

*Iowa Association of Naturalists*

*Iowa's Plants*



**Seeds, Nuts, and Fruits  
of Iowa Plants**



# Iowa Association of Naturalists

The Iowa Association of Naturalists (IAN) is a nonprofit organization of people interested in promoting the development of skills and education within the art of interpreting the natural and cultural environment. IAN was founded in 1978 and may be contacted by writing the Conservation Education Center, RR 1, Box 53, Guthrie Center, IA 50115.

## Iowa's Plants Booklet Series

Plants are a beautiful and important part of nature in Iowa. To assist educators in teaching their students about the common plants of Iowa, the Iowa Association of Naturalists has created a series of booklets which offer a basic, understandable overview of Iowa's plants, their ecology, and their benefits and dangers to people. The seven booklets in this series include:

- Iowa's Spring Wildflowers** (IAN-301)
- Iowa's Summer and Fall Wildflowers** (IAN-302)
- Benefits and Dangers of Iowa Plants** (IAN-303)
- Iowa's Trees** (IAN-304)
- Seeds, Nuts, and Fruits of Iowa Plants** (IAN-305)
- Iowa's Mushrooms and Nonflowering Plants** (IAN-306)
- Iowa's Shrubs and Vines** (IAN-307)

For ordering information about these and other IAN publications, please see the back cover of this booklet.



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# Seeds, Nuts, and Fruits of Iowa Plants

## What Are Seeds?

Seeds are tiny packages of life. Within them lie all the information necessary to begin a new plant's life. Seeds develop from flowers, and flowers develop from seeds. This continual cycle is the reason plants have inhabited Earth for millions of years.

### Angiosperms and Gymnosperms

Flowers and cones contain ovules, which hold the eggs of plants. When eggs are united with pollen, they become fertilized. Then the ovule and its fertilized egg become the seed.

Seeds are borne in one of two ways, enclosed or exposed. Enclosed seeds form in an ovary within a flower. As the ovary enlarges, a fruit is formed. This fruit provides protection for the seed. Examples of plants that form seeds this way are broad-leaved trees, grasses, and wildflowers. They are called **angiosperms** or flowering plants. Angiosperms put a great deal of energy into seed production and often offer pleasing treats like berries and fruits to ensure distribution.

Exposed or naked seeds are produced on the surface of scales in cones. They are not enclosed during pollination. Conifers are plants that produce seeds in this manner. Plants that produce naked seeds are called **gymnosperms** and are non-flowering plants.

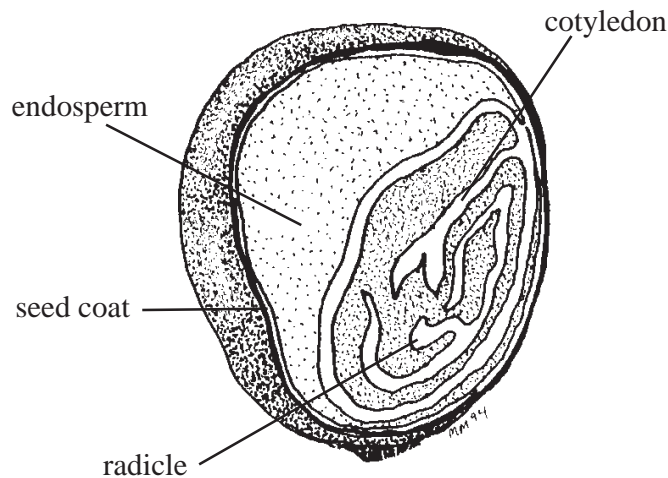
A seed consists of an embryo and stored food



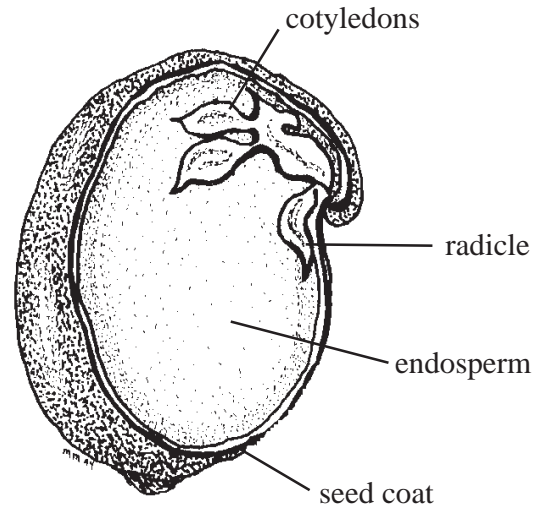
covered by a **seed coat**. The seed coat protects the seed from injury, insects, and water loss. Stored food is essential for the living embryo while the seed is dormant.

The embryo is the part of the seed that contains the necessary information that allows the seed to grow into a plant like its parent. Various cells within the embryo will become the roots, shoot, and leaves.

## Monocot



## Dicot



### **One Cotyledon, Two Cotyledons, More**

A **cotyledon** is the “leaf” of the embryo. It stores food for the developing embryo. There may be one, two, or more cotyledons in a seed. The number of cotyledons can be helpful in identifying plants. Gymnosperms have from two to eight cotyledons while angiosperms have either one or two cotyledons. Plants with one cotyledon are called **monocotyledons** (monocots), and those with two are **dicotyledons** (dicots).

Besides the number of cotyledons, monocots and dicots have other general differences. Monocots tend to have flower parts in threes and parallel leaf veins, as in a blade of grass. Dicots tend to have flower parts in fours or fives and webbed or netlike leaf veins, as in maple leaves.

## Seed Germination

Germination is the beginning of seed growth. It begins when the embryo starts growing and continues through the appearance of the first leaves above ground. Water, oxygen, and proper temperatures are needed for germination to take place. When a seed absorbs water, the embryo begins to use the stored food and grows. Before some seeds can absorb water, the hard seed coat must be broken. For some plants this occurs through cold winter temperatures. Others require exposure to minerals in the soil.

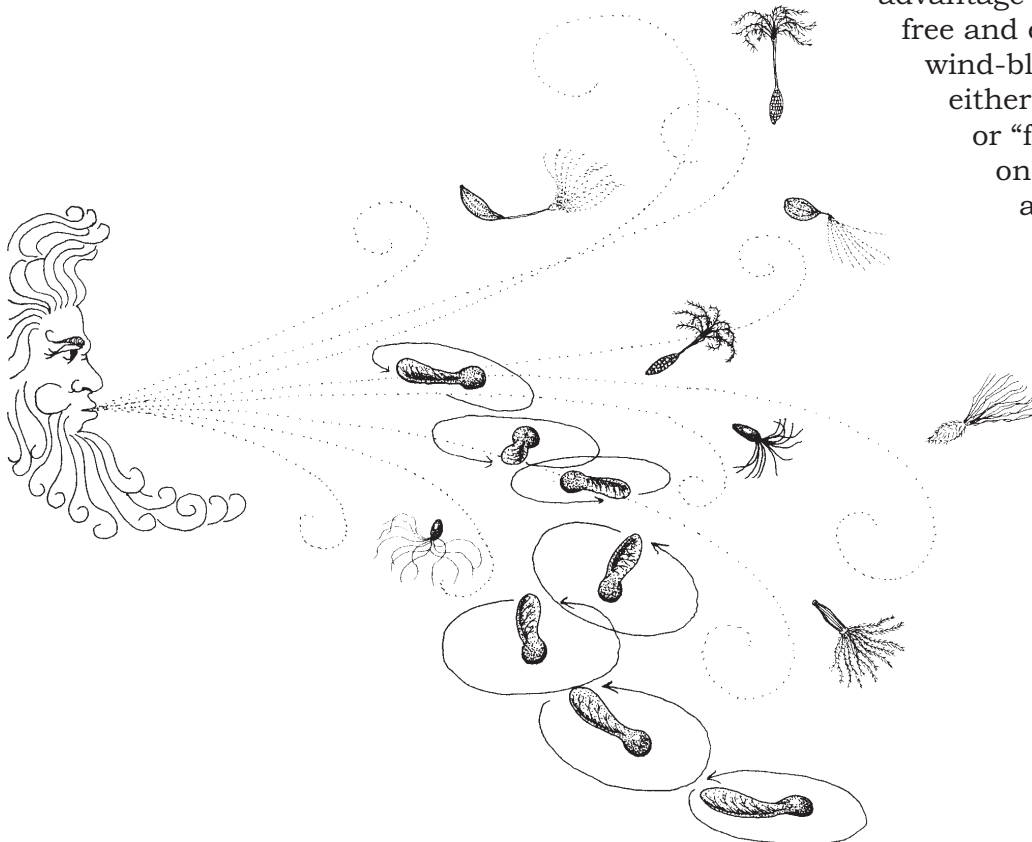
## Seed Dispersal

Seeds must be dispersed or scattered to ensure survival of the species. Getting away from the parent plant increases the opportunities for seeds to successfully become mature plants.

Since plants themselves cannot move, the seeds must be prepared to travel. Seeds are transported by one of four ways: water, wind, self-propulsion, and animals—including people.

### Wind Dispersal

Plants that rely on wind for distribution usually produce numerous light-weight seeds. To take advantage of the wind's free and easy service, wind-blown seeds either "parachute" or "fly." Dandelions, milkweed and thistles have seeds



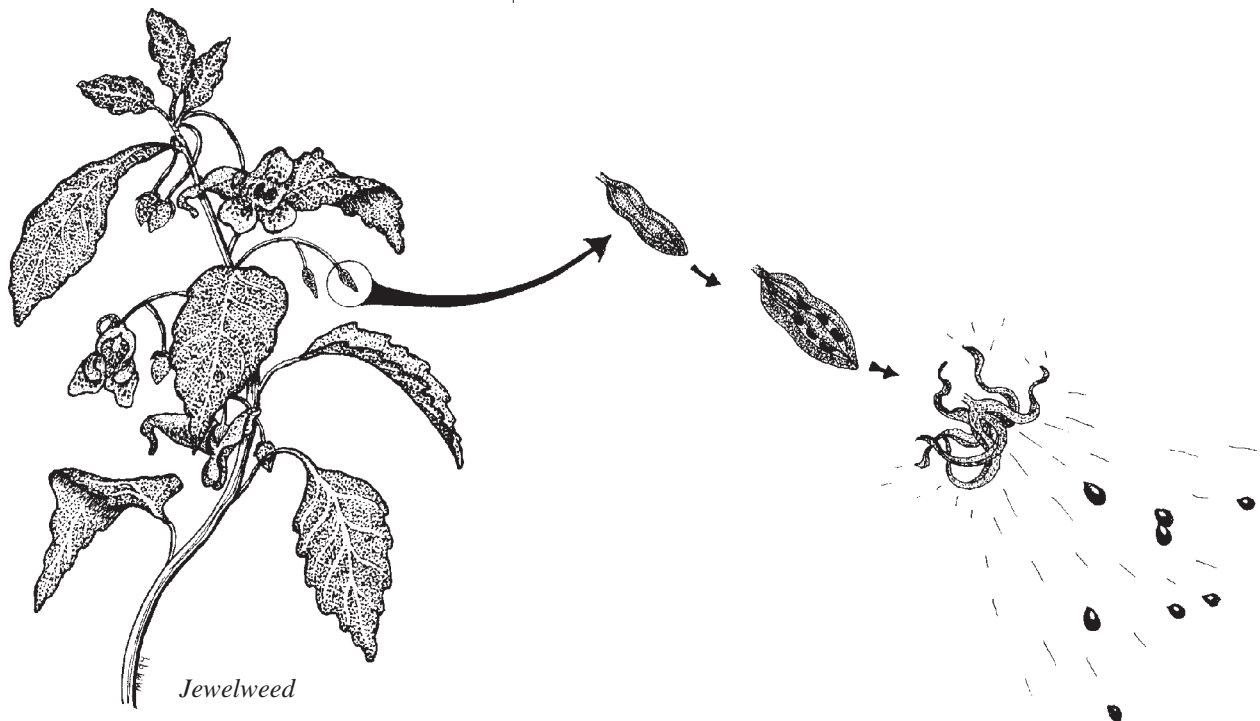
attached to tufts of hairs called pappis. These light tufts function as parachutes. Seeds that “fly” are actually enclosed in a fruit that has “wings.” Elm, ash, and maple are examples of plants that produce seeds with winged fruits.

### Water Dispersal

Water is another readily available transporter of seeds. Water-carried seeds are buoyant and have water-resistant seed coats. Seeds lighter than water easily float. Other seeds may be packaged in an envelope of air or contain a drop of oil. Rainwater runoff, streams, rivers, and oceans all move seeds from one place to another. Willow and cottonwood seeds may be carried by water.

### Self-Dispersal

Plants such as witch hazel, jewelweed, violets and wild cucumber fling their seeds. These plants are able to “shoot” their seeds into the air from pods. Water may force pods open, or, more commonly, the pods shrink as they dry and burst open to propel their seeds.

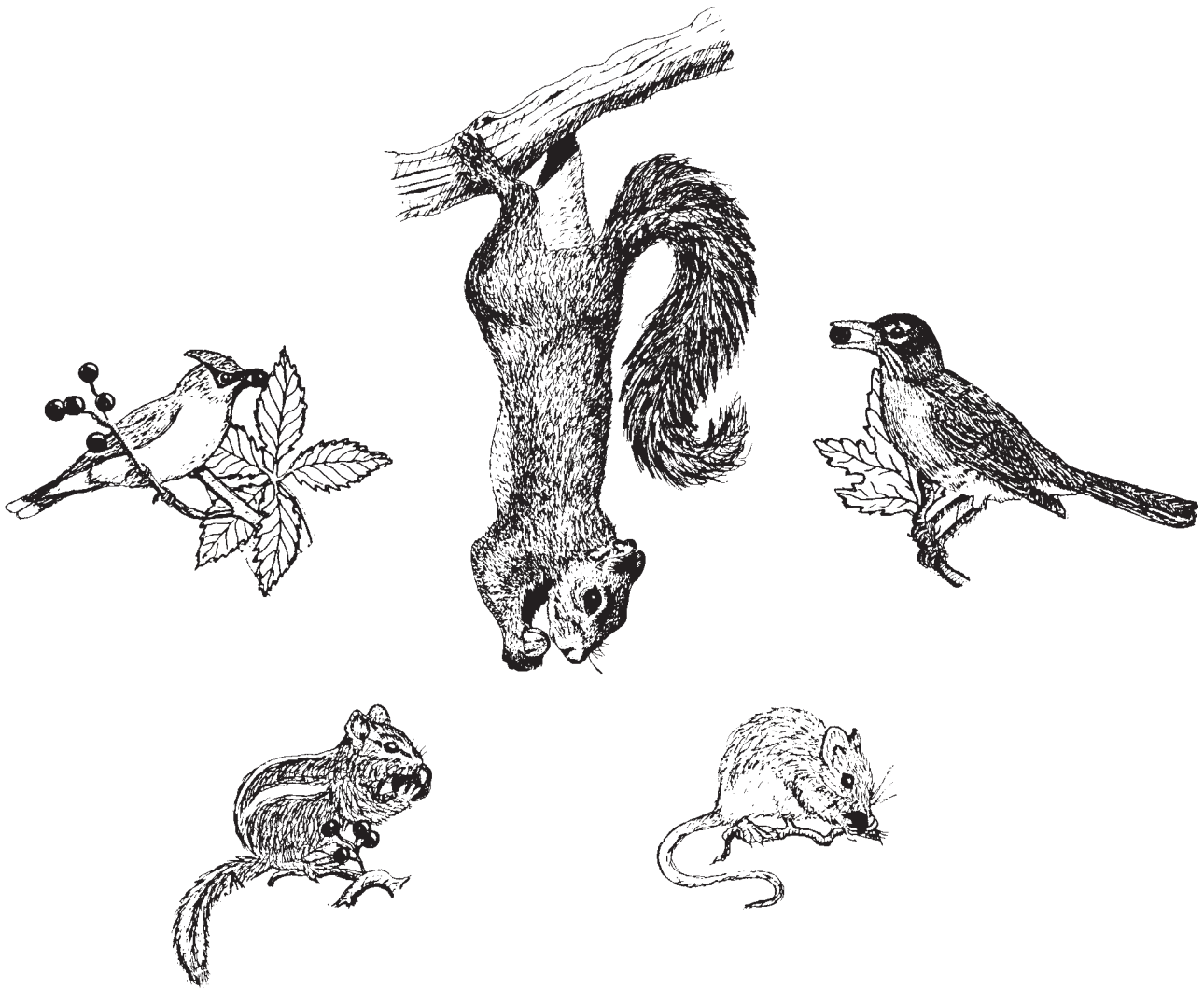




## Animal Dispersal

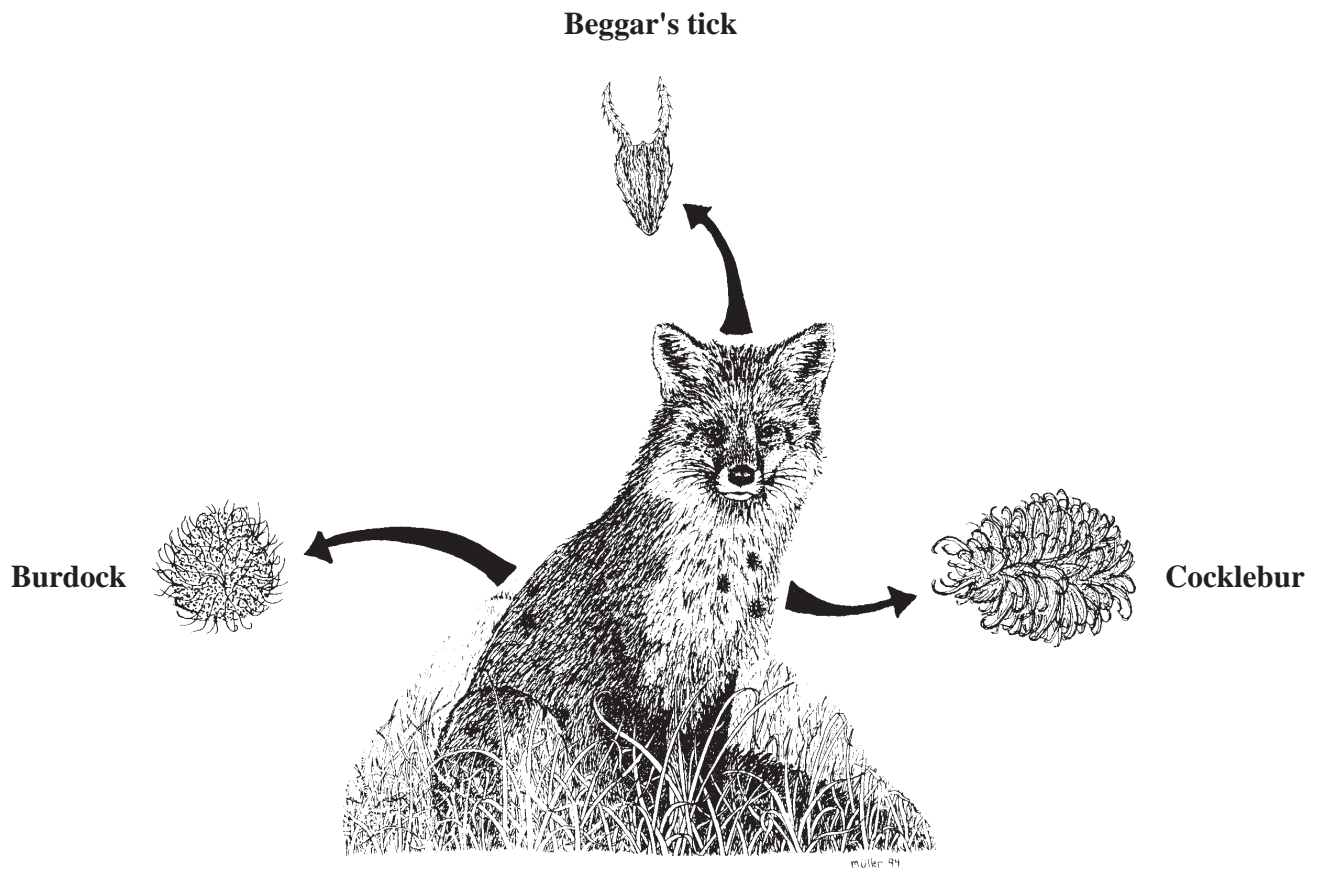
Animals haphazardly and purposely spread a variety of seeds. Animals such as squirrels and mice commonly collect and store seeds to be eaten later. Hidden seeds that are not eaten during winter often sprout in spring.

Seeds packaged in brightly colored fruits attract the attention of both wildlife and people. Some fruits eaten whole, such as strawberries, dogwood berries,



and cedar cones or “berries,” have seeds that pass through the digestive tracts of animals. The droppings of animals supply the seeds with a new location and their own package of fertilizer. Other fruits may contain seeds that are not eaten themselves. Apples and plums are eaten for their fruit, but the seeds are discarded after the fleshy treats are finished.

Some seeds have hooks and spines that easily attach themselves to objects that pass too closely. These “hitchhikers” catch rides on the fur of animals, feathers of birds, or clothing of people. For example, tick trefoil produces tiny pods covered with small hairs, and beggar’s ticks have two hooked prongs on each seed. Burdock, a common plant in farm yards and groves, creates a seed head with many sharp spines that easily entangle in almost anything, including the fur of animals and the socks of humans. The inspiration for Velcro is reported to have come from cocklebur, a plant known as a “weed” to many people.





Seeds come in many shapes, sizes, colors, and packages. We will examine a few seeds from trees, bushes, vines, wildflowers, and grasses.

## Seeds from Trees

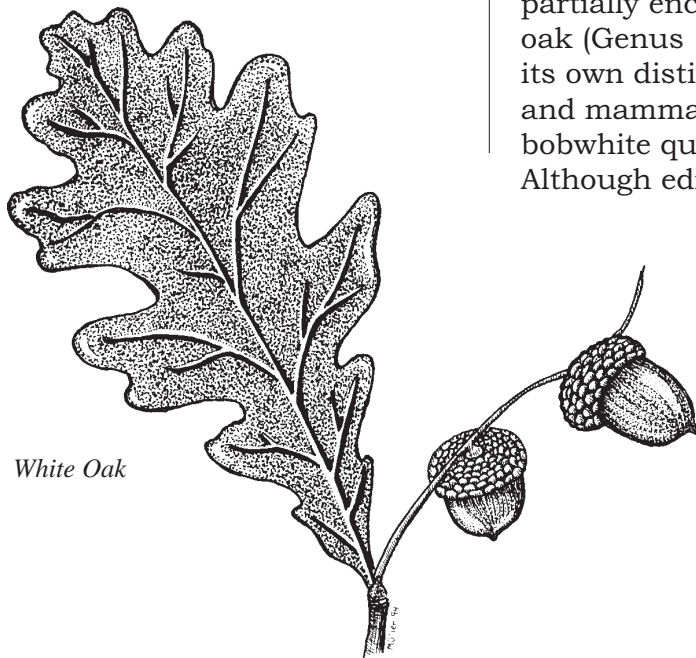
### Nut Trees

Tree fruits may be dry and woody, soft and fleshy, or thin and papery. Nuts are the hard, dry fruits of some broad-leaved trees.

Acorns are the fruit of **oak** trees. They grow partially enclosed in cups. There is a wide variety of oak (Genus *Quercus*) trees in Iowa, each producing its own distinctive acorn. At least 20 species of birds and mammals eat acorns, including whitetail deer, bobwhite quail, wild turkey, wood duck, and crows. Although edible to humans after the tannic acid

contained in them is removed, few people today actually eat acorns. However, some Indians used acorn flour as a staple in their diet.

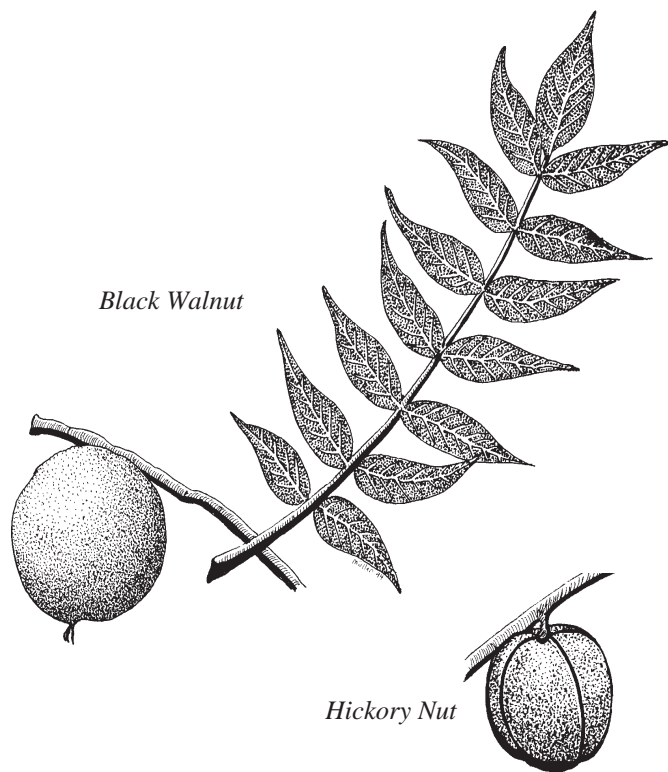
**Black walnuts** are round and approximately two inches in diameter. The seed, also called the



White Oak



Red Oak



*Black Walnut*

*Hickory Nut*

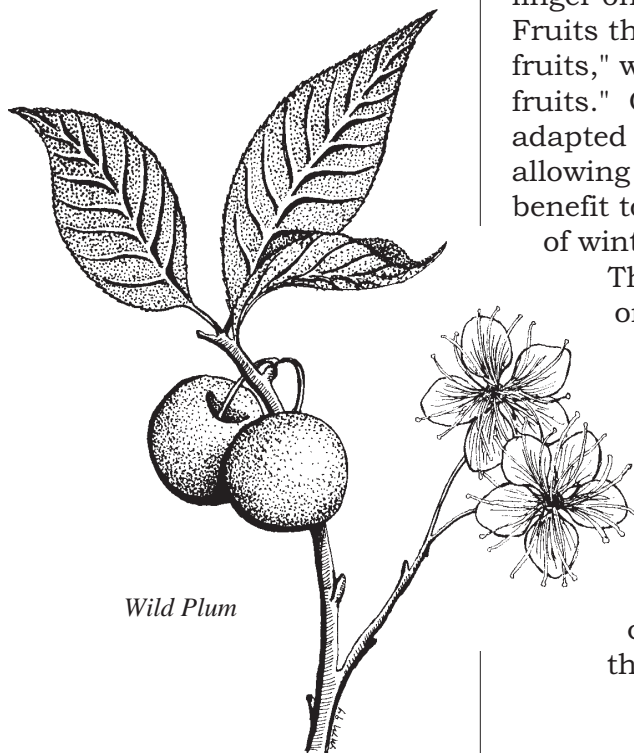
“nutmeat,” is used in baking. Surrounding the seed is a hard, furrowed **shell**. Protecting the shelled seed is a fleshy **husk**. The husk is green while the fruit is on the tree but turns black as the seed matures. Mice and squirrels are able to gnaw through the black walnut shell and eat the seed. It is estimated that black walnuts constitute ten percent of a squirrel’s food source. Animals such as deer and turkey cannot break into the hard shell.

**Shagbark hickory** trees produce nuts that are approximately one inch long with an outer husk. The husk splits into four parts when ripe. The nuts have an excellent flavor and are collected in Iowa woodlands to use in baking cookies and breads. Animals such as squirrels and wild turkeys also appreciate the taste of shagbark hickory nuts.

### Fruit Trees

Juicy, succulent fruits come in several forms. These fruits are packaged in brightly colored fleshy packets that offer an attraction to those that will eat and disperse the seeds.

Some fruits of trees disappear quickly and others linger on the limbs to be eaten in the dead of winter. Fruits that are eaten quickly are called "preferred fruits," while those that linger are called "persistent fruits." Over time, trees with persistent fruits have adapted to holding on to their fruits rather than allowing them to drop when ripened. This is a great benefit to wildlife during the cold, snow-covered days of winter.



*Wild Plum*

The American plum, or **wild plum**, produces a one-inch diameter fruit that turns reddish purple when ripe. Plum fruits contain a single pit or stone. Fleshy fruits that contain a single seed are called **drupes**. The cover provided by the thorny branches creates a nesting haven for many birds.

**Black cherry** and **chokecherry** are closely related to American plum. The cherries attract a greater variety of wildlife to their tart fruits. Catbirds, grosbeaks, and

robins dine in the branches of wild cherries. Raccoons, rabbits, and opossum feast on fallen fruits. Wild cherries and American plum can be made into flavorful jams.

**Hackberries** also produce valuable seeds for wildlife. The fruits persist on the twigs into the winter and are available after preferred fruits have been eaten. The fruit is a drupe or pit covered by a thin, deep purple flesh, drying to brown in the winter. Birds seen feeding on hackberries in late fall through winter include flickers, cardinals, and cedar waxwings.

Brown thrashers, cardinals, crows, and robins are just a few birds that enjoy the fruit of the **mulberry** tree. Mulberries do not persist on the tree in the winter, but they are readily available throughout the summer months. Seeds of the mulberry are borne in many one-seeded fruits grouped as one "fruit." Each individual oblong "fruit," therefore, has many seeds and is called an **aggregate fruit**. Mulberries are dark reddish purple when ripe.



*Red Mulberry*

## Other Trees

Several trees have seeds that are housed in papery structures that help protect and transport the seeds. These seeds and fruits come in a variety of forms.

Maple trees have seeds carried in a case called a **samara**, with papery paired wings and two adjoining seeds. The fruit carrying the tiny cotton-tufted seeds of cottonwood trees is a drooping **capsule**. Birch trees produce **nutlets**, or tiny nuts, with two wings which are eaten by a variety of song and game birds as well as small mammals.



*Silver Maple*



*Eastern Cottonwood*



## Seeds from Bushes and Vines

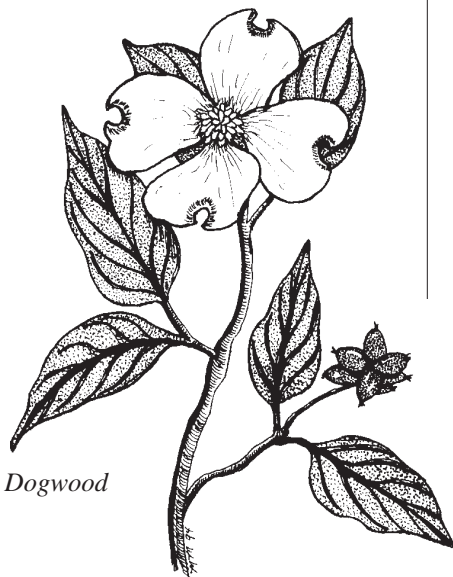
Along railroad rights-of-way and fencelines, amongst groves, and in our woodlands, grows a variety of vines and bushes. Many of these plants produce seeds in attractive fleshy fruits.

**Gooseberry** is a bush with small green to purple berries. Each berry contains many seeds. **Black raspberry** also produces a many-seeded berry. As many as 97 wildlife species may eat raspberries in late summer and fall. The white berries of **dogwood** bushes are an important winter wildlife food for approximately 60 different birds and mammals.

The climbing vines of **wild grape** yield fruits in clusters. Each berry is bluish black when ripe and contains two to four seeds. Whitetail deer, fox, skunks, and wild turkey are just a few of the animals that find grapes appealing.



Gooseberry



Dogwood



Wild Grape

## Seeds from Wildflowers



*Purple  
Coneflower*

The largest numbers of flowering plants are members of a family called the **composites**. Dandelion, a common backyard plant brought to the United States by European immigrants, is an example. The secret to the success of the composites may be their special means of seed production. What appears to be a single flower is actually a seed head of many tiny flowers. Each of these flowers produces its own seed. What is unique about composites is that the flowers mature at different times. This allows the plant to benefit from a variety of opportunities to receive pollen from a variety of pollinators.

The **sunflower** is a very familiar member of the composite family. Its many seeds are displayed in a wide seed head that makes good winter food for such animals as mice, cardinals, blue jays, and nuthatches. Other composite flowers include the **purple coneflower** of our prairies and **joe-pye weed** of our wetlands.

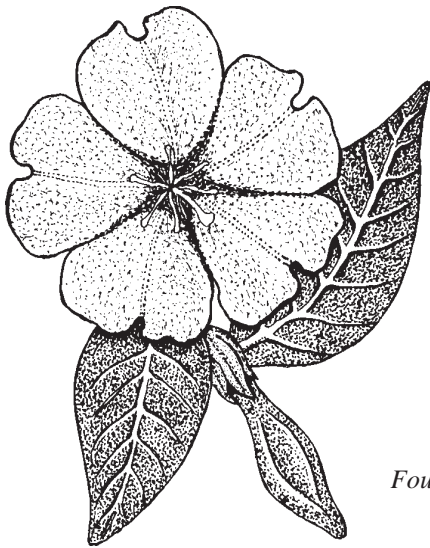
Some wildflowers produce capsules that hold seeds until maturity. Seeds may be scattered by the



*Sunflower*



capsule when it splits or are flung in the wind. Each capsule has openings through which seeds are released for distribution through the air like grains of salt in a shaker. Yellow star grass and **four o'clocks** are examples of wildflowers of this type. Garden flowers that fit this category are poppy and love-in-a-mist.



*Four O'clock*

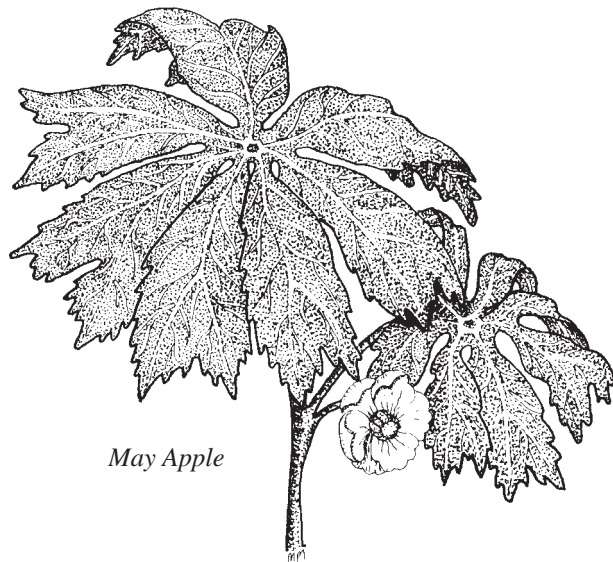


A few wildflowers carry seeds in fleshy fruits similar to those of trees and vines. False Solomon's seal offers small ruby-red berries, while the **May apple** sports greenish yellow berries that are two inches in diameter. The colorful seed head of Jack-in-the-pulpit may be seen in Iowa's autumn woodlands. These seeds are carried in clusters of bright red berries that are popular with wild turkeys.

Still other wildflowers demonstrate the hitchhiker method of seed dispersal. Bristles on both the fruit and plant parts of **bedstraw** ensure that their seeds will travel. Beggar's tick, with seeds in a composite seed head, has two prongs on the end of each seed that are adept at catching rides. Burdock and cockleburs both produce seeds enclosed in many-spiked balls. Animal fur and human clothing easily snag the fruits and transport the seeds.



*Bedstraw*



*May Apple*

## Seeds from Grasses

Grass seeds have fed wildlife and people for centuries. Today, three species of grasses—wheat, corn, and rice—supply more than half the world's food. As Iowans living in the Corn Belt, we may not always think of corn as grass, but it is. Corn is the most widely grown grass in Iowa. The grains from corn are used to make products as varied as sweeteners, corn meal, and ethanol. Crows, bobwhite quail, meadowlarks, grackles, and raccoons find kernels of corn a pleasurable treat.

Although corn has made Iowa famous, it is the centuries of growth of prairie grasses that created the fertile soil in which corn now thrives. Prairie is our heritage. There are several distinct grasses of the prairie which produce seeds in a variety of shapes and sizes. These seeds are eaten by a large number of birds and small mammals such as mice and ground squirrels.

Iowa prairies are perhaps best noted for the distinctive growth of **big bluestem**, reaching six to eight feet tall. The seed head divides into three branches, each two to four inches long. Because this seed head resembles a bird's foot, "turkey-foot grass" is the big bluestem nickname.

**Porcupine grass** is a cool-season grass, growing in clumps with seeds that mature in late June and early July. The seed itself is sharp, pointed, and approximately one inch long. It is the six- to eight-inch awn attached to the seed that truly makes this species unique. The awn is humidity-sensitive, turning one way when wet and twisting the other when dry. This capability allows the seed to be drilled into the soil.



*Porcupine  
Grass*

## *Seeds of Change*

A seed is a tiny vessel carrying an ark of information. Subtle changes may be favored and passed on through genetic information over a period of time. Although the information contained in seeds may change slightly, plant life on Earth relies upon successful fertilization to produce viable seeds that one day germinate and become new plants.

## Useful Resources

“American Wildlife and Plants,” Alexander C. Martin, Herbert S. Zim, Arnold L. Nelson, Dover Publications, 1951.

“Biology of Plants,” Peter Raven, Ray Evert, Helena Curtis, 1981.

“Eastern Trees,” George A. Petrides, Houghton Mifflin, 1988.

“Forest and Shade Trees of Iowa,” Peter J. Van Der Linden and Donald R. Farrar, Iowa State University Press, 1984.

“How to Know Wild Fruits,” Maude Gridley Peterson, Dover, 1973.

“Nature’s Heartland,” Bill Boon and Harlen Groe, Iowa State University Press, 1990.

“Plant Reproduction,” Colin Walker, Modern Curriculum Press, 1993.

“Trees Are Terrific,” National Wildlife Federation Nature Scope, 1985.

“Wildflowers of Iowa Woodlands,” Sylvan Runkel and Alvin Bull, Iowa State University Press, 1987.

“Wildflowers of the Tallgrass Prairie,” Sylvan Runkel and Dean Roosa, Iowa State University Press, 1989.

“The Visual Dictionary of Plants,” Eyewitness Books, Dorling Kindersley, 1992.

*Seeds, Nuts, and Fruits of Iowa Plants* is one in a series of seven booklets that are part of the *Iowa Plants Series*. The booklets in the series include:

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The Iowa Association of Naturalists also has produced five other booklet series that provide readers with a clear, understandable overview of topics concerning the Iowa environment and conservation. The booklets included in each of the other five series are listed below.

**Iowa Physical Environment Series**

Iowa Weather	(IAN-701)
Iowa Geology and Fossils	(IAN-702)
Iowa Soils	(IAN-703)

**Iowa Wildlife Series**

Iowa Mammals	(IAN-601)
Iowa Winter Birds	(IAN-602)
Iowa Nesting Birds	(IAN-603)
Iowa Reptiles and Amphibians	(IAN-604)
Iowa Fish	(IAN-605)
Iowa Insects and Other Invertebrates	(IAN-606)

**Iowa's Natural Resource Heritage**

Changing Land Use and Values	(IAN-501)
Famous Iowa Conservationists	(IAN-502)
Iowa's Environmental Laws	(IAN-503)
Conservation Careers in Iowa	(IAN-504)

**Iowa Wildlife and People**

Iowa Wildlife and Management	(IAN-401)
Keeping Iowa Wildlife Wild	(IAN-402)
Misconceptions About Iowa Wildlife	(IAN-403)
State Symbols of Iowa	(IAN-404)
Iowa Food Webs and Other Interrelationships	(IAN-405)
Natural Cycles in Iowa	(IAN-406)
Iowa Biodiversity	(IAN-407)
Adapting to Iowa	(IAN-408)

**Iowa's Biological Communities**

Iowa's Biological Communities	(IAN-201)
Iowa Woodlands	(IAN-202)
Iowa Prairies	(IAN-203)
Iowa Wetlands	(IAN-204)
Iowa Waterways	(IAN-205)

**Iowa Environmental Issues**

Iowa Habitat Loss and Disappearing Wildlife	(IAN-101)
Iowa Air Pollution	(IAN-102)
Iowa Water Pollution	(IAN-103)
Iowa Agricultural Practices and the Environment	(IAN-104)
People, Communities, and Their Iowa Environment	(IAN-105)
Energy In Iowa	(IAN-106)
Iowa Waste Management	(IAN-107)

✓ Booklets may be ordered through the Iowa State University Extension Service at a cost of \$1.00 per booklet. When ordering, be sure to use the IAN number to the right of each listed booklet title. Please send written orders and payment to:

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