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1. **Faunistic survey of Hydromedusae (Cnidaria, Medusozoa) from the coast of Parana State, Southern Brazil**
   巴拉那州巴西南部海岸的水螅水母研究调查
   http://biotaxa.org/Zootaxa/article/view/zootaxa.3768.3.3

This study is the first faunistic inventory of hydromedusae from the inner continental shelf of Paran á State. We describe the composition of hydromedusae species, collected with bottom-trawl and Hensen nets, in campaigns carried out from 1997 to 2006. We analyzed 17,797 specimens from 578 samples, and provide descriptions, photographs, and information about the biology of the 22 species found. All species had previous records from the Brazilian coast; however, this is the first record of *Bougainvillia frondosa*, *Ectopleura dumortieri*, *Cirrholovenia tetranema*, *Eucheilota maculata*, *Gossea brachymera*, *Solmaris corona*, and *Amphogona apsteini* for the coast of Paran á Most species are typical of tropical and subtropical coastal waters from the South Brazilian Bight. However, *Turritopsis nutricula*, Niobia dendrotentaculata, Solmaris corona, and *Aglaura* hemistoma are abundant in oceanic waters, and *Olindias sambaquiensis* and *Solmaris corona* are associated with colder waters (<20 ℃). The current number of species known for the state is 26. Additional collection effort is needed in regions not sampled in this work, such as bays and offshore waters.

2. **Ephyra jellyfish as a new model for ecotoxicological bioassays**
   碟状幼体水母作为生态毒理学生物测定的新模式
   http://www.biolbull.org/content/226/1/29.full.pdf+html

Antibodies to alpha- or beta-tubulin and to the bioactive peptide FMRFamide were used to investigate the organization of the ectodermal nervous structures in five species of scyphomedusae. Within the swim system, morphological evidence, including a developmental sequence, suggests that the tubulin-immunoreactive nerve net in the sub-umbrella is the Giant Fiber Nerve Net (Motor Nerve Net) that directly activates the swim musculature, and the FMRFamide-immunoreactive nerve net is the Diffuse Nerve Net that serves a sensory function and also enhances swim muscle activity. Similar dual labeling was found in other structures, including those involved in feeding and protective reactions (pedalia and tentacles, radial strips of smooth muscle), and in the exumbrella, where the networks were associated with batteries of nematocysts. In addition, FMRFamide immuno-staining in the rhopalia and rhopalial niches suggests that sensory components of these networks may aid in the gravitational sense of scyphomedusae.

3. **Determination of delta C-13 and delta N-15 and trophic fractionation in jellyfish: implications for food web ecology**
   δ ^{13}C and δ ^{15}N 在水母中的营养组成：食物网生态学的意义
   http://link.springer.com/article/10.1007%2Fs00227-013-2345-y

Application of stable isotope analysis (SIA) in jellyfish allows definition of trophic patterns not detectable using gut content analysis alone, but analytical protocols require standardization to avoid bias in interpreting isotopic data. We determined δ13C and δ15N in Aurelia sp. from the northern Gulf of Mexico (30°00′N, 89°00′W–30°24′N, 88°00′W) to define differences in stable isotope composition between body parts and whole body, the effect of lipid extraction on δ13C in tissues, and fractionation values from medusa to prey. The isotopic composition of bell and whole Aurelia sp. was not different. The increase in δ13C values after lipid removal suggested a correction is needed. To aid future analyses,

we derived a correction equation from empirical data for jellyfish samples. Laboratory feeding experiments indicated medusae increased +4 ‰ in δ13C and +0.1 ‰ in δ15N compared to their diet. These results suggest protocols commonly applied for other species may be inaccurate to define Aurelia sp. trophic ecology. Because Aurelia spp. are commonly found in marine ecosystems, accurately defining their trophic role by use of SIA has implications for understanding marine food webs worldwide.

4. **A cleavage clock regulates features of lineage-specific differentiation in the development of a basal branching metazoan, the ctenophore Mnemiopsis leidyi**
   美洲梳状水母 Mnemiopsis leidyi 的发展谱系特异性分化的特点
   http://www.evodevojournal.com/content/5/1/4

Background: An important question in experimental embryology is to understand how the developmental potential responsible for the generation of distinct cell types is spatially segregated over developmental time. Classical embryological work showed that ctenophores, a group of gelatinous marine invertebrates that arose early in animal evolution, display a highly stereotyped pattern of early development and a precocious specification of blastomere fates. Here we investigate the role of autonomous cell specification and the developmental timing of two distinct ctenophore cell types (motile compound comb-plate-like cilia and light-emitting photocytes) in embryos of the lobate ctenophore, Mnemiopsis leidyi.

Results: In Mnemiopsis, 9 h after fertilization, comb plate cilia differentiate into derivatives of the E lineage, while the bioluminescent capability begins in derivatives of the M lineage. Arresting cleavage with cytochalasin B at the 1-, 2-or 4-cell stage does not result in blastomere death; however, no visible differentiation of the comb-plate-like cilia or bioluminescence was observed. Cleavage arrest at the 8-or 16-cell stage, in contrast, results in the expression of both differentiation products. Fate-mapping experiments indicate that only the lineages of cells that normally express these markers in an autonomous fashion during normal development express these traits in cleavage-arrested 8- and 16-cell stage embryos. Lineages that form comb plates in a non-autonomous fashion (derivatives of the M lineage) do not. Timed actinomycin D and puromycin treatments show that transcription and translation are required for comb formation and suggest that the segregated material might be necessary for activation of the appropriate genes. Interestingly, even in the absence of cytokinesis, differentiation markers appear to be activated at the correct times. Treatments with a DNA synthesis inhibitor, aphidicolin, show that the number of nuclear divisions, and perhaps the DNA to cytoplasmic ratio, are critical for the appearance of lineage-specific differentiation.

Conclusion: Our work corroborates previous studies demonstrating that the cleavage program is causally involved in the spatial segregation and/or activation of factors that give rise to distinct cell types in ctenophore development. These factors are segregated independently to the appropriate lineage at the 8- and the 16-cell stages and have features of a clock, such that comb-plate-like cilia and light-emitting photoproteins appear at roughly the same developmental time in cleavage-arrested embryos as they do in untreated embryos. Nuclear division, which possibly affects DNA-cytoplasmic ratios, appears to be important in the timing of differentiation markers. Evidence suggests that the 60-cell stage, just prior to gastrulation, is the time of zygotic gene activation. Such cleavage-clock-regulated phenomena appear to be widespread amongst the Metazoa and these cellular and molecular developmental mechanisms probably evolved early in

metazoan evolution.

5. **Settlement of Planulae of the Moon Jellyfish Aurelia aurita onto Hydrophilic Polycarbonate Plates Modified by Atmospheric Plasma Treatment**
   月亮水母 Aurelia aurita 的浮浪幼虫在改性亲水聚碳酸酯板上的生存
   http://dx.plos.org/10.1371/journal.pone.0085569

It has been reported that planula larvae of some jellyfish prefer artificial substrates for settlement. This research focused on the relationship between the settlement of planulae and the wettability of artificial substrate surfaces. We used atmospheric plasmas to change the wettability of the surfaces of polycarbonate (PC) plates because plasma treatment has no chemical side effects. The treatment made the surfaces hydrophilic, as evidenced by the decrease of contact angle from 85 degrees to 35 degrees. X-ray photoelectron spectroscopy revealed that the change of wettability of the PC plates could be attributed to N-2, which was probably ionized in the air above the plates. Scanning electron microscopy revealed no difference in the surface morphology of the plates before and after plasma treatment. Results of bioassays using treated PC plates showed that planulae tended to preferentially settle on hydrophobic surfaces.

6. **Medusa consumption and prey selection of silver pomfret Pampus argenteus juveniles**
   水母对银鲳幼鱼的捕食选择性
   http://link.springer.com/article/10.1007%2Fs00343-014-3034-5

The current study explored Aurelia aurita and Rhopilema esculent um consumption by silver pomfret juveniles, as well as their prey selection between the twojellyfish species. Silver pomfret juveniles weighing 1 +/- 0.1 g actively preyed on both the species. Their daily A. aurita consumption was 11.6 times their own body weights regardless of the size of A. aurita medusae. Their daily R. esculent um consumption was 13, 9.1, 5, and 4.1 times their own body weights when the R. esculentum medusae were 10, 20, 30, and 40 mm in bell diameter, respectively. The survival rates of the R. esculent um were higher than those of the A. aurita. When the R. esculent um medusae were more than 30 mm in bell diameter, their survival rate exceeded 92%. Silver pomfrets serve as a type of potential predators on A. aurita in coastal waters, and they have little influence on R. esculent um with a size exceeding 30 mm. Besides, A. aurita may be able to be used as fish prey in silver pomfret artificial breeding.

7. **Fine-scale vertical distributions of Mnemiopsis leidyi ctenophores: predation on copepods relative to stratification and hypoxia**
   美洲梳状水母 Mnemiopsis leidyi 的精细尺度垂直分布
   http://www.int-res.com/abstracts/meps/v500/p103-120/

Plankton concentrations near discontinuities in the water column (clines) are believed to be important for intensifying trophic interactions; however, evidence for increased feeding by predators at clines *in situ* is scarce. Here we demonstrate enhanced feeding near pycnoclines by a voracious planktivore, the ctenophore *Mnemiopsis leidyi*. To determine their feeding relative to stratification, we quantified temperature, salinity, dissolved oxygen concentration (DO), densities of ctenophores and copepods at 1 to 2 m depth intervals, and gut contents of ctenophores collected by depth layer at stations in a tributary and in the mainstem Chesapeake Bay during summer from 1999 to 2001. We tested the null hypotheses that patterns in the tributary and the bay were similar and that ctenophore vertical distributions and feeding were independent of the vertical distributions of the

physical variables, stratification, and copepods. We rejected all null hypotheses. Ctenophores and copepods had peak densities below the pycnocline in the weakly stratified tributary, where DO was above 2 mg l^{-1} throughout the water column; by contrast, they were more concentrated above the strong pycnocline and near-anoxic waters at ~11 m in the bay. Predation on copepods by ctenophores was highest where both populations were concentrated. Our results illustrate the importance of stratification to planktonic trophic interactions for *M. leidyi*, which thrives in anthropogenically degraded waters and now is established throughout European seas, where it can negatively affect planktonic food webs and fisheries.

8. **Aurelia labiata jellyfish in Roscoe Bay on the West Coast of Canada: Seasonal changes in adult bell diameter and mingling of juvenile and adult populations**
   加拿大西海岸罗斯科湾的 Aurelia labiata 水母：成年水母直径以及幼年与成年种群的季节变化
   http://linkinghub.elsevier.com/retrieve/pii/S1385110113001019

The bell diameter of adult *Aurelia labiata* in Roscoe Bay increased from spring (April) to early summer (May/June) and decreased over the rest of the year (2009/2010). The increase in bell diameter in the spring would have been supported by the increase in zooplankton that occurs in the northeast Pacific at this time. Over the summer, bell diameter may have decreased because the food available/medusa would have been decreased by the arrival of a large number of juveniles and may have decreased further over the fall and winter when zooplankton levels are known to be low. Adults and juveniles were intermingled during 2010, 2011, and 2012. Correlations between the number of adults and number of juveniles obtained in individual net lifts across the entire bay and in different parts of the bay were all positive and most were statistically significant. In 2012, salinity in the entire water column of the west side of the bay dropped below 20 ppt in July and most medusae migrated to higher salinity in the east side of the bay, a distance of about 0.5 km. The mingling of adults and juveniles supports other evidence that adult *Aurelia* sp. medusae do not prey upon juveniles. The ability to withstand months with insufficient food and to inhibit preying on juveniles would contribute greatly to the survival of *Aurelia* sp. jellyfish.

9. **Morphological and molecular discrimination of two closely related jellyfish species, Cyanea capillata and C. lamarckii (Cnidaria, Scyphozoa), from the northeast Atlantic**
   东北大西洋两种密切相关的水母 Cyanea capillata and C. lamarckii 从形态学和分子学上的区分
   http://plankt.oxfordjournals.org/content/36/1/48

Detecting fluctuations in the species composition of bloom-forming jellyfish requires the ability to correctly identify each species in each developmental stage. We verified diagnostic morphological and molecular genetic characters to discriminate Cyanea lamarckii and Cyanea capillata from northern European waters. Intrusions in the sub-umbrellar muscle folds were present in all C. capillata >80 mm r-diameter (between opposite rhopalia tips), but absent in C. lamarckii. Clearly visible wart-like papillae on the central exumbrella were present in all C. lamarckii >10-80 mm r-diameter, but absent in C. capillata. Both morphological features were retained in formaldehyde-seawater (4%) preserved medusae which had shrunk by 12.8% (+/- 2.7%) after 1 year of preservation. Our molecular genetic analyses demonstrated that fragments of mitochondrial cytochrome

c oxidase subunit I (COI) and nuclear 18S rDNA clearly distinguished C. lamarckii from C. capillata, with intra- and inter-specific pairwise genetic distances of 0.0-1.5% and 15.5-17.0% (COI) and 0.0 and 0.2% (18S rDNA), respectively. The study revealed various bell colours in both species underlining that the identification based on the bell colours can result in misidentification. Our integrated taxonomic approach can help to correctly identify jellyfish species, which is fundamentally important for understanding the causes of jellyfish fluctuations and the development of jellyfish blooms.

10. **Emphasizing the diversity of North Sea hydromedusae by combined morphological and molecular methods**
    结合形态学和分子生物学方法强调北海水螅水母的多样性
    http://plankt.oxfordjournals.org/content/36/1/64

Hydromedusae are widespread and diverse representatives of the gelatinous zooplankton, but are often neglected because of their inconspicuousness and difficulties with identification. Here, we used an integrated approach combining both morphological and molecular genetic analyses of North Sea hydromedusae. Morphological identification was successfully carried out on living material, and preservation in 4% formaldehyde allowed re-examination of most morphological features. Ethanol and DESS were adequate fixatives for DNA analyses but led to distortion of morphological characters. In most cases, morphological species identifications were confirmed by molecular data (COI partial sequences) and the latter approach led to valid discrimination where morphological characters were insufficient. In comparison with 22 morphologically identified entities, COI analysis revealed 25 clades with a pronounced difference of ≥5.4% between intra- and inter-specific variability. Specimens morphologically identified as Obelia spp. were attributed to O. geniculata, O. dichotoma and O. longissima, while Clytiaspp. were allocated to C. hemisphaerica and C. languida by the comparison to hydroid and medusa sequences retrieved from GenBank. Our results highlight the molecular approach as a powerful tool, extending the possibilities for valid species discriminations where morphological identification is difficult, for example, in species with a similar or identical morphology, in early life stages with insufficient identifying features and in linking different generations (hydroid and medusa). However, genetic analysis cannot replace morphologically based taxonomy in studies on species' population dynamics, physiology and ecology. Thus, most information is achieved by combining both methods in integrative studies using both morphological and molecular taxonomy.

11. **Beneficial co-culture of jellyfish Rhopilema esculenta (Kishinouye) and sea cucumber Apostichopus japonicus (Selenka): implications for pelagic-benthic coupling**
    水母（Kishinouye）和刺参（Selenka）的有利共培养：浮游底栖耦合影响
    http://onlinelibrary.wiley.com/resolve/doi?DOI=10.1111/j.1365-2109.2012.03225.x

This study investigated monthly changes of sedimentation and sediment properties in three different culture systems (ponds) - i.e. jellyfish Rhopilema esculenta monoculture (J), sea cucumber Apostichopus japonicus and jellyfish co-culture (SJ) and sea cucumber monoculture (S) - to verify the feasibility of co-culturing jellyfish and sea cucumbers. Results showed that jellyfish culture accelerated the settling velocity of total particulate matter (TPM). Average TPM settling velocities in the SJ (75.6gm(-2) day(-1)) and J (71.1gm(-2)day(-1)) ponds were significantly higher than that in the S pond (21.7gm(-2)day(-1)) from June to September during the jellyfish culture period. Average

settling velocities of organic matter (OM), total organic carbon (TOC), total nitrogen (TN) and total phosphorus (TP) in the SJ pond increased significantly by 3.0, 2.9, 3.3 and 3.8 times, respectively, compared with those in the S pond. Sediment contents of OM, TOC, TN and TP in the SJ and J ponds were significantly higher than those in the S pond during the jellyfish culture season. The specific growth rate of sea cucumbers feeding on SJ sediment was significantly higher than that of those feeding on S sediment. Co-culturing sea cucumbers with jellyfish may help alleviate benthic nutrient loading due to the jellyfish and provide a secondary cash crop.

12. **Feeding of the Arctic ctenophore Mertensia ovum in the Baltic Sea: evidence of the use of microbial prey**

北极栉水母 Mertensia 卵子在波罗的海的取食：利用微生物的证据

http://plankt.oxfordjournals.org/content/36/1/91

Since its first reported appearance in the Baltic Sea in 2007, there has been a little research on the role of the Arctic ctenophore Mertensia ovum in this ecosystem. We provide results from the first feeding experiments of M. ovum from the northern Baltic Sea. Experiments were conducted with various prey types; picocyanobacteria Synechococcus bacillaris, ciliates Mesodinium rubrum, nauplii of mixed copepod species and copepodites of Eurytemora affinis. Molecular gut content analyses were also used to measure in situ feeding of M. ovum on the picocyanobacteria. The observed clearance rates on M. rubrum (< 9.0 mL predator(-1) h(-1)), and S. bacillaris (<7.5 mL predator(-1) h(-1)) were lower than those reported for similar-sized ctenophore species feeding on similar prey. Similarly, clearance rates of M. ovum on copepodites and copepod nauplii were close to zero, implying significantly lower predation on crustacean prey compared with other ctenophores. Overall, M. ovum predation rates were relatively low with a maximum daily consumption of 0.95 mu g C ind.(-1) day(-1) (similar to 15.8% of estimated predator carbon content). In addition, we examined the vertical distribution of M. ovum in relation to that of micro- and mesozooplankton and found greater overlap with potential microplankton prey than with mesozooplankton. Taken together, these results imply that in the Baltic Sea, M. ovum feed mainly on bacterio-and microplankton, thus potentially contributing to the coupling between the microbial loop and higher consumers in the pelagic food web.

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