of city people. It is heartening that 9 percent of the customers mentioned helping small farmers as a reason for shopping at a community market. Many of the growers and their regular customers know each other by name.

Many important questions still await further research, such as effects of the market on the surrounding area. The San Luis Obispo market is held on the parking lot of a local supermarket, whose manager considers the farmers' market to be a boon for business, because it brings customers who still need to buy other products. Chambers of Commerce in some other states actively support farmers' markets as a means of keeping the downtown healthy. The entire fresh produce industry benefits from an increase in consumer awareness of the quality of fresh fruits and vegetables.

In most California cities, the markets are open only one day of the week. Many customers find that this is not sufficient to keep fresh produce on the table. Nor does it provide small farmers with a sufficient outlet for their crops. The long-range solution would be local markets open two or three days a week linked in a regional network, such as the two market linkages in the state, in San Luis Obispo-Salinas-Santa Cruz and Davis-Woodland-East Yolo-Dixon, where the same sellers can make a weekly circuit. Most growers also sell through you-pick, roadside stands, or regular wholesale channels. For the sellers as well as the customers, the markets are an incremental rather than a primary outlet. However, the existence of markets has encouraged several small growers to expand their operations and to alter their planting schedules so that they will have many varieties of items ripening throughout the growing season.

California's certified farm market program is alive and healthy. Although only one market is more than a decade old, they have developed a cadre of satisfied regular customers. For most, the period of initial adjustment is over and the managers and small farmers can now look forward to consolidation and expansion. Conditions of certification make it unlikely that these markets will grow beyond a certain size. The bustling public markets in other cities, such as Pike Place in Seattle or Boston's Quincy Market, are a mix of coffee shops, boutiques, craftspeople, as well as small growers. The certification regulations are likely to keep California's community markets small, local, and "pure."

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Dense sod of dwarf spikerush covering the bottom of the Corning Canal has replaced the sago, curlyleaf, and slender pondweeds that previously grew there. Water flows have increased as a result.

Spikerush may help control waterweeds

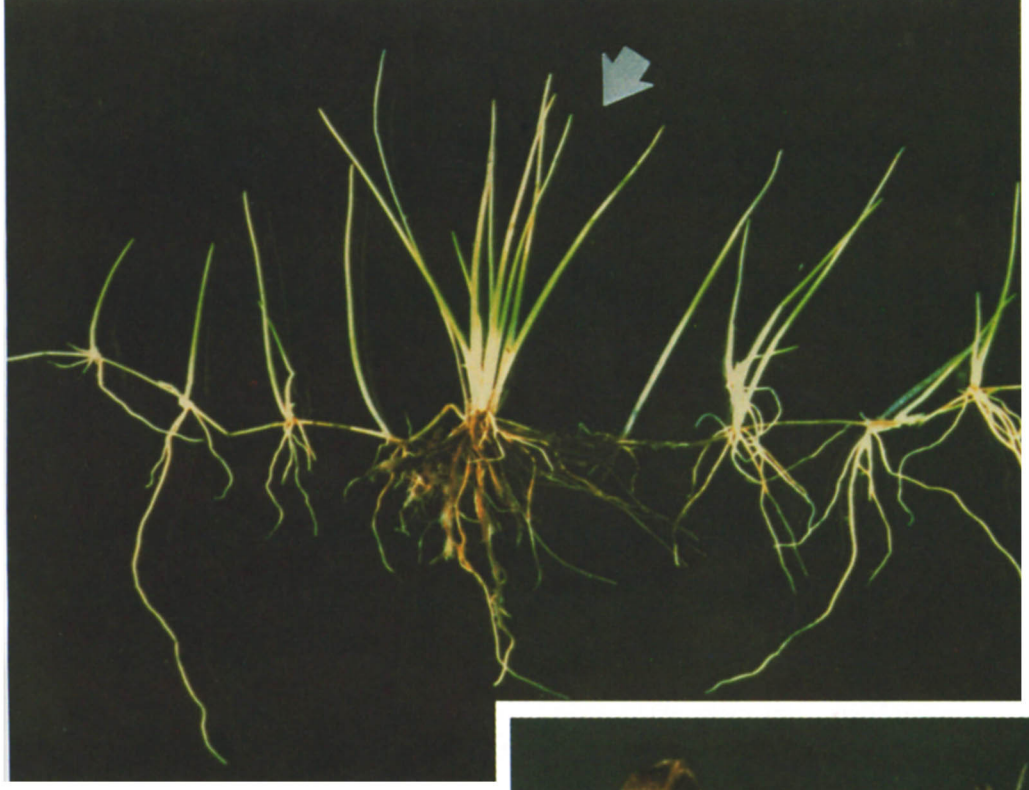
Richard R. Yeo

A promising new method for managing waterweeds that could be both economical and enduring is being investigated. Three low-growing aquatic plants have been found to invade areas occupied by rooted submersed aquatic weeds and to slowly displace them. The plants are dwarf spikerush [*Eleocharis coloradoensis* (Britt.) Gilly], barbed spikerush [*E. parvula* (R. & S.) Link], and slender spikerush [*E. acicularis* (L.) R. & S.]. They form large mats of lawnlike sod underwater. Not only do these plants replace submersed waterweeds under suitable conditions, but the crowded upright needlelike culms on the upper part of the spikerush plants can prevent the roots of young floating waterweeds from anchoring in the bottom soil.

The presence of spikerush sod in water transport and holding systems is much more desirable than having submersed waterweeds that grow to the surface through the entire water profile. Compared with the resistance to flow caused by waterweeds, these 2- to 6-centimeter-tall spikerush plants do not appreciably interfere with the water flow in channels. Their presence also improves navigation, swimming, and esthetic values in reservoirs and ponds.

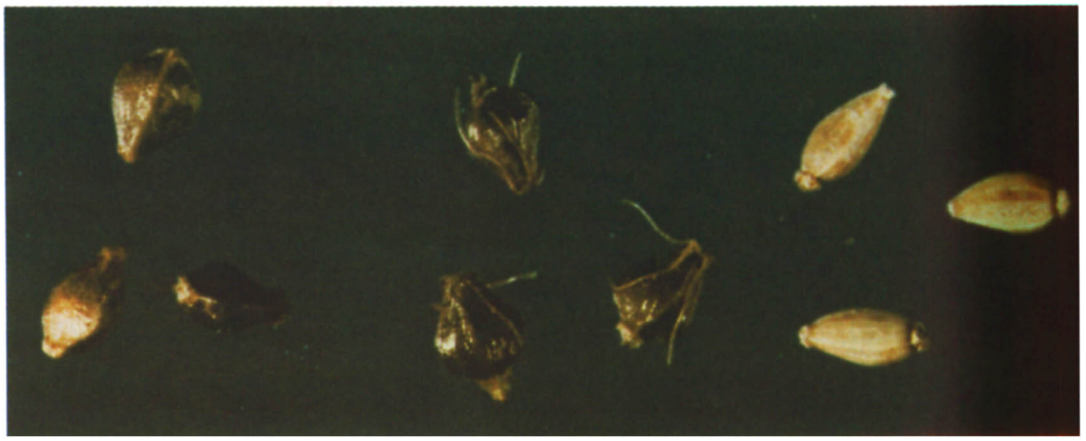
Several water systems in California have large populations of spikerush, including the Corning Canal in Tehama County, Solano Irrigation District in Solano County, South Sutter Irrigation District in Sutter County, Lake Almanor in Plumas County, Lake Valley Reservoir in Nevada County, and the Ground Water Recharge Facility at Fresno. Dissemination of seed by migrating waterfowl and shorebirds, and flowing water are probably the reasons these plants are so widespread.

Spikerush plants displace rooted and submersed aquatic weeds to depths of 1.5 meters in clear water. Displacement is fastest in canals and reservoirs that have a periodically fluctuating water level or that are emptied during the winter. Spikerush plants thrive both underwater or emersed;



A single spikerush plant consists of many rosettes growing in a chainlike series. The parent rosette (arrow) develops rhizomes that grow just under the soil surface, connecting the rosettes to each other.

Naturally occurring spikerush can displace waterweeds in canals and reservoirs. Researchers are seeking ways to establish the sod-forming plants.



The three short-growing spikerush species have similar foliage, but their seeds differ: dwarf spikerush (left); barbed spikerush (center); and slender spikerush (right).

they grow vigorously as long as their roots remain wet. In contrast, the foliage of submersed waterweeds dries up when it is exposed to air, and the plants cease active growth. Because the spikerush plants continue to grow well in wet soil, they invade areas occupied by the dried waterweeds. The spikerush plants also appear to have a competitive advantage in inundated habitats, because they generally continue vegetative growth after other waterweeds become senescent in the fall.

Monitoring the spread of dwarf spikerush in the Corning Canal for several years showed that several pondweeds were displaced in the upper 2.3 kilometers of the canal during the first 4 years. The waterweeds in the next 29 kilometers were displaced in the following 6 years. Although individual spikerush plants grow rapidly (a single plant can span a distance of 1.5 meters in one year), it usually takes a long time to establish a dense population that will displace waterweeds. This period may be shortened by using selected aquatic herbicides to suppress the growth of the waterweeds without harming the spikerush plants.

Methods for establishing spikerush plants are being studied. Current techniques include collecting and planting seed, tubers, and pieces of sod. Quiet waters are a prerequisite for sowing seed and tubers. Using hardware cloth to fasten pieces of sod up to 10 centimeters square to the bottom soil, 0.3 to 0.6 meter apart, is one of the more successful methods at this time for establishing plantings in slow-moving water.

Excessive water movement, such as that caused by a strong wind, adversely affects established stands, because it uproots large mats of spikerush sod. Also, draglining or deep-plowing established stands of spikerush plants reduces or eliminates them. Spikerush plants do not tolerate being buried, and they die when they are subjected to siltation rates greater than 1 centimeter per week. Shallow disking or rotary-tilling tends to promote rapid growth, making the soil more permeable.

This promising method of aquatic weed control is the subject of a 5-year pilot pest management study conducted by the Science and Education Administration, Agricultural Research of U.S. Department of Agriculture (USDA), and the University of California at Davis with special USDA funding. The results of this study should answer many of the questions on the biology and ecology of spikerush plants and develop an economically and technically feasible approach to using these plants to help solve California's increasing aquatic weed problems.

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