

Fine structure comparison of eggshell from *Lucilia sericata* and *Calliphora vicina*, Calliphoridae with forensic importance

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In forensic investigations, eggs of blowflies are very commonly found and can become essential for a proper identification of sarcosaprophagous Diptera. However, most of the time they cannot be used as entomological evidence since they are morphologically very similar, have not been studied in detail, and there are no references to distinguish among them in some geographical areas as the Iberian Peninsula, with exception of *Calliphora vicina* [1].

This study compares the ultrastructural morphology of eggs from *Lucilia sericata* (Meigen, 1826) and *Calliphora vicina* Robineau-Desvoidy, 1830, two cryptic species of blowflies frequently found in forensic context in Portugal, through SEM (JEOL JSM 5200 LV). Forty eggs for each species were analyzed. The use of this technique to differentiate calliphorid-fly eggs, although not widely used, has also been employed by others [2-11]. In these studies, the main structures used to discriminate species are the micropyle apparatus, the plastron and the chorion ornamental arrangements.

Our results show that it is possible to distinguish *L. sericata* from *C. vicina* based on SEM images through the use of qualitative criteria, as the plastron termination near the micropyle apparatus (Figure 1) and the distinctive aspect of the anastomosis in the islands located at the median area of the plastron (Figure 2), among others. The distinctive features of *C. vicina* are identical to those described in other studies [1,3,7]. Our structural results for *L. sericata* are the first ones ever recorded.

The morphological identification of insect eggs is very laborious and difficult, and sometimes impossible to be achieved. The employment of SEM allowed to distinguishing between the eggs of *Lucilia sericata* and *Calliphora vicina*. It is therefore considered its application in further studies on morphological structures of eggs, as this technique could be used as an important tool in forensic entomology by providing useful data for additional comparisons of other cryptic sarcosaprophagous species.

- [1] Ubero-Pascal, N. *et al.*, *Microscopy Book Series*, **4**, 1548-1556, 2010.
- [2] David, J.A.O. *et al.*, *Micron*, **39**, 1134-1137, 2008.
- [3] Erzinclioglu, Y.Z., *Med Vet Entomol*, **3**, 281-285, 1989.
- [4] Greenberg, B. and Singh, D. *J Med Entomol*, **32**, 21-26, 1995.
- [5] Greenberg, B. and Szyska, M.L., *Ann Entomol Soc Am*, **77**, 488-517, 1984.
- [6] Kitching, R.L., *Bull Entomol Res*, **66**, 195-203, 1976.
- [7] Lui, D. and Greenberg, B., *Ann Entomol Soc Am*, **82**, 80-93, 1989.
- [8] Mendonça, P.M. *et al.*, *Micron*, **39**, 802-807, 2008.
- [9] Peterson, R.D. and Newman, Jr S.M., *J Med Entomol*, **28**, 152-160, 1991.
- [10] Sukontason, K. *et al.*, *Parasitol Res*, **93**, 151-154, 2004.
- [11] Sukontason, K.L. *et al.*, available online: insectscience.org/7.09, 2007.

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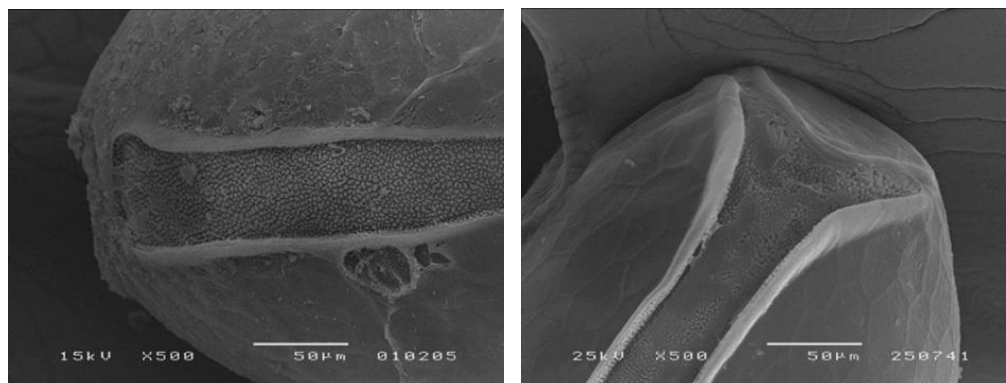


Figure 1. Scanning electron micrographs of plastron in the anterior region of the egg. SEM $\times 500$. Scale bar = 50 μm . **Left:** *Calliphora vicina* plastron reaches the micropyle apparatus, finishing with a round-shape. **Right:** *Lucilia sericata* plastron reaches the micropyle apparatus and forks in a "y-shape".

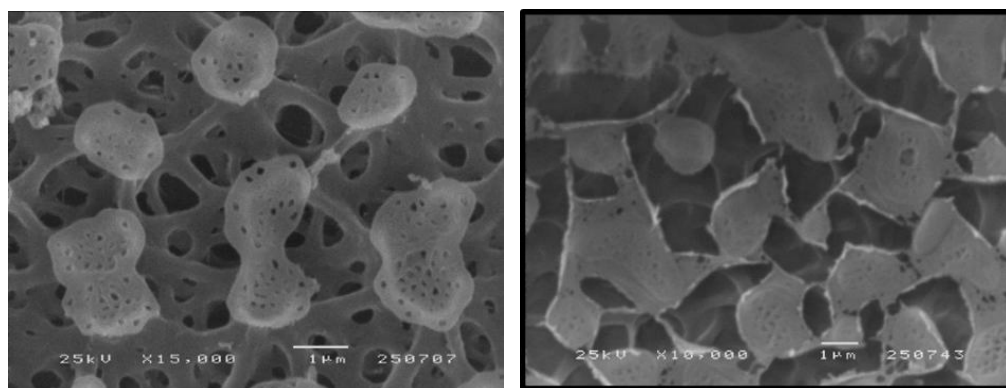


Figure 2. Scanning electron micrographs of islands in plastron middle area. **Left:** *Calliphora vicina* islands with a "web" of anastomosis and several pores. SEM $\times 15000$. Scale bar = 1 μm ; **Right:** *Lucilia sericata* islands show few anastomosis and little pores. SEM $\times 10000$. Scale bar = 1 μm .