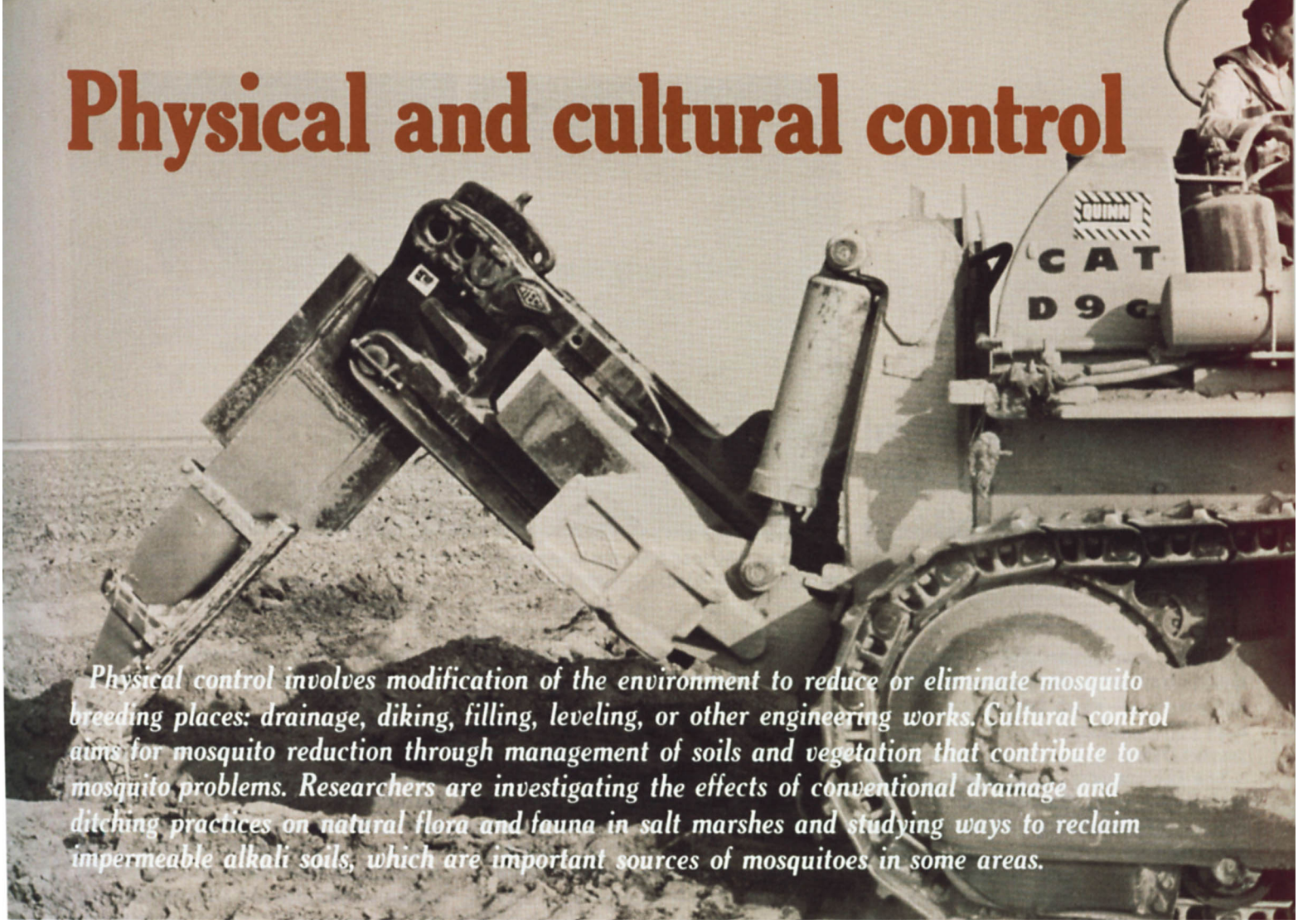
Physical and cultural control



Physical control involves modification of the environment to reduce or eliminate mosquito breeding places: drainage, diking, filling, leveling, or other engineering works. Cultural control aims for mosquito reduction through management of soils and vegetation that contribute to mosquito problems. Researchers are investigating the effects of conventional drainage and ditching practices on natural flora and fauna in salt marshes and studying ways to reclaim impermeable alkali soils, which are important sources of mosquitoes in some areas.

Photo by W. E. Wildman

Reclaiming alkali soils to reduce mosquito breeding sites

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Irrigation of sodium-affected (alkali) soils used for hay production and cow pastures creates extensive mosquito problems in some dairy areas of the San Joaquin Valley. This land is relatively cheap and has attracted dairymen forced to move from southern California because of high-priced, heavily taxed lands. Pasture production on their Central Valley acreage is negligible because of soil impermeability. When the land is irrigated, water tends to collect in puddles and pools, drowning out grass and creating ideal mosquito breeding sites.

The solution to this problem is to improve soil permeability. Some soils of this type have been reclaimed through the use of gypsum and sulfuric acid treatments, but others have not responded satisfactorily. In a six-year field study, the gypsum-sulfur treatment failed to demonstrate any perceptible change in permeability, and the mosquito problem was not measurably resolved when soils were treated with gypsum at rates of 5 to 15 tons per acre.

Another approach has been suggested based on empirical evidence that sodic soils may be improved through the application of large amounts of animal manure with or without gypsum. This approach appears particularly suited to dairies situated in the sodic soil areas where manure not only is available in great quantities, but also is a mosquito and sanitation problem when allowed to accumulate in manure storage ponds over long periods.

The experimental plan for this study includes (1) deep-ripping hardpan layers under sodic soils to prepare for deep leaching, (2) laser leveling to ensure uniform water application, (3) mixing into the soil enough manure to physically induce an increase in water infiltration to at least 18 inches deep, (4) adding the required amount of gypsum to half of the manure-treated plots, (5) adding gypsum alone as well as manure alone, and (6) growing barley and corn crops to assess the degree of reclamation attained.

If successful, the project will have a three-way benefit: The dairy owner will have a convenient and useful site for manure disposal. It will be possible to grow a crop that is worth more than pasture. The mosquito and farm sanitation problem will be greatly alleviated.

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