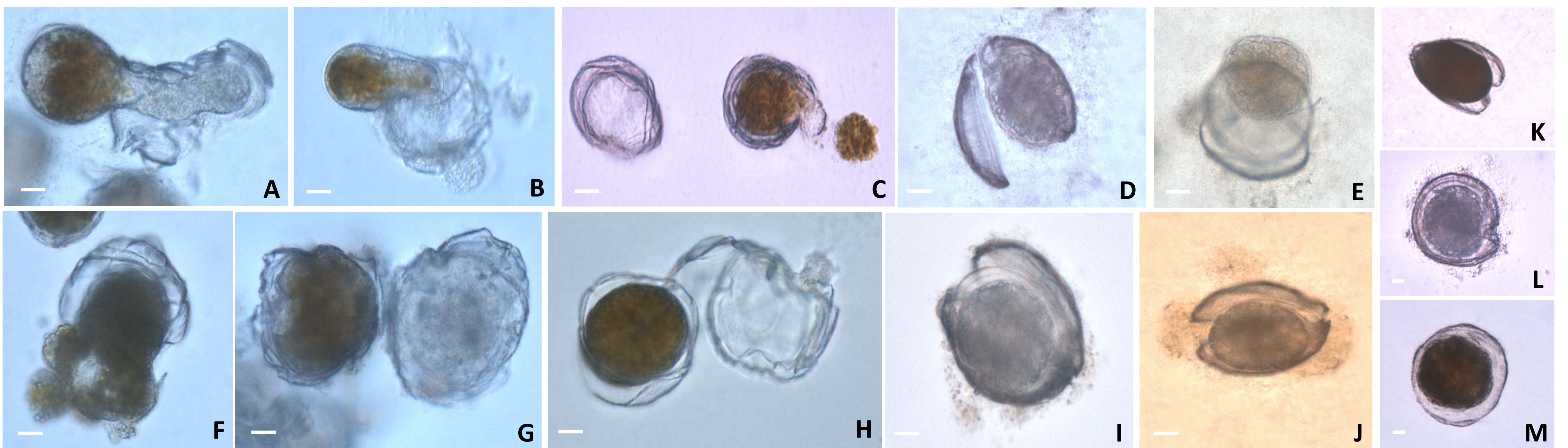


Cysts, Germination and other findings in *Gambierdiscus* spp. laboratory cultures

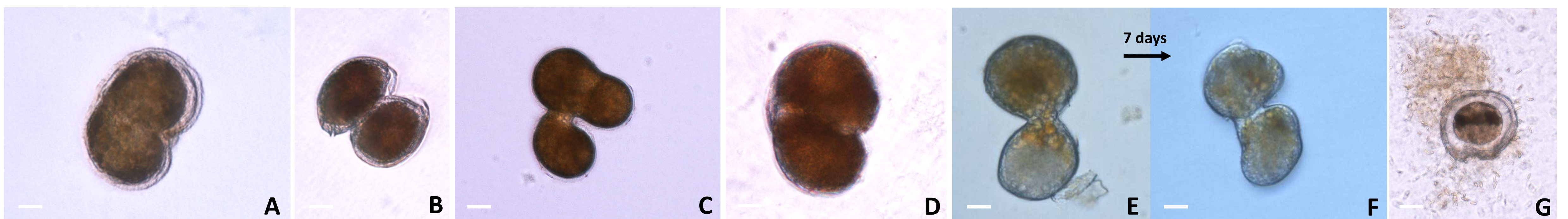
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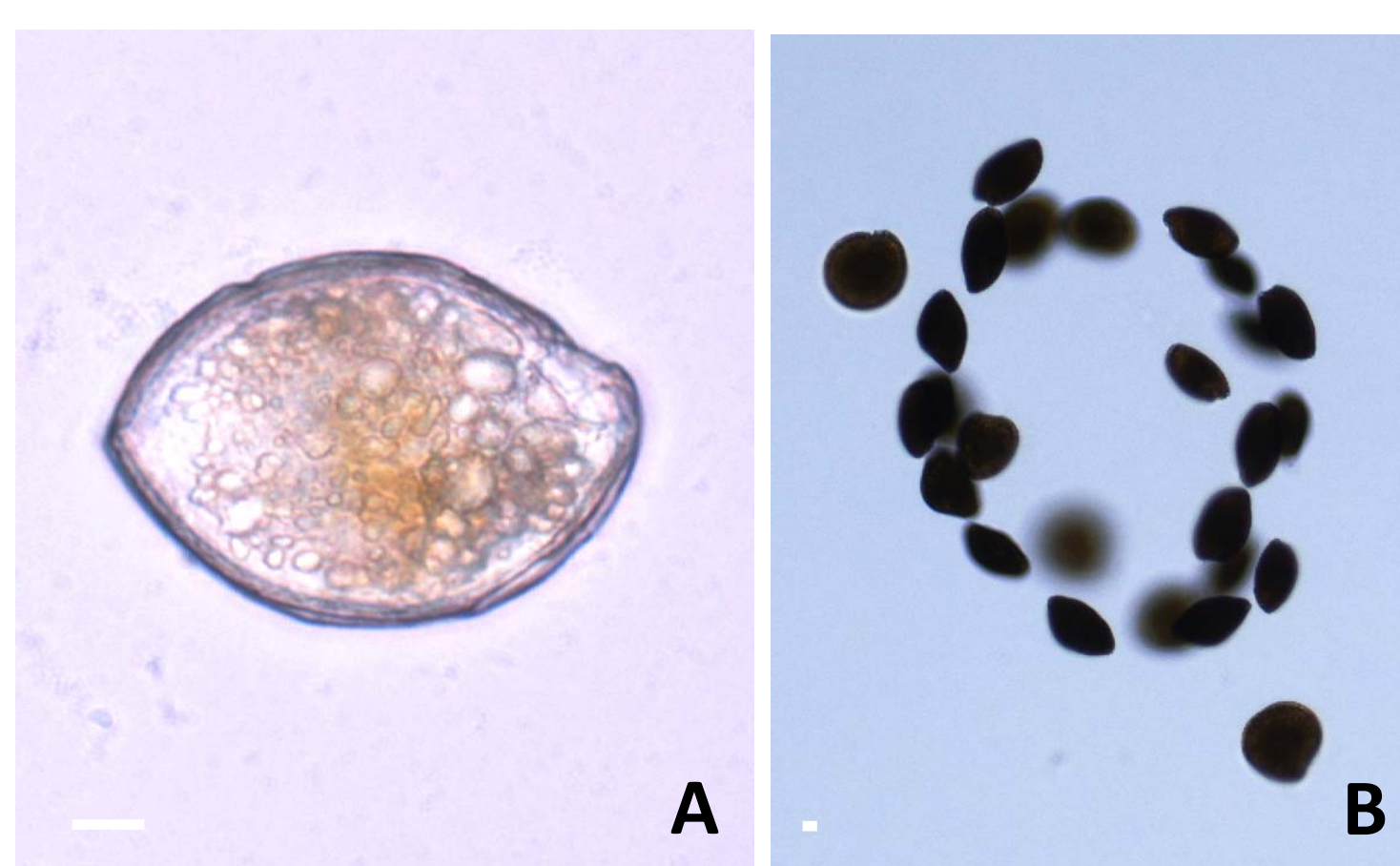
Dinoflagellates belonging to the genus *Gambierdiscus* are the former causative agent of ciguatera fish poisoning (CFP), a human illness induced by the consumption of fish that have accumulated ciguatoxins through their diet. Cysts formation is a part of dinoflagellate life cycle and play an important role in the ecology of the species, since remain in the sediment layer during unfavorable conditions for vegetative growth, reinoculating the water column when favorable conditions are restore. These long-term resting cysts can remain dormant for years before germination. Under favorable conditions, temporary cysts can germinate within 3 days, resting cysts can take as long as 5 months to germinate. On the other hand, total toxin concentration of cysts can be at least six-fold than vegetative cells. In this work we describe several observations of cells germination, division and cysts of *Gambierdiscus* spp. under laboratory conditions. We also show the inhibitory effect of *Gambierdiscus australes* cysts and temperature over diatoms. Temperature can be used as a way of diminish diatoms contamination in *Gambierdiscus* cultures and ease the establishment of monoalgal cultures.



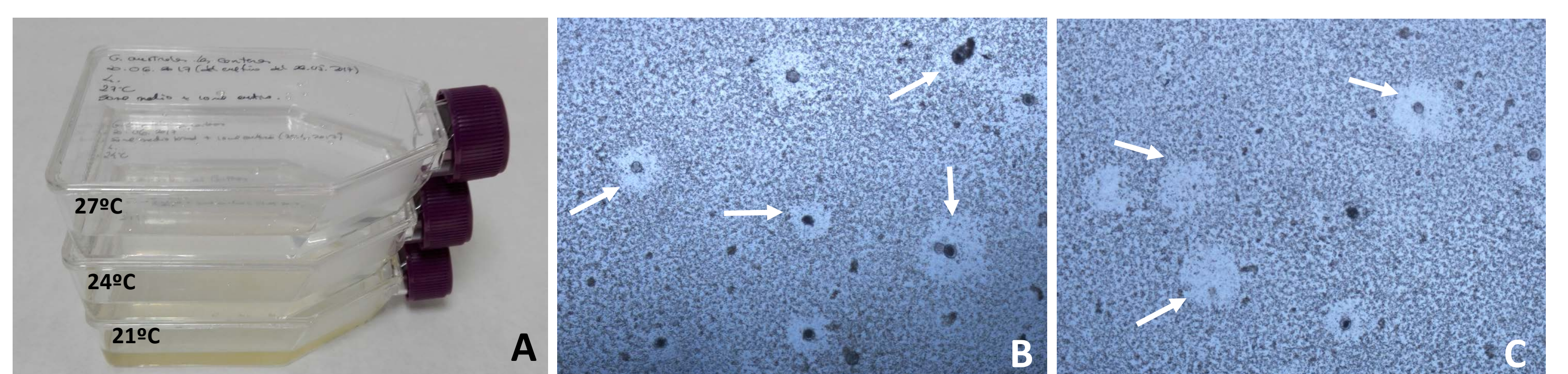
Different aspects and phases of *Gambierdiscus* sp. cells/cysts undergoing ecdysis (A-F, I-K). Doubled-walled cysts (I, J, L, M). Thin-walled cysts (E, K). Long-term cysts (L). Once the ecdysis process was finished there was always the presence of a cyst cell next to a empty cell (only theca) (C, G, H). The majority of the ecdysis process that we observed always resulted in a thin-walled or doubled-walled cyst, never in a flagellate cell form Bar: 10 µm.



Different aspects and phases of gameta pairs and cell division of *Gambierdiscus* sp. (A-G). Photo F was taken 7 days after photo E (same cells). After that time the cells formed were not viable and collapsed. Nucleus chromatin (?) condensation of a long-term resistant cyst (G). Bar: 10 µm.



Alteration of *Gambierdiscus* sp. morphology due to inadequate temperature culture (2°C above de optimal temperature which was 24°C) (A); *Gambierdiscus* cells forming groups and moving in a circle (the movement can not be appreciated in a photo, of course) (B). Bar: 10 µm.



Inhibitory effect of temperature over diatoms (A). Higher temperatures have a negative effect over diatoms growth (A). Microscopic observations (40x magnification) of inhibitory effect of *Gambierdiscus australes* long-term cysts over diatoms at 27°C (B, C). The inhibitory effect was still visible even in the places where cysts are no longer in their original positions (C). Arrows show some examples of inhibitory effect observed under the microscope (B, C).

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