OREGON HATCHERY RESEARCH CENTER

Recent and Ongoing Research Projects

Fall 2012

Holding and treatment of wild broodstock

Too many of the fish captured for the wild broodstock programs on the Alsea and Siletz rivers were not surviving. So OHRC staff worked with Alsea Hatchery to look at varying fish densities, tank types and treatment regimes to help improve survival of angler and trap caught fish. Based on study recommendations, survival of wild steelhead for these two programs has drastically improved.

It is now recommended that hatcheries with wild broodstock programs adopt the holding protocol developed by OHRC researchers.

Radio tagging and tracking adult hatchery steelhead in the Alsea River

Wild broodstock programs have been implemented in several places in order to minimize the impacts hatcheries have on wild fish populations. However, within an adult fish population there is a lot of phenotypic variation – fish that migrate to the spawning grounds rapidly versus slowly; fish that are aggressive versus passive; fish that mature in the lower river versus the upper river. Researchers at OHRC are studying winter steelhead wild broodstock programs on the Alsea and Nehalem to see how well they represent the phenotypic variety found in the natural run. This study will help managers develop hatchery practices that improve catch rates for anglers while minimizing risk to wild populations.

As part of this study, researchers are working with the Alsea Hatchery to see if releasing smolts lower in the river will increase the number of fish caught by anglers.

Winter steelhead harvest vulnerability

Do wild broodstock programs in coastal rivers create better steelhead fishing? Researchers will compare catch rates of returning steelhead whose wild parents were caught by anglers to those whose parents were caught in traps. The results will help determine if it's possible to select for fish that are more likely to be caught by anglers.

Reproductive behavior and breeding success of jacks

Hatchery programs used to supplement natural salmon populations may cause unintended genetic consequences when they don't include jacks in the broodstock. This study varied the proportion of jacks and adult males allowed to try to spawn with a fixed number of females, and used their relative breeding success to develop a recommended jacks to adult ratio for hatchery programs.

NOAA Fisheries staff is using the results of this study to develop management recommendations regarding the use of jacks in the hatchery production of chinook salmon.

Evaluation of Moist Air Incubation as an alternative to tradition incubation trays

Moist Air Incubators (MAI) offer many advantages over traditional incubation trays – reduced water use, better temperature control, fewer chances for disease outbreaks and less chemical use. But there may be a tradeoff when it comes to the survival and fitness of the fish raised in MAIs.

While researchers found more steelhead eggs survived in the MAI compared to traditional Heath trays, this was offset by the high purchase price and other pitfalls. OHRC recommended the MAI be used only where necessary.

Olafactory imprinting during embryonic rearing of chinook and steelhead

Researchers have long known that salmon and steelhead use chemical cues in the water to find their way back to natal streams to spawn. As a result, juvenile fish (smolts) are often "acclimated" in particular locations prior to release under the assumption they will key in on the water chemical profile of that location to find their way back to spawn. However, acclimation of smolts can be cumbersome and less than 100 percent effective, leading to "straying" of returning fish. Researchers at OHRC are studying whether or not salmon and trout embryos imprint on chemical features in the water. If they do, acclimating embryos instead of smolts could provide a simple, inexpensive technique to help reduce straying.

Impact of rearing density on the success of hatchery fish

Researchers want to determine if raising hatchery fish in crowded conditions helps speed the "domestication" of steelhead smolts and ultimately makes them less successful in reproducing. If they can find a link between rearing density and reproductive fitness, then they will have identified a factor that can be changed in order to improve fitness.

While it's still too early for any research results, this work has the potential to influence the way hatchery steelhead are produced to help restore threatened or endangered wild stocks through the Pacific Northwest.

Learn more about the Oregon Hatchery Research Center at www.dfw.state.or.us/OHRC/ or contact:

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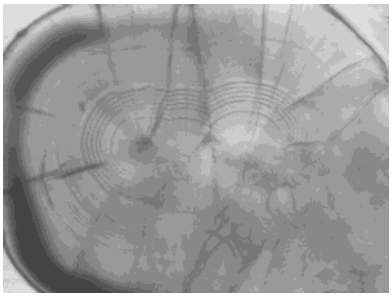
Pressure shock induction of triploid rainbow trout

Stocking sexually sterile trout such as triploids can help reduce the risk of hatchery trout interacting with wild fish. OHRC researchers developed a safe and effective way to treat trout eggs with high pressure to create sterile triploids.

Four state hatcheries are now using the pressure induced triploid protocols developed at OHRC to raise sterile trout for stocking in water bodies throughout Oregon.

Otolith marking using moist air incubators



Otolith thermal marking – using sudden changes in temperature to "mark" a tiny structure in a fish's ear – is a widely used technique to identify the origin of hatchery fish. Research is underway to see if Moist Air Incubators could be used to mark otoliths at an even younger age – prior to the "eyed" stage of development.

On this photo of a fish otolith, the dark band represent the thermal markings made during incubation.