Desert Wildflowers

Mark Wheeler

A spring bloom in the Southern California desert is truly one of Nature's most spectacular surprises. All of a sudden, lands that appear to be almost lifeless literally explode into vivid color and the busy business of living. During the peak of many spring blooms, it's next to impossible to walk anywhere on the landscape without trampling wildflowers, and many observers are often overheard to exclaim: "What a miracle this is." They wonder, "How could such a wasteland produce this bounty?"

To the same extent that Southern California desert lands are far from being "wastelands" and "lifeless," neither is the magnitude of a desert bloom a miracle, at least not in the supernatural sense of the word.

The operational mechanisms of the many different spring wildflower species that call the desert home are finely tuned to the challenges of local conditions. This, in turn, requires a certain procedural routine in their growth habits. Although there is a certain amount of variability involved in this growth routine, any significant deviation from it will almost certainly mean failure for the plant.

Fortunately, the species we recognize as spring wildflowers — but that are more properly called "winter annuals" — have adapted over time to be quite accomplished at following routine. In fact, the category of plants classified as annuals are more abundant in desert areas than they are in any other geographical zone. If it's wildflowers you want to see, watch for them to bloom in the desert.

WINTER ANNUALS

Forty percent or more of the plant diversity to be found on Southern California desert lands, depending on specific location, is accounted for by winter annuals. In some areas, lowlands in Death Valley for instance, it can be as much as 90 percent. This means that, conversely, when these plants aren't present, the species variety seen by any passer-by in any particular area will only be 10-60 percent of all the species that grow there.

These plants remain underground in seed form until local conditions trigger their growth, and the conditions they respond to are those that develop, at least in most of the Southern California region, during the mid to late fall. Survival of these plants in the Mojave and Colorado Desert environments has, over time, become tightly linked to fall and winter periods of the regional climatic cycle.

Winter annuals simply do not thrive in the hot temperatures so characteristic of desert climate. At about 77 degrees Fahrenheit, their chemistry reacts in a way that markedly

slows the rate of photosynthesis they can conduct, and this reduces the energy they have for living. Winter temperatures are far more agreeable, and it is during this season that they stand the best chance of establishing a solid plant structure that will support them through the life cycle.

GERMINATION

It all starts with germination of the seed, but this process has a catch. Almost all desert plant seeds are enclosed in a hard protein coating. This protects them from a variety of environmental hazards such as abrasion, drying out and, in some cases, even predation. These coatings are water-soluble, but it takes a measurable amount of water to accomplish the task, meaning that a rain of some substance is required.

In the deserts of Southern California, strong rains tend to arrive during summer as thunderstorms, and during the late fall and early winter as part of the typical winter weather cycle. The rain from summer thunderstorms, although it may be plentiful, doesn't usually last long enough on the landscape surface to penetrate into the soil. When the clouds break and sunlight once again reaches the ground, the water simply evaporates.

Late fall and winter rains, on the other hand, may remain longer on the ground due to reduced solar heating during those months. And, if the rainfall volume is sufficient, it can saturate the ground enough to soak seed coatings and break them down.

Desert plant authorities tend to agree that a really good spring wildflower show must be preceded by a strong, triggering mid- to late fall rain of an inch or more. This inch must occur in one rainfall event, or fall intermittently within a 24 hour period, and it must arrive sometime between mid-October and mid-December. Thereafter, some rain should fall every month through March in order to nurture the germination and bloom.

It takes time for seeds to develop the underground structure to support plant growth and winter is the ideal window of opportunity for this. By the time the plant breaks ground with a seedling and spreads a base of leaves, the temperatures are still cool to cold and the plant doesn't have to contend with heat stresses. It can remain small and near to the ground for protection from cold until days grow longer and warmer.

When the days do grow longer and warmer, the seedlings are poised to take quick advantage of conditions and start to produce a stalk, more foliage and, eventually, flowers. In a typical year, this phase of the life cycle will begin about end-January to mid-

February, which will normally give the plant another two to three months to fully mature and produce seed.

The triggering rainfall in mid- to late fall is the environmental cue for winter annuals to become active. If rain doesn't fall at this time, germination won't usually take place, or if it does, it will be sparse and anemic. Furthermore, chemical growth inhibitors in the seed coating prevent the seed from responding to heavy rains at other, less favorable times of the year.

These inhibitors also set a kind of biological clock in the seeds which prevents all the available seeds for the many different species from blooming all at once, even when conditions are ideal. In this way, the various species in any given area are protected from being coaxed into germination by a strong fall rain and then dying out during later phases of growth because additional rain didn't fall.

EXCEPTIONS

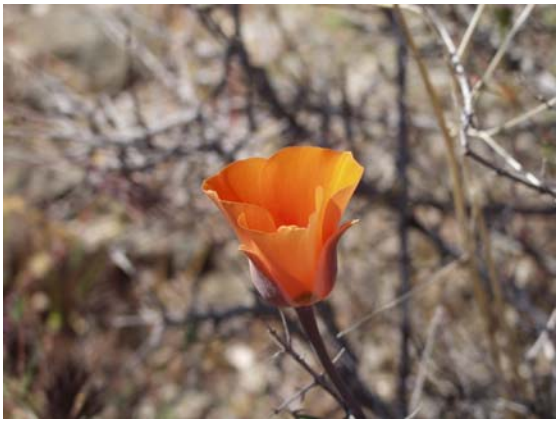
Two local rainfall/temperature scenarios will permit spring wildflowers to deviate from the norm. As Schoenherr (1992) explains it: "If rainfall doesn't arrive until mid-December, then germination will require an inch of rain coupled with soil temperature greater than 50 degrees Fahrenheit."

A soil temperature of this amount is unlikely in the higher desert regions of Southern California during December and January, although such conditions are reasonably common in the Colorado Desert areas. What the Colorado Desert areas typically lack at this time of year is the rainfall.

The other exception is what many call the "March miracle." This opportunity requires two inches of rain in one rainfall event, and may take place if the rains arrive as late as early April. Soil temperatures are sufficiently warm at the time, and the rainfall volume is sufficient to nurture rapid growth.

It is their need to grow rapidly that is the key to understanding the bloom schedule of winter annuals. They need tolerable soil temperatures and sufficient water in order to blossom, and they must also avoid extended exposure to very hot sun and successive days of hot, dry winds. Either of these two conditions can put an end to even the most ideal spring bloom. Fortunately, in the Southern California region, conditions like these are not the norm during spring.

Of course, this scheduling formula doesn't apply to either perennials or summer annuals. Both of these categories of plant have their own particular life cycles and they have adapted to survive in the desert landscape in ways altogether different from the winter annuals.



Perennials are the shrubs and trees that survive year after year on the desert landscape. Although many of them may also take advantage of spring conditions to blossom and reproduce, these plants are far more structurally and physiologically adapted to cope with desert conditions than are the winter annuals. Consequently, they may take advantage of rainfall opportunities at other times of the year and bloom when winter

annuals simply could not survive.

Summer annuals are plants that also complete their life cycle in a very short time. However, unlike winter annuals, these plants require higher soil temperatures to thrive and will only appear if ambient daytime temperatures are over 77 degrees Fahrenheit.

There are comparatively few of these species in the Southern California deserts, since their preferred range is farther east where summer rains are more dependable. The few species we do have, though, are prolific, and quite often after a strong summer thundershower, their foliage and color will transform an otherwise dull summer landscape into a genuine showcase.

LIFE OUT OF SIGHT

The presence of plant life in a forest is easy to see because of the continuously visible plant structure of trees and their canopies. It's different in the deserts. Very much of the plant life present at any given time is buried underground in dormant seed stock. The fact that it can't be seen doesn't mean it isn't there.

Seed banks for winter annuals can be prodigious. Sowell (2001) cites field survey results that have determined an average of 370 seeds per square foot in bajada and alluvial soils. In places that catch windblown sand and debris, many more seeds are found and surveys of these areas have counted as many as 18,500 seeds per square foot.

The seeds for all species are capable of lying dormant for many years without drying out and dying. Predators claim a lot of them for food but the enormous number of them assure some will always survive even the longest droughts and best collection efforts of hungry seed-eaters.

Although very short-lived above ground, the annual wildflowers are a vital part of the Southern California desert ecosystems. Without them, many ecosystem linkages would break down and it isn't too much to say that entire biotic zones would be lost without them. They are everywhere present and waiting the right opportunity to show themselves. Desert's best-kept secret, the annual wildflowers are life out of sight and underfoot…until it rains and they can wave their flags in living proof just how alive and dynamic the desert truly is.

Sources:

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