

**Table S6. Published records of 15 abundant genera in original/adjacent seawaters in which 13 *Karlodinium veneficum* cultures were initially established (Note that this table is not an exhaustive list but rather a list of publications represents a portion documenting the presence of these genera concerned).** A total of 13 strains of *K. veneficum* originally isolated from 5 geographic origins were employed in this study, 12 of which were from coastal waters of China and one from Chesapeake Bay, USA. Among them 7 strains (KV6, KV8, KV10, KV11, KV12, KV13 and KV15) were from the Yellow Sea (Jiaozhou Bay, Shandong Province), one (KV7) from the Bohai Sea (Dongying, Shandong Province), two (KV1 and KV9) from the East China Sea (Ningde, Fujian Province), two (KV16 and KV17) from the South China Sea (Pearl River Estuary, Guangdong Province and Beibu Gulf, Guangxi Province). The strain KV4 was isolated from Chesapeake Bay in the USA (see Table 2 in the main text for details).

Genus	The strains where it presents in this study	Published records in the adjacent seawaters where the 13 cultures were initially established
<i>Thyridium</i> <sup>1</sup>	All the 13 samples	South China Sea (Li et al., 2016); East China Sea (Li et al., 2016); Bohai Sea (Li et al., 2016); Yellow Sea (Li, 2013; Wang et al., 2021)
<i>Pseudeurotium</i>	All the 13 samples	South China Sea (Li et al., 2016); East China Sea (Li et al., 2016); Bohai Sea (Li, 2013, marine sediments; Li et al., 2016); Yellow Sea (Li et al., 2016; Wang et al., 2021)
<i>Candida</i>	All the 13 samples	Pearl River Estuary, South China Sea (Li et al., 2014); South China Sea (Sun et al., 2017; Wang et al., 2019; Sen et al., 2021); East China Sea (Li et al., 2016); Bohai Sea (Li et al., 2016); Yellow Sea (Sun, 2011; Li, 2013; Wang et al., 2021); Chesapeake Bay, USA (Walker et al., 1975; Motta, 1978)

<i>Cladosporium</i>	KV1 (Ningde, East China Sea); KV4 (Chesapeake Bay in USA); KV8 (Jiaozhou Bay, Yellow Sea); KV9 (Ningde, East China Sea); KV10 (Jiaozhou Bay, Yellow Sea); KV12 (Jiaozhou Bay, Yellow Sea); KV16 (Pearl River Estuary, South China Sea); KV17 (Beibu Gulf, South China Sea)	Pearl River Estuary, South China Sea (Li et al., 2014); South China Sea (Wang et al., 2019; Sen et al., 2021); East China Sea (Feng, 2012, marine sediments; Li et al., 2016); Yellow Sea (Sun, 2011; Feng, 2012, marine sediments; Li, 2013; Wang et al., 2021); Sargasso Sea, USA (Duan et al., 2021); Chesapeake Bay, USA (Walker et al., 1975; Motta, 1978; Newell, 1981)
UC Ascomycota	KV7 (Dongying, Bohai Sea), KV9 (Ningde, East China Sea); KV10 (Jiaozhou Bay, Yellow Sea); KV11 (Jiaozhou Bay, Yellow Sea); KV12 (Jiaozhou Bay, Yellow Sea); KV13 (Jiaozhou Bay, Yellow Sea); KV15 (Jiaozhou Bay, Yellow Sea); KV16 (Pearl River Estuary, South China Sea); KV17 (Beibu Gulf, South China Sea)	-
<i>Arthrinium</i>	KV1 (Ningde, East China Sea); KV8 (Jiaozhou Bay, Yellow Sea); KV9 (Ningde, East China Sea); KV10 (Jiaozhou Bay, Yellow Sea); KV11 (Jiaozhou Bay, Yellow Sea); KV16 (Pearl River Estuary, South China Sea)	Pearl River Estuary, South China Sea (Li et al., 2014); South China Sea (Li et al., 2016; Wang et al., 2019); East China Sea (Li et al., 2016); Bohai Sea (Li, 2013, marine sediments); Yellow Sea (Sun, 2011; Li, 2013; Wang et al., 2021)
<i>Tetracladium</i>	KV4 (Chesapeake Bay in USA); KV8 (Jiaozhou Bay, Yellow Sea); KV15 (Jiaozhou Bay, Yellow Sea); KV16 (Pearl River Estuary, South China Sea); KV17 (Beibu Gulf, South China Sea)	South China Sea (Li et al., 2016); Yellow Sea (Wang et al., 2021)

<i>Cryptococcus</i>	KV1 (Ningde, East China Sea); KV4 (Chesapeake Bay in USA); KV9 (Ningde, East China Sea); KV10 (Jiaozhou Bay, Yellow Sea); KV11 (Jiaozhou Bay, Yellow Sea); KV12 (Jiaozhou Bay, Yellow Sea); KV13 (Jiaozhou Bay, Yellow Sea); KV17 (Beibu Gulf, South China Sea)	South China Sea (Li et al., 2016); East China Sea (Li et al., 2016); Yellow Sea (Wang et al., 2021)
<i>Malassezia</i>	KV1 (Ningde, East China Sea); KV4 (Chesapeake Bay in USA); KV6 (Jiaozhou Bay, Yellow Sea); KV7 (Dongying, Bohai Sea); KV9 (Ningde, East China Sea); KV10 (Jiaozhou Bay, Yellow Sea); KV11(Jiaozhou Bay, Yellow Sea); KV17 (Beibu Gulf, South China Sea)	South China Sea (Sun et al., 2017; Wang et al., 2019; Sen et al., 2021); East China Sea (Li et al., 2016); Bohai Sea (Wang et al., 2018); Yellow Sea (Wang et al., 2021); Sargasso Sea, USA (Duan et al., 2021)
<i>Fusarium</i>	KV1 (Ningde, East China Sea); KV7 (Dongying, Bohai Sea); KV12 (Jiaozhou Bay, Yellow Sea); KV13 (Jiaozhou Bay, Yellow Sea); KV15 (Jiaozhou Bay, Yellow Sea); KV17 (Beibu Gulf, South China Sea)	South China Sea (Wang et al., 2019; Sen et al., 2021); East China Sea (Feng, 2012, marine sediments; Li et al., 2016); Bohai Sea (Li, 2013, marine sediments; Li et al., 2016); Yellow Sea (Sun, 2011; Feng, 2012, marine sediments; Li, 2013; Wang et al., 2021); Chesapeake Bay, USA (Motta, 1978)
<i>Acremonium</i>	KV1 (Ningde, East China Sea); KV4 (Chesapeake Bay in USA); KV9 (Ningde, East China Sea); KV10 (Jiaozhou Bay, Yellow Sea); KV16 (Pearl River Estuary, South China Sea); KV17 (Beibu Gulf, South China Sea)	South China Sea (Li et al., 2016); East China Sea (Feng, 2012, marine sediments; Li et al., 2016); Bohai Sea (Li, 2013, marine sediments); Yellow Sea (Sun, 2011; Feng, 2012, marine sediments; Li, 2013; Wang et al., 2021); Chesapeake Bay, USA (Newell, 1981)

UC Fungi	KV1 (Ningde, East China Sea); KV4 (Chesapeake Bay in USA); KV13 (Jiaozhou Bay, Yellow Sea); KV15 (Jiaozhou Bay, Yellow Sea); KV17 (Beibu Gulf, South China Sea)	-
<i>Phialocephala</i>	KV13 (Jiaozhou Bay, Yellow Sea); KV15 (Jiaozhou Bay, Yellow Sea)	Yellow Sea (Li et al., 2016; Wang et al., 2021)
<i>Teratosphaeria</i>	KV12 (Jiaozhou Bay, Yellow Sea); KV13 (Jiaozhou Bay, Yellow Sea); KV15 (Jiaozhou Bay, Yellow Sea)	South China Sea (Sen et al., 2021); Yellow Sea (Li et al., 2016; Wang et al., 2021)
<i>Thermomyces</i>	KV8 (Jiaozhou Bay, Yellow Sea); KV9 (Ningde, East China Sea)	East China Sea (Li et al., 2016); Yellow Sea (Wang et al., 2021)

UC: unclassified.

<sup>1</sup> *Thyridium*: formerly as *Phialemoniopsis* (Sugita and Tanaka, 2022) and *Phialemonium* (Perdomo et al. 2013).

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