Report of Forest Botany team, Operation Wallacea, Cusuco National Park, Honduras: 2011 field season.

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This was the 4th season of botanical survey work with Operation Wallacea in Cusuco National Park. As before, the focus was on the tree component of the flora, partly because these constitute the dominant life-forms in this forested landscape, and partly because they are representative of the overall plant diversity.

Methodology

Our survey was primarily plot-based, using the network of 20m x 20m plots established in 2005 (see Operation Wallacea website). (One site on each trail is designated as a 'Main Site', measuring 50m x 50m; we designated a 20m x 20m plot within each Main Site, sharing one of its four corners. The remaining sites are referred to as 'Subsidiary Sites' and are all 20m x 20m). Within each plot we surveyed all tree individuals of girth at breast height (gbh) 30 cm or over, recording girth, local name and scientific name. Samples of unknown species were collected where possible, using long-handed pruners. In addition, bark and slash characters were recorded. Where a sample could not be reached, identification was attempted using binoculars, and by searching the ground for samples of fallen leaves. In addition to the tree inventory, we recorded the dominant 1-3 species in the understorey and/or field layer within each sample plot; also total cover of saplings, shrubs, herbs, bryophytes, bare rock, coarse woody debris and leaf litter.

Opportunistic recording of tree species was also carried out, especially of flowering or fruiting specimens encountered along trails. In many cases these assist in identifying species previously collected only in a vegetative state. (A survey of the total vascular plant flora remains beyond the resources of the team). A limited amount of additional recording of other life forms was carried out, focussing on particularly abundant, conspicuous or otherwise noteworthy species.

Soil samples were taken for all plots, at depths of 0-5 cm. These are being analysed in collaboration with Dr Francis Brearley of the University of Manchester.

Plant specimens were placed in plant presses at the end of each day and subsequently dried in a field dryer (at Base Camp/Santo Tomás). Material was collected in duplicate, so that one specimen from each collection shall in due course be lodged in a Honduran herbarium and another in a European herbarium. Additional material was collected for

specimens that appeared to be of particular interest, to facilitate sending material to international specialists in particular plant groups.

Specimens were worked on in the course of a visit to the herbarium of Universidad Nacional Autónoma de Honduras in Tegucigalpa, and subsequently at Trinity College Dublin and at the Natural History Museum, London.

Results

We surveyed 24 plots, of which 23 were part of the Operation Wallacea network of permanent plots. The additional one is an elfin forest ('bosque enano') plot on the ridge-top of Cantiles trail 3, at 2100 m altitude. This was chosen to supplement the information on this highly distinctive forest type (the only elfin forest plot in the established network is site CA/2/MS). For elfin forest only, we reduced the lower limit of tree stem girth measurement to 20cm.

This brings the total number of 20m x 20m plots surveyed to 85, of which 65 are part of the Operation Wallacea network. Of the remainder, one is the additional elfin forest plot, one is the sample plot from the big landslide area on the main trail to Cantiles surveyed in 2008 and 18 are plots from the east side of the Park that were surveyed in 2004 prior to the setting up of the permanent plot network.

Cusuco forest plot survey: overview

Year	New plot: network	New plot: other	New plot: total	Plot resurvey: network	Plot resurvey: other
2004	0	18	18	0	0
2006	21	0	21	0	0
2008	21	1	22	12	4
2011	23	1	24	9	1
Total	**65**	**20**	**85**	**21**	**5**

Ten plots surveyed by the Forest Botany team in previous expeditions were revisited, with a view to clearing up problems in identification and filling in other missing data. This proved an important task additional to the recording of new plots. We found that site CO1/MS had been clear-felled a few months before, along with a substantial area of the Core Zone of the Park not far from El Cortecito camp-site. Recent large-scale felling was also observed in the Core Zone vicinity of El Danto camp-site, with plots logged along trails DA1 and DA2 (e.g. plot DA2/SS2).

About 180 opportunistic collections were made, mainly of specimens with flowers or fruit (including freshly fallen branches). Some trees that had hitherto been recorded only by their local names were scientifically identified for the first time (for instance, 'Aceituno' and 'San Juan' as *Tapirira guianensis* (Anacardiaceae) and *Vochysia guatemalensis* (Vochysiaceae) respectively).

The identification of specimens is ongoing. It is clear that we have collected a substantial number of species additional to those found during the previous three expeditions. We have added four additional families to our list of trees & shrubs (Chrysobalanaceae, Lamiaceae, Sabiaceae (Meliosmaceae) and Sterculiaceae), ten additional genera and at over 21 new species, of which at least two are trees that have been not previously reported from Honduras (a Sabiaceae and a Meliaceae). We have also identified for the first time a number of species that had been collected on previous collections but remained unidentified (often because we had been unable to collect flowers and/or fruits). These include the rare Mesoamerican endemic tree *Symplocos culminicola* (Symplocaceae). We believe that we have found at least two tree species new to science, but it would be premature to make definitive statements on these. Even for the trees and large shrubs, on which our survey is focussed, we are still far from approaching a complete list for the Park.

Problems encountered

Getting the specimens to the dryer in timely fashion, keeping the dryer burning and changing the drying papers when needed constituted an organisational challenge. In spite of our collective efforts, some specimens did go mouldy and a few had all the leaves drop off. A new pruner pole-head broke whilst being operated at a remote location (above El Cortecito) but, impressively, parts and tools were carried up from Santo Tomás, the equipment was repaired by the Head Guide and it was back in action the following day.

The principal constraints on the team's output was time; the ruggedness of the terrain; and the limited amount of personnel. We had some excellent volunteers, but seldom more than two at a time.

Locating the permanent plots continued to be a problem. The labelling of sites on some of the trails, notably in the Cantiles area, continues to be extremely unsatisfactory and requires careful revision.

Species identification has been slowed down by inadequacies in the taxonomic literature, notably the fact that there is no published Flora of Honduras. It has also been complicated

by the fact that we continue to add species not hitherto known from Honduras - which include as yet undescribed species!

Looming above other considerations, the scale of the recent logging in the Core Zone of the Park in the areas of El Cortecito camp-site and El Danto camp-site raises large questions about the future of the Park, especially the western parts - hitherto the least disturbed region of the Park.

Acknowledgments

We thank our guides, especially Sr Pastor Cortes, whose support and botanical flair have been priceless assets to this study; also Sr Wilmer Lopez, Sr José Jesus Diaz, Mino, Luis, Lito, Calin, Giovanni and Fredi.

We thank the volunteers who assisted in the field work, especially Ms Eleanor Hilton, Ms Jessica Tearle, Ms Abigail Goldberger, Mr Eoghan Hanley, Ms Cybele Collins, Mr Oliver Burdekin, Srta Ivany Argueta, Sr Felipe Fernandez and Rachel, also Ms Megan Lock and tree-climbers Mr Waldo Etherington and Mr Max Wade.

For other assistance and support we thank the Operation Wallacea team, and in particular Mr Alex Tozer, Sr Roberto Downing, Ms Kathy Slater and the camp managers.

For assistance in species identification we thank Dr Paul House of the Universidad Nacional Autónoma de Honduras, Ms Caroline Whitefoord of the Natural History Museum, London, Dr Lawrence Kelly of New York Botanical Garden, Dr Henk van der Werff of Missouri Botanical Garden and Sr Daniel Santamaria.