

First Year of Study by Fundación Cepsa and the University of Seville on Asian Algae Comes to an End

- **80% of most horizontal surfaces in the Strait of Gibraltar are occupied by *Rugulopteryx okamurae* algae**
- **The species is now dominant in the Bay of Gibraltar. Its distribution spans from Almería on the Mediterranean coast to Chiclana on the Atlantic coast**

The team working on the *Rugulopteryx okamurae* algae project, which is being undertaken by the FIUS (*Fundación de Investigación de la Universidad de Sevilla* — University of Seville research foundation) with support from Fundación Cepsa has completed its first year of research.

According to the report handed to Fundación Cepsa regarding the first year of work carried out by the team, comprising nine people (in addition to external collaborators) and led by the professor José Carlos García Gómez from La Línea, up to 80% of most horizontal rocky seabeds in the Strait of Gibraltar are occupied by this Asian algae, as are many illuminated vertical surfaces and, to a lesser extent, partially shaded surfaces. Preliminary observations regarding the geographical distribution of the algae suggest that its spread has been explosive given that its presence is extending, in particular, toward the Mediterranean, where it has even been observed off the coast of Almería; and that it has become a dominant species among the macroalgae on rocky seabeds in the Bay of Gibraltar. As for the Atlantic, *Rugulopteryx* has been observed as far along the coast as Sancti Petri (Cádiz), and may now have spread further.

Rugulopteryx okamurae can be found on any type of hard surface, although it is mainly observed in rocky areas up to 40 meters deep. Other sources state that it can be found up to 50 meters deep, and there have been instances of ships extracting large amounts of algae from depths of over 100 meters. It also occupies artificial objects and structures of all types, including ropes and fishing nets.

The study, which has involved more than 20 research outings including scientific diving, has generated a large amount of information. It confirms that the algae has a surprising capacity to adapt to its environment and to compete with native seabed species (benthic species), which are the species that have been most impacted by it. These include a large proportion of local submarine fauna and flora.

When there is massive detachment from the seabed, this Asian algae becomes abundant off the coast of the Campo de Gibraltar region. The impacts of this are numerous and include necessitating changes to fishing practices and tourist activities. Moreover, the algae becomes massively decomposed in these circumstances, particularly when it is out of the water, causing odors and an appearance of poor sanitation. It also poses a threat to marine organisms in subtidal areas (near the coast)

when there is pre-build up in sheltered coastal areas before the algae is cast onto the beach. This year of research did not detect any indigenous herbivorous species feeding on *Rugulopteryx okamurae*.

The algae has demonstrated an extraordinary ability to compete and colonize rocky surfaces, as reflected in this report on the first year of research by the University of Seville's Marine Biology Laboratory. It is not believed that there are other exotic marine plant species around the Iberian coast that have been able to emulate this ability to conquer spaces that are already occupied, and oust their native owners, with the efficiency and speed of the Asian algae. Another notable conclusion drawn from this first year of research is that the algae also has the ability to resist colonization.

This study has piqued the interest of the scientific community. The research project on *Rugulopteryx okamurae* algae, and its initial conclusions, have been published as a scientific article in *Almoraima. Revista de Estudios Campogibraltares* (a journal of studies in the Campo de Gibraltar region) and in the specialist international journal *Science of the Total Environment*. It has also been discussed at numerous scientific conferences in Spain and abroad.

The second year of research will see the methodology used in the first year retained, and monitoring stations will be put in place for the seasonal study of the species, in order to observe where the algae grows and detaches more easily and why. The impact of *Rugulopteryx* on fish in the Bay of Gibraltar will also be assessed.

Study on *Rugulopteryx* Algae

Fundación Cepsa and FIUS (*Fundación de Investigación de la Universidad de Sevilla* — University of Seville research foundation) signed a collaboration agreement last year to conduct a study on *Rugulopteryx okamurae* in the Bay of Gibraltar. This algae of Asian origin has appeared in the waters of the Bay of Gibraltar and the Strait of Gibraltar in general, causing a significant environmental impact, especially along the coastlines of El Estrecho (The Strait) Natural Park.

Biologist José Carlos García Gómez, who is from La Línea and is a professor at the University of Seville, is leading this research, which is being undertaken over a four-year period. He will also have the support of several diving clubs from the Bay and coastline of the Strait, including CIES Algeciras, CIES Tarifa and Club de Buceo Campo de Gibraltar from La Línea, Centro de Buceo Nitrox from Seville and CUASS (*Club Universitario de Actividades Subacuáticas de la Universidad de Sevilla* — the University of Seville underwater activities club). Scientific collaborations have already begun with the Universities of Malaga and Extremadura. The objective of the study is to analyze the strengths and weaknesses of this Asian species, as well as to propose mitigation and/or eradication measures for it, and to establish secondary projects to enable the exploitation of the large quantity of biomass that it generates annually.

Through this research project, Cepsa once again demonstrates its concern for the environment and its support for Campo de Gibraltar, given that this is a problem that is having a negative impact on the flora and fauna of the Bay of Gibraltar, as well as

costing the municipal treasuries of the towns involved in the removal of this algae from their beaches.

Fundación Cepsa

Fundación Cepsa is a general interest, non-profit entity that aims to carry out initiatives that serve the needs and priorities of the local communities where its founder, Compañía Española de Petróleos S.A. (Cepsa), conducts its activities. The areas of action for Fundación Cepsa are social, cultural, environmental, scientific-educational, and support for amateur sports.

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