



Micro-reserves 'capture' Valencia's special flora



Convolvulus valentinus is the symbol of the Biological Sciences Faculty of Valencia University.

Photos by Hugh Syngé



Link to official [web site](#) for microreserves programme, or to [Microhabitat](#) site.

Botanists in the Valencia autonomous region in eastern Spain are setting up an unusual network of micro-reserves – parcels of land of no more than a few hectares – for their threatened plants and habitats. JOHN AKEROYD reports.

We stood for a group photo on a stony plateau amongst open woodland of juniper and pine. In a pale, wintry light, with heavy clouds rolling in, we shivered in a chill wind and snow flurries. After driving in convoy for several kilometres on dirt roads, we had reached our objective, a signpost seemingly in the middle of nowhere that read □ Microrreserva de Flora □. Here in a remote part of Valencia province, 1800 m up on the slopes of Sierra de Javalambre, our tireless and exuberant guide Emilio Laguna was showing Hugh Syngé and myself from Plant Talk the highest micro-reserve □ one to protect unique juniper thickets □ that he and his colleagues have established in the Valencia Community.

We seemed as far from the warm Mediterranean as could be imagined,



but in reality we were just 80 km from the sea. Earlier in the week we had seen other micro-reserves on sunny seashores, dry hills and marshlands near the coast. We had travelled through holm and cork oak forests, matorral and arid, steppic landscapes. It is this variety of habitat and flora, including at least 338 endemic species, in the Spanish provinces of Valencia, Alicante and Castell n together comprising the autonomous Valencian region that the botanists behind the micro-reserve programme seek to conserve.

Micro-reserves are a network of the total biodiversity of the region, Emilio Laguna told us in the more congenial surroundings of a cafe in Valencia city. They complement the larger, more conventional protected areas and we need both. Their legislative status too is different. They are not strictly protected but we can upgrade the management plans as necessary. Micro-reserves are indeed a radical departure from the prevailing orthodoxy of large protected areas. None is bigger than 20 ha, most are smaller and usually no more than 1-2 ha.



Laguna (left) is one of nature's enthusiasts, especially when talking about plants, and a great communicator. Plants and botany have been his passion since childhood. He studied at Valencia University, from where he received a PhD for his study of the phenology of the Valencian holm oak woods. Since 1993 he has headed the micro-reserves project at the Environment Department (Conselleria de Medio Ambiente) of the regional government (Generalitat Valenciana), funded by the EU's LIFE programme. His nine young co-workers, who showed us around on our visit and gave us such a warm welcome, are also able, enthusiastic botanists.

The micro-reserves group keeps in close contact with other botanical and conservation organizations and institutes in Valencia, most of them under the aegis of Generalitat Valenciana. For example, the Valencian Institute for Agronomic Research (IVIA), famed for its work on *Citrus* fruits, a mainstay of the local economy, provides micropropagation facilities for the project and the Botanic Garden of Valencia a germplasm bank. Decentralization of government to the regions of Spain has unleashed a flood of local pride and patriotism a wave on which the micro-reserves programme and other Valencian conservation initiatives are riding successfully.

Covering the variety

Over 140 micro-reserves have been designated so far. Laguna plans to establish between 200 and 250 in all to cover the total plant diversity of the region. Many more would give us

problems for management. For this reason we are trying to encourage and include the participation of both the private sector and municipal authorities such as City Councils. □ Already micro-reserves cover all of the 56 priority habitats listed in the EU Habitats Directive (Annex 1) and known to occur in the Valencia community. EU member states are required to establish conservation areas for examples of the habitats named on Annex I and for the sites of rare species listed on Annex II. Together these sites will make up the □ Natura 2000 □ network.

The micro-reserves established so far contain most of the rare and endemic plants of Valencia, but unfortunately only a dozen or so of these are listed in the Habitats Directive and so receive Europe-wide protection. It is clear that the list of species on the Annex is far too small, certainly in plant-rich southern Europe, and that the Habitats Directive fails to cover them adequately.

One priority for Laguna's team is ferns: half of the 12 plant species recorded as extinct in the Valencian Community are ferns (including so-called fern allies). We visited one tiny micro-reserve with two rare ferns, the larger of two temporary pools that flood in winter and spring among arable fields near the town of Sinarcas (right). Here grow *Marsilea strigosa* and a quillwort



Isoetes velata, both some 300 km from their nearest stations in W Spain and SW France. Such pools, listed on Annex I of the Habitats Directive, are rapidly disappearing throughout the Mediterranean region. Two other *Marsilea* species are extinct in the Valencia region, one of which, *M. quadrifolia*, Laguna would like to reintroduce to fields of organically grown rice.

The micro-reserves do, however, include many of the rare and endemic plants of Valencia and adjacent regions. In the Desierto de Las Palmas Nature Park, near the coast of Castellón province, Laguna and his colleagues took us up on to an unprepossessing (at first sight!) rocky hillside, already drying out at the end of April. On a former cultivation terrace, the spring flora of the matorral was showing a final defiant burst of colour before long months of summer drought. A proposed micro-reserve will protect a diversity of endemics and rarities □ and a paradise for the flower hunter. Among them is an elegant storks-bill, *Erodium aguilellae*, demonstrated to us by Dr Carlos Fabregat, who works jointly with the Plant Biology Department of Valencia University and Conselleria de Medio Ambiente, and who had described this new species, a Castellón endemic flowering mainly in autumn. Other, less restricted, endemics here include *Antirrhinum barrelieri* subsp. *litigiosum*, *Coris monspeliensis* subsp. *fontqueri* and *Sideritis tragoriganum*. Toothed Lavender (*Lavandula dentata*) grows here 150 km from its nearest station, in Alicante province. More widespread species such as a foxglove, *Digitalis obscura*, and a flax, *Linum narbonense*, added to a colourful display.



Setting up the micro-reserves

To establish a new micro-reserve, the team first identifies a site, after which follows perhaps a year of consultation between the Conselleria de Medio Ambiente and experts from other institutes. The Regional Minister (Conseller) makes the formal declaration of legal protection for both plants and the physical habitat.

Most micro-reserves, in fact some 80%, are on public land. On private land the Valencian authorities bring the landowner into a long-term conservation partnership. Laguna explains: □The first stage is an agreement □ a contract □ with the landowner, who receives a one-off payment. He or she can then obtain grants and subsidies for stewardship of the site. The establishment of a micro-reserve is legally binding, even under new ownership.□ The idea of the micro-reserve is to think local and think small. □Most micro-reserves are small□, he says, □so the management plan is small, perhaps just a page!□ It is of course important that the area surrounding the micro-reserve is in reasonable condition.

□About half have some degree of intervention for conservation. The most important intervention is the reinforcement of populations of rare plants. We may close paths in order to avoid an excessive influx of people. Or we may carry out partial reforestation using local tree species to prevent soil erosion. There is usually little □traditional□ management because the reserves are in natural habitats. But for example we use beehives to promote pollination, and provide nest boxes for insectivorous birds.□

Coastal sites, subject to considerable public pressure, can present management challenges. They also illustrate many principles of the micro-reserves project. Prat de Cabanes Nature Park in Castellón province (adjacent to Desierto de Las Palmas) is a complex of coastal sand and shingle on the seaward side of extensive marshland. It is both plant-rich and a nesting site for birds such as Montague's Harrier, which we saw hawking above the marsh, and Pratincole, a tern-like wader that fortuitously flew across our path. Inland the site is hemmed in by the coastal motorway. The shingle vegetation has a somewhat Atlantic feel, with plants such as Sea Cottonweed (*Otanthus maritimus*) and Sea Spurge (*Euphorbia paralias*). Further back from the strand grow dwarf shrubs such as the white-flowered *Cistus clusii*, Dwarf Fanpalm (*Chamaerops humilis*) and *Ephedra distachya*. In June the violet flowers of *Iris xiphium* brighten the marsh.

Perhaps the most special botanical feature is a population of 22 shrubby coastal junipers, *Juniperus oxycedrus* subsp. *macrocarpa* (with one closer to subsp. *oxycedrus*). These, Laguna hopes, will be the basis for reinforcement □ several female plants bore abundant fruits for propagation □ and the building up of a more extensive population of a rare Valencian plant.

But the whole littoral plant community excites him. □We want to make a new micro-reserve. This type of shingle and sand is one of our rarest geological formations. The *Cisto-Lavanduletea* plant community is also rare. For example we have here *Cistus crispus*, mainly a plant of Andalucía and Estramadura in southern Spain, and found no nearer than 100 km.□ That the site survives at all is remarkable: this is one of the most developed coasts in Europe. It is not far from tourist resorts like Benidorm and its conservation is a tribute to the priorities of Generalitat Valenciana.

Further along the seashore grew another heterogeneous assemblage of plants. This spot too was earmarked for a new micro-reserve. The park authorities had already closed the road to the beach. □This area was a desert□, explained Laguna, □destroyed by visitors and their cars. After five years the vegetation has recovered substantially.□ The proposed reserve would include the shingle-saltmarsh transition, with *Schoenus nigricans* and *Iris xiphium*, and (poking up amongst the pebbles, p.33) the only Valencian population of Birthwort (*Aristolochia clematitis*), at its furthest south-western limit in Europe.

Back in Valencia province, at El Saler, an area of sand-dunes on the coast to the east of

Valencia city, owned and managed by the City Council, more drastic action has had to be taken to establish a micro-reserve. The area is a traditional place of recreation for Valencians and the dunes are much eroded in places. A microreserve to protect an intact fragment of dune woodland has a chain-link fence around it to exclude the public completely. Sadly, to allow people in would damage the fragile soil of this unique succession from strand to mature woodland. Entering by a small gate, we were able to walk seawards from dense, dark woodland of low-growing Aleppo Pine (*Pinus halepensis*), through Lentisc (*Pistacia lentiscus*) scrub to open plant communities on accreting sand.

Involving local communities

One of the first micro-reserves we had visited was in Alicante province near the ancient town of Alcoi, an important centre for textiles and dying since at least the Middle Ages. Another of Laguna's conservation projects is to record, and if possible conserve, ancient dye plants such as Madder (*Rubia tinctoria*), as well as the other 350 or so crops formerly cultivated in Valencia (some 50 species are cultivated today).

A magnificent forest dominated by evergreen Holm Oak or Ilex (*Quercus ilex* subsp. *rotundifolia*) covers a mountain ridge to the south of the city, on what is the most north-easterly extension of the Baetic Mountains of Andalucia. Other major trees include Portuguese Oak (*Q. faginea*), Manna Ash (*Fraxinus ornus*) and *Acer granatense*. In 1987, the Generalitat Valencia established the 2450-ha Natural Park of Carrascar de la Font Roja. But back as far as 1332 the City Council of Alcoi had protected the forest. As Laguna says, "Local people feel the area is a part of themselves, and so take care of the forest." It therefore makes an ideal site for a micro-reserve, quite apart from being one of the most outstanding old-growth forests in Spain. It is perhaps the nearest equivalent to Spanish primeval dry evergreen oak forest that still remains.

The micro-reserve, at 1350 m, is a fine representative sample of this community, and also includes endemic plants of open rocky ground like *Iberis carnosa* subsp. *hegelmaieri* and *Centaurea boissieri* subsp. *mariolensis*, and more northern floristic elements such as Yew (*Taxus baccata*). Font Roja is the only mountain in Alicante province to remain wooded. The others are too arid or have been denuded by too many fires.

Two days later we were up in the mists and cold of Sierra de Javalambre. This area of Valencia province, although a detached enclave between La Mancha and Teruel provinces, is proud to be the most ancient part of Valencia, captured from the Arabs early on in the *Reconquista*. The juniper forests themselves are a link with Spain's legendary freedom fighter El Cid, for the open woodland allowed his cavalry both concealment and mobility. On the arid hillsides of Javalambre isolated trees or clumps of the upright Spanish Juniper (*Juniperus thurifera*) are often surrounded by prostrate thickets of Savin (*J. sabina*), producing a characteristic "leopard-spot" vegetation.

Forestry experts have estimated the very largest Spanish Juniper trees to be of immense age. Luis Marva Alcusa, mayor of the adjacent community of Puebla de San Miguel, is proud of the trees and of the well-preserved mountain forests "owned by the City Council" about his village. "We do not know exactly which is the oldest", he told me as we admired a group of huge junipers near a spring, "but these five trees are between 1500 and 2000 years old. The secret is that perhaps few people lived here and they were very poor. We are going to make this spot a micro-reserve, probably this year, which will be funded by the Regional

Programme. □ Puebla de San Miguel is developing its potential for ecotourism, for example by refurbishing tiny shepherds' huts for the use of walkers and riders. An old winery in the village has been restored as a museum of rural life. Already sustainable development for tourism has created jobs and breathed new life into a once declining community □ at the end of the road □.

A blueprint for the future

The young, enthusiastic and confident Valencia team is justifiably pleased with the progress of the micro-reserves project. And, although the reserves do not have quite the status of, say, a National Park, co-operation with managers of existing protected areas and the goodwill of local people will clearly play a considerable role. It will be important too to make sure that each site remains buffered by an environmentally healthy hinterland.

Emilio Laguna sees the micro-reserves network as the first step towards eventual expansion □ building blocks for a larger network. □ The immediate purpose of the micro-reserves is not strict protection, but to create a network of biodiversity □ a framework for the future. And it is a chance to experiment with the techniques of plant conservation and reintroduction. □ One hopes too that the micro-reserve programme provides a stimulus and example to other regions of Europe and the world. It certainly makes sense in regions like southern Europe that are rich in local endemics, often in small, scattered and restricted populations. And everywhere it is getting harder to find larger species-rich areas to protect.

John Akeroyd and Hugh Synge were guests of Conselleria de Medio Ambiente de la Generalitat Valenciana and Empresa de Transformaci3n Agraria (TRAGSA).

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