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INDICATOR FACTSHEET

WELFARE INDICATORS FOR COMMON CARP

INTRODUCTION AND SCOPE OF THE TEXT

This fact sheet outlines the validated Operational Welfare Indicators (OWIs) for **common carp *(Cyprinus carpio)*** during live transport and harvesting stages. These indicators are practical tools used by **inspectors** to assess welfare status during routine checks and ensure that fish are handled according to scientific and ethical standards. OWIs serve as measurable signs of welfare conditions–ranging from water quality to physical condition of fish–providing consistent benchmarks that allow **National Competent Authorities** and farmers to identify and correct welfare issues promptly. Their simplicity and ease of implementation make them suitable for use even by non-specialist farm personnel.

LEGAL REQUIREMENTS

The welfare of farmed fish in the EU is governed by general legislation, without species-specific rules for common carp. Key legislative texts include:

- **Council Directive 98/58/EC on the protection of animals kept for farming purposes**

  This directive sets general principles for housing, feeding, and care of all farmed animals. For fish farming, it implies that fish must be maintained in conditions that avoid unnecessary suffering, including access to adequate water quality and feeding systems.

- **Council Regulation (EC) 1/2005 on the protection of animals during transport**

  While primarily designed for terrestrial species, this law requires that fish are transported in ways that acknowledge welfare risks and establish measures to mitigate them. For carp farming, this means adapting loading density, travel time, and water quality management to avoid mortality and injury.

- **Council Regulation (EC) 1099/2009 on the protection of animals at the time of killing**

  This regulation sets out conditions for humane slaughter. Although it does not prescribe specific methods for fish, carp farms are expected to apply effective stunning techniques that render fish insensible before slaughter, ensuring minimal pain or distress.

COMMON CARP LIVE TRANSPORTATION

Live fish transportation in case of common carp happens at the end of larvae stage, where the fish are transferred to on-growing ponds. Fingerlings are transferred to the new ponds at a weight of 0.1 to 0.2 g. Plankton availability is critical at this stage. Transportation practices such as fasting, crowding, confinement, netting, transfer to novel tanks, altered water quality parameters, unloading transportation vehicles and transfer to the on-growing ponds, are the main steps for standard operational procedure of common carp live transport, presented in Figure 4.

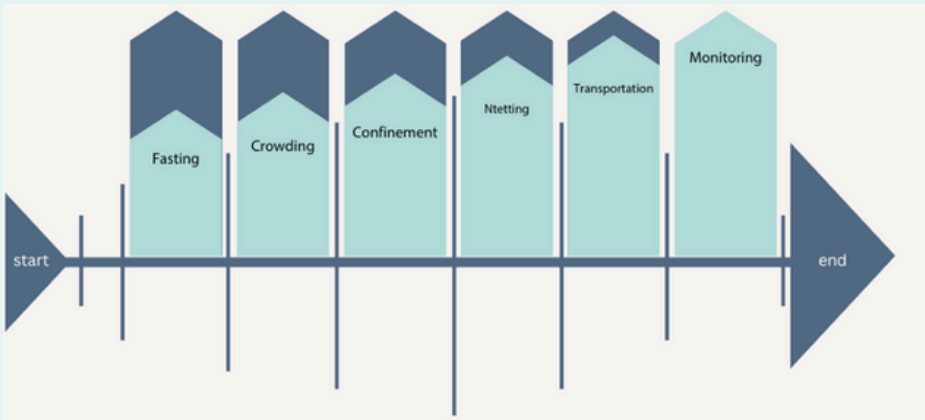

Figure 4. Common carp live fish transportation standard operational procedure steps.

Farmed carp are marketed in two main ways: either live or slaughtered. For slaughtered fish, harvesting involves lowering the water level and concentrating the fish at the pond outlet (monk), which increases fish density and stress levels. For human consumption, the fish are killed by bleeding after being stunned using percussion or electrical current. However, combining both methods is recommended to ensure the fish are rendered insensible.

Harvest starts by decreasing the quantity of feed provided; by the end of September, fish are fed using up the rest of the feed that remains in the feeding plan. Harvest usually begins in mid-October, in larger farms with many ponds, all yearlings of carp are caught in autumn for wintering in wintering ponds. In smaller farms, it is usually in November, but in all cases the water temperature in the pond needs to be as low as possible, preferably below 10 - 15°C. In Central Europe this is usually done from early October to mid-November.

Before slaughter, the fish are crowded at high densities in a fishing spot, which is the deepest part of the pond in front of the lowering monk, with a running water that provides the fish with the best conditions for harvesting. Harvest is carried out using nets (trawls), which size and mesh diameter depends on the size of the fish to be caught and species diversity. The ponds can be equipped with traps where the fish is caught. The trap is a scrubber behind the drain monk, outside the pond with a freshwater supply.

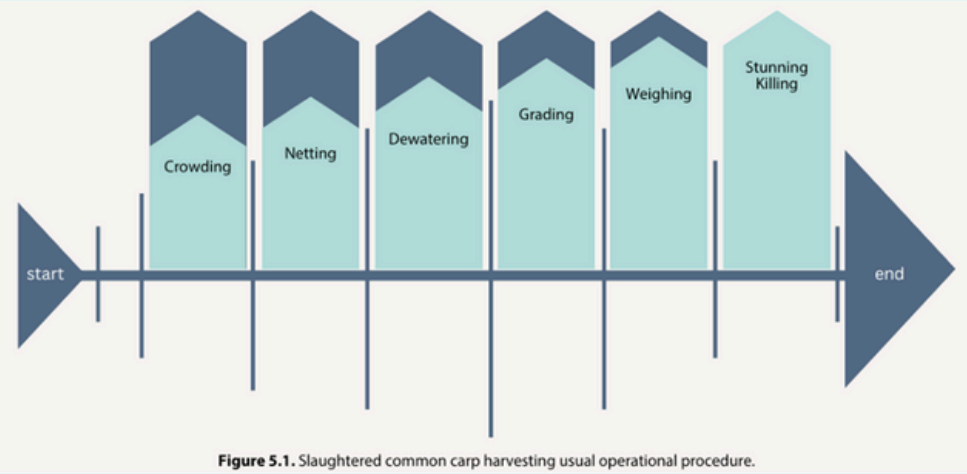

Figure 5.1. Slaughtered common carp harvesting usual operational procedure.

Fish, after a short drain (dewatering) and several minutes of rinsing the gills, are manually or mechanically placed into transport tanks. Upon collecting the fish, the fish that have been skimmed off are sorted and graded. Grading involves separating the fish into by species and by size, weighing and counting, and it happens outside the water. The weighing of fish should be done at 50 kg at a time without water, taking into account the 2% loss due to emptying of gut.

COMMON CARP LIVE TRANSPORTATION

Fish are then transported to storage facilities where they stay for several weeks until sale. Transport is done using transport tanks, on a volume of 1500 - 2000 liters. Fish transport tanks should be equipped with an oxygen supply, although when transporting to storage/ wintering ponds is very short (up to 1 hour) transport and no oxygen supply is necessary. The ratio of water to fish is as 1:3 and the loading time should be no longer than 15 minutes. The density of fish depends on the duration of transport and the conditions of harvesting, and is usually in the range of 500 - 1000 kg/ tank (330kg/m^3 - 500 kg/m^3).

During unloading from transport tanks, fish should be released from a low height directly into water of similar temperature, preferably sliding down a chute from the means of transport.

During long distance transport in summer, tanks of 2000-2300 l are used, with fish load <1000 kg (e.g., 800 kg of fish and 1400 l of water). The water temperature is critical during this time, and must be below 18-20°C for any 24 h transportation. Winter transport uses the same volume of tanks, but fish load can be >1000 kg. Water temperature 3-5°C, 1250 kg of fish per 1000 l of water for 24h transport is a standard. If transport over 24h is necessary, overflowing (water change) needs to be done.

In the case that common carp is marketed live, fish is transferred to containers sorted by size and transported to local markets live. Fish are sold to the consumers live.

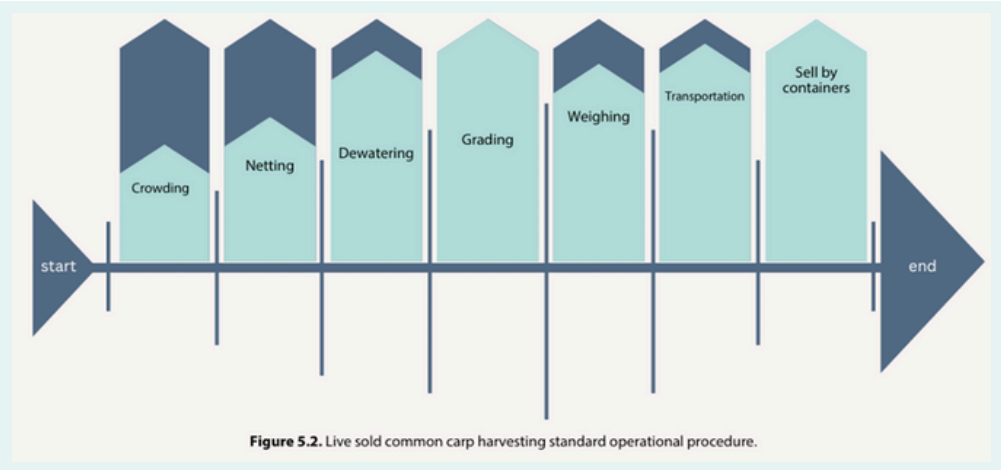

Figure 5.2. Live sold common carp harvesting standard operational procedure.

WELFARE RISKS ACKNOWLEDGED

Aquaculture imposes artificial environments that differ significantly from natural ecosystems. To ensure these systems support sustainable production and align with ethical standards, it is essential to recognize welfare risks and implement measures to reduce them wherever possible. Additionally, regulators and producers must define acceptable levels of risk–what may be called “welfare tolerance thresholds”–based on species-specific biology and practical feasibility.

Accordingly, it is necessary to analyze the critical stages of carp farming–live transport and harvesting–where welfare risks are most likely to occur. By breaking these stages into their core components, targeted indicators can be developed to monitor fish responses and environmental factors.

The main welfare risks identified for common carp during live transport and slaughter include:

- **Death** (from oxygen deficiency, handling errors)
- **Pain** (due to ineffective stunning)
- **Injury** (during grading, handling, or transport)
- **Disease** (linked to poor water quality or crowding)
- **Hunger** (from prolonged pre-harvest fasting)
- **Stress** (triggered by temperature shifts, confinement, or poor transport practices)

Measures in place expected by the farmers to mitigate the impacts on the identified welfare risks.

WELFARE INDICATORS PROPOSED BY WELFARE RISK AND FARMING STAGE

Key Definitions

- Welfare State: The overall condition of an animal's physical and emotional health at a specific moment, reflecting its experience of comfort, health, and ability to express natural behavior. A fish is in a good welfare state when it is free from suffering, pain, and distress.
- Affective State: The fish's emotional or mood state–a longer-term indicator of how it experiences its environment. These states arise from accumulated experiences and are essential in understanding animal well-being beyond momentary reactions.
- Operational Welfare Indicators (OWIs): Practical, validated, and repeatable tools for inspectors and farm staff to assess fish welfare during production. These indicators are categorized into:
  - OWI_A – Indicators that express the affective state of fish.
  - OWI_C – Indicators that assess the consequences of the farming process.

OWIs IN COMMON CARP FARMING

✅ Live Transport

- OWI_A:
  - pH
  - Oxygen saturation (%)
- OWI_C:
  - Overall mortality (%)
  - Incident mortality (%)
  - Injuries/fin bites (%)

Harvesting (Slaughtered or Live Market)

- OWI_A:
  - Oxygen saturation (%)
  - pH
- OWI_C:
  - Incident mortality (%)
  - Injuries (%)
  - Hematomas (%)

These OWIs allow inspectors and aquaculture professionals to track how environmental and handling factors impact fish welfare, and to identify when corrective actions are necessary

Conclusion

The welfare metrics established for transportation and harvesting of farmed common carp provide a standardized framework for National Competent Authorities (NCAs) to conduct routine evaluations.

Across both processes (transport and harvest), the OWI_C shared for assessing welfare consequences are:

- Overall mortality,
- Incident mortality, and
- Injuries/fin bites.

Meanwhile, OWI_A used to express the affective state of the fish include:

- pH and
- Oxygen saturation (%),

influenced by key factors such as stocking density, water exchange, and trip duration.

As this welfare monitoring system is implemented, the index is expected to evolve with new data, improving its accuracy and relevance for aquaculture practices across Europe.

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