

Cheng-Chung Lin<sup>1</sup>, Cheng-I Liu<sup>1</sup> and  
Guang-Hsiung Kou<sup>2</sup>

<sup>1</sup>Graduate Institute of Veterinary Pathology,  
National Chung Hsing University.

<sup>2</sup>Department of Zoology, National Taiwan University.

(Accepted 20 August 2001)



## Review of Eel Diseases Reported by Livestock Disease Control Centers in Central Taiwan

### Abstract

From January 1999 to September 2000, a total of 494 cases of eel diseases were diagnosed in central Taiwan. Among them, 437 cases belonged to *A. anguilla* and 57 cases were *A. rostrata* and *A. anguilla*. All the cases were categorized to: (1) bacterial infections: 41.5% (*Aeromonas* spp., *Edwardsiella tarda*, *Flexibacter* spp., *Vibrio* spp., *Streptococcus* spp.); (2) parasitic infestations: 33.4% (*Anguillicola* spp., *Gyrodactylogyrus* spp., *Pseudodactylogyrus* spp., *Trichodina* spp., *Pleistophora* spp., and others); (3) mycotic infections: 5.5% (*Branchiomyces* spp. and *Saprolegnia* spp.); (4) poor water quality: 13.4 %, and (5) others 6.3%. Most of the infectious cases occurred in summer, May to September, although most pathogens could be found all year round. Many of the pathogens were noticed as opportunistic bacteria and parasites. All the cases submitted for disease diagnosis were conducted by routine procedures including pathological and microbiological examinations, and water quality analysis.

**Key words:** Eel diseases, Livestock, Disease control centers

The scope of this task is to summarize the diagnostic cases of farmed eel reported from January 1999 to September 2000 in the central Taiwan. Most of the farmed eels reared in Taiwan were *Anguilla japonica*, although the production of *A. rostrata*, and *A. anguilla* were increased recently. Therefore, it is apparent that most attention still has been devoted to the diseases of *A. japonica*.

Large economic loss of our eel production was attributed to the diseases caused by infectious pathogens and/or poor water qualities. The specimens were sent to local county Livestock Disease Control Centers (LDCC) by the farms asking for disease diagnosis. The diagnostic data reported by 4 county

LDCCs (Chang-Hwa, Yun-Lin, Taichung and Ping-Tong counties) were exemplified in this presentation in order to know the disease patterns of our eel culture.

### Materials and Methods

This survey was scheduled from January 1999 to September 2000. In this period all the specimens submitted from the eel farms for disease diagnosis had been conducted by routine procedures including pathological and microbiological examinations and water quality analysis. All the diagnostic cases had been reported monthly in Aquatic Animal Health Bulletins published by Yun - Lin counties LDCC.

## Results

During this period, a total of 494 cases were obtained by 4 county LDCCs, among them, 437 (88.4%) cases belong to *A. anguilla* and other 57 (11.6%) cases were *A. rostrata* and *A. anguilla*. Seasonal distribution revealed that most disease problems concentrated on summer (Fig. 1). To

analyse the disease patterns, the bacterial infections (41.5%) were the most popular disease problem followed by parasitic diseases (33.4%) and fungal infections (5.5%). Some cases were due to poor water quality (13.4%), which are mostly complicated with bacterial infections, and still others (6.3%) included poor management, nutritional disorders, tumors and unknown factors.(Fig. 1).

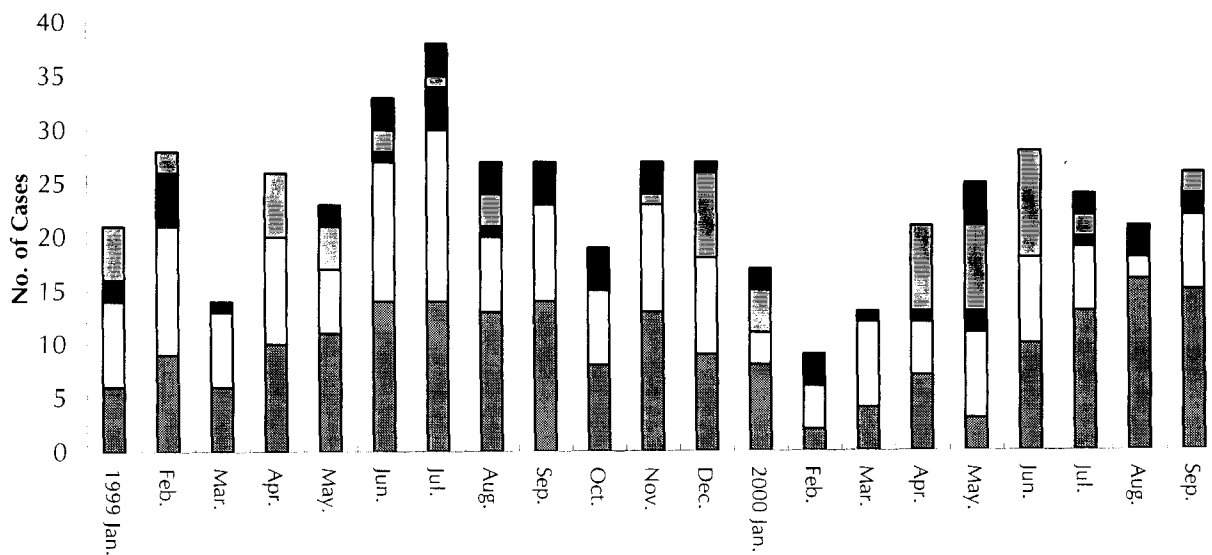


Fig. 1. Frequency of different disease patterns reported annually in central Taiwan.

■ Bacterial infections ; ▨ Parasitic infections ; ■ Fungal infections ; ▨ Poor water quality ; ■ Others

Among these bacterial diseases aeromonad infection (49.8%) was the most popular one and followed by bacterial gill disease (38.2%), edwardsiellosis (35.7%), vibriosis (23.9%), and streptococcal infections (6.5%). *Flexibacter* spp. was responsible for gill problems. Some cases were caused by co-infections. Most pathogens belonged to opportunistic bacteria and parasites.

*Pseudodactylogyrus* spp.( 38.5%) *Trichodina* spp.(26.0%), and *Gyrodactylogyrus* spp.(6.7%) were the major parasites usually found in gills and body surfaces which might cause lesions if heavy infestation. *Pleistophora* spp.(10.6%) in muscle, and

*Anguillicola* sp.(6.7%) in swim bladders were still frequently found in our eels. Parasitic complications were also noticed.

Both *Branchiomyces* spp. and *Saprolegnia* spp. were in similar ratio noticed in the diagnostic cases, of these, most were identified PAS (Periodic Acid-Schiff's reaction) stain to demonstrate their pathognomonic figures.

Many cases were caused by poor water qualities as low dissolved oxygen and high levels of ammonia and H<sub>2</sub>S etc. Stress syndrome was responsible for some infectious complications.

Besides, some cases were diagnosed to relate with

poor management, nutritional disorder, intoxication, tumors and unknown factors.

## Discussion

All the disease data were cited from the Aquatic Animal Health Bulletins edited by Yun-Lin county LDCC. The criteria of disease diagnosis have not been well established in our LDCCs. Therefore, it is questionable to ascertain the accuracy of disease diagnosis.

The occurrence of infectious diseases always perplexed our eel culture. Bacterial infections and parasitic diseases were prominent and often complicated spontaneously especially in summer season.

Poor water qualities were the important predisposing factors in the cases of infectious diseases. Some parameters such as dissolved oxygen, pH, nitrate, nitrite, and dissociated ammonia were always in stressful level. These were referred to our intensive culture system. Too much feeding and high density were responsible for this disease loss.

The production of american eel, *A. rostrata*, and european eel, *A. anguilla* were increased recently in Taiwan. These foreign species easily suffered massive

infestation of native nematode *Anguillicola* spp. How these new species adapt to our environment is an important issue in eel culture.

## Acknowledgement

C. C. Lin would like to thank Dr. I Chiu Liao, Director General of Taiwan Fisheries Research Institute, for the invitation to present this paper during the 3<sup>rd</sup> East Asian Symposium on Eel Research.

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