Plume moths in the protected areas of KwaZulu Natal province, Republic of South Africa

PETER USTJUZHANIN1,2,7, VASILIY KOVTUNOVICH3, PAVEL UDOVICHENKO4, ADRIAN ARMSTRONG5 & ALEXANDER STRELTZOV6

1 Altai State University, Lenina 61, Barnaul, RU–656049, Russia E-mail: petrust@mail.ru.
2 Biological Institute, Tomsk State University, Lenina Prospekt 36, Tomsk 634050, Russia
3 Moscow Society of Nature Explorers, Bolshaya Nikitskaya 2, Moscow, RU–125009, Russia.
4 Moscow Society of Nature Explorers, Bolshaya Nikitskaya 2, Moscow, RU–125009, Russia.
5 Ezemvelo KZN Wildlife, 1 Peter Brown Drive, Pietermaritzburg, 3200, South Africa.
6 Herzen State Pedagogical University of Russia, 48, Moika Emb., Saint-Petersburg, 191186, Russia.
7 Corresponding author. E-mail: petrust@mail.ru

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Abstract
The article gives 70 Pterophoridae species of nature reserves and national parks of KwaZulu Natal province, Republic of South Africa. New taxonomic combinations are revealed, new data on the distribution of Plume moths in the Republic of South Africa are indicated. New generic combinations were established for two species of Marasmarcha ammonias (Meyrick, 1909) and Sphenarches erythroductylus (Fletcher, 1911). 7 species are recorded for the first time for the province of KwaZulu Natal.

Key words: Lepidoptera, Pterophoridae, plume moths, KwaZulu Natal, Republic of South Africa, National Parks, Nature Reserves, Game Reserves, new data, new combinations.

Introduction
In 2010 we published a separate article on plume moths of KwaZulu-Natal province, South Africa, where we recorded 76 species, 8 of which were described as new to science (Ustjuzhanin & Kovtunovich, 2010). The present work describes the Pterophoridae fauna in some of the protected areas of this province. Using the specimens collected during our expeditions over the last 15 years and partially the published literature, we recorded 70 species of Pterophoridae in 4 subfamilies and 30 genera. Two species of plume moths, Platyptilia sochivkoi Kovtunovich & Ustjuzhanin, 2011, previously described from Lesotho (Kovtunovich, & Ustjuzhanin, 2011) and Procapteria insomnis Townsend, 1956, reported from Kenya and Yemen, are recorded for the first time for the Republic of South Africa. Seven species are recorded for the first time for
the province of KwaZulu Natal (marked with an * in Table 1). New generic combinations are established for two species, *Marasmarcha ammonias* (Meyrick, 1909) and *Sphenarches erythrodactylus* (Fletcher, 1911).

There are a total of 130 terrestrial protected areas in KwaZulu-Natal covering 859,071 ha and including a wide variety of vegetation types and habitats. Seventy of these protected areas are managed by Ezemvelo KZN Wildlife, covering a total of 739,994 ha. The 11 protected areas (Figure 1) sampled for Pterophoridae (Table 1) cover a large range in climate, from subtropical to temperate, and in altitude, from near sea level in the north-east to high altitudes in the western mountainous region. The following are the protected areas sampled.

![Figure 1](image.png)

**Figure 1.** Map showing the location of the protected areas sampled for Pterophoridae in KwaZulu-Natal province, South Africa.

1. **Cumberland Nature Reserve**

The vegetation in the Cumberland Nature Reserve (313 ha; Figure 2) is grassland and savanna, comprising the Dry Coast Hinterland Grassland and the KwaZulu-Natal Hinterland Thornveld vegetation types (Mucina & Rutherford 2006).
2. Cathedral Peak State Forest (uKahlamba Drakensberg Park World Heritage Site)
3. Giants Castle Game Reserve (uKahlamba Drakensberg Park World Heritage Site)
4. Royal Natal National Park (uKahlamba Drakensberg Park World Heritage Site)

The Cathedral Peak State Forest (ca. 25 000 ha; Figure 3), Giants Castle Game Reserve (ca. 42 000 ha; Figure 4) and Royal Natal National Park (ca. 7 000 ha; Figure 5) sections of the mountainous uKahlamba-Drakensberg Park World Heritage Site extend from the montane zone at lower altitudes (1 300 – 2 800 m a.s.l.) to the alpine zone at the highest altitudes (2 800 – ca. 3400 m a.s.l.). Most of the World Heritage Site consists of the Drakensberg Montane Sub-centre of the Drakensberg Mountain Centre of plant endemism (Carbutt 2019). The Maloti Alpine sub-centre of the Drakensberg Mountain Centre is of limited extent in the World Heritage Site. The major vegetation types in these three sections are (from lower to higher altitudes) the Drakensberg Foothill Moist Grassland, the Northern Drakensberg Highland Grassland, the uKahlamba Basalt Grassland and the Drakensberg Afroalpine Heathland (Mucina & Rutherford 2006). Northern Afromontane Forest (Mucina & Rutherford 2006), with herbaceous understory, shrub layer and closed-canopy tree layer occurs in fire-protected, usually southerly-facing, sites.

5. iGwala Gwala Nature Reserve

The vegetation at iGwala Gwala Nature Reserve (376 ha) comprises grassland and savanna, and is of the following vegetation types: Thukela Valley Bushveld, Dry Coast Hinterland Grassland, Northern Zululand Mistbelt Grassland, Paulpietersburg Moist Grassland, KwaZulu-Natal Highland Thornveld and KwaZulu-Natal Hinterland Thornveld (Mucina & Rutherford 2006).
Figure 3. View of the Cathedral Peak State Forest section of the uKhahlamba-Drakensberg Park World Heritage Site (Photo: Ezemvelo KZN Wildlife).

Figure 4. View of the Giants Castle Game Reserve section of the uKhahlamba-Drakensberg Park World Heritage Site (Photo: Ezemvelo KZN Wildlife).
Figure 5. View of the Royal Natal National Park section of the uKhahlamba-Drakensberg Park World Heritage Site (Photo: Ezemvelo KZN Wildlife).

Figure 6. View of Ithala Game Reserve (Photo: Ezemvelo KZN Wildlife).
Figure 7. View of Pongola Game Reserve (Photo: Ezemvelo KZN Wildlife).

Figure 8. View of Ndumo Game Reserve (Photo: Ezemvelo KZN Wildlife).
6. Ithala Game Reserve

Ithala Game Reserve (ca. 29 000 ha; Figure 6) is a rugged area encompassing a wide range of topography and soil types. Altitude ranges from 400 m a.s.l. in the north to 1 400 m a.s.l. in the south, and the vegetation is varied and includes tall and short grassland, savanna, thicket, woodland, forest and wetland vegetation (Pooley & Player 1995). The vegetation types present in the reserve are Subtropical Alluvial Vegetation, Ithala Quartzite Sourveld, Northern Zululand Mistbelt Grassland, Paulpietersburg Moist Grassland, Swaziland Sour Bushveld, Northern Zululand Sourveld, Southern Mistbelt Forest and Zululand Lowveld (Mucina & Rutherford 2006).

7. Mhlopeni Nature Reserve

This reserve (807 ha) has varied and some rugged topography, from a relatively wide river valley and plateaux to ravines and precipitous cliffs (Pooley & Player 1995). Two vegetation types occur in this savanna nature reserve, Thukela Valley Bushveld and KwaZulu-Natal Highland Thornveld (Mucina & Rutherford 2006).

8. Pongola Nature Reserve

Grassland, savanna, woodland, thicket and forest occur in Pongola Game Reserve (ca. 21 000 ha; Figure 7; Pooley & Player 1995). The scenery is dominated by the Pongolapoort Dam and the Lebombo Mountains. The vegetation types found in this reserve are the Lebombo Summit Sourveld, Makatini Clay Thicket, Western Maputaland Clay Bushveld, Southern Lebombo Bushveld, Zululand Lowveld and Scarp Forest (Mucina & Rutherford 2006).

9. Ndumo Game Reserve

Ndumo Game Reserve (ca. 12 000 ha; Figure 8) is a low-lying reserve, its altitude ranging from 25 m on the Pongolo River floodplain to 160 m a.s.l. at its highest point on Ndumo Hill (Pooley & Player 1995). The climate is sub-tropical. About one third of this reserve consists of floodplains, and there are 13 semi-permanent pans that derive their water from the Usutu and Pongolo Rivers (Pooley & Player 1995). There are 16 dominant soil types leading to a diversity of vegetation, from floodplain vegetation to thicket, woodland and forest (Pooley & Player 1995). The wide variety of vegetation types in Ndumo Game Reserve are as follows (Mucina & Rutherford 2006): Subtropical Freshwater Wetlands, Lowveld Riverine Forest, Freshwater Lakes, Subtropical Alluvial Vegetation, Makatini Clay Thicket, Western Maputaland Clay Bushveld, Western Maputaland Sandy Bushveld, Southern Lebombo Bushveld, Tembe Sandy Bushveld, Sand Forest and Subtropical Salt Pans.

10. Vernon Crookes Nature Reserve

This protected area (2 189 ha; Figure 9) consists of open, rolling hillsides and wooded valleys, with an altitude range of 150 to 610 m a.s.l. (Pooley & Player 1995). Savanna and various grassland and forest types of vegetation occur in Vernon Crookes Nature Reserve, these being KwaZulu-Natal Sandstone Sourveld, KwaZulu-Natal Coastal Belt, Moist Coast Hinterland Grassland, KwaZulu-Natal Coastal Belt Thornveld, Northern Coastal Forest and Scarp Forest (Mucina & Rutherford 2006).

11. Weenen Game Reserve

Weenen Game Reserve (ca. 5 000 ha; Figure 10) comprises savanna vegetation with some alluvial wetland vegetation as well. The terrain is varied, being rugged in part and flatish and open in other parts, with an altitudinal range from 1000 to 1240 m a.s.l. (Pooley & Player 1995). The savanna vegetation types present include KwaZulu-Natal Highland Thornveld, Thukela Valley Bushveld and Thukela Thornveld (Mucina & Rutherford 2006).

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Figure 9. View of Vernon Crookes Nature Reserve (Photo: Ezemvelo KZN Wildlife).

Figure 10. View of Weenen Game Reserve (Photo: D. Martin)
Table 1. List of Pterophoridae recorded from 11 protected areas in the province of KwaZulu-Natal, South Africa.

| N | Species | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 |
|---|---------|----|----|----|----|----|----|----|----|----|----|----|
| 1 | *Agdistis linnaei* Gielis, 2008 |   |    |    |    |    |    |    |    |    |    |    |
| 2 | *Agdistis malitiosa* Meyrick, 1909 | +  | +  | +  | +  |    |    |    |    |    |    |    |
| 3 | *Agdistis toliarensis* Bigot, 1987 |    |    |    |    |    |    |    |    |    |    |    |
| 4 | *Agdistis unguica* Arenberger, 1988 |    |    |    |    |    |    |    |    |    |    |    |
| 5 | *Agdistis varii* Kovtunovich & Ustjuzhanin, 2009 |    |    |    |    |    |    |    |    |    |    |    |
| 6 | *Deuterocopus socotranus* Rebel, 1907 |    |    |    |    |    |    |    |    |    |    |    |
| 7 | *Walsinghamiella orichalcias* (Meyrick, 1916) |    |    |    |    |    |    |    |    |    |    |    |
| 8 | *Walsinghamiella prolaui* (Gibeaux, 1994) |    |    |    |    |    |    |    |    |    |    |    |
| 9 | *Titanoptilus stenodactylus* (Fletcher, 1911) | +  | +  | +  | +  |    |    |    |    |    |    |    |
| 10 | *Platyptilia barbara* Ustjuzhanin & Kovtunovich, 2010 |    |    |    |    |    |    |    |    |    |    |    |
| 11 | *Platyptilia farfarella* Zeller, 1867 | +  | +  | +  | +  |    |    |    |    |    |    |    |
| 12 | *Platyptilia longalis* (Walker, 1864) | +  | +  | +  | +  | +  |    |    |    |    |    |    |
| 13 | *Platyptilia periacta* Meyrick, 1910 | +  | +  | +  | +  |    |    |    |    |    |    |    |
| 14 | *Platyptilia sabia* (Felder & Rogenhofer, 1875) |    |    |    |    |    |    |    |    |    |    |    |
| 15 | *Platyptilia sochikvii* Kovtunovich & Ustjuzhanin, 2011 |    |    |    |    |    |    |    |    |    |    |    |
| 16 | *Platyptilia sp.* |    |    |    |    |    |    |    |    |    |    |    |
| 17 | *Vietteilus vigens* (Felder & Rogenhofer, 1875) | +  |    |    |    |    |    |    |    |    |    |    |
| 18 | *Amblyptilia direptalis* (Walker, 1864) | +  | +  | +  | +  |    |    |    |    |    |    |    |
| 19 | *Stenoptilia johnistella* Ustjuzhanin & Kovtunovich, 2010 | +  | +  | +  | +  |    |    |    |    |    |    |    |
| 20 | *Stenoptilia natalensis* Ustjuzhanin & Kovtunovich, 2010 |    |    |    |    |    |    |    |    |    |    |    |
| 21 | *Stenoptilia zophodactyla* (Duponchel, 1838) | +  |    |    |    |    |    |    |    |    |    |    |
| 22 | *Bipunctiphorus dimorpha* (Fletcher, 1910) |    |    |    |    |    |    |    |    |    |    |    |
| 23 | *Lantanophaga pusillidactyla* (Walker, 1864) | +  | +  |    |    |    |    |    |    |    |    |    |
| 24 | *Stenoptilodes taprobana* (Felder & Rogenhofer, 1875) | +  | +  | +  | +  | +  |    |    |    |    |    |    |
| 25 | *Stenodacma richardi* Ustjuzhanin & Kovtunovich, 2010 | +  |    |    |    |    |    |    |    |    |    |    |

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### TABLE 1.

| No. | Species Name                        | Subscribers |
|-----|-------------------------------------|-------------|
| 26  | *Stenodacma wahlbergi* (Zeller, 1852) | + + + + + + + + |
| 27  | *Stangeia xerodes* (Meyrick, 1886)   | +           |
| 28  | *Buckleria negotiosa* (Meyrick, 1926) | +           |
| 29  | *Sphenarches caffer* (Zeller, 1852) | + + + + + + + |
| 30  | *Sphenarches erythrodactylus* (Fletcher, 1911) | + + |
|     | **comb.n.** Oxyptilus erythrodactylus Fletcher, 1911 |           |
| 31  | *Procapperia insomnis* (Townsend, 1956) | + |
| 32  | *Pseudoxyptilus secutor* (Meyrick, 1911) | + + + + + + |
| 33  | *Paracapperia esuriens* (Meyrick, 1932) | + |
| 34  | *Megalarhipida leucodactyla* (Fabricius, 1794) | + + + + + |
| 35  | *Megalarhipida leptomeres* (Meyrick, 1886) | + + + + + |
| 36  | *Megalarhipida subtilis* (Rebel, 1907) | + + + + + |
| 37  | *Megalarhipida tessmanni* (Strand, 1912) | + + |
| 38  | *Megalarhipida vivax* (Meyrick, 1909) | + + |
| 39  | *Marasmarcha ammonias* (Meyrick, 1909) **comb.n.** Pterophorus ammonias Meyrick, 1909 Hellinsia ammonias (Meyrick, 1909). [Gielis, 2003, 2011] | + |
| 40  | *Marasmarcha bonaespei* (Walsingham, 1881) | + + + + + |
| 41  | *Marasmarcha corniculata* (Meyrick, 1913) | + + + |
| 42  | *Marasmarcha empedota* (Meyrick, 1908) | + + + + + |
| 43  | *Exelastis atomosa* (Walsingham, 1885) | + + + + + |
| 44  | *Exelastis bergeri* Bigot, 1969 | + |
| 45  | *Exelastis crepuscularis* (Meyrick, 1909) | + + + + + |
| 46  | *Exelastis crudipennis* (Meyrick, 1932) | + |
| 47  | *Exelastis montischristi* (Walsingham, 1897) | + + + |
| 48  | *Exelastis phlyctaenias* (Meyrick, 1911) | + |
| 49  | *Exelastis pumilio* (Zeller, 1873) | + + + + + + |
| 50  | *Exelastis tenax* (Meyrick, 1913) | + + + |
| 51  | *Arcoptilia pongola* Ustjuzhanin & Kovtunovich, 2010 | + |
| 52  | *Gypsochares astragalotes* (Meyrick, 1909) | + + + |
| 53  | *Gypsochares londti* Ustjuzhanin & Kovtunovich, 2010 | + |
| 54  | *Crassuncus pacifica* (Meyrick, 1911) | + |
| 55  | *Crassuncus tripunctatus* (Walsingham, 1881) | + + |
| 56  | *Pselnophorus pachyceros* Meyrick, 1921 | + + + + + + |
| 57  | *Pselnophorus zulu* Ustjuzhanin & Kovtunovich, 2010 | + + |

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TABLE 1.

| No. | Species                          | Author       | Year | Status |
|-----|----------------------------------|--------------|------|--------|
| 58  | *Hellinsia acuminata* (Meyrick, 1920) | +            |      |        |
| 59  | *Hellinsia adumbratus* (Walsingham, 1881) | + + +       |      |        |
| 60  | *Hellinsia aethiopicus* (Amsel, 1963) | +            |      |        |
| 61  | *Hellinsia illatus* (Meyrick, 1917) | +            |      |        |
| 62  | *Hellinsia madecasseus* (Bigot, 1964) | +            |      |        |
| 63  | *Hellinsia sphenites* (Meyrick, 1913) | +            |      |        |
| 64  | Merrifieldia innae Ustjuzhanin & Kovtunovich, 2010 | + | | |
| 65  | Adaina gentilis Meyrick, 1911    | +            | +    | +      |
| 66  | Adaina perianga Meyrick, 1913    | +            | +    | +      |
| 67  | Pterophorus africanus Ustjuzhanin & Kovtunovich, 2010 | + | | |
| 68  | Pterophorus candidalis (Walker, 1864) | + +        |      |        |
| 69  | Pterophorus rhyparias (Meyrick, 1907) | + + + +   |      |        |
| 70  | Cosmoclostis brachybelae Fletcher, 1947 | + + + + + |      |        |

Discussion

The richness and diversity of the Pterophoridae in the protected areas of KwaZulu-Natal is undoubtedly great. The complete species composition of plume moths in each reserve is still unknown, since the studies were often superficial owing to limited sampling time. However, these data provide an overview of the faunal diversity, and further studies will no doubt significantly increase the species richness of the Pterophoridae in KwaZulu-Natal by least 10-15 species.

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