

Inventorying Lepidoptera (Insecta) in the Páramo of Colombia – first results

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Abstract The Lepidoptera taxocenoses excluding butterflies of two Páramo localities near Bogotá were studied using light traps and day samplings. The spectrum of families, encountered in November 2016, is presented with some notes on the faunal composition.

Key words: Microlepidoptera, Pyraloidea, Macrolepidoptera, family spectrum, taxonomy, light trap, Páramo biome, Bogotá, Choachí

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Introduction

The high altitude Páramo is one of the most unusual zones in Colombia. It has a special vegetation type rich in young endemic species that contributes considerably to the richness and wealth of Colombia's biodiversity (MANDRIÑÁN & al. 2013). Knowledge of indigenous groups of Lepidoptera (except butterflies) and other insects from the Páramo at species level is very poor with only isolated information widely scattered in the taxonomic literature. Biological or ecological data are best available at family level (cf. BONILLA-GÓMEZ 2005, GUHL-NIMITZ 2015). In 2016 a joint Colombian/German project was initiated. The project aims at providing new data and new insights into the insect fauna of the Páramo, with a special focus on aquatic groups. The main objectives of the project are the provision of inventories of non-biting midges (Diptera: Chironomidae), caddisflies (Trichoptera) and aquatic moths (Lepidoptera: Acentropinae) of Páramo streams.

The study concentrates above all on collecting the adult stages. The principal collecting methods for adults are using hand nets during the day and light traps at night. Light trap samples are usually dominated by Lepidoptera. Since terrestrial Lepidoptera also belong to the nearly unexplored groups, the obtained material was not discarded but preserved and prepared in the proper/usual way of handling moths (pinned or micro-pinned, set, etc.).

The identification of Trichoptera and Diptera species is a time consuming process. The application of the morphospecies concept does not offer much advantage in terms of a quicker determination. However, it is easily applicable to pinned Lepidoptera, and therefore, we have used this concept and sorted the Lepidoptera material to families. Eventually, the complete spectrum of resident Lepidoptera families was gathered and, thus, became available for Páramo localities for the first time. The present article provides this information and represents the first results of the project.

Methods and research localities

The Cordillera Oriental east of Bogotá has several areas above 3000 m with unspoiled Páramo vegetation. The Matarredonda Ecological Park and the La Laja Nature Reserve were selected as research localities (Figs 1 – 2). Both sites are separated by the deep intramontane valley of the upper course of Rio Guayuriba (= Rio Negro/Blanco as locally used names) with the small town of Choachí nearby. Collecting at night was conducted by using a battery (12 V) operated light tower from the F. WEBER company, Stuttgart,

equipped with two 15 W superactinic light tubes. All arriving Lepidoptera specimens were collected. Two night samples were summarized with the day catches obtained during three consecutive days at each locality.



Fig. 1: View over the plateau of La Laja Páramo (3500 m) with several species of *Espeletia*

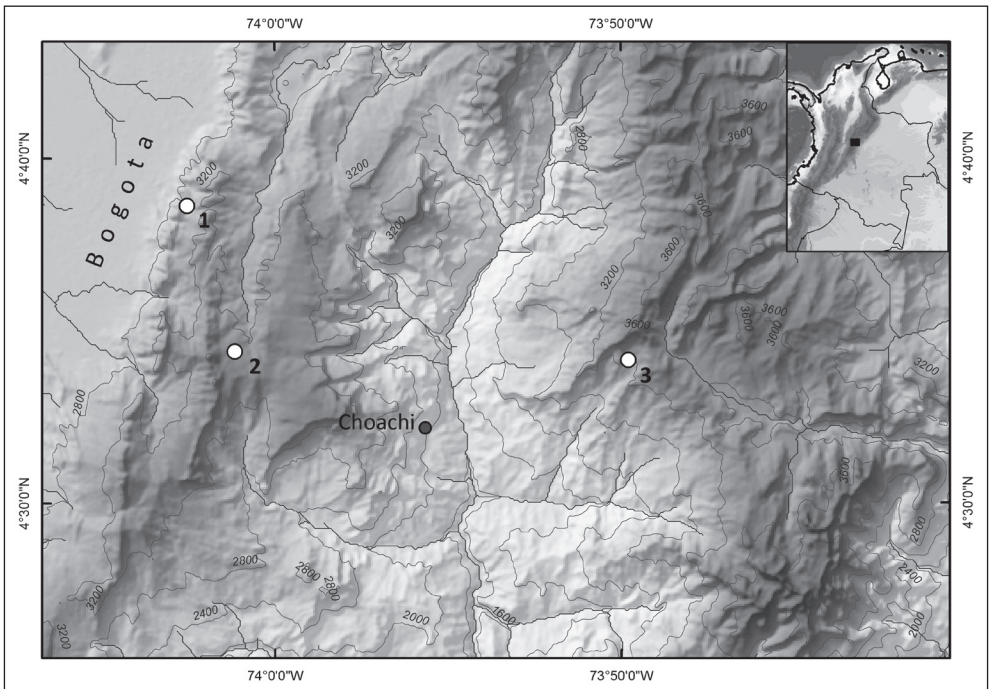


Fig. 2: Topographic map of the Cordillera Oriental east of Bogotá with indication of research localities (1 – Quebrada La Vieja, 2 – Parco Ecologico de Marredonda, 3 – Reserva Natural La Laja)

Results and discussion

In November 2016 the first collecting campaign was conducted by spending 3 days on each site. Table 1 provides a synopsis of the collected Microlepidoptera, Pyraloidea and Macroheterocera. Though collecting in the harsh environment of the Páramo is a special challenge and samples usually remain small, the number of recorded species was unexpectedly high, which seems to reflect the remarkable plant diversity of the Páramo biome. The majority of Microlepidoptera species appear to be undescribed and probably represent endemics of the Colombian Páramo. The study of the obtained material revealed the following interesting features:

1. Lepidoptera specimens keep on flying to the lights during the gradually declining temperature, and even below 8 °C, flight activities do not cease. At the lowest temperatures, mostly species of Noctuidae and Geometridae arrive at the lights, whereas Microlepidoptera species dominate the first hour of the evening/night.
2. In Microlepidoptera, the family Tortricidae and families of the Yponomeutoidea contributed the highest numbers of species and individuals to the total sample. The remaining groups are represented by a few specimens only, and the number of involved families is low.
3. In Pyraloidea about half of all species are from Pyraustinae/Spilomeninae.
4. In Macroheterocera, the families Geometridae and Noctuidae make up the majority of specimens in all night samples. Both families seem to be unexpectedly species-rich and diverse in the Páramo.
5. In general, the composition of Páramo light trap samples is similar to samples obtained from higher elevations in the mountains of the Palearctic or Nearctic regions.
6. In November, the abundance of day active micromoths was rather low and the obtained samples were even more poor than light trap samples.
7. There are no identification guides for Lepidoptera others than butterflies, which are applicable to the fauna of Colombia or South America. Without consulting specialists and research stays in the major Lepidoptera collections of the Smithsonian Institution, Washington and the Natural History Museum, London, a correct identification of these insects is nearly impossible. However, all species described from Colombia are included in Neotropical checklists of Microlepidoptera, Pyraloidea and some macroheteroceran families edited by HEPPNER (1984, 1995, 1996).

The amount of the hitherto amassed material is certainly still too low for doing comparisons among Páramo sites. Repeated sampling in the same localities distributed over the year is a necessary step to achieve a better knowledge and understanding of the autochthonous Lepidoptera fauna in the Páramo of Colombia.

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Table 1: Family spectrum of Lepidoptera of two Páramo sites, Matarredondo and La Laja (s = number of species, N = number of specimens)

Family	Matarredonda		LaLaja		total	
	s	N	s	N	s	N
Microlepidoptera						
Opostegidae	1	1			1	1
Tineidae	1	2	1	1	2	3
Gracillariidae			6	7	6	7
Yponomeutidae	2	3	4	8	5	11
Argyrestidae	2	4	2	3	3	7
Glyphipterigidae	10	17	7	11	12	28
Lyonetiidae	1	2	1	1	1	3
Elachistidae	1	1	1	1	2	2
Batrachedridae	1	1			1	1
Oecophoridae	1	1	2	2	3	3
Cosmopterigidae			1	1	1	1
Scythrididae			1	5	1	5
Stenomatidae	1	2	1	1	1	3
Gelechiidae	5	5			5	5
Copromorphidae			2	2	2	2
Pterophoridae			2	2	2	2
Tortricidae	21	41	18	33	32	74
Pyraloidea						
Pyralidae: Galleriinae	1	1			1	1
Crambidae: Crambinae	5	24	4	10	7	34
Crambidae: Scopariinae	2	6	4	17	5	23
Crambidae: Pyraustinae	7	10	12	21	16	31
Crambidae: Acentropinae			1	2	1	2
Crambidae: Musotiminae			1	1	1	1
Macroheterocera						
Dioptidae	1	1	1	3	1	4
Limacodidae			1	3	1	3
Megalopygidae	2	3	1	1	2	4
Geometridae	22	32	65	127	74	159
Eupterotidae			2	3	2	3
Lasiocampidae	1	1	2	4	2	5
Notodontidae			1	1	1	1
Erebidae			1	1	1	1
Nolidae			1	1	1	1
Noctuidae: Arctiinae	2	3	5	13	7	16
Noctuidae: Noctuinae	20	31	28	57	40	88
total	110	192	179	343	243	535