Pike Anglers Club of Great Britain

Lymphoma: A malignant disease of pike by Maire F Mulcahy. PHD

Lymphoma, a malignant cancer, occurs in the pike Esox lucius L. in Ireland. We have been investigating many aspects of the disease in our Department over the past twenty years.
This disease is an obvious and rather repulsive condition, as it manifests itself as soft cream-to-red growths, often massive, usually on the jaws but often on the flanks, fins or other parts of the body. In the earlier stages of the disease the tumours do not seem to inhibit the fish greatly, but as the growths progress and spread the fish become emaciated, and often cannot feed because of tumours and loss of teeth on the jaws, and often cannot breathe properly because of interference by tumour's on the gills or under the gill cover.

By histopathology the disease is defined as a malignant lymphoma and under a microscope is remarkably similar to lymphomas/ leukaemias found in man and higher chordates. It is therefore of interest not only as .a disease which can kill the pike but it is also of great significance as an animal model of human disease which may be studied in its spontaneous form in feral populations.
The disease is remarkable in that it occurs as epizootics or outbreaks when as many as one in eight fish may be affected. Just as unpredictably as an epizootic occurs it can disappear again within a year or two.

In Ireland, up to recently, the pike was regarded as a pest and every effort was being made to eradicate it. This is because the pike is a predator on salmon and trout and was making inroads into salmonids stocks of lakes and rivers. For almost 30 years pike were systematically removed by all feasible means: nets, traps, long-lines, rotenone etc. Policy has changed considerably recently, but the eradication period provided a unique opportunity for us to obtain data on pike populations and on the incidence of lymphoma. It also made it possible for us to obtain live diseased fish for experimental investigation.

The disease has been found in pike in all major fishery areas in Ireland at some time or another in the past twenty years. Male and female pike seem equally susceptible, and while pike from 1+ age have been affected, 4 years seems to be the age of greatest susceptibility.

Experimentally, we have been able to pass the lymphoma from diseased to healthy pike by cell transplants: live cells taken from a tumour, formed into a suspension in saline, when injected into healthy pike, will grow at the site of injection in one-third of cases. More significantly, cell-free filtrates of tumour: tumour homogenised and filtered so as to exclude whole cells and bacteria, when injected into healthy pike induce the lymphoma. These cell-free transmission experiments have provided strong evidence that the lymphoma may be caused by a virus.

We have had great help and assistance from anglers in Ireland in our investigations. But almost invariably anglers worry about handling pike with the tumours least they should be infected themselves. By way of reassurance it is worth mentioning that there is no evidence at all that the disease can pass from fish to man. In further support of this we have tried inducing the disease in a variety of other animals, including goldfish, frogs, toads and mice, with no success.

One of the most intriguing aspects of pike lymphoma is its world-wide distribution. The disease is known in Ireland, in Northern Europe, particularly in the Baltic Sea, and in North America and in Canada, where its larger relation, the muskellunge Esox masquinongy also may show the disease. However, there is not a single validated report, formal or informal, of the lymphoma from England, Scotland or Wales. Through this magazine about two years ago attention was drawn to this fact and quite a number of anglers kindly responded with reports, some of them accompanied by photographs, of growths in pike. One cannot diagnose the disease with certainty without histopathology, and I am very grateful to Neville Fielding who undertook considerable trouble to obtain a specimen of tumour from a pike which was regularly caught in a local gravel pit. This tumour when examined has indeed proved to be a malignant cancer, but it is a carcinoma and not in fact a lymphoma.

Thinking that perhaps pike in the U.K. might be a different genetic strain to those elsewhere in the range of the pike we carried out, over a number of years, an extensive genetic study of pike populations. We did a detailed protein (isoenzyme) analysis of pike populations from seven different regions of the world. The outcome of this was that there was no evidence at all for a genetic explanation for the absence of the disease. The pike populations proved to be very uniform. My own personal feeling is that the disease probably does exist in waters in England but has merely not been reported.

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