

The Morphology of the Egg of *Rhinomorinia sarcophagina* (Schiner, 1862) (Diptera, Rhinophoridae)

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Abstract. Description of the egg of *Rhinomorinia sarcophagina* (Schin.) illustrated by scanning micrographs is given. A key for the identification of the eggs of eight species of Rhinophoridae is included.

Key words: Diptera, Rhinophoridae, *Rhinomorinia sarcophagina*, egg, morphology, description, key.

INTRODUCTION

To date the morphology is known for the eggs of only seven species of Diptera belonging to the family Rhinophoridae (Bedding 1973). A key for their identification was provided by Draber-Mońko (1989). The present paper describes the egg of an additional species – *Rhinomorinia sarcophagina* – and gives an expanded key to all eggs known from Rhinophoridae. Most are parasites on terrestrial Isopoda and only *Rhinomorinia sarcophagina* (Schin.) has been reared from *Malacosoma neustria* (L.), moth of the family Lasiocampidae (Kolubajiv 1962), but Pape (1986) considered that to be highly questionable breeding record. *Rhinomorinia sarcophagina* (Schin.) is widely distributed in Europe, with northern Germany and

northern Poland forming the northern limits of the range. The species has not been recorded from Scandinavia or from the British Isles (Herting 1993). In Poland, the species has been recorded from the Baltic Coast, Pojezierze Pomorskie and Pojezierze Mazurskie, Nizina Mazowiecka, Puszcza Białowieska, Wyżyna Krakowsko-Wieluńska and Wyżyna Małopolska including Góry Świętokrzyskie, Wyżyna Lubelska, Roztocze, the Eastern Sudeten Mts, the Pieniny Mts and the Tatra Mts (Draber-Mońko 1966).

While working on the Diptera collected in Roztocze I found several *Rhinomorinia sarcophagina* females with an egg protruding from the ovipositor (Figs 1–5). The material for the present paper was collected at Kały (oak wood and montane-type meadow) on 18 June 1988 and in the Roztoczański National Park at Kosobudy-Niedźwiedz (fallow ground) on 7 June 1991. All specimens are deposited in the collection of the Museum and Institute of Zoology, Polish Academy of Sciences, Warsaw, Poland.

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The present key gives the dimensions of an egg protruding from the terminalia of one female. Eggs of different sizes were found in the ovipositor of the other females.

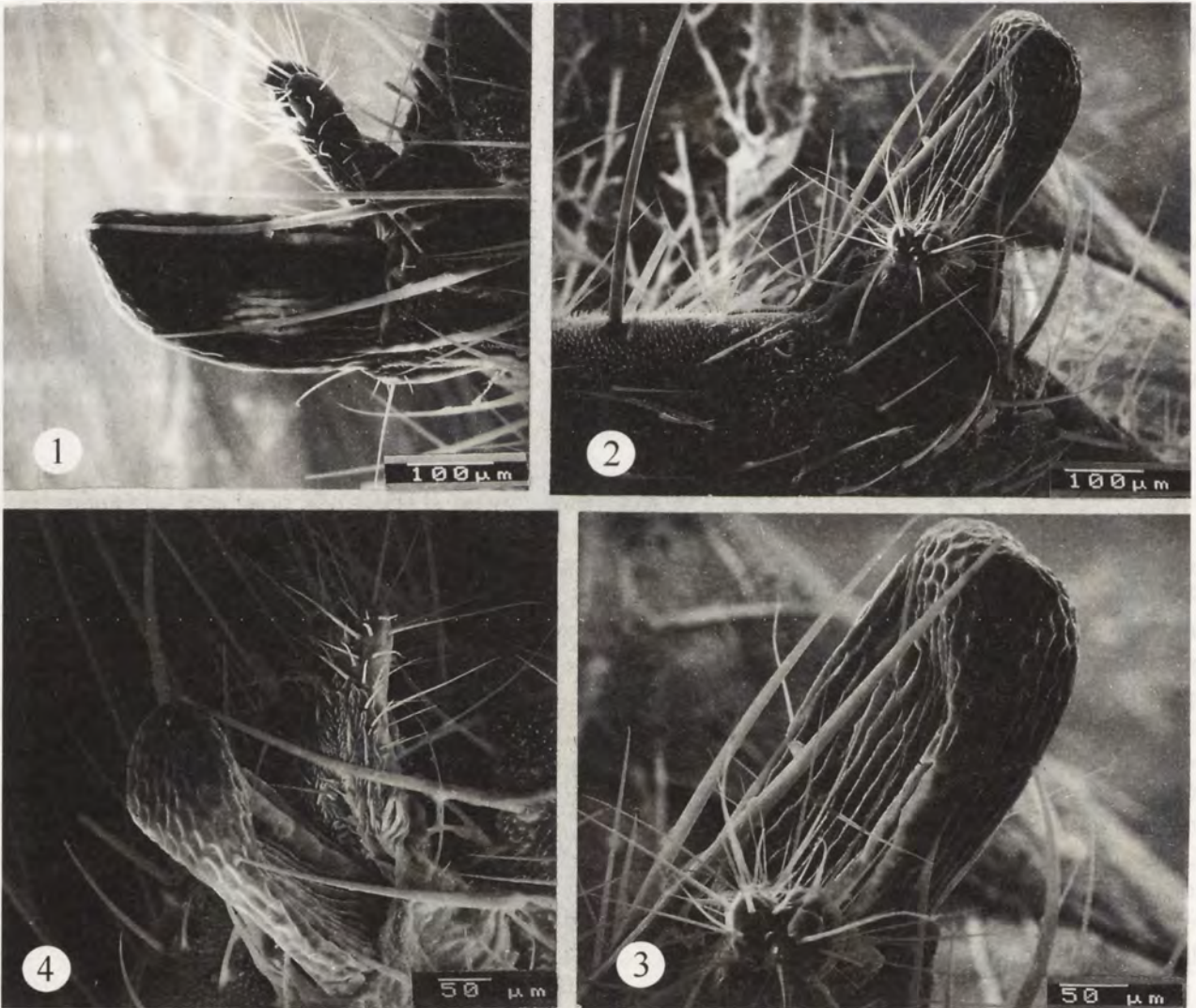
RESULTS

The morphology of the egg of Rhinophoridae

Egg elongate oval in outline, rounded ventrally, flatter dorsally where there is a median hatching strip

running for part or all of the length (Figs 17–32); hatching strip extended laterally into flanges in some species. Pearly white; chorion with pattern of raised lines (*Phyto*) or hexagonal reticulations (most of other known species) (Ferrar 1987).

In Diptera of the family Rhinophoridae two types of egg surface structure have been distinguished, namely a chorion with hexagonal reticulations and a chorion with longitudinal ridges (Bedding 1973). Both types of structure are found on the surface of the



Figs 1–4. Scanning electron micrographs of *Rhinomorinia sarcophagina* (Schin.). Egg protruding from end of abdomen. 1 – lateral view, 2, 3 – from above and posterior-lateral view, 4 – posterior-lateral view.

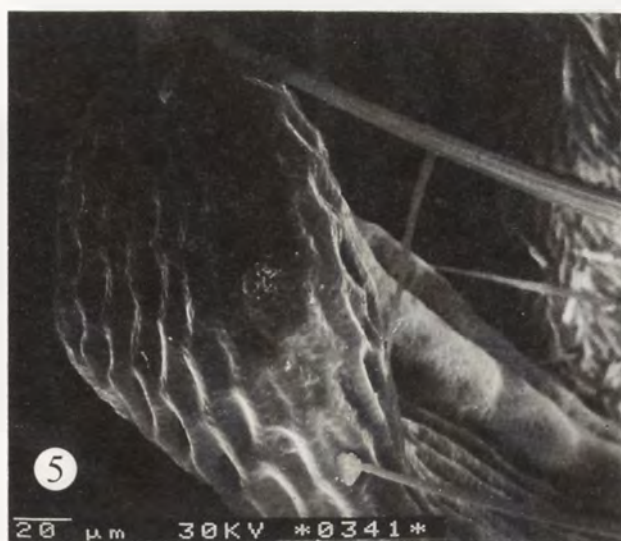
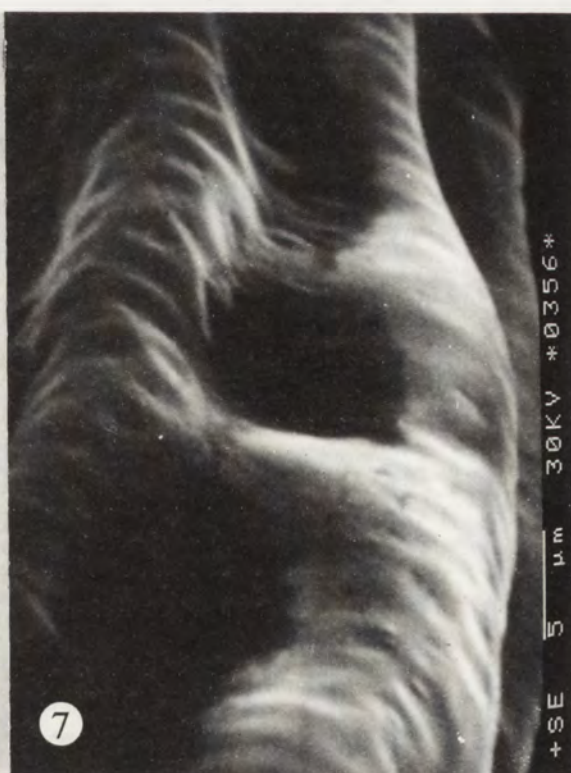
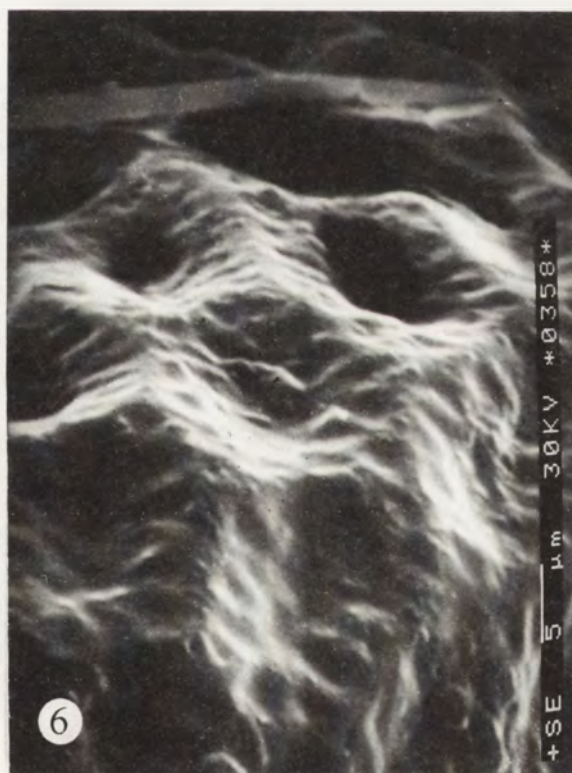


Fig 5. Scanning electron micrographs of *Rhinomorinia sarcophagina* (Schin.), posterior-lateral view of the egg.

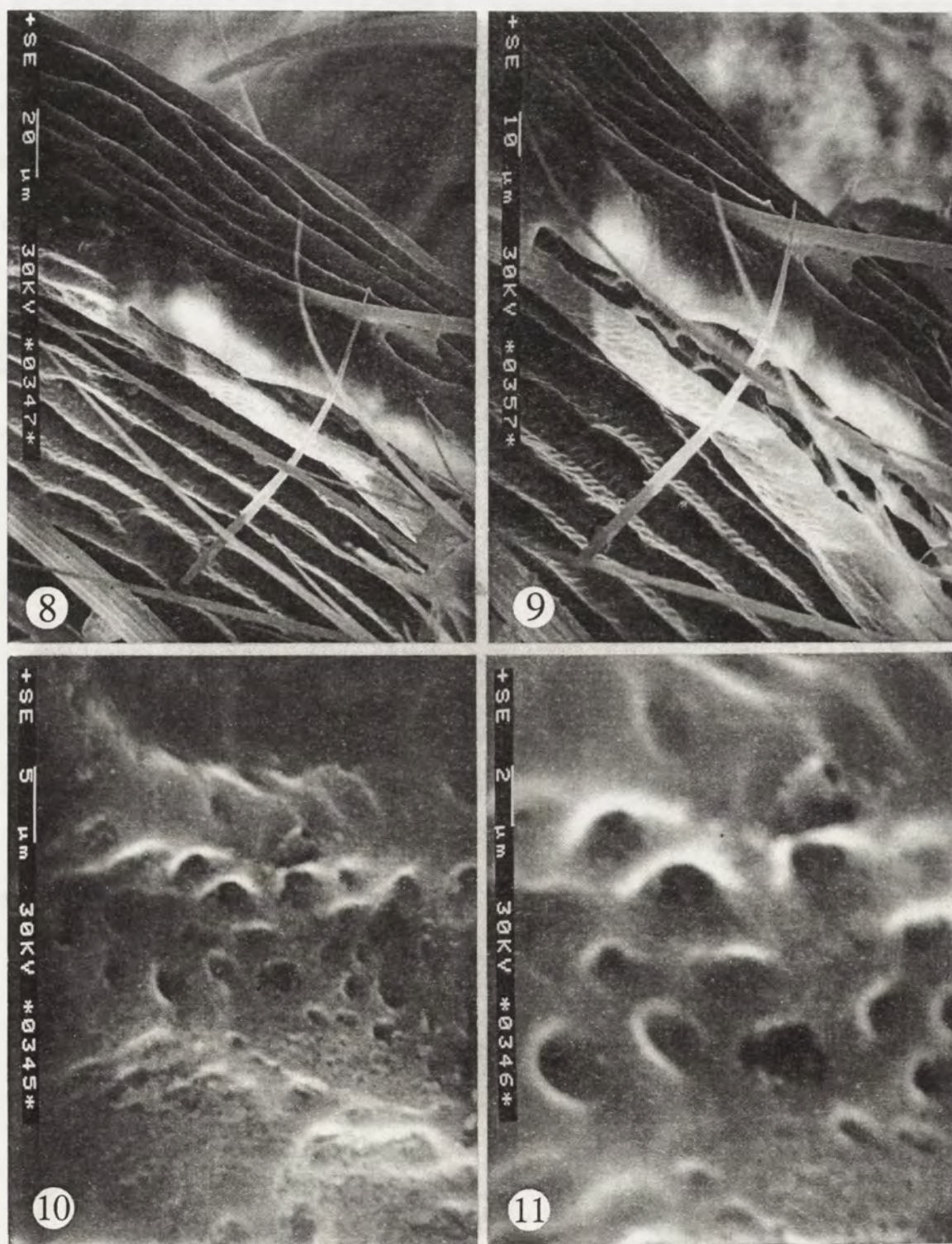
egg of *Rhinomorinia sarcophagina* (Figs 1–5, 8, 9, 12–16, 29, 30). Eggs are basically of normal muscoid type: fusciform, thin and soft-shelled, pearly white; with either hexagonal reticulations or longitudinal ridges; median area bordered by hatching lines with wing-like extensions in some species. Measurements given in mm (Bedding 1973).

Rhinomorinia sarcophagina (Schiner, 1862)
(Figs 1–16, 29, 30)

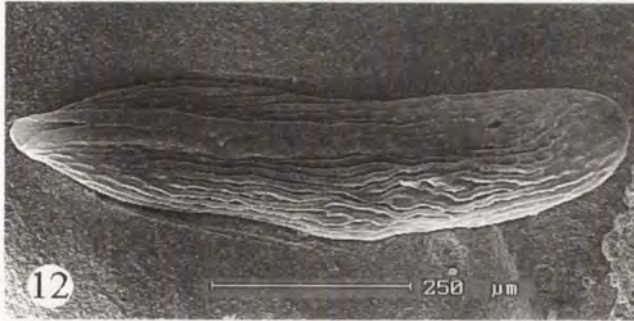
Length, 0.77–0.89, breadth, 0.18–0.22, depth, 0.20–0.22. Median area, 0.57–0.66. Egg pearly white. Chorion with hexagonal reticulations and sporadically branched longitudinal ridges (Figs 12, 13). Median area bordered by hatching lines (Figs 5, 8–11, 12–15, 29) occupying 0.75 x egg length (0.57–0.66) (Figs 12, 29). Distance between the posterior end of the median area and the posterior end of egg 0.21–0.23 (Figs 12, 29).



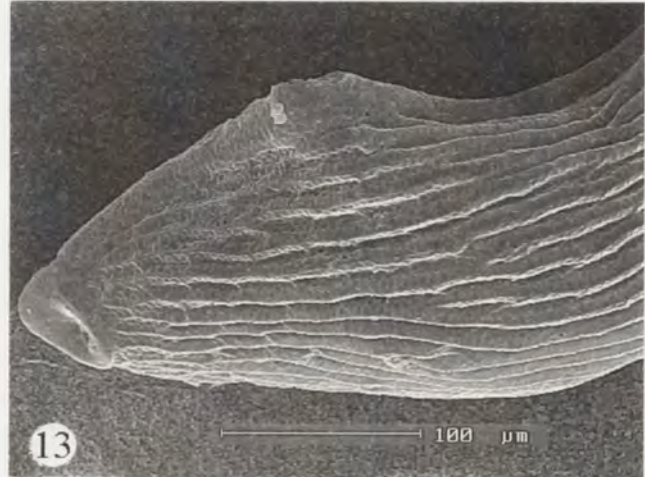
Figs 6, 7. Scanning electron micrographs of *Rhinomorinia sarcophagina* (Schin.), structure of chorion in posterior part of the egg.



Figs 8–11. Scanning electron micrographs of *Rhinomorinia sarcophagina* (Schin.), egg. 8, 9 – end of median area and hatching lines, 10, 11 – structure of hatching lines.



Figs 12, 13. Scanning electron micrographs of *Rhinomorinia sarcophagina* (Schin.), egg. 12 – dorsal view of egg. 13 – lateral view of left side of egg with anterior part of hatching lines.



The posterior part of the egg protruding from the terminalia of one female resembles the bow of a boat (Fig. 1). Surface of posterior part with distinct, irregular, hexag-

onal cavities (Figs 2–5) lined with polygonal depressions (Fig. 6). Other parts of the egg surface with distinct longitudinal ridges (Figs 12, 13, 16). Hatching lines



Fig. 14. Scanning electron micrographs of *Rhinomorinia sarcophagina* (Schin.). Dorsal-lateral view of egg. Plastron network of median area between hatching lines. Surface view of shell showing vertical columns grouped in irregular hexagons.

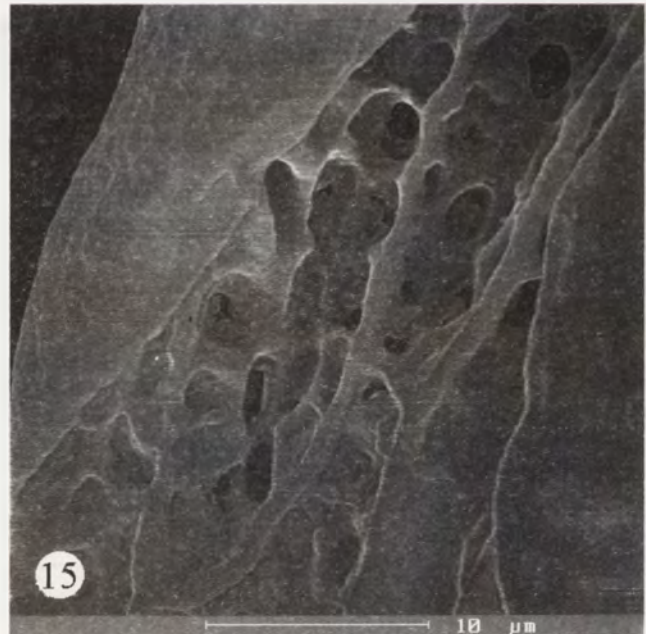


Fig. 15. Scanning electron micrographs of *Rhinomorinia sarcophagina* (Schin.). Anterior part of egg. Median area between hatching lines (or plastron network of median area between hatching lines).

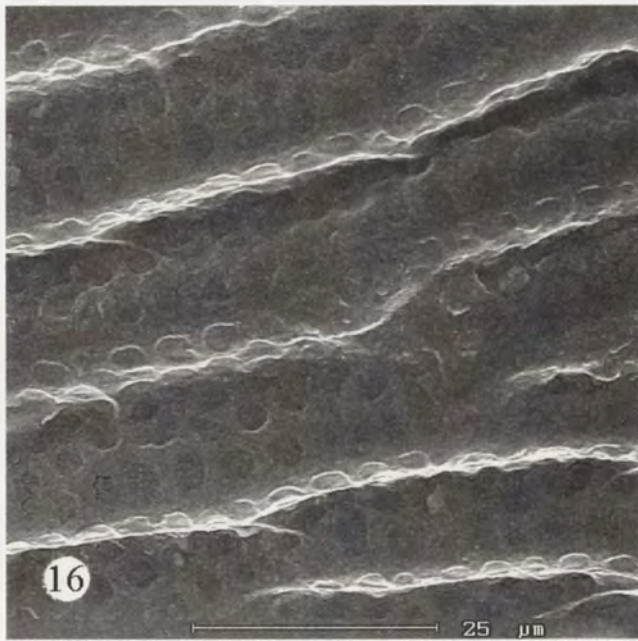


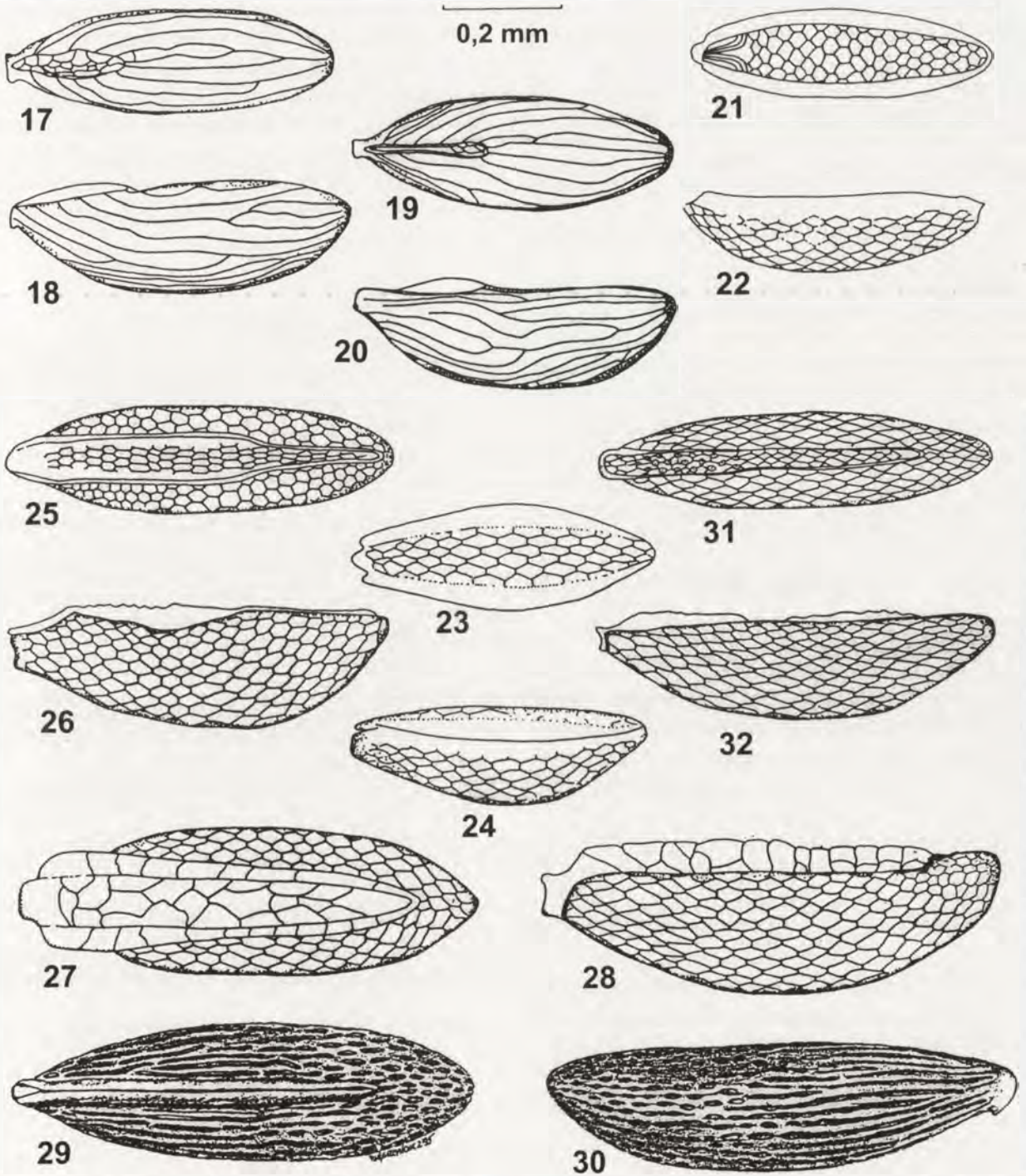
Fig. 16. Scanning electron micrographs of *Rhinomorinia sarcophagina* (Schin.), egg. Surface view of shell showing longitudinal ridges and irregular hexagons.

(Figs 8–11) of structure different from that of the rest of egg surface, namely smoother and with numerous small openings at greater part of sides. Hatching pleats of median area with big holes arranged in the form of cones (Figs 10, 11). Plastron network of median area between hatching lines of specific open-work structure made of flanges with big empty spaces between them (Figs 14, 15). Chorion with polygonal depressions (Figs 6, 14) on entire egg surface between ridges. Egg surface with columns grouped in irregular hexagons (Fig. 16). Hexagonal depression in apical part of egg capsule which may be impressions of follicular cells.

Key for the identification of eggs

- 1. Egg surface (chorion) with both longitudinal ridges and hexagonal reticulations (Fig. 1–16, 29, 30).
Length, 0.77; maximum breadth 0.22; maximum depth 0.22. Egg pearly white. Chorion with hexagonal reticulations and longitudinal ridges (Figs 12–14, 16). Median area narrow, bordered by hatching lines (Figs 5, 8, 9, 12–15), occupying 0.75 x egg length (0.57) (Figs 12, 29).
..... *Rhinomorinia sarcophagina* (Schiner).

- . Egg surface (chorion) either with longitudinal ridges or hexagonal reticulations (Figs 17–28, 31, 32) 2.
- 2. Egg surface with longitudinal ridges (Figs 17–20) 3.
- . Egg surface with hexagonal reticulations (Figs 21–28)..... 4.
- 3. Median area (area mediana) with distinctly marked reticulations, occupying 0.33 x egg length (Figs 17–18).
Length, 0.50; maximum breadth, 0.17; maximum depth, 0.17. Surface of egg with occasionally branched longitudinal ridges; transverse ridges just apparent. Median area: dilated; 0.33 x egg length with several irregular reticulations; bordered laterally by a low flange of uniform depth (Figs 17–18).
..... *Phyto melanocephala* (Meigen).
- . Median area with few obvious reticulations, occupying less than 0.5 x egg length (Figs 19–20).
Length, 0.5; maximum breadth, 0.175; maximum depth, 0.16. Median area: narrow; less than 0.5 x egg length and with few obvious reticulations; bordered laterally by low vertically directed flange (Fig. 20). Egg very similar to that of *Phyto melanocephala* (Meig.).
..... *Phyto discrepans* Pandellé.
- 4. Median area occupying 1.0 x egg length (Figs 21–26)..... 5.
- . Median area occupying 0.75 x egg length (Figs 27, 29, 31)..... 7.
- 5. Median area with three pairs of longitudinal ridges anteriorly (Fig. 21).
Length, 0.46; maximum breadth, 0.14; maximum depth, 0.125. Surface of egg with hexagonal reticulations. Median area: occupying 1.0 x egg length with three pairs of longitudinal ridges anteriorly but otherwise uniformly reticulated; bordered by wing-like, latero-vertically directed flanges with minute hexagonal reticulations (Figs 21, 22).
..... *Paykullia maculata* (Fallén).
- . Median area without longitudinal ridges anteriorly (Figs 23, 25)..... 6.
- 6. Median area with regular, hexagonal reticulations and flanges extending laterally farther than rest of egg (Figs 23, 24).
Length, 0.46; maximum breadth, 0.17 (including wings); maximum depth, 0.15. Egg very similar to that of *P. maculata*, but flanges extending laterally farther than rest of egg. Median area without longitudinal ridges anteriorly (Figs 23, 24).
..... *Melanophora roralis* (Linnaeus).



Figs 17–32. Dorsal and lateral views of eggs. (29, 30 – original drawings, the rest after Bedding). Dorsal view (odd numbers) and lateral view (even numbers). The 0.3 mm length of the scale is for the species *Tricogena rubricosa* (Meig.), the 0.2 mm length of the scale is for the other species. 17, 18 – *Phyto melanocephala* (Meig.). 19, 20 – *Phyto discrepans* Pand. 21, 22 – *Paykullia maculata* (Fall.). 23, 24 – *Melanophora roralis* (L.). 25, 26 – *Rhinophora lepida* (Meig.). 27, 28 – *Stevenia atramentaria* (Meig.). 29, 30 – *Rhinomorinia sarcophagina* (Schin.). 31, 32 – *Tricogena rubricosa* (Meig.).

- Median area with irregular hexagonal reticulations; bordered by vertically directed flange (Figs 25, 26).

Length, 0.64; maximum breadth, 0.17; maximum depth, 0.19. Chorion iridescent. Median area: broad; occupying full length of egg; with numerous hexagonal reticulations; bordered by vertically directed flange (Figs 25, 26).

..... *Rhinophora lepida* (Meigen).

- 7. Median area broad, with irregular reticulations (Figs 27, 28).

Length, 0.70; maximum breadth 0.22; maximum depth 0.20. Surface of egg with hexagonal reticulations. Median area: broad, with irregular reticulations; bordered by latero-vertically directed, wing-like, irregularly reticulated flange (Figs 27, 28).

..... *Stevenia atramentaria* (Meigen).

- Median area narrow, with regular reticulations (Figs 31, 32).

Length, 0.91; maximum breadth 0.22; maximum depth 0.20. Median area with 18 bordered perforations but otherwise with entire surface reticulated; bordered by irregular, vertically directed flange (Figs 31, 32).

..... *Tricogena rubricosa* (Meigen).

DISCUSSION

The egg of *Rhinomorinia sarcophagina* differs from that of most known species of the woodlouse-flies in the chorion structure which is different in the anterior and posterior parts. In the anterior part of the egg of *Rhinomorinia sarcophagina* the chorion structure is similar to that in *Rhinophora lepida* (Meigen). The chorion structure of the egg of *Rhinophora lepida* seen under a SEM (Hinton 1981) resembles the reticular structure of the surface of the anterior part of the egg of *Rhinomorinia sarcophagina*.

Yet at the same time and in some respects the chorion of the egg of the blow fly (Erzinçlioglu 1988, 1989) has a structure similar to that of the egg of the present species (*Rhinomorinia sarcophagina*).

In *Rhinomorinia sarcophagina* and *Protocalliphora azurea* (Fall.) the structure of the plastron network of the median area between the hatching lines is similar. Erzinçlioglu (1988) writes: "The unusual form of the median area in *Pr. azurea* may be an adaptation to the relatively warm dry environment of a bird's nest". It seems that in the case of *Rh. sarcophagina* a similar adaptation is at work because the hosts of this species develop in a dry environment too.

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Translated by Hanna Kobus
All photographs by A. Peźniński M. Sc.