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# Weeds

H.S. Coe

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**BULLETIN No. 150**

**APRIL, 1914**

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**AGRICULTURAL  
EXPERIMENT STATION**

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**SOUTH DAKOTA  
STATE COLLEGE OF AGRICULTURE  
AND MECHANIC ARTS**

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**WEEDS**

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**BROOKINGS, SOUTH DAKOTA**

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# WEEDS

by

H. S. Coe, Consulting Botanist.

This bulletin is intended to meet the already large and steadily increasing demand for information on the weeds of South Dakota. By no means does this publication cover all the weeds of the state, nor weeds which are noxious in only a small part of the state, but the aim is to discuss those weeds most important over the state in general. The descriptions are brief so that anyone may compare them readily with the plants in question. In addition such points are noted as will enable teachers of rural schools in South Dakota to use this bulletin as a guide to teaching the subject of weeds.

In writing this bulletin frequent reference was made to Clark & Fletcher's, "Farms Weeds of Canada"; Bulletin No. 260, "Seeds of Michigan Weeds", of the Michigan Agricultural Experiment Station; and Bulletin No. 4, "Weed Flora of Iowa", of the Iowa Geological Survey. The writer is indebted to Dr. E. A. Bessey of the Michigan Agricultural Experiment Station for figures 8, 9, 10, 13, 15, 18, 19, 22, 23, 24, 25, 26, 27, 28, and 29; to Dr. L. H. Pammel and the Iowa Geological Survey for figures 6, 7, 11, 14, 16 and 21; to the Minnesota Agricultural Experiment Station for figures 12 and 17; to the United States Department of Agriculture for figures 2 and 20, and to J. T. Sarvis for figure 5; also to Miss Ada Hayden for making the drawings for figures 1, 3 and 4.

## WHAT IS A WEED?

A weed has been defined as a plant out of place, and this is no doubt the best definition which has so far been given. Rye growing in a wheat field, if not wanted there, must be considered a weed. Many people are prone to term plants having inconspicuous flowers as weeds, yet this definition will not always hold true for

some of our most useful agricultural crops have inconspicuous flowers. Again, some people consider plants which grow in the forests as weeds, yet such plants as the Violet, Bloodroot and Hepatica are most useful plants and must be considered as much a part of the forest as the Oak or Elm.

### KINDS OF WEEDS.

Weeds may be classified in various manners, but probably the best classification is according to the duration of life. In this manner weeds are classified as annual, winter annual, biennial and perennial.

**Annual.**—The annual weeds are easily recognized. The seeds of these weeds germinate in the spring, send up a stem which produces leaves, flowers and seeds the same season and then die. Foxtail, Ragweed, Pigweed, Smartweed and Russian Thistle are good illustrations of this class of weeds.

**Winter Annual.**—These weeds differ from the annual weeds in that the seeds germinate in the fall and produce rosettes of leaves close to the ground. These plants live through the winter, send up their flowering stalks the next spring, produce seed, and die. Shepherd's Purse and Winter Wheat are good examples of this class.

**Biennial.**—The seeds of biennial weeds germinate in the spring and generally produce a mat of leaves the first year. These plants pass the winter in this stage and the next spring send up stems on which flowers and seeds are produced. After producing seed they die. Burdock and Wild Carrot are good representatives of this type.

**Perennial.**—The perennial weeds are often long lived. Flowers are sometimes produced the same season the seeds germinate although these plants do not die, but live from year to year. It is to this class of plants that our persistent and most pernicious weeds belong, such as the Canada Thistle, Morning Glory, Milkweed and Quack Grass.

### HOW WEEDS SPREAD.

Weeds may be spread in two ways, namely, by vegetative propagation and seed production. Some plants are spread by one or the other of these methods while other plants may be spread by both of them.

**Vegetative Propagation.**—When plants are spread by vegetative propagation the stems or roots serve for this purpose, the stem, however, may be above or below the ground. This vegetative propagation is brought about principally in three ways: Firstly, by creeping stems above ground or under ground. This method of reproduction is represented by such plants as Quack Grass, White Clover, Western Wheat Grass, and the like. The stems in this case differ from the upright stems in that the leaves are generally reduced to scales and the nodes or joints are from 1 to 2 inches apart. The Quack Grass stems, for instance, sometimes called roots, are generally near the surface of the soil and may be at least 3 feet in length. They are capable of sending up new plants at each joint. Secondly, vegetative propagation may be brought about by roots which may be either fleshy or thin and slender. Dock, Horse Radish, Sheep Sorrel and Dandelion are representatives of this type of propagation. The roots of Milkweed spread horizontally in the soil and have been known to attain a length of at least 14 feet. These roots may give rise to new plants at various intervals. Thirdly, vegetative propagation may be brought about partly by root and partly by stem. The upper part of the Canada Thistle is stem, bearing minute scales while the lower part which develops buds is root.

**Seed Production.**—The vast majority of weeds produce seed. Horse Radish, however, is a weed which seldom, if ever, has been known to produce seed, at least in this part of the country. It flowers frequently but seed is never formed. Quack Grass, on the other hand, spreads as freely by the production of seed as by its underground stems. Plants as a rule, produce an enormous number of seeds, although the great majority of



the seeds are never permitted to germinate on account of diverse conditions. A single seed of the Squirrel-tail Grass will produce a plant having a large number of stems, each with a spike containing 50 to 60 seeds; therefore, it is easily seen how rapidly weeds may be propagated. Dr. Beal estimates that a large Purslane plant produces 1,250,000 seeds; a patch of Fleabane 3,000 to the square inch. Dr. Pammel states that a single plant of Horseweed produces about 324,000 seeds; Pig-weed 115,600 seeds; and Jimson Weed 90,000 seeds. A single Wild Mustard plant has been known to produce about 10,000 seeds. Thus it is readily seen why weeds become scattered so rapidly even if but one seed in a hundred, and this is a large percentage, would germinate. Think of the comparatively short time which would be needed to distribute a weed over a great area.

### **DISSEMINATION OF WEEDS.**

The scattering of weeds or plants is called dissemination and this may be accomplished by any one of the following ways: (a) wind, (b) water, (c) animals, (d) explosive properties, (e) seeds burying themselves, (f) man as an agent.

**Wind.**—That wind is an important agent in distributing a large number of our weeds is well known to not only the average farmer but to the school boy as well. How many of us have not taken the heads of Dandelions and blown the seeds into the air? Thus it is that this plant is disseminated. Seeds which are distributed by the wind are light in weight and generally have attached to them some object which enables them to be readily picked up by the wind. The Dandelion seed, for instance, is cylindrical with a long peak and has attached to one end of it a parachute-like arrangement which permits the seed to sail through the air. The Canada Thistle, Bull Thistle, Horseweed, and many similar plants of the Composite Family have this manner of conveyance. The Tumbleweed and Russian Thistle, weeds well known to the Dakota farmer, are scattered by the

wind. These weeds grow in a circular form and when mature are easily released from the soil. Since they are light in weight and rather large and circular in form, they are rolled across the prairies for great distances, scattering seed as they go.

**Water.**—Weeds are scattered by water in that the plants or roots are often carried for long distances by streams. The writer has seen fields covered with weeds which have come from higher ground along the streams or ridges. Stems of Quack Grass have been scattered in this way. Some weeds have little bladder-like attachments which are filled with air. The Dock is a good representative of this type of weed. Seeds of this nature will readily float on water and are thereby carried for long distances.

**Animals.**—Various animals like cattle, sheep, horses, squirrels, birds, etc., scatter seeds and fruits. This is done in two ways: Firstly, where the fruit or seed is edible, as is the case with the Black Nightshade, Wild Cherry, Poison Ivy, Dandelion, etc. Secondly, seeds are scattered by clinging to the hair or wool of animals. Under the first method large numbers of seeds of weeds like those named are consumed by birds. Many of these seeds consumed by birds are too hard to be digested and, therefore, pass through the digestive tract unharmed. One of the best representatives of this type is the Poison Ivy. Poison Ivy has been scattered throughout a great portion of the country by birds. This is proved by the fact that the Poison Ivy is most common and, in fact, nearly always starts along fence rows and beneath telephone wires. The Wild Cherry is another plant widely distributed in this manner. The second method is characterized by such weeds as the Cockle-bur, the Burdock, the Spanish Needle, and Tick Trefoil. These weeds are scattered by clinging to the hair or wool of animals. For instance, the bur of the Cockle-bur is provided with hooks which readily catch and cling to passing animals and are in this manner carried long distances. The burs of Burdock readily stick to animals, especially to the

tails of horses and cattle and may be carried for quite a distance before they are broken open and the seeds released. As a rule, around woolen mills weeds may be found which are native to far distant places and which have been introduced solely through the source of transported wool.

**Explosive Properties.**—The seeds of a few weeds have explosive properties, for instance, the pods of certain vetches twist when mature thus forcing out the seed; contraction of the capsule of the Three-seeded Mercury throws the seed for some distance. This method is also common with the Caster-oil Bean.

**Seeds Burying Themselves.**—A few of our seeds bury themselves. A good illustration of seeds of this type is that of the Needle Grass. These seeds possess long awns which are very sensitive to moisture, contracting when dry and straightening out when moist. In this way these seeds are buried.

**Man as an Agent.**—Man is an agent in many different ways of which the following may be noted: (a) impure seeds, (b) railways, (c) vehicles, (d) threshing machines, (e) cultivation, (f) packing material, (g) wool, (h) plants cultivated for ornamental purposes, (i) plants cultivated for food. Little explanation is needed of the above means by which man distributes seeds. Since railways have crossed the country weeds have had a very desirable means of being distributed from one section to another. One of the best places the botanist has for collecting weeds is along the right-of-ways of railroads. Along these places weeds can be found which are present in no other section of the vicinity unless they have spread from these places. It is not a hard matter to trace the origin to the trains, and principally stock cars, which have come from other regions. Packing material is another means which serves to spread weeds long distances. Many times the straw or other material used for packing purposes is an inferior grade of material containing many seeds. This packing material is too often thrown out in the garden, thereby giving weeds

an opportunity to grow. Some of our worst weeds have also been introduced for ornamental purposes but through lack of attention have gained a foot-hold in fields. Chicory is a good illustration of this type.

Many weeds are scattered with various agricultural and garden seeds. Buckhorn, Dodder, Wild Carrot, Ragweed, Dock, Quack Grass, Canada Thistle, and many other seeds are to be found in agricultural seeds. It is not hard for the seed analyst to designate the approximate locality where certain agricultural seeds were grown by the weed seeds contained therein. This means of distributing seed is very common. For instance, in the years 1907 and 1908 when there was a shortage of clover seed in this country, a large quantity of clover seed was imported from Europe. This imported seed was, to a large extent, seed which would not stand the inspection law of Europe and was, therefore, dumped upon the American market where no laws were made to avoid the introduction of such seed. At the present time some of our grass seeds are imported from European countries and are thereby a source of various weeds. An effort should be made to buy only the best of agricultural seeds and then to have them tested for purity.

### **LOSSES CAUSED BY WEEDS.**

When growing with crop plants weeds rob the soil of much food and moisture which is, in all cases, needed by the crops themselves. Weeds may become so prevalent in fields as to greatly reduce the crop. The crop in this case is reduced partly from shade caused by the weeds and partly from the weeds utilizing a great deal of the moisture which the crop itself should have had. Weeds are not only unsightly on farm lands but they greatly reduce the value of such lands. The weeds on farms are greatly increased when the farms are in the hands of shiftless renters. The writer has in mind farms in central and southern Iowa which if free from such weeds as Horse Nettle would bring from \$150.00 to \$200.00 an acre, yet being infested as they are, it is



impossible for the owners to sell such land. Weeds are detrimental in hay crops because in some instances they will taint the milk of cows feeding on the hay. They also prevent proper curing. Other weeds, such as the Corn Cockle, if present in wheat to any great extent, will reduce the price of the wheat since the Corn Cockle seed is poisonous and gives the miller considerable trouble. Bread made from flour containing pulverized Corn Cockle seed has been known to prove fatal. Such weeds as Water Hemlock and Purple Loco are annually the cause of considerable losses of stock. Aside from this, weeds also harbor to a great extent insects and fungous diseases, helping them to live over from year to year.

### QUACK GRASS OR COUCH GRASS

**Description.**—Quack Grass or Couch Grass (*Agropyron repens* L. Beauv.) is, without question, one of the very worst perennial weeds with which the South Dakota farmer has to deal. This grass is rather dark green in color with somewhat slender but rigid, upright culms or stems varying from 2 to 3 feet in height. The blades of the leaves vary from 6 to 10 inches in length and  $\frac{1}{4}$  to  $\frac{1}{2}$  inch in width. The sheath, that is, the part of the leaf which clasps the stem, is somewhat shorter than the internode. The leaves are distinctly ribbed and somewhat hairy on the lower surface. The spikes or heads\* vary from 3 to 7 inches in length. They are composed of a number of parts called spikelets which lie flat against the stalk and which mature from 4 to 7 yellowish or light brown seeds about  $\frac{1}{2}$  inch in length. The long, creeping, underground rootstocks, which may become so thick as to form large matted beds, vary from straw color to a greenish yellow. Each one of the many joints, which are from 1 to 2 inches apart, is capable of sending up a new plant; this is why this pest is so easily

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\*The writer has not adhered strictly to botanical terms in this popular bulletin but has used terms throughout with which the farmer is more likely to be acquainted; for instance, "head" of Quack Grass.

distributed by machinery. In land which has been in meadow or pasture, these rootstocks are located in the upper three inches of soil, but in cultivated land they may penetrate to a depth of six or seven inches. It is these underground rootstocks which are responsible for the persistent efforts needed to eradicate this weed, for in them is stored plant food which has been manufactured by the green parts of the plant and which may be called upon at any time to send up new shoots.

**How it is spread.**—Quack Grass is very common along right-of-ways of railroads, highways, etc. It has been scattered along the railroads principally by falling from stock trains where it was present in the hay or bedding. The hauling of hay and grass from infested fields has helped to scatter it along the public highways; for instance, in rainy weather a wagon may be driven through a patch of Quack Grass when the seed is mature and the seed carried long distances by sticking to the mud on the vehicle. Farm implements are responsible for carrying pieces of rootstocks from one place to another where they will soon grow and form a new patch. The writer has witnessed ground squirrels carrying mature heads of Quack Grass quite long distances to be stored up as food for the winter. Quack Grass seeds are present at times in commercial farm seeds. The spikes or spikelets may also stick to the hair or wool of animals and be distributed in that manner. The straw packed around nursery stock has been known as a source of dissemination. In these cases the rootstocks were in the material used for packing. (See Fig. 1.)

**Eradication.**—Many methods have been suggested for the eradication of Quack Grass but in the end these various methods are merely variations of a few good practical ways and they mean hard and persistent work. There is no short-cut, or easy way of killing any of our persistent perennial weeds.

**Hand Digging Method.**—This method applies to only small patches and avoids the expense of buying tarred paper. It consists of spading the infested area

and raking up and burning all the rootstocks. After this has been done close watch should be kept of the patch and whenever a shoot of the Quack Grass makes its appearance, it should be destroyed. This is an efficient method yet it only applies to small patches.

**Tarred Paper or Mulching Method.**—Tarred paper and mulching are placed under one head because they have the same end in view, i. e., smothering out the grass. Tarred paper or any good durable roofing paper is to be preferred to compost in most instances. This method, however, only applies to small areas of the weed. The patch of Quack Grass should be cut as closely to the ground as possible, preferably in the early summer, and then carefully covered with tarred paper. The strips of paper should be overlapped and the laps sealed or covered up so that it will be impossible for the shoots to come up between them. If the work is carefully done, four inch laps will be sufficient. The paper should also extend far enough beyond the edge of the patch so that there is no danger of the grass coming up beyond it. Four or five feet will be sufficient. After the patch has been carefully covered, the paper should be weighted down; boards or dirt will answer this purpose. Eight or ten weeks of hot weather will, without question, be sufficient time to smother out the Quack Grass although it is advisable to keep the patch covered during the season.

Straw, hay, or manure are sometimes used for smothering out Quack Grass, but in using these one must be careful to make the mulch sufficiently deep so that that grass cannot penetrate it. Hay or straw permits air to penetrate for quite a distance and for this reason, well-rotted manure is to be preferred to either hay or straw for a mulch.

**Summer Fallowing after a Crop has been Removed.**—This method is one which is applicable to large areas of Quack Grass and one which has given very good success. The infested field should be planted to either meadow or small grain. Grass, however, is preferable to small grain since it causes the rootstocks to come closer



to the surface of the ground. If the infested area is planted to meadow it may be used to good advantage for hay or pasture several years before the final method of killing the Quack Grass is started. Quack Grass is a nutritious grass and will in no way hurt the hay if the hay is cut before the seed is mature. Just as soon as the hay or small grain has been cut, the field should be plowed and gone over from then on with a spring toothed harrow or disk **every week** or **ten days** until cold weather sets in. If the field has been in grass for several years, it should not be plowed deeper than four inches; however, if it has been in small grain, it should be plowed six inches in depth. The disking or harrowing will drag the rootstocks to the surface where they will be killed by the sun. If this disking or harrowing is kept up from the time the ground is plowed until cold weather, the rootstocks will practically all be killed. If the season has been a favorable one, that is, dry, corn may be planted the following spring. However, the corn should be planted in hills so that it can be cultivated both ways and a close watch kept for any stray plants which may come up. If there is any doubt in your mind as to whether it is completely killed or not, plant the field to a heavy sowing of millet the following spring. This will smother out any stray plants which may appear.

**Summer Fallow Method.**—While this method is a sure cure for Quack Grass in an ordinary year, yet it is to be recommended only when the Quack Grass has formed such a thick sod that it is impossible to get the ground into condition for a crop.

Mr. Cates\* recommends the following method of plowing: "To thoroughly turn over a stiff Quack Grass sod as shallow as three inches, it is advisable to use a special type of plow (Scotch bottom) having a very long, gradually-sloping moldboard. (Fig. 2.) It has been found that with this type of plow the sod can be turned very shallow."

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\*Farmers' Bulletin No. 464, United States Department of Agriculture.



Fig. 1. Quack Grass. a, spike; b, spikelet; c, spike enlarged; d, rootstocks; e, fibrous roots.

(Drawn by Ada Hayden.)

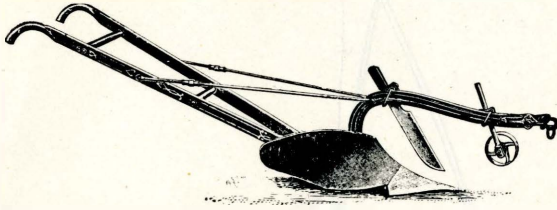


Fig. 2. A Scotch-bottom plow used in turning Quack Grass sod. (After Cates; U. S. Dept. of Agriculture).

About a week after the land has been plowed it should be gone over with a disk harrow, repeating this treatment every week or ten days for the remainder of the season. This method will, without question, kill the pest, although a crop will be lost.

**Precaution.**—Do not try to kill Quack Grass unless you intend to do a thorough job. Remember that it will not be of advantage to kill it out of a field and let it remain growing in the fence rows. If it is present in the fence rows, move the fence so you can get at it. Quack Grass is never killed out unless the last rootstock is dead.

Compare the cut of Quack Grass with those of Western Wheat Grass and Slender Wheat Grass and note the differences. These three grasses are many times confused.

### **WESTERN WHEAT GRASS OR COLORADO BLUE STEM.**

**Description.**—Western Wheat Grass (*Agropyron Smithii* Rydb.) is one of our most common grasses in the state, especially west of the Sioux Valley. It is an excellent range grass and mention is made of it here because it is so often mistaken for Quack Grass, not because it is considered a bad weed.

This grass is glaucous, or bluish green in color with upright, rigid stems or culms which vary from 2 to 4 feet in height. The leaves vary from 4 to 8 inches in length, are rigid, rather thick, smooth and generally roll up in



Fig 3. Western Wheat Grass. a, spike; b, spikelet; c, spikelet, side view; f, rootstock.

(Drawn by Ada Hayden.)



dry weather. The spikes or heads vary from 4 to 6 inches in length and are composed of a number of spikelets the same as Quack Grass. However, the spikelets do not lie flat against the stem as is the case with Quack Grass. They contain from 7 to 13 flowers. This grass also has creeping, underground rootstocks which appear in color and node formation very similar to Quack Grass. However, Western Wheat Grass does not produce rootstocks as extensively as Quack Grass, neither are its rootstocks as large or persistent. (See Fig. 3)

**Eradication.**—Western Wheat Grass can be killed out by thorough cultivation.

### **How to Distinguish Western Wheat Grass From Quack Grass.**

1. **Color.**—Western Wheat Grass has a distinct bluish green color which is so characteristic as to enable one to distinguish a patch of it from other grasses at quite a distance. Quack Grass is rather dark green in color.

2. **Heads.**—The heads of Western Wheat Grass are generally larger than those of Quack Grass. The spikelets are about twice the size and spread much more.

3. **Growth.**—Ordinarily Western Wheat Grass produces a more rigid and taller growth than Quack Grass.

4. Compare description and plates of this grass with those of Quack Grass and Slender Wheat Grass.

### **SLENDER WHEAT GRASS.**

Slender Wheat Grass (*Agropyron tenerum* Vasey) is also a grass mentioned here, not because of its noxious character, but because it is often mistaken for Quack Grass. This grass, like Western Wheat Grass, is a valuable forage crop.

Slender Wheat Grass is an erect perennial, growing from 3 to 4½ feet in height, with numerous narrow flat leaves which roll up during dry weather. The spikes or heads vary from 3 to 8 inches in length and are very slender, almost cylindrical, the spikelets are from 3 to 5 flowered and closely appressed to the stem. This





Fig. 4. Slender Wheat Grass. a, spike; b, spike; c, spikelets; d, sterile glumes; e, roots.  
(Drawn by Ada Hayden.)

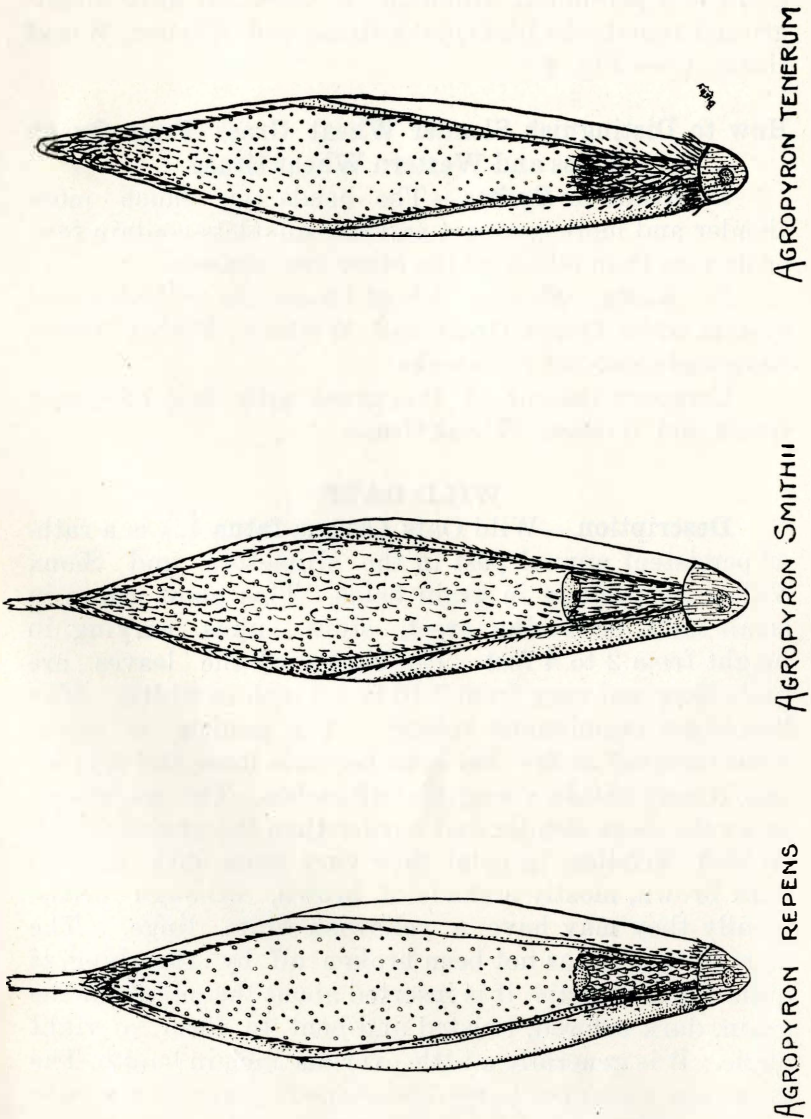


Fig. 5. Seed of Quack Grass (**Agropyron repens**); Western Wheat Grass (**Agropyron Smithii**); and Slender Wheat Grass (**Agropyron tenerum**).

(After J. T. Sarvis)

plant is a perennial, although it does not have underground rootstocks like Quack Grass and Western Wheat Grass. (See Fig. 4.)

### **How to Distinguish Slender Wheat Grass From Quack Grass and Western Wheat Grass**

1. **Heads or Spikes.**—The heads are much more slender and more compact and the spikelets contain fewer flowers than either of the other two grasses.

2. **Roots.**—Slender Wheat Grass has a fibrous root system while Quack Grass and Western Wheat Grass have underground rootstocks.

Compare the cut of this grass with those of Quack Grass and Western Wheat Grass.

### **WILD OATS.**

**Description.**—Wild Oats (*Avena fatua* L.) is a rather persistent annual pest in the Minnesota and Sioux Valleys, especially in grain fields. This plant grows in small tufts, producing erect, stout culms varying in height from 2 to 4 feet. The blades of the leaves are quite long and vary from 3-16 to 3-8 inch in width. The leaves are prominently veined. The panicle is somewhat compact at first but soon becomes loose and spreading; it may obtain a length of 12 inches. The grains are, as a rule, more slender and harder than the grains of cultivated varieties; in color they vary from dark gray to dark brown, mostly a shade of brown, although occasionally they may have a yellowish-white tinge. The awn, in case it has not been broken off by threshing, is quite characteristic; it is inserted about the middle of the grain, dark colored, twisted and bent to form a right angle. It is generally a little over one inch in length. The grain has a distinct horseshoe-shaped scar at its base which is surrounded by stiff bristles. Wild Oats is propagated by seed. This plant flowers earlier than cultivated oats, beginning the latter part of June. (See Fig. 6)

**Eradication.**—The first step is to stop sowing grain containing Wild Oats seed. However, if a field has once



Fig. 6. Wild Oats.

(After Clark & Fletcher. Loaned by Iowa Geol. Survey.)



become infested with this pest it is best to plant it to cultivated crops for several years since the seed may retain their vitality for at least that length of time.

The advantage in planting the land to cultivated crops is that the cultivation will cause many of the grains to germinate and the young plants will be killed by the following cultivation. It is also recommended to sow early maturing crops such as fall rye and barley. These crops will be harvested before the Wild Oats is mature.

### **SQUIRREL-TAIL GRASS OR WILD BARLEY.**

**Description.**—Squirrel-trail Grass or Wild Barley (*Hordeum jubatum* L.) is a biennial plant with fibrous roots, growing from 6 inches to 2 feet in height. The leaves which are very similar to those of Blue Grass, except being a little paler in color, arise from culms or stems which form solid and compact tufts. The heads are dense, from 2 to 4 inches in length, pale green to purplish in color and covered with long-awned glumes which spread at maturity, thus giving to the plant its bristly appearance. This is why it is sometimes called Squirrel-tail Grass. A single plant may produce as many as forty culms. (See Fig. 7).

**Eradication.**—Squirrel-tail Grass or Wild Barley readily yields to cultivation, thus infested land which can be cultivated may easily be cleared of this pest in this manner. However, it is in pastures where this grass generally gains a foot-hold and from this source it causes a great deal of trouble to stock by the awns penetrating their tongues and lips, thus causing ulcers. Since it is only a biennial plant, prevention from seeding for three or four years will almost, if not entirely, eradicate it. If it is kept from seeding for this period the greater majority of seeds already in the soil will have either produced a plant, which has died at the end of its second years growth, or have lost their vitality. Since this pest is spread largely by the wind it will be of no avail to attempt to eradicate it and let it seed in the fence rows or an adjoining field.



Fig. 7. Squirrel-Tail Grass or Wild Barley.  
(After Clark & Fletcher. Loaned by Iowa Geol. Survey.)

### GREEN FOXTAIL.

**Description.**—Green Foxtail (*Setaria viridis* L. Beauv.) is one of our most common weeds throughout the state. It is not only found in grain fields but inhabits lawns and waste places as well. This is an annual grass, the culms of which vary from 1 to 2 feet in height and are produced in tufts. The leaves are rough on the margins and vary from 3-16 to 3-8 inch in width and from 5 to 10 inches in length. The heads which vary from 1 to 3 inches in length, are slender, compact, and covered with green bristles. This plant has fibrous roots. Green Foxtail is propagated by seed. It flowers from June to September and mature seed may be found from July on-

The seeds are 1-12 inch long, striated, flat on one side and oval on the other. A glume is generally present on the flat side of the seed. The color of the seeds vary with the degree of ripeness. If they are not quite mature the color is light green although at maturity it varies from yellow to dark brown. The colored glumes are often broken off by the threshing machine. The kernel is greenish-white in color. The seeds of this plant are probably the most common impurity in clover and grass seed.

**Eradication.**—This pest is easily subdued by cultivation. Many times it takes possession of stubble fields after the grain has been removed, but this can be avoided by shallow plowing or disking shortly after harvest. Frequent use of the hoe will eradicate it from the garden. It is not troublesome in pastures since stock will readily eat it.

### YELLOW FOXTAIL.

**Description.**—Yellow Foxtail (*Setaria glauca* L. Beauv.) is an annual very similar to Green Foxtail in most respects. However, this plant is a little larger, more spreading, and possesses a narrower head. The bristles of the heads are distinctly yellow instead of green as in the Green Foxtail. This weed is propagated by seed. The seeds are about twice as large but other-



wise similar to Green Foxtail seed. Yellow Foxtail is a common impurity in agricultural seeds. See description of Green Foxtail.

**Eradication.**—(See method given for Green Foxtail)

**CURLED DOCK, SOUR DOCK, OR YELLOW DOCK.**

**Description.**—Curled Dock, Sour Dock, or Yellow Dock (*Rumex crispus* L.) is quite common in the state, especially east of the Missouri River. It is also becoming established in the Black Hills. This perennial plant of European origin has a deep tap-root and a smooth, erect, somewhat slender stem from 3 to 4 feet in height. The lower leaves are ovate to lanceolate, petioled, from 6 to 12 inches long, and with strongly wavy and curled margins; the upper or stem leaves are much smaller, less wavy and have either no petioles or only short ones. The bases of the lower leaves are somewhat truncate or inclined to be heart-shaped. The flowers are collected in dense whorls which are extended or prolonged into racemes. The flower stalks have swollen joints. The name "Curled Dock" is probably the most appropriate of the common names, since it comes from the curly or wavy appearance of the leaves. Curled Dock is propagated by seed and by shoots from the crown of the roots of the old plants. This plant flowers in June and mature seed may be found from July on.

The seeds of Curled Dock, which are covered by three brown calyx wings about 1-8 inch in length, each bearing a small tubercle, are 3-angled, shiny, 1-12 inch long and a rich, reddish-brown color. The seed of this weed is a very common impurity in agricultural seeds. (See Fig. 8)

**Eradication.**—Since this pest is distributed largely through agricultural seeds, the first thing to do is to sow clean seed. If land infested with Docks can be got into a short rotation they can be easily controlled. However, if they are not present to any great extent, Curled Dock can be successfully eradicated by hand pulling when the ground is wet. When the ground is in a moist condition they can be pulled with little trouble if the root is slight-



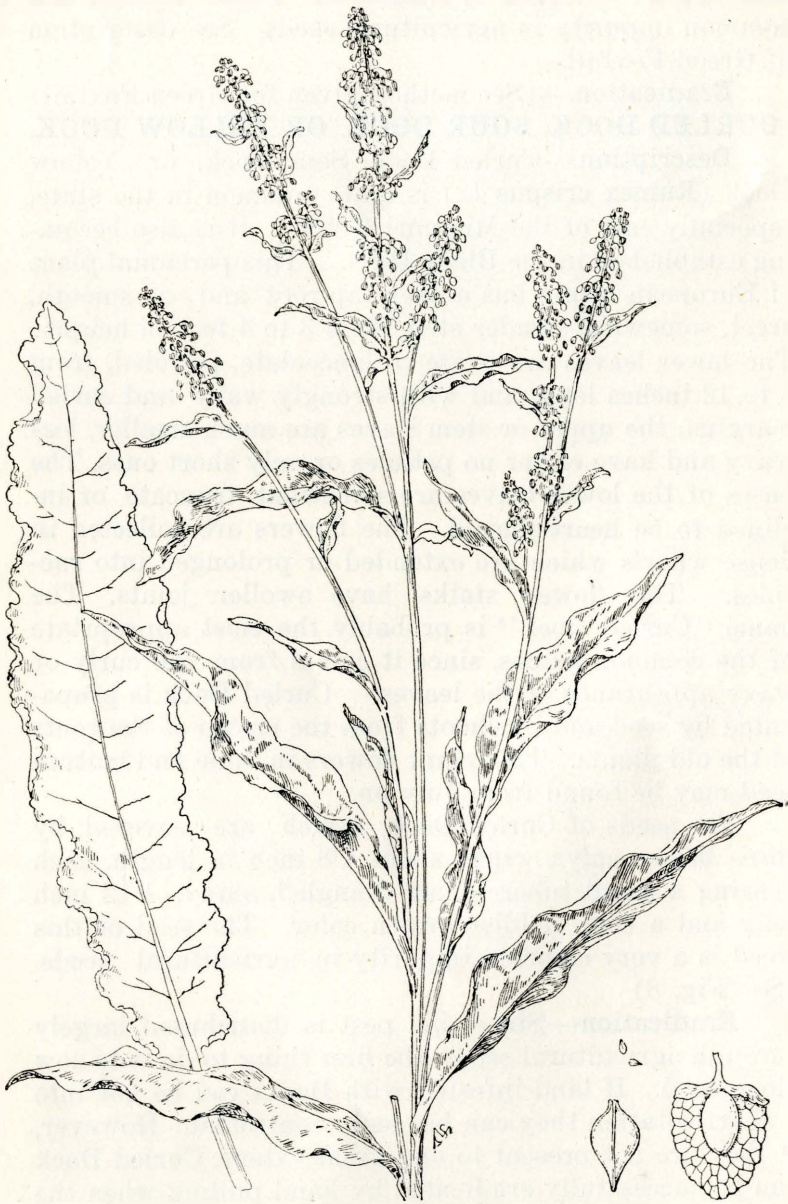


Fig. 8. Curled Dock, Sour Dock or Yellow Dock  
(After Beal, Mich. Agr. Expt. Sta.)

ly twisted while it is being removed. Clark and Fletcher state that a handful of salt placed on the crown of the Docks after cutting in dry, hot weather will extract the moisture and destroy the root.

### **SHEEP SORREL.**

**Description.**—Sheep Sorrel (*Rumex Acetosella* L.) is a perennial weed of European origin which has been introduced principally into pastures and timber claims of the Sioux Valley and the Black Hills, although it is prevalent in other portions of the state. The stems of this plant, which are produced upon woody, spreading rootstocks, are slender, smooth, branched, erect and from 6 to 15 inches in height. The lower leaves are petioled, somewhat arrow-shaped, with ear-like spreading appendages at the base, smooth and rather fleshy, while the upper leaves have short petioles and are more linear. The leaves are more or less silvery in appearance. They have a decidedly sour taste. The flowers are small, numerous, and produced in terminal naked panicles. This plant is propagated by seed and running rootstocks. It flowers from May to August and mature seed may be found by July. (See Fig. 9)

The seeds are closely covered by the dull, reddish-brown, roughened calyx. They are three-sided, broadly oval with convex sides, about 1-20 inch long and with rounded angles. The seeds of Sheep Sorrel are very common as impurities in clover and timothy seed. They are about 1-2 the size of the seeds of their near relative, the Sour Dock.

**Eradication.**—Sheep Sorrel is a weed which persists mostly upon soils which are gravelly or well worn. It is claimed that the presence of Sheep Sorrel indicates acidity of the soil. This, however, can be avoided by the application of lime. Professor Selby of the Ohio Experiment Station recommends the application of lime to soil infested with this weed as a means of controlling it. However, if this weed is prevalent in meadows they should be well manured, plowed and planted to some cul-



Fig. 9. Sheep Sorrel.

(After Beal, Mich. Agr. Expt. Sta.)

tivated crop for several years. If the soil can be got into a better state of cultivation and this weed is not permitted to seed for several years, it will, without question, be controlled.

### LADY'S THUMB OR SMARTWEED.

**Description.**—Lady's Thumb or Smartweed (*Polygonum Persicaria* L.) is an annual weed of European origin which is quite generally distributed over the state, especially east of the Missouri River. The stems of this plant are erect or nodding, smooth, simple or branched, and from 12 to 18 inches in height. The leaves are lanceolate or lance-shaped, 1 to 5 inches long, pointed, nearly stalkless, and often marked with a dark triangular or crescent-shaped spot near the center. The small pink flowers are borne in short, cylindrical, dense, erect spikes. In the southern part of the state this plant serves as a host for the corn root aphid. It is also the host of several fungous diseases. Lady's Thumb is propagated by seed. It flowers from July to September and mature seed may be found from the latter part of July on. (See Fig. 10.)

The seeds of Lady's Thumb are flattened, with rounded edges, ovate, shiny, jet black, and about 1-12 inch in diameter.

**Eradication.**—Lady's Thumb is not a hard weed to control if it is prevented from seeding, since the seeds do not retain their vitality for any length of time. Care should be taken to avoid sowing clover seed containing the seeds of this weed, since it is very commonly disseminated in this manner. Cultivation, and hand pulling where only a few plants are present, is recommended, together with mowing waste places several times a season.





Fig. 10. Lady's Thumb or Smartweed.

(After Beal, Mich. Agr. Expt. Sta.)

**WILD BUCKWHEAT OR BLACK BINDWEED**

**Description.**—Wild Buckwheat or Black Bindweed (*Polygonum Convolvulus* L.) is a troublesome weed throughout the state. It is an annual plant of European origin found in waste places, orchards, and grain fields as well as in cultivated crops. Wild Buckwheat is a twining or climbing vine, much branched, rather rough, with naked joints, and from 1 to 4 feet in length. The leaves are thin, smooth, arrow-shaped, and situated on rather long petioles or leaf stalks. The flowers, which arise in small clusters in the axils of the leaves, are small, greenish in color, and produced on short slender stalks. Flowers are also found on loose terminal racemes. Wild Buckwheat is propagated by seed. It flowers from June throughout the summer and mature seed may be found as early as the middle of July. (See Fig. 11.)

The seeds are dull, jet-black, equally three-sided, and from elliptical to obovoid in shape. The angles of the seeds are more or less rounded while the faces are slightly concave.

**Eradication.**—The seeds of Wild Buckwheat, as a rule, do not germinate until the ground has become quite warm and many of them do not germinate until the early summer, and for this reason, in order to eradicate this pest, it must be kept from seeding throughout the growing season. However, since it is only an annual plant and is propagated by seed alone, one cutting will suffice to kill the individual plants. The seeds do not retain their vitality for any length of time—seldom more than three years—so if the infested soil is kept under good cultivation during a season or so, this weed can be got under control. Clark and Fletcher, of Canada, recommend the turning of sheep into corn or potato fields after cultivation has been finished. They state that the sheep will readily eat the Wild Buckwheat vines and will do little or no injury to the crops. This pest probably gives the most trouble in grain fields and therefore is quite common in seed grain. However, most of the plants can be destroyed in the grain crops by harrowing



Fig. 11. Wild Buckwheat or Black Bindweed.

(After Clark & Fletcher. Loaned by Iowa Geol. Survey.)



when the grain is three inches or so in height. The young plants soon root firmly so this harrowing should be done when they are just making their appearance. It will also be well to cultivate the ground after harvesting and induce germination of as many seeds as possible. This has proved effective in some places. However, if clean grain is sown and rotation containing cultivated crops is used, in which the cultivation is thorough, this weed will give no trouble.

The food value of the seeds of Wild Buckwheat is practically equal to that of the cultivated Buckwheat, but if it is going to be fed to stock, the grain should be ground finely so as destroy its vitality. Otherwise many of the seeds will undoubtedly pass through the animals unharmed and be returned to the fields with manure.

### **LAMB'S QUARTER OR WHITE GOOSEFOOT.**

**Description.**—Lamb's Quarter or White Goosefoot (*Chenopodium album* L.), sometimes called Pigweed, is one of our most common annual plants of European origin, not only in fields and orchards but in gardens and waste places as well. This plant is quite variable in most of its characters, although it can readily be distinguished by its upright, succulent, grooved, and much-branched stem which is often streaked with purple. It generally attains a height of from 2 to 4 feet. The leaves, which are pale green in color, are especially variable; the lower leaves are angular-ovate in shape, coarsely toothed and narrowed at the base, while the upper leaves are lanceolate-linear in shape and more finely toothed. The flowers, which are small, greenish and inconspicuous, are produced in compound spikes both terminal and in the axils of the leaves. The entire plant presents a silvery gray or mealy appearance which can be noticed at quite a distance. This is especially true with the young plants and the under side of the leaves. Lamb's Quarter is propagated by seed. It flowers from June until frost and ripe seeds may be found from August on. (See Fig. 12).





Fig. 12. Lamb's Quarter.

(After Oswald, Minn. Agr. Expt. Sta.)

The seeds are about 1-20 inch in diameter, dull black, nearly circular, somewhat lens-shaped with the edge bluntly rounded. It is a common impurity in commercial seed.

**Eradication.**—This plant readily yields to cultivation. In places where cultivation is impossible, pulling or the use of a hoe will suffice.

### RUSSIAN THISTLE.

**Description.**—Russian Thistle (*Salsola Kali* L. var. *tenuifolia* G. F. W. Mey) is an annual weed of quite general distribution, especially in the West and Northwest. This plant, which is a native of Russia or Western Asia, was probably imported into Bonhomme County, South Dakota, with flax about 1880, and since that time it has spread very rapidly, partially on account of its rolling habit. Russian Thistle is herbaceous when young, smooth or slightly pubescent, much branched from the base, although at maturity it forms a sphere from 1½ to 3 feet in diameter which is readily loosened from the soil and carried long distances by the wind, thus scattering seed as it goes. The stems are conspicuously streaked with red as the plant nears maturity. The leaves are fleshy, linear, alternate, and from 1 to 2 inches in length. The lower leaves fall soon after the seeds are formed but the upper leaves persist, each subtending two leaf-like bracts and a flower. The flowers are inconspicuous, solitary, sessile, and have no petals. This plant is propagated by seed. It flowers from July to September and mature seed may be found by August. (See Fig. 13).

The seeds of Russian Thistle are conical, spirally coiled, base of the cone concave, about 1-10 inch in diameter, and often covered with a papery cap. From 100,000 to 200,000 seeds may be produced by a single plant.

**Eradication.**—It is principally from the fact that this plant is so productive and of such a succulent nature that it is considered a bad weed. It will give no trouble



Fig. 13. Russian Thistle.  
(After Beal, Mich. Agr. Expt. Sta.)

if cultivation can be practiced or if plants are kept from maturing seed. Clark and Fletcher recommend harrowing of growing crops as an effective means of eradicating it. Cultivation to induce late summer or fall germination will also prove effective since these plants will not mature seed before frost. Sheep will eat the young plants. However, these methods will not prohibit plants from neighboring fields blowing across the already infested land.

### PIGWEEED.

**Description.**—Pigweed (*Amaranthus retroflexus* L.) is an annual plant which has been introduced from tropical America and one which is quite common throughout the state, especially in waste places. This plant produces a roughish, more or less pubescent, erect, simple or slightly branched stem which varies from 2 to 4 feet in height. The leaves, which are situated on long margined petioles, are ovate, entire and bristle-pointed. The flowers of this weed are rather inconspicuous, although numerous, and crowded into thick compound spikes at the ends of the branches and in the axils of the leaves, the bracts of which are bristle-pointed and longer than the divisions of the green calyx. This plant is propagated entirely by seed. It flowers from June on and mature seeds, which are produced in enormous quantities, may be found after the first of August. (See Fig. 14).

The seeds of this plant are broadly ovate to round in shape, smooth, jet black, highly polished, and convex on both sides. They are approximately 1-20 inch in diameter.

**Eradication.**—Since Pigweed seed is distributed to a great extent by commercial seeds, principally clover and alfalfa, the first step in eradication is to guard against buying seed containing seeds of this weed. Since it is only an annual, clean cultivation will suffice to completely eradicate it. However, since the seeds will retain their vitality for at least four or five years, care must be taken to see that badly infested ground is planted to





Fig. 14. Pigweed.

(After Clark & Fletcher. Loaned by Iowa Geol. Survey.)

crops of such a nature that this weed can be kept from seeding during this time. Some people have had good success by thoroughly cultivating the seed bed before sowing grain, thus inducing early germination before the seed is sown.

### CORN COCKLE OR PURPLE COCKLE

**Description**—Corn Cockle or Purple Cockle (*Agrostemma Githago* L.) is an annual plant of European origin in which is quite common in grain fields, especially east of the Missouri River. It has been known in Europe since early times on account of the poisonous properties of the seed. This plant attains a height of from 1 to 3 feet and produces but few branches. The leaves, which vary from 2 to 5 inches in length, are linear or narrow and pointed. The flowers are solitary at the tips of the stems and branches on rather long flower stalks; they vary from 1 to 1½ inches in diameter, are purplish-red in color, paler toward the claws and spotted with black. The petals are notched. The sepals are very prominent, especially before the flowers open and are in part united into tubes surrounding the ovaries. The entire plant is very pubescent with soft, silky hairs. It is propagated by seed. Corn Cockle flowers in July and mature seed may be found from the latter part of July to September. (See Fig. 15.)

The seeds, which are borne in pods, vary from 1-12 to 1-8 inch in diameter, are dark brown to black in color, wedge-shaped and triangular with rounded corners. The surface is marked with distinct curved rows of conspicuous teeth.

**Poisonous Properties.**—The seeds of Corn Cockle give flour a dark color and a bad flavor. This bad flavor is due to the poisonous principle **sapotoxin** ( $\text{C}_{17}\text{H}_{26}\text{O}_{10}$ ). A number of fatalities have occurred from eating bread made from flour containing pulverized Corn Cockle seeds. Sapotoxin principally affects the digestive tract, causing vomiting, headache, nausea, diarrhea, and depressed breathing. Cases of poisoning have also been

noted among all sorts of poultry and household animals from feeding on grain containing Corn Cockle.

**Eradication.**—Since Corn Cockle is an annual it will yield readily to clean cultivation. Where it is giving trouble in grain fields a four year rotation will suffice to rid the land of it.



Fig. 15. Corn Cockle or Purple Cockle.  
(After Beal, Mich. Agr. Expt. Sta.)



**WILD MUSTARD OR CHARLOCK.**

**Description.**—Wild Mustard or Charlock (*Brassica arvensis* L. Ktse.) is one of the most common and best known annual plants to grain growers throughout the state. It produces erect, branching stems from 1 to 3 feet in height which are somewhat roughened by short stiff hairs. The leaves are quite variable; the lower ones are slender-stalked and deeply pinnatifid, forming one large terminal lobe with 2 to 4 smaller lateral lobes. The upper leaves, as a rule, are sessile or have only a very short petiole; the lobes are not very pronounced while the terminal one is much narrower than the terminal lobe of the lower leaves. Some of the upper leaves are barely lobed at all. The flowers, which are borne in racemes, are about 2-3 of an inch in diameter, yellow, quite fragrant, and consist of four petals arranged like the arms of a cross. This character was used as a basis for calling the family to which this plant belongs Cruciferae. Wild Mustard is propagated by seed. It flowers from June to September and mature seed may be found from August on. (See Fig. 16).

The seeds, which are round, reddish-brown to dull black, almost smooth, and about 1-16 inch in diameter, are borne in pods from 1 to 2 inches in length and tipped with a long empty or one-seeded, two-edged beak.

While this plant is only an annual, the extended vitality of its seed causes it to be as bad a pest as some of our short lived perennials. The seeds of Wild Mustard, according to Professor H. L. Bolley of North Dakota, gave a good germination after being buried in the ground for a period of four and one-half years, and it is claimed by some writers that their vitality is retained for a considerably longer time.

**Eradication.**—The first step in the eradication of Wild Mustard is to avoid sowing seed containing the same. Wild Mustard seed can readily be removed from the seed of most of our crops since it is round and much



smaller than any of the grains. However, it is not so easily removed from clover or alfalfa seed since the smaller mustard seeds are about the size of these. Wild Mustard is by far most common in fields which are devoted entirely to grain and generally disappears when a rotation is practiced, especially if the rotation contains grass and cultivated crops. Dr. L. H. Pammel of the Iowa State College made this statement: "Nothing has done so much to remove mustard from the fields of northern Iowa as the pasture and meadow." There is no reason to doubt that they will not do the same for South Dakota.

This pest will, without question, be greatly reduced if the infested land is plowed and harrowed several times at intervals of about ten days before planting to grass. This harrowing will cause many of the seeds to germinate and be destroyed before planting. If the land is left to grass for several years and then planted to a cultivated crop for a year or so, the mustard will be reduced if not entirely killed out. However, planting clean grain and spraying with iron sulphate will in time entirely eradicate this pest.

Spraying to eradicate mustard has proved an absolute success and for this purpose iron sulphate has proved to be the most efficient and cheapest spray. The spraying should be done at a time when the mustard is just beginning to flower for it can be sprayed at this time with little or no injury to the grain and yet kill practically all the mustard plants. The spraying should be done on a bright, still, sunshiny day when the conditions are not favorable for rain. For spraying, use a solution made by dissolving 100 pounds of iron sulphate in 52 gallons of water. This solution should be used at the rate of 52 gallons per acre and put on with a good traction sprayer at a pressure of 100 or more pounds per square inch. The spraying can be done at a cost of approximately \$1.25 per acre. (See Bull. 112, of the South Dakota Experiment Station.)



Fig. 16. Wild Mustard or Charlock.

(After Clark & Fletcher. Loaned by Iowa Geol. Survey.)

**TUMBLING MUSTARD.**

**Description.**—Tumbling Mustard (*Sisymbrium altissimum* L.) is a pernicious weed in grain fields, along roadsides, and in waste places. This weed, which has been introduced from Europe, is an erect, smooth, much-branched annual from 1 to 4 feet in height. This plant was first found in South Dakota in 1892 at Aberdeen and since that time it has spread over fields and waste places throughout the greater part of the state. The young plants form a rosette of soft, pale, downy leaves which are deeply incised. The leaves of the flowering plants, however, very greatly; the lower leaves are petioled, deeply incised, and with lanceolate lobes while the upper leaves are smaller, shorter petioled or nearly sessile and deeply pinnatifid, generally with a narrow projection on the lower side near the base. The uppermost leaves are linear, nearly entire bracts. The flowers, which are borne in racemes, are cream-colored, with four petals arranged like the arms of a cross. They are 1-3 inch in diameter. The manner in which the flowers are borne somewhat resembles the type described for Shepherd's Purse. This plant derives its name "Tumbling Mustard" from the fact that in the fall after the seeds have matured it breaks from the ground and is carried long distances by the wind. It produces an enormous number of seed—a single plant has been known to produce 1,500,000—and since they are not easily shed from the tough dry pods, the plant may be blown for miles and miles over the prairie and scatter seed here and there. Tumbling Mustard is propagated by seed. It flowers from June to July and mature seeds may be found from August on.

The seeds of Tumbling Mustard are borne in very slender or linear pods which vary from 2 to 4 inches in length. The seeds are reddish-yellow in color, oblong, minutely roughened with mucilaginous glands and cut off transversely at the scar end, sometimes almost square from a compression in the pod; one or two delicate grooves are generally present which are conspicuously



darkened. The seeds will average about 1-25 of an inch in length.

**Eradication.**—Tumbling Mustard will give little or no trouble in cultivated fields since it is an annual. However, it is more persistent in grain fields but here it can be effectively controlled by spring harrowing. It is also a good plan where this weed is bad to practice fall discing immediately after harvest. This will induce germination. Seed contaminated with the seed of this weed should not be planted. Plants along fence rows and waste places should not be allowed to mature seed. Hand pulling is effective and profitable where the weed has not become well established.

### **SHEPHERD'S PURSE.**

**Description.**—Shepherd's Purse (*Capsella Bursa pastoris* (L.) Medic.) is an annual or winter annual which has been introduced into the United States from Europe. This plant is one of the very first to make its appearance in the spring and it is not uncommon to find it making a good growth in March. The seeds, as a rule, germinate in the fall and form a rosette of leaves close to the ground. From this rosette the following spring, arise the stems which vary from 3 inches to 2 feet in height; these have but few leaves and are pubescent below but generally smooth above. The leaves of the rosettes are rather long, deeply cut, pinnatifid, or seldom entire, while the stem leaves are sessile, short, small, and arrow-shaped, with a sharp projection extending on each side of the stem. The flowers, which are very small and white, are produced in racemes. The racemes are characterized by having all graduations from mature pods below to a small bunch of flowers in bloom above. Shepherd's Purse is propagated by seed which germinates either in the fall or spring. It flowers and produces seed throughout the season. (See Fig. 17).

The seeds, which are produced in flat, triangular, wedge-shaped pods about 1-4 inch long, are reddish brown, granular, approximately 1-24 inch in length,





Fig. 17. Shepherd's Purse.  
(After Oswald, Minn. Agr. Expt. Sta.)

slightly flattened, and oblong. They usually have one or two longitudinal grooves on each side. A transparent mucilaginous covering of the seed coat appears when they are placed in water.

**Eradication.**—Frequent use of the hoe and cultivator will keep this weed under control in the garden or field. However, it seeds very abundantly and in order to completely eradicate it care must be taken to keep it down in fence corners and waste places as well. Where rotation is practiced, this plant will give no trouble.

### **FALSE FLAX.**

**Description.**—False Flax (*Camelina sativa* (L.) Crantz.) is an annual weed of European origin which is found in grain fields and waste places principally in the Sioux Valley and in the Black Hills. This plant has a single or sparingly branched stem from 1½ to 3 feet in length which is smooth or slightly pubescent with stellate hairs, especially upon the lower portion. The lower or root leaves are petioled, entire, or slightly toothed, from 2 to 3 inches in length and lanceolate or arrow-shaped, while the upper leaves are arrow-shaped, sharply pointed, and clasping. The flowers, which are small, numerous, pale greenish-yellow and 1-8 inch in diameter, are borne in racemes which become much elongated as the fruit matures. The flowers are borne in the same manner as those described for Shepherd's Purse. The name "False Flax" comes from the fact that this is a common weed in flax fields of Europe. This plant is propagated by seed. It flowers from June to August and ripe seed may be found by July.

The seeds of False Flax, which are about 1-12 inch long, reddish-yellow, granular, usually oval, with one flat or roundish side and the other furnished with a prominent vertical or oblique ridge, are borne in balloon or pear-shaped pods situated on slender foot-stalks curved upwards. These pods are about 3-8 inch long and tipped with a slender beak.

**Eradication.**—Clark and Fletcher recommend the

following treatment: "When a crop of winter wheat is infested with False Flax, harrowing in the spring will kill the young plants without injuring the wheat. A thorough summer fallow, with cultivation the previous fall and continuous cultivation throughout the summer is recommended for fields badly infested with this weed."

### **PENNY CRESS OR FRENCHWEED**

**Description.**—Penny Cress or Frenchweed (*Thlaspi arvense* L.) is an annual or winter annual of European origin which has become distributed over the state, especially in the Sioux Valley. It has undoubtedly been introduced into this Valley from Manitoba where it is considered a very troublesome weed. This plant produces an erect, smooth, simple or branched stem from 6 inches to 2 feet in height. The root leaves are petioled while the leaves upon the stalk are arrow-shaped, coarsely toothed and clasping. The flowers, which are produced in racemes on the uppermost branches, are white, about 1-8 inch in diameter and similar in structure to the flowers described for Wild Mustard. They are produced in clusters at the top of the branches, thus as the branches elongate and the pods mature they become scattered along the flower stalk. This plant is sometimes called Stinkweed on account of its disagreeable odor. It is propagated by seed. Penny Cress flowers from the first signs of spring until frost. Mature seed may be found by the early part of June. (See Fig. 18.)

The seeds which are produced in flat, somewhat arrow-shaped pods about 3-4 inch in diameter, are reddish-brown, ovate, and covered on each side by 12 to 14 curved ridges which originate and terminate at the narrow extremity. The seeds are about 1-12 inch in diameter. The pods are situated on upcurved foot-stalks.

**Eradication.**—When this weed becomes once established it is a serious pest because it tends to crowd out the cereals. However, Clark and Fletcher recommend hand pulling and burning as the best means in localities



where the weed has not become established. Where the weed has got a foot-hold they recommend cultivation to induce germination. Great care must be taken not to plow under any full-sized pods, even though they are green, since some of them will mature seed and thus in-

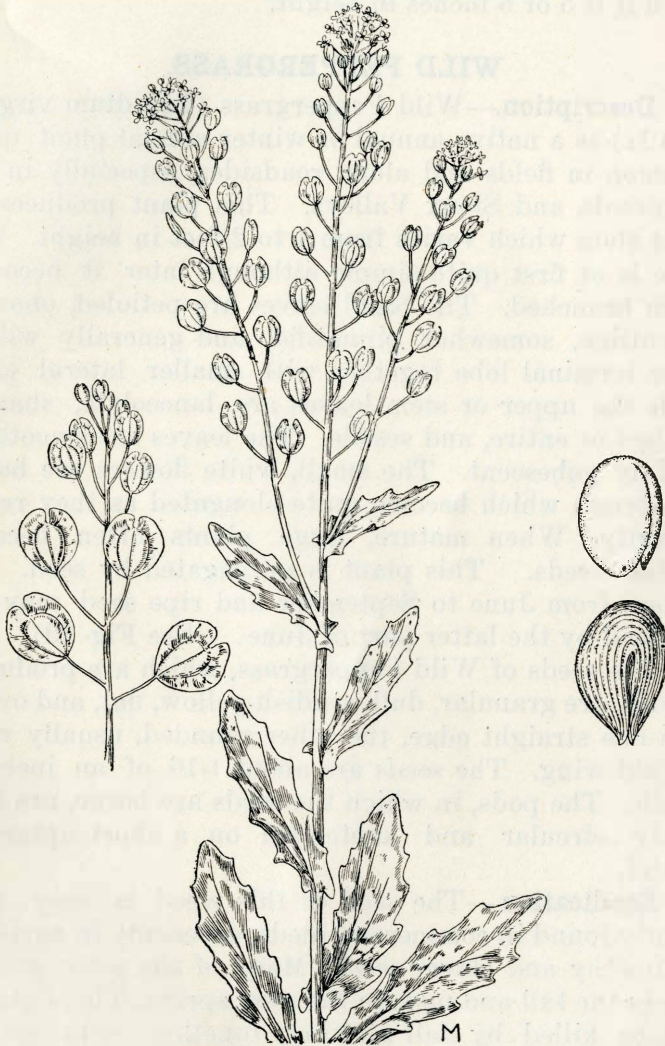


Fig. 18. Penny Cress or Frenchweed.

(After Beal, Mich. Agr. Expt. Sta.)



fest the soil. Probably the most important measure to be taken in controlling this weed is to harrow the growing crop to kill the seedlings. The harrowing should commence before the crop emerges from the ground and be repeated when the grain is about 3 inches high and again when it is 5 or 6 inches in height.

### **WILD PEPPERGRASS.**

**Description.**—Wild Peppergrass (*Lepidium virginicum* L.) is a native annual or winter annual plant quite common in fields and along roadsides, especially in the Minnesota and Sioux Valleys. This plant produces an erect stem which varies from 1 to 2 feet in height. The stem is at first quite simple although later it becomes much branched. The basal leaves are petioled, obovate in outline, somewhat pinnatifid, and generally with a large terminal lobe together with smaller lateral ones, while the upper or stem leaves are lanceolate, sharply toothed or entire, and sessile. The leaves are smooth or slightly pubescent. The small, white flowers are borne in racemes which become quite elongated as they reach maturity. When mature, large plants often become tumble weeds. This plant is propagated by seed. It flowers from June to September and ripe seed may be obtained by the latter part of June. (See Fig. 19).

The seeds of Wild Peppergrass, which are produced in pods, are granular, dull, reddish-yellow, flat, and ovoid with one straight edge, the other rounded, usually with a slight wing. The seeds are about 1-16 of an inch in length. The pods, in which the seeds are borne, are flat, nearly circular and subtended on a short upturned pedicel.

**Eradication.**—The seed of this weed is very frequently found in commercial seeds, especially in uncleaned timothy and clover seed. Many of the seeds germinate in the fall and mature the next spring. These plants can be killed by fall plowing, together with spring harrowing, especially if the land has been planted to small grain. Care should be taken in plowing under



Fig. 19. Wild Peppergrass.  
(After Beal, Mich. Agr. Expt. Sta.)

plants which are nearly mature since part of the seeds will germinate. However, if badly infested land can be planted to some cultivated crop, this weed will give no trouble.

### **SMALL PEPPERGRASS.**

Small Peppergrass (*Lepidium apetalum* Willd.) is a quite common native annual or winter annual in cultivated fields and waste places from the Missouri River eastward. This plant resembles very closely Wild Peppergrass in most respects. Methods of eradication are the same for this plant as for the Wild Peppergrass.

### **PURPLE OR STEMLESS LOCO WEED.**

**Description.**—Purple or Stemless Loco Weed (*Oxytropis Lamberti* Pursh.) is a native perennial plant which is quite generally distributed over the state, especially on higher ground. This poisonous plant produces tufts of numerous flower stalks which arise from a hard and thick rootstock containing many scales. These flower stalks are sometimes considered stems especially by the casual observer, but upon closer examination it will be found that they do not resemble a true stem. The leaves, which come from the top of the rootstock, have long petioles, while the blades are divided into a number of leaflets which are elongated and entire. The flower stalks and leaves are covered with silky and finely appressed hairs, although they may at times be comparatively smooth. The purple, violet, or sometimes white flowers are rather large and borne in racemes at the upper end of the flower stalk. This plant is propagated by underground rootstocks and seed. It flowers rather early in the spring and ripe seeds are produced by the middle of the summer. (See Fig. 20).

**Poisonous Properties.**—The Stemless Loco Weed is one of the most poisonous plants in the state, especially to cattle. The poisonous substance is not known definitely, although it is thought to be an alkaloid. The effect upon stock is not acute but it is somewhat slow in progress. The animals may live from several months to one



or two years in a stage of mania accompanied by defective eye-sight during which time they may perform all sorts of antics. After acquiring a taste for this plant the animal refuses every other kind of food and gradually dies from starvation. The animal in the advanced stages of loco poisoning is generally characterized by sunken eye-balls, lusterless hair and feeble movements.

**Eradication.**—Loco Weed gives no trouble where ground is cultivated. However, since it generally occurs on land where cultivation is impossible, there is little or no remedy for controlling it.



Fig. 20. Purple or Stemless Loco Weed.  
(After Marsh, U. S. Dept. of Agriculture.)



**WILD CARROT.**

**Description.**—Wild Carrot (*Daucus carota* L.) is a biennial plant of European origin which is working its way into this part of the country from the East, largely through the source of agricultural seeds. The seeds of this plant germinate one year and form a rosette of finely divided leaves close to the ground. It also develops a rather large, somewhat conical, fleshy tap root. From the roots of these plants the following year, arise the flowering stems which are branched, bristly, and from 1½ to 3 feet in height. The leaves are finely divided and vary somewhat in size; the lower and basal leaves being larger and more divided than the upper ones. The flowers are small, white, or occasionally light pink, and would be inconspicuous were it not for the fact that they are borne in compound umbels consisting of many rays. At flowering time the umbels vary from 1½ to 3 inches in diameter but as the seed begins to mature the rays bend inward producing an appearance like a bird's nest. Hence, the name of Bird's Nest, which is sometimes applied to it. The central flower of the umbellets is occasionally purple. Wild Carrot is no more than the cultivated carrot which has escaped from cultivation. This weed is propagated by seed and from the roots of the rosette plants of the previous season. It flowers from July to September and mature seed may be found by the middle of August.

The seeds are light brown, striped with white, oval, flattened, bearing numerous frail spines on the ridges and about 1-10 inch in length, excluding the spines which are often broken off by the hulling machines.

**Eradication.**—Since Wild Carrot has been introduced largely, and is scattered at the present time principally through agricultural seeds, the first thing to do is to avoid buying or sowing seed containing the same. It will yield without difficulty to cultivation and if cut or pulled before seed matures in the meadow for several years it can be easily got under control. Old meadows

badly infested should be broken up. If this plant is prevented from seeding it will give no trouble.

### **SPOTTED COWBANE OR WATER HEMLOCK.**

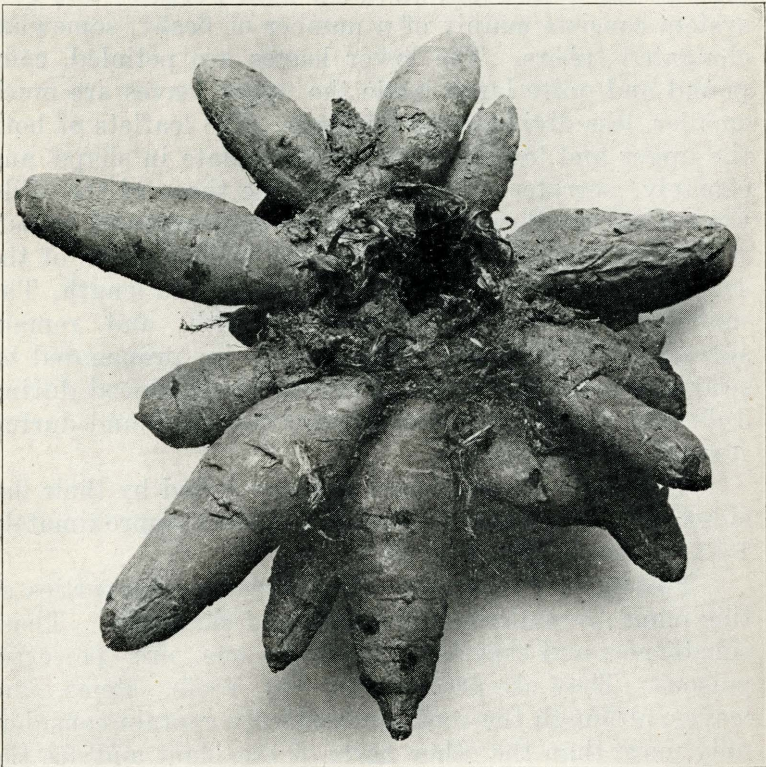
**Description.**—Spotted Cowbane or Water Hemlock (*Cicuta maculata* L.) is a native marsh perennial quite generally distributed over the state in the low lands, swamps, marshes, and along streams. This deadly poisonous plant varies from 2 to 5 feet in height, is widely branched, smooth, erect, with a stem hollow and jointed, pale green, dotted and streaked with purple. The root system consists mainly of a number of fleshy, somewhat elongated tubers. The lower leaves are petioled, compound and quite large while the upper leaves are much smaller, less divided and stalkless. The leaflets of both the upper and lower leaves are lanceolate in shape and coarsely serrate. The flowers, like those of the Wild Carrot are small, white, and borne in compound umbels which have many rays. The rays or foot-stalks of the secondary clusters vary from 1 to 2 inches in length. The umbels are from 2 to 4 inches in breadth, and remain spread out at maturity. This plant is propagated by seed and perennial roots. Flowers are produced during July and August and mature seed may be found during August and September.

The seeds are produced in pairs joined by their flat sides; they are broadly oval and ribbed, approximately 1-12 inch long. (See Fig. 21.)

**Poisonous Properties.**—The poisonous properties of this plant are undoubtedly **coniin** and **cicutoxin**. These substances, and especially the latter one, are powerful poisons. They are present in the roots, stems, and leaves, although the roots undoubtedly contain considerably more than the other parts of the plant and are the chief source of the poisoning. These poisons attack both man and stock causing violent convulsions. A number of cases are on record where children have eaten the roots for artichokes or parsnips and death has resulted in a short time in nearly every case. Mr. Chesnut states

that this is one of the most poisonous plants native to the United States. Large numbers of stock, principally cattle and sheep, die from eating the roots of this plant each year. Hay should not be fed containing this plant.

**Eradication.**—The first step in order to eradicate this pest is to drain the infested area and get it into cultivation. If this can be done the weed can be easily controlled. Hand pulling, especially after the roots have been loosened with a spade will also prove effective.



(Fig. 21. Fleshy tubers of Spotted Cowbane or Water Hemlock.

(After Pammel, Iowa Geol. Survey.)



**CLOVER OR ALFALFA DODDER.**

**Description.**—Clover Dodder (*Cuscuta Epithymum* Murr.) is an annual plant of European origin which lives a parasitic life, hence we may call it a weed-parasite. The dodder seeds germinate in the soil and soon perish unless they come in contact with a clover or alfalfa plant. Soon after coming in contact with a suitable host the roots decay; it then twines its rapidly growing and spreading, slender, yellowish and reddish stems about its host. The dodder derives its nourishment by sending little suckers or haustoria into the stems of the plant attacked. The dodder appears leafless to the casual observer since the leaves are reduced to mere scales. The flowers are whitish or pinkish, occurring in clusters along the slender stems. During the latter part of the summer these clusters may contain both flowers in bloom and mature seed at the same time. Dodder occurs in patches which may be the result of a single seed. These patches can be distinguished at quite a distance on account of their distinctly yellowish cast. It is propagated by seed. This plant flowers from June until frost and mature seed may be found from the latter part of July on. (See Fig. 22c.)

The seed is small, greenish-yellow to dark brown, oval to spherical, dull, lightly pitted or granular and varying from 1-30 to 1-20 of an inch in diameter.

**Eradication.**—Since dodder is an annual plant it will yield readily to cultivation but unless a field is very badly infested many farmers hesitate about breaking it up. However, dodder, when occurring in small patches, may be successfully eradicated by digging up the infested areas, permitting the plants to dry on the spot where they were dug up—to avoid scattering the seed—and burned to destroy the seed. It is a good plan to sprinkle the patches with oil before burning them. These spots can later be reseeded. This is especially desired if the field is in alfalfa. After a patch has been dug up, burned and again reseeded, it will be well to keep watch on it for any stray plant which may come up. If they do these can be destroyed before the dodder flowers. Seed,



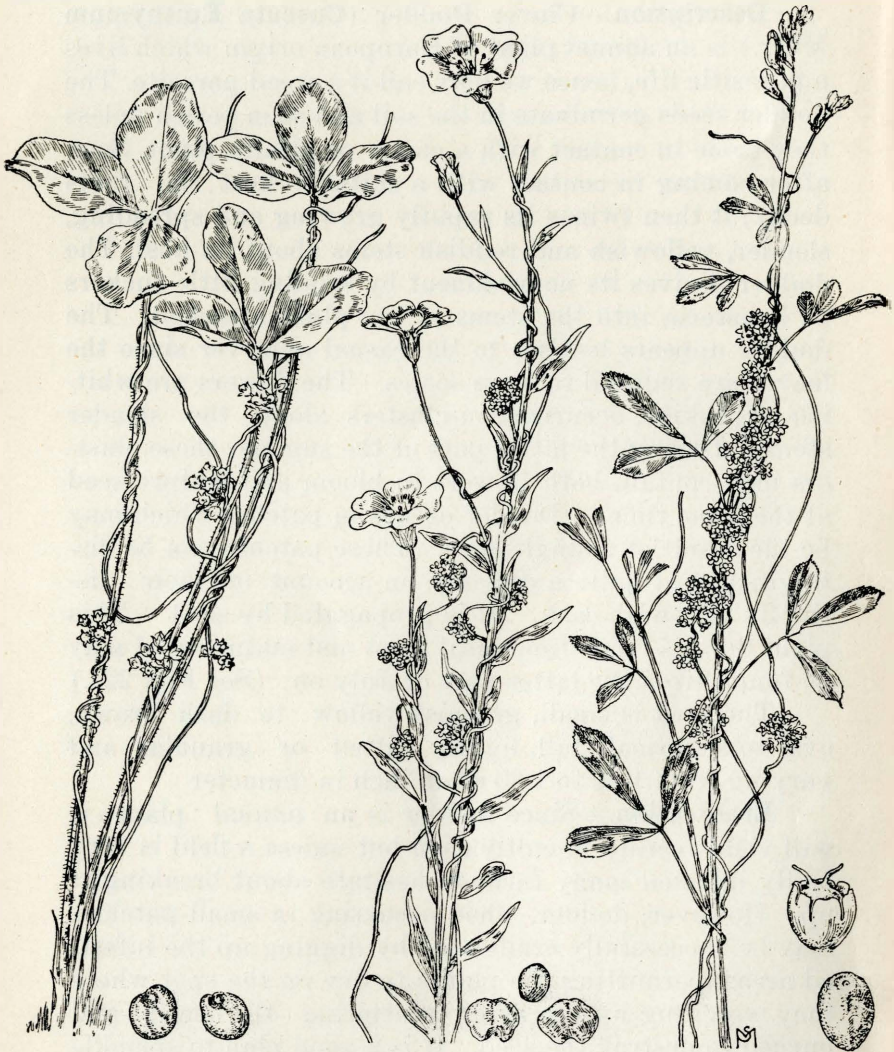


Fig. 22a

Fig. 22b

Fig. 22c

Fig. 22a, Field Dodder.

Fig. 22b, Flax Dodder.

Fig. 22c, Clover or Alfalfa Dodder.

(After Beal, Mich. Agr. Expt. Sta.)

free from dodder, should by all means be sown and a crop which contains dodder should **never** be harvested for seed. There is undoubtedly more legislation against dodder than any other single weed.

### **FIELD DODDER.**

**Description.**—Field Dodder (*Cuscuta arvensis* Beyrich) is also an annual plant and a weed-parasite. In fact it very closely resembles Clover Dodder in most respects. It is probably found on alfalfa more often than the Clover Dodder, yet the two species occur on both clover and alfalfa. The seeds of Field Dodder are about twice as large as the seeds of Clover Dodder and are generally darker in color. It is difficult for the observer to distinguish between these two species. (See Fig. 22a.)

For methods of eradication see Clover Dodder.

Flax Dodder (*Cuscuta Epilinum* Weihe) closely resembles the other dodders described. (See Fig. 22b.)

### **FIELD BINDWEED OR WILD MORNING GLORY**

**Description.**—Field Bindweed or Wild Morning Glory (*Convolvulus arvensis* L.) is a twining or creeping perennial plant of European origin which is propagated by deep, extensive, fleshy, and light-colored underground rootstocks. From these rootstocks many plants are produced each year. The leaves are from 1 to 1½ inches in length and vary from oval to arrow-shaped with pointed or projected basal lobes. The flowers are generally white or tinted with red, funnel-shaped, about an inch in diameter at the mouth of the tube, and produced on short slender stalks, which arise in the axils of the leaves. The flowers are generally produced singly although they may occur in pairs. This plant is propagated by seed and the underground fleshy rootstocks. It flowers from June throughout the summer and mature seed may be found by July.

The seeds, which are borne in round, delicate, cartilagenous capsules, containing either two or four cells, are dull, dark brown, coarsely roughened, oval, with one

face convex, the other two sloping to the edges from a broad central ridge, and about 1-6 of an inch in length.

**Eradication.**—So far as eradication of this pest is concerned it must be classed with our worst weeds. However, by persistent efforts it can be killed out.

**Clean Cultivation.**—Field Bindweed can be completely eradicated by keeping the land in clean cultivation for two years. This means that the land must be planted to such crops that can be cultivated quite often throughout the growing season. If the land is planted to corn, this will mean that as soon as the corn is too large to be cultivated with a cultivator the field should be gone over with a hoe and all young shoots cut off as soon as they make their appearance. Many farmers fail to kill out weeds by this method because they cut them but once or twice a season; this only stimulates them to a more rapid growth. Only persistent efforts will show results.

**Planting Land to Alfalfa.**—Cox\* recommends the planting of infested land to alfalfa to be used for hogs. The alfalfa will eventually crowd out the Bindweed since the frequent cuttings have somewhat the same effect as clean cultivation. The pest is greatly hindered in growth on account of shading by the alfalfa.

**Pasturing with Stock.**—Pasturing infested land with sheep has proved a good means of greatly reducing this weed since the sheep will readily eat the young plants as they come through the sod. Three years of pasturing with sheep where enough are kept to keep the pasture well down will greatly weaken this pest if not kill it completely.

Numerous cases are on record of completely eradicating this pest by pasturing with hogs. Hogs are very fond of the roots and rootstocks as well as of the stems and they will root up an infested field in a short time in order to get the rootstocks. Infested land should be

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\*Farmers' Bulletin No. 368, U. S. Department of Agriculture.





Fig. 23. Hedge Bindweed.  
(After Beal, Mich. Agr. Expt. Sta.)



plowed in the late summer after a crop has been removed and hogs, which have not been ringed, turned on to it and left until cold weather. If hogs are again turned in to the field as soon as possible in the spring and left until planting time this weed will be considerably weakened in vitality, especially if the land is planted to a crop where clean cultivation can be followed during the summer.

### **HEDGE BINDWEED.**

**Description.**—Hedge Bindweed (*Convolvulus sepium* L.) is a perennial, twining or creeping plant very similar to Field Bindweed, except in size. In this respect the leaves and flowers are about twice as large as those of the Field Bindweed. (See Fig. 23.)

**Eradication.**—(See Field Bindweed.)

### **MARSH ELDER.**

**Description.**—Marsh Elder (*Iva xanthifolia* Nutt.) is a native plant quite generally distributed in waste places in the Black Hills and from the Missouri Valley eastward. This annual plant attains a height of from 2 to 6 feet. The stems are much branched, rather coarse, pubescent above and smooth below. The pubescence on the stems is particularly noticeable when the plants are young. The leaves are for the most part opposite, broadly ovate to heart-shaped, long petioled, and with doubly serrate or cut-toothed edges. The upper surface of the leaves is minutely roughened while the lower surface is hoary. The somewhat inconspicuous flowers are borne in spike-like clusters which form a compound panicle. The outer bracts of the involucre are broadly ovate and greenish. Before flowering, Marsh Elder closely resembles the Great Ragweed, especially in habit of growth and leaf outline. The panicles of dark-colored flowers at the top of the stems of Marsh Elder are also quite different from the cylindrical spikes of the male flowers at the tips of the branches of Ragweed. This plant is propagated by seed. It produces flowers from

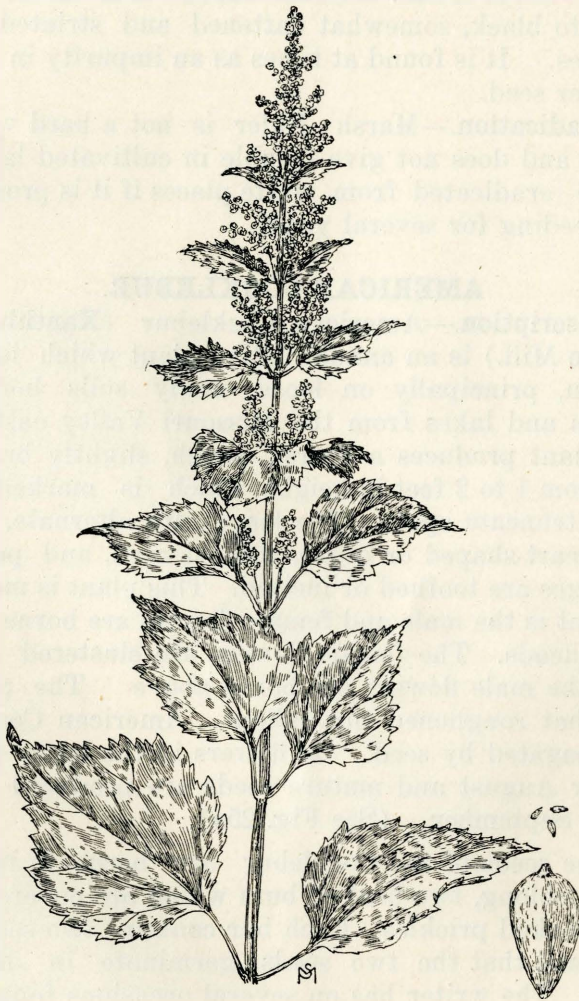


Fig. 24. Marsh Elder.  
(After Beal, Mich. Agr. Expt. Sta.)

July on and mature seed may be found in August. (See Fig. 24).

The seeds of this weed are about 1-10 of an inch long, brown to black, somewhat flattened and striated with fine lines. It is found at times as an impurity in alfalfa or clover seed.

**Eradication.**—Marsh Elder is not a hard weed to control and does not give trouble in cultivated land. It can be eradicated from waste places if it is prohibited from seeding for several years.

### **AMERICAN COCKLEBUR.**

**Description.**—American Cocklebur (*Xanthium canadense* Mill.) is an annual native plant which is quite common, principally on loose sandy soils bordering streams and lakes from the Missouri Valley eastward. This plant produces a coarse, rough, slightly branched stem from 1 to 2 feet in height which is marked with brown truncate spots. The leaves are alternate, somewhat heart-shaped or ovate, three-nerved, and petioled. The edges are toothed or incised. This plant is monoecious, that is the male and female flowers are borne in different heads. The female flowers are clustered below, while the male flowers are borne above. The plant is somewhat roughened throughout. American Cocklebur is propagated by seed. It flowers in the latter part of July or August and mature seeds are produced by the first of September. (See Fig. 25a).

The seeds of the Cocklebur are borne in reddish-brown, oblong, two-beaked burs which are covered with stout hooked prickles. Each bur contains two seeds. It is claimed that the two seeds germinate in different years. The writer has on several occasions found both seeds germinating at the same time. This is, however, an exception rather than the rule.

**Eradication.**—The best method of eradicating Cockleburs is by rotation of crops and clean cultivation. Cocklebur can be entirely controlled if it is not permitted to seed for a few years. If the field is in corn, thorough



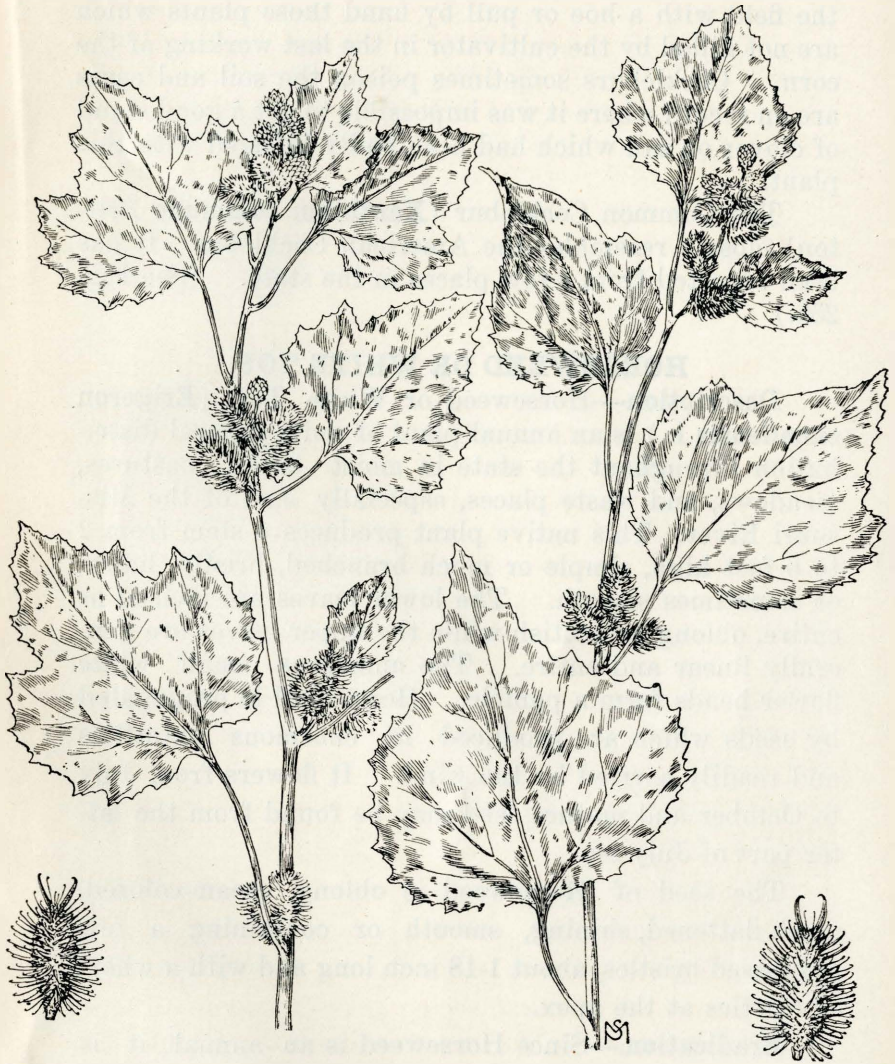


Fig 25a

Fig. 25a. American Cocklebur.  
Fig. 25b. Common Cocklebur.

Fig 25b

(After Beal, Mich. Agr. Expt. Sta.)



cultivation should be practiced. It will pay to go over the field with a hoe or pull by hand those plants which are not killed by the cultivator in the last working of the corn. Cocklebur sometimes poison the soil and cases are on record where it was impossible to get a good stand of clover on soil which had been badly infested with this plant.

The Common Cocklebur (*Xanthium commune* Britton) closely resembles the American Cocklebur. It has been reported from a few places in the state. (See Fig. 25b.)

### **HORSEWEED OR WHITE TOP.**

**Description.**—Horseweed or White Top (*Erigeron canadensis* L.) is an annual plant of quite general distribution throughout the state in moist lands, pastures, meadows, and waste places, especially east of the Missouri River. This native plant produces a stem from 2 to 6 feet high, simple or much branched, bristly, hairy, or sometimes smooth. The lower leaves are incised or entire, oblong or acutish while the upper leaves are generally linear and entire. The numerous small white flower heads form a panicle. Horseweed is propagated by seeds which are produced in enormous quantities and readily carried by the wind. It flowers from July to October and mature seed may be found from the latter part of July on.

The seed of Horseweed is oblong, cream-colored, much flattened, shining, smooth or containing a few appressed bristles, about 1-18 inch long and with a whorl or bristles at the apex.

**Eradication.**—Since Horseweed is an annual it is easily destroyed by cutting off just above the surface of the ground, although this will not prohibit seed from being carried by the wind to clean fields from other infested areas and waste places. A short rotation or cultivation should control it.

### SMALL RAGWEED.

**Description.**—Small Ragweed (*Ambrosia artemisiifolia* L.) is an annual native plant quite common in grain fields and waste places from the Missouri Valley eastward. This plant produces a coarse, much branched, hairy stem from 1½ to 3 feet in height. The lower leaves are usually opposite, petioled, pale or white beneath from downy hairs, smooth above, and greatly pinnatifid, while the upper leaves are smaller, usually alternate and generally stalkless. The flowers, which are quite small, are of two kinds, namely: staminate and pistillate. The staminate or male flowers are borne in long, slender spikes at the ends of the upper branches, while the pistillate or female flowers are borne in groups of two or three in the axils of the leaves at the base of the staminate spikes. The male flowers usually have a yellowish color due to the yellow and conspicuous stamens. The female flowers are inconspicuous. It is thought by some people that the pollen of the ragweed causes hay-fever. This plant is propagated by seed. It flowers from July to September and ripe seeds are generally found by the first of August. (See Fig. 26a.)

The seed of the Small Ragweed is dull, hard, straw colored to light brown, and tapering to a point at the apex. The surface is covered with a number of ridges which terminate in sharp teeth, thus giving the apex of the seed somewhat the appearance of a crown. It varies from 1-12 to 1-6 of an inch in length.

**Eradication.**—The seed of Small Ragweed is a very common impurity in clover seed. Stubble fields where this weed is prevalent should be disced or plowed before the weed matures seed. Since it is an annual plant this should keep it under control if the work is done carefully and carried out for several years. Small Ragweed gives but little trouble in cultivated crops. If badly infested land is put into a three-year rotation of cultivated crops, this weed will give no trouble.



Fig 26a

Fig. 26a, Small Ragweed.



Fig. 26b

Fig. 26b. Giant Ragweed.

(After Beal, Mich. Agr. Expt. Sta.)



### GIANT RAGWEED.

**Description.**—Giant Ragweed (*Ambrosia trifida* L.) is a native annual closely related to the Small Ragweed. This plant, however, produces a coarse, branching, rough stem which varies from 3 to 10 feet in height. The leaves are all opposite and petioled, three-nerved, and three to five-lobed. The flowers are of two kinds and resemble those of the Small Ragweed. The seed of this plant resembles in shape and markings the seed of Small Ragweed, however, it is about 1/4 of an inch in length.

**Eradication.**—Mowing of waste places to prevent the formation of seed and cultivation will serve to control this weed. See methods for eradicating Small Ragweed. (See Fig. 26b.)

### COMMON PLANTAIN.

**Description.**—Common Plantain (*Plantago major* L.) is a native and introduced perennial plant found in waste places and lawns throughout the state. This plant does not produce a true stem as is the case with most of our plants. The large tuft of dark green, coarsely toothed, ovate, long petioled leaves comes from a short thick rootstock. The petioles are characterized by having a distinct channel on the inner surface. The small, inconspicuous flowers are produced in dense spikes varying from 3 to 12 inches in length. Each plant may produce from 4 to 12 spikes. This plant is propagated by seeds and perennial rootstocks. It flowers from May throughout the summer and ripe seed may be found by July. (See Fig. 27b.)

The seeds of the Common Plantain are dark brown to black, slightly flattened with acute edges, variable in shape, about 1/20 of an inch in length, oval to oblong and roughened. There is generally a scar on one side of the seed from which radiates dark brown, broken, wavy lines.

**Eradication.**—Common Plantain is quite persistent, especially in lawns. However, when occurring in fields it will yield readily to cultivation. The most practical method of eradicating it in lawns is by hand



Fig. 27a

Fig. 27a, Rugel's Plantain.

Fig. 27b, Common Plantain.

Fig. 27b

(After Beal, Mich. Agr. Expt. Sta.)

digging. If the rootstock is cut off several inches below the surface the plant will give no more trouble. Care should be taken to see that the seeds of this plant are not present in commercial seed when purchased.

### **RUGEL'S PLANTAIN.**

Rugel's Plantain (*Plantago Rugelii* Dene.) very closely resembles the Common Plantain. However, it is a little larger and more erect plant with somewhat smoother leaves. The leaf-stalks are purple at the base. The spikes are a little longer. (See Fig. 27a).

### **RIB GRASS OR BUCKHORN.**

**Description.**—Rib Grass or Buckhorn (*Plantago lanceolata* L.) is without question one of the most common bad weeds disseminated through the agency of clover and alfalfa seed. This perennial weed, which is a native of Europe, produces a rather large rosette of leaves. The leaves are entire, 3 to 5 ribbed, oblong-lanceolate in shape, hairy at the base and from 2 to 10 inches in length. The leaves are generally erect on the old plants while they lie close to the ground when the plants are young. The stem which is one of the principal parts of most plants is replaced by a stiff, slender, and grooved flower stalk from 1 to 2 feet long. The small or somewhat inconspicuous flowers are borne in dense spikes at the apex of the flower stalk. These spikes are at first ovoid, but with age they turn dark brown to black, and become somewhat elongated. The root system is composed of a short perennial rootstock with many fibrous roots. This plant is propagated by seed and the rootstock of the previous year. It flowers throughout the summer and mature seed may be found by the first part of July. (See Fig. 28.)

The seeds, which are produced in two-seeded oblong capsules, are shiny, amber-colored to a rich brown, oval with rounded ends, somewhat flattened and concave on one side, and about 1-10 of an inch long. A dark colored scar is present on the concave surface while a yellow-



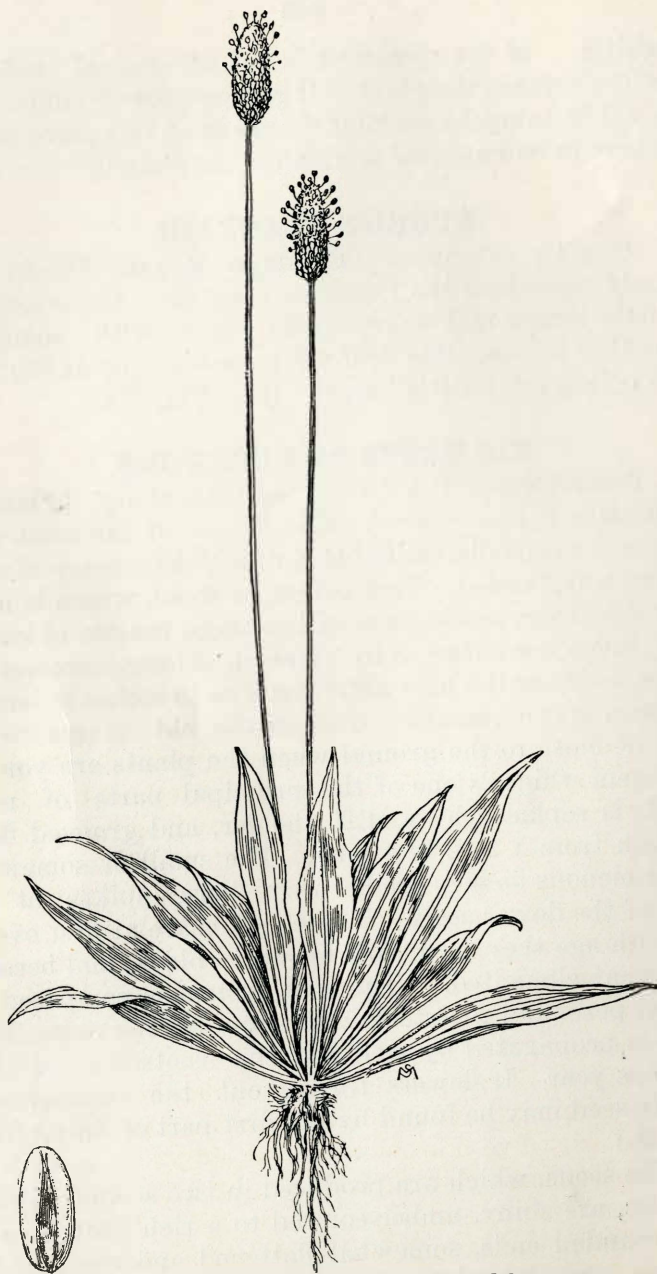


Fig. 28. Rib Grass or Buckhorn.  
(After Beal, Mich. Agr. Expt. Sta.)

ish-brown, longitudinal stripe is generally present on the back of the seed. In short, we may compare the seed of buckhorn to a tiny coffee grain.

**Eradication.**—Sow clean seed. Buckhorn is a persistent perennial weed in fields, lawns and meadows, and thorough cultivation is necessary to exterminate it. If it is present in lawns, hand digging and prevention from seeding is necessary to control it. Too much emphasis cannot be placed on the matter of buying or planting only clean seed. The buckhorn seeds are about the same size as red clover or alfalfa seeds and only by special devices, and then only partially, can they be removed. Good seed may cost a little more but it is by far the cheapest in the end.

### COMMON SOW THISTLE.

**Description**—Common Sow Thistle (*Sonchus oleraceus* L.) is an annual plant of European origin which has been introduced into portions of the state. This plant produces a single or slightly branched, succulent, leafy, roughened stem from 1 to 4 feet in height. The lower or basal leaves are petioled, pinnatifid, from 4 to 10 inches long and generally with a large and triangular terminal lobe, while the upper leaves are incised, much shorter, and clasp the stem by their somewhat heart-shaped base. The pale yellow flower-heads, which vary from 1-2 to 1 inch in diameter, are borne in clusters in the axils of the uppermost leaves and at the apex of the stems. This plant is propagated by seeds which are generally distributed by the wind. It flowers from May until fall and ripe seeds may be found by July.

The seed of this weed is reddish-brown, linear, slightly larger at one end, 1-10 of an inch in length, and flattened with five uneven wrinkled ridges on each side.

**Eradication.**—Sow Thistle can be kept under control by cultivation. Spraying with iron sulphate at the rate of 100 pounds to 52 gallons of water has also proved efficient. Several applications may be necessary. Rotation of crops and clean cultivation will suffice to ex-

terminate this weed.

### CANADA THISTLE.

**Description.**—Canada Thistle (*Cirsium arvense* (L.) Scop). is a perennial plant of European origin which has been introduced into the state and especially into the Sioux Valley. The stems of this plant, which are produced by deep running rootstocks, are smooth, much branched, and vary from 1 to 3 feet in height. The leaves vary somewhat although they are deeply pinnatifid, wavy, and crested, having numerous spiny teeth upon the lobes and margins. They are somewhat downy, especially upon the lower surface. The flower-heads, which are from  $\frac{1}{4}$  to  $\frac{1}{2}$  inch in diameter—seldom larger—are borne at or near the top of the stems and branches. The color of the flowers ranges from purple through shades of pink to white, although the greater majority of them are purple. This plant is dioecious, that is, some plants produce only male flowers while others produce female flowers. Canada Thistle is propagated by seed and underground perennial rootstocks. It flowers from June to August and ripe seed may be found by July. (See Fig. 29).

The seeds of Canada Thistle are smooth, light brown, straight or slightly curved, slightly flattened, and  $\frac{1}{2}$  of an inch in length. The top of the seed is nearly round, having a narrow rim with a somewhat cone-shaped point in the center.

**Eradication.**—Since Canada Thistle is a perennial plant propagated by deep underground rootstocks it is needless to say that it is a hard weed to eradicate. Many methods have been advocated from time to time but after all they have in view but one essential point, namely, to prohibit the plants from forming leaves above the surface of the ground. As long as the plants are permitted to form green leaves they will manufacture plant food which is stored in the rootstocks, and just as long as plant food is present in the rootstocks the thistles are capable of sending up new plants. The rootstocks must





Fig. 29. Canada Thistle.  
(After Beal, Mich. Agr. Expt. Sta.)

be starved out and this is done by sending new plants to the surface of the ground. If these new plants are killed before they can replace the food used in sending them to the surface, the rootstocks are somewhat weakened. The young plants must be kept cut back for one or two seasons, according to weather conditions, before they will be completely starved out. The patches should be gone over and the young plants cut off every ten days or two weeks. Cutting but several times a season only causes the rootstocks to send up a larger number of plants. The methods described in this bulletin for the eradication of Quack Grass with the exception of "The Hand Digging Method" have given good success for the extermination of Canada Thistle.