



Research Brief for Resource Managers

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The Hardest Grasses for Type-converting Chaparral

McKell, C. M., V. W. Brown, C.F. Walker and R. M. Love.
1965. *Species composition changes in seeded grasslands converted from chaparral. Journal of Range Management* 14: 321-326.

In 1955, four agronomists began a long-term project to study “a major problem in the conversion of chaparral to grassland – the selection of adapted grass and legume species to seed areas once dominated by brush.” At the time there was little data on the change in herbaceous species composition in the years following the initial conversion. They were particularly interested in the persistence of perennial grasses and the role played by resident annual species in the composition of a seeded area.

In California’s Cleveland National Forest on the Tule Springs Range, 63,000 brushland acres (chaparral and coastal sage) were burned by wildfire in 1950. This study followed changes in **Pasture B & Pasture C** treatment areas. Pasture B was disked and seeded but not burned in 1952. In 1953, the rest of pasture B & pasture C was control burned. The 86-acre pasture C was then disked and seeded, then disked again in 1954 and finally band-seeded with a commercial grain.

The work at the Manley Ranch Demonstration Range in the Sierra Nevada started in a 300-acre pasture that had been control-burned in August, 1951 that was later extended to include a nearby, 1000-acre pasture that was control-burned in August, 1956. The whole area was broadcast seeded by airplane, and a portion of it was drill-seeded. Annual inventories were collected using a

Management Implications

- Six and nine-year monitoring of type converted shrublands demonstrated that some seeded non-native annual and perennial grass species can persist and expand following shrub removal, while others drop out.

step-point method. At the Tule Springs Range, 50 points on each of six transects per pasture were sampled for 300 points per pasture for eight years. On Manley Ranch, five transects of 20 points were sampled for each type-acre for six years.

At the end of the monitoring period, both sites were dominated by invasive, non-native perennial and annual grass species (Tables 1&4). The native perennial grass, *Stipa* sp., that was reported as “common” prior to type conversion, was not recorded in the transects. At Tule Springs, perennial smilo grass, veldt grass, and harding grass increased and persisted to the end. Perennial orchard grass, brome and tall fescue, present in the first year, had disappeared by year two. Annual soft chess and red brome increased throughout and became the dominant cover species. Wild oats and riggut brome had disappeared by the end, but new nonnative species, foxtail fescue, filaree and downy chess, appeared midway through the trial and were still present at the end. The Manley Ranch site had a greater diversity of persistent species.

Table 1. Species composition changes in Pasture B, Tule Springs Demonstration Range from 1955 to 1962. Data in percent species cover.¹

	4/24 1955	4/29 1956	5/31 1957	4/12 1958	5/14 1959	5/2 1960	5/4 1961	5/2 1962
Perennials								
Hardinggrass ²	1.7	2.5	4.0	6.3	2.7	5.6	3.0	0.7
Veldtgrass ²	1.3	1.4	2.1	2.3	0.5	1.0	0.4	6.3
Smilo ²	1.2	2.4	4.7	7.5	9.1	10.9	16.3	
Orchardgrass ²	0.1							
Brome 25 ²	0.5							
Tall fescue ²	0.1		0.1	0.3				
Annuals								
Soft chess ²	3.3	3.9	4.0	20.0	7.4	14.6	7.8	14.1
Italian ryegrass ²	2.8	8.3	6.8	7.3	0.2	1.0	0.1	
Wild oats	0.2							
Red brome	0.1	0.1	0.6	4.4	4.3	7.7	13.0	14.9
Ripgut	0.1			1.6	0.1			
Foxtail fescue				0.3	0.1	0.5	0.4	0.3
Filaree					0.2	0.1	0.2	0.8
Downy chess					0.7	0.1	0.4	0.1
Legumes								
Rose clover ²		0.1						
Alfalfa ²								0.1
Misc. Weeds	0.6	0.3	0.7	2.0	0.7	3.5	1.4	3.7
TOTAL GROUND COVER %								
	12.0	19.0	23.0	52.0	26.0	45.0	43.0	41.0

¹ Numbers in table represent the percentage that each species contributed to the total herbaceous ground cover. Three hundred step-points plus 20 square foot cover estimates were recorded from each pasture per year.

² Species that were broadcast-seeded during the fall of 1953.

Table 4. Species composition changes from 1957 to 1962 in a 1,000-acre pasture at the Manly Demonstration Range, Tulare County. Data in percent species cover.¹

	1957	1958	1959	1960	1961	1962	Significance among years (.05 level)
Seeded grass species							
Perennial ryegrass	4.42	15.78	2.32	1.90	.70	.56	*
Smilo	1.81	7.38	2.46	4.45	7.64	2.99	*
Hardinggrass	1.69	3.46	2.18	5.68	9.08	7.27	*
Orchardgrass	6.94	5.13	1.80	1.92	.88	.72	*
Desert wheatgrass	1.31	1.44	.81	1.86	2.08	1.11	N.S.
Tall fescue	.84	1.82	.22	1.08	.60	.66	N.S.
Tall oatgrass	1.08	1.23	.43	.58	.30	.33	N.S.
Mountain brome	1.21	.48	—	—	.42	.19	N.S.
Intermediate wheatgrass	.61	.66	.39	.41	1.14	.66	N.S.
Total seeded species	19.91	37.38	10.61	17.88	23.40	14.48	
Total Ground Cover (all species)	32.40	58.00	24.00	51.40	75.40	59.40	
Seeded Species as % of Total Ground Cover	61.45	64.44	44.20	34.70	31.03	24.39	

¹ Five hundred step-points plus 50 square-foot cover estimates were recorded each year.