

**Table S2: Expected length of external branches.** The expected total lengths of external branches  $(e_{(n)}^{(a)}, e_{(n)}^{(d)})$  from Prop. S1.3 with sample configuration  $\underline{n} = (10, 0, 0, 0)$ , as a function of  $c$  and  $K$ . The expected length  $e_{(n)} = 2$  when associated with the Kingman coalescent (FU, 1995).

$c = 1$ , values of $d$			
$K$	0.001	1	100
0.001	(1.22e+03, 1.22e+06)	(610, 3.05e+05)	(14.2, 141)
0.01	(124, 1.24e+04)	(63, 3.15e+03)	(3.4, 3.36)
0.1	(14.3, 143)	(8.28, 41.4)	(2.18, 0.216)
1	(3.41, 3.4)	(2.77, 1.39)	(2.02, 0.02)
10	(2.18, 0.218)	(2.1, 0.105)	(2, 0.00198)
100	(2.02, 0.0202)	(2.01, 0.01)	(2, 0.000198)
$K = 0.01$ , values of $d$			
$c$	0.001	1	100
0.001	(56.7, 2.83e+03)	(2.03, 0.203)	(2, 0.002)
0.01	(102, 9.28e+03)	(2.68, 2.65)	(2.01, 0.0201)
0.1	(111, 1.1e+04)	(11.5, 104)	(2.12, 0.211)
1	(124, 1.24e+04)	(63, 3.15e+03)	(3.4, 3.36)
10	(174, 1.74e+04)	(158, 1.44e+04)	(17.9, 163)
100	(198, 1.98e+04)	(196, 1.94e+04)	(100, 5.01e+03)