IDAHO AGRICULTURAL EXPERIMENT STATION
MOSCOW, IDAHO

WEED PESTS OF IDAHO

AND

METHODS OF ERADICATION

By
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The regular bulletins of this station are sent free to persons residing in Idaho who request them.

WEED PESTS OF IDAHO AND METHODS OF ERADICATION

This bulletin seeks to give a description and methods of eradication of some of the worst weeds which the Idaho farmer has to combat in his crop farming. Weeds of various sorts appear to flourish mightily in the soils of Idaho and many of our farms are already badly infested. This bulletin is not intended as a treatise on weeds but largely to call attention to some of the worst weeds we have to contend with in our farming operations and to furnish an accurate description of each weed so that it might be readily recognized and the first plants destroyed when they appear. The methods of eradication given are suggestive and each farmer will have to adopt to some extent at least a system of his own, depending on the character of his soil, the system of farming followed and the extent to which the farm is infested.

WILD OAT

Description

(AVENA FATUA)

The wild oat is beyond doubt the worst weed that the farmers of Idaho have to contend with. By the cut it will be seen that the mature wild oat closely resembles the tame oat in general appearance. Through an examination of the grain, however, it will be found that the wild oat differs considerably from the tame oat. The hull is usually of a dark brown color and much thicker than that of the tame oat. Unlike the tame oat the palea and glume, (the two parts of the hull surrounding the kernel), are pubescent, or hairy, and to the center of the glume or larger portion of the chaff is attached a long twisted awn, usually bent at a right angle in the dry seed. When a dry grain is moistened by the rain, the awn will begin to revolve and, by so doing, causes the seed to move around on the ground or wriggle itself partly into the soil. Like the cultivated variety, the wild oat is an annual.

Pernicious Habits of the Wild Oat

The habits of the wild oat make it extremely difficult to eradicate for the following reasons:—1. The seeds drop off readily as soon as ripe. 2. The seeds will endure in the ground or in

WILD OAT
(Avena fatua)

an unrotted manure pile for years without losing their vitality. 3. It will thrive under adverse conditions of both soil and climate. 4. It thrives best under field conditions for all the cereals and hence is distributed by their seed. 5. As the seeds are lighter than the common cereals many of them get into the chaff during the threshing and hence blow away with high winds or are eaten by the cattle that feed in straw stacks and are distributed by them in their droppings. 6. The seeds ripen before most of the cereals.

Method of Eradication

From a study of the above habits it can be seen that the only course to pursue to completely eradicate the wild oat is to proceed to bring every seed in the soil into germination as rapidly as possible and then to destroy the seedlings as soon as they appear. Hence, plow, the field shallow or disk as soon as the grain crop is removed. In about ten days, if the weather has been warm and damp, use the disk again, then harrow every few days as the little seedlings appear. If the autumn is dry and the seeds do not germinate readily it is well to roll the soil to bring up the water from below. Continue the process of harrowing as long as possible before the winter plowing, then plow the usual depth for winter. Get onto the land in the spring as soon as the soil will permit and harrow again to kill the seedlings. Follow with a cultivated crop such as corn, potatoes, beans or cabbages. In case land is too dry to plow immediately after removing a grain crop turn cattle or sheep into the field in order to eat down the seedlings. Otherwise many of the oats will go to seed before winter sets in. Summer fallowing as practiced in many sections of this state is an excellent method of holding the wild oat in check, particularly if cattle are allowed in the field once in awhile, as above mentioned, to nip off the plants that were missed by the plow or harrow and to nip off the seedlings.

Early winter rye or barley is an excellent crop to raise if the farmer does not wish to resort to a cultivated crop. As a rule this can be cut before the wild oats ripen. Persistent cultivation should be kept up in the fall to the time of sowing the rye or barley, as directed in a previous paragraph.

Late autumn and spring cultivation, followed by a crop of millet or rape, (as late as it is safe to get it to germinate, say about the middle of May in the northern counties), is still another excellent method of controlling the oat. If rape is sown it should be pastured off.

Alfalfa is an excellent crop to grow to hold the wild oat in check, where at least three crops can be cut during a season. The several cuttings prevent it from maturing its seed and after several years the seed will lose its germinating power.

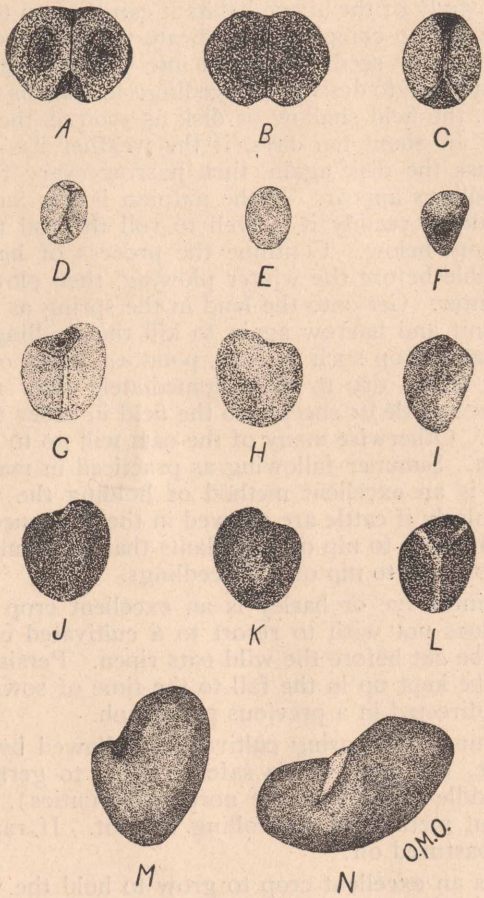
Whatever method is employed, the importance of a crop ro-

tation containing cultivated plants should not be lost sight of.

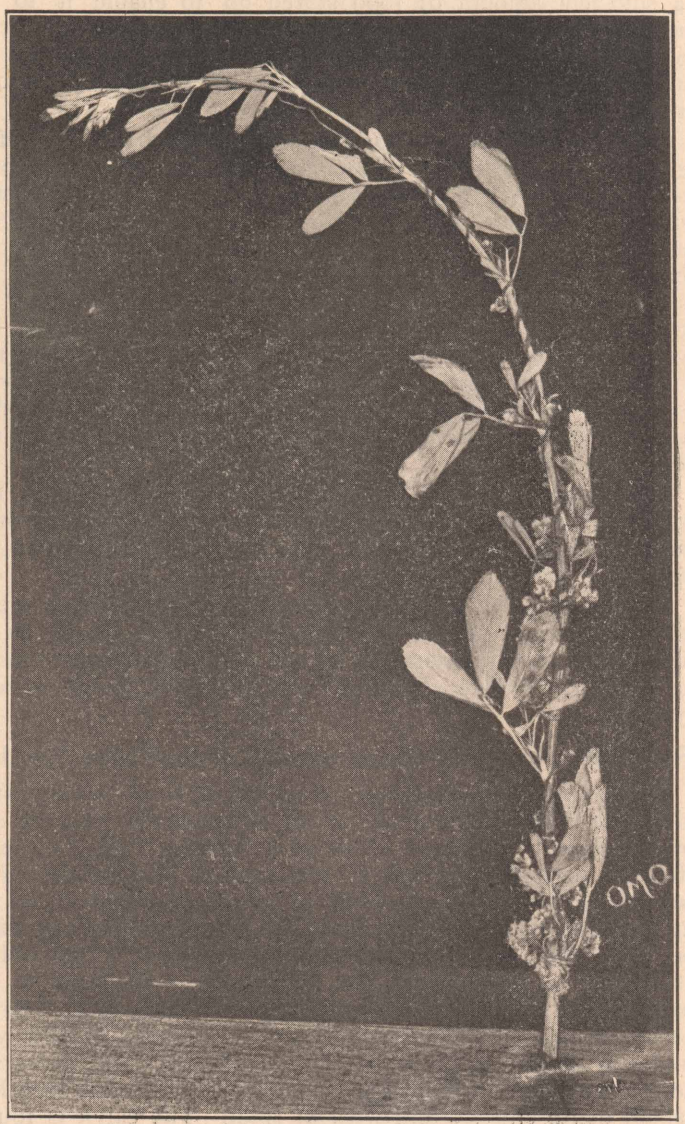
Caution. When buying seed grain inspect it carefully, particularly black oats, to see that it contains no wild oat seed.

DODDER

Dodder is a parasitic seed plant. Unlike ordinary weeds it possesses no leaves (except minute scales on the stems) and con-



SEED OF DODDER, CLOVER, AND ALFALFA COMPARED IN SIZE AND SHAPE. MAGNIFIED 10.5 TIMES. A, B AND C, FLAX DODDER; D, E AND F, CLOVER DODDER; G, H AND I, FIELD DODDER; J, K AND L, PRETTY DODDER; M, RED CLOVER; N, ALFALFA.



DODDER—Encircling a branch of Alfalfa.

tains no chlorophyll, the green coloring matter found in leaves, so it is dependent upon other plants for its food. In the seed there is a sufficient amount of food stored up to enable it to take root and to produce a threadlike stem until it reaches its host. It then twines around the unfortunate stem of the alfalfa or host plant and sends short wedge-shaped rootlets or haustoria into the stem to obtain nourishment.

As soon as these haustoria have penetrated the stem of the host plant, the part of the dodder in connection with the ground, dies. The dodder is now solely parasitic upon the host. It steals from it all the food necessary for its growth and reproduction. The alfalfa plant, unable to withstand such a loss, soon becomes exhausted and dies together with the part of the dodder connected with it, but the upper end of the dodder has by this time entwined itself around the stem of another plant which later must succumb to the same ill treatment. The parasite thus grows from plant to plant until a patch of alfalfa of several square yards has become an entangled mass of yellow threads and dried remains. It usually continues to spread and produce flowers until killed by the frost.

The seeds of the dodder have been found to retain their power of germination from four to six years under favorable conditions of soil and climate. They only germinate when covered with a very little soil.

Three species of dodder have been found on alfalfa in Idaho; viz., Flax Dodder (Cuscuta epilinum Weihe) occurring on flax and alfalfa; Clover Dodder (Cuscuta epithymum Murr) occurring on alfalfa and clover; and Field Dodder (Cuscuta arvensis Beyrich).

Some Distinguishing Characteristics of the Three Species

Each species is characterized by the filiform twining stems and by the numerous minute rootlets or haustoria. To the common observer the greatest distinction between them lies in the difference between the flowers and seeds. The flowers of the Flax Dodder are yellowish white in color, one-eighth of an inch long, in dense scattered heads and are sessile (without any stalk). The calyx (the outer perinath or floral envelop) is hemispheric in form and is five lobed. The seeds are one-sixteenth to one-twenty-fourth of an inch long, rough, pitted, rusty to dark brown in color, oval to ovoid in shape and the flattened side closely resembles a halved apple somewhat dried up. The flowers of Clover Dodder are whitish or pinkish, one-twelfth of an inch long, in small dense clusters and without stalk. The calyx is four to five lobed. The seeds are about one-thirty-secondth of an inch long, oval to spherical in shape, usually indented on one end, dull, pitted, rusty to dark brown or often greyish in color. The flowers

of the Field Dodder average about one-sixteenth of an inch long, are nearly sessile and in small clusters. The calyx is broad and five lobed. The corolla is bell-shaped, and if often larger than the calyx tube. The seeds are one-twenty-fourth of an inch long, broad, oval, ovoid or spherical in shape, and compressed on one end. Some have two flat intersecting surfaces on one side, are dull pitted and yellowish brown.

Method of Eradication

First of all obtain clover and alfalfa seed that is free from dodder. No words can be wasted in endeavoring to impress the importance of getting pure clover and alfalfa seed. For this reason the author has included under the preceding heading an accurate description of the seeds of the three dodders common in Idaho to enable one to readily identify them. When you are about to purchase clover or alfalfa seed, first insist that you be allowed to thoroughly examine a sample. With a small hand lens, which can be purchased for about fifty cents, carefully examine the seed for the presence of dodder and other noxious weeds. If you discover dodder seed go somewhere else for your seed, for such seed is too dear at any price.

Nearly forty per cent of the clover and alfalfa seed that was sent to the Station for analysis during the past spring, was found to contain dodder. You can therefore see that the chances for getting bad seed are many. A few minutes time spent on an analysis may in the end repay the purchaser a thousand fold. Especially would this be true when one considers that it is often necessary to plow up a whole field of dodder-infested clover or alfalfa.

The seeds of Clover Dodder being very small, can usually be entirely removed from clover or alfalfa seed by recleaning the seed with sieves of a proper sized mesh. It is not an easy matter to entirely remove those of Field Dodder or Flax Dodder on account of their much larger size. In fact it is impossible to remove all the latter by screening without allowing a large percentage of the small clover or alfalfa seed to pass through. The large seeds of Field Dodder are of about the same size as those of the smallest red or mammoth clover, and those of Flax Dodder, when joined in pairs as they often are, are much larger than those of Field Dodder.

Another species of dodder which is likely to occur in alfalfa or clover seed grown in the southern or middle states, Pretty Dodder (Cuscuta indecora Chois), averages but a little smaller than red clover seed. For the above reasons it can be seen that only one species of dodder can be successfully separated by machinery. Take no risk then and buy no seed with it in. If dodder has already become established in your fields, proceed to

eradicate it as follows:—First allow no dodder seed to mature. If the field is newly seeded, and only a few patches appear, mow them down closely and burn the remains on the infested spot as soon as dry. If the dodder has matured its seed, go over the patches with a large kerosene torch and burn the dodder from the host plants without scattering the seeds to the ground more than is necessary. Then mow the patch and burn on the original spot when dry. Keep a constant watch over the burned areas throughout the season and hoe it occasionally to remove any new dodder plants that may appear.

On a badly infested field the clover or alfalfa should be mowed, burned when dry and the ground plowed. Follow with a hoed crop one season and then with wheat, oats, barley or potatoes for three years. By the end of this time the seeds in the soil will be destroyed. Never save seed from a field in which dodder is found.

In the "Manual of Poisonous Plants," by Dr. Pammel, it is stated that dodder produces a bowel trouble in horses. For this reason dodder infested hay should be fed with caution.

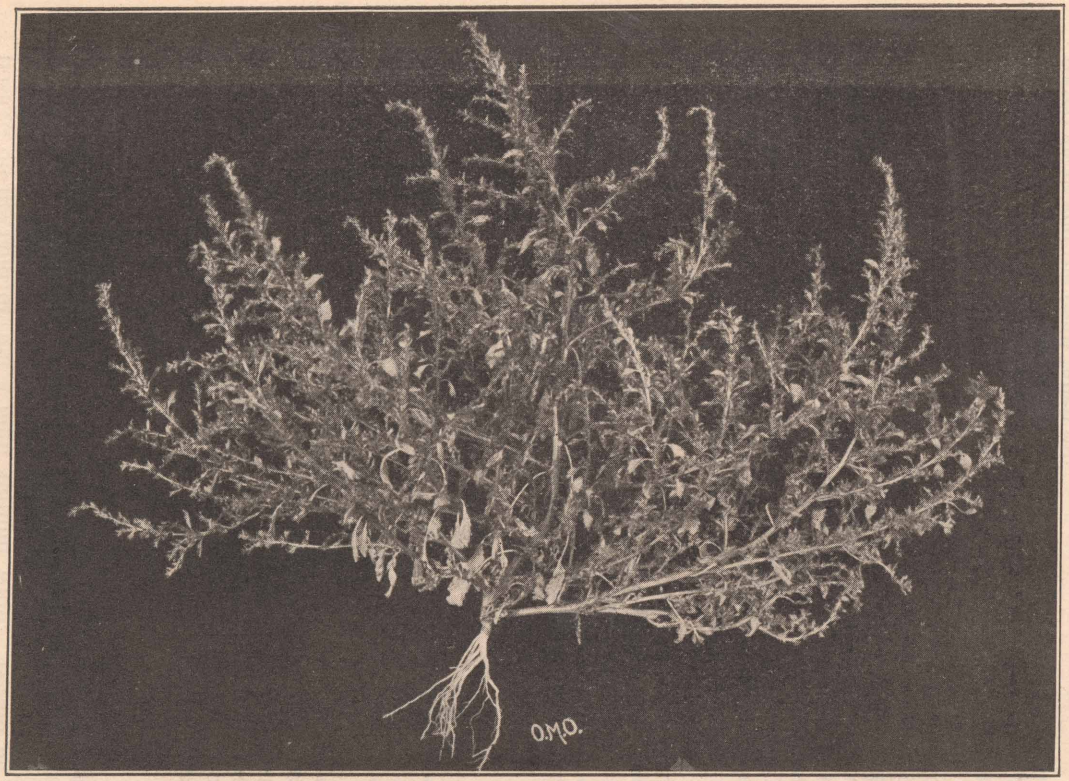
TUMBLE WEED

(AMARANTHUS ALBUS L.)

The cut on the accompanying page shows the typical shape of a mature tumble weed. The mature weed varies from six inches to two feet in height. It is an annual. The leaves are small, of a light green color, obovate or spatulate in shape (the broad end upward or in the shape of a spatula) one-half to one and one-half inches long and slender petioled. The stems are whitish and diffusely branched. The flowers are in little axillary clusters, mostly shorter than the leaves and greenish in color.

When the plant has fully ripened, it can easily be broken off next to the ground by a stiff wind. On account of its globular form it can be easily rolled over and over by the wind along the fields where it strews in its path the numerous small round shining black seeds. It is not uncommon in autumn to find wire fences nearly hidden from view by the vast number of these weeds that have found lodgment against the wires after traveling long distances. Many find lodgment in ditches or creeks where they continue the remainder of their journey of evil by water. Water thus aids the wind in carrying this pest into new regions.

The tumble weed thrives in almost any soil. Fortunately, however, it does not thrive in grain fields, for it cannot endure crowding or too much shade. Its favorite haunt is in neglected gardens and in poorly kept orchards. A certain prune orchard near Moscow is so badly seeded down with this weed that the whole orchard presents a very unsightly appearance. Neglected summer fallow also offers a fine abiding place to this pest. Land



TUMBLE WEED
(Amaranthus albus L.)

plowed for fallow in the spring and not cultivated until fall will often become completely covered with these weeds.

Imagine, if you will, a man trying to live up to that commandment which says: "Love thy neighbor as thyself," when his neighbor matures several acres of tumble weeds that become deposited on his land during a high autumn wind. Would he not experience a few difficulties while trying?

It is hoped that the new weed laws of Idaho will be so strictly enforced that farmers will receive in the future a just protection from the negligence of the shiftless.

Method of Eradication

On account of the seeds of the tumble weed often coming from a long distance, the complete eradication or prevention of it is rendered impossible without community effort. It must therefore be dealt with wherever found. In the garden a persistent use of a hoe and hand or a horse cultivator are the best means of eradicating it. In cultivated field crops a good horse cultivator usually proves sufficient but it is often well to go over the field with a hoe to cut out those weeds not reached by the cultivator. On fallow land the spike tooth harrow or a spring tooth harrow should be run over the field whenever seedlings appear.

SQUIRREL TAIL

(HORDEUM JUBATUM L.)

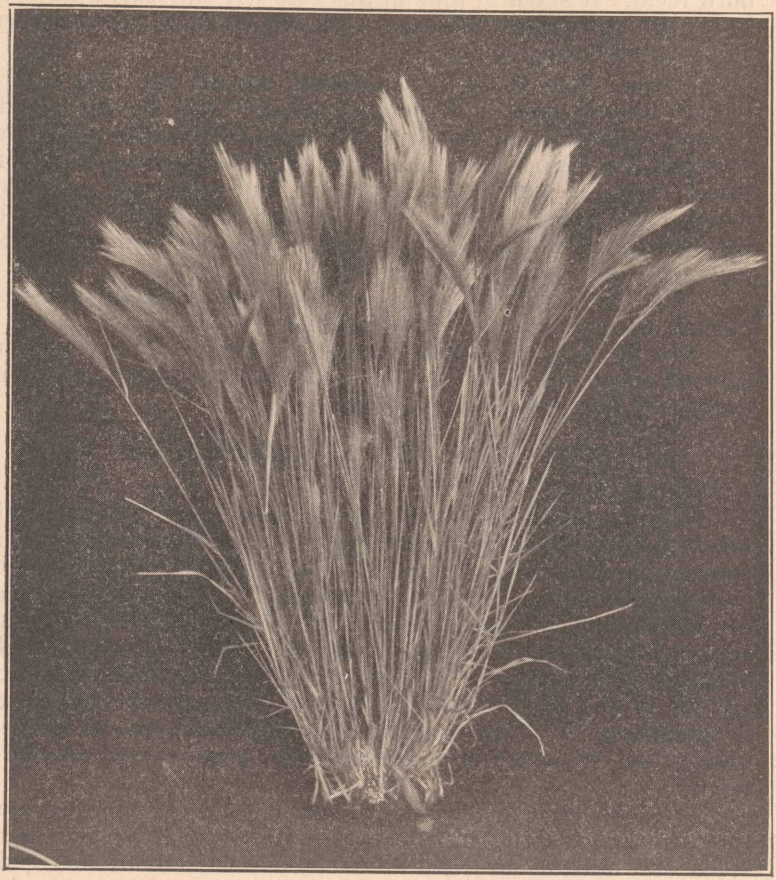
The general appearance of this weed can be seen from the illustration. It is an annual or winter annual, varying in height from ten inches to two and one-half feet. The leaves are one to five inches long, one-twelfth to one-sixth of an inch wide, erect and rough, spike (or head) is two to four inches in length. The awns are rough and are from one to two and one-half inches long.

This weed is found in every county of the state. It has been long known in the east where it has proven, as it has in Idaho, to be a very bad weed. Bad, not only on account of its ability to soon take possession of a field, but on account of the mechanical injury which it produces in farm animals. The injury is produced by the long sharp awns which work in between the teeth and produce a formation of pus. Where it has been left to ripen in the fields and cut with the hay it makes a dangerous feed for farm animals. The awns in such hay have been known to put out their eyes, to produce ulcers in the stomach and nostrils or to produce ulcers in the mouth as above mentioned. Many cases are on record where the gums and jaws of horses and cattle have become so ulcerated that the jaws have partially rotted away and the teeth fallen out.

Unfortunately squirrel tail has an extraordinary adaptability, for it is found, not only in regions where dry farming is practiced,

but in low moist lands. In Idaho it is particularly found on irrigated land, more especially on land adjoining ditches where seepage takes place.

In pastures it often crowds out the more desirable grasses. It is able to accomplish this very readily where a pasture is over-



SQUIRREL TAIL
(Hordeum jubatum L.)

stocked with cattle for since the other grasses are much preferred to it, it is not held back by close cropping.

The seeds are disseminated chiefly by the wind, farm animals and in baled hay.

Method of Eradication

From what has been said in the description, it can be seen that one should spare no pains in thoroughly ridding their premises of this dangerous weed, if they are unfortunate enough to possess it. If a few plants are discovered anywhere, dig them up at once. If they have gone to seed dig them up and burn them. A stitch in time in this case not only saves nine but better still saves many thousand if the mature seeds are not given an opportunity to germinate.

If your meadow is badly infested, cut the hay long before the weed seeds mature. Otherwise not only will the weed seeds become scattered, but the stiff dry awns will bring about the complications before mentioned. In pastures not too badly infested, it can be held in check, so that blue grass can grow, by mowing the squirrel tail as soon as the heads appear. If it is watched closely and mowed as stated it will not be necessary to plow up a meadow for a few years.

If either a meadow or a pasture becomes badly infested, plow it up and put in a cultivated crop.

The growing of cultivated crops, or grains and a persistent care of waste places, roadsides, meadows and pastures will in every case hold this weed in check.

WILD MUSTARD OR CHARLOCK

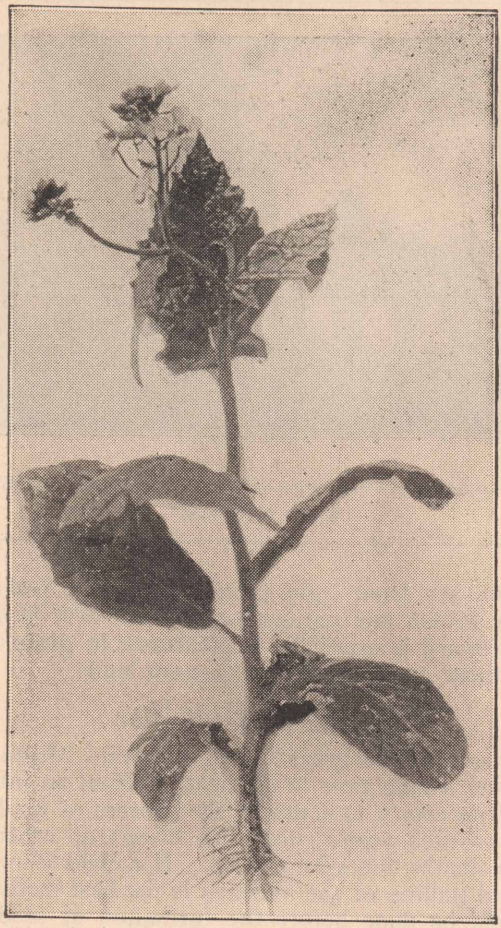
(BRASSICA ARVENSIS)

Wild mustard is, in many parts of Idaho, an extremely vicious weed. It is most prevalent in the low black soils of the state and in many irrigated sections where it is distributed largely by irrigation waters. When once thoroughly established it is one of the most difficult weeds to eradicate, therefore its first appearance should receive immediate attention. There are many kinds of mustards in Idaho, but the Tumbling Mustard, Black Mustard, and the Wild Turnip (belonging to the mustard family and closely resembling Wild Mustard, but less pernicious) may be ranked next to the Wild Mustard as pernicious weeds of the mustard family.

Wild Mustard is difficult to control for the following reasons:—1st, it produces an enormous number of seeds, and these seeds are difficult to separate from clover and alfalfa seed; 2d, it cannot be pastured off by sheep like many other weeds, for the acrid taste is offensive to animals; 3d, it ripens before oats and many other grains do, in which it occurs; 4th, the seeds retain their vitality in the soil for a great many years; 5th, the roots are so tough that it is usually necessary to resort to pulling up the plant instead of using the hoe.

It is distinguished from the other mustard species by the following characteristics:—It is an annual from one to two and

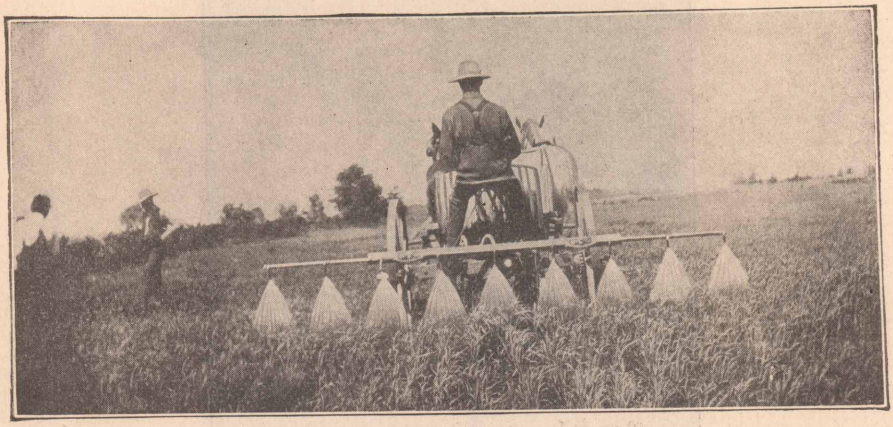
one-half feet in height, the tallest plants usually being found in grain spots containing a good amount of moisture. The plant has one main stalk sent up from a tap root; the leaves are simple, the upper ones rhombic (obliquely four-sided), with little or no stem and toothed, and the surface somewhat pubescent or hairy,



WILD MUSTARD PLANT OF A PROPER SIZE FOR SPRAYING

while the lower leaves are nearly divided to the middle and are slender stemmed. The flowers are bright yellow, one-half of an inch in diameter, and borne on an elongated raceme, the upper part of the raceme often containing buds and flowers while the base or lower part contains ripe seeds. The pods are from one to two

inches in length, about one-eighth of an inch in diameter. The ripened pods are knotted in appearance, due to the inclosed seeds. On the upper part of the pod there is a part called the beak, on the end of which are the remains of the stigma of the flower. The pods are smooth and in most cases there is no evidence of pubes-



A SPRAYING MACHINE IN OPERATION IN A FIELD INFESTED WITH WILD MUSTARD

cence. There are from eight to ten seeds in a pod; these are black, nearly round, and one-sixteenth of an inch in diameter.

Wild mustard is especially troublesome in grain fields, particularly in those on black soils or bottom lands.

Method of Eradication

On account of the great vitality of Wild Mustard seed, it generally takes a long time to eradicate it from an infested field. It is usually necessary to continue the process of eradication for many years as each year's cultivation brings up other old seeds to favorable depths for germination. If a field is only slightly infested, hand pulling of the mustard is the best method, but the pulling should be done before the formation of seeds. If any plants should happen to have seeds well-formed, they should be piled up, dried, and burned.

If spring grains are sown in drills, harrowing several times is very effective in killing mustard plants as well as other weeds that may appear. In order to kill the weeds the harrowing should be done when the soil is mellow and the weather clear. If cultivated crops such as, corn, potatoes, beans or cabbages can be

raised as profitably as grains, it is best to substitute them in the rotation until the mustard is under control.

During the past five years, the most effective method employed in the eradication of Wild Mustard on a large scale in grain fields is spraying with iron sulphate. This method has been so thoroughly tested in England, Germany, France, Canada, and the United States that there is no doubt as to its efficiency. The most effective solution has been found to be a twenty per cent solution of iron sulphate. The solution is made as follows:—For every acre to be sprayed put one hundred pounds of iron sulphate into four hundred pounds of water and stir until dissolved. About ten or fifteen minutes is required to dissolve the iron sulphate. Since one gallon of water weighs eight and one-third pounds, a pail holding a certain number of gallons makes a convenient method of measuring the water. A kerosene barrel which usually has a capacity of fifty-two gallons makes a good container for the solution. Where several acres are to be sprayed, time can be saved by having several such barrels on hand. When the solution is removed from the barrel into the sprayer it should be strained through several thicknesses of cheese-cloth.

There are now several makes of sprayers on the market for applying iron sulphate. Most of them are sold at prices within the reach of the average farmer. The cut on the accompanying page shows a spraying machine made by the Aspinwall Manufacturing Company of Jackson, Michigan. A few manufacturers are now making a long rod attachment or "boom" provided with many nozzles which can be attached to any orchard spraying outfit. Prices on these booms can be had by writing to the American Steel and Wire Company at Chicago, Ill. The spray should be applied in a real mist, and with a pressure of eighty to one hundred pounds at the nozzle. This pressure is necessary in order to force the spray on every part of the plant.

The spraying should be done on a bright warm day and not until the dew is entirely off the plants. The mustard can best be killed when the younger plants are in the third leaf and the older plants in the bud. If spraying is delayed until the pods of the mustard have developed seeds, the spraying will simply kill the leaves and probably will allow some of the seeds to mature sufficiently to possess the power of germination. The grain will be somewhat blackened by spraying, but it will soon recover and grow more rapidly than the unsprayed grain.

Iron sulphate is a by-product in the manufacture of steel and wire and can be purchased from the American Steel & Wire Company at Portland, Oregon; Seattle or Spokane, Washington. For shipments from any of these points the prices are as follows:—

200 pound bags.....$1.20 per 100 pounds.
100 pound bags..... 1.25 per 100 pounds.

These prices are for l. c. l. shipments. For carload shipments direct from the factory, prices can be had on application to the company at any office.

YELLOW DOCK, SOUR DOCK, OR CURLED DOCK.—

(RUMEX CRISPIS L.)

DESCRIPTION.—The Yellow Dock is a perennial weed which attains a height of from one and one-half to four feet. The leaves are lanceolate and acute in shape and are wavy and curled as shown in the cut. The flowers which are greenish in color are arranged in wand-like racemes. When dead ripe the racemes are of a reddish brown color. The main roots are long and fleshy, thus making them difficult to remove. The seed is three angled resembling in shape a grain of common buckwheat. It is of a shining reddish-brown color and averages about one-twelfth of an inch long and about two-thirds as wide.

This weed is getting to be quite common in the clover and alfalfa fields throughout the state.

Method of Eradication

When not in large numbers this weed can be controlled by hand pulling in the spring when the ground is soft. On account of the enormous number of seeds produced by a single plant of Yellow Dock, it is absolutely necessary that every plant in the field be destroyed. In case the ground is too dry to permit pulling, a chisel-spud is an excellent tool to use. This is made by fitting a hoe handle into the socket of an old two-inch wood chisel.

If a field is badly infested with this weed it should be plowed just before or during the flowering period. A jointer or chain should be used on the plow to completely cover up the plants.

If Yellow Dock is cut when nearly ripe and allowed to lay on damp ground a large percentage of the seeds will often ripen. When pulled in this stage or when fully ripe the plants should always be burned.

SHEEP SORREL

(RUMEX ACETOSELLA L.)

Sheep sorrel has good prospects of becoming one of our worst pasture and meadow weeds. It is a perennial, varying from six to twelve inches in height, with slender erect stems and with a horizontal or creeping rootstock. The leaves are narrowly hastate (shaped like a halberd), one to four inches long, obtuse or acute at the apex and petioled (furnished with a stem).

YELLOW DOCK
(Rumex crispis L.)
(Seed at the left magnified about ten times.)

The flowers are in erect panicled racemes (see flower clusters in cut), and the calyx (outer leaves of flowers) is green. The accompanying cut shows five individual plants starting from the same horizontal rootstock. The seeds are one-sixteenth of an inch long, of a dull reddish-brown color, three angled, smooth and shining when the covering is removed, but rough and of a dark-brown color when enclosed in the covering.

The favorite haunt of this weed is in the sandy soils of the state, although it is also found abundantly in clay regions. It grows in patches in meadows, pastures and waste land, where it spreads from year to year by means of its horizontal underground rootstocks and by means of seed which are produced in immense numbers, one plant alone producing several thousand. These patches when nearly ripe can be distinguished for long distances on account of their reddish color.

When a pasture has been cropped down short this weed frequently succeeds in crowding out the grasses. In samples of alsike clover sent to the Station for analysis, Sheep Sorrel has been found to be a very common impurity. The seeds of both being of nearly the same size, their separation by a machine is rendered very difficult.

In Bulletin No. 30 of the Montana Agricultural Experiment Station it is claimed that in the Gallatin Valley this weed has fairly taken some grain fields. It is usually, however, considered to be a pasture and meadow weed.

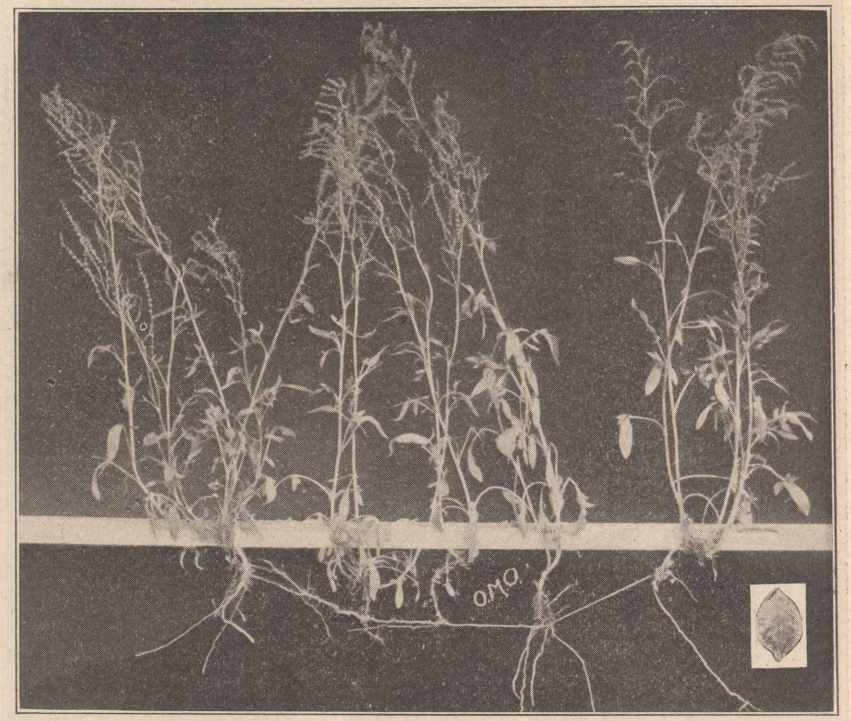
It is quite generally claimed in eastern states that the presence of this weed is an indication of an acid soil, or soil lacking in lime. They have even found in Ohio and Rhode Island that it can be largely controlled by liming the infested soil. In many eastern sections it is also associated with poor gravelly soils.

In Idaho this weed is as abundant on soils rich in lime and containing no traces of acidity, as upon acid soils. On a three-acre tract just added to the Experiment Station Farm during the present year, there was an abundant growth of this weed on a large part of it. The author made an acidity test of this soil from the infested spots by the official methods prescribed by the Bureau of Chemistry. The soil was found to be absolutely neutral. The soil had been well manured in the past and was of the deep rich loam characteristic of the Palouse country about Moscow. It can thus be seen that the pernicious habits of this weed in Idaho are not limited either to poor sandy soils or to acid soils.

Method of Eradication

The best method of eradication is to plow up the infested field and put in a cultivated crop of some kind, such as corn, potatoes, or beans. Use the hoe freely and see that no plants are allowed to produce seed. Usually one year of intensive cultiva-

tion will destroy it, but it is frequently found necessary to continue the process a second year.



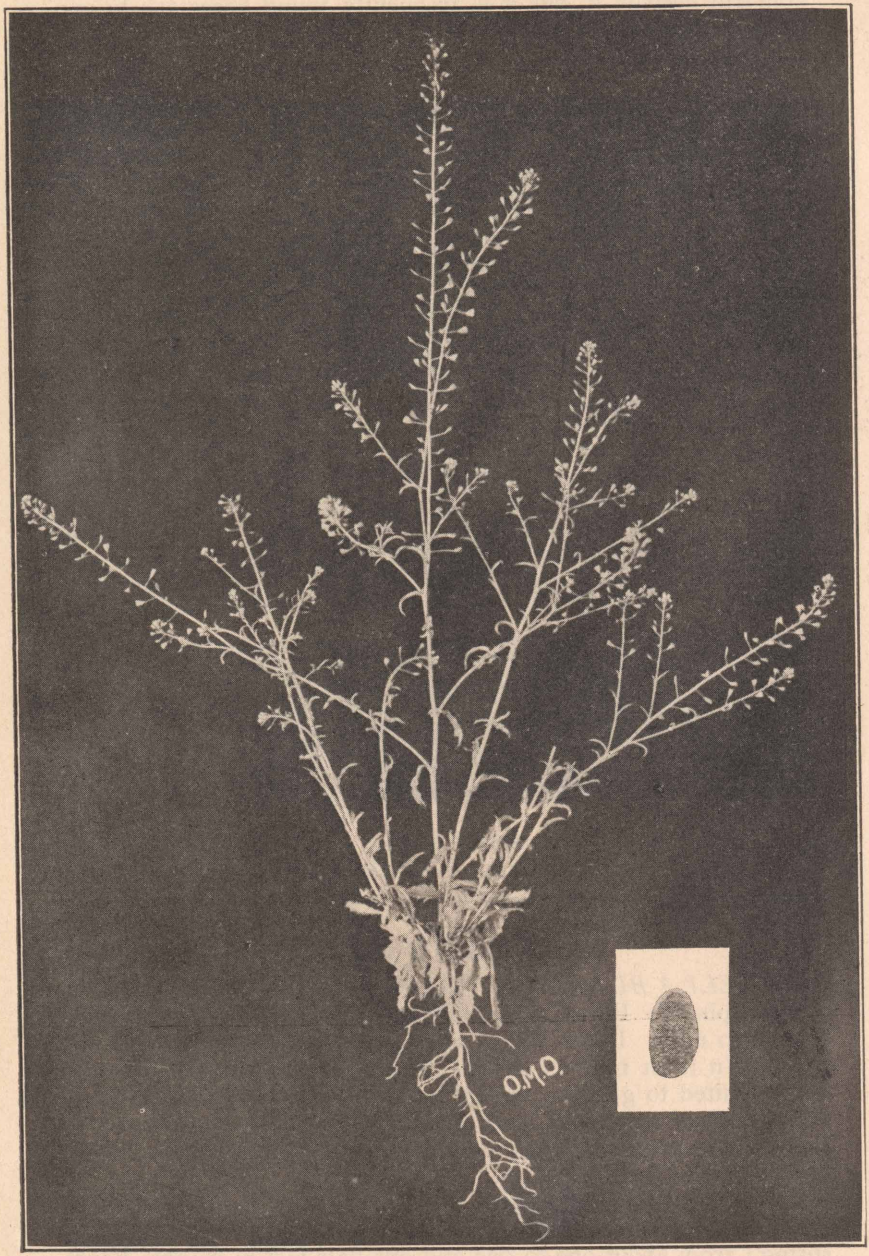
SHEEP SORREL
(Rumex acetosella L.)

SHEPHERD'S PURSE

(CAPSELLA BURSA PASTORIS)

Shepherd's Purse is perhaps the most cosmopolitan weed known to man. It has followed him to nearly every part of the globe. In most regions of the United States it has been found to be limited to gardens, orchards, and waste places particularly to borders of cultivated land, but in Idaho it has in addition to these places ventured into the alfalfa fields where it is proving to be a very bad weed.

Shepherd's Purse is an annual, or winter annual (a plant from seed sown in autumn which matures seed in the following spring) from about one to one and one-half feet in height. From



SHEPHERD'S PURSE
(Capsella Bursa-pastoris)
Seed at right is magnified from ten to twelve times.

its purse-shaped pods it gets its common name of Shepherd's purse. The accompanying illustration will enable one to recognize this weed. Its rapid spread is due to the enormous production of seeds. On the basis of from twenty to twenty-four seeds in each little capsule it has been estimated that one plant often produces from forty to fifty thousand seeds. The seeds are of a reddish-yellow color, one-twentieth of an inch long, nearly oval, slightly flattened and granular. Each face usually has two longitudinal grooves.

In gardens, especially, this weed should by no means be tolerated, for it has been found to harbor on its roots the club root or club foot fungus, (Plasmodiophora Brassicae Wor) which is so destructive in many localities to the cabbage, cauliflower, Brussels sprouts, rutabagas, turnips, and radishes.

Method of Eradication

Since this weed is only reproduced from the seed, its eradication depends entirely upon the prevention of the plants from maturing them. In gardens and orchards it can be controlled readily by cultivation, but in alfalfa fields the only available means is spraying the plants while small with a twenty per cent solution of iron sulphate. Perform the spraying in clear weather in order that the iron sulphate may be given sufficient time to perform its work.

PRICKLY LETTUCE

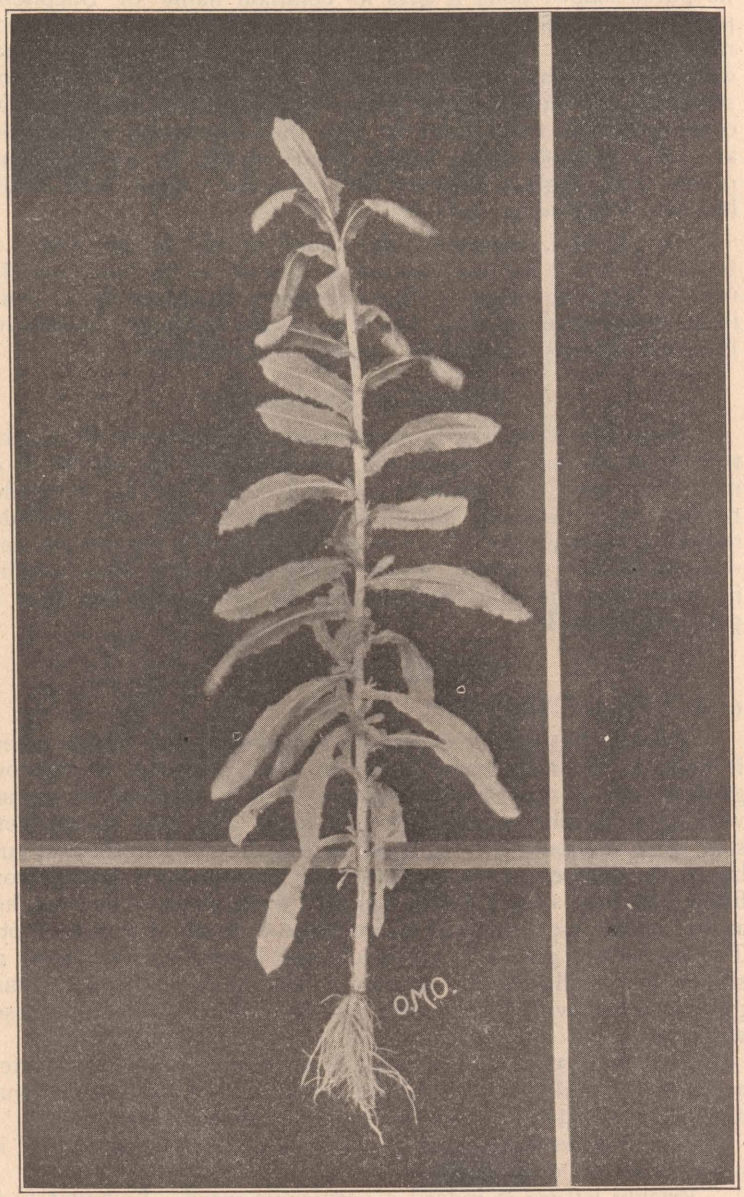
(LACTUCA SCARIOLA)

Prickly Lettuce is especially troublesome in Idaho where it finds in the rich loamy soils, an ideal place for a vigorous growth and a rapid reproduction. It is a biennial or annual varying in height from two to six feet. The root system consists of a shallow tap root about five inches in length, and just below the surface of the ground from this tap root spring from five to ten roots over a foot in length. From these main branches and from the tap root lead an immense number of fibrous roots. The leaves are glaucous green, oblong lanceolate in shape as shown in the illustration, spinulose denticulate margined (margin furnished with little teeth) and the midrib spinulose (beset with spinules.)

The stem of a mature plant is very woody and the cortex peels very readily. Often on the lower part of the stem of mature plants are stiff prickles about one-eighth of an inch long.

The inflorescence consists of yellow flowers produced in small heads on open panicles.

Prickly lettuce is indeed a pernicious weed. Fortunately it does not give much trouble in grain fields and hoed crops, but along roads, pastures, meadows, waste lands and fence borders



PRICKLY LETTUCE
(Lactuca scariola)

it gives a vast amount of trouble. Land left fallow often gets badly seeded down with this weed.

Prickly Lettuce matures its first seed about the first of July and continues to produce seed until autumn. The seed is provided with a pappus similar to that of the common bull thistle which enables it to be carried by the wind for long distances.

Method of Eradication

In case only a few plants of Prickly Lettuce are found in a field, they can be readily destroyed by spudding them off about two inches below the surface of the soil. A good spud for this purpose can be made in the manner described under "Yellow Dock," but in case a field is badly seeded down, as is often the case with old meadows and pastures, it should be plowed up and put into cultivated crops for a few years. Before the field is plowed, all plants that have matured their seeds should be mowed down and burned. Otherwise the seeds would be simply buried at different depths where they would remain until favorable conditions were offered from time to time for their germination. If one attempts to hold this weed in check or to prevent it from seeding by simply mowing it he will have to repeat the operation every few days for weeds mowed down before blossoming will quickly send out flowering branches that soon mature seeds.

In many states of the Mississippi Valley cattle and sheep have been found very effective in keeping down this weed but in Idaho this method cannot be recommended as the plants take on a more woody growth than where summer rains are prevalent and consequently are seldom molested. Since the seeds of this plant are so readily distributed by the wind, its complete extermination will demand community effort.

CHESS OR CHEAT

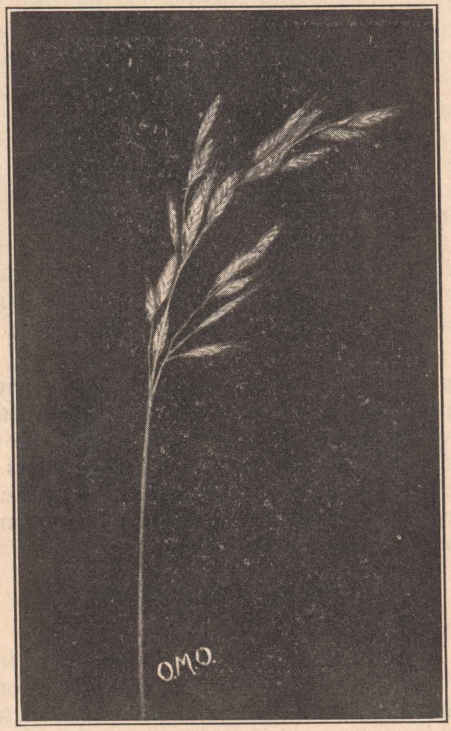
(BROMUS SECALINUS)

Chess is a weed which in many wheat growing sections of the state is giving much trouble. It is found in other fall sown grains besides wheat, but it seems to thrive best when sown with the latter. It is not as common in rye as in wheat on account of the greater hardiness of rye.

Chess is an annual which, while young, can hardly be distinguished from the young wheat plant except by a botanist. The cut shows a ripened panicle of a little less than the natural size. It is much more hardy than wheat, and when allowed to grow in the open, it is more prolific. Prof. Hunt of Cornell University sowed one pound of it on one-twentieth of an acre and reaped ninety-nine pounds of seed. The seeds are extremely small, there being as many in a pound as there are in a bushel

of wheat. As high as three thousand seeds have been obtained from a single plant. Chess only matures seed when sown in the fall, hence it does not mature seed when sown with spring grains. It is resistant to all insect attacks which are especially injurious to wheat. On account of its resistance to insect attacks and to the cold, the seed is frequently found in large percentages in grain that has been injured by the Hessian fly or by a severe winter.

By some farmers it is thought that wheat turns into Chess



CHESS
(Bromus secalinus)

under certain conditions, but this is not true. It has been proven experimentally that when only wheat is sown in clean land, only wheat will be reaped, and if only Chess is sown, only Chess will be reaped. The erroneous idea has likely arisen from the fact that Chess seed retain their vitality in the soil for a long time

and hence may appear under unaccountable circumstances. The average farmer does not give his seed grains as thorough an examination as he should before sowing. He places too much confidence in the fanning mill, which many times is not properly run and hence fails to remove all of the impurities.

It is stated by Hackel that flour containing an admixture of Chess is narcotic. remains moist and will be dark colored. For this reason the presence of Chess in wheat always lowers its market value, for it is necessary for the miller to remove the Chess completely before the wheat is ground into flour.

Method of Eradication

The methods of eradication of Chess are the same as those for the Wild Oat. To prevent its appearance the farmer should always thoroughly inspect his seed grain before sowing to see that no weed seeds are present. A good up-to-date fanning mill will usually remove every Chess seed. If it fails to do so, stir the grain up in a barrel of water just before sowing and skim off the Chess seeds which rise to the top. This can be done conveniently when treating the grain for smut.

BINDWEED

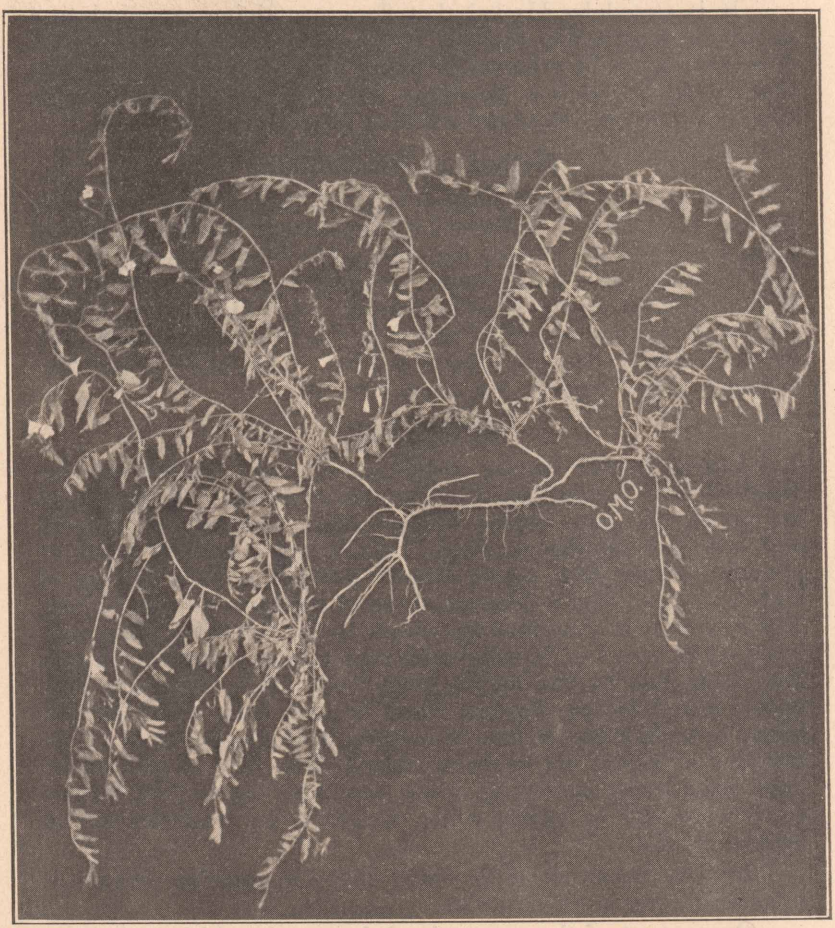
There are two species of this weed in the Northwest, viz., (Convolvulus sepium and Convolvulus arvensis). Both species are perennials quite similar in appearance and habit of growth and both are pernicious weeds. Each has a trailing habit of growth, slender stem, leaves slender petioled and the flowers of both resemble, from a distance, those of the tame morning glory. The species here described are unlike in the following characteristics. The leaves of (Convolvulus sepium) are triangular in outline, from two to five inches long, basal lobes divergent, peduncles one flowered, flowers white or pink with white stripes, bracts or scale leaves at base of corolla; while the leaves of (Convolvulus arvensis) are ovate or oblong, from one to two inches long, basal leaves spreading, acute, peduncles one to four flowered, flowers pink or nearly white, no bracts (or scale leaves) at base of corolla.

By Dr. Schaffner it is stated that Convolvulus sepium is supposedly poisonous to swine.

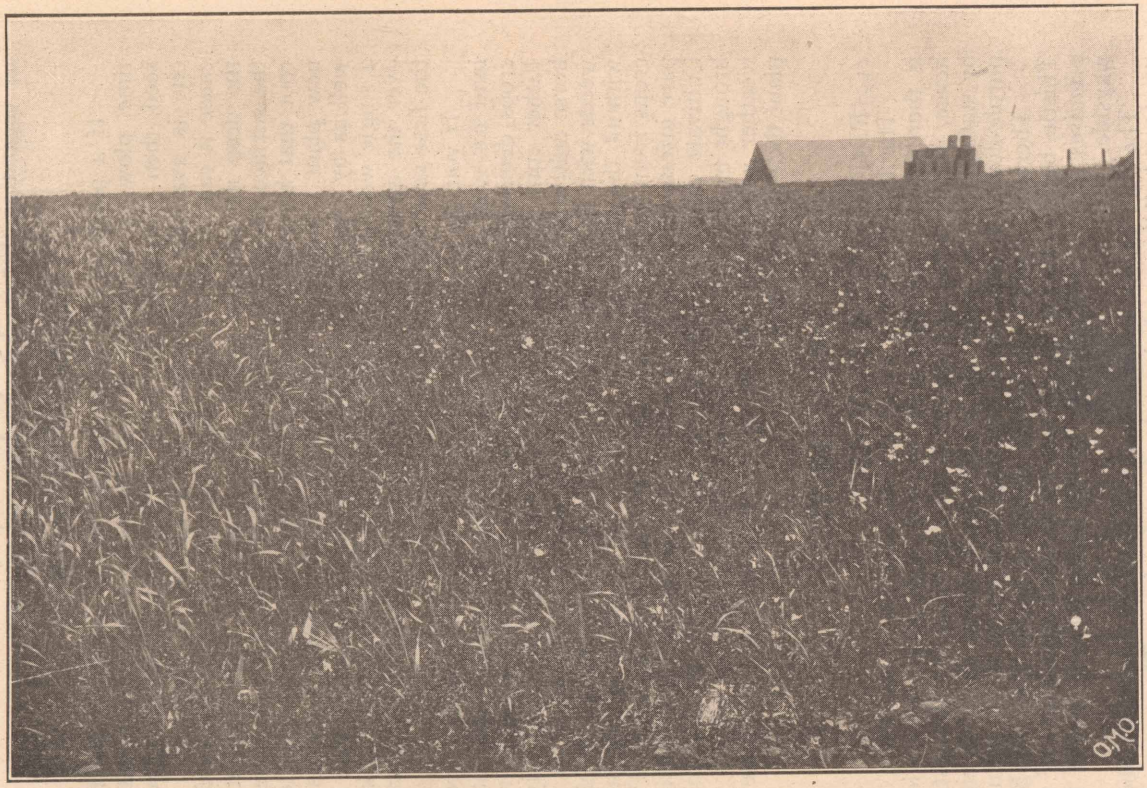
On account of the net work of deep roots which both these species possess their eradication is rendered very difficult.

Bindweed is not at the present time a widely distributed weed in this state, but wherever it has occurred it has wrought disastrous results. On account of its pernicious habits, its presence wherever found should demand immediate attention.

Bindweed performs its destructive work in the following ways:—1. It grows so rapidly that it soon shades all of the



WILD MORNING GLORY



A PATCH OF WILD MORNING GLORY IN A WHEAT FIELD NEAR MOSCOW.
NO GRAIN MATURED ON THE INFESTED AREA.

ground around the grain plant, thus cooling the soil and preventing circulation of air. 2. It robs the plant of food and water. 3. It twines upward around the culms and later pulls them downward. 4. It forms such a woven or entangled mass of vegetation that it clogs binders and mowers.

Method of Eradication

If a patch of this weed appears in the grain for the first time, plow up the patch at once before it has time to mature seed, then thoroughly harrow it with a spring-tooth harrow if one is available. The spring-tooth harrow is preferable because it can be set so as to dig down and bring to the surface the deep net-work of roots. The root-stocks thus brought to the surface should be raked off and destroyed, for each severed root that becomes covered with a little soil will give rise to a new plant. Since this weed also propagates itself by seeds as well as by creeping root-stocks, it is doubly important that not a single weed be left in the field. Unless a close watch is kept over the affected spots it is impossible to eradicate this weed the first year of its appearance.

If you are so unfortunate as to have had this weed on your land for some years, drop grains out of the rotation and put in crops demanding extensive cultivation, preferably a hoed crop. Either corn or potatoes makes a good crop, but not if only a horse cultivator is used, for it is impossible to destroy all of the weeds with this implement especially those growing in the hills, without the aid of a hoe. Continue the growing of cultivated crops from year to year until the field is entirely cleaned. Prepare infested ground for a cultivated crop by early fall plowing. Cultivate frequently and rake up and destroy all the rootstocks brought to the surface. Continue the cultivation as late as the weather will permit. In the spring cultivate until it is time to plant the cultivated crop.

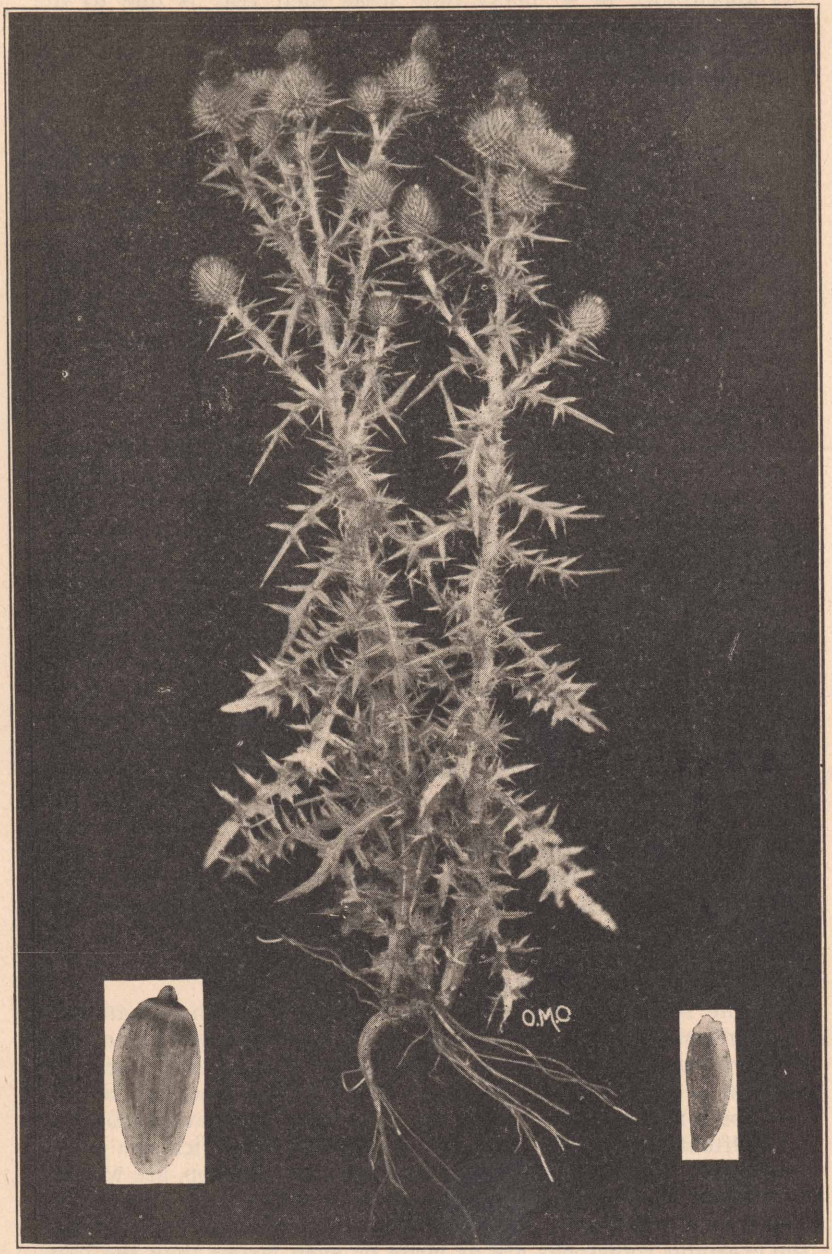
BULL THISTLE

(CARDUUS LANCEOLATUS L.)

The Bull Thistle is found in every section of the state. It is therefore too widely known to need a lengthy description; hence, it will suffice to supplement the accompanying illustration by stating that the weed is a biennial from two to five feet high, purple-flowered, stem stout, branched, and leaves dark green.

There are more troublesome weeds in Idaho than the Bull Thistle, but no other kind so mars the general appearance of the premises as does this tall ugly looking sharp pointed pest of the wayside.

The Bull Thistle is troublesome in pastures, roadsides, about the farm buildings and along the fence borders. The reason for



BULL THISTLE

(Carduus lanceolatus L.)

Bull Thistle Seed at Left and Canada Thistle Seed at the Right. Each magnified from six to seven times.

its appearance in so many new spots each year is due to the method by which the seeds are disseminated. Each seed is provided with a pappus, or thistle down, which serves as a parachute, thus allowing it to be carried long distances by the wind.

Method of Eradication

The first step in the eradication of the Bull Thistle should be to see that no seeds are allowed to mature. Cut the plants off in the spring below the crown by means of a chisel spud or a cutter mattock. In the early spring the plants can easily be cut off with a hoe, but if left until the late spring or summer, they take a rather woody growth and are too tough to be cut readily with any instrument except the ones mentioned above. Wherever continued cultivation is carried on this weed is destroyed.

QUACK GRASS

(AGROPYRON REPENS L.)

Quack Grass (also called couch grass, quitch grass and quick grass) is a creeping perennial. The stems vary from one to four feet in length and spring from a long jointed root-stock. The leaves are flat, from three to twelve inches long, from one-twelfth to five-twelfths of an inch wide, and are smooth beneath but often rough or hairy above. The sheaths (the part of the leaves clasping the stem) are shorter than the distance between the joints of the stem. The spikes are from two to eight inches in length. The spikelets are from four to eight flowered and alternate at each notch of the rhachis (the axis of the spike) as shown in the cut. The spike in the cut had just passed the blossoming stage when the picture was taken. The creeping rootstock is sharp pointed and possesses great vitality and power of penetration. In potatoe fields infested with this pest, it is not uncommon to find potatoes that have been completely pierced by these rootstocks.

The heads of Rye Grass (Lolium perenne) are often confused with those of Quack Grass. The two can be distinguished by the following: The spikelets of Rye Grass are turned with the edge toward the stem while those of Quack Grass are turned with the flat side toward the stem.

The seed of quack grass is about three-eighths of an inch long and much resembles a small oat except that it is slimmer and is more open on the furrow side. Under a hand lens it can be seen to be five nerved at the apex end. Some seeds are awned and some are awnless. They are usually of a yellowish color.

Oftentimes the white creeping rootstocks, which are much larger than those of Kentucky Blue Grass or Red Top, are wrongly termed roots. The roots, however, are fine and fibrous like many of our common grasses. From the cut it can be seen that the creeping rootstocks are as large or even larger than the low-

er portions of the upright stems, while the roots are fine and fibrous as above mentioned. At each joint new roots are formed and from many of them stems are sent upward. The plants thus spread indefinitely by means of these creeping rootstocks. Quack grass also reproduces itself by means of seed, but it is the creeping

QUACK GRASS
(Agropyron repens L.)
The Spike at the right is about one-half the natural size.

rootstocks which make it so extremely difficult to eradicate. Every jointed portion which may become served by cultivation will give rise to a new plant. It is therefore necessary to kill every piece of rootstock during the process of eradication. This is no easy matter on account of their remarkable vitality.

Quack Grass ripens its seed in July, therefore it is very liable to be cut with the hay and the seed scattered over the field during the haying process, or fed to cattle and scattered over the farm in the manure. It is also liable to be scattered by being cut with grain.

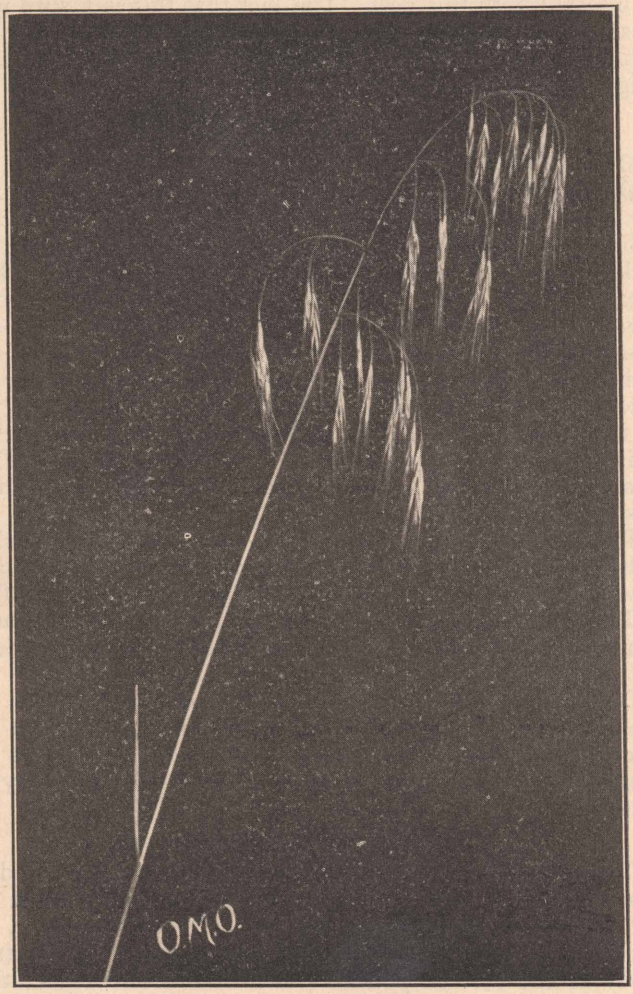
Methods of Eradication

If Quack Grass is discovered on a small area, it can be eradicated by the following method. Cut it off close to the ground when in bloom and cover it with tar paper or any other heavy building paper. Lap the strips of paper so that the Quack Grass cannot grow up between the strips. Weight the paper down with a few stones or planks. It is well to run the strips from east to west in order to prevent the edges from being raised by high westerly winds. Care should be taken that no light is admitted at the edges, for places thus exposed will admit light and air to the plants below and allow them to grow up between the strips. Leave the paper on the ground until quite late in the fall and then plow up the infested area. Plow these separately from the rest of the field, for if any plants have been allowed to breathe by reaching the light through some over-looked place between the strips of paper, their rootstocks might be carried by the plow to uninfested areas. In case that any plants should not be killed by this smothering process, they will be so greatly weakened, that they will be readily killed by cultivation the following spring.

The above method of eradication is, of course, only practical for small areas. For large areas the following method is applicable. First prevent the Quack Grass from maturing seed by mowing it near its blossoming time. As soon as the crop, in which it appears, is harvested, plow very deeply. Harrow at once with a common or spike-tooth harrow, or better still, with a spring-tooth harrow. It is preferable to use a spring-tooth harrow because it shakes the soil from the roots and can be set so as to bring the roots to the surface from many inches below. Never use a disk harrow for this purpose as the rootstocks will be cut up in numerous pieces and many left below the surface. Each of these pieces may give rise to an individual plant (as mentioned in a previous paragraph) if the ground is the least moist. Another objection to the disk harrow is that the small pieces cannot be brought to the surface by it. Rake up the rootstocks into piles with a horse-rake and burn them as soon as they are dry. Repeat this process of harrowing and raking every two weeks until late autumn, then rib the land and allow it to remain

over winter. The land is ribbed by turning two furrows together from opposite sides. The increase in surface brought about by ribbing the land exposes a larger number of roots to the weather during the winter and thus aids in killing them.

In the spring, as soon as the land will permit, harrow with the spring-tooth and again rake up the roots and burn them. Plow the land in about two or three weeks and twice more dur-



DOWNY BROME-GRASS
(Bromus tectorum)

ing the summer. Continue the harrowing, raking and burning between the intervals of plowing, often enough to prevent any leaves from forming, and until it is time to sow the fall grains. This method will completely eradicate the weed. It might be said that this method has the disadvantage of allowing the land to lay idle during a season, but the benefits that will be derived from the summer fallowing in the way of a much larger crop the succeeding year will far out-weigh the income derived from a crop infested with this pest. The fact that this is a sure method makes it much cheaper than other methods often recommended, which are either unsure or prolong the process of eradication through a number of years.

DOWNY BROME-GRASS

(BROMUS TECTORUM)

Downy Brome-Grass, often called Slender Chess, is causing many complaints as a weed from various sections of the state. Its ability to spread rapidly appears to exceed that of either of its relatives, Chess (Bromus secalinus), or Soft Chess (Bromus hordeaceus). It is an annual with smoth erect stems from six inches to two feet in length. The sheaths (the parts of the leaves clasping the stems) are usually longer than the internodes and the lower ones when held to the light are seen to be softly pubescent or covered with fine short hairs. The leaves which vary from one to four inches in length and from one-twelfth to one-sixth of an inch in width are also softly pubescent. The accompanying cut shows a small mature panicle of nearly the natural size.

The size of the panicles varies from two to six inches in length. The branches of the panicle are slender, drooping, and somewhat one-sided. The spikelets are from five to eight flowered. The flowering scales are from one-third to one-half an inch long and provided with an awn somewhat longer than the scale itself.

Downy Brome-Grass is troublesome on waste lands, along the roads, in pastures and along the edges of sidewalks. It ripens its seed in the latter part of June or in July. It becomes tough and unpalatable early in the season, hence it is not readily eaten by cattle.

Method of Eradication

Downy Brome-Grass, being an annual, is easily eradicated by preventing the formation of seed. To do this it must either be mowed off closely early in May or pulled at that time. It is well to pull or mow it at this time for often it matures its seed as early as the first of June. The introduction of a cultivated crop for one or two years will usually hold this weed under control. In case that it persists, employ one of the methods recommended for the eradication of the Wild Oat.