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1. **Rapid scavenging of jellyfish carcasses reveals the importance of gelatinous material to deep-sea food webs**
   水母尸体的快速清除揭示其对深海食物网的重要性
   http://rspb.royalsocietypublishing.org/content/281/1796/20142210

Jellyfish blooms are common in many oceans, and anthropogenic changes appear to have increased their magnitude in some regions. Although mass falls of jellyfish carcasses have been observed recently at the deep seafloor, the dense necrophage aggregations and rapid consumption rates typical for vertebrate carrion have not been documented. This has led to a paradigm of limited energy transfer to higher trophic levels at jelly falls relative to vertebrate organic falls. We show from baited camera deployments in the Norwegian deep sea that dense aggregations of deep-sea scavengers (more than 1000 animals at peak densities) can rapidly form at jellyfish baits and consume entire jellyfish carcasses in 2.5 h. We also show that scavenging rates on jellyfish are not significantly different from fish carrion of similar mass, and reveal that scavenging communities typical for the NE Atlantic bathyal zone, including the Atlantic hagfish, galatheid crabs, decapod shrimp and lyssianasid amphipods, consume both types of carcasses. These rapid jellyfish carrion consumption rates suggest that the contribution of gelatinous material to organic fluxes may be seriously underestimated in some regions, because jelly falls may disappear much more rapidly than previously thought. Our results also demonstrate that the energy contained in gelatinous carrion can be efficiently incorporated into large numbers of deep-sea scavengers and food webs, lessening the expected impacts (e. g. smothering of the seafloor) of enhanced jellyfish production on deep-sea ecosystems and pelagic-benthic coupling.

2. **Logistic density-dependent growth of an Aurelia aurita polyps population**
   海月水母幼体数量依赖群体密度的增长
   http://www.sciencedirect.com/science/article/pii/S0304380014003366

We show in this paper that the dynamics of an Aurelia aurita polyps population can be modeled by the basic density-dependent logistic, or Verhulst, ordinary differential equation. A laboratory experiment was conducted on polyps of A. aurita attached to oyster shells collected in 2013 from the Port of Koper, Slovenia (North Adriatic Sea). The purpose of the present work is twofold: to study how the substrate availability may affect the growth of the polyps (and consequently of the jellyfish) population, and to propose an example for the classic logistic equation, both in high density (over the equilibrium) and in low density (under the equilibrium).

3. **Individual shrinking to enhance population survival: quantifying the reproductive and metabolic expenditures of a starving jellyfish, Pelagia noctiluca**
   个体收缩以增强群体生存：夜光游水母的生殖与代谢支出的量化
   http://plankt.oxfordjournals.org/content/36/6/1585

The holoplanktonic jellyfish Pelagia noctiluca is renowned for periods of high abundance, causing considerable problems to tourism and aquaculture. Little is understood about the drivers of its periodic presence and absence or how it survives unfavourable periods. Studying the effect of starvation, we evaluated the main metabolic expenses (reproduction, respiration and excretion) during those periods. P. noctiluca could shrink in size, losing up to 85% of their mass (6.6-7.1% loss day(-1)), while continuing to release

eggs quasi-daily over a 28-day period. Egg production was proportional to size (mean 759 eggs day(-1) at 6 cm bell diameter), with up to 19 526 eggs released in a single spawn, thereby providing huge potential for population growth despite undergoing starvation. Small food rations decreased the rate of shrinking to 3.1% day(-1), prolonging life (49 days), potentially enhancing the chances of encountering more prey and regrowing. Metabolism increased with wet mass (allometric exponent: 0.93 for respiration, 0.82 for ammonium), however reproduction was the greatest carbon expenditure for individuals larger than 9 cm bell diameter. Temperature (9-29 degrees C) also significantly increased both respiration and, to a greater extent, excretion (Q(10) = 2.25 and 4.76). Consequentially a warming ocean may negatively affect survival rates unless prey abundance balances the increased metabolic demands.

4. **Spatial and temporal variation of planktonic cnidarian density in subtropical waters of the Southern Brazilian Bight**
   巴西湾南部亚热带海域浮游刺细胞动物密度的空间和时间变化
   http://journals.cambridge.org/action/displayAbstract?fromPage=online&aid=9363725&fileId=S0025315414000617

The spatial and temporal variations of planktonic cnidarians were studied across the inner continental shelf (<= 40 m) off the State of Parana in southern Brazil. Monthly zooplankton samples were taken between November 1997 and March 1999 at five stations. The holoplanktonic Liriope tetraphylla and Muggiaea kochi dominated during the entire period, comprising >80% of the specimens. The coast-ocean gradient became evident due to a near-coastal (<= 20 m) assemblage formed by L. tetraphylla, Solmaris corona and meroplanktonic medusae, and a distinct outer (25-40 m) assemblage formed by the medusae Corymorpha gracilis and Aglaura hemistoma and siphonophores. The estuarine runoff during warm rainy periods lowered the salinity (similar to 30) at the inner stations (1, 2 and 3), providing appropriate conditions for the estuarine/coastal species. Wind-driven onshore advection of outer-shelf species to the inner isobaths occurred from late autumn to winter, when the rainfall decreased and salinity increased (>35). Population peaks occurred in both summer and winter at the inner stations. For most species, the seasonal patterns were inconsistent with other studies conducted in the Southern Brazilian Bight, suggesting irregular and unpredictable seasonal distributions of abundance. Whereas in high-latitude ecosystems the dynamics of cnidarian populations follows the seasonal productivity cycle, here, complex hydrographic processes seem to be more important in determining the structure and seasonal dynamics of this community.

5. **Cnidaria in UK coastal waters: description of spatio-temporal patterns and inter-annual variability**
   英国沿海水域的刺细胞动物:时空模式和年际变化
   http://journals.cambridge.org/action/displayAbstract?fromPage=online&aid=9363657&fileId=S0025315414000137

Concern has been expressed over future biogeographical expansion and habitat capitalization by species of the phylum Cnidaria, as this may have negative implications on human activities and ecosystems. There is, however, a paucity of knowledge and understanding of jellyfish ecology, in particular species distribution and seasonality. Recent studies in the UK have principally focused on the Celtic, Irish and North Seas, but all in

isolation. In this study we analyse data from a publicly-driven sightings scheme across UK coastal waters (2003-2011; 9 years), with the aim of increasing knowledge on spatial and temporal patterns and trends. We describe inter-annual variability, seasonality and patterns of spatial distribution, and compare these with existing historic literature. Although incidentally-collected data lack quantification of effort, we suggest that with appropriate data management and interpretation, publicly-driven, citizen-science-based, recording schemes can provide for large-scale (spatial and temporal) coverage that would otherwise be logistically and financially unattainable. These schemes may also contribute to baseline data from which future changes in patterns or trends might be identified. We further suggest that findings from such schemes may be strengthened by the inclusion of some element of effort-corrected data collection.

6. **Levy night flights by the jellyfish Periphylla periphylla**
   缘叶水母的相关研究
   http://www.biolbull.org/content/227/1/7.full.pdf+html

Jellyfish blooms occur in marine environments around the world and have been linked to over-fishing, eutrophication and climatic change. In some coastal areas of Norway, the circumglobal Periphylla periphylla has increased to exceptionally high abundances and has replaced fish as the main planktivorous predator despite the ineffectiveness of its non-visual predation compared to visual fish predation. Using data from a bottom-mounted acoustic platform, we collected 12 341 in situ measurements of individual vertical movements of large individuals of P. periphylla. These jellyfish are characterized by a stepwise vertical movement. The distribution of their vertical swimming distances was extremely left skewed; about 85% of the swimming distances were less than 3 m, and a few displacements were extremely long with a maximum of 85 m. Chi-square tests of goodness of fit to the tail and Akaike's information criterion gave overwhelming evidence of the truncated power law. There was a clear diel pattern in the exponent with values significantly larger than 3 during the daytime and significantly lower than 3 at night. This pattern means that P. periphylla switches from relatively limited movements during the day to Levy-like flights during the night. Since the abundance of zooplankton is large in the P. periphylla fjord, Brownian motion, rather than Levy flight, is predicted by the optimal foraging hypothesis. It is therefore possible that the Levy-like search pattern has evolved in the food-scarce oceanic environment, which is the main natural habitat of P. periphylla. Alternatively, the large individuals of the population addressed here may forage on scarcer prey sources than the main prevailing zooplankton in Lurefjorden.

7. **Distribution of planktonic cnidarians in response to South Atlantic Central Water intrusion in the South Brazilian Bight**
   巴西湾南部浮游刺丝胞动物的分布对南大西洋中央水域入侵的响应
   http://www.sciencedirect.com/science/article/pii/S027843431400096X

Five oceanographic cruises were made between November 2005 and June 2006, sampling a cross-shelf transect off the South Brazilian Bight (SBB; 26° 46′ S) to follow the seasonal development of the South Atlantic Central Water (SACW) intrusion over the shelf and its influence on the assemblage of planktonic cnidarians. An onshore wind-driven bottom intrusion of the SACW was clearly perceptible, reaching the coast in January. From March onward, the SACW influence was gradually displaced seaward due to wind and

tidal mixing. By late June the SACW influence was offshore and the inshore was dominated by low-salinity waters (<34.5). The abundance, distribution, and general taxonomic composition of both medusae and siphonophores were strongly influenced by the onshore intrusion of the SACW. An inshore–offshore gradient was clear. The Canonical Correspondence Analysis suggested that coastal species – dominated by Liriope tetraphylla, actinula larvae and Muggiaea kochi – were mostly related to food availability and a vertically mixed environment inshore, and their abundance and extent were reduced during intrusion periods. In contrast, species with offshore affinities tended to increase their abundance and distribution during intrusion periods, and were mostly related to the presence of thermal stratification and a deep chlorophyll maximum layer. Most of these offshore species, such as Aglaura hemistoma, Rhopalonema velatum and many calycophorans, are associated with the warm upper layer. However, high concentrations of large (>20 mm in diameter) Solmaris corona were observed exclusively in cold waters, suggesting this medusa is a SACW indicator.

8. **Distribution of planktonic cnidarian assemblages in the southern Gulf of Mexico, during autumn**
浮游刺细胞动物秋季在南部墨西哥湾的分布

Background: Despite their ecological, economic and medical relevance, very little information is available on the distribution of planktonic cnidarians, this being particularly true for some regions of the ocean such as the Gulf of Mexico. In fact, the effect of locally important oceanographic features such as the offshore autumnal transport on the distribution of planktonic cnidarians has long been overlooked in this region. Because of this, the present study aimed to analyse the spatial patterns of planktonic cnidarian assemblages in the southern Gulf of Mexico during the autumn of 1998, when particularly intense conditions of convergence, offshore water transportation and productivity were recorded. The assemblages were described in terms of their composition, abundance (volume), diversity, dominance and equitability. Cluster (Bray-Curtis index) and ordination (multidimensional scaling (MDS)) analysis were performed in order to link the observed distribution of species with the environmental parameters.

Results: Sixty-eight taxa were recorded, with Koellikerina fasciculata and Muggiaea atlantica representing new records for the region. The holoplanktonic species Diphyes dispar, Abylopsis spp., Liriope tetraphylla, Diphyes bojani, Aglaura hemistoma, Muggiaea kochi, Chelophyes appendiculata and Eudoxoides mitra were dominant with respect to abundance (ml/1000 m(3)) and frequency of occurrence and defined the differences among the groups of stations. Four groups of sampling stations were identified: (A) the mouth of the Grijalva-Usumacinta system, (B) the Campeche Bank, (C) the area of offshore oil rigs and (D) the continental shelf off Tabasco and associated oceanic waters. The parameters that defined the groups of stations were zooplankton volume, sampling station depth, salinity and dissolved oxygen concentration.

Conclusions: Planktonic cnidarians are useful as indicators of water masses, since the observed zonation was congruent with the surface circulation patterns that are present during the autumn (offshore transportation) and the presence of particular local environmental conditions, including those at the mouth of the Grijalva-Usumacinta system and those associated with the area of oil rigs. We would expect that similar conditions of strong offshore transport would lead to a similar horizontal stratification in the

assemblages of planktonic cnidarians in other parts of the world, driven mainly by salinity, oxygen, depth and zooplankton gradients.

9. **Marine artificial structures as amplifiers of Aurelia aurita s.l. blooms: a case study of a newly installed floating pier**
海洋人工结构增加了海月水母的暴发
http://link.springer.com/10.1007/s10872-014-0249-1

Increase of marine artificial structures, providing more substrate for jellyfish polyps, has been argued to increase jellyfish outbreaks, although no explicit evidence exists. We report a case study demonstrating a remarkable increase of Aurelia aurita s.l. ephyrae after the installation of a floating pier (48 x 6 m) in a fishing port on the Inland Sea of Japan. Monitoring of ephyrae from January 2010, prior to the installation of the floating pier in April 2010, to July 2011, revealed that their time-weighted average density increased 3.5 fold, from 1.1 to 3.9 ephyrae m(-3), and the integrated number of ephyrae exported from the port increased 4.3 fold, from 5.7 x 10(6) to 25 x 10(6) ephyrae, after the installation. However, in a nearby port, a control site, the abundance of ephyrae decreased by ca. one third during the same period. Monitoring of polyps showed that they initially colonized the undersurface of the pier by August 2010, followed by a rapid population increase. They strobilated from December 2010 to May 2011. We computed the number of ephyrae released from the strobilae to be ca. 25 x 10(6), very close to the net increase of ephyrae produced and exported from the port. This study corroborates that the installation of an artificial structure provides new a substrate for polyps, which allows them to produce more ephyrae to induce medusa blooms.

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