UNIVERSITY OF IDAHO
AGRICULTURAL EXPERIMENT STATION
SANDPOINT SUBSTATION

Grains for the Cut-Over Lands of Northern Idaho

by
J. H. CHRIST

Fig. 1. Fall Grain Plats at the Sandpoint Substation

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Grains for Cut-Over Lands of Northern Idaho

By J. H. CHRIST *

THE success of farming in any region depends on the use of adapted, high yielding varieties. In the area represented by the timbered countries of northern Idaho this factor is just as important as elsewhere, and since the inauguration of experimental work at the Sandpoint Substation of the University of Idaho Experiment Station, the testing of grain varieties has received a major amount of attention. Grain production does not assume the importance that is given to the production of forage crops. In this area practically all the feed grown is used locally. Occasionally a car of oats is sent to a larger nearby market, but wheat and barley rarely meet the local demands and many carloads of corn are received each year from distant points to supply the needs of these farmers.

The purpose of this bulletin is to summarize the experimental work of the Sandpoint Substation which has dealt with cereal production, covering the work with varieties of grain and peas, rates of seeding, dates of seeding, and other experiments treating with cultural practices.

Other bulletins† issued by the Idaho Experiment Station have treated of the general aspects of the region and it is not necessary to go into detail in this publication with a discussion of these features except to state that the holdings average approximately 160 acres per farm with about 30 per cent of this cleared and in crop.

Nearly a third of the cleared acreage is used for grain production. The major portion of the farm income is derived from the sale of animals and animal products, principally dairy cattle. A grain crop is important to make use of the nitrogenous products accumulated by the growth of legumes. The cultivation which is necessary for grain production also frees the land of bluegrass which is so detrimental to long established stands of leguminous crops. It usually takes two or three years to kill out a heavy bluegrass sod and the grain crop is the one on which most dependence is placed for this purpose. A grain crop is also most commonly planted as the first crop after a piece of land is cleared. The newly cleared land is usually too rough for meadow seedings and the planting of grain and subsequent tillage operations of plowing,

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†Idaho Bul. 169. J. H. Christ. Alfalfa on the Cut-Over Lands of Northern Burned-Over Areas of North Idaho.
Idaho Bul. 136. G. R. McDole and J. H. Christ. Farming Practices for the Cut-Over Lands of Northern Idaho.
Idaho Bul. 141. H. W. Hulbert and J. H. Christ. Growing Sunflowers for Silage in Idaho.
Idaho Bul. 158. J. H. Christ. The Cut-Over Lands of Northern Idaho.
Idaho Bul. 169. J. H. Christ. Alfalfa on the Cut-Over Lands of Northern Idaho.

disking, and leveling brings the land to a more satisfactory surface for forage seedings. Grain is not recommended as a nurse crop except under limited conditions.

Power machinery is not frequently used in any of the operations of grain production on small fields. Fall plowing is the general practice except where the land has been cleared late in the spring and then left to lie in a summer fallow condition until seeding time for fall grain. The practice of fall plowing permits a better seasonal distribution of labor so that in the spring land preparation can be made earlier. The moisture retention is also higher in fall plowed land. This is especially a factor in a year when the spring precipitation is below normal and the soil cannot be brought up again to its greatest moisture-holding capacity after the plowing operations by the subsequent rainfall.

Soil Preparation and Seeding Practices

Very little difficulty is presented in preparing most of the soils in the forested areas for crop. The land is easily worked at the time of seeding and only on the heavier types does it have a tendency to clod or bake if the cultivation is insufficient or performed when having a high moisture content. Double disking and harrowing are normally all the tillage required in preparing a seed bed. If the land is weedy it may be necessary to reharrow to kill out the young weeds that start before the grain seedings are made.

Drilling of grain is the common practice. A few farmers having small acreages occasionally resort to broadcasting but when a drill is available its use is to be preferred because of the uniform distribution and covering of the seed. Most grain seedings are rolled after they are seeded and data are given in the following table which shows the advantage of this practice:

TABLE I.

Showing the Effect of Rolling Spring Wheat at the Sandpoint Substation 1928, 1929 and 1930

Treatment	Yield bushels per acre 1928	1929	1930	Aver.
Rolled	28.0	24.6	38.3	30.3
Not Rolled	24.6	19.3	34.5	26.1

These data show a substantial increase in yield by using a roller following the seeding operation. Rolling likewise promotes a more uniform germination with an emergence one to two days earlier than where it is not done.

The crop with which this test was made was Pacific Bluestem wheat. The grain on the non-rolled plots broke down badly at ripening time while that on those which were rolled was erect on the light soil at the Sandpoint Substation. This effect is shown in Figure 2. On seeding of fall grain the results for rolling have not been so positive. When the land has had a plentiful supply of moisture, rolling has given slight increases in yield, but when the land is dry and dusty

rolling forms ridges on the roller edges. These ridges are frequently so deep that the seedlings do not emerge through them. Where the crop preceding fall grain has been a legume or sod, the roots of these crops hold the roller up and the beneficial effect of the implement is obtained.

Fall Wheat

Wheat is the most important cereal grown in northern Idaho. Most of the wheat acreage on the upland farms is devoted to the growing of fall varities. Fall wheat is the highest yielding of all cereal crops. Except in occasional years when winter killing is severe, it usually outyields spring wheat about 30 per cent. The time of planting fall wheat is very important to obtain maximum yields. Five years' results are presented in the following table on seedings of wheat made August 15, September 8 and October 2.

Fig. 2. Rolled Seeding, Left, Not Rolled on Right

TABLE II.

Showing Effect of Rate and Date of Seeding on the Yield of Winter Wheat, at the Sandpoint Substation, 1923 to 1927, Inclusive

Date of Planting	Rate of Seeding Lbs. Per Acre	Yield bushels per acre 1923	1924	1925	1926	1927	5-Year Aver.
Aug. 15	60	25.6	34.2	19.7	26.1	36.3	28.4
" "	90	25.7	40.3	22.7	25.8	39.1	30.7
" "	120	24.9	40.1	25.2	23.9	36.7	30.2
Sept. 8	60	20.2	36.0	5.7	21.2	26.1	21.8
" "	90	21.7	42.3	7.1	19.9	29.5	24.1
" "	120	22.9	38.1	12.3	17.5	33.0	24.8
Oct. 2	60	16.0	23.6	.....	14.1	13.5	13.4
" "	90	18.9	26.1	.....	15.1	23.7	16.8
" "	120	18.3	27.9	.....	21.4	26.9	18.9

The advantage of the August seedings are clearly shown in these data. In some localities good results are had by even earlier seedings, sometimes as early as the last decade of July. The early seeded fields do not often make excessive growth so that pasturing is necessary to

prevent the crop from heading. The October seeding represented in this experiment was made on as late a date as seeding could be and still have the plants emerge before winter conditions prevented further growth. These late plantings did not have a chance to stool out and mat together any year of the experiment. During the severe winter of 1924-1925 the October planting was killed completely. Other years the yields were not equivalent to those of the earlier seedings. Seedings made so late that the plants did not emerge prior to the winter freezeup have never approached the yields of normal seedings. The 90-pound rate of seeding has given most satisfactory results except on the late seeding when an increase of rate has justified the use of extra seed.

The yields of the fall wheat varities tested at the Sandpoint Substation for the past eight years are shown in the table which follows. Jenkin and Coppei were dropped from the tests because of poor winter hardiness. White Odessa, which is not included in these data, was tested one year and because it killed so easily was not used in further work. Averages are given of the yields, but for a more exact rating of the various varieties the reader should study the last column in which the yield of each variety is compared to a standard for the years in which it was grown.

TABLE III.

Showing Yield of Fall Grain Varieties at the Sandpoint Substation, 1923-1930, Inclusive

Variety	Yield bushels per acre									Yield in Per Cent of Jones Fife
	1923	1924	1925	1926	1927	1928	1929	1930	Ave.	
Jones Fife	31.7	24.4	13.7	24.1	32.2	42.1	34.4	31.3	29.2	100.0
Hybrid 128	35.6	25.8	7.5	29.4	33.0	37.7	51.6	22.1	30.3	103.6
Goldcoin	30.4	23.1	9.1	23.6	36.6	38.9	38.4	28.5	28.6	97.9
Jenkin	16.7	23.1	.....	31.5	.....	.....	.....	.....	11.9	42.5
Mosida	37.9	26.4	12.7	28.8	43.8	36.0	44.3	31.0	32.6	111.6
Turkey Red	33.9	21.9	11.9	25.1	37.6	16.3	42.6	23.8	26.6	91.1
Coppei	32.3	21.6	.....	.....	.....	.....	.....	.....	18.0	77.3
Triplet	.....	.....	4.3	29.1	39.6	34.6	45.8	26.0	29.9	101.0
Ridit	.....	.....	10.5	27.3	36.1	28.0	39.8	32.5	29.0	98.3

Mosida, which has a rating of 111.6 per cent of Jones Fife, is the most outstanding variety used in the trial. In a recent farm survey Mosida constituted 80 per cent of the fall wheat acreage in Boundary and Kootenai counties so that it can be obtained readily by growers who wish to take advantage of its high yielding ability. Mosida is a beardless, hard, red wheat developed and distributed by the Idaho Experiment Station. Jones Fife is a variety that has been extensively grown but because of its lower yield and easier shattering should not be recommended in these areas. Varieties that do not exhibit a high degree of winter hardness are also unsuited. A complete failure of fall wheat plantings is rare but the winters are generally severe enough to make the use of the more hardy varieties necessary. Winter wheats are usually ripe the middle of July.

Spring Wheat

Spring wheat finds usage on farms where it is difficult to prepare the land early enough for fall seeding or where fall seeded grain has killed out. Other areas that are suited to spring wheat are those where the land is too wet for fall grains or in others where frost conditions are detrimental to fall varieties. Wherever fall varieties can be grown the superior yield leaves no question but that they should be used. Under normal conditions fall wheat outyields spring wheat about 30 per cent.

Investigation was made of the dates when spring wheat could be most advantageously seeded. The experiment in which this was determined was started in 1923 and finished in 1927. Seedings were made each year as early in the spring as the land could be prepared. This varied widely with the seasons from the earliest date of March 13 in 1924 to the latest early planting on April 15 in 1927. The mid-early plantings were made three weeks later and the late planting followed this by three weeks, making a total elapse of six weeks between the earliest seeding and the latest. The data for this experiment are shown in the following table:

TABLE IV.

Showing the Effect of Rate and Date of Seeding on the Yield of Spring Wheat, 1923-1927, Inclusive

Time of Planting	Rate of Seeding	1923	1924	1925	1926	1927	5-Year Average
Early	60 pounds	18.9	19.2	18.8	21.7	14.8	18.7
"	90 "	23.0	18.5	16.6	21.2	19.5	19.8
"	120 "	21.7	21.8	26.0	18.6	18.9	21.4
Mid-early	60 "	19.9	25.0	21.7	21.0	13.9	20.3
"	90 "	21.0	24.8	21.4	18.1	19.7	21.0
"	120 "	19.2	20.1	21.1	23.1	19.6	20.6
Late	60 "	3.4	11.8	9.4	18.0	6.1	9.7
"	90 "	3.6	15.7	8.8	24.8	11.4	12.9
"	120 "	3.6	17.2	9.3	20.7	13.8	12.9

The aforegoing results show a slightly higher yield for the mid-early plantings, with the late plantings very poor in comparison. The number of days for the seedling plants to emerge were 24 days with the early seeding, 14 for the mid-early and 9 for the late. The slow development of the plants in the cold, wet soil of early spring undoubtedly was the factor which made the early planting less productive than the mid-early planting. There seems to be no advantage in using in excess of 90 pounds of seed per acre with spring wheat.

The yields of all the varieties of spring wheat that have been grown in plat trial are shown in the next table. These are tabulated by averages and also by rating them in per cent of a standard variety.

Pacific Bluestem, Jenkin, Defiance, and Supreme outyielded Marquis, which was used as a standard for comparison. The first three of these are late maturing spring wheats. Bluestem matures satisfactorily over most of the areas but Jenkin, which ripens nearly eight

TABLE V.

Showing Yield of Spring Wheat Varieties at the Sandpoint Substation, 1923-1930, Inclusive

Yield bushels per acre

Variety	1923	1924	1925	1926	1927	1928	1929	1930	Aver.	Per Cent of Marquis
Pacific Bluestem	19.8	29.0	38.7	21.1	12.8	12.4	19.7	19.3	21.6	110.8
Federation	14.5	23.8	38.7	15.1	11.7	.....	.....	.....	20.8	98.1
Hard Federation	13.5	15.9	32.7	10.5	9.8	.....	.....	.....	16.5	77.8
Baart	18.4	22.4	35.1	16.2	12.2	.....	.....	.....	20.9	98.6
Marquis	17.4	24.3	34.2	17.0	13.1	13.6	18.1	17.9	19.5	100.0
Defiance	18.8	24.9	35.7	17.7	12.6	11.8	19.9	15.8	19.7	101.0
Jenkin	21.5	20.3	45.0	22.4	9.1	11.7	17.9	14.4	21.4	109.7
Red Bobs	.....	.....	.....	17.5	13.1	11.5	17.6	14.6	14.9	94.9
Quality	.....	.....	.....	12.4	11.6	6.3	.....	.....	10.1	69.2
Supreme	.....	.....	.....	.....	4.2	12.6	18.7	17.5	15.8	100.6
Reward	.....	.....	.....	.....	11.8	10.3	16.4	15.1	13.5	86.0
Reliance	.....	.....	.....	.....	.....	14.4	14.6	14.3	14.4	87.3
Garnet	.....	.....	.....	.....	.....	.....	15.9	16.3	16.1	89.4

days later, in many places does not ripen soon enough to escape fall frosts and fall rains. The use of Jenkin should be confined to those localities having a long growing season. The hard, red spring varieties like Marquis, Supreme, and Red Bobs are suited to the lower lying lands where early soil preparation is not practical or where late spring frosts and early fall frosts make it necessary to use a variety that will mature in the shortened period. Normally spring wheats ripen between August 5 and August 24.

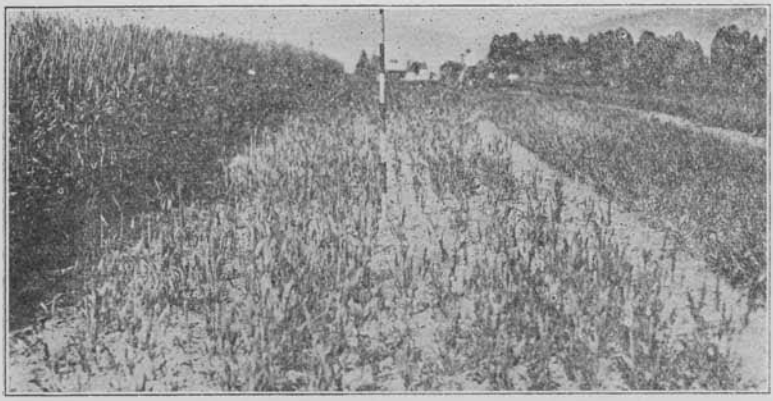

Fig. 3. Showing Winter Killing in Late Seeded Fall Grain

Barley

The production of barley has not assumed very much importance. Barley has a feeding value approaching that of corn and at this time there is a tendency for the farmers to make greater use of the crop. Only a small amount of corn is grown in northern Idaho. It is generally low in yield and unadapted to many places. The use of barley as a substitute for corn is important. The beardless varieties are sometimes grown for hay or for "hogging-off" purposes but those most commonly used are bearded varieties. In our data the bearded varieties, and particularly the two-rowed sorts, are the higher yielding.

Barley is planted under conditions similar to wheat, using about two bushels of seed per acre. Ripening normally takes place the last of July and the forepart of August. The following table shows the yield of the barley varieties tested at Sandpoint the past eight years:

Trebi barley has received a general distribution throughout northern Idaho and has produced satisfactory yields. From these data, however, it would seem from the shorter period during which they have been grown that Trebi could be replaced by Hannchen or Charlottetown 80. These are two-rowed barleys that produce a plump grain under practically all conditions. Charlottetown 80 is a selection of the Chevalier group of barleys made at the Experiment Farm, Charlottetown, Prince Edward Island, Canada. In years when barley is forced

TABLE VI.

Showing Yield of Barley Varieties at the Sandpoint Substation, 1923-1930, Inclusive

Yield bushels per acre

Variety	1923	1924	1925	1926	1927	1928	1929	1930	Aver.	Per Cent of Trebi
White Smyrna	22.0	44.3	47.8	23.7	19.0	18.6	.....	.....	29.2	101.7
Trebi	24.8	28.7	51.5	29.3	15.9	22.2	19.6	24.6	27.1	100.0
Han River	22.1	22.5	44.2	23.9	22.6	29.6	20.7	23.7	26.2	96.7
Horsford	17.5	21.1	45.3	31.5	19.0	20.5	20.3	26.8	25.3	93.4
Winter Club	.....	26.6	43.1	29.4	15.1	26.1	15.0	25.0	25.8	94.2
Colsess	.....	.....	.....	29.3	22.7	12.9	20.1	29.0	22.8	102.2
Nepal	.....	.....	.....	28.5	11.2	16.2	17.6	24.1	19.5	87.4
Faust	.....	.....	.....	25.5	10.6	22.5	12.8	21.5	18.6	83.4
Charlottetown 80	.....	.....	.....	.....	19.3	30.6	21.9	22.8	23.7	115.0
Hannchen	.....	.....	.....	.....	.....	.....	26.1	26.7	26.4	119.0
Beldi	.....	.....	.....	.....	.....	.....	20.3	23.8	22.1	100.0
Flynn	.....	.....	.....	.....	.....	.....	19.0	18.9	19.0	86.0
Etond	.....	.....	.....	.....	.....	.....	17.4	26.0	21.7	98.2

into a short ripening period most of the six-rowed varieties do not fill out well and produce the plumpness of kernel that is found with the two-rowed varieties. White Smyrna has the ability to produce well but has such a short straw that its use is unadvisable. Shortness of straw is often a factor on many farms. Adding a small amount of oats to the barley at planting time makes binding easier at maturity and also decreases the loss that otherwise might result from the grain being uncut or slipping from the binder or out of the bundles after they have been tied. From a test made in 1930, using various mixtures of oats and barley in seeding combination, there was no appreciable difference in yield in pounds per acre between straight seedings of barley and oats and the various portions of each between these points. The higher value of the barley for feed would of course warrant using a higher percentage of barley than oats in combination seedings of this nature.

Oats

Oats are extensively grown on the lower lands of northern Idaho, and on the peat and other wet soils, is the most important cereal. On the upland farms the crop is not so valuable and will ordinarily not produce the feed value per acre that is obtained from either wheat or barley. Seedings are usually made at about the same time as wheat and barley and the rate of seeding varies from two to three bushels per acre. A number of varieties of oats have been grown at Sandpoint in the past eight years and the yields of these are shown in the accompanying table.

Idamine, Markton, Abundance, Banner and in the few years that it has been grown, Nova, have been the high yielding varieties. Idamine, Markton and Victory are common varieties found in the oat growing sections which are available to growers. Oat harvest usually starts the forepart of August.

Field Peas

While field peas are a leguminous crop they are handled in much the same way as the cereals and can be included in this publication. The most extensive use of the crop is in forage production but the growing of the crop for seed purposes is assuming importance. In certain localities canning and garden varieties have been grown under contract with seed companies and have been valuable additions to the farm income. In this work attention has been given only to the crop from the field pea basis. In the following data it is shown that highest yields of peas are obtained from the earliest seedings. In this work the plantings were made as early in the spring as the land could be prepared and subsequent plantings were made at three-week intervals, making a spread of six weeks between the earliest and latest seedings.

TABLE VII.

Showing Yield of Oat Varieties at the Sandpoint Substation, 1923-1930, Inclusive

Variety	Yield bushels per acre									
	1923	1924	1925	1926	1927	1928	1929	1930	Aver.	Per Cent of Silvermine
Early Mountain	35.1	30.0	74.8	45.9	33.9	.....	.....	.....	43.9	95.9
Victory	31.3	33.4	81.5	44.0	37.2	34.2	27.9	28.0	39.7	99.5
Reg. Swedish Select	27.0	36.1	71.1	43.0	30.5	.....	.....	.....	41.5	90.6
Silvermine	30.6	46.9	75.3	45.6	30.4	31.0	27.3	31.8	39.9	100.0
Idamine	37.8	50.0	74.4	45.4	30.5	38.7	26.8	30.2	41.7	105.0
Markton	.....	50.0	71.7	41.7	34.5	39.7	33.4	34.5	43.6	105.8
Abundance	.....	48.5	78.4	42.9	34.1	36.1	25.8	31.1	42.4	105.9
Banner	.....	49.3	83.1	44.9	32.6	39.9	23.9	25.4	42.7	103.4
White Tartarian	.....	43.1	70.6	33.8	22.9	.....	.....	.....	42.6	85.9
Kherson	.....	.....	.....	41.2	23.8	.....	.....	.....	32.5	85.5
Gray Winter	.....	.....	.....	31.1	31.5	.....	.....	.....	31.3	82.4
Hulless	.....	.....	.....	21.3	10.5	.....	.....	.....	15.9	41.8
Ottawa	.....	.....	.....	.....	10.8	12.6	14.3	12.4	12.5	41.5
Crown	.....	.....	.....	.....	25.8	26.8	19.3	24.7	24.2	80.4
Golden Rain	.....	.....	.....	.....	29.6	33.9	26.3	29.6	29.9	99.3
Nova	.....	.....	.....	.....	.....	.....	32.8	33.5	32.9	111.1

TABLE VIII.

Showing the Yields of Field Peas From Plantings Made at Various Dates at the Sandpoint Substation, 1925-1929, Inclusive

Time of Planting	Yield bushels per acre 1925	1926	1927	1928	1929	5-Year Ave.	Per cent Yield of Mid-Early Seeding
Early	23.8	13.6	14.6	21.0	24.6	19.5	118.9
Mid-early	18.7	12.2	11.8	22.2	17.0	16.4	100.0
Late	11.3	7.1	9.4	12.7	14.2	10.9	66.5

Two of the most important varieties were also planted at varying rates of seeding for a five-year period. The rates were from one bushel per acre to two and a half bushels per acre, and in all cases they showed an increase in production to the maximum rate. Because of the expense of seed, most farmers hesitate to seed over a bushel and a half per acre. From these data it is shown that the yield of the heavier seedings is enough to justify the use of the heavier rates.

TABLE IX.

Showing Yield of Two Varieties of Field Peas With Varying Rates of Seeding at the Sandpoint Substation, 1926-1930, Inclusive

Variety	Rate Pounds Per Acre	Yield bushels per acre 1926	1927	1928	1929	1930	Ave.
Kaiser	60	10.5	13.6	17.8	10.6	8.5	12.2
"	90	12.5	17.6	21.9	13.2	12.6	15.6
"	120	12.5	20.4	26.1	17.2	13.0	17.8
"	150	14.7	24.6	27.9	20.1	21.3	21.7
White Canada	60	9.0	18.2	19.5	11.6	14.1	14.5
"	90	11.4	20.2	21.3	16.5	14.7	16.8
"	120	10.9	20.2	20.5	18.2	17.9	17.5
"	150	12.5	19.7	21.7	21.2	20.5	19.1

Since most of the peas in the northern Idaho section are grown for forage purposes, the choice of a variety demands high seed yield and also high forage production. In the comparison of the seven varieties that were used in the past eight years, White Canada showed slightly higher seed yield than the Kaiser but for forage purposes the Kaiser produces more growth.

TABLE X.

Showing Yield of Field Pea Varieties at the Sandpoint Substation, 1923-1930, Inclusive

Variety	Yield bushels per acre 1923	1924	1925	1926	1927	1928	1929	1930	Ave.	Per cent of Kaiser
Bangalia	25.3	16.9	16.3	8.4	12.9	9.4	11.4	13.1	14.2	80.2
Kaiser	21.2	17.7	23.3	13.8	19.8	21.0	11.4	12.9	17.7	100.0
White Canada	27.3	17.8	23.8	12.0	19.1	13.4	13.1	17.3	18.0	101.7
Alaska	18.4	13.7	17.3	8.2	17.9	8.1	10.0	14.9	13.6	76.8
Bluebell	17.5	14.8	22.5	8.6	14.4	14.1	6.3	12.8	13.9	78.5
Idabell	.....	.....	.....	9.9	13.9	14.3	7.9	16.4	12.5	79.1
Everbearing	.....	.....	.....	8.6	15.0	11.2	7.3	13.6	11.1	70.3

Miscellaneous Crops

In addition to the varieties of crops that have preceded this a few other grains have been tried for varying periods. Most of these have been unsuited to northern Idaho conditions, but for the information of anyone interested in this material the following table is included which gives the yield obtained. Black Winter emmer, White Canada peas and Gray Winter oats did not prove winter hardy for the conditions under which they were grown. Buckwheat bloom blasted in the heat of midsummer in certain years and was caught by frost at other times.

TABLE XI.

Showing Yield of Miscellaneous Crops at the Sandpoint Substation, 1923-1930, Inclusive

Variety	Yield bushels per acre								
	1923	1924	1925	1926	1927	1928	1929	1930	Ave.
Winter Club barley	39.2	24.3	.....	37.2	12.1	21.3	53.0	.....	23.4
Rosen rye	.....	26.4	29.5	25.7	41.6	51.1	34.8	31.9	34.4
Black Winter emmer	.....	25.7	.....	36.2	48.4	26.1	.....	.....	27.3
White Canada peas (fall seeded)	.....	.....	.....	17.3	.....	.....	.....	.....	4.3
Gray Winter oats (fall seeded)	.....	.....	.....	32.7	.....	.....	.....	.....	8.2
Vernal emmer	30.9	41.5	31.4	32.8	21.1	21.1	24.9	24.3	28.5
Spring rye	15.9	30.7	19.7	24.1	22.4	10.2	26.2	20.8	21.3
Flax	5.3	4.1	3.9	2.9	7.8	.....	.....	.....	4.8
Buckwheat	10.0	.....	.....	.....	7.3	.....	.....	.....	3.5

Grain Hay

Grain hay is the most important annual that can be planted for forage purposes in northern Idaho. For the farmers in the cut-over districts it is often necessary to resort to seedings of this sort to furnish enough hay to winter their livestock. Perennial legume seedings do not generally make sufficient gowth the first year to be of much value, consequently the new settler, or others where forages have been lost by winter killing, have to resort to a crop of this nature. In the five years that combination seedings of grains and annual legumes have been tested at Sandpoint, fall seeded rye and vetch have outyielded other combinations. Because of the poor feeding of rye hay this crop cannot be used very extensively. Fall wheat and vetch, while not producing the yield of the former, makes a much more suitable crop with good yield and feed value. With the spring seedings oats and peas, and wheat and peas, were slightly higher yielding than barley and peas, and wheat and vetch. The yields of the various combinations are given below:

TABLE XII.

Showing the Yield of Grain Hay and Legume Combinations at the Sandpoint Substation, 1926-1930, Inclusive

Combination	Yield bushels per acre					
	1926	1927	1928	1929	1930	Ave.
Rye and Vetch	4582	10040	5840	12400	8320	8236
Fall Wheat and Vetch	3465	8240	8050	12000	5400	7431
Barley and Peas	2440	2600	3080	2380	3520	2804
Oats and Peas	3040	3320	2600	3360	3320	3128
Wheat and Peas	2480	1760	4320	4240	3600	3280
Wheat and Vetch	2440	1720	3160	4360	3520	3040

In this experiment the grains were seeded about 70 pounds per acre, the winter vetch 20 pounds per acre, spring vetch 40 pounds per acre and peas 70 pounds per acre. For ordinary seeding the grain and legume can be mixed and seeded at the same time. It is usually necessary to set the drill a few points beyond that required for the grain when seeded straight. The averages of various seeding combinations of oats and peas for a four year period are presented in the next table.

Fig 4. Pea Varieties at the Sandpoint Substation, Showing Method of Handling to Prevent Blowing and Mixing

TABLE XIII.

Showing Effect on Yield of Pea and Oat Hay With Varying Rates of Seed at the Sandpoint Substation. Average for Four Years, 1921-1924, Inclusive

Amount of Seed Pounds Per Acre		4-Year Ave. Acre Yield
Peas	Oats	
60	30	1921
60	50	1928
60	70	1926
90	30	1951
90	50	2130
90	70	2494
120	30	2040
120	50	2045

These data show that highest yields were obtained from the higher amounts of seed planted per acre. The seed cost of such plantings brings the original investment for this hay to quite a high figure. Oat and pea hay is very palatable to all kinds of livestock. It is especially well adapted to growth on the lower more moist lands, and under the conditions of this experiment.

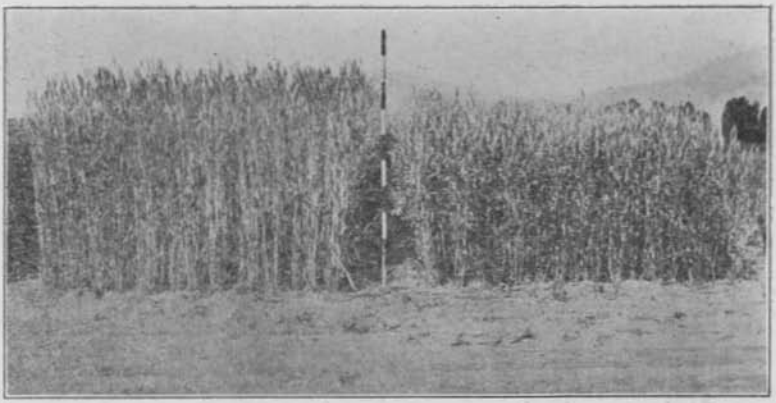

Fig. 5. Fall Rye and Vetch on Left, Fall Wheat and Vetch on Right