

## A standardized protocol for Organic Farming of Arctic Charr

Eva Brännas, Umea (Sweden)

IFOAM (International Federation of Organic Agricultural Movements) is a worldwide umbrella organisation of the organic agriculture movement, with about 750 member organisations and institutions in about 100 countries all over the world. The IFOAM have developed basic standards for certification bodies and standardising organisations to develop further. The specific certifications are often more detailed and consider local conditions and organism-specific requirements.

The development and history behind organic Aquaculture is described on the homepage of Soil association [www.soilassociation.org](http://www.soilassociation.org). Briefly the aim is to provide a lead for a controversial sector rather than ignoring the important role fish farming will have with the depleting natural stocks in mind. Also, among farmed animals, fish exhibit the best conversion factor of protein.

IFOAM has drawn up basic standards for Aquaculture organic production that covers carnivorous, omnivorous and herbivorous of all stages in fresh-, brackish- and saltwater. The organisms are grown in any form of enclosures such as tanks, cages and earthen ponds. Wild organisms are covered by the standards only if they are stationary in open collecting areas, i.e. mussels. These guidelines were approved on the IFOAM general assembly 1998.

There are so far few certification bodies and standardising organisations that have drawn up specific rules for organic fish farming and even fewer organisations that have specific rules for salmonid fish. The Swedish organisation KRAV [www.krav.se](http://www.krav.se) and the Norwegian organisation DEBIO [www.debio.no](http://www.debio.no) also include Arctic charr in their joint standards of organic farmed salmonid species. The British organisation SOIL ASSOCIATION has some specific and different rules for Atlantic salmon and rainbow trout and are working out rules for Arctic charr as well.

A summary of the general IFOM principles with recommendations for organic fish-farming are given in the left column. Additional certifications and specific rules for **salmonid** species by KRAV/DEBIO and SOIL ASSOCIATION are given in the right columns. The rules are continuously updated and KRAV/DEBIO have announced a major revision of their rules shortly.

The IFOAM basic rules for organic aquaculture can be found on their home page [www.ifoam.org/standard/basics.html](http://www.ifoam.org/standard/basics.html)

Here are some additional links to other European associations for organic farming:

Austrian association "Ernteverband". Organic standards  
<http://www.biofisch.at/link.htm>

Switzerland association "Bio Suisse"  
<http://www.bio-suisse.ch/en/marketandproduct/fish.php>

European organic farming (you might get some infos from here  
<http://www.uni-hohenheim.de/~i410a/ofeurope/>

	<b>IFOAM basic rules</b> <a href="http://www.ifoam.org">www.ifoam.org</a>	<b>KRAV (SE)/DEBIO (N)</b> <a href="http://www.krav.se">www.krav.se</a> <a href="http://www.debio.no">www.debio.no</a>	<b>SOIL association(GB)</b> <a href="http://www.soilassociation.org">www.soilassociation.org</a>
<p><b>Conversion to organic standard</b></p> <p><i>Principles and recommendations</i></p> <p><i>Standards</i></p>	<p>A specific time between the start of organic management and certification. The conversion period should be at least one life cycle.</p> <p>A plan for the conversion should be given.</p> <p>A specified length of the conversion period and length for brought-in fish from conventional farms is required. Specific requirements is also required if only a part of the production aim to be organic</p>	<p>The conversion period shall at least constitute the last 90% of the increase in biomass. An updated production description is required and available upon inspection.</p> <p>Distance between conventional and organic production is specified. Landbased systems require a physical barrier. Parallel production requires separate documentation. Switching between conventional and organic production require approval from KRAV</p>	<p>Conversion must take place according to a plan agreed with the certification body.</p> <p>The conversion period shall generally at least one production period.</p> <p>A species can not be managed as organic and non-organic on different units of the same holding. Once converted organic units may not be switched between organic and non-organic management</p>
<p><b>Basic conditions</b></p> <p><i>Principles and recommendations</i></p> <p><i>Standards</i></p>	<p>Management techniques must be governed by the physiological and ethological needs of the organisms in question.</p> <p>Standards must be set for:</p> <ul style="list-style-type: none"> <li>-Sustainable production method</li> <li>-Stock density</li> <li>-Water quality</li> <li>-Protection against dramatic temperature changes</li> </ul>	<p>A monthly record keeping on all relevant information specified in the standards are optional.</p> <p>Daily measurements in every production unit of temperature, oxygen and salinity.</p> <p>Oxygen at least 6 mg L<sup>-1</sup> measured in the outlet water of tanks and at 3 m depth at the centre of a cage.</p> <p>With KRAV/DEBIO's first set of rules for organic fish farming the maximum stocking density was specified. It was recognized that Arctic</p>	<p>The following parameters must be monitored both 'upstream' and 'downstream' of the operation:Applie for fresh water:</p> <ul style="list-style-type: none"> <li>-Water temperature.</li> <li>-Ammonia/nitrogen (max 0.6 mg/l.</li> <li>-Biological oxygen demand (maximum 4 mg/l)</li> <li>-Phosphate/nutrient levels</li> <li>-Dissolved oxygen (min 6 mg/l or 70 % 90 % of the time.)</li> <li>-pH (5.2 and 9)</li> <li>-Volume of discharge</li> </ul>

	<p>When the natural day length is artificially prolonged, the limit is 16 hrs per day.</p> <p>No compounds in the equipment that are harmful to the fish or environment may be used.</p> <p>Escapes must be prevented</p> <p>Predator damage must be prevented</p>	<p>charr is the salmonid species that most easily adopt a schooling behaviour at high stocking densities. Several studies have pointed out that Arctic charr exhibit higher levels of aggressive interaction at lower than higher densities which violates the principles of animal welfare. In the revised set of rules the objective is to maintain a low aggression level that prevents fish from injuring others. The recommendation is that stock densities should balance these extremes against each other and consider species-specific requirements.</p> <p>Not longer that the longest NLD in a year for the species' range. In open installation only underwater light.</p> <p>Contingency plans for all units. Escapes must immediately be reported. Special conditions for preventing escapes can be imposed.</p>	<p>-stocking density (max 20 kg/m<sup>3</sup> in running freshwater and 10 kg/m<sup>3</sup> in freshwater netpens. -flow rates (min 1 l/kg fish)</p> <p>The interval of measurement is determined by the certification body.</p> <p>Artificial light must not be used to manipulate smolting or maturation. Artificial light must only be used with fry and ≤16 hrs.</p> <p>The risk of escapes stocks from confined system must be kept to an absolute minimum by appropriate strategies and comprehensive measures.</p> <p>Relevant statutory bodies should be consulted in cases where specific predatory problem arise.</p>
<p>Location of production</p>	<p>Considerations must be made on the maintenance of the aquatic and terrestrial environment. An appropriate distance must be kept to all kinds of contamination sources as well as to conventional fish farms</p>	<p>Permission to start fish farms is subjected to strict national laws that take consideration to the environment.</p>	<p>An environmental management plan must be developed and detailed in the integrity management manual, drawn up in conjunction with appropriate authorities.</p>

<p><b>Health and welfare</b></p> <p><i>Principles and recommendations</i></p> <p><i>Standards</i></p>	<p>Management practice should be directed to achieving good health and welfare of the organism.</p> <p>Disease treatment must consider the well-being of the animal and should emphasis natural methods and reduce harmful impact on the environment. Outbreaks should also result in changes of the management practice.</p> <p>Conventional drugs may only be used if no alternative is available. After treatment a withholding period at least twice the conventional requirements must be defined</p> <p>Vaccinations (not genetically engineered) are allowed only if a specific disease exists in the area.</p> <p>No prophylactic treatment.</p> <p>No synthetic hormones or growth promoters</p> <p>No mutilation of the farmed animals</p>	<p>Preventing aggression by adjusting the density. The fish can form shoals.</p> <p>The size of the production unit shall for at least 50 % of the biomass be at least 50 m<sup>2</sup> and/or 250 m<sup>3</sup> for Arctic charr.</p> <p>Signs of disease require immediate treatment.</p> <p>Twice the withholding period of conventional requirements. Other units within 150 m in a sea or lake or downstream or within 10 m upstream in flowing water have the same withholding period.</p> <p>Drugs with no conventional withholding period have a 2 weeks KRAV withholding period. Mortality exceeding 0.5 % day<sup>-1</sup> shall be reported to KRAV as well as abnormal behaviour.</p>	<p>Management must be based on 'five freedoms':</p> <ul style="list-style-type: none"> <li>-from malnutrition</li> <li>-from thermal and physical discomfort</li> <li>-from injury and disease</li> <li>-from fear and distress</li> <li>-from unnecessary restrictions and behaviour.</li> </ul> <p>Size distribution for fish should not compromise welfare and lead to hierarchical behaviour.</p> <p>A health plan is required, preferably in conjugation with the farm's designed veterinary surgeon.</p> <p>Twice the withholding period of conventional requirements, not less than 14 days.</p>
<p><b>Breeds and breeding</b></p> <p><i>Principles and recommendations</i></p> <p><i>Standards</i></p>	<p>Breeding should interfere with the natural behaviour as little as possible.</p> <p>At least 2/3 of the animals lifespan should be in the organic system.</p> <p>A definition of minimum length is required.</p>	<p>Localy adapted stocks are preferable. Inbreeding should be avoided.</p> <p>The breeding fish or roe shall come from breeding that have been health checked and from domesticated fish.</p> <p>The breeding unit shall be</p>	<p>Parent stock with a non-organic origin must be managed by organic standards for at least 12 month before breeding. The personnel must have a competence and understanding of organic production.</p>

	<p>Triploids and genetically engineered species are not allowed</p>	<p>registered in a health control program.</p> <p>No artificially induced sex changes.</p>	<p>No artificially induced sex changes</p>
<p><b>Nutrition</b></p> <p><i>Principles and recommendations</i></p> <p><i>Standards</i></p>	<p>Nutritional needs and good quality are bases for the diet. Feeding should allow natural feeding behaviour and result in minimal loss. Certified by-products should be used. A high conversion factor is recommended.</p> <p>Specific requirements for aquafeeds; 100 % certified org. components. If not available 5 % conventional food is allowed. Wild fish require a (FAO, 1995). 50% of aquatic protein must come from by-products.</p> <p>Synthetic products not allowed in the diet:          -growth promoters and stimulants          -appetisers          -antioxidants and preservatives          No artificial colouring agents, urea, faeces, solvent extractions, pure aminoacids, genetically engineered organisms or products from the same organism can be used</p>	<p>Wet feed is not allowed</p> <p>Additives should be of natural origin.</p> <p>Shrimp peels, algae, fungi and bacteria culture are permitted feed additives. A monthly record of feed type, producer and quantity is required.</p>	<p>High energy diets (&gt;28 % per cent oil) are prohibited.</p> <p>Feeding behaviour must be monitored whilst feeding to avoid feeding methods that stresses the fish. Automatic feeding must be checked regularly</p> <p>Permitted:          Vitamins, minerals, and supplements from natural origin.          Shrimp peels, natural binders.          Phaffia yeast for brood stock, but the broodstock itself may not be sold as organic.</p>
<p><b>Harvesting</b></p> <p><i>Principles and recommendations</i></p> <p><i>Standards</i></p>	<p>Harvesting from enclosures require minimum stress to the organism. The impact on the environment should not exceed the sustainable yield of the ecosystem.</p> <p>Standard for handling and limits for exceeding</p>	<p>Capture methods can be a tight collecting bag, vacuum pump, seine and fish trap. Fish must not be caught by hook.</p>	

	the sustainable yield of the ecosystem when harvesting must be set.		
<p><b>Transportation</b></p> <p><i>Principles and recommendations</i></p> <p><i>Standards</i></p>	<p>The water quality should be appropriate. The distance and frequency minimised.</p> <p>Should not cause avoidable stress. No synthesised tranquillisers are allowed. Equipment shall not have potentially toxic effects. One person must be responsible for the well-being of the fish.</p> <p>Requirement should be set for :</p> <ul style="list-style-type: none"> <li>-water quality and quantity</li> <li>-stock density</li> <li>-distance and/or time</li> <li>-precautions against escape</li> </ul>	<p>Live fish can be transported for a maximum of 6 hours.</p>	
<p><b>Slaughter</b></p> <p><i>Principles and recommendations</i></p> <p><i>Standards</i></p>	<p>Stress and suffering must be minimised. The animals should be in a state on unconsciousness before bleeding out.</p> <p>Standards for minimising stress must be set. When applicable, animals should be in a state on unconsciousness before bleeding out. Regular surveillance. Specific slaughterhouse requirements on:</p> <ul style="list-style-type: none"> <li>-recovery from transport</li> <li>-timing between unconsciousness and bleeding.</li> <li>-type and quality of equipment</li> <li>-contact between living and slaughtered animals.</li> </ul>	<p>Fish must not be starved in connection with slaughter more than 100 day degrees. Fish shall be fully stunned before killed. Slaughter shall be done by bleeding. A blow to the head and CO<sub>2</sub> are approved methods</p> <p>Fish must not be prepared for slaughter at a temperature &gt; 18 °C</p>	<p>Fish should be held in high quality water for the allowed fasting period (depend on the size of the fish (&lt; 7days). Concussion to the head followed by bleeding is permitted as well as electrocution</p>