

A newsletter on the biology and control of sea lice for researchers, aquaculture and fisheries industry, educators, consultants, and management authorities

BIBLIOGRAPHY

This issue of *Caligus* is devoted to the bibliography of publications relevant to sea lice control on fish farms. Please send corrections and additional references, including papers 'in press' (i.e. accepted for publication but not yet published), to mcostello@ecoserve.ie for inclusion in this bibliography. The bibliography will be published on the World Wide Web. Please note that some publications are not easily available by inter-library loan if they do not have an ISBN (book), ISSN (periodical), or be a thesis lodged in a university library. If this may be the case (e.g. ICES reports) please add the address at which copies of the publication are available from to the end of the reference.

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Contributions on

- new and **current research** projects,
- forthcoming **meetings**,
- **reviews** of past meetings,
- **observations** on lice biology or related subjects,
- open **letters** raising questions or expressing points of view,
- **ideas** for research and lice management,
- **advertisements** (e.g. lice control products),
- new **publications** (scientific papers, books, reports, world wide web sites),
- and other information of possible interest to readers should be sent to The Editor of *Caligus*, Ecological Consultancy Services Ltd, 7 Glenmalure Park, Rialto, Dublin 8, Ireland; Email mcostello@ecoserve.ie.

CURRENT RESEARCH PROJECTS

A list of current research projects relevant to sea lice control is being compiled from abstracts presented at the first project workshop in Trondheim. This will both facilitate communication between researchers and others and help identify areas with insufficient research. Additional information on these and other projects are welcome. Please send

- ⇒ name and contact details of individual or research group leader
- ⇒ explanatory title of research project indicating type of study (e.g. field or laboratory, experimental or survey) and location
- ⇒ names of researchers involved
- ⇒ duration of research (start and end).

This newsletter is funded under the European Union FAIR (aquaculture) research programme as part of a project entitled 'Biology and management in the control of lice on fish farms' (contract number CT96-1615). The project is a 'Concerted Action' and so does not involve new research but rather facilitates the communication of information related to the control of lice on fish farms. This is being achieved through providing a **World Wide Web site** and **e-mail network**, hosting of **meetings (workshops and conferences)**, establishment of a **list of researchers, farmers and authorities** interested in lice control, producing a computerised **bibliography**, and **publishing** the bibliography, newsletter, and proceedings of meetings.

The project is co-ordinated by Dr Mark J. Costello (EcoServe, Dublin) in partnership with Dr Geoffrey A. Boxshall (Natural History Museum, London), Mr Kjell Maroni (KPMG, Lauvnes), Mr Per Gunnar Kvenseth (Norsk Hydro a/s), and Dr Carmel Mothersill (Dublin Institute of Technology). Enquires about the project should be sent to: mcostello@ecoserve.ie; Dr M. J. Costello, Ecological Consultancy Services Ltd, 7 Glenmalure Park, Rialto, Dublin 8, Ireland; or any of the project's partners.

A bibliography of publications relevant to the research and management of sea lice on fish farms.

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ICES Workshop on "Interactions between salmon lice and salmonids"

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The International Council for the Exploration of the Sea (ICES) convened a Workshop on "Interactions between salmon lice and salmonids" which was held at NASCO Headquarters in November 1996, with the objective of trying to consolidate the available scientific information on

- variations in lice and salmonid populations,
- on the pathogenicity of lice,
- on the parasite-host contact,
- on correlations and cause-effect relationships between data sets,
- and of identifying data gaps to achieve agreement on interpretation among the main research practitioners in the field.

The Report is now available from ICES as an official document (CM 1997/M:4)*. Most of the available data were from sea trout and there were indications that the pattern of lice infection in trout and salmon are considerably different, possibly associated with differences in the migration behaviour of the two salmonids. The main information available is summarised below.

Extensive infection with lice occurs in inshore waters with the highest levels being found in areas being used for salmon farming. Although some evidence of temporal and spatial variations in the level of lice populations in farmed and wild salmonids was available, there was no historic data on what were the previous levels of infection in farming areas. Consequently, it was impossible to state whether or not there have been changes in lice levels in wild salmonids since the development of salmon farming. Although noticeable effects of environmental factors such as season and salinity affect farm lice levels, any natural patterns of lice variation were masked by considerable variations in levels within and between farms caused by local conditions and farm management practices. Recycling of infection within farms is common but there is evidence that fallowing of farm sites between generations of stocks can greatly reduce lice levels.

The pattern of changes in salmonid populations was considered to be too complex to easily summarise but generally, it was considered that an overall problem in salmonid populations occurred mainly due to an increase in the post-smolt mortality.

There is no doubt that heavy lice infections are highly pathogenic both in farmed and wild fish. Heavy infections with juvenile stages of lice can stress fish but most of the gross pathology and mortality is caused by pre-adult and adult lice, particularly immediately following development of the lice to the pre-adult stage.

Information on the extent and mechanisms of lice dispersion from fish farms was scarce and there was a similar scarcity of information on the immediate post smolt behaviour of salmonids.

Correlations between data sets found with sea trout but not salmon were:

- highest levels of lice are found in sea trout post smolts in areas currently being used for fish farming but this correlation did not exist at distances less than 25 km from farms.
- high and low levels of lice can be found near farms but the higher levels were never found distant from farms.
- early returning sea trout post-smolts typically had high levels of lice
- sea trout stock collapses occurred in some but not all farming areas but did not occur outside farming areas.

Due to the general inadequacy of data available, only limited conclusions on cause effect relationships were proposed by the Workshop:

- pre-adult and adult stages of lice are dangerous to salmonids;
- some field trials have shown that heavy lice infection can cause the early return of sea trout post-smolts;
- it is reasonable to suggest that lice from fish farms may transfer to wild trout populations but as yet this cannot be quantified.

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