

WINTER SHIPPING

Killifish

By Jim Kostich

One of the joys of killie-keeping is sharing fish and eggs with other hobbyists around the country and even around the world. For decades, one of the frustrations has been that it is only wise to do so about 7 months out of the year, and those specifically don't include the winter months when interest in indoor hobbies is at its peak. By making use of the Internet, better insulating materials, heat packs, we can extend the shipping season considerably, at least within the same country. The following is based on my experiences with winter shipping in the United States, though hopefully much of the information can be applied in other countries as well.

Shipping in cold weather is not without risk, and not for those that are faint of heart. Some shipments get delayed, lost or mishandled, and sometimes the weather changes suddenly. Be sure that both sender and recipient agree on who will be responsible should disaster strike and shipment falls off the face of the earth or fish are dead on arrival. The American Killifish Association's Code of Ethics provides some guidance in this area. Although it is technically only binding upon exchanges among AKA members initiated through an AKA forum such as the Business News Letter or website, it is well thought out and can be used as a default for other fish shipments. The Code may be found on the AKA.org website, but the short version is that live arrival is expected to be guaranteed from April through October, and the remaining months are at buyer's risk. The sender and recipient are free to negotiate their own terms in any case, but any deviation from the norm should be clearly expressed and agreed to by both parties.

The use of the Internet and email has greatly facilitated shipping fish. Sender and recipient can communicate in minutes or hours, and hammer out details as to when and how fish will be shipped. Any payment can be processed instantly any time of day or night. Shipper can view weather maps of the entire country that show expected high and low temperatures over the next 10 days. And once shipped, sender can transmit tracking numbers to recipient, who can then follow the progress of the shipment online or by email or text, and make arrangements for its safe arrival.

The USPS services that are appropriate for shipping fish in cold weather are Priority Mail and Priority Mail Express (hereafter referred to as "Priority" and "Express"). Priority usually takes 2-3 days to most locations, but has no guarantee of arrival time; Express usually takes 1-2 days, and includes a money back guarantee that refunds the postage if USPS fails to deliver by the promised time. Rates vary depending on weight of parcel and destination, but Priority will typically be about half the price of Express. Both services include some insurance, and additional insurance may be purchased, but it is important to note that USPS insurance does not cover fish death caused by delay or temperature.

USPS has some specific requirements for shipping live fish, found in their DMM 526.6. Fish must be placed in a primary sealed container, which must be cushioned with sufficient absorbent material to take up all the liquid in case of leakage, all of must be placed in a secondary sealed container. The packing procedure described below is perhaps a bit more extensive than the average killifish shipment, but should meet all the official USPS requirements.

The Gold Standard in winter shipping containers for fish are the commercially manufactured Insulated Boxes available from shipping supply outlets. The bottom and four sides are all a single molded unit of styrofoam, and a separate lid fits tightly, often in a tongue and groove fashion. They come in a variety sizes, and are available with or without a



corrugated cardboard outer wrapper. By taping the lid to the bottom around its entire circumference, the box can be well sealed against heat loss and potential leakage. Unfortunately, these boxes are not inexpensive, usually at least \$10 for a box suitable to send a few pairs of killies. So, in order to keep costs down, many fish shippers assemble their own boxes, using commonly available insulated materials.

I use 1" thick foam board insulation found at any home improvement store; it has a respectable R value of 5, and it's easier to calculate the cutting dimensions. A standard #7 USPS Priority Mail box is 12x12x8, so we need 2 pieces a little under 12x12 for top and bottom, and 4 pieces a little under 11x6 for the sides. The "little under" gives us some leeway for imperfect cuts, and makes it a lot easier to cram that last side piece into place while still maintaining a pretty tight fit. A table saw works best for nice clean, square cuts, but produces quite a bit of very fine, light, static clingy sawdust. I have recently gone back to cutting by hand with a long-bladed snap-off type utility knife, with blade fully extended and held at a very sharp angle. A T-square made for drywall makes a great guide, and a little practice and maybe a spare set of hands makes the job go smoothly. A 4x8 sheet will produce all the parts needed for 8 boxes, and leave some narrow scrap pieces that may find other uses.



The real breakthrough in winter fish shipping has been the use of "heat packs" - small packets of measured amounts of powdered iron that generate heat when exposed to oxygen. Various heat packs are available for various purposes, but the 72 hour Uniheat brand is specifically designed for shipping live plants and animals over a two or three day period. Its surface promptly warms to about 100 degrees F, and holds it there for about 72 hours; most other heat packs (including the new 96 hour pack) peak much hotter and then drop temperature rapidly. The pack is activated by removing it from its plastic package and exposing the airflow side (marked with a pink stripe). Ideally, the heat pack could be opened a half hour before packing the fish

box to confirm the pack is working properly. If you choose to pre-warm / test the pack in this manner, wrap it in paper or cloth so it can breathe, but still hold its heat. Otherwise, the heat escapes about as quickly as it is produced, and it never feels warm to the touch even though it's working. I've personally only had heat packs fail in a couple of circumstances: if they had already been exposed to air as evidenced by being hard and solid, and if they were too cold (under 68 degrees F) when activation was attempted.

There are two things to keep in mind when bagging fish for winter shipping: more water resists temperature change better than less water, and Priority under a cubic foot and Express rates are based on one pound increments. A 12x12x8 package (the standard Priority Mail #7 box that USPS provides free for Priority Mail use) that weighs 3.1 lbs costs the same to mail as one that cost 3.9 lbs. So, making sure the package ends up just under the next pound buys the fish some extra temperature resistance without adding any cost. A Priority #7 box with foam, heat pack and peanuts weighs a bit under two pounds before adding the fish and water. So if you're aiming to keep the total weight under 3 pounds, you can divide about a pound of water (which equals one pint) among the fish bags. If that's not enough to keep the fish happy, move up to 2 lbs of water (a quart), and distribute as needed.

I've had the best success as both a sender and a recipient individually bagging killies in conventional poly bags and then sealing the small individual bags into larger master bags by species. But for those who are more skilled at sealing multiple "breathing bags" than I am, that is still an option. In either case, it is even more important than usual that the bags do not leak: the heat pack will fail if it gets wet.

To make a box ready for fish, start by folding and taping the bottom of the cardboard #7 box, line it with a large trash bag to meet USPS waterproofing requirements, then set the bottom foam panel into place. The side panels are then added, each slid down into the gap left between the previous side panel and the cardboard box. If there are only a pair or two of fish being shipped, I put a thin layer of biodegradable packing peanuts on the bottom, to help cushion and to help meet the USPS requirement for absorbent material in case of leakage or spill. I wrap each master bag of fish in newspaper to add absorbency, shade the fish, and help keep the fish bags from sliding out of place. They are then stacked in the box like cordwood, with one end tight against one side of the inner box, leaving a gap at the other end. The heat pack is then removed from its package, and a roughly 2x4 inch scrap of insulation is placed up against the non-ventilated side. This is wrapped in standard, non-shiny newspaper, and the pack is placed in the gap between the top of the fish bags and inner box, with the scrap insulation facing the fish. This leaves all the fish

bag getting a portion of the heat no matter how the box get reoriented, rather than a single bag ending up on top of the heat pack and getting overheated. Slightly overfill the box with more peanuts, pile them near the center, then place the top foam panel into place, crushing the peanuts to help immobilize the contents. Close the trash bag tightly with a rubber band to provide that second leak barrier, add a packing slip, and close and seal the box. If shipping multiple packages that day, now's a good time to write the recipient's name on the box, as well as the words "Liquids" or "Live Fish".



I am generally comfortable shipping fish by Priority with insulation and heat pack as long as most of their trip looks like it will be 20 degrees F or higher during the daytime and at least 10 degrees overnight. There are several weather websites that provide excellent maps of the US showing the high and low temperature forecasts. However, that rule of thumb presumes the parcels will be traveling by air and housed indoors at night. I have recently had to discontinue Priority shipping between "Black Friday" (the day after Thanksgiving) and Christmas regardless of the weather. The massive growth of Internet sales in recent years has left USPS scrambling to keep up, and resulted in delays and diversions. In 2017, all of my packages were at least a day late during this time, and tracking showed many stops, so it was likely the packages were outdoors for almost the entire time. Express Mail was largely unaffected.

During the remainder of winter, Priority is best shipped on Saturdays, Mondays or Tuesdays to most destinations, so they will likely be delivered before Saturday. Mail moves through the USPS system on weekends, but is often not delivered, leaving the fish waiting an extra day or two at the recipient's post office. If the recipient is in a nearby state, I may also choose to ship on a Wednesday. Since Express travels consistently faster, I can ship Monday through Thursday with a reasonable amount of confidence.

Sometimes there is a substantial difference in temperature

between the shipping and receiving cities. In my case, that usually means the temperature at the other end is warmer. I adjust for higher ambient temperatures by forgoing the rigid foam liners, using only the biodegradable peanuts with some scrap foam pieces to keep the fish bags somewhat centered in the box. That allows more of the heat to escape. I admit that there is more art than science in deciding when to tweak any given package. If the receiving end is colder, I may add extra water to the bags to provide more mass. I have occasionally used two heat packs in a full size (20") styro, but I find myself considering that in a cubic foot or less, I come to my senses and wait until the weather improves.

The recipient should be provided with the tracking information, of course, and be advised to follow the package and be sure someone is available to get it indoors as soon as possible after delivery. The most dangerous part of the fishes' journey is probably the minutes or hours left sitting on the porch next to the mailbox, after the heat pack is spent. Given the tracking number, the recipient can arrange to have USPS email or text status reports of the shipment, and this should be encouraged. If the recipient is unlikely to be available when the fish is delivered, arrangements should be made to have the box held at the recipient's post office to be retrieved at his earliest convenience. This can be scheduled in advance by the sender, or by the recipient after the parcel is in the mailstream. The heat pack should be removed from the box as soon as it is brought indoors, even if the fish are not to be put away immediately.

Should a shipment appear to be delayed, all is not necessarily lost. Well packed killifish can survive for weeks without food or change of water, as long as the surrounding temperature is moderate. So, if the shipment is indoors for the bulk of the time, an extra few days after the heat pack expires will not likely be catastrophic – providing again that the recipient is able to retrieve the package promptly.

Looking back at my stack of receipts for heat packs in the last few years, I have sent a good many boxes of killifish using the above techniques. While nowhere near trouble free, I have found my success rate to be similar to that of shipping in summer months.

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