

SEXING GOLDFISH AND KOI

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It is often useful to know the sex of a goldfish or koi. For some, knowing the sex is only important insofar as it allows them to select an appropriate name for their pet. Many koi keepers prefer females as show fish because they tend to grow larger. Others prefer male koi as they develop faster and are less likely to outgrow the confines of the pond. Some feel that goldfish and koi males have slightly brighter colors. Avoiding having koi spawn may be desirable as the rough and tumble spawning process can damage valuable fish and the release and deterioration of eggs and milt can degrade water quality. Of course, if you are trying to breed goldfish or koi it is important to know the sex of each individual. To control the time of spawning, the males and females are often separated beforehand. Selected individuals can then be paired to improve the quality of the offspring. Separating the sexes beforehand is also helps induce spawning.

Short of using a high-tech method like DNA analysis, it is difficult to impossible to determine the sex of koi or goldfish before they are mature. Sexual maturity usually occurs at about one year of age in goldfish but the range can be from nine months to almost two years. Goldfish will generally be three to five inches when they become mature. A few koi males are mature when they are not much more than one year old but, generally, koi are not mature until they are at least two and some females will not be mature until they are three years

old. Fish mature more quickly in warmer water. Determining the sex of goldfish and koi becomes much easier as the spawning season approaches.

There are numerous approaches to judging the sex of a goldfish or koi:

- conformation,
- tubercles,
- vent shape,
- expressing milt,
- cannulation, and
- behavior.

Some approaches are more reliable and others are easier to use. It is common to use more than one characteristic in determining sex and the amount of effort invested in determining the sex depends on the level of accuracy required.

Conformation

The overall shape of the body, or the conformation, is the most common characteristic used to determine the sex of display fish. This is characteristic is subjective, requires a trained eye, and is far from fool-proof. Females tend to be broader and more robust whereas males are more streamlined. Females also become deeper-bodied than males. This is particularly useful in evaluating goldfish in aquaria where they are viewed from the side. As the breeding season approaches, females develop roe and the differences become more apparent. Females developing eggs may become slightly asymmetrical or lop-sided with one side bulging more than the other. Improper feeding practices and some health-related issues can cause a koi to develop a "pot

belly” which makes it nearly impossible to use body conformation as an indicator of gender. Body shape can be somewhat useful in determining the sex of comets or shubunkin goldfish, but is of less value when evaluating ryukin, ranchu and the fancier varieties which always have a distended abdomen. The females will still become broader as the eggs develop, but the change may not be as obvious.

There is a tendency for the leading ray of the pectoral fins to be longer and thicker in males than females. This is not a reliable characteristic and even less useful in long-fin varieties. In females, the leading ray of the anal fin may be thicker. Typically, the overall body shape is used to indicate the sex, but if being positive about the gender is imperative then other characteristics must be considered as well.

Tubercles

Breeding tubercles often develop on the gill opercula (gill plates) and/or the leading edge of the pectoral fins of male goldfish and koi. In the spawning process, the male will position the female at the surface between himself and the spawning substrate (aquatic plants or artificial spawning material). The male will push the female's abdomen up and towards the spawning material which causes her to release eggs as the male simultaneously releases milt. The breeding tubercles are thought to help the male get traction and keep from slipping when he presses against the female's abdomen.

Some describe the breeding tubercles as a sand paper texture on the gill plates. Others say they are small bumps. Koi are less likely to have

tubercles on the pectoral fins than are goldfish. On goldfish, there is often what appears to be a row of white pimples on the leading edge of the pectoral fins. However, breeding tubercles are not always present and they may disappear after the breeding season. Some males never develop tubercles. Older males are more likely to retain tubercles throughout the year. The presence of breeding tubercles is a pretty good sign that the fish is a male, but the absence of tubercles does not necessarily mean it's a female.

Vent Shape

The shape of the vent can provide useful clues about a fish's gender; particularly as the breeding season approaches. A male's vent tends to be elongated or triangular in shape. There may be a distinctive elongated genital papilla on the rear portion of the vent opening. A female's vent is more round. As the spawning season approaches, the female's vent will begin to protrude and take on a convex instead of a concave shape. During the spawning season, the female koi vent often has a blush of red color around its perimeter. The goldfish female has a distinctly protruding vent which can be easily seen from a side view as the spawning season approaches. Some goldfish males develop a slight ridge on their abdomen which extends from the pelvic fins back to the vent opening.

Goldfish can be netted and held upside down to inspect the vent. For koi which are two years old or more, it is usually necessary to anesthetize them to keep them from struggling while the vent is inspected. Both koi and goldfish can be anesthetized with clove oil which is usually available at the local pharmacy.

Mix ten drops of clove oil per gallon of water and transfer the fish to clean aerated water immediately after inspection to revive it.

Expressing Milt

When inspecting the vent, check for the presence of milt. Males will usually have milt before and during the breeding season. To check for milt, press the abdomen between the thumb and forefinger while simultaneously running your hand back towards the vent. This is a milking action. Use no more pressure than is needed. For koi, this is about the same amount of pressure needed to dimple a tennis ball. Watch the vent closely for the presence of the white milt. The presence of milt definitely proves the fish is male. The absence of milt tells you very little but may be a useful clue when combined with other characteristics such as vent shape. On rare occasions, eggs may be expelled when checking for milt. This will only occur during a short period of time after the fish has ovulated and it indicates that spawning is eminent. The area between the pelvic fins and the anal fin is often more pliable in females while this area is firm in males.

Cannulation

Cannulation involves inserting a small tube into the fish's vent and removing a sample of eggs or milt. It is most often used to check for the stage of egg development when using hormone injections prior to artificial spawning. However, cannulation can also be used to determine sex. A small plastic or glass tube with an inside diameter of 0.9 to 1.0 millimeters is connected to a length of flexible surgical tubing. The end of a plastic cannulation tube should be cut smooth with a scalpel (not

scissors) and lightly flamed to remove the sharp edge. A glass tube should also be scored with a file and broken and then flamed to remove sharp edges. With the fish anesthetized, the tube is inserted into the vent. The vent area has an anal opening to the intestine and a urogenital opening to the gonads. The anal opening is in the front and the urogenital opening is to the rear. The tube is inserted into the urogenital opening at an angle which generally points towards the nose of the fish. The tube is inserted about 1/8 to 3/8 -inch for goldfish or 1/2- to 1-inch for koi. The flexible tubing is held in the mouth (your mouth, not the fish's mouth) and a slight suction is used to draw a sample of eggs or milt into the cannulation tube. If the fish is a male, the sample will be a white milky fluid. If it is a female, eggs will be found. The eggs will be about the same size as the inside diameter of the tube.

This technique must be used with some caution. Practice on fish which you can afford to lose before using cannulation on your best breeders. The immediate danger is that the tube will puncture the wall of the gonad. A more insidious danger is that water will be inserted into the end of the ovary causing eggs to swell and create a blockage called egg impaction. This is a serious condition which can kill the fish.

Behavior

A final way to determine the gender of a goldfish or koi is by watching its behavior at spawning time. Some say that if a known female is introduced into a tank or pond, all the males will soon come over to "check her out" while the other females will show little interest. Several days before spawning,

“chasing” or “following” will begin. Males will follow ovulating females around; often staying just behind and below them. Other females will show no interest. Males will occasionally chase other males, but only when there are no females present. The chasing behavior will intensify as the spawning day nears.

Spawning usually begins early in the morning – well before dawn in koi and about dawn in goldfish. The fact that the fish are spawning is usually obvious because there will be some foam on the water and every few minutes there will be the tell-tale splash as a male bumps a female pushing her up out of the water. Usually, one or two males will be doing all the heavy lifting and will be fertilizing most of the eggs. However, it is not uncommon for other smaller males to attempt to take part in the spawning process and their behavior at this time can be used to discern the sex of nearly all the fish in the pond or tank. Of course, by this time, it is too late to do much except sit back and watch.

Since most koi and goldfish have distinctive markings which can be used to differentiate individuals, this may be a good time to make some sketches and notes on which fish are males and which are females. Next time, you may want to separate the sexes beforehand or control the pairings. Thus, having a list of who's who will be very useful and save a lot of time and effort when trying to sort them all out again