
从群体基因组分析看可可树的驯化过程

作者：writer 来源：科学网

本文原地址：<https://www.iikx.com/news/progress/3263.html>

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论文标题：Population genomic analyses of the chocolate tree, *Theobroma cacao* L., provide insights into its domestication process

期刊：Communications Biology

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发表时间：2018/10/16

论文标签：Genome evolution, Plant domestication, Plant genetics, Population genetics

数字识别码：10.1038/s42003-018-0168-6

原文链接：<http://t.cn/ELWTK6g>

从群体基因组分析看可可树的驯化过程。驯化对现代社会的发展具有很大的影响。近日在Communications Biology上发表的一项研究Population genomic analyses of the chocolate tree, *Theobroma cacao* L., provide insights into its domestication process，通过对可可树*Theobroma cacao* L.的200个基因组进行测序，首次发现了Criollo这一种群在约3600年前(95% CI：2481-13,806年前)经历了高强度的驯化过程。

来自Mars公司的Juan C. Motamayor及其同事发现，驯化过程对以下基因有很强的选择性：与有色保护剂花青素，兴奋剂可可碱的代谢过程相关的基因，以及疾病抗性基因。分析显示，驯化过的*T. cacao*种群Criollo仍然保持了较高比例的高频有害突变。

此外，根据GLM的估算，随着Criollo系谱的增加，每年每公顷可可豆的产量显著减少($P = 0.000425$)，这些数据首次揭示了驯化期间有害突变积累的不断增加对个体适应性的负面影响。

图1：T. cacao 中的群体遗传结构.

摘要：Domestication has had a strong impact on the development of modern societies. We sequenced 200 genomes of the chocolate plant *Theobroma cacao* L. to show for the first time to our knowledge that a single population, the Criollo population, underwent strong domestication ~3600 years ago (95% CI: 2481 – 13,806 years ago). We also show that during the process of domestication, there was strong selection for genes involved in the metabolism of the colored protectants anthocyanins and the stimulant theobromine, as well as disease resistance genes. Our analyses show that domesticated populations of *T. cacao* (Criollo) maintain a higher proportion of high-frequency deleterious mutations. We also show for the first time the negative consequences of the increased accumulation of deleterious mutations during domestication on the fitness of individuals (significant reduction in kilograms of beans per hectare per year as Criollo ancestry increases, as estimated from a GLM, $P = 0.000425$).

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