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## Taming the tap

Matthew E. Green, Special to The Chronicle

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It wasn't by choice that Dan Lehrer cut off the water supply to his apple trees. When the irrigation system on his organic farm in Sebastopol broke down five years ago, repairing it was too costly, so his entire orchard of Red Rome Beauty and Golden Delicious went cold turkey.

Accustomed to enjoying drip irrigation 24 hours a day for roughly five months at a time, the trees were thirsty and stressed, but began producing smaller fruit that was less waterlogged and resulted in notably richer and crisper apples. They ripened later and kept better in storage. Meanwhile, Lehrer saved a hefty chunk on his water bill and conserved thousands of gallons each season, both from his well and from the public supply - notable in this low-water area of western Sonoma County. His apples haven't seen a drop from the tap since.

"The quality is way better," said Lehrer, who owns Flatland Flower Farm and sells his fall harvests at several Bay Area farmers' markets and to the Berkeley Unified School District. "We have to be very careful about water use at all times. We just don't have a lot ... The trees might not be that happy, but it's great for the fruit."

Lehrer is among an increasing number of regional farmers who have taken to cultivating certain hearty crops, notably tomatoes and a variety of fruit trees, without the use of irrigation. The loosely defined technique, known as dry farming, relies almost exclusively on seasonal rainfall and residual moisture in the soil. The practice was status quo among Napa Valley grape growers up until about a half century ago.

### Training vines

"It's all about training the vines to reach down in the soil structure," said Frank Leeds, the vineyard director at Frog's Leap Winery in Napa, which farms 95 percent of its vines without irrigation and reports conserving at least 16,000 gallons of water per acre-foot.

With ancient agricultural roots traced back to semi-arid and arid regions across the globe, from

olive groves in the Mediterranean to Native American gardens of corn and beans in areas of the Southwest with less than 7 inches of annual rainfall, dry farming is the quintessential, and saliently relevant, example of doing more with less.

And it's something, asserts Lehrer, that many residents in the Bay Area can do in their own gardens.

After an alarmingly dry January, California is heading toward its third year of drought conditions. One ramification: Producing food with minimal irrigation may soon switch from an alternative method to a full-out necessity for Northern California growers.

And economic woes and steep grocery bills have led a growing number of cash-strapped Bay Area residents to revisit their backyards and community gardens to start growing more of their own food.

### **Facing reality**

Lehrer's wife, Joanne Krueger, who grows plant starts at Flatland and sells them at Bay Area farmers' markets, said she's seen a notable increase in sales during the past two years. And while few oppose growth in urban food production - especially as it generally uses far less resources than landscaping - a spike in the number of gardens does inevitably mean an increase in residential water use.

"For sure, people are going to have to cut back on water use," said Lehrer. A former Bay Area journalist, he and his wife quit their desk jobs in the mid-'90s to become urban farmers. They initially grew plant starts and cut flowers in their home garden in the West Berkeley flats (hence the name of their current hillside farm). They then expanded operations to three other Berkeley backyards before buying the 22-acre property in western Sonoma County 10 years ago.

"The good news is that they are able to grow really high-quality tomatoes with very little water. Apples too. It's something that backyard gardeners can discover," Lehrer said. It seems like the logical thing to give plants a lot of water, he adds, "but that's not always the case."

Lehrer, 43, stands in a bare field at the top of the farm's gradual slope, the soft light of the late afternoon retreating quickly over the original orchard below. It's been an unseasonably warm winter here, and the trees are already beginning to bud, months ahead of schedule. Marked by tractor wheel tracks, this empty plot will be planted with new apple trees in the early spring. The shaped rows are at a slight grade so rain can collect in small pools and run down into the roots of the trees, a nifty design trick that will prevent erosion and allow the fledgling orchard to thrive without irrigation.

### **Size vs. taste**

Lehrer said the simple reason for why more fruit growers aren't farming this way is the profitability factor. Because of their long roots, dry-farmed trees and plants have to be spaced farther apart. The fruit also grows slower and, despite the boost in flavor, is notably smaller. Lehrer refers to most apples at supermarkets, which are huge largely because of their water content. They're mostly tasteless, he said, but they're heavy, and that's what's important at the cash register. "Farms get paid for size, not taste."

Best practices for dry farming vary widely, depending on who you ask, and there are few absolute rules. The basic idea is to keep the soil moist for as long as possible and train your plants to establish deep roots that seek it out. Some seasoned commercial farmers say it's a complex process requiring a generous amount of space and a certain method of tillage that can break up capillaries to allow for moisture to be captured and retained in the soil.

Opinions also differ on what crops can successfully withstand withdrawal, and whether plants should be irrigated minimally or starved completely.

But for folks who simply want to grow really good produce without sucking the state dry, Lehrer argues, it need not be so complicated.

"That kind of stuff tends to intimidate people, the need to do fancy tricks" he said. "For me, 99 percent of it is getting it in the ground."

### **Using less water**

Even if dry farming is not for you, there are ways to save water in your home or community garden. Here are some tips from urban gardener Antonio Roman-Alcala and Flatland Flower Farm's Dan Lehrer.

**Always use mulch.** Mulch (any organic material placed at the surface of the soil) will prevent evaporation and retain soil moisture. It also regulates soil temperature, suppresses weeds and provides a habitat for beneficial organisms. Straw is good for annual beds and wood chips for perennial crops.

**Drip irrigation.** If you have to irrigate, use drip lines as much as possible. They are far more water efficient than sprinklers and hoses and deliver water where it's needed - to the roots, rather than the leaves. It also reduces mildew and disease.

**Watering schedule.** If all you've got is a hose, reduce evaporation by watering in the early morning or evening, not during the heat of the day.

**Water catchment.** During the rainy season, capture precipitation in barrels, small ponds and other storage containers. Although the legality is in question if not up to code, home gray-water

systems are also a way to recycle large amounts of water from sinks and showers.

**Plant thickly.** Reducing open space in beds will cut down on evaporation.

**Row cover.** The translucent fabric can be draped over crop rows to protect against pests and help retain moisture and heat.

### **What to plant**

Flatland Flower Farm's Joanne Krueger recommends these non-edible plants that look good and don't ask for much in return.

Succulents, Kangaroo Paws, asters, lavender, blue-eyed grass, bay trees, rosemary, artemisia, perennial sunflowers, gladioli and a variety of bulbs, especially daffodils.

### **Tips, techniques and how-tos**

Several parameters should be considered to grow food crops successfully without irrigation, says Dan Lehrer.

For one, it won't work with greens and other water-dependent plants, which will quickly wither in dry months. Dry farming is also geographically specific, generally exclusive to temperate coastal climates with periods of consistent rainfall, as well as some fog exposure.

In addition, it's necessary to have a decent amount of space and deep, rich clay soil without any obstruction. It won't work in pots, since the roots should reach down far, upwards of 10 feet in the case of tomatoes. This factor is an automatic deal breaker for people gardening in raised beds or in yards on top of concrete foundations. Also excluded are most residents of San Francisco's Sunset and Richmond districts, who live on sandy ground that won't hold enough moisture during dry months.

But it can be done in areas of the city where food has traditionally been grown, including the Mission District, Bayview-Hunters Point and Noe Valley, said Lehrer. And, he adds, it's perfect for the rich clay alluvial plains of the East Bay that stretch from the flatlands in Richmond to the red earth of San Jose.

The chances of success for the plants will also increase if the soil is amended with compost before transplanting, and a generous helping of mulch laid down afterward to hold in the moisture.

"In the Bay Area, in a normal year of rainfall - though clearly normal may no longer exist - one can grow lots of crops over the rainy season with little or no additional irrigation," says Antonio Roman-Alcala, an urban gardener who works at Alemany Farm, a community project on a 4 1/2-acre plot off I-280 in the south end of San Francisco.

For the past two summers, the farm has grown dry-farmed tomatoes and this summer will likely try to dry-farm pumpkins as well. Outside of summer, Roman-Alcala notes, garlic, onions, cole crops like kale and collards, fava beans, peas and others can grow with minimal irrigation from October to June. "If there is enough rainfall, you just plant, maintain and collect your produce. No watering necessary."

Most experts agree that the best dry-farmed returns come from tomatoes, especially the Early Girl variety, a popular and hearty hybrid with deep roots.

"They're a really tough plant," said Lehrer. He notes that in the middle of the summer, after months without water, the plants might not look great. "You'll start to worry about them, but don't worry about it. They're putting all their energy into the fruit."

Jim Leap, the farm manager at the UC Santa Cruz Center for Agroecology and Sustainable Food Systems, began dry-farming Early Girls 19 years ago, a technique he learned at Molino Creek Farm in Davenport (Santa Cruz County). He's been teaching his students how to do it ever since, and has more recently experimented with beds of winter squash, dry beans and grain corn, as well as apple and apricot trees. He also knows of a Marin farmer successfully dry-farming potatoes.

"People just like to water plants, and plants just don't need that much water," he said, noting dry farming also cuts down significantly on weeds.

When Leap first started selling his dry-farmed Early Girls at local farmers' markets, they sold like hotcakes as customers became quickly enamored by their uniquely sweet, rich flavor. He describes a trial test he once did with irrigated and dry versions of his Early Girls, finding the former, in comparison, completely devoid of flavor. During one year, he said he made \$10,000 selling dry-farmed yields from a third of an acre alone. But in recent years, he's lost that market niche as more small farmers are growing them, some his former students. "Our sales are way off because there's so much more on the market," he notes. "You can blame us because we taught everyone else how to do it."

Leap said the challenge is to get the timing just right and trap the moisture by tilling the soil after the rainy season. In years of standard rainfall, he then transplants his tomato starts in late May. The plants will send roots into the moisture layer, typically as much as 10 feet down into the deep clay in search of residual rainfall.

Full sun exposure and generous spacing is required to accommodate the plant's extensive root system, he adds, which may be a limiting factor for home gardeners. He's calculated that each season, his crop conserves about 325,000 gallons of water per acre-foot compared to their irrigated counterparts.

"I'm this one lone voice in the woods, saying, 'You don't need to water, let it go,' " said Leap, noting

that many growers make the common mistake of watering heavily after transplanting, causing the plant to establish a shallow root zone and immediately wilt without steady irrigation. "If you over water, you're just leeching nutrients into the groundwater and wasting precious resources during drought times."

- M.G.

**Inside:** For a selection of drought- and bee-friendly perennials, see Check It Off on Page **F2**

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