

Appendix A
Colour plates.



Figure 38. 1. *Curcuma aeruginosa* Roxb. 1a) habit, 1b) flower, 1c) rhizome;
2. *Curcuma alismatifolia* Gagnep. 2a) habit, 2b) flower.



Figure 39. 1. *Curcuma amada* Roxb. 1a) habit, 1b) flower; 2. *Curcuma angustifolia* Roxb. 2a) terminal inflorescence, 2b) lateral inflorescence, 2c) lateral inflorescence with previous year corm and young leafy-shoot.

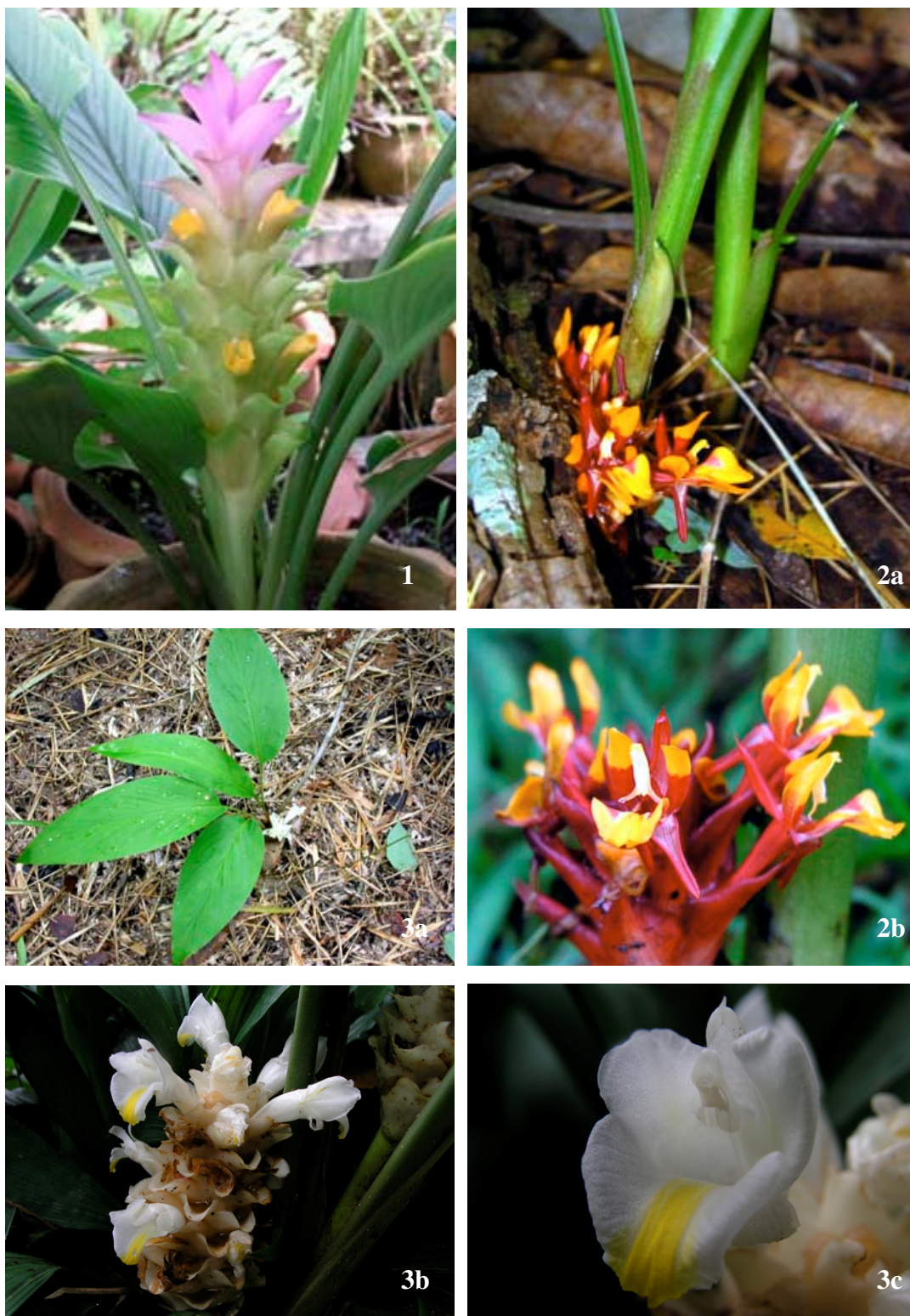


Figure 40. 1. *Curcuma aurantiaca* Zijp.; 2. *Curcuma bicolor* Mood & Larsen. 2a) inflorescence, 2b) flower; 3. *Curcuma cochinchinensis* Gagnep. 3a) habit, 3b) inflorescence, 3c) flower.



Figure 41. 1. *Curcuma comosa* Roxb. 1a) inflorescence, 1b) flower; 2. *Curcuma ecomata* Craib 2a) inflorescence, 2b) flower – dark color, 2c) flower – light color.



Figure 42. 1. *Curcuma flaviflora* S.Q. Tong. 1a) habit, 1b) inflorescence, 1c) flower;
 2. *Curcuma glans* Larsen & Mood. 2a) habit, 2b) flower, 2c) habitat.



Figure 43. 1. *Curcuma gracillima* Gagnep. 1a) inflorescence, 1b) flower; 2. *Curcuma harmandii* Gagnep. 2a) inflorescence, 2b) flower.



Figure 44. 1. *Curcuma latifolia* Roxb. 1a) habit, 1b) terminal inflorescence, 1c) lateral inflorescence, 1d) flower; 2. *Curcuma leucorhiza* Roxb. 2a) flower, 2b) habit.



Figure 45. 1. *Curcuma mangga* Valetton & Zijp 1a) inflorescence, 1b) flower;
2. *Curcuma parviflora* Wall. 2a) flower, 2b) inflorescence.



Figure 46. 1. *Curcuma petiolata* Roxb. 1a) inflorescence, 1b) flower; 2. *Curcuma pierreana* Gagnep. 2a) inflorescence, 2b) flower – side view, 2c) flower – front view.



Figure 47. 1. *Curcuma rhabdota* P. Sirirugsa & M.F. Newman. 1a) habit, 1b) inflorescence; 2. *Curcuma roscoeana* Wall. 2a) inflorescence, 2b) flower.



Figure 48. 1. *Curcuma rubescens* Roxb. 1a) inflorescence, 1b) flower; 2. *Curcuma rubrobracteata* Skornick., M. Sabu & Prasanthk. 2a) habit, 2b) inflorescence, 2c) flower.



Figure 49. 1. *Curcuma singularis* Gagnep. ; 2. *Curcuma* sp. (Maehongson). 2a) & 2b) inflorescence, 2c) flower.

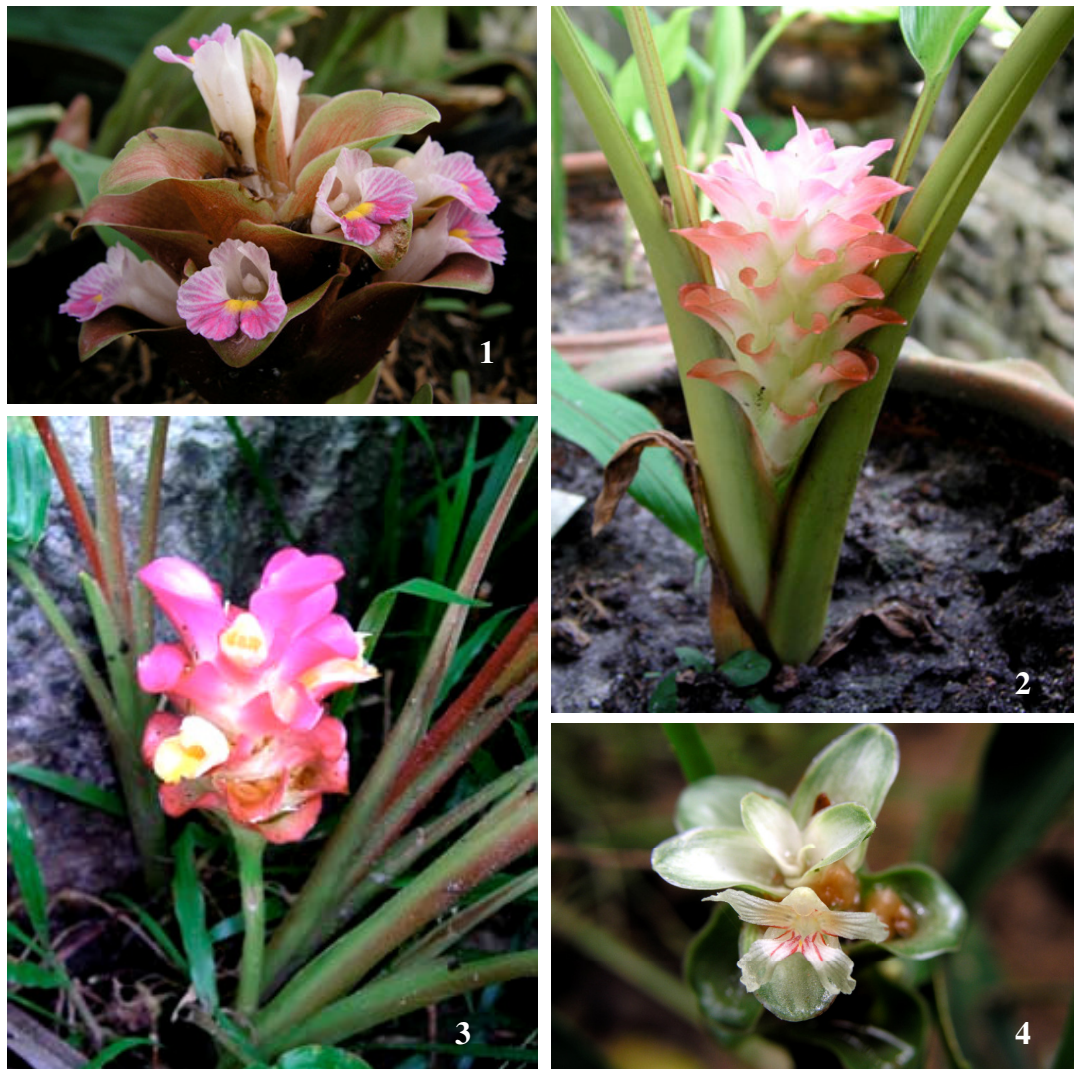


Figure 50. 1. *Curcuma* sp. (Pitsanulok); 2. *Curcuma* sp. (Ranong); 3. *Curcuma* sp. (Tak); 4. *Curcuma* sp. (Ubonratchathani).

Appendix B

DNA sequence obtained from this study.

	5	15	25	35
Curcuma caesia	--ACATTGTT	GAGAGAGCAT	--CATATAAT	GATGGATGAT
Curcuma cochinchin	GATCATTGTT	GAGAGAGCAT	---A--GAAT	GATGGATGAT
Curcuma flaviflora	GATCATTGTT	GAGAGAGCAT	---A--GAAT	GATGGATGAT
Curcuma longa	GATCATTGTT	GAGAGAGCAT	--CATATAAT	GATGGATGAT
Curcuma parviflora	AATCATTGTT	GAGAGAGCAT	---ATAGAAT	GACGGATGAA
Curcuma bella	GATCATTGTT	GAGAGAGCAT	---ATAGAAT	GACGGATGAA

	45	55	65	75
Curcuma caesia	TGTGAACGTG	TGAACGTGAC	CCTTTCGT-C	GTCAGCCCCG
Curcuma cochinchin	TGTGAACGTG	TGAACGTGAC	CCTTTC----	GTTAGCCCAC
Curcuma flaviflora	TGTGAATGTG	TGAACGCGAC	CCTTTC----	GTTAGCCCAC
Curcuma longa	TGTGAACGTG	TGAACGTGAC	CCTTTCGT-C	ATCAGCCCCG
Curcuma parviflora	TGTGAATGTG	TGAACGTGAC	CCTTTC----	TTTAGCCCAC
Curcuma bella	TGTGAATGTG	TGAACGTGAC	CCTTTC----	TTTAGCCCAC

	85	95	105	115
Curcuma caesia	CCGT--GTTG	GTGGGCGATT	GACCGTAGCT	CGGTGCGATC
Curcuma cochinchin	GTT---GG--	-TGGGCGATT	GACCGTAGCT	CGGTGCGATC
Curcuma flaviflora	GTTT--GA--	-TGGGCGATT	GAC--TA---	CGGTGCGATC
Curcuma longa	CCAT--GTTG	GTGGGCGATT	GACCGTAGCT	CGGTGCGATC
Curcuma parviflora	GTT---GG--	-TGGGCGATT	GACCGTAGCT	CGGTGCGATC
Curcuma bella	GTT---GG--	-TGGGCGATT	GACCGTAGCT	CGGTGCGATC

	125	135	145	155
Curcuma caesia	GGCACTAAAG	AACAACGAAC	TTGGAAGCAG	AGGGCCCC-C
Curcuma cochinchin	GGCACTAAGG	AACAATGAAC	TCGGAAGCAG	AGGGCCCC-T
Curcuma flaviflora	GGCACTAAGG	AACAATGAAC	TTAGAAGCAG	AGGGCCCC-T
Curcuma longa	GGCACTAAGG	AACAACGAAC	TTGGAAGCAG	AGGGCCCC-T
Curcuma parviflora	GGCACTAAGG	AACAATGAAC	TTGAGAGCAG	AGGGCCCC-T
Curcuma bella	GGCACTAAGG	AACAATGAAC	TTGAAAGCAG	AGGGCCCC-T

	165	175	185	195
Curcuma caesia	CAGCGTGAGC	GGGGAGCCCA	ATGCG~TCCG	AAATTCTTTCG
Curcuma cochinchin	CGCCGTGAGC	GGGGAGCACA	ATGCG~TCGA	AGATTCTTTCG
Curcuma flaviflora	TGCTGTGAGC	GGGGAGCCTA	ATGCA~TCGA	AAATTCTTTCG
Curcuma longa	CAGCGTGAGC	GGGGAGCCCA	ATGCG~TCCG	AGATTCTTTCG
Curcuma parviflora	TGGCGTGAGC	GGGGAGCACA	ATGCG~TCGA	AGATTCTTTCG
Curcuma bella	TGGCGTGAGC	GGGGAGCACA	ATGCG~TCGA	AGATTCTTTCG

	205	215	225	235
Curcuma caesia	GAAATC~AAT	GACTCTCGGC	AAAGGATATC	TCGGCTCTTG
Curcuma cochinchin	GAA~TCAAAT	GACTCTCGGC	AATGGATATC	TCGGCTCTTG
Curcuma flaviflora	GAA~TCAAAT	GACTCTCGGC	AATGGATATC	TCGGCTCTTG
Curcuma longa	GAA~TCAAAT	GACTCTCGGC	AATGGATATC	TCGGCTCTTG
Curcuma parviflora	GAA~TCAAAT	GACTCTCGGC	AATGGATATC	TCGGCTCTTG
Curcuma bella	GAA~TCAAAT	GACTCTCGGC	AATGGATATC	TCGGCTCTTG

	245	255	265	275
Curcuma caesia	CATCGATGAA	AAAAGTAATG	AAATGCGATA	CTTGGGGGGA
Curcuma cochinchin	CATCGATGAA	GAACGTAGTG	AAATGCGATA	CTTGGTGTGA
Curcuma flaviflora	CATCGATGAA	GAACGTAGTG	AAATGCGATA	CTTGGTGTGA
Curcuma longa	CATCGATGAA	GAACGTAGTG	AAATGCGATA	CTTGGTGTGA
Curcuma parviflora	CATCGATGAA	GAACGTAGTG	AAATGCGATA	CTTGGTGTGA
Curcuma bella	CATCGATGAA	GAACGTAGTG	AAATGCGATA	CTTGGTGTGA

	285	295	305	315
Curcuma caesia	ATTGGA AAAA	CTCGGGGACC	ATTTAGTCTT	TTAAANCCAN
Curcuma cochinchin	ATTGCAGAAT	CTCGCGAACC	ATTGAGTCTT	TGAACGCAAG
Curcuma flaviflora	ATTGCAGAAT	CTCGTGAACC	ATTGAGTCTT	TGAACGCAAG
Curcuma longa	ATTGCAGAAT	CTCGTGAACC	ATTGAGTCTT	TGAACGCAAG
Curcuma parviflora	ATTGCAGAAT	CTCGCGAACC	ATTGAGTCTT	TGAACGCAAG
Curcuma bella	ATTGCAGAAT	CTCGCGAACC	ATTGAGTCTT	TGAACGCAAG

	325	335	345	355
Curcuma caesia	TTGTGCCCGA	AGCCTTGTGG	TCCAGGGGAC	CCCTGGTTGG
Curcuma cochinchin	TTGTGCCCGA	GGCCTTGTGG	TCGAGGGCAC	GCCTGCTTGG
Curcuma flaviflora	TTGTGCCCGA	GGCCTTGTGG	TCGAGGGCAC	GCCTGCTTGG
Curcuma longa	TTGTGCCCGA	GGCCTTGTGG	TCCAGGGGAC	GCCTGCTTGG
Curcuma parviflora	TTGTGCCCGA	GGCCTTGTGG	TCGAGGGCAC	GCCTGCTTGG
Curcuma bella	TTGTGCCCGA	GGCCTTGTGG	TCGAGGGCAC	GCCTGCTTGG

	365	375	385	395
Curcuma caesia	GGGTCATGGC	ATTNCCCCTT	TTGCTCCCTG	CITTTGTCGG
Curcuma cochinchin	GTGTCATGGC	ATCGTCGCTT	TTGCTCTATG	CITTTTTTGGC
Curcuma flaviflora	GTGTCATGGC	ATTGTCGCTT	TTGCTCCATG	CITTCGTTAGC
Curcuma longa	GCGTCATGGC	ATCGTCGCTT	TTGCTCCATG	CITTTGTCCGGC
Curcuma parviflora	GTGTCATGAC	ATTGTCGCTT	ATGCCCCATG	CITTTGTTGGC
Curcuma bella	GTGTCATGAC	ATTGTCGCTT	ATGCTCCATG	CITTTGTTGGC

	405	415	425	435
Curcuma caesia	ATTTAACGCG	G-AAATTGGC	CCCCTGTGCC	C--TCCGGCA
Curcuma cochinchin	ATTGAGCGCG	G-AAATTGGC	CTCGTGTGCC	C--TCGAGCA
Curcuma flaviflora	ATTGAGCGCG	G-AAATTGGC	CCCCTGTGCC	C--TCGGGCA
Curcuma longa	ATTGAGCGCG	G-AAGTTGGC	CCCCTGTGCC	CTCTCGGGCA
Curcuma parviflora	ATTGAGTGCG	G-AAATTGGC	CCCCTGTGCC	C--TCGGGCA
Curcuma bella	ATTGAGTGCG	G-AAATTGGC	CCCCTGTGCC	C--TCGGGCA

	445	455	465	475
Curcuma caesia	CAGTCGGTCG	AAGAGTGGGT	AGTCCGGAAT	CCTCCAACAC
Curcuma cochinchin	CAGTCGGTCG	AAGAGTGGGT	AGTCGGTAGT	CGTCGAGCAC
Curcuma flaviflora	CAGTCGGTCG	AAGAGTGGGT	AGTCGGTATT	CGTCGAGCAC
Curcuma longa	CAGTCGGTCG	AAGAGCGGGT	AGTCGGTAAT	CGTCCAGCAC
Curcuma parviflora	TAGTCGGTCG	AAGAGTGGGT	ACTCGGCAAT	CGTCGAGCAC
Curcuma bella	TAGTCGGTCG	AAGAGTGGGT	ACTCGGCAAT	CGTCGAGCAC

	485	495	505	515
Curcuma caesia	NANNGNNNTT	NGNNNTCCCN	NAGNAAAAAC	GAACNNCCT-
Curcuma cochinchin	GACGGATGTT	GGTCGCCATG	AGCGGGAAC	GAACGTCGT-
Curcuma flaviflora	GATGGATGTT	GGTCGTCGTG	AGCGGGAAC	GAACGTCGT-

Curcuma longa	GATGGACGTT	GGTCGTCGCG	AGCGAGAACT	GAACGTCGT-
Curcuma parviflora	GATGGGCGTT	GGTCGTCGCA	AGCGAGAACT	GAACGTCGT-
Curcuma bella	GATGGGCGTT	GGTCGTCGCA	AGCGAGAACT	GAACGTCGT-

	525	535	545	555
Curcuma caesia	-CCNCNCGT	TTTNNGANGA	GACCNCNNA	AA--ANCNTN
Curcuma cochinchin	-CCTCGTCGT	TTCGGAACGA	GTCCTCAAGA	NA---CCCTG
Curcuma flaviflora	-CCTCGTCGT	TTCGTGATGA	GTCCTCAAGA	AA---CCCTG
Curcuma longa	-CCTCGTCGT	TTTGGGATGA	GCCCTCAATA	AAGAACCCTG
Curcuma parviflora	-CCTCGTCAT	TTTGGGATGA	GTCCTCAAGA	AA---CCCTA
Curcuma bella	-CCTCGTCAT	TTTGGGATGA	GTCCTCAAGA	AA---CCCTA

	565	575	585	595
Curcuma caesia	NNNGTTT-T	TTTTGGGGAC	CCCCGCNAAA	ACCCCCCGTN
Curcuma cochinchin	TGTGAT----	---TGC GGAN	TCGGACGAAA	GTGCCGTGTC
Curcuma flaviflora	TGTGAT----	---TGC GGAT	TCGGTCGAAA	GTGCCGTGTC
Curcuma longa	TGTGATTGAT	GATTGCGGAC	CCGCCC GAAA	GCGCCCCGTC
Curcuma parviflora	TGTGAT----	---TGCAGAG	TCGGACGAAA	GCGATGTGTC
Curcuma bella	TGTGAT----	---TGCAGAG	TCCGACGAAA	GNGCCGTGTC

	605	615	625	635
Curcuma caesia	AATTTT---T	TGGGGGCN-G	CCCCCAGNGA	GGCCNCCCCC
Curcuma cochinchin	AATCAT---T	TGTGGCCCCA	AGTCAGGCGA	GGCC-CCCGC
Curcuma flaviflora	AATCAT---T	TGTGGCCCCA	AGTCAGGCGA	GGCCACCCGC
Curcuma longa	AATCAT---T	TGCGGGCCNC	CNNCANNCAA	GACACCCCCC
Curcuma parviflora	AATCATCATT	TGCGGGCCCCA	AGTCAGGCGA	GACCACCCGC
Curcuma bella	AATCATCATT	TGCGGGCCCCA	AGTCAGGCGA	GACCACCCGC
	
	645	655		
Curcuma caesia	CCCGCCGAGT	TTTNNNTTTT	TT	
Curcuma cochinchin	CGAGTTTAAG	CATATCAATA	NN	
Curcuma flaviflora	CGAATTTAAG	CATATCAATA	NN	
Curcuma longa	CCNGTAANAT	TATATCTATT	NN	
Curcuma parviflora	CGAATTTAAG	CATATCAATT	AA	
Curcuma bella	CGAATTTAAG	CATATCATNN	NN	

Appendix C

The three most parsimonious cladograms resulted from this study.

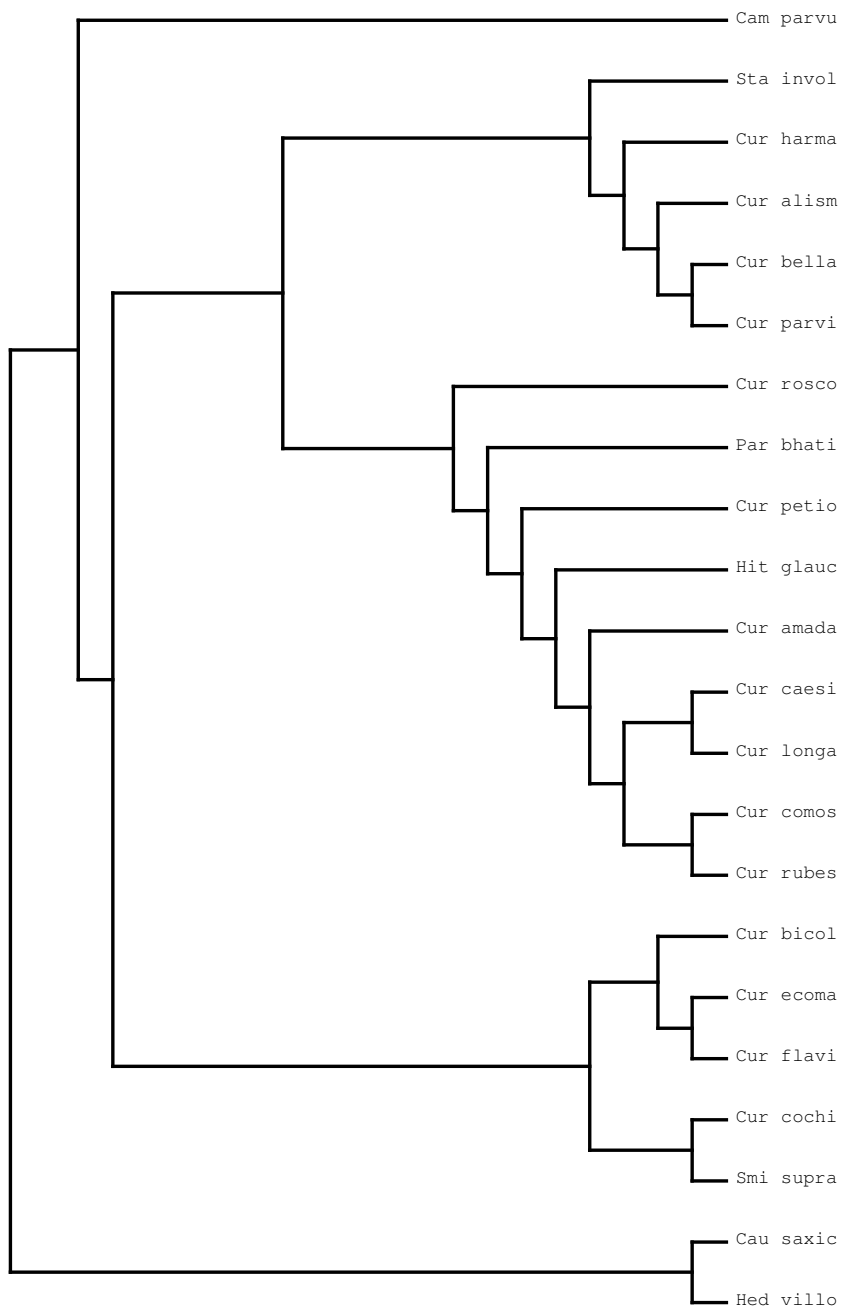


Figure 51. Most parsimonious tree 1

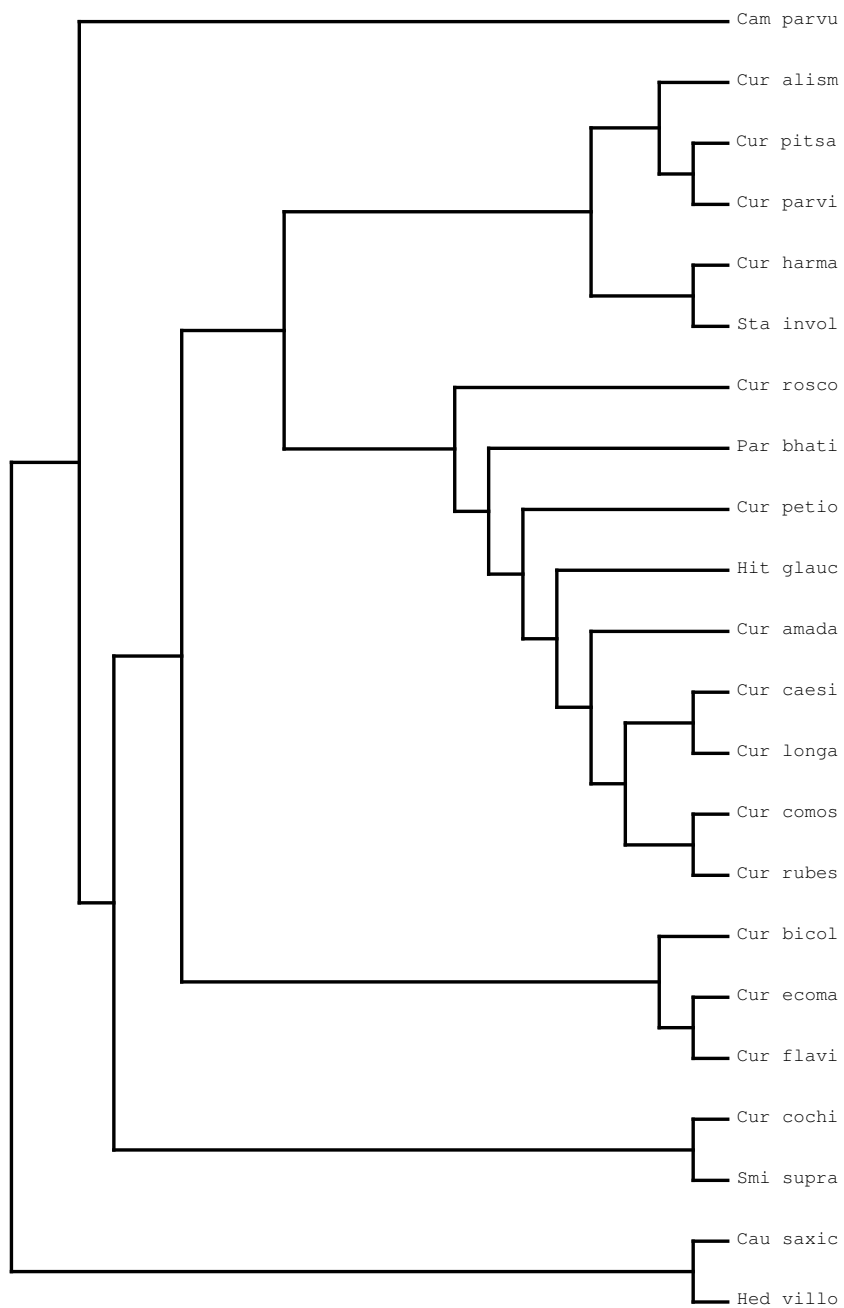


Figure 52. Most parsimonious tree 2

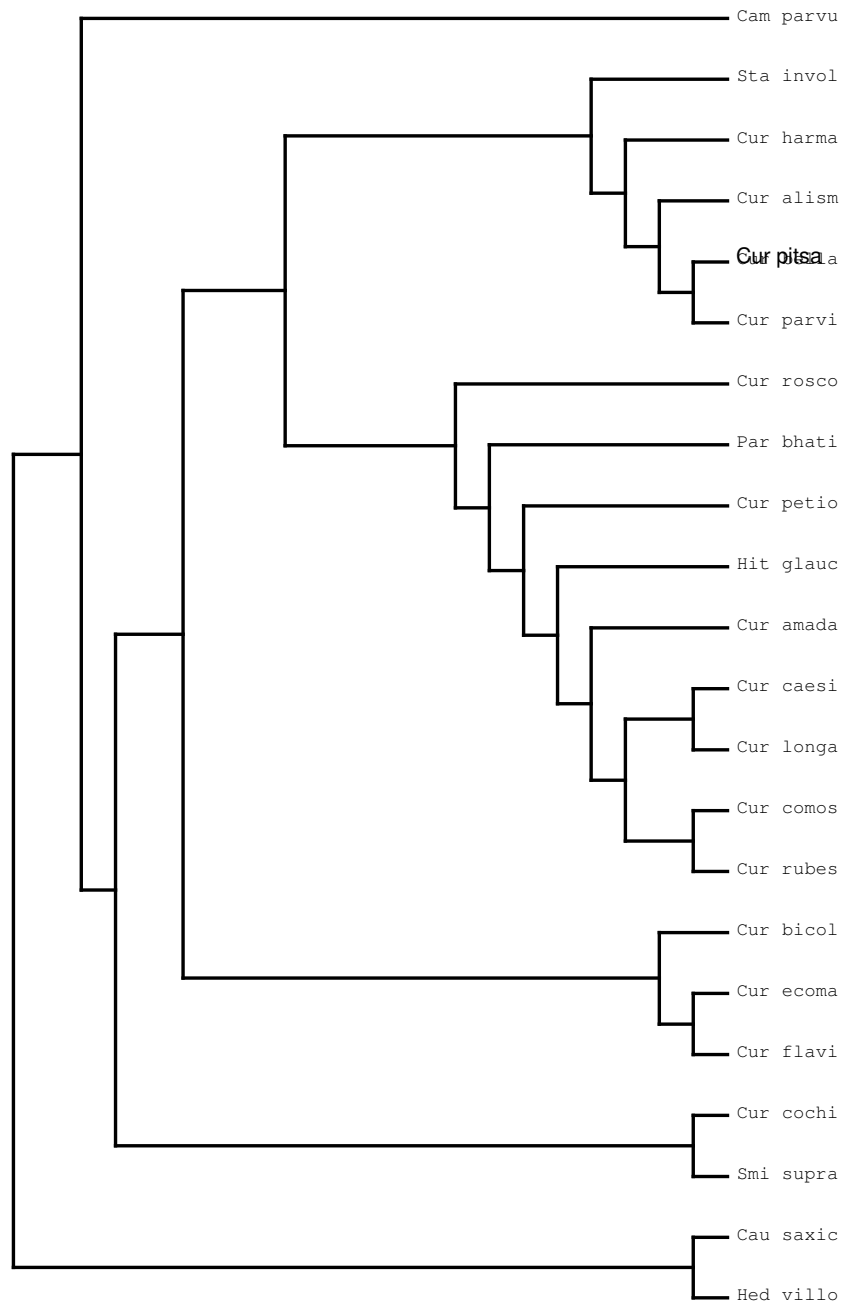


Figure 53. Most parsimonious tree 3