

# Scientists publish unique genomic discoveries with single molecule, real-time sequencing

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A new paper released in *Nature* today reported the virtually complete draft genome of *Oropetium thomaeum*, a grass species that can regrow after exposed to extreme drought when water becomes available.

The plant's 245 Mb [genome](#) was analyzed with 72x coverage on the PacBio RS II sequencing system by Donald Danforth Plant Science Center researchers and collaborators. The resulting assembly has an accuracy of 99.99995% and includes telomere and centromere sequences, long terminal repeat retrotransposons, tandem duplicated genes, and other difficult-to-assemble genomic elements. This plant was sequenced through Pacific Biosciences' "Most Interesting Genome in the World" grant program to help scientists determine the biological mechanisms behind its extreme drought tolerance for potential application in crop improvement.

"We submitted the idea to sequence the resurrection grass *Oropetium thomaeum* to PacBio because it has the smallest known genome among the grasses. Having the genomic data of a highly drought-tolerant species is really powerful in facilitating crop improvement, and providing a valuable resource for the plant comparative genomics community. Information gained from this collaboration is an important step in the effort to sustainably improve the ability of important food and energy crops to survive in drought conditions without reducing the harvest," said senior author Todd Mockler.

This hearty grass is called a resurrection plant due to its ability to survive in desert-like conditions; even though it looks lifeless, it still has less than a third of its original water content. The tiny C4 [grass](#), which grows on rock outcrops in parts of Africa and India, is closely related to major food, feed and

bioenergy crops and can be revived with a small amount of [water](#), resuming growth. The *Oropetium* genome sequence will contribute to understanding of novel [drought](#) tolerance mechanisms for efficient and productive agricultural land use.

"Our customers often tell us that SMRT sequencing helps them make completely new discoveries in the organisms they study," said Jonas Korlach, chief scientific officer at Pacific Biosciences. "With the highest-quality genome assemblies, targeted sequencing for incredibly complex regions, and the ability to study full-length isoforms as well as epigenetics, PacBio technology portrays a truly comprehensive view of biology that no other sequencing technology can offer."

**More information:** Antonio Bernardo Carvalho et al. Birth of a new gene on the Y chromosome of , *Proceedings of the National Academy of Sciences* (2015). [DOI: 10.1073/pnas.1516543112](https://doi.org/10.1073/pnas.1516543112)

Robert VanBuren et al. Single-molecule sequencing of the desiccation-tolerant grass *Oropetium thomaeum*., *Nature* (2015). [DOI: 10.1038/nature15714](https://doi.org/10.1038/nature15714)

Provided by Donald Danforth Plant Science Center

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