Current ecological problems in Romania

Case Study – The Danube Delta Biosphere Reserve

One of Europe's most important, and of the recently designated, Natural World Heritage sites demonstrates that, while Romania may be poor financially, it is extremely rich in terms of natural heritage. Nonetheless this heritage is at risk. In Part II of this report on a recent visit to members of the Romanian Ecological Society, Jonathan Cowie meets the current RES President, Prof. Vadineanu.

Any westerner talking to virtually any Romanian at length will, before long, hear complaints of how bad things are: that there aren't enough resources to do this or that, and that the prospects for the future are bleak. Indeed, if it were not for the obvious difference in circumstances, one might confuse such views with those of UK scientists. Yet the differences are obvious and the problems are orders of magnitude more stark. Nonetheless, Professor Vadineanu, the current President of the Romanian Ecological Society (RES), is different. He is not so much concerned with complaining but problem solving. 'Ecologists have much to contribute,' he enthuses.

I first met Prof. Vadineanu when his Department's mini-van drew up by our hot, dusty roadside rendez-vous near the bridge at Giurgeni over the lower Danube. The Danube Delta Biosphere Reserve is effectively divided into two parts. There is the delta proper beyond the towns of Braila and Galati; and, quite distinctly, a north-south pre-delta section of multi-channeled floodplain with annually flooded alluvial islands - this was where we were. Unfortunately, due to a separate public-understanding-of-science engagement in the southern tip of the reserve, we were not to see the delta proper, but the RES Secretary, Mihaela Pauca-Comanescu, had arranged for us to join Prof. Vadineanu, the RES's current President, for a day's cruise among the alluvial islands of the lower floodplain.

Having bundled into his van, he wasted no time in explaining his philosophy. Romanian ecologists need to develop an interface with the community and engage in public debate, he opined. They need to develop ecological and agricultural economic skills. Yes, Romania, and Romanian scientists, badly need resources so freely available by comparison in the west, but, he points out firmly, while Romania may be poor financially, it is incredibly wealthy in natural capital. The Danube Delta Biosphere Reserve is but one example, albeit a principal one, of this wealth.

Biogeographically the Reserve is on the boundary between the Palaearctic and Mediterranean zones. Consequently it represents a dynamic wetland zone, unique within Europe: indeed the delta itself is Europe's second largest. The site is ornithologically significant both as a breeding site and for migratory feeding; over 300 species of bird have been recorded. These include the pygmy cormorant *Phalacrocorax pygmeus* (some 2.5k pairs, 61% of the world population), a similar number of white pelican *Pelecanus onocrotalus* (half the Palaearctic population) and 45k of red breasted goose *Branta ruficollis* (95% of the world's wintering population). There are also 45 species of freshwater fish including some belonging to the rare Acipensenidae. The delta proper represents the largest continuous marshland in Europe and possibly the largest stretch of reed beds (dominated by *Phragmites australis*) in the world. Finally, the delta provides a hydrological buffer between Danube effluent (effectively from much of Austria, Hungary, Serbia, Bulgaria and Romania) and the Black Sea.

Though the best of the ecological attractions are found in the delta proper, the preceding lower floodplain (the pre-delta part of the Reserve) is not without interest. The entire landscape of the region has been determined by millennia of erosion of much of eastern Europe. Broadly speaking, geologically it is little more than hundreds of square miles of mud pie with only the occasional rocky outbreak breaking through (such as the limestone formation at Cheia which itself has the local designation equivalent to a Site of Special Scientific Interest). In effect, apart from a joining at Giurgeni, for some 75 miles the Danube is split into two main channels between the cities of Calarasi and Braila. Between these there are numerous minor channels winding their way between alluvial islands, as well as irrigation offshoots for agriculture. Some of this irrigation system (needed because of the low 450 mm annual rainfall), has fallen into disuse due to Romania's current economic depression. Ironically agricultural activity has drained some 80% of the wetlands upstream of the delta proper and back in the 1980s this agriculture resulted in considerable eutrophication.

The alluvial islands are themselves fascinating. Dominated by riverine alluvial forest of poplars and willows, they are dynamic in that their upstream ends are continually ablated by the current, while their sheltered downstream edges sees sediment deposition. This is assisted by annual winter flooding. These alluvial islands, in geological terms, are literally racing down the Danube with mature trees at their older upstream ends and younger ones downstream on the

newly formed sediment.

Prof. Vadineanu's department at Bucharest University has extensively studied the Danube, its fauna and flora, and its physico-chemical characteristics: studies that have enabled him to come up with solutions to some of the Danube's environmental problems. Having assessed the key biology, the Romanians are now completing an economic evaluation, but already Prof. Vadineanu has the basics of a management plan. If, he contends, some 150,000 ha of the Reserve's wetland can be restored (of which 130,000 ha is in the pre-delta zone), if flood plain agriculture can lower its fertilizer input, employ integrated pest management and other techniques (and as it happens Romanian agriculture is currently being reconstructed following the 1989 revolution), then he estimates the Danube's nitrogen and phosphorous load will be roughly halved. This will have economic benefits in increasing Danube fisheries by 120% from 5,000 tonnes *p.a.* to 11,000 tonnes. (To put this into context the Danube's fisheries used to be 17,000 in the 1960s prior to agricultural irrigation and the increased use of fertilizers so he is talking about a significant restoration of the ecology and river-based economy.)

Hearing Prof. Vadineanu talk one can almost detect pride behind his enthusiasm. If it is there he certainly has a right to it for Prof. Vadineanu was the driving force behind the lower Danube becoming a UNESCO Natural World Heritage site in the first place. It happened almost by chance for immediately following the revolution Prof. Vadineanu just happened to be in the right place at the right time with the appropriate expertise and became Romania's Secretary of State for the Environment (1990-92). However, today there are problems. In addition to climate change induced reduced summer flow, there are development pressures. The Black Sea coast to the south of the Reserve has already seen uncontrolled extensive tourist development to such an extent that even the local authorities (who first welcomed the economic boost) are now calling for a halt. Nonetheless a new motorway (one of Romania's first) is being constructed between Bucharest and the Black Sea that will clip the southern part of the pre-delta part of the Reserve. Furthermore there are proposals for development at the gateway to the delta including talk of a new airport. If these proposals come to pass then it is likely that the Reserve will see major impacts. UNESCO urgently needs to monitor the situation and actively work with those Romanians concerned for the Reserve's future.

As for Prof. Vadineanu, what is his message for western ecologists? He says that: 'A proper understanding of ecology is necessary for sustainability. However ecologists need to recognise the importance of their being pragmatically involved in real world issues. If ecologists are to address world issues, then ecologists from many nations have to work together.' Such sentiments clearly reflect those in the UK. The BES, after all, has an active Public Affairs Committee and takes a lead in the Institute of Biology's Environment Committee - which also has representatives from a dozen other environmentally-related learned societies - in talking to the UK Government, its Departments and Agencies.

Meanwhile with regards to Romania Prof. Vadineanu continues: 'If I were to have one hope of western ecologists, it would be that they actively recognise the value of, and seek to work with, their colleagues in the east.' All of which left me wondering whether scientists in the west would.

The Romanian Ecological Society has an e-mail link on the BES web page. Further information on the Danube Biosphere Reserve can be found on www.wcmc.org.uk/protected_areas/data/wh/danubed.html.

Jonathan Cowie is a BES member and head of Science Policy and Books at the Institute of Biology.

Top left: An alluvial island. Note the younger trees down stream where sediment deposition is creating extensions to the island.

Top right: The author at Cheia.

Left: A scientific boat belonging to Bucharest University, returning from sample collection.