

31 DNA sequences from the matK gene analysed by the DNAML programme (PHYLIP)

[85 other trees analysed by DNAComp some more reasonable than the tree below](#)

[31 DNA seq input file for PHYLIP](#)

Analysed by Hans Eiberg:

Materials: From Biobase

10 sequences from Katherine A Kron and

21 sequences (marked with ">") from from Kurashige Y, Mine,M., Kobayashi,N.,
Handa,T., Takayanagi,K. and Yukawa,T. (J.of Japanese Bot. (1998) In press)

Nucleic acid sequence Maximum Likelihood method, version 3.572c

Empirical Base Frequencies:

A	0.31331
C	0.16148
G	0.16509
T(U)	0.36013

Transition/transversion ratio = 2.000000

(Transition/transversion parameter = 1.772220)

```
+>pentaphyllum
!
! +>albiflorum
! !
+-29 ! +>wadanum
! ! ! +-28
! ! ! +-26 +>tashiroi
! ! ! ! !
! +-11 ! +>farrerae
! ! +-20
! ! ! ! +>tsusiophyllum
! ! ! ! !
! ! ! +-27 +kaempferi
! ! ! ! +-14
! ! ! ! ! +>indicum
! +--9 +--5 +-21
! ! ! +>kaempferi
! ! !
! ! +kiusianum
! !
! ! +>ovatum
! ! +-17
! +--7 +hongkongense
! !
! +R ovatum
!
! +molle
! +-15
```

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!           ! +>luteum
!           !
!         +--1                               +>santapau
!         ! ! +-----23
!         ! ! !                               +>jarvaicum
!         ! +--22
!         ! ! +>ponticum
!       +-16   +-18
!         ! ! ! +>grande
!         ! !   +--4
!         ! !   +falconeri
!     +--8 !
!     ! ! + >nipponicum
!     ! ! !
!     ! ! ! + >albrechtii
!     ! ! +-10
--2--3   + Ledum palustre (R. tomentosum)
!     !
!     ! + >stamineum
!     ! +-25
!     ! ! + >semibarbatum
!     +-24
!     ! + >canadense
!     ! !
!     +-12   + >primuliflorum
!         ! +-19
!         ! ! + hippophaeroides
!         +--6
!         ! + >ferruginium
!         +-13
!         + edgeworthii
!
+>camtschaticum

```

remember: (although rooted by outgroup) this is an unrooted tree!

Ln Likelihood = -5339.07817

Examined 2091 trees

Between	And	Length	Approx. Confidence Limits
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2	29	0.00003	(zero, 0.00171)
29	>pentaph	0.00326	(0.00044, 0.00615) **
29	11	0.00063	(zero, 0.00189) **
11	>albifl	0.00264	(0.00006, 0.00522) **
11	9	0.00003	(zero, infinity)
9	20	0.00198	(zero, 0.00423) **
20	26	0.00331	(0.00041, 0.00621) **
26	28	0.00003	(zero, infinity)
28	>wadanum	0.00064	(zero, 0.00191) **
28	>tashiroi	0.00003	(zero, infinity)
26	>farreuae	0.00066	(zero, 0.00196) **
20	27	0.00198	(zero, 0.00423) **
27	>tsusioph	0.00132	(zero, 0.00315) **
27	5	0.00199	(zero, 0.00423) **
5	14	0.00003	(zero, infinity)
14	kaempferi	0.00264	(0.00006, 0.00523) **
14	21	0.00005	(zero, 0.00135)
21	>indicum	0.00061	(zero, 0.00190)
21	>kaempfe	0.00003	(zero, infinity)
5	R kiusian	0.00132	(zero, 0.00314) **
9	7	0.00592	(0.00207, 0.00982) **
7	17	0.00003	(zero, 0.00154)
17	>ovatum	0.00005	(zero, infinity)
17	R hongkon	0.00464	(0.00121, 0.00807) **
7	R ovatum	0.00794	(0.00347, 0.01247) **

2	3	0.00069	(zero,	0.00201)	**
3	8	0.00063	(zero,	0.00189)	**
8	16	0.00069	(zero,	0.00201)	**
16	1	0.00064	(zero,	0.00192)	*
1	15	0.00597	(0.00207,	0.00989)	**
15	R molle	0.00665	(0.00252,	0.01077)	**
15	>luteum	0.00264	(0.00006,	0.00525)	**
1	22	0.00080	(zero,	0.00258)	
22	23	0.61810	(0.55630,	0.68569)	**
23	>santapau	0.00701	(0.00222,	0.01190)	**
23	>jarvaicu	0.00361	(zero,	0.00774)	**
22	18	0.00117	(zero,	0.00316)	
18	>ponticum	0.00532	(0.00163,	0.00900)	**
18	4	0.00327	(0.00045,	0.00619)	**
4	R grande	0.00270	(0.00000,	0.00529)	**
4	falconeri	0.00063	(zero,	0.00190)	**
16	>nipponic	0.00398	(0.00079,	0.00716)	**
8	10	0.00136	(zero,	0.00321)	**
10	>albrecht	0.00129	(zero,	0.00311)	**
10	ledum p	0.00805	(0.00347,	0.01258)	**
3	24	0.00005	(zero,	infinity)	
24	25	0.00198	(zero,	0.00423)	**
25	>stamineum	0.00261	(0.00009,	0.00521)	**
25	>semibarb	0.00331	(0.00041,	0.00621)	**
24	12	0.00061	(zero,	0.00188)	*
12	>canaden	0.00469	(0.00118,	0.00812)	**
12	6	0.00399	(0.00081,	0.00719)	**
6	19	0.00132	(zero,	0.00315)	**
19	>primuli	0.00200	(zero,	0.00424)	**
19	R hippopha	0.00132	(zero,	0.00316)	**
6	13	0.00061	(zero,	0.00189)	*
13	>ferrugin	0.00204	(zero,	0.00431)	**
13	R edgewort	0.00941	(0.00443,	0.01429)	**
2	>cantschat	0.01883	(0.01185,	0.02584)	**

* = significantly positive, $P < 0.05$

** = significantly positive, $P < 0.01$