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Source: *Revue suisse de Zoologie*, 130(1) : 51-57

Published By: Muséum d'histoire naturelle, Genève

URL: <https://doi.org/10.35929/RSZ.0087>

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## Notes on the genus *Epichilo* Ragonot, 1889 with description of the female of *E. vartianae* Bleszyński, 1965 (Lepidoptera, Pyralidae *sensu lato*, Crambinae)

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**Abstract:** The current knowledge on *Epichilo* Ragonot, 1889 is briefly discussed. The two Oriental species, *E. parvellus* Ragonot in Joannis & Ragonot, 1889 and *E. vartianae* Bleszyński, 1965 are compared with each other and illustrated, and the female of *E. vartianae* is described based on seven specimens collected in mangrove habitats in the Bushehr Province, south Iran. The genus *Epichilo* and *E. vartianae* are newly reported for the fauna of Iran.

**Keywords:** Pyraloidea - Crambidae - Iran.

### INTRODUCTION

*Epichilo* Ragonot in Joannis & Ragonot, 1889 is a small genus, presently known from four species equally distributed in the Afrotropical (Kenya to South Africa) and Oriental (India, Pakistan and Sri Lanka) regions. After being synonymous with *Crambus* for a long time (Hampson 1899: 305), it was restored to its original status by Bleszyński & Collins (1962: 301) and Bleszyński (1965: 160). In Southern Africa *Epichilo* species were found by GB during the rainy season in sandy habitats, sometimes near temporary streams. The discovery of *E. vartianae* in mangrove forests in Southern Iran gives a new perspective on the adaptive capacity of the genus to colonize brackish environments and allows us to describe the hitherto unknown female.

### MATERIAL AND METHODS

Genitalia preparations were made following Robinson (1976). The terminology of the genitalia follows Klots (1970) and Kristensen (2003) and, for tympanal organs, Landry (1995). Genitalia photographs in Iran were taken with a Dino-Eye microscope eye-piece camera, and the software Combine ZP was used to stack the images. The photographs in Italy were taken with a Canon S120 digital

camera. The habitus photos in Iran were made with a DSC-F717 digital camera, and in Italy with a Nikon D300 digital camera. The images were enhanced with Adobe Photoshop Elements. The following abbreviations are used: 'GB' for Graziano Bassi, 'GS' for genitalia slide', 'm' for meter(s), 'HA' for Helen Alipanah, 'HMIM' for Hayk Mirzayans Insect Museum, Tehran (Iranian Research Institute of Plant Protection), Iran, 'RCGB' for Graziano Bassi research Collection, Avigliana, Italy, and 'ZSM' for Zoologische Staatssammlung München, Germany.

### TAXONOMY

#### *Epichilo* Ragonot in Joannis & Ragonot, 1889

Type species: *Epichilo parvellus* Ragonot in Joannis & Ragonot, 1889. Type locality: India: Trichinopoly [Tiruchirappalli, Tamil Nadu]. Syntypes in Muséum national d'Histoire naturelle, Paris.

**Diagnosis:** Adults are small moths with a wingspan of 11-16 mm, the forewing with the apex pointed and with a brownish to greyish, sandy ground colour, often with transverse yellow bands. They are somewhat similar in wingspan and pale ground colour to *Alphacrambus* Bassi, 1995 and *Crambixon* Bleszyński, 1965, which, however,

always have longitudinal lines on the forewing. In male genitalia the blunt uncus, the membranous gnathos, the tegumen produced around the gnathos, the large, subtriangular vinculum combined with the phallus bearing strong subapical projection(s), represent distinctive features. Female genitalia, also based on undescribed Afrotropical females, are easily distinguishable by the stout papillae anales with apophyses posteriores large and poorly pointed apically, the rounded ostium bursae with a poorly produced sterigma, the ostium bursae never heavily sclerotized, and the large, suboval corpus bursae. Tympanal organs (Fig. 7) characterized by small tympanic drums, strong venulae secundae reaching tergite III, tympanic pockets only a thickening in the flat transverse ridge, features never present all together in Crambini genera, e.g. *Alphacrambus razowskii* (Błeszyński, 1961) (Fig. 8).

### *Epichilo vartianae* Błeszyński, 1965

#### Material examined

##### Pakistan:

5♂, [Pakistan, surroundings of Karachi airport] Umg. Flughafen Karachi, 23.ii/9.iii.1961, E. & A. Vartian [legunt], GS 4323 and 4603 GB, ZSM and RCGB.

##### Iran:

Bushehr Prov[ince]: 1♂ 3♀, Asaluyeh, N[orth] Nāyband Bay, Nāyband Marine Coastal National Park (Mangrove forest), N 27°26'36", E 52°40'35", 20 m, 6.xi.2021, Ālipanāh, Falsafi leg[unt], GS 2827 HA and 2847 HA, HMIM; 1♂ 4♀, Asaluyeh, S[outh]E[ast] Nāyband Bay, Nāyband Marine Coastal National Park (Mangrove forest), N 27°24'7", E 52°40'9", -10 m, 7.xi.2021, Ālipanāh, Falsafi leg[unt] GS 2794 HA and 2798 HA, HMIM.

**Type locality:** Pakistan: Surroundings of Karachi airport. Holotype male in Naturhistorisches Museum Wien.

**Diagnosis:** The adult of *E. vartianae* (Figs 1-3, 5, 6) is larger (12-14 vs. 11 mm) and paler than *E. parvellus* (Fig. 4). The male genitalia are similar, but in *E. vartianae* the sacculus and the lateral rounded projections behind the uncus on the tegumen are simple (Figs 12-18), as opposed to the sacculus with a median small triangular projection and the lateral rounded projection on the tegumen behind the uncus dentate in *E. parvellus* (Fig. 19). The phallus of *E. vartianae* (Figs 12, 15, 16) with a single lateral tooth and three cornuti differs conspicuously from that of *E. parvellus* (Fig. 20) which bears two lateral teeth and no cornuti.

**Description of the female:** Essentially as in male (Fig. 3; see also Błeszyński, 1965: pl. 8, fig. 94). **Head** (Figs 5, 6): Vertex covered with slightly raised, chequered greyish-brown and creamy scales; frons with nearly smooth scales, concolorous with vertex and creamy next to compound eyes; labial palpus correct,

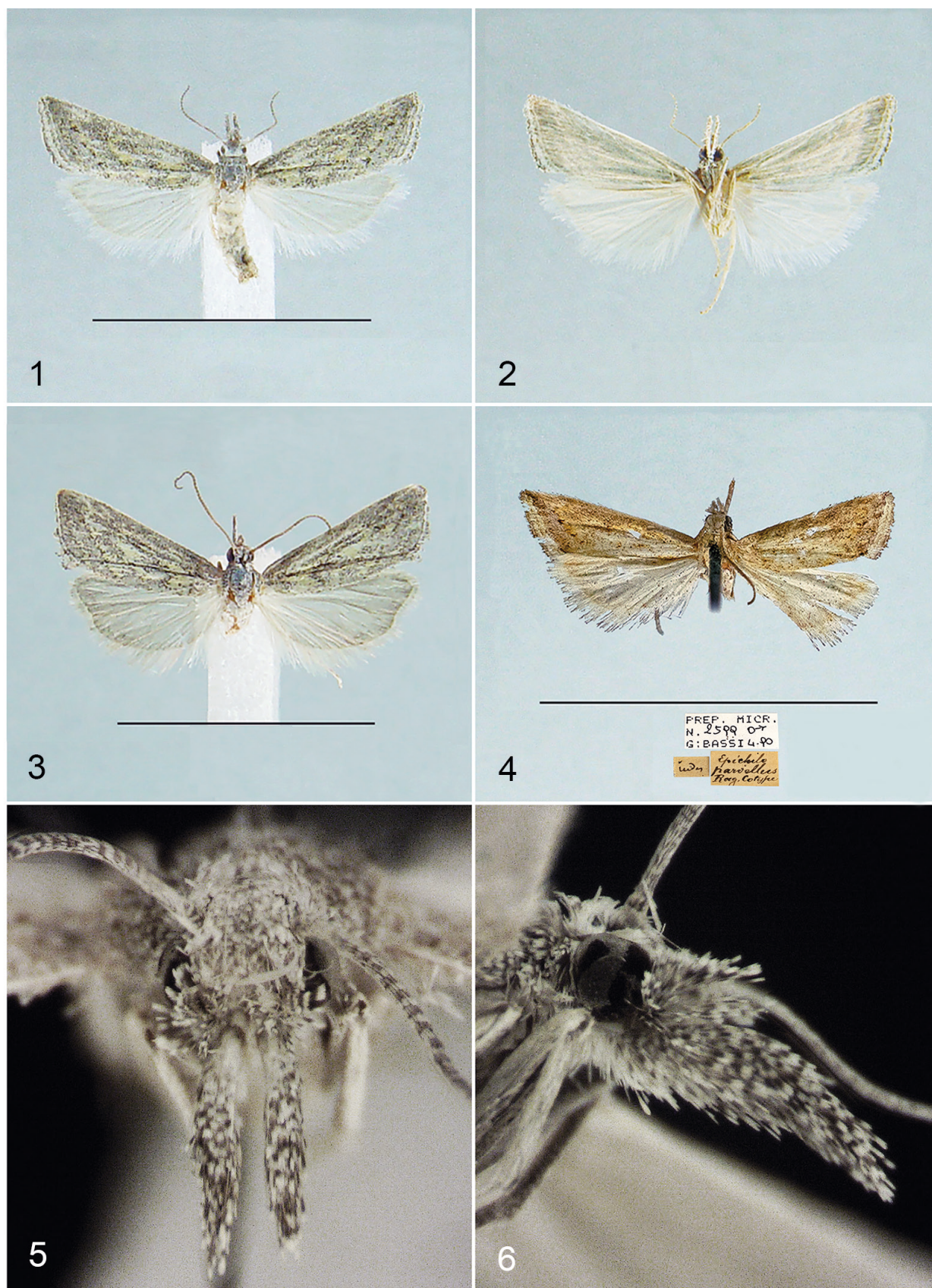
with third segment downwardly directed, covered with chequered greyish-brown and creamy scales dorso-laterally except most basal part of first segment at both dorsal and lateral sides, with length 3-4.5 times horizontal diameter of compound eye ( $n = 7$ ); second segment longest and slightly less than two times of length of third segment, first one shortest; maxillary palpus moderate, covered with raised chequered greyish-brown and creamy scales dorso-laterally; antennae ringed with greyish-brown and creamy scales, cilia sparse, short.

**Thorax:** covered with chequered greyish-brown and creamy scales. Forewing (Figs 1, 2) elongate, straight at costa, with oblique termen and nearly pointed apex, with length of 5.5-6.2 mm ( $X = 5.76 \text{ mm} \pm 0.26$ ,  $n = 7$ ); upperside with grey, sandy ground colour and four yellow transverse lines, cilia creamy with two transverse rows of brownish-grey scales; underside sandy grey, slightly paler at costal margin. Hindwing upperside shiny, off-creamy, cilia creamy, with hardly visible transverse row of pale brownish-grey scales; underside nearly as upperside.

**Abdomen:** covered with creamy scales except last segment with scattered greyish-brown scales distally. Female genitalia (Figs 9-11) with papillae anales stout, moderately sclerotized; apophyses posteriores narrow, apically blunt, apophyses anteriores poorly developed; abdominal segment VIII with sternite a large subrectangular plate, then a narrow ring; ostium bursae ring-shaped; sterigma suboval, moderately produced around ostium bursae; ductus bursae half as long as corpus bursae, widening towards ostium bursae, with longitudinal ridges more sclerotized distally; corpus bursae oval, lightly wrinkled basally; ductus ejaculatorius originating from distal end of ductus bursae near junction with ostium bursae (Figs 10, 11).

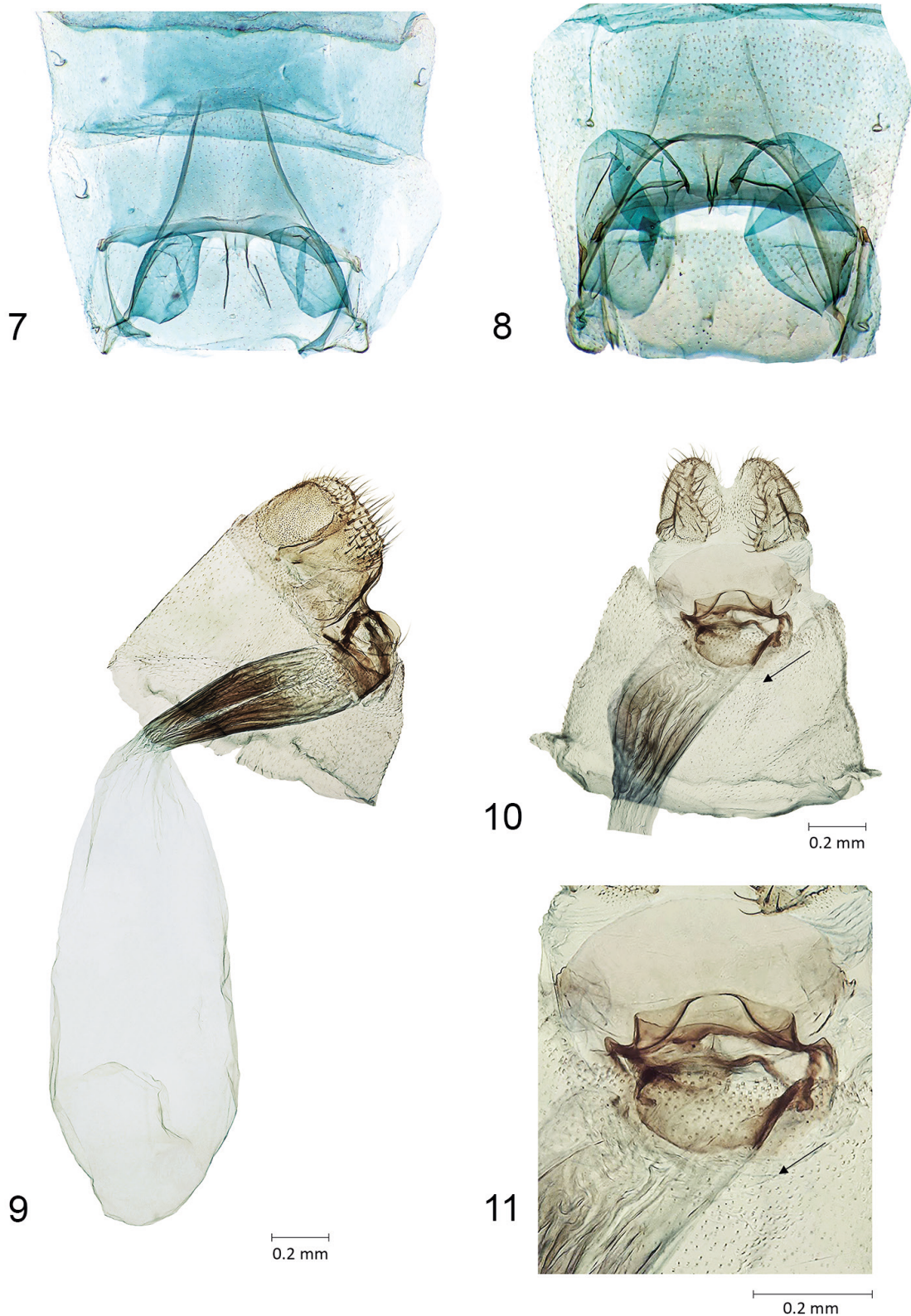
**Remarks:** The male genitalia of the specimens examined are as figured in Błeszyński, 1965: pl. 48, fig. 94, and in Figs 12-18 here, with the valva distally bearing a pointed projection originating medially, the phallus dentate dorso-apically, with a single subapical tooth, and the vesica with three cornuti. We found that the length and partly the size of the cornuti are slightly variable among the material examined (Figs 12, 14, 17). Furthermore, the dentitions on the dorso-apical surface of the phallus are arranged on a sclerotized plate irregularly (Figs 12, 16, 18). The costal edge of the valvae also shows small variations, as one of our examined Iranian males and the specimen from the type locality in Pakistan nearly have a smooth edge (Figs 14, 17) while the other Iranian specimen has the costal edge with a swelling (Fig. 12). The two examined males are slightly smaller (length of forewing 5.4-5.8 mm;  $X = 5.6 \text{ mm} \pm 0.28$ ,  $n = 2$ ) than the females. The genus *Epichilo* and *E. vartianae* are newly reported for the fauna of Iran.



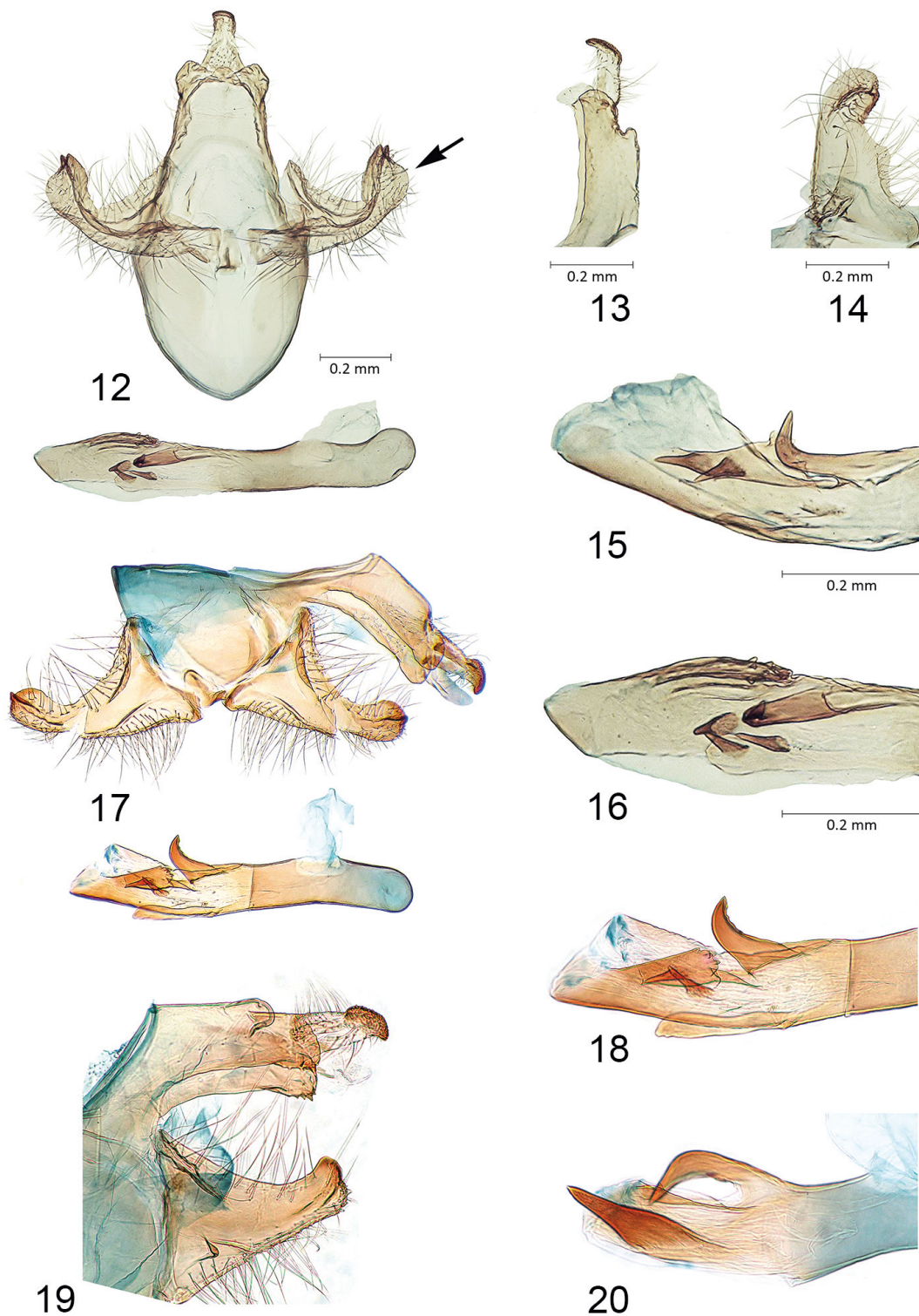


Figs 1-6. *Epichilo* spp., habitus. (1, 2) *E. vartianae*, female upperside and underside, respectively, Iran. (3) *E. vartianae*, male, Iran. (4) *E. parvulus*, male syntype, India. (5, 6) *E. vartianae*, head in frontal and lateral view (scale bar 1-4 = 10.0 mm).





Figs 7-11. *Epichilo* and *Alphacrambus* spp., tympanal organs and female genitalia. (7) *E. parvellus*, tympanal organ, male syntype, (GS 2599 GB). (8) *A. razowskii*, tympanal organ, South Africa, Mpumalanga, (GS 5304 GB). (9) *E. vartianae* female genitalia in lateral view (GS 2798 HA.). (10) Anterior half in ventral view (GS 2847 HA). (11) The same magnified. The arrows indicate the origin of the ductus ejaculatorius.



Figs 12-20. *Epichilo* spp., male genitalia. (12) *E. vartianae*, Nayband Bay, Iran (GS 2794 HA); arrow indicates swelling on costal edge. (13) The same, uncus and tegumen in lateral view. (14) The same (GS 2827 HA), valva in ventral view. (15, 16) The same, distal half of phallus magnified. (17) *E. vartianae*, Karachi airport, Pakistan (GS 4323 GB). (18) The same, distal half of phallus magnified. (19) *E. parvellus* Ragonot, syntype (GS 2599 GB). (20) The same, distal half of phallus magnified.





Figs 21-23. Habitats of *Epichilo vartianae*. (21) Mangrove forests in Nayband Marine Coastal National Park, Asaluyeh, Bushehr Province, Iran. (22) Nayband Bay, northern side. (23) Nayband Bay, south-eastern side.

The specimens examined of *E. vartianae* were collected near the mangrove forests of the Nayband Marine Coastal National Park, located in Nayband Bay, Asaluyeh, Bushehr Province (Figs 21-23). The mangrove forests of Iran are located in sheltered coasts, estuaries, and some near-shore islands of the Persian Gulf and the Oman Sea, with *Avicennia marina* (Forssk.) Vierh. as the dominant species (Ghayoumi *et al.*, 2022). The Nayband Marine Coastal National Park has a wide range of terrestrial and marine habitats including coastal sand dunes, rocky, muddy and sandy shores, coral reefs, mangrove forests, seagrass meadows and estuaries (Talebi, 2015). Even if host plants were not identified, the environment where the specimens were collected in Iran suggests that this species could have successfully adapted to brackish areas, which rarely happens in Crambinae, e.g. some species of *Euchromius* Guenée, 1845 and *Agriphila* Hübner, 1825, are adapted to coastal environments or to the surroundings of inland salty lakes.

## ACKNOWLEDGMENTS

We are grateful to Dr G. Luquet (Muséum national d'Histoire naturelle, Paris) and to Dr A. Hausmann (ZSM) for the loan of material. The financial support for this research was provided to Helen Alipanah through the grant project "Insect fauna of Mangrove habitats", Iran National Science Foundation (INSF), grant No. 99026159.

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