

Ornamental Fish Farming

to disinfect the filter. (There should be no significant ammonia build-up before the second day after introducing the fish if they are fed carefully.) Naturally it is essential to ensure as far as possible that the filter itself is free of any diseases already prevailing on site to prevent these from infecting the fish. For example, using a biofilter from a culture system containing consistently disease-free fish, or using filter medium drawn directly from an activating system. See 5.14 'Biological filtration' in PART 5.

- (5) **Introduce new fish to the quarantine tank with great care**, ensuring that no potentially contaminated water is spilled, or droplets splashed or dropped – even onto the floor. (If water is spilled onto the floor, a little disinfectant such as chlorine or iodophor should be used to disinfect the area.) Newly arrived fish can be transferred to quarantine tanks by pouring them gently into a net resting on a small bucket partially filled with water, so that fish land in water and not onto a dry net. The net and bucket are carried to the quarantine tank, and the fish are transferred to the tank in the net while holding the bucket over, or as close to the tank as possible, to minimize dripping. The waste (packing) water in the bucket is kept isolated and disinfected later with a little chlorine or iodophor. After disposing of the water, the bucket and net used for the transfer are then disinfected in a chlorine/iodophor dip.

Note that stocking densities of fish in quarantine should be kept low, to optimize the fishes' well-being and to minimize the chances of water quality deteriorating.

- (6) Immediately after introducing the fish, **cover the tank** as completely as practically possible to avoid cross-contamination by water droplets produced by aeration. Glass sheets or other non-porous, easily cleaned and disinfected material can be used as a cover. (Sheet plastic or Perspex, being light and unbreakable, are excellent.)
- (7) Clearly **mark the tank 'QUARANTINE'** to avoid inadvertent cross-contamination by equipment or when feeding. Mark the tank with the **date of introduction of the fish**, to record the commencement of the quarantine period.

- (8) **Feeding.** If available, live foods are usually best. They assist the fish in overcoming stress and rapidly regaining optimum health, and should produce a minimum of waste from uneaten food. Over-feeding with any food (which would require mechanical cleaning) must be avoided. Hands or any feeding equipment must not touch the water when feeding.

- (9) **Any equipment used during quarantine must be disinfected.** Disinfectants such as chlorine or iodophor (such as Betadine) can be used at concentrations of around 200 ppm for about 15 minutes for chlorine, or following the manufacturer's directions in the case of iodophor. Liquid chlorine is generally easily available, and highly effective, but will destroy most kinds of netting after exposure. Chloramine T at the same or even higher concentrations is not as likely to do so, or does so less rapidly and is far more stable in water, but is less readily available for purchase and is more costly. Near-boiling water is another good, cheap, quick and clean option for disinfection, without any risk of contamination from 'carry-over' chemicals, but must be used with care to avoid burns to the user.

- (10) **Observe fish closely for the entire quarantine period of preferably at least 30 days. In some circumstances a longer period is advisable. This would be the case for species of fish known to be potential carriers of particularly serious, slow-to-manifest or difficult-to-detect problems such as some sporozoa, GUD (goldfish ulcer disease), and lymphocystis or other viral diseases.**

If fish show any signs of ill health during quarantine, a sample specimen showing the symptoms is examined microscopically to see if the cause can be identified. Various possible actions are given in (11).

- (11) During the quarantine period, depending on what occurs, the following action can be taken:
 - (a) If, after at least 30 days, fish remain healthy and no signs of disease appear, they can be released into the general production area, but preferably kept on their own for a further