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寄生海水养殖鱼类的拟格拉夫涡虫的流行、危害与防治

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摘要:自2000年10月中旬,在罗源湾发现一种罕见的能够寄生鱼类的涡虫,对其流行病学、形态学以及进化地位进行了大量的研究,结果表明:这种涡虫是一种未被报道过的新种,在福建省的各海水养殖区广泛流行,能够寄生于眼斑拟石首鱼(*Sciaenops ocellatus*)、大黄鱼(*Pseudosciaena crocea*)、鲷鱼(*Micthys miuy*)、牙鲆(*Paralichthys olivaceus*)、黑鲷(*Sparus macrocephalus*)和横纹东方鲀(*Takifugu oblongus*)等海水养殖鱼类的鳃、鳍及体表,造成寄生部位的严重损伤,鱼因呼吸困难或细菌的继发性感染而造成大量死亡,死亡率可达20%~60%;流行季节主要为秋季(8-11月);水温22~26℃,盐度25~30。此外,提出了使用地下水,降低盐度、温度,合理用药等切实可行的防治本涡虫病的建议。

关键词:海水鱼;寄生涡虫;流行病;防治**中图分类号:**S941.5 **文献标识码:**A

The epidemic, harm and control of the *Pseudograffilla* sp. in marine cultured fish

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Abstract: A rare kind of parasitic turbellarian, parasitizing *Sciaenops ocellatus*, causing serious gill damages, and causing high mortality of the host fish, was reported for the first time by our previous study at Luoyuan Bay in October 2000. The subsequent survey revealed that this disease had the characters of large scale, high incidence and high intensity. In 2002 this disease took place in a company at Zhangpu County of Fujian Province, where *Paralichthys olivaceus* was cultured. It was not diagnosed and controlled immediately. The infection rate was over 50%. The mortality ranged from 20% to 50%. The loss was approximately 40 million yuan. This disease also caused the death of as many as twenty thousand *Pseudosciaena crocea*s within a week at net cages of No. 350 cultured in Luoyuan Bay. The mortality was higher than 50%. Therefore, it is urgent to study the epidemiology of this disease and to discover the method to control it. The biological characteristics of this turbellarian were studied by field survey, biostatistics, experimental infection, observation of living specimen, histological method, and so on. The results showed that the disease prevailed all over the cultural sea area in eastern Fujian, including Luoyuan County, Ningde City, Lianjiang County and Xiapu County, and southern Fujian, including Zhangpu County, Xiamen City and Tong'an County. This kind of turbellarian was found in both the cultural cages and the cultural tanks. It infected not only *S. ocellatus* but also *P. crocea*, *Micthys miuy*, *P. olivaceus*, *Sparus*

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macrocephalus and *Takifugu oblongus*. These turbellarians parasitized the gill, fins and the body surface of many kinds of marine cultured fishes. They made great lesion to the place where they lodged, causing asphyxiation or the secondary infection of bacteria which resulted in a high mortality of 20% - 60%. This disease prevailed mainly in autumn, from August to November, at the water temperature of 22 - 26 °C and the salinity of 25 - 30. A coincidence of high incidence area and the nearby seashell culture area, such as abalone and oyster culture area, was found. The primary experimental infections showed the commensal associations of the turbellarian with clam and oyster. However, it needs further confirmation on which kind of mollusc could serve as the reservoir host of the turbellarian. This study could provide scientific bases to control the diseases. According to the results of survey and experiments, several treatments to the disease were provided. Cupric sulfate, formaldehyde, trichlorphon can have a certain curative measure by spilling, bathing and hanging bag in the water. The using of underwater, reducing salinity and temperature, improving nutrition and using medicine reasonably and so on were also proved to be effective in the control of the disease.

Key words: marine fish; parasitic turbellarians; epidemic; control

福建是海水养殖大省,2002年总产值达 2.8×10^6 t,仅大黄鱼产量就达到44 780 t。主要海水养殖鱼类有眼斑拟石首鱼、大黄鱼、鲷、牙鲆、横纹东方鲀、红鳍东方鲀、花尾胡椒鲷、真鲷、黑鲷和鲷等。拟格拉夫涡虫宿主选择性不强,可广泛寄生及危害以上的多种养殖鱼类,2001年漳浦某牙鲆养殖公司因爆发流行涡虫病,未能及时防治,损失产值达近4 000万元。本文探讨了涡虫病的流行规律和防治方法。

1 材料与方法

1.1 调查地区

福建省的罗源、宁德、连江、霞浦、漳浦、长乐等地区。

1.2 调查内容

调查眼斑拟石首鱼(*Sciaenops ocellatus*)、大黄鱼(*Pseudosciaena crocea*)、鲷(*Miichthys miiuy*)、牙鲆(*Paralichthys olivaceus*)、黑鲷(*Sparus macrocephalus*)、横纹东方鲀(*Takifugu oblongus*)、青石斑鱼(*Epinephelus awoara*)、鲷(*Seriola quinqueradiata*)等鱼类的涡虫感染情况,流行规律,发病率和死亡率。

1.3 调查与检查方法

调查方法 2002年至2004年,3-7月份每月前往海区1~2次,7-8月份每月前往海区2~4次,9-12月份每月前往海区调查4~8次。访问鱼排,抽检病鱼。并经常与养殖户电话联系,以密切关注涡虫病的流行情况与病害情况。

检查方法 按《鱼病调查手册》中有关寄生虫病的检查、收集、制片方法^[1],取皮肤粘液、鳃、肾、肠、鳔、肌肉等组织镜检。记录检查结果。

组织切片 标本用4% $0.1 \text{ mol} \cdot \text{L}^{-1}$ PBS (pH 7.2) 甲醛固定,系列乙醇梯度脱水,石蜡包埋,切片3 μm 或间隔连续切片,H.E染色或PAS染色及六甲胺银染色;Olympus显微镜观察、Nikon 3100 像机摄影。

2 结果

2.1 涡虫感染统计

3-7月份在各地区,各种鱼体上均未检测到涡虫。2002年8-9月调查漳浦古雷半岛龙泽公司牙鲆养殖场。该公司牙鲆鱼养于5 m × 5 m × 1.5 m 的水泥池中,抽取海面水进行养殖,每天换水量为水池容量的8倍。水温24~28 °C,盐度25, pH 7.4。牙鲆感染率达50%以上,死亡率20%~50%。9月中旬至11月中旬,罗源、宁德、连江、霞浦等地区各种网箱养殖鱼类涡虫感染检出率及死亡率统计(表1)。福州长乐地区牙鲆养殖场使用地下水养殖牙鲆鱼,水温20~28 °C,盐度16, pH 7.0条件下未查见涡虫感染。

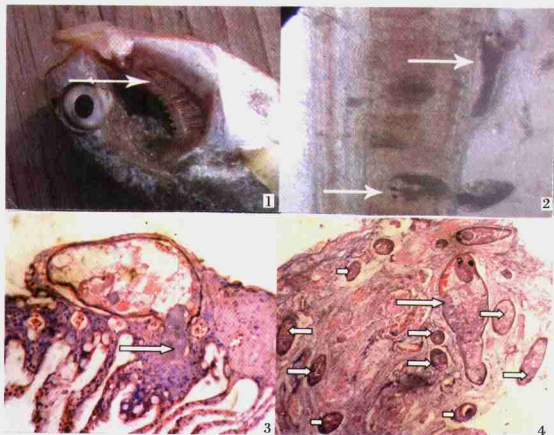
2.2 涡虫的危害

涡虫主要寄生于宿主的鳃与皮肤,它们的咽不断伸缩造成的机械刺激及头腺分泌物的化学刺激,能够刺激宿主组织增生及分泌大量粘液,这使得水中的脏物容易粘附在鳃丝上,因此鳃丝间常可见许多泥土样脏物(图版-1),也使得虫体能够紧紧地粘附在鳃丝上或钻进鳃丝间寄生(图版-2)。鱼被涡虫寄生后粘液增多,鳃的正常功能受到严重破坏(图版-3),再加上脏物的堵塞,鱼因呼吸困难而死亡。其次,涡虫还可以大量寄生在皮肤上(图版-4)也会刺激鱼体表的粘液大量分泌,体表常出现圆斑状滞痒,鱼体应激反应的结果

表 1 各种网箱养殖鱼类类洞虫感染情况统计

Tab. 1 The statistics of diversified marine cultured fishes infected with turbellarians

时间 date	鱼类名称 fish name	体重(g) weight	检查例数 specimen number	阳性数 infective number	感染程度 infective degree	检出率(%) detect rate	死亡率(%) mortality
10月 Oct.	大黄鱼 <i>P. crocea</i>	50~100	300	228	++-+++	76	60
		100~200	192	93	++	48	29
		>200	258	185	+ - ++	71.7	20
	红鼓鱼 <i>S. ocellatus</i>	50~200	482	323	++-+++	67	40
	鳗 <i>Mitsithys minis</i>	300~500	20	8	+ - ++	40	18
11月 Nov.	大黄鱼 <i>P. crocea</i>	>200	212	121	++-+++	57	25
		红鼓鱼 <i>S. ocellatus</i>	50~200	35	38	++	46
	东方鲀 <i>T. oblongus</i>	50~150	120	84	++	70	57
	黑鲷 <i>S. macrocephalus</i>	100~150	32	2	++	6	3



图版 Plate

1. 新鲜标本, 箭头示肉眼可见鱼鳃上许多泥土样脏物; 2. 活体标本, 箭头示鳃丝上及鳃丝间粘附着的虫体(光镜); 3. 组织病理切片, PAS染色, 箭头示涡虫的咽侵入鳃组织中(光镜); 4. 组织病理切片, PAS染色, 箭头示鱼皮肤粘液上的虫体(光镜)

1. Fresh sample, the arrow shows that there is a lot of earth and one kind of dirty things on the fish's branchial and can be seen by naked eye; 2. Living body sample, the arrow shows turbellarian adhered to the branchial filament and among the branchial filament (optical microscope); 3. The section of tissue, stained by PAS, the arrow showing the pharynx of turbellarian was putting into the branchial filament (optical microscope); 4. The section of tissue, stained by PAS, the arrow shows the turbellarian on the fish skin mucus (optical microscope)

使体质衰弱,首先表现为食欲明显下降,视被感染的程度不同,其摄食量只有正常摄食量的 1/3 ~ 1/10。此时脏物中的细菌更易趁虚而入,对一些平时较瘦弱及营养不良的鱼,更易造成大量死亡。

3 讨论

3.1 寄生的涡虫

大多数涡虫营自由生活,少数为共生或寄生生活。据报道,共生与寄生的种类主要宿主为贝类及鱼类^[2-6],但造成严重损害的报道极少。在我国,对涡虫研究主要是自由生活的种类,只有唐仲璋^[7]曾报道过一种寄栖在石蟹体上的淡水的寄生涡虫——切头涡虫 (*Temnocephala semperi* Weber)。本涡虫寄生海水养殖鱼类,并造成严重危害的报导在国内实属首例^[8]。这可能与福建省的气候、及养殖业发达,海水养殖密度高等特殊环境改变有关。

其次,我们还注意到,在我们调查中发病率特别高的地方,附近总是有鲍、牡蛎等贝类养殖,虽然还没有发现贝类因涡虫感染而死亡的病例,但据实验室的感染结果,在蛤和牡蛎中已发现涡虫可与其共生。涡虫是否能大量共生于贝类,以致感染鱼类并造成危害,尚需进一步的研究确定。

3.2 涡虫病防治建议

加强营养,健康养殖 在调查过程中我们发现,近年来虽然涡虫病的感染有增无减,但每个养殖场受染的时间从发现到爆发性死亡一般不超过 1 个月,如果鱼体健壮,病鱼虽减少食量,但能带虫熬过感染期,一旦温度下降,虫体受环境影响而丧失感染力,从鱼体上自然脱落,鱼很快便能恢复食量,恢复健康。反之,死亡率大大增加。

改善水质,杜绝传染源 根据涡虫病流行规律,在涡虫病发病季节,避免抽取海面水,尽量使用地下水或经沙过滤的海水,降低水温和盐度(水温 22 ℃ 以下,盐度 15 以下),均能有效防止涡虫病的发生。

药物预防和治疗 根据大量的生产现场用药结果发现,硫酸铜、甲醛、敌百虫泼洒、浸浴、挂袋

都有一定的治疗效果,但最有效的方法还是敌百虫加淡水浸浴。

对网箱养殖的鱼类,寄生涡虫病防范措施可在网箱的对角各挂 1 片杀虫 1 # (铜制剂)或每个网箱吊挂敌百虫 90% (鱼用)。同时内服复合维生素、免疫多糖类等,以加快病鱼的康复^[9]。

寄生涡虫病治疗 可用浓度为 (1 ~ 3) × 10⁻⁶ 敌百虫 (鱼用) 加淡水将盐度下降至 7 ~ 8 浸浴 20 ~ 30 min (时间可视鱼体的承受能力而定),然后将鱼连同原药液一同放回大水体中 (在海区,选择海水水平潮时用药)。使药物浓度有个过渡性稀释过程,有益于充分发挥药效。浸浴后的鱼,可配合内服多维、Vc、葡萄糖等,加强营养,缓解药物对鱼的毒性作用^[9]。有些鱼对敌百虫敏感,用药时要先做现场实验以确定和调节用量。

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