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### Filling in the gaps: South-Eastern Mountain Grassland as an important corridor and refuge for Montane Palaeogenic Elements within the southern African geometrid fauna (Lepidoptera, Geometridae)

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Revisionary work on various groups of moths, with a focus on Geometridae, since the late 1990's has provided substantial evidence for the existence of a Montane Palaeogenic Element as defined by Stuckenberg (1962) within the southern African geometrid fauna. However, although distribution patterns for several taxa are now well documented for the Western Cape, the Maloti Mountains of Lesotho and mountainous areas of the escarpment further north, virtually no data from suitable high-lying areas that may support this relictual fauna have been available for the vast area between the Western Cape and the foothills of the Malotis, representing a gap of more than 500 km.

A recent sample comprising 141 species of Geometridae collected in the Sneeuberge (approx. 32°10'S 24°55'E), situated in the western part of Eastern Cape Province, South Africa at altitudes between 993 and 1618 m, was analyzed for trends in composition according to altitude and/or vegetation type. (The highest peak in the area reaches 2122 m but areas above 1618 m could not be sampled due to difficulty of access.) Above 1600 m, the area is occupied by a southerly extension of South-Eastern Mountain Grassland (grassland biome), whereas the lower-lying areas fall into the semiarid Eastern Mixed Nama Karoo (Nama Karoo biome), a semi-arid veld type ecotonal to grassland.

No trends were observed regarding altitudinal distribution at subfamily level, and representation of Geometrinae, Sterrhinae and Ennominae as a percentage of the species total for southern Africa was similar (9.94 to 12.96 %), although Larentiinae were more strongly represented (34 species or 21.94 % of the total for the subregion). When viewed in isolation, the fauna of South-Eastern Mountain Grassland is characterized by a marked reduction in Geometrinae and Sterrhinae, with a concomitant increase in Larentiinae. Within Ennominae, however, samples from Eastern Mixed Nama Karoo were dominated by Macariini, whereas the diversity of Ennomini, Gnophini and especially Nacophorini increased in South-Eastern Mountain Grassland. Nacophorini have only recently been recorded from southern Africa; the tribe remains unsatisfactorily defined but is probably basal within Ennominae and almost entirely limited in its distribution to the former Gondwanan continents Australia, South America and southern Africa.

As would be expected from its being contiguous to Alti-Mountain Grassland, one of the two dominant high-altitude veld types in Lesotho, in the eastern part of its range, the montane moth community dependent on South-Eastern Mountain Grassland is overall more similar to that of the Maloti range and adjacent montane areas than to that of the Western

Cape. However, a number of species are continuously distributed, suggesting that South-Eastern Mountain Grassland plays an important role as a

corridor. Conversely, the comparative isolation of the Sneeuwege was sufficient to allow the development of at least nine local endemics.

**The genus *Bracca* Hübner in the Oriental and Australian tropics:  
Distribution patterns and the phenomenon of strikingly different island-races  
(Geometridae, Ennominae)**

**Dieter Stüning**

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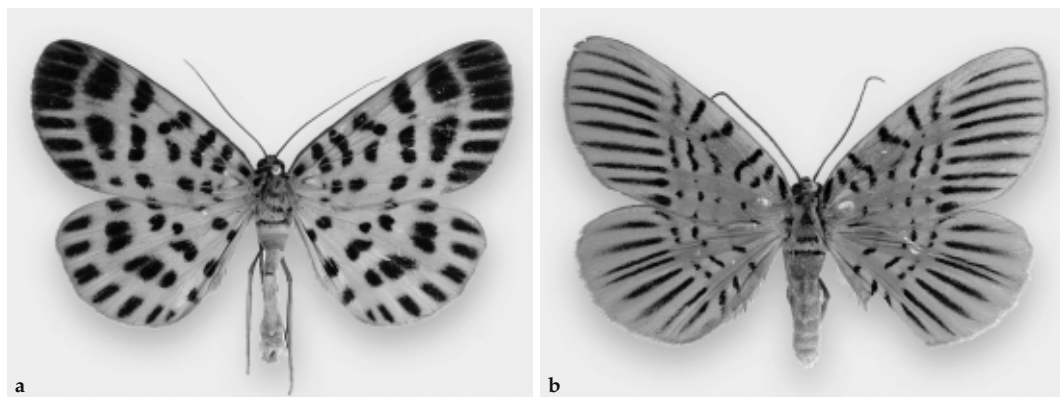
Species in the genus *Bracca* Hübner [1820] are distributed in the Oriental and Australian tropics; the geographic range extends from the extreme south of Thailand to tropical Australia. 26 species are recorded for the genus (Parsons et al., 1999), the majority (14 species) inhabit New Guinea and the surrounding islands, 4 species are found in Northern Australia (2 endemic). A further species has been described from Sulawesi recently (Stüning, 2005), but several undescribed species are still known to occur (Sulawesi, Luzon, Mindanao). A striking feature of the species now included in *Bracca* is the diversity of wing pattern. Until Holloway (1991) united them in the present genus, they have been scattered over at least fifteen genera. Five of them, *Arycanda* Walker, 1856, *Cosmethis* Hübner [1820], *Duga* Walker [1865], *Panaethia* Guenée [1858] and *Tigridoptera* Herrich-Schäffer, 1855, Holloway (l.c.) proved to be junior subjective synonyms of *Bracca*, the other names were just applied erroneously to

certain species, belonging even to different families like Arctiidae and Noctuidae.

Besides the variety of wing pattern on species level, some widespread species show a similar feature on subspecies level: this phenomenon of largely different island races has been found so explicit only in the genus *Bracca*. Four examples are discussed in detail:

*B. maculosa* Warren: the nominate subspecies, occurring in Sumatra, Borneo and Peninsular Malaysia has black pattern elements on a blue-grey ground colour, its subspecies *radiolata* Warren from Palawan has several dull orange, longitudinal streaks in addition and the black pattern elements are of different shape and arrangement (Fig. 1).

*B. exul* Herrich-Schäffer: the nominate subspecies, distributed in Java, also has black pattern elements on a blue-grey ground, several dull orange, longitudinal streaks and a broad distal area without any markings on both wings. Its subspecies *actinoides*



**Fig. 1.** *Bracca maculosa maculosa* Warren (a) and its subspecies *B. m. radiolata* Warren (b).