

NUTS & BOLTS

By IAN RACE

Moving Fish around the Hatchery

A variety of equipment is available for safely transporting your fish within the hatchery

Counting fish and moving them around the hatchery can be among the most labour intensive and stressful operations for both fish and employees. Fortunately, recent advancements in fish moving and counting equipment have become valuable assets for hatchery employees. In the last issue we discussed counting systems, now we will explore how to move fish around the hatchery and deliver them to equipment such as fish-counters. Several methods may be used to move fish from tank to tank, and although many hatcheries are seeing the benefits of using small cart-mounted pumps, other systems are still in use. These include fish drains, Archimedes screw fish elevators, and submersible impeller fish pumps.

Fish drains

Fish drains work best when they are part of the original hatchery design. A well designed system will have 'fish friendly' tank drains that are separate from the tanks' main plumbing system, and lead to a central fish-handling sump that incorporates a fish pump or elevator. In central sump systems the fish lift remains stationary with grading and sometimes loading for live-haul operations completed at this location. Care must be taken when installing these systems to ensure that they are in fact 'fish friendly' with few acute angles and no sharp edges. These 'built in' systems add capital cost, but if well designed can be very effective.

Archimedes screw fish elevators

Screw elevators have proven to be a reliable method of moving fish and are well suited for use in a central sump or live-haul station. Archimedes screw units use a slowly rotating auger bonded within a cylinder to gently lift fish in individual pools of water to the top of the screw where fish are dewatered and gravity-fed

into the receiving tank. These fish lifts are ideally suited for loading live-haul trucks, and for operations such as grading where a controlled supply of fish is required. Their advantages include: no fast moving parts to contact fish, flexibility to move fish of a wide range of sizes, the fish are in water at all times, relatively low capital and operating costs, and low maintenance because of their simple design. However, the lift height is limited by their length, and since they must be rigid, this makes them long, cumbersome and difficult for use indoors.

Submersible impeller pumps

Often called snail pumps because of the shape of the housing, these pumps use a hydraulically-driven single or double vane impeller. They are lowered into raceways, ponds or tanks, and when connected to a flexible hose can pump fish over long distances with a vertical lift of about 15 feet (5 m). The flexible hose allows for easy set-up around the hatchery. Adjustable speed enables the delivery rate to be controlled for use with graders and vaccination machines, and they are gentle on the fish when used correctly. They are relatively inexpensive to buy and operate, however, they can be awkward to use as they must be submerged in the tank or raceway.



Cart-mounted self priming pump.

Cart-mounted impeller pumps

This style of pump is becoming a favorite with many hatchery operators. Mounted on wheels, they can easily be moved around the hatchery and, with a built-in priming system, don't have to be lowered into the water. Cart-mounted pumps have virtually eliminated the need for terraced hatcheries (which allowed for transfer by gravity of fish from one level to the next) and now that counting technology has caught up to pump capacity, they are making hatchery operations more efficient. Cart-mounted pumps can be used to simply move fish from tank to tank or deliver fish for grading, counting, vaccination, dewatering and loading transport trucks. The latest models are available with optional remote controls, and various power configurations to suit almost any hatchery. Some models are very versatile and can pump eggs, alevins, fingerlings and nearly any size of fish in the hatchery. Their advantages include being easy to setup and manoeuvre around the hatchery, requiring only the suction hose to be placed in the water. They are also self-priming, gentle on the fish and may offer such features as variable speed control, uninterrupted fish submergence and quick-connect hose fittings. The only disadvantage to speak of is the high initial capital cost.

Vacuum chamber pumps

This type of pump works well in specific applications involving larger fish but has not typically been used around hatcheries. However, smaller versions of these pumps are now being used in hatchery settings with good results.

Crowding

Crowding is more stressful on fish than pumping, so which ever style of fish-moving



Archimedes screw fish elevator.

...over



A SPECIAL SECTION ON WATER RE-USE AND RECIRCULATION

system is used, it is important to have a well organized crowding procedure to limit stress on the fish, and not overcrowd them for long periods of time. Experienced hatchery managers are careful to limit the number of fish in the crowding system to reduce stress and the effect of oxygen depletion. Seine nets are often used, but should be made only of soft, knotless netting. Hydraulically-operated crowding fences are now being used in some large raceway systems eliminating the need for hatchery staff to enter the water. Placing several oxygen stones in the tank, and supersaturating the water entering the tank with O₂ will help reduce the stress.

Proper sizing

It is important to use the proper size of pump and hose for the size of fish being pumped; read and follow the manufacturers' recommendations on hose size. Use good quality hoses and check all hoses and connections for leaks before pumping. Planning the pumping and fish movement regime in advance, along with good maintenance practices will optimize the efficiency of labour and equipment.

Finally, whichever type of fish-moving or counting system you plan to use, practice first under a low pressure situation and learn to use the system. Don't wait until you have to transport

500,000 fish to try a new pump or fish counter for the first time. Spend a few days familiarizing the hatchery staff with the equipment so that use of time and labour are optimized. A well designed plan for moving and counting fish is likely as important as the wise choice of equipment; it will save on frustration and reduce stress on both fish and employees.

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Submersible impeller pump. Note the barrier used for crowding the fish into the pump.



NORTHEAST AQUACULTURE CONFERENCE & EXPOSITION
Mystic Marriott Hotel & Spa
December 6-8, 2006

SPECIAL SESSION! NOAA's Northeast Fisheries Science Center, Milford Laboratory's annual aquaculture seminar.

KEYNOTE SPEAKER!
 Dr. John Connelly, President, National Fisheries Institute NFI is the nation's leading trade association advocating for the fish and seafood business. NFI represents the fish and seafood commerce chain -- from "water to table"

For Conference Information:
 Conference Chair:
 Tessa Getchis (860) 405-9104
 tessa.getchis@uconn.edu

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SEND US YOUR PRESS RELEASES ON NEW PRODUCTS!

If your company has recently developed a NEW PRODUCT that's applicable to the fish hatchery sector, then please don't hold back! Send us a press release explaining it's usefulness to hatcheries and we'll consider previewing it in the NEW PRODUCTS section.



You can email details of your NEW PRODUCT to editor@hatcheryinternational.com or send it in by mail/post (include a product photograph) to: "NEW PRODUCTS" Hatchery International 4623 William Head Road, Victoria, BC, V9C 3Y7, Canada



HATCHERY INTERNATIONAL WORD SEARCH (Nov/Dec. 06)

It's coffee time! Find 16 different species of fish in this word search and win yourself a Hatchery International shirt!

Please remember that words run from left to right, right to left, up and down, and even diagonally.

Simply fill out your answers below along with your details and fax back to us at Fax 1-250-478-3979 (International Fax: +1.250.478.3979).

The 16 species of fish are:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
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I C N H T P B D J O S Z
 O O O S F H K O K N I R
 Z B M I U T H Q A S E I
 U I L F J Y R P B J D Z
 E A A E N A P O L N X F
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 S N A D R T U M A T X C
 E T J D H Y A P R A C N
 A M G A M R W W B Q I A
 B X A P R H A O G I I P
 A T X A I P A L I T H N
 S D B C S E A B R E A M
 S Z O P A P Y R G Y C H
 N G I C F T A E F D O W
 R K P W D H F I L Q E G
 E P E R C H E I P L S M
 J W S C R N I X S H A Q
 P E T D R F V K P H K W

The first correctly completed entry drawn after the closing date will win the shirt. All usual Hatchery International competition rules apply. Closing Date: Jan 5th. 2007.

Your Name: _____ Other: _____

Your Company/Hatchery Facility: _____

Address: _____

Post/Zip code: _____

Tel: _____

Species of fish that I work with are: _____

What type of articles would you like to see more often in Hatchery International. (check up to 4)

- hatchery manager
- hatchery technician
- Recirculation facility manager
- Recirculation facility technician
- Fishery Enhancement manager
- Fishery Enhancement technician
- Govt Agency
- research veterinarian
- research assistant
- University student/worker
- Commercial grow-out operator
- Equipment supplier to the hatcheries/recirc/fisheries enhancement industry
- New Equipment Reviews
- Hatchery Profiles
- Fish Health issues
- News items of interest to you
- Polyculture
- New species developments
- Innovative hatchery systems
- Innovative Re-circ systems
- Nutrition/diets
- Other (specify) _____

If you were to publish a:
 logbook
 diary
 other: _____
 I would read it/use it.