



PhyloSuite v2: 面向系统发育与分子定年的一体化高效可视化分析平台

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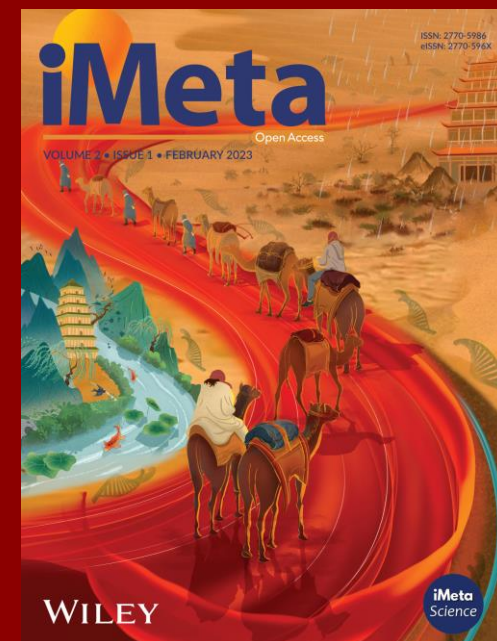
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⁴福建农林大学植物病毒研究所

⁵天津大学环境科学与工程学院

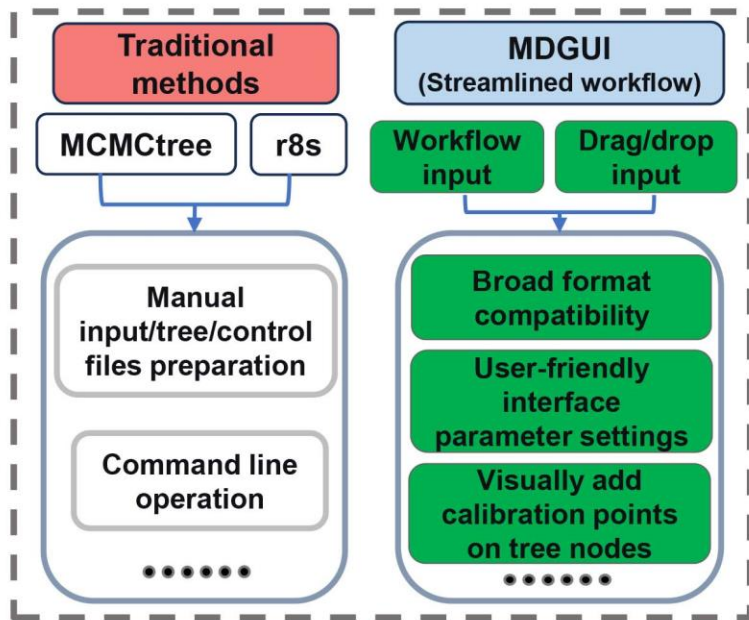
⁶湖南省水产研究所 (湖南省水产原种场)

⁷中国科学院水生生物研究所, 水产品种创制与高效养殖全国重点实验室



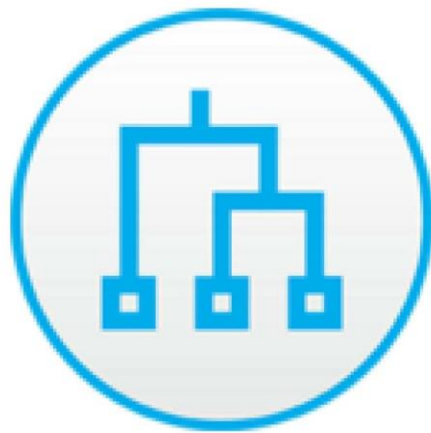
Dong Zhao, Tong Ye, Fangluan Gao, Ivan Jakovlić, Qiong La, Yindong Tong, Xiang Liu, et al. 2025. PhyloSuite v2: the development of an all-in-one, efficient and visualization-oriented suite for molecular dating analysis and other advanced features. *iMeta* 4: e70095. <https://doi.org/10.1002/imt2.70095>.

简介



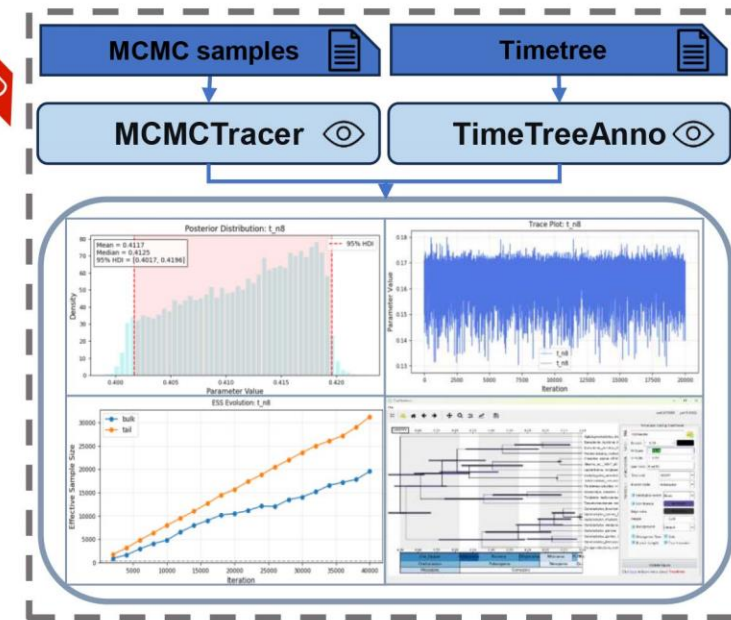
Easy configuration

Molecular Dating Suite

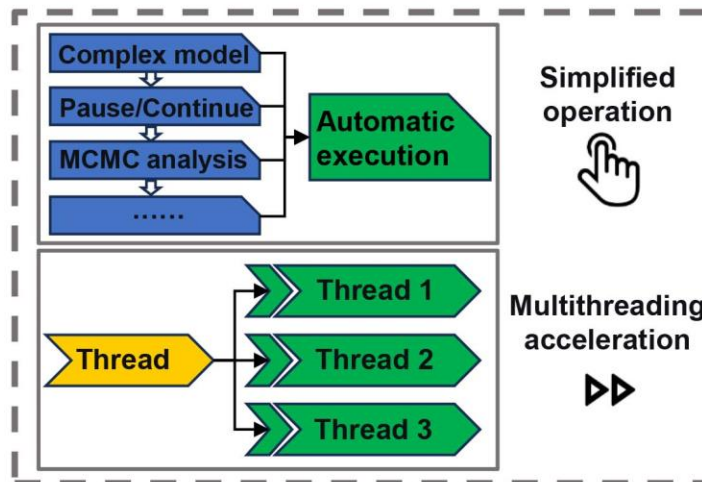


PhyloSuite v2

INTEGRATED



Visualization



Simplification & Acceleration



亮点

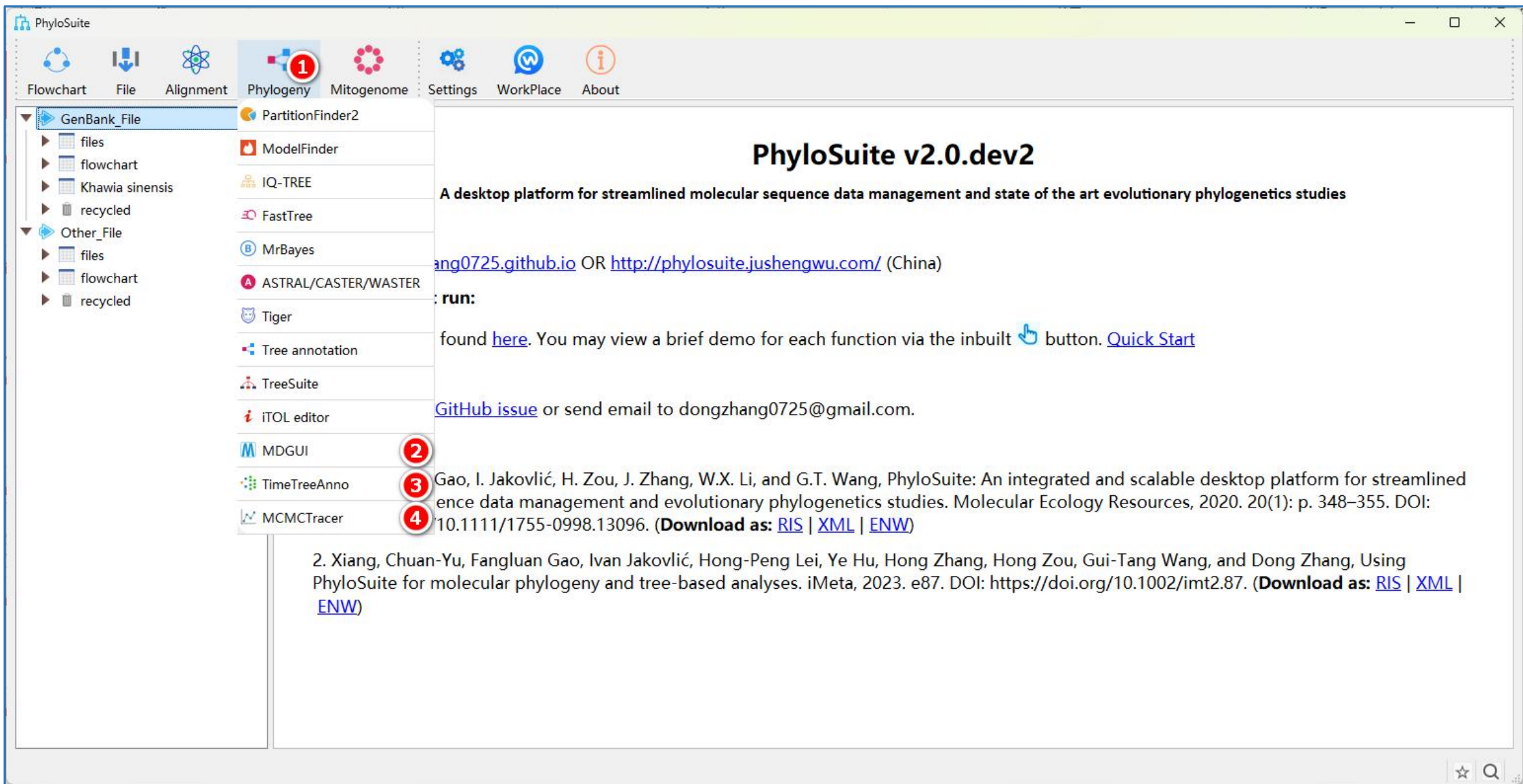


图1. PhyloSuite v2 主界面及分子定年分析套件入口

[PhyloSuite官网](http://phylosuite.jushengwu.com/)

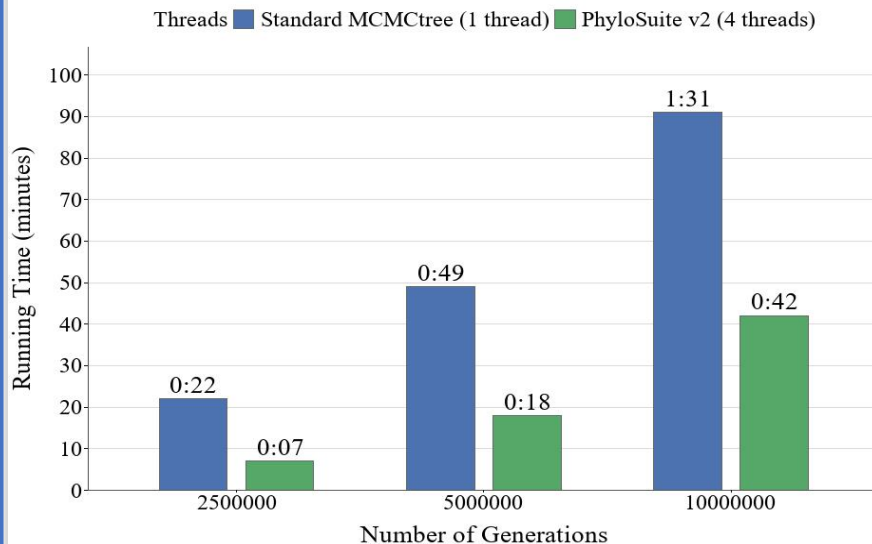
[分子定年分析教程](#)

亮点

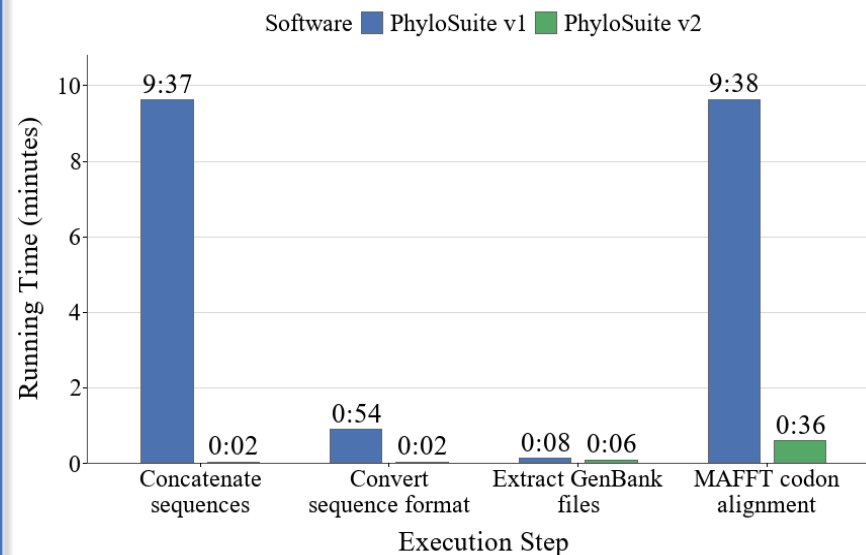
测试数据集 及电脑配置

- 41个物种
- 近37.5万个位点
- Ultra 5 125H
32G

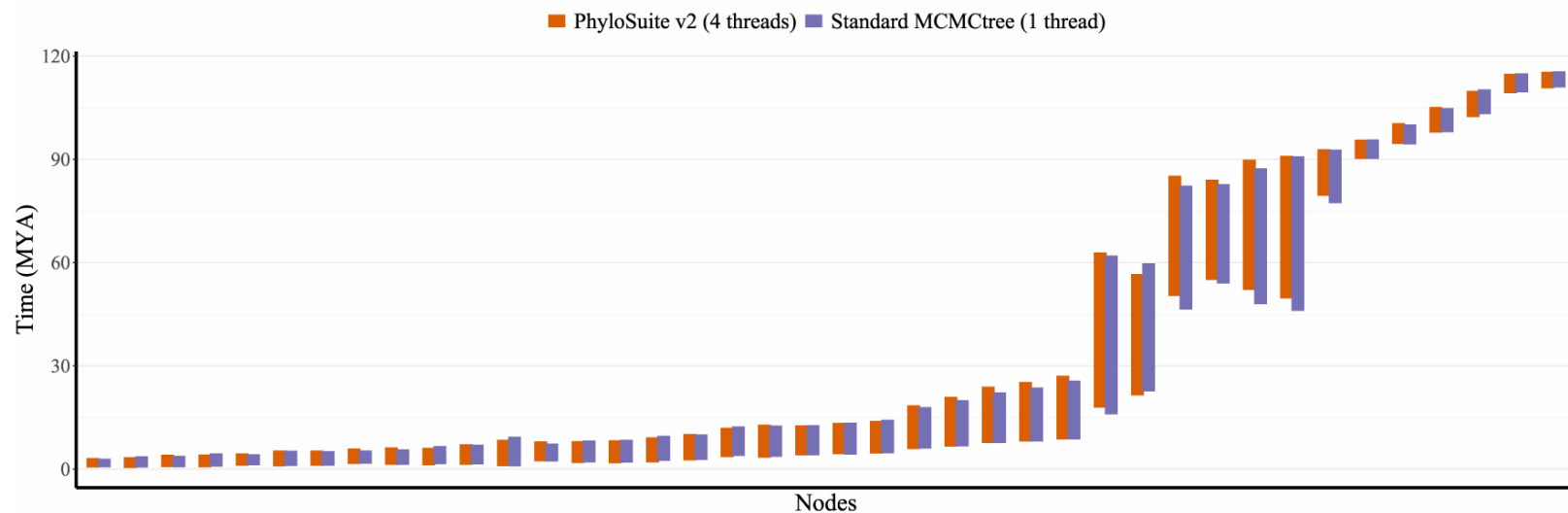
PhyloSuite v2 (4核) 与MCMCtree本地版 (1核) 分子定年
分析所需时间对比 (时: 分)



PhyloSuite v2相比于v1各步骤优化及速度提升表现 (分: 秒)



PhyloSuite v2 (4核) 与MCMCtree本地版 (1核) 各节点的分化时间及其置信区间对比





PhyloSuite (v2) 分子定年套件概述

PhyloSuite v2的分子定年套件的3个主要模块：MDGUI、TimeTreeAnno、MCMCTracer

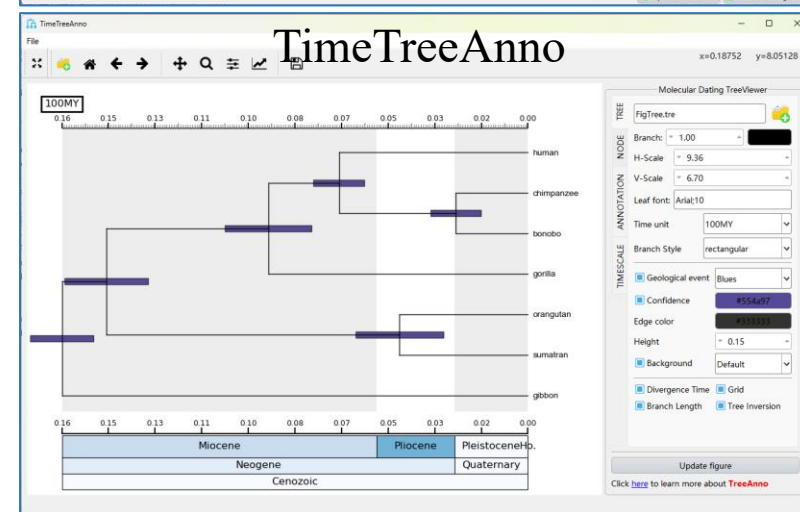
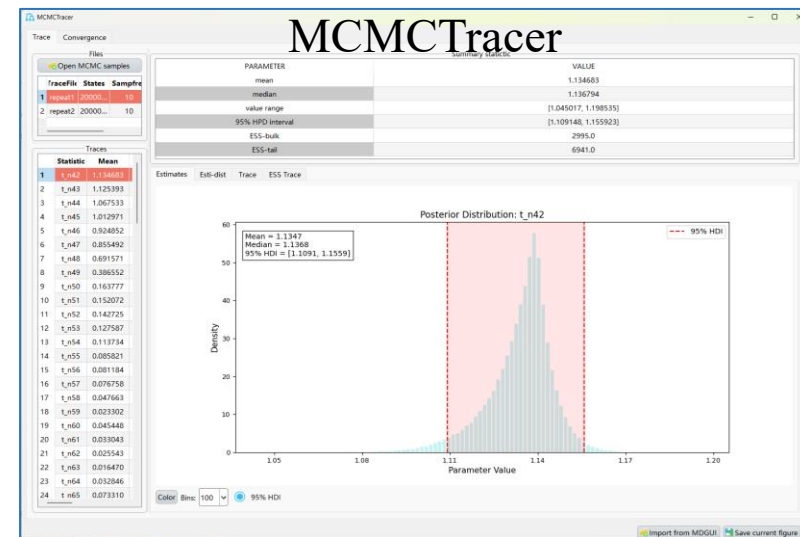
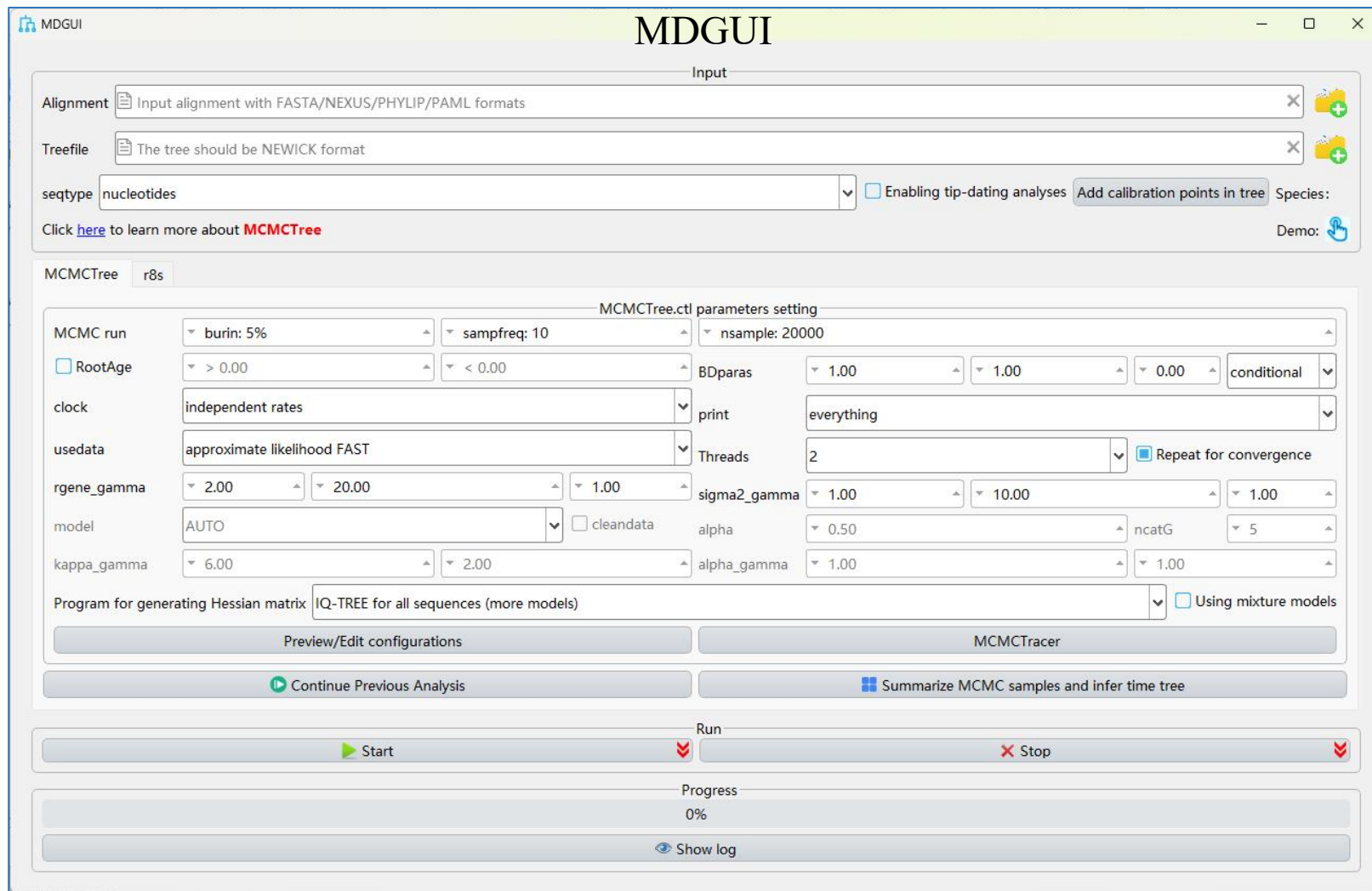


图2. PhyloSuite v2 分子定年分析套件功能界面



PhyloSuite (v2) 分子定年套件概述

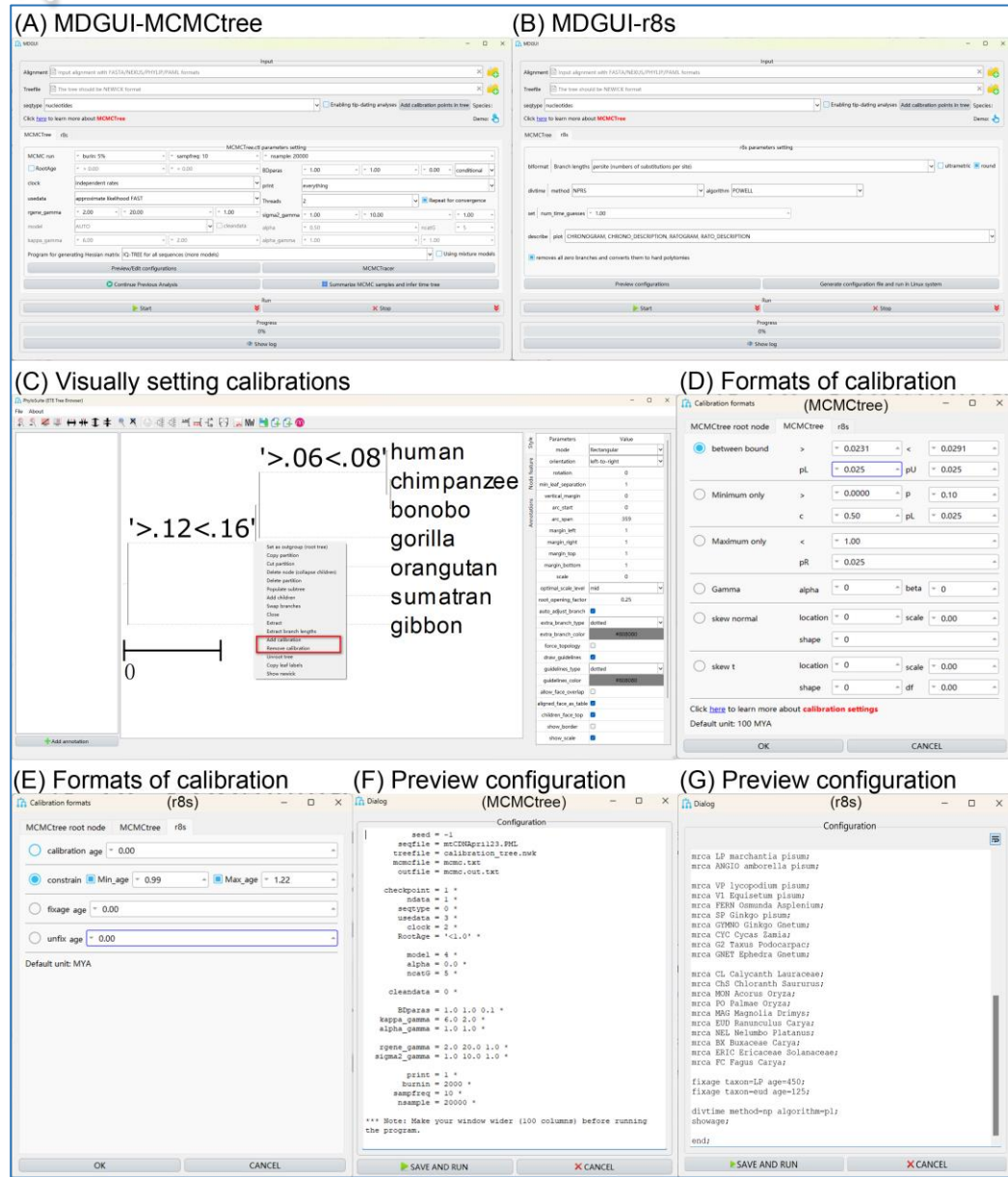


图3. MDGUI主界面及主要功能展示

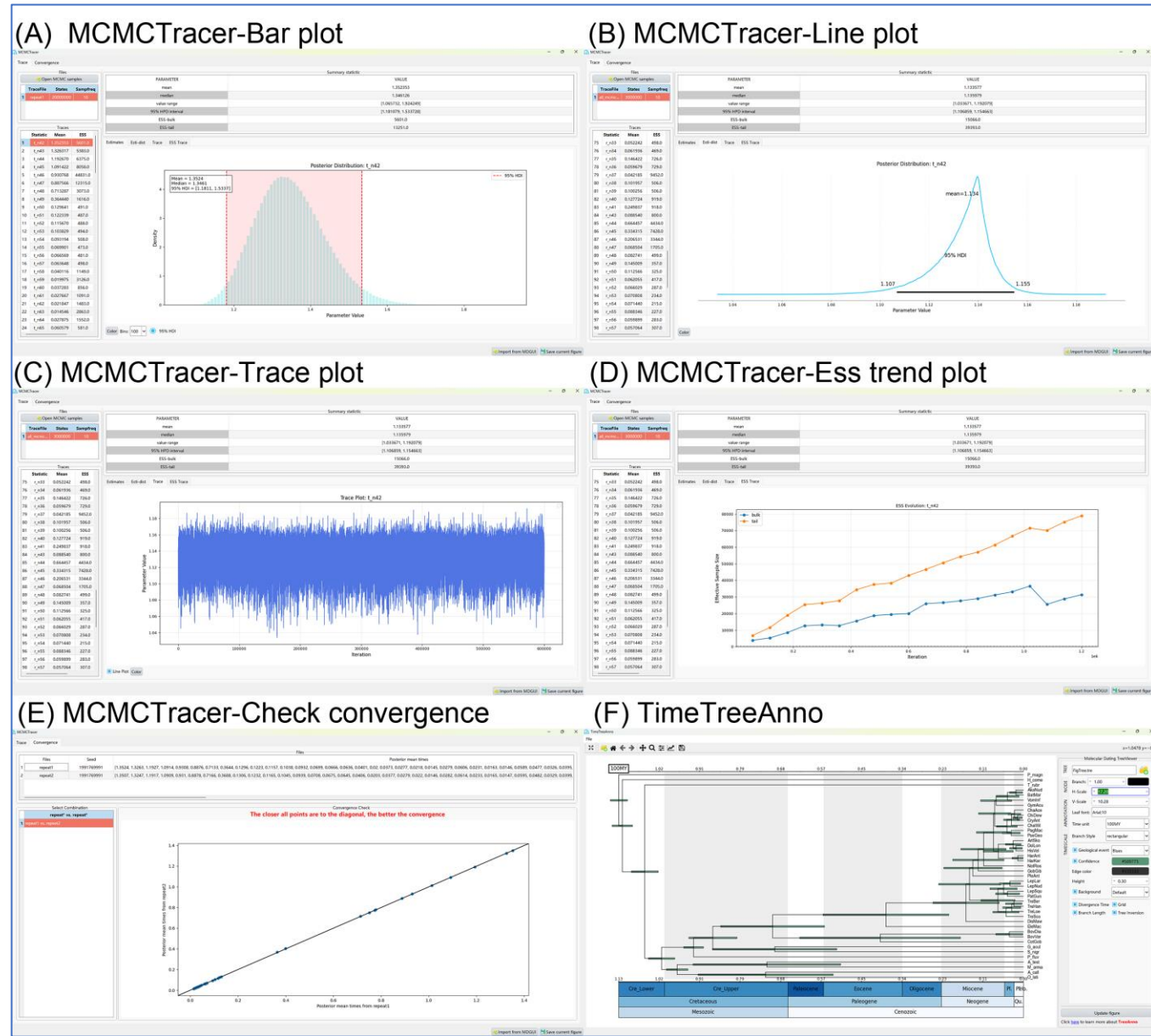


图4. MCMCTracer及TimeTreeAnno功能展示



分子定年分析流程

PhyloSuite v2: Molecular dating suite workflow

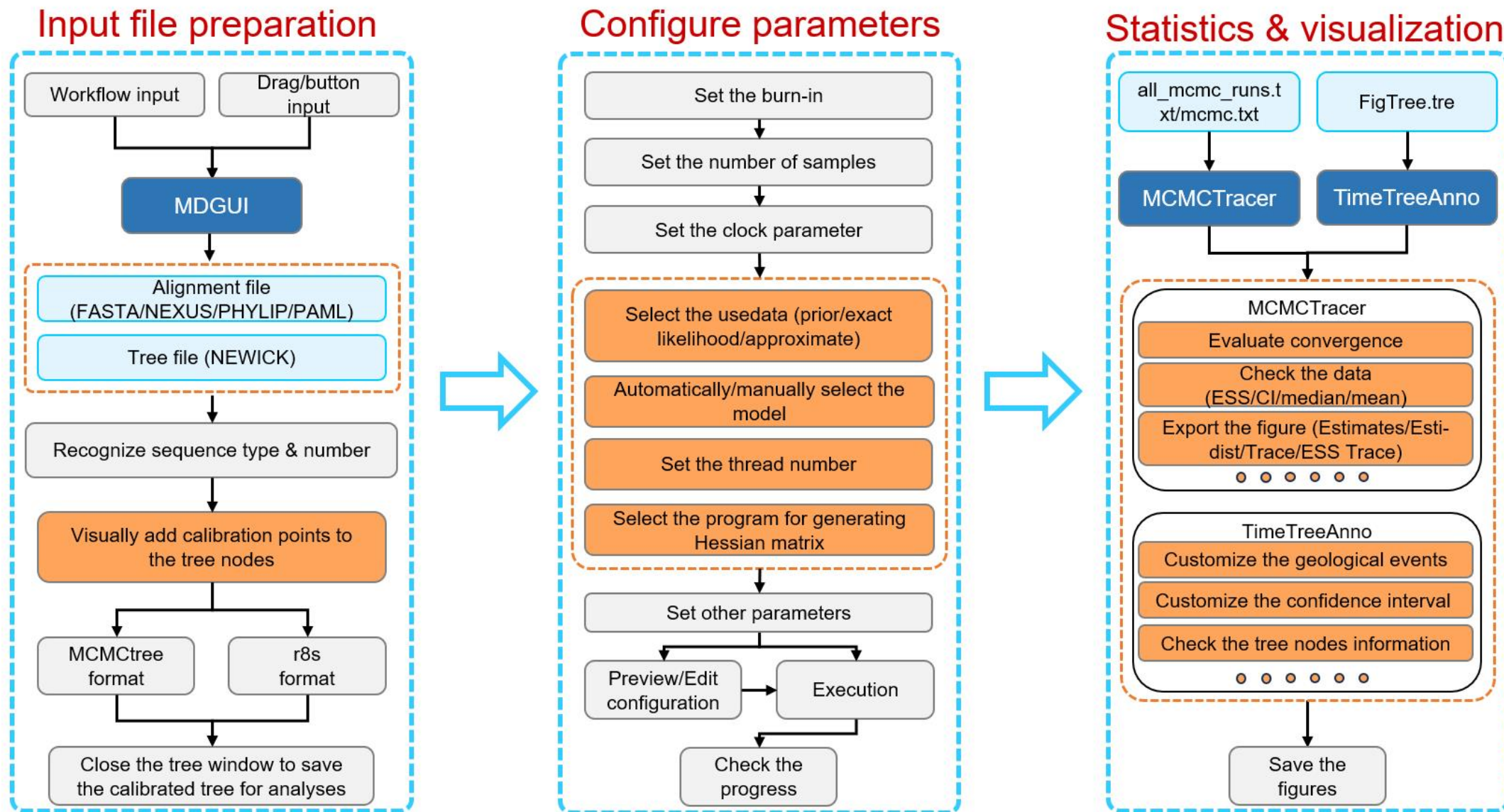


图5. PhyloSuite v2 分子定年分析流程图



案例：基于核基因组数据的分子定年分析

sequence1: TATGGAATG...
sequence2: TAGAATG...
sequence3: TCTATGATG...
.....

测试数据集

- 41个物种
- 近37.5万个位点

MDGL

Alignment concatenation.PML 1
Treefile calibration_tree.nwk 2
rtype nucleotides 3
Enabling tip-dating analyses Add calibration-points in tree Species: 41 Demo

Click [here](#) to learn more about MCMCTree

MCMCTree rbs

MCMCTree parameters setting

RootAge 4

clock Independent rates

usedata approximate likelihood FAST

rgene_gamma 2.00 20.00

model GTR

kappa_gamma 6.00 2.00

Program for generating Hessian matrix: Baseml for DNA/RNA sequence, Codeml for AA sequence

Preview/Edit configuration

Continue Previous Analysis

Start 5

Task completed! You can choose to:

- Open the results folder
- Open the results folder
- Import the results to TimeTreeAnno
- Import the results to MCMCTracer

MCMCTracer 6

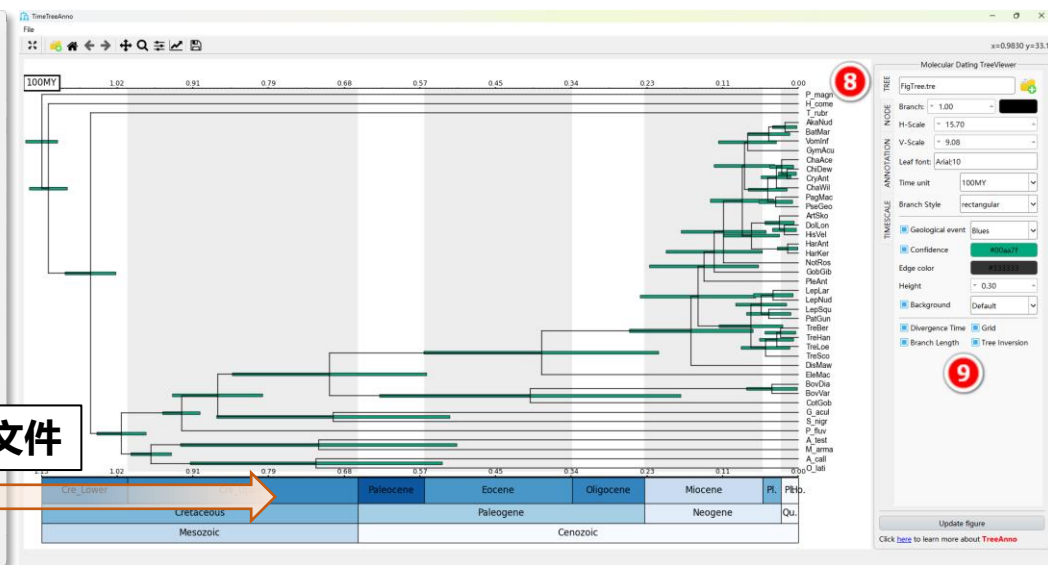
Summarize MCMC samples and infer time tree

Stop

序列比对文件

树文件

时间树文件



MCMCTracer

Trace Convergence

File	Seed
repeat1	1991709991
repeat2	1991709991

Select Combination

repeat vs. repeat

Convergence Check

The closer all points are to the diagonal, the better the convergence

Posterior mean times from repeat1

Posterior mean times from repeat2

10

11

MCMC样本统计与绘图

MCMCTracer

Trace Convergence

Open MCMC samples

Tracefile Status Samplefreq

1 repeat1 2000000 10

Statistic Mean ESS

Statistic	Mean	ESS
t_n43	1.326117	5383.0
t_n44	1.192670	6375.0
t_n45	1.091422	8058.0
t_n46	0.930768	44831.0
t_n47	0.887566	12315.0
t_n48	0.713287	3073.0
t_n49	0.364440	1616.0
t_n50	0.129641	491.0
t_n51	0.122339	487.0
t_n52	0.115670	488.0
t_n53	0.103829	494.0
t_n54	0.091184	508.0
t_n55	0.069901	473.0
t_n56	0.060569	481.0
t_n57	0.063648	498.0
t_n58	0.040116	1149.0
t_n59	0.019975	3126.0
t_n60	0.037283	856.0
t_n61	0.027667	1091.0
t_n62	0.021847	1483.0
t_n63	0.014546	2863.0
t_n64	0.027875	1552.0
t_n65	0.060579	581.0

Summary statistic

PARAMETER	VALUE
mean	1.352353
median	1.346126
value range	(1.065732, 1.924249)
95% HPD interval	(1.181178, 1.533728)
ESS-bulk	5601.0
ESS-tail	13251.0

Estimates Est-dist Trace ESS Trace

Posterior Distribution: t_n42

Mean = 1.3524
Median = 1.3461
95% HDI = (1.1811, 1.5337)

12

13

图6. 使用 PhyloSuite v2 平台进行分子定年分析



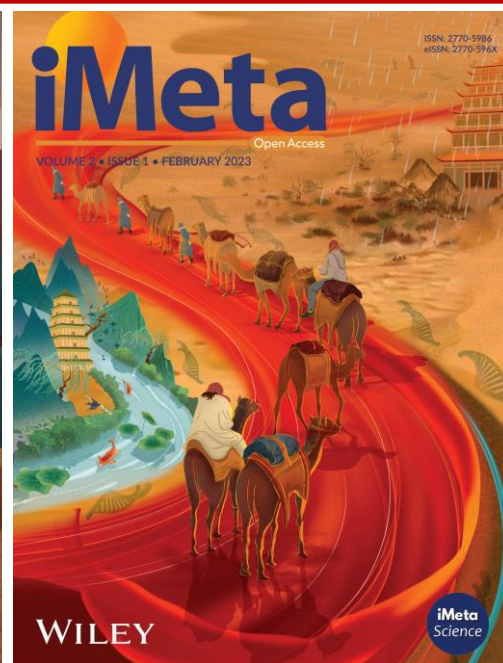
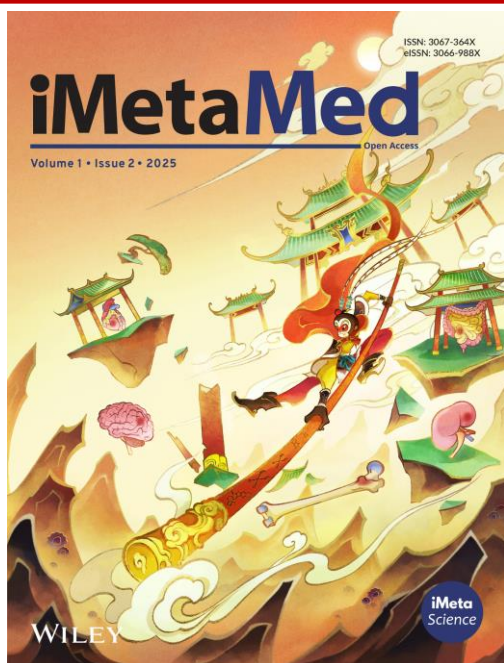
总结

- ❑ 在这项研究中，我们推出了 PhyloSuite v2 全新开发的分子定年分析三件套：MDGUI、TimeTreeAnno、MCMCTracer
- ❑ 它们提供拖拽式操作、上游结果自动导入，并允许在树节点上直观设置校准点；兼容多种输入文件格式并支持全部 IQ-TREE 进化模型；支持多线程加速、暂停/继续运行及实时 MCMC 收敛监控；增强了分子定年树及 MCMC 样本的可视化分析能力
- ❑ PhyloSuite v2 增强了重复基因处理、密码子拆分串联和 IQ-TREE 集成功能，加快了数据处理，并完成高分辨率界面优化及大量已知Bug修复
- ❑ 平台网址：<http://phylosuite.jushengwu.com/dongzhang0725.github.io/>
分子定年分析教程：
<http://phylosuite.jushengwu.com/dongzhang0725.github.io/PhyloSuite-demo/Molecular-dating-analysis/>



PhyloSuite使用交流群

Dong Zhao, Tong Ye, Fangluan Gao, Ivan Jakovlić, Qiong La, Yindong Tong, Xiang Liu, et al. 2025. PhyloSuite v2: the development of an all-in-one, efficient and visualization-oriented suite for molecular dating analysis and other advanced features. *iMeta* 4: e70095. <https://doi.org/10.1002/imt2.70095>.



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