

NADJA DIANE, HARALD FÖRTHNER, AND HARTMUT H. HILGER. 2002. A systematic analysis of *Heliotropium*, *Tournefortia*, and allied taxa of the Heliotropiaceae (Boraginales) based on ITS1 sequences and morphological data. *American Journal of Botany* 89(2): 287-295.

APPENDIX. Voucher information for species from which ITS1 sequences were generated. BSB = Institut für Biologie, Systematische Botanik und Pflanzengeographie, Freie Universität Berlin, Germany and M = Botanische Staatssammlung München, Germany.

BSB accession number	Species	Voucher	Source	GenBank accession number (ITS1)
6B	<i>Ceballosia fruticosa</i> (L.f.) G. Kunkel var. <i>angustifolia</i> (Lam.) G. Kunkel	Hilger anno 1986 s.n. (BSB)	Spain: Tenerife	AF396910
433	<i>Ehretia macrophylla</i> Wall. (as <i>Ehretia dicksonii</i> Hance)	cult. Tsukuba Botanical Garden, Japan (BSB, AFE-coll.)	Japan	AF385800
543	<i>Ehretia acuminata</i> R. Br. (as <i>Ehretia ovalifolia</i> Hassk.)	cult. Kyoto Prefectural Botanical Garden, Japan (BSB, AFE-coll.)	Japan	AF385799
16	<i>Heliotropium aegyptiacum</i> Lehm.	Schultka 1995/5 (BSB)	Kenya	AF396918
605	<i>Heliotropium amplexicaule</i> Vahl	Jenny 6.1.1991 s.n. (BSB)	Argentina	AF396906
454	<i>Heliotropium angiospermum</i> Murray	Hilger Cuba_99/44 (BSB)	Cuba	AF396907
442	<i>Heliotropium antillanum</i> Urb.	Hilger Cuba_99/26 (BSB)	Cuba	AF396891
606	<i>Heliotropium arbainense</i> Fresen.	Förther 4049 (BSB)	Egypt	AF396916
563	<i>Heliotropium arborescens</i> L.	commercial cultivated plant	not indicated	AF396896
443	<i>Heliotropium bursiferum</i> Wr. ex Griseb.	Hilger Cuba_99/25 (BSB)	Cuba	AF396888
207	<i>Heliotropium campestre</i> Griseb.	Jenny 37 (BSB)	Argentina	AF396887
515	<i>Heliotropium chrysanthum</i> Phil.	Hilger Arg_95/92 (BSB)	Argentina	AF396894
232	<i>Heliotropium curassavicum</i> L.	Hilger Arg_95/82 (BSB)	Argentina	AF396898
3B	<i>Heliotropium curassavicum</i> L. subsp. <i>oculatum</i> (A. Heller) Thorne	Hilger USA_94/21 (BSB)	USA	AF396897
211	<i>Heliotropium digynum</i> (Forrsk.) Asch. ex C. Chr.	Hilger Israel_94/23 (BSB)	Israel	AF396915
111	<i>Heliotropium europaeum</i> L.	cult. Botanical Garden Berlin-Dahlem, Germany (BSB, AFE-coll.)	not indicated	AF396914
607	<i>Heliotropium giessii</i> Friedr.-Holzh.	Hilger Nam_93/3 (BSB)	Namibia	AF396917
692	<i>Heliotropium hirsutissimum</i> Grauer	Kagiampaki 24.07.2000 s.n. (BSB)	Greece: Crete	AF396912
673	<i>Heliotropium humifusum</i> Kunth	Löschner March 2000 s. n. (BSB)	Cuba	AF396890
233	<i>Heliotropium krauseanum</i> Fedde	Weigend & Förther 97/727	Peru	AF396909
205	<i>Heliotropium mandonii</i>	Weigend, cult. Botanical	Ecuador	AF396895

	I.M.Johnst.	Garden of München-Nymphenburg, Germany 1.9.1997 (BSB, AFE-coll.)		
235	<i>Heliotropium mendocinum</i> Phil.	Hilger Arg_95/77 (BSB)	Argentina	AF396893
690	<i>Heliotropium microstachyum</i> Ruiz & Pav.	Weigend et. al. 97/320 (BSB)	Peru	AF396908
608	<i>Heliotropium oliverianum</i> Schinz	Hilger Nam_93/16 (BSB)	Namibia	AF396913
12B	<i>Heliotropium ovalifolium</i> Forssk.	Hilger Nam_93/5 (BSB)	Namibia	AF396886
210	<i>Heliotropium procumbens</i> Mill.	Feuerer 9452b (BSB)	Bolivia	AF396885
16B	<i>Heliotropium rariflorum</i> Stocks subsp. <i>hereroense</i> (Schinz) Verdc.	Hilger Nam_93/23 (BSB)	Namibia	AF396889
204	<i>Heliotropium suaveolens</i> M. Bieb.	Hilger Bg_97/5 (BSB)	Bulgaria	AF396911
350	<i>Heliotropium supinum</i> L.	Hilger anno 1985 s.n. (BSB)	Sizilien	AF396919
611	<i>Heliotropium transalpinum</i> Vell.	Hilger Arg_95/23 (BSB)	Argentina	AF396904
176	<i>Ixorhea tschudiana</i> Fenzl	cult. Botanical Garden of München-Nymphenburg, Germany (BSB, AFE-coll.)	Argentina	AF396880
708	<i>Schleidenia lagoensis</i> Warm.	Schessl 2831 (M)	Brazil	AF396892
687	<i>Tournefortia argentea</i> L.f.	Tillich 3555 (M)	Mauritius	AF396900
688	<i>Tournefortia glabra</i> L.	cult. Botanical Garden of München-Nymphenburg, Germany	Ecuador	AF396902
441	<i>Tournefortia gnaphalodes</i> (L.) Kunth	Hilger Cuba_99/34 (BSB)	Cuba	AF396903
74	<i>Tournefortia hirsutissima</i> L.	Stenzel 96/32 (BSB)	Cuba	AF396901
601	<i>Tournefortia luzonica</i> I.M.Johnst.	Liede 3302 (BSB)	Philippines	AF396899
686	<i>Tournefortia microcalyx</i> (Ruiz & Pav.) I.M.Johnst.	Weigend & Dostert 97/5 (M)	Peru	AF396905
718	<i>Tournefortia psilostachya</i> Kunth	Weigend & Weigend 2000/339 (M)	Peru	AF396883
719	<i>Tournefortia salzmannii</i> DC.	Franca & Melo 16843 (M)	Brasil	AF396884
147	<i>Tournefortia volubilis</i> L.	Hilger 09/80 (BSB)	Mexico	AF396882
689	<i>Tournefortia volubilis</i> L.	cult. Botanical Garden of München-Nymphenburg, Germany	not indicated	AF396881

Alignment (data matrix) of the ascertained sequences inclusive additional set of characters to signify the presence or absence of seven characteristic informative deletions.

	1	11	21	31	41	51
Emacro433	TCGAACCCTG	CGAAGGCAGA	ACGACCTGCG	AACCCGTTT-	-AAACAATGC	GGGG----CC
Eacumi543	TCGAACCCTG	CGAAGGCAGA	ACGACCTGCG	AACCCGTTTC-	-AAACACCGC	GGGG----CC
Ixorhe176	TCGAATCCTG	CAAAAGCAGA	ACGACCCGCG	AACCTGTTT-	--AACACCAC	TGGG----TT
Tvolub689	TCGAATCCTG	T-----C-GA	ACGACCCGCG	AACACGTTCT	--ACCACC--	GGG-T---CC
Tvolub147	TCGAATCCTG	T-----C-GA	ACGACCCGCG	AACACGTTCT	--ACCACC--	GGG-T---CC
Tpsilo718	TCGAATCCTG	-----CAGA	ACGACCCGCG	AACACGTTCT	--ATCACC--	GGG-T---CC
Tsalzm719	TCGAATCCTG	T-----C-GA	ACGACCCGCG	AACACGTTCT	--ATCACC--	GGG-T---CC
Hprocu210	TCGAATCCTG	CAAAAGCAGA	ACGACCAGCG	AACCCGTATT	--AACTGCTC	GGGA----TC
Hovali12B	TCGAATCCTG	CAAA-GCAGA	ACGACCAGCG	AACCCGTATT	--AACTGCTC	GGGA----TC
Hcampe207	TCGAATCCTG	CAAA-GCAGA	ACGACCAGCG	AACCCGTTTT	--AACTACTC	GGGA----TC
Hbursi443	TCGAATCCTG	CAAA-GCAGA	ACGACCAGCG	AACTTGTTCT	--AACCGCTC	GCGAG---TC
Hrarif16B	TCGAATCCTG	CAAA-GCAGA	ACGACCAGCG	AACCCGTTTT	--ATCTTCCC	GGGAG---C
Hhumif673	TCGAATCCTG	CAAA-GCAGA	ACGACCAGCG	AACCCGTTTT	--AACTTCTC	GCGAG---C
Hantil442	TCGAATCCTG	CAAA-GCAGA	ACGACCCGCG	AACCAGTTTT	--AACCGCTC	GGGA-----C
Slagoe708	TCGAATCCTG	CAAA-GCAGA	ACGACCCGCG	AACCAGTTTT	--AACCGCTC	GGGAG---C
Hmendo235	NNNNATCCTG	CAAA-GCAGA	ACGACCCGCG	AATCTGTTTT	--AACCGTTC	GGGG---AC
Hchrys515	TCGAATCCTG	CAAA-GCAGA	ACGACC-GCG	AATCTGTTTT	--AACCGTTC	GGGG----C
Hmando205	TCGAATCCTG	CACA-GCAGA	ACAACCCGCG	AAC--GTT-C	AAAACA---C	GAGGG-CCGC
Habor563	TCGAATCCTG	CACA-GCAGA	ACAACCCGCG	AAC--GTT-C	AAAACA---C	GAGGG-CCGT
Hoculat3B	TCGAATCCTG	CAAA-GCAGA	ACAACCCGCG	AACACGTTTC	C-AACA---C	-AGGTGCCTC
Hcuras232	TCGAATCCTG	CAAA-GCAGA	ACAACCTCGT	AACACGTTTC	CC-ACA---C	-AGGTGCCTC
Tluzon601	TCGAATCCTG	CAAA-GCAGA	ACGACCCGCG	AACACGTTTC	C-AACA---C	-AGGGTCCCTC
Targen687	TCGAATCCTG	CAA-GGCAGA	ACCACCAGCG	AACAAGTTTC	C-AACA---C	-AGGGTCCCC
Thirsut74	NCGAATCCTG	CAAA-GCAGA	ACGACCCGCG	AACACGTTTC	-AAACA---C	-AGGGTCCCTC
Tglabr688	NCGAATCCTG	CAAA-GCAGA	ACGACTCGCG	AACGTGTTTC	C-AACA---C	-AGG-TCCTC
Tgnaph441	TCGAATCCTG	CAAA-GCAGA	ACGACCCGCG	AACACGTTTC	C-AACAA--C	GACG--CCTC
Htrans611	TCGAATCCTG	CAAA-GCAGA	ACGACCCGCG	AACACGTT-C	AAAACA---C	GAGG-CCCTC
Tmicro686	TCGAATCCTG	CAAA-GCAGA	ACAACCCGCG	AACACGTTTC	C-ACCA---C	C-GGGTCCCTC
Hample605	NNNAATCCTN	NAAA-GCAGA	ACGACCCGCG	AACACGTTTC	--AA-TT--C	AACGG-ACTC
Hangio454	TCGAATCCTG	CAAA-GCAGA	ACGACCCGCG	AACACGTTTC	T-AACA---C	AAGGG-CCTC
Hmicro690	TCGAATCCTG	CAAA-GCAGA	ACGACCCGCG	AACACGTTTC	-AAACA---C	-AGGGTCCAT
Hkraus233	TCGAATCCTG	CAAA-GCAGA	ACGACCCGCG	AACACGTTTC	-AAACTT--C	AAGGG-CCTC
Cfrutic6B	TCGAATCCTG	CAAA-GCAGA	ACGACCCGCG	AACACGTTCC	-AAACA---C	C-GGG-CCTC
Hsuave204	TCGAATCCTG	GAACAGCAGA	ACGACCCGCG	AACACGTTCC	G-AACA---C	CGGGG-CCTC
Hhirsu692	TCGAATCCTG	CAACGGCAGA	ACGACCCGCG	AACACGTTCC	G-AACA---C	CGGGG-CCTC
Holive608	NNGAACCTG	CAACAGCAGA	ANNNCCGCG	AACACGTTCC	G-AACA---C	CGGGG-CCTC
Heurop111	TCGAACCTG	CAACGGCAGA	ACGACCCGCG	AACACGTTCC	G-AACA---C	GGGGG-CCTC
Hdigyn211	TCGAACCTG	CAACCGCAGA	ACGACCCGCG	AACACGTTCC	G-AACA---C	CGGGG-CCTC
Harbai606	NNGAACCTG	CAANNNCAGA	ACGACCCGCG	AACACGTTCC	G-AACAA--C	-GGGG-CCTC
Haegypt16	TCGAATCCTG	CGAGAGCAGA	ACGACCCGCG	AACACGTTCC	G-AACA---C	CGGGG-CCCG
Hgies607	TCGAATCCTG	CAACAGCAGA	ACGACCCGCG	AACACGTTCC	G-AACA---C	CGGGG-CCCA
Hsupin350	TCGAATCCTG	CAAA-GCAGA	ACGACCCGCG	AACACGTTCC	G-AACA---C	CGGGG-CCTC

	61	71	81	91	101	111
Emacro433	GACGC-GGG-	-GGAGGCGGC	TCGTCCCCA-	GCCCGCG---	---TGT----	-CGGT-CCCG
Eacumi543	GACGC-GGG-	-GGAGGCGGC	TCGTCCCCA-	GCCCGCG---	---CGT----	-CGGT-CCCG
Ixorhe176	GGGGC----T	TGGAA-CGG-	T-----AA	-CCCCTGCCA	---CGT--CT	-CGGT--CCG
Tvolub689	GGTGCCGGGT	-GG---CGGC	TCTT---A-	G-CCGTTTCG	---CGT-CCT	CCGTCCCC-
Tvolub147	GGTGCCGGGT	-GG---CGGC	TCTT---A-	G-CCGTTTCG	---CGT-CCT	CCGTCCCC-
Tpsilo718	GGTGCCGGGT	-GG---CGGC	TAGT---A-	G-CCGTTTCG	---CGT-CCT	CCGTCCCC-
Tsalzm719	GGTGCCGGGT	-GG---CGGC	TGTT---A-	G-CCGTTTCG	---CGT-CCT	CCGTCCCC-
Hprocu210	GGT-C-GGGT	-GT---CGGC	-----AC	G-CCGT-CA-	TT-CG---CT	CCGT-CCC-
Hovali12B	GGT-C-GGGT	-GT---CGGC	-----AC	G-CCGT-CA-	TTCC---CT	CCGT-CCC-
Hcampe207	GGT-C-GGGT	-G-A--CGGC	-----AC	G-CCGT-C--	TTCCGT---T	CCGT-CCC-
Hbursi443	GG---GGGT	-GGA--CGGC	-----AC	G-CCGT-C--	TTCCC---CT	CCGT-CGTG
Hrarif16B	GGA-C--GGT	-CGA--CGGC	-----AC	G-CCGT-C--	--CC---AT	CCGT-CGT-
Hhumif673	GGA-C--GGT	-GGA--CGGC	-----AT	G-CCGT-CC-	-TCC-T--CT	CCGT-CGTG

Hantil442	GGA-C-GGGT	GGGA--CGGC	-----CT	--CCGT-C-G	-TCCTCC-GA	CCGTT-CCCC
Slagoe708	GGA-C--GGT	-CGA--CGGC	-----TC	G-CCTT-CC-	-TCCGCCCG-	--TTT-CCCC
Hmendo235	GGA-C-TGGT	-----	-----	-----CC-	-TCCGTTCGT	CC--T-CCCC
Hchrys515	GGA-C-TGGT	-----	-----	-----CC-	-TCCGTTCGT	CC--T-CCC-
Hmando205	GG--C-GGGG	---AG----	-----	-----AC-	--CCGTCCC-	--GG-CCCC-
Harbor563	GG--C-GGGG	---AG----	-----	-----CC-	--CCGTCCC-	--GG-CCCC-
Hoculat3B	AGT---GGCG	---AG-CGGC	T-----T	G-CCGTGAA-	--CCACT-GT	--GG--CCC-
Hcuras232	AGT---GGCG	---AG-CGGC	T-----T	G-CCGTGA-G	--CCAGT-GA	--GG--CCC-
Tluzon601	GG--C-GGGG	---AG-CGGC	T-----AT	--CCGTGAA-	--CCGTC-GT	--TG--CCCC
Targen687	AG--C-GGGG	---AG-CGGC	T-----T	G-CCGTGAA-	--CCGTC--T	C-GG--CCCA
Thirsut74	GG--C-GGGG	---AA-CGGC	T-----AT	--CCGTGAA-	--CCGTC-GT	C--G--CCCC
Tglabr688	GG--C-AGC-	---AAGCGGC	T-----AT	--TCGTGAA-	--CTGTT-GT	--AG--CCTG
Tgnaph441	GG--C-GGGG	---AG-CGGC	T-----T	G-CCGTAA-	--CTGTT-GC	--GG--CCCC
Htrans611	G-T-C-GGGG	---AG-CGGC	T-----A-	G-CCGCGAA-	--CCGCC-GT	--GG--GCC-
Tmicro686	GG--C-GGGG	---AG-CGGC	T-----AT	--CCGTGAA-	--CCGTC-GT	--GG--CCCC
Hample605	G-T-C-GGGG	---AA-CGGC	T-----A-	G-CCGTGAA-	--CCGTC-GT	--GG--CCCC
Hangio454	GA--C-GGGG	---AG-CGGC	T-----A-	G-CCGTGAA-	--CCATC-GC	--GG-CCCC-
Hmicro690	G-T-C-GGGG	---AG-CGGC	T-----A-	G-CCGTTC-G	--CCGTC-GT	--GG--CCC-
Hkraus233	GA--C-GGCG	---AG-CGGC	T-----A-	G-CCGTGAA-	--CCGTCC-T	--GG--CCC-
Cfrutic6B	GG--C-GGCG	---AG-CGGC	T-----A-	GCCCGTAA-	--CCGCC-GT	--TG-CCCC-
Hsuave204	-----	-----	-----	-----	-----	--GG--CCCC
Hhirsu692	-----	-----	-----	-----	-----	--GG-CCCC
Holive608	-----	-----	-----	-----	-----	--GG--CCCC
Heurop111	C-----	-----	-----	-----	-----	--GG---CCG
Hdigyn211	-----	-----	-----	-----	-----	--GG--CCCC
Harbai606	-----	-----	-----	-----	-----	--GG-CCCC
Haegypt16	-----	-----	-----	-----	-----	--GG-CCCC
Hgiess607	-----	-----	-----	-----	-----	--GG-CCCC
Hsupin350	-----	-----	-----	-----	-----	---G--CCCC

	121	131	141	151	161	171
Emacro433	A---TCG-GG	CGAA-CGCCC	CG-AAAC-AA	C-GAACCCC-	GGCGCGGAAT	GCGCCAAGGA
Eacumi543	A---TCG-GG	CGCA-CGCCC	CGCAAAG-AA	C-GAAGCCC-	GGCGCGGAAC	GCGCCAAGGC
Ixorhe176	AA-GTCAGGG	CGCAT-GCCT	TGCAAAC-AA	C-AAACCCC-	GGCGCGGAAT	GCGCCAAGGA
Tvolub689	ATGACTGAGG	CCGAAAGCCC	-GCC-A-AAA	CTGAACCCC-	GGCGCGGAA-	GCGCCAAGGA
Tvolub147	ATGACTGAGG	CCGAAAGCCC	-GCC-A-AAA	C-GAACCCC-	GGCGCGTCCA	GCGCCAAGGA
Tpsilo718	CCGTC-GAGG	CCGAAAGCCC	CGCA-A-AAA	C-GAACCCC-	GGCGCGTCTA	GCGCCAAGGA
Tsalzm719	ATGAC-GAGG	CCGAAAGCCC	CGCC-A-AAA	C-GAACCCC-	GGCGCGTCCA	GCGCCAAGGA
Hprocu210	AA-GTCGGGG	CCTC-GGCC	CG--AA-AAA	C-GAACCCC-	GGCGCGGAAA	GCGCAAGGA
Hovali12B	AA-GTCGGGG	CCTC-GGCC	CG--AA-AAA	T-GAACCCCC	GGCGCGGAAA	GCGCCAAGGA
Hcampe207	AA-GTCGGGG	CCTC-GGCC	CG--AA-AAA	T-GAACCCC-	GGCGCGGCAA	GCGC-AAGGA
Hbursi443	A--GTCGGGG	CCTC-GGCC	CG-AAAC-AA	C-GAACCC-	GGCGCGGACA	GCGCCAAGGA
Hrarif16B	---GTC----	CCG--TTG--	---AACAAA	C-GAACCCC-	GGCG--GG-CC	GCGCCAAGGA
Hhumif673	A--GTCGGGG	CCTC-GGCC	CG-TAAC-AA	C-GAACCC-	GGCGCGGACA	GCGCCAAGGA
Hantil442	A--GTCGGGG	TCTC-GGCC	CG--AACAAA	C-TAACCCC-	-GCGCGGACA	GCGCCAAGGA
Slagoe708	A--GCCGGGG	CCTG-GGCC	CG--AACAAA	C-GAACCCC-	GGCGCGGACA	GCGCCAAGGA
Hmendo235	A--GTCGGGG	CCTC-GGTCC	CG--AACAAA	C-GAACCCC-	-GCGCGGACA	GCGCCAAGGA
Hchrys515	AATGTCGGGG	CCTC-GGTCC	CG--AACAAA	C-GAACCCC-	-GCGCGGACA	GCGCCAAGGA
Hmando205	AT-GTCGGGG	TGCG-AGCCC	CGGCAACAAA	C-GAACCCC-	GGCGCGGAAT	GCGCCAAGGA
Harbor563	ATGTTTCGGGG	TGCG-AGCCC	CGGCAACAAA	C-GAACCCC-	-GCGCGGAAT	GCGCCAAGGA
Hoculat3B	AACGTCGGGG	TGCA-AGCCC	CGC--ATAAA	C-GAACCCC-	GGCGCGGAAT	GCGCCAAGGA
Hcuras232	AATGTCGGGG	TGCA-AGCCT	CGC--ATAAA	C-GAACCCC-	GGCGCGGAAT	GCGCCAAGGA
Tluzon601	AATGTCGGGG	TGCA-AACCC	CGC-AA-AAA	C-GAACCCC-	GGCACGGAAT	GTGCCAAGGA
Targen687	GAT-TCGGGG	CTCA-AGCCC	CGC-AA-AAA	C-GAACCTC-	GGCGCGAAAT	GCGCCAAGTA
Thirsut74	AATGTCGGGG	TGCA-AGCCC	CGCC-A-AAA	C-GAACCCC-	GGCGCGGAAT	GCGCCAAGGA
Tglabr688	AA-GTCGGGG	TGCA-AGCCC	CGC-AA-AAA	C-GAACCCA-	GGCGCGGAAT	GCGCCAAGGA
Tgnaph441	TA-GTCGGGG	TGCA-AGCCC	CGC-AA-AAA	C-GAACCCC-	GGCGCGGAAC	GCGCCAAGGA
Htrans611	AAAGTCGGGG	CGAA-AGCCC	CGC-AA-AAA	C-GAACCCC-	GGCGCGGAAT	GCGCCAAGGA
Tmicro686	AA-GTCGGGG	TGCA-AGCCC	CGC-AA-AAA	C-GAACCCC-	GGCGCGGAAT	GCGCCAAGGA
Hample605	AA-GTCGGGG	TGCA-AGCCC	CGC--A-AAA	C-GAACCCC-	GGCGCGGAAT	GCGCCAAGGA
Hangio454	AA-GTCGGGG	TGCA-AGCCC	TGC-AA-AAA	T-GAACCCC-	GGCGCGGAAT	GCGCCAAGGA

Hmicro690	AAAGTCGGGG	TGAA-AGCCC	CGC--A-AAA	T-GAACCCC-	GGCGCGGAAT	GCGCCAAGGA
Hkraus233	AAAGTCGGGG	CGCA-AGCCC	CGC-AA-AAA	T-GAACCCC-	GGCGCGGAAT	GCGCCAAGGA
Cfrutic6B	AA-GTCGGGG	TGCA-AGCCC	CGCC-A-AAA	C-GAACCCC-	GGCGCGGAAT	GCGCCAAGGA
Hsuave204	AAAGCCGGGG	CGCA-AGCCT	TGC--ATAAA	C-CAACCCC-	-GCCCGGAAT	TCGCCAAGGA
Hhirsu692	ACAGCCGGGG	CGCA-AGCCC	CGC-AA-AAA	C-GAACCCC-	GGCGCGGAAT	GCGCCAAGGA
Holive608	AA-GCCGGGG	CGCA-AGCCC	CGCAAA-AAA	C-GAACCCC-	GGCGCGGAAT	GCGCCAAGGA
Heurop111	AATGCCGGGG	CGCG-AGCCC	CGGAAA-AAA	C-GAACCCC-	GGCGCGGAAT	GCGCCAAGGA
Hdigyn211	AA-GCCGGGG	CGCG-AGCCC	CGC-AA-AAA	C-GAACCCC-	GGCGCGGAAT	GCGCCAAGGA
Harbai606	AA-GCCGGGG	CGCG-AGCCC	CGC-AA-AAA	C-GAACCCC-	-GCGCGGAAT	GCGCCAAGGA
Haegypt16	AA-GCCGGGG	CGCG-AGCCC	CGCAAA-AAA	C-GAACCCC-	GGCGCGGAAT	GCGCCAAGGA
Hgiess607	AA-GCCGGGG	CGCG-AGCCC	CGCAAA-AAA	C-GAACCCC-	GGCGCGGAAT	GCGCCAAGGA
Hsupin350	A----CGGGG	-GCG-AGCCC	C----AAAAA	T-GAACCCC-	-GCGCGGAAT	GCGCCAAGGA

	181	191	201	211	221	231
Emacro433	AAACGACAAA	-T--GGGGG-	CCAGCCT---	AC--CCGTGC	CCCGTCCGCG	GTGTGCCGGG
Eacumi543	AAACGA--AA	-TACGAGGGA	CCTGCCT---	AT--CCGTGC	CCCGTCCGCG	GTGTGCCGGG
Ixorhe176	AAAC-TATAA	ATACGAGGG-	CCAGCCT--T	-TTCCCGT--	-CCGTTCGCG	GGGCGCGGGA
Tvolub689	AAAC-TAAAA	A-ATGAGGGA	ACGGTC-CCT	-TCCCTC--C	CCCGTCCGCG	GGCAGCGGGG
Tvolub147	AAAC-TAAAA	A-ATGAGGGA	ACGGTC-CCT	-TCCCTC--C	CCCGTCCGCG	GGCAGCGGGG
Tpsilo718	AAAC-TAAAA	A-ATGAGAGC	ACGGTC-CCT	-TCCCTC--C	CCCGTCCGCG	GGCAGCGGGG
Tsalm719	AAAC-TAAAA	AAATGAGGGA	ACGGTC-CCT	-TCCCTC--C	CCCGTCCGCG	GGCAGCGGGG
Hprocu210	ATACCTAAAA	---CGAGGG-	CC--TCCCC	-TTCCCGTG-	-CCGTTCGCG	-ACGTCCGGG
Hovali12B	ATACCTAAAA	---CGAGGG-	CC--TCCCC	-TCCCGCG-	-CCGTTCGCG	GACTTCGGGG
Hcampe207	ATACCTAAAA	A--CGAGGG-	CC--TCCCC	-TTCCCGT--	CCCGTTCGCG	GGCATCGGGT
Hbursi443	ATACATAAAA	---CGAGGG-	CC--TCTCCC	-TTTCCGT--	CCCGTTCGCG	GAGCGCGGGT
Hrarif16B	ATACATAAAA	---CGAGGG-	CC--TCTCCC	-TCCCGGT--	CCCGTTCGCG	GAGCGCGGGG
Hhumif673	ATACATAAAA	---CGAGGG-	CC--TCTCCC	-TTCCCGT--	CCCGTTCGCG	GAGTACGGGT
Hantil442	ATACATAAAA	---CGAGGG-	CC--TCTCCC	-TCCCGGT--	CCCGTTC- CG	GAGCCCGGGG
Slage708	ATACTTAAAA	---CGAGGG-	CC--TCTCCC	-TCCCGGT--	CCCGTTCGCG	GAGCACGGGG
Hmendo235	ATACATTAA-	-TA-GAGGG-	CC--TCTCCC	-TCCCGGT--	CCCGTTCGCG	GGCAGCGGGG
Hchrys515	ATACATAAAA	---CGAGGG-	CC--TCTCCC	-TCCCGGT--	CCCGTTCGCG	GGCAGCGGGG
Hmando205	AAAC-TAAAA	---CGAGAG-	CC--TGCCCC	-TCCCGGT--	CCCGTTC- CG	GTGCGCGGGG
Harbor563	AAAC-TAAAA	---CGAGAG-	CC--TGCCCC	-TCCCGGT--	CCCGTTC- CG	GGGCGCGGGG
Hoculat3B	AAAC-TAAAA	---CGAGGG-	CC--TACCTC	AT-CCTGT--	CCCGTTCGCG	GAGCGCGGGT
Hcuras232	AAAC-TCAAA	---CGAGGG-	CC--TCCCC	AT-CCTGT--	CCCGTTCGCG	GAGCGCGGGT
Tluzon601	AAAC-TAAAA	---CGAGGG-	CC--TCCCAC	AT-CACGT--	CCCGTTCGCG	GAGCACGGGT
Targen687	AAAC-TAAAA	---CGAGGG-	CC--TCCCAC	AT-CCCCT--	CCCGTTCGCG	GAGCGCGGGT
Thirsut74	AAAC-TAAAA	---CGAGGG-	CC--TCCCAC	AT-CCCCT--	CCCGTTCGCG	GAGCGCGGGT
Tglabr688	AAAC-TAAAA	---CGAGGG-	CC--TCCCAC	AT-CCCCT--	CCCGTTCGCG	GAGTGC GGGT
Tgnaph441	AAAC-TAAAA	---CGAGAG-	CC--TCCCAC	AT-CCCCT--	CCCGTTCGCG	GACC CGGGG
Htrans611	AAAC-TAA--	-TACGAGGG-	CC--CCCCAC	AT-CCCCT--	CCCGTTCGCG	GAGTGC GGGC
Tmicro686	AAAC-TAAAA	---CGAGGG-	CC--TCCCAC	AT-CCCCT--	CCCGTTCGCG	GAGCGCGGGT
Hample605	AAACATAAA-	---CGAGGG-	CC--TCCCAC	AT-CCCCT--	CCCGTTCGCG	GAGTGC GGGT
Hangio454	AAAC-TGAAA	---CGAGAG-	CC--TCCCAC	AT-CCCCT--	CCCGTTC- CG	GAGCGCGGGT
Hmicro690	AAAC-TAAAA	-T--GAGGG-	CC--TCCCAC	AT-CCCCT--	CCCGTTCGCG	GATTCGGGGT
Hkraus233	AAAC-TAAAA	---CGAGGG-	CCTG-CCC--	ATCCCCGT--	CCCGTTCGCG	GAGCGCGGG-
Cfrutic6B	AAAC-TAA--	-TACGAGGG-	CCTG-CCT-C	-TCCCCGA--	CCCGT- CGCG	GATTCGGGGG
Hsuave204	AAAC-AAAAA	A--CGAGGG-	CC-GTCCT-C	-TCCCCGA--	CCCGTTCGCG	GTGCGCGGGG
Hhirsu692	AAACCAAAAA	---CGAGGG-	CC-GTCCT-C	-TCCCCGA--	CCCGT- CGCG	GTGCGCGGGG
Holive608	AAACCAAAAA	---CGAGGG-	CCTG-CCT-C	-TCCCCGA--	CCCGT- CGCG	GGCCGCGGGG
Heurop111	AAACCAAAAA	---CGAGGG-	CCGG-CCT-C	-TCCCCGA--	CCCGTTCGCG	GTGCGCGGGG
Hdigyn211	AAACCAAAAA	---CGAGGG-	CC-GTCCT-C	-TCCCCGA--	CCCGT- CGCG	GTGCTCGGGG
Harbai606	AAACCAAAAA	---CGAGGG-	CC-GTCCT-C	-TCCCCGA--	CCCGTTCGCG	GTGCTCGGGG
Haegypt16	AAACCAAAAA	---CGAGGGC	CC--TCCC-C	-TCCCCGG--	CCCGTTCGCG	GGACGCGGGG
Hgiess607	AAACCAAAAA	---CGAGGGC	CC-G-CCC-C	-TCCCCGG--	CCCGTTCGCG	GGACGCGGGG
Hsupin350	AAAC-TAAAA	A--C-AGGGC	CCGG-CC--C	-TCCCCGA--	CCCGTCT- CG	G-GCGCGGGG

	241	251	261	271	281
Emacro433	-TTAGGCC-T	CGGTC-CCTT	ACGAAACGAA	-AACGACTC	000000

Eacumi543	-TTAGGCC-T	CGGTC-GCTT	ACGAAACGAA	-AACGACTC	0000000
Ixorhe176	-TTAGGTG-C	AGGCT-TCTT	TCGAAAC-AA	CAACGACTC	1000000
Tvolub689	-TC-GGT-CC	GCGTCTCCTT	TCTAAACTAA	-AACGACTC	0100000
Tvolub147	-TC-GGTC-C	GCGTCTCCTT	TCTAAACTAA	-AACGACTC	0100000
Tpsilo718	-TT-GGTC-C	GCGTCTCCTT	TCTAAACTGA	-AACGATCT	0100000
Tsalzm719	-TC-GGTC-C	GCGTCTCCTT	TCTAAACTAA	-AACGATCT	0100000
Hprocu210	-TGGGGAG-A	CGGCT-TCTT	TCGAAACAAA	CAACGACTC	0010000
Hovali12B	-TGGGGAG-A	CGGCT-TCTT	TCGAAACAAA	CAACGACTC	0010000
Hcampe207	-TGGTGTG-A	CGGCT-TCTT	TCGAAACAAA	CAACGACTC	0010000
Hbursi443	-TGGGAAG-A	CGGCT-TCTT	TCGAAACCAA	CAACGACTC	0010000
Hrarif16B	-TTGGGCG-A	TGGAT-TCTT	TTGAAATGAA	CAACGACTC	0010000
Hhumif673	-TGGGACG-A	CGGCT-TCTT	TTGAAACAAA	CAACGACTC	0010000
Hantil442	-TGGGGCG-A	CGGCT-CCTT	TCGAAACGAA	CAACGACTC	0010000
Slagoe708	-TGTGGCG-A	CGGCT-TCTT	TCGAAACGAA	CAACGACTC	0010000
Hmendo235	-TGGTGC-A	CGGCT-CCTT	TCGAAACTTA	CAACGACTC	0001000
Hchrys515	-TGGTGC-A	CGGCT-CCTT	TCGAAACTTA	CAACGACTC	0001000
Hmando205	-TGAGGTG-A	CGGCT-TCTT	TCGAAAC-AA	TAACAACCTC	0000100
Harbor563	-TGAGGTG-A	CGGCT-TCTT	TCGAAAC-AA	TAACAACCTC	0000100
Hoculat3B	-TGAGG-GTG	CGGCT-TCTT	TCGAAAC-AA	AAACAACCTC	0000010
Hcuras232	-TGAGG-GTA	CGGCT-TCTT	TCGAAAC-AA	AAACAACCTC	0000010
Tluzon601	-TGAGG-GTA	AGGCT-TCTT	TCAAAAAC-AA	AAACAACCTC	0000010
Targen687	-TGAGG-GTA	CGGGT-CCTT	TAGAAAA-AA	AAACAACCTC	0000010
Thirsut74	-TGAGG-GTA	CGGCT-TCTT	TCGAAAC-AA	AAACAACCTC	0000010
Tglabr688	-TGAGG-GTA	AAGGCATCTT	TCGAAAC-AA	AAACAACCTC	0000010
Tgnaph441	-TGAGGCG-A	CGGCT-CATA	TCGAAAC-AA	AAACAACCTC	0000010
Htrans611	-TGAGG-GTA	GGGCT-CCTT	TCGAAAC-AA	AAACAACCTC	0000010
Tmicro686	ATGAGG-ATA	CGGCT-TCTT	TCGAAAC-AA	AAACAACCTC	0000010
Hample605	-TGTGGGGTA	AGGCT-TCTT	TCGAAAC-AA	AAACAACCTC	0000010
Hangio454	-TGAGGTG-A	TGGCT-TTTT	TCGAAA--AC	AAACAACCTC	0000010
Hmicro690	-TGCGGGGTA	AGGCT-TCTT	TCTAAAT-AA	AAACAACCTC	0000010
Hkraus233	CTGAGGTG-A	CGGCT-TCTT	TTGAAAC-AA	AAACAACCTC	0000010
Cfrutic6B	C-GAGGTG-A	CGGCT-TCTT	TCGAAAC-AA	AAACAACCTC	0000010
Hsuave204	C-GAGGCGT-	CGGCT-CCTT	TCGAAACGAA	-AACCAACTC	0000001
Hhirsu692	C-GAGGCGT-	CGGCT-CCTT	TCGAAACGAA	-AACCAACTC	0000001
Holive608	C-GAGGCGT-	CGGCT-CCTT	TCGAAACGAA	-AACCAACTC	0000001
Heurop111	C-GAGGCGT-	CGGCT-CCTT	TCGAAACGAA	-AACCAACTC	0000001
Hdigyn211	A-GAGGCGT-	CGGCT-CCTT	TCGAAACGAA	-AACCAACTC	0000001
Harbai606	A-GAGGCGT-	CGGCT-CCTT	TCGAAACGAA	-AACCAACTC	0000001
Haegypt16	C-GAGGCGG-	CGGCT-CCTT	TCGAAACGAA	-AACCAACTC	0000001
Hgiess607	C-GAGGCG-A	CGGCT-CCTT	ACGAAACGAA	-AACCAACTC	0000001
Hsupin350	C-GAGGCG-A	CGGCC-CCCT	CCGAAACGAA	-AACCAACTC	0000001