

# ARTIFICIAL SPAWNING PROTOCOL FOR CENTRARCHIDS

Dan Bolnick  
University of California at Davis  
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## PROTOCOL

### A. Hormone treatment: 4 hours before crossing

#### *Equipment needed:*

MS-222

anesthetic container

gloves

scale for weighing fish (spring scale or digital scale)

Syringe

Cotton swabs and ethanol

Tape and sharpie

Holding tank

Do this on at least 1 male and 1 female simultaneously, preferably have species A (M+F) and species B (M) present. For reciprocal crosses, treat at least 4 fish: A (M+F), and B (M+F).

1. Prepare anaesthetic solution (MS-222 or Benzocane)
  - a) MS-222: 100 mg/L of water, 5 minutes to euthanize, 30-90 seconds to anesthetize
2. Put on gloves before handling fish
3. Place fish in MS-222 solution until it has stopped moving for 30-60 seconds.
4. Weigh fish
5. Calculate ovaprim dose

Mass(g)	Dose (ml)
25	0.0125
50	0.025
100	0.05
150	0.075
200	0.1
250	0.125
300	0.15
350	0.175
400	0.2
450	0.225
500	0.25
550	0.275
600	0.3
650	0.325
700	0.35
750	0.375
800	0.4
850	0.425
900	0.45
950	0.475
1000	0.5

6. Swab syringe with ethanol
  7. Fill syringe with the calculated dose (not more).
  8. Hold syringe upright and tap/squeeze to expel air bubbles
  9. Inject dose into belly or muscle just below dorsal fin, taking care to slide needle under scales before piercing the skin.
  10. Return fish to a holding tank. Be sure to mark the tank with tape to identify the species, treatment, and treatment time.
  10. If fish is in breeding condition, it should be ready to spawn within 4 hours. If not in breeding condition, allow 5-10 days before a second dose then spawning a few hours later.
  11. swab down syringe with ethanol again before putting away
- 

**B. Stripping:** Sources: Childers and Bennett, Childers 1967, Smitherman and Hester

This protocol is for reciprocal crosses. For a single cross, use 5 petri dishes, for a single species dam but with control and heterospecific cross use 10 petri dishes.

Note: crossing 4 males by 1 female can take < 5 minutes

*Equipment needed:*

Aged tap water (let stand > 1 day, **preferably aerated for a week or longer**)

20 Petri dishes

Gloves

MS-222

Anesthetic container

2-4 Recovery containers

Lab notebook and pencil

Milt can be diluted in 10 ml water and use 1 ml per fertilization, but sperm should be used within 15 seconds (< 1 minute limit) of stripping. Eggs should be used within a few minutes (< 30 min)

1. For each cross ready: 3 petri dish with a little water  
( 5 mm deep “film of water”)  
4 petri dishes filled with aged tap water  
1 large (1 L) beaker filled with aged tap water.
2. Fill anesthetic container with 100 mg/L MS-222
3. Either rinse and dry hands, or use wet gloves for handling fish
4. Anesthetize at least: 1 female fish and 1 male (if doing 1 cross), or more males/females. After 30-60 seconds, transfer to recovery container. If fish wake

- up prematurely, return to MS-222. Do not leave fish in MS-222 longer than 2.5 minutes (for an adult bluegill).
5. Strip eggs from female A into 1 damp Petri dish: “Gentle stroking motions with fingers on either side of abdominal region toward the vent. If eggs did not come with gentle pressure they generally were not ripe... watch classes contain a film of water”. Presumably stroking anterior to posterior.
  6. Immediately mix the eggs with a gentle swirling motion, then split into 2 batches in separate damp Petri dishes (not much water, maybe 5-20 mL water depending on size of Petri dish, - this low amount of water prevents eggs from sticking to substrate because fluid from female stops sticking until it is diluted. The mixing is needed because the first eggs to come out may be more ripe than later eggs.
  7. Return female to recovery container
  8. Strip sperm from male A over one dish of eggs, sperm from male B (if present) over the other dish, using same stroking motion.
  9. Shake dishes vigorously to mix milt and eggs: this shaking must be done within 30-60 seconds of stripping milt.
  10. Let dishes stand for 2 minutes.
  11. Label dishes with appropriate cross number (1,2,3...) and in lab notebook, record the cross number, species A \* species B mm/dd/yyyy
  12. If doing a reciprocal cross (A\*B and B\*A), then repeat steps 4-11 using the other species female.
  13. After 2 (not more than 5) minutes for fertilization, transfer ~100 eggs or more into up to 4 new Petri dishes per cross and fill with aged tap water. Mortality is higher when >300 eggs per dish. The water dilutes the egg fluid and the eggs with adhere to the bottom of the dish.
  14. Leave undisturbed for 10-15 minutes for eggs to adhere and harden, then rinse Petri dish by raising and lowering dish gently in a beaker of water 4 or 5 times.
- 

### C. Care of fertilized eggs.

#### *Equipment needed:*

Binocular microscope

Tray

Air pump

Air stone

2 Counters

1. Choose at least 1 petri dish per cross and count + record all eggs. Keep track of which dish was used to count eggs, fertilization, and hatch to make sure all from same dish(es)
2. Place Petri dishes in a tray filled with aged tap water so that the water level is over the top of the dishes. **gently** aerate the tray water with an air pump and air stone.

3. 1-3 hours after crossing, remove one Petri dish and place under microscope. Count and record the number of fertilized and unfertilized eggs (look for dividing zygotes by looking for a blastodisc) under binocular microscope.
  4. Incubate at ~ 25 degrees C with enough water to cover zygotes (2-8 mm).
  5. Change water 4-6 times daily by pouring off 50% -75% of the water. Check for fungal infections: if possible, count how many eggs are affected and remove all infected eggs immediately.
  6. Incubation time is 1-3 days.
  7. When zygotes hatch, count number of larvae in the dish for comparison with # eggs at start, to get the % of eggs hatching.
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#### D. Care of hatched larvae before swim-up.

##### *Equipment needed:*

Aquarium

Air pump

Air stone

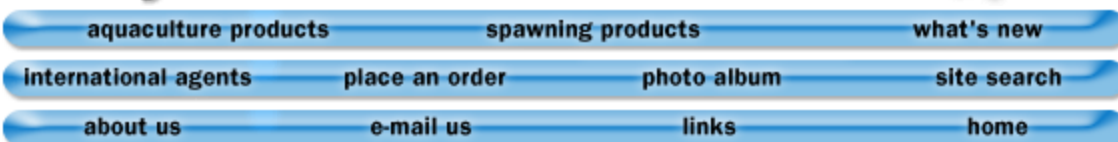
When eggs hatch, place the Petri dishes with the larvae in an aquarium with water kept in constant gentle motion by an airstone placed on the bottom (or equivalent). Incubation temperature of 22-27 degrees C is fine (71 to 84 degrees F) (Merriner incubated pomoxis and micropterus eggs at 18.3 C, Lepomis at 25 C).

After 7 days the larvae can do sustained swimming (measure swim speed?) and after 10 days parent usually abandons nest. Feed with protozoan infusion, brine shrimp larvae. After 2 months feed with frozen adult brine shrimp

To raise to adulthood: Transfer to 10' diameter 2.5' deep plastic pools fertilized with 100 lb 8-8-2- fertilizer per acre, maintain max transparency of 18 inches (40 lb 20-20-5 at 2 week interval). Feed and cover with something to minimize predators.

## HORMONE PRE-TREATMENT

[http://www.syndel.com/spawning/ovaprim\\_product\\_information.html](http://www.syndel.com/spawning/ovaprim_product_information.html)



### *Induced Spawning of cultured fish using OVAPRIM*

#### Product Information

##### **General Features:**

Ovaprim is a liquid peptide supplement that is used:

- ? to compress the spawning season,
- ? to coordinate spawning times,
- ? to increase milt production in males,
- ? safely and with predictable results.

Ovaprim utilizes the fish's own hormonal control mechanism to safely induce maturation and coordinate spawning dates. When used the normal spawning cycle, Ovaprim can synchronize and coordinate maturation in treated fish by significantly advancing maturation without affecting viability or fecundity. Ovaprim has been tested and proven effective in 6 species of salmonids and several other cultured species. Ovaprim is a licensed and registered product throughout the universe.

##### **Product Description:**

Ovaprim

- ? contains an analogue of salmon GnRH, the native peptide found in most teleost fish,
- ? also contains a dopamine inhibitor that is required in many cultured fish species,
- ? is a peptide supplement that is delivered in an inert vehicle,

- ? comes in a formulated concentration that can be used in any size of fish,
- ? will begin to induce maturation immediately (species dependant) after injection for fast results.

A single dose of Ovaprim is normally sufficient to induce maturation. Initial priming doses can be used to potentiate maturational effects. Ovaprim comes in self-sealing bottles of two sizes, 10 and 100ml. Injections of Ovaprim are delivered to the peritoneal (abdominal) cavity using a standard needle and syringe. Ovaprim can be used in photoperiod-controlled or temperature-controlled fish and can be used in conjunction with other therapeutants as advised by a veterinarian.

**Applications:**

Ovaprim has greatest efficacy when used:

- ? on fish with a documented history of spawning dates,
- ? to synchronize and coordinate maturation during the normal spawning season,
- ? to advance spawning times of later spawning fish in the normal spawning season,
- ? to increase milt production in males.

**Method of Action:**

In natural spawning, nerve cells in the brain deliver GnRH to the pituitary. The GnRH serves to liberate gonadotropins from pituitary cells. The gonadotropins then direct maturation of the gonads through gonadal steroid hormones. Ovaprim contains an analogue of salmon GnRH and a brain neurotransmitter (dopamine) inhibitor. The GnRH in Ovaprim elicits the release of stored gonadotropins from the pituitary. The dopamine inhibitor serves to remove any other inhibition of GnRH release and effect. The outcome of using Ovaprim is a burst of ovulatory hormones from the pituitary that induces final maturation of the gametes via gonadal steroid hormones. These steroid hormones are essential to final gamete maturation. The final maturation of gametes using Ovaprim does not interfere with spawning behaviour or gamete viability.

Ovaprim can expedite the maturation process in a predictable and repeatable fashion. Ovaprim supplies an exogenous source of salmon GnRH analogue which is more potent than either native salmon GnRH or LHRH. When used during the spawning season, the salmon GnRH analogue in Ovaprim immediately promotes the release of stored gonadotropins from the pituitary. This action of using the fishes own endocrine system works without adversely affecting viability or fecundity.

**When to Use:**

Ovaprim has the following uses:

- ? Induces maturation before the normal spawning season:
- ? stimulates milt production for a longer period and for greater volume,
- ? moves fish forward in the spawning season,
- ? maximizes reproductive potential in all spawners within a population,
- ? conserves genetic material in a population, between populations or in endangered stocks.
- ? Coordinates maturation during the normal spawning season:
- ? spawns a population in a shorter period of time,
- ? maximizes hatchery labour and infrastructure by concentrating efforts,
- ? moves fish through lifestages as a tightly-packed group according to spawning date,
- ? reduces overlap of hatchery duties due to protracted development of hatchery fish.

- ? Re-starts stalled maturation:
- ? handling stress may arrest maturation, Ovaprim can restart the process,
- ? reversing the affects of handling is done by the same action of stimulating the fishes own endocrine system,
- ? using Ovaprim post-transport may reduce the incidence of transport shock.

**How to Use:**

Anesthetize the fish as directed by a veterinarian using the appropriate dose of tricane methanesulphonate (TMS) or Marinil. Once anesthetized, weigh the fish and return to the anesthetic bath. Determine the dose for that fish. If the population has a small variance in median weight, a single dose of Ovaprim can be used for all fish that negates weighing. Work with sterile equipment and clean surfaces to limit infection potential.

For use in salmonids: invert the fish and hold head down in the anesthetic bath. This reduces the pressure on the fishes gills caused by the weight of internal organs as you invert and suspend the fish. Under the fishes left pelvic fin is a depression that has few or no scales. This area also has a thin body wall. At this location penetrate the body wall and slowly deliver the Ovaprim into the body cavity. The suspended fish will have its gonads at the forward portion of the body cavity and the left gonad is generally smaller due to the positioning of the liver. Observe if there is any bulging of adjacent tissues; this indicates an intramuscular or subcutaneous injection and reinsertion of the needle will be required. Before withdrawing the needle, leave it in place for a few seconds after delivery of the Ovaprim; this will prevent back-seepage. Transfer the fish to a clean aerated bath to recover.

For other, smaller species: secure fish on a soft wet surface such as a sponge. The heat from your hand may harm some smaller, coldwater fish; handling for extended periods should be avoided. Place the fish on its side and inject into the rear abdominal cavity to avoid contact with internal organs. Smaller fish may require an appropriate needle size that will take longer to deliver the liquid. As with salmonids, leave the needle in place for a moment after delivery to prevent seepage. Transfer the fish to a clean aerated bath to recover.

**Precautions:**

- ? Ensure instruments and affected areas are clean.
- ? Keep anesthetics and Ovaprim out of direct sunlight.
- ? Use a needle guard to limit the penetration of the needle into the fish.
- ? Ovaprim is viscous. Use an appropriately gauged needle and syringe. Do not warm the liquid.
- ? Intramuscular injections are also possible, but the injection site may bleed.
- ? Check that any other treatment of the fish is not contraindicated.

**Species List:**

Ovaprim contains salmon GnRH analogue. Salmon GnRH is common to most teleost fish. Ovaprim can be used on all teleost fish including: salmon, catfish, perch and perch-like fish, groundfish such as flounder, halibut, cod and sablefish. Ovaprim can also be used on fish such as sturgeon, gars, bowfin and others.

**Predicted Results:**

Ensure fish are anesthetized prior to handling. Treated fish should be checked for signs of maturation 4-10 days post-treatment for salmonids and after 4 hours for most warm water species

treated during the spawning season. When checking for ripeness, a steady stream of eggs or milt and a soft abdomen is a reliable indicator of full maturation. Males may respond in a shorter period of time and will produce copious amounts of milt throughout the spawning season.

### **Considerations:**

Ovaprim serves to mature fish in advance of the normal population. Ensure both males and females are implanted in equal number. If you are using Ovaprim for the first time, consider including an equal amount of untreated fish in your plan as a control group. This will allow a reliable comparison of treatments.

There are limits to how far spawning date can be advanced in a given population. Unrealistic dates of advancing maturation should be avoided in first-time users. Duration of the normal spawning season is another consideration. Maturation date can be readily moved, but if the spawning season for a population is long, early spawning fish within the population will be induced to mature and late-spawning fish may be unaffected. Therefore, grading for maturation would be recommended for this population and treated as two groups with two different treatment times. Treatment of fish with a single dose of Ovaprim is only affective in fish that are within or near their natural spawning season. Further advancement of spawning date can be achieved with repeated doses or by using Ovaplant implants.

### **Presentation:**

Ovaprim is a liquid shipped in resealing bottles containing 10 or 100ml. The liquid is formulated at a fixed concentration. Varied doses are achieved by delivering fewer or greater volumes. The liquid vehicle is a biodegradable compound that is not harmful to fish or humans. Ovaprim should be stored in a dark environment at room temperature or colder. Avoid contact with direct sunlight.

### **Safety and Handling:**

As with any chemical compound, humans should not consume Ovaprim, avoid direct contact. Keep out of reach of children. Keep the bottle upright in storage and between uses.

### **Dose -**

Weight the fish.

The recommended starting dose of Ovaprim is 0.5 ml per kilo of body weight. . e.g. If the fish weighs 2 kg, use 1 ml of Ovaprim. Male and female doases are similar , although males carps often require less. Ensure that an edequate ratio of males and females are induced at the same time.

### **Injection:**

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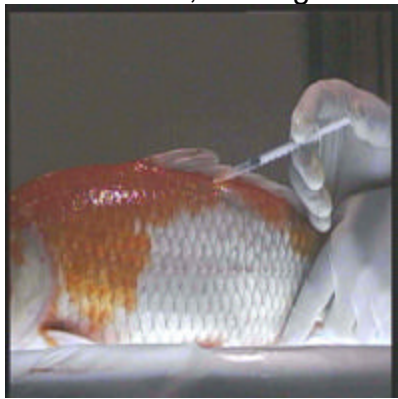
From the bottle of Ovaprim withdraw only enough solution as will be required for the fish according to the weight of the fish. With the needle pointed upwards, squeeze the syringe gently to expel any trapped air.

**Handling-** Hold the fish in one hand and the syringe in the other. The fish should be upside down in one hand with the head facing away from the person injecting the fish.



### **Injection -**

Insert the needle into the belly of the fish or the muscle just beneath the dorsal fin, making sure that the needle tip is carefully injected under the scales before piecing the skin. Inject Ovaprim quickly.



### **Cleanliness -**

Ensure that all equipment is clean and , if possible, sterilized. Always clean the needle with a cotton swab soaked in rubbing alcohol before and after each injection. Wear gloves .

### **Recovery -**

If the fish is sedated , make sure the fish has recovered before returning it to the breeding tank.

**Spawning-** return the fish to the breeding tank. Spawning should start to take place in a few hours - [see field trial results here](#). More than one fish may be induced at the same time.

Most frequently , it is the female fish that requires help to spawn her eggs. However , Ovaprim is equally effective in inducing males to sperm. The same procedure is used. Usually , a lesser concentration ( about 0.2 to 0.3 ml/kg body weight) is required for the males. Take

heed : higher dosages may retard spermiation.

CULTURING INFUSORIA TO FEED LARVAE

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# Malachite Green

## Disease Treatment

Item No. 37411-1 fl oz; Item No. 37444 - 4 fl oz

### KPD-26

#### PURPOSE AND BENEFITS

Kordon's Malachite Green is an effective medication used for the control of various external parasites of freshwater and marine fishes. When used as directed the medication will control or prevent the following common protozoan parasites: Ichthyophthirus (freshwater Ich), Costra, Chilodonella, Ambiphyra, Cryptocaryon (marine Ich), Epistylis, Oodinium and Trichodina. Kordon's Malachite Green is also effective against common external fungal infections of fishes and eggs which include Achlya and Saprolegnia. An extensive body of literature supports its use as an effective agent in the control of fungus on fish eggs.

#### GENERAL DIAGNOSIS OF PARASITIC DISEASES OF FISHES

The following brief summary of clinical signs often associated with the parasitic protozoans discussed above is intended only as an aid for the beginning aquarist. It is not to be thought of as a definitive diagnostic key. It is also important that the aquarist or pond keeper consult appropriate, accurate references for more specific information regarding disease problems of fishes. In addition, if possible, skin and/or gill smears should be made and examined by a qualified fish diagnostician. Microscopic examination is recommended and is always essential for confirmation of a particular disease. In the clinical signs indicated below, a particular description may be followed by a specific disease causing organism in brackets. It should be qualified that different clinical signs can be seen during the disease process and that these can occur as the result of more than one disease causing organism.

#### CLINICAL SIGNS

Increased respiration; loss of normal body color; presence of discrete white spots (freshwater or marine Ich); white areas on the body with circumscribed red perimeter [Epistylis]; scratching on tank bottom or on objects; lethargic behavior; white tufts or strands on body [Fungus]; dust like "peppered" spots on body surface, having a yellowish cast [Oodinium]. For detailed information on fresh water ich, click here: [LIFE CYCLE OF ICH](#)

#### SPECIFICATIONS

Contains zinc free, chloride salt of malachite green. Provided as a 0.038% solution.

#### DIRECTIONS FOR USE

Use 1 teaspoon (approximately 6 ml) per 10 gallons of water for most treatments. This produces a concentration of 0.05 ppm (see Toxicity and Suggested Treatment Procedures

for qualifying information). At this concentration, 4 ounces of Malachite Green will treat 240 gallons of water.

### **SUGGESTED TREATMENT PROCEDURES**

The following procedures are suggested for both freshwater and marine systems, unless otherwise noted. Remove any activated carbon filter material from the system as it will lower the treatment concentration. The drug will bind with certain materials such as silicone sealants, porous rocks, gravel and coral; hence, exposure to these can effectively reduce the therapeutic dosage as well as cause unsightly stains. If used in new aquariums, the dye can permanently color the silicone sealant. It is also recommended that excessively porous materials be removed prior to treatment, since they will become permanently colored. In established aquaria and outdoor ponds, the buildup of excessive debris and organics can reduce the therapeutic dosage of Malachite Green. Making the recommended water changes outlined in the treatment schedules will reduce the possible removal of the drug from solution by organics.

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### **Prevention or treatment of fungus on fish eggs:**

#### **Method 1 (Short Term Bath):**

- (a) Change the carbon in the outside filter or add an outside filter with fresh carbon to the hatchery tank. Use a high quality liquid phase activated carbon.
- (b) Start the filter.
- (c) Add 10 teaspoons of 0.038% Kordon Malachite Green per gallon of water. This produces 5 ppm activity of the drug.
- (d) Allow filter to run and allow it to remove the Malachite Green from the water for one hour. Note: If any color remains in the water after 1 hour, perform a partial water change of at least 25% change filter carbon and allow it to remove any additional Malachite Green.
- (e) Repeat treatment once a day prior to the hatching of the eggs. Discontinue after the eggs hatch.

#### **Method 2 (Dip)**

- (a) To a clean, non-metallic container, add 1 gallon of aged hatchery water, or water treated with NovAqua.
- (b) Add 5 fl. oz. of 0.038% Kordon Malachite Green (approximately 149 ml). This produces a concentration of 1500 ppm.
- (c) Agitate the solution with an airstone and adjust for a moderately strong flow of air.
- (d) Collect eggs in a net or grasp the object on which eggs are attached and dip them for not more than 10 seconds. Immediately replace the eggs into the original hatchery tank. Note: This is a one time treatment only. Do not repeat. The dip solution may be kept for future use. Keep container tightly capped when not in use.

### **Treatment for fungus on fishes**

- (a) Transfer fishes to a separate quarantine tank, if possible.
- (b) Remove carbon, clean outside filter and return to use with clean mechanical filter media.
- (c) Calculate the actual volume of water to be treated, taking into consideration the displacement of water by sand and rock.
- (d) Add 1 teaspoon of Malachite Green per 10 gallons of water to the tank. This will produce a concentration of 0.05 ppm.
- (e) Make a partial water change of at least 25% every 24 hours and re-treat. Superficial fungal infections will respond to a single treatment, while more advanced, deep seated mycosis will require additional prolonged therapy. The disappearance of the strands (fungal hyphae) from the affected areas signals a successful treatment.
- (f) Upon completion of the treatment, return fishes to the original aquarium (if moved) and add Kordon's NovAqua or PolyAqua.

### **Treatment of ectoparasites:**

The following procedure is applicable for control of ectoparasites in established aquaria, quarantine tanks, and outside ornamental ponds.

- (a) Transfer fish to a separate quarantine tank, if the treatment is to be used as a preventative measure. Note: while the fish may be treated in an established aquarium or moved to a quarantine tank, certain parasitic life cycles will require treatment in the aquarium or pond where the outbreak occurred, rather than movement of those fishes which have been clearly affected.
- (b) Remove carbon and clean outside filter. Replace filter media and return to use without the carbon.
- (c) If the treatment is being performed in an established aquarium or ornamental pond, it is recommended that a 25 to 50% water change be performed before treatment. Add Kordon's NovAqua when making water changes.
- (d) Calculate the actual volume of water to be treated, taking into consideration the displacement of water by sand and rock. (To calculate the aquarium's capacity measure its length, height and width in inches, multiply these dimensions together and divide the result by 232. Your answer will be the amount of water in gallons.)
- (e) Add 1 teaspoon of 0.038% Kordon Malachite Green per 10 gallons of water. This produces a concentration of 0.05 ppm. For treatment of Ichthyophthirius the dosage can be increased to within a range of 0.10-0.15 ppm. However, this is not advisable for use when used with delicate fishes (see Toxicity). Whenever possible, temporarily increase the water temperature during treatment with Malachite Green. An increase in temperature is beneficial since it speeds up the parasites' life cycle and decreases the required treatment period. The required total treatment period of any parasite must take into consideration the prevailing ambient water temperature and the parasites' life cycle.
- (f) Repeat the treatment with a partial water change of at least 25% daily. Add Kordon's NovAqua before replacing new water.
- (g) Upon completion of the treatment, return the fish to the original aquarium or pond (if transferred to a quarantine tank) and add Kordon's NovAqua or PolyAqua. If the

treatment took place in the original aquarium or pond, change 40% of the water and replace the activated carbon in the filter.

### **MODE OF ACTION**

Malachite Green is believed to bind strongly with the internal cytoplasmic structures of parasites and interfere in normal metabolism.

### **CONTRAINDICATIONS**

Kordon's Malachite Green is not indicated for the treatment of bacterial diseases with the exception of columnaris disease (*Hexibacter columnaris*), which has been demonstrated to show sensitivity to the drug. The drug is not recommended for use with fry and "scaleless" fishes (see Toxicity). This drug is primarily intended for the control of external parasites and fungi in freshwater and marine fishes. It is a drug of choice for common Ich (*Ichthyophthirius*).

### **STABILITY**

Kordon's Malachite Green is stable indefinitely in the 0.038% solution.

### **COMPATIBILITIES**

Kordon's Malachite Green is compatible when used in combination with formalin or Trichlorfon. The product is safe for use in recirculation systems with biological filtration when the concentration of Malachite Green does not exceed 0.10 ppm. Malachite Green is also compatible with Kordon's NovAqua® and PolyAqua®. Kordon's AmQuel® will reduce or eliminate Malachite Green depending upon the amounts in the water.

### **TOXICITY**

The toxicity of Malachite Green varies with a number of factors including species of fish and its size, and less with prevailing water conditions. Malachite Green can be used at concentrations of 0.05-0.15 ppm. Used at 0.05 ppm, most species can be treated with little if any toxicity problems. However, care must be exercised when treating known sensitive fishes such as dwarf cichlids, barbs, tetras, gouramis, livebearers, catfish, loaches, mormyrids and scaleless fishes. Keep the fishes being treated under close observation and stop treatment, filter the water with activated carbon and perform a water change if any undue signs of stress are noted. AmQuel can be used to reduce treatment concentrations. Caution must always be exercised when using this product at dosages higher than 0.05 ppm. It is recommended that the literature be consulted in such cases for additional information on treatments.

Water conditions in general do not significantly influence the toxicity of the drug and therefore are not prime considerations for altering treatment procedures. When the drug is used in short term exposures, Malachite Green may tend to be more toxic to some species in warm water than in cold water. Preliminary experiments have demonstrated that hardness or pH of the water has a negligible effect on increasing or decreasing the toxicity of the drug.

The effect on marine invertebrates is presently unclear and is not recommended. Until such information is available, use extreme caution if using Malachite Green in aquariums with invertebrates.

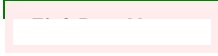
Click here to return to Kordon's [Home Page](#)

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<http://www.fishdoc.co.uk/treatments/malachite.htm>

## **Malachite green and formalin** **a good general-purpose anti-parasite treatment**

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<p style="text-align: center;"><a href="#"><u>Disease Treatments</u></a></p> <p style="text-align: center;"><a href="#"><u>Home</u></a></p>
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Malachite Green and Formalin are one of the main cornerstones of fish disease treatments having been used for many years against a range of parasites. They can be used together or separately as anti-parasite treatments against *Gyrodactylus* (skin flukes), *Dactylogyrus* (gill flukes), *Ichthyobodo* (*Costia*), *Trichodina*, *Chilodonella* and *Ichthyophthirius* (white spot).

The dynamic duo of MG&F is the treatment of choice against white spot (Ich). The relatively long active life of this treatment, together with the low filter toxicity makes it ideal for tackling the complex life cycle of this protozoan parasite. It also has a high success rate with *Costia* and *Chilodonella* and would, in most circumstances be my first choice. I have found a mixed result with *Trichodina* and flukes sometimes a total success, but in other cases not so good. It seems likely that the stronger dosage is needed against these two parasites and a follow up examination to assess the success of the treatment.

Malachite green has powerful anti-fungal properties and is used against *Saprolegnia* (fungus) either when present on fish or to as a prophylactic treatment to protect fish-eggs from infection. It is important to realise that in most cases, fungal infections of fish are secondary infections and unless the primary infection - quite often bacterial - is resolved then anti-fungal treatments such as malachite are unlikely to be successful.

**Malachite green and formalin are toxic poisons**

Malachite green acts as a respiratory poison, damaging the cell’s ability produce energy to drive vital metabolic processes. Formalin is a powerful disinfectant used to kill microorganisms or as a preservative for biological specimens. It works by reacting with cell proteins and nucleic acids - altering both structure and function. These chemicals can be used separately but are usually used together because they exert a synergistic effect; that is, together they give a greater effect than the sum of their separate individual capabilities.

They exert a mild anti-bacterial effect and in most circumstances will not destroy biological filtration bacteria, although they may ‘knock the filter back’ for a short while. However, it is still advisable to turn off or by-pass the filter system for a few hours if possible and as with any treatment always turn off any UV lamps. When using to treat against *Ichthyophthirius* (white spot or Ich) then it is important to keep the system running in order to destroy all stages of the parasite’s life cycle.

During prolonged treatments, especially when the filter has not been isolated, it is important to test for ammonia and nitrite on a daily basis in case the filter has been affected.

