



**Research Institute for Fisheries,
Aquaculture and Irrigation
(HAKI)**

Research Infrastructure Information

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1 HAKI in AQUAEXCEL

1.1 Introduction

Operating institution:	Research Institute for Fisheries, Aquaculture and Irrigation (HAKI)
Type Operating Institution:	Research Institute
Research Infrastructure(s):	<ul style="list-style-type: none"> • Outdoor Experimental Pond Station (OEPS) • Indoor Fish Rearing Facility for Semi- and Large-scale Experiments (RECIRK)

1.2 HAKI Research Infrastructure 1: Outdoor Experimental Pond Station (OEPS)

Name of the infrastructure:	Outdoor Experimental Pond Station (OEPS)
Location:	Szarvas, Hungary
Web site address:	http://www.haki.hu/
Contact:	István Lehoczky E-mail: lehoczkyi@haki.hu Tel: 0036/66515329
AQUAEXCEL TNA facility:	YES Outdoor Experimental Pond Station has facilities which are open for Access to external research groups within the framework of the AQUAEXCEL project
Short description	<p>The facility consists of 53 earthen ponds with surface areas varying between 150 and 1500 m². The ponds can be filled up with water and drained individually. Water is supplied to the ponds from the natural open surface waters. The ponds have electrical supply for the artificial aeration and also equipped with aerators. The ponds are operated by a professional staff (3 persons). The pond system is suitable for experiments in different purposes (e.g. feeding tests, testing different production, management and technological elements, ecosystem modelling, etc.).</p> <p>Besides the experimental ponds a constructed wetland system is also operated as a part of the experimental station. The open surface wetland system is equipped with flow metres and electrical system. It is suitable to test wastewater treatment techniques and mechanisms. The wetland system consists of 8 pond units with surface areas varying between 650 and 2500 m² (among others 3 macrophyta-covered ponds with Typha, Phragmites and Salix).</p>
Keywords	Feeding tests, production tests, ecosystem modelling, wastewater treatment.
Technical labs	Water and sediment lab for routine water quality measurements. This lab is equipped with various up-to-date analytical instruments (e.g. water TOC analyser, atomic absorption and ICP spectrophotometer).
Processing labs	None
EU projects	ARRAINA – Advanced Research Initiatives for Nutrition and

	Aquaculture AQUAMAX – Replacement and Supplementing of Fish Meal and Fish Oil with New Fish Feed Components
Number of researchers	12
Number of technicians	6
Lodging facilities	Yes, two guestrooms for one researcher each.
SERVICES - scientific support	The facility is a pilot scale system, built for experimental purposes, mainly for feeding and rearing experiments. It enables: <ul style="list-style-type: none"> • Research trials on the applicability of various feed additives (immunostimulants, vitamins, fatty acids, etc.) and replacement of fish meal and oil in fish feeding • Testing eco-technological elements for water treatment • Experiments about nutrient dynamics in pond ecosystems • Development of integrated fish production systems • Nutrient remediation experiments in wetlands and ponds.
SERVICES - electronic databases	No

1.3 HAKI Research Infrastructure 2: Indoor Fish Rearing Facility for Semi- and Large-scale Experiments (RECIRK)

Name of the infrastructure:	Indoor Fish Rearing Facility for Semi- and Large-scale Experiments (RECIRK)
Location:	Szarvas, Hungary
Web site address:	http://www.haki.hu/
Contact:	István Lehoczky E-mail: lehoczkyi@haki.hu Tel: 0036/66515329
AQUAEXCEL TNA facility:	YES RECIRK has facilities which are open for Access to external research groups within the framework of the AQUAEXCEL project
Short description	The recirculation system has 100 m ³ useful volume, consisting from plastic tanks of different shape and volume (from 40 l to 4 m ³). Water treatment is performed by sedimentation tanks, submerged gravel biofilters, UV-sterilisation and aeration. Water turnover rate for the 100 m ³ is once per hour. System is supplied with underground water (about 16 °C, 10 L/min.), but there are possibilities for supply it by tap, or geothermal water (about 25-27 °C). Part of the recirculated water can be heated up to 30 °C and even more. This variability of the temperature and the flexibility of the system – together with proper water management – give possibilities for year-round propagation and rearing fish species with different temperature requirements (i.e. Percidae, Acipenseridae, Siluridae, Claridae, Cichlidae, etc). The large volume of the system also allows to perform large-scale rearing trials, or to apply multi-variable treatments with the required replicates.

	The flow-through system contains about 80 m ³ volumes (mainly tanks of about 4 m ³). It is supplied mainly by geothermal water (about 25-27°C) but filtered and aerated pond water also is available in it. This unit mainly is suitable for year-round rearing of Claridae and Cichlidae and for large-scale trials with them.
Keywords	Recirculation system, flow-through system, temperature control, fish propagation, fish rearing.
Technical labs	Water and sediment lab for routine water quality measurements. This lab is equipped with various up-to-date analytical instruments (e.g. water TOC analyzer, atomic absorption and ICP spectrophotometer).
Processing labs	None
EU projects	ARRAINA - Advanced Research Initiatives for Nutrition and Aquaculture AQUAMAX – Replacement and Supplementing of Fish Meal and Fish Oil with New Fish Feed Components EUROCARP – Disease and Stress Resistant Common Carp: Combining Quantitative, Genomic, Proteomic and Immunological Marker Technologies to Identify High Performance Strains, Families and Individuals
Number of researchers	12
Number of technicians	6
Lodging facilities	Yes, two guestrooms for one researcher each.
SERVICES - scientific support	The facility is mainly used for propagation, feeding and rearing experiments, i-e: <ul style="list-style-type: none"> • Development of seasonal and out-of-season propagation and fry rearing technology of economically important species (European and African catfishes, sturgeon sp., pike-perch, etc.). • Development of growth and production models for the above species. • Rearing (up to 100) half-, and full-sib families of common carp for further genetic, immunological, feeding and nutriogenomic research. • Research trials on the applicability of different feed additives (immuno-stimulant, vitamins, amino-, and fatty acids, etc) and replacement of fish mil and oil in fish feeding.
SERVICES - electronic databases	No

1.4 Modality of access

The pond system provides facility for the implementation of joint or independent research projects. The ponds operate from March till November, but it could be investigated in winter period on demand. The operation and sampling staff are available; the water and sediment laboratories are able to analyze samples all the year. The user or user group will have a full access to the ponds belonging to the experimental work they plan. The work plan will be prepared before arriving to the institute to make sure that the users will be fully integrated into the scheduling of experiments. The

users will be able to use feeding machines, aerators and all other equipment necessary for pond experiments. The fisherman of the institute will help them with the introduction, feeding and harvesting of the experimental fish. The users will work independently based on their work plan.

The operation of the experimental system will be integrated with a professional team for sampling (i.e. water, sediment, plankton, fish, etc.) and in situ measurements (i.e. oxygen, conductivity, pH, turbidity, temperature, etc.) and with professional analytical laboratories (equipped – among others - with water, TOC analyzer, atomic absorption and ICP spectrometry) for water, sediment, soil, fish, plant, etc. analysis as well.

The infrastructural background of the HAKI-RECIRK is suitable for carrying out experiments in collaboration with our researchers or alone. In our system experiments can be realized with special needs such as special location or special equipments in the fields of immunology, production, ethology or nutrition etc. The institute ensures the user infrastructural base for the whole period of experiments e.g. laboratories, office with PC etc. for evaluations. As a result of these activities the new scientific results can be published in national or international journals and conferences. The typical user will prepare a working plan in advance to make sure that the planned research work can be adequately integrated into the schedule of this infrastructure. The typical experimental period vary between 4-12 weeks depending on the type of experiment and using experimental tanks for the research activities. During this period the user or user group will have full and access to the experimental tanks they use and work independently with the support of the institute's staff.

HAKI-RECIRK has professional fishermen who will assist in the fish nursing, feeding, harvesting etc. In the recirculation system a permanent worker will look after the continuity of the water recycling and always helps the researchers for their practical work. There are many assistants who can deal with the fish in work time e.g. feeding, cleaning the tanks, measuring etc. The researchers of the institute will share their knowledge (on fish genetics, immunology, nutrition, aquaculture production, waste waters, irrigation and aquatic ecosystems) and practical experiences with the guest and also can help organizing the logistics if it is necessary.

1.5 Unit of access

For the outdoor experimental pond station, the unit of access is defined as 1 m²/week; equalling the occupation of 1 m² pond surface for 7 days. One trial is expected to comprise 96 000 units of access on average (i.e. 16 pieces of 200 m² to test 4 factors in quadruplicate, during 30 weeks or 8 pieces of 400 m² to test 2 factors in quadruplicate, during 30 weeks or another combination that will suit the external users). The duration of 1 trial in pond installation is estimated for 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 1, 2, 29 and 30.

For the indoor fish rearing facility, the unit of access is defined as 1 m³/week; equalling the occupation of 1 m³ standard fish holding unit for 7 days. One trial is expected to comprise 48 units of access as a suggested minimum (i.e. 16 pieces of 0.25 m³ tanks to test 4 factors in 4 replications, during 12 weeks). Stay on site comprises 2 weeks (initial week 1 plus final week 12).