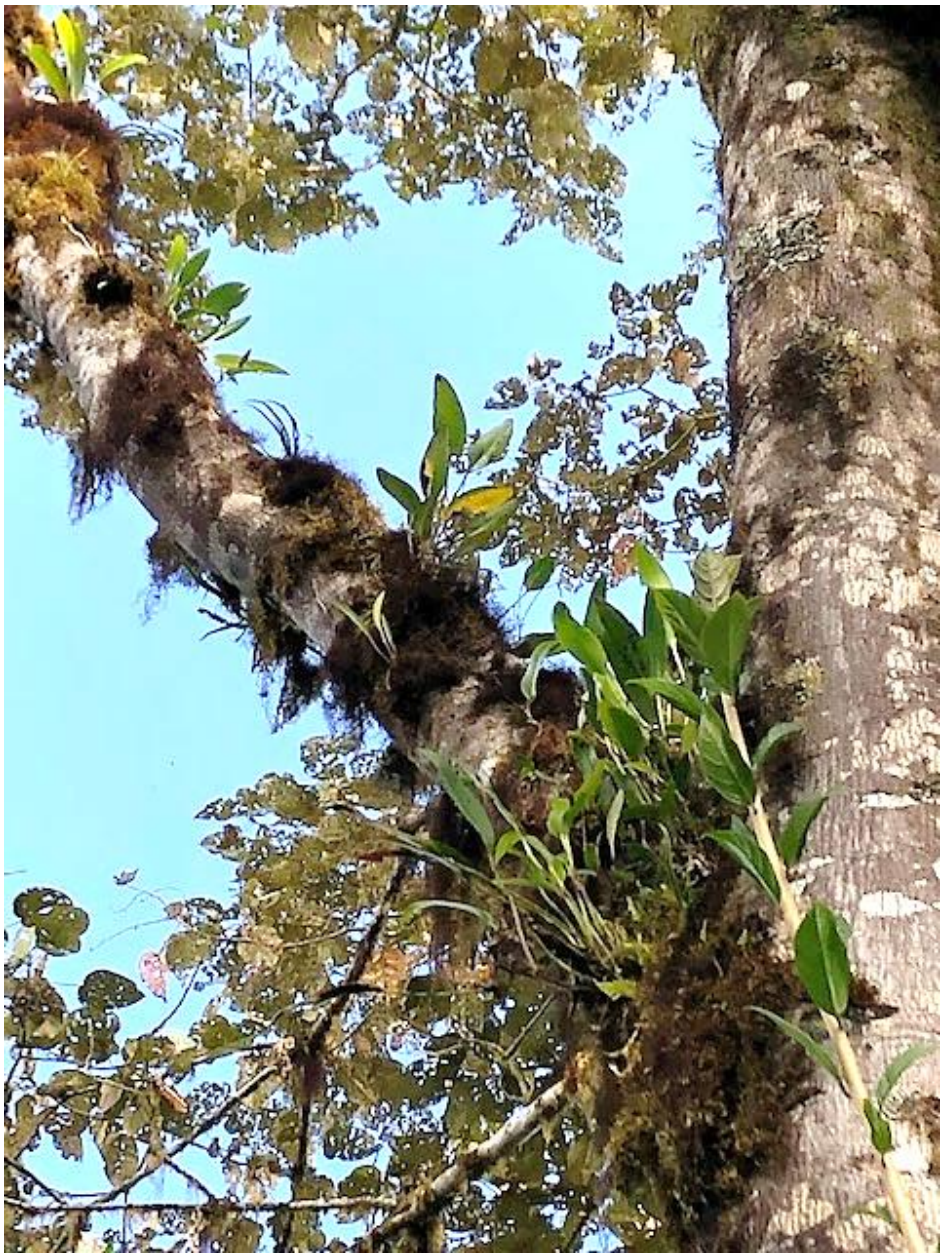
Tornado Aftermath: Life Goes On

By Jane A. Lyons

I received quite a lot of emails commenting on our 'mountain tornado' and interest in follow-up information.

After the tornado hit parts of the Mindo area on 1 April, at Reserva Las Gralarias (RLG) we cleaned up the necessary and left the rest to follow its natural course. The tornado had been wider than we thought. After checking our upper sites, we also found much in the way of downed trees and damaged vegetation, and just as many hail-damaged trees 4 kilometers away and at 2300 m as at our central site at 2100 m elevation.

As energy-laden clashing air temperatures barrel down, normally from a cold, often mountainous, zone to a flatter warmer zone, gathering force as they go, they may pick up enough upper-level winds to develop vertical wind shear which then may develop into a swirling tunnel. The leading edge of that tunnel is what has the most force and does the most damage, the latter trailing and weaker part leaving much less damage. That basic structure helped account for one tree having disappeared completely, others blown down, others twisted, and others not affected. Of course, the type of tree, age, type of root system, etc. make a huge difference also. As predictable, our hardwoods (laurel, mahogany, Clusiaceae Lecythidaceae, Meliaceae, Rubiaceae) with deep root systems, escaped most (although not all) damage, while fast-growing pioneer trees (with more shallow root systems) were the most affected (especially Euphorbiaceae species).



A Euphorbiaceae tree at our upper site, four months after the tornado, still with totally hail-damaged canopy leaves and yet with healthy orchids growing in the moss along its trunk and limbs. Photo by Jane A. Lyons, 1 August 2022

All of our trees seemed to follow the same post-tornado pattern. All of them, from the very highest tops of trees down to the ground level ferns, had badly hail-damaged leaves which stayed on the tree limbs for months, until at least 5 September when we still have hundreds of hail-damaged leaves to sweep up daily on our patios and basically zero healthy normal leaves.

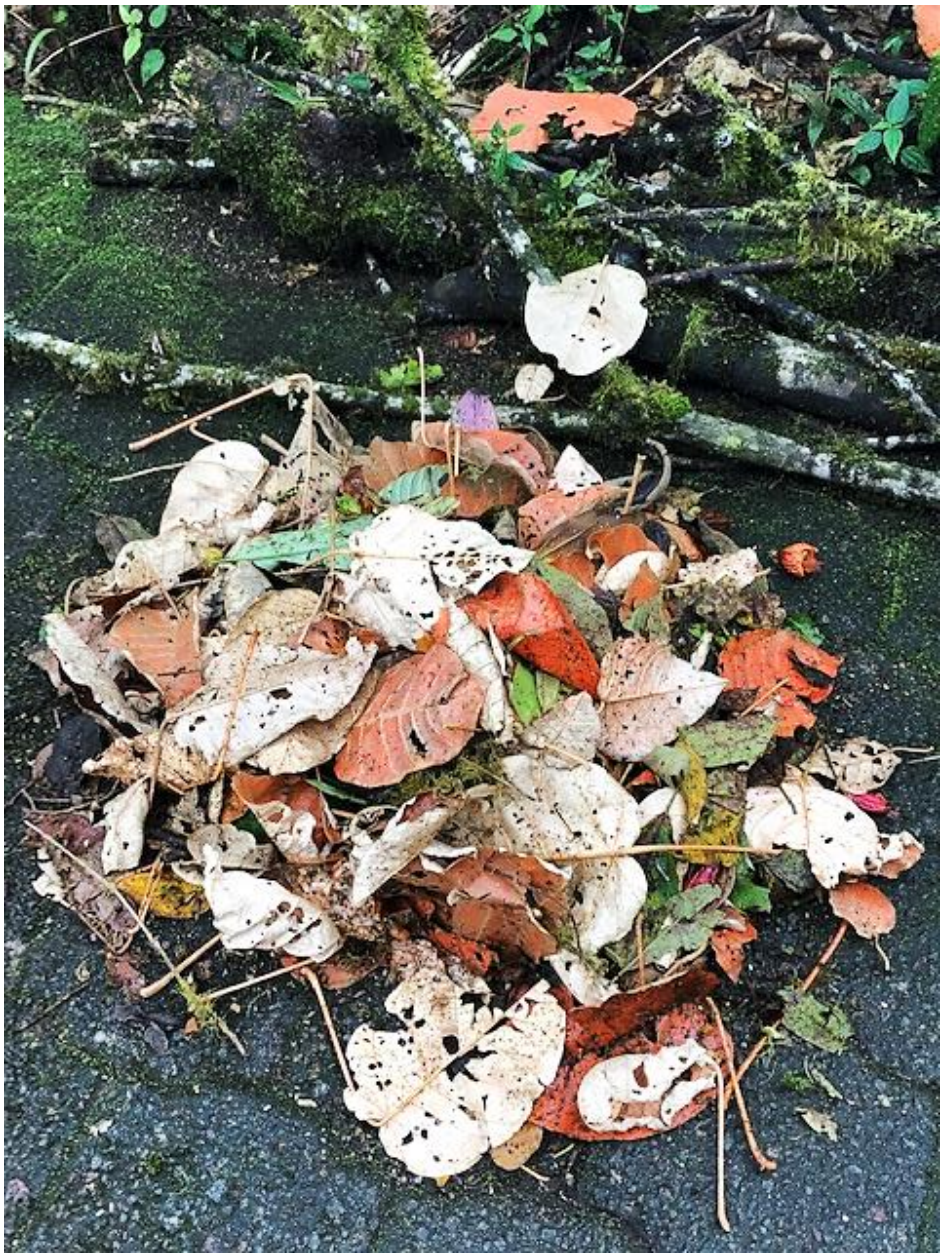


Photo by Jane A. Lyons, 31 July 2022

So the leaves themselves are basically killed by the hail, but the stem system stays intact. And through all the tornado and immediate aftermath those stems do not let go of the leaves. Eventually, slowly, the stems will let go of some of the damaged leaves which we find on the ground. But most of the stems do not release the leaves for many months. Even with more rain and more wind, those leaves do not drop off. It appears that the leaves of a broadleaf forest are critical to the forest's survival even when they are severely damaged. I am also impressed by the strength of the stem structure and whatever "glue" it has to hold those damaged and dead leaves onto the stem and onto the branch. Only when the tree 'decides' to drop them, do they, little by little, actually fall to the ground.

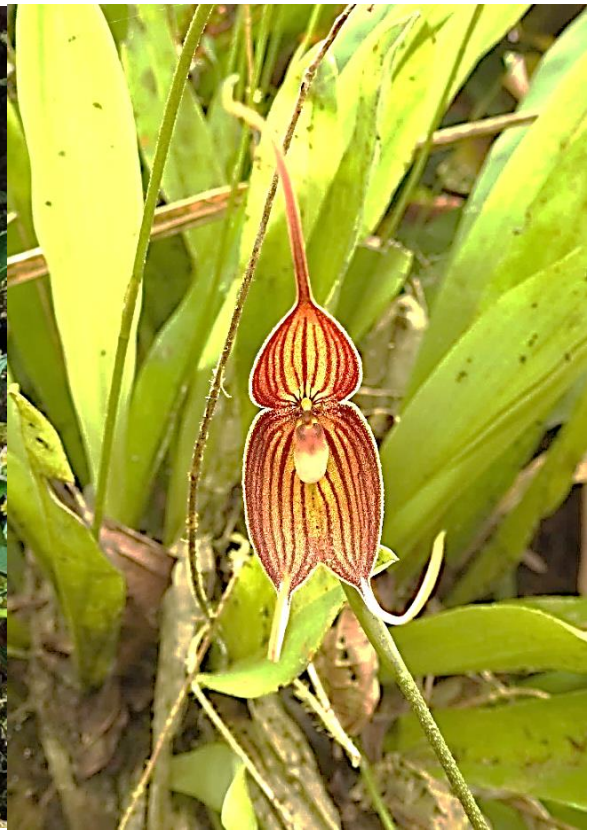
Fruits for the most part were demolished, so we have kept constant fruits included banana, watermelon, avocado and papaya at our fruit feeders and have had large numbers of frugivores feeding at our feeders. Photos by Jane A. Lyons, 25 August 2022

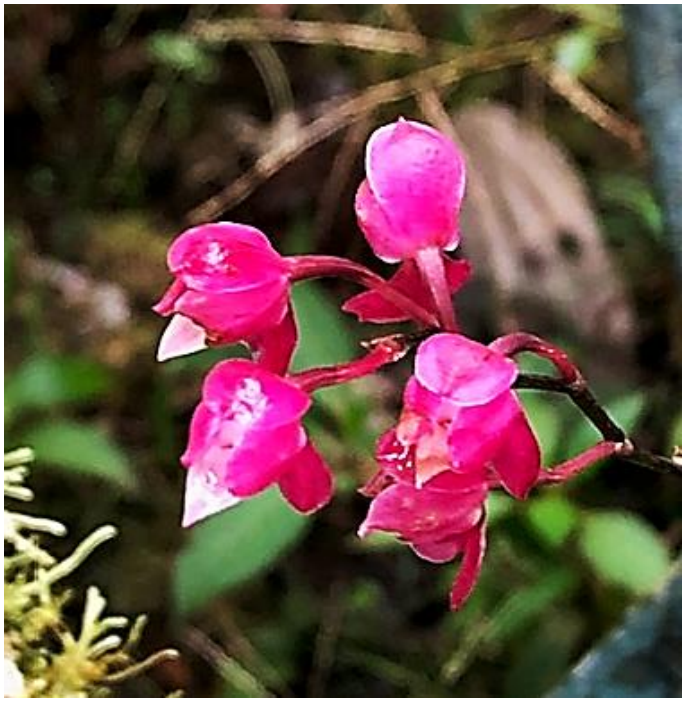
By early-September the resilience of our tornado-damaged forest was clear. Even with all the destruction, vegetation was recovering seemingly with no delay. Some regular rains helped to resuscitate damaged areas, but the hail-damaged leaves were still visible hanging on every tree. Hundreds have fallen each day on our patios, but seemingly on the trees the supply of damaged leaves is endless. Very few trees of any species had many new leaves appearing even while damaged leaves stayed on the branches.

Some of our most delicate plants and animals have thrived amidst the damage, such as one of the most fragile of our orchids, *Maxillaria lepidota* seen in full bloom with uprooted, tornado-damaged trees in the background (photo below).

Maxillaria lepidota orchid Photo by Milton Delgado, 18 August 2022

As well as some of our normal summer orchids seen below in August 2022.





Upper left *Odontoglossum hallii* and lower photo *Oncidium strictum* by Jane A. Lyons, 18 August 2022 Upper right photo *Dracula dodsoni* by Milton Delgado, 18 August 2022

By the end of August, four and a half months after the tree was snapped in half, this mahogany trunk was sprouting many new branches with large leaves.

Photo by Milton Delgado, 18 August 2022

Foot-high new branches with leaves on this Euphorbiaceae tree trunk blown over by the tornado. Photo by Milton Delgado, 18 August 2022

Surrounded by hail-damaged leaves, our Monkey Pot Tree fruits and flowers continued to develop normally. Photo by Jane A. Lyons, 19 August 2022

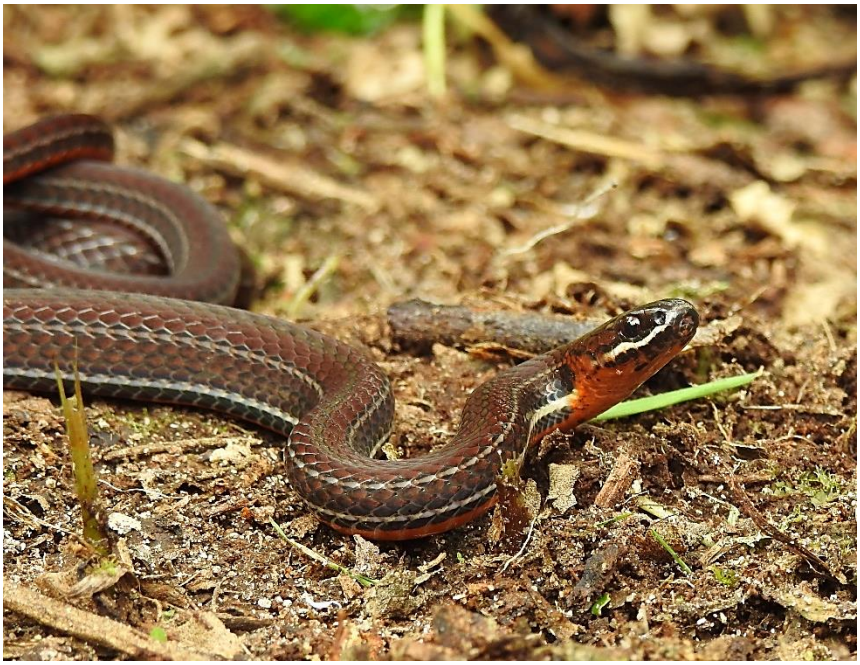
Insectivores like this Flavescent Flycatcher, were finding few flying insects.

Foraging for insects among hail-damaged leaves is slow.

Photos by Milton Delgado, 19 August 2022

Our antpittas were thankful for our daily hand-outs of worms as ground insects were also in short supply. Photos by Milton Delgado, 26 August 2022

Some of our hummers, still feeding at our feeders, seemed to have found new preferred sites amidst lower vegetation. Pumpkin, one of our long-time resident Velvet-purple Coronet, is now hiding among lower vegetation near our patio feeders. Photo by Jane A. Lyons, 25 August 2022.



A Ribboned Brittle-Snake *Urotheca lateristriga* was also looking for food. This species is considered Near Threatened and on 18 August was found at 200 m higher elevation than previously recorded. Photo by Milton Delgado, 18 August 2022

Most birds continued their regular summer routine, including many molting birds such as this well-camouflaged Buff-tailed Coronet. Photo by Jane A. Lyons, 31 July 2022

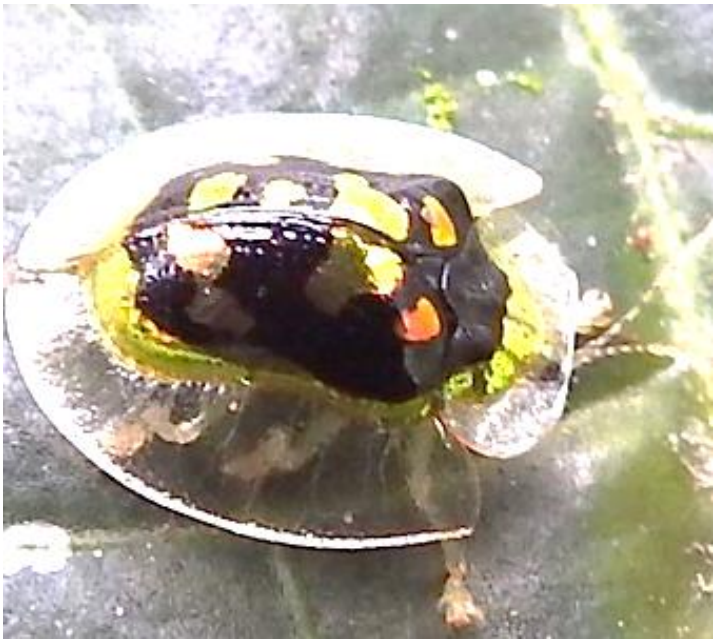
We observed pairs of Plate-billed Mountain-Toucan and of Toucan Barbet at our feeders and also a pair of Dark-backed Wood-Quail, but only males of Powerful Woodpecker, White-faced Nunbird, Scaled Fruiteater. Hopefully the females are still in our area also.

Our Lesser Violetear hummingbirds migrate by mid-October, so the female of this nest managed one last successful nesting before the end of her nesting season, in spite of the tornado. Photo by Milton Delgado, 19 August 2022

This male Golden-headed Quetzal found a nice mossy branch to perch on and apparently is eating well, possibly on aguacatillo fruits. Photo by Milton Delgado, 18 August 2022

These four hummingbirds of three different species normally would be fighting but post-tornado seemed to lose their agression. Photo by Milton Delgado, 19 August 2022.

25 August: Friends came to visit (maskless!) and even discovered a very strange new species of insect (below) – at least one we have never seen before. Photos by Milton Delgado, 25 August 2022.



Nature has astounding resilience if left to its own devices.

All of our damaged trees began immediately to recover and re-grow after being damaged by a fierce tornado. Thanks to regular summer rains much of the undergrowth vegetation stayed hydrated, and animal life was good and mostly normal. The leaves on the trees are still seriously damaged.

We will continue to document the recovery process.