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NEW HOSTS FOR LYMPHOCYSTIS

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ABSTRACT Lymphocystis disease is reported for the first time from the Koran angelfish, *Pomacanthus semicirculatus*; the Moorish idol, *Zanclus canescens*; the foureye butterflyfish, *Chaetodon capistratus*; and the orbiculate bat fish, *Platax orbicularis*. Also, lymphocystis is reported the second time from the queen angelfish, *Holacanthus ciliaris*. All hosts are commercially important exotic aquarium fishes.

INTRODUCTION

Lymphocystis is an infectious viral disease of teleosts that causes hypertrophy of connective tissue cells and usually occurs on the fins and skin. The enlarged cells (nodules) eventually slough off; there is no known treatment, but the disease is seldom fatal. A list of hosts reported to be susceptible to the disease since the work of Nigrelli and Ruggieri (1965) was presented by us previously (Lawler et al. 1977). We add four more species to the host list.

MATERIALS AND METHODS

All the fish examined were imported for sale in tropical fish stores. They were relaxed with MS-222 (Tricaine methanesulfonate, Crescent Research Chemicals Inc., Scottsdale, Arizona) and examined alive, so that they could be returned to display tanks. Suspected lymphocystis tissue was removed with forceps, examined under a compound microscope for confirmation of lymphocystis, and preserved in 10% buffered formalin for future microscopic examination. No internal organs or gills were examined. The fish were revived in fresh sea water of about the same salinity from which they were removed.

Preserved lymphocystis tumors were examined with a Siemens 1A Elmiskop electron microscope following the procedures of Lawler et al. (1974). Approximate diameters of viral particles (diameter = distance between opposite vertexes) are enclosed in parentheses in the discussion of each case report.

CASE REPORTS

1. *Pomacanthus semicirculatus* (Cuvier and Valenciennes), Koran angelfish; family Chaetodontidae. The fish occurs from the Red Sea and Indian Ocean to the Indo-Australian Archipelago, the Philippines, China, Okinawa, and Melanesia (Axelrod and Emmens 1969).

On 29 August 1977 two juveniles were examined, both approximately 60 mm long (total length [TL]). One had hypertrophied cells on the right pectoral fin; the other had

small nodules on all fins. The fish had been imported from the Philippines through California, and were heavily infected when received. They were held for about 4 weeks prior to microscopic examination, at which time most of the nodules were gone. The course of the disease (287 nm) in this species appears to last at least 4 weeks.

2. *Zanclus canescens* (Linnaeus), Moorish idol or toby; family Zanclidae. The fish occurs widely in the tropical Indo-Pacific, from the Red Sea to Mexico (Axelrod and Emmens 1969).

On 15 December 1977 one fish was examined. This fish, already infected, was imported from the Philippines through California on 19 November 1977 and was held in a tank at 32 ppt salinity until examination. The fish (70 mm TL) had clumps of lymphocystis cells on the dorsal fin and at the base of the left pectoral fin. Single nodules were scattered on the skin. It appears, that in this species also, the disease (287 nm) lasts at least 4 weeks.

3. *Chaetodon capistratus* Linnaeus, foureye butterflyfish; family Chaetodontidae. The fish occurs in the tropical Atlantic and Caribbean (Axelrod and Emmens 1969).

On 21 December 1977 one fish recently imported from Florida was examined. This fish (51 mm TL) had clumps of lymphocystis cells on the left pectoral fin and single nodules scattered on both the dorsal and caudal fins. On 10 February 1978, four more fish were received; all had lymphocystis (287 nm).

4. *Platax orbicularis* (Forskäl), orbiculate bat fish; family Platacidae. The fish occurs widely from the Red Sea, Indian Ocean, and Indo-Australian Archipelago to the Philippines, China, south Japan, and central to south Pacific islands (Axelrod and Emmens 1969).

Three fish were observed infected on 28 January 1978. The fish having the greatest infection (259 nm) died on 19 January 1978 apparently from another cause and was examined microscopically the next day. The fish (64 mm TL) had clumps of lymphocystis cells on the caudal, dorsal, anal, right pectoral, and both pelvic fins; scattered lymphocystis cells occurred on the skin.

5. *Holacanthus ciliaris* (Linnaeus), queen angelfish; family Chaetodontidae. The fish occurs from the Bahamas to Brazil, including the Gulf of Mexico (Böhlke and Chaplin 1968).

A queen angelfish (210 mm TL) received from Florida was examined on 10 February 1978. It had lymphocystis nodules on the dorsal, anal, and pectoral fins; the infection later spread to the skin underlying the pectorals. The fish died on 3 April 1978, still showing numerous nodules. The course of the disease (287 nm) in this fish was greater than 2 months. This is the second report of lymphocystis on this species, the first being Nigrelli and Ruggieri (1965).

6. *Zebrasoma veliferum* (Bloch), sailfin tang; family Acanthuridae. The fish occurs in the tropical Indo-Pacific and Red Sea (Axelrod and Emmens 1969).

On several occasions apparent lymphocystis nodules have been observed on fish of this species being held in display tanks. However, at present, lymphocystis has not been confirmed microscopically.

DISCUSSION

With increased new findings of infected hosts among imported fishes, we agree with McCosker et al. (1976) who noted that "it is quite likely that many infected species remain unreported, particularly among families of tropical

reef fishes." Although fish that were already infected, or soon showed signs of infection have been received, it has not been ascertained whether there is more than one strain of lymphocystis in these tropical fishes. Lawler et al. (1974) have already noted viral strain differences occurring in the Gulf of Mexico between two closely related hosts, *Bairdiella chrysura* (Lacépède) and *Micropogonias undulatus* (Linnaeus).

Although one may think that most aquarium fish are subject to lymphocystis infections, this is not so. Confinement in aquaria can lead to an increased prevalence of lymphocystis in specific hosts so maintained, but out of about 40,000 to 50,000 described species only about 100 (Lawler et al. 1977), or about 0.2%, have ever been reported with lymphocystis.

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