Newsletter

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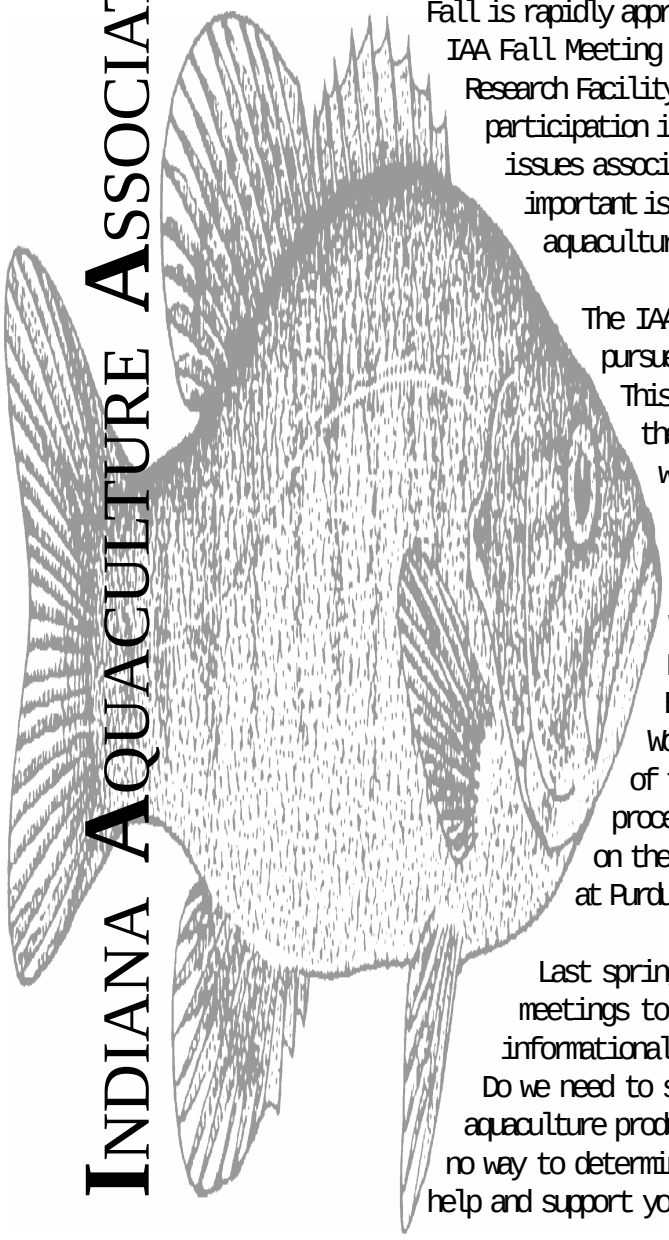
INDIANA AQUACULTURE ASSOCIATION



PRESIDENT'S MESSAGE

Fall is rapidly approaching which means it is time to attend the IAA Fall Meeting October 23, 1999 at the Purdue Aquaculture Research Facility. I cannot stress the importance of your participation in this organization. We need your input on all issues associated with the IAA. We will be discussing important issues that could significantly increase aquaculture awareness and growth in Indiana.

The IAA Board and its members are continuing to pursue the position of state aquaculture coordinator. This will be an important topic for discussion at the meeting. The function of the coordinator, as well as specific legislative support for the position, needs to be determined.

Our guest speakers will include Mr. Doug Wojaeszak from the Illinois House of Representatives Policy office and Dr. Paul Brown form Purdue University. Mr. Wojaeszak will be discussing the development of the Illinois Fish Farmers Cooperative and processing facility. Dr. Brown will be updating us on the current aquaculture research being conducted at Purdue.

Last spring we discussed changing the format of our meetings to better serve our members. Do we need more informational meetings for new and potential producers? Do we need to sponsor workshops for specific types of aquaculture production? If we don't hear from you, there is no way to determine your needs. We want to do our best to help and support you.

I know this is a busy time of year for everyone, but I hope you will make time for the meeting. See you in October.

Chad Nunley
Area 30 Career Center

In This Issue:

Message from the Editor

Attention! Our fall meeting is scheduled for Saturday, October 23. Registration starts at 9 a.m. with the meeting beginning at 10:00 a.m. The meeting will be held at Aquaculture Unit at the Animal Sciences Research and Education Center. From Lafayette take SR 52 west to 231 North at Montmorenci. Follow 231 N. to 600 N. Head east and the building is located on the South side of the road about 1.5 miles (look for the ponds). Mr. Doug Wojaeszak will update us regarding the newly funded Illinois Fish Farmers Cooperative and the fish processing facility. Dr. Paul Brown will provide an update regarding research at Purdue. I will provide an update of the status of the aquaculture facility that may be constructed at Purdue's regional farm in Jennings County. As usual we plan on having a fish fry for participants so bring a friend. During and after lunch we will be giving tours of our indoor and pond research facility. We are near completion of a new storage shed and fish holding facility adjacent to our ponds.

On October ninth a Getting Started in Freshwater Aquaculture Workshop was hosted by Southern Illinois University at Carbondale with Illinois-Indiana Sea Grant co-sponsoring. Over 100 people attended the day long workshop. Topics including water quality, production methods, species selection and economics. Based on attendence it appears that there a growing number of large farmers growing traditional forms of agriculture seriously considering diversification into aquaculture. This situation is the best example to date of traditional agriculture looking at alternate forms of agriculture in an attempt to save the family farm.

We look forward to seeing everyone on October 23rd. Please attend and bring a friend. If you do attend then contact LaDon Swann at 765-494-6264 or lswann@purdue.edu.

Calendar

October, 1999

IAA Fall Meeting - October 23, 1999, Purdue Aquaculture Research Facility, Contact: LaDon Swann, 765-494-6264

November, 1999

Workshop on Warm and Cold Water Fish Diseases - November 4, 1999, The Ohio State University Centers at Piketon; Contact Laura Tiu, Research and Extension Associate for Aquaculture, 1-740-289-2071, 1-800-297-2072 (in Ohio only), or tiu.2@osu.edu.

January, 2000

NCRAC Yellow Perch Producer Workshop, January 21-22, 2000, Hudson, Wisconsin

February, 2000

Aquaculture America 2000 - February 2-5, 2000, New Orleans Marriott, New Orleans, Louisiana; Contact - Conference Manager Bothell, WA, Tel: 425-485-6682, Fax: 425-483-6319; Email: worldaqua@aol.com; Web: www.was.org

Pesticides Registered for Use in Bait and Ornamental Fish Ponds

Andy Goodwin

In the last two years, great progress has been made in registration of chemicals for the production of bait and ornamental fish in Arkansas. The primary mechanism for these new registrations has been through 24c or "Special Local Needs" (SLN) registration. This registration mechanism can be used to legalize the use of chemicals that are needed in small geographical areas where use is not expected to be high enough to justify the expense of full registration. The prerequisites for this type of registration are that the chemical must already be registered with the EPA for some use, and that the holder of that EPA label must agree to support the 24c. This type of registration can be used on compounds that are legally pesticides, but is not a mechanism for labeling any compound used as a drug.

Through the combined efforts of UAPB and the Arkansas Bait and Ornamental Fish Growers Association (ABOFGA), five compounds have been registered for use in Arkansas fish bonds. These compounds are Dimilin, Dylox, Diuron, Baytex and Bayluscide. The 24c registration of one of these compounds, Dimilin, was allowed to expire when changes to its primary label allowed aquaculture use of the compound on a national level. All of the 24c labels now in effect are "third party" registrations. That means that the aquaculture label is not held by the manufacturer, but by another party (in this case, ABOFGA).

One of the liabilities inherent in the use of 24c registrations is that the EPA charges very substantial annual fees for the maintenance of the labels. These fees now amount to more than $6,000/yr. The fees are paid by ABOFGA and are offset by membership dues and by profits that ABOFGA makes from the sale of Baytex through a cooperative agreement with Southern Aquaculture Supply. For membership information, contact Danny Pool, president of ABOFGA, at the address at the end of this article.

Before using a 45c-labeled compound, all farmers should consider the following.

1. All of the compounds listed are legal *only* for use in ponds for the commercial production of bait and ornamental fish. These compounds are not legal for use in ponds used to grow food fish. Use of these compounds with foodfish could lead to the accumulation of residues in fish flesh that would pose a hazard to consumers and would expose the farmer to lawsuits and legal action by federal regulators including the EPA and the FDA.
2. In order to use the compound, the farmer must have in his possession both the national label and a copy of the 24c label that regulates the use of the compound in Arkansas. The 24c label is a supplement to the national label, and like all another pesticide labels; *the label is the law*. Failure to follow the label instructions is illegal. Copies of the 24c labels may be obtained from the ABOFGA, or the UAPB Fish Disease Diagnostic Labs in Lonoke or Pine Bluff.
3. The 24c label applies to a specific product produced by a specific manufacturer. For example, the Diuron 24c label applies only to Diuron 80W produced by Drexel, Inc., and use of other products like Karmex or Nautilus in baitfish ponds is illegal. Use of a form for concentration other than listed on the 24c label is also illegal.
4. If the compound is Restricted Use Pesticide, it must be applied by a licensed applicator and there are the same record keeping

obligations as with other Restricted Use compounds.

5. Be sure to follow all the label instructions including those regulating discharge.
6. The ABOFGA 24c registrations are only for Arkansas. These labels do not legalize the use of these compounds in other states.

The 24c labels include all of the information that farmers need to use these compounds safely and effectively. If further information is needed, farmers should contact UAPB Extension program specialists for help. Below is a list of the 24c compounds (and Dimilin) along with a brief description of their use. The information below is a summary and the actual 24c labels should always be consulted for details describing the safe and legal use of these compounds.

- **Dimilin 25W**: This compound is manufactured by Uniroyal Chemical. It is widely available from Arkansas agricultural and aquaculture chemical dealers. It now carries instructions for aquaculture use on its main label. It is used for the control of anchor worms (Lernaea).
- **Dylox 80**: This compound is manufactured by Bayer. It is widely available from Arkansas agricultural and aquaculture chemical dealers. It is labeled for control of predacious zooplankton. This is the same chemical as Trichlorfon which years ago carried an aquatic label as Masoten.
- **Baytex**: This compound is manufactured by Bayer. It is available only through Southern Aquaculture Supply. It is labeled for use against larval dragonflies. This is a restricted use pesticide. Those wishing to use this compound should contact Southern Aquaculture Supply at 1-501-676-2748 or 1-870-265-3584 or the ABOFGA to coordinate use-forecasts with the annual batch manufacturing of Baytex in Germany.
- **Bayluscide 70 percent Wettable Powder**: This compound is manufactured by Bayer but the only U.S. label is held by the U.S. Fish and Wildlife Service. The ABOFGA 24c label for this compound covers its use to kill snails. This 24c is very new and, at the time of this writing, the compound is not yet available. Contact Southern aquaculture supply or the ABOFGA for information on obtaining this compound.
- **Diuron 80W**: This compound is sold by Drexel Chemical. It is labeled for the control of bluegreen algae blooms. It is widely available from Arkansas agricultural and aquaculture chemical dealers. This is the same chemical as Karmex and Nautilus, but these other compounds are not legal in bait and ornamental fish ponds.

The 24c labeled compounds above constitute, along with other compounds already legal for use in aquaculture, a nearly complete arsenal of chemicals needed for bait and ornamental fish production. Farmers may use these compounds, and should not consider the use of illegal compounds. The only compound missing from this arsenal is disinfectant, bacteria-killing chemical that could be used to control the growth of bacteria in water contained in holding vats and fish haulers. Work is currently underway at UAPB to identify and label a compound suitable for this use.

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New Market Supplying the Sportfish "Put and Take" Niche

by Brent Bluanch

Odds are probably good that every striped bass grower at one time or another liked to go fishing. Even though at this time of year the thought of going fishing and relaxing (while the fish farm is in the height of excitement) seems as remote as Mars, the thought of someone else going fishing - to catch your fish - doesn't seem that far fetched. In fact, hybrid striped bass are one of the hardest-fighting, most aggressive fish one can angle for in fresh water.

Last month's issue of Pennsylvania Game and Fish Magazine (one of several State focused sportsman magazines published by Game and Fish Publications, Inc. of Marietta, GA) highlighted hybrids as a fish that "…fills a niche for anglers looking for big, aggressive, hard-fighting fish." The article wen on to talk about the State's best hybrid striper hotspots - stocked by the Fish and Boat commission - and the great angling opportunities afforded by these special fish.

Hybrids are known across the US for a formidable game fish, but the word hasn't quite leaked out that ANYONE can have great hybrid fishing by simply stocking catchable sized hybrids in their private lakes and ponds, just like they can with trout or catfish. They don't realize that there are excellent sources of full-grown hybrids available from established growers (like yourself) that can turn their fishing into catching, with immediate and gratifying results. "You gotta hook 'em to cook 'em," could be a slogan we hear over and over.

Granted, food market sales for hybrid striped bass must be expanded to meet our new anticipated production, if we are to keep farmgate pricing from deteriorating. However, with directed marketing of our fish to sportsmen groups, private landowners, clubs, and generally avid anglers, we should be able to uncover new market opportunities with customers who have interests close to our own - spending some relaxing time fishing.

Perhaps with some coordinated advertising in fishing publications, recreational sportsmen shows and expositions, and sponsorship of events like tournaments, we can bring an awareness of our growers' capabilities to a new market of anglers. The trout industry enjoys large market sales as well as large angling sales. We can do the same - we just need a little refocusing.

Predation of Cyclopoid Copepods on Sunshine Bass Fry

The Striper, July 1999

Low and variable survival rates have been observed for sunshine bass fry in rearing ponds despite following the standard procedures used to stock striped bass and palmetto bass fry. A mismatch between sunshine bass fry and forage of suitable size is regarded as the primary cause of mortality among the fry. Mortality could also be due to direct predation on the fry by carnivorous copepods. To test this hypothesis, recently hatched sunshine bass fry were exposed to a concentration gradient of cyclopoid copepods (0, 5, 50, and 500 copepods/L) during a 24-hour period. No significant differences in survival rates were found among the first three treatments, but fry suffered high mortality in the 500-copeepod/L treatment. Adult copepods are observed at such high densities in culture ponds. Results were also used to test a model that predicts predation rates on fish larvae by a variety of predators. This study indicates that stocking sunshine bass fry in ponds containing only rotifers and copepod nauplii will reduce the risk of predation and ensure suitable forage.

Diuron Approved for Use in Catfish Ponds

by Andy Goodwin
University of Arkansas-Pine Bluff

The leading cause of off-flavor in catfish ponds is the production of 2 methylisoborneol (MIB) by blue-green algae. It has long been recognized that much of the off-flavor problem could be overcome if a herbicide could be found that was inexpensive, selective for blue-green algae and that didn't leave dangerous residues in fish flesh. The most promising compound for meeting all of these requirements is Diuron. The same compound is also sold under the brand name Karmex. It has been shown in studies that Diuron is effective against blue-green algae at concentrations as low as 0.01 ppm and that Diuron is somewhat selective for blue-green algal species.

Work directed at labeling Diuron for off-flavor control has been underway for several years. Applications for Section 18 Emergency Exemption were prepared and submitted last year in Mississippi, and by the UAPB Extension Program in Arkansas. The EPA denied the original applications, but additional data was collected and new applications were submitted for the 1999 off-flavor season. Those applications resulted in the issuance of a Crisis Exemption for Diuron that makes the use of Diuron legal in Arkansas, Mississippi, Louisiana and Alabama until December 31, 1999. It is hoped that a permanent label will be allowed for Diuron before the Crisis Exemption expires.

There are a number of important conditions that must be met to use Diuron legally in catfish ponds. The only forms of Diuron that are legal to use on catfish are Diuron 80W (manufactured by Drexel Chemical) and Nautilus (manufactured by Griffin LLC). Use of any other form, brand or product name is illegal. In order to use Diuron, farmers must attend an approved Diuron training course. These courses were conducted by UAPB on May 5, 6, and 7 in Lake Village, Weiner and Brinkley. Farmers who did not attend may contact UAPB and arrange to view a video of the training sessions. Diuron may also be applied under the supervision of somebody that attended a training session. Because Diuron is labeled under an Emergency Exemption, farmers must report Diuron use to the Arkansas State Plant Board. And lastly, farmers must have a copy of the Emergency Exemption catfish label in hand when the product is used.

The product labels carry all of the information needed to use Diuron properly. It is critical to use the product exactly as directed. The product is used at 0.01 ppm which is the same as 0.5 ounces (weight)/acre-ft. A 10-acre pond 4 feet deep would have 40 acre-ft of water. Therefore, the farmer would apply 0.5 oz/acre-ft X 40 acre-ft = 20 oz, or 1 1/4 pounds of Diuron. To apply the chemical, turn on paddlewheels, then mix the Diuron in a 5-gallon bucket of water. Next, pour the Diuron into the aerator outflow. The aerator currents will distribute the compound throughout the pond. The chemical is applied once a week for a maximum of nine weeks.

IAA is Now
on the World Wide Web
ag.ansc.purdue.edu/aquanic/iaa/

1998 ATA Tilapia Situation & Outlook Report

Ray DeWandel

American Tilapia Association

United States domestic production of Tilapia increased to over eighteen million pounds in 1998, up eight percent from 1997. Production is projected to increase slightly in 1999. Intensive recirculating systems, many indoors, produced about 80 percent of the Tilapia sold for food fish consumption.

The live market dominated sales from domestic farms again in 1998 with whole fresh and eviscerated fish accounting for only about ten percent of total sales. The prices for live fish dropped precipitously in the East and Midwest at the close of year 1977, throughout all of 1998 and carrying over into the spring of 1999. Prices of $0.80 to $1.20 per pound at the farm gate have been common. Generally, market demand was held steady while supplies have increased over the past 12-18 months.

Imports of Tilpia

Products increased again this year from 81 million pounds (37000 mt) live weight equivalent (LWE) to 94 million lbs (43000 mt) in 1998, a 15 percent in volume. The value of imports rose seven percent to $52.7 million due to increased imports of frozen whole Tilapia, fresh fillets and frozen fillets. The whole frozen Tilapia market, mostly from Taiwan, saw prices drop from 71 cents per pound in 1996 to 50 cents in 1998. Much of this product is sold into Oriental and Latino supermarkets along with the West Coast where it provides a cheap alternative to live fish.

Domestic Production Increases

Tilapia aquaculture production was estimated at over 18 million lbs (8200 tonnes) for 1998. This is an increase of 8% over the 17 million produced and sold in 1997. Tilapia production in the United States has increased every year since I started collecting data in 1991. Production has increased an average of twenty percent annually over the period. Tilapia are raised in almost every state in the nation in a wide array of environments: open ponds, concrete raceways, circular tanks and cages. *Tilapia nilotica* are the species of choice but *Tilapia mossambica* are raised in California due to State restrictions.

However, proximity of the farm to the market is becoming increasingly important as competition stiffens. Typically, live-haulers charge $3.00 per loaded mile to transport live fish throughout the U.S. A fully loaded semi-truck with ten, 500 gallon compartments can haul about 10,000 pounds of food sized Tilapia for 24-36 hours. Freight cost alone for a 1700 mile trip from North Dakota to either coast is $5000 or $0.50 per pound of fish. Three to five ton trucks and smaller are more commonly used in the South and West and can haul from 2000 to 5000 pounds of live Tilapia for up to 24 hours. They are small enough to make deliveries directly to the retail outlets where the consumers buy, rather than to a New York wholesaler who needs an additional $0.30 to $0.50 for distribution.

Market Crunch Affect Producers Nationwide

An alternative to the large wholesale buyers is to sell small volumes of value-added product to niche markets such as specialty retail outlets and health food stores. There are a few farms which have been certified as "Organically grown." One producer sells smoked Tilapia fillets to Colorado restaurants for $10.00 per pound. Others have had some success selling whole fish in Latino communities. Still others market small volumes of processed fish directly to New Orleans restaurants.

Because of the market situation in 1998,

Tilapia farmers have been holding inventories and just trying to keep their businesses alive. Right now, experienced producers are expecting a major shake-out within the industry with the marginal operations closing completely. Insiders speculate that those entering the business today are not doing so for profits. Anyone coming into the business has to have a clear cut competitive advantage in order to have a chance as success.. Most enduring farms have something special that gives them an edge over the competition.

North Central Doubles Reproduction

The North Central Region posted the largest increase in production.

The volume more than doubled from 1.7 million pounds in 1997 to 3.8 million in 1998. The most significant newcomers were Minn-Aqua Coop in Minnesota and the Genesis Farm with Iowa Power and Light, founded by Myron Kloubec and former ATA Secretary, Curtis Stutzman. Although neither is currently associated with the project, General Manager David Lamboscus is confident that the farm will continue to produce quality Tilapia for the live market. Production in the North Central Region is expected to increase substantially again in 1999 if market prices can be increased.

Table 1 Average Tilapia Prices per lb in 1998 ($US)

Market	FOB Farm	Wholesale	Retail
WHOLE FISH			
Live	$0.80 - $2.00	$1.30 - $2.40	$2.49 - $4.59
Whole Fresh	$1.05 - $1.60	$1.20 - $2.00	$1.99 - $3.49
Whole Frozen or Wild		$0.30 - $0.70	$0.99 - $2.49
FILLETS	**FOB Farm**	**Whole Sale**	**Retail**
Frozen (imported)		$2.25 - $3.00	$3.49 - $5.99
Fresh (imported)		$3.35 - $3.75	$3.99 - $6.99
Large Producers	$3.40 - $3.75	$3.60 - $4.00	$4.00 - $6.00
Medium Producers	$3.60 - $4.00	$3.80 - $4.20	$4.50 - $6.00
Small Niche	$4.00 - $5.00		$5.00 - $8.00

Which Do Better in Holding Vats? Bull Agitators or Blowers?

Todd Lenger and Hugh Thromforde
University of Arkansas-Pine Bluff

Arkansas baitfish farmers frequently use shallow vats for holding fish, and aeration is required to supply oxygen. Typically, fish-farmers use regenerative blowers or bull agitators to aerate the water. An experiment was conducted to determine and compare the efficiency of regenerative blowers and bull agitators.

What we did

The experiment was conducted by UAPB graduate students Luke Iwanowicz, Todd Lenger, Josh Reilly and Diego Valderrama at a baitfish farm in Lonoke County, Arkansas. Three concrete vats, 6 ft by 33 ft, were filled to 20 inch depth with 2,500 gallons of clean aged well-water. One vat was equipped with 12 air-stones spaced in pairs along the length of the vat, connected to regenerative blowers. One vat was equipped with one bull agitator located in the middle of the vat. Another vat was equipped with two bull agitators equally spaced at 11 foot intervals along the length of the vat. This was not

a replicated experiment. Each treatment was tested only once. The water in the vats was first deoxygenated with sodium sulfite, utilizing cobalt chloride as a catalyst. The aerators were then operated to mix the sodium sulfite and cobalt chloride with the water, and to re-aerate the water. Electric current was measured prior to operation and confirmed that the aerators were drawing the rated amps. A dissolved oxygen meter was used to measure the dissolved oxygen as it increased from 0 to 80 percent saturation. Measurements were recorded at one-minute intervals.

Discussion

Standard aerator efficiency shows the amount of oxygen an aerator will transfer under standard conditions. The 12 air-stones had a standard aerator efficiency of 1.28 lb of oxygen per horse-power-hour. One bull agitator and two bull agitators had efficiencies of 1.00 and 1.51 lb oxygen/hp-hr respectively. The most efficient aeration was achieved with two bull agitators. The blower system was next best. The single bull agitator was the least efficient means to aerate the vat.

Operating cost decreased as efficiency increased. The single bull agitator was the most expensive, at 4 1/2 cents per pound of oxygen. The regenerative blowers provided oxygen at 3 1/2 cents per pound, and two bull agitators operating simultaneously cost only 3 cents per pound of oxygen.

In this comparison, two 1/3-hp bull agitators operating together gave the best results. Two bull agitators cost the least per pound of oxygen and aerated the best.

To aerate all 11 vats at this farm simultaneously, the regenerative blower system provided lower operating cost, as 24.6 cents per hour than the bull agitators, two per vat, at 33.0 cents per hour. However, because of better performance, more fish can be held in a vat with two bull agitators than a vat with 12 air-stones.

Operating costs were determined for specific aeration devices operating under the conditions described above. Operating costs increase if aerators are not working at their optimum rated amps, or if blowers are used at shallower water depths, or if insufficient number of agitators are used to aerate long, thin vats. Blower systems are inherently inefficient in shallow vats because contact time between rising air bubbles and water is short. Blowers often cause another problem: they increase temperature by bubbling warm air throughout the water. Bull agitators, on the other hand, introduce much greater risk of accidents to workers because the require electric power in the immediate vicinity of the vats. For efficient use of bull agitators in long, thin vats commonly used in Arkansas, use at least two agitators.

Many Hoosier Catching, Consuming Potentially Unsafe Fish

Charles Santerre
Department of Foods and Nutrition
Purdue University

Despite warnings about the potential hazards of eating fish caught in the wild, up to 10 percent of Indiana's 5.9 million residents may be at risk from exposure to polychlorinated biphenyls in fish, according to a survey conducted by researchers at Purdue University.

"Women and children are most susceptible to the problems of PCB contamination, " said Charles Santerre, a Purdue Extension specialist and associate professor of foods and nutrition. PCBs may cause developmental delays in children and fetuses. "Of the Hoosiers at risk, about 16,000 may be exposed in the womb, and an estimated 290,000 are children under the age of 18," he said.

"People should not stop eating fish — but they should make wise choices about how often and what kinds of fish they consume, " said Santerre. "Generally, 80 percent or more of the fish annually tested by the state register detectable levels of

PCBs. Just because PCBs are detected doesn't mean the fish are unsafe to eat, but people should consult the advisories before consuming wild fish."

Research shows farm-raised fish can contain extremely low levels of contaminants, but Santerre acknowledged it's not always easy to determine where fish come from when purchased at a store or restaurant. "For instance, most grocery-store catfish are farm-raised and contain very low levels of contaminants," he said.

The Purdue survey, conducted for the Indiana Department of Environmental Management, asked sport fishermen to describe their fishing activity and the amount of fish they caught and consumed. Graduate students Amy Shaeffer, of Palmyra, Penn. and Becky Williams of Hightstown,, NJ conducted the study under the direction of Joe O'Leary, a professor of forestry andnatural resources.

Shaeffer said this was the first time that Indiana had tried to collect fish consumption data. "Other states, including Michigan and Wisconsin, already keep track of wild fish consumption," she said.

Through mail-in questionnaires and on-site surveys, 2,700 fishermen were queried over the summers of 1997 and 1998. The surveys reached both licensed and non-licensed anglers. Santerre, who studies the contaminants in wild fish, used the survey results to calculate the population at risk from PCB consumption based on state census figures.

An estimated 19 percent of the state's population age 16 and older are anglers, according to the U.S. Fish and Wildlife Service. "If 38 percent of fishermen do not follow consumption guidelines, that translates into 325,000 anglers," Santerre said. "When you add in the estimated spouses and children who are also eating the fish, you come up with more than 600,000 people, or a little more 10 percent of the state's population that may be at risk."

Santerre said he believes part of the problem may be a misunderstanding about where fish with high levels of PCB contamination live. Indiana has 17 land areas recognized by the federal government as Superfund cleanup sites with high PCB levels. "However, because of the nature of how water travels, fish containing PCBs are found all over the state, not just near contaminiated sites," he said.

And although federal agencies warn that fish in the Great Lakes region includes higher levels of PCBs than most areas of the country,

Hoosiers may wrongly assume that the warning applies only to fish caught in Lake Michigan or other Great Lakes. "The Great Lakes region includes all of Indiana's waterways," Santerre said.

Copies of the state fish consumption advisory are available from the Indiana Departments of Environmental Management, Health and Natural Resources. The guidelines are also available on the Web at http://www.state.in.us/isdh/dataandstats/fish/fish_99/fish_cvr.htm.

This year's advisory lists several species of fish found in Indiana lakes, rivers and streams. Across the state, samples of tissue were analyzed from bottom-feeding fish, top-feeding fish and other fish species. The fish were tested for PCBs, pesticides and heavy metals. The advisory specifies how many meals one would eat from fish caught in various areas. That ranges from unrestricted amounts to no consumption at all.

PCBs were used for many years in electrical transformers and capacitors because of their fire resistance and thermal stability. However, because of the compound's persistent and toxic nature, production of PCBs was banned in the United States in 1976. The effects of PCBs in the body may last for years, so state health advisories recommend that women planning to become pregnant within six years be cautious about their PCB intake. Mercury is another pollutant considered in the advisories.

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