



INRA – PEIMA

Research Infrastructure Information

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1 INRA PEIMA in AQUAEXCEL

1.1 Introduction

Operating institution:	INRA - National Institute for Research in Agriculture
Type Operating Institution:	Research Institute
Research Infrastructure(s):	INRA PEIMA - Pisciculture Expérimentale INRA des Monts d'Arrée

1.2 INRA PEIMA

Name of the infrastructure:	INRA PEIMA
Location:	<p>Barrage du Drennec 29450 SIZUN, Brittany, FRANCE</p> <p>France PEIMA is located in the west of France, in Brittany. Near international Brest airport (45 minutes), and near on the VHV train station of Morlaix (4 hours from Paris)</p>
Web site address:	http://www.rennes.inra.fr/l_inra_en_bretagne_et_basse_normandie/ressources_specifiques/un_dispositif_experimental_unique/une_pisciculture_experimentale_d_eau_douce
Contact:	<p>Laurent, Labbé Barrage du Drennec 29450 Sizun, France Tel: +332 98 68 89 36 E-mail: Larent.labbe@rennes.inra.fr</p>
AQUAEXCEL TNA facility:	YES - INRA PEIMA has facilities which are open for Access to external research groups within the framework of the AQUAEXCEL project
Short description	<p>INRA PEIMA is a cold fresh water experimental unit for experiments on salmonids from egg to commercial size. It is the main trout experimental station in France, and one of the largest in Europe, and is dedicated to all kinds of studies on mainly trout genetics, nutrition and physiology, and interaction between those.</p> <p>INRA has internationally-recognized teams in fish physiology, genetics, nutrition and pathology (>400 peer-reviewed papers in the last 5 years) which will be involved in the networking and joint research activities.</p> <p>PEIMA provide a collection of trout lines that has no equivalent at the world level (base populations, selected lines, isogenic lines of experimental, males and females monosex lines)</p>
Keywords	genetic, fishes lines; physiology, trout behaviour, flesh quality
Technical labs	<ul style="list-style-type: none"> 1 wet lab used for biometric measurements on live fish. Equipped with a device for automatic recording of data on length, weight, RFID tag and with a Distell fish fat meter. 1 dry lab used for cryo bank, equipped with a automated filling and sealing machine 1 dry lab for water quality, measurement, equipped with

	a spectrophotometer Hach 2033 for measurement of different parameters of water quality (solubles and solids)
Processing labs	An experimental processing unit with individual data acquisition on morphometry, yields, physiological & quality traits, and processing of samples for sensory evaluation is currently under construction
EU projects	AQUAEXCEL
Number of researchers	Two engineers. There are no researchers based at PEIMA due to its status as experimental unit, but PEIMA work closely with researchers based in research units listed below
Number of technicians	10
Lodging facilities	PEIMA has 5 single rooms, 1 collective kitchen, and 1 meeting room. An office will be made available to visitors.
SERVICES - scientific support	<p>AQUAEXCEL visitors will be invited to work in conjunction with one of INRA's research groups in genetics (GENAQUA (Génétique en Aquaculture), physiology (http://www4.rennes.inra.fr/lpgp), and nutrition (http://www.bordeaux-aquitaine.inra.fr/st_pee/ur_numea)</p> <p>PEIMA will designate a contact person and together with the liaison officer and personnel from the technical and biological support groups make sure that the visitors will be given the same support as the local researchers.</p>
SERVICES - electronic databases	Not available
SERVICES - quality assurance	<p>The key aspects of INRA's quality assurance policy concern two main objectives: (1) ensuring the reliability of measurable results; (2) ensuring the traceability of research studies.</p> <p>These objectives are accompanied by other priorities presented in INRA's Quality Assurance Charter (in French)</p>
Safety and ethical issues	Approval number of the PEIMA for animal testing: B 29-277-02. In line with European legislation and its translation into French law, all PEIMA's technicians have cleared level 2
Other relevant information	PEIMA has a European health approval with respect to legally deemed contagious diseases (n° 29-177-501 under decision N°95/125/CE of 04/04/1995). It's free of major viral diseases of salmonids (SHV, NHI, ISA and IPN)

1.2.1 Fish Line information

Name Fish Line 1:	INRA-SY strain
Species:	Rainbow trout (<i>Oncorhynchus mykiss</i>)
General description	No specific agreement to access this genetic resource. Available every year. All mating designs available (from pair spawning to factorial designs with large number of families).
Type:	Base population - unselected population
Traits selected (if relevant):	
Nb generations:	Random breeding for more than 10 generations in INRA facilities.
Effective population size:	2000, for 1 year fingerling, 400 for brood-stock (2 years old) , 60

	males and 60 females are used a minima at each generation
Other:	Cryobanking: 50 males, Fall spawning strains

Name Fish Line 2:	INRA - Ability to transform plant based food_strain
Species:	Rainbow trout (Oncorhynchus mykiss)]
General description	Available in the frame of scientific collaborations with INRA-GABI scientists and under specific conditions to be specified case by case (MTA agreement regarding the use of animals and derived tissues or cells). Available every 2 year. All mating designs available (from pair spawning to factorial designs with large number of families). Ref: Mathilde Dupont Nivet and al
Type:	Selected population
Traits selected (if relevant):	Ability to transform plant based food
Nb generations:	3
Effective population size:	2000, for 1 year fingerling, 400 for brood-stock (2 years old) , 30 males and 30 females are used a minima at each generation
Other:	cryobanking of 50 males. 2 selected generations, Fall spawning strain, The base population (INRA-SY strain) is available, and may be used as control

Name Fish Line 3:	INRA-AUT strain
Species:	Rainbow trout (Oncorhynchus mykiss)]
General description	No specific agreement to access this genetic resource. Available every year. All mating designs available (from pair spawning to factorial designs with large number of families).
Type:	Base population [unselected]
Traits selected (if relevant):	
Nb generations:	Random breeding for more than 10 generations in INRA facilities
Effective population size:	2000, for 1 year fingerling, 400 for brood-stock (2 years old), 60 males and 60 females are used a minima at each generation
Other:	Icryobanking: 50 males (how many, which generation(s)), Fall spawning strains

Name Fish Line 4:	INRA-MRW strain
Species:	Rainbow trout (Oncorhynchus mykiss)]
General description	No specific agreement to access this genetic resource. Available every year. All mating designs available (from pair spawning to factorial designs with large number of families).
Type:	Base population [unselected population]
Traits selected (if relevant):	
Nb generations:	Random breeding for more than 10 generations in INRA facilities
Effective population size:	2000, for 1 year fingerling, 400 for brood-stock (2 years old), 60 males and 60 females are used a minima at each generation]
Other:	Icryobanking 50 males, Winter spawning strains

Name Fish Line 5:	INRA_PRN strain
Species:	Rainbow trout (Oncorhynchus mykiss)
General description	No specific agreement to access this genetic resource. Available every year. All mating designs available (from pair spawning to factorial designs with large number of families).

Type:	Base population [unselected population]
Traits selected (if relevant):	A slight selection pressure is applied to maintain the mean spawning date
Nb generations:	Random breeding for more than 10 generations in INRA facilities.
Effective population size:	2000, for 1 year fingerling, 400 for broodstock (2 years old) , 60 males and 60 females are used a minima at each generation
Other:	Icryobanking of 50 males, Spring spawning strains

Name Fish Line 6:	INRA-INRA fat and lean lines for muscle fat content
Species:	Rainbow trout (<i>Oncorhynchus mykiss</i>)
General description	Available under prior agreement on research topics and under specific conditions to be specified case by case. Divergent lines, spawning every two years. Artificial reproduction (from pair mating to large factorial designs).
Type:	Selected population (divergent selection)
Traits selected (if relevant):	Muscle fat content, measured at one year old with Distell Fatmeter [®] (Quillet et al, reference)
Nb generations:	7
Effective population size:	2000, for 1 year fingerling, 400 for broodstock (2 years old) , 60 males and 60 females are used a minima at each generation
Other:	Cryobanking of 50 males (how many, which generation(s)), The control population (unselected base population is available, see INRA-PRN strain) Spring spawning strain

Name Fish Line 7:	INRA-INRA Golden lines train
Species:	Rainbow trout (<i>Oncorhynchus mykiss</i>)
General description	No specific agreement to access this genetic resource. Available every year. All mating designs available (from pair spawning to factorial designs with large number of families).
Type:	Selected population [Color of the skin: dominant yellow color].
Traits selected (if relevant):	Colour of the skin: dominant yellow colour. Fish of the line are homozygous
Nb generations:	Random breeding for more than 10 generations in INRA facilities. Reselected for homozygosity after crossing with INA-SY line
Effective population size:	2000, for 1 year fingerling, 400 for broodstock (2 years old), 60 males and 60 females are used a minima at each generation
Other:	Cryobanking of 50 males, Fall spawning strains

Name Fish Line 8:	INRA- isogenic clonal lines
Species:	Rainbow trout (<i>Oncorhynchus mykiss</i>)
General description	Available in the frame of scientific collaborations with INRA-GABI scientists and under specific conditions to be specified case by case (MTA agreement regarding the use of animals and derived tissues or cells,...). A set of 12 to 16 genetically distinct isogenic homozygous lines are available each year for reproduction. Either pure homozygous or F1 heterozygous individuals can be produced. Lines are known to be exhibit different phenotypes

	for a number of traits.
Type:	Selected population [Not really selected, but the cloning process resulted in genetically and phenotypically different lines from the base population]
Traits selected (if relevant):	Isogenic lines are known to be different for growth potential, morphology (body shape, skin colour), reproduction traits (age at puberty, date of spawning, egg size and quality), stress response and disease resistance
Nb generations:	Lines were obtained by two successive generations of gynogenesis and are maintained each generation by within line mating (one female * one sex-reversed male)
Effective population size:	100, for 1 year fingerling, 40 for brood-stock (2 years old) availability of larger populations on request
Other:	Fall to winter spawning, according to the line. The base population (INRA-SY strain) is available, and may be used as control.

Name Fish Line 9:	INRA monosex male line
Species:	Rainbow trout (<i>Oncorhynchus mykiss</i>)
General description	Available in the frame of scientific collaborations with INRA-LPGP scientists and under specific conditions to be specified case by case (MTA agreement regarding the use of animals and derived tissues or cells,...).
Type:	Selected population [not really selected but males are all YY males]
Traits selected (if relevant):	Monosex male line
Nb generations:	Line is obtained by a cross between a male and one sex-reversed female (XY). Progeny is tested
Effective population size:	10, availability of larger populations on request
Other:	Cryobanking of 10 males. The base population (INRA-AUT strain) is available, and may be used as control. Fall spawning strain. Line sex-reversed male is also available ref: Fostier A, Guigen Y <i>et al</i>

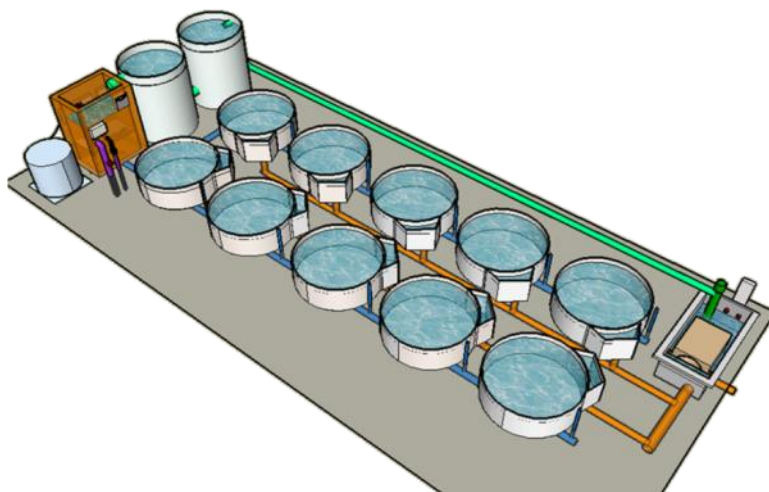
Name Fish Line 10:	INRA-Brown trout synthetic line strain
Species:	Brown trout (<i>Salmo trutta</i>)
General description	No specific agreement to access this genetic resource. Available every year. All mating designs available (from pair spawning to factorial designs with large number of families).
Type:	Base population [unselected population]
Traits selected (if relevant):	
Nb generations:	Random breeding for more than 10 generations in INRA facilities.
Effective population size:	2000, for 1 year fingerling, 400 for broodstock (2 years old), 60 males and 60 females are used a minima at each generation
Other:	Cryobanking of 50 males , Fall spawning strains

Name Fish Line 11:	INRA-PROSPER brown trout line
Species:	Brown trout (<i>Salmo trutta</i>)
General description	Available under prior agreement on research topics and under

	specific conditions to be specified case by case. Available every 2 year. All mating designs available (from pair spawning to factorial designs with large number of families)
Type:	Selected population
Traits selected (if relevant):	Individual growth: 15% increase in growth per generation of selection
Nb generations:	Random breeding for more than 10 generations in INRA facilities.
Effective population size:	2000, for 1 year fingerling, 400 for broodstock (2 years old), 60 males and 60 females are used a minima at each generation
Other:	Cryobanking of 50 males (generation7), Fall spawning strain, A mass selection for growth was applied using the PROSPER process (reference: Vandeputte M <i>et al</i>). The unselected control population is available. The INRA brown trout synthetic population is a mixture of domestic brown trout populations, including the population from which the selected line was derived

1.2.2 Facility Unit 1 Information: RAS

Name Facility Unit 1	RAS
TNA	YES
Contact (Researcher)	Laurent, Labbé Barrage du Drennec 29450 Sizun, France Tel: +332 98 68 89 36 E-mail: Larent.labbe@rennes.inra.fr
URL	See above
Postal Address	See above
General description	10 tanks 6m ³ each, volume, rainbow trout, all, 2 tons
Technical description	Semi industrial RAS (20-25 kg feed load /d): 10 tanks 6m ³ each, 2 fluidized bio-filter, self feeders
Remote monitoring & control	
Water and environmental conditions	Inlet water quality pH 6,2/7,2 o2 saturation, drum filter 100μ , oxygenation
Flowrate	2,5 flow per hour max (15m ³ /h) per tank. This parameter is monitored and controlled manually
Temperature	Temperature range 5 - 23. Please also indicate if this parameter is monitored automatically AND it is no controlled natural temperature
Salinity	No
Oxygen	Oxygen range 5 / 14 mg l. This parameter is monitored manually, it is controlled automatically
pH	pH range 6,5/7,2. This parameter is monitored manually , it is controlled automatically
Light intensity and wavelength	Natural
Photoperiod	Natural Photoperiod
Fish measurements	Manually or automatically: size, weight, tag, fat content



1.2.3 Facility Unit 2 Information: Hatchery desk

Name Facility Unit 2	Hatchery desk
TNA	YES
Contact (Researcher)	Laurent, Labbé Barrage du Drennec 29450 Sizun, France Tel: +332 98 68 89 36 E-mail: Larent.labbe@rennes.inra.fr
URL	See above
Postal Address	See above
General description	145 tanks, 150l to 400l volume, rainbow trout, fry stage, 5kg/max per tank
Technical description	1 electric belt feeder per tank
Remote monitoring & control	
Water and environmental conditions	Inlet water quality pH6 o2 saturation cO2 stripped
Flowrate	50 m ³ /h for 156 tanks. This parameter is monitored and controlled manually
Temperature	Temperature range 11/11,8. This parameter is monitored automatically, it is not controlled, natural temperature
Salinity	No
Oxygen	Oxygen saturation. This parameter is monitored manually, it is not controlled
pH	pH range 5.2_6.2. This parameter is monitored manually, it is not controlled
Light intensity and wavelength	
Photoperiod	Controlled photoperiod
Fish measurements	Manually or automatically: size, weight, tag, fat content



1.2.4 Facility Unit 3 Information: Grow desk

Name Facility Unit 3	Grow desk
TNA	YES
Contact (Researcher)	Laurent, Labbé Barrage du Drennec 29450 Sizun, France Tel: +332 98 68 89 36 E-mail: Larent.labbe@rennes.inra.fr
URL	See above
Postal Address	See above
General description	156 tanks, 2m ³ each, rainbow trout and brown trout, all stages , 100 kg max / tank
Technical description	Flow-through systems trow flow, tanks are all equipped with 1 Arvotec system
Remote monitoring & control	
Water and environmental conditions	Inlet water quality pH 6,2 _ 7,2, o2 saturation, filtered whit a drum filter 100μ , mechanical oxygenation a stripping gas
Flowrate	900m ³ /h. This parameter is monitored and controlled manually
Temperature	Temperature range 5_23. This parameter is monitored automatically, it is not controlled (natural temperature)
Salinity	No
Oxygen	Instructions: Oxygen range 5 / 14 mg l. This parameter is monitored manually, it is controlled automatically in several tanks
pH	pH range 6,5/7,2. This parameter is monitored manually, it is controlled automatically
Light intensity and wavelength	Natural
Photoperiod	24 tanks
Fish measurements	Manually or automatically: size, weight, tag, fat content



1.2.5 Facility Unit 4 Information: Behaviour desk

Name Facility Unit 4	Behaviour desk
TNA	YES
Contact (Researcher)	Violaine Colson, LPGP, INRA Campus de Beaulieu Bâtiment 16A35042 RENNES CEDEX France Tel: +332 23 48 50 20 E-mail: Violaine.Colson@rennes.inra.fr
URL	See above
Postal Address	See above
General description	32 tanks, rainbow trout and brown trout, all stages, 35kg max / tank
Technical description	Flow-through systems, tanks are all equipped with 1 Arvotec system, and an electric valve
Remote monitoring & control	8 video cameras
Water and environmental conditions	Inlet water quality pH 6,2_7,2, o2 saturation, filtered with a drum filter 100µ, mechanical oxygenation a stripping gas
Flowrate	1 to 3 removal/h. This parameter is monitored and controlled manually
Temperature	Temperature range 5_23. This parameter is monitored automatically, it is not controlled (natural temperature)
Salinity	No
Oxygen	Instructions: Oxygen range 5 / 14 mg l. This parameter is monitored manually, it is controlled automatically in several tanks
pH	pH range 6,5/7,2. This parameter is monitored manually, it is controlled automatically
Light intensity and wavelength	Controlled
Photoperiod	Controlled
Fish measurements	Manually or automatically: size, weight, tag, fat content, tracking system

1.3 Modality of access

INRA-PEIMA will carry out experiments for potential users and provide physical access to its facilities during crucial periods of the running experiments. As the standard procedures and the general maintenance will be carried out by trained and experienced staff, the external user might choose to be on-site only during sampling periods or other relevant procedures.

PEIMA offers access to carry out fish trials with all tank types and water qualities available at the premises. Access will comprise the use of tanks including maintenance, water supply, daily feeding and husbandry of fish; manipulation, and sampling of fish. Access to all dry laboratory facilities and other infrastructural, logistical, technical and scientific support to external users is offered, as well as accommodation and office access with PC and international phone, fax and internet communications.

PEIMA provides standardized experimental protocols, documentation of results, and appropriate sampling and conservation of samples. Provision of experimental fish will exclusively be done using the collection of fish lines (rainbow trout, brown trout) available on site. Provision of specific genetic settings (different lines and crosses, triploids, monosex) should be agreed in advance. Use of rainbow trout isogenic lines is subject to prior agreement on research topics and IP rights.

1.4 Unit of access

The unit of access is defined as 1 tank week; equalling the occupation of 1 standard fish holding unit (2 m³) for 7 days. Occupation of small (250 l) or large (> 2000 l) tanks will be assigned a fraction or a multiple, respectively, of the standard tank unit. One trial is expected to comprise 144 tank-weeks on average (i.e. 12 tanks to test 4 factors in triplicate, during 12 weeks).

Access typically consists of:

- Week n°1-2: Details of trial protocol and work planning, acclimatization, fish tagging and initial measurements/sampling (user on site).
- Week n°5: intermediate measurements (done by PEIMA personnel)
- Week n°9: intermediate measurements (done by PEIMA personnel)
- Week n°11-12: final measurements/sampling, completion of documentation, sample processing (user on site)