

# DIVERSITY

*A News Journal for the International Plant Genetic Resources Community*

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A News Journal for the International Plant Genetic Resources Community

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COVER PHOTO: Dr. Russell Mittermeier, president of Conservation International with a Huli wigman of Papua, New Guinea (see p.5).

(Photo courtesy of Conservation International)

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# Ecuador Increases Andean Crop Conservation and Development Work

by Raul Castillo and Carlos Nieto

## Introduction

In 1981 an international meeting held in Lima, Peru, concluded that the majority of Andean crops were in danger of disappearing. Because of this the Instituto Nacional de Investigaciones Agropecuarias (INIAP) began to establish regional priorities to collect, conserve, and evaluate these crops.

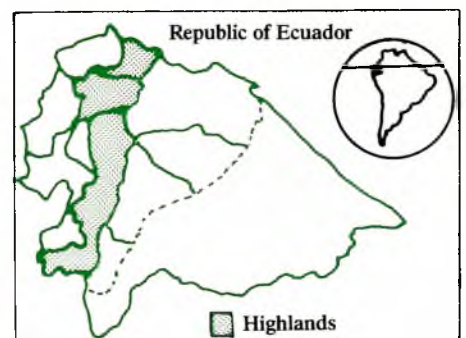
The International Board for Plant Genetic Resources (IBPGR) provided financial support and Ecuadorian scientists

Raul Castillo and Carlos Nieto, genetic resources specialists, work for the Andean Crops Program at INIAP in Quito, Ecuador.

started to collect important crops in various ecogeographic regions. These crops (Table 1) are considered important within the cropping systems of Andean farms.

## INIAP to Conserve Species

The accessions collected in the Andean region of Ecuador (see map) are being conserved in cold storage ( $-10$  to  $-12^{\circ}\text{C}$ ), and several species are vegetatively propagated. These vegetatively propagated species will be conserved using *in vitro* technology in the near future at INIAP. Most of the Quinoa (*Chenopodium quinoa*), Amaranth (*Amaranthus spp*), Chocho (*Lupinus mutabilis*), Melloco (*Ullucus tuberosus*), Oca (*Oxalis tuberosa*), and Mashua (*Tropaeolum tuberosum*) collections have been evaluated with IBPGR support. Nearly 50 descriptors were used



to evaluate these accessions. Important data are now available for scientists and researchers of any organization.

Future work in Ecuador on plant genetic resources will focus on the evaluation of Andean roots already collected. Collection, conservation, and evaluation of other native species that are in danger of disappearing will also be carried out. A national department of plant genetic resources is being developed that will collaborate with national and international organizations to work specifically on plant genetic resources.

Thirteen Andean crops were collected from 1982 to 1985 (Table 1). At present 2,061 accessions are being managed. Many accessions have been sent to various scientific centers for research purposes.

Most of the quinoa accessions were collected at altitudes of 2,200 meters to 3,600 meters. Wild or weedy species were found from 1,800 to 3,800 meters above sea level. Amaranth was also collected from 1,800 meters to 3,200 meters and weedy species have been collected at lower altitudes. Chocho or tarwi accessions were collected from 2,000 to 3,300 meters above sea level.

Generally, the Andean tubers (melloco, oca, and mashua) share the same ecosystem. Accessions of these tubers were collected from 2,800 to 3,900 meters above sea level. The three Andean roots, arracacha (*Arracacia xanthorrhiza*), jicama (*Polymnia sonchifolia*), and miso (*Mirabilis expansa*), also share similar ecological zones. However, arracacha grows from 1,400 to 3,200 meters; jicama from 2,400 to 3,000 meters; and miso from 2,500 to 3,200 meters above sea level. Latitudes of collection sites vary from 0°-55°N to 6°-00°S and longitudes from 77° to 79°W.

**Great Nutritional Potential**

About 60 percent of the accessions of different species have been evaluated using descriptors. The characterization has allowed the determination of promising accessions that will be used in INIAP breeding programs. Yield is the most important characteristic of these species. A high productivity for low investment gives a good net return. These Andean crops can be used in soups, salads, or as vegetables. The oca tubers, for example, have high quality starch. Mashua is a promising crop for stock feed. Quinoa and amaranth have high protein content (14-18 percent) with



Raul Castillo of INIAP collecting wild crop relative of *Lupinus mutabilis* in Ecuador. (Photo courtesy of Steven R. King)

an excellent amino acid balance.

These Andean crops could also be important crops at the high lands of other developing countries. Transplanting these crops to the African highlands or other areas could improve the food security of these countries. Therefore, interchange of these important crop genetic resources is needed. It is hoped that this information may be of use to other national and international genetic resource programs.

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Species	Number
Quinoa ( <i>Chenopodium quinoa</i> )	430
Amaranth ( <i>Amaranthus</i> spp)	207
Chocho ( <i>Lupinus mutabilis</i> )	112
Melloco ( <i>Ullucus tuberosus</i> )	191
Oca ( <i>Oxalis tuberosa</i> )	135
Mashua ( <i>Tropaeolum tuberosum</i> )	64
Arracacha ( <i>Arracacia xanthorrhiza</i> )	75
Jicama ( <i>Polymnia sonchifolia</i> )	20
Sweet potato ( <i>Ipomoea</i> spp)	170
Capuli ( <i>Prunus capuli</i> )	208
Chili ( <i>Capiscum</i> spp)	40
Miso ( <i>Mirabilis expansa</i> )	9
Maize ( <i>Zea maiz</i> )	340
Others ( <i>Lycopersicon</i> spp. <i>Phaseolus</i> spp, etc.)	60
<b>TOTAL</b>	<b>2061</b>

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