

Technical Report No. 140
PAWNEE SITE PLANT LIVE-DEAD SEPARATION

Charles E. Dickinson
Natural Resource Ecology Laboratory
Colorado State University
Fort Collins, Colorado

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ABSTRACT

For species which were not easily separated in the field, a reconnaissance procedure was used to separate aboveground plant biomass into a this year's growth and a previous year's growth fraction. Checks were made by mechanical and hand sorting methods. A complete data listing is included.

PLANT LIVE-DEAD SEPARATION

Separation of aboveground plant biomass into categories of live, old dead, recent dead, and later perennial live of *Opuntia polyacantha* was readily accomplished in the field at the Pawnee Site during 1971, and separation of *Bouteloua gracilis* was accomplished with the van Wyk tower (van Wyk 1972). Other species, which could not be separated in the field and which were too rare for tower use, were done by a reconnaissance method.

All species were divided into current year's production and previous year's production on a percent of weight basis. For this a simplified data sheet was created. Estimates of percent weight in each category were made on an overall ocular estimate for each ungrazed and grazed situation. Differences between intensity of grazing treatments were too subtle to detect.

A check on this system was made by comparing with hand separated samples collected during the same biweekly period. Grass production samples (primarily blue grama, *Bouteloua gracilis*, and buffalo grass, *Buchloe dactyloides*) were taken on several dates corresponding to the ocular estimate date. These samples were mechanically processed in the van Wyk tower (van Wyk 1972). During June separated samples showed 87.5% current live growth, while the estimation showed 90%.

Ocular estimations were made once in mid-May, twice in June, and only once in July. At this point it appeared that nearly all standing crop was current year's production, and estimates were discontinued.

The percent figures derived by ocular estimate are to be used for separation of total biomass data into live and dead categories. These

estimates appear to be at least as accurate as hand separation with its high sampling error and high cost.

Subsamples of blue grama were taken on a weekly basis throughout the "growing" season on each treatment and replicate. These were combined on a treatment basis in the on-site laboratory. A sample of approximately 15 g (dry matter basis) was left in an unseparated state for colorimetric analysis. Another 15 g were separated, first by machine, then refined by hand separation into current year's growth and an older fraction. The goal was to separate enough material to have at least 8 g of the lesser fraction. These samples were primarily taken for chlorophyll analysis and were field refrigerated in dry ice and stored in a freezer. Dry matter content is to be determined as well as chlorophyll. When processed these samples provide both the necessary sample for chemical analysis and a further check on reconnaissance data.

Plant codes used may be found in a forthcoming technical report by Dickinson and Baker (1972).

Prickly pear cactus (*Opuntia polyacantha*) and ball cactus [*Echinocereus viridiflora*, *Coryphantha* (= *Mammillaria*) *vivipera*] were separated into three categories in the field. These were perennial live, recent dead, and litter. The later two fractions were determined by their placement. If a dead (i.e., not green inside) cactus appeared to be in its original place or attached and would not yield readily to a reasonable push from a pair of grass clippers, it was classed as the equivalent of standing dead (i.e., recent dead). If a pad or whole plant failed to satisfy one of these criteria, it was portioned into the other category.

LITERATURE CITED

- Dickinson, C. and C. V. Baker. 1972. Pawnee Site field plant list. U.S. IBP Grassland Biome Tech. Rep. No. 139. Colorado State Univ., Fort Collins. 44 p.
- van Wyk, J. J. P. 1972. A preliminary report on new separation techniques for live-dead aboveground grass herbage; and roots from dry soil cores. U.S. IBP Grassland Biome Tech. Rep. Colorado State Univ., Fort Collins. (In progress).

APPENDIX I
FIELD DATA

PAWNEE SITE CATEGORY DATA

Day	Month	Year	Initials	Genus	Species	Standing Crop	
						This Year (%)	Previous Year (%)
24	5	71	CED				
				AG	SM	93	7
				AL	TE	100	--
				AR	DR	80	20
				AR	FR	95	5
				AR	LO	15	85
				AS	MI	98	2
				AS	TA	2	98
				AS	TR	98	2
				AT	CA	95	5
				BA	OP	85	15
				BO	GR	85	15
				BU	DA	85	15
				CA	FI	98	2
				CA	HE	95	5
				CH	AL	100	--
				CH	LE	100	--
				CH	NA	90	10
				CI	UN	45	55
				CR	Y	99	1
				CY	AC	100	--
				ER	EF	85	15
				EU	GL	90	10
				FE	OC	99	1
				GA	CO	99	1
				GR	SQ	98	2
				GU	SA	85	15
				HA	SP	98	2
				HE	VI	87	13
				HY	FI	98	2
				LA	RE	100	--

PAWNEE SITE CATEGORY DATA

Day	Month	Year	Initials	Genus	Species	Standing Crop	
						This Year (%)	Previous Year (%)
24	5	71	CED				
				LE	DE	100	--
				LE	MO	100	--
				LI	IN	100	--
				LO	OR	100	--
				LU	PU	100	--
				LY	JU	99	1
				MI	LI	100	--
				MU	DI	100	--
				MU	TO	25	75
				OE	CO	90	10
				OR	LU	--	100
				PE	AL	99	1
				PL	PU	100	--
				PS	TE	100	--
				SA	KA	95	5
				SC	BR	100	--
				SC	PA	25	75
				SE	TR	100	--
				SI	HY	90	10
				SP	CO	98	2
				SP	CR	95	5
				ST	CO	90	10
				TH	ME	98	2
				TH	TR	98	2
				TO	GR	100	--
				DE	PI	100	--
				TR	A	100	--
				SI	AL	100	--
				TA	OF	100	--
				VI	NU	100	--

PAWNEE SITE CATEGORY DATA - Exclosures

Day	Month	Year	Initials	Genus	Species	Standing Crop	
						This Year (%)	Previous Year (%)
24	5	71	CED				
				AG	SM	65	35
				AL	TE	100	--
				AR	DR	80	20
				AR	FR	90	10
				AR	LO	15	85
				AS	MI	98	2
				AS	TA	2	98
				AS	TR	98	2
				AT	CA	90	10
				BA	OP	75	25
				BO	GR	85	15
				BU	DA	85	15
				CA	FI	98	2
				CA	HE	95	5
				CH	AL	100	--
				CH	LE	100	--
				CH	NA	85	15
				CI	UN	45	55
				CR	Y	99	1
				CY	AC	100	--
				ER	EF	85	15
				EU	GL	90	10
				FE	OC	99	1
				GA	CO	99	1
				GR	SQ	98	2
				GU	SA	75	25
				HA	SP	98	2
				HE	VI	87	13
				HY	FI	98	2
				LA	RE	100	--

PAWNEE SITE CATEGORY DATA - Exclosures

Day	Month	Year	Initials	Genus	Species	Standing Crop	
						This Year (%)	Previous Year (%)
24	5	71	CED				
				LE	DE	100	--
				LE	MO	100	--
				LI	IN	100	--
				LO	OR	100	--
				LU	PU	100	--
				LY	JU	99	1
				MI	LI	100	--
				MU	DI	100	--
				MU	TO	25	75
				OE	CO	65	35
				OR	LU	--	100
				PE	AL	99	1
				PL	PU	100	--
				PS	TE	100	--
				SA	KA	95	5
				SC	BR	100	--
				SC	PA	25	75
				SE	TR	100	--
				SI	HY	80	20
				SP	CO	100	--
				SP	CR	98	2
				ST	CO	80	20
				TH	ME	98	2
				TH	TR	98	2
				TO	GR	100	--
				OE	PI	100	--
				TR	A	100	--
				SI	AL	100	--
				TA	OF	100	--
				VI	NU	100	--

PAWNEE SITE CATEGORY DATA

Day	Month	Year	Initials	Genus	Species	Standing Crop	
						This Year (%)	Previous Year (%)
9	6	71	CED				
				AG	SM	98	2
				AL	TE	100	--
				AR	DR	90	10
				AR	FR	96	4
				AR	LO	75	25
				AS	MI	98	2
				AS	TA	95	5
				AS	TR	98	2
				AT	CA	98	2
				BA	OP	100	--
				BO	GR	90	10
				BU	DA	90	10
				CA	FI	98	2
				CA	HE	98	2
				CH	AL	100	--
				CH	LE	100	--
				CH	NA	98	2
				CI	UN	99	1
				CR	Y	100	--
				CY	AC	100	--
				ER	EF	90	10
				EU	GL	100	--
				EV	NU	100	--
				FE	OC	100	--
				GA	CO	100	--
				GI	LA	100	--
				GR	SQ	100	--
				GU	SA	98	2
				HA	SP	100	--
				HE	VI	95	5

PAWNEE SITE CATEGORY DATA

Day	Month	Year	Initials	Genus	Species	Standing Crop	
						This Year (%)	Previous Year (%)
9	6	71	CED				
				HY	FI	98	2
				LA	RE	100	--
				LE	DE	100	--
				LE	MO	100	--
				LI	IN	100	--
				LO	OR	100	--
				LU	PU	100	--
				LY	JU	100	--
				MI	LI	100	--
				MU	DI	100	--
				MU	TO	85	15
				OE	CO	100	--
				OR	LU	20	80
				PE	AL	99	1
				PL	PU	100	--
				PS	TE	100	--
				SA	KA	99	1
				SC	BR	100	--
				SC	PA	85	15
				SE	TR	100	--
				SI	HY	96	4
				SP	CO	100	--
				SP	CR	99	1
				ST	CO	97	3
				TH	ME	99	1
				TH	TR	99	1
				TO	GR	100	--
				TR	OC	100	--
				SI	AL	100	--
				DE	PI	100	--
				TA	OF	100	--
				VI	NU	100	--
				PE	AN	99	1

PAWNEE SITE CATEGORY DATA - Exclosures

Day	Month	Year	Initials	Genus	Species	Standing Crop	
						This Year (%)	Previous Year (%)
9	6	71	CED				
				AG	SM	95	5
				AL	TE	100	--
				AR	DR	95	5
				AR	FR	98	2
				AR	LO	90	10
				AS	MI	98	2
				AS	TA	98	2
				AS	TR	98	2
				AT	CA	95	5
				BA	OP	98	2
				BO	GR	90	10
				BU	DA	90	10
				CA	FI	95	5
				CA	HE	98	2
				CH	AL	100	--
				CH	LE	100	--
				CH	NA	96	4
				CI	UN	99	1
				CR	Y	100	--
				CY	AC	100	--
				ER	EF	98	2
				EU	GL	100	--
				EV	NU	100	--
				FE	OC	100	--
				GA	CO	100	--
				GI	LA	100	--
				GR	SQ	100	--
				GU	SA	90	10
				HA	SP	100	--
				HE	VI	95	5

PAWNEE SITE CATEGORY DATA - Exclosures

Day	Month	Year	Initials	Genus	Species	Standing Crop	
						This Year (%)	Previous Year (%)
9	6	71	CED				
				HY	FI	98	2
				LA	RE	100	--
				LE	DE	100	--
				LE	MO	100	--
				LI	IN	100	--
				LO	OR	100	--
				LU	PU	100	--
				LY	JU	100	--
				MI	LI	100	--
				MU	DI	100	--
				MU	TO	85	15
				OE	CO	100	--
				OR	LU	20	80
				PE	AL	97	3
				PL	PU	100	--
				PS	TE	100	--
				SA	KA	99	1
				SC	BR	100	--
				SC	PA	85	15
				SE	TR	100	--
				SI	HY	96	4
				SP	CO	100	--
				SP	CR	99	1
				ST	CO	97	3
				TH	ME	99	1
				TH	TR	99	1
				TO	GR	100	--
				TR	OC	100	--
				SI	AL	100	--
				DE	PI	100	--
				VI	NU	100	--
				TA	OF	100	--
				PE	AN	99	1

PAWNEE SITE CATEGORY DATA

Day	Month	Year	Initials	Genus	Species	Standing Crop	
						This Year (%)	Previous Year (%)
21	6	71	CED				
				AG	SM	98	2
				AL	TE	100	--
				AR	DR	93	7
				AR	FR	98	2
				AR	LO	80	20
				AS	MI	100	--
				AS	TA	100	--
				AS	TR	100	--
				AT	CA	97	3
				BA	OP	100	--
				BO	GR	95	5
				BU	DA	95	5
				CA	FI	100	--
				CA	HE	100	--
				CH	AL	100	--
				CH	LE	100	--
				CH	NA	98	2
				CI	UN	100	--
				CR	Y	100	--
				CY	AC	100	--
				ER	EF	98	2
				EU	GL	100	--
				EV	NU	100	--
				FE	OC	100	--
				GA	CO	100	--
				GI	LA	100	--
				GR	SQ	100	--
				GU	SA	98	2
				HA	SP	100	--
				HE	VI	100	--
				HY	FI	100	--
				LA	RE	100	--
				LE	DE	100	--
				LE	MO	100	--
				LI	IN	100	--

PAWNEE SITE CATEGORY DATA

Day	Month	Year	Initials	Genus	Species	Standing Crop	
						This Year (%)	Previous Year (%)
21	6	71	CED				
				LI	PU	100	--
				LO	OR	100	--
				LU	PU	100	--
				LY	JU	100	--
				MI	LI	100	--
				MU	DI	100	--
				MU	TO	90	10
				OE	CO	100	--
				OR	LU	95	5
				PE	AL	100	--
				PL	PU	100	--
				PS	TE	100	--
				SA	KA	100	--
				SC	BR	100	--
				SC	PA	95	5
				SE	TR	100	--
				SI	HY	100	--
				SP	CO	100	--
				SP	CR	100	--
				ST	CO	100	--
				ST	PA	100	--
				TH	ME	100	--
				TH	TR	100	--
				TO	GR	100	--
				TR	OC	100	--
				TR	A	100	--
				CH	IN	100	--
				SI	AL	100	--
				TA	OF	100	--
				BR	TE	100	--
				VI	NU	100	--
				OE	PI	100	--

PAWNEE SITE CATEGORY DATA - Exclosures

Day	Month	Year	Initials	Genus	Species	Standing Crop	
						This Year (%)	Previous Year (%)
21	6	71	CED				
				AG	SM	95	5
				AL	TE	100	--
				AR	DR	93	7
				AR	FR	98	2
				AR	LO	75	25
				AS	MI	100	--
				AS	TA	100	--
				AS	TR	100	--
				AT	CA	97	3
				BA	OP	100	--
				BO	GR	95	5
				BU	DA	95	5
				CA	FI	100	--
				CA	HE	100	--
				CH	AL	100	--
				CH	LE	100	--
				CH	NA	98	2
				CI	UN	100	--
				CR	Y	100	--
				CY	AC	100	--
				ER	EF	98	2
				EU	GL	100	--
				EV	NU	100	--
				FE	OC	100	--
				GA	CO	100	--
				GI	LA	100	--
				GR	SQ	100	--
				GU	SA	98	2
				HA	SP	100	--
				HE	VI	100	--
				HY	FI	100	--
				LA	RE	100	--
				LE	DE	100	--
				LE	MO	100	--
				LI	IN	100	--

PAWNEE SITE CATEGORY DATA - Exclosures

Day	Month	Year	Initials	Genus	Species	Standing Crop	
						This Year (%)	Previous Year (%)
21	6	71	CED				
				LI	PU	100	--
				LO	OR	100	--
				LU	PU	100	--
				LY	JU	100	--
				MI	LI	100	--
				MU	DI	100	--
				MU	TO	90	10
				OE	CO	100	--
				OR	LU	95	5
				PE	AL	100	--
				PL	PU	100	--
				PS	TE	100	--
				SA	KA	100	--
				SC	BR	100	--
				SC	PA	95	5
				SE	TR	100	--
				SI	HY	100	--
				SP	CO	100	--
				SP	CR	100	--
				ST	CO	100	--
				ST	PA	100	--
				TH	ME	100	--
				TH	TR	100	--
				TO	GR	100	--
				TR	OC	100	--
				TR	AC	100	--
				CH	IN	100	--
				SI	AL	100	--
				TA	OF	100	--
				BR	TE	100	--
				VI	NU	100	--
				DE	PI	100	--

PAWNEE SITE CATEGORY DATA

Day	Month	Year	Initials	Genus	Species	Standing Crop	
						This Year (%)	Previous Year (%)
6	7	71	CED				
				AG	SM	98	2
				AL	TE	100	--
				AR	DR	95	5
				AR	FR	98	2
				AR	LO	90	10
				AS	MI	100	--
				AS	TA	100	--
				AS	TR	100	--
				AT	CA	97	3
				BA	OP	100	--
				BO	GR	95	5
				BU	DA	96	4
				CA	FI	100	--
				CA	HE	100	--
				CH	AL	100	--
				CH	LE	100	--
				CH	NA	100	--
				CI	UN	100	--
				CR	Y	100	--
				CY	AC	100	--
				ER	EF	98	2
				EU	GL	100	--
				EV	NU	100	--
				FE	OC	100	--
				GA	CO	100	--
				GI	LA	100	--
				GR	SQ	100	--
				GU	SA	100	--
				HA	SP	100	--
				HE	PI	100	--
				HE	VI	100	--
				HY	FI	100	--
				LA	RE	100	--
				LE	DE	100	--
				LE	MO	100	--

PAWNEE SITE CATEGORY DATA

Day	Month	Year	Initials	Genus	Species	Standing Crop	
						This Year (%)	Previous Year (%)
6	7	71	CED				
				LI	IN	100	--
				LI	PU	100	--
				LO	OR	100	--
				LU	PU	100	--
				LY	JU	100	--
				MI	LI	100	--
				MU	DI	100	--
				MU	TC	90	10
				OE	CO	100	--
				OR	LU	100	--
				PE	AL	100	--
				PL	PU	100	--
				PS	TE	100	--
				SA	KA	100	--
				SC	BR	100	--
				SC	PA	95	5
				SE	TR	100	--
				SI	HY	100	--
				SP	CO	100	--
				SP	CR	100	--
				ST	CO	100	--
				ST	PA	100	--
				TH	ME	100	--
				TH	TR	100	--
				TO	GR	100	--
				TR	OC	100	--
				TR	A	100	--
				CH	IN	100	--
				SI	AL	100	--
				TA	OF	100	--
				BR	TE	100	--
				VI	NU	100	--
				DE	PI	100	--