1955

NATIONAL OAT NEWSLETTER

Vol. VI

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March 1, 1956

Sponsored by the National Oat Conference

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March 1, 1956

Sponsored by the National Oat Conference
Neal F. Jensen, Editor

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I. CONFERENCE AND REGIONAL NOTES

Chairman's Report National Oat Conference Executive Committee January 31, 1955 to February 1, 1956
by K. J. Frey

The National Oat Conference did not meet during the twelve months ending with February 1, 1956. However, two important committees appointed by your chairman have submitted reports during the year.

The Oat Monograph Committee composed of F. A. Coffman (Chairman), H. L. Shands, W. H. Chapman, N. F. Jensen, H. C. Murphy and K. J. Frey met at Ames, Iowa on November 9, 1955 and drew up an outline for the oat monograph and selected authors for the various chapters. Mr. Coffman has consented to serve as editor of the monograph.

Another committee composed of N. F. Jensen (Chairman), A. M. Schlehuber, M. D. Simons, and F. A. Coffman submitted the following report on the future organization of the National Oat Conference. Incidentally this report has been approved by the membership of the National Oat Conference.

> The National Oat Conference at its meeting of November 11, 1954 at St. Paul, Minnesota, moved to schedule future meetings separately from meeting dates of the American Society of Agronomy in order to provide needed time for Conference programs and work. The Chairman, Dr. K. J. Frey, subsequently appointed a Committee on Reorganization of the National Oat Conference. This Committee, after study, recommends the adoption by the membership of the following statements which are intended to serve as a guide to the conduct of the organization:

1. The National Oat Conference is an informal organization of research workers concerned with oat improvement. Its objectives are to promote the exchange of ideas, plant materials and methods, and by so doing to advance progress in oat research, both fundamental and applied, leading to the development of better oat varieties and increased production and use of the oat crop.

2. Officers of the Conference shall consist of an Executive Committee composed of two (2) members each from the Northeastern, Southern and Western regions; three (3) members from the North Central region; the Head of the Section of Cereal Crops and Diseases, U.S.D.A., or his designated representative; the U.S.D.A. Oat Project Leader or his designated representative; the Editor of the National Oat Newsletter (non-voting); and a Secretary (non-voting). Regional members to the executive committee shall be chosen by members of the region concerned in whatever manner they deem appropriate. From its regional members the executive committee shall elect a national chairman whose term of office shall expire

at the conclusion of the next Conference meeting. The editor of the National Oat Newsletter and the Secretary of the Conference shall be elected by the members of the executive committee and shall serve at the discretion of the committee as non-voting members thereof. The executive committee shall conduct the business of the National Oat Conference between conference meetings. Actions of executive committee and officers are subject to approval by the Conference membership.

3. Meetings of the Conference shall be scheduled by the Chairman. An interim of three years between meetings is suggested. The Chairman may appoint a program chairman and in consultation with the executive committee shall make suitable arrangements for time and place of the next meeting. A business meeting shall be held at every regularly scheduled meeting of the Conference.

4. The Conference shall sponsor the National Oat Newsletter.

M. D. Simons
A. M. Schlehuber
F. A. Coffman
N. F. Jensen (Chairman)

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Secretary's Report National Oat Conference Executive Committee
January 31, 1955 to February 1, 1956

Although no meetings of the National Oat Conference Committee were held in 1955 two regional meetings were held during the twelve months January 31, 1955 to February 1, 1956. The North Central Oat Committee met at Iowa State College, Ames, Iowa, November 10 and 11, 1955, and the Northeastern Small Grains Committee met at the Hotel New Yorker, New York, New York, January 9, 1956. Reports on these sectional meetings will likely be prepared by the secretaries of those sections.

During the year a few changes occurred in the membership of the National Oat Conference Committee and for the first time there is a full representation for all Regions. At present the Committee includes:

Northeastern Region: C. S. Bryner, Neal F. Jensen (Newsletter Editor)
North Central Region: K. J. Frey (Chairman), E. G. Heyne, John Grafius
Northwestern Region: D. W. Robertson, F. C. Elliott
Southern Region: A. M. Schlehuber, W. H. Chapman
U. S. Department of Agriculture: H. A. Rodenhiser (Cereal Section),
H. C. Murphy (Oats)
Secretary: F. A. Coffman

Although the Committee held no meetings during the twelve months it was not inactive, two committees appointed by Chairman Frey made progress on duties assigned. The one on the future organization and arrangements for future meetings of the National Conference after consideration and considerable correspondence prepared a report and submitted it to the Chairman for future consideration. The Monograph Committee met at Ames, Iowa, on November 9, 1955, and prepared a tentative outline for the Oat Monograph and made decisions as to size of publication, chapters to be included and the prospective authors to be invited to prepare each of the different chapters. Deadlines were set for the submitting of the material.

At the meeting of the North Central Oat Committee at Ames, Iowa, Chairman K. J. Frey announced that the Quaker Oat Company would again assume the cost of publishing the National Oat Newsletter, Vol. VI.

Franklin A. Coffman
Secretary

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North Central Oat Technical Committee Meeting
November 10 and 11, 1955
Ames, Iowa

Approximately fifty persons attended the meeting at which questions pertaining to regional oat problems were discussed. The group was in agreement with the manner in which the uniform nurseries were conducted and suggested no changes. Considerable discussion occurred concerning policies relative to release of oat germplasm and experimental data to public and private agencies. The group concurred with the statement of responsibilities and policies relating to seeds approved by the Experiment Station Committee on Organization and Policy that was adopted by the Association of Land-Grant Colleges and Universities, November 13, 1954. A policy statement concerning the north central region will be drawn-up after considering all the phases of the problems that were discussed.

Oat rusts, smuts, genetics, lodging, Septoria, red leaf and quality were discussed. The prevalence of Victoria-type smuts in the southern area of the United States was pointed out as several new strains being increased in the north central region are susceptible to these races.

The executive committee in charge of the meeting was J. M. Poehlman, past chairman; K. J. Frey, chairman; and E. G. Heyne, secretary. John Grafius was elected new secretary. The executive committee responsible during the interim and the next meeting are K. J. Frey, past chairman; E. G. Heyne, chairman; and John Grafius, secretary. This group also represents the North Central States on the executive committee of the National Oat Conference.

E. G. Heyne
Secretary

Meeting of the Northeastern Small Grains Technical Committee
Hotel New Yorker, New York City
January 9, 1956

The committee met to consider progress reports on the regional research project NE-23. Six experiment stations within the region and the USDA are cooperating in this research project. Officers elected for 1956 are: Chairman, R. G. Rothgeb, Maryland; Secretary, Steve Lund, New Jersey. Representatives to the National Oat Conference are Clarence Bryner and N. F. Jensen.

by N. F. Jensen

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II. SPECIAL ARTICLES

Lewis John Stadler, an Outstanding Mutation Geneticist and Former Oat Breeder
by T. R. Stanton

Lewis John Stadler, Professor of Field Crops of the University of Missouri and geneticist for the United States Department of Agriculture, died on May 12, 1954, after a prolonged illness, in Barnes Hospital in St. Louis, Mo. He was an eminent, internationally known, mutation geneticist, an authority extraordinary on gene structure and gene mutation, and a former oat breeder.

Dr. Stadler received his B.S. degree in agriculture from the University of Florida in 1917; was a research fellow in cereal crop improvement at the University of Missouri, 1917-18, where he received an A.M. degree in agronomy and plant breeding in 1918, and completed his doctorate in 1922.

Dr. Stadler's most outstanding scientific achievements have been in the field of mutation genetics. He also, along with Dr. Muller, was a pioneer investigator of the genetic effects induced by x-ray treatments. Aside from these great contributions to theoretical genetics, this brief item is written primarily to give some recognition to Dr. Stadler's accomplishments as an oat breeder.

During Dr. Stadler's earlier years at the University of Missouri Agricultural Experiment Station, he became well known to many agronomists for the development of the Columbia oat. It was originated as an offtype plant selection from the Fulghum variety made by Dr. Stadler at Columbia in 1922. Columbia was first distributed to farmers in 1930 and by 1941 more than 85 percent of the oat acreage of Missouri was sown to the variety. It also has been of considerable economic importance in southern Ohio, Indiana, and Illinois, as well as in other areas of the southern part of the Corn Belt from Virginia westward to Kansas and Oklahoma.

In addition, Columbia has offered valuable germ plasm for the breeding of morphologically similar strains of oats, such as Mo. 0-205, a new variety with resistance to the rusts and smuts that is rapidly replacing Columbia after a long run in its area of adaptation.

Dr. Stadler also was greatly interested in the relationship of chromosome number to mutation rate in Avena species. He pioneered in showing that the A. byzantina and A. sativa species with 21 chromosome pairs produced fewer, or no mutations, from irradiated seed; whereas species, such as A. brevis and A. strigosa with 7-chromosome pairs, produced many more mutations from irradiate seed. In other words, the frequency of mutation in these so-called minor specie in his experiments was much higher than in the extensively cultivated species, A. byzantina and A. sativa.

Dr. Stadler was the author of many technical papers on plant variations, especially on mutations induced by x-ray and ultra-violet radiation. His valediction paper on "The Gene", in the preparation of which he apparently gave the last full measure of devotion, is truly a masterpiece.

Likewise, his tireless devotion to genetic research and great ability to analyze scientific data resulting therefrom were recognized by all workers who were so fortunate as to have worked with him, or to have received his helpful suggestions and advice, which he always so generously gave. In this writer's humble opinion, in Dr. Stadler, one of America's greatest geneticists has been called to that sphere from whence no traveler e'er returns. (For more complete information on Dr. Stadler and his work, see Missouri University Agricultural Experiment Station Bulletin 588, issued July 1955).

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A Half Century of Oat Improvement

By T. R. Stanton, formerly Senior Agronomist in Charge of Oat Investigations, U. S. Department of Agriculture

Oat improvement in the United States was virtually in its infancy at the beginning of the present century. Even progress was slow in this century until after the discovery of new, or the recognition of old germ plasm, with protective resistance to destructive pathogens, such as the smuts and rusts. Again, the sciences of cereal plant pathology and genetics were just emerging and there was no backlog, or reservoir, of scientific data on which to base plant-breeding projects such as are available today.

The primary purpose of this paper is to discuss some of the earlier advances, more particularly, the introduction and selection of varieties involving germ plasm, which has significantly contributed to the breeding of present-day superior oats.

The Previous Half Century

During the previous half century nearly all of the improvement in oats resulted from introduction from foreign countries, especially from northern Europe. Immigrants coming to America brought with them seed of the varieties commonly grown in their homelands for cultivation in the New World. Many of these varieties were markedly superior to those which had been brought in during the first half century, on which little definite information is available. However, some of the varieties introduced in the second half of the century became of considerable economic importance in their day and later provided valuable foundation breeding stocks. Varieties, such as Green Russian, Probsteier, White Tartar, White Russian and Red Rustproof (Red Texas), are good examples of introductions of this period. Farmers and commercial seedsmen improved them to some degree by mass selection, more particularly to remove mixtures of readily recognizable offtypes and other grains

Very little crossbreeding was practiced, although there are a few records of isolated cases of attempts to improve oats by hybridization. One of the early hybridizers was Cyrus G. Pringle of Charlotte, Vt., who originated several varieties by crossbreeding of which Pringle Progress, distributed in 1875, was the best known in its day. It, however, has been obsolete for over a half century.

Willet M. Hays, of the Minnesota Agricultural Experiment Station and a former Assistant Secretary of Agriculture, appears to be one of the first investigators to conduct extensive progeny tests of oat selections in 1888 at St. Paul, Minn. The writer, when a student at the old Maryland Agricultural College, was thrilled by a lecture given by Assistant Secretary Hays on advances in crop improvement at the Minnesota Agricultural Experiment Station, which was illustrated by motion pictures showing plots and centgeners of oats and other small grains, as well as the operation of grain binders, threshing machines, and other farm machinery.

Improvement by Foreign Introductions

Early in the present century the systematic introduction of foreign varieties of oats, as well as of hundreds of other plant species, began in earnest and became an integral part of the work of the United States Department of Agriculture with the establishment of an Office of Foreign Plant Exploration and Introduction.

Relative to oats, some of the most outstanding introductions were made around the first of the present century which included Kherson and Sixty-Day from Russia. These varieties not only in themselves contributed greatly to oat production in the United States, but provided valuable germ plasm for improvement by pure-line selection; some of the resulting varieties in turn later greatly contributed to even a more marked improvement through hybridization. The Kherson oat was brought to the United States in 1896 from Russia by the late F. W. Taylor of the Nebraska Agricultural Experiment Station. The Sixty-Day, a similar, or identical variety, was introduced from the same country in 1901 by the late Mark Alfred Carleton, the former pioneer cerealist of the U. S. Department of Agriculture.

Other important introductions that were made around this time included the pure-line Swedish Select variety from Russia, also by Carleton in 1899. Victory and Golden Rain, pure-line varieties originating in Sweden from the old Milton oat of the Baltic Region of Europe, also were introduced into North America early in the century. Victory became of much economic importance as a midseason, white oat for the northern United States and Canada, where a considerable acreage of the variety is still grown although limited by disease susceptibility. However, Victory has attained its greatest importance in the countries of northern Europe where the oat rusts are not limiting factors in production. Incidentally, it is in all probability the one most important improved variety grown throughout the common oat (Avena sativa) areas of the world. Golden Rain has been one of the most productive varieties ever grown in the northern United States, but, owing to its yellow lemmas (grains), and very tall straw, it failed to attain the importance of Victory, or even of the Swedish Select oat.

Improvement by Selection

Prior to the distribution of the multiple disease-resistant Boone in 1940, and the sister varieties, Tama and Vicland in 1941, originating from hybrids, nearly all the oats grown from about 1915 to that time were originated as pure-line selections from old domestic, or fairly recently introduced varieties. This 25-year period might aptly be designated as the pure-line selection oat-breeding era of the United States. These include a long list of varieties, many of which are well known to present-day oat breeders.

At this point, the fact should be stated that in this pure-line selectio era, for the most part, the improvement of agronomic characters was primarily stressed. However, in the case of several varieties, unrecognized rust resistance played an important role in their becoming leading economic oats. At this time the great losses caused by the incidence of both crown (leaf) and stem rust had not as yet become fully recognized. Hence, the major emphasis was placed on improvement of agronomic characters as is still true today in eastern and northern Europe. Because of the cool, temperate climate of these regions, fixed by the Gulf Stream, oat diseases, especially the rusts are of little consequence and not limiting factors in oat production. Whereas, in the United States and Canada, varieties without rust resistance are now virtually obsolete. The heavy toll taken by diseases, especially the rusts, in the pure-line breeding era, is now more fully comprehended, resulting mainly from new knowledge of the existence of definite physiological races of the rust and smut pathogens. Also, that certain varieties possess definite resistance to one or more of these races, which makes them of great potential value for use as breeding stocks for the development of varieties with both satisfactory agronomic characters and disease resistance.

To emphasize the great contribution made to oat improvement in the United States by the application of the pure-line breeding method, say prior to 1940, it is only necessary to name some of the varieties attaining some commercial importance in that period. A relatively small number, however, attained outstanding economic importance in their day.

A partial list, alphabetically arranged, follows (those attaining the most importance are underscored): Albion, Appler, Brunker, Coker Fulghum No. 4, Cole, Colorado No. 37, Columbia, Comewell, Cornellian, Delta Red No. 88, Empire, Ferguson No. 71, Ferguson No. 922, Forkedeer, Forward, Franklin, Fulwin, Golden Rain, Gopher, Idamine, Iogold, Iogren, Iowar, Keystone, Maine No. 340, Markton, Miami, Nebraska No. 21, New Nortex, Nortex, Otoe, Patterson, Rainbow, Richland, Rusota, Standwell, State Pride, Tech, Trojan, Upright, Wisconsin Wonder, Wolverine, Worthy, and Victory.

Oat Improvement by Hybridization

As already indicated, the discovery of the existence of physiological races of the rusts and smuts, as well as of certain other diseases, was a remarkable advancement in cereal plant pathology. This, coupled with the previously discovered fact that disease resistance is a heritable genetic character and can be readily transferred to and combined in varieties with desirable agronomic characters, has made the improvement of oats by hybridization paramount. Hence, through hybridization results have been obtained far beyond the expectations of the older oat breeders, who, naturally, were somewhat reluctant to abandon the selection method of breeding.

Furthermore, the rapid development of varieties with desirable agronomic characters, such as high yield, high test weight, and stiff straw, with protective resistance to nearly all the known races of the oat rusts and smuts, as well as resistance to Victoria blight, Septoria black stem, and other diseases, is unprecedented in the annals of crop breeding. This achievement has become one of the sagas of the plant science world.

In the past 10 years new oat varieties have been bred so rapidly by breeders at the State Agricultural Experiment Stations, especially in those States in which the crop is of some economic importance, that "old timers" like the writer has difficulty in keeping up to date on the varietal situation. Hence, the results of breeding oats by hybridization is so fresh in the minds of most current agronomists and oat breeders that the devotion of further space to this method of breeding and results is not warranted in this article. However, it should be pointed out that the combining of resistance to both rusts and smuts of oats in a highly productive agronomic type, such as was obtained in the once famous Victoria-Richland varieties, Boone, Control, Tama, Vikota, and Vicland, apparently was the spark that ignited an enthusiasm of what really could be accomplished in oat breeding by the most modern methods. Furthermore, just a decade and a half ago there were a mere handful of oat breeders in the United States, whereas today the "woods are full of them" -- all hopeful that they will be able to add their "bit" directly to oat improvement and indirectly to the betterment of mankind.

In Wallace's Farmer and Iowa Homestead for December 3, 1955 (page 19), Dr. Kenneth J. Frey of Iowa State College, Ames, in a brief report on the "Past, Present, and Future of Oat Breeding in the United States" concluded about as follows:

1. Introduction resulted in an immediate sharp increase in yield.

2. Pure-line selection beginning about 1920 resulted in a relatively small increase in yield, but much greater uniformity of varieties.

3. Hybridization resulted in an increase in yield of about 15 bushels. The advantages of this method are:

   a. Crossing "mixes" the genetic characters of the varieties involved in the cross or crosses.

   b. By rigid selection in the F_2, F_3, and following generations pure-breedi strains usually can be readily isolated.

   c. Back crossing enables the breeder to move from one variety, say a character such as disease resistance to a new one, almost identical to one of the parents.

   d. Irradiation with atomic particles can bring about genetic changes.

   e. Seed banks of the United States Department of Agriculture add to a brig future for oats.

   f. Tailor-made varieties are forseen for each major oat-producing area of soil and climate.

An interesting graph is appended showing the upward surge of oat yields in station tests since about 1905.

Behaviour of Winter Oats Planted in the Spring

Ivan K. Bespalov and William A. Rosenau
Eastern States Farmers Exchange
West Springfield, Massachusetts

During the spring of 1955, a number of winter oat varieties were planted at Feeding Hills, Massachusetts for the purpose of directly comparing their yielding abilities and grain quality characteristics with those of spring varieties. Previous determinations of hull percentage have indicated that wint oats generally carry a lower percentage of hull than spring varieties, and it was our intention to determine if this was in some way due to physiological factors related to over-wintering or to varietal characteristics. By early spring planting (April 12), the winter varieties headed normally and direct comparison with spring oats was possible. (This test was possible only with early seeding. In a similar test seeded two weeks later, several of the winter oat varieties did not head at all.) Clarion and Roxton were used as check varieties. Of these, Clarion is of midseason maturity and has usually shown an intermediate hull percentage, while Roxton is of late maturity and has consistently carried the lowest percentage of hull of any of the spring oats tested. Notes were taken on date of heading, date of ripening, yield, hull percentage and thousand kernel weight. These data were presented in Table I.

It had been expected that the winter types would head considerably later than the spring types, but this was not true. Only three varieties displayed their winter type by ripening later than Roxton. These were LeConte, Dubois, and New York Selection (C.I. 5346).

With the exception of the poor yields of these three late maturing varieties, yields of winter oats did not vary greatly from those of spring oats, and test weights were generally within the range presented by Clarion and Roxton.

Weights per thousand kernels varied greatly for the winter oat entries ranging both above and below those presented by Clarion and Roxton.

The greatest single difference between spring and winter types lay in the hull percentage. All the winter oats, with the notable exception of LeConte, carried a lower hull percentage than Clarion, and most of them more closely approximated Roxton. Three, Cimarron, Wintok and Early Wintok were markedly lower than Roxton, carrying only 19.2, 19.4 and 19.6 percent of hull, respectively.

This evidence would indicate that winter oats generally tend to carry a lower percentage of hull than spring oats due to varietal characteristics rather than a result of physiological factors related to over-wintering.

Table I (Average of two replications)

Ent. No.	Variety or Selection	C.I. No.	Date of Head	Date of Ripe	Test Weight	% Hulls	Weight of 1000 Kernels	Yield Bu/A Whole Grain	Yield Bu/A Groats
1	LeConte	5107	7/3	8/1	31.0	27.4	34.9	39.7	29.0
2	Wintok	3424	6/23	7/19	33.0	19.4	31.8	46.1	37.2
3	Cimmaron	5106	6/17	7/12	34.5	19.2	34.1	61.8	50.0
4	Early Wintok	5849	6/17	7/13	35.5	19.6	27.0	58.8	47.3
5	Forkedeer	3170	6/24	7/19	37.0	22.7	35.4	58.9	45.6
6	Dubois	6572	7/8	8/2	32.5	22.6	33.6	31.7	24.6
7	Lee	2042	6/24	7/24	36.0	21.0	30.5	67.6	53.4
8	Lee-Victor.-Fork.	6903	6/26	7/25	32.0	26.3	38.2	55.6	41.0
9	Coy	4600	6/18	7/20	33.0	21.6	35.1	48.2	37.8
10	Mustang	4660	6/24	7/18	31.0	23.5	33.0	48.8	37.4
11	Lemont Cross	6718	6/18	7/18	37.0	21.5	35.0	62.6	49.2
12	New York Selection	5364	7/9	8/4	31.0	21.7	28.0	25.3	19.8
13	New York Sel. Vernal.	5364	6/25	7/24	31.0	21.8	29.2	54.2	42.4
14	Fulwin	3168	6/21	7/21	34.5	21.5	38.6	55.6	43.7
15	Colo-Wintok	5118	6/26	7/24	32.5	21.4	30.0	52.5	41.3
16	Arlington	4657	6/18	7/17	33.5	21.3	36.3	46.9	36.9
17	Winter Turf	3296	6/30	7/25	32.5	23.8	27.5	55.3	42.2
18	Clarion Sp. (check)	5647	6/16	7/13	34.0	26.4	32.0	58.2	42.9
19	Roxton Sp. (check)	4134	6/26	7/25	32.5	21.5	38.0	57.0	44.8

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Heat Requirements for Oats in Florida

A. T. Wallace, W. H. Chapman, and H. H. Luke

One of the objectives in the oat research program in Florida is to determine the accumulation of degrees of temperature over 40°F. (commonly called heat units) that were required by different oat varieties for heading.

Wiggans (Agronomy Abstracts, page 83, 1954) reported that the number of heat units required to mature a certain variety of oats remained about the same regardless of when the oats were planted except for the very late planti He also states (National Oat Newsletter, Vol. IV, page 35, 1953) that the number of heat units is approximately the same each year. Wiggans' research was conducted with oats planted during an eight-week period in the spring.

In Florida the number of heat units required to make a variety head varies for different planting dates, for different years and for different locations within the state. This is pointed out in Tables 1 and 2. As can be seen in Table 1, any delay in planting reduces the number of heat units required for heading except for the February and March plantings.

In Table 2 it can be seen that the number of heat units required for grain to head varied as much as 30% between years. This table also shows that the number of heat units varied for the two stations at which the data were collected. In one year at Quincy (approximately 50 miles north and 125 miles west of Gainesville) the oat varieties required only 75% of the number of heat units that were required at Gainesville. (The planting dates for these locations were about the same over the years.)

Table 1. Relative percents of heat units required for heading and for different dates of planting - 1954-55.

	Date of Planting						
	Oct. 18	Nov. 18	Jan. 3	Jan. 17	Feb. 4	Feb. 14	Mar. 2
Southland (3240)	100	82	78	70	67	64	64
Sunland (3029)	100	79	69	65	65	68	69
Appler (3429)	100	88	80	76	-	-	-
Seminole (2714)	100	90	73	71	64	65	59
Floriland (2996)	100	81	66	63	64	83	85
Average		84	73	69	66	70	69

Table 2. Number of heat units required for heading for different years at two Florida stations.*

	1949-50	1950-51	1951-52	1952-53	1953-54	Average
Gainesville	3479	2942	3102	2444	2942	2791
Quincy	2630	2588	2655	2194	2398	2371
Percent of Gainesville	75.6	88.0	85.6	89.8	81.5	85.0

*Mean of seven varieties

It is interesting to note that the relative rank of these varieties for their heat unit requirement was the same at both stations in Florida (see Table 3).

Normally oats are planted in Florida during the fall. Although the varieties grown are spring type, some need a small amount of cold temperature before they will effectively enter the reproductive stage. This fact is illustrated in Table 1 with the Appler variety which did not head after the January planting. It can also be noted in Table 1 that Floriland and Sunland needed a larger number of heat units for the later plantings than for the mid-planting dates. Whyte states in his book "Crop Production and Environment" that the difference between winter and spring types is the amount of cold temperature required to break the vegetative stage. He further states that even though some varieties enter the reproductive stage more quickly if they have been exposed to sufficient cold temperature, they nevertheless will enter this stage after a period of growth in high temperature. This means there are some varieties that need the exposure to cold temperature before entering the reproductive stage. Other varieties don't need any cold temperature, and still other types will head much earlier if they have been exposed to cold temperature, is not absolutely necessary.

Thus it may be reasoned that as part of an explanation for the variatio in number of heat units required for heading from year to year in Florida is that the heat units are more effective after the plant enters the reproductive stage than before and that in Florida the date in the growing season at which the plant reaches the reproductive stage varies from year to year. The reason fewer heat units are required to make a variety head at Quincy than at Gainesville is that the average temperature at Quincy (Table 4) is about 3 to 4 degrees lower than that at Gainesville. The plants will reach the reproductiv stage at Quincy earlier than at Gainesville, thus accumulating fewer heat unit

Table 3. Number of heat units required by each of seven varieties to head at two Florida stations.

	Gainesville	Rank	Quincy	Rank
Southland	2942	4	2492	3
Victorgrain 48.93	2965	3	2456	4
Camellia	3205	1	2695	1
Red Rustproof 14	3192	2	2672	2
Floriland	2626	5	2195	5
Sunland	2385	6	2058	6
Seminole	2222	7	2029	7

Table 4. Average high and low temperature during the small grains growing season (8 months - Oct. through May) at two Florida stations.

	1951-52	
	Gainesville	Quincy
High	77.3	73.9
Low	54.5	50.2
Average	65.9	62.0
	1952-53	
	Gainesville	Quincy
High	76.7	75.0
Low	54.6	49.6
Average	65.6	62.3

Another reason for the year to year and location to location variation may be because of heavy thunderstorms. Whyte, quoting Russian workers, points out that oats will flower sooner if grown on soils low in nitrogen. If heavy rains fell in a particular season or at one of the locations, then the nitrogen could have been leached from the Florida sandy soils, thus influencing the number of heat units required for heading.

In addition to the temperature and nitrogen effect, there is a day length effect that influences heading in oats. Oats are a long-day crop. Plants growing from the earlier and later plantings (Table 1) would reach the long days in the spring at the same time, thus giving the plants from the later plantings less time to accumulate heat units. This is a partial explanation for the fewer heat units required for the later plantings.

Clipping also increased the number of heat units required for heading (Table 5). This is to be expected since clipping keeps the plants in a vegetative stage. It is interesting to note that the clipped as well as the non-clipped plants from the later plantings also required fewer heat units to head than those from the early plantings. Thus, it was indicated that the "cold temperature - day length effects" were not removed by the clipping.

Table 5. Effect of clipping on number of heat units required for heading.

Date Planted	No. Clipp.	Date Terminated Clipping: Feb. 1	Feb. 15	Mar. 1	Mar. 5	Apr. 1	Average
1950-51*							
October 24	100	101	-	109	118	131	100
December 11	100	-	-	103	108	123	80.4
January 5	100	-	-	-	102	113	76.6
*Average of 3 varieties							
1951-52*							
October 1	100	109	111	115	119	-	100
November 1	100	105	108	113	118	-	75.0
December 1	100	101	103	105	108	-	66.4
*Average of 2 varieties							
October 1	100	-	128	136	145	-	100
November 1	100	-	111	117	128	-	79.4
December 1	100	-	104	108	114	-	67.5
*Average of 7 varieties							

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Record Oat Crop in 1955
by H. C. Murphy, (USDA)

The 1955 national oat crop was one of the best quality, heaviest yield: and highest test weight crops ever harvested. An average yield of 38.5 bushe] per acre and a total production of 1,575,736,000 bushels of oats in the Unitec States in 1955 were the highest on record. The acreage seeded to oats for al] purposes for the 1955 crops was 47,634,000 acres - the largest on record. Th: marks the fourth consecutive year of increased oat seedings. A total of 40,933,000 acres were harvested for grain, with the remaining acreage being us for pasture, hay, silage, other uses, and abandoned. There was a sharp increa in acreage for winter pasture, hay and silage in the Southern Region because c two years of drought and also because of severe frost damage to much of the fa sown crop. Yields in 16 of the South Central and South Atlantic States were] percent below the high levels of 1954.

The North Central Region produced 81 percent of the total oat crop in 1955 with a record production of 1,282,196,000 bushels, on 31,304,000 acres ar a record yield of 41 bushels per acre. This record yield was produced despite appreciable damage from early drought and late rust damage in Kansas, Nebraska North and South Dakota, and Iowa. All-time record yields were produced in Illinois (56), Indiana (52), Ohio (52) and Michigan (46), and near record yields in Wisconsin, Missouri and Iowa. Test weight and overall grain qualit; were unusually high throughout the Region.

Oat Diseases were generally low in prevalence and severity in 1955. Because of spring drought conditions in most of the Southern Region and in the western portion of the North Central Region the normal increase and movement c rust infection northward was retarded. Even so, losses from oat stem rust was estimated to be approximately 5 percent in Oklahoma and Kansas, 3 percent in Iowa and Wisconsin and 6 to 10 percent in North and South Dakota. Crown rust caused an estimated loss of 2 percent in Iowa in 1955, the lowest since 1948. Estimated losses from all diseases in Iowa in 1955 were 10.5 percent, the lowe since 1937.

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Observation on Oats Grown in Yield Nurseries in the National Cooperative Coordinated Oat Breeding Program in 1954-55

by F. A. Coffman, H. C. Murphy and Harland Stevens[1]

During the crop season of 1954-55 one or more of the writers visited most of the stations cooperating in these experiments. Following visits to each of the major oat producing areas of the country and the recording and compiling of the data from the 124 yield nurseries on which yield data were received the following general observations were made:

1. Soil moisture was deficient in the fall of 1954 in some areas of the South and fall sown oats emerged late and unevenly in such areas.

2. Precipitation during the winter was sufficient in most areas and as rather mild winter temperatures prevailed fair stands eventually resulted almost everywhere.

3. Spring weather conditions were such in the South that oats made excellent progress but in late March an unseasonably late cold wave swept through the area from Texas to the Atlantic Coast. In many areas oats were frozen to the ground and on some stations the less winter hardy entries were killed. As a result the more hardy oats usually yielded best in 1955.

4. Droughty spring conditions prevailed in southern New York, in Pennsylvania, in the western part of the North Central Region and in the Southwest. As a result yields were reduced severely at some points.

5. In the Northwest spring seeding was delayed at some points because of cool weather and later than usual precipitation. This tended to result in shorter straw and a late harvest in some areas.

6. Rusts were not especially serious anywhere in 1955. This was an unusually favorable factor in the South in areas where the freeze had killed oats to the ground and where as a result yields from some fields were harvested from secondary tillers.

7. In the central and eastern portion of the North Central Region plentiful spring moisture and the absence of serious rust infections resulted in the best oat crop in years and total production in that area was so great as to more than offset all losses in all other areas.

8. Final total production figures indicate the oat crop of 1955 was in excess of 1.5 billion bushels or the greatest ever produced in the United States.

9. Summary data received and compiled from the uniform nurseries indicate agronomic data on the highest yielding entries in 1954-55 were as follows:

1/Senior Agronomist, Oat Investigations; Principal Pathologist in Charge of Oat Investigations; Agronomist, Field Crops Research Br., ARS, USDA, respectively.

(A) FALL SOWN OAT NURSERIES

Yield Rank	Variety or C.I. No.[1]	Yield (Bu.)	Test (Lbs.)	Height (Ins.)	Lodging %	Date Headed	Surv. %	Forage Rating[3] %
	Special Winter Oat Nursery (18 Stations)[2]							
1	6904	67.3	32.2	33.1	35.8	5/20	74.4	96
2	6717	66.1	33.0	32.7	32.5	19	74.4	90
3	6902	65.4	31.7	36.6	41.3	13	75.1	99
4	Forkedeer	65.3	34.3	36.5	53.4	16	74.4	98
5	6903	64.9	34.1	34.9	29.5	19	79.7	100
	Fall Sown Nurseries (11 More Northern Stations)							
1	6571	79.7	31.3	32.0	51.8	5/3	88.9	92
2	6717	76.4	31.1	32.6	47.6	3	87.5	86
3	Arlington	75.8	29.7	34.3	54.6	2	92.6	106
4	Local check	69.2	30.2	32.6	47.2	3	94.6	99
5	6994	68.3	31.6	32.1	54.2	4/29	92.6	109
	Fall Sown Nurseries (11 More Southern Stations)							
1	6571	57.5	33.2	43.7	62.5	4/10	97.2	99
2	6993	52.2	31.7	44.5	63.9	4	94.3	109
3	Victorgrain	51.7	34.1	40.7	39.3	4	98.8	111
4	Mustang	51.0	32.1	40.0	46.7	6	99.2	108
5	6995	50.8	33.7	43.0	54.9	5	99.3	107
	Florida - Gulf Coast Oat Nursery (11 Stations)							
1	Victorgrain	59.5	33.5	42.8	29.5	4/4	98.2	109.0
2	Appler (check)	56.3	30.0	38.8	52.0	14	100.0	100.0
3	Alamo	53.2	34.1	37.2	18.3	1	98.2	119.2
4	6985	52.1	33.5	47.6	28.5	16	94.1	111.7
5	6978	51.9	32.7	40.8	25.3	13	56.1	115.5

(B) SPRING SOWN NURSERIES GROWN EAST OF THE ROCKIES

Yield Rank	Variety or C.I. No.	Yield (Bu.)	Test (Lbs.)	Height (Ins.)	Lodging %	Date Headed
	Northeastern States Uniform Nursery (12 Stations)					
1	6641	64.7	31.0	34.1	10.1	6/24
2	Rodney	63.8	31.4	35.4	5.3	27
3	Simcoe	63.8	30.0	36.4	5.7	26
4	Ajax	63.6	29.1	36.3	6.1	24
5	Beaver	63.4	29.6	36.6	3.9	24

Yield Rank	Variety or C.I. No.	Yield (Bu.)	Test (Lbs.)	Height (Ins.)	Lodging %	Date Headed
	North Central States Uniform Nursery (17 Stations)					
1	5961	91.1	32.9	39.0	29.0	6/13
2	5962	91.0	32.5	41.0	26.0	13
3	7083	89.5	33.1	37.0	46.0	10
4	6935	89.4	30.9	36.0	40.0	15
5	Simcoe	88.9	32.0	42.0	34.0	15
	Spring Sown Red Oat Nursery (5 East and Southern Stations)					
1	6632	71.7	26.9	33.3	6.3	6/2
2	Andrew	70.6	29.7	34.5	3.0	3
3	Dupree	70.2	29.4	35.8	6.8	2
4	6620	69.1	28.7	34.9	4.0	3
5	Mo. 0-205	68.8	30.6	38.0	4.8	5
	Spring Sown Red Oat Nursery (9 North Central Stations)					
1	6632	97.6	32.5	34.5	42.7	5/29
2	Mo. 0-205	94.0	34.9	39.5	21.6	31
3	Andrew	92.9	35.0	37.3	25.6	28
4	6639	89.8	33.5	35.1	33.4	28
5	6621	88.9	32.6	35.8	51.8	28
	Spring Sown Red Oat Nursery (7 Southwestern Stations)					
1	Mo. 0-205	69.5	31.6	35.7	5.0	5/30
2	7029	68.7	30.6	28.5	6.2	27
3	6632	62.3	29.2	30.5	16.8	28
4	6913	61.3	30.8	34.2	5.0	29
5	Andrew	58.8	30.8	32.5	6.3	28

(C) SPRING SOWN NURSERIES GROWN WEST OF ROCKIES

Yield Rank	Variety or C.I. No.	Yield (Bu.)	Test (Lbs.)	Height (Ins.)	Lodging %	Date Headed
	Northwestern States Nursery (13 Irrigated Stations)					
1	3865	129.3	36.7	35.6	2.0	7/5
2	Markton	122.2	37.5	42.7	16.0	5
3	Cody	121.7	37.3	32.8	3.0	6
4	Park	121.2	37.4	38.2	.0	7
5	Shasta	121.1	37.1	45.8	2.0	9
	Northwestern States Nursery (12 Non-irrigated Stations)					
1	3865	80.3	34.7	31.8	4.6	7/7
2	Cody	79.5	35.9	29.4	1.6	9
3	6612	79.4	35.9	31.3	2.0	7
4	5347	79.1	36.2	34.2	3.4	9
5	Park	78.8	35.3	33.5	1.6	10

Yield Rank	Variety or C.I. No.	Yield (Bu.)	Test (Lbs.)	Height (Ins.)	Lodging %	Date Headed
(D)	SPRING SOWN NURSERIES GROWN IN ALASKA (2 Stations)					
1	5658	106.5	38.4	41.5	23.0	7/24
2	6613	94.8	38.4	41.0	37.5	30
3	Bannock	94.6	39.0	43.0	69.0	28
4	Exeter	91.2	38.6	42.0	73.0	30
5	Rodney	90.0	39.9	42.5	46.0	28
6	Golden Rain (ck)	90.2	39.6	45.5	33.0	27

1/ Key to parents of C. I. numbers

Winter Oats: C.I. No's. 6903 and 6904 are selections from the cross (Lee-Victoria) x Forkedeer; C.I. 6902 is Stanton, Okla. Sel.; C.I. No's 6571 and 6717 from the cross (Lee-Victoria) x Fulwin; C.I. 6994 from Tennex. x (Vict. x Haj-Ban.); C.I. No's. 6993 and 6995 are selections from Fulwin Composite cross; C.I. No. 6985 from Atlantic x (Cl[2] - S.F.) and C.I. No. 6978 from Trispernia x Cl[2] - S.F.)

Spring Oats: C.I. No. 6641 is from Clinton x (Boone-Cartier); C.I. No's. 5961 and 5962 from the cross [Rox. x (Vic. x H-B)] x [Ajax x (Vic. x H-B)]; C.I. 7083 from [Landhafer x (Mindo x H-J)] x Andrew; C.I. No. 6935 from [Landhafer x (Mindo x H-J)] x Clinton; C.I. No's. 6620, 6621, 6632 and 6639 from Andrew x Landhafer; C.I. 7029 from Osage x [(Bonda x H-J) x (Santa Fe)]; C.I. No. 6913 from (Bond-Rain x Haj-Joan.) x Landhafer; C.I. 3865 (Victoria-Richland) x Bannock; C.I. 6612 (Bond-Anthony) x (Iogold x Victa.-Rich.); C.I. 5347 and 6613 (Bond-Anthony) x Overland[2] and C.I. 5658 from the cross Andrew x Clinton.

2/ Number of stations shown indicates number reporting yields. Usually fewer reports were received on other characters.

3/ The checks of forage readings were Lee in the Special Winter and Appler in Fall Sown and Florida Gulf Coast Nurseries. Check equals 100 percent.

Based on the agronomic data presented the following comments can be made

Among hardy oats for fall seeding C.I. 6903 appears to be a new hardy, high yielding oat with a good test weight and better straw than most other entr whereas C.I. 6571 and its sister strain C.I. 6717 continue to indicate high yie potential; good cold resistance but rather inferior straw. In the area farther to the south Victor-grain and Alamo continue to rank high in grain and forage production and also standing ability.

Among Spring Sown Oats Simcoe and Mo. 0-205, Andrew, Cody, Park and Rodn appear to be among the best named varieties tested for a period of years. Amon these carried under C.I. No's. 6641, 5961, 5962, 6632, 7029, 3865, 6612, 5347 and possibly 6913 all had fair records in 1955. As a result these oats may wel be given consideration in crossing programs.

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Reaction of Entries in the 1955 Uniform Oat Disease Nurseries
by H. C. Murphy (USDA)

Saia had the lowest coefficient of crown rust infection of all 40 entries in the 1955 Uniform Oat Rust Nursery, with an average of 0.2 percent. The ten most resistant hexaploids were LMHJA (C.I. 6912), HJFLVL (C.I. 6666), BRHJL (C.I. 6913), Ukraine, Landhafer, Trispernia, Alring.-Delair x Trisp. (C.I. 6908), HJBR x S.F. - South (C.I. 7018), the recently named Fayette (C.I. 6916), and Bondvic, with average coefficients of 1.8, 2.0, 2.1, 2.2, 2.3, 2.3, 3.0, 3.1, 3.2 and 3.4 percent, respectively. Markton, Richland, Minrus, Canuck and Bond were the five most susceptible entries with average coefficients of 45, 39, 29, 28 and 23 percent, respectively. There was no evidence of the prevalence of virulent races 263 and 276 of crown rust in any of the uniform oat rust nurseries in 1955.

A cooperative uniform oat smut nursery consisting of 37 entries was grown at 10 locations in the North Central Region in 1955. The five entries with the lowest smut infection were VHB x Spooner (C.I. 6939), LMHJA (C.I. Nos. 7083 and 7084), LMHJ x Clin. (C.I. 6935) and Navarro, with average infection percentages of zero or trace minus. Fifteen of the 20 experimental agronomic selections entered in the smut nursery had average infection percentages below one percent. The most susceptible entry in the nursery was Anthony with an average infection of 48 percent.

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Oat Stem Rust

By J. J. Christensen, Cooperative Rust Laboratory,
University of Minnesota,
Institute of Agriculture, St. Paul, Minnesota

Race 7 of oat stem rust increased in prevalence by 10 percent in 1955 and was the predominant race for the sixth consecutive year, comprising 68 percent of the total of 508 uredial isolates identified. (This race became the most widespread and prevalent in the United States beginning in 1950 and parallels the development of 15B of wheat stem rust.) Other changes in 1955 were a decrease in races 8 and 7A by 5 and 4 percent, respectively. Race 8 comprised 12 percent of the isolates; race 2 (and 5), 14 percent; and 7A, 5 percent.

Although Rodney (R.L.2123) is the best variety yet found to differentiate race 7 from 7A at low or moderate temperatures, it was necessary to rerun over 100 cultures under cooler temperatures during the fall months because the infection type produced by race 7 approached that of 7A at the high temperatures which prevailed during the summer of 1955. The decrease in prevalence of 7A in 1955 is unexplainable.

The potentially dangerous race 6, hitherto associated closely with barberry in northeastern States, was found in Pennsylvania and New York and for the first time in Missouri. Whether the identification of this race from Missouri is an indication that it is extending its geographic range will have to be confirmed by further surveys. Race 13, closely related to race 6, was found twice in Maine.

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The Luminescence Test and its Validity in Detecting Certain Oat Varietal Mixtures[1]

L. D. Herink, Seed Technologist, Dept. Seed Investigations, Cornell University (Geneva)

In recent years a technique known as the luminescence test has been finding increased usage as a method of detecting certain oat varietal mixtures. Utilization of this test is dependent upon the differential reaction of the dry oat seed to ultra-violet light in a dark room. The reaction is of two types, luminescent and non-luminescent, depending upon the variety being observed. Among the oat varieties grown in New York, Craig, Ajax, Victory, Rodney and Garry are luminescent while Clinton, Mohawk, and Advance are non-luminescent. Only when both a luminescent and non-luminescent variety are present can the mixture be detected since the luminescent varieties are indistinguishable under ultra-violet light as are the non-luminescent varieties.

None of the varieties observed at the New York State Agricultural Experiment Station are entirely pure for their color reaction to ultra-violet light, i.e. varieties in the luminescent category will contain a few off-type non-luminescent kernels and vice-versa varieties in the non-luminescent category will contain a few off-type luminescent kernels. The presence of these off-type kernels is not surprising when it is realized that no attention was paid to the luminescence character when the varieties were developed. The small number of off-type kernels is therefore considered characteristic and their presence interpreted accordingly when checking for varietal admixture. Knowledge of the number of off-type kernels one can expect to find in any particular variety is essential if one is to know whether an actual varietal mixture is being observed or only the off-types characteristic of the variety. Data has been collected on the number of off-types found in samples of seed submitted for certification inspection in New York during the past year. Of about 325 samples checked, 90% contained no more than 50 off-type kernels per pound. This information suggests that the number of off-types

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1/The writer gratefully acknowledges the valuable suggestions and assistance of Dr. Neal Jensen, Dept. of Plant Breeding, Cornell University, who examined the field plantings and conducted the greenhouse test.

characteristic of the variety is no more than 50 per pound. The remaining 10% of the samples varied widely in the number of off-types they contained (from 50 to 630 per pound) and were presumed to be varietal mixtures. The various varieties inspected differed somewhat in the number of characteristic off-type kernels but all appeared to contain under 50 per pound.

Tests were run during the past summer to determine the validity of the luminescence technique. Field plantings were made of the certification samples which were suspected of being varietal mixtures as revealed by the luminescence test. The purpose of these plantings was to determine whether the separation of luminescent and non-luminescent kernels under ultra-violet light in the laboratory actually constituted a varietal separation visible in the field. The luminescent and non-luminescent kernels from the suspicious samples were separated and planted in separate rows side by side in the field. Of 11 suspicious Craig samples included in the plantings, all were shown to be definite varietal mixtures by these plantings with the off-type row exhibiting definite differences in plant height, glume color and maturity from the pure rows. The rows planted to pure seed appeared identical to the Craig control rows while the rows planted to off-type seed appeared identical to the Mohawk control rows. Of 7 suspicious Mohawk samples included in the plantings, 2 were clear cut varietal mixtures. The off-type rows of the remaining 5 samples showed less striking differences from the pure rows, but differences did exist and there is reasonable certainty that these were also varietal mixtures. These plantings showed quite vividly that these suspicious samples with their large numbers of off-type kernels were actual varietal mixtures. The seed from these plantings has been harvested and its luminescence reaction is being checked to find if the luminescence is the same as that of the parent seed. This part of the experiment is only partially complete but from the material examined to date, it appears that the pure rows did not produce any off-type seed. Complete data obtained from the field plantings will be published elsewhere.

Another test was run to determine whether a separation according to plant characteristics would give the same results as a luminescence separation. A certification sample of Craig oats which was revealed to be a varietal mixture by the luminescence test was used for this particular study. One hundred seeds which included both the luminescent pure and the non-luminescent off-types were planted in the greenhouse for identification purposes and identified only by a code number. Classification of the plants grown from these seeds as Craig or non-Craig according to plant characteristics agreed 100% with the classification made according to luminescence. The seed from each of these plants was harvested and its luminescence checked. Every seed in each head had the same reaction as the parent seed.

These tests furnished good evidence that the luminescence test is a satisfactory method of detecting certain oat varietal mixtures.

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Hazel Lee Shands
"Oat Man of The Year"
by T. R. Stanton

The undersigned wishes to nominate Dr. Hazel Lee Shands of the University of Wisconsin as "Oat Man of The Year" for 1955, for his achievement in the breeding of Sauk, a new oat variety of much potential promise on the basis of its performance to date. In Iowa where it has been very promising Sauk led all other varieties in acreage certified in 1955 with 11,500 acres.

Sauk was selected by Dr. Shands and associates from a hybrid combination of (Forward x Victoria - Richland) x Andrew, the first cross being made in 1935 and the second one in 1942. The selection later named Sauk was extensively increased at Madison, Wisconsin, in 1953, and distributed in 1954 by the Wisconsin Agricultural Experiment Station to approximately 275 growers of certified seed in Wisconsin; thus making available an abundance of seed, not only for further distribution in Wisconsin in 1955, but for growing in adjoining states as well.

Sauk's high productiveness and satisfactory resistance to several destructive diseases are its most outstanding characteristics. The test weight, however, is slightly lower than that of the Branch variety. Sauk has a short, stiff straw which is very desirable in a midseason to late variety to prevent lodging. The lemmas (grains) are yellow and similar in form to those of Vicland. It is resistant to Victoria blight and race 7 of stem rust, but susceptible to race 8 of this rust. Sauk has protective resistance to crown rust and is highly resistant to most races of oat smuts. It also is resistant to Septoria black stem.

Dr. Shands was born at Landrum, South Carolina, October 9, 1908, and is one of four brothers all of whom are professional scientists. He received the B.S. degree from Clemson College, Clemson, South Carolina, in 1929. He earned his Ph.D. degree at the University of Wisconsin in 1932 (majoring in agronomy and plant pathology) in which institution he has served as an assistant in agronomy, 1929-33; research associate in plant pathology, 1933-37; assistant professor of agronomy, 1937-42; associate professor of agronomy, 1942-46; and professor of agronomy 1946--.

Dr. Shands principal research has been in the pathology, genetics and breeding of oats. He also has had part in similar research on barley, winter wheat, and rye. In oats, his most important productions in addition to Sauk, have been the older Vicland and Branch, and the much newer Bendee and Fayette varieties. Vicland was the most widely and extensively grown of the famous Victoria - Richland oats. They were the first varieties to be distributed in the United States with a combination of protective resistance to the rusts and smuts of oats with highly desirable agronomic characters.

Dr. Shands also has had part in the development of several improved varieties of barley, winter wheat, and rye. Furthermore, although still a relatively young man, he has played an important role in the training of many graduate students in plant breeding and agronomy.

Dr. Shands has served on several committees of the Plant Science Division of the American Society of Agronomy as well as appearing on its programs. He served as chairman of the first National Oat Conference held in connection with the American Society of Agronomy meetings, at Milwaukee, Wisconsin, in November, 1950. Without his initiative, foresight and perserverance, it is doubtful if the National Oat Conference as well as its organ, the National Oat Newsletter, could have been launched at that time.

Dr. Shands was elected a Fellow of the American Society of Agronomy in 1955, in part, as recognition of his outstanding contributions to oat improvement. He has a long list of publications.

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Red-Leaf Studies in Oats

by R. M. Takeshita, C. M. Brown, O. T. Bonnett and W. M. Bever

In this program, special emphasis is being placed on identification of strains, on studies of the host range, varietal reaction, relationship of light and temperature to disease development, virus-vector relationships, and development of methods for field testing varieties for their reaction to the disease.

Transmission experiments conducted using red-leaf affected oat plants obtained from Illinois, Iowa, South Dakota, Wisconsin, Minnesota, New York, Maine, Massachusetts, Georgia, Mississippi, Texas, and Washington; and with yellow-dwarf affected barley plants obtained from, California, Washington, Iowa, Wisconsin, Minnesota, and Illinois, indicate that the red-leaf virus of oats and the yellow-dwarf virus of cereals are identical. Identity of the two viruses is proposed on the basis of the following points of similarity:

1. Identical symptoms produced by the viruses on oats, barley, wheat, and rye;
2. Identical incubation periods of the two viruses;
3. Tranmission of both viruses by means of the same aphid species;
4. Similar persistence of the viruses in the English grain aphid and the apple-grain aphid;
5. Failure to transmit either virus by mechanical means;
6. Failure to obtain transmission of either virus through the soil; and
7. Failure to obtain seed transmission of either virus.

Variation in virulence among the different isolates of the virus became apparent as the work progressed. There is no doubt that strains exist which differ in the severity of symptoms incited on the same hosts. The difference in virulence among the various isolates was of sufficient magnitude to justify precaution against the indiscriminate use of yellow-dwarf strains for varietal evaluations.

In 1955 the north central uniform yield nursery entries together with thirty additional varieties were tested against red-leaf. The results are listed in Table I. All were susceptible to the red-leaf virus (yellow-dwarf virus), and

Table I. - RELATIVE SUSCEPTIBILITY AND RESISTANCE OF A NUMBER OF OAT VARIETIES AND SELECTIONS TO TWO RED-LEAF VIRUS ISOLATES -- R. M. Takeshita, 1955, Urbana, Illinois

Variety or Cross	C.I. No.	Isolate One 1/			Isolate Two 1/		
		% reduct. in kernel No. 2/	% reduct. in kernel weight 3/	% reduct. in plant height 4/	% reduct. in kernel No. 2/	% reduct. in kernel weight 3/	% reduct. in plant height 4/
Andrew	4170	77.2	45.4	45.0	72.6	26.1	27.5
Andrew x Clinton	5966	72.2	50.6	34.5	68.0	21.9	24.5
Beacon x Hawkeye-Victoria	6752	72.2	30.0	32.4	68.4	25.0	30.1
Bentland	6930	74.8	35.0	35.7	70.0	23.7	30.0
Benton x Marion	6928	70.2	26.4	34.8	78.5	28.5	38.5
Benton x Marion	6929	82.3	35.1	49.3	77.5	18.6	41.1
(Bond-Rbw. x H-J) x Landhafer	6913	84.6	43.0	40.8	39.9	17.2	15.5
(Boone-Carter) x Clinton	6927	75.5	22.6	44.9	58.3	15.3	22.9
Clarion	5647	72.0	36.2	33.5	83.4	21.5	39.4
Clintland	6701	64.9	29.3	24.0	64.9	27.4	24.9
Clinton 59	4259	84.7	19.0	32.5	73.4	15.8	27.0
Clinton² x Ark. 674	6644	26.9	35.9	16.0	67.4	31.2	23.1
Clinton x (Boone - Cartier)	6668	50.7	30.8	20.2	30.7	22.9	22.2
Clinton x (Boone - Cartier)	6933	73.7	6.2	41.4	75.9	9.4	29.6
Clinton x Landhafer	5864	83.5	52.1	38.7	83.6	58.3	38.0
Clinton x [Victory x (Victoria x H-B)]	7030	64.7	22.3	32.6	---	---	---
Clinton x [Victory x (Victoria x H-B)]	7020	63.8	30.9	28.5	64.5	21.7	24.9
Clinton x Ukraine	6537	79.1	48.7	39.5	82.0	49.2	26.5
Clinton x Ukraine	6608	75.8	45.8	37.7	---	---	---
D69-Bond x (Vic. Rich. x Bannock)	7117	84.3	15.9	37.7	76.9	31.1	37.2
Gopher	2027	67.0	3.2	23.8	79.6	9.8	33.3
Jackson	5441	82.6	34.1	37.6	79.5	23.0	31.6
[Landhafer x (Mindo x H-J) x And.]	6878	---	---	---	69.9	14.4	29.5
[Landhafer x (Mindo x H-J) x And.]	7083	83.8	26.1	48.6	75.5	6.5	26.2
[Landhafer x (Mindo x H-J) x And.]	7084	74.1	35.8	31.1	64.3	26.2	32.6
[Landhafer x (Mindo x H-J) x And.]	6936	65.6	48.5	36.2	---	---	---
[Landhafer x (Mindo x H-J)] x Clinton	6935	73.7	22.6	36.4	26.0	35.6	27.5
Marion x D69 - Bond	7116	58.2	15.5	18.3	70.7	17.6	28.5
Minland	6765	44.4	38.8	30.5	48.7	32.5	25.4
Mo. 0-205	4988	67.4	30.5	41.6	67.1	8.3	22.5
Nemaha x (Clinton x Boone - Cartier)	6934	75.9	24.4	31.3	64.0	18.4	19.3

Variety or Cross	C.I. No.	Isolate One[1] % reduct. in kernel No.[2]	Isolate One[1] % reduct. in kernel weight[3]	Isolate One[1] % reduct. in plant height[4]	Isolate Two[2] % reduct. in kernel No.[2]	Isolate Two[2] % reduct. in kernel weight[3]	Isolate Two[2] %reduct. in plant height[4]
Newton	6642	65.3	21.9	30.7	65.2	11.6	27.2
/Rox x (Vic x H-B)7 x /AJ. x (Vic x H-B)7	5961	52.9	17.3	35.4	54.3	33.2	24.7
/Rox x (Vic x H-B)7 x /AJ. x (Vic x H-B)7	5962	73.6	23.7	28.8	55.9	51.9	27.1
Ransom	5927	50.3	28.8	25.0	61.9	25.9	31.6
Sauk	5946	69.3	28.8	31.2	68.5	20.4	32.1
Simcoe	6767	78.0	36.5	41.2	74.0	16.8	34.4
Vicland x (Branch x Clinton^2 - Santa Fe)	6916	56.1	41.5	43.0	66.2	8.3	26.2
(Victoria x Hajira-Banner) x Spooner	6939	70.0	18.0	32.5	73.9	+4.0[5]	29.6
Waubay	5440	74.7	41.0	38.0	78.6	1.9	29.3
Anthony	2143	72.9	6.7	25.3	64.8	84.4	25.7
Appler	1815	47.7	30.2	20.8	67.6	16.8	19.4
Benton	3910	84.9	21.3	34.5	70.7	15.8	28.6
Bond	2733	80.7	31.5	44.8	52.3	12.7	12.5
Bonda	4329	78.4	21.3	33.5	65.2	23.6	20.1
Branch	5013	77.8	19.9	34.2	66.0	16.3	27.4
Cherokee	5444	69.9	35.2	36.5	69.0	22.6	27.5
Clintafe	5869	83.6	46.7	47.8	72.2	27.0	29.2
Cody	3916	53.1	19.3	36.9	58.5	27.8	23.7
Columbia	2820	71.1	30.6	34.9	70.1	3.5	19.1
Dupree	4672	84.3	15.9	37.7	74.1	27.8	30.9
Fulghum	708	51.3	28.3	33.1	50.6	0.0	17.2
Hajira	1001	72.0	27.3	30.5	82.0	7.8	33.7
Improved Gary	6662	64.6	31.8	28.2	59.8	21.5	22.8
Kanota	839	64.0	2.4	40.4	54.7	14.2	24.2
LaSalle	5628	67.6	22.8	27.1	61.8	+1.3[5]	27.7
Landhafer	3522	77.0	46.6	31.5	--	--	--
Marion	3247	90.0	70.7	40.7	73.2	8.6	35.5
Mindo	4328	43.8	33.3	16.7	70.9	3.1	27.3
Nemaha	4301	64.6	30.5	32.9	79.1	+2.1[5]	33.1
Nemaha x Clinton x B.-C.	6641	47.4	21.2	17.5	71.0	14.9	28.8
Overland	4181	61.1	50.4	31.1	71.9	14.8	35.7
Rodney	6661	80.5	28.0	38.1	72.7	29.7	30.9

Variety or Cross	C.I. No.	Isolate One 1/			Isolate Two 1/		
		% reduct. in kernel No. 2/	% reduct. in kernel weight 3/	% reduct. in plant height 4/	% reduct. in kernel No. 2/	% reduct in kernel weight 3/	% reduct. in plant height 4/
Saia	4639	--	--	--	36.7	13.2	17.2
Santa Fe	4518	63.4	12.7	27.5	53.7	19.5	15.1
Shelby	4372	54.7	34.4	32.1	54.2	24.3	19.0
Trispernia	4009	73.6	30.9	40.8	70.0	10.3	33.7
Ukraine	3259	90.2	32.0	32.8	73.1	20.9	30.4
Victory	1145	71.4	28.5	29.1	48.7	23.7	14.0
Victoria	2401	47.4	21.2	17.5	71.0	14.9	28.8

1/ Both virus isolates used in these trials were obtained from Illinois.
2/ Percentage reduction in kernel number is based on the toal number of kernels obtained from five red-leaf affected panicles and five apparently virus-free panicles.
3/ Percentage reduction in kernel weight is based on the weight in grams of 100 kernels selected at random from five red-leaf affected oat panicles and five apparently virus-free panicles.
4/ Percentage reduction in plant height is based on the height of five red-leaf affected oat plants and five apparently virus-free plants.
5/ A (+) sign signifies that the kernels from red-leaf affected oat plants weighed more (expressed as %) than the kernels from apparently virus-free plants.

The seeds were planted in hills (3) by means of a corn planter, 10-15 seeds per hill. The plants in the 2-3 leaf stage were artificially infested with viruliferous apple-grain aphids, Rhopolasiphum prunifoliae. The percentage of plants affected with red-leaf in a hill varied from 40.0% to 100.0%.

The hill technique may not have given an accurate representation of the effect of red-leaf on diseased plants since they were compared with apparently virus-free plants grown in the same hill. Such "healthy" plants may have grown more vigorously than normal due to poor competition offered by diseased plants, and diseased plants may have grown less well due to vigorous growth of the "healthy" plants.

none of the entries are considered to possess any resistance to infection. In general, isolate-1 of the virus appeared to be more virulent than isolate-2. Blasting of the florets is undoubtedly the most serious aspect of the disease.

Bluegrass (Poa pratensis) probably is the most important host in which the virus overwinters. The virus was recovered from specimens of bluegrass obtained from Iowa, Wisconsin, and Illinois. Unfortunately, bluegrass is a symptomless carrier.

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Fungi In Oats Tested for Seedstocks
by Willard F. Crosier (Dept. Seed Investigations,
Cornell University, Geneva, New York)

Saprophytic, as well as disease-inciting fungi, are regularly observed during the germination testing of oats. The presence of the glume-discoloring fungus, Alternaria tenuis is regarded as proof that a mercurial treatment is absent or somewhat ineffective. As shown in Table 1, only 21 of the 311 treated samples from the 1954 crop were infested by A. tenuis. With two exceptions, less than 5% of the seeds in any of these 21 samples were discolored. An average of 92% of blackened seeds was observed in non-treated samples.

Every germination test of non-treated seed produced in New York or elsewhere was partially or wholly infested with Alternaria tenuis. In past years, many non-treated samples from Central United States carried no hyphae of A. tenuis, whereas those from New York were invariably infested.

Septoria avenae, the cause of blackstem also infests the glumes of oats usually without injury to the caryopses. A few seedstocks reaching this state in 1952 were originally infected with S. avenae. In 1953 the lemmas of many samples developed black spots during germination although no, or vague, discolorations were evident on the dry seed. No living hyphae or spores were found.

Since the black-stained areas appear on moistened oats after the fungus has died, chemical treatment does not prevent their appearance. The data in Table 1 indicate that treatment increases the development of the black stains. Actually Alternaria tenuis when present masks the symptoms of Septoria avenae. A mercurial treatment simply eliminates A. tenuis and then the black stains are readily observed.

Apparently Septoria avenae can infect the florets of any variety of oats now sold in New York. The percentages of stained seeds in 1510 treated samples examined in 1954 and 1955 varied from 0 to 33. Seedstocks produced locally were slightly less affected than those received from other states.

On the basis of the 1955 crop already examined, Garry exceeds other varieties in percentage of both affected samples and stained seeds per sample.

Fusarium spp., including Gibberella zeae, are found occasionally in germinating oats. The 1954 crop with 15 of 540 samples infected was about an average for the last 10 years. On the basis of only 254 samples examined to date, the 1955 crop with 6 infected samples is slightly below the 10-year infection average.

Epicoccum sp., probably E. neglectum, has been progressively more common on germinating oats since 1951. About one-half of the non-treated samples (1954 and 1955 crop) of Craig and Garry were discolored by this light red fungus. It also occurred in most other varieties. The average percentage of affected seeds was 1.5, with a maximum of 4.0 in a few samples of Craig. A mercurial treatment usually prevented development of Epicoccum sp.

Table 1. Signs or Symptoms of Fungi Observed on Seedstocks of Oats.

Variety name	Total number of samples		Number of germinating samples with evident							
			Alternaria tenuis		Septoria avenae		Fusarium spp.		Epicoccum sp.	
	Tr.*	NT*	Tr.	NT	Tr.	NT	Tr.	NT	Tr.	NT
					1954 Crop					
Advance	9	4	0	4	4	2	0	1	0	2
Ajax	20	9	1	9	9	1	0	0	0	2
Beaver	9	0	1	--	8	--	0	--	0	--
Clinton	68	47	4	47	41	9	0	2	0	11
Craig	109	96	6	96	60	14	2	2	1	45
Garry	4	0	1	--	3	--	0	--	0	--
Mohawk	85	51	7	51	48	13	1	2	2	15
Others	7	22	1	22	3	2	0	5	0	3
					1955 Crop					
Advance	4	3	1	3	1	0	0	0	0	0
Ajax	2	6	0	6	1	0	0	0	0	3
Beaver	0	2	--	2	--	0	--	0	--	0
Clinton	6	3	0	3	5	0	0	0	0	1
Clinton 11	2	1	0	1	2	0	0	0	0	0
Clinton 59	16	2	1	2	8	0	1	1	0	2
Craig	44	28	3	28	32	2	1	1	0	16
Garry	78	21	2	21	61	1	0	2	0	13
Mohawk	25	9	1	9	16	0	0	0	0	2
Others	1	1	0	1	1	0	0	0	0	0

*Tr. indicates treated and NT, non-treated seed.

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Mercurials Unable to Kill Mechanically Applied Smut Spores

by Willard F. Crosier (Geneva, New York)

Ordinarily naturally smut infected seed is used for testing the fungistatic value of chemical treatments. In 1953 a shortage of this seed necessitated the substitution of partial vacuum inoculated oats. The better mercurial formulations controlled smut from this source as effectively as from naturally-infected seed.

In 1954, however, a mechanical agitation method was substituted for the partial vacuum method. One-half pint lots of Victory oats were soaked in two pints of a mixed spore suspension of <u>Ustilago avenae</u> and <u>U. kolleri</u> for 30 minutes. A power stirrer with two one-inch blades turning at 300 RPM agitated the mass of seeds and spore suspension for 10 minutes. The seeds were then drained, dried, and treated with various chemical formulations. No seed treatment effected satisfactory control of smut.

The experiment was repeated in 1955 with Anthony oats and a suspension of 5 grams of spores (1950 source) per liter of water. The treated seed was stored for 3 hours, 3 days, 10 days, or 20 days prior to planting.

As shown in Table 1, the control of smut depended upon (1) volatility of the mercurial formulation, (2) length of storage period, and (3) confinement of the seed during storage. It would appear that mechanically-inoculated smut can be controlled but the amount of mercury vapor and/or the exposure period must be considerably greater than is required for control of naturally-infested smut.

Ceresan M2X applied at two-thirds of the manufacturer's rate effected complete control of smut if the seeds were held in sealed jars for 20 days. Other materials applied at this rate were slightly less effective than at the full dosage rate.

Table 1. Smutted panicles from Anthony Oats Treated at Recommended Rates and Stored 3 Hours to 20 Days before Planting.

Material, code No. and name	Percentage of smutted panicles from seed stored							
	3 hours	3 days in		10 days in		20 days in		Index of
	In jars	Jars	Boxes	Jars	Boxes	Jars	Boxes	control
Ceresan M	3	2	2	1	1	0	1	93
Ceresan M2X	13	2	3	3	1	0	2	84
DuPont D	6	7	10	3	3	Tr	2	80
DuPont S	7	18	16	7	12	2	3	58
DuPont 365	11	16	18	6	7	1	5	59
Mema BB 302	16	10	16	5	9	1	4	60
Panogen 15	20	12	13	4	6	2	8	57
Setrete	23	30	21	10	13	5	13	27
Check	26	31	36	14	16	14	15	0

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Progress in Breeding Stiffer Strawed Oats

By F. A. Coffman 1/

For some years many have been aware of the triumphs of oat breeders of this country in their efforts to produce through hybridization oats that were resistant to rust and other diseases. Much less, however, is known of their other accomplishments. One of these comparatively little publicized but none the less very important achievements has been the production of stiffer strawed oats. This attainment is all the more notable when it is realized that such oats have all been more or less "by-products" of breeding projects, the primary objective of which was to obtain disease resistant varieties. As a consequence one naturally wonders what might be accomplished if a well defined breeding program were to be initiated in which breeding for stiff straw is made a primary objective. With the increased use of fertilizer on fields sown to oats and the wider employment of the combine in harvesting operations, stronger straw in oats is becoming increasingly urgent. When one recalls that Gopher once was considered to have stiff straw and that Markton and Appler (Red Rustproof) were recommended varieties a quarter century ago the progress in breeding stiffer strawed oats for both spring and winter oat areas is evident.

A comparison of summary data on these three old oat varieties and on the more recently developed ones: Clinton, Overland and Fultex, when grown in experiments in the Northeastern - North Central, Northwestern (Irrigated), and Southern (fall-sown) areas, respectively, is presented in table 1.

It is recognized that the superiority in standing ability of these new varieties over the older ones with which they are compared often resulted from the freedom of the new oats from serious damage by rust. However, many of the reports included in this summary were from stations where diseases were not present. This was especially true of reports from the irrigated stations of the Northwest. As a consequence we have here definite proof that oat breeders have made real progress in satisfying that request once so frequently heard from growers: "Give us an oat that will stand up." As such improvement as had been made to date came about primarily as an attainment outside the principal objective being sought, the attainment of still further improvement in standing ability in oats should not prove impossible.

1/ Senior Agronomist, Field Crops Research Branch, ARS, USDA.

Summary Data on Average Lodging Observed in Old Standard and Improved New Varieties Grown in Different Regions of the Country.

Year	Northeastern and Central 1/ Station Reporting	Gopher (old)	Clinton (new)	Northwestern (Irrigated) Station Reporting	Markton (old)	Overland (new)	Southern (Fall Sown) Station Reporting	Appler (old)	Fultex (new)
	No.	%	%	No.	%	%	No.	%	%
1942	--	--	--	--	--	--	2	4.5	0
1943	--	--	--	2	22.0	3.0	3	13.3	1.6
1944	8	74.1	6.0	1	3.0	1.0	3	14.0	0
1945	10	52.7	7.4	3	15.3	0.3	7	51.9	26.1
1946	8	20.8	2.9	3	35.3	6.0	7	13.0	6.0
1947	11	49.8	6.4	5	30.6	4.4	4	58.2	35.2
1948	12	39.9	13.7	3	21.7	0	6	42.7	30.8
1949	8	54.9	22.0	2	0.5	0	7	58.7	24.3
1950	8	49.8	21.4	5	5.6	0.8	7	42.1	25.0
1951	13	56.2	24.3	3	46.0	19.0	10	32.1	10.5
1952	11	27.7	13.6	5	27.2	5.4	11	55.3	24.6
1953	12	68.0	44.0	6	22.3	2.2	10	43.2	27.3
1954	5	36.0	10.0	4	34.7	9.0	12	54.5	36.7
1955	14	51.0	32.0	2	16.0	0	7	66.3	49.8
Total Nurseries:	120			44			96		
Average:		49.1	18.5		23.3	4.2		44.0	24.4

1/ Data 1944 to 1952 were from the Uniform Early Maturing Oat Nursery grown in both Northeastern and North Central Regions; those for 1953 to 1955 North Central Region only; Gopher has not been grown in the Northeast. In 4 tests in 1953, 6 in 1954 and 7 in 1955 lodging in Clinton in that region averaged 2.0, 2.0 and 0.6 percent respectively whereas in the same tests in Victory it was 7.3, 8.3 and 2.9 percent respectively.

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Stiff Strawed Entries in the World Oat Collection

by H. C. Murphy (USDA)

The World Oat Collection consisting of 5,471 entries was grown under irrigation at Aberdeen, Idaho, in 1955. Extensive observations and notes on a number of agronomic and morphologic characteristics were recorded by D. J. Ward, F. A. Coffman, D. D. Morey, F. C. Petr, Harland Stevens, and others. The writer attempted to record the relative straw strength of each of the 5,471 entries by observation and the "snap" or "tension" test. Strength of straw was recorded on a 0 to 9 scale, with 0 being the stiffest and 9 the weakest. All entries were first evaluated, then those with a reading of 4 or lower were carefully rechecked. The final readings ranged from 2 to 9, with most of the entries reading 5 or higher. One hundred of the apparently stiffest strawed and most diverse types have been selected for evaluation for relative lodging resistance in replicated tests on both wet and dry soil at Aberdeen, in 1956, by determining the clr factor and using the "snap" test.

Since the 1955 readings for straw strength were only preliminary the data will not be reported in detail. Only three of the entries had a preliminary straw strength reading of 2. Since these three entries undoubtedly are among the stiffest strawed in the entire collection they will be reported. They are as follows:

C.I. No.	P.I. No.	Name	Source
5254	----	*A. byzantina*	Turkey
7026	193,477	Craigs Afterlea	Scotland
----	193,027	Unnamed	Scotland

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Variation of Color in Certified Seed Oats

By T. R. Stanton, Consultant - Coker's Pedigreed Seed Company

During recent years samples of winter oats from fields grown for the production of certified seed have been brought to the writer's attention in which a slightly more yellowish type of oats was present than that common to the variety. These oats were thought to be probable offtypes by seed analysts. As a consequence, the question arose regarding whether such oats should be approved by seed analysts for seed purposes, especially when being sold under blue labels as certified seed.

Insofar as the writer knows there is no quick or certain method of proving whether these slightly off-color oats are not representative of the variety, except by growing and studying them in identification nurseries as they mature under what is considered as fairly normal conditions of climate and soil.

The question also arises, is there danger of seeing just too much wrong with some samples that are submitted to the laboratory for analysis?

As a rule, seed samples of winter oats are less uniform in color than is true of spring oats. Fall-sown oats usually are subjected to a greater range of weather, including wider variations of temperature, deficient or excessive precipitation and sunshine. Hence, winter oats are more frequently badly weather-stained (discolored) than are spring oats. As a matter of fact, the grain (oats) may be rendered most unattractive, yet be genetically pure and fully viable.

Since so-called weathering is a common cause of confusion in making satisfactory varietal identifications through laboratory analysis, it usually is not wise to draw hasty conclusions regarding varietal purity, or the definite identification of the variety itself.

Again, very little is known as to what extent the thinning of stands by winterkilling, and the consequent development of many secondary tillers, may affect variation in grain color in known pure-breeding winter oat varieties. These phenomena undoubtedly could affect grain color to the degree that resulting variations might be considered as being genetic. These secondary tillers could produce a slightly less yellow grain color than the initial tillers primarily because of a gradient in time of ripening, as well as being partially protected from sunshine by the taller tillers.

It thus appears that some systematic studies should be made on the effect of winterkilling on grain (lemma) color in certain winter oat varieties, such as Forkedeer, Traveler, and Lee to provide a basis on which seed laboratories could make more definite analyses. Moreover, the commercial buyer of certified seed oats is entitled to more protection than is now possible by present methods.

The most interesting case in which color in oats has been decidedly influenced by climate came to the writer's attention some years ago in the use of the trade name "Puget Sound Golden," for high-quality oats of the Victory variety grown under the rather cloudy, humid, and foggy weather that prevails at time of ripening and harvesting of oats in the Puget Sound area of Washington state. These oats showed a glossy, dark-yellow color with the appearance of having been given a coat of yellow varnish.

In U. S. Department of Agriculture Technical Bulletin No. 1100; entitled, "Oat Identification and Classification," the writer reported on these oats as follows (Page 34):

> "For instance, Victory, a typical white oat, when grown in the Puget Sound area of Washington state develops a distinct reddish (copperish-yellow) color. This effect of environment is very misleading, as Victory oats from this area frequently are sold under the trade name, "Puget Sound Golden"."

The writer must confess that for several years these "Puget Sound Golden" oats were a mystery to him. It was not until numerous seed samples were collected and grown on irrigated land under the almost ideal environment for oats at the Branch Experiment Station, Aberdeen, Ida., was the true variety, Victory, identified.

It is of interest to mention here that nearly all the production of these very heavy, plump oats, sold under the attractive trade name, "Puget Sound Golden" at that time were shipped to the eastern United States for feeding race horses. Regardless of the fact that Victory, a white oat, when grown in that area develops a distinct, dark yellow color, there was sufficient justification for a commercial seed and grain company to process and offer them to the trade as yellow oats.

In conclusion, in the identification and confirmation of varieties of winter oats from seed grown for certification, it is exceedingly important to know that the appearance of so-called offcolor types may be due to environment rather than to genetic segregation for color types. In view of the fact that nearly all varieties of oats now grown commercially are of rather recent hybrid origin the natural assumption is that any slightly offcolor types must be primarily genetic.

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World Collection of Oats

David J. Ward 1/

The oat collection was grown at Aberdeen, Idaho, this past summer to renew the seed stocks. In addition to the regular Aberdeen staff, Harland Stevens and Frank Petr, W. H. Chapman, and Darrell Morey were on hand to observe the collection in late July. Frank Coffman and Pat Murphy spent many hours in the collection as the plants neared maturity.

The 5470 strains in the planting were arranged alphabetically according to names or pedigrees. This was done so that we might gain some additional insight into the nature of the material constituting the oat collection. We were impressed by the frequent occurrence of distinctly different types bearing the same name. It was made clear to us that an accession or selection number must accompany names for many varieties if a precise identification is to be made. Morphologic diversity such as that which permitted the selection of Gopher, Iogold, State Pride, et al from Kherson (Sixty-Day) was evident in many of the varieties; one wonders what latent diversity lies in their genes governing useful plant characters not readily apparent to the eye. The alphabetic arrangement also enabled us to observe the extent of the occurrence of morphologically similar types having like varietal designations.

Many sister selections from numerous crosses have been assigned C. I. numbers over the years. These groups of lines were especially conspicuous in the nursery. It was decided that many of these should be removed from the active collection. The following criteria were established for keeping hybrid lines in the active collection: maintain, (1) at least one representative from each

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1/ Agronomist, F. C. R. B., A. R. S., U. S. Department of Agriculture.

different cross, (2) representative morphological types from crosses known to be outstanding, (3) lines having specific useful genetic traits, (4) current lines thought to have varietal potential, and/or (5) named varieties.

A total of 2128 lines were withdrawn from the active collection and a small sample of each will be retained in storage at Aberdeen in the event of future demand for seed. The seed should remain viable there for many years.

The approximately 3350 entries remaining in the collection will be arranged alphabetically for future seed requests involving the entire collection. Observations on the collection should be more meaningful under this system.

Many notes on morphologic characters of the revised active collection were recorded at Aberdeen. It is hoped that these data, together with recently recorded agronomic, pathologic, and entomologic notes, may be recorded on I. B. M. cards to complement the information already on cards.

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III. CONTRIBUTIONS FROM CANADA

Cereal Crops Division, C.E.F.
Ottawa, Canada
by F. J. Zillinsky and R. A. Derick

In the Eastern Canada the 1955 spring growth conditions were generally favorable for oats. July and August however were unusually dry and hot, hastening maturity from 1 to 2 weeks. Oat yields were about equal to the long time average and the quality of the grain was good.

Except for local areas crown and stem rusts were not severe. Leaf blotch and black stem caused by *Septoria avenae* were quite prevalent throughout Eastern Canada. The amount of lodging which could be attributed to black stem was less during the two previous years. The development of the black stem phase was probably retarded by the dry hot weather prior to maturity. Red leaf was distributed widely in the East but in low proportions. The disease was probably associated with the widespread aphid infestation during the spring and early summer.

Rodney and Garry continued to perform well in yield trials in Eastern Canada. Rodney is becoming very popular with the farmers particularly because of its plump seed and good yields. As soon as sufficient seed is available both varieties will likely be recommended in most areas of Ontario and Quebec.

An early maturing selection Ott. 3928-2-2 (Roxton - R.L. 1276) x (Ajax - R.L. 1276) is being considered for release for the northern areas of Ontario and Quebec. Its resistance to the rusts and smuts is similar to that of Garry but does not yield as well. A number of selections from the cross Ott. 5055 (Abegweit x (Garry - Ukraine)) have performed well in a preliminary yield test.

These selections have good resistance to the smuts, stem rust, Victoria blight and the prevalent races of crown rust. They are however 2 to 6 days later maturing than the variety Garry.

Work is continuing on species hybrids, but progress is extremely slow due to the high degree of sterility occurring among the hybrids and their progenies. As the fertility increases in the later generations of hybrid progenies from crosses between tetraploid and hexaploid, and tetraploid and diploid species, the chromosome number tends to approach that of the parental species having the higher chromosome number. Normal fertility among these progenies is attained more readily than among progenies of artificially doubled hybrids of the same crosses. However the immediate increase in fertility is much greater in the amphiploid than in the untreated hybrid.

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Cereal Breeding Laboratory, Winnipeg
by J. N. Welsh

Both stem rust and crown rust were prevalent in Manitoba in 1955. Under these conditions Garry and Rodney were comparatively free from rust and were higher yielding than other less resistant varieties.

A number of lines from the cross (Santa Fe - R.L. 1942) x Garry which were given a yield test for the first time at Winnipeg in 1955, show considerable promise. They have the Santa Fe resistance to crown rust and the Garry resistance to stem rust and smut, as well as being high yielding.

A hulless selection made from the original Garry, and accessioned as R.L. 1692.33, has performed well in comparison with other hulless varieties over a period of years. It is a tall, late maturing variety which possesses the (improved) Garry resistance to Victoria blight and both rusts, but has only moderate resistance to smut. Over a six-year period at Winnipeg (1949-1955) it has outyielded Brighton by 16 bushels, while over a two-year period at five stations (1954-1955) it again outyielded Brighton by approximately 16 bushels and Torch by 21 bushels. It is our intention to apply for a license to distribute this variety.

To those who are interested in growing Garry it should be noted that this variety produces a number of off-type plants such as fatuoids, heterozygotes, and normal-appearing plants which have either black or grey kernels.

A number of heterozygotes were grown in the field during the past summer. These heterozygotes produced fatuoids, heterozygotes and normal plants, all of which segregated for rust reaction. The majority also segregated for seed color. Heterozygotes with black kernels either bred true for color or segregated, producing plants with black, grey, or white kernels. Heterozygotes with grey kernels, on the other hand, either bred true for color or segregated, producing plants with grey or white kernels, only. Information on the breeding behaviour of fatuoids and normal or sativa-like plants with black or grey kernels is inadequate at the present time. A large number of these will be grown in the field in 1956.

The presence of these off-types could be attributed to chromosomal irregularities within the variety, or to a natural cross between Garry and wild oats. This problem is being investigated.

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Plant Pathology Laboratory, Winnipeg
by B. Peturson and G. J. Green

Stem rust of oats was first observed in Western Canada, in 1955, at Morden, Manitoba, on June 20. Before the end of the season this rust had spread throughout much of the grain growing areas in Western Canada. Only light infections developed, even in Manitoba, on early sown crops. However, on late sown oats the stem rust infection averaged about 30% on suscpetible varieties in Manitoba and eastern Saskatchewan, while lighter infections occurred in western Saskatchewan and Alberta.

More than half of the oat acreage in Manitoba was sown to Garry, a variety resistant to all stem rust races, and Rodney, a variety resistant to all stem rust races except 7A. A considerable amount of stem rust developed on these two varieties. The infections developed during a period of high temperatures in late July and early August and consisted mostly of very small pustules. The rust which attacked these two varieties consisted of the common races to which they are normally resistant. It is considered that a partial breakdown of the resistance of these varieties occurred owing to high temperatures.

Races of oat stem rust isolated in Canada in 1955 were: 1, 2, 4, 5, 6, 7, 7A, 8, 10, 11, 12 and 13. As in several past years, race 7 predominated (56% of the isolates) and race 8 was second in order of prevalence. Race 7A, the only race known to attack the new variety Rodney, was of rare occurrence (2.3% of the isolates). The most important change in race distribution was the increase in prevalence of race 6 from 2.3% of the isolates in 1954 to 5.7% in 1955. This race was isolated in Western Canada in 1955 for the first time in many years.

Crown rust first appeared in the field in Manitoba on June 13. A moderately heavy infection averaging 40% developed on late oats in Manitoba and eastern Saskatchewan. A light infection occurred in western Saskatchewan and a trace infection in Alberta.

From collections obtained on oats in many localities throughout Canada in 1955, 18 distinct physiologic races of crown rust were isolated. The races identified were as follows: 201, 202, 203, 209, 210, 211, 212, 226, 228, 231, 232, 234, 235, 237, 238, 239, 240 and 280. There was very little change from last year (1954) in the races isolated. All but three races (205, 216 and 229) found in 1954 appeared again in 1955 and only one race (280) had not been found in Canada before. There was a slight change from previous years in the prevalence of some races. In 1954, 80.5% of isolates from Western Canada and 49.5% of the isolates from Eastern Canada belonged to races (201, 202, 203, 209, 210, 211 and 212) which attack varieties possessing the Bond type of resistance to crown rust, but in 1955, this group of races comprised 72.8% of isolates from Western Canada and 41.3% of the isolates from Eastern Canada. Of this group race 202 was the most prevalent and race 201 the second most prevalent race. The relative decrease in this group of races is probably due to the decrease in the culture of oat varieties derived from Bond.

No races were found this year in Canada which can attack the varieties currently being used in breeding for resistance to crown rust (Santa Fe, Landhafer, Trispernia and Victoria).

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IV. CONTRIBUTIONS FROM U.S.D.A. AND STATES

ARIZONA

By Arden D. Day (Tucson)

Oats in Arizona

Oats are not extensively grown in Arizona at the present time. In 1955, about 11,000 acres were grown for grain production and about 20,000 acres were grown for winter pasture and hay. The state average grain yield was about 55 bushels per acre.

California Red, Markton, and Palestine are the leading oat varieties grown for grain production. In southern Arizona, oats grown for grain production are usually planted from November 15 to December 31 and harvested in May and June.

Markton is the most popular oat variety grown in Arizona for winter pasture and hay. When grown for winter pasture oats are usually planted in September and October and pastured during the winter months. When grown for hay oats are usually planted from November 15 to December 31 and harvested in April and May.

Due to the warm, dry climate in Arizona, oat diseases and insect pests are not usually a serious problem; however, in 1955 southern Arizona did have a heavy aphid population which tended to reduce oat yields.

The present "Oat Improvement Program" in Arizona is directed toward superior oat varieties for winter pasture, since oats are being grown more for winter pasture and hay than for grain production.

ARKANSAS

by H. R. Rosen and R. L. Thurman (Fayetteville)

The 1955 oat acreage in Arkansas was probably the largest on record for the state, 751,000 acres, according to the Crop Reporting Service. This compares with 556,000 acres planted in 1954 and with the 10-year average of 362,000 acres for 1944-53. The 1955 increase in oat acreage was in part brought about by three preceding, successive drought years in which most summer-grown feed crops suffered severely, and in part by acreage allotments in which cotton and rice were reduced. The latter, however, played little or no role in the hilly parts of Arkansas where the increase in acreage was just as great or greater. In Washington County, for example, the agricultural agent for one of the larger banks published an estimate that one-half to two-thirds of the tillable land was planted in small grains, mostly oats, the varieties consisting almost wholly of Traveler and Arkwin. His figures would indicate about 100,000 to 150,000 acres in this county alone where an acreage of around 5,000 has been common in the past.

Outside of the delta and grand prairie regions of the state, where oats are grown mainly as a cash, grain crop, the remainder of the acreage is utilized in large measure for a combination of winter grazing and a hay or silage crop, or to a more limited extent for grazing and a grain crop. For the state as a whole, only 456,000 acres were harvested for grain according to the Crop Reporting Service. Unfortunately the latter Service publishes no information on the amount and distribution of oat acreage utilized for winter pasture plus hay, silage or grain crop or for winter and spring pasture exclusively. While it is well known that the amount of oat acreage utilized for winter grazing has risen considerably during the past decade, there are no official data to indicate this. Furthermore, there are data from experimental clipping plots, as well as from farms operated by farmers in which oats were used for grazing of dairy as well as beef animals, which indicate that such grazing is fully as valuable as the average grain crop on the same soil.

<u>Effects of severe late March freezes on grain yields</u>. Following a very mild first half of March, 1955, with above normal temperatures, oats and other small grains began shooting or jointing rapidly so that when severe freezes struck in late March there were very few varieties of any small grain that had not broken their dormancy with a loss of winter hardiness. Most varieties of wheat suffered more than the varieties of oats utilized because they were further advanced in their growth. The hilly parts of the state suffered far more than the remainder although there was considerable damage to wheat in the northern part of the delta region. The state average grain yield of oats of 35 bushels per acre represents a reduction of five bushels below that of 1954 largely due to these freezes, while the average wheat yield of 19.5 bushels represents a reduction of 6.5 bushels below that of the previous year.

In addition to reduction in yields, the freezes caused much weakening of straw and considerable reduction in quality of grain as well as other abnormalities. These ill effects are more fully discussed in an article that will appear in the January 15, 1956, number of The Plant Disease Reporter (by H. R. Rosen).

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CALIFORNIA

A Report on Ventura Oats

by C. A. Suneson and C. W. Schaller

In 1944 the California Agricultural Experiment Station participated in the release of Ventura, a product of the cooperative oat breeding program for which in this case the U.S.D.A. and the Idaho, Iowa and Kansas Experiment Stations were the principal contributors. Only in California has the variety "succeeded," though less than was initially expected. Elsewhere, Helminthosporium blight rendered its usefulness (and that of many other Victoria x Richland derivatives) short lived. Here it remains resistant to both crown and stem rust - the purpose in its creation.

Ventura holds a 2% yield advantage over Kanota from 13 years of testing at Davis. In these tests stem rust was recorded in 6 seasons and crown rust in 1. Obviously, therefore, there must be offsetting deficiencies. These include less winter hardiness, and heat or drought tolerance, and less resistance to mildew, halo blight, and yellow dwarf virus. In 222 out-state nurseries during the same period, it holds a 3% advantage over Kanota, doing best in the higher rainfall areas.

The small seeds of Ventura have been a deterrent to many growers.

Since the present acreage of Ventura (about 150,000 acres) is still below that of Kanota and California Red in California, the net gain in either grain or hay production from its release was not very great.

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FLORIDA

Oats in Florida

By W. H. Chapman, Quincy, Florida
A. T. Wallace, Gainesville, Florida
H. H. Luke, Gainesville, Florida

The 1954-1955 season was generally unfavorable for production of small grains. Dry weather in late September and early October prevented planting of oats for early forage. Rainfall was 11.52 inches below normal for the period from October 1 through March. Lack of moisture during February and March together with a March freeze materially decreased the yields of early varieties and selections. Heavy rains in early April and the lack of damage by cold weather to the late hardy varieties gave a distinct advantage to this group. As a result of the erratic weather conditions grain yields did not follow the trend of previous years.

Continued dry weather severely hampered fall planting. Thus far little grazing has been obtained from oats planted for winter forage.

Variability in Southern Oats: W. H. Chapman, A. T. Wallace, H. H. Luke.

When Floriland and Sunland were released, variability in seed type was noted by the State Seed Laboratory. Off-type kernels probably represented segregates or mutants resulting from wide crosses involving *Avena byzantina*. However, they presented a problem with certification or registration. In order to alleviate this condition, further purification of foundation stocks was attempted in cooperation with the Seed Laboratory. Approximately 2,500 panicles were selected from a foundation field of a variety. Before planting, each panicle envelope was examined by the seed analyst and any irregularities noted. Plantings were observed frequently throughout the growing season and morphological as well as seed characters were observed. It seems that rather accurate identification of varietal mixtures can be made (e.g., Southland in Floriland or Sunland). However, seed that were variable in such characters as awns, basal hairs, and sucker mouth, produced plants with diverse seed characteristics. These studies suggest that the variability encountered is due to the genetic instability of *A. byzantina* and many of its derivatives.

Dr. H. H. Luke joined the office of Cereal Crops and Diseases and is located with the Plant Pathology Department of the University of Florida. He will work with fundamental pathological problems of winter oats.

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GEORGIA

By A. R. Brown (Athens)

Oat yields were reduced considerably by a late freeze which occurred on March 27, 1955. After six weeks of mild weather with ample rainfall the temperature dropped to 16°F. causing severe damage to earlier maturing varieties. The cold wave was accompanied by high winds which caused considerable lodging in plots that had the rankest growth. Such varieties as Seminole, Sunland, Floriland, and Southland suffered 90 per cent damage. Fulgrain, Delair, and Dr. Gore's selections, 8M and 27M, were wiped out. The damage done to Victorgrain 48-93 and Arlington varied from one replication to another depending on how much lodging occurred. Those plots which lodged the most were damaged severely. Red Rustproof 14 suffered more freeze damage than did Terruf, Appler, Nortex or Nortex-Trelle Dwarf. Most entries made a good recovery, and yields were better than expected. The eight top yielders and their yields were as follows:

Tennex x (Vic. x H-B) CI 6994	57.5
Nortex x Trelle Dwarf	56.0
(Lee-Vict.) x Fulwin CI 6717	53.4
Nortex Strain	53.1

Fultex	51.4
Appler	51.0
Victorgrain	50.0
Terruf	49.6

Test weights were low all over the state, however good yields were obtained by farmers in the Coastal Plain area.

The 1955-56 Oat Nursery was planted on October 20, and came up to a good stand, however some winter killing has occurred among the Florida varieties.

By S. A. Parham and D. D. Morey (Tifton)

Oats in south Georgia have been subjected to the driest November-December (1955) on record. Temperatures were about 2° below normal. Diseases have not been serious so far this season. Grazing has been delayed from three to four weeks but rains in early January have improved the outlook for winter grazing.

Breeding work is being continued at the Coastal Plain Experiment Station in an effort to combine resistance to crown rust, stem rust and smuts into oats adapted to the Coastal Plain area. Several F_3 and F_4 oat lines appear promising for disease resistance but tests for yield and agronomic characters will need to be continued.

By U. R. Gore and E. S. Luttrell (Experiment)

With the best oat crop prospects in years the freeze of March 27-28, 1955, caused severe damage by killing the young heads in the "boot" stage. Later maturing varieties were damaged less than the early varieties or with high nitrogen fertilization. Much of this frosted crop was cut for ensilage and made excellent quality feed.

The frost damaged oats put out new tillers and made a fair crop. This crop matured later and H. victoriae did considerable damage. There was little crown or stem rust damage on oats in the piedmont of Georgia.

Screening of oats to several collections of H. victoriae was continued in the greenhouse. Blight resistant plants are then inoculated with races 202, 203, 213, 216 and 258 of crown rust. Testing for winter hardiness is done at Blairsville where differential killing usually occurs. There is a need for more hardy oats for winter grazing as well as for grain.

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IDAHO

By Harland Stevens and Frank C. Petr (Aberdeen)

A cool wet spring resulted in later than average planting of cereal crops in many areas of southeastern Idaho in 1955. Cereal crop yields were below average on many irrigated lands. There was a lesser reduction in oat yields than either barley or wheat.

Very heavy aphid populations were observed feeding on cereal crops. Many entomologists think the aphid potential is present most years but the cool, wet weather of 1955 retarded materially the predator population increase. Specimens of red leaf (yellow dwarf virus) were found at most locations in the Pacific Northwest. The damage to the crop, however, was a result of heavy bug population feeding rather than disease.

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ILLINOIS

By C. M. Brown, R. M. Takeshita, O. T. Bonnett and W. M. Bever.

A record average yield of 57 bushels of oats per acre was produced in Illinois in 1955. This is 9 bushels higher than the previous record crop of 1940, 15 bushels higher than the 1954 yield, and almost 18 bushels higher than the 10-year average for Illinois. A favorable growing season with little disease damage was primarily responsible for this record crop.

The Illinois oat acreage in 1955 was 3,195,000 acres, which is 133,000 acres lower than reported in 1954. Clinton still occupied more acres than any other variety, however its acreage dropped from 64 percent of the total in 1954 to 47 percent in 1955. Of the total acreage Nemaha accounted for 22 percent, Mo. 0-205, 7 percent, and Columbia, 5 percent. Other varieties listed among the top ten were Bonham, Clintland, Andrew, Bonda, Benton, and Clintafe.

Oat diseases were of minor importance in Illinois in 1955. Red-leaf was scattered throughout the state, but it was not considered important in the overall production. In a few isolated fields crown and stem rust were severe, but they caused only a small amount of damage. Probably the most prevalent and damaging disease, especially in the northern one-third of the state was Septoria black stem. Reports were received indicating that the leaf spot phase of the disease was very severe. Both the leaf spot and black stem phases were especially severe in the oat nursery seeded on the Northern Illinois Experimental Field located in DeKalb County.

Logan Oats

Seed of the new variety Logan will be distributed to certified seed growers in 1956. This variety was developed in the program at Illinois from the cross

Benton x Marion. In Illinois it has been in about the same yield class as Clinton and Andrew. It appears to have the same disease reaction as Clarion and Waubay, being moderately susceptible to race 202 of crown rust, race 8 of stem rust, and Septoria, and resistant to race 7 of stem rust. It is slightly taller than Clinton but is about equal in straw strength. Logan matures two to three days earlier than Clinton. It is a yellow oat, has thin hulls, with a comparable test weight to Clinton.

Straw Strength Studies

One of the important objectives of the oat breeding program at Illinois is to produce oat varieties that stand well on the highly fertile soils. Histological characteristics of varieties of varying standing ability are being studied to determine any differences that may exist among them. Efforts are also being made to locate some easily observable characters that can be used in a selection program.

Interspecific Crosses

Amphiploids of _Avena strigosa_ x _Avena abyssinica_ that carry the rust resistance of _Avena strigosa_ have been produced. These amphiploids are being used in a backcrossing program to incorporate this rust-resistant factor into some of the adapted varieties of common oats. Second backcrosses are being made at the present time. In addition to rust resistance it is hoped that some other desirable characters will be transferred to common oats by using this method.

Winter Oats

In southern and south-central Illinois winter oats, when they survive, produce much higher yields of better quality grain than spring oats. Usually, because of severe winters, they can be safely grown only in the extreme southern part of the state. Increased interest in winter oats has caused a breeding program to be initiated for developing improved winter oat varieties with stiff straw, disease resistance and winter-hardiness. Winter-hardiness is by far the most important objective of this program. Several hundred combinations of different varieties and selection have been made. These combinations represent crosses using spring oats, winter oats, and foreign introductions. A recurrent selection program will be utilized in attempting to obtain strains superior in winter-hardiness. In addition, a number of winter oat varieties have been treated with X-rays for the purpose of inducing mutations that might favor winter survival.

Dubois appears to be the best adapted winter oat for Illinois at the present.

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INDIANA

By F. L. Patterson, J. F. Schafer, R. M. Caldwell, L. E. Compton, J. E. Newman, R. R. Mulvey and K. E. Beeson

The Season

The 1955 growing season was an excellent one for oat production in Indiana. Record yields were obtained for spring oats and high yields of winter oats. The dry March weather permitted early seeding of the spring crop and allowed the crop to reach a stage of maturity less likely to be damaged by high temperatures in June and July. Rains shortly before harvest caused severe lodging in many areas. Winter oats survived well in southern Indiana and went on to give excellent yields.

Oat Diseases in 1955

Both crown and stem rust of oats were of little significance in Indiana in 1955, although conditions were ideal for rust development as evidenced by the most intense and early crown rust epidemic that we have ever observed in artificially inoculated nursery and disease testing plots. Stem rust also reached 100% severity in these plots. Both crown rust and stem rust became quite general although light from late introduction of inoculum into the state. Stem rust reached 50 percent severity in extreme southwestern Indiana in a very small area.

Both Red Leaf and Septoria Leaf Blotch and Black Stem were light this year and caused little loss. Septoria Leaf Blotch, however, was readily found. The Black Stem phase was exceptionally light. Red Leaf infection was the lightest observed in several years.

Advanced Performance Tests

Two lines of Canadian origin, 3928-5-4 and 3928-5-8 C.I. 5962, from the cross (Roxton, Victoria, Hajara, Banner x Ajax, Victoria, Hajara, Banner) were particularly outstanding in overstate drill plot trials. Purdue 424A1-71-5-9 C.I. 5927, from the cross (Boone-Cartier x Clinton), a very early line, performed well especially in southern Indiana. A number of lines from the same cross as Newton also performed well. Among named varieties, Clintland was outstanding in standing ability and performance.

New Varieties Distributed

The two new spring oat varieties released, described in the 1954 National Oat Newsletter, were named Bentland and Newton. An estimated 5000 bushels of Bentland CI. 6930 and 8000 bushels of Newton C.I. 6642 were available for distribution to registered seed growers in Indiana in February 1956.

Bentland was developed by crossing Benton with the crown rust resistant variety Landhafer, and backcrossing selected crown rust resistant progenies to Benton six more times. Bentland is similar to Benton except for added crown rust resistance. Bentland will be recommended in 1957 in the nothern half of Indiana and considered acceptable in southern Indiana.

Newton was selected from the final cross of a series of three successive crosses involving the varieties Nemaha, Clinton, Boone and Cartier. Newton compares favorably with Clintland in average performance but has a different seasonal adaptation and is particularly outstanding in straw strength. Newton has moderate resistance to crown rust derived from the Nemaha and Boone varieties and is resistant to race 7 and related races of stem rust. Newton will be recommended in 1957 in the northern three-fourths of Indiana and considered acceptable in southern Indiana.

Both Bentland and Newton were tested in the Uniform North Central States Oat Nursery in 1955.

Varieties Certified

Acreages of oats inspected for certification in Indiana in 1955 were: Clintland, 14,664; Clinton 59, 671; Clintafe, 205; Mo.0-205, 132; Benton, 42; and Dubois (Winter), 307.

Varietal Recommendations

Small grain varieties recommended for seeding in Indiana in 1956 are described in Purdue Agricultural Experiment Station Circular 417. Clintland is recommended for the northern half of Indiana and Mo.0-205 for the southern half. Benton and Clinton 59 are considered acceptable in all of Indiana, Clintafe is considered acceptable in the northern one-fourth of the state, and Clintland is acceptable in southern Indiana.

Dubois winter oat is recommended in the southern one-fourth of the state.

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IOWA

By S. C. Wiggans, M. D. Simons, J. E. Sass, K. Sadanaga,
H. C. Murphy, T. Hoerner, K. J. Frey, J. A. Browning and R. E. Atkins (Ames)

Components of Yield

In a study of factors affecting yield several varieties of oats were grown at different rates of seeding. The number of tillers per plant, number of seeds per head, and seed weight were correlated with yield. When the stand was held constant, at a seed rate of 3 bushels per acre, the following partial correlations were obtained:

	Seeds/Head & Yield	Tillers/Plant & Yield	Seed Weight & Yield
1954[1]	+.716**	+.215*	-.325**
1955[2]	+.668**	-.026	+.516**

[1]Ten varieties in test
[2]Three varieties in test

There was a highly significant positive correlation between seeds per head and yield, but tillers per plant was not closely related to yield. Seed weight and yield correlations were negative one year and positive in the other.

Correction of Parentage

In the North Central Uniform Oat Nursery for 1955 the Iowa Experiment Station had entered three oat strains which were labelled with the wrong parentage. They should be corrected as follows:

Nursery No.	C. I. No.	Correct Parentage
15	5864	[Victoria x (Hajira x Banner)] x Colo
18	6537	"
19	6608	"

The oat strain C.I. 6537 is being increased for distribution to farmers in Iowa and other interested states. At present the Iowa Agricultural Experiment Station has 130 bushels of breeders' seed. This strain is midseason in maturity and produces high yields of plump, high test weight grain. It is resistant to smut, races 6, 7 and 8 of stem rust, and has field resistance to the prevalent crown rust races. C.I. 6537 is very susceptible to a so called "physiologic" leaf spot but apparently this has had little effect upon its performance.

Culms Per Plant and Straw Strength

It has been apparent in recent experiments that the most strong strawed spring oat varieties tended to be low in tillering capacity. (Note-not all low tillering varieties are strong strawed, however). Examples are Craige-afterlea, Minor, Clintland, and Garry Selection #5. In an experiment conducted in 1955 the following relative straw strengths (cLr factors) were found for plants with varying numbers of tillers:

Strain	No. of tillers per plant			
	1	2	4	5 or more
Neb. 521444	2.82*	2.59	2.46	2.20
Neb. 521465	2.48	2.64	2.45	2.19
Neb. 521475	2.90	2.63	2.62	2.19
Neb. 521462	3.30	2.86	2.58	2.27
Ave.	2.82	2.59	2.46	2.20

*Number of chain links supported divided by plant height in inches.

Winter Hardiness in Oats

In the spring of 1954 several thousand seeds of each of five winter oat varieties, Dubois, Arlington, C.I. 5364, Wintok, and Atlantic, were treated with X-ray at the Iowa State College Genetics Laboratory. X_2 progeny rows derived from the treated seeds were planted at Ames in the fall of 1954. Also included in the nursery were appropriate checks and the Oat Winter Hardiness Nursery. The Winter Hardiness Nursery was completely winterkilled as were all of the rows derived from Wintok and Atlantic varieties. Some seedlings survived in one X_2 row in each of the varieties Dubois and Arlington. In C. I. 5364 a considerable number of seedlings survived in seven X_2 rows and one check row.

Individual heads were harvested from the surviving plants and a portion of the seed from each head was planted in the field at Ames in the fall of 1955 to obtain further winter hardiness test. A second portion of the seed will be planted at Aberdeen, Idaho to increase the seed supply of each head.

The Oat Winter Hardiness Nursery has been planted at Ames about 6 or 8 times in the past quarter century and no plants have ever survived. This would lead one to the conclusion that perhaps mutations for greater winter hardiness have occurred in the irradiated winter oats. The 1954-55 winter at Ames was of about average severity. The lowest temperature was -19°F. in January. Probably the most severe test of hardiness occurred in late March after the oats had started spring growth when the temperature went nearly down to zero.

Rust Resistance Available in Tetraploid Oats

Combined seedling resistance to the races 6, 7, 7A and 8 of stem rust and 202, 258 and 276 of crown rust has been obtained in two 28-chromosome (tetraploid) F_3 selections from the cross of Avena abyssinica (C.D. 4549) x A. strigosa (C.D. 3820) made by F. J. Zillinsky at Ames in the spring of 1953. One of these selections (Abd. SP 54-F_3 101) has been homozygous for resistance to the seven races of stem and crown rust, while the other (Abd. SP 54-F_3 100) has segregated for reaction to crown rust, which also attacks the A. strigosa parent and Saia. The selections possess good fertility with individual plants yielding up to 20 grams at Aberdeen, Idaho, and Ames, Iowa, in 1955. The tetraploid A. Abyssinica parent was susceptible to races 6, 7, 7A and 8 of stem rust and races 202, 258 and 276 of crown rust, while the tetraploid selections tested in the F_4, F_5 and F_6 generations appear to possess the same resistance as the A. strigosa parent.

About 50 percent of the plants of P. I. No. 193,958 (Avena abyssinica) introduced from Ethiopia, were found to be resistant to races 202, 205, 258 and 276 of crown rust. These races are sometimes spoken of as the "Bond", "Saia", "Victoria" and "Landhafer-Sante-Fe" races, respectively, because they attack these and other varieties. These resistant A. abyssinica plants, and the tetraploids mentioned above, are the first tetraploids found to be resistant to any race of either crown or stem rust. The reaction of the resistant A. abyssinica plants was a 1 - 2 infection type to race 258 of crown rust and a 0-type to races 202, 205, 276, and other key races.

These rust resistant tetraploids should be of value as parents in interspecific hybridization.

Oat Diseases in Iowa in 1955

A replicated experiment consisting of fungicide-sprayed and unsprayed plots of 4 oat varieties extensively grown in Iowa was conducted at Ames, Marcus, Kanawha and Cresco. The test demonstrated an average reduction in yield due to foliage diseases of 6.3 percent for the area represented with by far the most severe loss occurring in Northeast Iowa.

The final estimate for the entire state based on this and other information placed losses from root necroses at 4%, stem rust 3% crown rust 2% and Septoria disease, red leaf, blast, and blue dwarf at 0.5% each. Halo blight, scab, Helminthosporium avenae, smut and leaf spot were present in trace amounts only. Estimated losses due to oat diseases, then, totaled 10.5% or 5.8 bu./A. The estimated yield per acre of oats in Iowa in 1955 was 45.0 with a potential acre yield of 50.8 bu./A. This was the third highest average yield on record for Iowa, being exceeded only by estimated yields of 46 bu./A. in 1895 and 1937, and 47 bu./A. in 1917.

Oat Production Experiments

Results of an experiment carried out as part of the graduate training of Mr. G. J. Jarvis and Mr. J. G. Wheat were summarized during the past year. The effects of varying drill-row spacings of oats, applying different levels of nitrogen fertilizer and six oat varieties on a number of agronomic and quality criteria of the oat crop and on a companion alfalfa-brome seeding were measured. A Clarion silt loam soil at Ames in central Iowa and an Ida soil at Castana in western Iowa were the sites for the experiment conducted during the period 1952 to 1955. Nitrogen was broadcast at seeding time at rates of 0, 20, 40 and 60 pounds per acre as ammonium nitrate. Oats were drilled in rows spaced either 7 or 14 inches apart. Cherokee, Ransom, Clinton, Marion, Shelby and Santa Fe x Clinton (C.I. 5867) were the oat varieties seeded. The legume seeding consisted of approximately 8 pounds of alfalfa and 8 pounds of brome per acre in all tests and appropriate applications of phosphorus and potassium were made where necessary to correct deficiencies. Data were recorded for heading date, plant height, lodging, hull percentage, 100 kernel weight, protein content of the grain and grain yield for the oat crop and for stand establishment of the alfalfa and hay yield of the grass-legume mixture.

Nitrogen applications resulted in an average increase in grain yield of the oats for the 3 seasons of 3.3 bushels per acre at Ames and 10.5 bushels per acre at Castana. The optimum rate of nitrogen application at Ames appeared to be between 20 and 40 pounds per acre, while the results at Castana indicated that rates of greater than 60 pounds per acre might still give appreciable increases in yield. A reduction in yield of approximately five bushels per acre for oats grown in 14-inch drill-rows in comparison with oats in 7-inch rows was obtained for the average of the three year period at both Ames and Castana.

Heading date was hastened slightly and plant height, percent-lodging, and protein content of the oat grain generally were increased on the plots receiving nitrogen. Neither the application of nitrogen nor varying the width between oat drill-rows produced a marked or consistent effect upon hull percentage or 100 kernel weight of the oats. Oats grown in 14-inch drill-rows matured slightly later, grew a bit taller and lodged somewhat less than oats produced in 7-inch drill-rows, but the differences were very small and did not reach the accepted levels of statistical significance in many instances.

Alfalfa stand establishment and hay yields generally were not significantly influenced by the rates of nitrogen applied to the oats at seeding time, by the variations in width between oat drill-rows, or by the different oat varieties grown. A few exceptions to this general trend were noted. Alfalfa stands were slightly higher in plots with 14-inch spaced rows of the oat companion crop than when the oats were grown in 7-inch drill-rows at Castana in 1954. Some reduction in alfalfa stands at the 60-pound rate of nitrogen application was indicated in the 1954 Castana test, and reductions in hay yield were observed at both the 40- and 60-pound nitrogen rates for the Castana experiment established in 1952.

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KANSAS

By E. G. Heyne, Agronomy; C. O. Johnston, E. D. Hansing and M. D. Huffman, Plant Pathology; and W. M. Ross, Fort Hays Branch Station.

Oat production in Kansas was variable in 1955 but total production of 32 million bushels was 8 million more than the average of the previous 10 years. The 1955 average yield per acre was 27.5 bushels.

The breeding work was expanded in 1955 to include nursery testing at the Kansas Cornbelt Experiment Field in northeastern Kansas. This area is better suited to oat production than Manhattan and should be a useful addition to the Kansas oat breeding program. Yields of 100 bushels per acre were obtained at that location. Yields were also good at Manhattan where some strains yielded as much as 80 bushels per acre.

Tests for use of oats as a forage crop at Hays indicate that this may be the most profitable way to use oats in the semi-arid area of the state.

Additional support for oat smut work will be available in 1956 which should aid in keeping oat breeders informed on the oat smut problem.

New strains that appeared promising in Kansas in 1955 were Osage x Bonda-Hajira-Joanette-Santa Fe, CI 7029 an entry in the uniform red oat test; Bonda-Santa Fe : 3690 x Osage, Ks. 53385; and Nemaha x Neosho-Landhafer, Ks. 53345. The latter has very stiff straw and is similar to Neosho in appearance.

Little serious disease damage occurred on oats in Kansas during 1955. However, heavy infection of stem rust on Kanota oats in central Kansas counties late in the season caused severe lodging and rather heavy local losses. Both blue dwarf and red leaf virus diseases were present but did no damage in 1955. The most serious limiting factor in oat production was drought.

A. J. Casady has left the cereal breeding project to accept the position in grass breeding at Manhattan. W. C. Haskett has left the cereal rust work (USDA) to accept a position in forage diseases at Kansas State College and has been replaced by M. D. Huffman, who recently completed his work at Iowa State College.

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MAINE

Dr. Clinton Blackmon has taken the position vacated by Dr. Lincoln Taylor at Orono.

MASSACHUSETTS

See article by Bespolov and Walrath under "Special Articles" section.

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MICHIGAN

by R. L. Kiesling and J. E. Grafius (East Lansing)

The 1955 season was favorable for the oat crop, with yields in excess of 100 bushels at most locations.

Diseases

Oat varieties previously selected for resistance to black-stem and leaf-blotch (Septoria) were included in the Michigan oat breeding program. Studies on the nature of resistance to Septoria in these resistant varieties is being carried out.

Red leaf of oats was a serious disease in Michigan in 1955. Studies are being made of the spread of the disease in association with grasses and small grains.

Seeding Dates as Related to Varietal Recommendations

The influence of night temperatures on the genotype has been studied and the results are ready for publication in the Agronomy Journal. As a result of this study it can be concluded that the date of seeding is a major factor in determining varietal performance. Early sowing is recommended for both oats and spring barley but it is not always possible to follow recommendations.

The northward flow of temperature as the season advances has a direct influence on the variety. Specifically, it has been found that some varieties can stand high night temperatures better than other.

Clinton, a corn belt variety of oats, can stand high night temperatures better than Garry, a Canadian variety. On the other hand, Clinton can not compete favorably with Garry when the two varieties are sown early to avoid high night temperatures. If, however, a farmer in the thumb area of Michigan habitually sows late, he may be better off with a corn belt type oat. Following the same line of reasoning, unless a farmer in the southern part of Michigan can regularly plant about or before April 1, he had better stick to varieties such as Clinton and Clintland.

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MINNESOTA

I. Breeding

W. M. Myers, F. K.S. Koo, M. B. Moore, and B. J. Roberts

Since obtaining the lines with a combination of major genes for stem rust and crown rust resistance, 19 high-yielding varieties of diverse genetic backgrounds have been crossed with these lines in the past three years. Early generations have been screened for plants or lines with disease resistance, desirable maturity, good plant and panicle types and grain quality. Advanced selections (F_5 lines) are being increased over winter in Mexico and resistant lines (which will be confirmed by rust tests in the greenhouse this winter) will be harvested and planted in yield trials at St. Paul next year. Intensive selections will be made in lines which indicate a high yield and other good agronomic characters.

At the same time backcross programs for a few crosses are being carried out. Difficulties have been encountered in transferring in each backcrossing all the resistance genes (the linked White Russian and Rainbow genes, "Canadian" gene(s), and Landhafer gene) because of the number of backcross plants required. For this reason hybrid plants carrying individual genes for resistance are being separately backcrossed to the recurrent parents. Finally, it is planned that all the resistance genes will be combined in a single variety by crossing together the backcrossed derivatives which carry the different resistance genes.

Advanced breeding material from the crosses made in earlier years has been tested in the state or in the region for one to several years. Results indicate that a few selections from the crosses of Landhafer x (Mindo x Hajira-Joanette) or Landhafer x (Bond-Rainbow x Hajira-Joanette) with Andrew or Clinton are rather promising, especially the ones with the Rainbow gene for race 7A resistance in addition to the "Canadian" gene(s) and the Landhafer gene.

The selection Landhafer x (Bond-Rainbow x Hajira-Joanette) II-47-25 (C.I. 6913) has been tested for four years in rod-row trials. Results indicate that this selection is superior to Andrew in yielding ability and lodging resistance, and possesses factors for resistance to races 7, 7A and 8 of stem rust, to all prevalent races of crown rust, and to smuts. It is essentially like Andrew in maturity and plant height. The seed is slightly larger and test weight slightly higher than for Andrew. A limited increase of seed has been made for this selection and further increase will be made this year.

II. Genetic Studies of the White Russian and Rainbow Genes for Stem Rust Resistance

F.K.S. Koo, W. M. Myers, M. B. Moore, and B. J. Roberts

Since the White Russian and Rainbow genes for stem rust resistance were found to be closely linked in several Minnesota selections, questions as to their linkage intensity and the origin of this combination have been raised. Although studies designed to clarify these points have not been completed, certain preliminary results obtained from studies of LMHJA x Gopher cross in the coupling phase and of the crosses of Richland or Andrew with Clinton or White Russian in the repulsion phase suggest that the crossing over value for these two genes is somewhat less than one per cent, indicating a close linkage. To explain the origin of this combination where the White Russian and Rainbow genes were brought together on the same chromosome, two possibilities have been advanced. (1) It may be that, contrary to previous reports, the genes were pseudo-allelic and that the recombination resulted from rare crossing over. (2) That unequal crossing over might occur in the cross of the Landhafer x (Mindo x Hajira-Joanette) selection with Andrew so that the lines with combined resistance carry a tandem duplication of the White Russian and Rainbow genes. The results so far obtained are in favor of the former possibility. If the White Russian and Rainbow genes were allelic and unequal crossing over were responsible for bringing them together, we would expect this result also to occur in the crosses Andrew x Richland and White Russian x Clinton. For a simplified illustration, assuming that if F_2 plants susceptible to both races 7 and 8 (the class that is easily detected in this case) found in the crosses of Andrew or Richland with White Russian or Clinton were the products of unequal crossing over, we would expect to obtain the same type of susceptible plants in the crosses of Andrew with Richland or White Russian with Clinton. Results show that susceptible plants were observed only in the former group of crosses, indicating unequal crossing over was not responsible for the production of susceptible plants. Therefore, it can be reasonably concluded that the White Russian and Rainbow genes are not alleles and the combination of these two genes on the same chromosome simply result from crossing over.

III. Cytological and Cytogenetic Studies in Oat Species

W. M. Myers, M. Tabata, and F.K.S. Koo

Five diploid species, A. strigosa, brevis, pilosa, Wiestii, and nudibrevis; three tetraploid species, A. abyssinica, barbata, and Vaviloviana; and five hexaploid species, A. sativa, fatua, sterilis, ludoviciana, and byzantina, are being used at Minnesota in crosses for phylogenetic and cytogenetic studies. In crosses of diploid x diploid, 7 bivalents were obtained and meiosis was regular in each case indicating close relationship and high degree of homology between chromosomes of the different diploids. The chromosomal association in F_1 hybrids between diploid and tetraploid species indicates these two ploids have one genome in common. The relatively frequent occurrence of extra bivalents or trivalents in such crosses suggests that autosyndesis may occur within the second genome of the tetraploid species. Results with crosses between tetraploid and hexaploid species show the two polyploids may have only one genome in common or several genomes partially in common. In each cross of hexaploid x hexaploid (all possible combinations of the 5 species), a high frequency (about 50% of the microsporocytes had 2 or 4 univalents at metaphase I. Most other sporocytes had 1 or 2 open and loosely attached bivalents. Judging from chromosome size the open bivalents may have involved the chromosomes that were univalents in other sporocytes. The "species complex" characters such as base type, awn development, pubescence, etc., have been found in progenies of hexaploid species crosses to be inherited as a unit. This may suggest that the species complex may be governed by several closely linked genes or that these genes may be carried on structurally differentiated chromosomes that occur frequently as univalents at meiosis. Evidence obtained to date, however, does not support the latter suggestion.

In studies with irradiated Saia, pseudo-isochromosomes have been found in several instances. These aberrations are the products of reciprocal translocations between opposite arms of homologous chromosomes. Observations indicate that pseudoisochromosomes, behaving like isochromosomes or univalents at meiosis, tend to lag in movement and congression. Therefore, the transmission frequency of pseudoisochromosomes would be expected to be relatively low.

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MISSISSIPPI

By Donald H. Bowman and Paul G. Rothman (Stoneville)

The 1955 Mississippi oat crop was severely damaged by low temperatures of 23 and 22°F on March 25 and 26, respectively, accompanied by desiccating winds. Early varieties had started to head at this time. No relationship could be observed between normal winter cold tolerance and the damage resulting from this late freeze. Damage varied from field to field depending upon the stage of growth and vegetative vigor of any given field irrespective of variety. Much of the harvested grain resulted from the growth of new tillers. The nursery was harvested for the purpose of saving seed and as a matter of record. Data are not comparable with that from former years.

The 1956 crop generally was planted late and in dry soil. Temperatures have been low since the first of November. Because of these conditions growth has been limited with little or no forage available for livestock.

Dr. Paul G. Rothman joined the staff in August to replace Dr. H. H. Luke who transferred to Florida. Dr. Rothman will carry on a breeding program to improve varieties adapted to the deep South.

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by C. W. Manning, Stoneville Pedigreed Seed Co.

A late cold snap (March 27) caused considerable damage to the oat crop in the Mississippi Delta. The 22 degree weather occurred after some oats had headed and, of course, those not yet headed were shooting up vigorously. Oats that were more nearly mature were severely hurt, some being killed completely and a large percentage killed back to the ground. It appeared that the late varieties, or those that were planted late and those less heavily fertilized, were damaged least.

Many fields were not harvested at all and some were cut for silage. Much of the grain that was combined was light and not fully developed, a large percentage of heads having come from sucker growth.

Because of the severe cold, our nursery had to be written off to experience. Data on heading, ripening, lodging, height and yield were most unusual and could be compared only with years having similar growing conditions. We hope a year similar to 1955 does not occur again soon.

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MISSOURI

J. M. Poehlman, Marvin Whitehead, Charles Hayward, and Dale Sechler, (Columbia) and Carl Hayward (Pierce City)

1955 was an excellent year for oats in Missouri. The state average of 41.0 bushels has been exceeded only by the record 41.5 bushel average of 1954. The high yields in 1955 resulted from a combination of early planting, adequate rainfall during May and June, below normal temperature during May and June and little or no loss from disease. Heavy fertilization of oats has become more common in recent years. The season favored late maturing varieties and such varieties as Clintland and Newton (which are normally late maturing varieties in Missouri) produced relatively higher yields than normal.

Missouri 0-205 and Andrew are the leading varieties in Missouri although some Cherokee is grown in West Missouri and some Clinton and Clintland across North Missouri.

Breeding work has been concentrated on the addition of the Canadian type resistance to stem rust to Mo. 0-205, and improving the lodging resistance of Mo. 0-205. It is hoped that better seed quality may be obtained from these crosses also.

Interest in winter oats has been building up in South Missouri as the result of a succession of mild winters and the availability of new winter hardy varieties. Dubois, Forkedier, and Cimarron appear most promising.

Anthracnose on Winter Oats

Anthracnose, Colletotrichum graminicolum, was identified on winter oats growing on the Southwest Missouri Experimental Field at Pierce City. All varieties were infected, but damage appeared to be most severe on Cimarron.

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NEBRASKA

by J. W. Schmidt, V. A. Johnson, A. F. Dreier, and G. W. Lowrey

The 1955 oat crop season in Nebraska was characterized by dry weather and abnormally high temperatures that continued in the southern and eastern parts of the state up to heading time of the earlier varieties. Light rain combined with cooler temperatures thereafter favored development of the later-maturing varieties. Contrary to long-time trends, the mid-season to late varieties have been favored since 1953. Oats were grown on about 2 million acres in the state in 1955 with an average acre yield of 26 bushels. Diseases were not a factor in oat production. Stem rust came in late on those varieties known to be susceptible to race 7 and related races.

Clintland was released to Nebraska farmers in 1955 as a replacement for Clinton and recommended only for the northeast and east-central areas of the state.

Mo. 0-205 continued to perform well although it was exceeded in yield in state-wide tests by Cedar and Newton. On the strength of its 1955 performance, Newton is being increased in 1956 for possible release in 1957. Sauk, Jackson, Waubay, and Beedee all had excellent yields in the eastern Nebraska districts in 1955.

Plans for a new branch station in northeastern Nebraska were completed this year. This station to be located near Wayne, Nebraska, will provide a much-needed oat testing location for the main oat producing area of Nebraska. Oat experiments there will not get under way until the spring of 1957.

Several selections from the cross Clinton x [Victory x (Victoria x Hajira-Banner)] are in advanced tests. These combine stiff straw, moderate crown rust resistance, and stem rust resistance of either the ABC or BCD types. Largely because of their earliness, their yield performance was not outstanding in 1955. They are being tested extensively in 1956.

Oats are generally grown on fields following corn in Nebraska. On many of these fields, oat yields can be increased by the application of commercial fertilizers. In much of the eastern one-half of the state, supplemental applications of both phosphate and nitrogen are needed to effect optimum yields. This combination (40+30+0), over a period of years, has resulted in the following average yield increases in several sections of the oat-producing area of Nebraska: Southeastern - 19 bushels; East South Central - 18 bushels; Northeastern (fine textured soils) - 22 bushels; Northeastern (sandy soils) - 10 bushels. Soils in

Central and Western Nebraska usually are adequately supplied with phosphorus for small grain production. However, applications of nitrogen fertilizer have proved to be profitable in oat production on several fields in this part of the state.

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NEW HAMPSHIRE

by Leroy J. Higgins (Durham)

The 1955 oats in New Hampshire were grown under warmer and less rainfall than the means for a period of over 50 years.

The climatic data for Durham follows:

	April	May	June	July	4 Months' Total	Average Per Month
			Rainfall in Inches			
1955	2.57	2.07	4.96	1.64	11.34	2.81
Mean (over 50 years)	3.57	2.87	3.47	3.37	13.28	3.32
			Temperatures in F Degrees			
1955	47.3	60.9	64.8	75.2	248.2	62.05
Mean (over 50 years)	43.8	54.7	63.6	68.1	230.2	57.8

In the cooperative Northeastern nursery oat trials conducted near Durham, the average yield of 32 varieties, replicated three times, was 48.62 bushels per acre for grain and 2.37 tons of forage (grain plus straw before threshing). These yields exceeded those of the dry 1953 and the wet 1954 seasons.

The leading grain yields per acre were: Improved Garry, 77.4 bu.; Foward 2 x Victoria-Richland, 77.1 bu.; Rodney, 76.9 bu.; Beaver, 76.8 bu.; Clinton x Boone-Cartier, 76.1 bu.; and Craig, 73.2 bu.

The leading forage yields per acre were: Foward 2 x Victoria-Richland, 3.41 tons; N. Y. Selection, 3.12 tons; Rodney, 3.10 tons; Beaver, 2.90 tons; R.L. 1273 x Spooner, 2.88 tons; and Roxton, 2.81 tons.

In New Hampshire, more oats are grown for pasture, annual hay and nurse companion crop purposes than for grain. Ajax, Clarion and Clinton varieties were the predominating varieties seeded in 1955.

Some Garry seed will be available for 1956. In the variety trials, Garry produced a high grain yield of medium weight per bushel and was in the upper quarter for forage yield. It was one of the top varieties as regards disease and lodging resistance.

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NEW JERSEY

By Steve Lund
(New Brunswick)

Oat yields reached a record high of 41.0 bushels per acre in 1955 although total production was down slightly over 1954 due to acreage reduction. Climatic conditions during the spring were extremely favorable to oat production, but high temperatures during early summer hastened maturity and resulted in slightly lowered bushel weights.

Winter oats continue to make gains in the state primarily at the expense of the spring oat acreage. Most of the winter oat acreage is planted to LeConte which has been extended beyond its range of adaptation because of a series of mild winters in recent years.

Clinton remains our only recommended variety of spring oats as no rust trouble has developed on it in New Jersey thus far. Some plantings of Garry (C.I. 6662) were made in the state last year, but it does not appear to be sufficiently adapted this far south.

Oat diseases were of only slight importance in New Jersey in 1955. Septoria avenae was identified in the state for the first time but it did little damage.

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NEW YORK

By N. F. Jensen, G. C. Kent, E. J. Kinbacher (USDA), R. B. Musgrave and L. J. Tyler
(Ithaca)

1955 Oat Production

New York State produced an estimated 29,820,000 bushels of oats on 710, 000 harvested acres. Although it was not considered a good crop year because of extremely dry May and June the average yield per acre of 42.0 bushels was as high as in some so-called "good" years.

Personnel

During the year the United States Department of Agriculture stationed two men at Cornell on joint appointments. Dr. E. J. Kinbacher, plant physiologist, will study fundamental phases of cold resistance in cereals, principally winter oats. He will be interested in the regional aspects of winter hardiness. Dr. Kinbacher is a member of the staffs of the Plant Breeding and Agronomy Departments. Dr. Wm. Rochow, virologist, holds a joint appointment in the Department of Plant Pathology. He, too, will be concerned with regional problems and is particularly concerned with the viruses of oats.

Summary of Variety Yield Nurseries

Yield trials of 11 oats replicated 8 times were grown at 14 locations in 1955. The mean results are expressed below:

Entry	Yield bu./acre	Test weight lbs./bushel
N.Y.618a1-4-6	63.4	32.0
N.Y.556a2-9-4	63.4	31.2
Rodney	63.2	34.0
Garry	62.9	32.9
Ajax	62.4	31.6
N.Y.611B-176-9	57.8	31.2
Beaver	52.4	31.8
Craig	52.2	31.9
Clarion	51.6	34.2
Mohawk	49.6	33.8
Clintland	45.2	34.1

There will be extensive testing and local increases made of the Cornell lines in 1956 on a contingent basis but the matter of introduction will not be considered before another year.

Recommended Oat Varieties for 1956

Recommended varieties are Garry, Rodney, Craig, Ajax, Mohawk-Clinton, and Beaver. An expected quarter of a million acres will be planted to Garry in the spring of 1956. The use of Rodney also will be considerable due to plentiful supplies of seed at a reasonable price.

Stem Rust Race Identification in New York

In a letter to Dr. G. C. Kent of 1/17/56, Dr. J. J. Christensen for the Cooperative Rust Laboratory (USDA-Minn.) gave the following identification of races of P. graminis avenae from 1955 New York collections:

Race 6: 2 isolates; Race 7: 12 isolates; Race 8: 1 isolate.

Winter Oat Breeding

During 1955, 5670 F5 lines from hybrids of C.I. 5364 with other varieties, and approximately 5000 X2 panicle rows from seed of C.I. 5364 irradiated a few years ago at the Brookhaven National Laboratory were grown and evaluated. A total of 600 lines were selected and were replanted in the fall of 1955 in 3-rod-row plots with C.I. 5364 checks for 1956 evaluation for hardiness, yield and other characteristics. About 4 acres of X2 material from bulked seed lots of C.I. 5364 was also grown but no critical level of killing occurred on this field during the winter and plantings were remade in the fall of 1955.

A few advanced lines from irradiated C.I. 5364 were grown in a test of 4 replications in 1955. Limited seed amounts placed restrictions on the design of field experiment possible so that no valid test of statistical significance can be used. The means of estimates of spring survival and yield are interesting, nevertheless:

	Average estimate of spring survival %	Average yield bu./acre
Brookhaven Survivor-6	50.5	50.3
" -1	43.0	50.2
" -2	44.0	49.3
" -3	33.5	40.0
" -5	31.5	39.3
" -7	32.5	38.7
" -4	41.5	36.3
Parent C.I. 5364 (Check)	24.5	35.2

It is hoped that the nursery planted in the fall of 1955 will provide definite information in 1956 as to whether cold resistance and yielding ability have been affected by irradiation.

Hardy Oats in the USDA World Oat Collection

The World Oat Collection of 4757 lines was sown in the fall of 1954 at Ithaca. In the spring of 1955, 187 rows showed survival of one or more plants. The information on these lines is given in the following table. One should consider this survey as of a preliminary nature since it is based on the use of short rows and a single replicate of each entry.

Hardiness of Surviving Oats in the World Oat Collection grown at Ithaca, N.Y. in 1955 (Reported by Jensen & Kinbacher)[1]

Variety	P.I. or C.I. No.	Source	W.C. Entry No.	Spring 1955 Survival %
Hutcheson's Sel.	905	Virginia	59	tr.
Cliff	908	"	61	tr.
Lawson Red Rustproof	909	"	62	tr.
Bencroft	912	"	64	tr.
Winter turf	1234	Colorado	251	tr.
Culberson	1352	Texas	329	4
Bicknell	1353	"	330	4
Red Rustproof	1355	"	331	2
Lee	2042	Virginia	784	4
Randolph	2275	"	957	6
Dwarf Culberson x Fulghum	2278	"	960	12
Fulghum x Hatchett	2279	"	961	6
Winter Turf x Aurora	2281	"	963	40
" "	2283	"	965	44
" "	2284	"	966	8
" "	2285	"	967	10
" "	2287	"	968	28
" "	2288	"	969	6
Winter Turf x Sixty-Day	2289	"	970	30
(Unnamed)	2290	"	971	32
Dwarf Culberson x Fulghum	2291	"	972	44
Fulghum Sel. 699-2015	2500	"	1077	26
Norton	2501	S. Car.	1078	2
Arkansas Sel. 160	2502	Ark.	1079	2
Tenn.Sel. 1884 (from 699-2011)	3169	Tenn.	1484	24
" " 092 "	3170	"	1485	6
" " 1922 "	3171	"	1486	14
" " 1918 "	3172	"	1487	26
" " 11053 "	3173	"	1488	10
" " 1962 "	3174	"	1489	20
" " 909 "	3175	"	1490	tr.
Markton x Red Rustproof	3179	Georgia	1491	6
S-82	3370	Iowa	1562	tr.
1058 cu. 5/1/2	3378	"	1568	4
Lee x Victoria	3380	Virginia	1570	4
" "	3385	"	1575	tr.
" "	3387	"	1577	tr.
" "	3388	"	1578	10
" "	3390	"	1580	4
" "	3392	"	1582	36
" "	3393	"	1583	16
" "	3395	"	1585	30

[1]Seed furnished by Dave Ward, USDA, Beltsville

Variety	P.I. or C.I. No.	Source	W. C. Entry No.	Spring 1955 Survival %
Lee x Victoria	3396	Virginia	1586	4
" "	3405	"	1593	tr.
" "	3407	"	1595	tr.
Hairy Culberson x Victoria	3414	"	1602	4
S.D. 40	3418	S. Dakota	1606	6
Wintok	3424	Oklahoma	1612	12
N.J. Sel. 2	3425	New Jersey	1613	4
Markton x Red Rustproof	3430	Georgia	1615	4
Lee x Victoria (Tifton Sel. 8110)	3922	"	1882	tr.
Lee x Victoria	3923	Arkansas	1883	tr.
" "	3927	"	1887	4
" "	3933	"	1893	tr.
" "	3949	S. Car.	1909	4
R.R.x(Vic x Coker Norton)	4040	Florida	1975	10
(H.C.-Fulg) x R.R. x Vict-Coker Norton	4042	"	1977	4
" "	4044	"	1979	6
" "	4046	"	1981	4
" "	4048	"	1983	14
" "	4049	"	1984	12
" "	4050	"	1985	tr.
Fulghum (Winter) x Victoria	4203	Maryland	2093	2
(Lee x Victoria) x Fulwin	4316	Idaho	2183	2
Tenn. 090 x Bond	4380	Tennessee	2202	10
Fulwin x (Lee x Victoria)	4381	Idaho	2203	14
" " X37J	4382	Texas	2204	tr
Stanton Strain 2	4390	S. Car.	2212	4
Victoria x Norton Sel.	4445	Georgia	2242	14
P820 Rpf x H624-1-4	4450	"	2247	4
Terruf x H624-1-24-2	4451	"	2248	tr.
Bancroft	4468	"	2265	4
Letoria x Fulwin	4469	N. Car.	2266	66
" "	4470	"	2267	38
" "	4471	"	2268	62
" "	4472	"	2269	24
" "	4473	"	2270	4
" "	4474	"	2271	12
" "	4475	"	2272	20
" "	4476	"	2273	tr.
" "	4477	"	2274	10
" "	4478	"	2275	52
" "	4479	"	2276	40
" "	4480	"	2277	20
" "	4481	"	2278	18
" "	4482	"	2279	22
" "	4483	"	2280	8
" "	4484	"	2281	60
" "	4485	"	2282	32

Variety	P.I. or C.I. No.	Source	W. C. Entry No.	Spring 1955 Survival %
Letoria x Fulwin	4486	N. Car.	2283	32
" "	4487	"	2284	10
" "	4488	"	2285	12
" "	4489	"	2286	36
" "	4490	"	2287	30
" "	4491	"	2288	44
" "	4492	"	2289	48
" "	4493	"	2290	10
Hybrid Sel. X37M74B-489	4495	"	2292	4
Stanton Strain 3	4543	S. Car.	2340	4
Radford	4545	Maryland	2342	10
Calvert	4546	"	2343	22
Bristol	4547	"	2344	4
Raleigh	4548	"	2345	12
Boliver	4549	"	2346	8
(Lee-Vict.) x Fulwin Resel.	4551	"	2348	4
Coker 45-57	4569	S. Car.	2366	2
Letoria Sel. - Ga. 1042-5	4576	Georgia	2372	6
" " -6	4577	"	2373	28
" " -13	4578	"	2374	20
" " -16	4579	"	2375	10
" " -28	4580	"	2376	22
" " -30	4581	"	2377	12
Lee x Victoria	4587	"	2383	2
"Steriloid" (Allen)	4632	Texas	2428	6
Woodward Sel. Pl. 3	4828	Oklahoma	2603	8
Woodward Composite Pl. 7	4829	"	2604	20
Stanton (Coker 48 F.S.)	4830	S. Car.	2605	tr.
Hobson	4842	Maryland	2617	12
Stanton Resel.	4843	"	2618	16
Botler	4844	"	2619	10
Nelson	4845	"	2620	8
Olney	4846	"	2621	2
Tennex x Bond Sel. (R10-8d)	4848	Arkansas	2623	4
C.I. 4001 x C.I. 3644 (XCM39)	4849	Maryland	2624	48
Hermit No. 7	4850	Canada	2625	28
Hermit No. 10	4851	"	2626	12
Stanton 40-33 X-259-2-2 Fulgrain-3	4860	S. Car.	2635	4
" " -3 "	4861	"	2636	tr.
" " -7-1 "	4862	"	2637	4
" " -7-3 "	4863	"	2638	4
Fulton x Clinton (X43BH)	4991	Idaho	2750	28
Tenn. 1922 x Bond-20 gold	4992	Maryland	2751	14
" "	4994	"	2753	10
Woodward Sel. Stillwater 472606	5106	Oklahoma	2861	tr.
Kentucky "K. 45-79"	5108	Kentucky	2863	20
Fulwin Composite 152-44-280	5109	Texas	2864	4

Variety	P.I. or C.I. No.	Source	W. C. Entry No.	Spring 1955 Survival %
(Tennex-RR) x (Va. - Norton)	5148	S. Car.	2903	tr.
(Tennex-RR) x (Va. - Rich.)	5152	Georgia	2907	4
Coll. #2727 A. Byzantina	5247	Turkey	2989	tr.
" #2844 "	5248	"	2990	10
" #2851 "	5249	"	2991	6
" #3048 "	5251	"	2993	tr.
" #3611 "	5263	"	3002	4
" #4004 "	5272	"	3011	tr.
Kareela Sel.	5340	Maryland	3079	48
"	5341	"	3080	36
Anderson Resel. 48-216	5359	S. Car.	3097	tr.
" 48-235	5360	"	2098	4
" 48-414	5361	"	3099	6
Cornell 1375	5364	New York	3102	40
Carolina Red Strain 2	5365	S. Car.	3103	8
Clinton x Hairy Culberson	5368	Indiana	3106	16
Clinton x Forkedeer	5369	"	3107	8
Colo. x Wintok	5382	Idaho	3120	6
(Lee-Va.) x Forkedeer	5384	"	3122	tr.
Tenn. No. 28	5408	Florida	3146	tr.
Tenn. No. 40	5409	"	3147	6
Tenn. No. 52	5410	"	3148	tr.
(Lee-Va.) x Fulwin Sel.	5601	Idaho	3332	2
Osage x Landhofer	5664	Maryland	3374	2
(Lee-Va.) x Forkedeer	5848	Indiana	3555	10
Wintok (Early Sel.)	5849	Oklahoma	3556	6
Marrett's Anderson	5892	S. Car.	3599	2
Letoria x Fulwin	5902	N. Car.	3609	tr.
(Lee-Va.) x Fulwin	5903	"	3610	6
" "	5904	"	3611	4
Siberian 5	5908	Kansas	3615	2
New Jersey A-2-2	5911	Delaware	3618	42
" B-2-2	5912	"	3619	20
Marrett's H586-1-4	5977	S. Car.	3682	4
Marrett's H233-2-2-6-X-X-50	5982	"	3687	tr.
Marrett's H270-2-22-X-X-2	5985	"	3690	4
Marrett's H270-2-22-X-X-7	5986	"	3691	4
Marrett's H599-5-X-7	5994	"	3699	tr.
Steriloid Oat	5998	Texas	3703	2
" "	5999	"	3704	2
" "	6000	"	3705	6
Okla. Sel. 462567	6570	Oklahoma	4275	8
Fulwin x (Lee-Va.) Tex. 3770-7	6571	Texas	4276	6
Clinton x Forkedeer Ind. 4011-4-92	6572	Indiana	4277	6

Variety	P.I. or C.I. No.	Source	W.C. Entry No.	Spring 1955 Survival %
Fulwin x (Lee-Va.) x Tennex	6573	Kentucky	4278	4
Sel. 6808	6607	Md., Ia., Ida.	4312	tr.
X47AV Atlantic x (Cl^2x S.F.)	6628	Missouri	4333	tr.
" "	6629	"	4334	2
No Name	P.I.177769	Sacaton	4480	tr.
"	P.I.177811	"	4494	tr.
"	P.I.178473	"	4531	4

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For Article by Kinbacher see page 93.

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A Note on the Artificial Mutation Method

by Calvin F. Konzak
(Brookhaven National Laboratory)

The induced mutation technique for use in plant breeding has been under intensive study in this country for several years. Some tentative conclusions now seem justified.

Agronomically valuable mutant characteristics in oats which now seem to be recoverable at practical or near practical efficiencies from irradiated populations are: (1) stem rust resistance, (2) shortened straw height, (3) Victoria blight resistance, (4) increased winter hardiness, (5) increased straw stiffness, and (6) earliness or lateness. The efficiency with which improvements in these characteristics may be obtained appears as yet to be somewhat below the point desired for serious practical consideration: (1) crown rust resistance, (2) increased yield, (3) changes in seed color, and (4) changes in grain quality.

Screening techniques or mutation frequencies for the first group of characters are such that some plant breeders may find the method of value in their programs. The second group should be looked for, but it appears that the method will need to be improved before a search for them as the sole objective of a mutation program can be considered profitable. Also some varieties are difficult to mutate. Clintland may be one of these. Actual agronomic performance of artificially induced mutations is another matter. Sufficient time has not elapsed for mutants to have been evaluated in most programs. It may be necessary to cross some mutants (if they are valuable enough) back to the parental variety in order to remove chromosomal interchanges, inversions, or instability factors as a prerequisite to their commercial use. On the other hand, it may be possible to simply increase and distribute others after completing yield tests.

If the method can prove practical to the plant breeder it may save him considerable time, and sometimes effort, particularly in cases where simply inherited qualities of a variety need improvement. However, at its present stage the technique can not be considered as a substitute for other methods. It is not now practical for use on all problems that face the breeder, but should be considered as a supplement to his program.

No essential differences in the types of mutations induced have been shown in studies comparing different radiations (X rays, gamma rays, thermal and fast neutrons) for their properties as mutagens although the physical properties of the radiations are such that some differences should have been observed. It may be, however, that thermal neutrons and gamma rays do actually induce some different types of mutants, but either the frequency of mutation at specific loci is too low for a statistical measure, or classes in which mutants have been placed were so general that only a general picture of the induced events has been obtained. Our studies on the mutation of maize endosperm loci by X-rays, thermal neutrons and ultraviolet radiations indicate that there is a generally similar response, but specific loci may be affected in a quantitatively different manner by certain radiations. Thermal neutron radiation appears to be somewhat more efficient in producing mutations than X-rays. The reason appears to be that different individual seeds in a population are more or less sensitive to X-rays than other seeds, probably because of physiological factors; but all seeds are almost equally sensitive to thermal neutrons. The density of ionization produced in tissue following irradiation by neutrons is greater than that produced by X-rays. This appears to be the important physical factor involved.

A preliminary evaluation of our comparison between the effect of ultraviolet radiation and X-rays applied to pollen of barley indicates that the earlier studies of Stadler, Singleton and Clark, and others are correct as regards the frequency of chromosomal translocations induced by the two radiations. In our studies ultraviolet produced simple reciprocal translocations in 7 out of 415 plants studied, whereas with X-rays 33 out of 119 plants checked cytologically were similarly affected. In addition, the X-ray group had 1 plant with 4, 1 plant with 3, and 5 plants with 2 translocations.

In contrast, the two radiations produced nearly comparable mutation frequencies if dosages which caused a similar degree of damage to treated pollen were compared. This comparison, of course, is based on relatively small treated populations and therefore may not represent the true picture.

Our present attacks at the mutation problem are being directed at increasing the frequency and modifying the spectrum of mutations induced in treated populations. From these studies we hope to learn some ways to increase the efficiency of the technique.

Research results discussed here are from various sources, including this Laboratory.

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NORTH CAROLINA

by T. T. Hebert (Raleigh)

North Carolina farmers harvested 528,000 acres of oats in 1955, the highest acreage on record for the State. The average yields were 35 bushels per acre compared to 39 bushels per acre for the previous year. This drop in yield was attributed principally to the severe freeze of late March. Weather conditions following the freeze were generally favorable for oat production. Disease losses were light.

Victoria derivatives are still being grown on most of the oat acreage in this State. The principal varieties are Victorgrain 48-93, Arlington and Fulgrain. Since crown rust races which attack Victoria derivatives have been collected from North Carolina and also from surrounding states, it was expected that crown rust might cause considerable damage in 1955. However, most of the oat fields visited were free from rust and the total loss from this disease was considerably less than one percent of the crop.

The most promising selections in the breeding program are from crosses of Atlantic x Clinton-Sante Fe, (Wintok x Clinton-Sante Fe) x Forkedeer, New Nortex x Landhafer, and Trispernia x Lemont.

Soil-borne mosaic was found to be rather severely affecting Arlington oats in a fertility experiment where this variety had been planted for five consecutive years. Arlington has been considered one of our most resistant varieties. It is not known whether this increase in susceptibility of Arlington is due to an increase of a strain of the virus that is more virulent on Arlington or to some other cause. An oat nursery was planted in the fall of 1955 to get the reaction of other oat varieties to the virus in this field.

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NORTH DAKOTA

by T. J. Conlon (Dickinson)

Oat Variety Trials

Yields in this year's oat variety trial were higher than for any year since 1948. Highest yielding variety was Gopher which averaged 78.8 bushels per acre followed by Branch at 77.8 bushels per acre. Lowest yield was from Andrew, an average of 57.4 bushels per acre. Some oat stem rust was present again this year and undoubtedly depressed the yields of Palomino and Clarion, the two varieties which were carrying the worst infection.

Oat Nursery Trials

In the 1955 planting of the North Central Uniform Oat Nursery at Dickinson the five highest yielding entries were: Clinton x Landhafer, C.I. 5864; Clinton x Ukraine, C.I. 6537; Clinton x (Boone-Cartier), C.I. 6668; Simcoe, C.I. 6767; and Clinton x Ukraine, C.I. 6608. Average yields for all five of the above listed high yielders was above 82.0 bushels per acre.

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OKLAHOMA

by B. C. Curtis and A. M. Schlehuber (Stillwater)

Oat production in Oklahoma in 1955 was a failure for all practical purposes. The major hazards were: spring drought, hard freezes in late March, and heavy infections of crown and stem rust during the fruiting period. The prolonged drought greatly reduced the yields of the very early strains such as Cimarron. Late rains, beginning on May 9 and continuing through June, favored the medium and late maturing varieties except that they sustained, in most cases, heavy infections of crown and stem rust. Much regrowth or "re-tillering" occurred in a few of the late strains, particularly selections from the cross, Lee-Victa X Fulwin. It appears that these strains have a rather unusual type of drought resistance; i.e., the ability to remain dormant during dry periods and to resume growth under more favorable conditions.

The late March freezes destroyed more than 80 percent of the spring oats in the state. It is becoming more apparent each year that the true "spring-type" oats have little or no place in Oklahoma. In three of the past five years, spring freezes have destroyed a goodly portion of the spring oats that offer no resistance to low temperatures. This feature explains the de-emphasis of the production of the true "spring-type" oats and the greater emphasis toward the production of "two-way" oats or winter types that show good response to spring seeding. One such variety, Cimarron, is already in statewide production.

In the way of breeding material, several panicle-rows of the cross, Forkedeer X Minn. 0-363-3 and Forkedeer X Minn. 19-11 showed excellent resistance to both crown and stem rust under field conditions. Forkedeer checks interspersed among these lines sustained heavy infections of both rusts. The parent, Minn. 0-363-3, is a selection from the cross, (Haj.-Joan. X Bond-Rainbow) X S.F., and Minn. 19-11 is a selection from the cross, Land. X (Mindo X Haj.-Joan.). A few seeds of these lines are available to anyone who might be interested. Most of the lines appear to have winterhardiness equal to that of Forkedeer.

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PENNSYLVANIA

By C. S. Bryner and E. A. Hockett (University Park)

The 1955 oat crop was the largest on record since 1925 with production of 34,099,000 bushels from 793 thousand acres. The average yield of 43 bushels per acre equaled the record made in 1954. Somewhat over 50,000 acres of winter oats were grown with farmers yields averaging from near 50 bushels to over 100 bushels per acre. LeConte and Lee varieties were planted in the fall of 1954 on most of the acreage with some Dubois being used. Seedsmen report about equal amounts of Dubois and LeConte sold for seeding in the fall of 1955.

Winterkilling was rather severe at the University Station occurring during the month of February and early March. Strain Ky. 45-65 (C.I. No) obtained in 1947 from Dave Reid, formerly at the Kentucky Station, has shown continued improvement in resistance to winterkilling under our conditions.

A number of Canadian varieties have been at the top in our yield trials. Garry, Improved (C.I. No. 6662) is being recommended for seeding this spring based on its comparative performance in research trials over the past three years, and extension drill trials last year.

In nine research trials and thirty-seven drill trials Garry averaged 74.4 bushels per acre, Craig 74.0 bushels, Ajax 71.7 bushels and Clinton 59, 66.1 bushels.

Dr. Eugene A. Hockett recently appointed Agronomist of the Agricultural Research Branch of the United States Department of Agriculture will be stationed at University Park. He will be working primarily on winter oat problems of regional importance. (Bryner).

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In cooperation with the Pennsylvania Agricultural Experiment Station research work on winter and spring oats was initiated in December of 1955.

This work will consist of participation in overall experimental programs and to carry out agronomic phases of field and laboratory studies for the purpose of developing superior winter hardy, high yielding, stiff strawed, agronomically desirable oat varieties for growing in the Northeastern Region and in other areas where they might be adapted; to conduct similar but more limited studies on spring oats for the region, to initiate and conduct fundamental studies on agronomic and breeding phases of oat production and improvement. (Hockett-USDA)

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SOUTH CAROLINA

E. B. Eskew and R. W. Earhart (Clemson)

Oats represent the leading small grain crop of South Carolina. During the 1954-55 crop season 802,000 acres were harvested - producing 22,456,000 bushels of grain, or an average of 28.0 bushels per acre. The market value of this crop on the July 15 market was $13,473,600.00. The oat acreage harvested in 1955 was 19 per cent greater than that of the preceding season - which is in keeping with a current trend in the Southeastern United States, where small grain production is increasing. In the agricultural economy of South Carolina, oats are primarily used for livestock feeding either as pasture, ensilage, hay, or as harvested grain.

The majority of this oat acreage was planted to the following four varieties which are recommended by the South Carolina Crop Variety Recommendation Committee; Victorgrain 48-93, Fulgrain, Arlington, and Southland.

Oats are used quite extensively in such current crop rotational systems as: corn or cotton - small grain - annual legume; or soybeans - small grain. While many of the smaller acreages are still seeded by broadcasting the seed, the major portion of this crop is planted with the grain drill. Plantings are most commonly made in late October or early November. Fertilizer practices with this crop include a preceding application of 400 pounds of a complete fertilizer and top-dressing with 20 pounds of nitrogen in early March.

Agronomic Information

Small grains throughout South Carolina were damaged by the late March freezes. The injury to oats was principally confined to leaf burning, although the culms of early varieties which had not been grazed were killed.

The agronomic testing program conducted by the South Carolina Agricultural Experiment Station includes the growing of uniform tests at Clemson, Blackville, and Florence. These tests include the yield of performance of established and potential varieties, and the evaluation of rates and dates of seeding for grain and forage yields.

Yields from the oat variety tests at Blackville ranged from 34 to 16 bushels per acre. Southland produced the highest yield, followed in order by Arlington, Seminole, and Victorgrain 48-93 with yields of 30, 30, and 28 bushels per acre, respectively. At Clemson the yields ranged from 53 bushels per acre for Victorgrain 48-93 and Arlington, to 22 bushels for Southland.

Pathological Information

State-wide surveys of the 1954-55 crop were made in March and May to record the presence and prevalence of the major diseases attacking oats. The diseases found on these surveys are presented below in their estimated order of damage to this crop:

Leaf spot	*Helminthosporium avenae*
Culm rot	*Helminthosporium sativum*
Victoria blight	*Helminthosporium victoriae*
Septoria black stem	*Leptosphaeria avenaria*
Mosaics	*Marmor terrestre*
Smuts	*Ustilago avenae* and *U. Kolleri*
Crown rust	*Puccinia coronata*
Stem rust	*Puccinia graminis*

Plans for 1955-56

Dr. Gilbeart H. Collings, head of the Department of Agronomy, South Carolina Agricultural Experiment Station, has announced the appointment of Dr. Wilbert P. Byrd to the Agronomy staff to conduct breeding and research on the improvement of small grain crops. Dr. Byrd is a native of North Carolina. He received his B.S. and M.S. degrees from North Carolina State College in 1949 and 1952, and his Ph.D. from Iowa State College in 1955. Dr. Byrd is currently on the staff of the Agronomy Department of Ohio State University and plans to move to Clemson about April 1, 1956.

The agronomic and pathological effort in South Carolina is continuing with the addition of specialized field plots for the studies of oat diseases. This year field plots have been established to evaluate oat varieties and selections for their reactions to smuts, rusts, and soil-borne mosaic. Additional greenhouse and laboratory work is planned on the Helminthosporium diseases, soil-borne mosaic, and crown rust.

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TENNESSEE

by N. I. Hancock (Knoxville)

The season of 1954-1955 was an unusual one in this state. There was not sufficient rainfall to germinate seeds until latter part of October. Then very high temperatures in early March caused the plants to break dormancy or change to the reproductive phase. Very low temperatures the last week in March caught the plants in this phase resulting in severe damage to many varieties. Surprisingly, the oat varieties suffered less than either barley or wheat varieties from this unseasonable freeze.

Three selections, 12 and 24 out of Fulgrain St. 6 x LeConte, and 34 out of Fulgrain St. 6 x Forkedeer exceeded the yields of four other released and commercial varieties by 8 to 10 bushels per acre. These three strains also have considerable resistance to crown race 202 which is very prevalent in this state.

Two groups of farmers are finding oats to be very useful for winter pasture in Tennessee: Those who want some pasture along with high yields of grain and the dairymen who are concerned only with forage grazing. Thus, are semi-winter, semi-erect seedling types such as Victorgrain and Arkwin more adapted to such practices than Forkedeer and other prostrate seedling types. Early seedings in August or early September do favor the semi-erect types, but seedings the first week in October show no significant differences, while the late October plantings favor the prostrate types. The dairyman, however, practice high rates of seeding, 6 bushels per acre, or 3 bushels sown crosswise in two directions. A preliminary test at this rate of seeding shows both types have some seedling growth.

The meeting of the Southern group of workers on small grains will be held here at Knoxville the first week in April, tentatively agreed upon as April 3, and 4, 1956. A cordial invitation is extended to all who may wish to attend.

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TEXAS

by I. M. Atkins and G. W. Rivers (College Station)

Oat Improvement Work in Texas, 1955

Production of oats in Texas in 1955 was estimated at 26,110,000 bushels which was harvested from 1,492,000 acres, an average of 17.5 bushels per acre. This yield is 4.4 bushels below the long-time average for the State. This relatively large total production in a year when extensive areas were abandoned because of the drought and a late March freeze was the result of a large increase in seeded acreage. Unofficial estimates of oats seeded for grain and forage (the official estimates do not show acreages sown for forage only) indicate that 710,200 acres was seeded exclusively for forage and the total acreage was 2,825,135 acres or more than twice the 10-year average from 1943-52.

Owing to drought and an unusually late freeze on March 26, which caused widespread damage to all small grains, very little useful yield data were obtained. Also, as a result of these unfavorable environmental conditions, diseases were of minor importance in the State. Some damage was caused by Helminthosporium blight and by stem rust in parts of South Texas.

The fall of 1954 and early months of 1955 were favorable for forage growth of oats as temperatures were above normal and there was adequate moisture. The Forage Section obtained good data on the pasture value of commercial varieties and new strains at several locations. The new strains, C.I. 6993, 6994 and 6995 were especially promising as winter-hardy, high forage-producing strains.

Progeny rows from irradiated seed of Alamo, Ranger, Mustang and C.I. 6744 were grown and some interesting and possibly useful plants were isolated. Approximately one percent of the lines selected from Alamo and subjected to the rag-doll *Helminthosporium victoriae* test were resistant. These lines were increased and are being given further tests for blight and rust resistance.

In the breeding program particular attention is being given to incorporate resistance to Race 7a of stem rust and Race 216 of crown rust into commercial varieties and improved strains. Although these races have not given serious trouble on varieties such as Alamo to date, they are potentially dangerous.

The screening of oat varieties for resistance to greenbugs is being continued. Although small differences are noted, no highly resistant variety has yet been found.

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UTAH

by R. W. Woodward (Logan)

Cereal breeding at Utah is centered around wheat and barley improvement. This is due partly to their importance in acreage and production, but mainly to the excellent job accomplished by the oat project leaders who constantly supply suitable varieties for the region.

There has been a further reduction for 1955 with a total of 40,000 acres. Overland comprises a good part of this acreage, with some Uton being grown on farms where more straw is desired. Park and Cody, though not certified as yet, give good yields in the intermountain irrigated valleys. Some fields of oat and barley mixtures are being grown, but grain mixtures are not recommended on the basis of experimental studies.

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VIRGINIA

by T. M. Starling, C. W. Roane, and J. L. Tramel (Blacksburg)

Andrew oats was mistakenly included in our fall-sown oat varietal tests which were grown at nine locations in Virginia in 1954-55. As was expected, it completely winterkilled at locations west of the Blue Ridge and in the northern Piedmont. Whereas it winterkilled to some degree at all locations, it still survived sufficiently to produce yields varying from 44.0 to 82.0 bushels per acre at five locations. The yield of Andrew at these locations averaged from 20 to 30 bushels lower than that of the recommended varieties in the tests.

The survival of Andrew at locations in eastern Virginia, despite the colder than average winter, was of interest from the standpoint of its use as a variety for late winter planting. Previous tests had indicated that Andrew was superior to other spring oat varieties when planted in late winter, and this may be associated with its ability to withstand considerable cold weather. If spring oat varieties could be used for this practice, rather than the commonly sown fall oat varieties, it would mean that farmers who because of weather conditions did not get their oats sown until early spring could expect higher yields than would be expected from fall varieties planted at this date. It also indicates a possibility of developing varieties with spring growth type, but having considerable cold tolerance, for specific use in late winter planting. A considerable portion of the oat acreage in eastern Virginia is planted in late winter.

It also indicates to seedsmen that they cannot depend upon winterkilling to eliminate mixtures of spring varieties such as Andrew from fall varieties when fall sown in the southern Piedmont or Coastal Plains of Virginia. Several seed lots of Forkedeer oats were picked up in Virginia last fall which had a spring variety mixed with them. A check indicated that these spring oats, which tentatively have been identified as Andrew, had survived at least one winter as a mixture in the fall-sown Forkedeer variety.

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WASHINGTON

by F. C. Elliott (Pullman)

The Washington Agricultural Experiment Stations are interested primarily in evaluating selections from breeding programs of the USDA and elsewhere. Late to mid-late maturity with some smut resistance as well as resistance to lodging in both spring and winter oat selections are the main features desired. Hardy winter oats with forage possibilities would have a place in areas west of the Cascades. A search for lodging resistant mutants from irradiated seed of the spring variety Eagle is under way at Puyallup as well as at the Dominion Experimental Farm at Agassiz, British Columbia.

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WISCONSIN

by H. L. Shands

The 1955 average yield of Wisconsisn oats was 49.5 bushels per acre which is 5.5 bushels more than in 1954, but still 1.5 bushels less than the all time high in 1945. Rust loss estimates in percentages are as follows:

Rust	1953	1954	1955
Crown	5	3	2.5
Stem	7	4	3.0

The 1955 losses show a further decrease from the two previous years. Race 7 was severe on certain "Bond" varieties at Ashland where yields were about 10 bushels per acre compared to more than 40 bushels for other varieties. Hail damaged all varieties in this nursery.

Aphids were numerous enough to warrant spraying the Madison nursery with Systox June 14. Temperatures were above normal in April, May, and July; but below normal in June. The low June average favored artificial crossing and grain production. July was a scorcher and little rain fell in this month until harvest was mostly finished. Grain was bright.

The Crop Reporting Service showed varietal acreage percentages as follows: Branch - 26; Clinton - 18; Bonda - 16; Ajax - 11; Nemaha - 7; Rodney - 6; Sauk - 5.1; and Clintland 3.5. The writer thinks that Rodney, Sauk, and Clintland were overestimated. It is predicted that the acreage of Sauk and Clintland will materially increase in 1956 and that there will be further decreases in Clinton and Bonda acreages.

Below are paired comparisons by the same growers of certified seed for the years 1954 and 1955. (Courtesy Seed Certification Service).

Varieties paired	1954: Number comparisons	1954: Yield per acre in bushels	1955: Number comparisons	1955: Yield per acre in bushels
Branch	67	51.5	--	50.2
Sauk	67	55.8	--	55.9
Branch	49	51.7	60	52.4
Clintland	49	47.4	60	48.3
Clintafe	36	46.7	--	--
Clintland	36	51.8	--	--
Clintland	38	54.6	6 1/	51.7
Clinton	38	48.2	6	29.2
Clintland	101	50.4	88	50.4
Sauk	101	58.9	88	56.5
Clintafe	30	44.6 Branch	51	50.9
Clintland	30	51.4 Sauk	51	54.8
Sauk	30	59.6 Clintland	51	47.4

1/ Too few to be reliable.

The Wisconsin Experiment Station released Beedee and Fayette oats for growing certified seed for the first time in 1956. In releasing these varieties to seed growers, the statement was made that no new production hazard was threatening, and that the varieties already available were yielding well.

Beedee will probably find use where kernel plumpness and high bushel weights are desired. Fayette may find use where earliness and short straw are sought; but some yield may be sacrificed, especially when compared to mid-season varieties. Below are brief histories and descriptions of Beedee and Fayette. Both varieties were developed cooperatively with the Cereal Section of the U.S.D.A.

Beedee, C.I. 6752, is a selection from the 1947 cross Beacon x X216-23. The male was from a 1935 cross of Hawkeye and Victoria. X216-23 was selected by the writer and D. C. Arny for kernel plumpness and for resistance to _H. victoriae_ under epidemics of artificially produced blight. X216-23 is intermediate to moderately resistant in reaction to crown rust. Beedee is similar in crown rust reaction, is blight resistant, is moderately resistant to races 7 and 7A of stem rust, but is susceptible to races 6 and 8. The new variety resists smut in Wisconsin, but is susceptible to certain races (reported by E. D. Hansing). Septoria has been observed on kernels while the plant reaction may be intermediate to moderately resistant (A.L. Hooker).

Beedee is mid-season or slightly earlier in maturity, being about two days earlier than Sauk and has yielded slightly less than Sauk. It has a plump kernel which results in bushel weight higher than in most available varieties. Its straw, compared to Sauk, is about the same in strength and slightly shorter.

Fayette, C.I. 6916, is a selection from the cross Vicland X F_1 (Branch X Clinton^2-Santa Fe sel.). Clinton^2 - Santa Fe was obtained from H. C. Murphy in 1947 and was selected the following year. Three F_3 rows were grown in 1951, and one was noted as resembling Vicland. After the 1953 growing season, a late summer planting was made at Madison and the Hancock Branch Station. This seed was increased by R. W. Earhart in Florida in the winter of 1953-54. A late planting of seven acres was made May 11, 1954, using the Florida-produced seed.

Plant type and kernel color resemble that of Vicland. Fayette is resistant to leaf rust, smut, Helminthosporium blight and race 7 of stem rust, but is susceptible to race 8 of stem rust and Septoria. Even though it is lower in yield than Ajax, Branch, and Sauk, tests indicate that it will yield as much as varieties with early maturity.

From the above accounts of Beedee and Fayette, it will be seen that several people had a part in their development. Those not already mentioned may be listed as follows, though not necessarily in order of importance: Z. M. Arawinko, C. M. Brown, A. R. Brown, M. N. Grant, Steve Lund, and C. W. Schaller.

Although conventional breeding methods have been continued, selections have been made from X-rayed and thermal neutron-treated material.

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Several personnel changes are noted: M. L. Kaufman completed the Ph.D. degree training in January, 1956, and will accept a position at Lacombe, Alberta, Canada. A. J. Bourne obtained the Masters' degree and will enter teaching work. P. E. Pawlisch has been working on Septoria and grain quality under sponsorship of the Quaker Oats assistantship. R. A. Forsberg is now assisting after about 3½ years of naval service.

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Dr. A. L. Hooker has been in the oat work for more than a year and has concentrated mainly on Septoria, with considerable emphasis on oat strain testing and problems relating to breeding for Septoria resistance. No doubt he will join the ranks of those making a regular contribution to the newsletter next year.

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V. NEW OAT VARIETIES

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VI. PUBLICATIONS

Anonymous. Minland - A new oat variety. In Minn. Agrl. Expt. Sta. Farm and Home Service 12: 7. February 1955.

________ (Dupree) "Dryland" oat variety is out in South Dakota. S. Dak. State Col. of Agrl. Exten., release; /1 p./ February 15, 1955. (Processed.)

________ (Waubay) New oat variety suited to eastern part of S. Dak. S. Dak. State Col. of Agrl. Exten., release; /1 p./ February 15, 1955. /Processed./

________ What happens to oats; Wallaces' Farm., 80; 65. February 19, 1955.

________ Oats and seeding need fertilizer. Wallaces' Farm., 80; 18. February 19, 1955.

________ Grow good oats and seeding. Wallaces' Farm., 80; 98-99. March 5, 1955.

________ Sixty bushel oats every year. Successful Farm., 53; 55. April 1955.

________ More feed from oats. Wallaces' Farm., 80; 14. June 4, 1955.

________ Coming fast, oat silage. Successful Farm., 53; 110. June 1955.

________ Three new grain varieties -- two oats and a barley -- will be introduced to farmers -- 1956. Univ. Wis. Col. of Agr. /Special cir./. December 23, 1955.

________ Spring small grain varieties for Nebraska 1955. Univ. of Nebr. Col. of Agr. Exten. Cir. E. C. 55-101; 4 pp. 1955.

Akerman, A. and Hagberg, A. Interspecific sterility in oats. Hereditas 40 (3-4); 438-52. 1954.

Andersen, Sigurd. Relation between leaf number and ear development in spring-sown barley and oats. Physiologia Plantarum 8: 404-417. 1955.

Arny, D. C. and Wade, E. K. How to treat seed grain and corn. Univ. of Wis. Exten. Serv., Col. of Agr. Cir. 416; 8 pp. February 1955.

/Atkins, I. M./ Texas 1955 intra-state small grain variety tests, Rpt. Coop. Research, 24 pp. September 15, 1955. /Processed./

Atkins, I. M. What's New in small grain research. Texas Agricultural Progress 1(5):4-6. Nov-Dec. 1955.

Bates, R. P., Collier, J. W. and Atkins, I.M. Small grain variety tests at the Blackland station, 1949-54. Tex. Agrl. Expt. Sta. Prog. Report 1747; 4 pp. January 25, 1955. /Processed./

/Berger, Kermit/. Fall-sown oats prevent crusting. Univ. of Wis. Col. of Agr. Exten. Service /Special Cir./ 1 p. August 29, 1955.

Blount, Clyde L. and Ashley, T. E. Oats leading in south Mississippi grazing studies. In Miss. Farm Research 18; 2. August 1955.

Brubaker, L. G. Seeding spring oats. Breeders Gaz., 120; 7. March 1955.

Bula, R. J., D. Smith and E. E. Miller. Measurements of light beneath a small-grain companion crop as related to legume establishment. Bot. Gaz. 115:271-278. 1954.

Carpenter, P.N. and R. A. Struchtemeyer. The effect of the addition of VAMA to soil upon uptake of phosphorus and the utilization of phosphorus applied in fertilizer by the oat plant. Agron. Jour. 47(11):530-531. Nov. 1955.

Clapp, A. L. 1954 Experiment Station results - fall seeded wheat, barley, and oats. Kans. Agr. Expt. Sta. Cir. 314; 24 pp. August 1954.

__________ 1954 Experiment station results with varieties of sorghums, sudan-grass, soybeans, oats, and spring barley. Contrib. No. 522, Dept. of Agron. Kans. Agrl. Expt. Sta., Report of progress 14; 11-15. March 1955.

Coffman, F. A. Results from Uniform Winter Hardiness Nurseries of oats for the five years 1947 to 1951, inclusive. Agron. Jour. 47(2):54-57. Febr. 1955.

Coffman, F. A. Avena sativa L., probably of Asiatic origin. Agron. Jour. 47(6): 281. June 1955.

Craigmiles, J. P. and N. F. Jensen. Determining Disease Losses in oats. Agron. Jour. 47(12):591. Dec., 1955.

Crooke, W. M. and Inkson, R. H. E. /Oats./ Relationship between nickel toxicity and major nutrient supply. Plant & Soil 6; 1-15. January 1955.

__________ and Knight, A. H. /Oats./ Relationship between nickel-toxicity symptoms and the absorption of iron and nickel. Ann. Appl. Biol., 43; 454-64. September 1955.

__________ /Oats./ Further aspects of the relationship between nickel toxicity and iron supply. Ann. Appl. Biol., 43;465-76. September 1955.

Crosier, W. F. Seed treatments for oats and barley; good insurance. N.Y. State Agrl. Expt. Farm Research 21; 16 pp. April 1955.

Crowder, L. V., O. E. Sell, and E. M. Parker. The effect of clipping, nitrogen application, and weather on the productivity of fall sown oats, ryegrass, and crimson clover. Agron. Jour. 47(2):51-54. Febr. 1955.

Day, A. D. 1955 Small Grain Variety Tests. Arizona Agr. Exp. Sta. Rept. No. 121. Sept. 1955.

Earhart, R. W., "South Carolina Small Grain Diseases - 1954-55" Plant Disease Reptr. 39:947-948, 1955.

Ferrari, T. J. and Sluijsmans, C. M. J. Mottling and magnesium deficiency in oats and their dependence on various factors. Plant & Soil 6; 262-99. May 1955.

Finkner, R. E., Atkins, R. E., and Murphy, H. C. Inheritance of resistance to two races of crown rust in oats. Iowa State Coll. Jour. of Sci. 30:211-228. 1955.

Frey, K. J. Agronomic mutations in oats induced by X-ray treatment. Agron. Jour. 47:207-209. 1955.

Frey, K. J. and Browning, J. A. Mutations for stem rust resistance induced in oats by X-ray treatment. Phytopath. 45:490-492. 1955.

Frey, K. J., Browning, J. A., Atkins, R. E., Wiggans, S. C., and Dyas, E. S. Iowa oat variety trials summary 1951-1955. Agron. 351. 1955.

Frey, K. J., Hall, H. H., and Skekleton, M. C. Inheritance and heritability of protein, niacin, and riboflavin in oat. Agr. and Food Chem. 3:946-948. 1955.

Futrell, M. C. and G. W. Rivers. The effect of temperature on the response of oats to race 216 of crown rust. Plant Disease Reporter 39(11): Nov. 15, 1955.

Goulden, C. H. Can. Dept. of Agr. Exptl. Farm Service, Cereal Crops Division, Cen. Experimental Farm, Ottawa, Progress report 1949-1953; 40 pp. 1955.

Grafius, J. E., H. M. Brown and R. L. Kiesling. Stem-break in senescence in oats. Agron. Jour. 47(9):413-414. Sept. 1955.

Gray, R. B. Harvesting with combines. U. S. Dept. Agr. Farmers' Bul. No. 1761. 42 pp. (Revised) March 1955.

Henderson, J. H. M. Effect of 2,4-D on respiration and on destruction of IAA in oat and sunflower tissues. Science 120; 710-12. October 29, 1954.

Hooker, A. L. Septoria reactions of entries in the North Central States uniform oat yield nursery and other strains in 1955. Plant Dis. Reptr. 39:963-966. 1955.

Huffman, M. D. The Septoria disease of oats. Ph.D. Thesis, Iowa State College.

Huffman, M. D. Testing for resistance to the Septoria disease of oats. Pl. Dis. Reptr. 39:25-28. 1955.

Huffman, M. D. Disease cycle of Septoria disease of oats. Phytopathology. 45: 278-280. 1955.

Hunter, A. S., and James H. Johnson. A portable self-propelled plot combine. Agron. Jour. 47(4):194-195. April 1955.

Hutchinson, J. B. and Martin, H. F. Chemical composition of oats; oil and free fatty acid content of oats and groats. Jour. Agrl. Science 45; 411-18. April 1955.

__________________ Chemical composition of oats; nitrogen content of oats and groats. Jour. Agrl. Science. 45; 419-27. April 1955.

Ivanoff, S. S. and Wells, Darrell G. Diseases of small grains in Mississippi. In Miss. Farm Research 18; pp. 4-5. September 1955.

Jansson, S. L. et al. Preferential utilization of ammonium over nitrate by microorganisms in the decomposition of oat straw. Plant & Soil 6; 382-90. August 1955.

Johnson, A. A. Garry - a new and better oat. Amer. Agriculturist 152(18): 16(588). Sept. 17, 1955.

Joshi, A. B. and Howard, H. W. Meiotic irregularities in hexaploid oats; further observations on the frequency of univalents and other meiotic irregularities in spring x winter variety hybrids of Avena sativa. Jour. Agrl. Science 45; 380-87. February 1955.

Justus, Norman and R. L. Thurman. The effect of clipping and grazing on the subsequent growth of winter oats. Agron. Jour. 47(2):82-83. Febr. 1955.

Kaukis, Karl and L. P. Reitz. Tillering and yield of oat plants grown at different spacings. Agron. Jour. 47(3):147. March 1955.

Kinbacher, E. J. and H. M. Laude. Frost heaving of seedlings in the laboratory. Agron. Jour. 47(9):415-418. Sept. 1955.

Kolar, J. J. Inheritance of stem rust resistance in oats. Ph.D. thesis. Iowa State College.

Koo, F. K. S., M. B. Moore, W. M. Myers, and B. J. Roberts. Inheritance of seedling reaction to races 7 and 8 of Puccinia graminis avenae Eriks. and Henn. at high temperature in three oat crosses. Agron. Jour. 47(3):122-124. March 1955.

Lindley, C. E. Edgar, R. A., Deese, R. E. and Barrentine, B. F. Winter grazing crops compared at State College. In Miss. Farm Research 18; 5. October 1955.

Lund, Steve and Shands, H. L. Response of Oat Strains to Septoria avenae. Phytopath. In Press.

Lund, Steve and H. L. Shands. Seedling Infection of Oats caused by Septoria Avenae. Phytopath 45:181-182. 1955.

Lyle, J. A. Seed treatment protects seedling oats against disease and results in better stands. In Agricultural Newsletter 23; 88-89. Sept.-Oct. 1955. (E. I. duPont de Nemours & Co., Inc.)

McCain, F. S. and Selman, E. L. Small grain varieties for Alabama, a report of 1955 variety tests. Ala. Agrl. Expt. Sta. [Cir.]; 22 pp. August 1955.

Miller, J. D. and W. M. Ross. A four-row, V-belt nursery seeder. Agron. Jour. 47(6):282-283. June 1955.

Miller, Paul R. Seed treatment tests on oats for smut control 1953-54. Agrl. Chemicals 10; 56. February 1955.

Morey, Darrell D. Smut Resistance of Some Southern Oat Varieties. Plant Disease Reporter 39:960-962. 1955.

Mosher, Paul N. Oats - Maine's No. 1 grain. Univ. of Me. Agrl. Exten. Serv. Cir. 299. [7 p.], April 1955.

Mulder, E. G. Effect of mineral nutrition on lodging of cereals. Plant and Soil 5:246-306. Aug. 1954.

Murphy, H. C. Registration of oat varieties, XX. Agronomy Journal 47:535-538.

Neumann, A. L. and Schneider, V. Why not try oat silage? Successful Farm, 53; 58, May 1955.

Oswalt, Roy M. Wheat, Oats, and Barley in State-Wide Variety Tests. Okla. Agr. Exp. Sta. Bul. B-456. May 1955.

Read, H. Three-way profit in oat silage. Better Farm, 125; 71, March 1955.

Ross, W. M. and J. D. Miller. A comparison of hill and conventional yield tests using oats and spring barley. Agron. Jour. 47(6):253-255. June 1955.

Ross, W. M. Associations of morphological characters and earliness in oats. Agron. Jour. 47(10):453-457. Oct. 1955.

Shands, H. L., and Arny, D. C. Tips for oats. Breeders Gaz., 120; 7, March 1955.

[Shands, H. L.] Plant scientists are making firm progress in their long struggle with oat diseases - especially leaf rust. Univ. of Wis. Col. of Agr. [Special Cir.] 3 pp. November 11, 1955.

Shands, H. L. and D. C. Arny. OATS -- Culture and Varieties. Revised Wisconsin Cir. 418, 1-16. March, 1955.

Schallock, D. A. and Skogley, C. R. Field Crop Recommendations, 1956. N. J. Ext. Leaf. 1956.

Schlehuber, A. M. Cimarron Oats. Okla. Agr. Exp. Sta. Bul. B-457. June 1955.

Simons, M. D. The use of pathological techniques to distinguish genetically different sources of resistance to crown rust of oats. Phytopath. 45:410-413. 1955.

Simons, M. D. Adult plant resistance to crown rust of certain oat selections. Phytopath. 45:275-278. 1955.

Simons, M. D. An extensive type of necrotic host reaction of oats to crown rust. Phytopath. 45:462-463. 1955.

Simons, M. D. Physiologic races of crown rust of oats identification in 1954. Pl. Dis. Reptr. 39:949-955. 1955.

Simons, M. D. An examination of the present status and proposed modifications of the annual crown rust race survey in the United States. Pl. Dis. Reptr. 39: 956-959. 1955.

Simons, M. D., Peturson, B., and Murphy, H. C. Purification of differential oat varieties for identification of races of crown rust. Pl. Dis. Reptr. 39:23-24. 1955.

Simons, M. D., Murphy, H. C. A comparison of the relative efficiency of certain combinations of oat varieties in differentiating races of crown rust. U. S. Dept. Agr. Tech. Bul. 1112. 1955.

Singleton, W. R. The contribution of radiation genetics to agriculture. Agron. Jour. 47(3):113-117. March 1955.

Snell, Robert S. The case for winter oats in New Jersey. (N.J. Agrl. Expt. Sta.) In New Jersey Agriculture 36; 11-12. Sept.-Oct. 1954.

Stanford, G., J. Hanway, and H. R. Meldrum. Effectiveness and recovery of initial and subsequent fertilizer applications on oats and the succeeding meadows. Agron. Jour. 47(1):25-31. Jan. 1955.

Stanton, T. R. Oat identification and Classification. U.S. Dept. Agr., Tech. Bul. No. 1100. 206 pp. 2 col. plates, 157 figs. April 1955.

Stuke, H. Eine Schnellmethode zur Bestimmung der Spelzengehaltes beim Hafer. Der Zuchter 25:90-92. 1955.

Suneson, C. A. and Davis, L. L. Selecting oat varieties for California and briefs on oat production in California. Univ. of Calif. Agrl. Exten. Serv. [Leaflet] 4 pp. [1955].

Tessi, Juan L. Estudio comparativo de dos bacterios patogenos en Avena Y determinacion de una toxina que origina sus diffrencias. De-Revista de investigaciones Agricolas-Toma VII (No. 2); 131-145. Republica Argentina, Buenos Aires. 1953.

Tessi, Juan L. Razas de distinto poder patogen o dentro de "Pseudomonas striafaciens" en Argentina Y reaccion de variedades de Avena A su antaque. Pub. Tecnica No. 88. De la Revista de Investigaciones Agricolas, Toma VI (No. 2), 1952; 235-246. Republica Argentina. Buenos Aires. 1952.

Thompson, J. R. Effect of seed dressings containing an organo - mercurial and gamma BHC on germination tests of oats. Emp. Jour. Exptl. Agr. 22; 185-88. July 1954.

Thurston, J. M. Survey of wild oats (Avena fatua and A. luduviciana) in England and Wales in 1951. Ann. Appl. Biol., 41; 619-636. December 1954.

Thurston, R. L. When should oats be sown? (Ark. Agrl. Expt. Sta.) In Arkansas Farm Research 4; [1 p.]. Summer 1955.

Wallace, A. T., G. K. Middleton, R. E. Comstock, and H. F. Robinson. Variability in Letoria and Fulwin oats. Agron. Jour. 47(4):178-181. April 1955.

Wallace, A. T. and W. H. Chapman. Studies in Plot Technique for oat clipping experiments. Agron. Jour. 48(1):32-35. Jan. 1956.

Wiggans, S. C. and Frey, K. J. Photoperiodism in oats. Proc. of Iowa Acad. of Sci. 62:125-131. 1955.

Wiggans, S. C. and K. J. Frey. The effect of increased daylengths on the production of greenhouse grown oats. Agron. Jour. 47(8):387. August 1955.

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Late Contributions

Coffman, F. A., H. C. Murphy and H. A. Rodenhiser. Three New Oats from a single cross; and all of them look promising! What's New in Crops & Soils. 7(9): 1 p. Aug.-Sept. 1955.

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Expansion of Research on Winter Oats

by E. J. Kinbacher[1]

The interest in winter oats in the Northeastern States has increased greatly in the last few years. Commercial production of the crop is widespread in southern Pennsylvania and New Jersey and the crop is still advancing northward. About 1,000 acres have been sown this fall in Ontario County of central New York, compared to only a few acres the previous year. In response to this increased farmer interest the State Agricultural Experiment Stations and Field Crops Research Branch, ARS have expanded research on winter oats. The Field Crops Research Branch, ARS has stationed a physiologist at Cornell University and an agronomist at Pennsylvania State University.

A freezing unit has been constructed at Cornell to facilitate fundamental research on the nature of cold resistance and to evaluate advanced generation breeding material. This unit consists of a hardening room, with a working range of 35° to 45°F., and a freezing chamber, with a working range of -4° to 30°F. Both rooms are equipped with a bank of fluorescent and incandescent lights. The freezing chamber has a turntable 6-1/2 feet in diameter which makes one revolution in approximately three minutes. A thermostat in the freezing chamber maintains temperature within ± 1°F. of the desired temperature. The combination of an accurate thermostat and a turntable has provided excellent conditions for testing plant material.

Numerous greenhouse experiments were conducted to determine the best conditions for evaluating cold hardiness of varieties and advanced generation breeding material. During the first month of the life of a plant its cold resistance varied considerably. The oat seedling just emerging (6 to 9 days of age) had a fair degree of cold resistance. Fourteen-day-old plants had the lowest degree of cold resistance. The degree of cold resistance increased as the plants aged from 2 weeks to 2 months. Four-week-old seedlings were 75% to 100% more resistant than 2-week-old seedlings. Eight-week-old and 6-week-old seedlings were slightly more resistant than 4-week-old seedlings, but the advantages of using the older plants were not great enough to warrant the decrease in efficiency of use of greenhouse space. Exploratory experiments indicated that 4-week-old, greenhouse-grown seedlings hardened for 24 hours at 40°F., immediately before a 24 hour exposure at 23°F. gave the best results. The soil was thoroughly watered at the beginning of the hardening period, so that the soil was at or just below field capacity at the beginning of the freeze.

The 32 winter oat entries in this years' Uniform Winter Hardiness Nursery Experiment are being ranked for cold resistance by use of the freezing chamber. The results will be compared with the field results to determine the degree of correlation. Experiments are in progress to further evaluate laboratory methods of testing cold resistance in plants.

Efforts in the northern fringe area for the development of superior winter oat varieties have been expanded. Only time will tell where the northern limit of their commercial production will occur.

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INDIA

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In India, oat varieties NP-I and NP-2, bred by the Botany Division of the Indian Agricultural Research Institute, New Delhi, are very popular both for grain and fodder.

As regards smut, of the 60 oat varieties tested for their resistance to covered Smut (Ustilago kolleri Wille) in previous years only one of the crosses namely Cross I (Scotch Potato X N.P.4) has proved fairly resistant, while in Loose Smut (Ustilago avenae (Pers.) Rostr.) resistance tests, N.P.I., proved very resistant. Of the two smuts, the Covered Smut is much more common and widespread.

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