Supporting Information

Becerra et al. 10.1073/pnas.0904456106

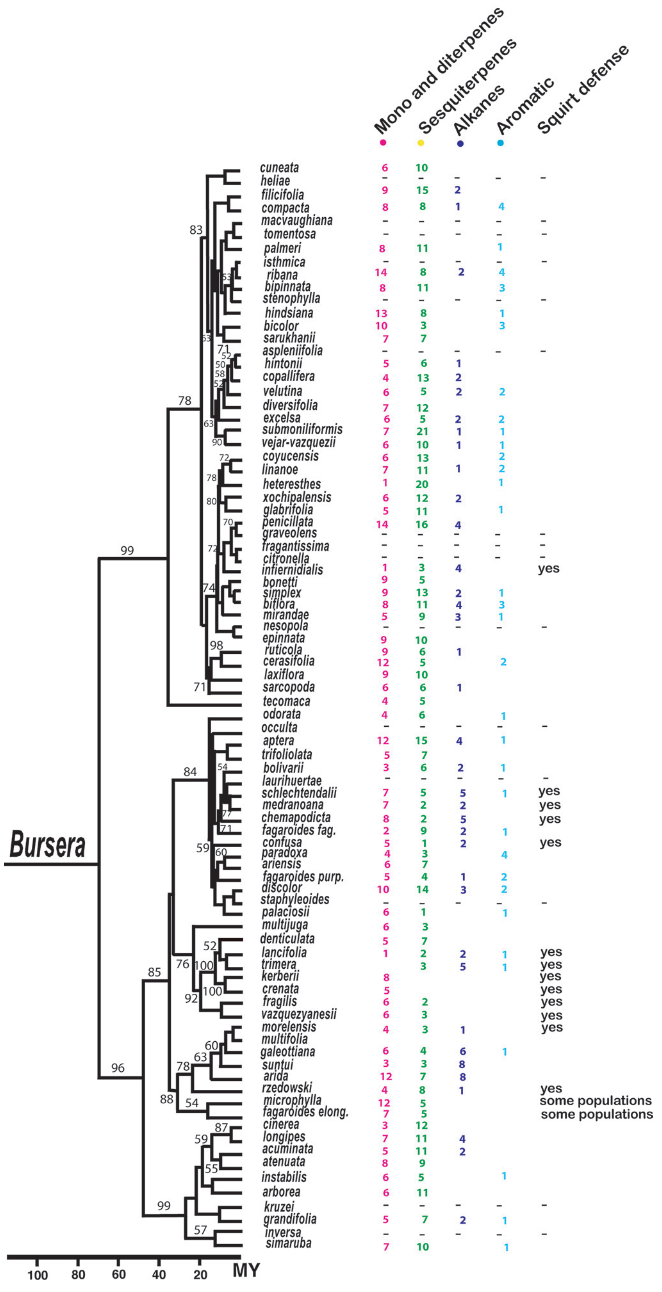

Fig. S1. Time-calibrated molecular phylogeny of *Bursera*, number of compounds of major types of volatiles found on species, and presence of the squirt response. Detailed information of phylogeny reconstruction can be found in refs. 1–4. Numbers on tree branches are bootstrap values. Species for which the number of compounds is denoted as − were not chemically analyzed.

1. Becerra JX (2003) Synchronous coadaptation in an ancient case of herbivory. *Proc Natl Acad Sci USA* 100:12804–12807.
2. Becerra JX (2005) Timing the origin and expansion of the Mexican tropical dry forest. *Proc Natl Acad Sci USA* 102:10919–10923.
3. Becerra JX (2003)Evolution of Mexican *Bursera* (Burseraceae) inferred from ITS, ETS, and 5S nuclear ribosomal DNA sequences. *Mol Phylogenet Evol* 26:300–309.
4. Becerra JX, Venable DL (1999) Nuclear ribosomal, DNA phylogeny and its implications for evolutionary trends in Mexican *Bursera* (Burseraceae). *Am J Bot* 86:1047–1057.

Table S1. Analyses of plant chemical diversity and complexity by using maximum-likelihood models

Plant chemical diversity
Section *Bullockia* (log-transformed data)
Log-likelihood of:
Model A (random walking): −7.52
Model B (directional): −3.63; β (slope) = 1,805.17
LR = 7.78, P = 0.005, df = 1
Scaling parameters included in models:
κ = 3.00
λ = 0.00
Section *Bursera*, including squirting *Bursera* species (log-transformed data)
Log-likelihood of:
Model A (random walking): −15.80
Model B (directional): −15.53; β (slope) = 2.833
LR = 0.54, P = 0.46, df = 1
Scaling parameters included in models:
κ = 3.00
λ = 0.00
Section *Bursera*, excluding squirting *Bursera* species (log-transformed data)
Log-likelihood of:
Model A (random walking): −13.61
Model B (directional): −11.66; β (slope) = 8.79
LR = 3.9, P = 0.047, df = 1
Scaling parameters included in models:
λ = 0.11
Plant chemical complexity
Section *Bullockia* log-likelihood of:
Model A (random walking): −24.91
Model B (directional): −21.44; β (slope) = 3375.98
LR = 6.94, P = 0.008, df = 1
Scaling parameters included in models:
κ = 3.00
λ = 0.00
Section *Bursera*, including squirting *Bursera* species log-likelihood of:
Model A (random walking): −37.56
Model B (directional): 35.48; β (slope) = 15.58
LR = 4.14, P = 0.04, df = 1
Scaling parameters included in models:
κ = 3.00
λ = 0.00
Section *Bursera*, excluding squirting *Bursera* species
Log-likelihood of:
Model A (random walking): −28.47
Model B (directional): −23.68; β (slope) = 23.25
LR = 9.57, P = 0.002, df = 1
Scaling parameters included in models:
λ = 0.05

Table S2. Shannon's index based on the presence or absence of the four kinds of chemical compounds

Compound	Species		
	A	B	C
Mono/diterpenes	1	1	1
Sesquiterpenes	0	1	1
Aromatic	0	0	1
Alakanes	0	1	0
$H_A = -\Sigma p \ln p$	0	1.10	1.10

A Shannon's diversity index was calculated for each species based only on whether they produce (score 1) or not (score 0) any of each of these four kinds of compounds.

Table S3. Shannon's index based on the relative concentrations of individual compounds

	Species		
Compound	A	B	C
Mono/Diterpenes			
1	0.1	0.1	0.5
2	0.7		0.1
3	0.2		0.1
Sesquiterpenes			
1		0.7	0.2
2			
Aromatic			
1			0.1
2			
3			
Alakanes		0.2	
1			
2			
$H_B = -\Sigma p \ln p$	0.80	0.80	1.36

A Shannon's diversity index was calculated for each species based on the relative concentration of all individual compounds, independently of the biochemical pathway they belong to.

Table S4. Index of chemical complexity calculated from Tables S2 and S3

	Species		
Chemical complexity index	A	B	C
$H_A + H_B$	0.80	1.90	2.46

The index of chemical complexity for each species was obtained by adding the two Shannon's indexes. Species B has greater complexity than A because it produces more kinds of compounds. Species C has greater complexity than B because it has a greater number of individual compounds with more even concentration.