

## Grow More by Paying Attention to Microclimates

By Joel Glanzberg

Microclimates are small niches of climate significantly different from the larger surrounding macro-climate. Microclimates are useful for extending the plant diversity and growing season of an area, as they allow us to grow plants that will not grow or fruit in the macroclimate.

Microclimates are created by landscape features such as hills, canyons, cliff faces, and by human-made structures like buildings and walls. For example, a south-facing wall or cliff not only reflects heat to plants in front of it, but acts as a thermal mass, storing heat during the day and radiating it at night. It also acts as a windbreak and protection from cold air drainage. Wildflowers can always be found blooming against south facing cliffs long before and long after specimens in the open. In the intense sunlight of arid regions, all these effects are pronounced, resulting in an incredible diversity of life.

Night sky radiation is also an important factor in microclimates. It is at night that the frosts occur, that limit plant growth and species selection. On clear nights the earth radiates the heat gained during the day out to the night sky. If the sky is cloudy the cooling is



much less. Tree cover or the building overhang can have the same effect as a cloudy sky. If a plant is against the south wall of a building and under an overhang, the growing season can be extended even longer.

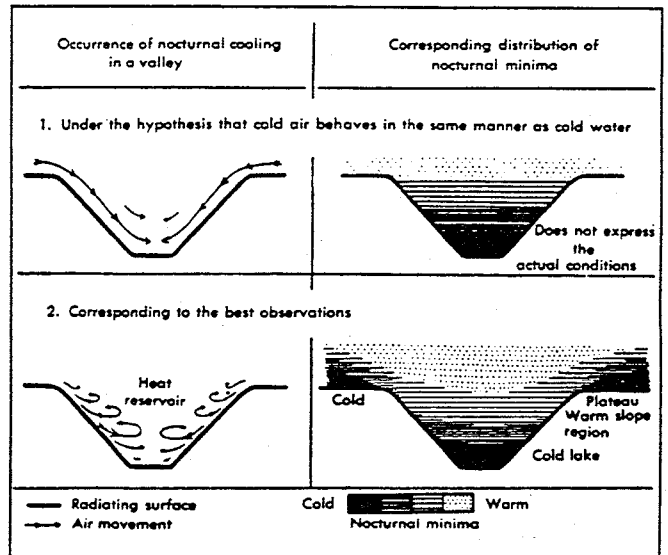
Heat is not only radiated directly overhead. The entire visible night sky is radiated to. For example, in a large forest clearing, there will be more frost and lower night temperatures than in a smaller clearing because more heat is lost by radiation.

Another microclimate condition arises due to cold air drainage. Because hot air rises and cold air falls, the lowest points of the landscape will have colder night temperatures. Cold air drainage is unlike water in that the isothermal bars conform more to the contour of the land rather than simply the elevation. Because cold air drains below, a warm thermal belt occurs about 2/3 to 3/4 of the way up a hillside. In low desert areas these hillsides can be frostfree, so frost-intolerant plants can be grown in macroclimates that experience frosts.

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## Microclimates

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This thermal belt is generally where gardens and orchards should be planted, unless a cold microclimate is needed, such as for apples or cherries in the low desert. In the high desert, peaches, apricots, almonds and other frost sensitive plants should be planted in the thermal belt where there is good frost drainage.

Cold air drainage, like water drainage, can be stopped by barriers. A wall, thick band of trees, or a railroad embankment running across a slope, will stop cold air, which will build up - causing a warmer air pocket immediately below. This makes it possible to create cold microclimates higher up a slope and warm ones lower down. If the barrier is angled down the slope, the colder air will continue to drain but won't affect the area below the barrier.

In the high desert, warm microclimates are important for extending the growing season. But throughout arid regions, cool, moist microclimates are important. They are the niches of favorable climate for establishing plants. Wherever the climate is cooler and more moist there will be more water available for plants. This is why little canyons and cracks in rocks are places where plants flourish in desert regions.

We can create these microclimates as well. By surrounding gardens with windbreaks, and planting trees and climbing vines throughout, we can keep our gardens cool and moist. The trees and trellised vines also minimize night sky radiation and frost, as do the windbreaks. The windbreaks can also serve as cold air drainage barriers, if that would be called for.

Microclimates occur naturally but are easy to create and utilize. Unfortunately we tend to create unwanted and unused microclimates such as baking parking lots and city street wind tunnels. It's time to create more life-enhancing niches so we can sit in the shade and listen to the dull thud of ripe fruit falling.

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