

Published online 23 April 2008 | Nature | doi:10.1038/news.2008.772

News

## Papaya genome project bears fruit

**Hawaiian researchers aim to help transgenic crop gain a bigger market.**

Brendan Borrell

The Hawaii Papaya Genome Project published the complete genome of the transgenic 'SunUp' papaya in *Nature* this week. The papaya marks the fifth plant genome to be completed and the first transgenic fruit crop.

Papaya (*Carica papaya*) is a tropical fruit tree, first domesticated in the Americas and now cultivated around the world, including in Hawaii, where it ranks as the fifth largest crop. The orange-fleshed papaya ranks number one among fruits for vitamin A, folate, and riboflavin. The enzyme papain has also been used in medicine and even as a meat tenderizer.

The SunUp papaya was created by Cornell University scientists to confer resistance to the papaya ringspot virus, which decimated Hawaii's crops in the 1990s. But Hawaiian farmers have yet to receive permission to sell the transgenic fruit in Japan, their primary market. "We decided to [sequence] the transgenic papaya, because we really wanted to help our farmers get through the regulatory process," says Maqsudul Alam, at the University of Hawaii in Honolulu.

The key transgene in the modified fruit comes from the ringspot virus itself, and codes for a viral coat protein. This, says Alam, confers resistance to the plant in much the same way as a vaccine. He thinks that precise characterization of the number and location of transgenic modifications in the papaya, along with data on the expression of associated allergenic proteins, could help the approval process in Japan and in the European Union.

### Small but juicy

At 372 million base pairs, the papaya genome is three times the size of the rockcress *Arabidopsis* genome, but contains 20% fewer genes. It also contains fewer genes than other flowering plants sequenced thus far — just 13,311 genes. The researchers have yet to sequence the natural papaya, but say it will be an easy task with the transgenic genome as a reference.

The papaya genome will be of interest to scientists interested in the dietary benefits of different fruits, the evolution of fruiting trees, and other basic questions of biology. Data from the genome will also help in designing field-based assays to differentiate hermaphroditic plants from female ones — a task that currently takes farmers three to four months of cultivation to achieve. Farmers prefer the hermaphroditic plants for easier pollination.

The researchers say the achievement should also help shift the image of Hawaiian research. "Everybody thinks



Papaya: Hawaii's 5th largest crop.

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we have nice beaches and surf,” says Alam. “Of course, we do. We also sequenced 2.5 billion base pairs in 18 months.”

## References

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1. Ming, R. et al. *Nature*, **452**, 991-996 (2008) | [Article \(http://www.nature.com/doi/10.1038/nature06856\)](http://www.nature.com/doi/10.1038/nature06856) |

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Cultivated, bred, developed by American Indians, papaya is delicious. How did the hermaphroditic features develop? My Indian host family called them 'male' plants, but this suggests how they would fruit.

Posted by: **joe woodside** | 24 Apr, 2008

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