

**Table 1.** Clinical sources, DNA-based and biochemical identifications of *Trichosporon* isolates analyzed

no	Strain Code	Clinical Source	IGS ID	ITS Clade	Biochemical ID
1	CL-4551	Catheter	<i>T. faecale</i>	Clade III	<i>T. asahii</i>
2	CL-4327	Skin	<i>T. faecale</i>	Clade III	<i>T. mucoides</i>
3	CL-4293	Nails	<i>T. faecale</i>	Clade III	<i>T. asahii</i>
4	CL-4294	Nails	<i>T. faecale</i>	Clade III	<i>T. asahii</i>
5	CL-0382	Subcutaneous abscess	<i>T. coremiiforme</i>	Clade III	<i>T. asahii</i>
6	CL-2148	Urine	<i>T. coremiiforme</i>	Clade III	<i>T. asahii</i>
7	CL-4323	Blood culture	<i>T. asahii</i>	Clade III	<i>T. asahii</i>
8	CL-2457	Broncoaspirate	<i>T. asahii</i>	Clade III	<i>T. mucoides</i> *
9	CL-4322	Blood culture	<i>T. asahii</i>	Clade III	<i>T. asahii</i>
10	CL-4296	Catheter	<i>T. asahii</i>	Clade III	<i>T. mucoides</i>
11	CL-4099	Pleural liquid	<i>T. asahii</i>	Clade III	<i>T. asahii</i> *
12	CL-3553	Blood culture	<i>T. asahii</i>	Clade III	<i>T. ovoides</i> *
13	CL-3876	Sputum	<i>T. asahii</i>	Clade III	<i>T. asahii</i>
14	CL-3562	Blood culture	<i>T. asahii</i>	Clade III	<i>T. asahii</i> *
15	CL-4295	Subcutaneous abscess	<i>T. asahii</i>	Clade III	<i>T. asahii</i>
16	CL-2324	Urine	<i>T. asahii</i>	Clade III	<i>T. mucoides</i>
17	CL-4032	Bronchial secretion	<i>T. asahii</i>	Clade III	<i>T. asahii</i>
18	CL-3316	Blood culture	<i>T. asahii</i>	Clade III	<i>T. mucoides</i>
19	CL-2846	Blood culture	<i>T. asahii</i>	Clade III	<i>T. mucoides</i>
20	CL-2847	Blood culture	<i>T. asahii</i>	Clade III	<i>T. mucoides</i> *
21	CL-2848	Blood culture	<i>T. asahii</i>	Clade III	<i>T. asahii</i>
22	CL-0225	Bone Biopsy	<i>T. inkin</i>	Clade III	<i>T. inkin</i>
23	CL-4290	Skin	<i>T. inkin</i>	Clade III	<i>T. inkin</i>
24	CL-4291	Skin	<i>T. inkin</i>	Clade III	<i>T. inkin</i>
25	CL-4292	Urethral exudate	<i>T. inkin</i>	Clade III	<i>T. inkin</i>
26	CL-4320	Skin	<i>T. inkin</i>	Clade III	<i>T. inkin</i>
27	CL-4319	Subcutaneous abscess	<i>T. inkin</i>	Clade III	<i>T. inkin</i>
28	CL-4324	Corneal exudate	<i>T. inkin</i>	Clade III	<i>T. ovoides</i>
29	CL-3925	Nails	<i>T. ovoides</i>	Clade III	<i>T. ovoides</i>
30	CL-4220	Skin	<i>T. ovoides</i>	Clade III	<i>T. cutaneum</i>
31	CL-0696	Skin	<i>T. ovoides</i>	Clade III	<i>T. inkin</i> *
32	CL-3915	Peritoneal liquid	<i>T. ovoides</i>	Clade III	<i>T. inkin</i> *
33	CL-4157	Nails	<i>T. ovoides</i>	Clade III	<i>T. inkin</i>
34	CL-4232	Nails	<i>T. japonicum</i>	Clade III	<i>T. mucoides</i> *
35	CL-4298	Pleural liquid	<i>T. japonicum</i>	Clade III	<i>T. asahii</i>
36	CL-3740	Skin	<i>T. jirovecii</i>	Clade I	<i>T. cutaneum</i> *

37	CL-4074	Urine	<i>T. jirovecii</i>	Clade I	<i>T. inkin</i> *
38	CL-3727	Skin	<i>T. dermatis</i>	Clade I	<i>T. cutaneum</i> *
39	CL-3092	Nails	<i>T. dermatis</i>	Clade I	<i>T. mucoides</i>
40	CL-3736	Nails	<i>T. dermatis</i>	Clade I	<i>T. mucoides</i>
41	CL-4399	Nails	<i>T. dermatis</i>	Clade I	<i>T. mucoides</i>
42	CL-4326	Subcutaneous abscess	<i>T. dermatis</i>	Clade I	<i>T. mucoides</i>
43	CL-4262	Nails	<i>T. dermatis</i>	Clade I	<i>T. mucoides</i>
44	CL- 5651	Nails	<i>T. dermatis</i>	Clade I	<i>T. mucoides</i>
45	CL-5672	Blood culture	<i>T. dermatis</i>	Clade I	<i>T. mucoides</i>
46	CL-0066	Skin	<i>T. cutaneum</i>	Clade I	<i>T. asahii</i> *
47	CL-0160	Nails	<i>T. cutaneum</i>	Clade I	<i>T. cutaneum</i>
48	CL-4289	Skin	<i>T. montevidense</i>	Clade II	<i>T. mucoides</i>
49	CL-3916	Skin	<i>T. domesticum</i>	Clade II	<i>T. inkin</i>

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\*Inconclusive results by biochemical and morphological identification

**Table 2.** *Trichosporon* reference strains used for comparison of ITS and IGS sequences and their GenBank accession number

<i>Trichosporon</i> species	Strain Identification	GenBank accession number		Acquired from CBS for this study
		ITS	IGS	
			AB066397	
<i>T. asahii</i>	CBS <sup>1</sup> 2530	AB018014	(490)	----
	CBS 2479	AB018013	AB066386 (485)	----
<i>T. faecale</i>	CBS 4828	AB018016	AB066413 (490)	----
<i>T. coremiiforme</i>	CBS 2482	AB018015	AB066406 (478)	----
<i>T. asteroides</i>	CBS 2481	AF444416	AB081515 (610)	----
<i>T. jirovecii</i>	CBS 6864	AF444437	AB066427 (328)	----
	CBS 6950	----	----	CL 5675
<i>T. mucoides</i>	CBS 7625	AF444423	AB066433 (357)	----
<i>T. cutaneum</i>	CBS 2466	AF444325	AB066415 (331)	----
<i>T. ovoides</i>	CBS 5580	----	----	CL 5685
<i>T. inkin</i>	CBS 5585	AF444420	AB066424 (489)	----
	CBS 7629	AB018024	AB066425 (489)	----
<i>T. dermatis</i>	CBS 2043	AB035581	AB066412 (357)	----
<i>T. montevidense</i>	CBS 6721	AF444422	AB066431 (719)	----
	CBS 8261	----	----	CL 5777
<i>T. domesticum</i>	CBS 8111	----	----	CL 5676
	CBS 8280	----	----	CL 5684
<i>T. japonicum</i>	JCM <sup>2</sup> 8357	AJ319760	AB066426 (470)	----
	CBS 8641	----	----	CL 5680

			AB066404	
<i>T. aquatile</i>	CBS 5988	----	(459)	
	CBS 5973	----	AB066403	
			(459)	
			AB066419	
			(542)	
<i>T. dulcitum</i>	CBS 8257	AF444428	AB066420	----
	CBS 5785	AB018022	(542)	----
	CBS 8193	----	AB066422	----
			(542)	
<i>T. moniliforme</i>	CBS 2467	AF444415	AB066429	---
			(436)	
<i>T. veenhuisii</i>	CBS 7136	----	----	CL 5678
<i>T. gracile</i>	CBS 8189	AB018023	AB066421	----
			(523)	
<i>T. sporotrichoides</i>	CBS 8246	AF444470	AB066438	----
			(302)	
<i>T. loubieri</i>	CBS 7065	AB018027	AB066428	----
			(430)	
<i>T. brassicae</i>	CBS 6382	AF444436	AB066414	----
			(385)	

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<sup>1</sup>CBS: Centraalbureau voor Schimmelcultures, Delft, The Netherlands

<sup>2</sup>JCM:Journal Clinical Microbiology

**Table 3.** Distinctive morphological and biochemical characteristics per *Trichosporon* species pathogenic for humans

Species	Assimilation <sup>1</sup> of								Growth <sup>2</sup>		
	Rha	Mel	Raff	Rib	Xyl	L-arab	Galac	Ino	0.1%	37°C	App <sup>3</sup>
<i>T. asahii</i>	+	-	-	V <sup>4</sup>	V	+	-	-	+	+	-
<i>T. asteroides</i>	V	-	-	-	V	V	-	+	V	V	V
<i>T. coremiiforme</i>	+	-	-	-	+	+	-	+	V	+	-
<i>T. cutaneum</i>	+	+	+	+	+	+	-	+	-	-	-
<i>T. dermatis</i> <sup>5</sup>	+	+	+	+	+	+	V	+	+	+	-
<i>T. faecale</i>	+	-	-	+	V	+	-	+	+	+	-
<i>T. inkin</i>	-	-	-	-	-	-	-	+	V	+	+
<i>T. japonicum</i>	-	-	-	V	V	V	V	-	NA	+	-
<i>T. jirovecii</i>	+	+	+	V	V	+	+	+	V	-	-
<i>T. montevidense</i>	V	-	-	V	V	V	V	+	V	V	V
<i>T. mucoides</i>	+	+	+	+	+	+	+	+	+	+	-
<i>T. ovoides</i>	+	-	V	-	V	-	-	-	+	V	+

<sup>1</sup>Abbreviations: Rha: Rhamnose; Mel: Melibiose; Raff: Raffinose; Rib: Ribitol; Xyl: Xylitol; L-arab: L-arabinitol; Galac: Galactitol; Ino: Inositol;

<sup>2</sup>Abbreviations: 0.1% : Growth on medium with 0.1% cycloheximide; 37°C: Growth at 37°C; App: Appresoria

<sup>4</sup>Strain variation

<sup>5</sup>Results obtained from reference 31

Table 4. Isolates erroneously identified by morphological and biochemical methods

IGS identification	no	Biochemical identification	no
		<i>T. asahii</i>	8
<i>T. asahii</i>	15	<i>T. mucooides</i>	6
		<i>T. ovoides</i>	1
<i>T. inkin</i>	7	<i>T. inkin</i>	6
		<i>T. ovoides</i>	1
<i>T. dermatis</i>	6	<i>T. mucooides</i>	5
		<i>T. cutaneum</i>	1
<i>T. ovoides</i>	5	<i>T. ovoides</i>	1
		<i>T. inkin</i>	3
		<i>T. cutaneum</i>	1
<i>T. faecale</i>	4	<i>T. asahii</i>	3
		<i>T. mucooides</i>	1
<i>T. coremiiforme</i>	2	<i>T. asahii</i>	2
<i>T. cutaneum</i>	2	<i>T. cutaneum</i>	1
		<i>T. asahii</i>	1
<i>T. jirovecii</i>	2	<i>T. cutaneum</i>	1
		<i>T. inkin</i>	1
<i>T. japonicum</i>	2	<i>T. mucooides</i>	1
		<i>T. asahii</i>	1
<i>T. montevideense</i>	1	<i>T. mucooides</i>	1
<i>T. domesticum</i>	1	<i>T. inkin</i>	1

**Table 5.** Antifungal susceptibility results of clinical isolates of *Trichosporon* spp. Data are grouped following both conventional identification and DNA-based identification. Data are geometric means (GM) and ranges of MICs expressed in mg/L.

<i>Trichosporon</i> spp	Identification procedure (no isolates)	Amphotericin B		Flucytosine		Fluconazole		Itraconazole		Voriconazole	
		GM	Range	GM	Range	GM	Range	GM	Range	GM	Range
<i>T. asahii</i>	Conventional* (15)	4.8	0.5-16.0	12.6	2.0-128.0	4.3	0.12-64.0	0.57	0.03-8.0	0.18	0.015-8.0
	DNA based+ (15)	5.2	2.0-16.0	13.2	4.0-64.0	7.6	0.5-64.0	0.43	0.03-8.0	0.28	0.03-8.0
<i>T. faecale</i>	Conventional* (0)	--	--	--	--	--	--	--	--	--	--
	DNA based+ (4)	3.3	0.25-16.0	19	8.0-32.0	4.7	4.0-8.0	0.69	0.06-4.0	0.17	0.06-1.0
<i>T. coremiiforme</i>	Conventional* (0)	--	--	--	--	--	--	--	--	--	--
	DNA based+ (2)	--	4.0-4.0	--	4.0-128.0	--	2.0-2.0	--	0.25-1.0	--	0.06-0.12
<i>T. inkin</i>	Conventional* (11)	0.21	0.03-1.0	41.1	4.0-128.0	2	0.5-4.0	0.129	0.06-0.25	0.12	0.03-2.0
	DNA based+ (7)	0.14	0.03-1.0	57.9	4.0-128.0	1.8	0.5-4.0	0.13	0.06-0.25	0.12	0.015-2.0
<i>T. ovoides</i>	Conventional* (3)	1.0	0.5-4.0	40.3	8.0-128.0	1.5	0.5-8.0	0.24	0.12-1.0	0.04	0.015-0.25
	DNA based+ (5)	0.37	0.25-0.5	48.5	16.0-128.0	1.74	1.0-8.0	0.1	0.06-0.25	0.05	0.03-0.12
<i>T. japonicum</i>	Conventional* (0)	--	--	--	--	--	--	--	--	--	--
	DNA based+ (2)	--	0.25-1.0	--	4.0-32.0	--	0.12-1.0	--	0.5-0.5	--	0.015-0.03
<i>T. domesticum</i>	Conventional* (0)	--	--	--	--	--	--	--	--	--	--
	DNA based+ (1)	--	0.25	--	128	--	2.0	--	0.25	--	0.12
<i>T. montevidense</i>	Conventional* (0)	--	--	--	--	--	--	--	--	--	--
	DNA based+ (1)	--	0.12	--	128.0	--	2.0	--	0.12	--	0.06
<i>T. dermatis</i>	Conventional* (0)	--	--	--	--	--	--	--	--	--	--
	DNA based+ (8)	0.24	0.015-16.0	58.6	16.0-128.0	12.3	1.0-128.0	0.58	0.06-8.0	0.48	0.06-16.0
<i>T. cutaneum</i>	Conventional* (4)	0.29	0.12-1.0	32.0	4.0-128.0	0.84	0.25-8.0	0.42	0.015-0.12	0.02	0.07-0.06
	DNA based+ (2)	--	0.25-0.5	--	2.0-4.0	--	0.25-0.25	--	0.015-0.03	--	0.07-0.015
<i>T. jirovecii</i>	Conventional* (0)	--	--	--	--	--	--	--	--	--	--
	DNA based+ (2)	--	1.0-1.0	--	4.0-32.0	--	0.25-4.0	--	0.03-0.12	--	0.07-0.12
<i>T. mucoides</i>	Conventional* (16)	0.69	0.015-16	30.6	4.0-128.0	7.0	0.5-128.0	0.38	0.06-8.0	0.25	0.015-16.0

DNA based+ (0)

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\***Conventional**: morphological and biochemical identification; +**DNA-based**: identification by IGS region sequencing

Figure 1. Unrooted phylogenetic tree of *Trichosporon* species based on confidently aligned ITS sequences using maximum parsimony cluster analysis and 1000 bootstrap simulations.

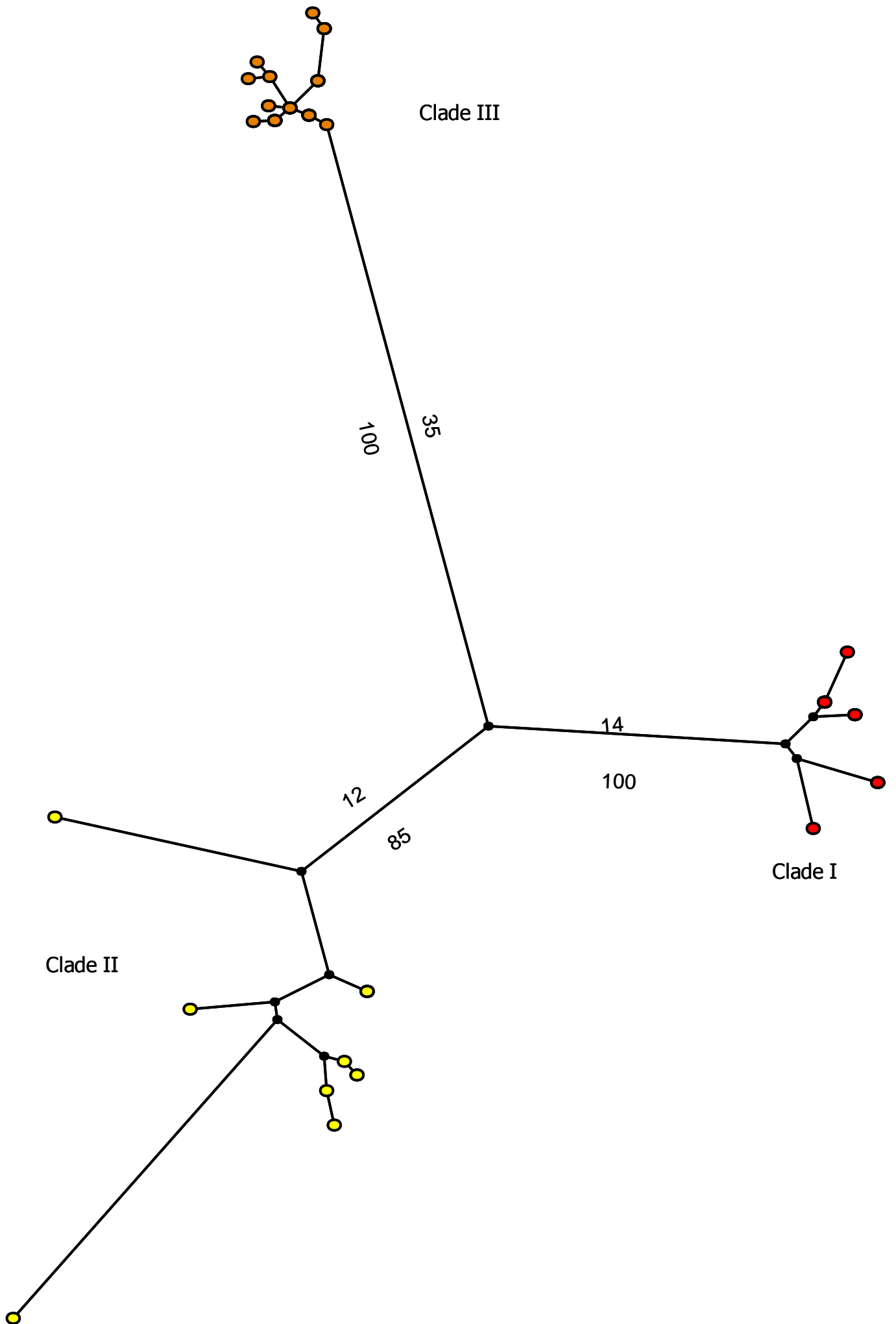
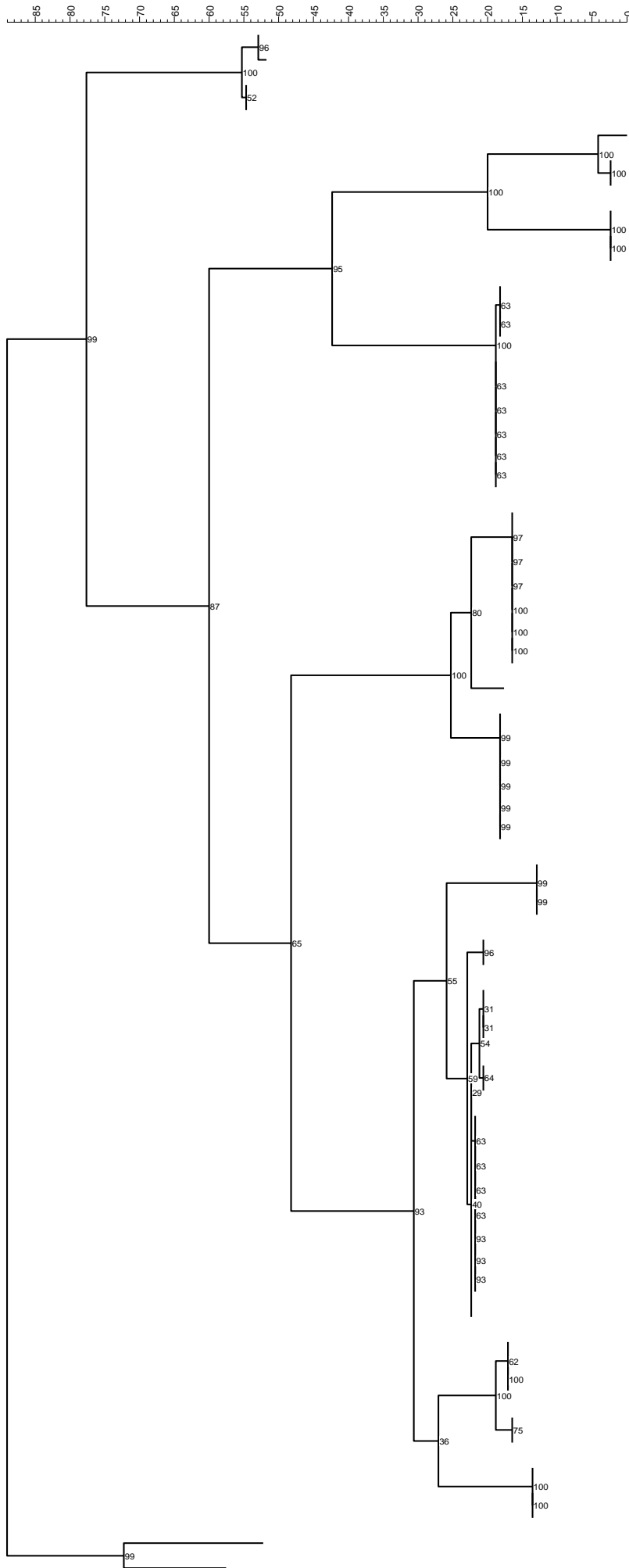


Figure 2. Rooted phylogenetic tree of *Trichosporon* species based on confidently aligned IGS1 sequences using maximum parsimony cluster analysis and 1000 bootstrap simulations.



CBS 6721	Trichosporon	montevideense
CL 4289	Trichosporon	montevideense
CL 5676_CBS 8111	Trichosporon	domesticum
CL 3916	Trichosporon	domesticum
CL 4074	Trichosporon	jirovecii
CL 5675_CBS 6950	Trichosporon	jirovecii
CL 3740	Trichosporon	jirovecii
CL 66	Trichosporon	cutaneum
CBS 2466	Trichosporon	cutaneum
CL 160	Trichosporon	cutaneum
CL 3727	Trichosporon	dermatis
CL 5651	Trichosporon	dermatis
CL 3092	Trichosporon	dermatis
CL 3736	Trichosporon	dermatis
CL 4262	Trichosporon	dermatis
CL 4326	Trichosporon	dermatis
CL 4399	Trichosporon	dermatis
CBS 2043	Trichosporon	dermatis
CL 5672	Trichosporon	dermatis
CL 4290	Trichosporon	inkin
CL 4291	Trichosporon	inkin
CL 4319	Trichosporon	inkin
CL 4292	Trichosporon	inkin
CL 4320	Trichosporon	inkin
CBS 5585	Trichosporon	inkin
CL 225	Trichosporon	inkin
CL 4324	Trichosporon	inkin
CL 3925	Trichosporon	ovoides
CL 4157	Trichosporon	ovoides
CL 4220	Trichosporon	ovoides
CL 696	Trichosporon	ovoides
CL 5685_CBS 5580	Trichosporon	ovoides
CL 3915	Trichosporon	ovoides
CL 382	Trichosporon	coremiiforme
CBS 2482	Trichosporon	coremiiforme
CL 2148	Trichosporon	coremiiforme
CBS 2530	Trichosporon	asahii
CL 2324	Trichosporon	asahii
CL 2847	Trichosporon	asahii
CL 2848	Trichosporon	asahii
CL 2846	Trichosporon	asahii
CL 4032	Trichosporon	asahii
CL 3316	Trichosporon	asahii
CL 3553	Trichosporon	asahii
CL 3562	Trichosporon	asahii
CL 3876	Trichosporon	asahii
CL 4099	Trichosporon	asahii
CL 4296	Trichosporon	asahii
CL 4322	Trichosporon	asahii
CL 4323	Trichosporon	asahii
CL 2457	Trichosporon	asahii
CL 4295	Trichosporon	asahii
CL 4294	Trichosporon	faecale
CBS 4828	Trichosporon	faecale
CL 4293	Trichosporon	faecale
CL 4551	Trichosporon	faecale
CL 4327	Trichosporon	faecale
CL 4298	Trichosporon	japonicum
CL 5680_CBS 8641	Trichosporon	japonicum
CL 4232	Trichosporon	japonicum
CBS 132	Cryptococcus	neoformans
CBS 6956	Cryptococcus	gattii



