

UNIVERSITY OF IDAHO  
AGRICULTURAL EXPERIMENT STATION  
DEPARTMENT OF HORTICULTURE

---

---

# The Home Garden in Idaho

---

---



Trellised beans on the Lewiston Orchard tract.

---

---

W. C. EDMUNDSON

J. S. WELCH

BULLETIN NO. 106

FEBRUARY, 1918

---

---

Published by the University of Idaho, Moscow, Idaho

**UNIVERSITY OF IDAHO**  
**Agricultural Experiment Station**

**BOARD OF REGENTS**

EVAN EVANS, President.....	Grangeville
RAMSAY M. WALKER, Secretary.....	Wallace
J. A. LIPPINCOTT.....	Idaho City
J. A. KEEFER.....	Shoshone
WILLIAM HEALY.....	Boise
ETHEL REDFIELD, Superintendent of Public Instruction, ex-officio.....	Boise

-----

ENOCH A. BRYAN, Commissioner of Education ..... Boise

**EXECUTIVE COMMITTEE**

RAMSAY M. WALKER	EVAN EVANS	ENOCH A. BRYAN	J. A. LIPPINCOTT
ERNEST H. LINDLEY			

**EXPERIMENT STATION STAFF**

ERNEST H. LINDLEY, Ph.D. ....	President
J. S. JONES, M.S.(Agr.).....	Director and Chemist

-----

E. J. IDDINGS, B.S.(Agr).....	Animal Husbandman
C. W. HICKMAN, B.S.(Agr.).....	Associate Animal Husbandman
J. E. NORDBY, M.S.(Agr.).....	Assistant Animal Husbandman
T. L. HILLS, Ph.D.....	Bacteriologist
J. J. PUTNAM, Ph.D.....	Assistant Bacteriologist
M. A. WILLIS, M.S.....	Botanist (Pathology)
R. E. NEIDIG, M.S.....	Chemist (Feeds and Animal Nutrition)
H. P. FISHBURN, M.A.....	Chemist (Feeds and Animal Nutrition)
C. W. COLVER, M.S.....	Chemist (Wheat and Flour)
C. L. von ENDE, Ph.D.....	Associate Chemist (Fruit Storage)
E. F. GOSS, M.S.(Agr.).....	Dairyman (Manufactures)
R. D. CANAN, M.S.(Agr.).....	Assistant Dairyman (Production)
A. C. BURRILL, M.S.....	Entomologist
G. S. RAY, B.S.(Agr.).....	Farm Crops
H. W. HULBERT, M.S.(Agr.).....	Assistant, Farm Crops
F. G. MILLER, M.F.....	Forester
C. C. VINCENT, M.S.(Agr.).....	Horticulturist
W. C. EDMUNDSON, M.S.(Agr.).....	Assistant Horticulturist
C. V. SCHRACK, B.S.(Agr.).....	Gardener
PREN MOORE .....	Poultry Husbandman
P. P. PETERSON, Ph.D.....	Soil Technologist
E. B. HITCHCOCK, M.S.(Agr.).....	Assistant Soil Technologist
L. C. AICHER, B.S.(Agr.).....	Superintendent Aberdeen Substation
C. M. EKLOF, B.S.(Agr.).....	Superintendent Caldwell Substation
G. W. DEWEY, B.S.(Agr.).....	Superintendent Jerome Substation
F. H. LAFRENZ, B.S.(Agr.).....	Superintendent Sandpoint Substation

## THE HOME GARDEN

W. C. EDMUNDSON AND J. S. WELCH\*

### INTRODUCTION

A fairly complete home vegetable garden should be considered an absolute necessity on every farm. Too many farmers consider the garden a trivial matter and make the mistake of thinking that they cannot take the time to bother with it, arguing they can better afford to buy vegetables required for the table use with the proceeds from their more important crops. If this plan is followed, however, the tendency is not to purchase fresh vegetables daily, but, to do without to a great extent or to substitute the more expensive and inferior canned product.

Fresh garden vegetables should furnish a large part of everyone's diet and if produced at home are not expensive. Abundantly used in the diet, they will aid substantially in forming the balanced ration and will greatly reduce the high cost of living. The ever present menu problem, which often perplexes the busy housewife will be materially lessened if she has an abundant supply of fresh vegetables which can be taken from the garden any day from April to October and from the storage cellar the rest of the year. Everything considered there is no part of the farm that will yield larger returns for the time and labor involved than will a well-kept garden.

Town and city people who have a small plot of vacant ground also can grow vegetables to advantage. If the area is limited, intensive gardening must be practiced. The soil should be very rich. The vegetables should be planted very close together. If the soil moisture supply can be controlled, a succession of crops can be grown. Only plants that yield a large amount of edible material in proportion to the space occupied should be grown.

### LOCATION

The home garden should be located as near the house as practicable. It should not be too close to large shade trees since their shade and their roots impoverish the soil.

A surface that slopes gently to the south is preferred because the soil warms earlier in the spring and permits early planting and early maturing of crops. This is especially true in non-irrigated sections. The land should have sufficient fall to permit good air and water drainage. It is also essential that the garden be fenced to guard against depredations of poultry and other livestock.

\* Now president of Maori Agricultural College, Hastings, New Zealand.

### CLASSIFICATION OF CROPS

Ordinarily vegetables are divided into two groups, "hardy" and "tender." This classification is based on the fact that certain vegetables can stand the ordinary spring frosts without injury, while others must not be planted until all danger of frost is past or must be started in a hotbed and later be transplanted in the open.

John W. Lloyd of Illinois makes a similar classification according to temperature and moisture requirements, grouping the vegetables into "cool season" and "warm season" crops. From a cultural standpoint, the "cool season" crops are divided into three groups. The first group can endure the spring frosts but cannot withstand the heat of summer. Such vegetables as lettuce, peas, radishes, spinach and turnips belong to this group. The second group must be started under glass and transplanted to the garden so that they may complete their growth before excessive hot weather. Early cabbage and early cauliflower belong to this group. Certain crops can endure the heat of the summer, but must have cool, moist weather during the early period of their growth. This group includes onions, beets, carrots, parsley, parsnips, leeks, spinach, and potatoes.

The "warm season" crops are divided into two groups. In the first group are placed those vegetables that have a sufficiently short period of growth to enable them to mature during the normal period of hot weather. This group includes string beans, lima beans, cucumbers, squashes, pumpkins, cantaloupes, watermelons, and sweet corn. The second group of "warm season" crops must be started under glass to enable them to develop before the killing frost of fall. Tomatoes, peppers, and egg plants belong to this group.

### HOTBEDS AND COLD FRAMES

In choosing the location for a hotbed, one should select a well-drained spot with a south exposure. For convenience in caring for the hotbed it should be located near the house and near the water supply. The pit should be dug in the fall so that it will be ready for use early in the spring. The size of the pit will depend on the size of the frame but it is usually about two feet deep. The hotbed frame is usually built of two-inch lumber altho a permanent bed may be made of cement or brick. The north side of the frame should be eighteen inches high, and the south wall twelve inches high. The sash should fit the frame to prevent loss of heat. A 2 x 4-inch piece should extend from the north to the south side of the frame to close the opening between the sashes. Fresh horse manure is generally used to supply the bottom heat. It is desirable that the manure be loosely packed and contain about one-third straw. Manure should be especially selected, kept by itself in a separate pile and protected from the rains until it is hauled to the place where it is to be used. Ordinarily the pile will begin to heat in two or three days. If fermentation does not start, it may be necessary to pour a few buckets of hot water into the center of the pile. A few days after fermentation starts, the center of the pile should be turned, to insure uniform heating. After three or four days more, it will be ready for the pit.

The manure should be placed in the pit in layers so that it may receive

a thoro tramping, especially along the sides and in the corners. Three or four inches of soil may be placed on the manure for a seed bed or flats may be used in which the seed is sown.

Cold frames are used for hardening-off plants after they have been taken from the hotbed. Cold frames are similar in construction to the frames used for hotbeds. They are placed upon the surface of the ground and no bottom heat is used. Often a cold frame is covered with cloth instead of glass.

Before transplanting the young plants in the garden they must gradually become acclimated to the outside conditions. If the cold frame is to be used for this purpose the plants must be transplanted from the hotbed, or if growing in flats, the latter must be transported to the cold frame. The plants may be hardened-off in the hotbed if there is no longer bottom heat. This hardening-off may be accomplished by gradually admitting outside air daily until the sash may be removed during the day. Afterwards, the same thing should be done at night until the plants are thoroly hardened.

It will probably be more economical for the farmer to buy all his plants to be transplanted and not to try to grow them in the hotbed.

#### IRRIGATION

Irrigation farming is particularly favorable to the production of garden vegetables. The control of the soil moisture supply is very desirable and under no other type of farming is complete control possible.

Most garden vegetables require a relatively high soil-moisture content to insure rapid development and good quality. This does not mean that the soil should be kept saturated for any length of time but that light irrigations should be applied often enough to keep sufficient moisture for good growth. If a handful of soil from near the roots of the plant will retain the prints of the fingers when pressed, it contains sufficient moisture for good growing conditions. The appearance of the plants themselves is a good indicator of soil-moisture conditions. There are certain vegetables that have special water requirements, and these will be discussed individually. Garden crops should never be flooded. Small furrows can be made quite close to each row with a wheel or hand hoe; a small stream of water running in these furrows will supply plenty of moisture for good growth. Flooding the surface will result in a hard or baked soil condition.

#### SOIL MANAGEMENT

The management of the soil is probably the most important phase of vegetable gardening. Nearly all vegetables require soils in a high state of fertility, and it must not be expected that a good garden can be grown on raw sagebrush ground or any soil that has not received proper treatment. For sagebrush land a short rotation with red clover in which the crop is plowed under for green manure is a good beginning in the preparation of the soil. The garden soil should be built up with repeated applications of barnyard manure. Some time is required for the organic matter to be incorporated in the sagebrush soil and for its plant food to become available, so that the best results may not be secured during the

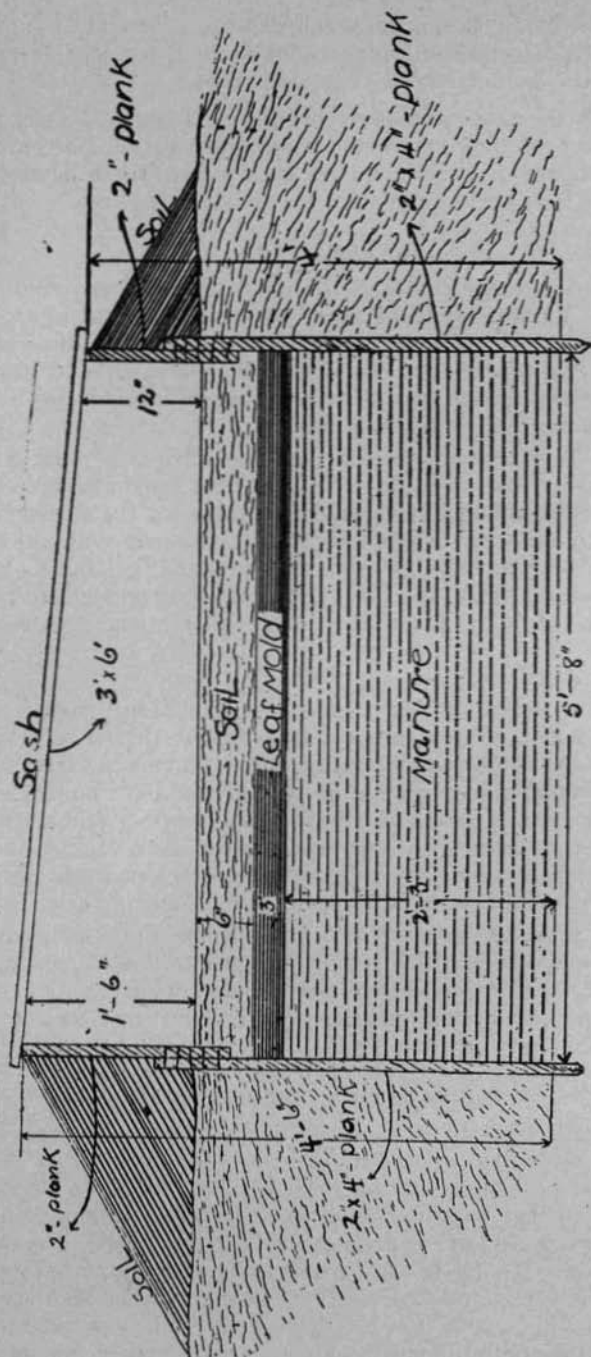


FIG. 1. Cross section of a hotbed.

first one or two years. When the sagebrush soil is brought to a high state of fertility and this condition properly maintained remarkable results can be secured in the production of vegetable crops.

As soon as the crops are harvested the land should be cleaned of all refuse from the preceding crops, and heavily fertilized. For garden crops there is no fertilizer that will compare with well rotted barnyard manure. Thirty to forty tons per acre are not excessive.

#### GARDEN PLAN

Every garden, large or small, should be planted according to some definite plan. A map should be made to scale before planting, showing the exact location of each vegetable in the garden. This enables the farmer to provide a place for everything that he wishes to grow. This map should be kept from year to year to aid in establishing next year's crop and providing for crop rotations.

The time is past when the farmer can afford to plant any of his vegetables in short rows or in beds. The garden should be laid out in long rows to permit the use of a horse and cultivator for the cultivation of the entire garden. The rows should be three feet apart with the exception of those given over to the vine crops which should be six feet apart.

As mentioned before, the village garden must be planned to produce a large amount of edible material in proportion to the ground occupied.

#### SEED

The best seed available is none too good. Many garden seeds lose their vitality if kept for a number of seasons, so that fresh, viable seeds must be secured. The seed should be the best not only from the standpoint of purity and high germination power but also from the standpoint of variety. For many years men have been breeding and selecting varieties of garden vegetables so that now the list is very extensive. Early, medium, and late-growing roots have been developed and varieties can be secured that can be adapted to many conditions and uses.

It is not advisable to buy seed merely upon the recommendation of a highly-colored picture which is printed upon the package and displayed in the ordinary seed cases. Select the varieties which are adapted to the local conditions and whose qualities are preferred and have the seed all on hand before planting time comes.

#### PREPARATION FOR PLANTING

If the garden has been manured and plowed in the fall, very little work will be needed to prepare the seed bed for early crops. To get the soil in the best possible condition it should be plowed in the fall, double disked in the spring, harrowed and then smoothed with a plunger. Soil treated in this way and at the proper time will need little or no hand work before planting. To be in the proper condition for working, the soil should crumble easily and finely. If it sticks to the hand when squeezed, it is too wet; if it breaks, it is too dry. If the soil is worked properly in the spring, little or no difficulty will be experienced in making the summer cultivations and maintaining the proper dust mulch.

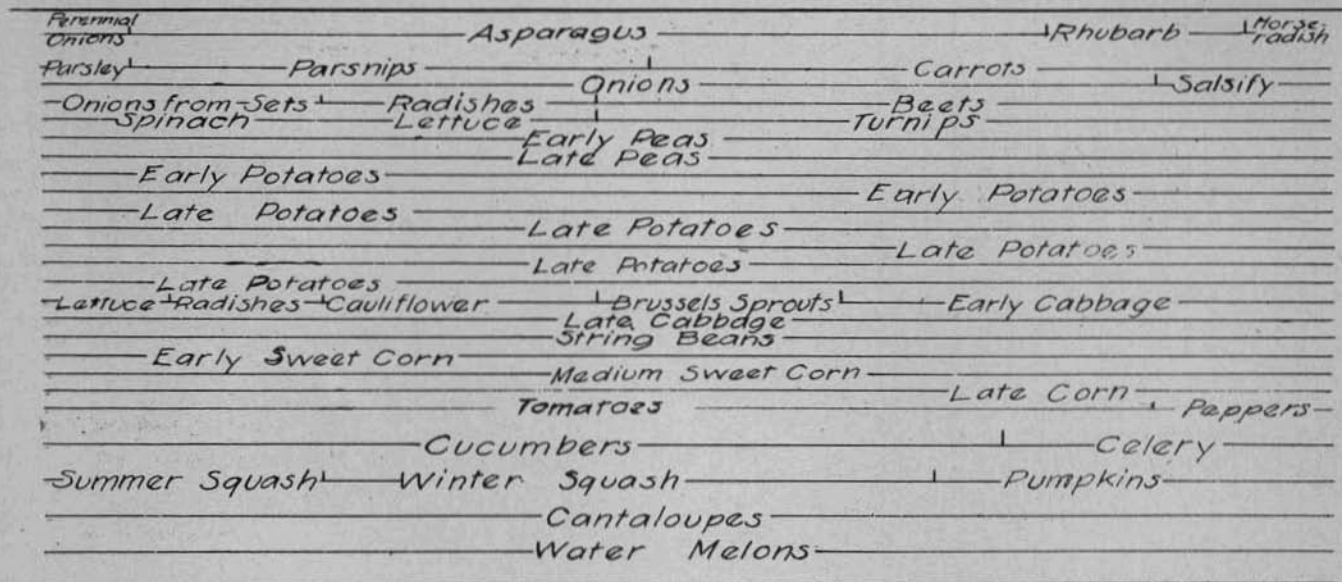


FIG. 2. Plan of a farmer's vegetable garden, 100 x 220 feet.



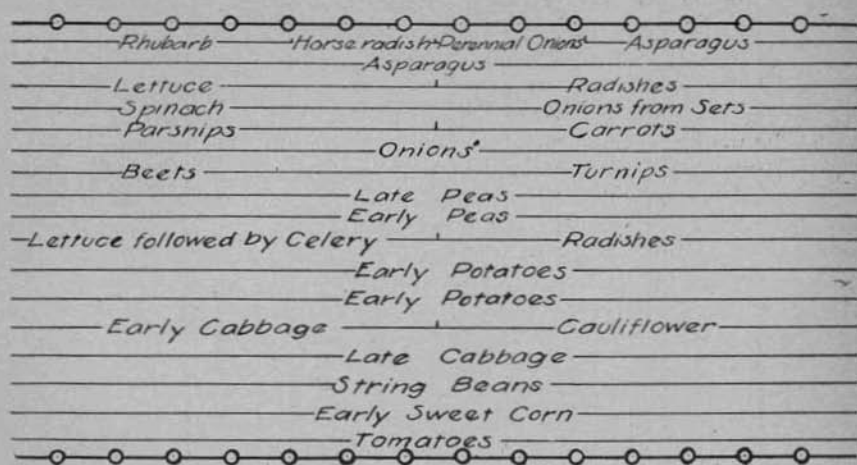


FIG. 3. Plan for village garden, 30 x 60 feet.

### SEEDING

Seed may be sown in drills by hand or with a garden drill. The seeding may be done much more quickly by using the seed drill, but where only a small garden is planted the hand method is usually employed. For sowing most small seeds the drills can be made by using a sled marker. The seed must then be dropped and covered and the soil firmed. The drills for peas and beans are usually made with a hoe, as a greater depth is required than can be made with a marker. A small ruler will be very useful in firming the soil about the seeds, altho the hoe may be used to good advantage. Where it is desirable to plant in hills a slight depression can be made with a hoe. After seeding, the soil can be replaced with a hoe and firmed.



FIG. 4. Seed drills.

The depth of planting is largely determined by the size of the seed and the temperature of the soil. Warmth, air and moisture are essential

to germination. In the spring moisture is abundant, but often the soil is cold, in which case the seed must be planted shallower than if sown in the summer. If planted deep in cold soil, seed will often rot.

#### REDUCTION OF HAND WEEDING

The matter of hand weeding is one of the most perplexing problems that confronts the farmer with his vegetable garden, and every possible means of lessening hand labor should be employed. Weed seed are often brought into the garden in the manure and it is therefore best to use only well-rotted manure, and that as free from weeds as possible. In order that the young vegetable plants may come up before the weeds it is essential that the soil receive a thoro cultivation immediately preceding the planting. This is especially true with all late plantings. With the slow germinating plants it will be found advantageous to sow some quick-growing vegetable, such as the radish, for making the rows for early cultivation. Early cultivation with the wheel hoe and narrow toothed cultivator close to the rows will also reduce hand weeding. Weeds should never be allowed to go to seed in the garden.

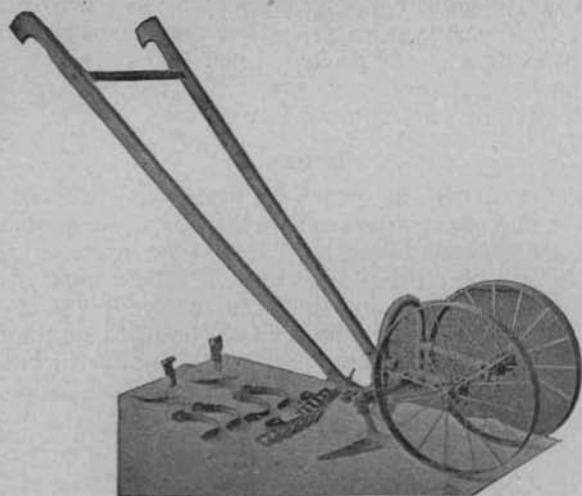


FIG. 5. Wheel hoe and attachments.

#### ASPARAGUS

Asparagus should be grown in every home garden where it will thrive. This vegetable is ready for use very early in the spring when something green and fresh is most appreciated. A bed once properly established will last for a number of years. This crop can be grown on almost any well-drained soil, but will do best on a deep, mellow, sandy loam. If planting a small bed, purchase roots from a seed man. One-year old roots are best. The plants should be set sufficiently deep that when the soil is leveled they will be six or eight inches below the surface.

No shoots should be cut the first year and very few if any should be removed the second. If white asparagus is desired, the soil is ridged

over the hills and the tips are cut as they begin to appear. However, this is not common practice in this State, as most asparagus is cut green. In cutting asparagus care should be taken not to injure the crowns or to cut into other shoots.

Thoro cultivation should be given at all times even after the cutting season has ended. The stalks should be mowed down when the berries are turning red. A liberal application of manure should then be applied and disked in at once. Conover's Colossal is a good variety to grow. Palmetto is also good.

#### BEANS

Beans will thrive on a wide range of soils and as they are capable of taking nitrogen from the air and appropriating it to their needs, they are frequently grown on soils of low fertility. If the soil is too rich in nitrogen, plants may run to foliage and fail to form pods. As beans are very sensitive to frost they should not be planted until all danger of frost is past.

Beans do not need special care in cultivation, altho frequent shallow cultivation should be given. For *green* snap beans the Stringless Green Pod is the very best variety; for the *yellow* snap beans the Currie's Rust Proof Black Wax is a good variety. Lima beans are very sensitive to the cold and may not mature every year in most sections of Idaho. One quart of seed will sow one hundred feet of row.

#### BEETS

The garden beet may be grown on many types of soil. It may be sown in the spring soon after radishes. For a succession of young beets during the summer, plantings should be made every three or four weeks during the spring months. The beet seed ball generally contains more than one seed and this accounts for the plants coming up very thickly. When plants are up well they should be thinned to four inches in the row. Beets for table use should be pulled when they reach the diameter of two and one-half to three and one-half inches.

Beets to be of good quality should be red all thru with a minimum of white. The rings should be numerous and narrow.

The Early Egyptian is recommended for all sections of Idaho. Detroit Dark Red is also good. An ounce of seed will sow 100 feet of drill.

#### BRUSSELS SPROUTS

Brussels Sprouts is a name given to one of the varieties of cabbage. Instead of producing one large head, the plant produces sprouts or buds in great profusion. The plants are handled in much the same way as cabbage. They are very hardy and may be left in the field until freezing weather begins. Many gardeners claim that freezing improves the quality of the sprouts.

Long Island Improved is a good variety to grow. One ounce of seed will produce about 4000 plants.

#### CARROTS

Carrots have been grown extensively for stock food for a long time

but they are now becoming popular for table use. Carrots grown for table use should not be over-grown. The quality of carrots is indicated by a cross section. The heart should be small and the flesh fine-grained and sweet.

The seed can be planted early in the spring. If radish seed is sown in the same row they will break the crust and mark the row, which will aid in early cultivation. The young plants should be thinned to two inches for table carrots. For stock carrots it is best to thin to three or four inches. After the roots reach full size too much irrigation will often cause them to rot.

For irrigated lands the Early Scarlet Horn and the Earliest Short Horn are the best table varieties. For the non-irrigated sections the Chantenay and the Danvers Half Long have given best results. One ounce of seed will plant about 200 feet of drill.

### CABBAGE

Cabbage will thrive in almost any soil where the ordinary farm crops will grow. A sandy loam is best for early cabbage, and late cabbage does best on the heavier types of soil. If late cabbage grows too rapidly it may burst and become unmarketable.



FIG. 6. Cabbage growing on Experiment Station grounds.

For early cabbage the seed should be planted in the hotbed about six or seven weeks before it is transplanted to the field. The farmer may find it more economical to buy the young plants, because of the time required to grow and harden them off. The seed for late cabbage may be planted outside in beds or it may be planted in hills in the field where the

plants are to grow. Late cabbage should be specially grown for winter storage.

Frequent cultivations are necessary for the best development of cabbage. A light surface cultivation kills weeds and retains the soil moisture by maintaining a dust mulch.

The quality of cabbage is determined by the firmness. The market prefers a medium-sized head rather than a large one. The outer leaves and the stalk should be removed from the cabbage for the market and that used for early consumption. Cabbage intended for late winter use should be harvested with leaves and stalks.

The varieties recommended for the irrigated and non-irrigated sections are the same. For early cabbage the Early Jersey Wakefield is the best. For late cabbage the Danish Ball Head and the Flat Dutch are the best. One ounce of seed will produce 2000 to 3000 plants.

### CELERY

While celery required more work than some other vegetables, its great value during the fall and winter months is ample reward for the time expended upon it. The seed should be sown about the last of February in a hotbed. The seed is very small and slow to germinate. Therefore the seed bed should be very carefully prepared and the seed should be very lightly covered. The plants should be hardened off when about two inches high and planted in the open ground when they are sufficiently strong. The plants are usually set six inches apart in the row. Celery should receive frequent irrigation and cultivation thru the summer. The blanching can best be accomplished by banking with the soil. During the early fall it should be blanched only as wanted for immediate use since it will not keep very long if blanched in too warm weather. After October first the entire crop should be blanched.

Golden Self Blanching is probably the best variety for all sections of Idaho. Giant Pascal has also given good results but it is somewhat harder to blanch.

One third of an ounce will supply 100 feet of drill.

### CAULIFLOWER

Cauliflower should be grown more generally in the farm garden. The soil requirements are about the same as those for cabbage, but the plants are more sensitive to drouth.

For early cauliflower the seeds are planted in hot beds and later transplanted in the open ground when the weather permits. The cultural methods recommended are the same as those for cabbage except that soon after the heads begin to form they must be shaded before they are injured by the sun. Shading can be accomplished by tying three or four of the larger outer leaves over the head.

Dry Weather and Snowball are good varieties to grow. One ounce will produce from 2000 to 3000 plants.

### CORN

Sweet corn should be planted after the danger of hard frost is past

and the soil is warm enough to insure rapid germination. If only one variety or planting is made, the best roasting ears will be available for only a period of two or three weeks, while if provision is made for it, a succession of prime ears may be enjoyed for a period of two months or more. In some sections of the State it is an advantage to plant early, medium, and late varieties at the same time rather than by making a succession of planting of the same kind. For south Idaho, Peep o'Day is the earliest variety. It is hardly equal in quality, however, to the medium varieties. Of these the best is the Golden Bantam and Early Minnesota. The most satisfactory late corn is the Country Gentleman. If early, medium, or late varieties are planted on the same day, no two will be in prime condition at the same time. Irrigation should be withheld as long as the plants will make good vigorous growth without it and then it should not be used extensively. Too much early water tends to cause extensive suckering and too much late water tends to delay the development of the crop.

In the non-irrigated sections of Idaho the growing period is shorter and roasting ears cannot be enjoyed over as long a period of time. Early Cob Corey, Golden West and Golden Bantam are good varieties to grow. For early corn, Early June will be found very successful.

Care should be taken to leave sweet corn in the garden until wanted for cooking since it loses its sugar very rapidly after being broken from the stalk. One-fourth to one-half pound of seed will plant 100 hills.

### CUCUMBERS

Cucumbers are very sensitive to cold and should not be planted before all danger of frost is passed. The seed should not be, as it sometimes is, sown in mounds. The soil should receive frequent shallow cultivation until the vines interfere. In the irrigated sections frequent irrigations should be given thruout the season. No fruit should be allowed to ripen on the vines until the close of the pickling season.

The White Spine and the Emerald are the best varieties for the irrigated sections. For the non-irrigated sections the Boston Pickling, Green Cluster and White Spine are recommended.

One to two ounces of seed will sow 100 hills.

### EGG PLANT

Egg Plants should be started and handled in the same way as tomato plants. This crop demands careful attention, high temperature, rich soil and thoro tillage for satisfactory results. As the plants are very sensitive to frosts they are often killed in north Idaho before the crop is matured. The plants require much moisture at the time they are transplanted to the garden, but once established they will endure much hot dry weather.

Black Beauty is probably the best variety to plant. One ounce of seed will produce 1000 to 2000 plants.

### GARLIC

Garlic belongs to the onion group, but the bulb is made up of a number of small group divisions called cloves. Garlic is very strong in taste

and smell and is primarily used for flavoring, altho by some people it is cooked and served as other vegetables. The plants are propagated by the cloves which correspond very closely to onion sets and are treated in much the same way. The cultural requirements are very similar to those of the onion. The crop is stored for winter by braiding the tops and hanging the bulbs in a cool dry place.

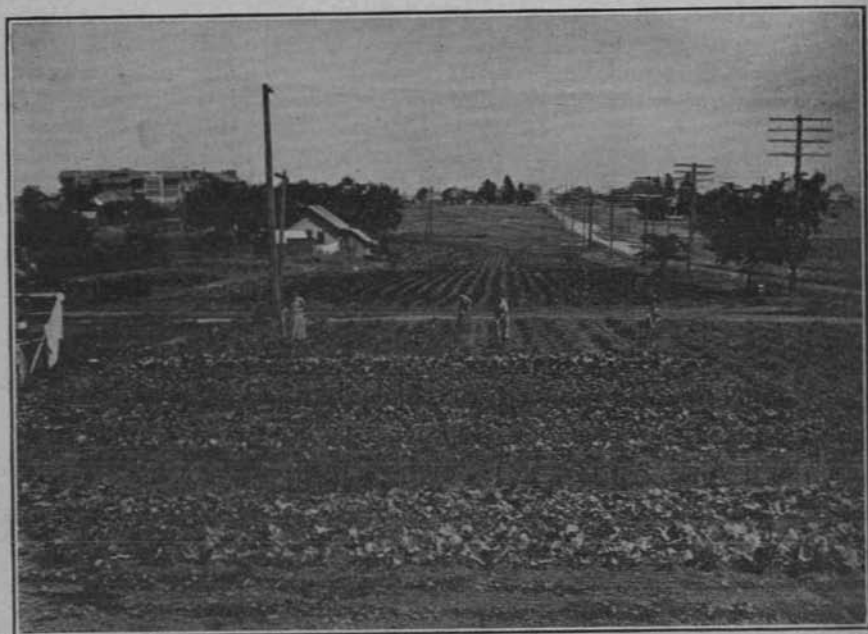


FIG. 7. School garden, Lewiston, Idaho.

### HORSE RADISH

The grated roots of the Horse Radish plant are used as a relish with meats. The roots are uninjured by freezing and may be dug any time of the year. A few plants should be grown in every garden. Horse radish seldom produces seed and is usually propagated by root cuttings.

### KALE

Kale belongs to the cabbage group. This plant is grown for its leaves which are used for greens in the late fall or early spring. The leaves are long and curled. It is best to pick them before the leaves are full size as matured leaves are often tough and stringy. This plant is hardy and is not injured by frost, therefore it is a valuable plant for late fall or early spring plantings. It is customary to pull off the lower tender green leaves and let the plant grow on to furnish a continuous supply. The Dwarf Curled is a good variety. One ounce of seed will sow 200 feet of drill.

### KOHL-RABI

Kohl-Rabi resembles the turnip and is grown and cared for in much the same way, altho it belongs in the same class as cabbage and cauliflower. The seed is usually sown in drills and thinned to five or six inches in the row. The edible portion is a swollen stem which grows above the ground. There are white and purple types of Kohl-Rabi.

Early White Vienna and Early Purple Vienna are the leading varieties. One ounce of seed will plant 300 feet of drill.

### LEEK

The Leek belongs to the same class as the onion, but it does not form a bulb, the edible portion being a thickened stem. The seed is usually sown in the early spring in an open trench and after the plants have grown full size they should be blanched in much the same way as celery. If not planted in a trench the plants can be banked with earth which will give the same effect. The quality of leeks is governed by the blanched portion. Leeks have a milder flavor than onions and are preferred by many for flavoring soups.

One ounce of seed will sow 100 feet of drill.

### LETTUCE

Lettuce is the most universally cultivated salad plant. In Idaho there are a number of gardeners making a specialty of lettuce growing.

Lettuce may be planted very early in the spring for it is not injured



FIG. 8. Head lettuce grown by Gordon Butler, Lewiston, Idaho.



by the cold and the crop must mature before the hot weather of the summer. In some sections of the State fall plantings are made with remarkable success.

In growing leaf lettuce, the plants are thinned gradually by pulling them for table use, as they reach the edible size, and by the time the patch is thinned the plants will have reached full size, after which they soon became worthless for table use.

Head lettuce is often grown in hotbeds, or frames, and transplanted to the field the same way as cabbage, for if head lettuce is overtaken by hot weather before the heads are fully mature, the plants may wither, the edge of the plants may burn and a bitter taste be developed. However, for home use it is generally planted in the garden. If the seed is sown in the fields the young plants should be thinned to eight or ten inches. This will allow the plants to form rather compact heads.

Lettuce to be of high quality, crisp and tender, should never be checked in its growth. Therefore, the plants should receive frequent irrigation where possible. Thorough cultivation should be given the lettuce in order that the soil moisture may be conserved.

For leaf lettuce Grand Rapids is a standard. The Improved Hanson and New York are good varieties of head lettuce for this State. One-fourth of an ounce of seed will sow 100 feet of drill.

#### MELONS

All kinds of melons are very sensitive to frost and in many sections of the State the growing season may not be sufficiently long for their successful production. The seed should not be sown until all danger of frost is passed. They may be best cultivated with a horse cultivator until the vines begin to cover the ground. After the vines begin to cover the ground they should not be disturbed, but large weeds should be pulled by hand. Melons should be irrigated very sparingly for too much water will delay ripening.

The Klondike watermelon has proven to be a very early variety. For localities that have a long frost-free season the Kleckley's Sweet is to be preferred because of its superior quality.

Of the cantaloupes, the Rocky Ford is the best variety.

Four ounces of watermelon seed will plant 100 hills. Two ounces of cantaloupe seed will plant the same number of hills.

#### ONIONS

Onions are grown in all sections of the State for home use and in many sections they are grown in large quantities for the market. Onions for market or winter use are generally grown from seed, but for early home use they are often grown from sets. The most common method of producing onion sets is by sowing the seed of onions very thickly. One hundred and fifty to two hundred seeds per foot of drill is not excessive. If planted in this way it is impossible for the bulbs to grow too large for sets. The sets should be placed in a cool dry place during the winter. When planted in the following spring, they will produce green onions in four or five weeks. Onions grown from sets go to seed quickly and

must be used while tender. The multiplier, potato and tree onions are also grown from sets.

It is much more economical to grow onions from seed and all late onions for winter storage are grown in this way. There is no crop that demands richer soil or more careful preparation of the seed field. The seed bed should be plowed deep in the fall and be in the finest possible condition in the spring by double disking and harrowing and dragging.

The seed should be sown with a seeder if a large area is to be planted. To kill weeds and preserve moisture, cultivation should begin as soon as the young plants break thru the crusts. In the irrigated sections, onions should receive frequent irrigations until the bulbs are nearly full grown. At this time the irrigation should cease for, if continued, it will materially delay the ripening.

When properly matured the tops will dry up at the neck and fall over. When tops do not dry at the neck it is sometimes necessary to break them down with a light roller to cause uniform ripening. When cured the onions should be pulled and piled in long rows for the tops to dry. When the tops are thoroly dried the onions should be topped and stored.

For the irrigated sections of Idaho, Yellow Danvers, Red Wetherfield, and Australian Brown are recommended. For the non-irrigated sections of the State, Red Wetherfield and Yellow Danvers are best. One-half ounce will seed 100 feet of drill.



FIG. 9. Growing onions under irrigation.

#### PARSNIPS

Parsnips, like other root crops, require a deep, rich, loose soil in order to form long, smooth, well-shaped roots. The seed may be sown

as soon as the soil will do to work. Early seeding gives the plants the benefit of early cool weather in which to make their growth for they do not grow much during the hot weather. Parsnips are never used in the immature stage, so they should be thinned to the required distance of from four to five inches as soon as possible.

If the plants do not receive sufficient moisture or if they are grown on poor soil they are usually spindly and unshapely. Long, smooth, tapering roots devoid of side roots or branches are to be desired.

As the plants are not injured by freezing they may be left in the soil during the winter, but it is best to harvest and store them. The Guernsey and Holiow Crown are good varieties to grow. One ounce of seed will sow 200 feet of drill.

### PEAS

Peas are very hardy and should be planted as soon as the ground can be worked. It is essential for early peas that the soil should be rich and friable with good drainage. As in the case of sweet corn, provision should be made for a succession of peas in prime condition for table use. This can be accomplished by using early, medium, and late varieties planted at the same time. If desired, a second planting of all three varieties can be made about five or six weeks later than the first. This plan is better and more convenient than making four or five plantings of the same variety, at intervals of about two weeks.

There are two general types of garden peas; one is smooth, and the other is wrinkled. The smooth seed varieties are hardier and may be planted much earlier than the wrinkled ones. The wrinkled type is much superior in quality to the smooth type.

Some varieties of peas produce much more vines than others. Those which under normal conditions make a growth under two feet are usually considered as dwarf. The dwarf varieties are grown mostly in the farmer's vegetable garden because they do not need supports and cultivation is easier.

When grown with irrigation, peas should be watered rather sparingly, if at all, until they begin to bloom. Early irrigation causes excessive vine growth. The soil should be kept clean and free from weeds.

For the irrigated sections of Idaho, the Alaska has proved the best as an early variety. The American Wonder is also good. Gradus is the most satisfactory medium variety. Of the late varieties, Telephone is to be recommended. For the non-irrigated sections of Idaho, the Alaska is the best early variety. The Dwarf Telephone and Carter's Daisy are good late varieties.

One to two pints of seed will sow 100 feet of drill.

### POTATOES

No home garden is complete without a few rows of early potatoes. The farmer's garden should also include enough late potatoes for winter use. The winter supply is often grown outside of the garden on another section of the farm.

For seed potatoes, one should choose smooth, medium size, uniform tubers, which are typical of the variety. Attention should always be given

to the selection of an ideal type. At the Gooding Irrigation Station the greatest yield of marketable potatoes was produced from eight to ten ounce seed halved. Very good yields, however, were secured from eight to ten ounce seed quartered, and from four to six ounce seed halved.



FIG. 10. Potatoes growing in the home garden.

In every weight of tubers selected the whole seed produced smaller yields of marketable potatoes than did the cut seed.

Potatoes are usually planted fifteen inches apart, in rows three feet apart. They should be covered to a depth of about four inches. The



FIG. 11. A good type of Netted Gem potato.

seed bed should be cultivated frequently before the plants push thru, to

keep down weeds, and the soil should be stirred during the season as long as it is possible to pass between the rows.

Where irrigation is necessary the water should be held off, if possible, until the young tubers set or the plants are in bloom. Sufficient water should then be applied to keep up a vigorous growth, care being taken not to over-irrigate. Potatoes should never be flooded. Neither should they be irrigated with furrows that are so shallow that the water is allowed to come in direct contact with the tubers.

For early potatoes the Early Ohio, Early Rose, and Irish Cobbler are good. For late potatoes the Netted Gem, Idaho Rural, and Gold Coin are good.

### PUMPKINS

Pumpkins are very often grown as a companion crop with corn, but they are usually grown as a separate crop and handled in the same way as squash or cucumbers. Mammoth pumpkins are often grown for exhibition purposes or for stock food. Almost any variety of pumpkins may be used for making pies but the fine-grained sweet varieties are preferable.

The Small Sugar is the best pumpkin for table purposes. Four ounces of seed will sow about fifty hills.

### PARSLEY

The leaves of parsley are usually used for garnishing meats but may also be used for flavoring soups and salads. The seed may be sown in the open garden in early spring. The seeds are slow to germinate and are sometimes soaked in warm water before planting. The plants may be started in flats, and later set in the garden after they have reached the height of two or three inches. Only a few leaves should be taken from a plant at one time; if so handled, plants will afford a continuous supply of foliage. Before freezing weather the plants should be lifted from the ground and transplanted to pots or window boxes and kept growing in the kitchen for winter use.

Dark Moss Curled is a good variety to grow. One-half ounce will sow 100 feet of drill.

### PEPPERS

Peppers require about the same temperature and care as tomato and egg plants. The young plants grow very slowly and must be started in advance of tomatoes. A crop started late is usually killed by the early autumn frosts. There are two general types of peppers, the large and the small. Peppers of the large type are used for pickling and stuffing. The Ruby King is a very mild sweet pepper of the large type. The small types are the hot peppers such as Cayenne, Chili, and Tobasco, and are used only for flavoring and the making of pepper sauce. One ounce of seed will produce about 1500 plants.

### RADISH

The radish is hardy and can be planted very early. The seed usually germinates very quickly and the plants come up in a few days after the seed is sown. The early varieties are usually ready for use about six

weeks after sowing. Successive sowings should be made about two weeks apart where a continuous supply is desired. Radishes usually become pithy so early that only a small planting should be made at one time. Radish seed should be sown rather thinly to avoid the necessity of much hand thinning. This crop is often planted as a companion crop or as a filler among slower growing crops. It is a common practice to sow radishes in the same row with beets or carrot seeds. Radishes require an abundance of soil moisture, and will stand frequent irrigation. For the irrigation section, the French Breakfast and the White Icicle are best. For the non-irrigated sections the Giant Crimson, French Breakfast and the White Icicle are very satisfactory.

One ounce of seed will sow 100 feet of drill.

### **RHUBARB**

Rhubarb is a cool weather plant and thrives best where the spring of the year is cool and there is an abundant supply of moisture. Rhubarb plants demand about the same cultural methods as asparagus and it is often best to plant them outside the garden for they interfere with the garden cultivation. The plants are generally started from roots as the rhubarb does not come true from seed. Rhubarb should not be cut the first year after planting as time must be given for the plants to become well established. The plant should never be allowed to produce seed as seed stalks always devitalize the roots.

Heavy applications of manure should be applied in the fall and worked into the soil in the spring. Clean cultivation should be practiced at frequent intervals to conserve soil moisture and kill weeds.

### **SALSIFY**

Salsify is often called the vegetable oyster. The seeds should be sown early in the spring the same as parsnips and carrots. The plants should be thinned while young for the roots branch later and are difficult to pull. The cultural requirements are much the same as for other root crops and the plants should be harvested late in the fall in much the same manner as parsnips.

One ounce of seed will sow 100 feet of drill.

### **SPINACH**

Spinach is the most important crop grown in our gardens for greens. It is distinctly a cool season crop and may be grown in the early spring or the fall. Spinach demands rich soil and an abundance of moisture. It is usually sown in drills but occasionally it is sown broadcast on the land intended for some later crop. The spinach is cut so early that it does not interfere with the crops that must be planted late. For fall use the crops are sown in August and plants are ready for use before severe frosts.

Savoy Leaved is the most common and the best variety. One ounce will sow 100 feet of drill.

### SQUASH

There are two general types of squashes, summer and winter. In Idaho the winter type is grown most extensively. The summer squashes are also of two types,—scalloped and crooked neck. They require a shorter period of growth than the winter type.

For early squashes a sandy loam is best, but for the late varieties the clay loams are most satisfactory. The soil should be well fertilized and the seed bed well prepared. The seed should be sown about the same time as corn.

Of the summer types, the White Bush Scallop and the Crooked Neck are excellent. Of the winter type, the True Hubbard, and the Golden Hubbard are best.

For summer squash sow four ounces to 100 hills. For winter varieties sow eight ounces to 100 hills.

### TOMATO

The tomato grows best where the season is long and the nights are fairly warm. This crop will grow on almost any soil but the best results are obtained from soils of the sandy loam type. In northern Idaho a south slope is often needed to mature a crop before the killing frosts.

It is very important in tomato growing to secure good stocky plants. All plants should be well hardened-off before being set in the garden and plants should never be set in the open ground until all danger of frost is past. The farmer will probably find it more economical to buy his plants from some merchant or grower rather than to try to grow them for himself.

In sections where the Colorado potato beetle is found, young plants should be dipped in arsenate of lead at the time of planting or sprayed within a very few days.

In the irrigated sections, tomatoes should be given frequent irrigations until the fruits are fairly well formed, after which they should be irrigated very sparingly or not at all, since further irrigation will very materially delay ripening. The young plants should receive frequent cultivation to preserve the moisture and kill the weeds. Spark's Earliana is recommended for all sections of Idaho. One ounce of seed will produce 3000 to 4000 plants—enough for about one-half acre.

### TURNIPS

The turnip is grown either as an early spring crop or for fall or winter use. For early crops the seed is sown as soon as the soil can be worked in the spring. Turnips desired for winter use should reach maturity late in the fall, the seed usually being planted in August. Turnips for table use should not be overgrown.

Turnips require about the same cultural methods as beets. For the irrigated sections the White Flat Dutch is recommended; in non-irrigated sections the Purple Top Milan has given best results.

*Table showing number of hills in one acre of land.*

	12 in.	18 in.	2 ft.	3 ft.	4 ft.	5 ft.	6 ft.
12 in.	43560	29040	21780	14520	10890	8712	7260
15 "	34848	23230	17440	11620	8710	6980	5810
18 "	29040	19360	14520	9680	7260	5808	4840
2 ft.	21780	14520	10890	7260	5445	4356	3620
2½ "	17424	11616	8712	5808	4356	3484	2903
3 "	14520	9680	7260	4840	3630	2904	2420
3½ "	12440	8297	6223	4148	3111	2489	2074
4 "	10890	7260	5445	3530	2722	2178	1815
4½ "	9680	6453	4840	3226	2440	1936	1613
5 "	8712	5808	4356	2904	2178	1742	1452
5½ "	7920	5280	3960	2640	1980	1584	1320
6 "	7260	4840	3630	2420	1815	1452	1210

### THE WINTER SUPPLY OF VEGETABLES

The garden should always be planned with special reference to the winter supply of vegetables. With an assortment of canned, dried or stored vegetables, the cost of living can be materially lowered. Vegetables can be canned, dried or pickled for winter use, and if prepared in this way the season of maturity is not important. String beans, peas, tomatoes and corn are commonly canned.

Vegetables to be stored in the fresh state should be in the proper stage of development at the time they are to be stored. Most vegetables should not be stored until late in the season and if they are to reach the height of perfection for storage they must be planted at the proper time. Most farm gardens are not properly planned and as a result the larger part of the crop is over-matured at the proper time for storage.

Potatoes, beets, carrots, parsnips, turnips, and kohlrabi can be stored in a root cellar or they may be stored in out-door pits. If stored in out-door pits they should be placed in a conical pile and first covered with six inches of straw and then with earth to a similar depth.

Cabbage for home use may be kept in a cool, well-ventilated cellar or it may be stored in the ground. If stored in the cellar the outer leaves should be removed and the heads packed in a box containing earth and sand. Cabbage may also be stored for early use by wrapping the heads in paper. For late winter use cabbage can best be stored in an outdoor pit. The plants are harvested with the roots and leaves on. Place three plants on the ground side by side, with roots up and two placed above them. This order should be repeated until the pile is completed. With this way of piling, five heads can be removed from the pit without disturbing the other heads. Earth should be piled on the cabbage until the roots are entirely covered.

Celery can be stored in outdoor pits but a much more satisfactory way is to harvest it with the roots on and to plant in shallow boxes in the cellar. If the soil can be kept moistened the plants will continue to grow.

A few parsley plants should always be placed in pots and grown in the kitchen during the winter months.

Onions intended for winter use should be thoroly cured before



storing. It is essential that onions be placed in a cool dry place. Baskets or crates are very convenient containers for onions.

Pumpkins and squashes keep best in a warm dry place. They may be placed in slatted crated and stored in furnace rooms or in an upstairs room close to the chimney.

### GARDEN PESTS

#### Colorado Potato Beetle

(*Leptinotarso decemlineata* Say.)

In northern Idaho the potato beetle is by far the worst potato pest and often strips the potato vines entirely of their leaves. This pest has not yet made its appearance in southern Idaho.

In the fall the beetles enter the earth and hibernate until the warm sunshine of the spring brings them out. It is not uncommon to find them in the fields several weeks before the potatoes are up. As soon as the young plants appear the beetles begin to feed on the leaves. They also deposit their yellow eggs in clusters on the under side of the leaves. These eggs hatch in about a week and the young larvae begin at once to eat the leaves. The young larvae are dark red in color with black spots on each side. They gradually get lighter in color as they grow. The larvae gorge themselves with potato foliage, a few of them often stripping a plant of all its leaves. They feed two or three weeks, then drop to the earth and pupate. In ten or twelve days the adult beetles emerge and begin to feed in the vines and to deposit their eggs for a second generation. If the food is scarce, the beetles will migrate to neighboring fields. There are two generations a year in north Idaho.

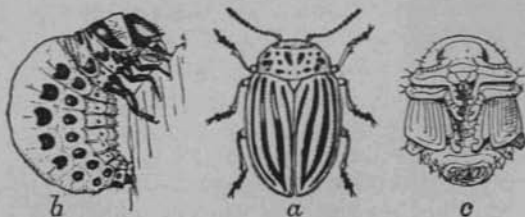


FIG. 12. Colorado potato beetle.

**Control.**—Early spring spraying as soon as the vines are up is very essential in controlling the potato beetle. Hand picking, if employed early in the season, is of great value, but where large areas are planted, other methods are necessary. Spraying the vines with arsenate of lead and Paris green have given excellent results. Directions for preparing these sprays will be found at the end of this bulletin.

#### Potato Flea-Beetles

(*Epitrix cucumeris* Harris)

There are several species of flea beetles found in the gardens of Idaho.

but unless found in large numbers, they never cause any serious damage. They are small black beetles, very active and have the power to jump a considerable distance. They are common in this State on potatoes, cabbages, and tomatoes. They eat small holes in the leaves, often causing the plant to wilt.

The adult beetles pass the winter under the leaves and rubbish. In the spring they come out and deposit their eggs on the roots of the weeds. The young larvae feed upon the roots of the weeds. The beetles come forth and attack the foliage of our garden crops. There are two to three generations a year.

*Control.*—Spray with arsenate of lead or with Paris Green. Either may be used with Bordeaux mixture which acts as a repellent. Dust sprays are also recommended. The sprays should be prepared as recommended and used when the beetles first make their appearance.

### Cabbage Worms

(*Pontia rapae* Linn.)

The cabbage worm is probably the worst cabbage pest in the State. The adult is a white butterfly. The female has two black spots on the fore-wings while the male has only one, but both sexes have one black spot on the hind wings. The worms are probably well known to gardeners.

The winter is passed as pupae among the rubbish in the garden. In the spring the butterflies emerge and deposit their small yellow, oval eggs. When the eggs hatch in a few days, the larvae begin to feed at once and eat large holes in the cabbage leaves. The worms feed about two weeks and then pupate. The pupal case is green at first and resembles a snail in appearance; later it turns brown. There are two or three generations in this State.

*Control.*—At the close of the season, all cabbage should be removed from the field or destroyed. Arsenical poisons have given good results. Use one-half pound of powdered arsenate of lead, or one pound of paste to twenty-five gallons of water. Soap added to the spray will make it stick better. Spray or use dust when worms first appear. If spray is used late in the season, it will be well to strip off and destroy the outer leaves for they may contain poison.

### Cabbage Aphis

(*Aphis brassicae* Linn.)

The cabbage louse is usually a common pest of the garden wherever cabbage is grown, and occasionally the aphids become abundant enough to cause damage to the crops. This species may also be found on brussels sprouts, kohlrabi, cauliflower, and closely allied plants. The cabbage louse is very prolific and a large number of generations may develop during the summer. The body of the louse seems to be covered with a dry powder which serves as a protection to the body against insecticides.

*Control.*—Black Leaf 40 has probably given the best results in spray-

ing for cabbage aphid. Kerosene emulsion is also good. It is very important to spray with a high pressure and wash as many off as possible.

#### Tomato Worm

(*Phlegethontius sexta* Joh.)

In some sections of the State the tomato worm causes considerable damage. These large green worms which attack the tomato are of the same species which attack tobacco.

The winter is passed as pupae in the soil. In late spring the moths emerge and deposit their eggs singly upon the leaves. The larvae hatch in a few days and begin to feed at once upon the foliage. When full grown the larvae are about three inches long. They drop to the earth, enter the soil and pupate. There is but one generation a year in Idaho.

*Control.*—As a rule this worm can be controlled by hand picking. Spraying with arsenate of lead a little stronger than for the codling moth will give good results. Two or three sprayings may be found necessary.

#### Cut Worms

The cut worms are among the most destructive pests in our gardens. They burrow just beneath the surface of the ground when not feeding and come out in the evening and feed. They usually attack the plants at the surface of the ground, often cutting them entirely off. There are many different species of cut worms that are active in our gardens. Some species climb fruit trees and do considerable damage. These worms are called climbing cut worms.

The moths usually fly at night in the midsummer. They are the brown owl moths so often attracted to lights. They deposit their eggs on weeds or grass. The young larvae pass the winter curled up in the soil. In the spring they come out and attack the plants.

*Control.*—Late fall and early spring cultivations will help to hold the cut worms in check. Keep land as free from weeds as possible. Place poison bran mash in the garden before seeds are planted or plants are set. Follow directions as given in back of bulletin.

#### Pea-Weevil

It is not known when the pea-weevil first made its appearance in Idaho, but it is known to exist in various parts of the State at the present time.

The weevil is about one-fifth of an inch long; it is black in color, but thickly covered with short brown hairs which give it a mottled appearance. The winter is passed in the adult stage. In the spring the weevils make their appearance and lay their eggs upon the surface of the pods. Upon hatching, the young larvae break thru the pod and enter the seed. The larvae continue to feed until full grown, pupate, change to the adult stage, but remain within the seed. In the dry peas, the presence of the weevil will be shown by a well defined circle made by the full grown larvae.

*Control.*—Peas may be held over one season, for the weevils will not breed in the dry peas. Dr. Chittenden states that if peas are heated to a temperature of 140 degrees F., the weevils will be killed without injury to the seed. Fumigation is probably the best method of destroying them in the seed peas. Place seed peas in a barrel; use one ounce of carbon bisulphide to 100 pounds of peas. Pour the carbon bisulphide into a pan placed on the surface of the peas. The top of the barrel must be tightly closed. Peas containing live weevils should never be planted.

#### Melon-Aphis

(*Aphis gossypii* Glover.)

Specimens of melon-aphis have been received at this station from different sections of the State and some growers report serious damage from this species. The aphids attack the vines, causing the leaves to curl. They are sometimes so abundant as to completely ruin the entire crop. Their life history is much the same as that of most of our common aphids. Multiplication is rapid and, as they become more numerous, winged forms migrate to other plants.

*Control.*—There are many insect enemies that feed on the melon-aphis and often hold it in control. Crops may be planted and destroyed before the vines are up. Kerosene emulsion and Black Leaf 40 are effective sprays. The nozzle must be held under the leaves and the spray applied upward to hit the aphids on the under surface of the leaves.

#### Corn-Ear Worm

(*Heliothis absoleta* fab.)

The Corn-ear worm is a very common pest in the corn fields of Idaho. It is virtually the only insect injuring the ears of corn, and is especially destructive to sweet corn.

The winter is passed as pupae in the soil. In the spring the moth emerges and deposits its eggs on corn, peas, beans or whatever food plants are available. The later generations deposit their eggs on the corn silk. The worms feed on the young kernels on the tips of the ears, causing considerable damage.

*Control.*—No spray has proved successful in controlling the corn-ear worm. As the winter is passed in the soil, deep plowing and harrowing will crush some of the pupae and others will be exposed and killed during the winter.

#### Onion Thrip

(*Thrips tabaci* Lind.)

The onion thrip has been reported from sections of Idaho where damage has been done to the onion crops. The insect is very small and probably will not exceed one-twentieth of an inch in length. It sucks and bites the foliage, leaving small yellowish dots on the leaves. The plants usually are stunted as the leaves become dry when severely attacked.

*Control.*—When the thrips appear, spray with kerosene emulsion or Black Leaf 40.

**SPRAY MATERIALS**

*Bordeaux Mixture*

Blue-stone .....	5 pounds
Lump lime .....	5 pounds
Water .....	50 gallons

Dissolve the blue-stone (suspended in a sack) in 25 gallons of water. Slake lime in another vessel and dilute with 25 gallons of water. Pour these solutions into a third vessel at the same time.

*Arsenate of Lead*

General formula:

No. 1. Arsenate of lead (paste).....	2 pounds
Water .....	50 gallons
No. 2. Arsenate of lead (powder).....	1 pound
Water .....	50 gallons

For more resistant insects:

No. 1. Arsenate of lead (paste).....	3 pounds
Water .....	50 gallons
No. 2. Arsenate of lead (powder).....	1½ pounds
Water .....	50 gallons

In mixing the amount of the arsenate of lead for each spray tank, it should be worked into a thin paste in a small amount of water and should never be thrown in as a mass into the spray tank. One should see that each package of arsenate bought bears a certificate of analysis as required by the insecticide law.

*Paris Green*

Lump lime .....	2 pounds	Lump lime .....	2 ounces
Paris green .....	¾ pound	Paris green .....	1 ounce
Water .....	50 gallons	Water .....	4 gallons

For cabbage worms add three pounds of soap to 50 gallons of water instead of the air slaked lime.

*Poison Mash*

Bran .....	16 pounds
Paris green .....	1 pound
Salt .....	½ pound
Syrup .....	1 gallon

*Poison Wash for Trees*

Soap .....	2 quarts
Crude carbolic acid .....	½ pound
Paris green .....	2 ounces
Lime .....	2 pounds

*Hellebore*

Hellebore .....	1 to 2 pounds
Water .....	50 gallons

Hellebore may also be mixed with flour and sprayed on the plants.

*Kerosene Emulsion*

Kerosene .....	2 gallons
Whale oil soap .....	½ pound
or	
Laundry soap .....	1 pound
Water .....	1 gallon

Dissolve soap in hot water. Add kerosene to hot suds. Agitate the mixture to emulsify. Dilute this stock solution at the rate of one gallon to ten gallons of water. The oil should not separate and come to the top of the diluted solution. If it does it is unsafe to use.

*Black Leaf 40*

Black leaf 40 .....	1 quart	Black leaf 40 .....	1 ounce
Soap .....	7 pounds	Soap .....	1-5 pound
Water .....	200 gallons	Water .....	6¼ gallons



The following publications may be obtained without cost, by addressing the Agricultural Experiment Station, Moscow, Idaho.

### Bulletins

65. Alaska Wheat Investigations.
72. A Report on the Milling Properties of Idaho Wheat.
73. A Study of Idaho Butter with Suggestions for Improvement.
75. Composition of Irrigated and Non-Irrigated Fruits.
76. Tomato Culture in Idaho.
81. Soils of the Cut and Burned-Over Areas of North Idaho.
85. The Use of Lime-Sulfur as a Summer Spray for Apple Scab.
86. Some Poisonous Plants of Idaho.
87. Insect Pests of the Orchards and Gardens of Idaho, and Their Control.
88. The Milling Values of Dry-Farmed and Irrigated Wheat.
90. Creamery Records.
91. Methods of Clearing Logged-off Lands.
92. The Annual Report of the Experiment Station for the Year Ending June 30, 1916.
93. Experiments with Small Grains Under Irrigation.
94. Experiments with Legume Crops Under Irrigation.
95. The Management of Irrigated Grass Pastures.
96. The Management of Farm Flocks in Idaho.
97. Commercial Onion Culture in Idaho.
98. Winter Versus Summer Pruning of Apple Trees.
99. Experiments in the Irrigation of Apple Orchards.
100. The Production of Clover Seed Under Irrigation in Southern Idaho.

101. The Production of Alfalfa Seed in Southern Idaho.
102. Dairy Herd Management.
103. Performance Records of Some Eastern Wheats in Idaho.
104. Annual Report of the Experiment Station for the Year ending Dec. 31, 1917.
105. Trees: What, Where, When and How to Plant.
- .... Measurement of Irrigation Water.
- .... Hog Cholera in Idaho.
- .... The Alfalfa Weevil.
- .... Directory of Idaho Pure-bred Breeders.

Farmers' Bulletin 769. Growing Grain on Southern Idaho Dry Farms.

\*Ground Squirrel Control.

\*Cost of Pumping for Irrigation.

\*Oats in Washington.

\*The Home Drying of Fruits and Vegetables.

\*Purchased of Washington State Experiment Station for distribution in Idaho.

### Circulars

2. Field Peas.
3. Feeding for Egg Production.
5. Tested Forest Trees for Planting in Idaho. This circular is a price list of trees for sale by the Department of Forestry at approximate cost.
6. The Spray Calendar.
7. Accumulators and Consumers of Nitrogen and Conditions Affecting Legume Inoculation.