The Natural News

Central North Field Naturalists Inc.

No. 52 ~ August 2012

Black-crowned Night-heron in E. globulus, Morro Bay California Photo S. Lloyd

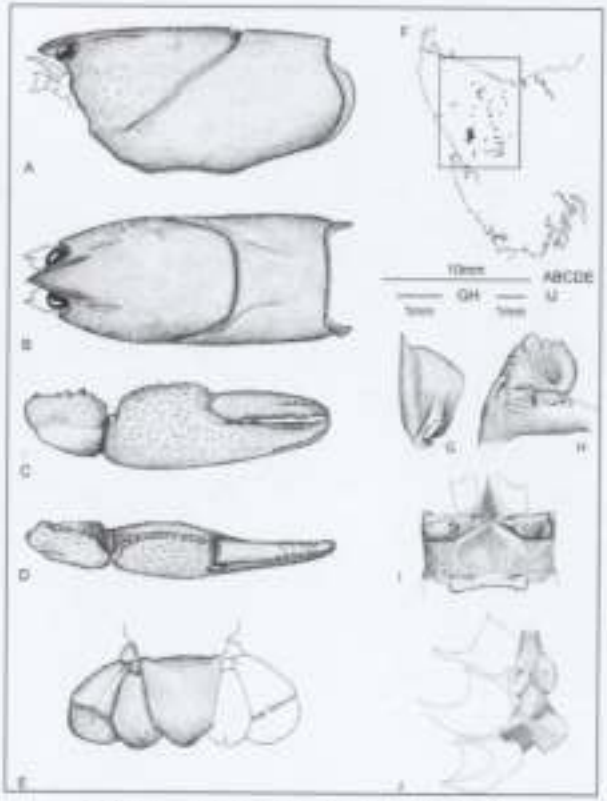
Revision of a Tasmanian Endemic Crayfish Genus

by Jim Nelson

Taxonomy is the area of science dealing with the identification, naming and classification of organisms. One of the common complaints coming from people (field naturalists, for example) is that "they keep changing the names". This can be frustrating of course, but it is also a necessary refining process that comes from new knowledge. DNA in particular has added a great deal of information which has assisted in the sorting of organisms, and has taken taxonomy beyond anatomical description. As much as we might find name changes annoying, we should see them in the light of the continuing refinement of our knowledge. The following is my attempt to sum up about 8 years of the taxonomic work of Brita Hansen in sorting out one of our groups of endemic crayfish. Hopefully it will serve to demonstrate some of the very hard work that can be behind some of the name changes that tend to irritate us. Brita's long and difficult task of sorting out the genus of crayfish called *Parastacoides* represents a significant advance of knowledge for this important endemic group.

Tasmania's freshwater crayfish fauna is incredibly rich by any measure. We have a diverse fauna that includes the world's largest freshwater invertebrate in the giant lobster (*Astacopsis gouldi*). The other genera have included *Geocharax*, *Engaeus* and *Parastacoides*. This last genus has long needed a revision, and for many years Dr Alastair Richardson and his students at the University of Tasmania have collected specimens from the far corners of western Tasmania. I believe the collection is around 1600 specimens. Alastair must have been pleased when he finally found the very able Brita Hansen to carry out the considerable task of a taxonomic revision of the genus as her doctoral work.

The crayfish in the genus until recently known as *Parastacoides* are found only in western Tasmania. They are mainly burrowing crayfish which tunnel down to the water table and spend life mostly underground. A few species can be found in streams and lakes (a wonderful example can be seen in Lake Herbert, which is a great day walk above Tullah). Perhaps one of the more noticeable examples of the burrows made by this group of crayfish would be in wet areas along the Overland Track. Unlike the near



Ombrastacoides leptomeris drawing by Britta Hansen

turrets of pelletised soil around their burrows made by members of the genus *Engaeus*, the burrows of this group just have a loose scattering of the excavated soil pellets near their holes.

During Brita's study the 1926 holotype specimen for *Parastacoides* was acquired from the Berlin Museum, and was rather strangely found to be a *Geocharax insignis*, a crayfish genus consisting of a single species confined to the north west of Tasmania. (The holotype is the reference specimen for a genus.) With the holotype name attached to a crayfish of the wrong genus, the name *Parastacoides* had to become a junior synonym for *Geocharax*, and the genus known as *Parastacoides* needed to be renamed and redefined.

New names for the crayfish previously known as *Parastacoides* have now been raised. A complete revision of the genus has resulted in two new genera and 14 new species. Keys, descriptions, diagnoses, synonymies and distribution maps of the genera and species are provided in Invertebrate Systematics, 2006, 20, 713–769.

The two new genera are *Ombrastacoides*, and *Spinastacoides*. Species in both genera were sorted out by fairly discreet morphological differences and confirmed by substantial genetic differences. Typical of many crayfish, these differences can be difficult to distinguish in the field and the key must be followed closely to determine species

Brita Hansen is to be applauded for this significant contribution to Tasmania's rich and unique freshwater crayfish fauna. But if her taxonomic efforts have been first class, her wonderful illustrations clearly match them.

Book Review *by John Wilson*

CORACINA by Jenny Pearce

2012 Limited edition 123pp; hard-cover; illustrated by StephenWilson and the author; photographs by Suzanne Talbot. RRP $55 + $6.00 postage.

Congratulations to Forth resident, Jenny Pearce, who has just self-published *Coracina*, a beautiful little book written mostly for teenagers. It's the story of Annie Goldern, a young English girl who inherits a property at Daisy Dell from her late uncle Tony, a poet, artist and recluse. The fictitious property is called *Coracina*, and this is the story of the year that Annie spent in residence there, getting to know the Tasmanian bush and the community at Daisy Dell, and ultimately making the biggest decision of her life. Annie is intelligent, inquisitive, musical and resourceful, but there is a lot that she has to learn about Tasmania, its native eucalyptus forests, rainforests and amazing wildlife. As she begins to do so, she discovers much that she didn't know about her reclusive uncle Tony, who was something of a 'black sheep' of the family. Gradually, she starts to appreciate what he loved so much about *Coracina*, including next door neighbour Ozzie Horton whose 'weird' jokes take some time for Annie to get used to.

This is a thoughtful, adventurous work, aimed at introducing urban television-bound teenagers to the natural beauty and mysteries of the sub-alpine country around the nearby Cradle Mountain Lake St. Clair National Park. The astute reader will recognize that it is loosely based on the Iris Farm Private Nature Reserve and Ike's Hut at Daisy Dell, and that the market village called "Willtown" is actually Wilmot.

You don't have to be a teenager to enjoy this book, and romantics would be well advised to have a box of tissues at hand. Offers for filming rights will be considered.

For purchases contact https://sites.google.com/site/ranksinker/Home/coracina.

Blue Gums in Ecuador

by Ron Nagorcka

Nearly all travelling Australians will be aware that our most successful export is undoubtedly the genus *Eucalyptus*. As we travelled through California, Sarah was intrigued to be able to photograph a local Night-heron in a gum tree, and one of the first things we noticed while travelling in Ecuador was the ubiquitous presence of *Eucalyptus globulus* – the Tasmanian blue gum – especially around the towns and cities of the high Andes.

Towards the end of our trip we booked a room for several nights in the Hacienda Guachala near the city of Cayambe which is situated at the base of the snow-covered mountain of the same name – the highest point in the world on the equator. We were expecting a modern hostelry of sorts, but were pleasantly surprised to find that Guachala is the oldest Hacienda in the country dating from the 16th Century with a fascinating history involving many of the country's most significant political events – including the foundation of the socialist party. A team of archaeologists from California were digging in the grounds and uncovering Inca and pre-Inca artefacts. It was all quite unexpected and exciting.

On our exploratory walks of the locality we soon discovered some of the hard facts of the area. The main industry is undoubtedly flower-farming – on a truly gigantic scale! Hectare upon hectare of plastic hothouses populated mostly by roses destined for the markets of North America, and evidence aplenty of wide scale irrigation, chemical fertilisers and insecticides. In short something of an ecological nightmare.

One day we sat down for a conversation with the Hacienda's current owner, Diego Bonifaz, an urbane and friendly gentleman with a Masters degree in science from Stanford University as well as seemingly countless civic honours celebrated on scores of plaques on the walls of the Hacienda library. Diego had many stories to tell of his family, but perhaps the most infamous was about his grandfather who had the dubious honour of being the cause of the "4-day war" in the capital Quito after the Congress decided not to recognise his election to the presidency in the 1930s. He (the grandfather) had also been responsible for the first concrete building in Ecuador in 1937. This may amaze anyone who has visited the country where houses, roofs, fences, even roads are made of concrete – just another astonishing and depressing ecological fact.

Diego was fascinated by our revelation that we came from the home of the myriad of Eucalyptus trees surrounding the Hacienda. He informed us that the species had been introduced in 1897, and its popularity was due to the fact that it was the only tree that could be grown successfully in the conditions that prevailed in the high Andes. Essentially this region is a desert, and its success as a centre of population since well before the Incas (as confirmed by one of the archaeological professors) was entirely due to sophisticated irrigation systems. *E. globulus* only needed to be watered for the first year of its growth and thereafter continued to thrive (no doubt assisted by the absence of its natural Tasmanian predators.) The specimens lining the driveway of the Hacienda were very large old trees indeed.

But back to the Bonifaz story. Over the centuries the Hacienda had thrived on the export of many different products to Europe, of which the most successful was undoubtedly wool. During the 19th Century the property shore 37000 sheep each year and exported the wool to Spain. Ironically perhaps it was the introduction of Spanish bred merino sheep into Australia along with the industrial revolution that destroyed this Ecuadorian industry, and

brought on bad times for the Hacienda in the early 20th century. Diego arrived back from his free and easy life in Stanford in the 1960s to a fairly dire family situation and to his consternation found himself milking cows in order to prove to the authorities that the Hacienda was still a productive farm (a legal necessity even now for many Ecuadorian properties). After 2 years of frustration he decided to plant eucalypts as an alternative. It was a well-timed move – as this was the time when large companies were setting up their flower farms and he sold every stick he could grow to them to build the frameworks for their hothouses. It didn't take long for this enterprise to earn him enough money to buy out the rest of the family and to take sole ownership of the Hacienda which he has retained ever since. His enthusiasm for *E. globulus* did not end there, and as the Hacienda was converted into a place for guests, all the solid and impressive furniture was constructed from blue gum timber.

In the high Andes and elsewhere in Ecuador you will see blue gum being used for every conceivable purpose: firewood, fence posts, stakes, formwork, framing timber furniture, mulch, filling potholes in roads. (Maybe there are lessons here for us…) But the main use is now one that is somewhat disturbing – huge plantings on hillsides (sorry mountain sides – there aren't really many hills) in order to stabilise them and prevent erosion. As several people with some ecological knowledge pointed out to us, this is a disastrous long-term policy, as the trees draw such massive amounts of ground water. As with introduced species anywhere, blue gums are rapidly becoming one of the countries most serious weed species. Fortunately you will not find them in the dense natural cloud forests on the Andean slopes, nor in the jungles of the Amazonian basin, but they are everywhere around the cities and towns.

I'm not sure that even *E.globulus* can make a Tasmanian feel at home in Ecuador. It is such a different place in so many ways, and this is manifested by their ecological behaviour. For instance, we were surprised to see (for the first time I can remember) large epiphytes growing on blue gum trunks. (We also saw large epiphytes on power lines, a phenomenon attributed to high humidity.) We saw very few Ecuadorian birds in eucalypts and given the country's astounding avian diversity, this was quite striking. Blue gums are obviously in Ecuador to stay, and for the people of the countryside they are undoubtedly a godsend, but their radical effect on the ecology of a poor, highly populated nation with a wondrous but fragile ecology is of great concern.

Epiphytes growing on the trunk of a blue gum (Eucalyptus globulus) in Parque Metropolitano, Quito's largest park and one of the largest city parks in South America. Blue gums currently dominate the area but attempts are being made to remove large swathes and replant with native species.

Weighing the evidence about orchids at the Vale of Belvoir

by Phil Collier

At Rubicon Sanctuary we have about 50 orchid species, and many are attractive blue sun orchids (*Thelymitra* spp.). While these have created problems of identification for us, the less attractive "green-brown" leek orchids (*Prasophyllum* spp.) have caused the real headaches. We feel that we have sorted out these at home: see "*Prasophyllum limnetes* D.L.Jones in Tasmania: Further evidence" (*Tasmanian Naturalist 2011*), but the sub-alpine species are a lingering problem.

There are four species of alpine to sub-alpine "green-browns" currently described in Tasmania: *P. alpinum*, *P. crebriflorum*, *P. sphacelatum*, and *P. tadgellianum*. *P. alpinum* was described by Robert Brown in *Prodromus Florae Novae Hollandiae* (in Latin) in 1810, with a type specimen later designated from the top of Mt Wellington. Soon after, Lindley in his 1830 worldwide treatment *The Genera and Species of Orchidaceous Plants*, reproduced Brown's description with added commentary in English. Lindley also describes a new species, *P. affine*, but notes that it may be a mere variety of *P. alpinum*; no further reference to this species is found in later publications. These early descriptions were written in obscure Latin and no measurements are provided, so we rely on later authors to clarify the species with reference to herbarium and other collections.

Next on the scene was R.S.Rogers who described *P. tadgellianum* (*Transactions and Proceedings of the Royal Society of South Australia* 1922 and 1923). In a 1934 review based on sighting type specimens, W. H. Nicholls (*Transactions and Proceedings of the Royal Society of Victoria*) considered *P. tadgellianum* as just another name for *P. alpinum*. This situation remained until David Jones published "Resolution of the *Prasophyllum alpinum* R. Br. (Orchidaceae) complex in mainland and south eastern Australia, Tasmania and New Zealand" (Muelleria 1996). Jones concluded that *P. alpinum* is endemic to Tasmania; *P. tadgellianum* occupies a similar niche in the Australian Alps, with a few records from Tasmania. Jones also described a new sub-alpine species *P. sphacelatum*, with much larger flowers than both. This was the state of knowledge when *The Orchids of Tasmania* was published in 1999.

the mystery plant P. sp "Vale of Belvoir"

Subsequently David Jones published "A revisionary treatment of four species of *Prasophyllum* R.Br. (Orchidaceae) loosely related to *P. correctum*" (Muelleria 2003) that described *P. crebriflorum* from the Surrey Hills estate. This has crowded fragrant flowers and is now known from subalpine grasslands on basalt between Waratah and Guildford in the north-west of Tasmania. Currently, *P. tadgellianum*

and *P. crebriflorum* are both listed as threatened in Tasmania, and therefore establishing size and extent of populations is important. In this article, we focus on *P. tadgellianum* while a story about the work we have done on *P. crebriflorum* can be told another day.

Threatened Plants Tasmania (TPT) jealously guards its relationship with Tasmanian Land Conservancy (TLC) to assist with surveying and monitoring threatened plant species at the Vale of Belvoir. TLC always guarantees perfect weather for our field trips at the height of the sub-alpine flower season in a wonderfully scenic location. One of our projects has been to survey for "green-browns" following an earlier record of *P. tadgellianum* on Daisy Dome at the Vale. We have subsequently found that "green-browns" are widespread at the Vale and are locally abundant, for example near the Cradle Link Road. However, they come in a variety of forms that defy straightforward identification, and there are no obvious habitat preferences for the different forms and sizes. In 2011, we sent several collections south to experts and received (at best) mumbled responses about several species being present.

The nub of the problem is that *P. alpinum* is described as having a flower that is up to 7.5mm in length and *P. tadgellianum* a flower that is more than 10mm in length. In 2012 we examined 48 flowers in separate plants near the Cradle Link Road (average length 9.4mm) and 8 flowers on Daisy Dome (average length 9.1mm). We had neatly slotted into a hole in the key. This flower size immediately eliminates *P. sphaerlatum* (14 mm+ in length) from consideration. However, some plants have 20+ flowers with quite a crowded spike that very much resemble *P. crebriflorum*. We are able to eliminate *P. crebriflorum* using a few criteria: (1) *P. crebriflorum's* flower length (12 mm+) is again a poor match with plants seen at the Vale; (2) plants at the Vale lack the strong distinctive scent of *P. crebriflorum* found elsewhere; and (3) the few isolated plants with crowded flower spikes are well mixed with other plants lacking the many crowded flowers, with no obvious "population" of plants with crowded flower spikes.

Of course the average value on any character, like flower length, can mask a range of underlying effects. It could be that there are two groups of observations: those less than 7.5 mm and those greater than 10 mm. Would we be so lucky? Figure 1 shows quite clearly that the actual values tend to cluster in the "hole in the key", many are 8 mm or 9mm in length. Only the tail of the distribution overlaps the flower lengths stated for *P. alpinum* or *P. tadgellianum*. (The number of specimens at Daisy Dome is too small to conclude that the distribution of values provides evidence of two species at that locality.) We measured 7 characters and they all tend to suggest that there is one species present, with a chart similar to but not quite as smoothly bell shaped, as Figure 1. In all cases the values recorded at Daisy Dome are included within the distribution of values recorded at the Link Road.

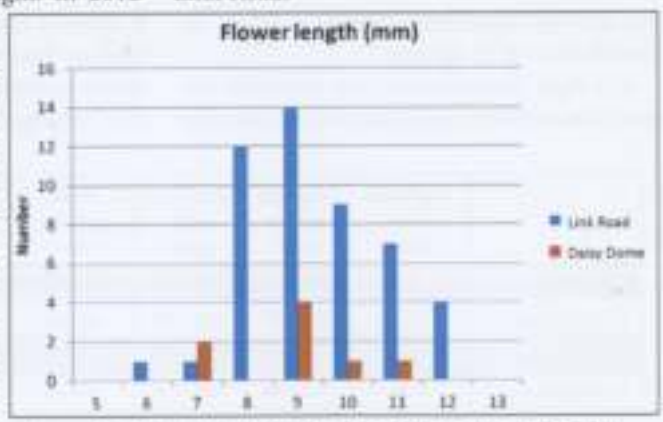


Figure 1 Distribution of values for flower length, shown at the Link Road site and on Daisy Dome.

So if we have only one species, which one is it? It is here that we play our joker. Recent orchid species tend to come with a description that includes information about "recognition" sometimes found under "notes". This is supposed to confirm an identification that is provided by the key, but also comes in handy when the key fails for some reason. Two of the mentioned characters are relatively easy to see; the other two much less so: (1) *P. tadgellianum* has a turgid leaf tip that remains green at flowering time, a character not mentioned for *P. alpinum*; (2) The labellum tip is bent or reflexed at a point well above the middle in *P. alpinum*, and near the midpoint in *P. tadgellianum*. Much less easy to see are *P. alpinum* characters (3) the labellum has a stalk; and (4) the column wings are shorter than the anther. At this stage, we have not attempted to examine the labellum stalk, which will be very small, and our attempts to examine the anthers have been inconclusive. Both would probably require dissection of the flower for high accuracy of observation. At the Vale, we have observed leaves, and those that are ungrazed tend to have shrivelled tips. Finally, we carefully observed the bend in the labellum for the 48 flowers at the Link Road and 8 flowers at Daisy Dome. The point where the labellum tip was reflexed was found to average 73.1% and 74.3% from the base respectively. These two "recognition" characters strongly point to an identification of *P. alpinum*.

As a final determination, we compared the seven measurements and observations from the 91 plants we examined at the Vale (quite a few did not have open flowers) with the most recent descriptions of the same characters for the four candidate species (Table 1). The result of this is presented in Table 2. The conclusion from this exercise is that the species of best fit is *P. alpinum*, assuming that all plants examined are from the same species.

It is unsatisfactory when published keys don't work and plants do not fit within a defined description. How can we rationalise our observations at the Vale? The iconic form of *P. alpinum* is that growing on a mountain plateau or high moorland, just like the type specimen on Mt Wellington. These are the forms of *P. alpinum* that have been (mostly) examined for recent descriptions, and for which the key is likely to work well. It is possible that specimens from lower more sheltered sites grow larger like those seen at the Vale. On the other hand, some specimens of *P. alpinum* growing in cushion plants have the turgid green leaf that is stated to be characteristic of *P. tadgellianum*. It is tempting to think that this may be an ecological adaption to extreme conditions. Without further evidence from elsewhere these are just speculations. It is possible of course, that the population at the Vale represents a new species. Flower length of specimens examined at the Vale barely overlaps with the described form of *P. alpinum*, and the position of the bend in the labellum barely overlaps with any other of the species considered, so it would be easy to slot this "new species" into the *Prasophyllum* key.

	Leaf Max width (mm)	Ungrazed Leaf Len. (mm)	Stem Total height (mm)	Flower spike len. (mm)	Total no. flower	Flower length (mm)	Labellum %to bend
P. alpinum	2–5	80–200	100–300	30–100	5–14	5.5–7.5	75
P. erebriflorum	2–5	120–260	250–350	60–200	6–25	12–15	50
P. sphaerulatum	2–4	280–380	200–400	80–140	6–18	14–18	50
P. tadgellianum	4–8	100–200	100–300	50–80	8–20	12–15	50

Table 1 Published up-to-date ranges of values for seven characters that were observed in plants at the Vale of Belvoir in January 2012.

	Leaf Max width (mm) N=91	Ungrazed Leaf Len. (mm) N=59	Stem Total height (mm) N=81	Flower spike len. (mm) N=81	Total no. flower N=79	Flower length (mm) N=56	Labellum %to bend N=56	Overall N=503
P. alpinum	93%	54%	100%	94%	92%	7%	70%	78%
P. crebriflorum	85%	93%	75%	20%	99%	7%	0%	60%
P. sphacelatum	91%	0%	30%	0%	97%	0%	0%	37%
P. tadgellianum	15%	53%	100%	41%	84%	39%	0%	49%

Table 2 Results of comparing actual values measured or observed at the Vale of Belvoir in January 2012 with published ranges of values. In all cells, the proportion of values that fit within the range stated in Table 1 is shown as a percentage. The proportion of values within range for all seven characters combined is shown in the right hand column.

P. crebriflorum

P. sphacelatum

P. tadgellianum
Mt Baw Baw Victoria

P. alpinum
Mt Wellington

P. alpinum at Mt Olympus

P. tadgellianum at Mt Twynam, NSW

Ecuador: the land of birds

by Sarah Lloyd

For as long as I can remember I have wanted to visit the Amazon rainforest and see a toucan.

Amazonia is a vast relatively flat area of seasonally flooded forests known as *varzea*, *tierra firma* forests, numerous lakes known as *cochas* and the many rivers that flow down the eastern slopes of the Andes eventually to join the Amazon River in Brazil. Ecuador, Peru and Brazil all lay claim to portions of Amazonia but to fulfil my dream Ron and I decided that Ecuador (dubbed 'the land of birds' by Ecuadorian ornithologist Juan Manuel Carrión) had enough flora and fauna to keep us well occupied for two months of exploration.

Ecuador is a small country of 270,678 sq km - about the size of Italy. It is one of 17 countries in the world considered 'mega-diverse', and the country with the highest number of species relative to its size. (The other mega-diverse countries, believed to hold 60% of the world's biodiversity, include Australia, Brazil, China, Colombia, Democratic Republic of Congo, India, Indonesia, Madagascar, Malaysia, Mexico, Papua New Guinea, Peru, Philippines, South Africa, USA and Venezuela.) It has approximately 369 species of mammal, 1616 species of bird, 394 species of reptile, 415 species of amphibians, 820 freshwater fish, 470 saltwater fish, over one million insect species (including 2200 butterflies) and 16097 vascular plant species, of which over 3000 are orchids.

It is Ecuador's location and topography that account for its remarkable diversity. Although situated on the equator its climate is surprisingly variable. Between the hot dry western lowlands and hot and steamy Amazonia are the much colder high altitude regions of the Andes, the mountain chain (whose highest peak is the spectacular snow-covered extinct volcano Chimborazo at 6310 metres asl) that runs the length of South America. There are seven main geographic areas: the wet north coast, the arid south coastal region known as Tumbesiana, western Andean slopes known as Choco, eastern Andean slopes, the páramo, (humid alpine meadows situated between the tree line and snowline), the Amazon region and the Galapagos Archipelago situated 970 km off

View from Pichincha Volcano: clouds build up daily over the pre-montane/subtropical (cloud) forests of the Andes.

the west coast. But within these broad zones are numerous micro-habitats that fill the very particular requirements of restricted range birds such as the Jocotoco Antpitta.

The Jocotoco Antpitta lives near streams on steep densely vegetated bamboo-dominated forest at 2300-2650 metres asl. It is an extremely rare bird and although first described scientifically in 1997, it has been known for much longer by local people as Jocotoco, a word that onomatopoeically describes its call.

Apart from the north coast, we visited all of the different areas starting our adventure at Bellavista, a privately owned reserve on the western slopes of the Andes.

Bellavista Cloud Forest Reserve

Pre-montane/subtropical rainforest (also known as cloud forest) covers the slopes of the Andes from approximately 900 metres to 2500 metres asl. On the western side moisture-laden air rises up the slopes from the lowlands and as it cools it condenses as rain and fog; similar conditions occur on the eastern slopes.

Bellavista is a 700 hectare reserve of primary and secondary forest and regenerating farmland. It lies between 1650m to 2350m asl and is situated on the southern end of the Choco/Andean rainforest (internationally recognised as a hotspot of biodiversity) that extends into south western Colombia. Bellavista is also part of the Mindo area of International Importance for Birds as designated by Birdlife International in 1997.

Travelling to Bellavista gave us our first experience of driving the often treacherous Andean roads with extremely precipitous slopes on one side and landslides and impatient Ecuadorian drivers on the other. But it was worth it. Arriving at Bellavista gave us our first glimpse of a subtropical rainforest with its riches of both vascular and epiphytic plants. (The New York Botanic Gardens considers the cloud forests of Ecuador, Peru and Colombia to have a higher diversity of epiphytic plants - bromeliads, orchids and bryophytes - than anywhere else in the world.) We also saw for the first time the bewildering confusion of flying creatures: the tiny hummingbirds buzzing around like oversized bees and butterflies so large they could be mistaken for birds.

Sugar-water filled feeders were a feature of all the reserves we visited.

Hummingbirds are exclusively American birds. They range from Alaska to southern Argentina but reach their peak of diversity in the northwest of South America. At Bellavista, reputed to have a particularly high number of these little jewels, we were greeted by a mesmerising profusion of different species that gathered around the sugar-water filled feeders. Some waited their turn on nearby branches while others aggressively dominated the source

of energy-rich sustenance so vital to maintain their high metabolic rate - their hearts beat at an incredible 600-1000 times per minute. They quickly starve if there is no readily accessible food and on cold nights when their energy levels are depleted they enter into a sleep-like state known as torpor when metabolic processes slow down and body temperatures drop.

Some hummingbird species never visit the feeders but instead find sustenance in the profusion of flowers in the forests. Many have bills that have evolved to feed from a particular genus or species of plant.

Most hummingbirds have some iridescent plumage, the brilliant colours being a result, not of pigmentation, but of microscopic structures on their feathers that deflect and reflect light. Thus, the colours that sometimes appear black can change to brilliant purple, green or blue depending on the light or position of the bird.

The flying ability of hummingbirds is truly awesome! They are capable of stationary hovering, they can rotate their wings at the shoulder, and, unique among birds, they can fly backwards.

If it weren't for Nelson Apolo, a really excellent and attentive young guide, the array of birds at Bellavista would have been overwhelming. Among the cacophony of trogons, tanagers,

Collared Inca (at Ericaceae flower) is one of 200 species of hummingbird that occur in Ecuador

Plate-billed Mountain-toucan on a bryophyte-covered branch in the choco cloud forest in northwest Ecuador

Crimson-rumped Toucanet (above left) and Pale-billed Aracari are smaller relatives of toucans

quetzels and tapoculo, some of which form mixed species flocks, he recognised the cackling calls of the Plate-billed Mountain-toucan, my first exciting toucan sighting! (We saw the closely related Pale-billed Araçari and Crimson-rumped Toucanet several weeks later.)

Amazonia

Our journey to the Amazon involved a half hour flight from Quito to the oil town of Lago Agrio near the Colombian border, a 3 hour bus ride to Puerto Cuyebeno followed by 2 ½ hours in a motorised canoe to Laguna Grande where we stayed for a week at Siona Lodge in the Cuyabeno Fauna Production Reservation.

The Cuyabeno Fauna Production Reservation is like no other area I have ever experienced. Situated in the Amazon basin in northeast Ecuador, this 603,380 hectare reserve of seasonally flooded forest criss-crossed by waterways connecting numerous lagoons was established in 1979 to protect the seven indigenous communities, the incredible biodiversity (the Amazon has among the highest diversity of plant species - 473 species per hectare - of anywhere in the world) and to prevent the negative impacts of oil companies that continue to exploit the 'black gold' since it was discovered in the 1960s.

We explored the area in motorised canoes accompanied by our multilingual guide, Luis Torres, who has an encyclopedic knowledge of natural history. With unbounding enthusiasm and an uncanny ability to detect the undetectable (how **did** he see that sloth?) he told us the names of all the plants and animals and clearly had a strong attachment to the place and its inhabitants - both human and non-human.

One possible exception was the Hoatzin, one of the strangest inhabitants of the lagoon, that he always referred to as 'stinkybird'. This common name alludes to the unpleasant odour the birds emit as a result of their unusual digestive system. They feed almost solely on plant material, mostly leaves, which ferment in their exceptionally large crop in much the same way as grass does in the stomach of ruminants. When disturbed young birds fall from the stick nests into the water and use vestigial claws on their wings to clamber back up the tree.

During our first outing to Laguna Grande, we tried our hand (Ron successfully!) at catching Piranha, a fish with an apparently undeserved reputation as a flesh eater. Although our 'catch and release' bamboo fishing lines were baited with meat, a large part of the diet of these sharp-toothed fish (especially the primarily

Hoatzin on its stick nest above the water

Anaconda on a branch overhanging the river

frugivorous young) is comprised of fallen fruits. Thus they play an important role in dispersing seeds away from parent plants.

During trips along the waterways we saw anaconda, bats, pink dolphins, a caiman, five species of monkey, numerous invertebrates, two species of sloth and an abundance of birds.

While walking through the dense tropical rainforest accompanied by the ethereal singing of distant howler monkeys our indefatigable guide described the medicinal properties of countless plants that are used by the indigenous people of Amazonia. And he noticed the inconspicuous, the gruesome and the dangerous: the numerous leaf toads camouflaged in leaf litter; the exquisite clear-winged butterflies; a *Cordyceps*-infected beetle and the conga ants whose excruciating sting make grown men weep.

For all its distressing poverty, disturbing environmental practices (they're digging up the rivers!) and exhausting schedules, we had a wonderful adventure. Stay tuned for more about the natural history of this extraordinary country!

clear-winged butterflies are restricted to the neotropics

Long-nosed bats roosting on a tree near the water
(130 of Ecuador's mammal species are bats.)

leaf toad *Bufo* cf. *margaritifer*

Laguna Grande

weevil infected with a cordyceps fungus

Census of Little Penguins at the Lillico Beach Conservation Area

A summary of the report prepared by the Census Organising Committee

On January 14th 2012 sixty nine adults and four children monitored the Little Penguins coming ashore along the 1 400 metres of Lillico Beach.

Approximately 1300 Little Penguins were recorded at 67 counting stations with the greatest concentration of birds occurring within 440 metres of the viewing platform.

Most birds came ashore between 9.30 and 11.00 after which most people stopped counting.

Mid-January is the best time to estimate the size of Little Penguin populations as this is when the largest numbers of parent birds can be expected to come ashore to feed their young. Most chicks at this time are still dependent on their parents but are mature enough to be left unguarded in the nests during the day while both parents go to sea to hunt for food.

Birds that breed at Lillico Beach that would not have been counted include early breeding and late breeding birds. This is because early breeders would be out at sea to feed up in preparation for their annual moult and late breeders would have stayed ashore to guard their younger, more immature chicks. (Of these late breeders one parent undertakes guard duty while the other hunts for food at sea). It is also likely that not all birds with dependent chicks came ashore– some birds do not return every night, particularly if food is difficult to find.

Although fewer birds were counted than in 2008 census there are several factors, including the timing of mating, that could explain the difference between the counts.

The Census Organising Committee for the 2012 census included representatives from the Friends of Lillico Penguins, the Tasmania Parks and Wildlife Service and the Penguin Monitoring Group.

Penguin Facts *by Sarah Lloyd*

Penguins are supremely adapted for their mostly aquatic lives.

Their rigid wings are modified into paddle-like flippers with which they 'fly' under water

Their short legs with sharp-toed webbed feet, placed well back on their torpedo-like bodies, are used to steer and brake underwater.

Unlike flying birds that have air-filled bones, penguins' bones are solid and heavy and serve as ballast when diving.

Their small scale-like feathers cover a dense layer of down that insulates them against the extreme cold of the southern marine region where most of them live.

They capture prey with strong sharply pointed bills. As can be seen in the photo of the Galapagos Penguin, the only penguin species that occasionally ventures north of the equator, they have rear-facing spines lining their mouths that help to hold their slippery or wriggling food of fish, squid and crustaceans.

Galapagos Penguin

Walks and other events

September 2nd Cluan Tier
October 7th Dial Range
October 12th - 14th Federation Weekend hosted by the North East Field Naturalists
November 4th Winifred Curtis Reserve, Scamander
December 2nd AGM at Weegena
January 6th Quamby Bluff
February 3rd Iris Farm Private Nature Reserve

Please see insert or CNFN website for more details
www.disjunctnaturalists.com/

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Sparkling Violetear, Quito, Ecuador Photo: S. Lloyd