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lascach Intíre Éireann Inland Fisheries Ireland

Welcome to the Newsletter

Standing before your colleagues and the public to present your results for open discussion has a long, long history in the scientific community. This issue highlights how IFI researchers embrace this way of communicating research with presentations at recent conferences and by holding seminars with visiting fisheries experts.

In October, we also proudly hosted a conference on brown trout genetics to communicate our collaborative research with Queen's University Belfast and citizen-scientist anglers. As always, we thank all IFI staff who contribute to our research programmes and to this newsletter. Slán,

Dr. Cathal Gallagher, Head of Research & Development

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"Understanding Brown Trout — Genes, Ecology and Citizen Science"



Brown trout spawning in the Corrib catchment

On October 17th, IFI hosted a conference at the Hodson Bay Hotel near Athlone on the genetic diversity of brown trout in catchments right across Ireland. Presenters at "Understanding Brown Trout — Genes, Ecology and Citizen Science" reported findings from collaborative research programmes that involved IFI staff, anglers and researchers based at Queen's University, Belfast (QUB).

In their welcoming remarks to attendees at the conference, Ciaran Byrne and Cathal Gallagher of IFI both praised the vision of Martin O'Grady, who retired from IFI in 2015. An expert in brown trout, Martin saw the potential of genetics research in trout fisheries management, and he initiated IFI's involvement in a series of genetics research projects from the mid-2000s.



Full house for the trout conference



Andy Ferguson (QUB) and Karen Delanty (IFI)

An engaging introduction was delivered by Andy Ferguson, a professor emeritus at QUB, who gave a thorough review of brown trout in Ireland and the origins of their genetic diversity. International perspective was provided by Thomas Quinn of the University of Washington, who compared trout conservation in North America and Ireland, and Nigel Milner of Bangor University, who worked with citizen-scientist anglers on the Celtic Sea Trout Project.

Paulo Prodöhl, Caroline Bradley and Rosaleen Hynes of QUB described trout genetic diversity in the Mid-Shannon, Moy and Dublin river catchments. Paulo, who led the genetics work at QUB, also spoke about trout genetics in the Corrib, Sheelin and Ramor catchments, and Jamie Magee of QUB described the ongoing Lough Derg trout genetics project.

Karen Delanty, who now leads IFI's work with genetics researchers and trout anglers, gave a fisheries management perspective on the science. Individual anglers and over twenty-five angling clubs were involved in supporting the projects and providing samples for the QUB researchers, and angling representatives and IFI staff at the conference contributed many interesting questions and comments.

The presentations from the conference can be accessed from the IFI website at https://goo.gl/JzN6xY.

Trout Genetic Diversity — Implications for Fisheries Management

Brown trout exhibit remarkable variation and adaptability in their appearance, ecology and life history, which is reflected by this species' enormous genetic diversity. Investigating population genetics is a powerful tool to provide new insights into wild trout fisheries and how they can be managed and protected.

A key question for the studies on the Mid-Shannon, Moy and Dublin catchments was whether hatchery reared fish interbred with wild trout where stocking had occurred. Very few fish in the adult stocks were found to be descended from hatchery fish. In some catchments, artificial barriers and water quality have influenced trout populations, but the colonisation history of catchments by wild trout appears to be the main explanation for genetic structure in trout stocks.



Click on catchments above for links to conference presentations



Overall, Ireland's trout populations show a high level of genetic structuring, with many distinct river subpopulations found in the catchments studied so far. The adult trout stocks of lakes and main river channels are usually mixed populations recruited from several spawning tributaries; the most important contributors to adult trout stocks are often quite small streams.

Genetic analysis can identify rivers that are particularly important for trout stocks, helping fisheries managers to identify streams that would benefit most from protection and habitat restoration to enhance adult fish stocks. IFI plan to hold follow-up meetings around the country to communicate these results to anglers in local clubs. The next steps will be to identify management strategies and to continue genetic studies to monitor changes in Ireland's trout fisheries.

Seminar With Kyle Young — Can Moving Wild Fry Enhance Production in Salmon Rivers?

On October 10th, staff at IFI Citywest enjoyed a visit from Kyle Young of the University of Zurich. Kyle's research is mostly focused on trout and salmon ecology and management, and his talk outlined an alternative strategy for enhancing production of salmon in rivers.

Salmon spawn in shallow riffles with gravels in which the fry can shelter after hatching. As they develop during the summer, salmon fry compete for food and space. This means that large numbers of emerging fry are doomed to die in areas where spawning produces high densities of fry.

In experiments in the River Ribble in England, Kyle electrofished riffles with high numbers of emergent fry and moved them short distances to nearby suitable habitat with low salmon fry densities; his aim was to lessen fry mortality and fill up the river's carrying capacity for juvenile salmon. Kyle feels that translocation of wild fry with minimal handling is a good alternative to stocking with hatchery fish: it takes advantage of wild populations' adaptation to their native rivers while offering a hands-on way for fisheries managers to enhance salmon stocks. At the seminar, IFI research staff discussed the scope for similar experimental work in Ireland, the potential impacts of fry translocation on genetic fitness in wild salmon populations and its feasibility in river systems containing both sea trout and salmon populations. Cathal Gallagher, Head of R&D, highlighted how Kyle's work complements our work on habitat restoration and offers a new perspective for IFI.

Kyle also visited the National Salmonid Index Catchment to discuss wild fry translocation with regional IFI staff and researchers based at IFI's research station on the River Erriff.



Kyle Young and Paddy Gargan in the Erriff catchment

IFI Presentations at EIFAAC and IFM: How Will Climate Change Affect Fish Stocks In Ireland?

Water temperature is a driving force underlying the ecology and life history of fish. Climate change will clearly have major effects on fish distribution worldwide, so what impact can we expect it to have on fish stocks in Ireland? New research by the National Research Survey Programme team on char and climate change was presented by Fiona Kelly at the EIFAAC symposium in September in Poland and by Lynda Connor at the Institute of Fisheries Management (IFM) conference in October in Belfast.



Lynda and Fiona's talks focused on one of Ireland's most threatened fish species: Arctic char. In Ireland, char tend to live in deep lakes that suit their preference for cold waters. Modelling of char's response to climate change using data on fish communities in 890 lakes showed that char were less likely to survive in mixed fish communities. Unfortunately for char, mixed communities, which include fish such as roach, perch and pike, are likely to become more dominant in projected future warmer climate scenarios. Char survival in Ireland may also be threatened by these species' potential dispersal due to predicted increases in rainfall and flooding. Also at the IFM conference, Rossa O'Briain of R&D reported on water temperature at natural sites with meandering channels, pool-riffle-glide habitat and tree cover contrasted with deepened, widened modified channels with less tree cover. His results showed that natural river hydromorphology and tree cover can buffer changes in water temperature in summer, maintaining the cooler conditions that trout prefer. Rossa also discussed how restoration of natural river morphology and riparian tree cover may help to lessen the impact of climate change on brown trout in rivers.

IFI was also represented at the IFM conference by Padraic O'Malley and Martin Butler with talks on salmon counters and *Lagarosiphon* management, respectively.



Tree cover vs open channels: where will trout prefer to live?

Currently chaired by Cathal Gallagher, EIFAAC promotes the conservation of Europe's inland fisheries based on scientific advice. The symposium gave IFI with an excellent opportunity to communicate our work on climate change and fish stocks.

Timed Electrofishing — Can We Do More Surveys With Less Resources?

IFI surveys of river fish stocks often involve area-delineated electrofishing (ADEF). In these surveys, stopnets are used to block off a stretch of river which is fished more than once, and the repeated fishings allow estimation of overall population. Although ADEF is the best method to investigate a river's fish stocks, it is a labour intensive and time consuming protocol, requiring more staff resources and time on site, thereby limiting the number of sites it is possible to survey per day.

On October 13th in Fisheries Research, Ronan Matson and colleagues from R&D reported on a potential alternative strategy: timed electrofishing (TEF), in which sites are electrofished for ten minutes without the use of stopnets. In 2015, ADEF and TEF surveys were conducted at 36 paired sites in the Barrow catchment, and statistical modelling was used to convert TEF results into ADEF results. Importantly, this allows new data from the TEF method to be compared with existing time-series data.

At the recent IFM conference in Belfast, Ronan also presented a comparison of the methods' resource requirements. TEF allows more site surveys with less staff and less potential operational problems than ADEF. Ronan hopes that TEF will provide IFI and fishery managers with a resource-efficient protocol to investigate fish stocks in rivers.



Electrofishing with stopnets: is there a more efficient alternative?

Citizen Science in Sligo — Elver Monitoring by the Ballisodare Angling Club

Over the last two years, IFI has installed new elver traps around the country to capture juvenile eels migrating into river systems. The traps direct a sample of elvers into a holding tank where they remain until they are counted before they are released to continue their migration upstream. This provides an informative index of elver recruitment, helping IFI to monitor the numbers of elvers replenishing the eel stock in Ireland annually.

In 2017, the Eel Monitoring Programme in the R&D Division began a new citizen-science initiative to monitor elvers with the help of Ballisodare Angling Club. The club agreed to check an elver trap located at a salmon pass on the Ballisodare River on a regular basis. As well as recording data on eels captured in the trap, the club also inspected and cleaned the trap to help ensure good fish welfare.



Fully pigmented elver captured on its way upstream

Eel Status Still Critical In Latest ICES Assessment

On November 7th, the International Council for the Exploration of the Sea (ICES) released its latest assessment of the recruitment of juveniles to Europe's eel stock. In 2017, the time-series indexes for both glass eels and young yellow eels remained at very low levels compared with the 1960–1979 historical reference level (see graphs on right).

This latest international report takes into account data reported by IFI regional staff who monitor elver traps on the Rivers Feale, Maigue, Inagh and Corrib as well as the Ballisodare (described above). Ciara O'Leary, who leads IFI's Eel Monitoring Programme and works with the ICES Working Group on Eels, says the trend observed around Europe for this year was mirrored in Ireland with a decline in catches observed by IFI staff around the country.



Although elvers usually move upstream at nighttime, club members noticed that elvers were appearing on the salmon pass after high tides irrespective of time of day. This sharp observation by the citizen scientists led to a bonus result: the Eel Monitoring Programme surveyed this behavior and concluded that elvers were using momentum gained from high tides to move upstream, thereby confirming previous scientific studies.

On November 2nd, Sarah Healy of the Eel Monitoring Programme met with the Ballisodare Angling Club to report the monitoring results and express IFI's gratitude for the club's valuable scientific work. Sarah reports that the results were well received, and the Eel Monitoring Programme hopes to continue this successful citizen-science initiative next year.





We Hope You Enjoyed the Newsletter

Feedback is always welcome, so please get in touch if you have any comments. Contact Rory Feeney at 01 8842636 or <Rory.Feeney@fisheriesireland.ie> Inland Fisheries Ireland, 3044 Lake Drive, Citywest Business Campus, Dublin D24 Y265 http://www.fisheriesireland.ie/Research-and-Development/fisheries-research.html

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