# Sea lice resistance to Slice accelerates wild salmon decline, study warns



The escalating threat to wild salmon populations from sea lice is revealing itself to be even more dire than previously thought, according to a recent study. This report highlights the increasing resistance of the parasitic sea lice to emamectin benzoate, commercially known as Slice, a chemical widely used in fish farming to control lice infestations. Concerned advocates and scientists are now calling for the chemical to be banned, citing environmental hazards and its detrimental effects on marine life.

The urgency of the issue is underscored by new evidence from the Irish government, which warns that the effectiveness of Slice is waning, allowing lice to flourish unchecked within fish farming operations. As young wild salmon migrate past these pens, they are increasingly exposed to infestations from lice that have developed resistance to the treatment. The report by Inland Fisheries Ireland, based on nearly two decades of data, concludes that the reduction in returning adult salmon is significantly linked to infestations from salmon farms, a situation exacerbated by growing resistance to Slice.

The chemical's adverse effects extend beyond just the salmon; it has been linked to damaging human DNA and is known to leak from farming pens, thereby harming marine ecosystems. Research indicates that residues of emamectin benzoate were detected in 97% of sediment samples from Scottish fish farms, revealing widespread contamination that has compromised local benthic communities and diminished species diversity.

While the Scottish Government extended the use of Slice until 2028, critics express concern over the political ties between the government and the salmon farming industry. Rural Affairs Secretary Mairi Gougeon has faced scrutiny following reports of hospitality valued at £1,500 from industry representatives, raising questions about regulatory impartiality. Despite her reassurances that the decision to continue using Slice was not directly influenced by her, campaign groups argue that the industry's rapid expansion has not included sufficient safeguards for the environment and wild salmon.

The current economic landscape indicates that the salmon farming industry contributes £760 million to the Scottish economy and employs around 2,500 people. However, the alarming figure of 17.4 million fish dying prematurely in captivity each year highlights severe animal welfare issues along with the environmental crisis. Opposition groups maintain that as the industry continues to administer highly toxic chemicals, the trajectory for wild Atlantic salmon subpopulations is perilously close to extinction.

Amid these challenges, the industry itself is beginning to explore alternative solutions. Discussions about new, targeted anti-sea lice treatments and potential vaccines are occurring, albeit slowly, as the burden of chemical reliance starts to show its limitations. Some experts advocate for integrated pest management strategies that would lessen dependency on drugs like Slice, aiming for a more sustainable future for both farmed and wild salmon.

As the situation evolves, the dialogue surrounding the balance between economic interests and ecological sustainability grows ever more critical. The pressing need for proactive measures to uphold environmental integrity alongside industry productivity remains at the forefront of this increasingly contentious issue.

### 📌 Reference Map:

* Paragraph 1 – [[1]](https://www.dailymail.co.uk/news/article-14790389/Threat-wild-salmon-sea-lice-resistance-chemical-used-protect-fish.html?ns_mchannel=rss&ns_campaign=1490&ito=1490), [[2]](https://pubmed.ncbi.nlm.nih.gov/30878944/)
* Paragraph 2 – [[1]](https://www.dailymail.co.uk/news/article-14790389/Threat-wild-salmon-sea-lice-resistance-chemical-used-protect-fish.html?ns_mchannel=rss&ns_campaign=1490&ito=1490), [[3]](https://royalsocietypublishing.org/doi/10.1098/rsos.210265), [[4]](https://pubmed.ncbi.nlm.nih.gov/31969584/)
* Paragraph 3 – [[5]](https://www.bestfishes.org.uk/chemicals-in-salmon-farming-an-update-on-slice-emamectin-benzoate/), [[6]](https://www.globalseafood.org/advocate/chem-free-fixes-emerging-in-sea-lice-saga/)
* Paragraph 4 – [[1]](https://www.dailymail.co.uk/news/article-14790389/Threat-wild-salmon-sea-lice-resistance-chemical-used-protect-fish.html?ns_mchannel=rss&ns_campaign=1490&ito=1490), [[6]](https://www.globalseafood.org/advocate/chem-free-fixes-emerging-in-sea-lice-saga/)
* Paragraph 5 – [[1]](https://www.dailymail.co.uk/news/article-14790389/Threat-wild-salmon-sea-lice-resistance-chemical-used-protect-fish.html?ns_mchannel=rss&ns_campaign=1490&ito=1490), [[7]](https://beyondpesticides.org/dailynewsblog/2022/04/ocean-health-first-reports-of-salmon-lice-resistance-in-the-pacific-ocean-threatens-local-ecosystems/)

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## Bibliography

1. <https://www.dailymail.co.uk/news/article-14790389/Threat-wild-salmon-sea-lice-resistance-chemical-used-protect-fish.html?ns_mchannel=rss&ns_campaign=1490&ito=1490> - Please view link - unable to able to access data
2. <https://pubmed.ncbi.nlm.nih.gov/30878944/> - A 2019 study published in the journal 'Science of the Total Environment' investigated the environmental impact of emamectin benzoate, a chemical used to treat sea lice in salmon farming. The research found that emamectin benzoate residues were present in 97% of sediment samples collected around Scottish fish farms, indicating widespread contamination. The study also observed significant negative effects on benthic crustacean communities, including reduced species richness and abundance, suggesting that the chemical has a detrimental impact on marine ecosystems at the concentrations found in the study.
3. <https://royalsocietypublishing.org/doi/10.1098/rsos.210265> - A 2021 study published in 'Royal Society Open Science' examined the development of resistance in salmon lice to chemical treatments across the North Atlantic. The research found that multiresistant lice, capable of surviving exposure to both organophosphates and pyrethroids, were widespread in regions with intensive aquaculture. The study concluded that the extensive use of these chemicals in salmon farming has led to and propagated multiresistant lice, posing a significant challenge to the sustainability of the industry.
4. <https://pubmed.ncbi.nlm.nih.gov/31969584/> - A 2020 study published in 'Scientific Reports' investigated the exposure of sea lice to sub-lethal concentrations of emamectin benzoate following treatments on Atlantic salmon farms in British Columbia, Canada. The research estimated that, on average, 0.12 juvenile sea lice per fish were exposed to concentrations below the recommended therapeutic level during the period when fish cleared the drug. The study highlighted the potential risk of drug resistance development due to such exposure, suggesting that sub-lethal levels of the chemical could contribute to resistance in sea lice populations.
5. <https://www.bestfishes.org.uk/chemicals-in-salmon-farming-an-update-on-slice-emamectin-benzoate/> - An April 2023 article from 'Best Fishes' provided an update on the use of emamectin benzoate (SLICE®) in salmon farming. The article discussed the environmental concerns associated with the chemical, noting that it is toxic to various marine organisms, including mammals, birds, fish, invertebrates, and aquatic plants. It also highlighted the development of resistance in sea lice populations and the potential risks to both farmed and wild salmon. The article called for a reduction in the use of SLICE® and the adoption of alternative, more sustainable methods for controlling sea lice infestations.
6. <https://www.globalseafood.org/advocate/chem-free-fixes-emerging-in-sea-lice-saga/> - A 2021 article from the 'Responsible Seafood Advocate' discussed the challenges of managing sea lice infestations in salmon farming, particularly in light of increasing resistance to chemical treatments. The article highlighted the development of new, more targeted anti-sea lice drugs and the potential for vaccines, though it noted that these solutions are still in development and may be costly. The piece emphasized the need for integrated pest management strategies and the importance of reducing reliance on chemical treatments to ensure the sustainability of salmon aquaculture.
7. <https://beyondpesticides.org/dailynewsblog/2022/04/ocean-health-first-reports-of-salmon-lice-resistance-in-the-pacific-ocean-threatens-local-ecosystems/> - An April 2022 article from Beyond Pesticides reported on the first signs of salmon lice resistance to emamectin benzoate in the Pacific Ocean. The article detailed a study conducted in the Broughton Archipelago, Canada, which found a dramatic decrease in the sensitivity of Pacific salmon lice to the chemical between 2010 and 2021. The findings suggest that resistance is developing in the Pacific, potentially complicating efforts to control salmon lice infestations and posing risks to local ecosystems.