

SWINE FEEDING EXPERIMENTS

AT THE
DOMINION EXPERIMENTAL FARM,
AGASSIZ, BRITISH COLUMBIA

BY
ROY GYLES AND W. H. HICKS



Agriculture
Canada

Canadian Agriculture Library
Bibliothèque canadienne de l'agriculture
Ottawa K1A 0C5

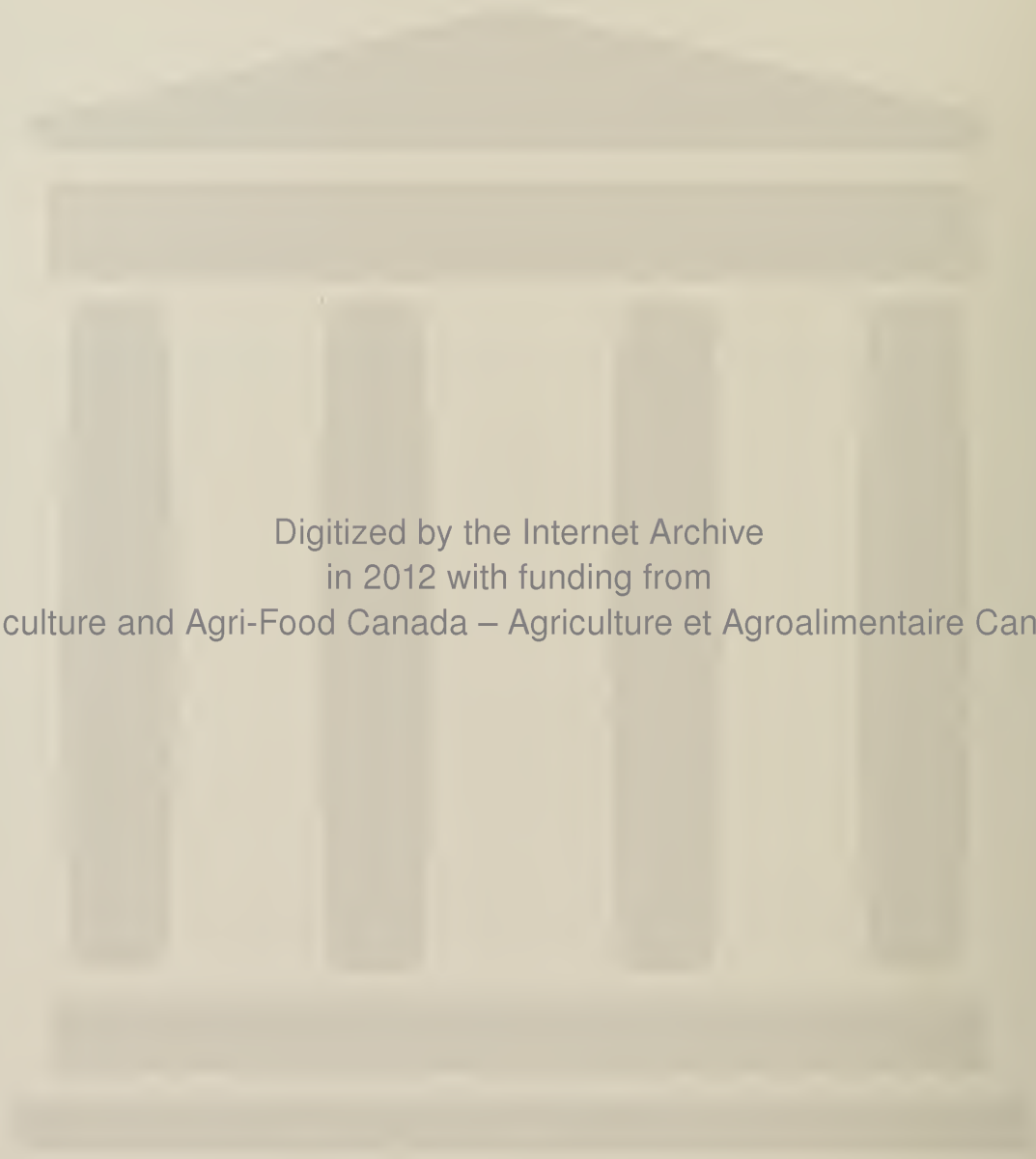


Yorkshire sows on pasture. An excellent way to keep stock in good breeding condition.

DEPARTMENT OF AGRICULTURE

OTTAWA, CANADA

630.4
C212
P 852
1950
c.3



Digitized by the Internet Archive
in 2012 with funding from
Agriculture and Agri-Food Canada – Agriculture et Agroalimentaire Canada

CONTENTS

| | |
|-------------------------------------------------------|----|
| INTRODUCTION..... | 3 |
| PRINCIPLES OF SWINE NUTRITION..... | 3 |
| Carbohydrates..... | 3 |
| Fibre..... | 3 |
| Fats..... | 3 |
| Protein..... | 4 |
| Minerals..... | 4 |
| Vitamins..... | 4 |
| Water..... | 4 |
| FEEDING EXPERIMENTS AT AGASSIZ EXPERIMENTAL FARM..... | 4 |
| Grains and Grain By-products..... | 4 |
| Barley..... | 5 |
| Buckwheat..... | 5 |
| Corn..... | 5 |
| Oats..... | 5 |
| Rice By-products..... | 6 |
| Rye..... | 6 |
| Wheat..... | 6 |
| Wheat Bran..... | 7 |
| Wheat Middlings and Shorts..... | 7 |
| Protein Supplements..... | 8 |
| Fishmeal..... | 8 |
| Skim-milk..... | 8 |
| Tankage and Meat Scraps..... | 8 |
| Linseed Oil Meal..... | 9 |
| Soybean Oil Meal..... | 10 |
| Animal Proteins versus Plant Proteins..... | 10 |
| Protein Supplement Quantities..... | 10 |
| Mineral Supplements..... | 11 |
| Vitamin Supplements..... | 11 |
| Pasture..... | 12 |
| Roots and Tubers..... | 12 |
| Mangels..... | 12 |
| Potatoes..... | 12 |
| MANAGEMENT IN FEEDING..... | 13 |
| Weanling Pigs..... | 13 |
| Growing Pigs..... | 13 |
| The Boar..... | 14 |
| The Dry Sow..... | 14 |
| The Pregnant Sow..... | 14 |
| The Lactating Sow..... | 14 |
| Limited and Full Feeding..... | 14 |
| Hand Feeding and Self Feeding..... | 14 |
| Dry Lot Feeding and Feeding on Pasture..... | 14 |
| Fall Litter and Spring Litter Feeding..... | 15 |
| Advanced Registry Feed Mixtures..... | 15 |

SWINE FEEDING EXPERIMENTS

at the

Dominion Experimental Farm, Agassiz, British Columbia

by

ROY GYLES and W. H. HICKS¹

INTRODUCTION

The Experimental Farm at Agassiz, B.C., has conducted research in swine feeding over a number of years. The results of these experiments are summarized and discussed in this bulletin for the benefit of the British Columbia swine breeder and farmer. The information offered should serve as a useful guide to improved swine feeding.

Hog production in British Columbia is not sufficient to meet the needs of the province. Every year live hogs and pork products have to be imported. The average annual number of live hogs in all Canada, for the ten-year period 1937 to 1946, inclusive, was 5,766,900 head. The average annual number of live hogs in British Columbia for the same period was 72,100 head. This represents 1.25 per cent of the all-Canada total. The average annual importation of live hogs and pork into British Columbia for the same ten-year period was 132,853 head of live hogs and 5,557,017 pounds weight of pork and pork products. Swine production in the province increased by 82 per cent during the war years, as compared with the preceding five years.

PRINCIPLES OF SWINE NUTRITION

Hogs make faster gains than other farm animals. On this account they must be provided with properly balanced rations containing all the required nutrients; carbohydrates, proteins, fats, fibre, minerals, vitamins, and water.

Carbohydrates: Starches, sugars, and fibre are regarded as carbohydrates. All the usual grains and grain by-products, which make up the greater part of a hog ration, are rich in carbohydrates. Sugars and starches are easily digested by the hog, and provide heat and energy for the body. When carbohydrates are fed in excess, the surplus is stored as body fat.

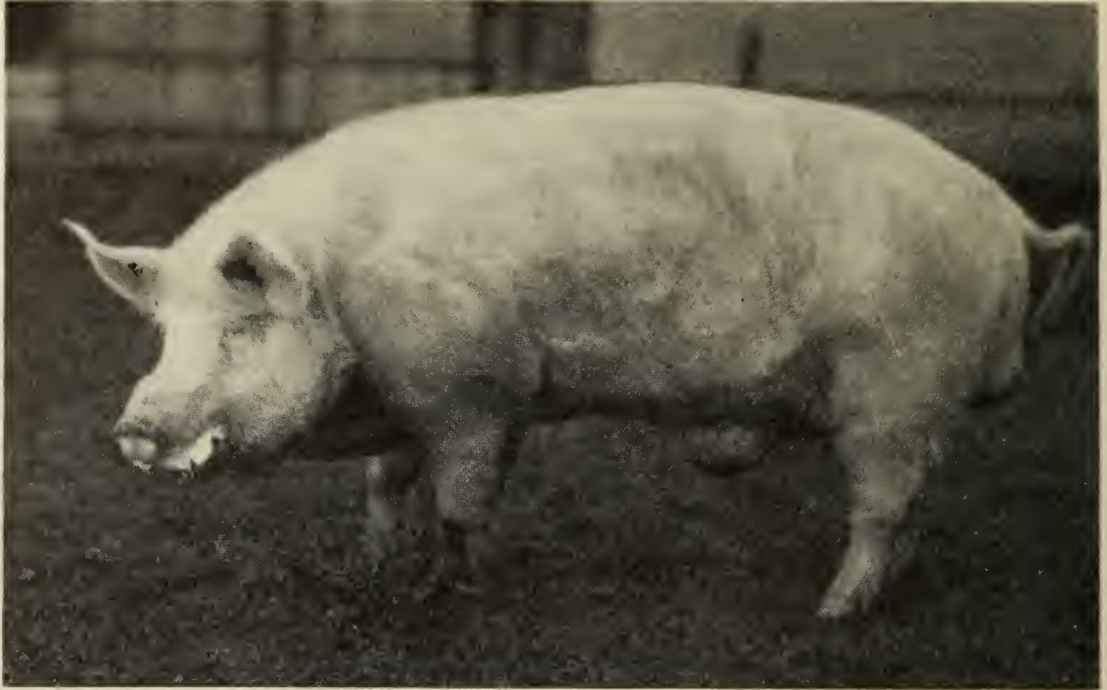
Fibre: The hog is poorly equipped to digest fibre, because there is no suitable bacterial action in its single glandular stomach. The digestion of fibre depends on bacterial action to break it down into simpler substances. In the case of ruminants this occurs in the rumen, where there is much bacterial action. In the horse, this bacterial action occurs in the caecum, which is the enlarged portion of the large intestine adjacent to the small intestine.

Since the hog is almost incapable of digesting fibre, the ration should not have more than about 6 per cent fibre, otherwise growth may be retarded. Grains with a high fibre content should be properly ground so as to aid digestion.

Fats: In supplying fat in a hog ration the important consideration is the quality of the fat and not the quantity. The quality of fat in the feed determines the quality of fat on the hog. It is desirable to produce firm fat on a hog as a soft and oily carcass will bring lower prices. The usual type of Canadian hog ration should produce a hard fat. It is only in certain areas of the United States, where soybeans and peanuts are fed, that soft pork becomes a problem.

¹ Superintendent, Dominion Experimental Farm, Agassiz, B.C.

Protein: Protein is responsible for growth. Young growing pigs require a higher proportion of protein than older pigs approaching market weight. The quality of the protein in a feed is important. For example, the protein in skim-milk is complete and produces better growth than the protein in corn, which is incomplete. As a rule, animal protein supplements provide a higher quality protein than plant protein supplements.



A. Springdale Major 10—125056.
First prize mature Yorkshire boar at Vancouver in 1931 and the first boar to qualify for advanced registry in Canada, as recorded in Vol. 44, 1933 of the Swine Registry.

Minerals: Minerals are required by the hog for proper bone development, and for keeping the blood and body fluids in good working condition. The usual hog ration should be supplemented with calcium, iodine, and salt, supplied in the form of ground limestone and iodized salt. Iron may be given to suckling pigs in the form of iron sulphate.

Vitamins: The hog requires a supply of vitamins A, D, and B-Complex. There is plenty of B-Complex in the usual grains, but A and D are lacking. During summer, pigs on pasture get enough vitamin A from green pasture and enough vitamin D from sunshine. In winter, a supplement of fish oil or sun-cured legume hay should be supplied in order to provide these two vitamins, A and D.

Water: Water is the cheapest and easiest to obtain of all the nutrients, but it is all-important. It performs vital functions in the body, and a good supply must be provided for swine.

FEEDING EXPERIMENTS AT AGASSIZ EXPERIMENTAL FARM

Grains and Grain By-products

The greater portion of the hog ration is made up of cereal grains and their by-products. Cereal grains are high in total digestible nutrients, and provide most of the energy in a ration. However, they are lacking in good quality protein, minerals and vitamins. Grains must be supplemented either with good pasture or with protein, mineral, and vitamin supplements.

Barley: This is the most popular grain for feeding hogs in Canada. It is palatable, fairly low in fibre content, and produces a high quality carcass with firm fat.

Buckwheat: This grain should be regarded as of only minor importance since it is not grown to any extent in British Columbia.

Corn: Corn is the most popular grain for feeding hogs in the United States. It is very palatable, low in fibre, and easily digested by swine.

Oats: Oats is the most commonly grown grain in British Columbia. In the Lower Fraser Valley varying amounts of oats are used in all swine rations. It is higher in fibre content than other grains and must be properly ground before feeding. It is not so palatable as barley and corn. Oats with hulls removed is a valuable feed for suckling and weanling pigs. Older growing pigs, boars, and sows can make good use of ground whole oats.

An experiment was carried out to test various quantities of oats in the following three rations:

| Grain fed | First period (start to 120 pounds weight) lb. | Second period (120 pounds to market) lb. |
|---------------------------|--------------------------------------------------------|---------------------------------------------------|
| <i>Low Oats Ration</i> | | |
| Ground barley..... | 50 | 60 |
| Cornmeal..... | 20 | 30 |
| Ground oats..... | 30 | 10 |
| <i>Medium Oats Ration</i> | | |
| Ground barley..... | 40 | 50 |
| Cornmeal..... | 20 | 30 |
| Ground oats..... | 40 | 20 |
| <i>High Oats Ration</i> | | |
| Ground barley..... | 30 | 40 |
| Cornmeal..... | 20 | 30 |
| Ground oats..... | 50 | 30 |

Twenty-five pigs were divided into five uniform groups, and fed from an average weight of 72 pounds to 199 pounds live weight in 126 days. Alternate groups were hand fed and self fed. The following results were obtained:

| Group | Daily gain per pig lb. | Pounds feed per 100 pounds gain | Advanced Registry carcass score |
|---------------------------|------------------------------|---------------------------------------|------------------------------------------|
| <i>Low Oats Ration</i> | | | |
| 1 Hand fed..... | 1.27 | 352 | 80 |
| 2 Self fed..... | 1.32 | 400 | 79 |
| <i>Medium Oats Ration</i> | | | |
| 3 Hand fed..... | 1.29 | 350 | 78 |
| 4 Self fed..... | 1.48 | 397 | 78 |
| <i>High Oats Ration</i> | | | |
| 5 Hand fed..... | 1.21 | 358 | 80 |

In another experiment, thirty pigs were divided into six uniform groups and fed from an average weight of 39 pounds to 203 pounds live weight in 123 days. Alternate groups were hand fed and self fed. The following results were obtained:

| Group | Daily gain per pig lb. | Pounds feed per 100 pounds gain | Advanced Registry carcass score |
|---------------------------|------------------------|---------------------------------|---------------------------------|
| <i>Low Oats Ration</i> | | | |
| 1 Hand fed..... | 1.36 | 344 | 82 |
| 2 Self fed..... | 1.46 | 358 | 82 |
| <i>Medium Oats Ration</i> | | | |
| 3 Hand fed..... | 1.31 | 352 | 85 |
| 4 Self fed..... | 1.26 | 389 | 74* |
| <i>High Oats Ration</i> | | | |
| 5 Hand fed..... | 1.26 | 372 | 87 |
| 6 Self fed..... | 1.40 | 398 | 83 |

* Pigs in group 4 were unthrifty throughout the experiment.

The results of these two experiments indicate that oats will give good results in proportions as high as 50 per cent of the ration up to 120 pounds live weight. The quantity should then be reduced to about 30 per cent of the ration during the finishing period.

Rice By-products: Many years ago, a by-product of the rice milling industry, called rice meal, was available to farmers in British Columbia at a low cost. An experiment was carried out to test the feeding value of this product. Pigs that were fed rice meal gave an average daily gain of 0.69 pounds, and consumed 481 pounds of feed to produce 100 pounds gain in live weight. Similar pigs that did not receive rice meal in the ration made an average daily gain of 1.03 pounds and consumed 400 pounds of feed to produce 100 pounds gain in live weight.

All the pigs receiving rice meal developed a diseased condition. Symptoms were unthriftiness, painful lameness of the hind legs, and a staring expression. Further experiments showed that additions of 20 grams of rock phosphate per pig each day to the ration prevented the diseased condition. Another later shipment of rice meal had a completely different effect on the pigs. It caused almost continuous scouring from about two days after feeding to the end of the experiment.

The overall results of these experiments indicate that the product that was being sold as rice meal varied greatly in quality and effect, and required proper standardization by the manufacturers before it could possibly be considered as a feed for livestock.

Rye: Rye is equal to corn in total digestible nutrients, but it is not palatable to swine. It should always be mixed with other grains such as barley and wheat, and should not comprise more than 30 per cent of the ration.

Wheat: A considerable amount of wheat is grown in British Columbia. The major production areas are in the upper country, where some of the best hogs are produced. Wheat is a suitable grain for hogs, and can be used to good advantage in equal amounts with oats and barley, especially during the finishing period.



B. Pine Grove Jock 2nd—49402.

This is one of the best boars ever used at the Agassiz Experimental Farm. Very fine type is shown in this boar.

An experiment was conducted to test the suitability of wheat as a substitute for barley in the grain ration. Sixteen pigs were divided into four uniform groups, and fed from an average of 27 pounds to 200 pounds live weight in 121 days. A barley-dominant and a wheat-dominant ration were prepared as follows:

| Grain | Barley dominant | | Wheat dominant | |
|-------------|------------------------------------------|-----------------------------------------------|---------------------------------------------|-----------------------------------------------|
| | First period (start to 110 pounds) | Second period (110 pounds to market) | First period (start to 110 pounds) | Second period (110 pounds to market) |
| Wheat..... | 20 | 30 | 50 | 60 |
| Barley..... | 50 | 60 | 20 | 30 |
| Oats..... | 30 | 10 | 30 | 10 |

The pigs on the barley-dominant ration made an average daily gain of 1.45 pounds, and consumed 316 pounds of feed per 100 pounds gain in live weight. Pigs on the wheat-dominant ration made an average daily gain of 1.45 pounds, and consumed 311 pounds of feed per 100 pounds gain in live weight. In this experiment, wheat proved to be an excellent substitute for barley.

Wheat Bran: Wheat bran is notable among livestock feeds for its bulk and laxative effect. It is more suitable, on this account, for brood sows and boars than for growing and fattening pigs.

Wheat Middlings and Shorts: Middlings and shorts should not be fed as the only supplement in a hog ration. However, they can be fed to good advantage in combination with other supplements such as skim-milk, tankage, and fishmeal.

Protein Supplements

Grains do not have sufficient protein of good quality to supply all the requirements of the hog. It is necessary to supplement the grain ration with high quality protein feeds such as skim-milk, fishmeal, tankage, and linseed meal.

Fishmeal: In British Columbia most of the fishmeals are prepared from salmon, herring, halibut, and pilchards. There are several grades of fishmeal, depending on the protein content, which may vary from about 50 per cent to 75 per cent.

An experiment was conducted to test the feeding value of three different grades of fishmeal. Sixty pigs were divided into six uniform groups and fed from an average of 32 pounds to 196 pounds live weight in 125 days. The different grades of fishmeal were fed in exact quantities, so as to supply the same amount of protein in each case. The "A" groups were fed fishmeal throughout the experiment, while the "B" groups did not receive any fishmeal after they reached 160 pounds live weight. The following results were obtained:

| Group | Protein supplement | Daily gain per pig lb. | Pounds feed per 100 pounds gain | Advanced Registry carcass score |
|-------|----------------------------|------------------------|---------------------------------|---------------------------------|
| 1A | White fishmeal..... | 1.41 | 322 | 71 |
| 1B | White fishmeal..... | 1.35 | 338 | 71 |
| 2A | B.C. low oil fishmeal..... | 1.34 | 335 | 72 |
| 2B | B.C. low oil fishmeal..... | 1.33 | 343 | 72 |
| 3A | B.C. oily fishmeal..... | 1.41 | 321 | 71 |
| 3B | B.C. oily fishmeal..... | 1.34 | 322 | 70 |

Pigs receiving white fishmeal and B.C. oily fishmeal performed equally well and made slightly higher gains than pigs receiving B.C. low oil fishmeal. The Advanced Registry carcass score showed no worthwhile differences between groups. Cooking tests revealed satisfactory odour and flavour for all groups of pigs.

Skim-milk: In quality, skim-milk is the best single protein supplement for swine. It is very palatable and easily digested, and produces high daily gains.

Four experiments were conducted to compare the feeding value of skim-milk and fishmeal as a protein supplement for growing and fattening pigs. One hundred pigs were divided into uniform groups, half being fed skim-milk at a rate of 6 pounds per pig each day, and the other half fishmeal at a rate of 7 per cent of the grain ration. The pigs receiving skim-milk made an average daily gain of 1.40 pounds and consumed 334 pounds feed per 100 pounds live weight gain. Pigs receiving fishmeal made an average daily gain of 1.27 pounds and consumed 374 pounds feed per 100 pounds live weight gain.

These results show that pigs receiving skim-milk made slightly higher and more efficient gains than pigs receiving fishmeal.

Tankage and Meat Scraps: Tankage and meat scraps are excellent protein supplements for all classes of swine, especially in combination with other protein supplements.

One experiment conducted with 27 pigs to compare the feeding value of tankage with skim-milk gave the following results:

| Group | Protein supplement | Daily gain per pig | Pounds feed per 100 pounds gain |
|-------|---------------------------------------|--------------------|---------------------------------|
| 1 | 4 lb. skim-milk per pig per day | 1.13 | 407 |
| 2 | 8 lb. skim-milk per pig per day | 1.22 | 412 |
| 3 | 10 per cent ration as tankage..... | 1.06 | 409 |

The pigs receiving skim-milk gave slightly higher daily gains.

Another similar experiment conducted with 20 pigs gave the following results:

| Group | Protein supplement | Daily gain per pig | Pounds feed per 100 pounds gain |
|-------|---------------------------------------|--------------------|---------------------------------|
| 1 | 8 lb. skim-milk per pig per day | 1.57 | 524 |
| 2 | 7 per cent ration as tankage..... | 1.48 | 568 |

The results of these two experiments indicate that pigs receiving skim-milk make slightly higher daily gains than pigs receiving tankage.

An experiment was conducted with 40 pigs to compare tankage with various grades of fishmeal. Exact quantities of tankage and fishmeal were fed so as to supply the same quantity of protein in each case. The following results were obtained:

| Group | Protein supplement | Daily gain per pig | Pounds feed per 100 pounds gain |
|-------|------------------------------------------------------|--------------------|---------------------------------|
| 1A | Tankage throughout experiment..... | 1.18 | 418 |
| 1B | Tankage up to 160 lb. live weight..... | 1.25 | 414 |
| 2A | White fishmeal throughout experiment..... | 1.35 | 353 |
| 2B | White fishmeal up to 160 lb. live weight..... | 1.29 | 363 |
| 3A | B.C. low oil fishmeal throughout experiment..... | 1.36 | 376 |
| 3B | B.C. low oil fishmeal up to 160 lb. live weight..... | 1.33 | 357 |
| 4A | B.C. oily fishmeal throughout experiment..... | 1.33 | 364 |
| 4B | B.C. oily fishmeal up to 160 lb. live weight..... | 1.33 | 360 |

Pigs receiving fishmeal made greater daily gains, and consumed less feed per 100 pounds gain in live weight than pigs receiving tankage.

Linseed Oil Meal: Linseed meal is palatable to swine and has laxative qualities, which makes it especially useful in the ration for brood sows. When it is fed to growing and fattening pigs, in combination with other protein supplements, it should constitute about 25 per cent of the protein supplement mixture.

An experiment was conducted to compare the relative feeding values of skim-milk, fishmeal, tankage, and linseed meal as protein supplements for growing and fattening pigs. Forty-five pigs were divided into nine uniform groups, and fed from an average of 70 pounds to 160 pounds live weight in 60 days. The following results were obtained:

| Group | Protein supplement | Daily gain per pig | Pounds feed per 100 pounds gain |
|-------|-----------------------------------------|--------------------|---------------------------------|
| 1 | Fishmeal 7 per cent of ration..... | 1.53 | 344 |
| 2 | Fishmeal 7 per cent of ration..... | 1.61 | 327 |
| 3 | Tankage 10.8 per cent of ration..... | 1.46 | 355 |
| 4 | Tankage 10.8 per cent of ration..... | 1.36 | 362 |
| 5 | Linseed meal 15 per cent of ration..... | 1.13 | 414 |
| 6 | Linseed meal 15 per cent of ration..... | 1.25 | 373 |
| 7 | Skim-milk 6 lb. per pig per day..... | 1.63 | 334 |
| 8 | Skim-milk 6 lb. per pig per day..... | 1.62 | 335 |
| 9 | Skim-milk 12 lb. per pig per day..... | 1.83 | 332 |

These results show that skim-milk gave the best results, followed by fishmeal, tankage, and linseed oil meal.

Soybean Oil Meal: Soybean oil meal is palatable to swine, and can be used satisfactorily as the only protein supplement for growing and fattening pigs. It is good policy, nevertheless, to feed it in combination with small amounts of an animal protein supplement.

An experiment was conducted to compare the feeding values of linseed oil meals and soybean oil meal. Eighteen pigs were divided into three uniform groups, and fed from an average of 63 pounds to 186 pounds live weight in 75 days. The following results were obtained:

| Group | Protein supplement | Daily gain per pig | Pounds feed per 100 pounds gain |
|-------|---------------------------------------------|--------------------|---------------------------------|
| 1 | Control..... | 1.52 | 357 |
| 2 | Linseed meal 11 per cent of ration..... | 1.72 | 354 |
| 3 | Soybean oil meal 11 per cent of ration..... | 1.72 | 349 |

The pigs receiving linseed meal and soybean oil meal made equally good gains and were superior in daily gains to the control lot receiving no protein supplement.

Animal Proteins versus Plant Proteins: Because of the scarcity of tankage and fishmeal during the war years, it was necessary to use more plant proteins such as linseed oil meal. Three experiments were conducted to test the effect of feeding three different proportions of linseed oil meal in the protein supplement mixture, namely 25 per cent, 40 per cent, and 60 per cent of the protein supplement. The overall results of these experiments show that the pigs receiving 60 per cent linseed oil meal in the protein supplement made gains as high as 1.62 pounds per day and consumed 360 pounds feed per 100 pounds gain in live weight.

Protein Supplement Quantities: The protein-rich feeds are usually the most expensive. They are also among the most important, since they are specifically required for growth.

Two experiments were conducted with a total of 80 pigs to determine the most suitable quantity of protein in the ration for growing and fattening pigs. The results of these experiments indicate that equally satisfactory performance may be obtained from feeding 12 per cent protein supplement up to 110 pounds live weight, subsequently reduced to 6 per cent from 110 pounds to marketing, as may be obtained from feeding 15 per cent protein supplement subsequently reduced to 10 per cent.

Mineral Supplements

The swine breeder and farmer should supplement rations with ground limestone and iodized salt, in order to provide calcium, iodine, sodium, and chlorine. In the case of suckling pigs, some source of iron supply should be provided.

Two experiments were conducted with 78 pigs to demonstrate the value of a mineral mixture of ground charcoal, bonemeal, and rock phosphate, supplied at the rate of 3 per cent of the ration. Pigs receiving minerals made an average daily gain of 1.02 pounds, and consumed 419 pounds feed per 100 pounds gain in live weight. Pigs that did not receive minerals made an average daily gain of 0.75 pounds, and consumed 538 pounds feed per 100 pounds gain in live weight.

Vitamin Supplements

During winter when pigs are off pasture and there is little or no sunshine, rations should be supplemented with either a fish oil or sun-cured legume hay in racks, so as to provide vitamins A and D.

An experiment was conducted with 20 pigs to demonstrate the value of cod liver oil and minerals in the ration. Cod liver oil was fed at the rate of one-quarter ounce per pig daily, and the minerals at the rate of 3 per cent of the ration. The following results were obtained:

| Group | Vitamin supplement | Daily gain per pig | Pounds feed per 100 pounds gain |
|-------|-----------------------------------|--------------------|---------------------------------|
| 1 | Control..... | 1.03 | 388 |
| 2 | Cod liver oil and minerals..... | 1.47 | 378 |
| 3 | Minerals..... | 0.95 | 398 |
| 4 | Cod liver oil..... | 1.49 | 349 |
| 5 | Cod liver oil and wood ashes..... | 1.51 | 354 |

Pigs receiving cod liver oil made higher daily gains. Wood ashes were a good substitute for the mineral mixture.

Two experiments were conducted to compare the feeding value of cod liver oil and pilchard oil in swine feeding. Forty-five pigs were grouped into nine uniform lots, and fed from an average of 43 pounds to 167 pounds in 99 days. The fish oils were fed at the rate of one ounce per pig each day.

Control pigs that received no fish oil made an average daily gain of 1.11 pounds and consumed 385 pounds feed per 100 pounds gain in live weight. Pigs receiving cod liver oil made an average daily gain of 1.41 pounds and consumed 363 pounds feed per 100 pounds gain. Pigs receiving pilchard liver oil made an average daily gain of 1.44 pounds and consumed 360 pounds feed per 100 pounds gain.

These results show that pigs getting the fish oils made higher and more economical gains than pigs receiving no fish oil in the ration.



C. Feeder hogs raised on pasture and later penned for finishing. Good results were secured under this system.

Pasture

In summer, good pasture can be a great saving on feed for swine. Breeding stock require pasture more than other classes of hogs.

Alfalfa meal may be included in the protein supplement mixture for growing and fattening pigs. In one experiment, growing pigs were fed from an average of 27 pounds to 200 pounds, receiving alfalfa meal as 10 per cent of the protein supplement mixture. These pigs made an average daily gain of 1.46 pounds and consumed 314 pounds feed per 100 pounds gain.

Roots and Tubers

Roots and tubers are succulent, slightly laxative, and very palatable to swine.

Mangels: In one experiment some pigs received 1.25 pounds of mangels per pig each day in addition to the usual grain and fishmeal ration. These pigs made an average daily gain of 1.30 pounds and consumed 441 pounds feed per 100 pounds gain in live weight. An equal number of similar pigs receiving the same ration with no mangels made an average daily gain of 1.13 pounds and consumed 499 pounds of feed per 100 pounds gain.

Potatoes: Low grade or reject potatoes may be cooked and fed to hogs as a substitute for as much as one-half of the grain ration. Eighteen pigs were divided into three uniform groups and fed from an average of 89 pounds to 154 pounds in 48 days. In one group, boiled potatoes were used as a substitute for the entire grain ration. In another group, boiled potatoes were used to substitute for half the grain ration. The following results were obtained:

| Group | Average ration | Daily gain per pig | Pounds feed per 100 pounds gain |
|-------|---------------------------------------------------------|--------------------|---------------------------------|
| 1 | All grain..... | 1.28 | 378 |
| 2 | No grain, boiled potatoes..... | 1.09 | 351 |
| 3 | $\frac{1}{2}$ grain, $\frac{1}{2}$ boiled potatoes..... | 1.54 | 357 |

Farmers can usefully dispose of low grade potatoes by feeding them to hogs, in proportions as high as one-half of the grain ration. The potatoes must be boiled before feeding.

MANAGEMENT IN FEEDING

Swine breeders and farmers have different conditions to contend with, so it is impossible to lay down rigid rules. However, some points in feeding management deserve discussion.

Weanling Pigs: Skim-milk is excellent for weanling pigs, but if it cannot be obtained tankage is a good substitute fed at a rate of 15 to 18 per cent of the ration. Chopped oats with hulls removed is an ideal grain for young pigs.



D. A home-made electric brooder showing a large type reflector in which a 100-Watt electric globe is used. This invites the young pigs to get where it is a little warmer and lighter and saves them from being crushed.

Growing Pigs: A protein-mineral mixture should be fed at a rate of about 12 to 15 per cent of the ration to pigs between 50 and 125 pounds live weight. This should subsequently be reduced to 6 to 8 per cent between 125 pounds live weight and marketing.

An experiment was conducted with 30 pigs, fed from an average of 44 pounds to 141 pounds in 78 days, to compare the performance of pigs on three rations recommended by the British Columbia Feed Standards Board. The rations were made up as follows:

| | Ration No. 1 | Ration No. 2 | Ration No. 3 |
|--------------------|--------------|--------------|--------------|
| Ground barley..... | 200 | 200 | 500 |
| Ground oats..... | 200 | 200 | 200 |
| Ground wheat..... | 200 | 200 | |
| Wheat shorts..... | | | 200 |
| Ground peas..... | | | 100 |
| Salt..... | 6 | 6 | 10 |
| Bonemeal..... | 6 | 6 | 10 |

Ration No. 1 was supplemented with skim-milk at a rate of 6 pounds per pig each day.

Ration No. 2 was supplemented with 70 pounds of tankage.

Ration No. 3 was supplemented with skim-milk at a rate of 6 pounds per pig each day.

The following results were obtained:

| Ration Number | Daily gain per pig | Pounds feed per 100 pounds gain |
|---------------|--------------------|---------------------------------|
| 1..... | 1.29 | 334 |
| 2..... | 1.25 | 334 |
| 3..... | 1.18 | 350 |

All three rations gave satisfactory results.

The Boar: A boar should be kept in a medium but vigorous condition, supplied with good pasture during the summer, and a properly balanced ration in winter.

The Dry Sow: The dry sow should be kept on good pasture whenever possible, with about one-half to two-thirds the normal quantity of grain, supplemented with skim-milk or a protein-mineral mixture.

The Pregnant Sow: Proper feeding of the pregnant sow will result in larger, heavier, and healthier litters. It is good policy to increase the protein-mineral supplement from 5 to 7 per cent of the ration during the second half of pregnancy, when the unborn pigs are making the greatest growth. Ground limestone and iodized salt must be included in the mixture.

The Lactating Sow: For the first few days after farrowing, the sow should be given only a warm slop of bran and middlings. This should be increased gradually until the normal ration of about 10 to 15 pounds of feed is supplied. The ration should include about 8 to 10 per cent of a protein-mineral mixture.

Limited and Full Feeding: Some authorities claim that pigs should receive reduced quantities of meal until they reach 100 to 150 pounds live weight, then they should be brought to market weight on full rations.

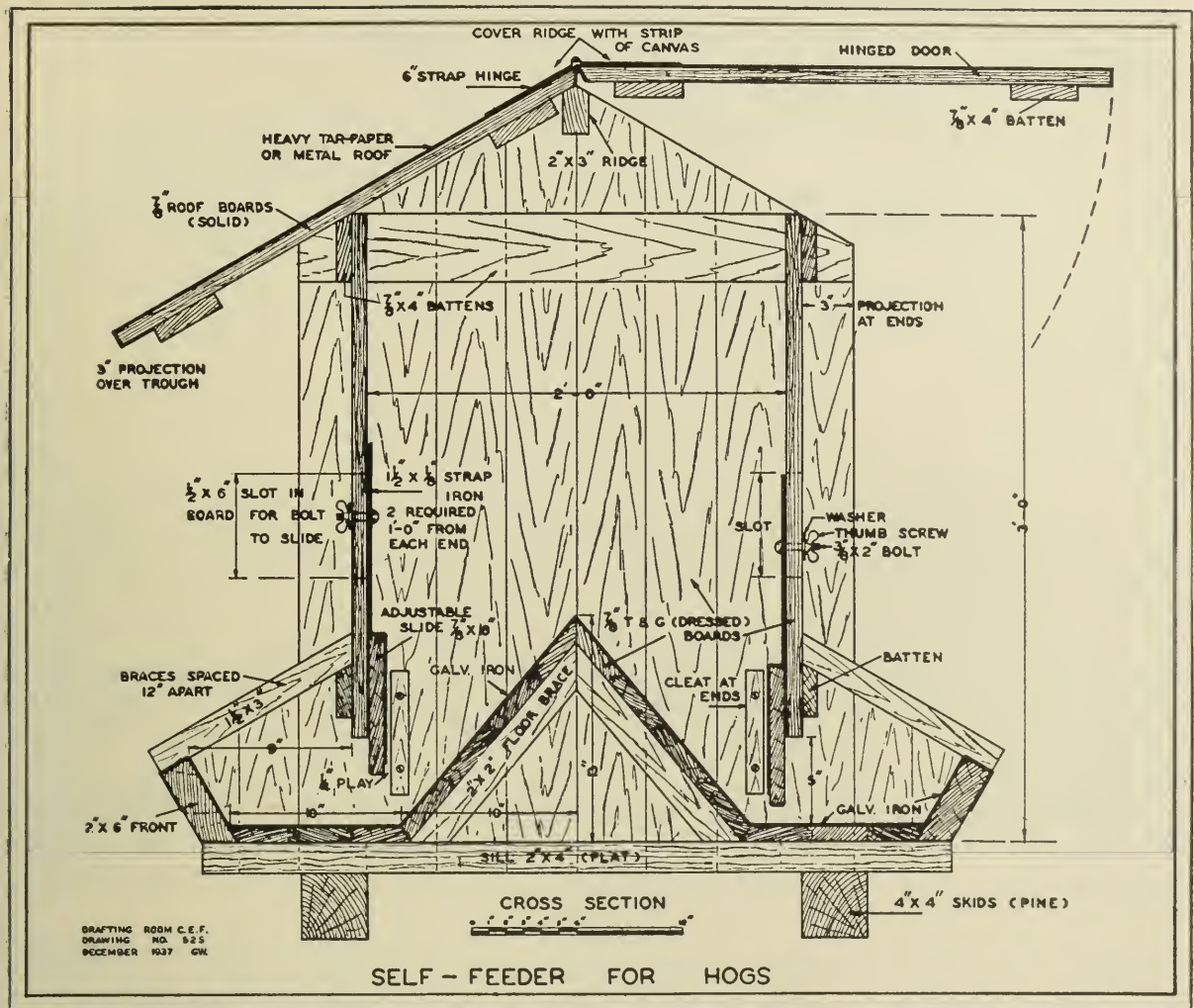
In one experiment, pigs that were fed limited quantities of grain on pasture for 54 days and then transferred to full feeding in the piggery produced longer carcasses and made slightly higher daily gains than a similar group of pigs that were fully fed in the piggery throughout the entire period of time.

Hand Feeding and Self Feeding: Self feeding is mainly a labour saving practice. Pigs on self-feeders usually produce higher daily gains, but consume more feed per 100 pounds live weight gain than hand-fed pigs. Self feeding also tends to produce over-finished carcasses.

The average results of eight experiments show that the hand-fed pigs made an average daily gain of 1.29 pounds and consumed 358 pounds feed per 100 pounds live weight gain; as compared with an average daily gain of 1.35 pounds and 383 pounds feed per 100 pounds gain for the self-fed pigs.

The hand-fed pigs gave an average Advanced Registry carcass score of 80.95 as compared with 79.53 for the self-fed pigs.

Dry Lot Feeding and Feeding on Pasture: Experimental results show that if pigs are grown and fattened on pasture, much of the feed provided by the pasture is used up to supply energy for exercise. Green feeds may be fed to best advantage by cutting off pasture and feeding in confinement on dry lots.



Fall Litter and Spring Litter Feeding: Spring and fall litters have been compared over a twelve-year period. The average number of pigs born per spring litter was 10.92 as compared with 11.29 per fall litter. At one day after birth, the average number of pigs alive was 9.59 for the spring litters with an average individual pig weight of 2.59 pounds; as compared with 10.09 for the fall litters with an average individual weight of 2.62 pounds. At three weeks after birth, the average number of pigs per litter was 7.87 for the spring, with an average individual pig weight of 11.42 pounds; as compared with 8.58 for the fall, with an average individual pig weight of 10.51 pounds.

The results show that at one day after birth the fall litters were slightly larger and more vigorous, and suffered lighter losses than the spring-farrowed litters. However, at three weeks of age, the average spring pig was heavier than the average fall pig. This may be due to the fact that since there were fewer spring pigs per litter, they obtained more milk from the sows than the larger fall litters.

Advanced Registry Feed Mixture: The Federal Department of Agriculture organized a program, designed to test the performance of purebred swine, with the object of improving the commercial hog type. This policy was started in 1928 and is known as Advanced Registry for Purebred Swine. The breeder and farmer should make good use of this policy. It is the best means available for assessing the true value of sows, and constitutes a sound basis for the selection of breeding stock.

Two experiments were conducted to test the suitability of Advanced Registry feed mixtures for the self feeding of swine. The two basal grain rations used were as follows:

| Grain | Ration A | | Ration B | |
|--------------------|--------------|-----------------------------------|--------------|-----------------------------------|
| | First period | Second period (110 lb. to market) | First period | Second period (110 lb. to market) |
| Ground barley..... | 50 | 60 | 40 | 50 |
| Ground oats..... | 30 | 10 | 40 | 20 |
| Ground wheat..... | 20 | 30 | 20 | 30 |

The protein-mineral mixture was made up as follows: tankage, 50 parts by weight; linseed meal, 25 parts by weight; fishmeal, 15 parts; iodized salt, 5 parts; ground limestone, 5 parts.

The protein-mineral mixture was fed to certain groups at a rate of 15 per cent of the ration in the first period, subsequently reduced to 6 per cent in the second period. Alfalfa meal was fed to certain groups at a rate of 5 pounds per 100 pounds ration. Skim-milk was fed to certain groups at a rate of 6 pounds per pig each day.

Eighty pigs were divided into eight uniform groups, and fed from an average of 64 pounds to 186 pounds in 102 days. The following results were obtained:

| Group | Average ration | Daily gain per pig | Pounds feed per 100 pounds gain | Advanced Registry score |
|-------|---------------------------------------------|--------------------|---------------------------------|-------------------------|
| 1 | Ration A, protein supplement, self fed..... | 1.35 | 372 | 80.0 |
| 2 | Ration A, protein supplement, hand fed..... | 1.28 | 338 | 79.0 |
| 3 | Ration B, protein supplement, self fed..... | 1.32 | 383 | 83.5 |
| 4 | Ration B, protein supplement, hand fed..... | 1.26 | 341 | 80.0 |
| 5 | Ration A, alfalfa, self fed..... | 1.34 | 408 | 80.0 |
| 6 | Ration A, alfalfa, hand fed..... | 1.26 | 348 | 84.0 |
| 7 | Ration A, skim-milk, self fed..... | 1.37 | 405 | 82.5 |
| 8 | Ration A, skim-milk, hand fed..... | 1.36 | 334 | 84.5 |

These results indicate that all four rations are suitable for the self feeding of hogs. There are only small differences in the results between the different rations, but the self-fed pigs gave higher daily gains, and used more feed to make these gains.



EXPERIMENTAL FARMS SERVICE

Acting Director, E. S. HOPKINS, B.S.A., M.Sc., Ph.D.

| | |
|------------------------------------------------|---------------------------------------|
| Dominion Field Husbandman..... | P.O. Ripley, B.S.A., M.Sc., Ph.D. |
| Dominion Horticulturist..... | M. B. Davis, B.S.A., M.Sc. |
| Dominion Cerealist..... | C. H. Goulden, B.S.A., M.S.A., Ph.D. |
| Dominion Animal Husbandman..... | Vacant |
| Dominion Agrostologist..... | T. M. Stevenson, B.S.A., M.Sc., Ph.D. |
| Dominion Poultry Husbandman..... | H. S. Gutteridge, B.S.A., M.Sc. |
| Chief, Tobacco Division..... | N. A. MacRae, B.A., M.Sc., Ph.D. |
| Dominion Apiculturist..... | C. A. Jamieson, B.S.A. |
| Chief Supervisor of Illustration Stations..... | J. C. Moynan, B.S.A. |
| Economic Fibre Specialist..... | R. J. Hutchinson. |

NEWFOUNDLAND

Officer-in-Charge, Experimental Station, St. John's, I. J. Green, B.S.A.

PRINCE EDWARD ISLAND

Superintendent, Experimental Station, Charlottetown, R. C. Parent, B.S.A., M.Sc.
Superintendent, Experimental Fox Ranch, Summerside, C. K. Gunn, B.Sc., M.Sc., Ph.D.

NOVA SCOTIA

Superintendent, Experimental Farm, Nappan, W. W. Baird, B.S.A.
Superintendent, Experimental Station, Kentville, A. Kelsall, B.S.A.

NEW BRUNSWICK

Superintendent, Experimental Station, Fredericton, S. A. Hilton, B.S.A., M.S.A.

QUEBEC

Superintendent, Experimental Station, Lennoxville, J. A. Ste. Marie, B.S.A.
Superintendent, Experimental Station, Ste. Anne de la Pocatiere, J. R. Pelletier, B.S.A., M.A., M.Sc.
Superintendent, Experimental Station, L'Assomption, R. Bordeleau, B.S.A.
Superintendent, Experimental Station, Normandin, A. Belzile, B.S.A.
Officer-in-Charge, Experimental Substation, Ste. Clothilde, F. S. Browne, B.S.A.

ONTARIO

Central Experimental Farm, Ottawa.
Superintendent, Experimental Station, Kapuskasing, F. X. Gosselin, B.S.A.
Superintendent, Experimental Station, Harrow, H. F. Murwin, B.S.A.
Officer-in-Charge, Experimental Substation, Delhi, L. S. Vickery, B.S.A., M.Sc.
Officer-in-Charge, Experimental Substation, Smithfield, D. S. Blair, B.S.A., M.Sc.
Officer-in-Charge, Experimental Substation, Woodslee, J. W. Aylesworth, B.S.A., M.S.

MANITOBA

Superintendent, Experimental Farm, Brandon, R. M. Hopper, B.S.A., M.Sc.
Superintendent, Experimental Station, Morden, W. R. Leslie, B.S.A.
Officer-in-Charge, Pilot Flax Mill, Portage la Prairie, E. M. MacKey, B.S.A.

SASKATCHEWAN

Superintendent, Experimental Farm, Indian Head, J. G. Davidson, B.A., B.S.A., M.S.A.
Superintendent, Experimental Station, Scott, G. D. Matthews, B.S.A.
Superintendent, Experimental Station, Swift Current, G. N. Denike, B.S.A.
Superintendent, Experimental Station, Melfort, H. E. Wilson, B.S.A.
Superintendent, Experimental Substation, Regina, J. R. Foster, B.S.A.
Superintendent, Forest Nursery Station, Indian Head, John Walker, B.Sc., M.S.
Superintendent, Forest Nursery Station, Sutherland, W. L. Kerr, B.S.A., M.Sc.

ALBERTA

Superintendent, Experimental Station, Lacombe, G. E. DeLong, B.S.A., M.Sc.
Superintendent, Experimental Station, Lethbridge, A. E. Palmer, B.Sc., M.Sc.
Superintendent, Experimental Station, Beaverlodge, E. C. Stacey, B.A., M.Sc.
Officer-in-Charge, Range Experiment Station, Manyberries, H. F. Peters, B.S.A.
Officer-in-Charge, Experimental Substation, Fort Vermilion, V. J. Lowe.

BRITISH COLUMBIA

Superintendent, Experimental Farm, Agassiz, W. H. Hicks, B.S.A.
Superintendent, Experimental Station, Summerland, R. C. Palmer, B.S.A., M.Sc., D.Sc.
Superintendent, Experimental Station, Prince George, F. V. Hutton, B.S.A.
Superintendent, Experimental Station, Saanichton, J. J. Woods, B.S.A., M.S.A.
Superintendent, Experimental Substation, Smithers, W. T. Burns, B.S.A., M.Sc.
Officer-in-Charge, Range Experiment Station, Kamloops, T. G. Willis, B.S.A., M.S.A.

YUKON AND NORTHWEST TERRITORIES

Officer-in-Charge, Experimental Substation, Whitehorse, Y.T., J. W. Abbott.
Officer-in-Charge, Experimental Substation, Fort Simpson, N.W.T., J. A. Gilbey, B.S.A., M.Sc.

OTTAWA
EDMOND CLOUTIER, C.M.G., O.A., D.S.P.
KING'S PRINTER AND CONTROLLER OF STATIONERY
1950