Radiant'	Radiant Crabapple	All	16	14	Introduced by the University of Minnesota in 1958, this hardy cultivar is now one of the more popular "Rosyblooms." This small "tailored" tree has a dense oval to rounded head and bears high quality rosy flowers in abundance. Young leaves have reddish cast changing to dark green. Highly resistant to cedar-apple rust and fireblight. Moderate resistance to apple scab. Bright red, ½-inch persistent fruits increase its value ornamentally. Popular specimen tree and used in some areas as a boulevard tree. Exceptionally beautiful ornamental when in flower.
X *Malus* 'Red Splendor'	Red Splendor Crabapple	All	18	15	Excellent cultivar, originating as a Red Silver crabapple seedling, selected by a Fertile, Minn., nurseryman. Informal in growth habit. Dark red buds open to bright pink flowers which tend to fade especially in warm weather, although this fault is not peculiar only to this selection. An important advantage is persistence of small scarlet fruits which ornament the tree all winter unless eaten by birds. Rated highly in crabapple lists throughout the United States. Reported to be essentially disease free. Seedlings of this crab are now being planted, at least in Minnesota, for shelter and wildlife plantings.
X *Malus* 'Rudolph'	Rudolph Crabapple	All	18	14	Very attractive, hardy 1954 introduction from Dropmore, Manitoba, Canada. Its frost-hardy buds are deeper red than those of Almey crab and open to large cup-shaped, bright pink blooms which contrast markedly with the dark buds. Flowers later fade to near white. Yellow fruits are overlaid with red giving an orange tinge for a short period. Currently under evaluation at SDSU.
X *Malus* 'Selkirk'	Selkirk Crabapple	All	25	20	A 1963 introduction of the Morden Experiment Station in Manitoba, Canada. Fairly large "Rosybloom" of rounded form. Foliage reddish in spring changing to bronze-green. Bright rosy flowers tend to be clustered at ends of branches producing a distinctive effect. Bright red ¾-inch fruits are showy until severe frost, usually dropping in November. This promising crab is receiving increased attention in the United States and is under evaluation at SDSU. It shows only slight susceptibility to apple scab and fireblight.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
X *Malus* 'Sparkler'	Sparkler Crabapple	All	12	16	A 1969 introduction from the University of Minnesota characterized by a lower and more spreading growth habit than most crabapples. New foliage opens with reddish cast changing to deep bronze-green. Reputed to have fairly good disease resistance. Dark-pink flowers hold color quite well and it flowers at an early age. Purplish-red fruits are less than ½-inch in diameter. Chief characteristic is its semi-horizontal growth form. Under test at SDSU.
X *Malus* 'Strathmore'	Strathmore Crabapple	All	18	9	Distinctly upright in growth habit, this Canadian cultivar is not nearly as narrow as the columnar Siberian crab. Lacks in flower and fruit quality with lavender-rose flowers which fade quickly and purplish-red ¾-inch fruits. Foliage shows considerable purplish pigment. Susceptible to fireblight, apple scab, and a leaf-spot problem in trials at SDSU. Except for its excellent upright form, this cultivar is definitely inferior to several improved "Rosyblooms."
X *Malus* 'Sundog'	Sundog Crabapple	All	24	7(15)	A 1947 introduction of the Morden Experiment Station in Manitoba, Canada. A compact, fastigiate tree while young, but as it matures it takes on a more spreading form. Reddish buds open to pink blossoms which unfortunately display a marked tendency to fade. Dark green, glossy foliage. Reddish 1-inch diameter fruits are larger than desirable. Under evaluation at SDSU.
X *Malus* 'Vanguard'	Vanguard Crabapple	All	14	5(10)	A 1963 introduction from the University of Minnesota. Young trees rather fastigiate, but become typically vase-shaped as they mature. Reputed to be semi-dwarf or at least slow in growth rate. Bright rosy-pink flowers are produced on very young trees. New foliage typically displays purplish pigment much of which is lost as the leaves mature. Red fruits are small, attractive and persist into winter. A worthy member of the "Rosybloom" group.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
WHITE-FLOWERED CRABAPPLES					
Malus baccata	Siberian Crabapple	All	30	26	One of the hardiest *Malus* species. Important in hybridizing and one of the parents of the popular "Rosybloom" crabs. Serves as a rootstock for fruiting and ornamental apples and crabs. Produces profusion of fragrant white flowers in early spring. Persistent fruits are less than ½-inch in diameter, variably yellow to red. This tree is capable of becoming one of the larger crabapples and has an informal, densely branched growth habit. It has been grown in shelterbelts but unfortunately such use has never increased. Relatively disease free.
Malus baccata 'Columnaris'	Columnar Siberian Crabapple	All	18	4(8)	Undoubtedly the most fastigiate crab named to date. Introduced by the Arnold Arboretum, Jamaica Plain, Mass., in 1940. Distinct vertical branch habit makes it a choice accent plant; although with age, branches may spread somewhat. Fruits are yellow and borne annually. Unfortunately, extreme susceptibility to fireblight precludes its general recommendation.
Malus baccata 'Jackii'	Jack Crabapple (syn. Korean Crabapple)	All	20	16	Introduced by the Arnold Arboretum, Jamaica Plain, Mass. Probably the best but least known cultivar of this species for landscape use. Flowers tend to be larger, borne on long stems. Persistent, glossy-red fruits are ⅓- to ½-inch in diameter. A vigorous, upright oval tree with good density and clean, attractive green foliage. Essentially disease free.
Malus baccata 'Manchu'	Manchu Crabapple	All	22	18	Extremely hardy crab grown from seed collected near Harbin, Manchuria. Choice rootstock on which to graft northern apple and ornamental crabapple varieties. It is the earliest crabapple to bloom, producing white flowers and persistent fruits which are reddish and exceptionally small or pealike. A vigorous grower and scaffold branches form at wide angles. It has good resistance to fireblight and apple scab. The original tree is still growing in the McCrory Gardens at SDSU. Worthy of acceptance for shelter type plantings. It is a seedling of the botanical var. *mandshurica* (Manchurian crabapple) but the Manchu has even smaller fruits.
X *Malus* 'Beauty'	Beauty Crabapple	All	20	12	Attractive upright dual purpose crab introduced in 1919 by the late N. E. Hansen of SDSU. Originated as a seedling from X *M. robusta* seed imported from Russia. Because of hardiness and freedom from diseases, (including apple scab and fireblight) it merits more attention. White flowers are 1¾-inches in diameter. One-inch diameter bright red fruits are good for jelly. Has a wide angle, scaffold branching habit.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
X *Malus* 'Dolgo'	Dolgo Crabapple	All	24	18	A dual purpose crab introduced in 1917 by the late N. E. Hansen of SDSU. It originated as an open pollinated seedling from similar parentage as X M. 'Beauty.' Popular orchard crab and brilliant red 1¼-inch fruits make it exceptionally ornamental. Egg-shaped fruits ripen by September 1 and make excellent jelly and crabapple sauce. Fruit flesh is yellow-white. Foliage quality is excellent and growth habit broadly-oval. Pink buds open to large white blossoms. Very hardy and resistant to apple scab. Fruits do not persist so are of no winter ornamental value. A vigorous tree with a well-spaced, neat, scaffold branch habit.
X *Malus* 'Flame'	Flame Crabapple	All	18	16	A very hardy 1934 introduction by the University of Minnesota. Characterized by a dense, rounded form. Pinkish buds open to single white flowers, a color sequence not represented by its cultivar name. The profusion of bloom and the ¾-inch persistent cherry-red fruits combine to make it ornamental. Foliage is resistant to fireblight and cedar-apple rust. Alternate bearer.
X *Malus* 'Red Jade'	Red Jade Crabapple	I*, II*	12	9	This crabapple, introduced in 1953, by the Brooklyn Botanic Garden is highly advertised and this is the main reason it is listed here. Pendulous branches bear small, single white flowers followed by ½-inch bright red, rather persistent fruits. Early tests at SDSU have not been encouraging. Trees appear to lack vigor although part of the problem may be due to winter rabbit injury. Small trees have shown susceptibility to fireblight. Probably best grown as a specimen ornamental. For trial only. (PP No. 1497.)
X *Malus* 'Snowdrift'	Snowdrift Crabapple	I, II, III*	16	12	A new flowering crab of unknown parentage selected at Painesville, Ohio. Pink flower buds open to single white flowers. The ⅜-inch tiny fruits color to glossy orange-red. Tree form is broadly-oval. Reputed to be relatively disease free. Although evaluations are not complete, early tests suggest sufficient hardiness. Recommended for trial plantings.
X *Malus* 'Spring Snow'	Spring Snow Crabapple	All*	14	12	A sterile (fruitless) white flowering crab originating at Parkside, Saskatchewan, Canada in 1966 in a row of Dolgo crab seedlings. It is reported to produce a shapely, rounded tree with attractive green foliage relatively free of fireblight. Merits early trial. Hardy. (PP No. 2667.)

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
Malus sieboldii 'White Angel'	White Angel Crabapple	I-A*, II*	14	12	A 1962 introduction selected from a row of *M. sieboldii* (Toringo crab) seedlings at Youngstown, Ohio. Presently under evaluation in regional trials, including SDSU. Single white blossoms with large petals appear before the leaves. Cherry-red fruits persist into winter. Grows quite fast and has good resistance to apple scab and fireblight. Bronzy bark color is also a feature. *M. sieboldii* 'Fuji,' a new cultivar, is being distributed by the National Arboretum, Washington, D. C. It has 1¼-inch double white flowers and forms a broad round-headed tree. Off-yellow ½-inch fruits are not showy. Hardiness ratings for these crabs await further evaluations. For trial only.
Morus alba var. *tatarica*	Russian Mulberry	I, II*, III*	28	22	White mulberry *(M. alba)* is native to China and is considered a weed tree in central and eastern United States. It is short-lived and messy when large numbers of fruits fall on sidewalks and streets. Tree form is quite irregular and requires pruning assistance. Mulberries are borderline in hardiness and fall color is yellowish at best. The Russian mulberry is the hardiest variety. It is capable of producing an acceptable small tree with attractive medium-textured foliage which varies markedly in degree or pattern of lobing. It is not particular about soil, withstands drought, and grows quite fast. Blackberry-like fruits are less than ½-inch long, pink to purplish when ripe, and messy but attractive to birds. Red mulberry *(M. rubra)* is native in eastern United States and into southeastern South Dakota. It has only minor differences and is confused with the former species. Red mulberry, however, usually has leaves which are rough or dull above, whereas white mulberry leaves are smooth and more lustrous above. Sexes are separate in both species and male trees are preferable for landscape use.
Morus alba 'Pendula'	Weeping Mulberry	I, II*, III*	14	8	Distinctly pendulous cultivar. Very effective specimen if properly used in landscape. Due to formal weeping outline it is truly an exotic. An excellent specimen is growing in Brookings, S. D.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
Ostrya virginiana	American Hop-hornbeam (syn. Ironwood)	I, II, III*	25	18	Small or at best medium-size tree native to moist, forested areas in the Dakotas. Grows rather slowly and does not transplant easily. Loosely-pyramidal in growth habit. From a distance, young trees are easily confused with small elms, but closer examination will show the presence of catkins and in fall flattened papery sacs in pendulous clusters enclosing a nutlet. Bark has a "shreddy" appearance due to the shaggy plates which curve away from the trunk. Quite free from pests but does not possess any outstanding ornamental characteristics.
Phellodendron amurense	Amur Cork-tree	I, II, III*	30	28	Medium sized tree native to northern China and Manchuria. Characterized by massive, spreading branches with deeply fissured, corky or spongelike bark light gray in color. Inner bark is bright yellow. Large pinnate-compound leaves are slow to appear in spring. Fall color is at best briefly yellowish. Flowers are inconspicuous, the fruits are blackish berries. Twigs are thick, coarse-textured. Due to a fibrous root system it transplants readily. Chief asset: picturesque, rugged appearance in the winter scene. Open and often irregular branch habit not particularly attractive in summer.
Platanus occidentalis	Sycamore (syn. American Planetree)	I-A*, II*	65	35	Large tree not fully adapted or hardy in South Dakota although it has been planted in recent years. Characterized by large maple-like leaves, bark which flakes off exposing greenish-white under layers and pendulous, ball-like fruits containing many seeds. Susceptible to twig blight (anthacnose). Selections are needed from northern seed sources. A 30-foot tree in Brookings is apparently fully hardy, but it cannot be recommended except in the southeastern corner of the state.
X *Populus acuminata*	Lanceleaf Poplar	I, II, III	40	20	Medium-sized, round-topped tree native to the Black Hills with dark green, glossy, rhombic-lanceolate to ovate-shaped leaves. Little is known about performance under cultivation. Generally regarded as a natural hybrid between *P. angustifolia* and *P. deltoides*.[12]

[12]Some authorities list the hybrid parentage as *P. angustifolia* x *P. sargentii*, the Plains cottonwood. *P. sargentii*, (or *P. deltoides* var. *occidentalis*) is not given species or varietal rank in this publication, but is considered as synonymous with the species *P. deltoides* (Cottonwood). Botanical differences are relatively insignificant.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
Populus alba	White Poplar	All	65	45	This poplar species deserves greater popularity, especially in dryer portions of the Northern Plains. Unfortunately, a suckering problem tends to limit usefulness. Only poplar species with dark green, lobed leaves which contrast markedly with white, felt-like undersurface. Growth habit often irregular, but capable of developing into a wide-spreading stately tree. One of few poplars with drought resistance. Extremely hardy and adaptable throughout South Dakota.
Populus alba 'Nivea'	Silver Poplar	All	65	45	Leaves of this clone are felt-like to the touch because they are even more densely tomentose below than those of the species. Whitish-gray bark roughens and darkens with age. It has good drought tolerance. Leaves are more distinctly lobed than those of the species. Two selections with improved branch habit are under evaluation at SDSU.
Populus alba 'Pyramidalis'	Bolleana Poplar	All	50	4(8)	A male tree, distinctly upright or fastigiate in form. Leaves tend to be more deeply lobed than those of silver poplar. Suckering is seldom encountered. Bark is a light greenish-gray. Hardy, rapid growing, and distinctly ornamental. Popularity as a screen or accent plant has been marred by poplar borer, and to a lesser extent, canker attack; consequently, it is often short-lived.
Populus angustifolia	Narrowleaf Cottonwood	I, II, III	50	18	Black Hills native which develops into fairly large pyramidal tree with smooth bark and lanceolate to ovate-lanceolate leaves. Slender, erect branches. Merits trial under cultivation due to its narrow leaves and upright growth habit.
Populus balsamifera	Balsam Poplar	I, II, III	50	18	Native, very attractive upright, pyramidal tree with clean, dark green glossy foliage. Narrow ovate-lanceolate leaves are not nearly as coarse-textured as cottonwood. It has resinous, fragrant buds and light greenish to grayish bark. Merits wider trial as an ornamental tree, especially for naturalistic settings with ample moisture. It may sucker, especially if the roots are disturbed.
X Populus berolinensis	Berlin Poplar	All	50	12	A narrow, almost fastigiate hybrid derived from *P. laurifolia* x *P. nigra* 'Italica.' Sufficiently hardy in South Dakota but has scarcely become known.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
X *Populus canadensis* 'Eugenei'	Carolina Poplar	I, II, III*	70	25	A tree of narrow, rather pyramidal habit and very rapid growth. Widely used in some parts of the country for city planting in the past, but now recognized as a notorious tree in clogging sewers and cracking sidewalks. Derived from *P. deltoides* x *P. nigra*, several growth forms are available. Main attribute appears to be hybrid vigor.
Populus deltoides	Cottonwood	All	80	48	Native. Largest tree in Northern Plains and one of the largest poplars. Coarse, deltoid leaves. Due to decline or death during periods of moisture stress, its popularity as a shelter species has declined. Part of this problem may be due to root nematode susceptibility. Generally not recommended for home landscape purposes due to size and structural weakness. It will remain a very useful species in the Northern Plains, however, due to its adaptability and rapid growth. Fall color is yellow.
Populus deltoides 'Siouxland'	Siouxland Cottonwood	All	70	35	A cottonless, male clone selected at the South Dakota Agricultural Experiment Station with considerable resistance to cottonwood rust. Used considerably for shelter plantings, but not recommended for home landscapes or boulevard plantings except where better trees cannot be grown.
Populus grandidentata	Bigtooth Aspen	I, II, III*	56	22	Rather narrow, upright, round-topped tree closely resembling quaking aspen. Leaves of bigtooth aspen have fewer, coarser teeth along the margins as opposed to fine crenate-serrate margins of the quaking aspen leaf. The latter generally has smaller leaves also. Native to Minnesota and on east to the coast. This tree might be used in parks and naturalistic plantings. It displays yellow fall color. A tall, attractive specimen is growing on the SDSU campus.
X *Populus* 'Griffin'	Griffin Poplar	All	40	12	Small male tree with a narrow pyramidal crown. Hybrid parentage is *P. deltoides* x *P. petrowskyana*. Apparently does best on well drained soils, but is not recommended due to poplar borer and canker attack.
Populus koreana	Korean Poplar	I*, II*	50	24	Handsome tree native to Korea with large bright green leaves. Leaves are elliptic in shape with a red midrib. Essentially unknown in South Dakota. For trial only.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
Populus nigra	Black Poplar	I, II, III*	55	25	Rather large, spreading European tree hardly known in Northern Plains, probably due to lack of need for a tree similar to the native cottonwood. This species and its clones are readily distinguished from white poplar since leaves of the former are lighter green, without lobes, and are not tomentose below. The clone 'Italica' is a very popular nursery item. Not as hardy as our native species.
Populus nigra 'Italica'	Lombardy Poplar	I, II, III	65	5(9)	A striking clone, fastigiate in growth habit. It remains popular, often serving only as a quick-growing temporary screen or accent due to canker attack. It shows less drought resistance and winter hardiness than bolleana poplar, but is less subject to damage by poplar borers. Bark and twigs tend to be yellowish in color. In northern and more droughty portions of South Dakota, winter die-back is sometimes a problem. Trees are vigorous and essentially staminate.
Populus nigra 'Thevestina'	Algerian Black Poplar	All, IV*	65	5(9)	A staminate, fastigiate clone very similar to lombardy poplar except for more conspicuous grayish or whitish bark and larger leaves. Vigorous grower. Differences between these two clones do not appear substantial enough to warrant a clear distinction. It may be worthwhile to thoroughly evaluate them side by side especially since Algerian black poplar is reportedly hardier and longer lived. Often listed by nurserymen as Theve's poplar.
X *Populus* 'Northwest'	Northwest Poplar	All	70	32	Large tree believed to be a natural hybrid of *P. deltoides* x *P. balsamifera*. A vigorous, hardy shelter tree in North Dakota where it originated. Has outlived cottonwood in certain trial plantings.
X *Populus robusta*	False Lombardy Poplar	All	60	10	Vigorous, single stemmed, narrow tree with ascending branches. This male hybrid has broad-ovate leaves and flattened yellow petioles. Parentage is *P. angulata* x *P. nigra* 'Plantierensis.' Exhibits good qualities for shelter plantings in dryer portions of the Northern Plains. Tolerant to drought and leaf rust.
Populus simonii	Simon Poplar	I, II, III*	40	10	Rather narrowly pyramidal, fine textured poplar, medium-small in size. Rhombic-elliptic to obovate leaf shape as well as reddish petioles are quite distinctive. Dense growing and attractive, but seldom available. Performance, especially in the western and northern portions of the plains, is questionable in that it often cankers and does not tolerate alkaline, poorly drained soils. It does not lack in hardiness, however.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
Populus simonii 'Fastigiata'	Pyramidal Simon Poplar	I, II, III*	35	8	A more nearly fastigiate form neither as tall or narrow in growth habit as lombardy and bolleana poplars.
Populus tremula 'Erecta'	Columnar European Aspen	I*, II*, III*	24	4	A fastigiate clone of the European aspen *(P. tremula)*. The latter is a tree very similar to our native North American quaking aspen. Early observations indicate the clone is stiffly upright and apparently difficult to propagate and transplant. Its adaptability is not well known, but it merits trial as a vertical accent plant.
Populus tremuloides	Quaking Aspen	All	45	20	Native. This tree probably has the most extensive natural range of any tree in North America. Due to root suckering, it occurs as scattered naturalistic thickets throughout the Northern Plains. The slightest breeze initiates the characteristic trembling leaf motion. It is weak-wooded, short-lived, not-readily propagated, and, consequently, seldom used for specimen purposes. Deserves wider usage in such naturalistic settings as parks where group plantings could be very effective. Smooth bark on young trunks and branches is attractive light gray and its yellow autumn color is striking.
Populus trichocarpa	Black Cottonwood	All*	70	32	A large tree native primarily to the Pacific Northwest, but extending east to a small outpost in southwestern North Dakota. Its ovate leaves are dark green with a finely crenate margin. Older trees develop thick blocky bark with deep furrows. It has scarcely been grown under cultivation as yet. For trial.
Populus tristis	Browntwig Aspen	All*	40	15	A small hardy tree native to Central Asia. Reddish-brown branches and narrow-ovate leaves are whitish-pubescent beneath. Presently under evaluation at SDSU. It is better known in Canada.
Prunus americana	American Plum (syn. Wild Plum)	All	18	14	Native. Common, small dual-purpose tree often no more than a large shrub in native thickets along roadsides and riverbanks. Used as rootstock for grafted fruiting and ornamental plums, but such use is declining due to the undesirable trait of prolific suckering. *P. hortulana* (Hortulana plum) is recommended as a substitute non-suckering rootstock, but it also suckers to some extent in SDSU trials. It is also of questionable hardiness in northern and western South Dakota. Although of little value for most ornamental plantings, wild plum should remain very useful for shelterbelts and wildlife plantings due to its hardiness and adaptability. It forms a somewhat thorny, irregular plant with rough, dark, exfoliating bark. Early white flowers are distinctly fragrant. Red to yellowish edible fruits average ¾-inch in diameter, but the tough skins are very astringent.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
Prunus cerasifera 'Atropurpurea' (syn. *P. pissardii*)	Pissard Plum	I-A, I-B* II*, III*	18	11	Although Cherry plum *(P. cerasifera)* is a little needed ornamental, several purplish leaved cultivars have been named. Foliage remains purplish throughout the season and these cultivars are practically indistinguishable on the basis of foliage color. Dark fruits are small, masked by the foliage and not effective ornamentally. Borer damage sometimes occurs and they generally require some pruning assistance due to crossing branches. Although none have gained real popularity, some excellent specimens are found in the area. They undoubtedly possess sufficient hardiness for most of South Dakota. Pissard plum produces ¾-inch pale pink flowers and develops into a small round-headed tree with slender, twiggy branches and black scaly bark. Used with discretion, such trees can be effective accents in the landscape. Recommended for trial.
X *Prunus* 'Newport'	Newport Plum	I, II, III*	16	10	The pissard plum is involved in parentage of this purple leaved hybrid. It is reported to be slightly hardier than the pissard plum and is planted more often than other purple-leaved cultivars. Flowers are white, tinged with pink. Merits wider trial as accent plant.
Prunus cerasifera 'Nigra'	Black Myrobalan Plum	I*, II*, III*	16	9	A clone characterized by very dark purple leaves as inferred by its name. Flowers are single pink. Performance in South Dakota awaits trial. For trial only.
Prunus cerasifera 'Thundercloud'	Thundercloud Plum	I*, II*, III*	14	10	This clone is reputed by some authorities to be superior to other purple-leaved plums. It has rich purple foliage and single light pink flowers. Merits early evaluation. For trial only.
Prunus cerasus	Sour Cherry	All, III*, IV*	16	12	Small dual-purpose tree. Valued for its sour cherries, as represented by such hardy hybrid varieties as 'Meteor' and 'North Star.' It also makes an attractive ornamental. Dark bronzy bark, clean glossy foliage, and dense, rounded growth habit are assets. Early single white flowers are followed by bright red fruits. One of few fruit trees which performs well in shady locations.
Prunus maackii	Amur Chokecherry	All	20	12	Very hardy small to medium tree of ornamental value for its very attractive, glossy, coppery-orange flaky bark. Does not sucker, produces a reasonably upright, oval-shaped tree. Small white flowers in racemes are followed by tiny inconspicuous black fruits. Leaves are fairly long, acuminate, and somewhat dull. Due to adaptability and ornamental bark, it merits wider usage in landscape plantings.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
Prunus mandshurica (syn. *P. armeniaca* var. *mandshurica*)	Manchurian Apricot	All, IV*	25	20	Very hardy dual-purpose tree which may grow considerably larger than the Siberian apricot. Growth habit is variably-rounded. Flowers very early in the spring, producing pinkish-white single blossoms. Fresh fruit quality is fair to good but spring frosts often prevent fruit set. Foliage is glossy and colors well in autumn. Contributes to parentage of hardy, cultivated apricot hybrids.
Prunus padus 'Commutata'	Harbinger European Bird Cherry (syn. May Day Tree)	All	28	26	Small tree which branches fairly low and becomes rather umbrella-like in shape. Can be grown as an acceptable single-trunked specimen tree. Suckering is no problem when compared to that encountered with common chokecherry, a closely related species. It has somewhat larger, coarser, and duller foliage than chokecherry. Undoubtedly the earliest flowering woody plant in the Northern Plains, coming into blossom as early as May 1. Fragrant ornamental flowers form on long drooping racemes. It is also among the earliest trees to unfold its leaves, and is a stand-out in the early spring landscape, however, it is not particularly ornamental during the summer or fall. Subject to black knot, a fungal disease which induces the formation of blackish, tumor-like growths on branches. Other cultivars are known, e.g., 'Plena,' which produces larger, double flowers.
Prunus pensylvanica	Pin Cherry	All, IV*	20	18	Hardy small tree native to eastern and central North America, which is attractive in bloom and fruit. White flowers are borne early in clusters of 2 to 5 rather than in long racemes which characterize many *Prunus* species. Leaves are fairly fine-textured, glossy and long-tapered; fruits are red, and only ¼-inch in diameter. Bark often displays glossy, reddish tint. Of interest for informal plantings, not as specimen tree.
Prunus pensylvanica 'Stockton'	Stockton Double Pin Cherry	All, III*, IV*	20	18	A double white-flowered form of the pin cherry from Saskatchewan, Canada. Characterized by bright green shiny leaves and early frost-resistant flowers. This cultivar merits early trial in South Dakota as a probable replacement for the species.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
Prunus serotina	Black Cherry	I, II, III*	40	16	Rather upright but only medium-sized tree in South Dakota. Wood is valued for furniture-making. Although not fully adapted to the Northern Plains, it is an acceptable ornamental with dense, glossy leaves and slightly pendulous branches. White flower racemes are followed by fruits which turn from red to black. Capable of producing excellent fall color. Several older specimens grow on the SDSU campus.
Prunus siberica (syn. *P. armeniaca* var. *siberica*)	Siberian Apricot	All, IV*	12	12	Very hardy apricot, small and rather spreading in stature. Attractive single, pinkish-white flowers appear very early in spring. Tough, leathery fruits are not edible. Glossy foliage takes on yellow, orange or even scarlet fall colors—a significant ornamental asset. This plant has contributed to the parentage of hardy, cultivated apricot hybrids.
Prunus virginiana	Common Chokecherry	All	24	12	Native. Very common species in Plains States, generally growing in thickets due to its extreme suckering habit. Although glossy foliage is attractive, a tendency to sucker precludes its recommendation for ornamental use. It has a place in shelter, wildlife or other informal plantings, and excellent jelly can be made from the small deep-purplish fruits. It is extremely hardy under difficult conditions. Flower racemes tend to be smaller than those of the harbinger European bird cherry.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
Prunus virginiana 'Schubert'	Schubert Chokecherry	All	20	12	Introduced at Bismarck, N. D. in 1950 but only recently becoming known. This interesting and attractive selection should definitely become popular over a wide area due to hardiness and adaptability. Unlike most trees with purplish foliage, this small tree produces bright, glossy green leaves in spring. As leaves harden-off at mid-season, they turn to a deep reddish-purple and remain this color until leaf-fall. New green foliage provides an interesting contrast with more mature maroon leaves during the active growing season. When propagated by root sprouts, the resulting plant will sucker like the species. For ornamental use obtain plants grafted on harbinger European bird cherry rootstocks or plants rooted from cuttings. Several propagators now effectively root this plant by cuttings and report little or no problem from suckering of plants which are on their own roots. It is easily grown and densely pyramidal to oval in growth habit. Flowers are white in terminal racemes. Useful as specimen tree or accent plant in home landscapes and parks, and also as small boulevard tree. If economically practical, it might become valuable for shelter and wildlife plantings. Size permits use in many situations. Highly recommended.
Ptelea trifoliata	Common Hop-tree (syn. Wafer-ash)	I, II, III*	15	14	Small, very attractive, rounded tree native east of Northern Plains. It has dark green, glossy, trifoliate leaves; small, rather unique creamy-lime flowers; and smooth, dark bronzy twigs and bark. Circular, papery, elm-like fruits are persistent and ornamental. This plant is essentially unknown to the public and is not offered locally by nurseries. However, it merits attention for ornamental use. An excellent specimen is growing on the SDSU campus. Its golden-yellow fall color is truly outstanding.
Pyrus ussuriensis	Ussurian Pear	All, III*, IV*	26	20	Native to northeast Asia, this is the hardiest pear species. Characterized by vigorous dense growth and oval to pyramidal form. Good quality, bright green, glossy leaves usually take on scarlet, or, at poorest, yellow autumn color. Very floriferous, probably the most attractive pear in bloom. Pink buds open to 1½-inch white blossoms just before the "Rosybloom" crabs. Greenish-yellow, 1½-inch fruits are of no commercial or ornamental value. An important asset: excellent resistance to fireblight.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
Pyrus ussuriensis 'Harbin'	Harbin Pear	All, III*, IV*	25	20	Extremely hardy ussurian pear selection made at SDSU by the late N. E. Hansen from a northern China seed source. Used in breeding hardy, quality fruiting pears; also as a hardy rootstock upon which to graft them. An excellent ornamental tree, resistant to fireblight. Used to limited extent for shelterbelts; a single row provides good wind protection.
Quercus alba[13]	White Oak	I*, II*	50	45	Long-lived, massive, round-headed tree in the eastern United States, not generally adapted to South Dakota. Leaf shape is variable with rounded lobes. It is difficult to transplant due to a taproot system. It is slow-growing. Fall color is often purplish and leaves tend not to drop until late winter. For trial only.
Quercus coccinea	Scarlet Oak	I*, II*	40	35	Open, rounded tree with lustrous foliage. Leaves are deeply cut, like those of the pin oak. Has attained some popularity as an ornamental shade tree and is noted for brilliant scarlet autumn coloration. Difficult to transplant. Not recommended except for trial due to questionable hardiness and adaptability.
Quercus ellipsoidalis	Northern Pin Oak	I*, II*, III*	45	35	Similar to pin oak but more commonly found on drier upland soils. Autumn browned leaves persist into winter. It undoubtedly has a hardiness advantage over pin oak, but comparative evaluation is needed. Seldom available in the nursery trade, but sufficiently hardy and merits wider trial planting.
Quercus macrocarpa	Bur Oak	All	64	45	Native. Very hardy, drought resistant, long-lived shade, street or specimen tree. Grows in difficult situations, including poor soils. Leaves are dark green and lustrous, pale below with variably rounded lobes. It develops massive spreading branches with stout, sometimes corky twigs. Deserves much wider acceptance, although popularity is limited due to difficulty in transplanting (deep taproot system) and a moderately slow growth rate. Capable of becoming a stately tree under good conditions, rugged and picturesque under more difficult conditions.

[13]Although a number of oaks can be grown in South Dakota, most are not fully adapted to our dryer and variably alkaline soils. This is also true of several maple species. Iron becomes insoluble and unavailable to many plants, even at only slightly alkaline pH levels. Consequently, oaks, with the exception of *Q. macrocarpa,* often exhibit symptoms of iron chlorosis. Chlorosis is a yellowing of the leaves due to blockage of chlorophyll production. Iron is more readily available to the plant in acid soils of the eastern United States, and, therefore, iron chlorosis is not a serious problem there. It is interesting to note that a majority of the oak species discussed are indigenous to the eastern and east-central United States. Iron chelate treatments, whether applied to the soil or sprayed on the leaves, are fairly effective in temporarily alleviating a chlorosis problem. Soil acidification by using sulfur or aluminum sulfate is sometimes practiced.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
Quercus mongolica	Mongolian Oak	I*, II*, III*	40	30	Essentially unknown in South Dakota, this east Asian native is vigorous in certain Canadian plantings. Dark green leaves are quite large, with broad, obtuse teeth. Leaves tend to be short-stalked, clustered at branch ends. Due to vigorous growth, this oak is worthy of early evaluation.
Quercus palustris	Pin Oak	I*, II*	45	26	One of the most outstanding ornamental specimen trees grown in the eastern United States due to its beautiful, pyramidal outline. Branch pattern is outstanding with top branches sweeping upwards, mid-branches horizontal and lower branches somewhat pendulous, often sweeping the lawn if left undisturbed. Foliage is lustrous, fine textured, deeply cut and sharply lobed. Limbs are not as massive as many species. Transplants readily, but, unfortunately, subject to iron chlorosis in alkaline soils. Not recommended for boulevard or street tree use due to its low branching habit. Excellent scarlet autumn color is produced with leaves persistent in the fall. Homeowners increasingly recognize the merits of this tree. Its performance in South Dakota, except in favored sites, is very questionable, however. This also depends somewhat on care and maintenance given after planting. (See footnote No. 13.)
Quercus palustris 'Sovereign'	Sovereign Pin Oak	I*, II*	45	24	New cultivar selected for a more upright branching habit. Recommended for street tree planting and other sites where pin oak is undesirable. Not yet evaluated and suggested only for trial. (PP No. 2662.)
Quercus rubra (syn. *Q. borealis)*	Northern Red Oak	I*, II*, III*	50	45	Excellent landscape tree in areas east of the Great Plains. Not as difficult to transplant and not as slow in growth as most oaks. Lustrous green leaves have sharply pointed lobes. Pyramidal when young, becoming rounded with age. Fall color is an attractive red. Deserves thorough evaluation especially in the eastern Dakotas.
Quercus velutina	Black Oak	I*, II*	40	28	Rounded eastern oak seldom offered by nurseries, primarily because a deep taproot makes it difficult to transplant. Growth rate is slower than that of northern red oak. Lustrous, dark green foliage is of good quality. Terminal winter buds are pubescent and inner bark is yellowish. Autumn color is orange to dull red and leaves are generally retained into winter. Not recommended except for trial.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
Rhamnus cathartica	Common Buckthorn	All	16	14	Common buckthorn is often found in older plantings as a large shrub, second-rate hedge or in shelter plantings. Because it is the alternate host of oat crown rust, planting has been discouraged and it is seldom available from nurseries. It has become naturalized, however, in many areas where originally planted, including South Dakota. Although lacking outstanding ornamental qualities, it will develop into an acceptable small tree when grown with a single clean trunk. Several old specimens, shaped somewhat like large spreading crabs, are growing in Brookings. Older bark becomes dark and irregular. Leaves are oval-shaped with finely serrated margins. Flowers are inconspicuous; abundant black pea-like fruits make this tree of interest for wildlife plantings. It has poor fall color. *R. frangula* (Glossy buckthorn) is a large shrub or very small tree which resembles common buckthorn, but its oval leaves have entire margins. This species and its cultivars might best be considered as large shrubs. Subopposite buds aid in identifying buckthorns.
Rhamnus davurica	Dahurian Buckthorn	All	18	15	Seldom seen in the Northern Plains. Attractive, lustrous leaves are often 3 to 4 inches long. Spines are fairly common. A more vigorous grower than common buckthorn, and may be used as a very large shrub or as a small tree. Small black fruits are attractive to birds. Merits wider trial for shelterbelt plantings. Often considered superior to the other two species for ornamental use.
Rhus typhina	Staghorn Sumac	All, IV*	20	8	Probably best grown as large massed shrubs in the landscape. However, it is capable of growing to heights comparable to small trees. Rugged, unpredictable growth form can be an advantage when used in landscaping ranch-style homes, in parks and other selected sites. Large pinnate compound foliage adds a tropical touch to any setting. Sexes are separate and male trees do not produce the persistent, ornamental, reddish seed heads in upright panicles. Orange or scarlet autumn color is striking. Hairy felt-like twigs are of added interest. Not recommended for screening purposes due to its open habit of growth. The cultivar 'Dissecta' (Shredleaf sumac) is characterized by deeply cut leaflets. Foliage is fern-like and highly ornamental. Grown individually or as a clump it makes an attractive specimen and merits increased popularity.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
X *Robinia* 'Idaho'	Idaho Locust	I, II*, III*	30	22	The parentage of this small hybrid locust is in question, but probably involves the black locust and the shrubby, Rose-acacia *(R. hispida).* Pendulous clusters of lavender-rose pea-like flowers are very attractive. Resembles the black locust, but its foliage is not quite as dark green. Dry seed pods are about 3-inches long. Although tested to a limited extent in South Dakota, it merits more extensive evaluation. Reputedly grows well in poor soils and tolerates drought. It might be tried as a street tree.
Robinia pseudoacacia	Black Locust	I, II*, III*	40	25	The "true locust" has darker green, slightly coarser textured foliage than honey-locust. Dark green foliage is retained very late in fall and does not display autumn color of interest. Leaves are pinnately compound. Two very short spines are often present at twig nodes. Fragrant white, pea-like flowers in drooping racemes are produced after foliage has developed. Trees sometimes sucker. Being a legume, it produces 2- to 4-inch brown pods. Although without exceptional qualities, this tree appears generally hardy in eastern South Dakota. Worthy of wider trial.
Robinia pseudoacacia 'Fastigiata' (syn. *R. pseudoacacia* 'Pyramidalis')	Fastigiate Black Locust	I*, II*	40	8	Performance of this narrow, columnar form of the black locust is not well known in South Dakota. It could be useful as a screen in parks and as an accent plant to emphasize vertical architectural design. Picturesque in bloom with white pea-like flowers in late spring or early summer. Since our popular fastigiate trees (poplars and columnar Siberian crab) are generally short lived due to borer or disease attack, it seems worthwhile to evaluate this locust. Two-year plantings at SDSU have persisted but do not appear to be fully hardy. Recommended only for trial.
Robinia pseudoacacia 'Umbraculifera'	Globe Locust	I*, II*	18	16	Performance of this small, formal, globe-headed tree is questionable in South Dakota. Used somewhat for street planting (under low utility lines) in eastern United States. Globes are normally grafted on a 6-foot standard to avoid low branching and conflict with pedestrians. For trial only.
Salix acutifolia	Ashleaf Willow (syn. Sharpleaf Willow)	All	32	24	Hardy, shrubby willow species with long, narrow leaves. Twigs are olive-brown to reddish. Recommended for shelterbelts in Canadian prairies and might be tried in the Dakotas where it is scarcely known.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
Salix alba	White Willow	All	45	20	A tree of variable habit and size. It has glossy lanceolate leaves and olive-brown colored young twigs. Although not particularly ornamental, hardiness and vigor render it useful in shelter plantings where moisture is not deficient. Its several cultivars are of much greater value.
Salix alba 'Chermesina'	Redstem Willow	All	35	20	Attractive bright red twigs characterize this shrubby tree. Young growth tends to be even more showy than that of most red-twigged dogwoods. Used for shelter plantings and to limited extent as an ornamental plant. If used as a winter accent plant, biennial pruning to promote vigorous shrubby juvenile growth markedly enhances its beauty.
Salix alba 'Sericea'	Siberian White Willow (syn. Silky White Willow)	All	45	15	The leaves of this clone are densely coated with white silky hairs. This imparts a characteristic silvery sheen to the leaves in sunlight. This cultivar may be of value for shelterbelts and limited ornamental use. It is scarcely known in the Dakotas, but is more common in Canada.
Salix alba 'Tristis'	Weeping Willow (syn. Weeping Golden Willow)	All	45	25	Tree with bright yellow, distinctly pendulous branches and branchlets. It is the hardiest and most reliable weeping willow, and without doubt the most attractive weeping tree for informal, naturalistic settings. It is especially effective near streams or other bodies of water. Its yellow twigs truly enhance the winter scene. Since the more refined cutleaf weeping birch is plagued by bronze birch borer, the weeping willow will retain or possibly even increase in popularity. Also sold under such names as Niobe weeping willow and 'Vitellina Pendula.' (See X *S. blanda* and *S. babylonica.*)
Salix alba 'Vitellina'	Golden Willow	All	40	20	Common in older farmstead plantings in the Northern Plains and in the winter landscape it is distinctly ornamental. Its main attribute is bright yellow twigs. Mass plantings of this willow, as well as other species and cultivars with colorful twigs, could be very effective in large parks or other naturalistic areas, especially if backed by evergreen plantings.
Salix amygdaloides	Peachleaf Willow	All	40	20	Native. Variable-sized tree generally found along streams in Northern Plains. It resembles white willow, but twigs generally carry more orange-brown coloring. Leaves are glabrous, more lustrous, and pale or glaucous beneath. Petioles are glandless. Lacks out-standing qualities but is a usable willow. Hardy.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
Salix babylonica	Babylon Weeping Willow	None	—	—	Attractive with long, fine textured, pendulous branches. Twigs are brown to purplish-brown. Lacks hardiness and not recommended for planting in South Dakota. A very similar weeping tree is the Thurlow weeping willow (X S. *elegantissima).* This hybrid is believed to involve S. *babylonica* in its parentage, although it apparently is slightly hardier. Thurlow weeping willow is recommended only for trial in Zone I-A in South Dakota. Its height would probably be no more than 25 feet at best.
X *Salix blanda*	Wisconsin Weeping Willow	I, II*, III*	36	34	Hybrid willow *(S. babylonica* x S. *fragilis)* with spreading head and pendulous dull-green to brownish branchlets. Leaves are dark glossy green above, bluish green beneath and glabrous. This graceful weeping willow is available in the nursery trade, but is not as reliably hardy as S. *alba* 'Tristis.' Ornamental quality is also poorer as twigs lack bright yellow color. Possibly these two willows are mixed in the trade. A few authorities, including certain nurseries, refer to this tree as the Niobe willow, however, most specimens offered as such fortunately turn out to be S. *alba* 'Tristis.'
Salix exigua	Coyote Willow	I, II, III*	13	8	A suckering species native to the western United States, including the Black Hills, and produces only a shrub in natural habitat. However, if grafted onto a non-suckering rootstock, e.g., S. *alba,* a very small but truly attractive tree can be produced. Leaves are very narrow, fine textured, and densely hairy, imparting a distinct silvery-white color to the foliage, making it even more colorful than Russian-olive as an accent plant. Fully hardy and deserves attention of nurserymen and consumers.
Salix fragilis	Crack Willow	All	40	20	This willow has long been under cultivation. Twigs are dull greenish, brittle at the base and consequently very susceptible to breakage. This trait also characterizes other willows, but to a lesser degree. Although a European tree, it has naturalized in the eastern United States. It is known to hybridize freely with S. *alba.* Not a particularly attractive or valuable tree.
Salix pentandra	Laurel Willow	All	35	20	Attractive European willow which often grows in a shrubby form in shelter plantings. One of the most ornamental willows due to rather broad, dark green lustrous foliage. Leaves are very reflective in bright sunlight. Twigs are shiny, yellowish-green to reddish-brown, and catkins are golden yellow in the spring. It merits wider acceptance for ornamental planting. With pruning it can be grown single-trunked.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
Sorbus alnifolia[14]	Korean Mountain-ash	I-A*	25	16	Small tree often rated as the best of *Sorbus* species, but only borderline in hardiness for South Dakota. Distinguished from other mountain-ash species by simple leaves. Tree form is upright pyramidal when young, oval at maturity. Flower clusters are creamy-white and blossoms are up to ½-inch in diameter. Fruit clusters are orange to scarlet as is the fall foliage color. Smooth, dark gray bark is also attractive. This tree is reported to be hardy at the University of Minnesota landscape arboretum. For trial only in southeastern South Dakota.
Sorbus americana	American Mountain-ash	I, II, III*	20	12	A small, shrubby tree native over a wide area of the eastern United States which has never become popularized in the nursery trade. It is less vigorous than the popular European mountain-ash, and distinguished from it by its nearly glabrous buds and smaller fruits. Reddish fruit clusters and other ornamental qualities are similar to the European species. Fully hardy, but does not do well in droughty soils. Deserves wider planting as a small landscape tree.
X *Sorbus arnoldiana*	Arnold Mountain-ash	I-A*	20	15	Originated in the Arnold Arboretum, Jamaica Plain, Mass., from the cross S. *discolor* (Snowberry mountain-ash) x S. *aucuparia.* Chief ornamental value is profuse light pink fruit clusters. Doubtful if sufficiently hardy in South Dakota. For trial only.
Sorbus aucuparia[15]	European Mountain-ash	All, IV*	35	20	Medium sized, distinctly ornamental tree which is the most popular mountain-ash species. Good qualities include: creamy-white flower clusters, large showy orange to reddish fruit clusters and attractive pinnately compound leaves. Fall color varies from bronze shades to reddish-purple and will develop even though early fall frosts occur. Bark is smooth and attractive coppery-brown in color. It grows quite fast, forming a densely branched upright-oval tree. Attractive when grown either single or multiple trunked. It should be grown single trunked for boulevard use. Outstanding specimens throughout the Northern Plains indicate this species will perform satisfactorily in somewhat alkaline soils. Exposed, droughty sites, are not favorable. Due to sunscald susceptibility young trees should be wrapped for several years. Fireblight attack may occur in some areas. Mountain-ash species have year-round ornamental qualities.

[14] All *Sorbus* should be wrapped for 3 to 5 years following transplanting. Due to thin bark, mountain-ash are susceptible to sunscald injury and also winter frost cracks. Wrapping the trunks helps alleviate this problem.

[15] In recent years a number of new mountain-ash hybrids are appearing in the nursery trade originating in Europe. Their parentage is in question, but undoubtedly involves the European mountain-ash. Primary landscape asset of these new hybrids is a broader range of fruit colors, including red or scarlet, pink, golden-orange, and white. The following hybrids leave little doubt as to the color of the fruit: 'Red Copper Glow,' 'Pennsylvania Red,' 'Scarlet Glow,' 'Kirsten Pink,' 'Apricot Queen,' 'Carpet of Gold' and 'White Wax.' All of these are reputed to grow about 18-20 feet tall. They merit early trial at least in zones I and II in South Dakota. Several authorities indicate their hardiness to be comparable to *S. aucuparia,* but they must be evaluated in the state before valid recommendations can be made. Several species of mountain-ash are not discussed in this publication but may prove sufficiently hardy in at least the more favored zones. Examples are *S. amurensis, S. intermedia* and *S. pohuashanensis.*

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
Sorbus aucuparia 'Asplenifolia'	Cutleaf European Mountain-ash	I, II, III*	30	16	Very graceful clone with doubly-pinnate leaves. Cutleaf, lacy foliage is fine textured and truly ornamental. Merits early trial.
Sorbus aucuparia 'Columbia Queen'	Columbia Queen Mountain-ash	I, II, III*	30	16	A vigorous growing clone selected at Olmsted Falls, Ohio, which develops a pyramidal to oval-shaped head. Foliage is of good quality and fruit clusters are red. Early evaluations at SDSU appear promising. Merits recommendation.
Sorbus aucuparia 'Fastigiata'	Upright European Mountain-ash	I, II, III*	25	6(15)	Upright in growth habit for at least 15 years, then due to production of heavy fruit clusters and multiple leaders, it begins to widen, eventually taking on the more rounded habit of the species. Deserves attention as a clone for use in landscape plantings.
Sorbus aucuparia 'Pendula'	Weeping European Mountain-ash	I, II, III*	18	18	Distinctive, pendulous form grafted on 6- or 7-foot standards. As a backyard specimen tree it is a real conversation piece. Due to exposure of attractive grotesque limbs it takes on a more naturalistic appearance than most weeping trees. It could be effectively used in park plantings and also in more formal landscapes.
Sorbus aucuparia 'Wilson'	Wilson Columnar Mountain-ash	I, II, III*	22	8	Very dense, markedly columnar clone selected at Olmsted Falls, Ohio. Fruit clusters are orange. Growth habit appears to more nearly approach a true fastigiate form than the clone 'Fastigiata.' Recommended for early trial as a specimen or vertical accent tree.
Sorbus cashmiriana	Cashmir Mountain-ash	I*, II*	15	10	Small, pyramidal tree with pinnate compound leaves. Pinkish buds open to ¾-inch diameter blooms with a tinge of pink. Fruit clusters are white tinged with pink. Fruit stalks are light red which adds to its ornamental qualities. Fall color is reported to be reddish. Since this tree is probably borderline in hardiness, it is recommended only for trial.
Sorbus decora	Showy Mountain-ash	All, IV*	20	12	One of the best and hardier mountain-ash species. Native to northeastern North America, it forms a more shrubby tree than S. *aucuparia*. Its ½-inch red fruits are larger than those of S. *americana*. This attractive small tree deserves increased popularity for ornamental use. A compact form of mountain-ash believed to be a selection of this species is called 'Nana,' which is extremely fastigiate or narrow in growth habit with dark green foliage. It is reported to produce dark red fruits. It is considerably narrower than S. *aucuparia* 'Fastigiata' and merits early evaluation.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
X *Sorbus hybrida*	Oakleaf Mountain-ash	I-A*, II*	24	15	Believed to be a natural hybrid of S. *aucuparia* x S. *intermedia* (Swedish mountain-ash), both European species. The foliage of this variable hybrid group is of special interest. Leaves on flowering stems may be simple, whereas other leaves are usually pinnate or cut nearly to the midrib at the base, but with leaflets lobed and toothed near the apex. The lower leaf surface is gray-pubescent. A number of clonal selections have been made from this hybrid, including 'Fastigiata,' with red fruits and a narrow, upright habit and 'Gibsii,' with beautiful coral-red fruits. Certain authorities list a clone named 'Leonard Springer' as belonging to this hybrid. It is reported to produce bitter red fruits not palatable to birds and consequently of extended ornamental value. Although questionable in hardiness, all of these cultivars merit trial by woody plant enthusiasts.
Sorbus scopulina	Greene's Mountain-ash	I, II, III*	15	11	Native. Large shrub or very small tree native to western United States. It has smooth brownish-orange bark and pinnate-compound leaves. Creamy-white flowers are followed by orange fruits. Young trees should be wrapped to prevent sun-scald damage. It is quite shade tolerant, but not tolerant to drought. An attractive ornamental, especially if pruned to a 3- or 5-trunk specimen. It has performed well as SDSU. Fall color is bright yellow.
Syringa pekinensis	Peking Lilac	I, II, III*	14	10	Little known but very attractive large shrub or very small tree. Chief ornamental quality is glossy, dark bronze peeling bark on trunk and older branches. Dark green leaves are ovate to ovate-lanceolate and branches are slender and spreading. Profuse yellowish-white flowers are produced in large panicles. Native to Northern China, this lilac merits popularizing. Excellent specimens grow in the University of Minnesota landscape arboretum.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
Syringa reticulata var. *reticulata* (syn. S. *amurensis* var. *japonica*)	Japanese Tree Lilac	All	22	14	Largest of the lilacs, this hardy plant is generally grown with multiple trunks as a small tree. It can be grown single trunked and the bark is very dark brown, rather smooth and cherry-like which is of interest in the winter. Leaves are variably broad-ovate in shape, generally pubescent beneath and somewhat coarse in texture. Although S. *reticulata* (Amur lilac) is a usable plant, the variety tends to bear larger, creamy-white, pyramidal flower clusters, flowers slightly later, and grows somewhat taller or more treelike. Main feature is showy flowers produced in mid-June after many woody plants have blossomed. Large size, presence of some suckers, and tendency to appear overgrown unless given maintenance pruning have hindered its acceptance.
Tilia americana[16]	American Linden (syn. Basswood)	All, IV*	65	45	Native. Rather large, round-topped, spreading tree excellent for shade in parks or wherever room permits. Not recommended in the drier locations. Trees growing in nature often display multiple trunks. Production of watersprouts around the base of the trunk is not uncommon, and sometimes occurs also in other linden species. Large broadly-ovate unsymetrical leaves are characteristic. It is capable of good yellow fall color, and merits wider planting.
Tilia americana 'Fastigiata'	Pyramidal American Linden	All, IV*	60	25	Pyramidal to ascending oval form makes this a distinctive tree. Foliage is fairly coarse. This cultivar might be used more for boulevards or even as a specimen because its growth habit is an advantage over that of the species.
Tilia cordata	Littleleaf Linden	I, II, III*	40	25	Medium-sized, slow-growing, densely pyramidal tree capable of becoming a fine specimen or street tree. Some problem has been encountered with hardiness and growth irregularities, depending upon origin or seed source. Trees under test at SDSU have proven fully hardy. Considerably finer textured than the above species, with rather leathery, glabrous and more glossy leaves. Young twigs are orange-brown and buds orange to reddish. Seldom produces fall color of value, but is relatively pest-free. Improved selections are becoming numerous.
Tilia cordata 'Chancellor'	Chancellor Littleleaf Linden	I*, II*, III*	35	15	The description for this clone varies little from that of Greenspire linden. It is compact, with a relatively narrow, upright growth habit. For trial only. (PP No. 2712.)

[16]Lindens flower in early to mid-summer. The inconspicuous flowers are mostly yellowish and very fragrant. Fruits are hard, pea-like nutlets which are pendent. Most lindens are slow in becoming established and grow slowly if sufficient moisture is not available. However, water and nitrogen fertilizer are best withheld in the fall because new shoots tend to winterkill on certain species if growth continues too late.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
Tilia cordata 'Greenspire'	Greenspire Linden	I, II*, III*	40	20	A cultivar selected for its straight trunk, upright-oval to pyramidal crown and radial branching habit. It has glossy leaves and is reported to grow more rapidly than the species. Although not adequately evaluated, trees grown under clean cultivation have shown some winter die-back at SDSU. (PP No. 2086.)
Tilia cordata 'Morden'	Morden Littleleaf Linden	All, III*, IV*	40	25	New cultivar, the lone survivor of a large lot of seedlings obtained by the Morden Research Station in Manitoba, Canada. Apparently very hardy; characterized by a symmetrical, dense, pyramidal to ovoid crown. Introduced through the Canadian Ornamental Plant Foundation. Worthy of early trial.
Tilia cordata 'Rancho'	Rancho Littleleaf Linden	I*, II*	35	16	Cultivar selected for whorled, wide angle branching pattern. Reportedly grows rather compact and narrowly pyramidal in shape. Performance in South Dakota is unknown. (PP No. 2092.)
Tilia cordata 'Swedish Upright'	Swedish Upright Linden	I*, II*, III*	30	10	This narrow, upright selection from Sweden is outstanding in form. Short lateral branches are borne at right angles to the trunk. For trial only.
X *Tilia euchlora*	Crimean Linden	I*, II*, III*	40	20	A hybrid linden believed to be of *T. cordata* x *T. dasystyla* (Caucasian linden) parentage. Seldom planted but often described as one of the handsomer lindens. Glossy, bright green foliage. Capable of producing excellent street or specimen tree broadly pyramidal in form. Adaptation in South Dakota is questionable but a cultivar introduced by a nursery in Fremont, Nebraska (see below) is proving to be a rather valuable tree.
X *Tilia euchlora* 'Redmond'	Redmond Linden	I, II, III*	50	20	Densely pyramidal, sturdy tree with large, dark green leaves. Buds and twigs often display reddish coloring. Has good growth rate, seems to be quite adaptable and is acquiring considerable popularty in the Midwest. This distinctive, beautifully shaped avenue tree shows potential as an American elm substitute. Use as specimen shade tree is also recommended. Performance in colder, drier and more exposed areas of the state is questionable.
X *Tilia europaea* 'Pallida'	Paleleaf Linden	I, II, III*	45	20	The European linden *(T. cordata* x *T. platyphyllos)* is a common hybrid street tree in Europe. The selection 'Pallida' is characterized by a straight central leader. Although similar to *T. cordata,* it has slightly larger leaves which tend to be a pale yellowish beneath. From a distance, leaf color is similar to the light green of common hackberry. Fully hardy at SDSU and deserves wider planting. Unfortunately, watersprouts sometimes develop along lower trunk.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
Tilia mongolica	Mongolian Linden	I, II, III*	30	16	Small, graceful tree proven hardy at SDSU. Leaves coarsely serrate and at times lobed. Twigs and buds are an attractive reddish-brown. Slight pendulous habit and overall pyramidal growth form is typical with age. Could well fill a need for parks, homes and general landscape use due to small to medium size.
Tilia platyphyllos	Bigleaf Linden	I*, II*	40	25	Where adapted this tree is capable of large size and a rounded to pyramidal form. Leaves are slightly smaller than those of native *T. americana*, but it is still one of the coarser foliaged European lindens. The cultivar 'Laciniata' is available in the nursery trade and is characterized by deep, irregular lobed leaves. Performance of these trees in South Dakota is unknown. For trial only.
Tilia tomentosa	Silver Linden	I-A*	—	—	A beautiful tree of broad pyramidal habit. Striking foliage is dark green above and whitish tomentose beneath. Listed strictly for trial purposes due to insufficient hardiness.
Ulmus americana[17]	American Elm	All	75	50	Native. Although this was the most popular shade and boulevard tree in North America, its future is in jeopardy over much of the continent due to the devastation and imminent spread of Dutch elm disease. Famous for its spreading vase or umbrella shape, this tree is outstanding in hardiness and adaptability under varied conditions of soil and climate. It was widely used in shelter plantings in the Plains. Rich, dark green foliage often turns bright yellow in the fall. American elm is characterized by a vigorous growth rate. Aphid attack and resulting honeydew production is annoying but damage generally slight. Development of weak V-crotches is a more significant problem and, unfortunately, appears to be accentuated in some of its more upright fastigiate cultivars. Such selections are clonally propagated, usually by grafting.

[17]The first case of Dutch elm disease was verified in southeastern South Dakota in 1967. A number of trees were found to be infected in 1968, especially in the Sioux Falls area. In 1969, the disease was found as far north as Hendricks, Minnesota, northeast of Brookings. In the summer of 1970 verified cases of the disease were noted at an accelerating rate, including the first trees in Brookings. As of July 1, 1970, Dutch elm disease was killing trees south and east of a line from Winner to Mitchell to Brookings in South Dakota. In 1971 the disease will likely spread north and west of this line. Therefore, general planting of American elm or its cultivars cannot be recommended. There is no known cure at present for the disease, although strict sanitation helps to limit or at least delay the disease. The use of DDT has been banned, and other insecticides, e.g., methoxychlor, are much less effective and more expensive. It is of significance that several seedling trees have been selected by tree breeders in different locations which are reputed to be resistant to the disease. Such trees will undoubtedly become available for evaluation, at least to experiment stations, within the next several years. However, due to the importance of this tree in northern plantings and the remote possibility that the disease will not reach epidemic proportions in the Northern Plains, the author believes that limited planting may still be permitted. With this in mind, the American elm and its cultivars have not been omitted from discussion in this publication.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
Ulmus americana 'Ascendens'	Ascending American Elm	All, IV*	65	16	Fastigiate cultivar with small lateral side branches forming narrow oval head. Potentially valuable accent tree, probably unknown or untested in South Dakota.
Ulmus americana 'Augustine'	Augustine Ascending Elm	All	70	18	Fastigiate selection regarded as having vigorous growth, stouter twigs and larger, more deeply toothed leaves. It has narrow, weak V-crotches but is a popular selection in some areas.
Ulmus americana 'Columnaris'	Columnar American Elm	All, IV*	65	20	A widely columnar form worthy of evaluation.
Ulmus americana 'Exhibition Boulevard'	Exhibition Boulevard Elm	All	70	30	Reportedly an upright, rather narrow vase-shaped tree with dense branchlet production.
Ulmus americana 'Lake City'	Lake City Elm	All	75	35	Densely branched tree of upright growth habit. Narrow at base, rather wide at top. Not truly vase shaped, however. Recommended for shade or boulevard purposes.
Ulmus americana 'Minneapolis Park'	Minneapolis Park Elm	All	75	35	Upright selection made by the Minneapolis Park Department with characteristics fitted for boulevard planting.
Ulmus americana 'Moline'	Moline Elm	All, IV*	75	30	Very attractive narrow tree. Main branches upright but with age become more spreading. Makes striking boulevard and accent tree with rich, dark green foliage.
Ulmus americana 'Morden'	Morden Elm	All	75	45	Very hardy, rapid growing, sturdy tree selected at the Morden Experiment Station in Manitoba, Canada, for ability to withstand severe ice storms without breakage. More spreading in habit than other cultivars under test at SDSU.
Ulmus carpinifolia 'Bea Schwarz'	Bea Schwarz Elm	I*, II*, III*	40	20	Smooth-leaved elm *(U. carpinifolia)* is a native of Europe. This species and its two cultivars are not fully adapted to Northern Plains conditions, but the two are resistant to Dutch elm disease. Bea Schwarz may be the hardier of the two, but is believed to be slower growing with little ornamental value. Not readily available in the nursery trade.
Ulmus carpinifolia 'Christine Buisman'	Christine Buisman Elm	I*, II*, III*	40	20	Produces more rounded tree rather than typical vase shape of *U. americana.* Leaves are bright green, creased at the midrib, leathery and glabrous. Canker susceptibility and slow growth have characterized plants under test at SDSU. Does not merit recommendation in South Dakota based on Dutch elm disease resistance alone.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
Ulmus glabra	Scotch Elm (syn. Wych Elm)	I-A, I-B* II, III*	65	30	Tall, European tree rather open and spreading. Dark green leaves are very coarse, sharply and doubly serrate, scabrous above and pubescent beneath. Bark remains smooth for many years. Two large trees are growing on the SDSU campus. Considering comparative qualities, including fall color, it is not as attractive as the American elm. For trial.
X *Ulmus hollandica* 'Groeneveld'	Groeneveld Elm	I-A*, I-B* II*, III*	—	—	Hybrid elm recently developed in Holland, highly resistant to Dutch elm disease. Parentage is *U. glabra* x *U. carpinifolia.* Described as small, stiff, upright tree with thick, attractively divided crown. Reputedly frost and wind resistant. Disadvantages: limited growth and heavy bloom production. This clone and another improved selection, named 'Commelin,' have largely replaced Christine Buisman elm in Holland. Performance in South Dakota unknown. Merit trial.
Ulmus japonica	Japanese Elm	I-A, I-B* II, III*	30	24	Medium sized, round topped tree which grows somewhat slowly. Specimens growing at SDSU are rather compact and attractive in form. Yellow fall color is common. Leaves are smaller than those of American elm, scabrous above and pubescent below. Sufficiently hardy and merits trial for use on smaller properties.
Ulmus laevis	European White Elm	I-A, I-B* II, III*	70	35	This attractive tree would not be distinguished from an American elm by the common observer. Several differences include elliptic or obovate leaves which are glabrous and more glossy above, sharp pointed buds, and bark that is not as deeply furrowed. Three large trees growing on the SDSU campus display a copperyorange fall color which readily distinguishes them from American elms. Although vase-shaped, they are not as spreading in growth habit as American elm. Branches are somewhat susceptible to breakage in storms, but it merits wider trial and evaluation.

Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
Ulmus pumila[18]	Siberian Elm	All	65	35	Extremely variable in growth habit producing rather open rounded head. It is finer textured than American elm and native to northern Asia. Early seed importations from Chinese sources were not sufficiently hardy in the northern plains and gave rise to the confusion in naming.[18] This species has become a very popular shelterbelt, shade and boulevard tree in the drier portions of the plains. Growth rate is extremely rapid, and it is drought resistant and tolerant of alkalinity. The value of this tree is now under question because a canker disease is taking a high toll in many areas, including shelter plantings. Apparently this problem may be caused by a complex of factors, one being the herbicide 2,4-D, which may weaken and predispose the trees to such maladies as canker. Consequently, it is not recommended for landscape purposes except where better species fail. Leaves are persistent in fall, resulting in poor autumn color. Due to rampant growth it is especially weak structured in moist or irrigated sites. It does have considerable resistance to Dutch elm disease.
Ulmus pumila 'Chinkota'	Chinkota Elm	All	60	40	Selection made at SDSU from hardy 'Dropmore' line for tendency to enter dormancy earlier in the fall. Also characterized by low, spreading branch habit, an attribute considered advantageous for better wind control in shelterbelts.
Ulmus pumila 'Dropmore'	Dropmore Elm	All	65	35	The Great Plains Section of the American Society for Horticultural Science proposed the cultivar name 'Dropmore' to designate the hardy strains of *U. pumila* grown from seed collected in Harbin, Manchuria, by the late F. L. Skinner of Dropmore, Manitoba, Canada. All lines now grown in Northern Plains are presumably of this origin.

[18]The Siberian elm is a classic example of a tree which has been carried along with an incorrect name by the general public as well as nurserymen. Laymen generally refer to this tree as the Chinese elm, which is actually an entirely different species (*U. parvifolia*) lacking sufficient hardiness for planting in the Northern Plains. Nurserymen are encouraged to list this tree by its legitimate name in nursery catalogs. It is unfortunate that the true Chinese elm lacks hardiness because it is a more attractive tree than the commonly planted Siberian elm.

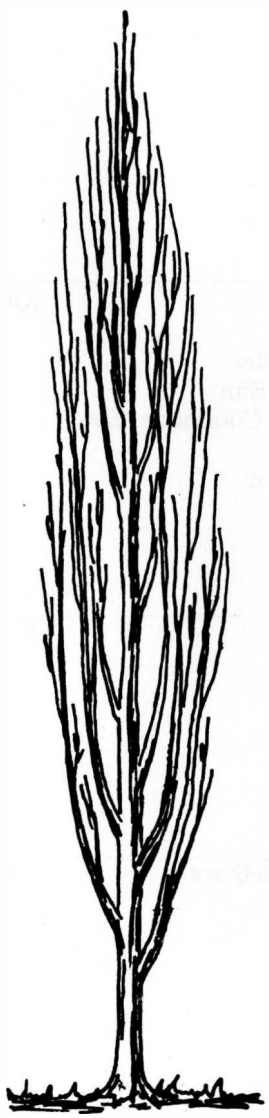
Botanical Name	Common Name	Zone Recommendation	Approximate Height in ft.	Approximate Spread in ft.	Descriptive Features
Ulmus rubra	Slippery Elm	I, II, III*	70	35	Native in the extreme eastern Dakotas. Several tall trees grow in Camden State Park south of Marshall, Minnesota. Although similar to American elm, it tends to produce a taller, clean trunk before main laterals arise. Bark is reddish-brown, whereas American elm has alternating rusty and buff-colored striations. Leaves are larger, often creased along the midrib, and scabrous. Large buds are pubescent and rusty-colored. Less usable species than American elm due to form and restricted adaptability, but it is of significance in elm hybridization.
X *Ulmus rubra-pumila* hybrids		All, IV*	65	40	Several Siberian-slippery elm hybrid cultivars have been named. These hybrids are very similar and probably indistinguishable. Generally characterized by very rapid growth and stronger branching habit than Siberian elm. Thus, they have greater resistance to splitting or breakage from ice and wind. Leaves vary from smaller *U. pumila* type to the larger, scabrous *U. rubra* type, but usually are intermediate in texture. These hybrids merit evaluation since they may have inherent Dutch elm disease resistance and drought tolerance. Performance to date appears promising.
X *Ulmus* 'Fremont'	Fremont Elm				
X *Ulmus* 'Hamburg'	Hamburg Elm				
X *Ulmus* 'Improved Coolshade'	Improved Coolshade Elm				
X *Ulmus* 'Rageth'	Rageth Elm				
Ulmus thomasii	Rock Elm	I*, II*	45	18	An eastern United States tree not fully adapted to the plains and generally of slow growth habit where it has succeeded. Twigs often develop conspicuous corky ridges, especially on younger trees, so it is often referred to as cork elm. Characterized by somewhat open but narrow growth habit. Tends to have leader with strongly crotched, short lateral branches. Seldom available commercially.
Zelkova serrata	Japanese Zelkova	I-A*, II*	30	24	Japanese relative of elms which becomes a large tree where adapted but produces only a small tree at best in South Dakota. Grows with short trunk and numerous ascending branches with round-topped outline. Leaves are rough above, turning a russet color in the fall. Closely resembles a small-leaved elm. It is resistant to Dutch elm disease, and Christine Buisman elm is sometimes grafted on this species. Because it is insufficiently hardy and adaptable, growth rate is very slow and it cannot be recommended. It shows susceptability to canker in some parts of the country.

Categorization of Trees by Form or Growth Habit

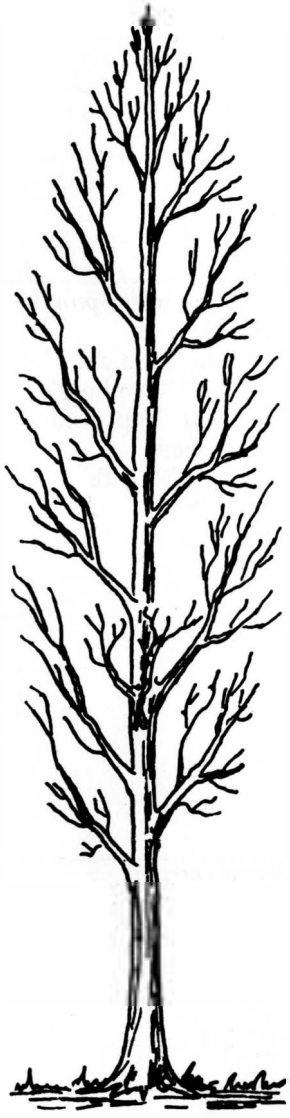
The following lists of trees are compiled on the basis of variation in tree form. Six of the major growth forms are illustrated in Figures 2-7. Although growth habit of most trees is quite predictable, considerable variation occurs due to genetic differences and environmental influences. Variation within clonal trees is due entirely to differences of environment. Such unforeseen factors as insects, diseases and storm damage may also play a role. Therefore, exceptions to the suggested tree forms are to be expected. One must remember that the tree forms illustrated in the figures are very idealistic. Due to variation in form, a few trees appear in more than one category. Trees are listed in alphabetical order by common name.

Fastigiate and/or Columnar (Figure 2)

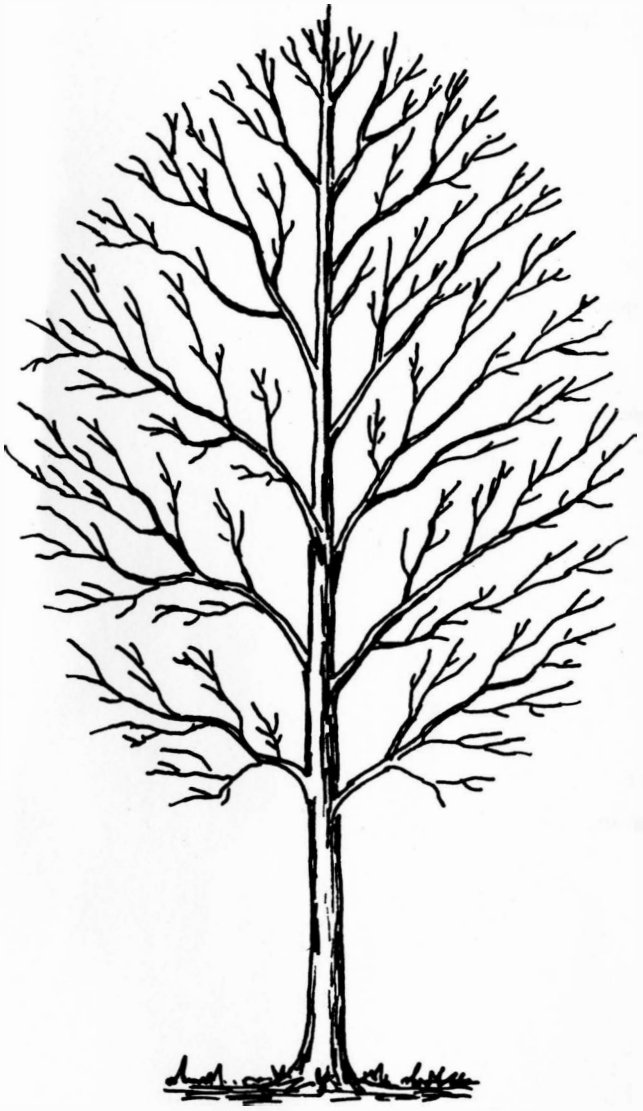
Algerian Black Poplar
Ascending American Elm
Augustine Ascending Elm
Berlin Poplar
Bolleana Poplar
Columnar American Elm
Columnar European Aspen
Columnar European Birch
Columnar Norway Maple
Columnar Siberian Crabapple
Cottonwood (young trees)
Fastigiate Black Locust
Lombardy Poplar
Newton Sentry Maple
Olmsted Norway Maple
Pink Spires Crabapple
Pyramidal Simon Poplar
Slavin's Upright Maple
Strathmore Crabapple
Sundog Crabapple
Swedish Upright Linden
Temple's Upright Maple
Upright European Mountain-ash
Van Eseltine Crabapple
Vanguard Crabapple
White Candle Crabapple
Wilson Columnar Mountain-ash



Fastigiate Tree



Columnar Tree



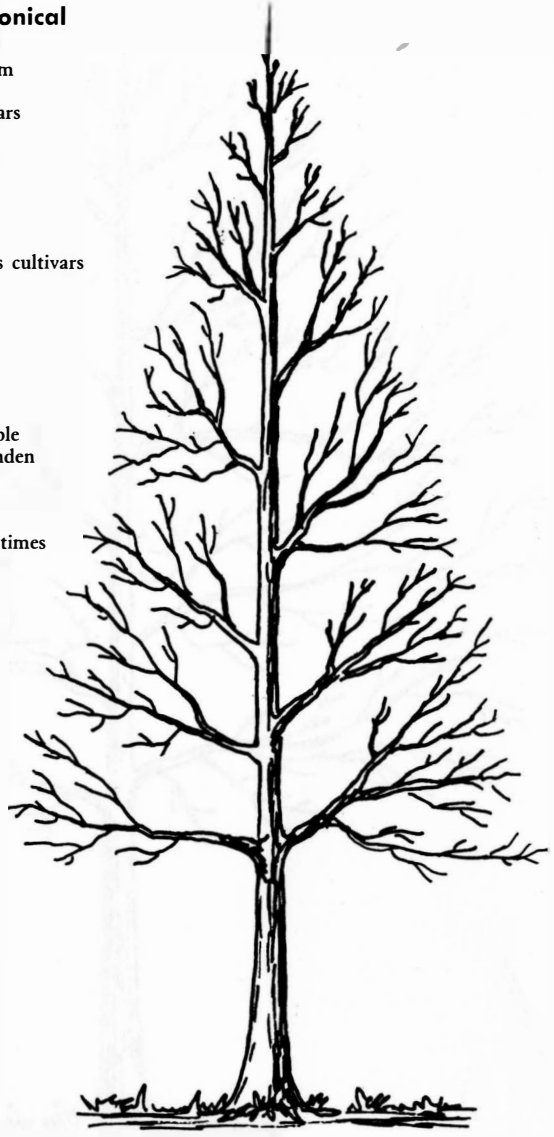
Oval Tree

Oval (Figure 3)

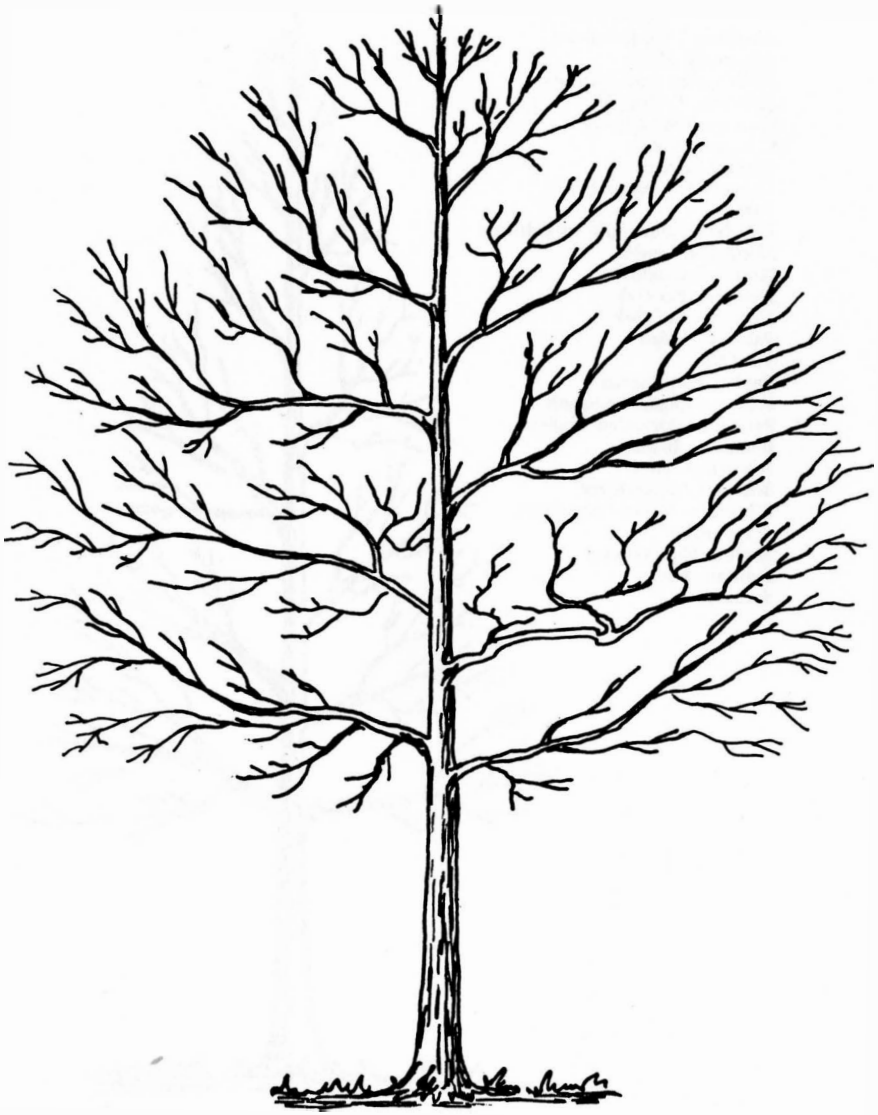
Amur Chokecherry
Black Cherry
Black Walnut
Cleveland Norway Maple
Dolgo Crabapple
Emerald Queen Norway Maple
Evelyn Crabapple
Green Ash
Greenlace Maple
Green Mountain Maple
Jack Crabapple
Kelsey Crabapple
Kentucky Coffee-tree
Lemoine Crabapple
Liset Crabapple
Marshall's Seedless Ash
Mountain-ash species and cultivars
Newport Plum
Rock Elm
Royalty Crabapple
Schubert Chokecherry
Shagbark Hickory
Snowbird Hawthorn
Snowdrift Crabapple
Sugar Maple
Summershade Maple
Ussurian and Harbin Pear
Variegated Norway Maple

Pyramidal or Conical (Figure 4)

American Hop-hornbeam
Armstrong Maple
Birch species and cultivars
Calocarpa Crabapple
Cashmir Mountain-ash
Crimean Linden
Gerling Maple
Korean Mountain-ash
Larch
Littleleaf Linden and its cultivars
Mongolian Linden
Northern Catalpa
Northern Pin Oak
Northern Red Oak
Paleleaf Linden
Pin Oak
Poplars and Aspens
Prince Georges Crabapple
Pyramidal American Linden
Redmond Linden
Scanlon Maple
Schubert Chokecherry
Schwedler Maple (sometimes rounded)
Skyline Honey-locust
Summit Ash
Sycamore



Pyramidal or Conical Tree



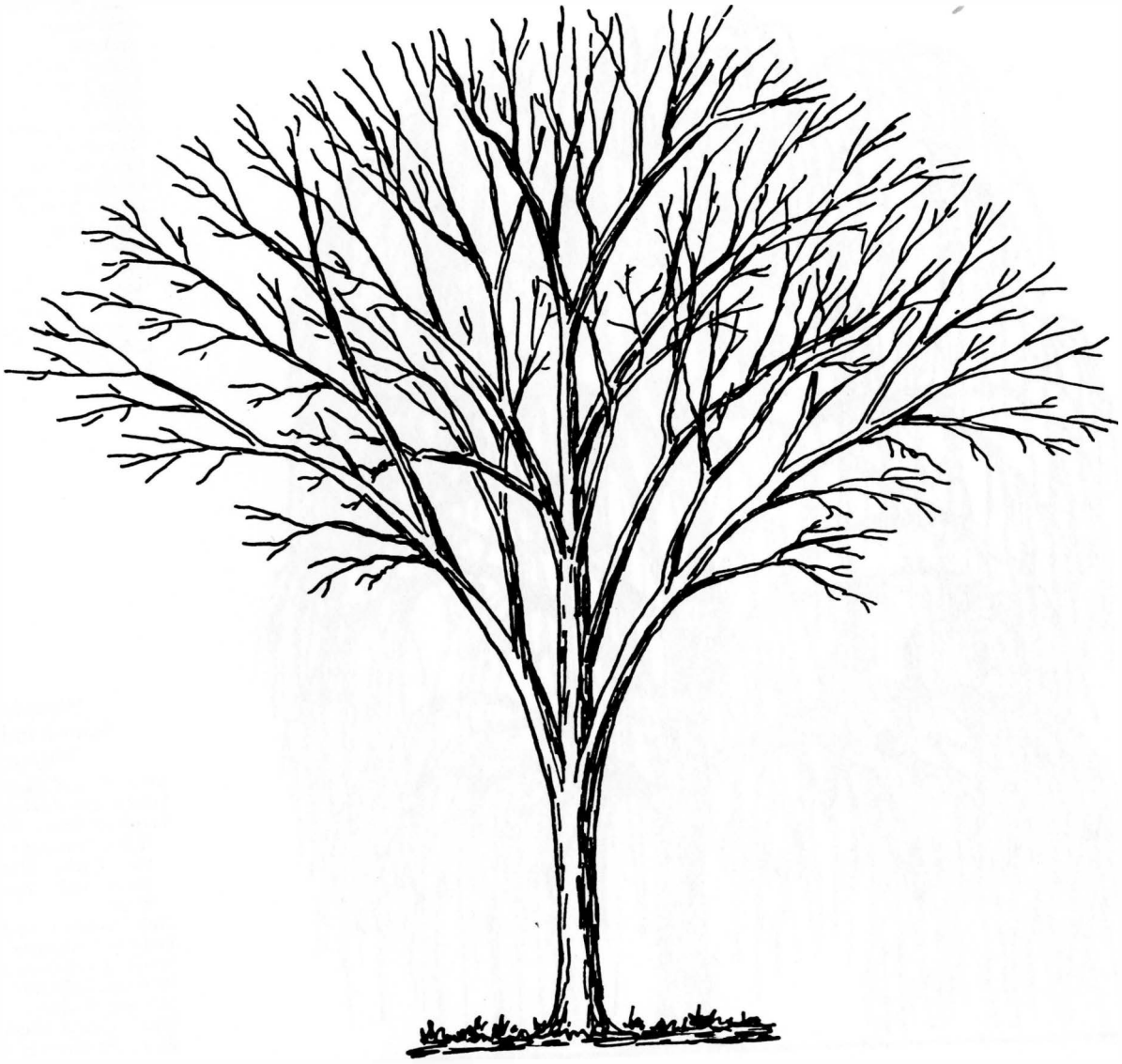
Rounded or Globe-Headed Tree

Rounded or Globe-Headed (Figure 5)

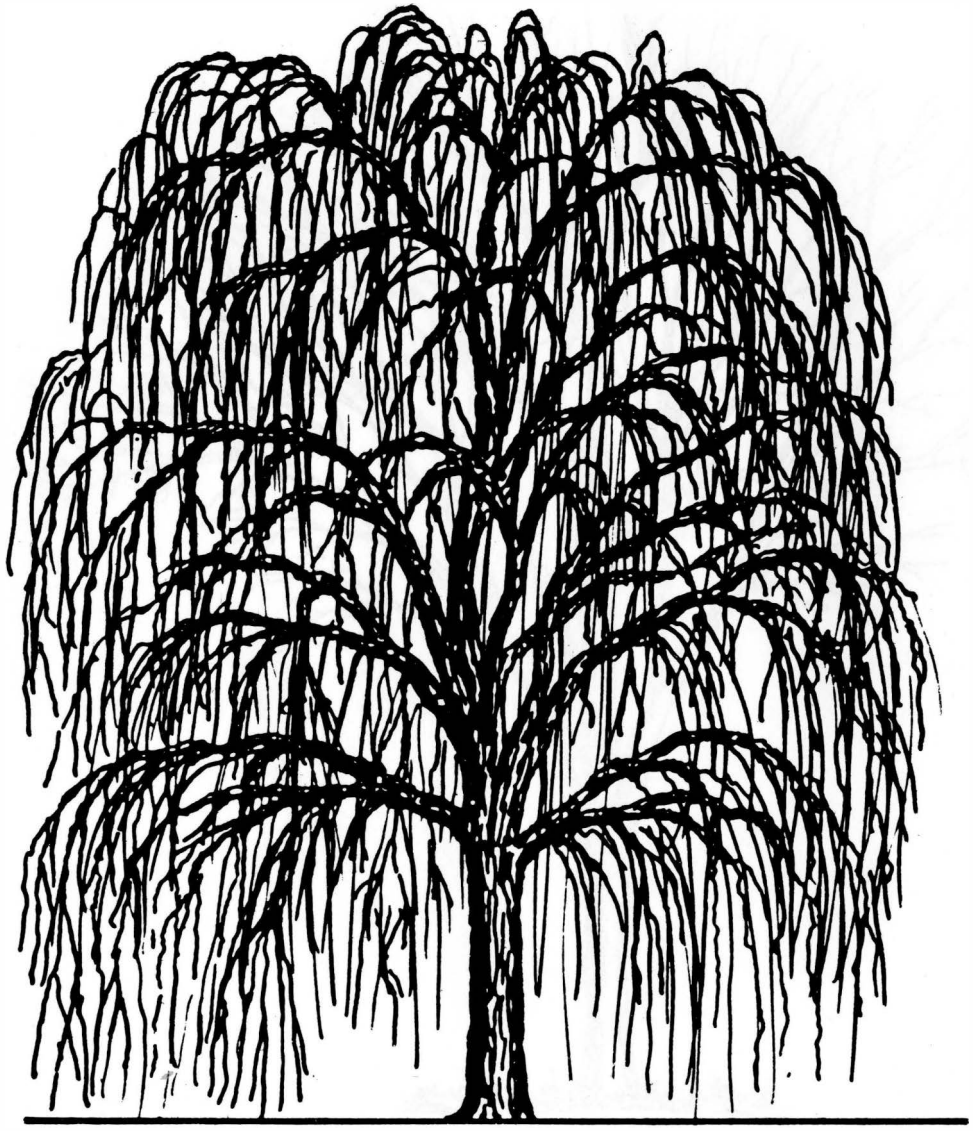
Amur Maackia
Bechtel Crabapple
Black Oak
Bur Oak (variable)
Common Buckthorn
Common Hackberry
Common Hop-tree
Crimson King Maple
Eley Crabapple
Ellen Gerhart Crabapple
Flame Crabapple
Globehead Norway Maple
Globe Locust
Goldenrain-tree
Hawthorns
Imperial Honey-locust
Indian Magic Crabapple
Japanese Elm
Japanese Tree Lilac
Japanese Zelkova
Laurel Willow
Norway Maple
Ohio Buckeye
Patricia Crabapple
Pissard Plum
Purpleblow Maple
Radiant Crabapple
Redglobe Crabapple
Roundhead Ash
Scarlet Oak
Selkirk Crabapple
Sour Cherry
Sparkler Crabapple
Spring Snow Crabapple
Tilford Maple
White Ash and its cultivars
White Oak

Vase or Umbrella (Figure 6)

American Elm
Beatrice Honey-locust
Common Hackberry
Cottonwood (older trees)
European White Elm
Exhibition Boulevard Elm
Ginkgo
Harbinger European Bird Cherry
Lake City Elm
Minneapolis Park Elm
Moline Elm
Morden Elm
Moraine Honey-locust
Scotch Elm
Silver Maple and its cultivars
Slippery Elm
Sundog Crabapple
Van Eseltine Crabapple
Vanguard Crabapple



Vase or Umbrella-Shaped Tree



Weeping Tree

Spreading to Variably Rounded

Almey Crabapple
American Linden
Amur Cork-tree
Amur Maple
Apricots
Bigleaf Linden
Black Locust
Butternut
Cockspur Hawthorn
Cottonwood
Crack Willow
Dorothea Crabapple
Eastern Redbud
Elm hybrids
Ginkgo
Green Ash
Honey-locust and certain cultivars
Hopa Crabapple
Horse-chestnut species and cultivars
Idaho Locust
Katherine Crabapple
Kibele Crabapple
Lanceleaf Poplar
Manchu Crabapple
Norway Maple
Northwest Poplar
Peachleaf Willow
Peking Lilac
Purple Wave Crabapple
Red Silver Crabapple
Red Splendor Crabapple
Russian Mulberry
Russian-olive
Siberian Crabapple
Siberian Elm and its cultivars
Silver Linden
Silver Poplar
Sycamore
Tatarian Maple
Tree of Heaven
White Poplar
White Willow and certain cultivars

Weeping or Semi-Pendulous[19] (Figure 7)

Beebe Cutleaf Maple
Echtermeyer Crabapple
European White Birch and its cultivars (especially Cutleaf Weeping Birch, Slender European Birch and Young's Weeping Birch)
Pink Cascade Crabapple
Red Jade Crabapple
Weeping European Mountain-ash
Weeping Mulberry
Weeping Willow
Wier's Cutleaf Maple
Wisconsin Weeping Willow

[19]Semi-pendulous trees are not as extreme in weeping habit as illustrated in Figure 7.

Irregular Growth Habit

Alders
American Plum
Amur Cork-tree
Box-elder
Bur Oak
Common Chokecherry
Cottonwood
Crack Willow
Green Ash
Japanese Tree Lilac
Manchurian Apricot
Mulberry
Peachleaf Willow
Pin Cherry
Siberian Elm and its cultivars
Slippery Elm
Staghorn Sumac
White Poplar
White Willow

Trees with Particular Landscape Qualities and Adaptabilities

The following tree lists serve as a quick reference in checking specific landscape assets and adaptabilities of deciduous trees. Trees are listed by common name in alphabetical order.

Trees with Colorful or Interesting Winter Twigs or Bark

Amur Chokecherry
Amur Cork-tree
Amur Maackia
Birch species and cultivars
Common Hackberry
Common Hop-tree
Hawthorns
Japanese Tree Lilac
Kentucky Coffee-tree
Lindens
Mountain-ash species and cultivars
Peking Lilac
Poplars and Aspens
Shagbark Hickory
Staghorn Sumac
Sour Cherry
Sycamore
Willows (especially Redstem, Golden and Weeping Willows)

Trees with Ornamental Flowers

Amur Maackia
Birch species and cultivars
Black Locust and its cultivars
Common Hop-tree
Crabapples
Eastern Redbud
Goldenrain-tree
Hawthorns
Horse-chestnut species and cultivars
Idaho Locust
Lilacs
Lindens
Mountain-ash species and cultivars
Northern Catalpa
Norway Maple and its cultivars
Ohio Buckeye
Poplars and Aspens
Prunus species and cultivars
Red Maple
Serviceberries
Silver Maple and its cultivars
Ussurian and Harbin Pear
Willows

Trees with Ornamental Fruits

American Plum*
Amur Maple
Beauty Crabapple*
Black Cherry
Common Chokecherry*
Common Hop-tree
Crabapples
Dolgo Crabapple*
Goldenrain-tree
Hawthorns
Kentucky Coffee-tree
Manchurian Apricot*
Mountain-ash species and cultivars
Mountain Maple
Northern Catalpa
Oaks
Patricia Crabapple*
Pin Cherry
Saskatoon Serviceberry*
Sour Cherry*
Staghorn Sumac
Sycamore
Tree of Heaven

An asterisk (*) following a name indicates that fruit from the tree is edible.

Trees with Colorful Summer Foliage

Coyote Willow
Crimson King Maple and related cultivars
Newport Plum
Pissard Plum and its cultivars
Purpleleaf Birch and related cultivars
"Purpurea" hybrids and related purple-leaved crabapples
Rubylace Honey-locust
Russian-olive
Schubert Chokecherry
Schwedler Maple
Sunburst Honey-locust
Variegated Norway Maple

Trees with Outstanding Fall Color

American Elm and its cultivars
American Linden
Amur Maple
Apricots*
Autumn Purple Ash
Bigtooth Aspen*
Birch species and cultivars*
Black Cherry
Cockspur Hawthorn*
Common Hop-tree
Cottonwood*
European White Elm
Ginkgo
Green Ash
Japanese Elm
Larch*
Oaks (excluding Bur Oak)*
Mountain-ash species and cultivars*
Mountain Maple
Norway Maple and its cultivars
Ohio Buckeye
Pink Spires Crabapple
Quaking Aspen*
Rocky Mountain Maple
Rosehill Ash
Shadblow Serviceberry
Silver Maple and its cultivars
Slavin's Upright Maple
Staghorn Sumac
Sugar Maple and its cultivars*
Summit Ash
Tatarian Maple
Ussurian and Harbin Pear*

An asterisk (*) following a name indicates that these trees are capable of producing good fall color even after a rather severe autumn frost.

Trees for Semi-Shaded Sites

Alders
American Hop-hornbeam
Birch species and cultivars
Common Hop-tree
Larch
Lindens
Mountain Maple
Serviceberries
Shagbark Hickory
Slavin's Upright Maple
Sour Cherry
Sugar Maple and its cultivars

Trees for Moist Soils

Alders
American Hop-hornbeam
Birch species and cultivars
Black Ash
Blue Ash
Larch
Lindens
Mountain Maple
Poplars and Aspens
Red Maple and its cultivars
Rocky Mountain Maple
Shagbark Hickory
Slavin's Upright Maple
Sugar Maple and its cultivars
Sycamore
Willows

Trees That Withstand Dry Soils

American Elm and its cultivars
American Plum
Amur Chokecherry
Amur Maple
Black Locust
Box-elder
Bur Oak
Common Buckthorn
Common Chokecherry
Common Hackberry
Crabapples (majority)
False Lombardy Poplar
Goldenrain-tree
Green Ash and its cultivars
Harbinger European Bird Cherry
Hawthorns
Honey-locust and its cultivars
Idaho Locust
Kentucky Coffee-tree
Northern Catalpa
Russian Mulberry
Russian-olive
Schubert Chokecherry
Siberian Elm and its cultivars
Staghorn Sumac
Tree of Heaven
White Poplar and its cultivars

Trees That Withstand Alkaline Soils

American Elm and its cultivars
American Plum
Amur Chokecherry
Box-elder
Bur Oak
Common Chokecherry
Common Hackberry
Cottonwood
Green Ash and its cultivars
Hawthorns (especially native species)
Honey-locust and its cultivars
Northwest Poplar
Quaking Aspen
Rosehill Ash
Russian-olive
Saskatoon Serviceberry
Schubert Chokecherry
Siberian Elm and its cultivars
Siouxland Cottonwod
White poplar and its cultivars
Willows

Iron Chlorosis in Alkaline Soils

The following trees especially exhibit iron chlorosis in alkaline soils:
Maples (excluding Box-elder)
Oaks (excluding Bur Oak)
Birch (certain species)

Sunscald Susceptibility

The following trees should be wrapped for several years after transplanting due to sunscald susceptability:
Crabapples
Honey-locust and its cultivars
Lindens
Maples (excluding Box-elder)
Mountain-ash species and cultivars
Prunus (certain species)
Sycamore

Trees Needing More Evaluation in South Dakota

The following trees need more thorough evaluation for South Dakota conditions because their performance is very questionable or unknown.
American Yellowwood
Arnold Mountain-ash
Babylon Weeping Willow
Bigleaf Linden
Black Ash
Black Myrobalan Plum
Black Poplar
Blue Ash
Cashmir Mountain-ash
Crimean Linden
Dahurian Birch
Eastern Redbud
Fastigiate Black Locust
Fuji Crabapple
Ginkgo
Globe Locust
Goldenrain-tree
Hedge Maple
Honey-locust (several cultivars)
Horse-chestnut species and cultivars
Korean Mountain-ash
Korean Poplar
Larch (several species)
Littleleaf Linden (several cultivars)
Mountain Maple
Norway Maple (several cultivars)
Oakleaf Mountain-ash
Oaks (excluding Bur Oak)
Purpleblow Maple
Purpleleaf Birch and related cultivars
Red Jade Crabapple
River Birch
Red Maple and its cultivars
Rocky Mountain Maple
Shadblow Serviceberry
Shagbark Hickory
Silver Linden
Slavin's Upright Maple
Sugar Maple (several cultivars)
Sycamore
Thundercloud Plum
Thurlow Weeping Willow
Tree of Heaven
White Angel Crabapple
White Ash and its cultivars
Wisconsin Weeping Willow

Glossary

Acuminate—tapering at the end, long pointed.
Alkaline soil—basic in pH, opposite of acid soil.
Alternate—not opposite, one leaf or axillary bud at a node.
Asexual propagation—starting a new plant by vegetative means, not by seed.
Ascending—growing almost vertically, curving upward.
Astringent—very sour in taste.

Bipinnate—doubly or twice pinnate.
Botanical variety—plants in nature which differ from the typical species; differences are often of geographical significance.
Bract—a modified leaf-like organ.
Bud scales—small, dry, modified leaves covering a bud.
Budding—transferring a bud of one tree by placing it in contact with the cambium of another tree—a means of asexual propagation.

Calcareous—composed of calcium carbonates or like materials.
Catkin—elongated flower clusters of birch, poplars and willows.
Chlorosis (chlorotic)—development of unnaturally yellowish or cream-colored leaves which often occurs in alkaline soils due to the unavailability of iron.
Clone—a cultivar developed by vegetative propagation (cuttings, grafting, budding, etc.) from a single original plant; not seed propagated.
Columnar—narrow, upright, closely branched tree.
Compound leaf—a leaf divided into separate parts called leaflets.
Conical—shaped like a cone.
Conifer—cone bearing tree.

Cultivar—a plant which is developed, propagated, and maintained under cultivation by man, a *cultivated variety.*

Cutting—shoot or twig removed from a plant as a means for propagating or renewing that plant.

Deciduous—leaves not persistent, not evergreen, leaves shed annually.

Deltoid—triangular, delta-shaped.

Dioecious—having staminate and pistillate flowers on separate plants.

Elliptic—widest at the middle, tapering equally to each end and about twice as long as wide.

Entire—with an even margin, not toothed or divided.

Exfoliating—peeling off in thin layers or plates.

Exotic—unusual.

Fastigiate—narrowly upright in form, usually with multiple erect branches.

Foliar—pertaining to leaf or leaf-like parts.

Genus—subdivision of a family usually consisting of several closely related species.

Glabrous—smooth, not rough or hairy.

Globe-headed—rounded.

Graft—a means of propagation whereby the scion of one tree is inserted into the stock of another tree.

Growth habit—form.

Hybrid—a cross-breed of two species or cultivars.

Internode—portion of stem between two nodes.

Lanceolate—lance-shaped, tapering gradually from the base to a point at the apex.

Lateral—side or secondary branches.

Leader—The primary, upright trunk of a tree.

Leaflet—a single division of a compound leaf.

Legume—pod or fruit of the pea family which splits into halves when ripe.

Lenticel—loose, corky tissue which appears as a line or dot on bark surface.

Linear—long and narrow with parallel margins.

Lobe—a segment of a leaf whose margin is too deeply cut to be called toothed.

Lobed—divided into or bearing lobes.

Macro-environment — The overall climatic complex to which plants are subjected on a large scale, e.g., South Dakota or the Northern Plains.

Micro-environment—Localized climatic conditions which vary from the norm (macro-environment), e.g., the Black Hills, a city locality or a farm well protected by shelterbelts.

Monoecious—having staminate and pistillate flowers on the same plant.

Naturalized—growing and reproducing without cultivation and originally from a foreign area.

Needle—very narrow, elongated leaf.

Node—point on stem where leaves arise.

Nutlet—very small, nut-like fruit.

Oblanceolate—lanceolate, but broadest near tip.

Obovate—ovate, but broadest near the tip.

Opposite—two leaves or buds opposite one another at a node.

Oval—Broadly elliptical, less than twice as long as wide.

Ovate—egg-shaped with widest end toward base.

Palmate—a compound leaf in which the leaflets diverge from a common point, like the fingers of a hand.

Panicle—a branched, compound flower cluster.

Pendulous—drooping.

Perfect—flower having both pistil and stamens.

Persistent—remaining attached, not falling off, e.g., leaves or fruits.

Petiole—stalk of a leaf.

Pinnate—compound leaf with leaflets arranged along the sides of a central axis.

Pistillate—flower having a pistil, but no stamens.

Pod—a dry fruit which splits into halves (legume).

Pubescent—covered with short, soft hairs.

Pyramidal—growth form of tree resembling shape of a pyramid.

Raceme—a cluster of pedicelled flowers borne on an elongated axis.

Resinous—with resin, sticky.

Rhombic—diamond-shaped.

Rugose—wrinkled.

Saline—salty.

Samara—a simple winged fruit, e.g., of ash or maple.

Scabrous—rough to the touch.

Serrate—with fine, sharp teeth along leaf margin.

Silky—close-pressed, soft pubescence.

Simple—not branched, not compound.

Species—a group of plants which have almost identical characteristics, based primarily on flower characters.

Spur—very short, blunt branches.

Staminate—flower bearing stamens, but no pistil.

Sterile—unproductive, fruitless.

Stipules—pair of leaflike appendages at base of petiole.

Subopposite—not truly opposite, e.g., buds of buckthorns.

Sucker—shoots produced from below ground arising at a distance from the base of the tree.

Taproot—single, long descending root.

Tomentose—woolly, feltlike.

Toothed—notched or serrated leaf margin.

Trifoliate—leaf consisting of three leaflets.

Variegated—multi-colored leaf pattern.

Watersprouts—vigorous adventitious shoots which arise along trunk or main branches.

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