

Morpho-taxonomic study on *Pleuroptya ruralis* Scopoli, 1763 (Crambidae: Lepidoptera) as a new record in Iraq

Ahmed J. Sabr^{1*}, Raghad Khalaf Ibraheem Aljoboory², Dhefah Radi Mahdi³

1. Department of Biology, College of Education for Pure Science Ibn Al-Haitham, University of Baghdad, Iraq

2. Department of Biology, College of Education for Pure Science, University of Al- Iraqia, Iraq

3. Department of Biology, Collage of Science, University of Tikrit, Iraq

* Corresponding author's E-mail: ahmed.j.s@ihcoedu.uobaghdad.edu.iq

ABSTRACT

This study was carried out to report the newly recorded species of the family Crambidae, belonging to the order Lepidoptera. During the investigation on subfamily Pyraustinae in middle of Iraq, the following snout moth's species, i.e., *Pleuroptya ruralis* Scopoli, 1763 is reported for the first time from Iraq. External and genital characteristics of adult were examined and illustrated. This newly recorded species is enumerated with their available information including the collecting localities, illustrations of adults, and female genitalia. There is a paucity of Iraqi research that deals with this family in terms of diagnosing and describing the species of its subfamilies.

Keywords: Snout moths, Pyraloidea, Pyraustinae, Genus *Pleuroptya*.

Article type: Report.

INTRODUCTION

The Order Lepidoptera (moths and butterflies) is a third most diverse order in class Insecta. There are a total in the world of 15.578 genera divided into 157.424 species of which about 18.000 are butterflies and more than 130.000 are moths. Moths and butterflies are very rich in numbers such that new descriptions and updates on their synonymy exceed more 800 species per year (Nieukerken *et al.* 2011). The species *Pleuroptya ruralis* Scopoli, 1763 belonged to subfamily Pyraustinae Meyrick, 1890, family Crambidae Latreille 1810, and superfamily Pyraloidea. It's the third largest superfamily of the Lepidoptera following Noctuoidea and Geometroidea, comprised of two families: Pyralidae and Crambidae. The group includes about 16.000 species worldwide, with greatest richness in the tropics. Morphologically, the superfamily is defined by a basally scaled proboscis and the presence of abdominal tympanal organs (Roh *et al.* 2014; Nuss *et al.* 2003-2020). Crambidae is one of the most important families of this group. It is mainly nocturnal micro-moths (Microlepidoptera). As many as 9655 species referable to 1.020 genera are known in family Crambidae worldwide that evolved diverse morphological and ecological habits (Théo *et al.* 2020). Crambidae are characterized by the forewing venation with R₅ free and an oval sclerotization costad on base of vein A; male genitalia without uncus arms (Garre *et al.* 2021). The subfamily Pyraustinae is numerically not only the largest subfamily of moths in family Crambidae but also in superfamily Pyraloidea. Moths of this subfamily are of immense economic as well ecological importance as they are associated with agricultural, ornamental and forest plantation (Jagbir *et al.* 2016). The species *Pleuroptya ruralis* (Scopoli; Pyralidae: Pyraustinae), mother-of-pearl moth, is widespread over the palaeartic region (Novak 1980). The ecology of this species - as for the majority of other members of the family Pyralidae - has hardly been studied to date (Goater 1987). Most Lepidopteran larvae are phytophagous, however, some species are economically important pests of crops (e.g., sugarcane, corn and rice) to different items such as household goods, clothing, paper and stored products such as flour, fodder, seeds as well as grains and even plastics (Adriana *et al.* 2018).

Caspian Journal of Environmental Sciences, Vol. 21 No. 5 pp. 1323-1328 Received: May 01, 2023 Revised: Sep. 18, 2023 Accepted: Nov. 24, 2023
DOI: 10.22124/CJES.2023.7439 © The Author(s)



The adults are about 25 to 40 mm in size, pearly-cream coloured with beige mottling. Females have their abdomens slightly shorter and broader than males. They feed on nectar and fly at night. By day, they are hiding amongst the nettles (Romanowski 1991). The crambid moth of Iraq has not relatively well studied because there is a need for further investigation on habitus and distribution, and the species of family Crambidae are poorly recorded and more precise data are necessary for the production of distribution maps. Thus, the aim of the present study is to report newly-recorded species of Pyraustinae in Iraq, in order to enrichment the moths in Iraq, especially this family, with species being first recorded. The external and genital features of this moth are briefly described with photographs.

MATERIALS AND METHODS

The study area was Abu Ghraib 2019, 15 km west of the capital Baghdad, located at longitude 44.186944 and latitude 33.307032; and Al- Yusufiya, 25 km south of the capital Baghdad, located at longitude 44.251662 and latitude 33.07908 (Fig. 1). A total of two localities were visited during March and April 2019. A total of seven female specimens were identified based on Carter (1992). The materials and devices examined in the present study were preserved in the Systematic Entomology Laboratory, University of Baghdad, Baghdad, Iraq, including the sticky trap, the hand trap, the square nozzle with a side length of 21cm and the rectangular hand trap with the nozzle 12 × 10 cm, small glass bottles and special wooden boxes for kept the collection samples after fixing their information from the date and place. The solutions used in the preparation of the gravitational substance and their concentrations included sec-butyl alcohol, concentration of 11.4 mL, Phenol of 9.0 g, Indole of 2.3 g and Acetone of 11.4 mL (Solis 2007). The study was made using a dissecting and compound microscopes (Olympus, Japan), using normal light. Images of insects were taken by photomicroscope type YA XUN Microscope User Manual, having enlargement power 20 X. The female genitalia were removed and macerated in a solution of 10% KOH and subsequently mounted on slides in Canadian balsam (Sabr 2018).

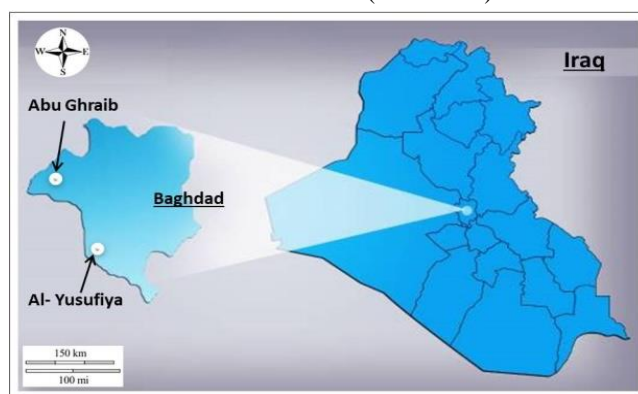


Fig. 1. Locations of study area; Abu Ghraib & Al-Yusufiya.

Systematic Accounts:

Order: Lepidoptera Linnaeus, 1758.

Family: Crambidae Latreille, 1810.

Subfamily: Pyraustinae Meyrick, 1890.

Species: *P. ruralis* Scopoli, 1763 (Seung *et al.* 2014).

RESULTS AND DISCUSSION

Diagnosis (Fig. 2): The individuals were medium in size, 13-17 mm in length and 31-36 mm in wing span. The colour of the species varied from white to white-yellowish. The body was elongated, spindle-shaped.

Studied specimens

-The number of specimens studied was 7 all females.

-The presence months: March, April.

Describe of *Pleuroptya ruralis* Scopoli, 1763.

Head (Fig. 3): The head was relatively small, 2 mm in long and 3 mm in wide, with a pair of well-developed compound eyes, black colour with white stripes curved in the form of compact ovals; it had elongate white scales

8-10 in number between the base of antenna. Antenna was long filamentous (filiform shape). The front was distinct light brown colour, broad and clothed with dense yellowish-white scales of short length and flat in shape. The labial palp was very broad, twice the length of the head, curved at the end, taking the shape of the beak, clothed with thin, dense and medium length of scales, light brown in colour (Fig. 4). The head and thoracic region were yellowish-white colour.

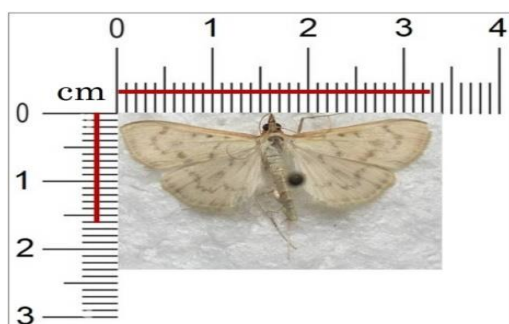


Fig. 2. External morphology of *Pleuroptya ruralis*

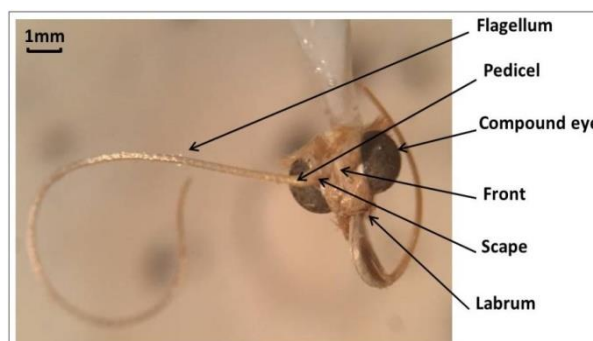


Fig. 3. The head of *Pleuroptya ruralis* (Facial view)

Thorax (Fig. 5): The long was 6 mm and 4 mm in wide. The prothorax was small, less than a quarter of the thorax length, clothed with dense white scales of varying lengths and shapes, bears a pair of small light brown lateral projections called patagia. The tigulae was developed. The last was clothed with dense, flat scales of yellowish medium length, and long white. The mesothorax was the largest part in the thorax; white to light brown in colour, it was more than two-quarters of the thorax length. The metathorax was small; a quarter of the thorax length, light brown colour.



Fig. 4. The head of *Pleuroptya ruralis* Lateral view

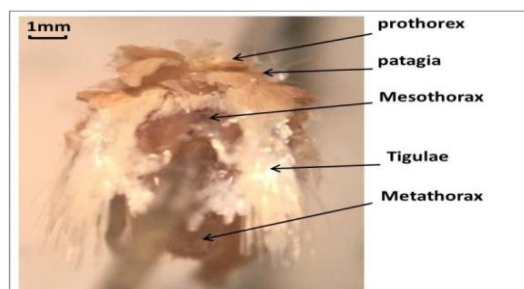


Fig. 5. The thorax of *Pleuroptya ruralis*

Wing: Fore wing (Fig. 6A and Fig. 7): The long was 14.5 mm, and 7 mm in wide. It was broad, covered with white scales and yellowish-brown at the area between costal and radial veins; with blackish scales extending from the half of the anterior margin to the apical angle. It had three spots of blackish scales at the second quadrant along the upper side of the wing cell. There was a black band called basal band at the end of the first third of the wing and extended below the wing cell to the anal margin, and a blackish band wider than the basal called median band, extending at the second third of the wing, specifically at the end of the R_1 , tends toward the outer margin, reaching the middle of the last third and then returning inward to end at the anal margin in the second third. In addition, a very thin band called terminal line run parallel to the apical margin. The Sc vein extended with the anterior margin to the last third of the wing. The R_1 vein was separated at the beginning of arises the R_s vein from the base of the wing and extended to the margin after the Sc vein. The R_2 vein was separated just before the middle of the wing to reach the margin after the R_1 . The R_3 and R_4 veins were extended separately to the margin before the apical angle; the R_5 vein was free and extended to the margin after the apical angle. The M_1 vein extended from the upper corner of the wing cell to the margin. The M_2 vein also extended from the top of the lower corner of the wing cell to ends at half the apical margin. The veins M_3 and Cu_1 free from under the lower corner of the wing cell and move away from each other to reach the margin. The Cu_2 vein was free before the lower angle of the wing, just before the end of the first half of the wing, and extended parallel to the Cu_1 vein, ending before the anal angle. The 1A and 2A were extending fused from the base of the wing toward the margin at the anal angle. The

3A extended from the base of the wing downwards and then heading up, connecting to the 1A and 2A at the first third end of the wing.

Hind wing (Fig. 6B and Fig. 8): The long was 11 mm, and 8 mm in wide. It was triangular in shape, covered with white scales, and blackish scales forming a spot in the centre of the wing, specifically at the wing cell, and it exhibited a median band of blackish scales slightly arched out in the second third of the wing, with a thin band called terminal line extending along the apical margin of the wing. The hind wing had a frenulum wing coupling apparatus, which was a long, light-brown three-spine tuft; it extended along the anterior margin and represented a quarter of the wing length. The Sc + R₁ veins were fused along the costal margin, ending before the apical angle. The Rs was accompanying with the two Sc + R₁ veins and separated from them at the mid-wing to reach the margin after the apical angle. The M₁ vein arose from above the cell and extended to the margin. The M₂ and M₃ veins are arising from under the wing cell and heading separately to the margin. The Cu₁ vein arose from the under wing cell, just at the mid-wing, and the Cu₂ vein arose from a distance before the Cu₁ vein at the end of the first third of the wing. The 1A, 2A and 3A veins were extended sequentially to the margin of the wing, where 3A vein was at the anal angle.

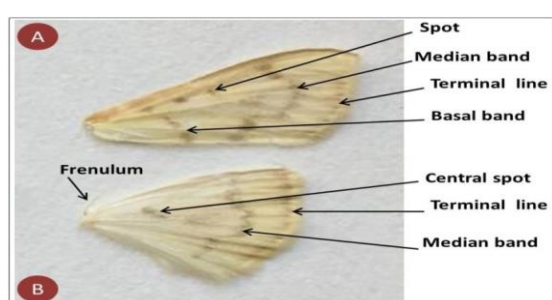


Fig. 6. A, Fore & B, hind wings with scales of *Pleuroptya ruralis*

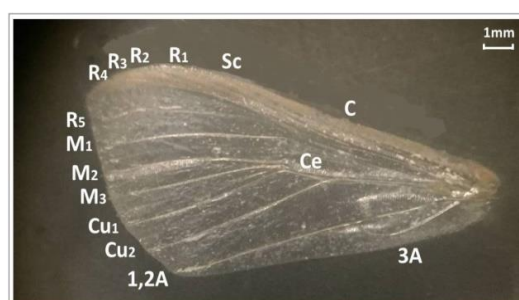


Fig. 7. Fore wing of *Pleuroptya ruralis*

Legs (Fig. 9)

Fore leg (Fig. 9-1): The long was 11 mm, light brown colour, with white dense and very small scales. The coxa was elongate in shape. Trochanter was very small, indistinct, oval and white brown colour, clothed with flat, medium length and white scales that arose from the last quadrant of the coxa. The femur was cylindrical, thinner and longer than the coxa; the last was making up three-quarters of its length. The tibia was small in size, cylindrical, thinner than the femur and lighter in colour. It was half-length of the femur length; bearing a pair of median tibial spurs, equal in length and clothed with small, dense white scales. These two spurs extending downwards to reach end of the tibia. The outer side of the tibial second half was clothed with medium length scales and that extended to cover the tibial end that attached to the tarsus. The tarsus had five segments, thinner than the leg; and the basitarsus is three-quarters of the tarsus.

Mid leg (Fig. 9-2): The long was 14 mm, white in colour. The coxa was small in size, brown-whitish. The femur was cylindrical in shape, elongated. The trochanter was very small. The tibia was cylindrical; it was equal to femur length, thinner and lighter in colour, broad at its distal base, bearing a pair of downward terminal tibial spurs. The short spur was one third of the long spur length. The long spur was less than the half length of the basitarsus. The basitarsus was two-thirds of the tibia length, thinner and slightly darker. Each tarsus segments exhibited four small, dark-coloured spines located at the base of each ring. The pulvillus was dark-brown.

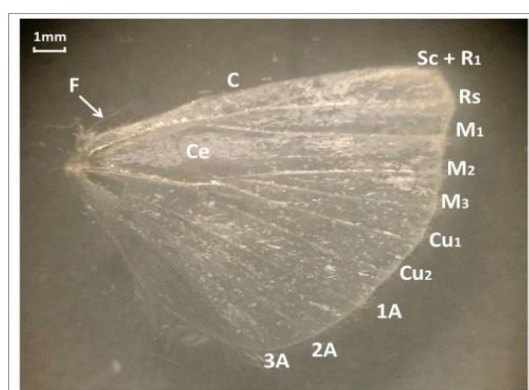


Fig. 8. Hind wing of *Pleuroptya ruralis*

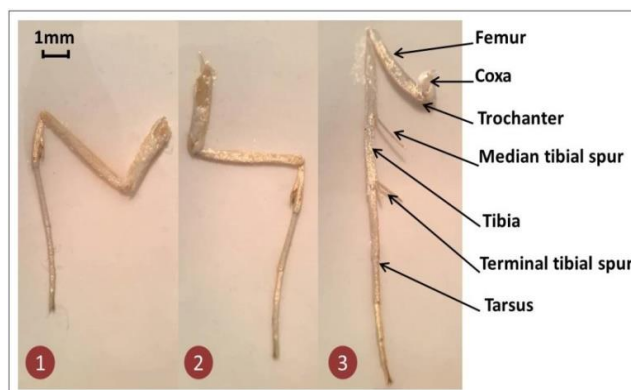


Fig. 9. Legs of *Pleuroptya ruralis*
1. Fore leg, 2. Mid leg, 3. Hind leg.

Hind leg (Fig. 9-3): The long was 9.5 mm; all its parts were white, shine scales. The coxa constituted 0.5 mm of the total leg length. The femur was cylindrical and covered with white scales, representing 2.5 mm of the leg length. The trochanter was very small, round shape. Tibia was cylindrical, longer than the femur, representing 4 mm from the leg length, bearing one of the median tibial spur, 1.5 mm in long; less than a third of the tibia length, curved slightly downward; and pair of terminal tibial spurs; the long spur 1mm and the small spur half in length of the long. The tarsus represented 5 mm from the leg length; the basitarsus 2 mm and the pretarsus 1mm dark colour. The tarsus exhibited small, dense and white spines along the inner side.

Genitalia Organs

The female ♀ (Fig. 10):

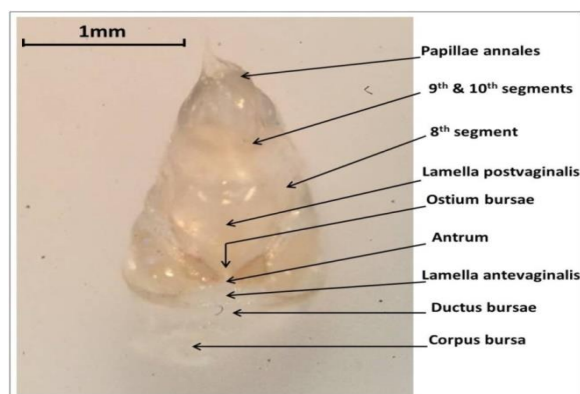


Fig. 10. Female genitalia of *Pleuroptya ruralis*

- The corpus bursa was completely membranous; it was elongate, and length 4× greater than width. The width at middle was appearing to contribute to overall shape of corpus rather than as lateral expansions.

-The sternite 8th with a broad, transverse “pocket shape” mostly concealing the genital opening called ostium bursae.

-Lamella antevaginalis was composed of a pair of hardened called antrum. The posterior margins of hardened exhibited posteriorly projecting extensions of lamella antevaginalis smooth and broadly arcuate, from medial to lateral edge, surrounding the ostium bursae laterally. The posteriorly projecting was extensions of lamella antevaginalis enlarged and conspicuous. While the middle membranous area was much narrower.

-Lamella postvaginalis was a forming an elevated crest and lacking setae; as a distinct light area that was smooth and shiny.

-The 9th and 10th sternites displayed a pear-shaped structure covered with dense, long and medium-length silvery bristles called papillae annales.

Prior to our investigation, we noticed a significant shortage of Crambidae species in Iraq based on an examination of the Iraqi Museum of Natural History specimens and published records that included a poor standing of species. This study presents a new species recorded for Iraq, belonging to sub family Pyraustinae within the family Crambidae, with morphological description and internal anatomy of the female genitalia. This study serves as both a guide for collection in the middle regions of Iraq from which the study samples were collected and adding a new and important species to the list of genus *Pleuroptya* Meyrick, 1890, that can be used to diagnose and describe other species of the same genus, in order to advance the insect diversity program in Iraq. We encourage lepidopterists holding additional data on systematically collected crambids to produce an updated data set. In addition, new intensive surveys are being conducted in adjacent regions of the study sites, as well as unknown specimens being continuously identified to species level in order to diagnose them correctly and accurately.

REFERENCES

- Carter, D 1992, Butter flies and moths. Dorling Kindersley hand Books.
- Chalup, AE, Aiup, MM, Garzia, ACM et al. 2018, First report of the lesser wax moth *Achroia grisella* F. (Lepidoptera: Pyralidae) consuming polyethylene (silo-bag) in northwestern Argentina. *Journal of Apicultural Research*, 27 (4), DOI:10.1080/00218839.2018.1484614

- Garre, MJ, Girdley, J, Guerrero JJ, Rubio, RM & Ortiz, AS 2021, An annotated checklist of the Crambidae of the region of Murcia (Spain) with new records, distribution and biological data (Lepidoptera: Pyraloidea, Crambidae). *Biodiversity Data Journal*, 9: 1-28.
- Goater B 1987, British pyralid moths. A guide to their identification. Harley Books, Colchester.
- Jagbir S, Navneet S, Harsimran S 2016, Inventory of subfamily Pyraustinae (Crambidae: Lepidoptera) from Sikkim. *Journal of Entomology and Zoology Studies*, 4: 700-705.
- Léger, T, Richard Mally, R, Neinhuis, C & Nuss M 2020, Refining the phylogeny of Crambidae with complete sampling of subfamilies (Lepidoptera, Pyraloidea). *Zoologica Scripta*, 50: 84-99.
- Nieukerken EJ, Van KL, Kitching IJ, Kristensen NP, Lees DC, Minet JE 2011 Order Lepidoptera Linnaeus, 1758. In: ZQ, Zhang (Ed.) Animal biodiversity: An outline to higher-level classification and survey of taxonomic richness. *Zootaxa*, 3148: 212-221.
- Novak I 1980, A field guide in colour to butterflies and moths. Octopus, London.
- Nuss M, Landry B, Mally R, Vegliante F, Tränkner A, Bauer F, Hayden J, Segerer A, Schouten R, Li H, Trofimova T, Solis MA, De Prins J & Speidel, W 2003-2020, Global information system on Pyraloidea. Retrieved from <http://www.pyraloidea.org>.
- Roh, SJ, Kim, SS, Bae, YS & Byun, BK 2014, Four newly recorded species of the Family Crambidae (Lepidoptera) from Korea. *Animal Systematics, Evolution and Diversity*, 304: 267-273.
- Romanowski, HP 1991, Population Ecology of *Pleuroptya ruralis* (Scopoli) (Pyralidae: Pyraustinae). Submitted in accordance with the requirements for the degree of Doctor of Philosophy Department of Pure and Applied Biology. The University of Leeds.
- Sabr, AJ 2018, Seasonality and relative abundance of deer and horse flies (Diptera: Tabanidae) from three farms in Al- Anbar, Iraq. *Biochemical and Cellular Archives*, 18: 1915-1920.
- Solis, MA 2007, Phylogenetic studies and modern classification of the Pyraloidea (Lepidoptera). *Revista Colombiana de Entomología*, 33: 1-9.

Bibliographic information of this paper for citing:

Sabr, AJ, Ibraheem Aljboory, RK, Mahdi, DR 2023, Morpho-taxonomic study on *Pleuroptya ruralis* Scopoli, 1763 (Crambidae: Lepidoptera) as a new record in Iraq. *Caspian Journal of Environmental Sciences*, 21: 1323-1328.
