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# Gasser WHEAT

*A New Grain for Alaska*

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## GASSER WHEAT

Developed from the hybrid Diamond x Khogot by the Alaska Agricultural Experiment Station, Gasser wheat was released to seed producers in 1955. This variety exhibits an excellent combination of high yield and agronomic desirability in Alaska. It is superior to the standard variety Khogot in lodging resistance, shattering resistance, and grain quality.

Gasser wheat is not satisfactory for commercial milling and baking. Its chief value in Alaska will be as a feed for poultry and livestock.

Gasser is recommended for production in the Matanuska and Tanana Valleys when a wheat crop is desired. Later maturing than other cereals, Gasser must be planted early to insure maturity during the short growing season. Cultural recommendations are the same as for other cereals.

The new variety was named for Dr. George W. Gasser, in recognition of his many years of outstanding service to agriculture in Alaska. Dr. Gasser was a pioneer in the agricultural development of the Territory and, although retired, still maintains an active interest in research. He was in charge of the cereal program at the Fairbanks Station at the time the cross which resulted in Gasser wheat was produced.

# Gasser Wheat

## *A New Grain for Alaska*

R. L. Taylor and J. C. Brinsmade\*

An increased interest in feed grain production has accompanied the expansion of livestock and poultry industries in Alaska. Although poultrymen are especially interested in locally grown wheat only a limited acreage is devoted to this crop annually inasmuch as varieties currently available are not satisfactory for Alaska. Gasser, a new spring wheat developed by the Alaska Agricultural Experiment Station, possesses a more favorable combination of yield and agronomic performance than varieties presently in use. The availability of this variety should stimulate wheat production in the area of its adaptation, the Matanuska and Tanana Valleys of Alaska.

Seed of Gasser has been distributed through the Alaska Crop Improvement Association. Approximately 40 bushels of foundation seed were available in 1955. This seed was released to qualified growers for the production of certified seed. Ample supplies of certified seed for general distribution are anticipated by 1956.

### HISTORY

Gasser wheat resulted from a cross, Diamond x Khogot, produced at the Fairbanks Station in 1940. Diamond, an early Swedish variety, has been largely replaced by newly developed varieties in the Scandinavian countries. This variety has not been grown in Alaska for several years and consequently little is known of its agronomic performance. Incomplete records indicate that it is an awnleted, brown glumed variety, somewhat later in maturity than desired in Alaska, but possessing resistance to lodging and shattering. Khogot, often called Siberian, is an introduction from Siberia, and has been grown in Alaska for many years. It produces small seed of poor quality, shatters readily at maturity, and lodges very badly. Khogot, despite its undesirable features, has been the only variety recommended for Alaska, largely because of its extremely early maturity in comparison with other wheat varieties.

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\*Agronomist, Matanuska Experiment Station, and Assistant Agronomist Fairbanks Experiment Station, respectively. The authors wish to acknowledge the efforts of the many individuals who assisted the cereal breeding program of the Alaska Agricultural Experiment Station during the development of Gasser wheat; also the assistance of Mr. C. C. Fifield, Senior Baking Technologist, Field Crops Research Branch, United States Department of Agriculture who performed the milling and baking analyses, and Dr. E. R. Ausemus, Agronomist, Field Crops Research Branch, United States Department of Agriculture, who supervised the increase planting at Brawley, California.



Typical heads, seed, and spikelets of Gasser (left) and  
Khogot wheat

The exact disposition of the progeny of the Diamond x Khogot hybrid between 1940 and 1948 is unknown. In 1948 what is believed to have been the  $F_1$  generation of the bulk hybrid was grown at the Matanuska Station. In the following year several hundred head selections were made from this bulked material. Visual selection for lodging and maturity eliminated most of these selections during the next two years. The remaining selections were compared with other varieties in experimental yield trials.

Gasser wheat was selected for release on the basis of agronomic and yield performance in comparative trials since 1952. The present seed traces to bulked selections from a head row nursery grown at

the Matanuska Station in 1953. Because of the urgent need for an adapted wheat variety in Alaska seed increase was attempted at Brawley, California during the winter of 1953-54 in cooperation with the United States Department of Agriculture. This increase arrived in Alaska too late for distribution in 1954, so was held for distribution along with the increase conducted at the Matanuska Station in 1954.

#### DESCRIPTION

Gasser is an early maturing, high yielding spring wheat. It grows medium tall, with slender, strong, hollow stems and short, narrow, dark green leaves. Gasser plants normally produce 2 to 4 tillers which are somewhat shorter and mature slightly later than the main stem. This variety produces oblong to fusiform, mid-dense awnleted spikes that remain erect at maturity. Awns vary from approximately one-half inch in length at the tip of the spike to nearly absent at the base. A fully awned plant may occasionally appear in the variety. Kernels are classed as hard red. They are relatively light in color, short and ovate, and have a narrow, mid-deep crease with slightly rounded cheeks. The clear, hard textured endosperm tissue imparts a translucent appearance to the kernels. The illustration shows typical spikes, spikelets and kernels of Gasser and Khogot wheat.

#### DESCRIPTION OF EXPERIMENTS

Gasser has been compared with other wheat varieties in small plot experiments at the Matanuska and Fairbanks Stations since 1952. Fields utilized for this purpose have been under cultivation for many years. During 1953 and 1954 experiments were conducted on both upland and bottomland at the Fairbanks Station. The experimental areas were spring plowed at the Matanuska Station while fall plowing was generally employed at the Fairbanks Station. Treatments of experiment fields the year previous to these tests were either vegetable crops, green manure crops or summer fallowing. A uniform application of 200 pounds of 10-20-10 fertilizer was applied at the time of planting. Seeding rates approximated 90 pounds per acre. The experiments were planted as early as possible each season but actual seeding dates varied with location and season, ranging from April 27 to May 20.

#### PERFORMANCE

Agronomic and yield performance of Gasser and Khogot are summarized in the table. Khogot, the only variety previously recommended for Alaska, is used as a standard of comparison. In 1952 three replications were grown at each location. Data for the Matanuska Station and Fairbanks upland are averaged over 26 replications in each of the latter two years. Six replications were employed in the Fairbanks bottomland plantings each year.

The ability to mature during the short growing season is a vital consideration in determining the suitability of a wheat variety for Alaska. Khogot, the earliest variety among thousands tested by the

Alaska Agricultural Experiment Station, is not as early as desired. Gasser averages 1 to 3 days later in heading and maturity than Khogot. Both varieties have matured satisfactorily in plantings at the Matanuska Station and on upland at the Fairbanks Station. The production of wheat on low lying, poorly drained fields like the bottomland field at the Fairbanks Station is very questionable, even though excellent yields may be obtained in favorable seasons. Plentiful moisture has delayed planting and contributed to excessive growth and delayed maturity in this field. Under these circumstances it is difficult to harvest and store the immature, high moisture content grain.

Gasser, averaging slightly over 30 inches in plant height, attains adequate growth for efficient harvest. This variety does not differ from Khogot in plant height or straw production. Straw yields are limited because of the fine stems and small leaves characteristic of this variety.

The lodging data presented in the table is indicative of the greater straw strength of Gasser in comparison with Khogot. Combined wind and rain have contributed to severe lodging at the Fairbanks Station. Only moderate lodging of wheat has occurred at the Matanuska Station in recent years. Gasser has exhibited outstanding resistance to lodging at both locations. While all cereal varieties may lodge severely when subjected to adverse weather conditions, Gasser will not lodge sufficiently to interfere with harvesting operations under normal circumstances.

Seed of Gasser has consistently exceeded the 60 pound per bushel standard test weight for wheat, except when harvested before maturity. Khogot has averaged slightly below this standard. The superiority of Gasser in test weight is indicative of the improved seed quality inherent in this variety.

Gasser wheat appears to possess considerable resistance to shattering, particularly before maturity. The tendency to shatter is one of the serious faults of Khogot. High winds accompanying rains, which frequently occur during the ripening period, have caused large grain losses in fields of Khogot. Under the same conditions Gasser has been observed to shatter very little. Grain losses should not be serious if this variety is harvested soon after maturity.

Yield data presented in the table indicate that Gasser and Khogot are nearly equal in yielding ability, averaging 36.0 bushels per acre at the Matanuska Station and on upland at the Fairbanks Station. Gasser appears equally well adapted to the Matanuska and Tanana Valleys. The bottomland plantings at the Fairbanks Station where the highest yields were recorded were very late in maturity. In fact, the 1953 planting failed to mature before frost. Because of the difficulty of handling immature grain in Alaska, wheat is not recommended for low lying moist areas, even though high yields may be obtained. The low yields recorded in other experiments during 1953 probably were a result of the depletion of moisture during a period of above normal temperatures.

Comparative performance of Gasser and Khogot Wheat at the Matanuska and Fairbanks Stations, 1952-54

Characteristic compared	Matanuska Station		Fairbanks Station			
	Gasser	Khogot	Upland planting		Bottomland planting <sup>1</sup>	
			Gasser	Khogot	Gasser	Khogot
Planting to — —						
Heading ..... days	60	58	55	52	55	52
Maturity ..... days	103	101	108	107	112 <sup>2</sup>	111 <sup>2</sup>
Plant height ..... inches	33	33	31	31	34	34
Lodging <sup>3</sup> ..... score	1.6	3.7	4.3 <sup>4</sup>	6.0 <sup>4</sup>	2.5	4.6
Test weight ..... lbs. per bushel	60.3	59.5	60.5	58.9	59.9	58.3
			Yield in bushels per acre			
1952 .....	34.3	35.3	44.5	40.0	—	—
1953 .....	29.2	29.9	28.0	28.5	49.3	46.4
1954 .....	45.0	44.2	35.2	35.5	52.6	51.4
Average .....	36.2	36.5	35.9	34.7	51.0	48.9

<sup>1</sup>Data for 1953 and 1954 only

<sup>2</sup>Data for 1953 only. Wheat was not mature when harvested in 1954, 118 days after planting

<sup>3</sup>Rated on scale 1 to 9, 1 being no lodging, 9 completely lodged

<sup>4</sup>Data for 1952 and 1954 only. Lodging not recorded in 1953

It should be pointed out that the yield figures in the table are the results of small plot tests. These plots receive special handling to insure accurate measurements of yield potential. Lodged plants are recovered and included in yield determinations. Prompt handling at maturity minimizes grain loss due to shattering. In general these types of tests have given excellent indications of actual yields to expect under field conditions. Under field conditions the superior lodging and shattering resistance of Gasser may permit more efficient harvesting with less loss of grain than has been possible with Khogot. The increase field of Gasser at the Matanuska Station in 1954 remained standing for nearly a week after maturity, but no lodging and very little shattering was observed. This field produced 42.3 bushels per acre of foundation seed.

### DISEASE RESISTANCE

Diseases have not been a serious problem in grain production in Alaska. Gasser wheat, like all cereal crops, should be treated with an organic mercury dust such as Ceresan M before planting as a protection from seedling diseases. This treatment is particularly important in Alaska because of the cool, wet soil conditions during seedling establishment.

Gasser is not as susceptible to loose smut as Khogot. This disease, present at low levels at this time, could become a serious problem in Alaska as grain acreage increases but Gasser appears to possess sufficient resistance for existing conditions. Covered smut, or bunt, has not been observed in Gasser. This disease has also been present at low levels in past years. It is relatively simply controlled by seed treatment.

### GRAIN QUALITY

Gasser wheat has been tested for milling and baking quality by the Field Crops Research Branch, United States Department of Agriculture. Their results suggest that this variety is of questionable value for commercial baking. Gasser produces a high yield of excellent appearing white flour but its dough handling properties are only fair and loaf volume is low. The bread produced was unsatisfactory in internal characteristics such as texture and crumb color. Gasser proved to be a more satisfactory bread wheat than Khogot, which produces a poor quality flour. The two were about equal in baking quality when whole wheat flour was produced. This would indicate that Gasser should be equal to or better than Khogot for home ground flour for private use.

Preliminary evaluations indicate that Gasser is a feed grain of excellent quality. It has averaged from 12 to 15 percent in protein content at Matanuska Station and from 14 to 17 percent at the Fairbanks Station. Higher protein contents are characteristic of grains produced in the Tanana Valley. The protein content of Alaska grown grains compare favorably with grain produced in other areas.