

# Sunflowers Have Circadian Rhythms, Too

By Paige Towers • August 12, 2016 at 4:28pm

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In the fictional story from 1903 titled “Bowser’s Pet Plant”,

a writer tells the story of Mr. Bowser, who loved sunflowers. “There is no vegetable or flower that brings the old days back to me like the sunflowers,” the titular character says. “As a child, I played beneath their shade. As a youth, I watched their golden heads follow the sun from east to west.” Mr. Bowser turns out to be a serial misogynist, blaming his wife when his only remaining sunflower is stolen because she went downtown instead of spending her time at home defending his beloved plant. But still: the sunflower sentiment is beautiful.

And as it turns out, the observation that sunflowers track the sun wasn't a new one: Charles Darwin wrote about the movement of plants based on sunlight in his 1880 book

“The Power of Movement in Plants,”

for instance. But the way young flowers all face east in the morning, follow the sun the west throughout the day, and then tilt back east by morning is still fascinating — so much so that circadian biologist

Stacey Harmer

of UC Davis decided to figure out why juvenile sunflowers are bound by the sun. As it turns out, they have an

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internal clock that works in tandem with their ability to detect light.

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First off, only young'uns track the sun — adult sunflowers seem to 'settle down' and always face east. This is because the sunflowers' genes related to growth allow the stems to bend. After taking samples from different sides of the stem, Harmer and her collaborators, who published their work in *Science*

, found that during the day, the stems' east sides grew; at night, the growth genes were more active on the stems' west sides.

But how did the researchers know that the flowers' circadian rhythms were controlling their growth patterns, and not just the daily movement of the sun?

In order to prove that the flowers had an internal clock, the researchers moved the sunflowers from a field into a lab. Some of the young plants were placed under constant overhead lighting, and despite the 24 hours of fixed light, they still maintained their headbending pattern for several days.

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The researchers also sought to prove the existence of the wee plants' internal clocks by placing them in a room with a 30 hour light cycle. Almost as if experiencing a bad case of jet lag, the sunflowers patterns were disrupted: they bent to the west way before before the room transitioned to dark, and moved to and fro throughout the night.

And, in an effort to understand why the plants stop going through this 24hour circular movement and permanently face east when they're done growing, the researchers studied what happened when some of the sunflowers in pots were forced to face west. The naturally eastfacing sunflowers had higher overall temperatures and attracted more pollinators than those who'd been turned away from the morning sun. The west facing flowers weren't as warm, and thus didn't have as many visits from insects and birds. Poor dears.

Plant or animal, it seems we're all bound by natural rhythms.

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