

## Do Plants Have Calendars? What about Insects?

Those questions came to mind recently when I noticed something on the drive home I had driven by many times but never paid any attention to. There are three agaves next to the driveway into a home that appear to be identical species and identical sizes, presumably all planted next to one another at the same time. There is nothing unusual about that, but now all three have put up a flower stalk and even the heights of the stalks are the same.

Since agaves take many years to bloom, it raises the question of whether the three were all keeping track of the number of years, and at their appointed time, began to put up a flower stalk at the same time.

Agaves are frequently called “century plants” and the “old wife’s tales” about them is that that is how long it takes for them to bloom. The reality is that it doesn’t take nearly that long—the numbers I have seen say 15 to 20 years, maybe less under ideal conditions of soil, moisture, and temperature. We planted several, from small nursery pots, in our yard that have bloomed—one took 15 years, one 14 years and another only about 11 or 12 years. I don’t know how old they were when we bought them, but probably not more than a couple of years.

It would appear, both from the literature and from our experience, that the plants are not responding to a calendar. The most likely explanation is that before the plants can bloom, they have to grow big enough to store enough carbohydrates and other material, and to be able to store enough water, to be able to produce the rather substantial flower stalk (20-30 feet) that their DNA is programmed to grow in just a few weeks. Under ideal conditions, that takes less time than under less-than ideal conditions.

So then the question is, do insects have calendars? Specifically, cicadas? Cicadas are an interesting order of insects, characterized by large widely-spaced eyes and transparent wings. They are best known for loud “singing” by the adults in the summer, before mating and laying eggs in cracks in tree bark. When the eggs hatch, the larva (nymphs) drop off the tree and burrow into the ground, where they undergo several stages (instars) until they emerge and molt to become adults again.

Depending on the species (there are a few thousand world-wide), this process may take a year, two years, or 13 or even 17 years! Most sources say that there are “13 year cicadas” and “17 year cicadas,” which are different species, both of which occur in this country.

That would lead you to assume, perhaps, that 17-year individuals that were adults in 2000 would be emerging this year, whereas individuals that were adults in 1999 would have emerged last year and those from 2001 would emerge next year. But the literature and common popular beliefs would say that, for those 17-year species, the adults all emerge at the same time every 17 years, so that if 2017 is “their year”, then previous

populations would have emerged in 2000, and 1983, etc. There would be no “17 year cicadas” in the intervening years.

Which raises the question, how, or why, do all individuals of that species happen to emerge on exactly the same years and no individuals of that species ever emerge in different years? There is some suggestion that this evolved as a defense mechanism against predators—no predator can wait 17 years for its next meal and if the cicadas all emerge at the same time, then the concentration of predators will never be enough to wipe out the whole population.

Obviously, the situation with cicadas is a lot more complicated than that with the agaves, and much less is known about the details of the insects.

And to complicate the matter further, there are recent articles that claim that climate change has begun to cause 17-year cicadas to emerge 4 years early—or is it that 13-year species have taken over the territories previously occupied by 17-year species?

If all the individuals of a given species in a given area really do emerge only every 17 years, it is hard not to think there is some kind of calendar embedded in their DNA. Or maybe we just don't know as much about these critters as we should to really understand them.

Mother Nature is always interesting and fun to watch.

Until next time...

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