

# They don't see it's

## They Don't See It's Ugly



If you take a close look at the face of a catfish, you are unlikely to love it for its looks. With their long whiskers, bulging small eyes and broad jaws they can look rather mean—and that would not be an unfair representation of their personalities. This freshwater fish is murderous with regard to any small fry around it. And, with regard to its smaller siblings, it is a cannibal—as long as they are small enough.

But otherwise, there is so much that can be said in favour of the catfish. If you want to hear about a catfish's good points, take a walk around the fish farm of Hamid Mohammad Abdel Semi. His farm is in the village of Al Baloua, around 75 km along the road to the Suez Canal, east of the Egyptian capital city, Cairo. Right now he is working to clear one of his 200 m<sup>2</sup> ponds of fish, as he is eagerly waiting to begin catfish production in a few weeks time, in August.

He has produced catfish once before, and they did very well here. They can grow with only a little feed being added to the pond and have a good market at all times. So, why does he not produce catfish

throughout his 3 ha of fishponds? Well, first of all it is not easy to get all the small fish needed to stock the pond and, second, they are not exactly cheap. What has changed this situation and caused him to try producing them this year? We will come to that in a moment.

Hamid runs a successful business growing rice and maize in fields behind the belt of ponds along the roadside, another 3 ha in all. But the fish make even better money, and have done so since he took up that line of work three years ago. The fish farm is not exactly his own, it belongs to his uncle, and they share the income. But still, if you compare the profit from 1 ha of land with that from fattening fish in a 1-ha pond, the fish give him twice as much.

You should also bear in mind the fact that the ponds occupy a poor quality piece of land—it is low lying and difficult to cultivate, as you will notice if you take a look at neighbouring fields along the roadside. If you did not know that these were rice fields, you would guess that they just contained stubborn patches of stiff grass growing in the field. The poor quality of the land, and Hamid's success are both so apparent that his next door neighbour has followed Hamid's example. He has invested money and work in preparing three ponds instead of growing rice, and is now saving money so that he can start fish production in the near future.

### *But why now?*

Small catfish (called fingerlings, because they are the length of an adult's little finger) used to cost a lot, and for good reason. They either had to be caught in the wild, which would take time and a lot of care, or raised on a commercial fish farm. Why so expensive? Because it was believed, until recently, that the commercial raising of catfish would not work well using cages or ponds. It was believed that you had to manipulate



*Fish ponds like this can be built on poor-quality land. Better land can then be used to grow food. So, the field in the background contains wheat.*

the fish in laboratories, one by one. To cause the fish to produce eggs, you had to inject them with hormones. What is more, your timing had to be exactly right—within a 24 hour timeframe. Or, to give this explanation in scientific terms, spawning by the female should be closely co-ordinated with semen production by the male for the eggs to be fertilised and hatched successfully into tiny larvae. You could not leave it to the fish on an ordinary farm.

So, this was specialist work which had to be paid for, which meant that an average Egyptian small-scale farmer, like Hamid, would have had to invest too much for the proposition to be attractive.

At the WorldFish Center station in Egypt (in Abbassa on the other side of the small town of Tel El Kabir) researchers were not entirely convinced that the catfish was unable to spawn 'naturally'. And they shared all Hamid Semi's warm feelings towards the catfish—even considering the fact that only a mother can love the way it looks. They would even have been prepared to add a few more positive words to its description. Certainly they would have told you that the catfish will thrive in waters very low in oxygen, and in which most other fish will give up. And even if the water might look too dirty for anybody else, the catfish will grow and produce an appetising rose coloured meat. And, the researchers would be happy to confirm Hamid Semi's judgement of the catfish's feed requirements: most of the nutrition it needs is produced by the organic life in its pond, stimulated by a simple fertiliser like chicken droppings. Surrounded by their own species, they are only predators when an insect comes their way.

Now, it was really a pity to see this wonderful fish, native to Africa, being so little used by the many thousands of small pond owners in the

country. So, in 2000, the WorldFish Center set up a large-scale experiment to try out a few ideas. The results of this experiment are now coming into play, and are helping Hamid and his uncle. The experiment really involved going back to nature and taking a look at what works for the catfish outside fish ponds and cages. So, we will have to side-step for a short while and look at the basics.

### *Back to the wild*

In the rivers and lakes of Egypt, the biological clock of the catfish provides it with some strong impulses. The eggs and the semen mature and are kept ready in the bodies of the female and male fish respectively. The reproductive process is unlike that of mammals, whose offspring mature in the mother and are born after a fixed number of days. In the catfish, the mother's eggs await optimal conditions so that the fish fry can have a head start in their fight for survival. So, to get them to breed, the adults should be in good shape, feeding as well as possible when spring comes.

This is a time when water temperatures are still low and are not at all good for youngsters, so nothing happens. But as summer sets in—and the Egyptian summer is really hot—water temperatures rise fast and water levels fall. This is a trigger for the catfish, who makes sure that its offspring are spawned then, mostly because the temperature is right, but also because the new fish should start growing before waters become dangerously low.

So, in late May or early June in a normal year, the eggs are spawned and fertilised. They stick to whatever surface they touch, and develop from larvae to fingerlings over a period of some weeks—that is the



*This farmer is able to save money by feeding leftovers to his fish. The fish seem to consider yesterday's bread to be a delicacy, and rush over to grab the best bits.*



*The catfish is not exactly a handsome fish, but it compensates for this by being bardy - it grows well in most places - and it is very tasty.*

10 per cent of them who survive under natural conditions. Thousands of them are produced by one couple. But Mother Nature knows that there are not necessarily only 'normal' years, so some catfish after spawning in May will develop new eggs and be ready to spawn another batch by August of the same year. Actually, this is what Hamid Semi relies on. But we will return to that in a moment.

### *The copycats*

The large-scale experiments run in Abbassa back in 2000 started with the stocking of a large number of adult catfish. The males and females were kept separately, and were very well fed during early spring. As the waters' temperature grew closer to 22°C, the minimum needed, the design of the experiment was fine tuned. Three groups of three ponds, each of them measuring 400 m<sup>2</sup>—the size of a really great swimming pool—were prepared. The standard depth of each pond was only 75 cm, but towards the end of the pond a small section, of 3 m by 3 m, was 35 cm deeper.

When, in May, the temperature was right, the adult female fish were inspected, to see if they were mature. You do this by pressing gently on their belly; the eggs will then seep out. The females which were ready were distributed throughout the nine ponds, together with an equivalent number of male catfish.

Three of the ponds containing the well-fed fish were then just left to themselves, a control group as the scientists would say. In another three ponds the water level was lowered, so that water was only left in the deeper basin. In the last three ponds, some basket-like shelters containing grass were put along the side of the ponds. These were supposed to resemble the fish's natural surroundings, in which the tiny fish hide from their enemies among water plants and under grasses. In these



*Surprisingly, these catfish are the same age. Some young catfish (called 'jumpers') grow very quickly and have to be moved to separate ponds, to prevent them out-competing their smaller siblings in the hunt for food.*

*ponds the water level was also lowered so that water only remained in the small deeper section.*

*And so the experiment was left in peace for seven days. The temperature in the small basins increased to 27.5 °C. After that, fresh water was pumped back into the nearly empty ponds, and every scientist, technician and farm worker eagerly waited to see what had happened. Would the catfish follow their instincts, even if they were not back in their natural environment? The counting did not begin for six weeks, so we had to wait to find out. But, the results were definitely worth waiting for.*

### *Back to the fish farm*

The details of the experiments were adjusted, and they were repeated once every year between 2000 and 2002. The idea was to make the working conditions on the research station similar to those at a fish farm like Hamid Semi's. Of course, as a non-specialist, you would not notice much difference between a fish farm and the research station anyway. Perhaps you might note that on the station, in between big holes in the ground with grass edges, there are number of concrete basins, some of them under roofing so that smaller and more controlled experiments can be run.

Until this time, Hamid Semi knew nothing about this experiment. Then he and a group of farmers were invited to the research station. They visited in early June and took part in a three-day course, during which they were told the following: "you can make catfish spawn. In fact, if you do nothing but make sure that the females are mature, and place them in a standard-sized fish pond, you might end up with around 450 fingerlings after six weeks, all of them of a reasonable size and growing."



Workers place a couple of mature catfish into an enclosure. Once the fish produce fertilized eggs, they will be removed and the fry will be left to grow safely inside the fine mesh of the enclosure.

But, they were also told that if they lowered the water level in their ponds—which farmers can do if they want—and followed the right approach—as they did at the WorldFish Center station, they could end up with over 5 000 fingerlings surviving their critical first six weeks.

But the visit by the farmers was more than an exercise in show and tell. The farmers discussed the catfish they saw. By this time, the catfish produced the previous summer weighed around 400 g apiece, and were growing day by day. By late summer they would reach a live weight of about 1 kg. The farmers also gained hands-on experience, as they learned how to select mature females and how to make sure that the water level and temperature of the pond were right. The final part of the course demonstrated how to start the process once again by draining the water from the pond.

And this is when the fun began for Hamid, as he decided to start producing his own catfish. He came over to the station with the other farmers, taking a look at the fingerlings to see how well they have grown. He and the others also want to see how much last summer's generation has grown in the six weeks or so since he was last here. The biggest ones he will be shown at the station (the 'jumpers', as the scientists call them) will be above 500 g, about half their marketable size.

*Is this the best bet?*

Only one pond on Hamid Semi's fish farm is empty at the moment—the one being made ready for the catfish and which promises to make him his own catfish fry producer. His other 10 ponds contain the local



*This female catfish is ready to deliver her eggs. Now the scientists must lower the water level in the ponds, to make the fish believe that summer—and spawning-time—is here.*

variety (what the researchers call a 'strain') of the tilapia, a fish which was originally from Africa. This is a nice-looking fish, which does not eat its siblings and which fetches an even better price than catfish at market. It does need more feed from outside the farm and it does grow more slowly than catfish, but you can always buy the fingerlings at a reasonable price because they are easy to breed. Still, everyone goes for tilapia these days, and the price is gradually falling.

So, as is true in farming all over the developing world, it is a good idea to play several cards at once—and catfish could work well as an addition to the fish farm. Hamid has an eye for such openings. He buys cheap left-over bread from the nearby military barracks for use as fish feed. The only problem is that the price is going up, and is getting a bit too high these days. So, special fish feed is becoming a better idea day by day. Still, bread works OK, as you will see when he empties a bucket into a pond and causes a riot, as fish race from all corners of the pond to get the best bits.

He has learnt what he knows about fish farming from looking at what other people have been doing and from reading a few manuals on the trade. But, most importantly, he has been able to learn from the people from the WorldFish Center. By visiting and giving him free advice, they have added much to the success of his new enterprise. And now, they are inviting him to gain from their new-found knowledge about catfish.

Actually, based on the latest additions they have made to the experiment, the researchers have expanded the advice they would give Hamid. If you select the catfish pair by pair and put them into a small double net cage with very fine mesh on the outside, you will reduce your fish fry losses a lot, and still be sure that the process will work. This technique requires more work by the farmer, but is not too complicated and can be taken directly back to the fish farm.

## *Rings in the water*

And, if the catfish story lives up to expectations, experience tells us that other farmers will come to visit. They too will look, listen and learn, and copy what they can use, producing even more of these ugly but tasty fish.

In Egypt, they will continue to work on the Egyptian strain of the catfish. But, the methods developed may have to be adapted to the needs of other local strains in Africa, and to the different natural conditions in other parts of the region. And so, workshops have been organised for researchers from Abbassa and its two sister stations in Africa (in Malawi and Cameroon). These workshops will help us identify what knowledge and techniques can be transferred from country to country and what must be country-specific. Also, researchers in Malawi and Cameroon are now undertaking experiments involving the local catfish, as there is, everywhere, a need for better methods which can be used by small-scale fish farmers.