

A PRELIMINARY STUDY FOR ASSEMBLING AND INTERPRETING DATA
BY DIFFERENT KINDS OF SOIL

By

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Thesis Approved:



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Dean of the Graduate School

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CHAPTER I

INTRODUCTION

Sound soil survey interpretations are the by-products of an integrated soil science research program. Soil management requirements, soil productivity ratings, and correct land use are interpretations that result from good soil mapping and a sound system of soil classification. Research in soil fertility, soil management, and other types dealing with soil-plant relationships is dependent upon good soil maps and when correlated with basic research and soil classification provides the basic information for increasing the reliability in making predictions concerning land use, productivity, and management requirements.

There is an increasing demand for information about a given soil's productivity which is influenced by management and climate. Soil is very complex in its make-up. It is common knowledge that soils are dynamic and are changing. Not only do soils support living plants and micro-organisms, but these, in turn, have a lot to do with the formation and behavior of soils. The complex soil system is not simply chemical and geological but also physical and biological. When the processes going on in dynamic soils are understood, a soil can be changed by management to increase its productivity for plants.

Many methods have been employed to measure or to estimate productivity of soils. These are chemical and biological tests to measure a sample's fertility rather than productivity, estimated plant performance based on texture, structure or permeability and estimated yields from

climatological data. In any event when only one factor or property is considered, less reliability is obtained than when the measured plant growth is closely related to specific combinations of practices for soils in their climatic setting.

Soil maps provide the firm connections between the experimental plots and the many fields of farmers. With this in mind a study was undertaken in order to devise an orderly means of assembling all important kinds of research data including crop yields by soil type. The major objective of this thesis is to assemble and evaluate the yield data from experimental plots and evaluate the experiences of farmers on wheat production on different soils in Oklahoma.

The results of this study will contribute to the reliability of crop yield estimates for major crops by different soils in Oklahoma. The results will contribute to the making of sound productivity ratings of important Oklahoma soils. Ratings of this type will be very useful to planning and technical people and also to agencies involved in lending and appraisal work.

CHAPTER II

LITERATURE REVIEW

Little work has been reported in the literature relative to assembling and interpreting mass data by soil type. However, many attempts to rate soils for various purposes have been made.

Early work in making predictions and ratings was initiated by the Bureau of Chemistry and Soils of the United States Department of Agriculture. These are found in many of the federal soil survey reports, and are arrived at in two principal ways: 1) Through judgments based upon evidence afforded by actual yield data from sample areas of the soil mapping units, and 2) through judgments based on comparisons of the characteristics of soils and basic knowledge of plant requirements (23).^{1/}

Storie has suggested an inductive method of rating the agricultural value of soils; where actual cropping experience with the soils is not considered necessary. A relative index of soils is arrived at by considering three general factors: 1) Character of soil profile, 2) Soil Texture, and 3) Modifying factors such as drainage and alkali. The value of the three factors expressed as percentages of the optimal conditions for plant growth are multiplied together to obtain the rating, and the product is expressed as a percentage of the maximum (12).

Murray, Englehorn, and Griffin discuss a method of soil yield rating that can be used, as a supplement to the general productivity

^{1/} Figures in parenthesis refer to literature cited.

ratings, to measure the production of soils on individual farms. Yield data are obtained which show the relative yielding ability not only of different soil types, but also of different depth and slope conditions within the same soil type (15).

Shrader, Riecken, and Englehorn found that the relative productivity of different Iowa soils is dependent upon the crop and management system under consideration (21).

Illinois workers started assembling yield and management data for all important Illinois crops in 1937 (18, 19). They studied records as far back as 1925, and the study is still being continued. A body of data of crop yields on individual soil types was assembled for the purpose of using it to convert relative values into absolute values, or to work out a soil rating or productivity rating for the more important soil types.

Recently, the Illinois workers have been using an electronic digital computer to assemble and analyze yield data by soil types. A lack of mass data is a deterrent to using statistical treatment (16). In the winter of 1956, they started collecting data on the productivity of some of the important forest soils in Illinois.

North Carolina workers have devised a method of recording systematically the usual data obtained in all phases of work in agronomy on punch cards (14). A double-hole punch card system was selected because soils for which there was available data could then be separated manually from those soils without such data.

Some cotton yield and management data by soil types in Oklahoma are presented in an M. S. thesis by Kenneth Snelling (22).

Some of the Oklahoma wheat work in which soil type was taken into consideration was initiated in 1951 by the Oklahoma Agricultural Experiment Station and the Agricultural Research Service, U. S. D. A. Several carefully selected locations in western Oklahoma were chosen for wheat fertilization studies. Many important soils of this area are represented by these studies (6). Some long and short-time averages are available from other research conducted at experiment stations and with cooperator farmers in the area.

Several short time yield averages are available from wheat research conducted in eastern Oklahoma. Wide ranges in productivity result from increased fertility on most of the soils on which wheat is grown in this part of the state. The increases in yield result from proper rates and combinations of nitrogen, phosphorus, and potassium (1, 2).

CHAPTER III

MATERIALS AND METHODS

Two methods of recording accumulated data by soil type were utilized in the collection phase of this study. Forms such as the one shown in figure 1 were adapted from the ones used at North Carolina. They were used for compiling available experimental data.

Questionnaires such as the one shown in figure 2 were used for interviewing farmers to obtain field yield and management data by soil types. The form and questionnaire are self-explanatory.

Sources of experimental data are all types of trials conducted at the state and federal owned stations, and trials conducted in cooperation with farmers in the state. When available data were compiled, those test sites on which the soil had not already been classified were located, examined and the soils described and classified. Data for all important crops were assembled and filed by soil type.

Wheat data were summarized for presentation in this thesis. The soil type, location, researcher, type of experiment, profile description, yield, year or years in which yield was produced, management and some chemical and physical data are presented.

Farmers' yields and management from fields that approach homogeneity according to the present concepts of individual soil types were obtained. The farmers were visited at least once the first year to explain what was wanted and why it was wanted. Past management and yields were also obtained at that time.

Soil testing methods were taken from the following sources:

Available phosphorus by extraction with sodium bicarbonate was estimated according to a method proposed by Olsen, Cole, Watanabe, and Dean (17). Total phosphorus was determined by a colorimetric procedure recommended by Shelton and Harper (20). Other chemical tests were conducted according to methods proposed by Harper (11).

Percentage of water held at $1/3$ atmospheres of tension and at 15 atmospheres of tension were determined according to methods 30 and 31 of the U. S. D. A. Salinity Laboratory (24).

Cultivation Virgin		State		Family											
Location		County		Phase											
		Relief		Parent Material											
		Drainage		Classification Comments											
		Slope													
		Erosion													
Cover		Stoniness													
Years in Cultivation		Geog. Position													
Profile Description: () correlator				Date sampled											
No.	Horizon	Depth	Color	Texture	Structure	Consistence	Comments	Sample Nos	Lab. Nos.						
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
Chemical Data: () analyst															
			Exchangeable				Base								
No.	pH	C.E.C.	H	Ca	Mg	K	Na	Sat.	P ₂ O ₅	O.M.	N	C	C/N	Fe	Others
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
Physical Data: () analyst						% Clay									
No.	Bulk Density		% Sand	% Silt	2-.2u <.2u		Water at F.C.		Water at P.W.P.		Total Pore Space				
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															

Figure 1. Form Used in Tabulating Experimental Data by Soil Type.

Mineralogical Data: () analyst

No.	D.T.A.	Clay Mineral Types	X-Ray	Chemical
	2-.2u	<.2u	2-.2u	<.2u
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Management Response Data: () project leader Project No. _____

Treatments		Year	Type of Experiment
N	P	K	Lime (kind)
			Others

Climatic Data: Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec. Total

Rainfall: (in.)

No. of Years:

Effective Rainfall:

Reference Source: (including publications)

Figure 1a. Form Used in Tabulating Experimental Data by Soil Type.

1. Information that should be acquired before contacting farmers
 - (a) Soil type, slope, degree of erosion, phase
 - (b) Crop
 - (c) Location (legal description)
 - (d) Kind of experiment (field yields by soil type)
 - (e) Farmer's name
2. Information acquired from farmer
 - (a) Size of yield area (this information may be checked with Agricultural Stabilization Committee records for allotted crops)
 - (b) Yields (past, present, future)
 1. records
 2. farmer's memory

(check one or both)

 - (c) System of management as accurate as farmer can furnish either from his records or memory.
 1. Rotations or continuous cropping (cropping history)
 2. Tillage practices
 3. Planting dates and rates; harvesting dates
 4. Fertilizers (commercial, barnyard or green manures)
 5. Varieties used
 6. Degree of damage to crop (hail, freeze, flood, wind, insects and other) Use insurance adjusters appraisal if available
 7. Rainfall
 8. Other

Figure 2. Questionnaire Used in Interviewing Farmers for the Purpose of Assembling Yield and Other Data by Soil Types.

CHAPTER IV

PRESENTATION OF YIELD DATA

Abbreviations used in recording morphological data. All horizons were described according to Soil Survey Manual (1951).

<u>Color</u>	<u>Texture</u>	<u>Structure</u>
blk - black	gv - gravel	Grade:
b - brown	s - sand	0 - structureless
g - gray	fs - fine sand	1 - weak
o - olive	vfs - very fine sand	2 - moderate
p - pink	sl - sandy loam	3 - strong
r - red	fsl - fine sandy loam	Size:
w - white	vfs1 - very fine sandy loam	vf - very fine
y - yellow	l - loam	f - fine
co. - coarsely	si - silt	m - medium
dk. - dark	sil - silt loam	c - coarse
lt. - light	cl - clay loam	vc - very coarse
pl. - pale	sicl - silty clay loam	Form or type:
mott. - mottled	fscl - fine sandy clay loam	pl - platy
stg. - strong	scl - sandy clay loam	pr - prismatic
str. - stratified	sic - silty clay	cpr - columnar
v. - very	sc - sandy clay	bk - blocky
	c - clay	abk - angular blocky
Munsell notations	ss - sandstone	sbk - subangular
follow color	fgdss - fine grained sandstone	blocky
symbols.	sist - silt stone	gr - granular
	sh - shale	cr - crumb
	ssh - sandy shale	m - massive
	sish - silty shale	frb - fragmental
	co. - coarse	breakage
	f. - fine	cub - cuboidal
	h. - heavy	sg - single grain
	lt. - light	cpd - compound

Other

Consistence

Moist Soil:

ml - loose
mvfr - very friable
mfr - friable
mfi - firm
mvfi - very firm
mefi - extremely firm
msfi - slightly firm

Wet Soil:

ws - sticky
wp - plastic

Dry Soil:

dl - loose
ds - soft
dsh - slightly hard
dh - hard
dvh - very hard
deh - extremely
hard

Abbreviations used in recording morphological data (continued)

Other (Continued)Concretions, films

con. - concretions
 conir. - iron concretions
 conca. - lime concretions
 ferr. - ferruginous
 fil. - films
 ir. - iron

Management

(c) - customary (prevailing practices)
 (I) - improved (includes application of lime and fertilizer, use of improved crop varieties, use of crop rotations that contained a legume, irrigation, and use of soil conserving practices).

Miscellaneous

abpt. - abruptly
 accum. - accumulation
 aeol. - aeolian
 calc. - calcareous
 coat. - coatings
 cps. - chips
 cry. - crystalline
 indst. - indistinct
 limest. - limestone
 mat. - material
 max. - maximum
 occas. - occasional
 orig. - origin
 peb. - pebbles
 pel. - pellets
 perm. - permeable
 rel. - relatively
 resid. - residium
 rk. - rock
 shin. - shine
 simil. - similar
 sltly. - slightly
 spk. - specks
 strik. - striking
 trans. - transition
 undet. - undetermined
 unwth. - unweathered
 wth. - weathered

Symbols listed under a certain category are not necessarily confined to that category in the presentation of data.

Bates series

Bates fine sandy loam, shallow phase, 2 percent slopes

Location: SESW Sec. 18, T. 15 N., R. 19 E. (Bacone Indian College property NE of Muskogee in Muskogee County.)

Roy Oswalt's variety study, Data source No. 1.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A ₁ & A _{1p} *	0-14	b(7.5YR5/2 4/2m)	fsl-2mgr	6.4	
A ₂	14-18	same, stg. b cps	same	6.2	10% wth. ss cps.
C ₁	18-30	stg. b		6.0	part wth. ss
C ₂	30-42	lt. g	ssh	5.8	
Dr	42+	pl. b(10YR6/3)			rel. unwth. rk.
* % OM 1.74 - % N .0914 - Avail. K 92 lbs/a - P 15 lbs/a. (acetic acid)					

Yield data: 1953, 54, 55, 57 (4 yrs) - 20.4 bu/a under continuous wheat, no fertilizers (c)^{1/}.

Bates loam, 2 percent slopes

Location: In 1954, the test was by the grain elevators south of the J. L. Fraley farm on the E side of Highway 69. In 1955 and 1956 the tests were on the J. L. Fraley farm 2.85 mi. S of Adair on Highway 69 in SWNESW Sec. 9, T. 22 N., R. 19 E. in Mayes County.

Roy Oswalt's variety study, Data source No. 2.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A _{1p} & A ₁ *	0-12	gb(10YR5/2 3/2m)	1-2mgr	5.8	mfr; ss peb.
A ₂	12-15	b(10YR5.5/3 4/3m)	1-2mgr	5.4	mfr; ss cps.
B ₂	15-26	yb(10YR5/6d)	cl-lmsbk	5.4	mfr; mfi; dh; blk con.
C	26-30*	yb	cl	5.4	lr. fil.
* % OM 3.07 - % N 0.1406 - Avail. K 64 lbs/a - P 0 lbs/a. (acetic acid)					

Yield data: 1954-56 (3 yrs.) - 15.5 bu/a under continuous wheat, no fertilizers except NH₄NO₃ (rate unknown) used as topdressing on the Fraley location in 1954 (c).

More data are needed to strengthen the reliability of these yield averages for use in making long-time yield predictions for the Bates series.

^{1/} Customary management.

Bethany-Kirkland Series

Bethany-Kirkland silt loams, 1 percent slopes

Location: Stillwater Agronomy farm.

Harper and others rotation study, Data source No. 3.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A ₁ *	0-8	gb(10YR _{4.5} /2 3.5/2m)	sil-lmgr	4.7	mfr
B ₂₋₁ **	8-22	dk.gb(9YR ₄ /2 3/2m)	c-2fbk	5.4	wp
B ₂₋₂	22-32	dk.gb(10YR ₄ /2 3/2m)	c-labk		1 shin.on peds
B ₃	32-42	b(7.5YR ₅ /4 4/3m)	c-lmbk		occas.blk pel.
C ₁	42-52	rb(5YR ₅ /4 4/4m)	sic1		blk ir. fil.

* %OM 1.54 - %N 0.078 - Avail. K 172 lbs/a - % total P 0.0198 - Avail. P 6.4 lbs/a (acetic acid).

** %OM 1.49 - %N 0.084 - Avail. K 160 lbs/a - % total P 0.0198 - Avail. P 6.4 lbs/a (acetic acid).***

*** These data are for the continuous wheat check plot. Data are also available for other treatments.

Yield data: 1926-54 (28 yrs.) - 12.8 bu/a under continuous wheat, no fertilizers (c).
 1926-53 (27 yrs.) - 17.4 bu/a under continuous wheat, 30 lbs P₂O₅ annually (I)₁.
 1926-53 (27 yrs.) - 25.7 bu/a under first year after Austrian winter pea rotation plus 3 tons of lime per acre in 1926 and 1 ton per acre in 1946 (I).

These are some of the most reliable yields available for making predictions for these soils. Compare with Data Source Nos. 31-35 and Nos. 4-9.

1/ Improved management.

Bethany SeriesBethany loam, $\frac{1}{2}$ percent slopes

Location: $W\frac{1}{4}$ cor. Sec. 13, T. 15 N., R. 9 W. (3 mi. N, 8 mi. W, $\frac{1}{2}$ mi. N of Okarche in Kingfisher County.)

H. V. Eck's fertility study, Data source No. 4.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A _{1p}	0-6*	b(10YR5/3 3/2m)	fsl-lfgr	7.7	mfr;dh
A ₁	6-15**	b(10YR5/3 3/2m)	sil-frb	7.2	mfi;dh
B ₂₋₁	15-26	dk.gb(10YR4/2 3/2m)	cl-m;frb	8.0	c fil.;mvfi
B ₂₋₂	26-34	dk.gb(10YR4/2 3/2m)	cl-m;frb	8.0	l calc.
B _{3c}	34-50	g(5YR6/1 5/1m)	sic-frb		CaCO ₃ cps.
C ₂	50-58	yr(5YR5/6 4/6m)	sic-frb		ir.fil.

* %OM 1.28 - %N .077 - P₂O₅ 53.1 lbs/a (NaHCO₃) 146.6 (acetic acid).

** %OM 1.12 - %N .074 - P₂O₅ 35.1 lbs/a (NaHCO₃) 47.6 (acetic acid).

* $\frac{1}{3}$ atmosphere percentage 21.28 - $\frac{1}{3}$ atmosphere percentage 8.92.

** $\frac{1}{3}$ atmosphere percentage 26.15 - $\frac{1}{3}$ atmosphere percentage 14.80.

Yield data: 1955-56 (2 yrs.) - 18.1 bu/a under continuous wheat, no treatment (c).
- 21.0 bu/a under continuous wheat, 40 lbs. N, 40 lbs. P (I).

Bethany silt loam, $\frac{1}{2}$ percent slopes

Location: $SW\frac{1}{4}$ Sec. 33, T. 26 N., R. 1 E. (On N side of Highway 60, 7 mi. W of Ponca City on the Bellinghausen farm in Kay County.)

Roy Oswalt's variety study, Data source No. 5.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	Other
A ₁ &A _{1p}	0-9	gb(10YR5/2 3/2m)	sil-lmgr	mfr
A ₃	9-16	dk.gb(10YR4/2 3/2m)	cl-2,3 msbk	mfi;dsh
B ₂₋₁	16-24	gb(10YR4.5/2 3/2m)	c-lmpr;lmbk	mvfi c fil.stg.
B ₂₋₂	24-30	b(10YR5/3d)	c-lmpr;lmbk	like above; w spk.
B ₃	30-38	b mott. with yb and by	sic	blk con.
C	38-54	b	scl	str.with dk. b c.

Yield data: 1948-57 (10 yrs.) - 24.5 bu/a under continuous wheat, no treatment (c).

Bethany silt loam, 50 percent; Kingfisher silt loam, 50 percent
1-3 percent slopes

Location: NE $\frac{1}{4}$ Sec. 16, T. 15 N., R. 7 W. (2 mi. E, 3 $\frac{1}{2}$ N of Okarche on
W. side of road; it is on E side of Highway 81.)

Farmer questionnaire - Fred Walta, Data source No. 6.

Management:

This 98 acre field, the two largest mapping units in the center of the quarter section, has been in continuous wheat with the exception of 35 acres along the east side that have grown oats the past 4 years. No fertilizer has been applied. The soil is moldboard plowed. Mr. Walta sometimes oneways before moldboarding. Triumph variety wheat was planted October 15, 1956.

At time of harvest, June 15, 1957, the wheat on the Bethany had lodged worse than on the Kingfisher. Farmer estimates yield on Kingfisher about 3 bushels better than on Bethany. In contrast, the reverse was true regarding yield in 1956. Bethany outyielded Kingfisher by approximately 3 bushels.

Yield data: 1955 - 5 bu/a
1956 - 20 bu/a
1957 - 15 bu/a

Bethany silt loam, 0-1 percent slopes

Location: NW $\frac{1}{4}$ Sec. 27, T. 15 N., R. 7 W. (2 mi. E and 1 $\frac{1}{2}$ mi. N of
Okarche on E side of road).

Farmer questionnaire - J. A. Young, Data source No. 7.

Management:

This quarter section has been in continuous wheat without any fertilizer. It has been moldboard plowed most of the time. A Graham-Hoeme was used in 1952 when it was too dry to moldboard. The sloping part was terraced in the fall of 1951. This comprises about 10 percent of the field mostly on the east side. 1956 was the only year that some small areas of Norge fine sandy loam on the east side of the quarter section outyielded Bethany.

Yield data: 1952 - 0.0 (Hail)
1953 - 16.0 bu/a
1954 - 21.0 bu/a
1955 - 5.5 bu/a
1956 - 19.5 bu/a
1957 - 12.7 bu/a

Bethany silt loam, 0-1 percent slopes

Location: SW $\frac{1}{4}$ Sec. 13, T. 16 N., R. 9 W. (9 $\frac{1}{2}$ mi. W of Kingfisher on N side of Highway 33).

Farmer questionnaire - W. C. Simmons, Data source No. 8.

Management:

This quarter section has been in continuous wheat for 30 years. No fertilizers have been used. The soil is usually moldboard plowed. In 1956, it was onewayed and chiseled 10 inches deep on most of the quarter section. Winter freeze damage was greater on the soil that was only moldboarded than on the chiseled soil. The wheat growth was more rank. Triumph variety wheat was planted in late October in the dust.

Yield data: 1955 - 18.0 bu/a
 1956 - 28.5 bu/a
 1957 - 10.5 bu/a

Bethany silt loam, 0-1 percent slopes

Location: N part of E $\frac{1}{2}$ NE $\frac{1}{4}$ Sec. 21, T. 15 N., R. 7 W. (2 mi. E, 2 $\frac{1}{2}$ N of Okarche on W side of road).

Farmer questionnaire - Ted Brueggen, Data source No. 9.

Management:

This 50 acre field is moldboard plowed each year directly after harvest. It is spring tooth harrowed two or three times. The soil is harrowed once in late July or early August, depending on rainfall, to keep weeds down. It is also harrowed before drilling wheat. About 15 acres of this 50 acres was in vetch in 1949. Early Triumph variety was planted October 1, 1956.

Yield data: 1956 - 23 bu/a
 1957 - 12 bu/a

The soil under Data source No. 5 probably had some additional fertility or green manure treatment which was unknown.

Carey Series

Carey silt loam, 1-3 percent slopes

Location: Southern Great Plains Field Station at Woodward in Woodward County.

U.S.D.A. Circ. No. 917 -- Rotation study, Data source No. 10.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	Other
A ₁	0-8	dk.gb to dk.bm	sil-1mgr	mfr
B ₁	8-20	dk.b	cl-2mgr	noncalc.
B ₂	20-48	dk.b to lt.b(grades)	cl-2mgr	calc.
C	48-62	lt.yb	cl-2mgr	calc.

Yield data: 1919-48 (30 yrs.) - 19.4 bu/a under continuous wheat, early prepared land (c).

Carey silt loam, 1 percent slopes

Location: NWNE Sec. 13, T. 27 N., R. 23 W. ($\frac{1}{2}$ mi. S of center of Buffalo on the Appleton farm in Harper County).

H. V. Eck's fertility study, Data source No. 11.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	Other
A _{1p}	0-6	b(7.5YR5/3 4/3m)	sil-frb;1pl	dsh
A ₁	6-13	b(7.5YR4/3 3/3m)	sil-frb;2mgr	mfr;noncalc.
B ₁	13-16	rb(5YR5/4d)	h.sil-cpd lpr;mgr	1 calc.
B ₂	16-24	p(5YR7/5d)	lt.sicl	seams CaCO ₃
B _{ca}	24-36	p(4YR7/4d)	lt.sicl	max.CaCO ₃ accum.
C	36-54	r(2.5YR6/6d)	sil	appears to be aecl. orig.

Yield data: 1956 - 8.4 bu/a under continuous wheat, no fertilizers (c).
- 10.6 bu/a under continuous wheat with 40 lbs. N and 80 lbs. P₂O₅ (I).

Carey silt loam, 1 percent slopes

Location: NWNW Sec. 25, T. 15 N., R. 17 W. (600 ft. S of NW Cor. on the Donnie Nicholas farm at junction of U. S. Highway 183 and Oklahoma Highway 47 W of Thomas in Custer County).

H. V. Eck's fertility study, Data source No. 12.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A _{1p}	0-7	b(7.5YR ₄ /3 3/3m)	sil	6.5	dsh
A ₁	7-13	rb(5YR ₄ /3 3/3m)	sil-3,2mgr	7.0	mfr
A ₃	13-20	rb(5YR ₄ /3 3/3m)	sic1-2mgr	7.0	mfr
B ₂₋₁	20-28	rb(5YR ₄ /4d)	sic1-2mgr	7.5	1 c fil.
B ₂₋₂	28-42	dk.r(2.5YR ₃ /6d)	sic1	8.0	calc.spots
C	42-54	r(2.5YR ₅ /8d)	soft sist		1 calc.

Yield data: 1956-57 (2 yrs.) - 17.2 bu/a under continuous wheat, no fertilizers (c).
- 22.2 bu/a under continuous wheat, 40 lbs. N, 20 lbs P₂O₅ (I).

Carey silt loam, 1 percent slopes

Location: NWSWSW Sec. 30, T. 15 N., R. 14 W. (N of McNeil elevator along Highway 33 on the east side of Thomas in Custer County).

Roy Oswalt's variety study, Data source No. 13.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A _{1p}	0-7	b(7.5YR ₅ /3 4/3m)	sil-1mgr	6.2	mfr;perm.
A ₁	7-12	b(6.5YR ₄ /2d)	sil-2mgr	7.0	mfr;perm.
B ₁	12-17	rb(5YR ₄ /3 3/3m)	sic1-2mgr	7.0	pores; casts
B ₂₋₁	17-28	rb(2.5YR ₄ /6d)	sic1-2mgr	7.0	1 c fil.
B ₂₋₂	28-38	r(2.5YR ₄ /6d)	cl	7.5	no c fil.
B ₃	38-48	r(2.5YR ₄ /6d)	scl	7.5	spots of b and rb
C	48-54+	lt.r(2.5YR ₆ /8d)	seams of fss and sh	7.5 8.0	

Yield data: 1948-53 (6 yrs.) - 21.2 bu/a under continuous wheat, no fertilizers (c).

Yield predictions with good reliability, especially under customary management may be made from the data presented for Carey silt loam.

Choteau Series

Choteau silt loam, 1 percent slopes

Location: Conners Agricultural School land.

Roy Oswalt's variety study, Data source No. 14.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	Other
A ₁	0-15	dk.gb(10YR4/2d)	sil-lmgr	mfr;pores
A ₂	15-26	lt.bg(10YR6/2d)	sil	con.-fil.
B ₂₋₁	26-40	yb(10YR5/4d)	sic-lmsbk	mfi;dk.fil, on peds

Yield data: 1954-56 (3 yrs.) - 21.8 bu/a under continuous wheat, no treatment (c).

Choteau silt loam, 2 percent slopes

Location: SESE Sec. 18, T. 17 N., R. 16 E. (SE Cor. of school land at Coweta in Wagoner County).

Roy Oswalt's variety study, Data source No. 15.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	Other
A _{1p} &A ₁	0-14	b(10YR5/3d)	sil-lmgr	very floury, d
A ₂₋₁	14-32	lt.bg; few yb spots	sil-lmgr	porous, perm.
A ₂₋₂	32-38	pl.b	sil	conir.
B ₂	38-50+	by; many stg.b and rb spots	sicl-lmsbk	mfi; slow perm.

Yield data: 1955-56 (2 yrs.) - 27.7 bu/a under continuous wheat, no treatment (c).Location: NENW Sec. 26, T. 22 N., R. 19 E. (Just S and E of Mennonite Church NE of Pryor in Mayes County).

O. H. Brensing's fertility study, Data source No. 16.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	Other
A _{1p} &A ₁	0-15	dk.gb	sil-lmgr; lcfbr	mfr
A ₂	15-25	lt.yb	sil-lmgr; lcfbr	blk con.
B ₂₋₁	25-36	pl.b	c-cpd lpr; 2mbk	c fil. not strik.
	36+			simil. to above

Yield data: 1953 - 32.0 bu/a following soybeans in 1952, 100 lbs of 4-12-4 starter plus 80 lbs. of N (urea) (I).

Until more data are available, these soils may be compared with similar soils in the Taloka series to make long time yield estimates.

Dennis SeriesDennis loam, $2\frac{1}{2}$ percent slopes

Location: SE Cor. of Sec. 17, T. 18 N., R. 15 E. (4 mi. E of Broken Arrow and $\frac{1}{2}$ mi. N of Highway 51 on R. Wagner farm in Wagoner County).

Roy Oswalt's variety study, Data source No. 17.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A ₁	0-12	dk.gb(10YR4/1.5 3/1.5m)	1-2mgr	6.0	mfr
A ₃	12-17	same	lt.cl-cpd lpr 2msbk	6.0	mfr;mfi
B ₂	17-26	b(10YR4.5/3 3/3m)	lt.sicl- 2msbk	5.8	many pores
C	26-36	b(10YR4.5/3 3/3m)	sicl	5.6	
Dr	36-42	lt.g(2.5YR7/2d)	sish	5.6	ss seams

Yield data: 1956-57 (2 yrs.) - 26.3 bu/a under continuous wheat, no treatment (c).

Dennis silt loam, 2 percent slopes

Location: SWNW Sec. 7, T. 17 N., R. 18 E. (3 mi. W, $\frac{1}{2}$ mi. N of Highway 51 on the Dean Jeffrey farm, W and N of the house and barns, in Wagoner County).

J. Q. Lynd's fertility study, Data source No. 18.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A _{1p}	0-6	dk.gb(10YR4/2)	sil-1, 2mgr	5.5	
A ₁	6-13	v.dk.gb(10YR3/2)	sil-2mgr	5.6	mfr
A ₃	13-20	yb(10YR5/4)	sicl-2mgr	5.7	mfr;conir.
B ₂	20-36	b(7.5YR5/5)	c-2fbk	5.3	mfi
B ₃	36-46	yb mott.with stg. b spots	c-lmbk	6.0	mfi;l shin.
C	46-54	yb with g bands	csb	6.5	

Yield data: 1957 - 8.92 bu/a under no treatment. This soil has been limed in the past, and vetch and legumes have been grown (I).
- 12.83 bu/a under 40 lbs. N, 40 lbs. P₂O₅, 40 lbs. K₂O (I).

Dennis silt loam, 2 percent slopes

Location: SWNE of section just S of Liberty School on the Shi Ketchum farm in Tulsa County.

J. Q. Lynd's fertility study, Data source No. 19.

Profile description*

Horizon	Depth in inches	Color	Texture & Structure	Other
A ₁	0-10	gb	sil-2mgr	
A ₃	10-18	b	cl-2mgr, cr	
B ₂	18-28	gb mott.with yb, rb	sic-2msbk, cr	
C	28-38	more b than above	c	

* Typical Dennis.

Yield data: 1957 - 8.78 bu/a under no treatment (c).
- 20.88 bu/a under 80 lbs. N, 40 lbs. P₂O₅, 60 lbs. K₂O (I).

The low yields for 1957 are due to high rainfall prior to and during harvest time. More data are needed to make reliable yield predictions.

Dill Series

Dill fine sandy loam, 1½ percent slopes

Location: NESW Sec. 24, T. 11 N., R. 21 W. (2 mi. E of Elk City 0.6 mi. S of U. S. Highway 66 on the P. A. McDonald farm in Beckham County).

Roy Oswalt's variety study, Data source No. 20.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A _{1p} *	0-7	r(2.5YR4/5 3/5m)	fsl-lmgr	6.5	mvfi; perm.
A ₁	7-12	r(2.5YR4/5 3/5m)	fsl-lmgr		many pinholes
B ₂₋₁	12-18	r(2.5YR4/6 3/6m)	scl-2mgr	6.2	1 c fil.
B ₂₋₂	18-38	r(2.5YR4/6d)	scl-lmgr		c fil.
C	38-54	r	scl	7.0	occas. hard blk con.

* %OM 0.58 - %N .0396 - Avail. K 328 lbs/a - P 10 lbs/a (acetic acid).

Yield data: 1953, 54, 56 (3 yrs.) - 19.9 bu/a under continuous wheat, no treatment (c).

This yield average is probably not too reliable due to the climatic variable, especially rainfall and rainfall distribution.

Foard Series

Foard silt loam, 1 percent slopes

Location: NENE Sec. 19, T. 2 N., R. 18 W. ($\frac{1}{2}$ mi. E of center of town of Headrick, 0.25 mi. N and 200 yd. W on Orville Southward farm in Jackson County).

H. V. Eck's fertility study, Data source No. 21.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A _{1p} *	0-8	b(7.5YR5/3 4/3m)	sil-lmgr	6.8	porous
A ₁ **	8-12	dk.b(7.5YR4/2 3/2m)	sil-cpd lfpr, 2mgr	6.9	mfr; blk pel.
B ₂₋₁	12-28	dk.b(7.5YR4/2 3/2m)	c		c fil.
B ₂₋₂	28-42	b	c		CaCO ₃ along
C _{ea}	42-54	gb(10YR5/2d)	calc.sc		planes
* %OM 1.48 - %N .081 - P ₂ O ₅ 53.1 lbs/a (NaHCO ₃) 146.6 (acetic acid).					
** %OM 1.3 - %N .085 - P ₂ O ₅ 42.1 lbs/a (NaHCO ₃) 146.6 (acetic acid).					
* 1/3 atmosphere percentage 17.95 - 15 atmosphere percentage 8.13.					
** 1/3 atmosphere percentage 21.8 - 15 atmosphere percentage 11.5.					

Yield data: 1953-55 (3 yrs.) - 20.3 bu/a under continuous wheat, no treatment (c).
- 24.4 bu/a under continuous wheat, 40 lbs. N (I).

Foard clay loam, 1 1/3 percent slopes

Location: SENE Sec. 2, T. 4 S., R. 15 W. (On Grandfield airport property 3 mi. W and 1/2 mi. N of Grandfield.)

H. V. Eck's fertility study, Data source No. 22.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A _{1p} *	0-5	dk.gb(10YR4/2 3/2m)	sic1-lmgr	7.2	mfr
A ₁ **	5-13	v.dk.g(10YR3/1 2/1m)	sic1-2msbk	7.2	mfi-mfr;dh
B ₂₋₁	13-24	v.dk.gb(10YR3/2m)	c-2mbk	8.0	stg.c fil.
B ₂₋₂	24-32	b(7.5YR5/2 4/2m)	c		CaCO ₃ con.
B ₃	32-46	b(7.5YR5/4 5/3m)	c-lmbk		
C _{ca}	46-54	yr(5YR5/6d)	granite peb.		
* %OM 1.87 - %N .106 - P ₂ O ₅ 31.9 lbs/a (NaHCO ₃) 146.6 (acetic acid).					
** %OM 1.98 - %N .095 - P ₂ O ₅ 22.9 lbs/a (NaHCO ₃) 146.6 (acetic acid).					
* 1/3 atmosphere percentage 22.31 - 15 atmosphere percentage 9.85.					
** 1/3 atmosphere percentage 25.04 - 15 atmosphere percentage 12.68.					

Yield data: 1952-56 (4 yrs.) - 29.3 bu/a under continuous wheat, no treatment (c).
- 34.9 bu/a under continuous wheat, 40 lbs. N, 80 lbs. P (I).

The Foard clay loam may be closer to Hollister clay loam. Granite pebbles in the C horizon tend to bear this out. A good nitrogen response which seldom occurs on these soils was recognized in 1953. These factors probably contribute to the unusually high yield for Foard clay loam.

Grant Series

Grant silt loam, 2 percent slopes

Stubble mulch and other cultural practices on Wheatland Conservation Experiment Station at Cherokee in Alfalfa County.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A _{1p}	0-8	b(7.5YR5/3 4/3m)	sil-0	6.2	mfr
A ₁	8-16	b(7.5YR4/3 3/3m)	sil-2mgr	7.0	porous and perm.
AB	16-22	rb(6YR4/3 3/3m)	lt.cl-lmsbk	7.5	1 shin. on peds
B ₂	22-32	rb(6YR4/3 3/2m)	cl-lmpr; 2msbk	7.0	1 shin. on peds
B ₃ C	32-42	rb(5YR4/4 3/4m)	cocl		occas. bands of fgv.
C	42-50	rb(5YR4/3 3/3m)	cl-lmsbk		mfi
B ₂ b	50-64	dk.b(7.5YR4/3 3/3m)	sic1-2fbk		1 shin.on peds
Cb	64-78	yr(5YR4/6 3/6m)	cocl		f.roots

H. A. Daniel, M. B. Cox, and H. M. Elwell - Tillage-row direction study, Data source No. 23a.

Yields of wheat by row direction and tillage method 1/				
	Up & down slope	Contour tillage	Open end terr. contour till.	Closed end terr. contour till.
1942-51 (10 yrs) (c)	16.5	17.8	17.8	16.6

H. V. Eck's Fertility study, Data source No. 23b.

Yields by fertility treatment		
	None	40#N and 20#P ₂ O ₅
1953-54 (2 yrs)	18.4 (c)	21.1 (I)

Grant silt loam, $1\frac{1}{2}$ -2 percent slopes

Location: Sec. 19, T. 22 N., R. 8 W. (Bob Graf farm $\frac{1}{2}$ mi. S and 1 mi. W of Lahoma in Garfield County: 200 yd. W of homestead or 300 yds. E of NW corner of section.)

H. V. Eck's fertility study, Data source No. 24.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A _{1p} *	0-8	b(7.5YR5/3 4/3m)	sil-lmgr	6.0	mfr;perm.
A _{1**}	8-12	b	sil	6.0	mfr;mfi
B ₁	12-16	b(7.5YR5/4)	sic1-lmsbk	6.0	mfr;mfi
B ₂	16-28	b(7.5YR5/4)	sic1-lmbk	8.0	mfr
B _{2-b}	28-46	dk.b(7.5YR 4/2 3/2m)	h.sic1-lmbk	8.0	mvfi;c fil.
B _{3-b}	46-54	lt.b	sic1-lmbk	8.0	less mfi than above

* %OM 1.57 - %N .083 - P₂O₅ 42.1 lbs/a (NaHCO₃) 146.6 (acetic acid).

** %OM 1.56 - %N .082 - P₂O₅ 42.1 lbs/a (NaHCO₃) 146.6 (acetic acid).

* 1/3 atmosphere percentage 17.37 - 15 atmosphere percentage 5.61.

** 1/3 atmosphere percentage 20.09 - 15 atmosphere percentage 7.6.

Yield data: 1954-55 (2 yrs.) - 19.7 bu/a under continuous wheat, no treatment (c).
- 19.8 bu/a under continuous wheat, 40 lbs. N, 20 lbs. P₂O₅ (I).

1/ Stubble mulch and other cultural practices, 1956. Production Research Report No. 6, Agric. Res. Serv., U.S.D.A.

Grant silt loam, $1\frac{1}{2}$ percent slopes

Location: 2 mi. E, 1 mi. N, 0.15 mi. E of the center of Okeene on the Owen Wimberly farm in Blaine County.

H. V. Eck's fertility study, Data source No. 25.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A _{1p} *	0-8	1t.b(7.5YR6/4 4/3m)	sil-labk-0	6.1	porous
A ₁ **	8-13	rb(6YR4/3 3/3m)	sil-2mgr	6.2	perm.
A ₃	13-18	rb(5YR4/3 3/3m)	sic1-cpd 2msbk-lfpr		mfi;dh
B ₂₋₁	18-28	rb(5YR4/3d)	sic1-2msbk	7.5	mfi
B ₂₋₂	28-36	r(2.5YR5/8 4/8m)	sic1-2msbk	7.5	ferr.fil.
B ₃	36-46	r	cl-lmsbk	7.5	conir.
C	46-54+	r(2.5YR5/8d)	sish		wth.
* %OM 1.53 - %N .079 - P ₂ O ₅ 39.8 lbs/a (NaHCO ₃) 146.6 (acetic acid).					
** %OM 1.42 - %N .079 - P ₂ O ₅ 25.2 lbs/a (NaHCO ₃) 146.6 (acetic acid)					
* 1/3 atmosphere percentage 16.6 - 15 atmosphere percentage 5.98.					
** 1/3 atmosphere percentage 18.2 - 15 atmosphere percentage 7.64.					

Yield data: 1954-56 (3 yrs.) - 13.3 bu/a under continuous wheat, no treatment (c).
- 14.3 bu/a under continuous wheat, 20 lbs. N, 40 lbs. P₂O₅ (I).

Yield predictions with good reliability may be made for Grant silt loam from the data presented. Very little increase in yields is obtained from addition of fertilizers.

Kingfisher Series^{1/}

Kingfisher silt loam, 1-3 percent slopes

Location: W $\frac{1}{2}$ NW $\frac{1}{4}$ Sec. 19, T. 15 N., R. 7 W. (3 mi. N and $\frac{1}{4}$ mi. W of Okarche on S side of road.)

Farmer questionnaire - Norman Grummer, Data source No. 26.

Management:

This 79 acre field has been in continuous wheat for years with no fertilizer treatment. The soil has been moldboard plowed and spring tooth harrowed. Triumph variety wheat is planted in early October.

Yield data: 1957 - 15 bu/a

^{1/} Check Data source No. 6 for additional data on Kingfisher.

Kingfisher silt loam, 1-3 percent slopes

Location: SW $\frac{1}{4}$ Sec. 28, T. 15 N., R. 7 W. (1 mi. E and 1 mi. N of Okarche.)

Farmer Questionnaire - Norman Grummer, Data source No. 27.

Management:

This quarter section has been in continuous wheat for 64 years. It has never been fertilized. The soil has been moldboard plowed the past 20 years. Before that, it was disk plowed. It has been spring tooth harrowed after plowing each year. Adolph Schroeder now farms the land for Mr. Grummer. The Schroeder family has always farmed this quarter. They have used a Graham Hoeme some, but the soil blows too easily after using this plow. Mr. Schroeder rotary hoes often to prevent blowing. The best yield on this soil was 24 bu/a in 1935 and again in 1956. Peck variety was used in 1935. Triumph is now planted September 25-30.

Yield data: 1954 - 17 bu/a
 1955 - 4 bu/a (greenbugs)
 1956 - 24 bu/a
 1957 - 16 bu/a

Kingfisher silt loam, 1-3 percent slopes

Location: N part of W $\frac{1}{2}$ SW $\frac{1}{4}$ Sec. 20, T. 15 N., R. 7 W. (2 mi. N of Okarche on E side of road.)

Farmer Questionnaire - Leo Buettner, Data source No. 28.

Management:

This 23 acre field has been in continuous wheat for years with the exception of oats in 1955. No fertilizer has been used. The soil is onewayed right after harvest. 27 bu/a is the highest yield the field ever produced.

Yield data: 1957 - 10.6 bu/a

Kingfisher silt loam, 1-3 percent slopes

Location: $W\frac{1}{2}NE\frac{1}{4}$ Sec. 11, T. 15 N., R. 7 W. (4 mi. S and 1 mi. E of Kingfisher on S side of road.)

Farmer Questionnaire - John Alden, Data source No. 29.

Management:

This field has been in continuous wheat without fertilizers with the exception of a little barnyard manure. The soil has been moldboard plowed most of the time. Early Triumph variety wheat was planted October 20, 1956 in plenty of moisture.

Yield data: 1955 - 5 bu/a (dry, weeds took it)
 1956 - 26 bu/a (avg. on Kingfisher and Port on east side of $NE\frac{1}{4}$)
 1957 - 18 bu/a

Kingfisher silt loam, 3-5 percent slopes

Location: N part of $E\frac{1}{2}NW\frac{1}{4}$ Sec. 20, T. 15 N., R. 7 W. (3 mi. N, $\frac{1}{4}$ mi. E of Okarche on S side of road.)

Farmer Questionnaire - A. H. Gruntmier, Data source No. 30.

Management:

This 64 acre field has been in continuous wheat for 20 years. It has been moldboard plowed during this 20 years. Only small areas have been fertilized and there was no apparent response.

Yield data: 1956 - 22 bu/a
 1957 - 15 bu/a

Kingfisher silt loam, 1-3 percent slopes and
Kirkland silt loam, 0-3 percent slopes

Location: NE $\frac{1}{4}$ Sec. 8, T. 15 N., R. 7 W. (5 mi. N and 1 mi. E of Okarcho on S side of road; Kirkland is in SE $\frac{1}{4}$ of Sec. 8.)

Farmer Questionnaire - George Walta, Data source No. 31.

Management:

This half section has been in continuous wheat for years. Rotations with cowpeas have been used and did give good results in those years in which rainfall was good. Eighty acres on the west part of the NE $\frac{1}{4}$ were fertilized with 400 lbs. of raw rock phosphate and with 2 $\frac{1}{2}$ tons of lime per acre in 1948.

Yield data: Kingfisher

1956 - 15 bu/a (in N part of NE $\frac{1}{4}$)
1956 - 19 bu/a (in S part of NE $\frac{1}{4}$)*
1957 - 14 bu/a (in N part of NE $\frac{1}{4}$)
1957 - 12 bu/a (in S part of NE $\frac{1}{4}$)

* The south part of the 160 acres is more level than the north.

Kirkland

1956 - 20 bu/a
1957 - 8 bu/a

The highest yield obtainable under continuous wheat with no fertilizers is 24 to 27 bu/a. Very little increase in yield has been observed by addition of fertilizers.

Kirkland Series

Kirkland silt loam, 2 percent slopes

Location: Stillwater Agronomy Farm.

Magruder plots, Data source No. 32.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A ₁ * A ₁ **	0-7 7-10	b(7.5YR4.5/2 4/2m) same sltly.dk.	sil-lmgr sil-2mgr	5.1 5.5	rests abpt.
B ₂₋₁	10-22	rb(5YR5/4 4/4m)	c		ferr. fil.
B ₂₋₂	22-34	rb(2.5YR5/5 4/5m)	sic		conca.
C	34-52	rb(2.5YR5/5 4/5m)	sic		calc.streaks

* %OM 1.35 - %N 0.077 - Avail. K 166 lbs/a - % total P 0.0198.

** %OM 1.35 - %N 0.092 - Avail. K 156 lbs/a - % total P 0.0198.***

*** These data are from no treatment plots; data are also available on treated plots.

Yield data: 1899 - 1957 (59 yrs.) - 12.6 bu/a under continuous wheat, no fertilizers (c).
 1930 - 1956 (27 yrs.) - 18.7 bu/a under continuous wheat, 30 lbs. P₂O₅ annually (I).
 1899 - 1957 (59 yrs.) - 20.25 bu/a under continuous wheat, manure (30 lbs. N) (I).

H. F. Murphy's fertility study, Data source No. 33.

Yield data: 1925 - 1937 (13 yrs.) - 13.06 bu/a under continuous wheat, no treatment (c).
 - 16.74 bu/a under continuous wheat, 150 lbs. superphosphate, 50 lbs. of Nitrate of soda annually (I).

Kirkland silt loam, $1\frac{1}{2}$ -2 percent slopes

Location: 300 yds S of NW corner of Sec. 34, T. 24 N., R. 1 W. (8 mi. E and $\frac{1}{2}$ mi. S of Billings in Noble County.)

H. V. Eck's fertility study, Data source No. 34.

Profile description					
Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A ₁ *	0-7	gb(10YR5/2 3/2m)	sil-lmgr	6.3	mfr;perm.
B ₂₋₁ **	7-22	dk.gb(10YR4/2 3/2m)	c-cpd 2msbk cpr,2mbk	7.2	mvfi;slow perm.
B ₂₋₂	22-34	gb(9YR5/2 4/2m)	c-like above	8.0	conca.
B ₃	34-46	rb(5YR5/4 4/4m)	c	8.0	conca.;blk pel.
C	46-54	str.yr and lt.g			r is calc.; g is noncalc.
* %OM 1.35 - %N .072 - P ₂ O ₅ 42.1 lbs/a (NaHCO ₃) 95.3 (acetic acid).					
** %OM 1.47 - %N .101 - P ₂ O ₅ 19.2 lbs/a (NaHCO ₃) 29.3 (acetic acid).					
* $\frac{1}{3}$ atmosphere percentage 18.77 - 15 atmosphere percentage 7.27.					
** $\frac{1}{3}$ atmosphere percentage 24.48 - 15 atmosphere percentage 11.42.					

Yield data: 1953-1956 (4 yrs.) - 17.9 bu/a under continuous wheat, no treatment (c).
- 22.5 bu/a under continuous wheat, 80 lbs. N, 40 lbs. P (I).

Kirkland silt loam, $\frac{1}{2}$ percent slopes

Location: Plots lie S of Highway 51, 1.6 mi. W of Okeene in Blaine County.

Roy Oswalt's variety study, Data source No. 35.

Profile description					
Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A _{1p} &A ₁ *	0-8	gb(10YR5/2.5 3/2m)	sil-lmgr	6.0	porous
B ₂₋₁	8-24	dk.gb(10YR4/2 2.5/2m)	c-lmbk	7.0	mvfi;slow.perm.
B ₂₋₂	24-48	b(10YR5/3 4/2m)	c-l,2mbk	7.8	mefi;v.slow perm.
B ₃ C	48-56	gb(10YR5/2 4/2m)	l calc.c		like above, less compact
* %OM 1.84 - %N 0.109 - Avail.K 850 lbs/a - P 65 lbs/a (acetic acid).					

Yield data: 1947-56 (10 yrs.) - 18.6 bu/a under continuous wheat, no treatment (c).

These are among the best yields available for making long time yield predictions. The yield for customary management under both Data source No. 34 and No. 35 are high compared with the customary management yield from Data source No. 32 and No. 33. These plots may have received additional treatment which was unknown or else these may have been good years from the standpoint of rainfall distribution. Both factors may have contributed.

Lawton Series

Lawton silt loam, 1 percent slopes

Location: Lawton Field Station in Comanche County.

U.S.D.A. Circ. No. 951 - Variety Study, Data source No. 36.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	Other
A ₁ *	0-6	b(7.5YR ₄ /2 2.5/2m)	sil-3fgr	mfr; noncalc.
A ₁₋₂ **	6-12	b(7.5YR ₄ /3 3/3m)	h.sil-3fgr	mfr; grades
A ₃	12-15	rb(5YR ₄ /4 3/3m)	sic1-v3mgr	mfr; noncalc.
E ₁	15-19	rb(5YR ₄ /4 3/4m)	sic-3mgr	mfr; noncalc.
B ₂	19-30	rb(4YR3.5/4 4/6m)	c-cpd 2mgr, mpr	mfi;
B ₃	30-35	r(3YR3/6)	c-gr	
C ₁	35-45	r(3.5YR3/5 3/6m)	c-3pr	mfi; noncalc.
C ₂	45-54	r(3YR ₄ /6m)	sc-3cpr	blk con.
C ₃	54-61		gv in a matrix of cf earth	partly wth. waterworn

* %N 0.158 - % Carbon 1.94 - C/N ratio 11.8.

** %N 0.106 - % Carbon 1.13 - C/N ratio 11.2.

Yield data: 1924-49 (26 yrs.) - 8.0 bu/a under continuous wheat, late disked (c).
 - 11.6 bu/a under continuous wheat, early disked (c).
 - 15.8 bu/a under continuous wheat, early plowed, 8 inches (c).

Lawton silt loam, 1 percent slopes

Location: SWNW Sec. 1, T. 2 N., R. 17 W. (1½ mi. N of Snyder on Highway 183 on the Floyd Patterson farm.)

H. V. Eck's fertility study, Data source No. 37.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A _{1p} *	0-6	dk.b(7.5YR ₄ /2 3/2m)	sil-lfgr	8.0	mfr;dsh;f conca.
B ₁ **	6-12	dk.b(7.5YR ₄ /2 3/2m)	cl-2m, fgr	8.0	mfi;mfr,dh;non-calc.
B ₂₋₁	12-20	dk.rb(5YR ₃ /3d)	h.gv cl-lmsbk	7.5	mfi;dvh
B ₂₋₂	20-24	dk.rb(5YR ₃ /3d)	h.cl-lmsbk	7.5	mfi;dvh
B ₃	24-36+	rb(5YR ₄ /3d)	h.cl		mfr;dh;40%CaCO ₃

* %OM 1.77 - %N 0.079 - P₂O₅ 18 lbs/a (NaHCO₃) 146.6 (acetic acid).

** %OM 1.83 - %N 0.098 - P₂O₅ 9.5 lbs/a (NaHCO₃) 146.6 (acetic acid).

Yield data: 1956 - 27.8 bu/a under continuous wheat, no treatment (c).
- 34.9 bu/a under continuous wheat, 80 lbs. N, 40 lbs. P (I).

Yield predictions with good reliability may be made for Lawton silt loam from the data presented. An adequate number of years with extremes as far as the climatic variable is involved are represented.

Norge Series

Norge loam, 1-3 percent slopes, 7-12 inch A horizon

Location: Perkins Agronomy farm 1300, 1400, 1500 plots.

Harper and Gray's rotation study, Data source No. 38.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A _{1p}	0-7	b(7.5YR ₅ /3 4/2m)	1-lmgr	7.0	mfr;perm.
A ₁	7-11	dk.b(6.5YR ₄ /5 3/2m)	1-2mgr	6.5	mfr;porous
B ₁	11-17	b(7.5YR ₅ /3 4/2m)	cl-2mgr	6.5	mfr;mfi
B ₂₋₁	17-26	rb(6YR ₅ /5 4/5m)	lt.sc-lmsbk 1 cpr	6.5	occas.blk con.
B ₂₋₂	26-36	ry(7.5YR ₆ /6 5/5m)	lt.sc-lmsbk 1 pr	6.5	f blk con.
B ₃	36-44	ry(7.5YR ₆ /6 5/5m)	scl		less compact
C ₁	44-60	ry(7.5YR ₆ /6 5.5/6m)	h ₁ fs1		ferr.fil.
C ₂	60-84	ry(6.5YR ₇ /6 6/6m)	vfs1		old alluvium

Yield data: 1931-57 (27 yrs.) - 16.4 bu/a under continuous wheat, 30 lbs. P₂O₅ annually (I).
- 20.3 bu/a under 5 yr. rotation with sweet-clover, 30 lbs. P₂O₅ (I).

Norge fine sandy loam, 0-1 percent slopes

Location: W $\frac{1}{2}$ SW $\frac{1}{4}$ Sec. 14, T. 16 N., R. 8 W. (5 mi. W of Kingfisher on N side of Highway 33.)

Farmer Questionnaire - Jim W. McCully, Data source No. 39.

Management:

This field has been in continuous wheat for 30 years. Mr. McCully has farmed it since 1950. If it is dry, he oneways and follows with a moldboard plow. When sufficient moisture is available, the soil is moldboard plowed only. It is springtooth harrowed to make a cloddy surface when windblowing is a hazard. Blowing is a problem, especially following heavy rains on the moldboard plowed surface.

Yield data:

1951	-	22.0 bu/a
1952	-	28.7 bu/a
1953	-	22.0 bu/a
1954	-	23.0 bu/a
1955	-	8.0 bu/a (dry freeze)
1956	-	24.0 bu/a
1957	-	11.0 bu/a

Norge fine sandy loam, 0-1 percent slopes

Location: SE $\frac{1}{4}$ Sec. 15, T. 16 N., R. 8 W. (5 mi. W of Kingfisher on N side of Highway 33. Field is in SE corner of quarter.)

Farmer Questionnaire - Raymond Wrobbel, Data source No. 40.

Management:

This 43 acre field has been in continuous wheat for years. There was a small field of alfalfa along the south edge of the field 10 years ago. The soil has been moldboard plowed most of the time. It was chiseled 12 to 16 inches deep in 1953. Eighty pounds of 13-39-0 fertilizer has been used about 3 years out of 5 on the average during recent years. Triumph variety is usually planted in early October. The 1957 crop was cut in the mud earlier than Mr. Wrobbel's neighbors' wheat on the same soil.

Yield data:

1955	-	10 bu/a
1956	-	30 bu/a
1957	-	30 bu/a

Norge fine sandy loam, 3/4 0-1 percent, 1/4 1-3 percent slopes

Location: SE Corner W $\frac{1}{2}$ Sec. 15, T. 16 N., R. 8 W. (5 $\frac{1}{2}$ mi. W of Kingfisher on N side of Highway 33.)

Farmer Questionnaire - Clyde Chlouber, Data source No. 41.

Management:

This 22 $\frac{1}{2}$ acre field was in alfalfa from 1941 to 1956. 500 lbs. of superphosphate per acre was applied to the field before planting the alfalfa. The alfalfa was plowed September 1, 1956. Early Triumph variety wheat was planted in early October, 1956. The wheat was cut about 3 inches above the ground June 20, 1957. Hail insurance adjusters appraised hail damage at 10%.

Yield data: 1957 - 22 bu/a

Norge fine sandy loam, 1-3 percent slopes

Location: W $\frac{1}{2}$ Sec. 18, T. 16 N., R. 8 W. (9 mi. W of Kingfisher on N side of Highway 33.)

Farmer Questionnaire - F. S. Dull, Data source No. 42.

Management:

This 135 acre field along the east side of the half section is moldboard plowed every other year and listed the other year. In 1956, it was plowed with a dryland plow. The farmer has been using a rotation of sorghum and cowpeas trying to get rid of cheat. He has tried some fertilizers but could not see any response. Early varieties of wheat are planted about the middle of October.

Yield data: 1955 - 14 bu/a
1956 - 16 bu/a
1957 - 8 bu/a

Predictions with good reliability may be made from the data presented for Norge loam and fine sandy loam. The maximum yield under improved management appears to be around 30 bu/a for the fine sandy loam.

Okemah Series

Okemah silt loam, $1\frac{1}{2}$ percent slopes

Location: SW Corner of municipal airport 1 mi. W of Holdenville
on U. S. Highway 270 in Hughes County.

Roy Oswalt's variety study, Data source No. 43.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A _{1p} *	0-6	gb(10YR5/2 3.5/2m)	sil-2m, cgr	5.8	mfr; perm.
A ₁	6-12	gb(10YR5/2 3/1m)	sil-cpd lmbk		f pores
B ₁ or A ₃	12-20	gb(10YR5/2 3/1.5m)	cl-2mgr	6.0	mfr; mfi
B ₂₋₁	20-38	g(10YR5/1 4/1m)	c-lf, mbk	6.5	mfi
B ₂₋₂	38-42	gb(2.5Y5/2 4/2m)	c-lmbk	6.5	mvfi; dvh
B ₃	42-50	g(2.5Y5/1d)	c	7.5	
C	50-60	lt.g(10YR7/2)	c sh		

* %OM 1.93 - %N 0.0852 - Avail. K 196 lbs/a - P 64 lbs/a (acetic acid).

Yield data: 1948-50, 1952-57 (9 yrs.) - 23.4 bu/a under continuous wheat,
no treatment (c).

The years represented here are about equally divided with dry and wet years. This yield average may be considered good for this soil. A comparison may be made with the more sloping soils of the Parsons series following.

Parsons Series

Parsons silt loam, 1 percent slopes

Location: NWNW Sec. 17, T. 26 N., R. 20 E. (7 mi. N and 3 W of
Vinita on the John L. Frost farm in Craig County.)

G. Hayne's fertility demonstration, Data source No. 44.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A _{1p}	0-7	lt.bg(10YR6/2 4/2m)	sil-lmgr	5.7	mfr
A ₂	7-13	lt.g(10YR7/2 6/2m)	sil-lmgr	5.7	mfr; stg.b spots
B ₂₋₁	13-28	dk.gb(10YR4/2d)	c-lmbk	5.6	mvfi; dvh; v.slow. perm.
B ₂₋₂	28-38	lt.g(10YR6/1 5/1m)	c-lmbk	5.8	mfi
B ₃ C	38-45	v.pl.b(10YR7/3 6/3m)	c-lmbk	5.8	mfi
C	45-54	lt.g	sic sh	5.8	

Yield data: 1955 - 32.0 bu/a under continuous wheat, 12 lbs. N, 36 lbs.
P₂O₅, 12 lbs. K₂O (I).

Parsons silt loam, $1\frac{1}{2}$ percent slopes

Location: SENW Sec. 2, T. 19 N., R. 17 E. (0.3 mi. S of Highway 33 on the Paul Fleming farm E of Inola in Rogers County.)

H. V. Eck's fertility study, Data source No. 45.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A ₁ &A _{1p} *	0-10	dk.gb(crushes 10YR4/3d)	sil-lmsbk	5.8	many pores
A ₃ **	10-18	lt.bg(10YR6/2d)	h.sil-2fgr	5.8	pinholes;b con.
B ₂	18-30	dk.b	c-2mbk	7.0	ferr.pel.and fil.
B ₂₋₂	30-40	dk.b	sic-2mbk	7.0	sic is layered

* %OM 1.99 - %N 0.117.

** %OM 2.01 - %N 0.106.

Yield data: 1955 - 29.2 bu/a under continuous wheat, 20 lbs. N, 40 lbs. P₂O₅, 40 lbs. K (I).

Parsons silt loam, $\frac{1}{2}$ percent slopes

Location: SENE Sec. 23, T. 22 N., R. 19 E. ($4\frac{1}{2}$ mi. N and $\frac{1}{4}$ mi. E of Pryor on the Lloyd Coblenz farm in a field just W of a meadow and 300 ft. W of a line due N of Mennonite Church in Mayes County.)

O. H. Brensing's fertility study, Data source No. 46.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A&A _{1p}	0-10	gb(10YR5/2 4/2m)	sil-lmgr	6.0	mfr;f con.
A ₂	10-17	lt.bg(10YR6.5/2 5/2m)	sil-lfgr	6.0	soft and floury
B ₂₋₁	17-24	yb(10YR5/4 4/4m)	c-cpr,lmbk	6.0	mott.with stg.b
B ₂₋₂	24-36	pl b(10YR6/3)	c-lmbk	6.0	grades to
B _{3C}	36-50	mott.lt.g and stg.b	c-lmsbk	6.0	many m size grains

Yield data: 1954 - 23.7 bu/a following grain sorghum, continuous wheat and no fertilizers prior to 1953, 5 lbs. N, 10 lbs. P₂O₅, 5 lbs. K (I).
- 27.7 bu/a following grain sorghum, 25 lbs. N, 10 lbs. P₂O₅, 5 lbs. K (I).

Parsons silt loam, $\frac{1}{2}$ percent slopes

Location: MWNW Sec. 20, T. 18 N., R. 18 E. (5 mi. N and 2 mi. W of Wagoner on the R. D. Lancaster farm 0.35 mi. S of road on N sec. line in Wagoner County.)

O. H. Brensing's fertility study, Data source No. 47.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	Other
A ₁ &A _{1p}	0-7	gb	soft sil-lgr	occas. holes
A ₂	7-9	lt.bg	soft floury sil.	rests on
B ₂₋₁	9-26	v.dk.b(10YR3/3d)	c-cpd 3pr lmbk	mefi;stg.c fil.
B ₂₋₂	26+	gb with yb mott.	c	

Yield data: 1952 - 43.2 bu/a under continuous wheat, 45 lbs. P₂O₅ (I).
- 53.3 bu/a under continuous wheat, 34 lbs. N, 45 lbs. P₂O₅ (I).

Parsons silt loam, $\frac{1}{2}$ percent slopes

Location: SESE Sec. 27, T. 18 N., R. 17 E. ($\frac{1}{2}$ mi. W, 2 N, 4 W, 1 N of Wagoner on Jas Church farm in Wagoner County.)

O. H. Brensing's fertility study, Data source No. 48.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A ₁ &A _{1p}	0-7	lt.bg	sil-lgr	6.0	mfr;perm.
A ₂	7-10	v.pl.b	sil	5.8	rests abpt.
B ₂₋₁	10-30	dk.gb(10YR3/2d)	c-pr,2bk	6.0	mvfi;compact
B ₂₋₂	30-46	dk.gb	c		blk.con.cry. spk.

Yield data: 1952 - 27.6 bu/a under continuous wheat, 9 lbs. N, 18 lbs. P₂O₅, 9 lbs. K₂O (I).
- 37.7 bu/a under continuous wheat, 25 lbs. N, 38 lbs. P₂O₅, 9 lbs. K₂O (I).
- 45.1 bu/a under continuous wheat, 41 lbs. N, 58 lbs. P₂O₅, 9 lbs. K₂O (I).

Parsons silt loam, 1 percent slopes

Location: SWNW Sec. 29, T. 12 N., R. 6 E. (1 mi. W of Prague on the N side of U. S. Highway 62 on the F. W. Brestann farm in Lincoln County.)

O. H. Brensing's fertility study, Data source No. 49.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A ₁	0-10	lt.bg(10YR6/2 4/2m)	sil-cpd l fgr lfbk	6.4	mfr
A ₂	10-12	lt.g(10YR7/2d)	sil-cpd f mgr lmsbk	6.0	roots;pinholes
B ₂₋₁	12-20	v.dk.gb(10YR3/2 2/2m)	c-lmbk cpr	7.5	mefi; c fil.
B ₂₋₂	20-31	b(10YR5/3d)	c-2msbk	8.0	mvfi; c fil. on peds
B ₃	31-43	co.mott.yr(5YR5/8d)	c-frb,cr	8.0	mfi;v.few c fil.
C	43-54+	mott.gb(10YR5/2d)	lt.c		some dk.r ss

Yield data: 1952 - 25.2 bu/a under continuous wheat, 6.5 lbs. N, 13 lbs. P₂O₅, 6.5 lbs. K (I).
 - 31.7 bu/a under continuous wheat, 46.5 lbs. N, 13 lbs. P₂O₅, 6.5 lbs. K (I).
 - 38.3 bu/a under continuous wheat, 86.5 lbs. N, 13 lbs. P₂O₅, 6.5 lbs K (I).

Yields are not available to show a long time average for this soil. With proper rates and combinations of fertilizers this is probably one of the more responsive soils to good management in Oklahoma.

Pond Creek Series

Pond Creek silt loam, 1 percent slopes

Location: Wheatland Conservation Experiment Station at Cherokee in Alfalfa County.

A. M. Schlehuber's variety study, Data source No. 50.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A _{1p}	0-6	pg(8.5YR6/2 5/2m)	sil-1mgr	6.5	compacted zone at 7" to 8 $\frac{1}{2}$ "
A ₁	6-20	b(7.5YR4.5/2 4/2m)	sil-2mgr	7.5	occas. f quartz and granite peb.
A ₂	20-28	b(7.5YR5/2 4/2m)	sic1-2mgr	7.5	mfr
B ₂	28-38	b(7.5YR5/4 4/4m)	sic1-lmsbk	7.5	like above, more mfi
B _{3C}	38-54	yr(5YR6/7)	lt.sic-2mgr		change in color over a space of 3" to 4" and seems to mark the change be- tween alluvium beneath and prob- able loess above.

Yield data: 1946-57 (12 yrs.) - 20.2 bu/a under wheat alternating with
Austrian winter peas (I).

Pond Creek silt loam, 1 percent slopes

Location: SWSW Sec. 17, T. 22 N., R. 8 W. (100 yds N of SW corner of section, 100 ft. E of road, on the Clarence Reming farm $\frac{1}{2}$ mi. S of Lahoma in Garfield County.)

H. V. Eck's fertility study, Data source No. 51.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A _{1p} *	0-8	b(9YR5/3 4/3m)	sil-lmgr	6.0	mfr;soft
A ₁ **	8-11	dk.gb(10YR4.5/2 4/2m)	sil-l,2mgr	7.0	many f pores
B ₁	11-17	dk.b(7.5YR4/2 3/2m)	sic1-lmsbk	7.0	mfi;dh
B ₂	17-34	b(9.5YR5/2d)	h.sic1-lmbk	7.5	
B ₃	34-42	b(7.5YR5/4d)	sic1	8.0	conca.
C	42-54+	yr(5YR5/6d)	lt.sic1	mod	loess calc.

* %OM 1.80 - %N 0.08 - Avail. K 160 lbs/a - P₂O₅ 55.4 lbs/a (NaHCO₃)
109.9 (acetic acid)

** %OM 1.93 - %N 0.08 - Avail. K 80 lbs/a - P₂O₅ 42.1 lbs/a (NaHCO₃)
95.3 (acetic acid).

* 1/3 atmosphere percentage 17.49.

** 1/3 atmosphere percentage 18.26.

Yield data: 1953 = 21.6 bu/a under continuous wheat, no treatment (c).
= 26.7 bu/a under continuous wheat, 40 lbs. N,
40 lbs. P (I).

Pond Creek silt loam, 1 percent slopes

Location: SESE Sec. 20, T. 23 N., R. 8 E. (0.3 mi. N of SE corner of section, 2 mi. S and 2 mi. W of Carrier on the Earl Nelson farm in Garfield County.)

H. V. Eck's fertility study, Data source No. 52.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A ₁ & A _{1p} *	0-12	b(7.5YR5/3 4/2m)	sil-lmgr	6.2	mfr
B ₁ **	12-18	b(7.5YR5/3 4/2m)	cl-2msbk	7.0	mfi;dsh
B ₂	18-36	b(7.5YR5/4)	sic1-lmbk	7.3	mfi;dk.b shin. peds
B ₃	36-44	b(7.5YR5/5)	sic1-lmsbk		mfr;no c fil.
C	44-54	yr(5YR5/6)	lt.sic1-gr		mfr;si loess

* %OM 1.63 - %N 0.099 - P₂O₅ 146.6 lbs/a (acetic acid) - Base sat.
20.5 (NaHCO₃).

** %OM 1.71 - %N 0.091 - P₂O₅ 146.6 lbs/a (acetic acid) - Base sat.
11.5 (NaHCO₃).

Yield data: 1956 - 22.8 bu/a under continuous wheat, no treatment (c).
- 23.8 bu/a under continuous wheat, 40 lbs. N, 80
lbs. P₂O₅ (I).

Pond Creek silt loam, 1 percent slopes

Location: NENE Sec. 35, T. 27 N., R. 14 W. (0.15 mi. S of NE corner of section, about 1.7 mi. S of center of Alva in Woods County.)

H. V. Eck's fertility study, Data Source No. 53.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A _{1p}	0-8	b(10YR5/3 4/3m)	h.sil-lmgr	6.8	mfr
A ₁	8-17	b(7.5YR4/2 3/2m)	lt.sic1- 2mgr	7.2	trans.of more c mat.
B ₂	17-28	rb(6YR5/4d)	sic1-2mgr; lmsbk	7.5	c fil.not evi- dent
B ₃	28-36	ry(5YR6/6d)	lt.sic1	8.0	conca.;noncalc.
Cca	36-54	ry(5YR6/6d)	lt.c		calc.CaCO ₃ ,15%of mass

Yield data: 1956 - 12.3 bu/a under continuous wheat, no treatment (c).
- 15.6 bu/a under continuous wheat, 40 lbs. N, 40
lbs. P₂O₅ (I).

Good predictions may be made for this soil, especially under improved management, from the data presented. A good idea of the ranges in increased productivity that can be expected due to fertilizers is given.

Port Series

Port silt loam, 3/4 percent slopes

Location: SESE Sec. 14, T. 8 N., R. 18 W. (N edge of Rocky along W side of Highway 183 in Washita County.)

Roy Oswalt's variety study, Data source No. 54.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A _{1p} *	0-6	b(7.5YR5/4 4/4m)	sil-lmgr	6.5	mfr;porous
A ₁₋₁	6-20	dk.b(7.5YR3/2m)	sil-2mgr	6.5	many pores
A ₁₋₂	20-36	b(7.5YR4/2 3/2m)	sil-2mgr	7.2	mfr
A _{1-b}	36-43	rb(5YR4/3m)	cl-2mgr	7.2	mfr;mfi
C _h	43-54+	rb(5YR4/4d)	cl-2msbk	7.2	mfi;dh;l c fil.

* %OM 2.41 - %N 0.1070 - Avail. K 516 lbs/a - P 65 lbs/a (acetic acid).

Yield data: 1948-56 (9 yrs.) - 23.2 bu/a under continuous wheat, no treatment (c).

Port silt loam, 1/2 percent slopes*

Location: NWSE Sec. 14, T. 9 S., R. 10 E. (3 mi. SW of Yuba on the John and Ralph Dyson farm in Bryan County.)

O. H. Brensing's fertility study, Data source No. 55.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	Other
A ₁	0-12	b	sil-lmgr	mfr
C	12-18	yr	vfs1	mvfr;free perm.
C ₂	18-54+	rb	cl-2msbk	mfi;mfr

* This test can represent the more sandy Port or the more retentive Yahola.

Yield data: 1955 - 34.6 bu/a under continuous wheat, no treatment (c).
- 39.5 bu/a under continuous wheat, 40 lbs. N, 40 lbs. P₂O₅ (I).

Port silt loam, 0-1 percent slopes

Location: Two fields in SE $\frac{1}{4}$ Sec. 11, T. 15 N., R. 7 W. (4 mi. S and 1 mi. E of Kingfisher on S side of road.)

Farmer Questionnaire - John Alden, Data source No. 56.

Management:

This field has been in continuous wheat without fertilizers with the exception of a little barnyard manure. The soil has been moldboard plowed most of the time. Early Triumph variety wheat was planted October 20, 1956, in plenty of moisture.

Yield data: 1956 - 39 bu/a (one field in SE corner of section 11)
1957 - 16 bu/a

This soil is found in more than one climatic area within the state and this must be taken into consideration before basing too much reliability upon a yield average at a given location.

Pratt Series

Pratt fine sandy loam, 1-3 percent slopes

Location: Southern Great Plains Field Station at Woodward in Woodward County.

U.S.D.A. Circ. 917, Rotation Study, Data source No. 57.

Profile description*

Horizon	Depth in inches	Color	Texture & Structure	Other
	0-11	gb	fs1	dl;mfr
	11-30	yb	fscl	
	30-60	by	sl	dl;incoherent

*Typical Pratt

Yield data: 1915-48 (34 yrs.) - 17.0 bu/a under continuous wheat, early plowed 8 inches deep (c).
- 16.4 bu/a early listed (c).
- 21.0 bu/a alternately cropped and fallowed (I).

Fertility Study.

Yield data: 1950-56 (7 yrs.) - 15.8 bu/a under continuous wheat, no fertilizers (c).
- 18.2 bu/a under continuous wheat, 40 lbs. N, 40 lbs. P₂O₅ (I).

Yield predictions with good reliability may be made from the data presented for Pratt fine sandy loam.

Pullman Series

Pullman silty clay loam

Location: Goodwell Experiment Station.

Data source No. 58.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	Other
A _{1p}	0-7	dk.gb(10YR4/2 3/2m)	sic1-lpr,mgr	mfi;dh
B ₂₋₁	7-18	dk.gb(10YR4/2 3/2m)	c-cpd.lpr,lmbk	mvfi;dvh
B ₂₋₂	18-24	pl.b(10YR6/3 5/3m)	sic1-lbk	calc.
C _{ca}	24-38	pl.b(9YR6/3 5/3m)	sic1-lgr	calc.
C	38-58	ry(7.5YR6/5 5/5m)	sic1	less CaCO ₃
C ₂	58-84	lt.b(8.5YR6/4 5/4m)	sic1	perm.

Available Chemical Data (0-7 inches)*

pH	pH	Avail. P						
1:2	soil	acetic acid	% OM	% total N	Exch	Exch	Exch	Exch
	paste	ppa			cap.	Ca	Mg	K
7.3	7.1	276.8	1.70	.095	20.195	7.60	7.50	1.41
Exch	Sol	Sol	Sol	Sol	Sol			
Na	Na	Ca	K	Mg	Salts			
	ppm	ppm	ppm	ppm				
0.22	60	25	50	75	650.0			

* Chemical analyses were determined by Dr. L. W. Reed.

Yield data: 1944-1949 (6 yrs.) - 23.8 bu/a under irrigation, amt.
unknown (I).

Reinach Series

Reinach silt loam, $\frac{1}{2}$ percent slopes

Location: 1956 - NESW Sec. 13, T. 9 W., R. 10 E.
 1952, 53 - SENW Sec. 14, T. 9 S., R. 10 E.
 (3 $\frac{1}{2}$ mi. SW of Yuba on the John and Ralph Dyson farm in
 Bryan County.)

O. H. Brensing's fertility study, Data source No 59.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A or W _p	0-14	1t.rb(5YR6/4d)	sil-2mgr	8.0	many roots
W	14-17	dk.rb	sic1-2msbk		mfi
A ₁	17-31	b(7.5YR4/2d)	sil-2mgr	7.8	mfr;perm.
C ₁	31-43	yr(5YR5/5)	sil-2mgr	7.8	mfr;porous
C ₂	43-54+	ry(5YR6/6d)	sil-2mgr	7.8	mfr;porous

Yield data: 1952, 53, 56 (3 yrs.) - 34.4 bu/a under continuous wheat,
 no treatment (c).
 1953, 56 (2 yrs.) - 46.9 bu/a under continuous wheat,
 40 lbs. N (I).
 1952 - 41.5 bu/a under continuous wheat,
 50 lbs. N (I).

Reinach soils are found in more than one climatic area within the state. These data show a high potential yield and good response to nitrogen. More data are needed to arrive at long time averages that might be expected.

Renfrow Series

Renfrow silty clay loam, 1 percent slopes

Location: Middle of Sec. 19, T. 16 N., R. 5 W. (10 mi. E of Kingfisher on the N side of Highway 33 in Kingfisher County.)

H. V. Eck's fertility study, Data source No. 60.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A _{1p} *	0-8	b(7.5YR5/4 3/2m)	h.sil-lfgr	6.2	mfr;dsh;num. roots
A ₁₋₂ **	8-12	b(7.5YR5/4 4/2m)	sic1-lfgr lmsbk	6.2	mfr;dh;num. roots
B ₁	12-16	rb(5YR4/4 3/4m)	cl-cpd, 3 fmgr;lmbk	6.3	mfi;dh;num. roots
B ₂₋₁	16-22	dk.rb(5YR3/3 2/2m)	c-frb	6.5	ws;dh;num.roots
B ₂₋₂	22-32	dk.rb(5YR3/4d)	c-lfgr;m	7.5	mfi;dh;few roots
B ₃	32-46	dk.r(2.5YR3/6d)	c-m;lfgr	8.0	mfi;dh;calc.
C	46-54	r(2.5YR4/6 3/6m)	calc.c-m, lfgr	8.0	mfi;dh;indst. conca.

* %OM 1.69 - %N 0.081 - P₂O₅ 53.1 lbs/a (NaHCO₃) 146.6 (acetic acid).

** %OM 1.64 - %N 0.087 - P₂O₅ 45.8 lbs/a (NaHCO₃) 73.3 (acetic acid).

* 1/3 atmosphere percentage 19.5 - 15 atmosphere percentage 9.2.

** 1/3 atmosphere percentage 25.0 - 15 atmosphere percentage 14.3.

Yield data: 1953-55 (3 yrs.) - 19.2 bu/a under continuous wheat, no treatment (c).
- 27.4 bu/a under continuous wheat, 160 lbs. N, 40 lbs. P₂O₅ (I).

Renfrow clay loam, 1-3 percent slopes

Location: NW $\frac{1}{4}$ Sec. 31, T. 15 N., R. 6 W. (5 mi. E, $\frac{1}{2}$ mi. N of Okarche on E side of road.)

Farmer Questionnaire - Frank Herner, Data source No. 61.

Management:

This quarter section grows wheat, oats, barley, and grain sorghum every year. These crops are rotated but without a definite plan. One hundred and six acres was in wheat in 1957, and about the same acreage is in wheat each year. No fertilizer has ever been used. Soil is onewayed or chiseled (Graham Hoeme) before moldboarding. Triumph variety was on 84 acres; Concho was on 22 acres in 1957. Triumph outproduced Concho. Concho had a lot of straw and heads shrivelled badly.

Yield data: 1956 - 25 bu/a
1957 - 11 bu/a

Renfrow clay loam, 1-3 percent slopes

Location: Along E and N sides of NW $\frac{1}{4}$ Sec. 9, T. 17 N., R. 9 W. (2 $\frac{1}{2}$ mi. W of Loyal on S side of road.)

Farmer Questionnaire - Jess Reeves, Data source No. 62.

Management:

This 38 acre field has been in continuous wheat since the country opened. In 1949, a good crop of cowpeas was turned under. The 1957 wheat crop is the best since 1949. No fertilizer has been used except a little chicken manure applied close to buildings. Soil is usually moldboard plowed. It was too dry in 1956 to moldboard so the field was double onewayed, deep (6-7") with 26" disks. Triumph wheat was planted November 11, 1956.

Yield data: 1957 - 23 bu/a
1957 - 22 bu/a*

* Renfrow clay loam, 0-1 percent slopes. This yield is from the Luther Watson farm in the part of SW $\frac{1}{4}$ Sec. 9, just to the S of Jess Reeves location and under the same management.

The reliability of long time yield predictions based upon these data would probably be weak. Nitrogen and phosphorus appear to increase yields considerably.

St. Paul Series

St. Paul silt loam, $1\frac{1}{2}$ percent slopes

Location: SE Sec. 9, T. 27 N., R. 22 W. (0.32 mi. W of SE corner of section. 3 mi. E of Buffalo in Harper County.)

H. V. Eck's fertility study, Data source No. 63.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A ₁ *	0-8	gb(10YR4/2d)	sil-1,2mgr	7.5	mfr;porous
A ₃ **	8-16	same, sltly. dk.	sil-2mgr		conca.
B ₂	16-26	lt.b(7.5YR6/3 4/3m)	lt.sic1-2mgr		spk.of CaCO ₃
B _{ca}	26-44	lt.rb(5YR5/6d)	sic1		stg.cals.
C	44-54	str.rb	cl		stg.calc.

* %OM 1.42 - %N 0.089 - P₂O₅ 53.1 lbs/a (NaHCO₃) 146.6 (acetic acid).

** %OM 1.68 - %N 0.085 - P₂O₅ 27.0 lbs/a (NaHCO₃) 146.6 (acetic acid).

* 1/3 atmosphere percentage 16.98 - 15 atmosphere percentage 8.39.

** 1/3 atmosphere percentage 19.87 - 15 atmosphere percentage 7.88.

Yield data: 1954, 55 (2 yrs.) - 8.6 bu/a under continuous wheat, no treatment (c).

- 9.4 bu/a under continuous wheat, 40 lbs. N, 20 lbs. P₂O₅ (I).

Roy Oswalt's variety study at the same location -

1957

- 23.8 bu/a under continuous wheat, no treatment (c).

More data are needed for reliable long time yield predictions.

Summit Series

Summit silty clay loam, 1 percent slopes

Location: SWSE Sec. 14, T. 28 N., R. 19 E. (8 mi. W and 2 N of Welch on the Willard Tallman farm, 0.5 mi. E of the Tallman home or 0.3 mi. W of SE corner of section on N side of road in Craig County.)

O. H. Brensing's fertility study, Data source No. 64.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A _{1p}	0-8	dk.g(10YR ₄ /1 2/1m)	sic1-2mgr	7.0	mfr
B ₂₋₁	8-20	dk.g(10YR ₄ /1 3/1m)	sic-2msbk	7.0	mvfr;slow perm.
B ₂₋₂	20-32	dk.gb(10YR ₄ /2 3/1m)	c	7.0	limest.resid.
C	32-36+	gb(10YR ₅ /2 4/2m)	csb	7.5	sltly.wth.

Yield data: 1954 - 37 bu/a under continuous wheat, no treatment (c).
 - 46.8 bu/a under continuous wheat, 20 lbs. N (I).
 - 55.9 bu/a under continuous wheat, 80 lbs. N (I).
 1955 - 22.1 bu/a under continuous wheat, 38 lbs. P₂O₅ (I).
 - 27.3 bu/a under continuous wheat, 20 lbs. N, 38 lbs. P₂O₅ (I).
 - 35.1 bu/a under continuous wheat, 80 lbs. N, 88 lbs. P₂O₅, 50 lbs. K₂O (I).

Summit silty clay loam has a high potential for wheat production. Response to fertilizers is good. More data are needed to make long time yield estimates.

Tabler Series

Tabler silt loam, $1\frac{1}{2}$ percent slopes

Location: Sec. 6, T. 28 N., R. 3 W. ($4\frac{1}{2}$ mi. E of Renfrow in Grant County, 0.25 mi. N of SW corner of section.)

H. V. Eck's fertility study, Data source No. 65.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	Other
A ₁	0-10	gb(10YR5/2 3.5/2m)	sil-lmgr	mfr; few f.pores
B ₂₋₁	10-28	v.dk.g(10YR3/1m)	c-2mbk	mvfi; slow perm.
B ₂₋₂	28-38	dk.gb(10YR4/2)	c-lmbk	mvfi; c fil. less evident
B ₃	38-48	dk.gb	c	conca.
C	48-54	b	lt.c	mfi; slow perm.

Chemical data

	pH	OM	N	P ₂ O ₅ (NaHCO ₃)	P ₂ O ₅ (acetic acid)
0-6"	6.0	1.79	.087%	35.3	95.3
6-12"	7.5	1.76	.089%	29.3	51.3

Physical data:

1/3 atmosphere percentage - 20.23 (0-6") 24.38 (6-12")
 15 atmosphere percentage - 7.21 (0-6") 11.11 (6-12")

Yield data: 1954-56 (3 yrs.) - 18.5 bu/a under continuous wheat, no treatment (c).
 - 23.7 bu/a under continuous wheat, 160 lbs. N, 40 lbs. P₂O₅ (I).

More yields are needed to strengthen the reliability of these data. This information may be compared with similar profiles in the Kirkland and Bethany series.

Taloka Series

Taloka silt loam, $1\frac{1}{2}$ percent slopes

Location: SWSW Sec. 26, T. 18 N., R. 17 E. (Fred M. Combite farm NW of Wagoner in Wagoner County.)

O. H. Brensing's fertility study, Data source No. 66.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	Other
A ₁ &A _{1p}	0-16	gb(10YR5/2d)	sil-2mgr	ds; rests with shear contact on
A ₂	16-23	lt.bg(10YR6/2d)	sil-1mgr	abpt. on
B ₂₋₁	23-28	gb(10YR5/2d)	h.c-2mbk	mefi; dvh; c fil
B ₂₋₂	28-40	yb	c-1mbk	no c fil
C	40-54	g and y	c	origin undet.

Yield data: 1952 - 31.6 bu/a under continuous wheat, 45 lbs. P₂O₅ (I).
 - 35.8 bu/a under continuous wheat, 17 lbs. N, 45 lbs. P₂O₅ (I).
 - 41.7 bu/a under continuous wheat, 50 lbs. N, 45 lbs. P₂O₅ (I).

Taloka silt loam, 1 percent slopes

Location: SWNE Sec. 2, T. 17 N., R. 17 E. (4 mi. W, 2 mi. N of Wagoner on the F. Cunningham farm in Wagoner County.)

O. H. Brensing's fertility study, Data source No. 67.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A ₁ &A _{1p}	0-19	gb(10YR5/2)	sil-1mgr	7.0	mfr; perm.
A ₂	19-28	v.pl.b(10YR7/3)	sil-1mgr	6.0	ferr.fil.&con.
B ₂₋₁	28-38	gb(10YR5/2)	c-2mbk	7.0	mvfi
B ₂₋₂	38-48	by; many dk.b spots	c-1mbk	7.5	
B ₃ C	48-54+	same	c-2cr	7.5	conir

Yield data: 1953 - 25.4 bu/a under continuous wheat, no treatment (c).
 - 31.7 bu/a under continuous wheat, 6.6 lbs. N, 40 lbs. P₂O₅, 60 lbs. K₂O (I).
 - 37.9 bu/a under continuous wheat, 26 lbs. N, 40 lbs. P₂O₅, 60 lbs. K₂O (I).

Taloka silt loam, 1 percent slopes

Location: NENW Sec. 23, T. 22 N., R. 19 E. ($4\frac{1}{2}$ mi. N and 4 mi. E of Pryor on the Loyd Coblenz farm, 0.27 mi. E of the NW corner of the section due S of tin barn which lies across road to the N, in Mayes County.)

O. H. Brensing's fertility study, Data source No. 68.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A ₁ &A _{1p} *	0-12	gb(10YR5.5/2 4/2m)	sil-lmgr	5.7	a few f pores
A ₂	12-18	pl.b(10YR6/3 5/3m)	sil-lmgr	5.7	soft & floury
B ₂₋₁	18-24	b(10YR5/4 4/4m)	c-lmbk	6.5	v.slow perm.
B ₂₋₂	24-40	b	c	6.5	blk con.
C	40-54	mott. g, b, by	sc	6.5	silica coat.

* %OM 2.33 - %N 0.13 - Avail K 80 lbs/a - P 38 lbs/a (acetic acid).

Yield data: 1955 - 39.2 bu/a under continuous wheat, 10 lbs. N, 20 lbs. P₂O₅, 10 lbs. K₂O (I).

These soils have a high wheat producing potential. However, long time yield predictions cannot be made from the data presented. Response to improved management is good. These soils may be compared with similar soils in the Choteau series.

Tillman Series

Tillman silt loam, 3 percent slopes

Location: 800 ft. NE of airport building in NE part of airport at Cordell in Washita County.

H. V. Eck's fertility study, Data source No. 69.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A _{1p} *	0-6	rb(6YR5/4 4/4m)	sil-lmgr	6.5	mfr;perm.
A ₁ **	6-10	rb(5YR4/3 3/3m)	sil-cpd, 2mgr;cub	7.0	mfr;
B ₁	10-15	dk.rb(3.5YR3/4)	cl-cpd, 2msbk;lbk	7.0	mfr;mfi
B ₂₋₁	15-24	rb(2.5YR4/4 3/4m)	c-2msbk lbk	7.2	mvfi
B ₂₋₂	24-38	rb(2.5YR4/5 3/5m)	c-2msbk	7.5	conca.
B _{3C}	38-48	r(10R 4/4d)	c	1 calc.	
C	48-54+	r(10R 4/4d)	shin.c	1 calc.	few con.

* %OM 1.94 - %N 0.091 - P₂O₅ 48.1 lbs/a (NaHCO₃) 146.6 (acetic acid).

** %OM 2.09 - %N 0.091 - P₂O₅ 25.2 lbs/a (NaHCO₃) 51.3 (acetic acid).

* 1/3 atmosphere percentage - 22.0 - 15 atmosphere percentage 10.3.

** 1/3 atmosphere percentage - 27.3 - 15 atmosphere percentage 13.97.

Yield data: 1954-55 (2 yrs.) - 15.7 bu/a under continuous wheat, no treatment (c).

- 18.2 bu/a under continuous wheat, 80 lbs. N, 40 lbs. P₂O₅ (I).

Tillman silt loam, 1 percent slopes

Location: SWSW Sec. 19, T. 2 S., R. 17 W. (1.8 mi. S of Frederick along Highway 183 on the Louie Mitchell farm in Tillman County.)

H. V. Eck's fertility study, Data source No. 70.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A _{1p} *	0-6	b(7.5YR5/2 4/2m)	sil-lmgr	7.0	porous
A ₁ **	6-9	dk.b(7.5YR4/3 3/4m)	sil-lcub; 2mgr	7.0	mfr;perm.
B ₂₋₁	9-18	dk.rb(4YR3/4m)	lt.c-lpr, 2msbk	7.5	1 shin.
B ₂₋₂	18-32	dk.rb(2.5YR4/4 3/4m)	c		conca.
B ₃	32-40	r(2.5YR4/5d)	lt.c		CaCO ₃ streaks
C ₁	40-49	r(2.5YR4/6d)	c		granite peb.
C ₂	49-54	r(10R4/5d)	sicl		granite, quartz peb.

* %OM 1.35 - %N 0.07 - P₂O₅ 33.4 lbs/a (NaHCO₃) 146.6 (acetic acid).

** %OM 1.28 - %N 0.066 - P₂O₅ 19.2 lbs/a (NaHCO₃) 73.3 (acetic acid).

* 1/3 atmosphere percentage 18.24 - 15 atmosphere percentage 6.62.

** 1/3 atmosphere percentage 22.48 - 15 atmosphere percentage 10.89.

Yield data: 1953-55 (3 yrs.) - 21.6 bu/a under continuous wheat, no treatment (c).

- 24.6 bu/a under continuous wheat, 40 lbs. N, 40 lbs. P₂O₅ (I).

Tillman silt loam, $1\frac{1}{2}$ percent slopes

Location no. 1: NENESE, Sec. 6, T. 3 N., R. 18 W. (1 mi. W, $1\frac{1}{2}$ mi. S of Consolidated 8 school on the Curtiss farm 6 mi. W and $5\frac{1}{2}$ S of Roosevelt in Kiowa County.)

Location no. 2: SENE, Sec. 16, T. 6 N., R. 18 W. ($1\frac{1}{2}$ mi. S of SW corner of Hobart along W side of blacktop road on Frank Stemple farm in Kiowa County.)

Roy Oswalt's variety study, Data source No. 71.

Profile description (Location no. 1)

Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A _{1p}	0-6	b(7.5YR ₄ /2; 3/2m)	sil-lfgr	7.0	mfr
A ₁	6-10	rb(5YR ₄ /4 3/4m)	sil-l, 2 msbk	7.0	mfi; mfr
B ₂₋₁	10-18	rb(5YR ₄ /3 3/3m)	c-lmbk	7.5	c fil.
B ₂₋₂	18-30	rb(5YR ₄ /4d)	calc.c-cr		grades
B ₃ or B _{ca}	30-50	rb	calc.c		conir.
C	50-54+	rb	calc.c		sltly. wth.

Profile description (Location no. 2)

Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A _{1p}	0-7	b(7.5YR ₄ /4 3/4m)	sil-lmgr	7.0	mfr; perm.
A ₁	7-16	b(7.5YR ₄ /2 2.5/2m)	sil-lcub, 2mgr	7.0	
B ₂₋₁	16-24	dk. rb(5YR ₃ /3 2/3m)	c-3msbk	8.0	
B ₂₋₂	24-32	rb(5YR ₄ /4 3/4m)	c		mvfi; dh; l shin.
B ₃	32-48	rb(2.5YR ₄ /4d)	calc.c		CaCO ₃ spots
C	48-54+	rb(2.5YR ₄ /5d)	c		Permian

Yield data: 1950, 54, 56, 57* (6 yrs.) = 12.9 bu/a under continuous wheat, no treatment (c).

* Tests were at no. 1 location in 1954 and 1956, and at no. 2 location 4 yrs.

These yield averages representing six different years are probably inadequate as a basis for making accurate long time yield predictions.

Vanoss Series

Vanoss loam, $\frac{1}{2}$ percent slopes

Location: Perkins Agronomy farm.

A. M. Schlehuber's variety study, Data source No. 72a.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A _{1p}	0-8	b(7.5YR5/3 3.5/2m)	1-lmgr	6.0	mfr
A ₁	8-16	b(7.5YR4.5/3 3.5/2m)	1-2mgr	6.2	mfr
A ₃	16-22	b(7.5YR4/3 3/2m)	h.l-2mgr	6.0	perm.
B ₂₋₁	22-32	b(7.5YR5/3 4/3m)	cl-cpd 2mgr;lfsbk	6.0	mfi;dh
B ₂₋₂	32-40	b(7.5YR5/4 4/4m)	scl-same	6.5	grades
B ₃	40-50	st.b(7.5YR5.5/6 5/6m)	scl-lmsbk	6.5	mfr;mfi;perm.
G ₁	50-60	same;few yr(5YR5/6) mott.	same	6.5	grades
C ₂	60-74	ry(7.5YR6/6 5/6m)	fsl;lenses of scl	7.0	mvfr;perm.
C ₃	74-90	r(2.5YR5/6 4/6m)	scl;fsl	7.0	perm.
G ₄	90-110	much like above	scl;fsl	7.0	dh.

Yield data: 1947-55 (8 yrs. excluding 1954) - 20.5 bu/a alternating
with Austrian winter peas.

H. V. Eck's variety-fertilizer interaction study, Data source No. 72b.

Yield data: 1954-56 (3 yrs.) - 15.5 bu/a under continuous wheat, no
fertilizers (c).

Vanoss silt loam, 2 percent slopes

Location: NWNE Sec. 15, T. 12 N., R. 11 W. (Along E side of Highway 281 on the Wesley Reckard farm 3 mi. N of Hinton in Caddo County.)

Roy Oswalt's variety study, Data source No. 73.

Profile description					
Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A _{1p} *	0-7	b(7.5YR5/3 4/3m)	sil-1mgr	7.0	mfr
A ₁	7-14	b(7.5YR4/3 3/2m)	sil-2mgr	6.0	mfr
B ₁	14-20	b(7.5YR4/3 3/2m)	cl-2mgr	6.5	msfi
B ₂₋₁	20-38	b(8.5YR5/4 4/4m)	cl-2mgr	7.0	msfi
B ₂₋₂	38-44	b(7.5YR5/4 4/4m)	sic1-2mgr	7.0	mfi
C	44-54	b(7.5YR5/5 4/5m)	sic1-2mgr	7.0	mfi

* %OM 1.3 - %N 0.0614 - Avail. K 420 lbs/a - P 44 lbs/a (acetic acid).

Yield data: 1948-54 (10 yrs.) - 22.5 bu/a under continuous wheat, no treatment (c).

The reliability of the yields presented for Vanoss loam and silt loam for making long time yield predictions should be good.

Wilson SeriesWilson silty clay loam, $\frac{1}{2}$ percent slopes

Location: NWSW Sec. 31, T. 5 S., R. 9 E. (Along E side of Highway 299 on the Fred Miller farm $\frac{1}{2}$ mi. S of Cobb in Bryan County.)

O. H. Brensing's nitrogen fertility study, Data source No. 74.

Profile description				
Horizon	Depth in inches	Color	Texture & Structure	Other
A _{1p}	0-4	g(10YR5.5/2 3/2m)	sil-frb;lgr	mfr;perm.
A ₁	4-9	v.dk.g(10YR3/2 2/2m)	h.sic1-2msbk	mfi;dh
B ₂₋₁	9-18	v.dk.g(10YR3/2 2/2m)	c	many roots
B ₂₋₂	18-32	v.dk.g	c	shin.;m
B ₃	32-42	dk.g	c	pockets of CaCO ₃
C	42-54	gb	c	calc.in seams

Yield data: 1954 - 12.6 bu/a under continuous wheat, no treatment (c).
 - 19.7 bu/a under continuous wheat, 20 lbs. N (I).
 - 25.0 bu/a under continuous wheat, 80 lbs. N (I).

More data are needed to make reliable yield estimates.

Woodson Series

Woodson clay loam, 1 percent slopes

Location: Just E of Liberty School, 7 mi. E of Mounds in Tulsa County.

O. H. Brensing's fertility study, Data source No. 75.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A _{1p}	0-6	dk.g(10YR5/1 3/1m)	cl-lmgr;1pl crust	6.5	mfi;dh
A ₁	6-12	v.dk.g(2.5Y3/1d)	h.sic1-2msbk	6.0	mvfi
B ₂₋₁	12-24	v.dk.g(2.5Y3/1d)	c-2mbk	6.0	mefi;dvh;wp
B ₂₋₂	24-42	dk.g(2.5Y4/1d)	c-2msbk	7.5	sist.peb.
B _{3C}	42-54	lt.ob(2.5Y5/4d)	c-2msbk;lgr		mefi;dvh;wp noncalc.

Yield data: 1955-56 (2 yrs.) - 21.2 bu/a under continuous wheat, no treatment (c).
 - 28.1 bu/a under continuous wheat, 80 lbs. N, 20 lbs. P₂O₅, 60 lbs. K₂O (I).
 - 32.5 bu/a under continuous wheat, 80 lbs. N, 40 lbs. P₂O₅, 60 lbs. K₂O (I).

More data are needed to make reliable yield estimates.

Yahola Series

Yahola very fine sandy loam, 1½ percent slopes

Location: SWSE Sec. 14, T. 9 S., R. 10 E. (3 mi. SW of Yuba on the John and Ralph Dyson farm in Bryan County.)

O. H. Brensing's nitrogen fertility study, Data source No. 76.

Profile description

Horizon	Depth in inches	Color	Texture & Structure	pH	Other
A ₁ &A _{1p}	0-14	b(7.5YR5/4 4/2m)	vfs1-lfgr	7.8	mfr;perm.
C ₁	14-36	yr(5YR5/6 4/4m)	lt.fsl-0	7.5	mvfr
Cu	36-54	dk.rb(5YR4/3 3/3m)	sic-lfbk	7.8	mvfi

Yield data: 1954 - 19.9 bu/a under continuous wheat, no treatment (c).
 - 26.2 bu/a under continuous wheat, 20 lbs. N (I).
 - 29.2 bu/a under continuous wheat, 80 lbs. N (I).

More data are needed to make reliable yield estimates.

CHAPTER V

SUMMARY AND CONCLUSIONS

Two methods of collecting and tabulating all available accumulated data by soil types were developed: 1) a card system for experimental data and 2) a questionnaire for field yields and management. Wheat experimental data from soils statewide and wheat yield and management data from soils of Kingfisher County were presented in this thesis.

Some of the major conclusions are as follows:

1. Wheat will grow on every individual soil on which data were collected.
2. Wide differences in average wheat yields on different soil types and phases do exist as well as differences in yields within one soil type due to differences in management or local climate.
3. With a few exceptions, actual data in the form of long time yield averages for a given soil are rare.
4. This study is merely a start toward arriving at productivity ratings. A cooperative effort by all research workers will hasten the accumulation of an adequate amount of data for this purpose. More chemical, physical and mineralogical analyses are needed. These would either confirm suspicions of certain trends or invalidate them.

5. The farmer questionnaires are the fastest means for acquiring mass yield and management data by soil type.
6. The best use of these data will be as a reference for specific information about a given soil under a specific set of conditions. These are the most accurate data available for the soils presented.
7. There are many variables involved in a study of this kind. Possibly the most difficult one to deal with as far as making accurate yield predictions is the climatic variable. It appears that yields for a period of several years are needed for more reliable accuracy.

TABLE I

A COMPARISON OF WHEAT YIELD ESTIMATES PRESENTED WITH
ESTIMATES AS REPORTED IN SOIL SURVEY REPORTS

Soil	Estimates in bu/a from soil survey reports		Estimates in bu/a from Research	
	Customary Management	Improved Management	Customary Management	Improved Management
Bates fsl	11			20.0 (4)
Bates l	13			15.5 (3)
Bethany-Kirkland sil	14.3	20	12.7 (28)*	25.7 (27)
Bethany l			18.0 (2)	21.0 (2)
Bethany sil	16		23.5 (10)	
Carey sil	16.0		19.2 (38)	16.5 (2)
Choteau sil			24.2 (5)	31.0 (1)
Dennis sil	15.0		17.5 (4)	16.7 (2)
Dill fsl			20.0 (3)	
Foard sil	12.5		20.2 (3)	24.5 (3)
Foard cl			29.2 (4)	35.0 (4)
Grant sil	16		16.0 (15)	17.7 (7)
Kirkland sil, 2% sl.	13	20	13.0 (63)	20.5 (63)
Kirkland sil, 1% sl.	12	20		18.5 (10)
Lawton sil			12.2 (27)	16.5 (27)
Norge l	12	22	16.5 (27)	20.2 (27)
Okemah sil			23.5 (9)	
Parsons sil	12		30.0 (6)	41.0 (4)
Pond Creek sil	17.7		20.0 (15)	22.0 (3)
Port sil	16	25	29.0 (10)	
Pratt fsl	12.7		17.8 (26)	20.0 (26)
Reinach sil	14.0	18	34.5 (3)	
Renfrow sil	11	20		
Renfrow cl			18.1 (3)	
Renfrow sicl			19.2 (3)	27.4 (3)
St. Paul sil	16.2		8.5 (2)	9.5 (2)
Summit sicl			37.0 (1)	55.9 (1)
Tabler sil			18.5 (3)	23.7 (3)
Taloka sil	13.0		28.0 (2)	39.5 (3)
Tillman sil	13.7		15.5 (11)	
Vanoss l	16.0	24.0	19.0 (11)	
Vanoss sil	15.0	21.0	22.5 (10)	
Wilson sicl			12.5 (1)	25.0 (1)
Woodson cl			21.2 (2)	32.5 (2)
Yahola vfsl			20.0 (1)	29.2 (1)

Yields as reported by farmers in Kingfisher County

Kingfisher sil	14.7 (14)
Norge fsl	19.4 (14)
Port sil	27.5 (2)
Renfrow sil	20.0 (4)
Bethany sil	14.7 (14)

* Figures in parenthesis are number of years average.

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