

Drop-out Disease

I. *Causative Agent and Disease*

Drop-out disease is commonly observed in hatchery reared juvenile salmonids but is not caused by an infectious agent or a deficiency in the diet. Affected fish may exhibit gill hyperplasia and severely clubbed gills, usually stop feeding and become emaciated or pinheaded. Other forms of drop-out are not associated with gill hyperplasia. Secondary bacterial, fungal and protozoan infections often develop in affected fish.

Drop-out associated gill hyperplasia causes include:

1. The fine particles in starter feeds irritate delicate gill epithelium.
2. Diatom blooms of *Chaetoceros convolutus* can cause severe gill abrasion in fish that are held in seawater netpens.
3. Repeated therapeutic chemical treatments for external parasites and bacteria can irritate gill epithelium.

Drop-out NOT associated with gill hyperplasia - causes include:

1. An increase in feed pellet size may prevent a proportion of the smaller fish from eating enough to maintain good body weight and they become pinheaded.
2. White spot or coagulated yolk causing incomplete organ development can result in mortality of seemingly healthy fish during early or later juvenile stages. Fish are not pinheaded.
3. Not enough yolk (minimum 3-5% body weight) remaining when alevins emerge from incubators. Mechanical removal may be necessary, especially with chum salmon.

II. *Host Species*

All salmonids are susceptible, but the condition is seen most frequently in Chinook, coho and chum salmon in Alaska.

III. *Clinical Signs*

Fish may stop feeding and become emaciated resulting in thin bodies and large heads referred to as pinheading. Gill hyperplasia, sometimes very severe, occurs in many instances but not all as indicated previously. Secondary infections commonly occur adding confusion to the primary diagnosis.

IV. *Transmission*

Since this is not an infectious disease, transmission between fish does not occur.

V. *Diagnosis*

Diagnosis of drop-out and its cause depends on whether the fish are pinheaded and have or do not have gill hyperplasia and have been exposed to one or more of the conditions listed.

VI. *Prognosis for Host*

Mortality can be up to 20-30% of the population or higher in the case of an algal bloom. Drop-out from gill hyperplasia can be corrected by removal or avoidance of the gill irritant(s). Drop-out from coagulated yolk or not enough yolk are sequellae from preexisting conditions that cannot be changed in the current cohort of fish but could be prevented in the next production cycle by improving incubator conditions or removing fish earlier.

VII. *Human Health Significance*

There are no human health concerns associated with this condition.



Severe gill hyperplasia with fusion and clubbing commonly seen in drop-out disease due to irritation caused by feeding starter diets, X 100.



Wet mount of *Chaetoceros convolutus* diatoms that can cause gill irritation and abrasion, X 400.