



Tank Topics

November/December 2019

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In a continuation of last issue's fish breeding strategies article, Rich Serva goes into detail on the different types of livebearing fish explaining what's going on inside of fish such as this rather gravid *Allodontichthys hubbsi*.

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Important Dates for 2019

March 3
Spring auction

June 8 & 9
Ultra Aqua 2019

November 3
Fall auction

Check out our website: www.akronfishclub.com

THE GREATER AKRON AQUARIUM SOCIETY

WHO ARE WE? We are a local group of aquatic enthusiasts. Formed in 1952, the Greater Akron Aquarium Society is a non-profit, non-commercial organization. Our membership ranges from the beginning hobbyist to the advanced aquarist with many years of experience. The goals of our club are to promote the care, study, breeding and exhibition of aquarium related aquatic life and to promote interest in the aquarium hobby.

MEETINGS: Our meetings are held on the second Friday of each month at 8:00 p.m. at the Ritchie Memorial Shelter House, 109 West Avenue, Tallmadge, OH 44278. It is located West of Tallmadge Circle with access from Sperry Ave., behind Vet Clinic and across from the Chevrolet dealer. Visitors are always welcome, it costs absolutely nothing to attend a meeting and look us over.

MEMBERSHIP: The cost is only \$10 for adults, a couple or a family (includes children under 10 years of age) and \$5.00 for a junior membership (10 to 17 years) Membership provides an opportunity to socialize with others that share your interests, a subscription to our bi-monthly magazine and more.

AGENDA: Our meeting agenda is simple and informal. The meeting will begin at 8:00 p.m. with a short business meeting. Immediately following is the program for the evening which usually lasts about 45 minutes. Our programs consist of a speaker, slide program, movie or perhaps a panel discussion always on a particular subject related to the hobby or various species of fish. Following the program is a short refreshment break. After which the winners of the Bowl Show are announced, the Breeder's Award Program fish are auctioned and tickets are drawn for the raffle.

THE BOWL SHOW: Each month members can bring in fish for specific classes to compete for first, second and third place awards. The charge for each entry is only \$.25. Members also compete for annual awards by accumulating wins throughout the year.

BREEDER'S AWARD and HORTICULTURE AWARD PROGRAMS: members can receive recognition for spawning species of fish or propagating aquatic plants. All that is required is to turn in a minimum of six fry from the spawn that are between 30 and 90 days old. Members earn certificates for each species and can work towards plaques in different categories.

EQUIPMENT RAFFLE: The raffle table has such items as tanks, fish food and aquarium accessories that are donated by national manufacturers, area dealers or purchased by the Society. Tickets may be purchased by anyone attending the meeting. Save your losing tickets for the Christmas Party raffle.

ANNUAL SHOW: The Ultra-Aqua show is held during the summer at the Tallmadge community Center. This has become one of the largest all-species tropical fish shows in North America. It is an international gathering of hobbyists to display their fish in class competition, talk fish and to learn about the hobby from each other.

TANK TOPICS: is published on a bi-monthly basis for the members of the Greater Akron Aquarium Society. Articles and comments for this publication are welcome and encouraged. Such articles are to be submitted no later than the board meeting prior to publication. All articles may be reprinted as long as the author(s) and GAAS are given proper credit. Please send any correspondence regarding this publication to:

Editor/Tank Topics, P.O. Box 494, Akron, OH 44309-0494 or email to dwilliamson223@hotmail.com

The Greater Akron Aquarium Society Membership Form

Name _____ Age _____

Address _____

City _____ State _____ Zip _____

Phone _____ email _____

How did you find out about GAAS? _____

Memberships are due one year from the date of joining. Completed membership forms can be turned in at a meeting or mailed to the membership chairman at this address:

GAAS Membership Chairman, P.O. Box 494, Akron, OH 44309-0494

Dues are for 1 year or 2 years if
email publications are chosen

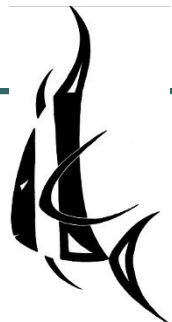
New Renewal

Electronic Mail

Adult (18 years and older) & Family
(includes children under 10) \$10.00

Junior (10-17 years) \$5.00

Dues Collected _____ Date Received _____



President's Message

Bud White

Hello everyone, the meetings are getting better and better, good speakers and lots of members showing up. Also several new members joined and have been coming to the meeting, life is good.

Next we have our auction coming up, Sunday November 3. We will be setting up on Saturday Nov 2at 7:00 pm, please

make plans for both. We need help setting up and with auction activities, as well as bringing items to sell and plan to buy something. We always have a great selection of fish, plants and items.

See you there,
Bud



Editor's Message

Dave Williamson

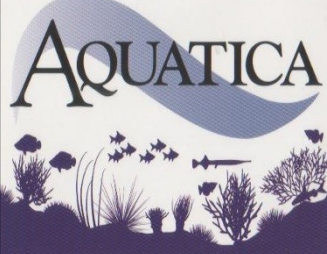
I usually start out the end of the year edition of Tank Topics with sections on the Fall Auction (which will be this coming Sunday, you've been warned so there's no excuses not to be there!) followed by the annual push for nominations for board members for the club. Well guess what? This year is no different! We have a fairly healthy, vibrant group here and we want to keep it that way. One of the best ways for that to happen is to have "new blood" infused. I know, I know, Halloween is this week too, but I'm not talking about that kind of blood letting experience! What I am talking about is new ideas and exuberance. I'm not saying that any of us are old and tired, but face it there will come a time when we'll need a new generation to take over so hopefully they will be eager and ready for the job when that time comes.

What better way for that to happen than for some interested folks to step up and help run "our" club? You might be thinking "I don't want to take X's job, they do it so well." You might be surprised, maybe X would like to take a break or try a different job, you just don't know unless you're willing to ask. Then there are always the inevitable "life changes" that

can get in the way of someone sticking around and being active. Well there you have it, my annual "pep talk" to try to drum up some board members. I hope it helped, and most importantly I hope you'll at least consider it.

Oh, and by the way, here's one other thing to think about. . . You guessed it, it's time for pleading for articles for Tank Topics. I have very little left in the "vault" so now is your chance if you are interested in the fame and fortune that comes with being a published author. Well, OK, maybe I exaggerated that last part a little but we would love to hear what goes on in your hobby. We all have something interesting to share if we'd just try it.

I'll see you at the meeting and the Fall Auction!



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BAP/HAP Report

Wayne Toven

Summer came and now it's gone, and now it looks like fall-out! All of my fish have migrated back inside for the winter, some spawned and some didn't, but they looked good! The BAP / HAP year is almost over, there's one more month to get those last minute spawns and plant propagations turned in! Either at the fall auction Sunday November 3rd or at the regular monthly meeting Friday November 8th. Don't forget about the auction setup on Saturday November 7th at 7 pm.

Things slowed down the past few months, but picked up a little in October when 5 spawns were turned in at the monthly meeting. In case you missed it the very informative talk about shrimp was given by Jeffrey Swanson, now I know why when I had red cherry shrimp they just sort of wasted away, at least they waited until after they had spawned.

September 2019

BAP

Species Common name Class Points

David Girard

<i>Julidochromis dickfeldi</i>	Cichlid ss	15
<i>Apistogramma cacatuoides</i>	Cichlid ss	15

October 2019

Ken McGill

<i>Allodontichthys tamazulae</i>	white patch darter goodeid	Livebearer	10
<i>Dawkinsia filamentosa</i>	Filamentosa barbs	Barbs etc.	10
<i>Xenotoca sp.</i>	La Minzita	Livebearer	10

Dan McMonigle

<i>Hypselecara temporalis</i>	Chocolate cichlid	Cichlid ss	10
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Dave Williamson

<i>Poeciliopsis prolifica</i>	Blackstripe livebearer	Livebearer	5
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2019 Totals

	Bap	Points	HAP	Points
Mike & Elsie Swanson	9	95	0	0
Dave Williamson	7	55	1	15
Ken McGill	6	55	0	0
Brandon & Samantha Snopek	5	50	0	0
Rob Williams	4	20	0	0
David Girard	3	40	0	0
Ty Hunsiker	3	15	4	25
Karthick Muthuveeran	2	20	4	45
Rich Serva	2	20	0	0
Stan Jachna	1	5	0	0
Daniel Jebaraj	1	10	0	0
Dan McMonigle	1	10	0	0
Wayne Toven	1	10	16	175
Bud White	1	5	0	0
Cody Alloway	0	0	2	25
Amy Mullens	0	0	1	5
Jeffrey Swanson	0	0	9	120



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Membership Report

Mike Swanson



Hello Everyone,

It is that time of year again, I hope everyone is making out to some of the fall auctions and finding good stuff. I have made it to a few so far and there are still more to come, including ours on November 3rd. As always any help from our members would be great, set up on Saturday evening at 7 or helping out during the auction. Well I hope to see everyone out and about at some of the functions.

I would like to welcome our newest member:

Tom Clinton

This is a list of memberships expiring soon:

Emilie Myatt
Doug Singer

Selene Shores
Phil Hypes

John Fleming

Remember you can renew online or at any function

Exchange Report

Wayne Toven



Missouri Aquarium Society Inc.
The Darter: July/Aug 2019

Calculations with Dechlor, by Gary Lange

Spring Events & ALA Convention, by Rick Tinklenberg

Barbodes semifasciolatus – the Golden Barb, by Mike Hellweg

Motor City Aquarium Society,
Tropiquarium: Aug 2019

Colony Breeding – the Zebra Obliquidens – *Astatilapia latifasciata*, by Mike Howe

Kitchener – Waterloo Aquarium Society, Fins & Tales: Sept 2019

Snail of the Month - Ramshorn Snails, by Glenn Roberts

Small Fish – Big Rewards (Killifish), by Karen Murray

Culturing Banana Worms, by Karen Murray

Southwestern Michigan Aquarium Society, SWAM: Sept/Oct 2019

Forktail Rainbow, *Pseudomugil furcatus*, by Chase Klinesteker

Hamilton & District Aquarium Society: Sept 2019

Mystery Fish, by Catherine Salmon

Breeding Red Lizard Catfish – *Rineloricaria sp.* L10A, by Jessica Bullock

Missouri Aquarium Society Inc.
The Darter: Sept/Oct 2019

Avoiding Possible Egg Hatch Issues

with Sodium Thiosulfate, by Gary Lange

Acanthopsis sp., the Horse Face Loach, by Mike Hellweg

Brevibora dorsiocellata, Known as the Eye-spot, Ocellated, or Emerald Eye Rasbora, by Mike Huber

Greater Pittsburgh Aquarium Society Inc. Finformation: Sept 2019

Lepthoplosternum beni, by Regina Spotti

Kitchener – Waterloo Aquarium Society, Fins & Tales: Oct 2019

Snail of the Month – Nerite Snails, by Glenn Roberts

Breeding Venezuelan Cory (*Corydoras venezuelanus*), by Stuart Morley

Livebearing Aquarium Fish

Part 2: In the Tank

By Rich Serva

With all this talk about viviparity, we really need a common definition. Viviparity was defined by Wourms, Grove and Lombardi as “the process in which eggs are fertilized internally and are retained and undergo development in the maternal (or paternal) reproductive system. Hatching (that is, eclosion from an egg envelope if one is present) precedes or coincides with parturition, and result is a free-living fish.” Like with egglayers, there is a variety of reproductive schemes employed by the different types of livebearers. Some livebearers simply house the egg until it comes to term while other types contribute nourishment to the developing embryo.

Why viviparity? What is the advantage? Viviparity is not as widespread as you might think. Only 55% of the approximately 900 cartilaginous sharks and rays are livebearing. Of the 24,000 bony fishes only 2-3% are viviparous. As you may (or may not) know the coelacanth (*Latimeria*) is a once thought to be extinct fish related to the lung fish and was found again in 1938. The fact that it is an efficient livebearing predatory fish contributes to it still being found today.

The evolution of egglaying to livebearing is quite the achievement. First the fish needed to shift external fertilization to inter-

nal fertilization. From there would begin an increased retention of eggs and the developing embryo within the female’s reproductive system which also calls for morphological and physiological adaptations of the ovary or oviduct. The egg envelope would also change allowing for female-embryo relationship in respiration and nourishment transfer.

For this much change to take place there has to be an advantage. 1) The young are further developed giving them a greater chance to survive. 2) This gives fish that are not as fecund a better chance to survive plus the species simply does not need to produce as many young to ensure that another generation will follow. 3) The development of a new reproductive mode eliminates competition with the previous mode. 4) In the pelagic sea this offers a large advantage to the fish carrying its developing embryo. 5) As the parents explore new habitats, young are left behind to colonize that habitat. 6) An efficiency of energetic effort is achieved through viviparous matrotrophes and patrotrophs.

There are disadvantages to viviparity such as the spent nutrient toll on the parent, reduced fecundity and an entire brood can be lost if the parent dies.

The evolution of viviparity devel-

ops a special parental-embryo relationship based on developmental, morphological, trophic (nourishment), osmoregulatory, respiratory, endocrinological and immunological. Viviparous fish are either lecithotrophic (yolk dependent) or matrotrophic (nourishment is received from the mother).

LECITHOTROPHIC (YOLK-FEEDING)

The egg yolk sac solely contributes to the nourishment of the developing embryo. With this mode the eggs usually have a large yolk sac which nourishes the developing embryo. Researchers can measure the ability of the trophic parent to offer nutrient by measuring the dry weight of fertilized eggs and comparing to the newborn fry. This would be considered the most primitive form of facultative viviparity. In lecithotrophic reproduction large eggs with large yolks are produced since no additional nourishment is needed from the parent, while trophic parents produce smaller eggs and the embryo requires supplemental nourishment to complete development. A strictly lecithotrophic, viviparous species undergoes a dry weight decrease ranging from 25 to 55% (roughly 35%). This decrease in embryonic dry weight is comparable to the decrease observed in oviparous fished during development. This loss of biomass provides the metabolic energy for embryonic development and growth.

In skates this form of viviparity is very primitive. It is also called Extended Oviparity. The egg is released by the female before embryo development is complete. The egg cases are deposited on the ocean floor during the last stages of de-

velopment.

Although many species of Poeciliids were originally thought to be lecithotrophs (ovoviviparous) a direct assay of nutrient transfer was used to examine post-fertilization transfer of nutrients in the following species of *Gambusia* and *Poecilia*: *G. affinis*, *G. clarkhubbsi*, *G. holbrooki*, *G. gaigei*, *G. geiseri*, *G. nobilis*, *P. formosa*, *P. latipinna*, and *P. mexicana*. They are all now considered matrotrophic. *Poeciliopsis monacha* and *Poecilia reticulata* (guppy) are strictly lecithotrophs. The eggs of these fish contain sufficient reserves to nourish the embryo until parturition.

PATROTROPHIC (FATHER-FEEDING)

In contrast to matrotrophs, the developing embryo is nourished in the pouch of pipefish and seahorses. There is an active gene – dubbed patristacin – that provides cell instructions in the brood pouch regulating saline content. The male also provisions his offspring with nutrients such as glucose and amino acids through a highly vascularized attachment site (placental analogue).

MATROTROPHIC (MOTHER-FEEDING)

In contrast to lecithotrophs, matrotrophs can undergo large increases in biomass. Further, they distinguish two types of matrotrophic viviparity: placental vs. aplacental. In placental Matrotrophy, the mother satisfies the respiratory, osmoregulatory, and excretory needs of the embryos. Matrotrophy permits a more efficient allocation of energy

resources

Placental matrotrophy involves provisioning nutrients to the embryo through the circulatory systems of mother and embryo (as in placental mammals, but not limited to them). There are four patterns of placentation that has evolved in fish: 1) yolk sac; 2) follicular; 3) branchial, and 4) trophotaenial placentae.

Yolk sac placentation: with the possible exception of the coelacanth, the yolk sac placenta occurs only in sharks. The embryo received additional nourishment from the female via transfer from the uterine wall through the yolk sac.

Follicular placentation is found in Anableps, except that the pericardial sac in Anableps forms the entire "bellywall." During gestation of the specialized, matrotrophic poeciliids, the follicular walls become extremely heavily vascularized and develop elongate vascular villi that are covered with a layer of secretory cells. Turner applied the term follicular pseudoplacenta to the complex composed of the follicular wall with its villi, the follicular space, and the adjacent vessels of the portal system covering the belly sac. Anableps displays an extreme degree of matrotrophy. Its eggs are small, about 0.7 mm in diameter with little yolk. Nevertheless, the embryos attain a length of 45 mm at term in *A. anableps* and 60-75 mm in *A. dowi*. The number in a brood varies according to the size of the female. It has been reported as many as 35

in a large female. It is estimated that during gestation, the young exhibit a 30,000-40,000%.

The concept of the follicular pseudoplacenta has been extended to poeciliids. In these species, the yolk sac forms the fetal portion of the pseudoplacenta. Unspecialized matrotrophs such as many *Gambusia*, *Poecilia*, *Xiphophorus* and *Belonesox* species receive a maternal contribution of around 30-40%. Follicular placenta as found in some *Heterandria* and *Poeciliopsis* receive nourishment transfer through enlarged pericardial highly vascularized surfaces.

Superfetation (Poeciliidae family) or as it is sometimes called, superembryonation. It is a reproductive condition where a female carries multiple broods of developing embryos at one time within the body. The biological advantage is greatest for small species. A female from a small species (for example, *Neoheterandria elegans*) could only carry a small brood to term without becoming quite large during late stage pregnancy. The large, not at all sleek shape would make them an easy target. In addition the nutritional burden on the female with a large number of embryos would be hard on the female. The smallest embryos do not need as much nutrition as later

term embryos so carrying multiple broods spreads the nutritional needs over a longer period of time. Although the number count of full term fry is smaller, it is somewhat constant allowing the females to drop more fry in a month. As with other reproductive strategies there is much variability from species to species. Species from some of the following general have been found to practice superfetation: *Neoheterandria*, *Heterandria*; *Brachyrhaphis*; *Quintana*; *Gambusia*; *Poeciliopsis*; *Poecilia*; *Priapella*; *Priapichthys*; and *Phalloptychus*. *Heterandria formosa* can carry as many as 9 broods at a time where as *Poeciliopsis gracilis* and *Poeciliopsis turneri* females can only carry up to 3 broods at a time. Some species show a tendency toward superfetation though they do not practice it in their normal reproductive cycles. This seems to be the case in *Gambusia*, *Brachyrhaphis*, and those species of *Poecilia* formerly assigned to the genera, *Lebistes* and *Mollienisia*. Most poeciliids are able to store viable sperm for periods as long as 10 months which is another advantage to livebearers.

Branchial placentation is found in Jenynsia where villous extensions of the ovarian epi-

thelium enter the gill chamber of the embryo and form intimate connections with the branchial epithelium. The maternal portion of the Jenynsiid branchial placenta is analogous to the trophonemata.

Trophotaenial placentation is found in the family Goodeidae. Trophotaeniae are external rosette or ribbon-like structures that are outgrowths of the embryonic hind gut.. Trophonemata is a term originally used to describe long, villous extensions of the uterine epithelium of stingrays which secrete proteins and lipids

Aplacental matotrophy involves feeding young by various ways.

Oophagy is literally "egg eating", is the practice of embryos feeding on eggs produced by the ovary while still inside the mother's uterus. Oophagy is thought to occur in all sharks in the order Lamniformes. This practice may lead to larger embryos at birth or prepare it for a predatory lifestyle. There are variations in the extent of oophagy among the different shark species. The grey nurse shark practices intrauterine cannibalism, the first developed embryo consuming both additional eggs and any other developing embryos. With other species egg capsules are formed which contain 30-80 ova within which only one ovum develops while all other ova are ingested. Other species eat cellular debris and breakdown products of moribund eggs and embryos, while in the uterus.

adelphophagy, the fetus eats sibling embryos. Intrauterine cannibalism is known to occur in lamnoid sharks as well as in some teleost fishes.

Uterine Milk (histotrophe), the uterus can secrete a fluid which bears varying amount of nutrients. This does not occur until all the contents of the yolk sac are consumed. This is the type of viviparity that is common in the rays.

Among halfbeaks (Hemiramphidae), three genera are known to be viviparous, *Hemirhamphodon*, *Nomorhamphus* and *Dermogenys*; however, *Nomorhamphus* and *Dermogenys* have been more extensively studied and are included in this discussion. With halfbeaks viviparity is more complex and the different types are listed below:

Type 1: Fertilized eggs are retained within the ovarian follicle (like Poeciliidae) and superfetation does not occur. The eggs are provided with a large yolk sac and have little or no connection to the maternal blood supply. Southeast Asian populations of *Dermogenys pusilla* are an example of this type.

Type 2: Fertilized eggs are retained within the ovarian follicle with up to three broods resulting from a single mating (superfetation). The eggs are provided with a small yolk sac but the embryos instead have a connection to the maternal supply through the coelomic cavity and pericardial sac. *Dermog-*

enys pusilla from Sabah and *Dermogenys orientalis* fit this type.

Type 3: Fertilized eggs retained within the ovarian follicle but only for the early stages of development. The embryos later develop along the full length of the ovary. Superfetation does occur, and up to two broods can develop simultaneously in the ovary. The eggs are provided with a small yolk sac but the embryos have a connection to the maternal supply through an expanded belly sac. Example: *Dermogenys viviparus*.

Type 4: Fertilized eggs retained within the ovarian follicle only for the early stages of development. The embryos later develop along the full length of the ovary but superfetation does not occur. The eggs are provided with a large yolk sac and the embryos have no connection to the maternal blood supply. Some examples of this type are *Nomorhamphus megarrhamphus*, *Nomorhamphus weberi*, and *Nomorhamphus towoetii*.

Type 5: Fertilized eggs retained within the ovarian follicle only for the early stages of development, with the embryos later developing along the full length of the ovary. Superfetation does occur, and embryos of different ages can be found in the ovaries. The eggs are provided with a small yolk sac and the embryos only have a connec-

tion to the maternal blood supply for only part of their development. Late-stage embryos appear to eat eggs and small embryos in ovary. Embryos eating eggs and other embryos have been observed. *Nomorhamphus ebrardtii* is an example of this type.

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The Greater Akron Aquarium Society

P.O. Box 494
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«firstname» «lastname»

«address»

«city», «state» «zip»

Meeting Notice - Do Not Delay

Meeting Notice

Friday, November 8

Annual elections and Program: Guppies, mollies, and other live bearing fishes of the genus *Poeciliopsis* are fascinating in the aquarium, but what maternal nutrients are provided to the embryo? Are there embryonic specializations that facilitate nutrient transfer? Dr. Tami Panhuis of Ohio Wesleyan University will present scanning electron micrographs that provide insights on the placenta traits of the genus *Poeciliopsis*.

Bowl Show Any live plant; Aquarium photography (whole tank photograph); Schooling fish (group of 6 fish)

Friday, December 13

Program: Don't miss the 2019 Christmas party at the Ritchie Memorial Shelter House. At this meeting, the Greater Akron Aquarium Society membership is rewarded for their participation with fun and prizes. There will be door prizes of fish and aquarium plants so that everyone will win something nice. Please bring a side dish, salad, or dessert to share.

Bowl Show: None, just come enjoy the party.

General meetings begin at 8:00 p.m. at the Ritchie Memorial Shelter House

Coming Events

Nov. 3rd – 2019 Sunday –
starts at 11am
Greater Akron Aquarium
Society –

GAAS Fall Auction
Tallmadge Community
Center – 80 Community
Dr. Tallmadge, Oh

Nov. 9th 2019 Saturday -
starts at 10:30 am
Motor City Aquarium
Society – fall auction
876 Horace Brown Dr.
Madison Heights, Mi.
48071

Nov. 22 – 24 2019

Ohio Cichlid Association
Extravaganza

Holiday Inn –
15471 Royalton Rd.
Strongsville, OH 44136

[www.ohiocichlid.com/
extravaganza](http://www.ohiocichlid.com/extravaganza)



[www.Akron Fish-
Club.com](http://www.Akron Fish-Club.com)

[www.motorcityaquarium
society.com](http://www.motorcityaquariumsociety.com)