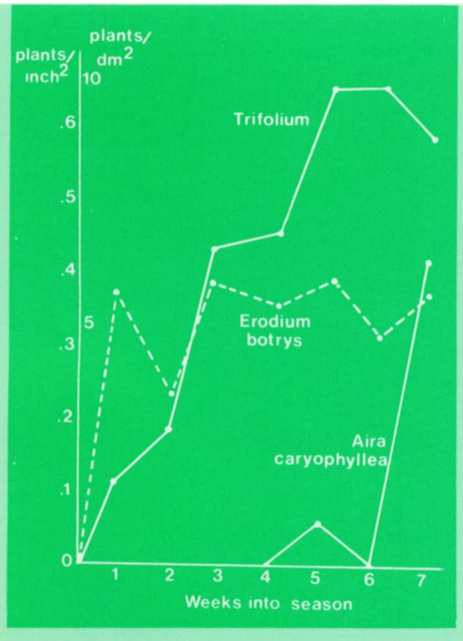

Fig. 2. Changes in density of clovers (Trifolium spp.), broad-leaved filaree (Erodium botrys), and silver hairgrass (Aira caryophyllea) during first seven weeks after rainfall sufficient to start germination. Samples taken in fall, 1973. L.S.D. (p .05) = 0.08 for Trifolium, 0.20 for Erodium, and 0.33 for Aira.

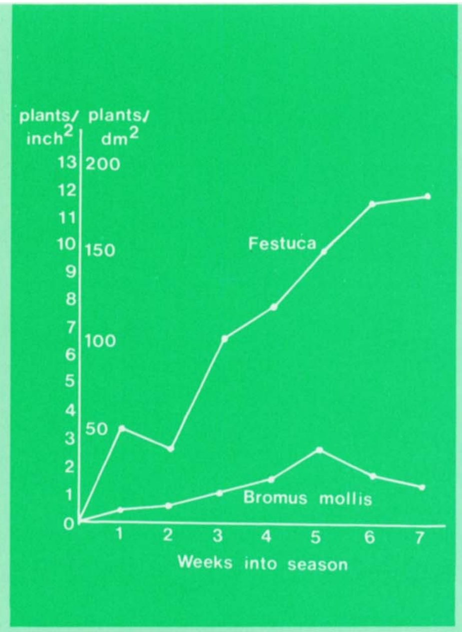

Fig. 3. Changes in density of annual fescues (Festuca spp.) and soft chess (Bromus mollis) during first seven weeks after rainfall sufficient to start germination. Samples taken in fall, 1973. L.S.D. (p .05) = 1.27 for Festuca, 0.52 for Bromus.

this plant in the grassland for the rest of the season depends on rainfall sufficient for survival of existing seedlings. Although many clover, soft chess, and annual fescue seedlings may now be evident and later die, enough seed will remain ungerminated in the soil to fully establish these species with later rains. Silver hairgrass will be unaffected by the early rains. Rainfall is only one of many factors influencing annual rangelands, yet an unusual year like 1976 emphasizes its importance in determining species composition through germination and establishment.

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ESTIMATED SEED DENSITY BEFORE FALL RAINS, AND ESTABLISHMENT OF SEEDLINGS SURVIVING AT THE END OF THE FIRST SEVEN WEEKS OF THE GROWING SEASON

	Density*			
	Seeds		Seedlings	
Plant group	Per in²	Per dm²	Per in²	Per dm²
Festuca	17.99 ± 2.04	279.2 ± 32	11.97 ± 0.64	185.8 ± 10
Bromus	3.16 ± 0.55	49.0 ± 8	2.74 ± 0.26	42.5 ± 4
Aira	6.37 ± 1.76	98.9 ± 27	0.42 ± 0.16	6.5 ± 2.5
Erodium	0.67 ± 0.12	10.4 ± 1.9	0.38 ± 0.10	5.9 ± 1.6
Trifolium	0.66 ± 0.12	10.2 ± 1.9	0.64 ± 0.04	9.9 ± 0.62
Total	39.37 ± 3.02	610.0 ± 47	16.87 ± 0.80	261.8 ± 12

*Values are means and 95 percent confidence intervals.

Research in progress

Energy and water in California

A study by University of California water scientists analyzed various potentially feasible alternatives (ground water, surface water, desalinization, wastewater reclamation) in terms of electrical energy required to deliver water to water-short areas, particularly southern California.

The researchers calculate that despite all the electricity it generates, water flowing to southern California through the State Water Project (SWP) is a net user of energy, losing 2,500 to 3,500 kilowatt-hours of electricity for each acre-foot of water delivered. The federally operated Central Valley Project (CVP) produces somewhat more energy than it uses.

Taking the salt out of brackish water or reclaiming municipal wastewater (now severely restricted by health regulations) would cost from 3,000 to 4,000 kilowatt-hours per acre-foot of water. Desalting seawater would cost as much as 20,000 kilowatt-hours per acre-foot.

The report concludes that if water demand in the state during the next century outgrows the ultimate capacity of existing systems, the energy cost for desalting seawater or reclaiming wastewater may turn out to be less than the cost of importing new water supplies from far-distant sources.

New project:

Environmental quality in lakes and streams

Physical and chemical measurements of California lake and stream water have limited value in that they only reflect conditions at the time of sampling. The objective of this new project is to develop the concept of biological indicators as long-term monitors of environmental quality. Selected streams and lakes throughout California will be examined in detail, and a sampling system will be established for biotic collections and measurements of key water chemistry and physical properties. Data will be used to prepare predictive models of the dynamic interactions occurring in lakes and streams. Project leader is V. H. Resh, U.C., Berkeley.