



**University of South Bohemia in Ceske
Budejovice,
Faculty of Fisheries and Protection of
Waters,
Research Institute of Fish Culture and
Hydrobiology
(VURH)**

Research Infrastructure Information

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1 Faculty of Fisheries and Protection Waters of the University of South Bohemia (VURH) in AQUAEXCEL

1.1 Introduction

Operating institution:	University of South Bohemia in Ceske Budejovice, Faculty of Fisheries and Protection of Waters, Research Institute of Fish Culture and Hydrobiology (VURH)
Type Operating Institution:	University
Research Infrastructure(s):	6 Laboratories of the Research Institute of Fish Culture and Hydrobiology: <ul style="list-style-type: none"> • Laboratory of Molecular, Cellular and Quantitative Genetic • Laboratory of Reproductive Physiology • Laboratory of Intensive Culture • Laboratory of Ethology and Nutrition of Fish and Crayfish • Laboratory of Environmental Chemistry and Biochemistry • Laboratory of Aquatic Toxicology and Ichthyopathology

1.2 VURH Research Infrastructure: Experimental Infrastructure of VURH

Name of the infrastructure:	Experimental Infrastructure of VURH Research Institute of Fish Culture and Hydrobiology (VURH) is a part of the Faculty of Fisheries and Protection of Waters of the University of South Bohemia in České Budějovice
Location:	Mailing address: Zátíší 728/II, 389 25 Vodňany Contact address: Dr. Hajného 22, 389 01 Vodňany
Web site address:	VURH: http://www.frov.jcu.cz/en/vurh-frov-ju/vurh-ju-ve-vodnanech FFPW USB: http://www.frov.jcu.cz/en University of South Bohemia: www.jcu.cz
Contact:	Jiri Kolecek Email: jkolecek@frov.jcu.cz Tel: +420 387 774 663 Mob: +420 606 050 576
AQUAEXCEL TNA facility:	YES Hatchery experimental units Recirculation experimental units Ponds experimental units
Short description	In faculty organization system the hatchery, recirculation system and ponds together make one infrastructure. Freshwater fish hatchery is about 400 m ² , well equipped for artificial reproduction of fish with 5 internal and 8 external tanks for broodstock handling. Incubation hall equipped with devices for experimental artificial reproduction of fish as well as with incubators for growing hatched larvae. A heating system provides researchers with possibilities to reproduce fish by means of controlled temperature. Six round outdoor tanks of 27 000L total volumes are available to extend the capacities for outdoor juvenile nursing. Indoor recirculation systems of tanks of 43 000 l total volume for freshwater intensive aquaculture

	<p>equipped with mechanical and 3 biological filters, with possibilities to switch tanks from recirculation to flow-through, and of round tanks of 1 800 l total volume for juvenile nursing. It is used also for induction of fish gametogenesis by manipulating with environmental stimuli as temperature and photoperiod. Both the hatchery and recirculation systems are equipped with computer monitoring and warning system to detect water level, temperature, oxygen saturation and pH in tanks in given intervals.</p> <p>Altogether, 70 ponds (20 ponds of 25 ha in total plus 50 ponds 0.1-0.2 ha each) for aquaculture of different species (common carp, tench, pike, pikeperch, European catfish, sturgeons) are used from juveniles to marketable size fish and for broodstock culture. These ponds are in size, which makes their management easy. Experimental complex has been used for different experiments such as testing of performance traits, common garden experiments, ecology and behaviour, feeding and nutrition, semi-artificial or natural reproduction, as well as fish disease and toxicology. Own broodstock of total 21 strains of common carp and own broodstock of sterlet and carnivorous fish.</p>
Keywords	Ecology and behaviour, feeding and nutrition, semi-artificial or natural reproduction, fish disease and toxicology
Technical labs	<ul style="list-style-type: none"> • Laboratory of Molecular, Cellular and Quantitative Genetics: http://www.frov.jcu.cz/en/faculty-structure/usb-rifch-in-vodany/index.php?option=com_content&view=article&id=42 The laboratory engages in both basic and applied research, university education, breeding work and consultancy activities in the field of genetic sources preservation, reproduction and increase of genetic potential of economically significant fish species. • Laboratory of Reproductive Physiology: http://www.frov.jcu.cz/en/faculty-structure/usb-rifch-in-vodany/index.php?option=com_content&view=article&id=39 This laboratory is besides the university education involved in both basic and applied research with focus on: <ul style="list-style-type: none"> - study of sperming of fresh water fish species - diagnostics of maturity level of spawners - gender changes • Laboratory of Intensive Aquaculture: http://www.frov.jcu.cz/en/faculty-structure/usb-rifch-in-vodany/index.php?option=com_content&view=article&id=23 Fish breeding under intensive conditions Utilization of recirculation systems for intensive fish breeding Production and breeding of early ontogenetic stages fish spermatology • Laboratory of Environmental Chemistry and Biochemistry http://www.frov.jcu.cz/en/faculty-structure/usb-rifch-in-vodany/index.php?option=com_content&view=article&id=72


	The laboratory activity is focused on occurrence of xenobiotic substances in water ecosystems and investigation of their impact on exposed organisms. Wild and farm fish contamination is also a concern.
Processing labs	Available on request. Processing unit is available at the FFPW's Institute of Aquaculture in České Budějovice.
EU projects	<p><u>Seventh Framework Programme</u></p> <p>-AQUAEXCEL – Aquaculture infrastructures for excellence for European fish research (2011 - 2015, leader for a part solved at the USB FFPW Prof. Dipl.- Ing. Otomar Linhart, D.Sc.)</p> <p><u>INTERREG IVC</u></p> <p>-Lake-Admin - Regional administration of lake restoration initiatives (2012 – 2015)</p> <p>Full list of current projects at the Faculty: http://www.frov.jcu.cz/en/faculty-projects/faculty-projects</p>
Number of researchers	61
Number of technicians	14 (laboratory assistants + technician)
Lodging facilities	<p>YES – the facility of the FFPW. http://www.frov.jcu.cz/en/aktuality-2012/faculty-s-new-building-finished</p> <p>Lodging is also possible in the nearby city of Vodňany, c. 1 km from the facility, accessible by walk or by car via peaceful surrounding.</p>
SERVICES - scientific support	<p>It is possible to use the background of our laboratories:</p> <p>Laboratory of Molecular, Cellular and Quantitative Genetic</p> <p>Laboratory of Reproductive Physiology</p> <p>Laboratory of Intensive Culture</p> <p>Laboratory of Ethology and Nutrition of Fish and Crayfish</p> <p>Laboratory of Environmental Chemistry and Biochemistry</p> <p>Laboratory of Aquatic Toxicology and Ichthyopathology</p>
SERVICES - electronic databases	On request
SERVICES – Quality assurance	<p>Accredited laboratories:</p> <p>Laboratory of Aquatic Toxicology and Ichthyopathology</p> <p>The testing laboratory accredited by the Czech Accreditation Institute for tests of acute toxicity of water organisms registered under No. 1052 performed toxicological tests of fish, cladocerans, green algae and white mustard seeds.</p> <p>Researchers and technicians are approved to perform experiments on live animals implementing the Principles of laboratory animal care and the national laws 246/1992 "Animal welfare" on the protection of animals (Ref. no. 22761/2009-17210.).Experiments where fish are sacrificed are performed by persons educated according to §17 paragraph 1 of act 246/1992 and in accordance with requirements of act 246/1992.</p>

Safety and Ethical issues	Employees are educated and approved to perform experiments with animals according to Czech law requirements. Researchers and technicians are approved to perform experiments on live animals implementing the Principles of laboratory animal care and the national laws 246/1992 "Animal welfare" on the protection of animals (Ref. no. 22761/2009-17210.).Experiments where fish are sacrificed are performed by persons educated according to §17 paragraph 1 of act 246/1992 and in accordance with requirements of act 246/1992.
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1.1.1 Facility Unit 1 Information: **Recirculation experimental systems**

Name Facility Unit 1	Recirculation experimental systems
TNA	YES
Contact (Researcher)	Dipl.-Ing. Pavel Lepič Suchomelka 863, 389 01 Vodňany Email: lepic@vurh.jcu.cz Tel: +420 387 774 638 +420 724 504 920
URL	http://www.frov.jcu.cz/en/vurh-frov-ju/experimental-fish-culture-facility
Postal Address	Zátiší 728/II, 389 25 Vodňany
General description	<p>This facility is intended for fish culture research under controlled conditions with a possibility to use flow-through and recirculation systems, either for industrial culture of various cold and warm water fish species, or feed testing, brood fish preparation, or nursing and rearing various age categories or riverine fish, including the endangered ones. It is also used for research of intensive fish culture optimization.</p> <p>The staff on duty is notified if there has been a component failure or an accident, via computer warning followed by SMS text message.</p> <p>Two different sources of inflowing water can be used for the facility. If colder water is needed, water from Blanice river channel can be used. If warmer water is needed or when water is turbid in Blanice river channel (after heavy rainfalls, snow melting, etc.), inflow from an adjacent pond can be used for certain period. Raw water inflows from the abovementioned sources by means of gravity. Source is chosen by manual control of gates. In the facility, there is an electrically operated valve closing the inflow of raw water to the hatchery, i.e. to the space of a mechanical drum filter in relation to height of water level in a reservoir. Filtered water flows to a pumping reservoir of raw water; from here it is pumped to an accumulation reservoir of raw water of 6 m³ volume in water works station located on the highest possible place.</p> <p>The maximum production capacity of rearing station is expected about 2 000kg of market sized fish. In the rearing station, there</p>



	<p>are Eighteen plastic containers of 600 litres giving a total volume of 10.8 m². The maximum flow rate through the rearing station is calculated at 10.5 l.s⁻¹. Eighteen rearing tanks are placed in three rows of six. This range or separate reservoirs can supply water to the flow as well as the recirculation system. Drains of all rearing stations are designed to allow participation in the flow or recirculation water system.</p> <p><u>1st version: Flow-through rearing system</u></p> <p>The inflow can be selected as required, either directly from the race of Blanice river or the tributary of the pond. The flow is provided through the following stages: an initial micro-sieve mechanical drum filter (BMF-B), a raw water storage tank (AK), where the water is aerated with oil-free diaphragm blowers. From there the water is distributed to the rearing tanks. Flow through rearing stations is adjusted manually using the valves. From the rearing stations the water is discharged into the sewer system. The flow-through system does not include heating of process water.</p> <p><u>2nd version: Recirculation system</u></p> <p>When fish breeding in recirculation systems is operated, it can cause a loss of disgorging water, washing filters, leak containment components, evaporation from the free surface, water loss in fish handling and technical failures. This water must be continuously replenished.</p> <p><u>The actual description of the recirculation system:</u></p> <p>The retention tank (RN) is replenished as necessary with the supplement of water of about 2 m³ raw from the water storage tank (AK). From there the water flows by gravity into the series of rearing tanks through UV lamps each with manual removal of a single element. Oxygenating is done by nozzles into the pipe. The flow is adjusted manually using the valves. The rearing tank water is drained by gravity to mechanical drum filter in a steel tub (BMF-O) based in the hatchery. From there it is pumped to 3 fluid filters (F1-F3) at the water treatment plant. Heating of water in recirculation system is currently implemented by using the space heating temperature control air conditioning. In the near future it is expected the installation of heating of process water with a gas boiler, later, possibly using a heat pump.</p>
Technical description	<p>The technological area is sectioned in three parts supporting various technological approaches:</p> <ul style="list-style-type: none"> • Hatchery – basement (area for egg incubation and hatching of larvae; also the inflowing water filter and filter for recirculation), equipped by Zug jars or incubation systems for salmonids. Both the flow-through system and recirculation systems can be used: water flows from the treatment plant to the retention tank to the hatchery. • Trough Rearing Station – ground floor (area for rearing the older age categories of fish). The maximum production capacity of rearing station is expected about 2 thousands kg of market sized fish. In the rearing station there are 18 plastic containers of 600 litres with a total volume of 10.8 m²

	<ul style="list-style-type: none"> • Water Treatment Plant – the first floor (area for biological purification, aeration, oxygenation, heating and retention of technological water for both the hatchery and trough the rearing station). • Aquarium room - the first floor (area for rearing larvae and juveniles). • Outdoor rearing flow-through rearing system - 8 tanks of 1 m3.
Remote monitoring & control	This model facility for fish culture is more or less automated. Sensors in inflowing water register pH value, temperature and dissolved oxygen content (DOC) in water, sensor in water out flowing from selected tanks also register water temperature and DOC. Values are monitored and stored for possible future computer processing.
Water and environmental conditions	Two different sources of inflowing water can be used for the facility. If colder water is needed, water from the Blanice river channel can be used. If warmer water is needed or when water is turbid in the Blanice river channel (after heavy rainfalls, snow melting, etc.), inflow from an adjacent pond can be used for a certain period. Raw water inflows from the abovementioned sources by means of gravity. Source is chosen by manual control of gates.
Flowrate	Maximum flow rate through the rearing station is calculated 10.5 l.s-1
Temperature	Heating of water in recirculation system is currently implemented by using the space heating temperature control air conditioning.
Salinity	Freshwater system
Oxygen	Dissolved oxygen content is automatically registered.
pH	pH is automatically registered
Light intensity and wavelength	Light intensity and wavelength are not manipulated or automatically registered
Photoperiod	Photoperiod is not manipulated or automatically registers
Fish measurements	Size, weight, tagging (classical or P.I.T.) can be recorded, behaviour can be monitored in special systems.
Pictures/videos	

	 <p>Recirculation systems</p>
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1.1.2 Facility Unit 2 Information: Hatchery experimental units

Name Facility Unit 2	Hatchery experimental units
TNA	YES
Contact (Researcher)	Dipl.-Ing. David Gela, Ph.D. Head of center Podvinice, 389 01 Vodňany Email: gela@frov.jcu.cz Tel: +420 387 774 635 +420 724 508 430
URL	http://www.frov.jcu.cz/en/vurh-frov-ju/genetic-fisheries-center
Postal Address	Zátiší 728/II, 389 25 Vodňany
General description	<p>The hatchery is a part of the Genetic Fishing Centre (GFC) which is interested in conservation of genetic resources (http://www.vuzv.cz/zdroje.htm) of existing stock and populations of carp, tench, sheatfish and sturgeon and management of fish stocks for the Faculty. This Centre has been entrusted with leading the breeding and testing program of carp and tench efficiency in the Czech Republic since 1982. The GFC and its hatchery provide a functional basis for laboratories of the faculty, dealing with genome manipulations of selected fish species (carp, tench, silverfish, sturgeon), studies of fish gametes and for subsequent application of obtained results in aquaculture as well as development and management of breeding programs. The Centre has also been serving since 1996 for education of fish breeding for USB students in the form of field and block training. The hatchery and GFC have about 25 ha of ponds and 65 m² of indoor and outdoor breeding pools with either a through-flow or a recirculation system.</p>

Technical description	The hatchery is modern and multi-purpose - consists of a room with several tanks for storage or preparation of spawners for artificial reproduction.
Remote monitoring & control	Water levels, water temperatures, oxygen saturation and control of preparation of technological flow or recirculation water are controlled, and status is reported using GSM technologies if needed.
Water and environmental conditions	River water necessary for roe incubation and farming of fingerlings is cleaned through a micro-screen filter, an ozonizer and is sterilized by UV radiation. The system can be supplied if needed with water from water pipeline system recirculated through biofilters. Water for generational fish, roe and fingerlings is heated to required temperature in three mutually independent reservoirs.
Temperature	Water for spawners, roe and fingerlings is heated to required temperature in three mutually independent reservoirs. Water temperature in the system is dependent on outside temperature but can be slightly warmed or cooled (in small scale) according to the actual needs.
Salinity	Freshwater system
Oxygen	Dissolved oxygen is automatically registered
pH	pH is not registered automatically
Light intensity and wavelength	Light intensity and wavelength are not manipulated or automatically registered
Photoperiod	Photoperiod is not manipulated or automatically registered
Fish measurements	Size, weight, tagging (classical or P.I.T.) can be recorded, behaviour can be monitored in special systems.
Pictures/videos	 

1.1.3 Facility Unit 3 Information: Ponds experimental units

Name Facility Unit 3	Ponds experimental units
TNA	YES
Contact (Researcher)	Dipl.-Ing. Pavel Lepič Suchomelka 863, 389 01 Vodňany Email: lepic@vurh.jcu.cz Tel: +420 387 774 638 +420 724 504 920
URL	http://www.frov.jcu.cz/en/vurh-frov-ju/experimental-fish-culture-facility
Postal Address	Zátiší 728/II, 389 25 Vodňany
General description	Altogether 70 ponds (20 ponds of 25 ha in total plus 50 ponds 0.1-0.2 ha each) for aquaculture of different species (common carp, tench, pike, pikeperch, European catfish, sturgeons) are used from juveniles to marketable size fish and for broodstock culture. These ponds vary in size, which makes their management easy. The experimental complex has been used for different experiments such as testing of performance traits, common garden experiments, ecology and behaviour, feeding and nutrition, semi-artificial or natural reproduction, as well as fish disease and toxicology.
Temperature	Outdoor pond system – temperature dependant on season and weather conditions
Salinity	Freshwater ponds
Oxygen	Manual monitoring available
pH	Manual monitoring available
Light intensity and wavelength	Light intensity and wavelength are not manipulated or automatically registered
Photoperiod	Photoperiod is not automatically registered
Fish measurements	Size, weight, tagging (classic or P.I.T.) can be recorded
Pictures/videos	



1.1.4 Fish Line information

Name Fish Line 1:	Pohorelice Mirror Carp, South Bohemian Scaly Carp, South Bohemian Mirror Carp, Marianske Lazne Scaly Carp, Milevsko Mirror Carp, Synthetic strains C434 and C435, Telc Mirror Carp, Northern Mirror Carp, Hungarian Synthetic Mirror Carp.
Species:	Common Carp (<i>Cyprinus carpio</i>)
General description	Breeds included in conservation of genetic resources (http://www.vuzv.cz/zdroje.htm) of existing stock and populations of carp.
Type:	Selected populations
Traits selected (if relevant):	These breeds/lines were selected for different traits
Effective population size:	120

Name Fish Line 2:	Vodnany Tench, Marianske Lazne Tench, Tabor Tench, Hluboka Tench, Velke Mezirici Tench, Gold Tench, Blue Tench
Species:	Tench (<i>Tinca tinca</i>)
General description	Breeds included in conservation of genetic resources (http://www.vuzv.cz/zdroje.htm) of existing stock and populations of tench.
Type:	Selected populations

Name Fish Line 3:	Populations of several species of sturgeons
Species:	Sterlet (<i>Acipenser ruthenus</i>), Russian sturgeon (<i>Acipenser guldenstaedti</i>), Siberian sturgeon (<i>Acipenser baeri</i>)
General description	GFC of FFPW has a collection of several species of sturgeons. Reproduction and experimental work is possible with three species mentioned above.
Type:	Base populations

1.2 Modality of access

The experimental Infrastructure of VURH offers to give access to experimental and pilot-scale assays with reproduction of common carp and other species, increase the efficiency and utilization of this infrastructure, testing of aquaculture Infrastructure prototype, fertilization trials using frozen/thawed spermatozoa after cryopreservation, induction of genome manipulations and sex reversal, and testing of performance traits of common carp. Experimental fish to be used will originate from the broodstock of VURH, free of diseases.

All three installations within the infrastructure are necessary and technologically linked together. Duration of 1 trial in the hatchery (reproduction, incubation, hatching and endogenous feeding) is estimated at two weeks with a stay for week No. 1 and 2. Duration of 1 trial in the recirculation system (start of exogenous feeding, on-growing of juveniles, gonad differentiation and maturation of freshwater fish) is estimated at 12 weeks with a stay for week No. 1 and 12. Duration of 1 trial in pond installation is estimated at 30 weeks (to utilize full potential of growing season for mass rearing of relatively slower growing freshwater fishes; for common garden experiments etc.) with a stay planned for weeks No. 1, 2, 29 and 30. For the above technological reasons, access exceeds 3 months for ponds.

The access will comprise of the use of the facilities with regard to experiments and access to the laboratory equipment. Usually, trained and experienced engineer and technical staff will carry out the standard procedures and the general maintenance. The external user will be strongly integrated in all processes, sampling, data recording, due analyses and assessment, and preparation and dissemination of results.

1.3 Unit of access

Short name of installation	Unit of Access	Unit cost (€)	Min. Quantity of access to be provided	Estimated number of users	Estimated number of days spent in the infrastructure	Estimated number of projects
VURH REU	Tank/week	120.74	324	6	84	3
VURH HEU	Week	1755.55	10	10	140	5
VURH PEU	Ponds/Week	33.97	1440	8	224	4
Updated Access numbers						
VURH PEU	Ponds/week	33.97	720	4	112	2

1.5 News and Updates

The third Call for Access will officially open in June 2012 (Keep an eye on www.aquaexcel.eu) and will have a deadline of the 14th September 2012.