Report of the November 2005 Field Exploration and Training Sessions in Northern Vietnam

My second visit to northern Vietnam, with Brian White (Capilano College), Scott Back, (BC Provincial Parks Service), and Sarah Wharton extended relationships between UBC Botanical Garden and Lao Cai Province and the Hoang Lien National Park (HLNP) Authority (Figure 1). Our purpose was to train local park employees in management and biodiversity conservation and continue our botanical surveys in the Hoang Lien Son National Park. Our hosts, Hanoi Open University (HOU), provided translators and technical support for our presentations and field trips within HLNP. Mr. Nguyen Quoc Tri, Director of the HLNP, ensured efficient organization and facilitated field trips. Topas Adventure, a tour-guiding company in Sapa, provided top-rate guides and porters.

We arrived in Hanoi on November 8 and drove from the airport past narrow, pastel colored, neo-French Colonial suburban buildings on the outskirts finally arriving at the Viet Anh hotel in Hanoi's old central district. Much of the first day was spent in meetings. The overnight uncomfortable train journey to Lao Cai began without the expected minibus to the station and continued with intermittent air conditioning and the inevitable cigarette smoke. The minibus to Mountain View Hotel in Sapa took us through highly degraded subtropical vegetation on recently upgraded roads that were still prone to mudslides during the monsoon season.

Sapa (Figure 2) was established in 1914 as a colonial hill station to which the French administration in Hanoi moved during the monsoon season. Many of the more than 200 villas and government buildings

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that were a feature of this "summer capital in the mountains" were bombed by the French in 1952, when the Viet Minh occupied the town. We climbed past the old fern-encrusted Catholic Church (built 1934) to visit the privately owned Orchid Garden and Ham Rong Park (Dragon's Jaw) Tourism Area. This park contains several theme gardens set on a jagged limestone ridge, at 1700m overlooking Sapa. Young plants of *Fokienia hodginsii* (Cupressaceae) thrived in the lower portion of the park. Other native species included *Amentotaxus yunnanensis* (Cephalotaxaceae) and its look-alike *Taxus wallichiana* (Taxaceae). I was particularly impressed with the sharp-edged limestone escarpments here smothered in lithophytes, as well as a trio of small, narrow-crowned tree species, *Carpinus pubescens* (Betulaceae), *Fagus longipetiolata* (Fagaceae) and *Sycopsis dunnii* (Hamamelidaceae). We saw a group of young fan palms, some 6m high, in one of the cultivated gardens, whose slim naked trunks and early shed leaf bases indicated a close relationship with *Trachycarpus oreophilus* (Arecaceae) from northern Thailand.

We were treated to a clear view of the whole Fan Si Pan ridge

Photo: Peter Wharton

Figure 1. Sarah Wharton, Scott Back, Nguyen Quoc Tri, Brian White and Le Van Lanh.

Photo: Peter Wharton

Figure 2. Sapa, established in 1914 as a colonial hill station to which the French administration in Hanoi moved during the monsoon season.

etched against a blue sky—a rare sight even in the dry season (Figure 3). The next two days were spent preparing the training program for approximately 30 HLNP staff, discussing several issues with Mr. Tri including field trips that would allow us to see some of the pressing problems facing the park administration. We confirmed plans for a six-day expedition over the main peak of Phan Si Phan to survey trail conditions and collect botanical specimens. We were also authorized to visit two botanically interesting areas, Ban Ho in the southern part of the HLNP and Ban Khoang on the northern flank of the park. The latter area is a known site for *Aesculus wangii* (Sapindaceae), which is endangered in this region. It is also an area of exceptional diversity, highlighted by the explorations of Keith Rushforth who discovered a new vireya *Rhododendron* (Ericaceae), now named *R. rushforthii*.

In the courtyard in front of the main HLNP headquarters office, several evergreen aralids were growing as pot plants, including *Schefflera bodinieri* and *S. delavayi*, and in a small bed close to the herbarium building we found the corpulent capsules of the beautiful yellow lily, *Lilium poilanei*. A small nursery close to the headquarters building is

Photo: Peter Wharton

Figure 3. The main ridge of the Fan Si Pan range etched against a blue sky

Photo: Peter Wharton

Figure 4. *Dacrycarpus imbricatus,* Podocarpaceae

devoted to orchids that had been confiscated from local collectors. We were told that these "stock plants" were now being used by authorized commercial nurseries in the Sapa area. The interception of illegal plants from the park is becoming more effective, as we saw no orchids, rhododendrons or other wild ornamentals for sale in the markets—a very different situation than we witnessed last year. Brian spotted a small potted *Dacrycarpus imbricatus* (Podocarpaceae) (Figure 4) under a bench. This was a new plant to me. Its wonderfully delicate foliage was reminiscent of the dawn redwood (*Metasequoia glyptostroboides*). The species is just one of several conifers in the Sapa area that are under great threat because most of the large specimens were logged many years ago and land use is now very different from earlier times. These conifers include *Calocedrus macrolepis* (Cupressaceae), *Fokienia hodginsii* and *Podocarpus neriifolius* (Podocarpaceae) all of which we only saw as young trees.

The herbarium and zoological specimen collections at the park headquarters were in very poor condition. Many of the herbarium

specimens were riddled with insect damage, and clearly extensive short-term remedial work (especially ventilation) is needed. A modern, environmentally controlled facility must become the preferred option no matter how extensive these herbarium collections become. Future plans include a National Park Interpretive Centre with a modern research database facility and possibly a botanical garden.

Our journey to Ban Ho, a Tay community some 20 km. SSW of Sapa, led us downhill along a much improved road through H'Mong and Red Dao communities. The landscape reflected intensive agriculture, terracing and fragmentary secondary forests on the hillsides. Primary woody vegetation has only survived on the mountain crests or very steep slopes. Temperatures soared as we approached Ban Ho at 394m (Sapa is at 1650m). This village has an almost tropical appearance, with *Musa* (Musaceae), timber bamboos and heavily laden persimmons (*Diospyros* sp., – Ebenaceae) in full fruit. We crossed the Ta Van River by a fine cable bridge in the centre of the village and followed a well-worn track along the rushing Nam Pu River that had cut a cleft between a tooth-like granite mountain and a mist shrouded hanging valley. In the upper valley, remnant primary forest climbs up to peaks of just over 2100m. On some ridges, we could just see what looked to be the ragged crowns of *Fokienia hodginsii.* Even this close to habitation, these upper ridges are worth investigating, as access is difficult even for the tough, mountain-savvy H'Mong people.

We passed several small motorbikes carrying enormous loads of dried cardamom. Scott Back calculated that each bike-load has an estimated value of over US$600, enough to finance a local village for a whole year. The vegetation here was badly disturbed by subsistence farming, some terracing, and grazing animals. A feature of this valley was the profusion of brightly coloured butterflies. They seemed to favor the white flowers of a large composite (*Ageratum conyzoides*?). We saw several raptors, including a hawk and a kestrel, observations that probably reflected the effects of new legislation to confiscate flintlock rifles from the local rural population. This firearms policy appears already to be having a positive effect on local bird and mammal populations in the Sapa region.

Photo: Peter Wharton

Figure 5. The Hoang Lien Mountains, looking southeast to peaks up to 2800 metres.

The main spine of the Hoang Lien Mountains (Figure 5) is about two days walk southwest from this point. Peaks up to 2800m demarcate the southern edge of the park, all of which are potential targets for future exploration. The vegetation, although greatly disturbed, is still rich in attractive plants. *Sambucus chinensis* (Adoxaceae) was in full flower (creamy white) and like its European and North American relatives, thrives around human habitation and nitrogenous soils. Trees of *Sapium discolor* (Euphorbiaceae) were turning a beautiful crimson that contrasted beautifully with the shrubby, hydrangea-like flowers of *Schizomussaenda dehiscens* [syn. *Emmemopterys rehderi]* (Rubiaceae), with its starched-white bracts and central clusters of bright yellow flowers. True members of the Hydrangeaceae, such as *Hydrangea indochinensis* and the rambling *Schizophragma integrifolia* seemed to favour rock outcrops. There is no doubting this is a subtropical region when you see the leathery tropical foliage of *Rhaphidophora decursiva* (Araceae) climbing up cliffs and tree trunks, combined with the almost excessive foliage of the aralids, such as *Brassaiopsis* and *Schefflera.* Our return journey was punctuated by much butterfly photography. We all felt that, in stark contrast to the

cold misty conditions of upland Sapa, this valley had great potential for trekkers with a keen interest in these lovely insects.

The drive to Ban Khoang on the morning of November 13th took us northwestwards past where the road branches north from the main Tram Ton Pass road into Lai Chau Province. There was a fire hazard rating sign at this road junction. Fire is a real concern in this northern region where, close to the pass, strong winds and a drier climate have resulted in several major fires in recent history. The dirt road was a challenge even for our 4-wheel drive vehicle. We stopped at a pass at 1695m and, after arranging to be picked up later in the afternoon, followed a trail that ascended Five-finger Mountain. This high ground consists of a series of mountainous ridges and peaks at around 2800m, much of which is covered in dense, primary cloud forest. The trail was well worn, gouged out by bikes hauling out bamboo canes, which created a surface that made climbing extremely difficult. These trenches in the orange clay must be extremely hazardous in the monsoon season when they become dangerous flumes. The area was dominated by weedy vegetation including scrubby *Cunninghamia* (Cupressaceae), *Buddleja* (Buddlejaceae), *Litsea* (Lauraceae), *Viburnum* (Adoxaceae) and the vicious *Smilax* (Smilacaceae). Increasingly, we saw hacked over forest remnants in a sea of cultivated bamboo. At 2000m, the primary forest cover becomes more continuous and I noted the vast profusion of epiphytes that encased the upper limbs on most forest trees. Epiphytic rhododendrons in particular were prolific including with *R. euonymifolium* and *R. rushforthii* (Vireya section), both dainty yellow-flowered species. There were several huge discoid, flattened acorns about 6cm across and 3cm thick beneath a massive evergreen "oak" (*Lithocarpus pachylepis*, Fagaceae). The equally impressive cups were covered in dense, regularly arranged leathery bracts. The tree, which is distributed in southern China (western Guangxi & SE Yunnan), was over 30m high and 2m in diameters with the whole length of the trunk to the outer branches richly festooned in epiphytes. There was still some evidence of past disturbance at this point, but the forest became increasingly dense, with a well-developed semi-continuous canopy. A particularly fine, upright specimen of *Daphniphyllum chartaceum* (Daphniphyllaceae), its branchlets

drooping with black fruit, stood out in a small clearing of cardamom.

On a steep ridge at 2070m in thick scrubby forest, with a sheer fall-off to the NNE, we found fine, bowed, 10 to12m tall trees of *Rhododendron protistum* leaning outwards from the cliff edge. The peaks of Five-finger Mountain are noted for their rich rhododendron flora, first mentioned by Keith Rushforth after his trips in the 1990s. We had to break off our explorations, as time was limited, but on our return, just below 2000m, we came across the remarkable, giant saprophytic orchid *Galeola lindleyana* with flowering stems reaching over 2m high. The older flowering stems were loaded with spindle shaped capsules up to 16cm long. Young, expanding, cherry pink shoots nearly a meter tall were connected to bright red, bootlace sized roots. These had a rather sinister appearance, ramifying through a huge rotting log, glowing like lava. As we retraced our steps, I saw specimens of *R. serotinum*, which confirmed that this area requires further exploration. Back at the Ban Khoang road we were gratified to find a cut-over specimen of *Aesculus wangii*, a rare and endangered species in the Sapa region. It is also found in southern China and is closely related to *A. assamica.* This can develop into a large tree, adorned with delightful, white, candle-like flowers in early summer. Below the road was a palm like aralid with a massive rosette of foliage. We pushed down the slope through an evil mixture of *Rubus* (Rosaceae)*, Smilax* and foul smelling herbs to a superb 7m specimen of *Schefflera petelotii.* The palmately compound leaves consist of five leaflets on large pink petiolules, each leaflet startlingly white on the underside. Large clusters of light green fruit and thick brownish-yellow felted hairs on the large petioles make this a plant a visual feast.

November 14th was the first day of our training sessions at HLNP headquarters. Our meeting room was dominated by the stone bust of leader, Ho Chi Minh in red and gold, with Marx and Lenin looming from a painting on the wall. The first session, entitled "Park Management and Planning," was led by Scott Back who explained park management in Canada, conservation versus recreation, management planning and park zoning, and extended into the following day. I presented a session, "Protecting Biodiversity and Traditional Land Use," followed on 16th November by Scott's contribution on "Managing People."

We visited the newly upgraded Cat Cat trail that Dr. White and I saw under construction on our Phan Si Pan climb in 2004. This is a tourist destination site, only 5 km outside Sapa. The trail runs along the suoi (river) Cat Cat, close to an old French colonial hydro-electric building, that is being tastefully restored. I recommended the use of other dramatic or flowering native-plants along this steeply forested river valley to increase tourist appeal. The huge local, clumping timber bamboo (*Dendrocalamus* sp., Poaceae), tree ferns (*Cyathea* spp., Cyatheaceae), aralids (*Schefflera* spp.) and magnolias such as *Magnolia foveolata* and *M. mediocris* would seem to be good choices in this locality. We were very impressed with the quality of the stone paved trails and the re-vegetation of the surrounding slopes. I was particularly intrigued by the use of indigo (*Indigofera tinctoria*, Fabaceae) as a slope stabilizing groundcover close to newly made trails.

The following day Scott continued with his presentation of "Managing Facilities," and we spent some time looking at the herbarium and zoological collections. The herbarium specimens are stored in metal boxes, heavily treated with insecticides. Nevertheless, the high humidity, lack of aeration and generally poor environmental conditions are causing rapid deterioration of both the herbarium specimens and the stuffed, mounted animals. Many of these metal boxes had been emptied of their collections and moved to the University of Hanoi where Professor Nguyen Nigh Thin, Head of the Herbarium there, has been caring for and identifying them. Professor Thin has done extensive botanical fieldwork on Pham Is Pan and in the Sapa Region and has published a number of works on the flora. We drove 15 kilometers to the Ban Khoang area, which we had visited earlier. The area has a moister climate than Sapa's with a well-developed, subtropical closed evergreen forest, and temperate floral elements at over 2400m. The rock substrate consist of mudstones and salty-sandstones that develop into richer soils that are more water retentive and support a richer flora.

We stopped at 1600m and climbed to just over 2000m examining the primary cloud forest along the way. We saw another cutover specimen of the rare and endangered *Aesculus wangii*, and were reminded of the need for protection through effective site inventory and cataloguing. Further

on our way the village of Ban Khoang we saw other rarities, such as *Emmenopterys henryi* (Rubiaceae) and *Tetracentron sinense* (Tetracentraceae), as well as several young, streamside groves of *A. wangii.* I pointed out the need to maintain "green corridors" from the well-preserved forests to the southwest, and on Five Fingers Mountain at the edge of the park to the more disturbed, fragmentary forests on the opposite side of the valley. There are good grounds for expanding the HLNP to include Five Fingers Mountain. Our own observations at 2000m indicate that this mountain has a unique flora, rich in epiphytes and woody plants.

The valley bottom surrounding Ban Khoang, a Red Dao community include intensively cultivated fields that rise to a man-made tree line at about 1700m. Here, the interface between primary forest and fields is abrupt. It appears that there has been effective control of forest clearance in recent years, as we saw no evidence of substantial logging in this community. We also saw park rangers confiscating illegal cut-boards from a villager on a motorbike.

The final day of training was devoted to "Outreach and Community Support" and a session called "Management Actions," followed by a brainstorming session with HLNP staff to determine the most important issues raised during our presentations. These are listed below in the order of their collective priorities:

1) Park management and planning
2) Effective communication with local people
3) Biodiversity protection
4) Developing tourism
5) International research and relationships

There are some significant differences between their priorities with those of the HLNP director (listed at the end of this report).

During the last afternoon, we visited the HLNP rhododendron nursery, which produces rhododendrons for the park and supports private nursery operations. Some of the plants we saw had been confiscated from local illegal collections. This facility has adequate poly-tunnels and space to develop, but personnel clearly require technical advice if they are to set up a commercial operation for rhododendron production. I gave some basic advice to correct some of the more obvious problems

regarding air circulation (e.g., the use of raised benches) and soil mix (use of a better draining sand/grit mixture). I strongly advised HLNP to invite Steve Hootman (Rhododendron Species Botanical Garden, Federal Way, WA, USA) to visit them. There is considerable potential for some kind of cooperative relationship. I discussed with Mr. Tri the need for the HLNP and UBCBG/CPR to establish a working research relationship with Hanoi University and Professor Thin, who has extensive knowledge of the Hoang Lien Son Mountain flora.

Peter Michaelsen (Director, Topas Adventure, Sapa) who was organizing our trek up Phan Si Pan had arranged the services of a guide, Mr. Tho, and 14 porters. We looked over and approved the proposed itinerary and campsites and spent 2 rest days, during which we had a chance meeting with Dan Hinkley who was en route from northern India, Sikkim and Vietnam to complete his collecting tour on the Laotian border.

The field objectives of our five-day field exploration, which began on November 21, included a detailed analysis of the trails we used, campgrounds and other issues relating to trekking routes from Heaven's Gate, at the north end of the HLNP, over the summit ridge of Phan Si Pan down the Cat Cat trail back to Sapa. The work was to be documented with herbarium vouchers, DNA collections and field data for target plants along the route. The route and sample sites were monitored with GPS records at frequent intervals to identify physical points and plant collections. Scott Back conducted a thorough trail/campground analysis for the HLNP.

We started our hike from the park entrance headquarters at Heaven's Gate, near Tram Ton Pass, at 1940m. We followed a more direct trail through disturbed secondary forest, instead of the carefully constructed "stone step route." In heavy mist we passed through a mosaic of burned areas, islands of regenerating forests, old campsites and bamboo groves. This area has a history of serious fires, notably in 1995 and in the period of the Chinese invasion in 1978/79. A combination of strong winds (*o qui ho* wind) funneled over the Tram Ton Pass, dry winter weather and human carelessness is always a potential recipe for disaster. This danger is regarded as the most serious threat to the integrity of the park. In

these grassy, burnt areas, successional brush vegetation included pioneers in the genera *Smilax, Senecio* (Asteraceae), *Symplocos* (Symplocaceae), *Hypericum* (Clusiaceae), *Luculia* (Rubiaceae), *Litsea, Pyrus* (Rosaceae) and *Malus* (Rosaceae). In the midst of this low vegetation the flamboyant crowns of several aralids provided dramatic counterpoint.

At 2000m, a few fragments of old primary forests contain huge specimens of *Gordonia tonkinensis* (Theaceae), one of which had a 76cm trunk diameter, in full flower, *Prunus phaeosticta* (Rosaceae), *Lithocarpus pachylepis, Quercus* spp. (Fagaceae) and a fine 18m *Rhodoleia championii* (Hamamelidaceae). In the moister gullies, *Acer sikkimense* subsp. *metcalfii*?, (Sapindaceae), *Acer laevigatum, Rehderodendron macrocarpum* (Styracaceae) and the evergreen *Stewartia laotica* (Theaceae), which looked to me no different from the Chinese *S. pteropetiolata*. In thick mist we passed through a series of depressing campgrounds with blackened fire debris and scorched stumps. Here, Scott noted that the trail was poorly sited along a stream, where, because of the extra moisture, the additional campground disturbance led to serious site degradation.

We climbed onto a series of rocky bluffs with interesting vegetation that was primarily scrub. Numerous regenerating *Magnolia floribunda* (Figure 6), *Rhodoleia*, *Schefflera* and a host of *Litsea, Vaccinium* (Ericaceae), *Ternstroemia* (Pentaphylacaceae) and *Rubus* formed bands of vegetation amongst a tide of bamboo that became ever more dominant as we climbed steeply to nearly 2800m. We climbed out of the mist at 2300m to see a spectacular panorama of mountaintops in a sea of mist.

While bamboo was the dominant vegetative element around us, there was evidence of frequent fires on this windy, dry side of the mountain, which indicated that tree cover has always been limited. We climbed steeply through dense bamboo scrub alongside a concrete-and-rebar-railing section of the trail. The railings were molded to resemble timber bamboo and painted green. Despite aesthetic reservations, these railings did provide welcome support on a very dangerous section of the mountain prone to severe winds. The final 100 metres to the peak of Phan Si Pan was exhausting, passing across a trail resembling a mud wallow to the final rocky viewpoint. *Pleioblastus*/*Phyllostachys* (Poaceae) bamboo scrub dominated the vegetation around the summit at 3142m.

Other woody plants in the genera *Berberis* (Berberidaceae), *Cotoneaster* (Rosaceae), *Rubus, Magnolia, Vaccinium, Rhododendron, Sorbus* (Rosaceae) and *Prunus* were present. Of particular note was a pair of rhododendrons that we often found growing together on rocky out-crops, *R. valentinianum* and another dwarf species that may be what Keith Rushforth is calling *R.* sp. aff. *tephropeplum* or perhaps the yellow flowered *R. xanthostephanum*, that is recorded in northern Vietnam. The clear views to the northwest and southeast followed the Hoang Lien Son Range provided us with an archipelago of 'island peaks' above 2300m set in a sea of low cloud (Figure 5). The recent discovery of the two, disjunct Himalayan species, *R. cinnabarinum* and *R. wallichii* in mountains just south of the HLNP is most exciting. There are still huge areas to explore in this southernmost upland outpost of temperate vegetation in South East Asia.

We descended from 2940m along the southern ridge of the mountain, marveling at a rich temperate scrub dominated by rhododendrons (including *R. cyanocarpum, R. kyawii, R.* sp. aff. *arboreum* subsp. *delavayi, R.* sp. aff. *arboreum* subsp. *delavayi* var. *peramoenum, R.* sp. aff. *irroratum*

Photo: Peter Wharton

Figure 6. A *Magnolia floribunda* flower dotted with rain drops.

(*ramsdenianum?*), *R. sinofalconeri*, *R. valentinianum*, *Vaccinium* spp., *Berberis wallichiana, Enkianthus chapaensis* (Ericaceae), *Gaultheria* spp. (Ericaceae), *Leucothoe griffithii* (Ericaceae), *Rhodoleia* sp. aff. *parvipetala* and the tropical looking *Schefflera alpina*. Fine examples of *Rhododendron cyanocarpum* and *R.* sp. aff. *irroratum* were the largest specimens. Pleated rhododendron forests of *R. sinofalconeri* on the steep lower southwestern slopes of Phan Si Pan rolled up towards stunted, leaf battered dwarfs at the ridge crest. The resilience and adaptability of this species is remarkable.

We now descended into the temperate cloud forest in Lai Chau province, out of the HLNP, and into the contiguous Muong Khoa Nature Reserve. This is a pristine forest dominated by huge, moss shrouded specimens of *R. sinofalconeri* (18m), a dense crowned *Lithocarpus* sp., *Acanthopanax trifoliatus* (Araliaceae) and statuesque specimens of *Acer pectinatum* subsp. *taronense,* the latter beginning to turn bright yellow. The under-story was a dense tangle of fallen trees, rock outcrops and thick brush. Here, shrubs of *Ilex nothofagifolia* (Aquifoliaceae), *Rubus lineatus* and *Vaccinium dunalianum* were underlain with thick carpets of the buttercup relative, *Coptis chinensis* (Ranunculaceae), and a wonderful array of ferns. We camped on a natural ledge at 2685m surrounded by forest and views to neighbouring ridges. Small groups of trees, with "lollypop-like" crown profiles similar to veteran *Araucaria araucana* (monkey puzzle tree) in their native southern Andes, were silhouetted against the skyline above. These proved to be the endemic *Abies delavayi* subsp. *fansipanensis* (Pinaceae), which is the southernmost, distributed *Abies* in Asia.

On our third day we followed a trail to the ridge above, which I had traveled in 2004, then resumed our southward route in dense brush and bamboo thickets towards the head of the Cat Cat trail. Here, the scrubby, elfin forest was again wonderfully diverse, consisting of *Ilex, Rhododendron, Rhodoleia, Cotoneaster, Daphne* (Thymelaeaceae), *Illicium* (Illiciaceae), *Eurya* (Pentaphylacaceae), *Schefflera, Schisandra* (Schisandraceae), *Ternstroemia, Rubus* and *Smilax*. Underfoot, we found members of the Gesneriaceae, Convallariaceae (including *Liriope*), Orchidaceae and Poaceae (primarily bamusoid species), with many ferns, notably Polypodiaceae (*Lepisorus* and *Polypodium*) predominating. The ferns often occurred as either lithophytes or epiphytes.

A rhododendron with affinities to *R. arboreum* subsp. *delavayi* var. *peramoenum* mentioned above formed extensive colonies on this crest-line. Its leaves were narrow and waxy with a slightly spongy indumentum and larger flower buds than is normal for this species. This is an intriguing rhododendron and could prove to be a new taxon. Mixed with this species, other rhododendrons noted were *R.* sp. aff. *irroratum* (*R. ramsdenianum?*), small plants of *R. kyawii* and scattered large specimens of *R. cyanocarpum.* Close to the trail we spotted populations of a most interesting evergreen shrub in the Hamamelidaceae, just coming into flower, which I feel is probably *Rhodoleia* sp. aff. *parvipetala.* Unfortunately, this species is generally recorded at elevations below 1000m. An alternative candidate is *R. macrocarpa*, only recorded in southeast Yunnan to 2400m, and to my knowledge never recorded in Vietnam. Its flowers are pink, up to nearly 3cm across, consisting of 15 to 18 petals, with an intense fragrance of *Hamamelis mollis.* Another species, which we had previously observed at lower elevations forming a large forest tree with deep carmine coloured flowers, was almost certainly *R. championii.* We followed this spine-like ridge to the south from which we could view distant mountains, up to 2800m, at the southern end of the HLNP, west of Ban Ho. All of these slopes are worthy of further exploration, though with extreme caution, as the terrain underfoot can be unstable, with hidden cliff edges, and sharp edged vertical trenches, hidden bamboo-plugged hollows and tangles of evil-thorned *Smilax* and *Rubus.*

The flamboyant foliage of *Schefflera alpina* and massed clusters of blackish-purple fruits contrast beautifully with the reddish-purple of their leaflet stems. The ground around the large leaved form of *Viburnum grandiflorum* (known as *V. nervosum*) was smothered with leaf fall, while in thick brush, *Skimmia arborescens* (Rutaceae) was stretched to the light, its terminal, pyramidal flower clusters unopened and resting. Beautiful and diminutive forms of *Pieris formosa* (Ericaceae) caught my attention, as their dainty form and appearance was in sharp contrast to the more stolid appearance of the surrounding vegetation. At the start of the descent along the Cat Cat trail at 2860m, we were at the edge of a discontinuous zone of the endemic conifer, *Abies delavayi* subsp. *fansipanensis.* These trees some up to 18m were scattered in dense bamboo and then into upper portions of a fine *Rhododendron*

sinofalconeri forest. The peeling bark of this species is not as impressively coloured as the closely related, Himalayan, *R. falconeri*, which often has fine rufous-orange bark. Further down we found the hunched forms of veteran *Tsuga dumosa* (Himalayan hemlock) (Pinaceae) shrouded in moss and mist. We camped at a site (2660m), which we visited in 2004, and were pleased that this campground area has improved since our last visit, with less visible rubbish and vegetational disturbance. The rhododendron flora of this location is impressive, with another most interesting form of *Rhododendron arboreum* being quite plentiful. Hard, narrow, in-rolled, light waxy leaves and thin woolly indumentum brings it close to subsp. *delavayi* var. *peramoenum.* Several individuals have grown through the dense 8m, or taller, ridgeline forest. The fine windswept Himalayan hemlocks, evergreen witch-hazel relative (*Rhodoleia* sp. aff. *parvipetala*) and an array of other broadleaved evergreens provided us with shelter.

On November 25th we passed through dense elfin cloud forest to a number of jagged ridges at 2480m covered in fine array of genera, including *Rhododendron, Magnolia, Rhodoleia, Eurya, Daphne, Castanopsis* (Fagaceae)*, Lithocarpus, Acanthopanax, Illicium, Vaccinium,* and *Sorbus*. One particularly strange rhododendron appeared to have affinities to *Rhododendron roxieanum*. If confirmed as this species, it represents a remote outlier of a species more widely known from southeastern Tibet (Xizang) and northwestern Yunnan. The leathery, linear leaves were arranged in compact rosettes at the branch tips, with the leafless internodes smothered in bleached, threadlike clusters of the lichen, *Usnea*. At 2150m, we walked into the lowland fog of the dripping upper montane forest that we had seen from the heights above. We had lunch in the increasingly conspicuous cardamom (*Amomum aromaticum*) (Zingiberaceae) plantations that dot the hillsides here between 1900 and 1600m. Clearings for these plantings are often concentrated along streams where moisture and nutrition are optimal. Large trees are retained, to ensure appropriate shade levels for the crop, but most of the cleared timber is used as firewood onsite, to dry the moist, ripened fruits. We camped at our last site at 1900m in thick, cold fog that saturated the vegetation, which in turn, dripped incessantly throughout the night.

Breakfast and breaking camp were fast as a dense fog blanket made life for the cooks and porters miserable. From here, we plunged down a trail that became increasingly dangerous, with vertical rock sections, tangled-roots, cut logs and mud gullies ending in rock piles or slippery stream-beds. The dismal, drizzling fog drenched us, especially when we ventured off the trail to investigate plants. At 1840m, a particular majestic *Schefflera* with gargantuan leaves beckoned me; the startling white undersides of the leaves drew my hands to the leaf stalk, which then unleashed a massive cascade of water onto my wincing, waiting face. The undergrowth here is full of interesting things, but exhaustion, drenched clothes and dangerous trail conditions limited my "vision." A fine specimen of the Maddenia Subsection, *Rhododendron excellens* still managed to attract my attention, with its stunning reddish-purple bark glistening in the saturated gloom. During a spring visit to this mountain we would expect to see a host of other Maddenia's, known for their intoxicating scent and sumptuous blooms; these include *R. crenulatum, R. fleuryi, R. lyi, R. nuttallii* and *R.* veitchianum. At 1530m we emerged into a highly degraded area, at one time a *Fokienia hodginsii* forest, now no better than poor open grazing land with scattered scrub forest. I passed some fine young flowering plants of *Gordonia tonkinensis* with interest, but was alerted by my companions to young trees of the interesting member of the Podocarpaceae, *Dacrycarpus imbricatus.* Our guide, Mr. Tho had promised us he would find this tree, yet I had almost given up hope at this late stage of our expedition. This is a most interesting example of the intrusion of southern hemisphere floristic elements into this part of Vietnam. Another dramatic example of this is *Rhododendron* Section *Vireya,* centered in New Guinea, with over 160 species there. A small group of vireyas has spread to the Asian mainland with 13 species recorded. *Rhododendron rushforthii*, in Subsection *Pseudovireya*, mentioned earlier, was first documented on Ban Khoang in 1992. We then dropped into the subtropical vegetation of the Suoi Hu with tree bamboo, bananas, tree ferns (*Cyathea spinulosa*) and luckily torpid leaches. Our five-day journey ended as we crossed the main cable footbridge at Cat Cat village.

This field expedition was very rewarding in several ways. It provided me with better ecological and botanical understanding of the many high

ridges of Phan Si Pan in the area between the northern Heaven's Gate's entrance of the HLNP to the southern base of the Cat Cat trail. We made over 30 herbarium and DNA collections (2 sets), as well as detailed field observations. Scott Back established GPS way stations throughout our route, which assisted documenting our botanical collecting activities. The fine weather at high elevation and our earlier field trips has further advanced our first hand botanical knowledge of this region. Many mountain peaks of between 2600m and 2800m remain unexplored within the HLNP, to the south and north of Phan Si Pan. The peaks on the southern boundary of the park, about two days march from Ban Ho look particularly interesting.

The following day we prepared for home but did have time to hear Mr. Tri's list of priorities for the HLNP:

1) Fire protection - Training staff and acquisition of fire fighting equipment. Scott Back (BC Parks) will develop a training session and arrange for some equipment to be sent out to the HLNP authority for November 2006.

2) Scientific research - The building of a new herbarium and biodiversity database facility, both of which require national and international support.

3) Continuing efforts to increase knowledge of the flora of the HLNP. Exploration should involve collaboration between a Vietnamese botanical institution, HLNP, UBC/CPR and others.

4) Developing appropriate tourism - The HLNP must be well protected from inappropriate development. The building of high quality rest houses, toilets and waste disposal sites are most important.

5) Community-based training programs are vital within the ethnic communities to increase family income. The 14 villages in the HLNP core area need assistance to help them protect surrounding forests and support environmental education programs. Rural poverty and forest degradation are interlinked. It is vital to find ways of supporting local village-based nurseries that generate family income. The production of trees for reforestation, orchids, rhododendrons, endangered plants, medicinal plants, and culinary herbs, etc. for use in the HLNP or for commercial purposes can assist in creating harmony between sustainable rural development and conserving the biodiversity of the HLNP.