

Contribution to the Knowledge of the Afrotropical Spilomelinae (Lepidoptera, Crambidae): Three New Species and One Taxonomic Update in the Tribes Margaroniini Swinhoe & Cotes, 1889 and Agroterini Acloque, 1897, from Saudi Arabia

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Abstract

Taxonomic and faunistic results on three genera in the tribes Margaroniini Swinhoe & Cotes, 1889 and Agroterini Acloque, 1897—*Omiodes* Guinée, 1854, *Patania* Moore, 1888 and *Notarcha* Meyrick, 1884 are presented, based on material sampled in the Afrotropical part of the Arabian Peninsula, in the south-western province of Jizan, Saudi Arabia. *Omiodes undularis* sp.n., *Patania orbicularis* sp.n. and *Patania rhomboidalis* sp.n. are newly described. Of *Omiodes undularis* sp.n., the adults, male genitalia, and tympanal organs are described and figured. The female genitalia are unknown. The Afrotropical and Oriental species of the genus potentially related to the new species by external characters are reviewed. The differential character states distinguishing the new species from the closest related *Omiodes indicata* (Fabricius, 1775) are listed. The adults and male genitalia of *Patania orbicularis* sp.n. are described and figured. The female genitalia are unknown. The species most closely related in the male genitalia is *Patania tchadalis* (Leraut, 2005). The differential character states are listed. Of *Patania rhomboidalis* sp.n., the adults, female genitalia, and tympanal organs are described and figured. The new species is externally closely related to *Patania tchadalis* (Leraut, 2005), *Patania harutai* (Inoue, 1955), *Patania crepuscularia* Matsui & Naka, 2023, *Patania accipitralis* (Walker, 1866) and *Patania fraterna* (Moore, 1885) externally and in the female genitalia. The external and internal differential character states are listed. A determination key to the newly described Arabian species

of the genus *Patania* Moore, 1888 and their closest relatives is given. The female genitalia of *Notarcha viridalis* Seizmair, 2021 attributed to the *Notarcha quaternalis* (Zeller, 1852) species complex, are described for the first time. The species is reported as new to the fauna of Saudi Arabia. A determination key based on the internal morphology of the species of the *Notarcha quaternalis* (Zeller, 1852) species complex is given.

Keywords

Pyraloidea, Taxonomy, New Species, Omiodes, Patania, Notarcha, Distribution, Arabian Peninsula

1. Introduction

The subfamily Spilomelinae is known as the most diverse subfamily in the Pyraloidea comprising at present 4100 valid species, 340 genera, and 12 tribes [1] [2]. A first comprehensive revision of the subfamily on a tribal level has been presented in [1].

For the Afrotropical regions studies in the subfamily have been confined to South Africa, West Africa and the Malagasy Islands [3]-[8]. The endemic potential at specific and generic levels of the Afrotropical region is still poorly explored and understood. Shaffer & Munroe and Maes presented recent advances [6] [9] [10]. In these studies, a total of 12 genera known to date to be endemic to Africa were described. The percentage of undescribed taxa in the Afrotropical region is estimated to be 30% [6]. According to Maes' discussion, this is probably an underestimation. A lower bound on the number of African taxa in the subfamily still to be described is estimated to be 500 [10].

The present paper is understood as part of a series of studies that contribute to the knowledge of the Spilomelinae in the Afrotropical part of the Arabian Peninsula, which comprises Oman, Yemen and southwestern Saudi Arabia. For a discussion of the historical and recent research status, we refer to [11]. The focus of the present study is on the genera *Omiodes* Guinée, 1854 in the Margaroniini Swinhoe & Cotes, 1889 tribe, *Patania* Moore, 1888 and *Notarcha* Meyrick, 1884 in the Agroterini Acloque, 1897 tribe. Differential characters between these two tribes include the shape of the uncus. In Margaroniini the uncus is long necked, conical or uncapitate. In Agroterini the uncus is strongly reduced in length, with a truncate or sub-rectangular shape. Furthermore, some genera in Agroterini exhibit a pseudognathos with a well-developed medial process [1].

In the genera *Omiodes* Guinée, 1854 and *Patania* Moore, 1888, three new species are described—*Omiodes undularis* sp.n., *Patania orbicularis* sp.n., and *Pantania rhomboidalis* sp.n. Furthermore, the female genitalia of *Notarcha viridalis* Seizmair, 2021, which is attributed to the *Notarcha quaternalis* (Zeller, 1852)—complex, are described for the first time. Further evidence of *Notarcha viridalis* Seizmair, 2021 as a bona species and a determination key to the species

of the *Notarcha quaternalis* (Zeller, 1852)—complex based on internal morphology is provided.

2. Materials and Methods

2.1. Sampling

The specimens (n = 5) presented in this paper belong to samples collected in research expeditions to the province of Jizan of the Kingdom of Saudi-Arabia in November 2023 and February 2024. The material was captured by night using light traps equipped with UV-Power-LEDs spanning a wave length spectrum of 365 nm - 385 nm. The trapping technique was described by Brehm [12].

2.2. Macro-Preparation, Dissection, and Digital Image Processing

The adults were photographed after relaxation and subsequent preparation using a CANON EOS M6 Mark II camera under an MP-E-65mm lens. To examine the genitalia and tympanal organs, dissection and slide-mounting techniques were applied to the specimens according to the protocols described by Robinson and Maes [13] [14]. The preparation of the tympanal organs and genitalia was performed under a Motic stereomicroscope (SMZ-171). The slides were photographed using a ToupCam c-mount camera (ToupTek Inc., Zhejiang, China). The images were processed using Adobe Photoshop PS, version 21.0.2.

2.3. Morphological Analysis and Comparison

Analyses of the wing pattern characters and morphological structures in the specimens of the sample were performed on the images. Structural ratios of external characters, genitalia, and tympanal organs were calculated from images using the imaging software ToupView, Version 1.0 (ToupTek Inc., Zhejiang, China).

Comparative Oriental and Afrotropical materials of the genera *Omiodes* Guinée, 1854 and *Patania* Moore, 1888 were studied in [6] [15]-[33].

2.4. Terminology and Abbreviations

The denotations of veins follow the terminology of Shaffer & Munroe [6]. The descriptions of the wing pattern characters, genitalia, and tympanal organs follow Maes' terminology [14]. Abbreviations: n = length of a sample. OUMNH = Oxford University Museum of Natural History, ZSM = Zoological State Collection Munich.

3. Results and Discussion

3.1. Tribe Margaroniini Swinhoe & Cotes, 1889

Genus *Omiodes* Guinée, 1854

Type species: *Omiodes humeralis* Guinée, 1854

Diagnosis: Forewing elongate, termen straight, presence of antemedial, postmedial lines, and a discoidal spot. Hindwing round or triangular. Antenna filiform ciliate. Labial palpus obliquely ascending, second segment dilated, third

segment small, tapered, with a short anterior-directed scale tuft. Maxillary palpus prominent, reaching the plane of the frons. The uncus is composed of a neck and head. The posterior end of the neck is arched. Head with a dorsal sclerotized patch of chaetae, apical tip upturned. Subscaphium present. Vinculum u-shaped, saccus short and broad. Valva with the costa convex, apex broadly rounded, sacculus sclerotized, fibula present. Transtilla continuous or medially separated, slender or basally dilated. Juxta elongated. Phallus slender, vesica anteriorly with patches of spinules, posteriorly with one elongated cornutus [6] [25].

***Omiodes undularis* sp.n.**

Zoobank ID:

urn:lsid:zoobank.org:act:321C5BCA-F144-4C53-B798-26129AE14921

Material: Holotype, ♂, Saudi Arabia, Prov. Jizan, Al Kasha, 17.241769°, 43.061394°, 640 m, 12-II-2024, slide no. 24GP018, leg. M. Seizmair, coll. ZSM.

External characters (Figure 1): Forewing length: 9.0 mm. Ratio forewing length/width: 1.9. **Head:** Antenna ochreous in the flagellum, grayish in the ciliae. Proboscis, vertex and frons grayish scaled, interspersed with yellowish scales. Labial palpus yellowish-scaled, interspersed with grayish-white scales dorsally in segment 2, total length relative to the diameter of the eye 0.8. Maxillary palpus yellowish-ochreous, with grayish-white scales at the tip, length relative to the labial palpus 0.35. **Thorax:** Dorsum and venter grayish scaled. Legs grayish scaled. Forewing ground yellowish-brown, antemedial, postmedial, subterminal lines, discoidal spot and termen darkish-brown. Antemedial line slightly oblique. Postmedial line developing from the costa, slightly undulated, with an inward turn near M1, a second downward turn immediately below the discoidal spot, and running straight to the anal border. Discoidal spot stroke-shaped. Subterminal line marked as a series of interneural spots. Fringe grayish. Presence of medial and subterminal lines in the hindwing, subterminal line straight, bare from interrupt. Underside fore- and hindwing ground grayish-ochreous, antemedial and postmedial lines strongly blurred, subterminal line straight, bare from interrupted in both wings. **Abdomen:** Dorsum grayish-white segments, and inter-segmentally yellowish-brown. Venter grayish-white. Anal tuft grayish-white.

Male genitalia (Figure 2(A)-(D)): Uncus neck posteriorly widened, length relative to the length of the tuba analis 0.6, four times as long as wide, scaphium marked as an elongated rod-shaped sclerite. Uncus head with the dorsal ridge arched and narrow with one elongate and medially dilated sclerotized patch, ventrally undulated, apex truncate, sub-quadrangular shaped, strongly sclerotized. Tuba analis medially dilated, posteriorly tapered and acuminate, subscaphium present, marked as lateral stroke-shaped sclerites. Transtilla with basal rhomboid, asymmetrical dilatation, short arms, broadened toward the basis, posterior end strongly sclerotized. Valva double long as broad, sub-rectangular shaped, costal border straight ventral border concave, apex broad, flattened, sub-rectangular. Fibula costad-directed, posterior end elongated, thorn-shaped, basis composed of a short anterior-directed projection and an elongate, rod-shaped costad-directed

process. Juxta split in the anterior half, posterior half lobar, laterally strongly sclerotized. Sacculus basally strongly dilated, lobar, with a strongly sclerotized dorso-distal process reaching to the fibula. Saccus strongly narrowed, apically rounded. Phallus elongated, cornutus extending over the entire length of the phallus.

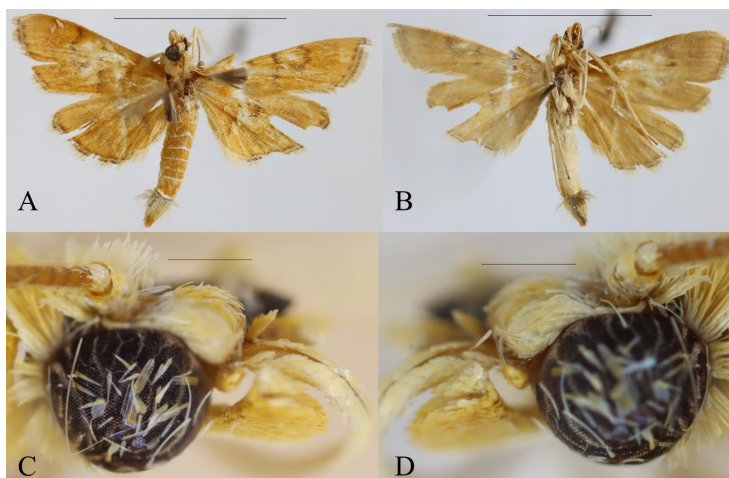


Figure 1. *Omiodes undularis* sp.n., ♂, holotype, slide no. 24GP018, external characters. (A): Upperside. (B): Underside. (C): Head profile—eye, vertex, frons, labial and maxillary palpus. (D): Head profile—dorsal border of labial palpus. Scale bars (A), (B) = 10 mm, scale bars (C), (D) = 0.3 mm.

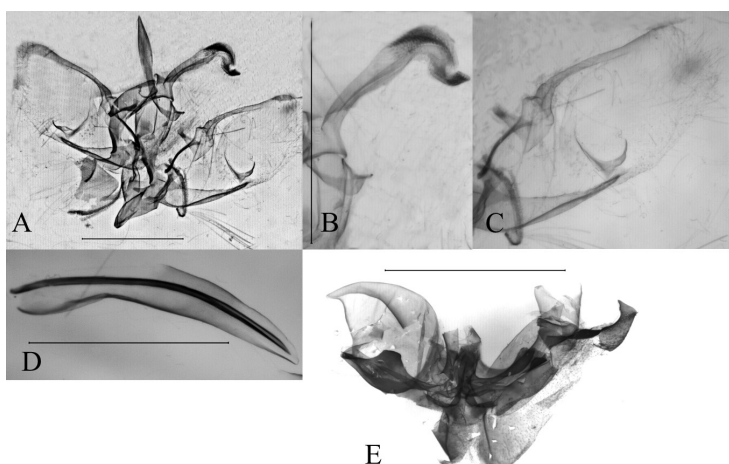


Figure 2. *Omiodes undularis* sp.n., ♂, holotype, slide no. 24GP018, internal characters. (A) - (D): Male genitalia. (A): Capsule, phallus omitted. (B): Uncus, close-up. (C): Right valva, close-up. (D): Phallus. (E): Tympanal organs. Scale bars = 1 mm.

Female genitalia: The female genitalia are unknown.

Tympanal organs (Figure 2(E)): Venua secunda elongated, with basal angulation. Rama tympani short, sub-triangular shaped. Lobuli present, strongly sclerotized. Fornix tympani broadly sclerotized.

Diagnosis: Among the Afrotropical and Oriental representatives of the genus, the new species is closest related to *Omiodes indicata* (Fabricius, 1775), *Omiodes*

diemenalis (Guenée, 1854), *Omiodes contubernalis* (Moore, 1888), and *Omiodes camphorae* (Tams, 1928). These species share the presence of ochreous-yellowish scaling in the fore- and hindwing uppersides. The new species, *O. indicata* and *O. camphorae* differ from *O. diemenalis* and *O. contubernalis* in the absence of extensive darkish fuscous subterminal fasciae in the fore- and hindwing and in the absence of darkish fuscous scales between the antemedial and postmedial lines and in the cell. *O. camphorae* is differentiated from the new species and *O. indicata* in the scaling of the labial palpus. In *O. camphorae* the labial palpus is darkish fuscous to black, interspersed with white scales basally. In the new species and in *O. indicata*, the labial palpus is yellowish scaled.

O. indicata and the new species differ in the following external and internal character states (**Table 1**).

The internal morphology of *O. indicata* is described and figured in [6] [20] [25].

Bionomics: The type specimen was captured on a terraced slope densely covered with ruderal vegetation and interspersed with shrubs on the verge of tropical rainforests.

Distribution: The new species is known only from its type locality in southwestern Saudi Arabia.

Etymology: The species name refers to one of the differential character states in the male genitalia, the undulated uncus head (lat. undus).

Remarks: The Oriental and Afrotropical species of the genus require revision. The applicability of the species groups set up in Gentili & Solis [25] to the Afrotropical and Oriental species requires further study. Based on external characters, the new species, the Oriental *O. camphorae*, *O. contubernalis* and the Oriental and Afrotropical *O. diemenalis* are attributable to the *O. indicata* group sensu Gentili & Solis [25]. However, the new species does not exhibit the key differential character in the male genitalia of this group, namely the quadrangular

Table 1. Differential characters *O. undularis* sp.n., *O. indicata*.

	<i>O. undularis</i> sp.n.	<i>O. indicata</i>
External characters		
Presence of white scales in the labial and maxillary palpus (0: absent, 1: present)	1	0
Presence of darkish-brown spots in the labial palpus (0: absent, 1: present)	0	1
Internal characters		
Shape and sclerotization of the uncus head (0: dorsal ridge narrow, one dorsal sclerotized patch, ventral undulation present, apical tip sub-quadrangular shaped, 1: dorsal ridge with a strong quadrangular shaped dilatation, two dorso-medial sclerotized patches, ventral undulation absent, apical tip rounded)	0	1
Shape of the valva (0: costa convex, apex medially rounded, 1: costa straight, apex flattened, broad, sub-rectangular)	1	0
Shape of the basal transtilla (0: ovoid, 1: rhomboid)	1	0
Length of the cornutus relative to the length of the entire phallus (0: 0.5, 1: 1)	1	0

dilatation of the uncus head. The male and female genitalia of *O. camphorae* and *O. contubernalis* are unknown.

3.2. Tribe Agrotterini Acloque, 1897

3.2.1. Genus *Patania* Moore, 1888

Type species: *Botys concatenalis* Walker, 1866

Diagnosis: Labial palpus vertically upturned. Maxillary palpus simple and filiform. Antenna simple, with ciliae in male. Male genitalia with uncus truncate. Pseudognathos present. Tuba analis exceeding uncus. Vinculum moderate to long. Vesica with zero to several cornuti. Bursa with 0 - 2 signa. Ductus bursae moderately long. Anterior apophyses basally dilated [22].

***Patania orbicularis* sp.n.**

Zoobank ID:

urn:lsid:zoobank.org:act:21320651-6A39-477D-959B-BAD00E601FD6

Material: Holotype, ♂, Saudi Arabia, Prov. Jazan, Fayfa Mts., Al Kasha, 17.241769°, 43.061394°, 640 m, 13-XI-2023, slide no. 23GP063, leg. M. Seizmair, coll. ZSM.

External characters (Figures 3(A)-(C)): Forewing length: 12.8 mm. Ratio forewing length/width: 1.8. **Head:** Antenna yellowish-ocherous in the flagellum, ciliae grayish-white. Labial palpus truncate, grayish-white scaled ventrally in segment 1, light yellowish scaled in segments 2 and 3, equal in length to the eye diameter. Maxillary palpus filiform, unscaled, length relative to the diameter of the eye 40%. Vertex and frons grayish-yellowish. **Thorax:** Dorsum yellowish-white, venter grayish-white. Legs are grayish-white scaled in the femur, and yellowish-brown in the tibia and in the tarsi. Forewing triangular-shaped, costa and anal borders straight, apex slightly down-turned and acuminate, termen straight and oblique, tornus edged. Upperside ground yellowish-gray. Antemedial line, postmedial line and discoidal spot brownish. Antemedial line weakly indicated. Postmedial line with an obtusely angled outward turn toward the termen at M2, followed by a right-angled inward turn toward the basis at CuA1 and a third turn toward the anal border between M3 and CuA1. Discoidal spot reniform. Subcostal and subterminal areas with yellowish-brown fasciae. Termen and fringe grayish-yellowish. The hindwing ground is concolorous with the forewing ground. Termen and fringe as for the forewing. The postmedial line is brownish, weakly indicated and strongly blurred. The fore- and hindwing undersides are identical to the upper-sides. **Abdomen:** Dorsum grayish-yellowish, interspersed laterally with brownish scales. Anal tuft grayish-white. Venter unicolorous, grayish-white.

Male genitalia (Figures 4(A)-(C)): Uncus of sub-triangular shape, tip rounded, dorso-laterally with short chaetae, scaphium marked as a rod-shaped sclerite. Tuba analis 2.3 times longer than the uncus, subscaphium present. Gnathos spatulate, short, length relative to the uncus 40%. Transtilla composed of a lobar, posteriad-directed basis and broadened, short sub-quadrangular-shaped arms, which are in contact. Valva 2.7 times longer than its width. Costa basally inflated,

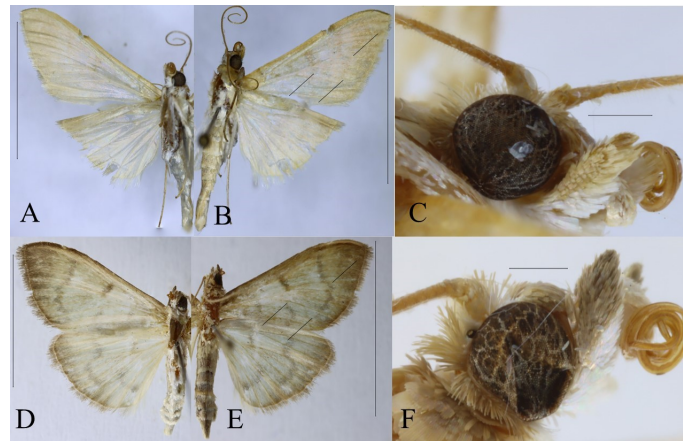


Figure 3. *Patania* Moore, 1888, newly described species, external characters. (A)-(C): *Patania orbicularis* sp.n., ♂, holotype, slide no. 23GP063. (A): Underside. (B): Upperside. (C): Head profile. (D)-(F): *Patania rhomboidalis* sp.n., ♀, holotype, slide no. 24GP011. (D): Underside. (E): Upperside. (F): Head profile. Scale bars (A), (B), (D), (E) = 10 mm, scale bars (C), (F) = 0.3 mm.

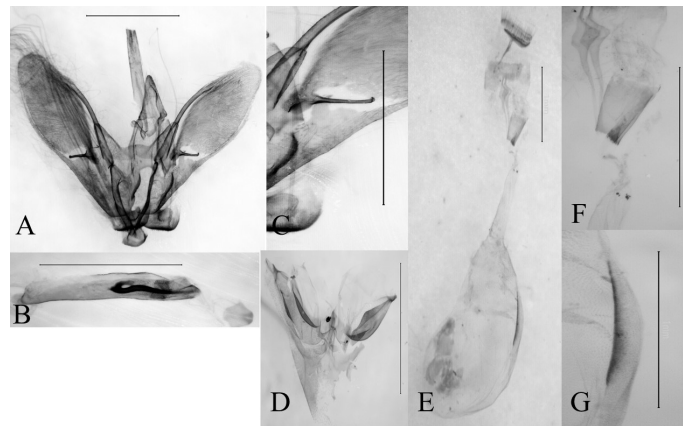


Figure 4. *Patania* Moore, 1888, newly described species, internal characters. (A)-(C): *Patania orbicularis* sp.n., ♂, holotype, slide no. 23GP063, male genitalia. (A): Capsule, phallus omitted. (B): Phallus. (C): Right valva, close-up. (D)-(G): *Patania rhomboidalis* sp.n., ♀, holotype, slide no. 24GP011, female genitalia. (D): Tympanal organs. (E): Capsule. (F): Posterior apophyses, posterior ductus bursae, close-up. (G): Signum, close-up. Scale bars = 1 mm.

medially convex. Apex medially rounded. Ventral border medially concave. Fibula elongate, developing from immediately below the basal costa, nearly reaching the sacculus, constant in width, very slender, posterior end up-hooked. Sacculus basally triangular-shaped, acuminate, post-basally strongly tapered with an elongate rod-shaped dorso-distal process. Juxta cordate, slightly invaginated. Vinculum strongly narrowed anteriorly, laterally strongly sclerotized. Saccus u-shaped. Coremata strongly broadened, of sub-quadrangular shape. Phallus with the coecum membranous, constant in width, and the posterior portion strongly narrowed. Vesical surface with granulated areas, two plate-shaped sclerites and a deciduous, elongated, s-shaped cornutus.

Female genitalia: The female genitalia are unknown at present.

Diagnosis: The new species is closest related in external character states and in the male genitalia to the Afrotropical *Patania tchadalis* (Leraut, 2005), with which it shares the truncate shape of the labial palpus with the first segment white scaled, the overall shape of the postmedial line characterized by three turns toward the termen, the basis and the anal border, the presence of subterminal fasciae in the fore- and hindwing, the presence of an s-shaped cornutus in the vesica, the sub-triangular shape of the uncus, the spatulate pseudo-gnathos and the cordate juxta. The new species is differentiated from *P. tchadalis* in the following character states: Scaling of the second and third segments of the labial palpus: yellowish in the new species, yellowish-ocherous in *P. tchadalis*. Shape of the forewing: triangular-shaped, with the termen straight and oblique in the new species, forewing termen convex, tornus rounded in *P. tchadalis*. Shape of the forewing: triangular-shaped, with the termen straight and oblique in the new species, forewing termen convex, tornus rounded in *P. tchadalis*. Shape of the second inward directed turn in the forewing postmedial line: right angled in the new species, with the third between M3 and CuA1, obtusely angled in *P. tchadalis* with the second turn between at M2. Shape of the uncus: border straight in the new species, border convex in *P. tchadalis*. Length of the fibula: elongated, ranging near to the sacculus in the new species, short, ranging to the middle of the valva in *P. tchadalis*. Shape of the juxta: slightly invaginated in the new species, deeply invaginated in *P. tchadalis*. Presence of numerous small cornuti in addition to the deciduous s-shaped cornutus: absent in the new species, present in *P. tchadalis*. Presence of plate-shaped sclerites in the vesica: present in the new species, absent in *P. tchadalis*.

The male genitalia of *P. tchadalis* are figured in [23].

Bionomics: The type specimen was captured on a terraced slope densely covered with ruderal vegetation and interspersed with shrubs on the verge of tropical rainforests.

Distribution: The new species is known only from its type locality in southwestern Saudi Arabia.

Etymology: The species name refers to one of the differential character states in the male genitalia, namely the presence of plate-shaped sclerotization in the vesica (latin: orbs, orbis).

Patania rhomboidalis sp.n.

Zoobank ID:

urn:lsid:zoobank.org:act:9E6575B7-7374-45A9-A399-B17372402CA5

Material: Holotype, ♀, Saudi Arabia, Prov. Jazan, Fayfa Mts., Al Kasha, 17.241769°, 43.061394°, 640 m, 09-XI-2023, slide no. 24GP011, leg. M. Seizmair, coll. ZSM.

External characters (Figures 3(D)-(F)): Forewing length: 13.0 mm, Ratio forewing length/width: 1.7. **Head:** Antenna yellowish in the flagellum, grayish-white in the ciliae and the scaling of the shaft. Vertex yellowish-brown. Frons grayish-brown. Labial palpus of rhomboid shape, half as wide as long, length relative to

the diameter of the eye 0.9, scaling darkish-gray interspersed with darkish-brown scales, first and second segments basally with whitish-gray scales. Maxillary palpus grayish white segments 1 and 2, grayish-brown in segments 3 and 4, half as long as the labial palpus. Basis of the proboscis grayish-white scaled. Thorax: Dorsum and venter grayish scaled. Forewing costal border straight, arched at the apex, apex down turned, acuminate. Termen straight, slightly convex at M2. Ground grayish-brown. Forewing with darkish-brown fasciae between the costa and the R1 and in the sub-terminal area. Antemedial and postmedial lines darkish-brown. Antemedial line weakly indicated. Postmedial line developing from the R1, with an obtusely angled outward turn toward the termen near M1, a second inward turn toward the basis near CuA1, and a third turn toward the anal border. The line segment between the first outward turn and the second inward turn is serrate. The line segment starting from the third turn is convex. Antemedial spot weakly indicated. Discoidal spot darkish-brown, reniform. Terminal line grayish. Fringe darkish-brown. Hindwing with the costal and anal borders straight, termen concave, apex rounded, with darkish-brown subterminal fasciae. Discoidal marking and postmedial line darkish-brown. Discoidal marking indicates an elongate stroke. Post-medial line developing from the Sc+R1 with an obtusely angled outward turn at M1, a right-angled inward turn toward the basis and a third turn toward the anal border at CuA2. The line segment between the first and second term is serrate, the line segment extending from the third turn is slightly convex. Discocellular spot brownish, weakly indicated, stroke-shaped. Subterminal line and fringe as for the forewing. The fore- and hindwing undersides are identical to the uppersides. Abdomen: Dorsum with yellowish-gray scales at the segments and inter-segmentally with darkish-gray scales. Venter grayish-white scaled.

Male genitalia: The male genitalia are currently unknown.

Female genitalia (Figures 4(E)-(G)): Papilla analis small, with short chaeta, length relative to the length of the posterior apophysis 1.4. Basal dilatation of the posterior apophysis is slight, of sub-triangular shape. Posterior apophysis with a strong dilatation basally of rhomboid shape, length relative to the anterior apophysis 1.8. Ostium membranous. Antrum with lateral line-shaped sclerotizations, slightly sclerotized internally, anteriorly slightly narrowed. Ductus bursae membranous, constant in width, short, half as long as the corpus bursae. Corpus bursae bulbous, elongate, twice as long as broad, posterior area near the transition to the ductus bursae granulated. Corpus bursae wall with one signum, marked as an elongate, strongly granulated strap, with lateral sclerotization on one side. The signum is constant in width, length relative to the length of the bursa 0.3.

Tympanal organs (Figure 4(D)): Bulla tympani strongly invaginated. Fornix tympani strongly sclerotized. Venula secunda present.

Diagnosis: The new species is closely related to *Patania tchadalis* (Leraut, 2005), *Patania harutai* (Inoue, 1955), *Patania crepuscularia* Matsui & Naka, 2023, *Patania accipitrals* (Walker, 1866) and *Patania fraterna* (Moore, 1885). The species share external character states, namely the presence of a band of darkish subterminal

fasciae in the fore- and hindwing, the presence of discoidal marking in the fore- and hindwing, the overall shape of the forewing postmedial line characterized by a sequence of angulations toward the termen, the basis and the anal border and white scaling in the first segment of the labial palpus. Furthermore, the new species shares with *P. tchadalis*, *P. harutai* and *P. crepuscularia* the presence of one single signum in the bursa. The female genitalia of *P. accipitralis* and *P. fraterna* are unknown. The character states differentiating the new species from the four comparative species are listed in **Table 2**.

Table 2. Differential character states *P. rhomboidalis*, *P. tchadalis*, *P. harutai*, *P. crepuscularia*, *P. accitriplis*, *P. fraterna*.

	<i>P. rhomboidalis</i> sp.n.	<i>P. tchadalis</i>	<i>P. harutai</i>	<i>P. crepuscularia</i>	<i>P. accipitralis</i>	<i>P. fraterna</i>
External characters						
Shape of the postmedial line – shape of the section between the inward angulation and the anal border (0 = straight, 1 = angulated)	1	0	0	1	0	0
Shape of the postmedial line – shape of the first outward turn (0 = obtuse, 1 = right angled, 2 = absent, replaced by a slight convexity)	0	0	0	1	1	2
Shape of the postmedial line – shape of the inward angulation (0 = obtusely angled, 1 = right angled)	1	0	1	1	1	0
Shape of the forewing discocellular marking (0 = point-shaped, 1 = claviform, 2 = reniform)	2	0	2	2	2	1
Shape of the labial palpus (0 = truncate, 1 = rhomboid)	1	0	0	0	0	0
Scaling of the second and third segment of the labial palpus (0 = darkish-gray to brown, 1 = yellowish-ocherous, 2 = yellowish-brown, 3 = brownish-ocherous)	0	1	2	3	3	2
Internal characters						
Presence of bilobed structure / appendix in the corpus bursae wall (0 = absent, 1 = present)	0	1	1	0	-	-
Presence of sclerotization in the anterior ductus bursae, close to the transition to the corpus bursae (0 = absent, 1 = present)	0	1	0	0	-	-
Shape of the signum (0 = constant in width, 1 = asymmetrically dilated)	0	0	1	1	-	-
Shape of the ductus bursae (0 = constant in width, short length relative to the length of the bursa < 1, 1 = short, length relative to the bursa < 1, widened anteriorly toward the transition to the bursa, 2 = elongate, length relative to the bursa > 1, widened posteriorly toward the antrum, 3 = elongate, length relative to the bursa > 1, slender, widened anteriorly toward the bursae...)	0	1	2	3	-	-

Furthermore, the new species is distinguished from the lectotype of *P. aegrotalis* (Zeller, 1852) figured in [21] [26] in the presence of subterminal fasciae, in the presence of angulation in the section between the inward angulation and the anal border of the postmedial line and in the broadened forewing – the ratio forewing length/width is > 1.5 in the holotype of the new species, ≈ 0.5 in the lectotype of *P. aegrotalis*.

Bionomics: The type habitat is the same as that of *P. orbicularis* sp.n..

Distribution: Currently, the distribution is the same as *P. orbicularis* sp.n..

Etymology: The epitheton refers to one of the external differential character states, the rhomboid shape of the labial palpus.

Key to the newly described species and their closest relatives based on external and internal morphology

The internal morphological character states of the comparative species listed in the determination key in **Table 3** are based on [18] [19] [22] [23] [27].

Table 3. Key to the newly described species and their closest relatives of *Patania* Moore, 1888.

1	Labial palpus elongate and of rhomboid shape	<i>P. rhomboidalis</i> sp.n.
-	Labial palpus short and truncate.....	2
2	Vesica in the male genitalia with an s-shaped cornutus	3
-	Vesica without s-shaped cornutus.....	4
3	Presence of plate-shaped sclerites, fibula elongate reaching near to the sacculus, uncus border convex, juxta slightly invaginated, forewing termen straight and oblique, postmedial line with the second turn right-angled, labial palpus light yellowish.....	<i>P. orbicularis</i> sp.n.
-	Presence of a cluster of small cornuti, fibula short ranging to the middle of the valva, uncus border straight, juxta deeply invaginated, forewing termen convex, tornus rounded, postmedial line with the second turn obtusely angled, labial palpus yellowish-ocherous in segments 2 and 3...	<i>P. tchadalis</i>
4	Uncus of sub-triangular or trapezoid shape, basally widened, posteriorly narrowed.....	5
-	Uncus constant in width, narrow, borders paralleled.....	6
5	Vesica bare from cornuti, Gnathos short, digitiform, fibula basally strongly broadened, juxta plate-shaped and unsplit, labial palpus brownish-ocherous in segments 2 and 3	<i>P. accipitralis</i>
-	Vesica with a cluster of cornuti differing in length, uncus sub-triangular, gnathos elongate and digitiform, juxta with posterior split, labial palpus yellowish brown in segments 2 and 3	<i>P. fraterna</i>
6	Fibula upturned, apex of valva pointed, cornutus indistinct, weakly sclerotized, ductus bursae elongate, slender, widened anteriorly toward the bursa, signum with medially pointed dilatation, labial palpus brownish-ocherous in segments 2 and 3.....	<i>P. crepuscularis</i>
-	Fibula quasi straight, apex of valva rounded, cornutus distinct, strongly sclerotized, ductus bursa elongate and widened posteriorly toward the antrum, signum ranging over the entire length of the bursa, labial palpus yellowish-brown in segments 2 and 3.....	<i>P. harutai</i>

3.2.2. Genus *Notarcha* Meyrick, 1884

Type species: *Zebronia cassualis* Walker, 1859

Diagnosis: Labial palpus vertically upturned, reaching or exceeding the plane of the vertex, first and second segments equal in length, third segment short and narrow. Maxillary palpus short, not reaching beyond the second segment of the labial palpus. Antenna filiform ciliate. Male genitalia with the uncus subtriangular, apex narrowed, rounded, truncate or weakly excavated. Tegumen dorsally with a pair of sclerotized rods. Transtilla (sub-)triangular shaped. Juxta shield-shaped. Vinculum laterally sinuate. Saccus anteromedially with a carina. Valva obliquely rounded, strongly exceeding the apex of the uncus, basal costa inflated, fibula present, spike-shaped, with a triangular shaped, sclerotized base developing from the basis of the valva. Sacculus basally broadened, with dorso-distal process. Phallus tubular with two or more deciduous cornuti. Female genitalia with papilla analis densely chaetose. Anterior apophyses with a rhomboid dilatation near the posterior end. Ostium widened, bare from sclerotization. Colliculum present, broad, laterally strongly sclerotized. Ductus bursae broad, short, with complex strong sclerotization composed of one or several sclerotized and spinose processes. Corpus bursae large, ovoid, unarmed [6].

***Notarcha viridalis* Seizmair, 2021**

Material examined: Saudi Arabia, Prov. Jazan, Fayfa Mts., Al Kasha, 17.241769°, 43.061394°, 640 m, 10-XI-2023, 1 ♂, slide no. 23GP062, 12-II-2024, 1 ♀, slide no. 24GP015, leg. et coll. M. Seizmair.

Further material examined: Oman, Dhofar, 20 km E Sarfait, Jebel Al Qamar, 07-XI-2018, 2 ♂♂, slide no. GPPYR2319 (Holotype, leg. M. Seizmair, coll. ZSM), slide no. GPPYR2219 (Paratype, leg. et coll. M. Seizmair).

Diagnosis: Forewing length: 8.2 mm - 8.5 mm. Ratio forewing length/width: 1.9 - 2.0. 1.7. Labial palpus short, not reaching the plane of the vertex, equal in length to the diameter of the eye, scales in the first and second segment grayish-yellow, the third segment with black scales basally and grayish-yellow scales at the tip. Proboscis basally with yellowish scales (**Figure 5(C), Figure 5(D)**). Forewing ground whitish, with greenish-yellow subterminal, postmedial and anteterminal lines, basis with a black spot near the anal border, costal border with three small spots, post-basally, ante-medially and post-medially. Hindwing ground concolorous with the forewing ground, with sinuate post-medial, medial, ante-medial and basal lines concolorous with the lines in the forewing (**Figure 5(A), Figure 5(B)**). Male genitalia with the uncus sub-triangular shaped. Subscaphium marked as elongate, fine, rod-shaped sclerites. Tuba analis three times as long as the uncus, basally narrowed, apically rounded (**Figure 6(A), Figure 6(C), Figure 6(D), Figure 6(F)**). Sclerites in the tegumen weakly concave, nearly straight, running oblique. Fibula elongate, nearly reaching the distal sacculus, running transversally. Transtilla short, basally strongly broadened. Vinculum obtusely angled, saccus v-shaped, carina retracted, evanescent. Vesica with two to three cornuti (**Figure 6(A), Figure 6(B), Figure 6(D), Figure 6(E)**) [34].

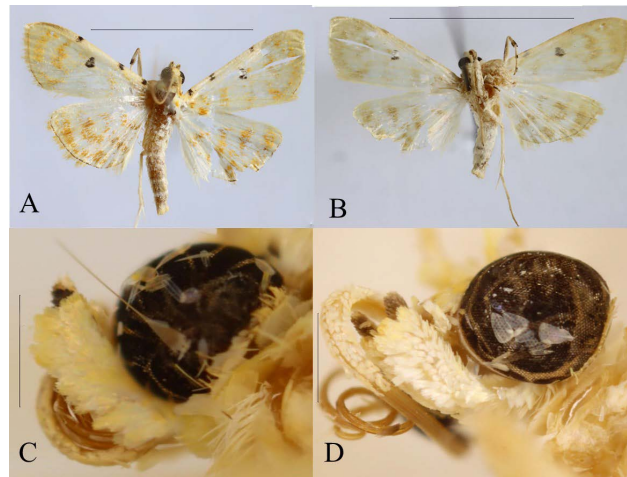


Figure 5. *Notarcha viridalis* Seizmair, 2021, external characters. (A – (C): ♂, slide no. 23GP062. (A): Upperside. (B): Underside. (C): Head profile. (D): ♂, holotype, slide no. GPPYR2319, head profile. Scale bars (A, B) = 10 mm, scale bars (C, D) = 0.5 mm.

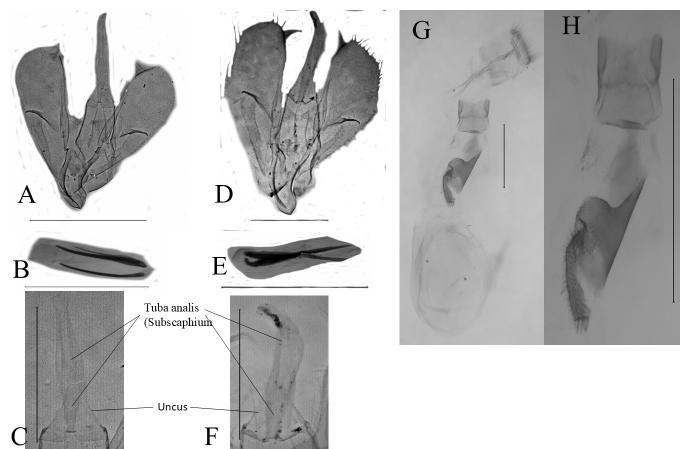


Figure 6. *Notarcha viridalis* Seizmair, 2021, internal characters. (A)-(F): Male Genitalia. (A)-(C): ♂, holotype, slide no. GPPYR2319. (D)-(F): ♂, slide no. 23GP062. (A), (D): Capsule, phallus omitted. (B), (E): Phallus. (C), (F): Uncus, tuba analis (subscaphium), close-ups. (G)-(H): ♀, slide no. 24GP015. (G): Capsule. (H): Ductus bursae, close-up. Scale bar = 1 mm.

Female genitalia (Figure 6(G), Figure 6(H)): Papilla analis lobar, three times as long as broad, posterior and anterior ends equal in length. Posterior apophysis medially with a sub-triangular dilatation. Anterior apophysis elongate, length relative to the of the posterior apophysis 1.75. Colliculum broad, quadrangular, laterally broadly sclerotized in the posterior half. Ductus bursae 2.7 times as long as broad, length relative to the length of the corpus bursae 0.70, bare from a diverticulum, with one strongly sclerotized, spinose process of lobar shape present. Sclerotization in the ductus bursae comprises an elongate, narrowed posteriad directed triangular element and a semi-orbicular, strongly broadened element whose width spans nearly the entire width of the ductus bursae. Corpus bursae bulbous, elongate, broad, 1.5 times as long as broad.

Distribution: Oman (Dhofar). **New to the fauna of Saudi Arabia.**

Remark: Misidentifications of character states in the head profile and in the male genitalia by the present author in the original description and diagnosis (Seizmair, 2021) are corrected in the present diagnosis section. The head profile and the male genitalia of the holotype are re-figured (**Figures 5(A)-(D)**) at higher zoom and resolution levels.

Key to the species of the *Notarcha quaternalis* (Zeller, 1852) species complex

Notarcha viridalis Seizmair, 2021 is attributed to the *Notrarcha quaternalis* (Zeller, 1852) species complex sensu Shaffer & Munroe [6] [35], originally comprising the Afrotropical *N. quaternalis* and *Notarcha digitalis* Shaffer & Munroe, 2007. The external characters of this species complex are listed in [6] [35]. The key differential characters of the members of this species complex are exclusively in the internal morphology [6] [26].

The character states in the female genitalia differentiating *N. viridalis* from the other two species are given in **Table 4**. A determination key to the three presently known species of the complex based on the male and female genitalia is given in **Table 5**.

Table 4. Diagnostic character states in the female genitalia differentiating the species in the *N. quaternalis* complex.

	<i>N. viridalis</i>	<i>N. digitalis</i>	<i>N. quaternalis</i>
Presence of a diverticulum in the ductus bursae (0 = absent, 1 = present)	0	1	1
Number of chaetose, lobar processes in the ductus bursae	1	3	1
Position of the chaetose processes in the ductus bursae (0 = posterior, at the transition to the corpus bursae, 1 = medial)	1	0	0
Presence of an additional sclerite in the medial ductus bursa besides the chaetose processes (0 = absent, 1 = present)	1	0	0
Overall length of the ductus bursae relative to the length of the corpus bursae (0 = less than 0.5, 1 = more than 0.6)	1	0	0
Shape of the colliculum (0 = rectangular, longer than wide, 1 = quadrangular)	1	0	1

Table 5. Key to the presently known species of the *N. quaternalis* complex based on internal morphology (male and female genitalia).

1	Ductus bursae with a distinct sclerite composed of triangular and semi-orbicular elements, with one chaetose lobar process medially, bare from diverticulum, length relative to the corpus bursae > 0.6, uncus sub-triangular shaped with the apex truncate, saccus v-shaped, with the antero-medial carina retracted	<i>N. viridalis</i>
-	Ductus bursae besides the chaetose lobar processes weakly sclerotized, chaetose lobar processes posteriorly near the transition to the corpus bursae, diverticulum present, length relative to the corpus bursae < 0.5, apex of the uncus rounded, saccus u-shapes, with the antero-medial carina marked as a protruding keel, number of cornuti = 3	2
2	Number of chaetose lobar processes in the posterior ductus bursae = 3, dorso distal process of the saccus strongly sclerotized, fibula longitudinally directed, number of cornuti = 2	<i>N. digitalis</i>
-	Number of chaetose lobar processes in the posterior ductus bursae = 1, fibular transversally directed, number of cornuti = 1	<i>N. quaternalis</i>

4. Conclusions

Three new species in the genera *Omiodes* Guinée, 1854 and *Patania* Moore, 1888 were described. The key differential characters between *Omiodes undularis* sp.n. and the closest related *O. indicata* are the shape of the uncus, the shape of the valva and the length of the cornutus. Further relatives in the Oriental and Afrotropical zone potentially belonging to the *O. indicata* group were identified – *O. diemenalis*, *O. contubernalis*, *O. camphorae*. The external character states in wing maculation and in the scaling of the labial palpus differentiate these latter species from the new species and *O. indicata* were listed. The relatedness of these taxa requires further study in the male and female genitalia. The internal morphology of *O. diemenalis*, *O. contubernalis*, *O. camphorae* and of all the other Oriental and Afrotropical species of *Omiodes* Guinée, 1854 is still unknown.

In the genus *Patania* Moore, 1888, the new species *P. orbicularis* sp.n. and *P. rhomboidalis* sp.n. were described. The two new species differ in the shape of the palpus—truncate in *P. orbicularis* sp.n., and rhomboid in *P. rhomboidalis* sp.n.. The key differential character states distinguishing the two new species from their closest relatives in the shape of the uncus, sclerotization of the phallus, sclerotization of the corpus bursae, shape and sclerotization of the ductus bursae were listed. A determination key is provided. The two new species differ significantly in wing shape and wing maculation from the lectotype of *P. aegrotalis* figured in Shaffer & Munroe (1989). *P. aegrotalis* is listed for the fauna of the Arabian Peninsula based on data from Yemen [36]. However, these historical data need verification.

The female genitalia of *N. viriddalis* were described for the first time. Further diagnostic characters in the ductus bursae—the presence of sclerite, number and position of lobar, chaetose processes distinguishing this species from the closest related congeners in the *N. quaternalis* species complex were given. The species was reported as new for the fauna of Saudi Arabia. The distribution, abundancy, ecology (habitat and larval foodplant choice) of the new species are till date unknown and topics for further research.

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Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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