

Ornamental Fish Farming

3.4 Lighting

Generally this is not critical for broodstock, though the author's preference is almost always for slightly subdued rather than very bright light. If glass tanks are used it may help to paint or cover three sides for very nervous or timid species, though this need should be rare.

If plastic containers or tank or pond liners are used it is generally better to avoid pure white for holding broodstock. Beige or other lightish or even darker colours are preferable. Natural light, with its slow changes, is also preferable to harsh electric lighting. Electric lighting alone is however also used very successfully, with time switches used to control the time when lights are switched on and off. One can also be used to supplement the other.

Note however that setting timers to switch lights on suddenly, early in the morning (when it is still dark), can be stressful and may interfere with spawning, so a gradual change from dark to full volume is preferable if this can be arranged. Time switches which gradually increase light intensity eliminate the problem of sudden change. The switch-off at night is not a problem from the shock perspective, but late-afternoon spawning may be affected if lights switch off too early.

Another option which works well if there is no natural light source at all and a gradual increase in light can't be provided in the morning, is to provide a very low light intensity which remains switched on through the night. This reduces the impact of the main light source when it switches on suddenly in the morning. A single 25 watt incandescent globe is sufficient for a fairly large area – 100 square metres (1080 square feet), possibly more. Facing the light source upwards spreads the light.

As spawning fish are likely to attempt to follow natural light cycles in their spawning routine (rather than artificial ones), it makes more sense – though is apparently not critical – to commence early morning artificial light to coincide with the dawn, and switch off well after dark when late afternoon spawning should be finished. This also enables a longer-than-natural photoperiod (hours of light) to be maintained through winter, as described below.

The great majority of ornamental fish species will spawn year-round, unaffected by the seasons.

However for those that do exhibit seasonal tendencies, such as goldfish, willingness to spawn year-round can be encouraged by increasing the daily photoperiod (length of daylight hours) through winter to equal or even exceed summer daylight time. This can be done using timers which switch lights on in the late afternoon *before* dark in naturally lit facilities – so that no gradual increase is necessary – and off again later in the evening, with morning light being allowed to arise naturally. For example, a total of twelve hours or more of light can be provided daily in this way.

3.5 Broodstock: numbers, turnover and replacement

The aim when managing broodstock numbers is to ensure that sufficient breeders are always available (year round) to produce an uninterrupted, controlled flow of the required numbers of offspring. The level of difficulty in achieving this is very much dependent upon the idiosyncrasies of the species. It is by far safer to keep more than one group of breeders of each species so as to minimize the chances of total loss of mature broodstock of any species. In this book, broodstock groups are differentiated into working breeders (currently in use for production) and back-up groups which are kept on stand-by, though any mature groups can be used for production if required.

There are several factors which dictate the number of fish needed in each group and how many groups of each species should be kept.

Factors which dictate the numbers of fish required per group:

- **Overall fecundity of the species.** This is the main deciding factor for the number of working breeders that will be needed to produce big enough groups of offspring to fill rearing tanks to the required stocking levels, as needed. Fecundity is rated using attributes which affect output, such as ease and speed of conditioning to spawning ripeness, willingness to spawn, numbers of eggs produced, and their hatch and survival rate.
- **Predisposition of individuals to become unproductive,** for example females becoming egg-bound if unspawned for long periods, or females which become difficult to condition or spawn for temporary periods.