

Technical Report No. 80
OSAGE SITE, 1970 REPORT,
PRIMARY PRODUCTION

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GRASSLAND BIOME
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ABSTRACT

Results of the study of primary production on the Osage Site in the 1970 season are summarized in tabular form. These include meteorological data, sampling dates and results of above- and belowground biomass, and litter collection on the grazed and the ungrazed treatment areas.

INTRODUCTION

The Osage Site has been described in Technical Report No. 44. This report makes no attempt to synthesize the data, but will present results of the study in tabular form.

Table 1. List of meteorological equipment^{a/} used for various abiotic components.

Factor	Equipment	Sensor Location
Precipitation	U.S. Weather Bureau Rain Gauge	76 cm above soil surface
Wind	Bendix Corporation Totalizing Anemometer	153 cm above soil surface
Solar Radiation	Belfort Instrument Co. Recording Pyranometer	76 cm above soil surface
Maximum and Minimum Air Temp.	Taylor Max - Min Thermometer	153 cm above soil surface
Continuous Air Temperature	Friez-Bendix Instruments Recording Hygro-thermograph	153 and 31 cm above soil surface
Continuous Air Humidity	Friez-Bendix Instruments Recording Hygro-thermograph	153 and 31 cm above soil surface
Continuous Soil Temperature	Friez-Bendix Instruments Thermograph	10.0 and 1.0 cm below soil surface
Soil Moisture	Gravimetric Technique	2-5.1 cm diameter cores/rep. on each biomass sampling date at depths of 0-15, 15-30, and 30-45 cm.

^{a/} With the exception of the soil moisture which was taken in both treatments, the abiotic factors were measured in the ungrazed plot.

Table 2. Sampling dates and number of clipped and ranked quadrats at each date. There are two replicates in each of the two treatments; ungrazed and moderately grazed.^{a/}

Date of Sample	Number of Quadrats Per Treatment			
	Ungrazed		Grazed	
	Clipped	Ranked	Clipped	Ranked
Dec. 1, 1969	10	0	10	0
April 1, 1970	6	100	10	100
May 1, 1970	6	60	14	100
June 1, 1970	10	60	14	100
June 17, 1970	10	60	14	100
July 1, 1970	10	60	14	100
July 16, 1970	10	50	20	200
August 1, 1970	10	50	20	200
August 17, 1970	10	50	20	200
Sept. 26, 1970	10	50	20	200
Oct. 17, 1970	10	0	20	0
Nov. 14, 1970	10	0	20	0

^{a/} All quadrats were square, 0.5 m × 0.5 m, and were located in a stratified random design. The same number of quadrats were always taken in the two replicates of a given treatment on any one sampling date.

Table 3. Sampling dates and number of quadrats used to measure transfer from the green and standing dead compartments to the litter compartments.^{a/}

Date of Sampling	Number of Screens Sampled
May 1, 1970	36
June 17, 1970	36
August 1, 1970	36
Sept. 26, 1970	36
Nov. 14, 1970	36

^{a/} The litter screens were 15.3 × 15.3 cm square and constructed of 2 mm mesh screen wire. The screens were nailed directly to the soil surface without disturbing the litter layer.

Table 4. Sampling dates and number of litter bags used to measure litter decomposition rates.^{a/}

Date of Sampling	Number of Bags Collected				
	<i>Andropogon scoparius</i>	<i>Andropogon gerardi</i>	<i>Panicum virgatum</i>	<i>Sorghastrum nutans</i>	All Species From Mixed Standing Dead
Sept. 30, 1970	1	2	1	1	4
Nov. 14, 1970	1	1	1	1	5

^{a/} The litter bags were constructed of 2 mm mesh screen wire and nailed to the soil surface. Litter was from the standing dead category and collected on the Osage Site. Each bag was 15.3 × 15.3 cm square and the litter was sewn inside. Initial bags were set out May 26, 1970.

Table 5. Sampling dates, depths, and number of soil cores collected to measure underground biomass.^{a/}

Date of Sample	Number of Cores at Each Depth Per Treatment															
	Ungrazed								Grazed							
	0-5	5-10	10-20	20-30	30-50	50-70	70-90	20-50	0-5	5-10	10-20	20-30	30-50	50-70	70-90	20-50
Dec. 1, 1969	20	20	20	6	6	6	6	14	20	20	20	4	4	4	4	16
May 1, 1970	20	20	20	6	6	6	6	14	20	20	20	4	4	4	4	16
June 17, 1970	20	20	20	6	6	6	6	14	20	20	20	4	4	4	4	16
July 16, 1970	20	20	20	6	6	6	6	14	20	20	20	4	4	4	4	16
Aug. 17, 1970	20	20	20	6	6	6	6	14	20	20	20	4	4	4	4	16
Sept. 26, 1970	20	20	20	6	6	6	6	14	20	20	20	4	4	4	4	16
Nov. 19, 1970	20	20	20	6	6	6	6	14	20	20	20	4	4	4	4	16

^{a/} Where possible, soil cores were taken within the clipped quadrat at each sampling date. The probe was 5.0 cm in diameter and two cores were taken from each quadrat. The hydraulic corer was furnished by the Soil Conservation Service, courtesy of Mr. Bob Boulter, Pawhuska, Oklahoma.

Table 6. Sampling dates and number of quadrats collected for litter data.^{a/}

Sampling Date	Number of Quadrats Per Treatment	
	Ungrazed	Grazed
April 1, 1970	10	10
May 1, 1970	6	10
June 1, 1970	6	14
June 17, 1970	10	14
July 1, 1970	10	14
July 16, 1970	10	20
August 1, 1970	10	20
August 17, 1970	10	20
Sept. 26, 1970	10	20
Oct. 17, 1970	10	20
Nov. 19, 1970	10	20

^{a/} Litter was taken from the clipped quadrats. The litter was collected by hand, dried, weighed, ashed, and reweighed.

Table 7. Average wind speed, precipitation, solar radiation, and air relative humidity.

Dates of Interval	Wind avg mph	Precipitation cm	Solar Radiation (cal cm ⁻² m ⁻¹) avg max	Air Relative Humidity			
				1.5 m		0.3 m	
				Max	Min	Max	Min
April 1, 1970	6.6	9.8		89	9	97	20
May 1, 1970	8.1	7.1		100	22	100	19
June 1, 1970	7.2	4.0		-	-	100	36
June 17, 1970	-	2.3		100	35	100	29
July 1, 1970	2.3	1.0		90	25	100	30
July 16, 1970	7.5	2.8	1.3	85	29	100	31
August 1, 1970	5.3	0.0	1.2	85	20	100	29
August 17, 1970	5.1	3.9	1.2	87	17	100	20
Sept. 26, 1970	3.2	4.2	1.0	92	14	100	15
Oct. 17, 1970	6.6	1.1	0.8	92	22	100	32
Nov. 14, 1970							

Table 8. Soil and air temperatures.

Sampling Interval	Air Temperature				Soil Temperature			
	1.5 m		0.3 m		25 cm		1 cm	
	Max	Min	Max	Min	Max	Min	Max	Min
April 1	80	29	82	24	54	48	75	55
May 1	91	36	90	39	65	56	75	50
June 1	94	47	88	50	69	62	80	58
June 17	99	51	95	57	74	70	83	66
July 1	101	49	99	57	77	73	87	65
July 16	105	50	100	76 52	78	68	88	62
August 1	108	60	108	65 62	80	74	90	70
August 17	105	59	104	55	79	71	90	79 65
Sept. 26	91	39	92	37	68	60	71	55
Oct. 17	82	34	82	31	61	55	65	48
Nov. 14								

Table 9. Soil moisture on ungrazed and grazed treatments.

Date of Sample	Soil Moisture (%)					
	Ungrazed			Grazed		
	0-15	15-30	30-45	0-15	15-30	30-45
May 1, 1970	36.8	33.9	33.4	30.6	30.2	30.3
June 1, 1970	32.3	30.1	30.2	29.9	25.8	20.9
June 17, 1970	25.1	25.7	26.1	21.4	21.1	21.5
July 1, 1970	19.7	20.1	21.8	15.2	16.6	18.3
July 16, 1970	14.8	14.8	16.2	12.6	13.9	14.3
Aug. 1, 1970	17.1	15.0	15.3	14.7	15.5	15.5
Aug. 17, 1970	12.0	13.4	14.9	11.6	12.9	13.4
Sept. 26, 1970	27.1	25.3	21.5	25.3	25.8	17.1
Oct. 17, 1970	26.8	27.1	26.2	25.2	25.7	23.7
Nov. 14, 1970	26.1	26.5	26.3	22.1	25.2	25.0

Table 10. Ungrazed aboveground biomass. Live, 1969 standing dead, and 1970 standing dead material (g/m^2).

Date of Sample	Live Material	S	1969 Standing Dead	S	1970 Standing Dead	S
April 1	0.21	0.68	289.53	49.36		
May 1	19.62	10.48	255.56	73.46		
June 1	145.33	24.80	298.67	97.68		
June 17	240.18	29.41	149.56	37.92		
July 1	270.37	86.34	222.90	34.63	0.76	1.59
July 16	249.31	69.25	278.09	79.53	7.84	22.73
Aug. 1	215.79	52.86	156.00	57.85	127.12	62.35
Aug. 17	207.59	49.43	156.86	47.17	162.35	76.35
Sept. 26						
Oct. 17						
Nov. 14						

Table 11. Grazed aboveground biomass. Live, 1969 standing dead, and 1970 standing dead material (g/m^2).

Date of Sample	Live Material	S	1969 Standing Dead	S	1970 Standing Dead	S
April 1	0.00	0.00	74.50	19.65		
May 1	27.20	7.47	29.87	41.37		
June 1	181.18	65.80	37.97	83.13		
June 17	249.78	73.52	46.67	88.66		
July 1	210.90	57.51	21.79	56.87	28.85	13.56
July 16	286.12	92.33	74.64	65.82	44.00	36.87
Aug. 1	193.91	53.42	29.80	31.61	78.08	56.18
Aug. 17	260.63	300.82	65.53	58.77	109.57	40.65
Sept. 26						
Oct. 17						
Nov. 14						

Table 12. Ungrazed and grazed litter (g/m^2).

Date of Sample	Ungrazed		Grazed	
	Litter	S	Litter	S
April 1	108.53	31.37	251.02	107.85
May 1	98.41	38.12	177.26	39.29
June 1	68.22	20.74	129.53	101.09
June 17	82.72	12.02	181.22	125.99
July 1	154.34	57.26	124.83	65.72
July 16	87.56	21.72	144.68	97.99
Aug. 1	130.47	38.87	246.52	109.17
Aug. 17	124.58	20.17	262.05	89.17
Sept. 29				
Oct. 17				
Nov. 14				

Table 13. Belowground biomass from ungrazed treatment.

Date of Sample	Ungrazed Depth Increment (cm)									
	0-5	5-10	10-20	20-30	30-50	50-70	70-90	20-50	Total	S Crown S
Dec. 1, 1969									** *	
May 1, 1970									*	
June 17	251.4	225.2	143.3	113.8	132.9	60.9	40.7	206.0	872.3*	76.5 172.6 127.0
July 16	224.3	181.1	204.4	106.2	159.7	87.4	66.1	297.2	981.0*	76.3 156.0 104.0
Aug. 17	183.9	113.8	172.3	106.9	155.5	88.4	45.1	245.0	851.9*	43.3 144.4 140.0
Sept. 26									*	
Nov. 19									*	

All values are ash-free g/m^2

* Total is calculated from both the 50 cm and 90 cm cores.

** Sample destroyed during processing at Central Laboratory.

Table 14. Belowground biomass from grazed treatment.

Date of Sample	Grazed Depth Increment (cm)									
	0-5	5-10	10-20	20-30	30-50	50-70	70-90	20-50	Total	S Crown S
Dec. 1, 1969									** *	
May 1, 1970									*	
June 17	239.2	129.4	129.8	77.1	68.9	101.8	17.8	204.2	773.4*	68.4 54.4 57.2
July 16	224.7	153.3	124.1	155.8	127.3	125.3	78.9	199.4	868.4*	53.9 192.2 284.6
Aug. 17	257.9	153.7	143.2	62.9	45.8	79.2	10.7	215.9	859.2*	41.9 104.9 52.1
Sept. 26									*	
Nov. 19									*	

All values are ash-free g/m^2 .

* Total is calculated from both the 50 cm and 90 cm cores.

** Sample destroyed during processing at Central Laboratory.

Table 15. Biomass collected on litter screens at each sampling date.^{a/}

Sample Number	Sample Dates			
	May 1	June 18	Aug. 1	Sept. 29
1	6.24	49.71	34.89	43.94
2	5.55	82.28	40.42	47.89
3	4.56	21.74	57.80	66.42
4	4.45	67.58	53.85	68.25
5		78.23	58.95	59.67
6	—	—	<u>68.21</u>	<u>60.46</u>
Mean g/m ² /date	5.20	59.91	52.35	57.78

^{a/} All values are g/m². The 36 screens were composited into 4 to 6 samples of each collection. All screens were located in the ungrazed treatment.

Table 16. Litter bag weights at each sampling date.

Species	Bag Number	Initial Weight	Sept. 30 Weight	Δ Weight g/m ² /day	Nov. 14 Weight	Δ Weight g/m ² /day
Litter	5	5.88	4.29	0.56		
	6	4.72	3.53	0.42		
	17	7.18	4.91	0.79		
	19	5.36	3.83	0.54		
	1	5.27				
	2	4.96				
	3	4.75				
	4	5.29				
	10	5.01				
ANSC	22	5.25	3.37	0.66		
	24	5.43				
ANGE	26	4.95				
	27	5.77	4.38	0.49		
	28	6.27	5.03	0.43		
PAVI	30	5.44				
	31	6.71	4.35	0.83		
SONU	34	7.20				
	33	5.52	4.05	0.51		

Table 17. *Andropogon scoparius* biomass in live, 1969 standing dead, and 1970 standing dead in grazed and ungrazed treatments (g/m^2).

[illegible]

Note: Sept. 26 sample sent Nov. 12; Oct. 17 sample sent Dec. 5.

Table 18. *Anairopogon gerardi* biomass in live, 1969 standing dead, and 1970 standing dead in grazed and ungrazed treatments (g/m^2).

Date of Sample	Ungrazed				Grazed			
	Live Material	S	1969 Stand. Dead	1970 Stand. Dead	% Comp.	Live Material	S	1969 Stand. Dead
April 1			46.28	55.54	15.97			
May 1	0.15	0.24	18.09	20.66	6.64			
June 1	22.49	19.26	37.69	49.97	13.56	8.43	10.46	3.85
June 17	15.34	20.53	9.37	17.05	6.34	4.53	10.55	1.53
July 1	10.05	3.11			0.21	0.36	1.60	0.09
July 16								
Aug. 1						0.89	3.97	0.29
Aug. 17								
Sept. 26								
Oct. 17								
Nov. 14								

Table 22. *Bromus japonicus* biomass in live, 1969 standing dead, 1970 standing dead in grazed and ungrazed treatments (g/m^2).

Date of Sample	Ungrazed				Grazed			
	Live Material	S	1969 Stand. Dead	% Comp.	Live Material	S	1969 Stand. Dead	% Comp.
April 1								
May 1					14.91	7.95		26.13
June 1					60.17	18.20		27.45
June 17	0.05	0.16		0.01	54.23	24.64		18.29
July 1							20.01	14.33
July 16							2.78	15.69
Aug. 1							13.57	4.50
Aug. 17							19.34	4.41
Sept. 26								
Oct. 17								
Nov. 14								

Table 23. *Poa pratensis* biomass in live, 1969 standing dead, and 1970 standing dead material in grazed and ungrazed treatments (g/m^2).

Date of Sample	Ungrazed				Grazed			
	Live Material	S	1969 Stand. Dead	S	1970 Stand. Dead	S	1969 Stand. Dead	S
April 1								
May 1						1.05	3.33	1.84
June 1						0.30	1.09	0.14
June 17						0.20	0.42	0.07
July 1								0.84
July 16						2.29	3.74	2.79
Aug. 1	1.34	4.08				6.67	8.83	1.02
Aug. 17						4.67	8.97	2.86
Sept. 26								
Oct. 17								
Nov. 14								

Table 24. *Artemisia psilostachya* biomass in live, 1969 standing dead, and 1970 standing dead material in grazed and ungrazed treatments (g/m^2).

Date of Sample	Ungrazed				Grazed			
	Live Material	S	1969 Stand. Dead	% Comp.	Live Material	S	1969 Stand. Dead	% Comp.
April 1								
May 1					0.02	0.05		0.04
June 1					0.15	0.21		0.07
June 17	0.46	10.95		0.12	0.26	0.47		0.09
July 1					1.06	2.11		0.42
July 16	0.40	1.26		0.07	0.06	0.13		0.01
Aug. 1	0.10	0.30		0.02	0.09	0.23		0.03
Aug. 17					2.60	8.52		0.60
Sept. 26								
Oct. 17								
Nov. 14								

Table 25. Miscellaneous grass biomass in live, 1969 standing dead, and 1970 standing dead material in grazed and ungrazed treatments (g/m^2).

Date of Sample	Ungrazed				Grazed			
	Live Material	1969 Stand. Dead	1970 Stand. Dead	% Comp.	Live Material	1969 Stand. Dead	1970 Stand. Dead	% Comp.
April 1		6.44		2.22		25.51		34.25
May 1	4.34	12.29		6.05	0.79	0.10		1.56
June 1	5.18	0.32		1.24	44.27	6.16		22.38
June 17	12.77	2.57		3.93	101.62			34.28
July 1	23.30			4.71	76.47			30.16
July 16	9.02			1.69	55.67	1.26	3.06	14.83
Aug. 1	26.26	28.66	20.11	15.03	49.38	9.37	9.51	22.62
Aug. 17	19.71	1.03		3.94	20.82	0.12	7.28	14.48
Sept. 26								
Oct. 17								
Nov. 14								

Table 26. Miscellaneous forbs biomass in live, 1969 standing dead, and 1970 standing dead categories in grazed and ungrazed treatments (g/m^2).

Date of Sample	Ungrazed				Grazed			
	Live Material	1969 Stand. Dead	1970 Stand. Dead	% Comp.	Live Material	1969 Stand. Dead	1970 Stand. Dead	% Comp.
April 1	0.22	0.74		0.33		4.00		5.37
May 1	2.79			1.01	0.36			0.64
June 1	3.81	0.49		0.97	4.06	0.11		1.90
June 17	14.26	0.26		3.57	24.71			8.34
July 1	19.80			4.01	17.07			6.73
July 16	27.13			5.07	5.30			1.31
Aug. 1	17.97	1.60	0.18	3.97	0.93			0.31
Aug. 17	7.52	0.49	1.66	1.84	3.91	0.08	1.59	1.28
Sept. 26								
Oct. 17								
Nov. 14								

APPENDIX I

FIELD DATA

Aboveground Biomass Data

Aboveground Biomass Data collected in 1970 at the Osage Site is Grassland Biome Data Set A2U0009. Data were collected on Form NREL-01. A sample data form and a sample of the field data follow.



GRASSLAND BIOME

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FIELD DATA SHEET - ABOVEGROUND BIOMASS

DATE TYPE	SITE	INITIALS	DATE			TREATMENT	REPLICATE	PLOT SIZE	QUADRAT	CLIP-RANK	GROWTH FM.	GENUS	SPECIES	SUBSPECIES	PHENOLOGY	RANK	SACK NO.	DRY WT.	SPECIAL	DRY WT. SP.
			Day	Mo	Yr															
1-2	3-4	5-7	8-9	10-11	12-13	14	15	16-19	21-23	25	27	29-30	31-32	34	36-37	39-40	42-45	47-52	54-57	59-64
DATA TYPE 01 Aboveground Biomass 02 Litter 03 Belowground Biomass 10 Vertebrate - Live Trapping 11 Vertebrate - Snap Trapping 12 Vertebrate - Collection 20 Avian Flush Census 21 Avian Road Count 22 Avian Road Count Summary 23 Avian Collection - Internal 24 Avian Collection - External 25 Avian Collection - Plumage 30 Invertebrate 40 Microbiology - Decomposition 41 Microbiology - Nitrogen 42 Microbiology - Biomass 43 Microbiology - Root Decomposition 44 Microbiology - Respiration																				
SITE 01 Ale 02 Bison 03 Bridger 04 Cottonwood 05 Dickinson 06 Hays 07 Hopland 08 Jornada 09 Osage 10 Pantex 11 Pawnee																				
PHENOLOGY 01 Germinated or sprouted 02 Early vegetation 03 Prebud 04 Bud stage 05 Early bloom 06 Mid-bloom 07 Full bloom 08 Late bloom 09 Milk stage 10 Dough stage 11 Ripe seed 12 Past ripe 13 Stem cured 14 Vegetative regrowth 15 Regrowth flowering 16 Regrowth ripe seed 17 Standing dead 18 Winter dormant																				
TREATMENT 1 Ungrazed 2 Lightly grazed 3 Moderately grazed 4 Heavily grazed 5 Grazed 1969. 6 ungrazed 1970																				
CLIP RANK 1 Harvested 2 Harvested and ranked 3 Ranked																				
GROWTH FORM 1 Perennial grass 2 Annual grass 3 Sedge, rush, etc. 4 Annual forb 5 Biennial forb 6 Perennial forb 7 Half-shrub 8 Shrub 9 Tree 0 Miscellaneous																				

+++ EXAMPLE OF DATA +++

+++ EXAMPLE OF DATA +++

[illegible]

01090RA160770110.50

1	2	1	ANSCO		03	1	200	48.82
1	2	1	SOMI		03	2	201	9.80
1	2	1	ANSCO		17	3	203	42.81
1	2	6	FOOR	A	03	4	204	0.14
1	2	1	MTSC	R	12	5	205	0.01
1	2	3	SENG	A	03	6	250	0.44
1	2	1	SPAS		03	7	247	0.54
2	2	1	ANSCO		03	2	208	19.44
2	2	1	ANSCO		17	3	209	98.04
2	2	1	SPAS		03	4	212	1.36
2	2	1	MTSC	R	12	5	213	1.45
2	2	1	SOMI		03	1	214	17.56
2	2	1	MTSC	A	03	6	220	3.25
2	2	3	SENG	A	03	7	256	1.05
3	2	1	ANSCO		03	1	221	69.20
3	2	1	SOMI		03	4	222	0.46
3	2	1	ANSCO		17	2	226	95.00
3	2	6	FOOR	A	03	3	227	6.54
3	2	1	DAVT		04	5	229	5.06
3	2	1	MTSC	R	12	6	230	1.65
4	2	6	FOOR	A	03	7	254	0.24
4	2	1	ANSCO		03	1	231	31.15
4	2	1	DAVT		04	2	233	8.29
4	2	1	MTSC	R	12	4	234	1.76
4	2	1	ANSCO		17	3	235	37.54
4	2	3	SENG	A	03	5	236	2.53
4	2	1	MTSC	A	03	6	253	1.51
5	2	1	ANSCO		03	1	237	57.68
5	2	6	FOOR	A	03	2	238	18.19
5	2	1	DAVT		04	5	239	0.99
5	2	1	SOMI		03	4	240	8.99
5	2	1	ANSCO		17	3	242	23.15
5	2	1	MTSC	R	12	6	243	0.54
5	2	1	SPAS		03	7	245	1.72
11	2	1	ANSCO		03	1		
11	2	1	ANSCO		17	2		
11	2	1	SOMI		03	3		
11	2	6	FOOR	A	03	4		
12	2	1	SOMI		03	1		
12	2	1	ANSCO		03	2		
12	2	1	ANSCO		17	3		
12	2	6	FOOR	A	03	4		
13	2	6	FOOR	A	03	1		
13	2	1	ANSCO		03	2		

13	3	1	SONII	03	3
13	3	1	ANSC	13	4
14	3	1	ANSC	03	1
14	3	1	ANSC	03	2
14	3	1	SONII	03	3
14	3	1	MTSC R	12	4
15	3	1	ANSC	03	1
15	3	1	ANSC	12	2
15	3	6	FODR A	03	3
15	3	1	SONII	03	4
15	3	1	MTSC A	03	5
16	3	6	FODR A	03	1
16	3	1	ANSC	03	2
16	3	1	MTSC R	12	3
16	3	1	SONII	03	4
16	3	1	ANSC	12	5
17	3	1	SONII	03	1
17	3	1	ANSC	03	2
17	3	1	SONII	17	3
17	3	1	ANSC	17	4
17	3	6	FODR A	03	5
17	3	1	MTSC R	12	6
18	3	1	ANSC	03	1
18	3	1	DAVT	04	2
18	3	1	MTSC R	12	4
18	3	1	ANSC	17	5
19	3	1	ANSC	03	1
19	3	1	SONII	03	2
19	3	1	ANSC	17	3
19	3	1	MTSC R	12	4
19	3	1	MTSC A	03	5
20	3	1	ANSC	03	1
20	3	1	ANSC	17	2
20	3	1	SONII	03	3
20	3	1	MTSC A	03	4
20	3	1	MTSC R	12	5
21	3	1	ANSC	03	1
21	3	1	ANSC	17	2
21	3	1	MTSC R	12	3
21	3	6	FODR A	03	4
22	3	1	ANSC	03	1
22	3	1	ANSC	17	2
22	3	1	SONII	03	3
22	3	1	MTSC R	12	4
22	3	1	SONII	17	5
23	3	1	ANSC	03	1
23	3	1	ANSC	17	2
23	3	1	MTSC R	12	3
24	3	1	ANSC	03	1
24	3	1	SONII	03	2
24	3	1	ANSC	17	3
24	3	1	MTSC R	12	4
25	3	1	ANSC	03	1
25	3	1	DAVT	04	2
25	3	1	SONII	03	3

25	3	1	ANSC	17	4
25	3	1	MTSC	12	5
26	3	1	ANSC	03	1
26	3	1	DAVT	04	2
26	3	1	MTSC R	12	5
26	3	6	FODR A	03	3
26	3	1	ANSC	17	4
27	3	1	ANSC	03	3
27	3	1	DAVT	04	1
27	3	6	FODR A	03	2
27	3	1	ANSC	17	4
27	3	1	MTSC R	12	5
28	3	1	SONH	03	1
28	3	1	SONH	17	2
28	3	1	SENG	03	3
29	3	1	SONH	03	1
29	3	1	ANSC	03	2
29	3	1	DAVT	04	3
29	3	1	DAVT	17	4
29	3	1	SPAS	03	5
29	3	1	MTSC R	12	6
30	3	1	ANSC	03	1
30	3	1	ANSC	17	2
30	3	6	FODR A	03	3
30	3	1	ANSC	19	3
30	3	1	MTSC R	12	6
30	3	1	DAVT	04	4
31	3	1	ANSC	03	1
31	3	1	SONH	03	2
31	3	1	ANSC	17	3
31	3	1	SONH	17	4
31	3	1	MTSC R	12	5
31	3	6	FODR A	03	6
32	3	1	ANSC	03	1
32	3	1	ANSC	17	2
32	3	1	ANSC	19	3
32	3	1	MTSC R	12	4
32	3	6	FODR A	03	5
33	3	1	ANSC	03	1
33	3	1	ANSC	19	2
33	3	1	SONH	03	3
33	3	1	ANSC	17	4
33	3	1	MTSC R	12	5
33	3	3	SENG A	03	6
34	3	1	ANSC	03	1
34	3	1	SONH	03	2
34	3	1	ANSC	17	3
34	3	1	ANSC	19	4
34	3	1	DAVT	04	5
34	3	1	MTSC R	12	6
35	3	1	ANSC	03	1
35	3	1	ANSC	17	2
35	3	1	ANSC	19	3
35	3	1	MTSC R	12	4
35	3	1	SONH	03	5

Litter Data

Litter Data collected in 1970 at the Osage Site is Grassland Biome Data Set A2U0009. Data were collected on Form NREL-02. A sample data form and a listing of the data follow.

U.S. INTERNATIONAL BIOLOGICAL PROGRAM

FIELD DATA SHEET - LITTER

[illegible]

	1	2	3	4	5	6	7	8
	12345678901	23456789012	34567890123	45678901234	56789012345	67890123456	78901234567	89012345678
0209PGR27037011 .50	1 1	3	74.98		32.57			
	2 1	10	63.65		27.65			
	3 1	15	56.12		19.49			
	4 1	22	52.10		24.44			
	5 1	27	40.45		23.06			
0209PGR27037012 .50	6 1	34	45.32		19.54			
	7 1	38	45.66		21.93			
	8 1	44	22.13		8.09			
	9 1	51	44.60		21.11			
	10 1	55	32.42		12.24			
0209 JDS11047051 .50	1 1	9	35.32		9.27			
	2 1	49	119.71		24.97			
	3 1	13	181.91		62.63			
	4 1	53	78.12		20.92			
	5 1	21	95.20		26.82			
0209FLJ11047052 .50	6 1	51	88.29		20.33			
0209FLJ11047052 .50	7 1	23	94.58		38.00			
	8 1	28	93.40		32.72			
	9 1	77	50.14		10.51			
	10 1	83	55.06		13.00			
0209 JDS010570110.50	1 1	18	41.01		13.12			
	2 1	33	30.85		7.90			
	3 1	43	28.82		13.43			
0209 JDS010570120.50	4 1	53	54.65		23.79			
	5 1	79	31.20		11.73			
	6 1	106	39.44		18.38			
0209PGR02057011.0727	13 3	219	1.02 0.00	0.52	040470			
	12 3	220	2.75 0.00	1.46	040470			
	25 3	221	1.45 0.00	0.39	040470			
0209PGR02057011.0563	34 3	222	0.93 0.00	0.36	040470			
0209FLJ020570510.50	1 1	88	33.91		9.66			
	2 1	94	49.06		11.89			
	3 1	107	81.72		39.50			
	4 1	112	51.12		22.93			
	5 1	117	57.03		19.68			
0209FLJ020570520.50	6 1	58	123.51		59.04			
	7 1	201	99.96		42.88			
	8 1	59	101.92		53.20			
	9 1	60	26.32		31.11			
	10 1	61	56.32		18.98			
0209PGR010670110.50	1 1	100	25.12		7.03			
	2 1	219	35.95		12.13			
	3 1	111	14.90		4.51			
0209PGR010670120.50	4 1	207	24.65		4.29			
	5 1	276	35.93		16.00			
	6 1	298	20.63		5.95			

020906R020670510.50	1	2	273	41.90	15.46	
	2	2	8	82.45	34.00	
	3	2	275	22.33	8.21	
	4	2	272	13.02	4.42	
	5	2	241	34.15	27.73	
	6	2	274	22.15	7.80	
	7	2	251	33.32	15.11	
020906R020670520.50	8	1	15	84.70	43.60	
	9	1	113	120.83	52.24	
	10	1	217	138.36	62.88	
	11	1	61	104.64	50.57	
	12	1	34	72.74	30.66	
	13	1	25	125.00	54.15	
	14	1	32	45.40	23.36	
02090A170670110.50	1	1	410	29.45	7.44	
	2	1	419	24.11	5.38	
	3	1	432	22.80	4.51	
	4	1	441	23.06	6.11	
	5	1	449	34.53	10.19	
02090A170670120.50	6	1	461	30.80	6.33	
	7	1	471	32.50	7.93	
	8	1	479	27.00	4.26	
	9	1	554	24.55	5.12	
	10	1	568	26.62	7.41	
020906R18067011.0609	21	3	091	15.95	3.22	020570
020906R18067011.0563	25	3	013	9.20	1.37	020570
020906R18067011.0651	12	3	202	13.47	1.99	020570
020906R18067011.0563	15	3	214	4.67	0.63	020570
020906R18067011.0609	13	3	123	11.03	1.61	020570
02090A180670510.50	1	1	232	38.40	14.21	
	2	1	125	23.91	6.69	
	3	1	271	56.68	34.08	
	4	1	247	116.20	57.21	
	5	1	60	164.50	54.05	
	6	1	65	120.70	55.40	
	7	1	59	152.30	47.73	
02090A180670520.50	8	1	27	45.15	12.68	
	9	1	248	27.80	14.26	
	10	1	38	39.03	18.70	
	11	1	46	34.15	14.35	
	12	1	265	41.07	18.16	
	13	1	249	76.03	31.20	
	14	1	71	137.35	60.45	
020908A010770110.50	1	1	280	56.95	34.11	
	2	1	238	65.82	25.63	
	3	1	244	71.78	27.77	
	4	1	100	51.41	12.31	
	5	1	207	89.56	18.34	
020908A010770120.50	6	1	457	98.41	61.49	
	7	1	448	72.74	35.80	
	8	1	414	39.05	9.23	
	9	1	415	91.45	47.78	
	10	1	111	93.48	57.34	

0209FL6020770510.50	1	1	97	32.15		27.58
	2	1	98	64.64		18.02
	3	1	103	105.15		31.16
	4	1	104	26.02		9.99
	5	1	106	58.25		28.63
	6	1	108	20.05		6.42
	7	1	115	31.64		13.53
0209FL6020770520.50	8	1	122	42.90		12.86
	9	1	79	32.45		8.35
	10	1	81	34.54		12.59
	11	1	82	44.14		16.86
	12	1	93	38.48		11.94
	13	1	500	35.84		12.96
	14	1	95	52.20		20.65
0209FLJ160770110.50	1	1	531	38.01	0	8.59
	2	1	532	29.80	0	11.23
	3	1	533	16.35	0	2.85
	4	1	534	32.01	0	6.60
	5	1	535	29.32	0	7.51
0209FLJ160770120.50	6	1	536	20.74	0	4.06
	7	1	537	30.48	0	7.32
	8	1	538	43.12	0	24.19
	9	1	539	36.65	0	14.44
	10	1	540	33.33	0	13.27
0209FLJ160770510.50	1	1	611	143.87	0	43.61
	2	1	612	45.99	0	10.89
	3	1	613	41.82	0	10.94
	4	1	614	39.65	0	14.54
	5	1	615	19.85	0	6.47
	6	1	616	29.32	0	11.41
	7	1	617	43.13	0	13.22
	8	1	618	52.32	0	19.62
	9	1	619	35.15	0	5.59
	10	1	620	33.99	0	13.06
0209FLJ160770520.50	11	1	601	19.74	0	6.01
	12	1	602	37.29	0	16.57
	13	1	603	108.62	0	35.36
	14	1	604	54.31	0	19.88
	15	1	605	31.25	0	10.19
	16	1	606	28.65	0	9.32
	17	1	607	122.65	0	38.62
	18	1	608	39.62	0	15.56
	19	1	609	79.29	0	23.12
	20	1	610	65.99	0	25.52
0209FLJ030870110.50	1	1	200	151.82	0	113.96
	2	1	201	32.25	0	50.20
	3	1	203	44.05	0	19.51
	4	1	204	91.05	0	56.51
	5	1	207	93.10	0	61.23
0209FLJ030870120.50	6	1	208	101.23	0	72.14
	7	1	209	172.70	0	118.32
	8	1	212	81.02	0	52.74
	9	1	213	113.10	0	77.07
	10	1	214	78.25	0	50.82

0209FL J03087011.0563	13	3	402	5.65	0.00	0.79	180670
	16	3	403	6.50	0.00	0.87	180670
	20	3	404	9.32	0.00	1.27	180670
	23	3	405	8.60	0.00	1.10	180670
	8	3	406	9.32	0.00	1.11	180670
0209FL J03087011.0563	32	3	407	10.81	0.00	1.31	180670
0209FL J040870510.50	1	1	237	74.85	0	44.38	
	2	1	238	118.60	0	52.12	
	3	1	239	104.45	0	59.63	
	4	1	240	145.60	0	70.28	
	5	1	242	76.54	0	38.40	
	6	1	243	218.04	0	141.56	
	7	1	244	124.60	0	74.74	
	8	1	245	156.90	0	99.60	
	9	1	247	154.39	0	99.77	
	10	1	250	189.88	0	104.30	
0209FL J040870520.50	11	1	226	144.88	0	64.95	
	12	1	227	49.70	0	17.88	
	13	1	228	44.40	0	24.50	
	14	1	229	61.42	0	29.15	
	15	1	230	182.94	0	79.58	
	16	1	231	123.20	0	68.18	
	17	1	233	211.50	0	103.30	
	18	1	234	197.44	0	83.50	
	19	1	235	82.86	0	33.48	
	20	1	236	137.84	0	78.27	
0209RKK170870110.50	1	1	5	88.82	0	51.78	
	2	1	6	53.99	0	18.91	
	3	1	9	47.34	0	22.48	
	4	1	11	69.14	0	38.78	
	5	1	16	29.89	0	9.67	
0209RKK170870120.50	6	1	18	67.50	0	36.50	
	7	1	20	65.48	0	33.77	
	8	1	21	63.50	0	29.83	
	9	1	22	66.21	0	32.64	
	10	1	24	60.45	0	26.52	
0209FL J170870510.50	1	1	48	136.60	0	47.40	
	2	1	49	88.00	0	34.21	
	3	1	50	52.40	0	16.68	
	4	1	2	98.72	0	53.59	
	5	1	1	102.60	0	29.08	
	6	1	19	156.28	0	56.90	
	7	1	41	105.05	0	36.04	
	8	1	69	171.38	0	77.74	
	9	1	67	122.00	0	50.57	
	10	1	66	159.35	0	71.28	
0209FL J170870520.50	11	1	28	44.84	0	17.09	
	12	1	30	115.06	0	44.60	
	13	1	33	112.78	0	43.35	
	14	1	35	132.99	0	65.92	
	15	1	37	51.20	0	20.04	
	16	1	39	102.00	0	59.65	

	17	1	42	116.99	0	39.41	
	18	1	43	89.00	0	19.42	
	19	1	44	72.05	0	34.40	
	20	1	45	141.15	0	42.84	
0209RKK260970110.50	1	1	101	37.24	0	12.53	
	2	1	102	46.35	0	18.12	
	3	1	103	22.08	0	5.12	
	4	1	104	43.00	0	4.19	
	5	1	105	40.50	0	7.80	
0209AJD260970120.50	6	1	106	81.04	0	40.60	
	7	1	107	145.22	0	71.01	
	8	1	108	126.99	0	71.39	
	9	1	109	46.86	0	39.03	
	10	1	110	59.04	0	26.18	
0209RKK260970510.50	1	1	111	166.24	0	78.33	
	2	1	112	58.25	0	32.21	
	3	1	113	163.82	0	99.26	
	4	1	114	230.05	0	149.65	
	5	1	115	105.69	0	39.26	
	6	1	116	116.39	0	44.90	
	7	1	117	155.76	0	76.21	
	8	1	118	53.10	0	22.57	
	9	1	119	132.20	0	88.73	
	10	1	120	184.42	0	90.72	
0209AJD260970520.50	11	1	121	63.12	0	22.69	
	12	1	122	46.42	0	20.57	
	13	1	123	25.40	0	8.95	
	14	1	124	53.42	0	14.55	
	15	1	125	37.26	0	11.65	
	16	1	126	32.81	0	9.14	
	17	1	127	101.16	0	38.41	
	18	1	128	66.37	0	16.81	
	19	1	129	145.00	0	72.02	
	20	1	130	51.36	0	13.46	
0209PGR29097011.0563	20	3	525	10.94	0.00	1.43	030870
	8	3	533	7.55	0.00	0.88	030870
	13	3	521	9.84	0.00	1.42	030870
	16	3	520	7.04	0.00	0.92	030870
	32	3	51	9.40	0.00	1.09	030870
	23	3	529	10.60	0.00	1.35	030870
0209RKK29097011.023	5	4	509	4.92	0.00	0.63	260570 5.88
	6	4	502	3.98	0.00	0.45	260570 4.72
	17	4	504	5.76	0.00	0.97	260570 7.18
	19	4	503	4.42	0.00	0.58	260570 5.36
	22	4	506	5.33	0.00	1.95	260570 5.25
	27	4	508	4.66	0.00	0.28	260570 5.77
	28	4	507	5.20	0.00	0.17	260570 6.27
	31	4	510	4.98	0.00	0.62	260570 6.71
	33	4	505	4.39	0.00	0.33	260570 5.52
0209RKK181070110.50	1	1	131	44.50	0	12.07	
	2	1	132	48.99	0	23.96	
	3	1	133	34.50	0	14.77	
	4	1	134	68.00	0	35.01	
	5	1	135	27.12	0	7.10	

0209PKK181070120.50	6	1	1.40	29.40	0	16.50
	7	1	1.39	72.80	0	39.76
	8	1	1.38	40.25	0	18.61
	9	1	1.37	49.40	0	25.98
	10	1	1.36	30.10	0	11.39
0209PKK181070510.50	1	1	1.41	116.99	0	37.25
	2	1	1.42	37.48	0	10.25
	3	1	1.43	68.88	0	21.86
	4	1	1.44	66.30	0	16.77
	5	1	1.45	73.75	0	19.97
	6	1	1.46	121.78	0	35.17
	7	1	1.47	85.80	0	42.75
	8	1	1.48	55.80	0	24.40
	9	1	1.49	135.32	0	59.03
	10	1	1.50	116.00	0	40.65
0209PKK181070520.50	11	1	1.60	169.88	0	61.46
	12	1	1.59	162.82	0	81.57
	13	1	1.58	136.10	0	67.02
	14	1	1.57	235.35	0	148.39
	15	1	1.56	42.99	0	17.91
	16	1	1.55	116.35	0	82.11
	17	1	1.54	41.40	0	8.46
	18	1	1.53	140.59	0	94.65
	19	1	1.52	46.50	0	24.56
	20	1	1.51	73.45	0	35.56
0209PKK141170110.50	1	1	1.81	68.05	0	42.53
	2	1	1.82	68.04	0	44.63
	3	1	1.83	44.56	0	27.63
	4	1	1.84	48.12	0	26.80
	5	1	1.85	60.15	0	30.74
0209PKK141170120.50	6	1	1.86	64.00	0	44.54
	7	1	1.87	74.25	0	50.19
	8	1	1.88	32.99	0	17.39
	9	1	1.89	35.60	0	19.19
	10	1	1.90	36.35	0	22.10
0209PKK141170510.50	1	1	1.61	92.54	0	48.95
	2	1	1.62	172.70	0	67.69
	3	1	1.63	56.58	0	23.02
	4	1	1.64	55.15	0	31.21
	5	1	1.65	93.22	0	44.83
	6	1	1.66	83.05	0	35.21
	7	1	1.67	74.88	0	31.97
	8	1	1.68	46.99	0	14.47
	9	1	1.69	77.55	0	25.98
	10	1	1.70	91.00	0	34.58
0209PKK141170520.50	11	1	1.71	67.00	0	31.29
	12	1	1.72	60.00	0	29.58
	13	1	1.73	34.69	0	17.66
	14	1	1.74	62.52	0	28.38
	15	1	1.75	47.40	0	22.04
	16	1	1.76	53.38	0	20.07
	17	1	1.77	51.50	0	20.75
	18	1	1.78	30.45	0	11.24
	19	1	1.79	54.70	0	27.35
	20	1	1.80	99.74	0	48.57