

PERU

population: **28 million**

capital: **Lima**

total land area: **128,522,000 ha**

primary forest 1990: **62,910,000 ha**

primary forest 2005: **61,065,000 ha**

primary forest lost 1990-2005: **1,845,000 ha**



PERU

High-altitude *Polylepis* forests represent one of the most threatened habitats in South America

by Dr Paul Ramsay, University of Plymouth

The threatened *Polylepis* forests of Peru are important for many endangered birds and other animal species, as well as being an invaluable resource for highland people. These woodlands grow throughout the Andes and are found above the usual treeline, right up to the snowline. The environment in these places is challenging to most species, and this explains the conservation value of these woodlands: they are filled with species adapted to the peculiar, high-altitude conditions found nowhere else.

Rainforest Concern is helping to conserve *Polylepis* forests in the high Andes of Peru through its collaboration with ECOAN, a group of Peruvian biologists who work with local people to provide alternatives to forest destruction. In 2005, the University of Plymouth began a programme of research, with ECOAN and Rainforest Concern, to help understand the ecology of this important habitat and several key species there. The work is based in the Cordillera de Vilcanota, between Cusco and Machu Picchu.

Before detailed forest ecology work could begin, the woodlands needed to be mapped. In such mountainous terrain, it is not practical to discover where the woodlands are by visiting each of them on foot. Instead, a satellite image from 2002 was analysed using specialist equipment at the University of Plymouth to highlight the possible locations of *Polylepis* woodlands. The woodlands reflect light in a different way to the surrounding vegetation types, rocks and snow, and this can be brought out by manipulating the satellite image on a computer.

To check that the satellite map accurately represented the true distribution of the *Polylepis* woodlands, one valley was targeted for more detailed study. The whole area was walked and photographed, in order to refine the map. The finished map shows clearly where all the fragments of forest are located, and forms the basis for biodiversity work in the future.

The map also provided another opportunity: to look at how the forests have changed over the last 50 years. The Peruvian military took air photographs of the area in 1956, and by identifying the forest on these and adding them to the computer analysis, it is possible to see how the forests have changed since then. This work demonstrates convincingly that most of the woodlands have not changed very much in size in the last 50 years, though a small number have been lost or damaged. In general, the forest cover seems to have remained remarkably constant. This is extremely valuable information when planning conservation strategies.



Expedition group from Plymouth University with ECOAN

However, the location of forest patches is not the only thing to consider. There seems to be a slow, but important reduction in the density of the trees. The research team carried out interviews with local farming families to ask them about the forests, and this confirmed the decline in forest quality. Overwhelmingly, elderly local farmers described the opening up of the forest canopy and the loss of large, straight trees by selective felling. Although the forest patches remain, the quality of the habitat appears to have been reduced.

It seems that efforts to conserve the remaining patches of forest in this part of Peru should concentrate on working with local farmers to help them to manage the forests, and in particular the quality of the forest habitat. In this way, the species that rely on these woodlands will live on, alongside the Andean people who have lived there for thousands of years.

The lack of change in forest cover over the last 50 years also highlights the difficulty *Polylepis* experiences in colonising open areas. There is not much evidence that tree seedlings are able to survive outside the protection of the forest canopy. This may be due to the environmental conditions, which are much more challenging in the open, or to human land use such as fires, cultivation of potatoes and heavy grazing. Another focus for the team's work has been examining the requirements of the seedlings, with a view to lending the plants a helping hand in the future.

Rainforest Concern has already taken some important steps in this regard and, with help from its supporters, has funded the planting of thousands of *Polylepis* trees in areas where it has

been lost. The Plymouth team carried out some detailed monitoring work in one of these areas. Despite the steep, rocky ground at altitudes above 4500 m above sea level, the plants have survived extremely well (fewer than 1 in 20 plants had died one year after planting). This is a testament both to the resilience of *Polylepis* itself, and the manner in which the planting was carried out by ECOAN and local farmers. Researchers from Plymouth University are also helping to develop a manual to train local biologists in how to monitor the quality of the remaining woodlands, and so focus the conservation work. Rainforest Concern has also funded a local radio campaign in the local Quecha dialect to warn about the risks to these endangered woodlands of burning mountainside, which has been a long established but damaging practice, and the purchase of locally made clay stoves, which are more fuel efficient and so help economise on the amount of wood needed for fuel. ECOAN are also working on developing other renewable sources of wood, and alternative activities to help generate income for these rural communities.

The results of this collaborative project were presented at an international conference on the ecology and conservation of *Polylepis* forests, which was hosted by ECOAN in Cusco in May 2006, and organised by its President Constantino Chutas. The conference was a great success, attracting some 200 scientists and conservation groups from around the world, who compared their work involving many different species of *Polylepis* and different habitats across Latin America.