Description of a new species from Africa in genus *Coccothera* Meyrick, 1914, with additional taxonomic and faunistic information on two other *Coccothera* species (Lepidoptera: Tortricidae: Grapholitinii)

A new species from Africa is described in the genus *Coccothera* Meyrick, 1914 (Lepidoptera: Tortricidae: Grapholitinii). *Coccothera albolineana* spec. nov. Laspeyresia nicomacha Meyrick, 1921 is transferred to *Coccothera* Meyrick, 1914 comb. nov. The unknown male is described and a full description of the hitherto only partly known female genitalia is presented. *Coccothera ferrifracta* Diakonoff, 1968 is a synonym of *Coccothera spissana* (Zeller, 1852) syn. nov. The genus *Coccothera* Meyrick, 1914 now contains eight species, Faunistic and distributional information of *Coccothera spissana* (Zeller, 1852), *C. nicomacha* (Meyrick, 1921) and *C. albolineana* spec. nov. is also presented.

INTRODUCTION

Material from the author’s numerous collecting trips to Africa and from museums and private collections has been examined by genital examinations and partly by DNA analysis. It was expected that the material would contain several cryptic species, but the thorough analysis of the extensive material of *Coccothera spissana* (Zeller, 1852) reveals that this species is rather variable both externally and especially in the male genitalia. The two remaining treated species were expected because of the characteristic outlook of imagines.

This is the first part of a revision of the genus *Coccothera* Meyrick, 1914.

METHODS AND MATERIALS

The majority of the material was collected with light traps powered by 125 W mercury vapour bulbs or 8 W super actinic tubes. A few specimens were caught flying in the afternoon around a large *Euphorbia* sp. plant in Tanzania: Iringa. Specimens of the treated species were caught in biotopes where other species from this group occurred.

The genitalia were mounted in euparal on slides in biotopes where other species from this group occurred. A few specimens were caught flying in the afternoon around a large *Euphorbia* sp. plant in Tanzania: Iringa. Specimens of the treated species were caught in biotopes where other species from this group occurred.

Photos of genitalia were taken using a Toup Tek camera mounted on a Toup Tek binocular microscope. Photographs of specimens were taken using a Canon EOS50D camera and a 100 mm Canon macro lens.

The type material has been deposited in the research collection of the author (KL) and will later be transferred to the Zoological Museum of Copenhagen (ZMUC).

The terminology of genitalia and morphological structures follows Horak (1991 & 2006), and the terminology of wing pattern elements follows Razowski (2003).

Abbreviations

Ht – holotype
Pt – paratype
spec. – specimen
spec. nov. – species nova
syn. nov. – synonym nova
comb. nov. – combination nova
gen. prep. – genital preparation
KL – research collection of Knud Larsen, Dyssegaard, Denmark
LA – Leif Aarvik, Oslo, Norway
Meyr. – Meyrick
MiN – Museum für Naturkunde, Berlin, Germany
NHMO – Natural History Museum, University of Oslo
ZMUC – Zoological Museum, Natural History Museum of Denmark, Copenhagen, Denmark
Zell. – Zeller

RESULTS

*Coccothera* Meyrick, 1914 is a genus with mainly Afrotropical distribution except *Coccothera spissana* (Zeller, 1852), which also occurs in dryer parts of the western Palearctic region. This genus including the present changes contains eight species (AfroMoths: accessed 30.iii.2023).

An overview of the changes in the generic definitions can be found in Razowski (2004 & 2019) and on Afrmoths (accessed 15.iv.2023).
Cocothera spissana (Zeller, 1852). Figs. 1–6.
Lepid. Micropt. Cafr. 82 (Grapholita)

Grapholita spissana Zeller 1852: 82; Diakonoff 1958: 74, Figs. 3–4, pl. 1, Fig. 4.

Eudemis spissana Walsingham 1891: 70, pl. III, Fig. 6.

Cocothera spissana Meyrick 1914: 189; Aarvik 2019: 327 Figs. 50–51, 85.

Cocothera ferrifracta Diakonoff 1968: 4–7, Figs. 5–7, syn. nov.

Grapholita pharaonana Kollar 1858: 154, pl. 5.

Grapholita sp.(pharaonana) Frauenfeld 1859: 41, pl. 7, Figs. 2a, b.

Pammene pharaonana Kennel 1921: 705, pls. 24, Fig. 106.

Cirriphora pharaonana Obraztsov 1951: 99, Figs. 1–2; Obraztsov 1961: 59, Figs. 119–122; Danilevskij & Kuznetsov 1968: 605 Figs. 461–462; Diakonoff 1983: 259, pls. 1, Fig. 13, Figs. 22–24; Razowski 1989: 212, Figs. 297 & 567.

Laspeyresia victrix Meyrick 1918: 12.


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Figure 1 – C. spissana (Zell.) ♂ 9 mm. Cameroun. Faro NP.

Figure 2 – C. spissana (Zell.) ♂ P. 3524 KL, 12 mm. Spain. Fuerteventura.

Material examined

Republic of South Africa:


Franz Friedl (1860) has found the species in combination with other gall

Remarks

Distribution: Coccothera spissana (Zell.) is a very widely
distributed species living in the dryer part of the African
savannah zone. Outside Africa it is found in Yemen, Saudi
Arabia (Diakonoff, 1983) and the Canary Islands: Fuerteventura. The species is relatively new to the Canary
Islands (Moreno, 2014). Kennel (1921) mentions the species from Bithynien, now northern Turkey and
Razowski (1989) mentions the species from Algeria and
Spain: 1 spec. Fuerteventura: Jandia, Barranco de

Biology: The species is bred from swollen thorns (domatia)
on different acacia trees (Agassiz & Aarvik, 2014; Aarvik,
2019), rather big galls on Tamarix (Kollar, 1858 &
Frauenfeld, 1859), galls induced by the host-specific rust
fungus Ravenelia macowaniana Páschke on Acacia karoo
Hayne (McGeogh, 1993 & McGeogh & Krüger, 1994) and
in shoots and leaves of groundnut plants (Diakonoff, 1968).
It is also reported living on the scale-insect Ceroplasta
(Meyrick, 1914). The species is bred from galls on different
species of Tamarix in Egypt around Cairo and the
Sinai Peninsula, described in detail by Kollar (1858) &
Frauenfeld (1859). Frauenfeld (1859) has found the species
in combination with other gall living insects and he
suggested that C. spissana is living in the galls but does not
cause the galls. The author has searched the larva

Extensive examination of the genitalia from the whole
range showed a wide range of variation presented in Figs.
3–5, especially in the lengths and size of the valva also
illustrated by Danilevskij & Kuznetsov (1968). The length
of the hair tufts at the base of the valva are also subject to
high variation, but in the female genitalia (Fig. 6) the
variation is rather limited.

Figure 3 – C. spissana (Zell.) ♂ P. 4165 KL, Tanzania,
Tungamalenga.

Figure 4 – C. spissana (Zell.) ♂ P. 3533 KL, Aethiopia, Adis
Abeba.
Results from a DNA analysis from Guelph, Canada (accessed 17.iv.2023) defined a maximum difference at 0.96% and average distance at 0.55%. A specimen from Spain, Fuerteventura (Fig. 2) has a distance to the nearest neighbouring species at 2.12%. The variation in the DNA is a normal variation at intraspecific level. The results are based upon 11 records. Distance model: kimura 2 parameter. Marker: COI-5P. Pairwise distance.

When this work began it was expected that the taxon C. spissana (Zell.) could contain several cryptic species, but the results clearly demonstrate that it just is a variable species, maybe due to its wide distribution in Africa and adjacent areas.

Coccothera ferrifracta (Diakonoff, 1968) was described based on specimens hatched from shoots and leaves of groundnut found in Ghana at Kumasi. The figures of the male and female genitalia (Diakonoff, 1968) are exactly like the genitalia of C. spissana (Zell.). At the time of this description the male genitalia of C. spissana (Zell.) were not figured. Diakonoff (1968) redescribed the genus Coccothera on the basis of the specimens from Ghana and used the males from this sample to define the males in the genus, emphasizing that the hindwings have a cubital pecten. Aarvik (2019) describes this pecten as a pencil of grey sex scales. It is included in the original description of the genus Coccothera (Meyrick, 1914) and figured by Obraztsov (1961: 99 Fig. 1C). Of the present known species in Coccothera only C. spissana (Zell.) has a cubital pecten. Aarvik (2019) gave an overview of the synonymy of C. spissana (Zell.), noting that Razowski & Krüger (2007) omitted the sclerotized narrow folds along the lateral edges of tergum seven, which is also the case in Diakonoff's description of the female genitalia of C. ferrifracta (Diakonoff, 1968). Consequently C. ferrifracta is regarded as a new synonym of C. spissana (Zell.).

Coccothera nicomacha (Meyrick, 1921), comb. nov.


Material examined

Namibia: 2 spec. E. Caprivi:15 km NW Ngoma, 930 m, 17°53'S, 24°34'E, 26.ii.2006, Li/LiFa, leg. H. Hacker & H-P. Schreier, coll. KL; gen. prep. ♂ 3525 & 3535 KL; 


Ethiopia: 1 spec. Southern, 08°13'49" N, 37°34'53" E, 23 km WSW Welkite, Giber, 28.x.2010, 1090 m, Li, leg. J. De Freina, H. Hacker, H. Peks & H-P. Schreier, coll. KL; gen. prep. ♂ 3540 KL.

Coccothera nicomacha (Meyrick, 1921) was described based on a single female and later the specimen and the remaining part of the female genitalia were figured (Razowski & Krüger, 2007).
The slide only contained bursa and half of ductus bursa. In this genus the connection of the ductus bursa to sterigma is extremely fragile and will often break off under preparation of the slide. However, the species is easy to recognize on the wing pattern as well as on the genitalia.

The female holotype is labelled: [Zimbabwe]: Umtali [Mutare], [Southern] Rhodesia, 5-I-1918 (A.J.T. Janse) gen. prep. 13654; type no. 1040.

Meyrick (1921) remarked that L. nicomacha is allied to Laspeyresia victrix Meyrick 1918.

Description

Imago: (Figs. 7–8). Wingspan 8–11 mm, ground colour dark grey to black with fine light beige strigulation. Wing shape triangular. Basal blotch bordered with a shiny metallic line and with a dorsal shiny metallic spot both dark lead coloured. The basal blotch can have darker shadows and marks. Median fascia present at costal half as a nearly square black area against apex with two projections and bordered with a light line. Speculum narrow reaching two thirds of the wing, lighter grey bordered with a fine black line more or less interrupted. Between the median fascia and speculum there is a round blotch divided by three to four fine black lines. The blotch is partially bordered with a fine black line. Three costal strigulae before apex. Termen with a black line interrupted by a postapical strigula. Fringes black. Hindwings dark grey to black, lighter towards basal part. Termen with a black basal line. Fringes divided black and light grey. Wing shape of females are squarer otherwise like males. The species is very variable in size and the markings can be more or less pronounced. The figure of the type has a strong black mark in the basal blotch, but this is not a diagnostic character.

Male genitalia: (Figs. 9 & 10). The male genitalia vary considerable in size. Valva simple elongate with parallel sides, rounded, cucullus hairy, ventrally with a few small thorns, sacculus indistinct straight; vinculum triangular, strongly sclerotized; uncus very weak; pedunculus weak, rounded; length of phallus like the valva, sausage shaped, slightly oblique at the end.

Female genitalia: (Fig. 11). Sterigma rounded; ostium indistinct; subgenital sternite weakly emarginated, broad; ductus bursa long, slender, slightly enlarged before bursa; bursa round with weakly sclerotized structure, two medium sized, thorn-shaped signa.

Diagnosis

Laspeyresia nicomacha Meyrick, 1921 resembles C. spissana (Zell.) and C. albolineana spec. nov.
Coccothera nicomacha was originally placed in the genus Laspeyresia based on a single female although the genus Coccothera was erected already in 1914 by the same author. The definition may be due to the lack of material. The strongly striigulated wing and the shiny metallic lines and spots on the wing have the same structure as in Coccothera spissana (Zeller, 1852). The shape of valva and the general structure of both male and female genitalia define the species as belonging to the genus Coccothera.

Coccothera albolineana spec. nov. Figs. 12–16. urn:lsid:zoobank.org:act:CCF07CF5-99BE-4CFE-81F4-C0F247E5356B

Material examined

Republic of South Africa: 1 spec. Limpopo: 10 km WNW Louis Trichardt, Madi A Thavha Lodge, 23°01’02” S, 29°49’40” E, 1008 m, leg. K. Larsen & A. Kingston; gen. prep. ♀ 4701 KL.

Biology
Only the ten mentioned specimens and the type specimen from Zimbabwe are known. They are found from October to March. Localities are indistinct dryer savannah or bush land. Host plant is unknown.

Distribution
Zimbabwe, Namibia, Tanzania, Ethiopia.

Remarks

Figure 11 – C. nicomacha (Meyr.) ♂. P. 2721 LA, Tanzania, Morogoro.

Imagines differ from C. spissana by the large black area in the upper half of the median fascia and with the round blotch divided by three to four fine black lines placed towards apex; from C. albolineana spec. nov. it differs by the larger size and by the dividing line on the fore wing which is shiny grey, not white. The male genitalia have a short rounded valva with a few thorns ventrally at the cucullus and a sausage shaped phallus. The female genitalia have a semicircular sterigma and two medium sized thorn-shaped signa. The subgenital sternite is broad and less emarginated dorsally.

Figure 12 – C. albolineana spec. nov. ♀. P. 4701 KL, 8 mm. RSA, Louis Trichardt.

Figure 13 – C. albolineana spec. nov. ♀. P. 4371 KL, 8 mm. Kenya, Naro Moru.
Description

Imago: (Figs. 12–13). Wingspan 7–8 mm. Head grey, with white tipped scales, dorsally longer and raised scales. Thorax as head, abdomen dark grey. Antenna 50% of forewing, grey with fine white rings. Labial palps short, coloured as head, legs the same but with white spurs. Forewings triangular with slightly indented termen, ground colour dark grey to black with fine light beige strigulation bordered with a fine white cross line. Median fascia darker grey bordered towards basal blotch by a shiny metallic line reaching two thirds from dorsum in the middle partly interrupted by a small black spot. Speculum shiny metallic bordered dorsally with small black spots. Between speculum and costa, a small white area divided by four fine black lines gradually shorter against costa. Four white costal strigula. Termen with a black basal line, cilia grey. Hindwings deep brown, sometimes white towards base. At termen a bright light basal line. Cilia with a narrow deep brown shadow followed by a light area dorsally white. Underside of wings deep grey at base of hindwings sometimes lighter.

Male genitalia: (Fig. 14). Valva short, evenly wide with a round exceedingly small cucullus, weakly haired and with two tiny thorns ventrally. Pedunculus very weak and phallus short, sausage shaped with emarginated curved apex.


Diagnosis

Coccothera albolineana spec. nov. is defined by its small size, the white dividing line between basal blotch and median fascia and the round white blotch towards apex divided by four fine black lines. Speculum is dorsally half bordered with well-defined black spots. The male differs from C. nicomacha in the exceedingly small valva with tiny teeth at cucullus ventrally and in the shape of phallus. In the female genitalia it differs in the shape of sterigma.

Biology

Only the six mentioned specimens are known, found from November to December. Localities are more dense forest savannah. Host plant is unknown.

Distribution
Kenya: Central and Rift Valley
Republic of South Africa: Limpopo province.

Etymology
The species is named after the characteristic white markings which make the species quite easy to identify.

Discussion
The biology of Coccothera species is an unsolved riddle.
Of the three species dealt with here only the biology of C. spissana is known, but only to a certain limit. It seems that the species itself does not produce the galls, but is somehow connected to galls on Tamarix and Acacia. It is not known if the larva lives off sap, parts of the galls or other insects producing the galls or are just living in the galls.
The species has also been bred from groundnuts where it lives on shoots and young leaves, which also could be the case when living on the other host plants. The question might be solved by breeding experiments in the laboratory.

This is the first part of a revision of the genus Coccothera Meyrick, 1914 treating three species connected with savannah biotopes. The next part will treat the species from biotopes in rainforests.

Acknowledgments
My thanks go to W. Mey (MiN), L. Aarvik (NHMO) and D. Agassiz for the loan of material from their collections and to Anthony Kingston, Shropshire, UK who has kindly provided linguistic assistance with the manuscript. The author is likewise grateful for the help and support of the Editor of Metamorphosis and the reviewers.

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