

Supporting evidence and references

Zebrafish behaviour and welfare posters

Zebrafish enrichment: Natural environment

- Wild zebrafish are found in habitats with a variety of vegetation, substrates and water flow rates¹⁻⁴.

Zebrafish enrichment: Plants

- Including plants in the tank is preferable to leaving it barren^{5,6}.
- Environments containing artificial plants may contribute to lower anxiety^{7,8}, reduced stress response⁹, social cohesion¹⁰, better learning and memory^{11,12}, larger brain size⁷, and improved fertility and fecundity¹³ for zebrafish. They also prevent oxidative stress⁹ and improve the fish's ability to cope with pain⁸.
- We recommend monitoring social behaviour after adding plants to the tank, to see if the zebrafish's behaviour changes¹⁴⁻¹⁷.

Zebrafish enrichment: Substrate

- Using gravel, sand – or even an image of gravel – in a tank is preferable to a barren environment⁵.
- Environments containing substrate may contribute to lower anxiety¹⁸, reduced stress response^{9,19}, larger brain size⁷, and higher rates of improved larvae survival¹⁸ for zebrafish. They also prevent oxidative stress²⁰ and improve the fish's ability to cope with pain⁸.

Zebrafish enrichment: Shelter and structure

- Tanks that contain structure such as rocks and shelters are preferable to barren tanks^{5,6}.
- Structured environments may contribute to lower anxiety, reduced stress response, increased exploration, improved learning, and larger brain size in zebrafish, and improve their ability to cope with pain^{7-9,19}.

Zebrafish enrichment: Live food

- Feeding zebrafish live food is widely used to promote short-term enrichment by stimulating their natural predatory behaviour²¹.
- Organisms fed to zebrafish, such as rotifers or *Artemia nauplii*, are not considered sentient.

Zebrafish enrichment: Group housing

- It's preferable to keep zebrafish in group housing rather than on their own or in pairs²²⁻²⁴, as group housing contributes to lower anxiety and faster recovery from stress^{22,25,26}.
- More information is needed on preferred group sizes, however.
- Aggression may be high in small groups of zebrafish (fewer than six fish), so caution should be taken and the fish carefully monitored²⁷.
- Where fish need to be housed alone or in pairs, using clear, perforated barriers will maintain visual and olfactory contact. Providing other enrichment such as plants can help reduce stress^{19,22,28}.

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