El Banco Español de Algas (BEA)

Spanish Bank of Algae

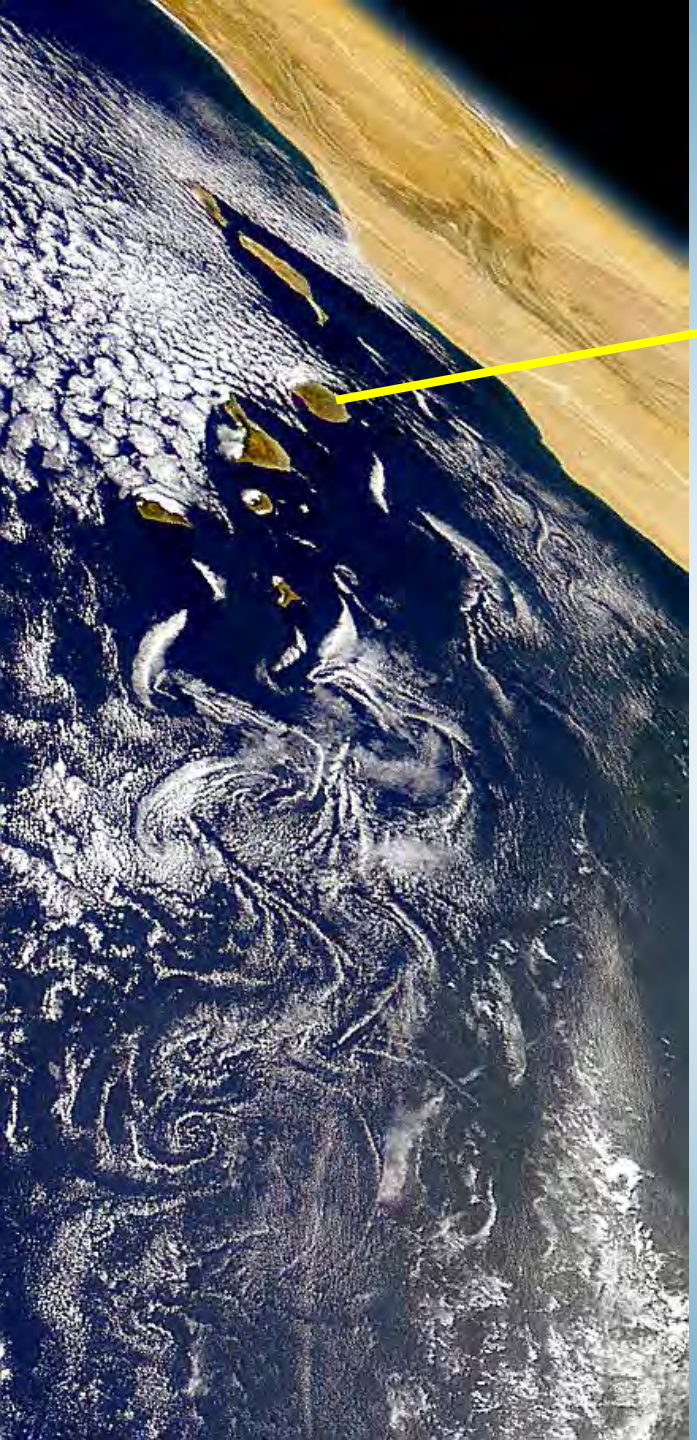
Nacional I+D+i Service

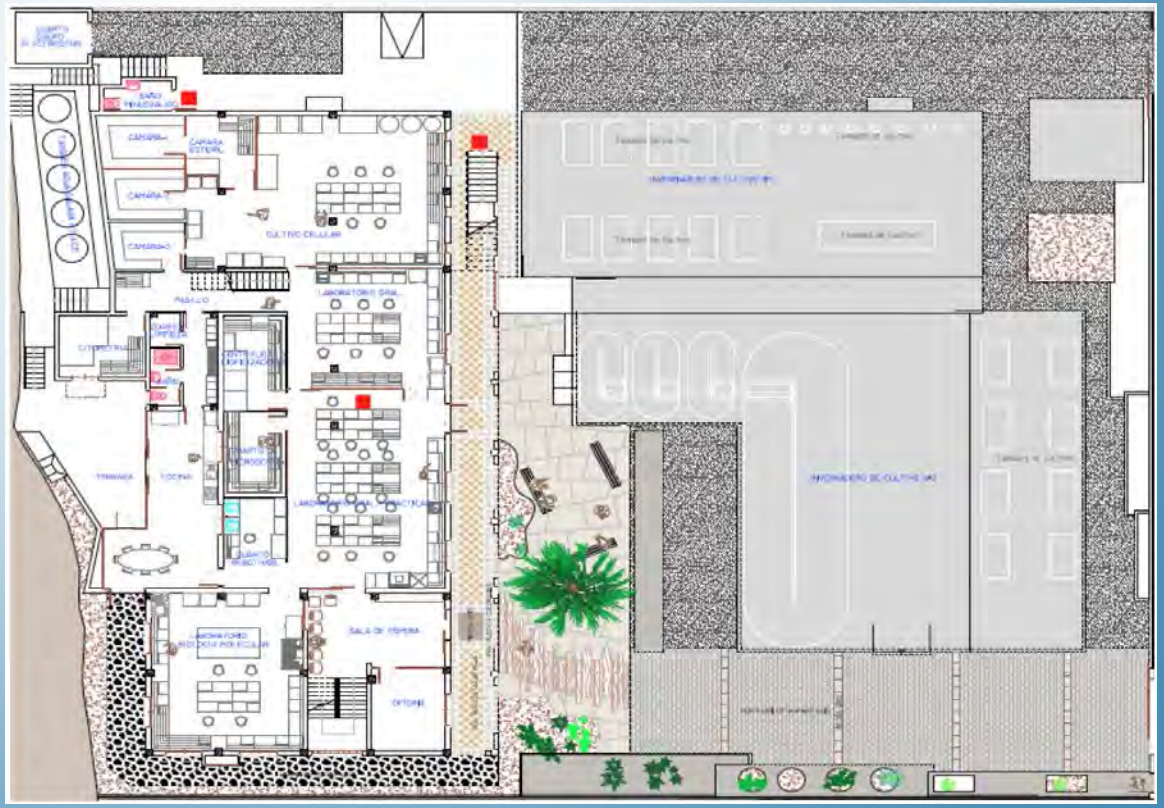
de La Universidad de Las Palmas de Gran Canaria

Basic tasks:

- Bioprospection
- Isolation
- Identification
- Maintenance
- Characterization
- Supply

Microalgae and Cianobacterias





El BEA is member:

European Culture Colección Organization (ECCO) since 2001

World Federation of Culture Colecctions (WFCC) since 2003

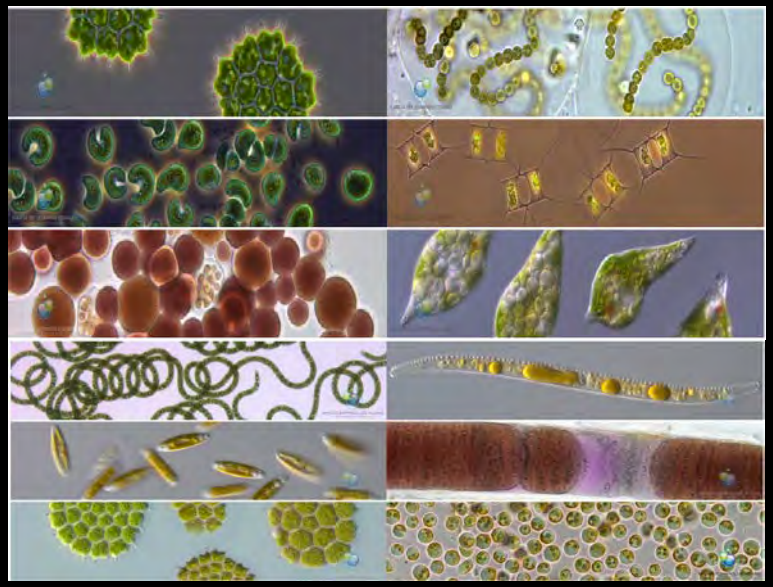
Included in **WFCC-MIRCEN** registered number 837.

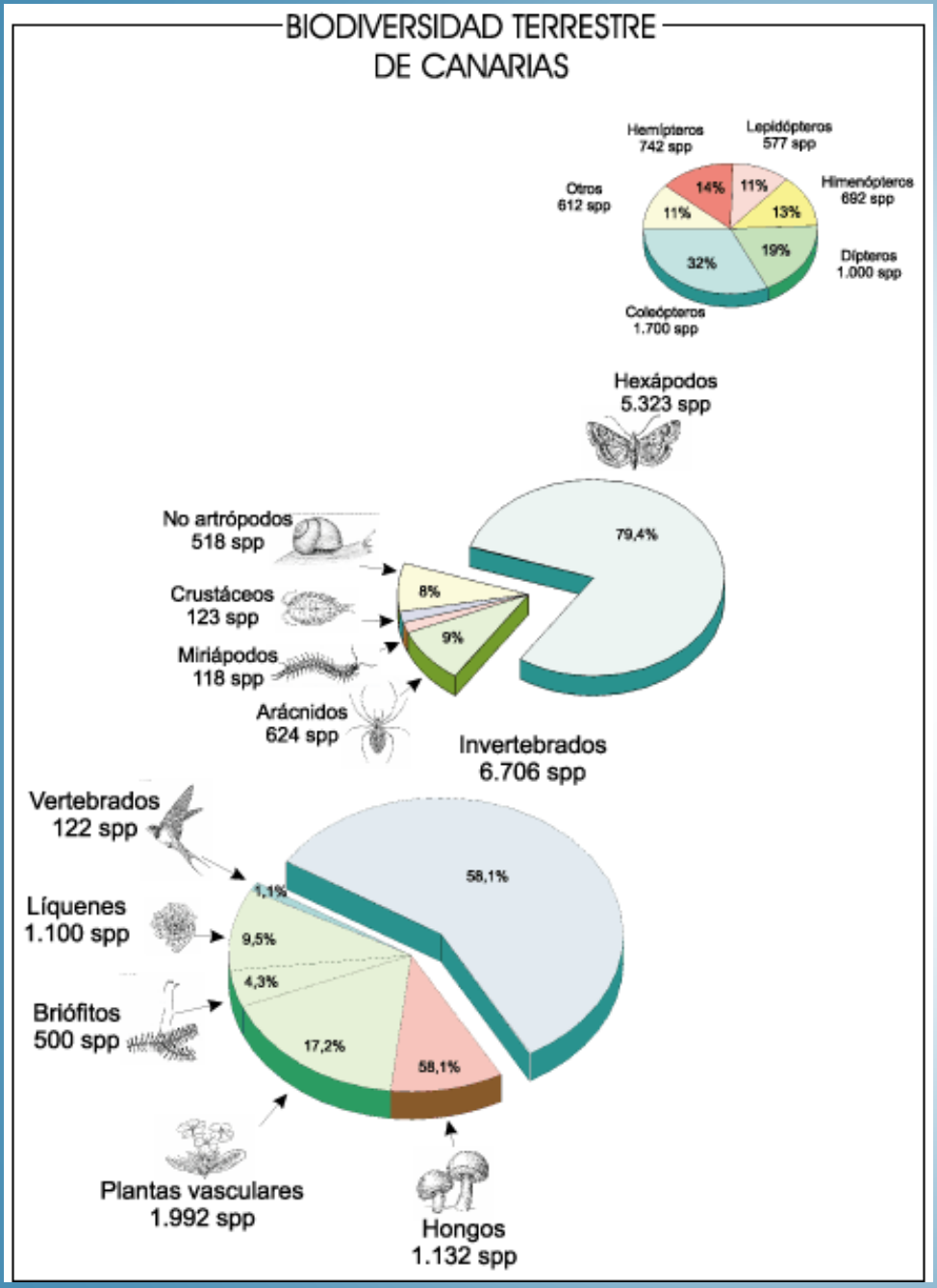
IDA. BEA is accredited before the Government of Spain as international authority for the deposit of microorganisms, in conformity with the regulations of Budapest Treaty. Resolution n º 239 of the World Organization of the Intellectual Property (OMPI) since 2005.

Dorsal mesoatlántica
Azores
Macaronesia
Madeira
Islas Salvajes
Cuenca de Canarias
Islas Canarias
Cabo Verde
Cuenca de Cabo Verde
Atlántico
Portugal
España
Estrecho de Gibraltar
Marruecos
Sahara Occidental
África
Mauritania
Senegal

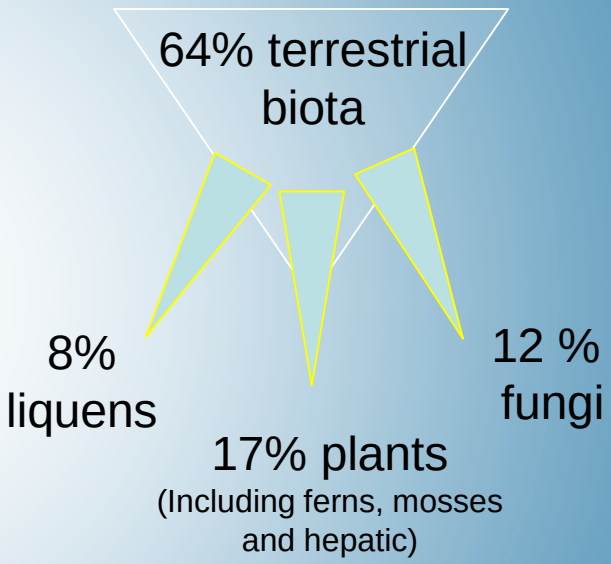
- The archipelago comprises seven islands and islets that together do not exceed 7,500 km^2.
- It is part of the Macaronesia region “islands of the fortunate” that volcanic in origin and a unique biogeography.
- Its situation is subtropical.
- It is 940 km from Europe and 95 km from the African continent.
- Special climatic characteristic of the oceanic Cold Current of Canaries, the dominant trade winds (Alisios) together with the rough orography and the altitude are responsible for the climatic differences between N-NE and S-SW and are responsible of the great microclimatic diversity. This joint to the geological characteristics lead to a habitats heterogenity.
- It has been a territory unaffected by glaciation or cold drafts.
- This combination of factors explains the great wealth of biodiversity and endemic species

Interactions between geological events, heterogeneous habitats, the influence of a stable climate and temperate ocean waters make the cryptogamic flora of the Canary Islands be high in terms of diversity.

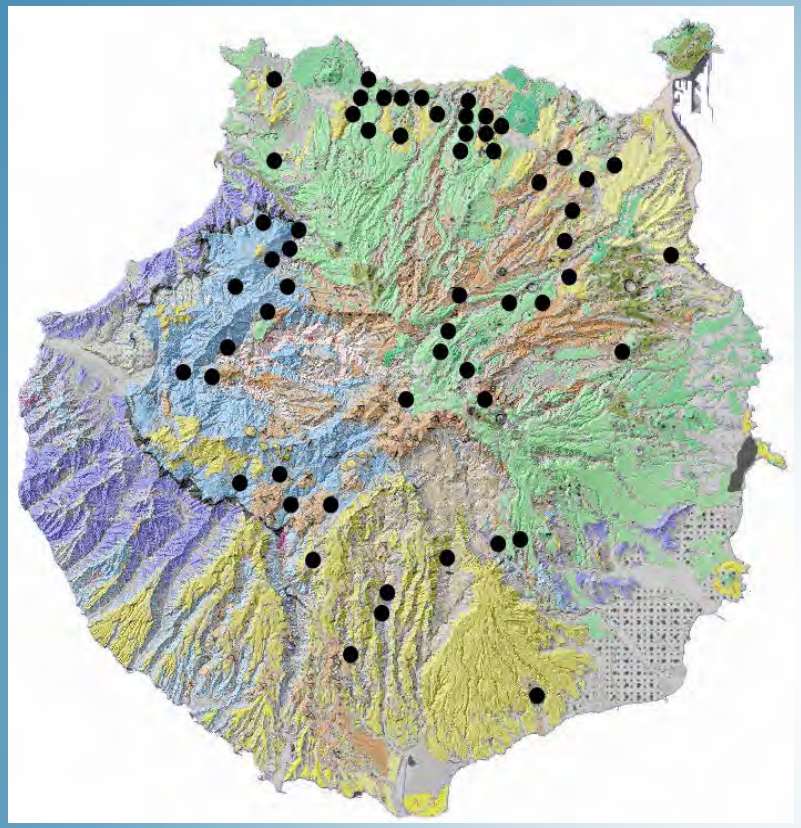


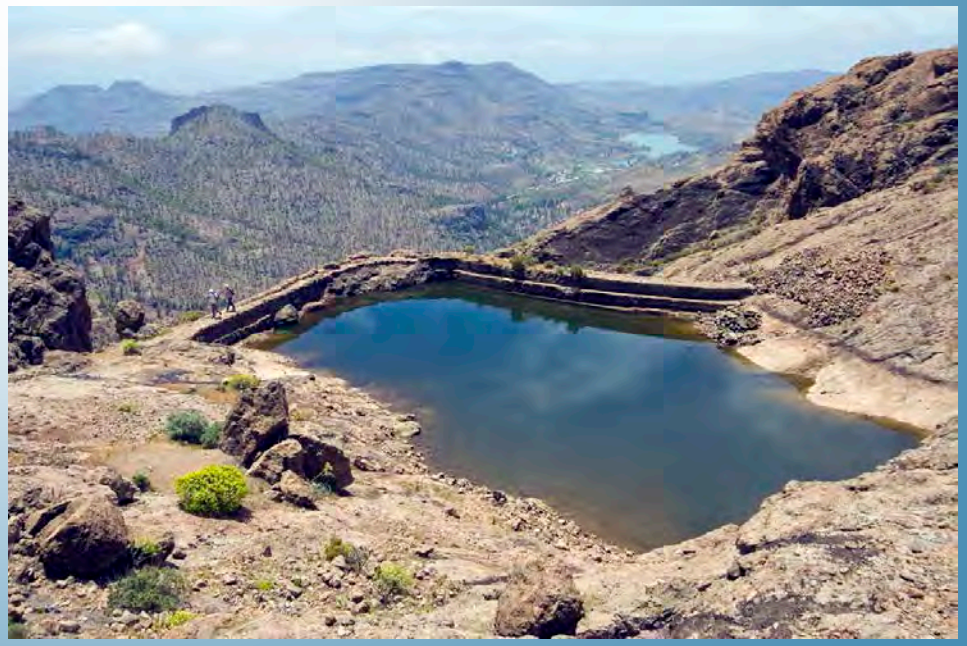


Machado (2002) he gathers in his work on the biodiversity of the Canary Islands that there are 23.000 species as estimation of the total biota of the Canaries:



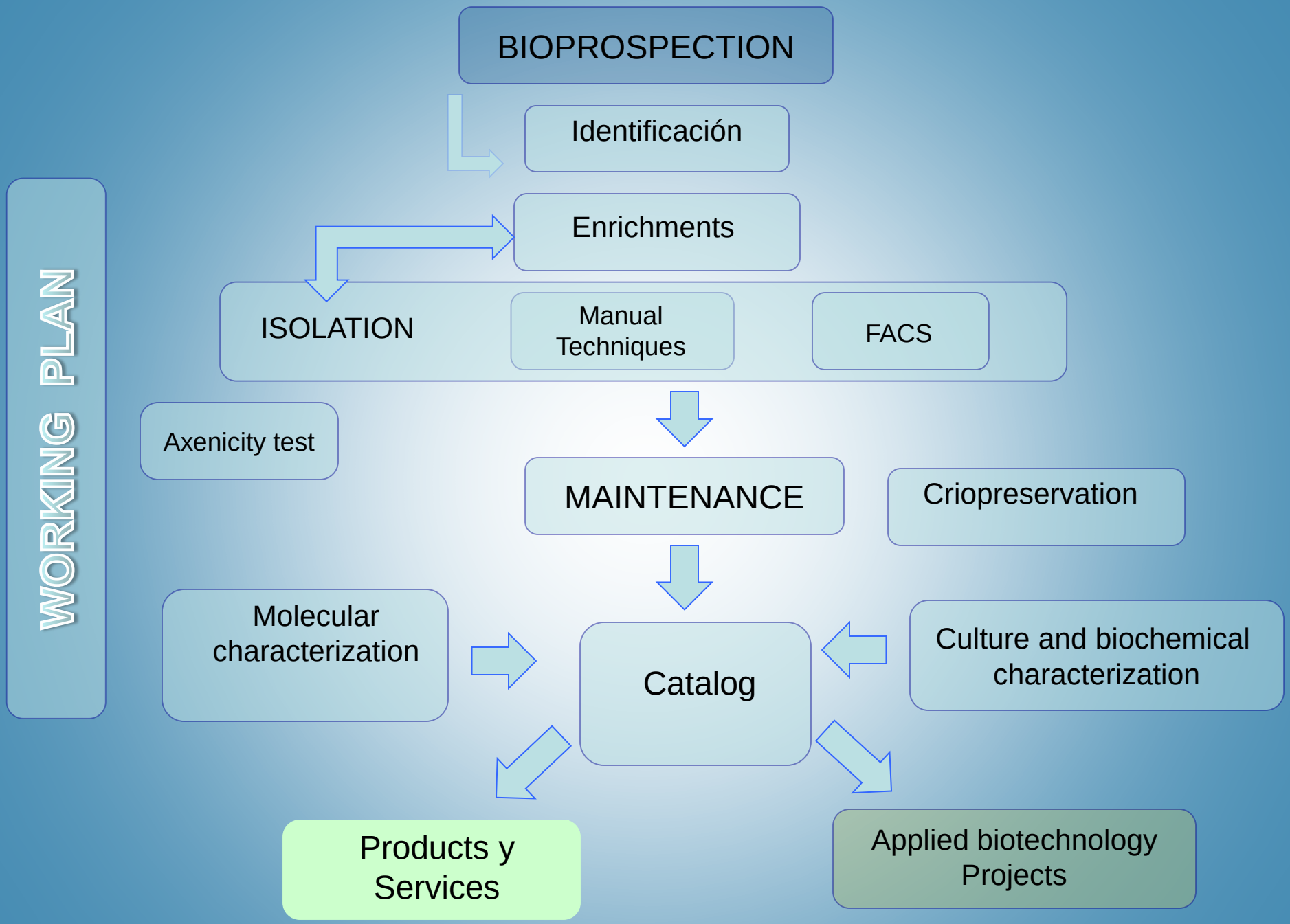
Do not exist any reference to the algae and **terrestrial microalgae**



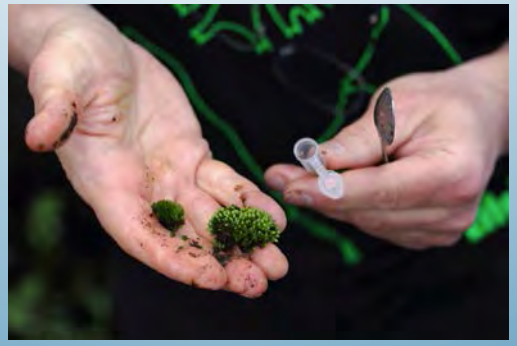


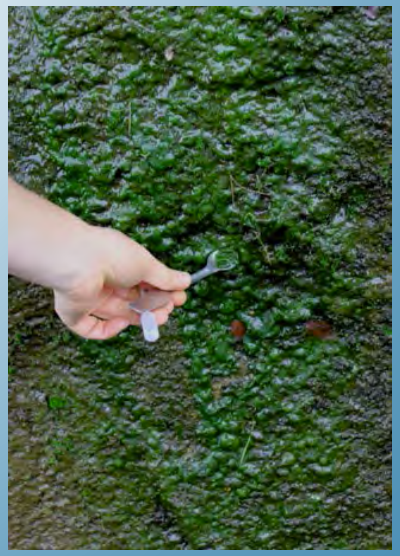
In Canaries the water is the supreme happiness, is the life. For this the water to get s the desire, the obsession of all, since it costs more than the gold itself.

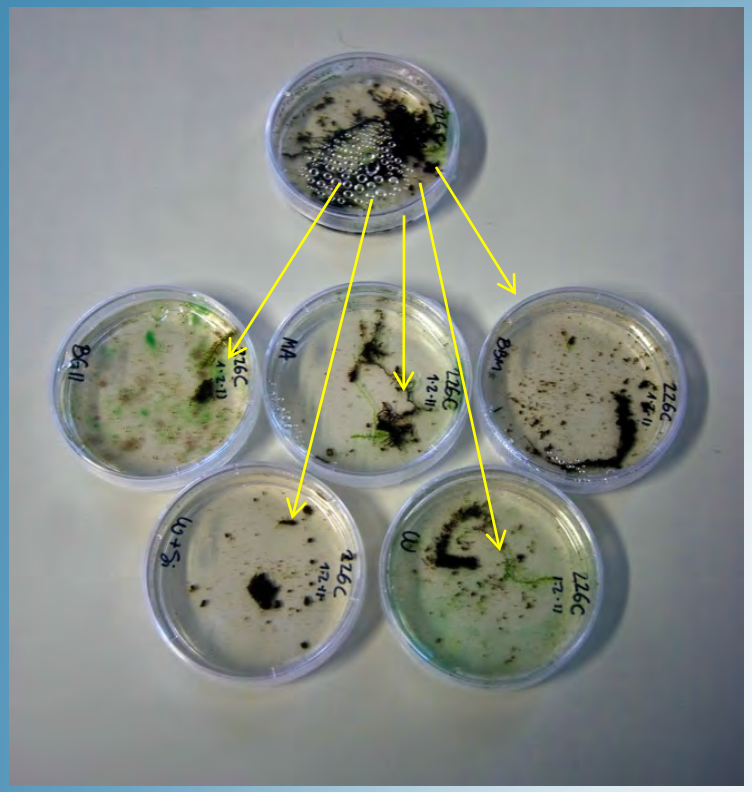
J. Maluquer and Viladot (1906)


WORKING PLAN
BIOPROSPECTION
Identificación
Enrichments
ISOLATION
Manual Techniques
FACS
Axenicity test
MAINTENANCE
Criopreservation
Molecular characterization
Catalog
Culture and biochemical characterization
Products y Services
Applied biotechnology Projects

BIOPROSPECCIÓN



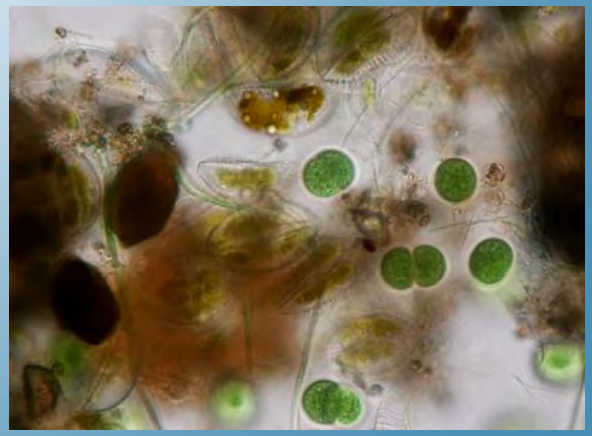


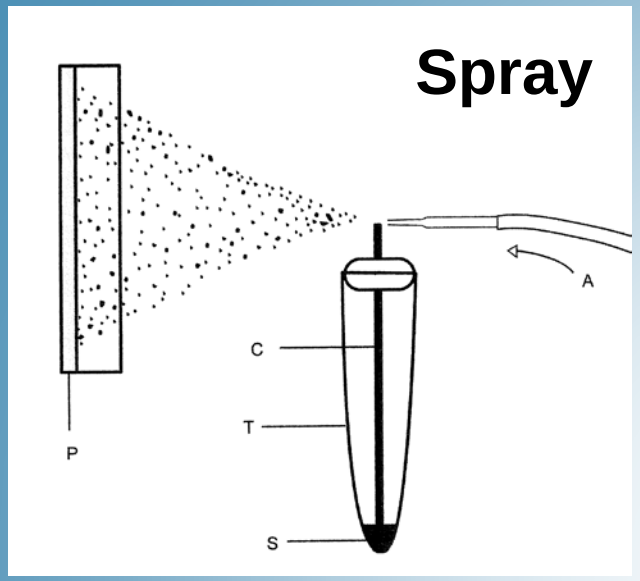


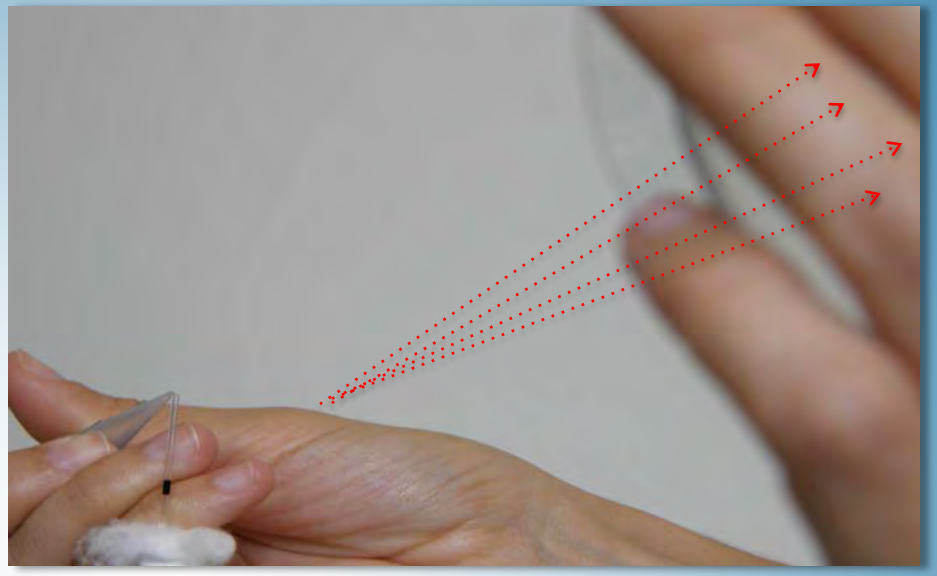
Original sample

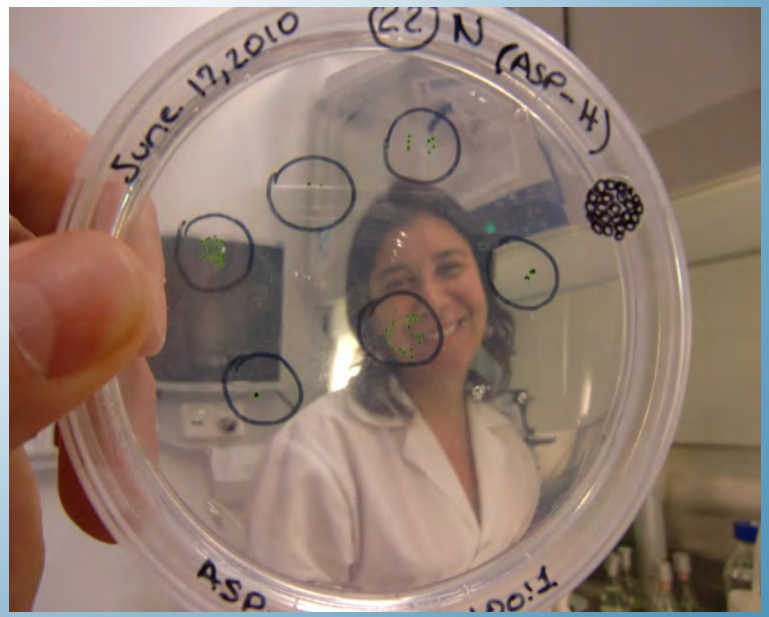
Enriched
Sub-samples

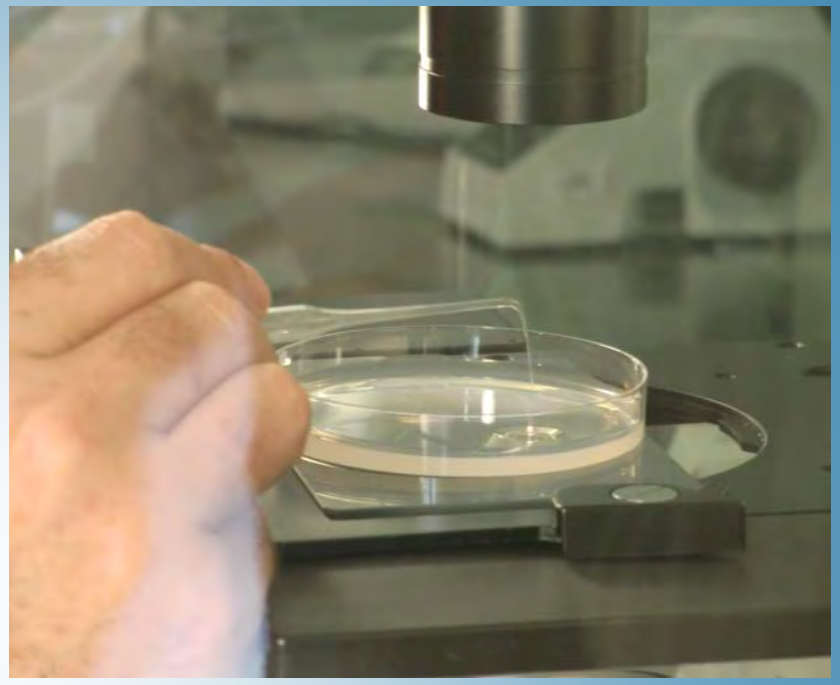
Incubation

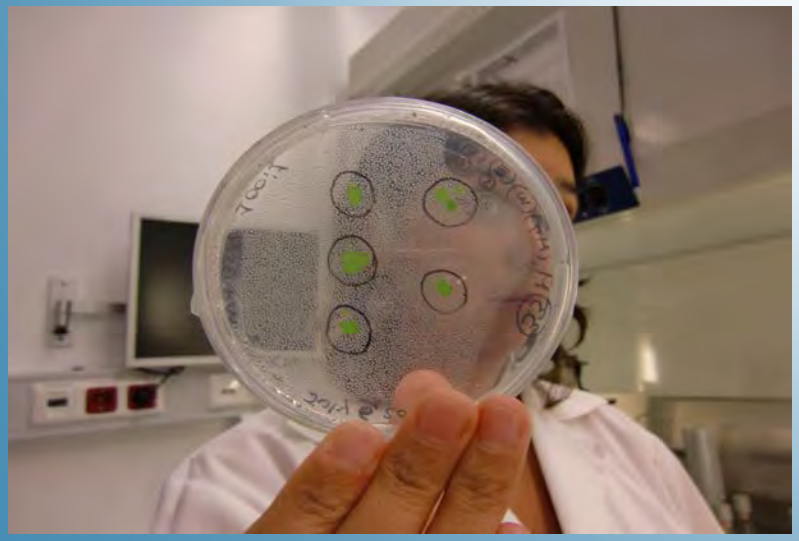



Spray
A
C
T
P
S



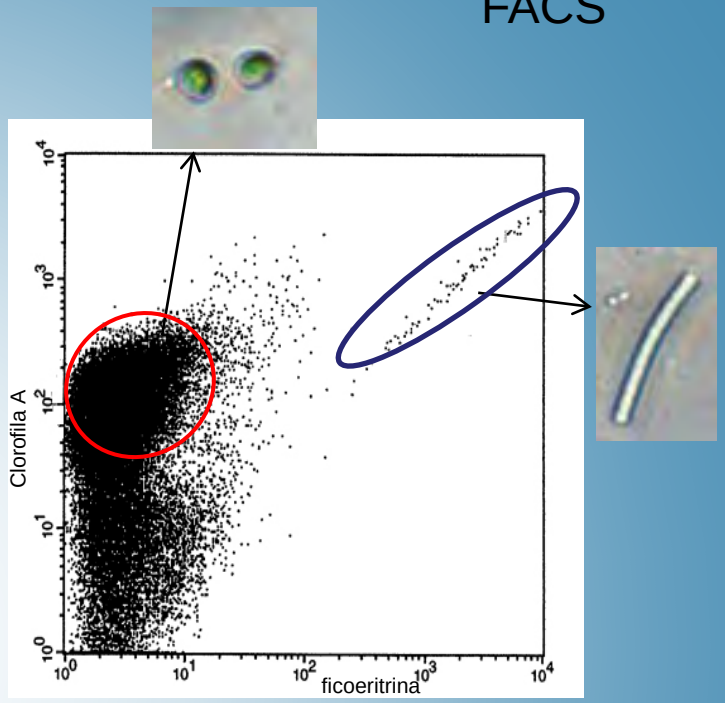

June 17, 2010
N (ASP-4)
ASP

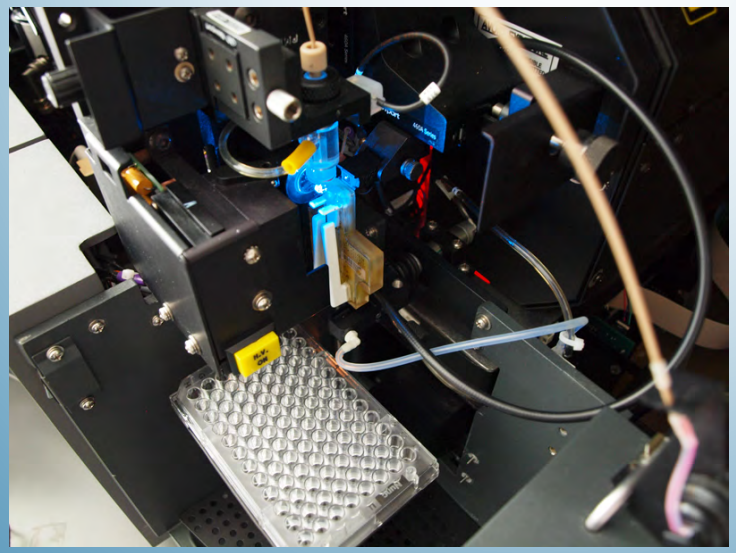


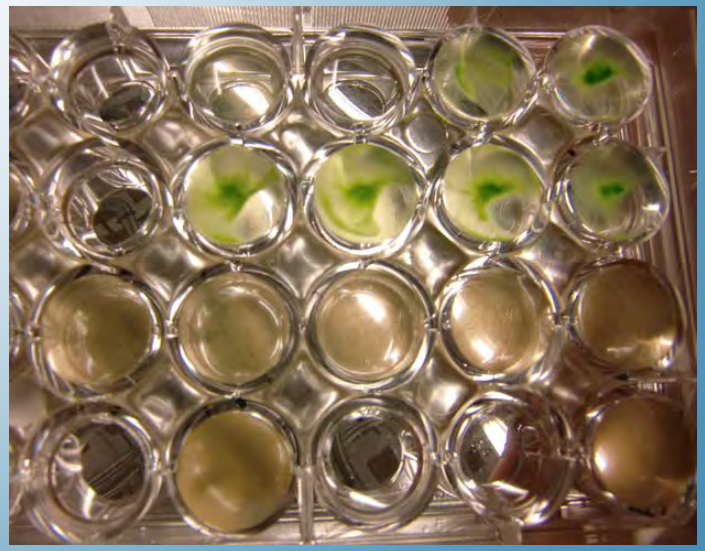


Microcapilar pippeting

FACS



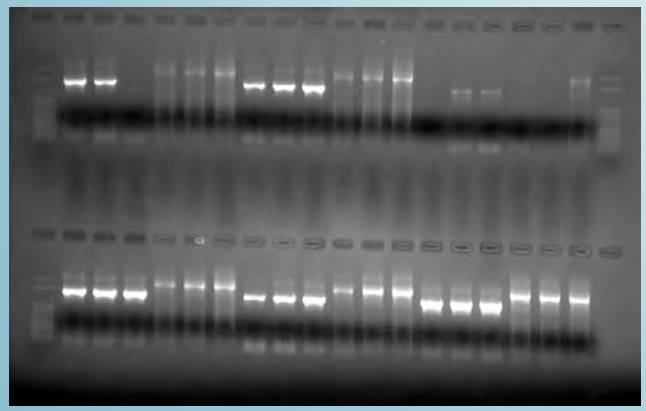


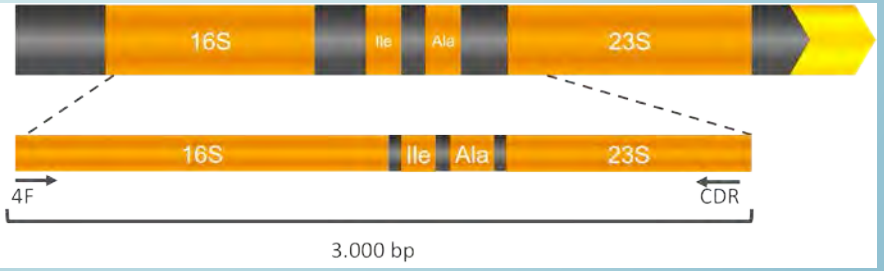


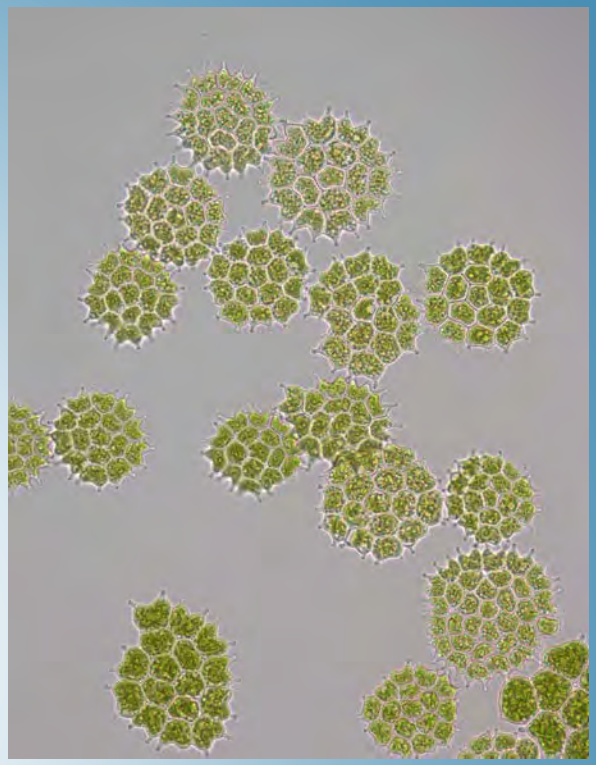
Deposit and maintenace

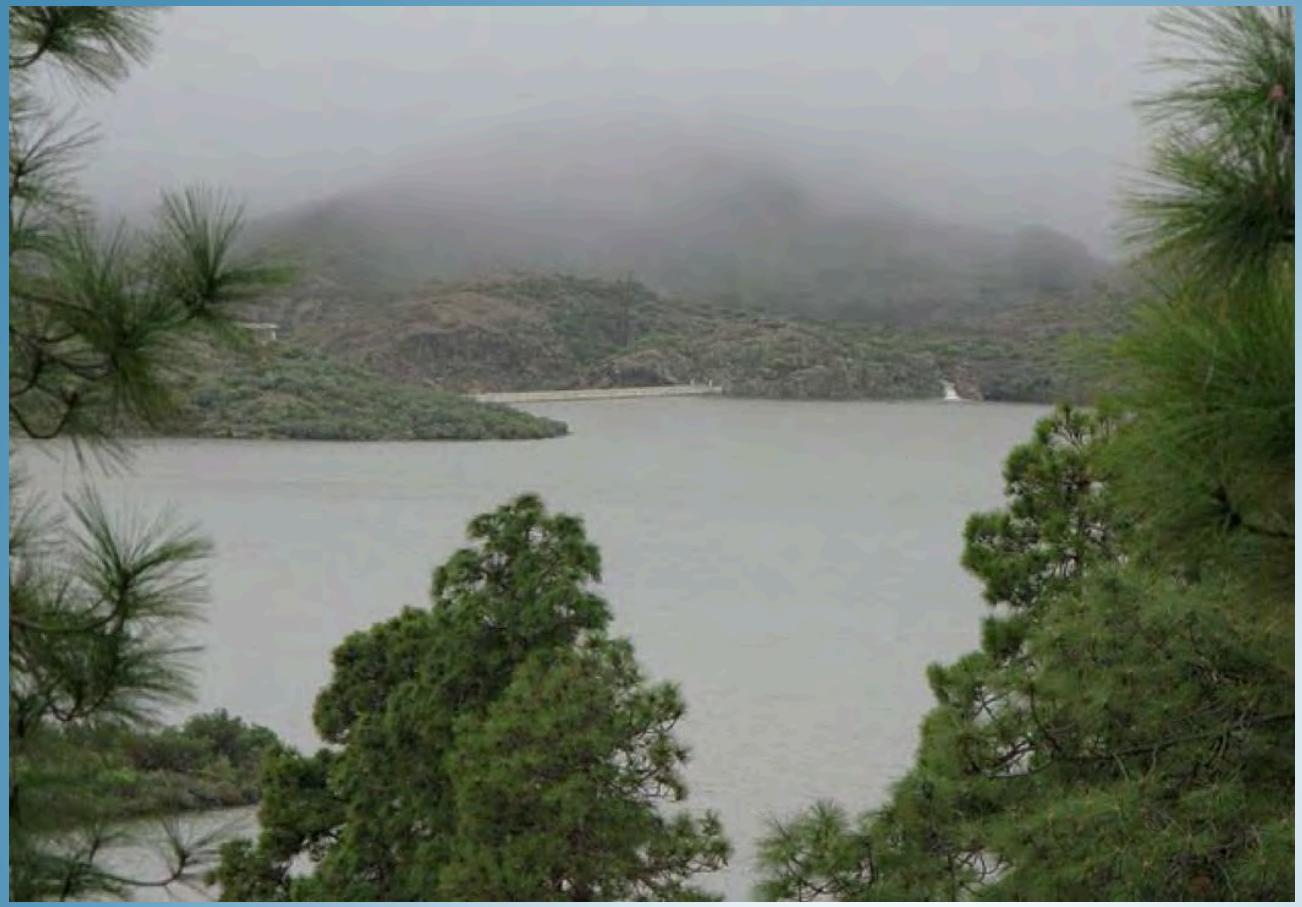
ULTRA LOW
Top Screen
Temp -150°C
-150°C
Alarm: Normal
Status: Stand-by
Door: Closed
2013/05/22 07:06:05
LCD CONTROL
CENTRO DE
BIOTECNOLOGIA MARINA
marinebiotechnology.org

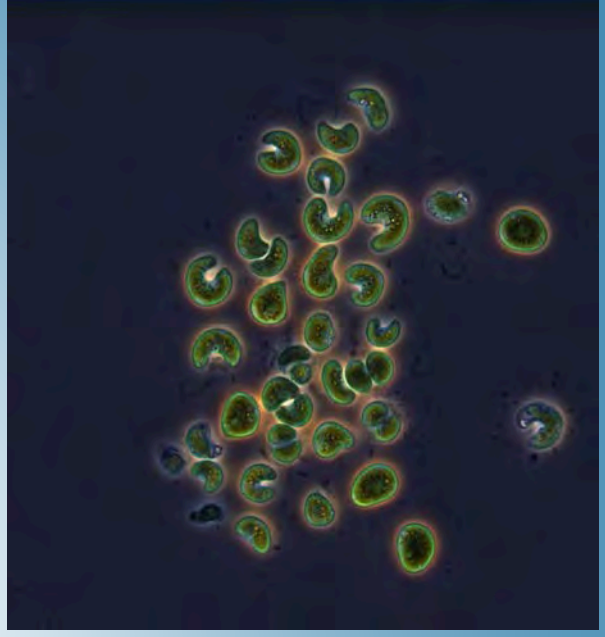
Molecular characterization







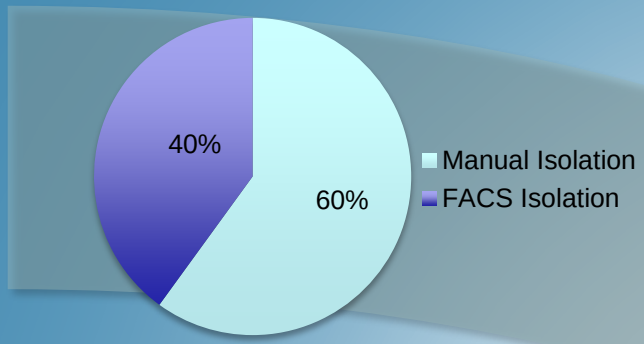


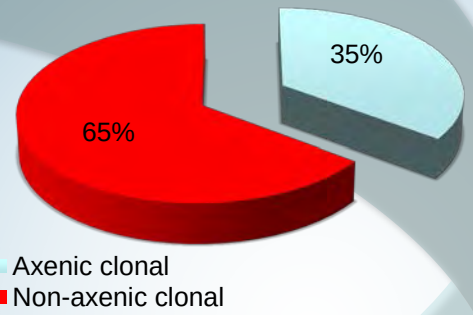


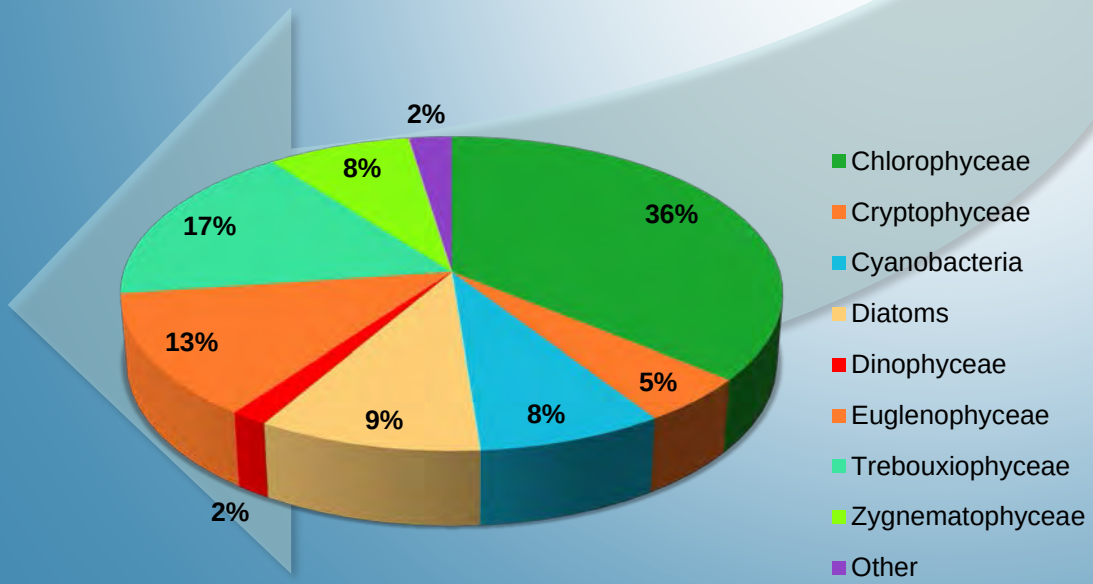
BEA 0182B *Volvox* sp.

BEA 0182B *Pinnularia* sp.

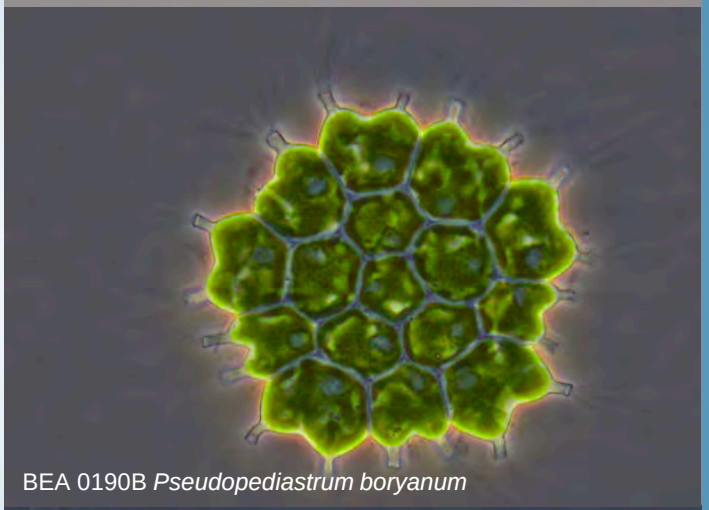
Gran Canaria water reservoirs







BEA 0362 *Carteria crucifera*



BEA 0190B *Pseudopediastrum boryanum*

Coenocystis sp.

Euglenophyceae

"beautiful eye"

General description of Euglenophyceae

Green flagellates with elongate, ovoid or fusiform cells, varying in length from 20 to 500 µm, and with 2 flagella originating within an anterior invagination of the cell.

All species have an extraplastidial, eyespot that curves partway around the canal reservoir junction in the anterior cytoplasmic matrix, opposite a crystalline swelling on the base of the long flagellum.

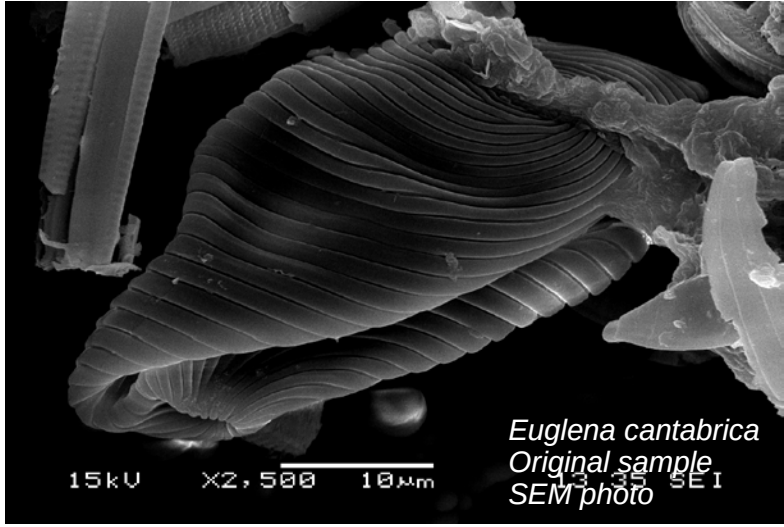
Chloroplasts vary in shape (discs, plates or ribbons), size, number per cell (from 2 to several hundred) and pyrenoid type.

All species are photoauxotrophic, some facultatively heterotrophic, none phagotrophic.

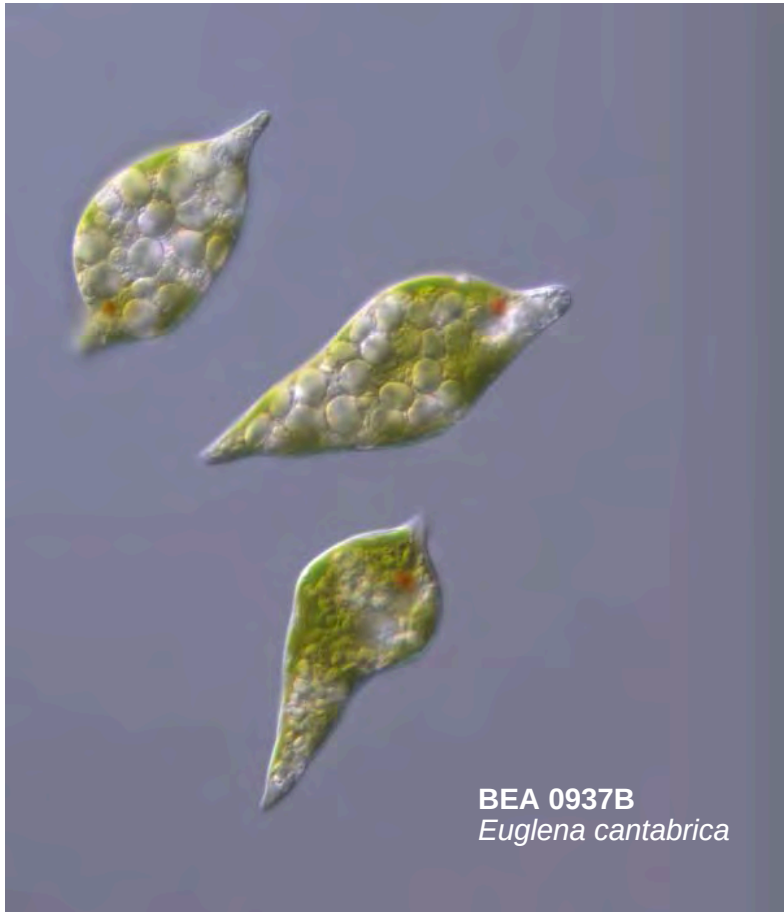
Storageproduct is a β-1,3-polyglucan, called paramylon starch. Some species form mucilaginous cysts or palmellae

Aging cells fill with brown droplets of lipid (lipofuscin) and cyclic metaphosphates.

Reproduction is by longitudinal fission. Records of sexual reproduction are rare.

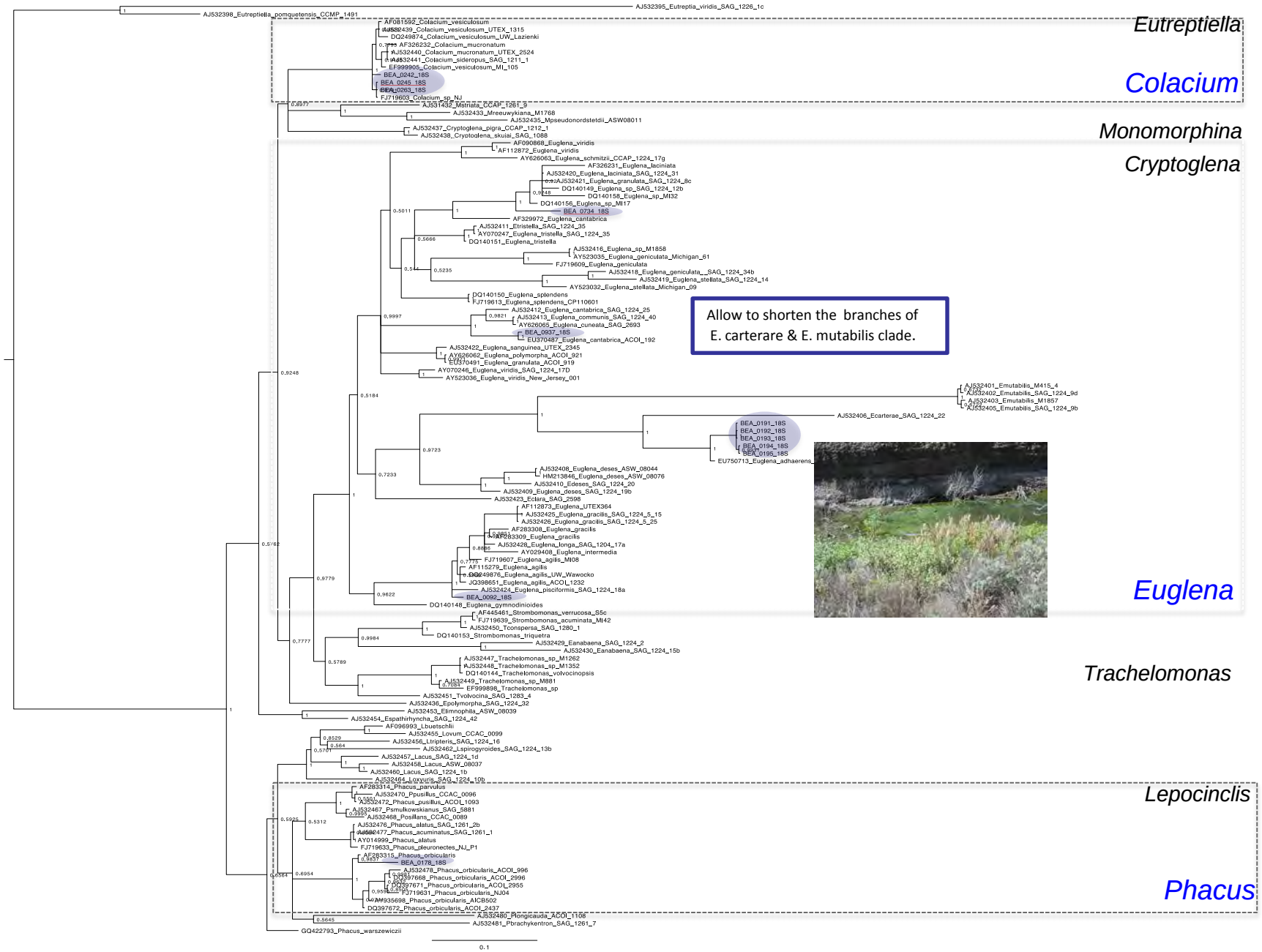


Euglena cantabrica
Original sample
SEM photo



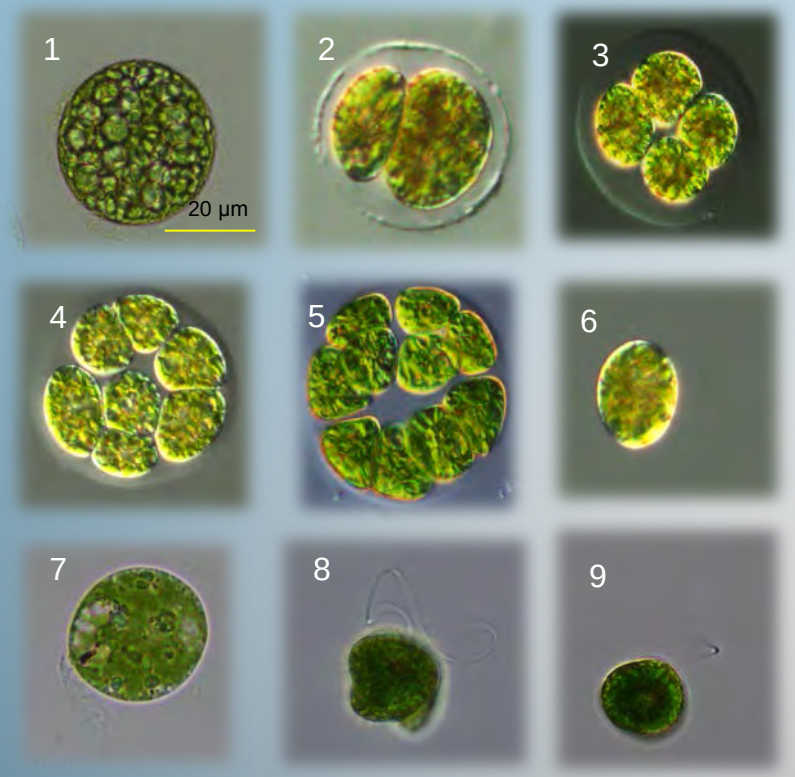
BEA 0937B
Euglena cantabrica

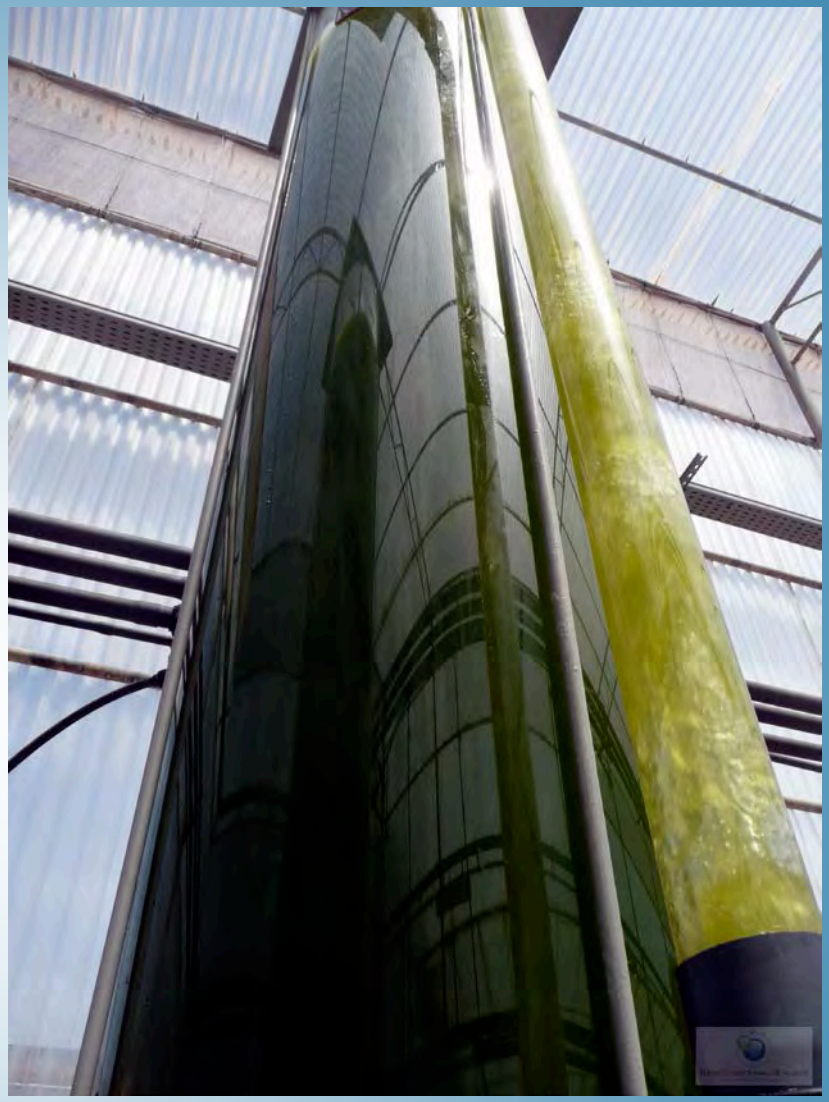
Euglenophyceae phylogenetic tree of SSU rDNA region by Bayesian Inference (BI) using Monte Carlo Markov Chain (MCMC) method

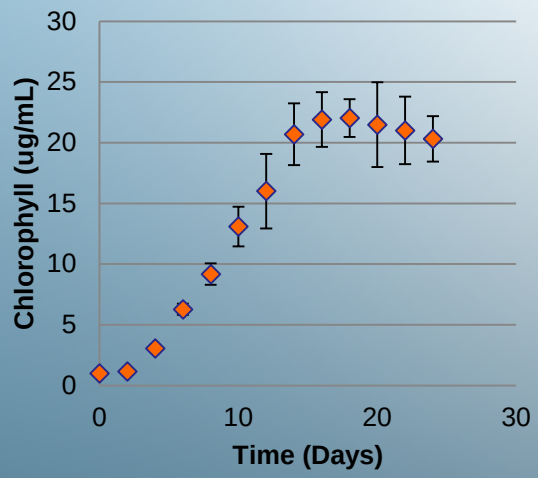


8 different clades that were reviewed in 2003 by Melkonian´s group

Besides these clasic functions of any culture collection of microorganisms, the Spanish Bank of Algae is a service that facilitates the development of a new bioindustrial sector based on the cultivation and application of the microalgae and cianobacterias.

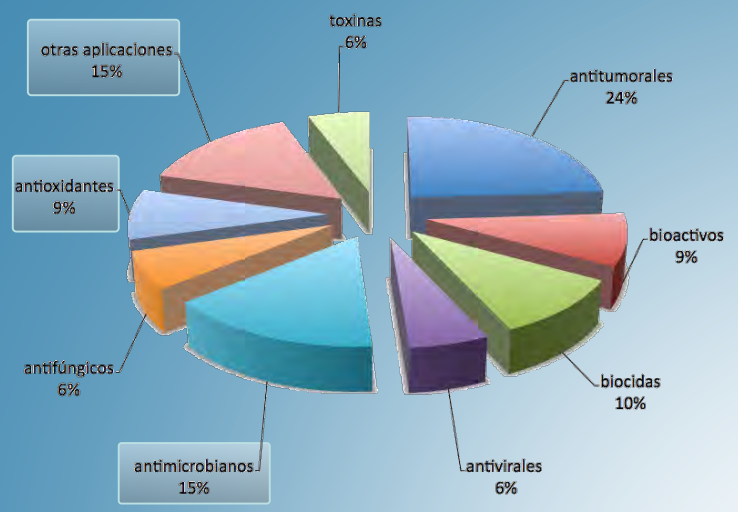






BEA 0937B *Euglena cantabrica*

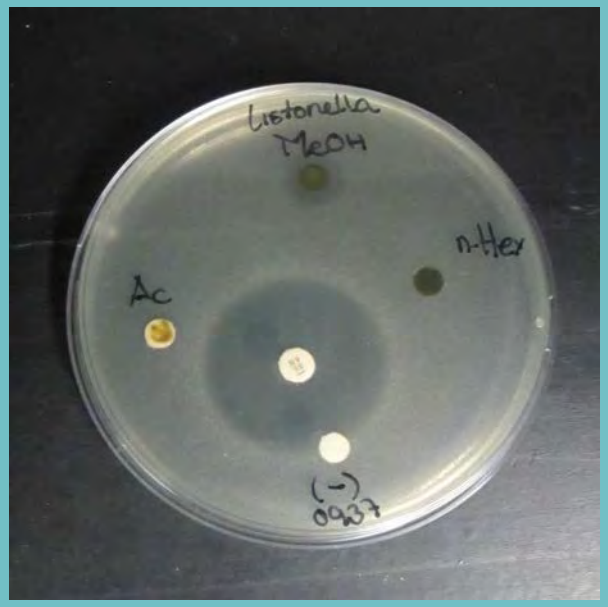
	Synechococcus sp.	*Gloeocapsopsis crepidium*	*Euglena cantabrica*	*Caespitella pascheri*
Growth rate (µ) (d -1)	0,132±0,003	0,502±0,022	0,260±0,002	a 0,324±0,003
Productivity (µg DW mL^{-1} d^{-1})	52,065±3,323	196,180±17,083	85,172±9,852	a 109,816±4,857
Doubling Time (Td)	5.23±0.12	1.38±0.06	2.69±0.02	a 2.17+0.26

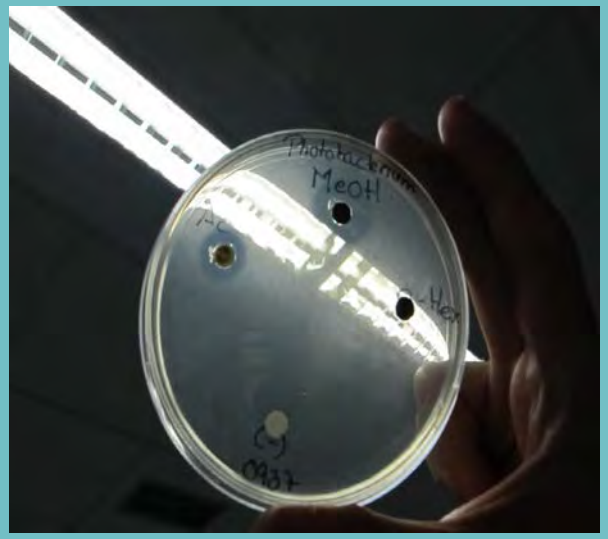


	BEA 0149B			BEA 0346B			BEA 0937B			REC 0057B				
	AC	MeOH	*n*-Hex	AC	MeOH	*n*-Hex	AC	MeOH	*n*-Hex	AC	MetOH	*n*-Hex	Control +	Control -
***Listonella* sp.**	-	++	-	-	-	-	-	+/-	-	-	-	-	+++	-
	-	++	-	-	-	-	-	+/-	-	-	-	-	+++	-
	-	++	-	-	-	-	-	+/-	-	-	-	-	+++	-
***Photobacterium* sp.**	-	++	+	-	-	-	+	++	-	-	-	-	+++	-
	-	+	+	-	-	-	+	++	-	-	-	-	+++	-
	-	++	+	-	-	-	+	++	-	-	-	-	+++	-
***Streptococcus* sp.**	-	-	-	++	-	-	-	-	-	-	-	-	++	-
	-	-	-	++	-	-	-	-	-	-	-	-	++	-
	-	-	-	++	-	-	-	-	-	-	-	-	++	-
***Bacillus* sp.**	-	++	-	-	-	++	-	+++	+++	+++	-	-	+++	-
	-	++	-	-	-	++	-	+++	+++	+++	-	-	+++	-
	-	++	-	-	-	++	-	+++	+++	+++	-	-	+++	-
Escherichia coli	-	-	-	-	-	-	-	-	-	-	-	-	++	-
	-	-	-	-	-	-	-	-	-	-	-	-	++	-
	-	-	-	-	-	-	-	-	-	-	-	-	++	-

AC: Aqueous extracts. MeOH: Methanolic extract. *n*-Hex: *n*-Hexane extract.

(+) inhibition halo of less than 8mm; (++) inhibition halo between 8 and 16mm; (+++) inhibition halo higher than 16mm; (+/-) inhibition halo was observed only after 24h, and (-) inhibition halo was not observed. The antibacterial activity of each strain was compared to inhibition halos from commercial antibiotic discs, Novobiocin (30 NB, Oxoid ®), which was used as reference

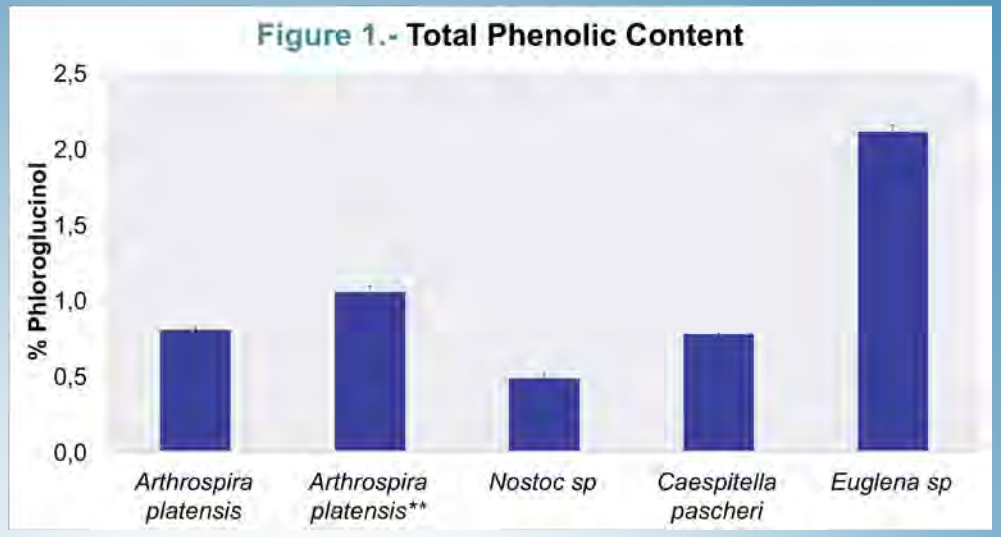




The antibacterial activity of each strain was compared to inhibition halos from commercial antibiotic discs, Novobiocin (30 NB, Oxoid ®), which was used as reference

Ana Carolina Peñuela Mendoza. Master Thesis. University of Las Palmas de Gran Canaria

DETERMINATION OF POLYPHENOLS AND ANTIOXIDANT ACTIVITY



Extract	(%) RSA Original	(%) RSA with PVPP	t_{50}	t_{plateu}
Arthrospira platensis	0	0	--	--
Arthrospira platensis**	0	0	--	--
Nostoc sp	0	0	--	--
Caespitella pascheri	6,2±0,01[a]	0	--	--
Euglena sp	73,0±0,06[a]	2,4±0,003[a]	33	202

In this study, the 73 % RSA of Euglena cantabrica extract in water represents a high value of the presence of potent antioxidants, that can be attributed to the enhancement of hydrogen-atom transfer as well as to secondary reactions that may take place. The t_{50} value determined for this microalgae, Euglena cantabrica, shows a high antioxidant activity. It only takes 33 seconds to neutralize 50% DPPH radicals. There exists a relation between the TPC and % RSA, and also exists a 89% reduction of phenolics antioxidants by PVPP addition. The rest of microrganisms analized didn't show any antioxidant activities in these conditions.

Bioplastics from paramylon (Euglenophytes)

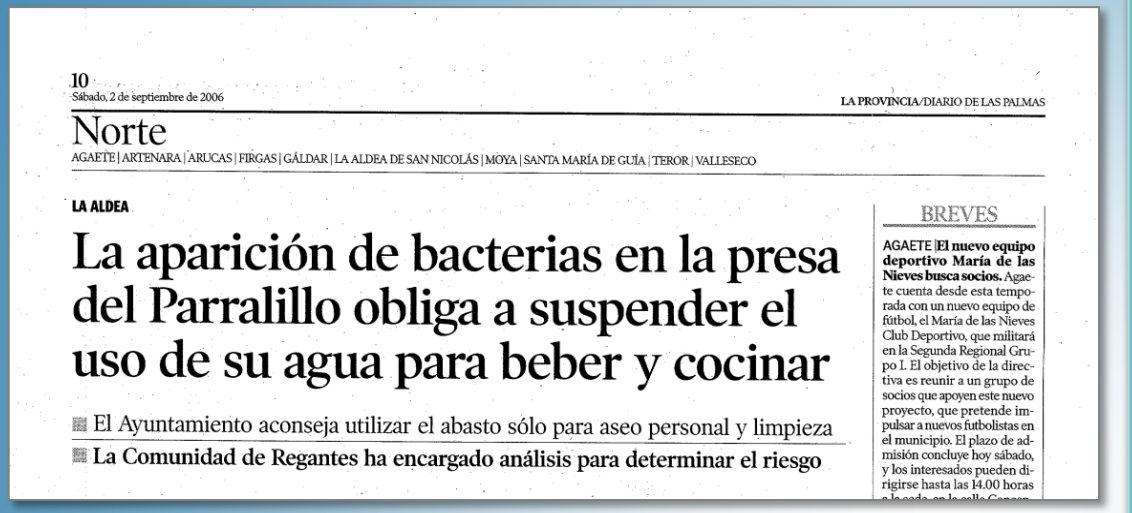
BEA is partner of:

MIRACLES
SPECIALTIES FROM ALGAE

Multi-product Integrated bioRefinery of Algae: from Carbon dioxide and Light Energy to high-value Specialties

SEPTEMBER 2006

Close of water reservoirs in Gran Canaria



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Sábado, 2 de septiembre de 2006

LA PROVINCIA/DIARIO DE LAS PALMAS

Norte

AGAETE | ARTENARA | ARUCAS | FIRGAS | GÁLDAR | LA ALDEA DE SAN NICOLÁS | MOYA | SANTA MARÍA DE GUÍA | TEROR | VALLESECO

LA ALDEA

La aparición de bacterias en la presa del Parralillo obliga a suspender el uso de su agua para beber y cocinar

- El Ayuntamiento aconseja utilizar el abasto sólo para aseo personal y limpieza
- La Comunidad de Regantes ha encargado análisis para determinar el riesgo

BREVES

AGAETE | El nuevo equipo deportivo María de las Nieves busca socios. Agaete cuenta desde esta temporada con un nuevo equipo de fútbol, el María de las Nieves Club Deportivo, que militará en la Segunda Regional Grupo I. El objetivo de la directiva es reunir a un grupo de socios que apoyen este nuevo proyecto, que pretende impulsar a nuevos futbolistas en el municipio. El plazo de admisión concluye hoy sábado, y los interesados pueden dirigirse hasta las 14.00 horas

MARTES 5 SEPTIEMBRE 2006. CANARIAS 7. PAG. 22

Gran Canaria

INSULARIO

Playas. San Bartolomé de Tirajana exige al Gobierr Gran Canaria que se impliquen «de una vez» en la lí **Limpieza.** Santa Lucía ampliará la dotación de med de residuos urbanos con la incorporación de 400 nu

LA ALDEA DE SAN NICOLÁS ■ PREOCUPACIÓN POR LOS PROBLEMAS DE ABASTECIMIENTO

Prohíben consumir agua de las presas por estar contaminada

» EL AYUNTAMIENTO DETECTA CIANOBACTERIAS EN LOS TRES EMBALSES LOCALES

En la totalidad de las presas situadas en el municipio de La Aldea de San Nicolás los técnicos han detectado la presencia de cianobacterias. Lo confirmó ayer el alcalde, Tomás Pérez, indicando que se ha prohibido el consumo del agua de los tres embalses.

GABRIEL SUÁREZ / LA ALDEA

Los habitantes de La Aldea están alarmados. El sábado el Ayuntamiento les pidió que se abstuviera de consumir agua procedente de la presa de Parralillo a raíz de que se había detectado que el embalse estaba contaminado por la presencia cianobacterias, y ayer la recomendación se extendió a las presas de Siberio y Caldero de las Niñas, donde se detectó la misma contaminación.

El alcalde, Tomás Pérez, indicó que se prohibió el consumo porque la cianobacteria es un alga que libera toxinas que pueden resultar peligrosas para la salud de las personas. No obstante destacó que el agua se puede utilizar para ducharse, lavar la ropa y para el riego de la agricultura.

Pérez señaló que se seguían estudiando las condiciones fisicoquímicas del agua de las presas para conocer el grado exacto de contaminación «porque hasta ahora todas las muestras se habían realizado en superficie y no en la profundidad de los embalses».

El alcalde tras confirmar ayer el cierre del abasto desde Parralillo expresó su preocupación por la falta de una red pública que permita abastecer a la población desde las plantas desaladoras de agua de mar. El problema es que la distribución del agua se hace por el canal de la Comunidad de Regantes y esto supone mezclar las aguas desaladas con las de las presas.

«Estamos buscando todas las alternativas», apuntó Pérez, quien en las últimas horas ha tenido que soportar duras críticas desde la oposición. «No culpamos al grupo de gobierno por el caso de la contaminación de las aguas, sino porque no ha hecho sus deberes respecto a la puesta en marcha de la desaladora» afirmó en un comunicado el portavoz de CC, José Francisco Navarro, quien «ante esta irresponsabilidad política» ha solicitado la dimisión del alcalde, Tomás Pérez y la del responsable de Aguas del Ayuntamiento y la gratuidad del agua de abasto.

Parralillo. *Imagen de Parralillo, una de las tres presas contaminadas por las algas.*

OTROS DATOS

TOXICOS PELIGROSOS

Fuentes consultadas señalaron que algunas cianobacterias producen toxinas y pueden envenenar a los animales que habitan el mismo ambiente o beben el agua. Se trata de una gran variedad de géneros y especies, algunas que producen toxinas muy específicas y otras que producen un espectro más o menos amplio de tóxicos. El fenómeno se hace importante sólo cuando hay una floración, lo que ocurre a veces en aguas dulces o salobres, si las condiciones de temperatura son favorables y abundan los nutrientes. Los mecanismos fisiológicos de la intoxicación son variados, con venenos tanto citotóxicos, como hepatotóxicos o nueroótóxicos

The highest temperature registered in the year 2006 it was of 39° C on September 4

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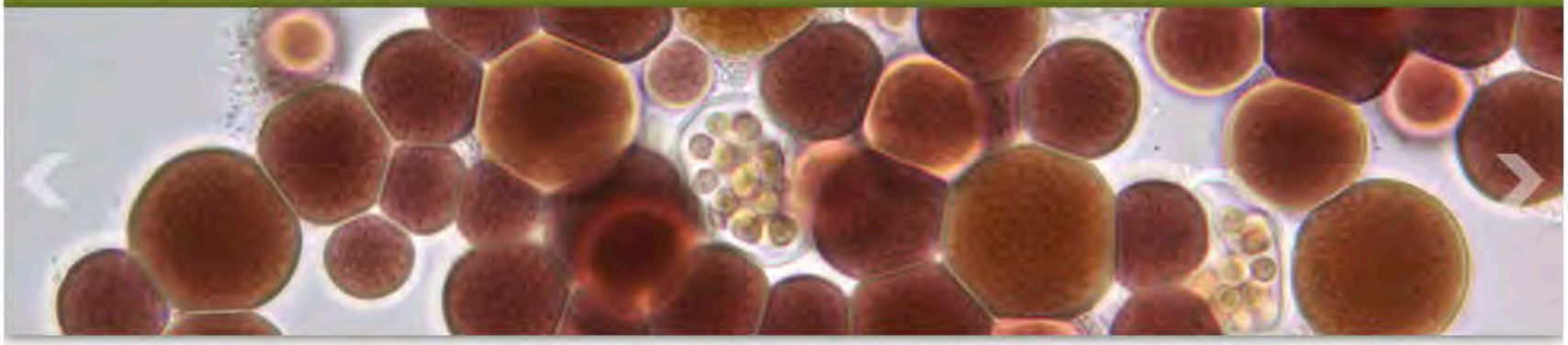

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News

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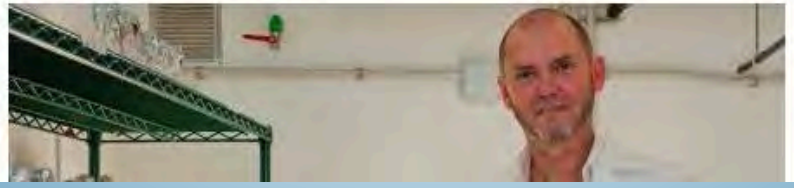

BOLSA DE TRABAJO

Listado provisional de las baremaciones del cv y méritos aportados de los aspirantes admitidos en la convocatorioa para la contratación de un técnico de laboratorio especialista en técnicas de Taxonomía Molecular y estudios filogenéticos de microalgas para incorporase al Proyecto de Investigación de consolidación del Banco Español de Algas en el periodo

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CENTRO DE BIOTECNOLOGIA MARINA

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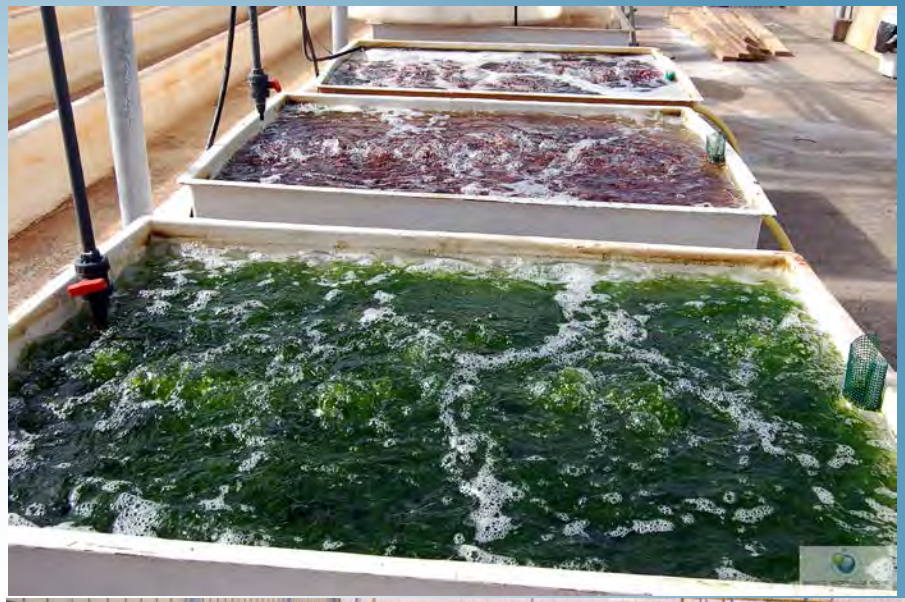

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