

# Molecular Discrimination and Phylogenetic Relationships of *Physalis* Species Based on ITS2 and *rbcL* DNA Barcode Sequence

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## Supplementary Tables

**Supplementary Table S1.** Geographical coordinates and number of *Physalis* samples collected from seven Counties in Kenya

Serial No.	County	Location	Latitude	Longitude	No. of samples collected
1.	Kericho	Londiani - Sorget	0.0684° S	35.5548° E	10
2.	Elgeyo-Marakwet	Chebororwa	0.9487° N	35.4234° E	13
3.	Homa Bay	Ndhiwa	0.7299° S	34.3671° E	3
4.	Nakuru	Gilgil market	0.4923° S	36.3173° E	1
5.	Kajiado	Ongata Rongai	1.3939° S	36.7442° E	5
6.	Nyeri	Mukurweini	0.5609° S	37.0488° E	5
7.	Kiambu	Tigoni	1.1651° S	36.7065° E	17
		Thika	1.0388° S	37.0834° E	9
		Muguga	1.2551° S	36.6580° E	1

**Supplementary Table S2.** *Physalis* accessions collected from various counties in Kenya

No.	Sample ID	County of sample collection	Specific Location of collection	Latitude	Longitude	Altitude (meters)	Assumed species status
1.	Londiani L1	Kericho	Londiani - Sorget	0.1635° S	35.5931° E	2300	<i>P. peruviana</i>
2.	Londiani L2	Kericho	Londiani - Sorget	0.1635° S	35.5931° E	2300	<i>P. peruviana</i>
3.	Londiani L3	Kericho	Londiani - Sorget	0.1635° S	35.5931° E	2300	<i>P. peruviana</i>
4.	Londiani L4	Kericho	Londiani - Sorget	0.1635° S	35.5931° E	2300	<i>P. peruviana</i>

5.	Londiani L5	Kericho	Londiani - Sorget	0.1635° S	35.5931° E	2300	<i>P. peruviana</i>
6.	Londiani L6	Kericho	Londiani - Sorget	0.1635° S	35.5931° E	2300	<i>P. peruviana</i>
7.	Londiani L7	Kericho	Londiani - Sorget	0.1635° S	35.5931° E	2300	<i>P. peruviana</i>
8.	Londiani L8	Kericho	Londiani - Sorget	0.1635° S	35.5931° E	2300	<i>P. peruviana</i>
9.	Londiani L9	Kericho	Londiani - Sorget	0.1635° S	35.5931° E	2300	<i>P. peruviana</i>
10.	Londiani L10	Kericho	Londiani - Sorget	0.1635° S	35.5931° E	2300	<i>P. peruviana</i>
11.	Chebororwa C1	Elgeyo-Marakwet	Chebororwa	0.9487° N	35.4234° E	2078	<i>P. peruviana</i>
12.	Chebororwa C2	Elgeyo-Marakwet	Chebororwa	0.9487° N	35.4234° E	2078	<i>P. peruviana</i>
13.	Chebororwa C3	Elgeyo-Marakwet	Chebororwa	0.9487° N	35.4234° E	2078	<i>P. peruviana</i>
14.	Chebororwa C4	Elgeyo-Marakwet	Chebororwa	0.9487° N	35.4234° E	2078	<i>P. peruviana</i>
15.	Chebororwa C5	Elgeyo-Marakwet	Chebororwa	0.9487° N	35.4234° E	2078	<i>P. peruviana</i>
16.	Chebororwa e1in	Elgeyo-Marakwet	Chebororwa	0.9487° N	35.4234° E	2078	<i>P. peruviana</i>
17.	Chebororwa e2in	Elgeyo-Marakwet	Chebororwa	0.9487° N	35.4234° E	2078	<i>P. peruviana</i>
18.	Chebororwa e3in	Elgeyo-Marakwet	Chebororwa	0.9487° N	35.4234° E	2078	<i>P. peruviana</i>

19.	Chebororwa e4in	Elgeyo-Marakwet	Chebororwa	0.9487° N	35.4234° E	2078	<i>P. peruviana</i>
20.	Chebororwa e5in	Elgeyo-Marakwet	Chebororwa	0.9487° N	35.4234° E	2078	<i>P. peruviana</i>
21.	Chebororwa e6in	Elgeyo-Marakwet	Chebororwa	0.9487° N	35.4234° E	2078	<i>P. peruviana</i>
22.	Chebororwa e7in	Elgeyo-Marakwet	Chebororwa	0.9487° N	35.4234° E	2078	<i>P. peruviana</i>
23.	Chebororwa e8in	Elgeyo-Marakwet	Chebororwa	0.9487° N	35.4234° E	2078	<i>P. peruviana</i>
24.	Ndhiwa hb1	Homabay	Ndhiwa	0.7299° S	34.3671° E	1276	<i>P. peruviana</i>
25.	Ndhiwa hb2	Homabay	Ndhiwa	0.7299° S	34.3671° E	1276	<i>P. peruviana</i>
26.	Ndhiwa hb3	Homabay	Ndhiwa	0.7299° S	34.3671° E	1276	<i>P. peruviana</i>
27.	Mukurweini ny1	Nyeri	Mukurweini	0.5609° S	37.0488° E	1669	<i>P. peruviana</i>
28.	Mukurweini ny2	Nyeri	Mukurweini	0.5609° S	37.0488° E	1669	<i>P. peruviana</i>
29.	Mukurweini ny3	Nyeri	Mukurweini	0.5609° S	37.0488° E	1669	<i>P. peruviana</i>
30.	Mukurweini ny4	Nyeri	Mukurweini	0.5609° S	37.0488° E	1669	<i>P. peruviana</i>
31.	Mukurweini ny5	Nyeri	Mukurweini	0.5609° S	37.0488° E	1669	<i>P. peruviana</i>
32.	Ongata Rongai nor1	Kajiado	Ongata Rongai	1.3939° S	36.7442° E	1731	<i>P. peruviana</i>

33.	Ongata Rongai nor2	Kajiado	Ongata Rongai	1.3939° S	36.7442° E	1731	<i>P. peruviana</i>
34.	Ongata Rongai nor3	Kajiado	Ongata Rongai	1.3939° S	36.7442° E	1731	<i>P. peruviana</i>
35.	Ongata Rongai nor4	Kajiado	Ongata Rongai	1.3939° S	36.7442° E	1731	<i>P. peruviana</i>
36.	Ongata Rongai nor5	Kajiado	Ongata Rongai	1.3939° S	36.7442° E	1731	<i>P. peruviana</i>
37.	Gilgil gm	Nakuru	Gilgil market	0.4923° S	36.3173° E	1981	<i>P. peruviana</i>
38.	Muguga DM	Kiambu	Muguga	1.2551° S	36.6580° E	2132	<i>P. peruviana</i>
39.	Thika TK1	Kiambu	Thika	1.0388° S	37.0834° E	1507	<i>P. peruviana</i>
40.	Thika TK2	Kiambu	Thika	1.0388° S	37.0834° E	1507	<i>P. peruviana</i>
41.	Thika TK3	Kiambu	Thika	1.0388° S	37.0834° E	1507	<i>P. peruviana</i>
42.	Thika TK4	Kiambu	Thika	1.0388° S	37.0834° E	1507	<i>P. peruviana</i>
43.	Thika TK5	Kiambu	Thika	1.0388° S	37.0834° E	1507	<i>P. peruviana</i>
44.	Thika TK6	Kiambu	Thika	1.0388° S	37.0834° E	1507	<i>P. peruviana</i>
45.	Thika TK7	Kiambu	Thika	1.0388° S	37.0834° E	1507	<i>P. peruviana</i>
46.	Thika TK8	Kiambu	Thika	1.0388° S	37.0834° E	1507	<i>P. peruviana</i>
47.	Thika TK9	Kiambu	Thika	1.0388° S	37.0834° E	1507	<i>P. peruviana</i>
48.	Tigoni T1	Kiambu	Tigoni	1.1651° S	36.7065° E	2100	<i>P. peruviana</i>

49.	Tigoni T2	Kiambu	Tigoni	1.1651° S	36.7065° E	2100	<i>P. peruviana</i>
50.	Tigoni T3	Kiambu	Tigoni	1.1651° S	36.7065° E	2100	<i>P. peruviana</i>
51.	Tigoni T4	Kiambu	Tigoni	1.1651° S	36.7065° E	2100	<i>P. peruviana</i>
52.	Tigoni T5	Kiambu	Tigoni	1.1651° S	36.7065° E	2100	<i>P. peruviana</i>
53.	Tigoni T6	Kiambu	Tigoni	1.1651° S	36.7065° E	2100	<i>P. peruviana</i>
54.	Tigoni T7	Kiambu	Tigoni	1.1651° S	36.7065° E	2100	<i>P. peruviana</i>
55.	Tigoni T8	Kiambu	Tigoni	1.1651° S	36.7065° E	2100	<i>P. peruviana</i>
56.	Tigoni T9	Kiambu	Tigoni	1.1651° S	36.7065° E	2100	<i>P. peruviana</i>
57.	Tigoni T10	Kiambu	Tigoni	1.1651° S	36.7065° E	2100	<i>P. peruviana</i>
58.	Tigoni T11	Kiambu	Tigoni	1.1651° S	36.7065° E	2100	<i>P. peruviana</i>
59.	Tigoni T12	Kiambu	Tigoni	1.1651° S	36.7065° E	2100	<i>P. peruviana</i>
60.	Tigoni T13	Kiambu	Tigoni	1.1651° S	36.7065° E	2100	<i>P. peruviana</i>
61.	Tigoni T14	Kiambu	Tigoni	1.1651° S	36.7065° E	2100	<i>P. peruviana</i>
62.	Tigoni T15	Kiambu	Tigoni	1.1651° S	36.7065° E	2100	<i>P. peruviana</i>
63.	Tigoni T16	Kiambu	Tigoni	1.1651° S	36.7065° E	2100	<i>P. peruviana</i>
64.	Tigoni T17	Kiambu	Tigoni	1.1651° S	36.7065° E	2100	<i>P. peruviana</i>

**Supplementary Table S3.** *Physalis* accessions that were successfully amplified and sequenced for the ITS2 gene.

No	Sample ID	Sequencing success	Sequence length (base pairs)	GC content %
1.	Londiani L1i	Not successful	N/A	N/A
2.	Londiani L2i	Successful	466	61.6
3.	Londiani L3i	Successful	602	62.1
4.	Londiani L4i	Successful	663	65.2
5.	Londiani L5i	Successful	656	61
6.	Londiani L6i	Successful	310	60
7.	Londiani L7i	Successful	511	60.3
8.	Londiani L8i	Successful	642	60.4
9.	Londiani L9i	Successful	624	59.6
10.	Londiani L10i	Successful	578	59.9
11.	Chebororwa C2i	Successful	679	61.1
12.	Chebororwa C5i	Successful	469	61.6
13.	Chebororwa e1ini	Successful	373	62.5
14.	Chebororwa e2ini	Successful	383	61.4
15.	Chebororwa e3ini	Successful	683	60.6
16.	Chebororwa e4ini	Successful	508	60.2
17.	Chebororwa e5ini	Successful	707	61
18.	Chebororwa e6ini	Successful	664	60.4
19.	Chebororwa e7ini	Successful	692	60.8
20.	Ndhiwa hb2i	Successful	676	60.8
21.	Ndhiwa hb3i	Not successful	N/A	N/A

22.	Mukurweini ny4i	Not successful	N/A	N/A
23.	Mukurweini ny5i	Successful	514	66.9
24.	Gilgil gmi	Successful	274	59.5
25.	Muguga DMi	Successful	595	61.7
26.	Thika TK1i	Not successful	N/A	N/A
27.	Thika TK2i	Not successful	N/A	N/A
28.	Thika TK3i	Not successful	N/A	N/A
29.	Thika TK4i	Not successful	N/A	N/A
30.	Thika TK5i	Not successful	N/A	N/A
31.	Thika TK6i	Not successful	N/A	N/A
32.	Thika TK7i	Not successful	N/A	N/A
33.	Thika TK8i	Successful	310	61
34.	Thika TK9i	Successful	272	62.5
35.	Tigoni T1i	Not successful	N/A	N/A
36.	Tigoni T2i	Successful	431	59.6
37.	Tigoni T4i	Successful	274	60.6
38.	Tigoni T6i	Not successful	N/A	N/A

39.	Tigoni T7i	Not successful	N/A	N/A
40.	Tigoni T8i	Not successful	N/A	N/A
41.	Tigoni T9i	Successful	545	60.4
42.	Tigoni T10i	Not successful	N/A	N/A
43.	Tigoni T11i	Successful	237	55.7
44.	Tigoni T12i	Not successful	N/A	N/A
45.	Tigoni T17i	Not successful	N/A	N/A
46.	Ongata Rongai nor1i	Successful	679	60.2
47.	Ongata Rongai nor3i	Successful	415	63.6
48.	Ongata Rongai nor4i	Successful	677	60.4
49.	Ongata Rongai nor5i	Successful	683	60.8

**Supplementary Table S4.** *Physalis* accessions that were successfully amplified and sequenced for the *rbcL* gene

No	Sample ID	Sequencing success	Sequence length (base pairs)	GC content %
1.	Londiani L1r	Successful	547	43.9
2.	Londiani L2r	Successful	615	43.3
3.	Londiani L3r	Successful	733	43.1
4.	Londiani L4r	Successful	520	43.1
5.	Londiani L5r	Successful	730	42.7
6.	Londiani L6r	Successful	634	43.1
7.	Londiani L7r	Successful	615	43.3
8.	Londiani L8r	Successful	621	42.8
9.	Londiani L9r	Successful	543	43.1
10.	Londiani L10r	Successful	604	43
11.	Chebororwa C2r	Successful	732	45.5
12.	Chebororwa C4r	Successful	745	43.5
13.	Chebororwa C5r	Successful	463	44.5
14.	Chebororwa e1inr	Successful	513	45.2
15.	Chebororwa e2inr	Not successful	N/A	N/A
16.	Chebororwa e3inr	Not successful	N/A	N/A
17.	Chebororwa e4inr	Successful	743	42.8
18.	Chebororwa e6inr	Successful	815	43.2
19.	Chebororwa e7inr	Successful	745	43.9
20.	Chebororwa e8inr	Successful	717	43.5
21.	Ndhiwa hb1r	Not	N/A	N/A

		successful		
22.	Ndhiwa hb2r	Successful	745	43
23.	Ndhiwa hb3r	Successful	744	43
24.	Mukurweini ny1r	Successful	854	42.3
25.	Mukurweini ny3r	Not successful	N/A	N/A
26.	Mukurweini ny4r	Successful	724	44.8
27.	Mukurweini ny5r	Successful	712	44.7
28.	Gilgil gmr	Successful	637	42.9
29.	Muguga DMr	Successful	475	44
30.	Thika TK1r	Not successful	N/A	N/A
31.	Thika TK2r	Successful	733	43.4
32.	Thika TK3r	Successful	792	43.2
33.	Thika TK4r	Successful	815	43.4
34.	Thika TK5r	Not successful	N/A	N/A
35.	Thika TK6r	Successful	789	43.5
36.	Thika TK7r	Successful	733	42.8
37.	Thika TK8r	Successful	626	43.1
38.	Thika TK9r	Successful	815	43.1
39.	Tigoni T2r	Successful	582	43.1
40.	Tigoni T4r	Successful	841	43.6
41.	Tigoni T6r	Successful	464	44.4
42.	Tigoni T7r	Successful	807	43.1
43.	Tigoni T8r	Successful	540	43.7
44.	Tigoni T9r	Successful	802	42.8

45.	Tigoni T10r	Successful	540	45
46.	Tigoni T11r	Successful	745	43.5
47.	Tigoni T12r	Successful	545	43.1
48.	Tigoni T13r	Successful	773	43.5
49.	Tigoni T14r	Successful	775	42.7
50.	Tigoni T16r	Successful	742	42.3
51.	Tigoni T17r	Successful	803	43.3
52.	Ongata Rongai nor3r	Successful	818	43.9
53.	Ongata Rongai nor4r	Successful	776	42.1
54.	Ongata Rongai nor5r	Successful	745	43.2

**Supplementary Table S5.** BLASTn analysis results for the *Physalis* accessions based on ITS2 and *rbcL* sequences

Sample ID	<i>rbcL</i>					ITS2				
	Species of best BLAST match	GenBank Accession number (of database)	E-value	Percent identity (%)	Accession number	Species of best BLAST match	GenBank Accession Number (of database)	E-value	Percent identity (%)	Accession Number
Chebororwa C2	<i>P. peruviana</i>	NC_026570.1	0.0	94.90	OQ507163.1	<i>P. purpurea</i>	MH763740.1	0.0	94.70	OQ371996.1
Chebororwa C5	<i>P. virginiana</i>	KT178121	0.0	95.46	OQ507165.1	<i>P. cordata</i>	AY665886.1	5e-122	87.78	OQ371997.1
Chebororwa e1in	<i>P. minima</i>	NC_048515.1	0.0	93.18	OQ507166.1	<i>P. cordata</i>	MH763728.1	1e-81	82.24	OQ371998.1
Chebororwa e4in	<i>P. minima</i>	NC_048515.1	0.0	99.46	OQ507167.1	<i>P. cordata</i>	AY665886.1	1e-108	86.06	OQ372001.1
Chebororwa e6in	<i>P. minima</i>	NC_048515.1	0.0	98.28	OQ507168.1	<i>P. purpurea</i>	MH763740.1	0.0	93.75	OQ372003.1
Chebororwa e7in	<i>P. minima</i>	NC_048515.1	0.0	99.19	OQ507169.1	<i>P. purpurea</i>	MH763740.1	0.0	94.27	OQ372004.1
Gilgil gm	<i>P. minima</i>	NC_048515.1	0.0	99.06	OQ507171.1	<i>P. purpurea</i>	MH763740.1	5e-35	81.98	OQ372005.1
Muguga DM	<i>P. minima</i>	NC_048515.1	0.0	98.74	OQ507177.1	<i>P. purpurea</i>	MH763740.1	0.0	93.83	OQ372007.1
Mukurweini ny5	<i>P. angulata</i>	NC_039457.1	0.0	92.90	OQ507180.1	<i>P. peruviana</i>	AY665914.1	4e-93	88.82	OQ372008.1
Ndhiwa hb2	<i>P. minima</i>	NC_048515.1	0.0	93.33	OQ507181.1	<i>P. purpurea</i>	MH763740.1	0.0	94.28	OQ372009.1

Ongata Rongai nor3	<i>P. peruviana</i>	NC_026570.1	0.0	95.47	OQ507183.1	<i>P. cordata</i>	AY665886.1	2e-76	86	OQ372012.1
Ongata Rongai nor4	<i>P. virginiana</i>	KT178121.1	0.0	91.10	OQ507184.1	<i>P. purpurea</i>	MH763740.1	0.0	94.09	OQ372013.1
Ongata Rongai nor5	<i>P. peruviana</i>	NC_026570.1	0.0	98.78	OQ507185.1	<i>P. purpurea</i>	MH763740.1	0.0	94.51	OQ372014.1
Thika TK8	<i>P. minima</i>	NC_048515.1	0.0	99.04	OQ507192.1	<i>P. minimaculata</i>	AY665905.1	2e-93	88.51	OQ372015.1
ThikaTK9	<i>P. minima</i>	NC_048515.1	0.0	98.03	OQ507193.1	<i>P. peruviana</i>	AY665914.1	1e-35	80.36	OQ372016.1
Tigoni T2	<i>P. minima</i>	NC_048515.1	0.0	98.31	OQ507194.1	<i>P. purpurea</i>	MH763740.1	7e-160	91.79	OQ372017.1
Tigoni T4	<i>P.s minima</i>	NC_048515.1	0.0	96.42	OQ507195.1	<i>P. microcarpa</i>	AY665903.1	1e-61	86.78	OQ372018.1
Tigoni T9	<i>P. minima</i>	NC_048515.1	0.0	98.13	OQ507199.1	<i>P. purpurea</i>	MH763740.1	0.0	92.22	OQ372019.1
Tigoni T11	<i>P. minima</i>	NC_048515.1	0.0	99.32	OQ507201.1	<i>P. purpurea</i>	MH763740.1	9e-32	84.85	OQ372020.1
Londiani 2	<i>P. minima</i>	NC_048515.1	0.0	100	OQ507153.1	<i>P. purpurea</i>	MH763740.1	0.0	92.98	OQ372021.1
Londiani 3	<i>P. minima</i>	NC_048515.1	0.0	99.59	OQ507154.1	<i>P. purpurea</i>	MH763740.1	0.0	94.06	OQ372022.1
Londiani 4	<i>P. minima</i>	NC_048515.1	0.0	100	OQ507155.1	<i>P. peruviana</i>	AY665914.1	0.0	97.41	OQ372023.1
Londiani 5	<i>P. minima</i>	NC_048515.1	0.0	99.86	OQ507156.1	<i>P. purpurea</i>	MH763740.1	0.0	94.45	OQ372024.1
Londiani 6	<i>P. minima</i>	NC_048515.1	0.0	100	OQ507157.1	<i>Physalis aff.</i>	AY665868.1	2e-	91.35	OQ372025.1

		1			1	<i>philadelphica</i>		144		1
Londiani 7	<i>P. minima</i>	NC_048515. 1	0.0	100	OQ507158. 1	<i>P. purpurea</i>	MH763740. 1	1e- 148	86.00	OQ372026. 1
Londiani 8	<i>P. minima</i>	NC_048515. 1	0.0	100	OQ507159. 1	<i>P. purpurea</i>	MH763740. 1	0.0	93.07	OQ372027. 1
Londiani 9	<i>P. minima</i>	NC_048515. 1	0.0	100	OQ507160. 1	<i>P. purpurea</i>	MH763740. 1	0.0	88.96	OQ372028. 1
Londiani 10	<i>P. minima</i>	NC_048515. 1	0.0	100	OQ507161. 1	<i>P. purpurea</i>	MH763740. 1	0.0	90.16	OQ372029. 1

## Supplementary Figures

### Supplementary Figure S1: Multiple alignment sequence for ITS2 and *rbcL* *Physalis*

accessions gene sequence as well as reference sequences.

(<https://esprout.ibcp.fr/ESProut/temp/1032964064/0-0-1680466160-esp.pdf>)

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NC_026570.1* ATGTCACCACAAAACAGAGACTAAAGCAAGT.GTTGGATTCAAGGCTGGTGTAAAGAGTACAAATTGACTTATTAA..TACTC
NC_039457.1* ATGTCACCACAAAACAGAGACTAAAGCAAGT.GTTGGATTCAAGGCTGGTGTAAAGAGTACAAATTGACTTATTAA..TACTC
NC_070364.1* ATGTCACCACAAAACAGAGACTAAAGCAAGT.GTTGGATTCAAGGCTGGTGTAAAGAGTACAAATTGACTTATTAA..TACTC
NC_039458.1* ATGTCACCACAAAACAGAGACTAAAGCAAGT.GTTGGATTCAAGGCTGGTGTAAAGAGTACAAATTGACTTATTAA..TACTC
NC_048514.1* ATGTCACCACAAAACAGAGACTAAAGCAAGT.GTTGGATTCAAGGCTGGTGTAAAGAGTACAAATTGACTTATTAA..TACTC
NC_048515.1* ATGTCACCACAAAACAGAGACTAAAGCAAGT.GTTGGATTCAAGGCTGGTGTAAAGAGTACAAATTGACTTATTAA..TACTC
OQ507153.1 .....
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NC_026570.1*	CT	GAGTAC	CAAA	CC	AA	GGATAC	TGA	TATATT	GGC	AG	CATT	CC	CGAG	TAA	CT	CC	CT	GG	...	AGT	TC	CA	CC
NC_039457.1*	CT	GAGTAC	CAAA	CC	AA	GGATAC	TGA	TATATT	GGC	AG	CATT	CC	CGAG	TAA	CT	CC	CT	GG	...	AGT	TC	CA	CC
NC_070364.1*	CT	GAGTAC	CAAA	CC	AA	GGATAC	TGA	TATATT	GGC	AG	CATT	CC	CGAG	TAA	CT	CC	CT	GG	...	AGT	TC	CA	CC
NC_039458.1*	CT	GAGTAC	CAAA	CC	AA	GGATAC	TGA	TATATT	GGC	AG	CATT	CC	CGAG	TAA	CT	CC	CT	GG	...	AGT	TC	CA	CC
NC_048514.1*	CT	GAGTAC	CAAA	CC	AA	GGATAC	TGA	TATATT	GGC	AG	CATT	CC	CGAG	TAA	CT	CC	CT	GG	...	AGT	TC	CA	CC
NC_048515.1*	CT	GAGTAC	CAAA	CC	AA	GGATAC	TGA	TATATT	GGC	AG	CATT	CC	CGAG	TAA	CT	CC	CT	GG	...	AGT	TC	CA	CC
Q0507153.1	CT	GAGTAC	CAAA	CC	AA	GGATAC	TGA	TATATT	GGC	AG	CATT	CC	CGAG	TAA	CT	CC	CT	GG	...	AGT	TC	CA	CC
Q0507154.1	CT	GAGTAC	CAAA	CC	AA	GGATAC	TGA	TATATT	GGC	AG	CATT	CC	CGAG	TAA	CT	CC	CT	GG	...	AGT	TC	CA	CC
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Q0507180.1	CT	GAGTAC	CAAA	CC	AA	GGATAC	TGA																

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KT178121.1*	TGAAGAA	CAGGG	CAGGG	CTGC	CTTCT	CAT	CTGT	GAC
NC_026570.1*	TGAAGAA	CAGGG	CAGGG	CTGC	CTTCT	CAT	CTGT	GAC
NC_039457.1*	TGAAGAA	CAGGG	CAGGG	CTGC	CTTCT	CAT	CTGT	GAC
NC_070364.1*	TGAAGAA	CAGGG	CAGGG	CTGC	CTTCT	CAT	CTGT	GAC
NC_039458.1*	TGAAGAA	CAGGG	CAGGG	CTGC	CTTCT	CAT	CTGT	GAC
NC_048514.1*	TGAAGAA	CAGGG	CAGGG	CTGC	CTTCT	CAT	CTGT	GAC
NC_048515.1*	TGAAGAA	CAGGG	CAGGG	CTGC	CTTCT	CAT	CTGT	GAC
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AY665868.1*	GGCGTGC	CGCTG	CGCGTGC	CGGG	CGACT	CGCAAC	CGCC	GAAC
AY665914.1*	GGCGTGC	CGCTG	CGCGTGC	CGGG	CGACT	CGCAAC	CGCC	GAAC
AY665905.1*	GGCGTGC	CGCTG	CGCGTGC	CGGG	CGACT	CGCAAC	CGCC	GAAC
AY665886.1*	GACGCC	CGCTG	CGCGTGC	CGTT	CGACT	CGCAAC	CGCC	GAAC
MH763728.1*	GGCGTGC	CGCTG	CGCGTGC	CGAT	CGACT	CGCAAC	CGCC	GAAC
MH763740.1*	GGCGTGC	CGCTG	CGCGTGC	CGGG	CGACT	CGCAAC	CGCC	GAAC
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Q0371998.1								
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Q0372003.1	AGCAGCC	CACGTG	CGCGTGC	CTAG	CGACT	CGCAAC	CGCC	GACG
Q0372004.1	AGCAGCC	CACGTG	CGCGTGC	CTAG	CGACT	CGCAAC	CGCC	GACG
Q0372005.1	GGCAGCC							
Q0372007.1	AGCAGCC	CACGTG	CGCGTGC	CTAG	CGACT	CGCAAC	CGCC	GACG
Q0372008.1	GGCGTGC	CGCTG	CGCGTGC	CGGG	CGCTG	CGCAAC	CGCC	GACG
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Q0372012.								

[illegible]

[illegible]

[illegible]

[illegible]

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NC_039457.1*	T.....TAAACCT.AAA.....	TGGGGTTATCTGCTAAAAAACTACGGTAGAGCTGT	TATGAATGCTT.....		
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NC_048515.1*	T.....TAAACCT.AAA.....	TGGGGTTATCTGCTAAAAAACTACGGTAGAGCTGT	TATGAATGCTT.....		
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OQ507159.1	T.....TAAACCT.AAA.....	TGGGGTTATCTGCTAAAAAACTACGGTAGAGCTGT	TATGAATGCTT.....		
OQ507160.1	T.....TAAACCT.AAA.....	TGGGGTTATCTGCTAAAAAACTACGGTAGAGCTGT	TATGAATGCTT.....		
OQ507161.1	T.....TAAACCT.AAA.....	TGGGGTTATCTGCTAAAAAACTACGGTAGAGCTGT	TATGAATGCTT.....		
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AY665868.1*	G.....GGGACGG.ATA.....	CTGGC.....	CTCCCGTGGCGCCGCCGCGC.....		
AY665914.1*	C.....GGGACGG.ATA.....	CTGGC.....	CTCCCGTGGCGCTCGCAGCG.....		
AY665905.1*	C.....GGGACGG.ATA.....	CTGGC.....	CTCCCGTGGCGCTCGCAGCG.....		
AY665886.1*	C.....GGGACGG.ATA.....	CTGGC.....	CTCCCGTGGCGCTCTCAGCG.....		
MH763728.1*	C.....GGGACGG.ATA.....	CTGGC.....	CTCCCGTGGCGCTCTCAGCG.....		
MH763740.1*	C.....GGGACGG.ATA.....	CTGGC.....	CTCCCGTGGCGCCATCGGCT.....		
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NC_026570.1*	CGC	GGT	GCA	CTT	.GATTTTACCAAAGATGATGAG	AAC	GTGAACTCACAA	CC.A	...	TTT	ATG	GC	...	GTT	GG
NC_039457.1*	CGC	GGT	GCA	CTT	.GATTTTACCAAAGATGATGAG	AAC	GTGAACTCACAA	CC.A	...	TTT	ATG	GC	...	GTT	GG
NC_070364.1*	CGC	GGT	GCA	CTT	.GATTTTACCAAAGATGATGAG	AAC	GTGAACTCACAA	CC.A	...	TTT	ATG	GC	...	GTT	GG
NC_039458.1*	CGC	GGT	GCA	CTT	.GATTTTACCAAAGATGATGAG	AAC	GTGAACTCACAA	CC.A	...	TTT	ATG	GC	...	GTT	GG
NC_048514.1*	CGC	GGT	GCA	CTT	.GATTTTACCAAAGATGATGAG	AAC	GTGAACTCACAA	CC.A	...	TTT	ATG	GC	...	GTT	GG
NC_048515.1*	CGC	GGT	GCA	CTT	.GATTTTACCAAAGATGATGAG	AAC	GTGAACTCACAA	CC.A	...	TTT	ATG	GC	...	GTT	GG
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Q0507177.1	CGC	GGT	GGGATT	.GATTTTACCAAATGTGAGAAG	AAC	CTTGA	ACTCACCA	ACC.T	...	TTT	GC	GC	...	GTT	GG
Q0507180.1	CGC	GGT	GCA	CTT	.GATTTTACCAAAGATGATGAG	AAC	GTGAACTCACAA	CC.A	...	TTT	ATG	GC	...	GTT	GG
Q0507181.1	CGC	GGT	GCA	CTT	.GATTTTACCAAAGATGATGAG	AAC	GTGAACTCACAA	CC.A	...	TTT	ATG	GC	...	GTT	GG
Q0507183.1	CGC	GGT	GCA	CTT	.GATTTTACCAAAGACAAATGAG	AAC	CTGAACTCACAA	CC.A	...	CTTT	GC	...	GTT	GG	...
Q0507184.1	CGC	GGT	GAACT	.GATTTTACCAAATTGCTGAG	AAC	GTTC	CTTGCA	ACC.	...	...	...	...	TTT	AG	...
Q0507185.1	CGC	GGT	GCA	CTT	.GATTTTACCAAAGATGATGAG	AAC	GTGAACTCACAA	CC.A	...	TTT	ATG	GC	...	GTT	GG
Q0507192.1	CGC	GGT	GCA	CTT	.GATTTTACCAAAGATGATGAG	AAC	GTGAACTCAA	...	...	...	...	...	...	...	...
Q0507193.1	CGC	GGT	GCA	CTT	.GATTTTACCAAAGATGATGAG	AAC	GTGAACTCACAA	CC.A	...	TTT	ATG	GC	...	GTT	GG
Q0507194.1	CGC	GGT	GCA	CTT	.GATTTTACCAAAGATGATGAG	AAC	GTG								

[illegible]

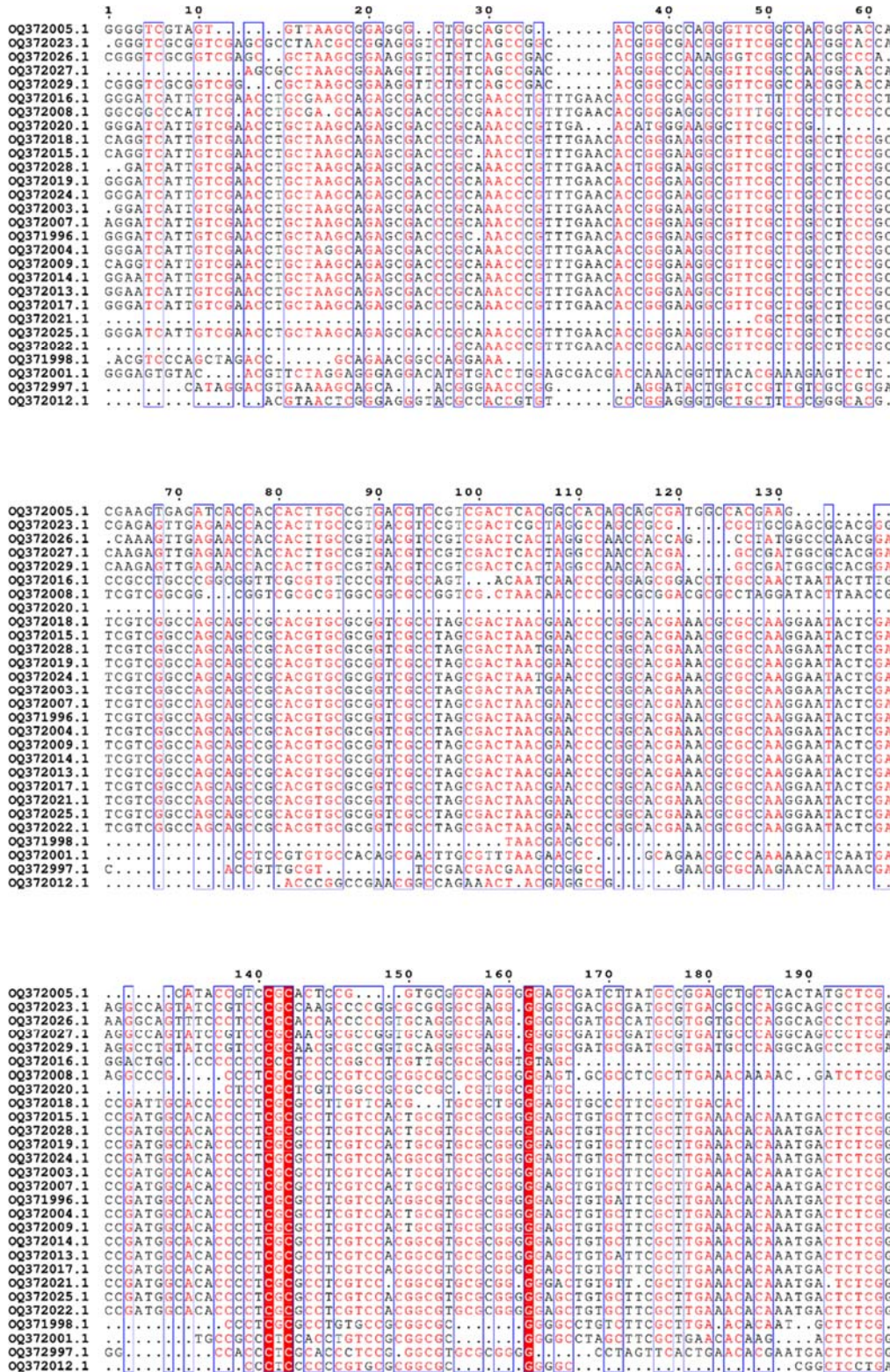
KT178121.1\* CT.....GAAACAGGTGAAATCAAAGGGCATTACTTGAATGCTACTGCAGGTACATGCGAAGAAATGATCAAAAGAG  
 NC\_026570.1\* CT.....GAAACAGGTGAAATCAAAGGGCATTACTTGAATGCTACTGCAGGTACATGCGAAGAAATGATCAAAAGAG  
 NC\_039457.1\* CT.....GAAACAGGTGAAATCAAAGGGCATTACTTGAATGCTACTGCAGGTACATGCGAAGAAATGATCAAAAGAG  
 NC\_070364.1\* CT.....GAAACAGGTGAAATCAAAGGGCATTACTTGAATGCTACTGCAGGTACATGCGAAGAAATGATCAAAAGAG  
 NC\_039458.1\* CT.....GAAACAGGTGAAATCAAAGGGCATTACTTGAATGCTACTGCAGGTACATGCGAAGAAATGATCAAAAGAG  
 NC\_048514.1\* CT.....GAAACAGGTGAAATCAAAGGGCATTACTTGAATGCTACTGCAGGTACATGCGAAGAAATGATCAAAAGAG  
 NC\_048515.1\* CT.....GAAACAGGTGAAATCAAAGGGCATTACTTGAATGCTACTGCAGGTACATGCGAAGAAATGATCAAAAGAG  
 Q0507153.1 ..  
 Q0507154.1 CT.....GAAACAGGTGAAATCAAAGGGCATTACTTGAATGCTACTGCAG.....  
 Q0507155.1 ..  
 Q0507156.1 CT.....GAAACAGGTGAAATCAAAGGGCATTACTTGAATGCTACTG.....  
 Q0507157.1 CT.....GAAA.....  
 Q0507158.1 ..GCCGAAGCATT.....  
 Q0507159.1 ..GCCGAAGCATTATATAA.....  
 Q0507160.1 ..AAA.....  
 Q0507161.1 ..  
 Q0507163.1 TT.....GGAACAGGTGGAATCAAGCAGCATTACTTGGATGCTTCGGCC.....  
 Q0507165.1 ..  
 Q0507166.1 CT.....GAAACAGGTGAAATCAAAGGGCATTACTTGAATGCTACTGCAGGTACATGCGA.....  
 Q0507167.1 CT.....GAAACAGGTGAAATCAAAGGGCATTACTTGAATGCTACTGCAGGTACATGCGAAGAAATATTCAAAAGAG  
 Q0507168.1 CT.....GAAACAGGTGAAATCAAAGGGCATTACTTGAATGCTACTGCAGGTACATGCGAAG.....  
 Q0507169.1 CT.....GAAACAG.....  
 Q0507171.1 ..  
 Q0507177.1 ..AACATTTTATAAAGGTCAAGGAGGAAACAAGGGAAATTTGAAGTAT.....  
 Q0507180.1 CT.....GAAACAGGTGAAATCAAAGGGCATTACTTGAATGCTACTGCAGGTACATGCAAAA.....  
 Q0507183.1 CT.....GAAAGAGGTGAAATCAAAAGGGCTTACTTGAATGCTACTGCAGGTACCCGCGAAGAAATGATCAAAAGAG  
 Q0507184.1 CT.....GAAATTGGTAAATCAAAAGGGGGTTACTTGAATTTTACTGCAGGTACCCGCGAAGAAATGAGTAAAAGAG  
 Q0507185.1 CT.....GAAACAGGTGAAATCAAAGGGCATTACTTGAATGCTACTGCAGGTACATGSCAAA.....  
 Q0507192.1 ..  
 Q0507193.1 CT.....GAAACAGGTGAAATCAAAGGGCATTACCTGAATGCTACTGCAGGTACATGCGAAGAAATGATCAAGAGTT  
 Q0507194.1 ..  
 Q0507195.1 CT.....GAAACAGGTGAAATCAAAGGGCATTACTTGGATGCTACTGCAGGTGCACCTTGAAGAATATTCAAAAGAG  
 Q0507199.1 CT.....GAAACAGGTGAAATCAACCGCGATTACTTGAATGCTACTGCAGGTACATGCGAAGAAATTTCTCAAAAGAG  
 CT.....GAAACAGGTGAAATCAAAGGGCATTACTTGAATGCTACTGCAGGTCCAGGGGGAA.....  
 AY665903.1\* TC.GGCTGATG.GACCCCTTCAT..GCGCTTAGGCGCTC..CGACCGCGACCCAGGTTCAGGCGGGATT.....  
 AY665868.1\* TC.GGCTTACA.GACCCCTTCG..GCGCTTAGGCGCTC..CGACCGCGACCCAGGTTCAGGCGGGATT.....  
 AY665914.1\* CC.GGCTGACA.GACCCCTTCG..GCGCTTAGGCGCTC..CGACCGCGACCCAGGTTCAGGCGGGATT.....  
 AY665905.1\* TC.GGCTGTGA.GACCCCTTCG..GCGCTTAGGCGCTC..CGACCGCGACCCAGGTTCAGGCGGGATT.....  
 AY665886.1\* TC.GGCTGCGA.GACCCCTTCG..GCGCTTAGGCGCTC..CGACCGCGACCCAGGTTCAGGCGGGATT.....  
 MH763728.1\* TC.GGCTGCGA.GACCCCTTCG..GCGCTTAGGCGCTC..CGACCGCGACCCAGGTTCAGGCGGGATT.....  
 MH763740.1\* TC.GGCTGACA.GAACCTTCCG..GCGCTTAGGCGCTC..CGACCGCGACCCAGGTTCAGGTGGAATT.....  
 Q0371996.1 TC.GGCTGACA.GAACCTTCCG.GCGCTTAGGCGCTT..CGACCGCGACCCAGGTTCAGGTGGAATT.....  
 Q0371997.1 ..  
 Q0371998.1 ..  
 Q0372001.1 ..  
 Q0372003.1 TC.GGCTGACA.GAACCTTCCGGCGC..TAGCGCTT..CGA.CGCGACCC.AGGTCAGGTGA.....  
 Q0372004.1 TC.GGCTGACA.GAACCTTCCG.GCGCTTAGGCGCTT..CGACCGCGACCCAGGTTCAGGTGGAAA.....  
 Q0372005.1 ..  
 Q0372007.1 TC.GGCTGACA.GAACCTTCCG.....  
 Q0372008.1 ..  
 Q0372009.1 TC.GGCTGACA.GAACCTTCCG..GCGCTTAGGCGCTT..CGACCGCGACCCAGGTTCAGTGGAA.....  
 Q0372012.1 ..  
 Q0372013.1 TC.AGCTGACA.GAACCTTCCG..GCGCTTAGGCGCTT..CGACCGCGACCCAGGTTCAGTGGAA.....  
 Q0372014.1 TC.AGCTGACA.GAACCTTCCGGCGC..TAGCGCTT..CGACCGCGACCCAGGTTCAGTGGAA.....  
 Q0372015.1 ..  
 Q0372016.1 ..  
 Q0372017.1 ..  
 Q0372018.1 ..  
 Q0372019.1 ..  
 Q0372020.1 ..  
 Q0372021.1 ..  
 Q0372022.1 TC.GGCTGACA.GAACCTTTCGGTSCGCTTAGGCGCTT..CGACCGCGACCCAGGTTCAGGTGGAA.....  
 Q0372023.1 ..CAATGATCCTTCCGCAG.....GTTCACCTATCGAAACC.....  
 Q0372024.1 TC.GGCTGACA.GAACCTCCG..GCGCTTAGGCGCTT..CGACCGCGACCCAGGTTCGGGATTTTCG.....  
 Q0372025.1 ..  
 Q0372026.1 ..GACACCT.....  
 Q0372027.1 TC...GACATGAACCTTCCG.....CATGCTACCTACGGGAAAC.....  
 Q0372028.1 TC.GGCTGACATAAACCTTCCGGCGTTTTTAGGCCCTTCCACCCGCGTACCC.....  
 Q0372029.1 ..

	770	780	790	800	810	820	830	840
KT178121.1*	CTGTATTTGCTAGAGAAATTGGGCGTTCCGATCGTAATGCATGACTACTTAACGGGGGGGATTACCGCAAATACTAGCTTGG							
NC_026570.1*	CTGTATTTGCTAGAGAAATTGGGCGTTCCGATCGTAATGCATGACTACTTAACGGGGGGGATTACCGCAAATACTAGCTTGG							
NC_039457.1*	CTGTATTTGCTAGAGAAATTGGGCGTTCCGATCGTAATGCATGACTACTTAACGGGGGGGATTACCGCAAATACTAGCTTGG							
NC_070364.1*	CTGTATTTGCTAGAGAAATTGGGCGTTCCGATCGTAATGCATGACTACTTAACGGGGGGGATTACCGCAAATACTAGCTTGG							
NC_039458.1*	CTGTATTTGCTAGAGAAATTGGGCGTTCCGATCGTAATGCATGACTACTTAACGGGGGGGATTACCGCAAATACTAGCTTGG							
NC_048514.1*	CTGTATTTGCTAGAGAAATTGGGCGTTCCGATCGTAATGCATGACTACTTAACGGGGGGGATTACCGCAAATACTAGCTTGG							
NC_048515.1*	CTGTATTTGCTAGAGAAATTGGGCGTTCCGATCGTAATGCATGACTACTTAACGGGGGGGATTACCGCAAATACTAGCTTGG							
Q0507153.1	.....							
Q0507154.1	.....							
Q0507155.1	.....							
Q0507156.1	.....							
Q0507157.1	.....							
Q0507158.1	.....							
Q0507159.1	.....							
Q0507160.1	.....							
Q0507161.1	.....							
Q0507163.1	.....							
Q0507165.1	.....							
Q0507166.1	.....							
Q0507167.1	.....							
Q0507168.1	GTGTCTTTGCCAGGGAATTGGGCGTTCCGGTCGTAATATATGACCACCTTAACGTT.....							
Q0507169.1	.....							
Q0507171.1	.....							
Q0507177.1	.....							
Q0507180.1	.....							
Q0507181.1	.....							
Q0507183.1	CTGTATTTGTTAGAGAAATTGGGCGTTCCGATCGTAATGCATTACAACTTAACGGGGAA.....							
Q0507184.1	CTGTATTTAGTAGAGG.....							
Q0507185.1	.....							
Q0507192.1	.....							
Q0507193.1	CTATATTTGCTAGAGAAATTGCGCGCTCCTGTCGTGATGTATGAGTACTTAACITC.....							
Q0507194.1	.....							
Q0507195.1	CTTCTTTTGGCCACGSAATTGGGGGTTCCGGTCGAAACGGATGAGCACTTGATGGGGGGTTTCACTACAAACACTAGCTTTG							
Q0507199.1	CTCTATTTCACTAGAGAAATTGCGCGTTCCGATCGTAATGGATG.....							
Q0507201.1	.....							
AY665903.1*	.....							
AY665868.1*	.....							
AY665914.1*	.....							
AY665905.1*	.....							
AY665886.1*	.....							
MH763728.1*	.....							
MH763740.1*	.....							
Q0371996.1	.....							
Q0371997.1	.....							
Q0371998.1	.....							
Q0372001.1	.....							
Q0372003.1	.....							
Q0372004.1	.....							
Q0372005.1	.....							
Q0372007.1	.....							
Q0372008.1	.....							
Q0372009.1	.....							
Q0372012.1	.....							
Q0372013.1	.....							
Q0372014.1	.....							
Q0372015.1	.....							
Q0372016.1	.....							
Q0372017.1	.....							
Q0372018.1	.....							
Q0372019.1	.....							
Q0372020.1	.....							
Q0372021.1	.....							
Q0372022.1	.....							
Q0372023.1	.....							
Q0372024.1	.....							
Q0372025.1	.....							
Q0372026.1	.....							
Q0372027.1	.....							
Q0372028.1	.....							
Q0372029.1	.....							

## Supplementary Figure S2: Multiple sequence alignment for 28 *Physalis* accessions

based on ITS2 marker ([https://espript.ibcp.fr/ESPrIPT/temp/1440398212/0-0-](https://espript.ibcp.fr/ESPrIPT/temp/1440398212/0-0-1688383904-esp.pdf)

[1688383904-esp.pdf](https://espript.ibcp.fr/ESPrIPT/temp/1440398212/0-0-1688383904-esp.pdf))



200

Q372005.1 .....TATATTGCG.....  
Q372023.1 CCTAATGGCTTCGGGGCAACTTGGCTTCAAG...ACTCGATGTTTACGGGATTCTGCAATTACACCAAGTATCGC  
Q372026.1 CCTATGGCTTCGGGGCAACTTGGCTTCAAG...ACTCCAAAGTTTACGGGATTCTGCAATTACACCAAGTATCGC  
Q372027.1 CCTAATGGCTTCGGGGCAACTTGGCTTCAAG...ACTCGATGTTTACGGGATTCTGCAATTACACCAAGTATCGC  
Q372029.1 CCTAATGGCTTCGGGGCAACTTGGCTTCAAG...ACTCGATGTTTACGGGATTCTGCAATTACACCAAGTATCGC  
Q372016.1 .....TCGCTTGAAT.....  
Q372008.1 CAC...GGTTCTCGGCTCTCGCTCGATGAAACGATATCGAATCTGTACTGGTGGATTGCAATCCCTGACGTCGATCTT  
Q372020.1 .....CTGCGACTACGA.....  
Q372018.1 .....  
Q372015.1 CAACGGATATCTCGGCTCTCGCATCGATTTTGA...ACGTAGCGAAACCGGATA.....  
Q372028.1 CAACGGATATCTCGGCTCTCGCATCGATGAAAG...ACGTAGCGAAATGCGATCTTGGTGTGAATTGCAGAAATCCCGT  
Q372019.1 CAACGGATATCTCGGCTCTCGCATCGATGAAAG...ACGTAGCGAAATGCGATCTTGGTGTGAATTGCAGAAATCCCGT  
Q372024.1 CAACGGATATCTCGGCTCTCGCATCGATGAAAG...ACGTAGCGAAATGCGATCTTGGTGTGAATTGCAGAAATCCCGT  
Q372003.1 CAACGGATATCTCGGCTCTCGCATCGATGAAAG...ACGTAGCGAAATGCGATCTTGGTGTGAATTGCAGAAATCCCGT  
Q372007.1 CAACGGATATCTCGGCTCTCGCATCGATGAAAG...ACGTAGCGAAATGCGATCTTGGTGTGAATTGCAGAAATCCCGT  
Q371996.1 CAACGGATATCTCGGCTCTCGCATCGATGAAAG...ACGTAGCGAAATGCGATCTTGGTGTGAATTGCAGAAATCCCGT  
Q372004.1 CAACGGATATCTCGGCTCTCGCATCGATGAAAG...ACGTAGCGAAATGCGATCTTGGTGTGAATTGCAGAAATCCCGT  
Q372009.1 CAACGGATATCTCGGCTCTCGCATCGATGAAAG...ACGTAGCGAAATGCGATCTTGGTGTGAATTGCAGAAATCCCGT  
Q372014.1 CAACGGATATCTCGGCTCTCGCATCGATGAAAG...ACGTAGCGAAATGCGATCTTGGTGTGAATTGCAGAAATCCCGT  
Q372013.1 CAACGGATATCTCGGCTCTCGCATCGATGAAAG...ACGTAGCGAAATGCGATCTTGGTGTGAATTGCAGAAATCCCGT  
Q372017.1 CAACGGATATCTCGGCTCTCGCATCGATGAAAG...ACGTAGCGAAATGCGATCTTGGTGTGAATTGCAGAAATCCCGT  
Q372021.1 CAACGGATATCTCGGCTCTCGCATCGATGAAAG...ACGTAGCGAAATGCGATCTTGGTGTGAATTGCAGAAATCCCGT  
Q372025.1 CAACGGATATCTCGGCTCTCGCATCGATGAAAG...ACGTAGCGAAATGCGATCTTGGTGTGAATTGCAGAAATCCCGT  
Q372022.1 CAACGGATATCTCGGCTCTCGCATCGATGAAAG...ACGTAGCGAAATGCGATCTTGGTGTGAATTGCAGAAATCCCGT  
Q371998.1 ...CAAGGATCTCGGCTCTCGCATCGATGAAAG...ACGTAGCGAAATGCGATCTTGGTGTGAATTGCAGAAATCCCGT  
Q372001.1 CAT...GGATTCTCGGCTCTCGCATCGATGAAAG...ACGTAGCGAAATGCGATCTTGGTGTGAATTGCAGAAATCCCGT  
Q372997.1 CAGGGATATCTCGGCTCTCGCATCGATGAAAG...ACGTAGCGAAATGCGATCTTGGTGTGAATTGCAGAAATCCCGT  
Q372012.1 ACACGAAGAATCTCGGCTCTCGCATCGATGAAAG...ACGTAGCGAAATGCGATCTTGGTGTGAATTGCAGAAATCCCGT

Q372005.1 .....  
Q372023.1 ATTTTCGCTACGTTCTTCATCGATGCGAGAGCCGAGATATCCGTTCCGAGAGTC...GTTCGGTTTCAAGCGAGGCG  
Q372026.1 ATTTTCGCTACGTTCTTCATCGAAGCCAGAACCGAAATATCCGTTCCGAGAGGC...ATTTGTTTCAAGCGAAAGC  
Q372027.1 ATTTTCGCTACGTTCTTCATCGATGCGAGAGCCGAGATATCCGTTCCGAGAGTC...ATTTGTTTCAAGCGAAAGC  
Q372029.1 ATTTTCGCTACGTTCTTCATCGATGCGAGAGCCGAGATATCCGTTCCGAGAGTC...ATTTGTTTCAAGCGAAAGC  
Q372016.1 .....  
Q372008.1 GACTGATTGCGCGCTCTTTTCGGGGGA...CTGGCTCGGCTCCACCG...  
Q372020.1 GAACGGCCAAATACCTACCCGA...  
Q372018.1 .....  
Q372015.1 .....  
Q372028.1 GAACCATCGAGTCTTTGAACCAAGTGTGCCGAAGCCATTAGGTCCGAGGACACGTCTGCCGCGCATCATCGC  
Q372019.1 GAACCATCGAGTCTTTGAACCAAGTGTGCCGAAGCCATTAGGTCCGAGGACACGTCTGCCGCGCATCATCGC  
Q372024.1 GAACCATCGAGTCTTTGAACCAAGTGTGCCGAAGCCATTAGGTCCGAGGACACGTCTGCCGCGCATCATCGC  
Q372003.1 GAACCATCGAGTCTTTGAACCAAGTGTGCCGAAGCCATTAGGTCCGAGGACACGTCTGCCGCGCATCATCGC  
Q372007.1 GAACCATCGAGTCTTTGAACCAAGTGTGCCGAAGCCATTAGGTCCGAGGACACGTCTGCCGCGCATCATCGC  
Q371996.1 GAACCATCGAGTCTTTGAACCAAGTGTGCCGAAGCCATTAGGTCCGAGGACACGTCTGCCGCGCATCATCGC  
Q372004.1 GAACCATCGAGTCTTTGAACCAAGTGTGCCGAAGCCATTAGGTCCGAGGACACGTCTGCCGCGCATCATCGC  
Q372009.1 GAACCATCGAGTCTTTGAACCAAGTGTGCCGAAGCCATTAGGTCCGAGGACACGTCTGCCGCGCATCATCGC  
Q372014.1 GAACCATCGAGTCTTTGAACCAAGTGTGCCGAAGCCATTAGGTCCGAGGACACGTCTGCCGCGCATCATCGC  
Q372013.1 GAACCATCGAGTCTTTGAACCAAGTGTGCCGAAGCCATTAGGTCCGAGGACACGTCTGCCGCGCATCATCGC  
Q372017.1 GAACCATCGAGTCTTTGAACCAAGTGTGCCGAAGCCATTAGGTCCGAGGACACGTCTGCCGCGCATCATCGC  
Q372021.1 GAACCATCGAGTCTTTGAACCAAGTGTGCCGAAGCCATTAGGTCCGAGGACACGTCTGCCGCGCATCATCGC  
Q372025.1 .....  
Q372022.1 GAACCATCGAGTCTTTGAACCAAGTGTGCCGAAGCCATTAGGTCCGAGGACACGTCTGCCGCGCATCATCGC  
Q371998.1 G.ACCATCGAGTCT...AAGCAAGTGTGCCGAAGCCATTAGGTCCGAGGACACGTCTGCCGCGCATCATCGC  
Q372001.1 GACCATC...GATCTTTGAACCAAGTGTGCCGAAGCCATTAGGTCCGAGGACACGTCTGCCGCGCATCATCGC  
Q372997.1 GACCATC...GATCTTTGAACCAAGTGTGCCGAAGCCATTAGGTCCGAGGACACGTCTGCCGCGCATCATCGC  
Q372012.1 AGATCCCTGACACAGTTTAAAGCAATGTGCCCAAAACCATATCCGAGGACACGTCTGCCGCGCATCATCGC

210

Q372005.1 .....CATTCCTT...  
Q372023.1 G.CAGCTCCCGCGCGCGCGGA...CGGGCGCGGAGCGCGCGTGG...TTTCTTGGCGCGCGGG.TCGT  
Q372026.1 A.CAGTTCCCGCGCGCGCGGA.CGAGCGCGGAGGTTTCCATCGGCTAGTTATTTCTG...  
Q372027.1 A.CAGTTCCCGCGCGCGCGGA.CGAGCGCGGAGGTTTCCATCGG...TTTCTTGGCGCGCGGG.TCGT  
Q372029.1 ACCAGCTCCCGCGCGCGCGGAGGACGAG.GCAGGCGGTGTGCCATCTGCGAGTATTCCTTG...  
Q372016.1 .....  
Q372008.1 T.CCCCGCGCGCGCGCTCGCTGCTCTCTGTTGGGGGCAACCG...CGGCGCGCGG...GGG  
Q372020.1 G.TCTACCTAGCCCGT...CCTTTTCTG...  
Q372018.1 .....CCTCGTT...  
Q372015.1 .....  
Q372028.1 A...TGGCCCGCTCGGCTCACCCGCGGCGGTTGGGAGGATACTGG...CCTTCCGTGCGCCATCGG.TCGT  
Q372019.1 A...TGGCCCGCTCGGCTCACCCGCGGCGGTTGGGAGGATACTGG...CCTTCCGTGCGCCATCGG.TCGT  
Q372024.1 A...TGGCCCGCTCGGCTCACCCGCGGCGGTTGGGAGGATACTGG...CCTTCCGTGCGCCATCGG.TCGT  
Q372003.1 A...TGGCCCGCTCGGCTCACCCGCGGCGGTTGGGAGGATACTGG...CCTTCCGTGCGCCATCGG.TCGT  
Q372007.1 A...TGGCCCGCTCGGCTCACCCGCGGCGGTTGGGAGGATACTGG...CCTTCCGTGCGCCATCGG.TCGT  
Q371996.1 A...TGGCCCGCTCGGCTCACCCGCGGCGGTTGGGAGGATACTGG...CCTTCCGTGCGCCATCGG.TCGT  
Q372004.1 A...TGGCCCGCTCGGCTCACCCGCGGCGGTTGGGAGGATACTGG...CCTTCCGTGCGCCATCGG.TCGT  
Q372009.1 A...TGGCCCGCTCGGCTCACCCGCGGCGGTTGGGAGGATACTGG...CCTTCCGTGCGCCATCGG.TCGT  
Q372014.1 A...TGGCCCGCTCGGCTCACCCGCGGCGGTTGGGAGGATACTGG...CCTTCCGTGCGCCATCGG.TCGT  
Q372013.1 A...TGGCCCGCTCGGCTCACCCGCGGCGGTTGGGAGGATACTGG...CCTTCCGTGCGCCATCGG.TCGT  
Q372017.1 A...TGGCCCGCTCGG...  
Q372021.1 A...TGGCCCGCTCGGCTCACCCGCGGCGGTTGGGAGGATACTGG...CCTTCCGTGCGCCATCGG.TCGT  
Q372025.1 .....  
Q372022.1 A...TGGCCCGCTCGGCTCACCCGCGGCGGTTGGGAGGATACTGG...CCTTCCGTGCGCCATCGG.TCGT  
Q371998.1 ...TGGCCCGCTCGGCTCGGCGCGG.GAGTTGGGAGGTACT...GCTCCGT.CGCCAAAGACGTGT  
Q372001.1 G...TGGCCCGCTCGGCTCGGCGCGG.GAGTTGGGAGGTACT...GCTCCGT.CGCCAAAGACGTGT  
Q372997.1 G...TGGCCCGCTCGGCTCGGCGCGG.GAGTTGGGAGGTACT...GCTCCGT.CGCCAAAGACGTGT  
Q372012.1 G...TGGCCCGCTCGGCTCGGCGCGG.GAGTTGGGAGGTACT...CCTCCGTGCGCTCGAAG.GCGC

OQ372005.1 .....GTTAGGTTTCATCTATCT...  
 OQ372023.1 AGTCGACCGCGACGGACCGCCGCGACGGCCTTCCGGGGGTTTGGGTTGGTTTCGACAAATTCCTTCCC..  
 OQ372026.1 .....GCGGTTTGTGGCAGGGTTTGTATCCCTAGGCTACTGACACC..  
 OQ372027.1 AGTCGCTAGCGATGGGCTGCTGGCAAAGCCCTTCCGGCGGTTCCGGGTAGGGTTTCGACCCGTGGTCACT..  
 OQ372029.1 .....GCGGTTTTCTGTCTGGGTATCTAGGCAAGTGGCTGCTGGTCTACGAGCGGAAATGTG..  
 OQ372016.1 .....GAAATGATTAGTCACGAAATCAGAGG..  
 OQ372008.1 GGTTAACCATGGTGGGCCACCCGCGGCGTGCTACTCTGCCAGCGGCAATGGATCCGTATTTGTTAGGGAG..  
 OQ372020.1 .....GGTGCTCGGTTCTTATCCTATACCTCTCTTTTTT..  
 OQ372018.1 .....TTTGGTTTGTCTTTTCGT..  
 OQ372015.1 .....  
 OQ372028.1 GGATGGCCTAAATGGAGCCCATGTGACGGACGTCATTGTAGTTTGTGGTIGATTCTCAACTCTTGGTGCCT..  
 OQ372019.1 GGTTGGCCTAATTGAAGCCCATGTGACGGACGTCACGTATAGTGGAGGTAGAATT.....  
 OQ372024.1 GGTTGGCCTAAATGGAGCCCATGTGACGGACGTCACGGCAAGTGGTGGTTGAATCTCAACTCTTGGTGCCT..  
 OQ372003.1 GGTTGGCCTAAATGGAGCCCATGTGACGGACGTCACGGCAAGTGGTGGTTGAATCTCAACTCTTGGTGCCT..  
 OQ372007.1 GGTTGGCCTAAATGGAGCCCATGTGACGGACGTCACGGCAAGTGGTGGTTGAATCTCAACTCTTGGTGCCT..  
 OQ371996.1 GGTTGGCCTAAATGGAGCCCATGTGACGGACGTCACGGCAAGTGGTGGTTGAATCTCAACTCTTGGTGCCT..  
 OQ372004.1 GGTTGGCCTAAATGGAGCCCATGTGACGGACGTCACGGCAAGTGGTGGTTGAATCTCAACTCTTGGTGCCT..  
 OQ372009.1 GGTTGGCCTAAATGGAGCCCATGTGACGGACGTCACGGCAAGTGGTGGTTGAATCTCAACTCTTGGTGCCT..  
 OQ372014.1 GGTTGGCCTAAATGGAGCCCATGTGACGGACGTCACGGCAAGTGGTGGTTGAATCTCAACTCTTGGTGCCT..  
 OQ372013.1 GGTTGGCCTAAATGGAGCCCATGTGACGGACGTCACGGCAAGTGGTGGTTGAATCTCAACTCTTGGTGCCT..  
 OQ372017.1 .....  
 OQ372021.1 GGTTGGCCTAAATGGAGCCCATGTGACGGACGTCACGGCAAGTGGTGGTTGAATCTCAACTCTTGGT..  
 OQ372025.1 .....  
 OQ372022.1 GGTTGGCCTAAATGGAGCCCATGTGACGGACGTCACGGCAAGTGGTGGTTGAATCTCAACTCTTGGTGCCT..  
 OQ371998.1 GG...CCTAAATGGAGCCCATGTGACGGACGTCACGGCAAGTGGTGGTTGA.TCTCAACTCTTGGTGCCT..  
 OQ372001.1 GGTTGGCCTAA..GGAGCCCATGTGACGGACGTCACGGCAAGTGGTGGTTGAATCTCAACTCTTGGTGCCT..  
 OQ372997.1 GGCTGGCCTAAATGGAGCCCATGTGACGGACGTCACGGCAAGTGGTGGTTGAATCTCAACTCTTGGTGC..  
 OQ372012.1 GGCTGGCCTAAATGGAGCCCATGTGACGGACGTCACGGCAAGTGGTGGTTGAATCTCAACTCTTGGTGC..

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