My thoughts on feeding and related matters
by Syd Mitchell

Great quantities of foam bubbles sometimes appear on the surface of a pond usually above areas where the water is being highly aerated. Typically, this will be above air stones (bubblers) or above areas where the water from waterfalls or shower type filters enters and aerates the water by dragging air down below the surface. Many hobbyists are puzzled as to what causes these foam bubbles but the answer is very simple:

If foam on a pond isn't due to an overnight spawning, then it is most likely caused by dissolved organic carbon (DOC) and it primarily comes from undigested or partly digested protein in fish excrement. In the wild, carp don't normally find as much protein at any one time as we feed them when we feed large amounts of high protein food a few times a day, especially when we want to encourage growth. Wheat germ can also be a problem since it often contains protein that is a low digestibility form and therefore is best fed in small amounts at any one time to prevent there being too much for the gut to deal with as it passes through.

Food passes through the gut at a steady rate and there are only a limited amount of enzymes available for catabolism (breaking down the food as the first part of the digestive process). If only small amounts of food are eaten at a time then there will be sufficient catabolic enzymes for it to be fully digested. If we feed too much high protein or low digestibility protein at any one time, there won't be enough of these enzymes to break it all down in the limited amount of time that the food is passing through the gut. The result is that the food won't be fully digested and will be excreted as DOC.

You can remove DOC by protein skimmers and/or water changes but koi food is expensive so, if a percentage is excreted undigested, it is just wasting money.

My suggestion is that the feeding regime is the first thing that should be addressed either by feeding less food or the same total daily amount but in smaller portions spaced throughout the day. This should dramatically reduce the DOC and allow the normal DOC reducing bugs to be able to cope with DOC from pheromones, sloughed off mucus and other metabolic wastes that aren't so easy to eliminate.

it's a widespread myth that carp hibernate in winter in lakes or in unheated ponds when the water becomes too cold for their normal behaviour. They don't, they just retreat to the bottom of their environment where it's slightly warmer. Their metabolism slows right down and they don't move very much in order to conserve energy. However, they must still use some energy in order to maintain the body functions necessary to stay alive. For example, the heart, gills and osmoregulation must never stop working and

these functions use energy. In the carp natural environment, as their stored energy in the form of ATP (adenosine triphosphate) depletes, they will occasionally feel the need to go searching for food in order to top it up again. No artificially imposed limits by koi keepers will stop fish in natural lakes from eating very small amounts when they need to.

Related to that, it's another myth that fish are too stupid to know when the water is too cold for them too digest food. The enzymes that control the metabolism of food and the appetite are linked so that they match, regardless of the temperature. So, when the temperature falls below the point where they can digest, they have no appetite and just simply don't attempt to eat anyway.

Fish have evolved to instinctively know what's best for them. If a fish in the wild wanted to eat, it would do so and fish have evolved quite successfully following their natural instincts. If carp continued to eat when it was too cold with the consequence that the food rotted in their gut and caused them serious health problems or death then they wouldn't have survived evolution and the species would now be extinct. So why do koi in a pond need us to impose artificial temperature limits when we stop them eating if they need to?

In winter in a natural lake, the availability of high protein sources of food such as insects is restricted so they survive on lower protein sources such as scraps of plants and they have evolved the range of enzymes that allow them to digest this at the appropriate temperature.

They will still find the occasional insect buried in the mud and they will eat it because that is what fish are genetically programmed to do but the high protein insect won't rot. It will travel through the gut at the normal rate and be expelled, undigested, along with the waste from any food that the fish will have eaten which they can digest.

By all means feed your koi in winter when they are actively looking for it because they would eat if they were in a natural lake but match what you feed to what they would normally find if they were in a lake i.e. low protein food. If you feed higher protein food, it won't harm them but it will be excreted almost completely undigested so, although it won't actually harm them, it won't benefit them either.

Some people say that they starve their koi during winter to slim them down after being overfed during summer. If humans regularly over eat then go on crash diets to lose weight, we would call that yo-yo dieting and that pattern of eating is just as bad for fish as it is for us. The obvious answer is not to over feed koi but to maintain a sensible summer feeding regime where they can achieve good growth rates but don't build up fatty deposits around their internal organs in the first place.

Since some hobbyists prefer the female body shape to the male shape, the absence of males in a pond full of females sometimes means that the females will prepare themselves for spawning and develop eggs in their ovaries but they won't be released because the male trigger to release them is absent. This is called dystocia (egg binding or egg retention). Egg stripping by an experienced person or by injection with spawning hormones can be very effective ways to relieve the problem but restricting food in order that eggs are reabsorbed is a solution that anyone can try. Often this is delayed until winter but my opinion is that, if restricting food is the chosen option, it should be done much earlier. Apart from the risk of infection due to the eggs rotting which increases if they are retained for long periods, in winter temperatures, a koi's protein requirement is small. Since the eggs are in the region of two thirds protein, I would say that reduction of food in order that eggs are reabsorbed would be more effective if done towards the end of summer as soon as it becomes obvious that they aren't going to be released. Apart from reducing the time that the eggs are being retained and therefore reducing the risk of infection, the koi will still be active and will use the protein much more quickly than in winter temperatures.

My thoughts on winter feeding are on my website here:
http://www.mankysanke.co.uk/html/winter_feeding.html