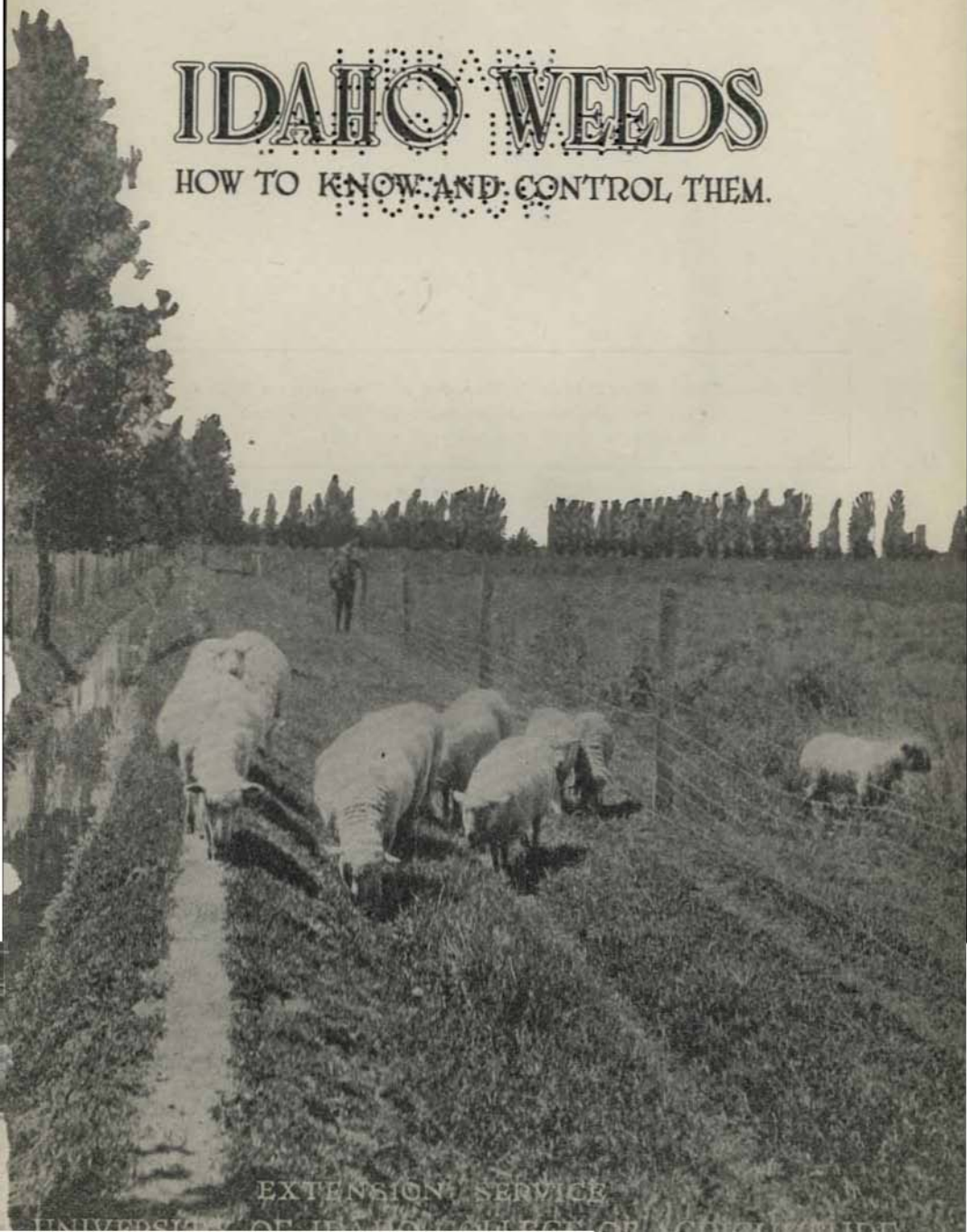


# IDAHO WEEDS

HOW TO KNOW AND CONTROL THEM.



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OF AGRICULTURE COOPERATING  
E. J. IDDINGS, DIRECTOR

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# \*IDAHO WEEDS

## HOW TO KNOW AND CONTROL THEM

JESSIE C. AYRES

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### INTRODUCTION

Weed pests have been spreading at an alarming rate in Idaho. Farmers are beginning to realize the danger in this spread as is evidenced by a large and rapidly increasing demand for information on the identification and control of weeds. This bulletin is written to furnish such information.

It is not possible to consider all weed pests found in Idaho in a publication of this kind. Therefore, only plates, descriptions and methods of control for the more serious pests are presented. Descriptions and control methods for a few weeds of lesser importance are outlined briefly.

Plates illustrating the weeds and their seed are presented to assist the farmer in identifying weeds. The accompanying plant and seed descriptions are also planned to be of value in identification. Methods of control given following each weed are based, as far as possible, upon experimental work that has been carried on by the department of agronomy, University of Idaho Agricultural Experiment Station in cooperation with farmers in many sections of Idaho. Where experimental results are not available, the best known methods of control are given.

The department of agronomy has been conducting experimental work in weed control for several years. Most of this work was carried on with farmers under actual farm conditions; this being possible through the cooperation of the following County Agents: R. E. Brossard, Twin Falls County, O. S. Fletcher, formerly of Latah County, J. W. Barber, Cassia County and R. N. Irving, Kootenai County. Altho the bulk of the work was carried on with these men, many suggestions were secured from agents in other counties. E. S. Larned, Director of Weed Control for Twin Falls County, has given excellent cooperation in furnishing the authors with the results of his trials.

### ECONOMIC LOSSES DUE TO WEEDS

It is estimated that the annual weed bill of the American farmer is \$100,000,000. Idaho's share of this total would approx-

\*The drawings for this bulletin were made by Miss Jessie C. Ayres, Seed Analyst for the Experiment Station and Extension Service.

The descriptive material concerning different weeds and control methods was prepared by Jessie C. Ayres, H. W. Hulbert, Professor of Agronomy in the College and Agronomist of the Experiment Station; and C. B. Ahlson, Field Agronomist in the Extension Service and Seed Commissioner for the Experiment Station.

imate \$2,000,000, which undoubtedly is a very conservative estimate. These losses are chiefly due to lowering of the yield and quality of crops, but many other factors enter in. Weeds not only rob cultivated plants of food and moisture, thus lowering the yield, but they increase the cost of crop production. Furthermore weed seeds in crop seeds lower the market value of the latter. Dodder in small seeded legumes has been known to reduce the sale value of the crop from four to ten cents a pound. Thus the actual monetary loss on a five bushel yield of alfalfa seed would vary from \$12 to \$30 to the acre.

Eighty percent of the red clover and alfalfa seed produced in Idaho in 1923 graded below number one. Thirty percent of the seed from these two crops graded "no grade." These lower ratings were due largely to weed seeds. Such reductions in grade meant a loss of \$310,000 to the growers of the two crops. The 1925 losses will be practically as great, nearly the same proportion of the seed from these crops grading below number one.

In 1924 Idaho produced nearly 18,000,000 bushels of wheat. The average amount of dockage in wheat sold on the western markets is approximately two percent. A large part of this dockage is weed seeds. At this rate Idaho farmers hauled 10,000 tons of dockage to market in 1924—a serious loss, and a preventable one since a large part of the waste was due to weeds. When similar losses in the other small grains are added an idea is gained of the serious losses incurred from only one class of crops grown in the state. Added to this are similar losses in other crops.

In addition weeds increase the cost of production, harbor plant diseases and insects, and lower the value of farms. These losses constitute one of the big leaks in our farming program which can be solved only by immediate, concerted action.

#### SPREAD OF WEEDS

Most plants which become serious weed pests are in some way especially fitted for competition with other plants. Unless a plant has some special adaptation which enables it to compete successfully with others, it cannot become a serious pest. Nearly all weeds have the ability to produce enormous numbers of seed. This enables a single plant to infest quite large areas. In some plants all the seeds do not germinate the first year, part of them living over to provide for new infestations the second season. Others have seeds of special vitality which lie dormant in the soil for several years. Some weed plants which have a disagreeable odor are not eaten by animals and are thus allowed to produce seed undisturbed.

Major factors in the spread of weeds are the special adaptations which many weed plants have for distribution of their seed. Some possess feather-like attachments which allow them to be

carried for long distances by the wind. Others float for long distances on water without injury. Still others have barbs by which they attach themselves to the clothes of man and coats of animals, and thus are carried from place to place.

Although wind, water, birds and animals aid in the spread of weeds, man has been responsible for most weed infestations. Farmers who are careless in the kind of seed they use often plant weed seeds. Others, who are careful, also sometimes plant weed seeds with crop seeds. This happens when the crop seed is infested with weed seeds similar in size, shape and color to those of the crop. Weed seeds are often carried from place to place by threshing machines. Many have been introduced in screenings, hay, feed stuffs and packing material. Some weeds, particularly those with running rootstalks, are carried from one field to another by tillage implements.

## GENERAL METHODS OF CONTROL

### CLASSES OF WEEDS

Weeds are ordinarily divided according to length of life into three classes: annuals, biennials and perennials. It is necessary to know to which class a weed belongs before one can proceed properly to eradicate it.

### CONTROL OF ANNUALS AND BIENNIALS

Annuals are plants that complete their growth and produce seed in one year. They generally have shallow fibrous roots and ordinarily produce large numbers of seed. Russian thistle, wild oats, lambs quarter and wild mustard are some of the more common annuals found in Idaho.

Winter annuals are hardy plants that may begin growth in the fall, live over winter, and produce seed the following summer. shepherd's purse, prickly lettuce, fanweed and tumbling mustard are well known weeds found in this class.

Biennials require two seasons to complete growth and produce a seed crop. During the first season the plant manufactures and stores a supply of food, which is used the second season to produce seeds. Burdock, sour dock and bull thistles are biennials commonly found on Idaho farms.

Both annuals and biennials produce seed only once before they die, and they are propagated only by seeds. Therefore, control depends upon preventing introduction and production of seed. Cultivation is the most common method of control. Since many weeds of these classes produce seeds which retain their vitality for a long time, prevention of seeding over a period of several years is often necessary.

## ERADICATION OF PERENNIALS

Perennials are plants that live from year to year, usually by means of underground running root stalks. Canada thistle, wild morning glory, quack grass and Russian knapweed are common members of this group found in Idaho. These plants are by far the most troublesome of all weed pests. Many of them require special treatment for control. Prevention of seeding is not sufficient, since the root stalks serve as means of spreading. An effective method of control must have as its object the starving or smothering of the underground root stalks which act as storage reservoirs for food used by the plant to start new growth. As soon as the leaves form, the plant is capable of manufacturing food which is again stored up in the root stalks. Therefore, in order to exhaust this reserve food supply all top growth must be kept down. This causes the root stalks to keep expending their plant food without any restorage from the leaves. Any method, therefore, that will keep down all top growth will eventually lead to eradication.

Clean cultivation is commonly recommended as a means of eradicating perennial weeds. Many farmers complain that it has been unsuccessful. This is due to misunderstanding of the term. If properly carried out, clean cultivation is effective. Cultivation at infrequent intervals is not sufficient. On the contrary, persistent cultivation, carried out two or three times a week during the more favorable part of the growing season, and slightly less often as the soil dries out, is necessary. Clean cultivation means never allowing any green growth to appear above the surface of the ground. A knife weeder is best, because it cuts off all new shoots at a uniform depth below the surface.

In the dry farm areas of the state proper care of summer fallow will do much to assist in the weed eradication program. To be of value in weed eradication, summer fallow should be cultivated at sufficiently frequent intervals to keep down all weed growth. Early tilled summer fallow followed by sufficient cultivation to keep down weed growth will also produce maximum grain yields the following year.

## NECESSITY OF PURE SEED

Clean seed is the first necessity in any weed control program. No matter how much care is given to eradicating weeds from our farms, if one fails to use crop seeds free from weeds much of the work is lost. Not only is the soil reinfested with the common weeds, but often new and serious weed pests are introduced. In fact, a large percentage of the most serious weed pests were introduced from other countries through importations of seeds. Therefore, buy only the best seed of legumes and grasses available. Use a fanning mill to clean every weed seed from cereal



grains that are to be used for planting. Clean the threshing machines that are used to thresh seed crops and thus avoid getting weed seeds from your neighbors.

#### PREVENTION OF SEEDING IN WASTE PLACES

Roadsides, fence rows and irrigation ditches are usually weed infested areas. Mowing of weeds in such places before seeding time is an essential practice if they are to be controlled in farming districts. In some places roadsides can be cultivated, but in most instances this is impossible, and mowing is the only alternative.

Irrigation water is one of the principal means by which weed seeds are spread in the irrigated sections. Weeds go to seed along the ditch banks, the seeds fall into the water and are carried on to the fields where that water is applied. Weed free ditch banks will solve the problem. Mowing weeds before seeding time is one means of getting rid of this menace. Many ditches can be fenced and the whole area pastured with sheep. The latter practice is becoming very popular with many farmers in seed producing areas and could well be in general use in all the irrigated sections.

#### WEEDS AND MANURE

On the average farm many weed seeds are fed to animals in the various feeds, and often they are not greatly injured by passage through the digestive tracts. In the seed districts of Idaho screenings from small seeded legumes are being fed to livestock with considerable success. Thus the danger of placing large numbers of weed seeds back on the land is increased. This danger can be lessened by steaming or cooking the screenings before feeding, or properly composting the manure before it is returned to the fields.

Experimental evidence shows that sheep are probably more efficient in digesting weed seeds than other classes of livestock.

#### COMMUNITY EFFORT ESSENTIAL FOR WEED CONTROL

If the serious weed pests of any district are to be eliminated, community effort is essential. This is necessary because of the special means that weeds have of being carried from place to place. Water and wind are two of the elements that play important parts in weed spread. Everyone must eliminate the seeds upon his own farm to prevent these weeds from seeding farms of neighbors. Waste land in all parts of the community must be prevented from producing its annual supply of weed seed. One farmer alone cannot combat weeds in all of these places. The weed situation in Idaho is improving rapidly where concerted community action is practiced. Weeds are flourishing in the "one man control" communities.

# CAN WE ROUT THE WEED ARMY?



## THE CONTROL FORCES

### WE NEED FEWER RESERVES FOR THE WEED ARMY

1. Farmers who plant screenings.
2. Farmers who sell untested seed to their neighbors.
3. Dealers who sell untested seed.
4. Any one looking for snap control methods.
5. County Commissioners who hesitate to declare weed districts.
6. Farmers who plant mail order seed before having it tested.
7. Landlords who expect the renter to bear the burden of weed control.
8. Ditch owners who do not keep banks clean.

### WE NEED MORE RECRUITS FOR THE CONTROL ARMY

1. Farmers who plant tested seed free from noxious weeds.
2. Dealers who always meet the seed law requirements.
3. Farmers who make an honest effort to control weeds.
4. County Commissioners who declare weed districts.
5. Landlords who share the burden of weed control.
6. Farmers who keep the ditch banks, fence rows and fields clean.
7. Threshermen who carefully clean their machines before each set.

## WHERE ARE YOU ENROLLED?

## DESCRIPTIONS AND METHODS OF CONTROL

## BINDWEED OR WILD MORNING GLORY

(*Convolvulus arvensis*, L.)

**OTHER NAMES:** Small flowered morning glory, field bindweed, orchard morning glory.

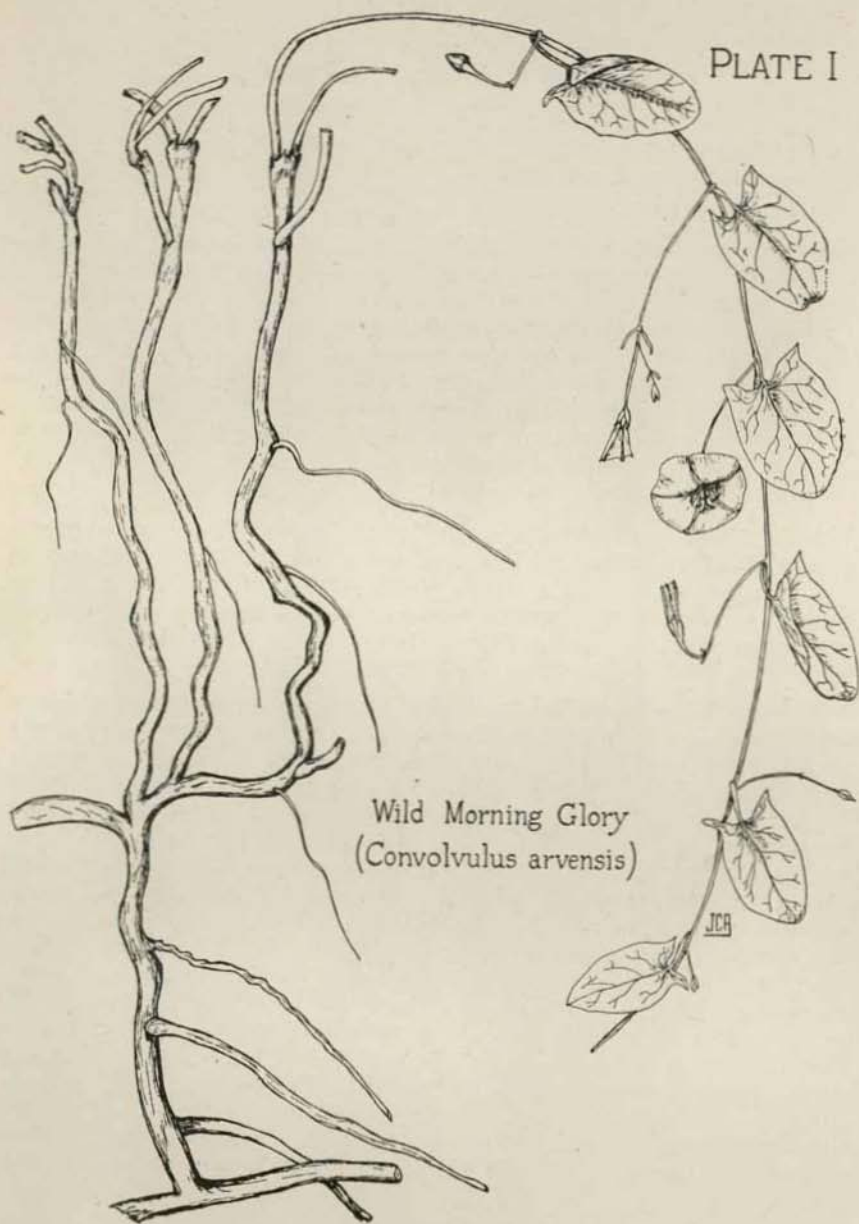
**DESCRIPTION:** (Plate I) This variety is the most destructive of the morning glory family. It is an introduced perennial, which spreads by means of fleshy cord-like running root stalks and by seeds. On these underground rootstalks, buds form at frequent intervals and start new plants, making a thick mat upon the ground, or twining about any upright plant or object present. Leaves somewhat arrow-shaped. Flowers funnel-shaped, similar to those of tame morning glory, about an inch across, usually white, sometimes pink, or white tinged with pink. Seed pods, spherical, straw-colored, papery, contain four brownish-black, roughened seeds about one-eighth inch in length.

**CONTROL:** Bindweed is one of the most serious weed pests in the United States. It is found in all sections of Idaho and in many cases has over-run whole fields so that they are practically useless for crop production. Since it has caused so much alarm, eradication studies have been carried on by the department of agronomy for the past five or six years.

Present recommendations include two methods, one for large areas and the other for small scattered patches. For large areas clean cultivation is the most economical and satisfactory means of control. Such cultivation should start shortly after the weed begins its growth. Many farmers prefer to begin eradication by plowing at this period. The plowing is followed by frequent cultivation the remainder of the growing season. Cultivation must be sufficiently frequent to keep down all top growth—no green stems should be allowed to appear above the surface of the soil. A few farmers have supplanted frequent cultivation with deep plowing three or four times during the season with satisfactory results. To control the weed by this method the plowings should not be more than a month apart and the patch should be allowed to become as dry as possible and in irrigated sections should never receive applications of water. The first plowing may well come in early July and should be followed by others, at four week intervals, until September, or even October. Frequent cultivation should be practiced thruout the rest of the season to finish the job.

A few farmers have eradicated the weed in a single season by cultivation, but two years are usually required. In non-irrigated sections, sunflowers seeded thickly with a grain drill may

## PLATE I



be used to replace the second season's cultivation. This crop draws heavily on moisture and plant food and tends to smother out the weed already weakened by one season's cultivation.

A few farmers have claimed that alfalfa will keep the weed under control. One farmer in northern Idaho was able to use it successfully as a smothering agent. Alfalfa will control the weed where a satisfactory stand can be secured, but it will never completely eradicate it, and under ordinary conditions the grower will not be able to get a stand sufficiently heavy for control.

Many other methods of smothering bindweed have been advocated for use in various sections of the United States, altho experimental evidence that such treatments are of value is lacking. At the University Farm, Moscow, an attempt was made to eradicate a small patch of bindweed by covering it with tar paper. The patch was thoroly covered by cementing the strips of paper together where they overlapped and burying the edges several feet beyond the limits of the patch. Thus a complete airtight roof was constructed over the patch and left on for an entire growing season. The following spring, after the paper had rotted, the weed came up and grew as vigorously as ever.

Results of experiments carried on in Latah, Kootenai and Twin Falls Counties show quite conclusively that the proper use of carbon bisulphide is the best means of eradicating small patches of the weed. This chemical was first used with success in California. The methods employed on California soils, however, did not produce satisfactory results in Idaho.

Carbon bisulphide is a heavy liquid which evaporates rapidly upon exposure to the air. The gas formed is heavier than air. The liquid is very inflammable and it must not be brought near fire of any kind. In warm weather, when it is being used in the field, it should be kept covered with wet sacks. The chemical is quite expensive, even when purchased in large amounts, and consequently can be economically used only on small patches. In barrel lots it can be laid down in Idaho at a cost of approximately \$1.25 a gallon. In larger lots the cost is much less. In gallon lots at local drug stores it retails at approximately \$2.00 a gallon.

To eradicate bindweed, carbon bisulphide must be applied to the roots of the plant. This is done by pouring at the rate of two ounces of the chemical to the hole, in small holes, eighteen inches deep and two feet apart each way. At this rate a gallon of the chemical will treat a patch about 10x15 feet in size. The entire cost of treating such a patch is approximately five dollars, provided the chemical is purchased locally.

Carbon bisulphide, to successfully control bindweed, should be applied when the soil is quite moist. Negative results have been secured in almost every case where the chemical was applied in dry soils. Some of the best results were secured on patches

treated during an early summer shower when the soil was already well saturated with moisture.

Many chemicals, guaranteed to kill bindweed and other perennial weeds having running rootstalks, are being sold on the market. So far none of these preparations that have been tried have proven successful. The farmer should hesitate to spend much money on such chemicals until they have been thoroly tried and proven worthy.

The use of salt has been advocated by a number of experiment stations in the United States. Work at the Kansas Station showed that this chemical has little practical value under average farm conditions. At Fort Hays, Kansas, it was found that a minimum of 20 tons of salt is necessary for successful treatment.\* Such applications are almost prohibitive under soil and climatic conditions common to Idaho.

Pasturing patches of the weed with sheep and hogs has also been recommended. The experience of most farmers with such practice has not been satisfactory. One farmer near Moscow built a hog pen over a patch of bindweed. Six years later, with hogs confined on the weed continuously, new shoots made their appearance. Naturally, the weed spread but little during that time, but as a method of eradication, the idea appears unsuccessful.

A number of other methods have been tried by the Idaho Agricultural Experiment Station, but so far none have proven entirely successful. Sodium arsenite applied to the plants in solutions varying in strength is one of the unsuccessful methods. Using this chemical at a dilution of one part of the chemical to two hundred parts of water seemed most effective. Such a treatment applied under favorable conditions killed the roots down several inches, but soon the plants were growing as vigorously as ever. A combination of sodium arsenite applied in the form of a dilute spray and cultivation were used with more success than the spray alone. However, cultivation alone proved to be cheaper and nearly as effective as the combination method.

### WILD BUCKWHEAT (*Polygonum convolvulus*, L.)

**DESCRIPTION:** (Figure I) Wild buckwheat is an introduced annual climbing plant, troublesome in grain fields because of the way it tangles, making harvesting difficult. Stems branching, slightly angular, not round, and from one to three feet in height. Leaves heart-shaped to arrow-shaped, tips pointed. Seeds

\*Kansas State Agricultural Exp. Station circular 101—by L. E. Call and R. E. Getty.

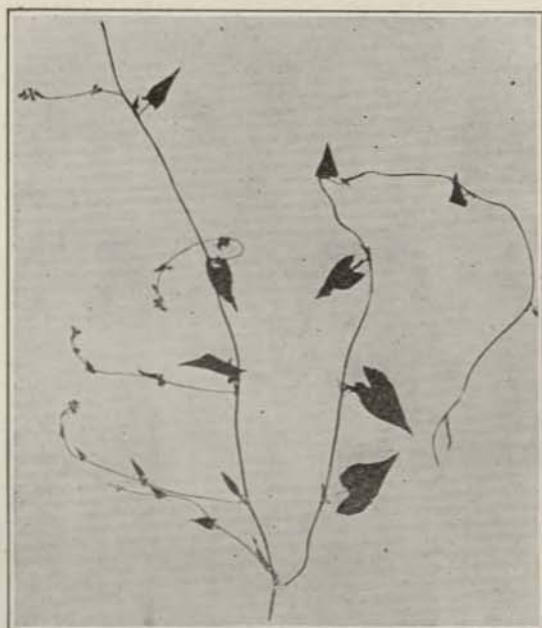


FIG. I

WILD BUCKWHEAT (*Polygonum convolvulus*)

Courtesy Colorado Experiment Station

black, three sided. Flowers small, inconspicuous, greenish colored, in small clusters. The plant has a single tap root. It can be readily distinguished from wild morning glory by its root system and flowers, the latter weed having running rootstalks and large bell-shaped flowers. (See Plate I).

**CONTROL:** Cultivated crops will check the spread of this weed. It produces seed of great vitality, and in grain fields it is quite troublesome. Summer fallowing or the use of cultivated crops on infested land will control it.

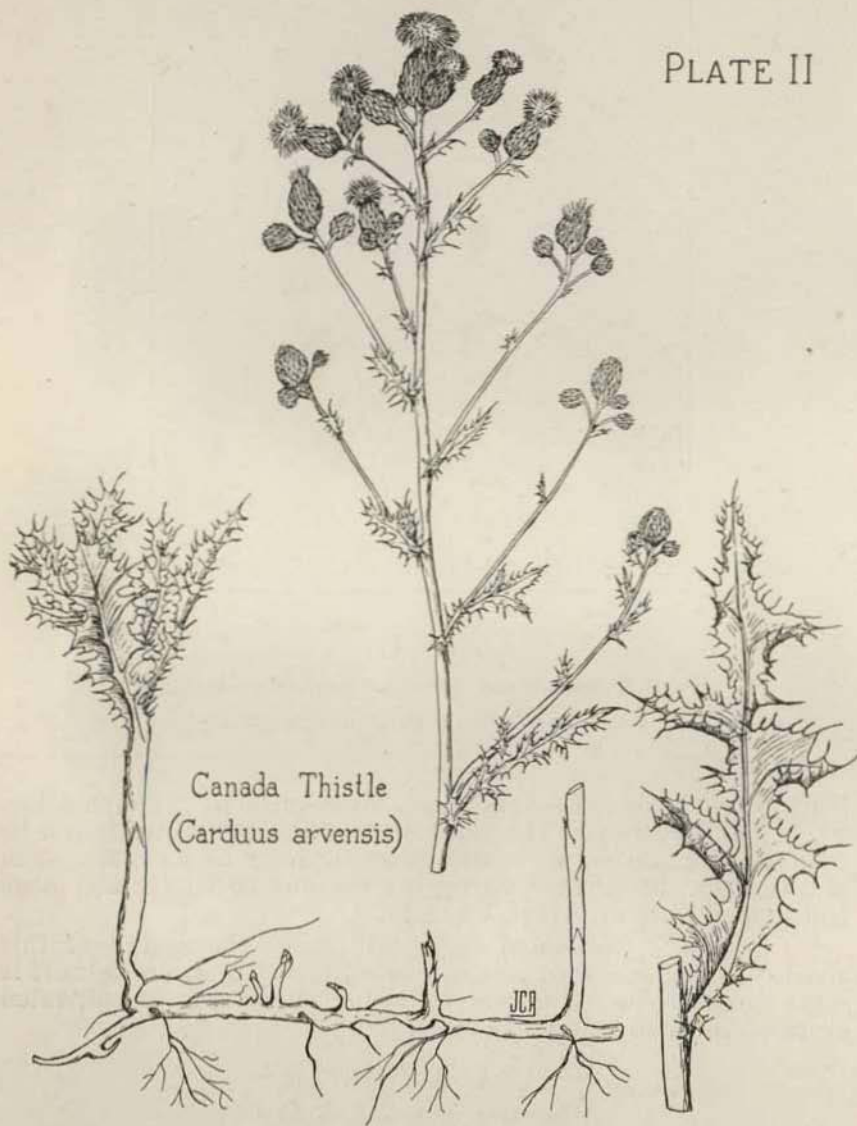
## CANADA THISTLE

*(Carduus arvensis, Bobs.)*

**OTHER NAMES:** Small flowered thistle, perennial thistle, cursed thistle.

**DESCRIPTION:** (Plate II) Canada thistle is the most nox-

PLATE II



Canada Thistle  
(*Carduus arvensis*)



ious of the thistle group. It is an introduced perennial which reproduces by running rootstalks and by seeds. Stems upright, slender, one to three feet in height, bearing many green, shiny, clasping, prickly, deeply notched, ruffled-like leaves. Spines are stiff and straight, altho one variety of Canada thistle that is not common in Idaho, has practically no spines. Flowers somewhat smaller than other species of thistles, about one inch across, purplish in color, borne in clusters, topmost bud blooms first. Seeds brown satin-finished, elongated, equipped with feathery bristles on crown which aid in carrying them great distances by the wind; produces abundantly some seasons, in others few are formed on well established plants.

Altho Canada thistle is sometimes confused with other thistles it can be readily identified by its jointed horizontal rootstalks, which are found from six inches to three feet deep. From these rootstalks at various points arise shoots that in time become individual plants forming dense patches.

**CONTROL:** Cultivation at sufficiently frequent intervals has proven to be the best method of getting rid of Canada thistles. In Cassia County under irrigation the weed was eradicated in one season by frequent and persistent cultivation. The patch was diked out of the rest of the field and plowed often enough—about once a week—to keep down all top growth. No plants appeared the following season.

Experiments at Moscow have shown that for the non-irrigated areas, spraying with a dilute solution of sodium arsenite followed by frequent cultivation eradicated the weed. Sodium arsenite is a cheap chemical and may be secured from the United States Smelting and Refining Company of Salt Lake City. It is a liquid and for spraying perennial weeds should be diluted at the rate of one part to one hundred parts of water. This dilute solution should be applied thoroly to the weed plants in the form of a very fine spray. The best time to use the spray is in the late evening or early morning, while the sun is not yet out. Applied at such a time the plants have time to absorb the chemical before it dries from the leaves. Using dilute solutions and giving the plants an opportunity to absorb them allows the poison to be distributed thruout the entire plant. In this way the leaves and a portion of the rootstalks will be killed. If the poison is applied in stronger solutions the leaves are killed immediately and the roots are not affected. If the sun is out the poison is dried from the leaves and the plants are left uninjured.

In a few days, after the thistle plants have been killed by the spray, cultivation should begin. Such cultivation should be carried on at sufficiently frequent intervals that no top growth appears above the surface of the soil at any time. This method, if carefully followed, will starve out the weed. Some farmers have

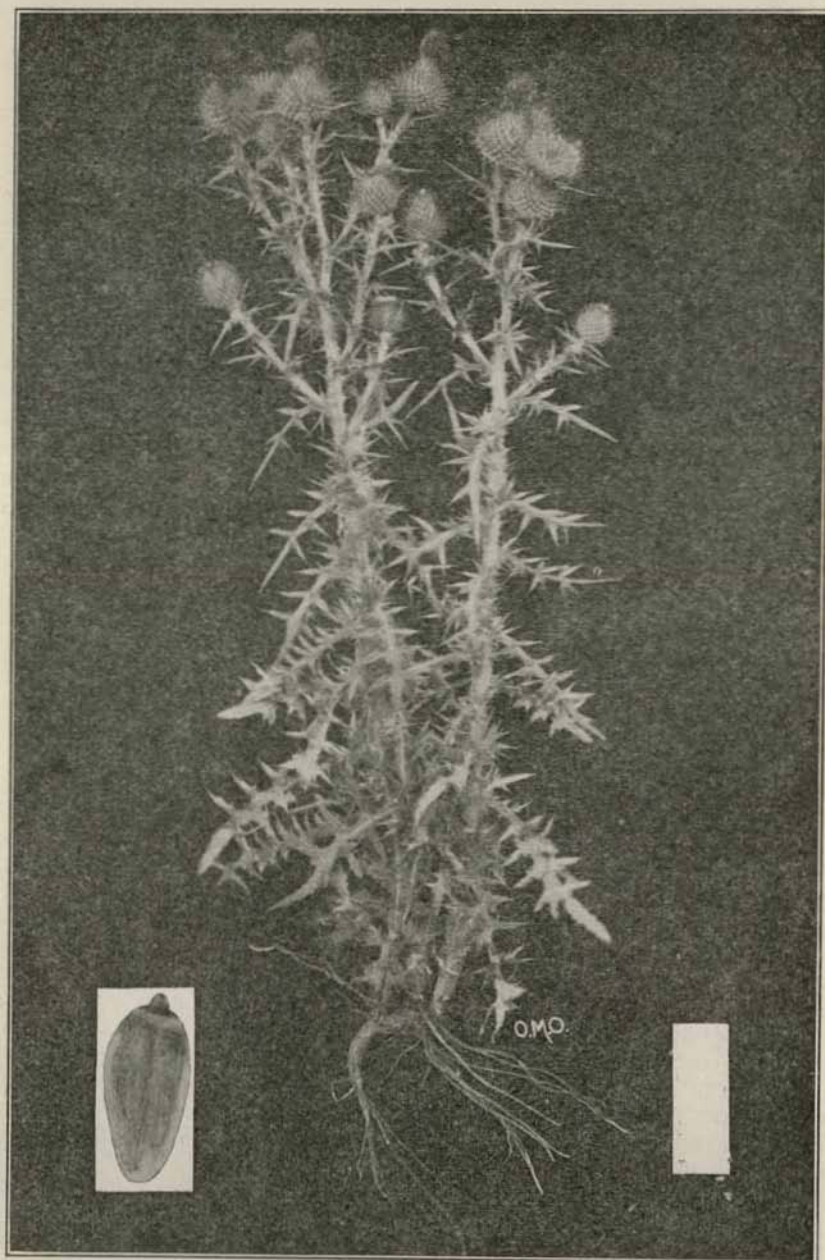


FIG. II  
BULL THISTLE (*Carduus lanceolatus*)

been able to control or in some cases eradicate the weed in a single season by this method.

A few years ago continuous flooding of thistle patches as a means of eradication for the irrigated sections was recommended, but under farm conditions it has not proven of much value. Idaho soils are very porous and considerable difficulty has been experienced in retaining sufficient water in the dikes to cover the weed sufficiently for eradication.

### BULL THISTLE

(*Carduus lanceolatus*, L.)

OTHER NAMES: Common thistle.

DESCRIPTION: (Figure II) Bull thistle is a biennial. The first season the plant produces only a small rosette of leaves, and utilizes most of its supply of plant food in developing a deep tap root. The second season food stored in the root is used to produce an erect, rough, stout, leafy seed stem, which usually attains a height of two to four feet. Leaves numerous, grayish-green, roughened above, lighter green and hairy below; young leaves very hairy and wooly. Leaf-blades coarsely toothed or deeply lobed, armed with sharp, stout, straight, yellow spines, leaf-margins wavy. Lower leaves six inches to one foot in length; attached to bases extending down stems on under side. Flowers in large prickly heads, deep purple, borne on summit of stems, usually solitary. Seeds grayish-white, oblong, curved, slightly flattened crowned with feathery down which, aids in distribution by the wind.

CONTROL: Since this plant is commonly found in waste places and is only propagated by seeds, prevention of seeding will eliminate it. To prevent a thistle from seeding it should be cut off below the crown either the first year, while in the rosette stage, or the second year before seeding.

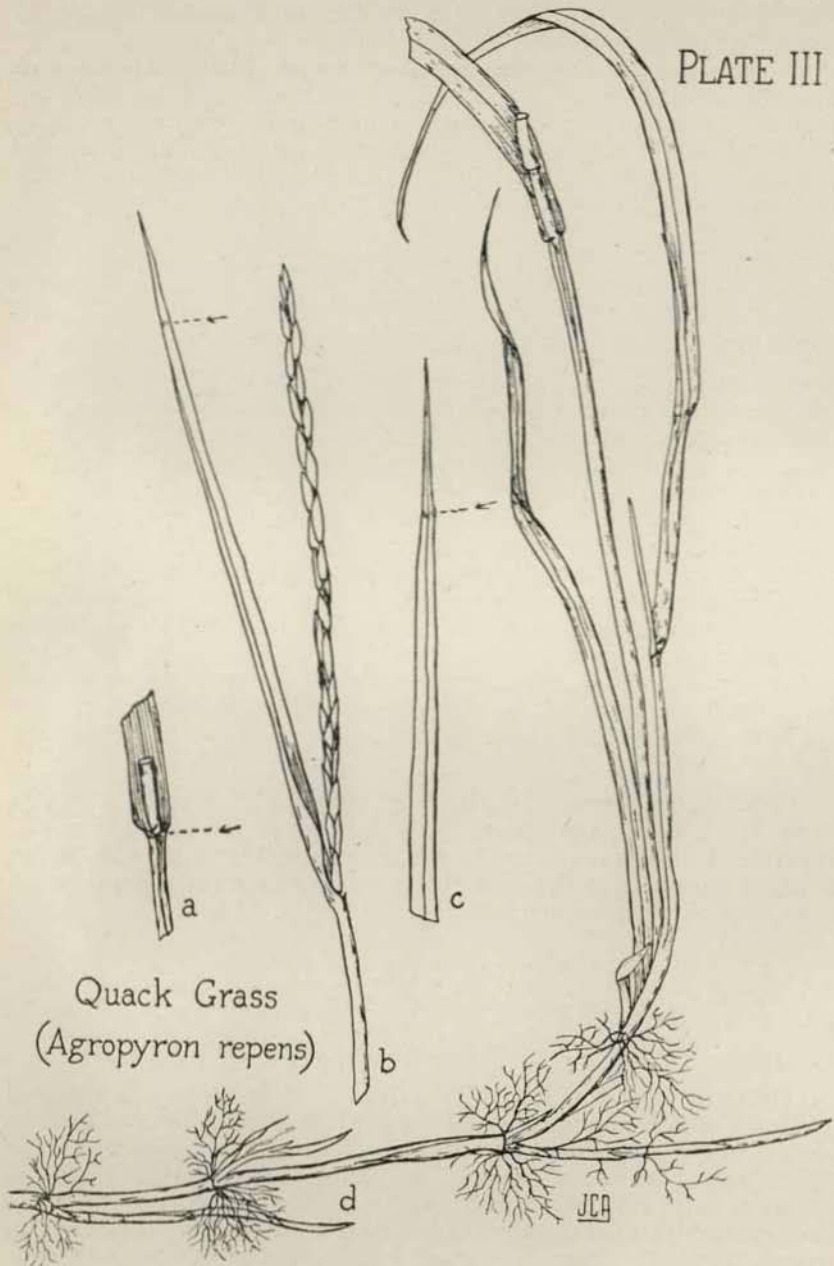
### QUACK GRASS

(*Agropyron repens*, Beauv.)

OTHER NAMES: Couch grass, quitch grass, twitch grass.

DESCRIPTION: (Plate III) Quack grass is an introduced perennial which reproduces by means of underground creeping, jointed, branching rootstalks and by seed. Each joint is capable of forming a new plant. Leaves are dark green, distinctly ribbed, and when dry roll or curl spirally. Before heading out, quack grass resembles awnless brome grass, a plant which also has running rootstalks. Upon close examination of the stems and leaves of the two plants, however, distinctive differential features are

PLATE III



Quack Grass  
(*Agropyron repens*)

found. The leaves of quack grass are slightly puckered about an inch or two from the tip and late in the growing season they break off at this point (Figure III, b and c). Another characteristic of quack grass is the overlapping edges of the sheaf auricles as shown in Figure III, a. Awnless brome grass possesses neither of these characteristics.

Quack grass and slender wheat grass are quite similar and often are confused. The two are readily distinguished by texture and position of the leaves. The following comparison gives the distinguishing characteristics:

	Quack Grass	Slender Wheat Grass
Color of foliage	Dark green	Grayish green or bluish green
Root system	Underground root-stalks Fibrous roots, mostly at joints of rootstalks	Underground rootstalks Fibrous roots mostly at base of tufts
	Rootstalks brownish yellow color	Rootstalks light straw color
Leaves	Wider and longer	Narrower
	Abrupt tips Arise chiefly along stems	Gradually taper and finely pointed
	Softer texture Bend downward at tip	Arise chiefly at base of tufts making undergrowth
	Roll spirally	More harsh in texture Bend upward at tip, stiffer
	Furrows not deep nor flattened Midrib depressed	When dry, rolls tightly longitudinally Furrows deeper Midrib raised

**CONTROL:** A method of control which will rid the land of this pest depends upon breaking up the sod. A number of farmers in the non-irrigated sections have eradicated whole fields of quack grass by plowing in late spring after the plant has made its maximum growth. The plow should be equipped with a jointer, so that it turns the sod completely over. Plowing is followed by frequent cultivation with a springtooth harrow. The harrow tears the sod to pieces and drags the rootstalks to the surface where they dry out and die. The first cultivation should be followed by others at frequent intervals, thus continually destroying the rootstalks and finally killing the weed. Many farmers by persistent effort have cleaned the land of the weed to such an extent that a crop could be seeded the following season. Under irrigated conditions the success of such a method will necessitate diking the water from infested areas.

## PLATE IV



Hoary Cress  
(*Lepidium draba*)

## HOARY CRESS OR WHITE TOP

(*Lepidium draba*)

OTHER NAMES: Perennial pepper grass.

DESCRIPTION: (Plate IV) Hoary cress is an introduced hoary perennial, which spreads rapidly by running rootstalks and by seed. Its foliage is of a grayish-green color. Leaves vary in size and shape according to fertility of soil and periods of growth. Those of first growth as shown in Plate IV ( Fig. a ), are more slender, inclined to have stems, while those borne on the flower stems are usually more circular and clasping. Much moisture in the soil seems to cause upper leaves to grow more circular, while unfavorable growing conditions seem to cause the plants to produce elongated, less clasping foliage. Flowers small, greenish-white, borne in large dense clusters, giving a showy appearance and hence the common name of White Top. Seeds reddish-brown, borne in heart-shaped pods. They cannot be successfully separated from alfalfa and red clover seeds.

CONTROL: The eradication of the annual pepper grasses presents little difficulty to the farmer as compared with hoary cress. Experiments in Bingham County would seem to indicate that the use of sodium arsenite spray, followed by frequent cultivation, is the quickest means of control. When this chemical is used the method outlined for the control of Canada thistle should be followed.

Where small patches are found in cultivated crops, the weed can be kept under control by hand pulling and thoro cultivation. Under any condition the plants should be kept from seeding.

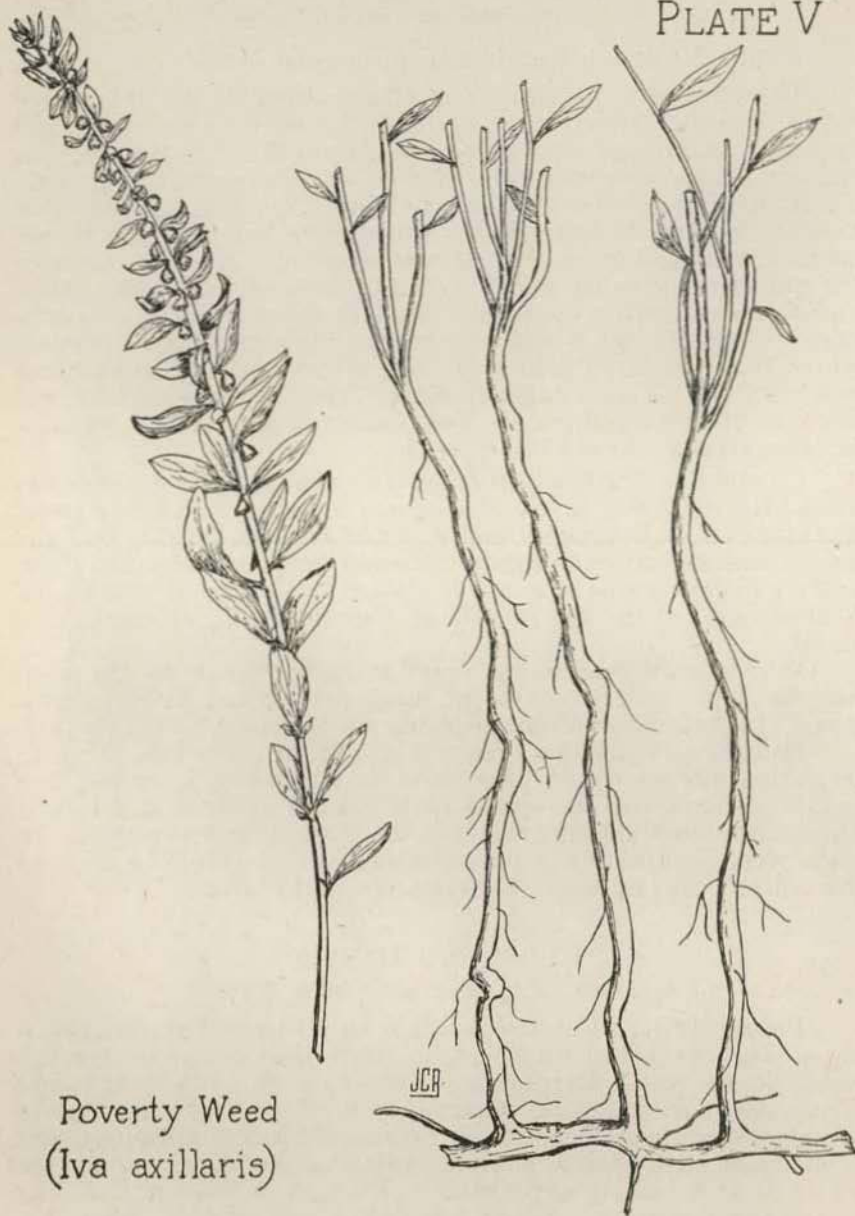
Patches of hoary cress may be present in waste land or along irrigation ditches where cultivation is impractical. Under such conditions spraying the weeds with sodium arsenite at frequent intervals to supplant cultivation is the most effective method. In cases where cultivation is possible, however, it should be used, as the top growth can be more effectively kept down.

## RUSSIAN THISTLE

(*Salsola kali*. L. var. *tenuifolia*, Meyer)

DESCRIPTION: Russian thistle is an introduced annual, forming a much branched bushy plant—it is the common “tumbleweed” of the west. Stems more or less reddish. Leaves of young plants very narrow, thick, watery, green, worm-like segments. As the plant begins to bloom these worm-like leaves disappear and form small stiff, sharp, pointed scale-like leaves, giving to the whole plant a prickly appearance. Flowers at base of scale-like leaves, inconspicuous. Seeds resemble a coil of rope, green, require a special screen for separating from alfalfa seed. They

## PLATE V



Poverty Weed  
(*Iva axillaris*)



continue to shake loose from the tumbling plants all winter, scattering along the way. A single plant may produce as many as 100,000 seeds. This pernicious weed is covering Southern Idaho.

**CONTROL:** On seed farms the Russian thistle is controlled ordinarily by the cultural practices used in seed production. Spring cultivation will usually kill most of the young weed plants. Those appearing later succumb to irrigation. Water applied when the thistles are two or three inches high will turn them yellow and check their growth. In moist seasons the thistle may start growth following the last irrigation of alfalfa seed fields and may make sufficient growth to be harvested with the seed crop. The hoe may be used on late thistles that are scattered thruout the field. Weeds on ditch banks should be cut and burned.

After grain crops have been harvested the fields should be cultivated in order to start fall germination of the thistle seed.

On dry farms, carefully handled summer fallow usually will keep the weed under control.

### POVERTY WEED

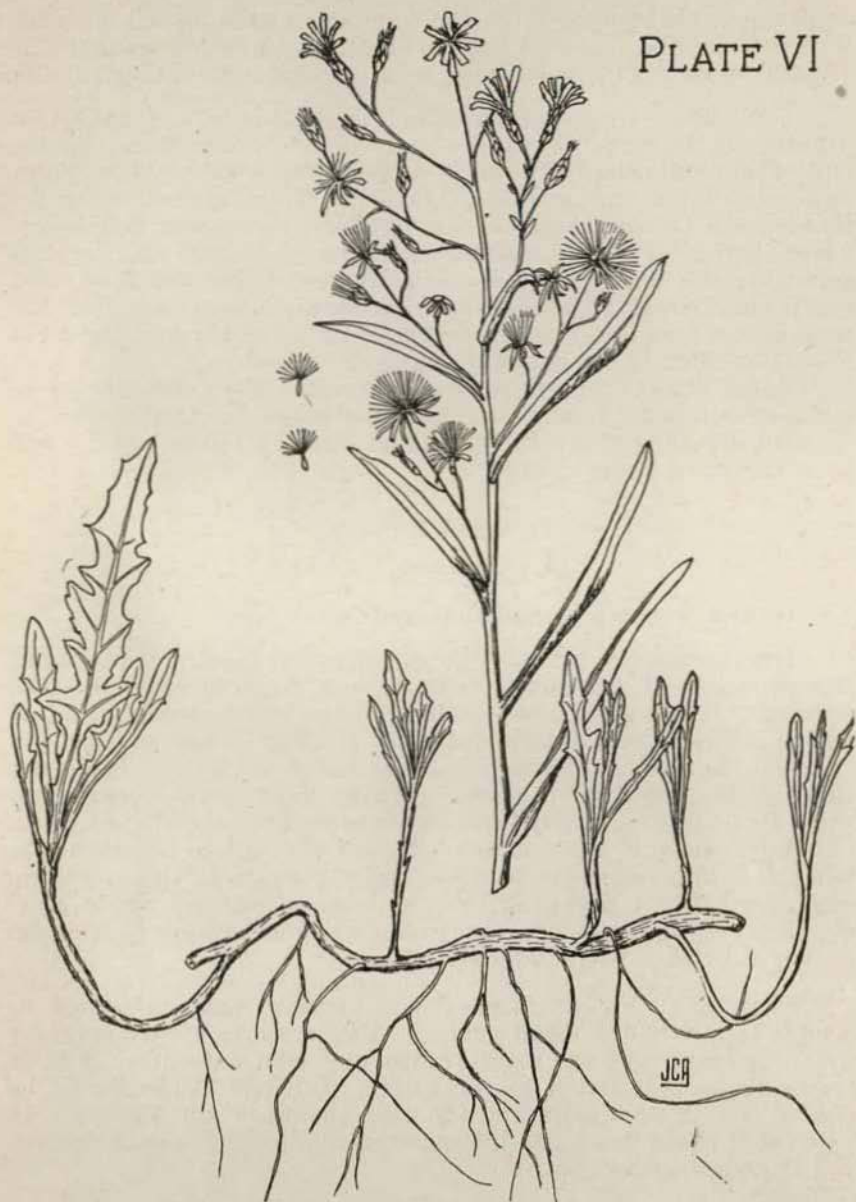
(*Iva axillaris*, Pursh)

**OTHER NAMES:** Small flowered marsh elder.

**DESCRIPTION:** (Plate V) A persistent perennial propagating by means of extensive, tough, woody, running rootstalks and by seed. It has great adaptability, endures dust, drought and alkaline soils. Emits unpleasant odor, making forage and hay unpalatable to stock. Stems erect, few inches to two feet in height, light green, slightly branched. Leaves light green, numerous, thick firm texture, longer than broad, sometimes egg-shaped, without stems, smooth, not notched, one and one-half to two inches in length. Flowers greenish-yellow, inconspicuous, in tiny heads resembling solitary drooping bells at base of leaves. Seeds pear-shaped, varying in color from green to almost black, bearing no crown of bristles for wind distribution.

**CONTROL:** Fields infested with poverty weed should not be seeded to any of the small grains. This weed is a very vigorous growing plant and has been known to crowd out corn. Alfalfa seems to be best fitted to combat it. Infested fields should be seeded heavily to alfalfa and the crop should be cut for hay. In cultivated fields thoro and intensive cultivation will assist in keeping the weed under control.

## PLATE VI



Blue Flowering Lettuce (*Lactuca pulchella*)

**BLUE FLOWERING LETTUCE**

(*Lactuca pulchella*, Pursh)

**OTHER NAMES:** Large flowered blue lettuce, Showy lettuce.

**DESCRIPTION:** (Plate VI) Blue flowering lettuce is a native perennial, propagating by running rootstalks, and to a small extent by seeds. Stems pale green, smooth, slender, one to four feet in height. Lower leaves dark-bluish green, elongated, toothed, smooth. Upper leaves lance-shaped, not toothed, smooth, stalkless. Flowers aster-blue, arranged in loose branching clusters. Seeds dark brown, ribbed, flat, tufted with white down, which aids distribution by wind.

**CONTROL:** If the weed has just made its first appearance in a field, hand pulling will be very desirable. This will prevent not only its spread by seeds, but it will also help to get control of the weed before its running rootstalks have penetrated far into the soil. Frequent, persistent cultivation will eradicate. In badly infested land short rotation, using mostly cultivated crops and thoro cultivation, are essential for control. In many sections of Idaho beets may be used satisfactorily as the cultivated crop.

**LAMB'S QUARTER**

(*Chenopodium album*, L.)

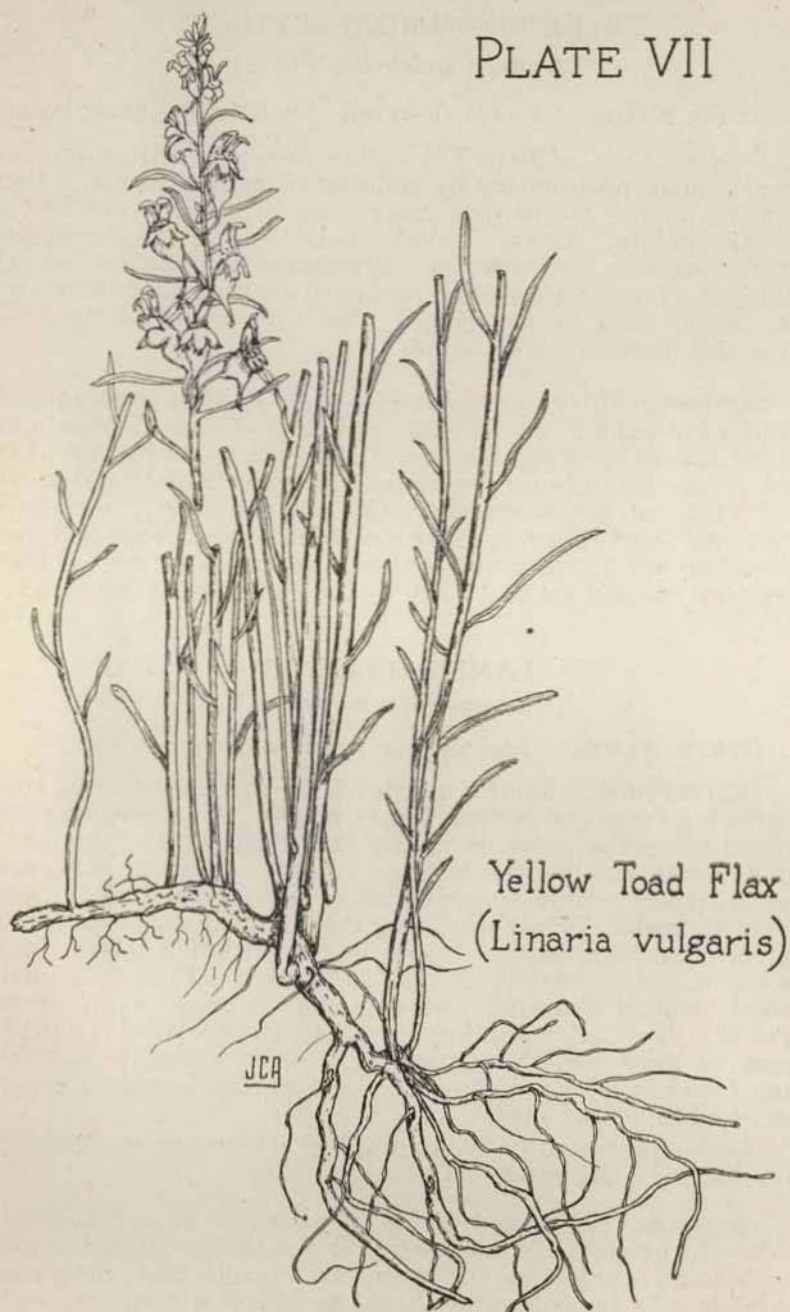
**OTHER NAMES:** Smooth pig weed, white goosefoot.

**DESCRIPTION:** Lamb's quarter is an introduced erect annual, growing from one to four feet in height. It is extremely variable in every character, is mostly tall, juicy, much branched, a rapid grower, and has slender grooved stems. Leaves pale green, fleshy, rather scurfy in appearance, varying in shape. Lower leaves somewhat egg-shaped, margins coarsely toothed, pointed tip, borne on long stalks. Upper leaves gradually become lance-shaped, margins notched to slightly notched. Flowers greenish colored, densely clustered. Seeds round, more or less flattened, edges bluntly rounded, shining black, usually enveloped in a brittle, brown or gray mealy covering. The seeds are quite separable when found in alfalfa and red clover seed, but inseparable in al-sike or white clover seed.

The webworm of the sugar beet lays its eggs on this weed and after hatching, migrates to the sugar beets.

**CONTROL:** The weed gives little trouble in well cultivated fields. In grain fields harrowing in the spring while the grain crop is small is effective. If it appears in cultivated crops, weeds not reached by the cultivator should be pulled or hoed out.

## PLATE VII



**YELLOW TOADFLAX**  
(*Linaria vulgaris*, Hill)

**OTHER NAMES:** Butter and eggs, yellow devil.

**DESCRIPTION:** (Plate VII) A persistent introduced perennial spreading by means of medium deep running rootstalks and by seed. Stock dislike its taste and odor and do not molest it in grazing. Stems slender, erect, smooth, slightly wavy. Leaves numerous, stalkless, long and slender, not notched. Flowers cream and orange or butter and egg color, resemble the cultivated snapdragons. Seeds round, thin, winged, borne in two celled pods, which contain 50 to 60 in each cell.

**CONTROL:** This weed, like all others with running rootstalks, is very hard to suppress. Ordinarily it inhabits cut over soils, but it has spread out into the prairie soils of the NezPerce and Camas Prairie sections. Clean cultivation is the only means of control that can be recommended at present. This cultivation should be confined to weed patches, so that the rootstalks will not be carried to other parts of the field. Experimental work to determine the best control methods has been planned, beginning in 1926. It is hoped that sodium arsenite spray may be effective since the rootstalks are not as deeply rooted as those of most of the other underground stemmed plants.

## PLATE VIII



Russian Knapweed  
(*Centaurea picris*)

## RUSSIAN KNAPWEED

(*Centaurea picris*)

**DESCRIPTION:** (Plate VIII) An introduced hardy perennial, propagating by running rootstalks and by seeds. Leaves of first growth thick, wooly, grayish-blue-green, deeply notched, and entirely unlike those borne on flower stems which are thin, smooth, not notched, pale green and clasping. Flowers somewhat resemble old fashioned bachelor's button only smaller, pale lavender, borne on loose branching clusters. Seeds somewhat larger than alfalfa, oblong, whitish-ivory, conspicuous in red clover and alfalfa seed, crowned by whitish stiff bristles. Underground rootstalks black, woody and scaly. In Idaho the hardy hedge-like plants spread more rapidly by shoots coming from underground rootstalks than by seeds.

**CONTROL:** Altho this weed is one of the most pernicious of our weeds, the plant does not seed readily. So far no satisfactory method of control has been found. More experimental work must be carried on before definite methods of eradication can be recommended. However, to prevent its spread thoro and frequent cultivation should be practiced on any patches found.

## SPREADING AMARANTH

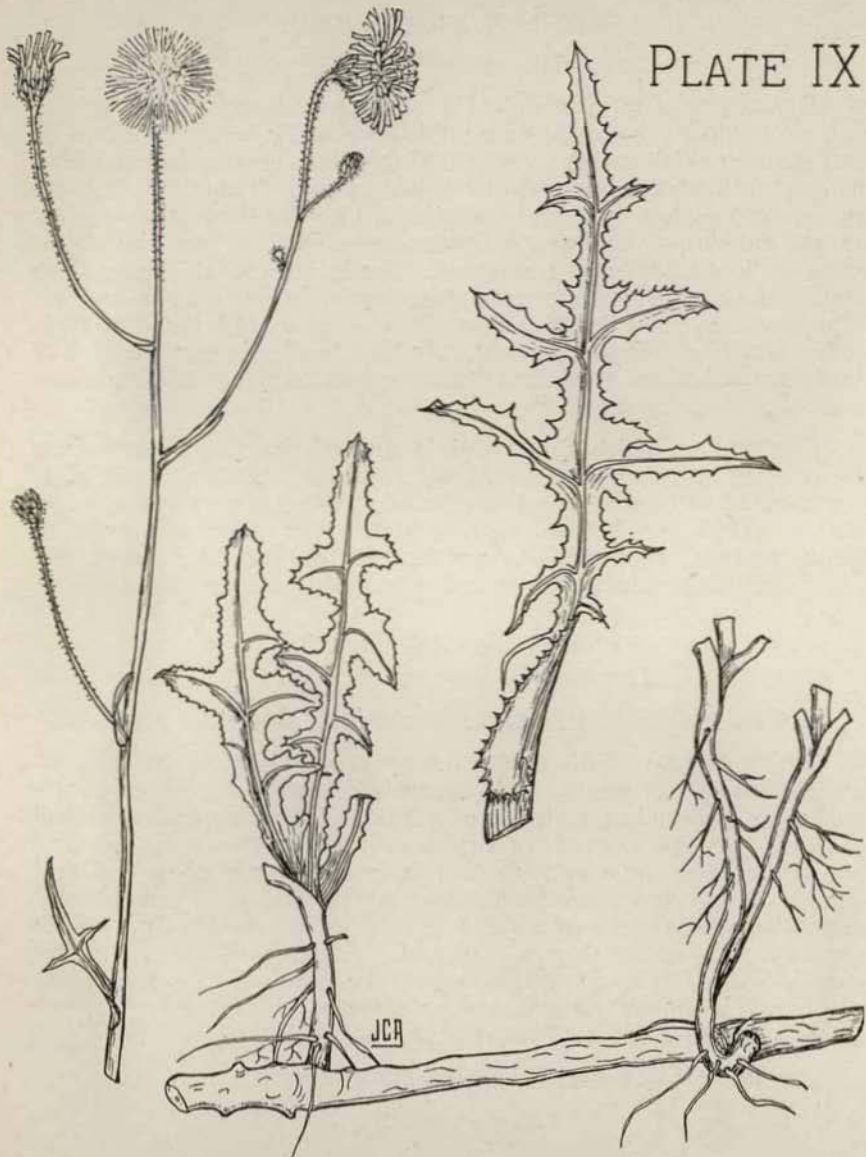
(*Amaranthus blitoides*, Wats)

**OTHER NAMES:** Prostrate amaranth, prostrate pigweed.

**DESCRIPTION:** This spreading or prostrate pigweed is a native annual of the west. It is becoming a serious menace in the small seed producing sections of Idaho. Its shiny black colored seeds are very conspicuous in alfalfa and many otherwise pure and fine looking lots have been docked from one to two cents a pound because of it. Seeds are larger in size than those of redroot and cannot be screened from alfalfa or red clover seed. The plants seed about the same time as redroot. Stems prostrate, forming reddish-green, mats of foliage upon the ground. Leaves thick, egg-shaped to spoon-shaped, watery smooth. Flowers inconspicuous, green, imbedded between the stems and leaves.

**CONTROL:** Same as for redroot pigweed.

PLATE IX



Perennial Sow Thistle  
(*Sonchus arvensis*)



## PERENNIAL SOW THISTLE

(*Sonchus arvensis*, L.)

**OTHER NAMES:** Field sow thistle, creeping sow thistle and sometimes incorrectly called milkweed.

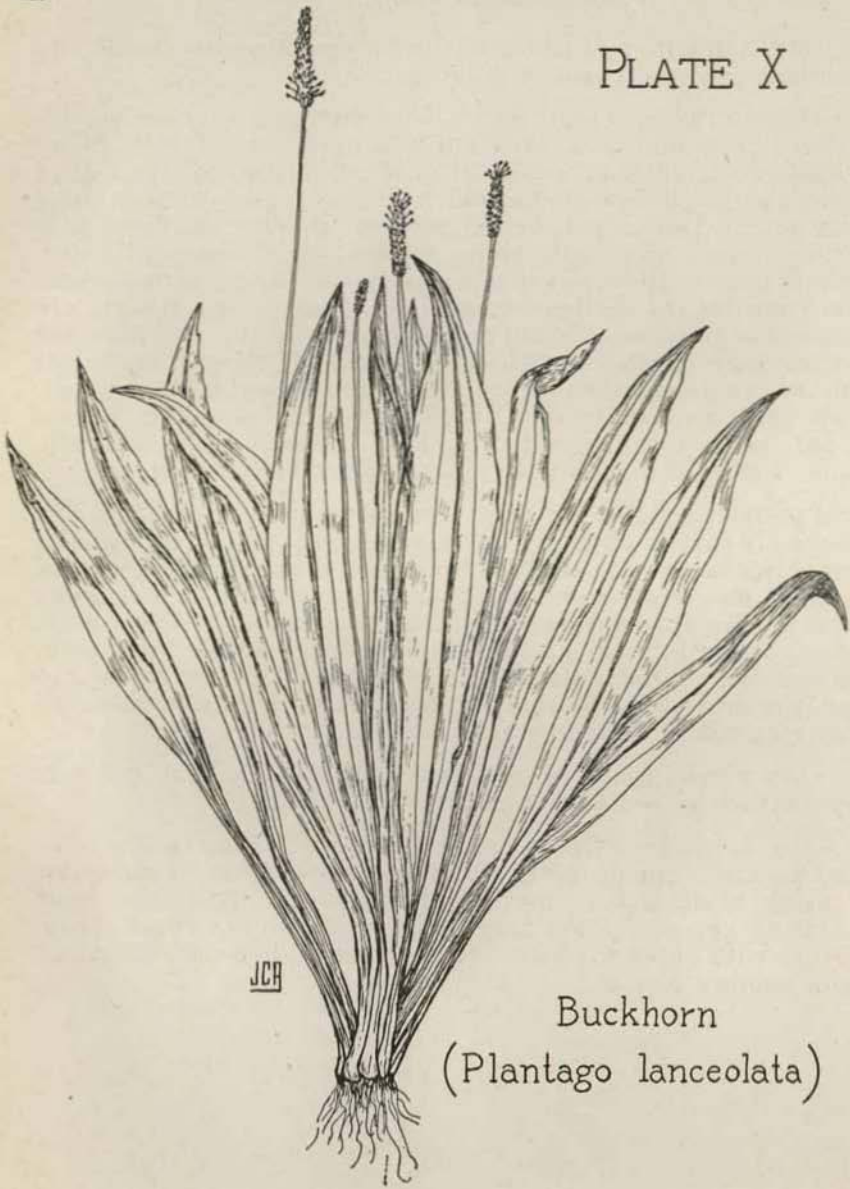
**DESCRIPTION:** (Plate IX) This weed is a very serious introduced perennial because it spreads by means of both fleshy creeping rootstalks and seed. It grows from two to five feet in height and has hollow stems, which, when broken, exude a bitter milky juice. Leaves pale green, notched, growing chiefly at base of flower stem edged with spines which become sharp with age. Flowers bright yellow, one to one and one-half inches across, somewhat resemble the ordinary dandelion. These showy flowers are conspicuous in fields of grain during early morning, but when the weather is warm they are closed by noon. If the plants are cut with the grain crop, the flowers often reappear within three weeks. Seeds thin, reddish-brown, ribbed, thin and somewhat spindle shaped, bear a tuft of down at the top. This latter characteristic enables the seeds to be carried long distances by the wind.

**CONTROL:** Since perennial sow thistle produces seeds which are readily carried about by the wind, prevention of seeding is of first importance. In addition to its pernicious seeding habits, the weed has creeping rootstalks, so that seed production is not necessary for propagation after it has once started. A successful method of control will depend upon keeping down the top growth and starving out the rootstalks. Patches should be cultivated separately to prevent infestation of other parts of the field. A single stray rootstalk is likely to start a new patch.

Only a well organized plan, consistently carried out, will win. Dry weather is the greatest enemy of sow thistle.

The following steps are recommended: Plow and expose roots to sun. Spring tooth to expose more roots. Follow this by using blade weeder or disc once a week. Allow no green growth to appear. Plant fall rye as nurse crop to sweet clover. Pasture with sheep or hogs. If sow thistle shows up, clean cultivate another season.

PLATE X



JCH

Buckhorn  
(*Plantago lanceolata*)

## BUCKHORN

(*Plantago lanceolata*, L.)

OTHER NAMES: Rib grass, narrow leaved plantain, ribwort.

DESCRIPTION: (Plate X) Buckhorn is an introduced persistent perennial, reproducing by seeds only. It is commonly found in meadows, pastures and lawns. The thickened tap-root which produce a new crown each season, also has the ability to develop new leaves shortly after the old ones have been removed. Leaves lance-shaped, thick, not notched, hairy on both sides, with small tufts of brownish hair at the base, three to seven ribbed, tapering at base. Flowers inconspicuous, borne at the top of tall stalks on spikes similar to timothy heads. Seeds brown, boat-shaped, light brown stripe running lengthwise, coated with a gelatinous substance which aids in their distribution by sticking to animals and birds. An average plant will produce one thousand seeds.

CONTROL: Buckhorn is a common weed in clover fields and is quite a serious pest because its seeds are practically inseparable from those of red clover. Since the plant will not stand clean cultivation, badly infested fields should be plowed up and put into some cultivated crop. Care should be taken in buying red clover seed which is to be used for planting seed fields, to see that it does not contain seeds of buckhorn. In some instances where only a small patch occurs the weed can be hoed or pulled out. In larger areas this is an impossibility. In lawns or where only a small patch occurs, hand cutting will kill the weed, provided the plant is cut off two inches below the crown.

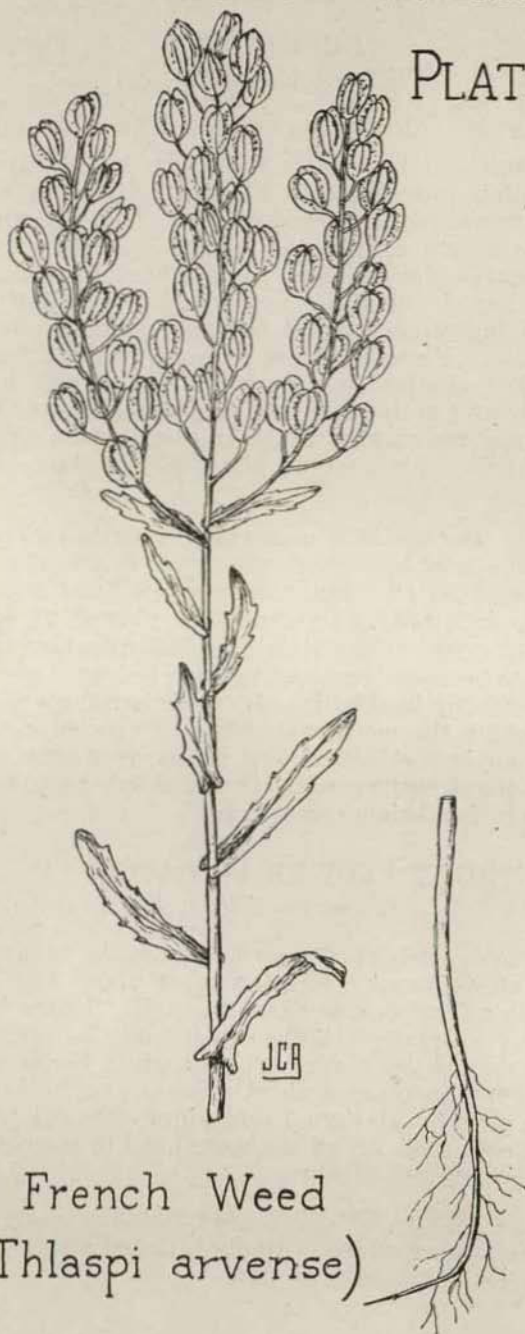
## NIGHT FLOWERING CATCHFLY

(*Silene noctiflora*, L.)

DESCRIPTION: Night flowering catch-fly is an introduced annual or winter annual. It is an erect plant with quite hairy and sticky stems from one to three feet tall. Upper leaves lance-shaped, opposite, directly attached to stems. Lower leaves large, rather spoon-shaped. Flowers creamy white borne in spreading clusters, fragrant, opening at night. Seeds grayish brown or dark slate colored, slightly flattened and kidney-shaped with rows of tiny knobs on each side. The seeds are hard to remove from those of white, alsike and red clover.

CONTROL: Hand pulling in seed fields as soon as the first blooms open is recommended. Badly infested fields should be put under cultivation for a year or two.

## PLATE XI



French Weed  
(*Thlaspi arvense*)

## FRENCHWEED

(*Thlaspi arvense*, L.)

OTHER NAMES: Fanweed, stinkweed, pennycress.

DESCRIPTION: (Plate XI) Frenchweed is an annual or winter annual. Stems range in height from four inches to two feet, are upright, and branch at the top. Leaves stalkless, smooth, margins notched or toothed. Flowers pure white, small, borne in flat terminal clusters. Pods fan-shaped notched at top, and divided into two parts. Those at bottom of flower cluster ripen first. As pods ripen they turn to a rusty-orange color. Seed deep reddish-brown color, roughened, with fine curved ridges about a central groove.

The foliage of Frenchweed or fanweed emits a garlicky odor when broken or crushed. When eaten by cattle it imparts a garlicky taste to the milk. Flour is injured if the seed is ground with wheat. When eaten by sheep an unpleasant flavor is given to mutton.

CONTROL: Although fanweed is an annual it is a very persistent, vigorous grower and is very difficult to eradicate. The fact that the plant can live over winter in the seedling stage and mature seed by the first of June makes it hard to control in winter grains. The plant also produces large numbers of seed capable of living in the soil without germinating for several years. Prevention of seeding and elimination of any seed already in the soil by cultivation for several years, is necessary if the weed is to be eradicated.

In cases of new infestations or where stray plants are found, hand pulling and burning are the most effective means of control. Burning is necessary since the seeds are likely to ripen if the plants are pulled and left on the ground.

In badly infested grain fields burning the stubble after the crop is removed will destroy many of the seeds. Cultivation to encourage the germination of the seed in early fall, followed by subsequent cultivation to kill the young seedlings, is effective.

Cultivation of grain in early spring with a spike tooth harrow will help to uproot any young plants present. The use of carefully tilled summer fallow will be of value in ridding the land of bad infestations. Raising of cultivated crops where they can be grown to advantage is also an aid in eradication.

## PLATE XII



Dodder  
(*Cuscuta* species)

**DODDER**  
(*Cuscuta species*)

**OTHER NAMES:** Love vine, Devil's hair, Strangleweed.

**DESCRIPTION:** (Plate XII) Parasitic annuals with thread-like yellowish to reddish colored stems. The newly germinated thread-like plants have only undeveloped roots upon which they rotate in search of living plants. They attach themselves to these plants by means of suckers, which tap the food and water vessels of the hosts. This parasitic arrangement eliminates the necessity for the usual roots and leaves ordinarily found in the plant kingdom.

**LARGE SEEDED DODDER.** (*Cuscuta indecora*, Chois.) This variety has coarse orange stems, which branch freely and attach themselves to the tops of surrounding host plants, making a dense entanglement. Flowers fleshy, cream-waxy texture, growing in loose clusters. Seed pods papery, usually containing four seeds. See Plate XII, Figure a.

**MEDIUM SEEDED DODDER.** (*Cuscuta arvensis*, Beyrich.) This variety has slender, pale yellow stems, having the same growing habits as the large seeded variety, but less top growth, and are not so spreading. Flowers same texture, but slightly smaller, stalkless, borne in dense clusters. See Plate XII, Figure b.

**SMALL SEEDED DODDER.** (*Cuscuta planiflora*, Tenore.) This is a fine stemmed variety. Not luxuriant in its habits, growth confined to base of host plants, difficult to detect in fields. Stems very fine, pale yellow or dirty white. Flowers very small, rather dirty white, not very waxy, arranged in compact button-like clusters. See Plate XII, Figure c.

Dodder is the worst weed enemy of Idaho seed growers. The seeds of the large and medium seeded varieties are impossible to separate from alfalfa or red clover seed to any satisfactory extent with ordinary cleaning machinery. There are special patented machines for their removal, but as yet such machinery is found only in the most elaborate cleaning establishments in the United States. The seeds of small seeded dodder will readily screen out of alfalfa or red clover seed but not out of white or alsike clover seed. Often, also, two small dodder seeds are found sticking together, which makes impossible their removal from alfalfa or red clover seed. Sometimes immature small seeded dodder seeds remain in their respective pods and for their removal special screens and machinery must be used. These specials and extra "machine-runs" increase the farmer's cleaning bill.

**CONTROL:** When dodder is present in a field it is a difficult matter to locate all patches so that they may be eradicated. Un-

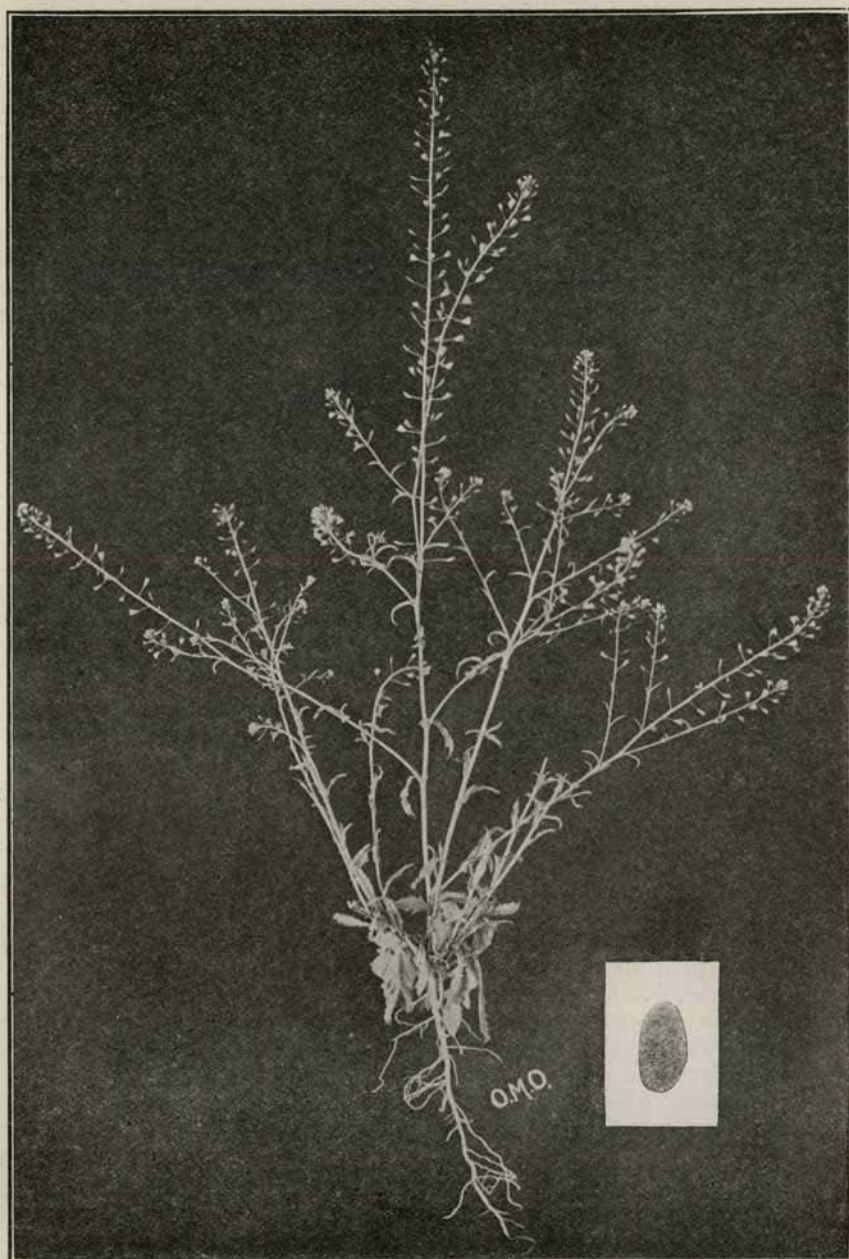


FIG. III  
SHEPHERDS PURSE (*Capsella Bursa-pastoris*)



der such conditions the alfalfa or clover seed produced is likely to contain dodder.

In case of small patches, the weed can be eliminated by cutting and burning. If this method is resorted to a very careful search of seed fields should be made so that every patch is found. If other patches are found at cutting time, the infested crop should be thrown out and burned.

If the field is badly infested, the best plan is to cut the entire crop for hay before the dodder blooms and not attempt to grow a seed crop. Afterwards, if the grower wishes to rid the field of dodder, he should plow the land and plant to a cultivated crop the following season. Since seeds of dodder remain alive in the soil for a number of years, the grower should not attempt to return the field to seed production before the third year.

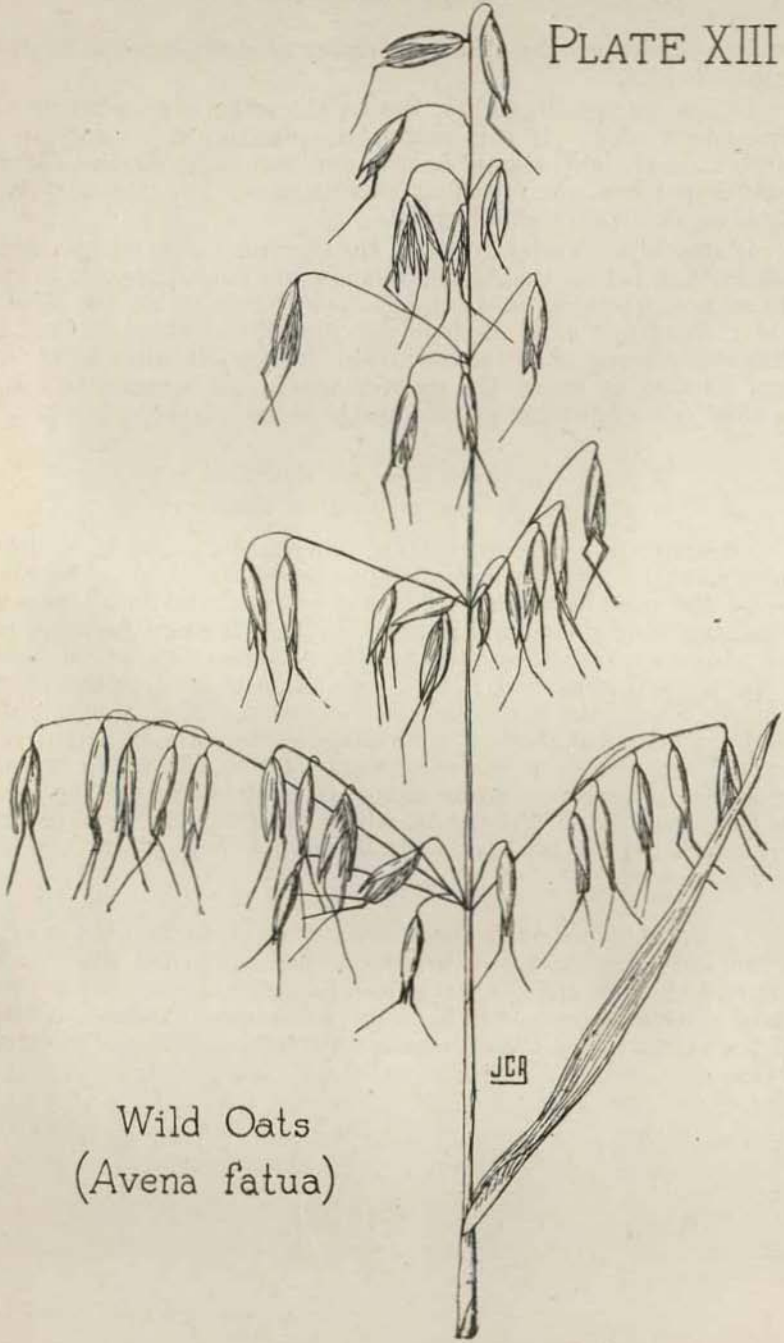
### SHEPHERD'S PURSE

(*Capsella Bursa-pastoris*, Medic.)

DESCRIPTION; (Figure III) Shepherd's purse is an introduced annual or winter annual reproducing by seeds. The plant, one of the most common weeds known, is found in all growing crops, and is very common in grain fields. It has a deep tap root and a slender branching stem. When it starts growth a rosette of leaves is formed and it is in this stage that it lives thru the winter. Basal leaves two to five inches long, more or less deeply lobed. Stems, shooting up from this rosette, vary in height from six to twenty-four inches. Flowers very small, white in color. Seed pods flat, triangular in shape and notched at the top, hence the common name. The seeds, which are produced in large numbers, are about one twenty-fourth of an inch long, oblong and light brown in color.

CONTROL: Infested fields should be given thoro cultivation to promote germination of any seeds present in the soil. Subsequent tillage will kill the young seedlings. Summer fallow or the use of cultivated crops will keep the weed under control. Cutting off the plants below the crowns is an effective means of control in lawns.

PLATE XIII



Wild Oats  
(*Avena fatua*)

## WILD OATS (*Avena fatua*, L.)

**DESCRIPTION:** (Plate XIII) Wild oats is an introduced annual reproducing by means of seeds only. The plant resembles the cultivated oat but usually is taller than cultivated grains. Stems slender, growing in tufts, two to four feet in height. Leaves long and narrow. Seed panicles or clusters more open, loose and drooping than those of the tame oat. Seeds resemble those of the cultivated oat except that they are more slender, have twisted and bent awns on their backs, "sucker mouth" opening at base, hairs and bristles at base, vary in color from yellow to black. The "sucker mouth" or horse-shoe shaped opening at the base of the grain is one of the chief means of identification. The twisted and bent awns enable the seed to cling to the wool of sheep and to grain sacks, thus assisting in the scattering of these noxious seeds. The awns twist up tightly when dry and unwind when damp. This characteristic helps the seed to pull itself into the soil, and irritates sheep when lodged in the wool.

**CONTROL:** Under irrigation in southern Idaho the use of certified seed grain which is free from wild oats naturally eliminates the weed. However, the non-irrigated and dry farm sections of the state are for the most part badly infested with this weed. In those sections seeding pure seed will not eliminate the pest, and cultivation and the use of a cultivated crop or summer fallow is essential.

The chief difficulty in the control of wild oats lies in the fact that its seeds mature and shatter before the grain crop is ready to cut. By this means the soil is kept well infested from year to year. Another factor that makes eradication difficult is the fact that the seeds usually do not germinate until the season after they are produced. Besides, the seed have the ability to remain dormant in the soil for several years.

In dry farm sections, properly tilled summer fallow will do much to keep wild oats under control, especially if the land to be summer fallowed is disced or plowed in early spring. Early tillage not only kills weeds but it also aids greatly in conserving the moisture supply.

In non-irrigated sections thoro preparation of the seedbed in early spring will do much to start germination, and subsequent cultivations will then eradicate the newly germinated plants. Harrowing of both spring and winter grain in the spring will assist in getting rid of the pest. Cultivated crops, where adapted, do much to assist in control.

The first essential in control is *not to sow the seed*. Certi-

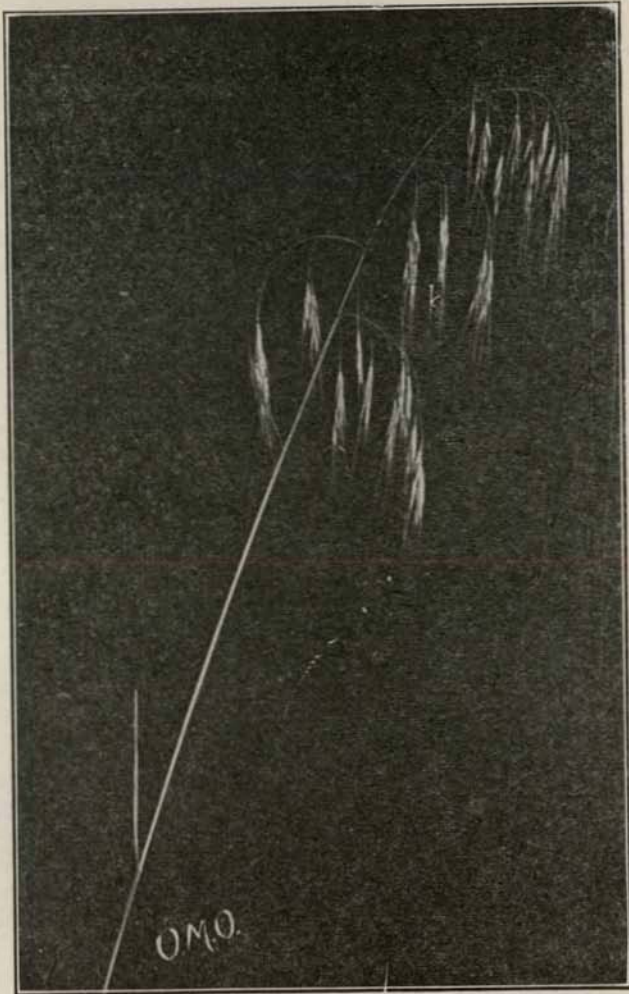


FIG. III  
DOWNY BROME GRASS (*Bromus tectorum*)

fied seed grain which is free from wild oats or good quality seed cleaned with a good fanning mill or portable disk cleaner at the threshing machine, or farm size disk type cleaner at the granary, should be used.

The second essential, is to make the seed which is already in the soil grow and to destroy the growth.

Shallow cultivation in favorable falls after the grain crop has been removed will start some growth. Early shallow cultivation in the spring to hasten germination followed by proper tillage, will eradicate the wild oat seedlings. Wild oat seeds should not be plowed under to a depth of more than four inches. Cultivation will not germinate the seed before planting if they are plowed under to a greater depth. When deeply lodged in the soil the seed retains its vitality and may germinate and grow if turned up from two to six years later.

A definite rotation system, workable for the season, should be adapted. The exact system in any case must be left to the good judgment and common sense of the farmer himself.

Under irrigation intertilled crops such as corn, potatoes and beets, well cultivated, will destroy the wild oats.

Under dry land and non-irrigated condition a properly tilled summer fallow will keep wild oats under control.

### DOWNY BROME GRASS

(*Bromus tectorum*, L.)

OTHER NAMES: Early chess, June grass.

DESCRIPTION: (Figure III) Downy brome grass is an introduced annual propagating by seeds. It is commonly found in waste places on the range and in old meadows and pastures. The seeds ripen before grain is cut and the stems soon become rough and unpalatable, lowering the quality of hay containing the weed. The plants rarely ever attain a height of more than two feet. They have downy leaves which turn to a lavender color when mature, and a one-sided penicle-like head resembling horse-mane oats.

CONTROL: The weed gives little trouble in well cultivated fields or in thick stands of legumes. Mowing waste places early in the season to prevent the plant from seeding is desirable.

## PLATE XIV



JCA

Green Fox-tail  
(*Chaetochloa viridis*)

## GREEN FOXTAIL

(*Choetochloa viridis*, L. Beauv.)

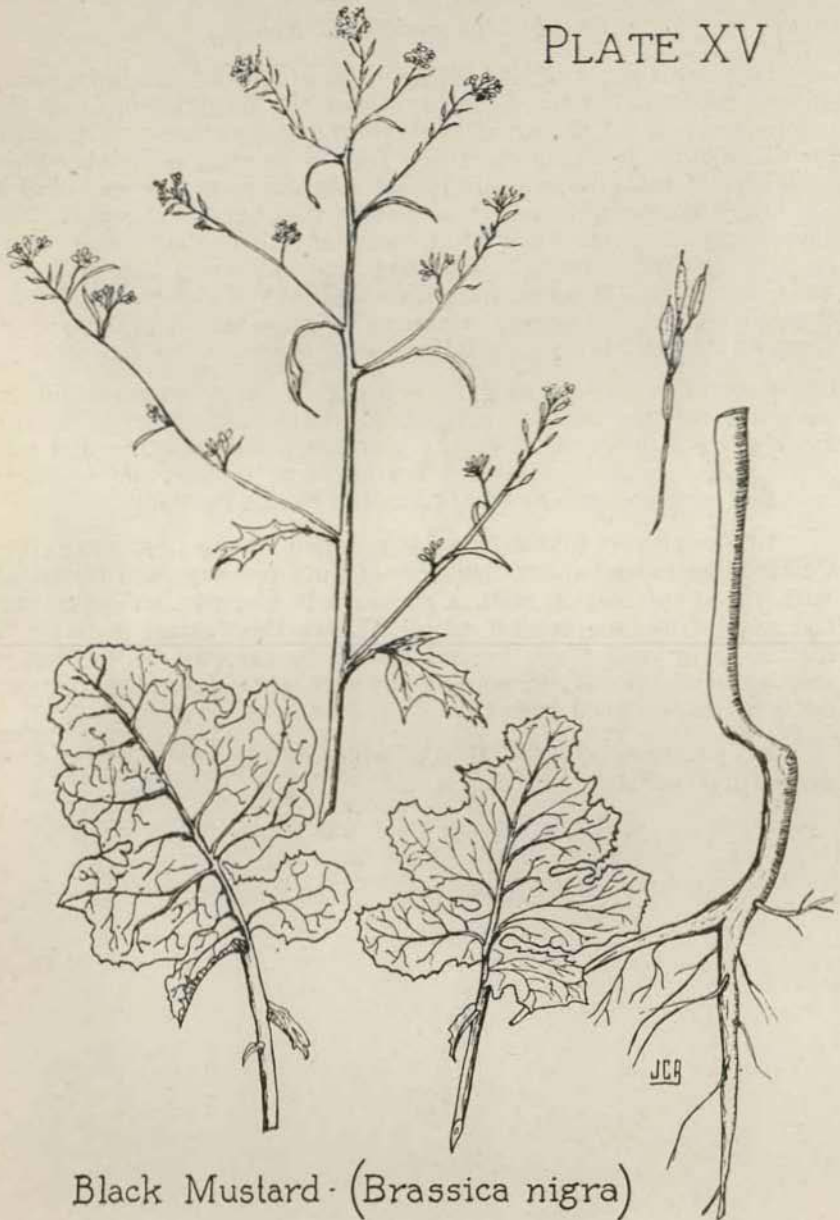
DESCRIPTION: (Plate XIV) Green foxtail, an introduced annual reproducing by seeds, is one of the most harmful of the common weeds in the small seed producing sections. The plant grows in tufts from one to three feet in height. Like the other members of the grass family it has long, narrow flat leaf blades. Seeds are borne in spikes from two to four inches in length. In shape they resemble the seed of common millet. Their color varies from green to brown. The seeds are smaller in size than millet, being about the same weight as seed of red clover, but lighter than alfalfa seed. Special cleaning is required to remove them from either red clover or alfalfa.

CONTROL: Prevention of seeding in every way possible is essential for the control of foxtail. Late cultivation of alfalfa fields does little good, since the plant is a late starting and maturing one. Hand pulling and hoeing form the best and probably the most common means of eradication in alfalfa fields.

In red clover, foxtail is seldom found in the first year crop. Cutting red clover about the first of July for hay, and following with thoro cultivation with a spike tooth harrow, will eliminate the weed from the second crop. Where the foxtail is likely to mature in a seed field, hoeing should be resorted to. A heavy seeding of red clover, 12 pounds per acre, should be used to crowd out and starve weed growth.

All patches of foxtail should be cut out of a field before crop seed is harvested.

## PLATE XV

Black Mustard · (*Brassica nigra*)



## BLACK MUSTARD

(*Brassica nigra*, Koch.)

**DESCRIPTION:** (Plate XV) Black mustard is an annual reproducing by seeds only. Stems green, two to nine feet in height, usually widely spreading, more or less hairy. Basal leaves three to eight inch long, deeply lobed, nearly cut to midrib, coarse, hairy, terminal lobe much the largest, widely rounded at tip. Upper leaves smaller, narrower, not deeply lobed, almost stalkless. Upper-most leaves very narrow, pointed, only slightly toothed, directly attached to stems. Flowers bright yellow, from one-fourth to three-eighths of an inch broad, borne in loose branching clusters, each flower having its own stalk. Seed pods slightly four-sided, from one-half to one inch in length, terminating in an abrupt beak. Seeds brickish-red to black color, round but inclined to be elongated, minutely pitted, bottom of pits smooth and shiny, seed coats often having a scurfy appearance.

**CONTROL:** Black mustard is very difficult to control. It is most serious in grain fields. Thoro preparation of the seedbed followed by harrowing of the grain after it is four or five inches high is the best means of keeping the weed under control. Eradication can usually be effected by using cultivated crops in the rotation. If seeds have matured in green fields, the stubble should be burned to destroy them. In some northern states control is effected by spraying the weeds with a solution of iron sulphate. Such a solution is made up at the rate of 100 pounds of iron sulphate to 50 gallons of water. This spray adheres to the grain crop and leaves it uninjured. Iron sulphate spray should be applied shortly before the mustard plants attain a height of ten or twelve inches.

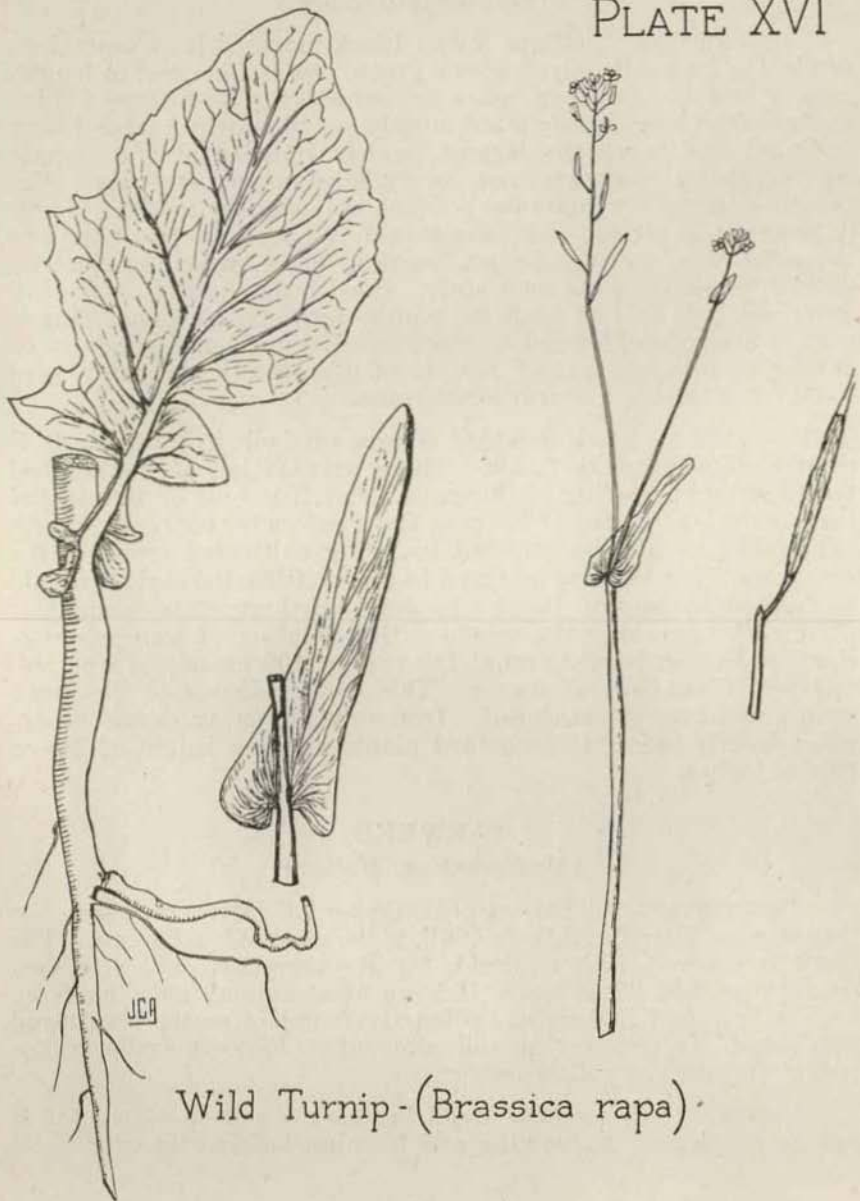
## TARWEED

(*Madia sativa*, Molina)

**DESCRIPTION:** There are a number of native tarweeds but this species, introduced from Chili, is the most offensive one. The plant is covered with a viscid, tar-like secretion, which injures everything that it touches. It is an erect annual, growing from one to four feet in height, ordinarily found in waste places and roadsides. Leaves entire and alternate. Flowers—pale yellow petals and darker yellow center.

**CONTROL:** Where the weed becomes a source of trouble it can be eradicated by mowing and burning before maturity.

PLATE XVI



Wild Turnip - (*Brassica rapa*)

### WILD TURNIP (*Brassica rapa.*)

OTHER COMMON NAMES: Wild rutabaga.

DESCRIPTION: (Plate XVI) Wild turnip is a tall, smooth annual, reproducing only by seeds. Lower leaves smooth, lobed, stalked, covered with bloom similar to those of the cultivated rutabaga. Upper leaves smooth, not lobed, clasping to stems. Flowers bright yellow, arranged in loose, much branched clusters. Pods long, tipped with a long beak. Seeds small, very round, resemble bird shot. This variety of mustard cannot be confused with black or Indian mustard on account of the smooth, bloom covered leaves similar to cabbage.

CONTROL: Same as for black mustard.

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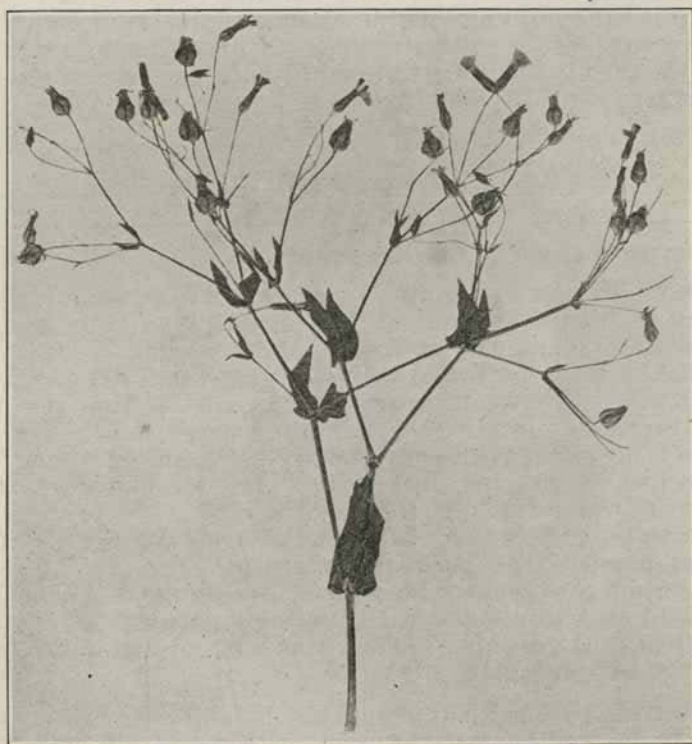


FIG. IV  
COW COCKLE (*Saponaria vaccaria*)  
Courtesy Colorado Experiment Station

## COW COCKLE

(*Saponaria vaccaria*, L.)

OTHER NAMES: Pink cockle, cow herb.

DESCRIPTION: (Figure IV) Cow cockle is an introduced annual, growing from one to three feet tall. Stems erect, slender, much branched, bushy. Leaves clasping stems, wide at base, twice as long as wide, very smooth, pale green and waxy, not notched. Flowers many, pink, borne in loose clusters. Seeds one-twelfth of an inch in diameter, round, dull black, roughened with very small points. Like corn cockle the seed, when ground with wheat, ruins flour. The weed is especially bad in grain and pea fields.

CONTROL: The first requisite is sowing of clean seed. Stubble fields where the weed has matured seed should be burned and disked to encourage germination, and the land summer fallowed or put into a cultivated crop. Harrowing of grain fields when the crop is small will kill many of the cockle seedlings. New infestations should be hand pulled to prevent seeding and spreading.

## PRICKLY LETTUCE

(*Lactuca scariola*, L.)

OTHER NAMES: Compass plant.

DESCRIPTION: (Figure V) Prickly lettuce is an introduced annual or winter annual. It has now spread over the entire United States, chiefly by means of impure seed and because of the fact that its seeds are tufted with white down and are blown about by the wind. The plant grows to a height of from two to five feet. Stems hard and woody, contain a milky juice. Leaves oblong to lance-shaped with wavy margins, spine on under side of midribs, leaves clasping directly to stems, ear-like lobes at base. Leaves of stems twisted at the clasping base, so as to stand vertically with the edge to the sun, instead of horizontally as in the case of most plants. This peculiar feature gave rise to the common name of compass plant. Seed about an eighth of an inch long, resembles seed of cultivated lettuce, only smaller. A menace to the lettuce seed growers. Some firms will not buy lettuce seed in Idaho for fear of impure stock.

CONTROL: The plant should not be allowed to go to seed in waste places and along fence rows. Deep cutting, or pulling of scattered plants to prevent seeding is desirable. Cultivated crops will hold the weed in check. In non-irrigated grain growing sections cultivation will get rid of many plants. Badly infested fields should be summer fallowed or planted to a cultivated crop.

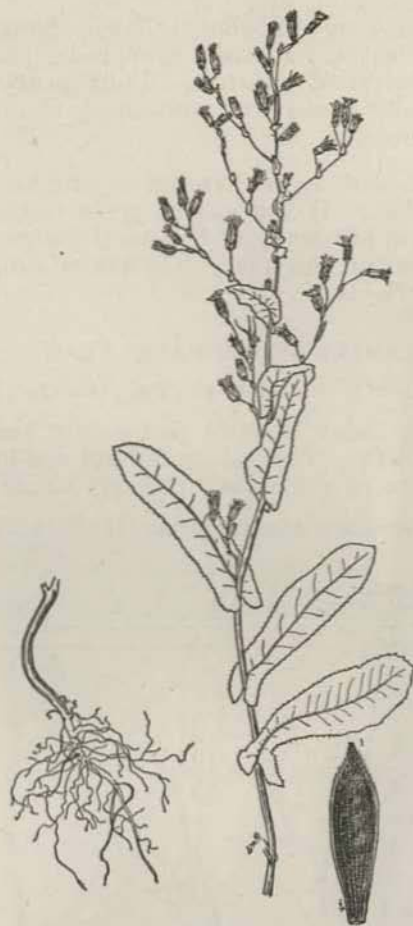


FIG. V

PRICKLY LETTUCE (*Latuea scariola*)

(Courtesy Colorado Experiment Station)

## FALSE FLAX

*(Camelina sativa, Crantz)*

OTHER NAMES: Wild flax, balloon mustard.

DESCRIPTION: False flax is an introduced annual or winter annual. It is two to three feet high, erect, slender, branching near top. Root leaves or lower leaves stalked, notched or not notched, downy, lance-shaped. Upper leaves clasping directly

to stems, edges wavy, smooth, sharply lance-shaped, covered with bloom as cabbage leaves. Flowers numerous, pale greenish yellow, borne on terminal clusters. Pods pear-shaped, margin tipped with a slender beak, each containing about ten yellowish-brown flattened seeds.

**CONTROL:** If seeds have matured in stubble fields, burning is a desirable practice. Harrowing of grain fields while the crop plants are small will kill many of the weed plants. Thick stands of alfalfa will crowd out the weed. Cultivated crops are desirable for badly infested fields.

#### SMALL SEEDED FALSE FLAX

(*Camelina microscarpa*, Andrz.)

This plant is similar to false flax except that all parts are smaller. (Figure VI). The pods are about one-half as large, but produce seed even more abundantly than its larger relatives.

Control measures are the same as for false flax.



FIG. VI

SMALL SEEDED FALSE FLAX (*Camelina microscarpa*)

Courtesy Colorado Experiment Station



FIG. VII

BARNYARD GRASS (*Echinochloa crus-galli*)

Courtesy Colorado Experiment Station

## BARNYARD GRASS

(*Echinochloa crus-galli*, Beauv.)

OTHER NAMES: Water grass, Barnyard millet.

DESCRIPTION: (Figure VII) Barnyard grass is an introduced annual thriving in moist locations. The plant grows from two to five feet tall, has stout stems, and coarse grass-like leaves. The green or brown and sometimes bearded spiked seed clusters are often a foot in length. Seeds smooth, shiny, dirty-white in color, oval and plump, similar to millet in shape, and about an eighth of an inch long.

CONTROL: Patches of this weed in seed fields should be mowed or cut frequently enough that it does not seed. In cultivated fields hoeing will be necessary to eradicate all plants.

## NIGHTSHADES

*(Solanum Sp.)*

Two species of nightshades are commonly found in Idaho. They are especially prevalent in the pea growing sections. The juice from the berries discolors the peas and lowers their market value.

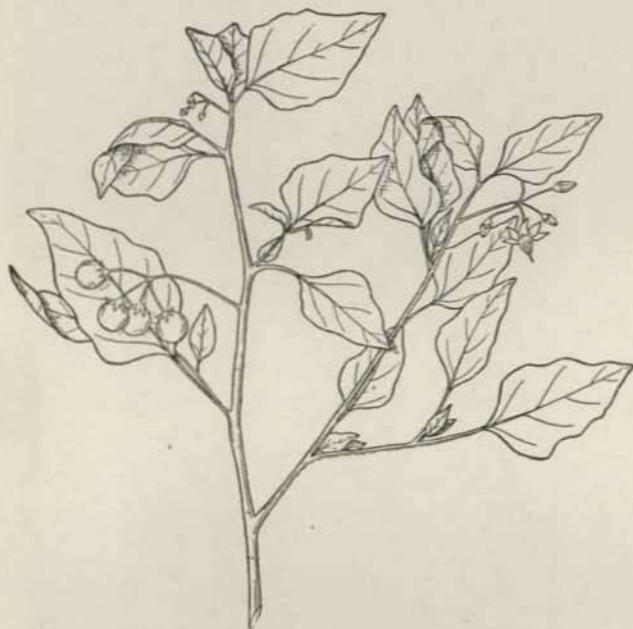


FIG. VIII

COMMON NIGHTSHADE (*Solanum nigrum*)

Courtesy Colorado Experiment Station

## COMMON OR BLACK NIGHTSHADE

*(Solanum nigrum, L.)*

OTHER NAMES: Deadly nightshade.

DESCRIPTION: (Figure VIII) Black nightshade is an annual plant, propagating by seeds. According to Ada Georgia\*, "The poisonous qualities of this plant are said to vary much with the conditions of its growth, the more dangerous having more of the characteristic musty odor. Children have been poisoned by it, also calves, sheep, goats and swine, but fortunately few cases are fatal tho the illness caused by eating its ripe fruit is one of excessive nausea."

Black nightshade is a low, coarse spreading plant, rarely

\*Manual of Weeds, by Ada Georgia.



attaining a height of more than one or two feet. Leaves oval in shape, notched, tip pointed, and borne alternately on the stem. Flowers white, borne in drooping clusters of from three to ten in number. Berries smooth, black and round. Seeds yellow to light brown, flattened and oval in shape.

THREE-FLOWERED NIGHTSHADE  
(*Solanum triflorum*, Nutt.)

This species has smaller and more deeply cut leaves than black nightshade, and flowers are borne in groups of three. (Figure IX) Berries greenish in color, larger than those of the other species. Control methods are the same as for black nightshade.



FIG IX

THREE-FLOWERED NIGHTSHADE (*Solanum triflorum*)

Courtesy Colorado Experiment Station

**CONTROL:** The plant is easily destroyed by cultivation. In the pea growing sections infested pea fields should be put into cultivated crops for a year or two before reseeding with peas. In waste places the plant should be kept from seeding by mowing and burning.

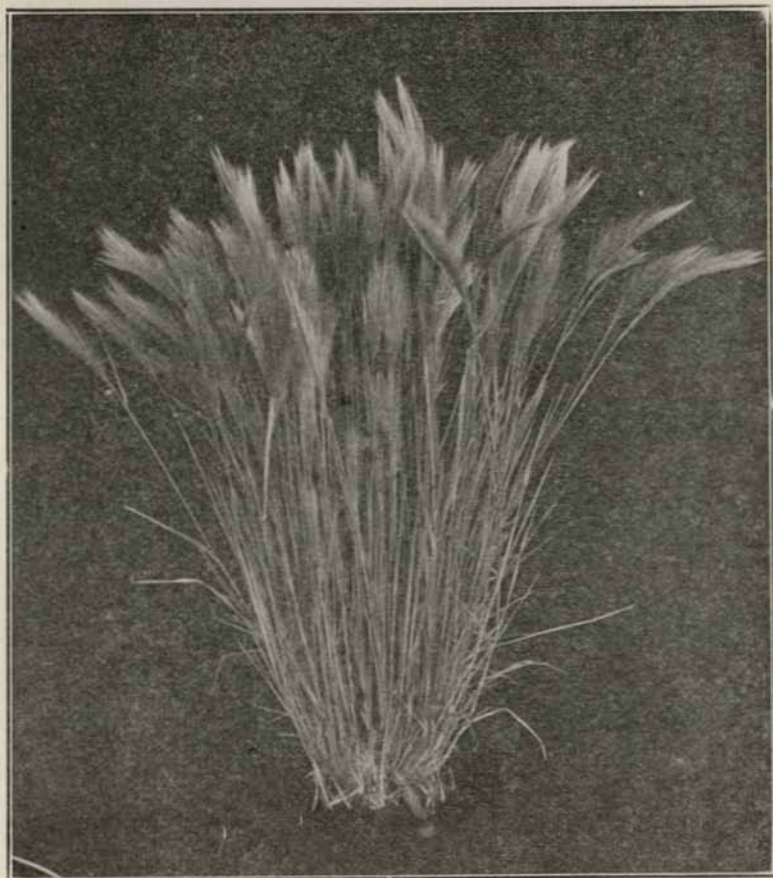


FIG. X

WILD BARLEY  
(*Hordeum jubatum*, L.)

OTHER NAMES: Squirrel tail.

DESCRIPTION: (Figure X) Wild barley is a native biennial or perennial seemingly especially adapted to moist, slightly alkaline locations. There are also two annual species of wild barley which are sometimes confused with *H. Jubatum*, and three other species of perennial wild barleys are found in California.\*

The plant grows in thick tufts from fibrous roots. Stems attain a height of six to thirty inches, depending upon growing conditions. Mature head covered with sharp awns, resembles cultivated barley. These awns pierce the lips and gums of animals eating them, causing inflammation.

When young, the plant is readily eaten by all classes of livestock. However, after the heads mature it is dangerous and very injurious to animals. According to Sampson,\*\* "This grass is particularly injurious to sheep. When a sheep's neck, back and flanks are densely pierced by innumerable needlelike awns of these grasses, the animal walks about stiffly, with an unnatural gait and seeks but little food. Eventually the skin loses its pliability, and the wool feels harsh and lifeless. Naturally such wool commands a low price on the market. Finally the animal refuses to eat and dies from starvation."

**CONTROL:** The weed is easily eradicated from cultivated fields. Any system of cultivation will control it. A heavy stand of alfalfa will also keep it under control. In meadows and pastures it should be cut before seeding, raked up and burned. Large areas may be burned over, thus killing both plants and seeds. Scattered plants should be hoed or pulled before they produce seed.

**YELLOW TREFOIL**  
(*Medicago lupulina*, L.)

**OTHER NAMES:** Black medic, non-such.

**DESCRIPTION:** (Figure XI) Yellow trefoil is an introduced annual. It is not a valuable member of the legume family like the clovers and alfalfa, because it is decumbent and produces less foliage. It is a serious weed in the small seed producing sections. Stems reclining, one to three feet in length. Leaves composed of three leaflets, similar to those of alfalfa, only smaller middle leaflet stalked. Flowers small, yellow, borne in head-like clusters. Pods kidney-shaped, black when mature, each containing one seed. Seeds about same size, color, shape, and weight as those of alfalfa; only an expert can detect them in alfalfa or red clover seed. Seed cleaning machinery is unable to separate them from the above seeds.

**CONTROL:** Thick stands of alfalfa or other legumes seeded after thoro cultivation of the land will usually crowd it out. In seed fields early cultivation will help control the weed. In thin seed stands, hoeing is usually necessary.

\*Weeds of California, Monthly Bulletin of the Department of Agriculture, Vol. XI. No. 2-3.

\*\*Range and Pasture Management, by A. W. Sampson. (John Wiley and Sons.)

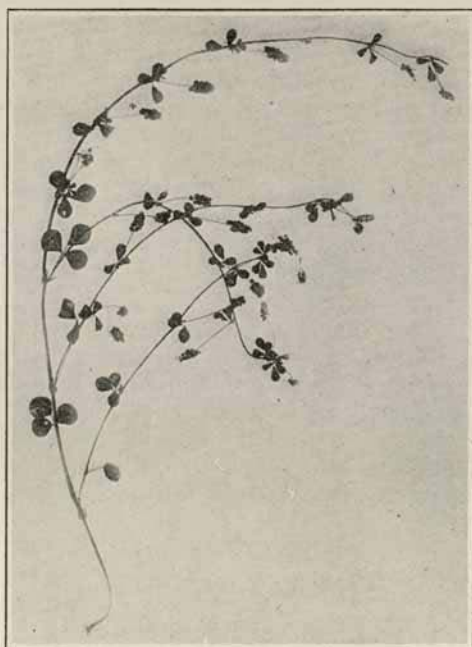


FIG. XI

YELLOW TREFOIL (*Medicago lupulina*)

Courtesy Colorado Experiment Station

## REDROOT PIGWEED

*(Amaranthus retroflexus, L.)*

OTHER NAMES: Rough pigweed.

DESCRIPTION: (Figure XII) Redroot is an erect, coarse introduced annual with lateral branches spreading and ascending. It grows to a height of one to six feet. Leaves egg-shaped to elliptical, or longer than wide with both ends equally rounded, base leaves rather blunt, upper leaves more pointed, borne on stalks, under side more or less reddish color. Tap root a pale pink color. Flowers green or greenish-yellow, crowded in spike-like clusters between the stems and leaf-stalks, at the end of branches, more prickly when dry. Seeds jet black, shiny, round, many times elongated, slightly flattened on both sides resembling those of lamb's quarter. The seeds are inseparable when found in seed of white or alsike clover. This plant is becoming quite prevalent in grain fields in northern Idaho, and is very common in southern Idaho.

CONTROL: Since the plant reproduces by seed alone, prevention of seeding in waste places is essential. When present in



FIG. XII

REDROOT PIGWEED (*Amaranthus retroflexus*)

Courtesy Colorado Experiment Station

grain fields spring harrowing is effective if the crop is small. Clean cultivation and prevention of seeding will soon eradicate the weed since the seed is not as long lived as that of many weeds. The weeds should be rogued out of the seed fields.

### COCKLE BUR

(*Xanthium canadense*, Mill.)

OTHER NAMES: Button-bur, Sheep-bur, Clotbur.

DESCRIPTION: (Figure XIII) Cockle bur is a tall growing, coarse annual. Stems rough, angular, often reddish in color. Leaves large, broadly oval to heart-shaped, rough on both sides, lobed. Seed pod or bur covered with hooked spines or bristles. Burs appear in clusters of one to many at base of leaves, and usually beaks or horns at apex. They contain two seeds, one of which is supposed to germinate the first year and the other the next. On the other hand, the whole bur may be carried in the soil and the



FIG. XIII  
 COCKLE BUR (*Xanthium canadense*)

Courtesy Colorado Experiment Station

seeds retain their vitality for several years. The plant is especially adapted to cultivated areas and waste places that are rich and moist.

**CONTROL:** Hand cutting and burning of the plants in waste places to prevent seeding is desirable. Plants in cultivated fields should also be prevented from seeding. Legume crops cut for hay prevent the weed from seeding and consequently will control it.

**TUMBLING MUSTARD**  
 (*Sisymbrium altissimum*, L.)

**OTHER NAMES:** Jim Hill mustard.

**DESCRIPTION:** (Figure XIV) Tumbling mustard is an introduced annual or a winter annual. Stems erect, much branched, two to four feet in height. The young plant appears as a ro-

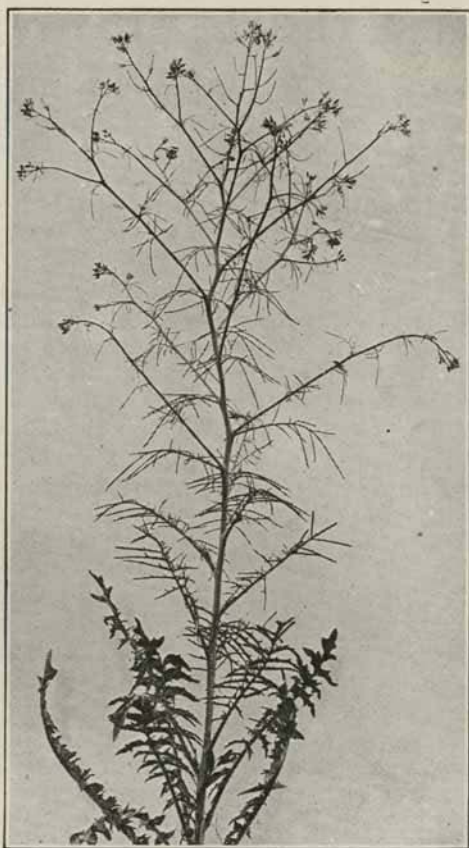


FIG. XIV

TUMBLING MUSTARD (*Sisymbrium altissimum*)

Courtesy Colorado Experiment Station

sette of soft, pale green, downy leaves, long stalks, coarsely toothed or cut to midrib. Upper leaves cut into narrow segments, no stalks. Flowers small, pale yellow, borne on widely branching clusters. Seeds small, elongated, greenish-yellow, borne in long slender pods. This weed occurs most frequently in grain fields, along road sides, and other waste places. At maturity the main plant breaks off near the surface of the ground and tumbles about scattering its seeds as it rolls. A single plant has borne as many as 1,500,000 seeds.

CONTROL: Same as for cow cockle.

## HOW TO USE THE SEED LABORATORY

In 1911 the state legislature of Idaho created a pure seed law. This much needed measure provided for the appointment of a seed commissioner and a seed analyst. A seed laboratory was organized and placed in the capitol building at Boise, under the direction of the University of Idaho Agricultural Experiment Station, and a branch seed laboratory has since been established at Moscow.

The pure seed law does two things: It enforces labeling and it specifies the number of noxious weed seeds allowed per pound in marketable seed within the state. It makes no provision for purity standards. Any lot of clover or alfalfa seed containing a high per cent of common weed seeds, cracked wheat and chaff, may be placed upon the market, provided the noxious weed seed content is within the law.

As it became more and more assured that southern Idaho had a great future in small legume seed production, it was realized that a change in legislation for the betterment of seed crops was necessary. After much consideration, the State Commissioner of Agriculture in 1919 promulgated the present seed grades, which are similar to those used in Canada. They not only regulate noxious weed seed content, but purity and color, which, in all, expresses a comprehensive idea of quality.

At that time Idaho was the only state in the Union to have grades for small leguminous seeds and upon this foundation a new constructive system for standardization was laid. Growers soon began to realize that during normal buying seasons better seeds bring better prices. For a number of years the farmers paid little attention to their seed crops, often using screenings for the planting of new fields, and thus ruining their farms as well as those of their neighbors. Records for 1925 show only 26 per cent of the samples condemned as compared to 43 per cent in 1921 and 54 per cent in 1920.

Dealers are continually using the seed laboratory to ascertain the quality of lots of seed exposed for sale. They have shown an excellent spirit of cooperation looking to the improvement of the small seed industry.

A great many farmers in the state always send in samples for analysis before seeding and they have learned that it pays in dollars and cents. More farmers should adopt the slogan, "Know What You Sow." A test may be obtained for the cost of postage on the sample sent to the laboratory.

Laboratory analysis for 1925 showed the following results: Of the total number of samples submitted for test, county agents sent .5 per cent, farmers 30 per cent, dealers 66 per cent and oth-



er sources 3.5 per cent. In a great seed producing state like Idaho the farmers should send in a larger percentage of samples. The ultimate aim of the grower is to produce a product that will command the highest market price. The planting of clean seed is the first step.

Rules for sampling and analyzing seed may be found on page 65. Samples should be addressed—carefully—to State Seed Laboratory, Boise, or to the Branch Seed Laboratory, Moscow. They should be mailed in small cloth sacks, strong paper safety envelopes, or securely wrapped packages.

## SUMMARY OF STATE SEED LAW

### CHAPTER 85

**2019. AGRICULTURAL SEEDS: DEFINED.** For the purpose of this chapter, agricultural seeds of alfalfa, barley, Canadian bluegrass, Kentucky bluegrass, brome (awnless) grass, buckwheat, alsike clover, crimson clover, red clover, white clover, field corn, kaffir corn, meadow fescue, flax, millet, oats, orchard grass, rape, red top, rye, sorghum, timothy and wheat which are to be used for sowing or seeding purposes.

**2020. SAME: REGULATIONS CONCERNING SALE.** Every lot of agricultural seed as defined in Section 2019 of this chapter, which is offered or exposed for sale within this state for seeding purposes in this state, in lots of 5 pounds or more, shall be accompanied by a plainly written or printed statement in the English language, stating:

1. Name of agricultural seed.
2. Name and address of the person selling or offering for sale such seed.
3. The approximate percentage of purity or freedom of such seed from foreign matter, or from other seeds distinguishable by their appearance.
4. The year and locality in which the seeds were grown and the kinds of noxious weeds contained therein, using their common name.

**2021. NOXIOUS WEED SEEDS DEFINED.** The seeds of wild mustard (any species), quack grass (*Agropyron repens*), Canadian thistle (*Carduus arvensis*), wild oats (*Avena fatua*), clover and alfalfa dodder (*Cuscuta epithimum*), field dodder (*Cuscuta Arvensis*), corn cockle (*Agrostemma githargo*), plantain (*Plantago lanceolata*), bracted plantain (*Plantago aristata*), and perennial sow thistle (*Sonchus arvensis*), are hereby defined as noxious weed seeds. No person shall sell, offer, or expose for sale within this state for seeding purposes in this state, any agricultural seeds defined in Section 1 of this chapter containing a greater amount or proportion than one seed of any or all of said noxious weed seeds, to 10,000 seeds of the variety of agricultural seed offered or exposed for sale.

### RULES AND REGULATIONS FOR SAMPLING AND ANALYZING SEED

#### Sampling

Where seed is in a bin or otherwise stored loosely, a small amount should be taken from several places, both at the surface and below the surface, and after thoro mixing, the sample for testing may be taken from this lot.

Where seed is in sacks, small amounts should be taken from the top, middle, and bottom of each sack, then thoroly mixed and sampled as before.

Corn on the ear may be sampled by shelling a number of average quality ears and then taking a small amount of the shelled grain for the testing. This

method is used only in sending samples to the seed analyst. Corn should be tested by the individual ear method.

#### Weights of Samples

Samples for testing the different kinds of seed must weigh at least the following amounts:

	Ounces
Red top, blue grass, timothy and all smaller seeds.....	1
Vegetable seeds, such as lettuce, onions, radish, turnip, etc.....	1
Clovers, alfalfa and sorghums .....	2
All the larger grass seeds, such as rye grass, brome grass, orchard grass, millet, etc.....	2
Large vegetable seeds, viz: beet, mangel, etc.....	2
Seeds of cereals, peas, beans, vetches, corn, etc.....	4

#### NUMBER SEEDS PER POUND COMMON CROPS

Kind of Seed	Pound
Alfalfa .....	219,500
Alsike Clover .....	698,500
Awnless Brome Grass .....	136,900
Bluegrass (Canada) .....	2,512,900
Bluegrass (Kentucky) .....	2,201,300
Buckwheat .....	16,300
Corn .....	1,808
Crimson Clover .....	149,600
Flax .....	112,000
Italian Rye Grass .....	275,300
Kaffir Corn .....	18,900
Meadow Fescue .....	227,200
Meadow Foxtail .....	908,100
Millet (Common) .....	220,900
Millet (Japanese) .....	155,100
Oats .....	12,700
Orchard Grass .....	586,500
Perennial Rye Grass .....	336,100
Rape (Dwarf Essex) .....	109,300
Red Clover .....	313,900
Red Top .....	5,084,500
Sheep's Fescue .....	680,800
Sweet Clover .....	259,400
Tall Oat Grass .....	14,900
Timothy .....	1,230,100
Vetch (Hairy) .....	16,300
Vetch (Spring) .....	8,600
Wheat .....	14,000
White Clover .....	785,200

2023. **SAME: FEES.** Whoever buys or sells agricultural seeds defined in Section 2019 of this chapter, for use in this state for seeding purposes, may submit fair samples of such seeds to the State Experiment Station for examination and test of purity and of viability, and the director of said station shall cause such examinations and tests to be promptly made and report thereon returned to the sender. For the test of purity said Experiment Station shall charge a fee of 25 cents for the examination of each sample, and for a test of vitality a further fee of 25 cents, either or both of which fees shall be payable in advance. All moneys received from receipt of such fees shall be paid into the general fund of the state.

2024. **DUTIES OF SEED COMMISSIONER.** The enforcement of this chapter shall be intrusted to the director of the State Experiment Station. Said di-

rector is hereby authorized to appoint a seed commissioner with an office at the State Capitol in Boise, and such inspectors, assistants and deputies as may be necessary to enforce this chapter, and said seed commissioner is authorized in person or by his inspectors or assistants to take for analysis, paying a reasonable purchase price, a sample not exceeding 4 ounces in weight, from any lot of agricultural seeds offered or exposed for sale; Provided, That said sample shall be drawn or taken in the presence of the vendor or parties in interest, or his or their agents or representatives, and shall be taken from a parcel, lot, or number of parcels which shall not be less than 10 per cent of the whole lot inspected, and shall be thoroly mixed and then divided into two samples and placed in glass or metal vessels, stating the name of the agricultural seed samples, the name of the vendor from whose stock said samples were taken, and the date and place of taking such samples, and said labels shall be signed by said seed commissioner or his duly authorized agent; or said samples may be taken in the presence of two disinterested witnesses if the vendor or party in interest fails or refuses to be present, when notified. One of said duplicate samples shall be left with or on the premises of the vendor or party in interest and the other retained by the seed commissioner for analysis, and comparison with the label required by Section 2020 of this chapter.

**2026. PENALTIES FOR VIOLATION.** Whoever sells, offers or exposes for sale within this state any agricultural seed defined in Section 2019 of this chapter, without complying with the requirements of all other sections of this chapter, or whoever falsely marks or labels any agricultural seeds under Section 2020 of this chapter, or whoever shall prevent the director of the Experiment Station or his duly authorized agents from inspecting said seeds and collecting samples as provided in Section 6 of this chapter, shall be guilty of a misdemeanor.

**2027. PROSECUTION OF OFFENDERS.** It shall be the duty of the seed commissioner, upon ascertaining by inspection or otherwise, that any agricultural seeds contained by any receptacle, package, sack or bag offered, exposed or had in possession for sale contrary to the provisions of this chapter, to make complaint and cause the arrest of the person violating the same, and it shall be the duty of the prosecuting attorney in such a case to prepare all necessary papers and conduct such prosecution; Providing, however, That a private hearing may be had prior to the commencement of any criminal prosecution.

**IDAHO OFFICIAL GRADES FOR THE SALE  
AND SHIPMENT OF ALFALFA, RED, ALSIKE, WHITE AND  
SWEET CLOVER SEEDS**

No person, firm or corporation shall sell, offer, expose, distribute, or have in possession for sale or distribution, any seeds of red clover, white clover, alsike clover, sweet clover or alfalfa, in or from any receptacle, sack or bag, of one pound or more unless such receptacle, package, sack or bag, or a label securely attached thereto be marked in a plain and indelible manner in the English language in letters not less than one-fourth inch in length:

- (a) Name of agricultural seed.
- (b) Name and address of the person selling, offering or exposing for sale such seed.
- (c) Grade, grader and date of grade.
- (d) The kinds and number per pound of noxious weed seeds contained therein, using their common names.

○	KIND OF SEED.....
	GRADE..... DATE GRADED.....
	NUMBER AND NAME OF NOXIOUS WEEDS PER LB.....
	PER CENT PURITY.....

○	DEALER'S NAME.....
	GRADER'S NAME.....
	WHERE GROWN.....
	GERMINATION..... STATE TEST No.....
	(Germination Report and State Test No. not compulsory)

These tags can be furnished by the Department for about 40c a hundred

The grades shall be Extra No. 1, No. 1, No. 2, No. 3, and No Grade; provided, however, that such marks may be accompanied by any other private mark or brand if such private mark or brand is not inconsistent with one of the five grades which is to be used with the said receptacle, package, sack or bag.

No person shall sell, or offer, expose, distribute or have in possession for sale or distribution any seed of red clover, white clover, alsike clover, sweet clover, or alfalfa, in or from any receptacle, package, sack or bag of one pound or more upon which is marked:

- (a) Extra No. 1 unless such seed is pure as to kind, clean, plump, of bright and live color, free from the seeds of any or all said noxious weeds and shall have a purity test of 99.0 per cent or above.
- (b) No. 1 unless such seed is clean, plump, of good color and shall have a purity test of 98.0 per cent or above and unless the seeds of alfalfa, sweet clover and red clover contain less than ten of any or all of said noxious weed seeds per pound and unless the seeds of alsike clover and white clover contain less than twenty of any or all said noxious weed seeds per pound.
- (c) No. 2 unless such seed is clean, sound and shall have a purity test

WEED CONTROL

of 97.0 per cent or above and unless the seeds of alfalfa, sweet clover and red clover contain less than nineteen of any or all said noxious weed seeds per pound and unless the seeds of alsike clover and white clover contain less than forty of any or all of said noxious weed seeds per pound.

- (d) No. 3 unless such seed has a purity test of 95.0 per cent or above and unless the seed of alfalfa, sweet clover and red clover contains less than twenty-eight noxious weed seeds of any or all said noxious weed seeds per pound, and unless the seed of alsike clover contains less than sixty-eight seeds of any or all said noxious weed seeds per pound and unless the seeds of white clover contain less than eighty of any or all said noxious weed seeds per pound.
- (e) \*"No Grade." Any seed of alfalfa, red clover, sweet clover, white clover, or alsike clover, that does not come under any one of the four said grades shall be designated as "No Grade."

\*SEED OF NO GRADE CANNOT BE SOLD FOR SEEDING PURPOSES IN IDAHO, BUT MAY BE SOLD TO A CLEANING ESTABLISHMENT TO BE CLEANED AND GRADED.

Noxious weeds shall be Quack Grass (*Agropyron repens*), Canadian Thistle (*Carduus arvensis*), Wild Oats (*Avena fatua*), Bracted Plantain (*Plantago aristata*), Buckhorn (*Plantago lanceolata*), Mustard (*Brassica Spp.*), Dodder (*Cuscuta Spp.*), Corn Cockle (*Agrostemma githago*), Perennial Sow Thistle (*Sonchus arvensis*), Poverty Weed (*Iva axillaris*), French Weed (*Thlaspi arvense*), Night Flowering Catchfly (*Silene noctiflora*), White Champion (*Lychnis alba*), Hoary Cress (*Lepidum draba*), Blue Lettuce (*Lactuca pulchella*).

THE ANALYSIS

In the event the analyses are to be made in the State Seed Laboratory, two similar samples shall be taken at the same time, one to be forwarded to the laboratory, the other to be retained by the sender. The report of the test will be made immediately after it has been completed.

Dealers expecting to make their own tests will be requested from time to time to submit samples in addition to those collected by state inspectors on their regular rounds. In case they desire to do this work, the Department of Agriculture will gladly assist them to become established. It is desirable that effort along this line be made by as many dealers as possible for by so doing they can eliminate any delay in transit that might happen to their sample or report.

Send samples to the State Seed Laboratory at Boise, or to the Branch Laboratory at the University of Idaho at Moscow. Mail samples in small cloth sacks, strong paper safety envelopes, or securely wrapped packages. Dealers are requested to enclose a fee of 25 cents for each purity or germination test desired.

DISCUSSION OF THE WEED LAW AND ITS OBJECT

Recognizing the fact that roadsides, neglected fence corners, ditch banks, and certain farms where indifferent agricultural methods are employed, are serious obstacles in the state-wide endeavor to produce clean, marketable seeds, and are the greatest factors in the promotion of weed multiplication and distribution, the State Legislature, in 1917, passed an Act providing for the extermination of weeds growing in such places. The law contained in this pamphlet embodies the amendments passed by the Fifteenth Session of the State Legislature.

The Board of County Commissioners shall order, on or before the first of March each year, the destruction of objectionable weeds in agricultural districts, lands belonging to railroads, the state, private owners, irrigation companies or on public roads. Notice is given to the individual or corporations to destroy such weeds as the commissioners specify, with the method best adapted for their

destruction. Upon the failure of the individual or the corporation to comply with the notice within the time limit set by said commissioners, the commissioners shall supervise the destruction of such weeds, having the authority to employ such help as they deem necessary. The cost of such labor is added to the taxes of the individual or corporation and collected in the usual manner.

Should weeds of a noxious nature infest the public lands or lands where agricultural value will not support the expenditure necessary for their destruction, the county commissioners are empowered to cause the destruction of such weeds, the cost to be paid from the general county fund. Should a highway district have its weeds destroyed by the county, the expense incurred shall be borne by the highway district.

Failure to comply with a notice from the county commissioners ordering the destruction of specified noxious weeds is a misdemeanor and, as such, is punishable by a fine of not to exceed \$100.00 and costs of prosecution.

This act was passed for the purpose of preventing the multiplication of weeds within the state and bears a direct relationship to the effort exerted for the production of clean seed in Idaho. This state is particularly favored for the production of choice seed. If the greatest advantage is to be taken of the splendid soil and climatic conditions, all forces interested must work to the end of the destruction of objectionable weeds. Clean seed is the result only of eternal vigilance. This law is a step in the effort for coordination of efforts for weed extermination, and community effort is essential if Idaho is to reach and maintain the position of seed excellence with which its productive possibilities have so richly endowed her.

To aid in attaining these ends, the law has provided that the Extension Department of the University shall cooperate with the county commissioners in determining the necessity for the destruction of noxious weeds, will suggest to the commissioners such action when they deem it necessary, and inform the county commissioners as to the names, habits and growth of noxious weeds prevalent in their districts, together with the best methods for their destruction.

## EXTERMINATION OF NOXIOUS WEEDS

### CHAPTER 150. ARTICLE 6

**3492. DUTY OF UNIVERSITY EXTENSION DEPARTMENT.** It shall be the duty of the Extension Department of the University of the State of Idaho to cooperate with the County Commissioners of each county within the state and to inform them of the names, habits and growth of noxious weeds which are prevalent in their counties and which are destructive to agricultural crops, and to describe methods for the destruction of such weeds.

**3493. CREATION OF WEED EXTERMINATION AREA. ORDER.** It shall be the duty of the Board of County Commissioners of every county in the state to issue an order on or before the 1st day of March of each year declaring and specifying the kind of noxious weeds that are detrimental or destructive to the agricultural interests of the county, and calling for their destruction. By such order they shall fix the manner for the destruction of such weeds, and the agricultural area within which they must be destroyed. Such order must be complied with on or before such date as the board may fix in said order.

**3494. NOTICES: SERVICE AND POSTING.** It shall be the duty of the County Commissioners to post in three conspicuous places in said county a copy of said order and serve said order on the owner of the said property, if an individual, or upon the superintendent or managing agent, if a corporation, association or person or joint stock company; Provided, That in cases where neither the owner nor his or its managing agent is a resident of the county in which the land is situated that service may be had by publication for two consecutive weeks in some newspaper of general circulation in the county. There shall be posted with said order a notice requiring the owner of agricultural lands within

said county to exterminate all such weeds, naming them, on or before the date fixed in such order, and there shall be served with said order where the same is personally served a notice directed to the owner of said property in the county requiring them to exterminate such weeds on or before the date fixed in said order.

**3495. DESTRUCTION OF WEEDS IN HIGHWAYS.** It shall be the duty of property owners whose lands are bordered by public highways to proceed to destroy all noxious weeds of the kind included in the order on the one-half of the highway nearest their land within the time fixed by the notice provided for in Section 3494.

**3496. ABATEMENT OF WEEDS WITHIN EXTERMINATION AREA.** After the expiration of the time fixed in said order, it shall be the duty of the Board of County Commissioners to proceed at once to destroy all such noxious weeds, mentioned in said order, that still remain growing, in the agricultural districts, and for that purpose they shall have the right, either by them or by their order, to enter upon the premises of another, and they shall have the right to employ such help as may be necessary to complete such work within such time as will prevent such weeds from maturing and going to seed, and the cost of such additional help, together with their own compensation, as now fixed by law, shall be levied as a tax against the property or land upon which such labor is performed.

**3497. SAME: ASSESSMENT OF ABATEMENT COSTS AS TAX.** It is the duty of the Board of County Commissioners, immediately after the work required of them by this article is complete, to render to the County Auditor of their county an itemized statement showing in detail the total cost of destroying noxious weeds on any piece of land, railroad or right-of-way in the county on which noxious weeds have been destroyed by them or under their direction, and the county auditor shall, under a proper heading, enter the same on the tax list as a charge against said land or right-of-way and against the owner thereof and the charge shall be collected at the same time and in the same manner as general taxes, and when collected, shall be turned into the general county fund.

**3498. DESTRUCTION OF WEEDS ON PUBLIC LANDS.** If noxious weeds of any kind included in the order of the Board of County Commissioners are growing on public lands, or on lands owned by county or municipal organizations, the Board of County Commissioners of such county shall have the weeds destroyed and the cost of destruction shall be paid from the general fund of the county or such municipality.

**3499. ABATEMENT OF WEEDS ON RIGHTS-OF-WAY.** Every person, company or corporation owning or operating any canal, railroad or irrigating system in an agricultural district shall, within the time fixed by the order of the Board of County Commissioners, destroy all noxious weeds of the kinds included in the order of the Board of County Commissioners of the county in which any portion of such canal, railroad or irrigating system is located, and in the event that such weeds are not so destroyed the Board of County Commissioners of such county shall cause the same to be done and the cost of the destruction of any and all such weeds shall be assessed against such property as general taxes and be collectible the same as other taxes.

**3500. SAME: PENALTY FOR VIOLATION.** Any person, company, or corporation owning, or operating such canal, railroad or irrigating system in an agricultural community and any such person and any officer or director of any such company or corporation failing to destroy such weeds within the time specified in said notice shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine of not to exceed \$100.00 and costs of prosecution.

**3501. REVIEW OF ASSESSMENT BY DISTRICT COURT.** The amount of any charge or assessment, under the provisions of this article, shall be sub-

ject to review and correction by action for that purpose brought by any person interested, in the district court of the county wherein the property or any part thereof is situated, within six months of the time of filing of the Board of County Commissioners' itemized statement or the time of the assessment against the canal, railroad or irrigating system.

### ESTABLISHMENT OF WEED DISTRICTS

On previous pages of this bulletin are given the names, habits, drawings of specimens, and habits and growth of various noxious weeds prevalent in the State. Methods for the destruction of each weed are given in detail. The formation of weed extermination areas is the next essential step.

Twin Falls County in particular has done some very excellent work on weed control. The County Commissioners have included the entire county in a weed district.

Declaration of a weed district must be made before the first of March of each year. It is best to include not to exceed five of the most troublesome weeds for the first season. As the effectiveness of the work increases from year to year more weeds may be included.

The form of declaration sheets and orders used is given on the following pages:

Form No. 1—Declaration of weed district issued before March 1st of each year.

Form No. 2—Order No. 1—Sent to the owner of weed infested farms.

The weed problem is not solved merely by declaring weed districts. A plan of organization must be adopted. The plan should include:

1. The appointment by the County Commissioners of a county weed supervisor. The county agent should not be called upon to enforce the orders of the county commissioners. He will cooperate in an advisory capacity on methods of control, and schedule meetings to acquaint growers with the various weeds. The field agronomist, University Extension Division, will assist in the dissemination of information and will attend meetings scheduled by the county agent.

2. A survey of county for noxious weeds.

3. The platting of noxious weeds on a county map.

4. Establishing of a system of collecting data on weed control.

5. Appropriation of funds needed by the county to carry on the work.

6. The destruction of weeds especially detrimental to the agricultural interests of the county.

#### Form No. 1

#### OFFICE OF THE BOARD OF COUNTY COMMISSIONERS

.....County, State of Idaho

### ORDER TO DESTROY NOXIOUS WEEDS

To.....

You are hereby notified that in conformity with the Statutes of the State of Idaho and an order of the Board of County Commissioners, made of the date of (before March 1st each year)....., 1926, in compliance with said Statutes, you are hereby required, on or before May 1, 1926, to destroy and control all noxious weeds listed in said order growing upon your land in.....County, State of Idaho, or the premises therein occupied by you as a tenant, in the manner or by the means set forth in said order of the Board of County Commissioners, a true and correct copy of which is hereto attached and made a part hereof; and also it shall be your duty and you are hereby required to continue to comply with said order as indicated



in said copy of said order after May 1, 1926, up to and until November 1, 1926, and

You are further notified that unless this order is complied with and the weeds destroyed as herein specified, the Board will, under the provisions of said law, enter in and upon said premises and forthwith destroy and exterminate said weeds and the cost attendant thereon will be levied as a tax against said property or land and the same will be collected as other taxes are collected.

In witness whereof, I have hereunto set my hand this.....day of  
....., 1926.

.....  
Representative of the Board of County Commissioners.

.....County,  
State of Idaho.

Form No. 2

### ORDER OF THE BOARD

Book....., Page....., Commissioners Proceedings: "In accordance with Sections 3492, 3493, 3494, 3495, 3496, 3497, 3498, 3499, 3500, 3501 of the Idaho Compiled Statutes, the following weeds are declared noxious and are ordered destroyed and controlled in such manner as is recommended and approved by the State Seed Commissioner of the State of Idaho: Canada Thistle, Wild Morning Glory or Bindweed, Dodders, Russian Knapweed, Perennial Pepper Grass or White Top, Buckhorn, Cockle Burr, Perennial Sow Thistle and Quack Grass." (Note: Perhaps not more than five undesirable weeds of the county should be included in the weed district.)

The agricultural area within which said weeds shall be destroyed and controlled is the whole of.....County, State of Idaho, and such control measures as are recommended by said State Seed Commissioner shall be put into effect on or before May 1, 1926, and shall be continued after May 1, 1926, and up to and until November 1, 1926.

Attest:..... Clerk

By Order of the Board of County  
Commissioners,

By ..... Deputy

..... County,  
State of Idaho.

By .....  
Chairman.

State of Idaho,  
County of.....  
ss.

I hereby certify that the above and foregoing is a full, true and correct copy of an order made and entered of record by the Board of County Commissioners of.....County, State of Idaho, on the.....day of  
....., 1926, and now of record in the records of said  
County.  
(SEAL)

.....  
Clerk of the Board of County Commissioners,

.....County,  
State of Idaho.

By.....  
Deputy.

Recommendations for Control Accompany This Order

CLASH (1914-1915)

1914  
1915