in the environment, (eds) D. R. Neilson and J. G. Mac Donald, Academic Press, New York, 1978, p. 260.

ULCERATIVE FORM OF *AEROMONAS HYDROPHILA* INFECTION OF *CATLA CATLA*

INDRANI KARUNASAGAR, P. K. M. MANZOOR ALI, G. JEYASEKARAN and I. KARUNASAGAR

Department of Fishery Microbiology, University of Agricultural Sciences, College of Fisheries, Mangalore 575 002, India.

AEROMONADS are considered important fish pathogens. Of these, *Aeromonas salmonicida* is best defined and its role in pathogenicity is well known. Shotts *et al*[1] have shown that *A. hydrophila* and *A. shigelloides* are associated with mortality among fish, turtles and alligators. Aquarium tropical fishes are also susceptible to *Aeromonas* infection and this was studied by Richard *et al*[2] who isolated 15 strains of *A. hydrophila* after several deaths occurred in two aquaria. Infectious dropsy, a condition where there is an abnormal accumulation of fluid in the whole body or localized in some organs of European carps causing severe epidemics in temperate areas, is well recorded[3,4] but Gopalkrishnan[5] was the first to observe the disease in Indian carps and found *Catla catla* to be the most susceptible followed by *Cirrhina mrigala* and *Labeo rohita* in that order. He recorded instances of entire populations getting wiped out by the epidemics in many stocking tanks in West Bengal. He observed abnormal and rounded bulging of the belly with grey fluid accumulation, exophthalmos and in terminal stages, septicaemia.

The ulcerative form of *A. hydrophila* infection, which is a milder form appears to be not frequently encountered in Indian major carps. We observed in *C. catla*, this form of infection wherein dropsy was not an accompanying feature and the predominant signs were white cutaneous lesions on the snout, loose scales at the base of the fins and mild disintegration of the fin margins (figure 1).

The infected fish which was observed in the College pond was brought to the laboratory for studying the etiology of the condition. Sterile cotton swabs were used for collecting material from the superficial regions. This was done by gently rubbing

Figure 1. Infected *Catla catla* with lesions in the snout and pectoral fins.

the swabs on lesions over the snout, gills, branchial region, margin of pectoral, pelvic and tail fins. Some loose scales were picked up using sterile forceps.

Primary inoculations were made on blood agar containing 5% rabbit blood in nutrient agar and MacConkey's agar. The scales were gently embedded on the agar surface. The plates were then incubated at room temperature (29°C ± 2°C) for 24 hr and incubation continued for 48 hr in plates where colonies had not developed well. All cultures from lesions were predominated by large typical, β-haemolytic colonies. These were further purified, put on nutrient agar slants and identified as follows[6].

Gram staining and hanging drop were done and after confirming them as gram negative bacilli exhibiting active motility, other biochemical tests such as oxidase test, O/F test on Hugh's and Leifson's medium, carbohydrate fermentation test, ability to produce indole, MR–VP test, starch and gelatin hydrolysis and ability to produce H_2S from cysteine were performed. Acid and gas production was recorded for glucose whereas other carbohydrates such as arabinose, cellobiose, dulcitol, galactose, lactose, maltose, mannitol, rhamnose, sucrose, xylose, sorbitol and salicin were observed merely for acid production. Table 1 shows the reactions of the isolates.

All the isolates were resistant to the pteridine compound 2-4 diamino 6-7 diisopropyl pteridine

Table 1 *Reactions of the isolates*

O/F test	+/+
Oxidase test	+
Gas from glucose	+
Acid production from:	
Sucrose	+
Galactose	+
Trehalose	+
Mannose	+
Mannitol	+
Maltose	+
Lactose	−
Arabinose	−
Salicin	−
Cellobiose	−
Dulcitol	−
Sorbitol	−
Adonitol	−
Kovac's indole test	+
H_2S from cysteine	+
Nitrate reduction	+
Arginine dihydrolase	+
Ornithine decarboxylase	−-
Lysine decarboxylase	−
Methyl red test	+
Voges Proskauer test	+
Starch hydrolysis	+
Gelatin hydrolysis	+

(0/129). The antibiotic sensitivity testing of the isolates was done by disc diffusion method. The antibiotics used in the test were penicillin, streptomycin, chloramphenicol, terramycin, ampicillin, erythromycin, kanamycin, gentamycin, nalidixic acid, nitrofurantoin, cloxacillin, amoxycillin and carbenicillin. All the cultures were sensitive to most of the antibiotics except penicillin, ampicillin, cloxacillin, amoxycillin and carbenicillin. Multiple drug resistance indicative of the presence of R factor was not seen. Dip treatment in water containing 2 ppm potassium permanganate for one hr per day helped the fish to become active.

This study reveals that *A. hydrophila* can be involved in superficial infections of *C. catla*. Perhaps the infection was secondary to an injury and invasion of blood stream had not occurred thus explaining the absence of dropsy, septicaemia and other accompanying signs. The LD_{50} proteases and other virulence factor studies of the isolates are in progress.

The authors express their gratitude to Prof. H. P. C. Shetty for critically reviewing the manuscript and providing constructive suggestions.

4 July 1986

1. Shotts, E. B. J., Gaines, J. J. (Jr.), Martin, P. and Prestwood, A. K., *J. Am. Vet. Med. Assoc.*, 1972, **161,** 603.
2. Richard, Y., Keck, G., Popoff, M., Domonec, E. and Oudar, J., *Rev. Med. Vet.*, 1976, **127,** 595.
3. Snieszko, S. F., *Trans. Am. Fish. Soc.*, 1954, **83,** 313.
4. Van Duijn, C. (Jr.), *Diseases of fishes*, Waterlife, London, 1956, p. 174.
5. Gopalkrishnan, V., *J. Sci. Ind. Res.*, 1961, **20,** 357.
6. Jean, F. MacFaddin, *Biochemical tests for identification of medical bacteria*, William and Wilkins, London, 1980, p. 393.

CRINKLE MOSAIC AND ENATION LEAFCURL OF POINSETTIAS—TWO HITHERTO UNKNOWN DISEASES

S. NATH, S. M. PAUL KHURANA*, C. L. MANDAHAR and H. S. KOMAL**

Department of Botany, Panjab University, Chandigarh 160 014, India.
**Plant Pathology Division, Central Potato Research Institute, Simla 171 001, India.*
***Division of Electron Microscopy, Department of Pathology, Post-Graduate Institute of Medical Education & Research, Chandigarh 160 012, India.*

DURING the years 1977–1980, poinsettias (*Euphorbia pulcherrima*) were observed to be affected with two different diseases in Panjab, Haryana and foothills of Himachal Pradesh. Symptoms of these diseases resembled those caused by viruses in other plants.

The diseased plants were stunted, had leaves either showing crinkle or leafcurl and enations, flow of latex, when cut or injured, was reduced and most of the affected plants did not 'flower' well. At times, either due to late or mild infection, flowering was observed but the bracts were small, deformed and bleached (pinkish rather than dark red). Two distinct disease isolates were delineated on the basis of the following symptoms.

Crinkle mosaic

In general, the diseased plants had thin, weak stems with stunted growth and striking leaf mosaic