ECOLOGICAL SURVEYS OF THE LEPIDOPTERA FAUNA OF THE HUNSTEIN RANGE, EAST SEPIK PROVINCE, PAPUA NEW GUINEA, EMPHASIZING BUTTERFLY POPULATIONS AND HABITAT IN THE MT. SAMSAI AREA

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Abstract- Starting with a preliminary survey of Lepidoptera species in March 1998 in the Hunstein Range of Papua New Guinea, a more intensive community-interactive research project was developed in collaboration with two national PNG government agencies and the University of Papua New Guinea. The first phase was carried out during October 2003 with an expedition to the west slope approach to Mt. Samsai, the highest peak (at 1525 m) in the remote Hunstein Range of southern East Sepik Province. More than 111 butterfly taxa were recorded during the 9-22 October 2003 expedition. Habitats and unusual taxa encountered are discussed and illustrated.

Key words: Faunistic survey, biodiversity, local community, sustainable use of resources, conservation.

INTRODUCTION

"Ecological Surveys of the Hunstein Range, East Sepik Province, Papua New Guinea Emphasizing Lepidoptera Populations and Habitat in the Mt. Samsai Area" is a cooperative two-phase research project to compile inventories and investigate ecological aspects of Lepidoptera (both butterfly and moth) populations in the Hunstein Range, a nearly pristine 220,000 ha expanse of tropical and lower montane forest in north-central Papua New Guinea (PNG) (Figures 1-2). An ornithological inventory and distribution studies are included as ancillary project objectives. The project approach is essentially community-interactive. Residents of local communities perform much of the fieldwork, their skills and service an integral part of the research. Hands-on collecting of specimens and collaborative habitat assessment provide key visual opportunities to discuss science, entomology, ecology, and natural resource management, in particular local conservation and development issues, with the local people

Ecophysiography and biota

The Hunstein Range is a densely forested and almost uninhabited cluster of low mountains located in southern East Sepik Province, and forms part of the vast Sepik River watershed. The Hunstein is nearly isolated from the central cordillera of New Guinea by the drainages of the Salumei and Sitipa/ upper April (=Nikisak) rivers. Adjoining land in the headwaters of these two encircling river systems rises to only 120 m at its minimum elevation (Cox and Emmel 2001).

The mountain range is elsewhere bordered by extensive wetlands and lowland forests associated with the Sepik floodplain. The main crest of the Hunstein is a 20 km east-west ridge at 1000-1300 m elevation, and includes Mt. Samsai (= Mt. Hunstein), at 1525 m the highest peak in the range (Figures 1 and 2). A secondary series of crests with heavy forest at 600-1000 m elevation (Figures 3 and 4) bifurcates northeast and east-northeast for 17 and 18 km, respectively (Cox and Emmel 2001). Topographic maps herein (Figures 5 and 6) depict these features as well as the expedition route.

The fauna and flora of the Hunstein Range remain poorly documented. Previous biological inventories are apparently limited to three investigations:

1) the botanical Kaiserin-Augusta Fluss Expedition of 1912-1913, led by Carl Ludwig Ledermann, which collected plants in the Sepik River vicinity but included parts of the Hunstein River. The entire collection, housed in the Berlin Herbarium, was destroyed by fire in World War II (Veldekamp *et al*. 1988);

2) a fauna and flora collection (apparently limited to plants and birds) made by R. D. Hoogland and L. A. Craven of the Commonwealth Scientific & Industrial Research Organization (CSIRO) in 1966 and 1967 (Appendix 1 in Sohmer *et al*. 1991);

3) a Bishop Museum-National Geographic Society-PNG Forest Research Institute expedition in 1989 that extensively collected flora and fauna in the Hunstein River watershed from 17 September to 20 October 1989, reaching 1100 m on Mt. Samsai (Sohmer *et al*. 1991). Approximately 40% of floral species collected at various elevations were found to be endemic to PNG, and nearly 25% of the identified plant species may be restricted to the Hunstein Range. This finding is consistent with inferences drawn from the ecophysiography of the range, which suggests a moderate to high degree of biological endemism, in particular in the higher *terra incognita* of Mt. Samsai and other summit areas. As far as can be determined, there are no taxa of birds or reptiles endemic to the Hunstein, but the degree of floral endemism should be matched, or perhaps exceeded, by that of the herbivorous insect fauna and probably their associated parasitoids.

Conservation importance and status

The biodiversity value of the Hunstein Range has gained the attention of conservation organizations and the Government of Papua New Guinea (GoPNG), in part due to timber concessions planned in the headwater rainforests of the upper Salumei and upper April river drainages. The southern slopes contain large

Fig. 1. Endless vista of Hunstein ridges and April Hills from Samsai *keel*, March 1998.

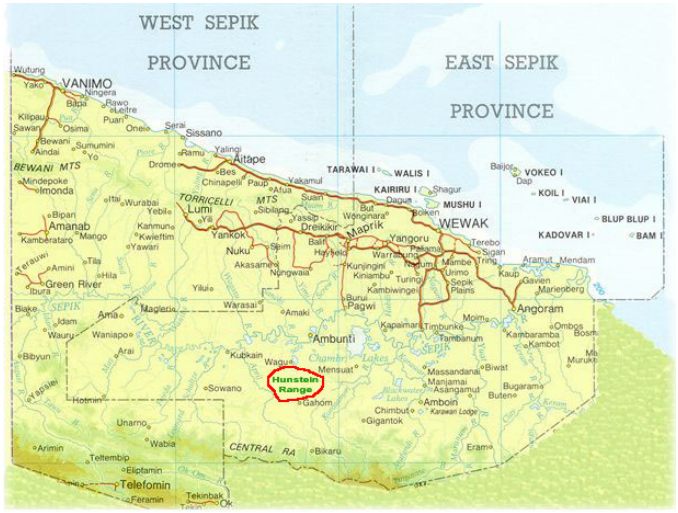

Fig. 2. East Sepik and West Sepik provinces including the Hunstein Range.

stands (pure and mixed) of kauri, *Agathis labilliardi*, a valuable hardwood (Douglas *et al*. 1998).

The Hunstein Range is listed as a site of Very High Priority (category of highest priority) for terrestrial biodiversity conservation in PNG (Olivieri and Hutchinson, 1993). In July 1998, a six-year US $2 million project, Sepik Community LandCare (SCLC), was initiated by the World Wide Fund for Nature Conservation (WWF) to conserve the Hunstein Range. The project emphasized conservation awareness and training but delivered few tangible benefits to Hunstein communities and was terminated in 2001.

The project did, however, obtain broad-based community support to have the Hunstein Range gazetted as a Wildlife Management Area (WMA). Impetus for this was provided by inclusion of the Hunstein Range inside a 489,000-hectare logging concession known as the April Salumei Forest Management Area (FMA), for which a management agreement was signed in 1996 between landowners and the national government (WWF 2005).

A number of landowning communities in the Hunstein Range area which are opposed to commercial logging formed a WMA in 1998 under the Flora and Fauna Act. This has apparently reduced the timber concession by some 220,000 ha. The Hunstein Range Wildlife Management Area, which was established to protect the wildlife and environment of the Bahinemo people, is managed according to rules written by the Wagu, Yigei and Gahom communities (WWF 2005). These rules are based on 'customary knowledge' and sustainable development principles

Human ecology

The Hunstein is barely affected by human activities. For many generations the nomadic Nigiru and Kagiru communities have routinely roamed the range as part of a mainly hunter-gatherer livelihood emphasizing the pursuit of dietary protein from wild boar *Sus scrofa*, tree wallabies and birds; and carbohydrate from tree products: principally sago palm, *Metraxolon sagu*. Some shifting cultivation of fruit and vegetables, particularly in recent decades, is also practiced.

By the 1970's the Nigiru were nearly annihilated by the cumulative effects of epidemics and warfare. Remaining members have gradually settled at Wagu, the main village at the northern base of the range, and to a lesser extent at Gahom in the upper Salumei. The predominate Kagiru now reside in small riverine villages of the upper April River and Sitipa tributary. Their principal village, also known as Kagiru, was moved in 1996 to the opposite bank of the upper April River, reportedly because many residents had recently and inexplicably died at the former site.

The Kagiru and Pukapuki tribal communities are the traditional landowners of Mt. Samsai. The summit area is said to be inhabited by a giant centipede that devours anyone who approaches its lair. Water holes along the crest of the summit purportedly contain colourful fish with magical powers. Insofar as known, the Samsai summit has never been reached, either by the local populace or outsiders.

New Tribes Mission (NTM) maintains a base and airstrip at Maripa, which nearly adjoins the present location of Pukapuki village. The mission is studying the language and culture of the Pukapuki people, and plans increased community development assistance and translation of the Bible (Dave Wall, NTM, pers. comm.).

PROJECT BACKGROUND

A preliminary scientific survey of Lepidoptera populations in the Mt. Samsai area was carried out 21-29 March 1998 and sponsored by the Association for Tropical Lepidoptera and Expedition Travel, Inc. Discussions with village residents, habitat assessment and sampling of Lepidoptera demonstrated the eminent feasibility of conducting more comprehensive fieldwork. The survey was part of a recce in keeping with National Research Institute (NRI) and Department of Environment and Conservation (DEC) guidelines that prior permission for research activities must be granted by local communities.

Results of the 1998 expedition were reported (Cox 1999) and used to develop a community-interactive research project proposal with Prof. Thomas C. Emmel of the University of Florida's Division of Lepidoptera Research, in collaboration

Fig. 3 View from Taiyam Keel camp.

Fig. 4. Dense forest above Gahom Camp on Samsai keel at *c*. 1060 m.

with The National Research Institute (NRI), Department of Environment and Conservation (DEC) and Professor Lance Hill of the Zoology Department, University of Papua New Guinea. UPNG agreed to act as the in-country research institution affiliate.

The project proposal was submitted to NRI and DEC in March 2000. Additional data and interpretation on the 1998 collection was requested by DEC and provided as a comprehensive report (Cox and Emmel 2001) in September 2001. Following further administrative processing, final approvals and research visa authorizations were received in September 2003.

Natural History Limited of Television New Zealand (TVNZ) contributed to the costs of project development and Phase 1 activities. TVNZ remains involved as a collaborator in both phases. The majority of funds and equipment required for Phase 1 were provided by private donations after WWF-SCLC reneged on its full funding agreement. Subsequent to 2000, the McGuire Center for Lepidoptera and Biodiversity at the Florida Museum of Natural History, University of Florida, U.S.A., was established and replaced the former UF Division of Lepidoptera Research as a research sponsor and partner in the Hunstein project.

RESEARCH OBJECTIVES

Project objectives and activities today are virtually unchanged from those in the original proposal in 1998:

1. Assemble a representative collection of butterfly and moth species from the various habitats of Mt. Samsai and peripheral areas to better understand the distribution, status and taxonomy of Lepidoptera populations.
2. Gain insight into the ecology of Lepidoptera populations in the Hunstein Range, and the implications and opportunities for habitat conservation.
3. Identify Lepidoptera forms that are endemic, rare or extralimitally distributed in the Hunstein Range; highlight these as 'flagship species' to illustrate the uniqueness of area biodiversity and to enhance conservation appeal.
4. Contribute to ornithological knowledge of the Hunstein Range by complementary observations made in the course of fieldwork.
5. Involve local communities in all stages of planning, organization and conduct of research at the field level, emphasizing substantial remuneration for services rendered, and evincing optimal support for the conservation and community welfare objectives of the research.
6. On behalf of Natural History New Zealand, Ltd., assess the suitability of producing a documentary film on the extraordinary faunal, floral and socio-cultural attributes of the Hunstein Range.
7. Seek to collaborate with successor components of the WWF-SCLC project to achieve enduring, community-driven conservation of the Hunstein Range.

Phase 1 of the current project was conducted 9-22 October 2003. A 12 day expedition focused on the Taiyam keel (west slope) approach to Mt. Samsai from Kagiru village, Nikisak River. A total of 1,000 butterflies and day-flying moths were captured 10-21 October 2003. Although beset by unseasonably wet weather, investigations reached 1110 m. The collection has been collated and most taxa tentatively identified (Tables 1, 2, and 3). McGuire Center associates at the University of Florida are at present spreading, cataloguing and further analyzing the collection. A detailed list of GPS coordinates for important landmarks on the October 2003 Mt. Samsai Expedition is included (Table 4). Details of Phase 1 results are reported herein.

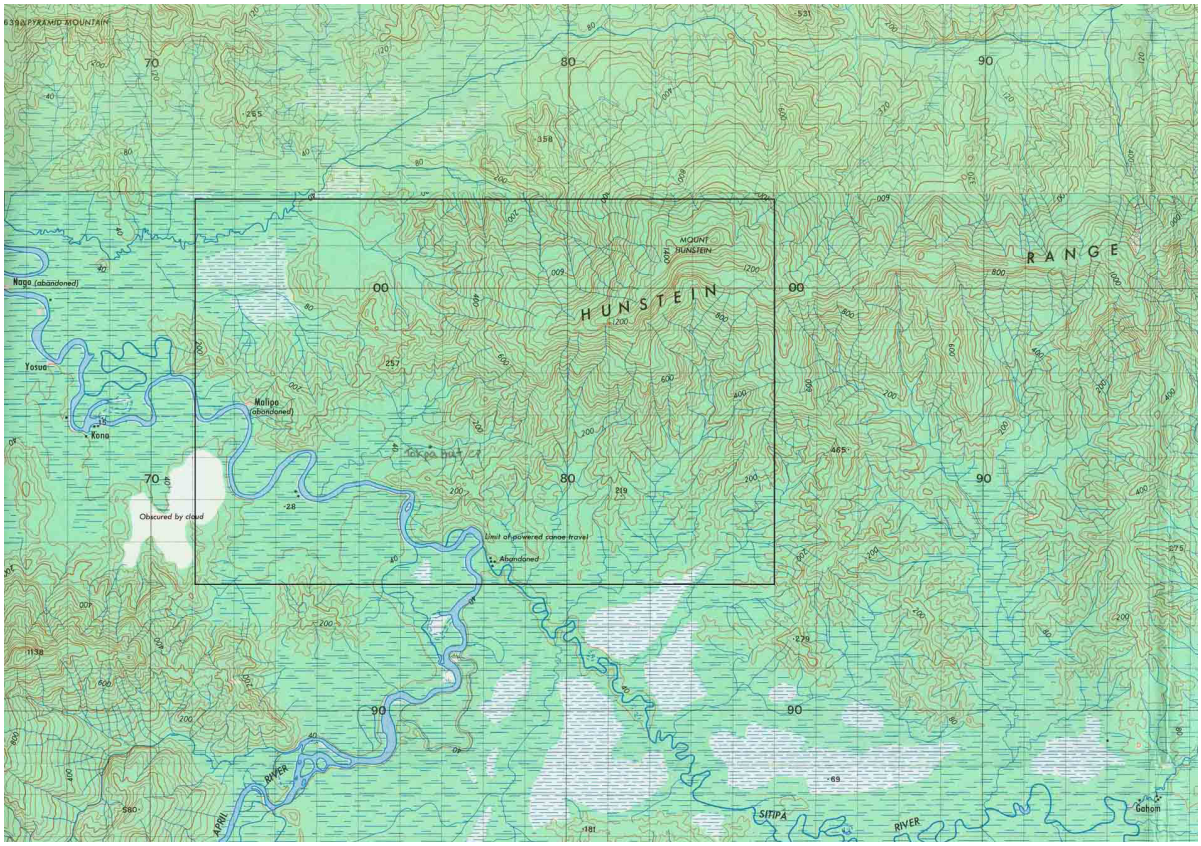

Fig. 5. Hunstein Range (Central and western areas) and the upper Nikisak (April) River.

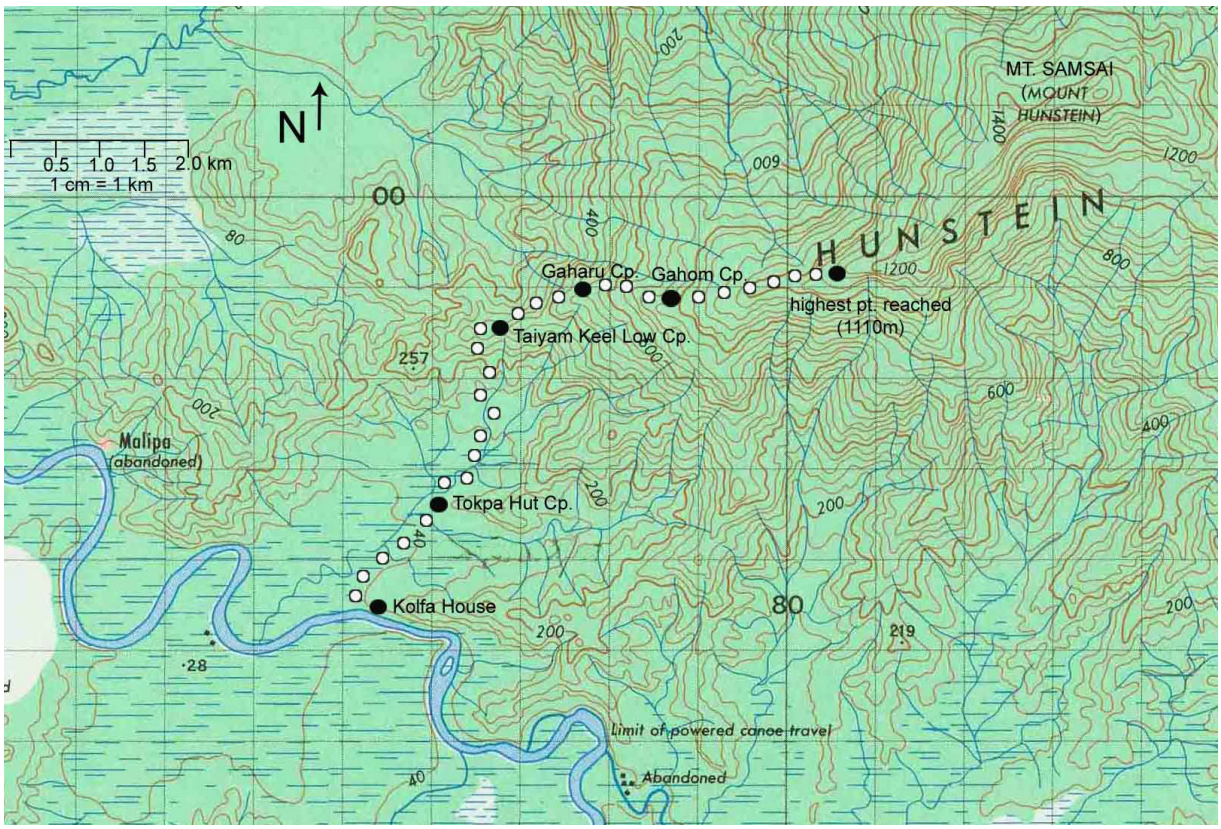

Fig. 6. Western slopes of Mt. Samsai and Phase 1 expedition landmarks.

MATERIALS AND METHODS

Collaboration with local communities

A community-interactive approach is central to project design and implementation. Members of the customary landowner community, usually men with extensive knowledge of local habitat and wildlife, are the primary samplers of local Lepidoptera.

Surveys are designed to generate a suite of mutual benefits for all cooperating parties. Local field assistants perform key roles as collectors, guides, trail cutters, carriers and camp organizers. They are remunerated fairly for their services and are fully involved in all stages of planning, organization and conduct of research. The knowledge and ideas of local participants also help develop and garner support for project-related initiatives to conserve the unique biodiversity of the Hunstein Range (Cox and Emmel 2005).

The methods for incorporating local knowledge and participation follow Participatory Rural Appraisal (PRA) as described by Chambers (1992) and Grant (1996). In villages and wetlands of the adjoining middle and upper Sepik, a PRA-based sustainable utilization strategy has facilitated holistic management of the crocodile resource (Cox 2002, 2005).

Lepidoptera Survey

Lepidoptera were captured by standard netting techniques. Poles for most nets were fashioned from sapling stems or tree branches. Most pole rings were made in the field from rattan cane. Construction of a trap to collect canopy-flying species (see Sourakov and Emmel 1995) was attempted, but the lack of a sturdy lightweight base rendered the structure ungainly and unable to be effectively deployed.

Local participants sampled some high-flying species by luring individuals down to a platform constructed of sticks or *limbum* (black palm bark) and smeared in places with participant feces. This bait was particularly effective for netting *Delias* individuals. Rotting fruit and participant urine were tried at several camps but attracted very few butterflies.

Captured butterflies and moths were pinched and placed in standard wax-coated stamp envelopes. These were labeled by JC, usually at the end of each field day, with collector, date and locality data. The collection was sorted into families and the approximate number of individuals in each family recorded for export permit application purposes. Subsequently in the USA, specimens were identified and numbered in taxonomic order following Parsons (2000).

RESULTS AND DISCUSSION

The Lepidoptera fauna

Exactly 1000 specimens of butterflies and day-flying moths were assembled in 12 days of collecting from Kagiru village (38 m) to *c*. 1110 m on the northwest crest (Taiyam Keel) of Mt. Samsai, and while backtracking to Kagiru. Tables 2, 3, and 4 list tentative identification of specimens, series number and related collecting data (date, site, altitude, collector, remarks on status and distribution). Local assistants collected 92.5 % (n=925) of all specimens. Specimen condition is generally good, but inadequacies in field handling have resulted in a higher than normal incidence of broken antennae and malfixed legs.

Weather often curtailed collecting activities. October is usually the start of the wet season in the middle Sepik region, but the pattern of many days of near total overcast and rainy nights was unusual for that time of year. Immediately preceding the expedition was a much clearer end to the dry season. On most days of the expedition, sunlight and associated flying and capture of butterflies were limited to 1-2 hours.

Butterflies were generally uncommon in the dense forest understorey. In montane habitats, most collecting was done at tree falls along *keell* (crest) paths and at several points along the Wasiafa baret (creek). At the floodplain forest base of Mt. Samsai, butterflies were found distributed mostly along the Tokpa and Kolfa stream courses.

A total of 917 specimens (91.7%) in the October 2003 collection have been provisionally identified to the subspecies level. These specimens comprise the five Rhopalocera families distributed in New Guinea and at least 111 taxa, with some still indeterminable and requiring comparative study with other collections. Most unidentified specimens (n=37; 4.03%) are colorful day-flying moths and hesperiids.

By far the largest representation among families is the Nymphalidae (57.8% of all identified specimens of 60 taxa), which mainly reflects recent systematic revisions placing the Satyridae, Danaidae, and Amathusidae under the Nymphalidae. The Papilionidae (98 specimens of 12 taxa), Pieridae (128 specimens of 16 taxa), and Lycaenidae (113 specimens of 23 taxa) are fairly evenly represented in the collection, but the Hesperiidae skippers are nearly absent (only 5 specimens, all unidentifiable), due in part to native collector avoidance of moth-like Lepidoptera during diurnal collecting.

Analysis of species distribution is also influenced by sampling effort at various altitudes, usually correlating with weather. For forms with ≥4 specimens, a category of altitudinal distribution was assigned: even, broad, or most at a specific section of range (*i*. *e*., low, low-medium, medium-high or high) (Figure 7). Where specimen sets of ≥ 4 were obtained exclusively from the Tokpa or Kolfa tributaries (at the Hunstein base), these forms are categorized as 'lowland only?' pending further sampling at montane elevations. The 1998 sample is excluded in the distributional analysis because altitudes of specimens were unable to be estimated with similar accuracy. This was due to an inferior GPS model and poorly known capture sites.

With additional material from all altitudinal zones of the Mt. Samsai area, and larger series of individual forms, analyses should reveal a more distinct distribution pattern and assist taxonomic aspects, including the determination of any new forms.

Photographic plates have been prepared of unusual butterflies in the 2003 expedition sample (Figures 8, 9). These comprise specimens representing aberrant morphological characters, extensions of known range, range-restricted distribution, and rare or uncommon abundance status.

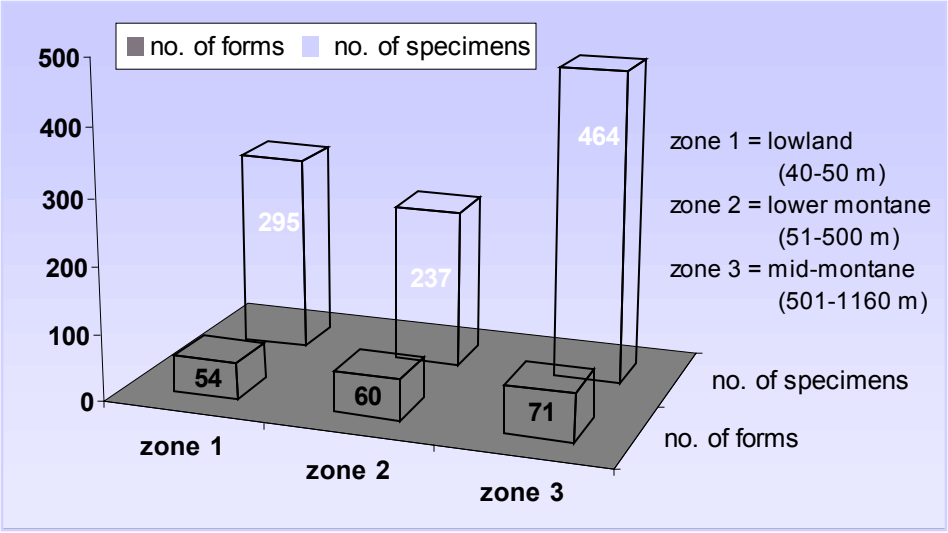

Fig. 7. Analysis of butterfly taxa and collecting effort by altitudinal zone.

Unusual Taxa

The most interesting taxa or variants and their unusual characteristics are listed below. Distributional data in PNG refer to Parsons (2000) unless otherwise noted.

- ***Delias gabia zarate*** (Grose-Smith 1900): apical spotting on the ventral forewing.
- ***Delias ornytion*** (Godman and Salvin, 1880): all specimens (n=13) lack the ventral hindwing red line; one specimen captured at the unusually low altitude of 345 m.
- ***Praetaxila tyrannus polyphemus*** (Toxopeus, 1944): 2 ♂♂, 4 ♀♀; rare; only 1 specimen of the ♂ is known from PNG.
- ***Praetaxila* nr. *satraps satraps*** (Grose-Smith, 1894): 2 ♂♂, 3 ♀♀. Female markings different than Parsons (2000) plate. No plate for ♂, one of which was captured at highest altitude of all specimens: 1085 m.
- ***Danis danis apollonius*** (C. & R. Felder, 1865): 12♂♂, at 375-910 m all are well above the previous maximum known altitude of 200m.
- ***Danis melimnos*** ssp. nov. (sensu Parsons, 2000): 3 ♀♀, 1 ♂. Endemic to PNG and Papua province, Indonesia. In PNG, known only from a small series collected near Kiunga, Western Province.
- ***Sahulana scintillata*** (Lucas, 1889): ♀?; ♀ unknown from PNG.
- ***Callictita upola*** Parsons & Hirowatari, 1988: endemic to Papua province (formerly Irian Jaya), Indonesia.
- ***Tellervo nedusia nedusia*** (Geyer, 1832): very short forewing under streak.
- ***Morphopsis biakensis*** Joicey & Talbot, 1916: crepuscular; few PNG specimens.
- ***Taenaris dina dina*** Staudinger, 1894: rare and local; 2 specimens from 760 m are new maximum altitude and new locality records.
- ***Mycalesis drusillodes*** (Oberthür, 1894): 6 ♂♂, 1 ♀; rare: eastward range extension.
- ***Elymnias paradoxa*** Staudinger, 1894: rare; far westward range extension.
- ***Lexias* nr. *aeropa eutychius*** (Frustorfer, 1913): different ventral hindwing pattern.
- ***Mynes anemone*** Vane-Wright, 1976: 2 ♂♂; endemic to East Sepik Province. 825 m is a new maximum altitude record; very few specimens known.
- ***Yoma algina netonia*** Fruhstorfer, 1912: only recorded in northern PNG from Kairiru Island (off the coast at Wewak); considerable range extension.

The table of GPS points obtained during the October 2003 expedition (Table 4) can be used to discern geographic coordinates of individual specimens. Each camp and prominent waypoint (often a vegetation break that provided a strong coordinate fix and best collecting results) is either recorded or referred to in the list of individual specimens (Tables 1, 2, 3). This allows the site of any specimen to be determined to ≤ 100 m, and for most to ≤ 30 m.

Larger series of specimens are needed to make and verify identifications of many taxa, especially those which are possibly new, rare, or taxonomically difficult, and to study morphological variation within taxa. In addition, preserved testes and leg materials are needed for cytological (chromosomal) and DNA analyses to verify identifications and discern taxonomic relationships.

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Arun Manandhar provided meticulous help with data analyses. Andrei Sourakov (McGuire Center) prepared the

0185.03 *Delias gabia zarate* male

0187.03 *Delias ornytion*

0230.03 *Praetaxila tyrannus male*

0231.03 *Praetaxila tyrannus* male

0235.03 *Praetaxila tyrannus female*

0237.03 *Praetaxila satraps satraps* male

0240.03 *Praetaxila satraps satraps* female

0269.03 *Danis danis apollonius male*

0270.03 *Danis danis apollonius male*

0297.03 *Danis melimnos* female

0347.03 Callictita upola

0376.03 *Tellervo nadusia nadusia*

Fig. 8. Unusual butterflies collected on Mt. Samsai, Hunstein Range, 10-12 October 2003.

0498.03 *Morphopsis biakensis*

0599.03 *Taenaris dina dina*

0686.03 *Mycalesis drusillodes* male

0687.03 *Mycalesis drusillodes* female

0738.03 *Elymnias paradoxa*

0805.03 *Mynes anemone* male

0817.03 *Yoma algina netonia*

0871.03 Lexias nr. *aeropa eutychius*

Fig. 9. Additional unusual butterfly taxa collected on Mt. Samsai, Hunstein Range, 10-12 October 2003.

photographic images of Lepidoptera specimens figured in this report. Christian Salcedo assisted greatly with the preparation, further identification and cataloguing of specimens. Arun Manandhar, Amrit Bajracharya, and Mongkon Ohh Jantawan formatted most of the charts and enhanced many of the figures. Bruce Beehler kindly approved use of Dale Zimmermann's plate of the Vulturine Parrot from 'Birds of New Guinea'.

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APPENDIX: BUTTERFLY SPECIES COLLECTED DURING THE SURVEY

Table. 1. Papilionidae and Pieridae collected in the Hunstein Range, PNG, October 2003.

Identified Lepidoptera Taxa and Distribution Data, October 2003 Mt. Samsai Expedition			
Complete Scientific Name	No. of specimens	Altitudinal Range (m)	Distribution & other remarks
Papilionidae Swallowtails			
Atrophaneura polydorus ssp. (Linnaeus, 1763)	7	735-770	narrow altitudinal zone?
Ornithoptera priamus poseidon (Doubleday, 1847)	4	60-765	broadly distributed
Graphium agamemnon ligatum (Rothschild, 1895)	6	40-735	broadly distributed
Grapium wallacei wallacei (Hewitson, 1858)	1	50	locally uncommon?
Graphium thule (Wallace, 1865)	3	345-620	
Graphium sarpedon choredon (C. and R. Felder, 1864)	10	45-350	most specimens at 45-50 m
Graphium aristeus parmatum (Gray, 1852)	5	40-50	lowland only?
Graphium eurypylus lycaenoides (Rothschild, 1895)	41	50-500	most specimens at low end of range
Papilio aegeus ormenus (Guerin-Meneville, 1831)	5	80-725	most specimens at high end of range
Papilio ambrax ambrax f. *ambracia*	6	50-600	broadly distributed?
Papilio ulysses autolycus (C. and R. Felder, 1864)	1	500	regularly seen; difficult to capture
Papilio euchenor euchenor (Guerin and Meneville, 1830)	10	50-700	broadly distributed?
Pieridae Whites			
Catopsilia pomona f. *crocale* (Fabricius, 1775)	7	50	lowland only?
Eurema hecabe oeta (Fruhstorfer, 1910)	18	40-735	most specimens at low end of range
Eurema (*blanda sahara*?) (Fruhstorfer, 1912)	1	50	identification tentative
Eurema puella diotima (Fruhstorfer, 1910)	23	40-775	broadly distributed
Gandaca butyrosa aiguina (Frustorfer, 1910)	8	50-635	most specimens at low end of range
Elodina nr. *hypatia* C. & R. Felder, 1865	12	500-775	most specimens at high end of range
Salatera cycinnia corinna (Wallace, 1867)	1	50	
Appias celestina galerus (Fruhstorfer, 1910)	6	45-700	at known maximum altitude
Appias ada thasia (Fruhstorfer, 1902)	6	50-780	all ♂♂; broadly distributed?
Cepora abnormis f. *euryxantha* (Wallace, 1867)	1	750	♂; New Guinea mainland endemic
Cepora abnormis f. *abnormis* (Wallace, 1867)	2	360-735	sex?; New Guinea mainland endemic
Delias mysis lara (Boisduval, 1836)	1	425	locally uncommon?
Delias gabia zarate (Grose-Smith 1900)	1	725	♂; FW und apical spotting
Delias ennia xelianthe (Grose-Smith, 1900)	1	735	♂; yellow is pale and reduced
Delias ornytion (Godman and Salvin, 1880)	13	345-760	lacks HW und red line; montane only?
Delias discus apodiscus (Roepke, 1955)	27	360-760	only 1 spec. not at high end of range

Table 2 (part 1). Nymphalidae collected in the Hunstein Range, PNG, October 2003.

Identified Lepidoptera Taxa and Distribution Data, October 2003 Mt. Samsai Expedition			
Complete Scientific Name	No. of specimens	Altitudinal Range (m)	Remarks
Nymphalidae			
Tellervo nedusia nedusia (Geyer, 1832) ?	25	600-1,060	high alt;1 w/ very short FW und streak
Tellervo assarica hiempsal Fruhstorfer 1910	89	50-1,100	most specimens at high end of range
Parantica melusine (Grose-Smith, 1984)	7	525-1,035	montane/upper montane only?
Euploea leucostictus f. *nemertes* Hubner, 1806	1	735	
Euploea leucostictus f. *swierstrae* Snelley, 1891	1	500	
Euploea algea race: *tenebrosa* (Grose-Smith, 1894)	1	45	
Euploea netsheri erana Fruhstorfer, 1910	10	50-775	most specimens at high end of range
Euploea alcathoe coffea Fruhstorfer, 1910	1	1,010	
Euploea wallacei melia Fruhstorfer, 1904	6	335-950	most specimens at high end of range
Euploea nr. *wallacei melia* Fruhstorfer, 1904	2	110-760	1 w/ very faint HW spots; 1 without spots
Morphopsis biakensis Joicey & Talbot, 1916	4	740-810	crepuscular; few PNG specimens
Hyantis hodeva hageni Röber, 1903	15	50-880	most specs at medium-high end of range
Taenaris catops westwoodi Staudinger, 1893	44	50-1,065	most specs at medium-high end of range
Taenaris nr. *catops westwoodi* Staudinger, 1893	14	50-970	FW upp veins faint or absent; most med-high
Taenaris bioculatus charon Staudinger, 1887	9	345-910	most specimens at low end of range
Taenaris dina dina Staudinger, 1894	3	735-760	new maximum altitude; rare and local
Taenaris myops wahnesi Heller, 1894	12	345-910	montane; broadly distributed?
Taenaris nr. *myops wahnesi* Heller, 1894	4	340-540	
Taenaris cyclops cyclops Staudinger, 1893	13	350-910	12 w/ 1 HW only und eyespot
Taenaris nr. *cyclops cyclops* Staudinger, 1893	1	350	wing edge straight; 1eyespot
Taenaris nr. *cyclops cyclops* Staudinger, 1893	1	345	extensive dark margins; 2 eyespots
Taenaris chionides chionides Godman and Salvin, 1880	1	750	
Taenaris dimona areia Fruhstorfer, 1904	3	550-770	
Mycalesis duponcelli eminens Staudinger, 1893	12	80-700	broadly distributed?
Mycalesis mucia mucia Hewitson, 1862	14	40-725	broadly distributed
Mycalesis phidon phidonides Fruhstorfer, 1908	5	40-500	most specimens at low end of range
Mycalesis elia elia Grose-Smith, 1894	12	370-770	most specs at low-medium end of range
Mycalesis drusillodes (Oberthür, 1894)	7	735-965	6♂♂ 1♀; rare; E-ward range extension
Mycalesis cacodaemon cacodaemon Kirsch, 1877	12	150-775	most specs at medium-high end of range
Mycalesis comes Grose-Smith, 1894	2	150-700	
Mycalesis nr. *comes* Grose-Smith, 1894	2	550-770	♀♀ ?

Table 2 (part 2). Nymphalidae (continued) collected in the Hunstein Range, PNG, October 2003.

Identified Lepidoptera Taxa and Distribution Data, October 2003 Mt. Samsai Expedition			
Complete Scientific Name	No. of specimens	Altitudinal Range (m)	Remarks
Nymphalidae (continued)			
Mycalesis fulvianetta fulvianetta Rothschild, 1916	3	80-700	FW upp med eyespot ½ enclosed
Lamprolenis nitida Godman & Salvin, 1880	15	535-900	most specimens at high end of range
Hypocysta isis pelagia Fruhstorfer, 1911	10	340-750	most specimens at low end of range
Hypocysta hygea noctula Fruhstorfer, 1911	4	500-770	
Mycalesis nr. *aleria (helena)* stat. nov.	2	735	1 with wide white band; 1 with narrower
Elymnias paradoxa Staudinger, 1894	1	345	rare; far W-ward range extension
Charaxes latona cimonides (Grose-Smith, 1894)	1	50	
Polyura jupiter jupiter (Butler, 1869)	1	50	
Prothoe australis hewitsoni (Wallace, 1869)	12	45-795	light & dark forms; evenly distributed
Cyrestis acilia acilia (Godart, 1819)	17	50-950	mostly montane & evenly distributed
Lexias aeropa eutychius (Frustorfer, 1913)	4	80-725	most specimens at high end of range
Lexias nr. *aeropa eutychius* f.? (Frustorfer, 1913)	8	45-1,010	most specimens at high end of range
Parthenos aspila aspila Honrath, 1888	10	45-700	most specimens at high end of range
Pantoporia venila anceps (Grose-Smith, 1894)	2	80-500	
Neptis praslini maionia Fruhstorfer, 1908	4	40-710	no plate in Parsons (2000)
Neptis satina Grose-Smith, 1894	2	50-80	
Phaedyma shepardi damia Fruhstorfer, 1905	4	40-370	most specimens at low end of range
Mynes geoffroyi f. *doryca* (Guérin-Méneville, 1831)	1	735	
Mynes anemone Vane-Wright, 1976	2	770-825	♂; ESP endemic, new max. alt., few specs
Hypolimnas alimena eremita (f. *alimena*?) Butler, 1883	10	40-50	4 ♀♀; f. *alimena*? 6♂♂ f. ?; lowland
Yoma algina netonia Fruhstofer, 1912	1	50	big range extn; prev only Kariru in N PNG?
Cethosia cydippe damasippe C. R. Felder, 1867	16	40-745	evenly distributed
Vindula arsinoe ada (M. R. Butler, 1874)	4	80-500	most specimens at low end of range
Terinos tethys udaios (Fruhstorfer, 1906)	38	80-950	most specimens at high end of range
Cirrochroa regina myra (Fruhstorfer, 1907)	10	40-775	broadly distributed
Vagrans egista propinqua (Miskin, 1884)	3	50-735	
Phalanta alcippe cervina (Butler, 1876)	28	40-835	most specimens at high end of range
Cupha prosope turneri (Butler, 1876)	34	40-820	broadly distributed

Table 3. Lycaenidae collected in the Hunstein Range, PNG, October 2003.

Identified Lepidoptera Taxa and Distribution Data, October 2003 Mt. Samsai Expedition			
Complete Scientific Name	No. of specimens	Altitudinal Range (m)	Remarks
Lycaenidae Blues			
Dicallaneura decorata ostrina (Grose-Smith, 1894)	1	770	♀
Praetaxila nr. *satraps satraps* (Grose-Smith, 1894)	5	345-1,080	♂♂ and ♀♀
Praetaxila tyrannus polyphemus (Toxopeus, 1944)	6	310-790	♂♂ and ♀♀; rare, only 1 PNG spec.
Hypochrysops chrysargyrus Grose-Smith, 1895	1	620	
Arhopala meander Boisduval, 1832	1	50	
Arhopala thamyrus phryxus Boisduval 1832	5	45-80	lowland only?
Hypolycaena phorbas silo Fruhstorfer, 1912	3	50	
Deudorix sp. *epijarbas* group	1	575	
Deudorix littoralis (*epijarbas group*) Joicey & Talbot, 1916	1	650?	elevation not on envelope; estimated
Anthene seltuttus seltuttus (Rober, 1886)	6	40	lowland only?
Nacaduba kurava cyaneira Fruhstorfer, 1916	4	500-850	montane only?
Danis danis apollonius (C. & R. Felder, 1865)	26	40-910	many >prev. max alt (200 m); 25♂ 1♀
Danis melimnos ssp. *nov*. (sensu Parsons, 2000)	4	80-770	3♀♀ 1♂; known only from Kiunga
Perpheres perpheres peri (Grose-Smith, 1894) ?	19	40-775	♀♀ & ♂♂: most at high end of range
Psychonotis caelius plotinus (Grose-Smith & Kirby, 1896)	2	50	
Sahulana scintillata (Lucas, 1889)	1	40	♀?; (♀ unknown from PNG)
Jamides aetherialis caerulina (Mathew, 1887)	9	40-200	7-8 ♂♂; 1♀; most at low end of range
Jamides allectus allectus (Grose-Smith, 1894) stat. rev.	2	350-780	
Jamides reverdini (Fruhstorfer, 1915)	2	450-760	1♀ 1♂
Jamides coritus pseudechylus (Strand, 1911)	11	40-500	only 1 spec. not at high end of range
Epimastidia inops pilumna (Druce, 1894)	1	50	
Callictita upola ?	1	500	known only from Papua, Indonesia
Udara rona rona (Grose-Smith, 1894)	1	500	

Table 4. List of collecting localities for the expedition.

GPS Coordinates for Important Landmarks, October 2003 Mt. Samsai Expedition							
Date	**Time**	**Way Point**	**Coordinate**	**Elev. (m)**	**Remarks**	**Route (km)**	**Sub-totals**
09. 10. 03	10h19	AMILOJ	4º 13.133' S 142º 49.388' E	23	Ambunti Lodge; Ambunti, East Sepik	n/a	n/a
09. 10. 03	21h43	KAGIRU	4º 28.139' S 142º 29.006' E	38	Kagiru village, Niksak River, E. S. P.	n/a	n/a
10. 10. 03	11h08	BKABKI	4º 32.414' S 142º 31.074' E	43	Pukapuki village, Niksak; end of airstrip	n/a	n/a
10. 10. 03	13h49	KOLFA	4º 33.677' S 142º 34.886' E	47	Kavia's house, Kolfa/Niksak confluence	0.00	0.00
10. 10. 03	18h43	TOKPA	4º 33.090' S 142º 35.208' E	54	CP/house at trail jct. with Tokpa tributary	1.24	1.24
11. 10. 03	18h59	HPT 2	4º 32.093' S 142º 35.546' E	N/A	trail on spur, Tokpa headwaters to keel	1.95	3.19
11. 10. 03	19h31	HCP 1	4º 32.066' S 142º 35.549' E	349	Taiyam Keel Low Camp, Mt. Samsai	0.08	3.27
13. 10. 03	14h00	HPT 3	4º 32.058' S 142º 35.523' E	335	saddle junction of spur and keel trails	0.05	3.32
13. 10. 03	17h39	HCP 2	4º 31.848' S 142º 36.074' E	499	'Gaharu Camp', Taiyam Keel, Samsai	1.05	4.37
15. 10. 03	13h35	HPT 4	4º 31.854' S 142º 36.408' E	654	along trail, Gaharu Camp - Gahom Camp	0.62	4.99
15. 10. 03	15h14	HPT 5	4º 31.852' S 142º 36.495' E	736	lookout off keel trail below Gahom Camp	0.16	5.15
15. 10. 03	16h09	HPT 6	4º 31.895' S 142º 36.634' E	784	excursion end pt., *c*. 10 m from HCP 3	0.27	5.42
16. 10. 03	18h33	HCP 3	4º 31.896' S 142º 36.633' E	771	'Gahom Camp', Samsai Keel, Samsai	0.01	5.43
17. 10. 03	12h18	HPT 7	4º 31.920' S 142º 36.773' E	820	cut flyway, keel above 'Gahom Camp'	0.26	5.69
17. 10. 03	13h44	HPT 8	4º 31.908' S 142º 36.983' E	932	small treefall along Samsai keel trail	0.39	6.08
17. 10. 03	14h54	HPT 9	4º 31.888' S 142º 37.040' E	958	small treefall, steep keel in dense forest	0.11	6.19
17. 10. 03	15h24	HPT 10	4º 31.864' S 142º 37.149' E	1005	flatland suitable for a camp/lodge site	0.21	6.40
19. 10. 03	12h35	HPT 11	4º 31.802' S 142º 37.199' E	1034	treefall open space, Samsai keel	0.15	6.55
19. 10. 03	13h12	HPT 12	4º 31.758' S 142º 37.338' E	1062	*c*. knoll, Samsai keel before saddle	0.27	6.82
19. 10. 03	14h45	HPT 13	4º 31.746' S 142º 37.635' E	1110	highest point reached on Samsai keel	0.55	7.37
21. 10. 03	13h19	MARIPA	4º 32.210' S 142º 30.762' E	90	New Tribes Mission; D. Wall residence	n/a	n/a