Title: EXPERIMENTAL WORK WITH WINTER WHEAT IN OMSK OBLAST' by N. A. Belozerova (USSR)

Source: Agrobiologiya, No 3, May-June 1949, pp 142-159, Russian Bimonthly periodical

CONFIDENTIAL

EXPERIMENTAL WORK WITH WINTER WHEAT IN OMSK OBLAST

N. A. Belozerova

Siberian Scientific Research

Institute of Grain Culture, Omsk.

This report is a direct extension of our work which was published in the journal "Agriobiologiya", issue No. 2, 1947. In that work we drew the following conclusions on the basis of experimental data concerning the planting of winter wheat on stubble, and the effect of the preceding crop on this planting, and in turn, of the stubble crop on the succeeding crop.

Tests conducted at the Institute on the planting of winter wheat on stubble and fallow confirmed the wisdom of Academician T. D. Lysenko's suggestion to plant winter wheat in the uncultivated stubble of spring grains in the steppes and open sections of the wooded steppes of Siberia.

1. When planted on untilled stubble in the steppes of Siberia, not only the variety strongly resistant to frost (Lutestsens 0329) wintered well, but also the less frost resistant varieties, such as Ukrainka, and Eritrospermum 1160 which was changed in Odessa from a spring to a winter variety, and even the spring wheat Mil'turum 0321.

2. Tests under optimum conditions for the production of high yield winter wheat by stubble planting showed that yields of 15-16 centners per hectare were easily attained. By the production of yields of 31.41 centners per hectare by planting winter wheat on the stubble of spring wheat which in turn had been planted in fallow ground, it was shown that by creating good soil conditions for the preceding spring crop it was possible to further increase the yield of winter wheat on stubble.

3. The stubble planting of winter wheat as the crop before spring wheat results in a significant increase in yield over the yield of spring wheat on old land.

4. Tests conducted with stubble planting of the conversion of spring wheat onto winter wheat, confirm the possibility of creating high-yield strongly frost-resistant varieties of winter wheat in Siberia by this method of cultivation.

This article contains the results of further studies of this problem.

The results of six years of investigation completely confirm not only that the wheat winters well, but that it is possible to produce high yields of winter wheat in the steppe and wooded steppe regions of Siberia by planting it on stubble by Academician T. D. Lysenko's method.

In 1948 the aim of the experimental work was to develop methods for producing high yields of winter wheat and extending the area in which it was planted to kolkhozes and sovkhozes.

Therefore in 1948 we set ourselves the following tasks;

a) to produce on a 17-hectare section of the Laboratory of Agricultural Engineering an average yield of 18 centners per hectare and on individual areas up to 30 centners per hectare.

b) to secure the production of an average yield of 16 centners per hectare on 60 hectares of the Institute's secondary sections.

c) to secure the production on an average winter wheat yield of not less than 10 centners per hectare in the sovkhozes and kolkhozes.

The results of the tests and the conditions under which they were conducted are cited below.

Conditions During the Winter and a Short Description of the Vegetative Period of 1947/48

In September the temperature was 1.2° below the average for many years; October and November were sunny and dry with considerably higher than usual temperatures (+3.4°), and frequent deep thaws. The moisture content of the upper layers of soil (0-10 cm) on 6 September was 24 mm. The winter wheat seedlings emerged on the 10th to the 13th day. At the beginning of the winter the winter wheat was in the first stages of tillering.

It was noted that large-scale leaf growth stopped on 12 October although some growth continued until 27 October. The presence of moisture in the soil at the beginning of winter created favorable conditions for seedlings and the development of winter wheat on stubble.

The winter of 1947/48 was one of little snow, and the temperatures were above average, 5° in November, 7° in January, 1° in February, and 2° in March. December was the coldest month, particularly between the 10th and 15th, when the atmospheric temperature dropped down to -38°, and the average for a third of the five day period was -32°.

The first snowfall, on 28 October, was 1-3 cm. At the time of the thaw (November 6 to 8) the snow melted on approximately half the area, and the snow which remained lasted until 15 November. During the second thaw between 15 and 23 November, the snow melted completely. A permanent snowfall covered the frozen ground to a depth of 25 to 30 cm on 25 November, and by 12 December the stubble was covered to a depth of 7 to 10 cm. By the end of December the snow cover had increased to 18 cm.

Rain on the night of January 1st and a deep thaw (up to +4.2°) which lasted for a week, removed the snow and later caused melted spots to form on the stubble, exposing 30 to 40 percent of the winter wheat plants.

With a drop in temperature there was more snow, and by 14 January there was a depth of 17 cm in certain fields. The snow cover increased further to an extent depending on the stubble and by the end of March had reached 35 cm. According to the data of the Steppe Agrometeorological Station, the depth of the snow cover on fallow land without snow barriers varied during the course of the winter from 0 to 18 cm. The average for total winter precipitation over the past ten years was 66 mm [of water].

The total precipitation for the winter of 1947/48 was 27 mm, or 39 mm less than the average. The lowest temperature of the soil at the depth of the tillering nodes of the winter wheat planted in stubble during the winter in question, was - 16.9°, and in the fallow soil without snow barriers, -25° (Table 2).

The small amount of snow cover, the deep thaw in the middle of the winter, and the low temperatures at the depth of the tillering nodes characterized the winter of 1947/48 as being unfavorable for winter wheat.

During the winter the soil was frozen down to a depth of 87 cm in the stubble, and down to 100 cm in the fallow. The thawing of the snow started on 20 March, continued until 11 April, and was interrupted by a freeze from 27 March until 4 April. The amount of water in the snow before the large-scale thaw was 70 mm in the stubble and 61 mm in the fallow.

On the stubble-planted winter wheat, the snow was completely melted by 9 to 11 April; the soil thawed slowly. The leaf growth of the winter wheat started on 21 to 22 March.

The Wintering of Winter Wheat

As in the preceding year, winter wheat sown on stubble in 1947 wintered well, and all of the leaf structures were completely preserved. Data on the wintering and yields of winter wheat at the Siberian Scientific Research

Institute of Grain Culture for the period from 1943 to 1948 are shown in Table 3. The winter wheat planted in fallow was completely killed. Data compiled by the Agrometeorological Station testifying to this, are listed in Table 4.

In spite of the sharp fluctuations in temperature and other unfavorable conditions for wintering, the winter wheat planted for the first time in the kolkhozes of Omsk Oblast did not winter badly either (Table 5).

As in the preceding four years, 360 specimens of winter wheat from the collection wintered well when planted in stubble on 9 to 10 September.

240 specimens of various southern strains of 'semi-winter' wheat sown in the stubble of oats on 30 September also winter well and are producing a crop.

All this confirms the possibility that many varieties of winter wheats, irrespectively of their degree of frost resistance, will winter in Siberia, when planted in stubble according to the method of Academician T. D. Lysenko.

Stubble planting makes it possible to use the more highly productive varieties of winter wheat from the European part of the Soviet Union both as winter and 'semi-winter' wheats, in order to produce more productive varieties of winter wheat for the steppes of Siberia.

Meteorological Conditions of the Spring and Summer of 1948

April and May were warmer than average by 1.3-to 1.4°. The small amount of precipitation in April (6 mm compared to the usual average of 14 mm) did not have a substantial effect on the growth and development of the winter wheat. The precipitation in May was 27, compared to the usual average for this month of 28 mm.

The summer of 1948 was hot and dry with frequent dry winds and dryness of the soil. At the end of the summer, the temperature on the surface of the soil went up to 56°, and to 22.8° at the depth of the tillering nodes. The relative humidity dropped to 19 percent for 6 days in July. (Table 6).

The basic moisture content of the soil during the vegetative period, shown in Table 7, demonstrates the great water deficiency during all of June and July. Despite this, the winter wheat developed well, which shows the strong resistance to soil and atmospheric dryness of stubble-planted crops.

We should mention the speed of passing from the "milk" stage to the "dough" stage and the early advent of complete maturity which was caused by the high atmospheric temperature, the dryness of the soil, and the low relative humidity.

Test of Planting Varieties of Winter Wheat on Stubble

In 1948, 9 varieties of winter wheat were tested: Populyatsiya No. 11(1), Ferrugineum 1239, Lyutestsens Sekasova, Mil'turum 329, Ukrainka, Eritospermum 1160, Eritrospermum 917, Alabasskaya, and Lyutestsens 329. The planting was done on 6 September by using the tractor disc drill twice on the oat stubble, thus turning the oat stubble downwards. The oats had been planted after spring tilling of winter wheat stubble. Granulated superphosphates in the amount of 1 centner per hectare were introduced with the seed during the planting. Nitrogen fertilizer was added to the surface twice during the spring: on 16 April 2 centners per hectare of ammonium sulfate.

The percentage of wintering of the various varieties of winter wheat planted on stubble is shown in Table 8, together with the data of the two preceding years.

A study of the speed with which the various varieties developed under the conditions of 1947/48 as shown in Table 9, do not indicate any sharp deviations with the exception of the variety Eritrospermum 1160 which eared three days earlier than the other varieties. Eritospermum 1160, a variety which develops quickly under the conditions of stubble planting, approximates Ferrugineum 1239 in the rate of its development. This variety produces a high yield each year. The variety Ferrugineum 1239 in 1948 was planted at the Institute on areas comprising 113 hectares. Eritrospermum 1160, a highly productive variety, is not grown in Siberia in view of its unusually strong tendency there to drop the grains. (2). The data compiled in Table 10 characterize the variety in yield and absolute weight.

Investigations carried out in the Laboratory of Technology (A. A. Voropayeva), revealed that the high index of baking quality of winter wheats significantly surpasses that of spring wheat, such as Mil'turum 321.

Along with the extension of test planting, work was ordered on the development of new varieties for stubble-planting in Siberia. Characteristic in this regard were some adapted specimens selected from the variety Ferrugineum 1239 which gave a yield of 33 centners per hectare.

In 1949 it was decided to turn over to the Gossortset' for further variety testing the specimens with the highest yields: Populyatsiya Sibniizkhoza No. 1, Ferrugineum 1239, Lyutestsens Sekisova, Mil'turum, and selections from Lyutestsens 329, Ukrainka, Eritrospermum.

The Effect of the Preceding Crops on The Yield of Winter Wheat

Study of crops preceding the stubble-planting of winter wheat established the fact that the higher the yield of the spring wheat had been, the higher was the yield of the winter wheat planted in its stubble.

In 1947 the maximum yield of winter wheat, 32.2 centners per hectare, was produced when it was planted in the stubble of spring wheat which had yielded 28.5 centners per hectare.

The tests also showed the effectiveness of timely application of fertilizers in the stubble planting of winter wheat. The best results were achieved by the addition of 1 centner of granulated superphosphates per hectare along with winter wheat seed and by supplying the seedlings with nitrogen fertilizer in the early spring after the snows had melted. This was confirmed by data produced in 1948. The winter wheat, Ferrugineum 1239, was planted on 4 to 5 September by the cross method on the stubble of spring wheat Tsezium 111 which had been planted on fallow. To the fallow soil were added 30 tons of manure and 2 centners of superphosphates per hectare. The yield of spring wheat in 1947 was 15.5 centners per hectare. The winter wheat on 14 April was fertilized with 1 centner of ammonium nitrate and 2 centners of ammonium sulfate per hectare, and the average yield from 5 hectares was 18.2 centners per hectare.

The winter wheat, Ukrainka, was planted in another rotation. The planting was done on 13 September by the cross plow method on the stubble of oats which had been planted after spring tilling as the third crop after grass. No fertilization was done before the oats were planted. The yield of oats in 1947 was 18.8 centners per hectare. In the spring the winter wheat seedlings were fertilized with 2 centners per hectare of ammonium nitrate, and on 2 June, 1 centner per hectare of ammonium sulfate was spread evenly on the surface of all fields. The yield of winter wheat on the two-hectare area was 17.3 centners per hectare.

In the first field of a 9 field rotation the winter wheat Populyatsiya 6 was planted on 6 September on the stubble of oats which had been planted on ploughland retilled in the spring.

The sowing standard was 190 kilograms per hectare. Nitrogen fertilizer was added on 8 September and on 14 April in the amount of 1 centner ofaammonium nitrate per hectare. The average yield in this field was 15.8 centners per hectare.

At the elite farm Sibniiskhoz, the winter wheat, Populyatsiya No. 1, was planted on an area of 55.5 hectares on the stubble of spring wheat. On a 23 hectare section of this area where the spring wheat had been planted on unfertilized fallow, the yield of winter wheat was 8.4 centners per hectare.

On the other half of the area where the spring wheat had been planted on fertilized fallow, the yield of winter wheat was 9.9 centners per hectare.

The Cultivation of High Yield Winter Wheat

The field where the test in question was conducted lay fallow in 1946. In 1947 it was used for spring wheat and after harrowing, on the 18th of April, 4 centners of superphosphates and 2 centners of ammonium nitrate per hectare were added and before the second cultivation, 20 tons of compost. The spring wheat was planted by the cross plow method on the 14th of May. Due to an early fall frost on 26 August the grain did not completely ripen and the yield was reduced and averaged 21.3 centners per hectare.

Two varieties of winter wheat, Ferrugineum 1239 and Eritrospermum 1160, were planted on the stubble of spring wheat on 12 September. The planting was done with a tractor disk drill by the cross method. One centner of granulated superphosphates per hectare ~~were~~ was introduced with the seed. The seedlings emerged on the 13th day. The plants developed well in the fall and went into the winter in the tillering stage. Two centners per hectare of ammonium nitrate was spread on the surface of the frozen soil on 15 April. The winter wheat plants wintered well, preserving their leaf structures intact, and grew quickly from 22 April on. The plants do not differ greatly from those sown by other methods in their stages of growth, but they do stand out because of the richness of their coloring, the width of their leaves,

and their excellent development. In order to increase the growth, a second surface fertilization of one centner per hectare of ammonium sulfate was added on 27 May when the shoots emerged.

The number of plants of the Ferrugineum 1239 variety in a square meter was found to be 556 on 4 June; 550 in the earing period, on 23 June, and 542 at harvest time, 30 August. Despite the low moisture content of the soil and atmosphere, there was no loss of plants of this variety. However, the planting of the same variety, Ferrugineum 1239, on the stubble of spring wheat which had been planted after plowing without the application of fertilizer, produced a loss between 7 June and 30 August of 35.2 percent.

In the variety Eritrospermum 1160, there occurred a loss of 16.1 percent of plants between the time of shooting and the time of harvest.

Counting the ~~straws~~ stalk per square meter of the variety Ferrugineum 1239 gave the following results; at the time of shooting; 1028; at the time of earing; 818; at the time of harvest; 785; of which 650 were productive. Of the variety Eritrospermum 1160, from among 920 ~~straws~~ stalks 647 remained at harvest time, of which 555 were productive. The dry summer with frequent dry winds reduced the number of ~~straws~~ stalk so that the possible yield was considerably reduced (Table 11).

The 28 to 33 centners per hectare yield of winter wheat on stubble which was produced is not the best that can be done. The creation of good soil conditions for the spring wheat (fallow, fertilization with compost), the supplementary addition of granulated superphosphates during planting, and the use of nitrogen fertilizer in the spring are means which will significantly increase the yield of winter wheat when it is planted in stubble by the method of Academician T. D. Lysenko.

Results of Tests on Fertilizing Winter Wheat

We have mentioned above the effectiveness of granulated superphosphate introduced in the amount of one centner per hectare when the seed is planted, and the supplying of nitrogen fertilizer in the early spring after the snow melts.

In the spring of 1948 field tests were made of the introduction of nitrogen fertilizer when granulated superphosphates had been previously introduced together with the seed of the winter wheat. Throughout the entire period of growth on the plot which had received the nitrogen fertilizer, better development of the plants was observed and the yield was considerably higher. This is well shown in Table 12, in which are arranged the indices of growth and yield of the winter wheat, Ferrugineum 1239, which had been planted in the stubble of spring wheat which in turn had been planted on unfertilized plowed land.

The 6.8 centners per hectare increase in yield which was produced, well attests to the effectiveness of springtime fertilization with nitrogen of winter wheat which has been planted on stubble.

Analagous results were produced in 1948 in the planting of the winter wheat, Populyatsiya No 1, on the stubble of oats which had been planted on plowed land. Here the increase in grain yield was 3 centners per hectare. In both variations of this test, one centner per hectare of granulated superphosphates was added when the winter wheat was planted. The yield without further fertilization was 13.5 centners per hectare, whereas when one centner per hectare of ammonium sulfate was added, the yield rose to 16.5 centners per hectare.

Stubble Planting of Winter Wheat, as a Factor in Restoring Conditions of Soil Fertility.

Academician T. D. Lysenko showed that under stubble planting of winter wheat, the soil 'rested' from tillage and its physical properties were improved. Data produced at the Laboratory of Agrology of the Institute corroborates this view.

In 1944, a nine field grassland crop rotation was divided into two parts. The first experimental rotation consisted of planting winter rye on fallow, followed by grass, which in turn was followed by the spring wheat, and the second consisted of planting spring wheat on fallow, and winter wheat on the spring wheat stubble, and grass after the winter wheat.

The data produced indicate the large quantity of structural aggregates in the tilled layer of the sections, after the stubble planting of winter wheat.

On comparing the yields for 3 years (1946-1948) under the two rotations, it is not difficult to see the superiority of the second (Table 13).

From the data cited it can be seen that in the second rotation, where for three years the winter wheat was planted on stubble, there were three tillages which provided a total yield of wheat of 96.1 centners per hectare. In the first rotation where the winter wheat was planted on fallow, six tillages provided a yield of edible grain of only 81.1 centners, or 18.5 percent less, and furthermore the greater part of this grain is Omka rye, since the more highly cultivated varieties of winter rye will not winter in fallow in the steppe regions of Siberia.

The tests in 1947 showed that in the fields where stubble planting of winter wheat had been employed, the yield of spring crops was higher than in old soft soil. Spring wheat which was planted on a field where rye had been planted for four years in succession produced a yield of 16.8 centners per hectare, but when planted on soft soil yielded only 12.77 centners per

hectare, despite the fact that the spring wheat in the first case was the ninth crop in rotation without grass having been planted on the field.

In 1948 the aftereffects of stubble planting on the yield of subsequent spring crops were determined. All four fields were plowed in the winter of 1947. In the spring (18 May) of 1948, they were planted in rye, Zolotoy dozhd', the yield of which in each field was relatively high (Table 14).

The test is evidence of the restoration of the soil fertility as a result of stubble planting. Grain crops were planted in the third field of the fifth rotation for 4 years (from 1945 on). In this period two tillages occurred and the following yields were produced:

1945, Millet on a seedbed	25.8	centners per hectare
1946, The spring wheat, Mil'turum 321, on ~~the~~ millet stubble	16	centners per hectare
1947, Oats, (balanced sowing)	25.16	centners per hectare
1948, Winter wheat on ~~the~~ oat stubble	22.4	centners per hectare

In 1945 and 1946 no fertilizer was applied, but in 1947, when the winter wheat was planted, granulated superphosphates in the amount of one centner per hectare were added with the seed, and in the spring of 1948, three centners per hectare of nitrogen fertilizer ~~was~~ added. Thus the planting of the spring crops on well prepared soil (fallow, seedbed, turning of the seedbed), and the planting of the winter wheat on its stubble in the fall, will successfully produce not only high yields of these two crops, but also secures high yields of the spring crops which are planted on the stubble of the winter wheat.

Rejuvenation of the Seed of Spring Wheat by Planting it in the Late Fall on Stubble

The wintering of spring wheat in stubble stimulates the hereditary characteristics of the plants. This stimulated plant, like a hybrid, possesses great vitality. When seed of spring wheat which has been wintered once, is planted in the spring on fallow or plowed land, the yield is higher than of winter land the ordinary seed of the same variety of spring crop is planted (Table 15). It was established by a three year investigation that wintered spring wheat is not infected by smut or fusariosis. The improvement of the yield quality of spring wheat by fall stubble planting is referred to in practice as the 'rejuvenation' of the seed. In 1948, the fall planting of spring wheat in stubble at the Institute produced yields of from 9.7 to 19.3 centners per hectare.

In 1948 at the Laboratory of Agricultural Engineering, yields of 16.6 to 22.09 centners per hectare were produced by the planting of rejuvenated seed of Mil'turum 321, whereas the ordinary seed produced yields of 15.06 to 16.66 centners per hectare.

On the basis of the compiled data it is possible to draw the conclusion that the rejuvenation of the seed of spring wheat is a simple and practical method of increasing the yield in kolkhozes and sovkhozes, and also a very effective means of controlling grain smut.

At the Siberian Scientific Research Institute of Grain Culture the rejuvenation of seed is used as a method for producing elite seed, and presents all the seed nurseries at the institute plant the spring wheat in the fall on stubble, and the superelite and elite seed in the spring on fallow and plowed land. In order to rejuvenate the seed, different varieties of spring wheat were planted in the fall of 1948 as follows: Mil'turum 321:

15 hectares, Mil'turum 553: 5 hectares, Tsezium 111: 30 hectares, Lyutestsen 62: 5 hectares, Al'bidum 3700: 3 hectares, and other varieties: 7 hectares.

Due to the significant increase in yield of the rejuvenated seed, the kolkhozes and sovkhozes of Siberia began widely using this method in their own fields. The fall stubble planting of spring wheat was carried out in 1948 at 679 kolkhozes and 31 sovkhozes on an area of 2,596 hectares. Investigations of the wintering showed favorable results.

The Planting of Winter Wheat on Stubble in the Fall of 1948

The area devoted to the planting of winter wheat on stubble in the Institute's fields was increased in 1948 to 266 hectares. In the kolkhozes and sovkhozes of Omsk Oblast the planting of winter wheat on stubble was carried out on about 5,000 hectares.

At the Institute, the winter wheat was planted from 24 August to 2 September. One centner per hectare of granulated superphosphates was added at the time of planting. The winter wheat was in the tillering stage at the the beginning of winter.

In the kolkhozes of Omsk Oblast by 1 September there were 1,779 hectares of winter wheat planted on stubble, from 1 to 5 September 1,481 more hectares were planted, and after 5 September 436 hectares were planted. The planting was carried out by the cross method on 3,185 hectares.

The granulated superhosphates was mixed locally with compost on 1,153 hectares, and with the husks of false flax and millet on 1,250 hectares. The standard application of the granulated superphosphates averaged around one centner per hectare and varied from 0.6 to 2 centners. Superphosphate and ashes were added to the surface of 1,236 hectares. Superphosphate was supplied to the young plants on 110 hectares. Most of the planting was carried out on the stubble of spring wheat which had been planted in fallow.

The dry summers and the absence of precipitation in the fall in the southern regions of Omsk Oblast retard the emergence of winter wheat seedlings, and most of them emerge here after 25 September. Due to the exceptionally porous upper layer of soil beneath the spring crop in 1948, the depth at which the seeds were set was not uniform and therefore the density of the stand on a square meter varied a great deal (Table 16). In some kolkhozes the planting of the winter wheat was carried out at a depth of 6 cm.

In the sovkhozes of Omsk Oblast the planting of winter wheat on stubble was carried out on an area of 1,042 hectares. The largest part of the planting, 680 hectares, was done after 5 September. Granulated superphosphates were added to 551 hectares. On 942 hectares the planting was carried out on the stubble of spring wheat which had been planted on fallow. Most of the seedlings emerged late, and data on the analysis of condition of the crops in Cherlakskiy and Sosnovskiy sovkhozes on 20 to 23 October 1948, presented the same picture as in the kolkhozes of the southern regions of Omsk Oblast.

Analysis of specimens taken on 25 January and 25 February, 1949, from the stubble planted crops of winter wheat on the kolkhozes and sovkhozes of Omsk Oblast, showed that the wheat wintered well. Despite the fact that between 25 December to 25 January the atmospheric temperature had dropped to - 42°, the percentage of plants which had lasted through the winter fluctuated between 80 and 100. The snow cover on the stubble - planted crops was 17 to 35 cm (Table 17 and 18).

Conclusions -

1. The tests in 1948 as well as the tests of the preceding year indicated that even weakly frost-resistant varieties, such as Ukrainka and Novokrymka, wintered well when planted on the stubble of spring crops. SSemi-winter wheats from Syria, Egypt, and Turkey wintered well and produced crops. Moreover, spring wheats wintered well when planted at later periods.

2. Stubble planting enables us to use poorly frost-resistant and highly frost-resistant varieties of winter, semiwinter, and spring wheats in order to produce productive varieties of winter wheat for the steppes of Siberia.

3. Fundamental conditions for a good yield of winter wheat when it is planted in stubble, are preparation of good soil conditions under the spring crop and a high yield in the spring crop.

4. The tests in 1948 as well as those of the preceding year showed that fertilization of the winter wheat was very effective. A centner of ammonium nitrate added in the early spring together with the introduction of a centner of granulated superphosphates at seeding time produces yield increases up to six centners per hectare. A second application of nitrogen fertilizer in the spring, after the emergence of the stems, provides an increase in yield up to 9 to 11 centners per hectare.

5. Planting winter wheat on the stubble of spring wheat which had been planted on fertilized fallow, produces a yield of 33.3 centners per hectare when one centner per hectare of granulated superphosphates is applied with the seed, and three centners of nitrogen fertilizer are added in the early spring.

6. Because the winter wheat had successfully passed through the winter each year and there was a fine possibility of high yield under the conditions of stubble planting, we were able in 1948, to extend the area on which this method of cultivation was used in Omsk Oblast to 5,000 hectares.

7. Tests, conducted on the study of stubble planting as a factor improving the fertility of the soil, confirmed Academician T. D. Lysenko's position that, 'under the stubble planting of winter crops, the soil rests from tillage, and its physical properties are improved'. Fields on which stubble planting has been conducted secure high yields in the spring grain crops.

8. A comparison of two rotations, 1) the planting of winter wheat on stubble, and 2) the planting of winter wheat on fallow, indicated that on a three year average, the stubble rotation produced an 18.3 percent higher yield of edible grain than the fallow rotation.

9. The cultivation of various varieties of winter wheat by stubble planting for six years enabled us to evolve highly productive specimens.

10. When spring wheat is planted in stubble in the fall, the yield quality of the seed is improved.

Footnotes

(1) In accordance with a suggestion by Academician T. D. Lysenko, in the fall of 1945, all the varieties at the Institute, about 20, were mixed together and this mixture was called 'Popyulatsiya Sibniizkoza No 1'. The individual varieties, tested at the Institute, were represented by improved specimens, which temporarily retained their old names.

(2) In Moscow and Odessa Oblasts where it is also grown, this variety does not evidence a strong tendency to drop grains as distinguished from this effect in Siberia. (Editors note).

Average Atmospheric Temperature for Ten Day Periods from the 1st of August to the 1st of November

	August				September				October			
	Average by Ten Day Periods			Monthly Average	Average by Ten Day Periods			Monthly Average	Average by Ten Day Periods			Monthly Average
	1	2	3		1	2	3		1	2	3	
Average Atmospheric Temperature	17.3	16.4	11.6	5.0	9.9	9.5	7.0	8.8	8.8	3.4	1.7	4.6
Average [illegible]	16.9	15.5	14.2	15.5	12.2	10.0	7.7	10.0	4.8	1.2	-2.3	1.2
[illegible]	+04.1	+0.9	-2.6	-0.5	-2.3	-0.5	-0.7	-1.2	+4.0	+2.1	+4.0	+3.4

CONFIDENTIAL

Temperature of the Soil during the Winter of 1941/42 at the Depth of the Tillering Nodes of Winter Wheat Planted on Stubble and on Fallow

Table 2

Method of Planting the Winter Wheat	November			December			January			February			March		
	Ten Day Period			Ten Day Period			Ten Day Period			Ten Day Period			Ten Day Period		
	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III
On stubble															
Depth of the Snow Cover (in cm.)	2	1	4	10	13	16	20	23	29	34	37	38	39	43	45
Minimum Temperature at the Depth of Tillering Nodes	-3.2	-4.9	-5.9	-15.1	-16.9	-10.9	-5.9	-8.9	-11.8	-11.4	-9.8	-11.4	-8.9	-9.7	-5.8
On Fallow without Snowbarriers															
Depth of the Snow Cover (in cm.)	1	0	2	2	1	1	1	2	7	9	12	18	15	14	13
Minimum Temperature at the Depth of Tillering Nodes	-3.4	-5.3	-8.3	-19.6	-25.0	-16.1	-14.1	-19.5	-21.5	-15.9	-15.0	-14.5	-11.5	-11.8	-6.5

CONFIDENTIAL

Table 3

[illegible] Wintering and Yield of Stubble [illegible] of Winter Wheat in the Siberian Scientific Research Institute of Grain Culture

Year of [illegible]	Area Planted (in hectares)	[illegible] Destroyed [illegible]		[illegible] of [illegible]	Yield (in [illegible] per hectare)		
					Minimum	[illegible]	Average
[illegible]	[illegible]	0	0	1	-	-	9.9
[illegible]	[illegible]	0	0	4.2	9.7	28.2	—
[illegible]	[illegible]	15	-	70	3.0	11	3.97
[illegible]	[illegible]	0	100	22	7.2	31.4	11.4
[illegible]	[illegible]	0	—	33.7	8.0	32	16
[illegible]	[illegible]	2.7	-	92.3	9.0	33.3	11.2
[illegible]	[illegible]	0	-	—	—	—	—

Table [illegible]

[illegible]

Variation of [illegible]	[illegible] When Planted			
	August [illegible]	August 25th	September [illegible]	September [illegible]
Winter Wheat on Stubble	[illegible]	[illegible]	[illegible]	[illegible]
Winter Wheat on Fallow without Snow barriers	0	0	0	0

Table 5

	2.0	80.0
	2.0	45.0
	11.0	76.0
	8.0	96.0
	15.0	75.0
	4.0	95.0
	4.0	95.0
	2.0	92.0
	5.0	80.0
	1.0	95.0
	2.0	77.0
	5.0	69.0
	5.0	70.0
	5.0	75.0
	2.0	86.0

CONFIDENTIAL

Table 6

Humidity

Date		Maximum Atmospheric temperature
July 1st	24	36.0
	28	25.3
	20	37.7
	19	35.2
	22	25.5

Table 7

	April 29th	May 6th	May 15th	May 24th	June 4th	June 14th	June 24th	July 1st	July 14th	July 24th
	In the layer of the soil from 0 to 20 cm									
Winter wheat on stubble	141	119	126	90	94	90	73	59	84	72
Winter wheat on fallow	137	112	110	94	92	73	50	38	72	50
	In the layer of the soil from 0 to 100 cm									
Winter wheat on stubble	218	196	210	170	177	172	150	136	163	145
Winter wheat on fallow	214	190	198	182	178	159	119	88	126	102

Table 8

	Wintered Successfully		
	1944/45	1945/46	1944/46
	90.0	94.3	87.0
	89.7	94.1	86.0
	90.0	92.7	89.0
	94.4	95.0	78.0
	90.0	94.7	91.0
	75.8	85.7	81.0
	91.2	94.5	84.0
	—	—	72.0

CONFIDENTIAL

Table 9

Growth Stages of Varieties of Winter Wheat Planted on Stubble in 1947/48

Name of Variety	Area Planted in hectares	Date of Planting	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	Milk Stage	Dough Stage	Complete Maturity
Populyatsiya Sibirizhkova	0.22	Sept 1?th	Sept 17-20th	[illegible]	[illegible]	[illegible]	[illegible]	June 2?th	July 10-15th	July 22nd	July 26th
Ferrugineum 1239	0.26	"	"	"	"	"	"	"	"	"	"
Lyutestsens [illegible]	0.22	"	"	"	"	"	"	"	"	"	"
Mil'turum 321	0.21	"	"	"	"	"	"	"	[illegible]	[illegible]	—
Ukrainka	0.22	"	"	"	"	"	"	"	July 10-15th	July 22nd	July 26th
Eritrospermum 1160	0.21	"	"	"	"	"	[illegible]	[illegible]	[illegible]	[illegible]	"
Alabasskaya	0.22	"	"	"	"	"	June 21st	[illegible]	[illegible]	[illegible]	—
Eritrospermum 47	0.21	"	"	"	"	"	"	June 24th	[illegible]	[illegible]	—
Lyutestsens 32?	0.21	"	"	"	"	"	[illegible]	"	[illegible]	[illegible]	—

CONFIDENTIAL

Declassified in Part - Sanitized Copy Approved for Release 2012/06/08 : CIA-RDP82-00039R000100110015-3

Table 10

Yield of Various Varieties of Winter Wheat in 1948 when they were Planted on the Stubble of Oats in the Fall of 1947

Name of Variety	Area Planted (in hectares)	Date of Harvest	Yield of Grain from Plot (in kilograms)	Yield of Grain (in centners per hectare)	Absolute Weight of Grain (in grams)
[illegible]	0.21	July 29th	503	24.0	28.2
Ferrugineum 1239	0.25	July 26th	546	21.8	30.77
[illegible]	0.21	"	436	20.8	26.0
Milturum 321	0.20	"	450	22.0	26.69
Ukrainka	0.21	July 27th	423	20.1	30.73
Eritrospermum 1160	0.20	"	545	27.2	32.25
Eritrospermum 917	0.20	"	424	21.2	31.62
[illegible]	0.21	July 28th	494	23.5	27.45
[illegible]	0.20	July 30th	418	20.9	26.82
[illegible]	—	—	137	—	—

Table 11

[illegible] Structure of Winter Wheat in 1948

Name of Variety	Area Planted (in hectares)	[illegible]	Number of Plants [illegible] meter	Number of Stems on [illegible] meter	Number of [illegible]	[illegible]
Ferrugineum 1239	0.73	33.3	542	745	650	1.45
Eritrospermum 1160	0.70	28.1	391	647	555	1.65

CONFIDENTIAL

Table 12

Effect of Nitrogen Fertilizer on the Growth Dynamics and Yield of Winter Wheat of the Variety, Ferrugineum 1239 in 1948

Variation in Test	On June 7th		On July 22nd		Yield of Grain (in centners per hectare)	Increase in Yield of Grain (in centners per hectare)
	Number of Plants in a square meter	Dry Weight of Plants (in grams)	Number of Plants in a square meter	Dry Weight of Plants (in grams)		
Without Fertilizer	430	12.6	316	41.4	19.5	—
Fertilized April 14th with 3 centners per hectare of ammonium nitrate, and 1 centner per hectare of ammonium nitrate on June 2nd.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]

[illegible]	31.1
[illegible]	30.6
[illegible]	12.4
[illegible]	10.5
[illegible]	
Barley on [illegible]	4.6
[illegible] Winter Wheat in 1941	—
Total Yield of Wheat and Rye in the Rotation over 3 years	91.1
Yield of Wheat and Rye in Rotation on an average per year (From 2 Fields)	27.03
2. Nine Field Rotation with Winter Wheat Planted on Stubble	
Spring Wheat, Milturum 321, on Fallow in 1946	28.5
Winter Wheat on the Stubble in 1947	21.8
Spring Wheat, Tserulum 111, on Fallow in 1947	17.6
Winter Wheat on the Stubble in 1948	17.8
Spring Wheat on Fallow in 1948	10.4
Total Yield of Wheat over 3 years	96.1
Yield of Wheat in Rotation on the average per year (From 2 fields)	32.03

Table. 14

Aftereffects of [illegible] in 1947 and [illegible]

Crop, Variety	Preceding Crop	Date of Planting	Area Planted hectare	Yield from Plot in kilograms	Yield in centners per hectare	Crop, Variety	Date of Planting	Area Planted in hectare	Yield from Plot in kilograms	Yield in Centners per Hectare	Total Yield for 2 years in centners per hectare
Effect of Stubble Planting on One Crop in 1947						Effects of Stubble Planting in 1948					
Spring Wheat, Mil'turum 321	Old land	May [illegible]	0.57	728	12.77	Oats [illegible]	May [illegible]	2.16	3,925	18.1	30.87
" " " 321	4 year field of Lucerne	[illegible]	[illegible]	[illegible]	[illegible]	Same	[illegible]	[illegible]	4,019	18.6	36.59
" " " 321	4 year field of winter rye without grass	May [illegible]	2.3	3,865	16.8	[illegible]	[illegible]	[illegible]	3,[illegible]	16.6	33.4
" " " 321	2 years of stubble planting of winter rye + 2 years of grass.	May [illegible]	2.3	[illegible]	[illegible]	"	[illegible]	[illegible]	4,[illegible]	19.0	39.0

CONFIDENTIAL

Table 15

Productivity of Spring Wheat, Planted in the Spring on Fallow, Using Rejuvenated Seed

Variations of Test	Yield of Grain in centners per hectare	Increase in Yield as Compared with Control: in centners per hectare	Increase in Yield as Compared with Control: in percent	Infected by smut (in percent)
Test in 1947				
Mil'turum 321, usual	10.93	—	—	1.8
Mil'turum 321, rejuvenated	15.85	4.92	45	0
Test in 1948				
Mil'turum 321, usual	13.15	—	—	0.3
" " ", rejuvenated	14.5	1.35	10.3	0
Lyutescens 62, usual	14.65	—	—	2.5
" " ", rejuvenated	15.5	0.85	6.1	0

Table 16

[illegible] State of [illegible]

Rayon, [illegible]	[illegible]	[illegible]	Initial Stage of Germination	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Pavlogradskiy, [illegible] Kolkhoz	240	141	30	38	35	27	—	—	11
Kolkhoz, "[illegible]"	44	212	62	40	68	11	—	—	31
[illegible]	50	263	60	55	76	60	2	—	10
Novouralskiy [illegible]	160	383	—	—	—	42	311	30	—
Charlakskiy sovkhoz	136	145	25	41	31	44	1	—	3
Charlakskiy sovkhoz	45	97	41	23	6	6	—	—	21
Charlakskiy sovkhoz	100	58	4	5	10	36	—	—	3

CONFIDENTIAL

Table 17

State in the Winter and Spring of 1949 of Winter Wheat Planted in Stubble at the Sovkhozes and Kolkhozes of Orsk Oblast

Names of Rayon, Kolkhoz or Sovkhoz	Stage of Growth	Minimum Atmospheric Temperature from Dec 25th to Jan 25th	Depth of Snow Cover on Jan 25th (in centimeters)	Percent of Plants Wintering Successfully	
				on Jan 25th	on Apr 20th
Chebarkul' [illegible]	[illegible]	- 42.0°	—	100-92	—
Tel'tav Kz, [illegible] Novaya zhizn'	No sprouts	- 42.3°	19	80	—
Chebarkul'skiy Rayon					
Kolkhoz "Progress"	Tillering	- 42.0°	—	100	88
" " "[illegible]"	[illegible]	—	22	90	87
" " "Rassvet"	[illegible]	—	19	82	83
" " "Rya rystitsatka"	2-3 leaflets	—	17	100	88
" " [illegible]	3-4 leaflets	—	21	100	90
" " "[illegible]"	3-4 leaflets	—	24	97	98
" " "[illegible]"	3-4 leaflets	—	19	99	97
Tevriz'skiy Rayon					
Kolkhoz "Sayatel'"	—	—	26	92	31
Okhotnichi Kovelskiy Rayon					
Kolkhoz imeni Andreyev	2-3 leaflets	—	19	100	80
Gor'kovskiy Rayon					
Kolkhoz "2-y bolshevistskiy sad"	—	—	35	95	—
imeni Lenina	—	—	—	100	—
Drobyshevskiy Rayon					
Kolkhoz "Novyy put'"	—	- 41.3°	—	97	60
"Kominternn"	2-4 leaflets	—	17	98	70
imeni Tel'mana	Sprouts	—	23	96	—
"Novaya derevnya"	1 leaflet	—	20	92	50

CONFIDENTIAL

Table 16

The State on February 25th 1949, of Winter Wheat, Planted on Stubble at the Kolkhozes and Sovkhozes of Omsk Oblast

Name of Rayon, & Kolkhoz or Sovkhoz	Area Planted in hectares	Stage of Development	Depth of Snow Cover in Centimeters	Percent of Loss of Plants
Chernlavskiy zernosovkhoz	80	Sprouts	17	8
Charlakskiy rayon, zernosovkhoz "Kommunist"	50	Tillering	27, 30	4
Kolkhoz "2-y bolshevistskiy sok"	15.8	Tillering	25, 30	3-5
" " imeni Lenin	8.3	Tillering	35, 36	6-7
Pavlogradskiy Rayon				
Kolkhoz "Svoboda"	41	1 leaflet	38	16
" " imeni Shevchenko	46	1 "	28	7
" " "Put' Oktyabrya"	44	1 "	35	5-12
" " "Pobeditel'nitye"	45	1 "	25	18
" " "Krasnaya Znamya"	28	1 "	20	25
Shchorbakul'skiy Rayon				
Kolkhoz "Bolshevik"	47	2 leaflets	21-22	20-25
" " "Yuzhyy pakhar'"	10	2 "	21-22	1-10
Azovskiy Rayon				
Kolkhoz imeni K. Marksa	46	2-3 leaflets	—	10-15
" " "Side"	47	2-3 "	28	24
Kalachinskiy Rayon				
Kolkhoz "Krasnoye znamya"	10	1-2 leaflets	35	2-14
Mar'yanovskiy Rayon				
Kolkhoz "Bolshevistskiy put'"	28.5	2-3 leaflets	10-14	0-14
"Ukrainets"	10	2-3 "	22	8

CONFIDENTIAL