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Fish Quarantine and Fish Diseases in Southeast Asia

Report of a workshop held in Jakarta, Indonesia, 7-10 December 1982

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FISH QUARANTINE AND FISH DISEASES IN SOUTHEAST ASIA

REPORT OF A WORKSHOP HELD IN JAKARTA, INDONESIA, 7–10 DECEMBER 1982

COSPONSORED BY THE
UNDP/FAO SOUTH CHINA SEA FISHERIES
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Résumé

Le commerce du poisson vivant — alevins pour la pisciculture — augmente rapidement, attendu que les coûts de la pêche sont à la hausse et que les rendements diminuent. L'aquaculture moderne repose sur l'approvisionnement en alevins dont l'introduction, telle que pratiquée aujourd'hui, compromet la survie des espèces (souvent une seule par élevage) cultivées de façon intensive. Déjà, des épizooties signalées en Asie du Sud-Est sont attribuées aux nouveaux stocks et ces incidents risquent de se reproduire si les gouvernements de la région ne réglementent pas la circulation des poissons vivants afin de n'autoriser l'entrée qu'aux populations exemptes d'agents parasitaires ou pathogènes. Cette situation existant dans plusieurs pays, des experts en maladie des poissons d'Indonésie, de Malaisie, des Philippines, de Singapour, de la Thaïlande ainsi que des consultants du Royaume-Uni, du Canada et de l'Australie, se sont réunis à Djakarta, du 7 au 10 décembre 1982 pour examiner la question et faire part de leur expérience. L'Indonésie imposera incessamment une quarantaine à tous les stocks de poissons vivants importés ou transportés d'une île à l'autre, dans le pays. L'isolement est de 14 jours et comprend l'analyse d'échantillons en laboratoire pour détecter la présence de parasites, d'infections bactériennes, etc, ainsi que des symptômes ou signes pathognomoniques. La période de quarantaine, qui est de même durée en Australie, suffit à obtenir les résultats des laboratoires, à identifier la plupart des symptômes et des maladies et à garantir l'importation de sujets exempts de pathogènes humains. Singapour applique cette mesure à titre expérimental et les autres pays étudient divers moyens de contrôle. Cependant, la pénurie de personnel et de locaux pour effectuer les diagnostics et les traitements fait obstacle a l'établissement de services appropriés.

Resumen

El tráfico de peces vivos —larvas para las operaciones de cría— aumenta rápidamente a medida que se elevan los costos de la pesca y disminuyen sus rendimientos. Este movimiento de peces es esencial para la acuocultura moderna, pero, bajo los procedimientos actuales, representa un serio riesgo para las grandes cantidades de pescado (a menudo una sola especie) que se cultivan en pequeñas áreas. En el Sudeste Asiático varios epidiontes pueden ser ya vinculados a la introducción de peces importados, y tales incidentes pueden volverse cada vez más comunes si los gobiernos de la región no toman medidas para controlar el tráfico de peces y asegurar que los cargamentos están libres de patógenos y plagas. Muchos de los países han reconocido el problema, e investigadores en enfermedades de los peces, procedentes de Filipinas, Indonesia, Malasia, Singapur y Tailandia, así como consultores del Reino Unido, Canadá y Australia se reunieron en Yakarta del 7 al 10 de diciembre de 1982 para discutir el problema y compartir experiencias. Ellos señalaron que Indonesia está en proceso de introducir la cuarentena obligatoria para todas las especies vivas de peces que se importen al país o sean transportadas entre las islas que lo conforman. La cuarentena es de 14 días durante los cuales las muestras del cargamento son sometidas a exámenes de laboratorio en búsqueda de parásitos, infecciones bacterianas, etc, y observadas en cuanto a signos y síntomas de enfermedades. La duración de la cuarentena, igual a la propuesta recientemente en Australia, asegura que no se importan patógenos humanos con los peces, que se obtienen los resultados de laboratorio y que los síntomas de la mayoría de enfermedades alcanzan a aparecer. Singapur está ensayando procedimientos de cuarentena y los otros países estudian las opciones de control. Sin embargo, la escasez de personal y la carencia de instalaciones para diagnóstico y tratamiento de las enfermedades constituyen una limitación seria al desarrollo de servicios apropiados.

CONTENTS

THAILAND[1]

SUPRANEE CHINABUT[2] AND YAOWANIT DANAYADOL[3]

Thailand is one of the major fish-producing countries of the region, with high levels of exports. In 1981, fishery-products exports were valued at 5.3 billion baht (US$ 1 = 22.9 baht). Of this total, live fish accounted for 30 million baht; ornamental fish constituted about 14.9 million baht. To maintain its markets abroad and protect its local industry, Thailand needs to adopt measures that ensure standards of quality for both the aquarium-fish exports (Appendix) and the consumable fish. For these reasons, concerted efforts are now under way in the area of fish-disease studies, which are carried out in the National Inland Fisheries Institute (NIFI) and the National Institute of Coastal Aquaculture (NICA). The range of fish species produced for sale in Thailand is great, as is the volume exported. The fry for such fish production are obtained in a variety of ways ranging from natural production to sophisticated breeding techniques involving hypophysation and, in the case of crustaceans, eyestalk ablation. Stocking is often very dense, and the fry, especially, suffer heavy mortalities.

The diseases that have been diagnosed by Thai research workers cover a wide spectrum, including infestations with metazoan and protozoan parasites, bacterial infections, mycotic infections, neoplasias, and nutritional abnormalities. For example, in one species of freshwater fish (*Kryptopterus apogon*) collected from Ubolratana Reservoir between October 1979 and September 1980, 11 species of parasites were found, representing monogenetic and digenetic trematodes, ciliate protozoans, acanthocephalans, copepods, nematodes, and Glochidia. Virus diseases are suspected in catfish culture and possibly in other systems, but definitive studies have not yet been carried out. The major farmed fishes are the catfishes, tilapias, sand goby, and carp, as well as crustaceans such as *Macrobrachium* sp. and *Penaeus monodon*.

Almost 40 disease agents have been found in Thailand, and some success has been experienced with the treatments used (Table 1). Most of the disease outbreaks occurring in the country are associated with the high stocking densities or with other environmental factors such as poor water quality, transportation, or handling. For instance, great losses were experienced from poor environmental conditions in 1981–82 in Songkhla Lake where brackish-water fish culture (primarily *Lates calcarifer* and *Epinephelus tauvina*) began only 3 years ago. Poor maintenance of the culture system was deemed to be the major cause of the four diseases observed in the fish. Recently, studies have also emphasized the important range of toxicological problems associated with pesticides and herbicides. Unreliable or improperly compounded feeds are also responsible for losses in intensive culture of both marine and freshwater fish.

Quarantine facilities are not currently available, but, as Thailand is a major exporter rather than an importer, the emphasis is placed on certification of live fish for export. Exporters provide samples of fish for visual inspection and diagnosis, after which a certificate of health is provided where necessary. Efforts are still being made to improve on this system and to develop quarantine services; a start has been made in the provision of lists of diseases occurring, provision of diagnostic services (for example, NICA has seven laboratories, although only two have relatively complete facilities), and training of extension workers.

The fish-diseases studies currently being sponsored by NIFI for freshwater fish and NICA for

[1]This paper is an edited version of two papers; the cooperation of the authors in agreeing to a single country report is acknowledged.

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Table 1. Disease agents reported in Thailand and their treatment.[a]

Agent	Recommended bath treatment
Trichodina sp.	Formalin, 25–75 ppm, prolonged
Epistylis sp.	Formalin, 25–75 ppm, prolonged
Oodinium sp.	Formalin, 25–75 ppm, prolonged
Ichthyophthirius sp.	Formalin, 25–75 ppm, prolonged
Cryptocaryon sp.	Formalin, 25–75 ppm, prolonged
Scyphidia sp.	Formalin, 25–75 ppm, prolonged
Glossatella sp.	Formalin, 25–75 ppm, prolonged
Zoothamnium sp.	Formalin, 25–75 ppm, prolonged
Dactylogyrus sp.	Formalin, 25–100 ppm, 24 h
Gyrodactylus sp.	Formalin, 25–100 ppm, 24 h
Ancylodescoides sp.	Formalin, 25–100 ppm, 24 h
Argulus sp.	Dipterex, 0.25–0.5 ppm, 24 h
Ergasilus sp.	Dipterex, 0.25–0.5 ppm, 24 h
Lamproglena sp.	Dipterex, 0.25–0.5 ppm, 24 h
Lernaea sp.	Dipterex, 0.25–0.5 ppm, 24 h repeated four times at 7-day intervals
Rocinella sp.	Dipterex, 0.25–0.5 ppm, 24 h
Piscicola sp.	Formalin, 50–100 ppm, 24 h
Glochidia	Formalin, 50–100 ppm, 24 h
Saprolegnia sp.	Malachite green, 0.1 ppm, with formalin, 25–50 ppm, 24 h
Aeromonas hydrophila	Antibiotic
Flexibacter columnaris	Antibiotic
Vibrio sp.	Antibiotic

[a]Other agents reported in Thailand for which no treatment is currently recommended include species of digenetic trematodes (*Pleurogenoides* sp., *Carassostrema* sp., *Allocreadium* sp., *Helostomatis* sp., *Macrotrema* sp.); of acanthocephalans (*Pallisentis* sp., *Acanthosentis* sp., *Fillicollis* sp.); of sporozoans (*Myxidium* sp., *Myxobolus* sp., *Henneguya* sp., *Myxosoma* sp.); of nematodes (*Camallanus* sp., *Cucculanus* sp., *Spinnitectus* sp., *Proleptus anabantis*); and a cestode (*Senga* sp.).

brackish-water fish are exemplified by work on *K. apogon* at Ubolratana Reservoir and on *L. calcarifer* and *E. tauvina* at Songkhla Lake.

The studies at Ubolratana were undertaken to support development efforts in techniques for culture of *K. apogon*, which is regarded in Thailand as one of the most delicious freshwater fish and is becoming increasingly scarce. From October 1979 to September 1980, 215 fish were collected by dip nets and by set pole-and-line and seine methods. They were taken to the laboratory alive, measured, separated by sex, killed, and examined post mortem within 24 h of capture. Each fish was examined for external parasites, after which fins were removed and mucous smears made for microscopic examination. Gills were removed from the left side of the fish, and, after examination under a microscope, were placed in formalin solution (0.25 ppt) for 45–60 minutes so that the monogenetic trematodes could be removed. The eyes, brain, alimentary system, heart, liver, spleen, kidney, swim bladder, urinary bladder, and gall bladder were removed, put in saline solution (0.85%), and examined microscopically. All parasites were fixed and stained by standard techniques. The resulting data were subjected to analysis of variance, correlation Chi-square analysis, and the Student's t-test.

Eleven species of parasites were found, including *Ancylodiscoides* sp. (97% prevalence); *Pleurogenoides* sp.; *Trichodina* sp.; *Pallisentis ophicephali; Fillicollis* sp.; and *Ergasilus* spp. There were significant ($P < 0.05$) differences in seasonal intensities, with maximum mean intensities (parasites/host) of monogenetic trematodes and *Ergasilus* sp. being in the rainy season and acanthocephalans in the summer. The host size did not appear to have any effect on intensity, but sex seemed to be related to intensity with *Ergasilus* sp., the males being more heavily infested than females.

At Songkhla Lake, culture of *E. tauvina* and *L. calcarifer* has been under way for 3 years in net cages. Four diseases caused serious losses in 1981–82: gill fluke disease, white spot disease, trichodiniasis, and vibriosis. Both gill fluke disease and trichodiniasis were associated with a decrease in salinity, whereas white spot disease occurred when the water temperature dropped from 28°C to 26°C. These findings clearly show the importance of maintaining water quality.

APPENDIX: SPECIES OF AQUARIUM FISH EXPORTED FROM THAILAND

Scientific names	Popular names
Acanthophthalmus kuhli	Coolie loach
A. myersi	Coolie loach
A. semicinctus	Coolie loach
Acanthopsis choirorhynchus	Longnose loach
Aplocheilus panchax	Blue panchax
A. siamensis	Killifishes
Astronotus ocellatus	Oscar
Balantiocheilus melanopterus	Tricolour shark
Betta splendens	Showey fighter
Botia beauforti	Tiger botia
B. horae	Skunk botia
B. hymenophysa	Tiger loach
B. macracantha	Clown loach
B. modesta	Yellowtail botia
B. pulchripimis	Yellowtail botia
B. sidthimunki	Dwarf siambotia
Brachydanio rerio	Zebra fish
Brachygobius xanthozona	Bumblebee fish
Bunocephalus coracoideus	Stone fish
Carinotetraodon somphongsi	—
Chalceus macrolepdoteus	—
Chanda ranga	Glass fish
C. wolffi	Glass fish
C. asiatica	Glass fish
C. lala	Glass fish
Cichlasoma negrofasciatum	Jack Dempsey
C. biocellatum	Jack Dempsey
C. salvini	Jack Dempsey
Cirrhina mrigala	Black carp
Clarias batrachus	Walking catfish
C. macrocephalus	Walking catfish
Colisa lilia	Dwarf gouramy
C. chuna	Honey gouramy
Datnioides quadrifasciatus	Fourbar tiger
D. microlepsis	Siamese tiger
Dermogenys pusillus	Halfbeak
Epalzeorhynchus kallopteurs	Flying fox
E. siamensis	—
Esomus danrica	Flying barb
E. malayensis	—
Garra taeniata	Mountain stream algae eater
Gyrinocheilus aymonieri	Algae eater
Halophryne trispinosus	Toad fish
Haplochromis callipterus	—
Helostoma rudolfi	Green kissing gouramy
H. temmincki	Pink kissing gouramy
Hemichromis bimaculatus	—
Hyporhamphus unifasciatus	—
Irvineia voltae	—
Kryptopterus bicirrhus	Glass sheet fish
K. cryptopterus	—
Labeo bicolor	Redtail black shark
L. chrysophekadion	Black shark
L. erythura	Rainbow shark
L. frenatus	Rainbow shark
Lates calcarifer	Cock-up
Leiocassis siamensis	Siamese rock catfish
Leonensis bamber	Lion fish
Leptobarbus hoeveni	—
Lobistes reticulatus	—
Macrognthus aculeatus	Peacock eel
Mastacembelus erythrotaenia	Fire spiny eel
M. maculatus	Spiny eel
M. pancalus	Spiny eel
Microphis boaja	Common freshwater pipe fish
Monodactylus argenteus	Monos
Mystus spp.	—
Notopterus afer	Knife fish
N. chitala	Spotted featherback
N. mikereedi	Clown knife fish
N. notopterus	Gray featherback
Ophicephalus micropeltes	Snake head
Oryzias javanicus	—
Osphronemus gouramy	Giant gouramy
Oxyeleotris marmoratus	Marbled sleepy goby
Pangasius micronema	—
P. pangasius	—
P. sutchi	Striped catfish
Pelmatochromis arnolde	—
Periophthalmus sp.	Mud skipper
Poecilia latipinna	—
P. sphenops	—
Potamorraphis groctos	—
P. guianensis	Asian gar-needle fish
Pterophyllus scalare	—
Puntius altus	Redtail barb
P. hexasona	Tiger barb
P. orphoides	Tiger barb
P. schwanenfeldi	Tiger foil barb
P. sumatranus	Tiger barb
P. tetrazona	Tiger barb
Rasbora argyrotaenia	Silver rasbora

Appendix continued

Scientific names	Popular names	Scientific names	Popular names
R. borapetensis	—	*T. palembangensis*	Puffer eight
R. dusonensis	Yellowtail rasbora	*T. somphongsi*	Green puffer
R. hengili	—	*Therapon jarbua*	Target fish
R. heteromorpha	Harlequin fish	*Toxotes jaculator*	Archer fish
R. meinkeni	Redtail rasbora	*Trichogaster microlepis*	Moonlight gouramy
R. trilineata	Scissors-tail rasbora	*Trichopsis pumilis*	Croaking gouramy
Scatophagus argus	Green scat	*T. vittatus*	Croaking gouramy
Stigmatogobius sadanundio	—	*Xenentodon caneila*	Fresh-water gar fish
Symphysodon discus	Regular discus	*Xiphophorus helleri*	Swordtail
Tetraodon fluviatilis	Spotted puffer	*X. maculatus*	Moonfish