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Norishige YOTSUKURA[a] and Louis D. DRUEHL[b]: **A New Name for *Laminaria sachalinensis* (*Laminariales*, *Phaeophyceae*)**

カラフトトロロコンブ（コンブ目, 褐藻綱）の新学名（四ツ倉典滋[a], L. D. ドゥリュール[b]）

Summary: Recent molecular phylogenetic analyses of non-digitate Japanese *Laminaria* resulted in these species being transferred to *Saccharina* (Lane et al. 2006). However, the non-digitate *L. sachalinensis* Miyabe was not included in this earlier study. When we examined the taxonomic position of *L. sachalinensis*, using comparisons of ITS, RUBISCO spacer, and nad6 sequences with other non-digitate laminariacean kelp in Japan, we concluded that the scientific name of this kelp should be changed to *Saccharina sachalinensis* (Miyabe) Yotsukura & L. D. Druehl.

Laminaria sachalinensis Miyabe is a cold water kelp species distributed along the coast from Abashiri to Nemuro, Hokkaido and on west and north coasts in the Kuriles (Kawashima 1989). When the kelp was first described, it was thought to be a variety of *L. cichorioides* Miyabe (Miyabe 1926). However, later it was described as a distinct species based on a few morphological characteristics such as "its blade being not crispate at the margin of the lower half" and "its larger size" (Miyabe and Nagai 1933).

Because it is now known that many morphological characteristics of the laminariacean sporophyte reflect differences of habitat environment and, therefore, there are not reliable features for classification (e.g., Kawashima 1989). Molecular phylogenetic analyses provide objective data for evaluating the classification of Japanese non-digitate *Laminaria*. (Yoon et al. 2001, Yotsukura 2005). Recently, nucleotide sequence comparison of specific DNA regions on nuclear, chloroplast and mitochondrial genomes (ITS, RUBISCO operon and nad6) was made for laminarialean kelp by Lane et al. (2006). They suggested that the genus *Laminaria* should be divided into two groups: *Laminaria* and *Saccharina*. In Japan, only the digitate *L. yezoensis* Miyabe remained in the *Laminaria* group. The non-digitate Japanese species, excluding *L. sachalinensis* that was not studied, were placed in the *Saccharina* group.

Molecular phylogenetic analyses dealing with *L. sachalinensis* have been published by Yotsukura (2005). In that study, it was reported that *L. sachalinensis* was closely related to *L. coriacea* (= *S. coriacea*), *L. cichorioides* (= *S. cicholioides*), *L. yendoanas* (= *S. yendoana*) and *L. saccharina* (= *S. latissima*) from distance trees using Neighbor-joining (NJ) method based on comparison of RUBISCO spacer and ITS-1 sequences. In our study, nucleotide arrangements of ITS-2 and nad6 were investigated using same samples as in the Yotsukura study (2005) (Table 1). The taxonomic position of *L. sachalinensis* was examined with phylogenetic trees constructed by Bayesian method comparing ITS-1, ITS-2, RUBISCO spacer and nad6 sequences. The sequencing methods of ITS-2 and nad6 were the same as those described in Yotsukura et al. (1999) and Lane et al. (2006). The trees were constructed following Lane et al. (2006) except for the following points: The Markov chains were run for one million generations, sampling every 100 generations, with the first 1000 samples on RUBISCO spacer and nad6 analyses, and the first 1500 samples on ITS analysis were discard as "burn-in."

Bayesian consensus trees, for which most branches were supported by high posterior probability were constructed by analyses on all of ITS, RUBISCO spacer and nad6. In

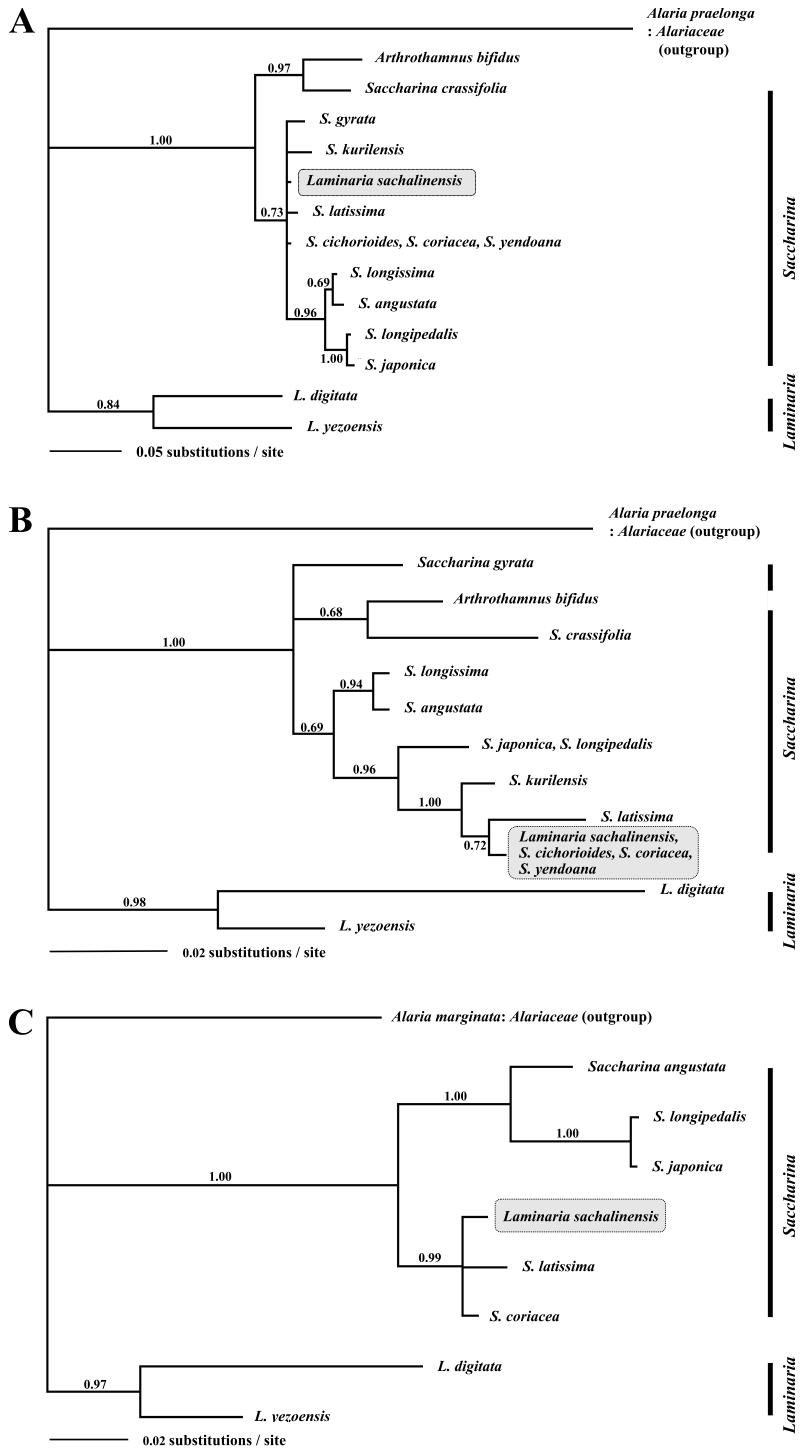

Fig. 1. Bayesian consensus trees based on ITS, RUBISCO and nad6 sequences data of Japanese cold water kelp mostly. A. ITS: combined ITS-1 and ITS-2. B. RUBISCO spacer. C. nad6. The varieties of *Saccharina japonica* (J. E. Areschoug) C. E. Lane, C. Mayes, L. D. Druehl & G. W. Saunders are treated as in the previous study (Yotsukura et al. 2008). Posterior probabilities are noted above branches.

Table 1. Collection site and date of materials used for this study

Species	Collection site and date	GenBank accession number			
		ITS-1	ITS-2	RUBISCO spacer	nad 6
Alaria marginata	Seal Rock, OR, USA				AY857907 (Lane et al. 2006)
Al. praelonga	Aininkappu, Akkeshi (13 XI 1997)	AB022813	AB022814	AB480836	
Arthrothamnus bifidus	Katsuragi, Nemuro (22 VII 1999)	AB480833	AB480834	AB480835	
Laminaria digitata	Green Pt., Lepreau, NB, Canada	AY857886 (Lane et al. 2006)		AY851559 (Lane et al. 2006)	AY857921 (Lane et al. 2006)
L. sachalinensis	Funami-cho, Rausu (14 IX 1999)	AB480841	AB480842	AB480843	AB480844
L. yezoensis	Katsurakoi, Kushiro (18 XI 1998)	AB480837	AB480838	AB480839	AB480840
Saccharina angustata	Charatsunai, Muroran (30 IV 1999)	AB480845	AB480846	AB480847	AB480848
S. cichorioides	Hourai, Wakkanai (19 XI 1997)	AB022805	AB022806	AB480849	
S. coriacea	Aikappu, Akkeshi (13 XI 1997)	AB022803	AB022804	AB480850	AB480851
S. crassifolia	Usujiri, Minamikayabe* (31 X 1997)	AB480852	AB480853	AB480854	
S. gyrata	Aikappu, Akkeshi (13 XI 1997)	AB022809	AB022810	AB480855	
S. japonica	Yasuura, Minamikayabe** (15 XI 1997)	AB022789	AB022790	AB480859	AB480860
S. kurilensis	Funami-cho, Rausu (23 VII 1999)	AB480856	AB480857	AB480858	
S. latissima	Pier of Spiddal, Ireland (1 XII 1999)	AB480865	AB480866	AB480867	
	Green Pt., Lepreau, NB, Canada				AY857926 (Lane et al. 2006)
S. longissima	Aikappu, Akkeshi (13 XI 1997)	AB022801	AB022802	AB480863	
S. longipedalis	Akkeshi-ko, Akkeshi (13 XI 1997)	AB022797	AB022798	AB480861	AB480862
S. yendoana	Oinaoshi, Muroran (6 X 1997)	AB022807	AB022808	AB480864	

*Present name of the place: Usujiri, Hakodate.

**Present name of the place: Yasuura, Hakodate.

these, *L. sachalinensis* joined the *Saccharina* group, that was shown in the analysis on ITS by Lane et al. (2006), together with other non-digitate *Laminaria* (= *Saccharina*) species in Japanese coast in all phylogenetic trees (Fig. 1). The morphological features to characterize *Saccharina* have not been consistent. *Laminaria sachalinensis* closely resembles *L. cichorioides* (Miyabe 1926, Kawashima 1999). Our results suggest that *Arthrothamnus bifidus* (Gmelin) Rupr. may be included in *Saccharina*. However, the transfer of *Arthrothamnus bifidus* to *Saccharina* should be re-examined carefully because this species has a distinct reproductive feature, i.e., vegetative reproduction to form one pair of auriculae on the lamina, as described in Yotsukura (2007).

We recommend, on the basis of our molecular analyses, that *L. sachalinensis* be placed in the *Saccharina* group.

Saccharina sachalinensis (Miyabe) Yotsukura & L. D. Druehl, comb. nov.

Laminaria sachalinensis Miyabe in Miyabe & Nagai in Trans. Sapporo Nat. Hist. Soc. **13**: 87 (1933). **Lectotype** (Tokida et al. 1980): JAPAN: Hokkaido, Abashiri, August 1894, K. Miyabe (SAPA).

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近年，分子系統学的解析により，日本沿岸に生育する単葉状 *Laminaria* の所属を *Saccharina* に移すことが提案されているが，唯一カラフトトロロコンブ *L. sachalinensis* Miyabe については議論されていない．今回，あらためて日本産コンブ科植物について ITS, RUBISCO spacer, nad6 のシークエンス比較の結果から *L. sachalinensis* の分類学的位置を考察したところ，他種と同様に *Saccharina* に移し，*Saccharina sacharinensis* (Miyabe) Yotsukura & L. D. Druehl とすることが適当と考えられた．

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テシオコザクラのレクトタイプ（高橋英樹[a]，村上麻季[b]）

Hideki TAKAHASHI and Maki MURAKAMI[b]: Lectotype of *Primula takedana* Tatew. (*Primulaceae*)

Summary: A specimen of *Primula takedana* Tatew. was lectotypified by Takahashi and Tsukui in 1994 and the lectotype is deposited in the Herbarium of the Hokkaido University Museum (SAPS). However, a specimen of *P. takedana* that was sent by Tatewaki to Makino has been displayed as the possible lectotype in the specimen database of MAK. The MAK specimen is recognized as an isolectotype in this study. Other isolectotypes are also kept in KYO, SAPS and TI.

テシオコザクラ *Primula takedana* Tatew. は，1928年植物研究雑誌上で北大の舘脇　操（1899–1976）によって発表されたサクラソウ属の新種で，北海道天塩地方の蛇紋岩砂礫地に固有である．発表当時，舘脇はまだ20代であり，本種は館脇にとっての新種発表第1号だった（伊藤 1989）．種形容語 *takedana* は本邦サクラソウ属の権威武田久吉に献名されたものである（Tatewaki 1928，舘脇 1928）．初発表文（Tatewaki 1928）では，以下の二つの標本（M. Tatewaki, VII. 17, 1927; Y. Saitô & M. Tatewaki, VI. 4, 1928）が引用されておりこれらがシンタイプとなるが，保管標本庫は明記されていない．舘脇（1928, 1931）には，1927年7月に結実した個体を得ていたものの，1928年5月にさらに開花期の個体を精査した（実際の採集日は6月初旬である）ことで新種であるという見解に至った旨が記されている．採集地は北大天塩演習林内のヌプロマッポロ沢で，自生地は現在でも保護されている．

北大植物標本庫には M. Tatewaki（VII. 17, 1927）は1枚あり，舘脇の標本番号9424の果実標本（SAPS 010617）であり，初発表の図IVで使われた果実の原図が台紙右上に貼られている．Y. Saitô & M. Tatewaki（VI. 4, 1928）と思われる標本は4枚あり，開花期の標本である．4枚のうち3枚には舘脇標本番号10765が手書きで付されており，これら3枚のうち2枚（SAPS 010620，SAPS 010621）の標本ラベルは全て手書きで採集者名が「Saito & Tatewaki」とあり「Grassy places: Upper Nupuromapporo, a branch of Teshio R., Prov. Teshio」と書かれている．標本番号10765が手書きで付されている3枚のうちの残りの1枚（SAPS 010619）は，採集者「M. TATEWAKI」のみ判が押され，「天塩演習林ヌポロマッポロ上流」と日本語の手書きとなっている．舘脇番号10765が付されていない残りの1枚の標本（SAPS 010618）ラベルには「TYPUS」の印が押されている．手書きの和名「テシホコザクラ」を除くと全て英文のタイプ打ちラベルとなっており，採集者は「M. Tatewaki」，「Upper Nupuromapporo, a branch of the R. Teshio, Teshio Experimental Forest」とある．タイプ標本であることを意識し，整えた体裁のラベルを作成したものと考えられる．

Y. Saitô & M. Tatewaki（VI. 4, 1928）と思われる以上4枚の標本の採集年月日はいずれも1928年6月4日であるが，採集者として「Saitô & Tatewaki」と「M. Tatewaki」の2種類があったり，地名表記に若干の不一致や標本番号が付されていたりいなかったりする．重複標本のラベルを複数枚作成する際に，採