

The occurrence of the citrus flower moth, *Prays citri* (Lepidoptera: Yponomeutoidea: Praydidae) for the first time in Iran

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Abstract

The citrus flower moth, *Prays citri* (Millière), was collected in Chubāgh village, Sari, Mazandaran Province, Iran, using ferolite water-based traps on Lemon trees at a greenhouse in the **May and July** of 2024. The considerable damages on Lemon flowers caused by this pest were observed at the same time. This is the first report of the genus and species from Iran, which was previously considered as an external quarantine pest in the country. A brief taxonomic characterization of the species, as well as the adult and genitalia figures of the examined specimens, are provided.

Keywords: Citrus, external quarantine pest, Lemon, new record, Iran.

The genus *Prays* Hübner, 1825, the largest genus of the family Praydidae, consists of 59 described species worldwide (Cong & Li, 2017; Bippus, 2020), with the most diversity in Asia (Cong & Li, 2017). This genus is characterized by the absence of pectens on the scape of the antenna, the membranous eighth tergum of the male **not protruded** medially on the posterior margin, the presence of the sacculus in male genitalia, and a rudimentary uncus (Sohn & Wu, 2011; Cong & Li, 2017).

In **May and July** of 2024, several moth specimens were collected using ferolite water-based traps on Citrus trees at a greenhouse in Sari, Mazandaran Province, and identified as *Prays citri* (Millière, 1873) following morphological and genitalia examination. The considerable damages on Lemon flowers caused by their larvae were observed concurrently. This species, which was previously being considered an external quarantine pest in Iran, has historically been a sporadic and minor pest on the

flowers of lemons and limes. However, in recent years, it has become a more regular pest, particularly causing damage to fruit up to a golf-ball size (Grout & Moore, 2024). The genus and species are here being reported from Iran for the first time.

Prays citri (Millière, 1873)

Material examined

Māzandarān Prov.: 3 ♂♂ 5 ♀♀, Sāri, Juybār County, Chubāgh village (Mr. Shaeri greenhouse), 36°45'21"N, 52°58'27"E, -23 m, 12.v.2024, 3.vii.2024, Damavandian legs (genitalia slides HA-2978, HA-2979, HA-2980, HA-2981, HMIM; HA: Helen Alipanah; HMIM: Hayk Mirzayans Insect Museum).

Morphological characters

Male, female similar externally, female somewhat lighter. Forewing length 5.2–6.2 mm; wingspan 11.5–14.6 mm. Forewing greyish-brown, strongly mottled by spots, costal margin with few ill-defined blackish brown strigulae alternated with whitish-grey on basal half; fringes greyish-brown. Hindwing brownish-grey, fringes concolorous (Fig. 1E) (Tamutis *et al.*, 2022; Grout & Moore, 2024). There was no external variation among the studied material.



Figure 1. Last larval instar (A), damages caused by the larvae (B, C), pupa inside cocoon (D), and the adult male of *Prays citri* (Millière), upperside. Arrows in the figures B and C indicate the damages caused by the larvae on sepals of the Citrus flower in the greenhouse in Sari region, Mazandaran, Iran. (A, after CABI, 2024; B–E, original; photos: B–D, Mohammad Reza Damavandian, E, Helen Alipanah).

Male genitalia (Figure 2A–G) with uncus as a small swelling (Fig. 2C, F), sometimes hardly visible (Fig. 2A); socius moderate to relatively short (based on slide preparation) (Fig. 2A, C, F), bearing long setae (Fig. 2A); tegumen trapezoidal; gnathos stripe-shaped, narrow, with a small, nearly triangular

projection posteriorly; valva in the examined specimens finger-shaped at the end of cucullus, sacculus broadened towards the base, with a tuft of strong dense setae and a relatively long, acute thorn distally; anellus lobes with long setae; vinculum V-shaped, broad; saccus rounded apically; phallus slender, curved medially (Tamutis *et al.*, 2022), in the examined specimens 1.66–1.67 times as long as the valva (n = 2), vesica with two long rod-shaped cornuti (Fig. 2A, B) and rows of minute spines. In another specimens it seems that there are three rod-shaped cornute in vesica (Fig. 2C, D).

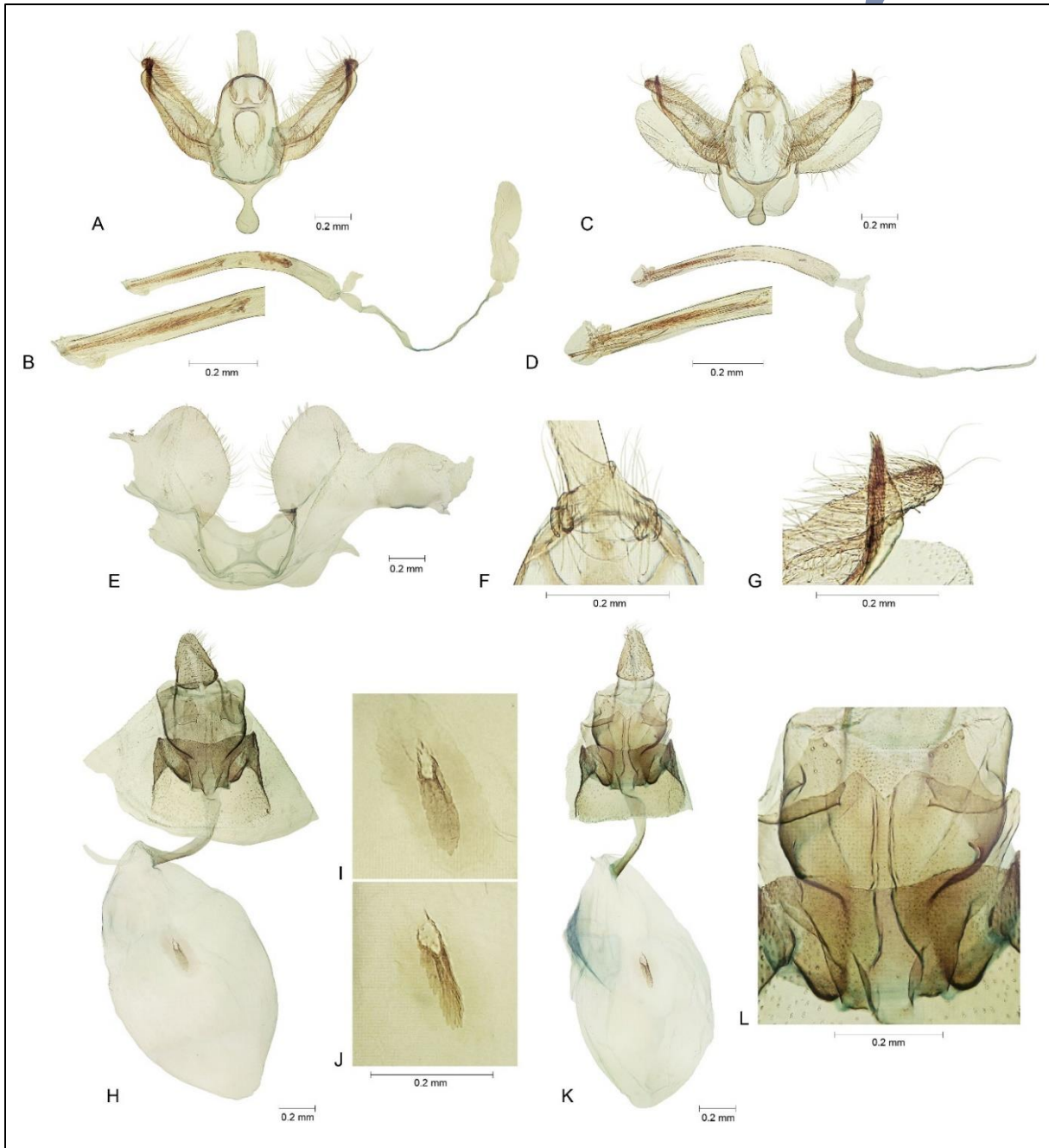


Figure 2. Male (A–G) and female (H–L) genitalia of *Prays citri* (Millière): A, C) Main body and phallus in ventral and lateral views, respectively (C, with pleural lobes of eighth abdominal segment). B, D) Distal one-third of the phallus. E) Pleural lobes of eighth abdominal segment. F) Uncus and socii. G) Distal end of the valva and sacculus. H, K) Main body in ventral view. I, J) Signum. L) Lamella postvaginalis and sternum VIII (genitalia slides, HA-2978, HA-2979, HA-2980, HA-2981, HMIM; slide preparation and photos: Helen Alipanah).

Female genitalia (Fig. 2H–L) with nearly triangular papillae anales; apophyses posteriores slightly longer than apophyses anteriores; lamella postvaginalis produced into a pair of finger-like sclerotized plates, with sparse long setae posteriorly; sternum VIII with longitudinal central groove; antrum short, cup-shaped; ductus bursae relatively short with sclerotized wall; corpus bursae oviform, signum placed medially, elliptical, concave elliptically at posterior end, with dentate margins (Tamutis *et al.*, 2022).

Distribution

Prays citri is widespread in the Mediterranean region. It is present in Africa, Asia, Oceania, and Europe (CABI, 2024). According to CABI (2024), the identifications of *P. citri* on Citrus from east of Turkey and the Middle East (Sri Lanka, Malaysia, Philippines, Pakistan, Fiji, Samoa) are likely to be erroneous.

Biology

The larvae (Fig. 1A) vary from light grey or greenish to brown with a brown head (Grout & Moore, 2024). The chrysalis (Fig. 1D) is found in a very soft, white and sharp cocoon (Bissanti, 2023) and the pupa is initially light green but soon turns chocolate brown (Grout & Moore, 2024). The adults fly at night and twilight. The females lay 1-3 eggs in spring preferably on the petals of the still closed flowers, and also in the sepals, shoots or small fruits. The last larval instars are normally pupate inside the flowers in which they have already fed (Bissanti, 2023). They overwinter as chrysalis, but sometimes in the pupal and larval stages, or as eggs or adults (Bissanti, 2023; Tamutis *et al.*, 2022). They can complete at least three (Karamaouna *et al.*, 2009) up to 11 annual generations (Badr *et al.*, 2018).

Host plants

Citrus species (Rutaceae) are the main host plants of *Prays citri*. However, it prefers Lemon (*Citrus limon* (L.)), Key lime (*C. ×aurantifolia* Swingle), Pummelo (*C. decumana* L.), Mandarin orange / tangerine (*C. reticulata* Blanco), Sweet orange (*C. ×sinensis* (Osbeck)), and Grapefruit (*C. ×paradisi* Macfad.) (Ibrahim & Shahateh, 1984; Abd El-Kareim *et al.*, 2017; Tamutis *et al.*, 2022). The other known host plants of the species are White sapote, Sour orange, *Citrus microcarpa* Bunge (Rutaceae), Broad-leaf privet (Oleaceae), and Sapodilla (Sapotaceae) (Sinacori & Mineo, 1997; Martinez *et al.*, 2019; Tamutis *et al.*, 2022; CABI, 2024).

Damage

The larvae are particularly destructive to blossoms and young fruit which occur in spring and mid-summer. Damaged flower buds and flowers quickly wilt and are shed (Grout & Moore, 2024). Penetration marks of the larvae are initially fairly small, but once the fruit matures, they appear as brown necrotic scars (Moore & Kirkman, 2014) (Fig. 1B, C). In the center of these spots, the chorion of the egg can be found.

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گزارشی از وجود شب‌پره گل مرکبات، *Prays citri* (Lepidoptera: Yponomeutoidea: Praydidae)، برای اولین بار در ایران

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چکیده فارسی:

در اردیبهشت و تیر ماه جاری نمونه‌هایی از شب‌پره گل مرکبات، *Prays citri* (Millière) در تله‌های فرولیت آبی کار گذاشته شده در گلخانه‌ای در روستای چوبگاه شهرستان ساری، استان مازندران، ایران، جمع‌آوری شدند و در همان زمان، خسارت قابل توجه ایجاد شده توسط لاروهای این آفت روی گل‌های لیمو مشاهده شد. جنس و گونه این آفت که تا به حال به‌عنوان آفت قرنطینه خارجی در کشور در نظر گرفته می‌شد، برای اولین بار از ایران گزارش می‌شوند. در این مقاله مشخصات تاکسونومیک گونه به‌همراه شکل حشره کامل، ساختار اندام‌های تناسلی نر و ماده نمونه‌های مورد بررسی، و نحوه خسارت آن‌ها به اختصار ارائه شده‌اند.

کلمات کلیدی: آفت قرنطینه خارجی، گزارش جدید، ایران، Lemon، Citrus.