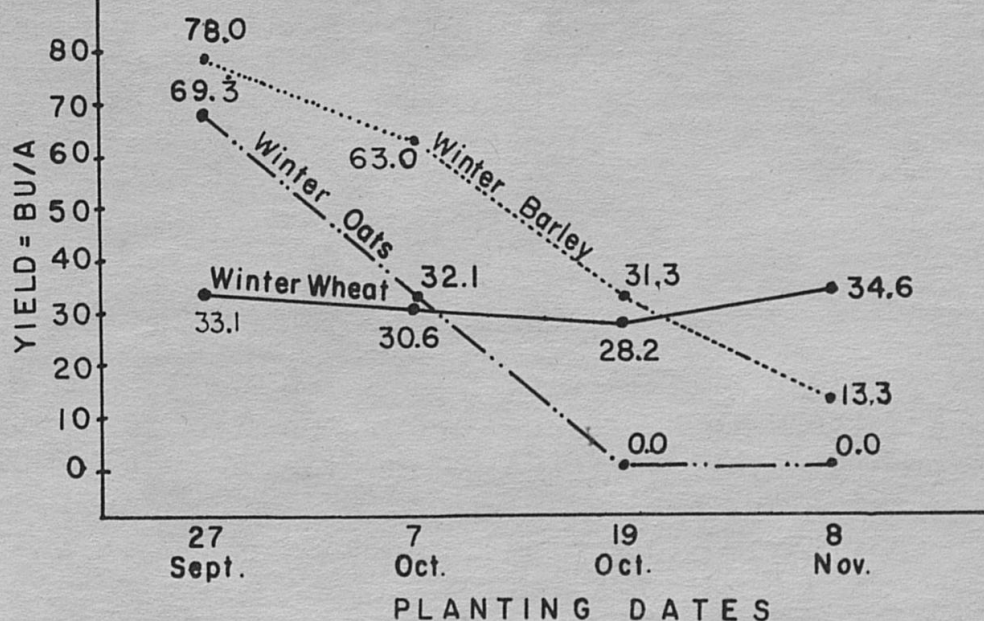


Results of the KENTUCKY SMALL GRAIN YIELD TRIALS 1958

BY V. C. FINKNER and RANDOLPH RICHARDS

EFFECT OF PLANTING DATE ON GRAIN YIELDS

Data from experiments conducted on the Woodford Farm
1958



PROGRESS REPORT 68
(Filing Code 1-1)

UNIVERSITY OF KENTUCKY
AGRICULTURAL EXPERIMENT STATION

AUGUST 1958

YOUR EXPERIMENT STATION RECOMMENDS

FOR THE 1958-59 SEASON

Winter Wheat varieties: TODD, DUAL, KNOX, VERMILLION
and VIGO

(Plant only Kentucky certified seed or seed known to
be relatively free of loose smut. Todd and Dual are
resistant to the Hessian fly.)

Winter Barley varieties: KENBAR AND DAYTON
(KENATE AND HUDSON for late
planting)

Winter Oats varieties: DUBOIS, ATLANTIC, FORKEDEER
and BRONCO

Spring Oats varieties: ANDREW AND MO. 0-205

Seed Source: Kentucky Certified Seed

Seed Treatment: Chemical seed treatment to
control seed-borne diseases.
(Especially important on scabby
grain this year.)

Explanation of terms used in this report

1. Acceptable variety: A variety which has been test-
ed and found to be as good as or superior to a
recommended variety for a particular purpose. An
acceptable variety is eligible for certification
but Kentucky may not produce foundation seed.
2. Certified Seed: It is seed which has been grown in
such a way as to maintain the identity of a variety.
It also helps to maintain freedom from weed and
other crop seed and, in some cases, freedom from
diseases. The Experiment Station recommends that
Kentucky certified seed be used whenever possible
for growing commercial crops of small grains.

3. Chemical Seed Treatment: This treatment helps to control a number of small grain diseases. It is relatively inexpensive and should be used whenever small grains are planted. Be sure to follow manufacturer's instructions for use.
4. Hard Red Winter Wheat: This refers to a commercial class of wheat. Since the different classes of wheat are used for different purposes -- for example, hard red wheat for bread flour, soft red wheat for pastry flour, white wheat for cracker flour -- commercial buyers prefer to buy wheat from areas producing only one class of wheat. Kentucky is primarily in the soft red winter wheat area and hard red winter wheats should not be grown here.
5. Heading Date: The date when the head emerges from the leaf sheath. It is important in determining the adaptation of a variety in a particular area. In general the early varieties have been superior in Kentucky.
6. Hessian Fly: An insect pest of small grain, particularly wheat. It has been controlled primarily by planting wheat after the average fly-free date. Susceptible varieties should not be sown until after the fly-free date. Todd and Dual are the first varieties of soft red winter wheat to be resistant to the fly. These varieties may be planted earlier or later than the fly-free date.
7. Highest Yielding Group: The group of varieties whose yield was not significantly lower than the highest yielding variety in that test. This is determined by subtracting the L.S.D. figure from the highest yield figure. Any variety that yields as much as or more than that difference is considered in the highest yielding group.
8. L.S.D.: The abbreviation "L.S.D." means least significant difference. This is a statistical term used to estimate the precision of a test. Two

varieties differing in yield by less than the L.S.D. cannot be said to differ in yield in that test if one wishes to be correct at least 95 percent of the time. As two or more tests are averaged and also over a period of years, the L.S.D. becomes smaller and smaller. More reliance may be placed on small differences in average yields when the yields are averages of several test locations over several years.

9. Loose Smut: True loose smut occurs in wheat and barley. It is a serious disease in Kentucky. Methods for control are through the use of resistant varieties, the planting of disease-free seed, or specialized water treatments. Chemical seed treatment will not control this disease. Smut in susceptible varieties may be kept within reasonable control by use of Kentucky certified seed each year.
10. Mildew: A leaf disease which is important in wheat and barley production. The only control of this disease is resistant varieties.
11. Plant Height: This is important from the standpoint of how much straw or hay is produced. Usually the taller varieties produce more straw or hay.
12. Recommended Variety: A variety which has been tested and found to be superior under Kentucky conditions. Seed stocks of recommended varieties are maintained under the direction of the Experiment Station in cooperation with Kentucky Seed Stocks, Inc. and the Kentucky Seed Improvement Association.
13. Rusts: Leaf and stem rusts often cause damage to our small grains. The only control now known is through the use of resistant varieties. Support your agricultural experiment station in their effort to develop disease resistant varieties.
14. Scab: A fungus disease that attacks our small grains. Swine refuse to eat scabby grain or

become sick if they do eat it. Usually severe on barley or wheat planted after corn if cornstalks are not plowed under. Plowing under cornstalks or small grain stubble and chemical seed treatment help to control scab.

15. Septoria: Another disease which caused serious damage to wheat in 1957. No control method is now known. Chemical seed treatment helps.
16. Soft Red Winter Wheat: (See hard red winter wheat)
17. Straw Strength: An important characteristic, particularly with combine harvesting. If the grain is lodged (weak strawed) harvesting is made more difficult and quality is usually poor.
18. Victoria Blight: A disease important in spring oats. Controlled by growing varieties resistant to this disease. Recommended varieties are resistant.
19. Weight per Bushel: Weight per bushel or test weight is a measure of the quality of grain. Weight per bushel is one of the factors determining the grade that is assigned in commercial marketing of grain. A price differential usually exists for the different grades of grain. The higher the test weight the better the quality and the higher the market value unless the grain is down-graded by another quality factor.
20. White Wheat: Another class of wheat that should not be grown in Kentucky.
21. Winterhardiness: Winterhardiness refers to the ability of the plant to survive winters when fall planted under Kentucky conditions. Most varieties of winter wheat and rye are sufficiently winter-hardy in Kentucky. Winter barley and winter oats often winterkill in Kentucky; therefore, winterhardiness is an important consideration. Winter barley is usually more winterhardy than winter oats.

THE 1957-58 TRIALS AND RESULTS

In 1957-58, 36 varieties of winter oats, 36 of winter wheat and 36 of winter barley were tested at the Experiment Station Farm, Woodford County and the Experiment Substation at Princeton. Twenty-five varieties each of winter oats, winter wheat, and winter barley were tested in cooperation with the Pennyryle Grain Improvement Association on the farm of Mr. W. G. Duncan, III, near Hopkinsville, and in cooperation with Murray State College on its farm near Murray. Thirty-six varieties of spring planted oats were tested at Lexington.

These tests include varieties being grown in Kentucky and neighboring states, older varieties which have been produced commercially in Kentucky and other states, and experimental varieties not yet named which were developed by Kentucky and neighboring state experiment stations. In this report only the named varieties and some Kentucky experimental varieties will be considered.

The recommended varieties were planted at different rates and on different dates to determine the effect of date and rate of seeding.

Effect of date and rate of seeding on grain yield

In these experiments the recommended and acceptable varieties were planted at the rate of 1, 2, and 4 bushels per acre on Sept. 25, Oct. 7, Oct. 19, and Nov. 8. The normal seeding dates for central Kentucky are Sept. 15-30 for winter oats; Sept. 20 - Oct. 7 for winter barley; and Oct. 8 - Nov. 1 for winter wheat. The Hessian fly-free date for the Lexington area is about Oct. 8.

There was no significant difference among the yields of winter wheat shown on the different dates, nor among the different rates. This indicates that rate of sowing and date of sowing, within the limits of this experiment,

made little difference in wheat grain yield. None of the wheat varieties used showed any winterkilling at any of the planting dates or planting rates. In winter small grain production the effect of date and rate of seeding is usually in direct proportion to the amount of winterkilling. Winter wheat seldom winterkills under Kentucky conditions.

The earliest date at which wheat should be sown has been limited by the Hessian fly-free date. All varieties susceptible to the Hessian fly (Knox, Vermillion, and Vigo) should not be sown until after the Hessian fly-free date. Varieties resistant to the Hessian fly may be sown prior to the fly-free date. While there may not be a grain yield advantage to earlier sowing, the grain would probably be earlier or more pasture produced. If good seed is used, the seeding rate of 1 to 1½ bushels per acre has been as good as higher rates. Earlier sowing or higher seeding rates might show to a greater advantage in severe winters. It would probably be a good farming practice to sow as early after the middle of September as the variety you are using permits; and, if you are sowing after the middle of October to increase your planting rate for added insurance against the effects of an unusually severe winter.

The planting date is extremely important in barley production. Winter barley is not as winterhardy as winter wheat and a greater difference is found among varieties. The barley varieties tested averaged 78 bu/A when sown Sept. 25, 63 bu/A when sown Oct. 7, 31 bu/A when sown on Oct. 19, and 13 bu/A when sown Nov. 8. At the seeding rate of 1 bu/A the varieties averaged 41 bu/A, at 2 bu/A 47 bu/A, and at 4 bu/A 51 bu/A. Some of the loss in yield due to delayed planting may be avoided if the planting rate is increased. This is particularly true when the planting date is such that a particular variety may or may not survive at that planting date. For example, Dayton sown at 1 bu/A on Oct. 19 survived only 22 percent and yielded 14 bu/A, a completely unsatisfactory crop. The same variety sown at 4 bu/A on Oct. 19 survived 50 percent and yielded

34 bu/A, a fair crop. The more winterhardy a variety is the later you can sow and still avoid some of the loss in yield, by increasing the planting rate. For example, Kenate is more winterhardy than Dayton. When sown on Nov. 8 at 1 bu/A Kenate survived 20 percent and yielded 22 bu/A and Dayton had zero survival and, of course, zero yield. At 4 bu/A Kenate survived 86 percent and yielded 29 bu/A, again a fair crop, while Dayton survived only 32 percent and yielded only 11 bu/A. The important effect of date of seeding may be modified then by planting according to the following chart. Of course maximum yields are obtained only at the earlier planting dates.

Seeding date	Variety and seeding rate to use
Sept. 15-Oct. 1	Dayton or Kenbar at 1-1½ bu/A
Oct. 1-15	Dayton or Kenbar at 2-4 bu/A Kenate or Hudson at 1½-3 bu/A
Oct. 15-Nov. 1	Kenate or Hudson at 2-4 bu/A (Don't use Dayton or Kenbar)
Nov. 1-15	Kenate at 4 bu/A (Taking a great chance of no crop at this late date.)

The effect of date of seeding and rate of seeding oats is similar to that of barley, only even more critical. Winter oats are not as winterhardy as winter barley. At the seeding dates used in 1957, a crop was produced at only the first two. None of the varieties survived sufficiently to produce a crop when seeded on or after Oct. 19 even at the 4 bu/A seeding rate. The 4 recommended varieties averaged 69 bu/A at the first seeding date and only 32 bu/A at the second seeding date. Dubois is the most winterhardy. Bronco, Forkeddeer and Atlantic follow in order. The important effect of seeding date may be modified with these varieties as shown

in the following chart; however, again maximum yields are obtained only at the earlier planting dates.

Seeding date	Variety and seeding rate to use
Sept. 15-30	Any recommended variety at 1-2 bu/A
Oct. 1-15	Bronco at 3-4 bu/A, Dubois at 2-4 bu/A (Don't use Atlantic or Forkedeer)
Oct. 15 and later	Don't seed winter oats

The effect of seeding date and seeding rate is conditioned by a lot of factors and needs to be evaluated over a period of years for each variety. The conclusions drawn here are based on limited data and may be modified as more data are collected.

WINTER WHEAT

The season in general was favorable for wheat production. Prolonged wet weather in July resulted in serious damage to wheat not yet harvested. All trials reported here were harvested under good conditions previous to the wet weather. Diseases were less severe this year than on the average with the exception of scab in certain areas of the state.

The recommended varieties of wheat have not always shown distinct yield advantages over all other varieties. The over-all performance and quality are possibly more important in wheat production than in other grain production. Only soft red winter wheat should be produced in Kentucky. Varieties of other classes are often tested but have not been superior to the soft red winter wheat class. Mixing of different classes of wheat often results in reduced market value and demand.

The variety Triumph (sometimes called Oklahoma) belongs to the class of hard red winter wheat. Its yield record has been good but not superior to that of our recommended soft red wheat varieties. Triumph should not be grown in Kentucky.

The older varieties Clarkan and Trumbull yielded well this year but are inferior to the recommended varieties in other agronomic characteristics. The new variety Lucas from Ohio has performed well but not superior to our recommended varieties and seed supplies are not available.

In the Kentucky experimental group, Taylor 16 (called Tay. 54-8904 in the 1957 report) again was superior in yield. Additional testing will be needed before any decision can be made concerning the experimental varieties.

Winter Wheat Varieties					
Yield in bu/A, 1958					
Variety	State av.	Prince- ton	Hopkins- ville	Murray	Lexington
VERMILLION	39.6*	44.8*	43.2*	31.2*	39.1
TODD	35.6	38.7	35.8	28.1*	39.6*
VIGO	34.8	38.0	35.7	24.2	41.4*
KNOX	34.3	37.2	37.9	29.6*	32.5
DUAL	34.2	35.2	38.6	28.2*	35.0
Triumph	34.7	36.3	41.0*	26.6	35.0
Clarkan	33.2	39.5*	32.9	21.5	39.1
Trumbull	30.6	34.0	30.3	23.5	34.7
Lucas	35.0	40.8*	32.0	25.0	42.1*
Ky. Experimental Varieties					
Taylor-16	41.2*	47.8*	41.6*	34.6*	40.7*
Ky. 55-283	36.0	38.9	39.4	29.9*	35.9
Ky. 55-241	35.0	36.6	35.6	31.5*	36.5
Ky. 56-225	34.2	36.4	31.8	32.2*	36.6
Ky. 56-250	34.2	40.3*	32.4	25.4	38.7
Ky. 56-2	35.8	37.3	36.4	31.0*	38.4
Ky. 56-68	33.7	33.9	34.0	30.9*	36.1
L.S.D.05	3.8	8.7	6.1	7.0	6.5
*Highest Yielding Group	37.4	39.1	39.7	27.6	39.4
Recommended varieties are in capital type					

WINTER BARLEY

The winter barley crop developed nearly normal and reasonably good yields were obtained at all locations. A rather severe winter reduced yields of late sown barley but probably caused only slight damage to earlier seeded fields. Scab was severe in some parts of the state. The scab developed late in the season and did not reduce yield to any great extent but made many fields unusable for swine feed. None of the winter barley varieties now available are resistant to scab.

Winter Barley Varieties
Yield in bu/A, 1958

Variety	State av.	Lexing-ton	Prince-ton	Hopkins-ville	Murray
DAYTON	55.9*	60.2	60.6*	62.5*	40.3*
KENBAR	55.0	68.8*	55.9*	58.1*	37.1
KENATE	56.1*	78.5*	58.4*	54.3	33.3
HUDSON	52.0	60.8	62.4*	51.7	33.0
Ky. 1	50.0	62.0	46.2	47.9	43.7*
Mo. B-475	52.9	63.4	53.9	57.2	37.2
Meimi	42.2	52.0	44.9	48.7	23.3
Ky. Experimental Varieties					
Ky.51-5321	48.3	59.7	54.6*	46.1	32.9
Ky.50-5400	53.3	63.0	66.7*	49.7	33.8
Ky.51-5752	58.4*	68.9*	65.8*	59.2*	39.8*
Ky.53-3903	54.4	65.0	56.7*	56.3*	39.5*
Ky.55-63	53.0	63.3	53.9*	55.4*	39.3*
Ky.56-74	57.5*	65.5	65.6*	58.1*	40.8*
L.S.D. 05	2.9	11.0	14.0	9.5	8.6
*Highest Yielding Group	55.6	67.5	52.7	54.7	38.6

Recommended and acceptable varieties are in capital type.

The recommended varieties Dayton and Kenbar were again the outstanding varieties along with the acceptable variety Kenate. Hudson was again slightly lower yielding.

The older variety Ky. 1 again yielded several bushels below the recommended varieties.

The newer variety Mo. B-475 from Missouri has had a good yield record but has been weak strawed under Kentucky conditions.

The variety Meimi is a foreign introduction and doesn't perform satisfactorily in Kentucky.

Among the experimentals, Ky. 51-5752 was outstanding. A preliminary seed increase of this variety was started in 1958. Ky. 55-63 and Ky. 56-74 also performed well but all need additional testing.

WINTER OATS

The winter oat varieties were injured severely by cold weather at Lexington (Woodford Farm) where non-hardy varieties winterkilled completely. Winterkilling also was heavy at Princeton with some damage at Hopkinsville and Murray. Even though winterkilling was severe, plots with 50 percent stand or more developed well in the cool spring and produced relatively high yields. Very few varieties are commercially available that are winterhardy enough for Kentucky, and some of those are not satisfactory agronomic types. The recommended varieties Dubois, Atlantic, Forkeddeer and Bronco are the hardiest of the satisfactory types.

Dubois and Forkeddeer were more outstanding this year than Bronco and Atlantic, while last year the opposite was true. Over a period of years all of these varieties have been reliable.

The variety Le Conte from Tennessee has been considered too winter tender for production in Kentucky; however this year it survived and performed as well as our recommended varieties.

Several of our experimental varieties show promise of being winterhardy and high yielding. A preliminary seed increase has been started with Ky. 53-368. All need further testing before a decision can be made.

Winter Oat Varieties
Yield in bu/A, 1958

Variety	State av.	Lexing- ton	Prince- ton	Hopkins- ville	Murray
DUBOIS	67.2*	78.2*	57.3*	71.8	61.4*
FORKEDEER	67.0	80.3*	56.8*	65.0	66.0*
ATLANTIC	57.0	63.2	49.2	66.3	49.2
BRONCO	54.2	70.3*	43.7	58.5	44.2
Le Conte	64.2	76.5*	50.1*	73.7*	56.7
Ky. Experimental Varieties					
Ky. 54-1630	72.2*	78.0*	68.9*	74.8*	66.9*
Ky. 54-1844	71.4*	74.7*	53.3*	85.7*	72.0*
Ky. 54-489	70.8*	81.2*	52.9*	77.9*	71.0*
Ky. 54-490	68.8*	72.9*	52.8*	84.2*	65.1*
Ky. 54-870	66.0*	83.2*	58.7*	65.3	56.8
Ky. 53-820	64.7	76.6*	60.1*	71.8	50.2
Ky. 54-959	64.2	70.9*	51.2*	75.5*	59.3*
Ky. 54-488	63.7	81.2*	55.5*	68.3	49.7
Ky. 54-463	63.6	68.1	59.2*	63.7	63.6*
Ky. 54-1826	63.4	78.8*	51.8*	63.6	59.5*
Ky. 54-799	63.1	82.0*	54.8*	69.4	46.2
Ky. 53-368	62.2	73.8*	46.1	74.0*	54.7
L.S.D. 05	7.1	13.3	17.1	13.7	13.4
*Highest Yielding Group	65.1	69.9	49.5	72.0	58.6

Recommended varieties are in capital type

SPRING OATS

The spring oat variety test was planted at Lexington on April 9. This is about a month later than spring oats should be planted but was as early as the ground could be prepared. Both recommended varieties Andrew and Mo. 0-205 were in the highest yielding group as were several of the other named varieties. The spring and summer were unusually cool making little difference in the yield between early and late varieties. Usually the early varieties are superior. The winter varieties spring sown produced a higher yield this year than previously, again probably due to the cool weather; however, the grain was extremely poor quality. The winter varieties are not satisfactory as spring sown varieties.

Period of years' summary											
Variety	1958		Yield bu/A	No. of tests	Test wt. Lbs/bu	No. of tests	Date Headed June	No. of tests	Plant ht. inches	No. of tests	No. of tests
	Yield bu/A	Yield bu/A									
ANDREW	38.2*	45.8	32.0	8	32.0	8	3.1	8	30.9	7	7
MO. 0-205	32.4*	44.6	33.2	8	33.2	8	3.7	8	33.0	7	7
Clintland	30.2*	37.5	32.1	5	32.1	5	7.0	5	30.4	4	4
Clinton 59	42.2*	41.7	31.5	5	31.5	5	6.9	5	28.4	4	4
Nemaha	22.7	35.3	32.0	8	32.0	8	4.7	8	29.1	7	7
Columbia	35.6*	43.2	32.8	8	32.8	8	2.3	8	32.2	7	7
Kanota	36.2*	39.9	32.1	8	32.1	8	4.2	8	29.9	7	7
Osage ^{1/}	21.2	23.0	30.6	8	30.6	6	3.7	6	25.4	7	7
Dubois ^{1/}	13.5	8.6	15.4	2	15.4	2	late	2	29.4	2	2
Forkedee ^{1/}	33.8*	19.9	15.0	2	15.0	2	late	2	31.8	2	2
Atlantic ^{1/}	28.0	20.8	20.3	2	20.3	2	late	2	30.6	2	2
Bronco ^{1/}	22.6	16.0	----	2	----	-	--	-	----	-	-
L.S.D. 05	12.1	-----	-----	-	-----	-	--	-	-----	-	-
*Highest Yielding Group	30.1	-----	-----	-	-----	-	--	-	-----	-	-

^{1/} Winter varieties spring planted.

Recommended varieties are in capital type

PERIOD OF YEARS' DATA

The following tables summarize the data obtained during the last eight years pertaining to the varieties given. Since the tests were conducted at different locations and in different years and all varieties were not included in all tests, direct comparisons between varieties are not wholly valid. However, after 8-10 tests the relative performance of a variety can be fairly well evaluated, particularly in characteristics other than yield. The relative importance of the different characteristics may differ for an individual and, therefore, these data are useful in helping a grower determine which varieties are best for him.

Winter Oat Varieties			Agronomic Data			Period of years' summary				
Variety	Yield bu/A	No. of Tests	Test wt. lbs/bu	No. of Tests	Lodg- ing %	No. of Tests	May Date Headed	No. of Tests	Plant ht. Inches	No. of Tests
Wintok	56.1	13	35.8	13	45.0	13	16.7	11	32.9	13
Lee	53.3	13	35.8	12	37.5	13	18.3	11	35.3	13
FORKEDEER	57.8	23	35.5	23	58.0	23	16.2	17	36.6	18
ATLANTIC	56.3	23	35.1	23	48.8	23	13.4	18	38.3	18
Cimmaron	54.1	13	34.3	13	76.8	15	11.5	11	29.8	13
Le Conte	56.9	23	35.1	23	32.1	23	17.5	13	36.7	17
BRONCO	61.1	19	34.0	19	35.6	20	19.4	13	36.5	15
DUBOIS	62.2	20	36.7	17	43.5	20	16.2	15	35.2	17

Recommended varieties are in capital type

Winter Barley Varieties Agronomic Data Period of years' summary

Variety	Yield bu/A	No. of Tests	Test wt. lbs/bu	No. of Tests	Lodg- ing %	No. of Tests	Date Headed*	No. of Tests	Plant ht. Inches	No. of Tests
Ky. 1	47.3	23	48.5	22	43.8	23	37.8	18	38.8	17
KENBAR	51.1	23	46.1	22	28.4	23	30.3	18	33.2	15
Mo. B-475	50.0	23	47.0	22	39.6	22	32.8	18	36.5	17
HUDSON	49.5	21	47.9	20	23.7	18	34.2	15	35.0	16
DAYTON	51.8	17	45.1	16	28.6	15	30.6	10	32.7	13
KENATE	51.2	13	44.9	12	40.5	13	32.0	9	32.4	11

*Days after March 31

Recommended and acceptable varieties are in capital type

Winter Wheat Varieties Agronomic Data Period of years' summary

Variety	Yield bu/A	No. of Tests	Test wt. lbs/bu	No. of Tests	Lodg- ing %	No. of Tests	May Date Headed	No. of Tests	Plant ht. Inches	No. of Tests
Clarkan	32.1	23	59.0	23	31.2	8	18.8	19	44.1	19
Trumbull	29.5	17	58.7	17	31.1	7	20.6	11	42.7	15
VIGO	31.6	23	58.2	23	28.0	8	19.0	19	44.8	19
KNOX	32.9	23	59.0	22	25.3	8	9.0	18	36.1	19
Lucas	34.3	15	59.3	15	15.7	7	22.5	9	41.8	13
TODD	36.0	21	57.0	21	18.8	8	18.9	15	43.4	18
DUAL	34.3	18	56.9	19	17.2	8	19.3	14	39.7	16
Genesee	35.5	14	57.2	14	15.1	4	21.6	12	40.7	12
Racine	32.6	11	58.5	11	5.5	5	23.7	7	41.4	9
VERMILLION	35.1	21	58.8	19	16.3	7	11.2	14	38.0	15
Triumph	30.1	12	60.1	12	32.2	6	9.3	9	36.1	9

Recommended varieties are in capital type