

# Impact of eucalyptus plantations on the ecology of rivers

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For more than twenty years this team has been trying to identify links between the ecology and functioning of rivers and the surrounding terrestrial environment because, when all is said and done, rivers are like the excretory apparatus of the continents, just like the kidney is to the human body. River water often reflect the state of health of the external environment.

Within this line of research, the UPV/EHU team from Spain is focusing on studying the possible impact of the afforestation of exotic species on the functioning of [rivers](#), both on the chemistry of the water as well as on the communities of organisms therein. An exotic species is a species introduced outside its normal area of distribution, for example, the eucalyptus - the case in hand.

Rivers of any specific geographical environment have a natural riverside type of vegetation and the community of organisms in the river is accustomed to consuming the dead leaves and [foliage](#) that enter the water from this surrounding vegetation. When this natural vegetation (in this case deciduous woods) are substituted by exotic plantations the quality of this [plant material](#) changes and the community of river organisms have to deal with the use or otherwise of this non-autochthonous [organic material](#). This use or not by the [aquatic organisms](#) of the new material entering the river system can have certain repercussions, both on the organisms themselves and on processes occurring in the river.

Until recently the methods on which the diagnosis of masses of water were based were structural ones, i.e. the study, for example, of the presence or otherwise of certain organisms were taken as indicators of better or worse quality of a river. Recently, however, attempts are being made to take into account not only the structure, i.e. the organisms that are there and not there, but also what the organisms that exist do, that is, if the river processes function in a suitable manner. In relation to the tendency that exists of examining the processes when evaluating the ecological state of the rivers, the team at the UPV/EHU focused principally on the decomposition of dead leaves and foliage. Their goal was to evaluate the ecological state of the river water based on the response of a process, in this case the decomposition of the dead leaves, to various kinds of impact.

## **Eucalyptus vs deciduous species**

Dead leaves are the source of energy in the streams that drain forest river basins. The researchers at the Department of Plant Biology and Ecology at the UPV/EHU undertook studies of the dead vegetation from the eucalyptus. The eucalyptus is a species that loses more leaves in the summer; in other words, most of the energy that can enter the river ecosystem from a eucalyptus plantation does so at this time of the year. It coincides with the period when the rivers are at their lowest level and, as a result, a large amount of this material stays in the rivers.

Theoretically the organisms would have a greater amount of material to consume. Nevertheless, certain studies have shown that the dead vegetation from eucalyptus has a number of toxic products (polyphenols) that can have negative effects on the development of some organisms. In any case the dead leaves rapidly lose these toxic compounds once in the water and so, according to the studies carried out, after the passing of a certain period of time, the eucalyptus material decomposes and used in the same manner as other material.

The UPV/EHU team also evaluated the quantity of material entering the rivers from eucalyptus populations which are interspersed with deciduous woods (those losing their foliage in the autumn). They observed that more material entered the rivers that go through deciduous forests. But, is this material consumed? The fact is that the dead vegetation from deciduous trees enters the rivers at a period when their levels are at their highest and a considerable part of this material is simply carried away downriver; most of the eucalyptus material, on the other hand, being produced in the summer, is retained in the rivers due to the low water levels. Thus, despite dead leaves from the [eucalyptus](#) having fewer problems of initial decomposition, i.e. less consumption for the organisms until the phenolic components are eliminated, the research team concluded that this material tends to be used in rivers as much as that from deciduous trees.

Provided by Elhuyar Fundazioa

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