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4. Jewels in the Sea

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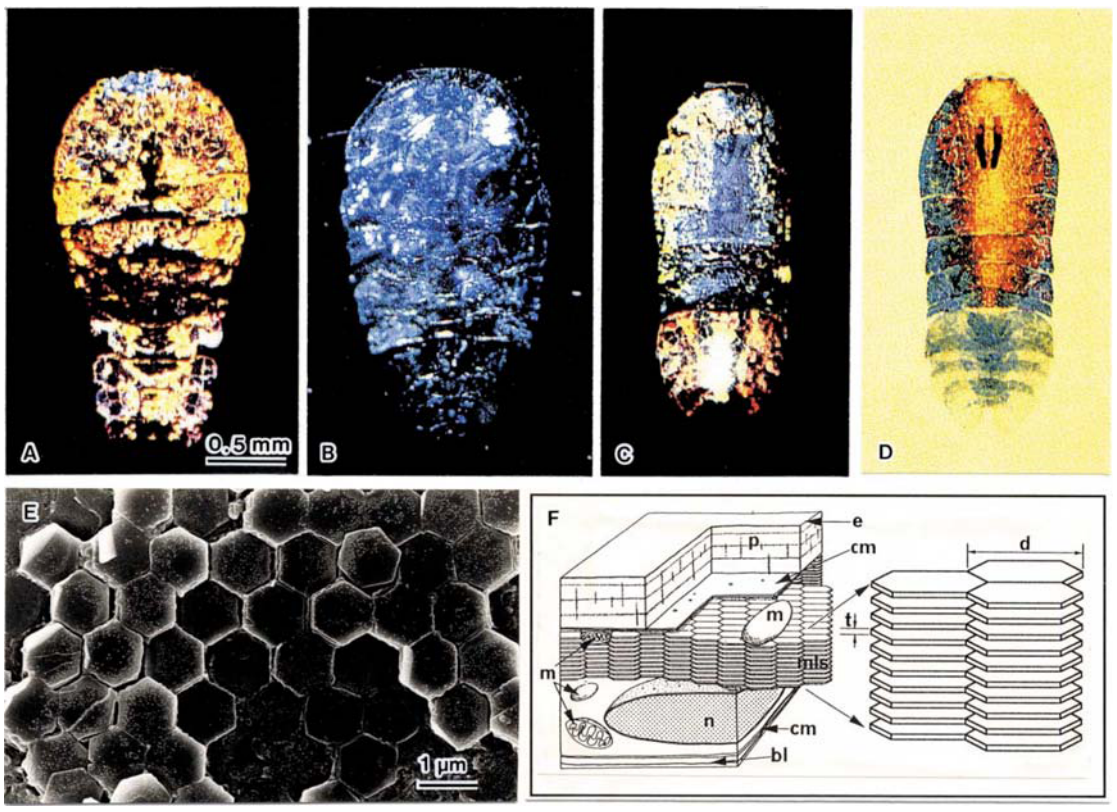

Known as among the most remarkable creatures in the open sea, males of the planktonic copepods (a group of small crustaceans of millimeter size) of the genera *Sapphirina* (A, C and D) and *Copilia* (B) show beautiful iridescence. They often appear in sunlit, near-surface layers and give the water an iridescent appearance. This iridescent water is called "tama-mizu" (meaning jewelly-water) by old Japanese fishermen as an indicator of the Kuroshio Current, a fishing ground of skipjack tuna. Their iridescent colors in the sea can be visualized in the laboratory by illuminating the animals with a white light which is reflected by their integument (A-C). The iridescent colors are different among species and are correlated with their distributional depths in the daytime; yellowish gold in shallow-living (< ca. 30 m) species (A) and bluer in deeper ones (B and C). Transmitted colors (D, the same animal as in C) are complementary to reflected ones (C), indicating that the iridescent color is a result of interference by multilayered platelets of guanine crystals as visualized by scanning electron microscopy (E). The crystal thickness (*t* in F, a scheme of integument) varies from ca. 60 to 80 nm according to species, corresponding to the species' colors and distributional depths, so that the highest contrast of the animal relative to the background light field is obtained when viewed both from above and below the animal. While the males are iridescent as such, females are non-iridescent but have more developed eyes than the males. The search for and the recognition of conspecific males by females has been proposed as a major role of this iridescence.

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