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1. Nutritional composition and total collagen content of three commercially important edible jellyfish

三种重要的商业用途水母的营养成分和总胶原蛋白含量

<http://www.sciencedirect.com/science/article/pii/S0308814615014375>

The study aimed to evaluate nutraceutical potential of three commercially significant edible jellyfish species (*Acromitus hardenbergi*, *Rhopilema hispidum* and *Rhopilema esculentum*). The bell and oral arms of these jellyfishes were analyzed for their proximate composition, calorific value, collagen content, amino acid profile, chemical score and elemental constituent. In general, all jellyfish possessed low calorific values (1.0-4.9 kcal/g D.W.) and negligible fat contents (0.4-1.8 g/100 g D.W.), while protein (20.0-53.9 g/100 g D.W.) and minerals (15.9-57.2 g/100 g D.W.) were found to be the richest components. Total collagen content of edible jellyfish varied from 122.64 to 693.92 mg/g D.W., accounting for approximately half its total protein content. The dominant amino acids in both bell and oral arms of all jellyfish studied includes glycine, glutamate, threonine, proline, aspartate and arginine, while the major elements were sodium, potassium, chlorine, magnesium, sulfur, zinc and silicon. Among the jellyfish, *A. hardenbergi* exhibited significantly higher total amino acids, chemical scores and collagen content ($p < 0.05$) compared to *R. hispidum* and *R. esculentum*. Having good protein quality and low calories, edible jellyfish is an appealing source of nutritive ingredients for the development of oral formulations, nutricosmetics and functional food.

2. Role of winds and tides in timing of beach strandings, occurrence, and significance of swarms of the jellyfish *Crambione mastigophora* Mass 1903

(Scyphozoa: Rhizostomeae: Catostylidae) in north-western Australia

风和潮汐在澳大利亚西北部海滩搁浅事件的时机，成群水母 (*Crambione mastigophora* Mass 1903) 的出现中的作用

<http://link.springer.com/article/10.1007%2Fs10750-015-2525-5>

Very large swarms of the red jellyfish *Crambione mastigophora* in north-western Australia disrupt swimming on tourist beaches causing economic impacts. In October 2012, jellyfish stranding on Cable Beach (density 2.20 ± 0.43 ind. m^{-2}) was estimated at 52.8 million individuals or 14,172 t wet weight along 15 km of beach. Reports of strandings after this period and up to 250 km south of this location indicate even larger swarm biomass. Strandings of jellyfish were significantly associated with a 2-day lag in conditions of small tidal ranges (<5 m). More than 90% of strandings occurred 2 days after winds were blowing onshore, but with the small number of days when satellite wind data were available during the study period, this result was not statistically significant. Dedicated instrument measurements of meteorological parameters, rather than the indirect measures used in this study (satellite winds and modelled currents) may improve the predictability of such events and help authorities to plan for and manage swimming activity on beaches. We also show a high incidence of predation by *C. mastigophora* on bivalve larvae which may have a significant impact on the reproductive output of pearl oyster broodstock in the region.

3. **Abundant box jellyfish, *Chironex* sp (Cnidaria: Cubozoa: Chirodropidae), discovered at depths of over 50 m on western Australian coastal reefs**
丰富的箱形水母 *Chironex* sp 在深度超过 50 米的西澳大利亚海岸珊瑚礁被发现
<http://www.nature.com/articles/srep22290>

Box jellyfish cause human fatalities and have a life cycle and habit associated with shallow waters (<5 m) in mangrove creeks, coastal beaches, embayments. In north-western Australia, tow video and epibenthic sled surveys discovered large numbers (64 in a 1500 m tow or 0.05 m⁻²) of *Chironex* sp. very near to the benthos (<50 cm) at depths of 39–56 m. This is the first record of a population of box jellyfish closely associated with the benthos at such depths. *Chironex* were not widespread, occurring only in 2 of 33 tow videos and 3 of 41 epibenthic sleds spread over 2000 km². All *Chironex* filmed or captured were on low to medium relief reefs with rich filter feeder communities. None were on soft sediment habitat despite these habitats comprising 49% of all sites. The importance of the reef habitat to *Chironex* remains unclear. Being associated with filter feeder communities might represent a hazard, and other studies have shown *C. fleckeri* avoid habitats which represent a risk of entanglement of their tentacles. Most of our observations were made during the period of lowest tidal current flow in the morning. This may represent a period favourable for active hunting for prey close to the seabed.

4. **Is the Scyphozoan jellyfish *Lychnorhiza malayensis* symbiotically associated with the crucifix crab *Charybdis feriatus*?**
Scyphozoan 水母 *Lychnorhiza malayensis* 与螃蟹 *Charybdis feriatus* 共生吗?
<http://www.currentscience.ac.in/Volumes/110/04/0479.pdf>

5. **Possible cryptic invasion of the Western Pacific toxic population of the hydromedusa *Gonionemus vertens* (Cnidaria: Hydrozoa) in the Northwestern Atlantic Ocean**
西太平洋有毒的水螅水母 *Gonionemus vertens* 可能入侵西北大西洋
<http://link.springer.com/article/10.1007%2Fs10530-015-1019-8>

We describe a possible cryptic invasion of the toxic Western Pacific hydromedusa *Gonionemus vertens* (Cnidaria, Hydrozoa, Limnomedusae) in the Northwest Atlantic Ocean. *G. vertens* was first noticed in Eel Pond in Woods Hole (Cape Cod), Massachusetts in 1894, but nearly disappeared in the 1930s, coincident with a large scale die-off of its preferred eelgrass habitat. During the 1894–1930 period, *G. vertens* was the object of numerous studies by local scientists, and was not reported as stinging. In contrast, Western Pacific *G. vertens* are known for their toxic sting symptoms, which include severe pain, respiratory distress, and paralysis. Here, we report new sightings in the northwest Atlantic from the late twentieth century onwards. Sightings are most frequent in Waquoit Bay on the southern-facing shore of Cape Cod, Massachusetts, and on the island of Martha's Vineyard, Massachusetts, but medusae have also been found in locations ranging from Long Island (New York) to Wellfleet Harbor on the north side of Cape Cod. We also describe reports of stings with symptoms similar to those produced by the toxic Western Pacific strain. The first sting report that we are aware of occurred in 1990 in Waquoit Bay, and stings have since occurred in most of *G. vertens*' known Northwest Atlantic locations. It appears likely that the recent sightings

associated with toxic stings represent a new, cryptic invasion of the Western Pacific form. These new observations are cause for public health concern, particularly as warmer temperatures associated with climate change may promote *G. vertens* blooms and thus the likelihood of dangerous human-jellyfish interactions in a populated, tourism-dependent region.

6. Population dynamics and factors controlling somatic degrowth of the common jellyfish, *Aurelia aurita*, in a temperate semi-enclosed cove (Kertinge Nor, Denmark)

在温带半封闭式海湾(丹麦)的常见水母 *Aurelia aurita* 的种群动力学和控制体内逆生长的因素

<http://link.springer.com/article/10.1007%2Fs00227-015-2802-x>

Life expectancy of the scyphomedusa *Aurelia aurita* seems closely linked to seasonal shrinkage, or somatic degrowth, which occurs synchronously with sexual reproduction in temperate regions. In the present study, the mechanisms controlling body mass losses and subsequent disappearance of medusae were examined by following seasonal dynamics in population density, individual size, and sexual reproduction of *A. aurita* during 2013 and 2014 in the shallow, semi-enclosed Kertinge Nor, and the adjacent Great Belt, Denmark. After sexual maturation in early summer, medusae were characterized by a distinct phase of somatic degrowth, expressed by weight-specific individual growth rates of -0.5 to -1.4 % day⁻¹, which was followed by the absence of *A. aurita* populations in both ecosystems during winter. The number of planula larvae per female (N_L , ind.) was positively correlated with medusa diameter (d , mm), following the exponential relationship $N_L = 160.8 \times e^{0.029d}$. The percentage of body mass made up by planulae ranged from 6 to 11 % in Kertinge Nor and 10 to 33 % in Great Belt. ≤ 15 % of total size-specific body mass losses were due to the release of planulae in Kertinge Nor, suggesting shortage of zooplankton prey during autumn as main factor causing degrowth in *A. aurita*. Starving medusae produced significantly fewer oocytes and revealed increased mortality compared to well-fed individuals in supplementary laboratory experiments, indicating that degrowth controls the energetic investment into sexual reproduction. Seasonal variability in food supply, rather than energy allocation to reproduction, appears to shorten life spans of *A. aurita* medusae in temperate Danish waters.

7. Trophic ecology of *Mnemiopsis leidyi* in the southern North Sea: a biomarker approach

北海南部 *Mnemiopsis leidyi* 的营养生态研究:一种生物标记方法

<http://link.springer.com/article/10.1007%2Fs00227-015-2800-z>

The non-indigenous ctenophore *Mnemiopsis leidyi* A. Agassiz 1865 was first observed in the southern North Sea in 2006 and has since then frequently been encountered. Knowledge on the diet, trophic position and interactions with other components of the pelagic food web will largely contribute to assess the impact of this species on the ecosystem. Using both stable isotope (SI) and fatty acid (FA) analysis, this study revealed spatial and temporal variation in the trophic ecology of *M. leidyi* in different ecosystems in the southern North Sea. Based on the isotopic composition, spatial differences were largely driven by variation at the base of the food web rather than diet

changes of *M. leidyi* in the different ecosystems. Temporal variation in *M. leidyi* SI composition was also influenced by shifting baseline values and driven by seasonal changes in the associated plankton communities. This study provides first data on the FA composition of *M. leidyi* as compared to FA concentrations of two indigenous ctenophores. Total FA concentration in *M. leidyi* was three to four times lower compared to *Pleurobrachia pileus* and *Beroe* sp., categorising it as a lipid-poor organism. Trophic interactions between *M. leidyi* and two co-occurring ctenophores (*P. pileus* and *Beroe* sp.) showed considerable resource differentiation, which could be the result of competition or different diets. A mixture of zooplankton was identified as potential food sources for *M. leidyi*. FA markers supported the carnivorous diet of *Beroe* sp., but its SI composition did not confirm the predatory relation with *M. leidyi*.

8. Local perspectives on regional challenges: jellyfish proliferation and fish stock management along the Israeli Mediterranean coast

以色列地中海沿岸的水母扩散和鱼类资源管理

<http://link.springer.com/article/10.1007%2Fs10113-014-0613-0>

The composition and abundance of marine biota in Israeli marine ecosystems are affected by natural and anthropogenic pressures, including blooms of non-indigenous jellyfish and overfishing. While overfishing is itself a major stressor of fish stocks, it appears that jellyfish may be outcompeting fish for scarce planktonic food resources. Beyond this direct impact on fisheries, jellyfish–ecosystem interactions are also important because of the disturbance they cause to multiple users of marine and coastal resources. This paper documents the concurrent changes in the composition of marine biotic communities, including jellyfish proliferation and dwindling stocks of endemic, commercially valuable fish and the rising rate of bottom trawling in Israeli fisheries. The capacity to deal directly with jellyfish is limited by lack of knowledge about their ecology. Therefore, we suggest that bolstering fish stocks and increasing their competitive advantage in the food web may be instrumental in limiting jellyfish blooms. Coordination of fishing and conservation policies is recommended, as are modifications to marine waste management and deployment of submerged artificial substrates.

9. Quantitative effects of pycnocline and dissolved oxygen on vertical distribution of moon jellyfish *Aurelia aurita* s.l.: a case study of Mikawa Bay, Japan

密度跃层和溶解氧对海月水母 *Aurelia aurita* s. l. 垂直分布的影响：日本 Mikawa 湾的案例研究

<http://link.springer.com/article/10.1007%2Fs10750-015-2451-6>

Blooms of moon jellyfish *Aurelia aurita* s.l. occur in various vertical distribution patterns within the water column. Reasons for these distribution patterns have remained obscure. To quantify the influence of pycnocline and low dissolved oxygen (DO) on the vertical distribution of *A. aurita* aggregations, we investigated temperature, salinity, DO, and observed densities of *A. aurita* at 1–2 m depth intervals via video camera in a eutrophicated, enclosed bay, Mikawa Bay, Japan, for 3 years. During the observed period, stratification and hypoxic status of the bay varied seasonally and interannually due to climatic events, such as rainy season and typhoon passage. Both sharp pycnocline and low DO limited *A. aurita* vertical distribution. The more strongly

stratified the water column, the more the upper boundary of *A. aurita* distribution was restricted. Bottom hypoxic water limited the lower boundary of *A. aurita* distribution. The DO threshold for in situ distribution was estimated to be similar to 2.5 mg l(-1), which is much higher than the experimentally obtained, sublethal values identified in previous studies. Our results show that climatic events affect *A. aurita* vertical distribution through changes in the physical characteristics of the water column.

10. Pathology and mortality associated with the mauve stinger jellyfish *Pelagia noctiluca* in farmed Atlantic salmon *Salmo salar* L.

与水母 *Pelagia noctiluca* 有关的养殖大西洋鲑鱼 *Salmo salar* L. 的病理学和死亡率研究

<http://onlinelibrary.wiley.com/doi/10.1111/jfd.12267/abstract>

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