

### **The *Azolla* bloom in the Mértola region: a sociological approach**

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#### **Summary**

This work analyses the environmental impact of the *Azolla* bloom which took place in the Guadiana river, in April 1993, namely in the Mértola region, where we describe the human population's behaviour, in particular that of professional communities, when facing this bloom. The fact that they had no previous knowledge of the phenomenon, as well as the absence of a practical management model in this kind of situation, brought about some difficulties. The lack of scientific and technical background and information associated with some of the institutions involved has generated a stressed and an apprehensive reaction among the local population. On another hand, the interruption of the fishing activity and the problems caused by the lack of the water consumption and fish coming from the river were also frequently brought up by the inquired population.

#### **Introduction**

The presence of blooms, namely by macrophytes, is a serious problem that affects many of our water bodies with environmental consequences, especially at economic and social levels (Carrapiço *et al.* 1996). This type of events can be included in so so called environmental hazards (Smith 1996). In this sense, the 1993 *Azolla* bloom of the Guadiana river can be considered as being an example of such a hazard.

The village of Mértola and its administrative territory is located in the south of Portugal (Alentejo) with an area of 1279.4 km<sup>2</sup> and the Guadiana river had and still has an important role in the economy, environment and social development of the region.

*Azolla* is an aquatic fern that under certain environmental conditions becomes a weed. The presence of this pteridophyte in the Guadiana river was previously referred to by several authors (Carrapiço *et al.* 1994), but not at such a large scale has been recorded as in April 1993. In fact, it was the first time that, in Portugal and also in Europe, an ecological event related with the uncontrolled growth of this fern has occurred. The *Azolla* bloom has generated a stressed and an apprehensive reaction among the population of the Mértola area, namely among the fishing community during several

weeks. Fishing was difficult and the fish captured could not be sold, because no one wanted to buy it fearing that it could be poisoned (Carrapiço *et al.* 1996; Baioa 1997).

For this reason, the governmental authorities took special decisions involving several departments, namely environmental and the military forces. This stressed situation became a national event with all the media focusing the situation. Unfortunately, some of the news was not correct and over exaggerated the incident, creating the conditions for a scare situation among the local population. On the other hand, the decision to remove *Azolla* was taken rashly and the results were unsatisfactory, namely on the fern control by the military forces which developed their intense work without adequate scientific support (Carrapiço *et al.* 1996). In this sense and with the goal of analysing these facts and consequences, this work tries to understand how a civil population can react to an unusual ecological situation and how the media can contribute to the amplification of it. Finally, some measures are purposed to help working out future similar situations.

### **Material and Methods**

The behaviour of the local population, in particular some professional communities, when facing the *Azolla* bloom were analysed. Three main targets studied were the fishermen, the restaurateurs and the representatives of the local authorities. With that purpose, an inquiry for the population was elaborated, paying special attention to those specific communities. The institutions involved in the process of removing *Azolla* from the river were also contacted and through interviews and inquiries, their representatives gave us their opinion about this issue.

### **Results and Discussion**

The *Azolla* bloom occurring in 1993 extended its distribution by several kilometers and was the first time it was noted in a river at such a large scale. The main characteristics of this bloom were the rapid growth of the fern with a thick mat that completely covered some sections of the river and a short vegetative life cycle of the plant, compared with the standard natural conditions of development. Chemical and physical characteristics of the aquatic medium, especially the phosphorus content, the higher temperatures and the lower flows, contributed to the development of the adequate conditions for the *Azolla* bloom (Carrapiço *et al.* 1994).

The fact that the local population and the authorities had no previous experience of such phenomena, as well as the non-existence of a practical management plan, brought some difficulties. The lack of scientific and technical background and information associated with some of the institutions involved, were also found to be an important aspect worth paying attention to in future situations. On another hand, the interruption of the fishing activity and the problems caused by the interference in water consumption and fish coming from the river were also frequently brought up by the inquired population (Baioa 1997).

The analysis of the interviews and inquiries reveals that the *Azolla* removal work developed by the military and civil Institutions was done without a coherent and co-ordinated plan. The main goal was to clean the river, not to manage the *Azolla*. This fact associated with the pressure of the media

contributed to the social crisis related to this phenomenon. During the removal operation, large amounts of the fern were harvested and placed to dry on the river banks without any scientific criteria. Associated with the removed biomass, a great amount of juvenile eels was detected. In fact, the *Azolla* bloom coincided with the juvenile eel migration in the river, creating apprehension and worry after the removal operation. The nature of the organism that caused the bloom was another important issue in the inquiries. The majority of the responses point towards an aquatic algae as the explanation for it. This means that we must reinforce the educational component in that kind of missions and a feedback-training program must be established to discuss the results of these events.

The uncontrolled growth of *Azolla* in the Guadiana River in April 1993 was an important ecological event that, we hope, can have consequences in the way our environmental authorities look to weeds management in Portugal. Also, the way a civil population can react in a stressed and an unusual ecological situation and how some of the media can contribute to its amplification creating some kind of scare scenario, are important points to be considered in the management models developed in the future. All these events reinforce our believe that only with monitoring and prevention control, involving central and local authorities and an adequate environmental education, namely with the development of a new attitude related to the weeds concept, associated with the knowledge of its potential benefits and disadvantages can future problems be solved, like those we experienced in April 1993 (Carrapiço *et al.* 1994; Baioa 1997).

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